LINCOLN
LIBRARY
OF ESSENTIAL
INFORMATION

THE LINCOLN LIBRARY OF ESSENTIAL INFORMATION

AN UP-TO-DATE MANUAL
FOR DAILY REFERENCE, FOR SELF-INSTRUCTION,
AND FOR GENERAL CULTURE
NAMED IN APPRECIATIVE REMEMBRANCE OF
ABRAHAM LINCOLN
THE FOREMOST AMERICAN EXEMPLAR
OF SELF-EDUCATION



Planned, Prepared, and Completed
Since the World War

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PREFACE

The Lincoln Library of Essential Information has been prepared with two controlling ideas constantly in view. One has been to embody in a single volume the largest amount of helpful information for the average reader that has ever been placed between two covers. The other aim has been to select, condense, arrange, and verify this material with a degree of thoroughness and accuracy much greater than has ever been attained in any work of similar scope. In our judgment, confirmed by years of publishing experience, the accomplishment of these aims insures the production of a book that stands in a class by itself.

Name. The title of this work, The Lincoln Library of Essential Information, expresses the fact that the volume contains the essentials of a library of informational material. The name signifies also that this essential information has been carefully adapted to the needs of those who, following in the steps of Abraham Lincoln, will eagerly welcome every available means of self-education.

Scope. This work is far more than a mere source book of information and presents a range of knowledge much greater than even experienced users of books would at first imagine possible. It offers first a vast array of practical information on subjects which are fundamental. These embrace English, History, Geography, and Mathematics. In the extensive sections devoted to their treatment, the essentials of each are set forth with unusual completeness. Science is introduced, and a separate treatment is accorded to each of its chief divisions—physiography, geology, mineralogy, astronomy, physics, chemistry, physiology, psychology, zoology, and botany. Following Science is an extensive Department of Economics and Useful Arts, after which will be found a remarkably complete exposition of the subject of Government and Politics.

The cultural divisions of the work embrace large departments on Literature and on the Fine Arts, including an especially full exposition of Music, and a valuable Department of Education. The interesting field of human achievement is covered in Biography, the largest separate division of the work, which contains sketches of nearly 4000 of the world's most noted men and women. A large amount of valuable information not directly referable to the foregoing divisions has been grouped under Miscellany. The whole body of information is made available by the comprehensive Index.

Method and Plan. The plan of presenting the subject matter of The Lincoln Library is unique. It is in no sense an experiment, however, but is a development based on more than 30 years' experience. During this period, the needs and desires of many million purchasers and users of books containing helpful information have been carefully and systematically studied. This study has settled beyond question many significant points, one of the most important of which is that, for practically all readers, the most satisfactory source of general information is a *comprehensive single volume.*

The careful planning by means of which this whole library has been published in a single volume obviates several of the chief obstacles to the average reader's use of the best reference works. Practically all such works are in many volumes, and the price is consequently prohibitive to the great majority of people. Moreover, in the libraries of those who have purchased such works, the individual volumes, after being used, are frequently returned to the shelves in the wrong order, thereby causing vexatious delay when they are next needed. Further loss of time is occasioned by cross references, which, in works of many volumes, usually involve the consulting of a second and sometimes a third volume. Such discouraging delays are virtually eliminated in using a one-volume work like The Lincoln Library.

Our study has shown also that the rigid alphabetical arrangement of subjects followed in the encyclopedias is not suitable for a single volume designed to contain the most information possible. When totally unrelated subjects are ranked next to each other in a uniform A-to-Z arrangement, a vast amount of information is unavoidably repeated or duplicated. This means a great loss of space, which, under the group plan, is utilized for additional information.

On the other hand, it has appeared desirable to avoid the methods of the coldly formal treatise, which often involve the inclusion of relatively unimportant matter. The elaborate refinements, also, which are seen in highly specialized textbooks, have been excluded. Without being a fact book, this work contains a much larger number of carefully selected facts than any fact book in print. It is not a dictionary, but it embraces the best features found in a dictionary. In short, adaptations of many widely used plans and methods have been worked out under the guidance of knowledge gained by long experience, and, in some instances, entirely new arrangements have been devised. In all cases, these methods have been designed to meet the fundamental requirement of placing the greatest amount of useful information in the least possible space.

Accuracy. While realizing that absolute perfection is unattainable, nevertheless, in conformity with our fixed policy of maintaining the highest standards, we have taken the utmost care that the material in every section of this volume should be as nearly accurate as is humanly possible. The services of many eminent scholars and specialists have been enlisted in preparing the different sections, and all material has been subjected to an intensive system of verification. As a result, the work will be found more generally free from error than many more extensive and costly reference works that are widely accepted as authoritative.

Up-to-dateness. This is only one of the various kinds of accuracy at which we have consistently aimed. The far-reaching changes wrought by the World War in practically every field of human activity have rendered obsolete large parts of every reference work prepared before the conclusion of this struggle. The Lincoln Library enjoys the distinction of having been planned and completed since the great conflict. This is a consideration of the highest importance, since practically every reference work of size, including those considered the most authoritative, are notoriously inaccurate with regard to thousands of subjects affected by the war.

Perhaps in no age have the rapid advances in knowledge and in mechanical inventions so quickly rendered obsolete much information that was accurate at the time it was published. Whole new fields have been added to human knowledge since many reference works of high repute were printed. In this work, it has been made a matter of especial care that such subjects should be adequately treated and that, as far as possible, the most recent positive contributions to human knowledge should be duly recorded.

In the case of statistics regarding populations and other factors that vary continually, the most recent authentic figures are given rather than still later estimates, which, at best, are only glorified guesses. In other words, it has appeared more desirable to present the most authoritative information rather than that which is merely recent but lacks the essential of all statements of alleged facts—reliability. On the whole, this work will be found to surpass all the large encyclopedias in up-to-dateness just as it excels all other single volumes in completeness.

Mass of Contents. By means of utilizing every available square inch of space, the mass of contents in this single volume has been made to exceed that of many well-known works consisting of from six to twenty volumes. The Department of Science

alone, for example, greatly exceeds in actual contents the whole four volumes of the widely known work entitled *The Outline of Science*. Similar comparisons may be made with reference to other and more costly works. This disparity in mass of contents, however, is only part of the difference between The Lincoln Library and the average work of several volumes. Not only does it excel in the amount of material presented, but the material itself is in a much more concise and highly condensed form. Consequently, this one volume contains from twice to many times as much information as the average work of many volumes.

By reason of this fact, The Lincoln Library occupies a unique place in the world of books. The elaborate work of many volumes has had a recognized place ever since the 18th century, when Diderot and his associates in France produced, by 21 years of labor, their monumental *Encyclopédie*. Such extensive works provide a digest of all human knowledge and are intended for the use of specialists and others having means and a certain amount of leisure. On the other hand, the one-volume reference work containing from 800 to 1000 pages has met the needs of a wider public, whose purposes are best served by a reference work of smaller cost containing the *minimum* essentials of knowledge. This type of reference book also has a well established place and has been used for a number of decades. The Lincoln Library occupies a position intermediate between these two recognized types. It combines the advantages of comparatively low cost and ease in consultation with a completeness in essential information which closely approaches that attained by the larger works.

Legibility and Compactness. In spite of the great amount of material that has been presented in this one volume, the utmost care has been exercised that the text should be legible and attractive. Apart from certain sections intended to be used as dictionaries, the type is of the same size as that employed in practically all newspapers. Nevertheless, by reason of its superior face, or design, and because of the quality of paper on which it is printed, the type is actually much more readable than that in the average newspaper. Moreover, frequent and careful paragraphing, combined with the division of the page into two columns, insures an openness of appearance that makes each page a delight to the eye.

The surprisingly small bulk of The Lincoln Library is due in large part to the choice of a superior quality of thin paper. This paper has the added advantage of a firmness that makes it easily handled. Thus, both by reason of the paper and type employed and of the openness and pleasing arrangement of the printed text, The Lincoln Library is, in a very real sense, a triumph of the bookmaker's art.

Introductions. Preceding the treatment of each major subject, such as The English Language, History, Science, or Government, there is a valuable explanatory section setting forth the scope of the subject, its importance, and its usefulness. In addition, many subdivisions, as, for example, Synonyms and Antonyms, have instructive introductory sections. These introductions give the user a clear idea of the value of the subject itself and they lead to accurate knowledge of branches with which he has not previously been acquainted. For purposes of self-education, the importance of this feature cannot be overestimated.

Dictionaries. In practically every department there is at least one dictionary, or group of specially selected topics arranged in alphabetical order. These dictionaries supplement, in a most effective manner, the other material in the department. Following the instructive discussions on government, there is a valuable Dictionary of Political Terms and Institutions. The Department of Science is especially well provided with dictionaries, which include alphabetically arranged articles on plants, animals,

minerals, electrical terms, and many other groups of subjects on which it is often important to obtain the most reliable information with a minimum expenditure of time and labor.

Tabulations. As a storehouse of condensed information, there is no superior to a well constructed tabulation. This work has utilized carefully planned tables to an extent never before carried out in a single volume and has thus, to a quite exceptional degree, been able to display condensed information in an attractive and readily accessible form. There are in all some hundreds of these helpful tables. Many of them, if expanded into descriptive text, would each provide material for a substantial volume. In numerous instances, single pages among these tables represent the labor of weeks or even of months. Several are of unique value. Among these are the table of Modern Literature, the table of the Growth of the United States, the numerous tables on agriculture, and especially the table of Vice Presidents of the United States, which involved extensive research at the Congressional library.

Illustrations. Each department is introduced by an appropriate full page illustration in color. The larger departments contain numerous color pages and half tones illustrating in all nearly 900 subjects. Many of these are exceedingly beautiful, and all are interesting and instructive. Under History, Geography, Science, and Fine Arts, there is a wealth of educational and artistic illustration which renders these important departments doubly valuable. In the section on Animals, there are full page illustrations from original paintings made for this work by Louis Agassiz Fuertes. The section on Plants contains a number of full page color studies of American wild flowers by Miss Mary E. Eaton. The Department of Biography is notable for its array of portraits of the world's great men and women. There are, in fact, in this volume more portraits than are given in any of the large encyclopedias.

Maps. Recently prepared maps of the world, of the different continents, and particularly of the United States and Canada complete the extensive descriptive material in the highly useful Department of Geography.

Pronunciation. Throughout the volume the pronunciation of unfamiliar words, especially names of persons and places, has been carefully indicated. Moreover, the section on Correct Pronunciation contains a dictionary of more than 1600 words which are frequently mispronounced.

Bibliographies. The user who may desire to extend his knowledge of some special subject beyond the generous array of information afforded by this volume will find, at the end of each of the several departments, a classified list of authoritative works. From these suggestive bibliographies, which have been carefully prepared for his aid, he will be able to select books in which he may pursue a favorite subject at greater length.

Test Questions. At the end of each department will be found carefully selected questions covering essentials of the subjects treated. In all, there are more than 10,000 such questions, the answers to which, in themselves, constitute the foundations of a liberal education. Yet this great number forms only a small fraction of the questions which the volume will answer. This special feature will be found a stimulating means of self-improvement for students, teachers, parents, club women, debaters, and all others who desire to be widely informed.

Index. The comprehensive Index enables the reader to obtain information with great speed and precision. While necessarily of generous size because of the extensive contents of the volume, this index is so simple and compact that the utmost ease will be experienced in the use of it.

THIS unique and comprehensive volume owes its origin, development, and completion to the constructive foresight and the untiring energy of Mr. M. J. Kinsella, the founder and late president of The Frontier Press Company. Under his vigorous and able management, this organization grew until it now stands in the foremost rank of American educational publishing houses.

By academic training and especially by practical and successful experience, Mr. Kinsella was unusually well qualified for the colossal task of building this volume. While the book itself is the best evidence of the intelligent manner in which it was planned and constructed, a few words concerning the training and experience of its chief builder may not be out of place.

Having had the usual preparatory training, Mr. Kinsella entered the Buffalo state normal school, where he completed a four-year classical course. Later he entered Cornell university, at which institution he was graduated in 1900. Incidentally, he devoted three years to teaching, an experience which subsequently proved of great value to him in that it made him familiar with the needs of the average pupil. Finally, Mr. Kinsella was always a diligent student of *instructive* books.

Publishing Experience. But by far the more significant part of the training enjoyed by the projector of this volume was that obtained in the course of his experience as a publisher of single-volume reference works of an educational nature. For many years prior to the preparation of this volume, he was engaged in the publication and distribution of one-volume reference works, and his labors were rewarded with an enviable degree of success. This wide experience brought him into intimate touch with all classes of people through the personal contact of an enormous force of educational salesmen and peculiarly fitted him for the great task of building The Lincoln Library.

Constructive Ideas. The completion of The Lincoln Library was the culmination of efforts directed by certain ideas which Mr. Kinsella entertained with strong conviction for many years. These ideas may be briefly stated as follows: that the typical one-volume reference book of from 800 to 1000 pages should be greatly expanded if it was completely to fulfill its mission; that the many-volume sets of encyclopedias are so costly that too small a percentage of the general public is able to purchase them; that extensive sets built on the A-to-Z plan are more difficult to use than a highly comprehensive one-volume work in which related subjects are brought together; that the material which is usually found in textbooks and special treatises can be greatly *condensed* and the real substance of it can be placed in an exceedingly small space; that, consequently, a single volume of sufficient size to contain the essentials of a liberal education is the ideal publication for general use.

With the foregoing ideas in mind, tentative plans for the building of this volume were made, a corps of editors was engaged, and certain standards of accuracy, quality, and comprehensiveness were set up by the builder in chief. As the work progressed, new features were decided upon, and additional editors and contributors were engaged. The detailed plans, the selection of the editors, and the handling of scores of manuscripts were a few of the numerous burdens that rested upon Mr. Kinsella, who made it a cardinal point that, in every part of the work, quality should be the first and paramount consideration. In this respect, he shouldered, not only the burdens that are usually borne by a managing editor, but also the manifold responsibilities of manufacturing.

In order to maintain throughout the work the uniform standard of quality which he had established at the outset, Mr. Kinsella was obliged in numerous instances to have manuscripts subjected to repeated revisions. This positive insistence on the highest standard of work is accountable, in a large degree, for the unusual length of time that was devoted to the building of this volume.

CONTRIBUTORS AND EDITORS

The following pages contain a list of 60 men and women, occupying various positions of importance in the United States, Canada, and Australia, who have collaborated extensively in building The Lincoln Library. After each name in this list is given the person's scholastic degree. Next is indicated the present or former position occupied by each collaborator, following which, in many cases, appears a list of some of the typical publications of which he is the author. Finally, there is a statement indicating in each instance exactly what task was performed.

In case a department, section, or article was prepared *in toto* by one of these collaborators, it is stated that he *contributed* it. A person performing such service is listed as a *contributor*. Dr. D. P. Barrows, for example, former president of the University of California, contributed the extensive Department of Government and Politics. Again, Dr. C. H. Judd, head of the department of education at the University of Chicago, contributed the entire Department of Education.

Moreover, a limited number of articles were so extensively rewritten by the collaborators to whom they were sent for revision that they must necessarily be regarded as original contributions. In such instances, these specialists also are properly listed as contributors.

In case a section, prepared by the office editorial staff or by an outside contributor, was edited, revised, expanded, or approved by one of these collaborators, the exact service performed is specifically defined. A collaborator rendering such assistance is described as a *revising editor*. Dr. W. W. Atwood, for example, president of Clark university, revised and expanded the section on Physiography.

For several years, a corps of office contributors and editors with numerous assistants was continuously engaged on the work of building this volume. The task of preliminary selection and the original preparation of considerable portions of the material necessarily devolved mainly upon this group. The complex nature of their duties renders it impossible to state precisely the contribution made by each member of this editorial staff. The names, however, of the principal editors in this group, with their academic degrees, will be found separately listed.

CONTRIBUTORS AND EDITORS

FRANK FROST ABBOTT, PH. D.

Late Kennedy Professor of Latin Language and Literature, Princeton University. Author: *A Short History of Rome*; *Society and Politics in Ancient Rome.*

Contributed the articles on Roman History and Latin Literature.

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Director of Extension Work, Buffalo Society of Natural Sciences; formerly, Department of Entomology, Cornell University.

Contributed the articles on the Ant and the Honeybee; also reviewed and revised the material on Plants for the section on Botany.

WALLACE WALTER ATWOOD, PH. D.

President, and Professor of Physical and Regional Geography, Clark University, Worcester, Mass. Author: *Interpretation of Topographic Maps*; *New Geography, Book II.*

Revised and expanded the section devoted to Physiography.

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President, and Professor of Political Science, University of California, 1919–23. Author: *A History of the Philippines*; *A Decade of American Government in the Philippines.*

Contributed the Department of Government and Politics.

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Professor of Scandinavian Languages and Literatures, and Head of the Department of Scandinavian Languages, University of Minnesota. Author of numerous papers and articles on Scandinavian subjects.

Contributed the articles on Norwegian, Danish, Swedish, and Icelandic Literatures; also on Norwegian, Danish, and Swedish History.

HENRY ELDRIDGE BOURNE, A. B., B. D., L. H. D.

Professor of History, College for Women, Western Reserve University. Author: *The Teaching of History and Civics*; *Mediæval and Modern History.*

Revised and materially extended the article on French History; also 47 items on French History for the Dictionary of World History.

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Dean of the Faculty of Applied Science and Head of the Department of Geology and Geography, University of British Columbia.

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Professor of Historical Geology and Paleontology, and Curator of the Paleontological Collection, University of Michigan. Author: *Geology and Physical Geography of Wisconsin*; also contributor of numerous papers and monographs, chiefly on vertebrate paleontology.

Contributed the section on Geology and Paleontology.

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Formerly Lecturer in Government, University of Buffalo; Lecturer in Banking, American Institute of Banking.

Contributed the section devoted to Business, Banking, and Legal Terms; also numerous dictionary articles embodied chiefly in the Dictionary of American History.

FRANK CRANE, HON. PH. B., D. D.

Late Editor of Current Opinion; noted contributor to periodicals and newspapers. Author: *War and World Government*; *Four Minute Essays*; *The Crane Classics.*

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Superintendent of Education for State of Pennsylvania, 1919–23. Author: *Text Book on New York School Law*; *Judicial Decisions in Education*; *Free Schools.*

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Dean of the College and Chairman of the Department of Modern Languages, Princeton University; Critic of Modern European History and Literature. Author: *The German Emperor*; *Through College on Nothing a Year*; *Why We Went to War.*

Contributed the Introduction to Literature and the table showing the Development of Modern Literature.

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Author: *A History of the French War Ending in the Conquest of Canada*; *A History of the War of 1812 between the United States and Great Britain*; *A History of the War of Secession*; *The Alphabet of Rhetoric*. Editor of The Universal Cyclopædia; Cyclopædia of Notable Americans.

Contributed the section on Meanings of Place Names; reviewed and revised the following articles for the Department of History: Arabia, Argentine, Assyria, Babylonia, Belgium, Brittany, Eastern Empire, Finland, Flanders, Hungary, India, the Netherlands, Phœnicia, Portugal, Provence; also reviewed original material on Biography, supplying hundreds of constructive suggestions.

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Professor, and Head of the Department of Education and Director of the School of Education; also Chairman of the Department of Psychology, University of Chicago. Author: *Introduction to the Scientific Study of Education*; *The Evolution of a Democratic School System*.

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Professor of Psychology and sometime Instructor in Russian, University of Buffalo. Author: *Education and Autocracy in Russia, from the Origins to the Bolsheviki*; report on Russian education to the Peace Conference; translator of several books and pamphlets from the Russian; Lecturer on Russian History and Literature.

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Superintendent of Schools, Oswego, New York. Author: *Students' Hand Book of Parliamentary Law*.

Contributed the section on Parliamentary Law.

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Reviewed and revised the section on Speaking and Writing.

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President of Vassar College. Author: *First Year English*; *Manual of Good English* (part author); *English Composition in Theory and Practice* (part author).

Reviewed, with constructive suggestions, the original manuscripts on Sentence Building, Prepositions, and Conjunctions; also reviewed and approved the final proofs.

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Contributed the articles on the Democratic and Republican Parties; also reviewed and revised the extensive sections on American History, the American History Charts, the Dictionary of American History, and the article on Libraries and Museums.

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Late Chief of Dendrology, Forest Service, Department of Agriculture, Washington, D. C. Author: *Forest Flora of the Rocky Mountain Region.*

Reviewed and revised the material on Trees and Shrubs for the section on Botany.

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FRANK HORACE VIZETELLY, LITT. D., LL. D.

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KEY TO PRONUNCIATION

ă, as in farm, father; *ȧ*, as in ask, fast; *ă*, as in at, fat; *ā*, as in day, fate; *ȃ*, as in care, fare. *ĕ*, as in met, set; *ē*, as in me, see; *ĕ*, as in her, perform. *ĭ*, as in pin, ill; *ī*, as in pine, ice. *ŏ*, as in hot, got; *ō*, as in note, old; *ȯ*, as in for, fought; *o͝o*, as in cook, look; *o͞o*, as in moon, spoon. *ŭ*, as in cup, duck; *ū*, as in use, amuse; *ȗ*, as in fur, urge. *ou*, as in out, about. *oi*, as in oil, boil.

ȃ, *ȇ*, *ȏ*, *ȗ* represent the sounds *ā*, *ē*, *ō*, *ū*; they are of shorter quantity but do not lose the quality of the "long" vowel, as in senâte, ȇvent, ȏbey, lectûre.

TH indicates the sound of th in thee, though. In foreign words this symbol indicates a more distinct d sound than in English words, as in the Irish word *Dail*. *zh* stands for the sound of z in azure.

ů cannot be exactly represented in English. The English sound of u as in *luke* and *duke* resembles the original sound of *ů*. *ŏ* cannot be exactly represented in English. The English sound of u in *burn* and *burnt* is perhaps the nearest equivalent to ö, or œ. K represents ch in German *ich*, *ach*. N represents the nasal tone (as in French) of the preceding vowel, as in *encore* (*ăN'kōr'*). H represents the guttural g or j in Spanish words, as in *jefe*.

The principal accent is indicated by a heavy mark,′, and the secondary accent by a lighter mark,′, placed at the end of the syllable.

SUGGESTIONS FOR THE USER

THE usefulness of this volume is so manifest and the information which it contains is so readily accessible that, in a certain sense, there is little need for this section. Nevertheless, since The Lincoln Library contains far more than the conventional books of reference and is intended for so many different classes of readers, it has seemed desirable to set forth certain suggestions that will enable every reader to derive from the work the greatest possible advantage.

Although this work, like all books of reference, is designed particularly to furnish general information of a wide range, nevertheless it is specially adapted also for the guidance of home students and as an aid to pupils and teachers in the preparation of supplementary school work. It will be found no less valuable for parents wishing to keep abreast of their children's education and for busy men and women in commercial life who are desirous of improving their business efficiency. In a like degree, this work will prove helpful to persons interested in civic improvement and better citizenship, to literary and other club workers, and to all who aspire to a higher degree of culture through self-improvement.

FOR GENERAL REFERENCE

Experience has shown that the information contained in The Lincoln Library will furnish satisfactory answers to innumerable questions that arise in the average person's daily life and affairs. These include questions that come up through contact with associates at work, in business, or at clubs; questions suggested through the reading of newspapers, magazines, and books; questions asked by children in connection with school work; and also questions growing out of political and various other discussions.

It should be remembered, on the other hand, that this volume will not furnish information on trivial matters or on matters of purely local or temporary interest. That such items have no part in this volume is made clear by its title. No attempt, for example, is made to include mention of the innumerable athletic contests which are a part of normal physical activity everywhere. Nevertheless, an athletic event of historic and international interest, such as the Olympic games, receives a treatment befitting its importance.

Strictly technical subjects, also, such as those connected with the practice of law or of medicine, will not be found treated in this volume. The work is not designed to assist a specialist in the practice of his speciality. It does not undertake to tell the farmer how to grow wheat, the miller how to grind it into flour, or the baker how to make it into bread. It will, however, enable the farmer, the miller, or the baker to become thoroughly informed in the whole range of things that tend to make him a more helpful parent, a more intelligent citizen, and a more effective business man. For such purposes, this volume will be of inestimable service.

The true value of The Lincoln Library, however, can be realized only by constant use. USE is the key which will unlock every door in this treasure house of knowledge. The familiar adage regarding the value of a "little farm well tilled" has application to The Lincoln Library, the use of which, if cultivated assiduously, will yield abundant harvests in personal achievement.

It should be borne in mind also that even the fortunate possessor of Aladdin's wonderful lamp could not have called to his assistance its magical powers unless he had kept it where he could rub it with his own hands. So it is with The Lincoln Library. It will be of no more practical value than a mummy in a museum if it is stored on a high shelf, hidden in a closet, or locked behind glass doors. It should have its place on the family reading table, the child's study table, or the office desk, where it will always be within easy reach.

The Table of Contents gives the names of the twelve departments under which all the material in the work is grouped. Facing the first page of each department there is a frontispiece in color, on the back of which will be found an explanatory outline of the contents of the department which follows. Taken in connection with the Table of Contents, these outlines at the beginning of the different departments reveal quickly what the volume as a whole covers.

The arrangement of the material in each department, wherever it lends itself to such a system, has been ordered with a view to bringing into especial prominence the subjects likely to prove useful most frequently. Thus, in the Department of Geography, the United States and Canada are described first, and Antarctica is dealt with last. In other divisions of the work, the most convenient arrangement of the minor topics is plainly alphabetic, and this system has been followed in all such cases.

The device of greatest utility in obtaining information from any book is a good index. To the busy user, in particular, even a good book with a poor index is of little or no value. The Index of The Lincoln Library has been made so comprehensive that every passage of importance bearing upon any subject may be found with the least possible expenditure of time. The immense number of subjects treated in the work makes it inevitable that the Index should be large, particularly as the subjects are carefully cross-indexed and subindexed. Nevertheless the preparation of this important part of the volume has been carried through with such care and judgment that the use of it will be found surprisingly simple.

With a view to its greater usefulness, the Index has been kept free of several classes of entries which would add bulk with little corresponding advantage and which, in some cases, might amount to positive hindrances.

In the first place, every single occurrence of a word or subject is not recorded in the Index. To do so would cause the reader a waste of time instead of enabling him to save it. Thus, to enter in the Index all the cities in the United States which are given in the table on pages 739–744 would serve no real purpose. All cities which are treated topically are separately indexed; for all others, the reader is referred to this table. These and similar features of the Index are made clear in a number of explanatory paragraphs preceding the Index.

Another class of reference excluded is that which some works list in order to be able to claim completeness but which do not lead to any helpful information. Thus, under *Switzerland* will be found references to separate articles treating its history, its geography, and its government as well as to tables containing facts regarding the country. No reference will be found, however, to many other passages where Switzerland is mentioned but in which little or no light is thrown on the country as such. Thus, in Biography, it is stated that Rousseau resided in Switzerland, but to refer to this passage under *Switzerland* would serve merely to detract from the usefulness of the Index.

No attempt is made to incorporate in the Index such supplementary material as, with more careful editing, would be placed in other parts of the work. In other words, the Index is rigorously restricted to the fulfillment of its proper purposes.

FOR SELF-EDUCATION

In years gone by, thousands of promising young men and women abandoned the hope of becoming educated simply because they could not attend high school or college. With this humiliating acceptance of failure, they relinquished the honors, the usefulness, and the happiness which only education can bring.

In recent years, however, it has become much more generally recognized that it is not positively essential to attend college in order to become educated. Moreover, this changing point of view is not confined to the young. Mature men and women who left the day schools years ago are now enrolled by thousands in the night classes of universities, colleges, and vocational schools. Still greater numbers, who cannot arrange for classroom attendance, are devoting their spare moments to systematic study and self-improvement.

The Lincoln Library is, in a special sense, dedicated to the task of meeting the needs of these people, and the work has been planned throughout with this end in view. It represents a determined effort to bring to every conscientious user of this book the advantages formerly supposed to be open only to those who could actually attend advanced institutions of learning. The accomplishment of this purpose involved enlisting the co-operation of a large number of professors of the outstanding universities of the United States, Canada, and Australia, and, in numerous sections throughout the work, may be seen the cream of the material which these teachers and scholars present before their classes in the universities.

Every department of this work is adapted for study by the careful student, but among those with which especial pains have been taken in order to make the subject easily intelligible is the Department of Mathematics. On account of the difficulty ordinarily experienced by learners in this field, the material has been explained with a care that is probably unexampled among the printed textbooks on mathematics.

Another feature of The Lincoln Library which makes it of exceptional value for self-education is the inclusion of Test Questions in each department. In no way can the mind be so sharply focused on a subject as by first becoming conscious of not knowing various aspects of the subject and then having such active inquiry satisfied as a result of search. It will, therefore, be found extremely helpful to read from the Test Questions first and then to obtain the answers to them by referring to the text.

FOR THE STUDY OF SPECIAL SUBJECTS

The Lincoln Library contains in brief and convenient form all the essentials for a detailed study of a large number of the most important departments of knowledge. Among the numerous subjects for the study of which it affords exceptional facilities are American history, arithmetic, astronomy, British history, chemistry, foreign government, geology, history of education, how things are made, invention, letter writing, mineralogy, physics, physiography, physiology, psychology, science of education, transportation, United States government, and zoology. The material on the different subjects necessarily varies in length and in manner of treatment; consequently the best method of mastering the different branches of knowledge covered in this work will differ somewhat in detail. In practically all cases, however, the following suggested procedure will be found helpful to one who is undertaking the systematic study of a special subject.

SUGGESTIVE METHOD

1. Consult the Index, locate the subject to be studied, and turn to the beginning of the section in which it is treated.

2. Read with especial care the introductory material.

3. Study the important divisions of the subject indicated in the introduction. These divisions may be located partly by means of the conspicuous headings and, in other cases, may be located best by a reference to the Index. Follow up all cross references to related topics.

4. Study the various minor topics mentioned in each of the chief divisions of the subject.

5. Consult the list of illustrations and turn to those which are related to any feature of the subject under study.

6. Whenever the text mentions unfamiliar persons or places, look them up in the Index and read the descriptions of such as are topically treated. The location of places mentioned should be fixed in the mind by a reference to the maps in the Department of Geography. The Index should be consulted also in regard to every term or subject that you do not fully understand.

7. By using the Test Questions, confirm the knowledge gained in this study. These questions will be found at the end of the department in which the subject is treated.

8. For more extensive study and for supplementary reading, consult the Bibliography, which either immediately precedes or follows the Test Questions. Here will be found a select list chosen from the best books on the subject.

Suppose, for example, that you desire to improve your knowledge of astronomy. Following the foregoing outline, turn to the section Astronomy, which, as the Index shows, begins on page 911. Read the introduction, which, in brief compass, gives the history, the value, and the scope of the subject. Under Scope, you learn that

astronomy treats of the earth, sun, moon, planets, planetoids, meteors, comets, stars, and nebulæ. You are informed also that these subjects have received additional treatment in separate articles.

Turning to the article on the earth, page 915, you learn the important astronomical facts concerning it. The closing paragraph states its relation to the sun and, in addition, gives cross references to the moon and planets. Taking next the article on the sun, you learn its size, heat, composition, and other characteristics. Following up the cross references from the earth, you then study the moon, page 918. For additional information, you are referred to the satellites, page 920, where you learn about other moons than ours, and to tides, page 883, where their cause and effect are explained.

Following up the cross reference to the planets from the article on the earth, you discover a general article, page 919, with references to a separate article on each of the major planets. When these articles, with their references, have been studied, you can extend your knowledge of the solar system by reading the articles on the planetoids, comets, and meteors, and then more fully complete it by mastering the articles on time, day, length of days, year, calendar, equinoxes, solstice, eclipse, aphelion, perihelion, sun spots, and other subjects in the list of alphabetically arranged topics in this section.

Next, following the cross reference from the article on the sun, you study the article on the stars. From this you are referred to articles on the constellations, Sirius, Betelgeuse, and the Pole Star. Then read the explanation of nebulæ, including the references, and finish your study by a very careful consideration of the articles on the Milky Way, light year, and cosmogony.

By consulting the list of illustrations, you will be directed to instructive pictures of heavenly bodies and also of astronomical observatories, whose powerful instruments are described in the article on telescopes.

After completing this study, examine yourself by means of the Test Questions on page 1125. By following this procedure, you will have learned the fundamentals of the fascinating science of astronomy. Should you desire to carry your study still further, you will find some of the best books for the purpose listed in the Bibliography at the end of the Department of Science.

FOR SUPPLEMENTING SCHOOL WORK

The busy teacher in need of reference material in fields outside the regular textbooks will find this volume an invaluable aid. Timely selections made from the immense store of knowledge which it contains, particularly in the subjects of history, civics, and geography, will add greatly to the interest and effectiveness of her work in the classroom. Much suggestive material for supplemental reading will also be found, and excellent outlines for review may be prepared by reference to the work. The Department of Mathematics will afford valuable hints for a clear and forceful presentation of many points in this difficult subject.

In the classroom, it is inevitable that questions should arise which no teacher could answer authoritatively at a moment's notice. This volume will furnish the answers to a large percentage of them. Therefore, it should always have a place in the classroom for ready reference. Time will thereby be saved, and a valuable educational advantage will be gained.

The Test Questions are useful for purposes of review. They will serve also as model questions and will thus be of value to many teachers, particularly to those who, through lack of experience, find the art of questioning a difficult one. The character of the questions asked by teachers is often an index of their improvement and an important factor in their advancement.

For any pupil who is sufficiently mature to use an index, this volume is a veritable treasure house. While it makes no attempt to write advanced subjects down to the mental level of the child learning to read, nevertheless it is surprising how early young pupils who can read will learn to use it with great profit and interest. This interest finds encouragement in the simplicity of language with which the essentials of each topic are stated.

From an educational standpoint, the importance of having children discover that they can look up information for themselves can scarcely be overestimated. Nothing gives a child a greater degree of pleasure or of confidence in his own powers than to be able to find things out for himself. It is scarcely less important that parents should encourage the natural curiosity of still younger children by being able to provide their eager minds with correct answers to the many questions which they ask. To perform this pleasurable duty aright, it is positively necessary to have at hand such a comprehensive and easily consulted work as The Lincoln Library.

For pupils of grammar, intermediate, and high school grade, this volume provides not only the essentials of nearly all subjects studied but furnishes also supplementary material covering thousands of points connected with daily work in school. No other volume contains so much useful information for pupils of these grades. The subjects in which the material will be of unusual helpfulness, however, are arithmetic, English, geography, and history—the great fundamental branches which underlie education for any walk in life. In these and other subjects, the material can be used by the pupil for purposes of review, and the Test Questions will greatly assist him in preparing for examinations.

The student who, by the use of this work, widens the scope of his knowledge as attained at school will find himself enjoying a distinct advantage over those who neglect to make use of such a help. The "home work," which is so embarrassing to pupils not provided with satisfactory sources of information, will then become a source of pleasure and will be multiplied many times in value.

High school pupils, particularly, will be greatly assisted by the material on literature, ancient and modern history, physiology, zoology, botany, and other sciences, and especially by the valuable section on Algebra and other branches of mathematics studied in high school.

The usefulness of The Lincoln Library extends also to the student in college. It will be found helpful particularly in the newest fields of knowledge, in regard to which most of the large

encyclopedias are deficient. Equally valuable are the lists of carefully selected books given under the heading of Bibliography. By means of these lists, the student is directed to more exhaustive treatments of special phases of the different subjects.

FOR PARENT-TEACHER ASSOCIATIONS

In the Department of Education, there is a special section devoted to parent-teacher associations, in which their function is described with examples of their methods and their work. There is also ample discussion of the curriculum and purposes of the modern school. The various intelligence tests and educational measurements are clearly explained with their application to children as well as to adults. Moreover, there is a discussion of the methods and results of school surveys together with a concrete example of the results of co-operative community action in substituting an efficient centralized school for several inefficient district schools.

Among other helpful features for both the parent and the teacher is the treatment of the problem of the junior high school, the vocational school, and the junior college. Throughout the text there are valuable condensed tables which show what the modern schools are doing. In addition, there are charts showing how greatly the curriculum in the elementary schools has been changed in recent years. Another feature of value, particularly for those who desire to be well informed on school matters, is a discussion of the national associations now studying educational problems. This section indicates also what sources of information on educational progress are now available.

Not only are the foregoing special features of great interest, but the entire section on the Science of Education will be found exceedingly helpful. Familiarity with these essentials will enable parents and teachers to co-operate more effectively in improving the work of the schools.

FOR LITERARY AND OTHER CLUB WORK

For aid in the preparation of literary club programs, courses of study, reviews, essays, or other papers, this volume offers an inexhaustible supply of valuable material. Every important literature, ancient or modern, is clearly outlined, and the most important authors and their works are mentioned. The wide field of English literature is treated in sections devoted to American, English, Canadian, Australian, and Irish writers. The whole is supplemented by the comprehensive Outline of Modern Literature; by the interesting section on Literary Plots, Characters, and Allusions; and by the section on Mythological Persons, Places, and Stories.

Moreover, the Department of Biography contains sketches of all the great writers and of a large number of minor authors, and includes mention of their most noteworthy works. When this biographical material is used in connection with the information to be found in the Department of Literature, it affords the opportunity of studying an author in a threefold way. He may be studied (1) in connection with the literature of his country or period, (2) through the characters which he has created, and (3) individually and personally, as in a biography.

Other departments of The Lincoln Library likewise furnish a wealth of material for the literary club worker. The extensive Department of Geography and Travel, with its instructive illustrations and maps, can be unfailingly drawn upon with profit. Similarly, the Department of Fine Arts, especially the section on Music and the dictionary of terms and subjects in architecture, painting, and sculpture, will contribute hundreds of interesting points.

But literature considers the works of nature as well as the works of man. Consequently, such sections as Astronomy, Physiography, Mineralogy, Plants, and Animals will make plain innumerable points that constantly arise in the study of great works of literature. Allusions to still other subjects will be frequently found in almost any important author. In following up all such allusions, every department in this volume will be found helpful. The student of literature should therefore make frequent use of the Index.

For members of all organizations having for their object better citizenship, civic improvement, or any form of cultural advancement, the information furnished by The Lincoln Library will be found indispensable. A member of a good citizenship league will derive great assistance from the section on the United States Government and from the Dictionary of Political Terms and Institutions. A member of a civic improvement association will gain much help from the section on Architecture, from the Dictionary of Art Terms and Subjects, and also from the Dictionary of American Geography, especially the articles on great cities, wherein important streets, parks, buildings, and other civic improvements are especially noted.

FOR IMPROVEMENT IN BUSINESS EFFICIENCY

At no time perhaps in the world's history has it been so necessary for the successful business man to be well informed, not only in his special department of activity, but also in regard to the wider questions affecting this activity. This need is due partly to the greater complexity of conditions affecting his business, and it is due partly to the higher level of education which prevails in modern communities. A business man who betrays conspicuous ignorance on matters of general information is likely to find that, for no other reason, people will distrust his knowledge of his own business. Such factors play a much larger part in business than many people suppose.

The Lincoln Library has many features which make it especially valuable for the business man. The Department of Economics and Useful Arts, for example, contains in convenient form the latest authoritative material on commerce, transportation, finance, insurance, crop production, animal industry, mineral production, and manufactures. This information is not available in any other single work of reference. It would, in fact, require a substantial library of carefully selected authoritative works to furnish the information which has been condensed and carefully arranged for the business man's use in this unique section.

Again, a careful study of the articles on Money and Banking, Investments, Insurance, Capital and Labor, Advertising, and Salesmanship will be amply rewarded by the results. A thorough knowledge of these and other subjects of basic importance for business will contribute greatly to the efficiency of the business man and will be of value alike to the proprietor of a crossroads grocery and to the manager of a great department store.

As in the other divisions of this volume, the Test Questions at the end will prove stimulating to those who wish to test and extend their knowledge of economic and commercial subjects.

FOR TRAINING IN GOOD CITIZENSHIP

The growing complexity of government in modern society places an increasing weight of responsibility on the citizens of a democratic country. Good citizenship demands that one should at least have available such information as is necessary for arriving at an intelligent judgment regarding the various political questions that arise. To meet this need, the extensive Department of Government and Politics was prepared. The value of the information which it presents for those who desire to become more intelligent citizens is not easily exaggerated.

Following the outline for the study of special subjects, the user may pursue an exceedingly profitable course in civics. Because of the importance of acquiring this knowledge, a few special suggestions are offered. First, the introductory material is of unusual value; it should be studied carefully so as to grasp with the utmost clearness the purpose of government in our own country and in foreign countries, the relation of politics to history, and the importance of social ideas in politics. Next, the reader should note that the whole subject is treated in two main divisions—the United States Government and Foreign Governments. The knowledge embraced in the first section will be found of the highest value to the American citizen who wishes authentic information concerning the political institutions of his own country, and the contents of the second section will enable him to become well informed regarding other countries. Moreover, the discussions in each are supplemented by a very great amount of helpful information condensed in tabular form. The whole treatment is rendered still more complete by a Dictionary of Political Terms and Institutions.

The Department of Geography also contains a large amount of up-to-date material which every student of foreign countries will be pleased to find available. The recently prepared maps in this department will be of great service in definitely fixing in the mind the location of countries mentioned in the text.

A feature of the department which will appeal strongly to thoughtful persons is its freshness, up-to-dateness, and thoroughness. Under The United States, for example, not only are the older Civil Service Commission and Interstate Commerce Commission explained, but there are explanations also of important newer bodies, such as the Federal Reserve Board, the Federal Trade Commission, the United States Shipping Board, the Federal Board of Vocational Education, the Railroad Labor Board, and the Veterans' Bureau. Similarly, under Foreign Governments, the changes resulting from the World War are seen in the treatment of Czechoslovakia, Danzig, Lithuania, Poland, and Soviet Russia.

FOR GENERAL CULTURE AND SELF-IMPROVEMENT

Because of its range and its freshness of treatment, this volume is a most timely and effective handbook of self-improvement for persons of all ages and of all degrees of education. It is designed to serve all classes and to be of benefit alike to the farmer, the carpenter, the schoolteacher, and the university president.

In order to make a wide appeal, it is necessary that a book should be scrupulously nonpartisan in character. For this reason, the greatest care has been taken that The Lincoln Library should have no material exhibiting a partisan point of view. It contains no secret propaganda and seeks to serve no factions.

Although The Lincoln Library is extraordinarily rich in the number of authoritative statements of fact which it contains, it has avoided the dullness that often characterizes a mere fact book. The material in it has been so arranged and indexed that the user will not only find readily what he is looking for but, in doing so, will unexpectedly encounter related information of an interesting character. His search will thus become doubly valuable, and, by stimulating him to consult the work frequently, it will lead him to acquire one of the most essential elements in all culture—the habit of effectively seeking to become better informed.

Educated people may usually be recognized as such by their familiarity with the achievements of great men and women both in past ages and in the present generation. An intimate knowledge of the lives of the famous may be not only an inspiration to greater accomplishment but also a means of broadening one's experience and widening the horizon of one's life.

It is an interesting and enlightening experience to open at any passage in the Department of Biography and to read at random the biographical sketches. Glimpses may thus be obtained into different ages and different types of society. By leafing casually through the letter A, for example, one may see Saint Anthony the Great tormented in the desert by visions of sinful delights; Archimedes deeply pondering over his mathematical discoveries and mechanical inventions; George Arliss, the celebrated impersonator of "The Devil" on the modern stage; and Arrhenius, a Swedish chemist whose researches were crowned by the award of a Nobel prize.

Among the many other fields in which reference to The Lincoln Library will be found profitable are those of literature, music, painting, sculpture, and architecture. In the divisions on Literature and on Music and the other arts, the careful user will find a surprisingly large storehouse of information. If one desires to learn the titles of an author's most important books, the names and locations of the masterpieces painted by a noted artist, the features of a city which one should see when traveling, or information on any one of hundreds of similar subjects, a brief search in this volume will furnish it.

I

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IN THE SHAKSPERE COUNTRY

Mary Arden's Cottage
Ann Hathaway's Cottage
Stratford-on-Avon from Memorial Theatre

THE ENGLISH LANGUAGE



INTRODUCTORY

LANGUAGE, spoken and written, is mankind's most valuable asset. How language first arose has long been a matter of debate, but it is certain that it was originally much simpler than at present and that it developed from a group of bodily movements and from sounds with which certain meanings were arbitrarily associated. As men's experience became more varied and complex, such gestures and sounds were elaborated and multiplied until there arose what might be called spoken language. Written language followed, when an ingenious man thought of making marks to represent spoken words. By writing a symbol for each sound, an alphabet was devised and written speech was simplified. Thus communications could be sent long distances and thoughts could be recorded and preserved for the use of later times. Each generation was thereby enabled to instruct the next, and rapid progress in knowledge and in skill became possible.

Our English Tongue. To no people has there fallen a richer inheritance of language or a more splendid opportunity to further enrich and perfect that heritage than belongs to the English-speaking nations. The English language has grown to its present excellence through the development of one of the world's great literatures. This fact means that the work of scholars, poets, story-tellers, orators, and scientists has been contributing, through a thousand years, to enlarge, strengthen, and refine the English vocabulary and grammar. Moreover, the nations that speak this tongue have been modern pioneers in free, democratic government, with all that this implies in popular education, in free discussion of political questions, and in wide circulation of books, magazines, and newspapers.

The English and the Americans have been adventurous, trading, and colonizing people, sailing all the seas, exploring every continent, trading with, civilizing, and governing, peoples of every race. Whenever, for unaccustomed things, strange ways, or novel ideas, new words have been needed, these men of English speech have unhesitatingly adopted the foreign words that met the need. During a thousand years they have been borrowing words and phrases from all the peoples of the world and have been assimilating them to the forms of English speech. Thus the language has gained an unparalleled variety of synonyms and turns of speech, and it is fitted better than any other to be the language of a nation made up, as are the Americans, of a people sprung from many races.

On the western front of the World War, men from America, England, Canada, Australia, and South Africa met upon the ground of a common language. Allowing for minor differences of dialect, colloquialisms, and slang, they understood and misunderstood each other in the English tongue. Nowadays, also, newspapers and books, whether published in London, New York, Melbourne, or Montreal, in South Africa or in New Zealand, circulate freely throughout the large territories represented by these men.

English and Related Tongues. In connection with this world-wide use of the English language, it is important to observe its relationship to other tongues. A person of native English speech who begins the study of any western European language, such as French or German, finds at once certain striking resemblances to English in forms of words and in grammar. The student of Latin and Greek observes similar likenesses among their evident dissimilarities. If he pursues his studies into the Slavic languages of Eastern Europe, such as Russian and Polish, he finds that they also resemble English in notable particulars. Further, similar phenomena appear to the student of certain ancient Asiatic languages, notably Zend and Sanskrit, the former spoken by the ancient Iranians or Persians, and deciphered only in the 19th century through its resemblance to Sanskrit, once the language of the Hindus.

Careful study of such facts has led scholars to the conclusion that all these languages are to be regarded as belonging to a great family of languages, sprung from a single tongue spoken by an ancient people of central Asia, to whom the term Aryan is sometimes applied. Properly, Aryan designates this ancient language, but it is used also to include all the ancient and modern languages which developed from it. This family is also called Indo-European, because its members are the great languages of India and Europe.

The outstanding characteristics of these Indo-European languages, which mark their relationship to each other and distinguish them from all others, are three: (1) They possess in common a number of words not found in other languages. (2) They indicate grammatical relations by means of endings added to words. (3) They are similar in the sounds they employ and in the general laws of their syntax. Other characteristics, also, such as uniform consonant changes, serve to distinguish groups and branches of languages within the general family. In the course of centuries, among different groups of people, the original consonant sounds in words have passed into other closely related sounds.

The close resemblance between the languages of Europe and those of India and Persia is shown clearly in the following table:

English	*German*	*Latin*	*Greek*	*Zend*	*Tokhar*	*Sanskrit*
mother	mutter	mater	mētēr	matar	macar	mātā
father	vater	pater	patēr	pitar	pacar	pitā
brother	bruder	frater	phratēr	brata	pracar	bhrātā

The Story of Old English. The beginnings of the English language, spoken today by more people than speak any one other tongue, are to be found in the dialects of the Saxons, Angles, and Jutes. At the invitation of British chieftains, these tribes came to Britain in the early part of the 5th century from the low-lying shores and islands of what are now the Dutch, German, and Danish North Sea coasts, bringing with them other adventurers from the Scandinavian countries. Having aided the Britons to drive back their foes, the Picts, these settlers turned upon the Britons themselves, forcing them back to the west and to the north. The Jutes settled in Kent, in the Southeast of England; the Angles, in the North, the East, and the Midlands; and the Saxons, in the South and the Southwest. The language of these tribes belonged to the West Germanic group of the Teutonic languages, and was more closely related to the Dutch than to the modern German.

From the old tongue of the conquered Britons a few words, such as *druid*, *bannock*, *down* (hill), *dun*

(color), and perhaps *lawn* (land), with a few place names, entered the new language. The mingling of the dialects of the conquerors produced Anglo-Saxon or English Saxon, virtually a new language, the speech of the English Kin. This language had in it very little foreign element; it was highly inflected, and it formed new words from its own resources. Our words of common life, such as *while, nevertheless, man, god, loaf,* and *town,* indicate that Anglo-Saxon is still the bone and sinew of the English language.

Probably the tribes brought a few words of Latin origin, such as *mint* (money), *pound, mile, street,* and *church* (of Greek derivation), from the continent; for Roman and Greek merchants as well as Roman armies had penetrated to the lands along the North Sea. However, though the Romans had ruled Britain for 400 years and Latin had been spoken in the towns, the new conquerors seem to have found but few words they wished to adopt. The Latin *castra* (camp) survives in the name *Chester* and in other place names ending in *caster* and *cester.* The name *London,* of British origin, remains from this early time. But, with the coming of Christianity in the 6th century, numerous Latin words, such as *creed, verse, clerk, rose, lily,* and *turtle* (dove), were introduced. This number increased to perhaps 300 by the end of the 10th century.

In the 9th century the Danish or Scandinavian pirates overran the northeast districts of England,—Northumbria and Anglia; in the 10th century there were in this territory probably as many Danes as there were English; a Danish king ruled England in the early part of the 11th century. The conquest by the Danes was marked by pillage and cruelty, so that culture and literature were practically destroyed in the territory they ruled. For this reason, they left little trace of their language in the Anglo-Saxon of the time, though many words were preserved in local dialects and appeared in written English 200 years later. Curiously enough, these people gave to the English the word *law,* perhaps by way of the Dane law, as the district was called to which the West Saxon king Alfred at one time confined them. We owe to the Danes also such words as *call, care, fellow, husband, sister, die, same, thrive, take,* such place name endings as *-by, -thorpe, -thwaite,* and many surnames ending in *-son.*

While the Danes were harrying England, another body of Scandinavian rovers had settled in northern France. Normandy perpetuates the memory of these Northmen. Like their fellows in England, they adopted the tongue of their subjects, so producing the Norman French. Between these Normans and the Englishmen, intercourse grew in the 11th century. Edward the Confessor was educated in Normandy and to his court brought Normans, who made Norman French the language of the court society.

The Middle English Period. When William the Norman won the battle of Hastings in 1066, Anglo-Saxon fell to the position of the tongue of a conquered race, a people excluded from the court and from public office by decrees of the conqueror as well as by their own pride. Yet, though shut out from literary, courtly, and school use, the vitality of the language remained unimpaired. Not only did it maintain itself, but, when the struggle against royal tyranny in the 12th and the 13th century had wrung from King John a great charter written in Latin, and had brought Norman nobles and Saxon commons together in a common cause, English emerged as the language of the English Kin and their conquerors. We are told that about 1350 John Cornwall, a "master of grammar," changed instruction in his grammar school from French into English. In 1368 English was declared the language of the law courts. The poetry of Chaucer and the prose of the Wiclif-Purvey Bible raised the Midland dialect to the level of a literary language.

The language of this period, now called by scholars Middle English, was, however, very different from the Anglo-Saxon of 300 years earlier. It had dropped inflectional endings and had changed many spellings; it had lost some words and had borrowed from the French and the Latin many more. The arrangement of the words in a sentence was uncertain, since endings had been dropped and writers had set the words in what seemed to them, at the time, the best order. It was not until the 16th century that rules for word order were again reasonably well settled. A most important fact, however, is that in the 13th and the 14th century, through borrowing and Anglicizing, there began that generous enrichment of the language which has ever since characterized English speech.

The Anglo-Saxon Chronicle, which closed in 1154, contained a very few French words, such as *rent, treasure, countess,* and *castle*; but the immediate predecessors of Chaucer in the 14th century drew lavishly upon the French for synonyms and for words having no equivalent in the English. Already many Latin words had come in through the language of religion and the law. The new learning brought more, and, since most of the borrowed French words were of Latin origin, the total Latin element in English became very large. In everyday speech, however, the French is now the most striking part of our borrowed vocabulary.

From the 14th century to the 16th, with the Midland dialect, or London English, as a nucleus, the processes of forming the language on its new scale of greatness went on. Inflections were dropped, word order was fixed, spellings were changed, and new words were borrowed—some to be retained and others to be finally rejected. Thus the beginnings of modern English were prepared in the 16th century.

Making the Modern English. The 16th century translations of the Bible and the writings of Shakspere and of other great Elizabethans contain many old forms of words and of grammar unfamiliar to us. But these works mark the beginning of modern English. Their wide circulation by means of the printing press has helped to stabilize the language, and, during the last three centuries, to make slower its rate of change in respect to spelling and grammar. However, as long as the language is living, changes will occur; some words will be dropped, new ones will be made or borrowed, and new meanings will be given to old words. In this modern period, the extension of commerce and the development of science have brought about the introduction of thousands of new words, science especially drawing very largely from the Greek.

A comparison of English synonyms tells vividly the story of this borrowing. For example, the word *royal* is from the French, *regal* is directly from the Latin, while *kingly* is the Anglo-Saxon word. These words, side by side, have taken on important distinctions of meaning. *Acute* is Latin, *keen* is Anglo-Saxon, *shrewd* appears in Middle English and probably is Anglo-Saxon. Similarly, *admit* is Latin; *receive* comes from the Latin through the French.

Another group of words, applying to manners and conduct, is illustrated by *brave,* which comes from either French or Italian. *Gallant* is directly from the French or Italian, though perhaps it was originally a German word. *Business* is of Anglo-Saxon or Danish origin, *trade* is Anglo-Saxon, while *profession* and *art* come from the Latin through the French. *Copy* comes from the French, *model* from the French or Italian, *pattern* from the French, *specimen* from the Latin. The business terms, *cost, expense, price, charge,* were very early taken into the language from the Old French.

The sources of the following synonyms, relating either to law or to religion, are interesting: *crime* comes from the Latin through the French, *vice* is from the same source, and *sin* is from the Anglo-Saxon; *holiness* is Anglo-Saxon, while *sanctity* comes directly from the Latin. The common word *draw* is Anglo-Saxon; its synonym, *haul,* is of French origin, perhaps originally from the German or

Scandinavian; while *pull* is Anglo-Saxon and *tug* is probably Scandinavian.

The following list of words of French origin will show to what degree the French element has been worked into our language of daily use: *age, air, aunt, beauty, boil, boot, broil, cape, card, chair, cloak, coat, cousin, cry, dainty, debt, dine, ease, engine, face, fame, fork, grace, hasty, jolly, justice, napkin, nephew, niece, peace, plate, river, roast, soil, supper, table, uncle, virtue.*

Another group will illustrate well the picturesque interest that may be found in English synonyms: *breeze* is French or Spanish; *gale* may be Danish; *blast* and *storm* are certainly Anglo-Saxon; *gust* finds a likely source in Icelandic; *tempest*, so common a colloquial word in New England, is from the Old French; while *hurricane* is a Carib word which has entered the English through the Spanish.

The Dutch were the sailors and traders of the 17th century, and they gave us such terms as *boom, skipper, sloop*, besides some common words like *spool* and *wagon*. From the Portuguese come the words *binnacle, caste*, and *junta*. From the Arabic, we get the words *alkali, algebra*, and *tariff*. Hebrew contributions to English are chiefly religious words: *cherub, seraph, hallelujah, Messiah, Satan, Jehovah. Cabal* is of this origin as is also *cinnamon*, itself borrowed by the Hebrew from some other source. *Pilgrim*, the earliest Italian word in English, is recorded in the 12th century. This was in the time of the Crusades. Since the 14th century, we have taken from the Italian many musical and art terms, such as *opera, fresco, prima donna, sonnet, cartoon, cameo*. Other words of Italian origin, some borrowed through the French, are *fiasco, alarm, piazza, balcony, caprice.*

American Words. America has added to our stock of words in several interesting ways. Exploration in the 16th and the 17th century brought us, through the Spanish, such words as *potato, tobacco, cargo*, and *banana*. The contact of Americans and Spaniards in the West has given us such words as *pueblo, burro, broncho, coyote, loco, adobe, mesa, cinch, tornado, ranch, canyon, arroyo*, and *stampede*, besides some slang words like *vamoose*, and, in the Southwest, hundreds of plant and place names, such as *chaparral, mesquite, madroña, manzanita*, and *tule, Sierra, Santa Fe*, and *Colorado*. At the present time, because of increasingly close relations with the South American countries, we are constantly getting words of Spanish origin, such as *peon* and *hacienda*. From the French in America we have taken over *depot, levee* (dike), *bayou*, and *crevasse*, also place names like *Butte, Boise, Saint Louis*, and *Terre Haute*. The Dutch in New York are responsible for the words *patroon* and *stoop* (porch or steps).

Out of our political life in America have come the words *congressional, presidential, federalist, nullification, gerrymander*. We have coined the word *mileage*, the word *eagle* means a coin, *corduroy* is American English for a kind of road, and we speak of *locating* land. *Outsider* and *creek* (stream) are Americanisms, while several old or dialect English words, such as *fall* (autumn), *rare* (underdone), *slump, spry, lam*, have been preserved in America. At Baltimore the word *clipper* was first applied to sharp-prowed, fast-sailing ships; and at Gloucester the first *schooner* was christened.

No less interesting are the words taken from the American Indians: *squaw, wigwam, pemmican, tepee, papoose, cayuse, hominy, moccasin, chinquapin, opossum, skunk, succotash, toboggan*, and very many place names like *Canandaigua, Spokane, Chautauqua, Chattahoochee*, and *Willamette*. Some of these Indian words, such as *tepee*, and place names, like *Willamette*, have been affected in form by the analogy of French, others by the Spanish, as *potato, tobacco*.

These illustrations will suggest that, in addition to the practical value to be realized from the study of words and the acquisition of skill in the use of them, there is the further worth of such study as an approach to the history of the race. Words are the symbols of ideas, and ideas have made history.

Word Building. Many words, as they were needed to express ideas, have been built from simple forms by the process called "composition." The simplest sounds or groups of sounds that had, in the beginnings of language, a separate existence and meaning are called roots. Examples are *duc*, meaning "lead," *ag*, meaning "drive," *ed*, meaning "eat," *cad*, meaning "fall." By the addition of other so-called nominal roots, as *i* which appears now in the pronoun "it," we reach the stage of stems. So from *agri*, meaning "of a field," and *colere*, meaning "to cultivate," the Latin formed the word *agricola*, meaning "a cultivator of a field," or "a farmer."

Some simple words have had very little change from the earliest stems, except alteration of the vowel sound. Frequently this change has resulted from altering the position of the accent. The following will illustrate this development:

The word *arm* is from a root *ar*, meaning a "joint." This word is to be distinguished from the word *arms* or *arm*, meaning "weapons," which comes from the Latin, although the Latin word may be from the same source. The word *book* comes from the stem *boc*, meaning "beech," probably because in early times, in northern Europe, letters were carved upon blocks of beechwood or upon beech trees themselves.

Birth was not used in Old English but probably was taken later from the Old Norse. It is derived from an ancient Aryan stem allied to the Sanskrit *bhrti*, which meant "bearing." Bread was in Anglo-Saxon *bréad* and in Old Saxon *brôd*, having the meaning originally of "piece" or "fragment." The Anglo-Saxon rarely used this word to mean *bread*, employing instead the word *hláf* in the sense both of "bread" and of "loaf." However, before the beginning of the 13th century, *bread* came to mean the substance, and *hláf* assumed the limited meaning it still retains in loaf. *Comb* is from an ancient Teutonic root, related apparently to the Sanskrit *gambha*, meaning "jaw" or "teeth." *Deep* is from a very ancient root *dhup*, meaning originally "hollow." *God* seems to come from a root *g'heu*, meaning "to invoke." *Hand*, a common Teutonic word, is thought by some to be derived from a Gothic word *hinthan*, meaning "catch" or "take."

Language and History. In the vocabulary of the English tongue we find embodied the power men possess of readily and happily imaging or ideally representing the mysterious world in which we live. In our words are recorded their inventions as well as their ideals and schemes for the establishment of religion, society, and education. Here are mirrored the growth and the decay of ideas and ideals, the rise of the new and the displacement of the old. The lofty and the low in human thought and imagination are reflected in our language.

Our word *guest*, for example, is from the same root as is the Latin word *hostis* meaning "enemy," the original meaning of the root being "stranger." *Cheat* is from the old word *escheator*, the name of an officer whose duty it was to look after estates which, on the death of the owner, reverted to the state, a sense still retained in the legal term *escheat*. The real or suspected corruption of the *escheators* in the 15th or 16th century probably brought about the degradation of the word.

History finds still further illustration in such words as *cabal*, which comes from the Hebrew through the Latin and the French and meant originally "tradition." In the middle ages it came to mean "secret scheming," and in English this meaning was re-enforced by the fact that the initials of the names of five members of the Foreign Affairs Council of Charles II spelled this word *cabal*. In similar fashion, the words *earl* and *alderman* in their changing meanings represent much of English and American local government history.

The word *cross* suggests Christianity; but we should see in it also the early faith and learning of the great Irish schools of the 5th and the 6th century, from which the Norsemen of Northumbria took the word and passed it on to the Anglo-Saxons. Our word *world* also carries in its form the thinking of our pagan ancestors, who made it from *wer* meaning "man" and *old* meaning "age." It thus carries the sense of the "age of man or mankind," hence the "dwelling place of man."

In the early 13th century the foreign words in common use in English made up probably 12 per cent of the entire vocabulary. In Shakspere's works the foreign element is estimated at 40 per cent. Today in our writing it is probably 60 per cent. It is estimated that in the dictionaries of today about 20 per cent of the words are of Anglo-Saxon origin, about 35 per cent are from the French, about 15 per cent from the Latin directly, about 12 per cent from the Greek. But the proportion of Anglo-Saxon words in our everyday speech is much greater than these figures show, because our grammar is English and our connective words, such as *or, and, but,* are Anglo-Saxon. The English language has borrowed vocabulary, but not syntax, and it has Anglicized foreign words. Therefore, in spite of great differences of spelling, pronunciation, and accent, we may include in the term *English* the Anglo-Saxon of the 7th century, the Middle English of the 14th century, and the tongue of today.

The making of dictionaries has maintained a record of words and usage which presents a vivid picture of the growth of the language in the last 300 years. Samuel Johnson's dictionary of 1755 contained about 15,000 words. The latest dictionaries record more than 400,000. It is estimated that the average person without special education may know and use from 5000 to 10,000 words, while the educated man may use and be familiar with the meanings of from 20,000 to 50,000.

The Study of English. Language grows by adding new words, by giving new meanings to old words, and by developing the figurative or poetic senses of many words. All these processes depend upon increase of knowledge, upon invention and discovery, and upon the cultivation of art and poetry.

Words are, after all, only means to right understanding and true feeling; but many accurate, fine words are necessary to much good thinking. There is always a *best* word to express thought accurately and clearly. The student who would better his command of language will first direct his attention to those things which can be felt and seen, so that he may have something definite and concrete about which to talk or to write. He will next consult the dictionary for the meanings and the history of words; he will examine closely synonyms and antonyms for their accurate distinctions in meaning; nor will he fail to attend to the poetic suggestiveness of those words which give especial beauty both to the spoken and to the written phrase. He will, in a word, be always on his guard to avoid and to correct the errors and improprieties of usage which are likely to creep into his conversation.

Order of Study. English is treated in the following pages in a form to be referred to readily, to be used easily for help in speaking or writing, and to serve as a guide for systematic study. The various parts of the subject are arranged in the general order in which the boy or girl meets them in studying this most important of all school subjects. This arrangement would appear to be also the most convenient for older people.

Usage.—The correct and appropriate uses of words are given first place. During the early years of the child's life, before he knows much about sentences, he learns many words. Afterward, the value of his ability to use the correct and appropriate word, "to say the right thing in the right way," can never be overestimated. Therefore Usage, or approved uses of common words, is treated first.

Word Building and Spelling.—Again, the child's first words are naturally simple; most of them have but one syllable. In the beginning these are all nouns, for he does not yet know the use of the pronoun. By degrees, as the infant mind develops, the child finds the need of other words to express his thoughts and ideas. Soon he discovers that, by adding little syllables to the words with which he is already familiar, he can make himself understood. Thus unknowingly does the child arrive at the art of word building.

It will at once be seen that a knowledge of word building is of great value to the student of English as an aid in enlarging his vocabulary. For this reason, the section on Word Building follows Usage. It precedes the important subject of Spelling, because a knowledge of the structure of many English words helps equally both in grasping their meanings and in learning their component parts.

Pronunciation.—The guide of everyday usefulness has directed the making of the spelling and pronunciation lists. These are arranged to help the child with troublesome school words and also to give ready aid in the use of common words in business, in the household, and in social life. Correct spelling and correct pronunciation are essential to a perfect command of the English language.

Sentence Building, Capitals, and Punctuation.—Following Word Building or etymology comes syntax or Sentence Building, which is the next important stage in the study of language. The essential rules and principles of grammar are given in this section. Rules for the use of capital letters and for the use of punctuation marks logically follow the treatment of the sentence.

Speaking and Writing.—The section which presents helps in writing papers and essays and in making talks and speeches appropriately follows the study of words and sentences. To the student who desires advanced work in oral and in written language, this section is invaluable.

Forms of Literary Composition.—Having made an exhaustive study of words, sentences, and practical composition, the student is next introduced to the various forms of literature. In this section the principal divisions and subdivisions of prose and poetry are described and illustrated.

Letter Writing.—Because of its importance, Letter Writing follows Speaking and Writing in a separate section. The writing of an interesting letter may be counted as one of the finest accomplishments. In writing letters, we must apply the principles given in all the preceding sections on words, sentences, and composition.

Reading.—The language a person uses is influenced largely by the kind of books and papers he reads. Therefore a condensed guide to the best types and examples of English reading is here given. The lists of books direct the reader to the masterpieces of English literature. They are arranged in groups suited to the various school grades. In each group are the books that teachers, librarians, and parents have found to interest most readily boys and girls of the corresponding grade or age. A lifetime might be spent in becoming acquainted with the books in these lists. Reading will reenforce all that can be learned from the preceding sections.

Synonyms and Antonyms.—The value of knowing the correct and appropriate word is pointed out above. We should now add to this the knowledge of how to choose with a nicety from among several appropriate words. It is this interest which leads to the study of the rich store of English Synonyms and Antonyms.

Foreign Words and Phrases.—Two dictionaries close this department: first, a dictionary of Latin phrases which are frequently found in English books; second, a similar dictionary made up of phrases from Modern Languages. These complete the material for the study of English.

GOOD USAGE

When a language has ceased to be spoken, as is true of Latin and ancient Greek, we refer to it as a "dead language." Its rules are fixed. They must be rigidly observed by those who may sometimes use such a language as a medium of expression.

It is otherwise with a living language. The rules and the principles governing it cannot be permanently established. For the grammar and the rhetoric of a language are but a compilation of the rules that govern it. These rules, however, are not the invention of the grammarian, nor are they dependent upon his authority for their validity.

Province of the Grammarian. It is not the duty of the grammarian to make the laws of language, but to teach it agreeably to the best usage. It is obvious, then, that the ultimate principle by which he must be governed is that species of custom which critics call "good use." This principle is the only proper standard of grammatical purity.

Essentials of Good Usage. The usage which gives law to language must be *reputable*. Such usage is to be found in the writings of those whose works are esteemed by the discriminating public and who, therefore, may be called authors of good repute. In the second place, this usage must be *national*; that is, it must not be confined to any particular state or province. Thirdly, it must be *present*; that is, it must be the usage of the most careful speakers and writers of the present time.

In general, words and forms of speech which have long been in disuse should not be employed. On the other hand, the usage of the present day is not, in all cases, implicitly to be adopted. To embrace every new-fangled upstart at its birth would argue a fondness for singularity and novelty. Whatever receives the sanction of reputable usage must be acknowledged.

The Canons of Good Usage. We must not forget that the language is growing. What was thought to be correct and elegant English in the time of Shakspere and Milton contains many expressions now regarded as solecisms. Even at the present time, there are many unsettled questions as to the correctness of certain forms of speech. Good usage is not always uniform in its decisions, and, in unquestionable authorities, there are found varying modes of expression. In such cases the student of usage may be guided by the following canons:

1. When usage is divided between any two words or phrases, if one of the expressions is susceptible of a meaning different from the one in question, while the other is not, the latter should be employed; for example, to express *consequently*, the two phrases *by consequence* and *of consequence* are used. The former is preferable because the expression *of consequence* may also mean *of moment, of importance.*

2. In doubtful cases, the *analogy* of the language should be regarded. By this means do we trace the similarity of relationship between words; as, Learning *enlightens* the mind, because it is to the mind what *light* is to the eye—enabling it to discover things hidden.

3. Among several different forms of expression, in other respects equal, that which is most *agreeable to the ear* should be preferred. Thus *amiableness* and *amiability* are correct words, but the latter, being more harmonious, should have preference.

4. When none of the preceding rules solves the problem, regard should be given to *simplicity.*

Province of the Critic. The province of criticism is not only to remonstrate against the introduction of any word or phraseology which may be either unnecessary or contrary to analogy, but also to eliminate whatever is reprehensible, though in general use. It is in this way that languages are gradually refined and improved. At the same time, criticism may not presume to condemn instantly any phraseology which it may deem objectionable, though it may by repeated remonstrances eventually effect its expulsion.

Principles Governing Criticism. The decisions of criticism should be directed by the following rules:

1. All harsh and unnecessary words and phrases should be dismissed.

2. When etymology plainly points to a different signification from that which a word bears, simplicity requires the elimination of such a word.

3. Words which are obsolete should be repudiated as serving only to obscurity in style.

4. All words and phrases which include a solecism should be dismissed.

5. All expressions, which according to established rules involve a contradiction or seem to convey a meaning different from that intended, should be rejected.

Purity of Style. It is, finally, by close and diligent application to the study of the usage of words, and the laws therein laid down, that we shall be enabled to speak and to write our language with grammatical purity. This implies simply that our words shall properly belong to the language we speak, that they shall be construed according to the rules of its syntax, and that they shall be employed in that sense only which "good usage" has attached to them.

Definitions. From the foregoing it is evident that forms of speech may be disapproved for one or more of several reasons. In the criticism of usage, the following terms are frequently used:

Colloquialisms are forms of speech acceptable in daily conversation but not always approved in formal writing; as, *aren't, isn't.*

Idioms are properly expressions which are peculiar to a language and which distinguish it from others. They do not fall readily under regular grammatical rules, and they are difficult to translate literally into another tongue; as, *How do you do? Monday week*, etc.

Provincialisms are forms of speech current in certain districts of a country.

Dialect, as generally understood, is a provincial form of speech so different from the literary language as almost to form a language by itself; for instance, the Scotch, Lancashire, and Cornish dialects.

Slang is undisciplined speech, usually made up of syllables of specific application but of indefinite meaning.

Barbarisms are offenses against purity of diction, especially the employment of foreign expressions; as, *You do me proud, politesse, fraicheur.*

Solecisms (*sŏl'ĕ-sĭz'mz*) are wrong grammatical forms; as, "*Every one*, except those who handle coins most, *are pleased* (correct, *is pleased*) with them." "*Each one* of them received *their* (correct, *his*) wages."

Vulgarisms are expressions which are common but not in good use: as, *to get into a scrape.*

Neologisms (*nē-ŏl'ō-jĭz'mz*) are new words whose meanings or forms are not yet well established or sanctioned by good usage.

Cant is the language belonging particularly to a craft, trade, or profession. It is applied also to the speech peculiar to a society or a group of people; as, the *cant* of fashion or of the stage.

Redundancy, or *over-flowing-ness*, is the fault of using too many words, often words of similar or nearly identical meaning (*tautology*). Economy in the use of words is a mark of good style in speech and writing.

Obsolete words, phrases, or meanings are those that have passed out of good usage. Words are said to be *archaic* or *antiquated* when they have gone out of common use although found in poetry and in the Scriptures; as, *doth* for "does," *ye* for "you."

CORRECT USE OF SOME COMMON WORDS AND PHRASES

A. General usage in America approves the use of the article *a* before initial *h* when sounded, before long *u*, and before the words *one* and *once: a house, a hospital, a historical society; a university; such a one.*

Colloquially, when two objects are thought of as belonging together or as used together, *a* need not be repeated: *a coat and hat; a cup and saucer; a sword and belt.* But, "She bought *a coat and a hat,*" meaning two purchases, is correct.

The expression "*a black and white dress*" means but one, while "*a black and a white dress*" means two dresses—one black and one white. This second expression is awkward, and the form "*a black dress and a white one*" or "*a black dress and a white*" may be substituted. "They elected *a secretary and a treasurer*" implies two persons; but "*a secretary and treasurer*" implies one person.

Absolutely. This word, so frequently used instead of *indeed, assuredly, of course,* or *certainly,* should be discarded in favor of the accurate and appropriate word: "*Certainly* (not *absolutely*), I shall go." However, "It is *absolutely* certain that he will come" is correct when one intends to express positive assurance.

Accept, Except. *Accept* means "take when offered"; *except* means "leave out," "exclude": "I *accept* the gift." "We will *except* him from our requirements."

Accept of. Never use the preposition after this transitive verb: We *accept* invitations, presents, hospitality, and the like. *Of* in this use is obsolete.

Accord. The primary meaning of *accord* is "agree" or "harmonize": "What you say *accords* well with my own opinion." It may mean, also, "award": "High praise was *accorded* him." It should not be used as a synonym for *give* or *furnish.* Say, "The information he desired was *furnished* (not *accorded*) him."

Acoustics. Although of plural form, this word is used as a singular. We say correctly: "*Acoustics is* a science"; "The *acoustics* of the hall *is* faulty."

Acquire. This word should be distinguished from *obtain* and *procure.* We *acquire* that which we retain more or less permanently, but we *obtain* or *procure* anything which we enjoy temporarily. Thus, we *acquire* wealth, *obtain* a loan, *procure* an engagement.

Across. "To get something *across,*" "to put a thing *across,*" "to come *across,*" are slang phrases. The first means usually "to make something understood," as an actor is said "to get it *across* (or *over*) to the audience." The second phrase implies *succeeding;* the third, *acceding,* as to a request or demand.

Adage. As this word describes a proverb, or old saying, one should never speak of an *old adage.*

Addict. This word, formed from the adjective *addicted,* has come into wide newspaper use. It means "one who has the habit of using" something generally harmful; as, "a drug *addict.*" It is widely used in medical works but has not yet come into general use. The term is a useful addition to our vocabulary. *Addicted* usually implies evil.

Addition. Number of verb. We say correctly, "Two and three *are* five," not "Two and three *is* five."

Administer. Do not say, "The man died from blows *administered* by the policeman." Oaths, medicine, affairs of state, are *administered.* Blows are *dealt.*

Admittance, Admission. In some uses these words are likely to be confused. *Admittance* refers to entrance to a place. "No *admittance*" means "entrance forbidden": "No *admittance* before 8 o'clock." *Admission* refers to entrance into a society or an audience, or into certain privileges: "*Admission* to the club depended upon scholarship." *Admission* may mean also the price or fee of entertainment: "*Admission* One Dollar."

Adore. This word means "worship," "venerate," or "hold in high respect or admiration." It is not appropriate to express a liking for chocolates.

Advert, Allude, Refer. The meanings of these words are sometimes confused. We *advert* to that to which we turn the attention or the mind; we *allude* to a matter that we touch upon playfully, lightly, or incidentally; we *refer* to a subject which we desire to bring back to notice.

Affect. See *Effect.*

Agendum, Agenda. The first (singular) indicates an item, as of business, to be considered; the second (plural), the list of all items for consideration or a program of business to be done.

Aggravate. Often inaccurately used when the speaker means *provoke, irritate,* or *anger.* The word means "increase" or "intensify." The following are correct uses: "His misery was *aggravated.*" "He is *irritated* by continually dealing with small matters." "She is easily *provoked* to jealousy."

Ago, Since. We say correctly, "a long time *ago*" and "some time *since,*" or "many years *ago*" and "a few days *since.*" *Ago* means before a certain time. If no point of time is specified, the word means before the present: "a year *ago* last Tuesday"; or, if we count back from the present, "a year *ago.*" *Since* means after a certain time and up to the present: "We have not met *since* 1910."

Agree. Do not use *agree* for *admit.* We *admit* a fact but *agree* in doing or thinking something. We may *admit* that a wall is not attractive but we *agree* in refusing to spend any more money to improve its appearance.

Agreeable, Agreeably. In a business letter, instead of writing "*agreeable* to your request, we have, etc.," write "*agreeably* with your request." The construction calls for an adverb, not for an adjective.

Agriculturist. Prefer this form to *agriculturalist.*

Aim. The not infrequent colloquial use of this word as a verb instead of *intend* or *plan,* as, "I *aim* to treat all customers fairly," is not approved by careful speakers, though formerly it was good English. As a noun, meaning "purpose," it is an excellent figurative word: "Young man, have an *aim* in life."

Ain't. The word is not an acceptable contraction today. Formerly, used as a substitute for "*Am not,*" it had wide vogue, but in present usage it is vulgar. Say, "I *am not,*" "He *is not,*" etc.

Alike. This word should not be preceded by *both,* nor by *both just,* as in "These hats are *both alike*" or "*both just alike.*" Say, "These hats are *alike* (or *just alike*)." *Both* is superfluous in these phrases. See *Both* and *Just.*

All, All of. In spite of critics, popular usage has sanctioned the employment of *all of it, all of them,* like *some of them.* The idioms may be regarded as established. One may say either, "I have *all of it*" or "I have *it all.*" From the viewpoint of economy, *it all* is preferable.

Similarly, the phrase *all over* has established itself, as in the sentence, "We have searched *all over* the place."

Do not say, "This is *all* the *farther* I have read." The use is vulgar. Say, "This is as far as I have read" or "I have read no farther." See *Farther, Further.*

Allege. Do not use this word as a synonym for *say* or *tell*, as in "He *alleges* that the engine ran sixty miles an hour." Instead, "He *says* or *tells* us that, etc." The word has a legal sense, and with this meaning it is used in news writing. To say "The reasons *alleged* for the nomination are, etc." is to imply doubt as to the truth of what is *alleged* or to disclaim responsibility for the statement. See *Assert*.

Allow. This word is frequently used in some parts of the United States to mean "think," "think likely," "intend," or "say": "He *allowed* you would buy that horse." Such use is not approved today, although formerly it was correct. The word properly means "refrain from preventing": "He always *allowed* us to pick apples in his orchard." It is used correctly and frequently as in the following sentence: "The purchaser failed to *allow* for depreciation of the car." *Allow* here means "take into account."

All right. The phrase should never be written *alright*, though formerly this usage was correct.

All together, Altogether. *All together* means "all in the same place at the same time" or "all acting at once": "We are *all together* in the business" or "Let us pull *all together*" or "Now, *all together*, boys." *Altogether* means "entirely"; as, "The time was *altogether* too short."

Almost, Nearly. These two adverbs should not be used indiscriminately. *Almost* suggests the ending of an act; *nearly*, its beginning. A man who receives an injury so severe that he barely comes off with his life *almost* loses it; a man who just escapes what would have killed him is *nearly* killed, or, as we say, "comes *very near* to being killed." These words are correctly used in "I have *almost* finished my work" and "I *nearly* ran over the child."

Almost never. Because *almost* means "nearly," "well-nigh," "for the greatest part," it should not be used with the emphatic word *never*, which means "not ever." Do not say, "I *almost never* go there." Use *very seldom* or *hardly ever* instead.

Alone, Only. To avoid ambiguity, observe the following distinction between these words: That is *alone* which is unaccompanied; that is *only* of which there is no other. "*Only* virtue makes us happy" means that nothing else can do it. "Virtue *alone* makes us happy" means that virtue unaided makes us happy. "This means of locomotion is used by man *only*." See *Only*.

Already, All ready. Discriminate carefully between these terms. *Already* means "beforehand" or "so soon"; *all ready*, "everything prepared" or "prepared in every way."

Also. Like *only*, this particle is often misplaced, as in "If he is satisfied, I am satisfied *also*." Write instead, "If he is satisfied, I *also* am satisfied." Place the word as close as possible to and usually following the word to which it applies.

Alternative. Do not use this word when more than two things are referred to. You may have the choice of three courses, not of three *alternatives*.

Alumni, Alumnæ. An *alumnus* is a graduate of a college, a university, or a school. *Alumni* (pronounced *ȧ-lŭm'nī*) is the masculine plural, but is used of men or women graduates. The feminine is *alumna*; plural, *alumnæ*, correctly pronounced *ȧ-lŭm'nē*: "Association of Collegiate *Alumnæ*."

Always. Often used redundantly. Say, "Whenever I see her, I think of mother," not "I *always* think of mother."

Amateur, Novice. *Amateur* means properly "one who pursues an art or plays a game *for the love of it*." The *amateur* may be highly skilled. The *novice* is a beginner; therefore, presumably unskilled.

Ameliorated. This word means "bettered," "improved." "Her troubles are greatly *lessened* (not *ameliorated*)." We say correctly, "Conditions in the famine district have been *ameliorated*."

Among. "He was there *among* the rest" should read "with the rest," because *rest* contradicts the idea of "mingling or including in a group" which is implied in *among*. "He was there *among* the first" is correct. *With* denotes simply accompaniment. Similarly, avoid such expressions as "*among one another, each other*." "*One another*" and "*each other*" imply individuals by themselves so that when they are used with *among* the resulting expression is self-contradictory. Say, "*among themselves*," "*with each other*," "*with one another*"; as "They exchanged hats *with each other*."

Amount. Used only of substances or material: "Only a small *amount* of grain could be purchased." Do not say, "a large *amount* of perfection" or "a large *amount* of people." *Degree of perfection* and *number of people* are correct.

Ample. This word should not be used, as it frequently is, to mean simply "sufficient." *Sufficient* means "enough to supply a need." *Ample* is a larger word and carries the sense of enough, as of space, time, supplies, with a wide margin for comfort or unforeseen demands.

An. Use this form of the article before words beginning with a vowel or a silent *h*; as, *an* inkpot, *an* oil well, *an* heir, *an* honor, *an* hour, *an* honest man.

And. See *Conjunctions*.

Answer, Reply. We *answer* a question, but we *reply* to a statement. *Reply* implies a more definitely planned expression than *answer*.

Answer to, for. We speak properly of the *answer to* a problem, but of the *solution of* or *for* it. But we also say, "I may *answer for* his truthfulness" and "That will *answer*," meaning that the matter referred to is suitable for a purpose.

Ante-, Anti-. These prefixes are frequently confused. *Ante-* means "before"; *anti-* means "against" or "contrary to": "In *ante*-suffrage days the *anti*-suffragists were active." Pronounce the latter *ăn'tī*, not *ăn'tē*.

Antecedents. The use of this word to mean the ancestry and the past life of a person has good authority, though the use is of recent origin and the need for it infrequent. We may say of a person whose life history we wish to know, "What can you tell me of his *antecedents*?"

Anticipate. A stronger word than *expect* or *foresee*, and in some senses not synonymous with either. It means "take beforehand" (from Latin *ante*, "before," and *capere*, "to take"), "forestall," "get ahead of": "The committee was *anticipated* by the senator in introducing the water power bill." The second meaning of the word is "look forward to," usually implying approval or enjoyment: "Only a few politicians *anticipated* his election" or "We *anticipated* a delightful vacation." One should say, "His death is daily *expected* (not *anticipated*)."

Antiquated, Ancient, Antique, Old. These words are frequently confused. *Old* is the opposite of *new, young, fresh; ancient* applies to what existed long ago, as *ancient states; antiquated* is a disparaging term for that which is old and in disuse or out of date, as "*antiquated* methods of business"; *antique* may be applied to something that has come down from olden times, as a vase or a piece of furniture, or to an imitation of the "real *antique*." See *Synonyms*.

Any. Sometimes used erroneously as an adverb to modify a verb; as, "Did you fish *any*?" Say rather, "Did you do *any* fishing?" *Any* should not be used for *all* in comparisons. Not, "That is the most beautiful car of *any* in the show," but "most

beautiful of *all* the cars in the show." *Any* may modify adjectives; as, "*any* longer."

Anyhow, Anyway. Although sometimes disapproved as unscholarly, these are idiomatic expressions, meaning "in any event," "at any rate," or "be that as it may." Avoid *anyways* as vulgar.

Any place, Some place. These phrases should not be used for *anywhere* and *somewhere*. One should say, "I cannot find my umbrella *anywhere*," not "*any place*." One says properly, "I want to go *somewhere*"; but the expression "I want to go *some place*" is vulgar. The fault lies in needlessly using a noun in place of an adverb which accurately expresses the idea.

Anywheres. A vulgarism for *anywhere*. Similar vulgarisms are *somewheres* and *nowheres*.

A one. In such a sentence as "All who promised to come arrived, but not *a one* was on time," *a* is superfluous.

Appeals. Sometimes erroneously used for *drafts*, as in the sentence "Constant *appeals* on the resources of the country are being made." Here the evident intention is to say, "Constant *drafts* on the resources of the country are being made." In "His constituents made frequent *appeals* to him" the word is correctly employed. See *Prepositions*.

Appear, Seem. *Appear* refers usually to what is evident to the senses: "The fruit *appears* to be well ripened." Every object may *appear*, but nothing *seems* except that which the mind admits to *appear* in a given form. Thus, *seems* is used to imply a result of thought or reflection: "He *seems* to be an honorable man."

Approach. Sometimes improperly used in the sense of *address*, *petition*, *appeal to*; as, "The committee has *approached* the council in some matters that concern the interests of the neighborhood." In popular use, *approach* conveys the impression of "feeling one's way" so as to learn the sentiments of the one *approached* before appealing to him. Because *approach* in this sense suggests an unusual and indirect or perhaps underhanded method of proceeding, it is in disfavor: "When he *approached* me on the subject, I refused to entertain the idea." The word is frequently used as a noun, as, "I repelled his *approaches* with indignation," especially when advances of financial assistance are implied or suggested.

Apt. Often misused for *likely*, and sometimes for *liable*. The following are examples of correct usage: "What is he *likely* to be doing?" "Where shall I be *likely* to find him?" *Liable* properly introduces some unhappy or disagreeable possibility: "If you go there, you are *liable* to incur his displeasure." *Apt* implies natural *fitness* or *tendency*: "Experienced men are *apt* to give good advice."

Aren't. A word in good usage when the subject follows the verb, with which it must agree; as, "*Aren't* you going?" but not "*Aren't* I?" which is using a verb in the plural with a pronoun of the singular number. When the subject precedes, usually the verb only is contracted; as, "*We're* not going." *I'll*, *I'm*, etc. are good form because they are proper contractions of *I shall* or *I will* and of *I am*.

As—as, So—as. Either combination may be used in negative statements involving comparison, but care should be taken to apply them appropriately. "James is not *as* tall *as* Tom" is a direct statement concerning the height of the two *without* implication that the speaker considers either of the persons spoken of as *tall*. But, if *so* be used instead of the first *as*, then it is understood that the second person referred to is notably tall in comparison with the first. Likewise, when age is spoken of, if one says, "My daughter is not *as* young *as* yours," the idea conveyed is that they may be nearly of the same age; but, by substituting *so* for the first *as*, one changes the sense and emphasizes the youth of the younger child and a marked difference between the two ages: "My daughter is not *so* young *as* yours."

As—as, only, may be used in affirmative declarative statements; as, "He is *as* good a man *as* anyone can find." *So—as*, however, is appropriate in some affirmative interrogative sentences when comparison is involved: "Is his estate *so* large *as* that?" Here an estate of great size is implied.

As for *that* is a vulgarism in such a sentence as "I do not know *as* I like him." Say, "*that* I like him." In such an erroneous expression as "Not *as* I am aware of," substitute *that* for *as*.

As, Than. One thing is *as* good *as* another, but better *than* another. "Better *as*" is illiterate.

Aspiration, Ambition. *Aspiration* is exalted desire and properly implies striving for something high and ennobling; as, "To the *aspiration* of the poet we owe Milton's *Paradise Regained*." *Ambition* may imply worthy eagerness to achieve some great purpose, but it also connotes persistent, often overweening or inordinate, desire for personal advancement: "An *ambitious* man may *aspire* to greatness"; but it is used in the bad sense by Shakspere in "*Ambition* should be made of sterner stuff." It is not properly used for *energy* or *fitness* for work, as in "He shows no *ambition* since his illness"; but it is correctly employed in "Repeated reverses curbed his *ambition*."

Assert, Allege. Two words often erroneously applied. Properly, one *asserts* that which one is ready to prove if called upon to do so, as a claim to property; one *alleges* that which is open to doubt or to question, as the existence of a will or the commission of a crime. See *Allege*.

As though. Often used for *as if*. This use has been condemned; but it is accepted as idiomatic English, notwithstanding the claim that it expresses a condition of remoteness approaching to impossibility: "We were received *as though* (or *as if*) there had been no war between our countries." *As if* is generally followed by a clause containing (1) a past subjunctive or (2) an infinitive expressing purpose or destination: (1) "Treating history *as if* it were a panorama intended to please the eye." "*As if* the dead the living should exceed." (2) "Buying agate and aluminum ware *as if* to set up housekeeping."

At. Redundant in the expressions "Where are we *at*?" "Where does he live *at*?"

At, In. *At* is a less definite word than *in*. Distinctions between them are not clearly drawn. The following examples, however, represent authoritative usage. We may say, "*in* the South," "*in* Chicago," also "The meeting was held *at* (or *in*) Baltimore." Of small towns or villages we say correctly, "They live *at* Walden"; but of larger cities, "His home is *in* Boston." To distinguish between points in a journey and the final destination, it is correct to say, "The ship calls *at* Halifax but docks *in* New York." A similar distinction is appropriate with the verb *arrive*. Either "We arrived *at* Denver," in which case the city is considered as one of the points to be reached in the journey, or "We arrived *in* Denver," which then is considered as the final stopping place. But, if the final destination is a small place, *at* is the correct word.

At all. An intensive colloquial phrase condemned by some critics, but entitled to standing as emphatic idiomatic English. There is a difference of emphasis between "I do not know him" and "I do not know him *at all*"; for, while the former denies acquaintance, it does not dispose of the possibility of acquaintance as emphatically as does the latter and more decided statement.

At best, At worst, At last. These are well-established idioms and are preferable to *at the best*, etc. They arose from an early joining of the preposition and the article into the form *atte*, whence *at*. See *Prepositions*,

At fault, In fault. Both phrases are correctly used for *in the wrong, in error, blameworthy*. *At fault* is the more common American usage.

Athletics. The word, when restricted to mean a system of physical exercises and training, should take a verb in the singular. But, when it is understood to mean the games and sports of a school, a verb in the plural is frequently used and is not incorrect. Similar use is current for *gymnastics* and *tactics*. Avoid the common error of saying *atheletics*, for the word is one of three syllables, *ath-let'ics*.

At last, At length. Two phrases having meanings that are akin in that they imply waiting. But while *at last* connotes finality, *at length* suggests that something more may follow: "We have been expecting you for a long time; *at last* you have come." "We have repeatedly invited him, and *at length* (that is, *after a long period*) he has consented to come."

At that. This colloquialism used as an intensified ending is usually redundant and as such is better omitted: "The new car has arrived, and is a beauty *at that*." This construction has been traced to the use of the phrase in matters in which the cost of an article is considered; as, "Here is a good umbrella for $8.00 and cheap *at that* (price, understood)."

Audience. Often inaccurately used in place of spectators: The *audience* hears; the *spectators* see. Say: "the *spectators* at the ball game," not "the *audience*"; "the *audience* at the concert," not "the *spectators*."

Aught, Naught, Ought. *Aught* means "anything"; *naught* means "not anything," "nothing," or "cipher, 0." *Ought* is a verb, implying duty: "I *ought* to go." *Aught* or *ought* should never be used in the sense of *nothing* or a *cipher*.

Auspicious, Propitious. The word *auspicious* is applied to an occasion, the beginning of an important undertaking, or the like, and indicates that such occasions are favored by the conditions and by the circumstances. *Propitious* is applied to the conditions themselves and indicates that they are favorable. The word was originally applicable to a person or to a god and was later transferred to the signs which showed favor. A picnic has an *auspicious* beginning when the weather is *propitious*.

Avenge, Revenge. To *avenge* is to punish on behalf of another; to *revenge* is to punish on one's own behalf. We *avenge* a wrong to satisfy justice; but we may take *revenge* merely to satisfy our own angry resentment.

Averse. *Averse to* is the accepted usage instead of *averse from*: "He was not *averse to* discussing his failure."

Avoid. This word means "to free oneself from" or "keep away from," but is often inaccurately used for *prevent* or *hinder*; as, "Nothing shall be lost if I can *avoid* it." Here *prevent* is the correct word to use: "if I can *prevent* it." But, "I shall not go if I can *avoid* it" is correct, for *avoid* here means "to free oneself from."

Awful, Awfully. Too frequently used as intensives. Avoid such phrases as "an *awful* shame," "*awfully* glad to see you." *Awful* is correctly used of that which fills with dread or inspires fear: "an *awful* catastrophe." Both of these words are colloquialisms that border on vulgarity when they are used in the sense of *extraordinary, highly remarkable*, or *excessively*.

Bad. Such phrases as *bad* cold, *bad* break, *bad* case are in wide colloquial use. Careful speakers try to use a more accurate and appropriate word, such as *serious, severe, troublesome*.

Badly, Bad. Discriminating people will try to avoid too general use of these words. When *feel* is used intransitively, like *seem*, the adjective *bad* (a predicate adjective) is grammatically correct: "She feels *bad* about the failure." In such a sentence as "I shall miss you *badly*," *very much* is to be preferred.

Balance. In bookkeeping, the sum to be added to the less or to be deducted from the greater of two amounts, as receipts and expenditures, so that the two "balance." It is incorrect to speak of the *balance* of a meal, the *balance* of an edition, etc. Here *rest* or *remainder* is correct. One may speak of the *balance* of an account.

Bank on. A slang phrase, meaning "depend upon," as in "Can I *bank on* him?"

Be back, Been to. Such expressions as "I will *be back* soon" and "I have *been to* town" are widely current. The first is approved, if *be back* signifies state or condition, not movement. For "I have *been to* town," one would better substitute "I have *been in* town." *In*, not *to*, is appropriate to the state or condition implied in *have been*.

Beastly. The word *beastly* when applied to weather or conditions, as, "It's a *beastly* nuisance," is English slang, and, in America, English affectation. The word should be avoided altogether in such application.

Because. The word is a contraction of *by cause* and means "for the reason that." Therefore it is redundant in such constructions as "The reason we go is *because* we have been summoned." The correct form is "The *reason* we go is that we have been summoned" or, preferably, "We go *because* we have been summoned." The use of *why* after *because*, in "*because why*," is a vulgarism in which *why* is redundant.

Before. Sometimes inappropriately used to connect alternatives. The phrase *rather than* is to be preferred. "War *before* peace at that price" should be "War *rather than* peace at that price."

Begin, Commence. Although, historically, these words are precisely alike in meaning, *begin*, the Anglo-Saxon word, is preferred by careful speakers for general use. *Commence* has more formal associations and implies a beginning which involves a certain procedure and completion: One *begins* the practice of law, but one *commences* a lawsuit. We *begin* a day's work, but we *commence* a ceremony.

Behalf (on, in). A distinction worth noting is that *on behalf of* means "in the name of," while *in behalf of* means "in the interest of": "*On behalf of* the school, we thank you." "I make this appeal *in behalf of* the prisoner."

Beside, Besides. *Beside*, in present day usage, is a preposition and means "by the side of," as in "She stood *beside* the chair." *Besides* is either adverb or preposition and means "moreover," "beyond what has been said," or "in addition to": "*Besides*, they knew the road better"; "*Besides* wealth, he desired culture."

Between. In its literal sense, this word applies to only two objects: "The candy was to be divided *between* the two boys, or *among* the four children." When used of more than two objects, it brings them severally and individually into the relation expressed: "a treaty *between* three powers." One may say, "The steamers ply *between* San Francisco, Honolulu, and Yokohama."

"*Between* each desk there is a wide space." This is a frequent error. Say, "There is a wide space

between each two desks" or "Wide spaces are left *between* desks."

Between may express contrast: "The two boys are brothers, but there is a great difference *between* them."

Biscuit. *Biscuits* is the correct plural. Although "Please pass the *biscuit*" is frequently heard, no one says, "Please pass the *cracker*." There is a tendency to use *biscuit* as a collective singular by analogy with *bread*, but no one would say "Please pass the *roll*" of a number of rolls served at table.

Blame it on. A vulgarism used in place of *accuse* or *suspect*: "He *blames it on* his brother" should be "He *suspects* or *accuses* his brother" or "He *blames* his brother for it." In such an idiomatic phrase as "She is to *blame*" the passive meaning, "She is to be *blamed*," is intended.

Borrow. This word should not be confused with *lend*: We *borrow* from others that which we need and *lend* to them that which we own.

Both. Regarded as superfluous in the sentence, "They are *both* alike." In "They *both* ran away from school," *both* has an intensive force. *Both*, as adjective or pronoun, may be applied to two objects or persons only. In "*Both* women spoke," *both* is an adjective; in "The general invited the colonel and the major and *both* went," *both* is a pronoun.

In the sentence, "They *both* met at the station," *both* is superfluous. "*Both* were alike good," meaning "*Both* were equally good," while approved usage, is not to be preferred to the latter sentence which is rhythmically perfect and linguistically sound.

As a conjunction, *both* may be used in connection with more than two things: "They lost all their property, *both* houses, barns, and crops."

Both of. Frequently condemned as colloquial; but the phrase has the support of literary usage, as in "*Both of* these arguments are sound."

Bother. Critics condemn this word when used as an imprecation or expression of impatience; as, "Oh, *bother* it all!" It is excellent English if used in the sense of *take trouble*, as in the sentence "You need not *bother* to return the paper."

Boughten. Although it has long been used, this word is a provincialism and as such is disapproved by careful speakers and writers. The principal parts of the verb are *buy, bought, buying, bought*.

Bound. In colloquial use to mean "determined" or "resolved," but challenged by the critics. The common phrase "*bound* and *determined*" may give the true distinction. *Bound* implies *compulsion* or *legal obligation*; as, "He is *bound* to pay it." "He is *bound* to do it" is correct if the person referred to is under *bond*, as through obligation or promise, but not when the act depends on the decision or resolution of the individual. Then say, "He is *certain*, *resolved*, or *determined* to do it," depending on the circumstances or conditions that govern the use of these words. "He is *bound* to fail" should be "He is *sure* to fail." But we may say, "He is *bound* for destruction," meaning "He is *on the way* to destruction."

Brainy. A colloquialism meaning "mentally alert," "of quick understanding," or "of vigorous intellect"; as, a *brainy* man.

Bursted. A vulgarism sometimes rendered *busted*. Both are forms that cannot be too severely condemned, for the past participle and the past tense of the verb are the same as the infinitive, *burst*.

But. Frequently redundant before *that*, although sometimes required to make sense. When *but* is a preposition and *that* is a pronoun, there is no danger of error, for the meaning is "except that," as in "Nothing would please him *but that*." It is when both words are used as conjunctions that care must be exercised. In such a construction as "You need have no fear *that* she will go," the sense is clear that "she *will not* go"; but, in "You need have no fear *but that* she will go," the intention is clearly to express the feeling that "she is *sure* to go."

Best usage would eliminate *but* from "I have no doubt *but that* he will go," when the intention is to convey the feeling of certainty of his going. The form *but that* preceded by a negative becomes a positive—but it is more emphatic and less involved to say "I have no doubt *that* he will go."

"I cannot think (believe) *that* they will come" means that I believe strongly that they *will not* come; "I cannot think (believe) *but that* they will come" means that I must believe that they *will come*. "I can *but* believe him" means that, notwithstanding my own doubts, there is no other course open to me than to believe him; "I cannot *but* believe him" means that I am compelled to believe him—even against my will I am convinced. *But what* when used for *but that* is regarded as a vulgarism. These examples of the use of *but* illustrate what is meant by "English idiom."

By, With. *By* generally introduces the agent or doer; *with*, the instrument or means: "The window was broken *by* a boy *with* a ball." "The electricity is generated *by* water power." "The manager filled the theater *with* children." But, "The theater was crowded *by* the patrons of the opera."

By the name of. This phrase should not be confused with *of the name of*: "The business is owned by a man *of the name of* Brown." *Of the name* implies the real name; *by the name* suggests an assumed name; as, "Charles Farrar Browne was better known *by the name of* Artemus Ward than by his own name." It is well to substitute "a man *named* Brown" for "a man *of the name of* Brown."

By way of. We say correctly, "*by way of* illustration," meaning "*as* an illustration," or "*by way of* Cleveland" for "*through* Cleveland." In "He was *by way of* learning the country," *by way of* is an English colloquialism meaning "making progress in" or "occupied in."

Calamity. The word means, in an abstract sense, "source of misery or of loss," rather than the "loss" itself, for which it is often misused. *Calamities* are causes, of which *losses* may be the results. Any disaster produced by natural causes, as a hurricane, a cyclone, or a volcanic eruption, and attended by widespread destruction, is a *calamity* whether or not it be attended by loss of life.

Calculate. In the sense of *surmise*, *think*, *guess*, or *judge at random*, this word is a provincialism and is to be avoided: "I *think* (not *calculate*) tomorrow will be a fine day" but "His next move was *calculated* (that is, *designed*) to discourage his opponents."

Caliber. Often misused for *order*, as in "His work is of a higher *caliber* than hers." *Caliber* in its figurative sense applies to mental endowments. Thus, we may speak of a woman possessing great intellectual ability as being a person of *high caliber*, and of her work as being of high order, or excellent.

Can but, Cannot but. See *But*.

Can, May. Frequently confused. *Can* expresses power or ability; in most cases *may* expresses permission. Avoid "*Can* I speak to you a moment?" When you know that you *can speak* but wish merely for permission to do so, then substitute *may* for *can*. But, "*Can* you go?" is correct when the inquirer senses the possibility of obstacles that might prevent going; "*May* you go?" is also correct if permission to do so is involved.

Can not. Commonly and correctly written *cannot*. The origin of this form is in the shortened colloquial pronunciation of the two words.

Can't hardly. As *hardly* means "*not* easily" or "*not* quite," it must never be used with another negative as in this phrase. Substitute *can hardly*: "I *can hardly* believe the story."

Can't seem. Such an expression as "I *can't seem* to understand this problem" is to be avoided. Say, "I *seem unable* to understand." The inability is not in the *seeming* but in the *understanding*.

Capable, Susceptible. *Capable* is said of one's ability to do things, and in general it applies to the individual as having the capacity or intelligence to do; *susceptible* connotes action upon or sensitiveness to. Plans are *susceptible* of alteration; we are all *susceptible* to pain, that is, *capable* of being acted upon by it. One man may be *capable* of judging the fitness of another to fill a vacancy, yet he may not be *susceptible* to the blandishments of the applicant.

Capacity, Ability. These words are frequently confused. *Capacity* is the power of receiving or containing, and is used of the ability of the mind to accept ideas; it is the receptive mental faculty. *Ability* is power, either bodily or mental, and the word is sometimes used to describe mental endowments, or talents, of a superior kind. Some men possess the *ability* to help others although they have not the *capacity* to better their own conditions.

Carry. Provincial in the sense of *take, bring*, as in a carriage; as, "Father *carried* us all home with him." The word is archaic in the sense of *escort*: "He *carried* us to the party." Prefer "He *escorted* (*accompanied*) us."

Carry on. The phrase is in rather common colloquial use to mean "playing or behaving boisterously or indiscreetly." The World War gave us an intensified form of an old colloquial meaning, "maintain spirit and courage" or "keep work going in spite of difficulties."

Casuality, Causality, Casualty. *Casuality* is an obsolete word meaning the "condition or quality of being casual (accidental)"; *causality* is an agency that causes, or is the relation of cause and effect; a *casualty* is an accident.

Chairman. Correct usage sanctions *Mr. Chairman* and *Madam Chairman* as forms in which to address a presiding officer.

Claim. This word, as a verb, means "ask for" or "demand" by virtue of some authority or right, as in "We *claim* our share of the estate." It should not be used loosely for *say, assert, declare*, or *maintain*, as in "They *claim* that the water of the lake is warm."

Cleave. There are in English two verbs of this spelling but they are of different origins. The first, *cleave*, derived from the Anglo-Saxon *clifian*, means "adhere" or "unite": "The skin *cleaves* to the bones." The second, *cleave*, derived from the Anglo-Saxon *clēofan*, means "split" or "hew": "We can *cleave* our way through the rocks." *Cleave* is sometimes wrongly used with *from*, in the intransitive sense of *separate* or *peel*.

Clever. As used in the sense of *good-natured* or *kindly*, this word is dialectal: "She is a *clever* woman." The commonly accepted sense today is *skillful, dexterous*, or *quick*. The word is used of mental alertness or mechanical ability. See *Synonyms*.

Clipped Endings. The practice of "*clipping*" the ending *-ing* is a vulgar error, as in *talkin', walkin', comin'*.

Close. This word is in colloquial use as meaning "stingy." *Near* and *nigh* are dialectal or provincial in a similar sense.

Coke Fiend. This is a vulgarism for an unfortunate individual addicted to cocaine or morphine. The recently introduced *addict* is the correct word to use. *Coke fiend* is in the same class as *rum hound* or *booze fighter*.

Commandeer. This word originated in South Africa during the Boer war. Its military meaning is "to compel to perform military service or to take for military purposes." As meaning "to take arbitrarily" it is in colloquial use only, the word *levy* or *requisition* being preferred by some as the literary term.

Company. The word is disapproved when used to mean "guests." Some writers look upon it as less formal, and therefore preferable, but no better word than *friends* need be used to express the intimacy of informal occasions. "The *company* has come" is decidedly provincial. "Our *friends* are here" and "The *guests* have arrived" serve to mark different degrees of formality.

Company, Corporation, Firm. With *company* or *firm*, either a singular or a plural verb is permissible; the word *corporation* takes a singular verb. A *corporation* is considered only as a unity, while one may think of a *company* or a *firm* either as a unit or as a number of partners.

Compared to, with. We may *compare* one thing *with* another in discussing the relative merits of both, but we *compare* one thing *to* another to point out some likeness: "*Compare* dead happiness *with* living woe." "*Compare* my life *with* his." "Life is *compared to* a voyage."

Comparison. In the *superlative degree*, comparison implies the inclusion of the things compared in a single group; in the *comparative degree* the things compared are thought of as in separate groups: *best of all; better than others*. See *Any, As, Else, Of*.

Complected. This is a dialectal word to be avoided. Say, "She is *dark-* (or *fair-*) *complexioned* (not *complected*)." Better still is the form, "She is of a dark (or fair) complexion." Frequently the simple "She is fair (or dark)" will serve.

Compliment, Complement. These words, so nearly alike and of the same origin, should not be confused. We say correctly, "They paid me the *compliment* of close attention" and "The ship had her *complement* (full number) of officers."

Comprised, Composed. These words are frequently confused. *Comprised* means "included"; *composed* means "made up" or "put together." We say correctly, "The ship's company *comprised* men of many nationalities," but "The bricks are *composed* of sand and clay."

Condign. This word seems to be commonly mistaken for *severe*, whereas it really means "well worthy," that is, "merited," "suitable," "deserved," or "fitting." In "They should receive *condign* punishment," the intention is to say that the punishment should adequately meet the offense; for "*condign* punishment" may be lenient or severe.

Condone. The word should not be used for *compensate* or *atone*: "The abolition of the income tax would more than *compensate* (not *condone*) for the turmoil of an election." *Condone* means "forgive tacitly" or "overlook": "For the sake of tranquillity we *condone* many public faults."

Conferring. We speak correctly of the *conferring* of a degree or other honor, not using *conference* for this meaning. The form *conferment* is possible but unusual.

Conscious, Aware. *Conscious* applies to the workings of one's mind and to what it may produce; *aware* refers to things outside. One is *conscious* of joy or of pain, of a thought or of reminiscence, of a sensation, of cold, or of hunger; but one is *aware* of, that is, "sensible of," danger or of an approaching object.

Consequence. Etymologically, "a following together" and, from its original sense, "that which follows as a result of something that has preceded it." By an inversion, it has come to be used to signify importance or prominence acquired, as

through the exercise of an office or through the ownership of land. Though some critics condemn this use of the word, it is authoritatively recognized and is logically sound: "He was a man of some *consequence* in his district."

Consider. The correct meaning of this word is "meditate," "deliberate," "reflect," "revolve in the mind." It should not be made to do service for *think, suppose,* and *believe*; as, "I *consider* that I have a bargain." This use, though frequent, is inappropriate.

Considerable. Frequently misused. Its association is with abstract rather than with concrete terms. A rich man may be one of *considerable* wealth, but we should not describe him as having *considerable* money. "We have had *considerable* rain" should be avoided. Prefer "an *abundance* of rain" or, more succinctly, "*plentiful* rain."

Co-operate together. A tautological phrase, for *co-* connotes *together*, or *with*, and *co-operate* means "operate with" or "work together."

Couple. The use of *couple* to mean merely "two" or "several" is vulgar or dialectal. The word correctly means "two like things or two persons acting in concert or so joined as to act together or to be considered together," as two mechanical parts or two partners in a dance.

Credible, Creditable. The latter word should not be used instead of *credible*, "believable." Say, "two *credible* (not *creditable*) witnesses." Say, "I am *credibly* (not *creditably*) informed." Formerly, *creditable* meant "credible," but this use is obsolete. It now means "commendable."

Curious. This word does not always mean "inquisitive," but frequently signifies "wrought with such care as to excite surprise" or "fashioned in such a way as to evoke surprise." The use of *curious* to mean "interesting," "unusual," or "novel" is sometimes condemned, but it is in good taste: "The museum possesses a collection of *curious* ornaments."

Dangerous. This word is misused in the sentence "He is *dangerous*," when we mean "He is sick." Say, "He is not in *danger*" or "He is not *dangerously* ill."

Dare not. If a contraction must be made, prefer *daren't* to *daresn't* or the vulgar *dassent*. The general preference for *dare not* rather than *dares not* is for the sake of euphony, though a feeling for the subjunctive sense of *dare* may have an influence in the matter, prompting the use of the subjunctive form; as, "I think he *dare not* go." See *Subjunctive Mode*.

Data, Memoranda, Strata. These words are the plural forms of *datum, memorandum,* and *stratum,* but are sometimes construed erroneously as singulars: "The *datum* (singular) is here"; "The *data* (plural) are all here"; "This *memorandum* is clear"; "These *memoranda* are correct." To form the plural, an *s* has sometimes been added to the words *stratum, memorandum,* but never to *datum*. *Stratum,* being a technical word, should be more carefully used and its plural be written *strata*.

Deceiving. This should not be used in place of *trying to deceive*. When we suspect deception but are not *deceived*, we should say, not "He is *deceiving* me," but "He is *trying to deceive* me."

Demand. A transitive verb which always requires an object. We *demand* the payment of a debt. Do not say, "He *demanded* me to do it." Say, "He *demanded* that I should do it." "It" stands for the thing or act required. "They *demanded* their pay" is correct. The direct object of *demand* must be other than the person *of*, or *upon*, whom the demand is made.

Demean. While this word, in the sense of *debase* or *humble*, is in wide literary as well as colloquial use, especially in England, it is disapproved by American critics as "lacking in distinction."

Deprecate, Depreciate. These words should not be confused. *Deprecate* means "regret," "express disapproval of": "His friends *deprecated* his hasty action." *Depreciate* means to "undervalue" or "decrease in value": "They *depreciated* the value of freedom"; "That stock has *depreciated* very greatly."

Desperately. The word should not be used to mean merely "seriously." It means "violently," "recklessly," "in a desperate manner." "He was *desperately* wounded" means wounded so seriously that he was beyond apparent hope of recovery.

Despite. This word may be preceded by *in* and followed by *of*, although *despite* has good standing as a preposition. Say, "*despite* all our efforts" or "*in spite of* all our efforts." *Notwithstanding* is a more dignified expression and has the same meaning.

Differ, Different. Persons or things *differ from* each other in appearance, size, etc. Persons may *differ with* each other in opinion. *Different from* is approved American usage, not *different to* or *different than*, both of which are accepted idioms in England, having substantial literary support, as of Goldsmith, John Henry Newman, and Thackeray. Shakspere used *different from*.

Direct, Call. *To direct* some one's attention to a thing is more accurate and specific than *to call* his attention to a thing.

Directly, Immediately. The use of *directly* as a synonym for *immediately* is sanctioned by good usage, though some critics pronounce it colloquial. One may say, "We will proceed *immediately* the train arrives" or "*immediately* after the train arrives." American usage prefers *immediately*. English usage favors *directly*.

Dirty. Refinement in speech prompts the use of the word *soiled* for ordinarily grimy and stained objects, saving the stronger word for really *dirty* or foul occasions. Although *dirty* is sometimes used correctly to characterize a base, mean, or despicable act, and we shall always hear of "*dirty* tricks," persons of refined instincts should encourage the use of *base* or *mean* instead. Avoid "washing their *dirty* linen in public" as coarse.

Disapproval. Say, "He expressed *disapproval of* (not *with*) the dance."

Dissent. This word should be followed by *from*: "They *dissent from* our judgment." "They *dissent from* us." Compare *Differ*.

Dive. The past tense of this verb is *dived*. The form *dove* in colloquial use is a dialectal form occasionally met in formal writing, and is based on faulty analogy with *drive, drove; thrive, throve*.

Do. This word has many idiomatic uses, which should be studied with the aid of a dictionary. Careful speakers select the most appropriate terms. "I am *done* with the book" should be "I have *done* (that is, *finished*) with the book" or, colloquially, "I am through with it."

Dock, Wharf. A *wharf* is a landing stage or pier; a *dock* is a body of water beside a *wharf* or between *wharves*. In American practice, *dock* is misused for *wharf*. Originally, *wharf* meant "bank" or "shore," and *dock* meant "ditch," "pit," or "pool." The distinction is more clearly apparent when one refers to the different forms of *dock* as *dry* or *graving dock, floating* and *wet dock*.

Don't, Doesn't. The first is a colloquial contraction for *do not*; the second, for *does not*. They should be used with care. Avoid "He *don't* want it" as illiterate. Say, "He *doesn't* want it."

Don't hardly. The expression "I *don't hardly* think they will go" is tautological, for *hardly* means "not quite" or "not easily." Say, "I *don't think* they will go," or "I *hardly think* they will go."

Don't think. "I *don't think* it will rain" is an established idiom, as are other similar expressions in use.

Dope. A word to be avoided. *Addict* is preferable to *dope fiend*. In a slang use *dope* means "material" or "information": "I gave him the *dope* for that article." Avoid also "I *doped* it out," meaning "thought" or "mapped," as vulgar.

Double Possessive. This construction is accepted as idiomatic English. Such phrases as "that house *of Brown's*" and "that car *of mine*" show the double possessive and may be used if required, but "*Brown's* house" and "*my* car" will usually express the thought more economically.

Dozen, Dozens. After indications of price, *a dozen* or *the dozen* is correct. In American usage *a dozen* is preferred: "fifty cents *a dozen*." The phrases, "a pair," "a gross," "a tale," are used in like manner. Correctly we say, "several (or many) *dozens*"; but, when linked with definite numbers or used with *pairs*, *dozen* is the approved form, as, "four *dozen* pairs." See *Pair*.

Drowned. Avoid *drownded* as illiterate. The correct forms of the verb are *drown*, *drowned*, *drowning*, *drowned*.

Due to. That which may be attributed to a cause is *due to* it, but, to express *cause* or *reason*, *due to* should be used *only when modifying a noun or standing as complement*: "His failure was *due to* unusual conditions" or "Failure *due to* the unusual conditions was not expected." Do not say, "He failed *due to* unusual conditions," but "His failure was *due to*, etc." or "He failed *because of* or *owing to* unusual conditions."

Each other. Properly applied to two only; *one another* must be used when the number referred to exceeds two. We say, "Great authors address themselves to *one another*," unless we refer to only two authors.

Eat, Ate, Eaten. These are the correct parts of the verb. Say, "He *ate* rapidly"; "I have *eaten* my dinner."

Effect, Affect. *Effect* means "bring about"; *affect* means "influence": "A man may *effect* a reform." "His ideas will *affect* the character of the reform." *Affect* may mean "pretend": "They *affect* an interest in the matter."

Egoism, Egotism. One may be an *egoist*, that is, may habitually advocate the doctrine of *egoism*, or the pursuit of self-interest, as the supreme aim of human effort, and yet he may not be an *egotist*. *Egotism* is offensive conceit.

Either, Each, Both. Note the following correct expressions: "You may enter by *either* door (meaning *one* or the *other*)." "A bench is placed at *each* side of the doorway (that is, one on *one* side, one on the *other*)." "There were windows on *both* sides (or *each* side) of the doorway." Formerly, *either* was widely used in the sense of *each*, but this use is rare today.

Elegant. The word connotes refinement; it implies niceness in choice, fine taste, and is a word worth saving for apt occasions: "This is a *fine* morning," not "This is an *elegant* morning." One uses fine tools for fine work; the same principle applies to the use of words. Avoid "We had an *elegant* time," as a vulgarism.

Elicit, Illicit. *Elicit* is a verb, meaning "draw out," "discover": "By questioning him we *elicited* the information." *Illicit*, an adjective, means "*illegal*" and "not allowed": "They operated an *illicit* still."

Else, Else's. Such an expression as "Do not take *anyone else's* place" is good form and to be preferred to "Do not take *anyone's else* place," which has some defenders but is not accepted as sterling.

Else but. Avoid the use of *else* before *but* in the expression "I have no one *else but* you."

Emigrant, Immigrant. *Emigrants* are persons *going out* of a country, and *immigrants* are persons *coming into* it. *Emigrate* is derived from the Latin *e*, "out," and *migrare*, "to go from the land"; *immigrate*, from the Latin *im* for *in*, "into," and *migrare*.

Eminent, Imminent. Two words of similar sound but of widely different meanings. *Eminent* signifies "distinguished" or "well known": "He has become *eminent* in his profession." *Imminent* means "about to happen" or "threatening": "The defeat of the army was *imminent*."

Enclose, Inclose. The history of these words as well as general English usage favors *enclose* rather than *inclose*. But most recent dictionaries give *inclose* the preference. Either is correct.

Endorse, Indorse. Either form is correct, but, while *endorse* is used in literature, *indorse* finds favor in law and commerce. Do not say, "I *endorse* the movement." Say, "I *approve* it." Do not say, "*Indorse* the check *on the back*." *Indorse* means "write one's name *on the back of*" documents or commercial paper, such as checks or notes.

Enthuse. The use of this word as meaning "inspire" or "give or gain inspiration or enthusiasm" is generally disapproved.

Equally as well. An incorrect phrase. *As well* and *equally well* are correct forms.

Everlastingly. The word means "in a manner lasting forever," "perpetually," "eternally," and should not be used when *repeatedly* is meant. Do not say, "The horse was *everlastingly* running away."

Ever so, Never so. *Ever so* is correctly used to mean "exceedingly." Both phrases are used to mean "however" or "no matter how," as in "were he *ever so* (or *never so*) rich." Modern usage prefers *ever so* in all such cases.

Except. Formerly, this word was used as a conjunction for *unless*; as, "I will not go *except* you go with me." This is no longer good usage.

Excuse, Pardon. While *pardon* is the more formal official word in respect to offenses, and *excuse* the more familiar in respect to minor matters, a further distinction is to be noted. For instance, when interrupting a conversation, one says, "*Pardon* the interruption," and, when leaving a guest, "*Excuse* me."

Exemption, Immunity. One claims *exemption* from taxes or from duty; one acquires *immunity* from disease, as by inoculation, or is granted *immunity* from punishment.

Exercise, Exorcise. Do not use these words interchangeably. *Exercise* means "put into use, action, or practice"; *exorcise* means "cast or drive out" (as evil spirits), by religious or magical formulas or ceremonies.

Expect. As this word means "look forward to as a contingency," it should never be used of any retrogression, for one cannot *expect* backwards. Not, "I *expect* you thought I would come yesterday," but "I *suppose*, etc." "I *expect* you know all about it" should be "*imagine*," "*think*," or "*suspect* you know." But "We *expect* that they will come" or "We *expect* them" is correct. Compare *Anticipate*.

Extempore, Impromptu. An *extempore* address is one delivered without manuscript and without memorization, though previous preparation may have been made by thought upon the subject treated. An *impromptu* speech is given on the moment, without previous preparation.

Extend. "They *showed* me every kindness" is better than "They *extended* every kindness to me." But, in such phrases as *extend sympathy* and *extend hospitality*, meaning "bestow" or "impart," that is, "show by words or deeds," the word is in good use.

Farther, Further. Careful speakers and writers use *farther* for distances in space and *further* for continuity of other kinds: "We walked *farther* today than yesterday"; "The chairman said *further* (that is, *in addition*) that all dues must be paid promptly." *Further*, then, is used for expressions of continuity, as of thought or action: "I had no *further* dealings with him"; "a *further* rise in temperature."

Fascinating. As that which *fascinates* operates on its object as by some irresistible power, *fascinating* should not be used when *charming* or *attractive* is meant. Properly, that is *fascinating* or *bewitching* which possesses the art to please beyond the power of resistance; as, "Her *fascinating* manner and words disarmed suspicion."

Faulty Comparisons. Avoid double comparatives and superlatives. Say, "*worse*," not "*worser*"; "*abler*," not "*more abler*." Avoid impossible comparisons. Say, "*more nearly perpendicular, more nearly universal*," not "*more perpendicular, more universal*." Use the comparative degree for two objects, the superlative for more than two.

Fearful. A much overworked word. The meanings of the nouns from which such words as *dreadful, terrible*, and *fearful* are derived should always be borne in mind when the adjectives are used. The colloquial use of these words to express intense feeling or annoyance easily passes into extravagant hyperbole. Do not describe the falling of a horse as a *terrible* but rather as a *serious* accident. "He was *fearful* for our safety," that is, "He *feared* that we were in danger" is correct.

Felicitate, Facilitate. We *felicitate* or *congratulate* people on success; we *facilitate* or *make easier* their progress toward their destination.

Female. In polite speech this word is restricted to sex or to animals. When applied to women, it is derogatory, and it should not be used in such expressions as "What is more delightful than the blush of a beautiful young *female*!"

Fewer, Less. *Fewer* refers to number; *less*, to quantity. Instead of "There were not *less* than ten chapters in the book," we should say, "There were not *fewer* than ten chapters in the book." But say, "The box weighed not *less* than ten pounds."

Fine. An adjective which should not be used as an adverb. Do not say, "She sang that *fine*," when you mean "well." "I like that *fine*" and "He is doing *fine*" are incorrect. Say, "I like that *well* or *very much*" and "He is doing *well* or *very well*."

First. When used in conjunction with other numerals, *first* should always precede not follow them: "Take the *first two* plates off the rack," not "the *two first*." There is but one *first*.

First-rate. Do not use this adjective as an adverb. "She plays *first-rate*" is a vulgarism. *First-rate* means "of the highest excellence or quality." "He is a man of *first-rate* ability" is correct.

Fix. Often misused colloquially for *arrange* or *repair*: "I must *fix* the books." "Who *fixed* the dishes on the shelves?" "He had the clock *fixed*." It is vulgarly used thus: "I will *fix* him"; "The jury was *fixed*"; "You must *fix* up, if you go"; "Your affairs are in a bad *fix*." *Fix* means "fasten," "make firm," or "settle": "The hooks are *fixed* in the wall." "Their income is a *fixed* amount."

Folk, Folks. Often incorrectly used interchangeably. Both words are construed as plurals, but the first refers to *people* or *peoples* generally, as "folk tales" or "fairy folk." In colloquial usage, *folks* has displaced *folk*. In "My *folks* have gone South," *folks* signifies "relatives." In "the *folks* next door," the word means "neighbors."

Former—Latter. These words should be used only when they really economize space and save the reader's time. By repeating the antecedents (nouns or phrases), one avoids sending the reader back to see which is *former* and which is *latter*. Sometimes, however, a disagreeable repetition is avoided by using "the *former*—the *latter*."

Funny. A word too frequently used when humor or amusement is not meant. Of something unusual, use *strange, odd, peculiar*, or a similar accurate word instead of *funny*: "It was a *peculiar* situation," not "*funny*" unless it is laughable.

Get, Got, Have. *Get*, like *do*, has many different meanings and is carelessly used. Avoid *get* for *be* and especially such expressions as "She will *get* laughed at for her pains." Say rather, "She will *be* laughed at, etc." If a man has inherited a fortune and has not dissipated it, we say correctly, "He *has* money"; if he obtains money through his own effort, we say correctly, "He *has gotten* money." "He *has* books" means merely that he *possesses* them; "He *has gotten* his books" means that he has *obtained* them through effort. *Have* indicates simple possession; *get* shows acquisition through effort.

"*Get* a move on" is a forceful but inelegant Americanism for "Be quick about it."

Do not say, "*Get* up a show" when you mean plan or prepare. Colloquially, a *get-up* is an equipment consisting of dress and accessories and is very frequently correctly used, as in "a clever *get-up*" or "a stylish *get-up*." A pleasing play is *well presented*, not *gotten up*. Avoid "*gotten up* to kill," as a vulgarism for "well or fashionably dressed," and "Do you *get* me?" for "Do you understand me?" as the height of vulgarity.

"He *has got* to do it" is a common colloquialism. "He *has got* it to do" shows the wasteful character of the phrase. "He *has* it to do," "He *must* do it," or "He *has* to do it" is correct. We may, however, say correctly, "The cat *has got* the mouse," but "*caught* the mouse" is preferable.

Both *got* and *gotten* are correct, as forms of *get*.

Get, meaning "become," is colloquial: "He will *get* well"; "as we *get* older."

Goes. In the phrase "anything *goes*" we have slang; in "the machine *goes*" we have idiomatic English. "That *goes* without saying" is a literal translation of a French idiom, in colloquial use.

Going to. "We are *going to* do it" is correct idiom. Do not say "*gonta*." Avoid "Where are you *going to*?" in which the *to* is redundant.

Good. The use of the adjective *good* for the adverb *well* is vulgar. Avoid "I feel *good*" and "He is working *good*." Say rather: "I feel *well*"; "He is working *well*."

Grand. That which is *grand* is "magnificent," "noble," or "splendid," yet there is strong tendency to misapply the word. Today anything from a bit of chewing gum to Mt. Shasta is described as *grand*. The word should be used only of that which possesses grandeur.

Great. The indiscriminate use of this word is evidence of a poverty-stricken vocabulary: "We had a *great* time" is a colloquialism; "I like it *great*" is a vulgarism.

Had. "*Had* I thought of that, I should have come." This sentence is correct; but the common practice of inserting *have* after the pronoun is reprehensible. Shun "*Had* I have known," "*Had* I've known," "If I *had've*," "If I *had of* (*uv*)," if you wish to avoid being classed as illiterate.

Had better, as in "He *had better* look out," is excellent English idiom.

Had ought is a solecism for *should have*. *Ought* is not a participle. Say, "We *should have* or we *ought*," not "We *had ought*."

Handy. The word should not be used in referring to houses, stores, or neighbors as *near*, *near by*, *close at hand*; as, "The store is *handy*." Say, "The store is *near*" or "*conveniently near*." We may say, "I had my tools *handy*," that is, *near at hand*.

Hanged, Hung. Criminals are *hanged*, clothes are *hung*. This is an old distinction, still in force.

Hate. A word that signifies "having a great aversion for," but used colloquially for *dislike*: "I *hate* to do that kind of work." *Hate* is too strong a word for such use. Say, "I *dislike* to do that kind of work" or "I *detest* that kind of work."

Haven't but. A solecism, for it contradicts itself. "I have *but* a dollar" means "I have *only* a dollar," which is what is intended when one says, "I *haven't but* a dollar." *Haven't but* means "have not only."

Have to have. Avoid this useless repetition. Not, "I *have to have* my work done by three o'clock," but "I *must have* my work, etc." Do not say, "I have *got to get*" when "I *have to get*" is what you should say.

Healthful, Healthy. Note the distinction in meaning between these words. *Healthful* is applied to conditions or environments: "Children should be reared in *healthful* surroundings." *Healthy* describes a good physical condition, without disease: "A *healthy* mind in a *healthy* body is desirable."

Hear to it. We "*hear of*" an incident or "will not *hear of*" a course being pursued, but *hear to it* is archaic. *Hear* signifies "listen to"; formerly, "He will not *hear to* reason" was accepted as idiomatic, but it is now rendered "He will not *listen to* reason."

Hearty. "He ate a *hearty* breakfast" is good English idiom. *Hearty* means "strengthening" and "satisfying."

Hectic. A word which specifically means "habitual," "constitutional," being derived from the Greek *hexis*, "habit of body"; but it has come to mean "flushed" as with fever, or affected with such fever as accompanies tuberculosis. It is often misapplied, as in "*hectic* haste," in the sense of *feverish* or *excited*.

Heighth. A corrupt form due to confusion with *width*, *length*, and *breadth*. The correct word is *height*.

Hence, Thence, Whence. These words connote *removal from*; therefore, they should not be used with *from*. *Hence* is superfluous in such a sentence as "It will be many years *hence*, we apprehend, before he returns."

Hisself. A vulgar substitute for *himself*. Similarly, *theirselves* is an error for *themselves*: "He went *himself*"; "They wanted it for *themselves*." See *Pronouns*.

Home. We say correctly, "*go home*," but the phrases *stay home* and *be home* are not approved. *Stay at home* and *be at home* are better. One should never be *to home*. *Be home* in the sense of *return* is, however, an allowable colloquialism: "He will *be home* soon."

How. "I have heard *how*, in Italy, one is beset on all sides by beggars" should read "I have heard *that*, in Italy, etc." But "He told me *how* he worked his passage" is correct, since the reference is not to the fact, as in the first sentence, but to the manner of action.

How that and *as how*, as in "He told *how that* he would never return" or "He said *as how* he would go," are most objectionable colloquialisms.

However. Frequently misused for *how*, in such a sentence as "*However* could you tell such a story!" One should say, "*How* could you *ever* tell such a story!" *However* means "no matter what the extent of." "*However* careful you may be, you will make mistakes" is correct.

Hustle. Properly this word means "shove," "push," or "jostle roughly." Although frequently used colloquially for *hurry*, as in "*Hustle* that order along," it is not properly a synonym for *hurry*.

I, Me. These forms of the personal pronoun of the first person are frequently confused. *Me* is the form to use with a preposition. Say "between you and *me*," not "between you and *I*." Similarly, "with her (him) and *me*," not "with she (he) and *I*."

If. *Whether* in place of *if* is preferred by most authorities in sentences like these: "I do not know *if* (*whether*) the book will suit you"; "I wonder *if* (*whether*) he has come." The use of *if* for *whether* is colloquial or poetic.

Ill, Sick. English usage confines the word *sick* chiefly to the meaning "nausea," as, *a sick headache*; but in America *ill* and *sick* are generally synonymous. However, we say: "He is a *sick* man," never "He is an *ill* man"; but, either "He is *ill*" or "He is *sick*."

In, Into. *In* is sometimes an adverb and sometimes a preposition, but its employment as an adverb is really an elliptical use of the preposition. As an adverb, *in* is correctly used in these sentences: "Come *in*," for here *in* means "into the house, room, etc."; and likewise, "Go *in*," meaning "Go into the room, house, etc." As a preposition, *in* may be used with verbs of rest or of motion and *into* with verbs of motion only: "He sat *in* his chair"; "The child runs *in* the yard"; "He walked *into* the house."

Inaugurate. A word that connotes solemn induction with appropriate ceremonies. It should not be used for *begin* or *institute*, properly applied to the simple things of daily life. It is a noble word suited only to high office.

In back of. The expression "They sat *in back of* us," meaning "behind," though analogous to "They sat *in front of* us," is disapproved. *Behind* accurately expresses the thought. As to *in front of*, we have no corresponding preposition, since *before* may convey the idea of *facing* and thus may produce ambiguity.

Incite, Insight. *Incite* means "to rouse to a particular action": "The mob was *incited* to riot." *Insight* is a noun and means "the power or faculty of immediate and acute perception or understanding": "The best *insight* we obtain into nature is that which we gain through careful first-hand observation."

Indict, Indite. Though pronounced alike, these words are very different in meaning. *Indict* means "charge formally with crime": "The jury *indicted* him for murder." *Indite* means "write" or "compose." See *Word Building*.

Individual. The word is jocosely or contemptuously used for *person*. It is used correctly in "Changes both in *individuals* and in communities are often produced by trifles"; contemptuously in "That *individual* left here several hours ago."

Indulge. This word means "give oneself up to (something)"; "yield to one's longings or passions unrestrainedly"; "give free course to one's habits"; "humor to excess, as children." Thus, one *indulges* in idleness, or one *indulges* children's whims or wishes. While one may *indulge* a thirst for fame, one should avoid "I never *indulge*" as objectionable in declining an offer of refreshment.

Infer, Imply. These words are frequently confused. One *infers* or *reasons* or *draws a conclusion* from something heard or read. One may *imply*

(*suggest*) in what one writes or says, for example, "One *infers* from what Jefferson wrote that the Declaration of Independence *implies* belief in democracy."

-ing. See *Clipped Endings*.

Ingenious, Ingenuous. *Ingenious* means "skillful," "inventive": "The boy is *ingenious* and loves machinery." *Ingenuous* means "candid," "frank," "open," "innocent," "guileless": "He made an *ingenuous* reply."

Innumerable number. The phrase is tautological. Therefore it should not be used. Say, "a *countless number*," that is, a number incapable of computation. Avoid "an *innumerable number* of times"; say instead, "*innumerable* times" or "*numberless* times."

In our midst. Condemned by most critics as a substitute for *in the midst of* (*us*). The purist prefers *among us*.

In so far as. A phrase formed on the analogy of *in as much as*, but *so far as* expresses the thought and *far* is itself an adverb; therefore *in* is superfluous. "*In so far as* I know" should be "*so far as* I know." In "in as much as," *much* is a noun and requires a preposition to give the phrase adverbial force.

Intend. See *Mean*.

Interesting. This is a word to beware of, for it is frequently used equivocally or ironically. When something is said that is *not at all interesting* to the hearer, he may take refuge behind "How *interesting!*" or "That is *very interesting*."

In or **Under the circumstances.** Both phrases are in good use. *Circumstances* may imply merely attendant conditions not thought of as seriously modifying action. *In* is then the proper preposition; as, "*In the circumstances* he hesitated." But when *action* is thought of as determined by the circumstances, as, "*Under the circumstances* prosecution of the case could not be avoided," *under* is the approved word.

Irrelevant. The word means "unconnected with" or "not related to": "His remarks were *irrelevant* to the discussion." Do not pronounce it *irrevelant*.

Is that so? Courtesy will prompt a thoughtful person to be careful *how* and *when* he uses this and the similar phrase, "You don't say so," for they imply doubt or disbelief as well as express surprise. As subject to equivocal interpretation they should be avoided. "I want to know," used in a similar sense, is vulgar.

Junk. Colloquial or slang when used as a verb for *discard*, or "throw away as useless."

Just. This adverb is correctly used for *precisely, only, merely*, or *by a slight margin*; it is colloquial when the meaning is "quite," "very," "altogether," or "simply." Say, "I *just* missed the car," but not "The hostess was *just* lovely, but the food was *just* awful." Such a statement is ambiguous.

Just going to. Instead of "I was *just going to* go," one may better say, "*just about to* go" and so avoid repetition of the word *go*. Such expressions as "I was *just going to* make the same remark" and "We are *just going to* visit our friends" are good idiomatic English, although they border on the colloquial.

Killing. *Perfectly killing*, like *perfectly dear*, belongs to the class of extravagant slang.

Kind. The word is singular. One should say, "this *kind*," not "these *kind*." But "those *kinds*," not "those *kind*," is correct.

Kind of. Avoid the use of *a* as a modifier before a noun when preceded by *kind of*. "What *kind of* man is he?" is correct. "What *kind of a* man is he?" is incorrect.

Kind of tired, amusing, etc., are slovenly speech. *Somewhat tired, rather amusing*, are preferred.

Lady. Address a woman who is a stranger to you as *Madam*, and not as *Lady*. Persons of culture do not say, "She is a fine *lady*," "a clever *lady*"; they use *woman* instead. Ladies say, "The *women* of America," "*women's* interests." In like manner use *man* or *men* instead of *gentleman* or *gentlemen*.

Last, Latest. We speak of an author's *latest* book, but hardly of his *last* book until he is dead. But we say properly, "Have you read the *last* number of this magazine?" Here *last* means "latest in a series."

Last two. This phrase is preferred by most authorities to *two last*: "They bought the *last two* copies."

Laundered. The clothes were *laundered*, not *laundried*.

Lay, Lie (verbs). *Lay* is transitive and denotes an *action* on an object; *lie* is intransitive and designates a *state* or a *condition*: "I *lay* the rug on the floor, and it *lies* there." "They *laid* him with his fathers." "He *lies* with his fathers." The following expressions are idiomatic: "A thing *lies* by us until we bring it into use"; "We *lay* it by for some future purpose."

The confusion arises probably from the fact that *lay* appears in both verbs. The words are correctly used in the following sentences:

I *lay* the book on the table today.
I *laid* it there yesterday.
I have *laid* it there every day.
I am *laying* it there now.
I *lie* on my bed today.
I *lay* there yesterday.
I have *lain* there every day.
I am *lying* there now.

Lay, Lie (nouns). Both of these words are in good use to signify the manner in which land *lies* in its relation to the surrounding country. "The *lay* of the land" is in popular favor; "the *lie* of the land" has the support of the scientists. The latter is the older English usage.

Learn, Teach. Formerly, *learn* and *teach* were used interchangeably, but now to confuse them is a mark of illiteracy. We *learn* things for ourselves; we try to *teach* others.

Leave, Let, Lief. One takes one's *leave*, after a call or visit. We ask *leave* or *permission*. One is *on leave*, that is, enjoying a permitted absence from his usual place of duty. But we say idiomatically, although the expression is somewhat archaic, "One had as *lief* do it" or "One had *liefer* (*rather*) do it." Properly, one *leaves* (goes away from) a place, but he *lets* a person or thing alone, that is, does not meddle or interfere. Still, one correctly asks to be "*left* to himself," that is, asks others to "*leave*" or "go away from" him.

Lend, Loan. The verb *lend* is the general word to use when we supply something to another with the understanding that it is to be returned. Say, "*Lend* (not *loan*) me the books or money." The use of *loan* as a synonym for *lend*, although of English origin, has been condemned as an Americanism; but it has fallen into disuse except in financial circles. One says correctly, "He tried to get a *loan* from the bank," where *loan* is used as a noun. "The company *loans* money on good security"; here the word is used as a verb.

Less. See *Fewer*.

Let alone. A vulgarism when used to mean "excluding," "not to mention." Avoid such expressions as "The inconvenience was bad enough, *let alone* the expense."

Lief. See *Leave.*

Like, As. *Like* is not used for *as* in the New England States; the use is common in the South and the West. The phrase *like of that* should be avoided in "We spend our days fishing, canoeing, and the *like of that* (or *like that*)," for it is a vulgarism. Do not say: "Do *like* I do"; "I felt *like* I would faint"; "My feet were heavy *like*"; or "He had *liked* to have been killed," meaning "came near to being killed." Say: "Do *as* I do"; "I felt *as if*"; "My feet *seemed* heavy." But one may say, "She walks *like* a queen," meaning "in the manner of." To use the tautological phrase *like as if* is to display one's ignorance.

Like, Likely. The first is frequently erroneously used in conversation instead of the second. *Like* means "similar," "corresponding," "equal," and "resembling." *Likely*, as an adjective, means "probable," "suitable," "adaptable," or, adverbially, "to be reasonably expected." Avoid "He is *like* to call today" as illiterate. The following is correct: "In *like* circumstances, a repetition of the occurrence is *likely*."

Like, Love. See *Love.*

Listen! A word very much abused and overused in trying to arrest attention or to obtain a hearing on the telephone.

Loan. See *Lend.*

Locate. Colloquial for *settle* or *establish*. Prefer "He *settled* in Colorado"; "They *established* their business in Birmingham."

Lot, Lots. These words are in colloquial use for *much, many*; as, "a *lot* of money," "*lots* of people." Prefer "a *great deal* of money," "*much* money," "*many* people."

Love, Like. *Love* is a much abused English word. In modern practice *like* is used where taste is concerned and where no strong emotion is involved. One who delights in sweets is appropriately said to *like* candy. Of course one may *like* a person without *loving* him—that is, enjoy his companionship. We *love* wives, husbands, sweethearts, children, friends, truth, country.

Lunch, Luncheon. *Luncheon* is the more formal of these words. The first is a colloquial contraction of the second, and the second is the equivalent of the early English *noonshun*, spelled also *nunchion*, in which *nunch* means "a piece" or "morsel" of food; hence, "a bite."

Luxurious, Luxuriant. Do not confuse these words. The first describes that which is "gratifying to the senses"; the second means "growing in abundance." Correctly we speak of *luxurious* furnishings and of *luxuriant* foliage or vegetation.

Mad. When used to signify "very angry," this word is a careless colloquialism. *Mad* properly means "crazy."

Make a visit. The phrase is a provincialism. The correct word to use is *pay*: "One *pays* a visit to an acquaintance."

Manner, Manor. The correct phrase is *to the manner born*, not *to the manor born*. The phrase means "familiar with from birth."

Materialize. When used to mean "take shape" or "happen," the word is colloquial. Improperly used in the general sense of *appear*.

Mathematics. When considered as embracing the science of mathematics in its entirety as a concrete term, this word is construed with a verb in the singular; as, "*Mathematics is* the science that treats of quantities, their properties and relations, especially by the use of symbols"; "*Mathematics is* a subject in the course of study." But, when used distributively, to convey the idea of its different branches or divisions, the word is construed with a verb in the plural; as, "*Mathematics are* mere evolutions of necessary ideas." It should be borne in mind that mathematics are classified as *pure* or *abstract, applied* or *mixed*, and *qualitative*, as projective geometry.

Mean. Do not use *mean* as an adjective for *sick, unpleasant*, or *ashamed*. Say, "He felt *ashamed* of it," not "He felt *mean* about it."

Mean, Intend, Purpose. Best usage may be illustrated as follows: "By this statement I *mean*, etc."; "We *intend* to go"; "He *purposes* a thorough test of the machine." *Purpose* is a stronger word than *intend* and implies more careful thought.

Meet. To say, "*Meet* Mr. A.," when introducing a friend, is bad form. But we say correctly, "Have you ever *met* Mrs. B.?" meaning "been introduced to." Prefer "I want you to *meet* Mrs. A." or "May I introduce Mr. A.?"

Middling. This word is an adjective, meaning "moderate," and should not be used as an adverb; therefore, we should not say that a thing is *middling* good, or that a thing is *middling* well done. "He resided in a town of *middling* size" is correct, but "of *moderate* size" is preferable.

Mighty. When used instead of *exceedingly, very*, or *extremely*, this word is a colloquial intensive. Correctly used, *mighty* is a strong word indicating power of unusual force or quality; as, a *mighty* flood, a *mighty* monarch. It may connote uncommon size; as, *mighty* mountains.

Mind. Often misused for *obey*. To *mind* is to pay attention to and, colloquially, to attend to a thing so that it shall not be forgotten: "Will you *obey* me?" not "Will you *mind* me?" But, "*Mind* what I say"; "Never *mind* the difference, we'll balance accounts later."

Mistaken. The expression "If I am not *mistaken*," though sometimes condemned as incorrect, is idiomatic and has been in use for several centuries with the sense "If I am not making a *mistake*." "If I *mistake* not" is more formal, but it is thought by some to be stilted.

More than. Although its form implies plurality, this phrase is correctly construed as a singular: "*More than* one *is* there" or "There *is more than* one there."

Most. As a contraction of *almost*, this word is a provincialism: "The dress is *almost* (not *most*) finished." The use of *most* in the phrases *most perfect, most complete*, is sanctioned by good usage, on the ground that things are at best but relatively perfect or complete. However, *most nearly perfect* and *most nearly complete* are in good use.

Move you. In submitting a motion for formal consideration by a deliberative body, "I *move* that, etc." is correct. It is not considered necessary to say, "I *move you* that, etc."

Muskrat. Do not say *mushrat*.

Mutual, Common. Recent writers do not insist so strongly upon the distinction between these two words. "We have *common* friends" or "We have *mutual* friends." *Mutual*, strictly, means "reciprocal," "existing between two parties"; but, because the meaning "ordinary" may be implied by the word *common*, many people prefer to say, "*mutual* friends," in spite of critics. There is, however, a clear and worth while distinction between the two words. *Common* means "belonging to all" as well as "ordinary." When we speak of a *mutual* friend we mean "one who reciprocates our friendship," and, when we refer to a *common* friend, we mean "one whose friendship we share in common with other friends of his." The sentence "We have many friends in *common*" illustrates the point clearly, and is a good substitute for "We have many

common friends." Persons interested in the same things have *common* interests. When they are interested in each other, their interest is *mutual*.

Myself. This pronoun is an emphatic or reflexive form for the first person and should be used only where emphasis is required, as in "Who did it? I *myself*," that is, "I alone did it." It is incorrect to say, "Mary and *myself* were satisfied" or "Two friends and *myself* went." Say, "Two friends and I went" or "I went with two friends." Do not say, "*Myself*, I do not like it."

Near. When used to mean "almost," as in *near* beer, *near* great, the word takes on a rather forceful colloquial sense, but it is not in good literary use. It is a comment upon an era of "substitutes."

Negatives, Double. The use of double negatives serves merely to confuse speech. Say, "*neither* you *nor* anybody else," not "*neither* you *nor nobody* else"; "I have had *hardly* a day's rest," not "I have *not* had *hardly* a day's rest."

Never expect. In the sentence "I *never expect* to see them again," the position of *never* is incorrect. Here *never* modifies *see*. Say, "I expect *never* to see them again." But one may say, "The man is ill-bred; I *never expect* courtesy from him."

New. Distinguish between *new* and *novel*. That which is *new* may be *novel*, but that which is *novel* need not be *new*. Anything striking or *different* from things with which we are familiar may be called *novel*. To say "*new* beginner" seems to argue utter indifference to the sense of words. To be a beginner is quite sufficient.

Nice. This word means "exact" or "discriminating," not "pleasant" or "good." A *nice* distinction is one resulting from discriminating reasoning; one who is *nice* in regard to matters of food is fastidious and hard to please; *nice* food is inviting, dainty food. Anything that is done or made with scrupulous exactness, precision, or accuracy is termed *nice*; as, a *nice* balance, that is, an exact balance; *nice* workmanship, that is, the result of skilled labor.

Nicely. This word is frequently misused in the attempt to make it do service for *well*, in this wise: "How will this pen do?" "*Nicely*." "How are you?" "*Nicely*." Use *well* or *very well*, for *nicely* means "accurately," "becomingly," "exactly."

None. A word that may be used with a verb in either the singular or the plural, depending on the intention of the person who uses it; as, "*None* of *these* things *move* me"; "*None* but the brave *deserves* the fair."

Nor. Use this word and not *or* after *no* when the definite exclusion of two distinct persons or things is intended; as, "He has *no* father *nor* mother." But we use *or* when the following word merely explains the preceding: "The boy has *no* father *or* guardian."

Not. After *not*, when the single negation applies to both objects, use *or*: "They do *not* see *or* hear." But say, "They do *not* come, *nor* do they intend to come," where two separate negations are implied. Here *nor* is, logically, the equivalent of *and not*.

Notorious. The word is not to be confused with *notable* or *noted*, as it frequently is, for *notorious* implies discredit and has an unfavorable sense. It should not be used for *well known*.

No use. "It is *no use* to do that" should be "It is *of no use* to do that" or, preferably, "It is *useless* to do that."

Novice. See *Amateur*.

Nowhere. Do not say, "*nowhere* (or *nowheres*) near so much," because *nowhere* means "not in any place or anywhere" or, by extension, "at no time." "Not nearly so much" is correct.

Number. A word that can be correctly construed with a verb in the singular or the plural, depending on the idea to be expressed or the word on which emphasis is placed. We say correctly, when thinking of the individuals of a group, "A large *number were* (not *was*) there." Similarly, "There *are* a large *number* of people" or "There *are* many." But, if we intend to convey the idea of a unit, we say "The *number* of women present *was* small." When any phrase that has qualifying force seems to contradict in number the noun or verb with which it is used, an adjective should be substituted, so that the sentence shall correspond in form with the idea it is intended to convey. For example, "A *number* of changes *was* made," or "A *number* of changes *were* made." Better,—"*Numerous changes were* made."

Observance, Observation. *Observe* the following distinction: "Close *observation* of our customs shows too little *observance* of Sunday and of patriotic anniversaries." *Observation* means "the act of looking at or examining," or the result of such action. *Observance* implies recognition, as with service or ceremony.

Of, Off. See *Prepositions*. The two words are from the same source and are subject to confusion in common speech.

When *of* follows a superlative, the thing referred to as best, largest, etc., is to be thought of as included in a whole group; hence the rule requiring *of all* in the following: "She was the loveliest *of all* (not *any*)." "He was the least observed *of all* (not *all others*)." *Any* and *others* imply separation of groups for comparison, and are used appropriately only with the comparative degree: "He was less observed than *any* of the others (who were observed—understood)." *Any* requires *other*(*s*) or *one else* or a similar expression to follow it.

Off of, Off from. *Of* or *from*, in these phrases, should be omitted from such a sentence as the following: "The pears fell *off* (*of*) (*from*) the tree." *Off* expresses the idea of separation. *Of* and *from* are superfluous.

O. K. This commercial expression is used as noun, adjective, and verb: "Give this your *O. K.* (approval)"; "His work is *O. K.* (all right, correct)"; "He refused to *O. K.* (approve) the order." Since *O. K.* as an adjective means "all right," do not say "all O. K."; "The requisition is *O. K.* (not *all O. K.*)."

Old Adage. See *Adage*.

One—One's. While purists insist that *one*, as in the sentence "*One* meets *one's* friends in the city," should be followed by *one's* and never by *her* or *his*, usage sanctions either form where no ambiguity would result. But after *anyone, every one, no one*, etc., use *he* (*his*) or *she* (*hers*): "*No one* knows where *he* will meet an acquaintance." Never use *they* (*their*) with *one* in such a sentence as "*Every one* makes *his* own choice," for *one* is singular. Do not say, "When *one* travels, *you* want pleasant companions," for *one* is a pronoun of the third person, and any following pronoun used in its place should be of the same person. Generally, avoid the use of *one* when a repetition of the word would be required.

Ones. Instead of saying, "I do not like the other *ones*," say, "I do not like the *others*." *Ones* is in good use only in such phrases as "big *ones*" and "little *ones*": "Here are big stones and little *ones*."

One time, Then. Such expressions as her *one time* guardian and the *then* bishop of New York are convenient, clear, and economical, and they are approved by good authority.

Only. This word is probably more often misplaced than any other word in the language. "He

only sang for us." "He sang *only* for us." The first sentence means that he *sang*, but did not *play* for us; the second means that he sang for *us* and not for *anyone else*. A change in the position of *only* will seriously affect the meaning of almost any sentence in which it is found.

Onto, On to. The use of *onto* in such expressions as "He got *onto* the platform with difficulty" is justified by good authority. This use follows the analogy of *upon*, *into*, and others implying motion. Some authorities do not yet allow *onto*, although they approve *on to*, but the two forms have quite distinct uses. One should not say, "He walked *onto* the next town," but "He walked *on to* the next town."

Oral, Verbal. *Verbal* means "in words," either *spoken* or *written*; *oral* means "uttered by the mouth," "spoken."

Other. This word should not be omitted from sentences like the following: "He said that his wife was dressed better than any *other* woman there." The omission of *other* makes the statement include the person spoken of in the group with which she is compared. In stating a comparison avoid comparing a thing with itself.

Ought, Should. *Ought* is the stronger term. What we *ought* to do, we are morally bound to do: We *ought* to be truthful and honest, and we *should* be respectful to our elders.

Over, Across. There is a nice distinction between these words: A dog walks *across* the street, but he leaps *over* an obstruction. *Across* suggests merely passage from one limit to another; *over* also implies elevation. See *Prepositions*.

Overlook, Oversee. *Overlook* means, usually, "miss seeing," "not notice": "He *overlooked* the important point." *Oversee* means "supervise." *Look over* may mean "examine."

Overly. The word is not in good use. Where it has been used, *over* may usually be substituted: "He is *overbold*."

Over with. In this phrase, *with* is superfluous. Say simply, "I am glad that ordeal is *over*."

Own. The use of *own* to mean "admit to be true" or "concede" is supported by good usage; as, "He *owned* to his fault." Colloquially, *own* has come to mean "confess" or "clear one's mind of a matter," as in the sentence "He was accused and finally *owned* up."

Pair. With numbers, as "three *pairs*," best usage favors the plural, the use of the singular, as "three *pair*," being confined to trade cant. See *Dozen*.

Parcel post. This form is correct, not *parcels post*.

Partake. The word means, literally, "take part," "share." In this sense, several persons may *partake*, or one may *partake* with others. But the word is also in good use to mean "take" or "appropriate," without reference to sharing; as, "He *partook* of the food."

Party. The word should not be used generally for *person*. Not "the *party* that I saw," but "the *person* that I saw." We speak correctly, however, of the *parties* to a contract or an agreement.

Passive Progressive. Modern practice prefers "The church *is being built*" or "Cattle *are being sold* at fifty dollars a head" to the former usage "The church *is building*" or "Cattle *are selling*, etc." Say, "The boy *is being taught*," not "The boy *is teaching*," when the intention is to express the idea that the lad is receiving instruction.

Peeved, Peevish. Words used to signify "fretfulness", and familiarly applied to a whimpering child. The terms *irritated* and *vexed* are often preferable in a serious style.

Pep. Expressive slang for *energy*, *vigor*, but as yet it seems usually to need an apology.

Per. *Per* day, *per* man, *per* pound, etc. are better expressed by the plain English *a* day, *a* man, *a* pound, etc. *Ten dollars per* is the slang for ten dollars a week, a month, apiece, etc.

Perform. Say, "She *plays* the piano beautifully," not "She *performs* beautifully on the piano." This sentence would be improved by using *well* or *admirably* in place of *beautifully*.

Peruse. This word is not merely a synonym for *read*. "He *perused* the article" implies an attentive and careful reading.

Place (verb). *Place* means "lay in position." Some authorities think one should say, "*place* a thing *into* a box"; but there is hardly enough of the idea of motion in the word *place* to justify *into*. *Place in* is more appropriate.

Plan on. "Do you *plan on* going?" A provincialism better expressed by "Do you *plan* going?"

Plebiscite. A word introduced into English from the French more than fifty years ago. Its recent revival is one of the results of the World War. The word means "a referendum, or vote of the people, in a district or state."

Plenty, Plentiful. One may say, "There will be *plenty* of fruit this fall"; but good usage calls for "Fruit will be *plentiful* (not *plenty*)."

Plurality, Majority. "The president received a *plurality* of the votes cast for all candidates throughout the country" means that he received more than any other candidate. "The election of an officer requires a *majority*" means that election requires one vote or more in excess of half the total number of votes.

Point of view. Frequently expressed by *standpoint* or *viewpoint* in common usage. There is but little difference by which to choose. Although some purists condemn *standpoint*, it has strong literary support, implying permanence rather than the transitoriness suggested by *viewpoint* or *point of view*.

Polite. This word should not be used for *kind* before the word *invitation*.

Politics. American usage approves *politics is*; English usage approves *politics are*.

Possessive with Verbal Noun. "We did not know of *his* going." "The idea of *our* doing such a thing." "The fact of the *team's* playing at home interested him." These sentences represent approved usage. Occasionally, in the use of nouns, the possessive seems awkward or sounds harsh, and is omitted as unnecessary.

Post, Mail. The distinction in the use of these words is merely national. We *mail* letters in the United States and *post* them in Great Britain.

Posted. The use of this word for *informed*, in such expressions as "The man *posted* me" and "If I had been better *posted*," should be discouraged in favor of *informed*.

Powerful. Avoid the provincial use of this word to mean "great" or "large," as in "That is a *powerful* sum of money." "A *powerful* sight of corn" is also provincial usage.

Practical, Practicable. *Practical* means "not theoretical" or "concerned with doing rather than with reasoning." *Practicable* means "capable of being done under given conditions": "A *practical* man will suggest *practicable* plans."

Practically, Virtually. These words are both used to mean "essentially" or "in reality": "The battle was *practically* over"; "He is *virtually* bankrupt." *Virtually* is preferred as expressing actuality in referring to conditions that exist but are not self-evident; for example, "Fighting continued *practically* all night, but the issue of the battle had already been *virtually* decided."

Prefer. "For making bread, do you *prefer* wheaten flour or corn flour?" "I *prefer* wheat *to* corn." Do not say, "I *prefer* wheat *rather than* corn." The *pre-* in *prefer* supplies the sense of *rather* or *before*.

Prejudice. This word connotes a bias or unfavorable attitude toward a person or thing and should not be used to indicate approbation, as in "The man is *prejudiced* in his favor." We should say, "He is *predisposed* (or *prepossessed*) in his favor."

Prepositions at Ends of Sentences. Sentences that end with prepositions are frequently more terse, always quite as idiomatic, and invariably simpler than they might be if differently constructed: "the man I gave it *to*" or "the man *to* whom I gave it"; "the verb it belongs *to*" or "the verb *to* which it belongs."

Pressure. This word in the sense of *influence* frequently carries a sinister meaning, but when it signifies *urgency* it is in good use; as, "the *pressure* of affairs or of business."

Pretty. Correctly used as an adverb, in such expressions as *pretty soon* or *pretty well*, meaning "rather," "somewhat." However, its repeated use tends to restrict one's vocabulary, to the exclusion of more appropriate words.

Preventive. This is to be preferred to the form *preventative*.

Previous to, Previously to. Both are in good use, but *previously* is necessary when the idea is adverbial: "*Previously to* our coming the affair had been settled." But we say correctly, "That event was *previous to* our coming." The same principle applies to *subsequent*, *relative*, etc.

Price. When used as a verb to mean "set a price on" or "ask the cost of," the word is colloquial: "The butter was *priced* at sixty cents"; "She *priced* everything before buying." *Price* with the meaning "suffer the consequences of" is current: "He will pay the *price* of his follies."

Proceeds. Use the plural verb with this word: "The *proceeds were* (not *was*) applied."

Procure. This Latin word is often made to do the work of the Anglo-Saxon word *get*. "Where did you *procure* it?" should usually be "Where did you *get* it?" *Procure* implies provision for the future.

Prodigy. This word is frequently misspelled and mispronounced. The correct form is *prodigy*, meaning "wonder": "He was a *prodigy* (not *progidy*) of learning."

Profiteer. One who takes undue profits in business. A product of war times, formed after good English analogy. This is a neologism.

Promise. Often misused for *assure*, as in "I *promise* you I was agreeably surprised," which should be "I *assure* you, etc." The word *promise* refers to the future: "We *promise* to do our best."

Propose, Purpose. These words are not exact synonyms, as the following sentence shows: "I *propose* to build a house and *purpose* to live in it when it is ready." *Propose* implies a definite, specific plan; *purpose*, a more general intention.

Proposition. Commercial cant for *proposal*, *task*, or *undertaking*, all of which are preferable.

Prove. In the past tense and the past participle, *proved*, not *proven*, is correct, except in legal papers.

Providing. This should not be used for *provided*: "He offered to furnish a car, *provided* (not *providing*) the company would pay for gasoline and repairs."

Publicity. When we give *publicity* to a statement or communication, we make it commonly known. Hence, the word is used as a synonym for *advertising*: "His trip was made for the sake of *publicity*."

Punch. Slang for *energy*, *effectiveness*.

Put. Like *do*, *put* has many meanings that are not in good literary use: *put*, meaning "go" or "get out"; *put up with* (*endure*); *put out* (*displease*); *put past*, as in "I should not *put* it *past* him," meaning "I suspect him to be capable of it"; *put up*, as in "He *put up* at the hotel (*stayed at*)."

Quite. The word means "entirely," "completely," "altogether": "The building is *quite* complete." It means, in addition, "to a considerable extent or degree," "noticeably"; as, "The water is *quite* cold"; "The day was *quite* warm." The word is not properly used to mean "very" or "rather," as in "The book is *quite* interesting" or "She is *quite* ill." Such a colloquial phrase as *quite a bit* is questionable. *Quite some* is vulgar.

Raise. Used for *rear*, this word is illiterate in that it classes human beings with live stock. Although it is in rather wide American colloquial and provincial use in the sense of *bring up*, as in "She *raised* four children," the use should be rigorously condemned. We *rear* or *bring up* children; we *raise* cattle. However, one *grows* or *raises* grain or fruit.

Re, In re. A piece of old law Latin transferred to business letters and not an abbreviation of *regarding*, as it is frequently taken to be. It means "matter," "in the matter of," or "on the subject of." The English phrase *referring to* is preferable and is, in fact, very generally used.

Real. Avoid the misuse of this word as an adverb in the sense of *very*. Say, "The house is *very* (not *real*) pleasant." The adverb *really* means "actually," as in "The story is *really* true."

Recipe, Receipt. The confusion of these two words is very old. *Recipe* has always meant a "medical formula," for which today we use the word prescription. *Recipe* is generally applied to *cookery directions*. This seems a good distinction, *receipt* being reserved for commercial and other use in the sense of *receiving* or in *acknowledgment of receiving*. Say, "He paid the bill and was given a *receipt*"; "She has an excellent *recipe* for making clam chowder."

Recollect, Remember. *Recollect* refers to the recalling of events or facts, while *remember* refers to what may be in the mind continually: "He *remembers* very well his early youth." "I *recollect* now my first visit to the circus."

Regard. The plural of this word is sometimes erroneously used in the phrase *in regards to*, meaning "relating to," "concerning," or "about." It is correctly used in "He spoke *in regard to* bonuses."

Relations, Relatives. The following sentence illustrates the preferred use of these words: "One's *relations* with one's *relatives* may be pleasant or unpleasant." *Kin* or *kinsfolk* implies blood relationship.

Respectively, Respectfully. Do not confuse these words: "They were called *respectively* (that is, *in the order named*) Jim, Sam, and Al"; but "They were *respectfully* called (that is, *in a respectful manner*) James, Samuel, and Albert." See *Letter Writing: Complimentary Close*, page 124.

Risqué. Sometimes written *risky*. The words are not properly used as synonyms. That which is *risqué* is broadly suggestive to the point of obscenity; it borders on the obscene or questionable in art or writing: "a *risqué* story." In English usage, *risky* means "bold," "audacious," "daring," but lacks the equivocal force of the French word.

Run. The principal parts of this verb are: present *run*, past *ran*, past participle *run*. Do not say, "He *run* this car yesterday." *Ran* is the correct form.

Same. Disapproved as a substitute for *it*, *they*, etc.: "We have sent the goods by express, and we hope you will receive *them* (not *same*) promptly." Legal usage allows *the same* for *it*: "If said tenant defaces *the same*, etc."

Say. Avoid this word in addressing another, as in "*Say*, Brown, when do you leave town?" as a vulgarism. *Listen*, similarly used, can well be spared from conversation.

"Says I." A vulgarism.

Scared. Do not use *scared of* when you mean *scared by*. Many people use this phrase carelessly. Prefer *afraid of* or *fearful of*.

Scrap. This is commercial cant, meaning, as a verb, "discard" as out-of-date or unprofitable: "The ships and the plant will be *scrapped*."

Secondhand. Say, "We bought the car *secondhand*, not *secondhanded*."

See. The frequent interrogatory "*See*?," with which some persons sprinkle their conversation in their anxiety to secure attention, is most objectionable from the point of view either of manners or of language.

Seen. Not to be used for *saw*, which is the correct past tense of *see*. Avoid "I *seen* him last week" or "He *seen* that," as the height of vulgarity.

Seldom or ever. This is a common error for *seldom if ever*. Say, "He *seldom if ever* interferes."

Sell. Formerly, "to *sell* a person" meant "to play a joke upon him." Now the same phrase is commercial cant, meaning "to *sell* something to him"; but it is not good in literary use.

Sequel. *Sequel* means "something that follows," as a continuation or consequence. It is used frequently of events or stories related in books: "The *Gay-Dombeys* may be called a *sequel* to *Dombey and Son*"; "The *sequel* of their marriage was a divorce."

Set, Sit. These verbs, like *lay* and *lie*, have long been subject to confusion. In modern usage, *set* is transitive; *sit* is intransitive. I *set* the hen, but she *sits* on her eggs. Incorrectly we speak of a *setting* hen, instead of a *sitting* hen. In Matthew, it was prophesied that Christ should come "*sitting* upon an ass," and his disciples took a colt and "*set* him thereon." The verbs are correctly used in these sentences: "My coat *sits* well"; "We will *sit* up," that is, "will not go to bed"; "Congress *sits*." "We *set* down figures"; but "We *sit* down on the ground." But a very old intransitive use of *set* persists in the expressions, "the sun *sets*," "*sunset*," "*setting* sun," which are accepted as correct.

Sat.—This is both past tense and past participle of *sit*. I *have sat* is correct.

Sewage, Sewerage. *Sewerage* is the system of pipes and tunnels for carrying away the *sewage*, or waste matter, from buildings.

Shall, Will. These are auxiliary (helping) verbs, used to determine various modes and tenses of the action involved in a principal verb. In respect to these words, there are four important groups of idiomatic uses: (1) in declarative statements; (2) in questions; (3) in subordinate clauses; (4) in expressions of future requirement (veiled command).

1. *Declarative Statements.*—The following are the correct uses of *shall* and *will* with the personal pronouns, to express simple future action, declaratively and interrogatively:

Declarative	Interrogative
I shall	Shall I?
You will	Shall you?
He will	Will he?
We shall	Shall we?
You will	Shall you?
They will	Will they?

For the expression of the speaker's determination or command, *shall* and *will* exchange places in the foregoing table. For example: "I *shall*" becomes "I *will*"; "He *will*" becomes "He *shall*."

In the sense of *willing*, *determining*, *commanding*, or *requiring*, neither *shall* nor *will* has anything to do with "time," except as any command must be executed "after" it is given. This is clear in certain cases, where expression and action may well come together: "*Will* you sit here?" "Yes; I *will*," where the action is suited to the word, or, "*Wilt* thou have this woman to be thy wedded wife?" "I *will*."

2. *Questions.*—In questions, one uses the word expected in the answer: "*Shall* you speak?" expecting "I *shall* speak"; but "*Will* you speak?" expecting "I *will* speak."

But notice that "*Shall* you be glad to go?" is appropriate, while "*Will* you be glad to go?" is not, since gladness is not a matter of will. Only rarely may *will* be used interrogatively in the first person, because, as long as there is question in the mind, there is no will. Such a formal sentence as "We *will* ratify this treaty, *will* we not?" is approved; and we not infrequently exclaim, somewhat ironically, "Will I?" as if to say, "I *will* not" or "I certainly *will*."

3. *Subordinate Clauses.*—In subordinate clauses introduced by *that*, after such expressions as "It is said" or "Some one has said" or "It has been commanded," use the auxiliary that would be used in the original principal statement. For example: when the original statement or command was "He (or You) *shall* do the work," the clause of indirect quotation becomes "He has said that he (or you or I) *shall* do the work"; similarly, "He (or You) *will* do the work" becomes "He has said that he (or you or I) *will* do the work." In the former case *shall* retains its ancient force of obligation; in the latter, *will* retains its essential meaning of willingness or readiness. The following sentence further illustrates the use of *shall* to express determination: "We have decided that the contract *shall* be let to you, and that you *shall* follow specifications." If the subordinate clause follows such a verb as *suppose*, *think*, *believe*, or *know*, then the usage for *shall* and *will* in the subordinate clause is the same as for an independent declarative statement.

In subordinate clauses introduced by such conjunctions as *if*, *when*, *whether*, or *although*, *shall* expresses simple future action in every person, while *will*, in every person, expresses willingness or determination. Examples: "If you *will* remember the rule, I *shall* be greatly obliged." "Although I *shall* see him, I *will* not speak." "If he *will* not meet me, I *will* not seek him."

Such use of *shall* is usually avoided by some other expression. Examples: "If I *see* him, I *will* speak"; "If he *does not meet* me, I *shall* not need to speak."

4. *Requirements and Commands.*—*Will* has a peculiar use to express a verbal command or a courteous request: "You *will* report back to headquarters on Sunday morning," that is, "You are required to report"; "You *will* please say no more about the matter" means that it is my wish, entreaty, or pleasure that you say no more about it.

Should, Would. Although, in origin, these are past tenses of *shall* and *will*, they are now properly to be thought of as independent of the latter verbs. Their uses are highly idiomatic.

In affirmative principal clauses, *should* may express obligation in all persons: "I (You or He) *should* (*ought to*) attend the lecture." *Would*, in affirmative principal clauses and in all persons, may express willingness or determination dependent upon circumstances: "We (You, They) *would* come, if an invitation were given."

1. In the first person, *should*, and, in other persons, *would*, may express simply action dependent upon circumstances: "I *should* (They *would*) come, were it convenient."

2. In simple questions, the word expected in the answer is used: "*Should* he go?" "He *should*"; "*Would* you consider it?" "I *would*."

3. In *if* clauses, *should* expresses a condition involving action merely, *would* expresses a condition involving will: "If I *should* correct the error, the work would be approved"; "If you *would* permit me, I would correct the error."

4. *Would* may express intense desire: "I *would* that we might see them again." It expresses also, in reference to past time, habitual action: "He *would* walk up and down."

5. It should be observed that *would* is rarely used interrogatively in the first person except in such a half-ironical expression as "*Would* I?" implying "I certainly *would*" or "I certainly *would* not."

6. Many of the shades of meaning attached to *should* and *would* can be expressed only by changes in the tone of the voice. A fair-sized volume might be written about them.

Should seem, Would seem. These are useless locutions when plain *seem* or *seems* would express the meaning. They are appropriate, however, to suggest doubt, hesitation, or modesty in expressing a judgment.

Show me. Slang for *prove to me.*

Sick, Ill. See *Ill.*

Signature. Present day usage prefers *under my* (*his*) *signature* to *over my* (*his*) *signature.* Compare "under my hand and seal."

Since when. This phrase, in which *when* is employed as a substantive, is used correctly in a relative clause: "We moved out West, *since when* (or *since which time*) we have not moved again." However, it is not approved in interrogative constructions; as, "*Since when* have you known that?" "How long have you known that?" is correct.

Sit up. We say to a child, "*Sit up*," meaning "sit erectly." We *sit up*, that is, *remain out of bed* until a late hour. Compare the expressive slang, "Make one *sit up* and take notice." These phrases are not in good literary use.

Size up. Slang for *estimate, judge, classify. Up* is very frequent in careless colloquial speech and slang; as, *eat up, all up* (*with*), *stay up*, etc.

Slow, Slowly. Many adjectives in English need no change of form for adverbial use. *Fast* and *slow* are examples of these. Space economy on signs probably helps to maintain this form *slow* in such expressions as "Go *slow*," though it has a long history in the language.

Smart. One should carefully observe the various meanings of this word. It is in good use for *bright, intelligent, brisk*, and *lively.* But in "He is a *smart* boy," the word may have the sense commonly attributed to it formerly, "sharp and impertinent," or that implied by bright and intelligent. After the English manner, one hears of *smart* clothes. The phrase *right smart*, meaning "much," "a good deal of," is provincial.

Smell of. We *smell* the rose, not *smell of* it. But we say properly, "The jar *smells of* rose leaves." The verb is transitive and intransitive.

Some, Somewhat. *Some*, properly an indefinite adjective denoting number or quantity, is often used erroneously for *somewhat*, an adverb of degree, even by educated men and women. Such use appears frequently in the newspapers; but it is condemned as dialectal or provincial by all authorities, and it has no support in literary usage. Say, "I am *somewhat* tired," never "I am *some* tired"; "His estimate is *somewhat* greater," not "*some* greater." The colloquial use of *some*, to suggest exceptional quality or importance, as in "He is *some* manager," is equally to be disapproved.

Sort of. See *Kind.*

Sparrowgrass. A very old dialectal corruption of the correct form *asparagus.*

Spend, Pass. Although *spend the holidays* is sometimes condemned, it is idiomatic English, and is just as good as *pass the summer.*

Split Infinitive. A great deal of ink has been wasted upon this subject. The fact is that English infinitives have been used with discrimination, either *whole* or *split*, for several hundred years. Insistence on *never* putting a word between *to* and the verb is a super-refinement. The following sentence illustrates good usage: "Probably one ought *to come promptly*, if he wants *to thoroughly enjoy* the play." The position of the adverb is a matter of the writer's judgment. Usually, however, good expression will not require a *split infinitive.*

Stand. Colloquial for *endure* in such an expression as "They can't *stand* it."

Stand a chance. Colloquial for *be likely.* "Does he *stand a chance* of election?" means "*Is* he *likely* to be elected?"

Stand for. Colloquial for *endure* or *allow*; as, "We will not *stand for* such conduct."

Standpoint. See *Point of view.*

State. We may say, "He *stated* his reasons in writing." *State* is a formal word and should not be used, as it frequently is in newspapers, to mean simply "say" or "tell."

Station, Depot. A *depot* is properly a place where goods or stores of any kind are kept; the places at which the trains of a railroad stop for passengers and the points they start from or arrive at are properly the *stations.* But, as a *depot* is a place of storage, so a *terminal* of a railroad line, where the rolling stock is kept to make up trains, may be spoken of correctly as a *depot.*

Stop, Stay. The colloquial phrases, *stop off, stop in, stop over*, are frowned on by critics. The first means to "step off" or "alight and stay at" some place; the second means "step in and call" or merely "call"; the last has gained position in railway cant, as in "*stop-over* privileges."

To stop is to arrest motion; *to stay* is to remain where motion is arrested. We may *stop* at a hotel; but how long we *stay* depends upon circumstances.

Storm. A violent commotion of the atmosphere is a *storm.* Avoid the word when referring to *rains* or *snows*, unless *rainstorms* or *snowstorms* are involved.

Street. Many careful speakers regard the expression "They live *in* John *street*" as better and more accurate than "They live *on* John *street.*" General American usage seems to approve *on the street.* Colloquially, we say, "play *in the street*," one's house being thought of as bordering *on* the real *street.* "He has offices *in* Wall *street*" is a form of speech frequently heard. This implies the idea of the *street* as a financial center, including the buildings on it. The whole question turns upon our idea of what the word *street* includes.

Stricken. This form of the past participle of *strike* is used when misfortune or disability is implied: "He was *stricken* with fever"; "They were panic-*stricken*." *Struck* is the usual form for other meanings: "He was *struck* by a stone."

Studying. Avoid the use of such expressions as "He is *studying* for a doctor," when you mean "*studying* medicine" or "preparing to be a doctor." The phrase is school cant. See *Taking*.

Such. "I have never seen *such a small* man" should be "I have never seen *so small a* man," as may be seen by transposing the words of the first sentence, which then becomes "I have never seen a man *such small*." Similarly, *such a pretty, lovely*, etc., should be *so pretty a, lovely a*. However, in the sentence "It was *such a large* package as could not be carried in the car," *such a* is regarded as correct, meaning "a *large package* like this one."

Suffixes. See *Word Building*. Several suffixes are sources of common error, because of indiscriminate use:

-ette. This syllable is a French feminine diminutive, the masculine being *-et*. A *kitchenette*, then, is a little kitchen, feminine because of associations, probably. But *leatherette* is imitation leather. So we pass to the half-humorous, half-contemptuous *farmerette* and *suffragette*.

-let. This is another French ending, meaning "little." One should not say, "little *booklet*," the *little* being superfluous.

Sure. "He will *surely* be here," not "He will be here *sure*." "*Sure*, I'll do it" is slang. *Surely* is the adverb; *sure*, the adjective.

Suspicion. *Suspicion* is not in good use as a verb; prefer *suspect*.

Take. A verb, either transitive or intransitive. Combined with various prepositions and adverbs, it forms many idiomatic phrases and also many colloquial and slang phrases: "One *takes* leave," that is, assumes or receives permission to leave a place or a company; "One *takes to* a person," that is, *likes him*. Some uses, however, are to be avoided as vulgarisms: "She *took on* (*scolded, raged, cried*) dreadfully"; "School *takes up* at 8:30." Compare "*lets out* at 4:00," which is school cant.

Taking. Such phrases as *taking music, taking lessons*, are school cant, probably often in the interest of truth, when *studying*, while more dignified diction, would hardly represent the facts.

Tasty. This word is an objectionable colloquialism for *tasteful*, when applied to persons, dress, furniture, etc. It is allowable in application to food. The following distinction is correct: Pie may be *tasty*, but the decorations of a room should be *tasteful*.

Taxi. A slang word, but occupying a field of its own. It is a short form of *taximeter* cab. *Taximeter* comes directly from the French *taximètre*. *Cab* was originally slang.

Teach. See *Learn*.

Terrible, Frightful. These belong to the class of extravagant adjectives. *Terribly* and *frightfully* are similarly misused for *very* or *very much* or *extraordinarily*, when "terror" and "fright" are not involved. Save strong words for occasions that demand them.

Than. See *Any, Else, Of*.

That, So. *That* is not in good use as an adverb in such phrases as the following: "*that* good," "*that* worthy." "She was *so* worthy that they could not turn her away" is correct. Do not say, "She was *that* worthy, etc." *That*, however, is approved as a demonstrative adverb with expressions of measure or degree: "We could not stay *that* long"; "You will be *that* much farther on your way."

The. As in the case of the indefinite article, the repetition of the definite article *the* in such a series as "*the* bear, *the* deer, and *the* panther" serves to emphasize the individual separateness of the things named. Such repetition is necessary in expressions like the following, to avoid ambiguity: "*the* secretary and *the* treasurer (two persons)," "*the* finished and *the* unfinished manuscript (two manuscripts)." "*The* secretary and treasurer" means one person only.

If used before the first adjective, *the* should be used before each of a series of adjectives applied to one substantive, but distinguishing different objects; as, "*the* expensive, *the* cheap, and *the* medium-priced goods." See *A, An*.

Them, Those. Do not confuse these words. *Them* is the objective case of the plural third personal pronoun; *those* is a plural demonstrative adjective. Say "*those* facts," never "*them* facts."

Then. Used in such a phrase as "the *then* Chief Justice," this word is approved. The use has a long and honorable history. The phrase *then some* for *some more* is slang.

Thence. The preposition *from* with *thence* is superfluous. "He came *thence*" is correct.

Think for. Such a word as *suppose* or *suspect* should be substituted for the phrase *think for* in a barbarous sentence like "He hears more than you *think for*."

Those kind. "*That kind* of shoe is good," not "*those kind*." *Those* is plural; *kind* is singular. Care should be taken to preserve the number in the sentence. See *Kind*.

Through. *To be through* is an American colloquialism, meaning "to have finished," "to have done": "How soon will you *be through* with the work?" The phrase is frequently used and may be classed among our idioms.

To. Never say, "She was *to* my house yesterday." Use *at* in place of *to*. We say, colloquially, "I have been *to* town," and some critics allow the phrase as idiomatic. See *Be back*.

Together. In *meet together* or *converse together*, *together* is superfluous.

Tomorrow. One may say, "*Tomorrow is* or *will be* Monday." But one should say, "*Tomorrow will be* a memorable day."

Touch. Slang in the phrase "*touch* one for money." The phrases, "get into *touch* with" and "keep in *touch* with," where *touch* means "communication," are business cant.

Transparent, Translucent. *Transparent* means "clear," allowing light to pass so that objects may be seen through the substance. *Translucent* means "partially transparent," allowing light to pass but not permitting vision.

Transpire. Do not use this word [illegible] *happen*. We may say, "No informa[illegible] has *transpired*," meaning "None has [illegible]

Treat. A book *treats of* (not *trea*[illegible] of its contents.

Try. We *make* experiments, [illegible] some critics. Others point out [illegible] is laboratory usage; but [illegible] generally approved verb in th[illegible] ments" is school cant.

Try and. It is better [illegible] phrase *try and do*. Use *try* [illegible] this phrase is not quite lik[illegible] *and see*, which is in good [illegible]

Under the circumsta[illegible] *stances*.

Unique. This adjective is not to be compared. One should not say *very unique*, though he may say *quite* or *altogether unique*.

United States. Whether to use *is* or *are* after these words may be a political as well as a linguistic question. General usage approves *is*, though in government official usage there is warrant for *are*.

Universally, All. Do not say, "He was *universally* praised by *all* who heard him." The two words are so similar in meaning that the use of both is redundant. Say, "He was *universally* praised" or "He was praised by *all* who heard him."

Unkempt. Literally, the word means "uncombed," or, figuratively, "rough," "unpolished." It is not to be used generally to mean "disordered," as in *unkempt* rooms. A person may be *unkempt*, a room never.

Up. Superfluously added to many verbs, as in *add up*, *open up*, etc. *Up* should be used with verbs only when it contributes definitely to the meaning or is in good colloquial use.

Use of Infinitive. The present infinitive is used after all tenses unless it refers to action occurring before the time implied in the assertion of the principal verb. Say, "He intended *to do* it," never "He intended *to have done* it." But "He is said *to have been* present" is correct, since his "being present" preceded the saying. *Ought*, being a defective verb, is followed by the present infinitive to express present or future duty, and by the perfect infinitive to express duty in past time: "They ought *to speak*"; "They ought *to have spoken*."

Use to. *Use to*, in the past tense, should be *used to*. "We *used to* live there" is correct.

Verbs, Agreement of. The verb in a sentence must agree with the substantive of the subject in person and number. But there are several puzzling cases which give rise to frequent error.

(1) The subject includes substantives of different numbers: Either the master or his servants *are* at fault. Usage approves a verb agreeing with the nearest substantive. Usually it is better to recast such a sentence and avoid this construction: "The fault lies either with the master or his servants."

(2) Subject collective or distributive: "There *are* (*is*) six dollars in the drawer." If the thought is of the total amount of money, use the singular verb; if the idea of several pieces of money is uppermost, use the plural verb.

Verdict. A word loosely used for *opinion*. *Verdict* should be reserved for official decisions, as of a jury, or for opinion publicly and formally expressed: "That he is unreliable is the *opinion* (not the *verdict*) of all who know him."

Very. Most critics insist that *very* should not immediately precede a past participle used as an ...jective. Not, "He was *very* pleased," but "He ... *much* pleased." *Very* may directly precede ... "That is a *very* good article." Where ...as chiefly an adjective sense, *very* is ... used: "She is a *very* charming

... "He worked with a *view to* the ...s business." "We talked with a ... each other's opinions." These ...pproved usage.

...on. A person's *vocation* is ...g, his business; his *avoca-* ...t occupy him incidentally: ...is banking; his *avocation* is

...fers to the actual fact of ...onal sense or view of the ...*ant* an automobile, when he does not *need* it for his business. Avoid using *want* and *need* loosely in the sense of *lack*.

Was, Is. When, in a subordinate clause, an unchanging truth or a present fact is to be stated, use *is*, not *was*, no matter what the tense of the principal verb: "He knew that ice *is* formed at 32°." The same rule applies to the use of the present tense of any verb: "They should have realized that war *settles* no disputes."

Ways. Wrongly used for *way*. "The house is a long *ways* off" should be "The house is a long *way* off."

Well, Why. The use of these words as exclamations of surprise or dismay may be defended, but too frequently they are simply drawling noises at the beginning of a sentence.

Welsh Rabbit. This excellent product of culinary art has always been just a *rabbit*. The spelling *rarebit* is an error.

Went, Gone. These forms of the verb *go* are frequently confused. *Went* is the past tense; *gone* is the past participle. Say, "They *have gone* (not *have went*)."

Wharf. See *Dock*.

What. "He would not believe *but what* I said it" should be "He would not believe *but that* I said it." See *But*.

Whence. "*Whence* came ye?" not "*From whence* came ye?" *Whence* means "from what place, source, or cause."

Whereabouts. In "His *whereabouts* is unknown," observe the correct singular verb.

Who, Whom. Avoid the common error of misusing *who* for *whom*. Say, "*Whom* are you thinking of?" not "*Who* are you thinking of?" "*Whom* did they mention?" not "*Who* did they mention?" *Whom* is the form to use as the object of a verb or preposition.

Whoever. One should write, "I will give it to *whoever* can use it," but, "I will give it to *whomever* you designate." The syntax of the pronoun in the subordinate clause determines the case.

Whole lot. As a substitute for *much* or *a great deal*, *whole lot* is only in vulgar use; as, "I don't care a *whole lot* for the theater."

Whose, Of which. Some critics object to the use of *whose* in referring to things, but there is precedent for the usage. Sometimes *of which* would bring in an awkward manner of speech. In such cases *whose* should be used: "This is the latest of those political changes *whose* causes we can easily find."

Widow woman. The word *woman* is superfluous here.

Without. This word is a preposition and should not take the place of the conjunction *unless*: "I shall not go *without* my father consents" should read "*unless* my father consents," or the expression might be changed to "*without* my father's consent," where *without* is a preposition.

Worst kind. A vulgarism frequently used in the sense of *very much*; as, "I want to go the *worst kind*."

Yes. Avoid the various vulgar and provincial varieties of this important little word: *yeh*, *ya*, *yep*, *eh-uh*.

You-all. When used to mean simply "you," and applied to more than one person, this is a provincialism of the southern United States. It is not properly used to mean one person only.

Z. The letter is *zee* or *zed*, the former being the common American name, the latter the British.

WORD BUILDING

To be skilled in language, one must know words and their right uses. The elements of spoken language are articulate sounds; those of written language are characters or letters which *represent* those sounds. From these elements, which are known as roots or stems, prefixes and suffixes, words are formed.

Roots. The *root* is the primitive form of any word and existed before the addition of prefix, suffix, or inflectional ending. The syllable preceding it is called the *prefix*; that which comes after it is named the *suffix*. For instance, the root of the word *prefix* is *fig* or *fix* from the Latin *figere*, "to attach"; the syllable *pre* signifies "before." Thus we get the meaning "to attach before." Similarly, the word *suffix*, from *sub* or *suf* meaning "under" or "after" and *figere* "to attach," means "to attach after." Since prefixes are attached before words or roots and suffixes are added at the end, prefixes or suffixes are called *affixes*, from *ad* or *af* meaning "to" and *figere* "to attach." Therefore, an *affix* is one or more letters or syllables added at the beginning or at the end of a word.

Stems. The *stem* is that part of a word to which the case endings or personal endings and tense signs are affixed; sometimes the *stem* is identical with the *root*, though generally it is derived from it with some formative suffix. Stems are so called because inflections were added to parts of words found in other languages, as branches are grafted to the stem or trunk of a tree. They have gradually been transplanted into the English language and may now be studied as constituent parts of our everyday speech. For example, in the Latin word *crucifigere*, "to crucify," we have the root *crux*, "a cross," changed into *cruci*, "to a cross," by the stem ending, *ci*; combining *cruci* and *figere*, which signifies "to attach," we get a word meaning "to attach to a cross."

By learning words from their etymology, we not only remember the meaning of the particular words thus studied, but we also immediately recognize all other words that are similarly formed.

Structure and Relations of Words. We know things best when we can relate them to other things and make comparisons. Besides, to understand a thing thoroughly we must know its parts; for instance, we know a house when we are familiar with its different rooms and the parts of its construction. Many words are built very much as houses are built; they have foundations, and to these are added various parts which are distinguished one from the other, thus making each word useful for definite purposes. We shall, therefore, learn words more intelligently if we are able to recognize the elements out of which they are built.

English has borrowed from Latin and Greek not only entire words, but also the elements of words; that is, stems, suffixes, and prefixes, out of which to make new combinations. By combining these elements, large groups of words have been built up, the words of each group being related through having the same stem.

An Aid to Memory. The meanings of words seldom used are easily forgotten. Recalling them is like groping in the dark. If, however, we know the elements of which these words are made, the difficulty largely disappears. Few people have time to learn Latin or Greek to get the meanings of these word elements; but the essential matters can be selected and grouped for ready reference and study. A little *grouping* of syllables will do away with much *groping* for word meanings. Learn the common meanings of the stems, prefixes, and suffixes given in this section. Master them, a few at a time. This study will largely increase your ability to remember and understand thousands of unfamiliar words. It will also enable you to make much better use of the English dictionary.

Native and Foreign Words. The English language may be regarded as made up, for the most part, of the following groups of words:

1. Simple words retaining exactly or nearly their original Anglo-Saxon form and meaning; as, *man, will, and.*

2. Simple words borrowed from other languages, which words retain their original sense or become somewhat modified in meaning; as, *grand* (French), *pedal* (Latin).

3. Compound words made up of Anglo-Saxon, Latin, Greek, or other elements; as, *roadway* (Anglo-Saxon), *camshaft* (Dutch or French and Anglo-Saxon), *phonograph* (Greek).

4. Anglo-Saxon words formed of a stem and a prefix or suffix; as, *willful, undo, lengthen.*

5. Words made up of stems and prefixes or suffixes from other languages; as, *excise* (Latin), *engage* (French).

Short and Long Words. The English language, like every other cultivated tongue, comprises both short and long words, or, to express it better, "popular" and "learned" words. The former belong to the people in common—are limited to no particular class; the latter are words which may be used by educated speakers in ordinary conversation and are to be met with in general literature.

The short or popular words are those we have known from childhood—they are sufficient to express our immature thoughts and ideas. Later, the mind develops, and, through reading good literature, we become acquainted with a more formal and distinctive style of phraseology. It is thus unconsciously, yet naturally, that we pass from the use of simple words of Anglo-Saxon origin to those so-called learned words derived from the French, the Latin, or the Greek.

The following examples will illustrate methods of building up words to express more or less complicated ideas:

Cablegram, cable-gram (writing) means a writing or message sent by cable or wire.

Centrifugal, centri (center) -fug (fleeing) -al (adj.) means fleeing, or tending to go, from a center.

Comprehensive, com (together) -prehens (grasping) -ive (adj.) means having the quality of seizing or grasping (much) together.

Cosmopolitan, cosmo (world) -polit (citizen) -an (adj.) means having the character or quality of a world citizen.

Impervious, im (not) -per (through) -vi (way) -ous (adj.) means having no way or passage through.

Paraffine, par (um) (too little) -affine (relation) means a substance having little relation, or tendency to unite, with other substances.

Periscope, peri (around) -scope (looker) means literally a looker around, or an instrument to look around with.

Prefixes and Suffixes. In the following lists are grouped the principal prefixes and suffixes and the most commonly used Latin stems of the English language. Their uses are illustrated by the analysis of about 350 common words. The principles illustrated in these lists may be applied generally, and the student will find his grasp of English meanings and spelling greatly improved by careful study of the significations, forms, and uses of the various word elements.

Prefixes commonly *alter the meaning* of the stem in some manner, while *suffixes convert the stem* into various parts of speech, usually without changing the meaning.

In English the same word is freely used as various parts of speech. Consequently, words here given as adjectives may often be met with as nouns, and nouns as adjectives or verbs.

WORD FORMATIONS

Throughout the following lists of words compounded under *Prefixes*, the prefixes are printed in **boldface,** the rest of each word is printed in *italics*; thus, **ob-***stinate.* Similarly, under *Suffixes*, the suffixes are in **boldface,** other syllables in *italics*; as, *verd-***ant.** In the list of *Stems*, the stems are in **boldface,** other syllables in *italics*; as, *in-***clus-***ive.* Meanings of foreign language syllables not defined at the head of each group are given in parentheses; as, *pro* (forth) **-duce.** The word (noun), (adj.), (verb), (adv.), following a suffix, indicates that the suffix gives to the word of which it is a part the force of a noun, a verb, an adjective, or an adverb.

Anglo-Saxon Prefixes

A-, meaning *on* or *in.*
- **A-** *live* means *on* or *in* life.
- **A-** *board* means *on* board.
- **A-** *sleep* means *in* sleep.

Be-, meaning *affecting with* or *by*, or merely emphatic.
- **Be-** *witched* means *affected by* witchcraft.
- **Be-** *dewed* means wet as *with* dew.
- **Be-** *spattered* means spattered or spotted *all over*, as with mud.

For-, meaning *away* or *not.*
- **For-** *bid* means bid or command *not*, or refuse.
- **For-** *get* means *not* to hold, lose hold of.
- **For-** *give* means give or let go *away.*
- **For-** *bear* means keep *away* or *from.*

Fore-, meaning *in front, beforehand*, or *ahead of.*
- **Fore-** *arm* means the arm from elbow to hand.
- **Fore-** *tell* means tell *ahead of* time.
- **Fore-** *stall* means stop *beforehand.*
- **Fore-** *shadow* means to shadow or typify *beforehand.*

Half- and **No-,** as in half-done, nowhere.

Out-, meaning *excelling.*
- **Out-** *shine* means surpass (another) in brightness.
- **Out-** *play* means defeat at play.

To-, meaning *this* or *the.*
- **To-** *morrow* means *the* morrow or morning.
- **To-** *day* means *this* day.

Un-, a negative prefix.
- **Un-** *aware* means *not* heeding or noticing.
- **Un-** *kind* means *not* kind.
- **Un-** *fasten* means loosen bonds or fastenings.
- **Un-** *fair* means *not* fair.

Latin Prefixes

Ab-, meaning *from, not.*
- **Ab-** *duct* (lead) means lead *away.*
- **Ab-** *norm* (rule) *-al* (adj.) means *away* from the rule (norm).
- **Ab-** *sent* (being) means being *away* from, not present.
- **Ab-** *sorb* (suck in) means suck in *from*, as a blotter.

A-, Ad-, Ac-, Ag-, meaning *to.*
- **A-** *scribe* (write) means write *to* or give *to*, grant.
- **Ad-** *here* (stick) means stick *to.*
- **Ac-** *cede* (yield) means yield *to.*
- **Ag-** *gression* (stepping) means a stepping *to* or *forward*, crowding.
- **Ag-** *grav* (weight) *-ate* (verb) means add weight *to*, increase.

Ante-, meaning *before.*
- **Ante-** *cedent* (going) means going *before.*
- **Ante-** *date* means date *before* or *ahead of* time.

Bi-, Bis-, meaning *two.*
- **Bi-** *weekly* means every *two* weeks.
- **Bis-** *cuit* (cooked) means *twice* cooked (dry and hard).
- **Bi-** *sect* (cut) means cut in *two.*

Circum-, meaning *around.*
- **Circum-** *stance* (standing) means that which stands *around*, or accompanies.
- **Circum-** *scribe* (write) means write or draw *around.*
- **Circum-** *spect* (looking) means looking *around*, hence careful.

Com-, Con-, Co-, meaning *with, together*, or *completely.*
- **Com-** *pose* (place) means place *together*, to make.
- **Con-** *ceive* (take) means take to one's self *completely*, understand.
- **Con-** *dole* (sorrow) means sorrow *with.*
- **Co-** *oper* (work) *-ate* (verb) means work *together.*

Contra-, Contro-, meaning *against.*
- **Contra-** *dict* (speak) means speak *against.*
- **Contro-** *versy* (turning) means a turning *against.*

De-, meaning *down, out of, from, completely.*
- **De-** *scend* (climb) means climb *down.*
- **De-** *pend* (hang) means hang *down from.*
- **De-** *ment* (mind) *-ed* (adj.) means *out of* one's mind, insane.
- **De-** *port* (carry) means carry *from* or *away.*
- **De-** *nude* (bare) means make *completely* bare.

Dis-, Dif-, meaning *apart from, from.*
- **Dis-** *sect* (cut) means cut *apart.*
- **Dis-** *perse* (strew) means strew *apart*, scatter.
- **Dis-** *tend* (stretch) means stretch *apart.*
- **Dis-** *sent* (think) means think *apart* or *differently from.*
- **Dif-** *ferent* (bearing) means bearing *away from, not like.*

E-, Ef-, Ex-, meaning *from, out of.*
- **E-** *vade* (walk, go) means walk *away from.*
- **Ef-** *fect* (doing) means a doing *from*, something made *from* another.
- **Ex-** *claim* (cry) means cry *out.*
- **Ex-** *tort* (wrench) means wrench or force *from* or *out of.*
- **Ex-** *tradition* (giving over) means surrender *from*, as a prisoner is given over *from* one authority to another.

Extra-, meaning *outside.*
- **Extra-** *ordinary* (common) means *out of* the common.
- **Extra-** *territorial* means *out of* the territory.

In-, Il-, meaning *not* or *contrary.*
- **In-** *ept* (apt) means *not* apt or fit.
- **In-** *sensible* (feeling) means *not* feeling.
- **In-** *nocuous* (harmful) means *not* harmful.
- **Il-** *legal* (lawful) means *not* lawful.

In-, Im-, Il-, meaning *in, on*, or *upon.*
- **In-** *hale* (breathe) means breathe *in.*
- **In-** *voke* (call) means call *on* or *upon.*
- **Im-** *press* means press *upon.*
- **Il-** *lustr* (light) *-ate* (verb) means throw light *upon.*

Inter-, meaning *between.*
- **Inter-** *urban* (city) means *between* cities.
- **Inter-** *national* means *between* nations.

Intra-, Intro-, meaning *between, among*, or *within.*
- **Intra-** *mural* (wall) means *between* or *within* the walls.
- **Intro-** *duce* (lead) means lead *within* or *into* (knowledge).

Non-, meaning *not.*
- **Non-** *partisan* means *not* related to a party.
- **Non-** *entity* (something) means *not* anything.

Ob-, Op-, meaning *against, to, upon.*
- **Ob-** *stinate* (standing) means standing *against.*
- **Ob-** *ligate* (bind) means bind *to*, as *to* a promise.
- **Op-** *posite* (placed) means placed *against.*
- **Op-** *press* means press *upon*, crush; hence burden, tyrannize over.

Per-, meaning *through, completely, very.*
Per- *ceive* (take) means take *through* (thoroughly), therefore, learn.
Per- *manent* (staying) means staying *through*, continuing.
Per- *forate* (bore) means bore *through.*
Per- *verse* (turned) means turned *around.*

Post-, meaning *after.*
Post- *pone* (place) means place *after*, put off, or defer.
Post- *mortem* (death) means *after* death.
Post- *lude* (play) means (music) played *after.*

Pre-, meaning *before* (in time, place, rank, or degree).
Pre- *lude* (play) means play *before*, hence, music played *before.* Compare *Postlude.*
Pre- *face* (say or speak) means something said or spoken *before.*
Pre- *eminence* (elevation) means an elevation *before*, i.e., *above* others.
Pre- *vail* (strength) means be strong *before* or *in excess of*, hence to be master of.

Pro-, meaning *forth, forward.*
Pro- *pel* (drive) means drive *forward.*
Pro- *ceed* (go) means go *forward* or *forth.*
Pro- *ject* (throw) means throw or extend *forward.*
Pro- *mote* (move) means move *forward.*

Re-, meaning *again* or *back.*
Re- *form* (shape) means change *back*, or into a new shape or form.
Re- *pel* (drive) means drive *back.*
Re- *claim* (call) means call (for) *again*, hence get *back.*
Re- *view* (look at) means look at *again.*

Retro-, meaning *backward.*
Retro- *spect* (looking) means a looking *backward.*
Retro- *gression* (going) means a going *backward.*

Se-, meaning *from, away.*
Se- *cede* (go) means go *away* or *from*, withdraw.
Se- *duce* (lead) means lead *away.*
Se- *cure* (care) means *free from* care or anxiety.

Semi-, meaning *half.*
Semi- *annual* (yearly) means every six months or *half*-yearly.

Sub-, Sup-, Sus-, meaning *under.*
Sub- *marine* (sea) means *under* the sea.
Sub- *soil* means the layer of material *under* or *below* the surface soil.
Sup- *port* (carry) means carry *under*, that is, carry by being *under.*
Sus- *pend* (hang) means hang *under.*

Super-, Sur-, meaning *above, upon.*
Super- *structure* (building) means the building *above* the foundation.
Sur- *pass* means pass *over* or *above*, hence excel.
Sur- *tax* means a tax *above* another.

Trans-, Tra-, meaning *across.*
Trans- *fer* (carry) means carry *across.*
Tra- *verse* (turn, go) means turn or go *across.*

Greek Prefixes

A-, An-, meaning *without, not.*
A- *byss* (bottom) means *without* bottom.
A- *chromat* (color) *-ic* (adj.) means *not* colored.
An- *archy* (government) means *no* government.

Amphi-, meaning *around.*
Amphi- *theater*, means a theater *around* an open space.

Ana-, An-, meaning *up, according to, backward.*
Ana- *tom* (cut) *-y* (noun) means cutting *up.*
Ana- *gram* (writing) means a writing *backwards*, opposed to the usual order.
Ana- *logy* (ratio or proportion) means *up* to the proportion; hence, a resemblance, a likeness.

Anti-, meaning *against.*
Anti- *christian* means *opposed* to Christianity.
Anti- *pathy* (suffering) means a suffering *against*, hence opposition of feeling.

Cata-, Cath-, meaning *down, according to, in respect to.*
Cata- *lepsy* (falling) means a falling *down.*
Cata- *log* (name) means *according to* the name, a list so arranged.
Cath- *olic* (whole) means *in respect to* or *having to do with* the whole; hence, universal.

Dia-, meaning *through, across.*
Dia- *meter* (measure) means a measure or distance *through.*
Dia- *gonal* (angle) means *through* the angle or corner.
Dia- *gram* (writing) means a writing *through*, a plan or drawing.
Dia- *dem* (bind) means something that binds *across*, as a band or fillet across the head.

Hyper-, meaning *over, above.*
Hyper- *critical* means *over*-critical.

Hypo-, meaning *below* or *under.*
Hypo- *dermic* (skin) means *under* the skin.
Hypo- *thesis* (placed) means something placed *under*, as a foundation for reasoning.

Meta-, most often denoting change.
Meta- *phor* (carrying) means a carrying *over* (to another meaning).
Meta- *morphosis* (form) means a *change of* form.

Syl-, Sym-, Syn-, meaning *with, together.*
Syl- *lable* (taken) means taken *together.*
Sym- *pathy* (suffering) means suffering *with.* Compare *Condole.*
Syn- *opsis* (view) means a view *together*, hence a general view or exhibit.
Syn- *thetic* (put) means put *together.*

Anglo-Saxon Suffixes

The following are the principal Anglo-Saxon suffixes. Like the prefixes, these are used with either Anglo-Saxon or foreign stems in their appropriate meanings.

-dom, noun suffix, meaning state or authority of, as in *kingdom.*

-ed, or **-d,** suffix for the past tense and the past participle of verb, as in *load, loaded; hear, heard.*

-en, a verb suffix, meaning to make or cause, as in *deepen, lengthen.*

-er, noun suffix, meaning the agent, as in *leader* or *doer.*

-ful, noun or adjective suffix, meaning full or, sometimes, inclined to, as in *armful, handful, playful.*

-hood, noun suffix of state or quality, as in *manhood* or *hardihood.*

-ing, verbal noun or participial ending, conveying the idea of process, continuance, art, etc., as in *homing, speaking, painting.*

-ish, an adjective ending, with the meaning of resembling, somewhat like or inclined toward, as *bookish, childish.*

-le, a verb suffix often with frequentative and diminutive force, as in *handle, kindle, joggle, nestle, sprinkle.*

-less, adjective suffix, meaning lacking, deprived of, as in *armless, godless, homeless.*

-let, noun suffix, meaning little, as in *booklet, streamlet.*

-like, an adjective suffix, meaning resembling, as in *godlike.*

-ly, an adjective suffix, meaning resembling or having the quality of, as in *godly, homely*; also an adverbial suffix, as in *deeply, warmly.*

-ness, noun suffix, signifying quality, as in *lightness.*

-ship, noun suffix, signifying state, condition, office, or quality, as in *lordship, marksmanship.*

-some, an adjective suffix denoting considerable degree or quality, as in *handsome, wholesome, gladsome, winsome.*

-ty, meaning "ten times," as in *fifty.*

-wise, an adjective or adverbial suffix, signifying manner, as in *lengthwise, otherwise.*

-y, an adjective suffix, meaning like or pertaining to, as in *handy, windy;* or noun suffix, often equal to Latin *-ia* or French *-ie,* as in *history, villainy.*

Suffixes from the Latin, Greek, and French

-able, -ible, adjective suffix.
Vis (see) **-ible** means *possible to see.*
Sal (sell) **-able** means *possible to sell.*
Peace (peace) **-able** means *tending to peace.*
Terr (fright) **-ible** means *tending to create terror.*

-acious, -icious, adjective suffix.
Avar (greed) **-icious** means *given to greed, greedy.*
Aud (dare) **-acious** means *abounding in daring.*
Ten (hold) **-acious** means *given to holding.*

-acity, -icity, noun suffix, often equals *-ness.*
Cap (take) **-acity** means *power of holding* or *taking in.*
Authent (original) **-icity** means the *quality of genuineness.*
Loqu (talk) **-acity** means the *habit of excessive talking, talkativeness.*
Pugn (fight) **-acity** means *fighting quality.*

-acy, noun suffix.
Liter (letter) **-acy** means the *quality of knowing letters.*
Candid (white) **-acy** means *condition of whiteness* (Roman candidates for office were so called because clothed in white.).
Prim (first) **-acy** means the *state of being first or chief.*

-al, adjective or noun suffix.
Leg (law) **-al** means *according,* or *pertaining, to law.*
Plur (many) **-al** means *pertaining to more than one.*
Fin (end) **-al** means *pertaining to the end.*
Gener (class) **-al** means *pertaining to a whole class or body.*

-an, adjective suffix.
Hum (man) **-an** means *pertaining to mankind.*
Urb (city) **-an** means *pertaining to the city.*

-ant, -ent, adjective (-ing) or noun suffix.
Expect (await) **-ant** means *awaiting.*
Verd (green) **-ant** means *of green* or *like green.*
Ard (burn) **-ent** means *burning.*
Pot (power) **-ent** means *powerful.*
Visit **-ant** means *one who visits.*

-ary, adjective or noun suffix, signifying *like* or *connected with.*
Exempl (pattern) **-ary** means *fitted to be a model.*
Liter (letter) **-ary** means *having to do with letters.*
Plen (full) **-ary** means *having fullness* (as of power).

-ate, verb or adjective suffix.
Ex- (out) *cav* (hollow) **-ate** means *to make hollow, hollow out.*
Hibern (winter) **-ate** means *to winter, sleep through winter.*
Dis (out of) *-loc* (place) **-ate** means *to put out of place.*
Plac (please) **-ate** means *to please.*
Aspir (breath) **-ate** means *like breath, breathy.*
De (lacking) *-sper* (hope) **-ate** means *without hope.*

-ation, noun suffix.
Cre (make) **-ation** means *that which is made,* or *making.*
Ex (out of) *-clam* (cry) **-ation** means *that which is cried out,* or *a crying out.*
E (out of) *-limin* (bound) **-ation** means *putting out of bounds, getting rid of.*
Found (basis) **-ation** means that on which anything *stands* or *is founded.*

-ative, adjective suffix.
Authorit **-ative** means *serving for authority.*
Talk **-ative** means *inclined to talk.*
Tent (try) **-ative** means *serving for a trial* or *test.*

-fy, verb suffix.
Ampli (large) **-fy** means *make large.*
Veri (true) **-fy** means *make* or *establish as true.*
Testi (witness) **-fy** means *bear witness.*

-ic, adjective suffix.
Hero **-ic** means *like a hero.*
Poet **-ic** means *like poetry.*
Ascet (exercise, discipline) **-ic** means *pertaining to* or *characterized by self-denial.*

-ile, adjective suffix.
Ag (do, act) **-ile** means *capable of* (*easy*) *action.*
Fac (do) **-ile** means *fit for doing, easy.*
Duct (draw) **-ile** means *capable of being drawn,* as *metal into wire.*
Puer (child) **-ile** means *suited to,* or *like, a child.*

-ine (-in), adjective suffix.
Alkal (lye) **-ine** means *like an alkali* or *lye.*
Femin (woman) **-ine** means *pertaining to a woman.*
Sal (salt) **-ine** means *like salt.*

-ion, noun suffix, equals *-ing.*
Act (do) **-ion** means the *process of doing.*
Re (back) *-tent* (hold) **-ion** means the *act of holding back.*
Solut (loosen) **-ion** means the *process of loosening* or *clearing up.*

-ism, noun suffix.
American **-ism** means a *characteristic of,* or the *spirit of, America.*
Despot **-ism** means the *power of a despot.*
Buddh **-ism** means the *system of religion founded by Buddha.*

-ist, noun suffix.
Flor **-ist** means *seller of flowers.*
Pian **-ist** means *one who plays the piano.*

-ive, adjective suffix.
Primit (first) **-ive** means *like first things* or *beginnings.*
Ef (out) *-fus* (pour) **-ive** means *pouring out* or *like a pouring out.*

-ize, verb suffix.
Real **-ize** means *make real* or *think of as real.*
Civil **-ize** means *make civil* or *refined.*
Agon (struggle) **-ize** means *make,* or *go through, a struggle.*
Critic (judge) **-ize** means *judge* or *cause to pass under judgment.*

-or, noun suffix, equals *-er.*
Fact (do) **-or** means a *doer,* hence something that affects a result.
Con-duct (lead) **-or** means *one who leads* (*with*).
In-struct (build) **-or** means *one who builds* or *prepares* (*teaches*).

-ous, adjective suffix, often equals Anglo-Saxon *-y.*
Aque (water) **-ous** means *watery.*
Courage (boldness) **-ous** means *possessed of boldness.*
Lumin (light) **-ous** means *having* or *giving light.*
Por (hole) **-ous** means *full of minute holes* or *pores.*

-tude, noun suffix, often equals *-ness.*
Ampli (full) **-tude** means *fullness* or *large size.*
Soli (alone) **-tude** means *condition of being alone.*

-ure, noun suffix, often equals *-ing.*
Press **-ure** means a *pressing upon.*
En-clos (shut) **-ure** means a *shutting in.*

Latin Stems

Ag, Act, meaning *do.*
Act *-or* (noun) means *doer.*
Ag *-ent* (noun) means *doer,* especially for another, (derived through the French).
In (not) **-act** *-ive* (adj.) means not *doing* or *acting.*
Re (back) **-act** *-ion -ary* (adj.) means given to *acting back,* or acting according to former habits.

Anim, meaning *life.*
Anim *-al* (adj.) (having quality of) *-cule* (little) means a little thing *having life.*
Anim *-ated* (adj.) (having) means *lively.*
In (not) **-anim** *-ate* (adj.) means not *having life.*

Cap, Capt, Cept, Cip, meaning *take, get.*
Ac (to) **-cept** *-ance* (noun) (the act of) means the act of *taking* to one's self.
Cap *-able* (adj.) means able to *take.*
Cap *-acity* (noun) means power of *taking in* or *holding.*
Capt *-iv* (like) *-ate* (verb) means cause to be like one *taken.*
Con (together) **-cept** *-ion* (noun) (result) means the result of *taking* together or completely, e.g., an idea.
Per (through) **-cept** *-ion* (noun) means a *taking* thoroughly, seeing clearly.
Re (back) **-cept** *-ive* (adj.) (inclined to) means inclined to *take,* or *receive.*

Ced, Cess, meaning *move, go, yield.*
Ac (to) **-cede** means *yield* to.
Ac (to) **-cess** *-ible* (adj.) (possible) means possible to *go* to, or get at.
De (away) **-ced** *-ent* (noun) (one who) means one who *has gone* away, died.
Ex (from, beyond) **-ceed** means *go* beyond.
Pro (forward) **-ceed** means *go* forward.
Pro (forth) **-cess** *-ion -al* (noun) means something related to a *going* forth.
Re (back) **-cess** *-ion -al* (noun) means something related to a *going* back.
(These last two words are used of the music accompanying the entrance and the exit of a choir.)
Se (apart) **-cede** means *go* apart from.
Un (not) *-suc* (under) **-cess** *-ful -ly* (adverb) means not *going* or *following* under, that is, not attaining or succeeding.

Clud, Clus, meaning *close, shut.*
Con (completely) **-clude** means *shut* finally.
In (not) *-con* **-clus** *-ive* (adj.) *-ly* (adv.) means not *closing* completely.
In (in) **-clus** *-ive* (adj.) means *shutting* in or including.
Pre (before) **-clude** means *shut before,* hence put up a barrier against.
Se (away) **-clude** means *shut* away, withdraw.
Re (away) **-cluse** means one who is *shut away,* one who lives apart from society.

Dic, Dict, meaning *speak, tell, declare.*
Ab (away) **-dic** *-ate* (verb) means *speak* or *declare* away, as a position, a throne, give up.
De (apart) **-dic** *-ation* (noun) (an act) means an act of *speaking,* or *declaring* (a thing) apart; hence, setting apart, as a church.
Dict *-at* (the act) *-or* (noun) (agent) *-ial* (adj.) means characterized by the act or manner of a *speaker* or commander—like a dictator.
In (against) **-dict** *-ment* (noun) means a *declaration* against (a person), an accusation.

Domin, meaning *power* or *rule.*
Domin *-ant* (adj.) means *ruling, controlling,* or *principal.*
Domin *-ation* (noun) (state of) means the state or act of *ruling.*
Pre (above) **-domin** *-ate* (verb) means *rule* above or as superior to.

Duc, Duct, meaning *lead, draw, bring.*
Ad (to) **-duce** means *lead* or bring to, as proof to a statement.
Con (with) **-duc** *-ive* (adj.) (tending to) means tending to lead, or suitable to be led with, that is, helpful.
De (from) **-duce** means *draw* from, as a conclusion from a statement.
De (from) **-duct** *-ion* (noun) (act of) means a *taking* away from.
In (into) **-duct** *-ion* (noun) (act of) means a *leading* into, as an electric current is led into one coil from another.
Pro (forth) **-duce** means *bring* forth.
Pro (forth) **-duct** *-iv* (having power of) *-ity* (state of) means the state of having power of *bringing* forth.

Fac, Fact, Fect, Fict, meaning *make* or *do.*
Af (to) **-fect** means *do* to, as one thing does something to another.
Af (to) **-fect** *-ion* (noun) (-ing) means *making* toward, aspiring to, hence love.
Fac *-simile* (likeness) means a *made* likeness.
Fact *-ory* (noun) (place for) means a place for *making.*
Per (thoroughly) **-fect** means *made* completely.

Fer, Lat, meaning *bear, carry, move.*
Dif (apart) **-fer** *-ent* (adj.) means *bearing* apart.
E (from) **-lated** means *carried* from or out of, as out of one's usual self.
Ob (to) **-lat** *-ion* (noun) means something *borne* to or offered.
Re (back) **-late** means *bear* or *carry* back, that is, to some one or to something else, connect.
Super (above) **-lat** *-ive* (adj.) means *borne* over or above, the highest.
Un (not) *-trans* (across) **-lat** *-able* means not possible to *carry* across, as from one language to another.

Fid, meaning *belief, trust, faith.*
Con (with) **-fide** means share *trust* with.
Dif (apart) **-fid** *-ent* (adj.) means lacking *trust* or *faith,* especially in oneself.
In (not) **-fid** *-el* (noun) (one who) means one who lacks *faith,* unbeliever.

Fin, meaning *end* or *limit.*
De (from) **-fin** *-ition* (noun) (that which) means something that marks off or *limits* one thing from another.
In (not) **-fin** *-ite* (adj.) means not *limited.*
Un (not) *-con* (together) **-fin** *-ed* (Anglo-Saxon participle ending) means not *bounded* or shut in.
Fin *-ish* (verb) means make an *end.*

Flect, meaning *bend.*
De (from) **-flect** means *bend* from or aside.
Re (back) **-flect** *-ion* (-ing) means a *bending* back.

Flict, meaning *strike.*
Af (to, at) **-flict** means *strike* at.
In (on) **-flict** means *strike* on.

Frang, Frag, Fract, meaning *break.*
Frang *-ible* (adj.) means possible to *break.*
Frag *-ile* (adj.) means fitted, or likely, to *break.*
Frag *-ment* (noun) means that which is *broken.*
Fract *-ure* (noun) means a break or a result of *breaking.*

Grad, Gred, Gress, meaning *step, go.*
Con (together) **-gress** means that which *goes* together, hence, an official gathering or body.
De (down) **-grade** means cause to *step* down.

In (in) **-gred** *-i -ent* (noun) means that which *goes* into, as a part of a mixture.
Retro (backward) **-grade** (adj.) means *going* backward.
Un (not) *-pro* (forward) **-gress** *-ive* (adj.) means not *going* forward.

Leg, Lig, Lect, meaning *choose, pick, read.*
E (from) **-lect** *-or* (noun) means one who *chooses* from, as from a number of candidates.
In (not) *-e* (out) **-lig** *-ible* (adj.) means not possible to be *chosen.*
Intel (between) **-lig** *-ent* (adj.) means fitted to *select* between, or choose.
Leg *-ibil -ity* (noun) means *readableness.*
Se (from) **-lect** *-ive* (adj.) means fitted to *choose* from, or concerned with choosing.

Mand, Mend, probably from *manus* (hand) and *dare* (to give).
The stems imply authority.
Com (emphatic) **-mand** (verb) means exercise *authority.*
Com (emphatic) **-mend** *-at -ion* (noun) means an *authoritative* approval.
De (from) **-mand** (verb) means ask from with *authority.*

Mitt, Miss, meaning *send, let go.*
Ad (to) **-miss** *-ion* (noun) means a *sending* or letting in.
Com (with) **-mit** means *send* with.
Re (back) **-mit** means *send back,* hence *restore* or *forgive.*
Miss *-ive* (noun) means that which is *sent.*
Inter (between) **-miss** *-ion* (noun) means a *sending between,* hence an interruption or recess.
Per (through) **-miss** *-ion* (noun) means *letting go* altogether, allowing.

Mov, Mot, Mob, meaning *move.*
Auto (self) **-mob** *-ile* (adj.) means able to *move* itself. Used as noun.
Com (emphatic) **-mot** *-ion* (noun) means a disturbed, violent *moving.*
Mot *-or* (noun) means that which *moves.*
Pro (forward) **-mot** *-er* (noun) means one who *moves* (things) forward.
Re (back) **-move** means *move* back or away.

Pend, Pens, meaning *hang.*
Ap (to) **-pend** means *hang* to.
De (from) **-pend** *-ent* (noun) means one who *hangs* from.
Sus (under) **-pense** means a *hanging* under.

Pon, Pos, meaning *place, put.*
Com (together) **-pos** *-ite* (adj.) means *put* together.
Im (on) **-pos** *-it -ion* (noun) means something *put* upon, a burden.
Ex (forth, out) **-pon** *-ent* (noun) means *that which puts forth, sets out,* or *explains.*
Op (against) **-pon** *-ent* (noun) means one *placed* against.
Pro (forth) **-pose** means *put* forth or forward.

Port, meaning *carry.*
Ex (out) **-port** means *carry* out.
Im (in) **-port** means *carry* in.
Im (in) **-port** *-ant* (adj.) means *carrying* in, as if something weighty or of worth.
Re (back) **-port** means *carry* back.

Prob, meaning *proof, esteem.*
Prob *-at -ion* (noun) means a state or process of *proving.*
Re (back) **-prov** *-ing -ly* (adv.) means in a manner indicating withdrawal of *esteem.*

Reg, Rect, meaning *rule, lead, straight.*
Cor (with) **-rect** means *straight* with, as with some standard.
Di (apart, asunder, i.e., distinctly) **-rect** means distinctly *straight.*
E (out) **-rect** means *straight* out, or up, from.
Reg *-ul -ar* (adj.) means according to *rule.*
Reg *-ul -ate* (verb) means bring under *rule.*

Rupt, meaning *break, burst.*
Ab (off) **-rupt** means *broken off,* hence sudden or hasty.
Cor (together, altogether) **-rupt** means *break,* destroy completely.
Inter (between) **-rupt** means *break* in between.

Scrib, Script, meaning *write.*
De (down) **-scribe** means *write* down.
In (in or on) **-scribe** means *write* in or on.
Pre (before) **-script** *-ion* (noun) means something *written* before to be followed.
Sub (under) **-scribe** means *write* under, as one's name.

Sent, Sens, meaning *feel, think.*
Sense *-less* (adj.) means lacking *thought* or *feeling.*
Sent *-i -ment* (noun) means that which is *felt.*
Con (with) **-sent** means *feeling with,* hence agreement.

Sequ, Secut, meaning *follow.*
Con (with) **-sequ** *-ence* (noun) means that which *follows* with.
Per (through, thoroughly) **-secut** *-ion* (noun) means a *following* through to the end.

Sta, Sist, Stin, meaning *stand.*
As (to) **-sist** *-ance* (noun) means that which *stands* to or by.
Con (with) **-sist** *-ent* (adj.) means *standing,* or agreeing, with.
Per (through) **-sist** means *stand* through, hence remain unmoved, continue steadfastly.
De (apart) **-stine** means cause to *stand* apart, or to make fast for a particular end.
Un (not) **-sta** *-ble* (adj.) means not able to *stand.*

Tend, Tent, Tens, meaning *stretch.*
At (to) **-tend** means *stretch* to or toward.
Ex (out) **-tend** means *stretch* out.
Ex (out) **-tens** *-ive* (adj.) means *stretched* out.
In (to) **-tent** *-ion* (noun) means a *stretching* to or toward, as of the mind toward an object.

Tent, Tin, meaning *hold.*
Dis (apart) *-con* (together) **-tin** *-u -ous* (adj.) means not *holding* together, but apart.
Re (back) **-tent** *-ive* (adj.) means fitted with or able to *hold* back, or keep.

Tract, meaning *draw, lead.*
Con (together) **-tract** *-ion* (noun) means *drawing* together.
Re (back) **-tract** means *take* back.
Tract *-able* (adj.) means possible to be *led.*

Ven, meaning *come.*
Ad (to) **-vent** *-ure* (noun) means something that is *come* to or met, a happening.
Con (together) **-vent** *-ion* (noun) means a *coming* together.
Inter (between) **-vene** means *come* between.
Pre (before) **-vent** means *come* before.

Vert, Vers, meaning *turn.*
A (from) **-vert** means *turn* from.
Ir (not) *-re* (back) **-vers** *-ible* (adj.) means not possible to be *turned* back.
Sub (under) **-vert** means *turn* under or destroy.

Vid, Vis, meaning *see, look.*
In (not) **-vis** *-ible* (adj.) means not possible to be *seen.*
Pro (forward) **-vis** *-ion* (noun) means a *looking* forward, getting ready.
Re (again) **-vise** means *look at again,* hence examine again and alter.

Viv, Vit, meaning *live, life.*
Re (again) **-vive** means *live,* or cause to *live,* again.
Vit *-al* (adj.) means like or connected with *life.*
Viv *-ac -ious* (adj.), characterized by *life, lively.*

Voc, meaning *call.*
E (out) **-voke** means *call* out.
In (on) **-voc** *-ation* (noun) means a *calling* on.
Ir (not) *-re* (back) **-voc** *-able* (adj.) means not possible to be *called* back.

DERIVATION OF ENGLISH WORDS FROM THE LATIN

The foregoing list of prefixes, suffixes, and stems will aid in the study of the derivation of words. Moreover, it serves as a key to the means by which words are deduced from others known as primitives. Since more than half the words in the English language come directly or indirectly from the Latin, a study of the derivation of these words will be found of inestimable value.

While it is true that the study of one language may help one to learn another language, and that the study of Latin in particular makes one know English better, it does not follow that it is necessary to have studied Latin in order to understand words of Latin origin.

In the following groups of derivatives will be found first the Latin word with its English equivalent. That the structure of the English words built on the Latin may stand out as clearly as possible, the nominative and genitive (possessive) cases of the nouns have been given, while each verb is shown in the first person singular present indicative, together with the perfect participle.

No attempt has been made to give a list of all words derived from each root. With the aid of the dictionary, it will be found both interesting and instructive to see how many more words from the same root or stem may be added to the different groups. Always compare carefully each English word with the Latin word placed at the head of each group. Note how much or how little of the Latin word enters into the formation of the English word derived from it. The analysis of a few words taken from the list will serve as an excellent guide:

Capio is a Latin word meaning *I take*. It is formed from the verb stem *cap*. By attaching to the verb stem *cap* the Latin adjective suffix *a-ble* (able), meaning *tending* or *possible to*, we get the word *capable*, meaning *possible to take*, hence *having ability*.

The Latin word *duco, I lead*, is formed from the verb stem *duc*. The perfect participle of *duco* is *ductus*. The Latin stem, known as the supine stem, is *duct*. By affixing *intro*, a Latin prefix meaning *within* or *into*, and affixing the Latin noun suffix *ion*, meaning *the act of*, we get the word *introduction*, meaning the *act of leading into*.

Labor is a Latin word meaning *work*. The genitive singular, corresponding to the English possessive, is *laboris*. The stem is *labor*. By adding to the stem the Anglo-Saxon noun suffix *er*, meaning *one who does*, we get the word *laborer*, a workman.

Dens is a Latin word meaning *tooth*. The genitive singular is *dentis*. The stem is *dent*. By affixing to the stem the Greek noun suffix *ist*, meaning *one who is skilled in*, we get the word *dentist*, a tooth doctor. By adding to the stem *dent* the Latin prefix *tri*, meaning *three*, we get the word *trident*, meaning three toothed, hence a three-pronged fork or spear.

AL'TUS, high.

al'tar, a raised place for sacrifice.
al-tis'o-nant, high-sounding, lofty.
al'ti-tude, height, extent upward.
al'to, high, a term in music.
ex-alt', to raise, to extol, to elevate.
ex-al-ta'tion, a lifting up.

AN'GU-LUS, a corner. AN'GU-LI, of a corner.

an'gle, a corner.
an'gu-lar, having angles or corners.
e'qui-an-gu-lar, having equal angles.
quad'ran-gle, a figure having four angles, a square.
rec'tan-gle, a figure having right angles.
tri'an-gle, a three-angled figure.

AN'I-MA, life, breath. AN'I-MÆ, of life, breath.

an'i-mal, a living creature.
an-i-mal'cule, a small animal.
an'i-mate, to impart life to.
an-i-ma'tion, state of possessing life.
in-an'i-mate, without life.
re-an'i-mate, to bring back to life.

AN'NUS, a year. AN'NI, of a year.

an-ni-ver'sa-ry, a yearly festival.
an'nu-al, yearly.
an-nu'i-tant, one who receives a yearly allowance.
an-nu'i-ty, an amount payable yearly.
bi-en'ni-al, occurring every two years.
cen-ten'ni-al, once in a hundred years.
per-en'ni-al, lasting for years.
su-per-an'nu-at-ed, disqualified by age.
su-per-an-nu-a'tion, a retiring allowance.
tri-en'ni-al, occurring every three years.

A'QUA, water. A'QUÆ, of water.

a-qua-for'tis, (literally, powerful water) nitric acid.
a-qua'ri-um, an artificial pond for aquatic plants or animals.
a-qua'ri-us, the water bearer, a constellation.
a-quat'ic, adapted to water.
aq'ue-duct, a conduit for water.
a'que-ous, watery.
a'qui-form, in the form of water.
sub-a'que-ous, being under water.
ter-ra'que-ous, consisting of land and water.

AR'MA, arms, weapons. AR-MO'RUM, of arms, weapons.

arm, a weapon, a limb.
ar'ma-ment, an armed force.
ar'mor-er, a maker of arms.
ar'mor-y, a place for arms, an arsenal.
ar'my, a body of soldiers.
dis-arm', to deprive of arms.
un-armed', without arms or weapons.

BE'NE, well, kindly.

ben-e-fac'tion, a doing good, a gift.
ben-e-fac'tor, one who benefits others
ben-e-fi'cial, useful, advantageous.
ben'e-fit, aid, an act of kindness.
be-nev'o-lence, good will.
be-nev'o-lent, kind, charitable.
be-nign', gentle, mild.
be-nig'ni-ty, mildness, kindness.

CA'DO, I fall. CA'SUS, fallen.

ac'ci-dent, that which comes or falls by chance.
ca'dence, a fall of the voice.
case, condition, state.
cas'u-al, accidental, unexpected.
cas'u-al-ty, that which occurs by chance.
cas'u-ist, one who settles cases of conscience
de-ca'dence, a falling away, a deterioration.
de-cay', to fall away, to decline.

CAL'CU-LUS, a pebble. CAL'CU-LI, of a pebble.

cal'cu-la-ble, that may be reckoned or depended on.
cal'cu-la-ry, pertaining to counting.
cal'cu-late, to count, to estimate, to plan.
cal-cu-la'tion, the process of counting.
cal'cu-la-tor, a ready reckoner, one who calculates.
cal'cu-li-form, shaped like a pebble.
cal'cu-lus, a stony concretion in the body, a disease; also a branch of mathematics.

CAP'I-O, I take. CAP'TUS, taken.

ac-cept', to take when offered.
ca'pa-ble, having ability, mental or physical.
ca-pa'cious, able to take on a large scale, spacious.
cap'tious, peevish, faultfinding.
cap'ti-vate, to capture, to take by charm.
cap'tive, one who is taken prisoner.
cap-tiv'i-ty, imprisonment, bondage.
cap'tor, one who takes or holds captive.
cap'ture, a seizure, a prize.

CA'PUT, the head. CAP'I-TIS, of the head.

cape, a headland.
cap'i-tal, standing at the head, chief.
cap-i-ta'tion, counting by heads.
pre-cip-i-ta'tion, headlong or rash haste.
re-ca-pit'u-late, to sum up or enumerate by heads.

CA'RO, flesh. CAR'NIS, of flesh.

car'nage, slain flesh, slaughter.
car'nal, fleshy, not spiritual.
car-na'tion, flesh color; a flower.
car-niv'o-rous, devouring flesh.
in-car'nate, clothed with flesh.
in-car-na'tion, state of being clothed with flesh.

CA'VE-O, I take care. CAU'TUS, avoided.

cau'tion, care, prudence.
cau'tion-a-ry, warning or caution.
cau'tious, careful, prudent.
ca've-at, a warning, a legal caution.
in-cau'tious, heedless, careless, rash.
pre-cau'tion, care beforehand.

CE'DO, I go, I yield, I give up. CES'SUS, given up.

cede, to give up, to grant, to surrender.
ces'sion, a yielding or a giving up.
con-cede', to yield, to grant, to admit to be true.
con-ces'sion, a conceding or yielding.
ex-ceed', to go beyond.
ex-cess', more than is necessary.
pre-cede', to go before.
pre-ced'ence, priority of place or rank.
pre-ced'ent, going before, previous.
prec'e-dent, an authoritative example.
pred-e-ces'sor, one who goes before.
pro-ceed', to go forward, to advance.

CEN'TRUM, the middle. CEN'TRI, of the middle.

cen'ter, the middle.
cen'tral, relating to the center.
cen-trif'u-gal, proceeding or flying away from the center.
cen-trip'e-tal, tending toward the center.
con'cen-trate, to bring to a common center.
con-cen'tric, having a common center.
ec-cen'tric, out of the center.
ec-cen-tric'i-ty, oddity.

CEN'TUM, a hundred.

cent, the hundredth part of a dollar.
cen'te-na-ry, a period of one hundred years.
cen-ten'ni-al, completing a hundred years.
cen'ti-pede, an insect with a hundred feet.
cen-tu'ri-on, the captain of a hundred soldiers.
cen'tu-ple, a hundredfold.
cen'tu-ry, one hundred consecutive years.

CIR'CU-LUS, dim. of CIR'CUS, a circle. CIR'CU-LI, of a circle.

cir'cle, a ring, a circumference.
cir'cled, surrounded.
cir'clet, a little circle.
cir'cuit, distance round any space or area.
cir-cu'i-tous, roundabout, indirect.
cir'cu-lar, in the form of a circle.
cir'cu-late, to move round.
cir'cus, an open space for sports.
en-cir'cle, to enclose in a circle, to surround.
sem-i-cir'cle, half of a circle.

CI'VIS, a citizen. CI'VIS, of a citizen.

civ'ic, pertaining to a city or a citizen.
civ'il, polite; pertaining to the rights of a citizen.
ci-vil'ian, a citizen, not a soldier.
ci-vil'i-ty, politeness; a state of civilization.
civ'i-lize, reclaim from savagery.
in-ci-vil'i-ty, neglect of courtesy.

CRE'DO, I believe. CRED'I-TUS, believed.

cre'dence, belief, credit.
cre-den'da, things to be believed.
cre-den'tial, that which gives a title to belief.
cred'i-ble, worthy of belief.
cred'it, belief, trust.
cred'i-ta-ble, worthy of belief.
cred'i-tor, one who believes, trusts, or credits.
cre-du'li-ty, belief, or readiness of belief.
cred'u-lous, believing too readily.
creed, that which is believed, doctrine.
dis-cred'it, to disbelieve.
in-cre-du'li-ty, unbelief.

CRE'O, I create. CRE-A'TUS, created.

cre-ate', to make, to form.
cre-a'tion, the act of creating.
cre-a'tive, having the power to create.
cre-a'tor, one who creates.
crea'ture, that which has been created.
re-cre-a'tion, making or forming anew.
rec-re-a'tion, refreshment after toil.

DENS, a tooth. DEN'TIS, of a tooth.

dent, a slight depression.
den'tal, pertaining to the teeth.
den'ti-frice, tooth powder, paste, or wash.
den'tist, a tooth doctor.
in-dent', to make a toothlike cut into.
tri'dent, a three-pronged fork or spear.

DEX'TER, (on) the right hand (adj.).

am-bi-dex'trous, using both hands equally.
dex'ter, pertaining to the right hand (heraldry).
dex-ter'i-ty, skill in using the hands.
dex'ter-ous, clever, handy.
dex'ter-ous-ly, skillfully.
dex-tral'i-ty, state of being more efficient with the right hand.

DE'US, God. DE'I, of God. DI-VI'NUS, from DI'VUS, pertaining to God.

de'i-fy, to make a god of.
de'ist, one who believes in God, but denies supernatural revelation.
de'i-ty, divinity, godhead.
di-vine', holy, sacred.
div-i-na'tion, a foretelling of future events, the act of divining.
di-vin'i-ty, theology, the Deity.

DI'CO, I appoint, DI-CA'TUS, appointed.

ab'di-cate, to give up or relinquish.
ded'i-cate, to devote to a special use.
in'di-cate, to point out, to show.
in-di-ca'tion, a pointing out, a hint or suggestion.
in-dic'a-tive, pointing out.
pred'i-cate, to proclaim, declare, affirm.

DI'CO, I say. DIC'TUS, said.

ben-e-dic'tion, a blessing.
con-tra-dict', to say against.
dic'tate, to say to, to declare with authority.
dic-ta'tor, one who has power to command.
dic'tion, a mode of speech.
dic'tion-a-ry, a wordbook.
dic'tum, an authoritative statement.
in'ter-dict, to forbid, to prohibit.
mal-e-dic'tion, evil speaking.
pre-dict', to say beforehand.
val-e-dic'tion, a farewell.
ver'dict, opinion pronounced.

DI'ES, a day. DI-E'I, of a day.

an-te-me-rid'i-an, before noon.
di'al, a plate marked with the hours of the day.
di'a-ry, a daily record.
di-ur'nal, daily.
me-rid'i-an, mid-day, or noon.
post-me-rid'i-an, after noon.
quo-tid'i-an, recurring daily.
si'ne di'e, without day.

DI'GE-RO, I dissolve, separate. DI-GES'TUS, dissolved, separated.

di-gest' (verb), to dissolve (as of food).
di'gest (noun), a compilation, a compendium.
di-gest'i-ble, capable of being dissolved.
di-ges'tion, the process of dissolving food.
di-ges'tive, that which aids digestion.
in-di-gest'ed, not digested, without order.
in-di-gest'i-ble, not easily dissolved.
in-di-ges'tion, lack of digestion, dyspepsia.

DI'VI-DO, I divide. DI-VI'SUS, divided.

di-vide', to sever, to separate.
div'i-dend, the number to be divided.
di-vis'i-ble, capable of being divided.
di-vi'sion, the process of dividing.
di-vi'sor, the number that divides.
in-di-vis'i-ble, not separable into parts.

DOM'I-NUS, a lord or master. DOM'I-NI, of a lord or master.

dom'i-nant, ruling, governing, prevailing.
dom'i-nate, to exercise control over.
dom-in-eer', to rule with insolence.
do-min'i-cal, belonging to the Lord's day.
do-min'ion, supreme authority, the power of ruling.
don, a Spanish title.
pre-dom'i-nance, superiority, ascendancy.
pre-dom'i-nate, to prevail, to rule.

DU'CO, I lead. DUC'TUS, led.

con-duct', to lead, to guide.
de-duc'tion, a withdrawing, an inference.
duc'at, a ducal coin.
duc'tile, capable of being drawn out.
duke, a leader, a chief.
ed'u-cate, to lead forth, to instruct.
in-duct', to lead in, to install.
in-tro-duc'tion, a leading into.
pro-duce', to bring forward, to lead forth.
pro-duc'tive, having the power to produce, fertile.
re-duc'tion, act of reducing, bringing down.
tra-duce', to slander, to defame.

DU'RUS, hard, solid, lasting.

du'ra-ble, able to endure, lasting.
dur'ance, personal restraint, imprisonment.
du-ra'tion, continuance in time.
dur'ing, throughout.
en-dur'ance, ability to bear, sufferance, patience.
en-dure', to last, to withstand, to suffer.

ER'RO, I wander. ER-RA'TUS, wandered.

err, to mistake, to wander from truth.
er'rant, roving, wandering.
er-rat'ic, wandering, moving.
er-ra'tum, an error or mistake in writing or printing.
er'ror, a wandering from the truth.

E-RUM'PO, I burst forth, break out. E-RUP'TUS, burst, broken out.

dis-rupt', to break asunder forcibly.
dis-rup'tion, bursting of rocks (in an earthquake).
e-rum'pent, bursting out (as of buds).
e-rupt', to burst forth (as a volcano).
e-rup'tion, a breaking out.
e-rup'tive, inclined to break out.
rup'ture, a breaking of tissues, or of a blood vessel.
rup'tured, having a hernia.

FAL'LO, I deceive. FAL'SUS, deceived.[1]

fal-la'cious, misleading, deceptive.
fal'la-cy, a deception.
fal'li-ble, liable to err.
false, not true.
fal-set'to, a feigned voice.
fal'si-fy, to make false.
fal'si-ty, an untruth.
in-fal'li-ble, not liable to err.

FE'RO, I carry, bring. LA'TUS, carried, brought.

con-fer', to consult together.
de-fer', to put off, to delay, to withhold.
fer'tile, capable of bearing, carrying.
pre-fer', to carry before or regard as better.
re-late', to bring into relation, to connect (as of facts).
rel'a-tive, that which can be brought close together, compared, connected.
trans-fer', to carry over.
trans-late', to carry across, to render into another language.

FI'DES, faith, trust. FI-DE'I, of faith, trust.

af-fi-da'vit, pledging one's faith, a declaration made on oath.
bo'na fi'de, in good faith.
con-fide', to trust in.
con'fi-dence, a firm trust.
dif'fi-dence, want of faith.
fi-del'i-ty, faithfulness.
fi-du'ci-a-ry, one who holds in trust.
in-fi-del'i-ty, unfaithfulness, unbelief.
per'fi-dy, a breach of faith.

FI-GU'RA, a shape. FI-GU'RÆ, of a shape.

con-fig'ure, to give form or shape to.
dis-fig'ure, to deform, to deface.
ef'fi-gy, an image, a likeness.
fig'ur-a-tive, not literal.
fig'ure, a shape, a digit.
pre-fig'ure, to shape beforehand, to foreshadow.

FI'NIS, the end or limit. FI'NIS, of the end or limit.

con-fine', to keep within limits.
con'fines, boundaries, limits.
de-fine', to mark limits.
def'i-nite, clearly defined.
fi'nal, at an end.
fin'ish, to bring to an end.
fi'nite, having an end.
in'fi-nite, without end.

FIR'MUS, strong, durable.

af-firm', to declare or assert positively.
con-firm', to make strong, to corroborate.
firm, fixed, strong, durable.
in-firm', weak, not strong.
in-fir'ma-ry, a place for the sick.
in-fir'mi-ty, weakness, feebleness.

FLAM'MA, a flame. FLAM'MÆ, of a flame.

flam'beau (*through Fr.*), a flaming torch.
flame, a stream of fire.
in-flame', to kindle, to excite.
in-flam'ma-ble, capable of being easily set on fire.
in-flam-ma'tion, a heated swelling, an excitement.
in-flam'ma-to-ry, tending to inflame, kindle.

FO'LI-UM, a leaf. FO'LI-I, of a leaf.

cinque'foil (*through Fr.*), a five-leaved clover.
foil, a leaf or thin sheet of metal.
fo-li-a'ceous, having the texture of leaves.
fo'li-age, a cluster of leaves, flowers, and branches.
fo'li-ate, to beat into leaves.
fo'li-o, a four-paged sheet.
port-fo'li-o, case for loose leaves.
tre'foil (*through Fr.*), a three-leaved clover.

FOR'MA, form, appearance. FOR'MÆ, of form, of appearance.

form, shape, figure.
for'mal, according to form.
for-mal'i-ty, state of being formal, ceremony.
for-ma'tion, the act of forming.
in-for'mal, without ceremony.
mul'ti-form, having many shapes.
ref-or-ma'tion, a reforming or changing for the better.
re-for-ma'tion, forming anew.
trans-form', to change form.
u'ni-form, alike in form.

FOR'TIS, strong, valiant.

com'fort, to give strength, to cheer.
ef'fort, to put forth strength.
en-force', to put in force.
fort, a stronghold.
for-ti-fi-ca'tion, a strong place.
for'ti-fy, to make strong.
for-tis'si-mo (*It.*), in music, a direction to sing with the utmost strength.
for'ti-tude, strength or firmness of mind.
for'tress, a fortified place.
re-en-force', to strengthen.

FRA'TER, a brother. FRA'TRIS, of a brother.

con-fra-ter'ni-ty, a society, a brotherhood.
fra-ter'nal, brotherly.
fra-ter'ni-ty, brotherhood.
frat'er-nize, to join as brothers.
frat'ri-cide, killing a brother.
fri'ar (*through Fr.*), a monk.

FU'GI-O, I flee. FU'GI-TUS, fled.

cen-trif'u-gal, flying away from the center.
fu-ga'cious, fleeing away.
fu'gi-tive, a runaway.
ref'uge, a place of shelter.
ref-u-gee', one who flees for refuge.
sub'ter-fuge, a fleeing under, or an artful evasion.

GRA'DI-OR, I step. GRES'SUS, stepped.

deg-ra-da'tion, a lowering in degree.
di-gress', to step aside, to diverge.
e'gress, a stepping out of.
gra-da'tion, an advance step by step.
grade, step, rank, or degree.
grad'u-al, step by step.
grad'u-ate, to grade.
in'gress, a stepping into.
prog'ress, a stepping forward.
ret'ro-grade, stepping backward.

GRA'TUS, thankful, acceptable.

grate'ful, thankful, agreeable.
grat'i-fy, to delight, to please.
gra'tis, free, without recompense.
grat'i-tude, thankfulness.
gra-tu'i-tous, free, uncalled for.
gra-tu'i-ty, a free gift.

GREX, a flock. GRE'GIS, of a flock.

ag'gre-gate, to collect or unite into a mass.
con'gre-gate, to collect or assemble as a flock.
con-gre-ga'tion, a gathering, an assembly.
e-gre'gious, away from the flock, hence remarkably bad.
gre-ga'ri-ous, moving in flocks.
seg're-gate, to set apart, to separate.

HA'BE-O, I have. HAB'I-TUS, had, or held.

ex-hib'it, to hold forth to view.
hab'it, custom, use.
hab-i-ta'tion, a place held as an abode.
ha-bit'u-al, customary, commonly done.
in-hab'it, to dwell or live in.
pro-hib'it, to hold away, to prevent, to forbid.

HÆ'RE-O, I stick, or adhere. HÆ'SUS, adhered.

ad-here', to stick to.
ad-he'sion, a sticking to.
ad-he'sive, sticky.
co-her'ent, sticking together, cleaving.
in-co-her'ent, loose, unconnected.
in-her'ent, inseparable by nature.

HOS'PES, a host. HOS'PIT-IS, of a host (*through hostis*, a stranger, an enemy).

hos'pi-ta-ble, kind to guests.
hos'pi-tal, a place for the sick.
hos-pi-tal'i-ty, generosity, liberality toward guests.
host'ess, a female host, a landlady.
hos'tler, originally master of an inn, one who takes care of horses.

HU'MUS, the ground. HU'MI, of the ground.

ex-hu-ma'tion, the act of taking up from a grave.
ex-hume', to take up from the ground, to disinter.
hu-mil'i-ate, to reduce to a low condition.
hu-mil'i-ty, lowness of spirit (as on the ground).
in-hu-ma'tion, putting into the grave.
in-hume', to bury.

JU'DEX, a judge. JU'DI-CIS, of a judge.

ad-judge', to order or decree.
ad-ju'di-cate, to give sentence.
judge, one who decides.
judg'ment, decision, sentence.
ju-di'cial, pertaining to justice.
ju-di'cious, prudent, wise.
pre-judge', to decide before hearing.
prej'u-dice, judgment beforehand.
prej-u-di'cial, hurtful, injurious.
un-prej'u-diced, free from bias.

JUN'GO, I join. JUNC'TUS, joined.

ad'junct, something joined, but not essential.
con-join', to unite, to combine.
con-junc'tion, a connecting word.
en-join', to command, to order.
join, to unite.
junc'tion, a joining, a union.
junc'ture, a joint, or union.
sub-junc'tive, binding together, connecting.

JU'RO, I swear an oath. JU-RA'TUS, sworn on oath.

ab-ju-ra'tion, the act of forswearing.
ab-jure', to deny or renounce upon oath.
con-ju-ra'tion, solemn entreaty.
con-jure', to put under oath.
con'jure, to practice magic, to conspire.
con'jur-er, a juggler.
ju'ror, one of a jury.
ju'ry, a body of sworn men.

LA'BOR, work. LA-BO'RIS, of work.

e-lab'o-rate, to work out with care.
la'bor, hard work, toil.
lab'o-ra-to-ry, a scientist's workroom.
la'bor-er, a workman.
la-bo'ri-ous, toilsome, involving much labor.

LEV'O, I lift up. LE-VA'TUS, lifted up.

al-le'vi-ate, to lighten sorrow.
el'e-vate, to raise, to lift up.
el-e-va'tion, a lifting up.
le'ver, a bar for lifting.
lev'i-ty, lightness of manner.
lev'y, to raise money or soldiers.

LEX, a law. LE'GIS, of a law.

al-le'giance, loyalty.
il-le'gal, unlawful.
le'gal, according to law.
le'gal-ize, to make lawful.
leg'is-late, to make laws.
leg'is-la-ture, the parliament or power that makes laws.
le-git'i-mate, lawful.

LO'CO, I place. LO-CA'TUS, placed.

al-lo-ca'tion, a placing for a set purpose.
dis'lo-cate, to displace, to disjoint.
lo'cal, belonging to a place.
lo-cal'i-ty, a place or situation.
lo'cate, to place.
lo-co-mo'tion, the act or power of changing place.

MAG'NUS, great. MA'JOR, greater.

mag-nif'i-cence, grandeur, spectacular beauty.
mag'ni-fy, to make great.
mag-nil'o-quence, pompous discourse.
mag'ni-tude, size, greatness.
ma'jor, greater, a military officer above a captain.
ma-jor'i-ty, the number greater than half; the age of 21 years.

MAN'DO, I command, MAN-DA'TUS, commanded.

com-mand', to give orders to.
com-mand'er, one who commands.
com-mand'ment, a precept.
coun-ter-mand', to revoke a command.
de-mand', to claim as a right.
man-da'mus, a legal order.
man'date, a command.
re-mand', to order or send back.

MA'NUS, a hand. MA'NUS, of a hand.

a-man-u-en'sis, one who writes what another dictates, a copyist.
e-man'ci-pate, to set free, to liberate.
man'a-cles, handcuffs.
ma-nip'u-late, to handle.
man'u-al, done by hand, a handbook.
man-u-fac'ture, made by hand or by machinery.
man-u-mit', to release from slavery, to set free.
man'u-script, literally, written by hand.
quad-ru'ma-nous, having four hands.

MAR'E, the sea. MAR'IS, of the sea.

ma-rine', pertaining to the sea.
mar'i-ner, a seaman, a sailor.
mar'i-time, near the sea.
mer'maid (*through Fr.*), a sea monster.
sub-ma-rine', under the sea.
trans-ma-rine', across the sea.
ul-tra-ma-rine', a beautiful blue color (beyond the sea in color).

MI'GRO, I go from the land. MI-GRA'TUS, gone from the land.

em'i-grant, one who leaves his own country.
em'i-grate, to leave one's country.
im'mi-grate, to settle in another country.
mi'grate, to remove to another country.
mi'gra-to-ry, roving, wandering.
trans-mi-gra'tion, removal from one place to another.

MI'NOR, MI'NUS, less (comparative of PAR'VUS, small, little).

di-min'ish, to lessen.
dim-i-nu'tion, a reduction in size, a lessening.
di-min'u-tive, small in size.
min'i-a-ture, a small likeness.
min'i-mum, smallest amount.
mi'nor, less, inferior.
mi-nor'i-ty, the smaller of two numbers (or parties) making up a whole; the state of being under age.
min'ute, a brief time, a moment.
mi-nute', very small, little.

MORS, death. MOR'TIS, of death.

im-mor'tal, not subject to death.
im-mor'tal-ize, to cause to live forever.
mor'tal, subject to death.
mor-tal'i-ty, death.
mor-ti-fi-ca'tion, the death of a part of the body; vexation.
mor'ti-fy, to cause death; to humiliate.

MO'VE-O, I move. MO'TUS, moved.

com-mo'tion, excited movement.
e-mo'tion, a movement of the mind.
mo'tion, a movement.
mo'tive, the moving power.
move, to put in motion.
move'ment, change of place or position.
pro-mote', to advance, to forward.
pro-mo'tion, a moving forward.
re-mov'al, a change of place.
re-move', to move from its place.

MUL'TUS, much, or many.

mul-ti-fa'ri-ous, having much diversity.
mul'ti-form, of many forms.
mul-ti-lat'er-al, having many sides.
mul'ti-plex, manifold.
mul'ti-ply, to increase in number.
mul'ti-tude, a great number.

NA'VIS, a ship. NA'VIS, of a ship. NAU'TA, a sailor. NAU'TÆ, of a sailor.

cir-cum-nav-i-ga'tion, sailing round the globe.
nau'ti-cal, seafaring.
nau'ti-lus, a shellfish that sails.
na'val, pertaining to ships.
nav-i-ga'tion, the art of sailing.
nav'i-ga-tor, a sailor.
na'vy, a fleet of ships.

NO'MEN, a name. NO'MIN-IS, of a name.

de-nom-i-na'tion, a distinguishing name.
mis-no'mer (*through Fr.*), a wrong name.
no'men-cla-ture, a list of names in any art or science.
nom'i-nal, in name only.
nom'i-nate, to name.
nom'i-na-tive, the case denoting the subject of a finite verb.
nom-i-nee', a person named.

NO'VUS, new.

in-no-va'tion, introduction of something new.
nov'el, new.
nov'el-ty, newness.
nov'ice, a beginner.
no-vi'ti-ate, state of being a novice.
ren'o-vate, to make new, to renew.

NU'TRI-O, I nourish. NU-TRI'TUS, nourished.

nour'ish (*through Fr.*), to cherish, to feed.
nour'ish-ing (*through Fr.*), promoting growth.
nour'ish-ment (*through Fr.*), act of nourishing.
nurse (*through Fr.*), one who nourishes.
nurs'er-y (*through Fr.*), apartment, in a house, appropriated to the care of children.
nur'ture (*through Fr.*), to feed, to foster.
nu'tri-ent, a nourishing substance.
nu'tri-ment, sustaining food.
nu-tri'tious, health giving.

OP'ER-A, work, labor. OP'ER-Æ, of work, labor.

co-op'er-ate, to work together.
in-op'er-a-tive, not at work.
op'er-a, a musical play.
op'er-ate, to work, to act.
op-er-a'tion, action.
op'er-a-tor, one who performs.

OS, a bone. OS'SIS, of a bone.

os'se-ous, bony.
os-sif'er-ous, containing or yielding bones.
os-si-fi-ca'tion, the process of changing into bone.
os'si-frage, the sea-eagle, or bone-breaker.
os'si-fy, to change into bone.
os-siv'o-rous, feeding on bones.

PA'TER, a father. PA'TRIS, of a father. PA'TRI-A, fatherland. PA'TRI-Æ, of the fatherland.

com-pa'tri-ot, a fellow countryman.
pa-ter'nal, fatherly.
pa-ter'ni-ty, fatherhood.
pa'tri-arch, a father and ruler.
pa'tri-ot, a lover of his country.
pa'tri-ot-ism, a love of country.

PEN'DE-O, I hang. PEN'SUS, hung. PEN'DO, I weigh, or value. PEN'SUS, weighed or valued.

de-pend', to hang from, to rely upon.
ex-pend', to lay out, to use up.
ex-pense', money, time, etc. laid out.
im-pend'ing, hanging over, threatening.
pend'ant, (n.) something hanging.
pend'ent, (a.) something hanging, awaiting decision.
sus-pend', to hang, to delay.
sus-pen'sion, a temporary withholding, a hanging up.

PES, a foot. PE'DIS, of a foot.

bi'ped, a two-footed animal.
cen'ti-pede, having a hundred feet.
ex-pe'di-ent, apt or suitable.
ex'pe-dite, to hasten, to facilitate.
ex-pe-di'tion, haste, speed.
im-ped'i-ment, something which impedes or hinders.
ped'al, pertaining to the foot.
ped'es-tal, the base or foot of a pillar, vase, or lamp, etc.
pe-des'tri-an, one who goes on foot.
ped'i-cle, a little foot, hence the stalk, or stem of a flower.
quad'ru-ped, having four feet.

PE'TO, I seek. PE-TI'TUS, sought.

ap'pe-tite, desire, longing.
cen-trip'e-tal, directed toward the center.
com-pete', to strive with another.
com-pe-ti'tion, common strife for the same object.
im'pe-tus, the force with which a body is driven forward.
pe-ti'tion, a request, a seeking after something.
re-peat', to say again, to recite.

PO'NO, I put, or place. POS'I-TUS, put, or placed.

com-pose', to put together.
com-pos'i-tor, one who sets up printing type.
dis-pose', to put in place, to arrange.
ex-pose', to place out, to lay open.
ex-pos'i-tor, one who explains.
op-pose', to set against.
op'po-site, placed against.
po-si'tion, place, situation.
post, a place or station.
pos'ture, the mode in which anything is placed, an attitude.
sup-pose', to put under, or imagine.

POR'TO, I carry. POR-TA'TUS, carried.

ex-port', to carry out.
im-port', to carry in.
port, carriage, bearing, demeanor.
port'a-ble, capable of being carried.
por'ter, a carrier.
port'ly, of noble carriage, stately.
re-port', to carry back or give an account of.
sup-port', to sustain, to carry, to hold up.

PRI'MUS, first.

pri'ma fa'ci-e, at first view.
pri'ma-ry, first in order of time.
pri'mate, an archbishop, ranking first among others.
prime, of the first rank.
prim'er, a first book.
pri-me'val, belonging to the first ages.
prim'i-tive, original, pertaining to early times.
pri-mo-gen'i-ture, the right which belongs to the first-born.
pri-mor'di-al, first in order.

QUÆ'RO, I seek, I inquire. QUÆ-SI'TUS, sought.

ex'qui-site, sought out with care, hence, matchless, perfect.
in'quest, an inquiry into the cause of death.
in-quire', to seek into.
in-qui-si'tion, a searching into.
in-quis'i-tive, prying, curious.
que'ry, a question.
quest, search, inquiry.
re-quest', to ask, to solicit.
re-quire', to demand, to ask.

RA'DO, I scrape, I shave. RA'SUS, scraped.

a-brade', to scrape off.
ab-ra'sion, a rubbing off.
e-rase', to scratch or rub out.
e-ra'sure, a scratching out.
raze, to level with the ground.
ra'zor, a shaving knife.

RID'E-O, I laugh at. RI'SUS, laughed at.

de-ride', to laugh at.
de-ri'sion, scorn, mockery.
rid'i-cule, to expose to laughter.
ri-dic'u-lous, laughable, silly.
ris-i-bil'i-ty, proneness to laugh.
ris'i-ble, exciting laughter.

RO'GO, I ask, I demand. RO-GA'TUS, asked, demanded.

ar'ro-gance, pride, making undue claims to self-importance.
in-ter'ro-gate, to ask questions
in-ter-ro-ga'tion, inquiry.
in-ter-rog'a-tive, a word used in asking questions; as, *Who? What?*
su-per-er-o-ga'tion, doing more than is asked.

SANC'TUS, holy, sacred.

sanc'ti-fy, to make holy.
sanc-ti-mo'ni-ous, having the appearance of holiness.
sanc'ti-ty, holiness.
sanc'tu-a-ry, a consecrated place.
sanc'tum sanc-to'rum, the most holy place.

SA'NUS, sound, healthful.

in-sane', of unsound mind.
in-san'i-ty, madness, lunacy.
san'a-tive, curative, tending to heal.
sane, sound, healthy.
san'i-ta-ry, pertaining to health.
san'i-ty, soundness of mind.

SCI'O, I know. SCI'ENS (pres. part.), knowing.

con'science, inward conviction or acknowledgment.
con'scious, aware of, knowing.
om-nis'cience, knowing all things.
pre'sci-ence, foreknowledge.
sci'ence, precise knowledge.
sci-en-tif'ic, according to science.
sci'o-list, a pretender to science, one who knows little.

SE'CO, I cut. SEC'TUS, cut.

bi-sect', to cut in two.
dis-sect', to cut in pieces.
dis-sec'tion, the art of cutting up, anatomy.
in'sect, a small animal that appears to be cut into or divided.
in'ter-sect, to cut between.
sec-ta'ri-an, belonging to a sect.
sec'tion, a cutting, a division.
seg'ment, a piece cut off.
tri-sect', to cut in three.

SER'VO, I preserve, I keep. SER-VA'TUS, preserved.

con-serv'a-tive, wishing to preserve.
con-serv'a-to-ry, a place where choice plants are preserved.
con-serve', to preserve from loss.
ob-serve', to notice, to keep in view.
res-er-va'tion, a keeping back.
re-serve', to keep back.
un-re-served', not kept back.

STRIN'GO, I bind, I hold fast. STRIC'TUS, bound or held.

as-trin'gent, binding, contracting.
con-strict', to draw together, to bind.
con-stric'tor, that which draws together; a class of serpents that crush their prey.
re-stric'tion, a holding back.
strict, held close, bound.
stric'ture, a contraction; a critical remark.
strin'gent, binding strongly.

TEN'DO, I stretch out. TEN'TUS or TEN'SUS, stretched out.

dis-ten'sion, a stretching asunder.
ex-tend', to spread out.
ex-ten'sion, a stretching out.
in-tense', strained, excessive.
pre-tend', to allege falsely.
pre-ten'sion, a claim, true or false.
su-per-in-tend', to overlook, to direct.
tend, to stretch towards.
tend'en-cy, direction, course.
ten'der, to offer, to stretch out the arm.
ten'don, a hard cord by which a muscle is attached to a bone.
tense, stretched to stiffness, rigid.
ten'sion, the state of being stretched.

TEN'E-O, I hold. TEN'TUS, held.

ab-stain', to hold back from.
ab'sti-nence, forbearance.
con-tain', to hold within limits.
con-tin'ue, to hold on.
de-tain', to hold from, to keep back.
de-ten'tion, a withholding.
main-tain', to uphold.
re-tain', to hold back, to keep.
ten'a-ble, capable of being held.
ten'ant, one who holds property of another.
ten'e-ment, that which is held by a tenant.
ten'et, a doctrine held.
ten'or, a state of holding on in a continuous course.
ten'ure, the manner of holding an estate.

TER'RA, the earth. TER'RÆ, of the earth.

dis-in-ter', to take out of the grave.
in-ter', to cover with earth, to bury.
in-ter'ment, burial, funeral.
sub-ter-ra'ne-an, underground.
ter'race, a raised level walk or platform of earth.
ter'ra cot'ta (*through It.*), cooked clay, potter's clay, of which statues and vases are made.
ter-ra'que-ous, consisting of land and water.
ter-res'tri-al, pertaining to the earth.

TEST'IS, a witness. TEST'IS, of a witness.

at-test', to bear witness.
pro-test', to declare, to witness against.
prot'es-tant, a Christian who rejects the tenets of the Roman Church.
test, a trial, a proof.
tes'ta-ment, a last will, a covenant.
tes'ti-fy, to bear witness to.
tes-ti-mo'ni-al, a writing which bears witness to one's character.

U'NUS, one. U-NI'US, of one.

u'ni-corn, a one-horned beast.
u'ni-form, of one appearance.
un'ion, concord, agreement.
u'ni-son, of one sound.
u'nit, a single thing.
u-nit'ed, joined, made one.
u'ni-ty, oneness, agreement.
u-niv'o-cal, of one meaning.

VE'RUS, true.

ve-ra'cious, observant of truth.
ve-rac'i-ty, truthfulness.
ver-i-fi-ca'tion, a proof of truth.
ver'i-fy, to prove true.
ver'i-ly, truly, indeed.
ver'i-ty, truth.

VI'A, a way, a road. VI'Æ, of a way, a road.

de'vi-ate, to go out of the way.
de-vi-a'tion, a wandering.
ob'vi-ate, to clear the way of.
ob'vi-ous, easily discovered, plain, clear.
per'vi-ous, capable of being penetrated.
pre'vi-ous, going before.
vi'a, by the way of.
vi'a-duct, a large bridge built to carry a road.

VI'VO, I live. VIC'TUS, lived. VI'TA, life. VI'TÆ, of life.

re-vive', to live again, to arouse.
sur-vive', to live longer than, to outlive.
vi'tal, necessary to life.
vi-va'cious, full of life.
viv'id, lively, bright.
viv-i-sec'tion, anatomy practiced on living animals.

VO'LO, I wish, I am willing.

be-nev'o-lent, well-wishing, desirous of doing good.
in-vol'un-ta-ry, not having will or the power of choice.
ma-lev'o-lent, wishing evil.
vo-li'tion, the act of willing; the act of forming a purpose.
vol'un-ta-ry, of free will.
vol-un-teer', one who serves of free will.

CORRECT SPELLING

To be able to spell correctly is an accomplishment greatly to be desired. Two important elements enter into the habit of correct spelling: (1) to *observe* words correctly; (2) to *hear* words correctly. Errors often arise from a lack of *thoughtful attention* when studying spelling. In this way the impression made upon the mind by the word as a whole is *incorrect*, or the impression of the correct word has been so dimly made as to be easily forgotten. Difficult words are often more easily spelled because of the added attention they receive and, conversely, the short simple words are misspelled because of undirected attention to them.

It is well to be able to spell all words correctly, but especially should one be able to spell words in common use. Your stock of everyday words may number 2000 or 2500. These are the words of first importance in learning to spell.

The habit of consulting the dictionary is invaluable. The use of diacritical marks and the divisions of words into syllables are an aid to correct pronunciation; but it is only by practice and by a conscientious and frequent reference to the dictionary that proficiency in correct spelling can be acquired.

The meaning of all words should be learned when learning their spelling. This is particularly important in the case of homonyms which are pronounced the same, yet spelled differently, as *there* and *their*. Having learned the spelling and the meaning, no confusion arises in the use of such words.

How to Improve Your Spelling. With the hope of helping to overcome the poor spelling of the present day, the following suggestions are offered:

Pronounce words correctly and distinctly; clear enunciation is of great value.

Learn the analysis of words, that is, learn to recognize the syllables, prefixes, suffixes, and their values; for the analysis of words makes one's spelling more reliable.

With the analysis and meanings of words, associate their uses. This will lead to a mastery of words and tends to better power in spelling.

Make a special study of those words which by reason of a peculiar combination of letters present some difficulty; for example, *believe, receive, precede, proceed.*

Observe particularly silent letters, obscure vowels, or variations in vowel sounds which appear in certain words, as in *homage, heir, subtle, benefit, separate.*

A most troublesome factor in the spelling problem is the repetition of common errors. The habit of repeatedly misspelling the same words may be overcome by any method of study which directs special attention to them.

There is no better way to master the art of spelling than by repeated oral and written practice; for it is the *repetition* which forms the habit.

Because of no special aptitude for spelling or because of some difficulty not easily overcome, some persons believe they can never learn to spell. This is an error. Any person of average intelligence can learn to spell if he fully determines to do so, and then diligently strives toward the accomplishment of that end.

Spelling Lists. The following lists are prepared to give ever present help in spelling. They will be found useful for reference, for study, and for review. The first list contains one hundred "spelling demons" first published in *A Concrete Investigation of the Materials of English Spelling*, issued from the University of South Dakota. A comparison of these words with the spelling scale prepared by L. P. Ayres for the Russell Sage Foundation indicates that eighth grade pupils should earn marks of 90 to 100 on groups of 20 words each, selected from the list. However, a large number of these words are among those found to be most frequently misspelled in the College Entrance Board examinations. The other lists have been prepared after a careful study of frequent spelling errors and everyday vocabularies, such as *The Child and His Spelling* by W. A. Cook and M. V. O'Shea and *The Spelling Vocabularies of Personal and Business Letters* by L. P. Ayres.

Rules for Spelling

1. If a termination beginning with *e, i,* or *y* is added to a word ending in *c*, when *c* is not to be pronounced as *s*, *k* is inserted after *c*: *picnic, picnicking; traffic, trafficker.*

2. If a word of one syllable or a word accented on the last syllable ends in a single consonant preceded by a single vowel, the final consonant is doubled before a termination beginning with a vowel: *fit, fitting; clan, clannish; prefer, preferring; permit, permitted.*

3. When a digraph, that is, two coupled vowels, precedes the final consonant, or when the accent is not on the last syllable, or when it goes to a preceding syllable in the new word, the final consonant is not doubled before a termination beginning with a vowel: *sail, sailing; travel, traveler; benefit, benefited; prefer, preferable.* Exceptions are: *handicapped, humbugged.*

4. When a word ends in silent *e*, unless *e* is preceded by another vowel, the *e* is usually retained before a termination beginning with a consonant and omitted before a termination beginning with a vowel: *hide, hiding; come, coming; late, lateness; race, racial; provoke, provoking; fine, fineness; spite, spiteful, spiting; use, usable.* Exceptions: *judgment, acknowledgment, abridgment, duly, truly,* and *awful.*

5. Words ending in *ce* or *ge* do not drop the *e* before *able* or *ous*. Retaining *e* in this case preserves the soft sound of *g* and the *s* sound of *c*: *notice, noticeable; change, changeable.*

6. Words ending in *y* preceded by a consonant usually change *y* into *i* before an additional letter or syllable: *spy, spies; cry, crier; gratify, gratifies.* But *y* is not changed before *-ing*: *deny, denying; reply, replying.*

Words ending in *y* preceded by a vowel usually retain the *y* unchanged, as in *boy, boys, boyish, boyhood. Laid, paid, said,* are exceptions.

7. The spelling of many words in *ie* and *ei* may be determined by the following rule: If the coupled vowels follow *c*, the *e* comes first; if they follow *l* or *r*, the *i* comes first: *receive, believe, grief.* Some exceptions are: *financier, leisure, sleigh.*

8. In the singular number, the possessive of nouns is formed by adding to the noun an apostrophe and *s*: *Burns's, Jones's, St. James's, St. Giles's, Dickens's, Douglas's.*

The *s* is omitted in the singular when too many hissing sounds would come together: for *Jesus'* sake; for *conscience'* sake; for *goodness'* sake; *Damocles'* sword. When the word consists of more than two syllables, the apostrophe only is added: *Achilles'* sword; *Socrates'* wife; *Euripides'* dramas; *Demosthenes'* orations.

9. Derivatives formed from the Latin stem *ced* are usually spelled *cede*; the exceptions are *exceed, proceed, succeed.*

10. Generally spell in full rather than use abbreviations or numerals for the following: Titles of business, honor, or respect, preceding proper names; Christian names; numbers of fewer than three digits, unless the number is followed by a word of measure; all numbers beginning a sentence; the time of day, except when the number is used with A. M. or P. M.; numbers of centuries, sessions of congress, and the words "United States."

11. *Plurals.* Most nouns form the plural number by adding *s* or *es* to the singular: *state, states; inch, inches.*

The plural of numerals and of unusual or artificial word formations is formed by adding an apostrophe and *s*: *7's, 9's,* the *1900's, t's, y's.*

Plurals of proper names are generally formed by adding *s* or *es*: *Brown, Browns; James, Jameses.*

COMMON WORDS FREQUENTLY MISSPELLED

One Hundred Spelling Demons

ache
again
always
among
answer
any
been
beginning
believe
blue
break
built
business
busy
buy
can't
choose
color
coming
cough
could
country
dear
doctor
does
done
don't
early
easy
enough
every
February
forty
friend
grammar
guess
half
having
hear
heard
here
hoarse
hour
instead
just
knew
laid
loose
lose
making
many
meant
minute
much
none
often
once
piece
quiet
raise
read
ready
said
says
seems
separate
shoes
since
some
straight
sugar
sure
tear
their
there
they
though
through
tired
to-night
too
trouble
truly
Tuesday
two
used
very
wear
Wednesday
week
where
whether
which
whole
women
won't
would
write
writing
wrote

School Words

abbreviate
absence
absolutely
academy
accessory
accident
accidentally
accomplice
accomplish
accurate
accustom
acid
across
addition
adjoin
adjourn
affairs
affect
aggravate
algebraic
all right
almost
alphabet
already
ambition
ammonia
analogous
analysis
ancient
anecdote
angle
aniline (-in)
antarctic
antecedent
anthracite
Apollo
apostrophe
apparatus
apparent
appearance
appliance
appositive
architecture
arctic
argument
arithmetic
artificially
arouse
assembly
assignment
athletic
atmosphere
attempt
attendance
autobiography
auxiliary
avalanche
average
avoidance
awkward
barrier
battalion
benefit
biography
biology
blizzard
buoyant
cafeteria
candidate
canyon
caterpillar
chalk
changeable
chautauqua
chemistry
chosen
circuit
circumference
circumstance
citizenship
civilization
clever
climate
coherence
college
colloquial
combination
comedy
commencement
commission
communication
comparison
compulsory
concede
conceivable
conceive
conception
conscientious
consequence
conspicuous
contemplate
continent
continually
control
courageous
crater
criminally
criticism
crucifixion
crucify
curriculum
customary
cyclone
cylinder
daily
decide
decimal
declension
definitely
demonstrable
demonstrative
demonstrator
denominator
descend
description
descriptive
desirable
despair
desperately
develop
diagonal
dialogue (-log)
diameter
dictionary
difference
diligence
diphthong
disappear
discipline
disinfect
dismissal
dissatisfied
dissipated
distribute
division
dynasty
eclipse
e'er
effect
eighth
elegy
embarrass
emphasis
encouragement
encyclopedia
enemy
enmity
enthusiasm
envious
equation
equator
equipped
eraser
[illegible]
erroneous
essential
exaggerate
examination
exceed
excel
excellent
exemption
exercise
exhibition
existence
expensive
explain
explanation
exposition
expression
extension
extremely
factoring
fascinate
felonious
figure
foreign
foresee
formally
formerly
frigid
gasoline
gauge (gage)
generally
genius
genuine
geology
geometry
glacier
granite
guard
gymnastics
happiness
height
hemisphere
hexagon
history
horizontal
humorous
hygiene
hypocrisy
hysterics
iambic
idiom
ignominious
ignominy
ignorance
illustrate
imagination
imperative
improvable
inborn
incident
incitement
incriminate
indefinitely
independence
independent
indictment
indispensable
infinite
infinitesimal
infinitive
influential
influentially
instigation
instigator
institute
intelligence
intelligible
intention
interrogative
intransitive
irregular
irresistible
island
isosceles
isthmus
its
it's
kindergarten
laboratory
later
latitude
latter
lead
lead pencil
learn
lecture
led
legend
lightning
literary
literature
livelihood
longitude
loyalty
Macaulay
machinist
malefactor
malign
malignant
malignity
maneuver
manual
marriage
martyr
martyrdom
mathematics
mechanic
mechanical
mechanism
mediocre
mediocrity
mercury
meridian
metaphor
metonymy
microscope
mirage
misspell
modifies
modifying
monosyllable
mountain
multiplication
municipal
muscular
naphtha
narration
nativity
neuter
nineteen
ninety
nominative
noticeable
numerator
obedience
occasion
occur
occurred
occurrence
o'clock
offense
omitted
opportunity
ostensible
ostentatious
oxygen
pageant
paragraph
parallel
paraphernalia
parliament
participial
participle
particularly
passed
passion
passionate
past
peaceful
peninsula
perfect
perfectly
perform
permanent
permission
perpendicular
perpetration
perpetrator
phenomenon
Philip
phrase
physics
physiology
picturesque
planet
plateau
poetry
polygon
polysyllable
positively
possess
possessive
possibility
practicable
practically
practice
prairie
precede
precinct
predicate
prejudice
preparation
principal
principle
prism
privilege
proceed
professor
progressive
pronounce
pronunciation
prophecy
prophesy
propitious
proportion
prove
psychology
punctuation
pyramid
quiet
quite
rabbit
rarefaction
rarefy
rareness
rarity
ravine
readiness
realize
reasonable
recess
recital
recognize
recollect
recommend
remember
remembrance
repellent
repetition
representative
review
rhetoric
rhythm
rhythmic
ridicule
rime (rhyme)
sacrifice
sacrificial
sacrilege
sacrilegious
satire
satyr
saucy
scholarship
seize
semicircle
seminary
senate
sentence
separately
session
severely
shepherd
siege
signature
simile
socialist
soliloquies
soliloquy
solution
sometimes
sophomore
specific
specimen
speech
squirrel
statement
strait
strengthen
strenuous
studying
subordinate
subtraction
succeed

sufficiently
suit
suite
summary
superintendent
surely
susceptibility
susceptible
syllable
sympathize
synonym
syntax
synthesis
systematic
talented
tariff
technical
temperature
temptation
tendency
therefore
thermometer
tournament
tragedy
traveler
tropical
turpentine
twelfth
typical
unanimous
uncomfortable
undoubtedly
university
until
usually
vacation
valuable
vertical
villain
vocabulary
volume
wealthily
weird
whimper
wholly
zoology

Social and Personal Words

accept
accompany
acquaintance
aeronaut
aeroplane
affectionately
afford
agreeable
airplane
aisle
almanac
altar
amateur
angel
angry
animal
anniversary
announcement
annual
anxiety
apartment
apologize
appetite
appreciate
appreciative
arrangement
arrival
assistance
association
asylum
audience
automobile
bachelor
baggage
banquet
baptize
baseball
bazaar
bicycle
billiards
borrow
breakfast
burglar
campaign
candidate
canoe
captain
career
carriage
catechism
cathedral
celebration
cemetery
ceremony
chapel
chaperon
character
chauffeur
chivalry
circus
citizen
cologne
colonel
committee
complement
complexion
compliment
conductor
congregation
contribution
convenient
coquette
cordially
cousin
croquet
crowd
daughter
delegate
delicate
dentist
dependent
dietitian
din
diner
dining
dinner
disappoint
economical
elaborate
embarrassment
emergency
engagement
environment
etiquette
euchre
excursion
fashionable
fatigue
fellowship
fiancé
fiancée
funeral
garage
golf
grief
guest
hammock
harassment
heathen
heavy
heresy
hospitable
hungry
icicle
idol
innuendo
invitation
kodak
laugh
league
liquor
luncheon
magazine
majority
matron
mischief
missionary
mosquitoes
motor
mucilage
neighbor
niece
nuisance
occupy
oculist
optician
orchestra
organization
pamphlet
parade
parasol
passenger
pennant
phonograph
photographer
pianist
picnic
picnicking
plaguy
playwright
pleasure
priest
prodigal
prohibition
promenade
protégé
providence
psalm
quarrel
quoits
rehearse
relative
religious
rendezvous
repentance
restaurant
revival
scene
sight-seeing
sincerely
sleigh
souvenir
spectacles
suffrage
surprise
synagogue
tabernacle
taxicab
temperance
tenant
tenement
testament
theater
thief
tobacco
tournament
umbrella
umpire
unfortunate
valise
vaudeville
vilify
village
waltz
wasteful
wealth
whistle
wholesome
yacht

Business Words

acceptance
accommodate
accountant
accrued
acknowledge
acquire
acre
address
administration
advertise
affidavit
agency
agreement
allege
annuity
application
approximately
arbitration
article
assets
assignment
assure
attorney
auction
auditor
balance
bankrupt
bankruptcy
bargain
bookkeeper
brief
calculation
calendar
capacity
capital
cashier
catalogue (-log)
certificate
check
clerical
collateral
collectable (-ible)
commercial
commodity
competent
competition
compromise
comptroller
confidential
consideration
consignment
convenient
conveyance
corporation
correspondent
counterfeit
credentials
credit
creditor
criminal
customer
debt
debtor
decision
defer
deficit
delivery
depositor
diary
difficulty
discount
discussion
dividends
draft
due
economical
efficient
elevator
embezzle
employee
enterprise
especially
estimate
evidence
expenditure
expense
experience
factory
finally
finance
financial
financier
fiscal
foreclosure
foreign
forfeit
forgery
franchise
fraudulent
freight
government
guarantee
heir
hundred
immediate
indorsement
information
insolvency
installment
insurance
interest
inventory
investment
invoice
issue
itemized
items
janitor
journal
judgment
judicial
lease
ledger
legacy
legislature
liability
license
lucrative
machinery
manager
manufacture
material
maturity
mercantile
merchandise
millionaire
mortgage
mortgagee
mortgagor
municipal
necessary
notary
oblige
operator
parcel
particular
position
preferred
preliminary
president
probably
proceeds
profitable
profits
promissory
proprietor
purchase
receipt
recommend
reference
referring
register
regular
remittance
renewal
request
requisite
resources
respectfully
responsible
résumé
retail
revenue
salary
salesman
schedule
secretary
securities
sincerely
situation
speculate
stationery
statistics
stenographer
stockholder
storage
substantial
success
suggest
surplus
syndicate
taxes
telegraph
telephone
testimony
treasurer
typewriter
unique
usury
value
warehouse
warrant
weight
wholesale

Household Words

abscess
ague
alcohol
almond
ambulance
anesthetic
anoint
antitoxine
appendix
apron
artery
asbestos
asparagus
asthma
automatic
banana
bandage
baste
bilious
biscuit
blouse
bread
breathe
bronchitis
bruise
buffet
bungalow
bureau
butcher
button
cabbage
calico
cambric
camphor
cancer
cantaloupe
capsule
caramel
carpenter
cashmere
casserole
cataract
catarrh
ceiling
celery
cellar
cereal
chamois
chandelier
chiffonier
chloroform
chocolate
cholera
cinder
cinnamon
cloth
clothes
coat
cocoa
coffee
collar
contagious
convalescent
corduroy
cough
cretonne
crochet
croquette
crystal
cucumber
culinary
currant
curtain
dairy
desiccate
dessert
diamond
diarrhea
diary
digestion
diphtheria
disease
doily
dye
electricity
embroidery
enamel
epidemic
ether
faucet
feather
flannel
flour
forehead
fragile
frieze

furnace
furniture
gasoline (-ene)
gelatine
gingham
glycerine
grease
grippe (grip)
groceries
handkerchief
hearth
hemorrhage
herbs
hoarse
homeopathic
hosiery
hospital
inoculate
invalid
iodine (-in)
ironing
jewelry
kernel
kerosene
khaki
kimono
knead
knee
knife
knob
knot
knuckle
larynx
lattice
lemon
lemonade
lettuce
library
licorice
ligament
liniment
macaroni
mackerel
mackintosh
mahogany
mantelpiece
mattress
measles
measure
medicine
melon
meringue
milliner
mirror
molasses
muscle
mustard
nainsook
nausea
nervous
neuralgia
odor
omelet
organdie (-y)
ostrich
oyster
palate
paneling
paraffine
paralysis
pattern
peach
pear
peritonitis
perspiration
physically
physician
picture
pillow
pitcher
plaid
plaited
plumber
pneumonia
poached
porcelain
porch
portière
portrait
potatoes
poultice
poultry
prescription
ptomaine (-in)
pumpkin
quinine
radiator
raisin
raspberry
recipe
refrigerator
relief
remedy
reservoir
rheumatism
rhubarb
roast
salad
sandwich
sanitary
sateen
satin
saucer
sausage
scissors
settee
sieve
sirloin
skein
sleeve
specialist
spigot
spinach
steak
stomach
sugar
sulphur (-fur)
surgeon
syringe
taffeta
tailor
threshold
tissue
tomato
tongue
trousers
trousseau
tuberculosis
turkeys
turnip
typhoid
unbleached
utensil
vaccinate
vacuum
vanilla
vaseline (-in)
vegetable
veil
ventilate
ventilation
veranda
vinegar
waist
woolen
worsted
yolk
zephyr

Irregular Plurals

Singular	Plural
beef	beeves
calf	calves
elf	elves
half	halves
knife	knives
leaf	leaves
life	lives
loaf	loaves
self	selves
sheaf	sheaves
shelf	shelves
thief	thieves
wife	wives
wolf	wolves
ally	allies
city	cities
daisy	daisies
fairy	fairies
fancy	fancies
lady	ladies
lily	lilies
mystery	mysteries
gentleman	gentlemen
goose	geese
man	men
mouse	mice
tooth	teeth
woman	women
deer	deer
gross	gross
grouse	grouse
hose	hose
mackerel	mackerel
salmon	salmon
series	series
sheep	sheep
species	species

Singular	Plural
trout	trout
swine	swine
attorney at law	attorneys at law
commander in chief	commanders in chief
court-martial	courts-martial
editor in chief	editors in chief
father-in-law	fathers-in-law
governor-general	governors-general
maid of honor	maids of honor
man-of-war	men-of-war
son-in-law	sons-in-law
knight templar	knights templars
man-child	men-children
manservant	menservants
woman servant	women servants
alumna (feminine)	alumnæ
alumnus (masculine)	alumni
analysis	analyses
animalcule	animalcules
antithesis	antitheses
apparatus	apparatuses apparatus
appendix	appendices appendixes
axis	axes
bacillus	bacilli
bacterium	bacteria
bandit	banditti bandits
basis	bases
beau	beaux beaus
brother	brothers (relatives) brethren (of the same society)
candelabrum	candelabra
cannon	cannons (individuals) cannon (collectively)
cherub	cherubim (collectively) cherubs
crisis	crises
cumulus	cumuli
curriculum	curricula curriculums
datum	data
die	dies (for stamping) dice (for gaming)
ellipsis	ellipses
erratum	errata
fish	fishes (individually) fish (collectively)
foot	feet (parts of the body) foot (infantry)
formula	formulæ formulas
genius	geniuses (men of genius) genii (spirits)
genus	genera
gymnasium	gymnasia gymnasiums
head	heads (parts of bodies) head (of cattle)
heathen	heathens (individuals) heathen (collectively)
hippopotamus	hippopotami hippopotamuses
horse	horses (animals) horse (cavalry)
hypothesis	hypotheses
index	indexes (tables of reference) indices (signs in algebra)
larva	larvæ
memorandum	memoranda memorandums
nebula	nebulæ
oasis	oases
parenthesis	parentheses
penny	pennies (single coins) pence (quantity in value)
phenomenon	phenomena
radius	radii
sail	sails (pieces of canvas) sail (vessels)
seraph	seraphim (collectively) seraphs
shot	shots (number of times fired) shot (number of balls)
stratum	strata
synopsis	synopses
tableau	tableaux
terminus	termini
thesis	theses
trousseau	trousseaux
vertebra	vertebræ

HOMONYMS

Words pronounced the same but differing in spelling and in meaning.

air, that which we breathe.
ere, before.
e'er, ever.
heir, one that is to inherit.

aloud, audibly.
allowed, permitted.

altar, a place for worship.
alter, to change.

arc, part of a circle.
ark, as Noah's ark; a chest.

ascent, going up; an upward slope.
assent, to agree to.

ate, past tense of eat.
eight, twice four.

aught, anything.
ought, is (are) bound in duty.

bad, ill or wicked.
bade, past tense of bid.

bale, a bundle.
bail, surety for some one; a handle.

ball, a sphere; a dance
bawl, to shout; to cry out.

band, that which binds; a narrow strip.
banned, forbidden.

bard, a poet.
barred, hindered; shut out.

bare, naked.
bear, to carry; a wild beast.

base, the lowest part; mean.
bass, the lowest part in harmonized music.

beech, a kind of tree.
beach, shore.

beer, a drink.
bier, anything on which the dead are carried to burial.

beet, a vegetable.
beat, to strike.

bell, a hollow metal body that rings or tolls.
belle, a beautiful or admired young woman.

berry, a small fruit.
bury, to inter; to conceal.

birth, being born; descent.
berth, a sleeping place.

bold, daring; courageous.
bowled, rolled, as in a game of bowling.

bole, the trunk of a tree.
boll, seed vessel of cotton plant.
bowl, a circular vessel.

bow, a weapon for shooting arrows; a kind of knot.
beau, a man of dress; a lover.

brake, a thicket.
break, to split.

bred, reared.
bread, baked flour.

breech, the lower or hinder part of a thing.
breach, a gap or opening.

brews, ferments; plots.
bruise, to crush; a contusion.

broach, a spit; to pierce.
brooch, an ornament for the breast.

brows, plur., the forehead.
browse, to eat the tender leaves of shrubs, as "sheep browse."

burrow, hole in ground made by an animal.
borough, a corporate town.
burro, a donkey.

by, a preposition and a prefix.
buy, to purchase.
bye, as in good-bye; a goal.
bi-, two, as in biweekly.

call, cry out; a visit.
caul, a membrane.

canon, a law; a rule.
cannon, a large gun.

canvas, a coarse cloth.
canvass, to solicit.

cast, to throw; a form.
caste, a tribe; a class.

cede, to give up.
seed, the embryo of a future plant.

ceiling, cover of a room.
sealing, tight closing, as with wax.

cell, a small cavity; a room.
sell, to exchange for a price.

cellar, an excavation in the ground.
seller, one who sells.

cent, a hundred.
sent, past tense of send.
scent, perfume; to smell.

cereal, pertaining to grain; food made of grain.
serial, pertaining to successive parts, as in a series.

cession, a giving up.
session, a sitting; a meeting.

chews, grinds with the teeth.
choose, to select.

choir, a company of singers.
quire, a set of sheets of paper.

cite, to summon; to quote.
site, place; position.
sight, the power of seeing; a look.

clause, part of a sentence.
claws, sharp nails or toes of animal or bird.

clime, a region; a country.
climb, to mount; to ascend.

core, an innermost part; a center.
corps, an organized company, as of soldiers.

course, a place for running; career.
coarse, not fine.

coward, one wanting in courage.
cowered, crouched through fear.

creek, a small stream.
creak, to make a harsh, grating noise.

crews, bodies of seamen for ships.
cruise, to sail from place to place on the ocean.
cruse, a small cup; a small bottle.

currents, streams.
currants, small fruit.

dew, moisture condensed and deposited from the air.
due, owing.

discreet, prudent; cautious.
discrete, distinct; disjoined.

doe, female of deer.
do, a musical sound name.
dough, unbaked bread.

done, performed.
dun, a color; to demand payment of debt.

dying, ceasing to live.
dyeing, shading or coloring.

faint, very fatigued; to swoon.
feint, a pretense.

fane, a temple.
fain, anxious; desirous.
feign, to pretend.

fare, money paid for a journey; food.
fair, beautiful; right; a market.

faun, a sylvan deity.
fawn, a young deer; to flatter meanly.

find, to discover.
fined, subject to a money penalty.

flour, fine part of meal.
flower, blossom of a plant.

fore, in front.
four, a number.

forth, forward; out.
fourth, the ordinal of four.

freeze, to congeal.
frieze, a coarse woolen fabric; an ornamented band on a wall.

gate, entrance; a door.
gait, one's way of walking.

gild, to overlay and adorn with gold.
guild, a society or corporation.

gilt, overlaid with gold.
guilt, responsibility for crime.

great, large.
grate, a fireplace; to rub against.

grieves, laments; causes grief.
greaves, armor for the legs.

guessed, estimated at random.
guest, one who is entertained.

hair, as of the head.
hare, an animal.

hale, strong in health; to drag.
hail, rain frozen in coming from the clouds; to greet.

hall, a large room.
haul, to drag; to pull.

heel, the hind part of the foot.
heal, to cure; to grow sound.
he'll, contraction for "he will."

herd, a collection of cattle.
heard, past tense of hear.

hoard, to lay up in secret.
horde, a wandering tribe; a savage band.

hoes, uses a hoe.
hose, stockings; socks.
hose, rubber pipe.

I, a pronoun.
aye or **ay,** yes.
eye, organ of sight.

indite, to compose and write.
indict, to charge or accuse formally.

isle, a contraction for island.
aisle, passage in an auditorium.
I'll, contraction for "I will."

kernel, the central part.
colonel, chief officer of a regiment.

lane, a narrow passage.
lain, past participle of lie, to rest lengthwise on or against.

leaf, as of a book, a tree, etc.
lief, willingly.

least, little; beyond all others.
leased, held on lease.

led, past tense and participle of led.
lead, a metal.

liar, one who tells lies.
lyre, a musical instrument.

lone, solitary; alone.
loan, a temporary grant.

male, opposite of female.
mail, armor; letters.

mane, the long hair on the neck of an animal.
main, the sea; principal; chief.

manner, method or way.
manor, an estate; a domain.

mantle, a cloak; a cover.
mantel, the slab or shelf above a fireplace.

marshal, a military or police officer.
martial, warlike.

maze, an intricate place.
maize, Indian corn.

mean, shabby; low; to intend.
mien, manner of look or appearance.

meet, fit; to assemble.
mete, to measure.
meat, food; flesh.

mind, the understanding.
mined, excavated.

miner, a worker in mines.
minor, one under age.

mite, something very small.
might, power; strength.

moan, to lament.
mown, cut down.

mussel, a shellfish.
muscle, the fleshy parts of an animal body.

mustard, a kind of plant.
mustered, assembled.

nave, hub of a wheel; main portion of a cathedral.
knave, a rogue.

nay, no.
neigh, cry of a horse.

need, want; poverty.
knead, to work the materials into dough.

new, not old.
knew, past tense of know.
gnu, a wild ox.

night, opposite of day.
knight, a title of honor.

no, opposite of yes.
know, to understand.

nose, the organ of smell.
noes, plural of no.
knows, has knowledge; understands.

oar, implement for rowing a boat.
ore, metal as it comes from the earth.
o'er, contraction for over.

ode, a short poem.
owed, indebted to; past tense of owe.

our, a pronoun.
hour, sixty minutes.

pain, soreness.
pane, a piece of glass.

pair, two; a couple.
pare, to slice thinly.
pear, a kind of fruit.

passed, gone through; gone.
past, not present or future.

pause, a stop.
paws, feet of a beast.

peace, a state of quiet.
piece, a part.

pedal, a foot lever; to operate such a lever.
peddle, to sell from house to house.

peel, skin; outside.
peal, sound of bells.

peer, to look intently; an equal.
pier, a wharf.

plane, a perfectly flat or level surface; a kind of tree.
plain, level, flat country.

plate, a flat piece of metal; a shallow dish.
plait, to fold; to braid.

please, to delight or gratify.
pleas, pleadings in law; excuses.

plum, a fruit.
plumb, perpendicular; an instrument to determine whether a wall is perpendicular.

pray, to entreat.
prey, plunder.

prays, supplicates.
praise, approbation; to approve.
preys, attacks, as a wild beast.

principal, invested funds; chief.
principle, a fundamental rule or law.

quarts, measures of two pints each.
quartz, a variety of rock crystal.

rain, water from clouds.
rein, part of a harness; to check.
reign, to rule as a king.

rap, to strike sharply.
wrap, to wind or roll together; to fold.

rapped, struck.
rapt, transported; ravished.
wrapped, folded; enclosed.

rays, beams of light.
raise, to exalt; to lift up.
raze, to destroy utterly.

read, as a book; to study.
reed, a hollow cane.

recks, cares or takes account of.
wrecks, destroys or shatters.

red, a color.
read, past tense of read.

rest, peace; quiet.
wrest, to twist; to wrench.

right, just; correct.
rite, a ceremony.
write, to trace letters or characters.
wright, a workman.

road, a path; a way.
rode, past tense of ride.
rowed, propelled with oars.

rôle, a part in acting a play.
roll, a round thing; a register.

rood, fourth part of an acre.
rude, uncultivated; rough.
rued, grieved for.

root, as of a plant; origin.
route, direction; road.

ruff, an article of dress.
rough, unpolished; rugged.

rung, sounded, as a bell.
wrung, twisted.

rye, a sort of grain.
wry, crooked.

sac, a membranous receptacle.
sack, a large, strong bag.

sail, to navigate.
sale, act of selling.

scene, a sight; part of a play.
seen, observed.

sea, a wide expanse of water.
see, to perceive.

sees, looks at.
seize, to take hold of.

skull, the whole bone of the head.
scull, a small boat; a light, short oar.

soared, mounted on the wing.
sword, a weapon of war.

sold, given for a price.
soled, furnished with a sole.

sore, painful.
soar, to mount by flight.

soul, the spirit.
sole, only; bottom of the foot; a fish.

sow, to scatter seed.
sew, to fasten, as with a needle.
so, in this manner.

staid, steady; grave.
stayed, supported with ropes, as a mast.

stair, flight of steps.
stare, to look at.

stake, a pointed piece of wood.
steak, a slice of meat.

straight, direct; not curved.
strait, narrow; confined.

style, manner of dress or action.
stile, steps over a wall.

sucker, a young shoot of a tree.
succor, help; to relieve.

sum, the amount of anything; to add up.
some, more or less of a quantity.

sutler, one who follows a camp to sell provisions, etc.
subtler, more cunning; more acute.

sweet, pleasant; delightful.
suite, attendants; a set of rooms.

tale, a story.
tail, an appendage; hinder part.

tare, a weed; allowance for weight.
tear, a rent; to rend.

tear, water from the eye.
tier, a row; a series.

teem, to produce in abundance.
team, a pair of horses or oxen, working together.

their, possessive of they.
there, adv., in that place.

threw, past tense of throw.
through, from side to side, or from end to end.

throw, to cast; to fling.
throe, extreme pain.

time, fit season.
thyme, a garden plant.

told, expressed in words.
tolled, rung, as a bell.

tract, a quantity of land.
tracked, followed by the marks left.

two, a pair; twice one.
too, adv., also; excess, as too much.
to, preposition.

use, to apply or handle for some purpose.
ewes, female sheep.
yews, evergreen trees.

vale, a valley.
veil, a curtain, a covering.

vice, a fault.
vise, a tool.

wade, to walk through water.
weighed, past tense of weigh.

wait, to remain; to stay.
weight, heaviness; importance.

ware, sing. of wares; goods.
wear, to last; to endure.

waste, to squander.
waist, the middle part, as of the body.

wave, a moving ridge; to undulate.
waive, to defer; to abandon.

way, a road; manner.
weigh, to determine heaviness; to ponder.

wood, a forest; timber.
would, verb of wish or determination.

HETERONYMS

Words spelled the same but differing in sound and in meaning. Strictly, heteronyms, from the very etymology of the word, have no alliance between them except the accidental one of the same orthography. They are derived from different roots and their meanings are so distinct that their separate origin is at once indicated by such meanings. Mere change of accent, moreover, does not constitute a heteronym.

bass (*bās*), a term in music.
bass (*bas*), a fish.

bow (*bou*), the forward part of a vessel.
bow (*bō*), an archer's weapon; an implement for playing the violin; a knot.

chap (*chăp*), a fellow.
chap (*chŏp*), fleshy covering of a jaw.

dives (*dīvz*), goes under water.
Dives (*dī'vēz*), the rich man.

does (*dŭz*), female deer.
does (*dŭz*), from the verb *do*.

gill (*jĭl*), quarter of a pint.
gill (*gĭl*), the organ of respiration of a fish.

glower (*glou'ẽr*), to stare.
glower (*glō'ẽr*), something that glows.

hinder (*hĭn'dẽr*), to prevent.
hinder (*hīn'dẽr*), back part.

job (*jŏb*), petty work.
Job (*jōb*), a man's name.

lead (*lĕd*), a metal.
lead (*lēd*), to conduct.

lower (*lō'ẽr*), to descend.
lower (*lou'ẽr*), to frown.

manes (*mānz*), the hair on the neck of animals.
manes (*mā'nēz*), departed spirits.

mate (*māt*), a companion.
mate (*mä'tā*), a beverage.

mow (*mō*), to cut down.
mow (*mou*), a heap of grain; a compartment for storing grain.

mowing (*mō'ĭng*), the act of cutting.
mowing (*mou'ĭng*), to store away.

polish (*pŏl'ĭsh*), to shine.
Polish (*pō'lĭsh*), adjective derived from *Pole*—pertaining to Poland.

poll (*pŏl*), a degree without honors.
poll (*pōl*), the head; a tax.

put (*pōōt*), to move; to push.
put (*pŭt*), a rustic; a clown.

repent (*rē'pĕnt*), creeping; prostrate; reptant.
repent (*rē-pĕnt'*), to feel penitence, contrition, or regret, for what one has done or has omitted to do.

row (*rō*), a rank or file; to propel with oars.
row (*rou*), a tumult.

sake (*sāk*), purpose, end, cause.
sake (*sä'kē*), liquor made from rice.

sewer (*sū'ẽr*), a ditch or a drain.
sewer (*sō'ẽr*), one who sews.

shower (*shō'ẽr*), one that exhibits.
shower (*shou'ẽr*), a light rain.

singer (*sĭn'jẽr*), one that singes.
singer (*sĭng'ẽr*), one that sings.

slough (*slou, slōō*), a hole full of mire; a marshy place.
slough (*slŭf*), cast-off skin of a serpent.

sow (*sō*), to scatter seeds.
sow (*sou*), female pig.

stingy (*stĭn'jĭ*), penurious.
stingy (*stĭng'ĭ*), piercing.

swinger (*swĭng'ẽr*), one that swings.
swinger (*swĭn'jẽr*), one that beats or chastises.

tarry (*tär'ĭ*), covered with, or like, tar.
tarry (*tăr'ĭ*), to abide at or in a place; to stay; to loiter; to delay.

tear (*târ*), to divide or separate on being pulled.
tear (*tēr*), a drop of limpid saline fluid secreted by the lachrymal gland.

tower (*tou'ẽr*), a high edifice; a citadel.
tower (*tō'ẽr*), that which tows.

wind (*wīnd*), air in motion.
wind (*wĭnd*), to twist.

wound (*wōōnd*), an injury.
wound (*wound*), twisted.

CORRECT PRONUNCIATION

For key to pronunciation, see page 19.

Correct spelling is the outward mark of education in attention and accuracy. But English spelling is not phonetic—the same letters do not always represent the same sounds. Consequently, we fall easily into habits of incorrect pronunciation. The price of correctness is constant reference to correct standards.

In a living language, spoken by so many people and in so many different parts of the world, some variety in the pronunciation of many common words may be expected. For not a few words, various dictionaries give three or four pronunciations, all of which are current in the English-speaking world. The pronunciations here given are those most commonly approved by standard authorities. Where two pronunciations are given, the first is a preferred pronunciation, the second is widely and correctly used.

In the following list will be found more than 1600 words concerning which many questions in regard to pronunciation frequently arise.

abbé, *ȧ′bā′; ăb′ȧ*
abdomen, *ăb-dō′mĕn*
abhor, *ăb-hôr′*
abhorrent, *ăb-hôr′ĕnt*
abject, *ăb′jĕkt*
abjection, *ăb-jĕk′shŭn*
absent (adj.), *ăb′sĕnt*
absent (v.), *ăb-sĕnt′*
abstemious, *ăb-stē′mĭ-ŭs*
accent (n.), *ăk′sĕnt*
accent (v.), *ăk-sĕnt′*
accessory, *ăk-sĕs′ō-rĭ*
acclimate, *ȧ-klī′mât*
accompaniment, *ȧ-kŭm′pȧ-nĭ-mĕnt*
accuracy, *ăk′ū-rȧ-sĭ*
acetylene, *ȧ-sĕt′ĭ-lēn*
acorn, *ā′kôrn*
acoustic, *ȧ-kōōs′tĭk*
actor, *ăk′tẽr*
acts, *ăkts*
acumen, *ȧ-kū′mĕn*
adagio, *ȧ-dä′jō*
address, *ȧ-drĕs′*
adieu, *ȧ-dū′*
adios, *ä′dyōs′*
adjourn, *ȧ-jûrn′*
adobe, *ȧ-dō′bē*
adult, *ȧ-dŭlt′*
adventure, *ăd-vĕn′chûr; -tûr*
adverse, *ăd′vẽrs*
advertisement, *ăd-vẽr′tĭz-mĕnt*
advertiser, *ăd′vẽr-tīz′ẽr*
aeroplane, *ā′ẽr-ō-plān′*
a fortiori, *ā fôr′shĭ-ō′rī*
aft, *ȧft*
after, *ȧf′tẽr*
again, *ȧ-gĕn′*
agile, *ȧj′ĭl*
alas, *ȧ-lȧs′*
alder, *ôl′dẽr*
algebra, *ȧl′jê-brȧ*
alias, *ā′lĭ-ȧs*
alien, *āl′yĕn*
allegro, *ȧl-lā′grō*
allies, *ă-līz′*
allopathist, *ă-lŏp′ȧ-thĭst*
alloy, *ă-loi′*
alma mater, *ăl′mȧ mā′tẽr*
almond, *ä′mŭnd; ăl′mŭnd*
alpaca, *ăl-pȧk′ȧ*
alpine, *ăl′pĭn; -pīn*
alterative, *ôl′tẽr-ȧ-tĭv*
alternate (v.), *ăl′tẽr-nāt; ôl′-*
alternate (adj.), *ăl-tẽr′nât; ăl′-*
alternate (n.), *ăl-tẽr′nât; ăl′*
alternately, *ăl-tẽr′nât-lĭ*
aluminum, *ȧ-lū′mĭ-nŭm*
alumnæ, *ȧ-lŭm′nē*
alumni, *ȧ-lŭm′nī*
amateur, *ăm′ȧ-tûr′*
ambrosia, *ăm-brō′zhĭ-ȧ*
ameliorate, *ȧ-mēl′yō-rāt*
amenable, *ȧ-mē′nȧ-b'l*
amenity, *ȧ-mĕn′ĭ-tĭ*
ammonia, *ă-mō′nĭ-ȧ*
amortization, *ȧ-môr′tĭ-zā′shŭn*
amortize, *ȧ-môr′tīz*
ampere, *ăm-pâr′; ăm-pēr′*
anarchist, *ȧn′ȧr-kĭst*
ancestor, *ăn′sĕs-tẽr*
ancestral, *ăn-sĕs′trȧl*
anchor, *ăng′kẽr*
ancient, *ān′shĕnt*
and, *ănd*
anemone, *ȧ-nĕm′ō-nē*
aniline, *ăn′ĭ-lĭn*
annihilate, *ȧ-nī′hĭ-lāt*
answer, *ăn′sẽr*
antarctic, *ănt-ärk′tĭk*
anxiety, *ăng-zī′ē-tĭ*
anxious, *ăngk′shŭs*
aperient, *ȧ-pē′rĭ-ĕnt*
aperture, *ȧp′ẽr-chûr; -tûr*
aphelion, *ȧ-fēl′yŭn*
apostle, *ȧ-pŏs′′l*
apotheosis, *ȧp′ō-thē′ō-sĭs; ȧ-pŏth′ē-ō′sĭs*
apparatus, *ȧp′ȧ-rā′tŭs*
appellate, *ȧ-pĕl′ât*
appendicitis, *ȧ-pĕn′dĭ-sī′tĭs*
applicable, *ȧp′lĭ-kȧ-b'l*
appreciation, *ȧ-prē′shĭ-ā′shŭn*
apricot, *ā′prĭ-kŏt; ȧp′rĭ-kŏt*
apron, *ā′prŭn; ā′pûrn*
apropos, *ȧp′rō-pō′*
aqua, *ā′kwȧ*
aquarium, *ȧ-kwā′rĭ-ŭm*
aqueduct, *ȧk′wē-dŭkt*
archangel, *ärk′ān′jĕl*
archbishop, *ärch′bĭsh′ŭp*
archipelago, *är′kĭ-pĕl′ȧ-gō*
architect, *är′kĭ-tĕkt*
archives, *är′kīvz*
arctic, *ärk′tĭk*
area, *ā′rē-ȧ*
aria, *ä′rĭ-ȧ; ā′rĭ-ȧ*
arid, *ăr′ĭd*
armada, *är-mā′dȧ*
armistice, *är′mĭ-stĭs*
aroma, *ȧ-rō′mȧ*
arras, *ăr′ȧs*
arroyo, *ă-roi′ō*
artisan, *är′tĭ-zăn*
asafetida, *ȧs′ȧfĕt′ĭ-dȧ*
ascetic, *ȧ-sĕt′ĭk*
ask, *ȧsk*
askance, *ȧ-skăns′; ȧ-skȧns′*
asphalt, *ȧs′fȧlt*
aspirant, *ȧs-pīr′ȧnt*
assay, *ă-sā′*
associate (v.), *ȧ-sō′shĭ-āt*
associate (n.), *-ât*
associate (adj.), *-ât*
association, *ȧ-sō′sĭ-ā′shŭn; -shĭ-ā′shŭn*
assume, *ȧ-sūm′*
asthma, *ăz′mȧ; ăs′mȧ*
atheneum, *ăth′ē-nē′ŭm*
athletics, *ăth-lĕt′ĭks*
attaché, *ȧ′tȧ′shā′*
attorney, *ă-tûr′nĭ*
audacious, *ô-dā′shŭs*
audience, *ô′dĭ-ĕns*
au gratin, *ō′grȧ′tăN′*
aunt, *ănt*
au revoir, *ō′rē-vwär′*
aurora borealis, *ô-rō′rȧ bō′rē-ā′lĭs*
authority, *ô-thŏr′ĭ-tĭ*
automobile, *ô′tô-mō′bĭl; -mō-bēl′*
auxiliary, *ôg-zĭl′yȧ-rĭ*
avenue, *ȧv′ē-nū*
aviator, *ā′vĭ-ā′tẽr*
avoirdupois, *ȧv′ẽr-dŭ-poiz′*
axiom, *ȧk′sĭ-ŭm*
aye, (yes) *ī*

bacchant, *bȧk′ȧnt*
bacilli, *bȧ-sĭl′ī*
bacillus, *bȧ-sĭl′ŭs*
bade, *bȧd*
badinage, *bȧ′dē′nāzh′; bȧd′ĭ-nâj*
balcony, *bȧl′kō-nĭ*
ballad, *bȧl′ȧd*
ballade, *bȧ-lȧd′*
ballet, *bȧl′ā′; bä′lā′*
balm, *bäm*
banquet, *bȧng′kwĕt; -kwĭt*
baptism, *bȧp′tĭz′m*
baptize, *bȧp-tīz′*
bargain, *bär′gĕn*
barrage, *bär′äj;* Fr. *bȧ′rāzh′*
barrel, *bȧr′ĕl*
basin, *bā′s'n*
basket, *bȧs′kĕt; bȧs′kĭt*
bath, *bȧth*
baton, *bȧ′tôN′; bȧt′ŭn*
bayou, *bī′ōō*
because, *bē-kŏz′*
bedstead, *bĕd′stĕd*
been, *bĭn; bēn*
begonia, *bē-gō′nĭ-ȧ*
believe, *bē-lēv′*
belles-lettres, *bĕl′lĕt′r'*
belligerent, *bē-lĭj′ẽr-ĕnt*
bellows, *bĕl′ōz; -ŭs*
beloved (adj.), *bē-lŭv′ĕd; bē-lŭvd′*
beloved (part.), *bē-lŭvd′*
beneficent, *bē-nĕf′ĭ-sĕnt*
bequeath, *bē-kwēTH′*
bestial, *bĕs′chȧl; bĕs′tĭ-ȧl*
betrothal, *bē-trŏth′ȧl; -trōTH′ȧl*
bicycle, *bī′sĭ-k'l*
biennial, *bī-ĕn′ĭ-ȧl*
bijou, *bē′zhōō′; bē′zhōō*
billet-doux, *bĭl′ĕ-dōō′*
bindery, *bīn′dẽr-ĭ*
biography, *bī-ŏg′rȧ-fĭ*
biology, *bī-ŏl′ō-jĭ*
biparous, *bĭp′ȧ-rŭs*
bipartite, *bī-pär′tīt*
bismuth, *bĭz′mŭth; bĭs′mŭth*
blackguard, *blăg′ärd*
blanch, *blȧnch*
blanc mange, *blȧ-mänzh′*
blasé, *blȧ′zā′*
blaspheme, *blȧs-fēm′*
blasphemous, *blȧs′fē-mŭs*
blast, *blȧst*
blessed (adj.), *blĕs′ĕd*
blessed (part.), *blĕst; blĕs′ĕd*
blouse, *blouz*
blue, *blōō*
bodega, *bō-dē′gȧ*
boisterous, *bois′tẽr-ŭs*
bolero, *bō-lā′rō*
boll weevil, *bōl wē′v'l*
bomb, *bŏm*

bona fide, *bō′nȧ fī′dē*
bon marché, *bôN′mȧr′shā′*
bonnet, *bŏn′ĕt; -ĭt*
borax, *bō′rȧks*
borrow, *bŏr′ō*
bosom, *bo͝oz′ŭm*
boudoir, *bo͞o′dwär′*
bouquet, *bo͞o-kā′*
bourne (bound), *bōrn; bo͝orn*
bourne (brook), *bo͝rn*
bourse, *bo͝ors*
bovine, *bō′vīn; -vĭn*
bow-legged, *bō′lĕg′ĕd; bō′lĕgd′*
brand-new, *brănd′nū′*
brassière, *brȧ′syȧr′*
breviary, *brē′vĭ-ȧ-rĭ*
brigand, *brĭg′ănd*
bristle, *brĭs″l*
brochure, *brō-shūr′*
brogan, *brō′gȧn*
bromide, *brō′mīd*
bromine, *brō′mĭn*
bronchitis, *brŏng-kī′tĭs*
brusque (brusk), *brŏŏsk; brŭsk*
bungalow, *bŭng′gȧ-lō*
buoy, *boi*
bureaucracy, *bû-rō′krȧ-sĭ*
burlesque, *bûr-lĕsk′*
bursar, *bûr′sẽr*
business, *bĭz′nĕs*
butcher, *bo͝och′ẽr*

cabal, *kȧ-băl′*
caballero, *kä′bäl-yä′rō*
cabaret, *kăb′ȧ-rĕt′; kä′bä′rā′*
cache, *kȧsh*
cadaver, *kȧ-dā′vẽr*
café, *kȧ′fā′*
cafeteria, *kăf′ē-tē″rĭ-ȧ; kä′fȧ-tȧ-rē″ȧ*
calf, *kăf; kȧf*
caliph, *kā′lĭf; kăl′ĭf*
caliphate, *kăl′ĭ-fāt*
calk, *kôk*
calliope, *kȧ-lī′ô-pē*
calm, *käm*
caloric, *kȧ-lŏr′ĭk*
calorie, *kăl′ô-rĭ*
calve, *käv; kȧv*
calyx, *kā′lĭks; kăl′ĭks*
camembert, *kă′mȧN′bâr′*
campanile, *kăm′pä-nē″lā; kȧm′pȧ-nēl′*
cancel, *kăn′sĕl*
candelabra, *kăn′dē-lā′brȧ*
canine, *kȧ-nīn′; kā′nīn*
cañon, *kăn′yŭn*
cant, *kănt*
can't, *känt; kȧnt*
cantilever, *kăn′tĭ-lē′vẽr; kăn′tĭ-lĕv′ẽr*
cantonment, *kăn′tŏn-mĕnt; kȧn-to͞on′mĕnt*
capitulate, *kȧ-pĭch′ū-lāt; kȧ-pĭt′yū-lāt*
capon, *kā′pŏn*
caprice, *kȧ-prēs′*
carafe, *kȧ-rȧf′*
carburetor, *kär′bû-rĕt′ẽr*
caricature, *kăr′ĭ-kȧ-chûr*
carillon, *kăr′ĭ-lŏn*
cartridge, *kär′trĭj*
cashmere, *kȧsh′mēr; kȧsh′mēr′*
casino, *kȧ-sē′nō*
caste, *kȧst*
catalogue, *kăt′ȧ-lŏg*
catalpa, *kȧ-tăl′pȧ*
catch, *kȧch*
catchup, *kăch′ŭp*
catechize, *kăt′ē-kīz*
catsup, *kăt′sŭp*
caveat, *kă′vē-ăt*
celestial, *sē-lĕs′chăl; sĭ-lĕs′tĭ-ăl*
cello, *chĕl′ō*
celluloid, *sĕl′ū-loid*
cemetery, *sĕm′ē-tĕr-ĭ*
centenary, *sĕn′tē-nȧ-rĭ*
centennial, *sĕn-tĕn′ĭ-ăl*
centime, *säN′tēm′*
century, *sĕn′chŭ-rĭ; sĕn′tū-rĭ*
ceramic, *sē-răm′ĭk*
cerebrum, *sĕr′ē-brŭm*
chagrin, *shȧ-grĭn′*
challis, *shăl′ĭ; chăl′ĭs*
chamois, *shăm′ĭ*
champagne, *shăm-pān′*
chaos, *kā′ŏs*
chaperon, *shăp′ẽr-ōn; -ŏn*
character, *kăr′ăk-tẽr*
chargé d'affaires, *shär′zhā′ dȧ′fâr′*
chassis, *shȧ′sē*
chasten, *chās″n*
chastise, *chăs-tīz′*
chastisement, *chăs′tĭz-mĕnt*
chatelaine, *shăt′ē-lān*
chauffeur, *shō′fûr′*
chef, *shĕf*
chemise, *shē-mēz′*
chemisette, *shĕm′ĭ-zĕt′*
chenille, *shē-nēl′*
chestnut, *chĕs′nŭt*
cheviot, *chĕv′ĭ-ŭt; chē′vĭ-ŭt*
chew, *chōō*
chic, *shēk*
chicane, *shĭ-kān′*
chicken, *chĭk′ĕn; -ĭn*
chiffon, *shĭf′ŏn; Fr. shē′fôN′*
chiffonier, *shĭf′ô-nēr′*
children, *chĭl′drĕn*
chimera, *kĭ-mē′rȧ; kī-*
chirography, *kī-rŏg′rȧ-fĭ*
chiropodist, *kī-rŏp′ô-dĭst*
chisel, *chĭz′ĕl*
chocolate, *chŏk′ô-lāt*
choleric, *kŏl′ẽr-ĭk*
chorister, *kŏr′ĭs-tẽr*
chorus, *kō′rŭs*
christen, *krĭs″n*
chyle, *kīl*
chyme, *kīm*
cinchona, *sĭn-kō′nȧ*
cinematograph, *sĭn′ē-măt′ô-grȧf*
circuit, *sẽr′kĭt*
circuitous, *sẽr-kū′ĭ-tŭs*
citadel, *sĭt′ȧ-dĕl*
civil, *sĭv′ĭl*
civilization, *sĭv′ĭ-lĭ-zā′shŭn*
clairvoyant, *klâr-voi′ănt*
clandestine, *klăn-dĕs′tĭn*
clapboard, *klăp′bōrd*
clasp, *klȧsp*
class, *klȧs*
cleanly (adj.), *klĕn′lĭ*
cleanly (adv.), *klēn′lĭ*
clematis, *klĕm′ȧ-tĭs*
clew, *klōō*
clientele, *klī′ĕn-tĕl′; -tēl′*
clique, *klēk*
clothes, *klōTHz*
coagulate, *kō-ăg′ū-lāt*
cocaine, *kō′kā-ĭn; -ēn; kō-kān′*
coccyx, *kŏk′sĭks*
codeine, *kō-dē′ĭn; kō′dē-ēn*
coffee, *kŏf′ĭ*
cognac, *kō′nyȧk*
cognizance, *kŏg′nĭ-zȧns; kŏn′ĭ-* (legal)
cognomen, *kŏg-nō′mĕn*
coiffure, *kwȧ′fûr′; koif′ûr*
colander, *kŭl′ăn-dẽr*
collation, *kŏ-lā′shŭn*
collect (n.), *kŏl′ĕkt*
collect (v.), *kŏ-lĕkt′*
colloquial, *kŏ-lō′kwĭ-ăl*
colosseum, *kŏl′ô-sē′ŭm*
colporteur, *kŏl′pōr′tẽr*
column, *kŏl′ŭm*
combatant, *kŏm′bȧt-ănt*
combine (v.), *kŏm-bīn′*
combine (n.), *kŏm-bīn′; kŏm′bīn*
comeliness, *kŭm′lĭ-nĕs*
comely, *kŭm′lĭ*
comity, *kŏm′ĭ-tĭ*
commiserate, *kŏ-mĭz′ẽr-āt*
communal, *kŏm′ū-năl; kŏ-mū′năl*
commune (v.), *kŏ-mūn′*
commune (n.), *kŏm′ūn*
comparable, *kŏm′pȧ-rȧ-b'l*
complex (n. and adj.), *kŏm′plĕks*
comport, *kŏm-pōrt′*
compromise, *kŏm′prô-mīz*
comptroller, *kŏn-trōl′ẽr*
concave, *kŏn′kāv*
concerto, *kŏn-chẽr′tō; kŏn-sẽr′-*
conclude, *kŏn-klo͞od′*
conclusive, *kŏn-klo͞o′sĭv*
concord, *kŏng′kôrd; kŏn′-*
concourse, *kŏng′kōrs; kŏn′-*
concrete (n. and adj.), *kŏn′krēt; kŏn-krēt′*
concrete (v.), *kŏn-krēt′*
condolence, *kŏn-dō′lĕns*
conduit, *kŏn′dĭt*
confidant, *kŏn′fĭ-dănt′; kŏn′fĭ-dänt′*
confiscate, *kŏn′fĭs-kāt; -fĭs′-*
congé, *kôN′zhā′; kŏn′jē*
congenial, *kŏn-jēn′yȧl*
congeries, *kŏn-jē′rĭ-ēz*
congregate, *kŏng′grē-gāt*
congress, *kŏng′grĕs*
congruous, *kŏng′grōō-ŭs*
conjure (implore), *kŏn-jo͝or′*
conjure (enchant), *kŭn′jẽr*
connoisseur, *kŏn′ĭ-sûr′; -sūr′*
conquest, *kŏng′kwĕst*
conscientious, *kŏn′shĭ-ĕn′shŭs*
considerable, *kŏn-sĭd′ẽr-ȧ-b'l*
consignee, *kŏn′sī-nē′; -sĭ-nē′*
conspiracy, *kŏn-spĭr′ȧ-sĭ*
constable, *kŭn′stȧ-b'l; kŏn′-*
consul, *kŏn′sŭl*
contemplate, *kŏn′tĕm-plāt; -tĕm′-*
contemplative, *kŏn-tĕm′plȧ-tĭv*
continuity, *kŏn′tĭ-nū′ĭ-tĭ*
contractor, *kŏn-trăk′tẽr*
contrary, *kŏn′trȧ-rĭ*
contumely, *kŏn′tū-mē-lĭ*
conversant, *kŏn′vẽr-sănt*
coquet, *kō-kĕt′*
coquetry, *kō′kĕt-rĭ*
coral, *kŏr′ăl*
cordial, *kôr′jăl; kôrd′yăl*
cornet, *kôr′nĕt*
corolla, *kō-rŏl′ȧ*
corps, *kôr*
corral, *kŏ-răl′*
corridor, *kŏr′ĭ-dôr; -dōr*
corrugate, *kŏr′ōō-gāt*
cortège, *kôr′tĕzh′*
cosmetic, *kŏz-mĕt′ĭk*
costume (n.), *kŏs′tūm; kŏs-tūm′*
costume (v.), *kŏs-tūm′*
costumer, *kŏs-tūm′ẽr; kŏs′-*
cotillion, *kō-tĭl′yŭn*
coup, *kōō*
coupé, *kōō′pā′*
coupon, *kōō′pŏn*
courier, *kōō′rĭ-ẽr; kŏŏr′ĭ-*
courteous, *kûr′tē-ŭs; kôrt′yŭs*
courtier, *kôrt′yẽr*
cousin, *kŭz″n*
covetous, *kŭv′ē-tŭs*
crabbed, *krăb′ĕd*
cranberry, *krăn′bĕr-ĭ*

crèche, *krĕsh; krāsh*
credence, *krē′dĕns*
credulous, *krĕd′ū-lŭs*
creek, *krēk*
crêpe de chine, *krāp d′-shēn′*
crescendo, *krē-shĕn′dō; -sĕn′-*
crew, *krōō*
crucial, *krōō′shăl*
cruel, *krōō′ĕl*
crux, *krŭks*
cuisine, *kwē-zēn′*
culinary, *kū′lĭ-nā-rĭ*
culture, *kŭl′chûr; kŭl′tūr*
cuneiform, *kū-nē′ĭ-fôrm*
cupboard, *kŭb′ĕrd*
cupola, *kū′pō-lȧ*
curator, *kū-rā′tĕr*
cycle, *sī′k′l*
cynosure, *sī′nō-shōōr; sĭn′ō-*

daguerreotype, *dȧ-gĕr′ō-tīp*
dahlia, *dăl′yȧ; dāl′yȧ*
damage, *dăm′āj*
dance, *dȧns*
data, *dā′tȧ*
daub, *dôb*
deaf, *dĕf*
debenture, *dē-bĕn′chûr; -tūr*
débris, *dā′brē′; dā′brē*
début, *dā′bū′; dē-bū′*
débutante, *dā′bū′tȧNt′; dĕb′ū-tănt′*
decade, *dĕk′ād*
decent, *dē′sĕnt*
décolleté, *dā′kŏl′ĭ-tā′*
decorous, *dē-kō′rŭs; dĕk′ō-rŭs*
dedicatory, *dĕd′ĭ-kȧ-tō-rĭ*
defalcate, *dē-făl′kāt*
defamation, *dĕf′ȧ-mā′shŭn; dē′fȧ-*
deficit, *dĕf′ĭ-sĭt*
deign, *dān*
delicatessen, *dĕl′ĭ-kȧ-tĕs′ĕn*
delirious, *dē-lĭr′ĭ-ŭs*
de luxe, *dē lŭks′*
demagogic, *dĕm′ȧ-gŏj′ĭk*
demi-tasse, *dē-mē′tăs′; dĕm′ĭ-tȧs′*
democratize, *dē-mŏk′rȧ-tīz*
demon, *dē′mŏn*
demonetization, *dē-mŏn′ē-tĭ-zā′shŭn; dē-mŭn′-; -tī-zā′shŭn*
demurrage, *dē-mŭr′āj*
dénouement, *dā-nōō′mäN; dā′nōō′mäN′*
depths, *dĕpths*
derisive, *dē-rī′sĭv*
deshabille, *dĕz′ȧ-bēl′*
desist, *dē-zĭst′; -sĭst′*
despicable, *dĕs′pĭ-kȧ-b′l*
dessert, *dē-zûrt′*
destine, *dĕs′tĭn*
detail (n.), *dē′tāl′; dē′tāl*
detail (v.), *dē-tāl′*
detour, *dē-tōōr′*
devoir, *dĕ-vwär′*
dew, *dū*
dexterous, *dĕks′tĕr-ŭs*
diagnostician, *dī′ăg-nŏs-tĭsh′ăn*
diastole, *dī-ăs′tō-lē*
dictator, *dĭk-tā′tĕr*
dictionary, *dĭk′shŭn-ȧ-rĭ*
dietetics, *dī′ĕ-tĕt′ĭks*
dietitian, *dī′ĕ-tĭsh′ăn*
different, *dĭf′ĕr-ĕnt*
diffuse (adj.), *dĭ-fūs′*
diffuse (v.), *dĭ-fūz′*
digest (v.), *dĭ-jĕst′; dī-*
digest (n.), *dī′jĕst*
digestion, *dĭ-jĕs′chŭn*
digitalis, *dĭj′ĭ-tā′lĭs*
digraph, *dī′grȧf*
dilettante, *dĭl′ĕ-tăn′tē; dē′lĕt-tän′tȧ*
diphtheria, *dĭf-thē′rĭ-ȧ*
diphthong, *dĭf′thŏng*
diploma, *dĭ-plō′mȧ*
direct, *dĭ-rĕkt′*
disaster, *dĭz-ăs′tĕr*
disburse, *dĭs-bûrs′*
discern, *dĭ-zûrn′*
discipline, *dĭs′ĭ-plĭn*
discourse, *dĭs-kōrs′*
discretion, *dĭs-krĕsh′ŭn*
disdain, *dĭs-dān′*
disease, *dĭ-zēz′*
dishabille, *dĭs′ȧ-bēl′; -bĭl′*
dishevel, *dĭ-shĕv′ĕl*
dispersion, *dĭs-pûr′shŭn*
disputant, *dĭs′pū-tȧnt*
district, *dĭs′trĭkt*
divan, *dĭ-văn′*
diverge, *dĭ-vûrj′*
divulge, *dĭ-vŭlj′*
domain, *dō-mān′*
domicile, *dŏm′ĭ-sĭl*
donkey, *dŏng′kĭ*
douche, *dōōsh*
drama, *drä′mȧ*
drawer, *drô′ĕr*
dromedary, *drŭm′ē-dā-rĭ; drŏm′-*
drought, *drout*
drowned, *drownd*
dubious, *dū′bĭ-ŭs*
due, *dū*
duty, *dū′tĭ*
dyspepsia, *dĭs-pĕp′sĭ-ȧ*

eau de cologne, *ō dē kō-lōn′*
ebullition, *ĕb′ū-lĭsh′ŭn*
éclat, *ā′klä′*
eczema, *ĕk′zē-mȧ*
edible, *ĕd′ĭ-b′l*
education, *ĕd′ū-kā′shŭn*
effigy, *ĕf′ĭ-jĭ*
effort, *ĕf′ôrt; -ĕrt*
ego, *ē′gō; ĕg′ō*
egret, *ē′grĕt; ĕg′rĕt*
electrometer, *ē-lĕk-trŏm′ē-tĕr*
elegiac, *ĕ-lē′jĭ-ăk; ĕl′ē-jī′ăk*
eleven, *ē-lĕv′n*
élite, *ā′lēt′*
elm, *ĕlm;* not *ĕl′ŭm*
elongate, *ē-lŏng′gāt; ē′lŏng-gāt*
embrasure, *ĕm-brā′zhûr*
emeritus, *ē-mĕr′ĭ-tŭs*
emolument, *ē-mŏl′ū-mĕnt*
employee, *ĕm-ploi-ē′*
enchant, *ĕn-chănt′*
encore, *äN′kôr′; äng-kōr′*
encyclical, *ĕn-sĭk′lĭ-kăl; ĕn-sī′klĭ-kăl*
endive, *ĕn′dīv; -dĭv*
enema, *ĕn′ē-mȧ*
enfranchise, *ĕn-frăn′chīz; -chĭz*
engine, *ĕn′jĭn*
ennui, *äng-nwē′*
en route, *äN′rōōt′*
ensign (n.), *ĕn′sīn*
entente, *äN′tänt′*
entrée, *äN′trā′*
entrepôt, *äN′tr′-pō′*
enunciate, *ē-nŭn′shĭ-āt; ē-nŭn′sĭ-āt*
envelope (n.), *ĕn′vĕ-lōp*
epaulet, *ĕp′ō-lĕt*
epistle, *ē-pĭs′′l*
epitome, *ē-pĭt′ō-mē*
equine, *ē′kwīn*
equitable, *ĕk′wĭ-tȧ-b′l*
era, *ē′rȧ*
erasure, *ē-rā′zhûr*
erratum, *ē-rā′tŭm*
erysipelas, *ĕr′ĭ-sĭp′ē-lȧs*
esquire, *ĕs-kwīr′*
etiquette, *ĕt′ĭ-kĕt*
étude, *ā′tūd′*
euphonic, *ū-fŏn′ĭk*
evasive, *ē-vā′sĭv*
exaggeration, *ĕg-zăj′ĕr-ā′shŭn*
examine, *ĕg-zăm′ĭn*
example, *ĕg-zăm′p′l; ĕg-zȧm′p′l*
excise, *ĕk-sīz′*
exemplary, *ĕg′zĕm-plȧ-rĭ; ĕg-zĕm′plȧ-rĭ*
exhalation, *ĕks′hȧ-lā′shŭn*
exist, *ĕg-zĭst′*
exit, *ĕk′sĭt*
exogenous, *ĕk-sŏj′ē-nŭs*
exorbitant, *ĕg-zôr′bĭ-tȧnt*
expedient, *ĕks-pē′dĭ-ĕnt*
exponent, *ĕks-pō′nĕnt*
exquisite, *ĕks′kwĭ-zĭt*
extant, *ĕks′tȧnt*
extempore, *ĕks-tĕm′pō-rē*
extraordinary, *ĕks-trôr′dĭ-nȧ-rĭ; ĕks′trȧ-ôr′-*

facet, *făs′ĕt*
facile, *făs′ĭl*
facsimile, *făk-sĭm′ĭ-lē*
factory, *făk′tō-rĭ*
falcon, *fô′k′n; fôl′k′n*
fallen, *fôl′′n*
falsetto, *fôl-sĕt′ō*
family, *făm′ĭ-lĭ*
fancy, *făn′sĭ*
far, *fär*
fast, *fȧst*
faucet, *fô′sĕt; fô′sĭt*
favorite, *fā′vĕr-ĭt*
fecund, *fē′kŭnd; fē′kŭnd*
fellow, *fĕl′ō*
feminine, *fĕm′ĭ-nĭn*
fête, *fāt*
fiancé, *fē′äN′sā′*
fiancée, *fē′äN′sā′*
fibril, *fī′brĭl*
fichu, *fĭsh′ōō*
fidelity, *fī-dĕl′ĭ-tĭ*
figure, *fĭg′ûr*
filet, *fē′lĕ′*
film, *fĭlm*
finale, *fē-nä′lā*
finance, *fī-nȧns′; fī-*
financier, *fĭn′ăn-sēr′; fī-năn′sĭ-ĕr*
finis, *fī′nĭs*
fleur-de-lis, *flûr′dē-lē′*
flew, *flōō*
floral, *flō′rȧl*
florid, *flŏr′ĭd*
florin, *flŏr′ĭn*
flute, *flōōt*
food, *fōōd*
forbade, *fôr-băd′*
forehead, *fŏr′ĕd*
forest, *fŏr′ĕst*
forum, *fō′rŭm*
fountain, *foun′tĭn*
foyer, *fwä′yā′; fŏy′ĕr*
fragile, *frăj′ĭl*
franchisement, *frăn′chĭz-mĕnt*
frappé, *frȧ′pā′*
fraternize, *frȧt′ĕr-nīz*
fricassee, *frĭk′ȧ-sē′*
friends, *frĕndz*
friendship, *frĕnd′shĭp*
frontier, *frŏn′tēr; frŭn′tĕr*
fuel, *fū′ĕl*
fulminate, *fŭl′mĭ-nāt*
funereal, *fū-nē′rē-ăl*
fungi, *fŭn′jī*
furniture, *fûr′nĭ-chûr; -tūr*
fusillade, *fū′zĭ-lād′*

gala, *gā′lȧ*
gallery, *gȧl′ĕr-ĭ*

gangrene, *găng'grēn*
gape, *gāp; gäp*
garage, *gä'räzh'; gär'äj*
garrulous, *găr'ōō-lŭs*
gaseous, *gās'ē-ŭs*
gastritis, *gās-trī'tĭs*
gather, *găTH'ĕr*
gazetteer, *găz'ĕ-tēr'*
geisha, *gā'shä*
genealogy, *jēn'ē-ăl'ō-jĭ; jē'nē-*
generally, *jĕn'ĕr-ăl-ĭ*
genii, *jē'nĭ-ī*
genre, *zhäN'r'*
gentleman, *jĕn't'l-măn*
genuine, *jĕn'ū-ĭn*
geranium, *jē-rā'nĭ-ŭm*
gerrymander, *gĕr'ĭ-măn'dĕr*
gerund, *jĕr'ŭnd*
gest, *jĕst*
gesture, *jĕs'chûr; -tūr*
get, *gĕt*
ghastly, *gäst'lĭ*
ghoul, *gōōl*
gibber, *jĭb'ĕr; gĭb'ĕr*
gibbet, *jĭb'ĕt*
gin, *jĭn*
giraffe, *jĭ-räf'*
girl, *gûrl*
gist, *jĭst*
gladiolus, *glă-dī'ō-lŭs; glăd'ĭ-ō'lŭs*
glycerine, *glĭs'ĕr-ĭn*
gneiss, *nīs*
golf, *gŏlf*
gondola, *gŏn'dō-lä*
gone, *gŏn*
gospel, *gŏs'pĕl*
government, *gŭv'ĕrn-mĕnt*
granary, *grăn'ä-rĭ*
granddaughter, *grănd'dô'tĕr*
grandeur, *grăn'jûr; grăn'dûr*
grasp, *gräsp*
grass, *gräs*
gratis, *grā'tĭs*
grimace, *grĭ-mās'*
grimy, *grīm'ĭ*
gripe, *grīp*
grisly, *grĭz'lĭ*
grotesque, *grō-tĕsk'*
grovel, *grŏv''l*
guardian, *gär'dĭ-ăn*
guillotine (n.), *gĭl'ō-tēn*
guillotine (v.), *gĭl'lō-tēn'*
gymnasium, *jĭm-nā'zĭ-ŭm*
gyroscope, *jī'rō-skōp*

habitant, *hăb'ĭ-tănt; Fr. ä'bē'täN'*
habitué, *hä-bĭch'ū-ā'*
hacienda, *ä-syĕn'dä; hä'sĭ-ĕn'dä*
hæmoglobin; hemo-, *hē'mō-glō'bĭn; hĕm'ō-*
handbook, *hănd'bŏŏk'*
handkerchief, *hăng'kĕr-chĭf*
hangar, *hăng'gär'*
harass, *hăr'ăs*
harbinger, *här'bĭn-jĕr*
harem, *hā'rĕm*
hasten, *hās''n*
haunt, *hänt; hônt*
hearth, *härth*
heaven, *hĕv''n*
height, *hīt*
heinous, *hā'nŭs*
helm, *hĕlm*
heroine, *hĕr'ō-ĭn*
hesitate, *hĕz'ĭ-tāt*
heteronym, *hĕt'ĕr-ō-nĭm'*
hieroglyphic, *hī'ĕr-ō-glĭf'ĭk*
highwayman, *hī'wā'măn*
hilarious, *hĭ-lā'rĭ-ŭs; hī-*
hirsute, *hûr'sūt; hĕr-sūt'*
history, *hĭs'tō-rĭ*
hoist, *hoist*
holocaust, *hŏl'ō-kôst*
holograph, *hŏl'ō-gräf*
homage, *hŏm'äj*
homeopathic, *hō'mē-ō-păth'ĭk*
homeopathist, *hō'mē-ŏp'ä-thĭst; hŏm'ē-*
homestead, *hōm'stĕd*
homogeneous, *hō'mō-jē'nē-ŭs; hŏm'ō-*
homonym, *hŏm'ō-nĭm; hō'mō-*
honest, *ŏn'ĕst*
honorable, *ŏn'ĕr-ä-b'l*
honorarium, *ŏn'ō-rā'rĭ-ŭm*
hoof, *hōōf*
horrid, *hŏr'ĭd*
horse-radish, *hôrs'răd'ĭsh*
hospitable, *hŏs'pĭ-tä-b'l*
hovel, *hŏv'ĕl; hŭv'ĕl*
humble, *hŭm'b'l*
humor, *hū'mĕr*
hundred, *hŭn'drĕd*
hydraulics, *hī-drô'lĭks*
hydrometer, *hī-drŏm'ē-tĕr*
hygiene, *hī'jĭ-ēn; hī'jēn*
hygienic, *hī'jĭ-ĕn'ĭk*
hypocrisy, *hĭ-pŏk'rĭ-sĭ*
hysteria, *hĭs-tē'rĭ-ä*
hysterical, *hĭs-tĕr'ĭ-kăl*

idea, *ī-dē'ä*
ideal, *ī-dē'ăl*
idiosyncrasy, *ĭd'ĭ-ō-sĭng'krä-sĭ*
ignoramus, *ĭg'nō-rā'mŭs*
illusory, *ĭ-lū'sō-rĭ*
illustrate, *ĭ-lŭs'trāt; ĭl'ŭs-trāt*
imbroglio, *ĭm-brōl'yō*
impious, *ĭm'pĭ-ŭs*
importune, *ĭm'pŏr-tūn'; ĭm-pôr'chûn*
impotent, *ĭm'pō-tĕnt*
improvise, *ĭm'prō-vīz'*
inaugurate, *ĭn-ô'gū-rāt*
incise, *ĭn-sīz'*
incisive, *ĭn-sī'sĭv*
incognito, *ĭn-kŏg'nĭ-tō*
incomparable, *ĭn-kŏm'pä-rä-b'l*
incredulous, *ĭn-krĕj'ū-lŭs; ĭn-krĕd'yū-*
incursion, *ĭn-kûr'shŭn*
indisputable, *ĭn-dĭs'pū-tä-b'l*
industry, *ĭn'dŭs-trĭ*
inertia, *ĭn-ûr'shĭ-ä*
inexplicable, *ĭn-ĕks'plĭ-kä-b'l*
inextricably, *ĭn-ĕks'trĭ-kä-blĭ*
infamous, *ĭn'fä-mŭs*
infantile, *ĭn'fän-tīl; -tĭl*
influence, *ĭn'flōō-ĕns*
ingénue, *ăN'zhā'nü'*
innocent, *ĭn'ō-sĕnt*
inopportune, *ĭn-ŏp'ôr-tūn'*
inquiry, *ĭn-kwīr'ĭ*
insatiable, *ĭn-sā'shĭ-ä-b'l; -shä-b'l*
insect, *ĭn'sĕkt*
insignia, *ĭn-sĭg'nĭ-ä*
instead, *ĭn-stĕd'*
insulate, *ĭn'sŭ-lāt*
integer, *ĭn'tē-jĕr*
interesting, *ĭn'tĕr-ĕst-ĭng*
intermezzo, *ĭn'-tĕr-mĕd'zō*
international, *ĭn'tĕr-năsh'ŭn-ăl*
interpellate, *ĭn'tĕr-pĕl'āt*
interpellation, *ĭn'tĕr-pĕ-lā'shŭn*
interpolate, *ĭn-tûr'pō-lāt*
intricacy, *ĭn'trĭ-kä-sĭ*
intrigue, *ĭn-trēg'*
inundate, *ĭn'ŭn-dāt; ĭn-ŭn'dāt*
inveigle, *ĭn-vē'g'l*
iodine, *ī'ō-dĭn; -dīn; -dēn*
irony, *ī'rō-nĭ*
irrefragable, *ĭ-rĕf'rä-gä-b'l*
irrefutable, *ĭr'ē-fūt'ä-b'l; ĭ-rĕf'ū-tä-b'l*
irremediable, *ĭr'ē-mē'dĭ-ä-b'l*
irrevocable, *ĭ-rĕv'ō-kä-b'l*
isinglass, *ī'zĭng-gläs*
isolate, *ī'sō-lāt; ĭs'ō-*
italic, *ĭ-tăl'ĭk*
ivory, *ī'vō-rĭ*

jardinière, *zhär'dē'nyâr'*
jocose, *jō-kōs'*
jocund, *jŏk'ŭnd*
jostling, *jŏs'lĭng*
judgment, *jŭj'mĕnt*
jugular, *jōō'gū-lär*
jujutsu, *jōō'jōōt'sōō*
junta, *jŭn'tä*
just, *jŭst*
jute, *jōōt*

kaleidoscope, *kä-lī'dō-skōp*
kept, *kĕpt*
keramic, *kē-răm'ĭk*
kettle, *kĕt''l*
khaki, *kä'kē*
khedive, *kē-dēv'*
kiln, *kĭl; kĭln*
kimono, *kĭ-mō'nō*
kindergarten, *kĭn'dĕr-gär'tĕn*
kinetoscope, *kĭ-nē'tō-skōp*
kiosk, *kē-ŏsk'*
kismet, *kĭs'mĕt*
kitchen, *kĭch'ĕn*
knout, *nout; nōōt*
kopje, *kŏp'ĭ*
kumiss, *kōō'mĭs*
kurd, *kōōrd*

label, *lā'bĕl*
laboratory, *lăb'ō-rä-tō-rĭ*
laborer, *lā'bĕr-ĕr*
lamentable, *lăm'ĕn-tä-b'l*
language, *lăng'gwăj*
largess, *lär'jĕs*
laryngitis, *lăr'ĭn-jī'tĭs*
larynx, *lăr'ĭngks*
last, *läst*
laths, *läTHz*
lattice, *lăt'ĭs*
laudanum, *lô'dä-nŭm; lŏd''n-ŭm*
laugh, *läf; läf*
lava, *lä'vä*
lavallière, *lä'väl'yâr'*
layette, *lā-ĕt'*
leaped, *lēpt*
leapt, *lēpt*
learned (adj.), *lûr'nĕd*
learned (v.), *lûrnd*
legate, *lĕg'ât*
legislature, *lĕj'ĭs-lā'chûr; -tūr*
length, *lĕngth*
lenient, *lē'nĭ-ĕnt; lēn'yĕnt*
leper, *lĕp'ĕr*
lese majesty, *lēz măj'ĕs-tĭ*
lethal, *lē'thăl*
lettuce, *lĕt'ĭs*
leverage, *lĕ'vĕr-äj; lĕv'ĕr-*
liaison, *lē'ä'zôN'*
libel, *lī'bĕl*
libertine, *lĭb'ĕr-tĭn*
librarian, *lī-brā'rĭ-ăn*
library, *lī'brā-rĭ*
lichen, *lī'kĕn*
licorice, *lĭk'ō-rĭs*
lief, *lēf*
lilac, *lī'lăk*
limn, *lĭm*
lineament, *lĭn'ē-ä-mĕnt*
lingerie, *lăN'zh'-rē'*
linoleum, *lĭ-nō'lē-ŭm*

linotype, *līn'ō-tīp'; lĭn'-*
liqueur, *lē'kûr'; lĭ-kûr'*
liquor, *lĭk'ẽr*
literati, *lĭt'ē-rä'tī*
literatim, *lĭt'ē-rā'tĭm*
literature, *lĭt'ẽr-ā-chûr; -tūr*
lithographer, *lĭ-thŏg'rā-fẽr*
livelong, *lĭv'lŏng'*
loath, *lōth*
loathe, *lōTH*
loggia, *lŏj'ä; lō'jĭ-ä*
longevity, *lŏn-jĕv'ĭ-tĭ*
long-lived, *lŏng'līvd'*
lower (threaten), *lou'ẽr*
lure, *lūr*
lurid, *lū'rĭd*
lyceum, *lī-sē'ŭm*

machination, *măk'ĭ-nā'shŭn*
mackerel, *măk'ẽr-ẽl*
madras, *mȧ-drȧs'*
madre, *mä'drā*
maestro, *mä-ĕs'trō*
magazine, *măg'ȧ-zēn'*
magna charta, *măg'nȧ kär'tȧ*
magnolia, *măg-nō'lĭ-ȧ*
malaria, *mȧ-lā'rĭ-ȧ*
malefactor, *măl'ē-făk'tẽr*
malign, *mȧ-līn'*
mallow, *măl'ō*
malpractice, *măl-prăk'tĭs*
mama, *mȧ-mä'; mä'mȧ*
mañana, *mä-nyä'nä*
mandamus, *măn-dā'mŭs*
mandatory, *măn'dȧ-tō-rĭ*
mange, *mānj*
mania, *mā'nĭ-ȧ*
maniacal, *mȧ-nī'ȧ-kăl*
manor, *măn'ẽr*
manufactory, *măn'ū-făk'tō-rĭ*
manzanita, *măn'zȧ-nē'tȧ*
maraschino, *măr'ȧ-skē'nō*
margarine, *mär'gȧ-rĭn; -rēn*
maritime, *măr'ĭ-tīm; -tĭm*
marquis, *mär'kwĭs*
marshmallow, *märsh'măl'ō*
masculine, *măs'kū-lĭn*
mask, *mȧsk*
massacred, *măs'ȧ-kẽrd*
massage, *mȧ-säzh'*
masseur, *mȧ'sûr'*
masseuse, *mȧ'sûz'*
maté (drink), *mä'tā*
matinée, *măt'ĭ-nā'*
matron, *mā'trŭn*
mattress, *măt'rĕs*
mausoleum, *mô'sō-lē'ŭm*
mauve, *mōv*
mavournin, *mȧ-vōōr'nēn*
mayonnaise, *mā'ō-nāz'*
mayoralty, *mā'ẽr-ăl-tĭ*
measure, *mĕzh'ûr*
mechanician, *mĕk'ȧ-nĭsh'ăn*
medicament, *mē-dĭk'ȧ-mĕnt; mĕd'ĭ-kȧ-*
medicinal, *mē-dĭs'ĭ-năl*
medieval, *mē'dĭ-ē'văl; mĕd'ĭ-*
mediocre, *mē'dĭ-ō'kẽr*
megrim, *mē'grĭm*
mêlée, *mā'lā'*
memoir, *mĕm'wŏr*
memory, *mĕm'ō-rĭ*
ménage, *mā'nȧzh'*
meningitis, *mĕn'ĭn-jī'tĭs*
menu, *mĕn'ū*
mercantile, *mûr'kăn-tĭl; -tīl*
mere (lake), *mēr*
meringue, *mĕ-răng'*
mesa, *mā'sȧ*
mésalliance, *mā'zȧl'yȧNs'*
mesdames, *mā'dȧm'*
mesmerism, *mĕz'mẽr-ĭz'm*
messieurs, *mĕs'yẽrz*
metric, *mĕt'rĭk*
mezzo, *mĕd'zō*
microscopic, *mī'krō-skŏp'ĭk*
microscopy, *mī-krŏs'kō-pĭ*
migraine, *mĭ-grān'; mī'grān*
milch, *mĭlch*
militia, *mĭ-lĭsh'ȧ*
mime, *mīm*
mineralogy, *mĭn'ẽr-ăl'ō-jĭ*
mirage, *mĕ-räzh'*
misanthrope, *mĭs'ăn-thrōp*
miscellany, *mĭs'ĕ-lā-nĭ*
mischievous, *mĭs'chĭ-vŭs*
misconstrue, *mĭs-kŏn'strōō; mĭs'kŏn-strōō'*
miserable, *mĭz'ẽr-ȧ-b'l*
mitten, *mĭt'ĕn*
mnemonics, *nĕ-mŏn'ĭks*
mock, *mŏk*
moderate (adj.), *mŏd'ẽr-ât*
modiste, *mō'dēst'*
modus vivendi, *mō'dŭs vĭ-vĕn'dī*
moiré, *mwä'rā'; mō'rā*
monetary, *mŏn'ĕ-tȧ-rĭ; mŭn'-*
monogram, *mŏn'ō-grăm*
monologue, *mŏn'ō-lŏg*
monomania, *mŏn'ō-mā'nĭ-ȧ*
monsieur, *mĕ-syû'*
monsignor, *mŏn-sē'nyôr*
morale, *mō-răl'; -räl'*
mountain, *moun'tĭn*
mountainous, *moun'tĭ-nŭs*
municipal, *mū-nĭs'ĭ-păl*
museum, *mū-zē'ŭm*
mushroom, *mŭsh'rōōm*
musicale, *mū'zĭ-kăl'*
muskellunge, *mŭs'kĕ-lŭnj*
muskmelon, *mŭsk'mĕl'ŭn*
mustache, *mŭs-tăsh'*
muzhik, *mōō-zhĭk'; mōō'zhĭk*
mystery, *mĭs'tẽr-ĭ*
mythology, *mĭ-thŏl'ō-jĭ*

naïve, *nä-ēv'*
nape, *nāp*
napery, *nā'pẽr-ĭ*
naphtha, *năf'thȧ*
nasal, *nā'zăl*
nascent, *nās'ĕnt*
natatorium, *nā'tȧ-tō'rĭ-ŭm*
natural, *năch'ū-răl; nāt'yū-*
nature, *nā'chûr; nā'tûr*
nausea, *nô'shē-ȧ; -sē-ȧ*
necessarily, *nĕs'ĕ-sā-rĭ-lĭ*
necrology, *nĕk-rŏl'ō-jĭ*
née, *nā*
negligee, *nĕg'lĭ-zhā'; nĕg'lĭ-zhā'*
nephritis, *nĕ-frī'tĭs; nĕf-rī'tĭs*
nepotism, *nĕp'ō-tĭz'm*
nervine, *nûr'vēn; -vīn*
neuralgia, *nû-răl'jĭ-ȧ*
neuritis, *nû-rī'tĭs*
neurosis, *nû-rō'sĭs*
nicety, *nī'sĕ-tĭ*
niche, *nĭch*
nomad, *nŏm'ăd; nō'măd*
nom de plume, *nôN dẽ plūm'*
nominative, *nŏm'ĭ-nȧ-tĭv*
nonchalant, *nŏn'shȧ-lȧnt; nôN'shȧ'lȧNs'*
nonpareil, *nŏn'pȧ-rĕl'*
nostalgia, *nŏs-tăl'jĭ-ȧ*
nostrum, *nŏs'trŭm*
notice, *nō'tĭs*
novice, *nŏv'ĭs*
noxious, *nŏk'shŭs*
nuance, *nū'ȧNs'*
nuisance, *nū'sȧns*
nuncio, *nŭn'shĭ-ō*
nuptial, *nŭp'shăl*
nymph, *nĭmf*

oasis, *ō-ā'sĭs; ō'ȧ-sĭs*
oaths, *ōTHz*
oatmeal, *ōt'mēl'*
obedient, *ō-bē'dĭ-ĕnt*
obeisance, *ō-bā'sȧns; ô-bē'-*
obelisk, *ŏb'ĕ-lĭsk*
obesity, *ō-bĕs'ĭ-tĭ*
obiter dicta, *ŏb'ĭ-tẽr dĭk'tȧ*
obscenity, *ŏb-sĕn'ĭ-tĭ*
occult, *ŏ-kŭlt'*
octave, *ŏk'tȧv*
office, *ŏf'ĭs*
often, *ŏf'n*
olden, *ōl'd'n*
oleander, *ō'lē-ăn'dẽr*
oleomargarine, *ō'lē-ō-mär'gȧ-rēn; -rĭn*
olfactory, *ŏl-făk'tō-rĭ*
on, *ŏn*
onerous, *ŏn'ẽr-ŭs*
opponent, *ŏ-pō'nĕnt*
oral, *ō'răl*
orange, *ŏr'ĕnj; -ĭnj*
orchestra, *ôr'kĕs-trȧ*
orchestral, *ôr-kĕs'trăl; ôr'-*
orchid, *ôr'kĭd*
ordeal, *ôr'dē-ăl; -dēl*
ordinance, *ôr'dĭ-nȧns*
ordinarily, *ôr'dĭ-nȧ-rĭ-lĭ*
ordnance, *ôrd'nȧns*
orgy, *ôr'jĭ*
oriental, *ō'rĭ-ĕn'tăl*
orifice, *ŏr'ĭ-fĭs*
oriole, *ō'rĭ-ōl*
orthoepist, *ôr'thō-ē-pĭst*
orthopedic, *ôr'thō-pē'dĭk*
ostler, *ŏs'lẽr*
overalls, *ō'vẽr-ôlz'*

pacifist, *păs'ĭ-fĭst*
padre, *pä'drā*
padrone, *pä-drō'nā*
pageant, *păj'ĕnt; pā'jĕnt*
pagination, *păj'ĭ-nā'shŭn*
pajama, *pȧ-jä'mȧ*
palatial, *pȧ-lā'shăl*
palette, *păl'ĕt*
palladium, *pȧ-lā'dĭ-ŭm*
palm, *päm*
palmistry, *päm'ĭs-trĭ; păl'mĭs-*
paltry, *pôl'trĭ*
panacea, *păn'ȧ-sē'ȧ*
panegyric, *păn'ē-jĭr'ĭk*
panorama, *păn'ō-rä'mȧ*
papa, *pȧ-pä'; pä'pȧ*
papier-mâché, *pā'pyā'mä'shā'; pā'pyā-mä'shā*
papyrus, *pȧ-pī'rŭs*
paraffin, *păr'ȧ-fĭn*
paramour, *păr'ȧ-mōōr*
parasitic, *păr'ȧ-sĭt'ĭk*
parasol, *păr'ȧ-sŏl'*
paresis, *păr'ē-sĭs; pȧ-rē'sĭs*
parliament, *pär'lĭ-mĕnt*
parotid, *pȧ-rŏt'ĭd*
participle, *pär'tĭ-sĭ-p'l*
particularly, *pär-tĭk'ū-lär-lĭ*
partner, *pärt'nẽr*
partridge, *pär'trĭj*
passé, *pă'sā'*
pasteurize, *pās'tẽr-īz; pās-tûr'-*
path, *pȧth*
pathos, *pā'thŏs*
patience, *pā'shĕns*
patio, *pät'yō*
patois, *pă'-twä'; păt'wä*
patriot, *pā'trĭ-ŏt; păt'rĭ-*
patrol, *pȧ-trōl'*
patron, *pā'trŭn*
pecan, *pē-kăn'; -kän'*
peculiar, *pē-kūl'yȧr*
peculiarity, *pē-kū'lĭ-ăr'ĭ-tĭ*

pedagogue, *pĕd'ȧ-gŏg*
pedagogy, *pĕd'ȧ-gō'jĭ; -gŏj'ĭ*
pedal, *pēd'ȧl*
pedometer, *pē-dŏm'ē-tẽr*
penal, *pē'nȧl*
penchant, *pĕn'chȧnt; pänx'shänx'*
penitentiary, *pĕn'ĭ-tĕn'shȧ-rĭ*
peon, *pē'ŏn*
peony, *pē'ō-nĭ*
peremptory, *pẽr'ĕmp-tō-rĭ*
pergola, *pûr'gō-lȧ*
perhaps, *pẽr-hȧps'*
peril, *pĕr'ĭl*
period, *pē'rĭ-ŏd*
periodic, *pē'rĭ-ŏd'ĭk*
peritoneum, *pĕr'ĭ-tō-nē'ŭm*
peritonitis, *pĕr'ĭ-tō-nī'tĭs*
perpetuity, *pûr'pē-tū'ĭ-tĭ*
persist, *pẽr-sĭst'*
perspicuity, *pûr'spĭ-kū'ĭ-tĭ*
perspiration, *pûr'spĭ-rā'shŭn*
peso, *pā'sō*
petard, *pē-tärd'*
petiole, *pĕt'ĭ-ōl*
petite, *pē-tēt'*
petrel, *pĕt'rĕl*
pharmaceutic, *fär'mȧ-sū'tĭk*
pharyngitis, *făr'ĭn-jī'tĭs*
phial, *fī'ȧl*
philology, *fĭ-lŏl'ō-jĭ*
phlegmatic, *flĕg-măt'ĭk*
photogravure, *fō'tō-grȧ-vūr'; -grȧ'vür*
phraseology, *frā'zē-ŏl'ō-jĭ*
physicist, *fĭz'ĭ-sĭst*
pianist, *pĭ-ăn'ĭst; pē'ȧ-nĭst*
piano, *pĭ-ăn'ō*
picture, *pĭk'chûr; pĭk'tūr*
pillow, *pĭl'ō*
pincers, *pĭn'sẽrz*
piquant, *pē'känt*
pique, *pēk*
piqué, *pē-kā'*
pistachio, *pĭs-tā'shĭ-ō*
pith, *pĭth*
placard, *plăk'ärd*
placer, *plȧs'ẽr*
plagiarist, *plā'jĭ-ȧ-rĭst*
plague, *plāg*
plait, *plāt*
plant, *plänt*
plebiscite, *plĕb'ĭ-sĭt*
plenary, *plē'nȧ-rĭ*
plethora, *plĕth'-ō-rȧ*
plural, *plŏŏ'rȧl*
pneumonia, *nū-mō'nĭ-ȧ*
poem, *pō'ĕm*
poignant, *poin'ănt; -yănt*
poilu, *pwȧ'lü'*
poinsettia, *poin-sĕt'ĭ-ȧ*
poll, *pōl*
polonaise, *pō'lō-nāz'*
pomegranate, *pŏm-grăn'ât; pŏm'grăn'ât*
poniard, *pŏn'yȧrd*
poor, *pŏŏr*
porcine, *pôr'sīn; -sĭn*
portière, *pôr'tyâr'*
posse, *pŏs'ē*
posterior, *pŏs-tē'rĭ-ẽr*
postern, *pōs'tẽrn*
posthumous, *pŏs'chû-mŭs; pŏst'hû-*
potato, *pō-tā'tō*
precedence, *prē-sēd'ĕns*
precedent (adj.), *prē-sēd'ĕnt*
precedent (n.), *prĕs'ē-dĕnt*
precise, *prē-sīs'*
predicament, *prē-dĭk'ȧ-mĕnt*
preface, *prĕf'ȧs*
preferable, *prĕf'ẽr-ȧ-b'l*
prelate, *prĕl'ât*
prelude (n.), *prĕl'ūd*
premature, *prē'mȧ-tūr'*
premier, *prē'mĭ-ẽr; prĕm'yẽr*
premise (n.), *prĕm'ĭs*
premise (v.), *prē-mīz'*
preparatory, *prē-păr'ȧ-tō-rĭ*
presentation, *prĕz'ĕn-tā'shŭn*
president, *prĕz'ĭ-dĕnt*
presidio, *prē-sĭd'ĭ-ō; prā-sē'dyō*
presumptuous, *prē-zŭmp'chŭ-ŭs*
pretense, *prē-tĕns'*
pretext, *prē'tĕkst*
pretty, *prĭt'ĭ*
prima donna, *prē'mȧ dŏn'ȧ*
prima facie, *prī'mȧ fā'shĭ-ē*
primates, *prī-mā'tēz*
pristine, *prĭs'tĭn; -tīn*
prodigious, *prō-dĭj'ŭs*
produce (n.), *prōd'ūs*
produce (v.), *prō-dūs'*
profile, *prō'fīl*
profuse, *prō-fūs'*
program, *prō'grăm*
progress (n.), *prŏg'rĕs*
projectile, *prō-jĕk'tĭl*
proletarian, *prō'lē-tā'rĭ-ăn*
promenade, *prŏm'ē-nād'*
pronunciation, *prō-nŭn'sĭ-ā'shŭn; -shĭ-*
propinquity, *prō-pĭng'kwĭ-tĭ*
propitious, *prō-pĭsh'ŭs*
pro rata, *prō rā'tȧ*
prosperous, *prŏs'pẽr-ŭs*
protégé, *prō'tā'zhā'*
protein, *prō'tē-ĭn*
protestant, *prŏt'ĕs-tănt*
protrude, *prō-trōōd'*
prussic, *prŭs'ĭk*
psalm, *säm*
pseudonym, *sū'dō-nĭm*
psychiatry, *sī-kī'ȧ-trĭ*
psychic, *sī'kĭk*
psychosis, *sī-kō'sĭs*
ptomaine, *tō'mā-ĭn*
publicist, *pŭb'lĭ-sĭst*
puerile, *pū'ẽr-ĭl*
pumpkin, *pŭmp'kĭn*
punitive, *pū'nĭ-tĭv*
purée, *pū'rā'*
pursue, *pẽr-sū'*
pyrites, *pī-rī'tēz*
pyrometer, *pī-rŏm'ē-tẽr*

quaff, *kwȧf*
quarrel, *kwŏr'ĕl*
quarter, *kwôr'tẽr*
quatrain, *kwŏt'rān*
quay, *kē*
queue, *kū*
quietus, *kwī-ē'tŭs*
quinine, *kwĭ'nīn; kwĭ-nēn'*
qui vive, *kē vēv'*
quixotic, *kwĭk-sŏt'ĭk*
quoit, *kwoit*
quorum, *kwō'rŭm*

rabies, *rā'bĭ-ēz*
raceme, *rȧ-sēm'; rȧ-*
radish, *răd'ĭsh*
ragout, *rȧ-gōō'*
raillery, *rāl'ẽr-ĭ; rȧl'-*
rajah, *rä'jȧ*
rancor, *răng'kẽr*
ransack, *răn'săk*
rapier, *rā'pĭ-ẽr*
raspberry, *răz'bĕr-ĭ*
rather, *rȧTH'ẽr; rä'THẽr*
ratio, *rā'shĭ-ō; -shō*
ration, *rā'shŭn; rȧsh'ŭn*
rational, *răsh'ŭn-ȧl*
rationale, *răsh'ŭn-ā'lē*
recipe, *rĕs'ĭ-pē*
recitative (n.), *rĕs'ĭ-tȧ-tēv'*
reclamation, *rĕk'lȧ-mā'shŭn*
recluse, *rē-klōōs'*
recognizance, *rē-kŏg'nĭ-zăns; rē-kŏn'ĭ-* (legal)
recognize, *rĕk'ŏg-nīz*
reconnaissance, *rē-kŏn'ȧ-săns*
reconnoiter, *rĕk'ŏ-noi'tẽr*
referable, *rĕf'ẽr-ȧ-b'l*
referee, *rĕf'ẽr-ē'*
regalia, *rē-gā'lĭ-ȧ*
régime, *rā'zhēm'*
regular, *rĕg'ŭ-lẽr*
reiterate, *rē-ĭt'ẽr-āt*
renaissance, *rĕn'ĕ-sänx'; rē-nā'săns*
rendezvous, *rändĕ-vōō; rĕn'-*
reparable, *rĕp'ȧ-rȧ-b'l*
repertoire, *rĕp'ẽr-twär*
replica, *rĕp'lĭ-kȧ*
reputable, *rĕp'ū-tȧ-b'l*
requiem, *rē'kwĭ-ĕm; rĕk'wĭ-*
requital, *rē-kwīt'ȧl*
research, *rē-sûrch'*
reservoir, *rĕz'ẽr-vwôr; -vwär*
residue, *rĕz'ĭ-dū*
resin, *rĕz'ĭn*
resolute, *rĕz'ō-lūt*
resonance, *rĕz'ō-năns*
resource, *rē-sōrs'*
respite, *rĕs'pĭt*
restaurant, *rĕs'tō-rănt; rĕs'tō-*
restaurateur, *rĕs'tō'rȧ'tûr'*
résumé, *rā'zü'mā'*
reveille, *rē-văl'yȧ; rĕv'ĕ-lē'*
revenue, *rĕv'ē-nū*
reversion, *rē-vûr'shŭn*
revocable, *rĕv'ō-kȧ-b'l*
rheumatism, *rōō'mȧ-tĭz'm*
rhythm, *rĭTH'm*
ribald, *rĭb'ȧld*
ridiculous, *rĭ-dĭk'ū-lŭs*
rind, *rīnd*
rinse, *rĭns*
ripeness, *rīp'nĕs*
rise (n.), *rīz; rĭs*
risk, *rĭsk*
robust, *rō-bŭst'*
roil, *roil*
romance, *rō-măns'*
roof, *rōōf*
room, *rōōm*
root, *rōōt*
roquefort, *rōk'fôrt; rōk'fôr'*
roseate, *rō'zē-ât*
rostrum, *rŏs'trŭm*
route, *rōōt*
routine, *rōō-tēn'*
rude, *rōōd*
rutabaga, *rōō'tȧ-bā'gȧ*

sabot, *sȧ'bō'*
sabotage, *sȧ'bō'tȧzh'*
saccharin, *săk'ȧ-rĭn*
sachem, *sā'chĕm*
sachet, *sȧ'shā'*
sacrament, *săk'rȧ-mĕnt*
sacrilegious, *săk'rĭ-lē'jŭs*
sagacious, *sȧ-gā'shŭs*
said, *sĕd*
salary, *săl'ȧ-rĭ*
saline, *sā'līn*
salmon, *săm'ŭn*
salve, *săv*
sanatorium, *săn'ȧ-tō'rĭ-ŭm*
sanguine, *săng'gwĭn*
sarcasm, *sär'kăz'm*
sarcophagus, *sär-kŏf'ȧ-gŭs*
sarsaparilla, *sär'sȧ-pȧ-rĭl'ȧ*
satin, *sȧt'ĭn*
satire, *sȧt'īr*
satyr, *sȧt'ẽr; sā'tẽr*

savage, *săv′ăj*
savant, *să′vänʹ*
says, *sĕz*
scared, *skârd*
scenario, *shä-nä′rĭ-ō*
schism, *sĭz′m*
scilicet, *sĭl′ĭ-sĕt*
scion, *sī′ŭn*
screw, *skrōō*
scrofula, *skrŏf′ū-lȧ*
séance, *sā′änsˌ; sā′ȧnsʹ*
seckel, *sĕk′l*
secretary, *sĕk′rē-tȧ-rĭ*
sedative, *sĕd′ȧ-tĭv*
seidlitz, *sĕd′lĭts*
seismic, *sīs′mĭk; sīz′-*
semiannual, *sĕm′ĭ-ăn′ū-ăl*
senile, *sē′nīl; -nĭl*
señora, *sā-nyō′rä*
separable, *sĕp′ȧ-rȧ-b′l*
separate (v.), *sĕp′ȧ-rāt*
separate (adj.), *sĕp′ȧ-rȧt*
sesame, *sĕs′ȧ-mē*
several, *sĕv′ĕr-ăl*
shampoo, *shăm-pōōʹ*
shan't, *shänt; shănt*
shillalah, *shĭ-lā′lȧ*
shrievalty, *shrēv′ăl-tĭ*
shrill, *shrĭl*
shrine, *shrīn*
sibilant, *sĭb′ĭ-lănt*
sidereal, *sī-dēʹrē-ăl*
sigh, *sī*
signora, *sē-nyō′rä*
simultaneous, *sī′mŭl-tā′nē-ŭs; sĭm′ŭl-*
since, *sĭns*
sinecure, *sī′nē-kūr*
sirup; syrup, *sĭr′ŭp*
ski, *skē*
skiing, *skē′ĭng*
slake, *slāk*
sleek, *slēk*
slept, *slĕpt*
slough (n.), *slou; slōō*
slough (v.), *slŭf*
snout, *snout*
sofa, *sō′fȧ*
soften, *sŏf′n*
soirée, *swȧ′rāʹ*
solace, *sŏl′ȧs*
solarium, *sō-lā′rĭ-ŭm*
solemn, *sŏl′ĕm*
sombrero, *sŏm-brā′rō*
sonata, *sō-nä′tȧ*
soprano, *sō-prä′nō*
souvenir, *sōō′vē-nērʹ; sōō′vĕ-nēr*
specie (coin), *spē′shĭ*
species, *spē′shēz; -shĭ-ēz*
spinach, *spĭn′ăj*
spirit, *spĭr′ĭt*
splenetic, *splē-nĕt′ĭk; splĕn′ē-tĭk*
spouse, *spouz*
stalactite, *stȧ-lăk′tīt*
stalagmite, *stȧ-lăg′mīt*
static, *stăt′ĭk*
status, *stā′tŭs*
steady, *stĕd′ĭ*
stipend, *stī′pĕnd*
stirrup, *stĭr′ŭp; stŭr′ŭp*
stoicism, *stō′ĭ-sĭz′m*
stomach, *stŭm′ŭk*
strata, *strā′tȧ*
strategic, *strȧ-tē′jĭk*
strew, *stroō*
strychnine, *strĭk′nĭn*
student, *stū′dĕnt*
suave, *swāv; swäv*
subdue, *sŭb-dūʹ*
submarine, *sŭb′mȧ-rēnʹ*
subpœna; subpena, *sŭb-pē′nȧ*
subtile, *sŭb′tĭl; sŭt′l*
subtle, *sŭt′l*
suburb, *sŭb′ûrb*
suède, *swād; Fr. swĕd*
suggest, *sŭg-jĕstʹ*
suit, *sūt*
suite, *swēt*
sumac, *sū′măk; shōō′măk*
sumptuous, *sŭmp′chū-ŭs; sŭmp′tū-ŭs*
superfluous, *sū-pûr′flōō-ŭs*
supple, *sŭp′l*
suppose, *sŭ-pōzʹ*
surcease, *sŭr-sēsʹ*
surprise, *sŭr-prīzʹ*
swan, *swŏn*
swept, *swĕpt*
syndicate, *sĭn′dĭ-kât*
synod, *sĭn′ŭd*
syringe, *sĭr′ĭnj*

table d'hôte, *tȧ′bl′ dōtʹ*
taciturn, *tăs′ĭ-tûrn*
tallyho, *tăl′ĭ-hōʹ*
tapestry, *tăp′ĕs-trĭ*
task, *tăsk*
teat, *tēt*
technique, *tĕk′nēkʹ*
tedious, *tē′dĭ-ŭs*
teething, *tēTH′ĭng*
telephonic, *tĕl′ē-fŏn′ĭk*
temperament, *tĕm′pĕr-ȧ-mĕnt*
temperature, *tĕm′pĕr-ȧ-chûr; -tūr*
temporarily, *tĕm′pō-rā-rĭ-lĭ*
tenet, *tĕn′ĕt*
tepid, *tĕp′ĭd*
terrain, *tĕ-rānʹ; tĕr′ān*
tête-à-tête, *tāt′ȧ-tātʹ*
textile, *tĕks′tĭl*
theater, *thē′ȧ-tĕr*
thermostat, *thûr′mō-stăt*
thresh, *thrĕsh*
tiara, *tī-ā′rȧ; tē-ä′rȧ*
tincture, *tĭngk′chûr; -tūr*
tolerable, *tŏl′ĕr-ȧ-b′l*
tomato, *tō-mā′tō; tō-mä′tō*
tongs, *tŏngz*
tonsillitis, *tŏn-sĭl-lī′tĭs*
tonsorial, *tŏn-sō′rĭ-ăl*
tortoise, *tôr′tŭs; -tĭs*
toupee, *tōō-pēʹ*
tourniquet, *tōōr′nĭ-kĕt*
toward, *tō′ẽrd; tôrd*
transmigrate, *trănsˌmī-grāt*
transparent, *trănsˌ-pâr′ĕnt*
travail, *trăv′ăl*
travel, *trăv′ĕl*
traveler, *trăv′ĕl-ĕr*
traverse (n. v. adj.), *trăv′ẽrs*
treacle, *trē′k′l*
tribune, *trĭb′ūn*
trichina, *trĭ-kī′nȧ*
triumph, *trī′ŭmf*
trough, *trŏf*
trousseau, *trōō′sōʹ*
truculent, *trŭk′ū-lĕnt; trōō′kū-*
trustworthy, *trŭst′wûr′THĭ*
tube, *tūb*
tulip, *tū′lĭp*
tune, *tūn*
turnip, *tûr′nĭp*
turquoise, *tûr-koizʹ; tûr′kwoiz*

ukulele, *ōō′kōō-lā′lā*
ultimatum, *ŭl′tĭ-mā′tŭm*
umbrella, *ŭm-brĕl′ȧ*
unaccented, *ŭn′ăk-sĕn′tĕd*
undersigned, *ŭn′dĕr-sīndʹ*
unfrequented, *ŭn′frē-kwĕn′tĕd*
uninterested, *ŭn-ĭn′tẽr-ĕs-tĕd*
unprecedented, *ŭn-prĕs′ē-dĕn-tĕd*
untoward, *ŭn-tō′ẽrd; -tôrdʹ*
usage, *ūz′ăj; ūs′-*
used, *ūzd*
usually, *ū′zhū-ăl-lĭ*
usurp, *ū-zûrpʹ*
usury, *ū′zhū-rĭ*

vagary, *vȧ-gā′rĭ*
vagrant, *vā′grănt*
valance, *văl′ăns*
valuable, *văl′ū-ȧ-b′l*
vanquish, *văng′kwĭsh*
vase, *vās; vāz; văz*
vast, *vȧst*
vaudeville, *vōd′vĭl*
vehement, *vē′hē-mĕnt*
veinous, *vān′ŭs*
velvet, *vĕl′vĕt; -vĭt*
venison, *vĕn′ĭ-z′n*
venous, *vē′nŭs*
ventriloquist, *vĕn-trĭl′ô-kwĭst*
veracious, *vĕ-rā′shŭs*
verbatim, *vẽr-bā′tĭm*
verdigris, *vûr′dĭ-grēs*
version, *vûr′shŭn*
veterinary, *vĕt′ẽr-ĭ-nȧ-rĭ*
via, *vī′ȧ*
vicar, *vĭk′ẽr*
vice versa, *vī′sĕ vûr′sȧ*
victim, *vĭk′tĭm*
victual, *vĭt′l*
vicuña, *vĭ-kōōn′yȧ*
vignette, *vĭn-yĕtʹ*
villain, *vĭl′ĭn*
vindictive, *vĭn-dĭk′tĭv*
vinous, *vī′nŭs*
vis-à-vis, *vē′zȧ-vēʹ*
viscid, *vĭs′ĭd*
viscount, *vī′kountʹ*
visé, *vē-zāʹ*
vitriol, *vĭt′rĭ-ŭl*
vituperation, *vī-tū′pẽr-ā′shŭn*
viva voce, *vī′vȧ vō′sē*
volatile, *vŏl′ȧ-tĭl*
volume, *vŏl′ŭm*
voluntarily, *vŏl′ŭn-tȧ-rĭ-lĭ*

waft, *wȧft*
wainscot, *wān′skŏt*
warily, *wā′rĭ-lĭ*
was, *wŏz*
wash, *wŏsh*
wasp, *wŏsp*
weird, *wērd*
well-bred, *wĕl′brĕdʹ*
when, *hwĕn*
where, *hwâr*
whisk, *hwĭsk*
whistler, *hwĭs′lẽr*
whole, *hōl*
whooping (cough), *hōōp′ĭng*
whortleberry, *hwûr′t′l-bĕr′ĭ*
widow, *wĭd′ō*
window, *wĭn′dō*
wiseacre, *wīz′ā-kẽr*
wistaria, *wĭs-tā′rĭ-ȧ*
withes, *wĭths; wīTHz*
women, *wĭm′ĕn; -ĭn*
wondering, *wŭn′dẽr-ĭng*
wont (custom), *wŭnt; wōnt*
wrath, *răth; rȧth*
wrestler, *rĕs′lẽr*

xenia, *zē′nĭ-ȧ*
xylophone, *zī′lō-fōn*

yacht, *yŏt*
yolk, *yōk; yōlk*

zealot, *zĕl′ŭt*
zenana, *zĕ-nä′nȧ*
zenith, *zē′nĭth*
zodiacal, *zō-dī′ȧ-kăl*
zoo, *zōō*
zoology, *zō-ŏl′ō-jĭ*

SENTENCE BUILDING

ENGLISH GRAMMAR is both a science and an art. As a science, it investigates the principles in general on which the English language is based; as an art, it teaches the method of applying these principles in speaking and in writing the English language correctly.

In the whole range of school subjects there is none of greater importance than that of language. To facilitate the study of the English language, therefore, the true principles of grammar have been outlined in the following pages in a convenient form, expressed in a simple manner, and illustrated by appropriate examples.

THE ENGLISH SENTENCE

Word Groups. We express our thoughts in groups of words,—sentences, clauses, phrases.

A *sentence* is a group of words used to express a complete thought.

The complete sentence must always contain a subject and a predicate. The subject is the thing named; the predicate is the assertion about the thing named: "*Autumn* (subj.) *lingers* (pred.)."

In an imperative sentence, like "Go to him," the subject "you" is not usually expressed. This is an instance of *ellipsis*, or the omission of words otherwise necessary to grammatical completeness, when their meaning is well understood by the reader or hearer: "The knife belongs to Tom; the pencil (belongs) to William."

A *clause* is a group of words containing, like the sentence, a subject and a predicate, but used only as part of a complete sentence: "The motor, | *which was new*, | suddenly failed to work."

A clause may be either *independent* (principal) or *dependent* (subordinate): "*He commanded*, | *who had never commanded before.*" The first words, *he commanded*, form an independent clause. The other words form a dependent clause; for, as they stand, they do not make a sentence. See *Complex Sentence.*

A *phrase* is a group of words so closely related as to express a single idea. The phrase is used as a part of speech: "*To become rich* (noun) was his ambition." "It was a matter *of importance* (adjective)." "Come *at your convenience* (adverb)."

Parts of Speech. In building sentences, we use name-words, action-words, modifiers, and connectives of various kinds. According to their use in sentences, these words are classified as *parts of speech*, of which there are eight:

1. A *noun* is a word used to name a person, a place, or a thing: *boy, city, foot, air, size.*

2. A *pronoun* is a word used in place of a noun: *it, her, none, who.*

Note.—Nouns, pronouns, and phrases or clauses used as nouns are called *substantives.*

3. A *verb* is a word used to say, or assert, something about a person, a place, or a thing: *walk, soften, drive, is.*

4. An *adjective* is a word used to modify, that is, describe or limit, a noun or pronoun: "*bright* sunshine," "*few* people," "I *alone.*"

5. An *adverb* is a word used to modify the meaning of a verb, an adjective, or another adverb: "speak *well*," "walk *swiftly*," "run *homeward*," "*very* pretty," "*so* quickly."

6. A *conjunction* is a word used to connect words, phrases, clauses, or sentences: *and, but, if, unless.*

7. A *preposition* is a word used to show the relation of some particular word, called its object, to another word: "flocks *of* birds (obj.)"; "strength *through* exercise (obj.)"; "peace *with* honor (obj.)."

8. An *interjection* is a word of exclamation used to express any emotion or feeling, as surprise, joy, grief, etc.: *ah! alas!*

Note.—Some words may be used as *several different parts of speech*:

Noun: "The *storm* was soon over."
Adjective: "The station displayed *storm* signals."
Verb: "The troops will *storm* the outworks."

Noun: "The *inside* of the house is pleasing."
Adjective: "He has *inside* information."
Adverb: "Will you step *inside?*"
Preposition: "*Inside* the door stood a clock."

Preposition: "I have been waiting *since* noon."
Conjunction: "*Since* I saw you, much has happened."

Adjective: "*Which* hat have you?"
Pronoun: "The hat *which* you see is mine."

Adjective: "*That* hat is mine."
Pronoun: "I want *that.*"
Conjunction: "He said *that* he would go."

PARTS OF THE SENTENCE

The Subject. The subject of a sentence is that about which the predicate says something: "*The weather* is cold." "*Health* counts for more than wealth."

Simple Subject.—The essential part of the *subject* is a substantive, that is, a noun, a pronoun, or a phrase or clause used as a noun. Noun means "name." The substantive is called the *essential*, or *simple, subject*, or the *subject substantive*: "A great *city* (noun substantive) is interesting"; "*She* (pro. substantive) is my friend"; "*To read well* (subst. phrase) requires much practice"; "*What he saw* (subst. clause) startled him."

Complete Subject.—The substantive with its modifiers is called the *complete subject*: "*His deposit* (subst.) *in the bank* (adj. phrase) | was large"; "*The nature* (subst.) *of his occupation* (adj. phrase) *in the city* (adj. phrase) | was never revealed"; "*The evil* (subst.) *that men do* (adj. clause) lives after them."

These modifiers of the substantive may be adjectives, possessive nouns or pronouns, nouns in apposition, clauses or phrases used as adjectives or nouns.

The Predicate. The word *predicate* means "something said." The predicate of a sentence is that which is said about the subject: "Roses *were blooming.*"

The essential part of a predicate is a *verb.* We call the verb in the predicate the *essential*, or *simple, predicate*, or the *predicate verb.* "The car *ran* (pred. verb) *against the curb.*" *Ran* is the simple predicate; *ran against the curb* is the complete predicate.

The *complete predicate* includes the verb with its modifiers and complements,—adverbs, predicate nouns or pronouns, predicate adjectives, object nouns or pronouns, phrases or clauses used as adverbs or nouns: "He *ran* (pred. verb) *fast* (adv.)." "George *is* (pred. verb) *king* (pred. noun)." "It *is* (pred. verb) *he* (pred. pro.)." "The air *turned* (pred. verb) *cold* (pred. adj.)." "All *love* (pred. verb) *truth* (object)." "He *writes* (pred. verb) *with a pen* (adverb. phrase)." "The sun *had set* (pred. verb) *when we started* (adverb. clause)." "Children *like* (pred. verb) *to play* (noun phrase)." "I *heard* (pred. verb) *what you said* (noun clause)."

For compound subject and compound predicate, see *Simple Sentence.*

CLASSIFICATION OF SENTENCES

Kinds of Sentences. In respect to their *meaning*, sentences may be classified as declarative, interrogative, imperative, and exclamatory.

The *declarative sentence* makes a statement: "*John is not here.*"

The *interrogative sentence* asks a question: "*Where is my hat?*"

The *imperative sentence* gives a command: "*Answer his question.*"

The *exclamatory sentence* expresses a strong feeling, as of surprise, joy, etc.: "*How free are the pleasures of youth!*"

Note.—The foregoing is the common grouping of sentences. A more logical classification is the following: (1) *affirmative* and *negative*; (2) *declarative* and *interrogative*; (3) *exclamatory* and *nonexclamatory*.

Forms of Sentences. In respect to their *grammatical form*, sentences are simple, compound, or complex.

The *simple sentence* is a sentence of one clause, that is, a sentence having but one subject and one predicate. The simple sentence may be very short: "*Birds* | *sing*." It may be longer, when the subject and the predicate are modified by several words and phrases: "*Those furs in the window* | *have been gathered from many different countries and climates*."

A simple sentence may have a *compound subject*; as, "*The house and the grounds* | are beautiful." It may have a *compound predicate*; as, "They | *sat and listened* to the music." Both subject and predicate may be compound; as, "*Mary and Elizabeth* | *lived and reigned* in England." These are important distinctions. Do not confuse the *long* sentence with the *complex* sentence.

The *compound sentence* is formed of two or more independent, or co-ordinate, clauses, which may or may not be joined by co-ordinating conjunctions, such as *and, but, for*: "*A man approached,* | *and* | *we asked him about the road*"; "*Some men are born great,*| *others achieve greatness.*"

The *complex sentence* is formed of a principal, or independent, clause and of one or more subordinate, or dependent, clauses. These subordinate clauses are introduced by subordinate conjunctions, such as *if, unless, because*, by relative pronouns, *who, which, what, that*, and by conjunctive adverbs, such as *when, where, while*: "I shall go *if it stops raining*"; "The child *that is happy* makes friends"; "Make hay *while the sun shines.*"

The Parts of Speech

Grammatical Relations. The relations of a word, a phrase, or a clause to other words in a sentence are called its *syntax* or *construction*. Either of these words means "placing or bringing together."

Inflection, in grammar, is the changing of the forms of words to indicate grammatical relation and change of meaning. Inflection of verbs is called *conjugation*. Inflection of nouns and pronouns is called *declension*. Inflection of adjectives and adverbs is called *comparison*.

In the English sentence, the grammatical relations of words are indicated by their position and by the use of connectives. The English language has dropped so many of the endings formerly attached to nouns and verbs that inflection in English grammar is of slight importance. So-called declension becomes in English the systematic arrangement in tables of the various forms of nouns and pronouns used for different cases and numbers. Conjugation consists in arranging in tables the various verb forms and verb phrases used for different modes and tenses.

Kinds of Substantives: Nouns and Pronouns

A *substantive* is a word, phrase, or clause used as a noun.

KINDS OF NOUNS

Proper Nouns. A *proper noun* is the name of a particular person, place, or thing. It is always written with a capital letter; as, *John, Paris, England, Europe.*

Common Nouns. A *common noun* is the name of any one of a class of persons, places, or things; as, *table, book, rabbit, boy, weather.*

Abstract Nouns. An *abstract noun* is the name of an idea; as, *honesty, hope, truth, system.*

Collective Nouns. A *collective noun* is the name of a group or collection of single things, considered as one; as, *crowd, army, jury, family, committee.*

Verbal Nouns. A *verbal noun*, or *gerund*, is the name of an action; as, *walking, skating, working.*

An *appositive* is a noun used after another noun or pronoun to describe or explain the meaning of that noun or pronoun. An appositive is said to be *in apposition to* the noun or pronoun it defines or explains: "Milton, the *poet*, became blind."

A *predicate noun* or *pronoun* is a noun or a pronoun that completes the predicate verb and refers to the subject: "Lincoln was *president.*" "It is *I.*"

KINDS OF PRONOUNS

Pronouns are classified as *personal, interrogative, demonstrative, relative* or *conjunctive*, and *indefinite.*

Personal Pronouns. The following are the forms of personal pronouns:

SINGULAR

	First Person	Second Person	Third Person Mas.	Fem.	Neut.
Nominative	I	you	he	she	it
Possessive	my, mine	your, yours	his	her, hers	its
Objective	me	you	him	her	it

PLURAL

	First Person	Second Person	Third Person
Nominative	we	you	they
Possessive	our, ours	your, yours	their, theirs
Objective	us	you	them

The possessive forms given in the table are sometimes called *possessive pronouns*. They are pronouns in origin, but in use they are *possessive adjectives.*

Special Uses. *Ye* and *thou, thy, thine, thee*, are old forms, now seldom used except in poetry or in the language of religion.

The masculine pronouns, *he, his*, and *him*, are used also as of common gender: "Let every child use *his* own book."

You, whether referring to one person or more, always takes the plural verb.

It often stands as the *impersonal subject* of a verb: "*It* rains"; "*It* is cold"; "*It* grew dark."

It may be used as the *impersonal object* of a verb: "He footed *it* all the way"; "They are roughing *it* in the woods."

It is sometimes used as an introductory word, the real subject following the verb: "*It* is well to think before you speak." See *There.*

Compound Personal Pronouns. The word *self* added to *my, thy, your, him, her, it*, and the plural *selves* to *our, your, them*, form *compound personal pronouns*, often called *reflexive pronouns.* They are used chiefly (1) to express emphasis, with or without the simple pronoun: "I *myself* am positive"; "She talks of no one but *herself.*" (2) as reflexive object of a verb, the object and the subject of the verb being the same person or thing: "He dressed *himself*"; "You will hurt *yourself.*"

These pronouns have the same form for *nominative* and *objective* cases. They are not used in the *possessive.*

The simple personal pronoun is sometimes used reflexively in poetry: "I lay *me* down."

Interrogative Pronouns. Pronouns used in asking questions are *interrogative pronouns*: *who, which, what.* "*Who* is here?" "*Which* do you like?" "*What* did you say?"

Singular and Plural	
Nominative	who
Possessive	whose
Objective	whom

The interrogatives *which* and *what* have no declension or change of form, however used. *Who* and *whom* refer to persons only; the other forms, to persons or things.

Which, what, and *whose* are used also as *interrogative adjectives*: "*Which* train did he take?" "*What* number is that?" "*Whose* book is this?"

Demonstrative Pronouns. *This, that,* and the plurals, *these* and *those*, are called *demonstratives*, because they point out definitely the persons or things to which they refer. Latin *demonstrare* means "to point out": "*That* is the question"; "*Those* are the bills"; "The reasons are *these*."

When used with nouns, like adjectives, the demonstratives are often called *demonstrative adjectives*: "*this* farm"; "*those* cattle."

Relative Pronouns. A relative pronoun is both pronoun and conjunction. As a *pronoun*, the word is used like a noun; as a *conjunction*, it joins clauses. Hence relative pronouns are sometimes called *conjunctive pronouns*. The relative pronouns are *who, which, what, that. As* and *but* may be used as relative pronouns.

	Singular and Plural	
Nominative	who	which
Possessive	whose	whose
Objective	whom	which

What and *that* have no change of form for the *nominative* and the *objective* and are not used in the *possessive*.

Who and *whom* refer to persons only.

Whose is used of both persons and things.

Which, as a relative, refers to things only.

That refers to both persons and things.

What may be called a *double relative*, being equivalent to *that which*, the demonstrative pronoun *that* and the relative pronoun *which*: "We know *what* (*that which*) he wants."

As is used as *relative pronoun*: "I want such *as* (*those which*) are desirable."

But is used as *relative pronoun*: "There is no fireside *but* (*that not*) has one vacant chair."

Which and *what* are used also as *relative adjectives*: "I know *which* (*that which*) book you mean"; "I see *what* (*that which*) reward she will receive."

Compound Relative Pronouns. *Who, which,* and *what* are combined with *ever* and *soever* to form *compound relative pronouns*: *whoever, whosoever, whichever, whichsoever, whatever, whatsoever*. The forms with *so* are rarely used.

Indefinite Pronouns. Indefinite pronouns do not point out definitely, but they refer in a general manner to persons or objects. Those commonly used are *each, every, either, neither, some, all, any, few, many, one, none, other, another, both*. Many of these words are used as indefinite adjectives:

(pro.) "*Some* dislike animals."

(adj.) "*Some* people dislike animals."

The only indefinite pronouns which have plural forms are *one* and *other*: "Give me a small *one* (sing.)"; "Give me small *ones* (plur.)"; "I want the *other* (sing.)"; "I want the *others* (plur.)."

Adjective Pronouns. The *demonstrative* and *indefinite pronouns* are also called *adjective pronouns*, because they are used both as adjectives and as nouns.

Grammatical Relations of Nouns and Pronouns

For nouns and pronouns, grammatical relations are said to be relations of *case, number, person,* and *gender*.

CASE

Nominative Case. The following are said to be in the *nominative* (naming) *case*:

1. A noun or pronoun used as subject: "The *boy* plays." "*He* came home."

2. A noun in apposition to a noun or pronoun in the nominative case: "John, my *brother*, is here." "She, the *woman* in black, wept bitterly."

3. A predicate noun or pronoun: "The man was *master*." "It is *he* whom you want."

4. A noun or pronoun used in direct address: "*Citizens*, remember your duties"; "O *thou* that rollest above! whence are thy beams?"

5. A noun or pronoun used absolutely with a participle: "The *storm* abating, the air grew colder."

6. A noun or pronoun used in exclamation: "A *horse*! A *horse*! My kingdom for a horse." "*He*, lost!"

Objective Case. The following are said to be in the *objective case* (*objective* meaning "thrown, or directed, toward," as the action of a verb is directed toward a noun):

1. A noun, a pronoun, a phrase or a clause used as the object of a transitive verb (*transitive* meaning "going across," as the action of a verb goes across to the object): "James studies *spelling*." "I like *her*." "I tried *to learn a foreign language*." "He said, '*I shall go*.'" "She knew *that all was well*."

2. Indirect object: "He wrote (to) his *brother* (indirect object) a *letter* (direct object)."

One may recognize the indirect object by the possibility of using *to* before it without changing the meaning of the sentence.

3. The object of a preposition: "He went into the *store*."

4. A word in apposition to a noun or pronoun in the objective case: "He found the house, a large stone *building*."

5. Objective of exclamation: "Oh, happy *me*!"

6. A noun of time, distance, or quantity used adverbially. This is called an *adverbial objective*: "I slept four *hours*"; "He walked three *miles*."

7. An objective complement (called also *predicate objective* and *adjunct accusative*): "They made him *chairman*"; "She called Mary *queen*."

8. The secondary object: "They allowed each speaker an *hour*." When such sentences are changed to the passive construction, the *secondary object* is retained as an object: "Each speaker was allowed an *hour*."

9. A subject of an infinitive: "I know *him* to be truthful."

10. A predicate of an infinitive: "I know it to be *her*."

Note.—Many recent authorities prefer the term *accusative case* for the foregoing constructions, except that of indirect object, for which they use the term *dative*.

Possessive Case. 1. A word expressing ownership or possession is in the *possessive case*: "*John's* books"; "*their* work."

2. When two nouns in the possessive case are in apposition, the second alone takes the possessive sign: "Webster the *statesman's* speeches"; "Jack the *giant-killer's* exploits."

3. The possessive form is used also to limit or define and does not necessarily indicate ownership: "six *days'* journey"; "*man's* duty"; "the *river's* brink."

Note.—Many authorities prefer the name *genitive* for the so-called possessive case.

Inflection.—English nouns have no inflection, or change of form, to denote cases, except the adding of the apostrophe and *s* for the possessive. See *Spelling*. Certain pronouns are inflected to denote cases. See *Kinds of Pronouns*.

Note.—Recent works on English grammar recommend the following classification of case forms and uses:

Forms,—*common* and *genitive*.

Uses,—*nominative, genitive, dative, accusative*.

SPECIAL USES

Compound names and groups of words add the possessive sign to the last word: "*William the Conqueror's* throne"; "the *king of England's* palace"; "my *father-in-law's* house."

Joint Possession. If two or more possessive nouns imply joint possession of the same thing, and are connected by *and*, the possessive sign is used with the last noun only:

"*Mary* and *John's* mother" implies common possession —one mother.

"*Mason* and *Hamlin's* organs."

"*Wheeler* and *Wilson's* store."

Separate Possession. If separate possession is implied, or if the nouns are connected by *or* or *nor*, each one takes the possessive sign:

"*Mary's* and *John's* mother" implies separate possession —two mothers.

"*Taft's* and *Wilson's* administration."

"Is that a *girl's* or a *boy's* voice?"

"He accepted neither the *skeptic's* nor the *clergyman's* view."

The possessive (genitive) case may be denoted by the objective case following the preposition *of*; "*Job's* patience," or "the patience *of Job*"; "*Somebody else's* work," or "the work *of somebody else*."

NUMBER

Nouns and pronouns denoting one person or thing are *singular*: *farm, wife.* Nouns and pronouns denoting more than one are *plural*: *farms, wives.* See *Spelling.*

Inflection.—English nouns regularly add *s* or *es* to form the plural. See *Spelling.* For pronoun plurals, see *Kinds of Pronouns.*

PERSON

The speaker or writer is the first person, *I, we*; the one addressed is the second person, *thou, you*; the person or thing spoken of is the third person, *he, it, they.*

Inflection.—English nouns are not inflected to distinguish person. See *Personal Pronouns.*

GENDER

In English, a noun or pronoun naming a male is *masculine*: *stag.* One naming a female, *feminine*: *girl.* One naming an object without sex, *neuter* (a Latin word, meaning "neither"): *tree.* Words which may be applied to either males or females are said to be of *common* gender: *animal.*

Inflection.—Nouns and pronouns are not inflected to distinguish gender. Personal pronouns have different forms to distinguish gender.

Antecedent. The substantive—word, phrase, or clause—for which a pronoun stands, and to which it refers, is called its *antecedent*, a Latin word, meaning "something going before":

"The man who planned the building made it his masterpiece." *Man* is the antecedent of *who* and of *his.*

"To sleep well, which is a blessing, is to repair and renew the body." *To sleep well* is a phrase, the antecedent of *which.*

"To lie is cowardly, and every one should know it." *To lie is cowardly* is a clause, the antecedent of *it.*

Agreement. The pronoun is said to agree with its antecedent in *gender, person,* and *number*, but its *case* depends upon its use in the sentence:

"The book which you found is mine." The antecedent of *which* is *book. Book* is in the *nominative case*, the subject of *is*: *which* is in the *objective case*, the object of *found.*

Verbs

KINDS OF VERBS

According to use, verbs are either *transitive* or *intransitive.*

Transitive Verbs. A transitive verb is one which requires an object to complete its meaning. The object, sometimes called *object complement*, names the receiver of the action of the verb: "The man *built* (verb) the *house* (object)."

Intransitive Verbs. An intransitive verb is one which does not require an object to complete its meaning. Some intransitives, however, need to be completed by a predicate noun or adjective, often called *attribute complement*, which refers to or modifies the subject: "That village *is* (verb) *Millville* (attribute complement)"; "The action *seems* (verb) *right* (attribute complement)."

GRAMMATICAL RELATIONS OF VERBS

The syntax of verbs involves relations of *voice, mode, tense, person,* and *number.* For the forms to express these, see *Table of Specimen Verb Forms.*

VOICE

Meaning of the Voices. *Voice* is often defined as that property of verbs which indicates whether the subject acts or is acted upon.

Active Voice.—If the subject is acting, the verb is in the *active*, or "doing," *voice*: "The man *broke* his cane."

Passive Voice.—If the subject is being acted upon, or receiving an action, the verb is in the *passive*, or "suffering," *voice*: "The cane *was broken.*"

Forms to Denote Voice. The terms "active voice" and "passive voice" are applied also to the forms of the verb.

That form of the verb which shows that the subject is acting is called *active voice*: "Mary *broke* the dish."

That form of the verb which shows that the subject is acted upon is called *passive voice*: "The dish *was broken* by Mary." Some part of the verb *be* is joined to the past participle of a transitive verb to make the *passive voice*: *is sold, were made.*

Any transitive verb may be used in the passive voice, its object in the active becoming its subject in the passive: "The boy *lights* (active) the lamps"; "The lamps *are lighted* (passive) by the boy."

Intransitive verbs ordinarily are active, but some verbs are used either as intransitive or transitive: "He *spoke* (intrans.) truthfully"; "He *spoke* (trans.) the truth." When used transitively, such verbs may become passive: "The truth *was spoken* by him."

Some intransitive verbs, used with a following preposition, have a transitive meaning; as, *laugh at, look over, wonder at*: "He *laughed at* me"; "She *looked over* the work"; "They *wondered at* his skill." Such phrases are transitive in the fullest sense as tested by the passive construction: "I *was laughed at* by him"; "The work *was looked over* by her"; "His skill *was wondered at* by them."

MODE

Meaning of the Modes. *Mode* (or *mood*) may be defined as that property of verbs which shows the manner in which the action or state is conceived.

If the action or state expressed is thought of simply as a fact, the mode is *indicative*; if it is regarded as doubtful or merely as desired, the mode is *subjunctive*; if it is viewed as a command, the mode is *imperative.*

Forms to Denote Modes. The term "modes" is applied also to the several series of verb forms. In this use, *mode* is the form of the verb which shows the manner of expressing an action or a state.

The indicative mode states a fact or asks a simple question; as, "The sun shines"; "Has the rain been heavy?"

The indicative forms, however, are commonly used to express subjunctive and imperative ideas: "The dam will break if the river *rises* (condition)"; "You *will report* at seven (command)."

The imperative mode expresses a command or an entreaty; as, "*Come* here"; "*Have* mercy upon me."

The subjunctive mode makes a doubtful or conditional assertion; as, "Though he *slay* me, yet will I trust him."

For the so-called *potential mode*, see *Modal Auxiliaries.*

TENSE

Meaning of Tenses. The *tense* of a verb indicates the time of the action or state.

As applied to verb forms, *tense* is the form the verb takes to indicate time.

According to the time expressed and the completeness or incompleteness of the action, state, or condition, the verb varies in tense.

Simple Tenses.—The simple (or incomplete) tenses, *present, past, future,* signify action or condition as continuing in present, past, or future time: "I *go*"; "I *went*"; "I *shall go.*"

Perfect Tenses.—The perfect (or complete) tenses imply the completion of an act in present time (*present perfect*), in past time (*past perfect*), or in future time (*future perfect*): "I *have gone*"; "I *had gone*"; "I *shall have gone.*" See *Table of Specimen Verb Forms.*

Other Tenses.—Some authorities distinguish a *past future* tense, as, "We thought he *would go,*" and a *past future perfect* tense, as, "We thought he *would have gone.*"

PERSON AND NUMBER

A verb must agree with its subject in person and in number: "I *do* not"; "He *does* not"; "You *do* not"; "They *do* not."

VERB FORMS

Inflection of Verbs, or Conjugation. In conjugation, English verbs change form to show voice, mode, tense, person, and number. The usually inflected forms are the third person singular of the present active indicative; the past active indicative; the present and past participles: *has, had, having, had.* For exceptions, see *Table of Specimen Verb Forms*: the verb *be*; *Subjunctive Mode.* See also *Thou Forms.*

Verb Phrases. All other mode, tense, and voice meanings are expressed by the simple verb or by verb phrases. A *verb phrase* is a group of verbs used as a single verb. A verb phrase is formed by prefixing an auxiliary (helping) verb to some infinitive or participle form of a principal verb: "Wars *shall cease*"; "It *may rain*"; "Fashions *have been changing.*"

Principal Parts. In order to conjugate any verb throughout its various modes and tenses, it is necessary to know only the *infinitive*, the *past tense*, and the *past participle.* These three, therefore, are called the *principal parts*: *find, found, found*; *go, went, gone.*

Regular Verbs. A regular (or weak) verb, in English, forms its past tense and past participle by adding *d* or *ed* to the present: *load, loaded*; *love, loved*; *wash, washed*; *persuade, persuaded.*

Irregular Verbs. An irregular (or strong) verb forms its past tense and past participle by a vowel change, frequently adding a change of ending: *hide, hid, hidden*; *drink, drank, drunk*; *eat, ate, eaten.*

A Defective Verb is one that lacks some of its principal parts; as, *ought, may, can.*

A Redundant Verb is one that has both a regular and an irregular form; as, *bereave, bereaved* or *bereft, bereaved* or *bereft.*

A Copulative Verb is an intransitive verb which connects the subject with a predicate noun or pronoun or with a predicate adjective. Such a verb is called a *linking* verb. Among intransitive verbs thus used are *be, become, seem, appear, feel, grow, remain, sit, stand*: "Mary *became* queen"; "He *grows* tall"; "She *feels* better."

A Reflexive Verb is a transitive verb, the subject and the object of which are the same individual: "I *wash* myself"; "He *contradicted* himself."

An Impersonal Verb is one used only in the third person singular with no definite personal subject: "It *rains*"; "It *snows.*"

Auxiliary Verbs. Auxiliary comes from the Latin *auxilium*, meaning "help"; hence, auxiliary verbs are verbs that help in the conjugation of other verbs. They are of two classes:

1. *Auxiliaries of tense and voice: will, shall, have, be, do, did.*

The forms of the auxiliary *be* used with a past participle make the passive voice; as, *are told, was told, shall have been told.*

Have and *had* are auxiliaries used with the past participle to form the present perfect and the past perfect tense, hence *have* and *had* are called "signs" of the perfect and past perfect tenses respectively:

Present Perfect.—I *have* told
Past Perfect.—I *had* told

Do and *did* are either emphatic or interrogative auxiliaries used with the present infinitive of another verb to form the present and past tenses respectively.

Present.—I *do* tell; *do* I tell?
Past.—I *did* tell; *did* I tell?

2. *Modal auxiliaries: may, might, can, could, would, should, must,* (in some cases *shall, will,* and *have*). For the uses of *shall, will, should, would,* see *Good Usage.*

The modal auxiliaries may be prefixed to the present infinitive or to the perfect infinitive of any verb in order to express various modes. They suggest doubt, permission, wish, ability, or duty: "I *may* tell, *may* have told"; "He *can* go"; "You *should* read."

May and *might* express permission, possibility, or doubt. *Might* was formerly used in the past tense, and it now expresses more doubt or dependence upon conditions than *may.* The time of the verb phrase formed with these auxiliaries is determined by the verb form following the auxiliary: "It *may* (*might*) have happened (past)."

Can and *could* express ability. *Can* signifies either present or future time: "We *can* go." *Could* may express past time: "Yesterday, I *could* do nothing." *Could* usually implies an uncertain condition: "They *could* have gone (if something had not interfered)."

Potential Mode.—The phrases formed with *may, might, can,* and *could* are called *potential verb phrases,* because these verbs imply power (potential from Latin *potentia* meaning "power"). They are often classified in tables as *potential* forms.

Must, followed by the present infinitive, usually expresses obligation or necessity: "You *must* hear him." Otherwise, it may express the speaker's certainty in respect to something in spite of contrary appearances: "His story *must* be true"; "They *must* have started."

Have is often used to express duty or necessity. For this meaning, it is prefixed to the present infinitive (with *to*): "We *have* (*had*) to listen to his tale."

Ought is sometimes called a *modal auxiliary.* It is used to express duty or obligation: "He *ought* to go"; "You *ought* to have spoken."

Participles. The participle, meaning "sharer," is the verb form that *shares* or *partakes* of the nature of an adjective. While modifying a noun, like an adjective, it may take an object or, like a verb, have adverbial modifiers: "Let *sleeping* dogs lie"; "The *burnt* child fears the fire"; "*Having found* his *mother* (obj.), the child was quiet"; "They found him *weeping bitterly* (adv.)."

A verb has three participles:

Present participle—*speaking* (action is in progress): "He stood *speaking.*"

Past participle—*spoken* (action is completed): "A little word in kindness *spoken.*"

Perfect participle—*having spoken* (action is completed before the time implied in the principal verb): "*Having spoken* the word, he departed." See *Table of Specimen Verb Forms.*

Gerund or Verbal Noun. Verb forms ending in *-ing* are used also as nouns. They may be modified

by adverbs, since they are verbal, or by adjectives, since they are used as nouns: "*Fishing constantly* (adv.) makes one taciturn"; "He found *good* (adj.) *fishing*." A gerund may also take an object: "*Writing the letter* (obj.) was difficult."

When the gerund is preceded by an article, *a*, *an*, or *the*, or by an adjective, it requires a following phrase with *of*, signifying the *object* of its action: "The *building of* the ship took many days"; "Success depends upon careful *planning of* work."

The Subjunctive. With the exception of the forms given under the conjugation of *be*, English has no regularly inflected subjunctive forms. *Have* is used occasionally for *has* in the third person singular, and in other verbs the indicative singular third personal ending *s* is dropped, to make a subjunctive form: "If he *tell*."

The ideas of *doubt*, *uncertainty*, *condition*, and *desire*, usually called *subjunctive*, are commonly expressed by the indicative or by various verb phrases. See *Good Usage: Should, Would*.

The past subjunctive *were* or *had* is often used in past conditional sentences when *if* is omitted. In such cases the verb precedes the subject: "*Were* I *going*, I should take supplies"; "*Had* we *thought* of it, we would have called on him."

The Infinitive. The *infinitive*, meaning "unlimited," is a form of the verb which partakes of the nature of a noun. It expresses action without person or number. The *present infinitive* represents incomplete action, *to go*; the *perfect infinitive* represents completed action, *to have gone*. Verb phrases are formed with the auxiliaries *be* and *have* to serve as present and perfect passive infinitives: *to be seen*, *to have been seen*. See *Table of Verb Forms*.

The English infinitive is usually preceded by the word *to*, which is a relic of an early stage of the language and no essential part of the infinitive. Most verbs, when they take a following infinitive, require the form with *to*: "I *want* him *to go*." The following verbs generally take the infinitive without *to*: *bid*, *dare*, *feel*, *hear*, *let*, *make*, *need*, *see*, and all auxiliaries; as, "*See* him *go*," "They *may return*."

The infinitive may be used as a *noun*, as an *adjective*, or as an *adverb*; but it takes only an adverbial modifier, and, if transitive, may take an object: "*To tell* the *facts* (obj.) *accurately* (adv.) is difficult."

In the sentence "I want you to buy some oranges," some authorities regard *you to buy some oranges* as an *infinitive clause*, the object of the verb *want*; *you* is the subject and *oranges* is the object of *to buy*. Others call the *infinitive phrase*, *to buy some oranges*, the objective complement, and *you* the object complement, of the verb *want*.

Thou Forms. An old form of the second person singular in present and past tenses, now found only in poetical or religious use, is made by adding *st* or *est* to the first person singular: "*Thou tellest*"; "*Thou toldst*"; "*Thou hast*"; "*Thou hadst*"; "*Thou lovest*"; "*Thou lovedst*." The verb *be* has the following forms: "*Thou art*"; "*Thou wast*."

Adjectives

Kinds of Adjectives according to Meaning. Adjectives are classified, according to meaning, as *limiting* and *descriptive*. An adjective modifies a noun or pronoun either by *limiting*, that is, setting it apart definitely from others, or by *describing*, that is, naming a quality of the thing for which the noun or pronoun stands. To say "a *third* report" is merely to set apart, or limit, the report as belonging to one class; to say "a *complete* report" is to describe it by a certain quality.

Such words as *three*, *five*, *eleven*, *second*, are limiting adjectives. They are called *numerals*. Those which merely give a number, as *two*, *four*, are called *cardinals*; those which designate an order in a series, as *seventh*, are called *ordinals*.

The, *a*, *an*, are limiting adjectives. *The* is called the *definite article*; *a* and *an* are called *indefinite articles*. *A* is used before consonant sounds, *an* before vowels. See *Good Usage*.

Kinds of Adjectives according to Use. Adjectives are commonly classified, according to their use in the sentence, as *attributive* and *predicate*.

Attributive Adjectives.—An adjective used in close connection with a noun is called an *attributive adjective*, although some prefer the term *adherent adjective*. Regularly the attributive adjective precedes its noun: "*pretty* flowers." For emphasis, it may sometimes be placed after the noun: "the city *beautiful*."

Predicate Adjectives.—An adjective which modifies the noun of the subject but is placed in the predicate, usually following the verb, is called a *predicate adjective*: "The book is *large*." For *demonstrative*, *interrogative*, *relative*, and *indefinite* adjectives, see *Kinds of Pronouns*.

Appositive Adjectives.—Some authorities distinguish a third type of adjective, the *appositive*; as, "The boy, *careless* and *indifferent*, paid no attention." Such adjectives do not limit their nouns but describe them. They usually follow the nouns.

Other adjectives regularly follow their nouns, some of them only as predicate adjectives,—*alone*, *awake*, *aware*, *asleep*, *alive*: "Man *alive*!" "The child is *asleep*"; "One star *alone*."

Grammatical Relations. The use of English adjectives is very simple, because, except *this* and *that*, they are not inflected to distinguish gender, person, number, or case. The only inflection used is that employed to distinguish the degrees of comparison.

Comparison.—Most English adjectives are compared by adding to the simple form, or positive degree, of the adjective, *r* or *er*, to form the comparative degree, and *st* or *est*, to form the superlative: *high*, *higher*, *highest*; *fine*, *finer*, *finest*. The comparative degree expresses a greater or lesser degree of the quality named by the adjective; the superlative expresses the greatest or least degree of that quality.

For spelling changes with added syllables, see *Spelling*.

Many adjectives, especially those of more than two syllables, are compared by prefixing *more* or *less* for the comparative, *most* or *least* for the superlative: "*more* merciful"; "*least* troublesome." Some adjectives admit of both forms of comparison: *able*, *abler* (*more able*), *ablest* (*most able*). A few adjectives are compared irregularly: *bad*, *worse*, *worst*; *good*, *better*, *best*.

Adverbs

Meaning of Adverbs. Adverbs modify the meaning of verbs, adjectives, and other adverbs, in respect to some one of the following ideas:

1. Place,—there, nowhere, yonder.
2. Time,—now, afterwards, soon.
3. Manner,—well, badly, thoroughly.
4. Cause,—therefore, consequently.
5. Number,—first, secondly, rarely.
6. Degree,—somewhat, more, highly.

They are classified, therefore, as adverbs of *place*, *time*, *manner*, *cause*, *number*, and *degree*.

Interrogative Adverbs. The adverbs *how*, *whence*, *wherefore*, *why*, and a few others are used to introduce questions, either direct or indirect: "*How* shall you go?" "They wanted to know *why* he did that."

Relative Adverbs. *As*, *how*, *now*, *since*, *so*, *thence*, *when*, *whence*, *whenever*, *where*, *wherever*, *whither*, *why*, and a few others are used to introduce *subordinate clauses*.

Forms. Most English adverbs end in *-ly*. Many of these are formed from adjectives: *quick* (adj.),

quickly (adv.); *easy* (adj.), *easily* (adv.). Some adverbs have the same form as the corresponding adjectives: *early, hard, long, loud, deep.*

Caution.—*Goodly, lovely, manly, lonely,* and *homely* are adjectives.

Comparison.—Most adverbs are compared by prefixing to the simple form or positive degree *more* or *less* to form the comparative and *most* or *least* to form the superlative: easily, *more* easily, *most* easily; truly, *more* truly, *most* truly, *less* truly, *least* truly.

Some adverbs having the same form as the corresponding adjectives are compared by adding *er* and *est* to the simple form: *early, earlier, earliest; deep, deeper, deepest.*

A few adverbs are compared irregularly: *well, better, best; badly, worse, worst; much, more, most.*

There.—The adverb *there* is sometimes used to introduce a sentence, with no idea of place. When so used, *there* is called an *expletive,* because it "fills up" and is unnecessary to the sense: "*There* are many ways of doing good." See *It* under *Pronouns: Special Uses.*

The.—The definite article *the* is sometimes used as an adverb before comparatives: "*the* more, *the* merrier; *the* sooner, *the* better."

First.—The word *first* may be an adjective or an adverb: "The *first* (adj.) boy is my brother"; "He came *first* (adv.)." See *Good Usage.*

Position of Adverbs. Because great liberty is allowed as to the position of English adverbs, care should be taken so to place an adverb that its grammatical relation shall be clear.

Prepositions

Position of Prepositions. The word preposition comes from the Latin *pre,* before, and *ponere,* to place. Hence prepositions commonly stand before the words they govern ("Give the pencil *to him.*"); but they may come after them. In English this inversion occurs most frequently when the preposition governs a *relative* or an *interrogative word*: "They are people *whom* we know nothing *about*"; "*What* are you looking *for?*" See *Good Usage.*

Prepositional Phrases. The preposition and its object, with the modifiers of the object, form a phrase, which may be used as an adjective or an adverb: "The picture *on the screen* (adj.)"; "He ran *at top speed* (adv.)"; "Home *at last* (adv.)." Some prepositions form such close combinations with certain verbs that these expressions have the force of single words: *look over, laugh at, carry off.* See *Verbs, Prepositions.*

Subordinate Clauses

According to use, subordinate clauses are *substantive, adjective,* and *adverbial.*

A *substantive clause* is a clause that performs the function of a noun: "*That he came* (subj. of verb) is true"; "I know *that he came* (obj. of verb)"; "He was anxious for *what had been promised him* (obj. of prep.)"; "He is *what he seems* (attribute complement)"; "The fact *that he did it* (appositive) is wonderful."

An *adjective clause* is a clause that modifies a noun or a pronoun. It may be introduced by a relative pronoun: "He *whom thou lovest* is sick"; "This is the tree *that we planted.*" It may be introduced by a conjunctive adverb: "The town *where* (in which) *she lived*"; "The time *when* (at which) *Rome was built.*"

An adjective clause may be *restrictive*: "I took the peach *that was ripe.*" It was a particular peach. *That was ripe* restricts or limits *peach,* telling which one was taken.

An adjective clause may be *non-restrictive*: "I read 'Marmion,' *which was written by Scott.*" *Marmion* defines what book was read. *Which was written by Scott* is a *non-restrictive* clause, merely adding another thought to the one already expressed. A comma is used after *Marmion* to separate the non-restrictive clause from the rest of the sentence.

Relative Clause.—A clause introduced by a relative pronoun is sometimes called a *relative clause*: "This tree, *which has stood for years,* bears no fruit."

An *adverbial clause* is a clause that modifies the meaning of a verb, an adjective, or another adverb.

Adverbial clauses are introduced by subordinate conjunctions or by conjunctive adverbs:

Time—"*When duty calls,* I obey."
Place—"*Where I go,* ye cannot come."
Degree—"It is better *than I expected.*"
Manner—"The child does *as he pleases.*"
Purpose—"He came *that he might learn.*"
Result—"She was so weak *that she fainted.*"
Cause—"The snow melted *because it rained.*"
Condition—"*If you do right,* you will win."
Concession—"*Though I failed,* I shall try again."

Conjunctions. See special section devoted to this subject.

Parsing

To parse a word is to classify it as a part of speech, explain its form, and show its relation to other words in the sentence.

In the sentence "He bought a car," *car* is a common noun, of neuter gender, in the third person, singular number, and in the objective case because it is the object of the verb *bought.*

Bought is an irregular, transitive verb. The principal parts are *buy, bought, bought.* It is active voice indicative mode, past tense; third person, singular number, to agree with its subject *he.*

He is a personal pronoun. Its declension is singular, nom. *he,* poss. *his,* obj. *him*; plural, nom. *they,* poss. *their* or *theirs,* obj. *them.* Third person, singular number; nominative case, the subject of the verb *bought.*

Sentence Analysis

To analyze a sentence, first classify the sentence according to *form* and *use.* Then point out the simple subject; the complete subject. Classify the modifiers of the simple subject, analyzing phrases and clauses. Point out the simple predicate; the complete predicate. Classify the modifiers of the simple predicate, analyzing phrases and clauses. If the sentence is complex or compound, also name and classify the clauses and the connectives which join them.

Simple Sentence. "Truth, crushed to earth, shall rise again" is a *simple, declarative* sentence. *Truth* is the *simple* subject; *truth, crushed to earth* is the *complete* subject; *crushed* is a participle formed from the verb *crush* and modifies the noun *truth*; *to earth* is an adverbial phrase, modifying *crushed*; *shall rise* is the *simple* predicate; *shall rise again* is the *complete* predicate; *shall rise* is the predicate verb, which is modified by the adverb *again.*

Complex Sentence. "Blessed is he who has found his work" is a *complex, declarative* sentence, composed of one independent clause, *blessed is he,* and one dependent clause, *who has found his work.* The subject of the independent clause is *he*; the predicate is *is blessed.* The predicate consists of the copulative verb *is* and the predicate adjective *blessed,* which modifies the subject *he.* The dependent clause, *who has found his work,* is an adjective clause modifying the pronoun *he.* The subject of the clause is the relative pronoun *who*; the complete predicate is *has found his work*; *has found* is the predicate verb, the direct object of which is *work*; *his* is a possessive pronoun modifying *work.* The relative pronoun *who* joins the two clauses; its antecedent is *he.*

TABLE OF SPECIMEN VERB FORMS

The Verb, **tell.** Principal Parts: *tell, told, told*

INDICATIVE MODE

ACTIVE VOICE		PASSIVE VOICE	
		Present Tense	
		Ordinary Form	
SINGULAR	PLURAL	SINGULAR	PLURAL
I tell	We tell	I am told	We are told
You tell	You tell	You are told	You are told
He tells	They tell	He is told	They are told
		Progressive Form	
I am telling	We are telling	I am being told	We are being told
You are telling	You are telling	You are being told	You are being told
He is telling	They are telling	He is being told	They are being told
		Emphatic Form	
I do tell	We do tell	No corresponding forms in the passive voice.	
You do tell	You do tell		
He does tell	They do tell		
		Negative Form	
I do not tell	We do not tell	I am not told	We are not told
You do not tell	You do not tell	You are not told	You are not told
He does not tell	They do not tell	He is not told	They are not told
		Negative Progressive Form	
I am not telling	We are not telling	I am not being told	We are not being told
You are not telling	You are not telling	You are not being told	You are not being told
He is not telling	They are not telling	He is not being told	They are not being told
		Present Perfect Tense	
I have told	We have told	I have been told	We have been told
You have told	You have told	You have been told	You have been told
He has told	They have told	He has been told	They have been told
		Past Tense	
		Ordinary Form	
I told	We told	I was told	We were told
You told	You told	You were told	You were told
He told	They told	He was told	They were told
		Progressive Form	
I was telling	We were telling	I was being told	We were being told
You were telling	You were telling	You were being told	You were being told
He was telling	They were telling	He was being told	They were being told
		Emphatic Form	
I did tell	We did tell	No corresponding forms in the passive voice.	
You did tell	You did tell		
He did tell	They did tell		
		Negative Form	
I did not tell	We did not tell	I was not told	We were not told
You did not tell	You did not tell	You were not told	You were not told
He did not tell	They did not tell	He was not told	They were not told
		Negative Progressive Form	
I was not telling	We were not telling	I was not being told	We were not being told
You were not telling	You were not telling	You were not being told	You were not being told
He was not telling	They were not telling	He was not being told	They were not being told
		Past Perfect, or Pluperfect, Tense	
I had told	We had told	I had been told	We had been told
You had told	You had told	You had been told	You had been told
He had told	They had told	He had been told	They had been told
		Future Tense	
I shall tell	We shall tell	I shall be told	We shall be told
You will tell	You will tell	You will be told	You will be told
He will tell	They will tell	He will be told	They will be told
		Future Perfect Tense	
I shall have told	We shall have told	I shall have been told	We shall have been told
You will have told	You will have told	You will have been told	You will have been told
He will have told	They will have told	He will have been told	They will have been told

Infinitive Forms

Present.—(to) tell	Present.—(to) be told
Perfect.—(to) have told	Perfect.—(to) have been told

Participle Forms

Present.—telling	Present.—being told
Perfect.—having told	Past.—told
	Perfect.—having been told

Imperative Forms

Tell (Negative) Do not tell *or* Tell not — Be told (Negative) Do not be told *or* Be not told

The Verb **be.** Principal Parts: *am, was, been*

Present Tense		Past Tense	
SINGULAR	PLURAL	SINGULAR	PLURAL
I am	We are	I was	We were
You are	You are	You were	You were
He is	They are	He was	They were

The Verb **have.** Principal Parts: *have, had, had*

I have	We have	I had	We had
You have	You have	You had	You had
He has	They have	He had	They had

PREPOSITIONS

Through the study of prepositions, one gains a command of many idiomatic phrases found in every civilized language. Especially is this true of English, because English prepositions united with other words often take the place of corresponding inflected word forms in other languages.

From the following list of the more important English prepositions, the reader will learn the distinctive meanings attached to each according to the varied purposes for which it is used.

About. In its usual meanings of *around, close to, because of, concerning, not far from, over,* etc., this preposition is employed to express: (1) indefinite position, "The idlers hung *about* the saloon"; (2) in attendance on, "The king had his bodyguard *about* him"; (3) close at hand, on one's person, "He had no money *about* him"; (4) attention to, "We sent him *about* (*to attend to*) his business"; (5) abstract connection in the sense of concerning, "to see, ask, hear, write, think, dream *about* a thing"; (6) approximation in weight, measure, time, or scale, "He is *about* my size."

Above. Commonly this word means *over, higher than, superior to*: "The colonel ranks *above* the major." "The airplane rose rapidly *above* the city." "Clouds seem to float just *above* the trees." "The man's record is *above* suspicion." "The president does not stand *above* the law." "Mr. Utterson could hear the footsteps *above* the hum of the city." "*Above* all, avoid the appearance of suspicion."

After. This word usually means *behind, following, as a result of, in spite of, for,* and *according to*. It may be used with the verb *be* and with any verb of motion, also after *seek, ask, hunt,* although, with these, modern usage generally prefers *for*. The following are examples of common usage: "The troops passed first and the supply train came *after* (*behind*) them." "It was *after* (*later than*) twelve when our friends left." "*After* (*as a result of*) careful examination the board approved the plans." "The picture is fashioned *after* (*according to*) an antique model." "Book *after* book was read." "Time *after* time Mr. Blank inquired *after* (*for*) you." "*After* (*in spite of*) all, they have failed." "*After* a while they grew tired."

Against. Common meanings: *opposite to* (in this sense expressed by *over against*), *opposed to, pressing upon, contrary, from.* Examples: "The mast stood out clearly *against* (*contrasting with*) the sky." "The governor had long held his ground *against* suffrage." "The machine was leaning *against* (*pressing upon*) the wall." "Such action seems *against* (*contrary to*) nature." "*Defend us against* (*from*) our enemies."

Along. Implies *motion* or *extension upon, at* or *near the side of*. In such connections it may mean *near, beside, following the line of*: "We wandered *along* (*beside*) the river bank." "Rare plants grow *along* (*by the side of*) that embankment." "Trees are planted *along* (*the whole length of*) the roadway." "The car proceeded *along* (*following the line of*) the Boston road."

Amid, Amidst. The two words do not differ essentially in meaning. Their first sense is that of *among, surrounded by,* used generally with plural *substantives*: "She dwelt *amid* (*surrounded by*) the ruins of her former glory." In an extended sense, the words apply to circumstances and conditions: "He was bewildered *amid* (*among*) the perplexities and temptations of his position." In poetry, *amid* is used with a singular noun to indicate *in the middle of*, or *surrounded by* some extended object: "*amid* the billowy deep"; "She strayed *amid* the corn."

Around, Round. Used interchangeably to signify motion or position *about, encircling, on all sides of, in all directions from, at random through*: "They made a journey *around* (*encircling*) the world." "*Around* (*on all sides of*) the mansion were gardens." "The beams of light radiate *around* (*in all directions from*) the central mass." "We spent the day riding *around* (*at random through*) the city." "They gathered *round* (*about*) the hearth."

At. This word primarily expresses the relation of *presence*, of *contact in place or time*, or of *direction towards*. (1) It designates more or less indefinitely the point or place where a thing is: "*at* the center," "*at* home," "*at* hand." (2) Sometimes it emphasizes contact with a place better than *in* or *by*: "*at* school," "*at* the helm." (3) It denotes presence at an event: "*at* the wedding," "*at* the ball"; also location of a feeling or quality: "sick *at* heart," "out *at* elbow." (4) It is likewise used to signify the end or object of directed effort: "look *at* it," "aim *at* the bull's eye"; similarly, with the verbs *strike, shout, wink, mock, laugh, be angry,* etc. (5) It implies action, occupation with, or employment: "*at* work," "*at* meals," "to pull *at* an oar."

Athwart. A word used of position or motion in space, meaning *across, from side to side of*: "The shadow fell *athwart* (*across*) his path." "*Athwart* (*from side to side of*) the darkness a flash of light appeared." Figuratively, *athwart* is used to suggest opposition: "The suspicions of his rivals were thrown *athwart* (*in hindrance of*) his plans."

Before. Usual meanings: *ahead of, preceding, face to face with, rather than, higher than.* Examples: "The visitors came *before* (*ahead of*) the appointed time." "The customer just *before* (*preceding*) you bought the last pound." "The culprit was brought *before* (*face to face with*) the judge." "The question is now *before* (*claiming the attention of*) (*subject to disposition by*) the house." "The ship drove *before* the wind." "Shakspere comes *before* (*higher than*) Chaucer in rank though not in time."

Behind. Common meanings: *in the rear, at the back, toward the rear, not up with, supporting, backing.* Examples: "The garden was planted *behind* the house." "*Behind* (*in the rear of*) the army came the stragglers." "His shadow betrayed his presence *behind* (*at the back of*) the screen." "Many, worn out by the march, fell *behind* (*to the rear of*) their comrades." "His ideas are *behind* (*not up with*) the times." "The contractor did not have sufficient capital *behind* (*supporting*) him." "The train was *behind* time."

Below. Used literally of position or direction, signifying *lower than, under*: "The shot struck *below* (*lower than*) the water line." "The signature is placed on the line *below* (*under*) the complimentary close." "Three miles *below* (*farther down than*) the town, on the bank of the stream, stands the fort." Figuratively, *below* is used to express an inferior degree of rank, dignity, and excellence: "The corporal ranks *below* the sergeant." "They are as inferior as the fields are *below* the stars."

Beneath. This preposition is used generally of lower position. It suggests also influence or control and unworthiness. The following examples illustrate accurate uses of the word: "The plank roadway echoed *beneath* their tread." "Loch Katrine lay *beneath* him." "The trees were bent *beneath* their burden of fruit." "His knees shook *beneath* him." "The people were held *beneath* the yoke of the conqueror." "She thought her neighbors *beneath* her notice."

Beside. In its literal sense, used to mean *by the side of, near*: "The guard rode *beside* the carriage." Figuratively, *beside* is used to suggest comparison: "*Beside* (*in comparison with*) his son's achievement, his own seemed petty." *Beside* has the force of *outside of* in "*beside* himself" and "*beside* the question."

Besides. Formerly used interchangeably with *beside*, this word now signifies *over and above, in addition to, as well as*, and also *apart from*: "The house had many rooms *besides* (*in addition to*)

those." "*Besides* (*as well as*) his income, he had other resources." "They are interested in nothing *besides* (*apart from*) their art."

Between. Used of position or movement in space separating two objects: "The courthouse was built *between* the rival towns." "He walks *between* his house and his office." *Between* is used also of intermediate qualities and conditions: "something intermediate *between* vice and virtue"; "a shade *between* orange and red." It may denote joint or reciprocal action either in agreement or opposition: "A struggle ensued *between* (*opposition*) the champions." "A compact was made *between* (*agreement*) the families." "*Between* them (*together*) they brought the game into camp." *Between* is likewise used to express confinement or restriction: "He took the bit *between* his teeth." It is employed particularly to signify privacy in conversation: "*between* ourselves," "*between* you and me."

Beyond. Used of an object in regard to both space and time, and signifying *farther on than*, *past*, *later than*: "They traveled *beyond* (*farther on than*) the mountains." "*Beyond* (*past*) the Alps lies Rome." "We were detained *beyond* (*past*) the usual hour of closing." Figuratively, the word is used in various senses of *exceeding* or *surpassing*: "The thing is *beyond* (*exceeds*) his power." "A scene lovely *beyond* (*surpassing*) expression was disclosed to view."

But. With the force of a preposition, *but* signifies *except*, *leaving out*: "The collector took all *but* (*except*) three." "There was no course open *but* (*except*) to submit." Some authorities treat these uses as conjunctive.

By. This word usually means *near*, *next to*, *in the course of*, *through the agency of*, *through the use of*, *according to* (*a specified unit of measure*). Examples: "The factory stands *by* (*near to*) the river." "Flight *by* (*in the course of the*) night was very dangerous." "No honest official is injured *by* (*through the agency of*) publicity." "*By* (*according to*) all physicians' rules he should have died." "More freight should be shipped *by* (*by way of*) water." "*By* whatever name it may be called, the tree is known *by* (*through the use of*) its fruit." "He works only *by* the day (work reckoned *according to* a day as a unit)." It may indicate a succession of units: "two *by* two"; "piece *by* piece"; "The timbers were dragged up the mountain one *by* one." The following are idiomatic expressions: "to take *by* and large" (to consider generally), "*by* seven o'clock," "to take *by* the hand," "two *by* the clock," "come *by*" (get), "do well *by* a person," "judge *by* appearance," "learn *by* experience," "take *by* surprise," "*by* the way," "*by* the pound," "*by* the book," "*by* hook and *by* crook," "*by* means of," "*by* dint of," "near *by*," "stand *by*" (help or support).

Down. Used literally of place and time and figuratively in various phrases, in the general sense of *descending direction*: "The machine sped easily *down* the incline." "A strange tradition comes *down* the years." The expression "*down* town" has the meaning of *into*, as denoting motion from a more elevated locality *down into* a lower one.

During. This word is used exclusively with reference to time, meaning *in the course of* or *throughout*: "We were repeatedly interrupted *during* (*in the course of*) the discussion." "*During* (*throughout*) this period a high temperature prevailed."

Except, Excepting. The two words are used interchangeably, in the sense of *exclusion* or *omission*: "Everybody was gay *except* the Major." "*Excepting* the last two articles, they adopted the agreement."

For. This preposition is a word of widely varied uses in reference to extent of space or of time, amounts of money, cause or occasion, purpose, seeking or reaching. It may mean *during*, *toward*, *in the interest of*, *in proportion to*, *in place of*, *in return*, *seeming*, *in relation to*, *in spite of*. Examples: "The road was torn up *for* (*throughout*) a distance of half a mile." "The firm's note is good *for* (*to the extent of*) that amount." "The mayor was censured *for* (*because of his*) permitting the meeting." "The farmers gave them ball *for* (*in return for*) ball." "*For* (*in proportion to*) one who sees anything, ten people look." "*For* (*in spite of*) all his bluster, the man was a coward." The following phrases are idiomatic: "leave *for* a destination," "atone *for*," "argue *for*," "account *for*," "allow *for*," "apologize *for*," "pay *for*," "call *for*," "care *for*," "go *for*," "write *for*," "look *for*," "name *for*" (*after*), "to be well *for*," "*for* thirty dollars," "*for* once," "*for* a while," "indebted *for*," "a time *for* anything," "a taste *for* luxuries," "a longing *for* home," "*for* the asking," "the train *for* (*going to*) Philadelphia."

From. This word denotes primarily separation in space; but it is used also of a starting point in time, and it may express distinction of ideas and the relation of cause or source. Examples: "The house was placed about three hundred feet *from* the barn." "*From* boyhood he was interested in flowers and trees." "Men pass quickly *from* youth to age." "Skill arises *from* constant practice." "Deliver us *from* (*out of the power of*) evil."

In. This word may mean "*within* a place, a group of people or a society, or a period of time." It may denote also the end of a period of time or the object of a motion or a feeling. It may further be used in respect to manner, method, material, cause or occasion, and of duty or measure. *In* should be carefully distinguished from *into*, which implies motion or change only. Examples: "The family lives *in* Jamestown." "*In* the 19th century there were many wars." "The note is due *in* three months." "*In* whom can one put confidence?" "He took great delight *in* his friends." "*In* my judgment, the man is guilty." "The picture was done *in* oils." "Undoubtedly you spoke *in* haste."

We may say, "Come *in*"; but we must say, "Come *into* the house." The following are idiomatic expressions: "*in* the name of the law," "*in* time," "*in* wrath," "*in* health," "*in* doubt," "*in* error," "*in* scorn," "*in* fact," "*in* truth," "*in* love," "one *in* a thousand," "call *in* question," "hope *in*," "believe *in*," "trustworthy *in* word and deed," "originate *in*," "steeped *in*," "persist *in*."

Into. A preposition implying direction or motion, used regularly after the verbs *go*, *come*, *bring*, *put*, *send*, etc., also in referring to state or condition: "They went *into* the house." "He thrust the money *into* his purse." "The work extended well *into* the next month." "Their fathers had gone *into* business together." "The child burst *into* tears."

Notwithstanding. This word belongs to the class of participial prepositions. It means *in spite of* or *in the face of*: "The plan succeeded, *notwithstanding* strong opposition."

Of. This is the most commonly used English preposition. It may refer to position or location, distance, possession, extent of time, separation, source, material or character, relief. The following expressions will illustrate these meanings: "North *of* Boston," "the mountains *of* California," "a shore line *of* forty miles," "a creature *of* (*living only*) a day," "deprived *of* liberty," "the shadow *of* the glen," "a man *of* honor," "a form *of* great beauty," "cured *of* a cold," "a bridge *of* stone and iron." The following are idiomatic expressions: "fond *of*," "tired *of*," "best *of* all," "warned *of* danger," "hear *of*," "talk *of*," "beware *of*," "conscious *of*," "convicted *of*," "accounted *of*," "think well *of*," "afraid *of*," "big *of* heart," "*of* a cruel temper," "built *of*," "born *of*."

Off. This word means *from*, and is used chiefly to denote separation. It is employed idiomatically in various ways implying former dependence: "*off*

one's hands," "*off* one's head." It sometimes indicates source or material with such verbs as *dine, eat*; as, "He dined *off* roast beef." It also signifies deduction or rebate; as, "They took it *off* the bill."

On, Upon. *On* and *upon* are generally identical in meaning. *On* is used to indicate: (1) support or contact from elsewhere than beneath: "a fly *on* the wall"; (2) nearness: "a house situated *on* the river"; (3) employment or activity with or in respect to: "*on* the committee," "*on* duty," "*on* the run." It indicates the ground or basis of action: "stated *on* authority," "He bet *on* the red"; also position and boundary: "The town lay *on* the east." It likewise denotes state or condition: "*on* fire," "*on* sale," "*on* tap." Where simple contact or proximity to the surface is implied, *upon* is used interchangeably with *on*. The following are idiomatic uses: "The gifts arrived *on time* (*at the time set*)." "They bought the goods *on* time (*payment being deferred*)." "They lived *on* vegetables." To talk *on* or *upon* a subject implies more careful treatment of the theme than to talk *about* it.

Out. As a preposition, *out* is now obsolete or colloquial. *Out of* is used in its place. Examples: "He came *out of* (*from*) his retirement." "We frequently see things *out of* (*not according to*) their true proportion." "The bells were *out of* tune and harsh." The following are idiomatic phrases: "made *out of*," "*out of* order," "*out of* doors," "*out of* supplies," "*out of* season," "*out of* sight," "*out of* mind."

Over. In the sense of *above*, this preposition is used to imply superiority, power, dignity, value, and preference; as, "to triumph *over* difficulties." It signifies *beyond*, in degree: "It cost *over* four dollars"; a whole surface: "to wander *over* the earth"; duration of time: "He let it soak *over* night." It has also the meanings of *across, from side to side*; as, "The dog leaped *over* the stream." *Over* is used idiomatically in such expressions as "*over* one's signature," "*over* head and ears in debt," etc.

Past. Used literally of space, time, and age, signifying *beyond, farther on than, later than*: "He walked *past* (*farther on than*) the house." "They were just *past* (*beyond*) the boundary." "It is now ten minutes *past* (*later than*) twelve." "The old lady was *past* (*beyond the age of*) seventy." *Past* denotes also *beyond the power of*: "The man was troubled *past* endurance."

Round. See *Around*.

Save. Used in the sense of *except* or *excepting*: "There was no sign of human life *save* the chimney smoke."

Since. With the force of a preposition, this word is used altogether of time, signifying *from a time, within a following time*, and *duration*: "*Since* (*from*) that day we have not heard from him." "Where have you been *since* (*within the time after*) yesterday?" "It is a fortnight *since* he embarked."

Through. Used of space and time and in various other connections. It signifies *from one limit to another of, into every part of, passing within* in the sense of penetrating or transmitting, *during the period of, by means of, on account of*: "The hall runs *through* (*from end to end of*) the house." "The visitors were shown *through* (*into every part of*) the town." "A light shone *through* (*penetrating*) the woods." "The noise continued *through* (*during*) the night." "*Through* (*by means of*) his own perseverance, he held the position." "We were detained *through* (*on account of*) his blundering."

Throughout. The preposition *through*, reenforced by *out*, signifying *the whole of, every part of, space, region, period of time*, or *course of action*: "*throughout* the length and breadth of the land"; "*throughout* the night."

Till, Until. These words are used interchangeably in reference to time, signifying *to, up to*: "They can wait *till* (*up to*) next week." "He will not reply to the letter *until* (*up to*) the end of the month."

To. Used primarily to denote relation of approach and arrival. It indicates that toward which there is movement—a terminal point: "He went *to* law about it." "She stretched her arms *to* heaven." Idiomatic uses: "The remarks were addressed *to* the audience." "Let us keep this *to* ourselves." "It was sweet *to* the taste." "We were bored *to* death." "The hall rang *to* the tramp of armed men." "The drawing was made *to* scale." "It was John *to* the very life."

Touching. Used with the force of a preposition in the sense of *concerning, with regard to*: "*Touching* the life of the interior villages, we have no authentic information."

Toward, Towards. Used interchangeably in the sense of *facing* or *looking in the direction of, approaching, aiming at, in respect to*: "The door was open *toward* (*facing*) the east." "A procession came *toward* (*approaching*) the village." "*Toward* (*approaching*) night the sky became overcast." "A strong trend *toward* (*aiming at*) independence was evident." "She maintained a critical attitude *towards* (*in respect to*) her family."

Under. The primary meaning of this word is *below, lower than*; as, "*under* a tree," "a cellar *under* the house." Hence, analogously it may have the meaning of *being weighed upon, oppressed*, or *controlled by* affliction, subjection, government, authority, and the like: "to travel *under* a heavy burden"; "to be brave *under* trials"; "*Under* (*during the government of*) the Tudors, England made great political progress."

Underneath. Used in the sense of *directly below*: "*Underneath* the desk, papers were piled."

Up. With respect to motion or position, this word signifies *from a lower to a higher place on or along, at a higher place upon, toward, near, at the top of*: "The party tramped *up* (*from a lower place*) the slope." "His farm lies *up* (*at a higher point upon*) the river." It may also denote movement from the coast to the interior; as, "to journey *up* the country." It may indicate direction from the mouth to the source of the river; as, "He sailed *up* the Hudson."

With. Denotes relation of contact or association. After the verbs *fight, contend, vie*, and the like, it has the meaning of *against*; as, "The Greeks fought *with* the Persians." "They are *with* (*in the employ of*) the telephone company." It may signify association in the sense of attribute; as, "a man *with* (*characterized by*) a clean record"; also the instrument or means; as, "He slew him *with* a sword." It may denote an accessory, as of contents, material, etc.; as, "to fill the stable *with* straw," "to line the hat *with* silk." *With* is used idiomatically in such phrases as "*with* all one's heart," "*with* tooth and nail," "to bear *with*," "to put up *with*," and the like.

Within. Used of place, signifying *inside of*: "*Within* the building were many curious objects." Used of time, signifying *inside the limits of*: "The train will arrive *within* an hour." The word is used of various other relations: "It is not *within* (*in the limits of*) his power to forbid the transfer." "Such an act does not come *within* (*in the scope of*) the court's jurisdiction." *Within* also implies limitation as to quantity: "He lived *within* his income."

Without. This word in the sense of *outside of* or *excluded from* is now seldom used and may be regarded as almost obsolete: "The poor folk dwelt *without* the walls." "She was *without* the pale of society." Its present meaning denotes *lack of, absence of, deprivation*: "The association was *without* (*lacked*) funds." "He was buried *without* (*deprived of*) the usual rites."

Special Prepositions

The following is a list of certain nouns, adjectives, and verbs, which require *special prepositions*:

Abhorrence *of* evil.

Abhorrent *to* his strict principles.

Abide *in* a place, *for* a while, *with* a company, *by* a promise.

Abound *in* vigor and courage, *with* theaters and churches.

Absolve *from* debt or allegiance or a charge of guilt.

A plant **absorbs** moisture *from* the air; one becomes absorbed *in* thought; nutriment may be absorbed *into* the system *through* the skin.

An **accessory** *to* the crime, *before* or *after* the fact; the accessories *of* an automobile.

The **accident** *of* family; an accident *to* the car.

Accommodate *to* circumstances, *with* money, materials, etc.

Accompanied *by* several friends, *with* a suggestion.

Accord *with* (agree) looks or profession.

Accuse *of* a crime or fault.

Acquaint *with* the facts.

Acquaintance *with* a subject, *of* one person *with* another, *between* persons.

Acquit a person *of* a charge.

Active *in* temperament, *in* business, *for* an object or purpose, *with* instruments, *about* something.

Adapted *to* a use or situation, *for* a purpose, *from* a source, as *from* Shakspere.

Adequate *to* a demand, *for* a purpose.

Admit *to* membership, *into* a house, *of* exceptions.

Admonish *of* error or duty, *against* a proposed act.

Advantage *of* education, *of* some one as "to get the advantage *of* us," *over* an opponent.

Advocate *of* free speech, *for* another person.

Affinity *between* colors and sounds, *of* one chemical element *for* another.

We **agree** *in* opinion *with* the speaker, *to* a proposition; persons agree *on* or *upon* a statement of principles, a contract, etc.; men should agree *among* themselves.

Alarm was felt *in* the village, *among* the women, *at* the sound.

Aliens *to* our national customs and thought; aliens *in* a country, *among* a people.

Alive *in* every fiber; alive *to* every good suggestion; alive *with* fervor, hope, resolve.

Allegiance *of* the citizen *to* the government; the government has a right to allegiance *from* the citizen.

Alliance *with* a state or people, *against* the common enemy, *for* offense and defense; alliance *of*, *between*, or *among* nations.

Allied. Wit allied *to* madness, a state allied *with* another.

Alter *from* one form *to* another.

Amazement *at* such reckless driving.

Ambitious *of* power.

Amused *with* toys, *at* a remark or a situation.

The **analogy** *between* a society and the plant body; the analogy *of* sound *to* light.

Anger *at* the insult prompted a retort in kind; anger *toward* an offender exaggerates the offense; angry *with* a person.

An **answer** *to* the question, *in* writing, *by* post, or *by* word of mouth.

Antipathy *to* (sometimes *for* or *against*) a person or thing; antipathy *between* two persons.

Anxious *for* a decision, *about* or *concerning* a person's safety.

An **apology** *to* a person *for* an error is fitting.

Appeal *to* an authority, *from* a decision, *for* help.

Appear *at* the theater, *among* the first, *on* or *upon* the surface, *to* the eye, *in* evidence, *in* print, *from* reports, *near* the place, *before* the audience, *through* the mist; appear *for*, *in behalf of*, or *against* one in court.

Apportion *to* each a fair share; apportion the property *among* the creditors, *between* two claimants; apportion *according to* rank, etc.

Apprehensive *of* danger, *for* one's safety.

Approximation *to* the correct solution.

Arraign *at* the bar, *before* the court, *of* or *for* a crime, *on* or *upon* an indictment.

Arrested *for* crime, *on* suspicion, *by* the officer, *on*, *upon*, or *by virtue of* a warrant.

Ask *for* a thing; ask a thing *of* or *from* a person; ask *after* or *about* one's health, welfare, friends, etc.

Astonished *at* a situation or a person's attitude, *by* an event.

Attend *to* (listen) instructions, *on* or *upon* (wait) an official or dignitary.

Attended *by* a train of servants, *with* difficulties, advantages, etc.

Behavior *of* a person *to* or *toward* people, *on* or *upon* the streets, *before* the multitude, or *in* a place, *with* companions.

Benevolence *of* or *from* a person, *to* or *toward* others.

Break *to* pieces or *in* pieces, *into* several pieces (when the object is thought of as divided rather than shattered), *with* a friend, *away from* a habit; break *into* a house, *out of* prison; break *across* one's knee; break *through* a barrier.

Burn *in* fire; burn *with* fire; burn *to* the ground; burn *to* ashes; burn *through* the skin or the roof; burn *into* the conscience, etc.

Call *on* or *upon* a person (to visit him), *after* (by the name of), *in* question, *at* a house.

Care *of* a property, *for* the future, *about* a matter.

Carry *to* a place; carry *from* or *out of* a place; carry qualities *into* conduct; carry *across* the street, *over* the bridge; carry a cable *under* the sea.

Catch *at* a straw; catch a person *by* the collar; catch a ball *with* the hand; catch a disease *from* a patient; catch one *in* the act, a bird *in* a snare.

Cause *of* disaster; cause *for* interference.

Change a house gown *for* a street dress; change *from* a caterpillar *to* or *into* a butterfly.

Cheat one *of* his desires, *out of* a right.

Choose *from* or *from among* a number; choose *out of* the army; choose *between* two, *among* many; choose *for* a purpose.

Commit *to* a person *for* safe-keeping; commit *to* prison *for* trial.

Complain *of* a thing *to* a person, *of* one person *to* another, *of* or *against* a person *for* an act, *to* an officer, *before* the court, *about* a thing.

Concerned *with* a person, *in* a result, *in* a proceeding, *about* a matter, *for* a person's health, etc.

Concur *with* a person, *in* an opinion.

Confirm *by* testimony; confirm *in* a belief.

Conformity *with* an opinion, *to* an order, custom, etc.

Considerate *of* a person's feelings.

Contend *with* a person, difficulties, trials, temptations, etc., *for* a principle, a truth, *against* an obstacle, *for* an object.

Contrast two things, one *with* another.

Controversy *with* a person, *between* two or more, *about* or *over* a subject.

Conversant *with* a subject or the facts in a case.

Conversation *with* people, *between* or *among* persons, *about* a matter.

Convey *to* a friend, a purchaser, etc.; convey *from* one place *to* another; convey *by* express, *by* hand, etc.

Copy *after* a person, a model, an example, *from* life, nature, *from* or *out of* a work.

Correspond *with* a person, *to* ideas, models, etc.

Deliver *from* temptation, *out of* difficulty, trouble, etc., *of* an opinion.

Die *of* fever, *by* violence; die *for* one's country; die *at* sea, *in* one's bed, *in* agony; die *to* the world.

Differ *among* themselves, *from* one another, *from* or *with* another in judgment, opinion, etc., *about*, *concerning* a question, subject, etc.

Discriminate *between* two or more things, one thing *from* another, *against* a person.

Disgusted *with* a person, *at*, *by*, *with* a thing.

Divide *between* two, *among* two or more, *in* or *into* parts, something *with* another person, a thing *from* another, *upon* a question.

Draw water *from* or *out of* a well; draw one *into* an argument; draw *with* cords or ropes; the truck is drawn *by* a tractor *along* the road, *across* the lots, *over* the bridge, *through* the streets, *to* the station.

Employ *in*, *on*, *upon*, or *about* a work, business, etc., *for* a purpose, *at* a certain rate of salary or wage.

Entrance *into* a place, *on* or *upon* a work or course of action, *into* or *upon* office, *into* a contest, *by* or *through* a door, *within* the gates, *into* or *among* the company.

Envious *of* (formerly *at* or *against*) a person; envious *of* another's wealth or power.

Faint *with* hunger; faint *in* color.

Fall *under* censure, observation, etc., *from* a high place, *into* water, a hole, bad habits, etc., *on* or *upon* a foe, *among* thieves, *to* or *on* the ground.

Friendship *of* one person *for* or *toward* another, or friendship *between* persons.

Good *at* a business or task, *for* some purpose, *to* another person.

Gratified *at* an action or course of conduct.

Grief *at* a loss, *for* a friend.

Hanker *after* or *for* amusement, dainties, luxury, etc.

A result **happy** *for* a person; happy *at* a reply; happy *in* his home, *with* his friends, *among* his children; happy *at* a discovery, *over* a success.

Help *in* business or emergency, *with* money; help *to* success, *against* opposition.

Impatient *with* a person, *at* conduct, delay, etc., *for* something expected, *under* grief, misfortune, etc.

Injury *of* a cause; injury *to* a structure; injury *by* fire, *by* or *from* collision, interference, etc.

Inquisitive *about, concerning, in regard to, regarding* matters.

Join *to* something more numerous or greater, *with* something equal.

A **journey** *from* Naples *to* Rome, *through* Mexico, *across* the continent, *over* the sea; a journey *into* Asia, *among* savages, *by* land, *by* rail, *for* health, *on* foot, *on* the cars, etc.

We **listen** *for* what we expect or desire to hear; we listen *to* what we actually do hear.

Love *of* country, *for* humanity; love *to* or *toward* God and man.

Made *of, out of* or *from* certain materials, *into* a certain form, *for* a certain purpose or person; made *with* hands, *by* hand.

Martyr *for* or *to* a cause, *to* disease, disappointment, sorrow, etc.

Mastery *of* a subject or a task, *over* an enemy or opponent.

Mourn *for* a loss, *over* misfortune or trouble.

Necessary *to* a purpose, *for* or *to* a result or a person; unity is necessary *to* completeness; decision is necessary *for* command, *for* or *in* a commander.

Offended *at* a remark or course of action, *by* a word or act, *with* a person.

Opinion *on* a question, *about* a subject or a person.

Opportunity *of* doing something, *for* service, thought, etc.

Pardon *for* the offenders, *for* all offenses; pardon *of* offenders or offenses.

Patient *of* toil, *with* a person, *toward* learners, *under* difficulty.

Plead *with* the tyrant, *for* the captive; plead *against* injustice; plead *to* the indictment, *at* the bar, *before* the court.

Pleasant *to, with* or *toward* persons, *about* a matter.

Present *to* a person, a person *with* something.

Prevail *on, upon,* or *with* (to persuade), *over* or *against* (to overcome).

Profit *of* labor, *on* capital, *in* business.

Provide *with* supplies, *for* the future, *against* misfortune.

Purchase *at* a price, *at* a public sale, *of* or *from* a person, *for* cash, *with* money, *on* time.

Rejoice *at* an occurrence or an event, *in* personal qualities or possessions.

Relieve *from* pain, trouble, *of* duty or responsibility.

Reproach a person *for* acts.

Rise *from* slumber; rise *to* an occasion or responsibility; *at* a summons; rise *with* the dawn.

Security *for* the payment *of* a debt; security *to* the state, *for* the prisoner, *in* a specified sum; security *from* attack, *against* loss.

Send *from* the hand *to* or *toward* a mark; send *to* a friend *by* a messenger or *by* mail; send a person *into* danger.

Shelter *under* a roof *from* a storm, *in* a stronghold, *behind* or *within* walls.

Skillful *at* or *in* a task, *with* tools.

Strive *with* or *against* a person opposed or a thing in opposition, *for* something to be obtained.

Suffer *from* a disease, *by* some one's act or conduct, *with* another (sympathy).

Taste *of* food, etc., *for* painting, music.

Versed *in* a subject.

CONJUNCTIONS

The correct use of conjunctions is necessary to well constructed, intelligible sentences. No matter how accurate a writer's use of other words may be, if he does not indicate appropriately the relations between words or clauses, his sentences cannot be clear.

Conjunctions are divided into two general classes, *co-ordinate* and *subordinate*.

A *co-ordinate* conjunction connects words, phrases, or clauses of the same rank; as, *and, but, or, nor, either, neither*: "Sun *and* moon are heavenly bodies." "To be *or* not to be, that is the question." "Be not overcome of evil, *but* overcome evil with good."

A *subordinate* conjunction connects clauses of different rank; as, *since, unless, because, for, if, though, although*: "*Unless* it rains, the crops will fail."

Conjunctions include adverbs used as conjunctions and known as *conjunctive adverbs*, such as *when, where, whence, whereby, while, why*: "*While* we sleep, the body is rebuilt."

Correlative conjunctions are those which are used in pairs; as, *both—and, either—or, neither—nor, whether—or, though—yet*: "He *neither* ate *nor* slept." "*Though* all men deny Thee, *yet* will I not."

The following list of the more important English conjunctions shows varied shades of meaning that these parts of speech may assume, according to the demands of the different sentences in which they are used.

Although and **Though.** These words do not differ in meaning. They introduce concessive ideas: "We must be content with this, *though* we had hoped for more." "*Although* clear writing is difficult to produce, it is worth earnest endeavor." Equivalent phrases are: *in spite of the fact that; granted that; albeit. Even though* is more emphatic, as *although* was formerly more emphatic than *though*.

And. The most nearly universal connective. It is the original Saxon word used to join sentence elements that are grammatically alike and is the typical copulative of narration. It has, besides, a variety of effective uses as follows: (1) to intensify a statement,—"He talked on for hours *and* hours"; "They worked, *and* worked hard, to get results"; (2) as almost equivalent to *but*,—"It is one thing to plan *and* quite another to carry out plans"; (3) in such expressions as "There are boys *and* boys," indicating differences of condition, class, or character; (4) to express result,—"After long search he found the lode *and* became very wealthy." *And* may be used to begin a sentence, especially where some feeling or thought of surprise or reproach is implied: "*And* did you once see Shelley plain?" "*And* do you mean to tell me such a story?"

As. Used where comparisons of quality, close likeness, or proportion are implied: "He was as happy *as* only a man with a clear conscience can be"; "*As* we approached the rapids, the roar became deafening." *As* may denote cause or reason: "*As* the ship was unseaworthy, it was abandoned."

Because. Originally a phrase consisting of preposition and substantive, *by cause*. The word signifies *for the reason that* or *in consequence of*. See *For*.

Both. This conjunction is used regularly to precede the first of two co-ordinate words or phrases, and is followed by *and* before the second. It signifies *alike, as well as, too, also*: "a masterpiece for *both* argument and style." It may follow the co-ordinate words; as, "Malice mars logic and charity *both* (*alike, too, also*)."

But. Used in a great variety of ways, the primary sense being that of contrast or opposition: "His progress was slow *but* sure"; "We cannot *but* believe." Sometimes *but* implies a concession:

"Lincoln is dead, *but* the government at Washington still lives." *But* may mean "that—not": "There is no rose *but* bears its thorn."

Either. A disjunctive connective used before two co-ordinated alternatives and followed by the correlative *or*: "*Either* the light is distant *or* it is dim." "We must *either* stay where we are *or* risk being carried away by the flood."

Ere. A conjunction used mostly in poetry, thus differing from its synonym, *before*: "We shall meet *ere* set of sun." *Ere* must be distinguished carefully from *e'er*, which is a poetic contraction of *ever*.

Except. The use of *unless* instead of *except* is preferred by modern writers: "I will not be satisfied *unless* (*except*) you come." After *except* or *unless*, the phrases *it be*, *it were*, etc. are frequently used instead of repeating the principal verb: "He never goes to church *except it be* (he goes) to hear the music." "He seldom laughed *except it were* (he laughed) at his own jokes."

For. As a conjunction, *for* introduces only clauses or sentences of cause or reason. It should be distinguished carefully from *as*, *since*, *because*. *Because* is now used to introduce a real cause; as, "The water boils *because* it is heated." But one may say, "The water must be hot, *for* I saw John light the gas." In the latter case, *for* introduces a reason for a belief. *As* and *since* introduce causes or reasons that may be taken for granted: "*Since* (*as*) the hat was mine, I took it."

If. Used to introduce a clause of condition with the *subjunctive* signifying *doubt*, and with the *indicative* implying *suspended opinion* in regard to a statement: "*If* that be true, this is false." "He shall not secure the property *if* we can prevent it." *If* also introduces a concession, as equivalent to *although*: "*If* (*although*) he is competent, he sometimes makes mistakes."

Lest. Used to introduce a negative intention or purpose, equivalent to *that—not* or *for fear that*: "We hastened to return *lest* our friends should be alarmed."

Neither. The negative of *either*, used to introduce the first of two or more co-ordinate words or clauses, and followed by *nor*: "They had *neither* food *nor* clothing." "Quarter was *neither* given *nor* asked."

Nevertheless. In meaning, this compound is equivalent to *yet*, *notwithstanding*, or *in spite of that*: "Although entrance is forbidden, *nevertheless* they will use the house."

Nor. See *Neither*.

Notwithstanding. Equivalent in meaning to *although* or *in spite of the fact that*: "John was a stranger to most of the villagers, *notwithstanding* he had lived in Oakfield for thirty years."

Or. See *Either*.

Save. Used with the force of a conjunction, this word is equivalent to *except* or *unless*: "The night was still, *save* that the distant cataract rumbled steadily." "'Tis said there were no thought of hell, *save* (*unless*) hell were taught."

Since. This word denotes either sequence or duration in time or a logical relation. As applied to time, it signifies *from* a time or *subsequent to* or *during* a time: "Many years have passed *since* they met." "It is a fortnight *since* he embarked." Logically, *since* means *because* or *inasmuch as*: "*Since* she has inquired, you may give her the facts."

So. In its conjunctive use, this particle has the sense of *provided that*, *on condition that*; as, "They will be satisfied, *so* their children receive an education." It is used also to introduce a clause of result; as, "The car had disappeared, *so* the entire party walked home."

Than. Formerly this word was thought of both as conjunction and as preposition, and such expressions as "older *than* me," "taller *than* him" were allowable. Now, however, *than* is recognized only as a conjunction; hence one must say "older *than* I," "taller *than* he." The expression *than whom* is an exception to the rule given; as, "Roosevelt, *than whom* no American has been better loved or more sincerely hated." This construction is now universally approved.

That. A few common uses of *that* should be noticed. Besides being generally used to introduce an objective or adjective clause, *that* is likewise employed to denote time, definitely or indefinitely: "It is time *that* we should be going home." "We left the day *that* he arrived." It may also denote the relation of purpose or result: "He was given leave *that* he might go to Paris." Both in speaking and in writing we often omit *that* when the connection may readily be supplied: "We believe (*that*) the work can be done in a week."

Therefore. A conjunction of formal sense, used to introduce a conclusion or consequence. Its meanings may be expressed by *in consequence*, *for this reason*, *on that ground*, *consequently*: "We have completed our examination of the case; *therefore* we should make our report."

Till, Until. These two words are used as conjunctions without any difference in meaning. Their general sense is that of expectancy or continuance, expressed by (*up*) *to the time when*: "They could not vote *until* the polls were opened." "It was his custom to remain in the house *till* darkness had fallen."

Unless. A word compounded of *on* and *less*, and meaning literally *in less* or *on less*, that is, *on any less grounds or condition than*, the conditions being stated in a following clause. Other equivalent phrases are *if—not*, *in the event that—not*, *supposing that—not*. The following are typical uses of the word: "How shall they learn *unless* they are willing to hear?" "*Unless* the government's plans miscarry, the ships will be built." "I cannot explain his conduct, *unless* he has not been warned."

Whereas. A conjunction of two principal uses: (1) In formal documents and arguments, expressing the idea of *since*, *considering*, it introduces a preamble or a reason upon which a conclusion or a resolution is based: "*Whereas*, The society has accepted the plan of the committee, therefore, be it Resolved, etc." (2) Like *although*, it may imply a contradiction between the clause it introduces and a preceding statement: "They claimed a victory, *whereas* they had really lost the contest."

Whether. As a conjunction, this word introduces an implied question. (1) It may introduce alternatives, followed by *or* before the second alternative: "He was uncertain *whether* he should reply *or* be silent." When the second alternative is a negative of the first, it is frequently expressed by *not* or *no* following *or*: "They will move, *whether* the order arrives *or not*." (2) It may introduce a single indirect question, with an alternative omitted but implied: "We do not know *whether* he has read that book (*or* not) (*or* some other)."

While. Used of time, in the sense of *as long as* or *during the time that*: "*While* I was musing, the fire burned." It may also have the sense of *although*, implying some contradiction: "*While* the cloth is very heavy, it is not firm in texture."

Yet. As a conjunction, meaning *however*, *nevertheless*, *yet* implies usually some opposition, or unlikeness: "The board approved the plan, *yet* was not ready to act." "The tools are similar in form, *yet* very different in use." It may be used in the sense of *although*, signifying a concession: "They were determined, *yet* courteous."

CAPITAL LETTERS

In early forms of writing, capital letters were exclusively employed. Gradually small letters appeared and initial letters were used at the beginnings of sections and paragraphs only. Later the first word of a sentence was capitalized to call attention to its importance. Finally words within the sentence were treated in the same manner. It became the custom to begin every noun with a capital. This custom, however, conducing to no useful end, has long since been laid aside.

Modern capitalization is determined somewhat by the thought to be conveyed. The chief uses of capitals are (1) to show the beginning of a unit of thought; (2) to give particular prominence to certain words, as names of countries, cities, persons, etc.; (3) to relieve the uniformity of the page.

Certain rules for capitalization are fixed. However, a slight variation in some instances may result from the individual usage of competent writers.

In the sciences, such as botany and geology, as well as in other departments of knowledge, certain customs of capitalization have become well established. Many of these special rules are to be found in the "stylebooks" issued by various publishers.

The following list contains the most generally approved rules and customs of capitalization in present day writing:

Rules for Capitals

1. The first word of every sentence should begin with a capital.

We receive good by doing good.
Always speak the truth.

2. The first word of every line of poetry should begin with a capital.

Like to a coin, passing from hand to hand,
Are common memories, and day by day
The sharpness of their impress wears away.

3. The first word of every direct quotation should begin with a capital.

Coleridge said, "Friendship is a sheltering tree."

4. The first word of every direct question should begin with a capital.

Ask yourself this question: Are you making the best use of your time?

5. The pronoun I and the interjection O should be capitalized.

Guide me, O thou great Jehovah.

6. Every proper noun should begin with a capital letter.

Europe, America, Chicago, James.

7. Words derived from proper nouns should begin with capitals unless, by long usage, they have lost all association with the nouns from which they are derived.

American, Americanize, Christian, Christianize, Roman, Hebrew, Elizabethan, etc.

But china dishes, india ink, prussian blue, turkey red, majolica ware, delft, castile soap, oriental rugs, galvanize, pasteurize, romance.

Capitalize all abbreviations of proper names.

Eng. (England), Sun. (Sunday), N. J. (New Jersey).

8. Names of geographical sections of the world, when used as proper nouns, should be capitalized.

The Far North, the Orient, the Near East, the Riviera, in the West.

9. The words North, South, East, and West and their compounds should begin with capitals whenever they refer to parts of the country, and not simply to points of the compass.

I have a friend in the South.
The river flows southwest.
Gold is found in the great Northwest.

10. The names of the days of the week, of the months of the year, and of feasts, fasts, festivals, and holidays, both religious and civic, should begin with capitals.

Tuesday, June, Arbor Day, Easter.

The names of the seasons are not capitalized except when personified.

The New England autumn is a delightful season.
Thou breath of Autumn's being.

11. Names of personified objects should be capitalized.

O Death! where is thy sting?
Then Memory disclosed her face divine.

12. All names and expressions which may be regarded as titles of the Deity should be capitalized.

Lord, God, Father, Son, Son of Man, Heavenly Father. But write King of kings, Father of mercies, Prince of peace, where the phrase is merely descriptive and not an essential part of the name.

As a rule, a personal pronoun referring to Deity should be capitalized when the meaning might otherwise be mistaken.

Be true thyself, and follow Me!

In general, do not capitalize a relative pronoun referring to Deity, because its antecedent is usually given.

Follow Him, whose truth shall deliver you.

13. The names of versions and of books and divisions of the Bible, names of sacred books of all religions, and titles of psalms and of parables should be capitalized.

Exodus, Psalms, New Testament, Epistle to the Romans, Sermon on the Mount, the Pentateuch, the Koran, Parable of the Vineyard.

14. The words street, river, gulf, sea, canal, coast, etc., may begin with capital letters when they are used in connection with proper names.

Bryant Street, Hudson River, Persian Gulf, North Sea, Erie Canal, Pacific Coast.

15. Names of political parties and of religious organizations, and generally the first word and all other important words in the names of societies and corporations, should be capitalized.

Conservative, Liberal, Republican, Democrat, Presbyterians, The Society for the Prevention of Cruelty to Animals.

16. Capitalize the first word and all other words, except articles, prepositions, and conjunctions, in titles of books, poems, essays, periodicals, plays, and pictures.

Gray's Elegy in a Country Churchyard.
Hawthorne's The Great Stone Face.
The Inside of the Cup.

Some publishers and the American Library Association capitalize only the first word and proper nouns and proper adjectives in titles.

A history of English local government.

17. Titles of honor, of respect, and of relationship, when used before the names of persons, should be capitalized; but, when used after the name, such titles are not capitalized.

King George, President Harding, Sir James, Uncle John, Aunt Edith.

Warren G. Harding, president of the United States; Honorable Joseph G. Cannon, representative from Illinois; George V, king of Great Britain.

Abbreviated titles of honor or respect should be capitalized.

James Bryce, D.C.L.; Dr. S. Weir Mitchell; Henry Brown, D.D., LL.D.

18. Names of important historical events and movements are capitalized.

The Revolution, the World War, the Reformation, the Colonial Period, the Renaissance.

19. In formal resolutions, capitalize the words Whereas and Resolved and the word immediately following each.

Whereas, This society, etc.; therefore, be it Resolved, That the office of secretary, etc.

PUNCTUATION

Punctuation is the art of separating composition or discourse into sentences, and members of a sentence, by means of certain marks or points (1) to make clear the author's meaning and (2) to show grammatical relations between words.

In spoken language, these relations are indicated by the pauses and by the inflections of the voice; but in written language there are no such aids, and it is necessary to supply the deficiency with definite marks.

As a means of conveying thought, punctuation does not generally receive the attention its importance demands. An omission, an insertion, or a transposition of points may completely alter the meaning of a sentence. To illustrate: An English statesman, having charged a government officer with dishonesty, was required publicly to retract the accusation in the House of Commons. The statesman read the following recantation: "I said he was dishonest, it is true; and I am sorry for it." The following day the papers printed the retraction thus: "I said he was dishonest; it is true, and I am sorry for it." By a simple transposition of the comma and the semicolon, the printed statement not only failed to carry an apology, but it also reiterated the original charge of dishonesty.

To a limited extent it is true that usage varies. But it is equally true that, as an art, punctuation is founded upon certain definite principles; and, while some latitude is allowed in their application, whatever directly violates these principles is incorrect and inadmissible.

Punctuation is, therefore, an essential part of good writing. A clear idea of what one wishes to say, a knowledge of the structure of sentences, and intelligent care in the application of definite rules will do much to perfect one in the use of this important art.

The generally accepted rules for punctuation are as follows:

Rules for Punctuation

The Period

1. A period should be placed at the close of every declarative or imperative sentence.

Washington is a beautiful city.
Think before you speak.

2. Place a period after all abbreviations, but not after chemical symbols, Roman numerals, per cent, or 8vo, 4to, 2d, 9th, etc. When an abbreviation ends a sentence, use only one period.

I know John Jones, M.D., LL.D.

When omission of letters is indicated by an apostrophe, a period is not used after the contraction: m'f'g for manufacturing; ass'n for association.

3. A period is not necessary after titles, headings, etc., on a page; but subheads and paragraph topics, not in separate lines, should be followed by a period.

The Exclamation Point

1. Place an exclamation point after every exclamatory sentence and after interjections and other expressions of emotion.

How welcome is the rain!
Alas! He died on the battlefield.
God forbid! May I never see it again!

In some cases, when an interjection is very closely connected with other words, the exclamation point is not placed between them, but is reserved for the close of the expression.

Oh, never may sun that morrow see!

2. The exclamation point is often used to express contempt or sarcasm.

And he is a writer!

The Interrogation Point

1. Place an interrogation point at the end of every direct question.

Is he telling the truth?
She asked, "When does school begin?"

The Colon

1. Place a colon between the great divisions of sentences, when minor subdivisions occur that are separated by semicolons.

We perceive the shadow to have moved along the dial, but did not see it moving; we observe that the grass has grown, though it was impossible to see it grow: so the advances we make in knowledge, consisting of minute and gradual steps, are perceivable only after intervals of time.

2. The colon separates a clause from the following clause or group of clauses illustrating or amplifying its meaning.

There is a singular and perpetual charm in a letter of yours: it never grows old; it never loses its novelty.

3. A colon precedes a formal enumeration of particulars.

Man consists of three parts: first, the body, with its sensual appetites; second, the mind, with its thirst for knowledge and other noble aspirations; third, the soul, with its undying principle.

4. A colon should be used before a long direct quotation.

Lord Bacon said: "Reading maketh a full man; conference, a ready man; writing, an exact man."

5. A colon follows *thus, as follows, this, these,* and similar expressions, introducing a statement or a series of clauses.

His credentials are as follows: he has studied economics; he has employed men; he has succeeded in business.

6. A colon usually follows the salutation in a letter.

My dear Mary: Sirs:

In short, informal letters, a comma may be used.

My dear Friend,

The Semicolon

1. A semicolon should be used to separate the parts of a compound sentence, when one or both members contain commas.

Mirth should be the embroidery of conversation, not the web; and wit the ornament of the mind, not the furniture.

2. When two clauses are joined by *for, but, and,* or an equivalent word, the one clause perfect in itself, and the other added as a matter of inference, contrast, or explanation, they are separated by a semicolon.

Economy is no disgrace; for it is better to live on a little than to outlive a great deal.

3. When the parts of a compound sentence, even though they are short, are not closely connected in thought, they should be separated by a semicolon.

Man proposes; God disposes.

4. If a series of expressions depends on a commencing or concluding portion of the sentence, the expressions should be separated by semicolons.

If we think of glory in the field; of wisdom in the cabinet; of the purest patriotism; of the highest integrity, public and private; of morals * * *,—the august figure of Washington presents itself as the personification of all these ideas.

5. A semicolon is commonly used before and a comma after *as, viz., to wit, namely, for example, i.e.,* or *that is,* when they precede examples or illustrations.

We have three great bulwarks of liberty; viz., schools, colleges, and universities.

The Comma

1. All nouns of direct address should be set off by commas.

Mary, shut the door.
I say, John, it is not true.

2. Parenthetical expressions or additional expressions that break the directness of the statement should be set off by commas.

Industry, as well as genius, is essential to the production of great works.
It is mind, after all, that does the work of the world.

3. Words or expressions used in apposition should be set off from the rest of the sentence by commas.

Milton, the blind poet, wrote *Paradise Lost.*
We, the people of the United States, do ordain and establish this constitution.

4. A comma is used to mark the omission of words grammatically essential.

To err is human; to forgive, divine.
Go today if you can; if not, tomorrow.

5. A comma is used before a short direct quotation or question.

He said, "Time will tell."
Jane shouted, "Are you going?"

6. A nominative absolute construction or an expression used independently should be separated from the rest of the sentence by a comma.

To tell the truth, I do not know.
Rome having fallen, the world relapsed into barbarism.

7. A series of words in the same construction should be separated by commas.

Ulysses was wise, eloquent, cautious, and intrepid.
Men, women, and children filled the building.

8. When the subject consists of a series of words not joined by a conjunction, use a comma before the predicate.

Men, women, children, filled the building.

9. As a rule, when a clause is used as the subject of a verb, it should not, even though long, be followed by a comma, unless it ends with a verb.

That he is a man well qualified to fill the position must be admitted.
Whatever is, is right.

A comma is sometimes needed to prevent ambiguity.

He who teaches, often learns himself.

10. Use a comma between words in the same construction when they are modified in different ways.

They saw fields, and hills covered with trees.

11. When the separation of sentence elements is desirable and is slightly marked, a comma is used between co-ordinate clauses.

I heard him speak, but I made no reply.
Jane frowned, and her friend turned away.

12. Words used in pairs take a comma after each pair.

The dying man cares not for pomp or luxury, palace or estate, silver or gold.

13. A phrase or a clause out of its natural order should be separated from the rest of the sentence by a comma. If the sentence is short, the comma may be omitted.

Of the five races, the Caucasian is the most enlightened.
To those who labor, sleep is doubly pleasant.
With this I am satisfied.

14. In a complex sentence, if the dependent clause comes first, it should be followed by a comma.

Where I go, ye cannot come.

15. When two or more antecedent portions of a sentence have a common connection with some succeeding clause or word, a comma should be placed after each.

She is as tall, though not as handsome, as her sister.

16. A comma should be placed before a relative clause, when it is explanatory of the antecedent, or presents an additional thought.

Why ask John, who knows nothing about it?

A comma should not be placed between a restrictive adjunct or clause and that which it restricts.

Bring me the book that lies on the table.
Who can respect a man that is not governed by good principles?

Quotation Marks

1. Every direct quotation should be enclosed in double quotation marks.

Franklin said, "One today is worth two tomorrows."

2. A quotation within a quotation should be enclosed in single quotation marks.

Said he, "I quoted Burns's line, 'A man's a man for a' that.'"

3. Words or phrases of unusual, technical, or ironical meaning, or to which particular attention is directed, may be enclosed in single or double quotation marks.

Ann was made "master of ceremonies."
The phrase "producer to consumer" is popular.
He always talks about 'contacts and aerials.'

4. When a quotation consists of more than one paragraph, quotation marks should be placed at the *beginning* of *each* paragraph, but at the *end* of the *last* paragraph only.

The period and the comma are always placed inside the quotation marks. If at the close of a quotation any grammatical point other than the period or comma is required, it should be placed before the quotation marks if it is applicable to the quotation alone, but after them if it belongs to the sentence or member as a whole.

I read Tennyson's "In Memoriam."
He answered briefly, "Am I a knave that you should suspect me of this?"
Are our lots indeed cast "in the brazen age"?

The Parenthesis

1. Marks of parenthesis are used to enclose words loosely connected with the rest of the sentence in thought and structure.

Every star (and this great truth is inferred from indisputable facts) is the center of a planetary system.

Words within parenthesis should be punctuated as they would be in any other position, except before the last parenthetical mark. There, if the subject matter is complete in itself as regards both construction and sense, a period, an interrogation point, or an exclamation point should be used, according to the character of the sentence. If the parenthesis is incomplete in sense, there should be no point before the last mark.

Men are born equal (can you doubt it?); it is circumstances only that cast their lot in different stations.
Jane (such was her name) smiled sweetly.

The Dash

1. The dash is used to denote a sudden change in thought or in construction.

Closely following came—What do you suppose?

2. A dash is used after other points when a greater pause than they usually denote is required.

A traitor!—Yes.

3. A dash is used to set off parenthetical expressions which have a closer connection with the rest of the sentence than parenthesis marks would show.

You have a whole day—two days, if needful—to finish your work.

4. A dash is frequently used to set off an appositive or a supplementary word or phrase added for emphasis or for explanation.

He wrote an excellent article on chemistry—a subject to which he has devoted the greater part of his life.
Her features were plain but not repulsive—at least not so when you heard her speak.

The Hyphen

1. A hyphen should be used between syllables at the end of a line when a part of a word must be continued on the next line.

2. The hyphen is used in forming compound words which are not permanent compounds. Such words rightly united by a hyphen are of two kinds:

(1) Those used conventionally or for a certain occasion only.

A well-known man; fresh-water fish; open-hearth furnace.
After-deliberation showed they were wrong.

(2) Those which are attributively used as a phrase to transfer to an object a certain meaning that the literal sense of the words would not otherwise indicate.

A forget-me-not; Jack-in-the-pulpit; love-lies-bleeding.

DICTIONARY OF ABBREVIATIONS

A. Alto.
A1. First class.
A., a., adj. Adjective.
A., ans. Answer.
a., @. (Lat. *ad*), To; At.
A. A. A. American Automobile Association.
A. A. A. & L. American Academy of Arts and Letters.
A. A. A. S. American Association for the Advancement of Science.
A. A. G. Assistant Adjutant General.
A. A. O. N. M. S. Ancient Arabic Order of the Nobles of the Mystic Shrine.
a. a. r. Against all risks.
A. & A. S. R. Ancient and Accepted Scottish Rite.
A. A. S. S. (Lat. *Academiæ Antiquarinæ Societatis Socius*), Member of the American Antiquarian Society.
A. A. U. Amateur Athletic Union.
A. B. (Lat. *artium baccalaureus*), Bachelor of Arts.
Abbr., Abbrev. Abbreviated, abbreviation.
Abp. Archbishop.
A. B. S. American Bible Society.
A. C. (Lat. *ante Christum*), Before Christ; Analytical Chemist.
A. C. A. American Congregational Association.
Acad. Academy.
Acc., Acct. Account.
A. D. (Lat. *anno Domini*), In the year of our Lord.
Ad., advt. Advertisement. Plur. *ads.*
A. D. C. Aide-de-camp.
Adjt. Adjutant.
Adjt. Gen. Adjutant General.
Ad lib., Ad libit. (Lat. *ad libitum*), At pleasure.
Adm. Admiral.
Admr. Administrator.
Admx. Administratrix.
Adv. Advertising; Advocate; Adverb, adverbial.
Æ., Æt. (Lat. *ætatis*), Of age, aged.
A. E. F. American Expeditionary Force.
Ag. (Lat. *argentum*), Silver.
Agr., Agric. Agriculture, agricultural.
Agt. Agent.
A. H. (Lat. *anno Hegiræ*), In the year of the Hegira, or flight of Mohammed.
A. H. C. American Hospital Corps.
A. H. M. S. American Home Missionary Society.
A. H. S. (Lat. *anno humanæ salutis*), In the year of human salvation.
A. L. American Legion.
A. L. A. American Library Association.
A. L. of H. American Legion of Honor.
Ala. Alabama.
Ald. Alderman.
Alex. Alexander.
Alg. Algebra.
Alta. Alberta.
A. M. (Lat. *anno mundi*), In the year of the world.
A. M. (Lat. *ante meridiem*), Before noon.
A. M. (Lat. *artium magister*), Master of Arts.
Am., Amer. America, American.
A. M. D. Army Medical Department.
Amer. Phil. Soc. American Philosophical Society.
Amt. Amount.
A. N. Anglo-Norman.
an. (Lat. *anno*), In the year.
Anal. Analysis.
Anat. Anatomy, anatomical.
Anc. Ancient.
Anon. Anonymous.
Ans. Answer.
A. N. S. Army Nursing Service.
A. N. S. S. Associate of the Normal School of Science.
Ant., Antiq. Antiquities, antiquarian.
Anthrop. Anthropology, anthropological.
A. O. H. Ancient Order of Hibernians.
A. O. U. American Ornithologists' Union.
A. O. U. W. Ancient Order of United Workmen.
Ap., App. Apostle, apostles; Appendix.
A. P. A. American Protestant Association; American Protective Association.
Apl., Apr. April.
Apoc. Apocalypse; Apocrypha.
Apog. Apogee.
approx. Approximate, -ly.
A. P. S. Associate of the Pharmaceutical Society.
Apt. Apartment.
Aq. (Lat. *aqua*), Water.
A. Q. M. Assistant Quartermaster.
A. Q. M. G. Assistant Quartermaster-General.
Ar., Arab. Arabic, Arabian.
Ar., Arr. Arrives, arrived, arrival.
A. R. A. Associate of the Royal Academy.
Aram. Aramaic.
Arch. Architecture.
Archæol. Archæology.
Archd. Archdeacon; Archduke.
Arith. Arithmetic, arithmetical.
Ariz. Arizona.
Ark. Arkansas.
Arm. Armorican; Armenian.
Art. Article; Artificial; Artillery.
A. S., A.-S. Anglo-Saxon.
Asst. Assistant.
A. S. S. U. American Sunday School Union.
Assyr. Assyrian.
Astrol. Astrology.
Astron. Astronomy, astronomical.
A. T. S. American Tract Society.
att. Attention.
Atty. Attorney.
Atty.-Gen. Attorney-General.
A. U. A. American Unitarian Association.
A. U. C. (Lat. *anno urbis conditæ*), In the year of the building of the city (Rome).
Aug. Augustus; August.
Auxil. Auxiliary.
A. V. Authorized Version.
Ave. Avenue.
Avoir. Avoirdupois.

B. Bass; Book.
b. Born.
B., Brit. British.
B. A. Bachelor of Arts.
Bal. Balance.
Balt., Balto. Baltimore.
Bap., Bapt. Baptist.
Bar. Barrel; Barometer.
Bart., Bt. Baronet.
Bat., Batt. Battalion, battery.
bbl. Barrel.
bbls. Barrels.
B. C. Before Christ; British Columbia.
B. Ch. (Lat. *baccalaureus chirurgiæ*), Bachelor of Surgery.
B. C. L. (Lat. *baccalaureus civilis legis*), Bachelor of Civil Law.
B. D. (Lat. *baccalaureus divinitatis*), Bachelor of Divinity.
Bd. Bound; Bond; Board; Band.
Bdls. Bundles.
Bds. Bound in boards.
B. E. Bachelor of Engineering; Bachelor of Elocution.
b. e. Bill of exchange.
Belg. Belgic, Belgian.
Ben., Benj. Benjamin.
Berks. Berkshire (England).
Bib. Bible, biblical.
Biog. Biography, biographical.
Biol. Biology, biological.
bk. Bank, book.
B. L., B.LL. (Lat. *baccalaureus legum*), Bachelor of Laws.
bldg. Building.
bls. Bales.
B. M. (Lat. *baccalaureus medicinæ*), Bachelor of Medicine.
B. M., B. Mus. (Lat. *baccalaureus musicæ*), Bachelor of Music.
B. O. Branch Office; Board of Ordnance; Bachelor of Oratory.
Bost. Boston.
Bot. Botany, botanical.
Bp. Bishop.
B. P. O. E. Benevolent and Protective Order of Elks.
Br., Bro. Brother.
Bret. Bas-Breton, or Celtic of Brittany.
Brig. Brigade, brigadier.
Brig. Gen. Brigadier General.
B. S. Bachelor of Surgery; Bachelor of Science.
B. Sc. (Lat. *baccalaureus scientiæ*), Bachelor of Science.
B. S. L. Botanical Society, London.
bu., bush. Bushel.
B. V. Blessed Virgin.
B. V. M. Blessed Virgin Mary.
bx. Box.
bxs. Boxes.

C. Cent, cents; Centigrade; Consul; Centime, centimes; Hundred.
C., Cap. (Lat. *caput*), Chapter.
C. A. Chartered Accountant.
Cal. Calendar.
Cal., Calif. California.
Cam., Camb. Cambridge.
Cant. Canticle; Canterbury.
Cantab. (Lat. *Cantabrigiensis*), Of Cambridge.
Cap. (Lat. *caput*), Capital; Chapter.
Caps. Capitals.
Capt. Captain.
car., k. Carat.
Card. Cardinal.
Cath. Catharine; Catholic; Cathedral.
C. B. Companion of the Bath.
C. C. Catholic Clergyman, Catholic Curate.
C. D. S. Companion of the Distinguished Service Order.
C. D. V. or *c. d. v.* Carte-de-Visite.
C. E. Civil Engineer.
Cel. Celsius.
Celt. Celtic.
Cent. (Lat. *centum*), Hundred; Centigrade.
Centig. Centigrade.
Cert., Certif. Certify, certificate.
Cf. (Lat. *confer*), Compare.
c. f. i. Cost, freight, and insurance.
c. ft. Cubic feet.
C. G. Coast guard; Commissary General; Consul General.
C. G. S. Centimeter-Gram-Second.
C. H. Court House.
Ch. Church; Chapter.
Chal., Chald. Chaldee.
Chanc. Chancellor, chancery.
Chap. Chapter; Chaplain.
Chas. Charles.
Chem. Chemistry, chemical.
Ch. Hist. Church History.
Chic. Chicago.
Chin. Chinese.
Chr. Christ; Christian.
Chron. Chronology, chronological.
C. I. Order of the Crown of India.
C. I. E. Companion of the Order of the Indian Empire.
Cin. Cincinnati.
Cit. Citation; Citizen.
Civ. Civil.
C. J. Chief Justice.
Cl. Clergyman.
Class. Classical.
Clk. Clerk.
cm. Centimeter.
C. M. Common meter.
C. M. (Lat. *chirurgiæ magister*), Master in Surgery.
cml. Commercial.
C. M. Z. S. Corresponding Member of the Zoological Society.
Co. Company; County.
C. O. D. Cash on Delivery; Collect (payment) on delivery.
Cogn. Cognate.
Col. Colonel; Colossians; Column.

Coll. College; Collection.
Colloq. Colloquial, colloquialism, colloquially.
Colo. Colorado.
Com. Commander; Commerce; Commissioner; Committee; Commodore; Common.
Comm. Commentary; Commerce.
Comp. Compare, comparative; Compound, compounded.
Compar. Comparative.
Com. Ver. Common Version.
Con. (Lat. *contra*), Against.
Cong. Congregation, Congregational, Congregationalist; Congress.
Conj. Conjunction.
Conn., Ct. Connecticut.
Cont. Contents; Continued.
Contr. Contracted, contraction.
Cop., Copt. Coptic.
Cor. Corinthians.
Corn. Cornwall, Cornish.
Corrup. Corruption, corrupted.
Cor. Sec. Corresponding Secretary.
C. P. Clerk of the Peace; Common Pleas; Chemically Pure.
C. P. A. Certified Public Accountant.
C. Q. D. Come quick—danger.
Cr. Credit, creditor.
Cres. Crescendo.
Crim. con. Criminal conversation, or adultery.
crit. Critical, criticized.
cryst., crystal. Crystallography.
C. S. A. Confederate States of America.
C. S. I. Companion of the Star of India.
Csks. Casks.
Ct. (Lat. *centum*), A hundred.
Ct. Court.
C. T. A. U. Catholic Total Abstinence Union.
ctge. Cartage.
Cu. (Lat. *cuprum*), Copper.
Cu., Cub. Cubic.
Cu. ft. Cubic foot.
Cur., Curt. Current—this month.
Cwt. A hundredweight, hundredweights.
Cyc. Cyclopedia.

D. Deputy; Democrat; Dutch.
d. (Lat. *denarius, denarii*), Penny, pence.
d. Died; Daughter.
Dan. Daniel; Danish.
Dat. Dative.
Dav. David.
D. C. Doctor of Chiropractic.
D. C. (Ital. *da capo*), From the beginning.
D. C., Dist. Col. District of Columbia.
D. C. L. Doctor of Civil (or Canon) Law.
D. D. (Lat. *divinitatis doctor*), Doctor of Divinity.
D. D. S. Doctor of Dental Surgery.
D. E. Dynamic Engineer.
Dec. December.
decim. Decimeter.
Def. Definition; Defendant.
Deg. Degree, degrees.
Del. Delaware.
Del. (Lat. *delineavit*), He (or she) drew.
D. Eng. Doctor of Engineering.
Dep., Dept. Department; Deputy; Deposit.
Der. Derived, derivation.
Deut. Deuteronomy.
D. F. Dean of the Faculty; Defender of the Faith.
dft. Draft; Defendant.
D. G. (Lat. *Dei gratia*), By the grace of God.
Dict. Dictionary.
Dim., Dimin. Diminutive.
Dis., Disct. Discount.
Dist. District.
Dist. Atty. District Attorney.
Div. Divide, dividend, division, divisor.
D. Lit., D. Litt. Doctor of Literature.
D. L. O. Dead Letter Office.
D. M., D. Mus. Doctor of Music.
D. M. D. Doctor of Dental Medicine.
D. O. Doctor of Osteopathy; Doctor of Oratory.
Do. (Ital. *ditto*), The same.
Dols. Dollars.
Dom. Econ. Domestic Economy.
Doz. Dozen.
Dpt. Deponent; Department.
Dr. Debtor; Doctor; Dram, drams.
D. S. (Ital. *dal segno*), From the sign.
D. S., D. Sc. Doctor of Science.
D. S. M. Distinguished Service Medal.
D. S. O. Distinguished Service Order.
D. T. (Lat. *doctor theologiæ*), Doctor of Theology.
Du. Dutch; Duke.
Duo., 12mo. Duodecimo (twelve folds).
D. V. (Lat. *Deo volente*), God willing.
D. V. M. Doctor of Veterinary Medicine.
D. V. S. Doctor of Veterinary Surgery.
dwt. (Lat. *denarius*, and English *weight*), Pennyweight, pennyweights.
Dyn., Dynam. Dynamics.

E. East, Eastern; English; Edinburgh.
Ea. Each.
Eben. Ebenezer.
Eccl., Eccles. Ecclesiastical.
Econ. Economy, economics.
Ed. Editor; Edition; Edinburgh.
Ed., Edm. Edmund.
Edin. Edinburgh.
Edw. Edward.
E. E. Errors excepted; Electrical Engineer.
e. g. (Lat. *exempli gratia*), For example.
Elec., Elect. Electric, electricity.
Eliz. Elizabeth, Elizabethan.
Emp. Emperor, empress.
Enc., Encl. Enclosure.
Ency., Encyc. Encyclopedia.
E. N. E. East northeast.
Eng. England, English.
Eng., Engin. Engineer, engineering.
Eng. Dept. Department of Engineers.
Ent., Entom. Entomology, entomological.
E. & O. E. Errors and omissions excepted.
Eph. Ephesians; Ephraim.
Epiph. Epiphany.
Epis., Episc. Episcopal.
Epis., Epist. Epistle, epistolary.
Eq. Equal, equivalent.
Equiv. Equivalent.
Esd. Esdras.
E. S. E. East southeast.
Esq., Esqr. Esquire.
et al. (Lat. *et alibi*), And elsewhere.
et al. (Lat. *et alii, aliæ*, or *alia*), And others.
etc., &c. (Lat. *et cetæri, cæteræ*, or *cætera*), And others, and so forth.
Ethnol. Ethnology, ethnological.
et seq. (Lat. *et sequentes*, or *sequentia*), And the following.
Etym. Etymology.
Ex. Example; Examined; Exception; Exodus; Export; Executive.
Exch. Exchange; Exchequer.
Exd. Examined.
Ex. Doc. Executive Document.
Exec., Exr. Executor.
Execx., Exrx. Executrix.
Ex. Gr. (Lat. *exempli gratia*), For example.
Exod. Exodus.
Exon. (Lat. *Exonia*), Exeter.
exp. Express; Export; Expense.
Ez. Ezra.
Ezek. Ezekiel.

F. Fellow; Fahrenheit; France.
f. Farthing, farthings; Folio.
f. Feminine.
f. Franc, francs.
Fahr. Fahrenheit.
F. & A. M. Free and Accepted Masons.
f. a. s. Free alongside.
Fcp. Foolscap.
F. D., Fid. Def. (Lat. *fidei defensor*), Defender of the Faith.
Feb. February.
Fec. (Lat. *fecit*), He (or she) did it.
Fem. Feminine.
Feud. Feudal.
F. F. V. First Families of Virginia.
F. G. S. Fellow of the Geological Society.
F. I. A. Fellow of the Institute of Actuaries.
F. I. C. Fellow of the Chemical Institute.
Fig. Figure, figures, figurative, figuratively.
Finn. Finnish.
Fl. Flemish; Florin, florins; Flourished.
Fla. Florida.
F. M. Field Marshal.
fo., fol. Folio.
f. o. b. Free on board.
fol. Folio; Following.
For. Foreign.
for'd., fwd. Forward, forwarded.
Fort. Fortification.
Fr. France, French; Francis; Francs.
fr. From.
F. R. A. S. Fellow of the Royal Astronomical Society.
Fred. Frederick.
F. R. G. S. Fellow of the Royal Geographical Society.
F. R. Hist. S. Fellow of the Royal Historical Society.
Fri. Friday.
Fries. Friesic.
Fris. Frisian.
F. R. S. Fellow of the Royal Society.
F. R. S. L. Fellow of the Royal Society of Literature.
frt. Freight.
ft. Foot, feet.
Fth. Fathom.
Fur. Furlong.

G. Genitive; Guinea, guineas; Gulf.
Ga. Georgia.
G. A. General Assembly.
Gael. Gaelic.
Gal. Galatians.
Gal., Gall. Gallon.
Galv. Galvanism, galvanic.
G. A. R. Grand Army of the Republic.
G. B. Great Britain.
G. B. & I. Great Britain and Ireland.
G. C. B. Grand Cross of the Bath.
G. C. L. H. Grand Cross of the Legion of Honor.
G. C. M. G. Grand Cross SS. Michael and George.
G. C. S. I. Grand Commander of the Star of India.
G. C. V. O. Grand Cross of the Royal Victorian Order.
G. D. Grand Duke, Grand Duchess.
Gen., Genl. General.
Gen. Genesis; Genitive.
Gend. Gender.
Gent., Gentn. Gentleman, gentlemen.
Geo. George.
Geog. Geography, geographical.
Geol. Geology, geological.
Geom. Geometry, geometrical.
Ger., Germ. German, Germany.
G. H. Q. General Headquarters.
Gi. Gill, gills.
G. L. Grand Lodge.
G. M. Grand Master.
Gm. Gram.
Go., Goth. Gothic.
G. O. P. Grand Old Party (applied to Republican party).
Gov. Governor, government.
Gov.-Gen. Governor-General.
Govt. Government.
Gr. Grain, grains; Great; Greek; Gross.
Gram. Grammar, grammatical.
Gro. Gross.
G. T. Good Templars; Grand Tyler.
Gtt. (Lat. *guttæ*), Drops.
Gun. Gunnery.

H., hr. Hour, hours.
Hab. Habakkuk.
Hag. Haggai.
Hants. Hampshire.
H. C. House of Commons.
h. e. (Lat. *hoc est*), That is or this is; (*hic est*), Here is.

Heb., Hebr. Hebrew, Hebrews.
H. H. His (or Her) Highness; His Holiness (the Pope).
Hhd. Hogshead, hogsheads.
H. I. H. His (or Her) Imperial Highness.
Hind. Hindu, Hindustan, Hindustani.
Hist. History, historical.
H. J. (Lat. *hic jacet*), Here lies.
H. J. S. (Lat. *hic jacet sepultus*), Here lies buried.
H. M. His (or Her) Majesty.
H. M. S. His (or Her) Majesty's service, ship, or steamer.
Hon., Honble. Honorable.
Hor., Horol. Horology, horological.
Hort., Hortic. Horticulture, horticultural.
Hos. Hosea.
H. P. Half pay; High priest; Horse power.
H. R. House of Representatives.
H. R. H. His (or Her) Royal Highness.
H. S. (Lat. *hic situs*), Here lies.
H. S. H. His (or Her) Serene Highness.
Hun., Hung. Hungary, Hungarian.
Hund. Hundred.
Hyd., Hydros. Hydrostatics.
Hydraul. Hydraulics.
Hypoth. Hypothesis, hypothetical.

I., Isl. Island.
Ia., Io. (unofficial) Iowa.
Ib., Ibid. (Lat. *ibidem*), In the same place.
Ice., Icel. Iceland, Icelandic.
Ich., Ichth. Ichthyology.
Id. (Lat. *idem*), The same.
Ida. (unofficial) Idaho.
i. e. (Lat. *id est*), That is.
I. H. S. Greek contraction for Jesus, —used as abbrev. for Lat. *Jesus Salvator Hominum*, "Jesus, the Savior of Men," and *In hoc signo*, "In this sign (cross)."
Ill. Illinois.
Imp. (Lat. *imperator*), Emperor; Imperial; Impersonal.
In. Inch, inches.
Incog. (Ital. *incognito, incognita*), Unknown.
Ind. India, Indian; Indiana.
Ind. Ter. Indian Territory.
In lim. (Lat. *in limine*), At the outset.
In loc. (Lat. *in loco*), In its place.
in re. In regard to.
I. N. R. I. (Lat. *Jesus Nazarenus Rex Iudæorum*), Jesus of Nazareth, King of the Jews.
Ins. Insurance.
Ins. Gen. Inspector General.
Inst. Instant; The present month; Institute, institution.
Int. Interest.
Int. Dept. Department of the Interior.
Intrans. Intransitive.
In trans. (Lat. *in transitu*), On the passage; In transit.
Int. Rev. Internal Revenue.
Intro., Introd. Introduction.
I. O. F. Independent Order of Foresters.
I. O. G. T. Independent Order of Good Templars.
I. O. O. F. Independent Order of Odd Fellows.
I. O. R. M. Improved Order of Red Men.
I. O. S. M. Independent Order of Sons of Malta.
I. O. U. I owe you.
i. q. (Lat. *idem quod*), The same as.
Ir. Ireland, Irish.
I. R. O. Internal Revenue Officer.
Irreg. Irregular.
Is., Isa. Isaiah.
I. S. Irish Society.
I. S. M. (Lat. *Jesus Salvator Mundi*), Jesus, Savior of the World.
It., Ital. Italy, Italian; Italic.
Itin. Itinerary.

J. Judge; Justice.
J. A. Judge Advocate.
Jac. Jacob, Jacobus (=James).
J. A. G. Judge-Advocate-General.
Jan. January.
Jav. Javanese.
J. C. Jesus Christ.
J. C. D. (Lat. *juris civilis doctor*), Doctor of Civil Law.
J. D. (Lat. *jurum doctor*), Doctor of Laws.
Jer. Jeremiah.
J. G. W. Junior Grand Warden.
J. H. S. See *I. H. S.*
Jno. John.
Jon., Jona. Jonathan.
Jos. Joseph.
Josh. Joshua.
Jour. Journal; Journey.
J. P. Justice of the Peace.
Jr. Juror; Junior.
Jr. O. U. A. M. Junior Order United American Mechanics.
J. U. D. (Lat. *Juris utriusque doctor*), Doctor of both laws (of civil and canon law).
Jud. Judith; Judicial.
Judg. Judges.
Jul. July; Julius, Julian.
Jul. Per. Julian Period.
Jun., Je. June.
Jurisp. Jurisprudence.

K. King; Knight.
k. Karat.
Kans., Kan. Kansas.
K. B. Knight of the Bath; King's Bench.
K. C. King's Counsel; Knights of Columbus.
Ki. Kings.
Kilo., Kilog. Kilogram.
Kilom., Kilo. Kilometer.
Kingd. Kingdom.
K. L. H. Knight of the Legion of Honor.
K. M. Knight of Malta.
K. P. Knight of St. Patrick.
K. of P. Knights of Pythias.
Kt. Knight.
K. T. Knight of the Thistle; Knight Templar.
Ky. Kentucky.

L. Latin; Lake; Lord; Lady.
L., l., £. (Lat. *libra*), Pound, pounds (sterling).
L., lb., lb. (Lat. *libra*), Pound, pounds (weight).
La., Lou. Louisiana.
Lam. Lamentations.
Lat. Latin; Latitude.
L. c. Lower case (in printing).
L. c., loc. cit. (Lat. *loco citato*), In the place cited.
l/c. Letter of credit.
L. D. S. Licentiate of Dental Surgery; Latter Day Saints.
Leg., Legis. Legislature, legislative.
Leip. Leipzig.
Lev., Levit. Leviticus.
Lex. Lexicon.
Lexicog. Lexicography, lexicographer, lexicographical.
L. G. Life Guards; Low German.
L. H. D. (Lat. *Litterarum Humanarum Doctor*), Doctor of Humanities.
L. I. Light Infantry; Long Island.
Lib. (Lat. *liber*), Book; Library, librarian.
Lieut., Lt. Lieutenant.
Lieut. Col. Lieutenant Colonel.
Lieut. Gen. Lieutenant General.
Lieut. Gov. Lieutenant Governor.
lin. Lineal, or right-line measures; as, lin. yd., lin. ft., etc.
Linn. Linnæus, Linnæan.
Liq. Liquor, liquid.
Lit. Literally, literature, literary.
Lit. D., Litt. D. (Lat. *literarum doctor*), Doctor of Literature.
Lith., Lithog. Lithography.
Liv. Livre.
LL. B. (Lat. *legum baccalaureus*), Bachelor of Laws.
LL. D. (Lat. *legum doctor*), Doctor of Laws.
LL. M. Master of Laws.
L. M. Long meter.
Lon., Lond. London.
Lon., Long. Longitude.
Loq. (Lat. *loquitur*), He (or she) speaks.
L. S. (Lat. *locus sigilli*), Place of the seal.
L. s. d. (Lat. *libræ, solidi, denarii*), Pounds, shillings, pence.
Lt. Lieutenant.
Lt. Inf. Light Infantry.
Luth. Lutheran.

m. Married; Masculine; Meter, meters; Mile, miles; Minute, minutes.
M. Marquis; Middle; Monday; Morning; Monsieur.
M. (Lat. *mille*), Thousand.
M. (Lat. *meridies*), Meridian; Noon.
M. A. Master of Arts.
Mac., Macc. Maccabees.
Mach., Machin. Machine, machinery.
Mad., Madm., Mme. Madam.
Mag. Magazine.
Maj. Major.
Maj. Gen. Major General.
Mal. Malachi; Malay, Malayan.
Man. Manitoba.
Manuf. Manufactures, manufacturing.
Mar. March; Maritime.
Marq. Marquis.
Mas., Masc. Masculine.
Mass. Massachusetts.
M. Ast. S. Member of the Astronomical Society.
Math. Mathematics, mathematical.
Matt. Matthew.
M. B. (Lat. *medicinæ baccalaureus*), Bachelor of Medicine.
M. B. (Lat. *musicæ baccalaureus*), Bachelor of Music.
M. C. Member of Congress; Master of Ceremonies.
Mch. March.
M. D. (Lat. *medicinæ doctor*), Doctor of Medicine.
Md. Maryland
Mdlle., Mlle. (Fr. *mademoiselle*), Miss.
Mdse. Merchandise.
M. E. Most Excellent; Military Engineer; Mining Engineer; Mechanical Engineer; Methodist Episcopal.
Me. Maine.
Meas. Measure.
Mech. Mechanics, mechanical.
Med. Medicine, medical; Medieval.
Med. Lat., Mediæv. Lat. Medieval Latin.
Mem. Memorandum, memoranda.
Messrs., MM. (Fr. *messieurs*), Gentlemen.
Met. Metaphysics, metaphysical.
Metal., Metall. Metallurgy.
Metaph. Metaphysics; Metaphorically.
Meteor. Meteorology, meteorological.
Meth. Methodist.
Mex. Mexico, Mexican.
Mfd. Manufactured.
Mfg. Manufacturing.
Mfrs. Manufacturers.
Mfs. Manufactures.
M. H. Most Honorable.
M. H. G. Middle High German.
M. I. C. E. Member of the Institute of Civil Engineers.
Mich. Michaelmas; Michigan.
Mid. Middle; Midshipman.
Mil., Milit. Military.
M. I. M. E. Member of the Institute of Mining Engineers.
Min. Mineralogy, mineralogical; Minute, minutes.
Minn. Minnesota.
Min. Plen. Minister Plenipotentiary.
Miss. Mississippi.
M. L. Latin of the Middle Ages; Master of Laws.
mm. Millimeters.
M. N. A. S. Member of the National Academy of Sciences.
M. N. S. Member of the Numismatical Society.
M. O. Money order.
Mo. Missouri; Month.
Mod. Modern.
Mon. Monday.
Mons. (Fr. *monsieur*), Sir; Mr.
Mont. Montana.
M. P. Member of Parliament; Military Police.

M. P. P. Member of Provincial Parliament.
M. P. S. Member of the Pharmaceutical Society; Member of the Philological Society.
Mr. Master, Mister.
M. R. G. S. Member of the Royal Geographical Society.
M. R. I. Member of the Royal Institute.
Mrs. Mistress.
M. S. Master of Surgery; Master of Science.
M. S. (Lat. *memoriæ sacrum*), Sacred to the memory of.
MS. Manuscript.
MSS. Manuscripts.
Mt., Mts. Mount, mountains.
mth., mo. Month.
Mus. Museum; Music, musical.
Mus. B. (Lat. *musicæ baccalaureus*), Bachelor of Music.
Mus. D., Mus. Doc., Mus. Doct. (Lat. *musicæ doctor*), Doctor of Music.
M. V. O. Member of the Royal Victorian Order.
M. W. A. Modern Woodmen of America.
Myth. Mythology, mythological.

N. Noon; North; Noun; Number; New; Neuter.
N. A. North America, North American.
Nah. Nahum.
Nat. Natural; National.
Nat. Hist. Natural History.
Nat. ord. Natural order.
Nat. Phil. Natural Philosophy.
Naut. Nautical.
N. B. New Brunswick; North Britain (= Scotland).
N. B. (Lat. *nota bene*), Note well; Take notice.
N. C. North Carolina.
N. Dak., N. D. North Dakota.
N. E. New England, Northeast.
N. E. A. National Education Association.
Nebr., Neb. Nebraska.
Neg. Negative, negatively.
Neh. Nehemiah.
Nem. con. (Lat. *nemine contradicente*), No one contradicting, unanimously.
Nem. diss. (Lat. *nemine dissentiente*), No one dissenting, unanimously.
Neth. Netherlands.
Neut. Neuter.
Nev. Nevada.
New Test., N. T. New Testament.
N. F. Newfoundland.
N. H. New Hampshire.
N. H. Ger. New High German.
N. J. New Jersey.
N. L., N. Lat. North Latitude.
N. Mex., N. M. New Mexico.
N. N. E. North northeast.
N. O. New Orleans.
No., Nos. Number, numbers.
nol. pros. (Lat. *nolle prosequi*), To be unwilling to prosecute.
Nom., Nomin. Nominative.
non-com. Non-commissioned officer.
Non con. Non-content, dissentient. (The formula in which Members of the House of Lords vote.)
Non obst. (Lat. *non obstante*), Notwithstanding.
Non pros. (Lat. *non prosequitur*), He does not prosecute.
Non seq. (Lat. *non sequitur*), It does not follow (as a consequence).
Nor., Norm. Norman.
Nor. Fr., Norm. Fr. Norman French.
Norw. Norway, Norwegian, Norse.
Nov. November.
N. P. Notary Public.
N. S. New style; Nova Scotia.
n. s. Not specified.
N. S. J. C. (Fr. *Notre Seigneur Jesus Christ*), Our Lord Jesus Christ.
Num., Numb. Numbers.
Numis. Numismatic, numismatology.
N. V. M. Nativity of the Virgin Mary.
N. W. Northwest, northwestern.
N. Y. New York.
N. Z., N. Zeal. New Zealand.

O. (unofficial) Ohio; Old.
ob. (Lat. *obiit*), He (or she) died.
Obad. Obadiah.
Obj. Objective.
Obs. Obsolete.
Oct. October.
Oct., 8vo. Octavo.
O. F. Odd Fellows.
O. H. G. Old High German.
O. K. "All correct."
Okla. Oklahoma.
Old Test., O. T. Old Testament.
Olym. Olympiad.
O. M. I. Order of Mary Immaculate.
Op. Opposite, opposition.
Opt. Optative; Optics, optical.
Ord., Ordn. Ordnance.
Oreg., Ore. Oregon.
Orig. Original, originally.
Ornith. Ornithology, ornithological.
O. S. Old Style; Old Saxon.
O. S. A. Order of St. Augustine.
O. S. B. Order of St. Benedict.
O. S. F. Order of St. Francis.
O. U. A. M. Order of United American Mechanics.
Oxf. Oxford.
Oxon. (Lat. *Oxonia, Oxoniensis*), Oxford, of Oxford.
Oz. Ounce. (The *z* in this contraction and in *viz.* represents an old symbol (ȝ), used to mark a terminal contraction.)

P. Page; Participle; Past; Pole; Port.
Pa. Pennsylvania.
Paint. Painting.
Pal., Palæont. Palæontology, palæontological.
Par. Paragraph.
Parl. Parliament, parliamentary.
Part. Participle.
Pass. Passive.
Pat. Patrick.
Pathol. Pathological.
Payt. Payment.
Pd. Paid.
Pd. D. Doctor of Pedagogy.
P. E. Protestant Episcopal.
P. E. I. Prince Edward Island.
Penn. Pennsylvania.
Pent. Pentecost.
Per., Pers. Persian; Person, personal.
Per. an. (Lat. *per annum*), Yearly.
Per cent., per ct. (Lat. *per centum*), By the hundred.
Peruv. Peruvian.
Pet. Peter.
pfd. Preferred.
P. G. M. Past Grand Master.
Phar., Pharm. Pharmacy.
Ph. B. (Lat. *philosophiæ baccalaureus*), Bachelor of Philosophy.
Ph. D. (Lat. *philosophiæ doctor*), Doctor of Philosophy.
Phil. Philip; Philippians; Philosophy, philosophical.
Phil., Phila. Philadelphia.
Philem. Philemon.
Philol. Philology.
Philos. Philosophy, philosophical.
Ph. M. Master of Philosophy.
Photog. Photography, photographic, photographer.
Phren., phrenol. Phrenology, phrenological.
Phys. Physics, physical; Physiology, physiological.
Physiol. Physiology, physiological.
P. I. Philippine Islands.
Pinx., Pxt. (Lat. *pinxit*), He (or she) painted it.
Pk. Peck.
Pl. Place; Plate; Plural.
Plf., Plff., Pltf. Plaintiff.
Plur. Plural.
P. M. (Lat. *post meridiem*), Afternoon.
P. M. Past Master; Peculiar meter; Postmaster.
P. M. G. Postmaster-General.
P. O. Post Office.
P. & O. Co. Peninsular and Oriental Steam Navigation Company.
Poet. Poetry, poetical.
Pol. Polish, Poland.
Polit. Econ. Political Economy.
P. O. O. Post-office order.
Pop. Population.
Port. Portugal, Portuguese.
Pp. Pages.
P. P. Parish Priest.
P. P. C. (Fr. *pour prendre congé*), To take leave. See *T. T. L.*
Pph. Pamphlet.
Pr. Present; Priest; Prince.
Pr. par. Present participle.
P. R. (Lat. *Populus Romanus*), The Roman People; Porto Rico.
P. R. C. (Lat. *post Romam conditam*), After the building of Rome. See *A. U. C.*
Pref. Prefix; Preface.
Pres. President; Present.
Prim. Primary.
Prin. Principal.
Print. Printing.
Prob. Problem; Probable, probably.
Prof. Professor.
Pron. Pronoun; Pronounced, pronunciation.
Pro tem. (Lat. *pro tempore*), For the time being.
Prov. Proverbs, proverbial, proverbially; Provincial, provincially; Provost.
Provinc. Provincial.
Prox. (Lat. *proximo*), Next; Of the next month.
Prs. Pairs.
Prus. Prussia, Prussian.
P. S. (Lat. *post scriptum*), Postscript.
Ps., Psa. Psalm, psalms.
Psychol. Psychology.
Pt. Part; Payment; Point; Port.
Pub. Public; Published, publisher.
Pub. Doc. Public documents.
Pvt., pte. Private.
Pwt. Pennyweight.
Pxt. See *Pinx.*
Pyro., Pyrotech. Pyrotechnics.

Q., Qu. Query; Question.
q. e. (Lat. *quod est*), Which is.
Q. E. D. (Lat. *quod erat demonstrandum*), Which was to be proved.
Q. E. F. (Lat. *quod erat faciendum*), Which was to be done.
Q. E. I. (Lat. *quod erat inveniendum*), Which was to be found out.
Q. M. Quartermaster.
Q. M. Gen. Quartermaster-General.
Qr. Quarterly; Quire.
Qt. Quart.
Qu. Queen; Query; Question.
Quar., quart. Quarterly.
Quar., 4to. Quarto.
Que. Quebec.
Ques. Question.
q. v. (Lat. *quod vide*), Which see.
Qy. Query.

R. Réaumur; River.
R. (Lat. *rex*), King; (Lat. *regina*), Queen.
R. A. Royal Academy, Royal Academician; Rear Admiral; Royal Arch; Royal Artillery; Royal Art.
Rabb. Rabbinical.
Rad. (Lat. *radix*), Root.
R. C. Roman Catholic; Red Cross.
R. E. Reformed Episcopal.
Réaum. Réaumur.
Rec. Recipe; Receipt.
Recd. Received.
Recpt. Receipt.
Ref. Reference; Referee.
Ref. Ch. Reformed Church.
Ref. Pres. Reformed Presbyterian.
Reg. Regular.
Reg., Regr. Registrar.
Reg., Regt. Regiment.
Rel. Religion, religious.
Rel. Pron. Relative Pronoun.
Rem. Remark, remarks.
Rep. Report; Representative.
Rep., Repub. Republic; Republican.
Res. Reserve; Residence.
Retd. Returned.
Rev. Revelation; Revenue; Reverend; Review; Revise.
Revd. Reverend.
Rev. Stat. Revised Statutes.
R. F. D. Rural Free Delivery.

Rhet. Rhetoric, rhetorical.
R. I. Rhode Island.
R. I. P. (Lat. *requiescat in pace*), May he (or she) rest in peace.
Riv. River.
R. N. Royal Navy.
Robt. Robert.
Rom. Roman, Romans.
Rom. Cath. Roman Catholic.
R. R. Railroad.
R. S. V. P. (Fr. *Répondez s'il vous plaît*), Please reply.
Rt. Right.
Rt. Hon. Right Honorable.
Rt. Rev. Right Reverend.
R. T. S. Religious Tract Society.
Russ. Russia, Russian.
R. V. Revised Version.
Ry. Railway.

S. Saint; Saturday; Section; Shilling; Sign; Signor; Solo; Soprano; South; Sun; Sunday; Sabbath.
s. Second, seconds; See; Singular; Son; Succeeded.
S. A. South Africa; South America; Salvation Army.
Sab. Sabbath.
Sam. Samuel.
Sam., Samar. Samaritan.
Sans., Sansc., Sansk. Sanscrit, Sanskrit.
Sask. Saskatchewan.
Sat. Saturday.
Sax. Saxon, Saxony.
S. C. South Carolina.
S. caps., Sm. caps. Small capitals (in printing).
Sc. B. (Lat. *scientiæ baccalaureus*), Bachelor of Science.
Sc. D. (Lat. *scientiæ doctor*), Doctor of Science.
Sch. (Lat. *scholium*), A note.
Sch. Schooner.
Sci. Science.
Scil., Sc. (Lat. *scilicet*), Namely, to wit.
S. C. L. Student in Civil Law.
Scot., Sc. Scotland, Scotch, Scottish.
Scr. Scruple, scruples.
Scrip., Script. Scripture, scriptural.
Sculp. Sculpture.
Sculp., Sculpt., Sc. (Lat. *sculpsit*), He (or she) engraved it.
S. D. Doctor of Science.
S. Dak., S. D. South Dakota.
S. D. U. K. Society for the Diffusion of Useful Knowledge.
S. E. Southeast.
Sec. Second.
Sec., Sect. Section.
Sec., Secy. Secretary.
Sec. Leg. Secretary of Legation.
Sen. Senate, senator.
Sen. Doc. Senate Document.
Sep., Sept. September.
Seq. (Lat. *sequentes, sequentia*), The following, or the next.
Serg., Sergt. Sergeant.
Serv. Servian.
Sess. Session.
Sing. Singular.
S. J. Society of Jesus.
S. J. C. Supreme Judicial Court.
Skr. Sanskrit.
Slav. Slavonic.
Sld. Sailed.
S. M. Sergeant Major.
Soc., Socy. Society.
Sol. Gen. Solicitor-General.
S. O. S. Wireless distress signal at sea.
Sp. Spain, Spanish; Spirit.
s. p. (Lat. *sine prole*), Without issue.
S. P. C. A. Society for the Prevention of Cruelty to Animals.
S. P. C. C. Society for the Prevention of Cruelty to Children.
S. P. C. K. Society for the Promotion of Christian Knowledge.
Spec. Special, specially.
S. P. G. Society for the Propagation of the Gospel.
sp. gr., s. g. Specific gravity.
S. P. Q. R. (Lat. *Senatus Populusque Romanus*), The Senate and the People of Rome.
sq. Square; *sq. ft.* Square foot, feet; *sq. in.* Square inch, inches; *sq. m.* Square mile, miles; *sq. yd.* Square yard; *sq. rd.* Square rod.
Sr. Senior.
SS. Saints.
S. S. Sunday School; Steamship.
S. S. C. Solicitor before the Supreme Court.
S. S. E. South-southeast.
S. S. W. South-southwest.
St. Saint; Stone; Strait; Street.
st. (Lat. *stet*), Let it stand (in printing).
S. T. Sons of Temperance.
Stat. Statute, statutes; Statuary.
S. T. B. Bachelor of Sacred Theology.
S. T. D. (Lat. *sacræ theologiæ doctor*), Doctor of Sacred Theology.
ster., stg. Sterling.
Str. Steamer.
Subst. Substantive; Substitute.
Sun., Sund. Sunday.
Sup. Superior; Superlative; Supplement; Supine.
Sup. Ct. Supreme Court.
Sup. Sgt. Supply Sergeant.
Supt. Superintendent.
Surg. Surgeon, surgery.
Surg.-Gen. Surgeon-General.
Surv. Surveying, surveyor.
Surv.-Gen. Surveyor-General.
S. V. Sons of Veterans.
S. W. Southwest.
Sw. Sweden, Swedish.
Swit., Switz. Switzerland.
Syn. Synonym, synonymous.
Synop. Synopsis.
Syr. Syria, Syriac.

T. Tenor; Ton; Tun; Tuesday.
T. A. B. Total Abstinence Brotherhood.
Tab. Table; Tabular statement.
Tart. Tartaric.
Tcs. Tierces.
Tech. Technical, technically.
Tenn. Tennessee.
Ter. Territory.
Term. Termination.
Teut. Teutonic.
Tex. Texas.
Text. rec. (Lat. *textus receptus*), The received text.
Th. Thomas; Thursday.
Theo. Theodore.
Theol. Theology.
Thess. Thessalonians.
Tho., Thos. Thomas.
Thu., Thur., Thurs. Thursday.
Tier. Tierce.
Tim. Timothy.
Tit. Title; Titus.
T. N. T. Trinitrotoluene, an explosive.
Tob. Tobit.
Tom. Tome, volume.
Tonn. Tonnage.
Topog. Topography, topographical.
Tp. Township.
Tr. Translation, translator, translated; Transpose; Treasurer; Trustee.
Trans. Transaction; Translation, translator, translated.
Trav. Travels.
Treas. Treasurer.
Trig., Trigon. Trigonometry, trigonometrical.
Trin. Trinity.
T. S. Transport Ships.
T. T. L. To take leave. See *P. P. C.*
Tu., Tues. Tuesday.
Turk. Turkey, Turkish.
Typ. Typographer.
Typog. Typography, typographical.

U. C. (Upper Case) Capital letters in printing.
U. C. V. United Confederate Veterans.
U. D. C. United Daughters of the Confederacy.
U. J. D. See *J. U. D.*
U. K. United Kingdom.
Ult. (Lat. *ultimo*), Last; Of the last month.
Unit. Unitarian.
Univ. University.
U. P. United Presbyterian.
U. S. United States.
U. S. A. United States of America; United States Army.
U. S. L. United States Legation.
U. S. M. United States mail; United States marine.
U. S. M. A. United States Military Academy.
U. S. N. United States Navy.
U. S. N. A. United States Naval Academy.
U. S. S. United States Senate; United States ship or steamer.
U. S. S. Ct. United States Supreme Court.

V. Verb; Verse; Victoria; Violin.
v. (Lat. *vide*), See.
V. A. Vicar Apostolic; Vice Admiral.
Va. Virginia.
Val. Valve; Value.
Var. Variety.
Vat. Vatican.
V. C. Victoria Cross.
V. D. M. (Lat. *Verbi Dei Minister*), Minister of the Word of God.
Ven. Venerable.
V. G. Vicar General.
Vice pres. Vice President.
Vid. (Lat. *vide*), See.
Vis., Visc. Viscount.
Viz. (Lat. *videlicet*), Namely; To wit. See *Oz.*
Voc. Vocative.
Vol., Vols. Volume, Volumes.
V. P. Vice President.
V. Rev. Very Reverend.
V. S. Veterinary surgeon.
vs., v. (Lat. *versus*), Against.
Vt. Vermont.
Vul., Vulg. Vulgate.
Vulg. Vulgar, vulgarly.

W. Wednesday; Week; Welsh; West, western.
W. A. A. C. Women's Auxiliary Army Corps.
Wall. Wallachian.
Wash. Washington.
W. C. A. Women's Christian Association.
W. C. T. U. Women's Christian Temperance Union.
W. D. War Department.
Wed. Wednesday.
Wel. Welsh.
w. f. Wrong font (in printing).
Whf. Wharf.
W. I. West Indies, West Indian.
Wis., Wisc. Wisconsin.
Wk. Week.
W. Long. West Longitude.
Wm. William.
W. N. W. West northwest.
W. O. W. Woodmen of the World.
Wpful. Worshipful.
W. R. C. Women's Relief Corps.
W. S. W. West southwest.
Wt. Weight.
W. Va. West Virginia.
Wyo. Wyoming.

X., Xt. Christ.
Xm., Xmas. Christmas.
Xn., Xtian. Christian.
Xnty. Christianity.
Xper., Xr. Christopher.

Y. Year.
Yd. Yard.
Yds. Yards.
Y. M. C. A. Young Men's Christian Association.
Y. M. Cath. A. Young Men's Catholic Association.
Y. M. H. A. Young Men's Hebrew Association.
Y. P. S. C. E. Young People's Society of Christian Endeavor.
Yr. Year; Younger; Your.
Yrs. Years; Yours.
Y. W. C. A. Young Women's Christian Association.

Zach. Zachary.
Zech. Zechariah.
Zeph. Zephaniah.
Z. G. Zoological Gardens.
Zool. Zoology, zoological.

SPEAKING AND WRITING

THE power to use effective language brings to its possessor ability to lead in social and civic affairs. Besides, more often than we commonly realize, personal success depends upon a command of good English.

Putting your thoughts together well in the sentences you speak or write is, therefore, always important. The social, professional, or business world measures you by the fitness of your language for the work you intend it to do. On the other hand, through persistent effort to adapt your language to your purposes, you gain a sense of self-command, an ease of manner, and a satisfying confidence in meeting people socially and in business.

Effective Language. Four requirements measure this fitness of language: *correctness, clearness, force, beauty.* Language is *correct* when it expresses thought in approved form. It is *clear* when those who hear or read it understand readily the thought of the speaker or writer. It is *forceful* when it interests those who hear or read it and impels them to respond according to the purposes of the speaker or writer. It is *beautiful* if it is correct, clear, and forceful, and also pleasing in sound or suggestion.

The art of expressing thought or feeling in effective language is called Rhetoric. The principles that govern the use of this effective language are rhetorical principles. One great principle underlies all others; namely, that true effectiveness of language depends upon the sincerity of the speaker or writer.

Choosing and Arranging Words. Words are wisely chosen when they express our thoughts and can be understood by our audience. Language has no value apart from the thought it expresses, the purpose of the speaker or writer, and the effect produced on his audience. If you are going to talk or write, you should have something to say and a motive for saying it, and you should understand your audience.

You want to find pleasure in carrying on conversation with a friend or a stranger. You may have to make a report upon some work. You may want to sell a house or secure the interest and the support of voters in an election. You may want to persuade a friend to give up a harmful habit. You may have to convince a hostile audience of the truth of your opinions. In conversation you will be alert, interested, and responsive; in reporting, cool and accurate; in persuasion, positive, earnest, and impassioned. These are your personal problems. They will make you prize every help toward mastery of language.

Ordering of Thought. Both in speaking and in writing it is of the utmost importance to marshal the parts of a discourse into an effective order. This careful observance of arrangement should be followed both in regard to the discourse as a whole and in regard to each portion of it which deals with a single thought. The divisions into which a discourse falls when thus logically ordered are usually indicated by some more or less mechanical means. In speech, a judicious use of pauses and of vocal inflections serves the purpose, and in written compositions we employ the device of paragraphing.

The Paragraph. This term means a group of sentences in which a single subject is discussed, its beginning being marked usually by indention, or setting the first word a little to the right of the usual margin. This group of sentences may make a separate unit, as in the editorial columns of a newspaper, or it may serve as a division of a longer article. The structure and the length of the paragraph are matters of logic and convenience. Too long a paragraph, as well as a succession of very short ones, is to be avoided.

There are three important rhetorical requirements for a paragraph. The first requirement is *unity*, which means that there must be in the paragraph only one main thought. The second requirement is *coherence*, which implies that the sentences in the paragraph must be well connected and arranged so that each added thought helps to make the main idea clearer and more forceful. The third requirement is *emphasis*, which demands that the more important sentences shall be so placed in relation to the others as to draw immediate attention. Arranging sentences in contrasting pairs, or in order of climax, and alternating long and short sentences—these are means of securing emphasis. The beginning and the end of a paragraph are usually the most emphatic positions for sentences.

The purpose of the paragraph is to develop an idea, or, as often in stories, a single situation. Development means, literally, unfolding the subject so that the reader may understand the topic better or see the situation more clearly. To this end, give details, comparisons, and examples, or repeat ideas in slightly different words. Clearness is frequently effected by using vivid contrasts. The main idea should be stated in a single sentence, preferably either near the beginning or near the close of the paragraph. The following paragraph from *Ancient Times* by James H. Breasted illustrates well these methods of development:

"The Phœnicians learned the methods of manufacturing their goods, in almost all cases, from Egypt. There they learned to make glass and porcelain, to weave linen and dye it, to cast and hammer and engrave metal. On the other hand, we find that the *designs* employed in their art were international. Their metal platters they engraved with designs which they found in both Egypt and Asia. The art of Phœnicia was thus a kind of oriental composite or combination, drawn chiefly from the Nile and the Two Rivers. We remember that it was Phœnician workmen whom the Assyrian kings employed to make furniture and metal work for the royal palace. King Solomon likewise employed Phœnician workmen to build for him the Hebrew temple at Jerusalem (I Kings, V). After 1000 B. C. the Phœnicians were thus the artistic manufacturers of a great world extending from Nineveh on the east to Greece on the west."

GENERAL FORMS OF DISCOURSE

Expression in language assumes, in relation to the purposes for which it is used, several well-recognized forms or types of discourse. We give talks or addresses, or we write papers or articles; we argue, explain, describe, or tell a story. Practical methods for everyday use of these various forms are given in the following paragraphs:

ARGUMENT AND PERSUASION

An *argument* is a reason given in support of a proposition. As a form of composition, argument is also the logical arrangement of a proposition and the reasons urged in support of it. Sometimes we merely defend an opinion; sometimes we try to convince others that certain opinions are true or false. When we use arguments to make people believe or act as we want them to, we use *persuasion.* Persuasion is the means by which a speaker or writer tries to move his audience to belief or action.

We succeed in persuasion partly through logical argument and partly through personal appeal to the sympathies and interests of an audience. Both these elements are necessary. Sometimes one plays the larger part, sometimes the other. Sincere human interest, added to a logical argument, is as necessary to a salesman as to a lawyer before a jury or to a preacher in his pulpit.

Debate. The best way to learn to argue well is to practice in formal discussions or debates. Free discussion of public questions is necessary to the welfare of people in a democracy. Therefore, schools, clubs, and societies should encourage such

discussion and give opportunity for debate. Any debate centers in a question about which two opposing propositions can be made and supported by arguments. We cannot debate words or phrases. We may speak of discussing "taxes" or "freedom of speech"; but the discussion cannot proceed until we have put together a sentence or proposition about the subject. Preparation for debate calls first for selecting a debatable question. This is a question (1) on which opinions may reasonably differ, (2) on which material for evidence and proof is available, (3) which is of real interest.

The steps in planning an argument or a debate are the following:

1. State the question clearly and definitely. Propositions should be stated affirmatively, and should be so worded as to throw the burden of proof upon the affirmative. For example:

"*Should the City of X purchase the local electric lighting plant?*" or "*Should James W. go to college?*" Sometimes the question is stated in the form of a resolution: "*Resolved, That the City of X should purchase the local electric lighting plant.*" The following form also is recommended by some teachers as a title for a debate: "*For and against the election of B. as mayor*"; "*For and against James W's going to college.*"

2. Define concisely the terms used in the question. For instance, the terms "purchase" and "plant," in the first question, and the term "college," in the second, need definition.

3. Find the main *issues*, or special subordinate questions, on which the decision may turn. This discovery of issues is really a most vital part of argument; for clear statement of main issues eliminates useless talk about unimportant details. The following is the best method of finding the issues: (1) set down a number of opposing statements upon the question; (2) analyze these to find what are the exact points on which they conflict; (3) state these points as questions. These questions are the issues. Such an analysis of arguments on the question as to the electric lighting plant would probably reveal the following issues:

Is the present electric service unsatisfactory? Is owning and operating public utilities a wise policy for this city? Is some other management to be preferred?

These issues appear in the form of questions, to which the affirmative answers *yes* and the negative, *no*. The skillful debater takes account of these questions and sifts them until he has found those which seem really essential. Then, by answering these essential questions, he answers the main question. Such an argument may be outlined as follows:

Question: Should James W. go to college?

Definition: The term college means a four year course in an institution for instruction in the liberal arts and sciences.

Issues:

1. Does James W. desire a career for which a college education would be advantageous?
2. Is he fitted by ability for taking advantage of college opportunities?
3. Can he finance four years in college?

Affirmative Proposition: James W. should go to college; *because*

1. He does desire a career for which a college education would be advantageous; for
   - A. He wants to be a physician.
   - B. Most medical schools require for entrance at least two years of college work. (Evidence.)
   - C. The best schools require for entrance the completion of a college course. (Evidence for both (B) and (C) would be statements from medical school catalogues.)

Negative Proposition: James W. should not go to college; *because*

1. He is not fitted to take advantage of college opportunities, etc.

The body, or *brief*, for the affirmative or negative side of the argument should thus take up the issues in order and answer each question, with reasons and evidence. Then, on the basis of the reasoning given, the *conclusion*, or final answer to the main question, should be stated.

In a debate on any question, certain of the apparent issues may be set aside, by mutual agreement, before opening the discussion. They are then called "admitted matter," and the discussion, for the sake of brevity and clearness, takes up only the issues on which there is clear difference of opinion.

Logic. "*Why?*" is the student's most troublesome question, but no progress in argumentative thinking can be made without clear answers to questions beginning with *Why*. The corresponding word in answers is *because*. One thing is true because another thing is true.

All human progress depends upon a true knowledge of the causes of things; failure comes from mistaken ideas about causes. Chanticleer, in the old story, noticed that the sun rose when he was crowing and he therefore thought that his crowing was the cause of the sunrise. People often make similar mistakes.

All reasoning must be based on long and careful observation of facts. *Logic*, which is the science or art of exact reasoning, teaches us how to arrange and test our propositions so that our conclusions shall be warranted.

The *syllogism* is a common form of logical reasoning. It may be represented as follows:

Major premise (general statement): Wooden houses can be burned.
Minor premise (particular statement): Mr. A's house is wooden.
Conclusion: Therefore, Mr. A's house can be burned.

To make this reasoning true, a sufficient number of cases must have been observed to justify the general statement. It must be certain also that Mr. A's house belongs to the general class of wooden houses.

If we said, "*Plants are good for food; geraniums are plants; therefore, geraniums are good for food,*" our reasoning would be faulty, because not all plants are good for food. Our general statement is untrue though our particular statement is true. If we said, "*Lumber is expensive; houses are made of lumber; therefore, houses are expensive,*" our reasoning would be faulty because not all houses are made entirely or mainly of lumber. The particular statement is untrue though the general statement and the fact stated in the conclusion are true. Therefore, in the first example, we would *distinguish* or *question* the *major* premise, *grant* the *minor*, and *deny* the *conclusion*; in the second, we would *grant* the *major*, *distinguish* the *minor*, and *deny* the *conclusion*.

Evidence and Proof. Answering these *why* questions involves evidence and proof. *Evidence* is any fact, testimony, or accepted principle, which tends to bring about a belief in the proposition which is being urged. Evidence may be direct or circumstantial. Direct evidence is such as immediately supports the proposition. For instance, a theft may have been committed, the thief pursued and caught; his possession of the stolen property and the testimony of the person who saw him steal would be *direct evidence*. If, however, no such evidence as this were available, *circumstantial evidence* might be used. This would be made up of facts about the suspected person and his movements, which would tend to show that he probably committed the deed. *Proof* is convincing evidence.

Formal Debate: Rules. In a formal debate, each side must know which are the most important of the issues raised, and the debaters must remember that the decision depends upon the balance of argument. Every argument advanced by one side must be answered by the other. Unanswered argument stands, no matter how weak the evidence presented by the side using it. *Refutation*, or the answering of opponents' arguments, is very important.

The debating leagues of colleges and high schools have developed certain customs and rules for the

conducting of debates. The most important of these follow:

1. *Selection of the Question.*—Usually one team proposes a question and the other team is allowed to choose to support either the affirmative or the negative side.

2. *Teams.*—Each side of the argument is maintained by a team of two (or three) members. An additional member, or alternate, is sometimes chosen. He may take one of the regular places in an emergency. Otherwise, he helps in the preparation of the debate.

3. *Teamwork.*—All members of the team should work together in preparing the debate. They should confer upon the selection of the important issues and the arrangement of material. Before the debate, each member of the team should be familiar with the entire argument, but the actual presentation should be divided among the three debaters. Each one should have a definite part of the case to present.

4. *Division of Work,*—The first speaker on each side has to state the position of his side, make one strong point, and win the attention and the interest of his audience. The second speaker has to maintain interest, make at least one striking argument, and refute some of his opponents' arguments. The last speaker has to drive home the strongest argument of his side, answer some of his opponents' arguments, and sum up the case.

5. *Organization of a Debate.*—A formal debate is organized with a chairman, a timekeeper, and usually three judges. The chairman calls the meeting to order, announces the question and any special rules for the discussion, and introduces the speakers. The timekeeper gives each speaker a signal one minute or two before his speech is to close and another, if necessary, when his time has expired.

6. *Order of Speaking.*—The speakers on the two sides alternate, first an affirmative and then a negative speaker. Usually the debaters give two series of speeches. The first consists of direct argument; the second, entirely of refutation. This second series of speeches is called rebuttal. The order of speakers in rebuttal may be changed from that followed in the direct argument. The affirmative may elect either to open or to close the rebuttal.

7. *Time.*—Each speaker in direct argument is allowed a definite time—six, eight, or ten minutes—for his direct speech and a shorter time for rebuttal. The first direct speakers and the last rebuttal speakers are sometimes allowed two or three minutes more than the others.

8. *Intermission.*—At the close of the direct speeches the debaters are allowed a brief intermission for conference before beginning the rebuttal.

9. *Limitations of Rebuttal.*—In rebuttal a speaker must confine himself to refuting his opponents' arguments. He is not allowed to bring in new material.

10. *Decision of the Judges.*—At the close of the debate the judges render their decision, usually without conferring. The chairman announces the decision, which is accepted as final.

EXPLANATION

A pencil seems to be a simple, everyday thing, but you may sometime ask yourself: *How is this pencil made? What is it made of? Could it be made better?* You discover a problem that needs explanation or clearing up. This problem concerns the parts of the pencil and the relations between them. Other questions arise: *Why are these particular materials used in the pencil? What is the history of pencil making? Why is this thing called "pencil"?* Similarly, such subjects as *How is a gas engine made?* or *What is a bank?* call for explanation. *The clear, orderly answering of these questions is explanation.*

The first step in explanation is to divide the subject into topics to be discussed. The purpose of division is to give logical orderliness and simplicity, and consequently clearness, to your composition. The method to be followed is that of the outline, as illustrated in the following examples.

The headings in these specimen outlines are numbered in several different ways, any one of which may properly be used. In any outline, however, the numbering must be consistent throughout.

Subject. The Pencil.

Introduction.
1. The pencil is a thing of common use, but its nature, history, and manufacture are little understood.
2. The study of the pencil under these heads may be both interesting and suggestive.

Body.
1. Taking a common pencil apart.
   a. The case of wood, paper, or metal.
   b. The "lead."
2. The history of the pencil.
   a. Early forms.
   b. The word "pencil."
3. Process of manufacture.
   a. Preparation of materials.
   b. Construction.

Conclusion.
1. Skill with the pencil.
2. A stock of pencils in a store and the occupations it may suggest.

Such an outline may serve for a single treatment of the subject, or any one of the headings may be used as a separate topic. It should then be outlined in this same form. For example:

Subject.—A Stock of Pencils.
1. Pencils for drawing.
2. Pencils for various kinds of writing.
3. Pencils of different shapes and sizes.

The following is another common form of outline:

HOW TO USE CONCRETE

I. What is concrete?
   A. Elements.
   B. Mixtures.
II. Uses of Concrete.
   A. Substitute for stone and wood.
   B. Unique uses.
III. Mixing concrete.
   A. Proportions.
   B. Method.
IV. Forms.
   A. Construction.
   B. Method of use.

The following outline will suggest various approaches to a topic and several methods of making an explanation interesting to people of different tastes. One audience may be interested in a plain talk about the processes of shoe manufacture; another group may want a story or some literary or social references to illustrate the discussion.

Subject. A Pair of Shoes.
Note.—This topic needs to be stated more definitely.
Suggestions:
1. History of Shoes.
2. The Story of Footwear.
3. Styles in Footwear.
   a. of the present, or
   b. in history.
4. Pointed or Broad Toes.
   a. The Hygiene of Shoes, or
   b. Historical Modes of Shoe Shapes.
5. Boots.
   Query: What was the "boots" at the old-fashioned inn?
6. Sock and Buskin,—Footwear on the stage. These names suggest the costumes of actors in comedy and tragedy of ancient times.

The second step is to look up information. A common and practical method for preserving facts is to copy information on cards about 3 by 5 inches in size, one fact or topic to a card, with a reference to book and page where the facts were secured.

The habit of thus looking up and noting facts will help to develop careful and trustworthy thinking.

The third step in planning explanation is the finding of apt comparisons; for we learn by observing likenesses and differences between things. The unknown or unfamiliar thing should be compared with something known or familiar. For example, to make dimensions clear, use comparisons in addition to figures. Compare a length of 15 or 20 feet to the length of a room, the extent of a small surface to a table top. Such expressions as *T-shape*, *S-shape*, *U-shape* are useful. More imaginative comparisons are suggested by figures of speech.

DESCRIPTION

Generally speaking, the purpose of description is to appeal so vividly to the senses through language that the reader or hearer feels as if he were actually in the presence of the object described. To produce good description: (1) Indicate clearly your point of view, that is, your position with reference to the thing described. A railroad wreck may be described by one who was a passenger on the wrecked train or by a reporter who was sent to the wreck. Their mental points of view will be different. A building or a mountain may be described as seen from a nearby or from a distant point. These different physical points of view determine the nature of the description. (2) Choose words to convey sense impressions, as of *sight*, *sound*, *smell*, *taste*, *touch*. (3) Select and use only such details as help to make the total impression clear and vivid. Notice the indications of the point of view and the appeals to the senses of sight, touch, and hearing in the italicized words of the following paragraphs:

"It was *close on noon*: there was no *breath* of wind, and the heat was scarce *bearable* when the two men came on deck, had the boat manned, and *passed down*, one after another, into the stern sheets. A *white* shirt at the end of an oar served as a flag of truce; and the men, by direction, and to give it the better chance to be observed, *pulled* with extreme slowness. The isle *shook* before them like a place *incandescent*; on the face of the lagoon *blinding copper* suns, no bigger than *sixpences*, danced and *stabbed* them in the eyeball. There went up from sand and sea, and even from the boat, a *glare* of *scathing* brightness; and as they could only peer abroad from between closed lashes, the excess of light seemed to be changed into a *sinister* darkness, comparable to that of a *thundercloud* before it bursts."—Stevenson: *The Ebb Tide*.

"There could not be a more *somber* aspect of external nature than as then seen *from the windows of my study*. The great *willow tree* had caught and retained among its leaves a whole cataract of water, to be shaken down at intervals by the frequent *gusts* of wind. All day long, and for a week together, the rain was *drip-drip-dripping* and *splash-splash-splashing* from the eaves and *bubbling* and *foaming* into the tubs beneath the spouts. The old, *unpainted* shingles of the house and outbuildings were *black* with moisture, and the mosses of ancient growth upon the walls looked *green* and *fresh*, as if they were the newest things and afterthought of Time. The usually *mirrored* surface of the *river* was *blurred* by an infinity of raindrops. The whole landscape had a completely *water-soaked* appearance, conveying the impression that the earth was wet through *like a sponge*; while the summit of a *wooded hill*, about a *mile distant*, was enveloped in a dense mist, where the demon of the tempest seemed to have his abiding-place, and to be plotting still direr inclemencies."—Hawthorne: *Mosses from an Old Manse*.

NARRATION

This most interesting form of composition is simply the telling of stories.

Narration without Plot. This is telling about a series of actual events,—a day's travel, the course of an investigation, or a report of some piece of work. For telling such a story the most important directions are these: Select carefully the details to be told. Make a connected account that moves straight forward in the time order of events and is not lost in little, unimportant matters.

The carefully written news story furnishes a good example. It usually begins with a *lead*, that is, a first sentence that summarizes the most important features of the account. Then the connected story, consisting of several sentences or paragraphs, follows. See *The Book or Article Review*.

Description finds its chief use in helping to make narration or explanation vivid and interesting.

Narration with Plot. The telling of a story in such a way as to arouse interest and hold the hearer or reader in suspense and uncertainty as to the outcome of events. You can spoil an *anecdote* or a *story* by giving the "point" too soon. Even anecdotes have miniature plots. Give the setting or background and introduce the characters first, then bring in their action or conversation, and finally "come to the point or climax." This method secures suspense while your audience waits for the climax. A master of English fiction is credited with the following recipe for story-telling: "Make them laugh; make them cry; but make them wait."

For the composition of other story forms, see *Forms of Literary Composition; The Book or Article Review,—Plot; The Scenario*.

SPECIAL FORMS OF DISCOURSE

We find the General Forms of Composition most frequently useful in the immediate telling of a story or in the preparation of a talk, a paper, or an essay. These occasions usually call for combinations of argument, explanation, description, and narration. The following suggestions are helps in real problems. They serve to answer the questions: What shall I put into the toast, the talk, or the club paper? What shall I leave out? How shall I begin? Getting started is often the hardest problem. See *Public Speaking*.

THE CLUB PAPER

As a member of some organization, a club or society, you are often expected to read papers upon various subjects. The theme or subject is usually given in the program or course of reading. Frequently, however, your topic is too big or too general. When you come to the task of preparing the paper, you must narrow the theme to something that you can treat interestingly in fifteen to thirty minutes. Here are four important principles:

a. Two or three important points, not more, can be treated well in a brief time. The attention of an audience is easily exhausted by too many details.
b. Perfection in speaking and writing is achieved by leaving out superfluous matter.
c. Statements of principles, conditions, or definitions must be made plain by clear illustrations or examples.
d. A brief anecdote or story is often worth pages of laborious explanation.

Suggestion.—Suppose, then, that you have your subject. Whatever it may be, remember that many of the most interesting facts and illustrations for most subjects are things right around you, things that you can see and hear. Any given topic is related to many other themes and to many other fields of knowledge. To point out some of these relations is to enhance the clearness as well as the interest of your paper.

A topic in art, for example, as you begin to look it up, will suggest related topics in literature, in history, in geography, in biography. As you follow these suggestions you will find your paper growing, not as a task, but as a pleasant interest. Make notes of what you find in your reading. Follow each hint of a related topic. Make more notes.

The Working Plan

Always prepare an *outline*, or *working plan*. An outline shows a general sketch or an indication of a plan, a system, or a course of thought. See *Explanation for suggestions about reading and cards. For suggestions as to interesting order of topics*, see *The Advertisement. For suggestions as to presenting the paper*, see *Public Speaking*.

The following plans represent typical ways of dealing with various kinds of subjects:

Subjects which fall under the general theme, *Community Plans*, are very frequently used in club programs. They may be concerned with material improvements in streets or buildings, or with political or social plans and organizations. The following well-tested general order of discussion is appropriate and effective. Either a single paper or a whole program may be built upon this plan. In the latter case, the subordinate topics become the titles of separate papers.

a. The situation outlined,
   1. By a summary of facts, or
   2. By a story or description.

b. Analogies, or comparisons with
   1. Other communities, or
   2. Other local projects or plans.

c. Proposals for action,
   1. Clearly stated, and
   2. Urged persuasively by appeal to such motives as the following: (1) community pride; (2) rivalry; (3) self interest; (4) duty; (5) moral ideals involved in religion and education.

An interesting type of paper is one which discusses *new discoveries* or *inventions* or *new ideas* put into action in society. In such a paper, do at least these four things:

a. Give a clear, brief statement of the discovery or idea or plan.

b. Illustrate with examples the meaning of a discovery or an idea, to make the matter clear and interesting.

c. Give the circumstances of the discovery or statement of the idea as nearly as possible in story form.

d. Show plainly how the thing affects the everyday interests of your audience. See *Suggestions* in the following outlines. This last point should never be neglected. Anything worth writing or talking about has a bearing on everyday life.

Specimen Outlines

The following outlines illustrate the application of the general plan to the discussion of special themes:

I. Subject. Advertising.

Suggestion: This topic needs to be narrowed or divided as follows:

1. What Use Do I Make of Advertisements?

Suggestion.—An intimate chat with two or three friends on the subject of advertising and its uses will help you. You will get their points of view, which will suggest to you a greater variety of topics and a better balanced treatment of your theme.

2. Some Interesting Advertising Pages.

Suggestion.—You need not depend merely upon description. Have the actual pages to show to your audience. Then you can better explain why they are interesting.

3. Art in Advertising.
   a. The Printer's Work.
   b. Opportunities for Artists.

4. The Store Window.
   Window Dressing.

Suggestion.—An interesting way to begin such a topic is to describe an actual window, especially if your audience may have seen it. If you have studied it carefully, you can surprise your audience and arouse interest by showing what they have failed to notice.

5. Advertising Associations and Ad Clubs.

Suggestion.—Any topic about organizations raises at least four questions: (1) How did they come to be formed? (2) What are their purposes? (3) What do they do? (4) Of what use are they to us?

6. The Responsible Advertiser.

Suggestion.—This kind of topic raises such questions as the following: (1) What gives the advertiser power? (2) For what is he responsible? (3) Do advertisers acknowledge this responsibility? (4) What are the reasons for your answer to (3)? (5) What personal experiences have you had with advertisers?

II. Subject. The Health of a Community.

The field of this theme is so large that a single paper should, as a rule, be restricted to one of the subordinate topics:

1. The Food Supply.
   a. Sources.

Suggestion.—To make a paper on this topic interesting, you should get some first-hand facts from your local market. Such investigation will enable you to use more intelligently the material from magazines and books.

   b. Markets.
      (1) Prices.
      (2) Handling the Food Supply.

2. Sanitation.
   a. Housebuilding.
   b. Water Supply.
   c. Sewerage.
   d. Waste and Garbage Removal.
   e. Flies, Microbes, and Vermin.

3. Control of Diseases.
   Public Health Service.
      (1) School Inspection.
      (2) Hospital Service.
      (3) Quarantine Regulations.

4. Public Parks and Playgrounds.

THE BOOK OR ARTICLE REVIEW

Treatments of historical, scientific, or literary themes frequently involve the reviewing of books or articles from magazines. In writing a book or article review, try (1) to convey a truthful, distinct impression of the outline—the plot, if the original is a story, or the logical plan, if it is a discussion—(2) to give a more specific idea of some notable feature of the work, and (3) to interest and instruct your audience so thoroughly that they will know whether they want to read the book or article.

By way of preparation, *read the material you are to review*. Then make sure that you have some general *reaction*, that is, some opinion or feeling about the book. Stating your own opinion or feeling furnishes a personal element which adds much to the worth and to the interest of your work.

Plot Outline. Remember that the outline or plot of a short story or of a novel concerns itself with the answers to six questions: *Who*? *What*? *When*? *Where*? *Why*? *How*? Usually the answers to the first four may be found very readily in a first reading of a story; they form the obvious framework for any tale. The writer of stories exercises his skill in cleverly managing the "How" and the "Why" of events and actions. Sometimes the answers to these two questions are reserved to the very end of the story and there made clear; in other cases one must draw one's own conclusions from the course of the narrative.

In planning a story review, especially for a rather brief paper, take a lesson from the *lead* of the newspaper reporter. The *lead* is an opening sentence in a news story, which summarizes accurately and concisely the substance of the article. It answers the six questions mentioned above. Such an opening sentence places the whole story briefly and concisely before the audience. Practice in writing such *leads* is a most valuable means of improving one's style of speaking or writing. Follow the lead with a brief outline of the plot. Then comment upon some especially interesting or important part of the book.

Suggestive Outlines

St. Ives, a novel by Robert Louis Stevenson.

Lead.—Viscount Anne de St. Ives, a poor private soldier of Napoleon, escapes from the military prison in Edinburgh, becomes heir, through his uncle's will, to a great English estate which had been settled on the older line of his family, marries a Scotch girl who had visited the prison, and becomes an English country gentleman.

I. Beginning.

1. *Setting.*—
   a. The French prisoners in Edinburgh Castle beguile their time by making souvenirs and toys to sell to the visitors from the city.
   b. One of the prisoners, St. Ives, is a gentleman of attractive manners, but a bungling craftsman.

2. *Inciting moments.*—
   a. St. Ives, by his handiwork and his courtesy, attracts the attention of a girl, Flora, who, with certain relatives, visits the prison.

b. A London lawyer appears, gives St. Ives news, leaves him money and the address of his wealthy uncle.

3. *Complications.*—
   a. St. Ives fights a duel, killing his opponent, who had used vile language about Flora.
   b. The English lieutenant, in command of the prison, suspects St. Ives's part in the duel and threatens to become a rival for Flora.
   c. On the eve of escape through a tunnel, St. Ives incurs the hatred of a soldier who knows of the duel. A threat of trial for murder hangs over St. Ives.

II. The Story of a Fugitive.

1. By the aid of Flora's aunt, St. Ives escapes to England in the company of two drovers.
   Complication.—In a fight he kills or severely injures a third, a rival drover.
2. In England he is invested with his uncle's estate.
   Complication.—This brings on him the deadly hatred of his disinherited cousin.
3. With a carriage and a valet he goes back to Scotland to find Flora and to save his drover friends from prosecution.
   Complication.—His cousin follows and they meet at a ball. But St. Ives escapes in a balloon.

III. The End.

1. After sundry adventures St. Ives gets to Paris.
   Complication.—His cousin tries to trap him.
2. The London lawyer, his uncle's solicitor, appears just in time to discomfit the spy and save the hero.
3. Back to Scotland and Flora.

The Making of Silly Billy, a short story by Ernest Thompson Seton.

Lead.—Silly Billy, a "fool-pup" on Bob Yancy's ranch, proves the hero of a bear hunt, and becomes "Billy, the pup that made good."

I. The Setting: *Where, Who, When.*

1. On Yancy's ranch: Old Thunder, a veteran leader of the pack; Terrible Turk, a new bulldog; Silly Billy, a bull terrier.
2. Reelfoot, a cattle-killing grizzly, comes to the Arrow-bell ranch.

II. The Hunt: *What, How, Why.*

1. Silly Billy, usually left at home because he is useless on a hunt, insists on going along. (Inciting moment)
2. The bear charges at Yancy, who falls on a rotten log. (Complication)
3. When the bear throws Thunder aside, Turk attacks, not the bear, but the old dog.
4. Silly Billy leaps and fastens his teeth in the bear's face, so giving Yancy a chance to escape. (Climax)

III. The End.

The rewards of Terrible Turk and Silly Billy.

Any story may be reviewed in this manner, by answering the six questions in an outline of about three main divisions.

Abstract. Many books and articles upon scientific, historical, or social themes call for the writing of abstracts. These are connected condensed statements of the theme and contents of the book or essay. Four qualities must be aimed at: (1) *accuracy*, that is, truth to the ideas presented in the original work; (2) *completeness*, that is, treatment of all essential parts of the original; (3) *clearness*, which is a matter of especial difficulty, because, in the effort merely to condense the matter, one is tempted to leave out words essential to the meaning; (4) *brevity*, which is to be desired and yet may be sacrificed to the other three qualities.

Remember that people who have not seen the original writing must be able to understand your abstract. Observe the following directions for planning your work:

(1) Following the idea suggested in connection with the *lead*, select a title or a topic sentence which will summarize the entire article.

(2) Choose similar titles or topic sentences for each section of the article.

(3) Separate the essential points and necessary illustrations from the unessential and unnecessary. The abstract must omit most of the merely illustrative content of the original article.

(4) Write the new condensed version of the article.

(5) Review the new version in order to condense it further.

(6) Be careful to give the last part of the article as full treatment as you give the first part.

Paraphrase. This is a method of interpreting a writing by turning it into simpler or more common language. It is a much more widely used kind of writing than many people suppose. The preacher and the teacher use paraphrase constantly. Commentaries on the Scriptures and upon the writings of many great authors, Dante or Shakspere for example, consist very largely of paraphrase.

Four kinds of writings usually call for paraphrase: the work of (1) old authors, such as Spenser or Chaucer, whose language has become unfamiliar; (2) such learned authors as Darwin or Emerson, whose expressions need simplifying; (3) writers like Francis Bacon, whose style is very condensed and therefore needs enlargement and illustration; (4) poets like Browning, whose language is obscure or figurative and therefore needs to be rendered into plain and literal expression.

The writer of paraphrase should first determine to which of these classes his author belongs; then he can suit his manner to the need. The preacher and the Sunday school teacher may find it necessary to render the language of the Bible in more familiar forms. They may wish to enlarge a parable or a proverb by some simple illustration or to turn the figurative language of a psalm into plain, everyday speech. Again, the teacher of science may be obliged to simplify certain paragraphs found in a very condensed textbook. He will develop single sentences into paragraphs and add illustrations. The general method of planning the *abstract* applies also to making the paraphrase.

THE ADVERTISEMENT

The purpose of an advertisement is persuasion. The following paragraphs suggest by examples some very important features in planning advertisements with this object in view. In general, the successful writer of advertising "copy" uses simple, direct language and keeps the reader and his interests most prominent in the advertisement. He maintains what is called the "*you* attitude." These features are equally good for *talks* and *papers*.

Statement of the Proposition and Illustrations of it. An organization like the Red Cross may open an advertisement by stating its general work; it may follow this by specific instances of its service. The way is thus prepared to appeal for funds at the close of the advertisement.

Order of Statements. An advertisement for ink begins with a general statement about the use of ink in business. It passes from this to a statement of the qualities of a particular ink. Then comes the definite suggestion that the reader should buy this ink for his own use.

An effective advertisement of an automobile begins with an appeal to the reader's interest in comfort, style, and economy. In two or three short paragraphs these ideas are developed. Then the advertisement closes with a few brief statements of statistics about the machine, made familiar to the reader by frequent repetition in successive advertisements.

The Apt Use of Comparison and Contrast. A banking house opens an advertisement of its investment service thus: "The deep sea captain takes on a pilot to guide him through New York harbor. Likewise the careful investor seeks experienced guidance in choosing the best channel for the investment of his funds."

Interest. Sometimes the story of the development of the business advertised may be told briefly; or a salesman's experience may be told to

illustrate the appeal of the product to people when its quality is known. An advertiser of mining machinery goes back to Greek coal mining for an interesting opening for his advertisement. This use of appropriate historical allusions is a very effective means of securing interest.

The "Human Touch." This appears in such forms as the following: A father is represented as advising his boy on some point of study or conduct or commending some books to his attention. A single phrase suggesting the comfort of some member of the family or the interest of the family in a son or daughter is frequently used to get attention through appeal to the feelings. An advertisement of furniture is made effective by illustrating its use for the "man's room." A stove advertisement gets its appeal from the suggestion that the use of this stove saves the housewife time for "shopping."

The printed advertisement must compete with others under the eye of the reader at the same time. Hence it must say to him something distinct, definite, and different. This necessity calls for skillful use of type and pictures.

THE EDITORIAL

This is a special form of writing used in newspapers and magazines to interpret items of news or to give opinion about subjects of current interest. The editorial may be a mere summary of information gathered from any source for the convenience of the reader. It may be an argument in support of some policy, or an informing essay on a political, social, moral, historical, literary, or scientific theme. The editorial should be timely. The judgments expressed should be based upon accurate knowledge of facts and upon sincere belief, and the style should be at once popular and dignified. The methods of writing given under *Argument*, *Exposition*, and *The Paragraph* apply to the composition of the editorial.

THE SCENARIO

This is a succinctly written sketch or outline of the scenes, situations, characters, and action of a story or play. Writers of fiction generally use it in planning their work. Producers of moving pictures, however, have developed a special form and technique of the scenario. Scenario making has come to be the business of specially trained writers employed by the producers.

Parts of the Scenario. An approved form of the scenario includes the following parts:

1. A summary or synopsis of the story.—This is the form in which producers require that stories be submitted. The synopsis should be written in ordinary direct narrative style. Each paragraph should present the essential characters of a scene in clear, vivid, descriptive language and tell the action in words that mean action. Thoughts and feelings should be conveyed through the suggested acts and movements of the characters. Each succeeding paragraph must carry the story straight toward its culmination. Action should, as far as possible, be written in the present tense. Titles and subtitles may be put in, preferably in capital letters, but all other technical directions should be omitted.

2. A list of characters, with the scenes in which each appears, thus: *Old Man, 3, 8, 15.*

3. A "scene plot," or schedule of the various stage settings, with the numbers of the scenes in which each setting is used, thus: *Hotel Entrance, 4, 10, 11, 18.*

A "scene," in moving picture studio language, is a part of the action that can be taken from one position of the camera. A move of the camera ushers in a new scene, except where the camera moves along with the actors or follows them, as in a race or some street scene.

4. A list of properties, or "props."

5. An outline of the scenes, numbered in order.—This is called the "continuity." The paragraph devoted to each scene gives (a) place or setting, (b) the characters, (c) the attitudes and actions of the characters (pantomime), (d) the thought or feeling these are intended to convey. The following is an approved short form of such a paragraph:

SCENE 5

Railroad Station. College boys and girls leaving after graduation. A send-off. Margaret and Winston meet. Realization of parting, long to speak; both too proud, part stiffly. Train pulls in. Boys and girls enter cars, waving good-byes. Margaret, assisted by Jim, enters end coach, her eyes following Winston, who enters adjoining car. Train pulls out. *Dissolve* into:

SCENE 6

Winston Library. Winston gazing at picture.—

Producers now employ professional continuity writers to work up synopses into the finished action plot, or continuity. The best authorities, however, advise writers to prepare their own continuities before writing synopses to submit to producers. This method gives clearer and firmer structure to the story, because the writer has followed his characters through all the details of the action that makes the story for the screen.

Technical Terms. The following technical terms are in common use to describe the management of scenes in the finished picture:

1. Subtitle.—This is the heading or explanatory phrase or sentence thrown on the screen between pictures, to introduce a series of scenes.

2. Insert, or *Cut-in.*—This may be a spoken title, that is, a quoted expression attributed to one of the characters, as it might be set down in a printed story. It may be a letter or telegram, or other document suggested by the action in the picture.

3. Cut-back.—A printed story will, in one chapter, carry the action of one set of characters up to a certain critical point and then, in the next chapter, go back and bring the parallel action of another group up to the same point of time. For this purpose, the moving picture uses the *cut-back*. This is an abrupt change from one scene or series of scenes to another, to bring two or more lines of action together for a complication or climax. The effect on the audience is to heighten the feeling of suspense.

4. Fade Out and *Fade In.*—The *fade out* is effected by gradually reducing the light on a scene until the screen is dark. The *fade in* is produced by gradually increasing the light. These methods are used to close and open series of scenes into which the play naturally divides. The *fade* is used also to show the present action of a character together with actions which he is either recalling from the past, or is planning for the future.

5. Iris Out and *Iris In.*—The *iris out* is a method of gradually narrowing the field of the picture without decreasing the light. Attention may thus be focused on some object, as a knife or a hand. *Iris in* is the gradual enlarging of the field of the picture. *Irising* may be used in place of *fading* to open and close series of scenes.

6. Dissolve.—This is a method of *fading out* one scene and at the same time *fading in* a very closely connecting scene.

7. Close Up.—The name applied to a picture taken with the camera at close range, to portray vividly the play of expression on a face, or to show some movements which are important to the telling of the story, but which might be lost amid the details of the ordinary picture.

8. Long Shot.—A picture taken at long range to show an entire room, building, or street, or a large group of people. This prepares the way for the action about to take place in a particular part of such setting.

The writer of a moving picture scenario should pack into each scene as much of the story as possible, with due regard to the range of the camera and the attention of an audience. He should be very economical in the use of *subtitles* and *inserts*. The *picture*, produced under the mechanical limitations and advantages of the film and the camera, is to tell the story.

VERSE

For many people the writing of verse is an interesting and amusing pastime. It is also one of the best means of improving one's command of language: (1) It calls for condensed and vivid expression and for a selection of words to produce good measure and rime; (2) it gives one occasion for searching out figurative language that will give variety, point, and concreteness to expression; (3) it improves one's appreciation of verse, which today forms so large a part of our current literature.

There is a wide and pleasant field for agreeable, witty, humorous, and fanciful verse. You may use it for a short, pointed speech. Often an unexpected "hit" is made in this way. Many epigrams, proverbs, mottoes, and sentiments are more vivid and more easily memorized, if expressed in couplets or quatrains.

Observe the following suggestions: (1) Verse must have a rhythm more striking and regular than that of prose or spoken conversation. (2) In English verse this rhythm is marked by the succession of beats or strong accents. Each *line* in English verse is made up of a number of feet. A *foot* consists of an accented syllable with one or more unaccented syllables closely connected with it. Several kinds of verse are named from the kinds of feet used and the number of accents to the line. (3) Select a model that you wish to imitate; read it over, beating out the accents with a pencil, until you get the swing of the lines. Such attention to a model will cure many a set of limping feet.

Rhythms. Recent writers of verse employ a wide variety of rhythms. They also use great freedom in choosing different lengths of line within the same poems. The best popular verse, however, keeps close to the well-established rules. The most common feet in English verse are the following:

a. Iambic (*ī-ăm'bĭk*), composed of two syllables, an accented preceded by an unaccented syllable;
b. Trochaic (*trō-kā'ĭk*), which is an accented syllable followed by an unaccented.

Two other types of feet, sometimes used, are:
a. Dactylic (*dăk-tĭl'ĭk*), which is an accented syllable followed by two unaccented;
b. Anapæstic (*ăn'ă-pĕs'tĭk*), which is an accented syllable preceded by two unaccented.

A line of two accents is called a *dimeter* (*dĭm'ē-tẽr*); a line of three accents is called *trimeter* (*trĭm'ē-tẽr*); one of four accents, *tetrameter* (*tĕt-răm'ē-tẽr*); one of five accents, *pentameter* (*pĕn-tăm'ē-tẽr*).

Specimens of Feet and Meter

(Accented syllables are marked with —; unaccented, with ⏑.)

Iambic.—
⏑ — ⏑ — ⏑ — ⏑ —
As flowers that bloom at morn, at eve decay.

Trochaic.—
— ⏑ — ⏑ — ⏑
Curls and ringlets of her tresses.

Dactylic.—
— ⏑ ⏑ — ⏑ ⏑ — ⏑ ⏑
This is the story the sailorman told.

Anapæstic.—
⏑ ⏑ — ⏑ ⏑ — ⏑ ⏑ —
Not a word, not a whisper, to soothe the sharp pain.

Mixed meter.—
— ⏑ — — ⏑ — ⏑ — —
Though it lashed the shallows that lined the beach.
⏑ — ⏑ — — —
Afar from the great sea deeps.

Dimeter.—
O'er folded blooms
On swirls of musk.

Trimeter.—
The lustrous blue of morn.
The night has a thousand eyes.

Tetrameter.—
They tempt the taste and charm the sight.
The crest and crowning of all good,
Life's final star, is Brotherhood.

Pentameter.—
Oft have I traveled in the realms of gold,
And many goodly states and kingdoms seen.
Bowed by the weight of centuries he leans
Upon his hoe and gazes on the ground.

Rime. The agreement of syllables in sound. A syllable in the middle of a line may be rimed with one at the end: this is called *internal rime*. Usually, syllables are rimed at the ends of lines: this is called *end rime*. Lines of poetry are commonly written in groups of two or more, forming stanzas. The lines may rime in couplet or alternately or in some other of the patterns illustrated below. *Blank verse* is unrimed, usually iambic pentameter. *Free verse* is unrimed; and its rhythm is said to be a rhythm of thought rather than of accent. It is difficult to distinguish from rhythmical prose. At best, it is not a form for the amateur.

Specimens of Rime

Couplet.—
Why has not man a microscopic eye?
For this plain reason,—man is not a fly.

Bubble, Bubble, flows the stream,
Like an old tune through a dream.

Alternate rime.—
We, in some unknown power's employ,
Move on a rigorous line;
Can neither, when we will, enjoy
Nor, when we will, resign.

Quatrain with two rimed lines.—
I think that saving a child
And bringing him to his own
Is a derned sight better business
Than loafing round the throne.

Quatrain with two rimes.—
Why should I stay? Nor seed nor fruit have I
But, sprung at once to beauty's perfect round,
Nor loss nor gain nor change in me is found,—
A life—complete in death—complete to die.

Six-line stanza with two rimes.—
The hollow sea-shell, which for years hath stood
On dusty shelves, when held against the ear
Proclaims its stormy parent, and we hear
The faint, far murmur of the breaking flood.
We hear the sea. The Sea? It is the blood
In our own veins, impetuous and near.

Four lines with one rime.—
A little peach in an orchard grew,—
A little peach of emerald hue;
Warmed by the sun and wet by the dew
It grew.

Sonnet.—
What is a sonnet? 'Tis a pearly shell
That murmurs of the far-off murmuring sea,
A precious jewel carved most curiously;
It is a little picture painted well.
What is a sonnet? 'Tis the tear that fell
From the great poet's hidden ecstasy;
A two-edged sword, a star, a song—ah me!
Sometimes a heavy-tolling funeral bell.

This was the flame that shook with Dante's breath,
The solemn organ whereon Milton played,
And the clear glass where Shakspere's shadow falls;
A sea this is—beware who ventureth!
For like a fiord the narrow floor is laid
Deep as mid-ocean to sheer mountain walls.
Richard Watson Gilder.

The *Limerick* is a form of nonsense stanza, made up of five lines with two rimes. The first, second, and fifth lines rime, and the third and fourth lines. The following specimen well represents the limerick:

Said the Snail to the Tortoise: "You may
Find it hard to believe what I say;
You will think it absurd,
But I give you my word,
They fined me for speeding today."
Oliver Herford.

The following school songs illustrate a method of adapting sentiment and words to a popular tune:

Tune: Come Back to Erin.
Come back to Normal, Good English, Good English!
Back to the ones who have missed you so long.
Come back to Normal, Good English, Good English!
And all the building will ring with our song.

Tune: Row Your Boat.
Watch, watch, watch your speech,
Every word you say.
Carefully, carefully, carefully, carefully
Watch it every day.

PUBLIC SPEAKING

Public speaking, as commonly understood, though it does not lay claim to the more formal title of oratory, is nevertheless a term which includes that art. As oratory is the appeal of a high order of eloquence to the understanding and to the emotions, so, too, the province of public speaking is not only to entertain and inform, but also to convince and persuade.

Possibilities and Probabilities. Although it is not given to every one to become an orator, nevertheless, it is well within the scope and the power of the average intelligent person to become a good public speaker. Moreover, there never was a time when public speaking formed a more important factor in American life than it does today, nor was there ever a time when this talent brought to the individual more social and political influence.

Every citizen is likely at any time to be called upon to express his views on any topic which may be exercising the minds of the public. As an efficient member of the community, he should be ready to respond to the claim thus made upon him and be able to lay before his fellow-citizens or townsmen, in language at once clear and forceful, his opinions and his judgment on the question put before him for discussion.

Fundamentals. "What then," it will be asked, "is necessary in order to prepare one's self to become a successful public speaker?"

1. The first essential is a knowledge of one's fellow-men. By this is not meant that one must necessarily be a psychologist. He must, however, have an all-round knowledge of people in general, especially of the man in the street, with his prejudices to be overcome, his rights to be defended, and his wrongs to be rectified. Only in this way can a speaker get in touch with an audience. He must understand his audience before they will understand him.

2. In the second place, the speaker should have a knowledge of books. He should become acquainted with good literature. Not every intending speaker has had the advantages of a college training. He may not have enjoyed the privilege of extensive travel, and he may be wanting in that broader knowledge that comes only to those of wide and practical experience. But books are always open to him; they will furnish him with facts, ideas, and all that is needed for the illustration of his subject. It was Bacon who said, "Reading maketh a full man." It is the man full of his subject, and thereby confident, who will interest and impress his audience.

3. As language is the chief means of conveying thought, it is a matter of the greatest importance to possess a ready command of words. To enlarge his vocabulary, the student of public speaking should make notes of all the new or strange words he meets in his general reading, or that he may hear in listening to lectures given by others. He should then make a point of using such words whenever opportunity offers; for it is by continuous use that they become his own.

The above three points sum up what may be regarded as the *remote preparation* for public speaking, in which lies in great measure the secret of success in this practical art. We now come to the *immediate preparation*, or the method to be followed in the actual planning and in the making of a speech.

Choice of Subject. Let the subject you choose be one of interest to yourself and one that is likely to be of interest to your audience. Remember you are to deliver a message. Unless you win the interest of your audience, your efforts to deliver a message will be in vain. Know beforehand the manner of audience you are about to address and adapt your subject to their capacity. In this way you will not be speaking "over their heads," and your purpose of convincing and persuading will be achieved.

The Plan. No matter how confident you may feel after you have gathered your material, always make in advance a plan or an outline of your intended talk or address. No builder undertakes the erection of a building until he has made a working plan of its different divisions, stories, and apartments. The same principle applies to an address. By making a plan you will put into your speech what you want to say, and will save time in saying it. Moreover, this much is due your audience. The habit of planning, if conscientiously cultivated, will enable you eventually to make a *mental* plan when opportunity will not allow of a pencilled outline.

A speech to be convincing must be logical,—that is, it must be made up of an *introduction*, a *body*, and a *conclusion*. This rule is applicable to the formal address, to the simple talk at a club meeting, to an after-dinner speech, or to the toast at a wedding breakfast.

Introduction or Beginning. This should be a brief and clear forecasting of what the speaker proposes to discuss before or prove to his audience, and it should contain the logical scheme of his entire address. In plain words, he should let his hearers know how he intends to deal with his subject. In opening his speech his manner should be easy and natural. This end may be achieved in several ways; for instance, (1) by some happy compliment paid to the audience; (2) by reference to some interesting topic of the moment; (3) by an anecdote relating to some well-known character, or by a brief and apt quotation. In this simple manner a speaker may get in touch with his audience and at the same time may lead up to his subject.

Body of the Speech. This consists in the gradual and logical development of the proposition already set forth in your introduction. As you proceed in the unfolding of your main statements, make free use of illustration and comparison from other themes and topics familiar to your audience. This tends to greater clearness and insures interest. It is thus that you imperceptibly paint a background from which your word-picture will stand out in more sharply defined and vivid lines. As you pass from one point to another, revert occasionally to the argument already put forward, so that your audience may hold in mind the main divisions of your talk.

The Conclusion. The conclusion should be a careful summing up and welding together of the chief arguments developed in the body of the speech. They must be made to stand out lucidly and forcefully, and in such order that, by the presentation of their combined strength, conviction is driven home to the minds of those listening.

As has already been pointed out, public speaking may serve either to entertain, inform, convince, or persuade. The formal speech will always have dignity of form and of diction. So much will not be expected of the informal, short address, though the structure of each is essentially the same, both being built on the basis of logical thought. This being true, the informal speech is here dealt with, for practical purposes.

Informal Speeches. You may be called upon suddenly to say "a few words" in public, to propose a toast or to make an after-dinner speech, to take part in a discussion, or to talk as an executive to employees. A hundred different occasions may arise and demand from you some kind of address. You have to win the attention of your audience on the spur of the moment, and make your points as quickly. If you know the essentials that go to the making of a speech, as already stated above, a few hurried notes will be sufficient for the skeleton outline of what you intend to say.

A useful suggestive outline for the short talk or informal address is furnished by the following questions: 1—What is the fact or situation under

discussion? 2—How has it come to be as it is? 3—How does it affect you? 4—What are you going to do about it?

Nucleus of an Informal Address. The nucleus, or concentrated matter, of a short talk may often be found (1) in the statement of some striking fact or incident, (2) in the presentation of clear and up-to-date statistics concerning a topic of real interest, (3) in the clever recital of a new story, or of an old one dressed in a new garb, and calculated to raise a laugh or a smile. The last method of beginning an address is perhaps the happiest of all, as by it the audience is warmed to sympathy with the speaker, the knowledge of which fact is no small aid to eloquence.

The following sentences illustrate what is meant by the nucleus of the short address. In them and in numerous other similar quotations will be found, as it were, in tabloid form, the ingredients necessary to the making of a short informal speech:

"More credit can be thrown down in a moment than can be built up in an age."

"A single fact is worth a shipload of argument."

"We do not count a man's years until he has nothing else to count."

"To believe in the heroic makes heroes."

"There are no points of the compass on the chart of true patriotism."

"Each day is the scholar of yesterday."

SOME STYLES OF SHORT TALKS

The occasions for the short talk are many, and there are almost as many styles as there are occasions. On the other hand, there are certain similarities to be noted in each, as the following examples will illustrate:

After-Dinner Speech. Usually, you have first to express some pointed sentiment in reference to the occasion, the host, or the guest of honor. A happy quotation or an adage similar to those enumerated above, which contains the gist of what you are about to say, will often serve as an appropriate *beginning*. Again, a half serious, half humorous comment will help in the development of the sentiment itself. Also, the flash light of a good crisp story will illumine your remarks so that your audience will see the point, and be won at once to your favor. As brevity is the soul of wit, so is it the essence of a good after-dinner speech.

The Wedding Toast. A short speech proposing the health of the bride and the bridegroom follows lines similar to those of the after-dinner speech. (1) You may begin felicitously by describing some pleasant journey, made more delightful by reason of congenial companionship. (2) The description of such a journey will be apt as a simile to describe life's journey, which the bride and the bridegroom have decided to make together. A few remarks on the ups and downs of life will add the humorous touch. (3) In the conclusion of your speech, leading to the drinking of the toast, you will voice the earnest wishes of the company for the welfare of the happy couple.

Impromptu Discussion. It may be that you are asked to take part in a running debate or discussion at which you happen to be present. In such a case you will have time to make a mental plan only. Nevertheless, you may adroitly begin your talk by referring to some salient fact or idea already mentioned in the debate, and thus gain time to put your thoughts in order. This is called a "point of contact" to which you may gradually attach your own trend of argument. Thus, often by an *impromptu* speech you can add to the interest of a debate by the orderly and well balanced presentment of your personal views. This happy facility comes from the persistent habit of making plans. To illustrate:

The debate is on the question of *safety*—an important topic to be discussed. Your opinion as an employer of labor, or as an employee, is sought on this subject. Possibly you will find a starting point for your talk by relating some accident which has taken place at the works or store in which you are employed. From this proceed to expand and make interesting your informal speech by putting forward your personal ideas on the best methods for preventing similar accidents in the future.

Again, the discussion may be on the question of *co-operation*. Once more you are asked to join in the debate. In such a case, a possible improvement in an industrial process, or a suggestion as to the better management of your business, may well supply you with a good opening and with excellent matter for an effective talk.

The examples given above illustrate some of the forms that a short address may take. It will be seen how some concrete and definite incidents, or accidents, may become the nucleus of your whole talk, and how, in time, you may find all the points you need to make a telling and striking address. If you have trained yourself in the habit of making plans, you will find that in an exigency you can do so without the aid of paper and pencil. You will unconsciously have taught yourself to make a hurried mental digest of what you are about to say, and so be enabled to speak *ex tempore* both with ease and with confidence.

Hints for Successful Talks. (1) Cultivate assiduously the habit of planning your speech. (2) In a short talk do not be anxious to exhaust your topic, lest you exhaust your audience. (3) Express your thoughts clearly by a proper arrangement of words, thus avoiding ambiguity. (4) Use figures of speech sparingly, and never, except to enforce or to illustrate a particular point. (5) A few lines of appropriate verse may sometimes be used either to begin or to end your address.

DELIVERY

The following words of Quintilian, the famous Roman orator and teacher of rhetoric, contain advice for the speaker which is as appropriate now as when they were written:

"In all kinds of public speaking, but especially in popular assemblies, it is a capital rule to attend to all the decorum of time, place, and character. No warmth of eloquence can atone for the neglect of this. That vehemence which is becoming in a person of character and authority may be unsuitable to the modesty expected from a young speaker. That sportive and witty manner which may suit one assembly is altogether out of place in a grave cause and solemn meeting. No one should ever rise to speak in public without forming to himself a just and strict idea of what suits his own age and character; what suits the subject, the hearers, the place, the occasion; and adjusting the whole train and manner of his speaking to this idea."

There are, in general, four methods of delivering speeches. Each has its especial strength and its peculiar weakness. It is important that a speaker should adopt for his main dependence the method to which his abilities are best suited.

Speaking from Manuscript. The use of a carefully prepared manuscript is the most certain method of delivering a speaker's thought completely, logically, and economically. It is especially appropriate for formal occasions, such as lectures, when the speaker's chief purpose is to convey information to his hearers. The weakness of this method lies in the tendency of the speaker to keep his eyes too closely riveted to his manuscript and thus lose the attention of his audience. The speaker who uses manuscript usually sacrifices some of the directness of address which is so important a quality of oratory. For the speaker of small experience, however, the use of manuscript during delivery is to be recommended.

Speaking from Notes. The speaker who uses notes, that is, an outline of the previously prepared manuscript, has the advantage of possessing

a ready guide through his argument, while at the same time he is freer to meet unexpected situations than is the man who must follow a complete manuscript. This is a weighty consideration in discussion or debate. All notes, however, should be clearly written, so that the speaker's eyes will not be taken from his audience for too long a time, while he attempts to decipher his outline.

Speaking from Memory. The memorized speech has the distinct advantage of permitting the speaker to look constantly at his audience. It does not, however, allow him to adapt himself readily to unforeseen circumstances, such as disturbances in an assembly or the necessity of answering unexpected arguments in debate. It is appropriate to formal occasions; for it permits the attainment of highly finished style both in composition and in delivery. The chief weakness of the method is that his effort to recall the memorized words may rob the speaker of directness and spontaneity. The ideal in the use of the memorized speech is to combine finished perfection of form with the appearance of that naturalness which marks the extemporaneous address.

Speaking Extemporaneously. Undoubtedly, the most effective form of public speaking is the extemporaneous address. This is to be defined as the presentation of thoroughly prepared thought in language which is the product of the occasion. As extemporaneous speaking is the most effective type of oratory, so it demands the most exacting and long-continued preparation and practice. However, the reward of the master of extemporaneous oratory is the consciousness of the most thorough command over his audiences. Extemporaneous speaking does not preclude the use of notes, and, for the short, informal address, the preparation of notes, outlining the thought to be clothed in extemporaneous language, is usually advisable.

Whichever of these general methods of speaking you choose to employ, you must observe certain well established principles pertaining to manner and to voice. The total effect of a speech is compounded of the words, the bodily attitudes, and the voice of the speaker. He must know how to adapt these elements to each other and to the spirit of his audience. It has well been said that the best oratorical style for a given individual is that of his best conversation.

The attainment of an effective manner before an audience is worthy of long and careful effort. Each speaker must study his own problems. However, there are two means which you will find to be fundamental:

1. Know your subject and your plan so well that you show *confidence* (a) by looking at your audience—letting them see your eyes, (b) by speaking directly to your audience—letting them see your lips move. The audience is entitled to this directness of address.

2. Be so thoroughly interested in your talk that you show ease (a) by standing so firmly *on both feet* that you can change your position without "teetering," (b) by such gestures with arms or body as are prompted by your thought and feeling *at the time*, (c) by directing your eyes and your voice at some time to every one in your audience, (d) by deep, steady breathing.

Gesture. The name for the bodily attitudes and movements and facial expressions by which a speaker supplements and emphasizes his words. Every speaker will use gesture in some way, because bodily movements are a fundamental mode of expressing ideas and feelings; and the more earnest and emphatic the speaker is, the more frequent and vigorous will be his gestures. Two rules you may well observe: (1) Do not try to repress all gesture. (2) Strive to make every gesture mean something definite. Superfluous gestures take the attention of your audience from what you are saying. Notice the gestures that you make spontaneously in conversation. Try to employ these and adapt them to the "enlarged conversation" of your public speech. We usually think of gestures as movements of the arms and hands. But remember that you can make many of your most effective gestures with your facial muscles, your head, or your whole body. This caution will help you to avoid the windmill method of gesture, or merely throwing your arms about. In gesture, as in every other phase of speaking, sincerity of thought and purpose is the best guard against meaningless expression.

Enunciation. For *good speech*, in uttering your own thoughts or reading orally the words of another, the first essential is this: *Carefully think* your words and phrases. Your voice will respond with wonderful accuracy to your understanding of the words you use. The second essential is this: Pronounce your words *distinctly and correctly*. This includes the true forming and arrangement of the sounds, faultless accent, and clear quality of voice. The list of words in the section entitled Correct Pronunciation will give you the precise sounds and accents for many words commonly used. For other words, consult unabridged dictionaries. Further, learn how to form these sounds exactly.

Voice Qualities. Pleasing and effective speech is very largely a result of the speaker's mastery of good voice qualities, the fundamental principle of which is proper breathing. Individual voices differ in quality because of the varied forms and conditions of the vocal cords and the resonance chambers of the mouth and nose. Each person has a normal quality of voice, which he uses in conversation, and by which it is possible to recognize him even when his features cannot be seen. But, by altering the shape of the mouth cavity or by opening or restricting the nasal and throat passages, each individual can produce several other qualities besides this normal one.

Eight qualities of the speaking voice are usually distinguished. Three of these the public speaker should cultivate: (1) *Normal*, which is a clear, resonant quality produced by the natural position of the vocal organs and the simple enunciation of vowels and consonants, the ordinary conversational voice. (2) *Orotund*, a fuller, clearer, and more resonant quality. It is appropriately used to express grandeur, sublimity, and similar thoughts and ideas of a lofty and impressive nature. The speaker should be careful not to use this quality too frequently, as it may easily pass into bombast and become unconvincing. (3) *Aspirate*, which is a breathy utterance either devoid of vocalization, as in a whisper, or partially vocalized, as in the so-called "stage whisper." The quality may suggest weakness or excessive emotion. It is sometimes used effectively in public speaking to give striking emphasis to an expression.

The remaining five qualities are generally undesirable and to be avoided in public speaking. They are confined to the art of the actor in portraying characters or in suggesting emotions with which they are associated. (4) *Guttural*, a throaty sound. (5) *Pectoral*, a hollow, breathy quality. (6) *Oral*, the result of a rather thin, mouth resonance. (7) *Nasal*, a quality characterized by a harsh twang. (8) *Falsetto*, a quality of tone above the speaker's natural range.

Cautions.—Three very common faults of American speech are *high pitch*, *nasality*, and *throatiness*. Too high a pitch of voice is due to nervousness and to lack of self-control. Nasality is not talking through the nose but failure to use the nasal cavity properly in speaking. It is frequently due to some obstruction of the nasal passages. Throatiness, or making sounds too low down in the throat, is usually caused by contraction of throat muscles.

Inflection. What punctuation is to written language, *inflection*, *change of pitch*, and *pauses* are to spoken language. The word *inflection* means "bending to or toward," that is, a bending of the speech to

the meaning. It is a gradual change of pitch toward a higher or lower tone while the word, phrase, clause, or sentence is being pronounced. For example, the sentence "You are going" may mean: (1) a simple statement of fact; (2) a question; (3) an exclamation. Each meaning will be determined by the inflection given to the sentence. Practice giving these different meanings to various short sentences.

Change of Pitch. By pronouncing one of the words in a sentence with a decidedly high or low pitch as compared with the pitch of the others, you can give several additional meanings to the sentence. For instance: If *you* is given a higher pitch than *are going*, the sentence means that you are going and not some one else; pronouncing *are* with a higher pitch than *you* and *going* may indicate either surprise or decided determination. This abrupt shifting of the key, or tone, of speech *between* words, phrases, clauses, or sentences is called *change of pitch*.

Practice will show you the importance of this means of emphasis. It is, in fact, the natural method of marking off one idea from another in speech. If you think clearly, you can hardly keep such changes out of your voice.

Cautions.—Be careful to vary the normal or usual pitch from which you make changes. Avoid making every change of pitch have just the same degree as every other. For example, if you begin to talk on a pitch corresponding to middle C of a piano and then rise to G, let the next "fall" of pitch be to D or to some pitch below C. Otherwise, you will drop into a singsong or "tune," a fault which is all too evident in many public speakers. This "tune" destroys all emphasis and defeats the very purpose of the pitch change.

Pauses. Plan your pauses as carefully as you arrange your words. Silences are the wells of thought. Definite pauses serve at least four main purposes: (1) They give your audience time to grasp important ideas. (2) They enable your audience to make the necessary transition from one thought to another and so to "follow" you. (3) They convey the impression that you are choosing your words carefully. (4) They impress your audience with a sense of your consideration for them. Thus, directly and indirectly, pauses serve to give emphasis to your speech.

Emphasis. The most significant words in spoken sentences must be made to command the especial attention of an audience by means of emphasis. For this, the speaker has at command a variety of means. In general, a word or phrase in speaking becomes emphatic when it is set apart from neighboring words by some marked difference of delivery. The speaker should study and practice the following methods:

(1) *Increased or Lessened Force of Utterance.*—A climax may be emphasized by the gradual augmenting or diminishing of the volume of the voice. A single word or phrase, or even a sentence, will gain emphasis from either a sudden increase or an equally abrupt decrease in the fullness or quantity of one's tone of voice.

(2) *The Rising Inflection.*—This gradual raising of the pitch of the voice is a very important means of emphasizing words. The emphasis is more pronounced as the inflection is decided and prolonged.

(3) *Change of Pitch.*—Abrupt and decided changes of pitch likewise produce emphasis. A lowering of the pitch is likely to be more impressive than a raising of pitch, especially if accompanied by a decrease in one's rate of speaking.

(4) *Change of Rate.*—A marked change from a normal rate of speaking to a slower rate is an effective means of stressing the weight, importance, or seriousness of what a speaker wishes to convey to his audience.

(5) *Pauses.*—The use of impressive pauses is closely related to change of rate as a means of emphasis. A word or a group of words preceded and followed by a pause gains a marked importance. These pauses, however, must not be so frequent as to indicate hesitancy, nor so long as to suggest uncertainty.

The emphasized words may be any of the parts of speech, provided they are really of particular significance. One of the most frequent and most serious faults of unskilled speakers is that of emphasizing unimportant words. In general, the structural words of a sentence—subject, predicate verb, complement—should receive the greatest stress. Qualifying words are usually not so important as the words they modify. Articles, conjunctions, and prepositions are rarely emphasized. Especially is it necessary to lay stress on words that stand in contrast, whether they are in the same sentence or in different sentences. Equally essential to effective speaking is emphasis upon words which introduce new ideas. These words, duly accentuated, serve as guides for the audience in following the speaker's thought.

Rate of Speaking. Just as the natural qualities of voice vary among individuals, so too their natural rates of speaking differ. Some people are naturally quick and nervous; others are slow and phlegmatic. It should be remembered, however, that the brain of the listener is capable of receiving and registering only a limited number of words in any given unit of time, and that a speaker should adjust his rate to the ability of the audience to take in what he says. Generally, it is unwise to exceed 125 words a minute in ordinary speaking. On the other hand, it is tiresome to listen to slow, drawling delivery. Hence, rate should be adapted (1) to the capability of the audience to grasp the speaker's meaning, as well as (2) to the nature of what is spoken.

Moderate rate is the average rate of utterance used in the delivery of normal, unemotional passages.

Slow rate is suggestive of great deliberation, dignity, solemnity.

Rapid rate bespeaks lightness, excitement, hurry. It should never be so fast as to prevent clear articulation.

It is important that, in the course of any speech or address, one should, from time to time, alter his rate of speaking. Change of rate (1) relieves monotony, (2) helps in emphasis, (3) suggests certain emotions or movements.

That which will quicken or retard a man's footsteps will also quicken or retard his rate of speaking. Narration, for example, is flowing, easy, and graceful; vehemence is firm and accelerated; anger and joy are sudden, sometimes hysterical. Again, dignity, authority, sublimity, and awe assume deeper tones and a slower movement. One may often hear a good speaker, at some sudden turn of thought or feeling, check himself in the full tide of utterance and give indescribable power to a passage by slackening his rate and by adopting a slow, deliberate enunciation.

Breathing. Breathe deeply and steadily, using the diaphragm and chest walls. Learn to feel your diaphragm, which is the flexible floor of your chest, expanding and moving downward as you "take in" breath. You can then control and steady its movement, keeping it expanded, and give *carrying power* to your voice. Practice this breathing. It will help you to avoid "stage fright." Take a "deep breath" before you begin to speak.

Correct Speech Sounds. These are secured by right breathing, proper shaping of the mouth, and correct placing of the various sounds. The voice is produced by vibrations, or waves, set up by the vocal cords in the column of air reaching from the lungs up into the mouth and the nose. The different shapes that the mouth cavity may take give special forms to these waves. The forms, thus produced, give rise to the *vowels*, or open voice sounds. Each vowel sound is made with the jaws and the flexible palate, lips, tongue, and cheeks in a definite position.

The cavities of the throat, nose, and mouth act as a *resonance chamber*, like an organ pipe or the body of a violin, to give volume and tone to the voice. Any obstruction, such as the mucus from a "cold," enlarged tonsils, or adenoids, interferes with the volume of the voice as well as with the purity and the clearness of its tone.

The *consonant sounds* we form by partially or entirely closing the mouth cavity with the teeth or tongue or lips. We thus, to some extent, shut off the vowel sound; at the same time, the friction or explosive force of the moving breath makes sounds which join or articulate with the vowels to form syllables.

The foregoing paragraphs indicate the way in which speech is produced, a few effective methods of improving it, and some of the common faults to be corrected. This, however, is only a good beginning. Success depends upon careful and continued practice. A good teacher of speech or expression can give you valuable help in a few lessons.

SPECIMENS OF PUBLIC SPEAKING

The following selections have been made from some well-known American and English orators, in order that the student of public speaking may have before him ready examples of that simplicity in style and matter required in any public address. So simple and unaffected indeed are they, in both form and expression, that he will find them admirably suited as models for framing whatever speech he may be called on to deliver. Any ambitious student with good sense and a warm heart, provided his faculties for elocution are not essentially defective, may render himself an easy, agreeable, and even an impressive speaker. To accomplish this end, he should supplement the discipline of his faculties, along the lines already pointed out in these pages, by the earnest and conscientious study of such examples of oratory as are here represented in brief passages.

The Gettysburg Address

By Abraham Lincoln

Comment.—This address, delivered at the dedication of the National Cemetery at Gettysburg, Pa., November 19, 1863, is an acknowledged masterpiece of the short speech. Not only should it be memorized, but it should be studied closely for its structure, its condensation of thought, its purity of sentiment, and its simplicity of diction.

Fourscore and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battle-field of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But in a larger sense we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here, have consecrated it far above our poor power to add or detract. The world will little note nor long remember what we say here; but it can never forget what they did here. It is for us, the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us: that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion; that we here highly resolve that these dead shall not have died in vain; that this nation, under God, shall have a new birth of freedom; and that government of the people, by the people, and for the people, shall not perish from the earth.

The Minuteman of the Revolution

By George William Curtis

Comment.—This extract from the address delivered at the centennial celebration of Concord Fight, April 19, 1875, at Concord, Mass., is an example of polished oratory, by a past master of finished English. With vivid description, happy quotation, and apt historical reference, the speaker draws a great patriotic lesson for the present and the future citizens of his country.

The Minuteman of the Revolution! And who was he? He was the old, the middle-aged, and the young. He was the husband and father, who left his plow in the furrow and his hammer on the bench, and marched to die or be free. He was the son and lover, the plain, shy youth of the singing school and the village choir, whose heart beat to arms for his country, and who felt, though he could not say with the old English cavalier:—

"I could not love thee, dear, so much,
Loved I not honor more."

He was the man who was willing to pour out his life's blood for a principle. Intrenched in his own honesty, the king's gold could not buy him; enthroned in the love of his fellow citizens, the king's writ could not take him; and when, on the morning of Lexington, the king's troops marched to seize him, his sublime faith saw, beyond the clouds of the moment, the rising sun of the America we behold, and, careless of himself, mindful only of his country, he exultingly exclaimed, "Oh, what a glorious morning!" And then, amid the flashing hills, the ringing woods, the flaming roads, he smote with terror the haughty British column, and sent it shrinking, bleeding, wavering, and reeling through the streets of the village, panic-stricken and broken.

Him we gratefully recall today; him we commit in his immortal youth to the reverence of our children. And here amid these peaceful fields,—here in the heart of Middlesex County, of Lexington and Concord and Bunker Hill, stand fast, Son of Liberty, as the minuteman stood at the old North Bridge. But should we or our descendants, false to justice or humanity, betray in any way their cause, spring into life as a hundred years ago, take one more step, descend, and lead us, as God led you in saving America, to save the hopes of man.

No hostile fleet for many a year has vexed the waters of our coast; nor is any army but our own likely to tread our soil. Not such are our enemies to-day. They do not come, proudly stepping to the drumbeat, their bayonets flashing in the morning sun. But wherever party spirit shall strain the ancient guarantees of freedom; or bigotry and ignorance shall lay their fatal hands on education; or the arrogance of caste shall strike at equal rights; or corruption shall poison the very springs of national life,—there, Minuteman of Liberty, are your Lexington Green and Concord Bridge. And as you love your country and your kind, and would have your children rise up and call you blessed, spare not the enemy. Over the hills, out of the earth, down from the clouds, pour in resistless might. Fire from every rock and tree, from door and window, from hearthstone and chamber. Hang upon his flank from morn to sunset, and so, through a land blazing with indignation, hurl the hordes of ignorance and corruption and injustice back—back in utter defeat and ruin.

Peroration of the Reply to Hayne

By Daniel Webster

Comment.—The conclusion, or peroration, of Daniel Webster's reply to Hayne, delivered in the United States Senate on January 26, 1830, represents one of the most notable examples of impassioned oratory in the history of extemporaneous utterance. It should be studied particularly for its thrilling portrayal of the motives and ideals that animated the speaker in one of the great debates of American history.

Mr. President, I have thus stated the reasons of my dissent to the doctrines which have been advanced and maintained. I am conscious of having

detained you and the Senate much too long. I was drawn into the debate with no previous deliberation such as is suited to the discussion of so grave and important a subject. But it is a subject of which my heart is full, and I have not been willing to suppress the utterance of its spontaneous sentiments. I cannot, even now, persuade myself to relinquish it without expressing once more my deep conviction, that since it respects nothing less than the Union of the States, it is of most vital and essential importance to the public happiness.

I profess, sir, in my career, hitherto, to have kept steadily in view the prosperity and honor of the whole country, and the preservation of our Federal Union. It is to that Union we owe our safety at home and our consideration and dignity abroad. It is to that Union that we are chiefly indebted for whatever makes us most proud of our country. That Union we reached only by the discipline of our virtues in the severe school of adversity. It had its origin in the necessities of disordered finance, prostrate commerce, and ruined credit. Under its benign influence, these great interests immediately awoke as from the dead and sprang forth with newness of life. Every year of its duration has teemed with fresh proofs of its utility and its blessings; and, although our territory has stretched out wider and wider, and our population spread further and further, they have not outrun its protection or its benefits. It has been to us all a copious fountain of national, social, and personal happiness.

I have not allowed myself, sir, to look beyond the Union to see what might lie hidden in the dark recess behind. I have not coolly weighed the chances of preserving liberty when the bonds that unite us together shall be broken asunder. I have not accustomed myself to hang over the precipice of disunion to see whether, with my short sight, I can fathom the depth of the abyss below; nor could I regard him as a safe counselor in the affairs of this Government, whose thoughts should be mainly bent on considering not how the Union should be best preserved, but how tolerable might be the condition of the people when it shall be broken up and destroyed.

While the Union lasts we have high, exciting, gratifying prospects spread out before us, for us and our children. Beyond that I seek not to penetrate the veil. God grant that in my day, at least, that curtain may not rise. God grant that, on my vision, never may be opened what lies behind. When my eyes shall be turned to behold, for the last time, the sun in heaven, may I not see him shining on the broken and dishonored fragments of a once glorious Union; on States dissevered, discordant, belligerent; on a land rent with civil feuds, or drenched, it may be, in fraternal blood! Let their last feeble and lingering glance rather behold the gorgeous ensign of the Republic, now known and honored throughout the earth, still full high advanced, its arms and trophies streaming in their original luster, not a stripe erased or polluted, nor a single star obscured, bearing for its motto no such miserable interrogatory as, "What is all this worth?" nor those other words of delusion and folly, "Liberty first and union afterwards"; but everywhere, spread all over in characters of living light, blazing on all its ample folds, as they float over the sea and over the land, and in every wind under the whole heavens, that other sentiment, dear to every true American heart—Liberty and Union, now and forever, one and inseparable!

Opportunity

By John Lancaster Spalding

Comment.—This introduction to a school dedication address, spoken at the opening of the Spalding Institute, Peoria, Ill., December 6, 1899, exemplifies the use of simple, vivid, picturesque language in arresting attention and in suggesting the important thought to be developed from the consideration of a single great word. The speaker's use of the rhetorical question in this address is especially worthy of study.

How shall I live? How shall I make the most of my life and put it to the best use? How shall I become a man and do a man's work? This, and not politics or trade or war or pleasure, is the question. The primary consideration is not how one shall get a living, but how he shall live, for if he live rightly, whatever is needful he shall easily find. Life is opportunity, and therefore its whole circumstance may be made to serve the purpose of those who are bent on self-improvement, on making themselves capable of doing thorough work.

Opportunity is a word which, like so many others that are excellent, we get from the Romans. It means near port, close to haven. It is a favorable occasion, time, or place for learning or saying or doing a thing. It is an invitation to seek safety and refreshment, an appeal to make escape from what is low and vulgar and to take refuge in high thoughts and worthy deeds, from which flows increase of strength and joy. It is omnipresent. What we call evils, as poverty, neglect, and suffering, are, if we are wise, opportunities for good. Death itself teaches life's value not less than its vanity. It is the background against which its worth and beauty stand forth in clear relief. Its dark form follows us like our shadow, to bid us win the prize while yet there is time; to teach that if we live in what is permanent, the destroyer cannot blight what we know and love; to urge us, with a power that belongs to nothing else, to lay the stress of all our hoping and doing on the things that cannot pass away.

"Poverty," says Ouida, "is the north wind that lashes men into Vikings." "Lowliness is young ambition's ladder." What is more pleasant than to read of strong-hearted youths, who, in the midst of want and hardships of many kinds, have clung to books, feeding, like bees to flowers? By the light of pine-logs, in dim-lit garrets, in the fields following the plow, in early dawns when others are asleep, they ply their blessed task, seeking nourishment for the mind, athirst for truth, yearning for full sight of the high worlds of which they have caught faint glimpses; happier now, lacking everything save faith and a great purpose, than in after years when success shall shower on them applause and gold.

Life is good, and opportunities of becoming and doing good are always with us. Our house, our table, our tools, our books, our city, our country, our language, our business, our profession,—the people who love us and those who hate, they who help and they who oppose—what is all this but opportunity? Wherever we be there is opportunity of turning to gold the dust of daily happenings. If snow and storm keep me at home, is not here an invitation to turn to the immortal silent ones who never speak unless they are addressed? If loss or pain or wrong befall me, shall they not show me the soul of good there is in things evil? Good fortune may serve to persuade us that the essential good is a noble mind and a conscience without flaw. Success will make plain the things in which we fail; failure shall spur us on to braver hope and striving.

If I am left alone, yet God and all the heroic dead are with me still. If a great city is my dwelling place, the superficial life of noise and haste shall teach me how blessed a thing it is to live within the company of true thought and high resolves. Whatever can help me to think and love, whatever can give me strength and patience, whatever can make me humble and serviceable, though it be a trifle light as air, is opportunity, whose whim it is to hide in unconsidered things, in chance acquaintance and casual speech, in the falling of an apple, in floating weeds, or the accidental explosion in a chemist's mortar.

The New South

By Henry W. Grady

Comment.—A famous selection which represents a response to a toast developed into a notable, even an epoch-making, specimen of brilliant and trenchant oratory. It was delivered at the eighty-first anniversary celebration

of the New England Society in the City of New York, December 22, 1886. The student should observe especially the speaker's form of opening with words directed to the chairman or toastmaster, his complimentary reference to the preceding speaker, and his use of humor to relieve the dark picture of war.

In speaking to the toast with which you have honored me, I accept the term, "The New South," as in no sense disparaging to the Old. Dear to me, sir, are the home of my childhood and the traditions of my people. I would not, if I could, dim the glory they won in peace and war, or by word or deed take aught from the splendor and grace of their civilization—never equaled, and perhaps never to be equaled, in its chivalric strength and grace. There is a New South, not through protest against the Old, but because of new conditions, new adjustments, and, if you please, new ideas and aspirations. It is to this that I address myself. * * * Dr. Talmage has drawn for you with a master's hand the picture of your returning armies. He has told you how, in the pomp and circumstance of war, they came back to you, marching with proud, victorious tread, reading their glory in a nation's eyes! Will you bear with me while I tell you of *another* army that sought its home at the close of the late war—an army that marched home in defeat, and not in victory; in pathos, and not in splendor; but in glory that equaled yours, and to hearts as loving as ever welcomed heroes home. Let *me* picture to you the footsore Confederate soldier, as, buttoning up in his faded gray jacket the parole, which was to bear testimony to his children of his fidelity and faith, he turned his face southward from Appomattox in April 1865. Think of him as ragged, half-starved, heavy-hearted, enfeebled by wounds and exhaustion—having fought to exhaustion—he surrenders his gun, wrings the hands of his comrades in silence, and, lifting his tear-stained and pallid face for the last time to the graves that dot the old Virginia hills, pulls his gray cap over his brow and begins the slow and painful journey.

What does *he* find, let me ask you, who went to your homes eager to receive, in the welcome you had justly earned, full payment for your four years' sacrifice—what does *he* find when, having followed the battle-stained cross against overwhelming odds, dreading death not half so much as surrender, he reaches the home he left so prosperous and beautiful? He finds his house in ruins, his farm devastated, his slaves free, his stock killed, his barns empty, his trade destroyed, his money worthless, his social system, feudal in its magnificence, swept away, his people without law or legal status, his comrades slain, and the burdens of others heavy on his shoulders. * * * What does he *do*—this hero in gray, with heart of gold? Does he sit down in sullenness and despair? Not for a day! Surely God, who had stripped him of his prosperity, inspired him in his adversity.

As ruin was never before so overwhelming, never was restoration swifter. The soldier stepped from the trenches into the furrow; horses that had charged Federal guns marched before the plow, and fields that ran red with human blood in April were green with the harvest in June. Women reared in luxury cut up their dresses and made breeches for their husbands, and, with a patience and heroism that fit women always as a garment, gave their hands to work. Cheerfulness and frankness prevailed. "Bill Arp" struck the keynote when he said, "Well, I killed as many of them as they did of me, and now I am going to work." * * * I want to say to General Sherman—who is considered an able man in our parts, though some people think he is a kind of careless man about fire—that from the ashes he left us in 1864 we have raised a brave and beautiful city; that, somehow or other, we have caught the sunshine in the bricks and mortar of our homes, and have builded therein not one ignoble prejudice or memory. * * *

This is said in no spirit of timeserving or apology. The South believes that the late struggle between the states was war, and not rebellion, revolution, and not conspiracy, and that her convictions were as honest as yours. I should be unjust to the dauntless spirit of the South, and to my own convictions, if I did not make this plain in this presence. The South has nothing to take back. In my native town of Athens is a monument that crowns its central hill—a plain white shaft. Deep-cut into its shining side is a name dear to me above the names of men; that of a brave and simple man who died in brave and simple faith. Not for all the glories of New England, from Plymouth Rock all the way, would I exchange the heritage he left me in his soldier's death. But, sir, speaking from the shadow of that memory, which I honor as nothing else on earth, I say that the cause in which he suffered and for which he gave his life was adjudged by higher and fuller wisdom than his or mine, and I am glad that the omniscient God held the balance of battle in His almighty hand, and that human slavery was swept forever from American soil—the American Union saved from the wreck of war.

The Attuning of the Voice

By Henry Ward Beecher

Comment.—In this passage, selected from the author's *Lectures on Oratory*, the reader will find a model which embodies in the music of its diction and in the rhythm of its sentences the very sentiment about which the lecturer is talking.

How much squandering there is of the voice! How little there is of the advantage that may come from conversational tones! How seldom does a man dare to acquit himself with pathos and fervor! And the men are themselves mechanical and methodical in the bad way who are most afraid of the artificial training that is given in the schools, and who so often show by the fruit of their labor that the want of oratory is the want of education.

How remarkable is the sweetness of voice in the mother, in the father, in the household! The music of no chorded instruments brought together is, for sweetness, like the music of familiar affection when spoken by brother and sister, or by father and mother.

Conversation itself belongs to oratory. How many men there are who are weighty in argument, who have abundant resources, and who are almost boundless in their power at other times and in other places, but who, when in company among their kind, are exceedingly unapt in their methods. Having none of the secret instruments by which the elements of nature may be touched, having no skill and no power in this direction, they stand as machines before living, sensitive men. A man may be a master before an instrument; only the instrument is dead; and he has the living hand; and out of that dead instrument what wondrous harmony springs forth at his touch! And if you can electrify an audience by the power of a living man on dead things, how much more should that audience be electrified when the chords are living and the man is alive, and he knows how to touch them with divine inspiration!

The High Standard

By Lord Rosebery

Comment.—This is a passage, complete in itself, taken from a longer address, that of the Lord Rector at the University of Edinburgh, in 1882. It is an especially good example of the occasional speech which aims to arouse devotion to ideals. The speaker's apt use of literary and historical references is particularly worthy of imitation.

Let us win in the competition of international well-being and prosperity. Let us have a finer, better educated, better lodged, and better nourished race than exists elsewhere; better schools,

better universities, better tribunals, ay, and better churches. In one phrase, let our standard be higher not in the jargon of the Education Department, but in the acknowledgment of mankind. The standard of mankind is not so exalted but that a nobler can be imagined and attained. The dream of him who loved Scotland best would lie not so much in the direction of antiquarian revival, as in the hope that his country might be pointed out as one that, in spite of rocks, and rigor, and poverty, could yet teach the world by precept and example, could lead the van and point the moral, where greater nations and fairer states had failed. Those who believe the Scots to be so eminently vain a race, will say that already we are in our opinion the tenth legion of civilization. Well, vanity is a centipede with corns on every foot: I will not tread where the ground is most dangerous. But if we are not foremost, we may at any rate become so. Our fathers have declared unto us what was done in their days and in the old time before them: we know that we come of a strenuous stock. Do you remember the words that young Carlyle wrote to his brother nine years after he had left this University as a student, forty-three years before he returned as its Rector?—

"I say, Jack, thou and I must never falter. Work, my boy, work unweariedly. I swear that all the thousand miseries of this hard fight, and ill-health, the most terrific of them all, shall never chain us down. By the river Styx it shall not! Two fellows from a nameless spot in Annandale shall yet show the world the pluck that is in Carlyles."

Let that be your spirit to-day. You are citizens of no mean city, members of no common state, heirs of no supine empire. You will many of you exercise influence over your fellow men: some will study and interpret our laws, and so become a power; others will again be in a position to solace and exalt, as destined to be doctors and clergymen, and so the physical and spiritual comforters of mankind. Make the best of these opportunities. Raise your country, raise your University, raise yourselves.

Introducing Henry Watterson

By Elihu Root

Comment.—A good specimen of the informal introduction, such as falls to the lot of a toastmaster, is Elihu Root's introduction of the great editor, Henry Watterson, at the eighty-ninth anniversary banquet of the New England Society in the City of New York, December 22, 1894. The speaker paints in an appropriate background of history and sentiment. He lights up his thought with flashes of humor, and finally, with a brief characterization, presents the guest. This is a speech that may well be closely imitated.

Gentlemen: We are forced to recognize the truth of the observation that all the people of New England are not Puritans; we must admit an occasional exception. It is equally true, I am told, that all the people of the South are not cavaliers; but there is one cavalier without fear and without reproach, the splendid courage of whose convictions shows how close together the highest examples of different types can be among godlike men—a cavalier of the South, of southern blood and southern life, who carries in thought and in deed all the serious purpose and disinterested action that characterized the Pilgrim Fathers whom we commemorate. He comes from an impressionist State, where the grass is blue, where the men are either all white or all black, and where, we are told, quite often the settlements are painted red. He is a soldier, a statesman, a scholar, and, above all, a lover; and among all the world which loves a lover, the descendants of those who, generation after generation, with tears and laughter, have sympathized with John Alden and Priscilla, cannot fail to open their hearts in sympathy to Henry Watterson and his star-eyed goddess. I have the honor and great pleasure of introducing him to respond to the toast of "The Puritan and the Cavalier."

The Physical Basis of Life

By Thomas H. Huxley

Comment.—The following passage from a lecture delivered in the city of Edinburgh is an excellent example of straightforward, popular scientific exposition. A very important scientific truth is set forth in simple and vivid language. The easy informality of the speaker's manner, combined with the clearness of his sentences, points to a secret of Mr. Huxley's great success as a lecturer. The speaker's selection and application of his illustrations are especially worthy of close study.

"In the wonderful story of the 'Peau de Chagrin' the hero becomes possessed of a magical wild ass's skin which yields him the means of gratifying all his wishes. But its surface represents the duration of the proprietor's life; and for every satisfied desire the skin shrinks in proportion to the intensity of fruition, until at length life and the last handbreadth of the *peau de chagrin* disappear with the gratification of the last wish. Balzac's studies had led him over a wide range of thought and speculation, and his shadowing forth of physiological truth in this strange story may have been intentional. At any rate, the matter of life is a veritable *peau de chagrin*, and for every vital act it is somewhat smaller.

"All work implies waste, and the work of life results, directly or indirectly, in the waste of protoplasm. Every word uttered by a speaker costs him some physical loss; and, in the strictest sense, he burns that others may have light * * * But, happily, the protoplasmic *peau de chagrin* differs from Balzac's in its capacity of being repaired and brought back to its full size after every exertion.

"For example, this present lecture, whatever its intellectual worth to you, has a certain physical value to me, which is, conceivably, expressible by the number of grains of protoplasm and other bodily substance wasted in maintaining my vital processes during its delivery. My *peau de chagrin* will be distinctly smaller at the end of the discourse than it was at the beginning. By and by I shall probably have recourse to the substance commonly called mutton for the purpose of stretching it back to its normal size. Now, this mutton was once the living protoplasm, more or less modified, of another animal—a sheep. * * * A singular inward laboratory which I possess will dissolve a certain portion of the modified protoplasm; the solution so formed will pass into my veins; and the subtle influences to which it will then be subjected will convert the dead protoplasm into living protoplasm and transubstantiate sheep into man.

"Nor is this all. If digestion were a thing to be trifled with, I might sup upon lobster, and the matter of life of the crustacean would undergo the same wonderful metamorphosis into humanity. And, were I to return to my own place by sea and undergo shipwreck, the crustacean might, and probably would, return the compliment, and demonstrate our common nature by turning my protoplasm into living lobster. * * *

"Hence it appears to be a matter of no great moment what animal or what plant I lay under contribution for protoplasm, and the fact speaks volumes for the general identity of that substance in all living beings. * * * An animal cannot make protoplasm, but must take it ready-made from some other animal or some plant—the animal's highest feat of constructive chemistry being to convert dead protoplasm into that living matter of life which is appropriate to itself. Therefore, in seeking for the origin of protoplasm we must eventually turn to the vegetable world. A fluid containing carbonic acid, water, and nitrogenous salts, which offers such a Barmecide feast to the animal, is a table richly spread to multitudes of plants; and with a due supply of only such materials many a plant will not only maintain itself in vigor, but grow and multiply until it has increased a millionfold, or a million-millionfold, the quantity of protoplasm which it originally possessed; in this way building up the matter of life, to an indefinite extent, from the common matter of the universe."

FORMS OF LITERARY COMPOSITION

Enjoyment in Reading. A good book is like an excellent dinner in good company, to which you bring a good digestion, a keen appetite, alert attention, and as ready a wit as you can muster. It is easy to indulge oneself in drifting idly through a maze of moving pictures. But some effort is necessary to keep the mind alert to the procession of thoughts on the printed page. If the author has written something worth while, he has taken much time to select the right words and set them in order. There is no higher pleasure than that of the reader who follows such an author through his pages and re-creates from the printed symbols his thought, his pictures, and his fancies. The book that you enjoy in this way becomes a part of your life.

Journals and Magazines. Business and professional people read the journals of their special interests. Members of churches, societies, and orders should read at least some of the papers and magazines published in their interest. Such reading is necessary to intelligent membership, as the reading of daily newspapers and weekly journals is necessary to efficient citizenship. But no one need read all of any paper or review. Let your special interest select and direct your attention. Reading the news that prompts to reflection upon the issues of the day is worth while; but trying to read the entire newspaper only produces a confused impression of many things, which serves to weaken the judgment. One should not, however, confine his reading to newspapers and magazines.

Books and Taste. The magazines offer, at small expense, acquaintance with the best literary work of the day. The novels of Charles Dickens were originally published in magazines. But the wise man will spend something for the sake of possessing at least a few good books. Even the public library cannot take the place of books on a shelf at home, whether home be a single room or a mansion. You may select your books according to your taste, but you should take pains to cultivate your taste.

A useful distinction has been drawn between the *literature of knowledge* and the *literature of power*. Keep this in mind in filling your bookshelf. Reliable volumes that contain the things one needs to know, or should be able to refer to on occasion, are of great importance; for exact information is indispensable. These make up the literature of knowledge. This class includes dictionaries, encyclopedias, histories, and books upon special sciences. Of even greater value are the books of power. These feed the imagination and inspire ideals. Such are the great biographies, classic stories, essays, and poetry. The wise man will value these, not for all they contain, but for what they actually bring to *him*. A single article in a work of reference, a single idea or fact in a history, one little poem out of a large volume, may be worth to you many times the cost of the book.

STORY OR NARRATIVE

Both of these words are derived from roots which mean simply *see* or *know*, but they have come to be applied to all accounts of events. The order of telling a story is either: (1) the time order in which things happen, as in history; or (2) an "arrangement" different from the time order. This "arrangement" may be made for the sake of (a) holding attention or (b) making clearer the relations of cause and effect among the events. Such an "arrangement" is called a plot, and stories so planned are fiction.

For plot outlines, refer to *The Book or Article Review, The Scenario*.

Ancient Stories. Everybody likes a good story, and story-telling is very nearly, if not quite, the most ancient of the arts. The oldest discoverable collections of writing contain well-developed narratives in the form of myths and legends. A *myth* is an ancient tale which usually conveys some imaginative account of the origin of gods, various human arts, or natural phenomena. The *legend* is similar to the myth, but it is more directly concerned with the deeds of men. In the course of centuries, many of these tales were combined by master story-tellers into *epics*, which are stories of the lives and deeds of heroes, such as the *Iliad* and the *Odyssey*. The word epic comes from the Greek *epos*, meaning "speech" or "song," because these great stories were told or chanted for generations before the poems were actually written.

Medieval Romance. During the middle ages, long *romances* about the careers and conquests of Alexander and Charlemagne and their followers took shape from the tales and songs of minstrels who wandered from court to court and were welcomed in the castles for the entertainment they brought. The name *romance* was given to these stories because they were composed in the common Romance, or French, tongue rather than in the Latin of scholars. In similar manner, the romances of King Arthur and of the Holy Grail were built. Upon this fund of romance many modern writers have drawn. Tennyson embodied the Arthurian legends in the *Idylls of the King*.

In their early form, these stories were told in verse. Later they were recast in prose form by various writers. With these poems in prose there grew side by side the *prose tale*, which was a story of adventure, in which the events were strung together loosely and the interest depended on the strangeness of the events or the unforeseen outcome of the adventures. Several romantic prose tales were produced by Greek writers in the early Christian centuries. One of the most famous was *Apollonius of Tyre*. From this tale came Shakspere's plot for *Pericles, Prince of Tyre*. To this general type of story belongs the series of tales known as the *Arabian Nights*. Washington Irving's *Tales of the Alhambra* furnish a more modern instance. Out of these loosely constructed legends there have developed in modern times the novel and the short story.

The Novel. Of the *novel* there are two general types. In the *romantic novel*, of which the stories of Sir Walter Scott are examples, the story is placed at a distance from the reader, in either time or space, and the strangeness of events and places contributes much to its interest. In romance our dreams come true. The *realistic novel* takes its subject matter from everyday affairs. The usual motives of people form the story, and the outcome must be made to seem reasonable and likely. William Dean Howells's work is among the best in the realistic style. The love motive is almost universal in the novel. The *psychological novel*, exemplified in Joyce's *Ulysses*, is primarily interested in recording the thoughts and feelings of the characters. The novel may vary in length from several thousand words to several hundred thousand.

The Short Story. The modern *short story* has been developed within the last hundred years. Its ancestors were many,—the Greek romances, the *fabliaux* in France, such tales as Boccaccio told in prose in Italy and Chaucer retold in verse in England; but it is a form clearly distinguished from all these. Edgar Allan Poe may be credited with the first characteristic work in the new form in America, and his stories are still reckoned among the best. The short story takes a small group of characters, carries them through a brief time, and, in rapid action, with a minimum of description, works out their fortunes and interactions. The story may vary in length from a few hundred to six or seven thousand words. The explanation of the plot must usually be cleverly concealed until the end of the story is reached, but it must then be made to seem reasonable and convincing. The works of Bret Harte, Francis R. Stockton, R. L. Stevenson, and Rudyard Kipling furnish examples of various types of the short story.

Special Forms of Prose Fiction. Both the novel and the short story appear in various special forms. The *mystery story*, for example, may be either long or short, but its plot turns upon some skillfully concealed relation between the events narrated. When this relation is revealed, in the end, as something very simple and commonplace, we have what is sometimes called a *surprise plot*. Or the mystery may be left as an unexplained something in the borderland of fancy or superstition, which human science has not yet mapped out. The mystery story is really a very primitive sort of tale, and many examples of it are to be found in early folklore. It carries all the thrills of unexpected and unexplained fortunes. Poe's *Gold Bug* and *Fall of the House of Usher* are classic examples of the modern mystery story.

The extraordinarily popular *detective story* is one sort of mystery tale, in which such a fascinatingly keen, questioning mind as that of Sir Arthur Conan Doyle's creation, Mr. Sherlock Holmes, is seen at work unraveling the tangled threads of the mystery. It is really a story built backward; for the real story is assumed to be already finished, and the detective is set to going over the obscure trail to discover the origin of the train of events. What we get is really two stories in one, the first being that of the original characters and events, the second, that of the detective and his discoveries. Such a story is *The Leavenworth Case*. The *adventure story* is more nearly like the old-fashioned tale. Its interest depends mostly upon the succession of unexpected and more or less complicated incidents calling for courage and address in the characters. *Robinson Crusoe*, *Treasure Island*, and *Kidnapped* are favorite examples of this kind.

Both the novel and the short story may be so written as to carry a special interest derived from the *location of the events*, from the *type of industry* in which the characters are engaged, or from the *class of society* in which they move. This last kind may involve only the people of one class of society. But more commonly it follows the ancient instinct of story-tellers for the effect of contrast. Then the clash of high and low, of rich and poor, which has interested mankind from the time of Aladdin and King Cophetua, furnishes the moving impulse.

The *historical novel* involves historical events as a necessary part of the story, and pictures some historical period. When it is based upon real scholarship and gives a trustworthy picture of the time in which its action is placed, it is not only interesting in itself but valuable as an aid to the study of history. *Hugh Wynne*, *The Crisis*, *The Cloister and the Hearth*, *Ivanhoe*, *Quentin Durward*, *The Last Days of Pompeii*, *The Conqueror*, *Quo Vadis*, and *Ben Hur* are excellent examples.

History. The almost universal desire for the true story finds satisfaction in *history*, the story of man's life from the beginning to the present time. Indeed, it is out of this material that most fiction and poetry are made. A knowledge of history is essential to a true education. An impartial and readable history, therefore, entitles its author to very high regard. The following works are masterpieces in this field: James F. Rhodes's *History of the United States*; Theodore Roosevelt's *Winning of the West*; Green's *History of England*; Ferrero's *Greatness and Decline of Rome*; Prescott's *Conquest of Mexico* and *Conquest of Peru*; Parkman's *France and England in the New World*; J. L. Motley's *Rise of the Dutch Republic*.

Biography. Second only to history in importance as a part of education, and in its masterpieces equally fascinating, is *biography*, or the life histories of important personages. To know the great thinkers and workers of the world through their biographies is not only interesting but of incalculable worth as an influence in developing character. The list of true and readable biographies is long. Many short lives have been written and published in such series as *American Statesmen* and *English Men of Letters*. The following are of high rank: Boswell's *Life of Johnson*, unique among biographies; Plutarch's *Parallel Lives of Illustrious Greeks and Romans*, an ancient work still full of interest; Morley's *Life of Gladstone*; Thayer's *Life of Cavour*; Carlyle's *Oliver Cromwell*; Palmer's *Life of Alice Freeman Palmer*; Booker Washington's *Up from Slavery*; Jacob Riis's *Making of an American*; Beveridge's *Life of John Marshall*. *Letters* and *journals* supplement biography.

Travel. Always and everywhere people are interested in *travelers' stories*, and many most entertaining books have been written to satisfy this appetite. A very large part of the *Odyssey* is made up of the wanderings of Odysseus, the Greek hero; the adventures of Sindbad the Sailor are proverbial; the book of the travels of Marco Polo through Asia is a classic. Among recent books, those of Harry Franck about his walking trips in various parts of the world are unique and interesting. The *Reminiscences of Rafael Pumpelly* contain some charming stories of travel in the 19th century. The stories of Arctic exploration by Peary and Stefansson, Roosevelt's travel and hunting narratives, the lives of Stanley and Livingstone, and Stevenson's chronicles of the South seas furnish mines of fascinating reading.

Folk Stories. The *folk tale*, or *folk story*, is what its name implies, a tale which has been told over and over again among the common people. This type of story is common to all peoples, and it is worthy of note that such stories circulated among widely separated peoples tell of similar adventures and teach similar truths. Many of these legends may be found in the collections made by Andrew Lang.

The *fairy tale* may be thought of as a type of folk story. Most fairy stories are of very ancient origin; some are modern. They are always concerned with a fanciful explanation of events and with the fate of people. The fairies are the little people of the air and the trees and the caves, who are either friendly or unfriendly to human folk. Some of these stories are very beautiful, while others are marred by the savage cruelty of barbarous times. Andersen's original tales and the *Märchen* gathered by the brothers Grimm offer excellent specimens of the fairy tale.

Stories That Teach. A very engaging type of story, of ancient origin, widely current in medieval times in Europe, and still to be found among remote and untutored peoples, is the *animal story*, in which the animals are personified, or endowed with human faculties. Frequently each sort of animal is supposed to embody a particular human trait, and the stories take on a moral flavor. In America, the finest examples of these tales are the Uncle Remus and Br'er Rabbit stories, retold in the negro dialect by Joel Chandler Harris.

Closely related to these animal stories are *fables*, pointed anecdotes in which animals are endowed with human qualities and are made to illustrate moral lessons. The fables of Æsop and of La Fontaine are universally popular.

The *parable* is a story of common events or happenings of every day, used to illustrate moral or religious truths. As the typical beginning of the old-fashioned story is "Once upon a time," so the typical beginning of the parable is "It is like." The New Testament affords us the best examples of the parable, though in one form or another a parable appears wherever any teaching of moral or social truth is to be done.

The *allegory* is a development of the story of common things which conveys moral and spiritual meanings. The allegory extends metaphor and personification into a story, in which the characters represent qualities, motives, or types of character. The morality plays of early English literature,

such as *Everyman*, and many modern short, poetic plays are really allegories. Indeed, the short allegory may be found frequently in fiction.

In English, the great prose allegory is Bunyan's *Pilgrim's Progress*. Dante's *Divine Comedy* is perhaps the greatest of the world's allegories. There is also much allegory in Tennyson's *Idylls of the King*.

DESCRIPTIVE PROSE

This type of composition appears as an important part of books on travel, art, architecture, cities, and natural scenery. The books of travel referred to under *Travel* contain many fine examples of this graphic style of writing.

EXPOSITION AND ARGUMENT

The logical development of themes is to be found in the form of *essays* on literary, historical, and scientific subjects, and in *speeches* and *orations*. The *essay* presents, either in serious or in light style, a writer's thoughts upon a subject, to inform, convince, explain, or entertain. The essays of Bacon, Addison, and Macaulay are English classics. Huxley was the great scientific essayist of the 19th century. Lord Bryce's *American Commonwealth* is a long essay, combining exposition and argument. Current magazines contain many essays upon a wide variety of subjects, in the form of editorials, special articles, and studies. The *speech* or *oration* is usually a discussion of a theme of public human interest, argumentative and persuasive in character, and prepared for a particular public occasion. The works of Edmund Burke, William Pitt, Patrick Henry, Daniel Webster, Abraham Lincoln, Stephen A. Douglas, Henry W. Grady, and Rufus Choate furnish examples of English and American oratory.

POETRY

When emotion and the creative imagination rule expression in language, we have poetry. The province of poetry is to kindle the imagination and inspire fine sentiments and high enthusiasms through beautiful language. English literature is rich in poetry that does just these things.

The Lyric. This is the simplest and most familiar form of poetry. The word *lyric* implies singing, but the lyric poem need not be set to music. It is simply the poet's personal expression of feeling, and it may be written upon any theme that arouses in him an emotional response. This theme is usually suggested by some person, place, or natural object. Usually the lyric is short, not more than a few stanzas, so that it can be read easily in a short time and grasped as a whole.

The songs of Robert Burns are among the purest lyrics in the English language. Tennyson's work includes many separate lyrics of very great beauty as well as numerous short songs inset in some of his longer poems. Rudyard Kipling's poetry should be read for a more rugged and vigorous type. Sidney Lanier produced several very beautiful lyrics, among which are *The Woods and the Master* and *The Marshes of Glynn*. James Whitcomb Riley's verses, even when he is telling a story, often seem to sing themselves. Riley is the great American master of the lyric in popular language. Joaquin Miller, among American poets, is to be read for his *Songs of the Sierras*. Among present day poets, also, the works of Alfred Noyes and John Masefield, in England, and of Richard Le Gallienne and Bliss Carman, in America, should be read.

The Sonnet. A lyric poem of the fixed length of fourteen iambic pentameter lines. Usually it has a first section of eight lines and a second section of six, though the sonnets of Shakspere do not conform to this rule. The sonnet was adopted into English from the Italian. It is a form that requires the finest mastery both of language and of thought. Every reader of literature should be acquainted with some of the greater sonnets of Shakspere and Milton and also with sonnets by poets of the present day. As fine examples of the English sonnet, one may read Wordsworth's *To Milton*, Keats's *On Chapman's Homer*, and Rupert Brooke's series of sonnets under the title "*1914*."

The Ode. A lyric adopted from the Greek, but altered greatly in form by various English poets. Today it is simply a poem written in dignified and elevated style, often for some set occasion. It varies, in length and metrical form, from such poems as Wordsworth's *Ode to Duty* and Shelley's *Ode to a Skylark* to a poem of the length of Lowell's *Commemoration Ode* or Tennyson's *Ode on the Death of the Duke of Wellington*.

Hymns and Songs. Hymns are written in stanzas usually of four or six lines with three or four accents to the line, though there is no special rule for these. *Popular songs* have most frequently the trochaic meter because of its lightness and rapidity of movement.

Elegies. These are funeral laments, often of a reflective character. Gray's *Elegy Written in a Country Churchyard* is an English classic.

Narrative Poetry. Aside from the great epics—the *Iliad*, the *Odyssey*, the *Æneid*, and *Paradise Lost*—and the metrical romances, such as those about Charlemagne and King Arthur, the most interesting form of narrative poetry is the *ballad*. This is really a folk story in lyric verse, though in modern use "ballad" means any short simple lyric. The manner of telling the story is frequently dramatic, that is, the characters are allowed to speak for themselves. The ballads of Robin Hood are perhaps the most familiar in English. These and many others may be found in such a collection as *English and Scottish Popular Ballads*, made by Francis J. Child.

Geoffrey Chaucer's *Canterbury Tales* mark the beginning of modern English narrative poetry. The stories of *Miles Standish* and *Evangeline*, as told by Longfellow, are familiar examples of the narrative poem of modern times. For many years the prose novel and the short story have crowded out the narrative poem, but recently it seems to be returning to favor in the work of several English and American poets. In America, Robert Frost is master of a type of short dramatic narrative, several examples of which are to be found in his volume *North of Boston*. John Masefield's *Dauber* and *Everlasting Mercy* and Alfred Noyes's *Drake* are excellent examples of recent poetic narratives.

Anthologies. The word means collections of flowers and was anciently used for compilations of short Greek poems and epigrams. Now it applies mostly to collections which represent the finest poetry of a given country, as an "American anthology," or poems about a certain class of subjects, as an "anthology of war poetry," or poems representing a certain type, as an "anthology of lyrics" or of hymns.

Vers libre, "Free Verse." This name is applied to a type of modern poetry in which the strict meters of the older verse do not appear and in which rime is rather deliberately rejected. Apart, therefore, from its arrangement in lines of irregular length, it is often difficult to distinguish this form of poetry from rhythmical prose. The writers of "free verse" attempt to make the rhythm of their poetry reflect truthfully the emotions that prompt them to write. Obviously, a poet must possess great skill to do this successfully. Hence very few pieces of good "free verse" have been written, the more successful being found in the works of Carl Sandburg, Amy Lowell, and Edgar Lee Masters.

DRAMA

A drama, or play, is essentially a story arranged to be told in action on the stage. This method of telling a story is very ancient, dating back to early

festivals, when legends connected with the god or patron of a feast were represented with music, dancing, and recitation. The history of the stage and the drama in all countries shows more or less intimate connection with the service of religion as well as with the human love of entertainment.

English dramas are written either in verse or in prose. Sometimes the dramatists may use both forms in the same play, as Shakspere did. At the present day, however, most plays that are to be both staged and printed are written in prose, for the modern public calls for a more "natural" mode of speech. The subject of the drama may be drawn from almost any source, according to the genius of the playwright, and, like the novel or short story, its manner may be romantic or realistic.

Tragedy and Comedy. Tragedy signifies a play of serious action and motive usually representing some human struggle having an adverse outcome. This struggle may be against the gods or fate, as in the ancient drama, against their own passions, as in the Shaksperian tragedies, or against their passions and social conditions, as in more modern plays. Comedy implies a lighter, more pleasant story, with a happy ending in place of the sad or disastrous close of tragedy. Few plays of the present day answer strictly to this classification, most of them exhibiting both tragedy and comedy.

Various Forms. We may have a *play of incident*, in which we are interested chiefly in what happens, or a *play of character*, in which we are interested chiefly in the people to whom things happen. The play may be said to belong either to *serious drama*, in the course of which some essential change or development in one or more characters is required, or to the *lighter drama*, in which there is frequently only change of situation or of relations among the characters. The *farce* is a light play of incident, carried to the extreme of artificial or ridiculous situations. The modern *melodrama* is, as the name implies, a play often accompanied with music, but characterized always by exaggerated sensational features together with a happy ending.

Goldsmith in the 18th century produced what is known as *comedy of manners*. He was followed by several playwrights in the same fashion. Plays in this class to be read are *The Good-Natured Man*, *She Stoops to Conquer*, *The Rivals*, and *The School for Scandal*.

A very large number of English and American plays of the last thirty years are to be classed as *social drama*. In these the method of the playwright is realistic, and his object is to portray the working of everyday human motives. Sometimes he rises to a discussion or criticism of modern social life and customs.

In America, William Vaughn Moody, Clyde Fitch, William Gillette, and Augustus Thomas have produced plays that are suitable for reading as well as for stage presentation. Among English playwrights, Sir Arthur W. Pinero, Henry Arthur Jones, and John Galsworthy have done notable work.

There are in English several dramas which, while not successful on the stage, should be read by the student. Among these may be mentioned Tennyson's *Becket* and *Mary* and Browning's *The Falcon* and *Pippa Passes*.

The modern play rarely goes beyond three or four acts, and at the present time there is a marked interest in short plays of one act or two acts. The short plays of Lady Gregory, Lord Dunsany, and Sir James Barrie represent the best in this type of drama. There is a widespread interest also in the *pageant*, which is simply an outdoor play with much action but with very little text. Its most frequent use is for portraying poetically the life and customs of past times, in celebrations of historical events. Much attention is being given to the religious play.

For further references, see *Family Library, articles and tables on the various national literatures*, and the *Table of Modern World Literature*.

FIGURES OF SPEECH

Apt figures of speech are pictures of one's thoughts. A good comparison throws light on an idea, thereby helping people to understand it. For this reason, the language of the plain, matter-of-fact man is full of comparisons and figures, which he has inherited or unconsciously learned from those around him. He says, "plain as day," "heavy as lead," "level headed," as naturally as he says "see," "lift," or "think."

A *figure of speech* is a deviation from the usual application of words in order to impart clearness, force, and beauty to the composition. By saying "an army of ants" we give a vivid impression both of orderliness and of vastness in number. When David says "they were swifter than eagles" and "stronger than lions," we at once get a graphic description of the physical qualities of Saul and of Jonathan. Figures may be grouped in the four following classes:

I. Figures that picture a hidden resemblance or make use of a close association.

Simile (*sĭm'ĭ-lē*). In this figure, a likeness between things is expressed, usually by *like* or *as*, in the form of a comparison: "Sweet *as the morning air*." One may recount the kind words and acts and cheerfulness of a visitor and thus describe her prosaically very well, but if one says, "Her presence was *like a ray of sunshine* in a darkened room," the whole story is pictured in a single phrase. Other examples: "Quick *as lightning*"; "Abundant *as the light of the sun*"; "Deaf *as any tradesman's dummy*"; "A baby's feet, *like sea-shells pink*"; "Jolted *like a solitary penny* in an iron bank"; "White *as chalk*."

Metaphor (*mĕt'à-fôr*). The word means "carrying over," "transfer." In this figure, the word *like* or *as*, used in *simile*, is omitted, and, by an implied comparison, a new meaning or picture is transferred directly to the word: "He was a *tower* of strength"; "*Seeds* of truth"; "Lowliness is young ambition's *ladder*"; "Sail on, O *Ship* of State"; "Hours and minutes are *dollars* and *cents*."

The next two figures, *synecdoche* and *metonymy*, are similar in that the things suggested for comparison are more closely associated than those used in *simile* or *metaphor*. They are not uncommon in everyday speech, and their skillful use is a secret of much that is fascinating in literature. It is often difficult to classify an expression definitely as one or other of these figures. The name "metonymy" is often used for both.

Synecdoche (*sĭ-nĕk'dô-kē*). A figure in which a striking part of the object is used to signify the whole, or sometimes the whole to signify the part: "A thousand *hands* waved farewell"; "This *roof* (house) protects you"; "Now the *year* (the summer) is beautiful"; "*Ten thousand swords* would have leaped from their scabbards"; "The *hearths* (homes) of the nation"; "The *city* welcomed him."

Metonymy (*mē-tŏn'ĭ-mĭ*). A figure by which we put the cause for the effect, or the effect for the cause, as when we say, "He reads Milton," i. e., Milton's works; "Gray hairs should be respected," meaning old age; "My son, give me thy *heart*" (affection); "He was the *sigh* of his mother's soul" (the boy she loved).

Personification. The figure by which inanimate things or ideas are endowed with the qualities of human beings: "*Wisdom crieth* in the streets"; "*Hope* hath never lost *her* youth"; "The little *Road says*, Go";

> "The *Worm* aware of his intent
> *Harangued* him thus, right eloquent";

"Hark! *Truth proclaims*, thy triumphs cease"; "The *Sea saw* it and *fled*."

Allusion. A figure in which reference, direct or indirect, is made to some personage, incident, expression, or custom, with which the reader is familiar, to

convey a vivid picture of the subject in hand: "A *Daniel* come to judgment"; "A *Napoleon* of finance"; "*They shall not pass.*"

II. Figures that depend for their force partly upon the arrangement of words in the sentence and partly upon the mental attitude of the speaker or writer.

Interrogation. This figure consists in asking a question with an implied contrary answer. Its force amounts to a vigorous denial: "*Am I a dog?*" "Hath the Lord said it, *and shall He not do it?*" "Hath He spoken it, *and shall He not make it good?*" "He that planted the ear, *shall He not hear?*" "He that formed the eye, *shall He not see?*" The figure is appropriate in intense expression, especially in oratory.

Apostrophe (*ȧ-pŏs'trô-fē*). Another figure which is appropriate in oratory or in exalted poetry. It consists in turning aside from the usual order of words and addressing an object, an absent person, or a personified idea, thus bringing the object or idea vividly to the reader or audience: "O *Duty*, if that name thou love!" "O *Death*! where is thy sting?" "O *Grave*! where is thy victory?"

Vision. A figure closely akin to apostrophe but less forceful. This figure consists in describing a scene, an object, or an event as if it were immediately in view: "*I see before me the gladiator lie.*" The value of the figure consists in its vividness. The use of the historical present is a form of vision: "*I remember well the day I entered the room, the familiar objects are all before me, but my mother is not there.*"

Irony (*ī'rô-nĭ*). This consists in saying the opposite of what is meant. A classical illustration of irony is to be found in the repeated phrase of Mark Antony in *Julius Cæsar*: "They are *honorable* men"; "We have, to be sure, great reason to believe the *modest* man would not ask him for a debt, when he pursues his life." Modern writing is characterized rather by touches of irony than by a full development of the figure. It is a dangerous tool to use even occasionally and not at all fit for habitual employment.

Litotes (*lī'tô-tēz*). A figure of speech by which a strong affirmative is expressed simply by the negative of the contrary: "a citizen of *no mean city*," i. e., "of an important city"; "A storm of *no small force* drove our vessel before it"; "To be polite in word and in deed is a matter of *no slight significance.*"

Hyperbole (*hī-pĕr'bô-lē*). An exaggeration for the purpose of compelling attention: "*Every word that Webster used weighed a pound*";

"The sky *shrunk upward with unusual dread*
And trembling Tiber *div'd beneath his bed*";

"My song *shall blossom at your feet*
My heart *your throne shall be.*"

Euphemism (*ū'fē-mĭz'm*). A mild or inoffensive expression used in place of what is regarded as an unpleasant statement. It is generally to be avoided: "*He is a little careless when handling the truth*"; "*He was in the habit of removing people's goods out of their houses without previous arrangement with the owners*"; "*He passed away.*" These are euphemisms for lying, for stealing, and for death.

III. Figures that are simply arrangements of well-chosen words to produce packed and pointed expression.

Antithesis (*ăn-tĭth'ê-sĭs*). This figure depends for its force upon vivid contrast of opposite terms or ideas. It gains power through the balanced construction involved in the sentence: "If one would be rich, *should he labor to increase his possessions, or to diminish his desires?*" "The Puritans hated bear baiting, *not because it gave pain to the bear, but because it gave pleasure to the spectators.*" Many catch phrases are antitheses: "*rich and poor*"; "*capital and labor.*"

Climax. An arrangement of words or groups of words in ascending order of force or importance: "*I know it, I concede it, I confess it, I proclaim it.*" "*Force, force to the utmost; force without stint or limit; the righteous, triumphant force which shall make right the law of the world and cast every selfish dominion down in the dust.*" The strongest expression must be placed last in order.

Epigram. A short, forceful expression which depends for its value upon its brevity and upon some surprise involved in it. The best epigrams imply some antithesis: "*The silence was audible*"; "*So good that he is good for nothing*"; "*Some laborious orators mistake perspiration for inspiration.*"

Epithet (*ĕp'ĭ-thĕt*). A descriptive word or phrase into which has been packed an important meaning or a vivid picture. The epithet is an important element in poetry, and many epithets have become common words. There are two kinds of epithets:

1. *Essential Epithets*, or names of qualities always associated with the thing described: "*green* grass"; "*bright* sword."

2. *Conventional Epithets*, such as adjectives which become commonly associated with certain names: "*honest* Abe"; "*doubting* Thomas"; "*bright-eyed* Athena." The Greek poems, the *Iliad* and the *Odyssey*, are particularly rich in epithets: "the *wine-dark* sea"; "*hollow* ships"; "*rosy-fingered* dawn." Other examples: "our *honored* dead"; "*daisied* fields."

IV. The following names are given to certain uses of words for their sound values:

Euphony (*ū'fô-nĭ*). A name applied to the pleasing effects of sounds produced by the combination of words in sentences or of phonetic elements in spoken words. Euphony is a fundamental requirement of poetry: "The most sounding and euphonic surname that English history or topography affords";

"The bells of Shandon that sound so grand on
The pleasant waters of the river Lee."

Onomatopœia (*ŏn'ô-măt'ô-pē'yȧ*). The word means name-making. Onomatopœia is the use of a word or phrase formed to imitate the sound of the thing signified. Many words in common use furnish examples: We say *rat tat tat* to denote a knocking at the door, *bow wow* to express the barking of a dog, or *buzz, buzz* to indicate the sound made by bees. Onomatopœia is frequently used in poetry where the sound of certain words is used to convey the sense; thus,

"When Ajax strives some rock's vast weight to throw
The line too labors, and the words move slow";

"And the *light Latin tripped* along her tongue
Amid the *roar of Irish gutturals.*"

Alliteration (*ă-lĭt'ĕr-ā'shŭn*). The use of a succession of words having the same initial letter or sound. The chief value of alliteration is in challenging attention. Alliterative phrases, also, are easily memorized: "*babbling babes*"; "*feathered fowl.*" Early English poetry used alliteration in place of rime and meter. The device is frequently used in modern poetry; as, for example, "*Still stands* the forest primeval"; "*Lisp* of *leaves* and *ripple* of *rain.*"

Assonance (*ăs'ô-nȧns*). A name applied to the recurrence of the same vowel sound in a group of words. Assonance is likely to become monotonous and disagreeable in prose or even in poetry, though sometimes it is used with good effect: "*So all* day *long* the *noise* of battle *rolled*"; "*Hark*! *Hark*! the *lark.*"

LETTER WRITING

Among the arts of everyday life there is none more important than that of letter writing. Our business and social relations are so dependent upon our written communications that the ability to write a clear letter in correct form is regarded as an essential mark of an ordinary English education. No accomplishment is more highly prized than skill in writing tactful, effective business letters, unless it be the ability to write a graceful personal letter of friendship. The general principles that govern the writing of letters and many suggestions that will help the student of the art to perfect his work are given in the following pages. The very fact that a letter is taken as an index of the personal character of the writer should prompt us all to most careful study of this art which is at once so practical and so easy to master.

We all know the kind of letters we like to receive—social letters that are really sincere and hearty, like the personal talk of friends, business letters that are frank and clear and that bring the writers, as we say, face to face with us. The telephone conversation, instead of taking the place of the letter, has served to emphasize the importance of the personal, direct, well-planned letter, and to increase the demand for it. Telegrams often require "letters to follow," which state more completely the contents of the messages. Good business records demand letters to "confirm" important telephone conversations.

THE BUSINESS LETTER: PRINCIPLES

We judge people and business houses by the letters they write. First, the appearance of the letterhead, the quality of the paper, and the outward form or display of the letter attract or repel us; then the substance of the message and its style and its tone make their impression. All these elements contribute to the general effect of any letter and determine what the response to it shall be.

As we judge others, so we are judged. If our letters are to be worthy representatives of us and fulfill the missions on which they are sent, we must plan and construct them carefully and intelligently. No detail either of material or of dress can safely be neglected.

How do you plan your letters? Do you organize the ideas so that they can be quickly and easily understood? Do you present them with the ease of manner and with the touch of individuality that you would put into a personal interview? Do the sentences you write and the order in which you write them so clearly express what you wish to say that the reader will naturally make the response you want? Do you use the tone of courtesy and of respect that will leave in the reader's mind a pleasant impression and build his good will for you?

BUILDING YOUR LETTER

The object of practically every business letter is to secure action, either immediate or remote. But the reader is not likely to act as the writer wishes, unless it appears to his own advantage to do so. Hence, it is wise to study the merits of the proposed action from the reader's viewpoint, and to present them in such a light that he can see them plainly. In every legitimate transaction both sides profit, but it is necessary to lay greatest stress upon the reader's profit, since his self-interest is his most powerful incentive to action.

It is true that we all act upon suggestions, either in the form of commands or in the gentler forms of persuasion. First, however, our attention must be secured, our interest must be aroused, and we must have inducements to action. Hence, the following steps in the building of a business letter are well established and are of almost universal application:

(1) Get the attention of the reader; (2) Give him definite information; (3) Arouse his interest; (4) Offer him an inducement to act or to respond to you; (5) Give him a positive suggestion or direction; (6) Close your letter with a courteous expression that leaves a good feeling behind it.

The following example illustrates one way of building the letter. The headings in the left margin are, of course, not a part of the letter.

(LETTERHEAD)

FOREST PRODUCTS ASSOCIATION

LUMBERMAN'S EXCHANGE
LASALLE AND MADISON STREETS, CHICAGO, ILL.

HOMES BUILDING DEPT.
WALTER C. HINES, *Manager.*

June 17, 1921.

Mr. Thomas C. Parsons,
22 Elm St.,
Utica, N. Y.

Subject: Expert Service.

Dear Sir:

ATTENTION AND INTEREST (the receiver's point of view)

As you say in your interesting reply to our advertisement, the time was, not so long ago, when a man built his house just as his neighbors built theirs. He used wood or brick or stone, because these were the only materials to be had. For the same reason, his roof was either shingle or slate.

Nowadays, however, as you suggest, a man tries to express his taste in a home. He wants also to fit his house artistically to its location. In response to these demands, the variety of available materials and of plans for their combination has been increased beyond the range of any one man's knowledge.

INFORMATION

Right here is where we can help you. Our business is to bring to the solution of your problem the best possible expert knowledge of materials and construction. This service we are able to supply economically through our large co-operative organization.

INTEREST AND INDUCEMENT

We enable you to save money on the cost of building and to realize with greater satisfaction your ideals of convenience, quality, and beauty.

Two booklets, "Some How's of Houses" and "Forest to Finish," which we are mailing to you today, will give you a suggestion as to our method of service. You will notice that we propose to furnish unbiased advice about ALL *kinds of building materials.*

POSITIVE SUGGESTION AND COURTESY

When you have examined these booklets, just fill out and sign the enclosed card. It will bring our nearest expert representative for a personal conference at any time you suggest.

Very truly yours,

Enc. *Walter C. Hines.*

This letter, to be sure, is a sales letter and therefore exemplifies more clearly the steps mentioned above than does a collection letter or letter of adjustment. All business letters, however, are in a sense sales letters, since all attempt at least to "sell" the writer's viewpoint and to secure the reader's favorable response.

Of course you can make these several steps in ways as varied as the kinds of people concerned and as the nature of the services involved. So, the particular contents of letters will vary with circumstances. Many very short notes, such as orders or brief acknowledgments, will not show all the steps. In general, however, the opening of the letter should recognize the reader's viewpoint. Beyond this very important approach to the recipient, the contents of the letter should further prepare him for the letter's real message by impressing upon him a sense of the writer's reliability, thus arousing his confidence. The next step is either direct statement or tactful suggestion of the writer's viewpoint. Persuasion of the reader to accept and to act according to that viewpoint is the final step.

The Letter as a Talk. You may think of the letter as a substitute for face to face talk. Hence, imagine as clearly as you can the characteristics of your reader, his immediate problems, and those features of his surroundings which you might see clearly in a personal interview. You will thus be able to put into your letter the welcome personal element. For instance, a letter planned to sell an article to a lawyer or to a doctor will be different in its appeal from letters designed to reach a farmer or a merchant. *Plan your letter for your reader.*

It should be noted that the letters quoted here are only illustrations of principles and methods and are not offered as models or guides. Since conditions vary greatly and every letter should be written with its particular reader definitely in mind, no set of letters, however extensive, could safely be copied or closely imitated. Imitation of models, moreover, destroys the element of personal character that is so important a part of the good business letter.

The Letter as a Record. The letter is a more permanent thing than the conversation. (1) It serves as a ready means of confirmation and of record. (2) In it matters may be elaborated, or treated more definitely and more connectedly than in a conversation. (3) Most people find it easier to understand an object or a statement if they can see it. They have more confidence in their eyes than in their ears. Besides, they can take more time to study the thing or the word that is before their eyes. Hence the letter frequently offers an occasion for clear, detailed explanation, which the reader may have before him for continuous study or for repeated examination.

In modern practice, clear explanation is recognized as the best means of persuasion through letters. Argument is generally regarded as out of place in a business letter, except as it appears in the form of a conclusion based upon clear explanation. This is a principle also of the best modern advertising; for an advertisement is really an "open letter" of business.

STYLE: QUALITIES

The preceding paragraph will suggest that the business letter is not necessarily brief. In practice, however, it is usually, if possible, limited to one page. But it must always be *clear*, *concise*, *positive*, and *courteous*.

I. Clearness. This is a quality to be secured through right order, simple, direct statements, and pleasing mechanical form. If you first arouse attention and interest, the way to understanding is open; clearness means ease of understanding for the reader, but nothing is clear to an inattentive mind. Clearness through style involves: (1) the use of accurate, definite, familiar words and phrases; (2) the use of well-made and well-punctuated sentences; (3) good paragraphing.

1. Words and Phrases. The words in your letter should be "loaded"—each one should carry a definite meaning. The habit of using a limited stock of words is easy to fall into, but it is fatal to clearness, except in the narrow circle of persons familiar with them. Every business has its peculiar set of *stock phrases*, its *cant* or *jargon*, which is unfamiliar to many people. For them, it must be translated into expressions they can understand readily. The letter writer should study *Usage* and *Synonyms*. This is the way to learn to adapt language to the reader. The following suggestions with respect to certain commonly used expressions are approved by good writers:

Advise, in the sense of *inform* or *tell*. The word is used too often. *Inform* or *notify*, except in formal writing, would be better.

Along these lines. A good phrase, but, when used too often, *lines* becomes indefinite. *In this way* or *following these plans* may be more definite.

And oblige, as in the phrase, "*and oblige* Yours truly." An obvious short-cut in courtesy, and therefore lacking in courtesy. Write "We (or I) shall be greatly obliged."

As per. Use *according to*, or some other phrase. See *Good Usage*.

At all times, At this time. The false formality in these phrases often repeated robs them of force. Prefer *always* and *now*.

At hand or **Has come to hand.** An obsolete phrase. Write "We have your letter—," or leave the fact to be understood.

Attached hereto. Appropriate only in the briefest, routine forms.

At the present writing. Prefer *now* or *at present*.

Beg, as in "We *beg* to state." An expression to be used only in the most formal correspondence. Otherwise it suggests a false humility.

Complaint. The word has been displaced in favor of *claim* and *adjustment*. The business advantage is obvious.

Contents carefully noted. A dead phrase. Use some words that will really convey the personal interest intended: "We have read with particular care, etc."

Enclosed herewith or **We enclose herewith.** *Herewith* is unnecessary.

Enclosed please find. *Please* is superfluous. Write "You will find enclosed" or "We enclose."

Earliest convenience. A faulty choice of words assumed to be courteous because of their indefiniteness. "As soon as possible" or "as soon as convenient for you" is the meaning usually intended.

Esteemed, as in "your *esteemed* favor." This and the following word are old forms of courtesy worn out by too frequent use. Say simply "your letter."

Favor, as in "*favor* us with a reply." Save the word for times when a reply is a real favor or courtesy.

Hand you herewith. Originally supposed to suggest personal presence in a letter, this phrase has lost its meaning through too frequent repetition. To say simply "inclose," or "enclose," is usually sufficient.

Inst., Ult., Prox. These are not now in good use to indicate present, last, or next month.

Kindly, as in "thanking you *kindly*." Superfluous. Kindness is implied in thanks.

Our Mr...... No longer good form. Omit *our*, or say "our representative," or use his official title; as, "our manager."

Participial Construction, as in "*Hoping* for an early reply." In English, the present participle frequently gives a weak form of expression. Its use in the conclusion of letters is to be avoided. Write, "We hope for."

Party, meaning *person*. See *Good Usage*.

Passive Construction, as in "goods *were not able to be shipped*." Use active form of expression: "It was not possible to ship" or "We could not ship."

Permit me to say. This phrase is too formal for ordinary use. It seems to imply some straining of relations.

Pronouns or Articles Omitted, as in "*Received yours and contents noted.*" The pronoun *I* or *we* is good form and should be used.

Proposition, meaning *affair*. See *Good Usage*.

Recent date, as in "yours of *recent date*." Exactness is preferable. Give precise date.

Same, as in "the *same* shall receive prompt attention." The word is overworked. Use regular pronouns, except in formal papers.

State, meaning *say*. See *Good Usage*.

The writer. People are not so much afraid of the first personal pronoun as they used to be. Use *I* or *we*, instead of *the writer* or *the undersigned*, except in official letters, reports, and other formal documents.

Valued, as in "your *valued* communication." False formality, except on special occasions.

Would say or **Wish to say.** Too frequently these are mere wasteful, roundabout phrases. Omit them.

Your obedient servant. Another worn-out form. Many of these business forms are relics of the old servant attitude of the shopkeeper toward a patron. Let your phrases of courtesy express self-respect.

2. Sentences. The sentence is the common unit of thought expression. In some special types of letters the separate phrase may be used to challenge attention, but good sentence structure is necessary to the good letter. See *Sentence Building*.

Three rhetorical types of sentences are recognized.

(1) *The loose sentence* simply adds idea to idea; it can be closed at any one of several different points and still be a complete sentence. Example: "Students from Central and South America are already coming to our colleges and universities in considerable numbers—and nothing has done so much to make Latin America acquainted with the United States."

(2) *The periodic sentence* is more rarely used and must be definitely planned in advance. It piles up one subordinate idea after another, preparatory to the main statement. Its advantage is in its effect of climax. Example: "That there is a serious housing shortage today, not only in the United States but throughout the civilized world, is a generally known fact."

(3) *The balanced sentence* is so called because it is built of contrasting clauses of similar form, which seem to balance each other like a pair of scales. This sentence is much used in advertising and in business letters. Its value lies in the emphasis and clearness which come from the contrasts in the sentence. Example: "Not only is order Heaven's first law, but it is the first and last law of Earth."

The skillful writer will adapt his sentence form to the subject in hand and to the purpose in view. He will vary the forms of his sentences to avoid monotony, for monotony is the foe of attention and, therefore, of clearness.

See *Punctuation.*

3. Paragraphs. The paragraph is the common form for the relating and the developing of ideas. In its construction, we must consider logic, style, and form. For *Paragraph Development*, refer to *Speaking and Writing* and see below under *Form.* The skillful letter writer will study the psychology of the paragraph. Good paragraph arrangement enables the reader to see the relationship of sentences that belong together as parts of the treatment of a single topic. It enables him also to get the intended emphasis by observing the position of the various sentences in the paragraph. The beginning and the end of a paragraph, as of a sentence, are the emphatic points.

The following is an excellent example of a business paragraph:

"Saving should be more than the accumulation of money. It should include the use of money to add to the total; in other words, investment. Reckless investment is speculation, but careful investment is the best form of saving."

The first sentence states a topic clearly; the second enlarges on the topic; the third, a balanced sentence, develops the "investment" idea and repeats, for emphasis, the word "saving," which thus is kept the most emphatic word in the paragraph.

II. Conciseness. One attains conciseness through using the exact word, and by using no more words than necessary. The quality is the result of precision and of economy in diction. Skill in this matter is to be attained through study of *Synonyms* and of *Usage.* Conciseness is not improved by omitting the pronoun subject from a sentence; as, "Received yours of the 24th." Always put the subject into the sentence. (The imperative sentence is an exception.)

III. Positiveness. This is a matter of *contents* and of *style.* It means direct, definite, unmistakable meaning in directions and suggestions.

1. Strive for positiveness in the *contents* of a business letter. The reason for this rule is psychological. We know how the mind works. Desired action is best secured by positive suggestion; undesired action is best prevented, not by negative suggestion, but by positive suggestion of the opposite action. For example: instead of saying, "Do not delay writing us," say, "Write to us at once"; instead of "We hope you will not read this until the rest of your morning's mail is out of the way," write, "This letter will repay careful attention. Please get the rest of your morning's mail out of the way. Then read what we have written."

2. In *style*, positiveness is emphasized (1) by avoiding the passive construction wherever the active will convey the thought and (2) by avoiding the use of the loose present participle at the beginning of sentences. Use straightforward simple or balanced sentences. Instead of "Finding that we have had no orders from you for some time, we write to inquire," write, "Our records show that recently we have not had our usual orders from you. Naturally, we wonder why."

IV. Courtesy. The true quality of courtesy arises from the writer's consideration for the interests and feelings of his reader. It is usually manifested, however, in the choice and in the use of expressions of politeness that have been well established by convention. It is often made even more evident by what the letter leaves unsaid. Words and phrases that might wound or irritate or might suggest lack of respect for the reader should be scrupulously avoided. The quality of courtesy should pervade the whole letter, but it is especially vital at the beginning and at the end. Most of the specimen letters quoted here illustrate the value of courtesy.

FORM

Good psychology prompts attention to the *mechanical form* of the letter as a means of securing attention and favorable consideration. Not only must the letter be easy to read, but it must invite reading. No matter how important or interesting the contents of a letter may be, if its form is not attractive, it may be a failure.

Quality and Form of Stationery. This is the first consideration. Select good stationery; then write letters of corresponding quality. Generally, commercial letter paper is about 8½ by 11 inches in size. A half sized sheet, 6 by 10 or 5½ by 8, is sometimes used, although the best form is the full sized sheet for all letters. For mailing, this full sized sheet should be folded from the bottom so as to bring the bottom edge within about a half inch of the top. This folding makes the opening of the letter easy. If a letterhead is used, this folding may be made so as to leave a part of the letterhead visible. The folded sheet is then again folded twice, the first fold beginning about one-third of the distance from the right, bringing the sheet to a convenient size for the ordinary business envelope.

For the long or legal envelope, fold the bottom third of the page upward, then the top third down. This folding allows the reader, on opening the letter, to see the heading at once. Folding the top third down first and the bottom third upward makes insertion in the envelope easier. Formal official letters are frequently written on stationery of the social form, that is, on a four-page, folded sheet adapted for folding once to fit either an envelope of commercial size or the square type of envelope. It may carry a short form of letterhead either printed or engraved.

The envelope should, of course, match the paper in color and in quality. A short form of letterhead or return address is printed in the upper left-hand corner of the envelope, or sometimes on the flap of the envelope, as on social stationery.

In general, white paper of the "bond" type is always good form. If tinted papers are used, the color should be such as will not interfere with ease of reading.

Placing the Letter Upon the Page. This is very important. For the positions of the various parts there are set rules. The reader habitually looks for the address of the writer in the upper right-hand part of the page, for his own address and the salutation at the upper left-hand part, on lines slightly below the writer's address, and for a formal conclusion at the bottom. Examples of these rules and of permissible variations are shown in the following specimens.

CORRECT BUSINESS LETTER FORMS

I. The Heading. This contains the address of the sender and the date of writing. It is the first item in the business letter. A printed or engraved letterhead should contain the address of the individual or firm. The address so given need not be repeated. The following forms are approved to be placed in the upper right-hand part of the page. Care should be taken that this heading is not too near the right-hand side. When the heading takes two lines or three, the second and third lines may be indented; as,—

810 Jefferson Ave.,
Cleveland, Ohio,
June 28, 1922.

or, in block,

810 Jefferson Ave.,
Cleveland, Ohio,
June 28, 1922.

or,

725 Tremont St., Boston,
June 28, 1924.

To give a personal or social *tone* to the letter, numbers and dates may be written out. The following form for dates, in both heading and body of the letter, finds favor with some writers:

15 May, 1922.

II. The Introduction, or Address. This is the second item in the letter. It should be placed one or two lines below the heading and at the left of the page. The following forms are in good use:

1. Addressing a firm,—

Messrs. Jones & Black,
480 Main St.,
Buffalo, N. Y.

or,

The Aetna Company,
7 Archer St.,
Omaha, Neb.

or,

Smith, Marks, & Co.,
Boston, Mass.

2. Addressing an individual, as a member of a firm,—

Mr. James T. Girard,
President Girard Steel Company,
St. Louis, Mo.

3. Addressing an individual,—

Mr. Thomas Brown,
513 Sacramento St.,
San Francisco, Calif.

Note.—These addresses may be written in block. Some writers prefer not to use commas at the ends of lines in the heading or address. This practice is permissible. Periods also, except after abbreviations, may be omitted from the ends of these lines. Omission of marks must, however, be consistent:

16 Park St., Denver
December 14, 1923

Miss Jean Phillips
1014 Chamber of Commerce
Cleveland, Ohio

When the firm is addressed, but it is intended that the letter should go to some particular person, *Attention of Mr.*..... may be written at the right below the heading, or on a line with the salutation. Frequently, the *subject* of the letter is written at the right in line with the name of the firm or person addressed. The following is a good form:

The Aetna Company, *Subject: Flour Shipment*
7 Archer St.
Omaha, Neb.

Gentlemen: *Attention of Mr. Brown*

4. Military Form,—

The following form is prescribed for U. S. Army correspondence:

U. S. Army Recruiting Station,
5 East Swan Street, Buffalo, N. Y.

825 *November 22, 1922.*

From: *Recruiting Officer.*

To: *The Adjutant General of the Army, Washington, D. C.*

Subject: Enlistments.

This is called the "brief." It occupies the upper third of the ordinary sheet and is folded back so as to be immediately visible in files or on opening the envelope. The usual *salutation* and the usual *complimentary close* are omitted. The number (825) refers to the office files.

Many business houses use a similar form, especially for routine letters between departments.

5. Addressing a firm of women,—

Mesdames Trigg & New,
5314 Michigan Ave.,
Chicago, Ill.

Note.—Some authorities permit omission of the period after *Mr.* and *Messrs.*

III. The Salutation. This is the third item.

1. In addressing a firm, *Gentlemen* is preferred to *Dear Sirs* by most writers. This form is used also in addressing firms made up of men and women.

2. In addressing a firm made up of women, *Ladies* is the usual salutation.

3. For individuals, *Dear Sir* is the usual form. *My dear Sir* is regarded as rather more formal. A little more informal, according to occasion, is *Dear Mr. Girard* or *My dear Mr. Girard.*

4. *Dear Madam* or, more formal, *My dear Madam* is appropriate in addressing either a married or an unmarried woman. *Dear Mrs. Smith* or, more formal, *My dear Mrs. Smith* may be used if the degree of acquaintanceship permits.

5. In addressing an unmarried woman, use such a form as *Dear Miss Walker* or, more formal, *My dear Miss Walker.*

6. In addressing a letter to a man *and* a woman, use the form *Dear Sir and Madam.*

Note.—The husband's title, as, *Doctor, Professor,* or *Reverend,* should never be prefixed to the wife's name.

In a letter to a doctor or a professor, the address may be *Dr. James Martin* or *James Martin, M. D.* (or *D. D., Ph. D., D. O., D. D. S.*), or *Professor Wm. James.* If *Dr.* precedes the name, the abbreviation for the degree should not follow. In such cases, the salutation may be *Dear Sir* or, less formal, *Dear Doctor Martin* or *Dear Professor James.*

Note.—In general, good taste seems to approve, even in business letters, the spelling out of a title in the salutation, although the abbreviation may be used.

Note.—In the punctuation of the salutation, usage varies. The colon is always correct. In short, informal letters, the comma may be used. The dash is superfluous. However, if the address takes more than three lines, the salutation may be made part of the first line of the letter and may be followed by colon and dash or by comma and dash:

Gentlemen:—In your letter of June 26, etc.

IV. The Body of the Letter. This should be well centered on the page. The margins at top and bottom should be approximately equal, and the margins at the sides should be kept, as nearly as possible, equal. It is easy to keep the left-hand margin regular, but some care is necessary to get an even right-hand margin. Wide margins at right and left are advisable for two reasons: (1) Short lines are easier to read than long ones; (2) the contrast of blank and filled spaces makes reading easier.

The Paragraphing of a Business Letter. This is perhaps the most important feature of its form. First of all, the paragraphs should be reasonably short, for a well broken page is more inviting to the eye and easier to read than solid masses of type. Secondly, the paragraphs should not have too great a contrast in length. Absolute uniformity is, of course, impossible and undesirable as well. Variety in the matter of length, however, should be only great enough to avoid monotony. Generally speaking, the paragraphs at the beginning and at the end of the letter should be somewhat shorter than those in the middle.

The following paragraph forms are in use:

The indented paragraph, like this one. The first line is set in from the margin a number of spaces approximately equal to the margin allowed.

The hanging paragraph, like this. The first line begins at the margin, and all other lines are indented a number of spaces equal to the margin allowed for the first line.

The blocked paragraph, like this. No line is given extra indention. This last type of paragraph calls for very wide margins. Examples of these various forms of paragraphing are given in the specimen letters on the following pages. Margins should be not less than one inch in width.

V. The Complimentary Close. In business letters this should be *Yours truly*, or *Yours very truly*, or *Respectfully yours*, *Very respectfully yours*, except in cases where the writer, because of close acquaintance, may prefer a more informal phrase, such as *Sincerely yours*, *Faithfully yours*. Never write *respectively* for *respectfully*. Some authorities permit omission of comma after the complimentary close.

Such an expression as *With sincerest regards, I am* should begin a new, indented line, just above the complimentary close.

Envelope. *The address on the envelope* and that in the letter should correspond accurately, although some authorities permit the omission of the street address in the letter. On the envelope, the first line of the address should be placed approximately halfway between the top and the bottom of the envelope, beginning about one-fourth of the length of the envelope from the left-hand end. This address should be written with particular care, that it may be legible and accurate.

Additional directions, such as *in care of*, *c/o*, or *introducing*, may be placed at the lower left-hand corner. A post-office box number is usually placed in this position, to avoid having more than three, or at most four, lines in the address. Neither the abbreviation *No.* nor the sign # should be placed before the street address. The address may be punctuated with commas at the ends of lines, except the last line, where a period should be used; or punctuation may be omitted entirely, except after abbreviations.

In *street numbers* involving *second* or *third*, it is sufficient to write *d* after the figures instead of *nd* or *rd*; as 32d, 23d. Many writers do not use *d* or *th*. To insure the return of a letter in case of failure of delivery, the writer's address should be placed on the outside of the envelope, either in the upper left-hand corner on the front of the envelope or on the flap at the back of the envelope. This latter arrangement avoids crowding the front of the envelope unduly.

Cautions. Certain things the careful writer will always do: (1) He will use the *correct* address of the person to whom he is writing and will make the salutation *appropriate*; (2) he will have the complimentary close *appropriate* and his own signature *legible*. If the writer of the letter is a woman, she will add to her signature whatever may be necessary to indicate whether or not she is married, as in the following:

Very truly yours,
(*Mrs.*) or (*Miss*) *Anna M. Worden.*

or,

(*Mrs. J. C. Truman*) *Very truly yours,*
Mary V. Truman.

If there are "enclosures" in the letter, such as stamps, money, or papers, these should always be mentioned; and it is customary to write in the lower left-hand corner either the word *Enclosure* or the abbreviation *Enc.*; similarly, *Inclosure* or *Inc.*

Letters sent in the name of a firm by an official or employee may be signed as follows:

Knight, Lymmes, and Co.
By (or *Per*) *L. R. Parsons.*

APPROPRIATE FORMS IN ADDRESSING OFFICIALS AND DIGNITARIES

The President of the United States.
Name and address,—The President, Executive Mansion, Washington, D. C.
Salutation,—*Mr. President:* or *Sir:*
Close,—*Respectfully yours*, or *Very truly yours*,

The Vice President of the United States.
Name and address,—The Honorable. . . . . ,Vice President of the United States, Washington, D. C.
or, To the Vice President of the United States, Washington, D. C.
Salutation,—*Sir:* or *Dear Sir:*
Close,—*Very truly yours*, or *Respectfully yours*,

Member of Cabinet.
Name and address,—The Secretary of State, Washington, D. C.
Salutation,—*Dear Mr. Secretary:*
Close,—*Yours very truly*,
or,
Name and address,—The Honorable the Secretary of the Treasury, Washington, D. C. or, The Honorable A. . . . . B. . . . . , Secretary of the Treasury, Washington, D. C.
Salutation,—*Sir:* or *Dear Sir:*
Close,—*Very respectfully yours*,

Members of Congress.
Name and address,—The Hon. Martin Warren, Senate Chamber, Washington, D. C.
or, The Hon. Martin Warren, House of Representatives, Washington, D. C.
Salutation,—*Sir:* or *Dear Sir:*
Close,—*Very truly yours*,

Foreign Ministers.
Name and address,—His Excellency, ... , Ambassador to the Court of St. James, London, England.
Salutation,—*Your Excellency:* or *Sir:*
Close,—*Very truly yours*,

Governors.
Name and address,—His Excellency, the Governor of New York, Albany, N. Y.
or, His Excellency, the Governor, Albany, N. Y.
or, His Excellency, Governor S. M. Smith, Albany, N. Y.
Salutation,—*Your Excellency:* or *Sir:*
Close,—*Very truly yours*,

Mayors.
Name and address,—The Honorable . . . . . , Mayor of New York City, New York City, N. Y.
Salutation,—*Sir:* or *Dear Sir:*
Close,—*Very truly yours*,

State Officers.
Name and address,—The Honorable Attorney-General of New York, Albany, N. Y.
or, The Honorable . . . . . , Attorney-General of New York, Albany, N. Y.
Salutation,—*Sir:* or *Dear Sir:*
Close,—*Very truly yours*,

Judge of Supreme Court (or highest court of a State).
Name and address,—The Hon. William V. Hinton, State Capitol, Columbus, Ohio.
Salutation,—*Dear Mr. Justice:*
Close,—*Yours very truly*,

Judge (other than Supreme Court).
Name and address,—The Hon. Henry A. Freeman, State Circuit Court Building, Chicago, Ill.
Salutation,—*Dear Sir:* or (less formal) *Dear Judge Freeman:*
Close,—*Yours very truly*,

Minor Officials (City or County).
Name and address,—Mr. James Wingate, City Treasurer, City Hall, Des Moines, Iowa.
Salutation,—*Dear Sir:*
Close,—*Yours very truly*,

President of a University.
Name and address,—President Abbott Lawrence Lowell, Harvard University, Cambridge, Mass.
Salutation,—*Dear Sir:* or (more formal) *My dear Sir:*
Close,—*Yours very truly,*

College or University Professor.
Name and address,—Professor Arthur K. Rimer, Ph. D. (or other proper degree), University of Denver, Denver, Colo.
Salutation,—*Sir:* or *Dear Sir:*
Close,—*Yours very truly,* or *Yours sincerely,*

Superintendent of Schools.
Name and address,—Superintendent Edward Jones, School Headquarters (or Department of Education), Cleveland, Ohio.
Salutation,—*Sir:* or *Dear Sir:* or *My dear Sir:* or (very informally) *Dear Mr. Jones:*
Close,—*Yours very truly,* or *Yours sincerely,*

Protestant Clergyman.
Name and address,—The Rev. Thomas L. Warner, 1645 East Avenue, Harrisburg, Pa.
Salutation,—*Sir:* or *Dear Sir:* or *My dear Sir:* or (very informally) *Dear Mr. Warner:*
Close,—*Yours very truly,* or *Yours sincerely,*

Parish Priest.
Name and address,—The Rev. Frederick E. Kane, 276 Francis Street, Detroit, Mich.
Salutation,—*Reverend and dear Father:* or *Dear Reverend Father:*
Close,—*Yours sincerely,*

Protestant Doctor of Divinity (or of Laws).
Name and address,—The Rev. Charles A. McArthur, D. D. (or LL. D.), 5927 Dorchester Avenue, Boston, Mass.
Salutation,—*Sir:* or *Dear Sir:* or *My dear Sir:* or (very informally) *Dear Dr. McArthur:*
Close,—*Yours very truly,* or *Yours sincerely,*

The Pope.
Name and address,—His Holiness, Pope Benedict XV, The Vatican, Rome.
Salutation,—*Your Holiness:*
Close,—*Sincerely yours in Christ,*

Cardinal.
Name and address,—His Eminence, William Cardinal O'Connell, Archbishop of Boston, 25 Granby Street, Boston, Mass.
Salutation,—*Your Eminence:*
Close,—*Faithfully your Eminence's servant,* or *Sincerely yours;* if the writer is a Catholic, the words "in Christ" are usually added.

Bishop.
Name and address,—The Rt. Rev. James A. McFaul, D. D., Bishop of Trenton, Trenton, N. J.
Salutation,—*Right Reverend and dear Bishop:* or *Right Reverend Bishop:* or, simply, and perhaps more commonly, *Sir:*
Close,—any of the ordinary forms, such as *Very truly yours,* or *Yours sincerely;* if the writer is a Catholic, the words "Sincerely yours in Christ" should be used.

Women in Religious Orders.
Name and address,—(1) The Reverend Mother Angela (in the case of the Mother Superior); (2) Sister Constance (in the case of a Sister); followed in each case by the address.
Salutation,—(1) *Reverend Mother:* (2) *Reverend Madam:* or *Dear Madam:*
Close,—*Yours sincerely,* or any of the more formal phrases.

Military Officer.
Name and address,—General John J. Pershing, War Department, Washington, D. C.
or, The Commanding Officer, Fort Niagara, N. Y.
Salutation,—*Sir:* or *Dear Sir:*
Close,—any of the ordinary forms.

Naval Officer.
Name and address,—Rear Admiral Henry T. Mayo, Naval Department, Washington, D. C.
or, if at sea, U. S. S. *Pennsylvania,* % Postmaster, New York, N. Y.
Salutation,—*Sir:* or *Dear Sir:*
Close,—any of the ordinary forms.

Note.—The salutation *Sir,* in nearly all cases, is used in formal official letters. This is also an approved salutation to use in addressing a letter to the editor of a newspaper or other journal. See *Official Letters.*

TYPES OF BUSINESS LETTERS

The following are the common types of letters. Each type has its own peculiar problems.

I. The Simple Order and Reply. This type, supplemented by the letter of inquiry and explanation, is the kind that most people have frequent occasion to use. Out of this simple exchange, however, may develop the elaborate system of *claim, adjustment,* and *follow-up* letters. Claim and adjustment letters, in particular, should be tactfully written. The wording should make plain the writer's intention to be accurate and fair.

1. Order for Goods.

572 East Avenue,
Rochester, N. Y.,

April 3, 1922.

Messrs. Rowen, Winstead, & Co.,
437 State Street,
Chicago, Ill.

Gentlemen:

Will you please send me by freight, addressed to James Wilson, Alva, N. Y., the following:

1 French row-motor;
1 set Franklin garage door tracks and hangers.

I enclose check for $96.25, net price as listed in your special March bulletin.

The building materials purchased from you last summer have proved so satisfactory that I am very glad to send you this further order. I hope that it can be shipped very promptly.

Yours very truly,
Robert T. Vane.

Enc.

2. Request for Adjustment.

572 East Avenue,
Rochester, N. Y.,

July 6, 1922.

Messrs. Rowen, Winstead, & Co.,
437 State Street,
Chicago, Ill.

Gentlemen:

I have had shipped to you today from Cayuga, N. Y., by insured parcel post, the propeller and housing from the row-motor which I recently purchased from you.

We have used this motor a very few times only. Yesterday, while we were on the river, the housing broke, and it was only by the merest accident that I was able to recover it at all. I do not know that the machine was subjected to any extraordinary strain, though, of course, it may have been. However, the metal looks to me as if it had been defective at the break. Will you please examine the housing and make such adjustment as you think is right.

I shall be glad to have this matter attended to promptly in order that we may have the engine to use as soon as possible.

Yours very truly,
Robert T. Vane.

3. Reply to Adjustment Request.

(Letterhead)

July 8, 1922.

Mr. Robert T. Vane,
572 East Avenue,
Rochester, N. Y.

Dear Sir:

We are very sorry to learn from your letter of July 6 that you have had trouble with the row-motor. We have not yet received the broken parts, but we appreciate the fact that during vacation time you will want a motor to use. Accordingly, we will ship by today's parcel post a propeller and housing to replace the broken parts.

When your shipment arrives, we will have an examination made and will make adjustment such as we think will thoroughly satisfy you. We appreciate your patronage and your good offices in our favor.

Yours very truly,
Rowen, Winstead, & Co.
By J. C. Marcus.

4. Order for Magazine.

24 Winfield Street,
Oswego, Ill.,
October 15, 1922.

Current Literature Publishing Co.,
65 West 36th Street,
New York City.

Gentlemen:

I enclose money order for $4.00 in payment for renewal of my subscription to Current Opinion for the year 1923.

Please note the change of address indicated at the head of this letter.

Former address: 371 Otis Ave., Kenmore, Ohio.

Yours very truly,

Enc. *(Miss) Myra V. Killian.*

5. Letter to College Officer.

622 Plymouth Ave.,
Harrisburg, Pa.,
July 13, 1922.

Mr. James Harvey, Registrar,
Fairmount University,
Fairmount, Pa.

Dear Sir:

Will you please send me a copy of your application blank for entrance to the engineering school in Fairmount. I completed my high school course in June, and I am planning to enter Fairmount this fall. I should be glad to receive also a copy of your catalogue and other information that would be useful.

Very respectfully yours,
William D. Brown.

II. Letters of Agreement. These usually supplement contracts of various sorts, and should be worded as nearly as possible in the terms of the accompanying contract.

III. The Sales or Advertising Letter. This has been very highly developed within the last few years. It is really the standard or type of all business letters. The psychological principles of the business letter, as stated before, apply with special force to this type, which has for its immediate purpose the securing of business. In present day practice, sales letters are frequently prepared in series, the whole series being planned to cover the steps already given for the typical business letter. The first letter is designed, for instance, to get attention; the last in the series is written as the "clincher," or final persuasive letter.

A short series of four or five letters may be used, each one distinctly different in contents and purpose. Again, a long series, sometimes called "continuous," may be employed, each letter differing only slightly from the others in point of view, all aimed at persuading the "prospect."

These series are the common form of the *follow-up systems*. The writer has a definite object in view, usually either to secure a new field of business or to maintain interest and good will among his present clients. If his first letter fails to produce the result at which it was aimed, he follows it up with others, in which the methods of approach or the inducements offered differ somewhat from those of the first. For example, the letter of the Forest Products Association, page 120, if the prospect fails to return the card, might be followed by one giving some more definite, *interesting* details about the special uses of woods, to arouse the attention and the interest of the man. If Mr. Parsons returns the card promptly, a second letter should precede the representative's call, introducing him and encouraging the fullest use of his services.

Such letters as the following (6, 7), when prepared as circular or form letters, should be so printed that the type style used in filling in the individual addresses shall be like that in the body of the letter. The whole then will have the appearance of a personal letter and will command attention.

6. Sales Letter.

(Letterhead)

April 6, 1922.

Mrs. Marion T. Archer,
1432 Delavan Ave.,
Altoona, Ind.

Dear Madam:

ATTENTION *On that auto trip last summer, you enjoyed tremendously the road and the ride through beautiful scenery. But when you came to the inn at the end of the day, did you find your gowns in the smooth, dainty condition you could have wished for? Isn't it annoying to find the only things you have to "change to" all rumpled and creased?*

INTEREST *The answer, of course, is a wardrobe trunk. It is a compact, dust-proof trunk in your car, and a handy, complete wardrobe in your hotel room.*

INFORMATION *Through an unusually large purchase of the widely known Plico trunks, we are able to offer, during the next*

INDUCEMENT *week, a full stock at prices that mean to you a saving of more than one-third the usual cost of these high-grade trunks.*

POSITIVE SUGGESTION *One look at the sturdy build of these trunks and their complete and dainty arrangement of trays and hangers for every sort of hat and garment will convince you that certainly, at these prices, you cannot afford another trip without such a convenience.*

Come in early and make your selection before the present full stock is picked over by other buyers.

Very truly yours,
Eldridge, Warren, and Co.,
Per B. F. Warren,
Manager.

7. Sales Letter.

(Letterhead)

PUBLIC SCHOOL SAVINGS SOCIETY
OLEAN, IOWA

December 1, 1920.

Mr. Walter Strong,
35 Duane St.,
Olean, Iowa.

Dear Sir:

If you pay $90 for a $100 bond that is sure to pay 4½ per cent on its $100 value and also return to you later $100 in cash, you are the gainer. For a dividend of 4½ per cent on $100 is the same as 5 per cent on $90; and you will make a profit of at least $10 on your investment.

The bonds of the U. S. Government are worth their face value. The fact that some Liberty Bonds can be bought in the market for less indicates merely that some people who held large amounts needed ready money to carry on business and that others valued luxuries more highly than thrift. Their loss may be your gain.

Within a very short time these Liberty Bonds will be purchasable only at $100 or more. That is certain, because all the resources of the U. S. Government and all the wealth of this country are behind them.

Let us not forget our war-time thrift lessons.

Keep the bonds you now have and buy more at market prices.

Meanwhile do not overlook the Treasury Savings Stamps and Certificates which you can purchase at the post office.

A $25 Certificate bought in January for $20.60 will be worth $21.15 in December. This is a good use for your Christmas check.

Save and Build National Thrift.

The Public School Savings Society of Olean wishes you a Merry Christmas and a Happy New Year.

James C. Higgins,
Secretary.

IV. The Collection Letter. Collection letters are of two main types,—personal notifications of indebtedness, and personal requests for payment. Both kinds should be courteous and should avoid the use of threats or other offensive measures except as a last resort. Collection letters are usually prepared as a series which begins with a very mild suggestion that payment would be appreciated and ends with an insistent demand. The orderly and systematic mailing of such a series is often of more importance in making the work of collection effective than is the construction of any individual letter. Every letter, however, should have the double purpose of securing the money due and also of retaining the good will of the debtor.

8. Collection Letter.

(Letterhead)

June 20, 1921.

Mr. M. C. Harris,
12 Arthur St.,
Conneaut, Ohio.

Dear Sir:

We find on our books a charge against you of $15.87, under date of May 14. We wish to call your attention to the fact that this is past due.

If there is no error in the account, your prompt remittance will be appreciated.

Very truly yours,
Owen, James, and Co.

9. Collection Letter (*a little more insistent*).

(Letterhead)

June 1, 1921.

Mr. L. R. Converse,
156 Oliver St.,
Owanda, Md.

Dear Sir:

According to our books, your account for invoice of April 7 amounting to $47.60 is unpaid and past due. We wrote you about this account on May 20, but we have had no reply. We wish again to call your attention to the need for payment.

In case of any misunderstanding, we hope you will at once write us fully.

Very truly yours,
Owen, James, and Co.

V. The Letter of Application. The letter of application is in most respects similar to the sales letter. The writer is attempting to sell his own services. To be sure, he must be somewhat more modest and restrained in talking about himself than he is in talking about commodities and the services of others. He should not, however, run the risk of making his letter awkward as well as hypocritical by avoiding the use of the first personal pronoun *I* or by any other device that has its basis in false modesty. If the reader is to desire the writer's services, he must know enough about them to be able to judge their value to him in his business.

10. Direct Application for Commercial Position.

419 Marshall St.,
Syracuse, N. Y.,
February 3, 1921.

Messrs. G. A. Case & Son,
193 Broad Street,
Syracuse, N. Y.

Gentlemen:

I wish to apply for the position in your engineering office which you mention in your advertisement in this morning's "Standard."

I am nineteen years old, a graduate of the Technical High School in the class of 1918. I have also completed a course in drafting in the Mechanics' Institute of Rochester. At present I am employed in the shops of the J. W. Atkins Company, Machinists.

I should be glad to be granted a personal interview at your convenience.

Yours very truly,
James Manson.

11. Teacher's Application for Position.

Townsend, Neb.,
April 10, 1920.

Mr. Howard C. Martin,
Superintendent of Schools,
Akron, Minn.

Dear Sir:

I have been informed that there is a vacancy to be filled in the Tenth Street Grammar School of your city, and I should be glad to have you consider me as an applicant for the position.

In 1914 I was graduated from the high school, and in 1917 I completed my normal school course in the State Normal School at Kearney, Nebraska. For the last three years, I have been teaching the eighth grade in the schools in this town.

I enclose copies of letters from the following:

Professor S. T. Smith;
President Arthur Miller,
Kearney, Neb.

I am permitted also to refer you to Superintendent Robert Jones, Townsend, Neb.

If you desire it, I shall be glad to come to Akron for a personal interview.

Respectfully yours,
Enc. *(Miss) Helen C. Thomson.*

12. Application Letter, with Side Heads.

311 East Walker Street,
Buffalo, N. Y.,
October 1, 1922.

Box 176,
Buffalo News.

Gentlemen:

Will you please consider me an applicant for the position mentioned in your advertisement in the Buffalo News of October 1. My qualifications are as follows:

Education. I am a graduate of the Central High School of this city, in the class of 1921. My course included commercial work in bookkeeping, typewriting, and stenography. In all these subjects my standing was high.

Experience. During the last two years, I have been employed in the office of R. D. Ward & Son, Ellicott Square Building. My work has included stenography and general office assistance.

References. I can refer you, for information as to my ability and my character, to R. D. Ward & Son, and also to the following: Mr. J. W. Archer, head of Commercial Department, Central High School; Mr. Martin B. Allen, Supreme Court Judge.

Very truly yours,
Thomas R. Stafford.

VI. Notes of Introduction. The writer should aim to make it easy for two of his friends to become acquainted with each other. The note may either be sent directly to the person whose good offices it bespeaks, or be given to the person introduced. In the latter case, the envelope is usually left unsealed. The wording should be frank and sincere and should suggest the opening for conversation.

13.

Trenton, Oklahoma,
May 7, 1922.

Mr. Chas. R. Andrews, Trustee,
School District No. 9,
Trenton, Oklahoma.

My dear Mr. Andrews:

Miss Emily Smith desires to secure a position as assistant in your school. She holds a first grade certificate and has had three years of successful experience in our school. We regret to lose her, but she prefers your district because it is nearer to her home. I can recommend Miss Smith as a skillful teacher. She will exert an excellent influence in any school.

Very truly yours,
Charles J. Major,
Trustee of School District No. 4.

14.

North Cornwall, Vermont,
July 6, 1922.

Mr. Walter C. Strong,
84 Arlington Ave.,
Pittsburgh, Pa.

My dear Mr. Strong:

It gives me great pleasure to introduce to you my friend, Mr. Weston Beach, who is to become a resident in your city. You will find him a delightful person. I shall greatly appreciate whatever courtesy you may show him in helping him to become acquainted.

Cordially yours,
Henry B. Johnson.

VII. Letters of Recommendation. Recommendations are sometimes included in notes of introduction, but often they are written as separate letters. They may be written as general letters addressed "To whom it may concern," or as special letters to some definite person.

15. General Recommendation.

Weymouth, Va.,
May 10, 1922.

To Whom It May Concern:

This is to certify that the bearer of this note, Miss Lillian Glades, was graduated from The Teachers' College, Cumberland University, and has since taught in the schools of this city. For the past three years she has taught in the Straymore School, and I have had opportunity to observe her work closely. I can recommend her as capable of filling any position in a city graded school.

John W. Grove,
Principal of Straymore School.

16. General Recommendation.

To Whom It May Concern:

Mr. Henry Laird has been in our employ as bookkeeper the past six years. He is a skilled accountant and a loyal man; in every way he has served us well. We regret to part with him. He goes at his own request because he feels that he should receive a higher salary than we can afford to pay.

We wish Mr. Laird every success.

Jones, Martin, and Co.

Birmingham, Ala.,
June 26, 1923.

17. Special Recommendation.

Lehigh University,
Bethlehem, Pa.,
January 1, 1922.

Mr. Harvey W. Jonson,
Superintendent of Public Works,
Topeka, Kansas.

My dear Mr. Jonson:

We have in our junior class a young man, Mr. Thomas Redding, who has done excellent work in the engineering department. He is a fine, clean young man and has commanded the respect of instructors and students, alike. His home is in Nebraska, and he is anxious, on account of the illness of his father, to get employment for the next year or two near home.

I shall greatly appreciate it if you will interest yourself in him and help him to get work.

Very truly yours,
Thomas Benedict.

VIII. The Formal or Official Letter. In formal or official letters, the heading is placed as in the business letter, but the best usage approves the spelling out of the date instead of the use of numerals.

In such letters, also, the address of the person to whom the letter is sent may be placed at the close of the letter, in the lower left-hand part of the sheet. The title of the person addressed, as *Reverend* or *Honorable*, should be spelled out and the initials or given name used. "The" is not necessary before these titles, although good formal usage approves such expressions as *The Reverend Mr. Thomas* in the body of the letter, and many good writers prefer this form for the address. The salutation in such a letter may be *Dear Sir* or simply *Sir*.

18. Note of Appreciation.

October eleventh,
Nineteen-twenty-one.

Dear Sir:

By formal vote the Rivoli Club last night instructed me, as secretary of the club, to convey to you their very sincere appreciation of your courtesy and genuine service in the address which you delivered before the club members and their guests on Friday evening, October 7.

I desire the privilege of adding also my own word of grateful acknowledgment.

Very sincerely yours,
James Wakefield.

The Honorable Thomas Downing,
7 Harcourt Street,
Denver, Colorado.

IX. Excuse for Absence from School.

19.

Will Miss Stringer please excuse Frances Prescott's absence from school, March 4 and 5, on account of illness in the family.

Sarah C. Prescott.
(Mrs. J. W. Prescott),
March 6, 1922.

20.

Dear Miss Townsend,

Please excuse James's absence from school, October tenth to fifteenth, on account of illness.

Very truly yours,
(Mrs.) James T. Orcutt.

Post Cards or **Postal Cards.** These are appropriate only for brief notices sent out by individuals or organizations, or for impersonal notes. They are not suitable for personal messages. Even the shortest note of any degree of intimacy should always be written as a letter and enclosed in an envelope. *The Picture Post Card* is no exception to this rule.

Telegrams. The rates for sending telegrams are based upon a message of ten words, without punctuation. If punctuation is essential for clearness, the words *comma*, *period*, etc. may be inserted and paid for at regular word rates. No charge is made for the date, address, or signature. A message may be repeated back from the receiving office to the sender, for the sake of accuracy, at established rates.

Other classes of telegraphic service, known as night telegrams, night letters, and day letters, are also available. They offer the advantage either of lower rates or of greater length, but delivery is less prompt.

Cablegrams. Cablegrams, on account of higher cost, are more highly abbreviated than telegrams. The use of code words, that is, either ordinary words given unusual meanings by agreement of the sender and of the receiver, or artificial words whose meanings have been agreed upon, is common. Since the use of codes is governed by certain restrictions, however, the regulations of the cable companies should be consulted before writing a code message for transmission over their wires.

TAKING CARE OF THE DAILY MAIL

1. *Read carefully* letters received. Where the daily mail is heavy, have letters sorted into groups according to subject, as *orders*, *inquiries*, *adjustment*, etc. You can then deal with them more economically.

2. Keep incoming letters and envelopes together until you are certain that the writer's proper local address is *in the letter*. The omission of this item is a frequent offense.

3. Have your own local address on your letterhead. Omission of this often arouses in your correspondents the feeling that you are not a responsible business man.

4. *Reply promptly* to letters, usually within a day. If delay for full reply is necessary, acknowledge briefly the letter received, giving reasons for delay. Then, keep a reminder or "tickler file" to bring the matter again to your attention at the proper time.

5. *Plan your replies* to cover all points called for. Keep before you, while writing or dictating, the letter you are answering or a memorandum of its contents. An incomplete reply is annoying and unfair to your correspondent and to yourself.

6. *File together* in some orderly system the letters received and duplicates of your replies.

7. When replies are made by telegraph, *supplement and confirm* them by brief letters. These letters make useful records.

8. *Form letters*, printed on your regular stationery, to imitate typewriting, are convenient and economical when the same message is to go to a large number of people.

9. *Guide Forms.*—If your business does not call for much dictation of letters, you will find it worth while to prepare a few guide forms. These are letters prepared at leisure as carefully as possible, applying to various cases that arise frequently in your correspondence. Then, in the hurry of dictation, by making in the form letter only such changes as the particular case calls for, you can be certain of getting out a good letter.

10. *Filing.*—The purpose of filing correspondence is to keep an accurate, convenient record of past business and a guide for future correspondence. Any system used should be accurate, compact, readily accessible. There are in common use three systems:

a. *The Alphabetical System*, which is the simplest. In this system, letters are filed according to the names of the writers or the addressees; for example, letters received from and sent to *Williams* would be filed in a paper folder under *W*.

b. *The Subject System.*—The divisions of the file are made to correspond to the important items of the business: furnishings, clothing, etc. Usually an alphabetical order is kept within each subject.

c. *The Numerical System.*—In this system various subjects or correspondents are given numbers, and all papers connected with them are filed under the proper numbers in the file. The advantage of this is that it will take care of a file of any size and of any number of subjects. But a separate card index of names must be kept as a key. Each card carries the name of a subject or of a person and also the corresponding file number. The cards are arranged alphabetically.

Combination Systems are used also. Adapt your system to the requirements of your business, not your business to a system.

SOCIAL CORRESPONDENCE: FORMS

Stationery. Good usage approves a wide variety of forms and the indulgence of personal taste in the choice of stationery and in the writing of social letters and notes. The principles governing the form and appearance of business correspondence apply generally to social letters, but many informal variations from these rules are permitted.

White, unruled paper and envelopes to match are always in good taste, although pale-tinted papers which do not interfere with the clearness of the writing are permissible. Social note paper is usually a folded four-page sheet adapted to fold again once for the envelope. This paper, as well as the correspondence card, is prepared in various sizes and styles.

The Written Page. *The various parts of the letter*, as shown in the specimens, should be placed properly on the page, with due allowance for margins; no writing should be done in the margins. The heading should be placed as in the business letter, or, informally, the street address of the writer may be omitted, the date alone being written at the top of the sheet. An approved custom is to write out the date fully instead of using figures. The address of the recipient may be omitted in very familiar notes; that of the writer may be placed at the top of the paper or at the end of the letter in the lower left-hand part of the page.

Beginning and **End.** In the *salutation*, whatever form seems appropriate to the writer is permissible, except that certain abrupt and uncouth forms, such as *James* or *Friend John*, are ruled out, and the name of the person is preferred by many to the old form *Dear Friend. My dear Friend*, in this case, seems to be regarded as informal. *The complimentary close* may take any one of several forms, according to the degree of formality or familiarity in the letter. In such expressions as *Sincerely yours, Truly yours, Affectionately yours*, the first word only is capitalized.

TYPES OF SOCIAL NOTES AND LETTERS

The social note, written either upon the usual note-size paper or upon the commonly used correspondence card, is an important form of social writing. Such notes are brief, and the best taste dictates that the language should be as cordial and courteous as it can be made. The following specimens will suggest forms of expression appropriate for these notes. The heading is placed as in business or social letters, generally as follows:

439 East 23d Street,
June 7, 1921.

or,

Lyons Place,
November the Thirteenth.

The salutation may be as follows: *My dear Mr. Martin, My dear Mrs. Smith*, or *My dear Mary.* Best usage requires the addressing of a married woman by her husband's given name: *Mrs. Henry T. Myers*, not *Mrs. Laura Myers.* A widow may use her own given name or her husband's, as she pleases. The address of the recipient is placed at the lower left-hand corner of the sheet or card, or the date and the address of the writer may occupy this position. The complimentary close may be as for the social letter.

INFORMAL NOTES

1. Invitation.

515 Martin Place,
Thursday Evening.

Dear Frank,

If you are free to accept an invitation for Saturday afternoon, Mrs. Archer and I shall be very glad to have you with us in a little auto party out at Fort Beach. We shall take luncheon with us, and I know you will enjoy the trip. We will call for you at two.

Very cordially yours,
William S. Archer.

2. Reply.

Friday Morning.

My dear Archer:

I shall be more than glad to be one of your delightful party for tomorrow afternoon, and I shall be ready at two o'clock.

Sincerely yours,
Frank Adams Bates.

or,

3. Reply.

Friday Morning.

Dear Will,

I am very sorry to miss the pleasant party I am sure you will have at the Fort, but, as I leave for Chicago at six this evening upon very important business, I shall not be able to be with you.

Very truly yours,
Frank Adams Bates,

4. Invitation.

My dear Mrs. Graham:

How about Thursday afternoon for a little theater party in honor of your guest, Miss Smith? If you and she are at liberty, I shall take pleasure in making the necessary arrangements for the play, and for tea at Huyler's later.

Sincerely yours,
Marie Langs.

909 Fountain Avenue,
June the sixth.

5. Reply.

My dear Miss Langs:

I thank you very much for your kind thoughtfulness for my guest. Miss Smith and I are delighted to set aside Thursday afternoon as you suggest.

Sincerely yours,
Julia Graham.

314 Kingsley Place,
June the seventh.

6. Note of Regret.

My dear Marie:

Such fascinating suggestions of "cake and tea and other things" you contrive to put into your note. I wonder if that same imagination of yours can help you to understand our disappointment at not being able to accept your invitation for Thursday afternoon. We have not words to express it. And all on account of an out-of-town appointment of such long standing that it must be kept on that particular afternoon.

Please try to imagine us just as "sorry as we can be."

Cordially yours,
Julia Graham.

314 Kingsley Place,
June 7.

or,

7. Regrets.

My dear Miss Langs:

I regret that a previous engagement on the part of Miss Smith makes it impossible for us to accept your kind invitation for next Thursday afternoon.

Sincerely yours,
Julia Graham.

314 Kingsley Place,
June seventh.

8. Invitation.

Sunnyslope Farm,
October 1, 1922.

My dear Mrs. Walters,

My sister Margaret and I are inviting a few friends, quite informally, to meet our cousin, Mary Arthur, on Thursday afternoon. May we count on the pleasure of having you and your daughter, Miss Esther, with us?

Sincerely,
Sara Beeman.

9. Invitation.

The Poplars,
April 10, 1922.

My dear Mrs. James:

Our Village Circle meets at our home on Monday evening next, April fifteenth. Mr. Williams and I shall be very glad to have you and Mr. James as our guests for the evening, that you may have an opportunity to meet some of your new neighbors.

Very cordially,
Harriet Williams.

10. Note with Birthday Gift.

My dear Miss Burns,

Please accept these flowers with my love and with the wish that you may enjoy many returns of this happy day.

Sincerely yours,
Helen Harvey.

73 Wellington Road,
September tenth.

Such a note, from a younger to an older person, accompanying a gift that gives so much pleasure, will naturally call forth a cordial letter of warm appreciation.

11. Reply.

Thursday Morning.

My dear Miss Helen,

Your note and gift of beautiful flowers completed a day of perfect happiness. It is good to grow old when friends emphasize the years with increasing kindness. Thank you, dear friend, for the love which has never failed me.

Cordially yours,
Celia Burns.

The Bread-and-Butter Note. A short letter to some one whose informal hospitality one has enjoyed should never be neglected or postponed. Something like the following is appropriate, though the matter should vary according to the relations and hearts of people. The language of friendship and courtesy is none too familiar to our pens.

12.

My dear Mrs. Hartley,

Back at routine again, I catch myself fancying that I am yet in the little circle of your guests of last week.

That is the joy of such hospitality as yours,—that the memory of it lingers so long and happily.

Sincerely yours,
John W. Dare.

10 Martin Street,
October 15, 1921.

13.

My dear Alice:

I wish I could tell you how much I have benefited from the physical relaxation and mental stimulus of my week-end with you. I have come back to the good old grind with real enthusiasm, and it is all a result of your cleverly planned hospitality. Saturday's picnic alone put enough new life into me to last for some time. Thank you so much for all your thoughtfulness from beginning to end.

Remember that you have promised to come to me for Christmas. I shall try to take a leaf out of your book and be as nearly as possible the perfect hostess that you are.

Cordially,
Marion.

35 Main Street, Overton,
August 17, 1922.

Letters of Condolence. Letters of condolence and sympathy are always difficult to write. Write only what is in your heart to say. In many instances the kindest thing is silence. The following letter of sympathy, now preserved in Oxford University, is a classic of this kind of expression, and appeals to us all.

14.

Executive Mansion,
Washington, November 21, 1864.

Dear Madame:

I have been shown on the file of the war department a statement of the Adjutant General of Massachusetts, that you are the mother of five sons who have died gloriously on the field of battle. I feel how weak and fruitless must be any word of mine which should attempt to beguile you from the grief of a loss so overwhelming, but I cannot refrain from tendering to you the consolation that may be found in the thanks of the republic they died to save. I pray that our Heavenly Father may assuage the anguish of your bereavement and leave only the cherished memory of the loved and lost, and the solemn pride that must be yours to have laid so costly a sacrifice upon the altar of freedom.

Yours very sincerely and respectfully,
A. Lincoln.

To Mrs. Bixby,
Boston, Mass.

15.

October 4, 1920.

My dear, dear Friend,

A little girl came home from a neighbor's house where her little friend had died. "Why did you go?" questioned the father. "To comfort her mother," said the child. "What could you do to comfort her?" "I climbed up into her lap and I cried with her." Dear friend, I, too, can weep with you, and I do.

Yours in loving sympathy,
Sarah A. Hume.

To Miss Cornelia Y. Maxon.

16.

My dear Tom:

I am very sorry to hear that business affairs have been apparently "going into reverse" for you lately. Be sure that I believe your difficulties are only temporary. They can't be otherwise, with your ability and faithfulness. Here is my hand. If I can be of any help, call on me at once.

Sincerely yours,
Robert.

September 10, 1921.

Letters of Congratulation. A letter of congratulation is easier to write. Here again let the letter come from your heart.

17.

My dear old Jack:

Could anything be finer than the result of yesterday's election? I don't know which to congratulate more, you or the city. The voters were satisfied with your past record and have acknowledged your worth by giving you this greater honor.

Continue to live up to your high ideals, and you will soon go to Washington to protect the people in their rights.

Remember me to the little woman at the head of the house, and accept my warmest congratulations and heartiest wishes for success.

Very sincerely yours,
Andrew Langtry.

November 10, 1921.

18.

My dear Martin,

Heartiest congratulations on the good news. Of course I know you don't entirely deserve such good fortune as the promise of Frances to become your wife, but fortunately we are not always treated strictly according to our deserts. We shall all be happy in the happiness that is to be yours.

Sincerely your well-wisher,
Robert Howard.

April 8, 1921.

19.

384 Linden Ave.,
August 18, 1923.

My dear Louise,

We are all greatly delighted over the announcement in the newspaper that you have won a scholarship in the university. You have our heartiest congratulations on your success in this severe test, as well as our sincere good wishes for your enjoyment of college life and work.

Sincerely yours,
Arlene Benham.

FORMAL INVITATIONS AND REPLIES

Formal invitations are written in the third person, and, for large affairs, are usually engraved or printed and mailed about two weeks in advance. An invitation sent out by a school, or a class in the school, a club, or any group of persons, is usually in the third person; and, if the invitation be to an entertainment, as at a church or a commencement program, no formal reply is needed. Formal replies, however, should always be sent where entertainment is to be provided for each individual, for the host or hostess will need to know how to provide.

The letters *R. S. V. P.* are sometimes put in the lower left-hand corner of an invitation. They stand for the French phrase, *Répondez s'il vous plaît*, meaning "Reply, if you please." The English words, *An answer will oblige* or *An answer is requested*, are now much used.

Invitations to class commencements furnish happy occasions for friends to send notes of congratulation. The feeling of obligation to present gifts is very much to be regretted. No gifts should be expected unless it may be from near family friends. The formal wording of engraved cards or invitations may best be left to the engraver, as the fashions change slightly from year to year.

The reply to an invitation should follow the form of the note received, and should repeat the date and the hour mentioned in the invitation. In declining an invitation it is not necessary to repeat the hour.

1. Invitation to Commencement Exercises.

The Senior Class of
Columbia Seminary
requests the pleasure of your presence at the
Commencement Exercises
June fifteenth to eighteenth
nineteen hundred twenty
Washington, District of Columbia

2. Invitation to Commencement Exercises.

The Faculty and Graduating Class
of the
Boston Teachers' Training School
invite you to attend the
Seventeenth Annual Commencement Exercises
Friday evening, April fifteenth, 1921
at half past eight o'clock
Teachers' Training School
1124 Tremont Avenue

3. Formal Invitation to a Reception and Dance.

The Epsilon Mu Sorority
invites you to be present at a
reception and dance to be held at the
COLONIAL CLUB
Tuesday evening, April twelfth
at half after eight o'clock

4. Wedding Invitation and Announcement.

Mr. and Mrs. Joseph Suffolk
request the honor of your presence at the
marriage of their daughter
Mabel Grace
to
Mr. Andrew Jackman
Wednesday afternoon, June seventeenth
at three o'clock
Saint-Mary's-on-the-Hill Church
Baltimore

5. Announcement.

Mr. Andrew Jackman
Miss Mabel Grace Suffolk
Married
on Wednesday, June the seventeenth
Nineteen hundred and nine
Baltimore

6. Announcement.

Mrs. George Sampson
announces the marriage of her daughter
Margaret Louise
to
Mr. William Randolph Holmes
of Roxbury, Massachusetts
Wednesday, December the twenty-sixth
nineteen hundred and six

Note.—At home cards are often inserted in the same envelope with the announcements.

7. For a Formal At Home.

Mrs. Jacques Randolph Stearns
At Home
on Wednesday, the fifth of December
from three until six o'clock
1106 Ballston Heights
to meet
Mrs. James Winchell Toynbee

8. Formal Note of Invitation.

Miss Belle Coe requests the pleasure of Miss Hinman's company on Thursday evening at eight o'clock.

128 Fremont St., January nine.

9. The Invitation Accepted.

Miss Hinman accepts with pleasure Miss Coe's invitation for Thursday evening at eight o'clock.

Wellington Place, January ten.

10. The Invitation Declined.

Miss Hinman sincerely regrets that she cannot accept Miss Coe's invitation for Thursday evening at eight o'clock.

Wellington Place, January ten.

11. A Less Formal Invitation. Calling cards are often used for small informal gatherings of friends.

At Home
Mrs. James Winchell Toynbee
Wednesday, January 14, 3 to 4.
40 College St.

12. Dinner Invitation.

1432 Lincoln Avenue
Mr. and Mrs. Thomas Dowd
request the pleasure of
Mr. James Morley's
company at dinner
On Wednesday evening, March the fifth
at eight o'clock

February the twenty-fifth

13. Acceptance.

415 Martin St.

Mr. James Morley accepts with pleasure the invitation of Mr. and Mrs. Thomas Dowd for Wednesday evening, March the fifth, at eight o'clock.

February the twenty-seventh.

14. Regrets.

Mr. James Morley sincerely regrets that a professional engagement made several months since prevents his acceptance of Mr. and Mrs. Thomas Dowd's kind invitation for Wednesday evening, March the fifth.

415 Martin St.,

February the twenty-seventh.

LETTERS OF FRIENDSHIP

The joy of letter writing is in letters of friendship, for which, most fortunately, there can be no exact rules. Write to your friend as if you were talking—good, bright, happy talk about the things in which you both are interested. No friendship can be so close as to excuse one for indifference or carelessness. Models of good letter writing are found in the memoirs of noted men and women. They form a valuable body of literature and will repay the reading.

Letter writing has been rightly called the "gentlest art." It is the art of giving joy to those who are dear to us, yet far away. An interchange of letters between members of the same family or between friends does more than anything else to keep alive the deep affections. Even brothers and sisters drift apart and hopelessly lose sight of each other when they forget to be faithful in their letters. Whatever the pressure of pleasure or of duties, the absent ones should take time for at least one letter every week to those who are left at home. Write cheerfully, never sharply or pettishly. The word once committed to paper may remain when the irritation has passed away. Never write unnecessarily of bad news. Letter writing, you remember, in its highest mission, is the "blessed art of giving joy." Answer home letters in detail. Many questions are asked which seem trifling, but they tell the very things about your life that the home people want to know.

The chief charm in letters of friendship is their naturalness. They should make the person who receives them feel that he has had a delightful visit with his friend who wrote. The following passage, taken from a letter written by Henry W. Longfellow, is full of the charm of simplicity: "I have just had the pleasure of receiving your photograph. It is so good, it could hardly be better. I wish the one I send you in return were as good. But that is wishing I were a handsome man, six feet high, and we all know the vanity of human wishes." Again he writes in a letter: "If 'Long Pond' were called Loch Long, it would be a beautiful lake. This and Sebago are country cousins to the Westmoreland lakes in England, quite as lovely, but wanting a little more culture and good society." This is simple language, but the thought is by no means commonplace. Our best thoughts belong to our friends, whether in conversation or in letters. Of Hawthorne's letters it is said, "They were full of passages of beauty and of details of his own plans and purposes, hopes and disappointments."

Bayard Taylor thus commends a friend for his naturalness in writing: "You somehow manage to bring your own bodily self before me when you write; I see your eyes and the changing expression of your face, as I read, and the sound of your voice accompanies the written word." Who would not, if he could, write letters that by their naturalness recall both face and voice? Charles Dickens thanks a friend for his letter "which is like a pleasant voice coming across the Atlantic, with that domestic welcome in it that has no substitute on earth." The following letter to Dickens from Thomas Hood carries such homelike, intimate qualities:

"Only thinking of the pleasure of seeing you again, with Mrs. Dickens, on Tuesday or Wednesday, I never remembered till I got home to my wife, who is also my flapper (not a young wild duck, but a remembrancer of Laputa), that I have been booked to shoot some rabbits—if I can—at Wantage, in Berks; a reverend friend, called 'Peter Priggins,' will be waiting for me, by appointment, at his railway-station on Tuesday. But I must and can only be three or four days absent; after which, the sooner we have the pleasure of seeing you the better for us. Mrs. Hood thinks there ought to be a ladies' dinner to Mrs. Dickens. I think she wants to go to Greenwich, seeing how much good it has done me, for I went really ill, and came home well, so that occasionally the diet of Gargantua seems to suit me better than that of Panta-gruel. Well, adieu for the present. Live, fatten, prosper, write, and draw the mopuses (money) wholesale through Chapman and *Haul*."

One likes letters written for the very joy of correspondence and not because the time has come and one must write. How welcome this passage must have been in one of Lowell's letters: "Somehow, this cool, beautiful summer day I feel my heart go out towards you all, and am not writing because I ought." Of the closeness and the intimacy of written thoughts that may be exchanged in letters, Lowell again writes: "I think it fortunate to have dear friends far away. For not only does absence have something of the sanctifying privilege of death, but we dare speak in the little closet of a letter what we should not have the face to at the corner of the street."

Occasions multiply for writing letters to our friends: birthdays, festivals, anniversaries, betrothals, weddings, funerals; any occasion for peculiar joy or sorrow when sympathy and love are called into expression. One of the most pleasing of the growing customs is the writing of letters to friends to accompany them on their journeys. Nowadays, those who go abroad in ships are showered with "steamer" letters, which keep them mindful of home and friends throughout their long voyage. The brightness and the sweetness of such letters enrich a whole lifetime with pleasant memories.

The mission of the letter has been summed up by Whittier in a letter to a friend: "I am thankful every day of my life that God has put it into the hearts of so many whom I love and honor to send me so many messages of good will and comfort."

In this day of complex living, when so much is said but so little realized of the "simpler life," we sometimes forget the joy which these simple "messages of good will and comfort" bring, and unnecessarily burden ourselves to overload our friends with purchased gifts; whereas, Christmas letters, birthday letters, any letters into which we put our best selves, are the most acceptable gifts that we can choose. Beyond compare is the joy of such written words as these sent as a Christmas offering by a young girl to an older friend:

"What can I wish for you that you have not already? Your heart is so full of good things that it needs no wish. Some day I may tell you just what you have done for me, my dear friend. Many a door have you opened for me, and these things cheapen in the telling.

"A blessed Christmas time to you and a New Year rich with God's best gifts."

The gift of "things" is forgotten but the gift of such words, never.

THE FAMILY LIBRARY

Every household should have a collection of books. In it there should be some books for all, and some that belong to individual members of the family. Such a library is not made all at once. It grows. But its growth can be directed so that it will contain books that tell something of all the great interests of men and women. We want, of course, good fiction and poetry, some picture books for the little folks, and a few books about inventions and discoveries. Then the heads of the household need some of the useful books about their business of housekeeping and of bringing up the children. Finally, histories, biographies, and books of travel should be on the shelves.

Of the many books of all kinds a short suggestive list is given here. The Reading Lists that follow will supply more titles that will help to make your bookshelves useful and interesting.

Sir John Lubbock's choice of the 100 best books and Theodore Roosevelt's "pigskin library" are useful guides for the young man or woman who is gathering a library. None of these is a "best list" for everybody. They are merely helps toward choosing the kinds of books that ought to be in every library.

Reference Books

Title	*Author or Publisher*
A dictionary.	
A good encyclopedia.	
Dictionary of the Bible (1 vol.)	James Hastings
Dictionary of National Biography	Sidney Lee
Century Dictionary of Names	Century
Dictionary of Music and Musicians	Groves
An Atlas of the World	
World Almanac and Encyclopedia	New York World
The Statesman's Year-Book	Macmillan
Reader's Handbook of Famous Names	Brewer
Dictionary of Phrase and Fable	Brewer
A Practical Medical Dictionary,	Thomas Lothrop Stedman
Dyke's Auto and Gasoline Engine Encyclopedia,	A. L. Dyke
Dictionary of Photography	E. J. Ward
Bryant's Practical Bookkeeping	Henry W. Bryant
Essentials of Advertising	F. L. Blanchard
American Banking Practice	W. H. Kniffin
Robert's Rules of Order	Scott Pub. Co.
Handy Book of Curious Information	Wm. S. Walsh
Dictionaries of Foreign Languages, as required.	

Literature

The Bible (a good print edition).	
The Bible for Children	Kent
Classic Myths	C. M. Gayley
Shakspere (1 vol.)	Ed.—Craig
Volumes of Poets (choice limited by personal preferences).	
Oxford Book of English Verse	Oxford Univ. Press
Oxford Book of American Verse	Oxford Univ. Press
Golden Treasury of Verse	Palgrave
Prose and Poetical Quotations	Wm. S. Walsh
Our Familiar Songs	Johnson
Modern American Poetry	Untermeyer
Cambridge History of English Literature	Cambridge Univ. Press
History of English Literature	Garnett and Gosse
The Great English Letter Writers,	W. J. and Coningsby Dawson
Studies in Literature	Frederick W. Tisdale
Chief Contemporary Dramatists (2 vols.)	T. H. Dickinson
Companionable Books	Henry van Dyke
The World's Greatest Short Stories	Sherwin Cody
A selection of our best novels to be chosen according to personal preference.	
Selected essays from Bacon, Lamb, Macaulay, Emerson, Huxley, Crothers (and others by personal preference).	
Valley of Democracy	Meredith Nicholson
Four on a Tour in England,	Robert and Elizabeth Shackleton
History of Everyday Things in England,	Marjorie and H. B. Quennell
Holy Days and Holidays	Edward M. Deems
American Pictures and Their Painters	L. M. Bryant
History of Painting in Italy	Ed.—Hutton
A Book of Opera	H. E. Krehbiel

History and Biography

General History	P. V. N. Myers
The Outline of History	H. G. Wells
The Story of Mankind	H. W. Van Loon
Greatness and Decline of Rome	Ferrero
Modern Times and the Living Past	H. W. Elson
The Changing Chinese	E. A. Ross
Principles of Human Geography,	Huntington and Cushing
Industrial and Commercial Geography	J. Russell Smith
Modern Europe	C. D. Hazen
The Making of Modern England	Gilbert Slater
Discovery of America	John Fiske
France and England in the New World	Parkman
Critical Periods in American History	John Fiske
Our Nation in the Building	Helen Nicolay
Presidents of the United States (4 vols.).	Ed.—James Grant Wilson
Civil Government of the United States	John Fiske
Riverside History of the United States (4 vols.),	Houghton, Mifflin, and Co.
History of the Civil War	James Ford Rhodes
A New History of the United States	H. W. Elson
Stories of the Great West	Theodore Roosevelt
Four American Leaders	Chas. W. Eliot
Select Orations Illustrating American History,	S. B. Harding
The American Commonwealth	Bryce
Congressional Government	Woodrow Wilson
The American Revolution	Trevelyan
The True George Washington	Paul Leicester Ford
Abraham Lincoln	Lord Charnwood
Short Life of Abraham Lincoln	J. G. Nicolay
The Boyhood of Abraham Lincoln	J. Rogers Gore
Lincoln's Own Stories	Ed.—Anthony Gross
Theodore Roosevelt: An Autobiography,	Theodore Roosevelt
Life of John Marshall	Beveridge
The Making of an American	J. A. Riis
The Americanization of Edward Bok	Bok
Lives of Poor Boys Who Became Famous	Sarah Bolton
Heroines of Modern Progress	Adams and Foster
Famous Scouts	Charles H. L. Johnston

Home and Education

A-B-C of Correct Speech and the Art of Conversation,	Mrs. F. M. Hall
Self-Cultivation in English	G. H. Palmer
Everyday Good Manners for Boys and Girls,	Laird and Lie
How to Use Your Mind: A Psychology of Study,	Harry Dexter Kitson
Psychology and the Day's Work	E. J. Swift
Philosophy of Play	Luther H. Gulick
The Efficient Life	Luther H. Gulick
Health through Self Control	W. A. Spinney
Heredity and Christian Problems	Amory Bradford
What Men Live by	Richard C. Cabot
Health, Strength, and Happiness	C. W. Saleeby
First Aid in Emergencies	E. L. Eliason
Manual of Home-Making,	Van Rensselaer and Rose and Canon
The Effective Small House	Green and Bayliss
The House in Good Taste	Elsie de Wolfe
Home Economics	Maria Parloa
1000 Shorter Ways around the House	Croy
Better Meals for Less Money	Green
Food Facts for the Home-Maker,	Lucille Stimson Harvey
Care and Feeding of Children	L. E. Holt
Among Country Schools	O. J. Kern
All the Children of All the People	Wm. H. Smith
Roads to Childhood	Annie Carroll Moore
The Backward Child	Barbara Spofford Morgan
The Gifted Child	Guy Montrose Whipple
On Our Hill	Josephine Daskam Bacon
Mothers and Children	D. F. Fisher
Profitable Vocations for Boys	Weaver and Byler
From Youth into Manhood	W. S. Hall
The Boy Problem in the Home	W. B. Forbush
Training the Boy	W. A. McKeever
Training the Girl	W. A. McKeever
Girl and Woman	Caroline Latimer
The High School Boy and His Problems,	Thomas Arkle Clark
Vesper Talks to Girls	Laura Knott
Yule-Tide in Many Lands	Pringle
Principles of Agriculture	L. H. Bailey
Manual of Gardening	L. H. Bailey
Law for the American Farmer	John B. Green

Home and Community

Outlines of Sociology	Blackmar and Gillin
Political Economy	Sidney John Chapman
Our Cities Awake	Cooke
City, State, and Nation	Wm. L. Nida
America's Creed and Its Meaning	Matthew Page Andrews
Land of Tomorrow	Wm. B. Stephenson

Title	*Author or Publisher*
The Land of Fair Play: How America is Governed,	Parsons and Geoffrey
The New Voter: Things He and She Ought to Know about Politics and Citizenship	Chas. Willis Thompson
The Community Health Problem	A. C. Burnham
Science of Home and Community,	Trafton, Gilbert, and Haven
Village Improvement	P. T. Farwell
Good Neighbors in the Modern City,	Mary Ellen Richmond
The Promised Land	Mary Antin
Twenty Years at Hull House	Jane Addams
From Alien to Citizen	E. A. Steiner
Americans by Adoption	Joseph Husband
Use Your Government: What Your Government Does for You	Alissa Franc
Democracy and Ideals	John Erskine
Uncle Sam's Modern Miracles—His Gigantic Tasks That Benefit Humanity	William Atherton Du Puy
American Red Cross in the Great War	H. P. Davison

Popular Science

The Outline of Science	Ed.—Thomson
A New Astronomy	David Todd
Astronomy with the Naked Eye	G. P. Serviss
The Friendly Stars	M. E. Martin
Rural Science Series	Ed.—L. H. Bailey
The Challenge of the Country	C. Walter Fiske
Pets for Pleasure and Profit	A. Hyatt Verrill
Studies in Arcady	R. L. Gales
Field and Study	John Burroughs
Nature's Garden	Neltje Blanchan
Handbook of Nature Study	A. B. Comstock
Book of Birds for Young People	F. Schuyler Mathews
The Holy Earth	L. H. Bailey
Sharp Eyes	Gibson
Wake Robin	John Burroughs
Maine Woods	Thoreau
Our Insect Friends and Enemies	John B. Smith
Bird Life	F. M. Chapman
How to Know the Butterflies	J. H. and A. B. Comstock
Our Trees and How to Know Them	Arthur Emerson
Our Own Weather	E. C. Martin
Familiar Features of the Roadside	F. Schuyler Mathews
Secrets of Earth and Sea	Sir Ray Lankester
Face of the Fields	D. L. Sharp
World Minerals	L. J. Spencer
The Romance of Modern Invention	Archibald Williams
Miracles of Science	H. S. Williams
Research and Invention	Neville M. Hopkins
Chemistry and Civilization	A. S. Cushman
Story of the Engine from Lever to Liberty Motor,	W. F. Decker
Principles Underlying Radio Communication,	Signal Corps, U. S. Army

Travel

Pioneering Where the World is Old	Alice Tisdale
Out of Doors in the Holy Land	Henry van Dyke
The People of Palestine	Elihu Grant
Certain Delightful English Towns	Wm. Dean Howells
Unvisited Places of Old Europe	Robert Shackleton
The Joyful Heart	Robt. Haven Schauffler
Vagabond Journey around the World	Harry Franck
The Innocents Abroad	Mark Twain
Some Strange Corners of Our Own Country	Chas. Lummis
Far Away and Long Ago	W. H. Hudson
Through the Brazilian Wilderness	Theodore Roosevelt
Abroad at Home, American Ramblings,	Julian Leonard Street
Literary Pilgrimages in New England	E. M. Bacon
Our National Parks	John Muir
Travels in Alaska	John Muir

Sir John Lubbock's List of 100 Books

The Bible.
The Meditations of Marcus Aurelius.
Epictetus.
Aristotle's Ethics.
Analects of Confucius.
St. Hilaire's Le Bouddha et sa Religion.
Wake's Apostolic Fathers.
Thomas à Kempis's Imitation of Christ.
Confessions of St. Augustine.
The Koran (portions of).
Spinoza's Tractatus Theologico-Politicus.
Comte's Catechism of Positive Philosophy.
Pascal's Pensées.
Butler's Analogy of Religion.
Taylor's Holy Living and Dying.
Bunyan's Pilgrim's Progress.
Keble's Christian Year.
Plato's Dialogues; at any rate, the Apology, Phædo, and Republic.
Xenophon's Memorabilia.
Aristotle's Politics.
Demosthenes' De Corona.
Cicero's De Officiis, De Amicitia, and De Senectute.
Plutarch's Lives.
Berkeley's Human Knowledge.
Descartes's Discours sur la Méthode.
Locke's On the Conduct of the Understanding.
Homer.
Hesiod.
Virgil.
Mahabharata.
Ramayana.
The Shah Nameh.
The Nibelungenlied.
Malory's Morte D'Arthur.
The Sheking.
Æschylus' Prometheus.
Trilogy of Orestes.
Sophocles' Œdipus.
Euripides' Medea.
Aristophanes' Knights and Clouds.
Horace.
Lucretius.
Chaucer's Canterbury Tales.
Shakspere.
Milton's Paradise Lost, Lycidas, and the shorter poems.
Dante's Divina Commedia.
Spenser's Faery Queen.
Dryden's Poems.
Scott's Poems.
Wordsworth (Mr. Arnold's selection).
Southey's Thalaba the Destroyer.
The Curse of Kehama.
Pope's Essay on Criticism.
Essay on Man.
Rape of the Lock.
Burns.
Byron's Childe Harold.
Gray.
Herodotus.
Xenophon's Anabasis.
Thucydides.
Tacitus' Germania.
Livy.
Gibbon's Decline and Fall.
Hume's History of England.
Grote's History of Greece.
Carlyle's French Revolution.
Green's Short History of England.
Lewes's History of Philosophy.
Arabian Nights.
Swift's Gulliver's Travels.
Defoe's Robinson Crusoe.
Goldsmith's Vicar of Wakefield.
Cervantes' Don Quixote.
Boswell's Life of Johnson.
Molière.
Sheridan's School for Scandal, The Critic, and The Rivals.
Carlyle's Past and Present.
Smiles's Self-Help.
Bacon's Novum Organum.
Smith's Wealth of Nations (part of).
Mill's Political Economy.
Cook's Voyages.
Humboldt's Travels.
White's Natural History of Selborne.
Darwin's Origin of Species.
Naturalist's Voyage.
Mill's Logic.
Bacon's Essays.
Montaigne's Essays.
Hume's Essays.
Macaulay's Essays.
Addison's Essays.
Emerson's Essays.
Burke's Select Works.
Voltaire's Zadig.
Goethe's Faust, and Autobiography.
Miss Austen's Emma, or Pride and Prejudice.
Thackeray's Vanity Fair.
Pendennis.
Dickens's Pickwick.
David Copperfield.
Lytton's Last Days of Pompeii.
George Eliot's Adam Bede.
Kingsley's Westward Ho!
Scott's Novels.

Roosevelt's Pigskin Library

The following list of books was selected by Theodore Roosevelt for his famous African trip:

The Bible; Apocrypha.
Borrow—Bible in Spain; Zingali; Lavengro; Wild Wales; The Romany Rye.

Shakspere—Dramas.
Spenser—Faery Queen.
Marlowe—Dramas.
Mahan—Sea Power.
Macaulay—History; Essays; Poems.
Homer—Iliad; Odyssey.
La Chanson de Roland; Nibelungenlied.
Carlyle—Frederick the Great.
Bacon—Essays.
Shelley—Poems.
Lowell—Literary Papers; Biglow Papers.
Emerson—Poems.
Longfellow—Poems.
Tennyson—Poems.
Poe—Tales; Poems.
Keats—Poems.
Milton—Paradise Lost.
Dante—Inferno (Cary's trans.).
Holmes—Autocrat; Over the Teacups.
Bret Harte—Poems; Tales of the Argonauts; Luck of Roaring Camp.
Browning—Selections.
Crothers—Gentle Reader.
Twain—Huckleberry Finn; Tom Sawyer.
Bunyan—Pilgrim's Progress.
Euripides—Hippolytus; The Bacchæ.
The Federalist.
Gregorovius—Rome.
Scott—Legend of Montrose; Guy Mannering; Waverley; Rob Roy; Antiquary.
Cooper—Pilot; Two Admirals.
Froissart—Chronicles.
Percy—Reliques.
Thackeray—Vanity Fair; Pendennis.
Dickens—Mutual Friend; Pickwick.

THE CHILDREN'S LIBRARY

The following list of books embodies the considered judgment of many experts and the results of careful scientific inquiry. These books may, in fact, be confidently accepted as those most likely to attract young people to the enchanted gates that lead into the world of literature. The list consists of two groups.

The first comprises books suitable for children of the "story-telling" age, before they are able to interpret readily the printed page.

The second is a list for children who have learned to read and is based mainly on the preferences of the children themselves. It contains the best titles from about 9000 selected through a systematic investigation financed by the Carnegie corporation and carried out by the American Library association. Over 36,000 children co-operated in the choosing of the books. Those titles marked with an asterisk (*) were considered of superior literary merit by a jury of expert children's librarians. The titles are grouped by grades and, for each grade, are arranged according to the preference shown by the children of that grade.

In the second group will be found forty titles printed in italics. These forty have been specially recommended by the Bureau of Education, Washington, D. C. According to a government bulletin, any boy or girl may select ten from the forty and, for reading them and submitting a satisfactory report to the Commissioner of Education at Washington, may receive an official certificate bearing the seal of the United States Government. Those who wish to undertake such a reading course should write direct to the Commissioner of Education, Washington, D. C.

I. STORY-TELLING AGE

Title	*Author or Publisher*
Art of the Story-Teller	Shedlock
Baby Days	Dodge
Book of Nursery Rhymes	Welsh
Caldecott Books (Illus.)	Caldecott
Child Stories and Rhymes	Poulsson
Clean Peter and the Children of Grubbylea	Adelborg
Days and Deeds, a Book of Prose	Stevenson
Fanciful Tales	Stockton
Farm Book (Illus.)	Smith
Firelight Stories	Bailey
Five Mice in a Mouse Trap	Richards
Five Minute Stories	Richards
For the Children's Hour	Bailey
Golden Goose	Brooke
Goops and How to Be Them	Burgess
Great Panjandrum	Caldecott
Here and Now Story Book (Illus.)	Mitchell
How to Tell Stories	Bryant
In Sunshine Land	Thomas
In the Child's World	Poulsson
Kindergarten Stories	Hoxie
Lazy Matilda and Other Tales	Pyle
Little Folk Lyrics	Sherman
Little Mother Goose (Illus.)	Dodd, Mead & Co.
Little Sunshine	De Wolf
Lullaby Land	Field
Marigold Garden	Greenaway
Once upon a Time	Perrault
Pied Piper (Illus.)	Greenaway
Pinafore Palace	Wiggin and Smith
Rhymes and Jingles	Norton
Six Nursery Classics	Welsh
Some Great Stories and How to Tell Them	Wyche
Songs for Little Children	Smith
Star People	Johnson
Stories to Tell	Bryant
Stories to Tell the Little Ones	Bryant
Story of the Three Bears (Illus.)	Brooke
Tale of Pigling Bland	Potter
Tales of Laughter	Wiggin and Smith
Telling Bible Stories	Houghton
Through the Farmyard Gate	Poulsson
Toby Tyler or Ten Weeks with a Circus	Otis
Treasury of Stories, Jingles, and Rhymes	Humphrey
With Trumpet and Drum	Field
Wonder Clock	Pyle

II. GRADES THREE TO TEN

Third Grade

Eskimo Stories	Mary E. Smith
Red Feather	Margaret E. Morcomb
Cherry Tree Children	E. A. and M. F. Blaisdell
Boy Blue and His Friends	E. A. and M. F. Blaisdell
Good Times on the Farm	Ethel C. Dietz
Twilight Town	Mary F. Blaisdell
Reynard the Fox	Louise Smythe
Tommy Tinker's Book	E. A. and M. F. Blaisdell
Five Little Friends	Sherred W. Adams
Stories of the Red Children	Dorothy Brooks
Work-a-day Doings on the Farm	E. Serl & V. Evans
Lost Monkey	Lucia W. Rice
Under the Story Tree	Mabel La Rue
So-fat and Mew-mew	Georgiana Craik

Fourth Grade

Dutch Twins	Lucy F. Perkins
**Grimm's Fairy Tales*	*Grimm*
**Child's Garden of Verses*	*Robert Louis Stevenson*
Japanese Fairy Tales	Teresa P. Williston
Old Mother West Wind	Thornton W. Burgess
About Harriet	C. W. Hunt
Pilgrim Stories	Margaret Pumphrey
*Little Black Sambo	Helen Bannerman
Peter Pan	Sir James M. Barrie
Peter and Polly in Autumn	Rose Lucia
Around the World with the Children	Frank G. Carpenter
Peter and Polly in Summer	Rose Lucia
Early Cavemen	Katherine E. Dopp
Story of Mrs. Tubbs	Hugh Lofting
*At the Back of the North Wind	George MacDonald
Peter and Polly in Spring	Rose Lucia
Peter and Polly in Winter	Rose Lucia
Jack the Giant Killer	Andrew Lang
Tree-dwellers	Katherine E. Dopp
*Tale of Peter Rabbit	Beatrix Potter
Mother Goose Village	Madge A. Bigham
Merry Animal Tales	Madge A. Bigham
Cinderella	Andrew Lang
Little Folks of Many Lands	Lulu Maud Chance
Stories of Great Americans	Edward Eggleston
Little Red Riding Hood	Andrew Lang
Overall Boys	Eulalie Osgood Grover
Four Wonders	Elnora E. Shillig
Polly and Dolly	Mary Frances Blaisdell
Book of Nature Myths	Florence Holbrook
Fairy Stories and Fables	James Baldwin
Jan and Betje	Mary Emery Hall
Cock, Mouse, and the Little Red Hen	Felicite Lefevre
Six Little Ducklings	Katharine Pyle
Sleeping Beauty in the Woods and Other Stories,	Andrew Lang

Fifth Grade

Black Beauty	Anna Sewell
*Pinocchio	Collodi
**Story of Dr. Dolittle*	*Hugh Lofting*
**Little Lame Prince*	*Craik*
**Andersen's Fairy Tales*	*Dutton*

Title	Author or Publisher
**Alice's Adventures in Wonderland*	*Lewis Carroll*
Japanese Twins	Lucy F. Perkins
French Twins	Lucy F. Perkins
Fifty Famous Stories Retold	James Baldwin
Belgian Twins	Lucy F. Perkins
*King of the Golden River	John Ruskin
*East o' the Sun and West o' the Moon,	Gudrun T. Thorne-Thomsen
Eskimo Twins	Lucy F. Perkins
*Princess and the Goblin	George MacDonald
Irish Twins	Lucy F. Perkins
**Just So Stories*	*Rudyard Kipling*
Cave Twins	Lucy F. Perkins
Swiss Twins	Lucy F. Perkins
*Adventures of a Brownie	Craik
Viking Tales	Jennie Hall
Lonesomest Doll	Abbie F. Brown
Puritan Twins	Lucy F. Perkins
Moni the Goat Boy	Johanna Spyri
Mexican Twins	Lucy F. Perkins
Mother West Wind's Animal Friends,	Thornton Burgess
Mother West Wind's Children	Thornton Burgess
Clematis	B. & E. Cobb
*Peter Pan and Wendy	Sir James M. Barrie
Wee Ann	Ethel C. Phillips
*Jataka Tales of India	Ellen C. Babbitt
Golden Goose	Eva M. Tappan
*Granny's Wonderful Chair	Frances Browne
Pinocchio in Africa	Cherubini
Mother West Wind's Neighbors	Thornton Burgess
Peggy in Her Blue Frock	Eliza O. White
*English Fairy Tales	Joseph Jacobs
Adventures of Odysseus (a)	*Padraic Colum*

Sixth Grade

**Heidi*	*Johanna Spyri*
Toby Tyler	James Otis
**Robinson Crusoe*	*Daniel Defoe*
Beautiful Joe	Marshall Saunders
Five Little Peppers and How They Grew,	Margaret Sidney
Katrinka	Helen Haskell
Blue Bird for Children	Maurice Maeterlinck
Birds' Christmas Carol	Kate D. Wiggin
Voyages of Dr. Dolittle	Hugh Lofting
Dog of Flanders	*Ouida*
**Jungle Book*	*Rudyard Kipling*
Scotch Twins	Lucy F. Perkins
*Blue Fairy Book	Andrew Lang
Doctor Dolittle's Circus	Hugh Lofting
Doctor Dolittle's Post Office	Hugh Lofting
Green Fairy Book	Andrew Lang
Spartan Twins	Lucy F. Perkins
Italian Twins	Lucy F. Perkins
**Water Babies*	*Charles Kingsley*
**Merry Adventures of Robin Hood*	*Howard Pyle*
Mr. Stubbs's Brother	James Otis
Red Fairy Book	Andrew Lang
John of the Woods	Abbie F. Brown
Monkey That Would Not Kill	Henry Drummond
Nancy Rutledge	Katharine Pyle
Yellow Fairy Book	Andrew Lang
*Peterkin Papers	Lucretia P. Hale
*Rip Van Winkle	Washington Irving
Five Little Peppers Midway	Margaret Sidney
**Tanglewood Tales*	*Nathaniel Hawthorne*
Arkansaw Bear	Albert B. Paine
Arlo	B. and E. Cobb
*Mopsa, the Fairy	Jean Ingelow
Burgess Bird Book for Children	Thornton W. Burgess
Magic Forest	Stewart Edward White
**Wonderful Adventures of Nils*	*Selma Lagerlof*
**Boy's King Arthur*	*Sir T. Mallory*
**Arabian Knights*	*Frances J. Olcott*
**Gulliver's Travels*	*Jonathan Swift*
**Æsop's Fables*	*Æsop (Jacobs)*

Seventh Grade

**Adventures of Tom Sawyer*	*Mark Twain*
**Little Women*	*Louisa M. Alcott*
**Hans Brinker*	*Mary Mapes Dodge*
Huckleberry Finn	*Mark Twain*
Call of the Wild	Jack London
**Treasure Island*	*Robert Louis Stevenson*
Secret Garden	Frances Hodgson Burnett
Little Men	*Louisa M. Alcott*
*Kidnapped	Robert Louis Stevenson
**Story of a Bad Boy*	*Thomas Bailey Aldrich*
Little Lord Fauntleroy	Frances H. Burnett
*Hoosier School Boy	Edward Eggleston
**Swiss Family Robinson*	*Johann David Wyss*
Anne of Green Gables	Lucy Maud Montgomery
Mrs. Wiggs of the Cabbage Patch	Alice Hegan Rice
Rebecca of Sunnybrook Farm	*Kate Douglas Wiggin*
Dandelion Cottage	Carroll Watson Rankin
Old Fashioned Girl	Louisa M. Alcott
*Biography of a Grizzly	Ernest Thompson Seton

Title	Author or Publisher
Understood Betsy	*Dorothy Canfield*
Uncle Tom's Cabin	Harriet B. Stowe
Eight Cousins	Louisa M. Alcott
Jack and Jill	Louisa M. Alcott
*Merrylips	Beulah Marie Dix
Penrod and Sam	Booth Tarkington
Sara Crewe	Frances Hodgson Burnett
Sapphire Signet	Augusta H. Seaman
Under the Lilacs	Louisa M. Alcott
Young Trailers	Joseph A. Altsheler
Daddy Long Legs	Jean Webster
*Jim Davis	John Masefield
Two Little Confederates	Thomas Nelson Page
Widow O'Callaghan's Boys	Gulielme Zollinger
Nelly's Silver Mine	Helen Hunt Jackson
Covered Wagon	Emerson Hough
*Tales from Shakespeare	Charles and Mary Lamb
*Christmas Carol	Charles Dickens
**Man Without a Country*	*Edward Everett Hale*
**Uncle Remus*	*Joel Chandler Harris*
**Boy's Life of Abraham Lincoln*	*Helen Nicolay*

Eighth Grade

Penrod	Booth Tarkington
**Prince and the Pauper*	*Mark Twain*
*Wild Animals I Have Known	Ernest Thompson Seton
**Ivanhoe*	*Sir Walter Scott*
**Master Skylark*	*John Bennett*
White Fang	Jack London
*Black Arrow	Robert L. Stevenson
**Captains Courageous*	*Rudyard Kipling*
**Men of Iron*	*Howard Pyle*
Twenty Thousand Leagues Under the Sea	Jules Verne
*Last of the Mohicans	James F. Cooper
Jo's Boys	Louisa M. Alcott
Little Shepherd of Kingdom Come	John Fox, Jr.
Lucky Sixpence	E. B. and A. A. Knipe
Wildfire	Zane Grey
Crimson Sweater	Ralph H. Barbour
Emmeline	Elsie Singmaster
Just Patty	Jean Webster
Oliver Twist	Charles Dickens
When Patty Went to College	Jean Webster
Hoosier Schoolmaster	Edward Eggleston
Young Pitcher	Zane Grey
*Stickeen	John Muir
Anne of Avonlea	Lucy M. Montgomery
Lad, a Dog	Albert P. Terhune
*David Copperfield	Charles Dickens
Baby Elton, Quarter-back	Lesley W. Quirk
Rose in Bloom	Louisa M. Alcott
Track's End	Hayden Carruth
Story of My Life	Helen Keller
Timothy's Quest	Kate D. Wiggin
Jacqueline of the Carrier Pigeons	Augusta H. Seaman
Ungava Bob	Dillon Wallace
Lass of the Silver Sword	Mary C. DuBois
*Evangeline	Henry W. Longfellow
*Dark Frigate	Charles B. Hawes

Ninth Grade

*Jim Davis	John Masefield
Janice Meredith	Paul Leicester Ford
Adventures of Sherlock Holmes	Arthur Conan Doyle
*Two Years Before the Mast	Richard Henry Dana
*Bob, Son of Battle	Alfred Ollivant
Continental Dollar	E. B. and A. A. Knipe
*Lorna Doone	Richard Dodderidge Blackmore
Mysterious Island	Jules Verne
*Tale of Two Cities	Charles Dickens
*Ramona	Helen Hunt Jackson
Ben-Hur	Lew Wallace
Connecticut Yankee in King Arthur's Court,	Mark Twain
Captain Blood	Rafael Sabatini
*Silas Marner	George Eliot
Diantha's Quest	E. B. and A. A. Knipe
Boys' Life of Theodore Roosevelt	Herman Hagedorn
Black Wolf Pack	Daniel Beard
Bar Sinister	Richard Harding Davis
*Lives of the Hunted	Ernest Thompson Seton
*Westward Ho!	Charles Kingsley
Gold Seekers of '49	Edwin L. Sabin
Blue Magic	Edith Ballinger Price

Tenth Grade

*Three Musketeers	Alexandre Dumas
Seventeen	Booth Tarkington
Buff, a Collie	Alfred Payson Terhune
Virginian	Owen Wister
That Year at Lincoln High	Joseph Gollomb
White Fire	Mary Constance DuBois
Oregon Trail (a)	*Francis Parkman*
Joan of Arc (a)	*L. M. Boutet de Monvel*

(a) Does not appear among books chosen through Carnegie Corporation survey but is recommended by the Bureau of Education. See the note at the head of this list.

SYNONYMS AND ANTONYMS

SYNONYMS are words having the same or nearly the same meaning: *custom, habit, fashion,* and *practice*; *enough* and *sufficient*. Antonyms are words of opposite meaning: *sharp, dull*; *long, short*; *high, low*; *weak, strong*.

There is probably no language which has not some synonyms; but the English language in particular abounds in synonymous terms. There are several reasons for this fact.

English is a highly developed language. In the course of its history the meanings of many words have changed, slowly, of course, but none the less surely. It is not surprising, therefore, that two or more words, having originally different meanings, should eventually come to signify the same thing. For example, *to refuse* and *to reject* an offer have essentially the same meaning. If we trace the words back to their origins, however, we find that to reject a thing was to throw it back and to refuse it was to pour it back, as if it were water that had been put into a glass before us. Thus from words which originally differed in meaning we have obtained two synonyms, which express the same idea. Such synonyms are to be found in all languages which have passed through long periods of development.

Numerous synonyms in English exist also in consequence of the fact that the language has received additions from many different sources. Upon no language has English drawn more freely for its vocabulary than upon Saxon and Latin. For this reason we often find a word of Saxon origin and another of Latin origin existing side by side and possessing the same meaning, as in the case of *help*, which is Saxon, and *assist*, which is Latin. Similarly, *sympathy*, derived from the Greek, occurs as a synonym of *compassion*, which has come into the language from the Latin.

While a few synonyms differ so imperceptibly that they are almost identical in signification, by far the greater number are definitely distinguishable in meaning.

Words are in some respects like living things; they bear the marks of their origin and of their history. Two words, therefore, which at first sight appear to be interchangeable, often show, on a closer examination, differences which they have acquired from the company they have kept. Thus *axiom* and *byword* are sufficiently alike to be classed as synonyms; but axiom cannot shake off the air of learning, which clings to it after its 25 centuries of use in Greek mathematical treatises. Similarly, *conclude* means *to close*. It may be used of a speech, but it would never suffer itself to be found in the humble company of a door. We must *close* a door; we cannot *conclude* it. It is only by practice and by the exercise of some care that we learn whether one word will exactly replace another or whether it will not.

The Study of Synonyms. Ability to use English comes in great part from hearing others use it and from reading what others have written. This is an easy method of learning; but it may fail of being effective because we do not always hear and read the best English and because the results of such a method come very slowly. It has been found that no method is more effective than the careful observation of the way in which closely related words differ in meaning. A man who cannot distinguish a Ford car from a Rolls-Royce would be highly incompetent to choose a car for himself. In the same way, a person who cannot tell the difference between *affect* and *effect* is sure to make blunders in his speech. It is necessary, therefore, to study the distinctions between words which are synonymous, if we would be precise in our choice of words.

The Value of Synonyms. A thorough acquaintance with English synonyms carries with it several practical advantages. It relieves one from the necessity of repeatedly using the same word to express several distinct ideas; for example, to say *grand*, when one means to say *great, fine, beautiful*, or *impressive*. Once we have acquired the habit of distinguishing words and of using the right one, we are able to speak much more justly and exactly, having at our command a variety of words which express distinctive qualities. We shall be able, for instance, by means of our diction, to discriminate between a person's *air* and his *manner*. Although *active* and *diligent* are synonymous, there is a real difference between an active and a diligent person. Similarly, *brave, courageous*, and *gallant* are synonyms, but each carries a precise meaning peculiar to itself.

The habit of using words accurately begets the habit of thinking accurately. By examining and comparing various synonymous expressions, one is able to select from among them such words as exactly convey the meaning and nothing more or less. It is this discriminating use of words which at once denotes the scholar and imparts the finest effect to composition.

The Value of Antonyms. Much that has been said regarding the study and the value of synonyms is true also of antonyms. The study of antonyms has other practical values, however. A knowledge that a word has two antonyms of different meanings will show us that the word itself has two meanings and will prevent us from using it ambiguously. For example, if we speak of a *poor* student, other people cannot tell whether we mean that the student is not clever or that he is not rich. But, if we recall that *poor* may have as antonyms *clever* or *good* and also *rich*, we shall be more careful to speak in a manner that will leave no doubt of our meaning.

A ready command of antonyms also enables us to contrast vividly two ideas or two facts and so to convey our meaning in a more impressive fashion. For example, in praising a statesman we may say that he is *always first*, but it is more effective to say that he is first in peace and first in war. By this use of contrasted words either in speaking or in writing, an instant and vivid impression is created.

How to Use. To get the greatest amount of value from the following dictionary of synonyms and antonyms, it is necessary that one should understand clearly the use of the index or key. Let us suppose, for example, that you are writing a letter in which you have used the word *trouble*. You may desire to repeat the idea of this word and yet you do not wish to employ the same word again. Perhaps you do not recall another word which will exactly express the thought you wish to convey.

Turn to the index or key beginning on page 172 and find the word *trouble* with a reference to page 170. You will also find *trouble* occurring twice followed by words in italics: once by *affliction* with a reference to page 139 and once by *difficulty* with a reference to page 153. First turn to page 170 and there you will find *disturb* and *molest* as variant words. It may be that one of these will suit your purpose. But, if both words fail, next refer to page 139 and look for *affliction*. Under it, in addition to *trouble*, are the words *distress, grief*, and *sorrow*. If up to this point you are not satisfied, you may turn to page 153 and look for *difficulty*. Under it you find the additional synonyms *obstacle, impediment*, and *embarrassment*, with an explanation of how each word is used. Among all these synonyms, you are almost certain to find a word to suit the need. But, in the very rare case that you do not find the precise word, you will have received many suggestions which will enable you to convey the desired idea in a different manner; for, by glancing at the antonyms under the three paragraphs you have read, you will have seen *soothe, quiet, compose, caress, happiness, comfort, satisfaction, cheer, aid, help, assistance, relief*, and *encouragement*.

DICTIONARY OF SYNONYMS AND ANTONYMS

Abandon, desert, forsake, relinquish. The idea of leaving or separation is common to these terms, which differ in the circumstances of the action; the first two are more positive acts than the last two. To abandon may be an act of necessity or discretion, as a captain abandons a vessel when it is no longer safe to remain in it. Abandoning may imply a violation of the most sacred ties, exposing the object to every misery; desertion is a breach of honor and fidelity, depriving a person of the assistance or the countenance which he has a right to expect. By forsaking, the kindly feelings are hurt, and the social ties are broken. A bad mother abandons her offspring; a soldier deserts his comrades; a man forsakes his companions. Things as well as persons may be abandoned, deserted, or forsaken; things only are relinquished. To relinquish may be an act of prudence or imprudence; men often inadvertently relinquish the fairest prospects in order to follow some favorite scheme which terminates in their ruin.

Antonyms.—Adopt, maintain, protect, uphold, keep.

Abase, humble, humiliate, degrade, disgrace, debase. Abase expresses the strongest degree of self-humiliation. To humble, marks a prostration to the ground, and figuratively a lowering of the thoughts and feelings. Abase and humble have regard to persons considered absolutely; degrade and disgrace, to their relative situation. To degrade signifies to lower in the estimation of others. Disgrace is always attended with circumstances of more or less ignominy. To debase is to reduce from a higher to a lower state or grade of worth, dignity, value, etc. The penitent man humbles himself; the contrite man abases himself; the man of rank degrades himself by a too familiar deportment with his inferiors; he disgraces himself by his vices; he debases his character by crime. Humiliation implies a feeling of disgrace. Coinage is debased by too much alloy.

Antonyms.—Exalt, honor, dignify, promote.

Abhor, detest, abominate, loathe. These terms equally denote a sentiment of aversion. What we abhor is repugnant to our moral feelings; what we detest is opposed to our moral principles; what we abominate does violence to our religious and moral sentiments; what we loathe offends our taste. We abhor what is base and ungenerous; we detest hypocrisy; we abominate profanation and open impiety; we loathe food when we are sick.

Antonyms.—Admire, approve, esteem, desire, love.

Abide, sojourn, dwell, live, reside, inhabit. Abide implies an indefinite stay in a place. Sojourn literally means to pass the day, or, generally, a portion of one's time in a place. Dwell, like abide, somewhat archaic, means to live in a place, implying a degree of permanence. Live and reside mean to have a permanent home in a place. Inhabit, unlike the other words, is used actively, meaning occupy, as a country or district, as a home; it is used of both men and animals.

Antonyms.—Move, migrate, depart, abandon.

Ability, capacity, faculty, talent. Ability is to capacity as the genus is to the species. Ability comprehends the power of doing in general, without specifying the quality or degree; capacity is a particular kind of ability. Ability may be either physical or mental; capacity, when used of persons, is mental only. Ability implies action, capacity refers to thought. Ability relates to human power generally, by which a man is enabled to act; it may vary in degree and quality with times, persons, and circumstances. Health, strength, and fortune are abilities; faculty is a gift of nature directed to a certain end and following a certain rule. An ability may be acquired, and consequently is properly applied to individuals, as an ability to speak extempore or an ability to write; but a faculty belongs to the species, as a faculty of speech or of hearing, etc. Talent signifies a particular type of ability; it imitates but does not originate.

Antonyms.—Inability, incompetence, ineptitude, stupidity.

Abolish, abrogate, repeal, revoke, annul, cancel. The word abolish conveys the idea of putting a total end to a thing, and is applied properly to those things which have been long in existence and are firmly established. An abolition may be effected by an act of power, as in abolishing an institution; or it may be a gradual act, or effected by indirect means, as in the case of doing away with a custom or practice. Laws are either repealed or abrogated, but repealing is a term of modern use, applied to the acts of public councils or assemblies, where laws are made or unmade by the consent or open declaration of numbers. Abrogate is a term of less definite import; to abrogate a law is to render it null by any act of the legislature: thus, the making of a new law may abrogate the old one. Revoking is an act of individual authority—edicts are revoked; annulling is an act of discretion, as official proceedings or private contracts are annulled; canceling is a species of annulling, as in the case of canceling bonds, obligations, etc.

Antonyms.—Establish, authorize, institute, confirm.

Absolute, despotic, arbitrary, tyrannical. Absolute power is independent of and superior to all other power: an absolute monarch is uncontrolled, either by men or by things. Despotic power is power exercised as by a master or lord. Despotic power is, therefore, as complete as absolute power but carries the added idea that the ruler has the right to treat his subjects according to his will or pleasure. With arbitrariness are associated the ideas of caprice and selfishness. With tyranny are associated the ideas of oppression and injustice. In modern use, both arbitrariness and tyranny are associated with despotism.

Antonyms.—Limited, constitutional, accountable, mild, lenient, just.

Acceptable, grateful, welcome. Acceptable signifies worthy to be accepted. Grateful signifies altogether pleasing; that which recommends itself is grateful. The acceptable is a relative good, the grateful is positive; the former depends upon our external condition, the latter on our feelings and taste. Welcome signifies come well or in season for us; it refers to whatever happens according to our wishes. It is a grateful task to be the bearer of welcome intelligence to our friends.

Antonyms.—Unwelcome, disappointing, saddening, painful, distasteful.

Accomplish, effect, execute, achieve. To accomplish an object signifies more than simply to effect a purpose, both as to the thing aimed at and the means employed in bringing it about. Extraordinary means are requisite for accomplishing and ordinary means, for effecting. To accomplish is properly said of that which a person sets before himself; but to effect, execute, and achieve do not relate to the views of a person acting, but to the thing brought about. What is executed is complicated in its nature, as to execute a design or project; what is achieved is of greater and worthier conception, as to achieve success in a profession.

Antonyms.—Fail, come short, default, give up.

Accuse, charge, impeach, arraign. The idea of asserting something to the prejudice of another is common to these terms. But accuse is said of acts; charge, of moral qualities constituting the character. We accuse a person of murder; we charge him with dishonesty. High officials are impeached; criminals are arraigned.

Antonyms.—Clear, discharge, exonerate, acquit.

Act, do, make. We always act when we do, but we do not always do when we act. Act is applied to either persons or things, as a spring or a lock acts; do applies in this sense to persons only. Act is generally used intransitively, as to act well or ill in this or that manner; do is usually transitive, as to do right or wrong, to do one's duty. To make is to bring a thing to being or form, as to make a pen.

Act, work, operate. A machine works, but each of its parts is said to act; so beer works, and bread works. Sometimes act as well as work is taken in the sense of exerting a power upon other bodies and producing changes, as the sun acts on the plants. Operate is applied to matters of a general nature in science or morals, as a measure operates, or words may operate on the mind, or reasons may operate on the understanding.

Action, gesture, gesticulation, posture, attitude. All these terms are applied to the state of the body; the first three indicate a state of motion, the last two a state of rest. Action respects the movements of the body in general; gesture is an action indicative of some particular state of mind; gesticulation is the act of making gestures. Raising the arm is an action; bowing is a gesture. Actions may be ungraceful; gestures, indecent. Posture and attitude both imply a mode of placing the body, but the posture is either natural or assumed; the attitude is always assumed or represented. We assume a sitting posture or an attitude of prayer.

Active, diligent, industrious, assiduous, laborious, busy, officious. We are active if we are only ready to exert our powers, whether to any end or not; we are diligent when we are active for some specific end; we are industrious when no time is left unemployed in some serious pursuit; we are assiduous if we do not leave a thing until it is finished; we are laborious when the bodily or mental powers are regularly employed in some hard labor. Busy implies continuous occupation. Officious implies being busy without discretion, especially about other people's affairs.

Antonyms.—Inert, indolent, lazy, trifling, idle, shiftless.

Actual, real, positive, true. What is actual has proof of its existence within itself, and may be exposed to the eye; what is real may be satisfactorily proved to exist; and what is positive precludes the necessity of a proof. That is true which is genuine, in accord with evident facts or susceptible of proof.

Antonyms.—Suppositious, imaginary, doubtful, uncertain, false, artificial.

Actuate, impel, induce. One is actuated by motives, impelled by passions, and induced by reason or inclination. Whatever actuates is the result of reflection—it is a steady and fixed principle. Whatever impels is momentary and vehement, and often precludes reflection. Whatever induces is not vehement, though often momentary.
Antonyms.—Restrain, inhibit, impede, check.

Acute, keen, shrewd. In the natural sense, a fitness to pierce is predominant in the word acute; that of cutting, or a fitness for cutting, in the word keen. The shrewd man exposes follies. Arguments may be acute, reproaches keen, and replies or retorts shrewd. A shrewd understanding is quicker at discovering new truths than at distinguishing truth from falsehood.
Antonyms.—Dull, obtuse, shortsighted, stupid.

Adhere, attach. A thing adheres to another by reason of some quality in itself; a person adheres to a party for some reason of his own. Things are attached to others by external means; a person may be attached to a church or his home by sentiment.
Antonyms.—Detach, loosen, separate.

Adjacent, adjoining, contiguous. Buildings or farms may be adjacent or contiguous without being joined or touching. Adjoining lands or buildings meet at a boundary line. Things that so meet may be called contiguous.
Antonyms.—Distant, separated, disjoined.

Admit, allow, permit, suffer, tolerate. Admit in this sense is used mostly of ideas and propositions, usually used with *of*. Allow is of more general application, frequently implying no more than a tacit refraining from refusal. We admit that which concerns ourselves; we allow that which is for the convenience of others, or what they wish to do. What is suffered may be burdensome to the sufferer, if not morally wrong; what is tolerated is contrary to one's desires, and is suffered only because it cannot be prevented. Permit implies a positive grant of privilege.
Antonyms.—Forbid, refuse, withstand, prevent, deny.

Admit, receive. Persons are admitted to the tables, and into the familiarity or confidence of others; they are hospitably received by those who wish to be their entertainers. We admit willingly or reluctantly; we receive politely or rudely.
Antonyms.—Shut out, forbid, exclude.

Adoration, worship, reverence, veneration. Adoration is the service of the heart toward a superior being, in which we acknowledge our dependence and obedience by petition and thanksgiving; worship consists in the outward form of showing reverence to some supposed superior being. Reverence differs from adoration inasmuch as it has a mixture of awe, arising from consciousness of weakness and dependence, or of obligations for favors received. The contemplation of any place rendered sacred by its antiquity awakens veneration.
Antonyms.—Contempt, dishonor, impiety, sacrilege.

Advance, proceed. Advance implies movement forward; proceed, movement from one point to another, also resumption of movement after a pause.
Antonyms.—Recede, retire, withdraw.

Advantage, benefit, utility. Advantage refers to external or extrinsic circumstances of profit, honor, and convenience; benefit, to the consequences of actions and events; utility respects the good which can be drawn from the use of any object. A large house or a particular situation may have its advantages; suitable exercise is attended with benefit; the utility of motor cars consists in their supplying means of rapid travel.
Antonyms.—Disadvantage, futility, worthlessness.

Adverse, contrary, opposite, inimical, hostile. Adverse is used of the feelings and interests of persons; contrary, in respect to their plans and purposes; opposite refers to the situation and relative nature of things. Fortune is adverse; an event turns out contrary to what was expected; sentiments are opposite to each other. Inimical implies positive harmful opposition. Lack of harmony in an organization is inimical to its success. Inimical is applied to private, personal unfriendliness; hostile, chiefly to public conflict.
Antonyms.—Auspicious, favorable, helpful, friendly.

Advice, counsel, instruction. Advice flows from superior professional knowledge, or from an acquaintance with things in general; counsel implies superior wisdom, or a superior acquaintance with moral principles and practice; instruction involves superior local knowledge in particular transactions. A medical man gives advice to his patients; a father gives counsel to his children; in points of law a counselor gives advice to his client and receives instructions from him in matters of fact.

Affect, assume, pretend. To affect is to use forced efforts to appear to have that which one has not; to assume is to appropriate to oneself that which one has no right to have. One affects to have fine feelings, and assumes great importance. We pretend by making a false declaration. One affects indifference to praise and pretends to have wealth.

Affect, concern. Things affect us which produce any change in our outward circumstances; they concern us if connected with our circumstances in any way. The price of corn affects the interest of the seller; therefore it concerns him to keep it up, without regard to the public good or injury.

Affectionate, kind, fond. Affectionate characterizes the feelings; kind usually has reference to action. Affectionate describes an attitude toward a particular object; kind a manner of acting toward objects generally. Fond implies tender, indulgent, often unreasoning, liking.
Antonyms.—Unkind, ill-disposed, indifferent.

Affirm, assert. Affirm is said of facts; assert, of opinions. We affirm what we know; we assert what we believe.
Antonyms.—Deny, retract, repudiate.

Affliction, distress, trouble, grief, sorrow. Affliction is applied both to severe misfortune and to the deep sorrow of heart that may come from it. Grief is keen, poignant sorrow springing from a definite cause. Distress implies severe, painful trouble from physical or mental causes. Trouble may imply merely confusion of mind, or it may signify deep-seated disturbance.
Antonyms.—Happiness, comfort, satisfaction, cheer.

Affront, insult, outrage. To affront is to show reproach in the presence of others—it piques and mortifies; to insult is to attack with insolence—it irritates and provokes; to outrage is to combine all that is offensive, to add insult to injury.
Antonyms.—Honor, gratify, please, benefit.

Afraid, fearful, timorous, timid. Afraid is the most general of these words, implying either a slight or a high degree of fear. Fearful is a stronger word than afraid: one may be fearful of defeat and yet not afraid in a discreditable sense. Timid and timorous imply constitutional liability to fear, even of slight matters.
Antonyms.—Brave, bold, fearless, intrepid.

Agree, accede, consent, comply, acquiesce. Agree is the general term, meaning to fall in with. We accede by becoming a party to a thing; those who accede are on equal terms; one objects to that to which one does not accede. We consent to a thing by authorizing it, we comply with a thing by allowing it; those who consent or comply are not on equal terms with those in whose favor the consent is given or compliance made. Consenting is an act of authority, complying an act of good nature or weakness. To acquiesce is quietly to admit; it is a passive act, dictated by prudence or duty.
Antonyms.—Disagree, dissent, refuse, decline, oppose.

Agreeable, pleasant, pleasing. Agreeable expresses a less vivid feeling than pleasant; pleasing marks a sentiment less vivid and distinct than either. A pleasing countenance denotes tranquillity and contentment; a pleasant countenance bespeaks happiness.
Antonyms.—Disagreeable, repulsive, irritating.

Aim, aspire. We aim at a certain proposed point by endeavoring to gain it; we aspire after that which we think ourselves entitled to, and which we flatter ourselves with gaining. Many men aim at riches and honor; it is the lot of but few to aspire to a throne.

Aim, object, end, view. The aim is that which the person has in his own mind; it depends upon the character of the individual whether it be good or bad, attainable or otherwise. The object lies in the thing; it is a matter of choice; it depends upon accident as well as design, whether it be worthy or unworthy. The end is that which follows or terminates any course or proceeding; the nature of the end determines to some degree the means to be used to reach it. It is the aim of the Christian to live peaceably; it is a mark of dullness or folly to act without an object; it is sophistry to suppose that the end will justify the means. View refers primarily to the end or purpose as conceived by the person. One does business with a view of making money.

Air, manner, mien, look, carriage, gait. Air lies in the whole person; manner refers to movement or action or expressive gesture. A man has the air of a common person; it discovers itself in all his manners. An air is noble or simple—it marks an elevation or simplicity of character; a manner is rude, rustic, or awkward, for want of culture, good society, and good example. We assume an air, and affect a manner. Mien implies the whole outward appearance, carriage and bearing: noble mien, frightful mien. Look refers especially to the facial expression—an honest look. Carriage applies to the manner of holding or carrying the body. Gait is the manner of walking.

Alarm, terror, fright, consternation. Alarm is felt at the sudden approach of danger or signs of danger. Terror may arise from any appearance or event suggesting great harm or catastrophe; alarm prompts us to defense, and terror disarms us. Fright is a less vivid emotion than either, as it arises from the simple appearance of danger; we may be alarmed or terrified for others, but we are mostly frightened for ourselves. Consternation springs from the view of some very serious evil, and commonly affects many. Alarm affects the feelings, terror the understanding, and fright the senses; consternation seizes the whole mind and benumbs the faculties.

Antonyms.—Calmness, repose, confidence, self-command.

Alertness, alacrity. Alertness signifies an attitude and manner of keen readiness, promising prompt, spirited action. Alacrity implies a quick, willing response to impulse or demand from without.

Antonyms.—Inertness, sluggishness, languidness, apathy.

Allay, soothe, appease, mitigate, assuage. All these terms indicate a lessening of something painful. In a physical sense an irritating pain is allayed; a wounded part is soothed by affording ease and comfort. Extreme heat or thirst is allayed; extreme hunger is appeased; a punishment or suffering is mitigated. Temper or enthusiasm that is fervid and vehement is allayed; one soothes a mind that is distressed or irritated; one appeases what is tumultuous and boisterous; one mitigates the pains of others or what is rigorous and severe; one assuages grief or afflictions.

Antonyms.—Arouse, irritate, intensify, kindle, excite.

Alleviate, relieve. A pain is alleviated by making it less burdensome; a necessity is relieved by supplying what is wanted. Alleviate refers to internal feelings only; relieve, to either internal feelings or external circumstances. That alleviates which affords ease and comfort; that relieves which removes the pain.

Antonyms.—Aggravate, intensify.

Alliance, league, confederacy. Alliances are formed for the mutual convenience of parties, as between states to promote commerce. Leagues and confederacies are entered into mostly for purposes of self-defense or for common safety against the attacks of a common enemy; but a league is usually a solemn act between states and for general purposes of safety,—it may, therefore, be both defensive and offensive. A confederacy is commonly a temporary union to resist a common adversary in a season of actual danger.

Allot, appoint, destine. Allot is used only for things; appoint and destine for persons or things. A space of ground is allotted for cultivation; a person is appointed as steward or governor; a youth is destined for a particular profession. Allot and appoint imply immediate purposes; destine implies remote purposes.

Allow, grant, bestow. That is allowed which may be expected, if not directly required; that is granted which is desired, or directly asked for; that is bestowed which is wanted as a matter of necessity. A grant comprehends in it something more important than an allowance, and passes between persons in a higher station; what is bestowed is of less value than either. A boy is allowed money for expenses; a king grants pensions to his officers; relief is bestowed on the indigent.

Antonyms.—Refuse, withhold, disallow.

Allowance, stipend, salary, wages, hire, pay. All these terms denote a stated sum paid according to certain stipulations. An allowance is gratuitous—it ceases at the pleasure of the donor. All the rest are the requital for some supposed service—they cease with the engagement made between the persons. Stipend is more fixed and permanent than salary, and salary than wages, hire, or pay; a stipend depends upon the fulfilling of an engagement rather than on the will of an individual. A salary is a matter of contract between the giver and the receiver; an allowance may be given in any form or at any stated times. Stipend and salary are paid yearly or at even portions of a year; wages, hire, and pay are estimated by days, weeks, or months, as well as by years.

Allude, refer, hint, suggest. To allude is not so direct as to refer, but it is more clear and positive than either hint or suggest. We allude to a circumstance by introducing something collaterally allied to it; we refer to an event by expressly introducing it into our discourse; we hint at a person's intentions by darkly insinuating what may possibly happen; we suggest an idea by some expressions relative to it.

Alone, solitary, lonely. Alone, compounded of all and one, signifies altogether one, or single, that is, by oneself. Alone marks the state of a person, solitary and lonely, the quality of a person or a thing. A person walks alone, or he takes a solitary walk in a lonely place. One may feel lonely in company; one is solitary in the absence of companions.

Ambiguity, equivocation. An ambiguity arises from a too general form of expression, which leaves the sense of the words indeterminate; an equivocation lies in the power of particular terms used, which admit of a double interpretation or an application to two different things. The ambiguity leaves us in entire uncertainty as to what is meant; the equivocation misleads us through the use of a term in the sense which we do not suspect.

Antonyms.—Clearness, plainness, definiteness.

Amend, correct, emend, improve, mend, better. Amend, emend, and correct are all applied to works of the understanding, with these distinctions: amend signifies to remove faults or defects generally, either by adding, taking away, or altering, as to amend a law; to emend is to remove particular faults in any literary work by the alteration of letters or single words; to correct is to remove faults, as to correct the copy. Mend is employed in respect to any works in the sense of putting that right which either is or has become faulty; to improve is said either of persons or things which are made better, as to improve the mind, morals, etc.; to better is usually applied to the outward condition on familiar occasions.

Antonyms.—Corrupt, impair, harm, mar.

Amicable, friendly. Amicable implies a negative sentiment, a freedom from discordance; friendly implies a positive feeling of regard, the absence of indifference. We make an amicable settlement and have a friendly understanding.

Antonyms.—Ill-tempered, unfriendly, hostile.

Amuse, divert, entertain. Whatever amuses serves to kill time, to lull the faculties, and to banish reflection; whatever diverts causes mirth and provokes laughter; whatever entertains acts on the senses, and awakens the understanding.

Antonyms.—Annoy, disquiet, bore.

Anger, resentment, wrath, ire, indignation, rage, fury. Anger is a sudden sentiment of displeasure; resentment is a continued anger; wrath is a heightened sentiment of anger, which is poetically expressed by the word ire. Indignation is a sentiment awakened by the unworthy and atrocious conduct of others; as it is exempt from personality, it is not irreconcilable with the temper of a Christian. Rage is a vehement show of anger, and fury is an excess of rage.

Antonyms.—Patience, acquiescence, gentleness, self-control, serenity, calmness.

Animadversion, criticism, stricture. Animadversion includes censure and reproof; criticism implies scrutiny and judgment, whether for or against; and stricture comprehends a partial investigation mingled with censure.

Antonyms.—Praise, approval, commendation.

Animate, inspire, enliven, cheer, exhilarate. To be animated in the physical sense is simply to possess animal life in however small a degree; to be animated in the moral sense is to receive the smallest portion of the sentiment or thinking faculty; to inspire expresses the communication of a strong moral sentiment or passion; to enliven respects the mind; cheer relates to the heart; exhilarate regards the spirits, both animal and mental. To be animated, in action, conversation, etc., is to show signs of vigorous life. One is inspired by strong sentiment, often conveyed by another. The mind is enlivened by music or wit; the heart is cheered by good news; one is exhilarated physically by a keen air, spiritually or mentally by success, joy, enthusiasm.

Antonyms.—Deaden, dull, dishearten, depress.

Announce, proclaim, publish. We announce an event that is expected and just at hand; we proclaim an event that requires to be known by all the parties interested; we publish what is supposed likely to interest all who know it.

Antonyms.—Conceal, suppress, withhold.

Answer, reply, rejoinder, response. An answer is given to a question; a reply is made to an assertion; a rejoinder is made to a reply; a response is made in accordance with the words of another. We answer either for the purpose of affirmation, information, or contradiction; we always reply, or rejoin, in order to explain or confute; responses are made by way of assent or confirmation.

Antonyms.—Question, query, interrogation.

Answerable, responsible, accountable, amenable. Answerable and responsible convey the idea of a pledge given for the performance of some act, or the fulfillment of some engagement, a breach of which subjects the defaulter to loss, punishment, or disgrace. A person is accountable to his employer for the manner in which he has conducted any business intrusted to him. To be amenable is to be accountable as far as laws and regulations bind a person; one is amenable to the laws of society, or he is amenable to the rules of the house in which he is only an inmate.

Antonyms.—Free, irresponsible, absolute.

Apologize, defend, justify, exculpate, excuse, plead. We apologize for an error by acknowledging ourselves guilty of it; we defend ourselves against a charge by proving its fallacy; we justify our conduct against any

imputation by proving that it was blameless; we exculpate ourselves from all blame by proving that we took no part in the transaction. Excuse and plead are not grounded on any idea of innocence; a plea is frequently an idle or unfounded excuse, a frivolous attempt to lessen displeasure; we excuse ourselves for a neglect by alleging indisposition.

Apparent, visible, clear, plain, obvious, evident, manifest. That which is simply an object of sight is visible; that which presents itself to our view in any form, real or otherwise, is apparent. The stars themselves are visible to us; but their size is apparent. What is clear is to be seen in all its parts and in its proper colors; what is plain is seen by a plain understanding; what is obvious presents itself readily to the mind of every one; what is evident is unquestionably seen, and leaves no hesitation in the mind. What is manifest is so openly shown as to admit of no doubt and to force conviction.

Antonyms.—Obscure, hidden, latent, doubtful.

Applause, acclamation. These terms express a public demonstration, the former by means of a noise with the hands or feet, the latter by means of shouts and cries. The former is employed as a testimony of approbation, the latter as a sanction or an indication of respect.

Antonyms.—Censure, hissing.

Appoint, order, prescribe, ordain. To appoint is the act of either an equal or a superior; we appoint a meeting with any one at a given time and place; a king appoints his ministers. To order is the act of one invested with a partial authority; a master gives his orders to his servant. To prescribe is the act of one who is superior by virtue of his knowledge; a physician prescribes for his patient. To ordain is an act emanating from the highest authority; kings and councils ordain, but their ordinances must be conformable to what is ordained by the Divine Being.

Antonyms.—Forbid, prohibit, veto.

Apprehend, conceive, suppose, imagine. To apprehend is simply to take an idea into the mind,—thus we may apprehend any object that we hear or see. To conceive is to form an idea in the mind, as to conceive the idea of doing anything, to conceive a design. What one supposes may admit of a doubt; it is frequently only conjectural. What one imagines may be altogether improbable or impossible; that which cannot be imagined may be too improbable to admit of being believed.

Approach, access, admittance. Approach signifies the coming near or toward an object, and consequently it is an unfinished act, but access and admittance are finished acts; access is coming to, or as close to, an object as is needful; admittance is coming into any place, or into the presence or society of any person. An approach may be quick or slow, an access easy or difficult, an admittance free or conditional.

Antonyms.—Recession, withdrawal, exclusion.

Approach, approximate. Approach means to draw or come nearer to, although the distance at any time may still be great. Approximate implies a very close approach—as close as conditions will permit.

Antonyms.—Avoid, miss, shun, evade.

Argue, evince, prove. To argue is to establish an indication amounting to probability; to evince denotes an indication so clear as to remove doubt; to prove marks an evidence so positive as to produce conviction.

Argument, reason, proof. An argument serves for defense; a reason, for justification; a proof, for conviction. Arguments are adduced in support of a hypothesis or a proposition; reasons are assigned in matters of belief and practice; proofs are collected to determine truth as to alleged facts.

Arise, rise, mount, ascend, climb, scale. Arise is used only in the sense of simply getting up, but rise is employed to express a continued motion upward. A person arises from his seat or his bed; a bird rises in the air; a person mounts a hill, and ascends a mountain. To climb is to rise step by step by clinging to a certain body; to scale is to rise as by an escalade, or species of ladder, employed in mounting the walls of fortified towns. Trees and mountains are climbed; walls are scaled.

Antonyms.—Settle, fall, descend, sink.

Arrogance, presumption. Arrogance is the act of the great; presumption, that of the little. The arrogant man takes upon himself to be above others; the presumptuous man strives to be on a level with those who are above him.

Antonyms.—Modesty, meekness, humility.

Artist, artisan, artificer, mechanic, craftsman. The artist ranks higher than the artisan,—the former requires intellectual refinement, the latter nothing but to know the common, mechanical practice of an art or trade. The sculptor is an artist; the sign-painter is an artisan. An artificer is a master artisan. Mechanic and artisan are used interchangeably. Craftsman implies technical skill and judgment; it is used of both artist and artisan. The mechanic is one whose work involves manual skill, or skill in the use of tools.

Ask, inquire, question, interrogate. We perform all these actions in order to get information; but we ask, for general purposes of convenience; we inquire from motives of curiosity; we question and interrogate from motives of discretion. Indifferent people ask of each other whatever they wish to know; learners inquire the reasons of things that are new to them; masters question their servants, or parents their children, when they wish to ascertain the real state of any case; magistrates interrogate criminals when they are brought before them.

Antonyms.—Answer, reply, respond.

Assemble, muster, collect. To assemble is to bring together by a call or invitation or, as machine parts, by mechanical process according to a plan; to muster is to bring together by an act of authority, or by a particular effort, into one point of view at one time, and from one quarter; to collect is to bring together at different times, and from different quarters.

Antonyms.—Adjourn, dismiss, scatter, disperse.

Assent, consent, approbation, concurrence. Assent concerns matters of judgment; consent, matters of conduct. We assent to what we admit to be true; we consent to what we allow to be done. Approbation is a species of assent, concurrence, of consent. To approve is not merely to assent to a thing as right, but to determine upon it positively; concurrence is properly the consent of many. Assent is given by equals or inferiors; consent, by superiors; approbation, by equals or superiors; concurrence, by equals.

Antonyms.—Dissent, refusal, disapproval, disagreement.

Association, society, company, partnership, corporation. Associations and societies are organizations for the promotion of literary, scientific, religious, or benevolent objects. Companies and partnerships are formed for business purposes. The partnership is the least stable of business organizations. A corporation is a more permanent organization, chartered by the state. It persists irrespective of the particular individuals owning or controlling its stock.

Asylum, refuge, shelter, retreat. Asylum is chosen by him who has no home; refuge by him who is apprehensive of danger. Shelter is a cover or a protection. Fatigues and toils of life make us seek retreat.

Atone for, expiate. Both these terms express a satisfaction for an offense: atone is general; expiate is particular. We may atone for a fault by any form of suffering; we expiate a crime only by suffering a legal punishment.

Attack, assail, assault, encounter, charge. To attack is to make an approach in order to do some violence to the person; to assail or assault is to make a sudden and vehement attack; to encounter is to meet the attack of another. One assails by means of missiles, reproaches, or invective; one assaults by direct personal violence. To charge is to attack from a particular quarter.

Antonyms.—Resist, withstand, sustain, defend.

Attempt, endeavor, effort, essay. An attempt is the act of setting about a thing with a view of effecting it; an endeavor is a continued attempt. An effort is to an attempt as a means is to an end; it is the act of calling forth those powers which are required in an attempt. An essay is an attempt with the idea of testing one's own powers. It is applied either to material or intellectual matters.

Attend, hear, listen. To attend is to have the mind intently engaged on what we hear; to listen is to strive to hear. People attend when they are addressed. Listen implies a lesser degree of heed than attend. To hear is merely to be conscious of sound.

Attentive, careful. We are attentive in order to understand and to improve; we are careful to avoid mistakes. Attentive refers to mental attitude; careful relates to mechanical action: we listen attentively; we read or write carefully.

Antonyms.—Inattentive, careless, heedless, indifferent.

Attract, allure, invite, engage. That is attractive which draws the attention toward itself; that is alluring which awakens desire; that is inviting which offers persuasion; that is engaging which takes possession of the mind.

Antonyms.—Repel, deter, estrange, disgust.

Augur, presage, forebode, betoken, portend. Augur signifies either to serve or to make use of as an augury; to forebode or presage is to form a conclusion in one's own mind; to betoken or portend is to serve as a sign. Persons or things augur; persons or things forebode or presage; things only betoken or portend. Auguring is a calculation of some future event, in which the imagination seems to be as much concerned as the understanding. Presaging is rather a conclusion or a deduction of what may be from what is; it lies

in the understanding more than in the imagination. Foreboding lies altogether in the imagination. Things which present natural signs are said to betoken; those which present extraordinary or supernatural signs are said to portend.

Auspicious, propitious. Those things are auspicious which are regarded as indicative of good omen. Persons are propitious to the wishes of others who listen to their requests and contribute to their satisfaction; favoring, helpful influences are propitious.
Antonyms.—Untoward, adverse, forbidding, ominous.

Austere, rigid, severe, rigorous, stern. The austere man is severe with himself; the rigid man binds himself to a rule. The manners of a man are austere when he refuses to take part in any social enjoyments; his probity is rigid, that is, inaccessible to the allurements of gain or the urgency of necessity. Severe is used with reference to conduct,—a man is severe in the restraints he imposes and the punishments he inflicts. Rigorous implies harshness, severity, as, rigorous treatment, a rigorous officer of justice. Sternness is a species of severity more in manner than in direct action: a commander may issue his commands sternly, or a despot may issue his stern decrees.
Antonyms.—Affable, gentle, indulgent, mild.

Avaricious, miserly, parsimonious, niggardly. An avaricious man shows his love of money in his ordinary dealings; but the miser lives for his money and suffers every privation rather than part with it. The avaricious man indulges his passion for money by parsimony, that is, by excessive personal saving, or by niggardly ways in his dealings with others.
Antonyms.—Unselfish, generous, lavish, free.

Awaken, excite, provoke, rouse, stir up. We awaken by a simple effort; we excite by repeated efforts or forcible means; we provoke by words, looks, or actions. The tender feelings are awakened; affections, or the passions in general, are excited; the angry passions are commonly provoked. We are roused from an extraordinary state by extraordinary means; we are stirred up from an ordinary to an extraordinary state.
Antonyms.—Calm, quiet, pacify, restrain.

Awe, reverence, dread. Awe and reverence both denote a strong sentiment of respect, mingled with some emotions of fear; but the former marks the much stronger sentiment of the two. Dread is an unmingled sentiment of fear for one's personal security.
Antonyms.—Familiarity, assurance, contempt.

Awkward, clumsy, bungling. Awkward applies to outward deportment; clumsy, to the shape and make of the object. A person has an awkward gait; he is clumsy in his whole person. Bungling applies to the result of awkwardness and clumsiness in performing work.
Antonyms.—Adroit, dexterous, neat, skillful.

Axiom, maxim, aphorism, apothegm, saying, adage, proverb, byword, saw. The axiom is a truth of the first value, a self-evident proposition which is the basis of other truths. A maxim is a truth of the first moral importance for all practical purposes; an aphorism is a truth set apart for its pointedness and excellence. Apothegm is, in respect to the ancients, what saying is in regard to the moderns; it is a pointed sentiment pronounced by an individual and adopted by others. Adage and proverb are common sayings, the former among the ancients, the latter among the moderns. The byword is a casual saying, originating in some local circumstance, frequently used in contempt; saw is an archaic word for saying.

Babble, chatter, chat, prattle, prate. Babbling denotes rapidity of speech, which renders it unintelligible; chatter is an imitation of the noise of speech properly applied to magpies or parrots, and figuratively to a corresponding mode of speech in human beings. The winter's fireside invites neighbors to assemble and chat away many an hour which might otherwise hang heavy on hand, or be spent less inoffensively. The prattling of babes has an interest for every feeling mind, but for parents it is one of the highest enjoyments; prating, on the contrary, is the consequence of ignorance and childish assumption. A prattler has all the unaffected gayety of an uncontaminated mind; a prater is forward, obtrusive, and ridiculous.

Band, company, crew, gang. All these terms denote a small association for a particular object. A band is an association in which men are bound together by some strong obligation, whether taken in a good or a bad sense, as a band of soldiers, a band of robbers; a company marks an association for convenience, without any particular obligation, as a company of travelers, a company of strolling players. A crew marks an association collected by some external power, or by coincidence of plan and motive; in the former case it is used for a ship's crew, in the latter and bad sense of the word it is employed for any number of evil-minded persons met together from different quarters and co-operating for some bad purpose. Gang and crew are applied to companies of workmen under one leader or on one job, or to bands brought together for boisterous or disorderly purposes. Gang is applied to groups of boys who play together under a leader.

Banishment, exile, expulsion. Banishment follows from a decree of justice; exile, either by the necessity of circumstances or by an order of authority; banishment is a disgraceful punishment inflicted by tribunals upon delinquents; exile is a disgrace incurred without dishonor; exile removes us from our country; banishment or expulsion drives us from it ignominiously.
Antonyms.—Recall, reinstatement, repatriation.

Be, become, grow. Be is positive; become is relative: a person is what he is without regard to what he was; he becomes that which he was not before. To grow is to become by a gradual process. A man may become a good man from a vicious one, in consequence of a sudden action of his mind; but he grows in wisdom and virtue by means of an increase in knowledge and experience.
Antonyms.—Die, stagnate, diminish.

Be, exist, subsist. We say of qualities, of forms, of actions, of arrangement, of movement, and of every different relation, whether real, ideal, or qualificative, that they are; we say of matter, of spirit, of body, and of substances, that they exist. Man is man, and will be man under all circumstances and changes of life; he exists under every known climate and variety of heat or cold in the atmosphere. Subsist implies generally dependence upon outside aid for existence. Cities subsist on the productivity of the country.

Bear, yield. Both words mean to produce: bear respects animals and plants, which bear young or fruit; yield respects plants and inanimate objects, which yield increase.

Beat, defeat, overpower, rout, overthrow. An army is beaten in important engagements; it is defeated and may be routed in partial attacks; it is overpowered by numbers, and overthrown in set engagements. These words are similarly applied to the fortunes of persons.
Antonyms.—Aid, help, succor, befriend.

Beautiful, fine, fair, handsome, pretty. Beautiful implies a certain perfection of form, correctness of proportion, unity of impression, harmony of details. Applied to human beings it connotes some spiritual excellence. Fine implies perfection of finish and design, both interior and exterior. Fair conveys the idea of external smoothness and freedom from blemish. Handsome implies superficial excellence, of proportion in particular. Pretty is confined to objects of refinement, especially those small and dainty: a beautiful landscape; a pretty fancy; a pretty child.
Antonyms.—Plain, uncouth, coarse, deformed, ugly.

Becoming, comely, graceful. Becoming applies to the decorations of the person and to the deportment; comely refers to natural embellishments; graceful, to natural or artificial accomplishments. Manner is becoming; figure is comely; air, figure, or attitude is graceful.
Antonyms.—Unsuitable, awkward, homely, uncouth.

Beg, beseech, solicit, entreat, supplicate, implore, crave. To beg denotes a state of want; to beseech, entreat, and solicit, a state of urgent necessity; supplicate and implore, a state of abject distress; crave, the lowest state of physical want. One begs with importunity, beseeches with earnestness, entreats by the force of reasoning and strong representation; one solicits by virtue of one's interest, supplicates by a humble address, implores by every mark of dejection and humiliation.
Antonyms.—Command, demand, claim, extort, refuse.

Begin, commence, enter upon. To begin has reference to the order of time; to commence implies the exertion of setting about a thing. A person begins a thing with a view of ending it; he commences a thing with a view of completing it. To enter upon implies a first doing of what has not been tried before.
Antonyms.—End, finish, complete, terminate, conclude, consummate.

Behavior, conduct. Behavior is more specific, and refers to acts, especially in the presence of or in reference to others. Conduct is more general and inclusive; it implies moral or ethical considerations governing behavior.

Belief, credit, trust, faith. Belief and credit are particular actions or sentiments; trust and faith are permanent dispositions of the mind. Things are entitled to our belief; persons are entitled to our credit; but people repose trust in others, or have faith in others. Belief is intellectual and may be quite impersonal. Faith and trust are personal and have immediate reference to conduct. Trust in God serves to dispel all anxious concern about the future.
Antonyms.—Doubt, denial, distrust, skepticism.

Beneficent, bountiful or **bounteous, munificent, generous, liberal.** The sincere well-wisher to fellow creatures is beneficent according to his means; he is bountiful in providing for the comfort and happiness of others; he is munificent in dispensing favors; he is generous in imparting his property; he is liberal in all he does. Beneficence and bounty are characteristics of the Deity as well as of his creatures.

Antonyms.—Stingy, niggardly, petty, mean.

Benevolence, benignity, humanity, kindness, tenderness. Benevolence lies in the will; benignity, in the disposition or frame of mind. Humanity lies in the heart; kindness and tenderness, in the affections. Benevolence indicates a general good will to all mankind; benignity, particular goodness or kindness of disposition. Humanity is a general tone of feeling; kindness and tenderness are particular modes of feeling.

Antonyms.—Malevolence, malignity, churlishness, harshness, brutality, ill will.

Bereave, deprive, strip. To bereave expresses more than deprive, but less than strip, which denotes a total and violent bereavement. One is bereaved of children, deprived of pleasures, and stripped of property. We are bereaved of that on which we set most value; the act of bereaving does violence to our inclination. We are deprived of the ordinary comforts and conveniences of life,—they cease to be ours. We are stripped of the things which we most want; we are thereby rendered, as it were, naked.

Antonyms.—Restore, supply, comfort, endow.

Blame, censure, condemn, reprove, reproach, upbraid. To blame is simply to ascribe a fault to; to censure is to express disapprobation. The former is less personal than the latter. The thing more than the person is blamed; the person more than the thing is censured. A person may be blamed for his good nature and censured for his negligence. That which is condemned is of a more serious nature, and it produces a stronger and more unfavorable expression of displeasure or disapprobation than that which is blamed; reprove is even more personal than censure. A reproof passes from one individual to another, or to a certain number of individuals. Reproaching and upbraiding are as much the acts of individuals as reproving, but the former denote the expression of personal feelings and may be just or unjust; the latter is presumed to be divested of all personal feelings.

Antonyms.—Praise, approve, abet, applaud, countenance.

Blemish, stain, spot, speck, flaw, defect, fault. Whatever detracts from the seemliness of appearance is a blemish. In works of art the slightest dimness of color or want of proportion is a blemish. A stain or spot sufficiently characterizes itself as that which is superfluous and out of its place; a speck is a small spot; a flaw is a defect that prevents the substance from holding together properly, as a flaw in glazing on china, in a steel rail, in an argument. A blemish tarnishes; a stain spoils; a spot, speck, or flaw disfigures. Defect consists in the want of some specific essential in an object; fault conveys the idea not only of something wrong, but also of its relation to the author. There is a blemish in fine china, a defect in the springs of a clock, and a fault in the contrivance.

Blot out, expunge, erase, efface, cancel, obliterate. Letters are blotted out, so that they cannot be seen again; they are expunged, so as to signify that they cannot stand for anything; they are erased, so that the space may be used for other writing. Efface does not designate either the manner or the object; inscriptions on stone may be effaced, that is, rubbed off so as not to be visible. Cancel is principally confined to written or printed characters; they are canceled by striking through them with the pen. Letters are obliterated which are in any way made illegible.

Antonyms.—Write, record, confirm, perpetuate.

Bold, fearless, intrepid, undaunted. Boldness is a positive characteristic of the spirit; fearlessness is a negative state of the mind, that is, simply an absence of fear. A person may be bold through fearlessness, but he may be fearless without being bold; he may be fearless where there is no apprehension of danger or no cause for apprehension, but he is bold only when he is conscious or apprehensive of danger, and prepared to encounter it. A man is intrepid who has no fear where the most fearless might tremble; he is undaunted whose spirit is unabated by that which would make the stoutest heart yield.

Antonyms.—Afraid, fearful, cowardly, timid, faint-hearted.

Booty, spoil, prey. Booty and spoil are used as military terms in attacks on any enemy; prey, in cases of particular violence. The soldier gets his booty; the combatant, his spoils; the carnivorous animal, his prey. Booty implies something of personal service to the captor; spoils, whatever serves to designate his triumph; prey includes whatever gratifies the appetite and is to be consumed.

Bound, limit, confine, circumscribe, restrict, enclose. Bound applies to the natural or political divisions of the earth: countries are bounded by mountains and seas. Limit applies to any artificial boundary,—landmarks in fields serve to show the limits of one man's ground. To confine is to shut within limits,—in this manner we confine cattle in a yard by means of walls. To circumscribe is literally to write or draw around, as a circle around a square or limits about our desires. To restrict is to exercise a strong degree of control: a person is restricted in his movements by the narrowness of a room; laws often restrict privileges. To inclose is to bound or limit on all sides, as a garden is inclosed.

Boundless, unbounded, unlimited, infinite. Space is boundless so long as no bounds to it have been discovered; desires are often unbounded which ought always to be bounded; power is sometimes unlimited which would be better limited. That is infinite which is without bound or end, as: the power of God; the series of figures in the decimal expression of the fraction ⅓.

Antonyms.—Confined, restricted, circumscribed, finite.

Bravery, courage, valor, gallantry. Bravery lies in the blood; courage lies in the mind. The latter depends on the reason, the former on the physical temperament. The first is a species of instinct; the second is a virtue. A man is brave in proportion as he is without thought of danger; he has courage in proportion as he reasons or reflects. Valor is a higher quality than either bravery or courage—it combines the fire of bravery with the determination and firmness of courage. Gallantry is extraordinary bravery combined with high-spirited manner, particularly on unusual occasions.

Antonyms.—Fear, cowardice, dismay, effeminacy.

Breach, break, gap, chasm. A breach and a gap are the consequence of a violent removal which destroys the connection; a break and a chasm may arise from the absence of that which would form a connection. A breach in a wall is made by means of cannon; gaps in fences are commonly the effect of some violent effort to pass through; a break is made in a page of printing by leaving off in the middle of a line; a chasm is left when an earthquake causes a gaping fissure.

Break, bruise, squeeze, pound, crush. Break always implies the separation of the component parts of a body; bruise denotes simply to injure without separation of parts. Hard, brittle substances, as glass, are broken; soft, pulpy substances, as flesh or fruits, are bruised. Squeeze is used for soft substances or for gentle compression. To pound is properly to crush in a mortar, so as to produce a separation of parts. To crush is the most violent and destructive of all operations, which amounts to the destroying of the structure of a body.

Break, burst, crack, split. To break does not specify any particular manner or form of action,—what is broken may be broken in two or more pieces, broken short or lengthwise, and the like; to burst is to break suddenly and with violence, frequently also with noise. To crack and to split are modes of breaking lengthwise: the former in application to hard or brittle objects, as clay, or the things made of clay; the latter in application to wood or substances like coal or rock that have seams or lines of cleavage.

Antonyms.—Join, attach, mend, unite, weld.

Breeze, gale, blast, gust, storm, tempest, hurricane. A breeze is gentle; a gale is brisk, but steady: we have breezes on a calm summer's day; the mariner has favorable gales, which keep the sails on the stretch. A blast is impetuous. The blare of a trumpet, the breath of bellows, are blasts. A gust is sudden and vehement; storm, tempest, and hurricane include other particulars besides wind. A storm throws the whole atmosphere into commotion; it is a war of the elements, in which wind, rain, hail, and the like conspire to disturb the heavens. Tempest is a violent storm. Hurricane is a species of storm which exceeds all the rest in violence and duration.

Antonyms.—Lull, calm, stillness, fair weather.

Brightness, luster, splendor, brilliancy. Brightness and luster are applied properly to natural lights; splendor and brilliancy have been more commonly applied to that which is artificial or unusual. There is always more or less brightness in the sun or moon; there is an occasional luster in all the heavenly bodies when they shine in their unclouded brightness; there is splendor in the eruptions of flame from a volcano or from an immense conflagration; there is brilliancy in a collection of diamonds.

Antonyms.—Dullness, dimness, shadow, obscurity, gloom.

Bring, fetch, carry. To bring is simply to take with oneself from one place to another; to fetch is to go first to a place and then bring a thing. To fetch, therefore, is a sort of bringing: whatever is near at hand may be brought; whatever is at a distance must be fetched. To carry implies taking with one, without reference to any particular place or destination.

Bulky, massive. Whatever is bulky is large, unwieldy, often awkward to handle, whether heavy or not; what is massive is compact in substance and combines solidity with large size.

Antonyms.—Compact, small, slight, slender.

Burial, interment, sepulture. We bury in order to conceal. Interment and sepulture are accompanied with religious ceremonies. Burial is confined to no object or place; interment refers properly to burial in the earth; sepulture is an abstract term confined to particular cases, as in speaking of the rites and privileges of sepulture.

Business, occupation, employment, engagement, avocation, vocation. Business occupies all a person's thoughts as well as his time and powers. Occupation and employment occupy only his time and strength; the first is mostly regular, the object of our choice; the second is casual, depending on the will of another. Engagement is a partial employment; avocation, a particular engagement. Vocation is applied to one's regular work; avocation, to the occupation with which one occupies his time outside the regular routine of work.

Antonyms.—Recreation, amusement, relaxation, pastime.

Business, trade, profession, art. Buying or selling of merchandise is inseparable from trade; but the exercise of one's knowledge and experience for purposes of gain constitutes a business. A profession implies scholarship and skill in application of principles. An art involves skill in the practice of accepted rules and methods of work to produce practical results with definite materials. We speak of the profession of letters, but of the art of writing. Trade is used also of mechanical occupation, as the carpenter's trade.

Bustle, tumult, uproar. Bustle has most of hurry in it; tumult, most of disorder and confusion; uproar, most of noise: the hurried movements of one, or many, cause a bustle; the disorderly struggles of many constitute a tumult. The loud elevation of many opposing voices produces an uproar; uproar is the consequence either of general anger or of mirth.

Antonyms.—Calm, quietness, order, tranquillity.

Calamity, disaster, misfortune, mischance, mishap. A calamity is a great disaster or misfortune; a misfortune is a great mischance or mishap. Whatever is attended with destruction is a calamity; whatever occasions mischief to the person, or defeats or interrupts plans, is a disaster; whatever is accompanied with a loss of property or the deprivation of health is a misfortune; whatever diminishes the beauty or utility of objects is a mischance or a mishap.

Antonyms.—Success, blessing, boon, achievement.

Calculate, reckon, compute, count. To calculate denotes any numerical operation in general, but is particularly applicable to the abstract science of figures. The astronomer calculates motions of the heavenly bodies; the mathematician makes arithmetical calculations. To reckon is to enumerate and set down things in detail. Reckoning is applicable to the ordinary business of life: tradesmen keep their accounts by reckoning; children learn to reckon by various simple processes. Calculation is therefore the science; reckoning, the practical art of enumerating. To compute is to come at the result by calculation. We count one by one,—we count the minutes.

Calendar, almanac, ephemeris. The calendar is a book which registers events under every month; the almanac is a book which registers times or the divisions of the year; an ephemeris is a book which registers the planetary movements every day.

Call, cry, exclaim. Call is used on all ordinary occasions in order to draw a person to a spot, or for any other purpose, when one wishes to be heard. To cry is to call loudly on particular occasions. A call draws attention; a cry awakens alarm. To exclaim implies the expression of some particular feeling.

Antonyms.—Hush, listen, be silent.

Call, invite, bid, summon. In the act of calling, any sounds may be used; we may call by simply raising the voice. Inviting may be a direct or indirect act; we may invite by looks or signs as well as by words, by writing as well as by speaking. To bid and summon require the express use of words; the former is always directly addressed to the person, the latter may be conveyed by an indirect channel. To summon is an act of authority, as to summon witnesses.

Antonyms.—Dismiss, disperse, send away.

Calm, placid, serene, composed, collected. Physically, calm means free from violent action; mentally, free from disturbing emotion or passion. Placid implies ease and contentment of mind. We speak also of a calm sea and a placid lake. Serene implies clearness and composure of mind. A sky is serene when free from clouds and clear. The mind is composed when excitement has been allayed; it is collected when all its powers are at command.

Antonyms.—Agitated, stormy, violent, passionate.

Candor, openness, sincerity. Candor obliges us to acknowledge even that which may make against ourselves; it is disinterested. Openness impels us to utter whatever passes in the mind—it is unguarded. Sincerity assures that our words and actions are true to our thoughts and feelings—it is positive.

Antonyms.—Cunning, deceit, craft, duplicity.

Captious, cross, peevish, petulant, fretful. Captious marks a readiness to find fault; cross indicates a readiness to offend or go contrary to the wishes of others; peevish expresses a strong degree of crossness; fretful, a complaining impatience. Captiousness is the consequence of ill will or pique; crossness, of ill humor; peevishness and fretfulness, of a painful irritability. Petulance is the result either of a naturally hasty temper or of a sudden irritability.

Antonyms.—Considerate, good-natured, appreciative, thoughtful, patient.

Capture, seizure, prize. A capture is made by force of arms; a seizure is made by direct and personal force. Prize relates only to the thing taken and its value to the captor.

Care, charge, management. Care will include both charge and management; but, in the strict sense, it comprehends personal labor. Charge involves responsibility; management includes regulation and order. A gardener has the care of a garden; a nurse has the charge of children; a steward has the management of a farm.

Care, solicitude, anxiety. Care is the most indefinite of the three; it may be accompanied with pain or not, according to the nature of the object or the intensity of the application. Solicitude and anxiety are accompanied with a positive degree of pain—the latter still more than the former. Care may be exercised with or without feeling; solicitude has desire, mixed with fear; anxiety has distress for the present, mixed with fear for the future.

Antonyms.—Satisfaction, indifference, unconcern, trust.

Careful, cautious, provident. Careful, or full of care, that is, having care, is the general term. To be cautious is to be careful in guarding against danger; to be provident is to be careful in preventing straits and difficulties. The term careful is applied for the most part to present matters, but provident only to that which is future. One is careful of his money, but provident toward a time of need.

Antonyms.—Careless, neglectful, reckless, heedless, spendthrift.

Carnage, slaughter, massacre, butchery. Carnage pictures heaped corpses; slaughter, the wholesale taking of lives as in battle. Butchery is the brutal word for killing men and women as cattle are killed. Massacre implies the killing or butchery of defenseless men, women, and children.

Case, cause. The case is matter of fact; the cause is matter of question. A case involves circumstances and consequences; a cause involves reasons and arguments. A case is something to be learned; a cause is something to be decided.

Cause, occasion, create. What is caused seems to follow naturally. What is occasioned follows incidentally, or what occasions may be incidental, but necessary. What is created receives its existence arbitrarily. A wound causes pain; accidents occasion delay; busybodies create mischief.

Cause, reason, motive. A cause is that which brings about any event, act, or fact. "The Creator is the first cause of all things." A reason is an explanation devised by the mind for a fact, an event, or an action. We give reasons also for our beliefs, that is, the grounds for them. A motive is an influence that determines choice or action. Effects follow causes, conclusions follow reasons, and actions spring from motives.

Cautious, wary, circumspect. We must be cautious on all occasions where there is danger, but we must be wary where there is great danger. A tradesman must be cautious in his dealings with all men, but he must be wary when he has to deal with designing men. Circumspect implies attention to all the conditions and probable consequences of action. A man must be circumspect when he transacts business of particular importance and delicacy.

Antonyms.—Rash, impulsive, audacious, precipitate.

Cease, leave off, discontinue. Cease is used for either particular actions or general habits; leave off, more usually and properly for particular actions; discontinue, for general habits. A restless, spoiled child never ceases crying until it has obtained what it wants; it is a mark of impatience not to cease lamenting when one is in pain. A laborer leaves off his work at any given hour. A sensitive person discontinues his visits when they are found not to be agreeable.

Antonyms.—Continue, persist, persevere.

Celebrate, commemorate. Everything is celebrated which is distinguished by any marks of attention, without regard to the time of the event, whether present or past:

nothing is commemorated but what has already passed in point of time.

Antonyms.—Forget, ignore, disregard.

Celestial, heavenly. Celestial is applied mostly in the natural sense of the heavens; heavenly is employed more commonly in a spiritual sense. Hence, we speak of the celestial globe as distinguished from the terrestrial, and of the celestial bodies. But we speak of the heavenly habitation, of heavenly joys or bliss, of heavenly spirits and the like.

Antonyms.—Terrestrial, earthly, mundane.

Censure, carp, cavil. To censure respects positive errors; to carp and cavil have regard to what is trivial or imaginary. The former is employed for errors in persons; the latter, for supposed defects in things. Carping and caviling are resorted to only to indulge ill nature or self-conceit: party politicians carp at the measures of administration; infidels cavil at the evidences of Christianity, because they are determined to disbelieve.

Antonyms.—Praise, approve, sanction, uphold.

Cessation, stop, rest, intermission. Cessation refers to the course of things; whatever does not go on has ceased; things cease of themselves. Stop implies an abrupt cessation, as if due to an outside force. Rest is cessation from labor or exertion—whatever does not move or exert itself is at rest. Intermission is cessation only for a time or at certain intervals. That which ceases or stops is supposed to be at an end; rest or intermission supposes a renewal.

Antonyms.—Stir, work, persistence, continuance.

Chance, fortune, fate. Chance applies to all things, personal or otherwise; fortune and fate are applied most often to that which is personal. Chance neither forms, orders, nor designs; neither knowledge nor intention is attributed to it; its events are uncertain and variable. Fortune forms plans and designs, but without choice; we attribute to it an intention without discernment; it is said to be blind. Fate forms plans and chains of causes; intention, knowledge, and power are attributed to it—its views are fixed; its results are decisive.

Antonyms.—Choice, free will, purpose.

Chance, hazard. As between chance and hazard, chance implies that the balance of probability inclines toward good fortune; hazard, that the chances of good or ill are about even, or inclining toward misfortune.

Change, exchange, barter, substitute. To change in respect to persons is to take one for another, without regard to whether they are alike or different,—as a king changes his ministers, or any person may change his servants. To exchange is to take one person in return for another who is in like condition, as prisoners are exchanged in time of war. In respect to things, to change is to take anything new or fresh, whether alike or different; clothes may be changed. To exchange is to take one thing for another, that is, either of the same kind or equivalent in value, as to exchange one commodity for another. To change may often be the result of caprice, but to exchange is always an act of either discretion or necessity. To barter is to give any commodity for other commodities. To substitute is to put one person or thing in the place of another for the purpose of doing any service or filling any office, as to substitute one for another in military service, or to substitute wood for steel in building.

Antonyms.—Keep, hold, retain.

Change, variation, vicissitude. Change consists simply in ceasing to be the same; variation consists in being different at different times; vicissitude consists in being alternately or reciprocally different and the same.

Antonyms.—Sameness, uniformity, permanence.

Character, letter. Character is any written or printed mark that serves to designate something; a letter is a species of character which is a constituent part of a word.

Character, reputation. Character lies in the man; it is the mark of what he is; it shows itself on all occasions. A person's reputation depends upon others; it is what they think of him.

Chasten, chastise. Chasten is used only of spiritual correction, as the chastening of men by God. Chastise implies physical pain or punishment with a corrective purpose.

Cheat, defraud, trick. One cheats by direct and gross falsehood or artifice; one defrauds by a settled plan or contrivance; one tricks by a sudden invention.

Check, chide, reprimand, reprove, rebuke. A person is checked that he may not continue to do what is offensive; he is chidden for what he has done, that he may not repeat it. People are checked by actions and looks, as well as by words; they are chidden by words only. A person may chide or reprimand in anger; he reproves and rebukes with coolness; great offenses call forth chidings. Omissions or mistakes occasion or require a reprimand; irregularities of conduct give rise to reproof; and improprieties of behavior demand rebuke.

Antonyms.—Allow, indulge, abet, approve, laud.

Check, hinder, stop. Check signifies to impede the course of a body in motion, that is, to cause it to move slowly; to stop is to cause it not to move at all. Hinder implies interference in a greater or less degree with action or motion.

Antonyms.—Accelerate, urge, quicken, expedite.

Cheer, encourage, comfort. To encourage is to give heart or courage for action, to strengthen resolution. To cheer and to comfort apply to the spirits or feelings; but to cheer expresses more than to comfort, the former signifying to produce a lively sentiment, the latter to lessen or remove a painful one. We are cheered in the moments of despondence, whether from real or imaginary causes; we are comforted in the hour of distress; we are encouraged in times of timidity and fear.

Antonyms.—Sadden, grieve, hurt, dishearten.

Chief, leader, chieftain, head. Chief denotes precedence in tribal or civil matters; leader regards the direction of enterprises; chieftain is a kind of leader; and a head is the superior in general concerns.

Antonyms.—Follower, aide, lieutenant.

Chief, principal, main. Chief respects order and rank; principal has regard to importance and respectability; main, to degree or quantity. We speak of a chief clerk, of a commander in chief, of the chief person in a city, but of the principal people in a city, of the principal circumstances in a narrative, and of the main object.

Antonyms.—Subordinate, minor, inferior, attendant.

Choose, prefer, pick, select. We may choose whatever comes in our way, without regard to the number of the objects to be chosen from, but we pick or select out of a number only, as to pick or select books from a library. We may pick one or many out of a number, but we mostly select a number. We select with even greater care than we pick. Prefer implies more definitely the mental comparison of one thing with others.

Antonyms.—Reject, disregard, ignore, dismiss.

Circumstance, incident, fact. A circumstance occurs or exists in connection with facts or incidents. Incidents occur or happen in the course of action, but are aside from the main plan or design. Whatever is or is produced or happens is a fact; it may be an incident or a circumstance, if it is thought of as merely attendant to some main fact.

Circumstance, situation. Circumstance is to situation as a part is to a whole: many circumstances constitute a situation; a situation is an aggregate of circumstances. A person is said to be in circumstances of affluence who has an abundance of everything essential to his comfort; he is in an easy situation when nothing exists to create uneasiness.

Circumstantial, particular, minute. Circumstantial expresses less than particular, and particular less than minute. A circumstantial account contains all leading events; a particular account includes every event and movement, however trivial; a minute account omits nothing as to person, time, place, form, and includes every trivial circumstance connected with the events.

Antonyms.—General, cursory, indefinite, vague.

Cite, quote. We quote exact words or the substance of a passage. We cite an author or a passage in his work by giving the exact location or reference, as line and page, so that the words may be found readily.

Civil, polite, obliging, complaisant. Polite expresses more than civil; it is possible to be civil without being polite. Civility is contented with pleasing when the occasion offers. Politeness seeks the opportunity to please: it prevents the necessity of asking by anticipating the wishes; it is full of delicate attentions, and is an active benevolence in the minor concerns of life. Civil applies to words or manner as well as to the action; obliging, to the action only. As civil is indefinite in its meaning, so it is often used indiscriminately in its application; obliging, on the other hand, is confined to what passes between particular persons or under particular circumstances. Civil and obliging both imply a desire to do a kindness; complaisant signifies the desire of pleasing others by being agreeable.

Antonyms.—Rude, discourteous, ill-mannered, churlish.

Clandestine, secret. To do a thing clandestinely is to elude observation; to do a thing secretly is to do it without the knowledge of anyone. What is clandestine is unallowed, which is not necessarily the case with what is secret.

Antonyms.—Authorized, public, open.

Clasp, hug, embrace. To clasp is the act of enclosing another in one's arms when it is performed with the warmth of true affection. To hug is to clasp tightly to the bosom. The more refined term, to embrace, is to infold in the arms in token of friendship or affection.

Classify, arrange, range. The general qualities and attributes of things are to be considered in classifying; their fitness to stand by each other must be considered in arranging; their capacity for forming a line is the only thing to be attended to in ranging. Classification serves the purposes of either public policy or science; arranging is a matter of convenience to the individual himself; ranging is a matter of convenience for others.

Antonyms.—Mix, disorder, jumble, confuse, scatter.

Clean, cleanly, pure. Clean expresses a freedom from dirt or soil; cleanly, the disposition or habit of being clean. A person who keeps himself clean is cleanly. Pure is used in a moral sense, as a pure heart; it is used also to mean free from other substances, as a solution is chemically pure.

Antonyms.—Soiled, dirty, foul, filthy.

Clearly, distinctly. That is seen clearly of which one has a clear view independent of anything else; that is seen distinctly which is seen so as to distinguish it from other objects. We see the moon clearly whenever it shines; but we cannot see the spots in the moon distinctly without the help of glasses.

Antonyms.—Dimly, vaguely, confusedly.

Clearness, lucidity, brightness, vividness. A mere freedom from stain or dullness constitutes clearness; a shining clearness, as of crystal, constitutes lucidity; brightness supposes a certain strength of light; vividness, a freshness combined with strength, and with a degree of brilliancy.

Antonyms.—Dimness, dullness, cloudiness, darkness.

Clearness, perspicuity. Clearness springs from right distinguishing of the ideas discussed. Perspicuity is a quality of the style in which thought is expressed. The argument is clear; the language, perspicuous.

Antonyms.—Obscurity, indefiniteness, ambiguity, vagueness.

Clever, skillful, expert, dexterous. Cleverness is mental power employed in the ordinary concerns of life—a person is clever in business. Skill implies both mental and physical ability, especially in mechanical operations and in science: a physician, a lawyer, or an artist is skillful; one may have a skill in divination or a skill in painting. Expertness and dexterity require more physical than mental power exerted in minor arts and amusements—one is expert at throwing the quoit, dexterous in the management of horses.

Antonyms.—Awkward, bungling, stupid, slow.

Cloister, convent, monastery. The proper idea of cloister is that of seclusion; the proper idea of convent is that of community; the proper idea of a monastery is that of solitude. One is shut up in a cloister, enters a convent; one retires to a monastery. Whoever wishes to take an absolute leave of the world shuts himself up in a cloister; whoever wishes to attach himself to a community that has renounced all commerce with the world goes into a convent; whoever wishes to shun all human intercourse retires to a monastery. In the cloister our liberty is sacrificed; in the convent our worldly habits are renounced, and, those of a regular religious community being adopted, we submit to the yoke of established orders; in a monastery we impose a voluntary exile upon ourselves, with the view of living only to God.

Close, conclude, finish. We may close anything, as a discourse or a meeting, at any point by simply ceasing to have any more to do with it; but we conclude in a definite and positive manner. To conclude is to bring to an end by determination; to finish is to bring to an end by completion. What is settled by arrangement and deliberation is properly concluded; what is begun and ended on a certain plan is said to be finished.

Antonyms.—Begin, open, start, commence, initiate.

Close, near, nigh. Close is more definite than near; houses which are almost joined stand close to each other; men stand close when they touch each other. Objects are near which are within sight; persons are near each other when they can converse together. Near and nigh, which are but variations of one root-word, admit of little or no difference in their use.

Antonyms.—Distant, far, remote, removed.

Coarse, rough, rude. In the physical sense, coarse refers to the composition and materials of bodies, as coarse bread, coarse meat, coarse cloth; rough applies to the surface of bodies, as rough wood and rough skin; rude respects the make or fashion of things,—as a rude bark, a rude utensil. The application of these words to manners and conduct follows their physical sense. A person's language may be coarse, his appearance rough, and his manner rude.

Antonyms.—Fine, refined, smooth, pleasant, suave, polished, civil, polite.

Cogent, forcible, strong. Cogency applies to reasons individually considered; force and strength, to modes of reasoning or expression. Cogent reasons impel to decisive conduct; strong conviction is produced by forcible reasoning conveyed in strong language.

Antonyms.—Feeble, ineffectual, unconvincing, weak.

Colleague, partner, associate. Colleague is used properly of people associated in high office, as in court or in legislature. It is used popularly by debaters associated on teams. Associate is a more general term. Used officially, it implies subordination, as an associate professor. Partner is used popularly of men associated for business and sharing common risks, especially in some hazardous undertaking.

Antonyms.—Opponent, rival, foe, adversary, competitor.

Colorable, specious, ostensible, plausible. The first three of these words are figures of speech drawn from what naturally pleases the eye; plausible is drawn from what pleases the ear. What is colorable has an aspect or face upon it that lulls suspicion and affords satisfaction; what is specious has a fair outside when contrasted with that which it may possibly conceal; what is ostensible is that which presents such an appearance as may serve for an indication of something real. The plausible sounds true, but may be false.

Antonyms.—Genuine, candid, open, unmistakable, ingenuous.

Combat, oppose. A person's views or attitudes are combated; his interests or his measures are opposed.

Antonyms.—Advocate, aid, promote, support.

Come, arrive. To come specifies neither time nor manner; to arrive is employed with regard to some particular period or circumstances. Guests arrive; trains arrive; what is to come is uncertain.

Antonyms.—Go, leave, depart, set out, take leave.

Comfort, pleasure, happiness. Comfort implies a freedom of the whole person from annoyance or pain, a positive feeling of contentment. Pleasure lies in a vivid and intense activity of the mind and is fleeting in its nature. Happiness is an abiding state of agreeable feeling.

Antonyms.—Uneasiness, pain, heartache, sorrow.

Command, direction, order, injunction, precept. A command is an exercise of power or authority; it is imperative and must be obeyed. Direction contains the idea of instruction; order, that of authority. Directions should be followed; orders, obeyed. An order serves to direct—it is instructive and must be executed. A superior issues his commands. Orders may be given by a subordinate or by a body, as orders of a court. Order is applied to the common concerns of life; injunction and precept, to the moral conduct or duties of men. Injunction imposes a duty by virtue of the authority which enjoins. The precept lays down or teaches such duties as already exist.

Antonyms.—Consent, leave, license, permission.

Commission, authorize, empower. We commission in matters where our own will and convenience are concerned; we authorize in matters where our personal authority is requisite; we empower in matters where the authority of the law is required.

Antonyms.—Refuse, prohibit, forbid, disallow, enjoin.

Commodious, convenient. Commodious is most often applied to that which contributes to the bodily ease and comfort; convenient, to whatever suits the purposes of men in their various transactions.

Antonyms.—Narrow, restraining, ill-contrived, awkward.

Commonly, generally, frequently, usually. What is commonly done is an action common to all; what is generally done is the action of the greatest part; what is frequently done is either the action of many, or an action many times repeated by the same person; what is usually done is done regularly by one or many.

Antonyms.—Rarely, occasionally, sometimes, seldom.

Communicate, impart. A thing may be communicated directly or indirectly, and to any number of persons, as to communicate intelligence by signal or otherwise. Impart is a direct action that passes between individuals, as to impart instruction.

Communion, converse. Both these terms imply a communication between minds; but the former may take place without corporeal agency, the latter never does. Spirits hold communion with each other; people hold converse.

Compatible, consistent. Compatibility has a reference principally to plans and measures; consistency, to character, conduct, and station. Everything which does not interrupt its prosecution is compatible with a plan; everything by which it is neither degraded nor elevated is consistent with a person's station.

Antonyms.—Discordant, incongruous, contradictory, inharmonious.

Compel, force, oblige, necessitate. To compel denotes moral rather than physical force; but to force is properly applied to the use of physical force or a violent degree of

moral force. A man may be compelled to walk if he have no means of riding; he may be forced to go at the will of another. Oblige expresses only an indirect influence, which may be resisted or yielded to at discretion. We are compelled to do that which is repugnant to our will and our feelings. That which one is obliged to do may have the assent of the judgment, if not of the will. We are necessitated by circumstances, or by anything which puts it out of our power to do otherwise.

Antonyms.—Induce, persuade, invite, tempt, lead.

Compensation, amends, satisfaction, recompense, remuneration, requital, reward. A compensation is a return for a loss or a damage sustained; amends is a return for anything that is faulty in ourselves or toward others. Satisfaction is that which satisfies the individual requiring it—it is given for personal injuries; a recompense is a voluntary return for a voluntary service—it is made from a generous feeling. Remuneration is estimated rather according to the condition of the person and the dignity of the service than for its positive worth. Authors often receive for their works a remuneration according to the reputation they have previously acquired and not according to the real merit of the work. A reward conveys no idea of an obligation on the part of the person making it—whoever rewards, acts optionally. When evil is returned for good, that is a bad requital, and, as a proof of ingratitude, wounds the feelings.

Competent, fitted, qualified. Competent especially regards the mental endowments and attainments; fitted, the disposition and character; qualified, the artificial acquirements or natural qualities.

Antonyms.—Unprepared, unsuitable, ill-adapted.

Complain, lament, regret. Complaint implies dissatisfaction; lamentation, grief; regret, pain. Complaint is expressed verbally; lamentation, either by words or signs; regret may be felt without being expressed. Complaint is made of personal grievances; lamentation and regret may be made on account of others as well as of ourselves. We complain of our ill health, of our inconveniences, or of troublesome circumstances; we lament our inability to serve another; we regret the absence of one whom we love.

Antonyms.—Rejoice, welcome, hail, approve.

Complaint, accusation. A complaint is usually made in matters that personally affect the complainant; an accusation is made of matters in general, but especially those of a moral nature. A complaint is made for the sake of obtaining redress; an accusation is made for the sake of ascertaining a fact or for the sake of bringing to punishment.

Antonyms.—Defense, justification, exoneration, acquittal.

Complaisance, deference, condescension. Complaisance signifies the act of complying with or pleasing others; deference marks the inclination to defer, or acquiesce in the sentiments of another in preference to one's own; condescension marks the act of conceding one's point, to yield to the satisfaction of others rather than rigorously to exact one's rights. The necessities and the allurements of society and of intimacy lead to complaisance; it makes sacrifices to the wishes, tastes, and personal feelings of others. Complaisance is the act of an equal; deference, that of an inferior; condescension, that of a superior.

Antonyms.—Refractoriness, discourtesy, impertinence, inconsiderateness, ungraciousness.

Complete, finish, terminate. The characteristic idea of completing is that of making a thing altogether what it ought to be; that of finishing, the doing all that is intended to be done toward a thing; and that of terminating, simply putting an end to a thing.

Antonyms.—Begin, commence, initiate.

Complete, perfect, finished. That is complete which has no deficiency; that is perfect which has positive excellence; and that is finished which is at an end.

Antonyms.—Deficient, faulty, marred, unaccomplished.

Compliant, yielding, submissive. A compliant person may want command of feeling; a yielding person may want fixedness of principle; a submissive person may want resolution. A too compliant disposition will be imposed upon by the selfish and the unreasonable; a too yielding disposition is unfit to exercise command; a too submissive disposition exposes a person to the exactions of tyranny.

Antonyms.—Stubborn, resolute, determined, recalcitrant, rebellious.

Comply, conform, yield, submit. To comply is to act from inclination; to conform is to act from judgment. Compliance is altogether optional—we comply with a thing or not, at pleasure. Conformity is binding on the conscience—it relates to matters in which there is a right and a wrong. To yield is to give way to another, either with one's will, judgment, or outward conduct. To submit is to give up oneself altogether—it is the substitution of another's will for one's own.

Antonyms.—Refuse, resist, differ, dissent, oppose, withstand.

Compose, settle. We compose that which has been disjointed and separated, by bringing it together again; we settle that which has been disturbed and put in motion, by setting it at rest.

Antonyms.—Disturb, disarrange, confuse.

Composed, sedate. Composed implies a temporary state of mental quiet and calm, arising from mastery of the emotions. Sedate signifies a permanent habit of calm steadiness of temper.

Antonyms.—Agitated, disturbed, flighty, indiscreet, frolicsome, sparkling.

Compound, compose. Compound applies in a physical sense only and refers especially to the mixing of substances in fixed proportions. Compose, in a physical, social, or moral sense, refers to the fact of a mixture of elements. The chemist compounds medicines carefully; society is composed of various classes.

Antonyms.—Resolve, analyze, dissect, break up.

Comprise, comprehend, embrace, contain, include. A library comprises a variety of books; the whole is comprised within a small compass. Laws comprehend a number of cases. A discourse embraces a variety of topics. A society contains very many individuals; it includes none but those of a certain class, or it includes some of every class.

Antonyms.—Exclude, debar, except, omit.

Conceal, dissemble, disguise. To conceal is simply to abstain from making known what we wish to keep secret; to dissemble and disguise signify to conceal by assuming some false appearance. We conceal facts; we dissemble feelings; we disguise sentiments.

Antonyms.—Reveal, discover, divulge, show, unveil.

Conceal, hide, secrete. To conceal is to keep from observation; to hide is to put under cover; to secrete is to set at a distance or in unfrequented places.

Antonyms.—Show, expose, exhibit, disclose.

Concealment, secrecy. Concealment has to do with what concerns others; secrecy, with that which concerns ourselves. What is concealed is kept from the observation of others; what is secret is known only to ourselves.

Antonyms.—Openness, frankness, ingenuousness.

Conceit, fancy. Conceit applies only to internal objects; it is mental in the operation and the result; it is a species of invention. Fancy is applied to external objects, or whatever acts on the senses. Nervous people are subject to strange conceits; timid people fancy they hear sounds or see objects in the dark which awaken terror.

Antonyms.—Actuality, reality, fact.

Conceive, understand, comprehend. Conception is the simplest operation of the three: when we conceive we may have but one idea; when we understand or comprehend we have all the ideas which the subject is capable of presenting. The builder conceives plans; the scholar understands languages; the metaphysician attempts to explain many things which are not to be comprehended.

Conception, notion, idea, image. Conception is the general, scientific word for idea, the product of the mind's relating and constructive work. Notion implies more direct reference to the thing known. Idea is used popularly and vaguely for conception, fancy, and image. An image is the product of the picturing activity of the mind. We speak of the conception of immortality, of the idea of God, of a notion of proper conduct, of an image of a face.

Concert, contrive, manage. There is a secret understanding in concerting, invention in contriving, execution in managing. Measures are concerted; schemes are contrived; affairs are managed.

Conciliate, reconcile. To conciliate is to get good will and affection for oneself; to reconcile is to unite the affections of two persons to each other.

Antonyms.—Disaffect, estrange, alienate.

Conclusion, inference, deduction, induction, demonstration. Demonstration is the most complete form of proof, but it is, strictly, not attainable outside of such deductive reasoning as is found in mathematics. A conclusion is a necessary consequence of certain admitted facts or statements. An inference is a probable conclusion; it may be hastily drawn from incomplete data. Induction is a process of reasoning from particular facts toward a general principle. Deduction is reasoning from a general principle, from which conclusions are drawn regarding particular facts to which the principle applies. Scientific conclusions are reached through the alternate use of induction and deduction.

Conclusive, decisive, convincing. Conclusive applies either to practical or theoretical matters; decisive, to what is practical only; convincing, to what is theoretical only. It is necessary to be conclusive when we deliberate, and decisive when we command. An argument is convincing, a chain of reasoning conclusive, a piece of evidence may be decisive.
Antonyms.—Uncertain, dubious, questionable, hypothetical.

Concord, harmony. Concord is generally employed for the union of wills and affections; harmony respects the aptitude of minds to agree. Harmony may be used in the sense of adaptation to things generally.
Antonyms.—Discord, disagreement, variance, dissension.

Condition, station. Condition commonly refers to circumstances, education, birth, and the like; station refers rather to rank, occupation, or fixed mode of life.

Conduce, contribute. To conduce signifies to serve the full purpose; to contribute signifies only to serve a secondary purpose. Exercise conduces to health; it contributes to give vigor to the frame.
Antonyms.—Counteract, contravene, hinder, defeat.

Conduct, manage, direct. Conducting requires most wisdom and knowledge; managing, most action; direction, most authority. A lawyer conducts the cause intrusted to him; an agent manages the mercantile concerns for his employer; a superintendent directs the movements of all the subordinate agents.

Confederate, accomplice. A confederate is a partner in a plot or a secret association; an accomplice is a partner in some active violation of the laws.
Antonyms.—Rival, adversary, betrayer.

Confer, bestow. Conferring is an act of authority; bestowing, an act of charity or generosity. Men in power confer; people in private station bestow.
Antonyms.—Deprive, withhold, retain, keep from.

Confidence, trust. Confidence is an extraordinary trust, but trust is always ordinary unless the term be otherwise qualified. Confidence involves communication of a man's mind to another, but trust is confined to matters of action.
Antonyms.—Doubt, distrust, suspicion, misgiving.

Confident, dogmatic, positive. Confidence implies a general reliance on our abilities in whatever is undertaken; dogmatism implies a reliance on the truth of our opinions; positiveness, a reliance on the truth of our assertions. A confident man is always ready to act, as he is sure of succeeding; a dogmatic man is always ready to speak, as he is sure of being heard; a positive man is determined to maintain what he has asserted, as he is convinced that he has made no mistake.
Antonyms.—Uncertain, reluctant, doubtful, hesitant, vacillating.

Confirm, corroborate. Confirm is the stronger word, implying support by established facts or assured knowledge. Corroborate implies support of a statement or belief by added statements or attendant circumstances.
Antonyms.—Refute, confute, invalidate, annul, weaken.

Confirm, establish. Confirm is applied to what is partial, if not temporary; establish, to that which is permanent and of importance; as, to confirm a report, to establish a reputation, to confirm a treaty or alliance, to establish a trade or a government.
Antonyms.—Annul, abrogate, destroy, unsettle.

Conformable, agreeable, suitable. Conformable is employed for matters of obligation; agreeable, for matters of choice; suitable, for matters of propriety and discretion. What is conformable accords with some prescribed form or given rule of others; what is agreeable accords with the feelings, tempers, or judgments of ourselves or others; what is suitable accords with outward circumstances.
Antonyms.—Inconsistent, ill-adapted, unwelcome, unfitted.

Confound, confuse. A person confounds one thing with another; objects become confused, or a person confuses himself. It is a common error among ignorant people to confound names, and among children to have their ideas confused on commencing a new study.
Antonyms.—Distinguish, separate, discriminate.

Confront, face. Confront implies to set face to face; face signifies to set the face toward any object. Witnesses are confronted; a person faces danger.
Antonyms.—Avoid, evade, shun, dodge.

Confusion, disorder. Confusion supposes the absence of all order; disorder, the derangement of order where it exists or is supposed to exist.
Antonyms.—Method, regularity, orderliness.

Confute, refute, disprove, oppugn. Confute applies to what is argumentative; refute, to what is practical and personal; disprove, to whatever is represented or related; oppugn, to what is held or maintained. An argument is confuted by proving its fallacy; a charge is refuted by proving the innocence of the party charged; an assertion is disproved by proving that it is incorrect; a doctrine is oppugned by a course of reasoning.
Antonyms.—Prove, substantiate, support, uphold, defend.

Connect, combine, unite. Things connected and combined remain distinct, but things united lose all individuality. Things the most dissimilar may be connected or combined; things of the same kind only can be united. Houses are connected by means of a common passage; the armies of two nations are combined; two armies of the same nation are united.
Antonyms.—Separate, sever, disjoin, part.

Connection, relation. Families are connected with each other by the ties of blood or marriage; persons are connected with each other in the way of trade or business; objects stand in a certain relation to each other, as persons stand in the relation of giver and receiver, or of debtor and creditor.

Conqueror, victor. A conqueror is always supposed to add something to his possessions; a victor gains nothing but the superiority. Those who take possession of other men's lands by force of arms make a conquest; those who excel in any trial of skill are the victors.

Consent, permit, allow. As the act of an equal, we consent to that in which we have a common interest with others. We permit or allow what is for the accommodation of others: we allow by not opposing; we permit by a direct expression of our will. Contracts are formed by the consent of the parties who are interested. The proprietor of an estate permits his friends to sport on his grounds; he allows a passage through his premises. A parent consents to the requests of his children; he permits them to read certain books; he allows them to converse with him familiarly.
Antonyms.—Refuse, forbid, prohibit, interdict.

Consequence, effect, result, issue, event. A consequence is that which follows of itself, without any qualification or restriction; an effect is that which is effected or produced, or which follows from the connection between the thing effecting, as a cause, and the thing effected. A result is general, following from a whole; there may be many consequences from the same thing, with one result only. We speak of the issue of a negotiation or a battle, and the event of a war. The fate of a nation sometimes hangs on the issue of a battle; the measures of government are often unjustly praised or blamed according to the event.
Antonyms.—Cause, reason, condition, occasion, antecedent.

Consider, reflect. To consider is employed for practical purposes; to reflect, for matters of speculation or moral improvement. Common objects call for consideration; the workings of the mind itself or objects purely spiritual occupy reflection.

Consider, regard. There is more of caution or thought in considering, more of personal interest in regarding. To consider is to bear in mind all that prudence or propriety suggest; to regard is to bear in mind all that our wishes or interests suggest.

Consideration, reason. The consideration influences particular actions; the reason determines a line of conduct.

Consonant, accordant, consistent. Consonant (with, to) implies such agreement as would avoid discord. Consistent (with) applies to agreement that avoids contradiction. Consonant and accordant are applied to matters of belief and sentiment; consistent, also to matters of conduct.
Antonyms.—Dissonant, discordant, incongruous, incompatible.

Constancy, stability, steadiness, firmness. Constancy involves the affections; stability, the opinions; steadiness, the action or the motives of action; firmness, the purpose or resolution.
Antonyms.—Variableness, fickleness, capriciousness.

Constitute, appoint, depute. To constitute is the act of a body; to appoint and depute, either of a body or of an individual: a community constitutes anyone their leader; a monarch appoints his ministers. Whoever is deputed has private and not public authority; his office is partial, often confined to the particular transaction of an individual, or of a body of individuals.

Consult, deliberate. Consultations always require two persons at least; deliberations may be carried on either with a man's self or with others. An individual may consult with one or many; assemblies commonly deliberate.

Consummate, complete. Consummate refers to desires or plans or movements brought to fulfillment. Complete is applied in the sense of finishing according to design.
Antonyms.—Fail, fall short.

Contagion, infection. Contagion implies the manner of spreading from one body to another; infection, the act of working into the system in such a way as to affect it, as by disease. Whatever acts by contagion acts by direct personal contact or by means of the clothing, breath, etc. Whatever acts by infection acts indirectly, the source of the infecting organisms not being definitely known.

Contagious, epidemic, pestilential. The word contagious applies to that which is capable of being caught, and which ought therefore to be avoided; epidemic, to that which is already caught or circulated and which requires therefore to be stopped; pestilential, to that which may breed an evil, and which is therefore to be removed. Diseases are contagious or epidemic; the air or breath is pestilential.

Contaminate, defile, pollute, taint, corrupt. Whatever is impure contaminates; what is gross and vile, in the natural sense, defiles and, in the moral sense, pollutes; what is contagious or infectious corrupts; what is corrupted may taint other things.

Antonyms.—Wash, purify, cleanse, disinfect.

Contemn, despise, scorn, disdain. Contemn signifies to view or think of as worthless, to hold in contempt. Despise signifies to look down upon, which is a strong mark of contempt; scorn implies stripping of all honors and exposure to derision; disdain signifies to hold altogether unworthy.

Antonyms.—Esteem, value, admire, covet.

Contemplate, meditate, muse. Different species of reflection are marked by these terms. We contemplate what is present or before our eyes; we meditate on what is past or absent. The heavens and all the works of the Creator are objects of contemplation; the ways of Providence are fit subjects for meditation. One muses on events or circumstances which have recently passed.

Contend, contest, dispute. To contend is simply to exert a force against a force; to contest is to struggle with an opponent for an object; to dispute, according to its original meaning, applies to opinions only and is distinguished from contend in this,—that the latter signifies to maintain one's own opinion, the former to call in question the opinion of another.

Antonyms.—Yield, give up, surrender, admit, acknowledge.

Contentment, satisfaction. Contentment lies in ourselves; satisfaction is derived from external objects. One is contented when one wishes for no more; one is satisfied when one has obtained all one wishes. Contentment is within the reach of the poor man, to whom it is a continual feast; but satisfaction has never been procured by wealth, however enormous, or by ambition, however boundless.

Antonyms.—Desire, distress, trouble, regret, mourning.

Continual, continuous, perpetual, constant, continued. Continual implies possible intermission but also regular beginning again. Continuous admits of no pause or interruption. What is perpetual admits of no termination. There may be an end to that which is continual, and there may be intervals in that which is perpetual. Constant, like continuous, admits of no interruption, and it also admits of no change. What is continual may not always continue in the same state; but what is constant remains in the same state; what is continued ceases for a time, only to be taken up again.

Antonyms.—Changing, intermittent, desultory, broken, concluded.

Continuance, continuation, duration. Continuance is said of that which itself continues; continuation, of that which is continued by some other agency, as the continuance of the rain, the continuation of a history, work, line, etc. Things are of long or short duration by comparison.

Antonyms.—Cessation, interruption, termination.

Continue, persevere, persist. We continue from habit or circumstances; we persevere from reflection and the exercise of our judgment; we persist from attachment to a desire or purpose. A child perseveres in a new study until he has mastered it; he persists in making a request until he has obtained the object of his desire.

Antonyms.—Pause, stop, give up, desist, forbear.

Continue, remain, stay. Continue is associated with a state of action; remain, with a state of rest. We are said to continue to speak or to do anything, to remain stationary or in a position. Stay is a voluntary act, as to stay at a friend's, or with a friend.

Antonyms.—Cease, leave off, depart, remove.

Contracted, confined, narrow. Contracted signifies drawn into a smaller compass than it might otherwise be in; confined signifies brought within unusually small bounds. Narrow is the opposite of broad, in extent, scope, views, and resources. A limb is said to be contracted when it is drawn up by disease; a situation is confined which has not the necessary or usual degree of open space; a road or a mind is narrow.

Antonyms.—Extended, roomy, free, unbounded, broad.

Contradict, deny. One contradicts in direct terms by asserting something contrary; one denies by advancing arguments or by suggesting doubts or difficulties. Both these terms may therefore be used in reference to disputations. We may deny the truth of a position by contradicting the assertions that are advanced in its support.

Antonyms.—Admit, assert, corroborate, support, maintain.

Controvert, dispute. To controvert has regard to speculative points; to dispute respects matters of fact: there is more of opposition in controversy, more of doubt in disputing. A sophist controverts; a skeptic disputes.

Antonyms.—Agree, accord, harmonize, concur, unite.

Contumacious, rebellious. The contumacious resist only occasionally; the rebellious resist systematically. The contumacious stand only on certain points and oppose the individual; the rebellious set themselves up against the authority itself. Contumacious implies a proud, contemptuous air.

Antonyms.—Compliant, deferential, obedient.

Convenient, suitable, proper. Convenient regards the circumstances of the individual; suitable, the ends or purposes in view and the things or persons to be affected. Proper is closely connected with moral fitness and a regard to generally received opinion.

Antonyms.—Inconvenient, unfit, unseemly, unbecoming.

Conversant, familiar. A person is conversant in matters that come frequently before his notice; he is familiar with such as form the daily routine of his business.

Antonyms.—Unacquainted, strange, ignorant, unversed.

Conversation, dialogue, conference, colloquy. A conversation is always something actually held between two or more persons; a dialogue is usually fictitious and written as if spoken: any number of persons may take part in a conversation, but a dialogue always refers to the two persons who are expressly engaged. A conference is always specifically appointed and is usually on public concerns. The colloquy has the same character as the dialogue but is not confined to two people.

Convert, proselyte. Convert is more extensive in its sense and application than proselyte,—in its full sense it includes every change of opinion, without respect to the subject. Proselyte, in its original application, denoted changes only from one religious belief to another; it now means a new convert to a religion, a religious sect, or to some particular system or party.

Convict, convince, persuade. A person may be convicted of heresy, if it be proved to the satisfaction of others; he may be convinced that the opinion which he has held is heretical. So a person may be convicted who is involuntarily convinced of his error, but he is convinced if he is made sensible of his error without any force on his own mind. What convinces binds; what persuades attracts,—our persuasion respects matters of belief or practice.

Antonyms.—Mystify, puzzle, perplex, unsettle.

Convivial, social. The prominent idea in convivial is that of sensual indulgence; the prominent idea in social is that of enjoyment through intercourse with society. We speak of convivial meetings, convivial enjoyments, or the convivial board; but we say social intercourse, social pleasure, social amusements, and the like.

Antonyms.—Temperate, retiring, cold, solitary.

Copy, model, pattern, specimen. The term copy is applied to that which is delineated, as writings or pictures, which must be taken faithfully and literally; a model is that which may be used as a guide or a rule; the pattern regards solely the outward form or the color of anything that is made or manufactured; the specimen is any portion of a material which serves to show the quality of that of which it forms a part.

Copy, transcribe. To copy respects the matter; to transcribe respects simply the act of writing. What is copied must be taken immediately from the original, with which it must exactly correspond; what is transcribed may be taken from the copy, but not necessarily in an entire state. A copier should be very exact; a transcriber should be a good writer.

Coquette, jilt. The coquette makes a traffic of her own charms by seeking a multitude of admirers; the jilt sports with the sacred passion of love, and lightly casts off those previously accepted as lovers.

Correct, accurate. What is done by the exercise of the judgment is said to be correct, as a correct style, a correct writer; what is done by the effort of the individual is more

properly accurate, as accurate observations, an accurate survey.

Antonyms.—Faulty, careless, imperfect, erroneous.

Correction, discipline, punishment. As correction and discipline have commonly required punishment to render them efficacious, custom has affixed to them a strong resemblance in their application, although they are distinguished from each other by obvious marks of difference. The prominent idea in correction is that of making right what has been wrong. In discipline, the leading idea is that of instructing or regulating. In punishment, the leading idea is that of inflicting pain. We remove an evil by correction; we prevent it by discipline.

Correspond, accord. To correspond is to answer or conform to the description of something else. Things that correspond must be alike in size, shape, color, and every minute particular. Appearance and reality seldom correspond. To accord is to agree or to be in harmony and without conflict. Things that accord must be suited to each other. His disposition accords with his looks.

Antonyms.—Differ, vary, disagree.

Cost, expense, price, charge. The cost is what a thing costs, or what is to be laid out for it; the expense is that which a person actually lays out; the price is that which a thing may fetch or which it may be worth; the charge is that which a person or thing is charged with. We do a thing at our own cost, but at another's expense; we can never set a price on anything until we have ascertained what it has cost us, nor can we know or defray the expense until the charge be made. In the moral acceptation, the attainment of an object is said to cost much pains; a thing is persisted in at the expense of health, of honor, or of life. The sacrifice of a man's quiet is the price which he must pay for the gratification of his ambition.

Countenance, sanction, support. Persons are countenanced; things are sanctioned; persons or things are supported. Persons or proceedings are countenanced by the apparent approbation of others; measures are sanctioned by the consent or the approbation of others who have due authority; measures or persons are supported by every means which may forward the object.

Antonyms.—Expose, denounce, oppose, disapprove.

Courage, fortitude, resolution. Courage respects action; fortitude respects passion: a man has courage to meet danger, fortitude to endure pain. Resolution simply marks the will not to recede; we require resolution not to yield to the first difficulties that offer.

Antonyms.—Fear, timidity, pusillanimity.

Cover, hide. The ruling idea in the word cover is that of throwing or putting something over a body; in the word hide is that of keeping carefully to one's self, from the observation of others.

Antonyms.—Show, reveal, expose.

Cover, shelter, screen. Cover includes the idea of concealing; shelter comprehends that of protecting from some immediate or impending evil; screen includes that of warding off some trouble.

Antonyms.—Discover, betray, expose, disclose, exhibit.

Credit, favor, influence. These terms mark the state we stand in with regard to others as flowing out of their sentiments toward ourselves. Credit arises from esteem; favor from good will or affection; influence from credit or favor or external circumstances. Influence is employed in directing others; weak people easily give their credit or bestow their favor, by which an influence is gained over them to bend them to the will of others.

Crime, vice, sin. A crime is a social offense; a vice is a personal offense. Every action which does injury to others, either individually or collectively, is a crime; that which does injury to ourselves is a vice. Crime consists in a violation of human laws; vice, in a violation of moral law; sin, in a violation of the Divine law.

Criminal, culprit, malefactor, felon, convict. When we wish to speak in general of those who by offenses against the laws or regulations of society have exposed themselves to punishment, we denominate them criminals; when we consider them as already brought before a tribunal, we call them culprits; when we consider them in regard to the moral turpitude of their character, as the promoters of evil rather than of good, we entitle them malefactors; when we consider them as offending by the grosser violations of the law, they are termed felons; when we consider them as already under the sentence of the law, we denominate them convicts.

Criterion, standard. The criterion is employed only in matters of judgment; the standard is used in the ordinary concerns of life. The former serves for determining the characters and qualities of things; the latter, for defining quantity and measure.

Cruel, inhuman, barbarous, brutal, savage. A person is cruel who neglects the creature he should protect and take care of; he is inhuman if he withholds from him the common marks of tenderness or kindness which are to be expected from one human being to another; he is barbarous if he finds amusement in inflicting pain; he is brutal or savage according to the circumstances of aggravation which accompany the act of torturing.

Antonyms.—Kind, humane, gentle, refined, tender, civilized.

Crying, weeping. Crying arises from an impatience in suffering bodily pains; weeping is occasioned by mental grief.

Cultivation, culture, civilization, refinement. Civilization implies for a people a high state of economic and social life. Cultivation primarily applies to the treatment of soil and plants to encourage growth. Applied to the human mind and character, it denotes the possession of training and refinement of which culture is the outcome. Culture comprehends the intellectual phases of civilization; in persons it implies a high mental, moral, and æsthetic development, with possession of graces and niceties of word and manner. Refinement connotes especially fineness and delicacy of feeling.

Antonyms.—Rusticity, rudeness, coarseness, crudity, savagery.

Cure, heal, remedy. To cure is employed for what is out of order; to heal for that which is broken. Diseases are cured, wounds are healed; the former is a complex process, the latter is simple. Whatever requires to be cured is wrong in the system; whatever requires to be healed is occasioned externally by violence, and requires external applications. To remedy, in the sense of applying remedies, has a moral application; an omission, a deficiency, or a mischief, requires to be remedied.

Antonyms.—Injure, irritate, inflame, aggravate.

Curious, inquisitive, prying. Curious implies an interest in learning about things generally, especially matters not of immediate concern to the person. Inquisitive connotes a rather persistent and impertinent curiosity. Prying applies to an officious, unwelcome, disagreeable inquisitiveness.

Antonyms.—Uninterested, indifferent, apathetic, nonchalant.

Cursory, hasty, slight, desultory. An author will take a cursory view of those points which are not necessarily connected with his subject; an author who takes a hasty view of a subject will mislead by his errors; he who takes a slight view will disappoint by the shallowness of his information. Between cursory and desultory there is the same difference as between running and leaping: we run in a line, but we leap from one part to another; so remarks that are cursory have more or less connection, but remarks that are desultory are without any coherence.

Antonyms.—Detailed, careful, thorough, methodical, coherent.

Custom, habit, fashion, practice. Custom is the practice of doing a thing in like circumstances and in a uniform manner for definite reasons. Social customs regulate many important concerns of men. Habit is the series of acts, which, through practice, has become involuntary or reflex. Fashion is arbitrary and capricious, and is applied to matters of minor importance. Practice signifies actual doing or the thing done: it may be the practice of a person to do acts of charity, as the occasion requires; but, when he uniformly does a particular act of charity at any given period of the year, it is properly denominated his custom.

Danger, peril, hazard. Danger signifies the chance of a loss; peril signifies imminent, threatening danger, as a critical situation, a rude trial, which may terminate in one's ruin. In all walks of life we are in danger; the explorer undergoes perils. Hazard respects the possibility of either good or evil. When we accept the hazard of battle, we may either win or lose.

Antonyms.—Safety, security, immunity, protection.

Daring, bold. He who is daring provokes resistance and courts danger; but the bold man is contented to overcome the resistance that is offered to him. A man may be bold in the use of words only; he must be daring in actions; he is bold in the defense of truth; he is daring in military enterprise.

Antonyms.—Fearful, hesitating, timorous, faint-hearted.

Dark, obscure, dim, mysterious, abstruse. Dark is opposed to light; obscure, to bright. What is dark is altogether hidden; what is obscure is not to be seen distinctly, or without an effort. Dim expresses a degree of darkness, but it is employed more in relation to the person seeing than to the object seen. Any intricate affair, which involves the characters and conduct of men, may be mysterious. Obscure may be applied to things or ideas; abstruse to ideas only.

Antonyms.—Light, bright, clear, distinct, plain.

Deadly, mortal, fatal. Deadly is applied to what is productive of death; mortal, to what terminates in or is liable to death; fatal applies not only to death, but to everything which may be of serious consequence.
Antonyms.—Vital, life-giving, wholesome.

Debate, deliberate. These terms equally mark the acts of pausing or withholding the decision, whether applicable to one or many. To debate supposes always a contrariety of opinion; to deliberate supposes simply the weighing or estimating the value of the opinion that is offered.

Debt, due. Debt is commonly applied to that which is owing from the person spoken of; due is always applied to that which is owing to the person: to pay one's debts, to receive one's due.

Deceit, deception, guile, art, cunning. Deceit is the habit of intentional falsehood. Deception is the act of misleading through false appearance. A person is deceitful; his look and manner may be deceptive. Guile implies crafty, insidious deceit. Art implies a disposition of the mind to use circumvention or artificial means to attain an end; cunning marks the disposition to practice disguise in the prosecution of a plan.
Antonyms.—Honesty, truth, candor, sincerity, straightforwardness.

Deceiver, impostor. A deceiver is anyone who practices any sort of deception; but an impostor is a deceiver who studiously deceives by putting on a false appearance.

Decency, decorum. Decency respects a man's conduct; decorum, his behavior.
Antonyms.—Unseemliness, impropriety, unfitness.

Decided, decisive. Decided marks that which is actually fixed and settled; decisive, that which appertains to decision. A person's aversion or attachment is decided; a sentence, a judgment, or a victory, is decisive.
Antonyms.—Indecisive, unsettled, doubtful.

Decided, determined, resolute. A man who is decided remains in no doubt; he who is determined is uninfluenced by the doubts or questions of others; he who is resolute is uninfluenced by the consequences of his actions.
Antonyms.—Irresolute, doubting, wavering, uncertain.

Decision, judgment, sentence. A decision has no respect to the agent; it may be said of one or many; it may be the decision of the court, of the nation, of the public, of a particular body of men, or of a private individual. But a judgment is given in a public court or among private individuals. A sentence is passed in a court of law or at the bar of a public assembly.

Declaim, inveigh. Declaim signifies literally to cry aloud in a set form of words; inveigh involves injurious censure or reproach. Public men and public measures are subjects for the declaimer; private individuals afford subjects for inveighing against.

Decree, edict, proclamation. A decree is a more solemn and deliberative act than an edict; on the other hand, an edict is more authoritative than a decree. A decree is the decision of one or many; an edict speaks the will of an individual. Councils and courts, as well as princes, make decrees; despotic rulers issue edicts. An edict is peculiar to a despotic government; a proclamation is any statement of will or information issued by authority. It may contain a decree or an edict.

Dedicate, devote, consecrate, hallow. There is something more solemn in the act of dedicating than in that of devoting, but less than in that of consecrating. To dedicate and devote may be employed in both temporal and spiritual matters; to consecrate and hallow, only in the spiritual sense. We may dedicate or devote anything that is at our disposal to the service of some object; but the former is employed mostly in regard to superiors, and the latter to persons without distinction of rank. An author dedicates a book to a friend or patron by prefacing it with the name and the complimentary inscription. We dedicate a house to the service of God; we devote our time to the benefit of our friends or to the relief of the poor. We may dedicate or devote ourselves to an object: the former always implies a solemn setting apart springing from a sense of duty; the latter, an entire application of oneself from zeal and affection. To consecrate is to declare sacred by means of religious ceremony. The church is consecrated; particular days are hallowed.
Antonyms.—Alienate, pervert, desecrate, profane.

Deduction, abatement. Both these words imply a taking from something. A person may make a deduction in an account for various reasons, but he makes an abatement in a demand when it is objected to as excessive.
Antonyms.—Increase, addition, augmentation.

Deface, disfigure, deform. Deface implies marring of the surface, frequently by destroying some of it, as letters or inscriptions. Disfigure applies to the deeper injury which mars beauty of form or shape. Deform means so to alter the structure as to produce a misshapen thing.
Antonyms.—Amend, better, improve, rectify.

Defective, deficient. Defective implies the quality or characteristic of lacking something or of being incomplete. Deficient is used with regard to the measure or character of the defect. A book may be defective in consequence of lacking some leaves. A man may be deficient in courage. Persons markedly deficient in some physical, mental, or moral quality are called defectives.
Antonyms.—Perfect, complete, unimpaired, whole.

Defend, protect, vindicate. A person may be defended in any particular case of actual danger or difficulty; he is protected from what may happen as well as what does happen. Defense respects the evil that threatens; protection involves the supply of necessities and the affording of comforts. Vindicate implies successful defense against a charge or accusation.
Antonyms.—Endanger, imperil, expose, betray.

Defendant, defender. The defendant is one called on to answer or defend or be defended in a suit or case in a law court; defender is the general word for one who defends another.
Antonyms.—Prosecutor, plaintiff, accuser, assailant.

Defender, advocate, pleader. A defender exerts himself in favor of one that wants support. An advocate signifies one who is called to speak in favor of another—he exerts himself in favor of any cause that offers. A pleader, from plea or excuse, signifies him who speaks or writes in behalf of one who is accused or in distress.
Antonyms.—Adversary, informer, complainant.

Definite, positive. Definite signifies that which is defined, or has limits drawn or marked out; positive, that which is placed or fixed in a particular manner. Definite is said of things as they present themselves or are presented to the mind, as a definite idea, a definite proposal. Positive is said of a person's temper of mind; a person is positive as to his opinions, or an assurance is positive.
Antonyms.—Doubtful, ambiguous, vague, uncertain.

Deity, divinity. Deity signifies a divine person; divinity signifies the divine essence or power.

Dejection, depression, melancholy. Depression is but a degree of dejection. Slight circumstances may occasion a depression; distressing events occasion dejection: the death of a near and dear relative may be expected to produce dejection in persons of the greatest self-possession. Melancholy is a severe form of depression which amounts to a mental disease.
Antonyms.—Rapture, happiness, elation, felicity, cheerfulness.

Delegate, depute—Delegate, deputy. To delegate is applied to the power or the office which is given; depute, to the person employed. Parents delegate their office to the instructor; persons are deputed to act for others. A delegate is the person commissioned, who is bound to act according to his commission; the deputy is the person deputed, who acts in the place of another, but may act according to his own discretion or otherwise, as circumstances require.
Antonyms.—Chief, master, principal.

Deliver, rescue, save. One may be delivered from any evil, whether great or small, and in any manner. To rescue is to deliver from a great impending danger or immediate evil, as to rescue from the hands of robbers or from the jaws of a wild beast. To save signifies to keep from evil.
Antonyms.—Abandon, destroy, surrender, lose.

Demand, require. We demand that which is owing and ought to be given; we require that which we wish and expect to have done. The creditor makes a demand on the debtor; the master requires a certain portion of duty from his servant.
Antonyms.—Appeal (for), entreat, request, beg.

Demur, doubt, hesitation, objection. Demurs often occur in matters of deliberation; doubt, in regard to matters of fact; hesitation, in matters of ordinary conduct; and objections, in matters of common consideration. Artabanes made many demurs to the [proposed invasion of Greece by Xerxes. Doubts have been suggested respecting the veracity of Herodotus as a historian. It is not proper to ask that which cannot be granted without hesitation. There are but few things which we either attempt to do or recommend to others that are not liable to some kind of an objection.
Antonyms.—Certainty, approval, promptness, consent.

Demur, hesitate, pause. We demur from doubt or difficulty; we hesitate from an undecided state of mind; we pause from circumstances. Demurring is a matter of prudence, it is always grounded on some reason—a lawyer for

the defense demurs to evidence presented by the prosecution, in the hope of throwing doubt upon its contents. Hesitating is rather a matter of feeling, and is oftener faulty than otherwise. When a request of a dubious nature is made of us, we hesitate in complying with it; one hesitates to voice objection to a plan about the wisdom of which his friends have no doubts.

Antonyms.—Assent, acquiesce, decide, proceed.

Denote, signify. Denote is employed with regard to things and their characters; signify, with regard to the thoughts or movements. A letter or character may be made to denote any number, as words are made to signify the intentions and wishes of the person.

Deny, refuse. Deny applies both to matters of fact and to matters of wish or request; refuse, only to the latter. We deny a report or we deny or refuse a request.

Antonyms.—Grant, accede (to), allow.

Deplore, lament. Deplore is a stronger expression than lament; it calls forth tears from bitterness of heart, though it may not find expression in words. Lament always implies an expression of intense grief. Deploring indicates despair; lamenting marks pain or distress.

Antonyms.—Rejoice (at), exult or glory (in).

Deponent, evidence, witness. All these words are properly applied to judicial proceedings, where the deponent testifies generally to facts either in causes or otherwise. The evidence consists either of persons or things, which are brought before the court for the purpose of making a doubtful matter clear; the witness is always a person who testifies to any fact for or against another.

Deposit, pledge, security. Pledge is the general term applying to anything given as assurance of fulfillment of an agreement. It may be a deposit, a term now generally used of money as commonly paid "to bind a bargain," or security, now usually some form of commercial paper, such as bonds, notes, etc.

Depravity, depravation, corruption. All these terms are applied to characters marked by a deep-seated tendency toward evil. But the term depravity characterizes the thing as it is; the terms depravation and corruption designate the making or causing it to be so. Depravity, therefore, excludes the idea of any cause; depravation always carries us to the cause or external agency. Hence we may speak of depravity as natural, but we speak of depravation as the result of circumstances. There is a depravity in man which nothing but the grace of God can correct. The introduction of obscenity on the stage tends to the corruption of a young man's morals.

Antonyms.—Virtue, goodness, correction, purifying.

Depth, profundity. Depth is indefinite in its signification; profundity is a positive and considerable degree of depth. Moreover, the word depth is applied to objects in general; profundity is confined in its application to matters of thought or feeling.

Antonyms.—Shallowness, superficiality.

Derive, trace, deduce. The act of deriving is immediate and direct; that of tracing, a gradual process; that of deducing, a reasoning process. We discover causes and sources by derivation; we discover the course, progress, and commencement of things by tracing; we discover the grounds and reasons of things by deduction.

Desert, merit, worth. Desert is taken for that which is good or bad; merit, for that which is good only. We deserve praise or blame; we merit a reward. Worth is that which is absolutely valuable—it must be sought for on its own account.

Antonyms.—Demerit, worthlessness.

Design, purpose, intend, mean. To design is to plan in a steady, methodical manner; to purpose is to propose to oneself, with some degree of determination; to intend is to have in mind to do something—a less definite expression than the others. Mean still has a colloquial flavor, signifying a vague intention.

Desire, wish, long for, hanker for or **after, covet.** To desire is imperious—it demands gratification; to wish is less vehement—it consists of a strong inclination. To long for expresses strong and continued desire; to hanker after is to desire with marked uneasiness; to covet is to desire that which belongs to another, or what it is in his power to grant.

Antonyms.—Dislike, detest, be averse to, spurn.

Desist, leave off. To desist is voluntary or involuntary; to leave off is voluntary. We are frequently obliged to desist, but we leave off at our option. He who annoys another must be made to desist; he who does not wish to offend will leave off when requested.

Antonyms.—Persist, continue, keep on.

Despair, desperation, despondency. Despair is a state of mind produced by the view of external circumstances; desperation and despondency may be the fruit of the imagination. The former therefore always rests on some ground; the latter are sometimes ideal. Desperation marks a state of vehement and impatient feeling; despondency is hopelessness, and is often a disease of the mind.

Antonyms.—Assurance, hopefulness, confidence, courage.

Destiny, destination. Destiny is the point or line marked out in the walk of life; destination is the place fixed upon in particular: as every man has his peculiar destiny, so every traveler has his particular destination. Destiny is altogether set above human control; destination is, however, under the specific control of an individual, either for himself or for another.

Destiny, fate, lot, doom. Destiny is used in regard to one's station and walk in life; fate, in regard to what one suffers; lot, in regard to what one gets or possesses; doom is the final destiny which terminates unhappily and depends mostly upon the will of another. Destiny is marked out; fate is fixed; a lot is assigned; a doom is pronounced or decreed.

Destroy, consume, waste. To destroy is to break or shatter or by other means put anything beyond hope of restoration. A house may be destroyed by fire or it may fall to ruin. To consume is to use up, as to consume food or merchandise; to waste is to expend unnecessarily, extravagantly, to spend to no purpose, as to waste time or property.

Antonyms.—Build, repair, restore, supply, preserve.

Destruction, ruin. Destruction is an act of immediate violence; ruin is a gradual process. A thing is destroyed by some external action upon it; a thing falls to ruin of itself. A reputation is destroyed; a character is ruined.

Antonyms.—Construction, upbuilding, preservation.

Determine, resolve. We determine how or what we shall do—this requires examination and choice. We resolve that we will do what we have determined upon—this requires a firm spirit.

Antonyms.—Hesitate, waver, question, vacillate.

Deviate, wander, swerve, stray. Deviate always supposes a direct path which is departed from; wander includes no such idea. The act of deviating is commonly faulty; that of wandering is indifferent. To swerve is to deviate from that which one holds right; to stray is to wander in the same bad sense. Men swerve from their duty to consult their interest; the young stray from the path of rectitude to seek that of pleasure.

Antonyms.—Continue, advance, progress.

Devise, bequeath. In the technical sense, to devise is to give lands by a will duly attested according to law; to bequeath is to give personalty for possession after one's death by a less formal instrument.

Dictate, prescribe. Dictate, from the Latin *dictatus* and *dictum*, "a word," literally signifies to make a word for another; prescribe signifies to write down for another. Thus the former of these terms is used technically for a principal who gets his secretary to write down his words as he utters them; the latter, for a physician who writes down for his patient what he wishes him to take as a remedy. They are used figuratively for a sort of counsel given by a superior; to dictate is however a greater exercise of authority than to prescribe.

Dictate, suggestion. Dictate signifies the thing uttered, and has an imperative sense; the suggestion signifies the thing intimated, and conveys the idea of its being proposed secretly or in a gentle manner. These terms are both applied, with this distinction, to acts of the mind. When conscience, reason, or passion present anything forcibly to the mind, it is called a dictate; when anything enters the mind in a casual manner, it is called a suggestion.

Dictionary, encyclopedia. The definition of words, with their various changes, modifications, uses, acceptations, and applications, are the proper subjects of a dictionary; the nature and properties of things, with their construction, uses, powers, etc., are the proper subjects of an encyclopedia

Dictionary, lexicon, vocabulary, glossary. We speak of a lexicon of Greek or Latin, of a dictionary of a modern language. A vocabulary is a partial kind of dictionary, which may comprehend a simple list of words, with or without explanation, arranged in order or otherwise. A glossary is an explanatory vocabulary, which commonly serves to explain the obsolete terms employed in any old author.

Die, expire, perish. Die is the general word for cessation of life or extinction of being. Expire is a softened expression for die. Trees die and a flame expires; figuratively, a lease expires. Perish signifies utter decay and disappearance.

Antonyms.—Live, survive, persist, exist.

Difference, dispute, altercation, quarrel. A difference, as distinguished from the others, is generally of a less serious and personal kind; a dispute consists not only of angry words, but of much ill blood and unkind action; an altercation is a wordy dispute, in which difference of opinion is drawn out into a multitude of words; a quarrel is the most serious of all differences, which leads to every manner of violence.

Difference, distinction. Difference lies in the thing; distinction is the act of the person—the former is therefore to the latter as the cause is to the effect. The distinction rests on the difference: those are equally bad logicians who make a distinction without a difference, or who make no distinction where there is a difference. A careful writer will make a distinction between words that may have slightly different meanings.
Antonyms.—Similarity, likeness, agreement, identity.

Difference, variety, diversity, medley. Difference and variety seem to lie in the things themselves; diversity and medley are created either by accident or by design. A difference may lie in two objects only; a variety cannot exist without an assemblage. A difference is discovered by means of a comparison which the mind forms of objects to prevent confusion; variety strikes on the mind, and pleases the imagination with many agreeable images. Diversity arises from an assemblage of objects naturally contrasted; a medley is produced by a casual assemblage of objects often so illy suited as to produce a ludicrous effect.
Antonyms.—Likeness, sameness, correspondence, orderliness.

Difficulty, obstacle, impediment, embarrassment, trouble. A difficulty is something or a circumstance that interferes with ease of action. Obstacle means anything directly opposed to one's effort toward an end. Impediment is like a clog or brake in hindering movement or progress. An embarrassment is any condition or circumstance that gives rise to confusion or perplexity, and so proves an obstacle or difficulty. Trouble is a general word applied to the circumstances or to feelings aroused by them. Embarrassment may result from failure to deal with troubles effectively.
Antonyms.—Aid, help, assistance, relief, encouragement.

Diffuse, prolix. Both mark defects of style opposed to brevity. A diffuse writer is fond of amplification, the prolix writer is fond of circumlocution, minute details, and trifling particulars.
Antonyms.—Brief, concise, succinct, condensed.

Digress, deviate. Both in the original and the accepted sense, these words express going out of the ordinary course. We digress only in a narrative, whether written or spoken; we deviate in actions as well as in words, in our conduct as well as in writings.

Dilate, expand. Dilate implies enlargement, as a circular ripple on water widens; expand suggests enlargement in every direction, as a flower expands. A speaker dilates upon a theme, dwells upon it with many words; he expands his argument by discussing points in greater detail.
Antonyms.—Contract, condense, narrow, compress.

Diligent, expeditious, prompt. Diligent marks the interest one takes in doing something; he is diligent who loses no time, who keeps close to the work from inclination. Expeditious marks the desire one has to complete the thing begun. Prompt marks one's desire to get ready; he is prompt who sets about a thing without delay, so as to make it ready.
Antonyms.—Inattentive, neglectful, slow, hesitant, dilatory.

Disappear, vanish. A thing disappears either gradually or suddenly; it vanishes of a sudden: it disappears in the ordinary course of things; it vanishes by an unusual effort or as if by supernatural or magic power.
Antonyms.—Appear, arise, emerge.

Disapproval, dislike, disinclination. Disapproval is an act of the judgment; dislike, a matter of feeling and sentiments. Disinclination implies a mild or careless dislike, usually of something to be done.

Disapprove, dislike. Disapprove is an act of the judgment; dislike is an act of the will or of the affection. To approve or disapprove is peculiarly the part of a superior, or of one who determines the conduct of others; to dislike is altogether a personal act, in which the feelings of the individual are consulted.
Antonyms.—Approve, like, enjoy, delight in.

Disbelief, unbelief. Disbelief properly implies the believing that a thing is not, or refusing to believe that it is. Unbelief properly implies skepticism or a withholding of belief. As generally applied to religion, unbelief signifies disbelief of dogmas or doctrines, usually with the indication of willfulness. Disbelief is most properly applicable to the ordinary events of life; unbelief, to serious matters of opinion.

Disclaim, disown. One may disclaim responsibility for an act; he may disown his children.
Antonyms.—Claim, acknowledge, own, recognize.

Discord, strife, dissension, contention. Discord consists mostly in the feeling; strife consists mostly in the outward action. Discord evinces itself in various ways—by looks, words, or actions; strife displays itself in words or acts of violence. A collision of opinions produces dissension; a collision of interests produces contention; a collision of humors produces discord.
Antonyms.—Concord, peace, agreement.

Discover, manifest, declare. We discover by any means direct or indirect; we manifest by unquestionable marks; we declare by express words. Talents and dispositions discover themselves; particular feelings and sentiments manifest themselves; facts, opinions, and sentiments are declared.
Antonyms.—Conceal, hide, suppress, dissemble.

Discredit, disgrace, reproach, scandal, dishonor, shame. Discredit interferes with a man's respectability; disgrace marks him out as an object of unfavorable distinction; reproach makes him a subject of adverse criticism; scandal makes him an object of offense or even of abhorrence. Dishonor connotes loss of dignity and favor; disgrace expresses positive reproach and fall from honorable regard; a consciousness of guilt and of the resulting disgrace will bring shame to a person. Shame, the consequence of open moral guilt, is the strongest of these words.
Antonyms.—Honor, favor, regard, respect, dignity.

Discuss, examine. Discuss signifies to shake asunder or to separate thoroughly so as to see the whole composition; examine is used where the judgment holds the balance. Discussion is altogether carried on by verbal and personal communication; examination proceeds by reading, reflection, and observation.

Disgust, loathing, nausea. Disgust is less than loathing, and loathing than nausea. When applied to sensible objects, we are disgusted with dirt; we loathe the smell of food if we have a sickly appetite; we nauseate medicine. When applied metaphorically, we are disgusted with affectation; we loathe the endearments of those who are offensive; we are nauseated by all the enjoyments of life, after having made an intemperate use of them and discovered their inanity.
Antonyms.—Desire, relish, craving.

Dishonest, knavish. What is dishonest violates the established laws of man; what is knavish supposes peculiar art and design in the accomplishment.
Antonyms.—Honorable, straightforward, upright.

Disjoint, dismember. Disjoint means to put out of joint, to dislocate, as a dislocated ankle, or to separate at the joints, as a tool or mechanism. Speech, when not well connected or when hesitating, may be called disjointed. Dismember implies mutilating or tearing apart of the animal or human body.
Antonyms.—Join, unite, assemble.

Dismay, daunt, appall. We are dismayed by alarming circumstances; we are daunted by terrifying circumstances; we are appalled by horrid circumstances.
Antonyms.—Hearten, encourage, incite, rouse.

Disorder, disease, distemper, malady. Disease connotes any deviation from health, whether in plants or animals. Disorder implies usually a slight, temporary sickness. Distemper is now used only of animal diseases. Malady carries the sense of lingering, deep-seated diseases, often with the idea of a morbid state of mind or spirits.

Disparity, inequality. Disparity applies to two objects which should meet or stand in coalition with each other; inequality is applicable to those that are compared with each other. The disparity of age, situation, and circumstances is to be considered with regard to persons entering into a matrimonial connection; the inequality in the portion of labor which is to be performed by two persons is a ground for the inequality of their recompense.
Antonyms.—Parity, equality, equivalence.

Dispassionate, cool. Dispassionate is taken negatively—it marks merely the absence of passion. Cool is taken positively—it marks an entire freedom from passion. When we meet with an angry disputant it is necessary to be dispassionate in order to avoid quarrels; in the moment of danger our safety often depends upon our coolness.
Antonyms.—Hasty, hot, choleric, passionate.

Dispel, disperse. Dispel means to drive away, as doubt or gloom. It applies only to intangible things. Disperse means to drive apart, to scatter, as a crowd.
Antonyms.—Collect, gather, accumulate.

Dispense, distribute. Dispense is an indiscriminate action; distribute is a particularizing action: we dispense to all; we distribute to each individually. One dispenses charity, but he distributes gifts.
Antonyms.—Hold, keep, retain, withhold.

Displeasure, anger, disapprobation. Displeasure is always a softened and gentle feeling. Anger is the intense feeling of dissatisfaction and resentment, rising often to vehement expression. Displeasure may be slight or intense, but it lacks the element of resentment and may not reveal its true intensity in words. Disapprobation is a definite sentiment of censure or of disapproval.
Antonyms.—Satisfaction, pleasure, approval.

Disposal, disposition. Disposal implies merely the removal of things; disposition implies their orderly or appropriate placing or arrangement.

Dispose, arrange, digest. We may dispose ordinary matters by simply assigning a place to each—in this manner trees are disposed in a row. We arrange and digest by an intellectual effort. We arrange by putting those together which ought to go together; we digest by both separating that which is dissimilar, and bringing together that which is similar. Books are arranged in a library according to their size or their subject; the materials for a literary production are digested.
Antonyms.—Muddle, confuse, disorder, derange.

Disposition, inclination. We may always expect a man to do that which he is disposed to do; but we cannot always calculate upon his executing that to which he is merely inclined. We indulge a disposition; we yield to an inclination. The disposition comprehends the whole state of the mind at the time; an inclination is particular, referring always to a particular object.

Disposition, temper. Disposition is permanent and settled; temper may be transitory and fluctuating. The disposition comprehends the springs and motives of actions; the temper influences the action of the moment. It is possible and not infrequent to have a good disposition with a bad temper, and vice versa.

Disregard, neglect, slight. We disregard the warnings, the words, or opinions of others; we neglect their injunctions or their precepts. To disregard results from the settled purpose of the mind; to neglect, from a temporary forgetfulness or oversight. Slight is altogether an intentional act toward an individual.
Antonyms.—Attend to, regard, observe, respect, defer to.

Distant, far, remote. Distant is used to designate great space; far, only that which is ordinary. Astronomers estimate that the sun is nearly 93 million miles distant from the earth; a person lives not very far off, or a person is far from the spot. Remote expresses the relative idea of having disappeared from sight.
Antonyms.—Near, close, neighboring, contiguous.

Distinguish, discriminate. To discriminate is in fact to distinguish specifically; hence we speak of a distinction as true or false, but of a discrimination as nice. We distinguish by means of the senses as well as by the understanding; we discriminate by the understanding only.
Antonyms.—Overlook, confound, confuse.

Distinguished, conspicuous, noted, eminent, illustrious. A thing is distinguished in proportion as it is distinct or separate from others; it is conspicuous in proportion as it is easily seen; it is noted in proportion as it is widely known. Eminent applies to those things which set a man high in the circle of his acquaintances; illustrious applies to that which makes him shine before the world.
Antonyms.—Ordinary, common, unknown, humble.

Distress, anxiety, anguish, agony. Distress is the pain felt when in a strait from which we see no means of extricating ourselves; anxiety is that pain which one feels on the prospect of an evil. Distress always depends upon some outward cause; anxiety often lies in the imagination; anguish arises from the reflection on the evil that is past; agony springs from witnessing or suffering intense mental or bodily pain.
Antonyms.—Comfort, calm, apathy, indifference, tranquillity.

Distress, harass, perplex. A person is distressed either in his outward circumstances or in his feelings; he is harassed in mind or body; he is perplexed in his understanding more than in his feelings. A deprivation distresses; provocations and hostile measures harass; stratagems and ambiguous measures perplex.
Antonyms.—Soothe, console, comfort, compose.

Distrust, suspicion, diffidence. Distrust is said either of ourselves or of others; suspicion is said only of others; diffidence, only of ourselves. To be distrustful of a person is to impute no good to him; to be suspicious of a person is to impute positive evil to him. As regards oneself, a person may distrust his own powers for the execution of a particular office, or have a distrust of himself in company; he has a general diffidence, or he is naturally diffident.
Antonyms.—Trust, confidence, faith, self-confidence.

Disturb, interrupt. Disturb implies more or less constant or continued breaking up of the settled or orderly state of affairs or action. Interrupt connotes a sharp, sudden break, as of a flow of water or a course of action. One's mind may be disturbed from within, but one's thinking is interrupted by something from without.
Antonyms.—Quiet, pacify, let alone.

Divide, distribute, share. We divide the thing; we distribute to the person. To share is to make into parts, the same as divide, and it is to give those parts to some persons, the same as distribute. The person who shares takes a part himself; he who distributes gives it all to others.
Antonyms.—Keep, reserve, withhold, retain.

Divide, separate, part. That is divided which has been or has been conceived to be a whole; that is separated which might be joined. An army may be divided into two or three divisions or portions; the divisions are frequently separated in their march. To part is to divide or separate into distinct portions or pieces.
Antonyms.—Join, connect, unite, unify, coalesce, fuse.

Doctrine, dogma, tenet. A doctrine rests on the authority of the individual by whom it is framed; a dogma, on the authority of the body by whom it is maintained; a tenet rests on its own intrinsic merits. A tenet is a species of principle maintained in matters of opinion by persons in general.

Doctrine, precept, principle. A doctrine requires a teacher; a precept requires a superior with authority; a principle requires only a maintainer or a holder. A doctrine is always framed by some one; a precept is enjoined or laid down by some one; a principle lies in the thing itself. A doctrine is composed of principles; a precept rests upon principles or doctrines.

Doubt, question. Doubt lies altogether in the mind; it is a less active feeling than question: by the former we merely suspend decision; by the latter we actually demand proofs in order to assist us in deciding. We may doubt in silence; we cannot question without expressing doubt, directly or indirectly. We doubt the truth of a position; we question the veracity of an author.
Antonyms.—Accept, believe, assume.

Doubt, suspense. Doubt respects that which we should believe; suspense, that which we wish to know or ascertain. We are in doubt for lack of decisive, positive evidence; in suspense for lack of certainty about the future. Doubt interrupts our progress in the attainment of truth; suspense impedes us in the attainment of our objects.
Antonyms.—Confidence, certainty, assurance.

Draw, drag, haul, pull, pluck, tug. Draw expresses here the idea common to the first three terms, namely, that of putting a body in motion from behind oneself or toward oneself. To drag is to draw a thing with violence, or to draw that which makes resistance; to haul is to drag it with still greater violence. To pull signifies only an effort to draw without the idea of motion; horses pull very long sometimes before they can draw a heavily laden cart uphill. To pluck is to pull with a sudden twitch in order to separate; to tug is to pull with violence, frequently without moving the object.

Dream, vision, reverie (revery). Primarily, dreams are visions, thoughts, or images passing in the mind during sleep. One's imagined ideals in life when far from realization are called dreams. A vision may come to one during waking hours. A reverie is a loose train of thought or imagery, running through the mind when one is awake but given over to musing—a waking dream or daydream.

Dull, gloomy, sad, dismal. When applied to natural objects, dull and gloomy denote the want of necessary light or life; in this sense metals are more or less dull according as they are stained with dirt. The weather is dull when the sun is obscured by clouds, and gloomy when the atmosphere is darkened by fogs or thick clouds. Dismal denotes not merely the want of that which is necessary, but also the presence of that which is repugnant to the senses. Dismal carries the sense of evil omen or unlucky foreboding. Sad implies a gloomy or downcast countenance and suggests grief.
Antonyms.—Bright, happy, joyous, merry, cheerful.

Durable, lasting, permanent. Durable is naturally said of material substances; lasting, of those which are spiritual, although in ordinary discourse sometimes they exchange offices. Permanent connotes fitness to endure or remain. We make permanent improvements of lasting or durable materials. That which perishes quickly is not durable; that which ceases quickly is not lasting; that which is only for a time is not permanent.
Antonyms.—Perishable, flimsy, unstable, temporary.

Duty, obligation. Duty has to do with the conscience, and arises from the natural relations of society; an obligation arises from circumstances and is a species of duty. He who guarantees to pay a sum of money contracts an obligation. He who marries contracts new duties.

Ease, quiet, rest, repose. Ease and quiet respect action on the body; rest and repose respect the action of the body. Ease denotes an exemption from any painful agency in general; quiet denotes an exemption from that in particular which noise, disturbance, or the violence of others may cause; rest simply denotes the cessation of motion; repose is that form of rest which is agreeable after labor.

Antonyms.—Disturbance, disquiet, toil, strain.

Ease, readiness. Ease implies freedom from strain or effort, with application especially to the thing done. Readiness applies to the doer, and implies promptness, alertness, and preparedness. A machine always in readiness may be operated with ease.

Antonyms.—Difficulty, annoyance, awkwardness, constraint.

Eclipse, obscure. Heavenly bodies are eclipsed by the passing of other bodies between them and the beholder; things are in general obscured which are in any way rendered less striking or visible. So, figuratively, real merit is eclipsed by the intervention of superior merit; it is often obscured by an ungracious exterior in the possessor or by his unfortunate circumstances.

Antonyms.—Reveal, show, illuminate.

Education, instruction, breeding. Instruction and breeding are to education as parts to a whole. Instruction implies the communication of knowledge, and breeding connotes the manners or outward conduct. Education comprehends not only both these, but the formation of the mind, the regulation of the heart, and the establishment of the principles. Good instruction makes one wiser; good breeding makes one more polished and agreeable; good education makes one really good.

Effect, produce, perform. To produce signifies to bring something forth or into existence, to perform, to do something completely. To effect is to produce a result by performing. Whatever is effected is the consequence of a specific design; it always requires, therefore, a rational agent to effect. What is produced may follow incidentally, or arise from the action of an irrational agent or an inanimate object; what is performed is done by specific efforts.

Effusion, ejaculation. An effusion commonly flows from a heated imagination uncorrected by the judgment; it is therefore, in general, not only incoherent but extravagant and senseless. An ejaculation is produced by the warmth of the moment, but never without reference to some particular circumstance. Enthusiasts are full of extravagant effusions; contrite sinners will often express their penitence in pious ejaculations.

Elderly, aged, old. The elderly man has passed the meridian of life; the old man is fast approaching the term of our existence; the aged man has already reached this term, or has exceeded it.

Antonyms.—Youthful, young.

Embarrassments, perplexities, entanglements. Embarrassments depend altogether on ourselves; want of prudence and of presence of mind is the common cause. Perplexities depend on extraneous circumstances as well as on ourselves; extensive dealings with others are mostly attended with perplexities. Entanglements arise mostly from the evil designs of others.

Emissary, spy. Both these words designate a person sent out by a body on some public concern among their enemies; but they differ in their office according to the etymology of the words. The emissary is sent so as to mix with the people to whom he goes, to be in all places, and to associate with every one individually, as may serve his purpose. The spy takes his station wherever he can best perceive what is passing; he keeps himself at a distance from all but such as may particularly aid him in the object of his search. The emissary is generally employed by those who have some illegitimate object to pursue; spies, on the other hand, are employed by all regular governments in a time of warfare.

Empire, reign, dominion. Empire signifies command, or the power exercised in commanding; it properly refers to the country or the people commanded. Reign signifies the act of reigning; it refers to the individual sovereign. Dominion may be applied in the proper sense to the power which man exercises over the brutes or inanimate objects, and, figuratively, to the power of the passions.

Employ, use. We employ either persons or things; we use only things, unless, in an evil sense, we use persons. One may be employed in his own or another's affairs.

Antonyms.—Reject, discharge, overlook.

Encomium, eulogy, panegyric. We bestow encomiums upon any work of art or production of genius, without reference to the performer; we bestow eulogies on the exploits of a hero, who is of another age or country; but we write panegyrics either in a direct address or in direct reference to the person who is panegyrized. The encomium is called forth by merit, real or supposed; the eulogy may spring from admiration of the person eulogized; the panegyric may be mere flattery, resulting from servile dependence.

Antonyms.—Dispraise, condemnation, invective.

Encourage, embolden. To encourage is to give courage, and to embolden is to make bold; the former impels to action in general, the latter incites to that which is more difficult or dangerous.

Antonyms.—Discourage, frighten, intimidate.

End, terminate, close. End is a general term; an end may come by chance or intention. A discussion may end without being finished, closed, or properly terminated. Close implies a preceding opening in the sense of beginning, as we open and close meetings. Terminate implies usually a purposed end or definite means of ending. His visit was terminated by an abrupt departure. The lane terminated in a high wall.

Antonyms.—Begin, open, commence, initiate.

Endeavor, aim, strive, struggle. An endeavor springs from a sense of duty; we endeavor to do that which is right and avoid that which is wrong. Aiming is the fruit of an aspiring temper—the object aimed at is always something superior either in reality or imagination. Striving is the consequence of an ardent desire—the thing striven for is always conceived to be of importance. Struggling is the effect of necessity—it is proportioned to the difficulty of attainment; the thing struggled for is indispensably necessary.

Endeavor, effort, exertion. Exertion is any strong exercise of power, whether toward a definite end or not. Effort implies exertion of will and ability toward a purpose. Endeavor signifies continued, sustained effort.

Antonyms.—Rest, laxity, slackness, negligence.

Energy, force, vigor, power. Energy is power, thought of or expressed in terms of actual or possible work,—as electrical energy, the energy of his words. Force implies resistance to be overcome. Vigor connotes physical or mental power in daily use, as vigorous growth of a plant. Power is the most general term for ability to do,—as a powerful engine, a speaker of great power.

Antonyms.—Weakness, inefficiency, impotence, incapacity.

Enlarge, increase, extend. Enlarge is applied to dimension and extent; increase is applicable to quantity, signifying to become greater in size by the junction of other matter; extend signifies to make greater in space. We speak of enlarging a house, a room, premises, or boundaries; of increasing an army, or property, capital, expense; of extending the boundaries of an empire.

Antonyms.—Lessen, decrease, contract.

Enmity, animosity, hostility. Enmity lies in the heart; it is deep and malignant. Animosity, from *animus*, a spirit, lies in the passions—it is fierce and vindictive. Hostility, from *hostis*, a political enemy, lies in the action—it is mischievous and destructive. Enmity is altogether personal; hostility respects public or private measures; enmity often lies concealed in the heart and does not betray itself by any open act of hostility.

Antonyms.—Friendliness, love, affection, amity.

Enormous, prodigious, monstrous. The enormous goes beyond our rules of estimating and calculating; the prodigious raises our minds beyond their ordinary standard of thinking; the monstrous contradicts nature and the course of things.

Antonyms.—Small, minute, usual, natural, reasonable.

Enough, sufficient. Sufficient sometimes implies, more distinctly than enough, the idea of an end or purpose, but in general the words are used without distinction of meanings. Sufficient may be thought more elegant than enough.

Antonyms.—Scanty, sparing, meager.

Enterprising, adventurous. The enterprising character conceives great projects and pursues objects that are difficult to obtain. The adventurous character is contented with seeking that which is new and with placing himself in dangerous and unusual situations.

Antonyms.—Shrinking, contented.

Epithet, adjective. Epithet is the technical term of the rhetorician; adjective, that of the grammarian. The same word is an epithet as it qualifies the sense; it is an adjective as it is a part of speech. Thus, in the phrase, "Alexander the Great," great is an epithet, inasmuch as it designates Alexander in distinction from all other persons; it is an adjective as it expresses a quality in distinction from the noun, Alexander, which denotes a thing.

Equal, even, equable, like, alike, uniform. Equal is said of degree, quantity, number, and dimensions, as equal in years; even is said of the surface and position of bodies—a board is made even with another board. Like is said of accidental qualities in things, as alike in color or in feature; uniform is said of things only as to their fitness to correspond; those which are unlike in color, shape, or make, are not uniform, and cannot be made to match as pairs. Equable signifies free from sudden or violent changes,—as an equable climate, equable temper.

Antonyms.—Variable, irregular, unlike, different.

Error, mistake, blunder, fault. Error is the general term, applied to the judgment or to conduct. Mistake is an error of choice; blunder, an awkward error of action. Fault is more serious error, implying frequently a flaw in character or habits.

Eruption, explosion. Eruption is the coming into view by a sudden bursting; explosion signifies bursting out with a noise. Hence, of flames there will be properly an eruption, but of gunpowder an explosion.

Estimate, compute, rate. To estimate is to obtain the aggregate sum in one's mind either by an immediate or a progressive act; estimate allows for some inaccuracy in results. To compute is to obtain the sum by the gradual process of putting together items; to rate is to fix the relative value in one's mind by deduction and comparison. A builder estimates the expense of building a house on a given plan; a proprietor of houses computes the probable diminution in the value of his property in consequence of wear and tear; the surveyor rates the present value of lands or houses.

Eternal, endless, everlasting. The eternal is set above time; the endless lies within time. That is properly eternal which has neither beginning nor end; that is endless which has a beginning but no end; that which is everlasting has neither interruption nor cessation.

Antonyms.—Finite, temporary, transitory, passing.

Evade, equivocate, prevaricate. We evade by artfully turning the subject or calling off the attention of the inquirer; we equivocate by the use of expressions of double interpretation; we prevaricate by the use of loose and indefinite expressions. We avoid giving satisfaction by evading; we give a false satisfaction by equivocating; we give dissatisfaction by prevaricating.

Antonyms.—Meet, face, be frank.

Event, incident, accident, adventure, occurrence. These terms are expressive of what passes in the world, which is the sole signification of the term event, while to that of the other terms are annexed some accessory ideas. An incident is a personal event; an accident, an extraordinary event; an occurrence, an ordinary or domestic event. Event, in its ordinary and limited acceptation, excludes the idea of chance; accident excludes that of design; incident, adventure, and occurrence are applicable in both cases.

Exact, extort. To exact is to demand peremptorily—it is commonly an act of injustice. To extort is to get with violence—it is an act of tyranny.

Exact, nice, particular, punctual. To be exact is to arrive at perfection; to be nice is to be free from faults; to be particular is to be nice in certain particulars; to be punctual is to be exact in certain points. We are exact in our conduct or in what we do; nice and particular in our mode of doing it; punctual as to the time and the season for doing it.

Antonyms.—Inexact, heedless, crude, careless, dilatory.

Example, instance. The example is set forth by way of illustration or instruction; the instance is adduced by way of evidence or proof.

Example, pattern. The example must be followed generally; the pattern must be followed particularly, not only as to what but how a thing is to be done. The former serves as a guide to the judgment; the latter, to the actions.

Excite, incite, provoke. To excite is said more particularly of the inward feelings; incite is said of the external actions; provoke is said of both. A person's passions are excited; he is incited by any particular passion to a course of conduct; a particular feeling is provoked, or one is provoked to a particular step by some feeling.

Antonyms.—Calm, inhibit, deter, restrain.

Excursion, ramble, tour, trip, jaunt. Excursion is properly a journey out of one's usual range of travel. It may be long or short. A tour is usually a more carefully planned "round trip" of some length, as a tour of the lakes. Trip, formerly a short journey on foot, is now applied generally. Ramble is a purposeless, pleasant walk. Jaunt is a short ramble or journey.

Excuse, pardon. We excuse a person by exempting him from blame; we pardon by giving up the punishment of the offense one has committed. We excuse a small fault; we pardon a great fault; we excuse that which personally affects ourselves; we pardon that which offends against morals. Pardon is also conventionally used as a courteous term in place of excuse, as in "pardon the suggestion," excuse being understood to imply withdrawal of the person from a place, as in "excuse us for a moment."

Antonyms.—Blame, condemn, convict, punish.

Execute, fulfill, perform. To execute is to bring about an end; it involves active measures and is peculiarly applicable to that which is extraordinary, or to that which requires particular spirit and talents. Schemes of ambition are executed. To fulfill is to satisfy a moral obligation. We fulfill the duties of citizens. To perform is to carry through by simple action or labor; it is more particularly applicable to the ordinary and regular business of life. We perform a work or a task.

Exercise, practice. Exercise is action for the purpose of stimulating or developing power; practice is regular exercise for the purpose of acquiring or increasing skill and ease of action.

Exigency, emergency. The exigency is more common but less pressing; the emergency is imperious when it comes, but it comes less frequently. A prudent traveler will never carry more money with him than will supply the exigencies of his journey; in case of an emergency he will borrow of his friends rather than risk his property.

Exonerate, exculpate. The first is the act of another; the second is one's own act. We exonerate him upon whom a charge has lain or who has the load of guilt; we exculpate ourselves when there is any danger of being blamed. Circumstances may sometimes tend to exonerate; the explanation of some person is requisite to exculpate.

Antonyms.—Inculpate, accuse, blame, incriminate.

Expediency, fitness. The expediency of a thing depends altogether upon the outward circumstances; the fitness is determined by a moral rule.

Expedient, resource. The expedient is an artificial means; the resource is a natural means. A cunning man is fruitful in expedients; a fortunate man abounds in resources.

Explain, expound, interpret. Single words or sentences are explained; a whole work, or a considerable part of it, is expounded; the sense of any writing or symbolical sign is interpreted.

Explain, illustrate, elucidate. To explain is simply to render intelligible; to illustrate and elucidate are to give additional clearness. Everything requires to be explained to one who is ignorant of it; but the best informed will require to have abstruse subjects illustrated and obscure subjects elucidated. See *Dark*.

Expostulate, remonstrate. We expostulate in a tone of authority; we remonstrate in a tone of complaint. He who expostulates passes a censure and claims to be heard; he who remonstrates presents his case and requests to be heard.

Antonyms.—Abet, countenance, urge (on).

Extraneous, extrinsic, foreign. The extraneous is that which forms no necessary or natural part of anything. The extrinsic is that which forms a part or has a connection with a thing, but only in an indirect form; it is not an inherent or component part. The foreign is that which forms no part whatever, and has no kind of connection with an object or an incident.

Antonyms.—Essential, intrinsic, native.

Extraordinary, remarkable. The extraordinary is that which is out of the ordinary course, but it does not always excite remark and is not therefore remarkable, as when we speak of an extraordinary loan; on the other hand, when the extraordinary conveys the idea of what deserves notice, it expresses what is remarkable.

Antonyms.—Ordinary, usual, commonplace.

Extravagant, prodigal, lavish, profuse. The extravagant man spends his money without reason; the prodigal man spends it in excesses. One may be extravagant with a small sum where it exceeds one's means; one can be prodigal only with large sums. Lavish and profuse are properly applied to particular actions,—the former to denote an expenditure more or less wasteful or superfluous, the latter to denote a full supply without any sort of scant.

Antonyms.—Careful, thrifty, provident, sparing.

Exuberant, luxuriant. These terms are both applied to any flourishing growth or abundance: exuberance expresses the excess; luxuriance, the profusion. Luxuriant is the more usual and of wider application,—as luxuriant foliage, hair, fancy. Exuberant is applied specifically to the feelings,—as exuberant spirits, fancy, joy.

Antonyms.—Impoverished, scanty, poor, deficient, short.

Facetious, pleasant, jocular, jocose. Facetious may be employed either for writing or for conversation; the rest, only in conversation. The facetious man deals in that kind of discourse which may excite laughter. The pleasant man says everything in a pleasant manner; his pleasantry even on the most delicate subject is without offense. The person speaking is jocose; the thing said, or the manner of saying it, is jocular.

Antonyms.—Serious, solemn, literal, crabbed.

Factious, seditious. Factious is an epithet to characterize the tempers of men; seditious characterizes their conduct. The factious man attempts to raise himself into importance; he aims at authority, and seeks to interfere in the measures of government. The seditious man attempts to excite others and to provoke their resistance to established authority. The first wants to be a lawgiver; the second does not hesitate to be a lawbreaker.

Antonyms.—Loyal, complaisant, governable.

Fair, clear. Fair is used in a positive sense; clear, in a negative sense. There must be some brightness in what is fair; there must be no spots in what is clear. The weather is said to be fair, which is not only free from what is disagreeable, but somewhat enlivened by the sun; it is clear when it is free from clouds or mists.

Antonyms.—Dark, cloudy, murky, dull, stormy.

Faith, creed. These words are synonymous when taken for the thing trusted in or believed; but they differ in this: faith has always a reference to the principle in the mind; creed respects the doctrine which is the object of belief.

Faith, fidelity. Faith here denotes a mode of action, namely, in acting true to the faith which others repose in us; fidelity, a disposition of the mind to adhere to that faith which others repose in us. We keep our faith; we show our fidelity.

Antonyms.—Untruth, faithlessness, treachery.

Faithless, perfidious, treacherous. A faithless man is faithless only for his own interest; a perfidious man is expressly so to the injury of another. Perfidy may lie in the will to do; treachery lies altogether in the thing done. A friend is perfidious whenever he evinces his perfidy; but he is said to be treacherous only in the particular instance in which he betrays the confidence and interests of another.

Antonyms.—Faithful, true, trustworthy, dependable.

Fall, downfall, ruin. Fall applies generally to decline from erectness or to descent from high position or state—it applies to things, institutions, and persons. Downfall now generally applies to descent from rank, place, or position—it implies destruction and ruin. The fall of Sedan brought the downfall of Napoleon and the ruin of French hopes.

Antonyms.—Elevation, ascent, rise.

Fallacious, deceitful, fraudulent. Fallacious applies to falsehood in opinion; deceitful, to that which is externally false: our hopes are often fallacious; the appearances of things are often deceitful. Fallacious, as characteristic of the mind, excludes the idea of design; deceitful excludes the idea of mistake; fraudulent describes a gross species of the deceitful.

Antonyms.—Logical, true, real, genuine.

Fame, report, rumor, hearsay. Fame serves to form or establish a reputation either of a person or of a thing; it will be good or bad, according to circumstances,—the fame of our Savior's miracles went abroad through the land. A report serves to communicate information of events; it may be more or less correct according to the veracity or authenticity of the reporter. A rumor serves the purposes of fiction; it is more or less vague according to the temper of the times and the nature of the events. The hearsay is an indefinite report, passed from mouth to mouth, its origin quickly lost.

Famous, celebrated, renowned, illustrious. Famous signifies having fame or being of conspicuous note. It is applicable to that which causes a noise or sensation, to that which is talked of, written upon, discussed, and thought of, or to that which is circulated among all ranks and orders of men. Celebrated signifies kept in the memory by a celebration or memorial and is applicable to that which is praised and honored with solemnity. Renown means named again or repeatedly and signifies wide and exalted fame. Illustrious implies conspicuous nobility or worth.

Antonyms.—Unknown, obscure, commonplace, humble.

Fanciful, fantastic, whimsical, capricious. Whatever is dictated by or arranged by fancy, independently of serious thought, is fanciful; the fantastic adds exaggeration and oddity to the fanciful. Whimsical implies eccentric, quaint turns of fancy and inclination. Capricious implies a certain willfulness in sudden, unreasonable changes of mind or temper. The light, fanciful account of things may be pleasant or easily amusing; a fantastic tale will intrigue by its strangeness.

Antonyms.—Serious, logical, reasonable, regular.

Fancy, imagination. The fancy employs itself about things without regarding their nature; but the imagination aims at tracing a resemblance and getting a true copy. The fancy consequently forms combinations, either real or unreal, as chance may direct; but the imagination is less often led astray. The fancy is busy in dreams, or when the mind is in a disordered state; but the imagination is supposed to act when the intellectual powers are in full play.

Fatigue, weariness, lassitude. Fatigue is an exhaustion of the animal or mental powers; weariness is a wearing out of the strength, or a breaking of the spirits; lassitude is a general relaxation of the animal frame.

Antonyms.—Freshness, strength, endurance, elasticity.

Fearful, dreadful, frightful, tremendous, terrible, terrific, horrible, horrid. A contest is fearful when the issue is important, but the event doubtful; the thought of death is dreadful to one who feels himself unprepared. The frightful is less than the tremendous; the tremendous, less than the terrible; the terrible, less than the horrible. Shrieks may be frightful; thunder and lightning may be tremendous; the roaring of a lion is terrible; the glare of his eye terrific; the actual spectacle of killing is horrible or horrid. We may speak of a frightful, dreadful, terrible, or horrid dream, of a frightful, dreadful, or terrible tempest, of dreadful, terrible, or horrid consequences.

Antonyms.—Pleasant, agreeable, inspiriting, encouraging.

Feel, be sensible, conscious. Feel is generally an indefinite word for a function of the senses and the emotions. Sensible has a more definite use in both cases, always with reference to some object, as to be sensible of light or of error, or of a friend's sympathy. One is aware of external things; conscious refers to the working of the mind in respect to either inner or outer purposes. The expression "conscious of a fault" may refer to the intellectual grasp of it; "sensible of a fault," to the emotion aroused by it.

Antonyms.—(Be) apathetic, indifferent, insensible, unconscious.

Feign, pretend, simulate. Pretend, or pretend to, is the general word for assuming a false appearance or character. Feign implies more careful invention; simulate, more specific representation of resemblance. One pretends to be occupied; he feigns illness; but he simulates the action of a lunatic. Feign and simulate are very close synonyms.

Antonyms.—Be frank, sincere, open, ingenuous.

Felicitate, congratulate. Felicitate is the more formal term; congratulate, the more hearty word. Properly, we congratulate others only; we may felicitate others or ourselves.

Female, feminine, effeminate. Female applies to animal and human species. Feminine connotes the qualities and characteristics peculiar to woman. Effeminate implies reproach for men marked by weak or womanish qualities.

Antonyms.—Male, masculine, mannish, manly.

Ferocious, fierce, savage. All these imply predominance of brute passion. Ferocious signifies a settled, bloodthirsty cruelty or the appearance of it. Fierce connotes blazing, angry temper or sometimes simply an intense purpose or determination. Savage, whether applied to nature, animals, or men, signifies a disposition or character untamed, heartless, of a natural cruelty.

Antonyms.—Gentle, mild, tame, civilized.

Fervent, ardent. Fervent implies warmth of feeling, earnestness. Ardent connotes keenest passion, burning enthusiasm in a cause or in pursuit of a purpose. We may speak of fervent prayers and ardent lovers.

Antonyms.—Cold, dispassionate, sluggish, phlegmatic.

Final, conclusive. Final designates simply the circumstance of being the last. Conclusive implies fitness to be final because of being convincing. Final proof may be the last introduced in a discussion; conclusive proof shuts off further argument. If the reasoning is conclusive the conclusion will be final.

Antonyms.—Temporary, tentative, partial, inconclusive.

Find, discover, invent. Find is the general word for coming to know or bringing to knowledge what was not known before. We discover the things not before known to exist; we invent combinations or processes. Iron was discovered; processes for making steel were invented. The principles of flying were discovered; the airplane was invented.

Antonyms.—Imitate, copy, reproduce.

Fine, delicate, nice. Fine, in the natural sense, denotes smallness in general. Delicate denotes a degree of fineness that is agreeable to the taste. Thread is said to be fine; silk is said to be delicate, when to fineness of texture it adds softness. Nice is said of what is agreeable to a discriminating taste and judgment.

Antonyms.—Coarse, crude, uncouth, unrefined.

Finite, limited. Finite is the natural property of things; limited is the artificial property. The former is opposite only to the infinite; but the latter, which lies within the finite, is opposed to the unlimited or the infinite. This world is finite and space infinite; one's powers or resources are limited.

Antonyms.—Infinite illimitable, boundless.

Firm, fixed, solid, stable. Firm implies steadiness. Fixed denotes the state of being secure; solid implies power of resisting deforming forces; stable implies ability to maintain a constant position. That is firm which is not easily shaken; that is fixed which is fastened to something else, and not easily torn away; that is solid which is able to bear and does not easily give way; that is stable which is able to make a stand against resistance or the effects of time.

Antonyms.—Insecure, unstable, shaky, loose.

Fit, apt, meet. A house is fit for the accommodation of the family, according to the plan of the builder; the young mind is apt to receive either good or bad impressions. Meet is a term of rare use, except in spiritual matters or in poetry: it is meet to offer our prayers to the Supreme Disposer of all things.

Antonyms.—Ill-adapted, inappropriate, unsuitable.

Flatterer, sycophant, parasite. The flatterer is one who flatters by words. The sycophant and the parasite are flatterers and something more; for the sycophant adopts every mean artifice by which he can ingratiate himself, and the parasite submits to every degradation and servile compliance by which he can obtain his base purpose.

Antonyms.—Critic, scorner, slanderer.

Flexible, pliable, pliant, supple, limber, lithe. Flexible implies ease of bending or of being changed in shape—figuratively, susceptible to external impression. Pliable suggests ease of bending, folding, or working (as with the hands). Pliant implies more distinctly an inherent quality of easy bending to meet resistance. Figuratively, pliable suggests readiness for control (especially by evil influence); pliant suggests a temper of easy complaisance or accommodation. Supple implies freedom of easy movement. Limber applies to flexible material objects. Lithe suggests grace of motion.

Antonyms.—Rigid, stiff, cross-grained, unyielding, stubborn, unbending, intractable.

Fluctuate, waver. To fluctuate conveys the idea of alternate movement; to waver, that of constant motion backward and forward. When applied in the moral sense, to fluctuate designates the action of the spirits or the opinions; to waver is said of the will or of the opinions.

Antonyms.—Stand, (be) firm, determined, resolute.

Follow, pursue. The idea of going after any object in order to reach or obtain it is common to these terms, but under different circumstances: to follow a person implies usually a friendly intention; to pursue, a hostile intention.

Antonyms.—Lead, go ahead of, flee from.

Follow, succeed, ensue. Follow and succeed are used of persons and things; ensue, of things only. Follow, in respect of persons, denotes going in order; succeed denotes going or being in the same place immediately after another. Many persons may follow one another at the same time, but only one individual properly succeeds another. Ensue is used in specific cases,—quarrels too often ensue from the conversations of violent men who differ either in religion or politics.

Antonyms.—Lead, precede, occasion.

Follower, adherent, partisan. A follower is one who follows a person generally; an adherent is one who holds to his cause; a partisan is the follower of a party.

Antonyms.—Independent, rival, opponent.

Folly, foolery. Folly is the general word for inconsiderate, foolish conduct, especially when leading to easily foreseen disaster. Foolery implies absurd, nonsensical, though frequently amusing, performances.

Antonyms.—Sense, sobriety, prudence, judgment.

Fool, idiot, buffoon. Fool, as commonly used, signifies one who acts or talks senselessly or foolishly, or one who uses no judgment. Buffoon—a word, like fool, connected in origin with wind, windbag—signifies a stage fool or clown. Idiot implies lack of reasoning powers; imbecile, meaning weak-minded, is the proper synonym for this word.

Foolhardy, adventurous, rash. The foolhardy man ventures in defiance of consequences; the adventurous man ventures from a love of the arduous and the bold; the rash man ventures for want of thought.

Antonyms.—Calculating, hesitating, cautious, careful.

Force, violence. The arm of justice must exercise force in order to bring offenders to a proper account; one nation exercises violence against another in the act of carrying on war. Force is mostly conformable to reason and equity; violence is always resorted to for the attainment of that which is unattainable by law. Force is often something desirable; violence is always something hurtful. We ought to listen to arguments which have force in them; we endeavor to correct the violence of all angry passions.

Antonyms.—Indulgence, clemency, gentleness, kindness.

Foretell, predict, prophesy, prognosticate. Foretell frequently implies some occult powers; predict generally implies reasonable inference from facts, though the words are used loosely to mean merely "tell before." Prophesy implies inspiration or great assurance on the part of the speaker that his predictions are true. Prognosticate means to predict from observation of symptoms, as a physician prognosticates. The word is sometimes used humorously for predict.

Forgetfulness, oblivion. Forgetfulness characterizes the person or that which is personal; oblivion, the state of the thing. The former refers to him who forgets; the latter to that which is forgotten.

Antonyms.—Remembrance, memory, recollection.

Forgive, pardon, absolve, remit. Individuals forgive each other personal offenses; they pardon offenses against law and morals. The former is an act of Christian charity; the latter, an act of clemency. To remit is to refrain from inflicting—it has more particular regard to the punishment. Remission is granted by an authority—it arrests the execution of justice. To absolve is to free from penalty either by the civil judge or the ecclesiastical minister—it re-establishes the accused in the rights of innocence.

Antonyms.—Condemn, convict, punish, inflict.

Form, ceremony, rite, observance. Form respects all determinate modes of acting and speaking, adopted by society at large, in every transaction of life; ceremony respects those forms of outward behavior which are made the expressions of respect and deference; rite and observance are applied to ceremonies, especially those of religion.

Form, fashion, mold, shape. Form conveys the idea of producing. When we wish to represent a thing as formed in any distinct or remarkable way, we may speak of it as fashioned. God formed man out of the dust of the ground; he fashioned him after his own image. When we wish to represent a thing as formed according to a precise rule, we should say it is molded. Thus the habits of a man are molded at the will of a superior. When we wish to represent a thing as receiving the qualities which distinguish it from others, we talk of shaping it.

Antonyms.—Break, destroy, demolish, mutilate.

Formidable, dreadful, terrible, shocking. The formidable acts neither suddenly nor violently; the dreadful may act violently but not suddenly. Thus the appearance of an army may be formidable, but that of a field of battle is dreadful. The terrible and the shocking act both suddenly and violently, but the former acts both on the senses and the imagination, the latter on the moral feelings. Thus the glare of the tiger's eye is terrible; the unexpected news of a friend's death is shocking.

Antonyms.—Weak, trivial, commonplace, insignificant.

Forsaken, forlorn, destitute. To be forsaken is to be deprived of the company and the assistance of those we have looked to; to be forlorn is to be forsaken in time of difficulty—to be without a guide in an unknown road; to be destitute is to be deprived of the first necessaries of life.

Antonyms.—Protected, cherished, cared for, supported, supplied.

Forswear, perjure, suborn. To forswear is applied to all kinds of oaths; to perjure is employed only for such oaths as have been administered by the civil magistrate. A soldier forswears himself who breaks his oath of allegiance by desertion; a man perjures himself in a court of law who swears to the truth of that which he knows to be false. Suborn signifies to make to forswear. A perjured man has all the guilt upon himself; but he who is suborned shares his guilt with the suborner.

Foster, cherish, harbor, indulge. These terms are all employed here in the moral acceptation, to express the idea of giving nourishment to an object. To foster in the mind is to keep with care and positive endeavors, as when one fosters prejudices by encouraging everything which favors them; to cherish in the mind is to hold dear or set a value upon, as when one cherishes good sentiments by dwelling upon them with inward satisfaction. To harbor is to allow room in the mind, and it is generally taken in the worst sense of giving admission to that which ought to be excluded, as when one harbors resentment by permitting it to have a resting place in the heart. To indulge in the mind is to give the whole mind to it, to make it the chief source of pleasure, as when one indulges an affection by making the will and the outward conduct bend to its gratifications.

Antonyms.—Cast off, reject, refrain from, abjure, forswear.

Foundation, ground, basis. A report is said to be without any foundation when it has taken its rise in mere conjecture or in some arbitrary cause independent of all fact. A man's suspicion is said to be without ground when not supported by the shadow of external evidence. Foundation and base are the lowest parts of a structure; but the former lies underground, the latter stands above. Basis is used now only in the figurative sense. Rumor which has no basis in fact may be called baseless fabrication.

Fragile, frail, brittle. That is fragile which, like a flower or a vase, is easily broken or destroyed; brittle implies liability to crack or shatter, as an eggshell. Frail is close to fragile in meaning, but it is applied to weak physical or mental natures. The human body is frail or a person's virtue shows frailty.
Antonyms.—Tough, strong, firm, unbreakable.

Frank, candid, ingenuous, free, open, plain. The frank man is under no constraint; his thoughts and feelings are both set at ease, and his lips are ever ready to give utterance to the dictates of his heart. The candid man has nothing to conceal; he speaks without regard to self-interest or to any like consideration—he speaks only the truth. The ingenuous man throws off all disguise; he scorns all artifice and brings everything to light—he speaks the whole truth. Free, open, and plain have not so high an office as the first three. Frank, free, and open men all speak without constraint, but the frank man is not impertinent nor indiscreet. The plain man speaks plainly but truly—he gives no false coloring to his speech.
Antonyms.—Insincere, disingenuous, close, reserved, shuffling.

Free, exempt. Free is applied to everything from which anyone may wish to be free; exempt, on the contrary, is applied to those burdens which we might share with others.
Antonyms.—Bound, restricted, liable, amenable.

Free, familiar. To be free is to be disengaged from the constraints which the ceremonies of social intercourse impose; to be familiar is to be upon the footing of a friend or a relative or of one of the same family.
Antonyms.—Restrained, reserved, distant.

Free, liberal. To be free signifies to act or think at will; to be liberal is to act according to the dictates of a large heart and an enlightened mind.
Antonyms.—Narrow, constrained, conservative.

Frequent, resort to, haunt. Frequent is generally used only of resorting often or repeatedly to a place and applies either to one person or to several together. Resort implies the gathering of a number of people in a place. Haunt implies frequenting continually or pertinaciously when unwelcome. He haunted the neighborhood or the memory haunts him.

Frighten, intimidate. Danger immediately present or evident to the senses frightens; danger distant but apprehended intimidates.
Antonyms.—Attract, encourage, stimulate.

Funeral, obsequies. We speak of the funeral as the last sad office which we perform for a friend; it is accompanied by nothing but mourning and sorrow. We speak of obsequies as the tribute of respect paid to the person of one who was high in station or public esteem.

Gape, stare, gaze. Gape and stare are taken in an ill sense. The former indicates the astonishment of gross ignorance; the latter, not only ignorance but impertinence. Gaze is taken in a good sense, as indicating a feeling of astonishment, pleasure, or curiosity.

Gather, collect. To gather signifies to bring things of a kind together; to collect annexes also the idea of binding or forming into a whole. We gather that which is scattered in different parts, as stones are gathered into a heap; vessels are collected so as to form a fleet.
Antonyms.—Scatter, disperse, separate.

General, universal, generic. What is general includes the greater part or number; what is universal includes every individual or part. Generic applies to the larger group or class; specific, to the individual example.
Antonyms.—Particular, specific, exceptional.

Genteel, polite. Gentility respects rank in life; politeness, the refinement of the mind and outward behavior. Genteel indicates now a pretension of superiority. All decent, intelligent people are polite; a decayed gentleman may be genteel.
Antonyms.—Common, uncouth, unpolished.

Gentle, tame. Gentle implies quietness, kindness; tame implies obedience and willingness, often with some lack of spirit.
Antonyms.—Fierce, wild, spirited.

Gift, present, donation. The gift is an act of generosity or condescension—it contributes to the benefit of the receiver. The present is an act of kindness, courtesy, or respect—it contributes to the pleasure of the receiver. The gift is private and benefits the individual; the donation is public and serves some general purpose. What is given to relieve the necessities of any poor person is a gift; what is given to support an institution is a donation.

Give, grant, bestow, present, confer. The idea of communicating to another what is our own or in our power is common to these terms; this is the whole signification of give. To grant is to give at one's pleasure; to bestow is to give from a certain degree of necessity. We give money, clothes, food, or whatever is transferable. Granting is confined to such objects as afford pleasure or convenience; bestowing is applied to such objects only as are necessary to supply wants. Present is to give formally; confer is to transfer something of value.
Antonyms.—Withdraw, refuse, deny.

Give up, abandon, resign, forego. To give up is applied to familiar cases; abandon, to matters of importance. One gives up an idea, an intention, a plan, and the like; one abandons a project, a scheme, a measure of government. A man gives up his situation by a positive act of his choice; he resigns his office when he feels it inconvenient to hold it. So, likewise, we give up expectations and resign hopes; we resign that which we have, and we forego that which we might have.
Antonyms.—Hold fast, guard, retain, enjoy, seize.

Glaring, barefaced. Glaring designates the thing; barefaced characterizes the person. A glaring falsehood is that which strikes the observer in an instant as a falsehood; a barefaced lie or falsehood betrays the effrontery of him who utters it.

Glimpse, glance. Glimpse is a casual or fleeting view determined by the position or movement of the object or the observer; a glance is a hasty look, determined by the eye alone. From a moving car one, glancing at the landscape, catches glimpses of trees.

Glory, boast, vaunt. To glory is to exult or to rejoice; to boast is to set forth to one's advantage; to vaunt is to set oneself up before others. To glory is more particularly the act of the mind, the indulgence of the internal sentiment; to boast denotes rather the expression of the sentiment; to vaunt is properly to proclaim praises aloud and is taken either in an indifferent or in a bad sense.

Glory, honor. Glory is something dazzling and widely diffused; honor is something less splendid but more solid. Glory impels to extraordinary efforts and to great undertakings; honor induces to a discharge of one's duty.
Antonyms.—Shame, discredit, disgrace.

Godlike, divine, heavenly. Godlike is a more expressive but less common term than divine. The former is used only as an epithet of peculiar praise for an individual; divine is generally employed for that which appertains to a superior being, in distinction from that which is human. A heavenly being denotes an angel or inhabitant of heaven, in distinction from earthly beings.
Antonyms.—Human, earthly.

Good nature, good humor. Good nature and good humor both imply the disposition to please and be pleased, but the former is habitual and permanent while the latter is temporary and partial. The former lies in the nature and frame of the mind, the latter in the state of the spirits.
Antonyms.—Ill nature, ill humor, sullenness, petulance.

Govern, rule, regulate. The exercise of authority enters more or less into the signification of these terms, but to govern implies the exercise likewise of judgment and knowledge. To rule implies rather the unqualified exercise of power, the making the will the rule. A king governs his people by means of wise laws and an upright administration; a despot rules over a nation according to his arbitrary decision. To regulate is to govern or control simply by judgment; the word is applicable to things of minor moment, where the force of authority is not so requisite. One governs the affairs of a nation or a large body where great interests are involved; we regulate the concerns of an individual.

Government, administration. Both these terms may be employed to designate either the act of governing and administering or the persons governing and administering. In both cases government has a more extensive meaning than administration. The former includes every exercise of authority; administration implies only that exercise of authority which consists in putting the laws or the will of another in force. When we speak of the government, as it respects the persons, it implies the whole body of constituted authorities; but the administration implies only that part which puts in execution the intentions of the whole.

Grace, charm, elegance. Grace is altogether physical; charm is either physical or mental. Grace qualifies the

action of the body; charm is an inherent quality in the person. A lady moves, dances, and walks with grace; the charms of her person are equal to those of her mind. A graceful figure is rendered so by the deportment of the body. A comely figure has that in itself which pleases the eye. Grace is a quality pleasing to the eye, but elegance is a quality of a higher nature and inspires admiration. Elegance implies niceties and polish of manner. All these words are extended in meaning, figuratively, to language and dress.

Gratify, indulge, humor. To gratify is a positive act of the choice; to indulge is a negative act of the will, a yielding of the mind to circumstances. One gratifies his desires or appetites; he indulges his humors or indulges in pleasures. We gratify and indulge others as well as ourselves, and mostly in the good sense. To gratify, when directed toward others, is an act of generosity. To indulge is to yield to the wishes or to be lenient to the infirmities of others—it is an act of kindness or good nature. To humor is taken mostly in an unfavorable sense.

Antonyms.—Restrict, mortify, discipline, restrain.

Gratuitous, voluntary. Gratuitous implies a giving or conferring beyond what is required; voluntary connotes free, willing, uncompelled action.

Antonyms.—Obligatory, compulsory, necessary, demanded.

Grave, serious, solemn. Grave expresses more than serious. It bespeaks not merely the absence of mirth, but that heaviness of mind which is displayed in all the movements of the body. Serious, on the other hand, bespeaks no depression but simply steadiness of action and a refraining from all that is jocular. A judge pronounces the solemn sentence of condemnation in a solemn manner; a preacher delivers many solemn warnings to his hearers.

Antonyms.—Light, cheery, frivolous, gay.

Great, grand, sublime. These terms are synonymous only in their moral application. Great simply designates extent; grand includes likewise the idea of excellence and superiority. A great undertaking characterizes only the extent of the undertaking; a grand undertaking bespeaks its superior excellence. Sublime designates the dimensions of height. A scene may be either grand or sublime. It is grand as it fills the imagination with its immensity; it is sublime as it elevates the imagination beyond the surrounding and less important objects.

Antonyms.—Mean, petty, unimpressive, ordinary.

Great, large, big. Great applies to all sorts of dimensions by which things are measured; large usually refers to magnitude, bulk, or scope. Big denotes great as to expansion or capacity. Great suggests the impression on the speaker, and is used more often of abstract ideas. Large suggests absolute size, and is used mostly of things. Big is in loose colloquial use for all these meanings of great and large.

Antonyms.—Little, small, diminutive, inconsiderable.

Groan, moan. Groan is a deep sound produced by hard breathing; moan is a plaintive, long-drawn sound produced by the organs of utterance. The groan proceeds involuntarily as an expression of severe pain, either of body or mind; the moan proceeds often from the desire of awakening attention or exciting compassion.

Gross, coarse. These terms are synonymous in their moral application. A person becomes gross by an unrestrained indulgence of his sensual appetites, particularly in eating and drinking; he is coarse from the want of polish either as to his mind or manners.

Antonyms.—Refined, polished, delicate, elegant.

Guard, defend, watch. To guard, in its largest sense, comprehends both watching and defending, that is, both preventing the attack and resisting it when it is made. In the restricted sense, to guard is properly to keep off an enemy; to defend is to drive him away when he makes the attack. Watch, like guard, consists in looking to the danger, but it does not necessarily imply the use of any means to prevent the danger—he who watches gives an alarm.

Guard, guardian. The guard defends only against external evils; the guardian takes upon him the office of parent, counselor, and director.

Guess, conjecture, surmise, divine. We guess when we have no means or facts from which to reason. Conjecture is to conclude upon incomplete evidence. Surmise implies still slighter foundation for opinion. Divine implies some mysterious or particularly keen power of knowing. Some people divine motives or secrets.

Antonyms.—Reason, calculate, compute, conclude.

Guest, visitor, or visitant. Guest signifies one who is entertained; visitor or visitant is the one who pays the visit. The visitor simply comes to see the person and enjoy social intercourse, but the guest partakes also of hospitality. Visitant implies a visitor from outside one's sphere or usual environment, as a supernatural visitant. Migratory birds are commonly said to be summer or winter visitors; properly they are visitants.

Guise, habit. The guise is that which is unusual and often only occasional; the habit is that which is usual among particular classes. A person sometimes assumes the guise of a peasant, in order the better to conceal himself; he who devotes himself to the clerical profession puts on the habit of a clergyman.

Habitation, home, house, residence. Habitation implies merely a dwelling place; house refers to a building constructed purposely for dwelling. Home is usually restricted to mean a dwelling endeared as the scene of domestic ties and family life. Residence is a more formal term than house, though less exact.

Happen, chance. Happen applies to all events, without including any collateral idea; chance comprehends likewise the idea of lack of causation in events. Whatever comes to pass happens, whether regularly in the course of things or particularly and out of the order; whatever chances happens altogether without concert or intention and often without apparent relation to any other thing.

Happy, fortunate. Both words are applied to the external circumstances of a man. The former conveys the idea of that which is abstractly good; the latter implies rather what is agreeable to one's wishes. A man is happy in his marriage; he is fortunate in his trading concerns. Happy excludes the idea of chance; fortunate excludes the idea of personal effort.

Antonyms.—Unlucky, unsuccessful, infelicitous.

Harbor, haven, port. The idea of a resting place for vessels is common to these terms. Harbor carries with it little more than the common idea of affording a resting or anchoring place; haven conveys the idea of security; port conveys the idea of an enclosure. A haven is a natural harbor; a port is an artificial harbor.

Hard, firm, solid. That is hard which will not yield to a closer compression; that is firm which will not yield so as to produce a separation. Ice is hard, so far as respects itself, when it resists every pressure; it is firm, with regard to the water which it covers, when it is so closely bound as to resist every weight without breaking. Hard and solid respect the internal constitution of bodies and the adherence of the component parts, but hard denotes a much closer degree of adherence than solid.

Antonyms.—Soft, yielding, fluid.

Hasten, hurry, accelerate, speed, expedite, dispatch. To hasten expresses little more than the general idea of quickness in moving toward a point: he hastens who runs to get to the end of his journey. Hurry implies planless and restless or perturbed haste. Accelerate expresses the idea of definite increase in speed. The word speed includes not only quick but forward movement. He who speeds goes effectually forward and comes to his journey's end the soonest. This idea is excluded from the term haste, which may often be a planless, unsuitable quickness. Hence the proverb, "The more haste, the worse speed." Expedite and dispatch are terms of higher import, in application to the most serious concerns in life. Expedite expresses a process, a bringing forward toward an end; dispatch implies a putting an end to, making a clearance. We do everything in our power to expedite a business; we dispatch a great deal of business within a given time.

Antonyms.—Impede, retard, clog, check.

Hate, detest. Hate implies a personal feeling directed toward the object, independently of its qualities; detest implies a feeling independent of the person and altogether dependent upon the nature of the thing. One may hate because of enmity and ill will. He detests when he has strong aversion.

Antonyms.—Love, admire, esteem.

Hateful, odious. Hateful is properly applied to whatever violates general principles of morality: lying and swearing are hateful vices. Odious is more commonly applied to such things or persons as excite especial repugnance by their nature or conduct.

Antonyms.—Pleasing, attractive, desirable.

Haughtiness, disdain, arrogance. Haughtiness is founded on the high opinion we entertain of ourselves; disdain, on the low opinion we have of others; arrogance is the result of both, but, if anything, more of the former than of the latter. Haughtiness and disdain are properly sentiments of the mind; arrogance, a mode of acting resulting from a state of mind.

Antonyms.—Modesty, respectfulness, consideration, courtesy.

Have, possess. One may be said to have what is in one's hand or within one's reach, but to possess is to have as one's

own. A clerk has the money which he has fetched for his employer; the latter possesses the money which he has the power of turning to his use.

Hazard, risk, venture. He who hazards an opinion or an assertion does it from presumptuous feelings and upon slight grounds; chances are rather against him than for him that it may prove erroneous. He who risks a battle does it often from necessity; he chooses the lesser of two evils although the event is dubious—yet he fears less from a failure than from inaction. One ventures on a business speculation from desire of gain, though the outcome may be uncertain.

Healthful, wholesome, salubrious, salutary. Healthful is applied to exercise, to air, situation, climate, and most other things except food, to which wholesome is commonly applied. The life of a farmer is reckoned the most healthful; the simplest diet is the most wholesome. Healthful and wholesome are rather negative in their sense; salubrious and salutary are positive. That is healthful and wholesome which does no injury to the health; that is salubrious which serves to improve the health; that is salutary which serves to remove a disorder.
Antonyms.—Hurtful, deleterious, unwholesome.

Heap, pile, accumulate, amass. To heap is an indefinite action—it may be performed with or without order. To pile is a definite action done with design and order—we heap stones, or pile wood. To accumulate is properly to bring or add heap to heap, which is a gradual and unfinished act; to amass is to form into a mass, which is a single complete act. A man may accumulate dollars or anything else in small quantities, but he properly amasses wealth.

Hearty, warm, sincere, cordial. There are cases in which it may be peculiarly proper to be hearty, as when we are supporting the cause of religion and of virtue; there are other cases in which it is peculiarly proper to be warm, as when our affections ought to be roused in favor of our friends. In all cases we ought to be sincere when we express either a sentiment or a feeling; it is peculiarly happy to be on terms of cordial regard with those who stand in any close relation to us. The man himself should be hearty; his heart should be warm; professions should be sincere; a reception, cordial.
Antonyms.—Formal, cold, insincere, indifferent.

Heed, care, attention. Heed applies to matters of importance to one's moral conduct; care, to matters of minor import. A man is required to take heed; a child is required to take care. The former exercises his understanding in taking heed; the latter exercises his thoughts and his senses in taking care. We speak of giving heed and paying attention. The former is applied only to that which is conveyed to us by another, in the shape of a direction, a caution, or an instruction; the latter is said of everything which we are said to perform.
Antonyms.—Heedlessness, carelessness, oversight, neglect, rashness.

Heinous, flagrant, flagitious, atrocious. A crime is heinous which seriously offends against the laws of men; a sin is heinous which seriously offends against the will of God. An offense is flagrant which is in direct defiance of established opinions and practice. It is flagitious if a gross violation of the moral law, or coupled with any grossness. A crime is atrocious which is attended with any aggravating circumstances.

Help, assist, aid, succor, relieve. Help signifies to do good to; assist signifies to place oneself by another so as to give him strength; aid signifies to profit toward a specific end; succor signifies to run to the help of anyone; relieve signifies to bring ease to. We help a person to prosecute his work or help him out of a difficulty; we assist in order to forward a scheme, or we assist a person in the time of his embarrassment; we aid a good cause, or we aid a person to make his escape; we succor a person who is in danger; we relieve him in time of distress.
Antonyms.—Oppose, obstruct, interfere with, aggravate.

Hesitate, falter, stammer, stutter. A person who is not in the habit of public speaking or of collecting his thoughts into a set form will be apt to hesitate even in familiar conversation; he who first addresses a public assembly will be apt to falter. Children who first begin to read will stammer at hard words; one who has an impediment in his speech will stutter when he attempts to speak in a hurry.

Heterodoxy, heresy. Heterodoxy means a belief different from an accepted doctrine; heresy usually implies pernicious erroneous doctrine. But one who has heterodox opinions is a heretic.
Antonyms.—Orthodoxy, conformity.

High, tall, lofty. High expresses the idea of extension upward. What is tall is high, but what is high is not always tall; that which attains considerable height by growing is tall; a thing may be high because on a pedestal. Lofty is said of that which is extended in breadth as well as in height. We say that a house is high, a chimney tall, a room lofty.
Antonyms.—Low, short, dwarfed.

Hinder, stop. To hinder is to interfere with the progress of a person or a thing; to stop implies entire, and usually sudden, cessation of motion.
Antonyms.—Further, promote, advance.

Hold, keep, detain, retain. To hold is a physical act and requires a degree of bodily strength, or at least the use of the limbs; to keep is simply to have by one at one's pleasure. Detain and retain are modes of keeping. The former signifies keeping back what belongs to another; the latter signifies keeping a long time for one's own purpose.
Antonyms.—Give up, surrender, return, restore.

Hold, occupy, possess. We hold a thing for a long or a short time; we occupy it permanently; we hold it for ourselves or others; we occupy it only for ourselves. We hold it for various purposes; we occupy only for the purpose of converting it to our private use. To occupy is to hold only under a certain compact; to possess is to hold as one's own.

Holiness, sanctity. Holiness implies inherent qualities of piety and godliness; sanctity is a character given or conferred upon persons or places because of relation to holy men or things. A priest should be holy; there is an air of sanctity about a church.
Antonyms.—Profaneness, impiety.

Hollow, empty. That is hollow which has an empty space, or cavity, as a hollow tree. That which has nothing in it is empty, as an empty chair.
Antonyms.—Solid, full.

Holy, sacred, divine. Whatever is most intimately connected with religion and with religious worship, in its purest state, is holy, uncontaminated by any worldly thought, and elevated in the greatest possible degree, so as to suit the nature of an infinitely perfect and exalted Being. The sacred derives its sanction from human institutions, and is connected rather with our moral than our religious duties. What is holy is altogether spiritual and abstracted from the earthly. The divine is often contrasted with the human, but there are many human things that are denominated divine. What is divine, therefore, may be so superlatively excellent as to be conceived of as having the stamp of inspiration from the Deity.
Antonyms.—Human, profane, secular.

Honor, reverence, respect. To honor is only an outward act; to reverence either is an act of the mind or is the outward expression of a sentiment; to respect is mostly an act of the mind, though it may admit of being expressed by some outward act. We honor God by adoration and worship; we honor our parents by obeying them and giving them our personal service; we reverence our Maker by cherishing in our minds a dread of offending him; we respect a person or a thing that is lofty, worthy, or honorable.
Antonyms.—Scorn, contemn, despise, disdain.

Hot, fiery, burning, ardent. In the figurative application, a temper is said to be hot or fiery; rage is burning; the mind is ardent in pursuit of an object. Zeal may be hot, fiery, burning, or ardent; but in the first three cases it denotes the intemperance of the mind when heated by religion or politics. The last is admissible so long as it is confined to a good object.
Antonyms.—Cool, calm, stolid, dispassionate.

Human, humane. The human race or human beings are opposed to the irrational part of the creation; a humane race or a humane individual is opposed to one that is cruel and fond of inflicting pain.
Antonyms.—Animal, divine, beastly, inhuman, cruel.

Humble, modest, submissive. A man is humble from a sense of his comparative inferiority to others in point of station and outward circumstances; he is humble from a sense of his imperfections, and a consciousness of not being what he ought to be. He is modest, inasmuch as he sets but little value on his qualifications, acquirements, and endowments. Between humble and submissive there is this prominent feature of distinction,—that the former marks a temper of mind, the latter a mode of action. We may be submissive because we are humble; but we may likewise be submissive from fear, from interested motives, and the like.
Antonyms.—Haughty, arrogant, vain, conceited, obstinate.

Humor, temper, mood. Humor is fluctuating, so that it varies continually in the same mind; temper is a more permanent quality, showing itself to be the same whenever it appears at all. Humor makes a man appear different at different times; temper makes him different from others. Hence we speak of the humor of the moment, the temper of youth or old age. Humor and mood denote temporary states of feeling, but mood is of a rather more pervasive,

controlling nature than humor, which seems more capricious. There is no calculating on the humor of the man; it depends upon his mood whether he does work ill or well.

Hurtful, pernicious, noxious, noisome. Between hurtful and pernicious there is the same distinction as between hurting and destroying: that which is hurtful may hurt in various ways; but that which is pernicious necessarily tends to destruction. Confinement is hurtful to the health; bad company is pernicious to the morals. Noxious and noisome are forms of the hurtful. That which is noxious inflicts a direct injury; that which is noisome inflicts it indirectly. Noxious insects are such as wound; noisome vapors are such as tend to create disorders.

Antonyms.—Healthful, wholesome, salutary, salubrious.

Ideal, imaginary. The ideal is not directly opposed to, but is abstracted from, the real; the imaginary, on the other hand, is directly opposed to the real—it is the unreal thing formed by the imagination. Ideal happiness is based on that which is conceived in the mind without having any direct and actual reality in nature; the imaginary is that which is opposite to some positive, existing reality. The pleasure which a lunatic derives from the conceit of being a king is based on something altogether imaginary.

Antonyms.—Real, actual, practical.

Idle, lazy, indolent. One is termed idle who will do nothing useful; one is lazy who will do nothing at all without great reluctance; one is indolent who does not care to do anything or set about anything.

Antonyms.—Busy, industrious, energetic, active.

Illuminate, illumine, enlighten. We illuminate by means of artificial lights; the sun illuminates the world by its own light. Preaching and instruction enlighten the minds of men. Illumine is but a poetic variation of illuminate. Figuratively, we speak of an illuminating remark. Illuminating examples are an aid to understanding principles.

Antonyms.—Darken, shadow, obscure, cloud.

Imminent, impending, threatening. All these terms are used in regard to some evil that is exceedingly near. Imminent conveys no idea of duration; impending excludes the idea of what is momentary. A person may be in imminent danger of losing his life in one instant, and the danger may be over the next instant; but an impending danger is that which has been long in existence and gradually approaching. A threatening evil gives intimations of its own approach—we perceive the threatening tempest in the blackness of the sky.

Antonyms.—Doubtful, unexpected, improbable, unheralded, unlikely.

Impair, injure. To impair is a progressive mode of injuring; to injure is to do harm either by degrees or by an instantaneous act. Straining of the eyes impairs the sight, but a blow injures rather than impairs the eye.

Antonyms.—Benefit, help, remedy, repair.

Imperious, lordly, domineering, overbearing. A person's temper or his tone is said to be imperious; his air or deportment is lordly; his tone is domineering. Overbearing is employed for men in the general relations of society, whether superiors or equals. A man of an imperious temper and some talent will frequently be so overbearing in the assemblies of his equals as to awe the rest into silence.

Antonyms.—Servile, submissive, humble, pliant.

Implicate, involve. Implicate denotes folding into a thing; involve, rolling into a thing. To implicate therefore marks something less entangled than to involve; for that which is folded may be folded only once, but that which is rolled is turned many times. In application to human affairs, therefore, people are said to be implicated who have taken ever so small a share in a transaction; they are involved only when they are deeply concerned. Implicate is now always used in an unfavorable sense. Involve may have this sense also, but is of more general use.

Antonyms.—Extricate, disentangle.

Impugn, attack. He who impugns may sometimes proceed insidiously and circuitously to undermine the faith of others; he who attacks always proceeds with more or less violence. When there are no arguments wherewith to impugn a doctrine, it is easy to attack it with ridicule and scurrility.

Antonyms.—Defend, uphold, vindicate.

Inability, disability. The inability lies in the nature of the thing and is irremediable; the disability lies in the circumstances and may sometimes be removed.

Antonyms.—Ability, competence, capacity.

Inadvertency, inattention, oversight. Anyone may be guilty of inadvertencies, since the mind that is occupied with many subjects equally serious may be turned so steadily toward some that others may escape notice; but inattention, which designates a direct want of attention, is always a fault and belongs only to the young or to such as are thoughtless by nature. An oversight is properly a species of inadvertency, which arises from looking over or passing by a thing. We must be guarded against oversights in business, as their consequences may be serious.

Inclination, tendency, propensity, proneness. All these terms are employed to designate the state of the will toward an object. Inclination denotes its first movement toward an object; tendency is a continued inclination; propensity denotes a still stronger leaning of the will; proneness characterizes a habitual and fixed state of the will toward an object. Propensity and proneness both designate a downward direction and consequently refer only to that which is reprehensible or low. A person has a propensity to drinking or a proneness to lying.

Antonyms.—Aversion, repugnance, abhorrence, distaste.

Include, enclose (inclose). A yard is enclosed by a wall; particular goods are included in a reckoning.

Inconvenience, annoy, molest. We inconvenience in small matters or by omitting such things as might be convenient; we annoy or molest by doing that which is positively painful. Molest implies malicious or hostile annoyance. We are inconvenienced by a person's absence; we are annoyed by his presence if he renders himself offensive; we are molested by that which is weighty and oppressive. The rude insults of ill-disposed persons may molest.

Antonyms.—Accommodate, soothe, appease, gratify.

Increase, grow. To increase is either a gradual or an instantaneous act; to grow is a gradual process. A stream increases by the addition of other waters; but, if we say that the river or the stream grows, it is supposed to grow by some regular and continual process of receiving fresh water, as from the running in of different rivulets or smaller streams.

Antonyms.—Decrease, diminish, shrink.

Indebted, obliged. Indebted is more binding and positive than obliged. We are indebted to whoever confers an essential service; we are obliged to him who does us any service. A man is indebted to another for the preservation of his life; he is obliged to him for an ordinary act of civility.

Indifferent, unconcerned, regardless. Indifferent applies only to the will; unconcerned, to either the will or the understanding; regardless, to the understanding only. We are indifferent about matters of minor consideration; we are unconcerned about, or regardless of, serious matters that have remote consequences. An author will seldom be indifferent about the success of his work; he ought not to be unconcerned about the influence which his writings may have on the public, or regardless of the estimation in which his own character as a man may be held.

Antonyms.—Heedful, anxious, careful, mindful, observant.

Indubitable, unquestionable, indisputable, undeniable, incontrovertible, irrefragable. When a fact is supported by such evidence as admits of no kind of doubt, it is termed indubitable; the authority of a man whose character for integrity stands unimpeached, is termed unquestionable authority; when a thing is believed to exist on the evidence of every man's senses, it is termed undeniable; when a sentiment has always been held as either true or false, without dispute, it is termed indisputable; when arguments have never been refuted in any degree, they are termed incontrovertible; when arguments have never been satisfactorily answered, they are termed irrefragable.

Antonyms.—Doubtful, questionable, uncertain, dubious, debatable.

Indulgent, fond. Indulgence lies more in forbearing from the exercise of authority; fondness, in the outward behavior and endearments. They may both arise from an excess of kindness or love. An indulgent parent is seldom a prudent parent; a fond parent is foolishly tender and loving. All who have the care of young people should occasionally relax from the strictness of the disciplinarian and show an indulgence where a suitable opportunity offers. A fond mother takes away from the value of indulgences by an invariable compliance with the humors of her children.

Antonyms.—Strict, stern, exacting.

Infamous, scandalous. Infamous and scandalous are both said of that which is liable to excite great displeasure in the minds of all who hear it, and to degrade the offenders in the general estimation. But the infamous seems to be that which produces greater publicity and more general reprehension than the scandalous, consequently it is more serious in its nature and a greater violation of good morals.

Antonyms.—Honorable, respectable, creditable.

Inform, instruct, teach. To inform is the act of persons in all conditions; to instruct and teach are the

acts of superiors, either on one ground or another. One informs by virtue of an accidental superiority or priority of knowledge; one instructs by virtue of superior knowledge or superior station; one teaches by virtue of superior knowledge rather than of station.
Antonyms.—Misinform, delude, mislead.

Ingenuity, wit. Ingenuity comprehends invention; wit in this sense implies only quickness of apprehension. He had the ingenuity to make good use of the opportunity if he had had the wit to see it.
Antonyms.—Dullness, slowness, stupidity.

Injustice, injury, wrong. The violation of justice or a breach of the rule of right constitutes injustice; but the amount or degree of ill that falls on the person constitutes injury. A wrong partakes of both injustice and injury; it is, in fact, an injury done by one person to another in express violation of justice.
Antonyms.—Justice, right, benefit.

Inside, interior. The term inside may be applied to bodies of any magnitude, small or large; interior is peculiarly appropriate to bodies of great magnitude. We may speak of the inside of a nutshell but not of its interior. The interior of the church was beautifully decorated.
Antonyms.—Outside, exterior.

Insinuate, ingratiate. A person who insinuates adopts every art to steal into the good will of another; but he who ingratiates adopts natural means to conciliate good will. Both are used in a bad sense.

Insinuation, reflection. An insinuation always deals in half words; a reflection is commonly open. They are both leveled at the individual with no good intent. The insinuation is general and may be employed to convey any unfavorable sentiment; the reflection is particular and commonly passes between intimates and persons in close connection.

Insist, persist. Both these terms express the idea of resting or keeping to a thing; but insist signifies to rest on a point, and persist signifies to keep on with a thing, to carry it through. We insist on a matter by maintaining it; we persist in a thing by continuing to do it.
Antonyms.—Desist, yield, abandon, forego, cease.

Insolvency, failure, bankruptcy. Insolvency is a state; failure, an act flowing out of that state; bankruptcy, an effect of that act. Insolvency is a condition of not being able to pay one's debts; failure is a cessation of business, from the want of means to carry it on; bankruptcy is a legal surrender of all one's remaining goods into the hands of one's creditors, in consequence of a real or supposed insolvency.
Antonyms.—Solvency, soundness.

Instant, moment. A dutiful child comes the instant he is called; a prudent person embraces the favorable moment. When both words have respect to the present time, instant expresses a much shorter space than moment.

Insurrection, sedition, rebellion, revolt. There may be an insurrection against usurped power, which is always justifiable; but sedition and rebellion are leveled against power universally acknowledged to be legitimate. Insurrection is always open,—it is a rising up of many in a mass, but it does not imply any concerted, or any specifically active, measure. Rebellion is the consummation of sedition; the scheme of opposition which has been digested in secrecy breaks out into open hostilities and becomes rebellion. Revolt is mostly taken either in an indifferent or a good sense for resisting a foreign dominion which has been imposed by force of arms, or for sudden rebellion.
Antonyms.—Subjection, obedience, submission, acquiescence, allegiance.

Intellect, genius, talent. Intellect is the power or faculty of knowing, improved by cultivation and exercise,—in this sense we speak of a man of intellect, or of a work that displays great intellect. Genius is the particular bent of the intellect which is born with a man, as a genius for poetry, painting, or music. Talent is a particular mode of intellect which qualifies its possessor to do some things better than others, as a talent for learning languages, a talent for the stage, etc.

Interchange, reciprocity. Interchange is an act; reciprocity is an abstract property. By an interchange of sentiment, friendships are engendered; the reciprocity of good services is what renders them doubly acceptable to those who do them and to those who receive them.

Interest, concern. We have an interest in whatever touches or comes near to our feelings or our external circumstances; we have a concern in that which demands our attention. Interest may be slight or intense; concern implies a serious care about something.
Antonyms.—Indifference, apathy, unconcern, insensibility.

Interval, respite. The term interval respects time only; respite includes the idea of ceasing from action for a time. Intervals of ease are a respite to one who is oppressed with labor.

Intervention, interposition. The light of the moon is obstructed by the intervention of the clouds; the life of an individual is preserved by the interposition of a superior.

Intrude, obtrude. To intrude is to go into any society unasked and undesired; to obtrude is to put oneself in the way of another by joining the company and taking a part in the conversation without invitation or consent.
Antonyms.—Recede, withdraw, remove.

Invalid, patient. An invalid is so called because he lacks his ordinary share of health and strength; the patient is one who is laboring under some bodily suffering for which he is receiving care and treatment.

Invest, endue, or **endow.** One is invested with that which is external; one is endued with that which is internal. We invest a person with an office or a dignity; a person is endued with good qualities. Endow carries the sense of bestowing upon, supplying, or equipping. One may endow a college; a man is richly endowed with intellect or ability; but he is endued with piety or virtue.
Antonyms.—Divest, deprive, strip, dispossess.

Irrational, foolish, absurd, preposterous. Irrational is applicable more frequently to the thing than to the person, to the principle than to the practice. Foolish, on the contrary, is commonly applicable to the person as well as to the thing, to the practice rather than to the principle; absurd is applied to anything, however trivial, which in the smallest degree offends our understanding. The conduct of children is therefore often foolish, but not absurd and preposterous. It is absurd for a man to persuade another to do that which he in like circumstances would object to do himself; it is preposterous for a man to expose himself to the ridicule of others, and then be angry with those who will not treat him respectfully.
Antonyms.—Reasonable, rational, sensible, consistent.

Irreligious, profane, impious. All men who are not positively actuated by principles of religion are irreligious. Profanity and impiety are, however, of a heinous nature; they consist not in the mere absence of regard for religion, but in a positive contempt for it and open outrage against its laws. The profane man treats what is sacred as if it were profane. The impious man is directly opposed to the pious man. The former is filled with defiance and rebellion against his Maker; the latter is filled with love and fear.
Antonyms.—Religious, pious, God-fearing, reverent.

Jealousy, envy, suspicion. We are jealous of what is our own; we are envious of what is another's. Jealousy fears to lose what it has; envy is pained at seeing others have that which it wants for itself. Suspicion denotes an apprehension of injury and has more of distrust in it than jealousy; the suspicious man is altogether fearful of the intentions of another.
Antonyms.—Friendliness, magnanimity, generosity, trust.

Journey, travel, voyage. Journey signifies the course that is taken in the space of a day or, in general, any comparatively short passage from one place to another. Travel signifies such a course or passage as requires labor and causes fatigue; in general, any long course. Voyage is now confined to passages by sea.

Joy, gladness, mirth. What creates joy and gladness is of a permanent nature; that which creates mirth is temporary. Joy is the most vivid sensation in the soul; gladness is the same in quality but inferior in degree. Joy is awakened in the mind by the most important events in life.
Antonyms.—Sorrow, sadness, distress, mourning.

Judgment, discretion, prudence. Judgment is conclusive,—it decides by positive inference, and it enables a person to discover the truth. Discretion is intuitive,—it discerns or perceives what is in all probability right. A person who exercises prudence does not inconsiderately expose himself to danger; a measure is prudent that guards against the chances of evil; the impetuosity of youth naturally impels to imprudence.
Antonyms.—Foolishness, recklessness, injudiciousness.

Justness, correctness. We estimate the value of remarks by their justness, that is, by their accordance to certain admitted principles. Correctness of outline is of the first importance in drawing; correctness of dates enhances the value of a history.
Antonyms.—Looseness, inexactness, inaccuracy, partiality.

Keep, preserve, save. The idea of having in one's possession is common to all these terms, which is, however, the simple meaning of keep. To preserve signifies to keep with care and free from all injury; to save is to keep laid up in a safe place and free from destruction.
Antonyms.—Lose, neglect, waste.

Keeping, custody. Keeping amounts to little more than having purposely in one's possession; but custody is a particular kind of keeping, for the purpose of preventing an escape. Inanimate objects may be in one's keeping; but a prisoner or that which is in danger of getting away is placed in custody.

Know, be acquainted with. We may know things or persons in various ways; we may know them by name only, or we may know their internal properties or characters. One is acquainted with either a person or a thing only in a direct manner, and by an immediate intercourse in one's own person.

Knowledge, science, learning, erudition. Knowledge is a general term which simply implies the thing known; science is the department of systematized knowledge; learning is that kind of knowledge which one derives from schools or through the medium of personal instruction; erudition is scholastic knowledge obtained by profound research.
Antonyms.—Illiteracy, ignorance, smattering.

Land, country. The term land, in its proper sense, excludes the idea of habitation; the term country excludes that of the earth or the parts of which it is composed. Hence we speak of the land as rich or poor according to what it yields; of a country as rich or poor according to what its inhabitants possess.

Large, wide, broad. A field is said to be wide both from its shape and from the extent of its space in the cross directions. In like manner, a house is large from its extent in all directions; it is said to be wide from the extent of its front. What is broad is in sense, and mostly in application, wide.
Antonyms.—Small, narrow, close, confined.

Laudable, praiseworthy, commendable. Things are laudable in themselves; they are praiseworthy or commendable in this or that person. That which is laudable is entitled to encouragement and general approbation. An honest endeavor to be useful to one's family or oneself is at all times laudable. What is praiseworthy obtains the respect of all men.
Antonyms.—Censurable, reprehensible, blameworthy.

Lay or **take hold of, catch, seize, snatch.** To lay or take hold of is here the generic expression; it denotes simply getting into one's possession, which is the common idea in the signification of all these terms, which differ in regard to the motion in which the action is performed. To catch is to lay hold of with an effort; to seize is to lay hold of with violence; to snatch is to lay hold of by a sudden effort.
Antonyms.—Let go, let slip, miss, lose.

Lead, conduct, guide. One leads by helping a person onward in any manner, as to lead a child by the hand; conduct and guide are different modes of leading,—the former by virtue of one's office or authority, the latter by one's knowledge or power, as to conduct an army, to guide a traveler in an unknown country.

Lean, incline, bend. In the proper sense, lean and incline are both said of the position of bodies; bend is said of the shape of bodies. That which leans rests on one side or in a sideward direction; that which inclines, leans or turns only in a slight degree; that which bends, forms a curvature.
Antonyms.—Rise, be erect, straighten.

Leave, quit, relinquish. We leave that to which we may intend to return; we quit that to which we return no more; we relinquish something unwillingly. We leave persons or things; we quit and relinquish things only.
Antonyms.—Stay by, retain, keep, hold.

Leavings, remains. Leavings are the consequence of a voluntary act; they signify what is left. Remains are what follow in the course of things; they are the residue.

Letter, epistle. Letter is a term altogether familiar; it may be used for whatever is written by one friend to another, even those which were written by the ancients, as the letters of Cicero, Atticus, and Pliny. In strict propriety, epistle is more formal than letter. An epistle is a written message or communication usually of serious import; it is applied generally to the ancient letters of sacred character or of literary excellence, as the epistles of St. Paul.

Lift, heave, hoist. We lift with or without an effort; we heave and hoist always with an effort. We lift a child up to let him see anything more distinctly; workmen heave the stones or beams which are used in a building; they hoist materials to the upper parts of the structure.
Antonyms.—Drop, lower, let fall.

Likeness, resemblance, similarity, or **similitude.** Likeness refers to either external or internal properties; resemblance, only to the external properties; similarity applies to the circumstances or properties. We speak of a likeness between two persons, of a resemblance in the cast of the eye, of a similarity in age and disposition. Similitude is a higher term than similarity; it implies a moral comparison, as in a parable.
Antonyms.—Unlikeness, dissimilarity, contrast, difference.

Linger, tarry, loiter, lag, saunter. To linger is to stop altogether, or to move but slowly forward; to tarry is properly to suspend one's movements: the former proceeds from reluctance to leave the spot on which we stand; the latter, from motives of discretion. To loiter is to move slowly and reluctantly. To lag is to move more slowly than others. To saunter is altogether the act of an idler; those who have no object in moving either backward or forward will saunter if they move at all.
Antonyms.—Hasten, hurry, press forward, rush, march.

Little, small, diminutive. What is little is so in the ordinary sense in respect to size; it is properly opposed to great. The small is that which is less than others in point of bulk; it is opposed to the large. The diminutive is that which is less than it ought to be, as a person who is below the ordinary stature is said to be diminutive in stature.
Antonyms.—Large, great, big, huge, immense.

Lodging, apartment. A lodging, or a place to dwell in, comprehends single rooms or many rooms, or in fact any place which can be made to serve the purpose; apartment applies to suites of rooms.

Look, appearance. Look or looks refers to an impression a person or thing makes; appearance implies outward characteristics. He presented a travel-stained appearance, but he had the look of a gentleman.

Lose, miss. What is lost is supposed to be entirely and irrecoverably gone; what is missed may be only out of sight or not at hand at the time when it is wanted.
Antonyms.—Find, hold, have.

Madness, frenzy, rage, fury. Madness is a confirmed derangement in the organ of thought; frenzy is only a temporary derangement from the violence of any disease or from any other cause. Rage refers more immediately to the agitation that exists within the mind; fury refers to that which shows itself outwardly. A person contains or stifles his rage, but his fury breaks out into some external mark of violence.
Antonyms.—Sanity, calmness, patience, self-control.

Magnificence, splendor, pomp. Magnificence lies not only in the number and the extent of the objects presented, but in the degree of richness as to their coloring and quality. Splendor is but a characteristic of magnificence, attached to such objects as dazzle the eye by the quantity of light or by the beauty and strength of coloring. Pomp signifies, in general, formality and ceremony.
Antonyms.—Plainness, meanness, simplicity, somberness.

Make, form, produce, create. To make is the most general and unqualified term; to form signifies to make after a given shape or pattern; to produce is to bring forth into the light, to call into existence; to create is to bring into existence by an absolute exercise of power.

Malevolence, maliciousness, malignity. Malevolence has a deep root in the heart and is a settled part of the character; we denominate the person malevolent, to designate the ruling temper of his mind. Maliciousness may be applied as an epithet to particular parts of a man's character or conduct; one may have a malicious joy or pleasure in seeing the distresses of another. Malignity is not so often employed to characterize the person as to describe the thing; the malignity of a design is estimated by the degree of michief which was intended.
Antonyms.—Good will, kindness, good nature, benevolence.

Manly, manful. Manly, or like a man, is opposed to juvenile, and of course applied properly to youths; manful, or full of manhood, is opposed to effeminate and is applicable more properly to grown persons.
Antonyms.—Boyish, unmanly, womanish, weak.

Manners, morals. Manners applies to the minor forms of acting with others and toward others; morals includes the important duties of life. By an attention to good manners we render ourselves good companions; by an observance of good morals we become good members of society.

Mark, trace, vestige, footstep, track. Mark implies a fresh and uninterrupted line; trace, a more or less temporary mark left by something passing. A carriage driven along the sand leaves marks of the wheels, but in a short time all traces of its having been there will be lost. The vestige is a species of mark or trace caused by the feet of men, or, which is the same thing, by the works of active industry, as the vestiges of buildings. Footstep is employed only for the steps of an individual. The track is made by the steps of many.

Martial, warlike, military, soldierlike. We speak of martial array, martial preparations, martial law, a court-martial, but of a warlike nation, meaning a nation which is fond of war, of a warlike spirit or temper, or a warlike appearance. We speak of military in distinction from naval, as military expeditions, military movements, and the like. The conduct of an individual is soldierlike or otherwise.
Antonyms.—Peaceful, unwarlike, civilian, unsoldierly.

Meeting, interview. Meeting is the act of coming into the company of anyone; interview is a personal conference, usually a formal meeting for consultation, as an interview with the president. A meeting is an ordinary concern and its purpose familiar; meetings are daily taking place between friends.

Memory, remembrance, recollection, reminiscence. Memory is the power of recalling images once made in the mind; remembrance is the exercise of memory by a conscious agent, and may be the effect of repetition or of habit; recollection carries us back to distant periods. Reminiscence implies a rather indefinite recalling of past experiences.
Antonyms.—Forgetfulness, oblivion.

Mercantile, commercial. Mercantile applies to the actual transaction of business or to a transfer of merchandise by sale or by purchase. Commercial comprehends the theory and practice of exchange; hence we speak in a peculiar manner of a mercantile house, a mercantile situation, and the like, but of a commercial education, a commercial people, and the like.

Mix, mingle, blend, confound. Mix is here a general and indefinite term, signifying simply to put together, but we may mix two or several things. We mingle several objects; things are mixed so as to lose all distinction, but they may be mingled and yet retain a distinction. To blend is only partially to mix, as colors blend which shade into each other. To confound is to mix in a wrong way, as separate objects of sight are confounded when they are erroneously taken to be joined.
Antonyms.—Distinguish, separate, segregate, sort.

Modesty, bashfulness, diffidence. Modesty is a proper distrust of ourselves; bashfulness is a state of feeling which betrays itself in a downcast look or a timid air; diffidence is a culpable distrust. Diffidence altogether unmans a person and disqualifies him for his duty.
Antonyms.—Boldness, self-confidence, forwardness, egotism.

Moisture, humidity, dampness. Moisture is used in general to express any small degree of infusion of a liquid into a body; humidity is employed scientifically to describe the state of holding any portion of such liquid. Hence we speak of moisture on a table, moisture on paper, but of the humidity of the air. Dampness is the popular term for the condition resulting from a permeating of a substance by moisture, as a wall or the earth may be damp.
Antonyms.—Aridity, drought, dryness.

Money, cash. Money is applied to everything which serves as a circulating medium; cash is, in ordinary use, coin or paper, legal tender, actually in hand for use.

Motion, movement. We speak of a state of motion as opposed to a state of rest, of perpetual motion, the laws of motion, and the like. On the other hand, we use movement generally in speaking of change of position, as an upward movement, a person's movements. As applied to a person, motion implies gesture.
Antonyms.—Rest, quiet, pause.

Moving, affecting, pathetic. The good or bad feelings may be moved; the tender feelings only are affected. A field of battle is a moving spectacle; the death of a friend is an affecting spectacle. The pathetic applies only to what is addressed to the heart; hence an address is pathetic.

Name, call. Name is employed for distinguishing or addressing one by name. To call signifies properly to address one loudly; consequently, we may name without calling, when we only mention a name in conversation, and we may call without naming.

Native, natural. Of a person we may say that his worth is native, to indicate that it is some valuable property which is born with him; we may say that it is natural, as opposed to that which is acquired.
Antonyms.—Acquired, adventitious, affected.

Necessity, necessary. Necessity is the quality or state of circumstances or things that admits of no choice or alternative; the necessary is that which is absolutely and unconditionally indispensable for some end or purpose.
Antonyms.—Choice, contingency, freedom, possibility.

Neglect, omit. To neglect is to disregard, to treat with little or no attention or respect; to omit is to leave out, to leave unnoticed or undone. We neglect an opportunity, we neglect the means, the time, the use, and the like; we omit a word, a sentence, or a figure, and we may omit an item from the day's work. To omit does not always involve the censure that attends neglect.
Antonyms.—Attend to, notice, grasp, insert.

Neighborhood, vicinity. Neighborhood is employed in reference to the inhabitants, or in regard to inhabited places, to denote nearness of persons to each other or to objects in general; but vicinity is employed to denote nearness of one object to another, whether person or thing.

New, novel, modern, fresh, recent. All these epithets are applied to what has not long existed. New expresses this idea simply without any qualifications; novel is something strange or unexpected; the modern is the thing of today, as distinguished from that which existed in former times; the fresh is that which is so new as not to be the worse for use, or that which has not been before used or employed; the recent is that which is so new as to appear as if it were just made or done.
Antonyms.—Old, familiar, accustomed, ancient, stale.

News, tidings, information, intelligence, advice, notice. News is the general term for communicated knowledge of happenings. Tidings is used poetically in the same sense. Information implies knowledge of some particular thing or event. Intelligence implies that the knowledge has been gained systematically or through organized agencies. Advice in this sense is a formal, an official, or a business term. Notice involves announcement, especially of a formal nature.

Nominate, name. To nominate and to name are both to mention by name. The former is to mention for a specific purpose; the latter is to mention for general purposes. Persons only are nominated; things as well as persons are named. One nominates a person in order to propose him, or appoint him, to an office; but one names a person casually, in the course of conversation, or one names him in order to make some inquiry respecting him.

Notice, remark, observe. To notice is a more cursory action than to remark; we may notice a thing by a single glance, or on merely turning the head. To remark supposes a reaction of the mind on an object. We observe things in order to judge of, or draw conclusions from, them, as to observe the condition of the weather. We remark things as matters of fact, as to remark the manner of a speaker.
Antonyms.—Overlook, pass over, disregard, slight.

Numeral, numerical. Numeral, or belonging to number, is applied to a class of words in grammar, as a numeral adjective or a numeral noun. Numerical, or containing number, is applied to whatever involves number or calculation of numbers, as a numerical difference, where there is a difference between any two numbers or a difference expressed by numbers.

Obedient, submissive, obsequious. One is obedient to command, submissive to power or the will, obsequious to persons. Obedient is always taken in a good sense; submissive, in a humble sense; obsequious, in a mean sense.
Antonyms.—Rebellious, stubborn, recalcitrant, self-respecting.

Object, oppose. To object to a thing is to propose or start something against it; but to oppose it is to set oneself up steadily against it.
Antonyms.—Support, maintain, promote, encourage.

Obnoxious, offensive. In the sense of giving offense, obnoxious implies as much as hateful, offensive little more than displeasing. A man is obnoxious to a party, whose interest or principles he is opposed to; he may be offensive to an individual merely on account of his manners or on account of any particular actions.
Antonyms.—Acceptable, agreeable, pleasing, attractive.

Occasion, opportunity. The occasion is that which offers us the possibility of doing an act or the chance of giving rise to a result. The opportunity is that which invites to action—it tempts us to embrace the moment for taking the step.

Occasional, casual. Occasional carries with it the idea of infrequency; casual, that of unfixedness or the absence of all design. Our acts of charity may be occasional, but they ought not to be casual.
Antonyms.—Regular, systematic, frequent, periodic.

Offender, delinquent. Those who do forbidden or prohibited acts are offenders; those who fail in required or prescribed conduct are delinquents.

Offspring, progeny, issue. Offspring is a familiar term applicable to one or many children; progeny is employed only as a collective noun for a number; issue is used in an indefinite manner without particular regard to number. When we speak of the children themselves we call them

the offspring; when we speak of the parents we call the children their progeny. Issue is used only in regard to a man that is deceased.

Antonyms.—Parents, parentage, stock.

Opinionated, conceited, egotistical. An opinionated man is not only fond of his own opinion but full of his own opinion; he has an opinion on everything, which is the best possible opinion. A conceited man has an inordinately high opinion of his own talent,—it is not only high in competition with others, but it is so high as to be set above others. The egotistical man makes himself the darling object of his own contemplation; he admires and loves himself to such a degree that he can talk and think of nothing else.

Antonyms.—Modest, generous, simple, unassuming.

Option, choice. The option or the power of choosing is given; the choice itself is made. Hence we say a thing is at a person's option, or it is his own option, or the option is left to him, in order to designate his freedom of choice more strongly than the word choice itself expresses it.

Antonyms.—Necessity, compulsion.

Outward, external, exterior. Outward signifies tending out from or appearing on the outside. Exterior applies to the outer side or face, as the exterior of a building. External adds to the idea of exterior the notion of whatever is outside and separate from a thing.

Antonyms.—Inward, internal, interior.

Paint, depict. To paint is employed either literally to represent figures on paper, or to represent circumstances and events by means of words; to depict is used mostly in this latter sense, but the former word expresses a greater exercise of the imagination than the latter. It is the art of the poet to paint nature in lively colors; it is the art of the historian or the narrator to depict in strong colors a real scene of misery.

Part, piece, patch. Things may be divided into parts without any express separation; but when divided into pieces they are actually cut asunder. Hence we may speak of a loaf as divided into twelve parts when it is only conceived to be so, and divided into twelve pieces when it is really so. The patch is that which is always broken and disjointed, a something imperfect; many things may be formed out of a piece, but the patch serves only to fill up a rent or break.

Particular, individual. Particular is much more specific than individual. The particular confines us to one object only of many; the individual may be any one object among many.

Antonyms.—General, collective, common.

Peace, quiet, calm, tranquillity. Peace implies an exemption from public or private broils; quiet implies a freedom from noise or interruption. Calm is a form of quiet which applies to objects in the natural or the moral world; it indicates the absence of violent motion as well as violent noise; it is that state which more immediately succeeds a state of agitation. Tranquillity expresses the situation as it exists in the present moment, independently of what goes before or after; it is sometimes applicable to society, sometimes to natural objects, and sometimes to the mind.

Antonyms.—War, disturbance, noise, commotion, storm, violence.

Pellucid, translucent, transparent. Pellucid is a word of poetic use, implying a crystal clearness, as of a clear stream. A substance is translucent which permits the passage of light but does not permit objects to be seen through it. A substance through which objects can be seen is transparent.

Antonyms.—Turbid, unclear, opaque.

Penurious, economical, saving, sparing, thrifty, niggardly. To be economical is a virtue in those who have but narrow means. Saving implies care in the use of money. To be sparing is to use frugally or stintingly; thrifty suggests careful management; penurious means miserly or sparing in regard to the use of money; niggardly implies spending grudgingly or letting go in the smallest possible quantities.

Antonyms.—Generous, lavish, extravagant, unthrifty, wasteful.

Perpetrate, commit. One may commit offenses of various degrees and magnitude; but one perpetrates crimes only, and those of the more heinous kind.

Pillar, column. The word pillar is the more general in its application to any structure, whether rude or otherwise; the term column, on the other hand, is applied to whatever is ornamental, as the columns in the Grecian orders.

Piteous, doleful, woeful, rueful. Piteous is applicable to one's external expression of bodily or mental pain; a child makes piteous lamentations when it suffers from hunger or has lost its way. Doleful applies to those sounds which convey the idea of pain; there is something doleful in the tolling of a funeral bell or in the sound of a muffled drum. Woeful applies to the circumstances and situations of men; a scene is woeful in which we witness a large family of young children suffering under the complicated horrors of sickness and want. Rueful applies to the outward indications of inward sorrow depicted in the looks or countenance.

Antonyms.—Happy, joyous, merry, cheerful.

Pity, compassion. Pity is excited principally by the weakness or degraded condition of the subject; compassion, by his uncontrollable and inevitable misfortunes.

Antonyms.—Pitilessness, hardness, antipathy.

Playful, gamesome, sportive. Playful is applicable to youth or childhood, when there is the greatest disposition to play. Gamesome and sportive are applied to persons of maturer years, the former in the bad sense, and the latter in the good sense. A person may be said to be gamesome who gives in to idle jests, or sportive who indulges in harmless sport.

Antonyms.—Sober, dull, serious, gloomy.

Poise, balance. To poise is properly to keep the weight from pressing on either side; to balance is to adjust or equalize two forces. The idea of bringing into an equilibrium is common to both terms. A thing is poised as respects itself; it is balanced as respects other things.

Antonyms.—Mispoise, unbalance, tilt, upset.

Poison, venom. Poison is the general word for substances deadly when introduced into the human system. Venom now means the particular poison of serpents, etc. It applies figuratively to hatred or malignity as blighting to life.

Politeness, polish, refinement. Politeness and polish do not extend to anything but externals; refinement applies as much to the mind as to the body. Rules of conduct and contact with good society will make a man polite; lessons in dancing will serve to give a polish; refined manners or principles will naturally arise out of refinement in mind.

Antonyms.—Impoliteness, rudeness, crudity, boorishness.

Pour, spill, shed. We pour with design; we spill by accident. We pour water over a plant or a bed; we spill it on the ground. Shed is applied specifically to blood and tears; it is also sometimes used of clouds.

Powerful, potent, mighty. Powerful is applicable to strength as well as to power: a powerful man is one who by size and make can easily overpower another; a powerful person is one who has much in his power. Potent is used only in this latter sense, in which it expresses a larger extent of power; a potent monarch is much more than a powerful prince. Mighty expresses a still higher degree of power; might is power unlimited by any consideration or circumstance. A giant is called mighty in the physical sense; genius which takes everything within its grasp is said to be mighty.

Antonyms.—Weak, impotent, powerless, feeble.

Press, squeeze, pinch, grip. The forcible action of one body on another is included in all these terms. In the word press this is the only idea; the rest differ in the circumstances. We may press with the foot, the hand, or any particular limb. One squeezes commonly with the hand. One pinches either with the fingers or with an instrument constructed in a similar form; one grips with teeth, claws, or any instrument that can gain hold of the object.

Antonyms.—Ease, let go, relieve, relax.

Presumptive, presumptuous, presuming. A presumptive heir is one presumed or expected to be heir; presumptive evidence is evidence founded on some presumption or supposition; so likewise presumptive reasoning. But a presumptuous man, a presumptuous thought, a presumptuous behavior, all indicate an overconfidence in regard to one's own powers; a man is presuming when he is disposed to take unwarranted liberties.

Previous, preliminary, preparatory, introductory. Previous applies to actions and proceedings in general, as a previous question, a previous inquiry, a previous determination. Preliminary is employed only for matters of contract; a preliminary article and a preliminary condition are what precede the final settlement of any question. Preparatory is employed for matters of arrangement; the disposing of men in battle is preparatory to an engagement. Introductory is employed for matters of science or discussion; remarks are introductory to the main subject in question.

Antonyms.—Following, succeeding, concluding, final.

Principle, motive. The principle lies in conscious and unconscious agents; the motive, only in conscious agents. All nature is guided by certain principles; man is put into action by certain motives.

Privacy, retirement, seclusion. Privacy is opposed to publicity; he who lives in privacy is one who follows no public line, who lives so as to be little known. Retirement is opposed to openness or freedom of access: he who lives in retirement withdraws from the society of others; he lives by himself. Seclusion is the excess of retirement: he who lives in seclusion bars all access to himself and shuts himself from the world.

Antonyms.—Publicity, prominence, notoriety.

Proceeding, transaction. Proceeding signifies literally going forward; transaction, the thing carried through. The former implies therefore something that is going forward; the latter, something that is already done. We are witnesses to the whole proceeding; we inquire into the whole transaction.

Production, performance, work. The term production cannot be employed without specifying or referring to the source from which it is brought forth or the means by which it is brought forth, as the production of art, the production of the inventive faculty. A performance cannot be spoken of without referring to the individual by whom it has been executed; hence we speak of this or that person's performance. When we wish to specify anything that results from work or labor, it is termed a work; in this manner we speak either of the work of one's hands, or of a work of the imagination.

Profligate, abandoned, reprobate. A profligate man has lost all by his vices, and consequently to his vices alone he looks for regaining the goods or the fortune which he has squandered; as he has nothing to lose and everything to gain in his own estimation by pursuing the career of his vices, he surpasses all others in his unprincipled conduct. An abandoned man gives way to his passions, which, having the entire sway over him, naturally impel him to every excess. The reprobate man is one who has been reproved until he becomes insensible to reproof, and becomes a prey to the malignity of his own vices.

Antonyms.—Virtuous, high-principled, self-controlled, conscientious.

Prominent, conspicuous. What is prominent is, in general, on that very account conspicuous; but many things may be conspicuous which are not expressly prominent. Nothing is prominent except that which projects beyond a certain line; everything is conspicuous which may be seen by many. A man is prominent by reason of an outstanding place in a community; his services might be conspicuous by reason of their difference from those of others.

Antonyms.—Ordinary, insignificant, unimportant, trivial.

Promise, engagement, word. In promises the faith of an individual is admitted upon his word, and built upon as if it were a deed; in engagements the intentions of an individual for the future are all that are either implied or understood. As a promise and an engagement can be made only by words, word is often used for either, or for both, as the case requires.

Proportionate, commensurate, adequate. Proportionate implies an adaptation to some assumed proportion, as a reward may be proportionate to an act. Commensurate connotes greater accuracy of measurement, as a man's powers may be commensurate with his task. Adequate signifies sufficient, without the implications of the other words.

Antonyms.—Disproportionate, incommensurate, unequal, inadequate.

Provide, procure, furnish, supply. Provide and procure are both actions that have a special reference to the future; furnish and supply are employed for that which is of immediate concern. One provides a dinner in the contemplation that some persons are coming to partake of it; one procures help in the contemplation that it may be wanted. We furnish materials for a building as they are needed. One supplies a family with any article of domestic use.

Antonyms.—Miss, fail of, withhold, deprive of.

Publish, promulgate, divulge, reveal, disclose. To publish is the most general of these terms, conveying in its extended sense the idea of making known; it is in many respects indefinite,—we may publish to many or few. To promulgate is always to make known to many. We may publish that which is a domestic or a national concern; we promulgate properly only that which is of general interest; we divulge things intended to be kept secret; we commonly divulge the secrets or the crimes of another; we reveal the secret or the mystery of a transaction; we disclose from beginning to end an affair which has never before been known or accounted for.

Antonyms.—Hide, conceal, suppress, hush up.

Put, place, lay, set. To put is a general term meaning to bring to a position,—we may put a thing into one's room, one's desk, one's pocket, and the like. To place is to put in a specific manner, and for a specific purpose, as one places a book on a shelf. To lay and to set are still more specific than place, the former being applied only to such things as can be made to lie, and set only to such as can be made to stand. A book may be said to be laid on the table when placed in a downward position, and set when placed on one end.

Antonyms.—Take up, move, remove, disturb.

Qualification, accomplishment. The qualification serves the purpose of utility; the accomplishment serves to adorn. By the first we are enabled to make ourselves useful; by the second we are enabled to make ourselves agreeable.

Quarrel, broil, feud. Quarrel is the general and ordinary term; broil and feud, including active hostility, are particular terms. The idea of a variance between two or more persons is common to these terms; but the first involves the complaints and charges which are reciprocally made. Broil implies the confusion and the entanglement which arise from a contention and a collision of interests; feud, the mutual hostilities which arise out of the variance.

Question, query. Questions and queries are both put for the sake of obtaining an answer. A question may be for a reasonable or an unreasonable cause; a query is mostly a rational question. Idlers may put questions from mere curiosity; learned men put queries for the sake of information.

Antonyms.—Answer, reply, response.

Radiance, brilliancy. Radiance denotes the emission of rays and is therefore peculiarly applicable to bodies naturally luminous, like the heavenly bodies; brilliancy denotes the whole body of light emitted, and it may therefore be applied equally to natural and artificial light. Radiance implies the activity of the shining source of light; figuratively we speak of a radiant face or personality. Brilliancy applies specifically to the appearance; figuratively we speak of a brilliant wit.

Antonyms.—Dullness, murkiness, darkness, dimness.

Rapacious, ravenous, voracious. Rapacious is the quality peculiar to beasts of prey, or to what is like beasts of prey. A lion is rapacious when it seizes on its prey; it is ravenous in the act of consuming it. The word ravenous respects the haste with which one eats; the word voracious respects the quantity which one consumes. A ravenous person is loath to wait for the dressing of his food; he consumes it without any preparation. A voracious person not only eats in haste, but he consumes great quantities, and continues to do so for a long time.

Antonyms.—Frugal, fastidious, dainty.

Rashness, temerity, haste, precipitancy. Rashness is a general and indefinite term, in the signification of which an improper celerity is the leading idea; in the signification of temerity the leading idea is want of consideration, springing mostly from an overweening confidence, or from a presumption of character. Haste and precipitancy are but modes or characteristics of rashness and are consequently employed only in particular cases, as haste in regard to our movements and precipitancy in regard to our measures.

Antonyms.—Prudence, deliberation, caution, circumspection.

Ready, prompt, apt. Ready is in general applied to that which has been intentionally prepared for a given purpose; prompt is applied to that which is at hand so as to answer the immediate purpose; apt is applied to that which is fit, or from its nature has a tendency to produce effects.

Antonyms.—Unprepared, unfit, dilatory, unavailable.

Reclaim, reform. Reclaim signifies to call back to its right place that which has gone astray; reform signifies to form anew that which has changed its form; the words are allied only in their application to the moral character. A man is reclaimed from his vicious courses by the force of advice or exhortation; he may be reformed by various means, external or internal.

Antonyms.—Corrupt, degrade, impair, vitiate, confirm.

Recover, retrieve, repair, recruit, restore. We repair that which has been injured; we recruit that which has been diminished; we recover that which has been taken away; we retrieve our misfortunes or our lost reputation; we restore that which has been lost or misplaced, as health or money.

Antonyms.—Lose, lessen, wreck, diminish, injure.

Reform, reformation. Whatever undergoes such a change as to give a new form to an object occasions a reform; when such a change is produced in the moral character, it is termed a reformation. The concerns of a state require occasional reform; those of an individual require reformation.

Refuse, decline, reject, repel, rebuff. We refuse what is asked of us, for want of inclination to comply; we decline what is proposed, from motives of discretion;

we reject what is offered to us, because it does not fall in with our views. To repel is to reject with violence; to rebuff is to refuse with contempt or with what may be considered as such.
Antonyms.—Accept, receive, acquiesce, comply, welcome.

Relax, remit. In regard to our attempts to act, we may speak of relaxing our endeavors and remitting our labors or exertions; in regard to our dealings with others, we may speak of relaxing in discipline, of relaxing in the severity or strictness of our conduct, and of remitting a punishment or a sentence.
Antonyms.—Intensify, maintain, exact, enforce.

Repeat, recite, rehearse, recapitulate. To repeat is to say or utter again; to recite is to repeat in a formal manner; to rehearse is to repeat or recite by way of preparation; to recapitulate is to repeat the chapters or principal heads of any discourse.

Repress, restrain, restrict, suppress. Repress implies usually a temporary holding back of something from action; restrain is a stronger word, frequently implying physical force and more permanent holding back. Restrict adds to restrain the idea of bounds within which the restricted activity is free. Suppress implies permanent repression or stifling of activity.
Antonyms.—Release, loose, arouse, set free, incite.

Reproach, contumely, obloquy. The idea of contemptuous or angry treatment of others is common to all these terms; reproach is the general term, contumely and obloquy are the particular terms. Reproach is either deserved or undeserved; the name of Puritan is applied as a term of reproach to such as affect greater purity than others. Contumely is always undeserved; it is the insolent resistance to authority. Obloquy is always supposed to be deserved; it is applicable to those whose conduct has rendered them objects of general censure, and whose name, therefore, has almost become a reproach.
Antonyms.—Praise, sanction, commendation, honor, laudation.

Reputation, fame, renown. Reputation is the estimate formed by others. It may be good or bad. Fame often means widespread reputation. Renown is both widespread and favorable.
Antonyms.—Ignominy, infamy.

Restore, return, repay. We restore upon a principle of equity; we return upon a principle of justice and honor; we repay upon a principle of undeniable right. We cannot always claim that which ought to be restored; but we cannot only claim but enforce the claim in regard to what is to be returned or repaid.
Antonyms.—Withhold, retain, default.

Retard, hinder. We retard or make slow the progress of any scheme toward completion; we hinder or keep back the person who is completing the scheme. We often retard a person, therefore, by hindering his progress; but we frequently hinder a person without expressly retarding him.
Antonyms.—Accelerate, advance, further, help.

Right, claim, privilege. Right, in its full sense, is altogether an abstract thing which is independent of human laws and regulations; claims and privileges are altogether connected with the establishments of civil society. We have often a claim to a thing which is not in our power to substantiate; and, on the other hand, claims are set up in cases which are totally unfounded on any right. Privileges are rights granted to individuals, depending either on the will of the grantor, on the circumstances of the receiver, or on both; privileges are, therefore, partial rights transferable at the discretion of persons individually or collectively.
Antonyms.—Duty, obligation, responsibility.

Royal, regal, kingly. Royal signifies belonging to a king, in its most general sense; regal signifies appertaining to a king, in its particular application; kingly properly signifies like a king. A royal carriage, a royal residence, royal authority—all designate the general and ordinary appurtenances of a king. Regal government, regal state, regal power, denote the peculiar properties of a king; kingly always implies what is becoming a king, or after the manner of a king—a kingly crown is such as a king ought to wear.

Rural, rustic. Rural applies to all country objects except man; it is, therefore, often connected with the charms of nature. Rustic, as here compared, applies only to persons or to what is personal, with reference to the country—it is generally associated with the want of culture.
Antonyms.—Urban, refined, cultured, urbane.

Safe, secure. We may be safe without using any particular measures; but none can reckon on any degree of security without great precaution. A person may be very safe on the top of a coach; but, if he wish to be secure from falling off, he must be fastened.
Antonyms.—Unsafe, insecure, endangered.

Salute, salutation, greeting. A salute may consist of either a word or an action; salutations pass from one friend to another. The salute may be either direct or indirect; the salutation is always direct and personal. Guns are fired by way of a salute. Bows are given in the way of a salutation. Greeting is frequently a particular mode of salutation adopted on extraordinary occasions, indicative of great joy or satisfaction in those who greet.

Satisfy, please, gratify. What satisfies is not always adapted to please; nor is that which pleases that which will always satisfy: plain food satisfies a hungry person; it does not please him when he is not hungry. To gratify is to please in a high degree, to produce a vivid pleasure; we may be pleased with trifles; but we are commonly gratified with such things as act strongly either on the senses or the affections.
Antonyms.—Displease, offend, disgust, anger.

Seaman, waterman, sailor, mariner. All these words denote persons occupied in navigation. The seaman, as the word implies, follows his business on the sea; the waterman is one who gets his livelihood on fresh water. The sailor and the mariner are both specific terms to designate the seaman; every sailor and every mariner is a seaman, although every seaman is not a sailor or a mariner. The former is one who is employed about the work of the vessel; the latter is one who traverses the ocean to and fro, and passes his life upon it.

Secret, hidden, latent, occult, mysterious. What is secret is known to some one; what is hidden may be known to no one. It rests in the breast of an individual to keep a thing secret; it depends on the course of things if anything remains hidden. The latent is the secret or the concealed, especially forces which give no hint of their presence by external appearances; a latent fury may exist in an apparently gentle tiger. An occult science is one that is hidden from the view of persons in general, and is attainable by but few; occult causes or qualities are those which lie too remote to be discovered by the inquirer. The operations of Providence are said to be mysterious, as they are altogether past our finding out.
Antonyms.—Open, revealed, evident, plain, understandable.

See, perceive, observe. The eye sees when the mind is absent; the mind and the eye or other senses perceive in conjunction. Hence, we may say that a person sees, but does not perceive. We observe not by a mere simple act of the mind, but by its positive and fixed exertion.

Seem, appear. Seem is said of that which is dubious, contingent, or future; appear, of that which is actual, positive, and past. A thing seems strange which we are led to conclude is strange from what we see of it; a thing appears clear when we have a clear conception of it.

Sensualist, voluptuary, epicure. The sensualist lives for the indulgence of his senses; the voluptuary is devoted to his pleasures, and, as far as these pleasures are the pleasures of sense, the voluptuary is a sensualist. The epicure is one who makes the pleasures of sense his god, and in this sense he is a sensualist and a voluptuary. In the application of these terms, however, the sensualist is one who is a slave to the grossest appetites; the voluptuary is one who studies his pleasures so as to make them the most valuable to himself; the epicure is a kind of voluptuary who practices more than ordinary refinement in the choice of his pleasures, especially of food.
Antonyms.—Stoic, ascetic, hermit.

Servant, domestic, menial, drudge. In the term servant is included the idea of service performed; in the term domestic, the idea of one belonging to the house or family; in the word menial is included the idea of servile labor; and in the term drudge, that of wearisome labor.
Antonyms.—Master, mistress, employer, boss.

Shade, shadow. Both these terms express that darkness which is occasioned by the sun's rays being intercepted by any body; shade simply expresses the absence of light; shadow signifies also the figure of the body which intercepts the light.
Antonyms.—Light, brightness, sunshine.

Sharp, acute, keen. The general property expressed by these epithets is that of sharpness, or an ability to cut. The term sharp is generic and indefinite; the two others are modes of sharpness differing in circumstance or in degree. Acute is not only more than sharp in the common sense, but signifies also sharp-pointed; a knife may be sharp, but a needle is properly acute. Things are sharp that have either a long or a pointed edge; but keen is applicable only to the long edge, and that in the highest degree of sharpness. A common knife may be sharp; a razor or a lancet is properly said to be keen. All these words are applied figuratively to mental ability, their meanings corresponding to their literal senses.
Antonyms.—Dull, blunt, obtuse.

Short, brief, concise, succinct, summary. We may term a stick, a letter, or a discourse, short. We speak of brevity only in regard to the mode of speech. Conciseness or succinctness applies to the matter of speech; summary, to the mode either of speaking or of acting.

Antonyms.—Long, prolix, full, diffuse, extended, developed, detailed.

Show, exhibition, representation, sight, spectacle. A show consists of that which merely pleases the eye—it is not a matter either of taste or art, but merely of curiosity. An exhibition, on the contrary, presents some effort of talent or some work of genius; a representation sets forth the image or imitation of something by the power of art. Hence we speak of a show of wild beasts, an exhibition of paintings, and a theatrical representation; sights and spectacles present themselves to view. Whatever excites notice is a sight; a spectacle, on the contrary, is that kind of sight which has something in it to interest either the heart or the head of the observer. Processions are sights; battles or bullfights are spectacles.

Sick, sickly, diseased, morbid. Sick denotes a partial state; sickly, a permanent state of the body, a proneness to be sick. He who is sick may be made well; but he who is sickly is seldom really well. Sickly expresses a permanent state of indisposition unless otherwise qualified; but diseased expresses a violent state of derangement without specifying its duration. Sickly and morbid are applied to the habitual state of the feelings or character: a sickly sentimentality; a morbid sensibility. Morbid is used in no other sense, except technically.

Antonyms.—Well, healthy, whole, cheerful.

Sign, signal. The sign enables us to recognize an object; it is, therefore, sometimes natural. Signal serves to give warning; it is always arbitrary.

Simple, single, singular. We may speak of a simple matter as something easily grasped or understood. A single instance or circumstance is unaccompanied by any other; a singular instance is one that rarely has its like.

Antonyms.—Complex, complicated, accompanied, common.

Simulation, dissimulation. Simulation is making oneself like what one is not; dissimulation is making oneself appear unlike what one really is. The hypocrite puts on the semblance of virtue to recommend himself to the virtuous; the dissembler conceals his vices when he wants to gain the simple or the ignorant to his side.

Antonyms.—Truth, frankness, sincerity, ingenuousness.

Slack, loose. Slack is said only of that which is tied, or of that with which anything is tied; loose is said of any substances, the parts of which do not adhere closely.

Antonyms.—Taut, tight, stretched, compact.

Slant, slope. Slant is said of small bodies only; slope is said indifferently of all bodies, large and small. A book may be made to slant by lying in part on another book on a desk or a table; but a piece of ground is said to slope.

Antonyms.—Be perpendicular, erect, level.

Slip, slide, glide. Slip is an involuntary, and slide a voluntary, motion. Those who go on the ice in fear will slip; boys slide on the ice by way of amusement. To slip and slide are lateral movements of the feet; but to glide is the movement of the whole body, and just that easy motion which is made by slipping, sliding, flying, or swimming. A person glides along the surface of the ice when he slides; a vessel glides along through the water.

Soak, drench, steep. A person's clothes are soaked in rain when the water has penetrated every thread; he himself is drenched in the rain when it has penetrated, as it were, his very body. Steep respects a manner of soaking employed as an artificial process. Soak is, however, a permanent action by which hard things are rendered soft; steep is a temporary action by which soft bodies become penetrated with a liquid. Dried fruits are prepared for eating by soaking; herbs are steeped to extract their essences or flavors.

Antonyms.—Dry, dehydrate, desiccate, evaporate.

Social, sociable. Social people seek others; sociable people are sought for by others.

Antonyms.—Solitary, retiring, uncompanionable.

Solicitation, importunity. Solicitation is general; importunity is particular. Solicitation itself may give trouble to a certain extent, but it is not always unreasonable; importunity is troublesome, insistent solicitation. There may be cases in which we may yield to the solicitations of friends, to do that which we have no objection to being obliged to do; but importunity is that solicitation which never ceases to apply for that which it is not agreeable to give.

Solitary, desert, desolate. Solitary simply denotes the absence of all beings of the same kind—a place is solitary to a man where there is no human being but himself. Desert conveys the idea of a place made solitary by being shunned, because of its unfitness as a place of residence. Desolate conveys the idea of a place made solitary or bare of inhabitants and of all traces of habitation by violent means.

Antonyms.—Populous, peopled, cultivated, inhabited, fruitful.

Sound, sane, healthy. Sound is extended in its application to all things that are in the state in which they ought to be to preserve their vitality. A horse is said to be sound in mind and limb; a tree is sound when not decayed in any part. Healthy expresses more than either sound or sane; we are healthy in every part, but we are sound in that which is essential to life. He who is sound may live, but he who is healthy enjoys life. Sane is applicable to human beings, in the same sense, but with reference to the mind; a sane person is one of sound mind.

Antonyms.—Decayed, diseased, flawed, corrupt.

Speak, say, tell. To speak may simply consist in uttering an articulate sound; but to say is to communicate some idea by means of words. A child begins to speak the moment it opens its lips to utter any acknowledged sound; but it will be some time before it can say anything. To say is to communicate that which passes in our own minds, to express our ideas and feelings as they rise. To tell is to communicate events or circumstances respecting ourselves or others.

Spread, expand, diffuse. To spread may be said of anything which comes to occupy more space than it has done, whether by a direct separation of its parts or by an accession to the substance; but to expand is to spread by means of extending or unfolding the parts. A mist spreads over the earth; a flower expands its leaves. To diffuse is to scatter, to cause to spread, as to diffuse information.

Antonyms.—Contract, condense, restrict, close, draw in.

Staff, stay, prop, support. Anything may be called a staff which holds up after the manner of a staff, particularly as it relates to persons, as bread is said to be the staff of life. The stay makes a thing secure for the time being—it keeps it in its place. A prop is usually of a temporary nature; a support is more permanent. Every pillar on which a building rests is a support; the timbers which keep a damaged structure from falling are props. Whatever supports, that is, bears the weight of an object, is a support, whether in a state of motion, like a staff, or in a state of rest, like a stay or a prop.

Stain, soil, sully, tarnish. All these terms imply the act of diminishing the brightness of an object, but the term stain denotes something grosser than the other terms, and is applied to inferior objects. Things which are not remarkable for purity or brightness may be stained, as hands when stained with blood. Nothing is sullied or tarnished but what has some intrinsic value. A fine picture or piece of writing may be easily soiled by a touch of the finger. The finest silver is the soonest tarnished; a man's life may be stained by the commission of some gross immorality; his honor may be sullied, or his glory tarnished.

Antonyms.—Cleanse, clean, brighten, polish, clear.

State, realm, commonwealth. The ruling idea in the sense and application of the word state is that of government in its most abstract sense; affairs of state may involve either the internal regulations of a country or the arrangements of different states with each other. The term realm is employed for the nation at large, but it is confined to such nations as are monarchical. The term commonwealth refers rather to the aggregate body of men, their possessions and common interests, than to the government of a country.

Stir, move. We may move in any manner, but to stir is to move so as to disturb the rest and composure of either the body or the mind.

Story, tale. Story is an account of events either real or fictitious. Children often use story to mean falsehood. Tale is used of a longer, more wandering narrative, frequently in the sense of a deceptive or malicious account. Implying the evil sense, we say that one should not tell tales and that one has made up a story.

Stream, current, tide. All rivers are streams, more or less gentle according to the nature of the ground through which they pass. The force of the current is very much increased by the confinement of any water between rocks, or between artificial embankments. The tide is high or low, strong or weak, at different hours of the day; when the tide is high, the current is strongest. Stream is the general term implying flow; current implies a more or less definite direction and rate of flow; tide applies to a regular flow, alternating in direction. In these senses the words are applied figuratively to human affairs.

Strengthen, fortify, invigorate. Whatever adds to the strength, be it in ever so small a degree, strengthens; exercise strengthens either body or mind. Whatever gives strength for a particular emergency fortifies; religion fortifies the mind against adversity. Whatever adds to the strength, so as to give a positive degree of strength, invigorates—morning exercise in fine weather invigorates.
Antonyms.—Weaken, enfeeble, enervate.

Strict, severe. He who has authority over others must be strict in enforcing obedience, in keeping good order, and in encouraging attention to duty; but it is possible to be very severe in punishing those who are under us, and yet to be very lax in all matters that our duty demands of us.
Antonyms.—Lax, indulgent, mild, compliant.

Successive, alternate. The successive may be accidental or intentional; the alternate is always intentional. It may rain for three successive days, or a fair may be held for three successive days. Trees are placed sometimes in alternate order, when every other tree is of the same size and kind.

Surround, encompass, environ, encircle. We may surround an object by standing at certain distances all round it; in this manner a person may be surrounded by other persons; a garden is surrounded by a wall. To encompass is to surround in the latter sense; it applies to objects of a great or indefinite extent, as the earth is encompassed by the air. To surround is to extend around an object of any form, whether square or circular, long or short; but to environ and to encircle carry with them the idea of forming a circle round an object. Thus a town or a valley may be environed by hills, a basin of water may be encircled by trees, or the head may be encircled by a wreath of flowers.

Sympathy, compassion, commiseration, condolence. Sympathy has the literal meaning of fellow feeling, that is, a kindred or like feeling, or feeling in company with another. Compassion, commiseration, and condolence signify a like suffering, or a suffering in company. Sympathy preserves its original meaning in its application, for we laugh or cry because of sympathy. Compassion is altogether a moral feeling, which makes us enter into the distresses of others. We may sympathize with others without essentially serving them; but, if we feel compassion, we naturally turn our thoughts toward relieving them. Commiseration is awakened toward those who are in an abject state of misery. Condolence is expressed sympathy.
Antonyms.—Antipathy, harshness, mercilessness, unkindliness, inhumanity.

Tease, vex, taunt, tantalize, torment. To tease is applied to that which is most trifling; torment, to that which is most serious. We are teased by a fly that buzzes in our ears; we are vexed by the carelessness and stupidity of our servants; we are taunted by the sarcasms of others; we are tantalized by the fair prospects which present themselves only to disappear again; we are tormented by the importunities of troublesome beggars or by the pain of anxious fears.
Antonyms.—Calm, comfort, gratify, satisfy, console, relieve.

Tenacious, pertinacious. To be tenacious is to hold a thing close, to let it go with reluctance; to be pertinacious is to hold out in spite of obstacles. Each is used in a bad or a good sense.
Antonyms.—Yielding, inconstant, irresolute, pliant.

Thick, dense. We speak of thick in regard to hard or soft bodies, as a thick board or thick cotton; we speak of thick in regard to solid or liquid bodies, as a thick cheese or thick milk. Dense specifically adds the idea of great closeness of parts and consequent weight and solidity. Applied to mind, dense is a stronger term than thick.
Antonyms.—Thin, tenuous, rarefied, quick, clever.

Think, suppose, imagine, believe, deem. We think a thing right or wrong; we suppose it to be true or false; we imagine it to be real or unreal. In regard to moral points, in which case the word deem may be compared with the others, to think is to draw a conclusion from certain premises. I think that a man has acted wrongly. To suppose is to take up an idea arbitrarily or at pleasure; to imagine is to take up an idea by accident, or without any connection with the truth or reality. To deem is to form a conclusion; things are deemed hurtful or otherwise in consequence of observation. We think as the thing strikes us at the time; we believe as the result of a course of thought.
Antonyms.—Know, prove, demonstrate.

Threat, menace. We may be threatened with either small or great evils; but we are menaced only with great evils.
Antonyms.—Attraction, allurement, enticement.

Timely, seasonable. The former signifies within the time, that is, before the time is past; the latter, according to the season, or what the season requires. A timely notice prevents that which would otherwise happen; mercy and kindness are seasonable in the time of affliction.
Antonyms.—Inopportune, untimely, ill-timed, unseasonable.

Torment, torture. Torture is an excess of torment. We may be tormented by a variety of indirect means; but we are mostly said to be tortured by the direct means that may be compared to the rack or a similar instrument.
Antonyms.—Comfort, ease, solace.

Transfigure, transform, metamorphose. Transfigure is to make to pass over into another figure; transform and metamorphose are to put into another form. Transfigure is used only of spiritual beings, particularly in reference to our Savior; the other two terms are applied to physical form. Transformation is commonly applied to that which changes its outward form; in this manner a harlequin transforms himself into all kinds of shapes and likenesses. Metamorphosis is applied to the form internal as well as external, that is, to the whole nature.

Trembling, tremor, trepidation. Trembling expresses any degree of involuntary shaking of the frame, from the affection of either the body or the mind; cold, nervous affections, fear, and the like are the ordinary causes of trembling. Tremor is a slight degree of trembling, which arises mostly from a mental affection; when the spirits are agitated, the mind is thrown into a tremor by any trifling incident. Trepidation is more violent and springs from fear or alarm; it shows itself in the action, or the different movements of the body, rather than in the body.
Antonyms.—Firmness, immobility, steadiness, self-command.

Trouble, disturb, molest. Trouble is the most general in its application; we may be troubled by the want of a thing, or troubled by that which is unsuitable; we are disturbed and molested only by that which actively troubles. Trouble may be permanent; disturbance and molestation are temporary, and both refer to the peace which is destroyed. A disturbance ruffles or throws out of a tranquil state; a molestation burdens or bears hard on either the body or the mind.
Antonyms.—Soothe, quiet, compose, caress.

Truth, veracity. Truth belongs to the thing; veracity, to the person. The truth of a story is admitted upon the veracity of the narrator.
Antonyms.—Deception, falsehood, falsity.

Turn, bend, twist, distort, wring, wrest, wrench. We turn a thing by moving it about a fixed point; thus we turn the earth over. To bend is simply to change direction; thus a stick is bent, or a body may bend its direction to a certain point. To twist is to bend many times, to make many turns. To distort is to turn or twist out of the right form; thus the face is distorted in convulsions. To wring is to twist with violence; thus linen that has been wetted is wrung. To wrest or wrench is to separate from a body by means of twisting; thus a stick may be wrested out of the hand, or a hinge wrenched off the door.

Turn, wind, whirl, twirl, writhe. To turn is to cause to rotate; wind is to turn a thing around in a regular manner; whirl, to turn it around in a violent manner; twirl, to turn it around in an irregular and unmeaning way. Writhe implies a twisting about within the thing itself, a contortion, as writhing in pain.

Unbelief, infidelity, incredulity. Unbelief implies a settled doubting state of mind; infidelity carries the idea of unfaithfulness to vows or responsibilities; incredulity is a doubting attitude toward tales more or less strange. In religion both unbelief and infidelity convey a sense of failure in duty, the latter being the stronger word.
Antonyms.—Belief, faith, faithfulness, credulity.

Understanding, intellect, intelligence. Understanding is employed to describe a familiar and easy power or operation of the mind in forming distinct ideas of things. Intellect is employed to mark the same operation in regard to higher and more abstruse objects. Understanding applies to the first exercise of the rational powers; it is therefore aptly said of children and savages that they employ their understandings on the simple objects of perception. Intellect, being a matured state of the understanding, is most properly applied to the efforts of those who have their powers in full vigor. Intelligence is less abstract, and is used of a particular person, often to denote large understanding.

Unspeakable, ineffable, unutterable, inexpressible. Unspeakable is sometimes used in religion to refer to those objects which are above human conception and surpass the power of language to describe, as the unspeakable goodness of God. Ineffable is said of such objects as cannot be painted in words with adequate force, as the ineffable sweetness of a person's look. Unspeakable is now applied especially to things too evil for utterance; ineffable is used of things too high or good for utterance. Unutterable

and inexpressible are extended in their signification to that which is incommunicable by signs from one being to another. Grief is unutterable which it is not in the power of the sufferer by any sounds to bring home to the feelings of another; grief is inexpressible that is not to be expressed by looks, or words, or any sign.

Antonyms.—Common, commonplace, obvious, trivial.

Unworthy, worthless. Unworthy is a term of less reproach than worthless: the former signifies not to be worthy of praise or honor; the latter signifies to be without all worth, and consequently in the fullest sense bad. There are many unworthy members in every religious community; but every society that is conducted upon proper principles will take care to exclude worthless members.

Antonyms.—Worthy, estimable, admirable, noble.

Usage, custom, prescription. Usage is what one has been long accustomed to do; custom is what one generally does; prescription is what is indicated by usage to be done. The usage acquires force and sanction by dint of time; the custom acquires sanction by the frequency of its appearance or by the numbers following it; the prescription acquires force by the authority which prescribes.

Antonyms.—Innovation, novelty, fancy.

Utter, speak, articulate, pronounce. Utter signifies to put out; that is, to send forth a sound. This, therefore, is a more general term than speak, which is to utter an intelligible sound. We may utter a groan; we speak words only, or that which is intended to serve as words. Speak, therefore, is only a form of utterance—a dumb man has utterance, but not speech. Articulate and pronounce are modes of speaking. To articulate, from *articulum*, "a joint," is to pronounce distinctly the letters or syllables of words; this is the first effort of a child beginning to speak. To pronounce is to speak words intelligibly.

Antonyms.—Be silent, make signs, mutter, mumble.

Value, prize, esteem. To value is to estimate the worth, real or supposed, relative or absolute, of a thing; in this sense men value gold above silver, or an appraiser values goods. Prize and esteem are taken only as mental actions; the former is taken in reference to sensible or moral objects, the latter, only to moral objects. We may value books according to their market price, or we may value them according to their contents; we prize books only for their contents; in this sense prize is a much stronger term than value.

Antonyms.—Contemn, disregard, depreciate, disprize, despise.

Venial, pardonable. Venial implies trivial offense. Pardonable implies a more serious guilt. The venial fault may be overlooked; the pardonable offense, though not escaping censure, allows of clemency.

Antonyms.—Deadly, unpardonable.

View, survey, prospect. We take a view or survey; the prospect presents itself. The view is of an indefinite extent; the survey is always comprehensive in its nature. Ignorant people take but narrow views of things; the capacious mind of a genius takes a survey of all nature. Prospect, used literally, signifies an outlook as from a window; figuratively, it implies a person's outlook or view toward the future.

Violent, furious, boisterous, vehement, impetuous. A man is violent in his opinions, violent in his measures, violent in his resentments; he is furious in his anger, or has a furious temper; he is vehement in his affections or passions, vehement in love, vehement in zeal, vehement in pursuing an object. Violence transfers itself to some external object on which it acts with force; but vehemence respects that manner of violence which is confined to the person himself; we may dread violence, because it is always liable to do mischief. Impetuosity is rather the extreme of violence or vehemence. An impetuous attack is an excessively violent attack; an impetuous character is an excessively vehement character. Boisterous is said of the manner and of the behavior rather than of the mind.

Antonyms.—Mild, quiet, gentle, cool, collected, self-restrained.

Wakefulness, watchfulness, vigilance. Wakefulness is an affair of the body and depends upon the temperament; watchfulness is an affair of the will and depends upon the determination. Some persons are more wakeful than they wish to be; few are as watchful as they ought to be. Vigilance expresses a high degree of watchfulness. A sentinel is watchful who on ordinary occasions keeps good watch; but it is necessary for him, on extraordinary occasions, to be vigilant in order to detect whatever may pass.

Antonyms.—Drowsiness, heedlessness, inattention, negligence.

Want, need, lack. To want is to be without that which contributes to our comfort or is an object of our desires; to need is to be without that which is essential to our existence or our purposes. To lack expresses little more than the general idea of being without, unaccompanied by any collateral idea; it is usual to consider what we want as artificial, and what we need as natural and indispensable. What one man wants is a superfluity to another; but that which is needed by one is in like circumstances needed by all.

Antonyms.—Have, share, possess.

Wave, billow, surge, breaker. Waves which swell more than ordinarily are termed billows; waves which rise higher than usual are termed surges; waves which dash against the shore, or against vessels, with more than ordinary force, are termed breakers.

Weak, feeble, infirm. We may be weak in body or in mind; we are feeble and infirm only in the body; we may be weak from disease, or weak by nature—both words convey the gross idea of a defect. But the terms feeble and infirm are qualified expressions for weakness. An old man is feeble from age; he may likewise be infirm in consequence of sickness.

Antonyms.—Strong, sound, healthy, well.

Weight, burden, load. A person may sink under the weight that rests upon him; a platform may break down from the weight upon it; a person sinks under his burden or load; a cart breaks down from the load.

Whole, entire, complete, total, integral. Whole excludes subtraction; entire excludes division; complete excludes deficiency. A whole orange has had nothing taken from it; an entire orange is not yet cut; a complete orange is grown to its full size. Total is the opposite of partial. Integral is applied now to parts or to numbers not broken.

Wicked, iniquitous, nefarious. It is wicked to deprive another of his property unlawfully, under any circumstances; but it is iniquitous if it be done by fraud and circumvention; the act is nefarious if it involves any breach of trust.

Antonyms.—Good, moral, right, just.

Will, wish. We can will nothing but what we can effect; we may wish for many things which lie above our reach.

Wisdom, prudence. Wisdom directs all matters present or to come; prudence, which acts by foresight, directs what is to come. Rules of conduct are framed by wisdom, and it is the part of prudence to apply these rules to the business life.

Antonyms.—Unwisdom, imprudence, indiscretion, folly.

Wonder, miracle, marvel, prodigy, monster. Wonders are natural; miracles are supernatural. The whole creation is full of wonders; the Bible contains accounts of miracles. Wonders are real; marvels are often fictitious; prodigies are extravagant and imaginary; monsters are violations of the laws of nature. The production of a tree from a grain of seed is a wonder; but a calf with two heads is a monster.

Wonder, surprise, astonishment, amazement. Wonder is the feeling induced by something strange or unusual. Surprise has the idea of sudden wonder. Astonishment is stronger, and includes failure to understand. Amazement adds the idea of bewilderment at something strange or unexpected.

Antonyms.—Comprehension, coolness, composure.

Work, labor, toil, drudgery, task. Every member of society must work for his support, if he is not in independent circumstances. The poor are obliged to labor for their daily subsistence; some are compelled to toil incessantly for the pittance which they earn. Drudgery falls to the lot of those who are the lowest in society. A man wishes to complete his work; he is desirous of resting from his labor; he seeks for a respite from his toil; he submits to drudgery. Task is a work imposed by others, and it is, consequently, more or less burdensome.

Antonyms.—Play, ease, relaxation, recreation, amusement.

Writer, author. Writer refers us to the act of writing; author, to the act of inventing. There are, therefore, many writers who are not authors; but there is no author of books who may not be termed a writer. Compilers and contributors to periodical works are properly writers, though not always entitled to the name of authors. Poets and historians are properly termed authors rather than writers.

Youthful, juvenile, puerile. Youthful signifies full of youth or in the complete state of youth; juvenile signifies the same; but puerile signifies childish. The first two terms are taken in an indifferent sense; the last is taken in the sense of what is suitable to a child only. Thus we speak of youthful vigor, youthful employments, juvenile performances, juvenile years, and the like, but of puerile objections, puerile conduct, and the like. We expect nothing from a youth but what is juvenile; we are surprised and dissatisfied to see what is puerile in a man.

Antonyms.—Mature, adult, manly, womanly.

KEY TO THE DICTIONARY OF SYNONYMS

The following is an index or a key to the synonyms which occur in the preceding section. It will be noticed that some words are in italics, while others are in roman type. The words in italics are *key* words; that is, each italicized word is the first word of a group of synonyms. By reference to the page indicated, the key word can be quickly found by reason of the alphabetic arrangement which has been observed in the text of the section. Words in roman type in the index are not key words but are synonyms of the key word. Each word in roman type is immediately followed by a word in italics, which is always the *key* word under which the word in roman type is to be found.

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DICTIONARY OF LATIN WORDS AND PHRASES

A considerable number of Latin words and phrases have found their way into English. Some of these are familiar legal terms; some are church terms; some are quotations from poets; and some are merely convenient expressions without an exact English equivalent. Often they cannot be understood without some information in regard to the manner in which they were used in the past. It is frequently necessary to know the meaning which was attached to such phrases by those who spoke Latin and also to know the precise sense in which they have come to be employed in English. Such information is seldom given in the ordinary Latin dictionaries and yet it is necessary for an adequate understanding of the terms. The following is a list of Latin words and phrases which are frequently met with; it is particularly valuable in that it contains the pronunciation and the meaning of all terms used.

Roman Pronunciation. The Roman method of pronunciation is an approximation to the ancient pronunciation of the Latin language, or to that used by the Romans themselves in the days of Cicero and Augustus. It is the system now used almost exclusively in the public schools, and is the one employed in the preparation of the following list.

But many Latin words and phrases have become so thoroughly anglicized that it would be pedantic to disregard their customary English pronunciation. Therefore, the English pronunciation of an anglicized word or phrase is given in parenthesis immediately after the Roman.

The key to the English pronunciation will be found on page 19.

The key to the Roman method is as follows:

Vowels and Diphthongs

Long vowels (marked ¯) are supposed to take twice as long to utter as short vowels (marked ˘). All diphthongs are long. The following table shows the *approximate* sound of the Latin vowels and diphthongs:—

ā is pronounced like *a* in *father*
ă is pronounced like *a* in *what*
ē is pronounced like *e* in *prey*
ĕ is pronounced like *e* in *met*
ī is pronounced like *i* in *machine*
ĭ is pronounced like *i* in *pin*
ō is pronounced like *o* in *note* (close *o*)
ŏ is pronounced like *aw* in *law* (open *o*—uttered very rapidly)
ū is pronounced like *u* in *rude*
ŭ is pronounced like *u* in *pull*
ȳ is pronounced like *French u* or *German ü*
ў is pronounced like *French u* or *German ü* (but uttered very rapidly)
ae is pronounced like *ai* in *aisle*
au is pronounced like *ow* in *how*
eu is pronounced like *eh-oo* (run rapidly together)
oi is pronounced like *oi* in *boil*

Consonants

The consonants have *approximately* the same sounds as in English, with the following exceptions:—

c is pronounced like *k* (never like *s*)
g is pronounced like *g* in *get* (never like English *j*)
j is pronounced like *y* in *yet* (never like English *j*)
s is pronounced like *s* in *sin* (never like *z*)
t is pronounced like *t* in *tin* (never like *sh*)
v is pronounced like *w* in *win* (never like *v* in *very*)
ch* is pronounced like *k-h* (in *back home*)
ph* is pronounced like *p-h* (in *up hill*)
th* is pronounced like *t-h* (in *at home*)

* But these three aspirates are commonly, if improperly, pronounced as *k*, *f*, and *th* (in *thin*) respectively.

DICTIONARY OF LATIN WORDS AND PHRASES

AB EXTRA, *ăb ĕx'trā*. Without, from outside; as, influence *ab extra*.

AB IMO PECTORE, *ăb ĭ'mō pĕc'tŏ-rĕ*. From the bottom of one's heart.

AB INITIO, *ăb ĭn-ĭ'tĭ-ō* (*ăb ĭn-ĭsh'ĭ-ō*). From the beginning.

AB OVO AD MALA, *ăb ō'vō ăd mā'lă*. From the eggs to the apples; from beginning to end. The Roman dinner began with eggs and ended with apples.

ABSIT OMEN, *ăb'sĭt ō'mĕn*. May no harm come from it, that is, from a word just used.

AB UNO DISCE OMNES, *ăb ū'nō dĭs'cē ŏm'nēs*. From one specimen, judge of the rest.

AB URBE CONDITA, *ăb ûr'bē cŏn'dĭ-tā*. From the foundation of the city,—Rome.

ABUSUS NON TOLLIT USUM, *ă-bū'sŭs nŏn tŏl'lĭt ū'sŭm*. Abuse of a thing does not argue its uselessness.

AD ASTRA PER ASPERA, *ăd ăs'trȧ pĕr ăs'pĕ-rȧ*. To the stars through difficulties. Motto of Kansas.

AD CALENDAS GRÆCAS, *ăd că-lĕn'dăs græ'cās*. At the Greek calends; never. The Greeks had no calends.

AD CAPTANDUM VULGUS, *ăd căp-tăn'dŭm vŭl'gŭs*. To attract the rabble, like "playing to the gallery."

AD INFINITUM, *ăd ĭn'fĭ-nī'tŭm* (*ăd ĭn'fĭn-ī'tŭm*). To infinity; without end.

AD LIBITUM, *ăd lĭb'ĭ-tŭm*. At one's pleasure.

AD MULTOS ANNOS, *ăd mŭl'tōs ăn'nōs*. For many years to come; long life! (a toast).

AD NAUSEAM, *ăd nau'sē-ăm* (*ăd nō'sē-ăm*). To the point of disgusting or nauseating.

AD REM, *ăd rĕm*. To the purpose; to the point.

AD UNGUEM, *ăd ŭn'guĕm*. To the finger nail; to a nicety. The ancient sculptors used the nail to put the finishing touches when modeling.

AD USUM, *ăd ū'sŭm*. For the use of.

AD VALOREM, *ăd vă-lō'rĕm* (*ăd văl-ō'rĕm*). According to value.

ADVORSUM STIMULUM CALCES, *ăd-vōr'sŭm stĭm'ŭ-lŭm căl'cēs*. To kick against the pricks.—Terence.

ÆQUO ANIMO, *æ'quō ăn'ĭ-mō*. With a calm mind; with equanimity.

ÆTATIS SUÆ, *æ-tā'tĭs sū'æ*. Aged; in the year of his or her age.

ÆTERNUM VALE! *æ-tĕr'nŭm vā'lē*. Farewell forever!

A FORTIORI, *ā fôr'shĭ-ō'rī* (*ā fôr'shĭ-ō'rī*). For the stronger reason; all the more.

ALIAS, *ā'lĭ-ăs* (*ā'lĭ-ăs*). Otherwise; generally indicating the variant of a name.

ALMA MATER, *ăl'mȧ mā'tĕr* (*ăl'mȧ mā'tēr*). Beloved or foster mother; one's college or university.

ALTER EGO, *ăl'tĕr ē'gō* (*ăl'tēr ē'gō*). Another or second self.

ANNO DOMINI, *ăn'nō dŏ'mĭ-nī* (*ăn'ō dŏm'ĭ-nī*). In the year of our Lord. *A. D.*

ANNO HEGIRÆ, *ăn'nō hĕ-jī'rœ* (*ăn'ō hĕ-jī'rē*). In the year of the Hegira (622 A. D.). A Mohammedan method of dating.

ANNO URBIS CONDITÆ, *ăn'nō ûr'bĭs cŏn'dĭ-tæ*. In the year of the founding of the city (Rome, 753 B. C.). A Roman method of dating. *A.U.C.*

ANTE BELLUM, *ăn'tē bĕl'lŭm* (*ăn'tē bĕl'ŭm*). Before the war.

A POSSE AD ESSE, *ā pŏs'sē ăd ĕs'sē*. From possibility to actuality.

A POSTERIORI, *ā pŏs'tē-rĭ-ō'rī* (*ā pŏs'tē-rĭ-ō'rī*). By induction; an *a posteriori* argument,—inferring causes from effects.

A PRIORI, *ā prī-ō'rī* (*ā prī-ō'rī*). Deductively; an *a priori* argument,—one which infers effects from known causes.

AQUÆ POTORIBUS, *ă'quæ pō-tō'rĭ-bŭs*. By water drinkers. Horace wrote that their poems could not live.

ARS ARTIUM, *ărs ăr'tĭ-ŭm*. Art of arts,—logic.

ARS ARTIUM OMNIUM CONSERVATRIX, *ărs ăr'tĭ-ŭm ŏm'nĭ-ŭm cŏn'sĕr-vā'trĭx*. The art preservative of all arts,—printing.

ARS EST CELARE ARTEM, *ărs ĕst cē-lā'rē ăr'tĕm*. Art is to conceal art.

ARS LONGA, VITA BREVIS, *ărs lŏn'gă vī'tă brĕ'vĭs*. Art is long, life is short. A Latin translation from Hippocrates.

ARTIUM MAGISTER, *ăr'tĭ-ŭm măg-ĭs'tĕr* (*ăr'shĭ-ŭm mă-jĭs'tĕr*). Master of arts.

ASINUS AD LYRAM, *ăs'ĭ-nŭs ăd lĭ'răm*. An ass at the harp; an awkward fellow.

ASINUS ASINUM FRICAT, *ăs'ĭ-nŭs ăs'ĭ-nŭm frĭ'căt*. One donkey rubs another. Used of two people extravagantly flattering each other.

AUDACES FORTUNA JUVAT, *au-dā'cēs fôr-tū'nȧ jū'văt*. Fortune favors the bold. A paraphrase from Virgil.

AUDI ALTERAM PARTEM, *au'dī ăl'tĕr-ăm pär'tĕm*. Hear the other side (of an argument).

AUREA MEDIOCRITAS, *au'rē-ȧ mē'dĭ-ŏ'crĭ-tās*. The golden mean. A paraphrase from Horace.

AURES HABENT ET NON AUDIENT, *au'rēs hă'bĕnt ĕt nŏn au'dĭ-ĕnt*. They have ears and will not hear. Applicable to obstinate people.

AURI SACRA FAMES, *au'rī sā'crȧ fā'mēs*. The cursed hunger for gold.—Virgil.

AUSTRIÆ EST IMPERARE ORBI UNIVERSO, *aus'trĭ-æ ĕst ĭm'pĕ-rā'rē ôr'bī ū'nĭ-vĕr'sō*. Austria shall rule the world. The ambitious device of Austria, written AEIOU.

AUT CÆSAR AUT NIHIL, *aut cæ'săr aut nī'hĭl*. Either Cæsar or nothing. A saying attributed to Cæsar Borgia and applicable to those unduly ambitious.

AUT VINCERE AUT MORI, *aut vĭn'cĕ-rĕ aut mŏ'rī*. To conquer or die.

AVE, IMPERATOR! MORITURI TE SALUTANT, *ā'vē ĭm'pĕ-rā'tôr mŏ'rĭ-tū'rī tē sā-lū'tănt*. Hail, Emperor! Those about to die salute thee.—Suetonius. Cry of the Roman gladiators on entering the arena.

BEATÆ MEMORIÆ, *bē-ā'tæ mĕ-mŏ'rĭ-æ*. Of blessed or happy memory.

BELLA MATRIBUS DETESTATA, *bĕl'lȧ mā'trĭ-bŭs dē'tĕs-tā'tȧ*. Wars hated by mothers.—Horace.

BIS DAT QUI CITO DAT, *bĭs dăt quī cī'tō dăt*. He gives twice who gives in a trice.

BIS PECCARE IN BELLO NON LICET, *bĭs pĕc-cā'rĕ ĭn bĕl'lō nŏn lī'cĕt*. One must not blunder twice in war.

BIS PUERI SENES, *bĭs pū'ĕ-rī sĕ'nēs*. Old men are in second childhood.

BONA FIDE, *bō'nȧ fī'dē* (*bō'nȧ fī'dē*). In good faith.

BONA FIDES, *bō'nȧ fī'dēs* (*bō'nȧ fī'dēz*). Good faith; word of honor.

BONUM VINUM LÆTIFICAT COR HOMINIS, *bō'nŭm vī'nŭm læ-tĭ'fĭ-căt cŏr hŏm'ĭ-nĭs*. Good wine gladdens man's heart.

CACOETHES SCRIBENDI, *că'cō-ē'thēs scrī-bĕn'dī*. The incurable passion for scribbling.—Juvenal.

CÆLUM, NON ANIMUM, MUTANT QUI TRANS MARE CURRUNT, *cæ'lŭm nōn ă'nĭ-mŭm mū'tănt quī trāns mā'rē cŭr'rŭnt*. They change their sky, not their mind, who run across the sea.—Horace.

CARCERE DURO, *căr'cĕ-rĕ dū'rō*. In durance vile; at hard labor.

CARPE DIEM, *căr'pē dĭ'ĕm*. Seize the day, enjoy life. —Horace.

CASUS BELLI, *cā'sŭs bĕl'lī* (*kā'sŭs bĕl'ī*). The cause that brings about war.

CAVEAT EMPTOR, *kā'vē-ăt ĕmp'tōr*. Let the buyer beware. An old maxim of the common law, which still applies to titles of real estate transferred.

CEDANT ARMA TOGÆ, *cē'dănt ăr'mȧ tō'gæ*. Let arms give place to the toga.—Cicero. Let the statesman's glory outshine the soldier's.

CENSOR DEPUTATUS, *cēn'sōr dē'pū-tā'tŭs*. A deputed censor; one empowered to examine books, plays, etc., before publication.

CETERA DESUNT, *cē'tē-rȧ dē'sŭnt*. The rest is wanting; an incomplete work.

CETERIS PARIBUS, *cē'tē-rĭs păr'ĭ-bŭs*. Other things being equal,—expressing a condition.

CIVIS ROMANUS SUM, *cī'vĭs rō-mā'nŭs sŭm*. I am a Roman citizen.

CLARUM ET VENERABILE NOMEN, *clā'rŭm ĕt vĕ'nĕ-rā'bĭ-lē nō'mĕn*. Illustrious and venerable name. Used when that of some celebrated person is mentioned.

COGITO, ERGO SUM, *cŏ'gĭ-tō ĕr'gō sŭm*. I think, therefore I exist. The basis of Descartes's philosophy.

CONSENSUS OMNIUM, *cŏn-sĕn'sŭs ŏm'nĭ-ŭm*. Universal agreement.

CONSILIO MANUQUE, *cōn-sĭl'ĭ-ō mȧ-nū'quē*. By deftness and the hand. Motto of the Barber of Seville.

CONSUETUDO PRO LEGE SERVATUR, *cŏn'suē-tū'dō prō lē'gē sĕr-vā'tûr*. Custom is held as law. The basis of English common law.

CORAM POPULO, *cō'răm pŏ'pū-lō*. Before the people; publicly.

CORPUS DELICTI, *côr'pŭs dē-lĭc'tī*. The body of a crime; anything which serves to prove its commission; essential proof in a case.

CREDAT JUDÆUS APELLA, NON EGO, *crē'dăt jū-dæ'ŭs ă-pĕl'lȧ nōn ē'gō*. The Jew, Apella, may believe it, not I.—Horace. The Jews were regarded by the Romans as highly superstitious.

CREDO QUIA ABSURDUM, *crē'dō quī'ă ăb-sûr'dŭm*. I believe because it is absurd; the conquest of reason by faith.

CRESCIT AMOR NUMMI, QUANTUM IPSA PECUNIA CRESCIT, *crēs'cĭt ă'mŏr nŭm'mī quăn'tŭm ĭp'sȧ pĕ-cū'nĭ-ă crēs'cĭt*. As wealth increases, so does the love of it.

CRUX, *crŭx*. A cross, a difficulty; as, the crux of the matter.

CUCULLUS NON FACIT MONACHUM, *cū-cŭl'lŭs nŏn fă'cĭt mŏ'nă-chŭm*. The cowl does not make the monk; appearances are deceiving.

CUI BONO? *cū'ĭ bŏ'nō* (*kī bō'nō*). To whose advantage? The criminal may possibly be traced by the answer to the question.

CUI FORTUNA IPSA CEDIT, *cū'ĭ fôr-tū'nȧ ĭp'sȧ cē'dĭt*. To whom Fortune herself yields; that is, a lucky person.

CUIQUE SUUM, *cū'ĭ quĕ sū'ŭm*. Let each one have his own.

CUM GRANO SALIS, *cŭm grā'nō sā'lĭs*. With a pinch of salt; not to be taken seriously.

CURIOSA FELICITAS, *cū'rĭ-ō'sȧ fē-lĭ'cĭ-tās*. The happy knack (of writing). Said of Horace.

CURRENTE CALAMO, *cŭr-rĕn'tē că'lă-mō*. With a running pen; without much reflection.

DA LOCUM MELIORIBUS, *dā lō'cŭm mē'lĭ-ō'rĭ-bŭs*. Give place to your betters.

DATE OBOLUM BELISARIO, *dā'tĕ ŏb'ŏ-lŭm bĕl'ĭ-sā'rĭ-ō.* Give an alms to Belisarius; lend a helping hand to one who has known better days.

DAT VENIAM CORVIS, VEXAT CENSURA COLUMBAS, *dăt vē'nĭ-ăm cŏr'vĭs vĕx'ăt cĕn-sū'rā cŏ-lŭm'bās.* Censure spares the crows and persecutes the doves. Applied to unfair or partial criticism.

DE AUDITU, *dē au-dī'tū.* From hearsay.

DE FACTO, *dē făc'tō.* Actually; as a matter of fact.

DE GUSTIBUS ET COLORIBUS NON EST DISPUTANDUM, *dē gŭs'tĭ-bŭs ĕt cŏ-lō'rĭ-bŭs nōn ĕst dĭs'pū-tăn'dŭm.* There's no use disputing about tastes or colors,—an old scholastic proverb.

DEI GRATIA, *dē'ī grā'tĭ-ā* (*dē'ī grā'shĭ-ā*). By the grace or favor of God. Part of the inscription on British coinage.

DE JURE, *dē jū'rē* (*dē jū'rē*). Lawfully, by right.

DELENDA EST CARTHAGO, *dē-lĕn'dā ĕst cär-thā'gō.* Carthage must be destroyed. Applicable to the intention of overcoming a difficulty.

DE MORTUIS NIL NISI BONUM, *dē mŏr'tŭ-ĭs nĭl nī'sī bō'nŭm.* Say nothing but good of the dead.

DE MINIMIS NON CURAT LEX, *dē mĭ'nĭ-mĭs nōn cū'răt lĕx.* The law pays no attention to trifles.

DENTE LUPUS, CORNU TAURUS PETIT, *dĕn'tē lū'pŭs cŏr'nū tau'rŭs pĕ'tĭt.* The wolf attacks with his teeth, the bull with his horns.—Horace. Use the gifts you have to best advantage.

DENTE SUPERBO, *dĕn'tē sū-pĕr'bō.* With disdainful tooth. —Horace. Used of accepting a gift gracelessly, especially from an inferior.

DENTIBUS ALBIS, *dĕn'tĭ-bŭs ăl'bĭs.* With white teeth; biting satirically without drawing blood—without hurting; jocosely.

DEO ADJUVANTE, *dē'ō ăd'jū-văn'tē.* With the help of God.

DEO GRATIAS, *dē'ō grā'tĭ-ăs* (*dē'ō grā'shĭ-ăs*). Thanks be to God. Used in the liturgy of the Mass.

DE OMNI RE SCIBILI ET QUIBUSDAM ALIIS, *dē ŏm'nī rē sci'bĭ-lī ĕt quī-bŭs'dăm ăl'ĭ-ĭs.* About everything knowable and more besides. A sarcasm attributed to Voltaire in reference to a young writer.

DEO VOLENTE, *dē'ō vō-lĕn'tē.* God willing. *D. V.*

DE PROFUNDIS, *dē prō-fŭn'dĭs.* Out of the depths. An appeal made *de profundis*, that is, in dire distress.

DEUS EX MACHINA, *dē'ŭs ĕx măch'ĭn-ā.* A god from a machine; an artificial solution of a problem, from the practice in the Greek drama of introducing a god by stage machinery to bring an otherwise insoluble plot to a satisfactory end.

DIES IRÆ, *dī'ēs ī'rē.* The day of wrath; the judgment day. The title of a celebrated Latin hymn.

DII PENATES, *dī'ī pē-nā'tēs* (*dī'ī pē-nā'tēz*). Household gods. Said of valuable ornaments, furniture, etc.

DISJECTA MEMBRA POETÆ, *dĭs-jĕc'tā mĕm'brā pō-ē'tē.* The scattered remains of the poet.—Horace. The fate of poetry transformed into prose.

DISPLICUIT NASUS TUUS, *dĭs-plīc'ŭ-ĭt nā'sŭs tū'ŭs.* Your nose has displeased you.—Juvenal. Said of one annoyed at trifles; a victim of caprice.

DIVIDE ET IMPERA, *dĭ'vĭ-dē ĕt ĭm'pĕ-rā.* Divide and rule. A motto of Roman imperialism.

DOCTUS CUM LIBRO, *dŏc'tŭs cŭm lī'brō.* Learned with the aid of a book.

DOMINUS VOBISCUM, *dŏm'ĭ-nŭs vō-bĭs'cŭm.* The Lord be with you,—words used frequently in the Roman liturgy.

DONEC ERIS FELIX MULTOS NUMERABIS AMICOS, *dō'nēc ē'rĭs fē'lĭx mŭl'tōs nū'mĕ-rā'bĭs ă-mī'cōs.* While you are happy, you will count many friends.—Ovid.

DULCE ET DECORUM EST PRO PATRIA MORI, *dŭl'cē ĕt dē-cō'rŭm ĕst prō pā'trĭ-ā mō'rī.* It is sweet and glorious to die for one's country.—Horace.

DURA LEX SED LEX, *dū'rā lĕx sĕd lĕx.* 'Tis a hard law, but it's law. Said of a harsh and unnecessary measure.

DUX FEMINA FACTI, *dŭx fĕ'mĭ-nā făc'tī.* A woman was the leader in the adventure.—Virgil.

ECCE HOMO! *ĕc'cē hŏ'mō* (*ĕk'sē hŏ'mō*). Behold the man! Applied specifically to any picture of Christ wearing the crown of thorns.

ECCE ITERUM CRISPINUS! *ĕc'cē ĭ'tē-rŭm crĭs-pī'nŭs.* Here comes Crispin again!—Juvenal. Used in reference to an unwelcome bore.

EDITIO PRINCEPS, *ē-dĭsh'ĭ-ō prĭn'sĕps* (*ē-dĭsh'ĭ-ō prĭn'sĕps*). A first edition of a printed work.

EGO SUM QUI SUM, *ē'gō sŭm quī sŭm.* I am who I am.—Exodus III:14. The answer of the Supreme Being to Moses.

EHEU! FUGACES LABUNTUR ANNI, *ē'heu fū-gā'cēs lā-bŭn'tŭr ăn'nī.* Alas! how the years slip by.—Horace.

EJUSDEM FARINÆ, *ē-jūs'dĕm fā-rī'nē.* Of the same flour or dough. Used disparagingly of people having the same faults or failings.

EPICURI DE GREGE PORCUM, *ĕp-ĭ-cū'rī dē grē'gē pŏr'cŭm.* A pig from the sty of Epicurus.—Horace. Said of those who love good things, the sensuous.

E PLURIBUS UNUM, *ē plū'rĭ-bŭs ū'nŭm* From many, one. Motto of the United States of America.

ERRARE EST HUMANUM, *ĕr-rā'rē ĕst hū-mā'nŭm.* To err is human.

ESSE QUAM VIDERI, *ĕs'sē quăm vī-dē'rī.* To be, rather than to seem.

EST MODUS IN REBUS, *ĕst mō'dŭs ĭn rē'bŭs.* There's a measure in all things.—Horace. Meaning,—excess in anything is a fault.

ESTO QUOD ESSE VIDERIS, *ĕs'tō quŏd ĕs'sē vī-dē'rĭs.* Be what you seem to be.

ET CETERA, *ĕt cē'tĕ-rā* (*ĕt sĕt'ĕ-rā*). And the rest; *etc.*, *&c.*

ETIAMSI OMNES, EGO NON, *ĕt-ĭ-ăm'sī ŏm'nēs ē'gō nōn.* Even should all fail thee, I will not. A phrase expressive of undying friendship.

ET IN ARCADIA EGO! *ĕt ĭn är-cā'dĭ-ā ē'gō.* I, too, once lived in Arcadia! An exclamation of regret for happiness no longer possessed.

ET SEQUENTIA, *ĕt sē-quĕn'tĭ-ă.* And what follows; *et seq.*

ET SIC DE SIMILIBUS, *ĕt sīc dē sĭ-mĭl'ĭ-bŭs.* And so of similar things.

ET TU, BRUTE! *ĕt tū brū'tē.* And thou also, Brutus! Usually given as the last words of Julius Cæsar, when he saw Brutus among his murderers.

EX ABRUPTO, *ĕx ă-brŭp'tō.* Suddenly, unexpected; as, an argument *ex abruplo.*

EX ÆQUO, *ĕx æ'quō.* Equal in merit; a prize won by two.

EX CATHEDRA, *ĕx cā'thē-drā* (*ĕks kā'thē-drā*). "From the chair." A statement bearing unquestionable authority.

EX DONO, *ĕx dō'nō.* As a gift. Used preceding the name of a public benefactor on what he has presented.

EXEGI MONUMENTUM ÆRE PERENNIUS, *ĕx-ē'gī mŏn'ū-mĕn'tŭm æ'rē pĕr-ĕn'nĭ-ŭs.* I have executed a monument more lasting than brass.—Horace. The poet's work will outlast all material monuments.

EXEMPLI GRATIA, *ĕx-ĕm'plī grā'tĭ-ā* (*ĕg-zĕm'plī grā'shĭ-ā*). By way of example,—written *e.g.*

EXEUNT OMNES; EXIT, *ĕx'ē-ŭnt ŏm'nēs ĕx'ĭt* (*ĕks'ē-ŭnt ŏm'nēz ĕk'sĭt*). All go out; he or she goes out.

EX NIHILO NIHIL FIT, *ĕx nī'hĭ-lō nī'hĭl fĭt.* From nothing, nothing comes.

EX ORE INFANTIUM VERITAS, *ĕx ō'rē ĭn-făn'tĭ-ŭm vē'rĭ-tās.* Truth from the mouths of children,—an adage sometimes too true.

EX PARTE, *ĕx pär'tē.* On one side only. An *ex parte* argument.

EXPENDE HANNIBALEM, *ĕx-pĕn'dē hăn-nĭ'bā-lĕm.* Weigh Hannibal.—Juvenal. How much for human glory?

EXPERTO CREDE, *ĕx-pĕr'tō crē'dē.* Believe one who has tried it.—Virgil.

EX TEMPORE, *ĕx tĕm'pō-rē* (*ĕks tĕm'pō-rē*). Offhand; without preparation.

EX UNGUE LEONEM, *ĕx ŭn'guē lē-ō'nĕm.* From the claw you tell the lion. A great artist is recognized by the slightest detail of his work.

FACILE PRINCEPS, *fă'cĭ-lē prĭn'cĕps* (*fās'ĭ-lē prĭn'sĕps*). The acknowledged chief; one who stands indisputably first.—Cicero.

FACILIS DESCENSUS AVERNI, *fă'cĭ-lĭs dē-scĕn'sŭs ă-vĕr'nī.* The descent to hell is easy.—Virgil. It is easy enough to get into trouble.

FAMA VOLAT, *fā'mă vō'lăt.* Fame flies,—expressing the rapidity with which news is spread.

FAVETE LINGUIS, *fă-vē'tē lĭn'guĭs.* Favor with your tongues; preserve a religious silence.

FAVORES SUNT AMPLIANDI, *fā-vō'rēs sŭnt ăm'plĭ-ăn'dī.* Favors should be taken in an enlarged sense.

FELIX CULPA, *fē'lĭx cŭl'pă.* Happy fault.—St. Augustine. Applicable when a mistake turns out to be a benefit.

FERÆ NATURÆ, *fē'ræ nā-tū'ræ.* Of a wild nature. Applied to wild beasts.

FERVET OPUS, *fĕr'vĕt ō'pŭs.* The work goes feverishly on.—Virgil. Used in reference to bees; said of one who loves his work.

FESTINA LENTE, *fēs-tī'nā lĕn'tē.* Make haste slowly; don't rush serious work.

FIAT JUSTITIA RUAT CÆLUM, *fī'ăt jŭs-tĭ'tĭ-ă rū'ăt cæ'lŭm.* Let justice be done though the heavens should fall.

FIAT LUX, *fī'ăt lūx.* Let there be light.

FIDEI DEFENSOR, *fī'dē-ī dē-fĕn'sōr.* Defender of the faith.

FIDUS ACHATES, *fī'dŭs ă-chā'tēs* (*fī'dŭs ă-kā'tēz*). Faithful Achates.—Virgil. A trusty friend.

FIERI FACIAS, *fī'ē-rī fā'cĭ-ăs* (*fī'ē-rī fā'shĭ-ăs*). A legal paper authorizing execution on the goods of a debtor.

FINIS CORONAT OPUS, *fī'nĭs cō-rō'năt ō'pŭs.* The end crowns the work; you judge the work by the result.

FLAGRANTE DELICTO, *flă-grăn'tē dē-lĭc'tō.* The crime blazing; red-handed; in the very act.

FLUCTUAT NEC MERGITUR, *flŭc'tū-ăt nĕc mĕr'gĭ-tŭr.* Wave-tossed but does not sink. Motto of the city of Paris. One unaffected by failures.

FŒNUM HABET IN CORNU, *fœ'nŭm hă'bĕt ĭn cŏr'nū.* He has hay on his horns.—Horace. Meaning,—a dangerous fellow.

FORTITER, FIDELITER, FELICITER, *fŏr'tĭ-tĕr fī-dĕl'ĭ-tĕr fē-lĭc'ĭ-tĕr.* Boldly, faithfully, successfully.

FORTITER IN RE, *fŏr'tĭ-tĕr ĭn rē.* With firmness in action.

FUGIT IRREPARABILE TEMPUS, *fŭ'gĭt ĭr'rĕ-pā-rā'bĭ-lē tĕm'-pŭs.* Time flies, never to be recalled.—Virgil.

FUIT ILIUM, *fū'ĭt ĭ'lĭ-ŭm.* Troy *has* been; it no longer stands.—Virgil.

GAUDEAMUS IGITUR, *gaud-ē-ā'mŭs ĭ'gĭ-tŭr.* Therefore, let us rejoice,—the burden of a macaronic song.

GENS TOGATA, *gēns tō-gā'tă.* Civilians. The toga was the national dress of the Romans in time of peace.

GENUS IRRITABILE VATUM, *gē'nŭs ĭr'rĭ-tā'bĭ-lē vā'tŭm.* Irritable race of poets.—Horace. Used to express the sensitiveness of men of letters.

GLORIA IN EXCELSIS DEO, *glō'rĭ-ă ĭn ĕx-cĕl'sĭs dē'ō* (*glō'rĭ-ă ĭn ĕk-sĕl'sĭs dē'ō*). Glory to God in the highest.

GRADUS AD PARNASSUM, *grā'dŭs ăd pär-nās'sŭm.* A step to Parnassus; aid in writing Latin poetry; a work on Latin verse-making containing rules and examples.

GRÆCUM EST, NON LEGITUR, *græ'cŭm ĕst nōn lĕ'gĭ-tŭr.* It is Greek, so skip it; don't meddle with what you know nothing about.

GRATIS PRO DEO, *grā'tĭs prō dē'ō.* Freely for God,—the manner in which charity should be bestowed.

HABEAS CORPUS, *hā'bē-ăs cŏr'pŭs* (*hā'bē-ăs cōr'pŭs*). Have the body. A writ issued for the purpose of bringing a person before a court or a judge, usually to determine whether he should be retained in custody or given his freedom.

HANNIBAL AD PORTAS, *hăn'nĭ-băl ăd pōr'tās.* Hannibal at the gates; the enemy is at hand.

HIC ET NUNC, *hĭc ĕt nŭnc.* Here and now.

HIC JACET, *hĭc jā'cĕt* (*hĭk jā'sĕt*). Here lies. Inscribed on tombstones.

HINC ILLÆ LACRIMÆ, *hĭnc ĭl'læ lā'crĭ-mæ.* Hence these tears.—Terence. This is the cause of the trouble.

HODIE MIHI, CRAS TIBI, *hō'dĭ-ē mĭ'hĭ crās tī'bĭ.* Today me, tomorrow you,—a warning to prepare for trouble.

HOMO HOMINI LUPUS, *hō'mō hŏm'ĭ-nī lū'pŭs.* Man is a wolf toward his fellow man.—Plautus.

HOMO SUM; HUMANI NIHIL A ME ALIENUM PUTO, *hō'mō sŭm hū-mā'nī nĭ'hĭl ā mē ā'lĭ-ē'nŭm pū'tō.* I am a man; there is naught which touches man that is not my concern.—Terence.

HONOS ALIT ARTES, *hŏn'ŏs ā'lĭt är'tēs.* Honor nourishes the arts.—Cicero. It is indifference that kills them.

HORRESCO REFERENS, *hŏr-rēs'cō rĕ'fĕ-rēns.* I tremble telling it.—Virgil. Words often used jocosely.

HORTUS SICCUS, *hŏr'tŭs sĭc'cŭs.* A dry garden; a collection of dried plants; a herbarium.

IMPAVIDUM FERIENT RUINÆ, *ĭm-pā'vĭ-dŭm fĕr'ĭ-ĕnt rū-ĭ'næ.* The ruins of the world strike but leave him undaunted.—Horace. Said of a man of resolute character.

IMPERIUM IN IMPERIO, *ĭm-pē'rĭ-ŭm ĭn ĭm-pē'rĭ-ō.* A government existing within another. Said of a power set up against constituted authority.

IMPRIMATUR, *ĭm'prĭ-mā'tŭr.* It may be published. A censor's permission at the beginning of certain Catholic works.

IN ARTICULO MORTIS, *ĭn är-tĭc'ū-lō mōr'tĭs.* At the point of death; the same as *in extremis.*

IN CAMERA, *ĭn că'mĕ-rā.* In the judge's chamber; in secret.

IN CAUDA VENENUM, *ĭn cau'dā vē-nē'nŭm.* Poison, sting in the tail; a speech beginning blandly and ending bitingly.

INCIDIS IN SCYLLAM CUPIENS VITARE CHARYBDIN, *ĭn'cĭ-dĭs ĭn scĭl'lăm cū'pĭ-ĕns vĭ-tā'rē chă-rĭb'dĭn.* You fall into Scylla trying to avoid Charybdis; from the frying pan into the fire.

INDE IRÆ, *ĭn'dē ĭ'ræ.* Hence the reason of his anger.—Juvenal.

IN ESSE, *ĭn ĕs'sē.* In being.

IN EXTENSO, *ĭn ĕx-tĕn'sō* (*ĭn ĕks-tĕn'sō*). Entirely, at full length; as, to treat a subject *in extenso.*

IN EXTREMIS, *ĭn ĕx-trē'mĭs* (*ĭn ĕks-trē'mĭs*). In very bad circumstances; at the point of death.

INFANDUM, REGINA, JUBES RENOVARE DOLOREM, *ĭn-făn'-dŭm rē-jī'nă jū'bēs rē'nō-vā'rē dō-lō'rĕm.* You command me, O Queen, to renew unspeakable sorrow.—Virgil.

IN FORO CONSCIENTIÆ, *ĭn fō'rō cōn'scĭ-ĕn'tĭ-æ.* In the tribunal of one's own conscience; privately.

INFRA DIGNITATEM, *ĭn'frā dĭg'nĭ-tā'tĕm.* Beneath one's dignity, *infra dig.*

IN GLOBO, *ĭn glō'bō.* Altogether; taken as a whole.

IN HOC SIGNO VINCES, *ĭn hōc sĭg'nō vĭn'cēs* (*ĭn hŏk sĭg'-nō vĭn'sēz*). In this sign thou shalt conquer. The motto is said to have been adopted by Constantine after his vision of a cross in the heavens just before his decisive battle with Maxentius, 312 A. D.

INITIUM SAPIENTIÆ TIMOR DOMINI, *ĭ-nĭ'tĭ-ŭm să'pĭ-ĕn'tĭ-æ tĭm'ŏr dŏm'ĭ-nī.* The fear of the Lord is the beginning of wisdom.

IN LOCO PARENTIS, *ĭn lō'cō pā-rĕn'tĭs* (*ĭn lō'kō pā-rĕn'tĭs*). In the place of a parent.

IN MEDIAS RES, *ĭn mē'dĭ-ās rēs.* Into the middle of the subject; without wasting words.

IN MEDIO STAT VIRTUS, *ĭn mē'dĭ-ō stăt vĭr'tŭs.* Virtue stands in the middle,—equally distant from extreme views.

IN MEMORIAM, *ĭn mē-mō'rĭ-ăm* (*ĭn mē-mō'rĭ-ăm*). In memory of.

IN PERPETUAM REI MEMORIAM, *ĭn pĕr-pĕt'ū-ăm rē'ī mē-mō'rĭ-ăm.* In everlasting remembrance of the event.

IN POCULIS, *ĭn pō'cū-lĭs.* In his cups; while drunk; also *inter pocula.*

IN POSSE, *ĭn pŏs'sē.* In possible existence.

IN PROPRIA PERSONA, *ĭn prō'prĭ-ă pĕr-sō'nā.* In one's own person.

(IN) RE, *ĭn rē* (*ĭn rē*). In the matter of, concerning; as, (*in*) re the election.

IN SITU, *ĭn sĭ'tū* (*ĭn sī'tū*). In position; the actual spot. A phrase especially employed in mineralogy.

IN SOLIDO, *ĭn sŏl'ĭ-dō.* In the lump; as, to condemn a thing *in solido.*

INSTAR OMNIUM, *ĭn'stăr ŏm'nĭ-ŭm.* Like every one; as, to follow the fashion *instar omnium.*

IN STATU QUO, *ĭn stā'tū quō* (*ĭn stā'tū kwō*). In its former state.

INTEGER VITÆ SCELERISQUE PURUS, *ĭn'tē-gĕr vī'tæ scĕ'lĕ-rĭs'quĕ pū'rŭs.* A man upright in life and free from blame.—Horace.

INTELLIGENTI PAUCA, *ĭn-tĕl'lĭ-gĕn'tī pau'cā.* But few words necessary for one who is intelligent (also *verbum sapienti, verb. sap.*).

IN TEMPORE OPPORTUNO, *ĭn tĕm'pō-rē ŏp'pōr-tū'nō.* At the right moment.

INTER ALIA, *ĭn'tĕr ā'lĭ-ă* (*ĭn' tĕr ā'lĭ-ā*). Among other things.

INTER NOS, *ĭn'tĕr nōs* (*ĭn'tĕr nōs*). Between, among ourselves.

IN TOTO, *ĭn tō'tō.* In the whole; entirely.

INTUS ET IN CUTE, *ĭn'tŭs ĕt ĭn cū'tē.* Inside and under the skin. Applicable to a good judge of character.

IN VACUO, *ĭn vā'cū-ō* (*ĭn vāk'ū-ō*). In a vacuum.

IN VINO VERITAS, *ĭn vī'nō vē'rĭ-tās.* In wine there's truth; a man becomes more confidential when he drinks.

INVITA MINERVA, *ĭn-vī'tā mĭ-nĕr'vā.* In spite of Minerva.—Horace. Said of one who writes without the necessary talent.

IPSE DIXIT, *ĭp'sē dĭx'ĭt* (*ĭp'sē dĭk'sĭt*). He himself has said it; a mere assertion.

IPSISSIMA VERBA, *ĭp-sĭs'sĭ-mă vĕr'bă.* The identical words.

IPSO FACTO, *ĭp'sō făc'tō* (*ĭp'sō făk'tō*). By the very fact; actually.

IRA FUROR BREVIS EST, *ī'rā fū'rŏr brĕ'vĭs ĕst.* Anger is a short madness.—Horace.

ITA EST, *ī'tă ĕst.* It is so.

JACTA ALEA ESTO, *jăc'tā ā'lē-ā ĕs'tō.* Let the die be cast.—Julius Cæsar. It is probable that the exact words uttered by Julius Cæsar on crossing the Rubicon were from a Greek play of Menander, the Latin being a translation.

JUS CIVILE, *jūs cī-vī'lē* (*jūs sĭ-vī'lē*). The law of citizens. The Roman law applied to citizens. See *Jus gentium.*

JUS EST ARS BONI ET JUSTI, *jūs ĕst ärs bŏ'nī ĕt jūs'tī.* Right is the art of the good and of the just.

JUS ET NORMA LOQUENDI, *jūs ĕt nōr'mă lō-quĕn'dī.* The law and rule of language. Horace says that usage decides both.

JUS GENTIUM, *jūs gĕn'tĭ-ŭm* (*jūs jĕn'shĭ-ŭm*). The law of nations. The Roman law applied to foreigners, or between foreigners and citizens. See *Jus civile.*

LABOR OMNIA VINCIT IMPROBUS, *lā'bŏr ŏm'nĭ-ă vĭn'cĭt ĭm'prō-bŭs.* Stubborn labor overcomes all things.—Virgil.

LAPSUS CALAMI, *lăp'sŭs că'lă-mī* (*lăp'sŭs kăl'ă-mī*). A slip of the pen.

LAPSUS LINGUÆ, *lăp'sŭs lĭn'guæ* (*lăp'sŭs lĭng'gwē*). A slip of the tongue.

LARES ET PENATES, *lā'rēs ĕt pē-nā'tēs* (*lā'rēz ĕt pē-nā'tēz*). Household gods.

LATET ANGUIS IN HERBA, *lā'tĕt ăn'guĭs ĭn hĕr'bā.* A snake lies hid in the grass.—Virgil. Said by way of warning.

LATO SENSU, *lā'tō sĕn'sū.* In a broad sense; with a wide meaning.

LAUDATOR TEMPORIS ACTI, *lau-dā'tŏr tĕm'pō-rĭs ăc'tī.* One who praises the good old days,—generally to the disparagement of the present.—Horace.

LAUS DEO, *laus dē'ō.* Praise to God.

LEVIUS FIT PATIENTIA QUIDQUID CORRIGERE EST NEFAS, *lē'vĭ-ŭs fĭt pā'tĭ-ĕn'tĭ-ă quĭd'quĭd cŏr-rĭ'gĕ-rē ĕst nē'fās.* What cannot be cured may be lightened by patience.—Horace.

LEX TALIONIS, *lēx tăl'ĭ-ō'nĭs.* The law of retaliation.

LOCO CITATO, *lō'cō cī-tā'tō* (*lō'kō sī-tā'tō*). In the place quoted. (*loc. cit.*)

LOCO DOLENTI, *lō'cō dō-lĕn'tī.* To the sore spot. Said of applying kind words to soothe a grievance.

LOCUM TENENS, *lō'cŭm tē'nĕns* (*lō'kŭm tē'nĕnz*). One occupying a place; a substitute; a proxy.

LOCUS CLASSICUS, *lō'cŭs clăs'sĭ-cŭs* (*lō'kŭs klăs'ĭ-kŭs*). A classical passage; the acknowledged place of reference.

LOCUS SIGILLI, *lō'cŭs sĭ-jĭl'lī* (*lō'kŭs sĭ-jĭl'lī*). The place for the seal. Usually abbreviated to *L.S.*

LUCIDUS ORDO, *lū'cĭ-dŭs ōr'dō.* A clear style in speaking or writing.

LUSUS NATURÆ, *lū'sŭs nā-tū'ræ.* A sport of nature.

MAGISTER DIXIT, *mă-jĭs'tĕr dĭx'ĭt* (*mă-jĭs'tĕr dĭks'ĭt*). The master has said it,—hence no more argument.

MAGNI NOMINIS UMBRA, *măg'nī nŏm'ĭ-nĭs ŭm'brā*. The shadow of a great name.—Lucan. Said of one whose greatness is but a memory.

MAGNUM OPUS, *măg'nŭm ō'pŭs* (*măg'nŭm ō'pŭs*). A great undertaking; the great work of a man's life.

MAJOR E LONGINQUO REVERENTIA, *mā'jŏr ē lŏn-gĭn'quō rĕv'ĕr-ĕn'tĭ-ā*. Distance increases reverence. To admire at a distance; used in a humorous sense.

MAJORES PENNAS NIDO, *mā-jō'rēs pĕn'nās nī'dō*. Wings bigger than the nest; one with high aspirations.—Horace.

MALESUADA FAMES, *măl'ĕ-suā'dā fā'mēs*. Hunger is a bad adviser.—Virgil. Often it prompts to crime.

MANIBUS DATE LILIA PLENIS, *mān'ĭ-bŭs dā'tē lĭl'ĭ-ă plē'nīs*. Give lilies in handfuls,—said of one deeply mourned, especially a child.—Virgil.

MATER FAMILIAS, *mā'tĕr fă-mĭl'ĭ-ās* (*mā'tĕr fă-mĭl'ĭ-ăs*). The mother of the family.

MATERIAM SUPERABAT OPUS, *mā-tē'rĭ-ăm sŭ'pĕ-rā'băt ō'pŭs*. The workmanship surpassed the materials.—Ovid.

MAXIMA DEBETUR PUERO REVERENTIA, *măk'sĭ-mă dē-bē'tŭr pū'ĕr-ō rĕv'ĕr-ĕn'tĭ-ă*. Greatest reverence is due to a child. —Juvenal. Nothing should be said to tarnish innocence.

MEA CULPA, *mē'ă cŭl'pā* (*mē'ă kŭl'pā*). Through my fault.

MEDICE CURA TEIPSUM, *mĕd'ĭ-cē cū'rā tē-ĭp'sŭm*. Doctor, cure yourself; practice what you preach.

MELIORIBUS ANNIS, *mē-lĭ-ō'rĭ-bŭs ăn'nīs*. In better years.—Virgil.

MEMENTO HOMO QUIA PULVIS ES, *mē-mĕn'tō hŏ'mō quī'ă pŭl'vĭs ĕs*. Remember, man, thou art but dust.

MEMENTO MORI, *mē-mĕn'tō mō'rī*. Remember death.

MENS AGITAT MOLEM, *mēns ă'gĭ-tăt mō'lĕm*. The mind moves the mass; it's brains that count.

MENS SANA IN CORPORE SANO, *mēns sā-'nă ĭn cŏr'pō-rē sā-nō*. A sound mind in a sound body.—Juvenal. Often wrongly interpreted to mean that the one depends on the other.

MINIMA DE MALIS, *mĭn'ĭ-mă dē mă'lĭs*. Of evils, choose the least.

MIRABILE DICTU, *mĭ-rā'bĭ-lē dĭc'tū*. Wonderful to relate.

MIRABILE VISU, *mĭ-rā'bĭ-lē vī'sū*. A wonderful sight.

MODUS OPERANDI, *mō'dŭs ŏ'pĕ-răn'dī* (*mō'dŭs ŏp-ĕr-ăn'dī*). Mode, or manner, of working.

MODUS VIVENDI, *mō'dŭs vī-vĕn'dī* (*mō'dŭs vĭ-vĕn'dī*). Mode, or manner, of living.

MORS ULTIMA RATIO, *mŏrs ŭl'tĭ-mă rā'tĭ-ō*. Death is the last reason; it solves all riddles of life.

MULTA PAUCIS, *mŭl'tă pau'cīs*. Many things in few words; conciseness.

MULTI SUNT VOCATI, PAUCI VERO ELECTI, *mŭl'tī sŭnt vō-cā'tī pau'cī vē'rō ē-lēc'tī*. Many are called, but few are chosen.

MULTUM IN PARVO, *mŭl'tŭm ĭn pär'vō*. Much in little.

MUTATO NOMINE, *mū-tā'tō nō'mĭ-nē*. The name being changed; the story fits you.

NATURA NON FACIT SALTUS, *nā-tū'ră nōn fă'cĭt săl'tūs*. Nature does not leap or bound,—you cannot force her except at your own peril.

NECESSITAS NON HABET LEGEM, *nē-cĕs'sĭ-tās nōn hă'bĕt lē'gĕm*. Necessity knows no law.

NEC MORTALE SONANS, *nĕc mŏr-tā'lē sō'nāns*. 'Tis not a mortal voice that sounds. Applicable to great orators and poets.

NEC TEMERE, NEC TIMIDE, *nĕc tĕm'ĕ-rē nĕc tĭm'ĭ-dē*. Neither rashly nor timidly.

NE PLUS ULTRA, *nē plŭs ŭl'trā* (*nē plŭs ŭl'tră*). Nothing beyond. The *ne plus ultra* of elegance; also *nec* or *non plus ultra*. Hercules engraved these words on the summits of Abyla and Calpe, the modern Iebel Musa and Gibraltar, the "Pillars of Hercules."

NEQUE SEMPER ARCUM TENDIT APOLLO, *nē'quē sĕm'pĕr är'cŭm tĕn'dĭt ă-pŏl'lō*. Apollo is not always stretching his bow.—Horace. Apollo is not always the angry god of pestilence and sudden death; he is sometimes the kindly god of art and of healing.

NE QUID NIMIS, *nē quĭd nĭ'mĭs*. Let there be nothing too much; excess is a fault.

NESCIT VOX MISSA REVERTI, *nĕ'scĭt vŏx mĭs'să rĕ-vĕr'tī*. A word uttered cannot be recalled.

NIHIL OBSTAT, *nī'hĭl ŏb'stăt*. Nothing prevents; there is no objection. A phrase sometimes placed at the beginning of books. See *Imprimatur*.

NIL ADMIRARI, *nĭl ăd'mĭ-rā'rī*. To be astonished at nothing. —Horace. A *nil admirari* state of mind.

NIL DESPERANDUM, *nĭl dĕ'spē-răn'dŭm*. Never despair.—Horace.

NIL MEDIUM EST, *nĭl mē'dĭ-ŭm ĕst*. There is no middle course.

NIL NOVI SUB SOLE, *nĭl nō'vī sŭb sō'lē*. Nothing new under the sun.

NOLENS VOLENS, *nō'lĕns vō'lĕns* (*nō'lĕnz vō'lĕnz*). Whether one will or not.

NOLI ME TANGERE, *nō'lī mē tăn'gĕ-rē*. Touch me not.

NOLLE PROSEQUI, *nŏl'lē prō'sĕ-quī* (*nŏl'ē prŏs'ĕ-kwī*). To be unwilling to proceed. A legal phrase to indicate the abandonment of a suit.

NON DECET, *nŏn dē'cĕt*. It is not proper, feasible.

NON EST, *nŏn ĕst* (*nŏn ĕst*). It is not; wanting; minus.

NON IGNARA MALI MISERIS SUCCURRERE DISCO, *nŏn ĭg-nā'rā mă'lī mĭs'ĕ-rĭs sŭc-cŭr'rĕ-rĕ dĭs'cō*. Knowing misfortune, I hasten to help the unfortunate.

NON LICET OMNIBUS ADIRE CORINTHUM, *nŏn lī'cĕt ŏm'nĭ-bŭs ăd-ī'rĕ cŏ-rĭn'thŭm*. Every one cannot go to Corinth; we cannot all take a holiday, through want of funds.

NON LIQUET, *nŏn lī'quĕt*. It does not flow; it is obscure, not quite clear.

NON MULTA, SED MULTUM, *nŏn mŭl'tă sĕd mŭl'tŭm*. Not many things, but much; quality, not quantity.

NON NOVA SED NOVE, *nŏn nŏ'vă sĕd nō'vē*. Not new things, but old things in a new manner.

NON OMNIA POSSUMUS OMNES, *nŏn ŏm'nĭ-ă pŏs'sŭ-mŭs ŏm'nēs*. We cannot all of us do everything.—Virgil.

NON OMNIS MORIAR, *nŏn ŏm'nĭs mŏ'rĭ-ăr*. I shall not altogether die; my good works will survive me.—Horace.

NON POSSUMUS, *nŏn pŏs'sŭ-mŭs* (*nŏn pŏs'ŭ-mŭs*). We cannot,—an irrevocable refusal; as, to utter a *non possumus*.

NON SEQUITUR, *nŏn sĕ'quĭ-tŭr* (*nŏn sĕk'wĭ-tŭr*). It does not follow; an unwarranted conclusion.

NOSCE TEIPSUM, *nō'scĕ tē-ĭp'sŭm*. Know thyself. From the Greek inscription written over the entrance to the Delphian temple.

NOTA BENE, *nō'tă bē'nē* (*nō'tă bē'nĕ*). Mark well; give good heed. *N. B.*

NOVISSIMA VERBA, *nō-vĭs'sĭ-mă vĕr'bă*. The last (dying) words; often, the latest news.

NOVUS HOMO, *nō'vŭs hŏ'mō* (*nō'vŭs hō'mō*). A new man; one who has raised himself from obscurity.

NUMERO DEUS IMPARE GAUDET, *nū'mĕ-rō dē'ŭs ĭm'pă-rē gau'dĕt*. There's luck in odd numbers.—Virgil.

NUNC EST BIBENDUM, *nŭnc ĕst bĭ-bĕn'dŭm*. It is time for a drink.—Horace.

OBIIT, *ŏb'ĭ-ĭt*. He (or she) died.

OBITER DICTA, *ŏb'ĭ-tĕr dĭc'tă*. Things said incidentally; an unofficial expression or opinion.

OCULOS HABENT ET NON VIDEBUNT, *ŏc'ŭ-lōs hă'bĕnt ĕt nŏn vī-dē'bŭnt*. They have eyes but will not see. Said of those who are obstinate.

ODERINT DUM METUANT, *ō'dĕr-ĭnt dŭm mĕt'ŭ-ănt*. Let them hate as long as they fear me.—Cicero.

ODIOSA SUNT RESTRINGENDA, *ō'dĭ-ō'să sŭnt rĕ'strĭn-gĕn'dă*. Vexatious rules should be taken in a restricted sense.

ODI PROFANUM VULGUS, *ō'dī prō-fā'nŭm vŭl'gŭs*. I hate the vulgar crowd.—Horace.

ODIUM THEOLOGICUM, *ō'dĭ-ŭm thē'ō-lŏ'jĭ-cŭm* (*ō'dĭ-ŭm thē'ō-lŏ'jĭ-cŭm*). The hatred of theologians.

O FORTUNATOS NIMIUM! *ō fōr'tū-nā'tōs nĭm'ĭ-ŭm*. O you who are too well off (and don't know it)!—Virgil.

OLEUM PERDIDISTI, *ō'lĕ-ŭm pĕr'dĭ-dĭs'tī*. You have wasted your oil; trouble for nothing.

OMNE IGNOTUM PRO MAGNIFICO EST, *ŏm'nē ĭg-nō'tŭm prō māg-nĭ'fĭ-cō ĕst*. Everything unknown is magnified; distance lends enchantment.—Tacitus.

OMNIA MECUM PORTO, *ŏm'nĭ-ă mē'cŭm pŏr'tō*. I carry all my belongings (my brains) with me.

OMNIA VINCIT AMOR, *ŏm'nĭ-ă vĭn'cĭt ă'mŏr*. Love conquers all things.—Virgil.

ONUS PROBANDI, *ō'nŭs prō-băn'dī* (*ō'nŭs prō-băn'dī*). The burden of proving. It rests with him who makes a gratuitous statement.

ORA PRO NOBIS, *ō'rā prō nō'bīs*. Pray for us.

ORE ROTUNDO, *ō'rē rō-tŭn'dō*. With rounded mouth; with polished words.—Horace.

O SANCTA SIMPLICITAS! *ō sāncʻtă sĭm-plĭ'cĭ-tās*. O blessed simplicity!—said ironically.

OS MAGNA SONATURUM, *ŏs māg'nă sō'nā-tū'rŭm*. A mouth for sublime speech.—Horace. One who possesses the gift of eloquent utterance.

O TEMPORA! O MORES! *ō tĕm'pō-rā ō mō'rēs*. Alas, for the age we live in and its manners!—Cicero.

O TERQUE QUATERQUE BEATI! *ō tĕr'quĕ quă-tĕr'quĕ bē-ā'tī*. O thrice and again happy!—Virgil. Meaning,—those who die for their country.

OTIUM CUM DIGNITATE, *ō'tĭ-ŭm cŭm dĭg'nĭ-tā'tē*. Ease with dignity.—Cicero. A phrase applied humorously to stout people.

O UBI CAMPI! *ō ū'bī cămʻpī*. O where are the green fields! —Virgil. A cry of regret after one's holidays.

PALMA NON SINE PULVERE, *păl'mă nōn sĭ'nĕ pŭl'vĕ-rĕ*. The palm (of victory) is not gained without dust; no excellence without great labor. A paraphrase from Horace.

PANEM ET CIRCENSES, *pā'nĕm ĕt cĭr-cĕn'sēs*. Bread and the games.—Juvenal. Words applied contemptuously to those who think only of pleasure.

PAR PARI REFERTUR, *pār pā'rī rĕ-fĕr'tŭr*. Like is paid by like; an eye for an eye.

PARTICEPS CRIMINIS, *pär'tĭ-cĕps crĭ'mĭ-nĭs* (*pär'tĭ-sĕps crĭ'mĭ-nĭs*). An accomplice.

PARTURIUNT MONTES, NASCETUR RIDICULUS MUS, *pär-tū'rĭ-ŭnt mŏn'tēs nās-cē'tur rĭ-dĭ'cū-lŭs mūs.* The mountains labor, a ridiculous mouse will be born; big boasting results in nothing.—Horace.

PATER FAMILIAS, *pā'tĕr fă-mĭl'ĭ-ăs* (*pā'tĕr fă-mĭl'ĭ-ăs*). The father of the family.

PATER NOSTER, *pā'tĕr nŏs'tĕr* (*pā'tĕr nŏs'tĕr*). Our father.

PATER PATRIÆ, *pā'tĕr pā'trĭ-æ.* The father of his country.

PATRES CONSCRIPTI, *pā'trēs cŏn-scrĭp'tī* (*pā'trēz kŏn-skrĭp'tī*). The conscript fathers; the Roman senate. The words are often jocularly applied to the members of a town council.

PAUCA SED BONA, *pau'că sĕd bŏ'nă.* A few things, but good things.

PAULO MAJORA CANAMUS, *pau'lō mā-jō'rā că-nā'mŭs.* Let us sing of things more elevating.—Virgil. Let us change the subject.

PAX VOBISCUM! *păx vō-bĭs'cŭm.* Peace be with you!

PECCAVI, *pĕc-cā'vī.* I have sinned. Used to acknowledge one's mistake.

PECTUS EST QUOD DISERTOS FACIT, *pĕc'tŭs ĕst quŏd dĭ-sĕr'tōs fā'cĭt.* 'Tis the heart that speaks eloquently.—Quintilian.

PEDE PŒNA CLAUDO, *pē'dē pœ'nă clau'dō.* Punishment follows on a lame leg.—Horace. Punishment may lag, but it seldom fails to overtake the criminal.

PER FAS ET NEFAS, *pĕr fās ĕt nē'fās.* By fair means and foul; by hook or by crook.

PERINDE AC CADAVER, *pĕr-ĭn'dē ăc că-dā'vĕr.* Just as a corpse; to have no will of one's own. The rule of obedience among the Jesuits except in cases of conscience.

PER JOCUM, *pĕr jō'cŭm.* For fun.

PER JOVEM! *pĕr jō'vĕm.* By Jove! By Jupiter!

PER SALTUM, *pĕr săl'tŭm.* By a jump. To get a rise above others *per saltum*.

PERSONA GRATA, *pĕr-sō'nă grā'tă.* A favored person; one always welcome.

PISCEM NATARE DOCES, *pĭs'cĕm nă-tā'rē dō'cēs.* You are teaching a fish to swim,—an absurd task because he knows all about it.

PLERUMQUE FIT, *plē-rŭm'quē fĭt.* What happens oftenest; the rule, not the exception.

PLURIMA MORTIS IMAGO, *plū'rĭ-mă mŏr'tĭs ĭ-mā'gō.* Death under a thousand aspects.—Virgil.

PLUS ÆQUO, *plūs æ'quō.* More than what is reasonable.

POETA NASCITUR, ORATOR FIT, *pō-ē'tă nās'cĭ-tŭr ō-rā'tŏr fĭt.* The poet is born, the orator made. The French say: "You can learn to cook but not to grill."

PONS ASINORUM, *pŏns ă'sĭ-nō'rŭm* (*pŏnz ăs'ĭ-nō'rŭm*). The bridge of asses.

POST EQUITEM SEDET ATRA CURA, *pŏst ē'quĭ-tĕm sē'dĕt ā'tră cū'ră.* Dark care is in the saddle behind the rider.—Horace. Wealth and high position cannot rid one of care.

POST HOC ERGO PROPTER HOC, *pŏst hŏc ĕr'gō prŏp'tĕr hŏc.* After that, therefore, on account of that; bad logic, taking an antecedent always as a cause.

POTIUS MORI QUAM FŒDARI, *pō'tĭ-ŭs mō'rī quăm fœ-dā'rī.* Death before dishonor.

PRIMA FACIE, *prī'mā fā'cĭ-ē* (*prī'mă fā'shĭ-ē*). At the first glance; as, *prima facie* evidence.

PRIMO MIHI, *prī'mō mī'hĭ.* First of all myself. Motto of the egotist.

PRIMUM VIVERE DEINDE PHILOSOPHARI, *prī'mŭm vĭv'ē-rē dē-ĭn'dē phĭ-lŏ'sŏ-phā'rī.* Earn your living first, then you may talk.

PRIMUS INTER PARES, *prī'mŭs ĭn'tĕr pā'rēs.* First among equals; for example, the president of a republic.

PRINCIPIA, NON HOMINES, *prĭn-cĭ'pĭ-ă nŏn hŏ'mĭ-nēs.* Principles, not men.

PRO ARIS ET FOCIS, *prō ā'rĭs ĕt fō'cīs.* For altars and hearths; for faith and fatherland.

PRO BONO PUBLICO, *prō bō'nō pŭb'lĭ-cō* (*prō bŏ'nŏ pŭb'lĭ-kō*). For the public good.

PRO FORMA, *prō fōr'mā.* As a matter of form.

PROH PUDOR! *prōh pū'dŏr.* For shame!

PROPAGANDA FIDE, *prō'pā-găn'dā fī'dē* (*prō'pā-găn'dă fī dē*). For extending the faith.

PRO REGE SÆPE, PRO PATRIA SEMPER, *prō rē'gē sæ'pē prō pā'trĭ-ā sĕm'pĕr.* For the king often, for my country always.

PRO TEMPORE, *prō tĕm'pō-rē* (*prō tĕm'pō-rē*). For the time being. *Pro tem.*

PULCHRE, BENE, RECTE! *pŭl'chrē bē'nē rēc'tē.* Beautiful, splendid, perfect!—Horace. A phrase implying that those who use exaggerated praise are to be distrusted.

PULSATE ET APERIETUR VOBIS, *pŭl-sā'tē ĕt ă-pĕr'ĭ-ē'tŭr vō'bĭs.* Knock and it shall be opened to you; perseverance is the key to success.

PUNICA FIDES, *pū'nĭ-că fī'dēs* (*pū'nĭ-kă fī'dēz*). Carthaginian faith; a worthless something.

QUÆRENS QUEM DEVORET, *quæ'rēns quĕm dē'vō-rĕt.* Seeking whom he may devour. Said of one who is fond of wrangling.

QUALIS PATER TALIS FILIUS, *quā'lĭs pā'tĕr tā'lĭs fĭ'lĭ-ŭs.* Like father, like son; a chip of the old block.

QUANDOQUE BONUS DORMITAT HOMERUS, *quăn-dō'quē bō'nŭs dōr-mĭ'tăt hŏ-mē'rŭs.* Even the good Homer sometimes nods.—Horace. Not even the greatest always excel.

QUID NUNC? *quĭd nŭnc* (*quĭd nŭnc*). What now? A newsmonger or gossip.

QUOD ERAT DEMONSTRANDUM, *quŏd ĕ'răt dē'mŏn-străn'dŭm* (*kwŏd ĕr'ăt dē'nŏn-străn'dŭm*). Which was to be proved. *Q.E.D.*

QUOD ERAT FACIENDUM, *quŏd ĕ'răt fā'cĭ-ĕn'dŭm.* Which was to be done. *Q.E.F.*

QUOD SCRIPSI SCRIPSI, *quŏd scrĭp'sī scrĭp'sī.* What I have written, I have written. To express an unalterable decision. Words attributed to Pontius Pilate.

QUOMODO VALES? *quō'mō-dō vā'lēs.* How are you?

QUOT HOMINES, TOT SENTENTIÆ, *quŏt hŏ'mĭ-nēs tŏt sĕn-tĕn'tĭ-æ.* As many opinions as there are persons.—Terence. Too many cooks spoil the broth.

RARA AVIS IN TERRIS, *rā'rā ā'vĭs ĭn tĕr'rĭs.* A rare bird on earth.—Juvenal. Sometimes used of a sly or knowing person.

RARI NANTES IN GURGITE VASTO, *rā'rī năn'tēs ĭn gŭr'gĭ-tē vās'tō.* Wreckage floating here and there in the vast abyss.—Virgil.

REDUCTIO AD ABSURDUM, *rē-dŭc'tĭ-ō ăd ăb-sŭr'dŭm* (*rē-dŭk-shĭ-ō ăd ăb-sŭr'dŭm*). A reducing to an absurdity.

RELIGIO LAICI, *rē-lĭ'jĭ-ō lā'ĭ-cī* (*rē-lĭj'ĭ-ō lā'ĭ-sī*). The religion of a layman.

RELIGIO MEDICI, *rē-lĭ'jĭ-ō mĕ'dĭ-cī* (*rē-lĭj'ĭ-ō mĕd'ĭ-sī*). The religion of a physician.

REQUIESCAT IN PACE, *rē'quĭ-ēs'căt ĭn pā'cē* (*rēk'wĭ-ēs'kăt ĭn pā'sē*). May he rest in peace. *R.I.P.*

RES ANGUSTA DOMI, *rēs ăn-gŭs'tă dō'mī.* The poverty at home,—which a man hides, and on account of which he fails to succeed.—Juvenal.

RES JUDICATA, *rēs jū'dĭ-cā'tă.* A matter decided; a case already settled. The French phrase is *chose jugée*.

RES, NON VERBA, *rēs nōn vĕr'bă.* Deeds not words. The secret of success.

RES SACRA MISER, *rēs să'cră mĭ'sĕr.* Misfortune is sacred; that is, we should respect it.—Seneca.

RISUM TENEATIS? *rī'sŭm tĕn'ē-ā'tĭs.* Can you help laughing (the thing is so absurd)?—Horace.

RUS IN URBE, *rŭs ĭn ŭr'bē* (*rŭs ĭn ŭr'bē*). A residence in or near town, with many of the advantages of the country.

SALUS POPULI SUPREMA LEX, *să'lūs pŏ'pŭ-lī sū-prē'mă lēx.* The welfare of the people is the first law.—From the Laws of the XII Tables.

SANCTUM SANCTORUM, *săn'tŭm săn-tō'rŭm* (*săn'k'tŭm săn-tō'rŭm*). The holy of holies.

SAPIENS NIHIL AFFIRMAT QUOD NON PROBET, *să'pĭ-ĕns nĭ'hĭl ăf-fĭr'măt quŏd nōn prŏ'bĕt.* A wise man says nothing he cannot prove.

SEDET ÆTERNUMQUE SEDEBIT, *sē'dĕt æ'tĕr-nŭm'quē sē-dē'bĭt.* There he sits and will sit forever.—Virgil. Jocosely applied to one who likes to see *others* work.

SEMPER FIDELIS, *sĕm'pĕr fĭ-dē'lĭs.* Always faithful.

SERVUS SERVORUM DEI, *sĕr-vŭs sĕr-vō'rŭm dē'ī.* Servant of the servants of God. A title used by the pope.

SESQUIPEDALIA VERBA, *sēs'quĭ-pē-dā'lĭ-ă vĕr'bă.* Words a foot and a half long.—Horace. Pompous twaddle with little meaning.

SIC SEMPER TYRANNIS, *sĭc sĕm'pĕr tĭ-răn'nĭs* (*sĭk sĕm'pĕr tĭ-răn'ĭs*). Ever thus to tyrants. The motto of Virginia.

SIC TRANSIT GLORIA MUNDI, *sĭc trăn'sĭt glō'rĭ-ă mŭn'dī.* Thus passes the glory of the world. Words addressed to the pope on his election,—accompanied by the burning of flax.

SIC VOS NON VOBIS, *sĭc vōs nŏn vō'bĭs.* You work, others reap the benefit.—Virgil.

SILENT LEGES INTER ARMA, *sī'lĕnt lē'gēs ĭn'tĕr ăr'mă.* The laws are silent in the midst of arms.—Cicero.

SIMILIA SIMILIBUS CURANTUR, *sĭ-mĭl'ĭ-ă sĭ-mĭl'ĭ-bŭs cū-răn'tŭr.* Like things are cured by like. The principle of homeopathy.

SI MONUMENTUM REQUIRIS, CIRCUMSPICE, *sī mŏn'ū-mĕn'tŭm rē-quī'rĭs cĭr-cŭm'spĭ-cē.* If you seek my monument, look around. The epitaph of Sir Christopher Wren in St. Paul's Cathedral, of which he was the architect.

SINE DIE, *sī'nē dī'ē* (*sī'nē dī'ē*). Without a day; finally. E.g., an adjournment *sine die*.

SINE QUA NON, *sī'nē quā nōn* (*sī'nē kwā nŏn*). Without which, not; essential; as, a *sine qua non* condition.

SINITE PARVULOS VENIRE AD ME, *sī'nĭ-tē pär'vŭ-lōs vē-nī'rē ăd mē.* Let the little ones come to me.

SI PARVA LICET COMPONERE MAGNIS, *sī pär'vă lī'cĕt cŏm-pō'nē-rē māg'nīs.* If it be allowed to compare small things with great.—Virgil.

SIT PRO RATIONE VOLUNTAS, *sĭt prō rā'tĭ-ō'nē vō-lŭn'tās.* Let my wish stand for the reason.—Juvenal.

SIT TIBI TERRA LEVIS, *sĭt tĭb'ĭ tĕr'ră lē'vĭs.* May the earth lie light on thee. Said in touching reference to one who is dead.

SI VIS PACEM PARA BELLUM, *sī vĭs pā'cĕm pär'ă bĕl'lŭm.* If you wish peace, prepare for war. A specious maxim.

SOLITUDINEM FACIUNT, PACEM APPELLANT, *sŏ'lĭ-tū'dĭ-nĕm fă'cĭ-ŭnt pā'cĕm ăp-pĕl'lănt.* They make a wilderness and call it peace.—Tacitus.

SOL LUCET OMNIBUS, *sōl lū'cĕt ŏm'nĭ-bŭs.* The sun shines for all; even the poorest have certain natural rights.

SOLVE SENESCENTEM, *sŏl'vĕ sĕ'nĕs-cĕn't'ĕm.* Unharness your horse, he's getting old; those advanced in age should retire from business.—Horace.

SPIRITUS PROMPTUS EST, CARO AUTEM INFIRMA, *spĭr'ĭ-tŭs prŏmp'tŭs ĕst că'rō au'tĕm ĭn-fĭr'mă.* The spirit is willing, but the flesh is weak; good-natured but indolent.

SPLENDIDE MENDAX, *splĕn'dĭ-dē mĕn'dăx.* Nobly untruthful; untrue for a good object.—Horace. Often used ironically of an unblushing liar.

STANS PEDE IN UNO, *stănz pē'dē ĭn ū'nō.* Standing on one leg; performing a task with ridiculous ease.—Horace.

STATU QUO ANTE BELLUM, *stă'tū quō ăn'tē bĕl'lŭm (stă'tû kwō ăn'tē bĕl'ŭm).* As things were before the war, or in *statu quo.* Used to express the unchanged state of things in general.

STULTORUM INFINITUS EST NUMERUS, *stŭl-tō'rŭm ĭn'fĭ-nĭ'-tŭs ĕst nū'mĕr-ŭs.* The number of fools is infinite.

SUB LEGE LIBERTAS, *sŭb lē'gē lī-bĕr'tăs.* Liberty under the law; the only freedom compatible with order.

SUB PŒNA, *sŭb pæ'nă (sŭb pē'nă).* Under a penalty. A judicial writ requiring attendance at a certain time and place under penalty.

SUB ROSA, *sŭb rō'să (sŭb rō'zâ).* Under the rose; secretly.

SUB SPECIE, *sŭb spē'cĭ-ē.* Under the appearance of.

SUFFICIT DIEI MALITIA SUA, *sŭf'fĭ-cĭt dĭ-ē'ĭ mă-lĭ'tĭ-ă sū'ă.* Sufficient for the day is the evil thereof; don't meet trouble halfway.

SUI GENERIS, *sū'ĭ gĕ'nĕr-rĭs (sū'ĭ jĕn'ĕr-ĭs).* Of its own kind; unlike any other.

SUMMUM JUS, SUMMA INJURIA, *sŭm'mŭm jŭs sŭm'mă ĭn-jū'rĭă.* Excess of justice is excess of injustice; the law applied too vigorously.—Cicero.

SUNT LACRIMÆ RERUM, *sŭnt lă'crĭ-mæ rē'rŭm.* There are tears for suffering.—Virgil.

SUNT VERBA ET VOCES PRÆTEREAQUE NIHIL, *sŭnt vĕr'bă ĕt vō'cēs præ-tē'rē-ă'quĕ nĭ'hĭl.* Words and sounds and nothing else; empty talk.

SUO TEMPORE, *sū'ō tĕm'pō-rē.* In its own time.

SUPREMUM VALE, *sū-prē'mŭm vă'lē.* Farewell for the last time.—Ovid.

SURSUM CORDA, *sŭr'sŭm cŏr'dă.* Lift up your hearts; take courage.

SUSTINE ET ABSTINE, *sŭs'tĭ-nē ĕt ăb'stĭ-nē.* Put up with evils and restrain yourself.

SUTOR NE SUPRA CREPIDAM, *sū'tŏr nē sū'prā crē'pĭ-dăm.* Let the cobbler stick to his last.—Pliny.

TÆDIUM VITÆ, *tæ'dĭ-ŭm vī'tæ (tē'dĭ-ŭm vī'tē).* The weariness of life, which comes from doing nothing.

TARDE VENIENTIBUS OSSA, *tär'dē vē'nĭ-ĕn'tĭ-bŭs ŏs'să.* The bones for the late comers; negligence is its own reward.

TE DEUM LAUDAMUS, *tē dē'ŭm lau-dā'mŭs (tē dē'ŭm lô-dā'-mŭs).* We praise thee, O God.

TELUM IMBELLE SINE ICTU, *tē'lŭm ĭm-bĕl'lē sī'nē ĭc'tū.* A toy arrow without force; an insult to a man of integrity.

TEMPORA SI FUERINT NUBILA, SOLUS ERIS, *tĕm'pō-rā sī fū'ĕr-ĭnt nū'bĭ-lă sō'lŭs ĕr'ĭs.* If times be cloudy, you will be alone (in reference to fair-weather friends).—Ovid.

TEMPUS EDAX RERUM, *tĕm'pŭs ē'dăx rē'rŭm.* Time is the devourer of all things.—Ovid.

TEMPUS FUGIT, *tĕm'pŭs fū'gĭt (tĕm'pŭs fū'jĭt).* Time flies.

TEMPUS OMNIA REVELAT, *tĕm'pŭs ŏm'nĭ-ă rē-vĕ'lăt.* Time reveals all things.

TENERE LUPUM AURIBUS, *tĕn-ē'rē lū'pŭm au'rĭ-bŭs.* To take the wolf by the ears, the bull by the horns; to overcome a difficulty courageously.

TERES ATQUE ROTUNDUS, *tē'rēs ăt'quĕ rō-tŭn'dŭs.* Smooth and round; polished and complete,—said of a wise man.

TERMINUS AD QUEM, *tĕr'mĭ-nŭs ăd quĕm.* The limit to which; the goal.

TERMINUS A QUO, *tĕr'mĭ-nŭs ā quō.* The limit from which; the starting point.

TERRA FIRMA, *tĕr'ră fĭr'mă (tĕr'à fĕr'mà).* The firm land; the continent.

TERRA INCOGNITA, *tĕr'ră ĭn-cŏg'nĭ-tă (tĕr'à ĭn-kŏg'nĭ-tă).* An unknown land.

TERTIUM QUID, *tĕr'tĭ-ŭm quĭd (tĕr'shĭ-ŭm kwĭd).* A third something, produced by the union of two different things or the collision of two opposing forces.

TESTIS UNUS TESTIS NULLUS, *tĕs'tĭs ū'nŭs tĕs'tĭs nŭl'lŭs.* One witness is no witness,—a legal axiom.

TIBI GRATIAS, *tĭb'ĭ grā'tĭ-ăs.* Thank you.

TIMEO DANAOS ET DONA FERENTES, *tĭm'ĕ-ō dā'nā-ōs ĕt dō'nă fĕ-rĕn'tēs.* I fear the Greeks even when they bring gifts. The guileful should never be trusted.—Virgil.

TIMEO HOMINEM UNIUS LIBRI, *tĭm'ĕ-ō hŏm'ĭ-nĕm ū-nī'ŭs lĭ'brī.* I fear the man of one book; he who possesses thorough knowledge of a book is a redoubtable adversary. —St. Thomas Aquinas.

TROS TYRIUSQUE MIHI NULLO DISCRIMINE AGETUR, *trŏs tĭr'ĭ-ŭs'quĕ mĭ'hī nŭl'lō dĭs-crĭ'mĭ-nē ă-gē'tŭr.* Trojan and Tyrian shall have the same treatment from me.

TU ES ILLE VIR! *tū ĕs ĭl'lē vĭr.* Thou art that man! Used often by way of comic denouncement.

TU QUOQUE, *tū quŏ'quĕ (tû kwō'kwē).* Thou also; a *tu quoque* argument, that is, a weak and worthless one.

UBI BENE IBI PATRIA, *ū'bĭ bē'nē ĭ'bĭ pā'trĭ-ă.* Where one is well off, there is his country. A paraphrase of Pacuvius.

ULTIMA RATIO REGUM, *ŭl'tĭ-mă rā'tĭ-ō rē'gŭm.* The last argument of kings,—engraved on French cannon by order of Louis XIV.

ULTRA VIRES, *ŭl'trā vī'rēs (ŭl'trà vī'rēz).* Beyond power; transcending authority. A phrase used frequently in relation to acts by corporations in excess of their legal rights.

UNGUIBUS ET ROSTRO, *ŭn'guĭ-bŭs ĕt rōs'trō.* With claws and beak; tooth and nail.

URBI ET ORBI, *ŭr'bĭ ĕt ôr'bĭ.* To the city (of Rome) and to the universe. The pope gives a blessing *urbi et orbi.*

USQUE AD NAUSEAM, *ŭs'quĕ ăd nau'sē-ăm (ŭs'kwē ăd nâ'-sē-ăm).* To disgust.

UT INFRA; UT SUPRA, *ŭt ĭn'frā ŭt sū'prā.* As below; as above (quoted). Direction notes in books.

VADE MECUM, *vā'dē mē'cŭm (vā'dē mē'cŭm).* Go with me; a constant companion.

VADE RETRO SATANA! *vā'dē rē'trō sā'tă-nă.* Get behind me, Satan! Used jocosely to refuse a tempting invitation.

VÆ VICTIS, *væ vĭc'tĭs.* Woe to the conquered. Said to have been the exclamation of Brennus, when he threatened to exterminate the Romans.

VANITAS VANITATUM ET OMNIA VANITAS, *vān'ĭ-tās vān'ĭ-tā'-tŭm ĕt ŏm'nĭ-ă vān'ĭ-tās.* Vanity of vanities and all is vanity.

VARIORUM, *vā'rĭ-ō'rŭm.* Of various things. With the comments of various critics; as, a *variorum* edition of Shakspere.

VELUT ÆGRI SOMNIA, *vĕl'ŭt æ'grī sŏm'nĭ-ă.* Like the dreams of a sick man.—Horace. Said of a book written incoherently.

VENI, VIDI, VICI, *vē'nī vī'dī vī'cī (vē'nī vī'dī vī'sī).* I came, I saw, I conquered. The laconic dispatch in which Julius Cæsar announced to the Senate his victory in Asia Minor.

VERA INCESSU PATUIT DEA, *vē'rā ĭn-cĕs'sū pă'tŭ-ĭt dē'ă.* In her walk was revealed the true goddess.—Virgil. Applied to a woman of great dignity.

VERBA VOLANT SCRIPTA MANENT, *vĕr'bă vō'lănt scrĭp'tă mă'nĕnt.* Spoken words fly; those written remain.

VERITAS ODIUM PARIT, *vĕr'ĭ-tās ō'dĭ-ŭm păr'ĭt.* Truth engenders hatred.—Terence.

VESTIGIA NULLA RETRORSUM, *vĕs-tĭ'jĭ-ă nŭl'lă rē-trōr'sŭm.* No footsteps backward.—Horace.

VIA MEDIA, *vī'ă mē'dĭ-ă (vī'à mē'dĭ-à).* A middle course.

VICE VERSA, *vī'cē vĕr'să (vī'sē vĕr'sà).* The terms being interchanged.

VIDEO LUPUM, *vĭd'ĕ-ō lū'pŭm.* I see a wolf. Said as a warning against an approaching parasite.

VI ET ARMIS, *vī ĕt ăr'mĭs.* By main force.

VIR BONUS DICENDI PERITUS, *vĭr bō'nŭs dĭ-cĕn'dī pē-rī'tŭs.* A good man skilled in the art of speaking. The Roman definition of an orator.

VIRES ACQUIRIT EUNDO, *vī'rēs ăc-quī'rĭt ĕ-ŭn'dō.* It gathers strength as it goes.—Virgil. Calumny; scandal.

VIRTUS POST NUMMOS, *vĭr'tŭs pōst nŭm'mōs.* Virtue after wealth. Virtue is not a bad thing to acquire, but money is more important.—Horace.

VIS A TERGO, *vĭs ā tĕr'gō.* Force from the rear.

VIS COMICA, *vĭs cŏm'ĭ-că.* The comic element or power; the gift of causing laughter.—Julius Cæsar.

VIS INERTIÆ, *vĭs ĭn-ĕr'tĭ-æ (vĭs ĭn-ĕr'shĭ-ē).* The power of inertia.

VIVA VOCE, *vī'vā vō'cē (vī'và vō'sè).* With the living voice; by word of mouth.

VIVE VALEQUE! *vī'vĕ vă'lĕ-quĕ.* Long life and prosperity!—Horace. Used at the end of letters.

VIVIT SUB PECTORE VULNUS, *vī'vĭt sŭb pĕc'tŏ-rē vŭl'nŭs.* The wound is still in her heart.—Virgil. An unforgetable sorrow.

VOLENTI NON FIT INJURIA, *vŏ-lĕn'tī nōn fĭt ĭn-jū'rĭ-ă.* No injury is done to a consenting party.

VOX CLAMANTIS IN DESERTO, *vŏx clă-măn'tĭs ĭn dē-sĕr'tō.* A voice crying in the wilderness. Said of one whose advice is not heeded.

VOX ET PRÆTEREA NIHIL, *vŏx ĕt præ-tē'rē-ă nĭ'hĭl.* A voice and nothing more; sound without sense.

VOX FAUCIBUS HÆSIT, *vŏx fau'cĭ-bŭs hæ'sĭt.* My voice stuck in my throat.—Virgil. Used to express horror in speaking about a certain subject.

VOX POPULI VOX DEI, *vŏx pŏ'pŭ-lī vŏx dē'ī (vŏks pŏp'ŭ-lī vŏks dē'ī).* The voice of the people, God's voice.

VULNERANT OMNES, ULTIMA NECAT, *vŭl'nĕ-rănt ŏm'nēs ŭl'tĭ-mă nē'căt.* They all wound, the last kills. An inscription found on old clocks referring to the hours.

WORDS AND PHRASES FROM MODERN LANGUAGES

All phrases from the Italian are marked (It.); those from the Spanish, (Sp.); and those from the German, (Ger.). The unmarked phrases are from the French.

The key to pronunciation of the following list of words and phrases will be found in the introductory pages of this volume.

ABANDON, *ă'bän'dôn'*. Unconstraint; an amiable negligence in speech or manner.

À BAS, *à bä'*. Down with (disapproving).

À BAS L'INJUSTICE, *à bä' lăn'zhûs'tēs'*. Down with injustice.

À BOUT PORTANT, *à bōō' pôr-tän'*. Quite close; point blank.

ABSENCE D'ESPRIT, *ăp'säNs' dĕs'prē'*. Absence of mind.

À CHEVAL, *à shĕ-văl'*. On horseback.

A CHI VUOLE, NON MANCANO MODI (It.), *ä kē vwō'lĕ nōn mäng'kä-nō mō'dē*. Where there's a will, there's a way.

A CHICO PAJARILLO CHICO NIDILLO (Sp.), *ä chē'kō pä-hä-rēl'yō chē'kō nē-thēl'yō*. Little bird, little nest; adapt your manners to your company.

A COMPTE, *à kôNt'*. On account.

À CORPS PERDU, *à kôr' pĕr'dü'*. Headlong; desperately.

À COUVERT, *à kōō'vĕr'*. Under cover; protected; sheltered.

À DEUX MAINS, *à dö' măN'*. With or for both hands; having a double office or employment.

ADIEU, LA VOITURE, ADIEU, LA BOUTIQUE, *à'dyû' là vwà'tür' à'dyû' là bōō'tēk'*. Good-by, carriage; good-by, shop,—all is over.

À DISCRÉTION, *à dĕs'krā'syôN'*. At discretion; unrestrictedly.

A DONDE FUERES HAZ LO QUE VIERES (Sp.), *ä dôn'dä fwā'rĕs äth lō kä vyā'rĕs*. Where you are, do what you see; when in Rome, do as Rome does.

A DROITE, *à drwät'*. To the right.

AFFAIRE D'AMOUR, *à'fâr' dà'mōōr'*. A love affair.

AFFAIRE D'HONNEUR, *à'fâr' dô'nûr'*. An affair of honor; a duel.

AFFAIRE DE CŒUR, *à'fâr' dĕ kûr'*. An affair of the heart; a love affair.

A FIN, *à făN'*. To the end or object.

À FOND, *à fôN'*. To the bottom; thoroughly.

À GAUCHE, *à gōsh'*. To the left.

À GENOUX, *à zhĕ-nōō'*. On one's knees; kneeling.

À GRANDS FRAIS, *à grăN' frĕ'*. At great expense.

À HAUTE VOIX, *à ōt' vwà'*. Aloud.

À HUIS CLOS, *à üĕ' klō'*. With closed doors; secretly.

À L'ABANDON, *à là'bän'dôN'*. In confusion; uncared for.

À LA BELLE ÉTOILE, *à là bĕl' à'twäl'*. Under the canopy of heaven; in the open air at night.

À LA BONNE HEURE, *à là bô'nûr'*. Well done! That's something like!

À L'ABRI, *à là'brē'*. Under shelter.

À LA CAMPAGNE, *à là kăN'pän'y'*. In the country.

À LA CARTE, *à là kärt'*. By the bill of fare; to dine *a la carte*.

À LA CRÉOLE, *à là krā'ōl'*. With tomatoes.

À LA DÉROBÉE, *à là dā'rō'bā'*. Stealthily.

À LA FRANÇAISE, *à là frăN'sāz'*. In the French fashion.

À LA GRECQUE, *à là grĕk'*. After the Greek fashion.

À LA MODE, *à là mōd'*. In the fashion; according to the custom or fashion.

À LA TARTUFFE, *à là tär'tüf'*. Like Tartuffe, the hypocritical hero of Molière's comedy, *Tartuffe*,—hence, hypocritically.

Á LA TEMPESTAD SIGUE LA CALMA (Sp.), *ä là tĕm-pĕs-täth' sē'gā là käl'mä*. After the storm comes the calm.

AL BUEN ENTENDEDOR POCAS PALABRAS BASTAN (Sp.), *äl bwān ĕn-tĕn'dĕ-thaor' pō'käs pä-lä'brās bäs'tän*. For a good listener but few words are needed; a word to the wise.

AL BUON VINO NON BISOGNA FRASCA (It.), *äl bwôn vē'nō nōn bē-zōn'yä frās'kä*. Good wine needs no bush.

AL CONTADO (Sp.), *äl kôn-tä'thō*. For cash; ready money.

À L'ENVI, *à lăN'vē'*. In emulation of one another.

AL FRESCO (It.), *äl frās'kō*. In the open air.

À L'IMPROVISTE, *à lăN'prô'vēst'*. Unawares; on a sudden.

ALLA VOSTRA SALUTE (It.), *äl'lä vôs'trä sä-lōō'tĕ*. To your good health.

ALLEZ-VOUS-EN, *à'lā'vōō'zăN'*. Away with you; be off.

ALLONS, *à'lôN'*. Come; now then!

AL PIÙ (It.), *äl pyōō'*. At most.

À MAIN ARMÉE, *à măN'nàr'mā'*. By force of arms.

AM ANFANG (Ger.), *ăm ăn'fäng*. In the beginning.

AMAR Y SABER NO PUEDE SER (Sp.), *ä-măr' ē sä-bĕr' nō pwā'thā sĕr*. No one can love and be wise at the same time.

AMENDE HONORABLE, *à'măN'dô'nô'rà'blˊ*. Fit reparation; a satisfactory apology.

À MERVEILLE, *à mĕr'vā'y'*. Marvelously; to perfection.

AMI DE COUR, *à'mē' dĕ kōōr'*. A friend of the court; a false friend; one who is not to be depended on.

AMI DU PEUPLE, *à'mē' dü pû'plˊ*. Friend of the people.

AMI EN VOIE, *à'mē' ăN vwà*. A friend at court; one who has influence.

AMOR CON AMOR SE PAGA (Sp.), *ä-môr' kôn ä-môr' sā pä'gä*. Love is paid with love; one good turn deserves another.

AMOUR PROPRE, *à'mōōr' prô'pr'*. Vanity; self-respect.

ANTES DE QUE TE CASES MIRA LO QUE HACES (Sp.), *än-tĕs' dā kā tā kä'sĕs mē'rä lō kā ä'thĕs*. Before you marry 'tis well to tarry.

ANCIEN RÉGIME, *ăN'syăNˊ rā'zhĕmˊ*. The former condition of things; of French government before 1789.

À OUTRANCE, *à ōō'trăNs'*. To the death; to the last extremity.

À PAS DE GÉANT, *à pà' dĕ zhā'ăN'*. With a giant's stride.

À PAS DE LOUP, *à pà' dĕ lōōˊ*. With stealthy steps.

À PERTE DE VUE, *à pĕrt' dĕ vü'*. Till out of sight.

À PEU PRÈS, *à pû' prāˊ*. Nearly.

À PIED, *à pyāˊ*. On foot.

À POINT, *à pwăN'*. Just in time; to a turn; exactly right.

APRÈS NOUS LE DÉLUGE, *à'prā' nōō' lĕ dā'lüzhˊ*. After us, the deluge.

À PRIMA VISTA (It.), *ä prē'mä vĭs'tä*. At the first glance.

À PROPOS, *à prô'pōˊ*. To the point; pertinently.

À PROPOS DE RIEN, *à prô'pō' dĕ ryĕnˊ*. Apropos to nothing; motiveless; for nothing at all.

Á QUIEN MADRUGA, DIOS LE AYUDA (Sp.), *ä kyăn mä-thrōō'gä dyôs lā ä-yōō'thä*. Those who get up early God helps; God helps those who help themselves.

AQUÍ SE HABLA ESPAÑOL (Sp.), *ä-kē' sä ä'blä ĕs-pä-nyôl'*. Spanish is spoken here.

ARGENT COMPTANT, *ärˊzhăNˊ kôn'tăNˊ*. Ready money.

ARMUTH IST KEINE SCHANDE (Ger.), *ärˊmōōt ĭst kīˊnĕ shänˊdĕ*. Poverty is no disgrace.

ARRIÈRE PENSÉE, *à'ryärˊ păNˊsā'*. Mental reservation; unavowed purpose.

À TORT ET À TRAVERS, *à tôr'tā à trà'vârˊ*. At random.

AU BOUT DE SON LATIN, *ō bōōˊ dĕ sôNˊ là'tăNˊ*. At the end of his Latin; at one's wit's end; in a fix.

AU CONTRAIRE, *ō kôN'trârˊ*. On the contrary.

AU COURANT, *ō kōō'răNˊ*. Well acquainted with; well informed.

AU DÉSESPOIR, *ō dā'zĕs'pwärˊ*. In despair.

AU FAIT, *ō fĕˊ*. Expert; up-to-date.

AU FOND, *ō fôNˊ*. At bottom; at heart; really.

AU GRATIN, *ō grà'tăNˊ*. With cheese or bread raspings to form a crust.

AU JUS, *ō zhüˊ*. With the natural juice.

AU PAS DE CHARGE, *ō pä dĕ shärzhˊ*. Double quick time.

AU PIS ALLER, *ō pē' zà'làˊ*. At the very worst; let the worst come to the worst. *Un pis aller* means a last resource, a makeshift.

AU RESTE, *ō rĕstˊ*. As for the rest.

AU REVOIR, *ō rē-vwärˊ*. Till we meet again.

AUSSITÔT DIT, AUSSITÔT FAIT, *ō'sē'tō' dē' ō'sē'tō' fĕˊ*. No sooner said than done.

AUTANT D'HOMMES, AUTANT D'AVIS, *ō'tăNˊ dômˊ ō'tăNˊ dà'vēˊ*. Many men, many minds.

AUTRE FOIS, *ō'trˊ fwäˊ*. Another time.

AUX ARMES, *ō zärmˊ*. To arms.

À VOLONTÉ, *à vô'lôN'tā'*. At pleasure.

À VOTRE SANTÉ, *à vô'trˊ săN'tā'*. To your health.

Á VUESTRA SALUD (Sp.), *ä vwās'trä sä-lōōthˊ*. To your health; good health!

BALLON D'ESSAI, *bà'lôNˊ dĕs'sĕˊ*. A balloon sent up to test the direction of air currents,—hence, anything said or done to gauge public feeling on any question.

BAS BLEU, *bà' blûˊ*. A bluestocking; a woman who seeks a reputation for learning.

BEAUX YEUX, *bō' zyûˊ*. Handsome eyes, a fair face.

BEL ESPRIT, *bĕl' ĕs'prēˊ*. A wit; a genius.

BENEDETTO È QUEL MALE CHE VIEN SOLO (It.), *bĕn-ĕ-dät'tō ĕ kwäl' mä'lĕ kā vyĕn sō'lō*. Blessed is the misfortune that comes alone.

BEN TROVATO (It.), *bĕn trō-vä'tō*. Well invented.

BÊTE NOIRE, *bāt' nwärˊ*. A black beast; a bore; a nuisance.

BILLET DOUX, or BILLET D'AMOUR, *bē'yĕ' dōōˊ* or *bē'yĕ' dà'mōōrˊ*. A love letter.

BIZARRE, *bē'zärˊ*. Odd; fantastic.

BLASÉ, *blà'zāˊ*. Surfeited; term applied to a pose of indifference.

BON AMI, *bôN'nà'mēˊ*. Good friend.

BON GRÉ, MAL GRÉ, *bôNˊ grāˊ màlˊ grāˊ*. With good or bad grace; willing or unwilling.

Bonhomie, *bôn'nô'mē'*. Good nature; simplicity.
Bon jour, *bôn' zhōōr'*. Good day; good morning.
Bon mot, *bôn' mō'*. A witticism.
Bonne et belle, *bôn' nā-bĕl'*. Good and handsome,—said of a woman.
Bonne foi, *bôn' fwȧ'*. Good faith.
Bon soir, *bôn' swȧr'*. Good evening.
Bon ton, *bôn' tôn'*. Good breeding; the style and manner of gentlefolk.
Boute-en-train, *bōō' tăn trăn'*. Mirth inspirer, merry companion.
Brevetē, *brĕv'-tā'*. Patented.
Buenas noches (Sp.), *bwā'nās nō'chĕs*. Good evening.
Buenas tardes (Sp.), *bwā'nās tär'dĕs*. Good afternoon.
Bueno (Sp.), *bwā'nō*. Good; all right.
Buenos dias (Sp.), *bwā'nōs dē'ȧs*. Good morning.

Ça vaut mieux voir le dessous des cartes, *sȧ vō myȧ' vwär' lē dĕs-sōō' dā kärt'*. 'Tis best to see the face of the cards; to be in the secret.
Cada oneja con su pareja (Sp.), *kȧ'thä ō-nä'hä kōn sōō pä-rä'hä*. Every sheep with its like; birds of a feather flock together.
Cada uno es como Dios le hizo, y aun peor, muchas veces (Sp.), *kȧ'thä ōō'nō ĕs kō'mō thĕ'ōs lā ē'thō ē ä-ōōn pä-ōr' mōō'chäs vā'thĕs*. Every one is as God made him and often much worse.
Cada uno sabe donde le aprieta el zapato (Sp.), *kȧ'thä ōō'nō sä'bĕ dōn'dä lā ä-pryā'tä ĕl thä-pä'tō*. Each one knows where his own shoe pinches.
Carte blanche, *kärt' blänsh'*. Full power; full permission.
Castello che dà orecchia si vuol rendere (It.), *käs-tĕl'lō kā dä ō-rāk'kyä sē vwōl rĕn'dĕ-rĕ*. The fortress that parleys soon surrenders.
Cela va sans dire, *sĕ-lá' vȧ' sȧn' dēr'*. That goes without saying; that is understood.
Ce n'est que le premier pas qui coûte, *sĕ nĕ' kĕ lĕ prē-myȧ' pä' kē' kōōt'*. It is only the first step that is difficult.
C'est à dire, *sĕ' tȧ' dēr'*. That is to say.
C'est une autre chose, *sĕ'tün' ō'tr' shōz'*. That is quite another thing.
Chacun à son goût, *shȧ'kûn' nȧ sôn' gōō'*. Every one to his taste.
Chacun tire de son côté, *shȧ'kûn' tēr' dĕ sôn' kō-tā'*. Every one inclines to his own side or party.
Chanson de geste, *shăn'sôn' dĕ zhĕst'*. A song of heroic deeds; medieval French epic poem.
Chapeau de bras, *shȧ'pō' dĕ brȧ'*. A military cocked hat.
Chapelle ardente, *shȧ'pĕl' ȧr'dănt'*. The chamber where a dead body lies in state.
Château, *shȧ'tō'*. A castle
Chauviniste, *shō'vē'nēst'*. Over-aggressive patriot; "jingo."
Chef-d'œuvre, *shĕ'dûv'r'*. A masterpiece; a crowning piece of work.
Chemin de fer, *shĕ-măn' dĕ fâr'*. Iron road; a railway.
Chère amie, *shâr' ȧ'mē'*. A dear (female) friend.
Che sarà, sarà (It.), *kā sä-rä' sä-rä'*. What will be, will be.
Cheval de bataille, *shĕ-vȧl' dĕ bȧ'tä'y'*. A war horse; chief dependence or support; one's strong point.
Chi lo sa? (It.), *kē lō sä'*. Who knows?
Chi tace confessa (It.), *kē tä'chĕ kōn-fĕs'sä*. He who keeps silent admits his guilt.
Chi va piano va sano (It.), *kē vä pyä'nō vä sä'nō*. Who goes slowly goes surely.
Ci gît, *sē zhĕ'*. Here lies. (A common inscription on tombstones.)
Comme il faut, *kō mēl fō'*. Proper; as it should be.
Comment vous portez vous? *kō'măn' vōō' pôr'tā' vōō'*. How are you?
Como se dice en ingles—? (Sp.), *kō'mō sā dē'thā ĕn ĕn'glĕs*. How do you say in English—?
Como se escribe en español? (Sp.), *kō'mō sā ĕs-krē'bā ĕn ĕs'pä-nyōl'*. How is it written in Spanish?
Como se pronúncia esa palabra? (Sp.), *kō'mō sā prō-nōōn'thyā ä'sä pä-lä'brä*. How is this word pronounced?
Como va (colloq. Sp.), *kō'mō vä*. How are you?
Compagnon de voyage, *kôn'pȧ'nyôn' dĕ vwȧ'yäzh'*. A traveling companion.
Compte rendu, *kônt' rän'dü'*. An account rendered; a report.
Concierge, *kôn'syârzh*. A portress, hall porter, lodge keeper.
Concours, *kôn'kōōr'*. Competition (as for a prize); contest.
Con diligenza (It.), *kōn dē-lē-jĕn'tsä*. With diligence.
Con dolore (It.), *kōn dō-lō'rĕ*. With grief; sadly.
Con mucho gusto (Sp.), *kōn mōō'chō gōō'stō*. With great pleasure.
Conseil de famille, *kôn'sĕ'y' dĕ fȧ'mĕ'y'*. A family council or consultation.
Conseil d'état, *kôn'sĕ'y' dȧ'tä'*. A council of state; a privy council.
Consommé, *kôn'sō'mā'*. A clear soup.
Con trabajar adelantamos (Sp.), *kōn trä-bä-här' ä' thĕl-dän-tä'mōs*. By working we progress.
Contretemps, *kôn'tr'-tän'*. An awkward mishap.
Cordon sanitaire, *kôr'dôn' sä'nĕ'târ'*. A line of sentries to prevent, as far as possible, the spread of contagion or pestilence. (Used also of other precautionary measures.)
Couleur de rose, *kōō'lur' dĕ rōz'*. Rose color.
Coup, *kōō*. A stroke; a blow; a thrust; a dig.
Coup de grace, *kōō' dĕ grȧs'*. A finishing-stroke. (Formerly applied to the fatal blow by which the executioner put an end to the torments of a culprit broken on the wheel.)
Coup de main, *kōō' dĕ măn'*. A sudden attack; an enterprise (military); an undertaking; a helping hand.
Coup de maître, *kōō' dĕ mā'tr'*. A master stroke.
Coup d'essai, *kōō' dȧ'sĕ'*. A first attempt; an experiment.
Coup d'état, *kōō' dȧ'tä'*. A stroke of policy, bringing about a sudden change of government (usually by unconstitutional means).
Coup d'œil, *kōō' dû'y'*. A rapid glance; a view.
Coup de pied, *kōō dĕ pyā'*. A kick.
Coup de poing, *kōō dĕ pwăn'*. A blow of the fist; a punch.
Courage sans peur, *kōō'rāzh' sȧn pûr'*. Fearless courage.
Courant d'air, *kōō'răn' dâr'*. A draft.
Course de chevaux, *kōōrs' dĕ shĕ-vō'*. A horse race.
Coûte que coûte, *kōōt' kĕ' kōōt'*. Cost what it may; at any price.
Cuisine, *küē'zēn'*. A kitchen; cookery.

Dame d'honneur, *dăm' dô'nûr'*. A maid of honor.
Dar la mano a (Sp. and It.), *där lä mä'nō ä*. To give the hand to; to shake hands with.
Dar un paseo (Sp.), *där ōōn pä-sā'ō*. To take a walk.
Das geht Sie nichts an (Ger.), *däs gät zē nĭxts än*. That does not concern you.
De bonne grâce, *dĕ bôn' grȧs'*. With good will; willingly.
Début, *dā'bü'*. First appearance.
Débutante, *dā'bü'tănt'*. A young lady just entering society.
De but en blanc, *dē bü' tăn blăn'*. Bluntly; right off.
Décolleté, *dā'kô'l'-tā'*. Wearing a low-necked dress.
Dégagé, *dā'gȧ'zhā'*. Free; easy; without constraint.
De gaieté de cœur, *dē gȧ'tā' dĕ kûr'*. In sport; sportively.
Déjeuner à la fourchette, *dā'zhû'nā' ä lȧ fōōr'shĕt'*. A meat breakfast; a lunch.
De la fama el atajo se entra por el trabajo (Sp.), *dā lä fä'mä ĕl ä-tä'hō sä ĕn'trä pōr ĕl trä-bä'hō*. The path of fame begins by work.
De mal en pis, *dē mȧl' ăn pē'*. From bad to worse.
Déme la mano (Sp.), *dā'mā lä mä'nō*. Give me your hand; shake hands.
De moda (Sp.), *dā mō'thä*. Fashionable.
Dénouement, *dā'nōō'măn'*. An unraveling or disclosure, as of a plot in a play; a wind-up; a catastrophe.
Dernier ressort, *dĕr'nyā' rē-sôr'*. The last resource.
Désagrément, *dā'zȧ'grā'măn'*. Something disagreeable or unpleasant.
De sol á sol (Sp.), *dā sôl ä sôl*. From morning till night.
Di buona volontà sta pieno l'inferno (It.), *dē bwōn'ä vō-lōn-tä' stä pyĕ'nō lĕn-fĕr'nō*. Hell is full of good intentions.
Dieu est toujours pour les plus gros bataillons, *dyû'ĕ' tōō'zhōōr' pōōr lā plü' grō' bä'tä'yôn'*. God is always on the side of the largest battalions; the largest army has the best chance.
Dieu et mon droit, *dyû' ā môn' drwȧ'*. God and my right. Motto on the British royal coat of arms.
Dieu vous garde, *dyû' vōō' gärd'*. God protect you.
Di grado in grado (It.), *dē grä'dō ĭn grä'dō*. Step by step; gradually.
Dios me libre de hombre de un libro (Sp.), *dē'ôs mä lĕ'brä dä ōm'brä dä ōōn lĕ'brō*. God deliver me from a man of one book.
Dir l'orazione della bertuccia (It.), *dēr lō'rä-tsyō'nĕ dal'lä bĕr-tōōt'shä*. To pray like a monkey; to chatter.
Di salto (It.), *dē säl'tō*. By leaps.
Dispénseme usted (Sp.), *dĕs-pĕn'sä-mä ōōs-tĕth'*. I beg your pardon; allow me.
Di tutti novello par bello (It.), *dē tōōt'tē nō-vĕl'lō pär bĕl'lō*. Everything new seems beautiful.
Dolce far niente (It.), *dōl'chĕ fär nyĕn'tē*. The sweet do-nothing; sweet idleness.
Donnant donnant, *dôn'năn' dôn'năn'*. Give and take.
Dorer la pilule, *dō'rā' lȧ pē'lül'*. To gild the pill.
Double entente, *dōōb'lăn'tănt'*. Double meaning.
Durante vita (It.), *dōō-rän'tā vē'tä*. During life.

Eau de cologne, *ō' dĕ kō-lōny''*. Cologne water.
Eau de vie, *ō' dĕ vē'*. Water of life—applied usually to brandy.
Éclat, *ā'klȧ'*. Splendor, brilliancy.
Édition de luxe, *ā'dē'syōn' dĕ lüks'*. A costly edition of a book, handsomely bound, and usually well illustrated.
Ehrlich währt am längsten (Ger.), *ârlĭK vârt ăm lĕngs'tĕn*. Honesty is the best policy.
Eile mit Weile (Ger.), *ī'lĕ mĭt vī'lĕ*. Make haste slowly.
Eine Schwalbe macht keinen Sommer (Ger.), *ī'nĕ shvȧl'bĕ măxt kī'nĕn zō'mĕr*. One swallow does not make a summer.

EIN GEBRANNTES KIND SCHEUT DAS FEUER (Ger.), *ĭn gā-brän'tĕs kĭnt shoit dās foi'ĕr.* A burnt child dreads the fire.

ÉLAN, *ā'lăn'.* Military dash; quick, sudden movement.

EL ÁRBOL SE CONOCE POR SU FRUTO (Sp.), *ĕl är'bōl sā kō-nō'thā pōr sōo frōō'tō.* The tree is known by its fruit.

EL EJERCICIO HACE MAESTRO (Sp.), *ĕl ĕh-ĕr-thē'thyō ä'thā mä-ĕs'trō.* Exercise makes the master; practice makes perfect.

ÉLITE, *ā'lēt'.* A select body of persons; society.

EL TRABAJO HACE LA VIDA AGRADABLE (Sp.), *ĕl trä-bä'hō ä'thā lä vē'thā ä-grä-thä'blā.* Work makes life worth living.

EMBARRAS DES RICHESSES, *ăn'bà'rà' dā rē'shĕs'.* The plague of riches; difficulty of choice.

EMBONPOINT, *ăn'bôn'pwăn'.* Roundness; corpulence; mostly used in humorous reference.

EN AMI, *ăn nà'mē'.* As a friend.

EN ARRIÈRE, *ăn nà'ryâr'.* In the rear; behind.

EN ATTENDANT, *ăn nà'tăn'dăn'.* In the meantime.

EN AVANT, *ăn nà'văn'.* Forward.

EN BADINANT, *ăn bà'dē'năn'.* In sport; jestingly.

EN CASA (Sp.), *ĕn kä'sä.* At home.

EN CUEROS, EN CUEROS VIVOS (Sp.), *ĕn kwā'rōs vē'vōs.* Naked; without clothing.

ENDE GUT, ALLES GUT (Ger.), *ĕn'dĕ gōōt ä'lĕs gōōt.* All's well that ends well.

EN DÉSHABILLÉ, *ăn dā'zà'bē'yā'.* Carelessly dressed as at early morning; unprepared.

EN DIEU EST TOUT, *ăn dyû' ĕ tōō'.* In God are all things.

EN EFFET, *ăn nĕ'fĕ'.* Indeed; really; in effect.

EN FAMILLE, *ăn fa'mē'y'.* With one's family; at home.

ENFANT GÂTÉ, *ăn'fän' gà'tā'.* A spoiled child.

ENFANTS PERDUS, *ăn'fän' pĕr'dü'.* Lost children; a forlorn hope.

ENFANT TERRIBLE, *ăn'fän' tĕ'rē'bl'.* A child or person whose acts or remarks are embarrassing.

ENFANT TROUVÉ, *ăn'fän' trōō'vā'.* A foundling.

ENFIN, *ăn'făn'.* In short; finally; at last.

EN GRANDE TENUE OR TOILETTE, *ăn' grănd' tē-nü'* or *twà'lĕt'.* In full official, or evening, dress.

EN MASSE, *ăn' màs'.* In a body or mass.

ENNUI, *ăn'nwē'.* Weariness; boredom.

EN PASSANT, *ăn' pà'săn'.* In passing; by the way.

EN PLEIN JOUR, *ăn' plăn' zhōōr'.* In broad daylight.

EN QUEUE, *ăn' kü'.* Immediately after; in the rear. Used especially of persons waiting in line, as at the door of a theater or at the ticket office of a railway station.

EN RAPPORT, *ăn' rà'pôr'.* In harmony, relation, or agreement.

EN RÈGLE, *ăn' rĕg'l'.* Regular; in order.

EN ROUTE, *ăn' rōōt'.* On the way.

ENSEMBLE, *ăn'săn'bl'.* The whole; together.

EN SUITE, *ăn' sŭēt'.* In company; in a set.

ENTENTE CORDIALE, *ăn'tănt' kôr'dyäl'.* A good understanding, especially between two states.

ENTÊTÉ, *ăn'tĕ'tā'.* Headstrong.

ENTOURAGE, *ăn'tōō'răzh'.* Surroundings; associates.

ENTRE AMIGOS HONRADOS CUMPLIMIENTOS EXCUSADOS (Sp.), *ĕn'trā ä-mē'gōs ōn-rä'thōs kōōm'plē-myĕn'tōs ĕks'kōō-sä'thōs.* Among honorable friends compliments are superfluous.

ENTRE DEUX FEUX, *ăn'tr' dû' fû'.* Between two fires.

ENTRE DEUX VINS, *ăn'tr' dû' văn'.* Between two wines; half drunk.

ENTRÉE, *ăn'trā'.* Entry; first course.

ENTREMETS, *ăn'tr'-mē'.* Small and dainty dishes set between the principal ones at table.

ENTRE NOUS, *ăn'tr' nōō'.* Between ourselves; in confidence.

EN VENIR AUX COUPS, *ăn' vē-nēr' ō kōō'.* To come to blows.

EN VERITÉ, *ăn' vā'rē'tā'.* In truth; really.

EN VEZ DE ORO ES DORADO (Sp.), *ĕn vāth dā ō'rō ĕs dō-rä'thō.* In place of gold 'tis only gilt; a false friend.

EN VOITURE! *ăn' vwa'tür'.* All aboard!

E PUR SI MUOVE! (It.), *ā pōor sē mwô'vĕ.* Nevertheless it moves! (Supposed words of Galileo after his condemnation; referring to the motion of the earth.)

ES FREUT MICH SEHR (Ger.), *ĕs froit mĭk zār.* I am very glad.

EST IST NICHT ALLES GOLD, WAS GLÄNZT (Ger.), *ĕs tst nĭkt ä'lĕs gôlt wās glĕntst.* All is not gold that glitters.

ESPRIT DE CORPS, *ĕs'prē' dĕ kôr'.* The animating spirit of a collective body of persons, as of a regiment, the bar, the clergy, a school.

ESPRIT DES LOIS, *ĕs'prē' dā lwä'.* Spirit of the laws.

ES THUT MIR LEID (Ger.), *ĕs tōōt mēr līt.* I am sorry.

EWIGKEIT (Ger.), *ä'vĭk-kīt.* Eternity.

FAÇON DE PARLER, *fà'sôn' dĕ pär'lā'.* Manner of speaking; phrase; locution.

FAIRE BONNE MINE, *fâr' bôn' mēn'.* To look pleasant.

FAIRE LES CENT COUPS, *fâr' lā săn' kōō'.* To play all sorts of tricks.

FAIRE SANS DIRE, *fâr' săn' dēr'.* To act without ostentation.

FAIRE SON DEVOIR, *fâr' sôn' dĕ-vwär'.* To do one's duty.

FAIT ACCOMPLI, *fĕ'tà'kôn'plē'.* An accomplished fact.

FAUX PAS, *fō' pä'.* A false step; an act of indiscretion.

FEMME DE CHAMBRE, *fam' dĕ shän'br'.* A chambermaid.

FEMME DE CHARGE, *fam' dĕ shärzh'.* A housekeeper.

FENDRE UN CHEVEU EN QUATRE, *fän'dr' ŭn shĕ-vû' ăn' ka'tr'.* To split a hair in four; to make subtle distinctions.

FÊTE, *fāt.* A feast; festival; holiday.

FÊTE CHAMPÊTRE, *fāt' shăn'pā'tr'.* A rural out-of-door feast; a festival in the fields.

FEU DE JOIE, *fû' dĕ zhwä'.* A bonfire or discharge of firearms as a sign of rejoicing.

FILLE DE CHAMBRE, *fē'y' dĕ shän'br'.* A chambermaid.

FILLE D'HONNEUR, *fē'y' dŏ'nûr'.* A maid of honor; a lady in waiting.

FLEUR-DE-LIS, *flûr'dĕ-lē'.* The flower of the lily. The coat of arms of France (a heraldic iris).

FRA MODESTO NON FU MAI PRIORE (It.), *frä mō-dĕs'tō nōn fōō mä'ē prē-ō'rĕ.* Friar Modest never became prior. "Push" is necessary to succeed.

FRISCH BEGONNEN, HALB GEWONNEN (Ger.), *frĭsh bĕ-gŏn'nĕn hälp gĕ-vŏn'nĕn.* Well begun is half done.

FROIDES MAINS, CHAUDE AMOUR, *frwäd' măn' shō'dä'mōōr'.* Cold hands, warm heart.

FRONT À FRONT, *frôn'tà frôn'.* Face to face.

FUYEZ LES DANGERS DU LOISIR, *füē'yā' lā dăn'zhā' dü lwä'zēr'.* Fly from the dangers of leisure.

GAIETÉ DE CŒUR, *gā'tā' dĕ kûr'.* Gaiety of heart.

GARÇON, *gàr'sôn'.* A lad; a waiter.

GARDE À CHEVAL, *gàr'dà shĕ-vàl'.* A mounted guard.

GARDE DU CORPS, *gàrd' dü kôr'.* A bodyguard.

GARDEZ LA FOI, *gàr'dā' là fwà'.* Keep the faith.

GARDEZ-VOUS-EN BIEN, *gàr'dā' vōō' zăn' byĕn'.* Don't you do it; do nothing of the kind.

GENDARME, *zhän'därm'.* Policeman; a turbulent woman; a flaw (as in a diamond).

GENS DE CONDITION, *zhän' dĕ kôn'dē'syôn'.* People of rank.

GENS DE MÊME FAMILLE, *zhän' dĕ mâm' fa'mē'y'.* People of the same family; birds of a feather.

GENTILHOMME, *zhăn'tē'yôm'.* A gentleman; a nobleman.

GIBIER DE POTENCE, *zhē'byā' dĕ pō'tăns'.* A gallows bird; one who deserves hanging.

GIOVINE SANTO, DIAVOLO VECCHIO (It.), *jō'vē-nĕ sän'tō dyä'vō-lō vĕk'kyō.* A young saint, an old devil.

GLEICH UND GLEICH GESELLT SICH GERN (Ger.), *glīk ŏont glīk gĕ-zĕlt' zĭk gărn.* Birds of a feather flock together.

GLI ASSENTI HANNO TORTO (It.), *lyē ăs-sĕn'tē än'nō tôr'tō.* The absent are in the wrong.

GOTA Á GOTA EL MAR SE APOCA (Sp.), *gō'tä ä gō'tä ĕl mär sä ä-pō'kä.* Drop by drop the sea can be emptied.

GOUTTE À GOUTTE, *gōō'tà-gōōt'.* Drop by drop.

GOUVERNANTE, *gōō'vĕr'nänt'.* A governess; housekeeper.

GRÂCE À DIEU, *grä'sà dyû'.* Thanks be to God.

GRANDE CHÈRE ET BEAU FEU, *grănd' shâr' ā bō' fû'.* Good fare and a good fire; comfortable quarters.

GRAND MERCI, *grăn' mĕr'sē'.* Many thanks.

GROSSE TÊTE ET PEU DE SENS, *grōs' tāt' ā pû' dĕ săn'.* A big head and little sense.

GUERRA Á CUCHILLO (Sp.), *gär'rä ä kōō-chēl'yō.* War to the knife.

GUERRA COMINCIATA, INFERNO SCATENATO (It.), *gwĕr'rä kō'mēn-chä'tä ēn-fĕr'nō skä'tē-nä'tō.* War begun, hell unchained.

GUERRE À MORT, *gâr à môr'.* War to the death.

GUTEN MORGEN (Ger.), *gōōt'ĕn môr'gĕn.* Good morning.

HACE BUEN TIEMPO (Sp.), *ä'thā bwăn tyĕm'pō.* It is fine weather.

HASTA LUEGO (Sp.), *äs'tä lwä'gō.* Until by and by; I'll see you later.

HASTA OTRA VEZ (Sp.), *äs'tä ō'trä vāth.* Until another time; till we meet again.

HASTA MAÑANA (Sp.), *äs'tä măn-yä'nä.* Good-by; until tomorrow.

HAUT GOÛT, *ō' gōō'.* High flavor; elegant taste.

HAUT TON, *ō' tôn'.* Highest fashion.

HOMME D'AFFAIRES, *ôm' dà'fâr'.* A man of business; an agent.

HOMME DE ROBE, *ôm' dĕ rôb'.* A person in a civil office.

HOMME D'ESPRIT, *ôm' dĕs'prē'.* A wit; a genius.

HOMME D'ÉTAT, *ôm' dà'tà'.* A statesman.

HONI SOIT QUI MAL Y PENSE, *ô'nē' swà' kē' mäl' ē päns'.* Shame be to him who thinks evil of it. (The motto of the Order of the Garter.)

HORS DE COMBAT, *ôr' dĕ kôn'bà'.* Out of the fight; disabled; unfit to continue a contest.

HORS DE LA LOI, *ôr' dĕ là lwä'.* Outlawed.

HORS DE PROPOS, *ôr' dĕ prō'pō'.* Wide of the point; inapplicable.

HORS DE SAISON, *ôr' dĕ sĕ'zôn'.* Out of season; unseasonable.

HORS D'ŒUVRE, *ôr' dûv'r'.* Out of course; a side dish; a digression.

HÔTEL DE VILLE, *ô'tĕl' dĕ vēl'.* A town hall.

HÔTEL DIEU, *ô'tĕl' dyû'.* The chief hospital of a town.

HÔTEL GARNI, *ô'tĕl' gär'nē'.* Furnished lodgings.

Ich dien (Ger.), ĭk dēn. I serve.

Idée fixe, ē'dā' fēks'. A fixed idea; a mental conviction or attitude.

Ignorance crasse, ēn'yō'rānsʹ krăsʹ. Gross ignorance.

I gran dolori sono muti (It.), ē grän dō-lō'rē sō'nō mōō'tē. Great griefs are silent.

Il a le diable au corps, ēl ä' lē dyäbʹl' ō kôrʹ. The devil is in him.

Il faut de l'argent, ēl fō' dē lär'zhänʹ. Money is needed.

Il n'a ni bouche ni éperon, ēl nä' nē bōōshʹ nē āp'-rôn'. He has neither mouth nor spur; he has neither wit nor courage.

Il ne faut jamais défier un fou, ēl nē fō' zhä'mĕʹ dā'fyāʹ ŭn fōō'. One should never provoke a fool.

Il ne faut point disputer des goûts, ēl nē fō' pwănʹ dēs'pū'tā' dā gōōʹ. There is no accounting for tastes.

Il n'est sauce que d'appétit, ēl nĕʹ sōs' kē dä'pā'tē'. Hunger is the best sauce.

Il souffle le chaud et le froid, ēl sōōf'l' lē shō ā lē frwäʹ. He blows hot and cold; he's a timeserver.

Impoli, ănʹpō'lē'. Unpolished; rude.

In un giorno non si fe' Roma (It.), ēn ōōn jōr'nō nōn sē fä rō'mä. Rome was not built in a day.

Ir por lana, y volver trasquilado (Sp.), ĕr pôr lä'nä ē vôl-vĕr' träs'kē-lä'thō. To go for wool, and come back shorn.

Jamais bon coureur ne fut pris, zhä'mĕʹ bôn kōō'rûr'ʹ nē fü' prē'. A good runner is not to be taken; old birds are not to be caught with chaff.

Je ne sais quoi, zhē nē sā' kwäʹ. I know not what; hard to describe; used humorously, as a "je ne sais quoi."

Je n'oublierai jamais, zhē nōō'blyā'rā' zhā'mĕʹ. I will never forget.

Je suis prêt, zhē süē' prĕ'. I am ready.

Jet d'eau, zhĕʹ dō'. A fountain; a jet of water.

Jeu de mots, zhü' dē mō'. A play upon words; a pun.

Jeu d'esprit, zhü' dĕs'prē'. A witticism.

Jeu de théâtre, zhü dē tā'ätʹr'. A stage trick; claptrap.

Jeunesse dorée, zhü'nĕsʹ dō'rā'. Gilded youth.

Jouer de bonheur, zhwā' dē bō'nûr'. To be in luck.

L'addition, lä'dē'syônʹ. The bill.

L'addition s'il vous plaît, lä'dē'syônʹ sē vōō' plĕ'. Give me my bill please.

La carga andando crece (Sp.), lä kärʹgä än-dänʹdō krā'thā. The farther we walk, the heavier becomes our burden.

La caridad bien ordenada empieza por uno mismo (Sp.), lä kä-rē-thädʹ byän ôr-dā-nä'thä ĕm-pyā'thä pôr ōō'nō mēs'mō. Charity well directed begins with oneself; charity begins at home.

La costumbre es otra naturaleza (Sp.), lä kôs-tōōmʹbrä ĕs ō'trä nä'tōō-rä-lā'thä. Custom is second nature.

La critique est aisée, l'art est difficile, lä krē'tēkʹ ĕ'tā'zā' lärʹfē' dē'fē'sēlʹ. Criticism is easy enough, but art is difficult.

Lade nicht Alles in ein Schiff (Ger.), läʹdĕ nĭktʹ ä'lĕs ĭn ĭn shĭfʹ. Do not load all in one ship; do not put all your eggs into one basket.

L'adversité fait les hommes, et le bonheur les monstres, lädʹvĕr'sē'tā' fĕ' lā'zômʹ ā lē bô'nûr' lā môNstr'. Adversity makes men, and prosperity, monsters.

La fortuna aiuta i pazzi (It.), lä fôr-tōō'nä ä-yōō'tä ē pätʹsē. Fortune helps fools.

La fortune passe partout, lä fôr'tünʹ päsʹ pär'tōō'. Fortune passes everywhere; all men are subject to the vicissitudes of fortune.

Laissez faire, lĕ'sā' fârʹ. Let it alone.—A *laissez faire* (careless) attitude.

L'amour et la fumée ne peuvent se cacher, lä'mōorʹ ā lä fü'mā' nē püv' sē kä'shāʹ. Love and smoke cannot be hidden.

Langage des halles, länʹgäzh' dā' älʹ. The language of the markets; Billingsgate.

La patience est amère, mais son fruit est doux, lä pä'syänsʹ ĕs'tä'märʹ mĕ sônʹ früē' tĕ' dōōʹ. Patience is bitter, but its reward is sweet.

La pluma es lengua del alma (Sp.), lä plōō'mä ĕs lĕn'gwä dĕl älʹmä. The pen is the tongue of the mind.

La pointe du jour, lä pwäNt dü zhōōr'. Daybreak.

La poverta è la madre di tutte le arti (It.), lä pô-vĕr-täʹ ĕ lä mäʹdrĕ dē tōōtʹtā lā ärʹtē. Poverty is the mother of all the arts.

L'argent, lärʹzhänʹ. Silver; money.

L'art pour l'art, lärʹ pōōr lärʹ. Art for art's sake.

Lasciate ogni speranza, voi ch'entrate (It.), läsh'shäʹtĕ ōn'yĕ spĕr-änʹtsä vō'ē kän-trä'tĕ. All hope abandon, ye who enter here. The inscription over the gates of hell in Dante's "Inferno" (III.9).

L'avenir, läv'"nēr'. The future.

La verdad es amarga (Sp.), lä vĕr-dädʹ ĕs ä-märʹgä. Truth is bitter.

La vertu est la seule noblesse, lä vĕr'tüʹ ĕ lä sülʹ nô'blĕs'. Virtue is the sole nobility.

Le beau monde, lĕ bō' môNdʹ. The world of fashion; society.

Le bon temps viendra, lĕ bôNʹ tänʹ vyäNdrä'. There's a good time coming.

Le coût en ôte le goût, lĕ kōō'tänʹ ôt' lĕ gōōʹ. The expense takes away the pleasure.

Le demi-monde, lĕ dē-mē'môNdʹ. The half-world, that is, of women of equivocal reputation, demimondaines.

Le jeu n'en vaut pas la chandelle, lĕ zhü'nänʹ vō' pä' lä shäNʹdĕlʹ. The game is not worth the candle; the object is not worth the trouble.

Le malheur ne vient jamais seul, lĕ mäl'ûrʹ nĕ vyäNʹ zhä'mĕʹ sülʹ. Misfortune never comes alone.

Le monde est le livre des femmes, lĕ môNdʹ lĕ lēv'r' dā fämʹ. The world is woman's book.

L'empire des lettres, läNʹpēr' dā lĕt'r'. The empire of letters.

Le parole son femmine, e i fatti son maschi (It.), lä pä-rôʹlĕ sōn fämʹmē-nē ĕ ē fätʹtē sōn mäsʹkē. Words are feminine, and deeds are masculine.

Les absents ont toujours tort, lā zäp'säNtʹ zôNʹ tōō'zhōōrʹ tôr'. The absent are always wrong.

Les convenances, lā kôNʹv'-näNsʹ. The proprieties; the rules of politeness.

Lèse majesté, lĕzʹ mäʹzhĕs'tā'. High treason.

Les murailles ont des oreilles, lā mü'räl'y'-zôNʹ dā zō'rā'y'. Walls have ears.

Les plus sages ne le sont pas toujours, lā plüʹ säzhʹ nĕ lĕ sôNʹ päs tōō'zhōōr'. The wisest are not always wise.

Le tout ensemble, lĕ tōō'täNʹsäNbl'. The whole taken together.

Lettre de cachet, lĕt'r' dĕ kä'shāʹ. A sealed letter containing orders; a royal warrant, usually authorizing the imprisonment, without trial, of a person named therein.

Le vrai n'est pas toujours vraisemblable, lĕ vrĕ' nĕ' päs' tōō'zhōōr' vrĕ'säN'blä'blʹ. Truth is not always probable.

L'homme propose, et Dieu dispose, lômʹ' prô'pōz' ā_dyüʹ dēs'pōz'. Man proposes and God disposes.

L'inconnu, läN'kô'nüʹ. The unknown.

L'incroyable, läN'krwä'yä'blʹ. The incredible; the marvelous. (The word incroyable was applied substantively to the fops of the Directory period in the great French Revolution.)

Lingerie, läN'zhʹ-rē'. Linen goods; also, collectively, all the linen, cotton, and lace articles of a woman's wardrobe.

Littérateur, lē'tä'rä'tûrʹ. A literary man.

Lo barato es caro (Sp.), lō bä-rä'tō ĕs kä'rō. A bargain is dear.

L'occhio del padrone ingrassa il cavallo (It.), lôkʹkyō dāl pä-drōʹnĕ ēn-gräsʹsä ēl kä-väl'lō. The master's eye fattens the horse.

Lo más pronto posible (Sp.), lō mäs prônʹtō pō-sē'blä. As soon as possible.

Lo que no se puede remediar se ha de aguantar (Sp.), lō kä nō sā pwä'thä rä-mä'thĕ-ärʹ sä ä' thä ä-gwän-tärʹ. What cannot be cured must be endured.

Loyauté m'oblige, lwä'yō'tā' mô'blēzhʹ. Loyalty binds me.

Ma chère, mäʹ shârʹ. My dear (fem.).

Mademoiselle, mädʹmwäz'zĕlʹ. Miss.

Maestro di color che sanno (It.), mä-ĕs'trō dē kō-lōr' kā sänʹnō. Master of those that know. (Applied by Dante to Aristotle.)

Ma foi, mäʹ fwäʹ. Upon my faith; upon my word.

Maintiens le droit, mäNʹtyäNʹ lĕ drwäʹ. Maintain the right.

Maison de campagne, mäʹzônʹ dĕ käNʹpänʹy'. A country house.

Maison de santé, mäʹzônʹ dĕ säN'tāʹ. A private asylum or hospital.

Maison de ville, mäʹzônʹ dĕ vēlʹ. A town hall.

Maître d'hôtel, mäʹtr' dô'tĕlʹ. A house steward.

Maladie du pays, mäl'äʹdēʹ dü pĕ'ĕʹ. Homesickness.

Mal à propos, mälʹ ä' prô'pōʹ. Out of place; ill suited.

Mal de mer, mälʹ dĕ märʹ. Seasickness.

Malentendu, mälʹäNʹtäN'düʹ. A misunderstanding; a mistake.

Malgré nous, mälʹgrā' nōōʹ. In spite of us.

Malheur ne vient jamais seul, mäl'ûrʹ nĕ vyäNʹ zhä'mĕʹ sülʹ. Misfortunes never come singly.

Mardi gras, märʹdē' grāʹ. Shrove Tuesday.

Mariage de conscience, mä'ryäzhʹ dĕ kôNʹs'-näNsʹ. A private marriage.

Mariage de convenance, mä'ryäzhʹ dĕ kôNʹv'-näNsʹ. A marriage of convenience, or from interested motives.

Marquer le pas, märʹkā' lĕ päʹ. To mark time.

Marzo ventoso y abril lluvioso sacan á mayo hermoso (Sp.), märʹthō vĕn-tō'sō ē ä-brēlʹ lyōō'vyō'sō sä'kän ä mī'ō ĕr-mō'sō. Windy March and showery April bring flowery May.

Más quiero asno que me lleve que caballo que me derrueque (Sp.), mäs kyäʹrō äs'nō kā mā lyäʹvā kā kä-bälʹyō kā mā dĕr-rwäʹkā. I prefer the ass that carries me to the horse that throws me.

MÁS SABE UN NECIO PREGUNTAR QUE PUEDEN CIEN SABIOS CONTESTAR (Sp.), *más sá'bā ōōn nĕ'thyō prā-gōōn'tār kā pwā'thĕn thyĕn sá'byōs kōn-tĕs-tár'*. One fool can ask more questions than a hundred learned men can answer.

MÁS VALE PÁJARO EN MANO QUE CIENTO VOLANDO (Sp.), *más vá'lā pá'rä-rō ĕn má'nō kā thyĕn'tō vō-lán'dō*. A bird in the hand is worth two in the bush (a hundred flying).

MÁS VALE TARDE QUE NUNCA (Sp.), *más vá'lā tár'dā kā nōōn'kä*. Better late than never.

MÁS VALE UN TOMA QUE DOS TE DARÉ (Sp.), *más vá'lā ōōn tō'mä kä dōs tĕ dä-rá'*. One "take" is better than two "I'll give."

MAUVAISE HONTE, *mō'vă' zônt'*. False modesty.

MAUVAIS GOÛT, *mō'vĕ' gōō'*. False taste.

MI CARO AMIGO (Sp.), *mē kä'rō ä-mē'gō*. My dear friend.

MIR IST ALLES EINERLEI (Ger.), *mēr ist ä'lĕs ī'nĕr-lī*. It's all the same to me.

MISE-EN-SCÈNE, *mēz'zän'sān'*. The staging of a play.

MON AMI, *môn' nä'mē'*. My friend.

MON CHER, *môn' shâr'*. My dear (fellow).

MONSIEUR, *mĕ-syû'*. Sir; Mr.; gentleman.

MOT DU GUET, *mō' dü gĕ'*. A watchword.

MOTS D'USAGE, *mō' dü'zázh'*. Words in common use.

MUCHOS POCOS HACEN UN MUCHO (Sp.), *mōō'chōs pō'kōs ä'thĕn ōōn mōō'chō*. Many littles make much; many a mickle makes a muckle.

MURAGLIA BIANCA, CARTA DI MATTO (It.), *mōō-rä'lyä byän'kä, kär'tä dē mät'tō*. A white wall is the fool's paper.

NAÏVE, *nä'ēv'*. Having unaffected simplicity.

NAÏVETÉ, *nä'ēv''tā'*. Native simplicity.

NÉE, *nā*. Born; maiden name.

NÉGLIGÉ, *nā'glē'zhā'*. A morning dress.

NESSUN MAGGIOR DOLORE CHE RICORDARSI DEL TEMPO FELICE NELLA MISERIA (It.), *nĕs-soōn' mä-jōr' dō-lō'rĕ kā rē-kōr-där'sē dāl tĕm'pō fĕ-lē'chĕ nāl'lä mē-zä'rē-ä*. No greater sorrow than to remember happy days when in misery.—Dante.

NEUE BESEN KEHREN GUT (Ger.), *noi'ĕ bā'zĕn kā'rĕn gōōt*. A new broom sweeps clean.

NI FIRMES CARTAS QUE NO LEAS, NI BEBAS AGUA QUE NO VEAS (Sp.), *nĕ fĕr'mĕs kär'tās kā nō lá'ās nĕ bā'bās ä'gwä kā nō vá'ās*. Sign no letter you have not read, nor drink water you cannot see; be very cautious.

NI L'UN NI L'AUTRE, *nĕ lůn' nĕ lō'tr'*. Neither the one nor the other.

N'IMPORTE, *năn'pōrt'*. It is of no consequence.

NOBLESSE OBLIGE, *nō'blĕs' ō'blēzh'*. Nobility imposes obligations; much is expected from persons of good position.

NO ES ORO TODO QUE RELUCE (Sp.), *nō ĕs ō'rō tō'thō kā rä-lōō'thä*. All is not gold that glitters.

NO HAY BIEN NI MAL QUE CIEN AÑOS DURE (Sp.), *nō ī byän nĕ mäl kā thyän än'yōs dōō'rä*. No good or evil lasts a hundred years.

NO HAY DE QUE (Sp.), *nō ī dā kä*. You are welcome; don't mention it.

NO IMPORTA (Sp.), *nō ēm-pōr'tä*. No matter; 'tis all the same.

NO LAS MERECE (Sp.), *nō lās mā-rā'thā*. It is not worth it (in answer to *Gracias*).

NOM DE GUERRE, *nôn' dĕ gâr'*. A war-name; an assumed name in controversy.

NOM DE PLUME, *nôn dĕ plüm'*. An assumed title; a pen name.

NON MI RICORDO (It.), *nōn mē rē-kōr'dō*. I do not remember.

NON OGNI FIORE FA BUON ODORE (It.), *nōn ōn'yĕ fyō'rĕ fä bwōn ō-dō'rĕ*. It is not every flower that smells sweet.

NON VENDER LA PELLE DELL' ORSO PRIMA DI PIGLIARLO (It.), *nōn vän'dĕr lä pĕl'lĕ dāll ōr'sō prē'mä dē pēl-yär'lō*. Don't sell the bearskin before you have caught the bear.

NO SE GANÓ ZAMORA EN UNA HORA (Sp.), *nō sā gä-nō' thä-mō'rä ĕn ōō'nä ō'rä*. (Zamora was not won in an hour), Rome was not built in a day.

NO SE PERMITE HURTAR PARA DAR POR DIOS (Sp.), *nō sā pĕr-mē'tā ōōr-tár' pä'rä dár pōr dē'ōs*. It is not lawful to steal in order to give to God.

NOT KENNT KEIN GEBOT (Ger.), *nōt kĕnt kīn gā-bōt'*. Necessity knows no law.

NOTRE DAME, *nō'tr' dám'*. Our Lady; the Virgin Mary; the great cathedral of Paris.

NOUS AVONS CHANGÉ TOUT CELA, *nōō' zá'vôn' shän'zhā' tōō' sĕ-lá'*. We have changed all that.

NOUS VERRONS, *nōō' vĕ'rôn'*. We shall see.

NOUVELLES, *nōō'vĕl'*. News.

NO VALE LA PENA (Sp.), *nō vá'lā lä pá'nä*. It is not worth the trouble.

NO VALE NADA (Sp.), *nō vá'lā nä'thä*. It is worthless; no use; no matter.

NUL BIEN SANS PEINE, *nül' byăn' săn pán'*. No pains, no gains.

NULLA NUOVA, BUONA NUOVA (It.), *nōōl'lä nwō'vä, bwō'nä nwō'vä*. No news is good news.

OGNI BOTTEGA HA LA SUA MALIZIA (It.), *ōn'yĕ bŏt-tā'gä ä lä sōō'ä mä-lē'tsyä*. Every shop has its trick; there are tricks in all trades.

OJOS QUE NO VEN, CORAZÓN QUE NO SIENTE (Sp.), *ō'hōs kā nō vĕn' kō-rä-thôn' kā nō syĕn'tā*. Eyes that see not, heart that feels not; out of sight, out of mind.

OLLA PODRIDA (Sp.), *ōl'yä pō-thrē'thä*. A heterogeneous mixture; a stew of meat and vegetables.

ON CONNAÎT L'AMI AU BESOIN, *ôn kō'nā' lá'mē' ō bĕ-zwăn'*. A friend is known in time of need; a friend in need is a friend indeed.

ON DIT, *ôn' dē'*. They say; a rumor.

ORO È CHE ORO VALE (It.), *ō'rō ĕ kā ō'rō vä'lĕ*. That is gold which is worth gold.

OUBLIER JE NE PUIS, *ōō'blyā' zhĕ nĕ püē'*. I can never forget.

OUÏ-DIRE, *ōō-ē' dēr'*. Hearsay.

OUVRAGE DE LONGUE HALEINE, *ōō'vrázh' dĕ lôn'gä'lăn'*. A work of time.

PARA TRABAJAR HACEN FALTA LOS BURROS (Sp.), *pá'rä trä-bā-hár' á'thĕn fál'tä lōs bōōr'rōs*. For work you must have the donkeys; let others do the work while you pocket the results.

PAR CI, PAR LÀ, *păr sē' păr lá'*. Here and there.

PAR EXCELLENCE, *păr ĕk'sĕ'lāns'*. Pre-eminently.

PAR EXEMPLE, *pár ĕg'zān'pl'*. For instance.

PAROLE D'HONNEUR, *pá'rōl' dō'núr'*. Word of honor.

PARTOUT, *pár'tōō'*. Everywhere.

PARVENU, *pár'vĕ-nü'*. An upstart.

PAS À PAS, *pá'zá'pá'*. Step by step.

PASSÉE, *pá'sā'*. Worn; faded, said of a woman no longer young.

PÂTÉ DE FOIE GRAS, *pá'tā' dĕ fwä' grä'*. A pie made from the livers of geese.

PEINE FORTE ET DURE, *pán' fôr'tā dür'*. Very severe punishment; a kind of judicial torture.

PENSÉE, *pän'sā'*. A thought expressed in terse, vigorous language.

PÈRE DE FAMILLE, *pâr dĕ fá'mē'y'*. The father of the family.

PERDU, *pĕr'dü'*. Lost.

PER PIÙ STRADE SI VA A ROMA (It.), *pār pyōō' strä'dĕ sē vä ä rō'mä*. There are many roads to Rome.

PERRO QUE LADRA NO MUERDE (Sp.), *pĕ'rō kā lá'thrä nō mwĕr'dā*. His bark is worse than his bite.

PETIT, *pē-tē'*. Small.

PETIT À PETIT L'OISEAU FAIT SON NID, *pē-tē' tá pē-tē' lwá'zō' fá sôn nē*. Little by little the bird builds its nest.

PETIT COUP, *pē-tē' kōō'*. A small mask; a domino.

PETIT-MAÎTRE, *pē-tē' mâ'tr'*. A little master; a fop.

PEU À PEU, *pů'á pů'*. Little by little; by degrees.

PEU S'EN FAUT, *pů' sän fō'*. Nearly so; very near.

PIED À TERRE, *pyā' tá târ'*. A resting place; a temporary lodging.

PIGLIAR DUE COLOMBI A UNA FAVA (It.), *pēl-yär' dōō'ĕ kō-lōm'bē ä ōō'nä fä'vä*. To catch two pigeons with one bean; to kill two birds with one stone.

PIS ALLER, *pē' zá'lā'*. The worst or last shift.

POCO A POCO (It.), *pō'kō ä pō'kō*. Little by little; by degrees.

POINT D'APPUI, *pwán' dá'püē'*. Prop; point of support.

POMMES DE TERRE, *pôm' dĕ târ'*. Potatoes (apples of the earth).

POR DONDE MENOS SE PIENSA SALTA EL LIEBRE, *pōr dōn'dā mā'nōs sā pyĕn'sä sál'tä ĕl lyā'brā*. The hare leaps whence you least expect; never be surprised.

PORTER UN COUP FUNESTE, *pōr'tá' ůn kōō' fü-nĕst'*. To deal a fatal blow.

POT-POURRI, *pō'pōō'rē'*. A medley.

POUR ACQUIT, *pōōr á'kē'*. Paid; settled. (The usual form of receipt.)

POUR FAIRE RIRE, *pōōr fâr' rēr'*. For fun; for a joke.

POUR FAIRE VISITE, *pōōr fâr' vē'zēt'*. To pay a visit,—written in the corner of a visiting card to notify of a formal call.

POUR PASSER LE TEMPS, *pōōr pá'sā' lē tän'*. To while away the time.

POUR PRENDRE CONGÉ, *pōōr prän'dr' kôn'zhā'*. To take leave. Usually abbreviated to P.P.C. on a visiting card.

PRENDRE LA LUNE AVEC LES DENTS, *prän'dr' lá lün' á'vĕk' lā dän'*. To seize the moon in one's teeth; to aim at impossibilities.

PRESTO MATURO, PRESTO MARCIO (It.), *prĕs'tō mä-tōō'rō prĕs'tō mär'chō*. Soon ripe, soon rotten.

PRÊT D'ACCOMPLIR, *prĕ' dá'kôn'plēr'*. Ready to accomplish.

PRÊT POUR MON PAYS, *prĕ' pōōr' môn' pĕ'ē'*. Ready for my country.

PREUX CHEVALIER, *prů' shă-vá'lyā'*. A brave knight.

PROTÉGÉ, *prō'tá'zhā'*. One protected by another; one to whom patronage is given.

PURÉE, *pü'rā'*. A thick soup, or mashed potatoes.

PURÉE AUX CROUTONS, *pü'rā' ō krōō'tôn'*. A thick soup with small cubes of toasted bread.

QUELQUE CHOSE, *kĕl'k' shōz'*. Something; a trifle.
QUÉ QUIERE DECIR ESO? *kā kyā'rā dā-thĕr' ā'sō*. What does that mean?
QUERIDO AMIGO MIO (Sp.), *kā-rē'thō ā-mē'gō mē'ō*. My dear friend.
QUI A BU BOIRA, *kē' à' bŭ' bwà'rà'*. The tippler will go on tippling; it is hard to break off bad habits.
QUIEN ABROJOS SIEMBRA, ESPINAS COGE (Sp.), *kyān ā-brō'-hōs syām'brā ĕs-pē'nās kō'hā*. He who sows brambles reaps thorns.
QUIEN CALLA OTORGA (Sp.), *kyān kāl'yā ō-tōr'gā*. Silence gives consent.
QUIEN MÁS TIENE MÁS QUIERE (Sp.), *kyān mās tyā'nā mās kyā'rā*. The more one has, the more one wants.
QUIEN MUCHO DUERME, POCO APRENDE (Sp.), *kyān mōō'chō dwĕr'mā pō'kō ā-prĕn'dā*. He who sleeps much learns little; the indolent make little headway.
QUIEN POCO SABE, PRESTO LO REZA (Sp.), *kyān pō'kō sā'bā prĕs'tō lō rā'thā*. He who knows little soon tells it.
QUIEN QUITA LA OCASIÓN, QUITA EL PECADO (Sp.), *kyān kē'tà là ō-kā-syōn' kē'tà ĕl pā-kā'thō*. He who avoids the occasion avoids sin.
QUIÉN SABE? (Sp.), *kyān sā-bā*. Who knows?
QUIEN TODO LO QUIERE TODO LO PIERDE (Sp.), *kyān tō'thō lō kyā'rā tō'thō lō pyĕr'dā*. Who wants all loses all.
QU'IL SOIT COMME IL EST DÉSIRÉ, *kĕl' swà' kō'mĕ' lĕ' dā'zĕ'rā'*. Let it be as desired.
QUI AIME BERTRAND AIME SON CHIEN, *kē'ăm' bĕr'trŭn' ăm' sōn' shyĕn'*. Love me, love my dog.
QUI N'A SANTÉ, N'A RIEN, *kē' nà' sān'tā' nà' ryĕn'*. He who has not health, has nothing.
QUI PRÊTE À L'AMI PERD AU DOUBLE, *kē' prāt' à là'mē' pĕr' tō' dōō'blĕ'*. Loan oft loses both itself and friend.
QUI VA LÀ? *kē' và' là'*. Who goes there?
QUI VIVE? *kē' vēv'*. Who goes there? On the "qui vive," adroit, watchful.

RAISON D'ÉTAT, *rĕ'zŏN' dā'tà'*. Interest of the state.
RAISON D'ÊTRE, *rĕ'zŏN' dā'tr'*. The reason for a thing's existence.
RÉGIME, *rā'zhēm'*. Mode or style of rule or management.
RENDEZVOUS, *rān'dā'vōō'*. A place of meeting.
RENDEZ MES DEVOIRS, *rān'dā' mā' dĕ-vwàr'*. Pay my respects.
RENTRER EN GRÂCE, *rān'trā' ăn grās'*. To be restored to favor.
RÉPONDEZ S'IL VOUS PLAÎT (R.S.V.P.), *rā'pŏn'dā' sĕl vōō' plĕ'*. Reply if you please, written on invitation cards.
RÉPONDRE EN NORMAND, *rā'pŏn'dr' ăn nôr'măn'*. To answer in Norman; to speak evasively.
RÉSUMÉ, *rā'zū'mā'*. A summing up.
RETE NUOVA NON PIGLIA UCCELLO VECCHIO (It.), *rā'tĕ nwō'và nōn pēl'yà ōōt-shĕl'lō vĕk'kyō*. A new net won't catch an old bird.
REVENONS À NOS MOUTONS, *rĕ-vnŏn' à nō' mōō'tŏn'*. Let us return to our sheep; let us come back to our subject.
RIEN N'EST BEAU QUE LE VRAI, *ryĕn' nĕ' bō' kē lĕ vrà'*. There is nothing beautiful but truth.
RIRA BIEN QUI RIRA LE DERNIER, *rē'rà' byĕn' kē' rē'rà' lĕ dĕr'nyà'*. He laughs best who laughs last.
RIRE ENTRE CUIR ET CHAIR; RIRE SOUS CAPE, *rēr' ăn'tr, kwēr' ā shâr'; rēr' sōō' kàp'*. To laugh in one's sleeve.
ROBE DE CHAMBRE, *rōb' dĕ shān'br'*. A dressing gown; a morning gown.
ROBE DE NUIT, *rōb' dĕ nüē'*. A nightdress.
RÔLE, *rōl*. A part in a performance.
RUSE DE GUERRE, *rüz' dĕ gâr'*. A military stratagem.

SALUD Y PESETAS! (Sp.), *sā-lōōTH' ē pā-sā'tàs*. Health and money (a toast).
SANAN CUCHILLADAS, MÁS NO MALAS PALABRAS (Sp.), *sà'nàn kōō'chēl-yà'THàs màs nō mà'làs pà-là'bràs*. Wounds from a knife will heal, but not those from the tongue.
SANS CÉRÉMONIE, *sān sā'rā'mō'nē'*. Without ceremony.
SANS PEUR ET SANS REPROCHE, *sān pûr' ā sān rĕ-prōsh'*. Fearless and stainless.
SANS RIME ET SANS RAISON, *sān rēm'ā sān rĕ'zŏn'*. Without rime or reason.
SANS SOUCI, *sān sōō'sē'*. 'Free from care.
SAUVE QUI PEUT, *sōv' kē' pû'*. Save yourselves; let each one look out for himself; headlong flight.
SAVOIR FAIRE, *sà'vwàr' fâr'*. Tact.
SAVOIR VIVRE, *sà'vwàr' vē'vr'*. Good breeding.
SDEGNO D'AMANTE POCO DURA (It.), *zdān'yō dà-màn'tĕ pō'kō dōō'rà*. A lover's anger is short-lived.
SÉANCE, *sā'ăns'*. A sitting given for a painting; an assembly gathered for some set purpose.
SE FAIRE JOUR, *sĕ fâr' zhōōr'*. To force one's way.
SELON LES RÈGLES, *sĕ-lôn' lā rĕg'l'*. According to rule.
SEMPRE IL MAL NON VIEN PER NUOCERE (It.), *sĕm'prĕ ēl màl nōn vyĕn pār nwō'chā-rĕ*. Misfortune is not always an evil.
SE NON È VERO, È BEN TROVATO (It.), *sĕ nōn ĕ vā'rō ĕ bĕn trō-vā'tō*. If it is not true, it is cleverly invented.
SÍ GRACIAS (Sp.), *sē grā'thyàs*. Yes, thank you.
SI JEUNESSE SAVAIT, SI VIEILLESSE POUVAIT, *sē zhû'nĕs' sà'và' sē vyā'yĕs' pōō'và'*. If youth but knew, if age but had strength.
SI JUVENTUD SUPIERA Y SI VEJEZ PUDIERA (Sp.), *sē hōō-vĕn-tōōTH' sōō-pyā'rā ē sē vā-hāth' pōō-thyā'rā*. If youth but knew, if age but had strength; lost chances.
SOIRÉE, *swà'rā'*. An evening party.
SOUFFLER LE CHAUD ET LE FROID, *sōō'flà' lĕ shō' ā lĕ frwà'*. To blow hot and cold.
SOUS UN FAUX JOUR, *sōō' zŭn fō' zhōōr'*. In a bad light.
SO VIEL ICH WEISS (Ger.), *zō fēl ĭk vīs*. As far as I know.
STURM UND DRANG (Ger.), *shtōōrm ōōnt drăng*. Storm and stress.

TABLE D'HÔTE, *tà'bl' dōt'*. Table of the host; a meal served entire, not from separate orders.
TÂCHE SANS TACHE, *tâsh' sān tàsh'*. A work without a stain.
TANT MIEUX, *tān' myû'*. So much the better.
TANT PIS, *tān' pē'*. So much the worse.
TEL MAÎTRE, TEL VALET, *tĕl mâ'tr' tĕl và'là'*. Like master, like man.
TÊTE-À-TÊTE, *tā'tà-tāt'*. A conversation between two parties.
TOUJOURS PERDRIX, *tōō'zhōōr' pĕr'drē'*. Always partridges; the same thing over and over again; too much of a good thing.
TOUJOURS PRÊT, *tōō'zhōōr' prē'*. Always ready.
TOUR DE FORCE, *tōōr' dĕ fôrs'*. A feat of strength or skill.
TOUT À FAIT, *tōō'tà-fē'*. Wholly; entirely.
TOUT À L'HEURE, *tōō'tà-lûr'*. Presently; just now.
TOUT AU CONTRAIRE, *tōō'tō-kôn'trār'*. Quite the contrary.
TOUT À VOUS, *tōō'tà-vōō'*. Entirely yours.
TOUT BIEN OU RIEN, *tōō' byĕn' nōō ryĕn'*. All well or nothing.
TOUT DE SUITE, *tōō'dĕ-süēt'*. Immediately.
TOUT ENSEMBLE, *tōō'tăn'sān'bl'*. All together, entire effect (of a work of art).
TOUT LE MONDE EST SAGE APRÈS COUP, *tōō' lĕ mōn'dĕ' sàzh' à'prĕ' kōō'*. Everybody is wise after the event,—when it's too late.
TRADUTTORI, TRADITORI (It.), *trà-dōōt-tō'rē trà-dē-tō'rē*. Translators are traitors,—they often give a wrong meaning to an author.
TRAVAUX FORCÉS, *trà'vō' fôr'sā'*. Hard labor (legal sentence).
TUTTE LE STRADE CONDUCONO A ROMA (It.), *tōōt'tĕ lĕ strà'dĕ kōn-dōō'kō-nō à rō'mà*. All roads lead to Rome.

UEBUNG MACHT DEN MEISTER (Ger.), *ü'bŏŏng măkt dĕn mīs'tĕr*. Practice makes perfect.
UN BIENFAIT N'EST JAMAIS PERDU, *ŭn byĕn'fĕ' nĕ' zhà'mē' pĕr'dü'*. A kindness is never lost.
UN SOT À TRIPLE ÉTAGE, *ŭn sō'à trē'pl' ā'tàzh'*. A consummate fool.
UN "TIENS" VAUT MIEUX QUE DEUX "TU L'AURAS," *ŭn tyĕn' vō' myû' kē dû tû lō'rà'*. One "take it" is worth two "you shall have it"; a bird in the hand is worth two in the bush.

VALET DE CHAMBRE, *và'là' dĕ shān'br'*. An attendant.
VAMOS (Sp.), *và'mōs*. Let us go; now, then!
VAYA USTED CON DIOS (Sp.), *và'yā ōōs-tĕTH' kōn dē'ōs*. Go with God; good-by and good luck!
VEDI NAPOLI E POI MORI (It.), *và'dē nà'pō-lē ĕ pō'ē mō'rē*. See Naples and then die.
VERDADES Y ROSAS TIENEN ESPINAS (Sp.), *vĕr-dà'THĕs ē rō'sàs tyà'nĕn ĕs-pē'nàs*. Truth and roses have their thorns.
VÉRITÉ SANS PEUR, *vā'rē'tā' sān pûr'*. Truth without fear.
VIELE HÄND' MACHEN BALD EIN END' (Ger.), *fē'lĕ hĕnt' măk'ĕn bălt īn ĕnt'*. Many hands make quick work.
VIGUEUR DE DESSUS, *vē'gûr' dĕ dĕ-sü'*. Strength from on high.
VINO DENTRO, SENNO FUORI (It.), *vē'nō dān'trō sān'nō fwō'rē*. When the wine is in, the wit is out.
VIS-À-VIS, *vē'zà vē'*. Face to face.
VIVE LA BAGATELLE, *vēv' là bà'gà'tĕl'*. Success to trifles! Said on hearing something ridiculous related.
VIVE LE ROI, *vēv' lĕ rwà'*. Long live the king.
VOILÀ, *vwà'là'*. See there; there is; there!
VOILÀ TOUT, *vwà'là' tōō'*. That's all; there you are!
VOILÀ UNE AUTRE CHOSE, *vwà'là' ü'nō'tr' shōz'*. That's quite another thing.
VOIR LE DESSOUS DES CARTES, *vwàr lĕ dĕ-sōō' dā kärt'*. To see the face of the cards; to be in the secret.
VOUS Y PERDREZ VOS PAS, *vōō'zē pĕr'drā' vō' pà'*. You will have your walk for nothing; you will lose your labor over it.

WAS FEHLT IHNEN? (Ger.), *vàs fālt ē'nĕn*. What ails you? What is the matter with you?
WIE DIE ARBEIT, SO DER LOHN (Ger.), *vē dē är'bīt zō dâr lōn*. As the labor, so the reward.

ZEITGEIST (Ger.), *tsīt'gīst*. The spirit of the age.

TEST QUESTIONS

THE following list of *test* questions has been prepared to serve as a *review* of the preceding subject matter on the English language. As the questions have been arranged in logical order for the proper development of each subject, they should serve also to suggest a thorough and systematic *course of study* for those who desire to improve their everyday English.

Although the list contains more than 1300 questions, it includes but a small fraction of the thousands of questions which the English department will answer. A similar list will be found at the end of each of the other 11 departments of the book.

HISTORY AND DEVELOPMENT OF THE ENGLISH LANGUAGE

How did the English language come to be so generally spoken? 25
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What kind of words were brought into the English language by the introduction of Christianity? 26
Name some words introduced by the Romans into the language spoken by the inhabitants of Britain 26
What effect had the conquest of the Danes upon the culture and the language of the people of England? 26
Mention six words of Danish origin 26
Who were the Northmen? 26
What was the language of the Northmen? . . 26
What country was called Normandy? Why? . 26
What effect did the Norman conquest have on the English language? 26
After the Norman conquest, which classes spoke the Saxon language? Which spoke French? . 26
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Mention two things which have contributed greatly to the growth of modern English . . 26
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By a comparison of the synonyms *royal, regal, kingly*, explain the way in which many words have found their way into English 26
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GOOD USAGE

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Distinguish between *aspiration* and *ambition* . 32
What is wrong with the expression, "Where are we at?" 32
Explain the difference in meaning between "I do not know him" and "I do not know him at all." 32
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What is the distinction in the use of *at last* and *at length*? 33
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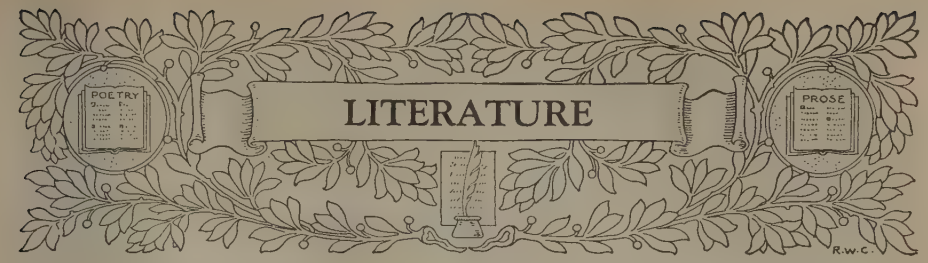
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HOMES OF NOTED AMERICAN WRITERS

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INTRODUCTORY

THE meaning of the term literature has been so widely extended during the past century that careless writers have sometimes used it to cover in rough-and-ready fashion all that has been written or printed. Thus we sometimes hear men in highly specialized professions speak of the "literature" of their subjects, and officers of corporations will speak of distributing their "literature." Such uses of the word are not only extreme, they are certainly incorrect. A chronological list of the presidents of the United States would contain many facts and would constitute a valuable historical record, but it would not be literature. On the other hand, the brief address which President Lincoln delivered at the dedication of the Gettysburg battlefield is imperishable literature. It differs from the historical list in both purpose and form.

Literature an Art. In order to be properly designated as literature, subject matter must be so arranged and ordered that it will appeal to the heart and mind of man, or, as we sometimes say, to the imagination. When any work, whether a musical score or a book, a painting, a statue, or a monument, succeeds in making this appeal, we say that it has the qualities of art. This, then, is the first requisite of literature. The appeal of art can be made only by works that have form. For a literary work to have form it is necessary that its creator shall be a master of language and construction. The author must have "style." He must be able to express or communicate effectively the emotion or idea that possesses him, and in ranking works of literature this must be one of our criteria. We shall give them a higher or a lower ranking in proportion as they have greater or less perfection of form. A work of art, like a story of the Greek gods, like a fable or a fairy tale, or a play or novel about an imagined character, may dispense with facts and still be great; but it cannot dispense with form.

Literature an Interpretation of Life. In addition to form, literature must have significant content. A statement of the rules of Latin grammar in perfect verse will not be great poetry. Without form, a work is not literature at all; without significance, it cannot be great literature. If, then, we assume that the form is adequate, a work of literature will be entitled to a higher ranking in proportion as the truths with which it deals are of greater significance to humanity.

Literature "Truer than History." Literature which meets these demands upon form and content constitutes our most valuable record of the inner life of man. Nowhere is the life of humanity, that is, the history of man's spiritual existence as distinguished from his mere animal existence, so thoroughly and fundamentally presented to us as in the world's great masterpieces; for, though literature is not valuable in proportion to the number of isolated facts presented, it is valuable because of the truths of life which it sets before us. It deals, not with what may once have chanced to happen, but with man's most vital, permanent, and significant relationships. It studies society and evaluates all those allegiances which man has found most fitting and necessary, the ties that bind him to his fellows, to his country, to nature. It provides, therefore, a standard of values for our human activities. It gives us, not the facts primarily, but, what is much more important, it gives us in beautiful form the meaning of human history and what may be called the logic of life. For this reason, Aristotle said that "poetry is truer than history." Literature may be studied with the greatest profit, therefore, not only by those who are interested in art, but also by those who wish to understand humanity's progress.

Three Types of Literary Excellence. Because of this dual appeal of literature we find that there are three types of literary excellence.

1. Judged from the point of view of construction and style, a certain work may stand in its formal perfection as a representative of one of the art forms—the epic, the elegy, or the short story, for instance. Such is the case with Milton's *Paradise Lost*, Gray's *Elegy Written in a Country Churchyard*, or a tale of De Maupassant's.

2. On the other hand, we may have other works not so perfect in form, which nevertheless give us profound insight into the life of men at certain periods of history. Such poems are the German *Nibelungenlied*, the French *Chanson de Roland*, and the Spanish *Poem of the Cid*.

3. In rare cases both of these elements—the artistic form and the historic or spiritual significance—will be present in the highest degree. This is true of the *Iliad* and the *Odyssey* of Homer, the *Divine Comedy* of Dante, and the *Hamlet* or *Macbeth* of Shakspere. Such works will naturally constitute the world's greatest masterpieces.

Modern Literature largely Western European. When we speak of "the world's" greatest literature, it should be remembered that we generally include in our survey only the literature and literary tradition which, first developed in Europe by the Greeks, has been passed down through the Romans to the modern European nations, from whom it has spread to the colonies which these nations founded. This literature, to be sure, includes the Bible, which comes to us from farther East, and there have been thin streams of influence from Persia and India. As a matter of fact, however, the literary traditions of the Hindus, of the Persians, or of the Chinese, for instance, have remained largely alien to us and are therefore not considered as constituting a part of our literary heritage.

The Test of Greatness. It is, of course, extremely difficult to give final rank to all the great works which have been passed down to us, and many works which enjoyed a great vogue in their day, like *Ossian* for instance, have been found subsequently to contain but little that is permanently valuable either as art or as a criticism of human ideals. Occasionally, a work like *Uncle Tom's Cabin*, appearing at a particular juncture, has exercised great immediate influence on history but is of relatively little permanent value as art. In so far as the critic himself applies principles, they should be the principles which we have stated: the degree of perfection exemplified in the construction of the work, and the significance of its content. The safest test, however,—and this should always be used as a corrective of personal judgment—is the sifting of time. Humanity has naturally taken to itself those works which it has found to express the great lessons of life.

MODERN LITERATURE IN THE WESTERN NATIONS FROM ABOUT 500 A. D. TO ABOUT 1900 A. D.

The table given below aims to present summarily the following points: (1) The general inheritance of the modern from the ancient world; (2) Important influences at work in each period; (3) The most important general types of literature developed in each period or century; (4) The characteristic contributions of each country to general world literature in each period; (5) The origin and flourishing of the chief types of literature; (6) The names of the greatest and most characteristic authors in each period. Necessarily many worthy names are omitted, and it is very difficult, especially in ages of great literary activity, to tell just where the line of exclusion should be drawn. Authors who belong only to their particular national literature will be found in the separate tables and sketches of the literatures of the world. A relative ranking of authors and books in point of greatness and world influence is indicated by different styles of type, as: (1) *PSALMS*, (2) CICERO, (3) *Juvenal*, (4) Pliny.

EUROPE'S COMMON INHERITANCE: WORKS MORE GENERALLY KNOWN OR WHOSE INFLUENCE IS STILL FELT AT THE BEGINNING OF THE SIXTH CENTURY

POETRY	SOURCES	PROSE
PSALMS, also in Latin and Greek. Epic: *HOMER'S ILIAD* and *ODYSSEY*. Known through references in Latin literature, by reputation as the work of the greatest of the poets, but in original unknown even to Petrarch. Tragedy: ÆSCHYLUS, SOPHOCLES, and EURIPIDES, the great Greek dramatists, will remain unknown until the Renaissance, except in so far as they influence Seneca. Comedy: *Menander*, through Latin adaptations and influence on Latin comedy. ARISTOPHANES, seemingly unknown until time of Renaissance. Lyrics: Lyric poets SAPPHO and ANACREON, and particularly the anthologies, known through their influence on Latin poetry and verse forms and through translations or imitations by Latin poets. PINDAR becomes an important influence only in the Renaissance and later period. Pastoral: *Theocritus* and Bion, known through Latin imitations but will become models in Renaissance.	***From the Hebrew*** ***From the Greek*** At the beginning of the so-called dark ages, Greek culture, and knowledge of and interest in Greek literature, become virtually extinct. Greek is known and sometimes used in commerce in southern Gaul during the 6th century, and later many Greek monks driven out by the Eastern Church take refuge in Italy. Charlemagne is supposed to have known it, and there are sporadic centers, especially monasteries, where Greek is taught as far west as Ireland up to the period of the Renaissance. But it may be safely said that the spirit of Greek literature is unknown, and Greek literature as such has little direct influence until after Petrarch.	*OLD TESTAMENT*, also in Latin and Greek. Religion: *NEW TESTAMENT*, in Latin translations. *The Church Fathers*, known through influence on Latin Church fathers. Philosophy: *ARISTOTLE*. Known only in part, through fragmentary Latin translations, and, during Mohammedan occupation of Spain, through influence of Arabian schools and teachers. After 1000 A. D. the most important influence on medieval philosophy. *PLATO*. Known through Boethius and Latin translation of the *Timæus*. His influence early enters the Church through the Greek fathers, from whom it passes to the Latin fathers. His is the strongest philosophical influence on the early Church, and tends to give literature first its allegorical turn and later its idealistic tendency. Biography and morals: PLUTARCH. Though not read in Greek, subject matter known in Latin. Will become one of most popular works of the Renaissance period because of subject matter and conception of the heroes of antiquity. Late Greek romances: Greek romances and tales of Greek mythology and Greek life pass into tradition, and at a later period Greek materials will enter through trade with Byzantium and through contacts during time of the Crusades. History and oratory: Historians like *Herodotus*, *Xenophon*, and *Thucydides*, and orators like DEMOSTHENES will become known as such and enter literary tradition in period of Renaissance. Fables: *Æsop*. Well known in popular tradition and in Latin versions used in medieval schools.

POETRY	SOURCES	PROSE
Epic: *VIRGIL'S ÆNEID*; Statius. Pastoral: VIRGIL: ECLOGUES and BUCOLICS. Lyric: HORACE; *Catullus* (almost unknown). Elegiac: Tibullus; Propertius; OVID. Narrative: Lucan; OVID. Philosophical: *Lucretius*. Didactic: HORACE. Tragedy: *Seneca*. Comedy: Plautus; *Terence*. Satire: HORACE; *Juvenal*; *Martial*. Fables: Phædrus.	***From the Latin*** The Latin authors fare much better than the Greek. Many of them are available, and some of them, like Ovid, Horace, and Virgil, have their readers, even during the dark ages. Latin itself continues to be the language of the Church. It is the failure to comprehend the spirit and the form of Latin literature, and occasionally the hostility of the Church, that leads to the disappearance of ancient culture in its Latin form. Knowledge of the language and the letter will remain, but the spirit of Latin culture will become moribund for some centuries. It will not, however, be so nearly extinguished as the Greek; consequently Latin culture will be the first to revive. Most of the great Latin poets, and particularly Virgil, will be known to Dante (1265–1321). He will take Virgil as his master and will know him by heart. ***From the East*** Persian ideas and faint Persian influence are apparent in later books of the Old Testament and in later Greek philosophy. During the middle ages there will be some contact with the East, especially during the Crusades; the Hindu story of Buddha, for instance, will be found in the old French *Barlaam and Josaphat*. ***From the North*** During the invasion of the barbarians, folklore and folk tales and possibly unwritten songs are brought by the Germanic tribes into southern Europe.	Oratory: CICERO, great master of style for Renaissance. Philosophy: Cicero; *Boethius*, *Consolations of Philosophy*. History: *Cæsar*; *Livy*; Sallust; *Tacitus* (little known). Natural history: Pliny the Elder. Religion: Church Fathers: Tertullian; *St. Augustine*,—*Confessions*, *City of God*.

THE MEDIEVAL PERIOD

6th TO 12th CENTURY—The Disappearance of Classical Culture

COUNTRY	POETRY	PROSE	IMPORTANT MOVEMENTS AND INFLUENCES
Europe	Latin hymns.	Sermons, Latin chronicles.	The "dark ages," particularly the 7th to the 10th century.
France	Saints' lives. Beginnings of liturgical drama, about 10th century. Epic: Chansons de Gestes,—CHANSON DE ROLAND.	The Oaths of Strasbourg, 842, first document written in Old French.	Disappearance of urban and development of feudal civilization. Romance languages supersede vulgar Latin as spoken language. Continuance of Latin tradition. Dominance of Church.
Germany	Nibelungen sagas, unwritten.		
Scandinavia and Iceland	"*Elder Edda*" and *sagas* in oral tradition, written in 12th and 13th centuries.		Development of monasteries as centers of learning, 9th to 12th century. Charlemagne crowned, 800.
Ireland	Growth of tale and folklore.		Development of schools.
England	Epic: *Beowulf*, 7th century(?). Religious poems. Songs of sea and travel: The Wanderer; The Seafarer.	Bede's Ecclesiastical History, 731, in Latin. Translations: King Alfred. Chronicles: Anglo-Saxon Chronicle.	Norman conquest, 1066. The introduction of Nordic element into literary tradition from Scandinavia, Germany, and Britain. First Crusade, 1095.

12th CENTURY—The Great Age of Medieval Romance

France	Religious poetry: Bernard of Cluny, in Latin; Bernard of Clairvaux, in Latin; medieval hymns, in Latin. Drama: Early miracle plays in Latin and French. Lyric: Provençal poetry; songs of troubadours and trouvères. Epic: Later Chansons de Gestes celebrating Charlemagne and French heroes. Romances of chivalry and adventure, dealing with "matter of Britain," King Arthur, etc. *Christian of Troy.* Beast epic: *Reynard the Fox.*	Romance, in prose and verse: *Aucassin and Nicolette.*	Founding of universities of Paris and Oxford. The development of modern lyric verse forms in Provence. Woman comes to occupy a more important place in courtly life, and love becomes the theme of poets. Development of Arabic civilization, particularly in Spain, through which knowledge of Aristotle is spread.
England		Chronicles and legendary history: Geoffrey of Monmouth,—History of the Kings of Britain, including stories of King Arthur and King Lear.	
Germany	Epic: NIBELUNGENLIED, written; *Gudrun.*		
Scandinavia		History: Saxo Grammaticus, includes story of Hamlet.	

13th CENTURY—High Point of Medieval Civilization

France	Folk song and satire: *The Fabliaux.* Allegory: *The Romance of the Rose.* Religious poetry: Saints' lives; Gautier de Coincy,—The Miracles of Our Lady. Drama: Beginnings of secular drama and farce.	Chronicles: Joinville.	Gothic art reaches its point of perfection. Epics gradually succeeded by romances in verse. Popularity of stories of King Arthur, Lancelot, and the Grail. Beginnings of romance in prose.
Italy	Poems of courtly love: The Sicilian School. Lyrics: *Dante.* Hymns: THOMAS OF CELANO,—DIES IRÆ, Latin.	Biography: *Dante,—The New Life.* Travel: *Marco Polo.* Theology: *Thomas Aquinas*, in Latin. Saints' lives: JACOPO DA VORAGINE,—THE GOLDEN LEGEND, in Latin.	Struggle for supremacy between popes and emperors. Growth of cities and development of guilds and municipal government.
Spain	Epic: THE CID.		
Germany	Romances: *Wolfram von Eschenbach,—Parzival*; Hartmann von Aue; Gottfried von Strassburg. Lyrics: *Walther von der Vogelweide.*	Encyclopedia: Albertus Magnus, in Latin.	
England	Romances: Imitations of Norman-French romances. Layamon's Brut. Songs and ballads.		The rise of parliaments. Magna Charta. Fusion of Saxon and Norman peoples and of English and Norman-French speech.

14th CENTURY—End of the Literature of Feudalism

COUNTRY	POETRY	PROSE	IMPORTANT MOVEMENTS AND INFLUENCES
France	Drama: Miracle plays,—The Miracles of Notre Dame. Mystery plays.	Chronicles: Froissart.	Societies for the production of plays become more numerous. Froissart shows the decay of feudalism and the end of chivalry. He marks the end of knighthood. Civilization will soon become urban.
Italy	Epic: *DANTE,—DIVINE COMEDY.* Love sonnets: PETRARCH.	Prose tales: BOCCACCIO,—THE DECAMERON. Politics: Dante,—On Monarchy, in Latin.	Petrarch introduces that enthusiasm for the study of the classical authors and intimate acquaintance with them which marks the beginning of the Revival of Learning. His interests and curiosities have earned him the title of "the first modern man." His younger admirer, Boccaccio, is the first modern man really to learn Greek.
England	Miracle plays. Allegory: Langland,—Piers Plowman. Narratives: CHAUCER,—CANTERBURY TALES. Romances: Sir Gawain and the Green Knight.	Religion: Wiclif,—Translation of Bible. Travels: Sir John Mandeville, originally in French (?).	Chaucer visits Italy and meets Petrarch.

THE RENAISSANCE

15th CENTURY—The Period of Transition

France	Poems in the medieval forms: Ballades. Charles of Orleans. VILLON. Religious drama: Mysteries,—The Mystery of the Passion. Farce: *Master Pathelin.*	Memoirs: Commines.	The Renaissance is sometimes taken to begin with the discovery of America, though the movement is under way before this time. Beginnings of modern personal poetry.
Italy	Romantic and burlesque epic: Pulci; Boiardo. Sonnets and songs: Lorenzo the Magnificent.	Translations: Boiardo's translation of Apuleius and Lucian; Bruni's renderings of Demosthenes, Æschines, Plutarch, Xenophon, Plato, Aristotle; Valla's Iliad, Thucydides, Herodotus, Æsop. Pastoral romance: Sannazzaro.	Early in century Greek masterpieces are brought to Italy, and the literature of the ancient Greek world begins strongly to influence modern literary tradition. Enthusiasm for art, literature, and science for their own sakes and not as subsidiary to theology. Struggle for dominance in literature between writing in Latin and Greek and writing in the modern languages.
Germany	Satire and allegory: Brant,—The Ship of Fools.	Popular romance: Till Eulenspiegel.	Gutenberg's invention of printing.
England	Morality plays.	Religion: *Thomas à Kempis,—Imitation of Christ.* Tales of chivalry: *Malory's Morte D'Arthur.*	Caxton prints first book in England, 1477. Fall of Constantinople, 1453.

16th CENTURY—The Reformation

France	Lyric: The Old School: Marot. The New School: *Ronsard*; Du Bellay.	Humor: RABELAIS. Essays: MONTAIGNE. Theology: *Calvin.* Translation: *Amyot's Plutarch.*	Enthusiasm for study and worship of ancients. Reform in religion, and wars of religion.
Italy	Epic: *Ariosto*; *Tasso.* Lyric and sonnet: *Michelangelo.*	Politics: *Machiavelli.* Biography: *Cellini*; Vasari.	The influences of classical drama,—of Plautus and Terence in comedy and of Seneca in tragedy,—as well as of the theories of critics like Aristotle and Horace, make themselves felt in modern drama.
Germany	Meistersinger: Hans Sachs. Hymns: *Luther.*	Translation: LUTHER'S BIBLE.	The end of Humanism.
Holland		Letters and colloquies: *Erasmus,* in Latin.	The Renaissance passes from Italy to France and England.
Spain	Drama: *Lope de Vega.* Ballads: The *Romancero General.*	Romances of chivalry: Montalvo's Amadis de Gaula. *Romances of Roguery.*	
Portugal	Epic: *Camoëns,—The Lusiad.*		
England	Allegory: *Spenser's Faery Queen.* Sonnets: Sidney; SHAKSPERE. Drama: *Marlowe*; SHAKSPERE'S EARLY PLAYS.	Politics: More's Utopia. Defense of Poesy: Sidney. Voyages: Hakluyt. Romance: Lyly's Euphues.	Age of adventure and discovery.

THE MODERN ERA

17th CENTURY—The Great Age of Drama

COUNTRY	POETRY	PROSE	IMPORTANT MOVEMENTS AND INFLUENCES
France	Poets of the French Classical Period: Tragedy: *Corneille*; RACINE. Comedy: *MOLIÈRE*. Fables: LA FONTAINE. Criticism: *Boileau*.	Drama, comedy: *MOLIÈRE*. Philosophy: *Descartes*; *Pascal*. Religion: *Pascal*; Bossuet. Letters: *Mme. de Sévigné*. Critics and moralists: *La Rochefoucauld*; La Bruyère.	Golden age of French literature; Richelieu, Louis XIV, and the "century of authority." French Academy founded and strict standards established.
Germany		Picaresque novel: Grimmelshausen's Simplicissimus. Religion: Jacob Böhme.	
Holland		Philosophy: *Spinoza*, in Latin. Law: Grotius, in Latin.	
Spain	Drama: *Lope de Vega*; CALDERÓN.	Novel: *CERVANTES' DON QUIXOTE*.	
England	Drama: *SHAKSPERE,—THE GREAT TRAGEDIES*; *Jonson*; Webster; Otway; Beaumont and Fletcher. Lyric: Donne; Herrick. Cavalier poets: Lovelace. Epic: MILTON. Satire: *Dryden*.	Translation: *KING JAMES VERSION OF THE BIBLE*; Chapman's Homer. Essays: *Bacon*. Religion: Jeremy Taylor. Politics: *Milton*. Walton's Compleat Angler. Diary: Pepys. Philosophy: *Locke*. Science and philosophy: Bacon's Novum Organum, in Latin, and The Advancement of Knowledge.	End of the Age of Elizabeth and rise of the Puritans. Settlement of America. The Commonwealth and the Restoration. Growth of political liberalism.

18th CENTURY, FIRST HALF—The Age of Reason

France	Drama: Voltaire.	Politics: *Montesquieu,—Spirit of Laws*. Novel: *Lesage,—Gil Blas*; *Abbé Prévost,—Manon Lescaut*. Drama: Marivaux. Translation: Abbé Galland's translation of the Arabian Nights. Morals: Fénelon.	Beginnings of cosmopolitan attitude. Rise of public opinion as a force in social and political affairs. English influence strong in France.
Italy		Philosophy: Vico.	
England	Poet of Classicism: POPE. Nature poetry: Thomson.	Translation: Sale's Koran. Novel: DEFOE; *Richardson*; Fielding. Essay: *Addison*. Satire: SWIFT. Philosophy: Hume; Berkeley.	Increasing importance of novel. Great advances in science by Newton and others.

18th CENTURY, SECOND HALF—Development of the Idea of Progress

France	The end of Classicism. Lyric, satire: Voltaire; Chénier.	The Encyclopedia: *Diderot*. Return to nature; Beginnings of Romanticism: ROUSSEAU. Novel: *Rousseau*; Saint-Pierre. Critic and satirist: VOLTAIRE. Natural history: Buffon. Drama: *Beaumarchais*.	Age of criticism and unrest preparing for overthrow of the existing order in the French Revolution. Beginnings of Romanticism, and return to nature. Increasing interest in human history, political and social problems. The French Revolution.
Italy	Drama: Alfieri.	Drama: *Goldoni*.	Growth of individualism and lyricism.
Germany	Lyric and ballad: GOETHE; *Schiller*; Bürger. Drama: *Goethe*; *Schiller*; Lessing.	Novel: *Goethe*. Criticism: *Lessing*. History: Herder. Philosophy: *Kant*.	Great age of German literature.
England	Narrative poetry: Goldsmith. Romantic songs and folk poetry: Percy's Reliques; BURNS; "Ossian"; Blake. Elegy: *Gray*.	History: *Gibbon*. Criticism: *Samuel Johnson*. Politics: Burke. Novel: *Goldsmith*; Sterne. Drama: Goldsmith; Sheridan. Biography: *Boswell*.	Beginnings of English Romanticism.
America		Autobiography: Franklin. Politics: Jefferson; Hamilton.	The American Revolution.

19th CENTURY, FIRST HALF—Romanticism and Beginnings of Realism

COUNTRY	POETRY	PROSE	IMPORTANT MOVEMENTS AND INFLUENCES
France	Romantic School: *Lamartine*; *De Vigny*; HUGO; *De Musset*. Drama: Hugo.	Religion: Chateaubriand. Criticism: Mme. de Staël; *Sainte-Beuve*. Romantic novel and novel with social thesis: *Hugo*; George Sand. Psychological novel: Stendhal. Realistic novel: BALZAC. Drama: Dumas the Elder; Scribe; De Musset. History: Michelet; Guizot.	Era of social and political reconstruction, following French Revolution. Development of nationalism and the spirit of nationalism in literature. Glorification of individualism. Increasing liberalism in politics, soon turning to humanitarianism.
Italy	Poetry of pessimism: Leopardi.	Historical novel: Manzoni.	
Germany	Lyric poetry: *GOETHE*; Heine; Uhland. Poetry of Romantic School: Novalis. Drama: *GOETHE'S FAUST*; *Schiller*.	Novel: *Goethe*. Tale: Hoffmann. Philosophy: *Hegel*; Schelling; *Schopenhauer*. Criticism: A. W. von Schlegel.	The romanticists turn to the "rich and strange," and present with enthusiasm pictures of the middle ages, using "local color." With this comes the development of the historical novel and of history. Under the influence of science there develops an increased respect for the facts, even the brutal facts of life, and many novelists turn more and more toward realism. Invention of steamboat and railroad, and application of steam to industry.
England	Poets of liberty: BYRON; *Shelley*. Poets of beauty and romance: *Keats*; Coleridge; Scott. Nature poetry: WORDSWORTH.	Essay: *Lamb*. Historical novel: *Scott*; *Thackeray*. Novel of contemporary life: *Dickens*; *Thackeray*; Austen. History and criticism: *Carlyle*. Philosophy: Emerson. Essay and tale: Irving. Frontier and sea stories: Cooper. Romance and psychological tales: Hawthorne. Short story: *Poe*.	
America	Lyrics: Poe.		
Poland	Poet of liberty: Mickiewicz.		
Russia	National poet: Púshkin.	Novel: Gógol.	
Hungary	Lyric poetry: Petőfi.		

19th CENTURY, SECOND HALF—The Age of Science and Evolution

France	*Later work of Victor Hugo*. The Parnassian School: Leconte de Lisle. Art for art's sake: Gautier and Baudelaire. The Symbolists: Paul Verlaine. Drama: Rostand.	Novel: *Hugo's Les Misérables*; *Flaubert*; Anatole France; Bourget. Naturalistic novel: Zola. Short story: *Maupassant*; Daudet. History: Renan; *Taine*. Criticism: Brunetière; Anatole France; *Taine*. Drama: Dumas the Younger; Maeterlinck.	The development, formulation, and spread of evolution, and its application, not only to the study of biology, but also to that of the social sciences and even to literature, constitute the most striking phenomenon of this time. There arises a bitter quarrel between the older theology and the newer science. For this reason two opposed tendencies appear in literature. One, the idealistic, emphasizes the life of the spirit; the other, the materialistic, attempts to explain everything in terms of matter and scientific laws. Widespread application to industry of new discoveries in electrical and other sciences. The basis of wealth and society becomes more and more industrial. Profound unrest and beginnings of strife between capital and labor. As America extends itself to the West, with Whitman and Mark Twain a newer and more characteristically American note appears. Unification of Germany and Italy. The further development of the idea of nationality.
Italy	Lyric poetry: Carducci; D'Annunzio. Drama: D'Annunzio.	Novel and drama: D'Annunzio.	
Spain		Drama: Echegaray. Novel: Galdós; Pereda; Valera.	
Germany	Drama: Hauptmann.	Novel, short story: Heyse. Drama: Hauptmann; Sudermann. Philosophy: *Nietzsche*. National history: Treitschke. History: Mommsen.	
England	Poets of the Victorian age: *Tennyson*; *Browning*; Swinburne. Love sonnets: Elizabeth Barrett Browning. The Pre-Raphaelites: William Morris; Christina Rossetti; D. G. Rossetti.	Science: DARWIN'S ORIGIN OF SPECIES; Huxley. Novel: George Eliot; *George Meredith*; *Thomas Hardy*. Religion: Newman. Romance and short story: Stevenson; Kipling. Scholarship and criticism: Ruskin; *Matthew Arnold*; Pater.	
America	Poet of democracy: Whitman. New England poets: Longfellow; Lowell; Whittier; Holmes.	Novel: *Mark Twain*; Henry James; W. D. Howells. State papers: Lincoln.	
Poland		Historical novel: Sienkiewicz.	
Russia	Realistic poet: Nekrásov.	Novel: *Tolstóy*; *Turgénev*; Dostoiévsky. Short story and drama: Chékov.	
Norway		Drama: *Ibsen*. Novel: Björnson.	
Sweden		Prose tale: Selma Lagerlöf.	
Denmark		Fairy tales: *Hans Christian Andersen*. Criticism: Georg Brandes.	



AMERICAN MEN OF LETTERS

William Dean Howells
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John Bigelow

Winston Churchill
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AMERICAN WOMEN WRITERS

Gene Stratton Porter

Alice Brown

Mary Roberts Rinehart

Edith Wharton

Margaretta Wade Deland

Mary E. Wilkins Freeman
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Gertrude Atherton
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Josephine Preston Peabody

Kate Douglas Wiggin
Photo by Paul Thompson

AMERICAN LITERATURE

AMERICAN literature, like the literatures of all peoples who have emigrated from lands already in an advanced stage of culture, is not an original native growth. On the contrary, from the very first, American writers began with a long tradition behind them. They brought with them an intimate familiarity with a rich literature and a deep interest in certain burning problems of religion and conduct. Faced with a new and stubborn land to conquer, they had at first little leisure to write, and, even when the leisure was available, it was long before they wrote with the consciousness that they belonged to a people having an individuality and a life of its own.

Colonial Period (1608–1775). Literary history in America begins with such accounts of life, travels, and adventures as appear in the simple, direct narrative of John Smith's *True Relation of Virginia* (1608). Smith followed this with a more pretentious work, *A Map of Virginia, with a Description of the Country* (1612). Of all the early accounts of explorers, this *Description* has made the greatest appeal to the popular imagination. It is fairly representative of many English pamphlets, written to draw attention to America and other distant parts of the world, and published in London during the 17th century. In New England, also, there were some who wrote narratives similar to John Smith's *True Relation.* One of these was Edward Winslow, whose *Good News from New England* was published in 1624.

Colonial Journals and Diaries.—To these published works there must be added numerous diaries and journals which long remained unpublished. The most important of these in New England were written by William Bradford and Edward Winslow of Plymouth and John Winthrop of Massachusetts Bay. The *Journal of Bradford and Winslow* is vivid and full of interesting incidents. Bradford's *History of Plymouth Plantation,* bringing the story of that colony down to the year 1646, is a book of charm and dignity, reflecting the best qualities of early Puritanism. Less interesting but no less valuable is the journal of John Winthrop. This diary was faithfully kept by the first governor of Massachusetts Bay from 1630 until a few months before his death in 1649. Although it bears the title *A History of New England,* it is concerned with little outside the author's own colony.

In the 18th century, the greater degree of leisure and comfort attained in the older settlements gave opportunity for journeys, of which several accounts have survived. These are frequently illuminated with comment upon the life of the times that gives them literary flavor. One of the most interesting of these narratives is the journal kept by a New England woman, Mrs. Sarah Knight, on a trip from Boston to New York in 1704-05. The *History of the Dividing Line* (between Virginia and North Carolina) by William Byrd of Westover in Virginia, which recounts his experiences and observations on a surveying expedition in the region of the Great Dismal Swamp in 1729, is of great value. Not only does it supply information, but, like other journals of this Virginia gentleman, it bears the impress of a genial and humane personality. Byrd was, in his European education, in his knowledge of the ancient and modern classics, and in his interest in public affairs, a typical Virginia aristocrat, while in his vivacious style and quaint humor he was one of the best colonial writers.

Of the more ambitious attempts to write colonial history, the most notable are the unfinished *Chronological History of New England,* by the Reverend Thomas Prince, of Boston, and the *History of the Colony of Massachusetts Bay,* likewise incomplete, by Thomas Hutchinson.

Religion.—In connection with the religious writing which was so important in colonial New England, the names of Roger Williams, Thomas Hooker, and John Wise should be mentioned as defenders of democratic church polity and of freedom of thought. These men stood in clear opposition to the powerful family of the Mathers,—Richard, Increase, and Cotton, father, son, and grandson. Of all the voluminous works published by this extraordinary family succession, only the *Magnalia Christi Americana* (1702), by Cotton Mather, retains today any real interest. It is a useful collection of material for the study of early New England, which reflects the curious compound of power, scientific spirit, and superstition that marked the character of its author.

Philosophers.—The 18th century produced, apart from the group of political thinkers and writers of the Revolutionary period, two outstanding figures, Jonathan Edwards and Benjamin Franklin. Edwards, descended from families of high standing and culture in New England, was educated at Yale college. After a stormy period as minister of the church at Northampton, Mass., he was sent as a missionary to the Indians at Stockbridge. Here he wrote his famous treatise upon the *Freedom of the Will,* which is widely known as one of the greatest of American contributions to philosophical thought. Edwards was also one of the leaders in the religious movement in New England, known as the Great Awakening.

Franklin, the son of a tallow chandler in Boston, inherited a sound taste for life and letters, was largely self-educated, and became the best exponent of the average American's practical philosophy of life. He wrote on many themes, political, scientific, and commercial, but his literary fame rests now upon his *Autobiography* and upon the proverbial sentences of *Poor Richard's Almanac.*

Two other names should be noted in this time. Samuel Johnson, an Episcopal clergyman of Connecticut and a friend of Franklin, is reckoned one of the clearest of American thinkers in religion and philosophy. John Woolman, a Quaker, who lived at Mt. Holly, New Jersey, where he was a tailor "by the choice of providence," left a *Journal* which is remarkably attractive in its transparent sincerity.

Newspapers.—During the first half of the 18th century, newspapers and magazines multiplied in America. These publications encouraged discussion of public questions and contributed largely to that growth of public opinion which resulted in the Revolution. The first newspaper published in the colonies was *Public Occurrences* (Boston, 1690). The *Boston News Letter* was first issued in 1704, and the *Boston Gazette* was founded in 1719 by James Franklin, an older brother of Benjamin Franklin. He also started the *New England Courant* in 1721. Benjamin was employed upon both papers as a printer.

Colonial Verse.—What has been called the "one really American poem" of the 17th century is an epitaph of 44 lines on Nathaniel Bacon, the insurrectionary leader in Virginia. This poem belongs to the class of elegies, of which a large number were produced in the colonies, especially by the New England clergy. The best one credited to New England is a "Funeral Song" by the Reverend Samuel Wigglesworth. His father, Michael Wigglesworth, was the author of the most widely read poem of colonial times, "The Day of Doom," a vivid résumé of the main tenets of Calvinism.

An attractive figure in this period is Anne Bradstreet. Amid her family of eight children on a frontier farm in the town of Andover, she found time to write many verses. These were published in London in 1650, by her brother, in a volume entitled *The Tenth Muse, Lately Sprung Up in America.* Most of her lines are crude and prosaic, although in some descriptions of nature and reflections upon life she gives evidence of accurate observation and of a pleasing fancy.

Revolutionary Period (1775–1800). Ballads and satirical verses mark the next notable stage in American poetry. Among all the patriotic ballads of the Revolution, one on the death of Nathan Hale is notable for its real poetic quality. Francis Hopkinson's "Battle of the Kegs" is the best-known of the purely humorous ballads of the time. Joel Barlow's mock-heroic "Hasty Pudding" is one of the best longer pieces of humorous verse in early American literature. The same author's *Columbiad* is an attempt to write an American epic, but it fails to reach the level of poetry. John Trumbull's "McFingal" is the most effective of the many political satires of the period.

The Hartford Wits.—From about 1780 to 1800 a group of talented and versatile men, known as the "Hartford Wits," formed a literary center at New Haven and Hartford. The chief of these were Timothy Dwight, John Trumbull, Joel Barlow, David Humphreys, Richard Alsop, Lemuel Hopkins, and Theodore Dwight. Timothy Dwight, afterward president of Yale, wrote a long poem, *Greenfield Hill*, in which he imitated the English poets from Milton to Goldsmith. His *Conquest of Canaan* represents a type of biblical epic which was popular at this time.

Freneau.—In quality and range of subject and style, Philip Freneau is equaled by none in the Revolutionary period, and is in fact the first of American poets. He first acquired reputation by his satirical verse, but his fame now rests upon his romantic lyrics, especially of the sea and of nature. In such poems as "The Indian Burying Ground," "Eutaw Springs," and "The Wild Honeysuckle," he clearly anticipates the spirit and the manner of the English romantic poets.

Politics.—The political literature of the Revolutionary period includes the speeches of James Otis, Samuel Adams, Patrick Henry, and others, as well as many pamphlets and letters which appeared during the period of controversy ushered in by the opposition to the Writs of Assistance in 1761. These publications discussed trenchantly, from both sides, the pressing problems of the times. The passage of the Townshend acts brought forth John Dickinson's *Letters from a Farmer in Pennsylvania to the Inhabitants of the British Colonies*, which were widely copied and translated. In his earlier days Franklin did much to bring about the union of the colonies, and the letters and published papers of his later life helped to interpret his country to Europe. From the loyalist point of view, the best statements came from Myles Cooper, president of King's college, and from Jonathan Boucher, at one time a clergyman in Maryland and Virginia, who wrote *A View of the Causes and Consequences of the American Revolution* (1797). Thomas Paine's pamphlet entitled *Common Sense* probably contributed more powerfully than any other single utterance to bring about the final break between the colonies and England. Paine wrote also the most effective of the war time pamphlets, *The Crisis* (1776–83), a series of stirring appeals, the first of which was published just after Washington's disastrous retreat across New Jersey. Jefferson gave classic form to the statement of the case for the colonies in the *Declaration of Independence*.

Of all the writings of this period, however, the most important are the 85 essays included in the collection known as *The Federalist*. These papers, written by Alexander Hamilton, James Madison, and John Jay, were first published in the *Independent Journal* of New York in 1787-88. They did more than any other one thing to bring about the adoption of the Constitution, and they remain of the highest value in American political history and literature.

Early American Drama.—The first American drama was *The Prince of Parthia*, a romantic tragedy by Thomas Godfrey, first acted at the Southwark theater in Philadelphia, April 24, 1767. The first American comedy to be presented by a professional company was *The Contrast* by Royall Tyler. It was produced in New York, April 16, 1787. Tyler was the author of more than 50 plays, most of which were successful. His immediate successors were James N. Barker and John Howard Payne. Barker used American material in *The Indian Princess* (1808) and *Superstition* (1824). During the next 25 years, many national themes were used by playwrights, of which R. P. Smith's *William Penn* is a good example. In 1855 George H. Boker's *Francesca da Rimini*, notable for literary and acting quality, was first presented. In *The Forest Rose* (1825) by Samuel Woodworth, the first permanent Yankee character, "Jonathan Plowboy," was developed.

First National Period (1800–1840). Two centuries of American writing had prepared the way for rapid development in the first decades of the 19th century. After Philip Freneau, the next American poet is William Cullen Bryant, lawyer, successful journalist, and publicist. His literary career extended over almost 70 years,—from "Thanatopsis," which he produced when he was but 18 years of age, to his translation of Homer, the work of his old age. His most original poems are those in which he interprets the primeval forests of America with a certain largeness of utterance and grandeur of verse. Like Freneau, Bryant hewed his own paths and produced distinctively American work. Minor poets of Bryant's early years were Samuel Woodworth, author of "The Old Oaken Bucket," Joseph Rodman Drake, who wrote "The Culprit Fay," the first fairy story in American verse, and Fitz-Greene Halleck, whose "Marco Bozzaris" is still popular.

The Knickerbocker Group.—In the first two decades of the 19th century, when the tempest of harsh criticism of American writers was at its height, a group of young men in New York were cultivating the informal, humorous, and half-satiric essay. The leaders were James K. Paulding and Washington Irving. They, with William Irving, published the *Salmagundi* papers. Washington Irving's literary career, however, really began with the *History of New York* (1809). This work attracted the attention of Walter Scott and afterward helped to secure for the author much-needed assistance in England. The *Sketch Book* was issued in New York and London (1819-20). Irving's writings established the prestige of American letters in Europe and at the same time interpreted the charm of Europe, especially of England, to the new nation. He was recognized as continuing in America the fine tradition of Addison. His early successes were followed by a long series of works in biography and travel; but the sort of tale, half essay, half short story, found in the *Sketch Book*, constitutes his distinctive contribution to letters.

First American Novelists.—American fiction in the longer novel form began with the work of Charles Brockden Brown, who was deeply influenced by the English writer, Godwin. He was a romancer. His first work was *Wieland* (1798); *Edgar Huntley*, his best. He anticipated Cooper in adventure and Poe in his use of mystery and horror. With all its flaws his work was an advance upon the current romances of England.

It was left for James Fenimore Cooper, sailor and farmer, to use in enduring tales the native material of the frontier and the Revolution. His series of novels began with *The Spy* and probably reached its climax in *The Last of the Mohicans*. Cooper was successful also in sea tales, such as *The Pilot* and *The Red Rover*. Like Irving, he won a large European popularity.

Two other popular novelists of Cooper's time, whose work followed his lead, were Daniel Pierce Thompson, author of *The Green Mountain Boys*, and John Pendleton Kennedy, of Baltimore, author of *Swallow Barn* and *Horse-Shoe Robinson*. William Gilmore Simms was a native of South Carolina and

gave his best effort to telling the story of her part in the Revolution. *The Yemassee* (1835), a tale of colonial Indian warfare, was his first striking success, not afterward surpassed. In his group of Revolutionary tales, *The Partisan* is generally considered his best.

In order of time, Herman Melville's work falls in the next period, but he belongs in spirit with the earlier writers. He began his career with *Typee*, ostensibly a record of his captivity on a South Sea island. This he followed with several other romances, the most famous of which is the whaling story *Moby Dick* (1851).

Transcendentalism.—In New England, during the third and the fourth decade of the 19th century, interest centers in the group of literary and religious leaders who reacted from rigid Puritanism toward Unitarianism and Transcendentalism. W. E. Channing, the leader of the Unitarians, was the greatest figure in the religious thought of the time. About 1836 the Transcendental Club, an informal group, was founded. It included Bronson Alcott, Margaret Fuller, Theodore Parker, and Ralph Waldo Emerson.

This Transcendentalist movement, partly philosophical, partly literary, attracted a large number of the best minds of the period; *The Dial*, published from 1840 to 1844, was their medium of expression. One phase of the movement is exemplified in the Brook Farm experiment (1841). This was an attempt to put into practice certain ideal communistic plans. Its failure brought ridicule upon Transcendentalism. But out of the emphasis which this movement placed upon ideals in life came the high, clear, moral tone of the literature of America in the middle years of the 19th century. This period (1840–76) was essentially a period of poetry, and poetry with a message of character.

Second National Period (1840–1870). Emerson became the prophet of the idealism that ruled the literature of the three decades just before the Civil War. His essays, poems, and addresses, asserting the individuality and the divinity of all men, had a very great contemporary influence and have become a permanent expression of American self-reliance and initiative. Henry David Thoreau represents the extreme, impractical phases of thought in his time, yet his *Walden* and other writings carry a tonic power for the reader. Hawthorne, in his backgrounds and in the ethical quality of his work, harks back to Puritanism, but his pronounced individualism and solitary habits of life and thought set him apart from the tendencies of his time. He contributed much in style and theme to the American romance, but he had no successful imitators.

Poetry.—The two outstanding figures in New England poetry are Henry W. Longfellow and John G. Whittier. Longfellow's didactic and simple narrative poems have made him the household poet of America. As a translator and diligent gatherer of poetic material from the literatures of the world, he contributed largely to the cultural life of his country.

Whittier is universally recognized as the most skillful ballad writer of America. A man of scanty formal education, no traveler, he expended his genius upon the narrow physical world of his New England. But this was a world thrilled by great controversies, into which Whittier threw himself. His antislavery poems, however, are not his best. His "Songs of Labor" and his hymns, together with "Snowbound" and other poems of New England country life, are his enduring works. James Russell Lowell, after Irving, was America's second literary ambassador to England. He was scholar and critic as well as poet. His poetic production ranged from *The Biglow Papers*, dialect satire, to the "Commemoration Ode." Oliver Wendell Holmes maintained through many years his hold upon a wide public by his polished verse of humor and sentiment, as well as by his more original *Autocrat of the Breakfast Table.*

Edgar Allan Poe achieved international fame with a score of poems, like "The Raven" and "The Bells," of extraordinary worth for the new and elfin music he produced in them. Like Walt Whitman, he is a solitary figure in American literature. Whitman's fame rests mainly upon his *Leaves of Grass*, poems for the most part formless but richly imaginative.

Oratory and History.—Among the orators and statesmen of this period are Daniel Webster, Edward Everett, Rufus Choate, Wendell Phillips, and Charles Sumner. Contemporary with these were the great orators of the South,—Henry Clay, Robert Y. Hayne, and John C. Calhoun. To these must be added the name of Abraham Lincoln, not the least of whose titles to immortality is his *Gettysburg Speech.* The writing of history has employed the pens of many Americans whose work rises to the plane of literature. Most notable among these are George Bancroft, Francis Parkman, John Lothrop Motley, William Hickling Prescott, and John Fiske.

Humor.—The humorous writing of the 19th century began with Seba Smith's *Letters of Major Jack Downing* (1830). Among his contemporaries deserving of mention were Augustus Baldwin Longstreet, author of *Georgia Scenes*, and Joseph G. Baldwin, author of *The Flush Times of Alabama and Mississippi.* Benjamin P. Shillaber created the character of "Mrs. Partington." George Horatio Derby (1823–61) is credited with originating the type of humor which ruled in the works of Henry W. Shaw ("Josh Billings"), David Ross Locke ("Petroleum V. Nasby"), and Charles Farrar Browne ("Artemus Ward"). The chief of all American humorists was Samuel L. Clemens ("Mark Twain"). His writings frequently had, however, a serious social purpose, which is more clearly appreciated as the years pass.

Later Poetry.—The Civil War period was productive of many inspiring lyrics from minor poets. Two of these are especially notable, "Maryland, My Maryland" by James Ryder Randall, and "Battle Hymn of the Republic" by Julia Ward Howe. Several poets of fine promise, whose work was cut short by early deaths, belong to the South of this period. Paul Hamilton Hayne, in "The Pine's Mystery" and "Love's Autumn," as well as in his war poem, "The Battle of Charleston Harbor," and Henry Timrod, in his "Confederate Ode" and in "The Cotton Boll," the first local color poem of the South, prove themselves entitled to high poetic place. Abram J. Ryan, better known as Father Ryan, was the author of such spirited lyrics as "The Conquered Banner." Sidney Lanier, whose life was shortened through the hardships of war, achieved a rare music in his verse, matched with thought and imagery of peculiar beauty. Such poems as the "Song of the Chattahoochee," the "Psalm of the West," and "The Marshes of Glynn" have given him a high and permanent place in American poetry.

Paul Laurence Dunbar, the poet of the colored race, had the lyric charm that belongs to true poetry. Some of his exquisite poems will be accounted among the best that America has produced. Nowhere is there a finer dialect poem than Dunbar's "When Malindy Sings," a poem written as a delicate tribute to his own mother, who was a negro slave. John Bannister Tabb, declares Professor C. Alphonso Smith of the United States Naval Academy, had "a concentric lyric genius without parallel in American literature." His poems are all brief lyrics and all perfect. With these names we must include James Whitcomb Riley, the beloved Hoosier poet, Eugene Field, writer of delightful children's verse, and Cincinnatus Heine ("Joaquin") Miller, poet of the Sierras.

Late Nineteenth Century and Contemporary Period (1870–). After 1870, the romantic style of novel was gradually displaced by the work of realists. Edward Eggleston is the first of a succession of authors who wrote of the Middle West with realistic fidelity. *The Hoosier Schoolmaster* and *The Circuit Rider* may serve as documents for the historian. Hamlin Garland and Stewart Edward White continue this realistic tradition into the present. William Dean Howells's works contain perhaps the "largest transcript of American life" made by any man. Henry James found his field in the "international novel," drawing the characters of Americans abroad. He has a worthy successor in Edith Wharton. Willa Cather, Ellen Glasgow, Sherwood Anderson, and Theodore Dreiser are among the best-known names in American fiction of the 20th century.

One notable exception to the supremacy of realism was Lew Wallace's *Ben Hur*, published in the 80's. This tale, it has been remarked, brought novel-reading to every American village.

Essayists.—An account of the American essay would include most of our literary men and women from the days of Washington Irving to the present. Poe's essays in literary criticism first commanded respect. The establishment of the *Atlantic Monthly* gave Holmes and Lowell and many others a medium for reaching the public through the essay. Charles Dudley Warner, Emma Lazarus, Julia Ward Howe, and Edmund Clarence Stedman represent the work of the latter half of the 19th century. Agnes Repplier, Samuel M. Crothers, and Paul Elmer More should be mentioned among many who have handled deftly and interestingly all themes of literature, art, and life. Among American naturalists whose writing has literary charm, John James Audubon, John Muir, and John Burroughs are noteworthy. Will Durant attained a notable popularity with his *Story of Philosophy*.

Dramatists.—In the field of the theater from 1870 to 1910, Bronson Howard, Augustus Thomas, Clyde Fitch, and William Vaughn Moody produced plays of literary as well as of acting worth. Fitch has been recognized as the most skillful dramatic writer America has produced. Moody, whose life, like that of Fitch, was cut short, gave promise of very great power in both drama and poetry. Among the works of contemporary American dramatists, none has excelled the powerful tragedies of O'Neill.

The Historical Romance.—The last decade of the 19th century brought forth a flood of historical romances dealing mostly with the Revolutionary period of American history. The best of these was *Hugh Wynne*, by S. Weir Mitchell. Paul Leicester Ford, Winston Churchill, and Mary Johnston also wrote of colonial life. This type of fiction was succeeded by novels dealing with "problems" of American society and politics. Frank Norris's *Octopus* may represent this group of stories. James B. Cabell produced a series of novels, partly satirical in intent, framed within an imaginary geographical and historical setting. Erskine's *Private Life of Helen of Troy* and *Galahad* are old stories living again through the power of modern motivation and psychology.

The Short Story.—The characteristic form of fiction in this recent period has been the short story. However, as with other literary forms, no strict bounds of time can be set for this development. Irving's short tales mark the beginning of the short story in America. Poe consciously adopted this form for his tales of pseudo-science, adventure, and horror. In such stories as *The Fall of the House of Usher*, he established a high standard of technical excellence. Hawthorne wrote short stories in his own style and upon his own peculiar themes. The works of these men and their lesser imitators have in common the large use of the supernatural. In the years following the Civil War a change in subject matter and method begins. The stories of Rose Terry Cooke show this transition to greater compactness of style and to realistic treatment of commonplace themes and characters. Henry James, although he could use the supernatural in such tales as *The Turn of the Screw*, definitely adopted the field of naturalist psychology.

At about this same time (1870) Bret Harte introduced the California mining camp to American fiction. George W. Cable contributed the atmosphere of the Creole life of Louisiana. These were followed by a host of writers who made the short story of local color the popular form in the 80's and 90's. To this group belong Mary E. Wilkins Freeman's stories of New England and the Southern stories of James Lane Allen, Thomas Nelson Page, Mary Johnston, Mary N. Murfree ("Charles Egbert Craddock"), F. Hopkinson Smith, and Joel Chandler Harris ("Uncle Remus"). In more recent years William S. Porter ("O. Henry") developed a new technique and achieved an almost universal appeal.

Recent Poetry.—The last twenty years have seen a marked renewal of interest in poetry, and much excellent verse is being written. Edwin Arlington Robinson is a leader of present day poets. Edgar Lee Masters, author of the *Spoon River Anthology*, and Vachel Lindsay, writer of rhapsodic ballads, are among the most popular American poets of today. Robert Frost's fame as a New England poet is secure. Carl Sandburg has been called the poet of American industry. Amy Lowell was the ablest exponent of the free verse movement.

TABLE OF AMERICAN LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1588–1649	John Winthrop	History of New England	
1590–1657	William Bradford	History of Plymouth	
1604–1690	John Eliot	Bible in Indian Language	
1608–1683	Roger Williams	Religious Controversy	
1612–1672	Anne Bradstreet		Poems.
1631–1705	Michael Wigglesworth		Poems (The Day of Doom).
1663–1728	Cotton Mather	New England Church History	
1674–1744	William Byrd	History of the Dividing Line	
1687–1758	Thomas Prince	History of New England	
1696–1772	Samuel Johnson	Philosophy	
1703–1758	Jonathan Edwards	Freedom of the Will	
1706–1790	Benjamin Franklin	Poor Richard's Almanac	
1711–1780	Thomas Hutchinson	History of Massachusetts	
1720–1772	John Woolman	Journal	
1725–1783	James Otis	Orations	
1736–1763	Thomas Godfrey		Prince of Parthia, Poems.
1736–1799	Patrick Henry	Orations	
1737–1791	Francis Hopkinson		Battle of the Kegs.
1737–1809	Thomas Paine	Common Sense, The Crisis	
1743–1826	Thomas Jefferson	Notes on Virginia, State Papers	
1750–1831	John Trumbull		Satire (McFingal).
1752–1817	Timothy Dwight		Conquest of Canaan.
1752–1832	Philip Freneau		Lyrics (Eutaw Springs).

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Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1754–1812	Joel Barlow		The Columbiad, Hasty Pudding.
1757–1804	Alexander Hamilton	State Papers	
1757–1826	Royall Tyler	Stories	Drama (The Contrast).
1771–1810	Charles B. Brown	Novels (Wieland, Clara Howard).	
1777–1852	Henry Clay	Orations	
1779–1843	Washington Allston	Lectures on Art	Poems.
1779–1860	James K. Paulding	Novels (The Dutchman's Fireside)	Poems (The Backwoodsman).
1780–1842	William E. Channing	Essays, Addresses	
1780–1843	Francis Scott Key		Star-Spangled Banner.
1782–1850	John C. Calhoun	Orations	
1782–1852	Daniel Webster	Orations	
1783–1859	Washington Irving	History of New York, Sketch Book	
1784–1858	James N. Barker		Plays, Poems.
1785–1842	Samuel Woodworth		Poems (The Old Oaken Bucket), Plays.
1787–1879	Richard H. Dana	Lectures on Shakspere	The Buccaneer.
1789–1841	James A. Hillhouse		Dramas (Percy's Masque, Hadad).
1789–1851	James F. Cooper	The Pilot, Leatherstocking Tales.	
1789–1867	Catherine M. Sedgwick	Novels (A New England Tale)	
1790–1867	Fitz-Greene Halleck		Poems (Marco Bozzaris).
1790–1870	Augustus B. Longstreet	Humor (Georgia Scenes)	
1791–1852	John Howard Payne		Home, Sweet Home, Plays (original and translated).
1791–1865	Lydia H. Sigourney		Poems (Pocahontas).
1791–1875	Charles Sprague		Poems (The Family Meeting).
1792–1868	Seba Smith	Humor (Letters of Major Jack Downing)	
1793–1860	Samuel G. Goodrich	Peter Parley Books	
1793–1868	Daniel P. Thompson	Historical Novels (Green Mountain Boys)	
1794–1865	Edward Everett	Orations	
1794–1878	William C. Bryant		Poems (Thanatopsis).
1795–1820	Joseph R. Drake		Poems (The Culprit Fay).
1795–1856	James G. Percival	History	Prometheus.
1795–1870	John P. Kennedy	Novels (Horse-Shoe Robinson), Memoirs	
1796–1828	John G. C. Brainard	Journalism	Poems.
1796–1859	William H. Prescott	History (Ferdinand and Isabella, Conquest of Mexico)	
1799–1854	Richard Penn Smith		Dramas (William Penn).
1799–1859	Rufus Choate	Orations	
1799–1888	Amos Bronson Alcott	Philosophy	
1800–1891	George Bancroft	History of the United States	
1802–1864	George P. Morris	Journalism	Lyrics (Woodman, Spare That Tree).
1802–1870	George D. Prentice	Journalism, Humor (Prenticiana).	Poems.
1802–1876	Horace Bushnell	Nature and the Supernatural, Sermons	
1802–1880	Lydia M. Child	Journalism, Essays, Biographies	
1803–1882	Ralph W. Emerson	Philosophy, Conduct of Life, Representative Men	
1804–1864	Nathaniel Hawthorne	Novels (Blithedale Romance, Scarlet Letter), Tales	
1806–1867	Nathaniel P. Willis	Sketches of Travel and Biography	Scriptural Poems.
1806–1870	William G. Simms	Novels (The Scout), Biography	Poems (Atalantis).
1807–1882	H. W. Longfellow	Outre-Mer	Poems (Hiawatha).
1807–1892	John G. Whittier		Poems (Maud Muller, Snowbound).
1808–1895	Samuel F. Smith	Biographies, Sketches	Poems (America).
1809–1849	Edgar Allan Poe	Tales (The Gold Bug)	Poems (The Raven).
1809–1865	Abraham Lincoln	Addresses (Gettysburg Speech)	
1809–1894	Oliver W. Holmes	Autocrat of the Breakfast Table	Poems (Chambered Nautilus).
1810–1850	Margaret Fuller	Essays	
1810–1860	Theodore Parker	Essays, Sermons	
1811–1874	Charles Sumner	Orations	
1811–1884	Wendell Phillips	Orations	
1811–1896	Harriet B. Stowe	Novels (Uncle Tom's Cabin)	
1814–1877	John L. Motley	History (Rise of the Dutch Republic)	
1814–1890	Benjamin P. Shillaber	Humor	
1815–1882	Richard H. Dana, Jr.	Two Years before the Mast	
1816–1887	John G. Saxe		Humorous Poems (The Proud Miss MacBride).
1817–1862	Henry D. Thoreau	Essays (Walden)	Poems.
1818–1885	Henry Wheeler Shaw, "Josh Billings"	Humor	
1819–1881	J. G. Holland	Novels (Sevenoaks), Essays	Poems (Kathrina).
1819–1886	Edwin P. Whipple	Essays, Reviews	
1819–1891	James R. Lowell	Essays (Among My Books)	Poems (Commemoration Ode).
1819–1891	Herman Melville	Typee, Moby Dick	Poems.
1819–1892	Walt Whitman		Poems (Leaves of Grass).
1819–1910	Julia Ward Howe	Essays	Battle Hymn of the Republic.
1822–1872	Thomas B. Read		Poems (The New Pastoral).
1822–1897	W. T. Adams, "Oliver Optic"	Juvenile Stories	
1822–1908	Donald G. Mitchell	Novels, Essays (Reveries of a Bachelor), The Man without a Country	
1822–1909	Edward E. Hale		
1823–1861	George Horatio Derby	Humor	
1823–1890	George H. Boker		Francesca da Rimini, Poems.
1823–1893	Francis Parkman	History (Conspiracy of Pontiac).	
1823–1911	Thomas W. Higginson	Essays (Outdoor Papers)	

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Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1824–1892	George W. Curtis	Essays (Potiphar Papers), Biography	
1824–1906	Adeline D. Whitney	Novels (The Gayworthys)	Poems.
1825–1878	Bayard Taylor	Travel, Novels (Hannah Thurston)	Poems, Translation (Faust).
1825–1903	Richard H. Stoddard	Criticism	Poems (Songs of Summer).
1827–1892	Rose Terry Cooke	Stories	Poems.
1827–1905	Lew Wallace	Novels (The Fair God, Ben Hur)	
1829–1867	Henry Timrod		The Cotton Boll.
1829–1900	Charles D. Warner	Essays (Backlog Studies, Being a Boy)	
1829–1914	Silas Weir Mitchell	Essays, Novels (Hugh Wynne)	
1830–1896	Mary A. Dodge	Essays (Country Living)	
1831–1885	Helen Hunt Jackson	Novels (Ramona)	Poems.
1831–1886	Paul H. Hayne		Poems (Legends and Lyrics).
1831–1922	Mary V. Terhune	Novels (Alone, Hidden Path)	
1832–1888	Louisa M. Alcott	Stories (Little Women)	
1833–1888	David Ross Locke, "Petroleum V. Nasby"	Humor	
1833–1908	Edmund C. Stedman	Criticism	Poems (Alice of Monmouth).
1834–1867	Charles Farrar Browne, "Artemus Ward"	Humor	
1834–1902	Francis R. Stockton	Stories (The Lady or the Tiger)	
1835–1910	Samuel L. Clemens, "Mark Twain"	Humor (Huckleberry Finn)	
1836–1907	Thomas B. Aldrich	Stories (Marjorie Daw)	Songs, Sonnets.
1836–1917	William Winter	Dramatic Criticism	Poems (Thistledown).
1837–1902	Edward Eggleston	Novels (The Hoosier Schoolmaster, Roxy)	
1837–1920	William D. Howells	Novels (The Rise of Silas Lapham)	
1837–1921	John Burroughs	Essays (Wake Robin, Signs and Seasons)	
1838–1888	Edward Payson Roe	Novels (Barriers Burned Away)	
1838–1905	Albion W. Tourgee	Novels (A Fool's Errand)	
1838–1905	Mary Mapes Dodge	Stories (Hans Brinker, Along the Way)	
1838–1914	John Muir	Story of My Boyhood and Youth.	
1838–1915	F. Hopkinson Smith	Stories (Colonel Carter of Cartersville)	
1839–1886	Abram Joseph Ryan		Civil War Poems.
1839–1902	Bret Harte	Stories (Luck of Roaring Camp)	Poems (The Heathen Chinee).
1839–1908	James Ryder Randall		Maryland, My Maryland.
1841–1887	Edward Rowland Sill		Poems (The Venus of Milo).
1841–1913	Cincinnatus H. Miller		Songs of the Sierras.
1842–1881	Sidney Lanier	Essays, Criticism	Poems (The Marshes of Glynn).
1842–1901	John Fiske	Histories, Essays	
1842–1908	Bronson Howard		Plays (The Henrietta, Shenandoah).
1843–1904	Lawrence Hutton	Dramatic Criticism	
1843–1916	Henry James	Novels (Daisy Miller, Portrait of a Lady)	
1844–1909	Richard W. Gilder		Poems (The Great Remembrance).
1844–1911	Elizabeth S. P. Ward	Gates Ajar; Men, Women, and Ghosts	
1844–1925	George W. Cable	Novels (Old Creole Days)	
1845–1909	John B. Tabb		Lyrics.
1847–	Arthur S. Hardy	Novels (Passe Rose)	
1848–1908	Joel Chandler Harris	Uncle Remus Tales, The Tar Baby	
1848–1927	James Ford Rhodes	Histories, Essays	
1849–1887	Emma Lazarus		Songs of a Semite.
1849–1925	James Lane Allen	Novels (The Choir Invisible)	
1849–1924	Frances H. Burnett	Little Lord Fauntleroy	Plays.
1850–1895	Eugene Field		Poems (With Trumpet and Drum).
1850–1922	Mary N. Murfree	Novels (The Prophet of the Great Smoky Mountains)	
1852–	Robert Grant	Novels (The Chippendales), Essays	Humorous Verse.
1852–	John B. McMaster	Histories, Biographies	
1852–	Edwin Markham		Poems (Lincoln).
1852–	Brander Matthews	Essays, Criticism (Aspects of Fiction)	
1852–	Henry van Dyke	Essays, Stories (The Blue Flower)	Poems.
1853–1916	James W. Riley		Poems (Pipes o' Pan).
1853–1922	Thomas Nelson Page	Novels (In Ole Virginia)	
1854–1909	F. Marion Crawford	Novels (Saracinesca)	Ballads.
1855–	George E. Woodberry	Essays, Criticism	Poems.
1856–	Edward S. Martin	Essays (In a New Century)	Poems (A Little Brother of the Rich).
1856–1924	Woodrow Wilson	History, Essays	
1857–	Gertrude Atherton	Novels (Ancestors).	
1857–	Alice Brown	Novels (The Prisoner)	Plays (Children of Earth).
1857–1927	S. M. Crothers	Essays (The Gentle Reader).	
1857–	Margaretta W. Deland	Old Chester Tales, Novels	
1858–1919	Theodore Roosevelt	History, Travel, Politics	
1858–	Agnes Repplier	Essays (Points of View)	
1859–	Katharine L. Bates	Essays, Criticism	Poems.
1859–	David Belasco		Plays (The Return of Peter Grimm).
1859–1923	William R. Thayer	History, Biography	Poems.
1859–	Augustus Thomas		Plays (Alabama, Arizona).
1859–1923	Kate Douglas Wiggin	Stories (Rebecca of Sunnybrook Farm)	
1860–	Hamlin Garland	Stories (Main-traveled Roads)	
1860–	Jennette Lee	Novels (Uncle William)	

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Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1860–	Bliss Perry	Novels, Stories, Essays	
1860–	Clinton Scollard		Pictures in Song, Lyrics.
1860–	Owen Wister	Novels (The Virginian)	Poems.
1861–	Richard Burton	Criticism (Forces in Fiction)	Poems.
1861–1925	John Herbert Quick	Novels (Vandemark's Folly)	
1862–1910	William S. Porter	Short Stories (The Four Million)	
1862–	Mary E. W. Freeman	Stories, Novels	Poems.
1862–	Edith Wharton	Novels (Ethan Frome)	Poems.
1863–1919	John Fox, Jr.	Novels (The Heart of the Hills)	
1863–	Gamaliel Bradford	Biographical Essays	
1863–	George Santayana	Essays (The Life of Reason)	Poems (The Hermit of Carmel).
1864–	Paul Elmer More	Shelburne Essays	
1865–1902	Paul Leicester Ford	Novels (Janice Meredith)	
1865–1909	William Clyde Fitch		Plays (Beau Brummell, The Truth).
1865–1914	Madison J. Cawein		Penetralia, and Other Poems.
1865–	William Lyon Phelps	Criticism	
1866–	George Ade	Humor (Fables in Slang)	Plays (The College Widow).
1867–	Finley Peter Dunne	Humor (Mr. Dooley's Philosophy)	
1868–	Mary Hunter Austin	Novels	Dramas (The Arrow-Maker).
1868–	Robert Herrick	Novels (The Common Lot)	
1868–	Edgar L. Masters	Essays	Spoon River Anthology.
1868–1924	Gene Stratton Porter	Stories (Freckles)	
1868–	Mary S. Watts	Novels (Nathan Burke)	
1868–	William A. White	Novels (A Certain Rich Man)	
1869–1910	William V. Moody		Poems, Dramas (The Great Divide).
1869–	Edwin A. Robinson		Poems (Merlin), Dramas (Van Zorn).
1869–	Booth Tarkington	Novels (Penrod and Sam)	Plays (The Intimate Strangers).
1869–	Brand Whitlock	Novels (The Turn of the Balance)	
1870–1902	Frank Norris	Novels (The Octopus)	
1870–	Mary Johnston	Novels (To Have and to Hold)	
1870–	Joseph C. Lincoln	Novels	
1870–	Alice Hegan Rice	Novels, Stories (Lovey Mary)	
1870–	Dallas Lore Sharp	Essays (The Face of the Fields)	
1871–	Winston Churchill	Novels (Richard Carvel)	
1871–	Theodore Dreiser	Novels (The Genius)	Plays.
1871–	Arthur Guiterman		Poems (The Ballad-Maker's Pack).
1871–	Charles Rann Kennedy		Dramas (The Servant in the House).
1872–1906	Paul Laurence Dunbar	Stories	Dialect Poems.
1872–	Cale Young Rice		Poems (Earth and New Earth).
1873–	Anne Douglas Sedgwick	Novels (Tante)	
1873–	Stewart Edward White	Novels (The Blazed Trail)	
1874–1922	Josephine P. Peabody	Folk Stories	Poetic Dramas (The Piper).
1874–	Zona Gale	Stories (Friendship Village)	Plays (Miss Lulu Bett).
1874–	Ellen Glasgow	Novels (Romance of a Plain Man)	
1874–1925	Amy Lowell	Criticism	Poems (What's O'clock)
1875–	Robert Frost		Poems (North of Boston).
1875–	Zane Grey	Novels (Riders of the Purple Sage)	
1875–	Percy Mackaye	Essays	Poetic Dramas (The Scarecrow).
1875–	Jeannette Marks		Plays (Welsh Honeymoon).
1875–	Henry K. Webster	Novels (An American Family)	
1876–1916	Jack London	Novels (The Sea Wolf)	
1876–	Sherwood Anderson	Stories, Novels (Marching Men)	
1876–	Willa Sibert Cather	Novels (My Antonia), Stories	
1876–	Mary Roberts Rinehart	Stories (The Circular Staircase)	Plays (Double Life).
1877–	William Beebe	Nature Essays (Jungle Peace)	
1878–1927	James Oliver Curwood	Novels	
1878–	Donald Marquis	Humor (The Old Soak)	
1879–	James Branch Cabell	Novels (Jurgen)	
1879–	Dorothy Canfield Fisher	Novels (The Brimming Cup)	
1879–	N. Vachel Lindsay		The Chinese Nightingale.
1879–	Elsie Singmaster	Novels (John Baring's House)	
1879–	John Erskine	Essays; Novels (Private Life of Helen of Troy)	
1879–	Simeon Strunsky	Essays (Sinbad and His Friends)	
1880–	Henry Sydnor Harrison	Novels (Queed; St. Teresa)	
1880–	Joseph Hergesheimer	Novels (Java Head)	
1880–	Robert Cortes Holliday	Essays (Walking-Stick Papers)	
1880–	Kathleen Norris	Novels (Lucretia Lombard)	
1880–	Ernest Poole	Novels (The Harbor)	
1881–	Witter Bynner		The Beloved Stranger.
1881–	John G. Neihardt		Poems (The Song of Hugh Glass).
1882–	Susan Glaspell	Novels (Fidelity)	Dramas.
1882–	Hermann Hagedorn, Jr.	Novels (Faces in the Dawn)	Poems and Ballads.
1882–	James Oppenheim	Novels and Short Stories	Poems (Songs for the New Age).
1882–	Hendrik Willem Van Loon	History (Story of Mankind)	
1883–	Coningsby Dawson	Novels (Garden without Walls)	The Worker, and Other Poems.
1884–	Sara Teasdale		Helen of Troy, and Other Poems.
1885–	Sinclair Lewis	Novels (Main Street; Babbitt)	
1885–	Louis Untermeyer	Criticism	The Younger Quire.
1885–	Will Durant	Essays (Story of Philosophy)	
1886–1918	Joyce Kilmer		Rouge Bouquet, and Other Poems.
1886–	John Gould Fletcher		Goblins and Pagodas.
1886–	Edward B. Sheldon		Dramas (Romance).
1886–	Wilbur Daniel Steele	Novels, Stories (Land's End)	
1886–	John Hall Wheelock		Poems (The Beloved Adventure)
1887–	Floyd Dell	Novels (Moon-Calf)	
1888–	Eugene G. O'Neill		Emperor Jones, and Other Plays.
1890–	Christopher Morley	Essays (Parnassus on Wheels)	Poems (Songs for a Little House)
1892–	Edna St. Vincent Millay		Poems (Renascence), Plays.

ENGLISH LITERATURE

When the Angles and Saxons went from the continent to Britain in the 5th and the 6th century, they had no written language, but they carried with them the love of song. Bards and gleemen accompanied them and sang the tales of the Northland. The oldest of the ancient songs which have been preserved for us is *The Far-Traveler*. *Beowulf* is their epic song. At the time of their invasion of Britain, these Anglo-Saxons were heathen, but when, after two long centuries of struggle, they had become possessed of the land, they came under the softening influence of Christianity. Monasteries were built, and in these safe shelters literature had a beginning. The glory of this beginning belongs to Northumbria in the 7th century. For nearly two centuries, this was the seat of learning.

Old English Period. The poem *Beowulf* is Anglo-Saxon, but it is not native to English soil. Cædmon's *Paraphrase of the Scriptures* is the first great native British poem. With Christianity a new spirit entered into English poetry.

Old English prose also began in the monastery of Northumbria with Bede. His learning was famed throughout Europe. How industrious he was is indicated by the tradition that he wrote no less than 45 works in Latin. His last work was a translation of the Gospel of St. John into English.

During the 9th century the greater part of England was laid waste by the Danes, and literature was almost extinguished. The long battle against these invaders was lost in Northumbria, but was gained for a time by Alfred the Great in Wessex. The center of learning was transferred from the North to the South, and as Whitby was the cradle of English poetry in the North, so Winchester became the seat of English prose in the South. Alfred gathered scholars about him, who translated the Latin works of Bede and the *Chronicles* of Orosius, adding an account of the voyages of Othere and Wulfstan. Many other works were rendered into the vernacular in Alfred's time. "At Winchester the king took the English tongue and made it the tongue in which history, philosophy, law, and religion spoke to the English people." He also established schools and wrote textbooks for these schools, so that every free-born youth might attend to his books till he "could read English writing perfectly."

The next great name in literature after King Alfred is Ælfric. He wrote numerous ecclesiastical works and was the first translator of any considerable portion of the Bible. His translations of the Pentateuch, Joshua, Judges, and part of Job are the best examples we possess of the language at the beginning of the 11th century. Indeed, our greatest Old English prose is perhaps to be found in the sermons and saints' lives by Ælfric. The *Old English Chronicle* records the most significant happenings of history, chiefly English history, and was continued in Peterborough Abbey down to the death of King Stephen in 1154.

Middle English Period. The overthrow of Saxon rule in England by William the Conqueror is an event of vast importance in literature as well as in history. For a hundred years after the conquest, literature was inert. A foreign king and an aristocracy of a foreign people ruled the land; an alien language had been introduced. However, after a few generations of such domination there were signs of returning life. The language could not die while the bulk of the people remained Saxon, but it underwent a great change. England was still to remain the land of the Saxon tongue, but the language was to be greatly modified by its contact with the Latin of the clergy and with the French of the Norman conquerors. For 300 years after the conquest these languages contended with the Saxon English for supremacy in England. In the reign of Edward III it had been fully demonstrated that the English were to be the ruling people, and Parliament enacted important laws making English the official language of law courts and schools.

But the English of King Edward's time was quite unlike the rude Saxon speech of *Beowulf* and Cædmon's *Paraphrase* or the later chronicles. Pure Anglo-Saxon was an energetic language, able to express with vigor the practical common thoughts of every day, but it lacked delicacy and flexibility of expression. The Saxon mind, too, was lacking in quickness of thought and in the creative play of the imagination. It has been well said that in this blending of languages the Saxon furnished the dough and the Norman French the yeast. Out of the combined product we get a strength and flexibility of language that belonged to neither element alone.

Chronicles and Romances.—The literature of England during the 12th century was almost entirely Latin and French, but we reckon it as a rich source of our story-telling. Geoffrey of Monmouth wrote twelve short books in Latin, which he called *History of the Kings of Britain*. It is a clever compilation of Welsh legends, a source to which we go for some of our King Arthur stories. These stories were afterward translated into French and were later brought back into English verse by Layamon in his *Brut d'Angleterre*. Later many other stories were added, and other cycles of romance were introduced into English literature. There were four of these great romantic cycles: (1) the King Arthur legends, to which later stories were added, such as *Quest of the Graal*, *Le Morte D'Arthur*, *Romance of Sir Tristram*; (2) Charlemagne and his Twelve Peers, containing the stories of Roland, Charlemagne, Roland and Otuel, the *Siege of Milan*, and others; (3) the *Life of Alexander*, romantic wonder stories from the East; (4) the *Siege of Troy*, derived from Latin sources. Popular ballads, such as "Robin Hood," Robert of Gloucester's *Rhyming Chronicles*, and lyrics sung among the people, kept the love of poetry alive until the greater burst of song in the 14th century.

Mandeville and Wiclif.—In the three centuries following the conquest there was very little prose writing done in England, but in the 14th century there appeared a book of stories entitled *The Voiage and Travaile of Sir John Mandeville*. We do not know who is the author of this book. Many of the stories seem to be translations. The exaggerations in the book make it valueless as a record of travel, but it did establish the love of story-telling. It is the first example of a definitely achieved prose style, and after the invention of printing it long remained one of the most popular books. John Wiclif, next to Chaucer, is the greatest literary name of the century. He and his friend, John Purvey, were the first to give a complete version of the Scriptures to the English people in their own tongue. The influence of such a translation read by all the people was to raise a dialect to the dignity of a national language. Besides this great work, Wiclif is the author of a large number of sermons and polemical writings. Contemporary with these religious tracts which Wiclif distributed so freely was *Piers Plowman*, by William Langland. It was a satire in verse upon certain ecclesiastical corruptions of the period and remained the greatest allegory in the language until the publication of Bunyan's *Pilgrim's Progress*.

Chaucer.—The most distinguished name in the literature of the 14th century is that of Geoffrey Chaucer. Some critics maintain that before him there was no permanent English verse. He is therefore often called the "Father of English Poetry." Chaucer's earlier poems are "Romaunt of the Rose," "The Boke of the Duchess," and "Parlement of Foules." His greatest work is *Canterbury Tales*, the plan of which was suggested by Boccaccio's *Decameron*. The Prologue to the *Canterbury Tales*

is one of the finest pieces of descriptive poetry in our language. Before Chaucer's time English was a language of dialects. He wrote in the Midland dialect and made that the language of the nation. Chaucer died in 1400, just 334 years after the Norman Conquest. To sum up the most important literary events of these years, we note the development of the English language, the translation of the Bible, and the creation in English of one of the world's supreme masterpieces, *Canterbury Tales*.

There was but little progress in the development of literary art in the century following Chaucer. Social conditions were changing, and there was intellectual and political unrest. The struggle between the houses of York and Lancaster absorbed men's minds. These are the reasons assigned for the dearth of literature. To the genius of Chaucer there arose no successor.

Printing and the Bible.—The greatest prose work of the 15th century is Sir Thomas Malory's *Morte D'Arthur*. This is a prose epic of the deeds of King Arthur and his knights of the Round Table. In 1477 Caxton established his printing press and issued the first printed book in England. This was the *Dictes and Sayings of the Philosophers*. He had already printed in English on the continent his *Recuyell of the Histories of Troy* and the *Game and Playe of the Chesse*. The 16th century was a period of Bible translation. Wiclif had made his rendering from the Latin, but, in the early years of the 16th century, Greek was being taught in the English universities, and William Tyndale made the first translation of the New Testament directly from the Greek text. He later translated the Pentateuch from the Hebrew, and in 1535 Miles Coverdale published the first printed copy of the whole Bible. In 1560 a new translation, called the Genevan Bible, was issued from Geneva in Switzerland. This was long the popular Bible among Protestants, even after the publication of the King James Version. In 1582, scholars in the Catholic college at Reims in France issued a translation of the New Testament.

The Elizabethans. The Elizabethan age is marked by features so distinct and so superior that it has been called the "Golden Age in English literature." Two mighty forces, the Renaissance and the Reformation, combined to make this a great intellectual age. Men's minds were stimulated, and a language completely formed was ready at their hand. There was freedom for thought to express itself, and there was variety in life and freshness of experience to nourish the mind. The printing press, travel, and social intercourse all stimulated intellectual activity. Life was worth enjoying and there was leisure for letters. It was an age of imagination and enthusiasm, and, in the midst of it all, geniuses were born. What other age ever produced greater poets than Shakspere and Spenser?

Spenser.—Edmund Spenser, the only great non-dramatic poet of Elizabeth's reign, has been called the successor of Chaucer. His first great work, the *Shepherd's Calendar*, was divided into twelve eclogues, one for each month. His greatest work, the *Faery Queen*, was also divided into twelve books, but only six books and a fragment of the seventh were ever written. Spenser has been justly called "the poet's poet." His languorous richness may have a cloying effect upon some modern readers, but the purity of his imagination, the beauty of his verse, and the music of his rhythm have furnished models for not a few distinguished poets since his time.

The Drama.—The beginnings of the drama in England may be traced to the *miracle plays* and *mysteries* which were introduced soon after the Norman Conquest. Following these were the later dramatic recitals, the *moralities*, *interludes*, *masks*, and *pageants*.

As early as the 11th century, *miracle plays* were performed in the monasteries by monks and choristers. Later, companies of professional players traveled about the country and enacted their plays in the yards of inns. In 1575 the Puritans expelled the players from the city, and theaters were built outside the limits. Shakspere was born in 1564. Twenty-two or twenty-three years later he made his way to London, where he was attracted by one of these forbidden theaters. Already English drama had attained classical utterance in the great plays of Christopher Marlowe, *Tamburlaine the Great*, *Faustus*, *The Jew of Malta*. The greatest of these plays is *Faustus*. Marlowe established the use of blank verse in the English drama, a form of verse which Shakspere adopted and brought to technical perfection.

Shakspere.—That Shakspere quickly rose to prominence in his art, we may judge from the fact that in 1592, when he had been in London not more than five or six years, he was already writing plays and was the object of a jealous attack by a rival playwright. At the age of 49 he was able to leave London with a competence and to return to his home at Stratford-on-Avon. This also argues for his success as a dramatist. In 1598 Francis Mere writes of the growing fame of Shakspere and prints the titles of a number of his plays. Ben Jonson, the second dramatist of the age, was his intimate friend. These are facts worth knowing about the personality of the man who is the greatest figure in English literature, perhaps in all literature.

Taking the number from the Globe edition of Shakspere's dramas, we attribute to him 34 plays, counting as single plays those which are written in two parts. His dramatic work may be divided into three classes: comedies, histories, tragedies. The following are a few of the best in each class. Every reader should be familiar with them:

Comedies: *Midsummer Night's Dream*, *As You Like It*, *Merchant of Venice*, *Winter's Tale*, *Twelfth Night*, *The Tempest*.

Histories: *Richard III*, *Henry IV*, *Henry V*, *Henry VIII*, *King John*, *Julius Cæsar*.

Tragedies: *Hamlet*, *Macbeth*, *King Lear*, *Othello*, *Romeo and Juliet*.

In addition to his dramas, Shakspere wrote two long narrative poems and 154 sonnets. It is said that the measure of Shakspere's greatness is his universality; he was "not of an age, but for all time." Other writers have equaled Shakspere in some one quality, but he excels them all in the combination of these diverse qualities.

Ben Jonson wrote *Volpone*, *The Alchemist*, and *The Silent Woman*, three great dramas which will repay reading, and to these three some would add a fourth, *Every Man in His Humor*. Jonson was weak in delineation of character. He was a critic of men's follies, and he gave a distorted and incomplete picture of life. In his delineation of women, where Shakspere was strongest, Jonson utterly failed.

The decay of the drama began while Shakspere was yet alive. In his hands the drama had been the painting of the whole of human nature, the painting of characters as they were built up by their natural bent and by the play of circumstance upon them. In Ben Jonson's hands the drama became the portrayal of that particular human nature which he saw in his own age; his characters are not men and women as they are, but as they may become when they are dominated by a special bias, or "humor," of the mind. In Beaumont and Fletcher, the women are overdrawn and the men are base in thought. Shakspere's men and women represent the noblest characters of all ages.

Elizabethan Prose.—One of the most remarkable of the men who adorned the court of Queen Elizabeth was Sir Francis Bacon, the greatest prose writer of the age. As courtier and scholar he adorned both this and the succeeding reign of James I. His political success and his political disgrace are familiar stories in history. His enduring work is in literature. He was both poet and philosopher.

His great work in philosophy is magnificent in scope, as may be inferred from the title *Instauratio Magna*, or "The Great Institution of True Philosophy." This monumental work was designed to be written in six parts, but it was never finished. The second part, *Novum Organum*, or the "New Instrument," is described as "the science of a better and more perfect use of reason in the investigation of things, and of the true aids of the understanding." It sets forth the methods to be adopted in searching after truth, points out sources of error, and suggests the means of avoiding errors in the future. His entire philosophy is built upon the idea of inductive investigation. Bacon had so little respect for the English language that he wrote his great philosophy in Latin. His *New Atlantis*, like Sir Thomas More's *Utopia*, pictures in romance an ideal commonwealth, some features of which have been realized in our own republic. The most important among his English works is his volume of essays, clear, concise, practical in observation, and of profound wisdom. Sir Walter Raleigh contributed to prose his ambitious *History of the World*, and to poetry a few beautiful lyrics.

Transition.—With the death of Bacon in 1626, we pass from the glory of the Elizabethan age into the Puritan age. There are some characteristics which sharply separate this age from the preceding. Intense patriotism, peace within the realm, general prosperity, and much worldliness characterized the reign of Elizabeth. The Stuart reign was characterized by controversy in religion and politics; the open rupture between the king and Parliament was protracted into the great Civil War. Puritan standards became triumphant during this period. Literature, which always reflects life, presented the somber tone of the age and was in large part religious. In 1609 the Roman Catholic English version of the Bible, the *Douai Bible*, was issued from Douai, France. The *King James Version of the Bible* was printed in 1611. It is impossible to overestimate the influence of both translations upon the lives of the people and upon the language of the day. The study of the Bible became more universal, so much so that it colored the imagination and the speech of the common people. Even those who were irreligious in their lives spoke in the language of the Scriptures.

The Puritan Age. The great literature of the Elizabethan age was in poetry. With one exception, John Milton, the main achievement of the Puritan age was in prose. But the prose writers of the Puritan age were not without imagination and delicacy of humor. Bunyan's *Pilgrim's Progress*, thought by some to be the crowning work of the Puritan imagination, is a product of this age. During the same period, Thomas Fuller brightens his *History of the Worthies of England* by irresistible touches of humor, and Izaak Walton gives expression to delight in nature and rustic pastimes in his *Compleat Angler*; but for the most part the world was looked upon seriously.

Milton.—John Milton is usually regarded as the second greatest name in English literature. He was born eight years before the death of Shakspere. It may be that Shakspere saw the boy Milton,—perhaps on Bread street as the great dramatist strolled past Milton's doorstep on his way to the Mermaid Tavern. One likes to think so. Milton's childhood was very happy. He had every advantage of a liberal education and of long quiet years of study at his father's country home in Horton. Here he stored up strength of mind and soul for the years of struggle that followed. Milton's literary career may be divided into three periods: his youth, his manhood, and his old age. It has been called "a drama in three acts." The first may be stated in years as extending from 1623 to 1640; the second, from 1640 to 1660; and the third, from 1660 to 1674.

The first period, that of his youth, was spent at school and with his family at Horton. During this period he wrote the "Hymn on the Morning of Christ's Nativity," the *Masque of Comus*, "Lycidas," "L'Allegro," "Il Penseroso," and a number of his sonnets. Some critics consider *Comus* Milton's finest poem. It is perfect in lyric qualities and, as an apotheosis of virtue, is lofty in conception. "If virtue feeble were, Heaven itself would stoop to her."

"Lycidas," an elegy on Milton's classmate, Edward King, ranks as one of the great elegies in our language. "L'Allegro" and "Il Penseroso" are companion poems; one describes the delights of social life, the other the deep enjoyment of the scholar in seclusion. These poems will always remain favorites for their beautiful imagery and for their truthful study of the emotions. Milton's sonnets have for their theme such subjects as religion, patriotism, domestic affection; whereas the older poets, Shakspere, Spenser, Wyatt, Surrey, and their imitators, preferred to write sonnets on love. The most remarkable of Milton's minor poems is the "Hymn on the Nativity." It was written when the author was only 21, yet rarely in his later work does he excel it in beauty of verse or in dignity of language.

The second period of Milton's life may be called the time of "storm and stress." For 20 years, from 1640 to 1660, his life was filled with religious and political controversy. He was forced to turn from poetry to prose, and lamenting it he says: "I have the use, as I may account it, but of my left hand." His prose works are voluminous. They are upon varied subjects but upon one theme, liberty. He struck heavy blows for liberty in church and state and in all the relations of life. He pleaded for more freedom of speech and for more liberal ideas in education. His greatest prose work is the *Areopagitica: A Speech for the Liberty of the Press*. In 1652, at the age of 43, Milton became totally blind; but, even in his blindness, he served the Commonwealth as secretary for foreign tongues under Oliver Cromwell, the lord protector, and continued to write his burning pamphlets against the royalists, who were struggling to regain power.

The third period is that which succeeds the Restoration, in 1660. With the return of Charles II, the leaders of the Commonwealth had to flee for their lives. Milton's life was at first endangered, and he was concealed by friends. Later, he preferred retirement where he might have leisure to do the great work of his life, the writing of *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*.

The beauty of *Paradise Lost* has been compared to that of a stately temple; its style is the loftiest in the whole range of English poetry. Its scenes are laid in heaven and earth and hell, its characters are God and the holy angels, Satan and his legions, and the newly created race of man. *Paradise Regained* and *Samson Agonistes* show a decline of power, though standing alone they would be great. In *Paradise Regained* Christ is tempted in the wilderness and resists Satan. In *Samson Agonistes* we have a choral drama modeled upon the form of a Greek tragedy. In the noble grandeur of his work, Milton can be compared only to the great classic writers, Homer and Virgil.

Bunyan.—The second notable name in the Puritan age is that of John Bunyan, the prince of prose writers for his time and the prince of storytellers for all times. *Pilgrim's Progress* has been pronounced the greatest of all allegories. Bunyan's pre-eminence is undoubted. It is no exaggeration to approve this estimate of him: "What Shakspere is to English dramatists, what Milton is to English epic poets, that John Bunyan is to writers of English allegory." From extreme poverty and ignorance and years of imprisonment in Bedford jail, he rose to the respected position of pastor over a large church. His biographer says of him, "The fame of his sufferings, his genius as a writer, his power as a speaker, gave him unbounded influence among the Baptists; while the beauty of his

character and the catholic liberality of his views secured him universal esteem. His ministrations extended over the whole region between Bedford and London."

Pepys and Hyde.—One of the most interesting prose works of the century is Samuel Pepys's *Diary*. It is a gossipy record of nine years and gives a lifelike picture of the gay and profligate portion of society, engaged in vigorous and not always edifying reaction against Puritanism, which fell under the diarist's observation. The chief historical work of the age is the *History of the Great Rebellion* by Edward Hyde, the first earl of Clarendon. A curious coincidence marks the life and the death of Clarendon. His life (1609–74) is virtually coextensive with that of John Milton, his principal opponent in the great civil strife. Clarendon has been called the "Cavalier-prince of historic portrait painters," and Milton the "Puritan-prince of epic poets."

Dryden.—Chaucer, Shakspere, Spenser, Milton, royal names in English literature, are succeeded by a comparatively meager school of artificial poets. Dryden and Pope are the representatives of this school. Dryden died in 1700, just 300 years after the death of Chaucer. The sweetness, the gay and kindly humor, and the tender sympathies, which so illumine Chaucer's poetry, are lacking in Dryden's didactic verse. His greatest satire is "Absalom and Achitophel," a bitter arraignment of those who opposed the succession of James, the brother of Charles II, to the English throne. "MacFlecknoe," another satire, is directed against a Whig poet. *All for Love*, a drama, is in this same cold, critical vein. He wrote long criticisms in argumentative verse, utterly lacking in the true spirit of poetry. His "Hind and the Panther" and "Religio Laici" are known today only as names. The greatness of poetry cannot be expressed by the critical spirit. Dryden's one really admirable poem, "Alexander's Feast," will be remembered for its lyric qualities. His prose writings are numerous, and the English in which he wrote them became a standard of style.

The English revolution of 1688 secured peace for the realm and an opportunity for the development of arts and sciences. The investigations of Newton and the development of philosophy under Locke mark this period.

The Eighteenth Century. Alexander Pope is the literary successor of John Dryden and the representative poet of his time. He was a precocious boy whose life was "one long disease." Reading was his passion, and before he was twelve years of age he had written an "Ode to Solitude." To understand Pope, one must remember his deformity and the spirit of the time in which he lived. The first half of the 18th century is marked by a low standard of morals. Political unrest and political double-dealing, coarse social life,—dull, unimaginative, brutal,—these are the common characteristics ascribed to it. Drunkenness was common and morality was laughed at. Out of such conditions, Pope, Swift, and Steele gathered the material for their satires. Of this distinguished group of writers, Addison alone kept his genial nature and wrote what was gentle and mirthful with such grace that satire lost its severity.

Pope.—The literary faults of this age are lack of moral earnestness and enthusiasm. Form was preferred to matter. The age was molded by classical rules. It delighted in studied regularities. Pope is the great exponent of the classic school. So deficient is he in warmth of feeling for man or nature, so fixed and formal are his lines, that it is often questioned whether Pope was entitled to the name of poet. But whether poet or not, Pope did enrich the language by epigrammatic couplets that are familiar in our common speech. Both Pope and Dryden did much good service in raising the standard of English speech.

Steele and Addison.—The first half of the 18th century is far more remarkable for its prose than for its poetry. A new and excellent field for essayists was found in the *Tatler*, planned by Richard Steele. Periodical papers containing news had existed in England from the time of the Commonwealth, but this was the first periodical designed to have literary merit, to discuss questions of common, everyday interest, and to include lively sketches, anecdotes, and humorous discussions. It was succeeded by the *Spectator*, which appeared every week day morning in the shape of a single leaf, from March 1, 1711 to December 1712; after a suspension it reappeared three times a week in 1714 and extended to 635 numbers. The *Guardian* was begun in 1713 but ceased after the 176th number. Steele was the principal contributor to the *Tatler* and to the *Guardian*, and Addison to the *Spectator*, but papers were also furnished by Swift, Pope, Berkeley, and Hughes. The essays, especially those of Addison, were often models of grace and delicacy and were highly influential in correcting and refining the tone of society.

The Novel.—Prose fiction is another development of the 18th century. Daniel Defoe (1661–1731) first gave to English fiction a simple, direct, matter-of-fact human interest, and the narrative of *Robinson Crusoe* has never been excelled. The *Tale of a Tub* and *Gulliver's Travels*, by Swift, and *The History of John Bull*, by Arbuthnot, are satires in the form of fictitious narratives. The writings of Swift are admirable for their vigor and humor. Under his successors, the novel became more complex and artistic, embraced greater varieties of character and diversities of treatment, and pictured the artificial refinements and distinctions of society. *Joseph Andrews*, *Tom Jones*, and *Amelia*, by Fielding, and *Pamela*, *Clarissa Harlowe*, and *Sir Charles Grandison*, by Richardson, were published near the middle of the century. *Peregrine Pickle*, *Humphrey Clinker*, and other novels by Smollett are distinguished for coarse, comic incidents and broad humor. *Tristram Shandy* and *Sentimental Journey*, by Sterne, contain passages sparkling with wit and humor and full of rare tenderness of sentiment. The *Vicar of Wakefield*, by Oliver Goldsmith, is without doubt the most delightful romantic novel of the century. It is not a book without artistic faults, but it combines delicate humor with sweet human emotion. Goldsmith was a writer in every field of invention, but he will be remembered chiefly because of the Vicar and his family. His "Deserted Village" and his "Traveler" contain passages that cannot be forgotten. So also Gray's "Elegy Written in a Country Churchyard" and Collins's *Odes* and Cowper's hymns belong to permanent English poetry.

History and Oratory.—The 18th century, which gave us the modern essay and the novel, also produced writers of carefully elaborated and finished history: *History of England* by David Hume; *History of the Decline and Fall of the Roman Empire* by Gibbon; and Robertson's histories of Scotland, Germany, and America. This century produced great orators, like Burke, Fox, and Pitt, and great philosophers, like Berkeley, Paley, and Hume, besides the economist, Adam Smith, and the great lawyer, William Blackstone.

Samuel Johnson.—In striking personality and in power to make others think, Doctor Samuel Johnson was, without doubt, the foremost man of later 18th century literary London. He was the central figure around whom all the literary men and women gathered, the Nestor of his age. Doctor Johnson founded and carried on as sole editor two periodicals, the *Rambler* and the *Idler*, in the style of the *Spectator*, which Addison had made so popular. His most famous work was a *Dictionary of the English Language*. His critical estimates of poetry must be read with caution, and his criticisms are often stilted and overstrained in language. His best prose is his romance, *Rasselas, the Prince of*

Abyssinia. Johnson is better known because of the intimate record of his life, written by his biographer, Boswell, than for what he wrote.

Romanticism. The close of the century, so remarkable for its development in prose, adds one great name to the poets already mentioned,—Robert Burns, the Scottish prince of lyric verse. With an intense love of nature and a keen sympathy for humanity, he has written for us as no other poet ever wrote. The poetic ideal of Gray and Collins, of Cowper and Blake and Burns, reacted against cold formalities in verse. The joys and sorrows of life they would put into poetry, and as it came from the heart they would have it touch the heart. Man and nature are the chosen themes, and man is always in the foreground with Burns. The songs of Burns minister to every feeling of the universal human heart. That he has won his audience is proved by the fact that since the day of his death the number of his readers has continually grown. All the world knows these songs: "Scots Wha Hae wi' Wallace Bled," "Auld Lang Syne," "Comin' through the Rye," "Ye Banks and Braes."

Poetry at the close of the 18th century was simpler than in the preceding generations. There were songs of joy and laughter and tender sympathies. Imagination was given free play, and it touched with beauty the familiar scenes of every day.

Poets of Nature.—The opening years of the 19th century ushered in a brilliant company of nature poets: Scott, Wordsworth, Coleridge, Southey, Byron, Shelley, Keats, belong to this group. Classic models gave place to freer expression, more individuality, and a deeper appreciation of the beauties of nature, and more value was set upon the commonplace. Imagination and a larger sympathy found beauty in that which had been counted low and mean. This had been illustrated already in the poems of Burns and Cowper. Sir Walter Scott showed this tendency in his romances. His romantic poems combine the refinements of modern poetry with the spirit and material of the neglected border minstrelsy. Wordsworth aimed to renew poetry by bringing it back to truth and nature. His verse is often weak, but his best poems, "The Daffodils," "Tintern Abbey," "Ode to Duty," and his sonnet "To Milton," are exquisite in their simplicity of feeling and in truthfulness of delineation. Coleridge's finest poems are "Christabel" and "The Ancient Mariner." They are unsurpassed in their strong, wild music, their imaginative power, and their exquisite magic. Southey wrote both prose and verse and displayed extensive learning. Byron was remarkable for strength and passion. Keats and Shelley loved beauty, the one sensuously, the other intellectually. "The Skylark" and "The Cloud," by Shelley, and "St. Agnes' Eve," by Keats, are perfect in their music and their imagery. Thomas Moore, sometimes called the "Irish melodist," besides his shorter poems, wrote *Lalla Rookh*, a volume containing four Oriental stories told with rich imagery and diction. Thomas Campbell wrote *The Pleasures of Hope*. Humor and pathos are subtly united in the poems of Thomas Hood; for example, "Song of the Shirt," "The Bridge of Sighs," "The Last Man."

The Victorian Age. The prose of this first half of the 19th century also takes high rank. Scott will always be remembered as the creator of the historical novel; Charles Lamb, for his rare humor and delicate use of language. His *Essays of Elia* have been called the finest of their kind in literature. Macaulay's essays are magnificent examples of English prose. De Quincey's *Opium Eater* and his *English Mail Coach* are also brilliant specimens of English. Mill, Bentham, and Malthus are the chief contributors to philosophical prose.

In 1837 Queen Victoria ascended the throne. The rest of the century is usually called the Victorian age. This age is remarkable, not for the development of any new type of literature, but for the quantity and general excellence of literature in every department. Representative names of the Victorian age are Browning, Tennyson, Matthew Arnold, the Rossettis, in poetry; Thackeray, Dickens, George Eliot, Trollope, in prose fiction; Carlyle, Macaulay, Ruskin, Matthew Arnold, Leslie Stephen, in essay writing; Spencer, Newman, Hamilton, Darwin, Tyndall, Huxley, Faraday, Mill, in philosophy and science; Milman, Grote, Froude, Freeman, Buckle, Green, and Lecky, in history.

Novelists.—Problems of life occupy the minds of the Victorian writers. It is an age of scientific thought and of practical reform. There is an upward struggle of the masses, a striving for better government, for higher moral ideals. Prose and poetry alike are imbued with an ethical purpose. Dickens desired to bring out what he called "the romantic aspect of familiar things," and he began with the study of "vicious poverty." Most of Dickens's novels were inspired by a firm purpose to accomplish some reform. His social creed has been formulated in these words: "Banish from earth some few monsters of selfishness, malignity, and hypocrisy, set to rights a few obvious imperfections in the machinery of society, inspire all men with a cheery benevolence, and everything will go well with this excellent world of ours." While Dickens with inimitable humor and exuberant optimism was presenting the cause of the submerged poor, Thackeray wrote of the follies of the upper classes of society, and George Eliot pictured the English middle class. These great novelists, with their deep human sympathies, pictured the interdependence of human beings, the relation that every man bears to his surroundings. Thus fiction kept in close touch with the social ideas of the time, reflecting not only its mood but also its important changes, and showed thereby that it has life and does not exist as a mere literary form.

Poets and Critics.—The vigor and idealism of the age were splendidly expressed by Browning and Tennyson. Carlyle was the mouthpiece of the strongly felt need of heroism. He was by far the greatest of the Englishmen of his time who taught the value of sincerity. Another author who had a profound influence upon his contemporaries was John Ruskin. Each generation has its message to deliver. Carlyle and Ruskin in their criticisms, the one of life, and the other of art, disseminated the message of their time. They would have men be true and live up to their own highest capacities. They spoke, as the poets Tennyson and Browning spoke, of the larger and truer meaning in life. They believed in growth through evolution and in the development of the individual soul.

A Transition Period. In the closing years of the 19th century, from 1890, roughly speaking, the old Victorian order of literature was changing, "yielding place to new." The problems and doubts that harassed and occupied Victorian artists and philosophers seemed remote and of little consequence to the young writers whose names so readily occur when we think of the "Eighteen-nineties." Oscar Wilde was the apostle of æstheticism in life and in letters, the brilliant dramatic wit whose best plays, *Lady Windemere's Fan* (1892) and *The Importance of Being Earnest* (1895), are still eminently actable and readable. William Ernest Henley, as editor and friend, drew out the genius of many of his contemporaries, among them Kipling, Conrad, Wells, and Yeats. His own verse and prose are of a ringing and courageous quality. Arthur Symons (b. 1865) is distinguished even more as an impressionistic critic than as a poet. John Davidson (1857–1909) wrote much beautiful poetry, the best of which may be found in his *Fleet Street Eclogues*. Ernest Dowson (1867–1900) was a poet of frail but very real genius, who tuned a delicately wistful instrument of verse.

All these and other lesser writers of the period were vigorously engaged in reacting in their lives and books against what they felt to be the formalities of Victorianism. There were other writers of the period—notably Francis Thompson (1860–1907), famous as the author of "The Hound of Heaven," the greatest religious poem of modern times, and William Watson (b. 1858), who wrote the unforgettable "Wordsworth's Grave"—whose genius was of a more traditional quality.

Hardy and Meredith.—Thomas Hardy (1840-1928), whose earliest novels appeared in the very noon of the Victorian period, received belated recognition for his profound and mournful studies of Wessex life. By virtue of some half dozen novels, among them *The Return of the Native, Far from the Madding Crowd,* and *Tess of the D'Urbervilles,* he has taken his place among the masters of fiction. George Meredith (1828–1909), whose earliest writings, in prose fiction and in verse, were also contemporary with the work of some of the major Victorians, likewise came into his own. The brilliance, subtlety, and extraordinary charm of his best novels, for example, *The Ordeal of Richard Feverel, Beauchamp's Career,* and *Diana of the Crossways,* at length received the acknowledgment long their due.

Stevenson and Kipling.—Not a few critics regard Robert Louis Stevenson (1850–94) as the most brilliant and interesting of later 19th century writers. His success was greatest in the field of romantic fiction, in which his finest work is *Treasure Island* (1883), "the best boys' story since Marryat" (Saintsbury). But his essays and letters are among the most charming of modern times, and his *Child's Garden of Verses* (1885) has been widely admired. Rudyard Kipling (b. 1865) has probably won a wider public for his writings than has any other English writer since Dickens. As a poet he is best known by his vivid and muscular ballads in soldier dialect. *Barrack-room Ballads* appeared in 1892. Upon the technique of contemporary writers his short stories of Indian life have had a marked influence. The best of these may be found in *Plain Tales from the Hills* (1887), *Soldiers Three* (1888), and *Under the Deodars* (1888). Perhaps his most original work is contained in the two *Jungle Books* (1894-95). His best novel is *Kim* (1901). He has been described as the unofficial laureate of British imperialism.

Contemporary Prose. Joseph Conrad (Josef Teodor Konrad Korzeniowski) (1857–1924), a Pole by birth but English by naturalization, after spending his youth and earlier manhood as a sailor, published in 1895 his first novel, *Almayer's Folly.* He produced thereafter more than twenty volumes of novels, short stories, and reminiscences. For years he was sadly neglected by the reading public (if not by professional literary critics), but he is today almost universally regarded as the greatest master of fiction of his time, and one of the half dozen or so world artists. His best novel is *Nostromo. Lord Jim, Youth,* and *Chance* are also remarkable examples of his genius at its finest. John Galsworthy (b. 1867), to whom Conrad dedicated *Nostromo,* is a writer of judicial temper, with a strong passion for justice and righteousness, and a profound interest in the social and economic aspects of modern life. This interest is best illustrated in *The Forsyte Saga,* a massive and closely knit commentary upon certain cardinal aspects of upper middle-class English society life as illustrated by the Forsyte family.

The foible of Arnold Bennett (b. 1867) is versatility; he has written novels, romances, fantasies, manuals of practical philosophy and of literary criticism. Most of these works are ephemeral, however, even in intention. His masterpiece is *The Old Wives' Tale,* a novel in vast outline, tracing the lives, from girlhood to old age, of two English women whose destinies are widely divergent. It is one of the great novels of this generation. Hardly less impressive is a sequence of three long novels entitled (1) *Clayhanger,* (2) *Hilda Lessways,* (3) *These Twain.* In the main, the rest of Bennett's work is negligible.

H. G. Wells (b. 1866) is, of serious English novelists of today, probably the most widely popular. He began his writing career with enchanting tales and romances of science, among the deftest of these being *The Time Machine* (his first book), *The Invisible Man,* and *The Food of the Gods.* He then passed into a phase of deeper interest in men and women as human beings, and in the development of character in conflict with environment. To this period belong *Love and Mr. Lewisham, Kipps,* and *The Wheels of Chance.* His later interest in social problems and in the study of certain intellectual *types* is illustrated by his novels, *The New Machiavelli* and *The Research Magnificent. Mr. Britling Sees It Through* reflected, in the mirror of the novel, Mr. Wells's attitude to the World War and its transforming influence upon national character. *God, the Invisible King* is a popular theological treatise wherein Wells endeavors to make articulate the new faith inarticulately held by Mr. Britling. But the work which has diffused Mr. Wells's name and fame more widely than anything else from his pen is *The Outline of History.*

William De Morgan (1839–1917) wrote his first and best novel, *Joseph Vance,* in his 66th year, and thereafter gave the world eight long novels in a style and manner curiously compounded of Dickens and Thackeray (in unequal proportions) and with a peculiarly delightful savor all his own. Of his other novels, the best are probably *It Never Can Happen Again* and *Somehow Good.* His work and that of Archibald Marshall (b. 1866) are interesting contemporary reversions to the Victorian mood and method in fiction. Characteristic novels by Marshall are *The Squire's Daughter* and *The Honour of the Clintons.* Maurice Hewlett (1861–1923) won high distinction as a master of historical portraiture in fiction. His earliest work in fiction was a romance, *The Forest Lovers. The Queen's Quair,* which concerns itself with the unhappy life and death of Mary Queen of Scots, has been declared by Frederic Harrison to be one of the best historical novels in English.

In his *Travels in Arabia Deserta,* C. M. Doughty (1843–1926) produced a travel epic which challenges comparison with the best of its kind in any language. Likewise inspired by the Arabian terrain, *The Seven Pillars of Wisdom,* by that picturesque soldier-scholar, T. E. Lawrence (b. 1888), is one of the few masterpieces of World War literature.

W. H. Hudson (1841–1922) wrote romances and romantic chronicles,—*Green Mansions* and *The Purple Land,*—but his fame will surely rest ultimately upon his wonderful essay-studies of wild nature, especially of birds. Many critics regard Hudson as the greatest contemporary master of English prose. Special mention may be made of his enthralling autobiography, *Far Away and Long Ago,* and of his book of Wiltshire studies, *A Shepherd's Life.* D. H. Lawrence (b. 1885) shows a hard graphic power and an apprehension of the crude forces of nature. Besides his novels and stories, which include *Women in Love* and *David,* he has written dramas, poems, essays, and a historical work, *Movements in European History.* Much of his work exhibits an almost biblical elevation of spirit, a brooding over the mysteries of sex, and a gift for sentences of lightning-like illumination.

Other essayists of rare distinction are Hilaire Belloc, Max Beerbohm, R. L. Gales, and G. K. Chesterton. Chesterton is, like Arnold Bennett, one of the most versatile of writers. His best prose works are his popular study in religious philosophy, *Orthodoxy,* and his book on Charles Dickens. Lytton Strachey's (b. 1880) *Eminent Victorians* and *Queen Victoria* did much to set a new fashion in realistic biography.

Contemporary Drama and Poetry. While recent years have seen no flowering of drama rich in literary values, John Galsworthy has achieved genuine dramatic significance in such plays as *Justice* and *Loyalties*. Bernard Shaw's plays, glittering with paradoxes and abounding in destructive criticism, exhibit the subtlety and originality of this outstanding playwright. *Man and Superman* and *St. Joan* are representative of his best work. John Drinkwater (b. 1881), in his earlier phase—and still—a poet of beautiful sensibility and technique, and a critic of delicate discernment, has of late acquired fame in the theater by his sincere and moving dramatic portrait of *Abraham Lincoln* (1918), and has consolidated a reputation for distinguished and vital artistry by his plays *Robert E. Lee*, *Oliver Cromwell*, and *Mary Stuart*. No living playwright has a surer "sense of the theater."

Among dramatists of the earlier part of the period under consideration whose plays still retain the theater-goer's interest are Sir Arthur Pinero and Henry Arthur Jones. Best beloved of living dramatists is Sir James Barrie (b. 1860), whose most popular play is the lovely fantasy of childhood, *Peter Pan*.

Of contemporary poets, first in popularity is probably John Masefield (b. 1875), who, known at first to a few readers as the author of lyrics enshrining his days at sea, became world-renowned almost overnight with his long verse narrative, *The Everlasting Mercy*. Steeped in sincerity and shot through with a lyrical beauty of phrase, its occasional technical weaknesses deprived the poem of the critical approbation of fastidious readers. But Masefield's fame has grown with each successive long poem from his pen, and his latest novels, *Sard Harker* and *Odtaa*, have been enthusiastically received by all admirers of Stevensonian romance.

Alfred Noyes (b. 1880), justly popular for such vigorous and fluent narrative poems as *Drake* and *Tales of the Mermaid Tavern* has recently, in his *Watchers of the Skies* and *The Book of Earth*, restored to modern English poetry—too long bereft of them—a high Wordsworthian seriousness and such an inspiringly imaginative attitude towards the results of scientific investigation as recalls Milton to the instructed reader. In these two poems, Noyes ascends to a higher poetic plane than any upon which he had hitherto wrought. Lascelles Abercrombie (b. 1881), in his *Interludes and Poems* and *Emblems of Love*, has achieved poetry full of massive energy and subduing vision. His fame as critic is not less great, chiefly by virtue of *The Idea of Great Poetry*. Thomas Hardy, who, in his later life, abandoned novel writing for the art of poetry, was one of the most potent of influences upon his verse-writing contemporaries. His epic-drama, *The Dynasts*, has been called the greatest single literary achievement of the 20th century. Walter de la Mare (b. 1873) has written delicately wistful poetry about children, and in *The Listeners* approaches the attainment of a magical music reminiscent of Coleridge. W. H. Davies (b. 1870) sings with happy spontaneity and in his *Songs of Joy* and in his prose *Autobiography of a Super-Tramp* reveals a winningly vivacious personality.

The present poet laureate, Robert Bridges (b. 1844), is still read with delight in his *Shorter Poems*, though his inspiration has almost entirely deserted him these many years. In *A Shropshire Lad* by A. E. Housman (b. 1859), a frugal volume of sixty-three short but very perfect lyrics, contemporary poets increasingly find inspiration and learn the lesson of their difficult art. Nor have the poems, especially the sonnets, of Rupert Brooke (1887–1915)—whom the World War took away in the glory of his youth and beauty—been without their vitalizing influence on the younger generation.

TABLE OF ENGLISH LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
?	Unknown		The Far-Traveler.
?	Unknown		Beowulf.
665 (about)	Cædmon		Paraphrase of the Scriptures.
673–735	Bede	Ecclesiastical History	Poems.
750 (about)	Cynewulf		Christ, Elene, Andreas.
849–901	Alfred the Great	Translations	
1095–1143	William of Malmesbury	History of Kings of England	
1100–1154	Geoffrey of Monmouth	History of English Kings	
1200 (about)	Layamon		Chronicles of Britain, Brut.
1324–1384	John Wiclif	Translation of Bible, Sermons	
1325–1408	John Gower		Ballads, Lover's Confession.
1332–1400	William Langland		Piers Plowman.
1340–1400	Geoffrey Chaucer		Canterbury Tales, Short Poems.
1422–1491	William Caxton	Translation (History of Troy)	
1430–?	Thomas Malory	Le Morte D'Arthur	
1478–1535	Sir Thomas More	Utopia	
1484–1536	William Tyndale	Translation of New Testament	
1488–1568	Miles Coverdale	Translation of Bible	
1503–1542	Sir Thomas Wyatt		Sonnets, Lyrics.
1536–1608	Thomas Sackville		Mirror for Magistrates.
1552–1599	Edmund Spenser		Faery Queen, Shepherd's Calendar.
1554–1586	Sir Philip Sidney	Arcadia	
1559–1634	George Chapman		Translation of Homer.
1561–1626	Francis Bacon	Essays, Philosophy	
1564–1593	Christopher Marlowe		Dramas (Faustus).
1564–1616	William Shakspere		Dramas, Poems, Sonnets.
1573–1637	Ben Jonson		Dramas (The Alchemist).
1577–1640	Robert Burton	Anatomy of Melancholy	
1579–1625	John Fletcher		Dramas (Philaster, Maid's Tragedy).
1584–1616	Francis Beaumont		
1591–1674	Robert Herrick		Poems.
1593–1633	George Herbert		Poems (The Temple).
1593–1683	Izaak Walton	The Compleat Angler	
1608–1674	John Milton	Areopagitica	L'Allegro, Comus, Paradise Lost.
1609–1674	Edward Hyde	History of the Great Rebellion	
1612–1680	Samuel Butler		Hudibras.
1613–1667	Jeremy Taylor	Holy Living	
1628–1688	John Bunyan	Pilgrim's Progress, Holy War	
1631–1700	John Dryden		St. Cecilia's Day, Satire.
1632–1704	John Locke	Philosophy	
1633–1703	Samuel Pepys	Diary	
1661–1731	Daniel Defoe	Robinson Crusoe	
1667–1745	Jonathan Swift	Gulliver's Travels, Tale of a Tub.	

TABLE OF ENGLISH LITERATURE—Con.

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1672–1719	Joseph Addison	Essays (The Spectator)	Dramas, Poems.
1672–1729	Sir Richard Steele	Essays (The Tatler)	
1685–1753	Bishop Berkeley	Philosophy	
1688–1744	Alexander Pope		Poems (Essay on Man).
1689–1761	Samuel Richardson	Novels (Clarissa Harlowe, Pamela)	
1700–1748	James Thomson		The Seasons.
1707–1754	Henry Fielding	Novels (Tom Jones, Amelia)	
1709–1784	Samuel Johnson	Dictionary, Rasselas, Essays	
1711–1776	David Hume	History of England	
1713–1768	Laurence Sterne	Tristram Shandy, Sentimental Journey	
1716–1771	Thomas Gray	Criticism	Poems.
1721–1759	William Collins		Odes.
1721–1771	T. George Smollett	Humphrey Clinker, Roderick Random	
1728–1774	Oliver Goldsmith	Novels (Vicar of Wakefield), Essays	Plays (She Stoops to Conquer), Poems (Deserted Village).
1729–1797	Edmund Burke	Essays, Speeches (On Conciliation)	
1731–1800	William Cowper		Poems (The Task, John Gilpin).
1737–1794	Edward Gibbon	Decline and Fall of the Roman Empire	
1740–1795	James Boswell	Life of Samuel Johnson	
1745–1833	Hannah More	Cœlebs in Search of a Wife	Sacred Dramas.
1748–1832	Jeremy Bentham	Philosophical Prose, Political Essays	
1749–1806	Charles James Fox	Orations	
1751–1816	Richard B. Sheridan	Speeches	Plays (The Rivals).
1757–1827	William Blake		Songs of Innocence and Experience.
1759–1796	Robert Burns		Cottar's Saturday Night.
1759–1806	William Pitt	Orations	
1767–1849	Maria Edgeworth	Novels (Castle Rackrent)	
1770–1835	James Hogg	Shepherd's Calendar	Pastorals.
1770–1850	William Wordsworth		Poems (The Excursion).
1771–1832	Sir Walter Scott	Waverley Novels	Lady of the Lake.
1771–1845	Sydney Smith	Sermons, Essays	
1772–1834	S. T. Coleridge	Essays	The Ancient Mariner.
1774–1843	Robert Southey	Biographies of Nelson and Wesley	Poems.
1775–1817	Jane Austen	Pride and Prejudice, Emma	
1775–1834	Charles Lamb	Essays of Elia	
1775–1864	Walter S. Landor	Imaginary Conversations	Count Julian, Heroic Idyls.
1776–1850	Jane Porter	Scottish Chiefs, Thaddeus of Warsaw	
1777–1844	Thomas Campbell		Pleasures of Hope, Lyrics.
1777–1859	Henry Hallam	History, Europe during Middle Ages, Constitutional History of England	
1778–1830	William Hazlitt	Table Talk, English Poets	
1779–1852	Thomas Moore	Biographies	Lalla Rookh, Irish Melodies.
1784–1859	Leigh Hunt	Essays, Sketches, Memoirs	Poems (Madoc).
1785–1854	John Wilson	Noctes Ambrosianæ	Poems.
1785–1859	Thomas De Quincey	An English Opium Eater	
1788–1824	Lord Byron		Poems (Childe Harold).
1791–1868	Henry H. Milman	History	Poems, Poetical Dramas.
1792–1822	Percy B. Shelley		Queen Mab.
1792–1848	Frederick Marryat	Mr. Midshipman Easy	
1793–1835	Felicia Hemans		Lyrics.
1795–1821	John Keats		Endymion, Hyperion.
1795–1881	Thomas Carlyle	French Revolution, Cromwell	
1797–1868	Samuel Lover	Handy Andy, Rory O'More	Songs, Ballads.
1798–1827	Robert Pollock	Tales of the Covenanters	Course of Time.
1799–1845	Thomas Hood		Poems.
1800–1859	Thomas B. Macaulay	Essays, History of England, Lays of Ancient Rome	
1801–1890	John H. Newman	Essays (The Idea of a University)	Poems, Hymns.
1803–1873	Edward Bulwer-Lytton	Last Days of Pompeii	
1804–1881	Benjamin Disraeli	Novels (Lothair, Vivian Grey)	
1806–1861	E. B. Browning		Poems (Aurora Leigh).
1806–1872	Charles Lever	Novels (Tom Burke, Charles O'Malley)	
1809–1892	Alfred Tennyson		In Memoriam, Idylls of the King.
1811–1863	William M. Thackeray	Novels (Vanity Fair, The Newcomes)	
1812–1870	Charles Dickens	David Copperfield, Oliver Twist	
1812–1889	Robert Browning		Poems (Dramatic Lyrics).
1814–1884	Charles Reade	Novels (The Cloister and the Hearth)	Plays.
1815–1882	Anthony Trollope	Novels (Barchester Towers)	
1816–1855	Charlotte Brontë	Novels (Jane Eyre, The Professor)	
1818–1894	James A. Froude	Essays, History of England	
1819–1875	Charles Kingsley	Novels (Hypatia)	Poems.
1819–1880	George Eliot	Novels (Silas Marner)	Poems (Spanish Gypsy).
1819–1900	John Ruskin	Essays (Modern Painters)	
1820–1897	Jean Ingelow		Poems.
1821–1862	Henry T. Buckle	History of Civilization in England	
1822–1888	Matthew Arnold	Essays, Criticism	Poems (Sohrab and Rustum).
1822–1896	Thomas Hughes	Tom Brown at Oxford	
1823–1892	Edward A. Freeman	Histories	
1824–1889	Wilkie Collins	Novels (Woman in White)	
1824–1905	George Macdonald	Novels (Sir Gibbie)	Poems (Phantastes).

TABLE OF ENGLISH LITERATURE—Con.

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1825–1895	Thomas H. Huxley	Essays (Man's Place in Nature)	
1825–1900	R. D. Blackmore	Novels (Lorna Doone)	
1826–1887	Dinah Maria Mulock	Novels (John Halifax, Gentleman)	Poems.
1828–1882	Dante G. Rossetti		Poems (The Blessed Damozel).
1828–1909	George Meredith	Novels (Diana of the Crossways)	Poems (Modern Love).
1832–1904	Sir Leslie Stephen	Biographies, Essays	
1834–1896	William Morris	Essays (Mural Painting)	Poems (Earthly Paradise).
1835–1902	Samuel Butler	Essays, Romances (Erewhon)	Novel (The Way of all Flesh).
1837–1909	A. C. Swinburne	Essays (Study of Shakspere)	Poems, Ballads.
1838–1901	Walter Besant	Essays, Novels (Dorothy Foster).	
1838–1903	William E. H. Lecky	History	
1838–1922	James Bryce	American Commonwealth	
1838–1923	John Morley	Essays, Biography	
1839–1917	Wm. F. De Morgan	Novels (Joseph Vance)	
1840–1928	Thomas Hardy	Novels (Wessex Tales)	Poems.
1843–1926	Charles Montagu Doughty	Travels (Arabia Deserta)	Poems (Dawn in Britain).
1844–	Robert Bridges		Poems, Shorter Poems, Plays (Ulysses).
1850–1894	Robert L. Stevenson	Essays, Romances	Child's Garden of Verses.
1851–1920	Mrs. Humphrey Ward	Novels (Robert Elsmere)	
1851–1929	Henry Arthur Jones	Essays	Dramas (Mary Goes First).
1853–	Hall Caine	Novels (The Christian)	
1855–	Arthur W. Pinero		Dramas (Iris, The Beauty Stone).
1856–	George B. Shaw	Essays	Plays (Man and Superman).
1857–1924	Joseph Conrad	Novels (Nostromo)	
1859–	Sir A. Conan Doyle	Novels (Sherlock Holmes)	
1860–	Sir James Barrie	Novels (The Little Minister)	Plays (Peter Pan).
1861–	Sir Rabindranath Tagore	Essays, Stories (Gitanjali)	Poems.
1865–	Rudyard Kipling	Tales (Jungle Book)	Barrack-room Ballads.
1866–	Herbert G. Wells	War of the Worlds, Novels, History	
1867–	Arnold Bennett	Novels (The Old Wives' Tale)	Plays.
1867–	John Galsworthy	Novels, Stories, Essays	Poems, Dramas (The Silver Box).
1868–1915	Stephen Phillips		Poems, Dramas (Herod).
1873–	Walter de la Mare	Novels (Memoirs of a Midget)	Poems (Peacock Pie).
1874–	G. K. Chesterton	Essays, Fiction	Poems.
1875–	John Masefield	Novels, Stories	Poems, Plays.
1880–	Lytton Strachey	Biography (Eminent Victorians)	
1880–	Alfred Noyes	Essays, Criticism	Poems (The Loom of Years).
1882–	John Drinkwater	Essays	Poems, Plays (Lincoln).
1885–	David H. Lawrence	Novels (Women in Love)	Poems, Dramas.
1888–	Thomas E. Lawrence	Memoirs (Seven Pillars of Wisdom)	

CANADIAN LITERATURE

Canada, as she has developed from a colony to a nation and acquired the measure of material prosperity essential to artistic creation, has had, besides her native-born authors, writers that, according to the extent of their association with the country, may be divided into four classes. There have been those whose residence in Canada was only incidental and temporary; those who came to Canada in maturity and retained an old-world point of view; those who, though they came to Canada in maturity, became thoroughly Canadian in sentiment; those who, though foreign born, came to Canada in their childhood and grew up under Canadian influences. This applies to English Canada and in a measure to French Canada, each of which has its own literature.

French Canadian Literature. The most important French Canadian prose writings are *Les relations des Jesuits; Les anciens canadiens*, by Philippe Aubert de Gaspé, a mine of information about life under the old Régime, translated into English by Charles G. D. Roberts; *Histoire du Canada*, by François Xavier Garneau, which started the first school of French Canadian literature; *Un pèlerinage au pays d'Evangeline*, by Abbé Casgrain. The first school of French Canadian poetry developed in Quebec between 1860 and 1870. Gérin-Lajoie wrote a truly national poem, *Un canadien errant*, voicing the homesickness of a French Canadian exiled on account of the rebellion of 1837. Octave Crémazie, regarded as the father of French Canadian poetry, wrote verse of distinct merit, including colorful, sentimental descriptions of the Canadian scene. Pamphile Le May translated Longfellow's *Evangeline* into French. Louis Fréchette, who married a sister of William Dean Howells and who is regarded as the greatest French Canadian poet, approached epic grandeur in his chief poem, *La légende d'un peuple*. The second school of French Canadian poetry began in Montreal in 1895. To it belong in fact Émile Nelligan and Albert Lozeau, and in spirit Paul Morin.

English Canadian Literature. In the main, the British settlers in Canada upheld the literary tradition of the British romanticists; the United Empire Loyalists, that of the English pseudo-classicists.

Miscellaneous Prose. The Honorable Joseph Howe, of the Loyalist tradition, whose published speeches are the best political literature in Canada, powerfully influenced Canadian prose by publishing in his paper, the *Novascotian*, his own sketches, the papers of the *Club*, of which he and Haliburton were members, and the series of sketches by Haliburton that constitute *The Clockmaker*.

Thomas Chandler Haliburton, a native of Nova Scotia, after a long career in that province as lawyer and judge, removed to England in 1856, where he was elected to the British House of Commons. *The Clockmaker, or The Sayings and Doings of Sam Slick of Slickville*, the first edition of the first series of which appeared in book form at Halifax in 1836, was the first Canadian work to achieve widespread fame and translation. Through the conversations of a country squire and Sam Slick, an itinerant Yankee clock seller who frequently quotes his New England parson, Haliburton discussed and criticized local and imperial politics and government. The remarks of his characters became widely current for their homely shrewdness. Later volumes in the Slick series were less successful. Haliburton wrote also *An Historical and Statistical Account of Nova Scotia* (1829), *Bubbles of Canada* (1839), *The Old Judge, or Life in a Colony* (1849), and *Rule and Misrule of the English in America* (1851).

The greatest Canadian humorists in nonfictional prose since Haliburton are Peter McArthur and Stephen Leacock.

As to history and biography, the older Canadian historians, whether writing voluminously like William Kingsford or on a smaller scale like James Hannay, tended to lack style when they were accurate or to fall short of fairness and proportion when they wrote with imaginative power. In recent years, Canadian scholars have done much diligent and careful work in organizing and writing the history of their country. Of those who have written somewhat extensively and have combined good material and style, William Wood is one of the best. There have been at least a dozen good biographers, but none of high distinction.

As literary essayists may be mentioned Sir William Osler, Sir Andrew MacPhail, and Professor Archibald M. MacMechan.

Canada has a good literature of voyages, travels, and color writing. This includes Alexander Mackenzie's *Voyages from Montreal through the Continent of North America* (1801); Alexander Henry's *Travels and Adventures in Canada and the Indian Territories* (1807); Mrs. Jameson's *Winter Studies and Summer Rambles in Canada* (1838); Mrs. Moodie's *Roughing It in the Bush* (1852); Lady Edgar's *Ten Years of Peace and War in Upper Canada* (1890); L. J. Burpee's *Search for the Western Sea* (1907); and the recent color writing of Arthur Heming, W. H. Blake, "Katherine Hale" (Mrs. J. W. Garvin), and F. P. Grove.

Fiction. What is regarded as the first Canadian novel, Mrs. Frances Brooke's *Emily Montague*, a story of frontier life, was published in 1769. In 1832, John Richardson published *Wacousta*, the earliest Canadian novel that has secured and held a place in Canadian fiction. To the middle of the 19th century belong several stories of pioneer life by Catherine Parr Traill and her sister, Susanna Moodie. James De Mille wrote voluminously,—humorous, romantic, and juvenile fiction. William Kirby was the first Canadian novelist to use with great power the romantic material in early Canadian history. His *Golden Dog* (1877), an excellent novel of 18th century life in Quebec, has been widely read in English and in translation into French.

Edward William Thompson did good work in short juvenile fiction. William McLennan wrote habitant tales in prose that correspond somewhat to Drummond's poetic stories, and essayed longer fiction. "Ralph Connor" (Rev. Charles William Gordon) has written novels of the West that have been widely read throughout the English-speaking world. Sara Jeanette Duncan (Mrs. Everard Cotes) wrote clever, humorous novels of travel and of life in India. Sir Gilbert Parker, most popular and productive of Canadian novelists, has set his novels and short stories in every part of the British Empire, but his Canadian fiction is probably his best.

Norman Duncan wrote successful travel sketches, atmosphere stories of land and sea, and juvenile fiction. Margaret Marshall Saunders and Grace Dean McLeod Rogers have attracted attention to Nova Scotia by their fiction. Lucy Maud Montgomery has done a similar work for Prince Edward Island. Gordon Hill Grahame has written fiction set in early French Canada. Robert Stead and Arthur J. Stringer interpret understandingly the Canadian West. William Alexander Fraser, Ernest Thompson Seton, and Charles G. D. Roberts have given Canada great animal fiction. A new school of realism of great promise is represented by Mazo de la Roche in the East and by Laura Goodman Salverson, Frederick Phillip Grove, and Martha Ostenso writing of the West.

Poetry. The first English Canadian verse of note is credited to Nova Scotia. Joseph Howe wrote some good poems. Oliver Goldsmith, a kinsman of the English Oliver, published *The Rising Village* at London in 1825. Charles Heavysege, an emigrant from England to Montreal, wrote several volumes of verse. His dramatic poem *Saul* was highly praised by Bayard Taylor and Longfellow in the United States and by Coventry Patmore in England. Alexander McLachlan, a disciple of Burns, was widely read in pre-Confederation Canada. Canadian natural scenery appears as poetic subject matter in Charles Sangster's *The St. Lawrence and the Saguenay, and Other Poems* (1856); in Charles Mair's *Dreamland and Other Poems* (1868) and collected poems (1901) (containing his poetic drama *Tecumseh*); and in Isabella Valancy Crawford's *Old Spookses' Pass, Malcolm's Katie, and Other Poems* (1884) and collected poems (1905). Miss Crawford, compared in intensity to Emily Brontë, was an artist in dialect narrative and in original handling and delicate workmanship in lyric.

Charles G. D. Roberts, most versatile of Canadian writers, was the leader of the greatest school of Canadian poetry, the first post-Confederation school. In his poetry he is an exquisite painter of Canadian scenes, a singer of ideals learned from nature, and a lyrist of love. Archibald Lampman, a great admirer of the poetic gift of George Frederick Cameron (most like Shelley of all Canadian poets), throughout his career wrote poetic descriptions of nature that in appreciation of beauty and felicity of diction rival the best work of Keats. Duncan Campbell Scott, who prefixed an excellent memoir to the 1900 edition of Lampman's poems, is one of Canada's greatest poets. Since his first volume in 1893, he has published several volumes of poetry of versatility and range. He images every aspect of the Canadian year, and expresses in apt meters the thoughts, sentiments, or emotional experiences of vastly different characters. William Wilfred Campbell, of the same stock as the poet Thomas Campbell and the novelist Henry Fielding, was chiefly interested in human life, but wrote some good nature poems in addition to his poetry of man. He wrote poetic dramas as well as lyrics and narratives, and essays and novels. Bliss Carman is a worshiper of beauty, especially in nature, and a master of melodious verse. Since he began with *Low Tide on Grand Pré* (1893), he has written a large amount of excellent poetry and several volumes of prose. Some critics rank him as Canada's major poet. Frederick George Scott has published several volumes of poetry since 1888. As a nature poet, he is especially associated with the Laurentians. His broad human sympathy manifests itself in poems on old literary themes, on the subject of empire, and on love and brotherhood. Pauline Johnson, the Indian poetess whose mother belonged to the Howells family, in striking verse interpreted the spirit of Indian life and the wide spaces of the plains. Ethelwyn Wetherald has written charming nature poetry.

Somewhat apart are two poets of Irish birth. Thomas D'Arcy McGee, enamored of the cause of freedom, at length came to think that it could not be realized in Ireland, but saw for it a future in Canada. William Henry Drummond in a unique form of dialect monologue has most sympathetically interpreted the French Canadian *habitant* and *voyageur* from his contact with them as a telegrapher and, later, a country doctor.

Of many later women poets, such as Jean Blewett, Helena Coleman, Virna Sheard, "Katherine Hale," Jean Graham, Louise Morey Bowman, the late Norah M. Holland, and the late Marjorie Pickthall, the greatest artist is the last. Among the later men to attract considerable attention by their verse are Tom MacInnes, Arthur J. Stringer, Robert W. Service, Robert Norwood, and the late John McCrae and Bernard Freeman Trotter.

Canadian literature is growing more truly Canadian and is gaining in power to express the life and the spirit of the Canadian people. With the large number of young writers of promise in both prose and verse, Canadians may well look forward to a literature that will express their national spirit and consciousness even better than they have been expressed in the past.

TABLE OF CANADIAN LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1739–1824	Alexander Henry	Travels	
1745–1789	Frances Brooke	Emily Montague	
1763–1820	Alexander Mackenzie	Travels	
1781–1861	Oliver Goldsmith		The Rising Village
1786–1871	Philippe A. de Gaspé	Les Anciens Canadiens	
1794–1860	Mrs. Anna Jameson	Color Writing	
1796–1852	John Richardson	Fiction, History	
1796–1865	Thomas C. Haliburton	Satiric Humor, History	
1802–1899	Catherine P. Traill	Stories	
1803–1885	Susanna Moodie	Stories, Color Writing	Poems
1804–1873	Joseph Howe	Essays, Orations	Poems
1809–1866	François X. Garneau	History of Canada	
1816–1876	Charles Heavysege		Saul
1817–1906	William Kirby	The Golden Dog	Poems
1818–1896	Alexander McLachlan		Poems
1819–1898	William Kingsford	History of Canada	
1822–1893	Charles Sangster		Poems
1824–1882	Gérin-Lajoie		Poems (French)
1825–1868	Thomas D'A. McGee	History, Oratory	Poems
1827–1879	Octave Crémazie		Poems (French)
1833–1880	James de Mille	Fiction	
1837–1918	Pamphile Le May		Poems (French)
1838–1927	Charles Mair		Poems, Poetic Drama
1839–1908	Louis Fréchette		Poems (French)
1842–1910	James Hannay	History of Acadia	
1844–1910	Lady Edgar	History, Biography	
1849–1919	Sir William Osler	Essays, Orations	
1850–1887	Isabella V. Crawford		Poems
1854–1885	George F. Cameron		Poems
1854–1907	William H. Drummond		Habitant Poems
1856–1904	William McLennan	Habitant Tales	
1857–	A. Ethelwyn Wetherald		Poems
1860–	E. Thompson Seton	Animal Tales	
1860–	"Ralph Connor" (C. W. Gordon)	Novels	
1860–	Charles G. D. Roberts	Fiction, Animal Tales	Poems
1861–1899	Archibald Lampman		Poems
1861–1918	W. Wilfred Campbell	Essays, Novels	Poems, Poetic Dramas
1861–	M. Marshall Saunders	Fiction	
1861–	Bliss Carman	Essays	Poems
1861–	Frederick G. Scott		Poems
1861–1924	W. H. Blake	Color Writing	
1862?–1922	Sara J. Duncan (Mrs. E. Cotes)	Novels	
1862–1913	Pauline Johnson		Poems
1862–	Sir Gilbert Parker	Fiction	Poems
1862–	Duncan C. Scott	Stories	Poems
1865–	Grace D. McLeod Rogers	Stories, Novels	
1866–1924	Peter McArthur	Humor	Poems
1869–	Stephen Leacock	Essays, Stories, Humor	
1871–1916	Norman Duncan	Fiction	
1872–1918	John McCrae		Poems
1873–	L. J. Burpee	Search for the Western Sea	
1875–1924	Albert Lozeau		Poems (French)
1876–	Robert W. Service		Poems
1877–	Lucy M. Montgomery	Stories, Novels	
1883–1922	Marjorie L. C. Pickthall	Stories, Novels	Poems, Poetic Drama

AUSTRALIAN LITERATURE

The past forty years have seen a notable development of literature, both poetry and prose, in Australia. Before this period, but few writers succeeded in freeing themselves from the trammels of imitation imposed by the conditions of a young settlement, in which a distinctive literature is a plant of slow growth. Yet, in the vividly alternating kindness and cruelty of nature in the new country, in the adventurous life of the bush and the mining camp, in the swing and clatter of horsemen, and in the varied moods of the sea, never left far behind by the earliest settlers, there was matter for poetry and romance that could not long remain unsung.

The chief strength of Australian literature lies in its poetry, which often in its meters suggests the gallop of horses or the rolling of high ocean waves. It is frequently humorous, showing a particularly keen appreciation of the unusual types of character which mark the unstable conditions of life in a new country. A gloomy view of life is, however, not infrequent in the earlier serious verse. The development of Australian poetry may be divided, roughly, into four periods.

Early Pioneer Period. The first poems actually written and published in Australia were the *Royal Birthday Odes* (1810–21) of Michael Robinson. These were broadsides, of which few are extant. The work of this period, with the exception of the poems of Charles Harpur (1817–68), is a washy overflow from England. Harpur was born in New South Wales, and spent much of his life in the bush. He was the first to give sincere poetic expression to the life around him. In narrative and description he reflected truly, with a certain largeness and simplicity, the pioneer land and people, and his work had a great influence on his younger contemporary, Kendall. *The Creek of the Four Graves* is his best-known poem.

Beginnings of Australasian Literature. The discovery of gold marked a new era in the life of Australia, and the establishment of a periodical entitled *The Australasian* in 1854 gave to Melbourne a literary pre-eminence, which it held for many years. Gordon, Kendall, Marcus Clarke, R. H. Horne, George G. McCrae (1833–1927), and others, in the South, James Brunton Stephens (1835–1902) in Queensland, Thomas Bracken (1843–98) and Alfred Domett (1811–87) in New Zealand, were founding a really Australasian literature. Several of them made considerable use of aboriginal and Maori legends,—Domett, for instance, in *Ranolf and Amohia*. The humorous poetic sketches of Brunton Stephens won for him the title of the Bret Harte of Australia, and his more serious work, such



CANADIAN WRITERS

William Drummond
Octave Cremazie
Charles William Gordon
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Duncan Campbell Scott
Sir Gilbert Parker
Photo by Brown Bros.
Lucy Maud Montgomery

Bliss Carman
Charles G. D. Roberts
Stephen B. Leacock
Photo by Keystone View Co.



MODERN BRITISH WRITERS

George Bernard Shaw
Photo by Underwood & Underwood

Rudyard Kipling
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Arnold Bennett
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Alfred Noyes
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John Galsworthy
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Arthur Pinero
Photo by Internat'l Newsreel

Herbert George Wells
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Gilbert Keith Chesterton
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John Masefield
Photo by Brown Bros.

as "Convict Once," shows a technical mastery and a depth of thought only too rare in his time and place. Horne was the mentor and guide of several young poets. The greatest names in this period, however, and possibly the greatest Australia has yet to show, are those of Gordon and Kendall.

Adam Lindsay Gordon (1833–70), whose adventurous disposition drove him through a short and tumultuous career, came to Australia in 1853. He had been educated at Cheltenham college, Woolwich, and Oxford in a desultory way, which yet gave him the technical capacity to write greatly of the horses he loved, and to breathe the pride and defiance of his spirit in poems which are certainly the most widely known in Australia. To many a rough unlettered man Gordon represents the very spirit of poetry. And his work is the expression of a truly poetic soul. His best themes are actions of gallant and stirring adventure. It was from the race-meeting that he drew inspiration for the first poems that brought him fame. A despairing melancholy, however, the atmosphere of an unhappy life, tinges his reflective poems. "The Sick Stockrider," "How We Beat the Favourite," and the Swinburnian "A Dedication" are his most characteristic works.

The quieter genius of Henry Clarence Kendall (1841–82) expresses itself in descriptions of delicate and haunting beauty, rising to its height in "Orara" and "After Many Years." Kendall was born in New South Wales, and he was the first Australian poet to win critical recognition in England, where his work was praised in the *Athenaeum*, as early as 1862. He was a lover of country life, and he gave enduring expression to the beauty of the mountains, rivers, and forests of Australia. These two true poets, each in his way, continued the work which Harpur had begun.

The Later Nineteenth Century. With the establishment of the *Bulletin* in 1880, the literary center shifted to Sydney. The racy cynicism of the *Bulletin*, though original and, in some respects, salutary, was not really a favorable atmosphere for contemplative poetry. A school of writers arose, however, inspired by genuine national feeling and capable of both refined and vigorous poetic expression. Victor James Daley (1858–1905), with his singing note of Celtic romance, is perhaps entitled to the highest rank. But the characteristic figure of the school in regard to both prose and verse is Henry Archibald Lawson (1867–1922), whose work is "honest Australian," vivid and truthful, often grim, full of sympathy with the poverty and struggle of the drover and the shearer. The same life, physical rather than mental, and occupied largely with horses, is depicted in a happier light by Andrew Barton Paterson (1864–). Terse narrative is the main achievement of this group,—good ringing rimes, written not only about the man outback, but for him.

Contemporary Poetry. The popularity of these bush verses had somewhat waned, when in 1900 Bernard O'Dowd (1866–) won a prize offered by the *Bulletin* for the best sonnet on Australia. At the present time, a great deal of serious, and sometimes excellent, work is being done in both Australia and New Zealand. O'Dowd and "Furnley Maurice" (Frank Wilmot) in Victoria, Arthur Adams and Dorothea MacKellar in New South Wales, Jessie Mackay and Blanche Baughan in New Zealand, are only a few of those who are worthy of mention. In another vein C. J. Dennis's *Songs of a Sentimental Bloke*, in slang, have been deservedly popular.

Australian Prose. Some interesting work has been done lately in drama, and there is a certain amount of novel writing, though the short story and the sketch predominate. The earliest Australian novels were *Clara Morison* and others by Catherine Helen Spence (1825–1910), but the best-known are *For the Term of His Natural Life* by Marcus Andrew Hislop Clarke (1846–81), published in 1874, a grim tale of the convict days, and *Robbery under Arms*, by "Rolf Boldrewood" (Thomas Alexander Browne, 1826–1915), a thrilling story of bushranging. "Steele Rudd" (Arthur Hoey Davis, 1861–) gives a humorous picture of country life, rich in local color, in *On Our Selection* and in kindred books.

"Ada Cambridge" (Mrs. G. F. Cross, 1844–1927) wrote many successful novels, notably *The Three Miss Kings*; and Mrs. Æneas Gunn (1870–) has gained an international reputation with her stories of the Northern Territory, *We of the Never-Never* and *The Little Black Princess*. The latter, though full of ethnological interest, is ostensibly a children's book, a field in which "Ethel Turner" (Mrs. H. R. Curlewis, 1872–) holds pride of place. To these should be added the name of Louise Mack, magazine writer and critic.

A considerable amount of literary criticism is written in Australia, the most delightful to read being that of Walter Murdoch, professor of English literature in the University of Western Australia. The literature of the country owes much to the high quality and the vigorous and independent character of Australian newspapers.

The keynote of Australian literature is sincere endeavor. Though as yet it has not attained to the heights, it has not striven after superficial technical achievement nor lost its way in affectation. Its crudeness is the crudeness of a youth that holds rich promise of maturity.

TABLE OF AUSTRALIAN LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
?	Michael Robinson		Poems (Royal Birthday Odes).
1811–1887	Alfred Domett		Poems (Ranolf and Amohia).
1817–1868	Charles Harpur		Poems (The Creek of the Four Graves).
1825–1910	Catherine Helen Spence	Novels (Clara Morison)	
1826–1915	Thomas Alexander Browne	Novels (Robbery under Arms)	
1833–1870	Adam Lindsay Gordon		Poems (The Sick Stockrider, How We Beat the Favourite, A Dedication)
1833–1927	George Gordon McCrae		Poems.
1835–1902	James Brunton Stephens		Poems (Convict Once).
1841–1882	Henry Clarence Kendall		Poems (Orara, After Many Years).
1843–1898	Thomas Bracken		Poems (Not Understood).
1844–1927	Mrs. G. F. Cross	Novels (The Three Miss Kings)	
1846–1881	Marcus Clarke	Novels (For the Term of His Natural Life)	
1858–1905	Victor James Daley		Poems (At Dawn and Dusk).
1861–	Arthur Hoey Davis	Novels, Humor	
1864–	Andrew Barton Paterson	Novels (An Outback Marriage)	Poems (Man from Snowy River).
1866–	Bernard O'Dowd		Poems.
1867–1922	Henry Archibald Lawson		Poems (While the Billy Boils).
1870–	Mrs. Æneas Gunn	Novels (We of the Never-Never, The Little Black Princess)	
1872–	Mrs. H. R. Curlewis	Children's Stories	
1874–	Walter Murdoch	Criticism, Essays (Loose Leaves)	
1876–	Clarence James Dennis		Poems (Songs of a Sentimental Bloke).

IRISH LITERATURE

Since the disappearance of Gallic, the ancient language of Gaul, the Celtic, or westernmost group of the Indo-European family of languages, has been represented by: (1) the Goidelic, or Gaelic, which includes the Irish, the Scotch Gaelic, and the Manx; (2) the Brythonic, which includes the Welsh or Cymric, the Cornish, and the Celtic dialects of Brittany, these last being the language of refugees from Britain at the time of the Anglo-Saxon invasion.

In the Scotch Gaelic there is a very rich store of ballads, folklore, and proverbs, besides versions of the Ossianic cycle of Ireland. The two most famous monuments of earlier Scotch Gaelic are (1) *The Book of the Dean of Lismore*, compiled by James and Duncan Macgregor, and (2) *The Book of Fernaig*, compiled by Duncan Macrae. The Cymric of Wales is the language of large collections of poetry, dating from the poets Aneurin of the 12th and Taliessin of the 13th century. The *Mabinogion* are poetic tales which were told by men during their training for admission to the guilds or societies of bards. The Eisteddfod, or annual poetry and music contest, is still maintained in Wales, and today more printing is done in this language than in all other Celtic languages combined.

The Saga Cycles. The manuscripts which contain the remains of early Irish literature show that Irish writers used their native legends, religious themes, and the mythology and legends of other nations. But the best contributions of the Irish to the world's literature are the heroic sagas, prose tales interspersed with poetry, recounting the early myths and legends of the Celtic inhabitants of Ireland and Scotland. These are preserved in such manuscript collections as the *Book of the Dun Cow*, of the 11th century, the *Speckled Book*, of the 14th century, and the *Yellow Book of Lecan*, of the 15th century. Although through the sacking of monasteries and the destruction of libraries by the viking invaders, in the 9th and the 10th century, many of the very early manuscripts perished, the production of the stories in the manuscripts that remain can be traced back to the 8th or the 9th century A. D.

These stories were composed and transmitted orally by guilds of trained story-tellers and poets, whom the early kings and chiefs of Ireland maintained at their courts. These guilds were organized into classes for the purpose of carefully training their members. The chief of the story-tellers (the *ollam*, *ollave*) was supposed to know 250 principal tales and 100 of secondary importance.

These early poets arranged their stories in several different series, probably for the sake of aiding their memories. Modern scholars have grouped them into three great cycles of saga-telling, the Mythological Cycle, the Red Branch or Ulster Cycle, and the Fenian or Leinster-Munster (sometimes also called the Ossianic) Cycle.

The earliest, or Mythological, Cycle introduces us to the gods of the early Irish as we are introduced to the gods of Greece, Rome, and Scandinavia in classical literature and northern saga. In these tales we meet Lugh, the long-handed, and Balor of the Evil Eye, who doubtless represent good and evil deities. But there is little or nothing about a so-called race of gods for, as Doctor Douglas Hyde points out, the gods came to be thought of as men, and "the Firbolgs, Fomorians, ...Tuatha de Dananns, etc., are spoken of, both by annalists and historians, as ordinary human tribes." The best-known, as well as the most complete and interesting of these cycles, is that of Ulster, variously called the Heroic, Ultonian, or Red Branch, Cycle. Its dominating theme is the rivalry and warfare between Ulster and Connaught, which had its origin in the murder of the sons of Usnach. The events narrated possibly took place about the beginning of the Christian era. The greatest tale in the collection, and one of the world's great early stories, is the *Táin Bó Chuailgne*, or "Cattle Raid of Cooley," which tells of the attempt of the queen of Connaught, Maeve, daughter of Eochy, *Ard-Righ*, or "High King," of Ireland, to carry off the great brown bull of Cooley (in Louth) from the Ultonians who were captained by Cuchulain, Maeve leading her own forces. Fact and myth are mingled in this tale, which, because it lacks high poetic finish, has been called "an epic in the making." Of the other tales of this cycle, probably the most famous are *The Wooing of Emer*, *The Death of the Children of Usnach*, and *The Death of Cuchulain*.

The third great cycle is the Ossianic, sometimes called the Fenian Cycle. The stories center around the exploits of Fionn (Finn MacCool) or, as he is known in the Scotch versions, Fingal, which may mean Finn the Stranger. Ossian (or Oisin) is the son of Fionn and also his poet. Fionn appears to have been a leader of warriors, possibly mercenaries, in the 2d or the 3d century A. D., when Britain was under the rule of the Romans.

Another smaller group of stories includes the tales of sea voyages undertaken by pious pilgrims, apparently in the 6th or the 7th century, when the Irish missionary spirit was most fervent. The most famous of these are *The Voyage of St. Brendan* and *The Voyage of Maeldune*.

In ancient Irish literature, the attention of almost all the leading modern scholars of the subject has hitherto been given mainly to the epic tales. In style these tales are forcible and abrupt, but they are shot through with gleams of strange, fierce tenderness, and are relieved, at unexpected moments, by the emergence of the unique humor of the Celt. Hardly less attractive is the early Christian poetry of the Irish, which is full of a beautiful awareness of all the natural loveliness of sea wave and cloud and tree and star. Such sensitive response to the changing moods of nature is unique in the earliest European poetry. "The bardic order," in W. B. Yeats's words, ". . . .had gone down in the wars of the 17th century, and poetry had found shelter amid the turf smoke of the cabins."

Poetry and prose in Irish never quite ceased to be written. The 18th century produced the poems of Red O'Sullivan, blind O'Heffernan, John MacDonnell of Claragh, Turlough O'Carolan, who has been called "the last of the bards," and Anthony Raftery, of whom Lady Gregory writes fully in her *Poets and Dreamers*. The distinct success, in our own day, of the Gaelic League (an Irish organization having for object the restoration of Gaelic as the spoken language of the people) has greatly increased the number of speakers and writers of Irish in Ireland. Among significant modern Gaelic writers are Canon O'Leary, Reverend P. S. Dinneen, Thomas Hayes, P. J. O'Shea (Conán Máol), and the late Padraic Pearse.

Irish Writers in English; Prose. The achievement of Irish writers in English is by no means the least glory of English literature. Richard Steele (1672–1729), Jonathan Swift (1667–1745), Oliver Goldsmith (1728–74), Edmund Burke (1729–97), and Richard Brinsley Sheridan (1751–1816) are the most famous names of an earlier day. But there was little in the writings of these men from which their nationality might be deduced. An indubitable entrance of Irish national sentiment into the work of Irish men of letters, a movement toward the restoration of a national literature, is hardly noticeable until after the passing of the act of Union (1801).

But the externals of Irish life are described with vigor and skill by Maria Edgeworth (1767–1849), whose best-known novels are *Castle Rackrent* and *The Absentee*, and whose work influenced Scott not a little. The name of Samuel Lover (1797–1868) will always be kept alive by the boisterous verve of his *Handy Andy*, and Charles James Lever

(1806–72) is still read for his rollicking records of soldier and squireen life. His masterpiece is *Charles O'Malley*. Gerald Griffin (1803–40) has written, in *The Collegians*, one of the tenderest and most delightful of Irish novels. The Banim brothers, Michael (1796–1876) and John (1798–1844), wrote in conjunction a powerful series of *Tales by the O'Hara Family* which do not deserve the oblivion into which they seem to have fallen. Charles J. Kickham (1830–82) displayed a subtle understanding of the Irish peasant in *Knocknagow, or the Homes of Tipperary*. William Carleton (1798–1869) is, however, generally esteemed the greatest of all Irish novelists and has been called "the prose Burns of Ireland." His *Traits and Stories of the Irish Peasantry*, a series of tales of which the finest is *The Poor Scholar*, is his best-known contribution to fiction, but *The Black Prophet*, a novel of the great famine of '49, is harrowing in its tragic intensity, and *Fardorougha the Miser* is reminiscent of the genius of Balzac at its greatest.

More recent novelists who have achieved fame are Canon P. A. Sheehan (author of *My New Curate, Luke Delmege, The Triumph of Failure*, and *The Blindness of Dr. Gray*), the finest interpreter in fiction of the Irish priest; James Stephens (b. 1882), who has displayed his mastery of realistic fantasy in *The Charwoman's Daughter* (American title *Mary, Mary*), in his volume of sketches, *Here are Ladies*, and in his best and most characteristic work, *The Crock of Gold*; and George Moore (b. 1853), who in *The Lake* evokes delicately and beautifully the spirit of the Western Irish countryside, and in the three volumes (*Ave, Salve*, and *Vale*) of his trilogy *Hail and Farewell* has recorded his participation in the Irish Literary Revival "of which they are the indispensable glossary and the sentimental history" (E. A. Boyd in *Ireland's Literary Renaissance*). Most of George Moore's major works (*Esther Waters, Evelyn Innes, A Mummer's Wife*, etc.) belong, however, to English rather than to Irish literature.

Since 1914, James Joyce (b. 1882) has become internationally famous by his autobiographical novel, *A Portrait of the Artist as a Young Man* (1916), a merciless and morbid study in self-analysis, set forth in prose of rare beauty; also by the privately-printed *Ulysses* (1922) which has been severely criticized for its unprecedented liberation of suppressions. St. John Ervine is most widely known for his *Changing Winds*, a "war novel" which includes a description of the Irish insurrection of 1916. Seumas O'Kelly (d. 1918) won well-deserved recognition by his *Waysiders* (1917), a volume of sketches of Connaught life, and by two posthumously published tales, *The Golden Barque* and *The Weaver's Grave* (1919), which contain some of the best writing that has been done in Ireland for many years. Daniel Corkery, author of *A Munster Twilight* (1916), a collection of sketches of Munster life, and of *The Threshold of Quiet* (1917), a long novel, has written in his *Hounds of Banba* (1920) a series of remarkable studies of life in Ireland during the months of conflict between the Irish Republican forces and the Black and Tans. This writer is hardly less distinguished as poet and as dramatist.

Irish Writers in English; Poetry. Irish poetry written in English may be divided into four somewhat overlapping classes:

First, the work of such poets as Goldsmith, Oscar Wilde (1856–1900), and Edward Dowden (1843–1913), which is distinctly English in matter and manner.

The second class embraces that poetry of the closing 18th and the opening 19th century which was Irish in sentiment. Examples of this are the patriotic songs of Thomas Moore (1779–1852), author of the famous *Irish Melodies*, the poems of Wm. Drennan (1802–73), of Gerald Griffin, of James Joseph Callanan (1795–1829). The work of all these men is characterized by grace and tenderness, while the songs of Charles Lever, Samuel Lover, and "Father Prout" (Francis Sylvester Mahony, 1804–66) exhibit the gaiety and exuberance which is so marked an element in the Irish temperament.

To the third division belong the poets of *The Nation*, the organ of the Young Ireland party, founded in 1842 by Sir Charles Gavan Duffy. Irish patriotism is almost exclusively their theme, and to inspire a love of country or a hatred of foreign domination, their object. Chief among these poets were Thomas Davis (1814–45) and Richard Dalton Williams (1822–62).

To the fourth division belong the poets of the modern Irish Literary Revival, who are essentially and pervasively Irish, but whose concern is with poetry primarily as a fine art. The great precursor of this movement was James Clarence Mangan (1803–49), author of *My Dark Rosaleen*. The initiator of it was Sir Samuel Ferguson (1810–86), who wrote *Lays of the Western Gael*. The chief contemporary figure in the movement is William Butler Yeats (b. 1865), whose place is conceded to be the highest among Irish artists in verse who have used English as their medium.

Among the younger Irish poets of today, especial mention must be made of Padraic Colum (b. 1881), whose *Wild Earth* is the finest of all books of Irish poetry dealing with peasant types; "Seumas O'Sullivan" (James Starkey, b. 1879), author of *The Twilight People*; James Stephens (b. 1882), who strikes out a sturdy full-bodied music in his *Insurrections*; Joseph Campbell (b. 1881), a poet of mystic and brooding intensity, at his best in *The Mountainy Singer*; Winifred Letts, who sings simple and delightful *Songs from Leinster*; and "Moira O'Neill" (Nesta Higginson, Mrs. John Skrine) whose voice rises no less clearly and sweetly in *Songs from the Glens of Antrim*.

Irish Drama. There is no drama of literary significance to be found in modern Irish literature before the Irish Literary Theatre was established in 1899 by William Butler Yeats, Augusta Lady Gregory, and Edward Martyn (b. 1859). The most interesting plays produced by these pioneers were Yeats's *Cathleen Ni Houlihan, Deirdre* by "A. E." (George Russell, b. 1867), and *The Heather Field* by Edward Martyn. The story of the foundation and early struggles of the modern Irish movement in the theater has been told finally by Lady Gregory in *Our Irish Theatre*. The latent powers of John Millington Synge (1871–1909), the most vivid and powerful genius of the new drama, were suspected and evoked by W. B. Yeats. Synge then left Paris to live in loneliness upon the Aran islands, listening to the rich peasant idiom. While his greatest single work, *Riders to the Sea*, is the expression in dramatic form of a tragedy of frequent occurrence in those bleak, storm-swept coasts, his fantastic comedy, *The Playboy of the Western World*, has given rise to the most violent controversy in America no less than in Ireland.

The prevailing theme of Padraic Colum's plays is "the land" and the influence exercised by it and the passions connected with it. His dramatic characterization is consistently fine and searching, and in his three most important dramas, *The Land, The Fiddler's House*, and *Thomas Muskerry*, he displays an Ireland which one may take to be Ireland "on the average, as one cannot take it that what we have in the plays of Synge or Lady Gregory is Ireland on the average" (Professor Weygandt in *Irish Plays and Playwrights*). The best plays of Augusta Lady Gregory (b. 1852) are probably *The Rising of the Moon* and *Spreading the News*. W. B. Yeats's *The Countess Cathleen* perhaps best represents the essentially lyrical quality of his dramatic energy. Other Irish dramatists of today are Lord Dunsany, St. John Ervine, and William Boyle.

FRENCH LITERATURE

The colloquial speech of Rome was the Latin that Cæsar's legions and their following of colonists and traders carried into Gaul. Absorbing possibly forty Celtic words there and, later, several hundred Germanic, this speech developed, clipping its unaccented syllables and changing vowel sounds, until by the 8th century the average Gallo-Roman could not understand the church offices, and preachers were ordered to preach in the "rustic, Roman tongue." In 842 it was used for the oath of an armistice; by 900, for the translation of a Latin hymn. In the 11th century it was called "French" from the kingdom of "France," around Paris and Orleans.

Medieval Verse and Story. The 11th century saw hymns to saints, secular lyrics, and war songs against the Moors who were barring the way to St. James's tomb at Santiago in Galicia, which French pilgrims were seeking. Minstrels (*jongleurs*) may have begun these songs, but they were soon aided by the monks, who found in Latin chronicles of Charlemagne's day the record of invasions of Spain, and of that emperor's wars against the infidels. So racial pride was added to religious zeal, and, these factors being given the environment of the newly formed feudal system, the national French epic was created. It grew until no less than eighty specimens of it (*chansons de gestes*—"songs of deeds") were known. Its masterpiece, in style and plot, was the *Song of Roland*, that told (about 1106) of the destruction of Charlemagne's rear guard and his Peers, by treason and overwhelming numbers, in a pass of the Pyrenees.

The 12th century witnessed the bloom of medieval French literature. There were didactic and narrative poems, often from the Latin, like *Saint Brendan's Voyage*. There were poems praising Alexander, the longest being in lines of twelve syllables that were henceforth known as "alexandrines." And there were romances of love and war, based on Virgil's *Æneid* and other epics of antiquity. The folklore and legends of the Celts, often called the "matter of Britain," also went into French poetry. Marie de France rimed short *lais* in octosyllabic couplets, on the loves of fairies for mortals; the story of Tristan and Isolt was expanded into long poems; and Chrétien de Troyes, choosing for his heroes the knights of Arthur's Round Table, emphasized knightly gallantry in his *Lancelot* and *Story of the Grail*. At the same time, following the example of the troubadours of southern France and profiting by the development of the art of music, lyric poetry claimed many writers.

Fables and Plays.—Animal fables, generally about the quarrels of the fox and the wolf, were rimed into the long *Romance of Reynard*. Jocose and coarse stories, often of wanton wives tricking their dull husbands, were made into poems called *fabliaux*. Good comedy in verse appeared at Arras after 1200. But the main effort of the playwrights was spent on the liturgical drama, which had begun centuries before in the churches, by interpolations of Scripture into the liturgy of Easter and Christmas. These interpolations had grown. They had become real scenes, too long for church services; they had been translated from Latin into French; and their stage had been removed from the choir to the front of the church. Continuing to expand, they presented to admiring crowds many of the leading events of the Old and New Testaments.

Prose.—In the early 12th century the Psalter had been translated into French prose. By 1200, Latin lives of saints and didactic and dogmatic treatises had followed in its train. History also was being written in French prose, notably Villehardouin's picturesque account of the Fourth Crusade with its capture of Constantinople. Huge prose romances on Lancelot's guilty love and the quest for the Grail were written, while in the quaint *chantefable* of *Aucassin and Nicolette* only the chapter headings were in verse.

Devout poetry and allegory developed in the 13th century. Guillaume de Lorris's *Romance of the Rose* (about 1235) told how the lover, aided by Friendly Greeting, would pluck the bud that Resistance defended. It also laid down Love's commands. The Parisian poet, Rutebeuf, composed saints' lives and saints' plays for pious patrons, and tried realistic, personal verse also. Jean de Meung, continuing the *Romance of the Rose*, made almost an encyclopedia of it, criticizing abuses and enjoining naturalness. Adam de la Halle, of Arras, produced in Italy the operetta "Robin and Marion" (1285). A farce written about the tricks played on a blind beggar by his boy guide was acted, while all kinds of learned and moral works went into prose.

The early 14th century saw Joinville's sympathetic memoirs of Louis IX, besides various short stories. Later, lyric poetry, which had survived the Hundred Years' War under the lead of the musician, Guillaume de Machaut, produced Deschamps, Froissart, Christine de Pisan, and Chartier, author of *La Belle Dame sans Merci*. Plays on Christ's Passion and dramatized *miracles* of the Virgin, together with a play on Griselda, represent the stage. Then came Froissart's dazzling chronicles of court and camp life, written by a gifted author from personal observation of events and intimate association with warring princes in the long 14th century struggle between France and England.

The old epic went into storybooks in the 15th century, short tales abounded, and the *Cent Nouvelles Nouvelles*, salacious anecdotes from the Italian and from native wit, offered models of clarity and conciseness. La Salle may have written them, as he did that amusing novel of manners, *Little John of Saintré*. Sermons, often abusive of the higher classes, moral treatises, and chronicles were numerous. And Commines compiled his philosophical memoirs of Louis XI.

Drama.—The liturgical drama had now grown into enormous plays called "mysteries," as the *Mystery of the Old Testament*. Paid for from the public purse and requiring crowds of actors, these plays would entertain entire populations with their mixture of Scriptural scenes and rough horseplay. In Paris they were performed by the Fraternity of the Passion, chartered in 1402. Associations of amateurs, as the *Basoche*, formed of law clerks, or the *Sots*, "Fools," improved the *farces*, invented diverting or instructive *monologues*, and played allegorical *moralities* in which personified vices and virtues edifyingly dealt with themes of daily existence. But the best medieval play was the farce of *Pathelin* (about 1470), where a seedy lawyer, who had wheedled a cloth merchant and then confused him by appearing in court as attorney for the merchant's thievish shepherd, was cheated of his fee through the very trick he had taught his client.

The larger part of the century's poetry is too rhetorical, too extravagant in its rimes. But Charles d'Orléans wrote pleasing society verse, and there was François Villon, the penniless, dissipated student, the best poet, the most human writer of them all. Having nothing in the world of his own, he amused himself and delighted posterity with a series of pretended legacies, written in separate stanzas that were formed into the *Little* and *Great Testaments*. To his ill-wishers he left his worthless garments or whatever else they could get; to his friends, his gratitude and his pity; to his mother, a *ballade* in honor of the Virgin. Of his other poetry, the "Ballade of the Hung," on the Montfaucon gibbet at Paris, and the "Ballade of the Ladies of Olden Time," with its haunting refrain, "Where are the snows of yesteryear?" would alone make him famous.

The Renaissance. Printing, the immigration of Greek scholars, the French invasion of Italy, and Luther's schism, all contributed to the intellectual and spiritual upsetting of the 16th century. Rabelais' *Gargantua and Pantagruel*, a romance of giants, father and son, of a lively, gluttonous monk and the tricky Panurge, told in ludicrous language, with much coarseness, erudition, and mother wit, well illustrated the prevailing confusion of thought, impatience of dogma, and desire for new standards of living. Pantagruel's education comprised bodily exercise, visits to workshops, and direct observation of nature, as well as study of books. A reformer also, yet rigidly logical, was Calvin, who translated his *Institutes of the Christian Religion* (1541) from its original Latin into French, in order to reach the laity. Lighter prose came with Marguerite of Navarre's *Heptameron*, suggested by Boccaccio's *Decameron*, and the romance, *Amadis of Gaul*, which Francis I brought back from Spain.

The liturgical drama, attacked by both the Reformers and the lovers of good literature, was killed in 1548 by an edict of the Paris parliament. That year also saw Ronsard and Du Bellay form a group of seven writers, the "Pléiade," for the purpose of renewing poetry and the theater after classical and Italian models. Marot had already written sonnets. Now odes and elegies were composed, while five-act tragedies in twelve-syllable lines, with an action which did not last over 24 hours, replaced the forbidden *mysteries*. The public taste was improved also by Bishop Amyot's translations of Greek novels and Plutarch's *Lives*. Then Montaigne summed up the efforts of the age in his rambling, piquant *Essays*, replete with human experience, fortified by copious quotations from the ancients, yet constantly postulating the skeptical query "What do I know?"

The Seventeenth Century. To reduce the confusion of the Renaissance to reason and order was the first task of the 17th century. Malherbe, arguing that poetry should express universal ideas in general terms and harmonious phrases, and that the rime should always emphasize the sense, was supported by Madame de Rambouillet's *salon* and by the French Academy, founded by Richelieu in 1634. Malherbe's views were also adopted by Corneille in his comedies and tragedies. Corneille's *Cid* (1636), with its theme of love struggling with honor and duty, was so perfect rhythmically that "beautiful as *The Cid*" became a popular saying.

The Great Dramatists.—Molière, the greatest of French dramatists, learned his art from Corneille and the Italian farces. In 1658 he established himself at Paris with a satire, *The Affected Misses*, on women of the trades class who tried to copy the refinements in language practiced at the *salon* of Madame de Rambouillet. The success won with this comedy was increased by plays that ranged from amusing skits to studies of character, like *The Misanthrope* and *Tartufe*, on hypocrisy, and studies of manners, like *The Learned Ladies*. In all his work he preached the favorite doctrines of the French people,—moderation, common sense, avoidance of extremes.

Racine, Molière's contemporary, wrote tragedies which dealt especially with woman. In *Andromache* he showed the heroine divided between maternal love and respect for her husband's memory. In *Phædra* he pictured the result of unrestrained jealousy. In *Athaliah*, written for the girls' school of St. Cyr, he painted an ambitious, yet irresolute, woman vanquished by a more determined man.

Writers of Prose.—Descartes had affirmed the dominance of reason in his *Discourse on Method* (1637) which, with its dictum, "I think, therefore I exist," introduced philosophy to the public. Pascal's biting *Provincial Letters*, against hypocrisy, and his unfinished *Thoughts*, on man's need of God, offered genuinely classical prose. La Rochefoucauld's *Maxims*, on human selfishness, were most cutting, while La Bruyère tellingly painted man's foibles in his *Characters*. Madame de Sévigné's sprightly *Letters* chronicled court doings, as did Saint-Simon's *Memoirs* later. Pulpit oratory reached its height with Bossuet's sermons and funeral orations, on the vanity of the world.

Fiction had developed many long romances, with pen portraits of society folk in disguise as a leading feature. But Madame de La Fayette's *Princess of Cleves* is modern in its theme of self-renunciation. Perrault, who preferred modern writers to ancient, wrote down the nursery *Tales of Mother Goose* (1697).

Poetry, outside the drama, was found mainly in society verse. But the critic, Boileau, used it for his attacks on other poets and for his defense of Malherbe's ideas. La Fontaine, advocating naturalness, like Boileau, Molière, and Racine, chose poetry for his famous *Fables*.

The Eighteenth Century. Newtonian science and increasing humanitarianism characterized the 18th century. Bayle's *Dictionary*, partly encyclopedic, foreshadowed the one. The other appeared in Fénelon's *Telemachus*, a romance of adventure, filled with wise counsels for his pupil, the Dauphin. Voltaire, skeptical and argumentative, preached religious tolerance and the equality of man in his plays, studied national movements in his *Essay on Manners*, and attacked abuses in tales and pamphlets. Brilliant, clever, daring, he advanced both scientific thought and political freedom. His vast correspondence remains a model of epistolary style.

Montesquieu was more philosophical, discussing social changes in his *Causes of the Greatness and Decline of the Romans*, and arguing in his *Spirit of Laws* (1748) for a division of governmental authority into the executive, the legislative, and the judicial—a plan adopted later in the Constitution of the United States. The *Encyclopedia*, edited mainly by Diderot and D'Alembert, was the mouthpiece of scientific criticism. It exerted an enormous influence. Buffon's *Natural History* (1748), through its excellent style, gave to the science of zoology the charm of literature.

Molière and Racine were followed by many playwrights. Marivaux created light comedies of intrigue. Destouches, La Chaussée, and Diderot undertook the problems of the family. But Beaumarchais, master of stage effects and witty dialogue, excelled all, making his valet, Figaro, who was a most merry jester in the *Barber of Seville*, a defender of the rights of man in *Figaro's Marriage*, a play which anticipated some of the ideas of the French Revolution.

Rousseau.—Fiction was much cultivated in short stories and novels. Lesage's *Gil Blas* and Marivaux's *Life of Marian* studied manners. Prévost's *Manon Lescaut* is a faithful history of love's errors. Rousseau's *New Heloïse* (1760) is as much a thesis as a romance. Hating social restraints and hostile to science and civilization, Rousseau had appealed in various essays for a return to the primitive state of man, when all property was held in common. His *Social Contract* was communistic, anarchical. His *New Heloïse* carried on the same warfare, with much praise of nature and the simple life. His *Emile* advocated education through nature and experience, before books are studied. Rousseau had most intense convictions. He expressed them in burning language. Pleading for justice, he inaugurated the present social unrest. Egotistical, a lover of nature, he was the father of French Romanticism. Saint-Pierre's delightful idyl, *Paul and Virginia*, is a concrete illustration of his theories.

Throughout this century, poetry was neglected, its best specimens being Chénier's odes and elegies, at the century's end, and Rouget de Lisle's "Marseillaise" (1792).

The Nineteenth Century. Chateaubriand described with marvelous colors the savannas of the Mississippi as seen by the sorrowful eyes of his characters, Atala and René, whose careers form two episodes of his *Genius of Christianity*, a book which attacked modern science and eulogized medieval and Christian art. Madame de Staël, in her novels, *Delphine* and *Corinne*, pleaded for woman's freedom, while her *Germany* introduced German thought and literature to France and England. George Sand, a most fluent writer, sided with Madame de Staël in various novels, and in her peasant stories drew charming pictures of her home province.

Romanticism.—Romantic fiction as a whole, however, imitated Scott. De Vigny's *Cinq-Mars*, Hugo's *Notre Dame de Paris*, Dumas's *Three Musketeers* are instances. Later, Hugo's *Les Misérables* and *Toilers of the Sea* described man's futile efforts against society and nature. Romanticism, with its insistence on what is individual and peculiar in races and epochs, transformed historical studies. Thierry was both picturesque and dramatic in his essays on French and English history, and Michelet most eloquent and democratic in his *History of France*. Guizot, who discussed the chief factors of national development in his *Courses on Modern History*, was more philosophical, as was De Tocqueville in his *Democracy in America* (1835). Renan's numerous works on religious history were more critical and scientific.

Romanticism was at its best in lyric poetry,—individualistic, emotional. Lamartine, De Vigny, Hugo, and De Musset have few equals. Admirers of form, of "art for art's sake," such as Gautier and Baudelaire, followed them. Then came the Parnassians (1866) with Leconte de Lisle and Coppée, who had more kindliness. Later still were Verlaine—lewd, devout, human—and the Symbolists, who would carry poetry back again to its origin in music, appealing to the ear rather than to the eye.

The Romantic drama, taking Shakspere for its guide, discarded the unities of time and place and mingled the comic with the tragic. But it produced few good plays, the elder Dumas's historical tragedies, Hugo's *Hernani* and *Ruy Blas*, and De Musset's comedies being the best. It was soon supplanted by the broader theater of Scribe, a master of dramatic construction. Scribe's ideas were carried on by the next generation of playwrights, Dumas *fils* and Augier, who found their subjects in contemporary life, and Sardou, who began with comedy of manners, to continue with tragedies intended chiefly for Madame Bernhardt. But Rostand, with *Cyrano*, *L'Aiglon*, and *Chantecler*, went back to the praise of the homely virtues, writing lines of unusual lyric beauty.

The Realists.—Realism, the offspring of scientific study, had given Dumas *fils* and Augier their especial bent. But it had taken possession of fiction even earlier. Stendhal's *Red and Black* and Balzac's *Human Comedy* showed men fighting for wealth and power, while Mérimée's *Colomba* and *Carmen* described the influence of race and environment. More positive and agnostic after 1850, realism produced Flaubert, a pathologist who, pitilessly impersonal, endowed with an exceptional style, traced human decadence in *Madame Bovary* and other works. Zola, choosing his characters from a lower social class, emphasized heredity in his series of the *Rougon-Macquart*, while Maupassant surpassed even Flaubert in exactness of description. Less extreme, more human, Daudet, "the French Dickens," wrote up the trades class, the politician, and the adventurer in Parisian life. His short stories, however, are delightfully fanciful.

The Present Day. A less harsh realism still holds in fiction. Anatole France, ironical, learned, protests against injustice, defending liberty of thought and action. Rolland's *Jean Christophe* is the careful biography of a talented musician. Loti, atheistic, seeing death at the end of everything, imbues his many-hued descriptions of customs and peoples with an atmosphere of melancholy foreboding. Bazin looks to the French provinces for novelistic material. Bordeaux enjoins the homely virtues and fearlessness of living.

The drama, under Ibsen's influence, continues the study of manners with Hervieu, Brieux, and their compeers. Poetry has developed free verse and offers in the rhythms of Paul Fort most charming pages, while the emotional Comtesse de Noailles has returned to traditional forms.

Throughout her entire career France has maintained a high standard of literary excellence. Montaigne, Molière, La Fontaine, Voltaire, Rousseau, and Hugo are her especial gifts to the world. But more than these, her sense of order, her objective point of view, her insistence on clarity, and her admirable taste have ever exercised, from the middle ages down, a most beneficial influence on the thought and style of Western Christendom.

TABLE OF FRENCH LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1140–?	Chrétien de Troyes		Arthurian Romances.
1150–?	Marie de France		Lais.
1160–1213	Villehardouin	Conquest of Constantinople	
1210–1235	Guillaume de Lorris		Romance of the Rose.
1224–1317	Joinville	Chronicles	
1230–1287?	Rutebeuf		Poems.
1240–1287	Adam de la Halle		Robin and Marion.
1240–1305	Jean de Meung		Romance of the Rose.
1300?–1377?	Guillaume de Machaut		Poems.
1336–1406	Eustache Deschamps		Poems.
1338–1410	Jean Froissart	Chronicles	
1364–1430?	Christine de Pisan		Poems.
1385–1432	Alain Chartier		Poems.
1387–1460	Antoine de la Salle	Stories	
1394–1465	Charles d'Orléans		Poems.
1431–1465	François Villon		Ballads.
1445–1511	Philippe de Commines	Memoirs	
1492–1549	Marguerite of Navarre	Heptameron	
1495–1553	François Rabelais	Lives of Gargantua and Pantagruel	
1497?–1544	Clément Marot		Sonnets.
1509–1564	John Calvin	Institutes of the Christian Religion	
1513–1593	Jacques Amyot	Translations of Plutarch's Lives and of Greek Novels	
1524?–1560	Joachim du Bellay		Poems.
1524–1585	Pierre de Ronsard		Sonnets, Odes.
1533–1592	Michel de Montaigne	Essays	
1555–1628	François de Malherbe		Poems.
1596–1650	René Descartes	Philosophy	

TABLE OF FRENCH LITERATURE—Con.

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1606–1684	Pierre Corneille		Plays (The Cid, Le Menteur).
1613–1680	Duke de La Rochefoucauld	Maxims, Memoirs	
1621–1695	Jean de la Fontaine		Fables, Contes.
1622–1673	Molière		Comedies (The Misanthrope, Tartufe).
1623–1662	Blaise Pascal	Mathematics, Thoughts	
1626–1696	Mme. de Sévigné	Letters	
1627–1704	Jacques Bossuet	Sermons, Funeral Orations	
1628–1703	Charles Perrault	Tales of Mother Goose	
1634–1693	Mme. de La Fayette	Princess of Cleves	
1636–1711	Nicolas Boileau-Despréaux		Poems, Art Poétique.
1639–1699	Jean Racine		Tragedy (Andromache, Athaliah).
1645–1696	Jean de la Bruyère	Characters	
1647–1706	Pierre Bayle	Dictionary	
1651–1715	François de Fénelon	Telemachus	
1657–1757	Bernard Fontenelle	Dialogues of the Dead	Tragedies.
1668–1747	Alain René Lesage	Gil Blas, Translations	
1675–1755	Saint-Simon	Memoirs	
1680–1754	Destouches		Plays.
1688–1763	Marivaux	Novels	Comedy.
1689–1755	Montesquieu	Spirit of Laws	
1692–1754	P. C. Nivelle de La Chaussée		Plays.
1694–1778	Voltaire	Critical Essays, Satires, Letters	Poems, Dramas.
1697–1763	Abbé Prévost	Manon Lescaut	
1707–1788	Buffon	Science	
1712–1778	Rousseau	The New Heloïse, Confessions	
1713–1784	Denis Diderot	Fiction, Encyclopedia	Plays.
1717–1783	D'Alembert	Essays, Encyclopedia	
1723–1799	Marmontel	Memoirs, Stories	
1732–1799	Pierre de Beaumarchais		Comedies (The Marriage of Figaro).
1737–1814	Bernardin de Saint-Pierre	Paul and Virginia	
1760–1836	Rouget de Lisle		Marseillaise.
1762–1794	André Chénier		The Girl Captive, Iambes.
1766–1817	Mme. de Staël	Delphine, Corinne, Germany	
1768–1848	Chateaubriand	René, Genius of Christianity	
1780–1857	Pierre Jean de Béranger		Popular Songs.
1783–1842	Stendhal	Novels	
1787–1874	François P. G. Guizot	Courses on Modern History	
1790–1869	Alphonse de Lamartine	History of the Girondists	Poems.
1791–1861	Eugène Scribe		Comedy (Bataille de Dames).
1795–1856	Augustin Thierry	History of France	
1797–1877	Adolphe Thiers	History of the Empire	
1798–1857	Auguste Comte	Philosophy	
1799–1850	Honoré de Balzac	Novels ("Comédie Humaine")	
1799–1863	Alfred de Vigny	Novels (Cinq-Mars)	"Poèmes Antiques et Modernes."
1802–1870	Dumas the Elder	Novels (Three Musketeers)	Dramas.
1802–1885	Victor Hugo	Novels (Les Misérables)	Lyrics, Dramas (Hernani).
1803–1870	Prosper Mérimée	Novels (Colomba), Letters	
1804–1857	Eugène Sue	Wandering Jew, Mysteries of Paris	
1804–1869	C. A. Sainte-Beuve	Criticisms	
1804–1876	George Sand	Novels (Indiana), Peasant Tales	
1805–1859	Alexis de Tocqueville	Democracy in America	
1810–1857	Alfred de Musset	Short Stories	Poems, Comedies.
1811–1872	Théophile Gautier	Criticisms, Novels	Poems.
1811–1883	Jules Sandeau	Novels (Marianna)	Plays.
1818–1894	Leconte de Lisle		Poems, Dramas.
1820–1889	Emile Augier		Dramas (The Son-in-law of M. Poirier).
1821–1867	Charles Baudelaire		Poems.
1821–1880	Gustave Flaubert	Novels (Madame Bovary)	
1821–1890	Octave Feuillet	Novels, "Feuilletons"	Dramas.
1822–1899	Emile Erckmann	Novels, with Chatrian	
1823–1892	Ernest Renan	Life of Jesus	
1824–1895	Dumas the Younger	Novels	Dramas.
1826–1890	Alexandre Chatrian	Novels, with Erckmann	
1828–1885	Edmond About	Novels (Le Roi des Montagnes)	
1828–1893	Hippolyte Taine	Criticism	
1830–1914	Frédéric Mistral		Provençal Poetry (Mireille).
1831–1908	Victorien Sardou		Dramas (Patrie).
1839–1907	Sully-Prudhomme	Criticism	Poems (Les Solitudes).
1840–1897	Alphonse Daudet	Novels, Short Stories	
1840–1902	Emile Zola	Novels (La Débâcle)	
1842–1908	François Coppée	Short Stories	Poems, Dramas.
1844–1896	Paul Verlaine		Poems.
1844–1924	Anatole France	Novels, Essays	Poems.
1849–1906	Ferdinand Brunetière	Essays, Criticism	
1850–1893	Guy de Maupassant	Short Stories (The Necklace)	
1850–1923	Pierre Loti	Novels, Travel	
1852–	Paul Bourget	Novels (La Terre Promise)	
1853–	René Bazin	Novels	
1857–1915	Paul Hervieu	Novels	Dramas (The Labyrinth).
1858–	Eugène Brieux	Essays	Dramas (The Red Robe).
1859–	Henri Bergson	Creative Evolution	
1859–	Henri Lavedan	Novels	Dramas.
1862–1923	Maurice Barrès	Novels (Le Voyage de Sparte)	
1862–	Maurice Maeterlinck	Essays (Life of the Bee)	Poems, Dramas.
1866–	Romain Rolland	Novels (Jean Christophe), Essays	Plays.
1868–1918	Edmond Rostand		Dramas (Cyrano de Bergerac).
1870–	Henri Bordeaux	Novels	
1872–	Paul Fort		Free Verse.
1876–	Comtesse M. de Noailles	Novels	Poems (The Quick and the Dead).

ITALIAN LITERATURE

For convenience, the history of Italian literature may be divided into five periods: (1) beginning about 1230 with the Sicilian poets gathered at the court of the emperor Frederick II and including the three writers of cardinal importance, Dante, Petrarch, and Boccaccio (d. 1375); (2) the Revival of Learning, initiated by Petrarch and extending through the age of Lorenzo de' Medici (1449–92); (3) the mature Renaissance, to the death of Tasso (1595); (4) a period of decline extending to the middle of the 18th century; (5) the period of the regeneration of Italy, extending to the present.

The Early Period. The poetry of the Sicilians is mainly amatory as to subject, but the individualities of the poets are not strongly marked. The writer of courtly lyrics celebrates the perfections of his lady in an emphatic but somewhat conventional manner that does not often convince us of the sincerity of his emotions. However, it should be borne in mind that this poetry depended for no small part of its effect upon the music to which it was set. Nor is it by any means all artificial; a number of poems have survived, which bear a partially popular stamp, and which charm through their evident genuineness of feeling. Such poems are a girl's lament for her lover who has gone on a crusade overseas; and a dialogue between a lover and his beloved—the so-called *Contrasto* (debate), attributed to an otherwise unknown Cielo d'Alcamo—famous enough to have been quoted by Dante. A notable achievement as to form was the invention of the sonnet by Giacomo da Lentino, a member of this group.

Among poets of continental Italy, who continued the work of the Sicilians but broadened their range of subjects, was Guittone d'Arezzo, who was regarded as a leader by a considerable group of minor writers in central Italy, and who is noteworthy besides for a collection of letters written about 1260 as models for prose writing. Italian prose was then in its infancy, but it developed speedily, largely through translations, from Latin and French, of lives of saints, religious treatises, romances of chivalry, and Latin classics, but also through original works, such as chronicles and collections of short stories.

The wave of intense religious emotion which swept over Italy in the 13th century, in the wake of the Franciscan movement, found expression in religious poetry of deep sincerity, such as the *laudi* (hymns) of Jacopone da Todi. These, being sometimes written in the form of dialogues, became the starting-point of the religious drama which reached the climax of its development in the Florentine religious plays of the 15th century.

Outside of the more or less faithful followers of the Sicilian poets in central Italy, there arose, in opposition to them, two groups of writers that were powerful forces in advancing the rapid development of Italian poetry.

The earlier group was composed mainly of Florentine poets of the middle class, in whom the courtly, artificial idealism of the Sicilians and their adherents provoked a reaction, out of which came a quantity of realistic and often broadly humorous verse. The second group includes a number of Florentine poets whose work began around 1280. To them came a new lyric impulse from an ode by a distinguished poet of Bologna, Guido Guinizelli, beginning "Love e'er betakes him to the gentle heart." Guinizelli's theory of the source of love differed from that of his predecessors in declaring that love, instead of being merely communicated from the eyes to the heart—as had been held by the earlier poets—has its natural home in the "gentle heart," and that none but gentle hearts can know true love. Such a conception of a company of elect souls, to whom alone true love can be known, was bound to prove a kindling spark to this young and enthusiastic group, who are referred to in the *Divine Comedy* as the writers of the "sweet new style."

Their leader was for a time the noble and scholarly Guido Cavalcanti, a member of one of the most powerful Florentine families, to whom Dante dedicated his first great work, the *Vita Nuova*, "New Life." On the appearance of this little book, however, its young author speedily took the first rank.

Dante.—The *Vita Nuova* is at once a selection from the lyric poetry of the writer's youth and early maturity (interspersed with explanatory and narrative prose passages), the story of his spiritual awakening through the love of a gentle lady, Beatrice, and the forerunner of his greatest work, the *Divine Comedy*.

The ten years between 1292, when the *Vita Nuova* was probably completed, and 1302, when Dante was forced into exile, were the period of the poet's preparatory studies for his masterpiece; likewise, of his political career, that ended in disaster. In spite of the handicap of lifelong banishment, he not only wrote some lesser though highly important works, but planned and brought to a triumphant conclusion the *Divine Comedy*, one of the most monumental achievements of the poetic imagination in the world's literature. See *Divine Comedy*.

The purpose of helping his fellow men, by diffusing among them useful knowledge which might otherwise have remained inaccessible to them, is revealed in several of the poet's minor works, particularly the *Convivio*, "Banquet," a philosophical commentary, preceded by an introduction, on three of the poet's own odes. The *Monarchia* is a treatise in Latin, setting forth the necessity of a universal temporal monarchy coexistent with the spiritual sovereignty of the pope. *De Vulgari Eloquentia* is another Latin treatise on Italian language and poetry, of great value though unfinished. The most important of Dante's Latin letters defines the structure and purpose of the *Divine Comedy*.

Petrarch.—Francesco Petrarca, the second of Italy's great writers, came into prominence about a dozen years after the death of Dante, and was for more than forty years the undisputed leader in Italian poetry and scholarship. The main inspiration of his lyric poetry was his love for Laura, a French lady of Avignon; but patriotic and religious sentiments find noble expression in his work. His shorter Italian poems number well over 300, the majority of which are sonnets.

Petrarch wrote many treatises, poems, and letters in Latin. An enthusiastic student of the Latin classics, he broke away from the medieval method of seeking in them allegorical meanings wholly foreign to their spirit, and tried to understand them by striving to put himself back in the times in which they were written. He thus probably unconsciously initiated a new era in the study of the classics, and is rightly regarded as the pioneer of the movement known as the Revival of Learning. He has been styled, on the whole justly, the "first modern man." His discovery, in a northern Italian library, of some letters of Cicero, hitherto believed lost, started the search for vanished literary treasures, and, from his time on, the monastery libraries of Europe were ransacked with diligence and notable success by generations of scholars, mostly Italians.

Petrarch, after an honored and varied career, died peacefully (1374) in his little country home in the Euganean hills in northern Italy.

Boccaccio.—The third great figure of this period is Giovanni Boccaccio, to whom the Italians owe their first masterpiece of prose,—the collection of 100 stories known as the *Decameron*. The materials for this famous collection were derived from a variety of sources, European and Oriental. The tales are as varied in character as in origin, ranging from gay anecdote to tragic story, and reveal the author's great gift of lifelike portrayal of human types from every class of society. Whatever the alleged scenes of their action, it was the life of his

country and time that Boccaccio put into his tales, in such profusion and variety as to suggest to some its characterization as the "Human Comedy," in contrast to the *Divine Comedy* of Dante.

A devoted admirer of Dante, Boccaccio made with his own hand a copy of the *Divine Comedy*, and wrote a life of the poet. Later, he publicly read and expounded Dante's great work, appointed to the task by the government of Florence, which thus strove to make amends for its injustice to its greatest citizen. Like his friend Petrarch, Boccaccio was an eager student of the Latin classics, and wrote in Latin numerous treatises that were useful to generations of scholars.

As a result of the work of Dante, Petrarch, and Boccaccio, the prestige acquired by Tuscan Italian established it definitely as the literary language of Italy.

The Revival of Learning. The second period of Italian literature, extending until nearly the end of the 15th century, is more remarkable for the vigorous development of classical studies, fostered by the fresh impulse given them by Petrarch, Boccaccio, and their followers, than for the production of great works in Italian; although such were by no means lacking, especially toward the close of the period. In this age the field of studies was immeasurably extended by the revival of the knowledge of Greek. Even Petrarch and Boccaccio had been able to acquire but the merest smattering of this language, owing to the lack of competent teachers. In 1397, however, Coluccio Salutati (1331–1406), a friend and the worthiest successor of Petrarch in the domain of scholarship, who had risen to be chancellor of the Republic of Florence, extended, in the name of the government, an invitation to a Greek scholar in Constantinople—then still in Greek hands—to come to Florence as official instructor in Greek. This scholar, Manuel Chrysoloras (1350?–1415), was the first of a notable line of Greek men of learning who, after the break of nearly seven centuries between the Greek and the Roman world, brought back to western Europe the language, literature, and philosophy of ancient Greece.

Enthusiasm for these studies was not confined to scholars alone, but spread rapidly and widely. The rulers of many Italian states—including the popes, several of whom were famous scholars—invited humanists, as these men of learning came to be called, to grace their courts; wealthy merchants fitted out ships to sail for Constantinople and to return with cargoes of precious manuscripts. The collections made in this age formed the nuclei of many famous libraries, such as those of Venice, Florence, and Rome.

It was natural that during this intensive revival of classical studies the cultivation of Italian should have been relatively neglected. In the end, however, Italian literature, far from losing, was incalculably benefited by the widening of the intellectual horizon achieved through the scholarship of this time. Indeed, the masterpieces of the ensuing age, in both poetry and prose, could never have been written without the background of classical culture derived from the humanistic period.

The neglect of Italian was also, as has been said, only relative. From about 1465, we come upon a generation of admirable poets, some of whom, like Pulci, Boiardo, Poliziano, and the great Lorenzo de' Medici, were themselves classical scholars of high attainments. Of these writers, Pulci and Boiardo wrote mainly narrative poetry; the others, chiefly lyric and dramatic.

The Renaissance. In the third period of Italian literature, the elements of classical culture, blended with those of the brilliant life of the epoch, combined to produce the ripest fruits of the age of the Renaissance, a term broader than humanism, as it is not, like the latter, applied exclusively to literary activities, but to those in all the arts—painting, sculpture, architecture, and music—which flourished with incomparable splendor at this time in Italy. A further aid to men of letters of this time was the art of printing, which, invented during the preceding age, incalculably multiplied the resources and opportunities of literary production.

Ariosto.—Among the remarkable number of distinguished writers brought forth by this age, the greatest are the following: (1) Ludovico Ariosto, author of the *Orlando Furioso*, "Orlando in Madness," a romance of chivalry in verse (46 cantos) continuing the *Orlando Innamorato*, "Orlando in Love," of his predecessor Boiardo. The hero is the medieval Roland, whom legend made into a nephew of Charlemagne. Vividness of imagination, fertility of invention, skill in character drawing, and a rich, mellow style, through which the attractive personality of the author is pleasantly revealed, have combined to insure the permanent vitality of the work, in which the life of Renaissance Italy is mirrored as faithfully as is that of the end of the middle ages in the tales of Boccaccio's *Decameron*. Ariosto wrote, besides, five comedies—mostly free adaptations of the Latin plays of Plautus and Terence—and seven partly autobiographical satires, as well as some lyric poetry in Italian and in Latin.

Machiavelli.—(2) Niccolo Machiavelli, the first great modern writer on statecraft and the art of war. His treatise entitled *The Prince*—an examination of the methods of acquiring and maintaining sovereign power—has been discussed more than any other single work of this period. Written for its time, when might usually made right, and intended as a practical guide for the ruler, its advocacy of expediency and ruthlessness over justice and good faith naturally laid it open to the harsh criticism of later ages that have witnessed vast improvements in methods of government. Machiavelli's *History of Florence* shows his characteristic political and historical insight, as do his *Discourses on Livy*, which deal with popular forms of government. Besides minor works, he wrote, in a lighter vein, several comedies, a fantastic, satirical short story, and some poetry.

Castiglione.—(3) Baldesar Castiglione, the author of the *Cortegiano*, "Courtier," the best treatise in dialogue form since those of Plato and Cicero. The discussions of the qualifications of the courtier are represented as having taken place during four successive evenings in 1506 at the court of Urbino, the capital of a diminutive duchy in central Italy. The artistic handling of one of the most difficult literary forms, and the realistic and pleasing picture of Italian society of the Renaissance at its best, unite to make the *Cortegiano* perhaps the most delightful prose work of 16th century European literature.

Tasso.—(4) Torquato Tasso, the last great figure of this age. The son of a minor but not negligible poet and scholar, Bernardo Tasso (1493–1569), he achieved fame at eighteen with *Rinaldo*, a romance of chivalry in verse. In 1573 he obtained another great success with *Aminta*, a pastoral drama, a form to which the popularity of this work gave a great vogue. His highest achievement, however, was in the field of epic poetry. His *Gerusalemme Liberata*, "Jerusalem Delivered," first published complete in 1581 (20 cantos), is the last truly great work of Italian poetry until the middle of the 18th century. Tasso chose for his subject the stirring story of the First Crusade (1095–99), handling it imaginatively, but still preserving the dignity of the theme.

Minor Writers.—Besides these four principal writers, there are many others of distinction and influence: Bembo, scholar, poet, and historian; Vasari, the biographer of painters, sculptors, and architects; Guicciardini, the historian; Bandello and Giraldi Cinthio, authors of voluminous collections of tales, drawn upon for plots by many dramatists of the 16th and 17th centuries, including Shakspere. The "Othello" story was derived from Cinthio, who himself wrote tragedies, but never rose above mediocrity in this form. Among the

most picturesque figures of the time was the Florentine sculptor and goldsmith, Benvenuto Cellini, whose autobiography, one of the most original works of its kind, is of inestimable value to the student of the life of the Renaissance. This work is likewise accessible in English, having been finely translated by John Addington Symonds, an authority on the Renaissance.

The Period of Decline. In the interval between 1595, the year of Tasso's death, and the middle of the 18th century, there are no writers of enduring significance in the purely literary field. National life was at a low ebb, and the official censorship of books, which had been established about the middle of the 16th century, increasingly hampered free expression of thought. Poetry declined notably, not in quantity of production, but in quality. In this era of Italy's political weakness and dependence, her writers could derive no inspiration from the life of the nation. Literature, as a consequence, lost contact with life; its subjects, especially in poetry, became artificial and futile; taste and style deteriorated in a welter of exaggeration, sensationalism, and affectation. Toward the end of the century a reaction led to an attempt at reform; but this ended in puerile artificialities of pseudo-Arcadian simplicity. The Muse of Poetry was all powder and rouge.

Until a regeneration of the national life could set in, and contact between writing and reality could be restored, nothing great in literary production was to be expected.

Even during this time, however, the Italian genius was by no means dormant in all fields. The 17th century is the period of the development of a hybrid but still vital compound of poetry and music, the opera—originally planned as a revival of the Greek tragedy; and it was likewise in this time that the spirit of scientific investigation was nobly embodied in the imposing figure of Galileo. The early part of the age, moreover, produced one historical masterpiece, the *History of the Council of Trent* (1619), by the brilliant and fearless Venetian ecclesiastic, Fra Paolo Sarpi.

The Regeneration. About the middle of the 18th century, signs of a change appear. The Treaty of Aix-la-Chapelle (1748) brought relief from protracted wars and inaugurated a long era of peace for Italy, during which the currents of liberal ideas and the spirit of investigation characteristic of the 18th century manifested their quickening influence there as elsewhere. Aspirations toward the moral progress of the individual and toward the social betterment of the people as a whole began to find expression in writings of enduring value.

One of the most striking literary reforms belonging to the middle of the 18th century is that which was effected in comedy, through the efforts of Carlo Goldoni, who became the founder of modern Italian comedy. His great achievement was to substitute written-out comedy, as we know it, for the unwritten improvisations based upon stock scenarios and characters—the so-called *commedia dell' arte* (professional comedy)— which had monopolized the Italian comic stage for 200 years.

Parini.—In lyric poetry, amid the long-cultivated futilities of unreal Arcadianism, the note of moral earnestness and sincerity finally makes itself heard in the work of Giuseppe Parini, who, more than any other Italian writer, joined again the broken links between literature and life. A man of humble origin but of genuine nobility of soul, he felt keenly the moral laxity and social injustices of his age, and, throughout his life, he devoted himself to combating these with the powerful weapon of satire. Some of the contemporary abuses he attacked in powerful odes; in a longer poem, *Il Giorno*, "The Day," he treats, in a mock-heroic vein, of a day in the life of a young Italian nobleman, a representative of the prevailingly corrupt privileged class of his time. The whole constitutes one of the most effective and cleverly handled pieces of satire in all literature.

Alfieri.—Parini's endeavors toward the moral reform of his contemporaries were extended to the political field by the dramatic poet, Vittorio Alfieri. Nobody felt more deeply than he the degradation of the national life of his country. The task he set before himself was the reawakening of the national consciousness, deadened in the majority of his countrymen by ages of foreign domination. This he strove to achieve through a series of tragedies glorifying champions of liberty against oppression. He tells us himself that, unable to fight alone, in the literal sense, against tyranny in rulers and apathy in the ruled, he is forced to content himself with the "mimic warfare of the stage." He chose the drama as the most appropriate vehicle for his propaganda, in order to reach the Italians through their passion for the theater, and for the purpose of reforming their taste in the drama by substituting the spoken tragedy for the song of the long popular opera, which he considered effeminate and demoralizing. The poet at whom he particularly struck was the popular Pietro Metastasio, whose sentimental tragedies, set to music by two generations of Italian composers, were sung all over Europe.

Alfieri was not so richly endowed with poetic gift as with energy and determination, and his tragedies are not dramatic masterpieces—with the possible exception of the biblical tragedy *Saul*, which is still occasionally revived in Italy. Nor was he able to wean his countrymen from their love of opera. His tragedies were widely read, however, and his principal aim was attained. Furthermore, he inspired greater poets, who followed him, with his passion for the national regeneration of Italy, to which they were able to give higher artistic expression than he could attain.

The Nineteenth Century. Among the successors of Alfieri were Ugo Foscolo, Giacomo Leopardi, and Alessandro Manzoni.

Foscolo.—In a much read epistolary novel, *The Last Letters of Jacopo Ortis* (1802), Foscolo eloquently voiced his sorrow over the fate of the ancient republic of Venice, which had been traded to Austria by Napoleon in 1797. His best lyric poem is *I Sepolcri*, "The Graves," in which he feelingly expresses his reverence for Parini, Alfieri, and other great Italians. His odes and sonnets, while not numerous, are of a very high poetic quality. His collected correspondence gives interesting pictures of himself and of his time. Unwilling to take the oath of allegiance to Austria in 1815, he went into exile, first to Switzerland and then, in 1817, to England, where he died in 1827.

Leopardi.—Leopardi, the greatest of modern Italian poets, achieved renown at twenty with two remarkable odes. The first of these, beginning "O Italy, I see thy walls, arches, columns, statues and solitary towers, but thy glory I do not see," contains the keynote of his patriotic poetry, which echoed widely among his contemporaries and maintains its appeal to this day. After three or four further odes, he discarded the patriotic strain and devoted what little strength remained to him during a long period of distressing invalidism to the expression of his personal disillusionments with life, which he came to consider not worth living.

In spite of the sterile pessimism of the poet's thought, the later odes live through their unsurpassed beauty of style. Among miscellaneous prose works, he wrote a series of essays—some in dialogue form—which display the learning for which he was as famous as for his poetry, and in which the pessimistic theme reappears in many variations. Leopardi's personality, as revealed in his poems, essays, and correspondence, has the quality of haunting the imagination of his reader as does that of his contemporary, Keats, different as were their natures.

Manzoni.—In proportion to the length of his life, the amount of Manzoni's literary output is small.

He belongs among those writers whose vein of inspiration is not copious but is intense while it lasts, and who have the restraint not to force it. He wrote when deeply stirred, with a resultant sincerity which his readers cannot help but feel. His conversion from a skeptical attitude in religion to an abiding faith he voiced in hymns (*inni sacri*) of deep feeling. In the discouraging, reactionary period of the so-called restoration which followed Napoleon's fall and the Congress of Vienna, he contributed two plays and a historical novel to the national and patriotic literature of his country.

In both novel and plays the background is historical. In the first of the latter, the *Conte di Carmagnola* (1820), Manzoni pictures the disastrous policy of the Italian states of the 15th century, whose internecine strife only prepared the way for foreign domination. The scene of the other play, the *Adelchi* (1822), is laid in northern Italy of the 8th century, during the struggle for supremacy between the Lombards and the Franks, neither of whom were of Italian stock. The moral of the play is that an oppressed people can hope for no improvement of its lot from a mere change of masters, but solely from its own efforts. In the *Promessi Sposi*, "The Betrothed," the application of the rule of force in government and the petty tyranny of the nobles over the weak are exhibited in a series of vivid pictures from 17th century life in the Milanese district. The story is unified by the adventures of three or four humble characters, victims of the forces of injustice. Manzoni's insight into human nature, his power to create living characters, his descriptive force, and his sustained excellence of style make of this work perhaps the greatest historical novel of the 19th century. Among his nonreligious minor poems, that on the abortive revolution of 1821 and the ode on the death of Napoleon are the finest.

Manzoni's life was prolonged until well into the period when the aspirations of his predecessors and contemporaries with respect to Italy's unity and independence were happily fulfilled. The stirring years leading up to the great campaign of 1859, when, with French help, the Austrian grip on the country was loosened, and that of 1866, when it was finally broken—except in limited areas recovered by Italy after the World War—produced numerous writers whose work, while valuable and effective at the time, is hardly of permanent vital quality. There are, however, five outstanding figures in this period who should be mentioned. Giuseppe Giusti, Giuseppe Mazzini, Francesco de Sanctis, Pasquale Villari, and Giosuè Carducci.

Giusti's field was political satire. A number of his poems possessed intrinsic value sufficient to preserve their vitality long after the causes they advocated or condemned had passed into history.

Mazzini's power and versatility as a writer on political and miscellaneous subjects ensure him a place in the literary as well as in the political history of his time. De Sanctis is the greatest literary critic yet produced in Italy. His numerous essays on various literary subjects, as well as his *History of Italian Literature*, have attained the rank of classics.

Carducci.—Beginning to write in 1850, Carducci became the leading poet of Italy from about 1870 until his death in 1907. As was natural in one who had lived through one of his country's greatest crises, his inspiration was largely derived from history. No great poet of recent times has written so little about himself. His great historical odes, some of them in meters adapted from Greek and Latin lyric poetry, are the finest in Italian literature since Leopardi. He excels also in the smaller forms, such as the sonnet. For over a generation he was professor of Italian literature at the University of Bologna, and in this period he published many volumes of critical essays. His style, in both poetry and prose, is characterized by nervous vigor.

Villari.—Like Carducci, Villari, whose literary career covered nearly 70 years, was a link between the Italy of the old order and that of the new. An admirable historian, he treated early Florentine history, the life and times of the reformer Savonarola (1452–98), and the life and times of Machiavelli, in highly readable and accurate books that are indispensable to students of those periods. They are available in English translations.

Recent Literature. Among men of letters no longer living, whose work was done chiefly or wholly after the establishing of Rome as the capital of the Kingdom of Italy (1870), the most notable are the following: Giovanni Verga, Antonio Fogazzaro, Renato Fucini, Edmondo de Amicis, Giuseppe Giacosa, and Giovanni Pascoli.

Verga, a powerful realist, excels in depicting in a peculiarly intense but restrained manner, the peasant and middle-class life of his native Sicily. His best work is in the short story or sketch, in which he has achieved highly original and artistic effects with outwardly simple means.

As both poet and prose-writer, Fogazzaro reveals a noble, generous, sympathetic nature, endowed with keen psychological insight and ability to create a great variety of characters. His *Piccolo Mondo Antico*—translated into English under the title of "The Patriot"—is the best Italian historical novel since Manzoni's *Promessi Sposi*. It vividly portrays life in northern Italy during the period culminating in 1859.

Fucini, blending humor and pathos, wrote delightful and penetrating sketches of Tuscan peasant life, that are likely to stand the test of time. He produced also a set of sonnets, mostly in dialect.

De Amicis was a versatile and popular writer, mainly of short stories and books of travel. His clever and kindly personality, which one easily distinguishes through his work, has endeared him to a host of readers.

Giacosa was the author of a number of successful plays that, in an effective, if not always especially original, way, usually deal with modern social life. His best work is *Come le Foglie*, "Like Falling Leaves," which has been published in English.

Pascoli was looked upon as the legitimate successor to Carducci in poetry, but survived him only a few years. He was a poet of great delicacy of feeling, a lover of nature and of country life.

Of writers living or very recently deceased, the following are the most noteworthy:

Roberto Bracco, a Neapolitan playwright of considerable power, but seemingly obsessed by themes of rarely relieved gloom.

Gabriele d'Annunzio, a prolific poet, novelist, and playwright. His main asset is a colorful style, which he uses with effect in descriptive passages—always the best parts of his work, as his powers of thought are insignificant.

Benedetto Croce, a Neapolitan critic and philosopher, vigorous, prolific, and influential. A follower of De Sanctis, he is at the head of the younger school of æsthetic criticism, which has lately arisen in Italy in opposition to the historical method of criticism, of which Carducci was one of the chief exponents.

Giovanni Papini, a brilliant and versatile writer, who became widely known as an iconoclast. To the great surprise of his readers, he subsequently evolved into a mystic with his famous *Life of Christ*.

Besides the foregoing men, there are several women who have attained distinction as writers. Matilde Serao successfully portrayed Neapolitan life and character, and Grazia Deledda, recipient of a Nobel prize, similarly described the people of her native Sardinia.

As in other lands, literary activity in Italy is being stimulated to overproduction through the ever-increasing commercialization of bookmaking. Nevertheless, although this pressure and haste form an atmosphere unfavorable to the growth of masterpieces, there is no reason to apprehend that the Italian genius will not continue to enrich the world of literature with works of power and beauty.

TABLE OF ITALIAN LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1230?–1276	Guido Guinizelli		Sonnets, Canzoni (odes).
1230–1290	Poets of the Sicilian School		
1230?–1294	Guittone d'Arezzo	Letters	Sonnets, Canzoni.
1230–1306	Jacopone da Todi		Hymns.
1250?–1300	Guido Cavalcanti		Sonnets, Canzoni.
1255?–1336	Cino da Pistoia		Sonnets, Canzoni.
1265–1321	Dante Alighieri	Monarchia (Latin), De Vulgari Eloquentia (Latin), Letters (Latin)	Divina Commedia, Vita Nuova (poetry and prose), The Banquet (poetry and prose), Various Lyric Poems.
1270?–1348	Giovanni Villani	Chronicles	
1304–1374	Francesco Petrarca (Petrarch)	Letters (Latin), De Viris Illustribus (Biographies in Latin), De Vita Solitaria (Latin), De Contemptu Mundi (Latin), Epistola ad Posteros (Autobiographical Letter to Posterity, Latin)	Sonnets, Canzoni, Madrigals, Sestinas, Ballads, Triumphs, Latin Epic Poem (Africa).
1313–1375	Giovanni Boccaccio	Decameron, Filocolo, Fiammetta, Corbaccio	Narrative Poems (Teseide, Filostrato), Ameto (Pastoral, poetry and prose).
1432–1484	Luigi Pulci		Romance of Chivalry (partly burlesque), Il Morgante.
1440–1494	Matteo Maria Boiardo	Translation of Herodotus	Romance of Chivalry (Orlando Innamorato), Lyric Poems.
1449–1492	Lorenzo de' Medici		Sonnets, Canzoni, Ballads, Carnival Songs, Pastoral Poems, a Sacred Drama.
1454–1494	Angelo Poliziano	Letters, Critical Works (Latin)	Lyric Poetry, Drama (Orfeo), Stanze per la Giostra.
1458–1530	Jacopo Sannazzaro		Arcadia (Pastoral, poetry and prose), Sonnets, Canzoni, Latin Poetry.
1469–1527	Niccolo Machiavelli	The Prince, The Discourses on Livy, The Art of War, History of Florence	Comedies (La Mandragola, La Clizia).
1470–1547	Pietro Bembo	History of Venice, Asolani	Poems (Sonnets, Canzoni).
1474–1533	Ludovico Ariosto		Romance of Chivalry (Orlando Furioso, continuation of Boiardo's work), Lyric Poems.
1478–1529	Baldesar Castiglione	Il Cortegiano (The Courtier)	
1483–1540	F. Guicciardini	History of Italy, Political Writings	
1490–1547	Vittoria Colonna		Sonnets and Canzoni, commemorating her husband, and on religious subjects.
1500–1571	Benvenuto Cellini	Autobiography	
1504–1573	Giraldi Cinthio	Tales	
1512–1574	Giorgio Vasari	Lives of Celebrated Artists	
1544–1595	Torquato Tasso	Treatises, Dialogues, Letters	Romance of Chivalry (Rinaldo), Pastoral Play (Aminta), Epic on First Crusade (Jerusalem Delivered).
1548–1600	Giordano Bruno	Scientific Treatises	Comedy (Il Candelaio).
1552–1623	Fra Paolo Sarpi	History of the Council of Trent	
1564–1642	Galileo Galilei	Scientific Treatises	
1568–1639	Tommaso Campanella	Philosophical Treatises, The City of the Sun (System of Ideal Government)	
1672–1750	L. A. Muratori	Annals of Italy, Italian Antiquities, Publication of Medieval Chronicles	
1698–1782	Pietro Metastasio		Dramas (used as opera librettos).
1707–1793	Carlo Goldoni		Comedies.
1729–1799	Giuseppe Parini		Odes, Il Giorno (satirical mock-heroic).
1731–1794	Girolamo Tiraboschi	Literary History	
1749–1803	Vittorio Alfieri	Autobiography	Lyric Poetry, Tragedies (Saul).
1754–1828	Vincenzo Monti		Poems, Tragedies, Epic (Mascheroniana).
1766–1837	Carlo Botta	History of Italy (continuation of Guicciardini)	
1778–1827	Ugo Foscolo	The Last Letters of Jacopo Ortis	Odes, I Sepolcri.
1785–1873	Alessandro Manzoni	I Promessi Sposi	Dramas, Odes, Hymns.
1788–1854	Silvio Pellico	My Prisons	Tragedies (Francesca da Rimini).
1789–1853	Cesare Balbo	History, Politics	
1798–1837	Giacomo Leopardi	Moral Essays	Odes.
1804–1895	Cesare Cantù	History, Novels	
1805–1872	Giuseppe Mazzini	Essays (Political and Literary)	
1809–1850	Giuseppe Giusti	Letters	Poems (Political Satire).
1817–1883	Francesco de Sanctis	History of Italian Literature, Essays	
1827–1917	Pasquale Villari	History, Biography, Essays	
1835–1907	Giosuè Carducci	Essays	Poems.
1840–1922	Giovanni Verga	Short Stories, Novels	
1842–1911	Antonio Fogazzaro	Novels (The Patriot)	Poems, Dramas.
1843–1921	Renato Fucini	Short Stories	Sonnets.
1846–1908	Edmondo de Amicis	Novels, Travel	
1847–1906	Giuseppe Giacosa		Dramas (Triumph of Love, Like Falling Leaves).
1856–1927	Matilde Serao	Novels, Short Stories	
1862–	Roberto Bracco		Dramas.
1863–	Gabriele d'Annunzio	Novels (Il Piacere)	Poems, Dramas (Francesca da Rimini).
1866–	Benedetto Croce	Criticism, Philosophy, Æsthetics	
1875?–	Grazia Deledda	Novels, Short Stories	
1881–	Giovanni Papini	Criticism, Autobiography	Poems.

SPANISH LITERATURE

The Spanish language, like the French, is a descendant of the popular Latin spoken by soldiers and colonists brought into Spain by the Roman conquest. This conquest, completed by Augustus, changed the language of the country as thoroughly as it changed the customs. During the period of the Empire, Spain gave to Rome not a few Latin writers, the greatest of whom were Martial, Quintilian, Lucan, and the Elder and the Younger Seneca. The languages of Germanic origin, introduced into Spain by the barbarian invasions of the 5th century, gradually changed the character of the Latin spoken in the peninsula. The Arabian occupation of the country, begun in the 8th century and continued for seven centuries, also left important traces in the language of the population.

Early Writers. The oldest manuscript in Spanish is a fragment of a mystery play of the Magi, written for the Church of Toledo about the middle of the 12th century. Allusions in later literature suggest that the early heroic poetry of Spain may have been quite rich, and from prose passages in the *Crónica General*, or "Universal Chronicle," begun by Alfonso X, scholars have been able to reconstruct parts of several early poems. But the only work of any length from this period is the *Poema del Cid*, which was composed probably about the middle of the 12th century, though our earliest manuscript copy is of the 14th. A later manuscript, *Crónica rimada del Cid*, or "The Rimed Chronicle of the Cid," supplements the poem with a story of the youth of this hero, who was a certain Rodrigo Díaz de Bivar of the 11th century, called "El Cid" or "Lord" by the Moors.

Many ballads of later centuries also give clear evidence that early minstrels sang of Roderick the Goth and several other popular heroes.

Side by side with the school of heroic poetry, whose subjects were chosen from history and legends, there grew up in the 13th century one of religious and narrative verse written mostly by monks and of much greater bulk than was that of the romantic school. Among these monastic writers was Gonzalo de Berceo, who wrote poetical lives of the saints, devotional poems, and religious hymns. To this century belong the *Book of Apollonius*, from a Latin version, and a *Life of St. Mary of Egypt*, translated from the French. The miracle play, *El Auto de los Reyes Magos*, or "The Drama of the Three Kings," said to have appeared as early as 1120, is regarded as the oldest drama extant in any modern literature.

King Alfonso X (1226–84), better known to history as Alfonso the Wise, was author of that admirable compilation of laws known as the *Siete Partidas*, from which is derived all subsequent Spanish legislation, and of which traces are found in the state laws of Florida and Louisiana. Under his patronage many scientific compilations were made, and he is honored as the founder of history written in Spanish. The *Crónica General*, begun under his direction, tells of universal history from the creation of the world. The parts of it devoted to Spanish history, called *Historia de España*, form a veritable treasure house of Spanish tradition.

King Alfonso's example encouraged the production of various prose works, chronicles, biographies, romances, and translations of many foreign works, particularly proverbs and sayings from the Arabic. To the beginning of the 15th century belongs the most famous of the tales of chivalry, the *Amadis de Gaula*, translated from the Portuguese by Montalvo. There is also evidence that the principal themes of French romance were familiar to the Spanish writers of this time.

Don Juan Manuel, a nephew of Alfonso X, is one of the foremost prose writers of the 14th century. Both soldier and statesman, he found time to write didactic and historical treatises, but his most famous work is the *Conde Lucanor*, a collection of 51 tales drawn from various Spanish and foreign sources, each one intended to illustrate some principle of conduct or to point a moral. Juan Manuel's style is simple, dignified, and unpretentious.

Development of Poetry and Fiction. In the 14th century appeared the first of the genuine Spanish poets, Juan Ruiz, a wayward priest, who called his work *The Book of Good Love*. The genius and the skill of this Spanish poet, though lacking the dignity and tenderness of Chaucer, have nevertheless won for him a comparison to the great English master. Pedro López de Ayala, who lived in the 14th century, is the author of the didactic poem, *Rimado de Palacio*, "Court Rimes," which is a grim satire on the society of the period. He wrote also the *Chronicles of the Kings of Castile*, a narrative of great vividness and historic accuracy.

It was the 15th century which saw a full development of poetry. In the reign of John II of Castile (1406–54) there appeared a court poetry, written in short fragments and in complicated verse form. It was made up of love ditties, debates, repartees, burlesques, and satirical songs. To understand or appreciate these poems, one must read them in connection with the history of the time. Mendoza, marquis of Santillana, stands first among these courtiers and poets, and some of his lighter poems are very graceful and full of melody. Not less fascinating are those of Enrique de Villena, a scion of the royal houses of both Castile and Aragon, who is justly celebrated as being the chief propagator of the Provençal style of verse. He was, moreover, the forerunner of the Spanish humanists. Juan de Mena belongs to a succeeding phase of this period, when the influence of Italy, and especially that of Dante, began to dominate lyrical writing in general and such allegorical poems as *The Labyrinth*, from the pen of De Mena.

The 16th century produced a long line of artificial and religious epics, numerous novels of the pastoral and chivalric type, and also the first of the realistic picaresque (roguery) tales. Such tales as *El Lazarillo de Tormes*, *Guzmán de Alfarache*, *La Pícara Justina*, and *Marcos de Obregón* set the pace for all nations in the novel of adventure and intrigue. At the beginning of the 17th century, Miguel de Cervantes Saavedra produced in *Don Quixote* the supreme example in this kind of literature and put an end to the vogue of the exaggerated romance of chivalry. *Don Quixote* is Spain's greatest contribution to universal literature and remains one of the world's indestructible treasures.

The Drama. As the beginning of Spanish drama during these centuries, liturgical representations, or miracle plays, had been given at church festivals, with the object of explaining the ritual to the lay folk. Gradually, dialogue was added and plays were enacted in the public squares. Near the close of the 15th century appeared *La Celestina*, a book written by Fernando de Rojas, a most astonishing work, exhibiting for the first time persons of all classes, particularly the lowest, talking in harmony with their natural surroundings. This work, consisting of 21 acts or parts, could not have been represented on the stage, but nevertheless it left its mark on the later drama and romance of Spain.

Cervantes wrote in the great period of the Spanish drama, and he had some degree of success with play-writing, as well as with the short story. But the two great names of this period are Lope de Vega and Calderón.

The life of Lope de Vega (1562–1635) is profoundly interesting. He was a prodigy of learning and imagination. Besides tales, poems, and dramatic sketches, he produced about 1500 regular dramas, with a very large proportion of real masterpieces among them. His themes ranged from history to everyday life, the latter to be found in his comedies of character and manners. Calderón

de la Barca (1600–81) succeeded Lope de Vega as head of the Spanish drama. His plays are of four kinds: sacred dramas from Scriptural sources, historical dramas, classic dramas, and pictures of society and manners. The most celebrated are *La vida es sueño*, "Life Is a Dream," and *El Mágico Prodigioso*. Calderón was attached to the court for the purpose of furnishing dramas for the royal theater. But it is as a writer of the Sacramental drama, *auto sacramental*, that his fame as a Spanish playwright stands imperishable.

The work of Lope de Vega, Calderón, Tirso de Molina, Moreto, Rojas, and others produced for Spain one of the three great dramatic literatures of the world, destined to exercise a considerable influence on other literatures, especially on the French classic drama.

History. With the celebrated Jesuit Juan de Mariana (1536–1623), a new manner of writing history appeared. In place of merely recording one fact after another, with no apparent connection, he wrote a general survey of the history of Spain, his *Historia de España*, surpassing in achievement any work of either Ribadeneira or Sigüenza. Garcilaso de la Vega, a descendant of the Incas, wrote a history of Florida, based upon the adventures of De Soto. To the historian, Antonio de Solís y Ribadeneira, above mentioned, belongs a *Conquest of Mexico*, a flattering picture, and very successful. López de Gomara, Oviedo y Valdéz (1478–1557), and Bartolomé de las Casas (1474–1566) left records of adventures in the New World, and on these records all history of early Spanish settlements in America is founded. Among numerous writers of letters and memoirs, none surpasses Antonio Pérez (1539–1611) in style and interest. Pérez was minister to Charles V and secretary to Philip II. His *Revelations* give a most vivid picture of the intrigues, policies, and vices of the court of Philip.

Lyric Poetry. Juan Boscán (1493?–1542?) and Garcilaso de la Vega, born in 1503, were the leaders in Spain of the Italian school of lyric poetry, led by Petrarch, and very much in vogue at the time. Other lyric poets of great merit are Fray Luis Ponce de León (1527–91) and Fernando de Herrera, born in 1534. De León, recognized as the prince of all Spanish lyrists, is the first to have freed himself from Italian influence. Much of their verse shows a mystical inspiration drawn from the Hebrew Scriptures. To the category of mystic writers must also be added such brilliant masters of style as Fray Luis de Granada, St. John of the Cross, and St. Theresa, whose prose and verse rank them among the shining lights of Spanish literature. Nor are the popular ballads (*romances*) of this period to be overlooked. These have always been the delight of the Spanish people. No poetry of modern times has been more widely known or has so thoroughly influenced national life. The earliest collections of ballads, in praise of the valorous deeds of national heroes, date from the 15th century. From the 16th century, all poets who have sought fame or distinction among the Spanish people have written ballads. Wherever Spaniards have settled in new colonies, there they have kept the old ballads and produced many new ones.

The Eighteenth Century. With the coming of the Bourbons to the throne of Spain in 1700, France gained a large place in Spanish thought; French customs crept into use, and French became the language of the court.

Native Spanish literature had, in the 17th century, followed in the path of the poet Luis de Góngora y Argote (1561–1627), who had introduced freaks of style and meaningless obscurity into his work. The result was a decay which left the first three decades of the 18th century practically barren, but for the establishment of the Royal Academy (1713) and the publication of its dictionary, which had no equal in any other European language. Ignacio de Luzán attempted to reform the Spanish theater upon French principles, and his *Poética* (1737), a work dealing with the French system of dramatic unities, marks the beginning of this renovation, which was assiduously promulgated by his followers, Nasarre, Montiano, and Luis Velásquez, in their subsequent productions. Ramón de la Cruz delighted the Spanish public at this time with witty, vivacious *sainetes*, short dramatic pieces imitated or freely translated from the French.

Leandro Fernández de Moratín, an enthusiastic disciple of Molière and a son of Nicolás de Moratín, himself a writer of some repute, produced *El Sí de las Niñas*, a still popular masterpiece of comedy. José Francisco de Isla, a Jesuit, in his novel *Fray Gerundio*, ridiculed the extravagant pedantry of the pulpit of his day, and succeeded in bringing about some wholesome reform. Tomás Iriarte, a contemporary of De Isla, evoked the spirit of La Fontaine in fabled verse of a high degree of poetic excellence.

The Nineteenth Century. Imitation of the French Classicists still persisted in the opening decades of the 19th century. Two poets, Manuel José Quintana and Juan Nicasio Gallego, acknowledge French models, even while, as patriotic Spaniards, in their heroic odes they assail the Napoleonic invaders. The highly gifted José de Larra (1809–37), famous as a political writer and satirist under the pseudonym "Fígaro," shows in some of his novels and plays a tendency toward Romanticism, as may be seen in his *El doncel de Don Enrique El Doliente* and his *Macías*.

The romantic movement reached Spain in the third decade of the 19th century through a group of patriotic writers. These men looked to the middle ages for inspiration, and in their writings voiced the enthusiasm for social and political freedom which marked this movement in other countries. José Zorrilla, author of the popular *Don Juan Tenorio*, the Cuban poetess, Gertrudis Gómez de Avellaneda (La Peregrina), and Antonio García-Gutiérrez, upon whose play *El Trovador* Verdi's opera "Il Trovatore" is founded, are notable writers of this period. But in 1850 the romantic movement gave way to realism, which continues to be the mood of present day Spanish literature.

Contemporary Writers. Within recent years Spain has witnessed a remarkable revival of letters which evokes the best phases of the classic period. In Echegaray, in Pérez Galdós, in Benavente, in the brothers Alvarez Quintero, in Martínez Sierra, the Spanish dramatic instinct finds itself anew and bows to no superior in originality, in resourcefulness of invention, or in the colorful portrayal of life. Spain's literary prowess has also been seen to advantage in the novel, especially in the realistic depiction of life in various regions of the country. In the words of the American novelist, W. D. Howells, Spanish contemporary fiction "easily surpasses the fiction of any other people in our time." Among the earlier significant names of the period may be mentioned Fernán Caballero (Cecilia Böhl von Faber), pioneer in realistic fiction; Juan Valera, who produced *Pepita Jiménez*; Palacio Valdés, the creator of *Marta y María* and *La hermana San Sulpicio*; Pérez Galdós, whose monumental *Episodios nacionales* rivals Balzac's *Comédie Humaine*. Blasco Ibáñez, author of *The Four Horsemen of the Apocalypse*, is more popular outside his own country. Of the living writers, the novelist, Pío Baroja and the brilliant dramatist Jacinto Benavente are among the best-known. Such writers as Valle-Inclán, Jiménez, the Machado brothers, Azorín, and Pérez de Ayala represent so many phases of the literary and intellectual awakening which is bringing Spain into closer communion with the modern world; while Miguel de Unamuno, in his searching revaluation of the Spanish soul, is seeking to draw the modern world into a deeper and more sympathetic understanding of Spain.

TABLE OF SPANISH LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1176–1250	Juan Lorenzo de Segura		Poem on Alexander the Great.
1198–1268	Gonzalo de Berceo		Religious Poems.
1226–1284	Alfonso X	Works on Laws, Astronomy, Spanish History	Canticles of the Virgin.
1282–1349	Don Juan Manuel	Tales (Conde Lucanor)	Poems.
1300–1360	Juan Ruiz de Hita		Poems (The Book of Good Love).
1332–1407	Pedro López de Ayala		Court Rimes, Poems.
1384–1434	Marquis de Villena	Labors of Hercules	
1398–1458	López de Mendoza		Sonnets.
15th Cent.	Fernando de Rojas	La Celestina	
1411–1456	Juan de Mena		The Labyrinth.
1474–1566	Las Casas	History of the Indies	
1478–1557	Oviedo y Valdéz	History of the Indies	
1493?–1542?	Juan Boscán		Poems.
1503–1536	Garcilaso de la Vega		Poems, Pastorals, Sonnets.
1503–1575	Diego de Mendoza	History, Fiction	
1512–1581	Jerónimo de Zurita	Annals of Aragon	
1527–1591	Fray Luis de León		Religious Lyrics.
1533–1595	Alonso de Ercilla		La Araucana.
1534–1597	Fernando Herrera		Lyrics.
1535–1616	Garcilaso de la Vega, the Inca	History of Florida	
1536–1623	Juan de Mariana	History of Spain	
1539–1611	Antonio Pérez	Letters, Memoirs, Revelations	
1547–1616	Cervantes	Novels (Don Quixote, Galatea)	Short Dramatic Pieces.
1561–1627	De Góngora y Argote		Sonnets, Odes, Ballads, Songs.
1562–1635	Lope de Vega	Tales	Dramas (La Moza de Cántaro, El Mejor Alcalde el Rey).
1569–1631	Guillén de Castro		Dramas.
1580–1645	Gómez de Quevedo	Theology, Satires	Poems.
1590–1639	Ruiz de Alarcón y Mendoza		Dramas (Truth Suspected).
1596–1669	Manuel de Villegas		Lyrics.
1600–1681	Calderón		Dramas (Life Is a Dream, El Mágico Prodigioso, The Constant Prince).
1610–1686	Antonio de Solís	Conquest of Mexico	
1675–1764	Feijóo y Montenegro	Scientific Essays, Criticism	
1702–1754	Don Ignacio Luzán	Art of Poetry (Poética)	Poems.
1703–1781	José Francisco de Isla	Fray Gerundio, Translations	
1731–1799	Ramón de la Cruz		Dramas.
1750–1791	Tomás de Iriarte	Proverbs	
1760–1828	Leandro F. Moratín		Dramas (El Sí de las Niñas), Poems.
1772–1857	Manuel José Quintana		Poems.
1775–1848	Alberto Lista	Criticism	
1777–1853	Juan Nicasio Gallego		Poems.
1796–1877	Fernán Caballero (Cecilia Böhl von Faber)	Novels (La Gaviota)	
1807–1878	De la Escosura	Fiction	Poems.
1809–1837	José de Larra	Political Satires, Novels	Plays.
1814–1873	Avellaneda y Arteaga		Dramas, Poems.
1817–1893	José Zorrilla y Moral		Poems (Don Juan Tenorio).
1824–1905	Juan Valera y Alcalá	Long and Short Stories (Pepita Jiménez)	Poems.
1832–1916	José Echegaray		Plays (The Great Galeoto).
1833–1891	Antonio de Alarcon	Novels (The Three-Cornered Hat)	Poems.
1845–1920	Benito Pérez Galdós	Novels (Doña Perfecta)	Dramas.
1853–	Armando Palacio Valdés	Novels (Marta y María)	
1866–	Jacinto Benavente		Dramas (Los Intereses Creados).
1867–1928	Blasco Ibáñez	Novels (La Barraca, The Four Horsemen)	

LATIN AMERICAN LITERATURE

Latin American literature of the colonial period represents the life of the colonies with its adventures, its strong religious element, and its close relation with the mother country. It interprets also the life of the native Indians. Long before the arrival of the Spanish conquerors, we find from fragments still preserved that the Aztecs, Mayas, and other tribes possessed literatures of oratory and story-telling in which are disclosed both grandeur of conception and transcendent power of imagery.

Mexico. After the conquest, numbers of native Indians acquired proficiency in the Spanish tongue, but, under the fierce oppression of their new masters, this activity was ruthlessly checked. Yet, in the latter part of the 16th century, native-born Mexicans, some of Spanish, others of Indian, blood, manifested an extraordinary enthusiasm for literature, and we are told of literary contests taking place in which as many as 300 competitors strove for the laurels of poetry alone.

One of the most popular writers of this period was Fernán González de Eslava, whose *autos sacramentales*, or "sacred dramas," became so popular when presented on festival occasions that they continued to be performed for over a hundred years. Francisco Terrazas, a contemporary of De Eslava's, was another poet of prominence, whose rich and polished style won for him the praise of the great Cervantes.

A poet of rare excellence among those of the 17th century, whose name is well worthy of recording, was Sister Juana Inés de la Cruz, a nun of the Convent of St. Jerónimo. She was known in her time as "The Tenth Muse." Her writings are full of exquisite tenderness, spiritual beauty, and grace. Indeed, it may be remarked that most of the Mexican poetry of this and the following century was imbued with the deep religious feeling of the age.

José Fernandez de Lizardi (1771–1817) belongs to the transition period which marks the passing of Mexico from beneath the sway of the Spanish crown. He was the fiery evangelist, who evoked in his writings the spirit of Mexican independence. He is known as "The Mexican Thinker," and his

El Periquillo Sarniento is regarded as a classic wherever the Spanish language is spoken.

Manuel de Gorostiza (1789–1851) wrote mainly for the Spanish public, although he adapted some of his comedies to please the Mexican public. It was Ignacio Rodríguez Galván (1816–42) who first drew on national themes for his dramas. Fernando Calderón and Manuel Carpio were other contemporary writers who attained distinction, the former as a playwright and the latter as an epic and lyric poet.

The latter half of the 19th century in Mexico is remarkably prolific of literary genius. Undoubtedly, the most striking figure among the many brilliant writers of this period is Guillermo Prieto (1818–97). He was the leading spirit of republicanism. In his lyrics and novels, as well as in his political and historical works, he wrote with a flaming pen and did much to reform the abuses of his time. His style is seen to best advantage in his work *El Romancero Nacional*.

In the field of the drama, it will be noted, Mexico has ever been exceedingly rich and fertile. Nor in recent times has this fecundity shown any signs of weakening. So true is this that today Mexico City is the stronghold of a dramatic talent surpassing, it is said, that which produced the *autos sacramentales* of former times.

Among present day writers, Juan Tablada ranks high as a lyrist of tender melodies. In much of his poetry is to be found a wealth of imagery and oriental coloring strongly reminiscent of Moore's *Lalla Rookh*. Both Francisco Bulnes and Luis Obregón have won distinction as historical writers. An author of unenviable fame is Antonio Plaza. Undoubtedly possessing genius, he has, by his realistic tendencies and blasphemy, drawn upon himself the condemnation of both the Church and the critics.

Argentina. As in other colonies, the early literature of the Argentine Republic is full of that revolutionary spirit that gave birth to the nation. Pre-eminent among these early Argentine poets was Estéban Echeverría (1805–51). A cultured linguist, he wrote profusely, and in one of his poems, "La Cautiva," established new literary ideals which in great measure influenced the later writers of Latin America.

Ricardo Gutiérrez (1836–96) is the best interpreter of *criollo* life in Argentina. He possesses an intimate knowledge of the lower classes on the plains and has portrayed the strong characteristics of these people with great vividness and imagination. In the list of contemporary writers are to be found the names of Carlos María Ocantos, whose novels are read throughout Spain as well as Latin America, and Emma de la Barra, who draws her characters from society life in Buenos Aires.

Chile. The Spaniard José Joaquín de Mora (1783–1864) and the Venezuelan Andrés Bello (1780–1865) first gave impetus to Chilean literature, which had languished since the early days of independence. Due to the sturdy homogeneity of their race and to their comparative geographical isolation, Chilean writers have excelled particularly in the more objective type of literature, such as history, the chronicle, the general essay, and historical fiction. In history and the general essay, such writers as José Victorino Lastarria (1817–88), the brothers Amunátegui, Benjamin Vicuña Mackenna (1831–86), and Diego Barros Arana (1830–1907), author of the monumental *Historia general de Chile*, have imparted to Chilean letters a note of seriousness and scholarship which richly compensates for the more brilliant but uneven literature of most of the other Spanish American countries. In the field of fiction, Alberto Blest Gana (b. 1831) is unquestionably the greatest novelist Chile has yet produced, and perhaps the greatest in Spanish America. His realistic manner betrays keen powers of observation and bold characterization. His best work is *Martín Rivas*. Among his followers may be mentioned Martín Palma (1821–84), Vicente Grez (1843–1909), and, more recently, Luis Orrego Luco (b. 1866), all well known for their keen studies of Chilean life.

Although poetry has had many clever devotees, it has flourished more as a cultivated plant than as one of spontaneous growth. The grandiloquent patriotic note and the narrative form set in classic molds have been especially dominant in Chilean poetry. Guillermo Matta, Domingo Arteaga Alemparte, and José Antonio Soffia are typical of this manner. Of late, however, romantic and *modernista* influences have inspired the verse of such writers as Eduardo de la Barra, Pedro Antonio González, Diego Dublé Urrutia, Miguel Luis Rocuant, and others.

Uruguay. The literatures of Uruguay and Argentina have always been intimately related because of the geographical propinquity of the two countries. Each country has given refuge to literary men exiled from the other. The most brilliant name in the literature of Uruguay is unquestionably that of Alejandro Magariños (1825–93), who was at once diplomat, dramatist, poet, and novelist. Not only in his native Uruguay, but throughout Latin America and Spain, was he the object of unstinted and enthusiastic admiration. *Caramarú*, a novel of great constructive power, is looked upon as his finest work. Juan Zorilla de San Martín (1857–) is admitted to be the leading figure among romantic poets, as Eduardo Díaz (1851–) is the chief of story-writers, while with pungent realism Carlos Reyles depicts ranch life in the interior of the country.

Peru. For a considerable period the disturbed conditions in Peru and Bolivia retarded an otherwise natural development of native literature. Yet despite this fact the land of the Incas has shown signs of rejuvenation throughout the years of the 19th century and onward. Peru claims Carlos Agusto Salaverry (1831–90) as essentially a lyric poet with depth of feeling and great attractiveness. Manuel González Prada (1844), albeit displaying a wayward and turbulent fanaticism, shows himself a past master in beauty of style. Clorinda Matto de Turner, the Peruvian wife of an Englishman, has written much patriotic poetry besides several stories and novels. Her *Aves sin Nide*, "Birds without a Nest," in which she portrays the distress of the native Indians, has been compared to *Uncle Tom's Cabin*.

Colombia. Colombia has, in the short span of its national life, produced a goodly number of literary men. The figure which looms largest among those of the 19th century is that of José María Samper (1828–98), a dramatist and novelist of rare versatility and of a high order. Rafael Núñez (1825–94), president of Colombia for many years, was a writer of polished verse as well as of political prose at once dignified and trenchant. Jorge Isaacs is credited with having written *María*, the best novel in all Latin America.

Venezuela. In Venezuela, as in Argentina, we find literature in its earlier stages chiefly political and revolutionary. Of distinctively literary fame, however, Rafael María Baralt (1810–60), historian, poet, and scholar, is known to every student of literature in Venezuela as well as in Spain, where his talents received the recognition of membership in the Spanish Academy. Cecilio Acosta, orator and poet, is justly famous as a prose writer of great dignity and power, no less than as a master of verse full of simple grace and beauty, recalling at times the quaint and fascinating rhythm of the native Indian writers. Julio Calcana, essayist and novelist, whose work *The Castilian Language in Venezuela* has done much to inspire literary progress among his countrymen, was well known in both Europe and America. As a delineator of Venezuelan life with all its local details, Manuel Romero

García has become the model for the younger writers of the present day.

Brazil. The freedom of the press and the abolition of the censorship in Brazil (1821) opened up a new era for the literature of the country. Previously, literature had been gagged and bound by political partisans, and at best there existed but a desultory spirit of dilettantism among those who were educated. Once the shackles were removed, the real soul of the Portuguese awoke and began to express itself in prose and verse. Intellectual activity was aroused, and a band of brilliant journalists and polemic writers proceeded to exert a wholesome influence on a hitherto intractable government. Tavares Bastas by his forceful *Cartas do Solitario*, "Letters of a Solitary," brought about the abolition of slavery and forced the hands of those in power to throw open the Amazon to the world's commerce. Francisco Adolpho Varnhagen is a historian of eminence, whose *Historia do Brazil* ranks high as a standard work. José de Alencar holds first place among writers of romance, to which list may be added the names of Escragnolle Taunay and Machado de Assis. The most popular of the poets are Bernardo Guimarães, Thomaz Gonzaga, and Antônio Dias. But the plasticity of the language, together with the temperament of the Portuguese people, has resulted in a school of modern minor poets of no small number, whose lyric writing, if it may not be classed with the highest, is still full of winsome grace and singular sweetness.

Cuba. Cuba has contributed to literature mainly through her verse. "Every one in Cuba," writes a celebrated critic, "makes verses." The first of the great Cuban poets in the order of time is Manuel de Zequeira (1760–1846), whose patriotic odes breathe the intensive fervor of the Spaniards, Quintana and Gallego. Next, but greater than De Zequeira, comes José María de Heredia (1803–39), noted not only for his political poems, but for his descriptive verse such as "Niágara" and "Tempestad," full of glowing imagery shot with a dark and fateful melancholy.

Gabriel de la Concepción Valdés (1809–44), if a lesser light, was a poet of true worth. A mulatto foundling, his lyrics will live as long as the Spanish tongue is spoken. Of Gertrudis Gómez de Avellaneda (1814–73), it is said she has no rival of her sex as a lyric poet in any literature, unless we go back to Sappho and Corinna or to the Italian Renaissance and Vittoria Colonna.

Cuba shows a lamentable dearth of prose writers, and the work of the few that can be mentioned ranks much inferior to that of her poets. In the list of historians, the names of Arrati and Urrutia in the 18th century and those of Valdés and Arrango y Castillo in the 19th are perhaps the most prominent and noteworthy. There have been a goodly number of legal, moral, and philosophic writers, but none seem to have attained to any high degree of distinction.

An interesting essay by Menéndez y Pelayo on the lyric poets of Cuba forms the preface to the *Antología de poetas hispano-americanos*, in which may be found an excellent selection of the works of the more important.

No literary sketch of Latin America as a whole would be complete without touching upon the *modernista* movement, which has not only transcended the several Spanish American nationalities, but has extended also to the mother country. The *modernistas*, finding their source of inspiration in the French Parnassians, decadents, and symbolists, and in Poe and Walt Whitman, have enriched the Spanish language and made it more lucid and vigorous. The leader of this important movement is the Nicaraguan Rubén Darío, whose *Azul*, published in 1888, set the pace for a brilliant galaxy of poets and essayists, of whom the Peruvian José Santos Chocano and the Uruguayan José Enrique Rodó are perhaps the best-known representatives.

GERMAN LITERATURE

The origins of German literature are shrouded in obscurity, but it is certain that the Germans were the last important people of western Europe to achieve international literary repute. This was due partly to their geographical isolation from Roman and Gallic culture (the Alps, the Rhine), partly to the great migrations which swept across the German lands again and again (Visigoths, Vandals, Huns) and which diverted the minds of the people from literary pursuits, partly to certain characteristic traits of the German people—great physical energy combined with a somewhat sluggish mentality, making them a warlike but backward folk.

Early Medieval Epics. The bases of their literary beginnings were the same as in other Western lands: songs and epic lays celebrating their military triumphs, written in rugged alliterative verse, such as that of *Beowulf*, and sung in the halls of the chiefs by professional bards. These were orally transmitted, and are largely lost to us, for the great collection which Charlemagne caused to be made was subsequently destroyed by pious zealots. Only a fragment is preserved for us in very nearly its original form: a bit of the *Hildebrandslied* (about 800), which relates in crude but powerful alliterative verse the widely popular story of a father who is forced to do battle with a knight and slay him, knowing it is his own unsuspecting son.

Ancient saga material, though in a modernized form, comes to us in the *Nibelungenlied*, the greatest national epic of Germany, and one of the great epics of the world. Crude in form, it tells a story which for primitive dramatic power can hardly be surpassed. It is the story of Siegfried, who wins Brunhild for his master Gunther; of his death at the hands of Gunther's henchman Hagen because Siegfried's wife, Kriemhild, boasts of his triumph over Brunhild; and of Kriemhild's vengeance on her kinsmen, Gunther and the Burgundians.

From the monasteries, which alone kept literature alive in the 9th and the 10th century, we have two interesting literary figures. One is Otfried von Weissenburg, who (about 868), using rime for the first time in Germany, wrote a Gospel harmony to show his disapproval of "the obscene songs of the laymen." The other was the nun Hroswitha of Gandersheim (10th century), who wrote Latin plays dealing with the struggle between the virtues and the vices. *Dulcitius* is a typical example of her art, which derives from the Latin poet Terence.

The Crusades, that ushered in the age of chivalry (11th to 13th century), fostered a new narrative literature that grew out of the old epics and sagas, but was adapted to a courtly audience and a modern taste. Among the many writers of the so-called court epic, the three outstanding figures are Hartmann von Aue, Wolfram von Eschenbach, and Gottfried von Strassburg. Hartmann (d. 1220?) takes his *Erec* and *Iwein* from the French romances of the Arthurian cycle, and tells in *Der Arme Heinrich* (see Hauptmann's drama) one of the most affecting tales of medieval literature: a peasant girl offers her lifeblood to cure her master's leprosy; his refusal of her sacrifice purifies his soul and his body.

Gottfried (1165?–1215?) writes in *Tristan und Isolde* a story of forbidden love, with a tragic outcome, which Wagner's opera has made famous. Nowhere else in medieval German literature do we find so convincing a study of the love-passion.

Wolfram (d. 1225) is the greatest thinker and philosopher of the three. He gets the theme of *Parzival* from the French, but deepens and broadens it until it becomes the epitome of the development of the human soul. The raw youth Parzival sins and errs, is purified by suffering, and finally becomes worthy to be lord of the castle of the Holy Grail.

Minnesinger and Meistersinger. With the Crusades and chivalry came the development of the feudal system, one of whose happier by-products was the so-called *minnesong*, in which poets embodied in lyric verse a chivalric conception of love. Scores of noble knights turned to song in praise of their ladyloves, until such lyrics became almost a standard product. One poet, however, Walther von der Vogelweide (d. 1230), succeeded in making the conventional love song the vehicle for some of the most charming lyrics in the German language. Nor did Walther confine himself to songs of courtly *minne* or "love"; he also wrote lines glowing with religious fervor, and some of the earliest patriotic verses in German come from his pen. He was also a master of humor, as are all who come close to life.

The rapid bloom of this great epoch faded as rapidly, and German literature entered upon a long decline (1350–1650). The minnesong grew more and more conventional and empty, and in its place rose the *Meistergesang*, or "mastersong," so deliciously satirized in Wagner's "Meistersinger." Poetry and song were to be produced by rule of thumb, like shoes or bricks, and judged by pedantic criteria. Yet there were powerful forces at work; only they found no master minds to bring them to full fruition. The natural fondness of the common people for songs of love and war and history, of religious fervor and the joys of wine, burst forth in the artless but vigorous folk song, in which Germany still stands pre-eminent. The religious spirit of the time and of the German people found expression in the mysticism of Meister Eckhart (about 1260–1328), and in the only less powerful Heinrich Suso (1295–1366) and Johannes Tauler (1290–1361). Aside from their own writings, their importance lies in the fact that their individualistic trend was preparing for the struggle in which the Protestants battled for the rights of the individual conscience; and their early translation of the Bible paved the way for Martin Luther.

At this period the drama begins to emerge as a special literary category, growing out of the so-called mystery plays, which were at first given in the churches as genuine religious performances, then gradually became secularized. The influence of Latin comedy, brought in by the humanists, was especially marked in the form of the German plays One of the most productive writers of short comedies was Hans Sachs (1494–1576), the famous cobbler of Nuremberg, who deserves more notice, however, as singer and story-teller.

Mention might be made, too, of Sebastian Brant (1458–1521) and his *Ship of Fools*, a bitter and widely influential satire on the gross ignorance of the common people. Grotesque and often coarse practical jokes were collected as the pranks of *Till Eulenspiegel*, and the animal fables of the middle ages developed into the fascinating epic of *Reynard the Fox* (printed 1498).

The Reformation. Great importance in the history of German literature must be accorded to Philipp Melanchthon (1497–1560), Ulrich von Hutten (1488–1523), and Martin Luther (1483–1546). Hutten and Melanchthon were reformers of the intellect, Luther a reformer of the spirit. The labors of the former, who were leaders in the humanistic movement in Germany, sharpened men's wits and polished their speech through the study of the classics; the labors of the latter came to work a profound change in the relations of men to God. Luther's prime literary service, however, apart from his stirring and devout hymns, was the great translation of the Bible into the language of the Saxon chancelleries, whereby he created a classic that set the standard for the literary speech of his country.

On the other hand, Luther's work brought upon the literature of Germany the most disastrous blight it had ever known, when the deluge of the Thirty Years' War (1618–48) left Germany at a lower stage of political and moral degradation than that reached by any European people since the middle ages. The crushing of the middle classes destroyed all political and religious liberty; the country was impoverished; its population was reduced by three-fourths; the best energies of its citizens were needed in the indispensable work of restoration.

For nearly one hundred years German literature sank into utter insignificance. One great novel did indeed result from the turmoil: Grimmelshausen (1625–76) bequeathed to us in his *Simplicissimus*, a story of life in Germany during the Thirty Years' War, that is worthy of its place among the great books of the world. But otherwise we have mediocrities: Opitz (1597–1639) with his unsuccessful efforts to reform German poetry; Gryphius (1616–64) with his two farce-comedies, of which *Peter Squentz* alone has any vitality; and other lesser lights, such as Gellert, writer of fables and odes, Haller, author of the didactic poem *The Alps*, Gessner, whose pastoral idyls were widely read in his day, and Gottsched (1700–66), the advocate of French classicism on the German stage.

The German Revival. By an odd paradox, it is with the reign of Frederick the Great of Prussia (1740–86), who himself spoke and wrote only French and had nothing but contempt for the best German writers of his day, that we associate the renaissance of German letters. The German people were recovering from the effects of the Thirty Years' War; conditions had become more settled, and were more favorable to the leisure that literary production requires. The stage was set for the most dramatic literary development that any European literature has witnessed. Three men stand out as leaders of the German people toward the brilliance of its classical period in letters. Klopstock (1724–1803), in his *Messiah*, was the first German poet to attempt the sublime, and he succeeded in voicing the religious idealism of the German people of his time; in his *Odes* he sounds the note of cosmopolitanism coupled with genuine patriotism. Wieland (1733–1813) attempted, in his *Agathon*, to exemplify by an object lesson the true way toward individual perfection, and gave expression in it to the same spirit that was to underlie Goethe's *Faust*—faith in the innate goodness and the unwearied aspiration of the human soul. His graceful, charming style and manner cultivated German taste as Klopstock's work had promoted German idealism and moral sentiment. Greater than either is Lessing (1729–81), whose versatility and keenness of intellect hardly yield the palm to Goethe's own. He it was whose fierce polemic freed German letters from the fallacies that hemmed its growth, and who set up the new canons of theory and technique that the literary world has subsequently justified. But not only was he a critic; he could produce. *Minna von Barnhelm* is the first great play of German life, the first German comedy to outlive its author, and the first German work to voice the plea for national unity. *Emilia Galotti* is a bitter indictment of the evils of monarchic absolutism. *Nathan the Wise* champions, in the very teeth of intolerance, the now universally accepted principle of free inquiry in religious as in other matters.

The seeds of the doctrine of individualism which the Mystics had preached and the Protestants had died to defend, which Lessing had championed and Rousseau had made into a passionate slogan, became as grains of dynamite in France, whereas in Germany they flowered out in a golden age of literature. The frenzy of "Storm and Stress"—the term is the title of a play by Maximilian Klinger—soon gave place to the restrained symmetry of the classic writers.

The Classic Period. There are four men that guide the peaceful triumph of this German revolution. Herder (1744–1803) defended individualism, but viewed it as an element in national character,

thus enforcing the patriotic lesson of *Minna von Barnhelm*. He drove home the theory of the embodiment of national traits in all significant literature, and made the first studies in what we now call comparative literature. As Herder showed history to blend individual and collective forces, Kant (1724–1804) revealed a similar ideal in the mental and moral life of man. First proving that all human knowledge is subjective, in his *Critique of Pure Reason*, he proceeded to formulate, in his *Critique of Practical Reason*, religious and ethical principles which still sway the civilized world. Our individual freedom, Kant says, lies in obedience to the moral law that speaks within us.

What Kant and Herder taught, one as critic, the other as philosopher, was creatively embodied in the works of the two great poets of the age. Goethe (1749–1832) saw life as an organic whole, like Herder; Schiller (1759–1805) saw it as a continual struggle for perfection. Goethe strove for æsthetic universality; Schiller, for moral freedom. Both began as poets of "Storm and Stress": Goethe's *Götz von Berlichingen*, *Werther*, and *Faust*, Schiller's *Robbers*, *Love and Intrigue*, and *Fiesco*—all deal with excessively emotional and impulsive natures, and all are more or less tragically conceived. Their influence and their appeal to contemporaries were unexampled: utter strangers embraced and wept on each other's necks at the first performance of *The Robbers*.

But this early individualism was soon transmuted into a classic collectivism, partly under Italian influence. Goethe produced *Iphigenia*, *Wilhelm Meister*, and *Hermann und Dorothea*; Schiller, his great dramas,—*Wallenstein*, *Mary Stuart*, *William Tell*. Still later, at the very close of his life, Goethe embodied in the second part of *Faust* a supreme utterance of one of the fundamental tendencies of all modern life.

Romanticism. The individualistic note of the closing 18th century rings through the discordant harmonies of the Romantic school, in the unrestrained imaginings and fantastic self-assertiveness of Tieck (*William Lovell*), F. Schlegel (*Lucinde*), Novalis (*Henry of Ofterdingen*), and J. P. Richter (*Quintus Fixlein*, *Siebenkäs*).

On the other hand, the collectivistic humanism of Goethe and Schiller was held fast by Kleist (*Prinz von Homburg*) and by Uhland, author of many of the best-known lyrics and ballads in the language; while the speculative genius of Kant found worthy successors in Fichte, Schelling, Hegel, and Schleiermacher.

The reaction from the liberalizing tendencies of the late 18th century was fateful for German literature, and a fresh decline set in, which reached almost as low a level between 1850 and 1870 as it had a hundred years before. The Austrian censorship stunted the growth of Grillparzer (*Sappho*, *The Golden Fleece*); political pressure forced Rückert, a patriotic lyric poet, into retirement; Schopenhauer, the pessimistic thinker, Lenau, the morbid poet, and Platen, the morose one, are characteristic results of this discordance. Gravest harm was done to Heine (1797–1856), one of the most original lyric poets Germany has had, who, despite his patriotic fervor, was virtually driven into exile, a humiliated, embittered, disappointed man.

Recent and Contemporary Writing. With the turn of the mid-century, however, there begins that steady rise of German letters which has not yet ceased. Friedrich Hebbel (*Agnes Bernauer*, *Herodes und Mariamne*) writes some of the most powerful dramas of the 19th century; Richard Wagner combines drama and music with surpassing genius in creations of overwhelming power. There is a new school of novelists: Freytag (*Debit and Credit*), Ludwig (*Between Heaven and Earth*), K. F. Meyer (*The Saint*), Spielhagen (*Storm and Flood*), Anzengruber (*Meteor Farm*), Sudermann (*Dame Care*), Frenssen (*Jörn Uhl*), Thomas Mann (*Buddenbrooks*), including the women writers Böhlau (*The Switching-Station*), Ebner-Eschenbach (*The Child of the Parish*), and Viebig (*Our Daily Bread*). And of short story writers several are notable—Gottfried Keller (*Seldwyla Folk*), Heyse (*The Fury*), Storm (*Immensee*), Rosegger, and others. Foremost in the field of biography is Emil Ludwig (*Napoleon*, *Wilhelm II*).

Lyric poetry remains at a high level throughout. One might mention, as outstanding figures of recent years, Liliencron, Dehmel, Hofmannsthal, and some of the above-mentioned novelists, notably Keller, Meyer, and Storm.

With the eighteen-nineties, German drama entered into a new period of success and eminence, under the influence of Zola, Ibsen, Tolstóy, and other naturalistic writers. Chief among the dramatists are Gerhart Hauptmann (*The Weavers*, *Lonely Lives*, *Rose Bernd*, *Henry the Wretched*, *The Sunken Bell*), who cultivates both a romantic and a realistic vein, and Sudermann (*Heimat*, *Sodom's End*), a playwright rather than a dramatist. Mention might also be made of Hofmannsthal (*The Adventurer and the Singer*), Schnitzler (*Light o' Love*), and Wedekind (*Spring's Awakening*).

Present day tendencies in German literature are obscure, but it is safe to say that, while great achievements in the novel are seemingly rare in Germany, there is no country today in which the lyric and the drama are more assiduously cultivated, or more widely and worthily produced.

TABLE OF GERMAN LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
About 865	Otfried		Rimed Gospel Harmony.
About 967	Hroswitha		Latin Comedies (Dulcitius).
?–1225	Wolfram von Eschenbach		Court Epics (Parzival).
?–1230	Walther von der Vogelweide		Love Songs, Hymns, Patriotic Poems.
1165?–1215?	Gottfried von Strassburg		Epic (Tristan).
1170–1220?	Hartmann von Aue		Epics (Der Arme Heinrich).
1458–1521	Sebastian Brant		Satiric Poem (Ship of Fools).
1483–1546	Martin Luther	Bible Translation	Hymns (Ein Feste Burg).
1494–1576	Hans Sachs		Verse Tales, Shrovetide Plays (The Hot Iron).
1597–1639	Martin Opitz	Literary Theory (Von der Deutschen Poeterei)	Songs, Odes, Sonnets.
1607–1676	Paul Gerhardt		Hymns (O Haupt voll Blut und Wunden).
1609–1640	Paul Fleming		Lyrics, Hymns.
1616–1664	Andreas Gryphius		Comedies (Peter Squentz).
1625–1676	H. J. K. von Grimmelshausen	Novel (Simplicissimus)	
1700–1766	J. C. Gottsched	Criticism (Versuche einer Kritischen Dichtkunst)	
1708–1777	A. von Haller		Odes, Didactic Poems (The Alps).
1715–1769	Christian Gellert	Story (Swedish Countess)	Fables, Religious Poems.
1724–1803	F. G. Klopstock		Messiah, Odes.

TABLE OF GERMAN LITERATURE—Con.

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1724–1804	Immanuel Kant	Philosophy (Critique of Pure Reason)	
1729–1781	G. E. Lessing	Criticism (Laokoön)	Dramas (Minna von Barnhelm).
1730–1788	S. Gessner	Idyls	
1733–1813	C. M. Wieland	Novels (Agathon)	Epic (Oberon).
1744–1803	Johann G. von Herder	Criticism	Translations (Cid, Folk Songs).
1747–1794	G. A. Bürger		Ballads (Lenore), Lyrics.
1749–1832	Wolfgang von Goethe	Novel (Wilhelm Meister)	Dramas (Faust), Lyrics, Epic (Hermann und Dorothea).
1751–1826	Johann H. Voss		Translation (Iliad), Idyl (Luise).
1759–1805	F. von Schiller	History of Thirty Years' War	Dramas (William Tell), Ballads (The Glove).
1762–1814	Johann G. Fichte	Philosophy (System of Ethics).	
1763–1825	Jean P. Richtêr	Humorous Novels (Awkward Age, Quintus Fixlein)	
1767–1845	A. W. von Schlegel	Criticism	Translations (Shakspere, Calderón).
1768–1834	F. E. D. Schleiermacher	Philosophy of Religion	
1769–1860	Ernst M. Arndt	History Spirit of the Times)	Patriotic Songs.
1770–1831	Georg W. F. Hegel	Philosophy (Logic, Science of Philosophy)	
1772–1801	Novalis	Novels (Henry of Ofterdingen)	Lyrics (Hymns to Night).
1772–1829	F. von Schlegel	Criticism, Novel (Lucinde)	
1773–1853	Ludwig Tieck	Satire, Fancy (Puss in Boots, Blond Eckbert)	Dramas (Genoveva).
1775–1854	F. von Schelling	Philosophy (Transcendental Idealism)	
1777–1811	H. von Kleist	Tales (Michael Kohlhaas)	Dramas (Prinz von Homburg).
1781–1838	A. von Chamisso	Tales (Peter Schlemihl)	Ballads.
1785–1863	Jakob Grimm	Fairy Tales	
1786–1859	Wilhelm Grimm	Fairy Tales	
1787–1862	Ludwig Uhland		Ballads, Lyrics.
1788–1860	Arthur Schopenhauer	Pessimistic Philosophy (World as Will and Idea)	
1791–1813	Karl Theodor Körner		War Lyrics (Lyre and Sword).
1791–1872	Franz Grillparzer	Tale (The Poor Fiddler)	Dramas (Sappho).
1796–1835	August von Platen		Polished Lyrics.
1797–1854	Jeremias Gotthelf	Peasant Novels (Uli the Farm Hand)	
1797–1856	Heinrich Heine	Pictures of Travel (Harz Journey)	Love Songs, Ballads (Lorelei).
1802–1850	Nikolaus Lenau		Somber Lyrics.
1812–1882	Berthold Auerbach	Novels (Black Forest Stories)	
1813–1863	Friedrich Hebbel		Dramas (Maria Magdalena).
1813–1865	Otto Ludwig	Novel (Between Heaven and Earth)	Dramas (Der Erbförster).
1816–1895	Gustav Freytag	Novels (Debit and Credit)	Plays (Journalists).
1817–1888	Theodor Storm	Stories (Immensee)	Lyrics.
1817–1903	Theodor Mommsen	History (Roman History)	
1819–1890	Gottfried Keller	Novels (Der Grüne Heinrich)	Poems.
1819–1898	Theodor Fontane	Novels (Effi Briest)	
1825–1898	K. F. Meyer	Novels (The Saint)	Poems.
1829–1911	F. Spielhagen	Novels (Storm and Flood)	
1830–1914	Paul Heyse	Stories (The Fury)	
1830–1916	Marie von Ebner-Eschenbach	Novel (Child of the Parish)	
1839–1889	Ludwig Anzengruber	Novel (Meteor Farm)	
1843–	Peter Rosegger	Stories of Peasant Life	
1844–1900	F. Nietzsche	Philosophy	
1844–1909	D. von Liliencron	Stories (Kriegsnovellen)	Lyrics.
1846–1926	R. C. Eucken	Philosophy	
1857–	Hermann Sudermann	Novels (Dame Care)	Dramas (Heimat).
1859–	Helene Böhlau	Novels (Switching-Station)	
1860–	Clara Viebig	Novels (Our Daily Bread)	
1862–	Gerhart Hauptmann	Novels (Emanuel Quint)	Dramas (Sunken Bell).
1862–	Arthur Schnitzler	Stories (Sterben)	Dramas (Liebelei).
1863–	Richard Dehmel		Poems (Zwei Menschen), Lyrics.
1863–	Gustav Frenssen	Novels (Jörn Uhl)	
1864–1918	Frank Wedekind		Dramas (Spring's Awakening).
1864–	Ricarda Huch	Novels (Ludolf Ursleu)	
1874–	H. von Hofmannsthal		Lyrics, Dramas (Death and the Fool).
1875–	Thomas Mann	Novels (Buddenbrooks)	
1883–	Emil Ludwig	Biography (Napoleon)	

DUTCH LITERATURE

Dutch literature, including Flemish, begins with the rise of the Low Frankish dialect, or *Niederdeutsch*, about the middle of the 13th century. The first writing of literary rank is said to be a version of the French romance of Floris and Blanchefleur. Very soon several Dutch authors gave their countrymen tales from the romances of Charlemagne and Arthur. In the latter part of the 13th century, the language was used with such skill and vigor by Jakob van Maerlant that to him has been assigned the title "Father of Dutch Poetry." His most notable work is his *Spiegel Historiæ*, or "Mirror of History." He used subjects from the Arthurian cycle, and at the same time freed the Dutch language from undue French influence.

Popular Drama. Like that of England and France, the drama of the Netherlands began in the medieval mystery and miracle plays. In the 14th and 15th centuries, burgher literary guilds or clubs arose in the towns from the organizations that produced these sacred dramas. Poetic and dramatic contests, held by these clubs on popular festivals, served to popularize literature among the people. However, virtually no important original work came out of this period of comparative barrenness, which corresponds to the Burgundian and Spanish

supremacy in the Netherlands. The publication of the *Staatenbijbel*, the Dutch authorized version of the Scriptures, in the 16th century, exerted a powerful influence in stabilizing the language. One cultured writer, Dirk Potter (d. 1428), who had traveled to Italy, wrote a long poem, *Der Minnen Loep*, "Course of Love," after the manner of Boccaccio.

Renaissance and Reformation. The 16th century saw, along with the Reformation, a revival of classical learning. Three names in this century are notable. Anna Bijns (1494–1575) is said to have been the "first writer to use the Dutch tongue with grace and precision of style." Dirk Volkertszoon Coornhert (1522–90), a man of philosophic bent, wrote poetry, drama, and prose, all of considerable merit. Philip van Marnix (1538–98) produced a famous folk song, "William of Nassau," and satirized the Roman Church. To this period belongs the famous Dutch scholar, Erasmus (1466?–1536); and in the following century the works of Spinoza, the philosopher (1632–77), and those of Grotius, the great jurist and theologian (1583–1645), imparted luster to Dutch scholarship. But these authors wrote mostly in Latin.

Amsterdam, with its freedom of thought, was the center of Dutch literary activity in its Augustan age, the 17th century. Pieter Corneliszoon Hooft (1581–1647), author of a valuable history of the Netherlands, is regarded as the prose master of this period, as Joost van den Vondel, his contemporary (1587–1679), is the greatest of all Dutch dramatists. His powers were well adapted to the treatment of sublime conceptions. Of 32 tragedies that he wrote, half are founded upon biblical subjects. The influence of his drama *Lucifer* is discoverable in Milton's *Paradise Lost*. Two other great lyric poets worthy of mention are Dirk Camphuizen (1586–1627) and Constantine Huygens (1596–1687). Other dramatists of the century were Geeraerdt Brandt (1626–85) and Antonides van der Goes (d. 1684), the latter noted for a beautiful descriptive poem called *De Ystroom*. The popular poet of the time was Jakob (Father) Cats (1577–1660). He took his themes from everyday life, and through his verse there runs a vein of homely wit mingled with shrewd common sense that appealed to the people.

Decadence and Revival. After the close of the wars in the late 17th century, there began a period of literary decadence. For nearly a century, Dutch writers were, for the most part, mere imitators under French influence. The literary society "Nil volentibus arduum," established by Andries Pel, followed strictly the French school of drama, while Johann Oudaen (d. 1692), Van Focquenbrock, and Rotgans held to traditions of a more native cast. Voltaire's *Henriade* was translated with elaborate detail by Sybrand Feitama (1694–1758); Hoogvliet produced the remarkably fine epic, *Abraham* (1763); and Van Waagenaar, his great history of Holland. In the last quarter of the 18th century, however, the influence of the great literary awakening in Germany touched the Dutch genius. A fresh stream of romantic and patriotic poetry flowed in the verse of Jan Helmers (1767–1813) and Hendrik Tollens (1780–1856). Willem Bilderdijk (1756–1831),—after Vondel the most powerful among Dutch writers,—and likewise his successor, Isaac da Costa (1798–1860), showed themselves in brilliant opposition to the classic spirit.

The Nineteenth Century. After the resplendency of Bilderdijk, a new period of Dutch literature begins with the 19th century. Jakob van Lennep (1802–68), poet, dramatist, and romancer, has been called the "Dutch Sir Walter Scott." He was followed by Mrs. Bosboom-Toussaint, Schimmel, and a host of other excellent writers. In the work of Nikolaas Beets (1814–1903), who is reckoned the greatest Dutch humorist, the influence both of Scott and of Dickens may be seen. Edward Dekker (1820–87), known by his pen name of "Multatuli," is celebrated outside of the Netherlands for his romance, *Max Havelaar*, in which he attacked Dutch rule in Java.

The novel is still the most representative phase of Dutch literature. Adèle Opzoomer (A. S. C. Wallis) and Louis Couperus are both well-known authors of popular stories. Among several poets who have attained distinction since 1880 are the lyrist Hélène Lapidoth-Swarth, M. Emants, and F. Van Eeden, the last a writer of both lyrics and drama. Many journals and reviews have done much to keep Dutch literature at a high level of excellence, as may be testified in such periodicals published in the United States as the *Holland Amerikaan* of Rochester, New York, *De Hope* and *De Grondwet* of Holland, Michigan, and *De Volksvriend* of Orange City, Iowa, not to mention many others of like importance.

DANISH LITERATURE

Outside of the runic inscriptions, no literary monument from pagan times (before 1000) has been preserved in Denmark. The first half of the middle age (1000–1500) was a period of growing power and influence culminating in the age of the Waldemars, while the second half shows decline. The earliest written literature is in Latin, the most famous Latin work being *Gesta Danorum*, the early history of Denmark, written by Saxo. The provincial laws of Scania and Zealand and the later law of Jutland (1241) were in Danish. The famous Danish ballads had their beginning in the 12th century. This popular literature reached its highest development in the 14th century but continued for many generations after that.

At the time of the Reformation (1530), the most important name is that of Kristiern Pedersen, who contributed an important part to the first complete Danish translation of the Bible (1550). The early leaders of the Lutheran Reformation tried to reach the common people by publishing, in the mother tongue, polemical writings, songs, and satires. The first Danish hymn book was printed in 1528. In the Age of Learning, following the Reformation, Latin was again used by the learned. The sciences have brilliant representatives in this age: Tyge (Tycho) Brahe, Thomas Bartholin, Steno, Ole Römer. A. S. Vedel, who translated Saxo's work, and A. Huitfeldt were historians. To the 17th century belongs the famous hymn writer, Thomas Kingo. Toward the close of the century there was a revival of interest in the Danish language.

The greatest name of the 18th century is that of the Norwegian Ludvig Holberg, the real father of modern Dano-Norwegian literature. He towers far above his contemporaries. Yet, in his age lived the great hymn writer, A. Brorson, and Ambrosius Stub shows his love of nature in poems that still are popular. The latter half of the century is the Age of Enlightenment. The Norwegian Tullin wrote his highly admired *May Day*, the Norwegian Brun wrote *Zarine* in imitation of the French classical drama, the Norwegian Wessel wrote his immortal parody *Love without Stockings*, which cleared the atmosphere of bombast and artificiality. The outstanding Danish genius of the time is Johannes Ewald, author of the Danish national hymn "King Christian."

With the 19th century came the Age of Romanticism, beginning the golden age of Danish literature. A. G. Oehlenschläger is the greatest name of the period. His *Poems* of 1803 were epoch making, and after that he published one successful work after another, among them *Hakon Jarl* and *Aladdin*. Contemporary with him was N. F. S. Grundtvig, one of the most powerful men Denmark has produced, exerting great and lasting influence. Ingemann is Denmark's Walter Scott, Blicher portrays life in Jutland in masterly fashion, Hauch is a prominent writer, Winther a great lyric poet. J. L. Heiberg created the popular form of comedy,

technically called "vaudeville," and was an eminent literary critic. *The Soul after Death* is his best-known work. Henrik Hertz was a versatile dramatist and a master of style. H. C. Andersen won world fame through his fairy tales, and Paludan-Müller was an author of great power and depth. Ploug became the poet of the historical movement called Scandinavianism; Goldschmidt, the great prose writer, attacked absolutism in politics unsparingly, till Denmark adopted her constitution in 1849. The most generally popular author in this period is Hostrup, whose comedies are most entertaining, rivaling the works of Heiberg and Hertz. In the period of 1850–70, several new men of talent appear, winning much popularity, but there is no outstanding genius.

With the famous lectures of 1871 by Georg Brandes, for over fifty years Europe's best-known literary critic, begins the Age of Realism. Of the new men, the best-known are Drachmann, who was Denmark's greatest lyric poet, Schandorph, and J. P. Jacobsen, two of whose novels have recently been translated into excellent English. Somewhat later appear K. Gjellerup, H. Pontoppidan—these two are the Danish writers who have won the Nobel prize—H. Bang, G. Wied, Karl Larsen. Of other writers still living, the best-known are S. Michaelis, J. Jörgensen, V. Rördam, L. C. Nielsen, J. Aakjær, J. V. Jensen. The last mentioned is a master of style and is endowed with a superior creative imagination. Andersen Nexö has powerfully depicted the life of the proletariat.

TABLE OF DANISH LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1200–?	Saxo Grammaticus	History of Denmark	
1480–1554	Kristiern Pedersen	Tales, Translation of Bible	
1494–1561	Hans Tausen	Religion	
1495–?	Broder Niels		Rimed Chronicle.
1587–1637	Anders Arrebo		World's First Week, Poetic Version of David's Psalms, Hexameron.
1634–1703	Thomas Kingo		Psalms, Hymns, Winter Psalter.
1684–1754	Ludvig Holberg	History of the World, Philosophy	Comedies, Comic Poetry.
1694–1764	Hans A. Brorson		Hymns.
1743–1781	Johannes Ewald		King Christian, Lyrics, Tragedies.
1744–1812	Werner Abrahamson	Criticism	
1760–1830	Knud Lyne Rahbek	Novels, Essays	Dramas, Songs.
1764–1826	Jens Baggesen	Novels, Essays, Travels	Humorous Poems, Lyrics, Rimed Letters.
1769–1826	Adolph Schack-Staffeld		Lyrics.
1773–1856	Baroness Gyllembourg	Novels	
1775–1854	Bishop Mynster	Theology	
1777–1817	Peter T. Foersom		Translation of Shakspere.
1779–1850	A. G. Oehlenschläger	Romances	Tragedies, Poems (Hakon Jarl, Aladdin).
1783–1872	N. F. S. Grundtvig	Theology, Politics	Poems, Hymns.
1789–1862	Bernhard S. Ingemann	Historical Novels	Lyrics, Epics.
1791–1860	Johan L. Heiberg		Lyrics, Dramas.
1791–1862	Niels M. Petersen	History, Mythology	
1793–1877	H. N. Clausen	Criticism	
1794–1838	Poul Möller	Novels	Poems, Student Songs.
1796–1876	Christian Winther	Tales	Poems.
1798–1865	A. N. de Saint-Aubain	Romances	
1798–1870	Henrik Hertz		Lyrics, Satire, Dramas, Epics.
1805–1875	Hans C. Andersen	Fairy Tales, Novels (Only a Fiddler)	Dramas, Poems.
1809–1876	Frederik Paludan-Müller		Dramas, Poems.
1813–1855	Sören A. Kierkegaard	Philosophy	
1818–1892	J. C. Hostrup		Comedies, Popular Songs.
1819–1887	Meir Goldschmidt	Journalism, Novels, Short Stories.	
1840–1921	T. F. Troels-Lund	History, Biography, 16th Century	
1842–1927	Georg Brandes	Criticism (Main Currents in 19th Century Literature)	
1846–1908	Holger Drachmann	Novels	Lyrics, Dramas.
1857–1919	Karl Gjellerup	Novels	
1857–	Henrik Pontoppidan	Novels	Plays.

NORWEGIAN LITERATURE

The earliest Norwegian literary monuments are the runic inscriptions, of which the oldest are from about 400. At the beginning of the 9th century, the viking age brought the Norwegians into contact with western Europe. Their religious views had by this time found their final form in all essentials, but influence from Christian Britain and Ireland may also be traced in the *Elder Edda*, a collection of poems dealing with gods and heroes. While the manuscript was preserved in Iceland, the greater number of the poems are of Norwegian origin. These poems are all anonymous. Also the oldest lays of known *scalds*, or poets, are Norwegian. The greatest of Norwegian scalds was Eyvind Skaldaspillir, whose mighty *Hakonarmal*, "Poem about Hakon," was composed in memory of Hakon the Good (961). In 874 the first settler came to Iceland from Norway, and in the following centuries this island became the center of Norwegian-Icelandic literature. While the Icelandic sagas to a great extent treat of persons and happenings in the mother country, Norway herself contributed only a smaller part of the Norwegian-Icelandic literature.

Among Norwegian works may be mentioned an excellent translation of (a part of) the Bible, a translation of a collection of sermons, and *The King's Mirror* (13th century), the remarkable handbook of court customs, which has since become a gold mine of knowledge concerning the highly developed culture of that period. During the reign of Hakon IV and his successors (13th century), numerous French poems and stories were translated in Norway into old Norwegian (Icelandic). Other Norwegian works of importance to be mentioned are the provincial laws and King Magnus's law for the whole country (1274). The most important work in Latin produced in Norway was *About the Old Norwegian Kings* by Theodoricus Monachus.

When the old royal house became extinct in the 14th century, and Norway later was united with Denmark, the fellowship in culture between Norway and her colony Iceland ceased, and the upper classes gradually acquired a Danish and North German stamp of culture. In this period, preceding the Lutheran Reformation of the 16th century, the

old literary language of Norway was broken up into dialects; the ballads, folk stories, and fairy tales produced were not reduced to writing, but were handed down from generation to generation until they were printed in the 19th century.

After the Reformation the writers of Norway used the Danish language. This Dano-Norwegian period lasted until the two countries separated in 1814. The most prominent name in this period is that of the Norwegian Ludvig Holberg (1684–1754). He produced excellent historical works and his comedies are immortal. He is a representative of the farseeing and liberal men of his times.

After the separation from Denmark, Norway declared her independence and adopted a constitution, May 17, 1814. In a general way, it may be said that the great literary men Norway has produced in the 19th century have served the historical mission of making the two fundamental principles of the constitution a reality: national independence and democracy.

Henrik Wergeland (1808–45), the most beloved and honored of all Norwegian writers, was the very embodiment of the aspirations of the rejuvenated nation. No Scandinavian has written more beautiful, more strongly felt, more powerfully conceived, or more luxuriously formed, lyrics. But, because so much of his verse is well-nigh untranslatable, his fame has not spread as that of some other writers of his country. The poetry of his contemporary, Welhaven, is harmonious and perfect in form and shows the reflection of a more critical nature. The central figure in the succeeding period is the historian, P. A. Munch, whose monumental work is *The History of the Norwegian People.* Around him are arrayed many talented men who brought into the light of day the hidden treasures of national poetry, music, and dialects. Most important were the fairy tales, edited by Asbjörnsen and Moe, fresh and full of humor, truly reflecting the national character, creating a new style and infusing new life into the language. Out of the dialects, descendants of the old Norwegian language, Aasen created the idiom called *Landsmaal*, which he himself used for literary work, and in which he was later succeeded by such masters as Vinje, Garborg, and others. At this period appeared Wergeland's famous sister, Camilla Collett, whose *The Governor's Daughters* made her the leader of the woman's emancipation movement.

With the appearance of Björnson (1832–1910) and Ibsen (1828–1906), comes the great era of Norwegian literature. From Björnson's *Synnöve Solbakken* (1857) until the end of the century, the Norwegians took the lead in Scandinavian literature, and many of their works, through translations, became known throughout the world. Björnson, winner of the Nobel prize in 1903, excelled as poet, story-teller, and dramatist. As an orator he was without a peer in his age. Ibsen became the leading dramatist of the 19th century, and his dramatic technique has been imitated by authors of many lands. Contemporary with these giants of the North were Jonas Lie, whose stories of sea life, of the Northland, and of family life made him very popular; and Alexander Kielland, whose charm and wit at once won the reading public. Of living authors, the best-known outside of Norway are Knut Hamsun, whose *Growth of the Soil* won the Nobel prize in 1920, and Johan Bojer, the author of *The Great Hunger* and *The Last Viking.* Sigrid Undset, winner of the Nobel prize for 1928, shows remarkable insight into feminine psychology and into the medieval mind.

Other prominent writers are Gunnar Heiberg, Hans Kinck, Nils Kjær; among women writers, Barbra Ring and Nini R. Anker; and the poets Vilhelm Krag, Th. Caspari, N. C. Vogt, Olaf Bull, H. Wildenwey.

TABLE OF NORWEGIAN LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
800?–?	Bragi Boddason		Poem on Ragnar's Shield.
850–933	Harold Haarfagre (Fair-haired)		Poem on Snefrid.
9th Century	Thorbjörn Hornklovi		Poem on King Harold.
9th Century	Thjodolf of Hvin		Ynglingatal, Genealogy of Royal Family.
910–995	Eyvind Finnson Skaldaspillir		Poem on Hakon the Good, Poem on Genealogy of Earl Hakon.
1200–?	Anonymous	King's Mirror	
1545–1623	Peder Clausen (Friis)	Description of Norway	
1647–1708	Petter Dass		Poems (Northland's Trumpet).
1684–1754	Ludvig Holberg	History, Philosophy	Comedies, Comic Poetry.
1722–1780	Gerhard Schöning	History of Norway	
1728–1780	C. B. Tullin		Poems.
1742–1785	J. H. Wessel		Lyrics, Play (Love without Stockings).
1746–1791	Claus Fasting		Poems.
1749–1794	Edv. Storm		Poems.
1751–1833	Niels Treschow	Philosophy	
1792–1842	H. A. Bjerregaard		Dramas, Poems (Sons of Norway).
1794–1842	M. C. Hansen	Novels	
1802–1880	M. B. Landstad		Hymn Book, Collection of Norwegian Ballads.
1803–1864	R. Keyser	History	
1807–1873	J. S. C. Welhaven		Poems (The Dawn of Norway).
1808–1845	H. A. Wergeland		Patriotic Poems, Dramas.
1810–1863	P. A. Munch	History (Scandinavian)	
1811–1884	A. Munch		Lyrics, Translations, Dramas.
1812–1885	Peter Asbjörnsen	Folk Tales	
1813–1882	J. I. Moe	Folk Tales	Poems, Lyrics.
1813–1895	Camilla Collett	Novels, Essays	
1813–1896	Ivar Aasen	Philology	Dramas, Poems.
1818–1870	A. O. Vinje	Journalism	Lyrics.
1828–1906	Henrik Ibsen		Dramas (A Doll's House), Poems.
1832–1910	B. Björnson	Novels	Dramas (Sigurd Slembe), Lyrics.
1833–1908	Jonas Lie	Novels	
1835–1917	J. E. Sars	History, Essays	
1849–1906	Alexander Kielland	Novels	
1851–1924	Arne Garborg	Novels	Lyrics.
1856–	Gerhard Grau	Literary Criticism, Essays	
1860–	Knut Hamsun	Novels (Growth of the Soil)	
1872–	Johan Bojer	Novels (The Great Hunger)	
1882–	Sigrid Undset	Novels (Kristin Lavransdatter)	

SWEDISH LITERATURE

Traces of ancient Swedish literature are very rare and consist principally of inscriptions on the rune stones. There are about 2000 of these in Sweden, the oldest from the 6th century, the majority belonging to the period of transition from paganism to Christianity. Some of the inscriptions are in alliterative versification, the most famous being *Rökstenen*, the longest known in the world, consisting of 750 runes.

The oldest of the written provincial laws is the *Västgöta Law*, "Westgothian Law," from the beginning of the 13th century. St. Bridget (1302–73) is the most eminent Swedish author of the middle ages; her *Revelations*, first written in Swedish, then translated into Latin, are distinguished by glowing fancy and imagery. The purest national poetry of medieval times consists of what we call national ballads, which have survived on the lips of the people to the present day.

The greatest name of the time of the Reformation is that of Olaus Petri (1497–1552), a personal disciple of Luther. All his writings are marked by a powerful genius, and his style bears the stamp of simplicity coupled with erudition and an exceptionally keen insight. After the Thirty Years' War, poetry for the first time became an art with patriotic aims, and not merely a handmaid of religion. Stiernhielm (1598–1672) is the most prominent author of the 17th century. Efforts were made to prove that the ancient history of Sweden could be traced as far back as that of any other nation, or still further. O. Rudbeck (1630–1702) has given a good expression of these ideas in his brilliant and learned though fantastic *Atland*.

In the Period of Liberty, after the fall of Charles XII, scientific interests were uppermost. It is the age of Linnæus and Scheele. In literature the principal name is O. von Dalin (1708–63), pre-eminent because of his prose style and because he opened the way for the ideas of the Age of Enlightenment.

K. M. Bellman (1740–95) is the most original and perhaps the greatest of Sweden's poets and is entirely national. He has especially an eye for the beauties of nature, and he has depicted the scenery around Stockholm as no other poet has. French influence reached its climax during the reign of Gustavus III (1771–92). With the French Academy as a model, the king founded the Swedish Academy, now awarding the Nobel literary prize. Gustavus himself took a great interest in the drama. Kellgren is, side by side with the king, the most typical representative of the period. His contemporaries were K. G. Leopold and Anna M. Lenngren.

T. Thorild (1759–1808) was a follower of Rousseau and advocated the rights of feeling and of nature. J. O. Wallin (1779–1839) is the greatest hymnologist of the country.

After the revolution of 1809 and the loss of Finland, the Romantic school appears. Atterbom's *The Island of Felicity* is one of the most beautiful works created by Romanticism. Other writers are Stagnelius and Sjöberg. The men through whom Swedish literature attained almost classical perfection were Esaias Tegnér (1782–1846) and E. G. Geijer (1783–1847). Geijer's poems are not numerous, but possess a manly and national ring. He was also a philosopher and composer and is above all the greatest historian of Sweden. The best-known of Tegnér's works is his lyrical epic *Frithjof's Saga*, which has been translated by some fifty different hands into eleven foreign languages. Almqvist (1793–1866) is an exponent of Romanticism in a state of dissolution. His chief literary works are the two collections called *The Book of the Wild Rose*.

In the following age of Liberalism, several noted names appear in literature: Sturzen-Becker is the finest and most brilliant Swedish publicist; Blanche is known by his comedies and novels; Strandberg was a great lyric poet and a distinguished translator; Malmström produced poems born of patriotism and ancient classical studies; Witterbergh wrote short, highly appreciated sketches.

The realistic tendencies of the age found expression in the ever-increasing predominance of prose in literature. Fredrika Bremer (1801–65) wrote many novels, advanced the emancipation of women, and gained fame outside of Sweden. A very popular novelist was Emilie Flygare-Carlén (1807–92). Living in Finland but of Swedish descent was the great writer, J. L. Runeberg (1804–77). His most famous work is *The Tales of Ensign Stål*. Another Finnish writer using the Swedish language was Topelius (1818–98), whose *The Surgeon's Tales* is extremely popular.

In the middle of the 19th century, Viktor Rydberg (1829–95) gradually obtained the position of intellectual leader in modern Swedish literature. His contemporaries were the lyrical poets, Count Snoilsky and C. D. af Wirsén. The greatest name afterward is that of August Strindberg (1849–1912), a genius of extraordinary dimensions and overwhelming production. He is Sweden's greatest dramatist, but he produced great works in many other fields. Geijerstam (1858–1909) portrayed the life of the peasantry and the middle classes in a fresh and good-natured style and also wrote comedies. Heidenstam, still living, produced *Karolinerna*, "The Heroes of Charles XII," inspired by love of nation and the history of Sweden. G. Fröding (1860–1911) showed a masterly handling of rimes and meters and was as great a poet as was Bellman. The foremost of all recent Swedish authors is Selma Lagerlöf (b. 1858), who won the Nobel prize in 1909. Ellen Key (1849–1926) aroused attention by her treatment of social problems. Others are Gellerstedt, Österling, Karlfeld, F. Hedberg, T. Hedberg, Ossiannilsson. Very popular in most recent times is the dialect literature. Among authors cultivating this style are Dahlgren and Bondeson.

TABLE OF SWEDISH LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1302–1373	St. Bridget (Birgitta)	"Revelations"	
–1484	Johannes Budde	Translation of Bible	
1497–1552	Olaus Petri	Chronicle of Swedish History, Religious Works, History	Hymns.
1499–1573	Laurentius Petri		Psalms.
1579–1636	Johannes Messenius	History of Sweden	Poems, Lyrics.
1594–1632	Gustavus Adolphus	Speeches, History	Hymns.
1598–1672	Georg Stiernhielm	Works on Language and Mathematics	Masques, Poems.
1605–1669	Lars Wivallius		Lyrics.
1688–1772	Emanuel Swedenborg	Philosophy	
1707–1778	Karl von Linné (Linnæus)	Botany, Travels	
1707–1787	Sven Lagerbring	History of Sweden	
1708–1763	Olof (von) Dalin	History of Sweden, Journalism, Swedish Freedom	Poems, Dramas.
1714–1763	Jakob Henrik Mörk	Novels	

TABLE OF SWEDISH LITERATURE—Con.

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
1718–1763	Charlotta Nordenflycht		Lyrics.
1731–1785	Gustav Filip Creutz		Poems.
1731–1808	G. F. Gyllenborg		Poems.
1740–1795	Karl M. Bellman		Odes, Lyrics, Songs.
1751–1795	J. H. Kellgren	Journalism	Poems.
1754–1817	Anna Maria Lenngren		Household Poems.
1759–1808	Thomas Thorild	Criticism	
1772–1847	Frans Franzén		Lyrics, Hymns.
1779–1839	Johan Olof Wallin		Hymns.
1782–1846	Esaias Tegnér	Speeches	Poems (Frithjof's Saga).
1783–1847	Erik Gustaf Geijer	History, Philology	Poems.
1789–1877	Gustav W. Gumaelius	Historical Novels	
1791–1844	K. F. Dahlgren	Novels, Short Stories	Poems.
1793–1823	E. J. Stagnelius		Dramas, Lyrics, Sonnets.
1793–1866	K. J. L. Almqvist	Novels (Thorn Rose), Essays	Poems.
1795–1881	Anders Fryxell	History	
1800–1877	Per Wieselgren	History of Swedish Literature	
1801–1865	Fredrika Bremer	Novels	
1804–1877	J. L. Runeberg		Poems, Dramas.
1811–1868	August Blanche	Novels, Short Stories, Sketches	Comedy.
1818–1898	Zakarias Topelius	Historical Novels	
1829–1895	Viktor Rydberg	Historical Novels, Philosophy, Mythology, History	Poems.
1829–1907	King Oscar II	Criticism	Poems.
1841–1903	Karl Snoilsky		Poems.
1849–1912	August Strindberg	Novels, Short Stories	Dramas (The Father), Lyrics.
1858–	Selma Lagerlöf	Novels, Tales (Wonderful Adventures of Nils)	
1859–	V. von Heidenstam	Novels, Essays, Short Stories	Poems.
1860–1911	Gustav Fröding		Lyrics.
1862–1906	Oskar Levertin	Short Stories, Essays	Poems.
1866–	Per Hallstrom	Novels, Short Stories	Lyrics, Dramas.

ICELANDIC LITERATURE

The Icelandic literature is a continuation of the Old Norwegian literature. Most of the poems of the *Edda* were composed in Norway, but they were preserved in Iceland, where the art of poetry flourished after it had all but disappeared from Norway. The Icelandic scalds, or poets, were welcomed at the courts of the British Isles and in the Scandinavian countries. In honor of the princes and chieftains, they composed poems and songs, which are now of historic as well as of poetic value. The first great Icelandic poet is Egil Skallagrimson (about 900). He was both poet and warrior. Glum Geirason was the first poet at the court of the Norwegian king (10th century), and from that time on practically all of the poets at the royal court are Icelanders. Many of them are prominent. Most famous is Sigvat Tordson, a friend of St. Olaf and his son Magnus the Good.

The first historical saga is Are Frode's *Islendingabok* (beginning of 12th century). Soon after follows *Landnamabok*, which tells about the settlement of Iceland. This is succeeded by a long series of family sagas. These, for the most part, tell of persons and events in the period from the first settlement of the island until about the year 1030. The most important are *Egil's Saga*, *Gunlaug's Saga*, *Laxdölasaga*, *Vatsdölasaga*, *Njal's Saga*. The series ends with the very comprehensive *Sturlungasaga*. Another series deals with the history of Norway: *Morkinskinna*, "Rotten-skin" (so called from the appearance of the manuscripts), *Fagrskinna*, "Fair-skin" (the Icelandic authors of which are unknown), and Snorre's famous *Sagas of the Kings of Norway* (to 1177), often called "Heimskringla" from the first words in the original text. Snorre is the greatest writer among the Icelanders. Abbot Jonson wrote *Sverri's Saga*; Sturla Tordson, *Hakonarsaga*. In connection with these there are historical descriptions of the Faroe islands, the Orkney islands, Greenland—all old Norwegian settlements—and Denmark. In addition to these, sagas which were mostly fiction were written. Best-known among these are *Frithjof's Saga* and the *Volsung Saga*. From this period (1100–1300) is also Snorre's *Edda*—the *Younger* or *Prose Edda*—dealing with mythology and the art of poetry.

In the following period (1300–1550), the day of the old scald, or bard, is passed. A new form of narratives in verse form, called *rimur*, arises, taking its material from the earlier sagas and the *Eddas*. Religious poetry has several notable representatives, the most important of whom are Eysteinn Asgrimson, the author of *Lilja*, and Jon Arason, the last Catholic bishop, who was executed in 1550.

With the introduction of the Lutheran Reformation, the last remnants of political independence in Iceland are lost, and, as far as literature is concerned, the following period (1550–1780) is one of even greater decline than the preceding period. Of outstanding writers there are only few. Reverend Hallgrimur Pjetursson has become famous because of his hymns. After 1600 there is a revival of interest in the early history and literature of Iceland, and a number of learned works in Latin, dealing with these subjects, were produced. Best known among the men of this period is Professor Arni Magnusson, who made a large collection of manuscripts, which he presented to the University of Copenhagen.

It is only from about 1830 that one can speak of a real revival of Icelandic literature. The famous Dane, Rasmus Rask, one of the world's greatest philologists, had been a great influence in awakening the new interest. Four prominent Icelanders started a new periodical whose object was to purify the language, elevate the literature, and arouse the national sentiment. Hallgrimsson's beautiful poem *Island*, "Iceland," may be said to contain the program of the new movement. A number of poets produced lyric poetry, some have excelled as writers of novels, and in most recent times powerful dramas have been produced by Icelanders. Of poets who made their home in America, the best-known name is that of Stephan G. Stephansson. Jon Sigurdsson, most beloved of Icelanders in recent times and the champion of Icelandic independence, which was finally won in 1918, has written much on politics and history. Björn Olsen became the first president of the Icelandic university at Reykjavik (established 1911); Gudbrandur Vigfusson has done much to acquaint the English-speaking world with Iceland; Professor Finnur Jonsson of the University of Copenhagen, besides being a very learned philologist, has written the most important works on Icelandic literature.

RUSSIAN LITERATURE

Russia, the vague territory known to the ancients as the land of wandering Scythian tribes and the Hyperboreans, enters the pale of history in the 9th century. Rurik, a Norse chieftain of the same group of adventurers who were making new homes for themselves in France and England, came to Novgorod. At the invitation of the people, who were beset by neighboring enemy tribes, he established himself as prince. Out of this dim period of tribal warfare, there has come down to us only oral tradition in the form of *skazki* (prose folk tales) and *byliny* (tales of old time).

Early Folk Tales. There was no writing in the Russian language before the time of Peter the Great. A few of the byliny, which are rude, epic songs depending for rhythm upon a certain cadence and the endless repetition of stock figurative phrases, were first written down by an Oxford scholar who in the early 17th century was secretary of legation in Russia. A Cossack writer made another collection early in the 18th century, and the romantic interest in common life and tradition prompted the publication of this in the year 1800. These songs reflect native Russian history and beliefs as well as some foreign elements. They cover in all a long period, some of the latest dealing with Napoleon.

Differences of subject matter and locality, as well as of time, mark off several distinct groups of stories. (1) The earliest of them, belonging to the period before 1000 A. D., represent a nature mythology, the characters depicted being monstrous creatures, such as the Giant of the Mountain and Gorinich, a serpent who guards metals in caves of the earth. Other more human characters are Pagan Idol, a glutton, and Nightingale, the robber, who has a nest in six oaks and is the terror of travelers. (2) Kiev, one of the most famous and beautiful of medieval cities, and her great prince, Vladimir, of the 10th century, are the center of a large group of these byliny, in which one of the main characters is Ilya Muromets, a giant who performs prodigies of valor. (3) A third group of stories arose around the northern merchant republic of Novgorod. In these, the adventures of Sadko, a rich merchant, figure largely. (4) Another group of tales reflects the Tatar conquest and the transfer of the government to Moscow. (5) The Cossack group pictures with vigorous realism the life of the times and the surrender of the Cossack republic to the czars, and tales about the exploits of Peter the Great are numerous. In addition to the phases of life embodied in these tales, the beliefs and religious customs of the middle ages in Russia are reflected in a large number of religious poems that have been preserved in various collections.

Slavic Writings. With the introduction of the Greek Church into Russia through the conversion of Vladimir of Kiev in the 10th century, the old church Slavic (a Bulgarian language) came into use for the liturgy. Very soon this imported language was used for all official and literary purposes. From this period and from the following centuries, we have numerous sermons, lives of the saints, accounts of pilgrimages, some real and some imagined, and a great variety of books of instruction, as well as some romances and chronicles, such as the *Chronicle of Kiev*. An edition of the Slavonic Gospels dates from the years 1056-57. Hilarion's discourse concerning the Old and New Testaments is a famous piece of medieval writing. The *Chronicle of Kiev* becomes more than a dry record of events through its sprinkling of picturesque incidents and quaint stories of daily life and adventure. The most interesting of these productions, however, is the story of the Raid of Igor, a 12th century epic, which recounts the expedition of Prince Igor of Novgorod against his troublesome neighbors, the Polovtzes. This was first published in the year 1800.

The period from the 13th century to the middle of the 17th is the time of Tatar supremacy. Under a pernicious Oriental tyranny in Moscow, literature and learning as well as piety and morality disappeared. During this time, Kiev was united with the kingdom of Lithuania and became a center of learning from which scholars and teachers afterward went into Russia. Reform began in the middle of the 17th century with Simeon Pólotsky of Kiev, the pioneer of modern culture and the first Russian versifier. His writings include secular as well as religious subjects, with several religious plays which he composed in his attempt to introduce Western culture as he knew it. The first Russian theater was opened in 1674, and the first newspaper was issued in manuscript shortly after this date.

Royal Patronage of Letters. Peter the Great, who came to the throne in 1689, undertook, in connection with all his other radical reforms, to modernize and purify the Russian language. In this task he had the assistance of Bishop Prokopovitch, a very learned and politic scholar. The most important work in this reform of the language was done by Lomonósov in the early 18th century. He wrote extensively upon grammar, rhetoric, and versification, besides producing some original verse and prose. A remarkable work was produced in this time by a peasant, Pososhkóv, entitled *Poverty and Riches*. Pososhkóv may be called the Russian Adam Smith.

The latter part of the 18th century in Russia was a period of French influence, especially during the reign of Catherine II (1762–96), who herself wrote much. Catherine gathered around her a group of poets, mediocre for the most part, whom she exhorted to imitation of the classics, especially Ovid and Virgil, but whose real models were the French pseudo-classicists. To her court she invited many French scholars and writers who, because of their liberal ideas, were threatened in their own country. This classical influence, however, was not in harmony with Russian genius and soon passed away before the coming of the Romantic movement.

Sumarókov deserves an important place in the early history of literature in Russia. His writings were of various kinds, but he was most successful in the drama, both prose and verse. He was made director of the first theater opened in Petrograd in the year 1766, just a year after the founding of the University of Moscow. Before this time only religious plays had been permitted, but Sumarókov both wrote and produced in the theater work after the style of Racine, Corneille, and Voltaire. Other members of Catherine's court circle were Denis von Visin, who produced a real national comedy keenly satirizing Russian life, especially the treatment of the serfs, and Gabriel Derzhávin, who has been called Catherine's poet laureate, and whose poems, "Ode to God," "The Nobleman," and "The Taking of Warsaw," are well known.

But, in spite of her encouragement of these men of letters, Catherine held a tight rein upon real literary development, fearing the spread of modern ideas among the people. In a small book entitled *A Journey to St. Petersburg and Moscow*, Alexander Radístchev was unfortunate enough to criticize severely the treatment of the serfs. So he was banished to Siberia. Nicholas Nóvikov was an enthusiastic and hard-working journalist who did much for education in Russia, but he too overstepped the bounds that Catherine thought proper, and she put him in prison.

Karamzín, under the reign of Alexander I (1801–25), was more fortunate in his opportunity. He refined the Russian language and developed a reading public in Russia through his writings on history and travel, and by his fiction and translations.

Translation from Western languages was in this time an important contribution to Russia. Vasilii Zhukóvsky translated numerous works from the English, including poems by Gray and Byron. Out of the German he translated selections from

Goethe and Schiller, and he also rendered into Russian some German translations from the Indian *Mahabharata* and the Persian *Shah Nameh*. Through these translations the Romantic movement, which was dominant elsewhere in Europe in the early years of the 19th century, came into Russia, but, like the classical influence, it soon disappeared before the rise of the peculiarly Russian realistic style. Alexander Púshkin (1799–1837) in his short life made good his title to the place that has been assigned him as the father of Russian literature. He first truly expressed the Russian spirit, drawing upon Russian antiquity and legends for subject matter, as in his verse novel *Eugene Onegin*, probably his greatest work. Ivan Kozlóv translated Burns's "Cottar's Saturday Night." He is sometimes called the Russian Burns because of his expression of the peasant life of Russia in his own poetry.

The Novel and the Drama. The greatest work of Russian writers has been in the field of the novel. Russia may be said to have contributed to the world's literature the realistic method in prose fiction, and it is notable that this development took place within a very few years after 1840. There is in Russian prose literature no such long development as is to be seen in the history of either English or French prose. The first of the Russian novelists is Nikolai Gógol. His *Taras Bulba* is a story of the Cossack and Polish wars; his other masterpiece, *Dead Souls*, which he did not live to finish, is a vivid realistic picture of the peasant life of Russia and a bitter satire upon the official class.

Some critics give the highest place in Russian literature to Ivan Turgéniev. His work, which began with a volume of short stories, entitled *A Sportsman's Sketches*, depicting life on the great estates, furnishes an unsurpassed record of the Russian life of his time, and his prose in style and structure is unequaled among Russian writers. Dostoiévsky is the greatest psychological novelist of Russia. Probably his masterpiece is *Crime and Punishment*, a work which grew out of his experiences during his period of imprisonment and exile in Siberia. His analysis of character is very skillful, but he is rough in point of style. Count Liov Tolstóy is recognized as a great genius in various fields. He became famous in the last two decades of the 19th century for his social and religious opinions, which led him to adopt a life of asceticism. His *Anna Karenina* and *War and Peace* rank among the world's masterpieces of fiction. In recent years the folk life of the lower classes in Russia has been portrayed in a masterly fashion in the stories of Grigoróvitch and "Maxim Gorky."

The Russian drama, although not so important as the novel, has had a remarkable development since the work of Sumarókov in the 18th century. *The Woes of Wit* by Griboiédov and *The Inspector General* by Gógol are still reckoned as the greatest Russian comedies, though the greatest dramatist is Ostróvsky. His masterpieces are *Poverty Is No Vice* and *The Thunderstorm*. Anton Chékov is famous as a writer of both comedies and short stories, particularly the latter. *The Cherry Orchard* probably represents his best work in the drama. His numerous stories are crowded with brilliantly drawn characters from humble life. The short story has been developed notably in recent years by "Gorky" (Alexei Pyéshkov), Andréiev, and Chékov. They have influenced Western short story writing in both form and matter.

But the Russian short story, while it is powerful in its condensation and realism, is frequently a closed field to the foreign reader, whose insight into Russian life and character is too limited. This difficulty, however, will be obviated in proportion as the reader realizes that in Russian literature, as in no other, there is a deep sense of seriousness and social purpose. To an American, a novel is a novel, intended always to amuse, seldom if ever to instruct or to arouse. To a Russian, literature is a social instrument, one of the few he had in the old days, whose purpose, beneath all its art and power, was to solidify social purpose and desire and to bring a little nearer, through the creation of a larger body of like-minded people, the dawn of freedom. Seen in this light, the realistic treatment of life is justified; it is not sorrow and sordidness for its own sake, but for the sake of a new era.

The Russian language, contrary to opinions so often ignorantly expressed, belongs to the same family as those of western Europe and our own English. Although it apparently differs in sound and appearance from English, study soon reveals that the differences are no vaster, say, than those between Greek and English. The pronouns, numerals, and many common words are almost recognizable upon first hearing. The flexibility of the language and its wealth of idiom and vocabulary justify far more study of its literature than has been the practice in this country. Indeed, it is no exaggeration to say that only through a mastery of the language of Russia can one attain to a real appreciation of its literature and culture.

TABLE OF RUSSIAN LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
900–1200	Numerous	Annals	
About 1200	Unknown		Lay of Igor's Raid.
1629–1680	Pólotsky		Mystery Drama.
1712–1765	Lomonósov	Science, Philosophy, History	Odes.
1718–1777	Sumarókov		Poems, Fables.
1743–1816	Derzhávin		Poems.
1744–1818	Nóvikov	Essays, Philosophy	
1749–1802	Radistchev	Political Essays	
1766–1826	Karamzín	Historical Novels	
1768–1844	Krylóv		Fables.
1779–1840	Kozlóv		Poems, Translations.
1783–1852	Zhukóvsky		Poems, Translations.
1795–1829	Griboiédov		Drama.
1799–1837	Púshkin	Novels	Odes, Lyrics, Drama.
1809–1852	Gógol	Novels, Satire	Comedies.
1814–1841	Lérmontov	Novels, History	Nature Poetry, Odes, Drama.
1817–1875	A. K. Tolstóy		Poems, Drama.
1818–1883	Turgéniev	Novels, Sketches	Comedies.
1821–1877	Nekrásov	Essays	Poems.
1821–1883	Dostoiévsky	Novels, Essays	
1823–1886	Ostróvsky		Comedies, Tragedy.
1828–1910	L. N. Tolstóy	Novels, Tales, Essays, Criticism in Art, Religion, and Education	Poems, Drama.
1860–1904	Chékov	Short Stories, Sketches, Novels	Plays.
1866–	Merezhkóvsky	Criticism, Novels, Essays	Poems.
1868–	"Gorky"	Tales, Short Stories	Poems, Plays.
1871–1919	Andréiev	Short Stories, Tales	Plays.

POLISH LITERATURE

The language of Poland belongs to the Western family of Slavic tongues and possesses the same pliancy and power of composition as does the Russian. It has preserved certain nasal sounds which are traceable to the Paleo-Slavonic, once the language of the Polish Church, but now extinct.

Of Polish literature before the advent of Christianity (965), but few fragments have been left to us. Chroniclers, such as Gallus, Kadlubek, and Boguchwal, appearing between the 12th and 13th centuries, wrote in Latin. However, we have a version of the Psalms in Polish dating from 1292 and also a manuscript copy of the Psalter, known as that of Queen Margaret, belonging to the 14th century.

The Renaissance. The University of Cracow, which had its origin in the famous academy founded by Casimir the Great in the year 1400, attracted many students within its walls. A great number of young Poles also went abroad to foreign universities, returning later as humanists and pioneers of the Renaissance.

As a consequence of this development of national intellectual life, the Polish language superseded the Latin tongue in literary usage. A printing press was established at Cracow in 1474, and the first book printed in Polish was *The Sayings of the Wise King Solomon.* Other books—translations, paraphrases, versions of the Bible—now followed in rapid succession. The influence of Italian culture was notably nurtured under the patronage of Queen Bona, and many young writers like Modrzewski, Rey, and Orzechowski sprang into fame.

Poland's Golden Age. The period between 1548 and 1600 is known as the golden age of Polish literature. Jan Kochanowski (1530–84), called the prince of Polish poets, in 1557 wrote the first of his poems which for beauty and tenderness have never been surpassed save perhaps by those of Mickiewicz. Especially notable are his *Lamentations* on the death of his daughter Ursula. Two other writers, Rey and Bielski, wrote didactic poems and satires of considerable merit. Peter Skarga, a Jesuit (1536–1612), the embodiment of all that is pure in Polish patriotism, by the fiery intensity and clarity of his style in preaching and in writing, did much to enhance the literature of his country.

Decadence. After the beginning of the 17th century, a decadence in Polish literature became evident. The period between 1606 and 1764 has been styled *macaronic,* owing to the fashion, in vogue among writers, of introducing Latin words into their compositions. At best, it was a period of imitation when poets who affected the style of Jan Kochanowski mistook imitation for inspiration. The writers of this time certainly lacked originality, though the name of Potocki (1622–96) should be excepted for his *War of Chocim,* and that of Kochowski (1633–99), for many spirited odes instinct with true patriotic feeling.

Polish literature may now be said to have reached its lowest ebb, and, between the years 1696 and 1763, but few writers can lay claim to any distinction. Among the few may be mentioned Druzbacka (1695–1760), the first Polish authoress, who wrote many poems showing both grace and depth of feeling. With her name may be coupled those of Krasicki (1735–1801), called the Alexander Pope of his period, and Trembecki (1722–1812), whose writings are marked by wit, humor, and clearness of style.

The Nineteenth Century. The period of the last division of Poland (1796–1822) saw a vigorous revival of the native literature. The instinct of national self-preservation prompted a united effort to save the language from obloquy and destruction. Such effort, fostered by the Society of the Friends of Learning at Warsaw, resulted in a glorious achievement for Polish literature. The first promulgator of the Romantic movement was Kasimir Brodzinski (1791–1835), author of the idyl *Wieslau.* Following him came Adam Mickiewicz (1798–1855), the sublimest of all Polish poets, from whom the Romantic period rightly takes its name.

With Mickiewicz, Stowacki (1809–49) and Krasiński (1812–59) form a transcendent trio of lyric and idyllic writers. Alexandro Fredo (1793–1876) appeared as a writer of successful comedies. His work was characterized by purity of style and strong dramatic quality. Another popular playwright of this period was Zablocki, noted as a writer of comedy and satire.

Among numerous poets writing since the middle of the 19th century, Adam Asnyk (1838–97) and Marya Konopnicka are two of the most notable. The outstanding master of prose fiction of recent times was Henryk Sienkiewicz (1846–1916), famous for his *Quo Vadis* and for his great trilogy of Polish history, *With Fire and Sword.* Glowacki (1847–1912), under the pen name of "Boleslaw Prus," was a writer of romances, notably *The Outpost* and *The Doll.* Wladislaw Reymont (1868–1925), a writer of the realistic school, is known especially as the author of *The Peasants,* which has been translated into English, French, and German.

Such is a brief outline of Polish literature, in which may be seen the admirable perseverance with which it has striven to preserve its integrity and to attain to still higher and nobler ideals of development. In such an endeavor Poland has given to the world a proof of its full comprehension of the meaning of Christian civilization.

CZECH (BOHEMIAN) LITERATURE

The Czech language was the first of the Slavonic tongues to be developed scientifically. The earliest literary impulse came with the introduction of Christianity into Moravia and Bohemia by Cyril and Methodius in 863. With the exception of the Bulgarian, Czech is the oldest among all Slav literatures and, until the 17th century, was the richest and most copious. Cyril adapted the characters of the Greek alphabet to the demands of the Czech speech and originated what is known as the Cyrillic alphabet. For a long period, however, the influence of the Latin churchmen gave Latin precedence over the native language. Literary remains from the period before the 14th century include various chronicles and a few national songs. The famous Reims Gospel is said to date from the 11th or 12th century; what is known as the newer part of it, however, was written in 1395 and is the only remnant of Old Slavonic extant. The church song *Hospodine pomiluj ny,* "Lord, have mercy," belongs to the 11th century and is the most precious relic of this period,—unsurpassed save by the beautiful hymn in honor of St. Wenceslas.

The Awakening. About the year 1250, through the crusaders and wandering minstrels from the Western lands, Bohemia came into touch with the manners and customs of the world outside her boundaries. Crusaders' tales of the East and troubadours' songs of chivalry and knightly adventure profoundly influenced the Bohemian spirit and imagination. The *Book of Marco Polo* and the *Travels of John Mandeville* were translated, and an adaptation of the *Alexandreis* of Walter de Chatillon testifies to the eager rendering of episodes from the Alexandrian and Arthurian cycles of romance. Original didactic and satirical poems also characterize this period. Under the emperor Charles I the use of the Bohemian language was encouraged. In 1348 the University of Prague, the first institution for higher learning in central Europe, was founded, and in a short time it became one of the most noted establishments of learning and culture in the whole continent.

The Reformation Period. The period from 1410 to 1620 is looked upon as the greatest age of Czech literature. The era opened with religious discussion which gave rise to sermons and controversial prose, as well as to translations of the Bible. John Huss (1370?–1415), a thorough Latin scholar, used the Bohemian language for writings designed to reach the people. He employed the dialect of Prague and its surrounding territory. In addition to his sermons, addresses, and letters, Huss composed and translated many beautiful hymns. To his genius and scholarship is due also the present system of accents used with the Czech vowels and consonants.

The schools of learning were at this period thrown open to all classes in Bohemia, as was the case in but few other countries. A group of brilliant writers belonging to the Bohemian Brethren appeared (about 1457) and added a new luster to the native literature. Printing was introduced in 1468, the *Trojan Chronicle* being the first book printed. In the 15th and 16th centuries many translations were made from Latin and Greek. The first printed Bible appeared in 1488. The Kralická Bible, translated from the original Hebrew and Greek languages, under the supervision of Jan Blahoslav, and published 1579–93, took in Bohemia a place similar to that held in England by the King James Version. In the 17th century, Bishop Jan Komenský, better known as Comenius (1592–1670), attracted international attention by his writings on education. His masterpiece, *The Labyrinth of the World and the Paradise of the Heart*, was a forerunner of *Pilgrim's Progress*. He prepared also the *World in Pictures*, probably the first illustrated textbook ever published for children.

Decline and Revival. The year 1620, notable in Bohemian history for the battle of the White Mountain, saw the end of this glorious development in Czech literature. A period of decadence, occasioned by the desolation of Bohemia in the Thirty Years' War, continued until about 1774. The German language came to be in the ascendant for official and school use. Not a single literary work of any particular merit appeared in Bohemia during the 17th century. However, near the close of the reign of the emperor Joseph II, Bohemian writers were again encouraged. The Bohemian Society of Sciences was established, and the emperor founded professorships of the Czech language in the universities of Vienna and Prague. Joseph Jungmann, leader of a group of national poets, translated *Paradise Lost*, in addition to his renderings of Goldsmith, Pope, Goethe, and many other Western writers.

The Nineteenth Century. The years from 1820 to 1848 form a period of brilliant activity. In poetry, the two greatest names are Kollar, author of *The Daughter of Slava*, a collection of poems in praise of Slavic life and speech, and Celakovský (1799–1852), a diligent collector of folk songs and a popular writer of lyric and epic verse.

After 1848 a rich revival of Czech literature took place. The impulse of this movement has been continued to the present day in the production of a strong and varied literature. Karel Havlichek, in journalism, and Ján Néruda and Vitezslav Hálek (1835–74), in poetry, were leaders in the first enthusiastic years of the new era. In the field of the drama, Joseph Jiri Kolar was the first Czech to translate and stage Shakspere's plays. He followed this work with popular original dramas.

Jaroslav Vrchlický (b. 1853) is recognized as the most versatile and prolific of modern Czech writers, having to his credit no less than 67 volumes of original verse, and a vast number of translations from almost every language in Europe. Eliska Krasnohorska has long been a leader in the modern women's educational movements, and is a skillful writer of both verse and stories. The foremost historical novelist is Alois Jirasek (b. 1851), who draws his inspiration from the hopes and struggles of his native land.

Among other prominent writers of the rising generation should be mentioned Karel Rais (b. 1859); Brodsky (b. 1862); Jan Havlasa (b. 1883); and the Bohemian American poet Jan Vránek, of Omaha, Nebraska.

It is a matter of no small interest to note how, in the short space of little more than a century, Czech literature has grown to such dignity of stature, grace, and beauty, that it can today take its place worthily among the literatures of civilized countries. The native of Czechoslovakia certainly owes a debt of lasting gratitude to that small group of patriotic priests and teachers who, in its darkest hour, saved their language from threatened dissolution and became the heralds of its glorious resurrection.

HUNGARIAN (MAGYAR) LITERATURE

The Hungarian language, spoken at the present day by nearly twelve millions of people, is terse, cogent, and full of rich vowel sounds, lending itself readily both to oratory and to serious poetry. Differing essentially from the majority of literary tongues, it belongs to the Ural-Altaic group of languages, in which are included the Lapp, the Finnish, and the Turkish.

Its literary development was long retarded, owing chiefly to the fact that Latin was, up to comparatively recent times, the official language of Hungary. Not until 1840, after a struggle dating from a literary movement begun in 1780 against the Germanizing efforts of Austria, did Hungarian receive official recognition as the dominant language of the country.

Reformation and Counter-Reformation. Before the year 1450, there is little to record of vernacular literature, save a few scanty remnants of the elusive songs of the bards and gypsies who sang in praise of Attila and the Arpáds. Scattered legends of the saints are here and there also to be found. Two of the oldest literary monuments of this era are *Harlotti Beszéd*—a funeral oration (1230)—and a hymn to the Virgin dating from 1300. Literary productions during the period between 1570 and 1711 are notably influenced by the spirit both of the Renaissance and of the Reformation as well as imbued with the fiery enthusiasm called forth by Matthew Hunyadi. Impetus too was given to the vernacular literature of this age by the establishment of a printing press at Buda (1473) and the founding of the Pozsony university with the Corvina library. Many controversial writings, spiritual books, and volumes of sermons were the natural outcome of the Reformation. A complete translation, for the first time, of the Protestant Bible by Karolyi appeared in 1589, as did one of the Catholic Bible by Kaldi, a Jesuit, in 1626.

Profane literature in the 16th and 17th centuries is represented by the following writers: Michael Sztarai, who produced the first Hungarian drama, *The Marriage of Priests* (1550); the epic poet and wandering minstrel Tinodi (d. 1557); Balassi, the author of many beautiful lyrics, including the notable *Flower Songs* (1551–94); and Albert Gergei, who wrote the well-known and still popular *Argivius Kiralyfi*. Hungarian literature throughout the 17th century was considerably hampered, owing to the preference affected by Latin Schoolmen and by the upper classes for Italian and French productions. The two outstanding figures in the prose of this epoch are Cardinal Pazmany (1570–1637) and Molnar de Szenick (1574–1634). The publication of an encyclopedia (1655) and that of a dictionary (1708) mark the close of what may be called the Reformation and Counter-Reformation period.

The Modern Revival. After the Peace of Szatmar, 1711, began an age of peaceful development for Hungary. But not until the third quarter of the 18th century is there anything of notable interest in the native literature to be chronicled. In 1772 a revival set in, fostered by the influence of the French Revolution. Journals and periodicals of great repute were founded, and notable establishments arose, such as the Magyar and Classical schools and that known as the Hungarian Guard, which produced many brilliant writers, among others, Kazinezy (1759–1831), Alexander Kisfaludy (1772–1844), and Daniel Berzsenyi (1776–1826)—three poets of the foremost rank.

Modern Hungarian literature owes much in particular to Count Stephen Széchenyi, through whose efforts and inspiration it may be said to have reached its acme of perfection. Through his instrumentality, also, the Academy was founded in 1830 and the National Theater at Pest in 1837. It was the eloquence of Count Széchenyi in Parliament which finally succeeded in banishing Latin from the Hungarian Diet in 1844.

Among a galaxy of brilliant writers, may be mentioned, in particular, Charles Kisfaludy (1788–1830), regarded as founder of the modern Hungarian drama; Vörösmarty, composer of the national hymn, *Szózal*; Petöfi (b. 1823), author of *Rise O Magyar*; and John Arany (1817–82), who wrote the *Toldi Trilogy*, *Flower Fables*, and the humorous poem, *The Lost Constitution*. A few of the more notable novelists are Nicolas Jósika (1796–1865), author of *The Bohemians in Hungary*; Joseph Eötvös (b. 1813), who wrote *The Carthusian* and *The Village Notary*; and Mór Jókai (1825–1904), writer of no less than 250 novels, the best of which are *A Hungarian Nabob*, *Black Diamonds*, and *Love's Fools*.

Katona comes first in order among the dramatists, followed by Szigligeti (1814–78), a writer of folk-plays, Charles Bernstein (1817–77), author of *Banker and Baron*, and Gregory Gsiky (1842–90). The name of Joseph Bajza (1804–58), director of the National Theater, ranks high as that of poet, historian, and critic.

Native periodical literature is fully represented in the United States, where between twenty and thirty periodicals are published in Hungarian, including some half a dozen daily newspapers. In Canada likewise are published several Hungarian periodicals. It is regrettable to have to state that the periodical press in Hungary is not only for the most part antichristian but, what is perhaps still worse, largely pornographic. Such a condition of affairs is undoubtedly the result of a lack of wholesome criticism, due unfortunately to the singular isolation of the Hungarian language.

CHINESE LITERATURE

Four important and clearly distinguished epochs should be noticed in the history of Chinese literature. The first is the classical period, distinguished by the work of Confucius (551–478 B. C.) and Mencius (372–289 B. C.) and by that of Lao Tzu (604 B. C.) and Chuang Tzu (330 B. C.).

The Classical Period. Confucius modestly declared that he was merely a lover of the ancients, a transmitter and not a creator, but he was really an original thinker and he did an important work. He gathered together the fragmentary records of antiquity and edited them: (1) the Book of History; (2) the Book of Changes, used in divination; (3) a selection from the ancient odes, including those few of religious character, used in sacrifices; and (4) perhaps a collection of the Rites,—a sort of Leviticus which prescribed the ceremonies to be used in private and public worship, in marriages, in funerals, and upon all other important occasions in life. His collection, if made, was not identical with the extant Book of Rites. In addition (5) he wrote the Spring and Autumn Annals, drawn from the official records of his native state, which, with the commentary by Tso, forms a continuation in brief outline of the chronicles of the Book of History.

Mencius, although a devoted disciple of Confucius, surpassed his master in his comprehension of the principles of government. In his teaching he emphasized the rights of the people. "The people," he said, "are the foundation of the state; the national altars are second in importance, and the sovereign is the least important of all."

Some deny to Lao Tzu the authorship of the *Tao Te King*, but the greatness of Lao Tzu is evidenced by the teachings of his disciple, Chuang Tzu, the idealist. The *Tao Te King*, no matter who wrote it, is one of the most remarkable books of this period. It preserves many striking sayings ascribed to Lao Tzu, rejoices in paradox, declaims against war, preaches the simple life, and urges us to "recompense evil with kindness."

The Reconstructive Period. The second period begins with the overthrow of the Chou dynasty (249 B. C.). The greatest monarch of the new dynasty called himself the "First Emperor." He tried to destroy all Confucian literature and was guilty of the murder of many scholars because their bigoted conservatism hindered the reforms he sought to introduce.

The Han dynasty which followed restored Confucius to honor, but the period was one given very generally to the things which Confucius contemned,—tales of the marvelous. The philosopher's stone, the elixir of immortality, and the isles of the blessed, where the elixir was to be found, were the objects of search. It was probably at this time that the *Shan Hai King*, or "Classic of Mountains and Seas," was written. Although its tales are ridiculous to us, it undoubtedly has a certain value as preserving much of the folklore and many of the traditions of the Chinese.

The time was one, too, during which foreign influences crept in. Alexander's conquests in central Asia and Chinese exploration of adjoining lands created a channel of communication between the East and the West. Buddhism spread into Turkestan in the 3d century B. C. In the early years of the Christian era it received imperial recognition in China. In the following centuries, a great volume of Hindu literature was translated into Chinese by Buddhist missionaries,—not only Buddhist religious works, but Hindu mathematical, astronomical, and philosophical treatises. Chinese thought was profoundly affected.

This age may very properly be called the reconstructive period. In striking contrast to the credulity of the masses of the people were the works of two men: Ssu-ma Ch'ien (163–85 B. C.), the Herodotus of Chinese history, whose careful method and love of accuracy have become the model of later historians; and Wang Ch'ung (19–90 A. D.), whose originality and boldness won praise in spite of his heretical attacks upon the sages of antiquity and in spite of his denial of the immortality of the soul.

The Golden Age. This period of reconstruction prepared the way for what has sometimes been called the "golden age" of Chinese literature, which may be said to begin with the T'ang dynasty (618 A. D.) and include the Sung (960–1278). For our purposes it will cover also the period of the Mongol rule (to 1368). The T'ang period was noted for its poets, conspicuous among whom were Li Po, also called "Li T'ai Po" (699–762), whose verses in form and sentiment remind one of Omar the "tent-maker." Scarcely second to him was Tu Fu (712–770).

The Sung dynasty was adorned by its love of philosophy. The speculations of Buddhists and Taoists had produced a reaction. Confucianism separated itself entirely from their metaphysical theorizing. Chou Tun-i (1017–1073), the brothers Ch'eng (1032–1107), and, greatest of all, Chu Hsi (1130–

1200), although calling themselves Confucianists, departed far from the cautious views of the master. Their philosophy, which has generally been regarded as materialistic but has also been interpreted otherwise, has dominated Confucian thought from that day to this. The Sung period also had its poets, among whom Su Tung-po (1036–1101) may be mentioned as justly celebrated.

The Mongol dynasty, glorified by the praise given to it by Marco Polo, was distinguished in its literature chiefly for its attention to the drama and the novel. Because the drama and the novel use the spoken rather than the written style of language, the Confucianist of the old school was disposed to regard these forms of literature as beneath his notice. Yet the Chinese are among the most confirmed playgoers in the world. The most popular plays are representations of historical incidents, and this is true also of many of the novels.

Period of Western Influence. The fourth period in the history of Chinese literature, the period of Western influence, may be said to begin with the close of the 15th century, after the discovery by the Portuguese of the sea route to the Far East around the Cape of Good Hope. From that date, European intercourse with China increased rapidly.

Foreign missionaries aided both the Mings and the Manchus by preparing mathematical and scientific works, and since the beginning of the 19th century they have published an enormous mass of literature, both religious and secular. Chinese, educated abroad or in mission schools, have added greatly to the volume of translations. Original works by native authors have not been lacking. Poetry and fiction flourished both under the Mings and during the Manchu dynasty. One of the most celebrated novels, the *Hung Lou Meng*, commonly translated "The Dream of the Red Chamber," was written about the beginning of the Manchu period. The *Liao Chai*, by P'u Sung-ling, is a collection of stories that dates from about the same time. The splendid K'anghsi Dictionary belongs to this period, which is distinguished also for its topographical histories, in which China excels, and for its voluminous encyclopedias.

The influence of Western thought increased greatly after China's defeat by Japan in 1894-95. China saw her former pupil transformed by the new learning. The old viceroy, Chang Chih-tung, in a small volume appealed to his countrymen to take up the study of the sciences. The advice was not taken by the Manchu government until after further humiliation through the suppression of the Boxer rising. Chang Chih-tung was called to assist in creating a new system of public education. This caused a demand for translations of Western literature, particularly treatises on political science, economics, engineering, and medicine. A new impetus was given to literary effort. The stilted style, once so popular, with its penchant for literary allusion and empty verbiage, is giving way to a simple, direct expression. The invention and adoption of a syllabary is supplementing, but not supplanting, the use of ideograms and thus is popularizing learning. Polite literature is not neglected, but urgent need prompts discussion of political and economic problems. Newspapers and magazines abound; the periodical press is a powerful engine of reform.

JAPANESE LITERATURE

There is some reason to believe that the Japanese in the island of Kyushu had come into possession of the Chinese written characters some centuries before the time of Christ, yet the oldest Japanese literary works extant today are the *Kempo*, a constitution of 17 articles (604 A. D.); the *Kojiki*, a record of ancient events (612); the *Rokkokushi*, which consists of six works on national history, including the famous *Nihongi* or *Nihon Shoki* (620–901); and the *Manyoshu*, a collection of renowned ancient poets and poetesses (756). All these works were written in the Chinese characters. The *Kempo* and the *Rokkokushi* were written in pure Chinese classical style. The *Kojiki* and the *Manyoshu* used the Chinese characters as phonetics.

Early Poetry. Japanese poetry, which has neither meter nor rime, is peculiarly a native product. Its form is the same as in ancient times. The essential feature of a popular poem is that it consists of 5 successive lines of 5, 7, 5, 7, and 7 syllables respectively, that is, a total of 31 syllables. Longer poems are sometimes written, but the present tendency is toward shorter ones. Near the close of the 17th century, *Hokku* poems, which consisted of 3 lines of 5, 7, and 5 syllables respectively, a total of 17 syllables, became very popular. The poets Basho and Kikaku are rightly regarded as originators of this style. The poetry of Japan, like her pictorial art, gives strong impression and suggestion, rather than the description and narration so characteristic of Occidental poetry.

Many Japanese believe that poetry has declined since the *Heian* era (9th and 10th centuries). Yet the poets Tsurayuki and Katei and the poetess Murasaki-Shikibu rank as high as do Hitomaru and Akahito of the golden age of Japanese poetry, during which period many poetic works were compiled in accordance with imperial decree.

The Drama. The period from the 13th to the 17th century is known as the dark ages of Japanese literature. Because most men were engaged in warfare, literature was neglected. Only one or two schools in the entire empire remained open. Yet, even under such conditions, many famous works were produced, such as the *Hojoki*, a journal of important events, and the *Tsurezuregusa*, a collection of essays and anecdotes. In this period appeared also the splendid type of classical drama known as the *Noh*, which somewhat resembles the drama of ancient Greece. Singers, dancers, and musicians plied their arts both at Shinto shrines and at imperial and shogunate courts. In the *Noh* drama, Chinese and Japanese historical narrations are frequently delivered in conversational tone. The singing part of the *Noh*, which is often performed by itself, is called *Yokyoku* or *Utai*. In the same period, the *Kyogen*, a sort of farce or comedy, had its beginning. Most of the *Noh* and the *Kyogen* were composed by Buddhist priests along the lines of the drama of the Yuan dynasty of China (12th century). They were both enacted and patronized chiefly by the nobility. Even at the present time, these types are very popular with the higher classes. In their presentation, magnificent costumes are worn.

Toward the end of the 16th century, the *Kabuki*, a type of popular drama, was introduced. Notwithstanding that the *Kabuki* was originated by a woman, and was for some time enacted only by women of the courtesan class, yet from the early 18th to the latter part of the 19th century, because actors and actresses were strictly forbidden by law to play on the same stage, the higher type of *Kabuki* productions came to be presented entirely by men, who took the part of both sexes. The *Kabuki* has recently been subjected to critical reform and has become a popular amusement with all classes. Amateurs and professionals both play the *Kabuki*, and men and women appear together now on the same stage. This has led to the translation and presentation of many Western plays.

Another popular drama is the marionette play, accompanied by songs which are called *joruri*. Such songs also form an essential part of the *Kabuki*, taking the place of the orchestra in Western plays. The marionette plays originated in a chant (*Gidayu*) telling a love story, to which the marionettes were added. The development of this since the 17th century has produced most skillful performers. The chanters sit in one corner of the stage, while the marionettes are worked by players in harmony

with the chant. These plays always aim at the encouragement of good and at the condemnation of evil.

The words of the *Kabuki* are frequently changed and are often impromptu, but the text for the marionette chant must be carefully finished. It is the marionette play, therefore, rather than the *Kabuki* that has given rise to a literary form most nearly like the Western drama.

Modern Fiction. Since the beginning of the 18th century, Japan has produced a large body of fiction. Children's stories, in particular, have been very popular and have frequently been translated into Western languages. Many novels and romances with a great variety of settings and a wide range of subjects have been produced.

In all periods of Japanese literature the work of women has been notable. It is said that the *Kojiki* and *Nihongi* were produced under the patronage of empresses. During the 10th and the 11th century, feminine authorship was at its best. In the 11th century, a woman produced the first novel, "a prose epic of real life." To the same century belongs the *Makura no Zoshi*, "Pillow Sketches," a realistic picture of social life in Kyoto of that time.

The distinction attained by women in Japanese literature may be ascribed to the fact that in the 8th and 9th centuries the two forms of the Japanese syllabary, the Katakana and the Hiragana, were brought to perfection. This enabled the women to write without having to learn the Chinese ideograms, and they were quick to seize upon the new style of writing, while the men still clung to the Chinese classical models.

Western Influence. Contact with the West during the past century has greatly influenced Japanese literature as well as politics. Men of Western education have taught in the universities. English has become very largely the language of learning. Much translation from English and other European languages has been done. Political and historical romances have been produced upon both native and Western models. Much writing has been done with the motive of interpreting Japan to the outside world and the outside world to Japan.

The growth of newspapers and other periodicals is a remarkable feature of this period. About 1800 periodicals are published in the empire, and in Tokyo alone there are several newspapers which have a daily circulation of 100,000 each.

The greatest problem in the Japanese literary world at present is to find a way to get rid of the use of Chinese characters. Japanese literature was founded in the Chinese written language, and the best has been embellished with quotations from the Chinese classics. At present, publishers are discouraging the use of these ideograms and have practically agreed to reduce the number employed to about 2000. But, after Japan has rid herself of the use of Chinese characters, the question will arise whether it would not be better to employ the Roman alphabet rather than the Japanese syllabary.

ASSYRO-BABYLONIAN LITERATURE

The literature of Babylonia and Assyria has for us a threefold interest, because of (1) the romantic progress of discovery in the last century, (2) the revelations of a rich and ancient civilization given us by the excavations in the Tigris and Euphrates valley, and (3) the light these discoveries have thrown on the Old Testament.

Deciphering the Inscriptions. In 1835 Henry C. Rawlinson, an English officer, found at Behistun, in Persia, a long inscription on the smoothed face of a high rock. The writing was in three languages, old Persian, Elamite, and Babylonian. Although these tongues belong to different families of languages, the cuneiform characters were used for all. Rawlinson succeeded first in deciphering the old Persian, and during the next twenty years he, with other scholars, particularly a German named Grotefend, whose researches had in fact preceded those of Rawlinson by a few years, penetrated the secrets of the other two languages of the inscription. Thus we were given the means of studying the culture and the literature of Babylonia in its records on rocks, walls, and vast collections of clay tablets.

Early Sumerians and Babylonians. The cuneiform writing, which consists of wedge-shaped characters placed at various angles and in groups of from two to thirty, probably originated among the Sumerians at a quite remote date. The Sumerians were a non-Semitic people who migrated into the fertile Mesopotamian valley, probably from the northeast, before 4000 B. C. They early developed a high civilization, a complex nature religion, and an elaborate system of writing. Most of the inscriptions found in the temple libraries at Telloh and Nippur are in Sumerian. The oldest Sumerian inscriptions are short, historical in character, and were probably composed shortly after 4000 B. C.

Commencing apparently about 4000 B. C., Semites from the southwest also settled in Mesopotamia. Gradually they conquered and absorbed their Sumerian neighbors. But, although the Babylonian people resulting from this fusion was predominantly Semitic, and the Babylonian language was Semitic, nevertheless the superior Sumerian civilization prevailed. The Babylonian religion contains many elements of Sumerian origin. Sumerian survived for over thirty centuries as the language of religious documents, while the Semitic Babylonian, or Akkadian as it is commonly called, became the language of daily intercourse and profane literature. And Sumerian cuneiform writing was employed in all Babylonian documents.

Babylonian and Assyrian Libraries. The libraries, like the very ancient one in the temple of En-Lil, the Sumerian god, at Nippur, provided a record department and an educational department, equipped with grammars, dictionaries, commentaries, and interlinear translations. The great Babylonian period lasted from about the 22d to the 13th century B. C. After this time the Assyrians, a kindred people, succeeded to power. Among them, warfare and conquest were held in honor, and the works of culture were but little regarded. In consequence, their literary work shows little originality. They copied the Babylonian writings and preserved them in libraries, notably that of Assurbanipal (668–626 B. C.)—better known perhaps by the Greek version of his name, Sardanapalus—at Nineveh, which contained about 30,000 clay tablets. This library, explored by Layard and George Smith, was our first great source of information about Babylonian literature. It contained histories, grammars, lexicons, law books, works on astrology and astronomy, mathematics, epic poems, books of magic and incantations, omens, liturgies, psalms, and prayers. With the fall of Nineveh (607 B. C.), the library was buried in the ruins of the palace.

The Gilgamesh Epic. But, while these libraries are rich in all manner of writings, their principal treasures are the great mythological epics of the Babylonians. Chief of these is the Gilgamesh epic. It is the story of Gilgamesh, semimythical king of the ancient city, Erech. Ishtar, the Babylonian Venus, tries to win his love. But he rejects her advances and, instead, with his faithful companion En-Gidu, goes forth to seek immortal life. After many adventures, during which En-Gidu is killed, Gilgamesh finds his ancestors, Ut-Napishtim and his wife, enjoying immortality upon the Isle of the Blessed far to the west across the waters of death. Ut-Napishtim tells Gilgamesh the story of the great flood brought by the gods, from which only he and his companions in the ship escaped, while all the

rest of mankind perished. This Babylonian flood story parallels the biblical flood story so exactly that it is probable that the biblical story was borrowed from the Babylonian. Ut-Napishtim tells Gilgamesh that at the bottom of the sea grows a magic plant which will restore his youth. But, just as he is about to possess it, a serpent steals it, and thus gains immortality for serpents, while Gilgamesh and all mankind forfeit it. The epic concludes with the account of the bringing up of the ghost of En-Gidu, who describes for Gilgamesh the abodes of death and the nature of life after death and informs him that his search is vain, that for mankind there is no escape from death. This Gilgamesh epic has a peculiar literary significance. It is written in twelve books or tablets, corresponding seemingly to the twelve months of the year, and must have initiated the custom of composing epic poems in twelve books or multiples thereof.

Epic of Creation. Another epic of almost equal interest tells the story of Creation. Marduk, the great god, slays Tiamat, the dragon of Chaos. Out of one half of her body he forms the heaven, out of the other half the earth. He then creates plants, animals, and man on earth. This story is strikingly similar to the biblical Creation story, and again it is likely that borrowing has taken place. This epic is arranged in seven tablets, corresponding probably to the seven days of the week, or else to the seven days of creation.

Other poems of epic character exist, chief among them being the legend of Adapa and the South Wind, the descent of Ishtar into Hell, the legend of Etana and the Eagle, the legend of the Zu-bird and the tablets of destiny, and the myth of Ura, the plague god.

Code of Hammurabi. Of equal literary and historical significance is the Law Code of Hammurabi, king of Babylon about 2100 B. C. It is engraved upon a large diorite column which was found at Susa in 1898. It contains almost 300 laws dealing with all manner of subjects, and is probably the oldest law code in the world's history.

Up to the present time, about 150,000 tablets and inscriptions have been discovered in Babylonia. Comparatively few of these have been deciphered, but scholars are continually at work, and each year adds to our knowledge and understanding of this great ancient literature.

The principal collections of tablets are in the British Museum at London, in the Louvre at Paris, in the Royal Museum at Berlin, in the National Museum at Constantinople, and in America in the museums of the universities of Pennsylvania, Chicago, and Yale.

HEBREW LITERATURE

The people of Israel form a part of the Semitic branch of the Caucasian race. Their language, Hebrew, belongs to the Western group of Semitic languages. Cradled in the great Arabian desert, they migrated to Palestine about 1400–1200 B. C. and established a nation which endured until overthrown by the Romans in 70 A. D. Since then, Israel has been scattered throughout the world.

In the solitudes of the Arabian desert the Israelite mind pondered over the deep mysteries of life. Gradually there was revealed to it through the long course of its history the knowledge of one, only God, sole Creator of the universe, who has fashioned all things in infinite wisdom, goodness, and love, and has ordained laws of justice and righteousness for human guidance. This ethical monotheism is the foundation principle of Judaism. It became the eternal and unquenchable passion of the Jewish people and the keynote of Hebrew literature.

Early Songs and Legends. Hebrew literature began, like almost every other ancient literature, in folk songs and legends probably recited in camp and village gatherings by tribal bards. As civilization developed, some of these poems were written down. The Bible mentions two collections of ancient Hebrew songs, *The Book of Yashar* and *The Book of the Wars of Yahwe*. Unfortunately, both books have been lost, and only a few fragments of these ancient poems, such as the "Song of Lamech" (Genesis IV:23-24), the "Song of the Well" (Numbers XXI: 17), and the "Song of Deborah" (Judges V) survive.

By the time of David (1000 B. C.), Israelite culture had advanced materially. One of David's court officials was the scribe, who recorded the important events of Israelite history. This marks the definite beginning of literary activity in Israel.

The history of Hebrew literature may be divided into four periods: (1) the Biblical (from the earliest times to 70 A. D.); (2) the Rabbinic (70 to about 1000); (3) the Medieval (1000 to about 1800); and (4) the Modern.

The Bible a Collection of Books. We generally think of the Bible as a single book and as comprising the whole, or almost the whole, of Hebrew literature. Both conceptions are wrong. The Bible is not a single book, even though usually printed in one single volume, but is, rather, a collection of books, a small library, a national literature—all that survives of the quite considerable mass of writings composed during the national period of Israel's history. Therefore, it naturally contains many kinds of writing, including historical sketches and unhistorical or semihistorical legends, religious and social laws, the inspired utterances and visions of the prophets, liturgical and lyric poems (the Psalms), didactic poetry (Proverbs and Ecclesiastes), pragmatic fiction (Ruth), and even a pure love poem (Song of Songs) and two dramas (Job and Esther).

Pentateuch and Hexateuch. After the ancient poems referred to above, the oldest biblical writings are found in the Pentateuch and in Judges and Samuel. They were composed during the 10th and 9th centuries B. C. Science has established that, contrary to tradition, the Pentateuch is not the work of Moses, nor of any one man, but was composed by different groups of writers between 900 B. C. and 400 B. C., or even somewhat later. It has proved also that the book of Joshua was composed by these same writers; therefore, science speaks of the *Hexateuch*, "the six books," rather than of the *Pentateuch*, "the five books."

The oldest document of the Hexateuch, composed probably in 899 B. C. in the Southern Kingdom, is found in Exodus XXXIII:12–XXXIV:28. It contains an interesting and historically important tradition about Moses and also a little code of laws, which Exodus XXXIV:28 calls explicitly the "Ten Commandments." These are by no means identical with the Ten Commandments of Exodus XX, which were composed much later, probably in the 8th century B. C.

About a half century after this first document, a similar work was composed in the Northern Kingdom. It is found in Exodus XX:23–XXIV:8, and is generally designated by the name applied to it in Exodus XXIV:7, "The Book of the Covenant." It contains a code of laws, of greater extent than the code in the older document. In fact, several of the laws of the Book of the Covenant were borrowed from this older book, with minor changes to meet conditions obtaining in the Northern Kingdom.

Following these two oldest writings came the so-called Yahwist and Elohist documents, composed in the Southern and the Northern Kingdom respectively. The former, the product of the 8th and 7th centuries B. C., is so called by scholars because it uses only the name Yahwe (usually, but mistakenly, pronounced Jehovah) for the Deity. The Elohist Document, written during the 8th century B. C., is likewise so designated because it employs the word Elohim for God. The vast majority of the narratives of Genesis, Exodus, Numbers, and Joshua belong to the Yahwist and Elohist documents.

The Book of Deuteronomy. II Kings XXII and XXIII tell of the finding of a book in the Temple at Jerusalem in the eighteenth year of Josiah. This pious king, persuaded that this was the law of Moses, made it the basis of a far-reaching religious, social, and economic reformation. Scholars have established conclusively that this book was the book of Deuteronomy, or rather the greater part thereof. But, instead of having been written by Moses, then lost for centuries, and suddenly found again, it was composed by prophetic writers at this very time, 621 B. C., and the story of its discovery was merely a pious fiction designed to induce the devout and credulous king to institute the legal provisions of Deuteronomy as the law of the land. The plan succeeded, and the ensuing reformation brought about a greatly needed, thoroughgoing purification of the Israelite religion, and an abolition of the idolatrous rites. The book of Deuteronomy is animated by the fine religious spirit of the prophets. It adapts many of the laws of the Book of the Covenant to the conditions of the end of the 7th century B. C., and reveals a deep humanitarian spirit and a marked progress in civilization.

The Priestly Code. One unforeseen result of this Deuteronomic reformation was the centralization of the worship in the Temple. Gradually the priestly influence overshadowed that of the prophets, and the religion of Israel became steadily more ritualistic. This tendency grew during the Babylonian Exile (586–536 B. C.). This spirit of ritualism and formal religion characterizes the last main stratum of the Hexateuch, which is known, therefore, as the Priestly Code. This was composed, partly in Babylonia and partly in Palestine, between 570 and 400 B. C. or somewhat later. The main body of the Priestly Code is found in Exodus XXV–XXXI and XXXV–XL, the whole of Leviticus, and Numbers I–X:28, while other portions are scattered through Genesis, the early chapters of Exodus, and the latter chapters of Numbers and Joshua.

Sometime after 400 B. C., these various documents were woven together into a kind of running narrative that purported to recount the history of Israel in the period preceding its entrance into Palestine. In this way the Pentateuch, or better, the Hexateuch, came into being.

The Prophets. The prophetic writings, in the main, come from the same period as the Hexateuch. Amos, oldest of the literary prophets, lived about 760 B. C. A generation later came Hosea, Isaiah, and Micah. Nahum wrote about the middle of the 7th century B. C.; Zephaniah, Habakkuk, and Jeremiah, in the last quarter of the same century. Both Jeremiah's style and the content of his prophecy show a marked affinity to the book of Deuteronomy. Ezekiel wrote in Babylon at the very beginning of the Exile. His writings, in turn, exhibit a significant relationship to the Priestly Code. The great anonymous prophet, called Deutero-Isaiah because his supremely rhapsodic utterances are found in Isaiah XL–LVI, lived at the end of the Exile.

The Hagiographa. To the postexilic period belong the books of Zechariah, Haggai, Obadiah, Malachi, Jonah, and Joel. All the books of the Hagiographa, the third division of the Old Testament, were composed during the Exile or in the postexilic period, with the possible exception of a few pre-exilic psalms. Many of the Psalms, however, and also the book of Daniel, were written as late as the 2d century B. C. The book of Job, written about 400 B. C., is generally regarded as one of the masterpieces of the world's literature.

Apocryphal Writings. The Old Testament, in its present arrangement, came into being in the 2d century A. D. through a clear-cut distinction made by the rabbis between those books that were pronounced sacred and those that were declared profane. The latter were forbidden to be read, and gradually disappeared from use in Palestine. Many, however, continued to be regarded as sacred by the Greek-speaking Jews of Alexandria, and have been preserved in Greek translations in two collections known as the Apocrypha and the Pseudepigrapha. The books of the Apocrypha are included in Catholic editions of the Bible. Of the Apocryphal writings, the three books of Maccabees, Esdras, Judith, Tobit, Ben Sirach, and the Wisdom of Solomon are the most important. Recently a large portion of the Hebrew original of Ben Sirach was discovered in Egypt. Of the Pseudepigrapha, Enoch, Jubilees, The Testaments of the Twelve Patriarchs, the Sibylline Oracles, and the Psalms of Solomon are best known. All these works were composed between 200 B. C. and 200 A. D.

The Mishna. With the destruction of the Temple at Jerusalem by the Romans in 70 A. D., the religious life of Israel underwent a complete transformation. Without altar and priesthood, sacrifice and elaborate ritual were impossible. Prayer, reading of the Scriptures, and ceremonies in synagogue and home became the main elements of religious practice. The biblical laws were carefully studied, commented upon, and amplified by the rabbis in the great schools of the land. New laws that regulated all the activities of daily life were devised. Eventually they became so numerous that codification was necessary. This work was successfully accomplished by the great teacher and leader, Rabbi Judah the Prince, about 200 A. D. His work, called the *Mishna*, or "Teaching," is a systematic compilation in six books of all the laws evolved by the rabbis up to that time.

The *Mishna* almost immediately came to be regarded as second in authority only to the Bible. Along with the Bible it became the chief object of discussion by the rabbis in the schools of Palestine and Babylonia. Constantine the Great closed the schools in Palestine in 327, but not until the discussions of the laws of the Bible and *Mishna* had been compiled into a large work known as the *Palestinian* or *Jerusalem Talmud*.

The Talmuds. About the middle of the 6th century, a similar compilation of the rabbinical discussions of the laws of the Bible and *Mishna* in the Babylonian schools was made. This is known as the *Babylonian Talmud*. Hence there are, actually, two *Talmuds*. But, since the *Babylonian Talmud* was compiled two centuries after the *Palestinian*, it is naturally a far larger work, and contains practically everything found in the latter, with much new material. When the *Talmud* is referred to, the *Babylonian Talmud* is usually meant.

But it must not be imagined that these *Talmuds* are purely legalistic works. They abound in information about diverse matters,—folklore, medicine, history, geography, religion and ethics, legends, stories, wise maxims, and the like. This material constitutes a good half of the content of the *Talmud* and is known as *Haggada*, or "Narrative," in contrast to the legalistic matter, called *Halacha*, "Rule." Moreover, a vast store of additional Haggadic material is contained in various collections known as *Midrashim*, or "Expositions" (of biblical texts). Of these, the *Midrash Rabba* is the largest and most popular. The many well-known stories and sayings of the rabbis are taken from the *Haggadic* portions of the *Talmud* and the *Midrashim*.

Medieval Hebrew Literature. After the year 1000 A. D., the center of Jewish life shifted from Babylonia to southwestern Europe. During this period the Jews transmitted much of Arabic science and culture to the European nations and thus contributed mightily to the Renaissance. Hebrew literature during the medieval period dealt with a wide range of subjects,—philosophy, ethics, biblical commentaries, history, mathematics, astronomy,

geography, travel, Hebrew grammar, poetry, and the like. The leading Jewish philosopher, Moses Maimonides, exerted a strong influence upon medieval scholasticism. The best-known medieval Hebrew poets were Judah Halevi and Solomon ibn Gabirol.

The Modern Period. During the 16th, 17th, and 18th centuries, Hebrew literature declined noticeably both in extent and in the value of its content. The last century, however, has witnessed a remarkable revival of Hebrew literature, due chiefly to the Zionist movement, which has sought, with some success, to revive Hebrew as a spoken language. This modern Hebrew literature deals with the same wide range of themes as do other modern literatures. Of the present day Hebrew dramatists, David Pinski is perhaps the foremost. The most gifted modern Hebrew poet is H. N. Bialik, while Asher Ginzberg, better known by his pseudonym, *Achad Haam*, "One of the People," is recognized as the leading essayist.

SYRIAC LITERATURE

The Syriac language belongs to the Aramaic group of Semitic languages, and is, therefore, akin to Hebrew. Syriac was the vernacular of Syria and Mesopotamia until after the Arab conquest (7th century), when Arabic gradually superseded it. Today, Syriac survives as a spoken language only in a few isolated communities in Mesopotamia.

Syriac literature had its beginnings early in the Christian era, and reached its zenith between the 4th and the 7th century. Thereafter it gradually declined and eventually ceased about 1300. It is largely a church literature, and was cultivated chiefly in the Jacobite and Nestorian ecclesiastical schools, particularly those of Edessa and Nisibis. It is rich in hymns, homilies, martyrologies, church histories, and the like.

Of especial interest are the early Syriac versions of the Bible. At least three such are known, composed probably between the 2d and the 5th century. Most important is the version known as the *Peshitta* (the "simple" text). Of some biblical books it is a literal translation, of others a free translation, and of still others merely a paraphrase. In those books of which it is a literal translation, its text frequently varies materially from the Hebrew. It is therefore much used by biblical scholars in determining the original and correct text of the Bible.

Besides church writings, Syriac literature contains many important scientific works, such as treatises on the Syriac grammar and language, histories, and translations, chiefly from the Greek. Some of the works in Aristotle's *Organon* were known to Europe, prior to the Revival of Learning, only by translation from Syriac versions.

Among the leading Syriac writers may be mentioned Bardesanes (b. 154), seemingly the father of Syriac literature, author of an interesting account of the heathen religions of the Orient; Ephraem Syrus (d. 373), the homilist and hymnologist; and Gregory Abulfarag bar Hebræus (1226–86), one of the last and probably the greatest Syriac writer. His extant works are exceedingly numerous and treat a great variety of subjects, mostly scientific. Of particular value is his *Chronikon*, one of the earliest attempts at a universal history in the world's literature.

ARABIC LITERATURE

The Arabic language commands the attention of students of the history of civilization because (1) with the exception of English it is spoken by more people than is any other language; (2) it is the language of the *Koran*, and therefore the sacred tongue of one of the world's great religions; (3) it is the instrument of expression of a vast and varied literature, through which the elements of science and philosophy were communicated to European scholars during the middle ages, thus, in large part, giving rise to the Renaissance; and (4) through it many familiar stories, such as those of the *Thousand and One Nights*, were brought to the Western world.

Arabic is a Semitic language, with a vocabulary far larger probably than that of any other language, and possessing a flexibility that permits the utmost delicacy and imagery of expression. It is primarily the language of the nomad tribes of the Arabian desert, but through the rapid development and spread of Mohammedanism it became the language of a very large part of the Orient.

Pre-Islamic Poetry. Arabic literature began, as might be expected, in the songs of tribal bards extolling the glories of their respective tribes. At the great gatherings of the tribes, and notably at the annual fair at Ukaz, when the tribes came together each year in peaceful intercourse, contests of skill were regularly held between the poets of the various tribes. Poems were first committed to writing in the 6th century A. D., shortly before the birth of Mohammed and the rise of Islam. The greatest of pre-Islamic poets was Imru-'l-Qais, though others, notably Labid and Amr-ibn-Kultum, rank with him. Antar, another famous poet of this time, was the hero of a very long, romantic poem that goes by his name.

The Koran. The *Koran*, the Bible of Islam, contains the inspired utterances of Mohammed, the supposed revelations of God through the prophet to his people. It is written in rimed prose, which produces a rhythmic, dignified, and impressive effect. It is divided into 114 sections or *suras*. For a time after Mohammed's death (632) various versions of the *Koran* were current, but under Caliph Uthman (644–656) these were collected into the present official text. Since then the *Koran* has served as the chief model and inspiration of all Arabic literature. It has been widely studied and commented upon by Mohammedan scholars, and commentaries upon it form an extensive branch of Arabic literature. Baidawi (d. 1282) is the best-known and most authoritative commentator of the *Koran*.

Forms, of Arabic Poetry. Pre-Islamic poetry likewise exerted an important and lasting influence upon subsequent Arabic literature, particularly upon its poetry. The poems of the five greatest pre-Islamic poets were collected and hung up, as the lasting glories of the Arab tribes, in the Kaaba, the great temple at Mecca. Hence they were known as the *muallakat*, "the suspended ones." They served as the models of later Arabic poetry. Therefore it happens that the Arabic *qasida*, or long poem, usually begins with a description of a camping ground and with a lamentation for the fallen or absent companions of the poet. After this introduction the poet takes up the story of his love, his sufferings, and his journey, and adds many details in praise of his horse, his arms, and the like. And then he usually concludes, in typical Oriental manner, with fulsome praise of some influential man, from whom a substantial reward is expected in return.

After the time of Mohammed, when cities and courts developed, these early literary forms, which had sprung out of wandering tribal life, were retained for a time. But in the atmosphere of the cities they became so artificial that, about the 8th century, poets began to employ new forms and treat new subjects. In this century, Abu Nuwas is the most distinguished name in Arabic poetry.

A closely related type of Arabic literature is the *maqama* (assembly), consisting of stately rimed prose interspersed with metrical passages. It therefore exhibits the influence of both pre-Islamic poetry and the *Koran*. It is a combination of legend and story, in which the writer tells how in various places he meets a wandering scholar who puts all his rivals to shame. This type of writing was practiced as late as the 19th century. Hamadhani in the 10th

century was the originator, and Hariri in the 11th century is regarded as the most brilliant writer, of the *maqama*.

Arabic Fables and Stories. From the 8th through the 15th century, and particularly during the brilliant reign of the caliph Haroun-al-Raschid (786–809), Arabic literature reached the height of its development. Arabic writers drew largely upon outside sources. Thus the fables of Bidpai were borrowed from the Persian, and the story of Kalilah and Dimnah, from Indian literature. Best-known of this class of writing is the widely read collection of stories known as the *Thousand and One Nights*, or, less correctly, the *Arabian Nights*. These have been translated into almost every European language.

History and Science. Historical composition has been diligently cultivated by Arabic writers. Their method is peculiar. The historian follows the principle that, if a thing has once been told well, the words of this account can be used again; therefore he keeps as close as possible to his sources. Moreover, if two or more accounts of an incident are current, instead of attempting to determine which is the correct, or at least the most probable, account, he usually cites all the accounts, scrupulously stating his sources for each, and leaves it to his readers to choose whichever tradition pleases him best. In this way thirty or more accounts of a single incident are frequently recorded by Arabic historians.

Other sciences besides history were diligently cultivated by Arabic sages, and the literature is extremely rich in important works on mathematics, astronomy, chemistry, grammar, and philosophy.

Recent Literary Revival. With the advent of the Turks into western Asia and Europe and the conquest of the Moors in Spain in the 15th century, Arabic literature began to decline. The 19th century, however, saw numerous attempts to revive and modernize Arabic literature, due to the increasing contact between Arabic and Western writers and thinkers. Large printing presses have been set up in Beirut and Cairo, and numerous works of poetry and history as well as historical novels by both Mohammedan and Christian writers have been published. Translations of important European works have also been made.

ETHIOPIC LITERATURE

Ethiopic is a Semitic language, closely related to Arabic. The Ethiopians were Semites who, about the beginning of the Christian era, were driven from their home in Sheba in southern Arabia by kindred tribes pushing in from the Arabian desert. They crossed over the narrow strait of Bab el Mandeb at the southern end of the Red Sea and settled in Abyssinia, where they established a powerful kingdom. Today Ethiopic has resolved itself into several dialects spoken by the Abyssinians, the modern descendants of the Ethiopians.

The introduction of Christianity into Ethiopia in the 4th century marks the systematic beginning of Ethiopic literature. The Bible and other writings of the ancient Church were early translated from Greek, Coptic, and Syriac into Ethiopic. Although quite extensive, Ethiopic literature is almost entirely religious in character, occasionally varied by some work of historic or semihistoric nature. Ethiopic writers have been, almost without exception, devoid of distinctive individual merit.

None the less, the literature is important because it contains several important Jewish and early Christian pseudepigraphic writings which have survived only in Ethiopic. Chief of these are the books of Enoch (one version) and Jubilees, the Apocalypse of Ezra, the Ascension of Isaiah, and the Life of Adam and Eve.

There are a few modern works of secular character in the Amhari and Geez dialects.

EGYPTIAN LITERATURE

Egyptian literature presents to modern readers several unusual features: (1) the long history of the Egyptian language, from 4000 B. C. to 1500 or 1600 A. D. (including the Coptic period); (2) the very slight connection of ancient Egyptian literature with that of neighboring countries; (3) an almost total lack of progress in style or subject matter; (4) the fragmentary and inaccurate manuscripts in which the large mass of writings have come down to us.

Three forms of writing were used in ancient Egypt: (1) the hieroglyphic (priestly writing), consisting of pictures to represent ideas, a system in use for inscriptions down to the 2d or 3d century B. C.; (2) the so-called hieratic, an abbreviated form of the hieroglyphic, used by the priests for writing manuscripts; (3) the demotic (popular) script, which came into use very late. The key to these forms of writing was found on the famous Rosetta Stone, discovered in 1798-99 in Fort St. Julien de Rosetta near the Rosetta mouth of the Nile. Knowledge of writing, however, was apparently never widely distributed in Egypt, and the numerous errors and corruptions in the most beautiful of existing papyri show that the copyists were more interested in making accurate characters to be placed with the dead in tombs than in reproducing the thought for living readers.

The remains of Egyptian literature include inscriptions upon monuments and in tombs and a vast mass of papyri which, well preserved in the dry Egyptian climate, have been gathered into the various museums of the world. Most of this literature was produced during the period of the Middle Kingdom (3000 to 1600 B. C.), and the papyri were copied in later times. In general, although the records reveal an ancient, busy, and religious civilization, they are devoid of significance as literature.

Herodotus remarked the devotion of the Egyptians to their gods, and modern scholars find that much of the literature that has survived is concerned with the religious beliefs of the people and with accounts of ceremonies and magical charms and incantations. These are gathered into collections, such as the *Book of the Dead*, portions of which are found on tombs and sarcophagi.

The mythology of the Egyptians seems to have been very rich. It is said that every sanctuary had local legends of the gods, which the priests presented in dramatic form at the local festivals. But very little of such material has survived.

In philosophy, nothing has been found except a few collections of proverbs, sayings such as those ascribed to Ptah Hotep. One such collection, known as the *Papyrus Prisse*, is assigned to the 12th dynasty (about 2500 B. C.) and is called the oldest book in the world.

In poetry a few hymns and some graceful love songs have survived; and one epic poem, celebrating the victory of Rameses II over the Hittites in the battle of Kadesh, is well known. But the Egyptian verse, while it sometimes resembles Hebrew poetry, has very little of real poetic quality and was never highly developed.

The largest body of literary remains, other than the religious works, consists of tales and stories, such as are found in the *Arabian Nights*. These bear evidence of having been passed down through many generations. Some of them are in the form of fables, such as the story of *The Lion and the Mouse*; among fairy tales a Cinderella story appears. For the most part these are written in a simple and unaffected style. Fairly representative of these collections is the story of King Cheops of the Middle Kingdom, who, to relieve his insomnia, called upon his sons for entertainment. They, in obedience, narrated in turn tales of wonders wrought by famous magicians.

In the time of the Middle Kingdom another more

artificial or rhetorical type of story developed, in which the interest centers rather in the semipoetical passages than in the plot. The most famous of such stories have been called *The Fated Prince*, *The Tale of Two Brothers*, and *The Eloquent Peasant*. In the last of these the peasant has been robbed of his ass and applies to an official of his district for redress. The official is so charmed by the peasant's speech that he makes report to the king, and the case is carried on from term to term to give occasion for the peasant to make more of his eloquent speeches. This rhetorical narrative gave place under the New Kingdom to a simpler style of tales of magic and adventure.

After the Greek conquest (about 300 B. C.) Egyptian literature ceased. Its place was taken by the work of Greek authors, and Alexandria became a center of Greek learning. From the 3d to the 16th century A. D., Coptic, a descendant of the ancient Egyptian language, was the tongue of Christian Egypt, but it gave way to Arabic, which is now the popular language of the country. Except for a few unimportant fragments, the only Coptic literary remains are religious,—stories of saints and martyrs, and translations of parts of the Bible. The Gospels and Epistles are still taught to children in Coptic Christian schools in both the Coptic and the Arabic language.

PERSIAN LITERATURE

Persian literature has for Western readers three chief points of interest: (1) its long history and great works; (2) its influence on the later Greek and Hebrew writers; (3) its transmission of Hindu thought and story to the West.

Zoroaster, living probably in the 11th century B. C., did so thoroughly his work of religious teaching and reform, that but scant traces of earlier Persian religion and customs survive. But he and his followers left the world one of its noblest bodies of religious writing, the *Avesta*, which is our earliest example of Persian literature. The language of the *Avesta* is called *Zend*, a word which means literally "interpretation," *Zend-Avesta* meaning "commentary and text." This language and the Vedic Sanskrit were dialects of an earlier Aryan or Indo-European language spoken on the highlands of Iran. Both very early passed out of general use and knowledge.

With the conquest of Persia by the Greeks under Alexander in the 4th century B. C., the "middle" period of Persian literature begins. The *Avesta* was translated into Pehlevi, the language of this period, a mixture of Persian and Arabic. Other literary remains of the time are very scanty.

The successive waves of conquest and tyranny which passed over Persia during the next few centuries, as well as the introduction of Mohammedanism, severely restricted the variety of themes for Persian writers, but these very influences enriched their stock of materials through contact with Greece, Arabia, and especially India, where for several centuries Persian was the official language. From the winning of a partial independence from the caliphs in the 9th century A. D. dates modern Persian literature, written in an Aryan language mixed with many Arabic words.

The 10th century brought the first high tide of Persian literature. Chief among a multitude of writers stands the name of Firdousi, whose greatest work, the *Shah Nameh* or "Book of Kings," is ranked as one of the world's great epics. This poem is a source from which Persian and Western poets and story-tellers have drawn much material. Matthew Arnold made Rustan or Rustum, Firdousi's greatest hero, familiar to English readers in his narrative poem *Sohrab and Rustum*. Firdousi also produced the earliest poetic treatment of the biblical story of Joseph, which has been retold by many of his followers.

Firdousi is counted the originator of romantic, didactic, and mystic Persian poetry. A contemporary of his, a mystic poet, originated the form of the *ruba'i* or "quatrain," peculiarly adapted for the writing of moral and ethical reflections in the skeptical strain characteristic of Persian poetry. It is familiar to Western readers through Fitzgerald's translation of the *Rubaiyat* (Quatrains) of Omar Khayyam, the fascinating freethinker and ironist of the 11th century.

Rather strangely, the next great period of Persian literature falls in the fearful time of conquest and devastation under the Mongolian conqueror, Jenghis Khan. In the 14th century, Hafiz wrote what are called the most perfect of Persian lyrics. The last of the great Persian poets is Djami, who wrote epic, lyric, and mystic verse. These poets, perhaps because of the tyranny of government, did not attempt new themes but gave themselves to treating old themes in new ways; hence their elaborate system of figures, synonyms, and rimes, which in translation often produce an effect monotonous to Western taste. It should be noted that romantic passion, as known among Western nations, does not appear in Persian poetry.

The three centuries after 1500 produced a great wealth of prose in the form of fables, fairy tales and myths, novels and short stories, as well as folklore and history. This Persian telling of many of these stories is the first stage of their journey from India toward the West. Many of them find a place in the collection known as the *Arabian Nights*.

The 19th century in Persia was marked by the late beginnings of the drama. As in other countries, this found its origin in religious ceremonies. The range of themes is very small, although some biblical stories and Christian legends have been used upon the stage. Although much restricted as compared with earlier periods, there is today in Persia literary activity which produces both prose and poetry.

INDIAN LITERATURE

The literature of India (Sanskrit and Hindustani) claims our interest for three reasons: (1) its antiquity; (2) its peculiarly rich development; (3) its vast contributions to Western literature, especially in the form of proverbs, fairy stories, and fables.

This ancient literature, so amazingly vigorous and luxuriant, was opened up to the Western world by the discovery of the Sanskrit language in the 18th century. The discovery revealed the *Vedas*, the most ancient sacred books of the Brahman religion. The contents of these four *Vedas* or "Books of Knowledge," an elaborate body of religious ritual and legend, had been handed down by tradition through many centuries before they were committed to writing perhaps ten centuries before the Christian era. The language in which they are written is called Vedic (knowledge) or Vedic Sanskrit, and it is the ancestor of the Classic Sanskrit. The name Sanskrit (formed, refined) was given to this "older sister" of the western Aryan tongues by grammarians about the 4th century B. C. Since that time, at least, it has been the special language of the high literary and priestly classes, distinguished from the Prakrit (common) dialects of medieval India and from the modern Hindi and Urdu.

The immense literature of this Classic Sanskrit is very rich in epic, didactic, lyric, and dramatic poetry, as well as in prose fables, fairy tales, and romances.

There are two classes of Sanskrit epics. Of the *puranas* (ancient tales) the greatest are the *Mahabharata* (great poem or tale of the Bharatas) and the later and more artistic *Ramayana* (poem concerning Rama). These are partly legendary histories and partly mythical accounts of the universe, all with a religious motive. The greater ones antedate the Christian era, but lesser puranas were written in the first and following centuries A. D. to promote special Brahman beliefs. The *kavyas* (court epics)

are artificial epics, most of which belong to the period between 500 and 1300 A. D. Of these the two best-known are *The Family of Rama* and *The Birth of the War God*. These epics mingle many grotesque fancies with passages of high poetic grace and power. Their delineation of the sentiments of love and forgiveness make an appeal to Western readers that is not always found in the Greek epic.

All forms of Sanskrit literature are strongly lyric, but long lyric poems are rare, their place being taken by series of little poetic pictures. Many poets are known only through some of these detached stanzas, which are commonly intensely sensuous in feeling and full of elaborate figures drawn from natural scenery. A very famous long lyric is *The Cloud Messenger* of Kalidasa. Bhartrhari in the 7th century was a much admired writer of both long and short lyrics.

In didactic and proverb verse, the Sanskrit literature is very prolific. It is said that practically all the proverbs and sayings to be found in other languages can be matched in the Sanskrit. One collection of about eight thousand of these didactic stanzas, representing all periods of the Sanskrit, has been made.

In the 5th or 6th century A. D., the Sanskrit drama began to develop from the pantomime dances connected with religious service. Although rather meager in extent, it is very noteworthy in theme and style. In several points it is similar to the romantic Shaksperian drama; the jester is there, and both comic and serious actions are included in the same play. Its themes are taken from heroic legend or contemporary court life, and its action always ends happily. The most famous of the dramatists, as he was the most illustrious poet of his time, is Kalidasa, whose best-known play is the *Sakuntala*.

The 4th century B. C. saw the earliest collection of fables, made for the purpose of instruction. Assigning of manlike parts to animals and mingling of prose and poetry are characteristic of these stories. We may trace the beast fable, so popular in medieval Europe, to the *jatakas* or Buddhist birth stories, in which the chief character is identified with some previous existence of Buddha. The most famous collection of fairy tales was put together in verse by Somadeva in the 11th century A. D. The titles of three story collections of this period are interesting: *Seventy Stories Told by the Parrot, The Great Cluster of Stories*, and the *Ocean of the Streams of Story*.

The 6th or 7th century A. D. may mark the beginnings of prose romances somewhat like the earlier English novels. One of the best-known is *The Adventures of the Ten Princes*. These romances are sometimes classed with the *kavyas*.

In modern times, two principal dialects, Hindi and Urdu, both of which contain a large Persian element, have achieved the standing of literary languages. The literature in Hindi is said to permeate all classes of the people more thoroughly than is the case with any literature of Europe. Its great poetic period was the 16th century, the Elizabethan period of English. Both Hindi and Urdu have been encouraged by the schools established in India during the 19th century, and they are adapting themselves in style and vocabulary to the expression of modern native and foreign thought. Native presses issue large numbers of books and periodicals. The newspapers of India are of unusual literary importance, because through them rather than through books, modern thought is disseminated among the people.

Extended instruction in English in the schools of India has been accompanied by the rise of numerous Hindu writers of English, several of whom have attained very high rank. The best-known to Western readers is Rabindranath Tagore, teacher and author, to whom the Nobel prize for literature was awarded in 1913.

GREEK LITERATURE

Greek literature is the living record of a great people, comprising works in many fields, which have served as models for all succeeding ages. This remarkable contribution was made possible by the sheer force and originality of the Greek genius, which displayed extraordinary creative power. For the literature of Greece is in the truest sense original; it is the unhampered expression of her great men in a language unsurpassed in grace and dignity.

Epic Poetry. The literature of Greece, as we know it, begins with epic poetry which is plainly the finished product of a society long familiar with this form of literary expression. When these poems were written, the Greeks already possessed, besides the myths of the gods, a large body of so-called historical myths,—of Thebes, of Troy, of the Argonauts, of Theseus, and of Heracles, or Hercules. These myths had long been the subject of the songs of the bards, or wandering minstrels, before Homer composed the two greatest of the world's epic poems. The *Iliad* tells the story of the incidents in the tenth year of the Trojan War; the *Odyssey* recounts the adventures of the return of Odysseus, one of the Trojan heroes, to his home in Ithaca after ten years' wandering. From both their matter and their style, most scholars conclude that a great master poet, Homer, living probably in the neighborhood of Smyrna in Asia Minor, in the 9th century B. C., gave final form in these poems to the stories and songs of a long line of earlier poets. The degree of originality shown by Homer in composing the *Iliad* and the *Odyssey* can only be estimated, and will probably never be known with certainty.

In the two centuries following Homer's time, there flourished a number of writers, known as the cyclic poets, who told and retold in the language of Homer many early legends and hero stories from the well-known "cycles," or groups of myths. During this epic age the Greeks created a larger body of literature of myth and legend than has been developed by any other people, but the most of this literature has not been preserved.

About 100 years after Homer, Hesiod, who wrote the *Works and Days*, a sort of farmer's almanac, wrote also a *Theogony*, an account of old beliefs about the gods and the origin of the world; in the former work he set forth an account of the five ages, beginning with the age of gold and passing through the ages of silver, of bronze, and of heroes, coming finally to the present wicked age of iron.

Reflective and Lyric Poetry. In the next period of Greek literature (about 700–475 B. C.) the turbulent growth of democracy seems to have encouraged reflective and lyric verse, though we know the early writers of this poetry only in tantalizing fragments of their work; these, however, are sufficient to prove its exquisite beauty. Pure lyric poetry was written early in the Æolian island of Lesbos, and the local dialect was one of the first used for lyric expression. This poetry was always sung to the accompaniment of the harp, just as the songs of the epic writers had been sung. At about the same time, lyrics were produced in the Dorian city of Sparta, where life was still free and natural, and not yet hardened into the rigid artificiality which was the blight of Sparta in the 5th century. Sappho and Alcæus, both of Lesbos, are the greatest of the Æolian school of lyric poetry. Toward the end of the period under consideration, a Dorian poet, Pindar, born in the Æolian city of Thebes, rose to the distinction of a national lyric poet of all Greece, and his works are for the most part preserved.

Reflective poetry, with its calmer mood, adopted the elegiac couplet for the treatment of a great variety of subjects. This measure, derived from the Homeric hexameter, was accompanied by a strain of flute music, the "elegy," which had been heard by the Greeks in Asia in songs of mourning. Simonides employed this measure in epitaphs honor-

ing the Greek heroes who fell in the Persian wars. Solon, the lawgiver, used the elegy to publish his political precepts.

The Drama; *Origin.*—After the Persian wars in the beginning of the 5th century, Athens became one of the chief political centers of Greece, and she maintained a position of intellectual and literary leadership in the Mediterranean world for over 200 years. The drama is the most important literary development of this period, and it belongs peculiarly to Athens. It had its origin in very ancient religious observances, and its performance always remained essentially an act of worship of the god Dionysus. It grew out of a dance-song performed annually in honor of the god; this simple dance-song, rendered by a large group of men, came to be called a *dithyramb*, and at Corinth it became dignified into a literary form. Arion is said to have been the first to introduce this improvement, limiting the number of dancers to fifty and dressing them in goatskins as satyrs. At first they sang only of Dionysus and his adventures as he first journeyed into Greece, but later the theme was taken at will from any of the stories of the heroic *saga*.

Tragedy.—The beginning of the tragic drama, as distinguished from the dithyramb, is ascribed to Thespis of Icaria, a village near Athens, in the 6th century; he introduced an actor or speaker distinct from the chorus of singers, so that a legendary story might be enacted by the single actor and the chorus leader, supported by the chorus. Because of the satyr-like dress of the chorus (goatskins) the performance came to be called *tragœdia* or "goat-song"—hence *tragedy*. Æschylus, the first great tragic poet, added a second actor to the one used before his time. Of the eighty or more tragedies which he wrote, only seven remain. He took all his stories from the Homeric and cyclic poems, except that of the *Persians*, in which he celebrated the victory of the Greeks over Xerxes. His greatest work is the *Agamemnon*, which tells the story of the return of Agamemnon from Troy and of his treacherous murder. Sophocles we know through eight plays, the greatest of which is the *Œdipus Tyrannus*, a story taken from the epic cycle of Thebes. Sophocles is held to be the greatest of the Greek writers of tragedy in portrayal of character, and his work holds an unchallenged position among the world's greatest masterpieces. Euripides closely followed Æschylus and Sophocles, but, while the work of his predecessors was marked by profound religious feeling, that of Euripides was characterized by a rationalizing or "modern" spirit. He was regarded with suspicion during his lifetime, but after his death he became the most popular of the three tragedians, so that more tragedies of Euripides have been preserved than of Æschylus and Sophocles together. His is a realistic art, and it was well said by an ancient that, while Sophocles represents men as they should be, Euripides represents them as they are. His songs are particularly admired for their beautiful lyric quality.

Comedy.—Soon after tragedy had been molded by Æschylus into a noble literary form, another kind of dramatic performance came to the front, inspired by the same god. This grew out of the boisterous revels which took place during the festivals in honor of Dionysus—hence the name, *comœdia*, or "revel-song." The earliest comedy is known as the "old comedy"; in this, Aristophanes was the master; he used it as a vehicle of satire, both personal and political. The "middle comedy," which succeeded this Aristophanic comedy, became an instrument of social satire. The "new comedy," beginning about the end of the 4th century, was a light comedy of manners. The greatest writer of this type of comedy was Menander, of whose plays large fragments have recently been discovered in Egypt. This was the comedy which was adopted and imitated in Rome by Plautus and Terence.

Prose Literature; *History.*—The story of Greek prose begins after many centuries during which poetry was the only form of literary expression. The earliest prose, in the 6th century, recorded the speculations of philosophers or the monotonous records of chroniclers; the first prose of lasting importance is the history written by Herodotus in the 5th century, telling the story of the wars between Persia and Greece. Thucydides later wrote a history of the Peloponnesian war, in which he showed the critical insight of a philosophic historian. Xenophon, master of a simple, delightful style, wrote a continuation of Thucydides' history and also the *Anabasis*, an account of the expedition of the Greeks under Cyrus; besides recollections of Socrates and minor essays.

Oratory.—The free Athenian democracy of the 5th century was bound to encourage the art of public speaking and the study of rhetoric. Pericles himself was an orator of pre-eminent ability, and by this gift he maintained his leadership. The art of writing speeches for delivery by clients in the Athenian courts was perfected by Lysias, the master of the plain style, and he was himself an orator of no mean ability. In the following century, the greatest Athenian orators, Isocrates and Demosthenes, pleaded eloquently, but vainly, for a Greece united against the barbarian.

Philosophy.—The profound speculations of mature Greek philosophy are recorded in the writings of Plato, who stands pre-eminent among the writers of Greek prose. Socrates, the teacher of Plato, left no writings; and Aristotle's work, though characterized by the acute penetration of one of the greatest minds of all time, lacks the imaginative quality and the literary value of Plato's writings.

The Alexandrian Age. The productive period of Greek literature ends with the Alexandrian age. The center of intellectual life had shifted from Athens to Alexandria, and great scholarly industry took the place of creative work. Theocritus was the one outstanding exception. He, as the first writer of pastoral poetry, has furnished models and inspiration to many poets of succeeding ages, beginning with the Roman, Virgil. In this period the Hebrew Scriptures were translated into Greek in the version known as the Septuagint.

The Roman Period. In the Roman period, which extends from the middle of the 2d century B. C. to the beginning of the 6th century A. D., among a host of writers we find one of conspicuous ability, Lucian, who wrote in a clear and sparkling style a number of works on a variety of subjects, always handled in a light or playful manner. His *Veracious History* is a story of adventure such as Swift later produced in his *Gulliver's Travels*. His work often assumed a satiric tone, as in his *Dialogues of the Dead*. Plutarch, the father of biography, placed all succeeding centuries in his debt with his *Parallel Lives of the Illustrious Greeks and Romans*, while Strabo wrote on geography, and Josephus produced his *History of the Jews*. It was in this period that the modern novel had its beginning in such writings as the romance of *Daphnis and Chloe*, ascribed to Longus.

The Byzantine Period. From the 6th to the 15th century, the time of the fall of Constantinople, Greek, in the form of a stereotyped literary dialect imitating the Attic, continued to be the language of the culture which centered at Byzantium (Constantinople), as Latin was the language of Rome and the West. Apart from the work of a few able historians, such as Procopius of Cæsarea, most of the writings produced are of theological interest only, being the work of the Church fathers, such as Eusebius and Chrysostom. But it was during this period that the collection of short poems known as the *Greek Anthology* was completed. This collection includes thousands of poems, some of universal interest, and others inspired by some particular occasion, ranging in date from the 5th century B. C. to the 6th century A. D.

MODERN GREEK LITERATURE

Greek literature in the modern period, beginning about 1453, has been written partly in classical Greek, partly in the vernacular, but mainly in a literary language based on the classical tongue but modified by the vernacular and given definiteness through the work of the philologian Cortaës (1748–1833). The literary language was not spoken, but until the early years of the 20th century it was employed generally in prose writing. The use of the vernacular, or Romaic, language spread from poetry to all other types and had virtually completed its conquest of the literary tongue by 1925.

Before the national revival in the 18th century, few modern works were produced in Greek. A number of philosophical tracts in the classical tongue appeared during the 15th century, and an anonymous ballad poetry expressed in the vernacular arose in the mountainous districts of Greece. Crete too was represented by a number of poems in the local dialect, of which the *Eratocritus* by Cornaro (16th century) was the most noted. Several chronicles appeared in the literary tongue, which do not, however, attain to the distinction of histories.

The period of the revolution in the 18th century is represented by many writers, among whom the more noted were Rhigas (1760–89), who wrote stirring patriotic odes, and Trikoupis (1788–1873), the author of *History of the Revolution*.

Like other Western literatures, that of Greece in the 20th century has been especially rich in novels and short stories. Best known of modern Greek poets is Costis Palamas (1859–), whose *Immutable Life* won him international recognition. His influence was one of the most powerful factors leading to the triumph of the vernacular over the literary tongue in Greek letters.

TABLE OF GREEK LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
B. C.			
About 900	Homer		Iliad, Odyssey.
About 800	Hesiod		Works and Days, Theogony.
About 700	Tyrtæus		Elegies.
About 600	Sappho		Lyrics.
About 600	Alcæus		Lyrics.
639–559	Solon		Elegies.
6th Cent.	Thespis		Tragedy.
About 563	Anacreon		Lyrics.
556–468	Simonides		Choral Lyrics, Elegies.
525–456	Æschylus		Tragedy (Prometheus Bound, Agamemnon).
522–443	Pindar		Choral Poetry.
500–428	Anaxagoras	Natural Philosophy	
495–406	Sophocles		Tragedy (Antigone, Œdipus Tyrannus).
484–424	Herodotus	History (Persian Wars)	
480–406	Euripides		Tragedy (Medea, The Bacchæ).
454–399	Thucydides	History (Peloponnesian War)	
445–385	Aristophanes		Comedy (The Birds, The Frogs).
445–378	Lysias	Oratory (Eratosthenes)	
436–338	Isocrates	Oratory (Panegyricus)	
434–355	Xenophon	History (Hellenica, Anabasis)	
429–347	Plato	Philosophy (Republic, Phædo)	
389–314	Æschines	Oratory (Against Ctesiphon)	
385–322	Demosthenes	Oratory (Philippics, On the Crown)	
384–322	Aristotle	Philosophy (Organon)	
372–287	Theophrastus	Philosophy (Characters)	
342–291	Menander		Comedy.
342–270	Epicurus	Philosophy	
About 300	Euclid	Geometry	
About 300	Theocritus		Pastoral Lyrics (Idyls).
287–212	Archimedes	Mechanics	
276–196	Eratosthenes	Astronomical Geography	
B. C. A. D.			
64– 21	Strabo	Geography	
A. D.			
37–100	Josephus	History (History of the Jewish War)	
46–125	Plutarch	Biography (Parallel Lives of the Illustrious Greeks and Romans)	
125–192	Lucian	Dialogues of the Dead, Veracious History	
264–340	Eusebius	Church History (Chronicle)	
347–407	Chrysostom	Sermons	
5th Cent.	Longus	Pastoral Romance (Daphnis and Chloe)	

LATIN LITERATURE

Latin literature is to be prized because it contains such masterpieces as the poems of Lucretius, Virgil, and Horace, and the prose writings of Cicero and Livy. It has also transmitted to the Western world and adapted for it much of Greek thought and culture. Thus it has had an abiding influence on the form and content of the literatures of Europe and America. It deserves careful study also because the Latin language is one of the most perfect vehicles of literary expression that man has ever perfected, and because Latin is not only the predominant element in French, Spanish, and Italian, but also a very powerful factor even in the English language.

Early Epic and Drama. The early development of pure literature among the Romans is closely related to their political and military history. Southern Italy and Sicily were Greek. The war which the Romans carried on in the South against Pyrrhus and later in Sicily against the Carthaginians gave them a better acquaintance with the Greek people, Greek literature, and the Greek theater than they had had before. It was a Greek teacher, Livius Andronicus, brought to Rome as a captive from Tarentum in southern Italy in 272 B. C., who composed the first piece of formal Latin literature. It was a translation of the *Odyssey*. Later, in 241 B. C., to celebrate the successful conclusion of the long war with Carthage, a festival was held, and for this festival Andronicus adapted a Greek tragedy and a comedy. Nævius,

the successor of Andronicus, and a native Italian, broke away in part from the Greek tradition by writing in verse the story of the first Punic war, and by basing some of his plays on Roman subjects.

Ennius also chose a Roman theme for his great epic, the *Annals*, which Virgil has followed here and there in the *Æneid*. Ennius used the hexameter verse too for the first time in Roman epic poetry. Greek tragedy in a Roman dress flourished in the early period, but it never attained great popularity with the Romans, and the writing of it for the stage ceased before the time of Cicero. The drama was best represented by the comedies of Plautus and Terence, in the latter part of the 3d and the early part of the 2d century B. C. Twenty of the plays of Plautus and six plays of Terence have come down to us. These two writers contented themselves with adapting Greek plays to their Roman audiences, but, in the century after them, plays based on Italian life made their appearance and won a place on the stage.

Oratory and History. While some native themes appeared in comedy and satiric verse, the practical Latin genius found best expression in this period in the prose of history and oratory. Cato the Censor is called the first of the orators, as he was the first historian in Latin. One hundred and fifty of his speeches are said to have been extant in the time of Cicero. He wrote also on agriculture and country life, and his *Origines* furnished Virgil with much material on the local history of Italian towns.

The following century (about 150–50 B. C.) witnessed the development of a Latin prose which combined the earnestness of the Roman temperament with something of the Greek artistic skill. The republican form of government was friendly to political discussion and furnished the motive for reflective political and historical prose. Sallust wrote history of the philosophic type found in the Greek historian, Thucydides. Cæsar, in his *Commentaries on the Gallic War*, created a model of direct, simple prose narrative.

Cicero. But the greatest figure of this time is Cicero, whose career falls in the first half of the 1st century B. C. Cicero was the greatest orator of his time, both in training and in performance. He developed a temperate style of oratory in contrast to the more florid Asiatic style then in vogue, and set a high standard for all orators of later centuries. His best-known speeches are those delivered against the conspirator Catiline. But, besides being a master of oratory, Cicero was a practical interpreter of the Greek philosophers. He was a finished critic and a graceful writer of letters which, in historical interest and personal charm, have perhaps never been surpassed. Among his famous books on criticism and philosophy are those *On the Orator*, *On Old Age*, and *On Friendship*.

The Augustan Age. To this "age of Cicero" belong two poets,—Lucretius, who wrote what has been called the world's greatest didactic poem, *De Rerum Natura*, an exposition of the atomic theory of Epicurus, and Catullus, the first great lyric poet of Rome. But the half century immediately following Cicero, called the Augustan age, saw the great outburst of Roman poetry. Loss of political freedom brought about the decline of oratory and political writing. Livy is the only great historian of the time, and he devoted his attention to giving the world splendid pictures, especially of the earlier periods of Roman history. Horace, for whom Catullus had prepared the way, wrote satires, epistles in verse, and odes, producing the finest Latin lyric verse. Ovid is best known through his *Metamorphoses*, in which he retold many Greek myths.

Virgil. The work of these men, as well as that of their greater contemporary, is still a living influence. The greatest of Roman poets is Virgil, whose earlier work, prompted by his own love of country life and perhaps by a suggestion of Augustus that he might kindle a like enthusiasm among the people, consisted of *Eclogues*, that is, shepherd or pastoral poems, and *Georgics*, or poems of farming, which have inspired many later poets. But Virgil's greatest theme was the glorification of Rome and through Rome the praise of the empire and Augustus. In his crowning work, the *Æneid*, which he modeled upon the Greek *Iliad* and *Odyssey*, he gave deathless form to the story, first attempted by Nævius and Ennius 200 years before, of the adventures of Æneas and his companions from the fall of Troy to the founding of Rome.

The Period of Decline. After the Augustan age, Latin literature begins to decline. In the years following the death of Virgil, we have in the drama only Seneca, whose artificial, closet-tragedies were taken as models by early French and English dramatists. Pliny the elder left a great name as an encyclopedist. Martial, who was the court poet of Domitian, is known as the creator of the epigram. Juvenal is the great satirist of the period. By an age that had lost creative power much attention was given to rhetoric, in which Quintilian was, for many centuries, the highest authority. In the reigns of Nerva and Trajan, Tacitus, embittered by the persecutions of the reign of Domitian, wrote independently and with some republican bias upon the early empire. He is the last of the great historians of antiquity.

Up to the time of Tacitus, Rome had been the center of literary activity. All the great writers had been born there or had come there to live. In the later period, Rome and Italy lose their primacy in the literary as well as in the political world. Their vitality is gone. But literature springs up afresh in the new soil of the Western provinces, especially in Africa and in Gaul, and flourishes there from the 2d to the 6th century. In this latter century we find the last piece of pure literature which seems to belong to the old civilization, the *Consolations of Philosophy* of Boethius. It is to the 6th century also that we owe the *Code* of Justinian, which has served as a basis for all later jurisprudence. It does not fall within the field of pure literature, but it is the most characteristic product of the Roman genius. It summarizes in its *Institutes* the great principles of law which the Romans had developed through the generations; in the *Digests* it sets forth the opinions of distinguished jurists on important points of law; while in the *Code* proper and in the *Novels* edicts and decrees of the emperors are grouped together.

It is quite impossible to fix any point as marking the end of Latin literature, but, by the 7th century, French, Italian, and Spanish were beginning to develop, and it is convenient to take Isidore, the bishop of Seville, who died in the year 636, as marking the end of the long line of Latin authors. As if conscious of the fact that he closed the series of writers in Latin, he tried to sum up in his great work on *Etymologies* all the learning of past generations of Romans.

Medieval Latin. Even after French, Italian, and Spanish came into use in everyday life, Latin continued to be the language employed by the scholar, by the diplomat, and especially by the churchman, even in the services of the Church and in the sermons of the clergy. The rapid spread of Christianity from the 3d century on made radical changes in both the form and the content of Latin literature, and to the scholars of the Church and to her institutions we owe such learning as the middle ages had and the transmission of the masterpieces of Latin literature to us. So far as literary form was concerned, Christian writers brought in accentual, rimed poetry in place of the quantitative blank verse of pagan literature. This new form of verse was used especially in their hymns, which St. Hilary of Poitiers introduced into the Latin Church in the 4th century.

Shortly afterward, in 405 A. D., St. Jerome completed his translation of the Bible into Latin, the Vulgate so called, perhaps the most widely used book that the world has ever known. A contemporary of

his, St. Augustine, wrote his great treatise on the *City of God*, the first philosophic interpretation of history from the Christian point of view. As we come into the later period, we find in the 6th century the valuable *History of the Franks* by Gregory, bishop of Tours, and, corresponding to this work, the *Ecclesiastical History of the English People* by Bede, the monk of Jarrow. The classical tradition is kept alive in the Latin plays of the German nun, Hroswitha, in the 10th century, and in the works of John of Salisbury, the great English scholar of the 12th century.

Manuscripts in Monasteries. The preservation of the classics also is due primarily to the Church. In 540 Cassiodorus established a monastery in southern Italy, in which he employed the monks in copying Latin authors. When the rest of Europe was sunk in ignorance and poverty, the Irish monks kept up this practice, until order was restored on the continent by Charlemagne, and the copying of manuscripts was again taken up there, in the great monastery and school of Tours. When, in the time of the Renaissance, the works of Cicero, Virgil, and the other great writers of the early period were found in the monasteries and carefully studied, their Latin appeared so much finer than that in current use, that the latter fell into disrepute, and consequently the humanists may be said to have put an end to Latin as the accepted vehicle of literary expression.

Roman literature as we have it owed much to the Greeks, but it may well have been a misfortune to it that in the very beginning it was brought under the influence of so highly perfected a literature as was that of the Greeks. As a consequence, it never had an opportunity to develop along the lines of the Roman national genius. In the writing of satire, in letter writing, and in the realistic romance, the Romans found fields essentially new and especially adapted to their talent; but all the other literary *genres*—the epic, the lyric, the pastoral, the drama, oratory, history, biography, and the essay,—they found represented by finished Greek productions. That their prose literature in the last century B. C. and their verse in the Augustan age did attain such a high degree of excellence, is an indication that the Romans had a marked strain of originality and made themselves masters of literary technique.

TABLE OF LATIN LITERATURE

Authors		Representative Works	
Time	Name	Prose	Poetry and Drama
B. C.			
3d Cent.	Livius Andronicus		Translation of the Odyssey, Tragedy.
269?–199	Nævius		Comedy, Tragedy, Epic (The Punic War).
254–184	Plautus		Comedy, (Aulularia, Captivi, Pseudolus).
239–169	Ennius		Epic (The Annals), Tragedy, Miscellanies.
234–149	Cato the Censor	De Re Rustica, Origines	
220–130	Pacuvius		Tragedy.
190?–159	Terence		Comedy (Andria, Phormio, Adelphi).
180–103	Lucilius		Satires.
170– 90?	Accius		Tragedy.
116– 27	Varro	On Agriculture, Antiquities	
106– 43	Cicero	Orations, Letters, Essays	
100– 44	Julius Cæsar	Commentaries on the Gallic War and the Civil War	
99?– 55	Lucretius		De Rerum Natura.
87– 54	Catullus		Lyrics.
86– 34	Sallust	History (Conspiracy of Catiline, War with Jugurtha)	
70– 19	Virgil		Eclogues, Georgics, Æneid.
65– 8	Horace		Odes, Satires, Epistles, Epodes.
1st Cent.	Nepos	Biographies	
B. C. A. D.			
59 – 17	Livy	History of Rome	
54?– 19?	Tibullus		Elegies.
50?– 15?	Propertius		Elegies.
43 – 18	Ovid		Heroides, Metamorphoses, etc.
4?– 65	Seneca	Investigations, Moralistic Essays.	Dramas.
A. D.			
23– 79	Pliny the Elder	Natural History	
35– 95?	Quintilian	Rhetoric	
39– 65	Lucan		Pharsalia.
40?–104?	Martial		Court Poetry, Epigrams.
55?–120?	Tacitus	Germany, History, Annals	
60?–140?	Juvenal		Satire.
61–113?	Pliny the Younger	Letters	
70?–150?	Suetonius	Lives of the Cæsars	
125?–200?	Apuleius	Romance	
?–366	Hilary		Hymns.
340–420	St. Jerome	The Vulgate	
354–430	St. Augustine	Confessions, City of God	
480?–524	Boethius	De Consolatione Philosophiæ, Translations	
490?–580?	Cassiodorus	History, Rhetoric	
538–593	Gregory of Tours	History (of the Franks)	
540?–604	Gregory the Great	Commentaries, Letters	
560?–636	Isidore of Sevilie	Theology, Encyclopedia	
673–735	The Venerable Bede	Ecclesiastical History	
About 967	Hroswitha	Legends	Epics, Plays.
1100–1156	Bernard of Cluny		Hymns (Jerusalem the Golden; For Thee, O Dear, Dear Country; The World Is Very Evil).
1118–1180	John of Salisbury	Encyclopedia, Letters	Elegies.
?–1192	Adam of St. Victor		Hymns.

LITERARY PLOTS, CHARACTERS, AND ALLUSIONS

Of the making of books there is no end. This statement is attributed to one of the sages who lived centuries ago. If it was true then, it is a hundredfold more true today. The result is that no one can hope to be conversant with all the stories that have been told and with all the characters that have been depicted in literature.

Not even the more famous books can be familiar to those who have limited time to devote to reading. Nevertheless, one cannot go far in reading, or even in conversation, without being confronted with some allusion or some reference to a great literary work or to a story or a character drawn from such a book.

The following dictionary is intended to make such allusions more intelligible: to *outline* the stories in a few words; to *place* the characters; to *explain* terms that get their meaning from their connection with celebrated works; and, in general, to be a *guide* through that complex, imaginary world built up by the literatures of all lands.

Abbot, The. Sir Walter Scott. A story of thrilling adventures and vivid historic scenes around Lochleven Castle, north of Edinburgh, where Mary Queen of Scots was imprisoned. The story centers about the fortunes of Mary. A famous scene in the book is Mary's signing of her abdication, at the insistence of Lindsay and Ruthven, the royal commissioners.

Abdallah. Life of Mohammed, Washington Irving. A hero in Mohammedan legend. It is said that Abdallah, the father of Mohammed, was so beautiful that, when he married Amina, 200 virgins died of broken hearts.

Abdiel (*ăb'dĭ-ĕl*). **Paradise Lost, Milton.** The name, meaning "servant of God," of the seraph, who, when Satan stirred up a revolt, boldly withstood him.

Abou Hassan (*ä'bōō hăs'ăn*). **Arabian Nights.** According to *Arabian Nights*, a merchant of Bagdad who was carried in his sleep to the bed of Caliph Haroun-al-Raschid and on waking was made to believe himself the caliph, a deception which occurred twice. He afterward became in reality the caliph's favorite and companion.

Abraxas. In Persian literature a word denoting a supreme being. In Greek notation it stands for the number 365. In old tales or romances Abraxas presides over 365 impersonated virtues, one of which is supposed to prevail on each day of the year. In the 2d century the word was employed by the Basilidians for the deity; it was also the principle of the Gnostic hierarchy, and that from which sprang their numerous Æons. The word is found on stones used as talismans in the middle ages, called abraxas stones.

Absalom. Absalom and Achitophel, Dryden. A name given by Dryden, in his satirical poem "Absalom and Achitophel," to the duke of Monmouth, a natural son of Charles II. Like Absalom, the son of David, Monmouth was remarkable for his personal beauty, his popularity, and his undutifulness to his father.

Absolute, Captain. The Rivals, Sheridan. The hero in Sheridan's comedy *The Rivals*. He is distinguished for his gallant, determined spirit, his quickness of speech, and his dry humor.

Absolute, Sir Anthony. The father of the hero in Sheridan's *Rivals*. He is represented as testy, positive, impatient, and overbearing, but yet of a warm and generous disposition.

Abudah (*ä-bōō'dä*). A merchant of Bagdad. He finds the only way to rid himself of the torment of an old hag by whom he is haunted is "to fear God and keep his commandments." In James Ridley's *Tales of the Genii* (1764).

Acadia. The original, now the poetic, name of Nova Scotia. The name is derived from the Micmac Indian word *akade*, meaning plenty; in old documents the territory was called L'Acadie or La Cadie. It was granted by Henry IV of France, November 8, 1603, to De Monts, a Frenchman, and a company of Jesuits. They were finally expelled from the country by the English governor and colonists of Virginia, who claimed all that coast by virtue of its prior discovery by the Cabots in 1497. In 1621, Sir William Alexander, a Scotchman, applied to and obtained of James I a grant of the whole peninsula, which he renamed Nova Scotia, in honor of his native land. In 1755, the French inhabitants were seized, forcibly removed, and dispersed among the English colonists on the Atlantic coast. Longfellow has made this event the subject of his poem "Evangeline."

Achitophel (*ă-kĭt'ō-fĕl*). **Absalom and Achitophel, Dryden.** Achitophel, a nickname given to the first earl of Shaftesbury by his contemporaries, and made use of by Dryden in his poem "Absalom and Achitophel," a satire designed as a defense of Charles II against the Whig party. There is said to be a striking resemblance between the character and career of Shaftesbury and that of Achitophel, or Ahithophel, the treacherous friend and counselor of David, and the fellow conspirator of Absalom.

Acrasia (*ă-krā'zhĭ-ă*). **Faery Queen, Spenser.** A witch represented as a lovely and charming woman, whose dwelling is the Bower of Bliss, situated on an island floating in a lake or a gulf, and adorned with everything in nature that can delight the senses. The word signifies intemperance. She is the personification of sensuous indulgence and intoxication. Sir Guyon, who represents the opposite virtue, is commissioned by the faery queen to bring her into subjection and to destroy her residence.

Acres, Bob. The Rivals, Sheridan. A character in *The Rivals*, celebrated for his cowardice and his peculiar method of allegorical swearing.

Acrostic (*ă-krŏs'tĭk*). A form of verse in which the first letters of the lines form a word, usually a name. The Hebrews wrote a form of acrostic poetry in which the initial letters made their alphabet in regular order. Some of the psalms of the Old Testament are on this plan, especially the 119th Psalm.

Adam. Meaning "the made one." (1) A character frequently alluded to in the *Talmud*. Many strange legends are related of him. He was buried, so Arabian tradition says, on Aboncais, a mountain of Arabia. (2) In Shakspere's *As You Like It*. An aged servant to Orlando, who offers to accompany Orlando in his flight and to share with him his carefully-hoarded savings of 500 crowns. (3) In Shakspere's *Comedy of Errors*. An officer known by his dress, a skin-coat.

Adamastor. Lusiad, Camoëns. A hideous phantom described by Camoëns as the spirit of the stormy cape (Cape of Good Hope).

Adams, Parson. Joseph Andrews, Fielding. A character in Fielding's story *Joseph Andrews*. He is distinguished for his goodness of heart, poverty, learning, and ignorance of the world, combined with courage, modesty, and a thousand oddities.

Adelphi (*ă-dĕl'fī*), "The Brothers." A play by Terence. Two brothers are brought up, one under stern parental discipline, the other under a scheme of indulgence. The play shows neither plan by itself to be successful. A golden mean between the extremes is suggested as the right method of education.

Adonais (*ăd'ō-nā'ĭs*). A poetical name given by Shelley to the poet Keats, on whose untimely death he wrote an elegy bearing this name for its title. The name was coined by Shelley probably to hint an analogy between Keats's fate and that of Adonis.

Adrastus. (1) *Jerusalem Delivered*, Tasso. An Indian prince from the banks of the Ganges, who aided the king of Egypt against the crusaders. He was distinguished by his garment, a serpent's skin. Adrastus was slain by Rinaldo. (2) A mythical king of Argos. While in exile in Sicyon, he instituted the Nemean games.

Æneas (*ē-nē'ăs*). A Trojan prince, son of Anchises and the goddess Venus. When Troy fell, he quitted the city with his followers, accompanied by his father and son, visited various countries, settled in Latium, and married Lavinia, the daughter of Latinus. To him tradition ascribes the founding of the Roman state. Virgil tells his story in the *Æneid*.

Æneid. An epic of Latin national life. Virgil introduces into his poem the outlines of the Roman history and a number of interesting episodes. The first three books are not arranged in the order of time. The second book, which relates the downfall of Troy, and is the basis of the poem, is the first in time. The third, which relates the voyage of Æneas until after his departure from Sicily for Italy, follows. The first, which relates the dispersion of his fleet and his arrival in Africa, with his kind reception by Dido, succeeds the third. By this change the hero relates the downfall of his country, and the fortunes of his long and eventful voyage. The idea which underlies the whole action of the poem is the great part played by Rome in the history of the world.

Æsop's Fables. In the 5th century B. C., fables were in circulation in Athens, which were attributed to a certain Æsopus. Nothing is known for certain of his career. Probably he did not write the stories, but merely told them. The common collections bearing the name "Æsop" are versions of a book made by Phalereus in Athens about 320 B. C. and translated into Latin by Phædrus in the 1st century A. D.

Agamemnon. A Tragedy by Æschylus. The first of a trilogy consisting of *Agamemnon*, *Choëphori*, and *Eumenides*. In the play, Clytemnestra, wife of Agamemnon, aided by Ægisthus, kills him, ostensibly to avenge their daughter Iphigenia, whom he had sacrificed.

Agapida (*ă-gā-pē'thă*), **Fray Antonio.** The imaginary chronicler of the *Conquest of Granada*, written by Washington Irving.

Agib. Arabian Nights. The third Calendar in the story of "The Three Calendars," in the *Arabian Nights*. Also, in "The Story of Noureddin Ali and Bedreddin Hassan," the son of the latter.

Agnes. (1) A young girl in Molière's *L'Ecole des Femmes*, who affects to be remarkably simple and ingenuous. The name has passed into popular use, and is applied to any young woman unsophisticated in affairs. (2) A strong, womanly character in *David Copperfield*, who proves a true friend to David's "childwife," Dora, and to David himself. Later, Dora dies and David marries Agnes.

Agramante (*ă'grȧ-mȧn'tā*) or **Agramant** (*ăg'rȧ-mȧnt*). King of the Moors in Ariosto's poem *Orlando Furioso*.

Aguecheek (*ā'gū-chēk'*), **Sir Andrew. Twelfth Night, Shakspere.** A simpleton to whom life consists only of eating and drinking. He is stupid even to silliness, but so devoid of self-love or self-conceit that he is delightful in his simplicity.

Ahmed, Prince. Arabian Nights. A hero who possessed a magic tent which would cover a whole army but might be carried in the pocket. He also possessed a magic apple which would cure all diseases.

Al Aaraaf (*ăl ă-răf'*). The Mohammedan limbo, or abode of souls who have been about equally good and bad. The subject of an uncompleted poem by Edgar Allan Poe.

Aladdin. One of the best-known characters in the *Arabian Nights*. Aladdin becomes possessed of a wonderful lamp and ring. On rubbing them, two genii appear, who are the slaves of anyone who possesses the lamp and ring. They obey Aladdin and perform incredible deeds by their magic.

Alasnam. The hero of a story in the *Arabian Nights* entitled "The History of Prince Zeyn Alasnam and the Sultan of the Genii." Alasnam had eight diamond statues, but had to go in quest of a ninth more precious still, to fill the vacant pedestal. The prize was found in the lady who became his wife, at once the most beautiful and the most perfect of her race.

Alastor, the Spirit of Solitude, Shelley. A poem in which he pictures an uncorrupted youth who, in seeking sympathy in the world, finds only the solitude of the crowd. In Greek story, Alastor is the avenger who follows the guilty man.

Albany, Albainn. A name given to Scotland or the Scottish Highlands in old romances and early histories. The title "Duke of Albany" has been frequently conferred since the 14th century. The "Duke of Albany" is the husband of Goneril in Shakspere's *King Lear*.

Alberich, Dwarf. In the *Nibelungenlied* the dwarf "Alberich" is the guardian of the famous "hoard" won by Siegfried from the Nibelungs. The dwarf is twice vanquished by the hero, who gets possession of his "Tarnhelm," or cap of invisibility.

Albion. An ancient name of Britain, now used only in poetic allusion. Some say the name is derived from the lofty white cliffs on the south coast. Others derive it from the name of a fabulous giant, Albion, son of Neptune, who called the island after his own name and ruled it 44 years.

Albracca (*ăl-brăk'kă*). **Orlando Innamorato, Boiardo.** A castle of Cathay to which Angelica retires in grief at being scorned and shunned by Rinaldo, with whom she is deeply in love. Here she is besieged by Agricane, king of Tartary, who resolves to win her, notwithstanding her indifference to his suit.

Alceste (*ăl-sĕst'*). **Le Misanthrope, Molière.** A noble but misanthropic man, the hero of Molière's comedy.

Alchemist, The, Ben Jonson. A comedy. The alchemist is Subtle, a quack, who makes dupes of Sir Epicure Mammon and others. He leads them to believe that he has discovered the philosopher's stone. The best of Jonson's dramas.

Alcina. Orlando Innamorato, Boiardo. A fairy represented as carrying off Astolfo. She reappears in great splendor in Ariosto's *Orlando Furioso*.

Aldiborontiphoscophornio. A character in Henry Carey's burlesque tragedy *Chrononhotonthologos*.

Aldine (*ăl'dīn*) **Edition.** This name is now applied to some editions of English works. The original Aldine editions were books from the press of Aldus Manutius, printed in the years 1490–1597 in Venice. These books have been highly prized for both their literary value and their handsome exterior. The distinguishing mark of the Aldine books is an anchor entwined with a dolphin. Collections of these books have been made. Many of the works are now very rare and are highly prized.

Aldingar (*ăl'dĭng-gär*), **Sir.** A character in an ancient legend, and the title of a celebrated ballad, preserved in Percy's *Reliques*. This ballad relates how the honor of Queen Eleanor, wife of Henry Plantagenet, impeached by Sir Aldingar, her steward, was submitted to the hazard of a duel, and how an angel, in the form of a little child, appeared as her champion and established her innocence.

Alexandrian Codex (*kō'dĕks*). A manuscript of the Scriptures in Greek, which belonged to the library of the patriarchs of Alexandria, in Africa, A. D. 1098. In 1628 it was sent as a present to Charles I and was placed in the British Museum. It is on parchment, in uncial letters, and contains the Septuagint version (except the Psalms), a part of the New Testament, and the Epistles of Clemens Romanus. It is much consulted by biblical scholars, especially in the critical study of the epistles.

Alhambra (*ăl-hăm'brȧ*), **The, Washington Irving.** A series of legends of this famous Moorish fortress and palace near Granada, Spain. The book contains the finest descriptions of the palace. The name means "Red Castle."

Alice Brand. Lady of the Lake, Scott. Alice signed Urgan the dwarf thrice with the sign of the cross, and he became "the fairest knight in all Scotland." Then Alice recognized in him her own brother.

Alice's Adventures in Wonderland. A popular children's story by Lewis Carroll (C. L. Dodgson). In the story Alice, in a dream, in which she follows a rabbit into his burrow, comes out in a marvelous land underground where the animals act and talk like human beings. Her later adventures are given in *Through the Looking-Glass*.

Allan-a-Dale. A friend of Robin Hood's in the ballad. He is introduced into Sir Walter Scott's *Ivanhoe* as Robin Hood's minstrel.

All's Well that Ends Well. A comedy by Shakspere. The hero and heroine are Bertram, count of Rousillon, and Helena, a physician's daughter, who are married by the command of the king of France, but separate because Bertram thinks the lady not sufficiently well born for him. Ultimately, however, all ends well.

Allworthy. Tom Jones, Fielding. Tom's foster father. He is distinguished for his benevolence. This character is said to be drawn from Fielding's friend, Ralph Allen.

Alph. Kubla Khan, Coleridge. A name invented by Coleridge and applied to a river mentioned in this poem.

Alquife (*ăl-kē'fā*). A personage that figures in all the books of the lineage of Amadis as a powerful wizard.

Al Rakim (*ăl rā-kēm'*). A fabulous dog connected with the legend of the "Seven Sleepers." The Mohammedans have given him a place in paradise.

Al Sirat (*ăl sē-răt'*). A bridge from this world to the next, extending over the abyss of hell. This narrow bridge, less than the thread of a famished spider, must be passed over by every one who would enter the Mohammedan paradise.

Amadis (*ăm'ā-dĭs*) **of Gaul.** The hero of a celebrated medieval romance. The first part of the story is said to have been written by Lobeira of Portugal in the 14th century. Other portions were added later in Spain and France. Amadis, the hero, is a prince of Gaula, or Wales. He is exposed to the sea in his cradle, is rescued, brought up in Scotland, and, finally, after numerous adventures, marries the princess Oriana, in some versions daughter of a king of England, in others, of a king of Denmark.

Amaimon or **Amaymon.** An imaginary king of the East, one of the principal devils who might be bound or restrained from doing hurt from the third hour till noon, and from the ninth hour till evening. He is alluded to in Shakspere's *Merry Wives of Windsor*.

Amanda. A young woman who impersonates spring in Thomson's "Seasons."

Amaurot. Utopia, Sir Thomas More. Amaurot was the chief city in Utopia.

Amaurote. A bridge in Utopia. The word means "faintly seen."

Amelia. The title of one of Fielding's novels, and the name of its heroine, who is distinguished for her tenderness and affection. The character of Amelia is said to have been drawn from Fielding's wife.

Amine (*ăm'ĭ-nē*). In *Arabian Nights* a female character who leads her three sisters by her side as a leash of hounds.

Aminte (*ä'măxt'*). **Les Précieuses Ridicules, Molière.** A contradictory character in this comedy. She dismisses her admirers for proposing to marry her, scolds her uncle for not carrying himself as a gentleman, and marries a valet whom she believes to be a nobleman.

Amlet, Richard. The name of a gamester in Vanbrugh's *Confederacy.*

Amoret. (1) The name of a lady married to Sir Scudamore, in Spenser's *Faery Queen.* She is the type of a devoted, loving wife. (2) The heroine of Fletcher's pastoral drama, *The Faithful Shepherdess.*

Amys and Amylion. Two faithful friends. The Pylades and Orestes of the feudal ages. Their adventures are the subjects of ancient romances. An abstract of this early romance is found in Ellis's *Specimens of Early English Metrical Romances.*

Anabasis (*ă-năb'ă-sĭs*). A Greek work by Xenophon, which describes the expedition of the 10,000 Greeks, allies of Cyrus, particularly their retreat after the defeat and the death of Cyrus in 401 B. C.

Anacreontic (*ă-năk'rē-ŏn'tĭk*) **Verse.** Commonly of the jovial or Bacchanalian strain, named after Anacreon of Teos, the Greek lyric poet, born at Teos, an Ionian city in Asia Minor. He removed to Abdera in Thrace, when Teos was taken by the Persians, but he lived chiefly at Samos, under the patronage of Polycrates. After the death of Polycrates, he went to Athens at the invitation of the tyrant Hipparchus. He died at the age of 85, probably about the year 550 B. C. In his poems Anacreon sang chiefly the praises of love and wine, to the enjoyment of which his life appears to have been dedicated. Many fragments of his songs are preserved, which are models of delicate grace, simplicity, and ease.

Anagram. A transposition of the letters of a name or sentence, the change of one word or phrase into another, by reading the letters backward or by transposing them.

Anastasius (*ăn'ăs-tā'shŭ-ŭs*). **Anastasius, Thomas Hope.** The hero of this novel purports to be a Greek, who, to escape the consequences of his own crimes and villainies, becomes a renegade, and passes through a long series of the most extraordinary vicissitudes.

Ancient Man. Idylls of the King, Tennyson. Merlin, the old magician, King Arthur's protector and teacher.

Ancient Mariner. Rime of the Ancient Mariner, Coleridge. The ancient mariner, for the crime of having shot an albatross, a bird of good omen to voyagers, is doomed to undergo terrible suffering. Dreadful penalties are visited upon his companions, who have made themselves accomplices in his crime. The penalties are at last remitted in consequence of his repentance. When pity enters his heart he can pray, and the dead albatross, bound about his neck, falls off. The ship moves on, and he returns to his home port. There he encounters a hermit to whom he relates his story. At certain times the agony of remorse returns and drives him on, like the Wandering Jew, from land to land, compelled to relate the tale of his suffering and crime as a warning to others, and as a lesson of love and charity toward all God's creatures. The conception of this poem and the mystical imagery of the skeleton-ship are said to have been borrowed by Coleridge from a dream of his friend Mr. Cruikshank.

Andrews, Joseph. The hero in a novel of the same name, written by Fielding, to ridicule Richardson's *Pamela.* Fielding presents Joseph as a brother to the modest and prudish Pamela, and pictures him as a model young man.

Androclus or **Androcles** (*ăn'drō-klēz*) **and the Lion.** A story of a runaway slave who extracted a thorn from the paw of a lion. Later the slave, Androclus, was condemned to fight with a lion in the arena at Rome. The lion let out against him, turning out to be the animal he had befriended, expressed affection for him. G. B. Shaw wrote a satirical play on the subject.

Angel of the Schools, Angelic Doctor. Epithets applied to the medieval philosopher, Thomas Aquinas.

Angelica (*ăn-jĕl'ĭ-kä*). An infidel princess of exquisite beauty in Boiardo's *Orlando Innamorato* and Ariosto's *Orlando Furioso.* A beautiful heiress in Congreve's *Love for Love.*

Anna Karenina (*kä-rä'nē-nä*), **Count Tolstóy.** One of Tolstóy's most powerful books. The story of an attractive and, in many points, admirable woman, who forsakes her husband for a lover. The end, for her, is tragic suicide.

Antipholus of Ephesus, Antipholus of Syracuse. Twin brothers, sons of Egeon and Emilia, in Shakspere's *Comedy of Errors.*

Antiquary, The, Scott. One of the Waverley novels. The Antiquary is Sir Jonathan Oldbuck, who has William Lovel as his guest at Monkbairns. Lovel there meets the daughter of Sir Arthur Wardour. He reveals himself as the earl of Glenallan and marries her.

Antonio. A frequent name in Shakspere's plays. (1) In *The Merchant of Venice,* the friend to Bassanio, and the object of Shylock's hatred. (2) The usurping duke of Milan, and brother to Prospero, in *The Tempest.* (3) The father of Proteus, in *Two Gentlemen of Verona.* (4) A minor character, in *Much Ado about Nothing.* (5) A sea captain, friend to Sebastian, in *Twelfth Night.*

Antony and Cleopatra (*klē'ō-pā'trä*). Historical tragedy by Shakspere, which may be considered as a continuation of *Julius Cæsar.* In the opening scene of *Julius Cæsar* absolute power is lodged in one man. In the conclusion of *Antony and Cleopatra* a second Cæsar is again in possession of absolute power, and the entire Roman world is limited under one imperial ruler. There are four prominent characters in this play: Cleopatra, voluptuous, fascinating, gross in her faults, but great in the power of her affections; Octavius Cæsar, cool, prudent, calculating, avaricious; Antony, quick, brave, reckless, prodigal; Enobarbus, a friend of Antony, at first jocular and blunt, but transformed by penitence into a grief stricken man who dies in the bitterness of despair.

Aonian Mount. Milton says his muse is to soar above "the Aonian Mount," i. e., above the flight of fable and classic themes, because his subject was "Jehovah, lord of all." Mount Helicon, home of the Muses, was in Aonia in Greece.

Apemantus (*ăp'ē-măn'tŭs*). A churlish philosopher in Shakspere's play *Timon of Athens.*

Apocalypse (*ă-pŏk'ă-lĭps*). The Greek name of the last book of the New Testament, termed in English "Revelation." It has been generally attributed to the apostle St. John, but some wholly reject it as spurious. In the first centuries many churches disowned it, and in the 4th century it was excluded from the sacred canon by the council of Laodicea, but was again received by other councils, and confirmed by that of Trent, held in the year 1545. Most commentators suppose it to have been written after the destruction of Jerusalem, about A. D. 96, while others assign it an earlier date. Its figures and symbols are impressive.

Apocrypha (*ă-pŏk'rĭ-fä*). The word originally meant secret or hidden. The books of the Apocrypha are not found in either the Aramaic or the Hebrew language. The Old Testament apocryphal writings are fourteen in number: Baruch, Ecclesiasticus, Wisdom of Solomon, Tobit, Judith, two books of the Maccabees, Song of the Three Children, Susannah, Bel and the Dragon, The Prayer of Manasses, Esdras 1 and 2, parts of Esther found only in Greek. Their style proves that they were a part of the Jewish-Greek literature of Alexandria, within 300 years before Christ; as the Septuagint Greek version of the Hebrew Bible came from the same quarter, it was often accompanied by these Greek writings, and they gained a general circulation. No trace of them is found in the *Talmud;* they are mostly of legendary character, but some of them are of value for historical information, for their moral and maxims, and for the illustrations they give of ancient life. Several of these books were received as canonical by the Roman Catholic Church, at the Council of Trent. Protestant churches differ in the use of them. New Testament Apocrypha are certain letters and gospels, mostly of the 2d century, written to supplement the canonical books.

Apollyon. An evil spirit introduced by Bunyan in his allegorical romance *Pilgrim's Progress.*

Arabian Nights Entertainments. A series of one thousand and one stories, told by the sultana of the Indies to divert the sultan from the execution of a bloody vow which he had made to marry a lady every day and have her head cut off next morning, to avenge himself for the disloyalty of the first sultana. The story on which all the others hang is familiar. Scheherazade, the generous, beautiful young daughter of the vizier, like another Esther, resolves to risk her life in order to save the poor maidens of her city whom the sultan is marrying and beheading at the rate of one a day. She plans to tell an interesting story each night to the sultan, breaking off in a very exciting place in order that the sultan may be tempted to spare her life so that he may hear the sequel.

Arcadia, Sir Philip Sidney. The full title of this prose romance is "The Countess of Pembroke's Arcadia." Shakspere, at times, borrowed matter from this popular book. The word had long stood for a country of simple life and customs.

Archer. The Beaux' Stratagem, Farquhar. A servant to Aimwell and an amusing fellow.

Archimago (*ăr'kĭ-mā'gō*) or **Archimage. Faery Queen, Spenser.** The name implies a hypocrite or deceiver. He is an enchanter in the *Faery Queen*, opposed to holiness embodied in the Red Cross Knight. In the disguise of a reverend hermit, he wins the confidence of the knight, and, by the help of Duessa, or Deceit, separates him from Una, or Truth.

Arcite (*ăr'sīt*). **Palamon and Arcite, Chaucer.** "Palamon and Arcite" is the first story told by Chaucer in his *Canterbury Tales*. Chaucer borrowed this story from Boccaccio, who, in his turn, borrowed it from a more ancient medieval tale. Dryden later put the same story into verse. Dryden pronounced the word Ar'cite' or Ar-ci-te'. Arcite, a young Theban knight, made prisoner by Duke Theseus, is shut up in a prison in Athens with Palamon. Both the captives fall in love with Emily, the duke's sister-in-law. Both gain their liberty, and Emily is promised by the duke to the one who wins in a tournament. Arcite wins but is killed by a fall from a horse, and Emily marries Palamon. This story is better known through Dryden's "Palamon and Arcite," and through *Two Noble Kinsmen*, by Shakspere and Fletcher.

Arden, Enoch. The hero of Tennyson's poem of the same name, a seaman who is wrecked on an uninhabited, tropical island, where he spends many years. He returns home at last only to find that his wife, believing him to be dead, has married his old playfellow and rival, and is prosperous and happy. In a spirit of heroic self-sacrifice, he determines not to undeceive her, and soon dies of a broken heart.

Arethusa. The name of a sylph in Pope's "Rape of the Lock." A reference to the Greek story of the love of Alpheus for Arethusa.

Argalia (*ăr'gā-lē'ä*). **Orlando Innamorato, Boiardo.** A brother to Angelica in this romantic poem. He is celebrated as the possessor of an enchanted lance which threw whomsoever it touched. Ferraù eventually killed him, and Astolfo obtained the lance.

Argalus. An unhappy lover in Sir Philip Sidney's *Arcadia*.

Argan. The hero of Molière's comedy *Le Malade Imaginaire*.

Argonauts of '49. A literary name applied to the gold seekers who made the long overland trip or the longer sea journey to California in 1849 in search of gold. A reminiscence of the ancient Greek search for the golden fleece.

Ariel. (1) In the demonology of the cabala, a water spirit. (2) In the fables of the middle ages, a spirit of the air, the guardian angel of innocence. (3) In Shakspere's *Tempest*, a bright, airy spirit whom Prospero had released from a tree to do his bidding and work his magical spells. By obedience Ariel is to win freedom when Prospero leaves the island.

Ariodantes (*ăr'ĭ-ō-dăn'tēz*). A lover in Ariosto's *Orlando Furioso*.

Armageddon. The name of the field in the plain of Esdraelon where the Israelites fought many battles with their enemies. Now applied to any great, decisive conflict.

Armida (*ăr-mē'dä*). **Jerusalem Delivered, Tasso.** A beautiful sorceress whom Rinaldo loved. By a talisman he is disenchanted. Not being able to allure him back, Armida rushes into the midst of a combat, is defeated, and, after conversion to Christianity, regains his love.

Arnolphe (*ăr'nôlf'*). **L'Ecole des Femmes, Molière.** A selfish and morose cynic.

Aroundight (*ăr'ŭn-dīt*). The sword of Lancelot of the Lake.

Arrow-Maker, The, Mary Austin. A drama of Indian life. The story is that of Chisera, a Piute medicine woman. Wearying of the loveless rôle she is compelled to play, she gives her love to Simwa, the "arrow-maker." He deserts her for the chief's daughter. Chisera ceases to serve as intermediary between the gods and the Indians. Disaster for the tribe follows. Chisera dies by one of her own magic arrows.

Arsinoe (*ăr-sĭn'ō-ē*). **Le Misanthrope, Molière.** A prudish character in this comedy.

Artegal. Also written Artegall, Arthegal, and Artegale. (1) A legendary king of Britain mentioned by Geoffrey of Monmouth in his chronicles and by Milton in his *History of Britain*. (2) A character in Spenser's *Faery Queen*, representing justice. (3) The hero in a poem by William Wordsworth, entitled "Artegal and Elidure."

Arthur, King. A poetical character, based on historical traditions. The Arthur of the old Welsh bards was a warrior chieftain ruling over fierce and warlike tribes. Every generation of poets has added something to this picture, until the Arthur of modern romance is the Christian gentleman as Tennyson pictures him in his *Idylls of the King* surrounded by his chivalrous knights, all bound together in one quest for the Holy Grail.

Arthurian Romances. These may be divided into six parts: (1) The romance of the "San Graal." (2) "Merlin," which celebrates the birth and exploits of King Arthur. (3) "Lancelot." (4) The search or "Quest of the San Graal." (5) "Le Morte D'Arthur," or death of Arthur. (6) "Sundry Tales."

Arthur's Drinking-Horn. No one could drink from this horn who was either unchaste or unfaithful.

Arthur's Round Table. It contained seats for 150 knights. Three were reserved,—two for honor, and one, called the "siege perilous," for Sir Galahad, destined to achieve the quest of the Holy Grail.

Arthur's Sword. Excalibur or Excaliber. Geoffrey of Monmouth calls it Caliburn and says it was made in the isle of Avalon, by Merlin.

Ascapart. The name of a giant whom Bevis of Southampton conquered. This is a favorite story of the old British romancers. The effigy of Ascapart may be seen on the city gates of Southampton. He is said to have been thirty feet high, and to have carried Sir Bevis, his wife, and his horse, under his arm. Allusions to him occur in Shakspere, Drayton, and other English poets.

Ashton, Sir William. The lord keeper of Scotland; a prominent character in Scott's *Bride of Lammermoor*.

Asmodeus (*ăz'mô-dē'ŭs*). (1) In the Jewish demonology, an evil spirit, sometimes the demon of vanity, or dress. One legend makes him the destroyer of seven husbands of Sara, daughter of Roguel, on their bridal nights. In modern times he has been spoken of as the destroying demon of matrimonial happiness. (2) The demon hero of *Le Diable Boiteux* by Lesage, from which Foote took his play *The Devil on Two Sticks*.

Aspasia (*ăs-pā'shĭ-ä*). A woman of ancient Athens, celebrated, in the age of Pericles, for wit, beauty, and influence.

Aspatia (*ăs-pā'shĭ-ä*). The unfortunate heroine of Beaumont and Fletcher's play *The Maid's Tragedy*.

Astolat. The home of Elaine, "the lily maid of Astolat," in Tennyson's *Idylls of the King*.

Astolfo or **Astolpho.** A boastful and generous English knight in the tales of the adventures of Charlemagne and his Paladins. He was the possessor of a magic horn and book.

Astoria, Irving. A book of rambling sketches of Western trading and exploration, centering about the founding of Astoria, at the mouth of the Columbia, by John Jacob Astor in 1811. Still interesting and valuable.

As You Like It. A comedy by Shakspere. A French duke, driven from his dukedom by his brother, sought a refuge in the forest of Arden with a few of his followers. Here they lived a free and easy life. Rosalind, the daughter of the banished duke, remained at court with her cousin Celia. At a wrestling match Rosalind fell in love with Orlando, who threw his antagonist, a giant and professional athlete. The usurping duke, Frederick, now banished her from the court, but her cousin Celia resolved to go to Arden with her; so Rosalind in boy's clothes, and Celia, as a rustic maiden, started to find the deposed duke. Orlando, being driven from home by his elder brother, also went to the forest of Arden, and was taken under the duke's protection. Here he met the ladies, and a double marriage was the result—Orlando married Rosalind, and his elder brother Oliver married Celia. The usurper retired to a religious house, and the deposed duke was restored to his dominions.

Athalie (*ăt'ä-lē*). **Athalie** (Anglicized, **Athaliah**), **Racine.** Daughter of Ahab and Jezebel, and usurping queen in Jerusalem, in Racine's famous tragedy by this name.

Attic Salt. The phrase is used to mean a certain wit or vigor of style in writing, in reference to the superior quality anciently attributed to Athenian works. The Roman style was heavier, less spirited.

Auburn. The name of a village immortalized by Oliver Goldsmith in his "Deserted Village." Some critics are disposed to connect it with Lissoy near Athlone in Ireland; but Goldsmith's "Auburn" is purely poetical.

Aucassin and Nicolette (*ō'kä'săN'*) (*nē'kō'lĕt'*). The delicate and vivid love story of Aucassin, son of the French count of Beaucaire, and Nicolette, a captive daughter of a king of Carthage. A product of the 12th century, it is the best of early French tales. Translated into English by Andrew Lang.

Audrey. A country wench, in Shakspere's *As You Like It*.

Aulularia (*ô-lōō-lā'rĭ-a*). A comedy by Plautus, in which a miser, Euclion, is the central character. The name comes from *aulula*, meaning "a pot." This play has influenced several modern "miser" plays.

Autolycus. The craftiest of thieves. He stole the flocks of his neighbors and changed their marks. Sisyphus outwitted him by marking his sheep under their feet. Shakspere introduces him in *The Winter's Tale* as a peddler, and says he was called the son of Mercury.

Avalon or **Avilion.** The earthly paradise of the Britons. In medieval romance the name of an ocean island and of a castle. It is represented as the abode of Arthur and Oberon and Morgan le Fay. It is most fully described in the old French romance of *Ogier le Danois*. It is the island kingdom to which King Arthur is finally borne by the mysterious barge in Tennyson's "Passing of Arthur." Some identify Avalon with the modern Glastonbury.

Avare, L' (*là'vâr'*). A comedy by Molière. The old miser, Harpagon, who has planned to marry a young girl, Marianne, finds his son, Cléante, a rival for her affection. Cléante obtains possession of Harpagon's gold and gives his father a choice of girl or gold. He chooses the gold.

Aymer (*ā'mĕr*), **Prior.** A Benedictine monk, prior of Jorvaulx Abbey, in Sir Walter Scott's *Ivanhoe*.

Aymon (*ā'mŏn*). The family name of four brothers who lived in France in the 8th century. Their exploits are celebrated in many chivalric tales of the middle ages.

Azazel (*ā-zā'zĕl*). **Paradise Lost, Milton.** Represented in this poem as Satan's standard bearer. According to the *Koran*, when God commanded the angels to worship Adam, Azazel replied, "Why should the son of fire fall down before a son of clay?" and God cast him out of heaven.

Azo. The name given by Byron to the prince of Este, in his poem "Parisina."

Bab Ballads, The. A collection of light satiric and comic verses by W. S. Gilbert which appeared as occasional poems in "Fun" (1866–71), and were published in volumes as "The Bab Ballads" (1869) and "More Bab Ballads" (1873). They have been issued later in several editions. The "Yarn of the Nancy Bell" and "Bob Polter" are famous examples of these pieces.

Babbitt. The central character in Sinclair Lewis's novel of the same name. Babbitt is a type of the successful business man whose viewpoint and sympathies are determined solely by his business interests and personal pride and comfort. Lewis depicted this type so convincingly that the term Babbitt has passed into popular use to designate a person of this character.

Babes in the Wood. See *Children in the Wood*.

Baboon, Lewis. History of John Bull, Arbuthnot. A name given to Louis XIV of France. The name Philip Baboon was given in the same writing to Philip Bourbon, duke of Anjou.

Babu or **Baboo** (*bä'bōō*). A Hindu title equivalent to "Mr." Often used of a native official or clerk who writes English.

Backbite, Sir Benjamin. School for Scandal, Sheridan. A vacantly busy man who peddled scandal.

Bagstock, Joe. Dombey and Son, Dickens. The insistent and selfish "J. B.," "old J. B.," and "Joey B." of the story.

Baillie, Harry. Canterbury Tales, Chaucer. The jolly landlord at Tabard Inn, where the Canterbury Pilgrims gathered in making ready for their journey.

Balafré, Le (*lĕ bà'là'frā'*). **Quentin Durward, Scott.** Nickname given to an old archer belonging to the Scottish guards. The name means "the man with a scar."

Balderstone, Caleb. Bride of Lammermoor, Scott. The butler of the Ravenswoods, who tries to conceal the poverty of the family. A type of faithful servant. His pretentions have often been laughingly quoted.

Baldwin. Jerusalem Delivered, Tasso. The brother of Godfrey of Bouillon. In the tale of *Reynard the Fox* the name Baldwin is given to one of the beasts.

Balmawhapple (*băl'mà-hwŏp''l*). **Waverley, Scott.** An obstinate, stupid-faced, blundering Scotch laird.

Balthazar (*băl-thā'zär*). (1) In Shakspere's *Comedy of Errors*, a merchant, ordered to furnish impossible merchandise. (2) In *Much Ado about Nothing*, Balthazar appears as servant to Don Pedro. (3) Portia takes the name in the *Merchant of Venice*. (4) Chaucer, in "The Monk's Tale," gives this name to Belshazzar. (5) Balthazar is also the traditional name of one of the wise men who followed the star to Bethlehem.

Balwhidder (*băl'hwĭTH-ẽr*). **Annals of the Parish, Galt.** A sincere, kind, talkative Scotch Presbyterian clergyman. With natural prejudices and old-fashioned ways he is too "easy" to carry on his parish work with zeal. His friends enjoy Balwhidder's jokes.

Banquo. Macbeth, Shakspere. A thane of Scotland, said to belong to the 11th century and to be ancestor of the Stuarts. In fiction, made immortal as the innocent laird murdered by Macbeth. Banquo's ghost is more famous than Banquo himself.

Barabas (*băr'à-bäs*). **The Jew of Malta, Marlowe.** A monster, the hero of the tragedy, who wears a big nose and invents infernal machines.

Barbara Frietchie, Whittier. A poem based on an alleged incident at Frederick, Md., in the Civil War. It exhibits the patriotism of the aged Barbara Frietchie, who dared to fly the Union flag in the presence of Confederate troops, and the chivalry of Stonewall Jackson, who forbade punitive measures against her.

Barber of Seville, Beaumarchais. This comedy has been called the wittiest of all dramas. The plot, in which Bartolo, who wants to marry his ward Rosina, is duped and outwitted by her lover, Almaviva, and the ex-valet and barber, Figaro, serves to carry brilliant dialogue and satire. First presented in 1775.

Bardell, Mrs. Pickwick Papers, Dickens. The landlady, a widow, who sues Mr. Pickwick for breach of promise to marry her.

Bard of Avon. Name given to Shakspere, who was born and buried in Stratford-on-Avon.

Bard of Ayrshire. A name often given to Robert Burns, the great poet of Scotland, who was a native of the county of Ayr.

Bard of Rydal Mount. An epithet sometimes applied to the poet Wordsworth, who resided at Rydal Grasmere, in the county of Westmoreland from 1813 to 1850. His dwelling overlooked a beautiful view of the lake.

Bardolph. Merry Wives of Windsor, Shakspere. A follower of Falstaff, known as the "knight of the burning lamp," from his red nose.

Barkis. David Copperfield, Dickens. Remembered by the much-quoted "Barkis is willing," his form of proposing marriage to his beloved Clara Peggotty.

Barleycorn, Sir John. Tam O'Shanter, Burns. Name given to the personification of a malt liquor made from barley. Sir Barleycorn has also been noticed by Scott and Hawthorne. The name comes down to us from an old English pamphlet in which Sir John Barleycorn is arraigned in court, tried by jury, and acquitted.

Barmecide (*bär'mê-sīd*) **Feast.** The phrase, which means a feast with little or nothing to eat, refers to a Persian story. One of the Barmecide family invited a poor man to dine, but, while the host called for the most delicious dishes and urged his guest to eat, there was nothing to eat. The poor man played the game, even feigning to get drunk on the make-believe wine and knocking his host down. This so pleased the Barmecide that he provided a real banquet and took the poor man into his household.

Barnaby Rudge. Barnaby Rudge, Dickens. A half-witted lad who wanders about with a pet raven. They experience together many adventures, including a no-popery riot.

Barry Lyndon, The Memoirs of, W. M. Thackeray. A famous story of the picaresque, or roguery, type. The hero, Barry Lyndon, is represented as telling his own story of scoundrelly adventure. Throughout his revelations of rascality and villainy in gaming and in illtreatment of his wife, he maintains a confident air of gentility. His life ends in imprisonment and a sordid death. Thackeray wrote the story in a vein of sustained irony.

Basilisco (*bà-sĭ'lĭs'kō*). **Soliman and Persida, Old Play.** A boasting knight who became so popular with his foolish bragging that his name grew into a proverb.

Bassanio (*bà-sä'nĭ-ō*). **Merchant of Venice, Shakspere.** The lover of Portia, who won her when he chose a leaden casket in which her portrait was hidden.

Bath, Major. Amelia, Henry Fielding. A noble-minded gentleman, pompous in spite of poverty, and striving to live according to the "dignity and honor of man." He tries to hide his poverty under bold speech even when found doing menial service.

Battle, Sarah. Essays of Elia, Lamb. Sarah considered whist the business of life, and literature one of the relaxations. When a young gentleman, of a literary turn, told her he had no objection to unbending his mind for a little time by taking a hand with her, Sarah declared "Whist was her life business, her duty, the thing she came into the world to do. She unbent her mind afterwards over a book."

Battle of the Books, The, Jonathan Swift. A famous satire, in which Swift discusses the endless controversy over the comparative merits of ancient and modern writers.

Battle of the Kegs, Francis Hopkinson. A humorous poem. It ridiculed the British, who are represented as firing at all the kegs floating in the river at Philadelphia, because some explosive machines had been sent among their ships. The ballad was one of the greatest sources of inspiration to the colonists in the trying revolutionary crises.

Bayard (*bā'ärd*). **Old Poems and Romances.** Bayard was a famous horse belonging to the four sons of Amyon, a semimythical character. He seemed but an ordinary horse when one person rode, but, if the four mounted, the horse accommodatingly grew in length. Among wonderful things related of him is that his hoofprints have been found on rocks and in deep forests. Bayard is also known as the property of Amadis of Gaul in an old Portuguese romance. He was found under the watch of a dragon whom a wizard knight charmed in order to rescue the horse. In French tales Bayard is represented to be yet living in some of the forests of France but disappearing when disturbed. Bayard is also the name of the horse belonging to Fitz-James in Scott's poem "Lady of the Lake." He appears as Bayardo in *Orlando Furioso* and other poems. It is said that Rinaldo was riding on his favorite steed, when a demon sprang behind him, but the animal in terror took three tremendous leaps and unhorsed the fiend.

Bayes. The Rehearsal, George Villiers, second duke of Buckingham. This farce, or satire, was brought out in 1671, and its wit has been much quoted. In its present form the hero, Bayes, is intended to represent Dryden as at the head of heroic rimes. He is shown as greedy for applause, impatient of censure or criticism, inordinately vain, yet obsequious to those who, he hopes, will gratify him by returning his flattery, and, finally, as anxiously mindful of the minute parts of what, even as a whole, is scarce worthy of attention.

Bay Psalm Book, The. The first book printed in the British American colonies (1640). A metrical version of the psalms, prepared by Richard Mather, Thomas Wilde, and John Eliot.

Beatrice. (1) Daughter of an illustrious family of Florence, for whom Dante had a great love. In the *Divine Comedy* she is represented as being his guide through paradise. (2) Beatrice is also the name of the heroine of Shakspere's *Much Ado about Nothing*. Of her Mrs. Jameson says: "The extraordinary success of this play in Shakspere's own day, and ever since, in England, is to be ascribed more particularly to the parts of Benedick and Beatrice, two humorsome beings, who incessantly attack each other with all the resources of raillery. In Beatrice, high intellect and high animal spirits meet, and excite each other like fire and air. In her wit there is a touch of insolence, not infrequent in women when the wit predominates over reflection and imagination. In her temper, too, there is a slight infusion of the termagant. But Beatrice, though willful, is not wayward; she is volatile, not unfeeling."

Beau Brummell. This was the nickname of George Bryan Brummell, a dandy and "glass of fashion" of the time of George IV. He finally fell from royal favor and lived in exile in Calais. His life was made the subject of a play by William Blanchard Jerrold (1859) and the subject of another by Clyde Fitch (1891).

Beauty and the Beast. Fairy Tale, Mme. Villeneuve. Often repeated in stories for children." Beauty and the Beast" is known in many forms and in many languages. In the tale referred to, young and lovely Beauty saved the life of her father by putting herself in the power of a frightful, but kind-hearted, monster, whose respectful affection and deep melancholy finally overcame her aversion to his hideousness, and induced her to consent to marry him. By her love, Beast was set free from enchantment and allowed to assume his own form, that of a handsome and graceful young prince.

Bede, Adam. Adam Bede, George Eliot. An ideal workman, hero of the novel.

Bedivere (*bĕd'ĭ-vēr*). **Tales of the Round Table.** Bedivere was the last knight of King Arthur's Round Table. He had served as a butler, was of much importance, and was sent by the dying king to throw his sword, Excalibur, into the lake. A hand and an arm rose from the lake, caught the sword, flourished it three times, and sank. Bedivere watched King Arthur's departure for Avalon, the "Isle of the Blest." This knight is noticed, under the name Bedver, in Geoffrey's British History.

Beggar's Daughter. Reliques, Percy. First known as the Beggar's Daughter of Bethnal Green, a beautiful girl named Bessie, who is wooed by a knight, and whose father turns out to be a son of Simon de Montfort, living in disguise as a blind beggar. The story was dramatized by James Sheridan Knowles.

Beggar's Opera, The. This work, by John Gay, with music by Dr. Pepusch, was given in London in 1728. It satirized the polite society and the opera of the day. The characters are mostly thieves and highwaymen, among them Captain Macheath and his wife, Polly Peachum. It is said that three actresses who played the part of Polly won marriages into the English nobility. The play with the original music was reproduced in England and in the United States and Canada with the greatest success in 1919-20.

Bel and the Dragon. (1) Two stories, apocryphal additions to the book of Daniel, telling how Daniel convinced Cyrus of the fraud imposed upon him and his people in the worship of the god, Bel, and the Dragon. (2) A story found in the Babylonian cuneiform tablets, which is thought to resemble closely the account of the struggle of Michael and the Dragon in the Book of Revelation.

Belch, Sir Toby. Twelfth Night, Shakspere. Uncle to Olivia, a jolly, care-free fellow, type of the roisterers of Queen Elizabeth's days.

Belinda. Rape of the Lock, Pope. Poetical name of the heroine whose real name was said to be Arabella Fermor. In a frolic Lord Petre cut a lock from the lady's hair. This was so much resented that it broke the great friendship between the two families. The poem, "Rape of the Lock," was written to bring them into a better temper and lead to reconciliation. Belinda is also the name of the heroine in a novel written by Maria Edgeworth.

Bell, Adam. Old Ballad. A famous wild outlaw belonging to the north country and celebrated for his skill as an archer.

Bell, Laura. Pendennis, Thackeray. One of the sweetest heroines in English literature.

Bell, Peter. Peter Bell, a Tale in Verse, Wordsworth. A wandering tinker, subject of Wordsworth's poem, whose hard heart was touched by the fidelity of an ass to its dead master. Shelley wrote a burlesque of this poem, entitled "Peter Bell the Third," intended to ridicule the ludicrous puerility of language and sentiment which Wordsworth often affected. This burlesque was given the name of the Third because it followed a parody, already published as "Peter the Second."

Bellman. L'Allegro, Milton. The watchman who patrolled the streets and called out the hour of night. Sometimes he repeated scraps of pious poetry in order to charm away danger.

Bell-the-Cat. Name given to a nobleman at Lauder, Scotland, early in the 16th century. King James II called an assembly of Scottish barons to resist a threatened invasion of his realm by Edward IV of England. After long discussion one of the barons related the nursery tale of a convention of mice in which it was proposed to hang a bell on the cat's neck, to give warning of her presence. No one would serve on the mouse committee. To the story Archibald Douglas responded by saying, "I will bell the cat" and was afterwards known by the name, Bell-the-cat.

Beloved Physician. Bible. Name given to St. Luke and first used in the Apostle Paul's epistle to the Colossians.

Belphœbe (*bĕl-fē'bē*). **Faery Queen, Spenser.** A delicate and graceful flattery offered to Queen Elizabeth through the huntress, Belphœbe, intended to represent the queen. The name is taken from *belle*, meaning beautiful, and Phœbe, a name sometimes bestowed on Diana.

Belvawney, Miss. Nicholas Nickleby, Dickens. She belonged to the wonderful Portsmouth theater, always took the part of a page, and gloried in silk stockings.

Belvidera (*bĕl'vĭ-dē'rä*). **Venice Preserved, Otway.** The beautiful heroine of this almost forgotten tragedy. Sir Walter Scott said, "More tears have been shed, probably, for the sorrows of Belvidera and Monimia than for those of Juliet and Desdemona."

Benedick. Much Ado about Nothing, Shakspere. A young lord of Padua who is gentleman, wit, and soldier. He was a pronounced bachelor, but after a courtship full of witty sayings and coquetry he marries the lovely Beatrice. From this gentleman comes the name Benedick or Benedict, applied to married men who had thought they never were going to marry.

Benengeli, Cid Hamet (*sĭd hăm'ĕt bĕn'ĕn-gē'lĭ*). **Don Quixote, Cervantes.** Supposed to be a writer of chronicles among the Moors and claimed as authority for the tales of adventure recorded by Cervantes. The name, Cid Hamet, has been often quoted by writers.

Ben Hur, General Lew Wallace. Messala, the Roman playmate and young friend of Ben Hur, afterward became

his remorseless enemy. Ambitious, hard, and cruel, when he came into power he made Ben Hur a galley slave, confiscated his property, and imprisoned his mother and sister. Ben Hur escaped, returned later as a wealthy Roman, and entered in the famous chariot race against Messala who had put up enormous sums in wagers. Messala recognized Ben Hur and hoped to win the race and bring him to final ruin; but Messala himself was thrown and seriously injured. His cruelties were made known, and he was at last slain by his wife, Isas, the daughter of Balthasar.

Benvolio (*bĕn-vō'lĭ-ō*). **Romeo and Juliet, Shakspere.** One of Romeo's friends who would "quarrel with a man that had a hair more or a hair less in his beard than he had." Mercutio says to him, "Thou hast quarreled with a man for coughing in the street."

Beowulf (*bā'ō-wo͝olf*). **Anglo-Saxon Poem.** He was a Gothic warrior who slew the monster Grendel, which infested the great hall of Hrothgar, king of the West Danes. This great poem of over 6000 lines is divided into two parts. The first part describes the beautiful palace of King Hrothgar, the ravages wrought by the fiend Grendel and his mother, and the deliverance wrought by the hero Beowulf. The second part describes the combat between the aged king Beowulf and the dragon which was wasting the land of the Goths. The Beowulf who took part in Hygelac's historical expedition against the Hetware is probably historical, but the Beowulf of the four great exploits of the poem, the swimming match with Breca, and the contests with Grendel, with his dam, and with the dragon, is more probably a character allied to the Norse divinities.

Bergerac, Cyrano de (*sē'rà'nō' dē bĕr'zhĕ-rȧk'*). In history, he was a French poet, a contemporary of Molière. Edmond Rostand makes him the exaggerated hero of the play named for him. The hero is violently in love with Roxane, but aids Christian de Neuvillette to win her, writing letters for the rather dull gallant. After the death of Christian, Cyrano plays the part of platonic friend to the widow, revealing the truth of his feelings only in the immediate prospect of death.

Bertram. Guy Mannering, Scott. The character was suggested by James Annesley, rightful heir of the earldom of Anglesey, of which he was dispossessed by his uncle Richard. He died in 1743. Bertram was also the name of a haughty and dissolute count, who was the husband of Helena in Shakspere's comedy *All's Well that Ends Well*.

Bianca (*bĭ-ȧng'kȧ*). **Othello, Shakspere.** Cassio's sweetheart.

Bibliomania. A passion for rare and curious books. The word means book madness, and is usually applied by people unsympathetic toward those who collect books for their rarity rather than for their value in use. The term bibliophile, "lover of books," is the more complimentary word for amateur or professional book collectors.

Big-endians (*bĭg'ĕn'dĭ-ȧnz*). **Gulliver's Travels, Swift.** The name of a religious party in the imaginary empire of Lilliput who made it a matter of duty and conscience to break their eggs at the large end. They were regarded as heretics by the law, which required all persons to break the smaller end of their eggs, under pain of heavy penalties in case of disobedience.

Birch, Harvey. The Spy, Cooper. The chief character of the novel.

Black Beauty, Anna Sewall. Full title, "Black Beauty, His Grooms and Companions." The story of a horse. Written in the form of a horse's autobiography it is a strong plea for kind treatment of animals.

Black-eyed Susan. Ballad, John Gay. The heroine of the popular sea song.

Blatant Beast. Faery Queen, Spenser. A bellowing monster typical of slander; or, an impersonation of what we now call "*vox populi*," or the "voice of the people."

Blifil (*blĭ'fĭl*). **Tom Jones, Fielding.** Allworthy's nephew, a talebearer and consummate hypocrite.

Blimber, Miss Cornelia. Dombey and Son, Dickens. The daughter of Dr. Blimber, the head of a first-class educational establishment conducted on the forcing or cramming principle. She is a very learned, grave, and precise young lady, "no light nonsense about her," who has become "dry and sandy with working in the graves of deceased languages."

Blouzalinda (*blouz'ȧ-lĭn'dȧ*). **Shepherd's Week, John Gay.** The country girl, heroine of this pastoral poem written over 200 years ago, and quoted as a picture of the poverty and rudeness of rural life at that time.

Bluebeard. A fairy tale by Perrault (1697). The ugly, blue-bearded rich man has for his seventh wife Fatima. One day, when he is away, she finds in a closet the bodies of the former wives. Bluebeard discovers her disobedience of his command, and is about to kill her, when her brothers rescue her. Earlier Italian and Arabian stories resemble this tale.

Bluebird, The. (1) A fairy tale by Countess d'Aulnoy. A prince, refusing to marry the ugly one of two sisters, is changed into a bluebird. Finally, a friendly fairy restores him to his former shape and to his sweetheart. (2) A fairy play by Maurice Maeterlinck, in which two children, Mityl and Tyltyl, set out to seek for happiness, the bluebird. They wander in a dream through the lands of Memory, Night, and the Future. At last, when Tyltyl gives up his dove to a neighbor's sick child, they find happiness for a moment. The bird turns blue and then flies away.

Bob, Son of Battle, Alfred Ollivant. The hero and title of a popular dog story. Bob is the last of a famous breed of shepherd dog; his adventures are most realistic.

Bobadil (*bŏb'ȧ-dĭl*), **Captain. Every Man in His Humor, Jonson.** A boasting coward, who passes himself off with young and simple people for a Hector.

Bois Guilbert, Brian de (*brē-ȧN' dē bwȧ gēl'bĕr'*). **Ivanhoe, Scott.** A brave but cruel, crafty, and dissolute commander of the Knights Templars.

Boniface (*bŏn'ĭ-fās*). **The Beaux' Stratagem, Farquhar.** A fine representation of an English landlord. Hence, the name is applied to landlords generally.

Bontemps, Roger (*rô'zhā' bôN'tȧN'*). **Song, Béranger.** Known in France as the personification of care-free leisure. The equivalent, among the French peasantry, for the English proverb, "There's a good time coming," is "Roger Bontemps," one of Béranger's most celebrated songs written in 1814.

Bottom, Nick. A Midsummer Night's Dream, Shakspere. A man who fancies he can do everything, and do it better than anyone else. Shakspere has drawn him as profoundly ignorant, and with an overflow of self-conceit. Oberon, the fairy king, desiring to punish Titania, his queen, commissioned Puck to watch her till she fell asleep, and then to anoint her eyelids with the juice of a plant called "love-in-idleness," the effect of which, when she awoke, was to make her dote upon Bottom, upon whom Puck had fixed an ass's head.

Bowling, Tom. Roderick Random, Smollett. A name made almost famous as hero of the novel. Critics have said, "The character of Tom Bowling, in *Roderick Random*, will be regarded in all ages as a happy exhibition of those naval heroes to whom Britain is indebted for so much of her happiness and glory." The Tom Bowling referred to in Dibdin's famous sea song was Captain Thomas Dibdin, brother of Charles Dibdin, who wrote the song.

Box and Cox. Farce, Morton. Principal characters in the farce known as a "dramatic romance of real life." The two men, Box and Cox, rent the same room from a Mrs. Bouncer. One works in the daytime, the other at night, so they do not meet until a holiday reveals the situation. The conflict, however, is adjusted amicably.

Brag, Jack. Jack Brag, Theodore Hook. Hero of the novel and a spirited embodiment of the arts employed by a vulgar pretender to creep into aristocratic society, and of his ultimate discomfiture. General Burgoyne figures in an old ballad known as "Sir Jack Brag."

Bramble, Matthew. Humphrey Clinker, Smollett. Noted character in the novel, described as "an odd kind of humorist," afflicted with the gout, and "always on the fret," but full of generosity and benevolence.

Brass, Sally and Sampson. Old Curiosity Shop, Dickens. Brother and sister, well mated, he a "shystering" lawyer and she outreaching him in villainy. Sampson was dishonest, sentimental, and affected in manner, and both are interesting characters to read about.

Brentford, The Two Kings of. The Rehearsal, Villiers. Much question has been raised as to who was to be ridiculed under these characters. The royal brothers, Charles II and James II, have been suggested; others say the fighting kings of Granada. In the farce the two kings are represented as walking hand in hand, as dancing together, as singing in concert, and, generally, as living on terms of the greatest intimacy and affection.

Br'er Rabbit. In the plantation stories of Uncle Remus, he is the personification of mental agility and craft, by which he vanquishes Br'er Fox.

Brick, Mr. Jefferson. Martin Chuzzlewit, Dickens. A ranting American politician who makes a ridiculous figure as editor.

Britomart. Faery Queen, Spenser. The embodiment of chastity. Having seen in a magic mirror the face of Sir Artegal, who embodies justice, she falls in love with

him. After a long search and many adventures, she at last finds him and they are united.

Brook Farm. The full name was "Brook Farm Institute of Agriculture and Education," a stock company of nearly 70 members, located on a farm of 200 acres at West Roxbury, Mass. Among the members were George Ripley, Charles A. Dana, George William Curtis, Margaret Fuller, and Nathaniel Hawthorne. Among their frequent visitors were Ralph Waldo Emerson, Theodore Parker, Bronson Alcott. This idyllic life lasted about five years, from 1841 to 1846. Brook Farm was a financial failure, but it was important in intellectual results. Hawthorne took from it some suggestions for his *Blithedale Romance*.

Brown, Tom. Tom Brown's School Days and **Tom Brown at Oxford, Thomas Hughes.** The hero of these stories of school days, a typical English schoolboy and undergraduate.

Brunhild (*brōōn'hĭlt*). **Nibelungenlied.** The story of Brunhild figures largely in ancient German romance. She was, herself, a warrior, proud and skillful, and she promised to be the bride of the man who could conquer her in three trials: in hurling the lance, in throwing the stone, and in leaping after the stone when thrown. By the arts and bravery of Siegfried, she was deluded into marrying Gunther, king of Burgundy; but, discovering the trick, she planned and accomplished the destruction of Siegfried and the humiliation of Kriemhild, his wife.

Bumble, Mr. Oliver Twist, Dickens. A pompous, disagreeable beadle who figures largely in the beginning of the story. The name Bumble has since attached itself to the office.

Bunsby, Jack. Dombey and Son, Dickens. A commander of a ship, looked up to as an oracle by his friend, Captain Cuttle. He is described as wearing a "rapt and imperturbable manner" and seeming to be "always on the lookout for something in the extremest distance."

Bunthorne. Patience, Sullivan. A gloomy poet shown most distinctly in his gloom when surrounded by the characters of a comic opera. He was inserted as a satire on the æsthetic cult affected at the time by Oscar Wilde and his imitators.

Burchell, Mr. Vicar of Wakefield, Goldsmith. A prominent character who passes himself off as a poor man, but is really a baronet in disguise. He is noted for his habit of crying out "Fudge!" by way of expressing his strong contempt for the opinions of others.

Burd, Helen. Scotch Ballad. A traditional name standing for constancy. She was carried to England by fairies and imprisoned in a castle. The youngest brother of the fair Helen was guided by the enchanter Merlin and accomplished the perilous task of rescuing his sister. This is recited in the line "Childe Roland to the dark tower came," quoted by Shakspere. Only a fragment of the old ballad has been preserved.

Buskin. A name used to mean "tragedy." Known in English since the 16th century. The word means "boot." It early took on the sense given here. The Greek tragic actors used to wear a sandal some two or three inches thick, to elevate their stature. To this sole was attached a very elegant boot top. The whole boot was called *cothurnus*. Milton uses the phrase "buskined stage" in *Il Penseroso*.

Buzfuz, Serjeant. Pickwick Papers, Dickens. A pompous, chaffing lawyer, who bullies Mr. Pickwick and the witnesses in the famous breach of promise suit, Bardell *v.* Pickwick.

Byfield. A New England parish, the scene of a historical novel by John Lewis Ewell. Here lived the ancestor of Longfellow, to whom the poet dedicated "The Village Blacksmith," himself a blacksmith, keeping his accounts in peculiar orthography. According to the deed of sale in 1681, the Byfield Indians got a larger price from the first English settlers than was paid for Manhattan island.

Cabala (*kăb'ä-lä*). The oral law of the Jews handed down from father to son by word of mouth. It is the usual belief that God instructed Moses, and Moses his brother Aaron, and so on from age to age. The cabalists developed an elaborate system of mystic symbolism, in which combinations of letters and numbers are important.

Cadmean (*kăd-mē'ăn*) **Victory.** A victory purchased at great expense of life. The allusion is to the armed men who sprang out of the ground from the teeth of the dragon sown by Cadmus. These men fell foul of each other, and only five of them escaped death.

Caius (*kā'yŭs*), **Doctor. Merry Wives of Windsor, Shakspere.** A physician in the comedy, who adds a touch of humor. He is most conspicuous as the lover of Anne Page.

Calandrino (*kä-län-drē'nō*). A simpleton frequently introduced in Boccaccio's *Decameron*; expressly made to be befooled and played upon. His mishaps, as Macaulay states, "have made all Europe merry for more than four centuries."

Caleb. (1) The enchantress who carried off St. George in infancy. (2) A character in Dryden's satire of "Absalom and Achitophel," meant for Lord Grey, one of the adherents of the duke of Monmouth.

Caleb Quotem. A parish clerk or jack-of-all-trades, in Colman's play *The Review*, or *Wags of Windsor*. Colman borrowed the character from *Throw Physic to the Dogs*, an old farce.

Caliban. (1) A savage and deformed slave of Prospero in Shakspere's *Tempest*. He is represented as being the "freckled whelp" of Sycorax, a foul hag, who was banished from Argier, or Algiers, to the desert island afterward inhabited by Prospero. From his rude, uncouth language we get the phrase "Caliban style," "Caliban speech," meaning the coarsest possible use of words. (2) A character in Browning's *Caliban on Setebos*.

Calidore. A knight in Spenser's *Faery Queen*, typical of courtesy, and said to be intended for a portrait of Sir Philip Sidney.

Calipolis. Battle of Alcazar, George Peele. A character in the *Battle of Alcazar*, used by Sir Walter Scott and others as a synonym for ladylove, sweetheart, charmer. Sir Walter always spells the word Callipolis.

Calista. The name of a celebrated character in Rowe's *Fair Penitent*.

Calydon. A forest celebrated in the romances relating to King Arthur and Merlin. Also an ancient city of Ætolia, in Greece, celebrated in the stories of the Calydonian Hunt.

Camacho (*kä-mä'chō*). **Don Quixote, Cervantes.** A character in an episode in *Don Quixote*, who gets cheated out of his bride after having made great preparations for their wedding.

Camaralzaman (*kăm'ä-răl'zä-măn*), **Prince. Arabian Nights.** One of the stories of the *Arabian Nights* and the name of a prince who fell in love with Badoura, princess of China, the moment he saw her.

Cambalo or **Cambel. Faery Queen, Spenser.** A brother of Canace. He challenged every suitor to his sister's hand, and overthrew all except Triamond, who married the lady.

Cambalu (*kăm'bä-lōō*). In the *Voyages* of Marco Polo, the chief city of the province of Cathay.

Cambuscan (*kăm-bŭs'kăn*). A Tatar king identical with Jenghis Khan. The king of the Far East sent Cambuscan a "steed of brass, which, between sunrise and sunset, would carry its rider to any spot on the earth." All that was required was to whisper the name of the place in the horse's ear, mount upon his back, and turn a pin set in his ear. When the rider had arrived at his destination, he had to turn another pin and the horse instantly descended, and, with another screw of the pin, vanished till it was again required. This story was begun by Chaucer in the *Squire's Tale* but was never finished. Milton refers to Chaucer as the poet who "left half told" this story (*Il Penseroso*).

Camelot. A parish in Somersetshire, England, now called Queen's Camel, where King Arthur is said to have held his court. In this place there are still to be seen vast intrenchments of an ancient town or station—called by the inhabitants "King Arthur's Palace." Several other localities dispute the tradition, notably Winchester.

Camille (*kä-mēl'*). English adaptation of *La Dame aux Camélias*, a play by Dumas the younger. Also known in America as *The Lady of the Camellias*. The story is that of Marguerite Gautier, a courtesan, whose genuine love for Armand Duval prompts her to live only for him. But his father persuades Marguerite that such a union would wreck Armand's career. Therefore she deliberately estranges him, and really sacrifices her life for him. The meaning of her acts Armand learns too late.

Canace (*kăn'ä-sē*). **Faery Queen, Spenser.** A paragon among women, the daughter of King Cambuscan, to whom the king of the East sent as a present a mirror and a ring. The mirror would tell the lady if any man on whom she set her heart would prove true or false, and the ring, which was to be worn on her thumb, would enable her to understand the language of birds and to converse with them. Canace was courted by a crowd of suitors, but her brother announced that anyone who aspired to her hand must encounter him in single combat and overthrow him. She ultimately married Triamond, son of the fairy Agape.

Candide (*kăn'dēd'*). The hero of Voltaire's work of the same name. All sorts of misfortunes are heaped upon him, and he bears them all with philosophical indifference.

Candour, Mrs. A most energetic slanderer in Sheridan's *School for Scandal*.

Canidia. A sorceress, alluded to by Horace, who could bring the moon from heaven.

Canterbury Tales, Chaucer. The Prologue to the "tales" introduces the reader to "full nine and twenty" pilgrims, each of whom, on the way to and from Canterbury, is to tell two stories, the one telling the best tale to be treated to a dinner on their return to the Tabard Inn in Southwark, whence they start. Only 24 of the 58 tales called for in the scheme have come down to us. These are: "The Knight's Tale," "The Miller's Tale," "The Reeve's Tale," "The Cook's Tale," "The Man of Law's Tale," "The Wife of Bath's Tale," "The Friar's Tale," "The Summoner's Tale," "The Clerk's Tale," "The Merchant's Tale," "The Squire's Tale," "The Franklin's Tale," "The Doctor's Tale," "The Pardoner's Tale," "The Shipman's Tale," "The Prioress's Tale," "Chaucer's Tale of Sir Thopas," "Chaucer's Tale of Melibœus," "The Monk's Tale," "The Nun's Priest's Tale," "The Second Nun's Tale," "The Canon's Yeoman's Tale," "The Manciple's Tale," "The Parson's Tale." The plan of the work affords artistic scope for introducing a company of pilgrims on their way to the shrine of Thomas Becket. It represents all classes of society and presents a series of tales of great interest set in the midst of beautiful descriptions of nature. Perhaps the most interesting tales by which to gain introduction to Chaucer are: "The Clerk's Tale" (Griseldis); "The Knight's Tale" (Palamon and Arcite); "The Man of Law's Tale" (Constance); "The Prioress's Tale" (Hugh of Lincoln); "The Nun's Priest's Tale" (Chanticleer and Pertelote).

Caora. Description of Guiana, Raleigh. A river, on the banks of which are a people whose heads grow beneath their shoulders. Their eyes are in their shoulders, and their mouths in the middle of their breasts. The original picture is found in Hakluyt's *Voyages* 1598.

Cape Cod Folks. The group of characters drawn from Cape Cod life in the stories of Joseph C. Lincoln.

Captains Courageous, Kipling. One of the best stories for boys. The young son of a wealthy American family is lost overboard from an Atlantic liner. He is picked up by a fishing boat off Newfoundland. The captain sets him to work. He learns much of fishing and fishermen. When the boat returns to Gloucester, his parents come, and the family are reunited.

Capulet (*kăp'ū-lĕt*). The head of a noble Veronese house in Shakspere's tragedy *Romeo and Juliet*—hostile to the house of Montague. He is at times self-willed and tyrannical, but a jovial and testy old man.

Capulet, Lady. The proud and stately wife of Capulet, and mother of Juliet.

Carabas, Marquis of. (1) The master of the cat in the nursery tale of *Puss in Boots*. (2) In a lyric by Béranger, Carabas is an emigré who comes back after the battle of Waterloo to reclaim his property. (3) In Disraeli's *Vivian Gray*, a servile and pompous character, the Marquess of Carabas.

Caradoc (*kă-răd'ŏk*). A knight of the Round Table. Also in history, the British chief whom the Romans called Caractacus. Caradoc is the hero of an old ballad entitled "The Boy and the Mantle."

Carker. A scoundrel clerk in Dickens's *Dombey and Son*.

Carpetbaggers. Name applied to Northerners who, after the enfranchisement of the negroes, went into the South for the purpose of representing the negroes in state and national offices. Since most of these men held no property in the South, their possessions were all supposed to be in their "carpetbags" or grips. Hence the name. *A Fool's Errand* by A. W. Tourgee is a story of the period.

Carrasco, Sanson (*săn-sōn' kär-răs'kō*). A waggish bachelor of Salamanca, in Cervantes' *Don Quixote*.

Carton, Sidney. A hero transformed by unselfish love in Dickens's *Tale of Two Cities*. He voluntarily goes to the guillotine to save his successful rival in love.

Casca. Julius Cæsar, Shakspere. A blunt-witted Roman, one of the conspirators against Julius Cæsar.

Casella. The name of a musician and old friend of Dante, immortalized by him in his *Divine Comedy*.

Cassandra. A daughter of Priam, king of Troy, gifted with the power of prophecy; but Apollo, whom she had offended, brought it to pass that no one believed her predictions. Shakspere makes use of this character in *Troilus and Cressida*.

Cassibelan. Great-uncle to Cymbeline, in Shakspere's play by that name.

Cassio (*kăsh'ĭ-ō*). A Florentine lieutenant of Othello and a tool of Iago, in Shakspere's tragedy *Othello*. Iago made Cassio drunk, and then urged on Roderigo to quarrel with him. Cassio wounded Roderigo. Othello suspended Cassio, but Iago induced Desdemona to plead for his restoration. This interest in Cassio aroused the jealous rage of Othello and moved him to murder Desdemona and to kill himself. After the death of Othello, Cassio was appointed governor of Cyprus.

Castle Dangerous. A keep belonging to the Douglas family, which gives its name to one of Sir Walter Scott's *Tales of My Landlord*. It was so called by the English because it was always retaken from them by the Douglas.

Castle of Indolence. The title of a poem by Thomson, and the name of a castle described in it as situated in a pleasing land of drowsiness, where every sense was steeped in the most luxurious and enervating delights.

Castlewood, Beatrix. The heroine of Thackeray's novel *Henry Esmond*, a picture of splendid, lustrous, physical beauty.

Cattle Raid of Cooley. An early Irish story. Queen Maeve of Connaught, to make her herd equal to that of her husband Ailill, asked Daré Mac Fiachne, of Ulster, for the loan of his wonderful "Brown Bull of Cooley." He at first granted the request, but later, in anger, refused. Upon this, the queen invaded Ulster, to take the bull by force. It happened that a disease unfitted the Ulstermen for battle during the winter. A youth of 17, Cuchulain, exempt from the disease, faced the foe alone. Agreement was made that each day a Connaught warrior should fight with him, and that when he had killed this opponent Queen Maeve's forces should halt and camp for the night. Day after day Cuchulain was victorious, until, when the queen impatiently broke her agreement, the Ulstermen were able to do battle. They drove the invaders out, but not until Queen Maeve had captured and carried off the "Brown Bull."

Caudle, Mrs. Margaret. The feigned author of a series of curtain lectures delivered to her husband, Job Caudle, who was a patient sufferer under this form of persistent nagging by his wife. The real author of these humorous lectures was Douglas Jerrold.

Cauline, Sir. The hero of an ancient English ballad preserved in Percy's *Reliques*.

Cave of Mammon. The abode of the god of riches, described in the second book of Spenser's *Faery Queen*.

Caxton, Pisistratus (*pĭ-sĭs'trā-tŭs*). The hero of Bulwer-Lytton's novel *The Caxtons*, and of its sequel *My Novel*.

Cecilia (*sē-sĭl'ĭ-ā*), **St.** A patron saint of the blind, also patroness of musicians, and "inventor of the organ." According to tradition, an angel fell in love with her for her musical skill, and used nightly to visit her. A crown of martyrdom was bestowed upon both her and her husband. Dryden and Pope have written odes in her honor, and both speak of her charming an angel by her musical powers.

Cedric (*sĕd'rĭk*). A Saxon thane in Scott's *Ivanhoe*. Father of Ivanhoe and uncle of Rowena.

Celia. (1) In Spenser's *Faery Queen*, the mother of Faith, Hope, and Charity. She was herself known as Heavenliness and lived in the hospice Holiness. (2) Celia, cousin to Rosalind, in Shakspere's comedy *As You Like It*. Celia is a common poetical name for a lady or a ladylove.

Cephalus (*sĕf'ā-lŭs*) **and Procris** (*prŏk'rĭs*). Cephalus was the husband of Procris, who, out of jealousy, deserted him. Cephalus went in search of her, and rested awhile under a tree. Procris discovered him, and crept through some bushes to ascertain if a rival was with him. Cephalus heard the noise and, thinking it to be made by some beast, hurled his javelin into the bushes and slew Procris. When the unhappy man discovered what he had done, he slew himself in anguish of spirit with the same javelin. This story is alluded to in "Pyramus and Thisbe" in Shakspere's *Midsummer Night's Dream*, where it is humorously miscalled "Shafalus and Procus."

Chadband, The Rev. A clerical character in Dickens's *Bleak House*. He will always stand as a type of critical piety.

Chanticleer. The cock, in the tale of the Fox" and in Chaucer's "Nun's Priest's Tale."

Characters, "Caractères." A work of La Bruyère, in which he sketches with great skill women and manners of the 17th century. The work is based in part upon the "Characters" of Theophrastus, which La Bruyère had translated.

Charge of the Light Brigade, The. Tennyson's famous descriptive lyric celebrating the charge of the brigade of light cavalry at Balaklava in the Crimean war.

Charlemagne (*shär'lĕ-mān*). The romance of Charlemagne and his Paladins is of French origin, as the romances of King Arthur and the Knights of the Round Table are of Celtic or Welsh origin. According to one tradition, Charlemagne is not dead, but waits, crowned and armed, in Odenberg, near Salzburg, till the time of antichrist, when he will wake up and deliver Christendom. According to another tradition, Charlemagne appears in seasons of plenty. He crosses the Rhine on a golden bridge and blesses both cornfields and vineyards.

Charmian. A kind-hearted but simple-minded female attendant on Cleopatra in Shakspere's play *Antony and Cleopatra*.

Chauvinism (*shō'vĭn-ĭz'm*). An attitude of exaggerated, unreasoning patriotism. The word is said to be derived from the name of Nicolas Chauvin, a soldier in the army of Napoleon and a person in Cogniard's *Cocarde Tricolore* (1831). The equivalent English word is "jingoism," derived from a jocular oath, "By Jingo," which came into vogue through a popular patriotic song.

Cheeryble Brothers, The. A firm of benevolent London merchants in Dickens's *Nicholas Nickleby*.

Cherry Orchard, The, Chékov. A play of Russian life, portraying the reversal of relations between the old landed families and the freed serfs. Through the futile wastefulness of Madame Ranévsky and her brother Leonid Gayef, their estate, on which is a cherry orchard, has become hopelessly involved in debt. Their sentimental love for the place blinds them to practical matters. Lopákhin, son of a former serf on the estate, suggests that the orchard be cut up into building lots, since it is near the city, but his suggestion is ignored. Finally, he buys the place at auction, and the family, including Anya, Madame Ranévsky's daughter, and her adopted daughter Barbara, are scattered. The tragic element is heightened by the presence of Firs, an old servant, who, forgotten by all, lies down to die in the abandoned house.

Chery and Fair-Star. Countess d'Aulnoy's Fairy Tales. Two children of royal birth, whom their father's brothers and their mother's sisters cast out to sea. They are found and brought up by a corsair and his wife. Ultimately they are told of their birth by a green bird and marry each other. A similar tale is found in the *Arabian Nights*.

Chevy Chase. The subject and the title of a famous old English ballad. Percy Hotspur entered the domain of Douglas, in Scotland, slew 100 deer, and was attacked by Douglas. The ensuing combat resulted in the slaughter of both leaders and many of their bravest followers. The ballad is apparently intended to commemorate the battle of Otterburn in 1388, but it is impossible to reconcile the incidents of the poem with history.

Childe. A title of honor often used in old English ballads, as "Childe Harold," "Childe of Ellechilde Waters," "Childe Roland," "Childe Tristram," "Childe Arthur." Use is made of the term in Byron's poem entitled *Childe Harold's Pilgrimage*. See *Harold, Childe*.

Children in the Wood. Two characters in an ancient and well-known ballad entitled "The Children in the Wood, or The Norfolk Gent's Last Will and Testament," which is said to be a disguised recital of the alleged murder of his nephews by Richard III. This is the story as related in Percy's *Reliques*. The master of Wayland Hall, Norfolk, on his deathbed left a little son, three years old, and a still younger daughter, named Jane, to the care of his wife's brother. If the children died before they came to their majority, their uncle was to inherit their estate. After twelve months had elapsed, the uncle hired two ruffians to murder the two babes. As they went along, one of the ruffians relented and killed his fellow; then, left down the children in a wood, left them. The poor babes gathered blackberries to allay their hunger, but died before night, and "Robin Redbreast" covered them with strawberry leaves. Addison says of the ballad that it is "one of the darling songs of the people."

Children of the Abbey, The, Regina Maria Roche. A novel (1798). The heroine, Amanda, daughter of Mowbray, is disowned by her first wife, is cast out through the influence of her stepmother. After rather more than the usual misfortune and slander, she triumphs over her enemies and lives happily.

Chillingham. The hero in a novel of this name by Edgeworth.

Chillon (*shē-yôN'*; Fr., *shē'yôN'*). A castle in Vaud, Switzerland, at the eastern end of Lake Geneva. It covers a rock rising from the edge of the lake, and is a very picturesque pile, consisting of semicircular and square towers and connecting curtains grouped about a higher central tower. It is famous in literature and song, especially as the prison of Bonivard, a defender of Swiss liberties against the duke of Savoy in the 16th century. This is the theme of Byron's "Prisoner of Chillon."

Chillon, The Prisoner of. See *Chillon*.

Chimmie Fadden. The hero of a series of stories by E. M. Townsend. The character is drawn from that of Patrick O'Connell, or "Chuck Conners," known as "The White Mayor of Chinatown" in New York. Chimmie Fadden's career has been dramatized.

Chingachgook. A sagamore of the Mohicans, and father of Uncas, in Cooper's *Leatherstocking Tales*.

Chloe. (1) In *Daphnis and Chloe*, by Longus, the shepherdess loved by Daphne. (2) *Paul and Virginia* by St. Pierre is founded on this romance. (3) Chloe is also a shepherdess in Shakspere's *As You Like It*. (4) The heroine in George Meredith's *Tale of Chloe*.

Chœreas. The lover of Callirrhoë, in Chariton's Greek romance.

Choir Invisible, The, James Lane Allen. A story of the pure love of a man and a woman who were separated by marriage. The scene is Kentucky in the period following the Revolution. A story of the inner life, with little action.

Chouans, Les (*lā shōō'äN'*), **Balzac.** This romance is a story of the Chouans, or bands of Vendean peasants, who maintained a guerrilla warfare against the French Republican forces from 1792 to 1800. Their leader, Cottereau, a salt-smuggler, had acquired the title "Chouan" from the screech owl cry he used as a signal.

Christabel. (1) The subject and heroine of an old romance by Sir Eglamour of Artois. (2) The heroine of an ancient ballad "Sir Cauline." (3) The lady in Coleridge's poem "Christabel."

Christian. The hero of John Bunyan's allegory *Pilgrim's Progress*. He flees from the City of Destruction and journeys to the Celestial City. He starts with a heavy burden on his back, but it falls off when he stands at the foot of the cross. All his trials on the way are depicted.

Christiana. The wife of Christian, who started with her children and Mercy from the City of Destruction, forms the subject of Bunyan's *Pilgrim's Progress*, part II. She was placed under the guidance of Mr. Greatheart, and met her husband at the Celestial City.

Christmas Carol. See *Scrooge, Ebenezer*.

Christopher, St. The giant that carried a child over a brook and said, "Chylde, thou hast put me in grete peryll. I might bere no greater burden." The Chylde was the Christ and the burden was the "sin of the world." This has been a favorite theme for painters.

Christus, a Mystery. A dramatic trilogy by Henry W. Longfellow: Part I, "Divine Tragedy"; Part II, "The Golden Legend"; Part III, "New England Tragedies."

Chrysalde (*krē'zäld'*). A character in Molière's *L'Ecole des Femmes*; a friend of Arnolphe.

Chrysale (*krē'zäl'*). An honest, simple-minded, henpecked tradesman, in Molière's *Les Femmes Savantes*.

Chuzzlewit, Jonas. A miser and murderer, the opposite type of character from Martin.

Chuzzlewit, Martin. The hero of Dickens's novel of the same name.

Cid, The, Corneille. This play established Corneille's fame, although it was bitterly criticized. He borrowed material from many Spanish sources. The play tells the story of the love of Rodrigue, "the Cid," and Chimène. Rodrigue, to defend his father's honor, kills Chimène's father. She demands his life, though not concealing her love. Meanwhile, Rodrigue has defeated the Moors. Chimène accepts Don Sanche as her champion, but when he returns from the duel with a bloodstained sword, she scorns him and plans to enter a convent. It then appears that Rodrigue has merely disarmed Don Sanche, refusing, because of his love, to injure a champion of Chimène. After this proof of loyalty the lovers are wedded.

Cid Campeador (*thĕTH kăm'pā-ā-THōr'*). The name given in histories, traditions, and songs to the epic hero of Spain. So greatly was he honored that he was called *Mio Cid el Campeador*, "my lord the champion." Relics of the "Blessed Cid," as he is still called in Spain, such as his sword, shield, banner, and drinking-cup, are still held in great reverence by the populace. The numerous "Cid romances" that were first published in the 16th century contain the most romantic improbabilities concerning the life and deeds of the Cid. The most interesting chronicle of the Cid for English readers was written by Robert Southey.

Cinderella. Heroine of a fairy tale. She is the drudge of the house, while her elder sisters go to fine balls. At

length a fairy enables her to go to the prince's ball; the prince falls in love with her, and she is discovered by means of a glass slipper which she drops. This will fit no foot but her own. She is represented as returning good for evil and heaping upon her half sisters every kindness a princess can show.

Cipango (*sĭ-păng′gō*). A marvelous island, described in the *Voyages* of Marco Polo, the Venetian traveler. It is represented as lying in the Eastern seas, some 1500 miles from land, and of its beauty and wealth many stories are related. Columbus and early navigators made a diligent search for this island.

Clare, Ada. The wife of Carstone, and one of the most important characters in Dickens's *Bleak House*.

Clayhanger, Arnold Bennett. The hero of the novel *Clayhanger* is a shy, average young man of the Five Towns in the Potteries district of England, in which Bennett places his stories of common life. He marries Hilda Lessways.

Clementina, The Lady. A beautiful and accomplished woman, deeply in love with Sir Charles Grandison, in Richardson's novel of that name.

Clifford, Paul. An attractive highwayman and an interesting hero in Bulwer's novel of the same name. He is familiar with the haunts of low vice and dissipation, but afterward is reformed and elevated by the power of love.

Clinker, Humphrey. The hero of Smollett's novel entitled *The Expedition of Humphrey Clinker*, a philosophic youth who meets with many adventures. Brought up in the workhouse, put out by the parish as apprentice to a blacksmith, he was afterward employed as a hostler's assistant. Having been dismissed from the stable, and reduced to great want, he at length attracts the notice of Mr. Bramble, who takes him into his family as a servant. He becomes the accepted lover of Winifred Jenkins, and at length turns out to be a natural son of Mr. Bramble.

Cloister and the Hearth, The, Charles Reade. The great historical novel of the Renaissance. The time is the close of the 15th century. Gerard Eliassoen, a humble Dutch boy, is betrothed to Margaret, daughter of a wealthy alchemist-physician. But their marriage is prevented and Gerard flees to Rome. There he hears that Margaret is dead. Hopeless of love, he becomes a monk. Returning to Holland, he finds Margaret alive and the mother of a boy. But Gerard, devoted to the Church, cannot return to Margaret. The son grew up to be the great scholar Erasmus.

Clorinda. Jerusalem Delivered, Tasso. Clorinda, the heroine of this poem, is represented as an Amazon inspiring the most tender affection in others, especially in the Christian chief Tancred; yet she is herself susceptible of no passion but the love of military fame.

Cloten. A rejected lover of Imogen, in Shakspere's play *Cymbeline*.

Clout, Colin. A name that Spenser applies to himself in the *Faery Queen* and "Shepherd's Calendar." Colin Clout also is introduced into Gay's pastorals.

Cœlebs (*sē′lĕbz*). The hero of a novel by Hannah More, *Cœlebs in Search of a Wife*.

Collean, May. The heroine of a Scottish ballad.

Cologne, The Three Kings of. A name given to the three Magi who visited the infant Savior, and whose bodies are said to have been brought by the empress Helena from the East to Constantinople, whence they were transferred to Milan. Afterward, they were removed to Cologne and placed in the principal church of the city, where, says Cressy, "they are to this day celebrated with great veneration." Their names are commonly said to be Gaspar, Melchior, and Balthazar.

Colonel Carter of Cartersville, F. Hopkinson Smith. A story of an old Virginia gentleman set down among New York financiers, and involved in railroad building schemes.

Comédie Humaine (*kō′mā′dē′ ü′mân′*). The uncompleted series of nearly a hundred novels by Balzac, designed to give a panoramic picture of the manners and morals of his time. He began the work in 1829, adopting the general title in 1842. The appearance of the same characters in various stories binds them into a single series.

Comedy of Errors. Shakspere. Twin brothers of exact likeness, named Antipholus, are served by attendant slaves named Dromio, also of striking resemblance. The humor of the play lies in the complications that arise. The two brothers are lost at sea with their servants and are picked up by different vessels. After long separation they all reappear in Ephesus. There is great entanglement of plot until both brothers face each other in a trial before the duke and all is explained.

Common Sense, Thomas Paine. The title of a famous pamphlet published by Paine in Philadelphia in 1776, in which he urged separation of the colonies from England. The work helped to crystallize American sentiment for independence.

Compleat Angler, The. A famous book by Izaak Walton. It was first published in 1653, and it is said to have been issued in a new edition, on the average, every two and a half years since. The "compleat angler" is the fisherman who loves peaceful nature and seasons his hours by the stream with wise philosophy. The book is written in the form of a prose pastoral, the chief characters being "Piscator" and "Venator."

Comus. In Milton's poem entitled *Comus: a Masque*, he is represented as a base enchanter, who endeavors, but in vain, to beguile and entrap the innocent by means of his enchantments. The name in Greek means "a revel."

Concord Bridge. The old bridge at Concord, Mass., made famous by the battle between Americans and British, April 19, 1775, and celebrated in Emerson's "Concord Hymn," written for the dedication of the Concord monument, April 19, 1836.

Concord, Mass. The town of Concord, noted in revolutionary history, became famous later as the residence of several literary men and women,—Emerson, Thoreau, Bronson Alcott, Louisa May Alcott, William Ellery Channing, and others. Here was the center of the so-called Concord school of philosophy.

Consuelo (*kŏn′sû-ā′lō*). The heroine of George Sand's novel of the same name, an impersonation of noble purity sustained amid great temptations.

Cooperstown. A village in Otsego county, New York. It was for many years the home of James Fenimore Cooper, where he wrote most of his novels. In *The Pioneers* he wrote of the wilderness life about Cooperstown, introducing the place under the name of Templeton.

Cophetua (*kō-fĕt′ū-ā*). An imaginary African king, of whom a legendary ballad told that he fell in love with a beggar maid and married her. This ballad is found in Percy's *Reliques*. Many poets have made use of the story. Tennyson has given us a modern version in "The Beggar Maid."

Copperfield, David. The hero of Dickens's novel of the same name. This is said to be Dickens's favorite among his works and somewhat autobiographic.

Cordelia. King Lear, Shakspere. The youngest of Lear's three daughters, and the one who truly loved him.

Corydon. A shepherd in one of the idyls of Theocritus and in one of the eclogues of Virgil. Used by Shakspere and later poets to designate a rustic swain.

Costard. A clown, in Shakspere's *Love's Labor's Lost*, who apes the display of wit and misapplies, in the most ridiculous manner, the phrases and modes of combination in argument that were then in vogue.

Cottar's Saturday Night, Robert Burns. This famous poem was published in 1786. Celebrated for its beautiful picture of humble Scotch life. One of the most frequently quoted of English poems.

Count of Monte Cristo, The, Dumas. A young sailor, Edmond Dantes, with the world and hopeful love before him, is imprisoned on a false charge of being a Bonapartist emissary. The time is 1815. In prison he is told by a fellow prisoner of a treasure buried on the island of Monte Cristo. He escapes, finds the treasure, and spends the rest of his life as the mysterious count, bringing punishment upon his enemies and rewarding his friends.

Crabtree. A character in Smollett's novel *The Adventures of Peregrine Pickle*.

Crane, Ichabod. The name of a Yankee schoolmaster, whose adventures are related in the *Legend of Sleepy Hollow*, in Irving's *Sketch Book*.

Crawley, Rawdon. The husband of Becky Sharp in *Vanity Fair*, Thackeray's novel without a hero.

Creakle, Mr. A tyrannical and cruel schoolmaster in Dickens's *David Copperfield*.

Cressida. The heroine of Shakspere's play *Troilus and Cressida*, also the heroine of one of Chaucer's *Canterbury Tales*.

Cricket on the Hearth, The, Dickens. A Christmas story. The title is suggested by the singing-match between the kettle and the cricket on Dot Peerybingle's immaculate and snug little hearth. The cricket wins the match. A love story is woven in. Edward, son of old Caleb Plummer, the toy maker, comes home from South America just in time to save his sweetheart, May Fielding, from marriage to Tackleton, a toy merchant.

Crisis, The, Churchill. A story of Civil War times, the scenes located for the most part in St. Louis. A Yankee and a Southern girl are the lovers. Lincoln, Grant, and Sherman are brought into the tale.

Cris Kingle (*krĭs′ kĭng′l*). Also variously spelled Kriss Kingle, and Kriss Kringle, has been corrupted from the German word, *Christ-Kindel*, meaning the "little *Christ-child*." Later uses, especially among German peoples, have identified the name with that of Santa Claus and Saint Nicholas.

Croaker. A character in Goldsmith's comedy *The Good-natured Man*.

Crocodile Tears. False tears, often affected for a purpose. The expression appears first in Greek and Latin proverbs and is based on the erroneous belief that the crocodile weeps in order to arouse the pity of a human being who, on approaching, is promptly devoured.

Crossing, The, Churchill. A historical tale of a boy's adventures in the westward movement of settlers across the Alleghenies after the Revolution. George Rogers Clark is the hero of the story.

Crummles, Vincent. A theatrical head of a theatrical family in Dickens's *Nicholas Nickleby*.

Crusoe, Robinson. See *Robinson Crusoe*, page 310.

Cuchullin, Cuchulain (*kōō-hōō′lĭn*). See *Cattle Raid of Cooley*.

Cuneiform (*kū-nē′ĭ-fôrm*) **Writing.** So called from the wedge shape of the characters (Latin *cuneus*, wedge). The signs, to represent objects and also sounds, were composed of the wedge-shape marks arranged in groups. These marks were impressed on soft clay tablets with a stylus or cut into rock with a chisel. This system was in use in Babylonia from 7000 B. C. to 300 B. C. and in neighboring countries, including that of the Hittites.

Cuttle, Captain. A character in Dickens's *Dombey and Son*, good-humored, eccentric, pathetic in his simple credulity.

Cymbeline. A mythical king of Britain and the titular hero of Shakspere's play of the same name. Imogen, daughter of Cymbeline, king of Britain, married clandestinely Posthumus Leonatus; and Posthumus, being banished for the offense, retired to Rome. One day, in the house of Philario, the conversation turned on the merits of wives, and Posthumus bet his diamond ring that nothing could tempt the fidelity of Imogen. Through the villainy of Iachimo, Posthumus was forced to believe Imogen untrue. The villainy was in time disclosed and the beautiful character of Imogen revealed.

Daddy-Long-Legs, Jean Webster. The story of an orphan girl who is sent to school by an unknown benefactor. She writes to him under the name of "Daddy-Long-Legs."

Dagonet, Sir. In the romance *Le Morte D'Arthur* he is called the fool of King Arthur.

Dalgetty, Rittmaster Dugald. A soldier of fortune in Sir Walter Scott's *Legend of Montrose*, distinguished for his pedantry, conceit, valor, vulgar assurance, knowledge of the world, greediness, and a hundred other qualities, making him one of the most amusing, admirable, and natural characters ever drawn by the hand of genius.

Damocles (*dăm′ō-klēz*). A flatterer in the court of Dionysius of Syracuse. By way of answer to his constant praises of the happiness of kings, Dionysius seated him at a royal banquet, with a sword hung over his head by a single horsehair. In the midst of his magnificent banquet, Damocles, chancing to look upward, saw the sharp and naked sword suspended over his head. A sight so alarming instantly changed his views of the felicity of kings. "Sword of Damocles" signifies now a dread foreboding of evil or tantalizing apprehension.

Damon and Pythias or **Phintias.** Two noble Pythagoreans of Syracuse, who have been remembered as models of faithful friendship. Pythias, having been condemned to death by Dionysius, the tyrant of Syracuse, begged to be allowed to go home, for the purpose of arranging his affairs, Damon pledging his own life for the reappearance of his friend. Dionysius consented, and Pythias returned just in time to save Damon from death. Struck by so noble an example of mutual affection, the tyrant pardoned Pythias, and desired to be admitted into their sacred fellowship.

Dandie Dinmont. A jovial, true-hearted store farmer, in Sir Walter Scott's *Guy Mannering*.

Dantesque (*dăn-tĕsk′*). Dante-like—that is, a minute, lifelike representation of the infernal horrors, whether by words, as in the "Inferno," or in visible form, as in Doré's illustrations of the poem.

Daphnis and Chloe (*klō′ē*). A pair of lovers in the pastoral romance of the same name written by Longus in Greek prose probably in the 5th century.

Darby and Joan. A married couple said to have lived in the village of Healaugh, in the West Riding of Yorkshire, and celebrated for their long life and conjugal felicity. They are the hero and the heroine of a ballad called "The Happy Old Couple," which has been attributed to Prior but is of uncertain authorship. Timperley says that Darby was a printer in Bartholomew Close, who died in 1730, and that the ballad was written by one of his apprentices named Henry Woodfall.

Dares (*dā′rēz*). One of the competitors at the funeral games of Anchises in Sicily, described in the fifth book of Virgil's *Æneid*.

Dark Rosaleen. A poetical name for Ireland. See James Clarence Mangan's beautiful poem of that name.

Darrel of the Blessed Isles, Irving Bacheller. A story of an old clock-mender whose imagination traveled through a country of poetry, the "blessed isles," fashioned out of his familiarity with Shakspere, Milton, and the Bible.

David. In Dryden's satire called "Absalom and Achitophel," the character representing Charles II; Absalom, his beautiful but rebellious son, represents the duke of Monmouth.

David, Saint. He was said to be the uncle of King Arthur. St. David first embraced the ascetic life at Witland in Carmarthenshire, but subsequently removed to Menevia, in Pembrokeshire, having founded twelve convents in West Britain.

Davy. Henry IV, Shakspere. The varlet of Justice Shallow, who so identifies himself with his master that he considers himself half host, half varlet. Thus, when he seats Bardolph and Page at table, he tells them they must take "his" good will for their assurance of welcome.

Dawfyd. The Betrothed, Scott. The one-eyed freebooter chief.

Dawkins. Oliver Twist, Dickens. Known by the sobriquet of the "Artful Dodger." He is one of Fagin's tools. Jack Dawkins is a scamp, but of a cheery, buoyant temper.

Deadwood Dick. The adventurous character to be found in many dime novels of the middle of the 19th century. In real life, he was Robert Dickey (1840–1912), who had a romantic career as Indian scout, trapper, and fur trader.

Deans, Douce Davie. A poor herdsman at Edinburgh, and the father of Effie and Jeanie Deans, in Sir Walter Scott's novel *The Heart of Midlothian*.

Deans, Effie. A beautiful but unfortunate character in Sir Walter Scott's *Heart of Midlothian*.

Deans, Jeanie. The heroine of *The Heart of Midlothian*, characterized by her kindness, sturdiness, and good sense. She journeys from Edinburgh to London and obtains pardon for her sister Effie, condemned for child murder.

Debon. One of the heroes who accompanied Brut, or Brutus, to Britain. According to British fable, Devonshire is the county or share of Debon.

Decameron (*dē-kăm′ĕr-ŏn*). A volume of 100 tales told by Boccaccio. Seven ladies and three gentlemen, assembled in one place, agree that each shall tell one story every day for the entertainment of the rest. Thus ten stories daily are told for ten consecutive days. Chaucer borrowed the plan but reconstructed it for his *Canterbury Tales*.

De Coverley, Sir Roger. One of the members of the imaginary club under whose direction the *Spectator* was professedly edited. He represents a kind-hearted, simple-minded English squire in the time of Queen Anne. He figures in thirty papers of the *Spectator*.

Dedlock, Lady. Wife of Sir Leicester, beautiful, and apparently cold and heartless, but suffering constant remorse. A daughter had been born to her before her marriage to Sir Leicester. The daughter's name is Esther Summerson, the heroine of the novel.

Dedlock, Sir Leicester. Bleak House, Dickens. An honorable and truthful man but of such fixed ideas that no one could shake his prejudices. He had an idea that the one thing of greatest importance to the world was a certain family by the name of Dedlock. He loved his wife, Lady Dedlock, and believed in her implicitly. His pride had a terrible fall when he learned the secret of her life before her marriage and knew the fact she had been hiding from him, that she had a daughter.

Dedlock, Volumnia. Cousin of Sir Leicester, a young lady of sixty, who had the disagreeable habit of entering into other people's business.

Deerslayer. The hero of a novel of the same name, by James Fenimore Cooper. A strong fine character, honorable, truthful, brave, without cultivation but without

reproach. This character appears under different names in five of Cooper's novels,—*The Deerslayer*, *The Pathfinder*, *The Last of the Mohicans*, *The Pioneers*, and *The Prairie*.

Defarge (*dĕ-färzh'*), **M. Tale of Two Cities, Dickens.** Keeper of a wine shop in the Faubourg St. Antoine, in Paris. He is a bull-necked, implacable-looking man.

Defarge, Madame. Wife of the wineseller, a dangerous woman, "everlastingly knitting."

Delectable Mountains. In Bunyan's *Pilgrim's Progress*, a beautiful range of hills from the summit of which the pilgrim could see the Celestial City.

Delphin Classics. For the use of the dauphin, son of Louis XIV (1674–91), the writings of 39 Latin authors were collected and published in sixty volumes. Notes and an index were added to each work. An edition of the Delphin classics was published in London in the year 1818. The name comes from Latin *delphinus*, meaning "dolphin," from which "dauphin" also is derived, because of the device of a dolphin worn on his helmet.

Delphine. The title of a novel by Mme. de Staël, and the name of its heroine.

Delphine, Madame. Old Creole Days, George W. Cable. A free quadroon connected with the splendor of La Fitts, the smuggler and patriot. Madame Delphine disowned her beautiful daughter Olive in order to assure to her the rights of a white woman.

Demetrius (*dĕ-mē'trĭ-ŭs*). **A Midsummer Night's Dream, Shakspere.** The young Athenian to whom Egeus promised his daughter Hermia in marriage.

De Profundis (*dē prō-fŭn'dĭs*), "Out of the Depths." (1) The 130th Psalm is so called from the first two words in the Latin version. In the Roman Catholic Church it is sung when the dead are committed to the grave. (2) Title of a poem by Oscar Wilde.

Deronda, Daniel. One of George Eliot's strongest character sketches in her novel of the same name.

Der Tag, "The Day." For many years this was a favorite toast in the German army and navy, the day when war should come.

Deserted Village. A poem by Goldsmith in which he describes rural England. He calls the village Auburn, but tells us it was the seat of his youth, every spot of which was dear and familiar to him. He pictures familiar persons, the preacher, the teacher, pastimes, and favorite haunts.

Desmas. The repentant thief is so called in "The Story of Joseph of Arimathea." Longfellow, in "The Golden Legend," calls him Dumachus. The impenitent thief is called Gestas, but Longfellow calls him Titus.

Despair, Giant. Pilgrim's Progress, Bunyan. A giant who is the owner of Doubting Castle, and who, finding Christian and Hopeful asleep upon his grounds, takes them prisoners and thrusts them into a dungeon.

Deus Ex Machina, "A god from the machine." Used of some external power or idea brought into a story or argument to resolve a difficulty. An allusion to the custom of the ancient theater, where a god was brought in by machinery to explain or resolve situations past the power of human actors to understand or control.

Dhu, Roderick. A Highland chieftain and outlaw in Scott's poem "Lady of the Lake," cousin of Ellen Douglas, and also her suitor. He is slain by James Fitz-James.

Diana of the Crossways, George Meredith. This was the first of Meredith's novels to gain popularity, and it is still ranked as a masterpiece. The heroine, Diana Merion, the victim of a youthful, unhappy marriage, plunges into the gaiety of London and becomes unfortunately involved in the betrayal of a political secret. Sobered and disillusioned, she finally, after the death of her first husband, marries a strong, sensible man, Redworth, who had been devoted to her.

Dido. The daughter of Belus, king of Tyre, and the wife of Sichæus, whom her brother Pygmalion murdered for his riches. Not far from the Phœnician colony of Utica she built the city of Carthage. According to Virgil, when Æneas was shipwrecked upon her coast, in his voyage to Italy, she hospitably entertained him, fell in love with him, and, because he did not requite her passion, stabbed herself in despair.

Dies Iræ (*dī'ēz ī'rē*). The name generally given, from the opening words, to the famous medieval hymn on the Last Judgment. On account of the solemn grandeur of the ideas which it brings before the mind, as well as the deep and trembling emotions it is fitted to excite, it soon found its way into the liturgy of the Church. The authorship of the hymn has been ascribed to Gregory the Great, St. Bernard of Clairvaux, Umbertus, and Frangipani, the last two of whom were noted as hymnists. The consensus of recent hymnologists, however, is in favor of Thomas of Celano.

Diggon, Davie. A shepherd in the "Shepherd's Calendar," by Spenser. He tells Hobbinol that he drove his sheep into foreign lands, hoping to find better pasture; but he was amazed at the luxury and profligacy of the shepherds whom he saw there and the wretched condition of the flocks.

Dimmesdale (*dĭmz'dāl*), **Arthur.** In Hawthorne's romance *The Scarlet Letter*, a Puritan minister of great eloquence and spirituality, in colonial New England, who secretly commits adultery and afterward makes a public confession.

Dinah. (1) Aunt of Walter Shandy in Sterne's novel *Tristram Shandy*. She leaves Mr. Walter Shandy £1000, which he fancies will enable him to carry out all the schemes that enter into his head. (2) A character in Mrs. Stowe's *Uncle Tom's Cabin*. (3) *St. Ronan's Well*, Scott. Daughter of Sandie Lawson, landlord of the Spa hotel.

Dingley Dell. Pickwick Papers, Dickens. The home of Mr. Wardle and his family, and the scene of Tupman's love adventure with Miss Rachel.

Dirlos, Count. One of Charlemagne's paladins, an ideal of valor, generosity, and truth.

Divine Comedy. The immortal work of Dante Alighieri, written between 1300 and 1321, the year of the poet's death. It consists of a vision of the world beyond the grave, and depicts the final destiny of the human soul in accordance with its exercise of free will during life, by which it has chosen to follow the way of evil or of good.

The structure of the sublime poem is based upon the dual scheme of the *De Monarchiâ*. It is made up of a hundred cantos in metrical lines of eleven syllables, written in *terza rima*, a form of the popular poetry of the day but distinctly modified in an especial manner by the poet.

The vision of which Dante writes is one which was vouchsafed to him for his salvation's sake twenty years previously when leading an evil life. During the year of Jubilee, 1300, commencing on the morning of Good Friday and continuing for six consecutive days, the poet passed through the confines of hell, purgatory, and paradise. He held converse with the souls in each of the three realms and learned the future purposes of Divine Providence in his own regard and in that of the world at large.

The poet relates how, by special grace, while yet in the flesh, he was permitted to travel through these three realms of the After Life. Virgil appears to him, typifying human wisdom, informed by the moral and intellectual virtues. He guides Dante by the light of reason, from the dark forest, wherein the beasts of pride, avarice, and lust keep men from ascending the Holy Mount, through hell and purgatory as far as the earthly paradise. Here the poet realizes how the state of temporal happiness is reached through purgatorial travail which regains for the soul its spiritual liberty.

Beatrice, representing divine philosophy, illumined by revelation, leads him next up through the nine heavens of spiritual preparation of the mind. Then slowly, before the eyes of Dante, is opened up the true paradise, limitless, timeless, wherein is found the eternal happiness of the sight of God.

Here the place of Beatrice is taken by St. Bernard who typifies divine contemplation, which is the eternal life of the soul. The saint commends the poet to the patronage of the Blessed Virgin, through whose intercession Dante is awarded a foretaste of the Beatific Vision.

The poem closes in ineffable grandeur and majesty, showing how Faith is lost in Vision, Hope in Fruition and with nothing remaining but that "Charity which moves the sun and the other stars." The powers of the soul are consumed in their union with the Divine Essence and the finite will at last has become one with the Infinite.

In this stupendous allegory, we have in truth the transcendent vision of a god-given genius, who unfolds before us what has been revealed to him of the unspeakable justice, mercy, and glory of the Most High. In spiritual wisdom, dramatic force, infallible confidence of touch, and terseness of expression, the *Divine Comedy* has never been excelled. It is the culminating and crowning glory of medieval culture, which rivals in splendor that of the classical world at any period of its history.

Dobbin, Captain William. The awkward, plodding, patient, faithful friend of George Osborne in *Vanity Fair* by Thackeray. After years of unselfish devotion, he finally wins Amelia, George's widow, and marries her.

Doctor Syntax. The hero of a work entitled *The Tour of Dr. Syntax in Search of the Picturesque*. Doctor Syntax is a simple-minded, pious, henpecked clergyman, but of excellent taste and scholarship, who left home in search of the picturesque. His adventures are told in eight-syllable verse by William Combe.

Doctour of Phisikes, Tale of the. The Roman story of Virginius, given by Livy. Told by Chaucer in *Canterbury Tales*.

Dods. The old landlady in Scott's novel *St. Ronan's Well.* An excellent character, a mosaic of oddities, all fitting together, and forming an admirable whole. She was so good a housewife that a cookery book of great repute bears her name.

Dodson. The Three Warnings, Mrs. Thrale. A youth called upon by Death on his wedding day. Death told him he must go with him. "With you!" the hapless youth cried, "young as I am." Death then told him he would not disturb him yet, but would call again after giving him three warnings. When he was 80 years of age, Death called again. "So soon returned?" old Dodson cried. "You know you promised me three warnings." Death then told him that as he was "lame, and deaf, and blind" he had received his three warnings.

Dodson and Fogg. The lawyers employed by the plaintiff in the famous case of "Bardell *v.* Pickwick," in the *Pickwick Papers* by Charles Dickens.

Doeg (*dō'ĕg*). **Absalom and Achitophel, Dryden.** Doeg was Saul's herdsman, who had charge of his mules and asses. He told Saul that the priests of Nob had provided David with food; whereupon Saul sent him to put them to death, and 85 were ruthlessly massacred.

Dogberry and Verges. Two ignorant, conceited constables, in Shakspere's *Much Ado about Nothing.*

Dolly Varden. Barnaby Rudge, Dickens. Daughter of Gabriel Varden, locksmith. Dolly dressed in the Watteau style, and was lively, pretty, and bewitching.

Dolopatos. Sandabar's Parables. The Sicilian king, who placed his son Lucien under the charge of "seven wise masters." Because the queen, Lucien's stepmother, had wrongfully accused him of violence toward her, he fell under his father's fury and was condemned to death. By astrology the prince discovered that if he could tide over seven days his life would be saved; so the wise masters amused the king with seven tales, and the king relented. The prince himself then told a tale which embodied his own history; the eyes of the king were opened, and the queen was condemned to death.

Dombey. Dombey and Son, Dickens. Mr. Dombey, a self-sufficient, purse-proud, frigid merchant, who feels satisfied there is but one Dombey in the world, and that is himself. When Paul was born, his ambition was attained, his whole heart was in the boy, and the loss of the mother was but a small matter. The boy's death turned his heart to stone.

Dombey, Florence. A motherless child, hungering and thirsting to be loved, but regarded with indifference by her father, who thinks that sons alone are worthy of regard.

Dombey, Little Paul. A pathetic child in Dickens's novel *Dombey and Son.* He is a delicate, thoughtful boy, the only son of a rich and pompous London merchant.

Domdaniel (*dŏm-dăn'ĭ-ĕl*). A cave in the region adjoining Babylon, the abode of evil spirits. By some traditions said to have been originally the spot where the prophet Daniel imparted instruction to his disciples. In another form, the Domdaniel was a purely imaginary region, subterranean, or submarine, the dwelling place of genii and enchanters. Arabian mythology.

Domesday Book or **Doomsday Book.** The name of one of the oldest and most valuable records of England, containing the results of a statistical survey of that country made by William the Conqueror, and completed in the year 1086. The origin of the name—which seems to have been given to other records of the same kind—is somewhat uncertain; but it has obvious reference to the supreme authority of the book in doom or judgment on the matters contained in it.

Dominical Letter or **Sunday Letter.** One of the seven letters A, B, C, D, E, F, G, used in almanacs, etc., to mark the Sundays throughout the year. The first seven days of the year are marked in their order by the above corresponding letters. The following seven, and all consecutive sets of seven days to the end of the year are similarly marked; so that the 1st, 8th, 15th, 22d, etc., days of the year are all marked by A; and the 2d, 9th, 16th, 23d, etc., by B; and so on. The days being thus marked, it is evident that on whatever date the first Sunday of the year falls, the letter which marks it will mark all the other Sundays in the year, as the number of the letters and of the days in the week is the same. As the common year consists of 52 weeks and one day over, the dominical letters go backwards one day every common year. If the dominical letter of a common year be G, F will be the dominical letter for the next year.

Don Adriano de Armado (*dŏn ăd'rĭ-ā'nō dā ăr-mä'dō*). A pompous, fantastical Spaniard in Shakspere's *Love's Labor's Lost,* "who has a mint of phrases in his brain." His language is fantastically out of proportion to the thought. He uses "examples suited only to the gravest propositions and impersonations, or apostrophes to abstract thoughts impersonated, which are, in fact, the natural language only of the most vehement agitations of the mind."

Donatello. The hero of Hawthorne's romance *The Marble Faun.* He is a young Italian with a singular likeness to the "Faun of Praxiteles." He leads an innocent but purely animal existence, until a sudden crime awakens his conscience and transforms his whole nature.

Don Cherubim. The "Bachelor of Salamanca" in Lesage's novel of this name; a man placed in different situations of life and made to associate with all classes of society, in order to give the author the greatest possible scope for satire.

Donegild. Man of Law's Tale, Chaucer. Mother of Alla, king of Northumberland, hating Constance, the wife of Alla, because she was a Christian, placed her on a raft with her infant son, and turned her adrift. When Alla returned from Scotland and discovered this cruelty of his mother, he put her to death. The tradition of St. Mungo resembles the "Man of Law's Tale" in many respects.

Donet (*dŏ'nĕt*). The first Latin grammar put into the hands of scholars. It was that of Donatus the grammarian, who taught in Rome in the 4th century and was the preceptor of St. Jerome.

Don Juan (*dŏn jū'ăn*). A legendary and mythical personage like Dr. Faustus. Don Juan is presented in the life of a profligate who gives himself up so entirely to the gratification of sense, especially to the most powerful of all the impulses, that of love, that he acknowledges no higher consideration, and proceeds to murder the man that stands between him and his wish, fancying that in so doing he had annihilated his very existence. He then defies that spirit to prove to his senses his existence. The spirit returns and compels Don Juan to acknowledge the supremacy of spirit and the worthlessness of a merely sensuous existence. The traditions concerning Don Juan have been dramatized by Tirso de Molina; thence passed into Italy and France. Glück has a musical ballet of Don Juan, and Mozart has immortalized the character in his opera "Don Giovanni." His adventures form the subject of a half-finished poem by Byron.

Don Quixote (*dŏn kwĭk'sŏt*). The hero of a celebrated Spanish romance of the same name by Cervantes. Don Quixote is represented as "a gaunt country gentleman of La Mancha, full of genuine Castilian honor and enthusiasm, gentle and dignified in his character, trusted by his friends, and loved by his dependents," but "so completely crazed by long reading the most famous books of chivalry, that he believes them to be true, and feels himself called on to become the impossible knight-errant they describe, and actually goes forth into the world to defend the oppressed and avenge the injured, like the heroes of his romances." The fame of Cervantes will always rest upon this incomparable satire upon the foolish and extravagant romances of chivalry.

Dooley, Mr. The Irish American character made popular by F. P. Dunne in humorous monologues of comment on men and affairs. Mr. Dooley, a saloon-keeper of Archey Road, appeared first in a series of sketches in the Chicago *Times-Herald.*

Doorm. Idylls of the King: Enid, Tennyson. An earl called "the Bull," who tried to make Enid his handmaid; but, when she would neither eat, drink, nor array herself in bravery at his bidding, "he smote her on the cheek"; whereupon Geraint slew the "russet-bearded earl" in his own hall.

Dora. David Copperfield, Dickens. The childwife to David, affectionate and tender-hearted. She was always playing with her poodle and saying simple things to her "Dody." She could never be his helper, but she looked on her husband with idolatrous love. While quite young she died.

Dorastus. The hero of an old popular "history" or romance, upon which Shakspere founded his *Winter's Tale.* It was written by Robert Greene, and was first published in 1588, under the title of *Pandosto, the Triumph of Time.*

Dorothea. The heroine of Goethe's celebrated poem "Hermann und Dorothea."

Dorrit, Edward and "Little." Little Dorrit, Dickens. The "father" of the Marshalsea prison and his interesting daughter. It is a fine picture of innocent, affectionate child life in the midst of the trying circumstances of a debtor's prison.

Dory, John. (1) Hero and title of an old English ballad. (2) A character in *Wild Oats,* or *The Strolling Gentleman,* a comedy by John O'Keefe.

Dotheboys (*dŏŏ'тнĕ-boiz'*) **Hall. Nicholas Nickleby, Dickens.** A school for boys kept by a Mr. Squeers, a

puffing, ignorant, overbearing brute, whose system of education consisted of alternately beating and starving.

Doubting Castle. The castle of the giant Despair, in which Christian and Hopeful were incarcerated, but from which they escaped by means of the key called "Promise," which was able to open any lock in the castle.

Dousterswivel. A German schemer, in Sir Walter Scott's novel *The Antiquary*.

Drac (*drăk*). A sort of fairy in human form, whose abode is the caverns of rivers. "Faire le drac," same as "Faire le diable." Irish, "Play the Puck"; English, "Play the deuce."

Drama of Exile, A. A poem by Elizabeth Barrett Browning (1844). The exile is Eve, driven out of paradise into the wilderness. Lucifer, Gabriel, and Christ are introduced into the poem, as well as Adam and Eve.

Dramatic Unities, The Three. One catastrophe, one locality, one day. These are Aristotle's unities of time, place, and action. To these the French added a fourth, the unity of uniformity; i. e., in tragedy all the *dramatis personæ* should be tragic in style, in comedy comic, and in farcical.

Drap. Drayton. One of Queen Mab's maids of honor.

Drawcansir (*drô'kăn-sēr*). The name of a blustering, bullying fellow in the celebrated mock-heroic play *The Rehearsal*, written by George Villiers, duke of Buckingham, assisted by Sprat and others. He is represented as taking part in a battle, where, after killing all the combatants on both sides, he makes an extravagantly boastful speech. From the popularity of the character, the name became a synonym for a braggart.

Driver. Guy Mannering, Scott. Clerk to Mr. Pleydell, advocate, Edinburgh.

Dromio. The Brothers Dromio. Two brothers exactly alike, who serve two brothers exactly alike, in Shakspere's *Comedy of Errors*, based on the *Menæchmi* of Plautus.

Dryasdust, The Rev. An imaginary personage who serves to introduce Scott's novels to the public.

Dudu. One of the three beauties of the harem into which Juan, by the sultana's order, had been admitted in female attire.

Duessa (*dû-ĕs'ä*). A foul witch, in Spenser's *Faery Queen*, who, under the assumed name of Fidessa and the assumed character of a distressed and lovely woman, entices the Red Cross Knight into the House of Pride. The knight, having left the palace, is overtaken by Duessa, and drinks of an enchanted fountain, which paralyzes him. In this state he is attacked, defeated, and imprisoned by the giant Orgoglio. Duessa becomes the paramour of Orgoglio, who decks her out in gorgeous ornaments, gives her a gold and purple robe to wear, puts a triple crown on her head, and sets her upon a monstrous beast with seven heads. Prince Arthur slays Orgoglio and rescues the knight. Duessa is stripped of her gorgeous disguise and is found to be a hideous hag.

Duff, Jamie. Guy Mannering, Scott. The idiot boy attending Mrs. Bertram's funeral.

Dulcinea del Toboso (*dōō'thē-nā'ä dĕl tō-bō'sō*). A country girl whom Don Quixote courts as his ladylove.

Dumaine. A lord attending on the king of Navarre, in Shakspere's *Love's Labor's Lost*.

Duncan. (1) A king of Scotland immortalized in Shakspere's tragedy *Macbeth*. Shakspere represents him as murdered by Macbeth, who succeeds to the Scottish throne, but according to history he fell in battle. (2) A Highland hero in Scott's "Lady of the Lake."

Dunder, Sir David, of Dunder Hall. A conceited, whimsical old gentleman, who forever interrupts a speaker with "Yes, yes, I know it," or "Be quiet, I know it." *Ways and Means*, by Colman.

Dundreary, Lord. A grotesque character in Taylor's comedy *Our American Cousin*; noted for his aristocratic haughtiness of manner. The part, insignificant in the first form of the play, was enlarged and made famous by the actor, E. A. Sothern.

Durandal. Written also Durandart, Durindana, and Durlindana. The name of the marvelous sword of Orlando, the renowned hero of romance. It is said to have been the workmanship of the fairies, who endued it with such wonderful properties that its owner was able to cleave the Pyrenees with it at a blow.

Durandarte (*dōō'răn-där'tā*). A fabulous hero of Spain, celebrated in the ancient ballads of that country and in the romances of chivalry. Cervantes has introduced him, in *Don Quixote*, in the celebrated adventure of the knight in the cave of Montesinos.

Durden, Dame. (1) The heroine of a popular English song. She is described as a notable housewife, and the mistress of five serving girls and five laboring men. The five men loved the five maids. (2) A sobriquet playfully applied to Esther Summerson, the heroine of Dickens's *Bleak House*. (3) Mistress of the Inn of Sherwood in the opera "Robin Hood."

Dwarf, Peter. An allegorical romance by Ludwig Tieck. The dwarf is a castle specter that advises and aids the family; but all his advice turns out evil, and all his aid productive of trouble.

Dwarf, The Black. A novel by Sir Walter Scott. The black dwarf is a fairy of the most malignant character; a genuine northern Duergar, and once held by the dalesmen of the border as the author of all the mischief that befell their flocks and herds. In Scott's novel the "Black Dwarf" is introduced under the "aliases" of Sir Edward Mauley; Elshander, the recluse; Cannie Elshie; and the Wise Wight of Mucklestane Moor.

Earnscliffe, Patrick. The Black Dwarf, Scott. The young laird of Earnscliff.

Earthly Paradise, The, William Morris. A narrative poem, the scene of which is laid in a "nameless city in a distant sea" to which come a band of Norse rovers fleeing from the Black Death and seeking a paradise. In this city they linger and find freedom from fear. During the year of waiting they tell 24 tales. These stories are gathered from Greek, Norse, French, and Arabian sources. They are connected by lyric passages of landscape poetry.

Eckhardt, The Faithful. A legendary hero of Germany, represented as an old man with a white staff, who, in Eisleben, appears on the evening of Maundy Thursday and drives all the people into their houses, to save them from being harmed by a terrible procession of dead men, headless bodies, and two-legged horses, which immediately after passes by. Other traditions represent him as the companion of the knight, Tannhäuser, and as warning travelers from the Venusberg, the mountain of fatal delights in the old mythology of Germany. Tieck has founded a story upon this legend, which has been translated into English by Carlyle, in which Eckhardt is described as the good servant who perishes to save his master's children from the seducing fiends of the mountain. The German proverb, "Thou art the faithful Eckhardt; thou warnest every one," is founded upon this tradition.

Eclecta. The "Elect" personified in "The Purple Island," by Phineas Fletcher. She is the daughter of Intellect and Voletta (free will).

Ecole des Femmes, L' (*lā'kōl' dā fam*), "The School of Wives," **Molière.** The dramatist in this comedy developed an Italian story. Arnolphe adopts a young girl, Agnes, whom he proceeds to educate in a school where distinctions of sex and social class are ignored. When her education is finished, he plans to marry her, but she betrays her training in her very naïve treatment of men as if they were schoolgirls. The upshot is that a young fellow, Horace, falls in love with her and they are married. Arnolphe's experiment has failed.

Ecole des Maris, L' (*lā'kōl' dā mă'rē'*), "The School of Husbands," **Molière.** In this comedy, Sganarelle appears as a surly despot. To him and his brother Ariste, the father of two girls, Isabelle and Léonor, has given the care of them until they have grown up. With marriage in view, the brothers set out to educate their charges. Sganarelle restricts Isabelle severely, and as a consequence she deceives him and marries Valère. Ariste, on the other hand, through giving Léonor liberty and trusting her, gains a loving, dutiful wife.

Ector or **Hector, Sir.** The foster father of King Arthur, and lord of many parts of England and Wales. Father of Sir Kay, seneschal to King Arthur.

Edda. There are two religious codes, so called, containing the ancient Scandinavian mythology. One is in verse, composed in Norway and Iceland by various unknown authors; the other is written in prose, attributed to Snorre Sturleson, who wrote a commentary on the first edda.

Edenhall, The Luck of. A painted goblet in the possession of the Musgrave family of Edenhall, Cumberland, said to have been left by the fairies on St. Cuthbert's Well. The tradition runs, that the luck of the family is dependent on the safe-keeping of this goblet. The German poet Uhland embodied the legend in a ballad, translated into English by Longfellow.

Edgar. Son of Gloucester, in Shakspere's tragedy *King Lear*. He was disinherited for his half brother Edmund.

Edgar or **Edgardo.** Master of Ravenswood, in love with Lucy Ashton in Scott's *Bride of Lammermoor*.

Edith. The "Maid of Lorn" in Scott's *Lord of the Isles*, who married Ronald when peace was restored after the battle of Bannockburn.

Edith Granger. Dombey and Son, Dickens. Daughter of the Hon. Mrs. Skewton, married to Colonel Granger of "Ours," who died within two years. Edith became Mr. Dombey's second wife, but the marriage was altogether unhappy.

Edith, The Lady. Ivanhoe, Scott. Mother of Athelstane "the Unready," thane of Coningsburgh.

Edith Plantagenet (*plăn-tăj'ĕ-nĕt*), **The Lady. The Talisman, Scott.** Called "The Fair Maid of Anjou," a kinswoman of Richard I, and attendant on Queen Berengaria.

Edmund. A bastard son of Gloucester in Shakspere's tragedy *King Lear*.

Edward. Count Robert of Paris, Scott. Brother of Hereward, the Varangian guard. He was slain in battle.

Edward, Sir. The Iron Chest, Colman. He commits a murder, and keeps a narrative of the transaction in an iron chest. Later, he trusts the secret to his secretary, Wilfred, and the whole transaction becomes public.

Edwin. (1) The hero of Goldsmith's ballad entitled "The Hermit." (2) The hero of Mallet's ballad "Edwin and Emma." (3) The hero of Beattie's "Minstrel."

Edyrn. Idylls of the King: Enid, Tennyson. Son of Nudd. A suitor for the hand of Enid and an evil genius of her father, who opposed him. Later, Edyrn went to the court of King Arthur and became quite a changed man,—from a malicious "sparrow hawk" he was converted into a courteous gentleman.

Egeus (*ē-jē'ŭs*). Father of Hermia in Shakspere's *Midsummer Night's Dream*.

Egil. Brother of Weland, a great archer. The story related is similar to the William Tell story. There are many such stories. One day, King Nidung commanded him to shoot at an apple placed on the head of his own son. Egil selected two arrows, and being asked why he wanted two replied, "One to shoot thee with, O tyrant, if I fail." Such stories, though probably not true to fact, are true to the spirit of patriotism, and are worth repeating.

Eglamour. (1) A character in Shakspere's *Two Gentlemen of Verona*, who is an agent of Silvia in her escape. (2) A valiant knight of the Round Table, celebrated in the romances of chivalry, and in an old ballad. Written also Eglamore.

Eglantine (*ĕg'lăn-tīn*), **Madame.** The prioress in Chaucer's *Canterbury Tales*, who was "full pleasant and amiable of port." She was distinguished for the ladylike delicacy of her manners at table, for her partiality to "small hounds," and for a peculiar mixture in her manner and dress of feminine vanity and slight worldliness, together with an ignorance of the world. She is noted for her delicate oath, "by Seint Eloy," her "entuning the service swetely in her nose," and her speaking French "after the scole of Stratford atte Bowe."

Egoist, The, George Meredith. A psychological novel in which the intense egoism of the central figure, Sir Willoughby Patterne of Patterne Hall, is analyzed. The cruelty of such egoism or egotism appears in Willoughby's treatment of Laetitia Dale, daughter of a retired officer living on the Patterne estate. Its comic side is revealed through the conduct of Clara Middleton, daughter of a learned clergyman. After fancying herself in love with Sir Willoughby, she is awakened to a clear understanding of his character and administers severe and appropriate punishment to him.

Egyptian Thief. A personage alluded to by the duke in Shakspere's *Twelfth Night*. The reference is to the story of Thyamis, a robber chief and native of Memphis.

Elvir. Harold the Dauntless, Scott. A Danish maid, who assumes boy's clothing and waits on Harold "the Dauntless" as his page.

Elaine. A mythic lady in the romances of King Arthur's court. She is called "the lily maid of Astolat" in Tennyson's *Idylls of the King*. For love of Sir Lancelot she died, and then according to her request was borne on a barge to the castle of King Arthur, holding a lily in one hand and a letter to Lancelot in the other. Sir Thomas Malory states that Elaine was sister of King Arthur by the same mother. She married Sir Nentres of Carlot and was by King Arthur the mother of Modred.

Elbow. A constable, in Shakspere's *Measure for Measure*, modest and well-meaning, though of simple mind and the object of wit among those who are wiser but not better.

El Dorado (*ĕl dō-rä'dō*). Spanish, meaning "the gilded." A name given by the Spaniards to an imaginary country, supposed, in the 16th century, to be situated in the interior of South America, between the rivers Orinoco and Amazon, and abounding in gold and all manner of precious stones. Expeditions were fitted out for the purpose of discovering this fabulous region; and, though all such attempts proved futile, the rumors of its existence continued to be believed down to the beginning of the 18th century. Proverbial now for any ideally rich territory.

Electra. The daughter of Agamemnon and Clytemnestra, and the heroine of a tragedy by Sophocles and of another by Euripides. She saved the life of her brother Orestes and afterward assisted him to avenge their father's death. See *Agamemnon*, *Clytemnestra*, and *Orestes*.

Elfland. The realm ruled over by Oberon, king of Fairies.

Elgitha. Ivanhoe, Scott. A female attendant on the Lady Rowena at Rotherwood.

Elidure. A legendary king of Britain, fabled to have been advanced to the throne in place of his brother Artegal, or Arthgallo. Returning to the country after a long exile, Artegal accidentally encountered his brother, who received him with open arms, took him home to the palace, and reinstated him in his old position, abdicating the throne himself. Wordsworth has taken the story of these two brothers for the subject of a poem.

Elim. The Messiah, Klopstock. The guardian angel of Libbeus the Apostle. Libbeus, the tenderest and most gentle of the apostles, at the death of Jesus also died from grief.

Elliott, Hobbie. There are seven Elliotts in Scott's *Black Dwarf*. The farmer Elliott himself, whose bride-elect is Grace Armstrong; Mrs. Elliott, Hobbie's grandmother; John and Harry, Hobbie's brothers; Lilias, Jean, and Arnot, Hobbie's sisters.

Elope. Milton gives this name to the dumb serpent which gives no warning of its approach.

Elsie. The daughter of Gottlieb, a farm tenant of Prince Henry of Hoheneck, who offered her life as a substitute for the prince. She was rescued as she was about to make the sacrifice. Longfellow has told this story in "The Golden Legend."

Elsie Venner. The heroine of a novel of the same name by O. W. Holmes. The story tells of the gradual humanizing of a girl whose moral and physical system had been poisoned by a snake bite suffered by her mother before the girl's birth. Love is the correcting force, but the severe struggle results only in Elsie's death.

Elspeth. Scotch, shortened from Elizabeth. (1) A character in Sir Walter Scott's *Antiquary*. (2) An old servant to Dandie Dinmont, in Scott's *Guy Mannering*. (3) The housekeeper in Stevenson's *Weir of Hermiston*.

Elzevir or **Elzevier.** The name of a celebrated family of printers at Amsterdam, Leyden, and other places in Holland, whose beautiful editions were published chiefly between the years 1583 and 1680. These editions are unrivaled for both beauty and correctness. It is said that the Elzevirs generally employed women to correct the press, under the conviction that they would be less likely than men, on their own responsibility, to introduce alterations into the text. They printed in all about 2000 books, of which 968 were in Latin, 44 in Greek, 126 in French, 32 in Flemish, 11 in German, 10 in Italian, and 22 in Oriental languages. Rare editions of the Elzevirs are highly valued by collectors.

Emerald Isle. The author of this epithet was Dr. William Drennan, of Belfast, who died 1820. It occurs in a poem entitled "Erin," of which the fourth stanza runs thus:

> "Arm of Erin! prove strong, but be gentle as brave,
> And, uplifting to strike, still be ready to save,
> Not one feeling of vengeance presume to defile
> The cause, or the men of the Emerald Isle."

Emile (*ā'mēl'*). The hero of Jean Jacques Rousseau's novel of the same name, in which he has depicted his ideal of a perfectly educated young man.

Emilia. (1) The sister-in-law of "Duke Theseus," beloved by the two knights, Palamon and Arcite. (2) A lady attending Hermione in Shakspere's *Winter's Tale*. (3) Wife of Iago, and waiting woman to Desdemona, in the tragedy *Othello*, a woman of thorough vulgarity and loose principles, united to a high degree of spirit, energetic feeling, strong sense, and low cunning. (4) The sweetheart of Peregrine Pickle in Smollett's novel *The Adventures of Peregrine Pickle*.

Em'ly, Little. David Copperfield, Dickens. Orphan daughter of Tom, the brother-in-law of Dan'el Peggotty, a Yarmouth fisherman, by whom she was brought up. David Copperfield and Em'ly were at one time playfellows. While engaged to Ham Peggotty, Dan'el's nephew, Little

Em'ly runs away with Steerforth, a friend of David's, who was a handsome but unprincipled gentleman. Being subsequently reclaimed, she emigrates to Australia with Dan'el Peggotty and old Mrs. Gummidge.

Empyrean. According to Ptolemy, there are five heavens, the last of which is pure elemental fire and the seat of deity: this fifth heaven is called the empyrean from the Greek *empyros*, "fiery."

Encyclopedists or **Encyclopædists** (*ĕn-sī'klō-pē'dĭsts*). The collaborators in the encyclopedia of Diderot and D'Alembert (1751–65). The Encyclopedists as a body were the exponents of the French skepticism of the 18th century.

Endell, Martha. David Copperfield, Dickens. A poor girl, to whom Em'ly goes when Steerforth deserts her.

Enid. The wife of Geraint, one of the Knights of the Round Table in the legends of King Arthur. The story was elaborated by Tennyson in his *Idylls of the King*. Falsely suspected of infidelity by Geraint, she nevertheless nursed him back to health after he had been desperately wounded in combat. His faith in her restored, he implored and received her forgiveness. In the older legends, Geraint supposed that Enid had lost her love for him because of his indolence at the court, and he therefore set out to win back her love by some brave deed.

Epimenides (*ĕp'ĭ-mĕn'ĭ-dēz*). A philosopher and poet of Crete, who probably lived in the 6th or 7th century, B. C. He is said to have fallen asleep in a cave, when a boy, and to have remained in that state for 57 years. On waking and going out into the broad daylight, he was greatly perplexed and astonished to find everything around him altered. But what was more wonderful still, during his long period of slumber, his soul, released from its fleshly prison, had been busily engaged in the study of medicine and natural philosophy, and, when it again became incarnated, Epimenides found himself a man of great knowledge and wisdom. Goethe has written a poem on the subject, "Des Epimenides Erwachen." See *Klaus, Peter*, and *Rip Van Winkle*.

Epithalamium (*ĕp'ĭ-thȧ-lā'mĭ-ŭm*). A species of poem which it was the custom among the Greeks and Romans to sing in chorus near the bridal chamber of a newly married couple. Anacreon, Stesichorus, and Pindar composed poems of this kind, but only scanty fragments have been preserved. Spenser's "Epithalamium," written on the occasion of his marriage, is one of the finest specimens of this kind of verse.

Eppie. (1) In George Eliot's *Silas Marner*, the child of Godfrey Cass, brought up and adopted by Silas Marner, whose love transformed him from a miser into a tender, loving father. (2) *St. Ronan's Well*, Scott. One of the servants of the Rev. Josiah Cargill. (3) In the same novel is Eppie Anderson, one of the servants at the Mowbray Arms, Old St. Ronan's, kept by Meg Dods.

Erlking. King of the elves, who prepares mischief for children, and even deceives men with his seductions. He is said to haunt the Black Forest. Goethe has a ballad called "The Erlking."

Ermangarde of Baldringham, Lady. The Betrothed, Scott. Aunt of the Lady Eveline Berenger, "the betrothed."

Ermeline. The wife of Reynard, in the tale of *Reynard the Fox*.

Erminia (*ĕr-mē'nyȧ*). The heroine of Tasso's *Jerusalem Delivered*, who fell in love with Tancred. When the Christian army besieged Jerusalem, she dressed herself in Clorinda's armor to go to Tancred, but, being discovered, fled, and lived awhile with some shepherds on the banks of the Jordan. Meeting with Vafrino, sent as a secret spy by the crusaders, she revealed to him the design against the life of Godfrey, and, returning with him to the Christian camp, found Tancred wounded. She cured his wounds, so that he was able to take part in the last great day of the siege.

Ernest, Duke. A poetical romance by Henry of Veldig (Waldeck), contemporary with Frederick Barbarossa. It is a mixture of Greek and Oriental myths and hero adventures of the crusader.

Error. Faery Queen, Spenser. A monster who lived in a den in "Wandering Wood," and with whom the Red Cross Knight had his first adventure. She had a brood of 1000 young ones of sundry shapes, and these cubs crept into their mother's mouth when alarmed. The knight was nearly killed by the stench which issued from the foul fiend, but he succeeded in "rafting" her head off, whereupon the brood lapped up the blood, and burst with satiety.

Escalus. An ancient and kind-hearted lord, in Shakspere's *Measure for Measure*, whom Vincentio, the duke of Vienna, joins with Angelo as his deputy during a pretended absence on a distant journey.

Escanes. A lord of Tyre, in Shakspere's *Pericles*.

Esmeralda (*ĕs'mȧ-rȧl'dȧ*). **Notre Dame de Paris, Victor Hugo.** A beautiful gipsy girl, who, with tambourine and goat, dances in the "place" before Notre Dame.

Esmond (*ĕz'mŭnd*), **Henry.** A cavalier and fine-spirited gentleman in the reign of Queen Anne. Hero of Thackeray's novel of the same name.

Estella. The heroine of Dickens's novel *Great Expectations*.

Esther Summerson. Bleak House, Dickens. The unacknowledged daughter of Lady Dedlock. She becomes the notably skillful housekeeper of Bleak House for Mr. Jarndyce and finally marries Allan Woodcourt. Her character is said to have been drawn from life. She is the narrator of a large part of the story.

Estotiland (*ĕs-tŏt'ĭ-lănd*) or **Estotilandia.** An imaginary region in America, near the Arctic circle, referred to by Milton as "cold Estotiland," and variously fabled to have been discovered by Frisian fishermen in the 14th century, and by a Pole named John Scalve, in 1477.

Ettrick Shepherd, The. He is one of the characters in the *Noctes Ambrosianæ* of Christopher North. Identified as James Hogg, the Scotch poet, who was in early life a shepherd in the parish of Ettrick.

Etzel or **Attila.** King of the Huns, a monarch ruling over three kingdoms and more than thirty principalities; being a widower he married Kriemhild, the widow of Siegfried. In the *Nibelungenlied*, where he is introduced, he is made very insignificant.

Eulalie, Eulalia, St. In the calendar of saints there is a virgin martyr called Eulalie. She was martyred by torture, February 12, 308. Longfellow calls Evangeline the "Sunshine of St. Eulalie."

Eulenspiegel, Till (*tĭl oi'lĕn-shpē'gĕl*). The hero of a German tale, which relates the pranks and drolleries of a wandering cottager of Brunswick. The name means "owlglass."

Euphrasy. Paradise Lost, Milton. The herb eyebright; so called because it was once supposed to be efficacious in clearing the organs of sight. Hence, the archangel Michael purged the eyes of Adam with it, to enable him to see into the distant future.

Euphues (*ū'fū-ēz*). The principal character in Lyly's two famous works, entitled *Euphues, or the Anatomy of Wit*, and *Euphues and His England*. These works are remarkable for their pedantic and fantastical style, and for the monstrous and overstrained conceits with which they abound. Euphues is represented as an Athenian gentleman, distinguished for the elegance of his person and the beauty of his wit, and for his amorous temperament and roving disposition. He gained a bosom friend, Philautus, and then robbed him of his lover, Lucilla. The lady is false to both, the friends are reconciled, and Euphues returns to Athens and philosophy. The peculiarities of Lyly's style are a perpetual striving after alliteration and antithesis, and a most ingenious stringing together of similes. This book immediately became the rage in the court circles, and for many years was the court standard. From it we get our word *euphuism*, meaning an affected, bombastic style of language.

Evan Dhu M'Combich. Waverley, Scott. The foster brother of MacIvor.

Evan Dhu of Lochiel (*lŏx-ēl'*). **Legend of Montrose, Scott.** A Highland chief in the army of Montrose.

Evangeline. The heroine of Longfellow's poem. The subject of the tale is the expulsion of the inhabitants of Acadia (Nova Scotia) from their homes by order of George II, and the lifelong wanderings of Evangeline in search of her lover, Gabriel. It is a story of a woman's love and devotion.

Evangelist. In Bunyan's *Pilgrim's Progress*, he represents the effectual preacher of the Gospel, who opens the gate of life to Christian.

Evelina. The heroine in a novel of the same name, by Miss Burney.

Eve of St. Agnes, The, Keats. The Lady Madeline, on St. Agnes's Eve, goes supperless to bed, trying the old superstition that thus a maid might see her future husband on awaking. An old servant admits Porphyro, Madeline's lover, to her chamber. After arranging a dessert by her bed, he wakens her with a favorite air, and persuades her to leave the castle with him while the festivities are going on in the great hall.

Every Man in His Humor. A comedy by Ben Jonson. Every person in the play is liable to be duped by his special humor: Captain Bobadil's humor is bragging; Kitelly's is jealousy; Stephen's is stupidity; Knowell's is suspicion; Dame Kitelly's, like her husband's, is jealousy.

Evir-Allen. Fingal, Ossian. The white-armed daughter of Branno, an Irishman. "A thousand heroes sought the maid; she refused her love to a thousand. The sons of the sword were despised, for graceful in her eyes was Ossian."

Excalibur. Meaning of the words: "liberated from the stone." The name of Arthur's far-famed sword, which he unfixed from a miraculous stone, though previously two hundred and one of the most puissant barons in the realm had singly been unable to extract it. In consequence of this remarkable feat, Arthur was chosen and proclaimed king by general acclamation. When about to die, he sent an attendant to throw the weapon into a lake hard by. Twice eluding the request, the squire at last complied. A hand and arm arose from the water, caught the sword by the hilt, flourished it thrice, and then sank into the lake and was seen no more. Written also Excalibor, Escalibar, Escalibor, and Caliburn.

Eyre (*âr*), **Jane.** The heroine of Charlotte Brontë's novel of the same name, a governess in the family of a Mr. Rochester, to whom she is finally married.

Ezzelin, Sir. Lara, Byron (1814). The gentleman who recognizes Lara at the table of Lord Otho, and charges him with being Conrad the Corsair. A duel ensues, and Ezzelin is never heard of more. A serf used to say that he saw a huntsman one evening cast a dead body into the river which divided the lands of Otho and Lara, and that there was a star of knighthood on the breast of the corpse.

Faa, Gabriel. Guy Mannering, Scott. Nephew of Meg Merrilies. One of the huntsmen at Liddesdale.

Fabliaux (*fȧ'blē'ōz'*). The metrical fables of the trouvères, or early poets north of the Loire, in the 12th and the 13th century. The word fable, in this case, is used very widely, for it includes not only such tales as *Reynard the Fox*, but all sorts of familiar incidents of knavery and intrigue, as well as legends and family traditions. The fabliau *Aucassin and Nicolette* is full of interesting incidents and contains much true pathos and beautiful poetry.

Fada. A fee or kobold of the south of France, sometimes called "Hada." These house spirits, of which, strictly speaking, there are but three, bring good luck in their right hand and ill luck in their left.

Fadladeen. The hypercritical grand chamberlain in Thomas Moore's poem *Lalla Rookh*. Fadladeen's criticism upon the several tales which make up the romance are very racy and full of humor; and his crestfallen conceit when he finds out that the poet was the prince in disguise is well conceived.

Faery or **Fairy Land.** The land of the fays or fairies. The chief fay realms are Avalon, an island somewhere in the ocean, Oberon's dominions, situated "in wilderness among the holtis hairy," and a realm somewhere in the middle of the earth, where was Pari Banou's palace.

Faery Queen. A metrical romance, in six books of twelve cantos each, by Edmund Spenser. The hero, Prince Arthur, arriving at the court of Glorians, the queen in Faeryland, finds her holding a solemn festival during twelve days. At the court there is a beautiful lady, for whose hand twelve most distinguished knights are rivals, and in order to settle their pretensions these twelve heroes undertake twelve separate adventures. The first book contains the legend of the Red Cross Knight, who is the allegorical representative of "holiness," while his mistress Una represents true "religion"; and the action of the knight's exploit shadows forth the triumph of holiness over the enchantments and deceptions of heresy. The second book is the legend of Sir Guyon. The third book is the legend of Britomartis—a female champion—or "chastity." Britomartis is Diana, or Queen Elizabeth the Britoness. The fourth book is the legend of Cambel and Triamond (fidelity). The fifth book is the legend of Artegal (justice). The sixth book is the legend of Sir Calidore (courtesy). The remaining books were never completed. The plan of the *Faery Queen* is borrowed from the *Orlando Furioso*, but Spenser's creative power is more original, and his imagery more striking, than Ariosto's.

Fag. A lying servant to Captain Absolute in Sheridan's *Rivals*.

Fagin. An old Jew in Dickens's *Oliver Twist*, who employs young persons of both sexes to carry on a systematic trade of robbery.

Fainall, Mr. and Mrs. Noted characters in Congreve's comedy *The Way of the World*.

Fainéant, Le Noir (*lẽ nwȧr' fā'nā'äN'*), "The Black Idler." In Sir Walter Scott's *Ivanhoe*, a name applied to Richard Cœur de Lion, in disguise, by the spectators of a tournament, on account of his indifference during a great part of the action, in which, however, he was finally victorious.

Fairies. Fairy lore of the nursery grows out of belief in unseen powers of good and of evil. Good fairies are called fairies, elves, elle-folks, and fays; the evil ones are urchins, ouphes, ell-maids, and ell-women.

Fair Maid of Perth. The title of a novel by Sir Walter Scott, and the name of the heroine.

Fairservice, Andrew. A shrewd Scotch gardener at Osbaldistone Hall in *Rob Roy*, by Sir Walter Scott.

Fairy of the Mine. A malevolent being supposed to live in mines, busying itself with cutting ore, turning the windlass, etc., and yet effecting nothing.

Faithful. One of the allegorical personages in Bunyan's *Pilgrim's Progress*, who dies a martyr before completing his journey.

Faithful, Jacob. The title and hero of a sea tale, by Captain Marryat.

Faith Healer, The, William Vaughn Moody. A play. In a farmhouse in the Middle West live Matthew Beeler, his invalid wife Mary, who has not walked for several years, Annie, their little daughter, Martha, sister of Matthew, and Rhoda Williams, a niece. Ulrich Michaelis, a spiritual healer, has come as a lodger to the farm. The time is just before Easter. Under his treatment, Mrs. Beeler walks. Then Michaelis falls in love with Rhoda, and, since he believes earthly love inconsistent with his mission, his power fails for a time. But, when he sees that his love for Rhoda and hers for him are good, his power of healing returns in even greater effectiveness than before.

Fakenham Ghost. A ballad by Robert Bloomfield, author of "The Farmer's Boy." The ghost was a donkey.

Fakreddin's Valley. Over the several portals of bronze were these inscriptions: (1) "The Asylum of Pilgrims"; (2) "The Traveler's Refuge"; (3) "The Depository of the Secrets of All the World."

Falkland. In Godwin's novel called *Caleb Williams*. He commits murder, and keeps a narrative of the transaction in an iron chest. Williams, a lad in his employ, opens the chest, and is caught in the act by Falkland. The lad runs away, but is hunted down. This tale, dramatized by Colman, is entitled *The Iron Chest*.

Falstaff (*fôl'stȧf*), **Sir John.** A famous character in Shakspere's comedy *Merry Wives of Windsor*, and in the first and second parts of his historical drama *Henry IV*. He is as perfect a comic portrait as was ever sketched. In the former play, he is represented as in love with Mrs. Ford and Mrs. Page, who make a butt and a dupe of him; in the latter, he figures as a soldier and a wit; in both he is exhibited as a monster of fat,—sensual, mendacious, boastful, and cowardly. In *Henry V* his death is described by Mrs. Quickly.

Fang. (1) A sheriff's officer, in the second part of Shakspere's *King Henry IV*. (2) Dickens's *Oliver Twist*. A bullying, insolent magistrate, who would have sent Oliver Twist to prison, on suspicion of theft, if Mr. Brownlow had not interposed.

Fata Alcina (*fȧ'tȧ ȧl-chē'nȧ*). **Orlando Innamorato, Boiardo.** Sister of Fata Morgana. She carried off Astolfo on the back of a whale to her isle, but turned him into a myrtle tree when she tired of him.

Fata Morgana (*fȧ'tȧ môr-gȧ'nȧ*). The name of a potent fairy, celebrated in the tales of chivalry and in the romantic poems of Italy. She was a pupil of the enchanter Merlin, and the sister of Arthur, to whom she discovered the intrigue of his queen, Geneura, or Guinever, with Lancelot of the Lake. In the *Orlando Innamorato* of Boiardo, she appears at first as a personification of Fortune, inhabiting a splendid residence at the bottom of a lake, and dispensing all the treasures of the earth, but she is afterward found in her proper station subject to the all potent Demogorgon.

Fat Boy, The. A laughable character in Dickens's *Pickwick Papers*; a youth of astonishing obesity, whose employment consists in alternate eating and sleeping.

Father, The, Strindberg. A drama exploiting the conflict between the sexes. A cavalry captain, intensely interested in science, and his wife, outwardly a pious churchwoman, are divided over the kind of education their daughter Bertha shall have. To gain her end, the control of the daughter, the wife Laura sows in her husband's mind a suspicion that Bertha is not his child. She has already intercepted the captain's letters so that he is robbed of the fruits of his scientific studies. Then she so plays upon his violent temper and his fear of becoming insane that he falls ill and dies. The woman has demon-

strated, to her own satisfaction, her superiority and has won control of her daughter.

Father Brown, The Innocence of, G. K. Chesterton. Father Brown is the hero of an interesting series of detective stories. He attains results through his unusual insight into the workings of the ordinary mind.

Fathom, Ferdinand, Count. The title of a novel by Smollett, and the name of its principal character, a complete villain, who proceeds step by step to rob his benefactors and finally dies in misery and despair.

Fatima (*făt'ĭ-mă*). (1) An enchantress, in the story of Aladdin, in the *Arabian Nights' Entertainments*. (2) The last of the wives of Bluebeard, and the only one who escaped being murdered by him. (3) The favorite daughter of Mohammed.

Faust. The hero and title of a celebrated tragedy by Goethe, the materials of which are drawn in part from the popular legends of Dr. Faustus, a famous magician of the 16th century. Faust is a student who is toiling after knowledge beyond his reach, and who afterwards deserts his studies and makes a pact with the Devil, Mephistopheles, in pursuance of which he gives himself up to the full enjoyment of the senses, until the hour of his doom arrives, when Mephistopheles reappears upon the scene, and carries off his victim as a condemned soul. This mythical personage dates back to the time of the Reformation.

Faustus. The hero of Marlowe's tragedy of the same name; represented as a vulgar sorcerer tempted to sell his soul to the Devil, Mephistopheles, on condition of having a familiar spirit at his command for 24 years, the possession of earthly power and glory, and unlimited gratification of his sensual appetites. At the end of that time, when the forfeit comes to be exacted, he shrinks and shudders in agony and remorse, imploring yet despairing of the mercy of heaven. This has been the theme of many writers. It is the subject of an opera by Gounod.

Faw, Tibbie. Redgauntlet, Scott. The ostler's wife, in Wandering Willie's tale.

Feeble. In Shakspere's *Henry IV*, a starveling tailor, whom Falstaff calls "most forcible Feeble."

Felton, Septimius. Septimius Felton is the mystical hero in Hawthorne's novel of the same name.

Femmes Savantes, Les (*lā fàm sà'vănt'*), "The Learned Ladies," **Molière.** This comedy is a satire upon women who pretend to literature and learning. The plot concerns the plans of Philaminte for the marriage of her daughter Henriette. She wishes her to marry Trissotin, but Henriette loves Clitandre. In the end, when Henriette's father is nearly bankrupt, Trissotin loses interest in the match, and the lovers are wedded. The "learned ladies" are Philaminte and her friends, Armande and Bélise.

Fenella. A fairylike creature, a deaf and dumb attendant on the countess of Derby, in Sir Walter Scott's *Peveril of the Peak*.

Fenton. A character in Shakspere's *Merry Wives of Windsor*, who woos the rich Anne Page for her money, but soon discovers treasures of character in her which quite transform him.

Feramorz (*fĕr'ă-mōrz*). **Lalla Rookh, Thomas Moore.** Feramorz in *Lalla Rookh* is the young Cashmerian poet, who relates poetical tales to Lalla Rookh, in her journey from Delhi to Lesser Bucharia. Lalla Rookh is going to be married to the young sultan, but falls in love with the poet. On the wedding morn she is led to her future husband, and finds that the poet is the sultan himself, who had gallantly taken this course to win the heart of his bride and beguile her journey.

Ferdinand. (1) A character in Shakspere's *Tempest*. He is a son of the king of Naples, and falls in love with Miranda, the daughter of Prospero, a banished duke of Milan. (2) King of Navarre, a character in *Love's Labor's Lost*.

Ferrars. Endymion, Benjamin Disraeli. The story tells of the progress of the colorless hero who, by the aid of his wife and sister, rises to the position of prime minister.

Ferrex and Porrex. Two sons of Gorboduc, a mythical British king. Porrex drove his brother from Britain, and when Ferrex returned with an army he was slain, but Porrex was shortly after put to death by his mother. The first tragedy in the English language was *Gorboduc*, or *Ferrex and Porrex*, by Thomas Norton and Thomas Sackville.

Fib. Nymphidia, Drayton. One of the fairy attendants of Queen Mab.

Fidele (*fĭ-dē'lē*). **Cymbeline, Shakspere.** (1) The name assumed by Imogen, when, attired in boy's clothes, she started for Milford Haven to meet her husband, Posthumus. (2) Subject of an elegy by Collins.

Fidelio (*fē-dā'lĭ-ō*). In Beethoven's opera of the name, the heroine Leonore, disguised as a man under the name of Fidelio, serves the jailor of the prison in which her lover, Florestan, is confined. She is thus enabled to save Florestan's life.

Fidessa. Faery Queen, Spenser. The companion of Sansfoy; but, when the Red Cross Knight slew that "faithless Saracen," Fidessa turned out to be Duessa, the daughter of Falsehood and Shame. See *Duessa*.

Fine-ear. Fairy Tales (Fortunio), Countess d'Aulnoy. One of the seven attendants of Fortunio. He could hear the growing of the grass and of the wool on a sheep's back. This is an old, old story. It is also found in Grimm's *Fairy Tales*. There the heroine is Fortunio. In the German tale *Fortunio*, the fairy gives her a horse named Comrade, not only of incredible swiftness, but all-knowing, and endowed with human speech; she also gives her an inexhaustible turkey-leather trunk, full of money, jewels, and fine clothes. By the advice of Comrade, she hires seven gifted servants, named Strongback, Lightfoot, Marksman, Fine-ear, Boisterer, Tippler, and Gormand. Fortunio goes forth disguised as a warrior, meets her king, and marries him.

Finetta, The Cinder Girl. A fairy tale by the Countess d'Aulnoy. This is merely the old tale of Cinderella slightly altered.

Fingal. A mythical hero, whose name occurs in Gaelic ballads and traditions, and in Macpherson's *Poems of Ossian*.

Fires of St. John. A representative play of the school to which Sudermann belongs. The whole group of plays of which *The Fires of St. John* is a type reflect a revolt against the conventionalities of life in Germany, as Ibsen's dramas express the revolt against the conventionalities of life in northern Europe.

Firmin, Philip. The hero of Thackeray's novel *The Adventures of Philip*.

Fleance. A son of Banquo, in Shakspere's tragedy *Macbeth*. The legend relates that after the assassination of his father he escaped to Wales, where he married the daughter of the reigning prince, and had a son named Walter. This Walter afterwards became lord high steward of Scotland, and called himself Walter the Steward. From him proceeded in a direct line the Stuarts of Scotland, a royal line which gave James VI of Scotland, James I of England. This is myth.

Fledgeby. Our Mutual Friend, Dickens. An overreaching, cowardly sneak who pretends to do a decent business under the trade name of Pubsey and Co.

Fleet Street. Formerly called Fleet Bridge street. A London street running from Ludgate Hill to the east end of the Strand. It is named from the Fleet river. In the early chronicles of London many allusions are made to the deeds of violence done in this street. By the time of Elizabeth the street had become a favorite spot for shows and processions of all descriptions. It was noted formerly for its taverns and coffeehouses, frequented by many persons of literary fame. Among these were Ben Jonson, later, Goldsmith, Doctor Samuel Johnson, and Charles Lamb. It is now the chief center of British journalism.

Flite, Miss. Bleak House, Dickens. The poor little old woman who haunts the Chancery Court in hope of a judgment in her favor, and becomes insane from long waiting.

Florentius (*flō-rĕn'shĭ-ŭs*). A knight whose story is related in the first book of Gower's *Confessio Amantis*. He bound himself to marry a deformed hag, provided she taught him the solution of a riddle on which his life depended.

Florian. The Foundling of the Forest, W. Dimond. Discovered in infancy by Count de Valmont, and adopted as his own son. Florian was light-hearted and volatile, but with deep affection, very brave, and the delight of all who knew him.

Florimel. A female character in Spenser's *Faery Queen*, of great beauty, but so timid that she feared the "smallest monstrous mouse that creeps on floor," and was abused by every one. She was noted for sweetness of temper amid great trials. The word Florimel signifies "honey flower."

Florizel. (1) A prince of Bohemia, in Shakspere's *Winter's Tale*, in love with Perdita. (2) Character in Stevenson's *New Arabian Nights*.

Fluellen. A Welsh captain, who is an amusing pedant, in Shakspere's *Henry V*.

Flying Dutchman. A spectral ship, seen in stormy weather off the Cape of Good Hope, and considered ominous of ill luck. Captain Marryat has taken this theme for his novel *The Phantom Ship*.

Folk, Good. Fairies, also called good people, neighbors, wights. The Germans have their *kleine volk*, "little folk," the Swiss their hill people and earth people. See *Fairies*.

Ford. Mr. and Mrs. Ford are characters in *The Merry Wives of Windsor*. Mrs. Ford pretends to accept Sir John Falstaff's protestations of love, in order to punish him by her devices.

Fortinbras (*fôr'tĭn-brăs*). Prince of Norway, in Shakspere's tragedy *Hamlet*.

Fortunatus. You have found Fortunatus' purse. You are in luck's way. The nursery tale of Fortunatus records that he had an inexhaustible purse. It is from the Italian fairy tales.

Fortunio's Horse. Comrade not only possessed incredible speed, but knew all things and was gifted with human speech. See *Fine-ear*.

Forty Thieves. In the tale of Ali Baba in *Arabian Nights' Entertainments*. Represented as inhabiting a secret cave in a forest, the door of which would open and shut only at the sound of the magic word "Sesame," the name of a kind of grain. One day, Ali Baba, a woodmonger, accidentally discovered the secret, and made himself rich by carrying off gold from the stolen hoards. The captain tried several schemes to discover the thief, but was always outwitted by Morgiana, the woodcutter's female slave.

Four Horsemen of the Apocalypse, The, Blasco Ibáñez. A story of the German invasion of France in 1914. In the panorama presented, a wealthy Argentinian settled in France, with a passion for "collecting," is the central figure. His family are connected with German families by marriage, and this circumstance complicates the story. The family represent the country of France under the scourge of the four horsemen, War, Famine, Pestilence, and Death.

Four Million, The. The title of a volume of short stories by O. Henry. The stories reflect the common life of the people in the great city of New York.

Foxley, Squire Matthew. Redgauntlet, Scott. A magistrate who examines Darsie Latimer (Sir Arthur Darsie Redgauntlet), after he had been attacked by the rioters.

Francesco. The "Iago" of Massinger's *Duke of Milan*.

Frankenstein. The hero in Mrs. Shelley's romance of the same name. As a young student of physiology he constructs a monster out of the horrid remnants of the churchyard and dissecting-room, and endues it, apparently through the agency of galvanism, with a sort of spectral and convulsive life. This existence, rendered insupportable to the monster by his vain craving after human sympathy, and by his consciousness of his own deformity, is employed in inflicting the most dreadful retribution upon the guilty philosopher. It is a parody on the creature man, powerful for evil, and the instrument of dreadful retribution on the student, who usurped the prerogative of the Creator.

Freeport, Sir Andrew. The name of one of the members of the imaginary club under whose direction the *Spectator* was professedly published. He is represented as a London merchant of great eminence and experience, industrious, sensible, and generous.

Friar Lawrence. The Franciscan monk who attempted to befriend the lovers in *Romeo and Juliet*.

Friar's Tale, The. Canterbury Tales, Chaucer. An archdeacon employed a summoner as his secret spy to find out offenders, with the view of exacting fines from them. In order to accomplish this more effectually, the summoner entered into a compact with the Devil, disguised as a yeoman. Those who imprecated the Devil were to be dealt with by the yeoman-devil, and those who imprecated God were to be the summoner's share.

Friar Tuck. Chaplain and steward of Robin Hood. Introduced by Scott in *Ivanhoe*. He is a self-indulgent, combative Falstaff, a jolly companion to the outlaws in Sherwood Forest. Also in *Sherwood*, by Alfred Noyes.

Friday. Robinson Crusoe's faithful man Friday pictured by De Foe.

Friendly, Dinah. The Bashful Man, Moncrieff. Daughter of Sir Thomas Friendly.

Frollo, Archdeacon Claude. A noted character in Victor Hugo's *Notre Dame de Paris*, absorbed in a bewildering search after the philosopher's stone.

Front de Bœuf (*frôN' dē bĕf'*). **Ivanhoe, Scott.** A follower of Prince John of Anjou, and one of the knight's challengers.

Froth, Master. A foolish gentleman in Shakspere's *Measure for Measure*. His name explains his character.

Fudge Family. A name under which the poet Moore satirized the absurdities of his traveling countrymen, who, having been long confined at home by the wars waged by Napoleon, flocked to the continent after his defeat at Waterloo. The family is composed of a hack writer and spy, his son, a young dandy of the first water, his daughter, a sentimental damsel, and Madame Le Roy, in love with a Parisian linen draper, whom she has mistaken for one of the Bourbons in disguise. The tutor, a "poor relation" of this egregious family, is an ardent Bonapartist and Irish patriot.

Fusbos. In "Bombastes Furioso," the minister of state to the king of Utopia. This was a burlesque opera by W. B. Rhodes.

Fuzzy-Wuzzy. The name applied by Kipling to the Sudanese native in a ballad of the same name. The "big, black, boundin' beggar" that "broke the British square."

Fyrapel, Sir. The leopard, the nearest kinsman of King Lion, in the beast epic of *Reynard the Fox*.

Gabriel. The name of an angel described in the Scriptures as charged with the ministration of comfort and sympathy to man. In the New Testament, he is the herald of good tidings, declaring the coming of the predicted Messiah and of his forerunner. In Jewish and Christian tradition he is one of the seven archangels. Gabriel has the reputation, among the rabbis, of being a distinguished linguist, having taught Joseph the 70 languages spoken at Babel. The Mohammedans hold him in even greater reverence than the Jews. He is called the spirit of truth, and is believed to have dictated the *Koran* to Mohammed. Milton posts him at "the eastern gate of paradise," as "chief of the angelic guards," keeping watch there. The *Talmud* describes him as the prince of fire, and as the spirit who presides over thunder.

Gadshill. A companion of Sir John Falstaff, in the First Part of Shakspere's *King Henry IV*.

Galahad, Sir. A celebrated knight of the Round Table who achieved the quest of the Holy Grail. Tennyson has made him the subject of one of his idylls. In Malory he is also represented as the perfect knight clad in wonderful armor. He was the only knight who could sit in the "siege perilous," a seat reserved for the "knight without a flaw."

Galapas. A giant of marvelous height in the army of Lucius, king of Rome. He was slain by King Arthur.

Galaphrone or **Galafron.** A king of Cathay and father of Angelica in Boiardo's *Orlando Innamorato* and Ariosto's *Orlando Furioso*.

Galatea (*găl'ă-tē'ă*). (1) A sea nymph beloved by the Cyclops Polyphemus, who in his jealous rage destroyed her lover Acis with a rock torn from the mountain side. (2) W. S. Gilbert in his comedy *Pygmalion and Galatea* represents the artist as creating a piece of sculpture so perfect that he loves it with a passion that awakens it into life.

Gamp, Mrs. A nurse who is a prominent character in Dickens's novel *Martin Chuzzlewit*. She is celebrated for her constant reference to a certain Mrs. Harris, a purely imaginary person, for whose feigned opinions and utterances she professes the greatest respect, in order to give the more weight to her own.

Gandercleugh (*găn'dĕr-klūĸ*), "Folly-cliff." That mysterious place where a person makes a goose of himself, in *Tales of My Landlord*, by Sir Walter Scott.

Ganelon, Gan, or **Gano.** A count of Mayence, and one of the paladins of Charlemagne, whom he betrayed at the battle of Roncesvalles; always represented as a traitor, engaged in intrigues for the destruction of Christianity. His character was marked by spite, dissimulation, and intrigue, but he was patient, obstinate, and enduring. He loved solitude, disbelieved in the existence of moral good, and has become a byword for a false and faithless friend. He figures in the romantic poems of Italy, and is placed by Dante in his "Inferno." He is introduced into Chaucer's "Nun's Priest's Tale."

Garcias, Pedro (*pā'drō gär-thē'ăs*). A mythical personage, of whom mention is made in the preface to *Gil Blas*, in which it is related that two scholars of Salamanca discovered a tombstone with the inscription, "Here lies interred the soul of the Licentiate Pedro Garcia," and that, on digging beneath the stone, they found a leathern purse containing a hundred ducats.

Gareth (*găr'ĕth*). In Arthurian romance a knight of the Round Table, who was first a scullion in King Arthur's kitchen, but afterward became champion of Lady Linet, or Lynette, whose sister Lionês, or Lyonors, he delivered from Castle Perilous.

Gargamelle (*găr'gà'mĕl'*). The mother of Gargantua in Rabelais' celebrated romance, *Gargantua*.

Gargantua (*gär-găn'tū-ă*). The hero of Rabelais' celebrated romance of the same name, a gigantic personage, about whom many wonderful stories are related. He lived

for several centuries, and at last begot a son, Pantagruel, as wonderful as himself. The *Pleasant Story of the Giant Gargantua and of his Son Pantagruel* so satirized the monastic orders of his time that it was denounced by the spiritual authorities. Francis I, however, protected the author, and allowed him to print the third part of it in 1545.

Gargery, Mrs. Joe. Great Expectations, Dickens. Pip's sister. A virago, who kept her husband and Pip in constant awe. Joe Gargery, a blacksmith, married to Pip's sister. A noble-hearted, simple-minded young man, who loved Pip sincerely. Joe Gargery was one of nature's gentlemen.

Gaspar or **Caspar.** The white one, one of the three Magi or kings of Cologne. His offering to the infant Jesus was frankincense, in token of divinity.

Gaunt, Griffith. Hero of a novel by Charles Reade, of the same title.

Gawain (*gô'wân*), **Sir.** A nephew of King Arthur, and one of the most celebrated knights of the Round Table; noted for his sagacity and wonderful strength. He was surnamed "the courteous." His brothers were Agravaine, Gaheris, and Gareth.

Gebir (*jē'bēr*). A legendary Eastern prince, said to have invaded Africa and to have given his name to Gibraltar. He is the subject of a poem of the same name by Walter Savage Landor.

Gellatley, Davie. The name of a poor fool in Sir Walter Scott's novel *Waverley.*

Genevieve. (1) The heroine of a ballad by Coleridge. (2) Under the form "Genoveva," the name occurs in a German myth as that of the wife of the Count Palatine Siegfried, in the time of Charles Martel. Upon false accusations her husband gave orders to put her to death, but the servant intrusted with the commission suffered her to escape into the forest of Ardennes, where she lay concealed, until by accident her husband discovered her retreat and recognized her innocence. This legend is often repeated in the folk tales of Germany. Tieck and Miller have given it in modern versions.

Genevra. A lady in Ariosto's *Orlando Furioso.* Her honor is impeached, and she is condemned to die unless a champion appears to do combat for her. Her lover, Ariodantes, answers the challenge, kills the false accuser, and weds the dame. Spenser has a similar story in the *Faery Queen,* and Shakspere availed himself of the main incident in his comedy *Much Ado about Nothing.* From Italian romances "Genevra" has been taken as subject of "The Mistletoe Bough," by T. Haynes Bayly, and as both title and subject of a metrical tale by Samuel Rogers, in which he tells of a young Italian, who, upon her wedding day, secreted herself, from motives of frolic, in a self-locking oaken chest, the lid of which shut down and held her captive. Many years afterward the chest was opened and the skeleton was revealed.

Genius (*jē'nĭ-ŭs*) pl. genii. Tutelary spirits believed by the Romans to attend each individual from the cradle to the grave, determining his character and governing his fortunes. They were two in number for each person, a "good genius" bringing good fortune and an "evil genius" being responsible for his ill luck. In some translations of *The Thousand and One Nights* the word genius is used for Jinn, a fallen angel under the dominion of Eblis, the Evil One.

Georgics (*jôr'jĭks*). Bucolic poetical compositions, treating of farm-husbandry and the tillage of the soil. The most famous examples of the kind are those by Virgil, 31 B. C., in four books.

Geraint (*gĕ-rānt'*), **Sir.** One of the knights of the Round Table. His story is told in Tennyson's *Idylls of the King* under "Geraint and Enid."

Geraldine. A name frequently found in romantic poetry. The name is said to have been adopted from the heroine, connected with Surrey, whose praises he celebrates in a famous sonnet, and who has been the occasion of much controversy among his biographers and critics. There is no doubt that the lady called Geraldine was an Irish lady named Elizabeth Fitzgerald, the daughter of Gerald Fitzgerald. This sonnet led to the adoption of the name into the class of romantic names. Used by Mrs. Browning in "Lady Geraldine's Courtship."

Gertrude of Wyoming. Heroine of a poem by Thomas Campbell, which tells the story of the Indian massacre of Americans in the Wyoming valley of Pennsylvania in 1778.

Gesta Romanorum (*jĕs'tà rō'mà-nō'rŭm*). A collection of old romances and tales, mostly from Roman sources, which has been the storehouse for our best story-writers. Shakspere, Spenser, Gower, and many later writers have gone to this source. Compiled probably about the close of the 13th century. Moralizing paragraphs and other religious and mystical tales are said to have been added by Pierre Bercaire, a Benedictine prior of Poitou.

Giaour (*jour*). Byron's tale called "The Giaour" is represented as told by a Turkish fisherman, who had committed a crime which haunted him all his life. *Giaour* means "unbeliever." See *Hassan.*

Gibbie, Goose. A half-witted boy in Scott's *Old Mortality.*

Gibbie, Sir. A simple-hearted, fine character in George Macdonald's novel of the same name.

Gifts of the Magi, O. Henry (W. S. Porter). The title of one of O. Henry's most successful and typical stories. A young husband and wife, living in a little New York flat, with little to spend, plan each to give the other a perfect Christmas gift. They have two most treasured possessions,—a watch, inherited from his grandfather, and her long, beautiful hair. The husband covets a fob, the wife a set of combs. Christmas Eve, pawning the watch to buy the combs, he comes home to find that she has cut off and sold her hair to buy him a fob.

Gil Blas (*zhēl blàs*). The title of a famous romance by Lesage, and the name of its hero. The tale is full of adventures, and Gil Blas is represented as squire to a lady and as brought up by his uncle, Canon Gil Peres. Gil Blas went to Dr. Godinez's school of Oviedo and gained the name of being a great scholar. He had fair abilities, wit and humor, and good inclinations, but was easily led astray by his vanity and became lax in his morals. Duped at first, he afterwards played the same devices on others. As he grew in years, his conduct improved, and when his fortune was made he became an honest man.

Gilgamesh (*gĭl'gà-mĕsh*). The hero of an ancient Babylonian epic, who searches for the secret of immortality. He fails in his search, receiving, at the end, only some vague information about the abode of the shades.

Gilpin, John. A citizen of London, and "a train-band captain," whose adventures are related in Cowper's humorous poem, "John Gilpin's Ride." After being married twenty years his wife proposed a holiday. They agreed to make a family party and dine at the Bell, at Edmonton. Mrs. Gilpin, her sister, and four children went in the chaise, and Gilpin promised to follow on horseback. The horse, being fresh, began to trot, and then to gallop, and John, a bad rider, grasped the mane with both his hands. On went the horse, off flew John Gilpin's cloak, together with his hat and wig. He flew through Edmonton, and never stopped till he reached Ware, when his friend the calender furnished him with another hat and wig, and Gilpin galloped back again, till the horse stopped at his house in London.

Glastonbury (*glàs'tŭn-bĕr-ĭ*). A town in Somerset, England, 21 miles south of Bristol. Its abbey, founded in Roman times, was refounded under Ine in the 8th century. Glastonbury is associated in legend with Joseph of Arimathea, who is said to have visited it, and, in sign of possession, to have planted his staff, which took root and became the famous Glastonbury thorn that is reputed to burst into leaf on Christmas Eve. The Isle of Avalon, to which King Arthur was taken, is supposed to have been here.

Gloriana (*glō'rĭ-ā'nà*). In Spenser's *Faery Queen,* the "greatest glorious queen of Faeryland."

Gloss. In biblical criticism, an explanation of purely verbal difficulties of the text, to the exclusion of those which arise from doctrinal, historical, ritual, or ceremonial sources. These explanations were frequently inserted between the lines of the text, or in the margins; and many modern critics of the Bible explain certain passages there as due to "glosses." From an early period, these verbal difficulties were the object of attention, and the writers who devoted themselves to the elucidation were called "glossatores," and their works "glossaria."

Glumdalca. Tom Thumb the Great, Fielding. Queen of the giants, captive in the court of King Arthur.

Glumms. Peter Wilkins, Robert Paltock. The male population of the imaginary country Nosmnbdsgrsutt, visited by Peter Wilkins. Both males and females had wings which served both for flying and for clothes.

Gnome (*nōm*). (1) A pithy and sententious saying commonly in verse, embodying some moral sentiment or precept. The gnome belongs to the same generic class with the proverb; but it differs from a proverb in wanting the common and popular acceptance. The use of gnomes prevailed among all the early nations, especially the Orientals, and the literatures of most countries abound with them. In the Bible, the book of Proverbs, part of Ecclesiastes, and still more the apocryphal book of Ecclesiasticus, present numberless illustrations of the highest form of this composition. (2) In ancient times the name gnome represented one of the classes of imaginary beings

which are supposed to be the presiding spirits in the mysterious operations of nature in the mineral and vegetable world. They are introduced in Pope's "Rape of the Lock."

Gobbo, Launcelot. A clown in Shakspere's *Merchant of Venice*. He left the service of Shylock the Jew for that of Bassanio, a Christian. Launcelot Gobbo is one of the famous clowns of Shakspere.

Gobbo, Old. Father to Launcelot Gobbo in *Merchant of Venice*. He was stone-blind.

God Save the King. The national anthem of Great Britain, and formerly that of Prussia and the German states. Its words are apparently imitated from the *Domine Salvum* of the Catholic Church service.

Gold Bug, The. Found in Poe's most successful tale of the same name. Scene laid on Sullivan's island, near Charleston, S. C., and the cipher made to concern Captain Kidd's buried treasure.

Golden Ass. A celebrated romance by Apuleius, a Latin writer of the 2d century. Lucius, the hero, changed by enchantment into an ass, has many adventures and is finally restored to his human form by the priests of Isis. The story of Cupid and Psyche is found in this book. Many modern writers have borrowed from it.

Golden Legend, The. (1) The title of an ecclesiastical work in 177 sections, dating from the 13th century, written by Jacopo da Voragine, a Dominican monk, and descriptive of the various saints' days in the Roman calendar. It is deserving of study as a literary monument of the period, and as illustrating the religious habits and views of the Christians of that time. (2) A poem by Longfellow, second part of his *Christus*.

Gold of Nibelungen, The. Unlucky wealth. "To have the gold of Nibelungen" is to have a possession which seems to bring a curse with it. See *Nibelung, King*.

Goneril (*gŏn'ẽr-ĭl*). The oldest of the three daughters of King Lear, in Shakspere's tragedy. Having received her moiety of Lear's kingdom, the unnatural daughter first abridged the old man's retinue, then gave him to understand that his company was not wanted and sent him out, a despairing old man, to seek refuge where he could find it. Her name is proverbial for filial ingratitude.

Gonzalo (*gŏn-zä'lō*). An honest old counselor in Shakspere's *Tempest*, a true friend to Prospero.

Good-natured Man, The, Oliver Goldsmith. The hero of this comedy, Honeywood, tries to order his life on the principle of "universal benevolence," giving indiscriminately and disagreeing with no one. Because he believes his friend Jack Lofty to be in love with Miss Richland, he even abstains from telling her of his own love. His uncle, Sir William Honeywood, and Miss Richland finally cure the young man of his folly.

Goody Blake. A character in Wordsworth's poem entitled "Goody Blake and Harry Gill." A farmer forbids old Goody Blake to carry home a few sticks, which she had picked up from his land, and in revenge she invokes upon him the curse that he may "never more be warm"; and ever after "his teeth they chatter, chatter still."

Goody Two-shoes. The name of a well-known character in a nursery tale by Oliver Goldsmith. Goody Two-shoes was a very poor child, whose delight at having a pair of shoes was unbounded. She called constant attention to her "two shoes" which gave her the name.

Gordian Knot. A great difficulty. Gordius, a peasant, chosen king of Phrygia, dedicated his wagon to Jupiter, and fastened the yoke with a rope so ingeniously that no one could untie it. Alexander was told that "whoever undid the knot would become king," and he cut the knot with his sword.

Gotham (*gŏt'ăm*). At one time the term was applied to a parish of Nottingham, England. The people here were famed for their stupidity and simplicity, which obtained for them the satirical appellation of the "wise men of Gotham." Many nations have designated some particular locality as the paradise of fools; for example, Phrygia was the fools' home in Asia, Abdera of the Thracians, Bœotia of the Greeks, Swabia of the modern Germans, etc. To Americans it is chiefly significant as a colloquial term (pron. *gō'thăm*) for the city of New York. Thus applied, it first appeared in *Salmagundi*, by Washington Irving and James K. Paulding, and is supposed to hint sarcastically at the worldly wisdom of its inhabitants.

Graal, Grail, or **Greal** (a word derived probably from the old French, through the medieval Latin, *gradalis*, a cup or platter). In the legends and poetry of the middle ages, we find accounts of the Holy Graal—San Gréal—a miraculous chalice, made of a single precious stone, sometimes said to be an emerald, which possessed the power of preserving chastity, prolonging life, and other wonderful properties. It is fabled to have been the dish from which Christ ate at the Last Supper and in which Joseph of Arimathea received His blood at the Cross, later preserving it and carrying it to England. It remained there many years, an object of pilgrimage and devotion, but at length it disappeared, one of its keepers having violated the condition of strict virtue in thought, word, and deed, which was imposed upon those who had charge of it. The quest of this cup forms the most fertile source of adventures to the knights of the Round Table. The story of the Sangreal or Sangraal was first written in verse by Troyes in the 12th century. The legend of the graal was introduced into German poetry in the 13th century by Wolfram von Eschenbach, who filled his *Parzival* with deep allegorical meanings. Malory embodied the story in his *Morte D'Arthur*, and Tennyson told it in his *Idylls of the King*.

Graciosa (*grā'shĭ-ō'sä*). A princess in an old and popular fairy tale,—the object of the ill-will of a stepmother named Grognon, whose malicious designs are perpetually thwarted by Percinet, a fairy prince, who is in love with Graciosa.

Gradgrind. A hardware merchant in Dickens's *Hard Times*. He is a man of hard facts and cultivates the practical. His constant demand in conversation is for "facts." He allows nothing for the weakness of human nature, and deals with men and women as a mathematician with his figures.

Gradgrind, Mrs. Wife of Thomas Gradgrind. A little thin woman, always taking physic, without receiving from it any benefit.

Grandison, Sir Charles. The hero of Richardson's novel *The History of Sir Charles Grandison*. Designed to represent his ideal of a perfect hero,—a union of the good Christian and the perfect English gentleman.

Gratiano (*grā'shĭ-ä'nō*). A friend to Antonio and Bassanio in Shakspere's *Merchant of Venice*. He "talks an infinite deal of nothing, more than any man in Venice." (2) Brother to Brabantio, in Shakspere's tragedy *Othello*. (3) A character in the Italian popular theater called "Commedia dell' Arte." He is represented as a Bolognese doctor, and has a mask with a black nose and forehead and red cheeks.

Gray, Auld Robin. The title of a popular Scotch ballad written by Lady Anne Lindsay, and name of its hero. Auld Robin Gray was a good old man married to a poor young girl whose lover was thought to have been lost at sea, but who returns to claim her hand a month after her marriage.

Great Divide, The, William Vaughn Moody. A three-act play. Ruth Jordan, left alone in a ranch house in Arizona, impulsively goes off into the desert with Stephen Ghent, who, with his drunken companions, forced the door of the house. He buys off one of these, a Mexican, with a string of gold nuggets. Having obeyed this call of the wild, Ruth allows her New England conscience to blind her to the manhood that love for her has awakened in Stephen. After secretly working to buy back from the Mexican the gold nuggets, she suddenly goes back to her New England home, feeling that she must cleanse herself from a great offense. Stephen follows her, and, in the end, having come to see the narrowness and injustice of her attitude, she goes back with him.

Great Galeoto (*gä-lā-ō'tō*), **The, José Echegaray.** The title of this tragedy is derived from the saying placed in the mouth of Francesca da Rimini in Dante's "Inferno," that Galeoto was the book that prompted her sin and Paolo's. Echegaray makes Galeoto a kind of personification of common gossip. Julian, at first, is deaf to gossip about his young wife, who is thrown daily with his secretary and adopted son. He is fatally wounded in a duel over the matter and is borne to Ernest's chamber. Here he finds his wife and dies believing her guilty, although she is really innocent. In the end, Ernest kills the slayer of Julian, marries Julian's widow, and upbraids the world for its stupid, tragic chatter.

Greatheart, Mr. In Bunyan's *Pilgrim's Progress*, the guide of Christian's wife and children upon their journey to the Celestial City.

Gremio. In Shakspere's *Taming of the Shrew*, an old man who wishes to wed Bianca.

Grendel. Beowulf. The half brute, half man monster from which Beowulf delivered Hrothgar, king of Denmark. Night after night Grendel crept stealthily into the palace called Heorot, and slew sometimes as many as thirty of the inmates. At length Beowulf slew it in single combat.

Griffin. A chimerical creature, which the fancy of the modern has adopted from that of the ancient world. The griffin is variously described and represented, but the shape in which it most frequently appears is that of an animal having the body and legs of the lion with the beak and wings of the eagle. Like all other monsters, griffins



MODERN WORLD WRITERS

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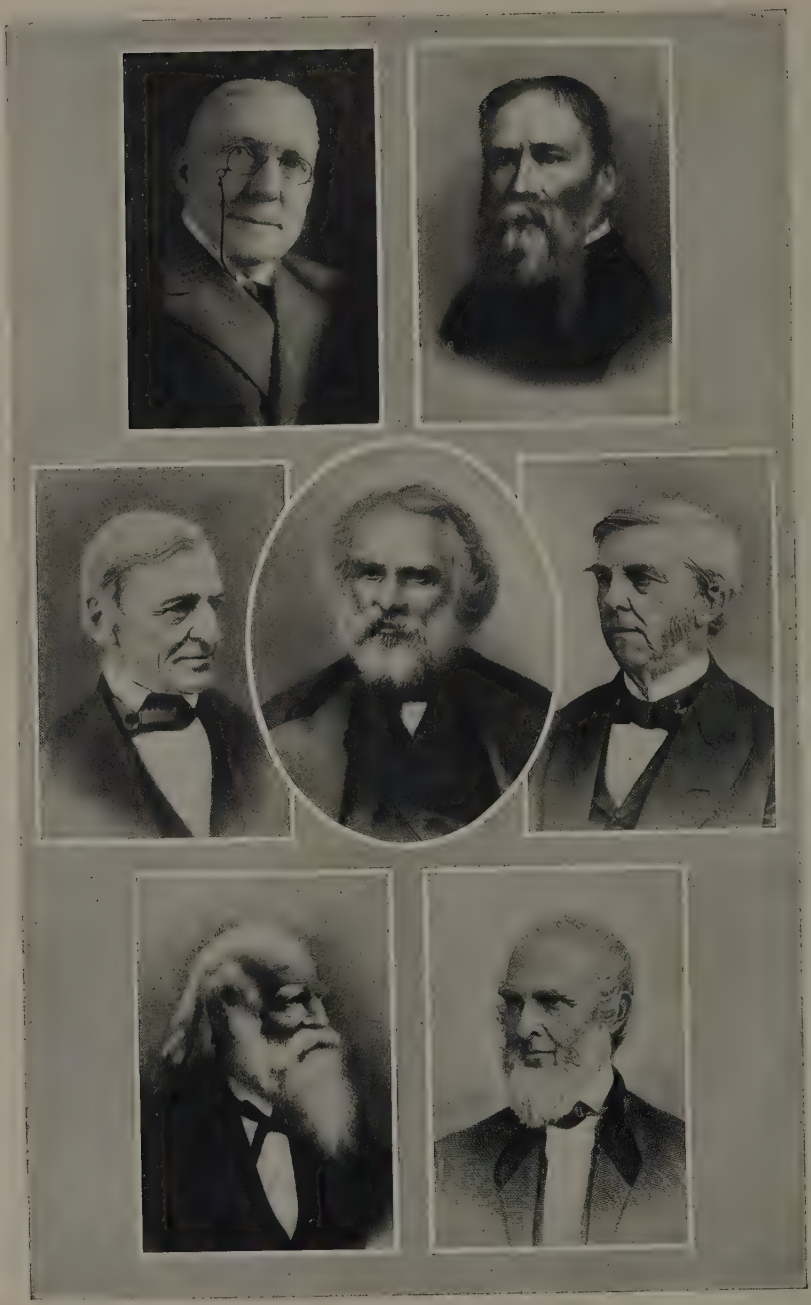
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AMERICAN POETS

James Whitcomb Riley — James Russell Lowell

Ralph Waldo Emerson — Henry Wadsworth Longfellow — Oliver Wendell Holmes

William Cullen Bryant — John Greenleaf Whittier

abound in the legendary tales of the Teutonic nations. Same as *Gryphon*.

Griffin-Feet. Fairy Tales, Countess d'Aulnoy. The mark by which the Desert Fairy was known in all her metamorphoses.

Grim, Giant. A giant, in *Pilgrim's Progress*, who seeks to stop the march of the pilgrims to the Celestial City, but is slain in a duel by Mr. Greatheart, their guide.

Grimalkin (*grĭ-măl'kĭn*). A cat, the spirit of a witch. Any witch was permitted to assume the body of a cat nine times.

Grimwig. Oliver Twist, Dickens. An irascible old gentleman, who hid a very kind heart under a rough exterior. He was always declaring himself ready to "eat his head" if he was mistaken on any point on which he passed an opinion.

Griselda (*grĭ-zĕl'dà*), **The Patient.** A lady in Chaucer's "Clerk of Oxenford's Tale," immortalized by her virtue and her patience. The model of womanly and wifely obedience, she comes victoriously out of cruel and repeated ordeals. The story of Griselda is first told in the *Decameron*. Boccaccio derived the incidents from Petrarch, who seems to have communicated them also to Chaucer, as the latter refers to Petrarch as his authority. The story has been told by many modern writers.

Grub Street. Thus described in Dr. Johnson's Dictionary: "Originally the name of a street near Moorfields, in London, much inhabited by writers of small histories, dictionaries, and temporary poems, whence any production is called Grub Street." The name in its appropriate sense was freely used by Pope, Swift, and others.

Grundy. "What will Mrs. Grundy say?" What will our rivals or neighbors say? The phrase is from Tom Morton's *Speed the Plough*, but "Mrs. Grundy" is not introduced into the comedy as one of the dramatis personæ. The solicitude of Dame Ashfield, in this play, as to "what will Mrs. Grundy say," has given the latter great celebrity, the interrogatory having acquired a proverbial currency.

Gudrun (*gōōd'rōōn*). (1) Norse Edda. A lady married to Sigurd by the magical arts of her mother; and, on the death of Sigurd, to Atli (Attila) whom she hated for his cruelty, and murdered. She then cast herself into the sea, and the waves bore her to the castle of King Jonakun, who became her third husband. (2) Low German Saga. A model of heroic fortitude and pious resignation. She was the daughter of King Hettel (Attila), and the betrothed of Herwig, king of Helgoland.

Guildenstern (*gĭl'dĕn-stĕrn*). The name of a courtier in Shakspere's tragedy *Hamlet*.

Gulliver, Lemuel. The imaginary hero of Swift's celebrated satirical romance known as *Gulliver's Travels*. He is represented as being first a surgeon in London, and then a captain of several ships. After having followed the sea for some years he makes in succession four extraordinary voyages.

Gunga Din. The hero of Rudyard Kipling's poem of this name. He is a water carrier for the regiment, a Hindu, who meets heroic death in devotion to his duty.

Guppy, Mr. Bleak House, Dickens. A weak, commonplace youth, who has the conceit to propose to Esther Summerson, the ward in Chancery.

Gurth. Ivanhoe, Sir Walter Scott. The swineherd of Rotherwood.

Gurton, Gammer. The heroine of an old English comedy *Gammer Gurton's Needle*, first acted at Christ's college, Cambridge, in 1566.

Guy, Sir, Earl of Warwick. The hero of a famous English legend, which celebrates the wonderful achievements by which he obtained the hand of his ladylove, the Fair Felice, as well as the adventures he subsequently met with in a pilgrimage to the Holy Land. He is reputed to have lived in the reign of the Saxon king, Athelstan. The romance of Sir Guy, mentioned by Chaucer in the *Canterbury Tales*, was written in French in the 12th century, in English in the 14th.

Guy Mannering. The second of Scott's historical novels. It contains the excellent characters, Dandie Dinmont, the shrewd and witty counselor Pleydell, and also the desperate, seabeaten villainy of Hatteraick, the uncouth devotion of that gentlest of all pedants, poor Dominie Sampson, and the savage, crazed superstition of the gypsy dweller in Derncleugh.

Guyon (*gī'ŏn*). The impersonation of Temperance or Self-government in Spenser's *Faery Queen*. He destroyed the witch Acrasia, and her bower, called the "Bower of Bliss." His companion was Prudence. "Sir Guyon represents the quality of Temperance in the largest sense: meaning the virtuous self-government which holds in check not only the inferior sensual appetites but also the impulses of passion and revenge."

Hagen (*hà'gĕn*). The murderer of Siegfried, in the German epic, the *Nibelungenlied*. He is a pale-faced dwarf, who knows everything and whose sole desire is mischief. After the death of Siegfried he seized the "Nibelung hoard" and buried it in the Rhine, intending to appropriate it. Kriemhild invited him to the court and had him slain.

Haidee (*hā-dē'*). A beautiful young Greek girl in Byron's poem, "Don Juan." She is called the "beauty of the Cyclades."

Hakim (*hà-kēm'*). **The Talisman, Scott.** Saladin, in the disguise of a physician, visited Richard Cœur de Lion in sickness, gave him a medicine in which the "talisman" had been dipped, and the sick king recovered.

Hamlet. In Shakspere's tragedy of the same name, son to the former, and nephew to the reigning king of Denmark. The ghost of his father appears to him, and urges him to avenge his murder upon his uncle. But the prince feigns madness, and puts off his revenge from day to day by "thinking too precisely on the event." Hamlet's mother had married Claudius, king of Denmark, after the death of her former husband. Claudius prepared poisoned wine, which he intended for Hamlet; but the queen, not knowing it was poisoned, drank it and died. Hamlet, seeing his mother fall dead, rushed on the king and killed him almost by accident, and is killed himself by a poisoned rapier in the hands of Laertes. See *Ophelia*.

Hamlin, Jack. The gentlemanly gambler in *Gabriel Conroy* and other tales by Bret Harte. The appearance of this character revolutionized the gambler of popular story and drama.

Hanswurst. A pantomimic character formerly introduced into German comedies. It corresponds to the Italian "Macaroni," the French "Jean Potage," and the English "Jack Pudding."

Hardcastle, Mr. A character in Goldsmith's comedy *She Stoops to Conquer*, represented as prosy and hospitable. Father of Kate, the pretty heroine.

Hardcastle, Mrs. A very "genteel" lady indeed. Tony Lumpkin is her son by a former husband.

Hard Times. A novel by Dickens, dramatized under the title of *Under the Earth* or *The Sons of Toil*. Bounderby, a street arab, raised himself to banker and cotton prince. When past fifty years of age, he married Louisa, daughter of Thomas Gradgrind. The bank was robbed, and Bounderby believed Stephen Blackpool to be the thief, because he had dismissed him from his employ. The culprit was Tom Gradgrind, the banker's brother-in-law, who escaped out of the country. In the dramatized version the bank was not robbed, but Tom removed the money to another drawer for safety.

Harlequin. The name of a well-known character in the popular extemporized Italian comedy.

Harlowe, Clarissa. The heroine of Richardson's novel entitled *The History of Clarissa Harlowe*. In order to avoid a marriage urged upon her by her parents, she casts herself on the protection of Lovelace, who grossly abuses the confidence thus reposed in him. He subsequently proposes to marry her, but Clarissa rejects the offer.

Harold, Childe. Childe Harold's Pilgrimage, Byron. A man of gentle birth and peerless intellect, who exhausted all the pleasures of youth and early manhood, and loathed his fellow-bacchanals and the "laughing dames in whom he did delight." To banish his disgust and melancholy, he determines to travel; but, though he traverses some of the fairest portions of the earth, the feelings of bitterness and desolation still prey upon him.

Haroun-al-Raschid (*hà-rōōn'ăl-rà'shēd*). Caliph of the Abbasside race, contemporary with Charlemagne, and, like him, a patron of literature and the arts. Many of the tales in the *Arabian Nights* are placed in the caliphate of Haroun-al-Raschid.

Harpagon (*ăr'pà'gŏN'*). The hero of Molière's comedy *L'Avare*, represented as a wretched miser.

Harpier or Harper. Some mysterious personage referred to by the witches in Shakspere's tragedy *Macbeth*.

Harum, David, Edward Noyes Westcott. A novel. David Harum is a shrewd country banker in a central New York town. The deeper springs of humor and goodness in his nature are revealed in the story, in contrast to his unprincipled trading. The love story of his clerk, a young city man, is woven into the narrative.

Hassan. The Giaour, Byron. Caliph of the Ottoman empire, noted for his hospitality and splendor. In his seraglio was a beautiful young slave named Leila, who loved a Christian called the Giaour. Leila is put to death by an

emir, and Hassan is slain by the Giaour. Caliph Hassan has become the subject of popular romance.

Hassan, Al. The Arabian emir of Persia, father of Hinda, in Moore's *Fire-Worshippers*.

Hatto. In German legend, an archbishop of Mentz in the 10th century, who, for his hard-heartedness to the poor in time of famine, was eaten by mice in the "Mouse Tower" on an island in the Rhine near Bingen. Robert Browning has made this legend the subject of a poem.

Havelok (*hăv'lŏk*) **the Dane.** A fisherman, known as Grim, rescued an infant named Havelok, whom he adopted. This infant was the son of the king of Denmark, and, when the boy was restored to his royal sire, Grim was laden with gifts. He built the town which he called after his own name This is the foundation of the medieval tales about "Havelok the Dane."

Hazard of New Fortunes, A, Howells. A story of New York City life, involving Mr. and Mrs. March, the principal figures in *Their Wedding Journey* and *Their Silver Wedding Journey*. In this story Mr. March has come to New York to conduct a magazine.

Hazlewood, Sir Robert. The old baronet of Hazlewood, in Scott's *Guy Mannering*. In the story, Charles, son of Sir Robert, is in love with Lucy Bertram, whom he marries.

Headstone, Bradley. Our Mutual Friend, Dickens. The schoolmaster, in love with Lizzie Hexam. He tries to murder Eugene Wrayburn, whom he throws into the river. Lizzie rescues Eugene and nurses him back to life. Headstone tries to throw suspicion of the crime on Roger Riderhood, but fails, and both are drowned when, during a fight, they fall into the river lock.

Heart of Midlothian, The. The tollbooth, or old jail of Edinburgh, which is the county town of the county of Midlothian. It is the title of one of Sir Walter Scott's novels.

Heep, Uriah. David Copperfield, Dickens. A detestable character who, under the garb of the most abject humility, conceals diabolic malignity. Mrs. Heep, Uriah's mother, was a character equally to be despised for her hypocritical assumption of humility.

Heinrich, Der Arme, Hartmann von Aue. A court epic written about 1200. Prince Henry, smitten with leprosy, takes refuge in the house of one of his tenants, whose twelve-year old daughter cared for him. One day she learned that her prince could be cured by the blood of an innocent maiden. She determined to make the sacrifice. But at Salerno, when she was about to submit to the operation, Prince Henry refused to accept her sacrifice. On the homeward journey he was healed, and he afterward made the girl his wife. Longfellow used the story in his "Golden Legend," and Gerhart Hauptmann has written a poetic drama about the subject.

Helena. (1) A lady in Shakspere's *Midsummer Night's Dream*, in love with Demetrius. (2) The heroine of Shakspere's *All's Well that Ends Well*, in love with Bertram, who marries her against his will and leaves her, but is finally won by the strength of her affection. (3) A character in an old popular tale, reproduced in Germany by Tieck. (4) A Greek tragedy by Euripides.

Helvetia (*hĕl-vē'shĭ-ă*). The old Latin name of Switzerland; often used as a poetical appellation in modern literature. The country is often mentioned as the "Helvetic Republic," which was formerly the official name.

Hermann and Dorothea. The hero and heroine of Goethe's poem of the same name.

Hermengild (*hĕr'mĕn-gĭld*). **Canterbury Tales, Chaucer.** The wife of the lord-constable of Northumberland. She was converted by Constance, but was murdered by a knight. Hermengild at the bidding of Constance restored sight to a blind Briton.

Hermia. A lady in Shakspere's *Midsummer Night's Dream*, in love with Lysander.

Hermione (*hĕr-mī'ō-nē*). The heroine of the first three acts of Shakspere's *Winter's Tale*.

Hernani (*ĕr-nä'nē*) **or Ernani.** The hero of Victor Hugo's tragedy of the same name, and of Verdi's opera, founded on the play. He was a Spanish noble in revolt against the emperor Charles V and killed himself from a high sense of honor.

Hero and Leander. See *Leander*.

Hexam, Lizzie. The heroine of Dickens's novel *Our Mutual Friend*.

Hiawatha (*hī'ă-wō'thă*). A mythical person believed by the North American Indians to have been sent among them to clear their rivers, forests, and fishing-grounds, and to teach them the arts of peace. When the white man came, then Hiawatha knew that the time of his departure was at hand, when he must go "to the kingdom of Ponemah, the land of the Hereafter." These legends of Hiawatha were used and given a literary form by the poet Longfellow in his "Hiawatha."

Hilda. A New England girl of the most sensitive delicacy and purity of mind, in Hawthorne's romance *The Marble Faun*. She is an artist, living in Rome, and perhaps typifies the conscience.

Hildebrand. (1) The Nestor of German romance, a magician and champion. (2) The famous pope, Gregory VII, whose stern dealings with Henry IV have given rise to the phrase "a regular Hildebrand."

Hildesheim (*hĭl'dēs-hĭm*). In an old German legend, the monk of Hildesheim, doubting how a thousand years with God could be "only one day," listened to the melody of a bird, as he supposed, for only three minutes, but found that in reality he had been listening to it for the space of a hundred years.

Hobbididance. The name of one of the fiends mentioned by Shakspere in *King Lear*, and taken from Harsnett's *Declaration of Egregious Popish Impostures* (1603).

Holofernes (*hŏl'ō-fĕr'nēz*). (1) The pedantic schoolmaster of Italian comedy. (2) A pedant living in Paris, under whose care Gargantua is placed for instruction. (3) A pedantic schoolmaster in Shakspere's *Love's Labor's Lost*. (4) The Assyrian general slain by Judith.

Holt, Felix. The hero of George Eliot's novel of the same name.

Holy Grail. See *Graal*.

Honeycomb, Will. One of the members of the imaginary club by whom the *Spectator* was professedly edited. He is distinguished for his graceful affectation, courtly pretension, and knowledge of the gay world.

Honeyman, Charles. A fashionable preacher in Thackeray's novel *The Newcomes*.

Hoosier Schoolmaster, The, Edward Eggleston. A realistic story of life in southern Indiana about the middle of the 19th century.

Hopeful. A pilgrim in Bunyan's *Pilgrim's Progress*, who accompanies Christian to the end of his journey.

Hop-o'-my-Thumb. A character in the tales of the nursery. Tom Thumb and Hop-o'-my-Thumb are not the same, although they are often confounded. Tom Thumb was the son of peasants, knighted by King Arthur, and was killed by a spider. Hop-o'-my-Thumb was a nix, the same as the German "daumling," the French "le petit pouce," and the Scotch "Tom-a-lin" or "Tamlane." He was not a human dwarf, but a fay.

Horatio (*hō-rā'shĭ-ō*). **Hamlet, Shakspere.** An intimate friend of Hamlet, a prince, a scholar, and a gentleman.

Horatius Cocles (*hō-rā'shĭ-ŭs kō'klēz*). Captain of the bridge-gate over the Tiber. He and two men to help him held the bridge against vast approaching armies. Subject and title of a poem by Lord Macaulay.

Hornbook. The primer or apparatus for learning the elements of reading, used in England before the days of printing, and common down to the time of George II. It consisted of a single leaf, containing on one side the alphabet, large and small, in black letter or in roman, with perhaps a small regiment of monosyllables. Then followed a form of exorcism and the Lord's Prayer, and, as a finale, the Roman numerals. The leaf was usually set in a frame of wood, with a slice of transparent horn in front,—hence the name of "hornbook." Copies of the hornbook are now exceedingly rare.

Horner, Jack. The name of a celebrated personage in the literature of the nursery. A Somersetshire tradition says that the plums which Jack Horner pulled out of the Christmas pie alluded to the title deeds of the abbey estates at Wells, which were sent to Henry VIII in a pasty, and abstracted on the way by the messenger, a certain Jack Horner.

Hortense. Bleak House, Dickens. The vindictive French maidservant of Lady Dedlock. In revenge for the partiality shown by Lady Dedlock to Rosa, Hortense murdered Mr. Tulkinghorn, and tried to throw the suspicion of the crime on Lady Dedlock.

Hourglass, A Morality, The, W. B. Yeats. The Wise Man has taught in his village that the visible world is all. Suddenly, an angel appears and tells the Wise Man that in an hour he must die, but that, if within that time he can find one person who believes in God and heaven, he shall enter paradise. In haste he sends out, but all his pupils and his children have lost all belief. At last comes Teigue the Fool, who has learned, not in the Wise Man's school, but on the hills. He believes, and in joy at finding the believing fool the Wise Man dies.

Houris (*hōō'rĭz*). In the fairy tales found in the *Koran*, these are the black-eyed daughters of paradise. They are created from musk and are free from all physical weakness and are always young. It is held out to every male believer that he will have 72 of these girls as his household companions in paradise. See Tom Moore's *Lalla Rookh*.

House of Fame. Of this poem it has been said that of itself it might have given fame to Chaucer. Under the form of a dream, it gives a picture of the "Temple of Glory," crowded with aspirants for immortal renown, and adorned with statues of great poets and historians.

Houssain (*hōō-sān'*). A prince in the *Arabian Nights* who had a flying carpet which would carry him whithersoever he wished.

Hubbard, Old Mother. A well-known nursery rime. "Mother Hubbard's Tale," by Edmund Spenser, is a satirical fable in the style of Chaucer.

Hubert de Burgh. Justice of England, created earl of Kent, introduced by Shakspere into *King John*. He is the one to whom the young prince addresses his piteous plea for life. The lad was found dead soon afterwards, either by accident or foul play.

Hubert, Saint. The legend of Saint Hubert makes him a patron saint of huntsmen.

Hudibras. The title and hero of a celebrated satirical poem by Samuel Butler. Hudibras is a Presbyterian justice of the time of the Commonwealth.

Hugh of Lincoln. A legendary personage who forms the subject of Chaucer's "Prioress's Tale," and also of an ancient English ballad. Wordsworth has given a modernized version of this tale.

Hugh Wynne. Hero of Dr. S. Weir Mitchell's novel of the American Revolution, *Hugh Wynne, Free Quaker*. Hugh, born of a French mother, defies his father's nonresistance principles, joins Washington's army, and gains rank on the general's staff. A love story of interesting complications runs through the book.

Hugo Hugonet. Castle Dangerous, Scott. Minstrel of the earl of Douglas.

Humphrey. The imaginary collector of the tales in *Master Humphrey's Clock*, by Charles Dickens.

Humpty Dumpty. The hero of a well-known nursery rime. The name signifies humped and dumpy, and is the riddle for an egg.

Huon of Bordeaux, Sir. A hero of one of the romances of chivalry bearing this name.

Hypatia (*hī-pā'shĭ-ă*). Of this romance its author, Charles Kingsley, said: "My idea in the romance is to set forth Christianity as the only really democratic creed and philosophy; above all, spiritualism as the most exclusively aristocratic creed." Hypatia was a beautiful and learned woman of Alexandria, who was murdered by jealous, fanatical monks.

Hyperion. This myth has formed a favorite theme for various English poets. In Keats's "Hyperion," descriptions of nature and classic imagery are combined with exquisite delicacy.

Hypocrites' Isle. An island described by Rabelais in one of his satires. He pictures this island of "Hypocrites" as wholly inhabited by people of low and defiled natures, by sham saints, spiritual comedians, seducers, and "such-like sorry rogues who live on the alms of passengers like the hermit of Lamont."

Iago (*ē-ä'gō*). **Othello, Shakspere.** Othello's ensign and the villain of the play. Iago is said to be a character next to a devil, yet not quite a devil, such as Shakspere alone could delineate with skill.

Idleness, The Lake of. Faery Queen, Spenser. Whoever drank thereof grew instantly "faint and weary." The Red Cross Knight drank of it and was readily made captive by Orgoglio.

Idylls of the King. Tennyson has told the purpose and the meaning of these idylls. Taken together they form a parable of the life of man. Each idyll taken as a separate picture represents the war between sense and soul. In Lancelot and Guinevere the lower nature leads them astray, and there is intense struggle before the higher nature prevails. In Vivien, Ettarre, Tristam, and Modred, the base and sensual triumph. In Arthur, Sir Galahad, and Percival, it is the victory of the spiritual.

Ignaro (*ĭg-nä'rō*). **Faery Queen, Spenser.** Foster father of Orgoglio. Spenser says this old man walks one way and looks another, because ignorance is always "wrong-headed."

Iliad. The tale of the siege of Troy, an epic poem in 24 books. It is written in Greek hexameters, and commemorates the deeds of Achilles and other Greek heroes at the siege of Troy. The date of its composition may, with much probability, be assigned to the 9th century B. C., and the poem is so deficient in continuity, and contains so much that is inconsistent and irrelevant with the main topic, that it has been thought by many critics to have been the performance of several persons, although its authorship is still nominally accredited to Homer. Books one, two, and three are introductory to the war. Paris proposes to decide the contest by single combat, and Menelaus accepts the challenge. Paris, being overthrown, is carried off by Venus, and Agamemnon demands that the Trojans shall give up Troy in fulfillment of the compact, and the siege follows. The gods take part and frightful slaughter ensues. At length Achilles slays Hector and the battle is at an end. Old Priam, going to the tent of Achilles, craves the body of his son Hector; Achilles gives it up, and the poem concludes with the funeral rites of the Trojan hero. Virgil continues the tale from this point, shows how the city was taken and burned, and then continues with the adventures of Æneas, who escapes from the burning city, and makes his way to Italy. See *Æneid*.

Illuminating. The art of adorning manuscripts and books with ornamented letters and paintings, which was practiced by artists, generally monks, called "illuminators," in the middle ages, prior to the introduction of printing. Manuscripts, containing portraits, pictures, and emblematic figures, form a valuable part of the riches preserved in the principal libraries in Europe and America.

Il Penseroso, Milton. Title of one of two companion poems. The name is shortened from Italian *Il Pensieroso*, meaning "The Thoughtful Man." The poem pictures a day in the life of such a person.

Imogen (*ĭm'ō-jĕn*). The wife of Posthumus, and the daughter of Cymbeline in the play *Cymbeline*. "Of all Shakspere's women," says Hazlitt, "she is, perhaps, the most tender and the most artless."

Improvvisatori (*ēm'prôv-vē'zä-tō'rē*). Poets who utter verses without previous preparation on a given theme. Among the ancients, Greece was the land of improvisation. In modern times, it has been almost entirely confined to Italy, where Petrarch introduced the practice of singing improvised verses to the lute.

Incantation. Derived from a Latin root meaning simply "to sing." It is the term in use to denote one of the most powerful and awe-inspiring modes of magic, resting on a belief in the mysterious power of words solemnly conceived and passionately uttered.

Inchcape Rock. A rock in the North Sea, off the Firth of Tay. It is dangerous for navigators, and therefore the abbot of Aberbrothock fixed a bell on a float, which gave notice to sailors. Southey says that Ralph the Rover, in a mischievous joke, cut the bell from the buoy, and it fell into the sea, but on his return voyage his boat ran on the rock, and Ralph was drowned. Precisely the same tale is told of St. Goven's bell.

Inferno, The. Divine Comedy, Dante. Epic poem in 34 cantos. Inferno is the place of the souls who in life were wholly given up to sin. The ascent is through Purgatorio to Paradiso.

Ingoldsby Legends, The, Rev. R. H. Barham, "Thomas Ingoldsby." A collection of laughable tales in prose and verse first printed in magazines and published later in a volume in 1840. A second and a third series appeared in 1847. They treat all sorts of ancient, medieval, and modern matters of society and superstition in a burlesque fashion that has made them famous.

In Memoriam, Tennyson. An elegy, or philosophical poem, in memory of the poet's friend, Arthur Hallam, who died at the beginning of a seemingly brilliant career. It is reckoned as one of the great literary expressions of faith.

Innocents Abroad, Mark Twain. Travelers seeing Europe without any illusions. The fun consists in an irreverent application of modern common sense to historic associations, and in ridiculing sentimental humbug. An air of innocence and surprise adds to the drolleries of their adventures.

Interludes, The. Springing from the moralities and bearing some resemblance to them, though nearer the regular drama, are the interludes, a class of compositions in dialogue, much shorter and more merry and farcical. They were generally played in the intervals of a festival.

Invocation. An address at the commencement of a poem, in which the author calls for the aid of some divinity, particularly of his muse.

Iphigenia (*ĭf'ĭ-jē-nī'ä*). The heroine of Euripides' tragedy *Iphigenia in Aulis*, and of Goethe's tragedy *Iphigenie auf Tauris*. She was placed on the altar because of her father's rash vow. Artemis at the last moment snatched her from the altar and carried her to heaven, substituting

a hind in her place. The similarity of this legend to the Scripture stories of Jephthah's vow and of Abraham's offering of his son Isaac is noticeable.

Iras. (1) A strongly delineated character in *Ben Hur, a Tale of The Christ*, by Lew Wallace. (2) A female attendant in Shakspere's play *Antony and Cleopatra*.

Iron Mask, The Man with the. Alexander Dumas wrote his *Viscomte de Bragelonne* around this personage. The real person was a mysterious prisoner of the time of Louis XIV. He wore at all times a mask of iron. He was kept in various prisons, and his identity has remained a profound secret.

Irvington. A residential village in Westchester Co., N. Y., named in honor of Washington Irving, whose former home, Sunnyside, stands near by.

Isaac of York. A wealthy Jew, the father of Rebecca, in Sir Walter Scott's novel *Ivanhoe*.

Isabella. (1) The heroine in Shakspere's comedy *Measure for Measure*. (2) A character of absorbing grief in Keats's *Isabella*.

Iseult (*ī-sōōlt'*) or **Isolt.** Iseult of the Fair Hands was the unloved wife of Sir Tristram in the Arthurian romances. Iseult the Fair, whom Tristram loved, was the bride of his uncle, Sir Mark.

Island of Lanterns. In the celebrated satire of Rabelais, an imaginary country inhabited by false pretenders to knowledge. The name was probably suggested by the "City of Lanterns," in the Greek romance of Lucian. Swift has copied this same idea in his "Island of Laputa."

Island of St. Brandan. A flying island, the subject of a widely-spread legend of the middle ages. Though the Island of St. Brandan has been a disappointment to voyagers, it has been a favorite theme with poets.

Israfel. In the *Koran* the archangel commissioned to blow the trumpet of the resurrection. Poe, in his poem "Israfel," uses the Mohammedan legend of the sweet-voiced Israfel.

Italics. The name applied to printed type sloping from left to right, as exemplified *thus*. Ordinary vertical type is called roman. Italics were first used by Aldus Minutius in printing an edition of Virgil in 1501. They are now used principally for emphasis, although in the ordinary versions of the Bible they indicate words supplied by the translators, corresponding words not being present in the original.

Ithuriel (*ĭ-thū'rĭ-ĕl*). In Milton's *Paradise Lost*, an angel commissioned by Gabriel to search through paradise, in company with Zephon, to find Satan, who had eluded the vigilance of the angelic guard, and effected an entrance into the garden. It is related that Ithuriel found Satan "squat like a toad, close at the ear of Eve," and transformed him by a touch of his spear to his proper shape.

Ivanhoe. The hero of Sir Walter Scott's novel of the same name. He figures as Cedric of Rotherwood's disinherited son, the favorite of King Richard I, and the lover of the Lady Rowena, whom, in the end, he marries. The scene is laid in England in the reign of Richard I, and we are introduced to Robin Hood in Sherwood Forest, banquets in Saxon halls, tournaments, and all the pomp of ancient chivalry. Rowena, the heroine, is quite overshadowed by the gentle, meek, yet high-souled Rebecca.

Ivanovitch, Ivan (*ē-vän' ē-vän'ō-vĭch*). An imaginary personage, who is the embodiment of the peculiarities of the Russian people, in the same way as John Bull represents the English, Jean Crapaud the French, and Brother Jonathan the American character.

Ivory Gate of Dreams. A passage in Virgil's *Æneid* tells of twin gates of sleep, one of horn, the other of ivory. Dreams which delude are said to pass through the ivory gate, but those which come true, through the horn gate. The fancy is introduced at the beginning of Sir William Watson's poem "The Dream of Man." The fancy depends upon two Greek puns: ivory in Greek is *elephas*, and the verb *elephairo* means "to cheat with empty hopes"; the Greek for horn is *keras*, and the verb *karanoō* means "to accomplish."

Ivy Green, The. Dickens published this song in *Pickwick Papers*. The theme is the creeping of the ivy over old buildings and ruins.

Jack and the Beanstalk. A nursery legend said to be an allegory of the Teutonic Alfadur; the "red hen" representing the all-producing sun, the "moneybags" the fertilizing rain, and the "harp" the winds.

Jack-in-the-Green. A prominent character in Maypole dances.

Jack Robinson. A famous comic song by Hudson.

Jack Sprat. The hero of a nursery rime. Jack and his wife form a fine combination in domestic economy.

Jack the Giant Killer. The name of a famous hero in the literature of the nursery, the subject of one of the many Indo-European legends which celebrate the triumph of skill over brute force.

Janice Meredith, Paul L. Ford. A historical novel of the American Revolution. Janice, daughter of a New Jersey Tory, falls in love with a young Englishman indentured to her father. She persists in her attachment and gets into many adventures. Finally, when her lover, whose real name is Brereton, has risen to the rank of general in Washington's army, they are betrothed.

Jaquenetta (*jăk-ē-nĕt'ä*). **Love's Labor's Lost, Shakspere.** A country wench courted by Don Adriano de Armado.

Jaques (*jā'kwēz*). A lord attending upon the exiled duke, in Shakspere's *As You Like It*. A contemplative character who thinks and does—nothing. He is called the "melancholy Jaques," and affects a cynical philosophy. He could "suck melancholy out of a song, as a weasel sucks eggs."

Jarley, Mrs. The proprietor of a waxworks' show in Dickens's *Old Curiosity Shop*. She has lent her name to a popular game of parlor tableaux.

Jarndyce. A prominent figure in Dickens's *Bleak House*, distinguished for his philanthropy, easy good nature and good sense, and for always saying, "The wind is in the east," when anything went wrong with him. The famous suit of "Jarndyce *v.* Jarndyce," in this novel, is a satire upon the court of Chancery.

Jarvie, Baillie Nicol. A prominent character in Sir Walter Scott's novel *Rob Roy*. He is a magistrate of Glasgow.

Jekyll (*jē'kĭl*), **Doctor, and Mr. Hyde.** The duplex hero of Robert Louis Stevenson's singular romance of the same name. Doctor Jekyll is a benevolent and upright physician, who by means of a potion is able to transform himself for a time into a second personality, Mr. Hyde, of a brutal and animal nature.

Jellyby, Mrs. A character in Dickens's novel *Bleak House*, a type of sham philanthropy. She spends her time and energy on foreign missions, to the neglect of her family. Mrs. Jellyby is quite overwhelmed with business correspondence relative to the affairs of Borriboola Gha.

Jenkins, Winifred. The name of Miss Tabitha Bramble's maid in Smollett's *Expedition of Humphrey Clinker*. She makes ridiculous blunders in speaking and writing.

Jenkinson, Ephraim. A green old swindler, whom Dr. Primrose met in a public tavern. Dr. Primrose sold the swindler his horse, Old Blackberry, for a draft upon Farmer Flamborough.

Jeroboam Sermon. One of Dr. Emmons's sermons which made a great noise at the time. It was known as his Jeroboam Sermon. It was written on the occasion of Jefferson's inauguration as president, and, although Jefferson is not named, the delineation of the character of Jeroboam is such that no one can doubt Emmons's intention.

Jerusalem Delivered. An epic in twenty books, by Torquato Tasso (1544–1595). The crusaders, encamped on the plains of Tortosa, chose Godfrey for their chief, and Alandine, king of Jerusalem, made preparations of defense. The Christian army having reached Jerusalem, the king of Damascus sent Armida to beguile the Christians. It was found that Jerusalem could never be taken without the aid of Rinaldo. Godfrey, being informed that the hero was dallying with Armida in the enchanted island, sent to invite him back to the army; he returned, and Jerusalem fell. Armida fled into Egypt, and offered to marry any knight who slew Rinaldo. The love of Rinaldo returned; he pursued her and she relented. The poem concludes with the triumphant entry of the Christian army into the Holy City, and their devotions at the tomb of the Redeemer. The two chief episodes are the loves of Olindo and Sophronia, and of Tancred and Clorinda.

Jessamy Bride. A by-name given to Miss Mary Horneck, afterward Mrs. Gwyn. She was a contemporary and friend of Goldsmith. Also title of a novel by F. F. Moore. Jessamy means "Jasmine."

Jessica. The beautiful daughter of Shylock, in Shakspere's *Merchant of Venice*.

Jew, The Wandering. An imaginary person in a legend connected with the history of Christ's Passion. As the Savior was on the way to the place of execution, overcome with the weight of the cross, he wished to rest on a stone before the house of a Jew, who drove him away with curses. Driven by fear and remorse, he has since wandered, according to the command of the Lord, from place to place, and has never yet been able to find a grave. Romances, ranking among the best in literature, have been founded on this character. The best-known is the story by Eugène Sue, *Le Juif Errant*.

Job. The central figure in the dramatic poem which forms the biblical book of the same name. The theme of the book is the question of why trouble comes to men. Because of his endurance of great woes, Job has become a synonym for patience.

Jones, Tom. The hero of *The History of Tom Jones, a Foundling*, by Henry Fielding. One of the first English novels. The hero is represented as a model of generosity, openness, and manly spirit, though thoughtless and dissipated.

Joseph Vance, William De Morgan. The novel is named for the hero. His life in London streets and his rise in his career form the central theme of the story, which involves a varied crowd of characters.

Joyeuse (*zhwä'yēz'*), **La.** The sword of Charlemagne as mentioned in romances of chivalry.

Joyeuse Garde, La. The residence of the famous Lancelot du Lac.

Judith. The heroine in the book of the same name in the Apocrypha. She was a beautiful Jewess of Bethulia, who, when her town was besieged by Holofernes, the general of Nebuchadnezzar, attended him in his tent, and, when he was drunk, killed him, whereupon her townsmen fell upon the Assyrians and defeated them with great slaughter. The tale is not mentioned by Josephus, and has, from an early period, been held to be an allegory. It has frequently furnished poets and painters with subjects.

Jungle Books, Kipling. The title of two series of tales of animal life in the Indian jungles. The animals use the language of men, yet they always are animals, never personified.

Justice, Galsworthy. A play in which the author attacks certain abuses in the administration of justice. The drama involves a terrible portrayal of the effect of solitary confinement upon a prisoner.

Just So Stories, Kipling. A series of animal stories for children, *How the Leopard Got His Spots*, *How the Elephant Got His Trunk*, etc.

Kadr, Al. The night on which the *Koran* was sent down to Mohammed. Al Kadr is supposed to be the seventh of the last ten nights of Ramadan, or the night between the 23d and 24th days of the month.

Kalevala (*kä'lā-vä'lä*). One of the so-called "artificial epics," or modern poems made up of more or less ancient popular song and story. It belongs to Finland, the name meaning "the country of Kaleva," who is one of the heroes. The work, consisting of 22,800 verses, was put together first in 1835 and revised in 1849 by Dr. A. Lönnrot. It contains a vast treasure of Finnish popular songs, magic and mythical lore, and heroic tales.

Karma. A Sanskrit word, meaning "action" or "sequence." The Buddhist uses the word to mean a judgment on actions. The Theosophist uses it to mean the connected sequence of things as causes and effects.

Kay. A foster brother of King Arthur, and a rude and boastful knight of the Round Table. He was the butt of King Arthur's court. Called also "Sir Queux." He appears in the "Boy and the Mantle," in Percy's *Reliques*. Sir Kay is represented as the type of rude boastfulness, Sir Gawain of courtesy, Sir Lancelot of chivalry, Sir Modred of treachery, Sir Galahad of chastity, Sir Mark of cowardice.

Kehama (*kē-hä'mä*). A Hindu rajah, who obtains and sports with supernatural power. His adventures are related in Southey's poem entitled "The Curse of Kehama."

Kenilworth (*kĕn'il-wĕrth*). A town in Warwickshire, England, five miles north of Warwick. The castle is one of the most admired of English feudal monuments, and was long of note as a royal residence. The chief scene of Sir Walter Scott's novel *Kenilworth*. The story is based on a ballad called "Cumnor Hall." The earl of Leicester, favorite of Queen Elizabeth, had secretly married Amy Robsart. For fear of Elizabeth's displeasure, he conceals her in Cumnor Hall. During a visit to Leicester's Castle of Kenilworth, the queen encourages Leicester to believe that she might marry him. Persuaded that Amy has been unfaithful, he commands her death. Later, finding that he has been deceived, Leicester confesses the truth, but messengers reach Cumnor Hall after Amy has been killed by falling through a trapdoor arranged by Varney, Leicester's retainer.

Kent, Earl of. A rough, plain-spoken, but faithful nobleman in Shakspere's *King Lear*, who, disguised as a servant and under the assumed name of Caius, follows the fallen fortunes of the king.

Kentucky Cardinal, A, James Lane Allen. A delicate story of Kentucky. A misunderstanding creeps into the romance of two young people through an unkind act toward a cardinal bird. The sequel is *Aftermath*.

Kenwigs. A family in Dickens's novel *Nicholas Nickleby*, which includes a number of little girls who differed from one another only in the length of their frilled pantalettes and of their flaxen pigtails tied with bows of blue ribbon.

Kilkenny Cats. Two cats, in an Irish story, which fought till nothing was left but their tails. It is probably a parable of a local contest between Kilkenny and Irishtown, which impoverished both boroughs.

Kim, Kipling. A story of India. The hero, Kimball O'Hara, nicknamed "Kim," orphaned while a baby, "grows up" to the precocious "age of indiscretion" in the native quarter of Lahore. He attaches himself to a Tibetan pilgrim, with whom he wanders over India, learning much of native ways. Eventually, the Irish regiment to which his father had belonged find and adopt Kim. He is sent to school and inducted into the Indian Secret Service.

King Cambyses (*kăm-bī'sēz*). The hero of "A Lamentable Tragedy" of the same name, by Thomas Preston, contemporary of Shakspere. A ranting character known to modern readers by Falstaff's allusion to him in Shakspere's *Henry IV*.

King Estmere. The hero of an ancient and beautiful legend, which, according to Bishop Percy, seems to have been written while a great part of Spain was in the hands of the Saracens, or Moors, whose empire was not fully extinguished before the year 1491.

King Horn. A metrical romance which was very popular in the 13th century. King Horn is a beautiful young prince who is carried away by pirates; but his life is spared, and after many wonderful adventures he weds a princess, and regains his father's kingdom.

King Log and King Stork. Characters in a celebrated fable of Æsop, which relates that the frogs, grown weary of living without government, petitioned Jupiter for a king. Jupiter accordingly threw down a log among them, which made a satisfactory ruler till the frogs recovered from their fright and discovered his real nature. They, therefore, entreated Jupiter for another king, whereupon he sent them a stork, who immediately began to devour them.

Klaus, Peter. The hero of an old popular tradition of Germany—the prototype of Rip Van Winkle. He is represented as a goatherd.

Knickerbocker, Diedrich. The imaginary author of a humorous fictitious *History of New York*, written by Washington Irving.

Knights of the Round Table. A name given to King Arthur's knights. They were so called because they sat with him at a round table made by Merlin for King Leodegraunce. This king gave it to Arthur on his marriage with Guinevere, his daughter.

Knight's Tale, The. Canterbury Tales, Chaucer. Two Theban knights, Palamon and Arcite, captives of Duke Theseus, were accustomed to see from their dungeon window the duke's sister-in-law, Emily, and fell in love with her. Both captives having gained their liberty contended for the lady by single combat. Arcite was victor, but being thrown from his horse was killed, and Emily became the bride of Palamon.

Koppenberg. The mountain of Westphalia to which the pied piper (Bunting) led the children when the people of Hamelin refused to pay him for killing their rats. Browning's poem, "The Pied Piper," tells the tale. Josephine Preston Peabody has dramatized it in her poetic play *The Piper*.

Kriemhild or **Chriemhild.** A beautiful Burgundian lady, daughter of Dancrat and sister of Gunther. She first marries Siegfried, king of the Netherlands, and next Etzel, king of the Huns. In the first part of the *Nibelungenlied*, Kriemhild brings ruin on herself by a tattling tongue. In the second part of the great epic she is represented as bent on vengeance, and, after a most terrible slaughter of both friends and foes, she is killed by Hildebrand.

Kubla Khan (*kōōb'lä kän*). A poem by Coleridge. Coleridge says that he composed the poem in a dream immediately after reading a description of "Cublai Can's" palace in Purchas's *Pilgrimage* and that he wrote it down upon waking.

Laconic. Very concise and pithy. The name came from the Spartan manner of curt speech. A Spartan was called a Lacon from the name of his country, Laconia.

La Débâcle (*lä dā'bäk'l'*), **Zola.** A realistic novel portraying the horrors of the breakdown of France before the German invasion in the Franco-Prussian War. One of the most powerful novels ever written.

Lady Day. The 25th day of March, anniversary of the Annunciation.

Lady of Lyons, The, Bulwer-Lytton. Pauline Deschappelles, daughter of a Lyonese merchant, rejected the

suits of Beauseant, Glavis, and Claude Melnotte, who therefore combined on vengeance. Claude, who was a gardener's son, aided by the other two, passed himself off as Prince Como, married Pauline, and brought her home to his mother's cottage. The proud beauty was very indignant, and Claude left her to join the French army. He became a colonel, and returned to Lyons. His father-in-law was on the eve of bankruptcy, and Beauseant had promised to satisfy the creditors if Pauline would consent to marry him. Pauline was heartbroken; Claude revealed himself, paid the money required, and carried home the bride.

Lady of the Lake, The. The heroine in the poem by Sir Walter Scott. She was Ellen Douglas, once a favorite of King James; when her father fell into disgrace, she retired with him to the vicinity of Loch Katrine.

Lady of the Lake and Arthur's Sword. The heroine who gave to King Arthur the sword "Excalibur." She ordered King Arthur to sail out into the lake and take the sword as it was seen rising from the water. He sailed out with a knight and Merlin, came to the sword that a hand held up, and took it by the handles. The arm and hand went under the lake again. This Lady of the Lake asked in recompense the head of Sir Balin, because he had slain her brother; but the king refused the request. Balin, who was present, exclaimed: "Evil be ye found! Ye would have my head; therefore ye shall lose thine own." With his sword he smote off her head in the presence of King Arthur.

Lady or the Tiger, The, Stockton. A famous short story, the conclusion of which is left to the reader. The hero, in the arena, stands before two doors. Behind one stands the lady he loves, behind the other a tiger. The princess, who loves him but cannot wed him, is to give him a sign indicating which door he shall open.

Laertes (*lā-ûr'tēz*). The son of Polonius, lord chamberlain of Denmark, and brother of Hamlet's beloved Ophelia. The king persuades him to challenge Hamlet, after Ophelia wanders in mind, and he calls him out in "friendly" duel, but poisons his own rapier. He wounds Hamlet, and, in the scuffle which ensues, the combatants change swords, and Hamlet wounds Laertes, so that both die.

Lagado (*là-gä'dō*). **Gulliver's Travels, Swift.** The name of a city belonging to the king of Laputa. Lagado is celebrated for its grand academy of projectors, who try to extract sunbeams from cucumbers, and to convert ice into gunpowder. In the description of this fancied academy, Swift ridicules the pretenders in philosophy and science.

Lake District, English. A region in Westmoreland and Cumberland, England, which abounds in lakes enclosed by mountains. The district is a celebrated tourist center, and is associated with the poetry of Wordsworth. The lakes include Windermere, Ullswater, Derwentwater, and Bassenthwaite Water; and Skiddaw, Helvellyn, and Scafell Pike are the principal mountains. See *The Lake Poets*.

Lake Poets, The. Wordsworth, Southey, and Coleridge, who lived about the lakes of Cumberland. The name was applied also to other contemporary poets, who took subjects and inspiration from nature.

Lalla Rookh (*lä'lä rōōk'*). Poem by Thomas Moore. The name of the heroine, daughter of the emperor Aurungzebe, gives the title. On the journey to meet Aliris, her betrothed, in the Vale of Cashmere, she is entertained by a young Persian poet, Feramorz. She falls in love with him, and her delight is unbounded to find at the end of the journey that the poet is Prince Aliris.

L'Allegro, Milton. Title of a poem in which is sketched the life of a contented, happy man through one day. A companion poem to *Il Penseroso*. *L'Allegro* means "The Happy Man."

Lame Dog's Diary. A clever diary in which the provincial life of a little English village is reflected. It is supposed to be kept by an invalid officer who returned crippled from the Boer war. The suggestion of the diary came from a winning, tantalizing young widow, who cheered the invalid by her amusing, paradoxical talk. The diarist and his sister Palestrina are true English types—quiet gentlefolk.

L'Ami Fritz (*là'mē' frĭts*), **Erckmann-Chatrian.** A quiet tale of Bavaria, which carries a lesson of peace and tolerance. Fritz Kobus, a bachelor of 36, proud of his escape from matrimony, gradually falls victim to the housewifely charms of Suzel, daughter of one of the tenants. The story was dramatized and translated as "Friend Fritz."

Lampoon. A personal satire, often bitter and malignant. These libels, carried to excess in the reign of Charles II, acquired the name of lampoons from the burden sung to them: "Lampons, lampons, camerades lampons." From a French slang verb, meaning "to drink, booze."

Lamps of Sleep. Magic lamps. A wonderful knight of a mythical land had an equally wonderful black castle. In the mansion of the knight of the black castle were seven lamps, which could be quenched only with water from an enchanted fountain. So long as these lamps kept burning, all within the room fell into a deep sleep, from which nothing could rouse them.

Landlady's Daughter. Longfellow's Hyperion. She rowed Fleming "over the Rhine-stream, rapid and roaring wide," and told to him the story of the Liebenstein.

Land of Beulah. The paradise in which souls wait before the resurrection. In *Pilgrim's Progress* the land from which the pilgrims enter the Celestial City. The name is found in Isaiah LXII: 4.

Land of Bondage. Name given to Egypt in the Bible, because of the oppression of Israel in that country.

Land of Cakes. A name sometimes given to Scotland, because oatmeal cakes are a common national article of food, particularly among the poorer classes. The title has become popular through its use by Burns and Scott.

Land of Nod. In common speech, sleepy-land or land of dreams, as if an unknown land. Cain fled to Nod, east of Eden.

Land of Promise. The land of Canaan; so called because it was promised to Abraham.

Land of Shadows. A place of unreality, sometimes meaning land of ghosts.

Land o' the Leal. An unknown land of happiness, loyalty, and virtue. Carolina Oliphant, Baroness Nairne, meant heaven in her song, and this is now its accepted meaning. Leal means "faithful," and "Land of the Leal" means the "land of the faithful."

Land of Veda. Name often given to India.

Lanternland. The land of literary charlatans, whose inhabitants, graduates in arts, doctors, professors, and artists of all grades, waste time in displaying their wonderful learning. See *Island of Lanterns*.

Laodicean (*lā-ŏd'ĭ-sē'ăn*). One indifferent to religion, like the Christians of that church mentioned in the Book of Revelation.

Laputa (*là-pū'tà*). The name of a flying island described by Swift in *Gulliver's Travels*. It is said to be "exactly circular, its diameter 7837 yards or about four miles and a half, and consequently contains ten thousand acres." The inhabitants are chiefly speculative philosophers, devoted to mathematics and music; and such is their habitual absent-mindedness, that they are compelled to employ attendants, called "flappers," to rouse them from their profound meditations. This is done by striking them gently on the mouth and ears with a peculiar instrument consisting of a blown bladder with a few pebbles in it, fastened to the end of a stick.

Last Days of Pompeii, The, Bulwer-Lytton. A historical novel of the time of the destruction of the city by the eruption of Mount Vesuvius, 79 A. D. The vivid descriptions of life in the Græco-Roman city are the most interesting features of the book. The lovers, Glaucus and Ione, are aided to escape by the blind flower girl, Nydia. They become Christians and go to live in Greece.

Last of the Mohicans (*mō-hē'kănz*). A romantic novel of North American Indian life by James Fenimore Cooper, the second of his Leatherstocking series. The title of the work is descriptive of the character Uncas, son of Chingachgook and the last of the Mohican line. Represented as gallant, swift, courteous, and a noble lover, he makes the perennial appeal of youth cut off in the flower.

Latitudinarians. Persons who hold very loose views of Divine inspiration and of what are called orthodox doctrines. A common name in England for the less strict groups in the Anglican Church.

Launfal, Sir. Steward of King Arthur. Detesting Queen Guinevere, he retired to Carlyoun, and fell in love with a lady named Tryamour. She gave him limitless money and told him if he wished to see her he was to retire into a private room, and she would be with him. Sir Launfal now returned to court, and excited much attention by his great wealth. Guinevere made advances to him; he would not turn from the lady to whom he was devoted but sang her praises. At this repulse, the angry queen complained to the king, and declared to him that she had been insulted by his steward. Arthur bade Sir Launfal produce this paragon of women. On her arrival, Sir Launfal was allowed to accompany her to the isle of Oleron; and no one ever saw him afterwards. James Russell Lowell has written a poem entitled "The Vision of Sir Launfal."

Laus Deo (*lôs dē'ō*), "Praise to God." A poem by Whittier, inspired by the passing of the Constitutional amend-

ment abolishing slavery, and suggested to the poet as he sat in the Friends' meetinghouse in Amesbury and heard the bells proclaiming the fact.

Lavaine. Son of the lord of Astolat, who accompanied Sir Lancelot when he went to tilt for the ninth diamond. Lavaine is described as young, brave, and a true knight. He was brother to Elaine.

Lavender, Dr. A wise and lovable old clergyman in Margaret Deland's Old Chester stories.

Lavinia and Palemon. Thomson's Seasons. Lavinia was the daughter of Acasto, patron of Palemon. Through Acasto, Palemon gained a fortune and wandered away from his friend. Acasto lost his property and, dying, left a widow and daughter in poverty. Palemon often sought them, but could never find them. One day, a lovely modest maiden came to glean in Palemon's fields. The young squire was greatly struck with her exceeding beauty and modesty, but she was known as a pauper, and he dared not give her more than a passing glance. Upon inquiry, he found that the beautiful gleaner was the daughter of Acasto; he proposed marriage, and Lavinia was restored to her rightful place. Similarity between this story and that of Ruth in the Bible is notable.

Lawyer's Alcove. Name given to a volume of poems selected from the best poems by lawyers, for lawyers, and about lawyers. Included in this volume are Shakspere's "Sonnet CXXXIV"; Blackstone's "A Lawyer's Farewell to his Muse"; "Justice," by John Quincy Adams; Landor's "At the Buckingham Sessions"; "The Judicial Court of Venus," by Jonathan Swift; Saxe's "Briefless Barrister" and "The Lawyer's Valentine"; "General Average," by William Allen Butler; "The Festival of Injustice," by Carlton, and Riley's "Lawyer and Child."

Lay of the Last Minstrel, Scott. Lady Margaret of Branksome Hall, "the flower of Teviot," was beloved by Baron Henry of Cranstoun, but a deadly feud existed between the two families. A goblin lured Lady Margaret's brother into a wood, where he fell into the hands of the English. At the same time an army of 3000 English marched to Branksome Hall to take it; but, hearing that Douglas was on the march against them, the two chiefs agreed to decide the contest by single combat. Victory fell to the Scotch, when it was discovered that "Sir William Deloraine," the Scotch champion, was in reality Lord Cranstoun, who then claimed and received the hand of Lady Margaret as his reward. This united the two houses.

Lazy Lawrence. Name and description of a character in one of Miss Edgeworth's stories. Probably derived from a chapbook *The Infamous History of Sir Lawrence Lazy.* This hero of Lubberland had served the schoolmaster, his wife, the squire's cook, and the farmer, which, by the laws of Lubberland, was accounted high treason. He was arraigned and tried, but acquitted of the many treasons laid to his charge.

Leander (*lē-ăn'dẽr*). A young man of Abydos, who swam nightly across the Hellespont to visit his ladylove, Hero, a priestess of Sestos. One night he was drowned in his attempt, and Hero leaped into the Hellespont also. The story of Hero and Leander is so old and so well known as nearly to belong to mythology.

Lear. A legendary king of Britain, and the hero of Shakspere's tragedy of the same name. He had three daughters, and when four score years old, wishing to retire from the active duties of sovereignty, resolved to divide his kingdom among them. By elaborate but false professions of love and duty on the part of two daughters, Goneril and Regan, King Lear was persuaded to disinherit the third, Cordelia, who had before been deservedly more dear to him, and to divide his kingdom between her sisters. The tragedy is wrought out in the ungrateful conduct of the older sisters and the suffering of Lear. The beauty of the play is the exquisite character Cordelia.

Leatherstocking Tales. Five stories or romances written by James Fenimore Cooper. The same hero, Leatherstocking, or Natty Bumppo, figures throughout in his life among the Indians. Natty had learned wood-lore as the young Indian learned it. He knew the calls of the wild animals far across the wilderness. He could follow the deer and bear to their haunts. He could trace the path of the wolf by the broken cobwebs glistening in the sunlight; and the cry of the panther was a speech as familiar as his own tongue. When he was thirsty he made a cup of leaves and drank in the Indian fashion. He lay down to rest with that sense of security that comes only to the forester. These tales take Leatherstocking from young manhood to old age, following the fortunes of the American Indian tribes. The order in which his story is told in these volumes is *The Deerslayer*, *The Last of the Mohicans*, *The Pathfinder*, *The Pioneers*, and *The Prairie*. He is also known by the name of Hawkeye in one part of his story. The best writers on the American Indian are thus quoted in our literature: James F. Cooper, the romancer of the Indian; Henry W. Longfellow, the poet of the Indian; Francis Parkman, the historian of the Indian; Helen Hunt Jackson, the novelist of the Indian.

Leaves of Grass. The title of a small volume of poems published by Walt Whitman in 1855. It contained his first unconventional work. Later, other poems were included under the same title.

Legend. Anciently, a kind of rubric containing the prayers appointed to be read in Roman Catholic churches. In later times, the word was employed to denote a chronicle or register of the lives of saints, because they were to be read on the festivals of the saints. The manner in which credulous love of the wonderful, exaggeration of fancy, and ecclesiastical enthusiasm, at times even pious fraud, were mixed up with true history in these narrations caused stories of a religious or ecclesiastical nature generally to be designated as "legends," to distinguish them from real history. The word has come to mean a tale handed down by tradition, unauthentic, but popularly believed. Among the medieval collections of legends, that drawn up by the Genoese archbishop, Jacopo da Voragine, in the second half of the 13th century, under the title of *Legenda Aurea*, "Golden Legends," or *Historia Lombardica*, is the most celebrated.

Leonine Verse. This form of verse was used in the middle ages in Latin hymns and in secular verse. Said to derive its name from Leonius, a canon of the church of St. Victor, in Paris. In English, any verse which rimes middle and end is called a Leonine verse.

Les Misérables (*lā mē'zā'rā'bl'*), **Victor Hugo.** This great work is the story of a sturdy, courageous peasant, who, sent to the galleys for a minor offense, becomes a hardened convict. He is reclaimed through the kindness of a saintly bishop and becomes a respected manufacturer and town official. Discovered and hunted by his enemies, he becomes once more an outlaw. But he bears his misfortunes with heroism. His noble death is one of the great episodes in fiction.

Letterpress. Printed matter. The word is often used to distinguish printed words from engraving, or matter printed from types instead of from plates.

Lexicon. A vocabulary, or book containing an alphabetical arrangement of the words of a language, with an explanation of the meaning or sense of each. The term is used chiefly with reference to dictionaries or wordbooks of the Greek, Hebrew, Arabic, or Syriac languages.

Libations. With the prayers among all ancient peoples were usually joined the libations, or drink offerings. These consisted generally of wine, part of which was poured out in honor of the gods, and part of it drunk by the worshiper. The wine must be pure, and offered in a full cup. Sometimes there were libations of water, of honey, of milk, and of oil.

Ligeia. A story written by Poe. Suggested by a dream in which the eyes of the heroine produced the wonderful effect described in the story. Its theme is the conquest of death through the power of will.

Light of the Harem. Name given to the bride of Selim in the poem *Lalla Rookh.* She was the sultana Nourmahal, afterwards called Nourjeham, "light of the world."

Light that Failed, The, Kipling. The hero of the novel, Dick Hildar, after years of military campaigns in Egypt, goes back to London, where, in the midst of success as an artist, he meets Maisie, his boyhood sweetheart. She, bound up in her hopes of success in art, cannot or will not return his whole-hearted love. Suddenly, Dick goes blind, and Maisie is incapable of sacrificing anything for him. He returns to Egypt and is killed. The tragic ending of the story was, for one publication, changed into a happy ending, which was used in a dramatization of the novel.

Lilliput. An imaginary country described in *Gulliver's Travels*, where an ordinary man becomes a great giant beside the small people of the land. Lilliputian is used to designate small ways of expressing malice or jealousy. Among amusing characters in Lilliput land were the Little-endians and the Big-endians who made up two religious factions, which waged incessant war on the subject of the right interpretation of the 54th chapter of the "Blundecral": "All true believers break their eggs at the convenient end." The godfather of Calin, the reigning emperor of Lilliput, happened to cut his finger while breaking his egg at the big end, and therefore commanded all faithful Lilliputians to break their eggs in future at the small end. The Blefuscudians called this decree rank heresy, and determined to exterminate the believers of such an abominable practice from the face of the earth. Hundreds of treatises were published on both sides, but each sect put all those books opposed to its own views into the "Index Expurgatorius," and not a few of the more zealous sort died as martyrs for daring to follow their private judgment in the matter.

Limbo. From Latin *limbus*, meaning "edge" or "border." A place where the souls of good men not admitted into heaven wait the general resurrection. A similar place exists for the souls of unbaptized children. Still another limbo is a fool's paradise, a place for all nonsense. This old belief has been used by Dante and Milton in their poems.

Lincoln's Inn Fields. A square in London near the junction of High Holborn and Chancery Lane. It is surrounded by lawyers' offices, Lincoln's Inn, the Royal College of Surgeons. and the Soane Museum. It was laid out by Inigo Jones, the celebrated architect. The square is named from Lincoln's Inn, one of the legal societies of England through which men are called to the bar. The buildings occupied by the society formerly belonged to the earl of Lincoln. Hence their name.

Literati (*lĭt'ē-rā'tī*). (1) Men of letters, scholars of note. (2) "The Literati" was the title of a series of comments by Edgar Allan Poe on 38 New York authors which appeared in *Godey's* from May to October, 1846.

Lithgow's Bower. A favorite residence of the kings and queens of Scotland, especially of Mary of Guise; and here the unfortunate Mary Queen of Scots was born in 1542.

Little Billee. Trilby, Du Maurier. The nickname of the hero, William Bagot, an impulsive, boyish art student in Paris, who falls in love with Trilby, an artist's model. The match is broken off by Little Billee's mother. Trilby, under the tutelage of Svengali, musician and hypnotist, becomes a great singer. At the death of Svengali, her power leaves her and she dies. After the death of Little Billee, Taffy, one of his Paris friends, marries his sister.

Little Breeches, John Hay. The title of a poem published in *Pike County Ballads* in 1871.

Little Brother. An appellation made popular through the tale bearing the name. Josiah Flynt ran away from home when he was three years old and continued to do so frequently ever after. His first piece of fiction was naturally based on trampdom. His hero is a boy-tramp, a little fellow whose irresistible impulse to view the great world around him causes him to become a "Prushun" to an old inhabitant of Hoboland. He wished people to see where a number of stray boys land, for he had found out that a great many of the so-called "kidnapped" youngsters are in reality simple runaways with romantic temperaments.

Little Citizens, Myra Kelly. A New York schoolteacher's stories of her East Side Jewish charges. Human nature and American Yiddish dialect are alike faithfully rendered.

Little Dorrit. The heroine and title of a novel by Dickens. Little Dorrit was born and brought up in the Marshalsea prison, where her father was confined for debt.

Little John. A big, stalwart fellow, named John Little, who encountered Robin Hood and gave him a sound thrashing, after which he was rechristened, and Robin stood godfather. Little John is introduced by Sir Walter Scott in *The Talisman*.

Little Lord Fauntleroy. The seven-year-old hero of the story of this title by Frances Hodgson Burnett. He is the son of an Englishman who has been disinherited by his father, an English earl, for marrying an American. Upon the death of the boy's father, the old earl has the boy brought to England, but on condition that his mother, "Dearest," shall not accompany him to the family home. Gradually, the boy wins for himself and his mother a place in the old man's heart.

Little Men, Louisa May Alcott. A story of the boys in the school at Plainfield, kept by "Jo" and her husband, Mr. Baer. *Jo's Boys* is a sequel to this story.

Little Minister, The, Barrie. A romantic "Thrums" story. An Auld Licht minister's love for the beautiful "Egyptian," a lady in disguise, is the theme.

Little Nell. Old Curiosity Shop, Dickens. The prominent character of the story, pure and true, though living in the midst of selfishness and crime. She was brought up by her grandfather, who was in his dotage, and who tried to eke out a narrow living by selling curiosities. At length, through terror of Quilp, the old man and his grandchild stole away and led a vagrant life.

Little Women, L. M. Alcott. A story of the girlhood life of Louisa May Alcott and her three sisters, at Concord, Mass. The sequel to the story is *An Old-Fashioned Girl*.

Llewellyn. A legendary Welsh prince who, on returning from hunting, found his baby boy missing and his favorite greyhound, Gelert, covered with blood. Thinking that the hound had eaten him, he killed it. But, on searching more carefully, the child was found alive under the cradle clothes, and near him the body of a huge wolf which had been killed by the faithful hound.

Lochiel (*lŏĸ-ēl'*). The title of the head of the clan Cameron. Thomas Campbell's poem, "Lochiel's Warning," is a prophecy of the battle of Culloden.

Lochinvar (*lŏĸ'ĭn-vär'*). The hero—a young Highlander—of an incidental song in "Marmion." who was much in love with a lady whose fate was decreed that she should marry a "laggard." Young Lochinvar persuaded the too-willing lassie to be his partner in a dance; and while the guests were intent on their amusement he swung her into his saddle and made off with her before the bridegroom could recover from his amazement.

Locksley. So Robin Hood is sometimes called, from the village in which he was born. He appears as an archer in *Ivanhoe*.

Locksley Hall. A poem by Tennyson, in which the hero, the lord of Locksley Hall, having been jilted by his cousin Amy in favor of a rich boor, pours forth his feelings in a flood of scorn and indignation. Many lines from this poem have passed into common speech, such as "In the spring a young man's fancy lightly turns to thoughts of love."

Locrin or **Locrine.** Father of Sabrina, and eldest son of the mythical Brutus, king of ancient Britain. On the death of his father he became king of Loegria.

Loegria (*lō-ē'grĭ-ā*) or **Logres** (*lō'grĕs*). England is so called by Geoffrey of Monmouth, from Logrine, or Locrine, eldest son of the mythical King Brute, or Brutus.

Logos. This word, occurring at the beginning of the gospel of St. John, was early taken to refer to the "second person of the Trinity, i. e., Christ." Yet the apostle's precise meaning—who alone makes use of the term in this manner, and only in the introductory part of his gospel,—whether he adopted the symbolical usage in which it was employed by the various schools of his day, which of their differing significations he had in view, or whether he intended to convey a meaning quite peculiar to himself,—these are some of the innumerable questions to which the word has given rise, and which, though most fiercely discussed ever since the first days of Christianity, are far from having found a satisfactory solution.

Lohengrin. The Knight of the Swan; the hero of a romance written by a disciple of Wolfram von Eschenbach, in the 13th century, and also of a modern music drama by Richard Wagner. He was the son of Parsifal, and came to Brabant in a ship drawn by a white swan, which took him away again when his bride, disobeying his injunction, pressed him to discover his name and parentage.

Lord Jim, Joseph Conrad. The hero of this novel, a young ship's officer, had been dismissed from the merchant marine service because he had erred in a serious emergency. Self-exiled among Malaysian savages, he tries to redeem himself by devoted service. Among these people he gains the title of "Lord Jim."

Lorna Doone, R. D. Blackmore. A novel. Lorna, child of the outlaw family of the Doones in Exmoor, saves John Ridd, a fourteen-year-old boy, from capture by them. Seven years later, grown to manhood, John becomes her champion against her own people, and finally they are married. It is a story of England in the 17th century, and involves the infamous Judge Jeffrey.

Lothario (*lō-thā'rĭ-ō*). The name has come to stand in literature for the type of the gay, handsome, and gallant libertine. The original is a Florentine cavalier in Cervantes' story *The Curious Impertinent*. Rowe, in *The Fair Penitent*, gave the name to a Genoese noble, and Richardson developed the character in Robert Lovelace of his novel *Clarissa Harlowe*.

Lotos-Eaters. Tennyson wrote a poem called "The Lotos-Eaters," describing a set of islanders who live in dreamy idleness, weary of life, and regardless of all its stirring events.

Love Doctor, The. L'Amour Médecin (*là-mōōr' mād''sĭN'*). A comedy by Molière, written about the year 1665. Lucinde, the daughter of Sganarelle, is in love, and the father calls in four doctors to consult upon the nature of her malady. They see the patient, and retire to consult together, but talk about Paris, about their visits, about the topics of the day; and, when the father enters to know what opinion they have formed, they all prescribe different remedies, and pronounce different opinions. Lisette then calls in a "quack" doctor, Clitandre, the lover, who says that he must act on the imagination, and proposes a seeming marriage, to which Sganarelle assents. The assistant being a notary, Clitandre and Lucinde are married.

Lover's Vows. Altered from Kotzebue's. Baron Wildenhaim, in his youth, seduced Agatha Friburg, and then forsook her. She had a son, Frederick, who became a soldier. While on furlough, he came to spend his time with his mother, and found her in abject poverty and almost starved. A poor cottager took her in, while Frederick,

who had no money, went to beg charity. Baron Wildenhaim was out with his gun, and Frederick asked alms of him. The count gave him a shilling; Frederick demanded more, and, being refused, seized the baron by the throat. The keepers arrived and put him in the castle dungeon. Here he was visited by the chaplain, and it came out that the count was his father. The chaplain, being appealed to, told the count the only reparation he could make would be to marry Agatha and acknowledge the young soldier to be his son. This advice he followed, and Agatha Friburg, the beggar, became the Baroness Wildenhaim of Wildenhaim castle.

Love's Labor's Lost, Shakspere. Ferdinand, king of Navarre, with three lords named Biron, Dumain, and Longaville, agree to spend three years in study, during which time no woman was to approach the court. The compact signed, all went well, until the princess of France, attended by Rosaline, Maria, and Katharine, besought an interview respecting certain debts said to be due from the king of France to the king of Navarre. The four gentlemen fell in love with the four ladies. The love of the king sought the princess, by right, Biron loved Rosaline, Longaville admired Maria, and Dumain adored Katharine. In order to carry their suits, the four gentlemen, disguised as Muscovites, presented themselves before the ladies; but the ladies, being warned of the masquerade, disguised themselves also, so that the gentlemen in every case addressed the wrong lady. A mutual arrangement was made that the suits should be deferred for twelve months and a day; and, if, at the expiration of that time, they remained of the same mind, the matter should be taken into serious consideration.

Loves of the Angels. A poetical story written by Thomas Moore. It may be called the stories of three angels, and was founded on the Eastern tale of "Harût and Marût," and the rabbinical fictions of the loves of "Uzziel and Shamchazai." (1) The first angel fell in love with Lea, whom he saw bathing. She returned love for love, but his love was carnal, hers heavenly. He loved the woman, she loved the angel. At last the angel gave to her the password which should open the gates of heaven. She pronounced it, and rose through the air into paradise. The angel degenerated and became no longer an angel of light, but "of the earth, earthy." (2) The second angel was Rubi, one of the seraphs. He loved Liris, who asked him to come in all his celestial glory. He did so; and she, rushing into his arms, was burned to death; but the kiss she gave him became a brand on his face forever. (3) The third angel was Zaraph, who loved Nama. It was Nama's desire to love without control, and to love holily; but, as she fixed her love on a creature and not on the Creator, both she and Zaraph were doomed to live among the things that perish. When the end of all shall come, Nama and Zaraph will be admitted into the realms of everlasting love.

Loving Cup. A large cup passed round from guest to guest at state banquets and city feasts. On the introduction of Christianity, the custom of wassailing was not abolished, but it assumed a religious aspect. The monks called the wassail bowl the loving cup. In the universities the term "Grace Cup" is more general. Immediately after grace the silver cup, filled with wine, is passed round. The master and wardens drink welcome to their guests; the cup is then passed to all the guests. A loving or grace cup should have two handles, and some have four. This ceremony, of drinking from one cup and passing it round, was observed in the Jewish paschal supper, and our Lord refers to the custom in the words, "Drink ye all of this."

Lubberland. An imaginary country of idleness and luxury. The name has been applied to certain cities in burlesque.

Luck of Roaring Camp, The, Bret Harte. A story of the softening influence of a child's presence among the men of an early mining camp in California. The poem, published in the second number of the *Overland Monthly* (1868), brought Harte his first real fame and popularity.

Luggnagg. Gulliver's Travels. An imaginary island whose inhabitants have the gift of eternal life, lacking with it the gift of immortal health and strength.

Lumbercourt, Lord. Character in Macklin's comedy *The Man of the World*. A voluptuary, greatly in debt, who consented, in return for considerable money, to give his daughter, Lady Rudolphe, to Egerton McSycophant. Egerton, however, had no fancy for the lady, but married Constantia, the girl of his choice. His lordship was in alarm lest this should be his ruin; but Sir Pertinax told him the bargain should still remain good if Egerton's younger brother, Sandy, were accepted by his lordship instead. To this his lordship and the lady readily agreed.

Lure of the Labrador Wild, The, Wallace. A recital of the ill-fated expedition to Labrador undertaken by Leonidas Hubbard, Jr., during the summer of 1903. The party consisted of Mr. Hubbard, Mr. Wallace, and a half-breed Cree Indian named Elson, who proved himself a veritable hero. As is generally known, the object of the party was to reach the interior of Labrador over a portion of that country unexplored, or at least unmapped by white men. This purpose was only partially carried out. The winter came on long before Hubbard was ready to turn back, the provisions were exhausted, game was scarce, and the fish failed to rise to the fly. On the return journey toward the coast, Hubbard gave out and had to be left behind until aid could be brought. Wallace succeeded in finding some provisions which had been thrown aside on the inland trip and had returned within a few hundred feet of Hubbard's tent, but without finding it. Elson, the half-breed, managed to reach a trapper's camp and sent back a relief expedition, which picked up Wallace, and later found the body of Hubbard, who had died of starvation.

Lusiad (*lū'sĭ-ăd*), **The.** The only Portuguese poem that has gained a world-wide celebrity. It was written by Luiz de Camoëns, appeared in 1572, and was entitled *Os Lusiadas*, the "Lusitanians," that is, the Portuguese—the subject being the conquests of that nation in India. It is divided into ten cantos, containing 1102 stanzas. Among English translations, that by Sir Richard Burton is especially notable. *The Lusiad* celebrates the chief events in the history of Portugal, and is remarkable as the only modern epic poem which is pervaded by anything approaching the national and popular spirit of ancient epic poems. Bacchus was the guardian power of the Mohammedans, and Venus or Divine Love, of the Lusians. The fleet first sailed to Mozambique, then to Melinda (Africa), where the adventurers were hospitably received and provided with a pilot to conduct them to India. In the Indian Ocean, Bacchus tried to destroy the fleet; Venus, however, calmed the sea, and Gama arrived at India in safety. Having accomplished his object, he returned to Lisbon. Among the most famous passages are the tragical story of Inez de Castro, and the apparition of the giant Adamastor, who appears as the Spirit of the Storm to Vasco da Gama, when crossing the cape. The versification of *The Lusiad* is extremely charming. The best edition was published in Paris (1817), reprinted in 1819, and again in 1823. *The Lusiad* has been translated into Spanish, French, Italian, English, Polish, and German.

Lusitania (*lū'sĭ-tā'nĭ-ă*). The ancient name of Portugal; so called from Lusus, the companion of Bacchus in his travels. He colonized the country, and called it "Lusitania," and the colonists "Lusians."

Lustrum. The solemn offering made for expiation and purification by one of the censors in the name of the Roman people at the conclusion of the census. The animals offered in sacrifice were a boar, a sheep, and a bull. They were led round the assembled people on the Campus Martius before being sacrificed. As the census was quinquennial, the word lustrum came to signify a period of five years.

Luther's Postil (*pŏs'tĭl*) **Gospels.** Advent, Christmas, and Epiphany sermons, first published in Latin in 1521, and dedicated to his protector, the elector Frederick. Translated immediately into German, Luther's postils, or homilies, on the gospels are esteemed the best of his sermons. "Postils" was a common name in the 16th century for expositions of the gospels and epistles for Sundays and holydays. The word is explained from the fact that the gospels and epistles were printed first and that after them (*post illa*) came the commentary.

Lycidas (*lĭs'ĭ-dăs*). The name under which Milton celebrates the untimely death of Edward King, who was drowned in the passage from Chester to Ireland, August 10, 1637. He was the son of Sir John King, secretary for Ireland.

Lydia Languish. The heroine of Sheridan's comedy *The Rivals*, distinguished for the extravagance of her romantic notions.

Lydia. Orlando Furioso. A daughter of the king of Lydia, who was sought in marriage by Alcestes, a Thracian knight; his suit was refused, and he repaired to the king of Armenia, who gave him an army, with which he laid siege to Lydia. He was persuaded by the king's daughter to raise the siege. The king of Armenia would not give up the project, and Alcestes slew him. Lydia now set him all sorts of dangerous tasks to "prove his love," all of which he surmounted. Lastly, she induced him to kill all his allies, and when this was done she mocked him. Alcestes pined and died, and Lydia was doomed to endless torment in hell, where Astolfo saw her, to whom she told her story.

Lygia. The Christian bride of the pagan, Vinicius, in *Quo Vadis*, a historical novel treating the age of Nero, written by Sienkiewicz, a Polish novelist.

Lyric. Literally, pertaining to the lyre. In poetry a name originally applied to what was sung or recited to the accompaniment of the lyre, but it is now applied to

odes, ballads, and other verses, such as may be set to music. Lyrics were originally employed in celebrating the praises of gods and heroes, and their characteristic was melodiousness. The Greeks cultivated them with effect, particularly Anacreon and Sappho, but among the Romans Horace was the first and principal lyric poet. It has been said that all poets are singers and these singers are divided into three classes. First, the lyric poet, who can sing but one tune with his one voice. Second, the epic poet, who with his one voice can sing several tunes. Third, the true dramatist, who has many tongues and can sing all tunes.

Mab, Queen. Romeo and Juliet, Shakspere. The origin of the name is obscure. By some it is derived from the Midgard of the Eddas. The name is given by the English poets of the 15th and succeeding centuries to the imaginary queen of the fairies.

Mabinogion (*măb'ĭ-nō'gĭ-ŏn*). A series of Welsh tales, chiefly relating to Arthur and the Round Table. A manuscript volume of some 700 pages is preserved in the library of Jesus college, Oxford.

Macbeth. The tale of Macbeth and Banquo has been borrowed from the legendary history of Scotland, but the interest of the play is not historical. It is a tragedy of human life, intensely real, the soul, with all its powers for good or evil, deliberately choosing evil. The three witches in the desert place, in thunder, lightning, storm, strike the keynote of evil suggestion. The awfulness of soul destruction is felt in Macbeth and Lady Macbeth as in no other of Shakspere's dramas.

Maccabees, The. This Jewish family led the struggle of their people against Antiochus Epiphanes, B. C. 168–135. The two Books of the Maccabees give an account of this struggle.

Macheath, Captain. A highwayman who is the hero of Gay's *Beggar's Opera*.

Machiavellism (*măk'ĭ-ă-vĕl'ĭz'm*). The name came from a writing by Machiavelli, under the title *The Prince*, a famous treatise, written probably to gratify the Medici, in which are expounded those principles of political cunning and artifice, intended to promote arbitrary power, ever since designated "machiavellism."

MacIvor. Waverley, Scott. Fergus MacIvor is a prominent character in the novel, and his sister, Flora MacIvor, is the heroine. They belong to a Scotch chieftain's family.

Macreons, The Island of. Pantagruel, Rabelais. The title is given to Great Britain, derived from a Greek word, meaning long-lived, "because no one is put to death there for his religious opinions." Rabelais says the island "is full of antique ruins and relics of popery and ancient superstitions."

Madasima, Queen. An important character in the old romance called *Amadis of Gaul*; her constant attendant was Elisabat, a famous surgeon, with whom she roamed in solitary retreats.

Madge Wildfire. The Heart of Midlothian, Scott. A poor, wandering, fantastically dressed girl, driven insane by the profligate abuse of George Staunton. She is the daughter of old Meg Murdochson, the gypsy thief.

Madoc (*măd'ŏk*). A poem by Southey; founded on one of the legends connected with the early history of America. Madoc, a Welsh prince of the 12th century, is represented as making the discovery of the Western world. His contests with the Mexicans form the subject.

Madrigal. (1) A short lyric poem, generally on the subject of love, characterized by epigrammatic terseness or quaintness, and composed of a number of free and unequal verses, confined neither to the regularity of the sonnet, nor to the subtlety of the ode. The madrigals of Tasso are noted in Italian poetry. (2) In music, a part song for several voices, properly with contrapuntal imitation and without musical accompaniment.

Magi (*mā'jī*). The three "Wise Men" who followed the star to Bethlehem. The traditional names of the three Magi are Melchior, represented as an old man with a long beard, offering gold; Gaspar, a beardless youth who offers frankincense; Balthazar, a black, or Moor, who tenders myrrh.

Magic Rings. These are mentioned by Plato, Cicero, and other writers and are supposed to make the wearer invisible.

Magic Staff. The story of the magic staff belongs to the days of legends and seems to be of French origin, but has found its way into other lands. This staff would guarantee the bearer safety from all the perils and mishaps incidental to travelers. According to earliest traditions the staff was a willow branch cut on the eve of All Saints' Day.

Magic Wands. These are found in many old tales or writings. In Tasso's *Jerusalem Delivered* the hermit gave to Charles the Dane and Ubaldo a wand, which, being shaken, infused terror into all who saw it, and in Spenser's *Faery Queen* the palmer who accompanied Sir Guyon had a wand of like virtue. It was made of the same wood as Mercury's caduceus.

Magnalia. The best-known in the long list of Cotton Mather's works was his *Magnalia Christi Americana* (1702), purporting to be an ecclesiastical history of New England, from its first planting in 1620 to the year 1698, but including also civil history, an account of Harvard college, the Indian wars, the witchcraft troubles, and a large number of biographies. The work is of no historical value, but has an important place in puritan psychology.

Magnano. Hudibras, Butler. One of the leaders of the rabble that attacked Hudibras at a bear baiting.

Magnificat (*măg-nĭf'ĭ-kăt*). In the ritual of the Roman Catholic Church, the name given to the "Song of the Virgin Mary," in Luke I:46–55. The name is derived from the opening word of the song in the Vulgate or Latin New Testament.

Maiden Lane. A street in London, between Covent Garden and the Strand. Andrew Marvell, Turner, the landscape painter, and Voltaire lived here at different times. The name is said to have been given from an image of the Virgin which once stood there.

Maidens' Castle. An allegorical castle mentioned in Malory's *Morte D'Arthur*. It was taken from a duke by seven knights, and held by them till Sir Galahad expelled them. It was called "The Maidens' Castle," because these knights made a vow that every maiden who passed it should be made a captive.

Maid Marian. (1) A half mythical character, but the name is said to have been assumed by Matilda, daughter of Robert Lord Fitzwalter, while Robin Hood remained in a state of outlawry. The name Maid Marian is connected with the morris dance, or May-day dance, at which she was said to appear. (2) The title of a charming novel by Thomas Love Peacock (1822).

Maid of Athens. Made famous by Lord Byron's song of this title. Twenty-four years after this song was written, an Englishman sought out "the Athenian maid," and found a beggar without a vestige of beauty.

Maid of Saragossa. Childe Harold, Byron. A young Spanish woman distinguished for her heroism during the defense of Saragossa in 1808-09. She first attracted notice by mounting a battery where her lover had fallen, and working a gun in his place.

Malaprop, Mrs. A character in Sheridan's *Rivals*, noted for her blundering use of words.

Malbecco. Faery Queen, Spenser. The husband of a young wife, Helinore, and himself a crabbed, jealous old fellow.

Malengrin. A character in Spenser's *Faery Queen*, who carried a net on his back "to catch fools with." The name has grown to mean the personification of guile or flattery.

Malepardus. The castle of Master Reynard the Fox, in the beast epic *Reynard the Fox*.

Malvoisin. Ivanhoe, Scott. One of the challenging knights at the tournament, Sir Philip de Malvoisin. Sir Albert de Malvoisin was a preceptor of the Knights Templars.

Mambrino (*măm-brē'nō*). (1) In *Orlando Furioso* by Ariosto, a king of the Moors, who was the possessor of an enchanted golden helmet, which rendered the wearer invulnerable, and which was the object of eager quest to the paladins of Charlemagne. This helmet was borne away by the knight Rinaldo. (2) In *Don Quixote* we are told of a barber who was caught in a shower of rain, and who, to protect his hat, clapped his brazen basin on his head. Don Quixote insisted that this basin was the helmet of the Moorish king, and, taking possession of it, wore it as such.

Managarm. Prose Edda. The largest and most formidable of the race of giants. He dwells in the ironwood, Jamvid. Managarm will first fill himself with the blood of man, and then will he swallow up the moon. This giant symbolizes war, and the "ironwood" in which he dwells is the wood of spears.

Man and Superman, G. B. Shaw. Called by many the most important of Shaw's plays. It is a comedy in which he "modernizes" the Don Juan motive. John Tanner, a social revolutionist, of spotless character and a foe of convention, is determined to escape love and marriage. But he is overtaken and captured by Ann Whitefield, who personifies the demands of the Life Force. Other clearly drawn characters add to the keen comedy of the piece.

Manfred. Subject of a poem by Byron, written under this title. Manfred sold himself to the prince of darkness

and received from him seven spirits to do his bidding. They were the spirits of "earth, ocean, air, night, mountains, winds, and the star of his own destiny." Wholly without human sympathies, the count dwelt in splendid solitude among the Alpine mountains. He loved Astarte and was visited by her spirit after her death. In spirit form she told Manfred that he would die the following day, and, when asked if she loved him, she sighed "Manfred," and vanished.

Manon Lescaut (*mȧ'nôN' lĕs'kō'*), **Prévost.** One of the first of modern novels, published in 1733. Chevalier des Grieux, who tells the story, is disgraced through his association with Manon. But she proves her love by going with him into exile in America.

Mantalini (*măn'tȧ-lē'nē*). **Nicholas Nickleby, Dickens.** The husband of madame; he is a man-doll, noted for his white teeth, his oaths, and his gorgeous morning gown. This "exquisite" lives on his wife's earnings, and thinks he confers a favor on her by spending. Madame Mantalini is represented as a fashionable milliner near Cavendish Square, London.

Man with the Hoe, The, Edwin Markham. The subject of a famous poem, suggested by the picture by J. F. Millet. The theme is the hopelessness of the toiler.

Marble Faun, The, Nathaniel Hawthorne. A romance. Miriam, a beautiful art student in Rome, whose origin and relations are mysterious, is loved by Donatello, a young count, whose striking resemblance to the "Faun of Praxiteles" suggests his descent from the woodland fauns. Donatello is singularly unsophisticated. One night, at a sign from Miriam, he throws Brother Antonio, who has been following Miriam, over the Tarpeian rock to his death. Miriam disappears, but Donatello, awakened to responsibility, gives himself up to justice.

Marcellus. Hamlet, Shakspere. An officer of Denmark, to whom the ghost of the murdered king appeared before it presented itself to Prince Hamlet.

Marchioness, The. Old Curiosity Shop, Dickens. A half-starved maid-of-all-work, in the service of Sampson Brass and his sister Sally. She was so lonesome and dull that it afforded her relief to peep at Mr. Swiveller even through the keyhole of his door. Mr. Swiveller called her the "marchioness," when she played cards with him, "because it seemed more real and pleasant" to play with a marchioness than with a domestic. While enjoying these games they made the well-known "orange-peel wine."

Mariana in the Moated Grange. (1) In Tennyson's poem of this name, a young damsel who sits in the moated grange, looking out for her lover, who never comes. (2) In Shakspere's *Measure for Measure*, Mariana is a lovely and lovable lady, betrothed to Angelo, who, during the absence of Vincentio, the duke of Vienna, acted as his lord deputy. Her pleadings to the duke for Angelo are wholly unrivaled.

Mark Tapley. Martin Chuzzlewit, Dickens. A young man with an ambition to be "jolly" under adverse conditions. He accompanies young Martin Chuzzlewit to America, is constantly the good genius of that heedless youth, and on his return marries Mrs. Lupin, thus becoming landlord of the Blue Dragon, where he had formerly worked.

Marplot. "The busy body." A blundering, good-natured, meddlesome young man, very inquisitive, too officious, and always bungling anything with which he interferes. Character found in comedies written by Mrs. Centlivre.

Marriage of Figaro (*fē'gȧ'rō'*), **The, Beaumarchais.** This play is the sequel to the *Barber of Seville*. It was presented in 1784, and was immediately popular. It helped forward the Revolution. In the play, Almaviva and Rosine are weary of married life. The husband has turned his fancy to Suzanne. But Figaro is in love with her, and he succeeds in checkmating the noble gallant. Brilliant wit and careless mockery both adorn and mar the play.

Marse Chan, T. N. Page. A short story, told in the language of the hero's negro servant. A Virginia gentleman loves a lady, who, though loving him, is cold and haughty. He is killed in battle, and she mourns him as a husband during the rest of her life.

Martin's Summer, St. Halcyon days; a time of prosperity; fine weather. Mentioned by Shakspere in *Henry VI*, etc.

Masora or **Massorah** (*mȧ-sō'rȧ*). A critical work or canon, whereby is fixed and ascertained the reading of the text of the Hebrew Bible. The word means "tradition."

Masques (*măsks*). Dramatic representations made for a festive occasion, with a reference to the persons present and the occasion. Their *dramatis personæ* were allegorical. They admitted of dialogue, music, singing, and dancing, combined by the use of some ingenious fable into a whole. They were made and performed for the court and the houses of the nobles, and the scenery was gorgeous and varied. According to Holinshed's *Chronicle*, the first masque performed in England was at Greenwich, in 1512. Shakspere, as well as Beaumont and Fletcher, have frequently introduced masques into their plays. Milton himself made them worthier by writing *Comus*. H. W. Longfellow wrote the "Masque of Pandora," taking the story from Hawthorne's *Wonder Book*.

Master Builder, The, Ibsen. A drama which embodies the dangers of selfish ambition and the struggle of age against youth. Sollness, a master builder, has gained success through sacrificing his wife and his business associates. He thinks himself secure from the competition of younger folk, when Hilda Wangel appears and tempts him to climb a high tower "as he did in his youth." He falls to his death.

Master of Ballantrae, The, Stevenson. A novel of the time of the Stuart Pretender, about 1745. The story is told by the old steward of Ballantrae. The older son of the house, James Durrie, espouses the Stuart cause, the younger, Henry, staying at home, the decision being made on the turn of a coin. Alison Graeme, in love with James, marries Henry when James is reported dead. But James returns, with a disgraceful record behind him, and takes advantage of the situation to persecute the family with diabolical persistence. Henry, with Alison and their son, at last emigrates to her estate in New York. James follows. Both brothers die on an ill-fated search for treasure which James claims to have hidden in the northern woods, and are buried side by side.

Mauth Dog. Lay of the Last Minstrel, Scott. A black specter spaniel that haunted the guardroom of Peeltown in the Isle of Man. A drunken trooper entered the guardroom while the dog was there, but lost his speech, and died within three days.

Mavournin or **Mavourneen.** Irish for "my darling."

Mayeux (*mȧ'yĕ'*). The name of a hunchback, who figures prominently in numberless French caricatures and romances.

Mayfair (*mā'fâr'*). A fashionable locality in London, east of Hyde Park. All streets north of Piccadilly now lead into the district of Mayfair, which takes its name from a fair which used to be held in Shepherd's Market and its surrounding streets.

Mayor of Casterbridge, The, Thomas Hardy. One of the most famous of Hardy's Wessex stories. Michael Henchard, a hay trusser by trade, comes one day with his wife and little daughter, Elizabeth Jane, to a village fair. While drunk he offers the wife and daughter for sale. The offer is taken up by a young sailor, who takes them away with him. The next morning, Michael, sobered, takes a vow to touch no liquor for twenty years. He comes to the town of Casterbridge, and in time becomes wealthy in the grain trade and is made mayor of the town. One evening the wife he had sold, with her daughter, comes to Casterbridge. To avoid discovery of his old folly, Henchard provides them a cottage, and after a time marries his wife again. But she soon dies, when Henchard discovers that Elizabeth Jane is not his child, but the child of the sailor. His old character comes to the surface, and disaster overtakes him. He dies miserably in a moorland cottage, after the sailor, now wealthy himself, has returned to claim his child, who marries Donald Farfrae.

Mazeppa, Byron. Mazeppa, in a poem under the same title, was a Cossack of noble family who became a page in the court of the king of Poland. While in this capacity, he intrigued with Theresia, the young wife of a count, who discovered the amour, and had the young page lashed to a wild horse and turned adrift.

McFingal. The hero of Trumbull's political poem of the same name; represented as a burly New England squire, enlisted on the side of the Tory party of the American Revolution, and constantly engaged in controversy with Honorius, the champion of the Whigs.

Measure for Measure, Shakspere. There was a law in Vienna that made it death for a man to live with a woman not his wife, but the law was so little enforced that the mothers of Vienna complained to the duke of its neglect. So the duke deputed Angelo to enforce it and, assuming the dress of a friar, absented himself awhile to watch the result. Scarcely was the duke gone, when Claudio was sentenced to death for violating the law. His sister Isabel went to intercede on his behalf, and Angelo told her he would spare her brother if she would become his Phryne. Isabel told her brother he must prepare to die, as the conditions proposed by Angelo were out of the question. The duke, disguised as a friar, heard the whole story, and persuaded Isabel to "assent in words," but to send Mariana, the divorced wife of Angelo, to take her place. This was

done, but Angelo sent the provost to behead Claudio, a crime which "the friar" contrived to avert. Next day, the duke returned to the city, and Isabel told her tale. The end was, the duke married Isabel, Angelo took back his wife, and Claudio married Juliet.

Médecin Malgré Lui, Le (*lẽ mād''săN' mal'grā' lwē*), "The Doctor in Spite of Himself," **Molière.** In this comedy Sganarelle, Molière's frequently used character, appears as a woodcutter whom Geronte summons as a physician to cure his daughter's dumbness. When Sganarelle discovers that Lucinde is pretending dumbness to avoid marriage with Horace, her father's choice, he brings in an apothecary who soon effects a cure. The apothecary turns out to be Léandre, Lucinde's lover, and all ends happily.

Meeting of the Waters. Title of a poem by Moore, better known under the name "Sweet Vale of Avoca." "The Meeting of the Waters" forms a part of that beautiful scenery which lies between Rathdrum and Arklow, in the county of Wicklow, Ireland. The poem was suggested by a visit to this romantic spot in the summer of 1807.

Meg Merrilies. A half-crazy gypsy or sibyl, a prominent character in Scott's *Guy Mannering*.

Meister, Wilhelm. Hero and title of a philosophic novel by Goethe. The object is to show that man, despite his errors and shortcomings, is led by a guiding hand, and reaches some higher aim at last. This is considered to be the first true German novel.

Meistersinger. In Germany an association of master tradesmen, to revive the national minstrelsy, which had fallen into decay with the decline of the minnesinger or love-minstrels (1350–1523). Their poems were chiefly moral or religious, and were constructed according to rigid rules.

Melissa. Orlando Furioso, Ariosto. The prophetess who lived in Merlin's cave. Bradamant gave her the enchanted ring to take to Rogero; so, assuming the form of Atlantes, she not only delivered Rogero, but disenchanted all the forms metamorphosed in the island, where he was captive.

Melnotte, Claude. Lady of Lyons, Bulwer. The son of a gardener in love with Pauline, "the Beauty of Lyons," but treated by her with contempt. Beauseant and Glavis, two other rejected suitors, conspired with him to humble her.

Melyhalt. A powerful female subject of King Arthur's court. Sir Galiot invaded her domain, but she forgave his trespass and chose him for her knight and chevalier.

Menard. The Road to Frontenac, Merwin. The hero of the novel, a leader among Indians and white men during the making of New France. From Quebec he goes west, holding control of affairs in spite of treachery in both races. His companions are chiefly French, amid whom figure a Jesuit and two Indians, and the story contains much of that romantic charm peculiar to early French pioneer life, whence Longfellow and other poets and story-tellers have drawn inspiration.

Mengtsu (*mŭng-tsū'*). One of the sacred "four books" of China, so called from its author, Mengtse, Latinized into Mencius. This great work was written in the 4th century B. C., and contains the wisdom of the age. These are some of its teachings: "Humanity, righteousness, propriety, knowledge, are as natural to man as his four limbs." "Humanity is internal, righteousness is external." In this same book Mencius taught that government is from God, but for the people, whose welfare is the supreme good. The phrase "mother of Meng," which has been borrowed from the Chinese, signifies "a great teacher."

Menteur, Le (*lẽ măN'tĕr'*), "The Liar," **Corneille.** The propensities of the leading character give the play its name and lead to the complications of the plot. This is generally considered Corneille's best comedy and the most important before the time of Molière.

Merchant of Venice. Antonio, the merchant, in Shakspere's play, signs a bond in order to borrow money from Shylock, a Jew, for Bassanio, the lover of Portia. If the loan were repaid within three months, only the principal would be required; if not, the Jew should be at liberty to claim a pound of flesh from Antonio's body. The ships of Antonio being delayed by contrary winds, the merchant was unable to meet his bill, and the Jew claimed the forfeiture. Portia, in the dress of a law doctor, conducted the defense, and saved Antonio by reminding the Jew that a pound of flesh gave him no drop of blood.

Merchant's Tale, The, Chaucer. Substantially the same as the first Latin metrical tale of Adolphus, and not unlike a Latin prose tale given in the appendix of Wright's edition of *Æsop's Fables*. It is the story of the betrayal of an old husband by a young wife. The story is evidently of Oriental origin and very old. Boccaccio and Chaucer may have borrowed it from the *Commedia Lydiæ*. The well-known incident of the pear tree is found in all these sources, an interesting account of which has been given by the Chaucer Society Publications under *Origins and Analogues of the Tales*. Pope used this story as his basis for "January and May."

Merlin. (1) The name of an ancient Welsh prophet and enchanter. He is often alluded to by the older poets, especially Spenser, in his *Faery Queen*, and also figures in Tennyson's *Idylls of the King*. In *Le Morte D'Arthur* by Malory, Merlin is the prince of enchanters and of a supernatural origin. He is said to have built the Round Table and to have brought from Ireland the stones of Stonehenge on Salisbury Plain. (2) A dramatic poem by E. A. Robinson, in which the poet embodies modern life and problems in the story of Merlin, Vivian, and Arthur.

Merlin's Cave. In Dynevor, near Carmarthen, noted for its ghastly noises of rattling iron chains, groans, and strokes of hammers. The cause is this: Merlin set his spirits to fabricate a brazen wall to encompass the city of Carmarthen, and, as he had to call on the Lady of the Lake, bade them not slacken their labor till he returned; but he never did return, for Vivian held him prisoner by her wiles.

Merry Wives of Windsor, The, Shakspere. A rollicking farce. The merry wives are Mrs. Ford and Mrs. Page, to whom Falstaff makes love. The two ladies set traps and tricks for him, making him the laughing stock of the town. The booby love of Slender for Anne Page parallels Falstaff's adventures. Justice Shallow, Bardolph, Pistol, and Mistress Quickly find place in the play. In this play, Shakspere makes his most extended use of prose.

Messiah, The. An epic poem in fifteen books, by F. G. Klopstock. The subject is the last days of Jesus, His crucifixion and resurrection.

Michael and His Lost Angel, H. A. Jones. Michael Feversham, a young, mystical, ascetic clergyman, has insisted upon a public confession in the village church by the daughter of his secretary, who has been concealing an illicit love affair. Within a few months he himself falls deeply in love with a woman, Audrie Lesden, who has recently come to his parish and who gives the money to rebuild his church. He makes public confession at the dedication of the rebuilt church and leaves the parish. In Italy, as Michael is about to enter a monastery, Audrie, very ill, appears and dies in his arms. Seeing his life as a tissue of blundering mistakes, he seeks the monastery for peace.

Midsummer Night's Dream, A, Shakspere. Egeus promised his daughter Hermia to Demetrius. She loved Lysander and fled from Athens with her lover. Demetrius went in pursuit of her, followed by Helena, who doted on him. All four came to a forest and fell asleep. Oberon and Titania had quarreled, and Oberon, by way of punishment, dropped on Titania's eyes during sleep some lovejuice, or "love in idleness," the effect of which is to make the sleeper fall in love with the first thing seen when waking. The first thing seen by Titania was Bottom the weaver, wearing an ass's head. In the meantime King Oberon dispatched Puck to the lovers, and with the juice Puck changed their vision and made all content. It has been suggested that in this play Shakspere may have borrowed hints from Chaucer. *The Tempest* and *A Midsummer Night's Dream* are called Shakspere's fairy plays.

Mildendo. Gulliver's Travels, Swift. The metropolis of Lilliput, the wall of which was two feet and a half in height and at least eleven inches thick. The emperor's palace, called Belfaborac, was in the center of the city.

Miles Standish. In "Courtship of Miles Standish," a poem by H. W. Longfellow. From this poem the robust figures of the Puritan captain, in his haps and mishaps, and of John Alden and Priscilla, are now part of our national treasures.

Miller, Daisy. Name of heroine and title of the story by Henry James. An American girl traveling in Europe, where her innocence, ignorance, and disregard of European customs and standards of propriety put her in compromising situations and frequently expose her conduct to misconstruction.

Mill on the Floss, The, George Eliot. Maggie Tulliver, living with her brother Tom and their parents at the mill, as she grows up, becomes confused and entangled in the mysteries and disappointments of existence. Separated from her lover, Philip Wakeham, she is estranged from her family through her imprudent conduct with Stephen Guest. She welcomes death, which comes to her and Tom in a tidal wave that sweeps away the old mill.

Mincing Lane. A street in London connecting Fenchurch street with Great Tower street; the center of colonial (wholesale) trade. It received its name from the "minchens" (nuns) of St. Helen's, a part of whose domain it once was.

Minnehaha. Hiawatha, H. W. Longfellow. The daughter of the arrow-maker of Dacotah, and wife of Hiawatha. She was called Minnehaha from the waterfall of that name.

Minnesänger or **Minnesinger.** A name given to the German lyric poets of the middle ages, on account of love being the principal theme of their lays, the German word *minne* being used to denote a pure and faithful love.

Miranda. The Tempest, Shakspere. The daughter of Prospero, the exiled duke of Milan, and niece of Antonio, the usurping duke. She is brought up on a desert island, with Ariel, the fairy spirit, and Caliban, the monster, as her only companions.

Miriam. A beautiful and mysterious woman in Hawthorne's romance *The Marble Faun*, for love of whom Donatello commits murder, thus becoming her partner in crime.

Misanthrope, Le (*lẽ mē'zȧn'thrōp'*), **Molière.** The hero of this comedy, Alceste, wearied with society, has grown misanthropic. He loves Célimène, but she will not share his seclusion, and he gives her up. The play is famous for its vivid contrasts among the characters, as for example, that between Alceste and his friend Philinte.

Miserere (*miz'ẽ-rē'rē*). A title given in the Roman Catholic Church to the 51st Psalm, usually called the "psalm of mercy," and derived from the opening word in the Latin version.

Monsieur Beaucaire (*mẽ-syû' bō'kâr'*), **Booth Tarkington.** The plot is laid at Bath, in England, in the time of Beau Nash. A young French barber has the temerity to fall in love with an aristocratic English woman. He gives a good account of himself with gentlemen's weapons, and turns out to be Louis Philippe of Valois, who had fled from France to escape marriage with a princess.

Morality, The. An old play in which the characters were the Vices and Virtues, with the addition afterwards of allegorical personages, such as Riches, Good Deeds, Confession, Death, and any human condition or quality needed for the play. These characters were brought together in a rough story at the end of which Virtue triumphed.

Morituri Salutamus. Latin, meaning "We about to die salute you." A "hymn to age," written by H. W. Longfellow, for the jubilee reunion of Bowdoin's Class of 1825. It contains a number of classic allusions and an entire tale from the *Gesta Romanorum*.

Morris Dance. The name is derived from "Moorish dance," introduced into England in the reign of Edward III. It was a prominent feature of the May-day and other outdoor festivities.

Mortality, Old. Old Mortality, Scott. A religious itinerant, who frequented country churchyards and the graves of the Covenanters. He was first discovered at Gandercleugh, clearing the moss from the grey tombstones, renewing with his chisel the half-defaced inscriptions, and repairing the decorations of the tombs.

Morte D'Arthur, Le. (1) A prose version of the Arthurian romances, made by Sir Thomas Malory before 1470 and printed by Caxton in 1485. The classic English version of these stories. Tennyson drew on this source. (2) Title of a poem by Tennyson, *Morte d'Arthure*.

Mother Goose. The origin of this name has been variously explained. *Mother Goose's Melodies* was published in Boston by Thomas Fleet in 1719. His mother-in-law is said to have been Mother Goose. But the suggestion of the name may have come from the *Mother Goose's Tales* published in French by Perrault in 1697. These contained the stories of Cinderella, Little Red Ridinghood, and others.

Mother Hubbard, Old. The subject of this nursery rime has been rather reasonably traced to the work of some untutored rimester, who mistook a picture of St. Hubert, patron of dogs, for that of an old woman. The saint was often represented with long hair and a loose, long gown. He was often besought to cure the illnesses of pet dogs. Spenser used the name simply as that of any old dame in "Mother Hubbard's Tale." This is a tale of a fox and an ape in human form, out for adventures.

Mowgli (*mou'glī*). **Jungle Books, Kipling.** The name given to the man-cub suckled and brought up in the jungle by Mother Wolf. He runs with the pack and learns the law of the jungle. But, in the end, he is forced to seek a home among men, where he marries the daughter of Abdul Gafur.

Mualox. The Fair God, Lew Wallace. The old paba or prophet who assured Nenetzin that she was to be the future queen in her father's palace.

Much Ado about Nothing, Shakspere. One of the dramatist's most successful comedies. The play is located in Messina. Claudio, deceived by Don John into thinking his affianced bride, Hero, unfaithful, repudiates her at the altar. Friar Francis, suspicious, reports her dead. Don John, who had bribed Hero's maid to dress in her mistress' clothes and meet him, thus imposing upon Claudio, flees, and the maid confesses. The lovers are happily married. Beatrice and Benedick, whose linked names have become proverbial, are also wedded. In this play appear Dogberry and Verges, ignorant police officers.

Mucklebacket. The Antiquary, Scott. Name of a conspicuous family, consisting of Saunders Mucklebacket, the old fisherman of Musselcrag; Old Elspeth, mother of Saunders; Maggie, wife of Saunders; Steenie, the eldest son, who was drowned; Little Jennie, Saunders' child.

Munchausen (*mŭn-chō'zĕn*), **The Baron.** A hero of most marvelous adventures, and the fictitious author of a book of travels filled with most extravagant tales. The name is said to refer to Hieronymus Karl Friedrich von Münchhausen, a German officer in the Russian army, noted for his marvelous stories.

Mussel Slough Affair. The Octopus, Norris. The basis of plot for the novel, and name given to an actual though little-known piece of California history. The story of the conflict between the wheat growers of the San Joaquin valley and the railroad trust, which they believed was trying to defraud them of their land.

My Prisons, Silvio Pellico. Italian *Le Mie Prigioni* (1832). The poignant story of the author's experiences in Austrian prisons. He had been condemned to death and then to fifteen years' imprisonment, for conspiracy. The simple recital of the author's experiences, with no word of personal condemnation, has made the book one of great influence in Italy.

Mystery of Edwin Drood, The, Dickens. A novel unfinished at the time of the author's death. The scene of the story is laid in the cathedral town of Cloisterham. The choirmaster, John Jasper, secretly an opium addict, is guardian for his nephew, Edwin Drood, who is just about to come of age. During the Christmas holidays, Edwin and an orphan girl at school in Cloisterham decide to break off the engagement their parents had arranged for them. Then, after a dinner in Jasper's rooms, Edwin disappears. His watch is found in a weir near the town, but the body cannot be found. Consequently, a young man with whom Edwin had had a dispute is freed from the charge of murder. Numerous hints point to Jasper as the villain, but no satisfactory conclusion has ever been offered for the book, though many people have tried their hands at it.

Natty Bumppo. Called "Leatherstocking." He appears in five of Cooper's novels: (1) *The Deerslayer*; (2) *The Pathfinder*; (3) "The Hawkeye," in *The Last of the Mohicans*; (4) "Natty Bumppo," in *The Pioneers*; and (5) as "The Trapper," in *The Prairie*, in which he dies.

Nexra (*nĕ-ē'rȧ*). The name of a girl mentioned by the Latin poets, Horace, Virgil, and Tibullus; sometimes also introduced into modern pastoral poetry as the name of a mistress or sweetheart, as in Milton's "Lycidas."

Nerissa. Merchant of Venice, Shakspere. The bright, lively maid to Portia. She marries Gratiano.

Nest of Linnets. Title given to a story by F. F. Moore, a sequel to his *Jessamy Bride*, and noted for the group of people collected. Richard Brinsley Sheridan may be called its hero, inasmuch as he is the lover of its heroine, Miss Linley, the famous singer, who became Sheridan's first wife. The whole remarkable group to which she belonged gave title to the book,—Garrick, Goldsmith, Sir Joshua Reynolds, Mrs. Thrale, Dr. Johnson, Burke, Thomas Sheridan, the father of Richard, and others.

New Atlantis, The. An imaginary island in the middle of the Atlantic. Bacon, in his allegorical fiction so called, supposes himself wrecked on this island, where he finds an association for the cultivation of natural science and the promotion of arts. Called the "New" Atlantis to distinguish it from Plato's Atlantis, an imaginary island of fabulous charms.

Newcome, Colonel. A gallant, simple-hearted retired East Indian officer, in Thackeray's novel *The Newcomes*. His unworldliness leads to the loss of his fortune, and he finally dies, poor and broken-hearted, in the Charter House hospital.

New England Primer. This book, of which it is estimated that 2,000,000 copies were sold in the 18th century, was published by Benjamin Harris, a printer of Boston, shortly before 1690. A copy of the New England Primer, published in Walpole, N. H., in 1814, contains an illustrated alphabet. The letter "L" is illustrated by a lion with one of its paws resting upon a lamb, which is lying down. Accompanying the picture are the following lines:

"The Lion bold
The Lamb doth hold."

New England Tragedies. Among the poems of H. W. Longfellow are the "New England Tragedies" and the "Divine Tragedy." These, taken in connection with "The Golden Legend," form one connected work of art, *Christus, a Mystery.*

New Jerusalem. The name by which, in the Christian faith, heaven, or the abode of the redeemed, is symbolized. The allusion is to the description in the 21st chapter of the book of Revelation.

New Pastoral. A poem by T. B. Read, truly American in character, like its companion poem, "The Wagoner of the Alleghanies."

News. This word is made up of the first letter of each point of the compass: North, East, West, South. This fanciful explanation is frequently given as the origin of the term "news," as something coming from all points of the compass. Actually, however, the word probably comes from the French *nouvelles*, meaning "news," or medieval Latin *nova*, neuter plural of *novus*, meaning "new things." Some authorities would trace it to Anglo-Saxon, but, in the sense of "tidings" or "information," it has been in common use only since 1500.

Nibelung (*nē'bē-lōōng*), **King.** A king of the Nibelungen, a mythical Burgundian tribe, who gives name to the great medieval epic of Germany, the *Nibelungenlied.* He bequeathed to his two sons a hoard or treasure beyond all price and incapable of diminution, which was won by Siegfried, who made war upon the Nibelungen and conquered them.

Nibelungenlied. A historic poem generally called the German "Iliad." It is the only great national epic that European writers have produced since antiquity, and belongs to every country that has been peopled by Germanic tribes, as it includes the hero traditions of the Franks, the Burgundians, and the Goths, with memorials of the ancient myths carried with them from Asia. The poem is divided into two parts, and 32 lieds, or cantos. The first part ends with the death of Siegfried, and the second part with the death of Kriemhild. The death of Siegfried and the revenge of Kriemhild have been celebrated in popular songs dating back to the lyric chants now a thousand years old. These are the foundation of the great poem.

Nickleby, Mrs. Nicholas Nickleby, Dickens. The mother of the hero Nicholas, a widow fond of talking and of telling long stories with no connection. She imagined that her neighbor, a mildly insane man, was in love with her because he tossed cabbages and other articles over the garden wall. She had a habit of introducing, in conversation, topics wholly irrelevant to the subject under consideration, and of always declaring, when anything unexpected occurred, that she had expected it all along and had prophesied to that precise effect on divers (unknown) occasions. Nicholas Nickleby has to make his own way in the world. He first goes as usher to Mr. Squeers, schoolmaster at Dotheboys Hall; but leaves in disgust with the tyranny of Squeers and his wife, especially to a poor boy named Smike. Smike runs away from the school to follow Nicholas, and remains his humble follower till death. At Portsmouth, Nicholas joins the theatrical company of Mr. Crummles, but leaves the profession for other adventures. He falls in with the brothers Cheeryble, who make him their clerk; and in this post he rises to become a merchant, and ultimately marries Madeline Bray.

Nils, The Wonderful Adventures of, Selma Lagerlöf. A delightful story of the dreams of a boy about birds and animals.

Nine Worthies, The. Famous personages often alluded to, and classed together, rather in an arbitrary manner, like the Seven Wonders of the World, the Seven Wise Men of Greece, etc. They have been counted up in the following manner:

Three Gentiles.	1. Hector, son of Priam. 2. Alexander the Great. 3. Julius Cæsar.
Three Jews.	4. Joshua, conqueror of Canaan. 5. David, king of Israel. 6. Judas Maccabeus.
Three Christians.	7. Arthur, king of Britain. 8. Charlemagne. 9. Godfrey of Bouillon.

Noctes Ambrosianæ (*nŏk'tēz ăm-brō'zhĭ-ā'nē*), "Ambrosian Nights." The name of a famous series of literary and political disquisitions which appeared in *Blackwood's Magazine* from 1822 to 1835. These articles, consisting of supposed conversations, purported to be a verbatim report of convivial gatherings held at Ambrose's tavern, Edinburgh, by several literary celebrities of the time. At first these brilliant dialogues were the work of several writers, among them J. G. Lockhart and William Maginn. Those appearing after 1825 were nearly all contributed by John Wilson, under the pen name "Christopher North." Of the 71 "Noctes" 49 were afterward published separately as being entirely Wilson's work. By reason of their inexhaustible humor and trenchant wit, these imaginary discussions enjoyed an immense vogue and were largely responsible for the success of *Blackwood's Magazine.* Their great permanent literary creation is Wilson's delineation of the character of the Ettrick Shepherd, an idealized portrait of James Hogg, who is described as one of the frequenters of the "Ambrosian" feasts.

No Man's Land. The name given to the strip of territory between the trenches of opposing armies in the World War. A proverbial phrase for disputed ground or the borderland between two opinions.

North Americans of Yesterday. Name given to the Indians of North America by recent writers, among them F. S. Dellenbaugh, in a work under same title. This work, a comparative study of North American Indian life and customs, is written on the theory that the races are of ethnic unity.

Notre Dame de Paris (*nō'tr' dăm' dē pă'rē'*), **Victor Hugo.** English title, "The Hunchback of Notre Dame." A romance. The time is the reign of Louis XI; the scene, Paris. Esmeralda, a dancing girl, is loved by Quasimodo, the hunchback bell ringer, but she, repelled by his deformity, only pities him. She is condemned as a witch, but Quasimodo hides her in the church. Claude Frollo, the archdeacon, to whose passion she will not surrender, betrays her to the mob, and she is hanged. The hunchback throws Claude over the battlements of Notre Dame. Years afterward, Quasimodo's skeleton is found beside that of Esmeralda in the charnel cave.

Nourmahal (*nōōr-mä-hăl'*). **Lalla Rookh, Moore.** "Light of the Harem." She was for a season estranged from the sultan, till he gave a grand banquet, at which she appeared in disguise as a lute player and singer. The sultan was so enchanted with her performance, that he exclaimed, "If Nourmahal had so played and sung, I could forgive her all"; whereupon the sultana threw off her mask.

Novum Organum (*nō'vŭm ôr'gă-nŭm*). Published by Francis Bacon in 1620 under a general title *Instauratio Magna*, but having, after the preface, a second title: "The second part of a work called Novum Organum, or certain opinions on the Interpretation of Nature." It outlines his scientific, or inductive, method, that is, reasoning from observed facts to general laws.

Nucta. Paradise and the Peri, Moore. The name given to the miraculous drop which falls from heaven, in Egypt, on St. John's Day, and is supposed to stop the plague.

Nun of Nidaros. Tales of a Wayside Inn, Longfellow. The abbess of the Drontheim convent, who heard the voice of St. John while she was kneeling at her midnight devotions.

Nut-brown Maid. Reliques, Percy. The maid who was wooed by the "banished man." The "banished man" described to her the hardships she would have to undergo if she married him; but, finding that she accounted these hardships as nothing compared with his love, he revealed himself to be an earl's son, with large hereditary estates, and married her.

Oakhurst, John. The Outcasts of Poker Flat, Bret Harte. Oakhurst, the hero of the story, is a gambler who has been driven out of the mining camp in winter, with three other "undesirable citizens." He kills himself that the others may have a chance to live and escape.

Oberon. King of the Fairies, whose wife was Titania. Shakspere introduces both Oberon and Titania in his *Midsummer Night's Dream.* Oberon and Titania, his queen, are fabled to have lived in India, and to have crossed the seas to northern Europe to dance by the light of the moon.

Oberon the Fay. A humpty dwarf only three feet high, but of angelic face, lord and king of Mommur.

Octopus, The, Frank Norris. A California story of a struggle between the wheat growers and the railroads. See *Mussel Slough Affair.* The first of a trilogy, the story of a wheat crop. The second in the series, *The Pit,* a tale of gambling in grain, is a story of the middleman. Mr. Norris, when he died, had planned the third story, to be called *The Wolf,* which was to have dealt with the consumption in Europe.

Odyssey (*ŏd'ĭ-sĭ*). Homer's epic, recording the adventures of Odysseus, or Ulysses, in his voyage home from Troy. The poem opens in the island of Calypso, with a complaint against Neptune and Calypso for preventing the return of Odysseus to Ithaca. Telemachus, the son of Odysseus, starts in search of his father, accompanied by Pallas in the guise of Mentor. He goes to Pylos, to consult old Nestor, and is sent by him to Sparta, where he is told by Menelaus that Odysseus is detained in the island of Calypso. In the meantime, Odysseus leaves the island,

and, being shipwrecked, is cast on the shore of Phæacia. These wanderings of Odysseus occupied ten years after the close of the ten years of the Trojan War. Penelope is tormented by suitors. To excuse herself, Penelope tells her suitors he only shall be her husband who can bend Odysseus' bow. None can do so but the stranger, who bends it with ease. Odysseus is recognized by his wife, and the false suitors are all slain and peace is restored to Ithaca.

Œdipus Tyrannus (*ĕd'ĭ-pŭs tĭ-răn'ŭs*), **Sophocles.** One of a group of three tragedies. Œdipus, or "Swollen-feet," son of Laius, king of Thebes, and Jocasta, is exposed on a mountain, but found and brought up by a shepherd. Grown to manhood, and learning the prophecy that he should kill his father and marry his mother, he leaves Corinth. Journeying toward Thebes, he unwittingly fulfills all the prophecy. A plague is sent on the city, which can be averted only by banishment of the king. Tiresias, a seer, reveals the truth to Œdipus. Jocasta hangs herself, and Œdipus, led by his daughter Antigone, wanders forth. *Œdipus at Colonna* and *Antigone* are the other two plays of the trilogy.

Offertory. In the Roman Catholic Church that portion of the Mass, with accompanying prayers and chants, which consists of the oblation, or offering, of bread and wine. In Protestant religious services, the word is frequently used to indicate the collection of money and the music which accompanies it.

Ogham or **Ogam** (*ŏg'ăm*) **Inscriptions.** These are mostly ancient Celtic names found on stones in Ireland, Scotland, Wales, the Shetlands, and England. A peculiar alphabet is used, consisting of straight vertical or slant lines arranged along a middle horizontal line. Different letters are represented by groups of lines, of varying number and direction. They are referred to in T. W. Rolleston's world-famous Irish lyric "The Dead at Clonmacnoise."

Ogier (*ō'jĭ-ĕr*) **the Dane.** One of the paladins of the Charlemagne epoch. Also made the hero of an ancient French romance, and the subject of a ballad, whose story is probably a contribution from the stores of Norman tradition, Holger, or Olger Danske, being the national hero of Denmark. He figures in Ariosto's *Orlando Furioso*.

O'Groat. A name often alluded to in early English parables or sayings coming from the legend of "John O'Groat's House." This ancient building was supposed to stand on the most northerly point in Great Britain. John of Groat and his brothers were originally from Holland. According to tradition, the house was of an octagonal shape, being one room with eight windows and eight doors, to admit eight members of the family, the heads of eight different branches of it, to prevent their quarrels for precedence at table, which, on a previous occasion, had well-nigh proved fatal.

Old Bailey, The. The central criminal court of London, England, situated on the street named Old Bailey, which runs from Newgate to Ludgate Hill, not far from St. Paul's, London. It was the site of the Roman *vallum*, forming part of the city's fortifications external to the wall, hence Ballium and Bailey. A *vallum* was a rampart of palisades, so called from *vallus*, a "stake," and was planted on the top of the *agger*, or "mound," thrown up for the purposes of defense. Vividly described in Dickens's *Tale of Two Cities*.

Oldbuck, Jonathan. Antiquary, The, Scott. The character whose whimsies gave name to the novel. He is represented as devoted to the study and accumulation of old coins, medals, and relics. He is irritable, sarcastic, and cynical from an early disappointment in love, but he is full of humor and is a faithful friend.

Old Chester Tales, Margaretta Deland. A series of artistic tales of the vicissitudes of old-fashioned people in a quiet old New England village. The series is extended in *Dr. Lavender's People*.

Old Creole Days, George W. Cable. A collection of tales of New Orleans life in the early 19th century. It contains some of the best of modern stories, for example, *Jean-ah Poquelin* and *Café des Exilés*.

Old Curiosity Shop, The, Dickens. See *Little Nell*.

Old Grimes. The New England character in a popular American ballad by Albert G. Greene. The name probably is borrowed from George Crabbe's Peter Grimes in "The Borough," though resemblance ends here.

Old Man of the Sea. In the *Arabian Nights*, a monster encountered by Sindbad the Sailor in his fifth voyage. After carrying him upon his shoulders a long time, Sindbad at last succeeds in intoxicating him, and effects his escape. The "Old Man of the Sea" was also made the title of a humorous and well-known poem by O. W. Holmes.

Old Mortality, Scott. A novel which tells a story of the days of the Covenanters of Scotland in the latter part of the 17th century. "Old Mortality" is an old man who makes it his business to clean the gravestones of old Covenanters and to keep the inscriptions on them clear. The love story is that of Edith Bellenden, an heiress, who marries Henry Morton, a Covenanter, after the death of her betrothed, Lord Evendale.

Old Red Sandstone. One of the most noted of Hugh Miller's famous writings on geological subjects. It revealed his discovery of fossils in a formation which, up to that time, had been deemed almost destitute of them.

Oliver Twist, Dickens. The hero, Oliver, is an orphan, born in a workhouse, of a mother who did not reveal her name. Starved and illtreated, he runs away to London, falls in with Fagin's gang of thieves, and finally, in the house of the Maylie's, which he has been forced to enter for robbery, finds, in their adopted daughter, his aunt. Her name, as his, had been Fleming.

Olivia. Twelfth Night, Shakspere. A rich countess, whose love was sought by Orsino, duke of Illyria; but, having lost her brother, Olivia lived for a time in entire seclusion, and in no wise reciprocated the duke's love. Olivia fell in love with Viola, who was dressed as the duke's page, and sent her a ring. Mistaking Sebastian, Viola's brother, for Viola, she married him out of hand.

Opal, The Story of. The diary of a child, Opal Whitely, whose parents had died while she was very small, leaving her to the care of a family in the backwoods of Oregon. Gifted with acute powers of observation, a vivid imagination, and a naïve command of words, she wrote and printed on scraps of paper her daily play life. These sheets were afterward torn into fragments, but, with the encouragement of a publisher, Miss Whitely laboriously pieced together the torn bits. The result is an interesting picture of natural child life.

Ophelia. Hamlet, Shakspere. Daughter of Polonius, the chamberlain. Hamlet fell in love with her, but, after his interview with the ghost, finds that his plans must draw him away from her. During his real or assumed madness, he treats her with undeserved and angry rudeness, and afterward, in a fit of inconsiderate rashness, kills her father, the old Polonius. The terrible shock given to her mind by these events completely shatters her intellect, and leads to her accidental death by drowning.

Opium Eater, Confessions of an English. A famous series of papers or essays, which describe the effect of opium upon the mind and body. The writer, Thomas De Quincey, had become a victim of the opium habit.

Ordeal of Richard Feverel, The, George Meredith. The story of a youth brought up by his father on an abstract theory of education. The "system" fails when Richard comes to manhood and falls in love with Lucy, an innocent girl of great nobility of character. This period is the "ordeal" of Richard. The story ends in bitter tragedy.

Organon. The name given to the first work on logic by Aristotle. He is said to have created the science of logic. The *Organon* has been enlarged and recast by some modern authors, especially by Mr. John Stuart Mill in his *System of Logic*, into a structure commensurate with the vast increase of knowledge and extension of positive method belonging to the present day.

Orlando Furioso (*ôr-lăn'dō fōō'rē-ō'sō*). An epic poem in 46 cantos, by Ariosto, which occupied his leisure for eleven years, and was published in 1516. This poem, which celebrates the semimythical achievements of the paladins of Charlemagne, in the wars between the Christians and the Moors, became immediately popular, and has since been translated into all European languages, and passed through innumerable editions.

Ormulum. The *Ormulum*, as originally planned, was to consist of English paraphrases of the gospels for the church year as arranged in the missal, with an exposition for English readers at the end of each. The result embodies only thirty paraphrases with the corresponding homilies. There are very few French words in the poem, but Scandinavian words and constructions abound. The writer, Orm, or Ormin, belonged to the East of England, and he and his brother Walter were Augustinian monks. He makes no use of rime or of alliteration, and he handles his verse form—the iambic *septenarius*—mechanically and with no freedom or license.

Osbaldistone. Rob Roy, Scott. A family name in the story which tells of nine of the members: (1) the London merchant and Sir Hildebrand, the heads of two families; (2) the son of the merchant is Francis; (3) the offspring of the brother are Percival, the sot; Thorncliffe, the bully; John, the gamekeeper; Richard, the horse-jockey; Wilfred, the fool; and Rashleigh, the scholar, by far the worst of all. This last worthy is slain by Rob Roy, and dies cursing his cousin Frank, whom he had injured.

Osman. Sultan of the East, conqueror of the Christians, a magnanimous man. He loved Yara, a young Christian captive. This forms the subject of a once famous ballad.

Osric. A court fop in Shakspere's *Hamlet.* He is made umpire by Claudius in the combat between Hamlet and Laertes.

Osseo. Hiawatha, Longfellow. Son of the Evening Star. When broken with age, he married Oweenee, one of ten daughters of a North hunter. She loved him in spite of his ugliness and decrepitude, because "all was beautiful within him." As he was walking with his nine sisters-in-law and their husbands, he leaped into the hollow of an oak tree and came out strong and handsome; but Oweenee at the same moment was changed into a weak old woman. But the love of Osseo was not weakened. The nine brothers and sisters-in-law were transformed into birds. Oweenee, recovering her beauty, had a son, whose delight was to shoot the birds that mocked his father and mother. An Algonquin legend gave the foundation of the story.

Ossian (*ŏsh'ăn*) or **Oisin.** A bard of Gaelic legend, son of the hero, Finn. In the middle of the 18th century, James MacPherson, a Scotch schoolmaster, published what he said were translations from ancient Gaelic poetry. These he collected as *The Poems of Ossian.* The poetry was meritorious, but it has been proved that MacPherson had misrepresented matters in calling his verses "translations."

Othello. A Moor of Venice, in Shakspere's play of the same name. He marries Desdemona, the daughter of a Venetian senator, and is led by his ensign Iago, a consummate villian, to distrust her fidelity and virtue. Iago hated the Moor both because Cassio, a Florentine, was preferred to the lieutenancy instead of himself, and also from a suspicion that the Moor had tampered with his wife; but he concealed his hatred so well that Othello wholly trusted him. Iago persuaded Othello that Desdemona intrigued with Cassio, and urged him on till he murdered his bride.

Othello's Occupation's Gone. A phrase much quoted from the play *Othello,* meaning "the task is ended," or that one has retired from active work.

O'Trigger, Sir Lucius. The Rivals, Sheridan. A volatile, fortune-hunting Irishman, fighting and forgiving with equal readiness.

Outre-Mer (*ōō'trĕ-mâr'*). A "Pilgrimage beyond the Sea." This title was given to the work by H. W. Longfellow, published in 1835, and written before European travel was much known to Americans. It is a poetical prose work, not unlike the *Sketch Book* of Washington Irving.

Over the Top. The phrase used by soldiers in the World War to mean going over the high front of the trench to a charge. Generally applied to the successful attainment of a goal or aim.

Pacolet. In *Valentine and Orson,* an old romance, a character who owned an enchanted steed, often alluded to by early writers. The name of Pacolet was borrowed by Steele for his familiar spirit in the *Tatler.* The French have a proverb, "It is the horse of Pacolet," that is, it is one that goes very fast.

Page. Merry Wives o Windsor, Shakspere. Name of a family of Windsor, conspicuous in the play. When Sir John Falstaff made love to Mrs. Page, Page himself assumed the name of Brook. Sir John told the supposed Brook his whole "course of wooing."

Page, Anne. Daughter of Mrs. Page, in love with Fenton. Slender calls her "the sweet Anne Page."

Page, Mrs. Wife of Mr. Page, of Windsor. When Sir John Falstaff made love to her, she joined with Mrs. Ford to dupe and punish him.

Palimpsest (*păl'ĭmp-sĕst*). A parchment on which the original writing has been effaced and something else has been written. The monks and others used to wash or rub out the writing in a parchment and use it again. As they did not efface it entirely, many works have been recovered by modern ingenuity. Thus Cicero's *De Republica* has been restored from an ancient manuscript which had been partly erased. There are relics of ancient learning of which even the mutilated members have an independent value. This is especially true of biblical manuscripts for criticism, and, in a still broader sense, of all the remains of the ancient historians.

Palinurus. The pilot of Æneas, in Virgil's *Æneid,* who fell asleep at the helm and tumbled into the sea. The name is employed as a generic word for a steersman or pilot, and sometimes for a chief minister. Thus, Prince Bismarck was called the palinurus of William, emperor of Germany.

Palladium (*pă-lā'dĭ-ŭm*). Something that affords effectual protection and safety. The Palladium was a colossal wooden statue of Pallas in the city of Troy, said to have fallen from heaven. The statue was carried away by the Greeks, and the city was burned. The Scotch had a similar tradition attached to the great stone of Scone, near Perth. Edward I removed it to Westminster, and it is still framed in the coronation chair of England. Stories connected with the palladium of a nation or a family are common in literature, as "Luck of Edenhall," a poem by Longfellow. Matthew Arnold uses the Trojan idea in a moral sense for the individual soul in his beautiful lyric "Palladium."

Pallet. A painter in Smollett's novel *Peregrine Pickle.* The absurdities of Pallet are painted in lurid colors.

Pamela (*păm'ē-lă*). Name of heroine and title of novel by Richardson. She is a simple country girl, and maid-servant of a rich young squire. She resists every temptation, and at length marries the young squire and reforms him. Pamela is very modest, bears her afflictions with much meekness, and is a model of maidenhood. The story is told in a series of letters which Pamela sends to her parents.

Pamphlet. This word seems to be derived from *Pamphilus seu de Amore,* a well-known 12th century amatory poem in Latin, colloquially known as "Pamphilet." Other little books were similarly named, as *Æsopet,* the "Fables of Æsop."

Pandarus. A son of Lycaon, and leader of the Lycians in the Trojan War, celebrated by Homer in the *Iliad.* In medieval romances, and by Shakspere in *Troilus and Cressida,* he is represented as procuring for Troilus the love and good graces of Chryseis,—hence the word "pander."

Panegyric (*păn'ē-jĭr'ĭk*). A eulogistic harangue or oration, written or uttered in praise of a person or body of persons.

Panjandrum, The Grand. A sort of mythical nonentity invented by Foote, the comic dramatist. The word occurs in Foote's farrago of nonsense, which he composed to test the memory of a person who said he had brought his memory to such perfection that he could remember anything by reading it over once.

Pantagruel (*păn-tăg'rōō-ĕl*). A character in a famous romance by Rabelais. The name is said to have been given him because he was born during the drought which lasted thirty and six months, three weeks, four days, thirteen hours, and a little more, in that year of grace noted for having "three Thursdays in one week." His father was Gargantua, the giant, who was four hundred fourscore and forty-four years old at the time. He was chained in his cradle with four great iron chains, like those used in ships of the largest size. Being angry at this, he stamped out the bottom of his bassinet, which was made of weavers' beams. When he grew to manhood he knew all languages, all sciences, and all knowledge of every sort. The character has originated the English phrase "pantagruelian humor," that is, extravagant, coarse mirth like that of Pantagruel.

Pantagruelian Law Case. Pantagruel, Rabelais. This case, having nonplused all the judges in Paris, was referred to Lord Pantagruel for decision. After much "statement" the bench declared, "We have not understood one single circumstance of the defense." Then Pantagruel gave sentence, but his judgment was as unintelligible as the case itself. So, as no one understood a single sentence of the whole affair, all were perfectly satisfied.

Pantaloon. The character in old Italian comedy. He is represented as a wizened old man in dressing gown and slippers. See *As You Like It,* act 2, scene 7, "the lean and slippered Pantaloon."

Panurge (*păn-ûrj'*). A celebrated character in Rabelais' *Pantagruel,* and the real hero of the story; represented as an arrant rogue, a drunkard, a coward, and a libertine, but learned in the tongues, an ingenious practical joker, and a boon companion. He was the favorite of Pantagruel, who made him governor of Salmygondin, and finally set out with him in quest of the oracle of the Holy Bottle.

Paolo and Francesca (*pä'ō-lō*) (*frăn-chĕs'kă*), **Stephen Phillips.** A tragedy based upon the story in Dante's "Inferno." Giovanni, tyrant of Rimini, occupied with his wars, leaves his young bride and his brother Paolo much together in his castle. Though both wish to be loyal to the husband and brother, youth and love overmaster them. The old housekeeper arouses Giovanni's suspicions. Discovering their guilt, he slays both, though he thus destroys all that he loves.

Paracelsus (*păr'ă-sĕl'sŭs*). The name of the hero in Browning's poem of the same name. Paracelsus, at twenty, starts out to find the supreme good in knowledge, but after eight years of study, he is disappointed. Then, after being again disillusioned in the search for good in love, he gives himself to such happiness as he may get from material things. The historical Paracelsus was a famous Swiss doctor and alchemist (1493–1541).

Paradise and the Peri. The second tale in Moore's poetical romance *Lalla Rookh*. The peri laments her expulsion from heaven, and is told she will be readmitted if she will bring to the gate of heaven the "gift most dear to the Almighty." After several failures the peri offered the "repentant tear," and the gates flew open to receive the gift.

Paradise Lost. The poem by Milton under this name opens with the awakening of the rebel angels in hell after their fall from heaven, the consultation of their chiefs how best to carry on the war with God, and the resolve of Satan to go forth and tempt newly created man to fall. Satan reaches Eden, and finds Adam and Eve in their innocence. This is told in the first four books. The next four books contain the archangel Raphael's story of the war in heaven, the fall of Satan, and the creation of the world. The last four books describe the temptation and the fall of man, and tell of the redemption of man by Christ and the expulsion from paradise.

Paradise Regained. In this poem Milton tells of the journey of Christ into the wilderness after his baptism, and its four books describe the temptation of Christ by Satan.

Pardoner's Tale. Canterbury Tales, Chaucer. Three rioters agreed to kill Death, and were directed to a tree under which he was to be found. At the foot of the tree they came upon a treasure, which all coveted. The youngest of the three went to buy wine and the other two conspired to kill him on his return. He poisoned the wine and was slain by his brothers, who soon died from the effect of the poison. Thus all found Death under the tree.

Parian Chronicle. A chronological register of the chief events in the mythology and history of ancient Greece, kept in the island of Paros. It is engraved on marble tablets now in the collection of Oxford university.

Parian Verse. Ill-natured satire; so called from Archilochos, a native of Paros.

Parizade (*pă'rê-zăd'ă*). A princess whose adventures in search of the Talking Bird, the Singing Tree, and the Yellow Water, are related in the "Story of the Sisters" in the *Arabian Nights' Entertainments*.

Parley, Peter. Name assumed by Samuel Griswold Goodrich, an American (1793–1860). His series of *Peter Parley* books, popular and juvenile, included more than a hundred volumes.

Parody. A kind of writing in which the words of an author or his thoughts are, by some slight alterations, adapted to a different purpose.

Parthian Shaft. An unexpected and effective witticism, especially when satirical. The phrase refers to a custom of the ancient Parthians, who in battle would feign retreat and then shoot backward with unerring aim. It has come to mean "parting shot" or "last word" in a controversy.

Partington, Mrs. An imaginary old lady whose laughable sayings have been recorded by an American humorist, B. P. Shillaber.

Partlet. The hen in "The Nun's Priest's Tale," and in the famous animal epic *Reynard the Fox*.

Parzival or **Parsifal.** The German name of Perceval, the hero and title of a metrical romance of the 13th century, by Wolfram von Eschenbach, and of a modern music drama by Richard Wagner. Parzival was brought up by a widowed mother in solitude, but, when grown to manhood, two wandering knights persuaded him to go to the court of King Arthur. His mother consented to his going if he would wear the dress of a common jester. This he did, but soon accomplished such noble deeds that Arthur made him a knight of the Round Table. Sir Parzival went in quest of the Holy Graal, which was kept in a castle called Graalburg, in Spain. He reached the castle, but, having neglected certain conditions, he was shut out, and, on his return to court, the priestess of Graalburg insisted on his being degraded from knighthood. Parzival then led a new life, and a wise hermit became his instructor. At length he reached such a state of purity and sanctity that the priestess of Graalburg declared him worthy to become lord of the castle. Lohengrin, "Knight of the Swan," was the son of Parzival.

Pasquinade (*păs'kwĭ-nād'*). A widely used name for a lampoon or satire. A certain free-spoken, witty tailor, Pasquino by name, is said to have lived in Rome in the 15th century. He was locally famous for his epigrams, directed especially at the popes. About the time of his death a mutilated statue was discovered and set up in one of the squares. Its origin was unknown, though it was recognized as part of a masterpiece. The populace gave it the name of the dead tailor. The custom grew up of hanging placards carrying satiric epigrams upon this statue. Hence the name.

Pastoral. Something descriptive of a shepherd's life, or a poem in which any action or passion is represented by its effects on a country life. The characteristics of this type of poetry are simplicity, brevity, and delicacy.

Pastor Fido (*păs-tôr' fē'dō*). "The Faithful Shepherd." Title of a pastoral drama by Guarini, first played in Turin in 1585. A very famous piece, which has been translated into many modern languages.

Paternoster Row (*pā'tĕr-nŏs'tĕr rō*). A street in London, north of St. Paul's, long famous as a center of book publishing. See *Amen Corner*.

Patterne, Sir Willoughby. See *The Egoist*.

Pattieson, Peter. An imaginary assistant teacher at Gandercleuch, and the feigned author of Scott's *Tales of My Landlord*, which were represented as having been published posthumously by his pedagogue superior, Jedediah Cleishbotham.

Paul and Virginia, Bernardin de St. Pierre. A pastoral romance. The scene of the story is the island of Port Louis in the Mauritius. Virginia, daughter of a French widow who had been disowned by her family, and Paul, an illegitimate son of a woman betrayed by a lover, were brought up in complete ignorance of the outside world. An aunt of Virginia has the girl taken to France to be educated, but, on her refusal to marry according to dictation, sends her back to the island. Within sight of the eager Paul the ship is wrecked and Virginia is drowned. Paul soon dies, broken-hearted. The story has been used with variations in operas and plays.

Pauline (*pō-lēn'*). (1) The "Lady of Lyons" in Bulwer-Lytton's play of this name. She was married to Claude Melnotte, a gardener's son, who pretended to be a count. (2) Heroine of Browning's dramatic poem of the same name.

Paul Pry. Paul Pry, John Poole. An idle, inquisitive, meddlesome fellow, who has no occupation of his own, and is forever poking his nose into other people's affairs. He always comes in with the apology, "I hope I don't intrude."

Peeping Tom of Coventry. A tailor of Coventry, the only soul in the town mean enough to peep at the Lady Godiva as she rode naked through the streets to relieve the people from oppression. Tradition says he was stricken blind. See Tennyson's *Lady Godiva*.

Peer Gynt (*pā'ĕr gŭnt*), **Ibsen.** A poetic drama in which is presented the career of a reckless, irresponsible dreamer. His motto is "To thyself be enough." At last, realizing that he has been a bungler and failure in life, he finds a healing influence in the love of the heroine, Solveig. Ibsen seems to have intended this work for reading rather than for the stage.

Peggotty, Clara. The nurse of David Copperfield in Dickens's novel of this name. Being very plump, whenever she makes any exertion some of the buttons on the back of her dress fly off.

Peggotty, Dan'el. Brother of David Copperfield's nurse. Dan'el was a Yarmouth fisherman. His nephew, Ham Peggotty, and his brother-in-law's child, "Little Em'ly," lived with him.

Peggotty, Em'ly. She was engaged to Ham Peggotty; but being fascinated with Steerforth she eloped. She was afterwards reclaimed, and emigrated to Australia.

Peggotty, Ham. Represented as the very beau ideal of an uneducated, simple-minded, honest, and warm-hearted fisherman. He was drowned in his attempt to rescue Steerforth from the sea.

Pelléas and Mélisande (*pĕl'ê-ăs*) (*mĕl'ĭ-sănd'*), **Maurice Maeterlinck.** An exquisite romantic tragedy. Mélisande, discovered in a forest, is married, unwillingly, to Goland in the gloomy castle in Allemonde. She and Goland's younger brother Pelléas fall in love. Goland murders Pelléas and wounds Mélisande. She dies after giving birth to a child.

Pendennis. Name of title and hero of a novel by Thackeray, published in 1849 and 1850,—the immediate successor of *Vanity Fair*. Literary life is described in the history of Pen, Arthur Pendennis, a hero of no very great worth.

Pendennis, Laura. Cousin of Arthur Pendennis. She has been regarded as one of the best of Thackeray's characters.

Pendennis, Major. A gentlemanly dandy, who fawns on his patrons for the sake of insinuating himself into their society. Uncle of Arthur.

Pendragon. A title conferred on several British chiefs in times of great danger, when they were invested with dictatorial power; thus Uther and Arthur were each appointed to the office to repel the Saxon invaders. The word means "chief of the kings."

Pennsylvania Farmer. A name given to John Dickinson, a citizen of Pennsylvania. In the year 1768 he published his *Letters from a Pennsylvania Farmer to the Inhabitants of the British Colonies.* These were republished in London, with a preface by Dr. Franklin, and were subsequently translated into French.

Penny-a-liner. A contributor to the local newspapers, but not on the staff. At one time these collectors of news used to be paid a penny a line on English newspapers. Applied to cheap literary work.

Penny Dreadfuls. Cheap sensational papers and books.

Penrod, Booth Tarkington. A story of the life and adventures of a twelve-year-old boy in a town of the Middle West. One of the most successful studies of the boy and his contacts with the adult and child worlds around him.

Pentateuch (*pĕn'tă-tūk*). A name given by Greek translators to the first five books of the Old Testament. The Pentateuch describes the origin and history of the Hebrew people up to the conquest of Canaan, and the theocracy founded among them. Genesis, Exodus, Leviticus, Numbers, and Deuteronomy—these form the Pentateuch, and, with Joshua, are called the Hexateuch.

Pepys' (*pēps*) **Diary.** A work which brought fame to Samuel Pepys, the author, was written in shorthand. It was deciphered and published in 1825. It extends over the nine years from 1660 to 1669, and is the gossipy chronicle of that gay and profligate time. We have no other book which gives so lifelike a picture of that period.

Père Goriot (*pâr' gō'ryō'*), "Father Goriot," **Balzac.** A novel. The tale is that of King Lear and his ungrateful daughters, brought down to the plane of a bourgeois grocer, but lacking the light of a Cordelia for comfort.

Peregrine Pickle. The hero and title of a novel by Smollett (1751). Peregrine Pickle is a savage, ungrateful spendthrift, fond of practical jokes, and suffering with evil temper the misfortunes brought on himself by his own willfulness.

Peronella. The subject of a fairy tale, represented as a pretty country lass, who, at the offer of a fairy, changes places with an old and decrepit queen, and receives the homage paid to rank and wealth, but afterward gladly resumes her beauty and rags.

Peter Pan. The hero and title of a children's drama by J. M. Barrie. Peter Pan runs away to Never-Never-Land to escape growing up. The play relates his adventures among his fairy playmates. Three of them, including Wendy Darling, return home with him for a time and meet with many adventures of a serio-comic nature.

Petruchio (*pê-trōō'chĭ-ō*). A gentleman of Verona, in Shakspere's *Taming of the Shrew.* A very honest fellow, who hardly speaks a word of truth, and succeeds in all his tricks. He acts his assumed character to the life, with untired animal spirits, and without a particle of ill humor.

Phædo (*fē'dō*). An ancient and well-known work by Plato, in which the doctrine of the immortality of the soul is most fully set forth. It is in the form of a dialogue which combines with the abstract philosophical discussion a graphic narrative of the last hours of Socrates, which, for pathos and dignity, is unsurpassed.

Phantom Rickshaw, The, Kipling. A ghost story of India. An English woman, who had been cruelly treated by her lover, returns and haunts him in Simla.

Philax. Fairy Tales, D'Aulnoy. Philax was cousin to the Princess Imis. The fay Pagan shut them up in the "Palace of Revenge," a palace containing every delight except the power of leaving it. In the course of a few years Imis and Philax longed as much for a separation as at one time they had wished for a union.

Philip. The Madness of Philip, Josephine Daskam Bacon. A representation of "the child of strong native impulses who has not yet yielded to the shaping force of education; the child, therefore, of originality, of vivacity, of humor, and of fascinating power of invention in the field of mischief."

Philippic. A word used to denote any discourse or declamation full of acrimonious invective. It derives its name from orations made by Demosthenes against Philip of Macedon, in which the orator bitterly attacked the king as the enemy of Greece.

Philistines (*fĭ-lĭs'tĭnz*). Meaning the ill-behaved and ignorant. German students gave meaning to the word by calling all outside the universities "Philisters." The idea goes back to the conflicts of Israelites and Philistines in Palestine. Matthew Arnold, in his *Culture and Anarchy,* applied the term Philistine to the middle class in England.

Philo. The Messiah, Klopstock. A Pharisee, one of the Jewish Sanhedrin, who hated Caiaphas, the high priest, for being a Sadducee. Philo made a vow that he would take no rest till Jesus was numbered with the dead. He commits suicide, and his soul is carried to hell by Abaddon, the angel of death.

Philtra. Faery Queen, Spenser. A lady of large fortune, betrothed to Bracidas; but, seeing the fortune of Amidas daily increasing, and that of Bracidas getting smaller, she attached herself to the more prosperous younger brother.

Phineas. Uncle Tom's Cabin, Mrs. Stowe. The Quaker, an "underground railroad" man who helped the slave family of George and Eliza to reach Canada, after Eliza had crossed the river on cakes of floating ice.

Phyllis. In Virgil's "Eclogues," the name of a rustic maiden. This name, also written Phillis, has been in common use as meaning any unsophisticated country girl.

Pickaninny. A young child. A West Indian negro word, derived from Spanish *pequeño.*

Pickwick, Mr. Samuel. The hero of the *Pickwick Papers,* by Charles Dickens. He is a simple-minded, benevolent old gentleman, who wears spectacles and short black gaiters. He founds a club, and travels with its members over England, each member being under his guardianship. They meet with many laughable adventures.

Pied Piper of Hamelin. Old German legend. Robert Browning, in his poem entitled "The Pied Piper," has given a metrical version. The legend recounts how a certain musician came into the town of Hamelin, in the county of Brunswick, and offered, for a sum of money, to rid the town of the rats by which it was infested. Having executed his task, and the promised reward having been withheld, he in revenge blew again his pipe, and drew the children of the town to a cavern in the side of a hill, which, upon their entrance, closed and shut them in forever.

Piers Plowman. The hero of a satirical poem of the 14th century. He falls asleep, like John Bunyan, on the Malvern Hills, and has different visions, which he describes, and in which he exposes the corruptions of society, the dissoluteness of the clergy, and the allurements to sin. The author is supposed to be Robert or William Langland. No other writings so faithfully reflect the popular feeling during the great social and religious movements of that century as the bitterly satirical poem, *The Vision of Piers Plowman.* In its allegory, the discontent of the common people with the course of affairs in church and state found a voice.

Pietro (*pyĕ'trō*). **The Ring and the Book, Browning.** The professed father of Pompilia, criminally assumed as his child to prevent certain property from passing to an heir not his own.

Pilgrim's Progress. Written by Bunyan in the form of a dream to allegorize the life of a Christian, from his conversion to his death. His doubts are giants, his sins a pack, his Bible a chart, his minister Evangelist, his conversion a flight from the City of Destruction, his struggle with besetting sins a fight with Apollyon, his death a toilsome passage over a deep stream, which flows between him and heaven.

Pillars of Hercules. In ancient geography, the two opposite promontories Calpe (Gibraltar) in Europe and Abyla in Africa, situated at the eastern extremity of the Strait of Gibraltar, sentinels, as it were, at the outlet from the Mediterranean into the unknown Atlantic.

Pilot, The. Title of a sea-story by Cooper, which was called the "first sea-novel of the English language." It was published in the year 1823 and was soon translated into Italian, German, and French. It is founded on the adventures of John Paul Jones.

Pinch, Tom. A character in Dickens's *Martin Chuzzlewit,* distinguished by his guilelessness, his oddity, and his exhaustless goodness of heart.

Pippa Passes. The title of a dramatic poem by Robert Browning. Pippa is a light-hearted peasant maiden, who resolves to enjoy her holiday. Various groups of persons overhear her as she passes by singing, and some of her stray words act with secret but sure influence for good.

Place in the Sun, A. A phrase used by the German emperor in 1901 with reference to the commercial concessions secured for Germany in China. It became the slogan of the Pan-German party, with the meaning of a larger share of the colonial and commercial opportunities of the world.

Platonic Love. Spiritual love between persons of opposite sexes. It is the friendship of man and woman, without mixture of what is usually called love. Plato strongly advocated this pure affection, and hence its distinctive name.

Playboy of the Western World, The, J. M. Synge. An extravagant, boisterous play of Irish peasant life. In a

lonely public house, Christy Mahon, under questioning, confesses that he is a fugitive, because he has killed his tyrannical father with a spade. His hearers convince themselves and Christy that he is a hero. So inspired he makes love to Pegeen. But suddenly his old father appears, only a little the worse for the blow. Christy's fame is shattered, and Pegeen, enraged at her broken romance, leads the attack upon the fallen hero.

Pocket, Matthew. Great Expectations, Dickens. A real scholar, educated at Harrow, and an honor man at Cambridge; but, having married young, he had to take up the calling of "grinder" and literary fag for a living. Pip was placed in his care.

Pocket, Mrs. Daughter of a city knight, brought up to be an ornamental nonentity, helpless, shiftless, and useless. She was the mother of eight children, whom she allowed to "tumble up" as best they could, under the charge of her maid Flopson.

Pocket, Sarah. Sister of Matthew Pocket, a little, dry, old woman, with a small face that might have been made of walnut shell, and a large mouth.

Poet Laureate. A poet appointed by the English crown to compose odes and other verses in honor of grand state occasions. The name seems to have originated in the custom at the English universities of presenting a laurel wreath to a graduate, who was then called *laureatus*. The king's laureate, then, would be a graduated rhetorician, or poet, in the king's service. The early history of the laureateship is obscure, and statements conflicting. Chaucer and Spenser received royal pensions. They were unofficial laureates. The offices of Historiographer and Master of the Revels were united at times with that of Poet Laureate. The stipend of the office was formerly £100 a year, with a tierce of canary, but this latter emolument was commuted in Pye's time to an annual payment of £27. The present salary is equivalent to $360 a year. Formerly it was the duty of the laureate to write an ode on the birthday of the sovereign and on the occasion of a national victory, but this custom ceased with the death of James Pye. The appointment is now simply an official recognition of a poet as worthy to represent English letters. Ben Jonson was the first laureate to be formally appointed. He held the appointment at his death in 1637. William Davenant succeeded him. Later appointments have been as follows: John Dryden, 1670–1688; Thomas Shadwell, 1688–1692; Nahum Tate, 1692–1715; Nicholas Rowe, 1715–1718; Lawrence Eusden, 1718–1730; Colley Cibber, 1730–1757; William Whitehead, 1757–1785; Thomas Warton, 1785–1790; Henry James Pye, 1790–1813; Robert Southey, 1813–1843; William Wordsworth, 1843–1850; Alfred Tennyson, 1850–1892; Alfred Austin, 1896–1913; Robert Bridges, 1913. The first real history of the office and its holders was issued from the Clarendon Press in 1922.

Pollu (*pwá'lü'*). The word means "hairy." As a noun, it was applied to the French soldiers in the World War, because of their bearded faces.

Polyglot (*pŏl'ĭ-glŏt*). The word means, in general, an assemblage of versions in different languages of the same work, but is almost exclusively applied to manifold versions of the Bible. Besides the Bible, many other works, or small pieces, have been published in polyglot. Of smaller pieces, the Lord's Prayer has been the favorite, of which many collections have been published since the 15th century. Of these, the most comprehensive, and the most valuable, is the well-known *Mithridates* of Adelung, which contains the Lord's Prayer in more than 400 languages.

Ponte Vecchio (*pōn'tĕ vĕk'kyō*). A bridge in Florence, over the Arno; a picturesque structure with three wide arches, rebuilt in 1345. The roadway is bordered on both sides by quaint little shops, except over the middle arch, where there is an opening. Over the south row of shops is carried a gallery, built by Vascari, connecting the Pitti Palace with the Uffizi and the Palazzo Vecchio.

Poor Richard's Almanac. From 1732 to 1757 Benjamin Franklin issued in Philadelphia a yearly almanac, under the name of Richard Saunders, or "Poor Richard." The publication was popular throughout the colonies for its comments and sayings. These have been translated into all languages.

Popinjay. A butterfly man, a fop; so called from the popinjay or figure of a bird shot at for practice. The title is used by Scott in *Old Mortality*, by Shakspere in *Henry IV*, and by others.

Porterhouse Steak. The name is of American origin, said to be derived from "porterhouse," a kind of tavern, because the proprietor of such a house in New York made the cut popular. There is a story that Charles Dickens christened it because an innkeeper of the name of Porter served him such excellent steak at one town during his first American tour.

Portia. Merchant of Venice, Shakspere. A rich heiress whom Bassanio loved and who defended Antonio.

Potboilers. Articles written and pictures of small merit drawn or painted for the sake of earning daily bread.

Potiphar Papers. A series of brilliant satiric sketches of society written by George W. Curtis in the year 1852, and afterward collected in book form.

Prester John. The name given, in the middle ages, to a supposed Christian sovereign and priest of the interior of Asia, whose dominions were variously placed. He has been the subject of many legends and is mentioned by Shakspere in *Much Ado about Nothing*.

Pride and Prejudice, Jane Austen. A novel of domestic life. The plot turns upon the struggle of Elizabeth's love with her pride and the prejudice aroused in her by Darcy's rather proud consciousness of family position. Love triumphs in the end.

Primrose, Rev. Charles. Vicar of Wakefield, Goldsmith. A clergyman, rich in heavenly wisdom, but poor indeed in all worldly knowledge.

Primrose, George. Son of the vicar. He went to Amsterdam to teach the Dutch English, but never once called to mind that he himself must know something of Dutch before this could be done.

Primrose, Moses. Brother of George, noted for giving in barter a good horse for a gross of worthless green spectacles with copper rims.

Primrose, Mrs. Deborah. The doctor's wife, full of motherly vanity, and desirous to appear genteel. She could read without much spelling, and prided herself on her housewifery, especially on her gooseberry wine.

Primrose, Olivia. The eldest daughter of the doctor. Pretty, enthusiastic, a sort of Hebe in beauty. "She wished for many lovers," and eloped with Squire Thornhill.

Primrose, Sophia. The second daughter of Dr. Primrose. She was "soft, modest, and alluring."

Prince and the Pauper, The, Mark Twain. A humorous tale, exploiting the possibilities of an exchange of places between Prince Edward and a poor man.

Priscilla. Courtship of Miles Standish, Longfellow. A Puritan maiden who is wooed by Captain Standish through the mediation of his friend John Alden, who is in love with Priscilla. She prefers John Alden and marries him after the captain's supposed death. The captain, however, appears at the close of the wedding service, and the friends are reconciled.

Prospero. Tempest, Shakspere. Rightful duke of Milan, deposed by his brother. Exiled on a desert island, he practiced magic, and raised a tempest in which his brother was shipwrecked. Ultimately, Prospero "broke his wand," and his daughter married the son of the king of Naples.

Puck of Pook's Hill, Kipling. A delightful book of history stories. The children, Dan and Una, in the fields around their country home, meet Puck, "the oldest old thing in England." The little man tells them fascinating tales of Roman, Saxon, and Norman times, often calling up his friends, characters from early times, to talk to the children.

Pudd'nhead Wilson, Mark Twain. A tale of a little Missouri town of the middle 19th century. A son of a slave, almost pure white, substituted for the master's son, grows up in luxury, but displays peculiarly mean traits. He is, by means of finger prints, detected in a crime and punished. Wilson is the lawyer.

Punch. Name of a famous London comic weekly. Derived from the puppet-show character, Punch.

Punch and Judy. The name of a popular puppet show. Punch is shortened from the Italian "Pulcinella," the character in 17th century *commedia*. Judy, or Joan, was added later, probably from an English ballad of the 18th century. In the play, the hunchback Punch strangles his infant child, beats his wife Judy to death, throws a policeman into the street, and is finally carried off by the Devil. Punch's dog Toby is usually in the play.

Puss in Boots. The subject and title of a well-known nursery tale derived from a fairy story in the *Nights* of the Italian author Straparola, and Charles Perrault's *Contes des Fées*. The wonderful cat secures a princess and a fortune for his master, a poor young miller, whom he passes off as the rich marquis of Carabas.

Pyncheon. The name of an ancient but decayed family in Hawthorne's romance *The House of the Seven Gables*. There are: (1) Judge Pyncheon, a selfish, cunning, worldly man; (2) His cousin Clifford, a delicate, sensitive nature, reduced to childishness by long imprisonment and suffering; (3) Hepzibah, the latter's sister, an old maid who devotes

herself to the care of Clifford; (4) A second cousin, Phœbe, a fresh, cheerful young girl, who restores the fallen fortunes of the family and removes the curse which rested on it.

Quasimodo (*kwäs'ĭ-mō'dō*). **Notre Dame de Paris, Hugo.** A misshapen dwarf, one of the prominent characters in the story. He is brought up in the cathedral of Notre Dame de Paris. One day he sees Esmeralda, who had been dancing in the cathedral close, set upon by a mob, and he conceals her for a time in the church. When, at length, the beautiful gypsy girl is gibbeted, Quasimodo disappears mysteriously, but a skeleton corresponding to the deformed figure is found after a time in a hole under the gibbet.

Quaver. The Virgin Unmasked, Fielding. A singing master, who says, "if it were not for singing masters, men and women might as well have been born dumb." He courts Lucy by promising to give her singing lessons.

Queen Labe (*lā'bē*). **Arabian Nights.** The queen of magic, ruler over the Enchanted City. Beder, prince of Persia, is connected with her in the tale. She transforms men into horses, mules, and other animals. Beder marries her, defeats her plots against him, but is himself turned into an owl for a time.

Quentin Durward, Scott. A historical romance of about 1470. The hero, Quentin Durward, a young Scottish guardsman in the service of Louis XI of France, after a series of adventures leading here and there in the monarch's maze of activities, wins the love of Countess Isabelle of Croye. When Liége is assaulted, Quentin and the countess, who has been put into his charge, escape on horseback. The countess publicly refuses to marry the duke of Orleans, to whom she has been promised, and ultimately marries the young Scotchman.

Quidnunkis. Title and name of hero in a fable found or written by Gay in 1726. This hero was a monkey which climbed higher than its neighbors and fell into a river. For a few moments the monkey race stood panic-struck, but the stream flowed on, the monkeys continued their gambols. The object of this fable is to show that no one is of sufficient importance to stop the general current of events or cause a gap in nature.

Quilp. Old Curiosity Shop, Dickens. A hideous dwarf, cunning, malicious, and a perfect master in tormenting. Of hard, forbidding features, with head and face large enough for a giant. He lived on Tower Hill, collected rents, advanced money to seamen, and kept a kind of wharf, containing rusty anchors, huge iron rings, piles of rotten wood, and sheets of old copper, calling himself a ship breaker. He was on the point of being arrested for felony, when he was drowned.

Quilp, Mrs. Wife of the dwarf, a young, obedient, and pretty little woman, treated like a dog by her husband, whom she loved but more greatly feared.

Quintessence, "the fifth essence." In the modern and general sense, an epithet applied to an extract which contains the most essential part of anything. The ancient Greeks said there are four elements or forms in which matter can exist: fire, or the imponderable form; air, or the gaseous form; water, or the liquid form; and earth, or the solid form. The Pythagoreans added a fifth, which they call "ether," more subtle and pure than fire, and possessed of an orbicular motion. This element, which flew upwards at creation, and out of which the stars were made, was called the "fifth essence"; quintessence, therefore, means the most subtle extract of a body that can be procured.

Quintus Fixlein. Title of a romance by Jean Paul Richter and the name of the principal character.

Quixote. See *Don Quixote*.

Quixote of the North. Charles XII of Sweden, sometimes called in derision the Madman, was also called the Quixote of the North.

Quixotic (*kwĭk-sŏt'ĭk*). Like Don Quixote, or one who has foolish and impractical schemes—a would-be reformer.

Quiz. A word of uncertain origin. It is said that Daly, the manager of a Dublin playhouse, laid a wager that a new word of no meaning should be the common talk and puzzle of the city in 24 hours. In consequence of this the letters *q u i z* were chalked by him on the walls of Dublin, with an effect that won the wager. But the word appears in literature some years before the date given for this episode.

Quodling, The Rev. Mr. Peveril of the Peak, Scott. Chaplain to the duke of Buckingham.

Quo Vadis, Sienkiewicz. Lygia, a Christian girl in a Roman household, who will not yield her virtue to Vinicius, is by him denounced as a Christian. She is condemned to the arena, but her attendant, Ursus, saves her from death on the horns of the bull. Later, she marries Vinicius, who has been converted by Paul and Peter.

Radigund. Faery Queen, Spenser. Queen of the fabled Amazons. Having been rejected by Bellodant "the Bold," she revenged herself by degrading all the men who fell into her power by dressing them like women, and giving them women's work.

Ramona. Name of heroine and title of romance by Helen Hunt Jackson. Ramona saw the American Indian followed by "civilization" while retreating slowly but surely toward his own extinction, and had herself a share in the tragedy. Ramona is considered the great romance of Indian life.

Rappaccini. Mosses from an Old Manse, Hawthorne. A doctor in whose garden grew strange plants whose juices and fragrance were poison. His daughter, nourished on these odors, became poisonous herself. Her lover found an antidote which she took, but the poison meant life and the antidote meant death to her.

Rasselas (*răs'ĕ-lăs*). An imaginary prince, hero of the romance by Dr. Johnson, bearing same title. According to the custom of his country, Abyssinia, he was confined in paradise, with the rest of the royal family. This paradise was in the valley of Amhara, surrounded by high mountains. It had only one entrance, a cavern concealed by woods and closed by iron gates. He escaped with his sister Nekayah and Imlac the poet, and wandered about to find what condition or rank of life was the most happy. After careful investigation, he found no lot without its drawbacks, and resolved to return to the "happy valley."

Raud the Strong. Tales of a Wayside Inn, H. W. Longfellow. The viking who worshiped the old gods and lived by fire and sword. King Olaf went against him, sailing from Drontheim to Salten Fiord.

Ravenswood. Bride of Lammermoor, Scott. The lord of Ravenswood, an old Scotch nobleman and a decayed royalist. His son Edgar falls in love with Lucy Ashton, daughter of Sir William Ashton, lord keeper of Scotland. The lovers plight their troth, but Lucy is compelled to marry Frank Hayston, laird of Bucklaw. The bride, in a fit of insanity, attempts to murder the bridegroom and dies. Bucklaw goes abroad. Colonel Ashton, seeing Edgar at the funeral of Lucy, arranges a hostile meeting; and Edgar, on his way to the place appointed, is lost in the quicksands. A prophecy, noted as a curse, hung over the family and was thus fulfilled.

Raymond. Jerusalem Delivered, Tasso. Raymond was known as the Nestor of the crusaders, slew Aladine, king of Jerusalem, and planted the Christian standard upon the tower of David.

Realism. In literature, realism is opposed to idealism and romanticism. Realism aims at depicting things as they actually appear in ordinary human experience. Hence the realistic writer will choose familiar subjects and will take pains to emphasize accuracy in details.

Rebecca. Ivanhoe, Scott. Daughter of Isaac the Jew, in love with Ivanhoe. Rebecca, her father, and Ivanhoe, as prisoners, are confined in Front de Bœuf's castle. Rebecca is taken to the turret chamber and left with the old sibyl, but when Brian de Bois Guilbert comes to her she spurns him with heroic disdain. Ivanhoe, who was suffering from wounds received in a tournament, is nursed by Rebecca. After escape and adventure, and being again prisoner, the Jewish maiden is condemned by the Grand Master to be tried for sorcery, and she demands a trial by combat. The demand is granted, and Brian de Bois Guilbert is appointed as the champion against her. Ivanhoe undertakes her defense, slays Brian, and Rebecca is set free. In contrast with this strong character, Rowena seems insignificant even when she becomes the bride of Ivanhoe. Scott is said to have named Rebecca from the beautiful Rebecca Gratz of Philadelphia, described to him by Washington Irving.

Rebecca of Sunnybrook Farm, Kate Douglas Wiggin. The pathetic and humorous experiences of an imaginative little girl who, on account of the poverty of her home, is sent to live with two maiden aunts. The story has been dramatized.

Recessional, The, Kipling. A poem written for the celebration of the 60th anniversary of Victoria's accession to the throne of England.

Red Cross Knight. The Red Cross Knight is St. George, the patron saint of England, and, in the obvious and general interpretation, typifies holiness, or the perfection of the spiritual man in religion. In Spenser's *Faery Queen* the task of slaying a dragon was assigned to him as the champion of Una.

Redgauntlet. One of the principal characters in Sir Walter Scott's novel of the same name, a political enthusiast and Jacobite, who scruples at no means of upholding the cause of the Pretender, and finally accompanies him into exile. His race bore a fatal mark resembling a horseshoe,

which appeared on the face of Redgauntlet as he frowned when angry.

Red Riding Hood. This nursery tale is, with slight variations, common to Sweden, Germany, and France. In Charles Perrault's *Contes des Fées* it is called "Le Petit Chaperon Rouge."

Regent Street. One of the principal streets of the West End of London, extending from Portland Place to Waterloo Place.

Representative Men, R. W. Emerson. A series of essays on the characters of certain great men, in which Emerson embodied his philosophy of manhood. The topics are: (1) Plato, the Philosopher; (2) Swedenborg, the Mystic; (3) Montaigne, the Skeptic; (4) Shakspere, the Poet; (5) Napoleon, the Man of the World; (6) Goethe, the Writer. The mental portraits sketched under these six heads give us Emerson himself, so far as he is capable of being formulated at all.

Republic, The, Plato. This work, in the form of a dialogue, is usually regarded as the finest product of Plato's genius. It is ostensibly an inquiry into the nature of justice, but actually sets forth, in a lucid and convincing form, Plato's views on the ideal state, education, and morality. It contains analyses of, and searching comments on, the major political and social problems connected with democracy and other forms of government. In the broad sweep of its argument, it undertakes to give a systematic answer to the fundamental questions of psychology, economics, science, religion, and philosophy. Its literary form and its intellectual grasp combine to make it one of the enduring masterpieces of the world's literature.

Return of Peter Grimm, The, David Belasco. A play made famous by David Warfield in the part of Peter. Peter, an old nurseryman, makes, in sport, an agreement with his Scotch doctor that whichever one dies first will try to communicate with the other. Peter has arranged the marriage of his niece and his grandson Frederick, who turns out to be a cheat and scapegrace. To correct this fleshly blunder, Peter "returns." He succeeds in "getting his message over" through the little illegitimate son of Frederick, and takes the little fellow "back with him."

Reveries of a Bachelor. Name of a writing by D. G. Mitchell. A collection of sketches of life and character, painted in such a dreamlike, delicate manner as to make the reader lose for the time being the full consciousness of his own reality.

Reynard (*rā'nārd*) **the Fox.** The hero in the animal epics, celebrated *fabliaux* of the middle ages, belonging to the series of poems in which "beasts" are the speakers and actors. The "beast fable" goes back to the remotest antiquity, and is a common inheritance of the Aryan or Indo-Germanic races. This story of Reynard the Fox, certainly known as early as the 12th century, is the great creation of the people of the Netherlands, northern France, and western Germany. Its source was Flanders, where, apparently, the beasts were named. Few contributions to it were made in England; but Odo of Cheriton made use of the stories, and an English *fabliau*, "The Fox and the Wolf," belongs to the Reynard family and is the best example of comic satire before Chaucer. Reynard means "strong in counsel." According to many authorities, this prose poem, in its later form, is a satire on the state of Germany in the middle ages. Reynard typifies the Church; his uncle, Isengrin the Wolf, typifies the baronial element; and Nobel the Lion, the regal. However that may be, in the real fable, Reynard the Fox has a constant impulse to deceive and victimize everybody, whether friend or foe, but especially Isengrin; and, though the latter frequently reduces him to the greatest straits, he generally gets the better of it in the end.

Rhapsody. Means songs strung together. The term was originally applied to the books of the *Iliad* and *Odyssey*, which at one time were in fragments. Certain bards collected a number of the fragments, enough to make a connected "ballad," and sang them as our minstrels sang the deeds of famous heroes.

Rhoda Fleming. The heroine of George Meredith's novel of this name. Of a proud nature, she sets out to right the wrong done to her sister Dahlia, who has fled from home. At last she finds she has really destroyed her sister's last chance of happiness. Humbled and chastened, she repents of her obstinacy. In the end she marries her deserving lover, Robert Armstrong.

Richelieu, Bulwer-Lytton. The action of the play hinges upon the attempt of certain courtiers, among them the duke of Orleans and the count of Baradas, to displace the old cardinal. But their plots are revealed to Richelieu by Marion de Lorme, and he crushes them successfully. The pretty love story of Julie, Richelieu's ward, is involved in the main plot.

Riders to the Sea, J. M. Synge. A one-act tragedy of peasant life in the Aran islands. Maurya, who already has lost in the sea five of her sons, entreats the last, Bartley, not to go to the boat with his horses for the Connemara fair. He persists in going, and he too is lost. The mother's revolt turns to utter resignation. "There isn't anything more the sea can do to me," she says.

Rights of Man, Thomas Paine. The title of this work was suggested by the *Déclaration of the Rights of Man* issued by the French National Assembly. It was a reply to Edmund Burke's *Reflections on the French Revolution*. In it Paine vigorously defended the French.

Rigolette. The name of a female character in Eugène Sue's *Mysteries of Paris*. It has acquired a proverbial currency, and is used as a synonym of "grisette," or shop-girl.

Rimmon, The House of. A biblical play by Henry van Dyke. The story of the Hebrew slave girl Ruahmah in the house of Naaman the Syrian, who persuades her master to go to the prophet in Israel for healing.

Rinaldo (*rē-nāl'dō*). A character in Tasso's *Jerusalem Delivered*. He belonged to the army of the Christians. He was the son of Bertoldo and Sophia, and nephew of Guelpho, but was brought up by Matilda. The name Rinaldo is also found in Boiardo's *Orlando Innamorato*, in Ariosto's *Orlando Furioso*, and in other romantic tales of Italy and France. He was one of Charlemagne's paladins, and cousin to Orlando. Having killed Charlemagne's nephew Berthelot, he was banished and outlawed. After various adventures and disasters, he went to the Holy Land, and, on his return, succeeded in making peace with the emperor.

Ring and the Book, The. An epic by Robert Browning. It is founded on Italian history. Guido Franceschini, a Florentine count of shattered fortune, married Pompilia, thinking her to be an heiress. Finding this a mistake the count treated Pompilia so brutally that she left him, under the protection of Caponsacchi, a young priest. Pompilia sued for a divorce, but, pending the suit, gave birth to a son. The count murdered Pompilia, and Pietro and Violante, her supposed parents, but, being taken red-handed, was brought to trial, found guilty, and executed.

Rip Van Winkle. Sketch Book, Irving. An indolent, good-natured fellow, living in a village on the Hudson. While shooting among the Catskill mountains he meets with a stranger whom he helps in carrying a keg over rocks and cliffs; with him he joins a party who are silently rolling ninepins. Rip Van Winkle drinks deeply of the liquor they furnish, and falls into a sleep which lasts twenty years, during which the Revolutionary War takes place. After awaking, Rip returns to the village, finds himself almost forgotten, and makes friends with the new generation. The name of the great actor, Joseph Jefferson, became so identified with this character, in the dramatic version of the story, that to the English-speaking world he was Rip Van Winkle.

Rise of Silas Lapham, The, Howells. The story of the business and social fortunes of a wealthy paint manufacturer and his family in Boston in the middle of the 19th century. Silas, a coarse, crowding man, already rich when the story opens, loses his fortune, but in his adversity he rises in moral power.

Rivals, The, R. B. Sheridan. A comedy. Miss Lydia Languish, niece of Mrs. Malaprop, has two suitors, Bob Acres, a young country man, and Ensign Beverley, the latter of whom she loves and hopes to elope with. Meanwhile Sir Anthony Absolute and Mrs. Malaprop arrange that she shall marry Captain Absolute, son of Sir Anthony. Sir Lucius O'Trigger sets Bob on to challenge Beverley. When they meet for the duel, and Bob finds Beverley to be Captain Absolute and his best friend, he refuses to fight. Lydia, though deprived of the romantic elopement, accepts the captain.

Roast Pig, A Dissertation on, Charles Lamb. In *Essays of Elia*. Ho-ti, a careless Chinese swineherd, one day allowed the pigsty to burn. Desperately searching in the smoking ruins, he burned his fingers in the charred remains of a pig. But, on putting them involuntarily to his mouth, he found clinging to them some bits of meat of a most enticing flavor, "crackling." This discovery led to the burning of many pigsties, until the further discovery that the toothsome morsel, roast pig, could be produced by less wasteful means.

Robert the Devil. The hero of an old French metrical romance of the 13th century, the same as Robert, first duke of Normandy, who became an early object of legendary scandal. Having been given over to the Devil before birth, he ran a career of cruelties and crimes unparalleled until he was miraculously reclaimed, did penance, became a shining light, and married the emperor's daughter. In the 14th century the romance was turned into prose, and

of the prose story two translations were made into English. There was also a miracle play on the same subject. The opera "Robert le Diable" was composed by Meyerbeer, in 1826.

Robin Goodfellow. A domestic spirit. He is sometimes called Puck, son of Oberon. He attends the English fairy court; he is full of tricks and fond of practical jokes. He is also considered the same as Lob-lie-by-the-fire, in some tales. His character and achievements are recorded in the well-known ballad beginning "From Oberon in Fairyland."

Robin Hood. A famous English outlaw whose exploits are the subjects of many ballads, but of whose actual existence little or no evidence can be discovered. Various periods, ranging from the time of Richard I to near the end of the reign of Edward II, have been assigned as the age in which he lived. He is usually described as a yeoman, and his chief residence is said to have been the forest of Sherwood, in Nottinghamshire. Of his followers, the most noted are: Little John; his chaplain, Friar Tuck; and his companion, Maid Marian. The popular legends extol his personal courage and generosity, and his skill in archery. Scott introduces Robin Hood in two novels, *Ivanhoe* and *The Talisman*. In the former he first appears at the tournament as Locksley the archer. Robin Hood's adventures are the theme of an opera by De Koven, "Robin Hood."

Robinson Crusoe. A tale by Daniel Defoe. Robinson Crusoe went to sea, was wrecked, lived on an uninhabited island of the tropics, and relieved the weariness of life by numberless contrivances. At length he met a young Indian, whom he saved from death. He called him his "man Friday," and made him his companion and servant. This story has been translated into more languages than any other English book.

Rob Roy. The title and hero of a novel by Sir Walter Scott. It signifies "Rob the Red," and was the sobriquet of a famous Scottish outlaw, Robert MacGregor, the chief of the clan MacGregor.

Roderick Dhu. Lady of the Lake, Scott. An outlaw and chief of a band of Scots who resolved to win back what had been lost to the Saxons. In connection with Red Murdock he sought the life of the Saxon, Fitz-James.

Roderick Random. The Adventures of Roderick Random, Tobias Smollett. Random, hero of the novel, is a reckless, mischievous, thankless young Scot who, apprenticed to an apothecary, goes to sea as surgeon's mate. His adventures run the gamut of the sea and of English town and country life. Hugh Strap, his devoted attendant, he treats heartlessly. Finally, he marries Narcissa, a wife much too good for him.

Roderigo (*rŏd'ẽr-ē'gō*). In Shakspere's *Othello*, a Venetian in love with Desdemona. He, when the lady eloped with Othello, hated the "noble Moor."

Roger Drake. Name of hero and title of novel by H. K. Webster. "Captain of Industry" is the title added to the name of the hero, who is interested in the working of a copper mine, the founding of a trust, the change from the old-fashioned trust to the simple plan of one monster corporation, and the deadly business fight for supremacy found in modern industrial struggles.

Roland. The hero of one of the most ancient and popular epics of early French or Frankish literature was, according to tradition, the favorite nephew and captain of the emperor Charlemagne. In Italian romance he is called Orlando. He was slain in the valley of Roncesvalles as he was leading the rear of the army from Spain to France. The oldest version of the "Song of Roland," forming part of the *chansons de gestes*, which treat of the achievements of Charlemagne and his paladins, belongs to the 11th century. Throughout the middle ages, the "Song of Roland" was the most popular of the many heroic poems. William of Normandy, when on his way to conquer England, had it sung at the head of the troops, to encourage them on their march. At the present day, the traditionary memory of the heroic paladin is still held in honor by the hardy mountaineers of the Pyrenees, among whose dangerous defiles the scene of his exploits and death is laid. Roland is the hero of Théroulde's *Chanson de Roland*; of Turpin's *Chronique*; of Boiardo's *Orlando Innamorato*; of Ariosto's *Orlando Furioso*.

Romance of the Rose. A poetical allegory, begun by Guillaume de Lorris in the latter part of the 13th century and continued by Jean de Meung in the first half of the 14th century. The poet dreams that Dame Idleness conducts him to the palace of Pleasure, where he meets many adventures among the attendant maidens, Youth, Joy, Courtesy, and others, by whom he is conducted to a bed of roses. He singles out one, when an arrow from Love's bow stretches him fainting on the ground. Fear, Slander, and Jealousy are afterward introduced. The part written by De Lorris is the greatest embodiment of French romance; De Meung's continuation is a rambling allegorical satire especially against women. The whole work had a profound influence on early English poetry, especially that of Gower and Chaucer.

Romances. The French troubadours composed romances and sang them at the courts of the Norman kings. Richard I was himself a troubadour. The subjects of the romances were generally the deeds of Charlemagne and his knights, or of King Arthur and his knights. A little later, tales of the crusaders became popular. Old tales were retold, and the incidents were transferred to Eastern lands. From the time of Edward II many of these tales were translated into English.

Romanticism. The name of both a spirit and a method in art and literature. As contrasted to *classicism*, it means the introduction of the artist's hopes and ideals, his personality, into his work, and the attempt to suggest more than can be definitely expressed. The ideal of the classicist is harmonious objective beauty. As contrasted to *realism*, romanticism means the treatment of distant, strange themes and scenes, while realism handles the near and familiar.

Romeo. In Shakspere's tragedy *Romeo and Juliet*, a son of Montague, in love with Juliet, the daughter of Capulet, who was the head of a noble house of Verona, in feudal enmity with the house of Montague.

Romeo and Juliet, Shakspere. Romeo, of the house of Montague, and Juliet, of the house of Capulet in Verona, are lovers. But between their families is a deadly feud. Juliet takes a sleeping draft, that she may be borne to the family tomb, later released and married to Romeo by Friar Lawrence. Romeo, coming to keep the appointment, sees what he thinks is Juliet's dead body. He at once kills himself, and Juliet, awaking, follows his example. Over the dead bodies of their children, the two families are reconciled.

Rosetta Stone. A stone found at Rosetta in the delta of the Nile. It contains equivalent inscriptions in hieroglyphics and in Greek letters. The meaning of the Greek text being known, the hieroglyphics were translated.

Rotten Row. A fashionable promenade in London. The origin of the name is found in its older form, *rottan raw* or lane of the rats, from the rodents which formerly infested the unsavory banks of the near-by Serpentine canal.

Round Table, The. Le Morte D'Arthur, Malory. A table made by Merlin for Uther pendragon. Uther gave it to King Leodegraunce of Camelyard, and when Arthur married Guinevere, the daughter of Leodegraunce, he received the table with a hundred knights as a wedding present. The table would seat 150 knights, and each seat was appropriated. What is usually meant by Arthur's Round Table is a smaller one for the accommodation of twelve favorite knights. King Arthur instituted an order of knighthood called "the knights of the Round Table," the chief of whom were Sir Lancelot, Sir Tristram, and Sir Lamerock or Lamorake. The "siege perilous" was reserved for Sir Galahad, the son of Sir Lancelot by Elaine.

Roussillon, Alice. The heroine of the romance, *Alice of Old Vincennes*, by Maurice Thompson. Her guardian was Gaspard Roussillon, a successful trader with the Indians. "Eat frogs and save your scalps" was the plan of the Latin Creoles. "Papa Roussillon" was a frog eater and the ruling spirit in his little village. The English and their Indian allies arranged their attack on the fort at Vincennes, and the American flag was in danger. Alice, with the help of a crippled boy, Jean, stole the flag. No search or questioning could reveal the whereabouts of either flag or thief. At the end of the siege it was produced, much to the amazement of General Hamilton. Alice forgot her flag for a moment in the appearance of her lover, Beverly, whom she had mourned as dead, but Jean raised it on a staff from which the stars and stripes still floats.

Ruach (*rōō'ăĸ*). **Pantagruel, Rabelais.** The isle of winds, visited by Pantagruel and his companions. The people of this island live on wind, such as flattery, promises, and hope. The poorer sort are very ill-fed, but the great are stuffed with huge mill-drafts of the same unsubstantial puffs.

Rubaiyat (*rōō-bī-yät'*). The word means "quatrains." Omar Khayyam, a famous Persian astronomer of the 11th century, wrote, in this four-line stanza form, his reflections upon life. Edward Fitzgerald translated and adapted about a hundred of the many quatrains attributed to Omar. The later editions of this work differ in many points from the first edition of 1859.

Rübezahl (*rü'bē-tsäl'*). The name of a famous spirit of the Riesen-Gebirge in Germany, corresponding to the Puck of England. He is celebrated in innumerable sagas, ballads, and tales, under the various forms of a miner, hunter, monk, dwarf, giant, etc. He is said to aid the

poor and oppressed, and to show benighted wanderers their road, but to wage incessant war with the proud and wicked.

Rubric. From the Latin *ruber*, meaning "red." A portion of the type in a book distinguished by being printed in red ink, or, nowadays, by a type-face different from the rest of the print. The use of the rubric arose in the custom of old copyists of making the first letter of a new passage or paragraph red. The usage was extended to whole sentences, and it persists today in prayer books and other books of religious service.

Rudge. Barnaby Rudge, Dickens. Barnaby, a half-witted lad, with pale face, red hair, and protruding eyes, dressed in tawdry finery including peacock feathers in his hat, is the hero of the novel. His inseparable companion is a raven. Barnaby joined the Gordon rioters for the proud pleasure of carrying a flag and wearing a blue bow. He was arrested and lodged in Newgate, whence he made his escape, with other prisoners, when the jail was burned. But both he and his father were recaptured, brought to trial, and condemned to death. By the influence of Gabriel Varden, the locksmith, the poor half-witted lad was reprieved. Mr. Rudge, the father of Barnaby, was supposed to have been murdered the same night as Mr. Haredale, to whom he was steward. Rudge himself was the murderer both of Mr. Haredale and also of his faithful servant, to whom the crime was attributed. After the murder, he was seen by many, haunting the locality, and was supposed to be a ghost. He joined the Gordon rioters. Mrs. Mary Rudge, mother of Barnaby, was very like him, "but where in his face there was wildness and vacancy, in hers there was the patient composure of sorrow."

Ruggiero (*rōōd-jā'rō*). **Orlando Furioso, Ariosto.** A young Saracen knight born of Christian parents, who falls in love with Bradamante, a Christian Amazon, and sister to Rinaldo. After numerous adventures and crosses, they marry and found the house of Este. Ruggiero is noted for the possession of a hippogriff, or winged horse, and also a veiled shield, the dazzling splendor of which when suddenly disclosed, struck with blindness and astonishment all eyes that beheld it.

Rumpelstilzchen. Old German Tales. According to Grimm, this name is a compound, but the spirit represented is one familiar to all German children. The original story tells of him as a dwarf who spun straw into gold for a certain miller's daughter. He has since done favors for many people and paid visits known only by the results of his helpfulness.

Runes. The earliest alphabet in use among the nations of northern Europe. The exact period of their origin is not known. They are found engraved on rocks, crosses, monumental stones, coins, medals, rings, brooches, and the hilts and blades of swords. There is no reason to believe that they were at any time in the familiar use in which we find the characters of a written language in modern times, nor have we any traces of their being used in books or on parchment.

Rupert, Knight. Formerly in the villages of northern Germany, a personage clad in high buskins, white robe, mask, and enormous wig, who at Christmas time distributes presents to the children. Like St. Nicholas, he keeps watch over naughty children. The horseman in the May pageant is in some parts of Germany called Ruprecht, or Rupert.

Rustam. Persian Romances. He is the chief of the Persian mythical heroes, son of Zal, king of India, and descendant of Benjamin, the beloved son of Jacob. He delivered King Caicaus from prison, but afterwards fell into disgrace because he refused to embrace the religious system of Zoroaster. Caicaus sent his son Asfendiar to convert him, and, as persuasion availed nothing, single combat was resorted to. The fight lasted two days, and then Rustam discovered that Asfendiar bore a "charmed life." The valor of these two heroes is proverbial, and the Persian romances are full of their deeds. *Sohrab and Rustum* is the title of a poetical romance by Matthew Arnold.

Ruydera. Don Quixote, Cervantes. A duenna who had seven daughters and two nieces. They were imprisoned for 500 years in a cavern in Spain. Their ceaseless weeping stirred the compassion of Merlin, who converted them into lakes in the same province.

Sabrina. English legend. The daughter of King Locrine and his mistress Estrildis. Gwendolen, the queen, jealous, after the death of Locrine in war, caused Sabrina and Estrildis to be thrown into a river, called since, Sabrina or Severn. Sabrina became the nymph of the stream. Refer to Milton's *Comus* and Fletcher's *Faithful Shepherdess*.

Sacripant, King. (1) King of Circassia, and a lover of Angelica, in Boiardo and Ariosto. (2) A personage introduced by Alessandro Tassoni, the Italian poet, in his mock-heroic poem entitled the "Rape of the Bucket," represented as false, brave, noisy, and hectoring. The name is quoted as a synonym for vanity and braggart courage.

Sagas. Scandinavian myths or hero stories, in prose or poetry. "Saga" is also the name of a goddess of history in Norse mythology. The name given to those ancient traditions which form the substance of the history and mythology of the Scandinavian races; the language in which they are written is supposed to be the old Icelandic. In the *Edda* there are numerous sagas. As our Bible contains the history of the Jews, religious songs, moral proverbs, and religious stories, so the *Edda* contained the history of Norway, religious songs, a book of proverbs, and numerous stories. The original or *Elder Edda* was compiled in the 9th century in Iceland. It contains 28 parts or books, all of which are in verse. In the 12th century, Snorre Sturleson of Iceland abridged, rearranged, and reduced this *Edda* to prose, and his work was called *The Younger Edda*. In this we find parts of the famous *Nibelungenlied*. Besides the sagas contained in the *Eddas*, there are numerous others, and the whole saga literature makes over 200 volumes. Among them are the *Volsung Saga*, a collection of lays about the early Teutonic heroes. The *Saga of St. Olaf* is the history of this Norwegian king. *Frithjof's Saga* contains the life and adventures of Frithjof of Iceland. Snorre Sturleson, at the close of the 12th century, made the second great collection of chronicles in verse, called the *Heimskringla*, or "World-Circuit," *Saga*.

St. Leon. The hero and title of a novel by William Godwin. St. Leon obtains the elixir of life and the secret of the transmutation of metals, acquisitions which only bring him misfortunes and misery.

St. Nicholas. The patron saint of boys and girls, of the poor and the weak, and of mariners. He is said to have been bishop of Myra, and to have died in 345 or 352. The young were universally taught to revere him, and the popular fiction which represents him as the bearer of presents to children on Christmas Eve is well known. His name, "Santa Claus" or Klaus, is of Dutch origin

St. Patrick's Purgatory. The subject and locality of a legend long famous throughout Europe. The scene is laid in Ireland, upon an islet in Lough Derg. The punishments undergone here are analogous to those described by Dante in his *Divina Commedia*. The story was made the subject of a romance in the 14th century; and, in Spain, in the 17th century, it was dramatized by Calderón.

St. Swithin. Rain on St. Swithin's day, July 15, is said to entail rain for 40 days thereafter. St. Swithin was the bishop of Winchester, who died in 862. He requested burial in the churchyard. When he was canonized, the monks thought to honor him by removing his body into the church. The ceremony was set for July 15 but was prevented by rain for 40 days. The saint was believed thus to show disapproval of the project, and it was abandoned.

Sakuntala (*sā-kōōn'tā-lā*). Drama by Kalidasa, famous dramatist of India. The heroine, Sakuntala, left at birth in the forest, is fed by the birds until the king, Dushyanta, finds her and marries her. A ring he had given her she loses while on her way to join him. When, without this ring, the king refuses to acknowledge her, she is compelled to return to the forest. A fisherman who had found the ring is brought before the king on a charge of theft. Recognizing the ring, Dushyanta sends for Sakuntala and proclaims her his queen.

Sally in Our Alley. This popular song was written by Henry Carey in 1734. The author tells of getting the material for the poem by watching a shoemaker's apprentice and his sweetheart on a holiday.

Salmagundi. The name of a periodical started by Washington Irving, his brother, and James K. Paulding, in the year 1807. The object of the paper was the same as that of the *Spectator*, to "correct the town." The publishers became tired of their venture before their subscribers did, and only twenty-two numbers were issued. The political pieces were full of humor, but were not in support of any party. The wit and satire were connected with things local and would not be thoroughly understood or appreciated now. The writers touched upon the follies of fashionable life as well as other follies of their day.

Salt-Box House. Title of book by J. D. Shelton and name given to an imaginary house supposed to stand in a Connecticut hill town more than a century ago. The life of the family to whom the house belonged is followed for three generations. The people, like most families of the same social station, have no sympathy with the war for colonial independence. They have little to do with political life, but in their everyday concerns, work and play, school and church, love and marriage, sickness and death, with their old-time customs, traditions, and habits of thought, they are very interesting. Miss Mary, the last mistress of the Salt-Box House, is a most attractive old maid.

Salt River. American political slang. An imaginary river, up which defeated political parties are supposed to be sent to oblivion. The name and application said to have originated in connection with a river of Kentucky where, for one reason or another, travelers were lost.

Sambo. This term and the name Cuffey used to designate the negro race. Both were used by Mrs. Stowe in her stories.

Samian (*sā′mĭ-ăn*) **Letter, The.** The letter Y used by Pythagoras as an emblem of the paths of virtue and of vice.

Samian Sage. Pythagoras, said to have been born at Samos.

Samian Wine. The cup of despair and regret over the decay of Greece in Byron's *Isles of Greece.*

Sampson, Dominie. Guy Mannering, Scott. A village schoolmaster and scholar, poor as a church mouse, and modest as a girl. He cites Latin like a "porcus literarum," and exclaims "Prodigious!" He has fallen to the leeward in the voyage of life. He is no uncommon personage in a country where a certain portion of learning is easily attained by those who are willing to suffer hunger and thirst in exchange for acquiring Greek and Latin.

Samson Agonistes (*săm′sŭn ăg′ô-nĭs′tēz*). The principal character in Milton's sacred drama *Samson Agonistes* or *Samson the Combatant.* Samson, blind and bound, triumphs over his enemies. As in the Bible story, he grasps two of the supporting pillars and perishes in the general ruin.

Sancho Panza (*săng′kō păn′zā*). The esquire and counterpart of Don Quixote in Cervantes' famous novel. He has much shrewdness in practical matters and a store of proverbial wisdom. He rode upon an ass which he dearly loved, and was noted for his proverbs.

Sandals of Theramenes (*thĕ-răm′ĕ-nēz*). Theramenes, one of the Athenian oligarchy, was nicknamed "the trimmer," from the name of a sandal or boot which might be worn on either foot, because no dependence could be placed on him. The proverb, "He walks in the sandals of Theramenes," is applied to those who speak fairly but do the things that promise to profit themselves.

Sandford and Merton. Harry Sandford and Tommy Merton, the two heroes of Thomas Day's once popular tale for the young, the *History of Sandford and Merton* (1783–1789).

Sanskrit. The ancient language of India, now extinct, from which most of the languages there spoken are derived. It belongs to the Aryan or Indo-European group of tongues. It was declared by Sir William Jones to be more perfect than the Greek, more copious than the Latin, and more refined than either. The earliest existing work is the *Vedas.* These and the *Puranas* are religious writings; but there are also epic poems, dramas, and philosophical compositions.

Santa Claus. In fable he was first known as patron saint of children. The vigil of his feast is still held in some places, but for the most part his name is now associated with Christmastide. The old custom used to be for some one, on December 5th, to assume the costume of a bishop and distribute small gifts to "good children." See *St. Nicholas.*

Santiago (*săn-te-ä′gō*). The war cry of Spain; adopted because St. James (Sant Iago) rendered, according to tradition, signal service to a Christian king of Spain in a battle against the Moors.

Satan. Hebrew, "the adversary." One of the names of the Devil, and that by which in the Bible, in poetry, and in popular legends, he is often designated. Those medieval writers who reckoned nine kinds of demons, placed Satan at the head of the fifth rank, which consisted of cozeners, as magicians and witches. Milton represents him as the monarch of hell. His chief lords are Beelzebub, Moloch, Chemosh, Tammuz, Dagon, Rimmon, and Belial. His standard bearer is Azazel.

Satyrane. Faery Queen, Spenser. A noble knight who delivered Una from the fauns and satyrs. The meaning seems to be that Truth, driven from the towns and cities, took refuge in caves and dens, where for a time she lay concealed. At length Sir Satyrane rescues Una from bondage; no sooner is she free than she falls in with Archimago, who poses as the Red Cross Knight, but whose falsehood is later exposed.

Saunders, Clerk. The hero of a well-known Scottish ballad.

Sawney. A sportive designation applied by the English to the Scotch. It is a corruption of "Sandie," the Scottish abbreviation of "Alexander."

Sawyer, Bob. Pickwick Papers, Dickens. A drinking young doctor who tries to establish a practice at Bristol, but without success. Sam Weller calls him "Mr. Sawbones."

Scalds or Skalds. Court poets and chroniclers of the ancient Scandinavians. They resided at court, were attached to the royal suite, and attended the king in all his wars. These bards celebrated in song the gods, the kings of Norway, and national heroes. Few complete scaldic poems have survived, but a multitude of fragments exist.

Scarecrow, The, Percy Mackaye. A New England phantasy. Farce. Goody Rickby, reputed a witch, at her forge making a scarecrow for her cornfield, is persuaded by her "familiar," Dickon, to fashion a figure of cornstalks and pumpkin, animate it with a brimstone pipe, and send it as Lord Ravensbane to ask for the hand of Rachel, niece of Justice Gilead Merton. Dickon tells Merton that this young "lord" is really his own son by Goody Rickby, whom he has thought dead. Rachel, who is betrothed to young Squire Talbot, falls in love with the scarecrow "lord." The scarecrow, through love of her, gradually wins enough manhood to break his pipe, thus giving up life and leaving Rachel to Richard. Goody Rickby disappears, but she has had revenge on Justice Merton.

Scarlet Letter, The. Title of a romance by Nathaniel Hawthorne. The heroine, Hester Prynne, was condemned to wear conspicuously the letter "A" in scarlet, token of her sin as mother of her child, Pearl, whose father was not known. She was first exposed in disgrace on a raised scaffold, then served a term in prison, and afterward gained a moderate support for herself and child by embroidering. She refused to reveal the name of the father, although she might then be allowed to lay aside the letter. He was always near, held an important position, and lived a life of wearing remorse. After his death Hester Prynne took her child to another country, but returned to spend her old age in seclusion and comfort in the same place that had witnessed her punishment. She always bore herself proudly but not defiantly and brought to herself such love and respect that the scarlet letter became a badge of honor. Roger Chillingworth, Hester's husband, appeared as a learned foreign physician, visited her in prison, but promised not to reveal his relation to her, and devoted his life to learning her secret. The characters in the story are intense and the analysis of motives subtle.

Schahriah. Arabian Nights. The sultan of Persia. His reign was a despotism and his decrees absolute.

Scheherazade (*shĕ-hä′rä-zä′dĕ*). **Arabian Nights.** The fabled relater of the stories in these "Entertainments." Among other decrees the sultan had decided upon a new wife for every day. Tradition or fable tells that Scheherazade, wishing to free Persia of this disgrace, requested to be made the sultan's wife. She was young and beautiful, of great courage and ready wit, had an excellent memory, knew history, was poet, musician, and dancer. Scheherazade obtained permission for her younger sister, Dinarzade, to sleep in the same chamber, and instructed her to say, "Sister, relate to me one of those stories." Scheherazade then, under pretense of speaking to her sister, told the sultan a story, but always contrived to break off before the story was finished. The sultan, in order to hear the end of the story, spared her life till the next night. This went on for a thousand and one nights, when the sultan's resentment was worn out, and his admiration of his sultana was so great that he revoked his decree.

Schlemihl, Peter. The title of a little work by Chamisso (1781–1838), and the name of its hero, a man who sells his shadow to an old man in gray (the Devil) who meets him just after he has been disappointed in an application for assistance to a nobleman. The name has become a byword for any poor, silly, and unfortunate fellow.

Scholar-Gipsy. The subject of one of Matthew Arnold's greatest poems.

Scotland Yard. A short street in London, near Trafalgar Square. Here formerly were the headquarters of the metropolitan police, now removed to New Scotland Yard on the Thames embankment, near Westminster bridge. The detectives are known as Scotland Yard men. Often mentioned in the detective stories of Conan Doyle and others.

Scourge of God. Attila, king of the Huns. A. P. Stanley says the term was first applied to Attila in the Hungarian Chronicles. It is found in a legend belonging to the 8th or 9th century.

Scrap of Paper, A. A phrase used by the German chancellor, von Bethmann-Hollweg, with reference to England's entry into the World War in 1914. He is quoted as saying that England was going to war for Belgian neutrality, "just for a scrap of paper." But his phrase was widely understood as expressing the German attitude toward the Belgian treaty and hence toward all treaties.

Scrooge, Ebenezer. Christmas Carol, Dickens. The prominent character, made partner, executor, and heir of old Jacob Marley, stockbroker. When first introduced, he is a grasping, covetous old man, loving no one and by none

beloved. One Christmas, Ebenezer Scrooge sees three ghosts: The Ghost of Christmas Past; the Ghost of Christmas Present; and the Ghost of Christmas To-come. The first takes him back to his young life, shows him what Christmas was to him when a schoolboy, and when he was an apprentice. The second ghost shows him the joyous home of his clerk, Bob Cratchit, who has nine people to feed on what seems a pittance, and yet could find wherewithal to make merry on this day; it also shows him the family of his nephew, and others. The third ghost shows him what would be his lot if he died as he then was, the prey of harpies, the jest of his friends on 'Change. These visions wholly change his nature, and he becomes benevolent, charitable, and cheerful, and makes Christmas a happy day for many within his reach.

Seasons. A well-known poem said to be the foundation of Thomson's literary fame. Its description of the phenomena of nature during an English year is minute, and the poem has been much read by foreigners. Its real value today is largely historical, in that Thomson represents, in relation to nature, the transition in English literature from the classicism of Pope and his school to the romanticism of the Lake School.

Sedley, Mr. Vanity Fair, Thackeray. A wealthy London stockbroker, brought to ruin in the money market just prior to the battle of Waterloo. The old merchant tried to earn a living by selling wine, coals, or lottery tickets by commission, but his bad wine and cheap coals found but few customers. Mrs. Sedley, wife of Mr. Sedley, a homely, kind-hearted woman, soured by adversity, and quick to take offense. Amelia Sedley, daughter of the stockbroker, educated at Miss Pinkerton's academy, and engaged to Captain George Osborne, son of a rich London merchant. After the ruin of Mr. Sedley, George marries Amelia, and old Osborne disinherits him. George is killed in the battle of Waterloo. Amelia is reduced to great poverty, but is befriended by Captain Dobbin, and after many years of patience and great devotion she consents to marry him. Joseph Sedley, vain, shy, and vulgar. He told of his brave deeds, and made it appear that he was Wellington's right hand; so that he obtained the sobriquet of "Waterloo Sedley." He became the "patron" of Becky Sharp, who fleeced him of all his money, and in six months he died under suspicious circumstances. Interest in the novel is centered on Amelia, an impersonation of virtue without intellect as contrasted with Becky Sharp, who is an impersonation of intellect without virtue. The one has no head, the other no heart. Amelia and Becky afforded brilliant contrasts in acting in the dramatized version of *Vanity Fair*,—"Becky Sharp."

Selim (*sē'lĭm*). **Bride of Abydos, Byron.** The character of Selim is bold, full of enterprise, and faithful. The story runs that Selim was the son of Abdallah and cousin of Zuleika. When Giaffir murdered Abdallah, he took Selim and brought him up as his own son. The young man fell in love with Zuleika, who thought he was her brother; when she discovered he was Abdallah's son, she eloped with him. As soon as Giaffir discovered this he went after the fugitives, and shot Selim. Zuleika died broken-hearted, and the old pasha was left childless. Selim, son of Akbar, in Arabian tales, marries Nourmahal, the "Light of the Harem."

Selith. The Messiah, Klopstock. One of the two guardian angels of the Virgin Mary and of John the Divine.

Sellers, Colonel Mulberry. A famous character in *The Gilded Age*, a novel by Mark Twain and C. D. Warner. John T. Raymond made a dramatized version popular. The colonel is a Southern gentleman of visionary but invincible optimism. Mark Twain wrote that he had drawn the character from the life of James Lampton, a cousin of his mother.

Sellock. Peveril of the Peak, Scott. A servant girl in the service of Lady and Sir Geoffrey Peveril of the Peak.

Senena. Madoc, Southey. A Welsh maiden in love with Caradoc. Under the assumed name of Mervyn she became the page of the princess Goervyl, in order that she might follow her lover to America, when Madoc colonized Caer-Madoc. Senena was promised in marriage to another; but, when the wedding day arrived, the bride was nowhere to be found.

Sentimental Journey, The, Laurence Sterne. It was intended to be sentimental sketches of his tour through Italy in 1764, but he died soon after completing the first part.

Sentimental Tommy, Barrie. The story of a "Thrums" boy with an insuppressible insincerity and habit of posing. The story is continued in *Tommy and Grizel*. The two stories form a comedy of sentimentality.

Septuagint (*sĕp'tû-ă-jĭnt*). A Greek version of the books of the Old Testament; so called because the translation is supposed to have been made by 72 Jews, who, for the sake of round numbers, are usually called the "seventy interpreters." It is said to have been made at the request of Ptolemy Philadelphus, king of Egypt, about 280 B. C. It is that out of which all the citations in the New Testament from the Old are taken and from which the Psalter in the English Book of Common Prayer is translated. It was also the ordinary and canonical translation made use of by the Christian Church in the earliest ages; and is still retained in the churches of both the East and the West.

Serena. Faery Queen, Spenser. Allured by the mildness of the weather, she went into the fields to gather wild flowers for a garland, when she was attacked by the Blatant Beast, who carried her off in its mouth. Her cries attracted to the spot Sir Calidore, who compelled the beast to drop its prey.

Sesame (*sĕs'ă-mē*). In Arabian tales given as the talismanic word which would open or shut the door leading into the cave of the forty thieves. In order to open it, the words to be uttered were, "Open, Sesame!" and in order to close it, "Shut, Sesame!" Sesame is a plant which yields an oily grain, and hence, when Cassim forgot the word, he substituted "barley," but without effect. Sesame has come into general use in connection with any word or act which will open the way for accomplishment of the thing desired. "Sesame and Lilies" is one of the most important and beautiful of Ruskin's works.

Seven Sleepers, The. The tale of these sleepers is told in divers manners. The best accounts are those in the *Koran*; *The Golden Legend*, by Jacopo da Voragine; the *De Gloria Martyrum*, by Gregory of Tours; and the *Oriental Tales*, by Caylus. According to one version they were seven noble youths of Ephesus, who fled in the Decian persecution to a cave in Mount Celion, the mouth of which was blocked up by stones. After 230 years they were discovered, and awoke, but died within a few days, and were taken in a large stone coffin to Marseilles. Another tradition is, that Edward the Confessor, in his mind's eye, saw the seven sleepers turn from their right sides to their left, and whenever they turn on their sides it indicates great disasters to Christendom. This idea was introduced by Tennyson in his drama *Harold*.

Seven Wise Masters. The title of a medieval collection of novels, important from both its contents and its widespread popularity. The work is undoubtedly of Oriental origin, yet neither the period when it was composed, nor how far it spread through the East, is known, but it existed in Arabic as a translation from Indian sources before the 11th century. The work became known in literature, sometimes in a complete form; sometimes only particular novels were reproduced, under all sorts of names, in verse and in prose. Latin versions began to appear about the beginning of the 13th century and parts have been translated into English.

Seven Wise Men. The collective designation of a number of Greek sages, who lived about 620–548 B. C. and devoted themselves to the cultivation of practical wisdom. Their moral and social experience was embodied in brief aphorisms, expressed in verse or in prose.

Sganarelle (*z'gà'nà'rĕl'*). The hero of Molière's comedy *Le Mariage Forcé*. He is represented as a humorist of about 53, who, having a mind to marry a fashionable young woman, but feeling a doubt, consults his friends upon this momentous question. Receiving no satisfactory counsel, and not much pleased with the proceedings of his bride elect, he at last determines to give up his engagement, but is cudgeled into compliance by the brother of his intended.

Shallow. A braggart and absurd country justice in Shakspere's *Merry Wives of Windsor*, and in the second part of *King Henry IV*.

Shalott, The Lady of. The heroine of Tennyson's poem of the same name. She weaves into her web all the sights reflected in the mirror which hangs opposite her window; but, when Sir Lancelot passes, she leaves her mirror and looks out of the casement at the knight himself, whereupon a curse comes upon her. She entered a boat bearing her name on the prow, floated down the river to Camelot, and died heartbroken on the way.

Shandy, Mrs. The mother of Tristram Shandy in Sterne's novel of this name. She is the ideal of nonentity, a character individual from its very absence of individuality.

Shandy, Tristram. The nominal hero of Sterne's *The Life and Opinions of Tristram Shandy, Gent.*

Shandy, Walter. The name of Tristram Shandy's father in Sterne's novel of this name, a man of an active and metaphysical, but at the same time a whimsical, cast of mind, whom too much and too miscellaneous learning had brought within a step or two of madness. The romance, *Tristram Shandy*, is not built on a regular plot. The hero has no adventures, and the story consists of a series of episodes which introduce the reader to the home life of an

English country family. This family is one of the most amusing.

Sharp, Rebecca. The prominent character in Thackeray's *Vanity Fair*, the daughter of a poor painter, dashing, selfish, unprincipled, and very clever, who manages to marry Rawdon Crawley, afterwards his excellency Colonel Crawley, C. B. He was disinherited on account of his marriage with Becky, then a poor governess, but she taught him how to live in splendor on no income. Lord Steyne introduced her to court, but her conduct with this peer gave rise to scandal, which caused a separation between her and Rawdon. She joins her fortunes with Joseph Sedley, a wealthy "collector," of Boggley Wollah, in India. Having insured his life and lost his money, he dies suddenly under very suspicious circumstances. Becky at last assumes the character of a pious, charitable Lady Bountiful, given to all good works.

Shaving of Shagpat, The, George Meredith. A burlesque version of an Oriental tale. The style suggests the *Arabian Nights*.

Shepherdess, The Faithful. A pastoral drama by John Fletcher. The "faithful shepherdess" is Corin, who remains faithful to her lover although he is dead. Milton has borrowed from this pastoral in his *Comus*.

Shepherd of Banbury. The ostensible author of a work entitled "The Shepherd of Banbury's Rules to judge of the Changes of Weather, Grounded on Forty Years' Experience, etc.," a work of great popularity among the English poor.

Shepherd of Salisbury Plain, The. The hero and title of a religious tract by Hannah More. The shepherd is noted for his homely wisdom and simple piety.

Shepherd's Calendar, The. Twelve eclogues in various meters, by Spenser, one for each month. January: Colin Clout (Spenser) bewails that Rosalind does not return his love. February: Cuddy, a lad, complains of the cold, and Thenot laments the degeneracy of pastoral life. March: Willie and Thomalin discourse of love. April: Hobbinol sings a song on Eliza. May: Palinode exhorts Piers to join the festivities of May, but Piers replies that good shepherds who seek their own indulgence expose their flocks to the wolves. June: Hobbinol exhorts Colin to greater cheerfulness. July: Morrel, a goatherd, invites Thomalin to come with him to the uplands. August: Perigot and Willie contend in song, and Cuddy is appointed arbiter. September: Diggon Davie complains to Hobbinol of clerical abuses. October: On poetry. November: Colin, being asked by Thenot to sing, excuses himself because of his grief for Dido, but finally sings her elegy. December: Colin again complains that his heart is desolate. Thenot is an old shepherd beat with age, who tells Cuddy, the herdsman's boy, the fable of the oak and the briar, one of the best-known fables included in the calendar.

Shepherd's Pipe. Pan, in Greek mythology, was the god of forests, pastures, and flocks, and was the reputed inventor of the shepherd's flute or pipe, a series of graduated tubes set together, open at one end and closed at the other, played by blowing across the open ends.

Sheridan's Ride. A lyric by T. B. Read, one of the few things written during the heat of the Civil War that have survived.

Sherlock Holmes, The Adventures of, Conan Doyle. A series of clever and popular detective stories in which the hero, Holmes, a private detective, employs his extraordinary fund of scientific knowledge and unusual powers of reasoning to solve many baffling mysteries of crime. The stories are told by Holmes's friend and companion, Dr. Watson. The plan of these stories was suggested by Poe's *Murders in the Rue Morgue*. The methods of Holmes are said to have been suggested to Doyle by the work of Dr. Joseph Bell, a physician of Edinburgh and at one time an instructor of the novelist.

Sherwood Forest. A forest in Nottinghamshire, England, fourteen miles north of Nottingham. It was formerly of large extent. It is the principal scene of the legendary exploits of Robin Hood.

She Stoops to Conquer. This well-known comedy by Oliver Goldsmith is said to have been founded on an incident which actually occurred to its author. When Goldsmith was sixteen years of age, a wag residing at Ardagh directed him, when passing through that village, to Squire Fetherstone's house as the village inn. The mistake was not discovered for some time, but all concerned enjoyed the joke. *She Stoops to Conquer* is one of the gayest, pleasantest, and most amusing pieces of English comedy.

Shingebis. In Longfellow's "Hiawatha," the diver who challenged the North Wind and put him to flight in combat.

Shocky. The Hoosier Schoolmaster, Edw. Eggleston. The little lad from the poorhouse who adores the schoolmaster and early warns him of plans for upsetting his authority. He is also somewhat of a poet, not in versification, but in the comprehension of things about him and in his way of looking at life, and he grows to be a helper in the "Church of the Best Licks," founded by the schoolmaster. He is brother to Hannah whom the master loves. Shocky and Hannah and their companions in the story bring the speech and life of their people and their time into American literature.

Shylock. The Jew, in Shakspere's *Merchant of Venice*.

Siege Perilous, The. The Round Table contained sieges, or seats, in the names of different knights. One was reserved for him who was destined to achieve the quest of the holy grail. This seat was called "perilous," because if any one sat therein except him for whom it was reserved it would be his death. This seat finally bore the name of Sir Galahad.

Siegfried. The hero of various Scandinavian and Teutonic legends, particularly of the old German epic poem, the *Nibelungenlied*. He is represented as a young warrior of physical strength and beauty, and in valor superior to all men of his time. He cannot easily be identified with any historical personage.

Sikes, Bill. A brutal thief and housebreaker in Dickens's novel *Oliver Twist*. He murders his mistress, Nancy, and, in trying to lower himself by a rope from the roof of a building where he had taken refuge from the crowd, he falls and is choked in a noose of his own making. Sikes had an ill-conditioned savage dog, the beast-image of his master, which he kicked and loved, illtreated and fondled.

Silas Marner. The principal character in George Eliot's story *Silas Marner, the Weaver of Raveloe*. Silas, a cataleptic, lived his younger life in a little religious community of weavers in Lantern Yard. Robbed of his sweetheart and his good name by his best friend, Silas withdrew to the village of Raveloe. Here in his lonely hut he hoards his earnings. Robbed of these, he is saved from utter despair by finding a baby girl. On her he spends his love. In the end the shattered man is remade by this influence, and the stolen savings are found and restored to him.

Silken Thread. Gulliver's Travels. In the kingdom of Lilliput, the three great prizes of honor are "fine silk threads six inches long, one blue, another red, and a third green." The thread is girt about the loins, and no ribbon of the Legion of Honor, or of the Knight of the Garter, is won more worthily or worn more proudly.

Sindbad the Sailor. A character in the *Arabian Nights*, in which is related the story of his strange voyages and wonderful adventures.

Singed Cat. An allusion found in Haliburton's *Old Judge*. "That crittur is like a singed cat, better nor he seems." Found also in Ramsay's *Scotch Proverbs* (1750). "He's like a singed cat, better than he's likely." Applied to one whose looks belie his real quality.

Sinon (*sī'nŏn*). In Virgil's *Æneid*, the cunning Greek who, by a false tale, induced the Trojans to drag the wooden horse into Troy.

Slay-Good, Giant. A giant, in *Pilgrim's Progress*, slain in a duel by Mr. Greatheart.

Sleeping Beauty. The heroine of a celebrated nursery tale which relates how a princess was shut up by fairy enchantment, to sleep a hundred years in a castle, around which sprang up a dense, impenetrable wood. At the expiration of the appointed time, she was delivered from her imprisonment and her trance by a gallant young prince, before whom the forest opened itself to afford him passage. Grimm derives this popular and widely diffused tale from the old northern mythology.

Slender. A silly youth in Shakspere's *Merry Wives of Windsor*, who is an unsuccessful suitor for the hand of "Sweet Anne Page."

Slick, Sam. The title and hero of various humorous narratives, illustrating and exaggerating the peculiarities of the Yankee character and dialect, written by Judge Thomas C. Haliburton, chief justice of Nova Scotia. Sam Slick is represented as a Yankee clockmaker and peddler, full of quaint drollery, unsophisticated wit, knowledge of human nature, and aptitude in the use of what he calls "soft sawder." Haliburton's *Sam Slick* may be said to originate the American school of humor.

Slop, Dr. The name of a choleric and uncharitable physician in Sterne's novel *The Life and Opinions of Tristram Shandy, Gent.*

Slough of Despond. Pilgrim's Progress, Bunyan. A deep bog, which Christian had to pass on his way to the Wicket Gate. Neighbor Pliable would not attempt to pass it, and turned back. While Christian was floundering in the slough, Help came to his aid and assisted him over.

Sly, Christopher. Taming of the Shrew, Shakspere. A keeper of bears and a tinker, son of a peddler and a sad drinker.

Sohrab and Rustum, Matthew Arnold. A narrative poem. The story is Persian. Sohrab, son of Rustum, long an adventurer, is a warrior who appalls the Persian armies. At last, in a fight with Rustum, he is mortally wounded. Rustum, discovering in Sohrab his son, is inconsolable.

Soldiers Three, Kipling. The title of a series of tales of army life in India, which recount the adventures of three private soldiers, whose portraits are perhaps Kipling's best work. Of them he writes in beginning their story, "Mulvaney, Ortheris, and Learoyd are privates in B Company of a Line Regiment and personal friends of mine."

Song of Roland. An ancient song recounting the deeds of Roland, the renowned nephew of Charlemagne, slain in the pass of Roncesvalles. At the battle of Hastings, Taillefer advanced on horseback before the invading army, and gave the signal for onset by singing this famous song. See *Roland*.

Songs of the Sierras. A collection of poems by Joaquin Miller, which made him known on two continents within a year of their publication. The title explains the chief subject of the songs.

Spanish Main. The southern banks of the West India islands, and the water extending for some distance into the Caribbean Sea, so called from the fact that the Spaniards confined their buccaneering enterprises to this locality.

Spectator, The. A periodical famous in literature, in which most of the articles were written by Addison or Sir Richard Steele. The first number was published in London in the year 1711, the last, No. 635, was issued in December 1714. The most noted of Addison's writings is said to be the series of sketches in *The Spectator*, of which Sir Roger de Coverley is the central figure, and Sir Andrew Freeport and Will Honeycomb the side ones. Sir Roger himself is an absolute creation; the gentle yet vivid imagination, the gay spirit of humor, and the keen, shrewd observation mark it a work of pure genius. In this, Addison has given a delicacy to English sentiment and a modesty to English wit which it never knew before. Dr. Johnson says, "To attain an English style, familiar but not coarse, and elegant but not ostentatious, one must give his days and nights to the volumes of Addison."

Sphinx. A Greek word, applied to certain symbolical forms of Egyptian origin. The most remarkable sphinx is the Great Sphinx at Gizeh, a colossal form, hewn out of the natural rock. Immediately in front of the breast is a small naos, or chapel, formed of three hieroglyphical tablets. Votive inscriptions of the Roman period, some as late as the 3d century, were discovered in the walls and constructions. On the second digit of the left claw of the Sphinx, an inscription, in pentameter Greek verse, by Arrian, was discovered. Another metrical and prosaic inscription was also found. In Assyria and Babylonia, representations of sphinxes have been found, and they are not uncommon on Phœnician works of art.

Spoon River Anthology, Edgar Lee Masters. The best-known work of this poet. It is a collection of poems in free verse and rime, in the form of realistic epitaphs on the citizens of a village of the Middle West. The plan was suggested by Masters' reading of the *Greek Anthology*.

Squeers. Name of a family prominent in Dickens's *Nicholas Nickleby*. Wackford Squeers, master of Dotheboys Hall, Yorkshire, a vulgar, conceited, ignorant schoolmaster, overbearing and mean. He steals the boys' pocket money, clothes his son in their best suits, half starves them, and teaches them next to nothing. Ultimately he is transported for theft. Mrs. Squeers, a rawboned, harsh, heartless virago, with no womanly feeling for the boys put under her charge. Miss Fanny Squeers, daughter of the schoolmaster. Miss Fanny falls in love with Nicholas Nickleby, but later hates him because he is insensible to her tender passion. Master Wackford Squeers, overbearing, self-willed, and passionate. The picture of this family and their ways had great influence on the schools of England, by rousing the people to a knowledge of their management.

Squire of Dames. A personage introduced by Spenser in the *Faery Queen*, whose curious adventures are there recorded. A phrase often used to express a person devoted to the fair sex.

Stalky and Company, Kipling. A series of stories of English school life. Corkran (Your Uncle Stalky), McTurk, and Beetle, who is probably the author, combine to play pranks, victimizing both masters and boys.

Steerforth. David Copperfield, Dickens. The young man who led Little Em'ly astray. When tired of his toy, he proposed to her to marry his valet. Steerforth being shipwrecked off the coast of Yarmouth, Ham Peggotty tried to rescue him, but both were drowned.

Stentor. A Grecian herald in the Trojan War, whom Homer describes as "great-hearted, brazen-voiced Stentor, accustomed to shout as loud as fifty other men." Hence our adjective "stentorian."

Stephano. (1) A drunken butler, in Shakspere's *Tempest*. (2) A servant to Portia, in Shakspere's *Merchant of Venice*.

Stickeen, John Muir. The story of a dog.

Stiggins, Rev. Mr. A red-nosed, hypocritical "shepherd," or Methodist parson, in Dickens's *Pickwick Papers*, with a great appetite for pineapple rum. He is the spiritual adviser of Mrs. Weller and lectures on temperance.

Stone of Sardis. The Great Stone of Sardis, Stockton. In this stone the imaginary science of the future is joined to the actual science of today in an extremely plausible way. The north pole is visited by a submarine vessel, a light is found capable of penetrating for miles into the interior of the earth, and finally the center of that earth is discovered to be an enormous diamond.

Storm and Stress Period. In the literary history of Germany, the name given to a period of great intellectual convulsion, when the nation began to assert its freedom from the fetters of an artificial literary spirit. The period derives its name from a drama of Klinger (1753–1831), whose high-wrought tragedies and novels reflect the excitement of the time.

Strife, John Galsworthy. The scene of this play is the Trenartha Tin Works. A strike is on, led by David Roberts, determined foe of the owners. John Anthony, founder and president of the company, is all for fighting. Among the directors, called down from London, and also among the workers are those who are for compromise. These finally come to agreement, in spite of Roberts and Anthony, the strong men and "bitter enders." At the close of the play, these two evince their sense of a common defeat and a reluctant respect for each other's strength, mixed with contempt for the weak compromisers. The action of the play is confined to one day.

Sunken Bell, The, Hauptmann. A fairy drama which portrays the bitter struggles of a bell-founder, Heinrich, against the forces that thwart his ambition. A fairy will not endure the ringing of a bell he wants to place in a mountain chapel. The bell is sunk in a deep abyss. Discouraged, he finds help in a mountain elf, Rautendelein. With her, he plans new things. But the eternal strife between the low and the high wears him out at last.

Swallow Barn. The three novels, *Swallow Barn*, *Horse-Shoe Robinson*, and *Rob of the Bowl*, besides their value as works of art, are all careful historical studies giving admirable pictures of life in the southern states in the earlier days of the republic. They were written by John P. Kennedy, who holds a place among American novelists not far removed from that of Cooper.

Swiveller, Dick. A careless, light-headed fellow in Dickens's novel *Old Curiosity Shop*, whose flowery orations and absurdities of quotation provoke laughter, but whose real kindness of heart enlists sympathy.

Tabard, The, Chaucer's Inn. The old London tavern, immortalized by Chaucer as the "Tabard" in *Canterbury Tales*. It took its name from its sign, a tabard, or loose, sleeveless jacket. From this hostelry in Southwark, on the south side of the Thames, the "pilgrims" started on the famous journey to Canterbury, "the holy blissful martyr for to seek." The inn was burned in the great fire of 1676. Upon its restoration the name was changed to the "Talbot," or Dog, which name it retained until about 1873, when it was demolished.

Tales of a Wayside Inn. Name given by Longfellow to a collection of his short poems arranged in much the same form as Chaucer's *Canterbury Tales*. These "tales" were mostly gathered from old literatures and translated into Longfellow's own verse. Only one, "The Birds of Killingworth," is said to be entirely original. Seven narrators are represented: the Landlord, the Student, the Spanish Cavalier, the Jew, the Sicilian, the Musician, and the Theologian. Four colonial tales are included in the work: "Paul Revere's Ride," "Elizabeth," "Lady Wentworth," and "The Rhyme of Sir Christopher."

Tales of My Landlord, Scott. A series of novels in which the stories are told by the landlord of the Wallace Inn, parish of Gandercleugh, and edited by Jedediah Cleishbotham, schoolmaster. The series includes, besides others, *The Black Dwarf* and *Count Robert of Paris*.

Talmud. A Hebrew word meaning "doctrine." It is the name applied to a work containing traditions respecting the usages and laws of the Jewish people. The

law, among that people, was divided into the written and the unwritten. The written law embraced the five books of Moses; the unwritten was handed down orally; the oral being, in fact, expianatory of the written. But, in time, the oral came, also, to be put in writing, and formed the text of the *Talmud*. This was first done, it is believed, about the year 200. There are two separate commentaries on this text, which are distinguished as the Babylonian and the Jerusalem. The *Talmud* of Jerusalem consists of two parts, the "Mishna" and the "Gemara." The "Mishna" gives a simple statement of a law; the "Gemara" presents the discussion upon it. The *Talmud* of Babylon, which is of higher authority among the Jews than that of Jerusalem, was composed by Rabbi Aser, who lived near Babylon; he did not live to finish it, but it was completed by his disciples about 500 years after Christ.

Taming of the Shrew, Shakspere. A farce-comedy. Katherine, the shrewish daughter of Baptista Minola of Padua, is transformed by Petruchio, a good-humored but determined gentleman, into a model of the obedient wife. By thwarting her every wish, under the pretense of the most thoughtful care for her comfort, he brings her to terms through sheer weariness of strife.

Tam O'Shanter. The title of a poem by Burns, and the name of its hero, a farmer, who, riding home very late and very drunk from Ayr, in a stormy night, had to pass by the kirk of Alloway, a place reputed to be a favorite haunt of the Devil and his friends and emissaries. On approaching the kirk, he perceived a light gleaming through the windows; but, having got courageously drunk, he ventured on till he could look into the edifice, when he saw a dance of witches. His presence became known and in an instant all was dark, and Tam, recollecting himself, turned and spurred his horse to the top of her speed, chased by the whole fiendish crew. It is a current belief that witches, or any evil spirits, have no power to follow a poor wight any farther than the middle of the next running stream. Fortunately for Tam, the River Doon was near, and Tam escaped while the witches held only the tail of his mare, Maggie. It has been said of "Tam O'Shanter" that in no other poem of the same length can there be found so much brilliant description, pathos, and quaint humor, nor such a combination of the terrific and the ludicrous.

Tancred. The hero of the First Crusade. The love of woman was his one besetting weakness. Tasso follows his career in *Jerusalem Delivered*, and he appears in Scott's *Count Robert of Paris*. Disraeli uses the name for the hero of his novel *Tancred, or the New Crusade*.

Tannhäuser. A famous legendary hero of Germany, and the subject of an ancient ballad of the same name. The noble Tannhäuser is a knight devoted to valorous adventures and to beautiful women. In Mantua, he wins the affection of a lovely lady, Lisaura, and of a learned philosopher, Hilario, with whom he converses frequently upon supernatural subjects. Enchanted by marvelous tales, he wishes for nothing less than to participate in the love of some beauteous elementary spirit, who shall, for his sake, assume the form of mortal woman. Hilario promises to grant even more than he has wished, if he will have courage to venture upon the Venusberg. Tannhäuser ascends the mountain, and, hearing of his departure, Lisaura dies. Tannhäuser stays long on the enchanting mountain, but at last, moved to repentance, he obtains permission to depart. He hastens to Mantua, weeps over the grave of Lisaura, and thence proceeds to Rome, where he makes public confession of his sins to Pope Urban. The pope refuses him absolution, saying he can no more be pardoned than the dry wand which he holds can bud and bear green leaves. Tannhäuser flees from Rome, and vainly seeks his former preceptor, Hilario. Venus appears before him and lures him back to the mountain, there to remain until the day of judgment. Meanwhile, at Rome the dry wand bears leaves. Urban, alarmed at this miracle, sends messengers in search of the unhappy knight; but he is nowhere to be found. This Tannhäuser legend is very popular in Germany, and is often alluded to by German writers. Tieck has made it the subject of a narrative, and Wagner, of an opera which has gained great celebrity.

Tartarin. The quixotic hero of a series of humorous, half-satiric masterpieces by Alphonse Daudet. Tartarin, at his home in Tarascon, in southern France, is continually dreaming of travel and adventure. By reading of distant lands and viewing the guns in his collection, he persuades himself that he actually has had the adventures he imagines. Finally, he does journey to Africa to hunt lions, and to Switzerland to climb mountains. The stories of these exploits and others Daudet makes a source of never-failing entertainment.

Tartufe (*tär-tōōf'*), "The Hypocrite." (1) A comedy by Molière, in which the leading character is Tartufe (*Fr. tar'tüf'*). Tartufe, an adventurer, masquerading under a cloak of piety, worms his way into the household of Orgon, a well-to-do merchant. Orgon, with the connivance of his mother, goes so far as to make Tartufe a deed to his estate and promises him his daughter Mariane, already affianced to Valère. But Tartufe really wants Elmire, Orgon's second wife. She arranges that Orgon shall overhear the hypocrite's declaration of love to her. Tartufe meets Orgon's anger by claiming his property under the deed. Louis XIV intervenes, saves Orgon's estate, and imprisons Tartufe. (2) A common nickname for a hypocritical pretender to religion. It is derived from the name of the character in Molière's comedy.

Teazle, Lady. The heroine of Sheridan's comedy *The School for Scandal*, and the wife of Sir Peter Teazle, an old gentleman who marries late in life. She is represented as being "a lively and innocent, though imprudent, country girl, transplanted into the midst of all that can bewilder and endanger her, but with enough of purity about her to keep the blight of the world from settling upon her."

Teazle, Sir Peter. A character in Sheridan's play *The School for Scandal*, husband of Lady Teazle.

Tel-el-Amarna Letters. A collection of several hundred clay tablets with cuneiform inscriptions found at Tel-el-Amarna, a village on the Nile. Official correspondence of about 1400 B. C., between Egypt and Syria.

Tempest, The. This has been called one of Shakspere's fairy plays. The story of it runs: Prospero, duke of Milan, was dethroned by his brother Antonio, and left on the open sea with his three-year-old daughter Miranda, in "a rotten carcass of a boat." In this they were carried to an enchanted island, uninhabited except by a hideous creature, Caliban, the son of a witch. Prospero was a powerful enchanter, and soon had not only Caliban, but all the spirits of the region under his control, including Ariel, chief of the spirits of the air. Years afterward Antonio, Alfonso, Sebastian, and other friends of the usurper came near the island. Prospero, by his magic, raises a storm which casts their ship on the shore, and the whole party are spellbound and brought to Prospero. Plots and counterplots follow, bringing in Caliban and clowns, but all are made ridiculous and defeated by Prospero and Ariel.

Tenson (*tĕn'sŏn*). A kind of poem among the troubadours which carries on a contention or dispute, apparently serious, and often concerning love. The tenson was usually recited by two persons in alternating stanzas. The greater number of these are found in early Italian and French literature.

Ten Times One. A writing in story form by E. E. Hale. It is said that the inspiration of this story led to the founding of the "King's Daughters" society.

Tess of the D'Urbervilles, Thomas Hardy. A tragic novel. Tess Durbeyfield, whose father fancies himself related to the great family of D'Urberville, is employed by them. Alec, the eldest son, seduces her. Her child dies. Several years afterward, Angel Clare, who has married Tess, deserts her on learning her past secret. Later, he tries to win her back, but Alec treacherously meddles, and Tess, in anger, murders him and is executed for the crime.

Thaddeus of Warsaw. The hero and title of a novel by Jane Porter.

Thangbrand. Tales of a Wayside Inn, H. W. Longfellow. King Olaf's drunken priest, "short of stature and large of limb," who was sent to Iceland, found the people poring over their books, and sailed back to Norway to say to Olaf that there was "little hope of those Iceland men."

Thekla. The daughter of Wallenstein, in Schiller's drama of this name. She is one of the poet's own creations.

Theodorus. The name of a physician, in Rabelais' romance *Gargantua*. At the request of Ponocrates, Gargantua's tutor, he undertook to cure the latter of his vicious manner of living, and accordingly purged him canonically with Anticyrian hellebore, by which medicine he cleared out all the foulness and perverse habit of his brain, so that he became a man of great honor, sense, courage, and piety.

They Shall Not Pass. During the World War, this phrase became the watchword of the defenders of Verdun. It has become the symbol of determined resistance.

Thomas the Rhymer or **Thomas Rhymer.** The popular name in Scotland of an old prophet, supposed to have been inspired by the fairies. Thomas Rhymer's real name is supposed to have been Thomas Learmount of Ercildoune (Earlston). He lived in the 13th century. A metrical romance called *Sir Tristram* is attributed to him. He is also the subject of one of the best-known English ballads.

Thorberg Skafting. Tales of a Wayside Inn, H. W. Longfellow. The master builder ordered by King Olaf

to build a ship twice as long and twice as large as the *Dragon* built by Raud the Strong, which was stranded. Thorberg built the ship, watching his workmen closely, and when she was ready for launching, King Olaf and the workmen were amazed to see every plank down her sides cut with deep gashes and more amazed to find that Thorberg had done the deed. From these gashes he then chipped and smoothed the sides, to the delight of all; she was christened the *Long Serpent* and the name of her builder recited in the saga.

Thorpe, Harry. The Blazed Trail, S. E. White. The hero of the novel, a vigorous young man, who, as a "landlooker," finds and takes up a valuable timber tract, against the crafty old corporation which seeks first to steal the timber, then to forestall him in buying it, and finally to ruin him. The true romance of the story is that of the forest and the titanic struggle of man against nature and against man.

Three Kings, Feast of the. A famous medieval festival, identical with the Epiphany. But the name is more particularly given to a kind of dramatic or spectacular representation of the incidents recorded in the second chapter of Matthew: the appearance of the wise men in splendid pomp at the court of Herod; the miraculous star; the manger at Bethlehem; the solemn and costly worship of the Babe. This was long very popular.

Three Musketeers, The, Dumas the Elder. A romance of the time of Richelieu. Also called "The Three Guardsmen." The three are Athos, Porthos, and Aramis. Their adventures, with those of D'Artagnan, make up this popular story. Dumas is said to have taken material for the story from a manuscript, *The Memoirs of D'Artagnan*, in the National Library of Paris. The story hinges on the successful attempt of the four soldiers to recover certain jewels that the queen had given to the Englishman, Buckingham. In doing this, they not only free the queen from a trap Richelieu had set for her, but they rid Richelieu, the queen's opponent, of a dangerous woman messenger, and D'Artagnan is rewarded by the cardinal with a promotion.

Thrums. The market town of Kirriemuir, in which J. M. Barrie places many of his stories and sketches, *A Window in Thrums*, *Auld Licht Idylls*, etc.

Thunderer, The. Name popularly given to the English newspaper, *The Times*. The accepted version of the way in which the great journal got its name of "The Thunderer," is that Captain Sterling, one of the "staff," once wrote a sort of apology in reference to a mistaken assertion and used the phrase "We thundered out." This caught the public fancy, hence the name. Captain Sterling was a well-known figure in London political circles and was father of the more famous John Sterling, critic, essayist, and friend of Wordsworth, Coleridge, and De Quincey.

Thwackum, Parson Roger. The learned and honest, but selfish and hot-tempered, pedagogue in Fielding's novel *The History of Tom Jones, a Foundling*.

Thyrsis (*thûr'sĭs*). (1) Corydon and Thyrsis are favorite names given to shepherds by writers of pastoral poetry. So also, Phyllis and Thostylis are names often applied to rustic maidens or shepherdesses. (2) The title of one of the most beautiful elegies in English literature in which Mathew Arnold mourns the loss of his friend, the poet Clough.

Tibbs or **Tibs.** A character in Goldsmith's *Citizen of the World*, quoted as a "most useful hand." He will write you a receipt for the bite of a mad dog, tell you an Eastern tale to perfection, and understands the business part of an author so well that no publisher can humbug him.

Tigg, Montague (*mŏn'tă-gū*). **Martin Chuzzlewit, Dickens.** A clever impostor, who lives by his wits. He starts a bubble insurance office and makes considerable gain thereby. Having discovered the attempt of Jonas Chuzzlewit to murder his father, he compels him to put his money in the "new company," but Jonas afterwards murders him.

Timon. Timon of Athens, Shakspere. The drama begins with the joyous life of Timon and his hospitable extravagance, launches into his pecuniary embarrassment and the discovery that his "professed friends" will not help him, and ends with his flight into the woods, his misanthropy, and his death. Introduced into the play is "Timon's Banquet." Being shunned by his friends in adversity, he pretended to have recovered his money, and invited his false friends to a banquet. The table was laden with covers, but, when the contents were exposed, nothing was provided but lukewarm water.

Tintern Abbey. (1) A noted ruin of great beauty on the Wye in Monmouthshire, England. The abbey was founded by Cistercian monks in 1131. (2) The shortened title of a reflective poem by William Wordsworth,—one of his finest works. The complete title is "Lines Composed a Few Miles above Tintern Abbey, on Revisiting the Banks of the Wye during a Tour, July 13, 1798."

Tiny Tim. Christmas Stories, Dickens. A striking character, the little son of Bob Cratchit, whose family were made happier by gifts from the converted Scrooge. See *Scrooge*, *Ebenezer*.

Tippecanoe. Name given to William Henry Harrison during the political canvass which preceded his election, on account of the victory gained by him over the Indians in the battle which took place on the 6th of November 1811, at the junction of the Tippecanoe and Wabash rivers.

Tirzah. Ben Hur, General Lew Wallace. A beautiful Jewish maiden, sister of Ben Hur. Their father had been a prince of Jerusalem, and died leaving a large estate. At the age of fifteen, Tirzah, with her mother, was imprisoned through the cruelty of Messala who coveted their property. They both became lepers and when released from prison were forced to live among the outcasts. They were healed by Jesus, Ben Hur himself witnessing the miracle. As soon as the change in their look had taken place he recognized them, and, when the Jewish statutes had been complied with, Tirzah and her mother were united with their brother in their former home.

Toby, Uncle. A character in Sterne's *Tristram Shandy*. A captain who was wounded at the siege of Namur, and was obliged to retire from the service. He is the impersonation of kindness, benevolence, and simple-heartedness; his courage is undoubted, his gallantry delightful for its innocence and modesty.

Token, The. A collection of original articles, prose and poetry, by various contributors, issued first in the year 1824. This was the first "annual" in America; it became popular and was continued for fifteen years under the supervision of S. G. Goodrich, or "Peter Parley." To it Hawthorne owed his first hold on the public.

Tom, Dick, and Harry. An appellation very commonly employed to designate a crowd or rabble.

Tommy Atkins. Barrack-room Ballads, Kipling. The name is here used in its general meaning, a British soldier. The name came from the little pocket ledgers served out, at one time, to all British soldiers. In these manuals were to be entered the name, the age, the date of enlistment, etc. The War Office sent with each little book a form for filling it in, and the hypothetical name selected was "Thomas Atkins." The books were instantly so called, and it did not require many days to transfer the name from the book to the soldier.

Tom Sawyer. Adventures of Tom Sawyer, Mark Twain. An "elastic" youth whose performances delight both old and young readers. Queer enterprises influenced by the old superstitions among slaves and children in the Western states give reliable pictures of boy-life in the middle of the 19th century.

Tom the Piper. One of the characters in the ancient morris dance, represented with a tabor, tabor-stick, and pipe. He carried a sword and shield, to denote his rank.

Tom Thumb. In legendary history, a dwarf no larger than a man's thumb. He lived in the reign of King Arthur, by whom he was knighted. He was killed by the poisonous breath of a spider in the reign of the successor of King Arthur. Among his adventures it is told that he was lying one day asleep in a meadow, when a cow swallowed him as she cropped the grass. At another time, he rode in the ear of a horse. He crept up the sleeve of a giant, and so tickled him that he shook his sleeve, and Tom, falling into the sea, was swallowed by a fish. The fish being caught and carried to the palace gave the little man his introduction to the king. The oldest version of this nursery tale is in rime.

Tonio. Daughter of the Regiment, Donizetti. The name of the youth who saved Marie, the sutler girl, from falling down a precipice. The two fall in love with each other, and the regiment consents to their marriage, provided Tonio will enlist under its flag. No sooner is this done than the marchioness of Berkenfeld lays claim to Marie as her daughter, and removes her to the castle. In time, the castle is besieged and taken by the very regiment into which Tonio had enlisted, and, as Tonio had risen to the rank of a French officer, the marchioness consents to his marriage with her daughter.

Topsy. Uncle Tom's Cabin, Mrs. Stowe. A young slave girl, who never knew whether she had either father or mother, and, being asked by Miss Ophelia St. Clare how she supposed she came into the world, replied, "I 'spects I growed." Topsy illustrates the amusing and humorous side of the African character, as well as its capacity for education.

Touchstone. A clown in Shakspere's *As You Like It*.

Townley Mysteries. Certain religious dramas; so called because the manuscript containing them belonged

to P. Townley. These dramas are supposed to have been acted at Widkirk Abbey, in Yorkshire.

Traddles. David Copperfield, Dickens. A simple, honest young man, who believes in everybody and everything and who is never depressed by his want of success. He had the habit of brushing his hair up on end, which gave him a look of surprise. Traddles was generally accompanied by "the dearest girl" and her numerous sisters.

Treasure Island, Stevenson. A story of pirates' gold. After the death of an old seaman in the Admiral Benbow inn, a map is found in his chest. Squire Trelawney, Dr. Livesey, men of the neighborhood, and Jim Hawkins, the young son of the innkeeper, go on a voyage in search of the island shown on the map. Unluckily, they ship some of the original pirates in their crew, chief of them, Long John Silver, ship's cook. Mutiny and fighting arise at the island. But in the end, through a sailor long marooned on the island, they find the treasure.

Triads. The Welsh triads, known in literature, are collections of historic facts, mythological traditions, moral maxims, or rules of poetry, disposed in groups of three.

Trilby. See *Little Billee.*

Trim, Corporal. Uncle Toby's attendant, in Sterne's novel *The Life and Opinions of Tristram Shandy, Gent,* distinguished for his fidelity and affection, his respectfulness, and his volubility.

Tristram, Sir. One of the most celebrated heroes of medieval romance. His adventures form an episode in the history of Arthur's court. He appears in Tennyson's "The Last Tournament."

Trotwood, Betsey. David Copperfield, Dickens. A great-aunt to David, whose daily trial seemed to be donkeys. A dozen times a day would she rush on the green before her house to drive off the donkeys and donkey-boys. She was a most kind-hearted woman, who concealed her tenderness under a snappish manner. Miss Betsey was the true friend of David Copperfield.

Troubadours. Minstrels of southern France in the 11th, 12th, and 13th centuries. They were the first to discard Latin and use the native tongue in their compositions. Their poetry was about either love and gallantry or war and chivalry. In northern France, similar minstrels were called trouvères.

Truth, The, Clyde Fitch. Becky Warder, who has been in the habit of telling fibs, "white lies," about all sorts of things, suddenly finds herself involved in disaster. Her husband, whose faith in her has been complete, finds she has lied to him about money sent to her father, a gambler, about bills, and about meeting the husband of a friend. He leaves the house, offering her a divorce if she wants it. She goes to her father in Baltimore. He telegraphs Warder that Becky is dying, and Warder hastens to Baltimore. Becky resents the lie in the message and faces her husband with the truth. The two are reconciled, with the prospect of the wife's sincere attempt to tell the truth thereafter. The subtle interplay of the lie and the truth is skillfully presented in the drama. The problem as to whether Becky can tell the truth remains unsolved.

Truthful James. The character whom Bret Harte makes the narrator of a number of his poetic stories, among them "The Society on the Stanislaw" and "The Heathen Chinee."

Tuck, Friar. Ivanhoe, Scott. The father-confessor of Robin Hood and connected with Fountain Abbey. He is represented as a clerical Falstaff, very fat and self-indulgent, very humorous, and somewhat coarse. His dress was a russet habit of the Franciscan order. He was sometimes girt with a rope of rushes. Friar Tuck also appears in the "morris dance" on May Day.

Tulkinghorn, Mr. Bleak House, Dickens. The family lawyer of Sir Leicester Dedlock. He is murdered by Lady Dedlock's French maid.

Tulliver, Maggie. See *Mill on the Floss, The.*

Turveydrop. Bleak House, Dickens. A conceited dancing master, who imposes on the world by his majestic appearance and elaborate toilette. He is represented as living upon the earnings of his son, who has a most slavish reverence for him as a perfect "master of deportment."

Twelfth Night. A drama by Shakspere. The story is said to have come from a novelette written early in the 16th century. A brother and sister, twins, are shipwrecked. Viola, dressed like her brother, becomes page to the duke Orsino. The duke was in love with Olivia, and, as the lady looked coldly on his suit, he sent Viola to advance it, but the willful Olivia, instead of melting towards the duke, fell in love with his beautiful page. Sebastian, the twin brother of Viola, was attacked in a street brawl before Olivia, who, thinking him to be the page, invited him in. The result was the marriage of Sebastian to Olivia and of the duke to Viola.

Twice Told Tales. This name was given by the author, Nathaniel Hawthorne, to the tales included under its title, because some of them had been already published in the *Token* and other periodicals. They are mystical and, though in prose form, are the work of a poet. The tales are nearly all American in subject but treated from the spiritual rather than the practical side.

Two Gentlemen of Verona, The, Shakspere. One of the early comedies. The two gentlemen, Valentine and Proteus, go to Milan. Both fall in love with Sylvia. Proteus persuades the duke to banish Valentine, who gathers a following of bandits to capture Sylvia, who is affianced to Thurio. But Proteus had forgotten Julia, his Veronese sweetheart, who, following to Milan, serves him, unrecognized, as a page. In the end, Thurio proving unworthy, Sylvia is married to Valentine, while Proteus, repenting, takes Julia as his bride.

Two Noble Kinsmen, The, Shakspere and **Fletcher.** The story of this play is that of Palamon and Arcite, told by many poets. The two young men, prisoners, fall in love with Emilia, sister-in-law of Duke Theseus, who rules that she shall be the bride of the victor of a combat. Arcite wins, but is later killed by a fall from his horse, and Palamon marries the lady.

Ubaldo. Jerusalem Delivered, Tasso. One of the older crusaders, who had visited many regions. He and Charles the Dane went to bring back Rinaldo from the enchanted castle.

Ubeda. Don Quixote, Cervantes. A noted artist who one day painted a picture, but was obliged to write under it, "This is a cock," in order that the spectator might know what was intended to be represented.

Ulin. Tales of the Genii, Ridley. An enchantress, who had no power over those who remained faithful to Allah and their duty; but, if any fell into error or sin, she had full power to do as she liked. Thus, when Misnar, sultan of India, mistrusted the protection of Allah, she transformed him into a toad.

Ulrica. Ivanhoe, Scott. An old woman, one-time mistress of Front de Bœuf. She gets revenge for all his illtreatment of her in the burning of the castle of Torquilstone.

Ultima Thule. The extremity of the world; the most northern point known to the ancient Romans. Pliny and others say it is Iceland. See William Black's novel *A Princess of Thule.* Also applied to Ireland.

Una. Faery Queen, Spenser. The personification of truth. She goes, leading a lamb and riding on a white ass, to the court of Gloriana, to crave that one of her knights might undertake to slay the dragon which kept her father and mother prisoners. The adventure is accorded to the Red Cross Knight. Being driven by a storm into "Wandering Wood," a vision is sent to the knight, which causes him to leave Una, and she goes in search of him. In her wanderings a lion becomes her attendant. After many adventures, she finds St. George, the Red Cross Knight, but he is severely wounded. Una takes him to the house of Holiness, where he is carefully nursed, and then leads him to Eden.

Uncle Remus. The old plantation negro, whom Joel Chandler Harris makes the narrator of the fascinating animal fables in his fourteen "Uncle Remus" books (1881–1908).

Uncle Tom. Uncle Tom's Cabin, Mrs. Stowe. A negro slave of unaffected piety, and most faithful in the discharge of all his duties. His master, a humane man, becomes embarrassed in his affairs, and sells Tom to a slave dealer. After passing through various hands and suffering intolerable cruelties, he dies.

Underground Railroad, The. A popular embodiment of the various ways in which fugitive slaves from the Southern states of the American Union were assisted in escaping to the North, or to Canada; often humorously abbreviated U. G. R. R. H. D. Thoreau, the naturalist and philosopher, is said to have aided escaping slaves at his cottage on Walden Pond. "The Underground Railway" is the title of an absorbing historical work on the struggle of the slaves by Professor W. H. Siebert (N. Y. 1898).

Undine (*ŭn-dēn'*). In a German fairy romance by Fouqué, a water nymph, who was exchanged for the young child of a fisherman living near an enchanted forest. One day, Sir Huldbrand took shelter in the fisherman's hut, fell in love with Undine, and married her. By marrying a mortal she obtained a soul, and with it all the pains and penalties of the human race.

Unicorn. The name means "one horn." The origin of the belief in the existence of this fabulous animal has been assigned to the animal profiles on Egyptian sculptures. Travelers in the middle ages often reported having seen unicorns. But the spirit and prowess of the animal were said to be such that it never could be taken alive. These qualities probably induced James III of Scotland to adopt the unicorn as supporter for the royal arms. Later, James VI, who was James I of England, adopted the unicorn and the lion for the royal shield of the united realms.

Urgan. Lady of the Lake, Scott. A human child stolen by the king of the fairies, and brought up in elfland. He said to Alice Brand, the wife of Lord Richard, "If any woman will sign my brow thrice with a cross, I shall resume my proper form." Alice signed him thrice, and Urgan became at once "the fairest knight in all Scotland," and Alice recognized in him her own brother Ethert.

Urganda. In the romance of *Amadis of Gaul*, a powerful fairy sometimes appearing in all the terrors of an evil enchantress.

Uther (*ū'thẽr*). Son of Constans, one of the fabulous or legendary kings of Britain, and the father of Arthur.

Utopia. The name of an imaginary island described in the celebrated work of Sir Thomas More, in which was found the utmost perfection in laws, politics, and social arrangements. More's romance obtained a wide popularity, and the epithet "Utopian" has since been applied to all schemes for the improvement of society which are deemed impracticable.

Valentine. (1) One of the heroes in the old romance *Valentine and Orson*, which is of uncertain age and authorship. (2) One of the *Two Gentlemen of Verona*, in Shakspere's play of that name. (3) A gentleman attending on the duke in Shakspere's *Twelfth Night*. (4) One of the characters in Goethe's *Faust*. He is a brother of Marguerite.

Valerian or **Valirian. Canterbury Tales, Chaucer.** The husband of St. Cecilia. Cecilia told him she was beloved by an angel, who constantly visited her; and Valirian requested to see this visitant. Cecilia replied that he should do so, if he went to Pope Urban to be baptized. This he did, and, on his return, the angel gave him a crown of lilies and to Cecilia a crown of roses, both from the garden of paradise.

Valley of Humiliation. Pilgrim's Progress, Bunyan. The place where Christian encountered Apollyon, just before he came to the "Valley of the Shadow of Death."

Vanity Fair. Pilgrim's Progress, Bunyan. (1) A fair established by Beelzebub, Apollyon, and Legion, for the sale of all sorts of vanities. It was held in the town of Vanity, and lasted all the year round. Here were sold houses, lands, trades, honors, titles, kingdoms, and all sorts of pleasures and delights. Christian and Faithful had to pass through the fair, which they denounced. (2) Thackeray gave the name *Vanity Fair* to the first of his famous works. It has been called "a novel without a hero." See *Sedley*.

Varden, Dolly. In Dickens's *Barnaby Rudge*, the pretty, coquettish daughter of the locksmith, Gabriel Varden. She marries Joe Willet, and is for many years the mistress of the Maypole Inn. Her name was formerly applied to certain styles of gay dress stuffs.

Veck, Toby. The Chimes, Dickens. A ticket porter who went on errands and bore the nickname Trotty. One New Year's Eve he had a nightmare and fancied he had mounted to the steeple of a neighboring church, and that goblins issued out of the bells. He was roused from his sleep by the sound of the bells ringing in the new year.

Veda (*vā'dā*). The technical name of those ancient Sanskrit works on which the first period of the religious belief of the Hindus is based.

Veiled Prophet. Lalla Rookh, Moore. He assumed to be a god, and maintained that he had been Adam, Noah, and other representative men. Having lost an eye, and being otherwise disfigured in battle, he wore a veil to conceal his face, but his followers said it was done to screen his dazzling brightness.

Veni Creator Spiritus (*vē'nī crē-ā'tŏr spĭr'ĭ-tŭs*). An ancient and very celebrated hymn of the Roman breviary, which occurs in the offices of the Feast of Pentecost, and which is used in many of the most solemn services of the Roman Catholic Church. Its author is not known with certainty.

Vernon, Die or **Diana. Rob Roy, Scott.** The heroine of the story, a highborn girl of great beauty and talents. She is an enthusiastic adherent of a persecuted religion and an exiled king. She is excluded from the ordinary wishes and schemes of other girls by being predestined to a hateful husband or a cloister, and by receiving a masculine education, under the superintendence of two men of talent and learning.

Vicar of Wakefield. A novel by Goldsmith, praised by Goethe as one of the best ever written. Its title refers to the hero, Dr. Primrose, whose experiences and naïve observations are frequently to be understood as those of the author himself. The tale abounds in amusing episodes, as memorable as proverbs. These include the purchase, by the vicar's son Moses, of a pair of green spectacles at the price of a horse; also the painting of the family portrait, which, when completed after great care and expense, was found to be too large to be hung. The chief charm of the work lies in its easy movement of idyllic events recorded in language at once homely and felicitous. Many of the incidents verge on melodrama, but the work as a whole leaves an inescapable impression of reality. See *Primrose*, page 307.

Vincentio (*vĭn-sĕn'shĭ-ō*). The duke of Vienna in Shakspere's *Measure for Measure*. He commits his scepter to Angelo, under the pretext of being called to take an urgent and distant journey, and, by exchanging the royal purple for a monk's hood, observes incognito the condition of his people.

Viola (*vī'ō-lā*). **Twelfth Night, Shakspere.** A sister of Sebastian. They were twins, and so much alike that they could be distinguished only by their dress. When they were shipwrecked, Viola was brought to shore by the captain, but her brother was left to shift for himself. Being in a strange land, Viola dressed as a page, and, under the name of Cesario, entered the service of Orsino, duke of Illyria. The duke greatly liked his beautiful page, and, when he discovered her true sex, married her.

Violenta. All's Well that Ends Well, Shakspere. A character in the play who enters upon the scene only once and then neither speaks nor is spoken to. The name has been used to designate any young lady nonentity; one who contributes nothing to the amusement or conversation of a party.

Virginian, The, Owen Wister. A story of the cattle country of Wyoming in the '80's of the 19th century. The hero is a young Virginian, in love with a school-teacher from Vermont. The Virginian "cow-puncher" character is said to have been drawn from the ranch life of Theodore Roosevelt.

Virginians, The, Thackeray. The story of the two grandsons of Henry Esmond. They take opposite sides in the Revolution. The action lies in both America and England. The gallery of characters includes George Washington, Dr. Johnson, and Richardson and Fielding, the novelists.

Vision of Sir Launfal, J. R. Lowell. A poetic story of a dream of the knight on the eve of his setting out on a quest. In this vision he sees the opportunity for best service at his own gates in giving himself with his alms. In Arthurian story Sir Launfal was a knight of the Round Table and a steward of King Arthur.

Vivien or **Vivian. Idylls of the King, Tennyson.** She is also known as the Lady of the Lake, and according to early legends was of a high family. These legends tell that Merlin, in his dotage, fell in love with her. She then persuaded Merlin to show her how a person could be imprisoned by enchantment without walls, towers, or chains and, after he had done so, she put him to sleep. While he slept, she performed the needful ceremonies, whereupon he found himself enclosed in a prison stronger than the strongest tower, and from that imprisonment was never again released.

Walden. A record of the experiences of the author, Thoreau, while living near Walden Pond on nine cents a day. He read Homer, watched the birds, bees, ants, and the animals that came within his range, describing the results of his acute powers of observation in a characteristic, quaint form.

War and Peace, Count Tolstóy. The title of a long philosophical novel. The action centers in the Napoleonic invasion of Russia. The story includes a vast number of characters, drawn with minute care and great realism. The author tries to show even the great leaders as creatures in the hands of overpowering fate or chance.

Waverley. Name of hero and title of novel by Scott. Captain Waverley, of Waverley Honour, after an injury resigned his military commission and proposed to Flora MacIvor, but was not accepted. Flora's brother, Fergus MacIvor, introduced him to Prince Charles Edward. He entered the service of the Young Chevalier, and in the battle of Prestonpans saved the life of Colonel Talbot. The colonel, out of gratitude, obtained the pardon of young Waverley, who then married Rose Bradwardine and settled down quietly in Waverley Honour. The novel *Waverley* was the first of Scott's historical novels, published in 1814. The materials are Highland feudalism, military

bravery, and description of natural scenery. The chief characters are Charles Edward the Chevalier, the noble old baron of Bradwardine, the simple faithful clansman Evan Dhu, and the poor fool Davie Gellatley.

Waverley Novels. General name given to Scott's historical novels. Those founded on English history are *Ivanhoe*, *Kenilworth*, *Peveril of the Peak*, *Betrothed*, *Talisman*, and *Woodstock*. Founded on Scotch history are *Waverley*, *Old Mortality*, *Monastery*, *The Abbott*, *Legend of Montrose*, *Fair Maid of Perth*, and *Castle Dangerous*. Treating of continental history are *Quentin Durward*, *Anne of Geierstein*, and *Count Robert of Paris*. Twelve others in the series, including *Rob Roy*, *Heart of Midlothian*, *Bride of Lammermoor*, are connected with historical events, but are more personal and deal mainly with Scottish character.

Weird Sisters, The. Three witches, in Shakspere's tragedy *Macbeth*.

Weller, Samuel. In Dickens's celebrated *Pickwick Papers*, a servant to Mr. Pickwick, to whom he becomes devotedly attached. Rather than leave his master, when he is sent to the Fleet, Sam Weller gets his father to arrest him for debt. He is an inimitable compound of wit, simplicity, quaint humor, and fidelity. "Tony Weller," father of Sam; a coachman of the old school, who drives between London and Dorking. On the coach box he is a king, elsewhere a mere London "cabby." He marries a widow and his constant advice to his son is, "Sam, beware of the vidders." Everybody was merry over Mr. Pickwick and Sam Weller, and everybody was eager to read this entertaining author.

Werewolf (*wēr'woŏlf'*), **"Man-Wolf."** The notion of the changing of men into wolves is very old in literature. The Romans fancied the change made by magic. The Norse tales employ the wolfskin shirt, by which the man becomes a wolf for nine days out of ten.

When Knighthood Was in Flower, Charles Major. A historical novel, which tells the love story of Mary Tudor, sister of Henry VIII, and Charles Brandon.

Whittington, Dick. The hero of a famous old legend, in which he is represented as a poor orphan boy from the country, who went to London, where, after undergoing many hardships, he obtained a penny and bought a cat. Shortly after, he sent his cat on a venture in his master's ship; and the king of Barbary, whose court was overrun with mice, gladly bought the cat at a high price. With this money Whittington commenced business, and succeeded so well that he finally married his former master's daughter, was knighted, and became lord mayor of London.

Wife of Bath. One of the pilgrims in Chaucer's *Canterbury Tales*. She tells, in her turn, the story of Midas. The prologue to her story is famous for the wife's naïve revelation of her own story and character.

Wild Duck, The, Ibsen. An ironic play, its leading idea being that sometimes it is unwise to tell the entire, bald truth.

Wilfer. Name of a family prominent in *Our Mutual Friend*, by Dickens. Reginald Wilfer, called by his wife R. W., and by his fellow clerks Rumty. He was clerk in the drug house of Chicksey, Stobbles, and Veneering. Mrs. Wilfer, wife of Mr. Reginald, a most majestic woman, with an exalted idea of her own importance. Bella Wilfer, daughter of Mr. and Mrs. Wilfer, a wayward, playful, affectionate, spoiled beauty, so pretty, so womanly, and yet so childish that she was always captivating. She spoke of herself as "the lovely woman." Bella married John Harmon. Lavinia Wilfer, a younger sister of Bella, and called "The Irrepressible."

William Tell. The hero of a Swiss legend, which has been told in many poems and dramas. He obeys the command of Gessler, the governor, to shoot an apple from his son's head. Asked by Gessler why he had put a second arrow in his belt, he replies, "To kill you with, had I slain my son." He is then placed in a boat as prisoner, but escapes and kills the governor, thus opening the Swiss War of Liberation from Austria. The date is placed in 1307. But the fact seems to be that, in the middle of the 15th century, an unknown author introduced into Switzerland a Danish archer and apple story, which fitted local needs so well that it grew into a national legend. Schiller's *William Tell* is the best-known telling of the story in drama.

Winter's Tale, The, Shakspere. Leontes, king of Sicily, invites his friend Polixenes to visit him, becomes jealous, and commands Camillo to poison him. Camillo warns Polixenes and flees with him to Bohemia. Leontes casts his queen, Hermione, into prison, where she gives birth to a daughter. Hermione is reported dead, and the child is brought up by a shepherd, who calls it Perdita. Florizel sees Perdita and falls in love with her; but Polixenes, his father, tells her that she and the shepherd shall be put to death if she encourages the suit. Florizel and Perdita flee to Sicily and are introduced to Leontes. It is soon discovered that Perdita is his lost daughter. Polixenes tracks his son to Sicily and consents to the union. The party are invited to inspect a statue of Hermione, and the statue turns out to be the living queen.

Witching Hour, The, Augustus Thomas. A play upon the theme of hypnotism and telepathy. In the rooms of Jack Brookfield, a professional gambler of Louisville, Ky., Clay Whipple strikes Tom Deming with a heavy paper cutter. Deming, who while drunk has been pursuing Clay with a cat's-eye stickpin, to which Clay has an inherited aversion, falls dead. A jury convicts Clay of murder. The prosecutor is Hardmuth who is Clay's rival for the hand of Brookfield's niece, Viola Campbell. On a retrial Clay is acquitted. Between the two trials, Brookfield has come, under the tutelage of Supreme Court Justice Prentiss, to believe in the effectiveness of his own powers of telepathy. He makes use of these powers to influence the trial jury. Believing that much of his gambling success has been due to these powers, he quits that business. Further, he has publicly charged Hardmuth, on good evidence, with having planned the murder of a governor of the state. But, believing that his own previous thought may have influenced Hardmuth, he helps him to escape from the state. Under his suggestion also, Clay is freed from his morbid fear of the "cat's-eye."

Worldly Wiseman, Mr. One of the characters in Bunyan's *Pilgrim's Progress*, who converses with Christian by the way, and endeavors to deter him from proceeding on his journey.

Wrayburn, Eugene. Our Mutual Friend, Dickens. Barrister at law. He is an indolent, moody, whimsical young man, who loves Lizzie Hexam. After he is nearly killed by Bradley Headstone, he reforms, and marries Lizzie, who saved his life.

Yahoo. A name given by Swift, in his satirical romance *Gulliver's Travels*, to one of a race of brutes having the form and all the vices of man. The Yahoos are represented as being subject to the Houyhnhnms, or horses endowed with reason.

Yarpe. The Gray Horse Troop, Hamlin Garland. The resolute leader of the cowboy gang that undertook to drive the Tetons from their reservation lands in the Far West. The real hero of the story, Captain Curtis, is in charge of the Indians. His fight against the political ring that would defraud his wards and his courageous handling of a serious crisis show him to be a different power from that with which these cowboys generally met, when they "shot up" towns and raced the Tetons across the hills, making of themselves a lynching party on Federal territory. United States soldiers appear on the scene and Yarpe and his men depart.

Yeast. A romance by Charles Kingsley. It was the outcome of his interest in the Chartist riots and disturbances, and it gives some of the most powerful delineations of the sufferings of the poor, found in English literature.

Yemassee. A historical tale founded on personal knowledge of the American Indian character. It was written in the first half of the 19th century by W. G. Simms, of whom it has been said, "He has done for the historical traditions of the Carolinas what Cooper did for those of the North and West."

Yeo. Westward Ho! Chas. Kingsley. A character in the novel, prominent as a bold mariner, a true friend, a terrible foe. He was a lifelong sailor, and made voyages to New Guinea for negro slaves that were sold in the West Indies. He joined in the search for fabulous wealth in New Spain, crossed the Isthmus of Panama, was pursued, and wandered in the woods of the isthmus for some months. *Westward Ho!* is a historical novel of the Elizabethan English period.

Yorick. (1) The king of Denmark's jester, mentioned in Shakspere's *Hamlet*. Hamlet picks up his skull in the churchyard and apostrophizes it. (2) A humorous and careless parson in Sterne's *Tristram Shandy*.

Zarathustra (*zăr'ă-thōōs'trä*). *Thus Spake Zarathustra* is the title of a work by Frederick Nietzsche, in which he embodied his philosophy. Zarathustra is a form of the name of Zoroaster, the Persian sage.

Zenobia. Blithedale Romance, Hawthorne. A strong-minded woman, beautiful and intelligent, who was interested in playing out the pastoral of the life at Brook Farm. She is represented as disappointed in love; at last she drowned herself.

Zero Hour. The name given in the World War to the moment set for a charge from the trench. Generally used to mean the instant for beginning any important move or work.

Zuleika (*zōō-lā'kä*). (1) In Byron's "Bride of Abydos," the pasha's daughter in love with her cousin Selim. They elope, but are pursued. Selim is killed, and Zuleika dies of a broken heart. (2) A character in the Persian story of Joseph and Zuleika.

MYTHOLOGY

THE term mythology is applied to the body of stories current among ancient and primitive peoples regarding their gods and heroes. Many of these myths, particularly those of the Greeks and Romans, have been woven into the literatures of the world, from which, to no small degree, they have passed into common knowledge.

This section is a guide to mythology from two separate and distinct approaches—the literary and the practical.

The student of literature is continually meeting allusions to myths which must be understood if the author's meaning is to be intelligible. In such instances, the reader is already in possession of the name of the mythical character or place and he wishes to learn the story connected with it. For this purpose he will find a trusty guide in the Dictionary of Mythology on the following pages.

On the other hand, there are many purposes for which it is desirable to know the mythical names and stories associated with certain ideas, qualities, or the like. Beginning with such terms as love, war, friendship, or fleetness, for instance, one may wish to know what deities or mythical characters are associated with them. The answers to such questions are quickly found by consulting the Table of Mythological Associations given below. For every mythological name in this table a descriptive article will be found in the Dictionary of Mythology. If the reader wishes to know, for example, what mythical names and stories are associated with beauty, he finds in the table the term Beauty, followed by the names Adonis, Aphrodite, and others. Then by referring to each of these names in the Dictionary of Mythology, he learns the principal stories connected with them.

TABLE OF MYTHOLOGICAL ASSOCIATIONS

AGRICULTURE. See *Earth, Fruit, Harvest, Sheep, Woods.*
ART. Apollo, Muses, Parnassus.
AVIATION. Dædalus, Icarus, Pegasus.
BEAUTY. Adonis, Aphrodite, Apollo, Graces, Freya, Helen, Hyperion, Krishna, Phaon, Rambha, Venus.
BIRDS. Æsacus, Alectryon, Blue Jay, Coronis, Leda, Paupukkeewis, Philomela, Phœnix.
BRAVERY. Achilles, Deiphobus, Euphorbus, Fortitudo, Pyrrhus, Tyr.
CELESTIAL REGIONS. Asgard, Bilskirnir, Cauther, Elysium, Gladsheim, Glasir, Islands of the Blest, Valhalla.
CIVILIZATION. Cadmus, Cecrops, Egeria, Hou Chi, Italapas, Melissa, Old One, Prometheus, Votán.
COLD. Elivagar, Fafnir, Gerda, Ginungagap, Hymir, Lord of Cold Weather, Mowis, Niflheim, Ymir.
CREATION. Afraid of Nothing, Chaos, Dagan, Earth-Namer, Embla, Iapetus, Ormuzd, Pandora.
DANCE. Corybantes, Silenus, Terpsichore.
DAWN. Aurora.
DEATH. Azrael, Giallar, Hell Shoon, Lethe, Libitina, Manes, Pauguk, Ponemah, Valkyries.
DEMONS, SPIRITS, and DWARFS. Azazel, Barguest, Beelzebub, Berg Folk, Diatyas, Dives, Elf, Galar, Gian ben Gian, Gnome, Goblins, Kelpie, Kobold, Lilith, Mammon, Mephistopheles, Moakkibat, Nickneven, Nix, Trolls.
DESTRUCTION. Apollo, Nickar, Ragnarok, Siva.
EARTH or SOIL. Demogorgon, Duergar, Frigga, Great Turtle, Midgard, Pachacamac.
EDUCATION. Athena, Minerva.
ELOQUENCE. Bragi, Mercury.
EVIL. Ahriman, Akuman, Belphegor, Dahak, Eblis, Hobomoko, Hugon, Loki, Nickar, Rakshasas.
FAIRIES. Befana, Elf, Hodcken, Melusina, Peri.
FAITHFULNESS. Penelope.
FATE. Atropos, Clotho, Fates, Lachesis, Norns.
FERTILITY. Danu, Draupnir, Frey, Isis, Mithra, Ops.
FIRE. Agni, Fire People, Fire Spirit, Nanabozho, Vulcan.
FLEETNESS. Ajax, Atalanta, Hippomenes.
FLOOD. Coxcox, Deucalion and Pyrrha.
FLOWERS. Clytie, Flora, Hyacinthus, Narcissus.
FOOD and DRINK. Ambrosia, Nectar.
FOUNTAINS. Aganippe, Arethusa, Camenæ, Castilia, Hippocrene, Naiads, Pirene.
FRIENDSHIP. Iolaus, Lofen, Nisus, Patroclus, Pylades.
FRUIT. Feronia, Golden Apples, Iduna, Pomona.
GARDENS. Pomona, Priapus.
GIANTS. Antæus, Atlas, Briareus, Egia, Enceladus, Giants, Læstrygonians, Ogre, Orion, Ravana, Tityus.
GOOD FORTUNE. Felicitas, Fortuna.
GUARDIANS. Bertha, Heimdall, Irus, Jizo, Melic Nymphs, Mentor, Palladium, Polias, Radegaste.
HAPPINESS. Nepenthe.
HARVEST. Ceres, Consus, Demeter, Paimosaid, Saturn.
HEALTH. Æsculapius, Apollo, Eira, Hygeia, Podalirius.
HEROES. See KINGS.
HEROINES. Antigone, Camilla, Electra, Hecuba, Helle, Hermione, Hippolyta, Ismene, Nausicaa.
HOME and HEARTH. Hestia, Lares, Penates, Vesta.
HUNTING. Actæon, Artemis, Diana, Herla, Orion.
IMMORTALITY. Ambrosia, Calypso, Nectar, Tithonus.
INFIDELITY. Clytemnestra, Cressida.
ISLANDS. Atlantis, Ithaca.
JEALOUSY. Helice, Io, Juno, Latona.
JUSTICE. Æacus, Minos, Orlog, Rhadamanthus, Themis.
KINGS and HEROES. Agamemnon, Anchises, Bellerophon, Baldud, Diomedes, Hector, Idomeneus, Ion, Ixion, Laertes, Laius, Laomedon, Lycomedes, Meleager, Memnon, Menelaus, Neleus, Neoptolemus, Œdipus, Orestes, Palamedes, Peleus, Pelops, Perseus, Polydorus, Priam, Romulus, Telamon, Theseus, Ulysses.
LIGHT. Agni, Amida, Diana, Janus, Lucifer, Mithra.
LOVE. Aphrodite, Astarte, Cupid, Derceto, Dione, Eros, Freya, Hylas, Hymen, Kama, Lofua, Venus.
LOVE LURE. Fata Morgana, Lilinau, Lorelei, Sirens.
LOVERS. Acis, Alcestis, Ariadne, Echo, Eurydice, Laodamia, Nala, Narcissus, Parthenope, Pasiphaë, Phædra, Philemon and Baucis, Psyche, Pyramus, Tithonus.
MAGIC. Circe, Hecate, Medea, Paupukkeewis.
MEMORY. Mnemosyne.
MESSENGER. Hermes, Hofvarpnir.
MONSTERS. Argus, Centaurs, Cerberus, Chimæra, Chiron, Cyclopes, Fenris, Geryon, Gorgons, Harpies, Hydra, Lamia, Laomedon, Medusa, Minotaur, Nemean Lion, Nithhogg, Polyphemus, Scylla, Sphinx.
MOON. Astarte, Diana, Endymion, Luna, Mani, Phœbe.
MOUNTAINS. Calpe, Cybele, Helicon, Ida, Koppenberg, Latmus, Mænalus, Meru, Olympus, Parnassus, Pelion.
MUSIC. Amphion, Apollo, Arion, Bran, Chibiabos, Israfel, Marsyas, Orpheus, Pan.
NATURE. Mendes, Pan.
NAVIGATION. Argo, Argonauts, Pleiades.
NIGHT. Hecate, Hoder, Nox.
OCEAN and SEA. Ægir, Mermaids, Mimir, Neptune, Nereids, Oceanids, Oceanus, Poseidon, Thetis, Triton.
PEACE. Balder, Concordia, Frey, Frodi, Harmonia, Irene, Janus, Pax, Pukwana.
POETRY. Apollo, Bragi, Bran, Brigit, Calliope, Daphnis.
PRIDE. Arachne, Niobe, Thersites.
PROPHECY. Apollo, Augurs, Brigit, Calchas, Cassandra, Delphi, Dodona, Gripir, Helenus, Pythia, Silenus.
PURITY, or CHASTITY. Artemis, Diana.
RAIN and RAINBOW. Frey, Hyades, Iris, Pluvius.
REVELRY. Comus.
RICHES and GAIN. Kubera, Mercury, Midas, Plutus.
RIVERS. Alpheus, Elivagar, Enipeus, Ifing, Pactolus.
ROBBERY and THIEVING. Cacus, Charybdis, Mercury.
RULERS OF GODS. Amen, Ammon, Anu, Baal, Brahma, Cronus, Frigga, Grid, Hera, Juno, Jupiter, Manitou, Odin, Ormuzd, Rhea, Zeus.
SEASONS. Æstas, Glooskap, Horæ, Ostara, Peboan.
SERPENTS. Adissechen, Laocoön, Midgard Serpent, Python.
SHEEP and CATTLE. Pales, Pan.
SLEEP and DREAMS. Morpheus.
STARS and CONSTELLATIONS. Ariadne, Callisto, Cassiopeia, Gemini, Hyades, Orion, Pleiades, Sirius.
STRENGTH. Chou, Hercules, Megingiard.
STRIFE. Discordia, Eris.
SUN. Ama-Terasu, Aten, Frey, Helios, Horus, Hyperion, Ipalnemohuani, Phaëthon, Rama Chandra, Sol.
THUNDER. Donar, Haskah, Mjöllnir, Thor, Thunder Bird.
TREASURE. Cluricaune, Golden Fleece, Hesperides.
TREES. Daphne, Lotis, Phyllis, Sedrat, Yggdrasil.
UNDERWORLD. Aralu, Avernus, Cerberus, Charon, Cocytus, Dis, Elbegast, Erebus, Garm, Giall, Hades, Hecate, Hel, Naraka, Persephone, Pluto, Styx, Tartarus.
VENGEANCE. Alecto, Diræ, Eumenides, Furies, Nemesis.
WAR. Ares, Bellona, Mars.
WINDS. Æolus, Auræ, Boreas, Feng, Zephyrus.
WINE. Bacchus, Dionysus, Icarius, Liber, Mæra.
WISDOM. Athena, Mimir, Minerva, Nestor, Odhrerir.
WOODS. Artemis, Dryads, Fauns, Satyr, Silvanus.
YOUTH. Agni, Hebe, Iduna, Jamshid.

MYTHOLOGICAL PERSONS, PLACES, AND STORIES

Acheron (*ăk'ĕr-ŏn*). One of the four rivers of the lower regions. See *Styx*.

Achilles (*ă-kĭl'ēz*). The son of Peleus and Thetis. In the Trojan War he was the most distinguished of the Greeks for his strength and bravery. When Achilles was born, Thetis plunged him in the river Styx, which made him invulnerable in every part except the heel by which she held him. And in this heel later he received a fatal wound.

Acis (*ā'sĭs*). The handsome shepherd loved by the nymph Galatea, whose favor the monstrous Cyclops, Polyphemus, sued for in vain.

Acrisius (*ă-krĭs'ĭ-ŭs*). Son of King Abas of Argos, grandson of Lynceus, and great-grandson of Danaus. An oracle had declared that Danaë, the daughter of Acrisius, would give birth to a son who would kill his grandfather. For this reason Acrisius kept Danaë shut up in a brazen tower. But here she became the mother of Perseus, by Zeus, who visited her in the form of a shower of gold.

Actæon (*ăk-tē'ŏn*). The son of Aristæus and Autonoë, daughter of Cadmus. He was reared by Chiron, and, becoming passionately fond of the chase, passed his days chiefly in pursuit of wild beasts that haunted Mount Cithæron. There, having accidentally come upon and seen Diana taking a bath, he was turned into a stag by her and killed by his own dogs.

Adad (*ā-dăd'*). An Assyrian and Babylonian god of the storm, identified with Ramman and Rimmon, the latter of whom is mentioned in the Old Testament. His weapons were flood, lightning, and famine.

Adissechen (*ă-dĭs'ĭ-kĕn*). In Hindu mythology, the serpent of a thousand heads which holds the universe in place.

Admetus (*ăd-mē'tŭs*). See *Alcestis* and *Apollo*.

Adonis (*ă-dō'nĭs*). A beautiful youth, loved by Venus and slain by a wild boar which he was hunting. Venus was inconsolable at his loss, and at last obtained from Proserpina consent that Adonis should spend six months on earth with her and six months among the shades.

Adrammelech (*ă-drăm'ĕ-lĕk*). A god of the people of Sepharvaim, to whom infants were burned in sacrifice. He was later known as one of the fallen angels.

Æacus (*ē'ă-kŭs*). Son of Jupiter and grandson of the river god Asopus. He was renowned throughout Greece for his justice and piety, and after his death he became one of the judges in Hades.

Æetes (*ē-ē'tēz*). Father of Medea and king of Colchis when Phrixus brought there the golden fleece.

Ægæon (*ē-jē'ŏn*). Another name for Briareus, the giant.

Ægeus (*ē'jē-ŭs*). King of Athens, and father of Theseus. In grief at the supposed loss of his son he threw himself into the sea, thereafter called Ægean.

Ægir (*ē'jĭr*). God of the ocean, whose wife is Ran. They had nine daughters, the billows, who were clad in colored, diaphanous robes and whose moods varied with that of their brother, the wind.

Ægis (*ē'jĭs*). The shield of Jupiter made by Vulcan.

Ægle (*ēg'lē*). The mother of the Graces. Also the name of one of the sisters of Phaëthon.

Æolus (*ē'ō-lŭs*). A son of Neptune, or, according to others, of Hippotes, an ancient lord of the Lipari Isles. Jupiter made him keeper of the winds, which, having previously been represented as mythical persons, under the names Zephyrus, Boreas, Notus, and Eurus, were afterwards considered the servants of Æolus. He held them imprisoned in a cave of an island in the Mediterranean Sea, and let them loose only to further his own designs or those of others, in producing storms. He is usually described by the poets as virtuous, upright, and friendly to strangers, and is represented pictorially as a vigorous man supporting himself in the air by wings, and blowing into a shell trumpet, like a Triton, while his short mantle waves in the wind.

Æsacus. A son of Priam, who was enamored of the nymph Hesperia and, on her death, threw himself into the sea. He was changed by Thetis into a cormorant.

Æsculapius (*ĕs'kū-lā'pĭ-ŭs*). The son of Apollo and of Coronis, the daughter of a Thessalian king. By his father he was committed to the care of the wise centaur, Chiron, who taught him botany, together with the secret efficacy of plants. He became a great physician, even restoring the dead to life on one occasion. For this, Jupiter, at the request of Pluto, struck the physician dead with lightning. After his death, at the request of Apollo, he was placed among the stars. In later centuries he was worshiped as the god of healing.

Æsir (*ē'sĭr*). The name of the thirteen celestial gods of Scandinavia, who lived in Asgard, accessible only by the bridge of the rainbow. The chief was Odin.

Æson (*ē'sŏn*). The father of Jason. In extreme old age he was restored to youth by the magic arts of Medea.

Æstas. Personification of summer; he is crowned with corn and generally holds a sickle in his hand. So he appears on reliefs, medals, and gems, usually in company with the representations of the other three seasons. He is depicted as youthful and sprightly, while Ver, "spring," is infantile and tender; Autumnus, "autumn," is mature and manly; and Hiems, "winter," is old and decrepit.

Afraid of Nothing. Among some North American Indian tribes, the goddess dwelling in the East, who created the world and prepared it for the dwelling of men.

Agamemnon (*ăg'ă-mĕm'nŏn*). King of Argos in Greece and commander in chief of the allied Greeks who went to the siege of Troy. Agamemnon married Clytemnestra, the daughter of Tyndareus, by whom he became the father of Iphianassa (Iphigenia). On his return home from Troy, he was killed by Clytemnestra and her paramour.

Aganippe (*ăg'ă-nĭp'ē*). A fountain at the foot of Mount Helicon, in Bœotia, consecrated to Apollo and the Muses. It was supposed to have the power of inspiring those who drank of it. From it the Muses were called Aganippides.

Agni. A Vedic god of light and fire. He appears under many characters, but chiefly embodies eternal youth. Sometimes he is regarded as a beneficent household god and a protector against the horror of darkness.

Ahriman (*ä'rĭ-măn*). In early Persian, Angra Mainyu (*ăn'grä mī'nū*). A deity of the ancient Persians, representing the principle of evil. Unlike Ormuzd, the principle of good, who is eternal, Ahriman is created and will one day perish.

Ajax (*ā'jăks*). The son of Telamon, and one of the Greek heroes in Homer's *Iliad*. He was of great stature, strength, and courage, but dull in mind. He killed himself out of vexation because, in a competition for the armor of Hector, the prize was awarded to Ulysses.

Akuman. The most malevolent of all the Persian gods.

Alcestis or **Alceste** (*ăl-sĕs'tĭs*) (*-sĕst*). A daughter of Pelias, and the wife of Admetus. By request of Apollo, the gods had granted eternal life to Admetus, but on the condition that, when the appointed time came for the good king's death, some one should be found willing to die in his stead. This decree was reported to Alcestis, Admetus' beautiful young wife, who offered herself as substitute and cheerfully gave her life for her husband. But immortality was too dearly bought at such a price. Admetus mourned until Hercules, pitying his grief, descended into Hades and brought back Alcestis.

Alecto (*ă-lĕk'tō*). One of the Furies. She is represented with her head covered with serpents, and breathing vengeance, war, and pestilence.

Alectryon (*ă-lĕk'trĭ-ŏn*). A servant of Mars, who was changed by him into a cock because he did not warn his master of the rising of the sun.

Alfadur or **Alfadir** (*ăl-fā'dŭr*). In Scandinavian mythology, one of the many names of Odin. It means "father of all."

Alpheus (*ăl-fē'ŭs*). A river god who fell in love with the nymph Arethusa and pursued her. Diana came to her rescue and changed her into a fountain.

Althæa (*ăl-thē'ă*). Sister of Atalanta, and mother of Meleager. She caused the death of her son and killed herself in remorse.

Ama-Terasu. A Japanese sun goddess. She figures in myths which represent her as hiding in a cave and coming out only after the other gods exhaust their powers of persuasion. Thus the alternation of night and day is portrayed. Ama-Terasu is the fabled ancestress of the royal house of Japan.

Amazons. A nation of women warriors who lived in Scythia. Early traditions tell of their appearance at the siege of Troy, under Penthesilea, their queen, who was eventually slain by Achilles. Hercules defeated them when, as one of his labors, he was required to obtain the girdle of their queen Hippolyta. Theseus later made an expedition against them and carried off their queen Antiope. In revenge they invaded Greece and were defeated on the site of Athens. A similar story was told among the Caribs in regard to a tribe of women warriors in South America and accounts for the name of the river Amazon.

Ambrosia (*ăm-brō'zhĭ-ă*). The food of the gods; so called because it preserved their immortality.

Amen (*ä'mĕn*). An ancient Egyptian god, identified with Ammon and also with the Greek Zeus. Under the name Amen-Ra, he was worshiped as king of the gods. He is at different times represented as a ram with large twisted horns; a human figure with a ram's head; a king seated on a throne and wearing a disk surmounted by two tall ostrich feathers.

Amida. One of the principal Buddhist gods of Japan, originally a god of light. Usually he is represented as seated cross-legged on a lotus flower. The "Great Buddha" at Kamakura is an image of Amida.

Ammon. A cult name of Jupiter, under which he was worshiped at Thebes in Egypt. As Jupiter Ammon he was represented as having the horns of a ram. See *Amen*.

Amphion (*ăm-fī'ŏn*). Son of Jupiter and Antiope, and brother of Zethus. He and Zethus were born on Mount Cithæron and grew up among the shepherds. When they had learned their origin they marched against Thebes, where reigned Lycus, the husband of their mother Antiope, who had married Dirce in her stead. They took the city and killed Lycus and Dirce, because they had treated Antiope with great cruelty. After they had obtained possession of Thebes, they fortified it by a wall. Amphion had received a lyre from Mercury, on which he played with such magic skill that the stones moved of their own accord and formed the wall.

Ancæus (*ăn-sē'ŭs*). A son of Neptune who, having left a cup of wine untasted to pursue a wild boar, was killed in his attempt to destroy it. With this story is connected the proverb, "There's many a slip 'twixt the cup and the lip."

Anchises (*ăn-kī'sēz*). King of Dardanus and, by his union with Venus, father of Æneas. On the capture of Troy by the Greeks, Æneas carried his father on his shoulders from the burning city.

Andromache (*ăn-drŏm'ä-kē*). The wife of Hector, prince of Troy. After the death of Hector, she was given to Neoptolemus of Epirus. Later, she married a Trojan, Helenus. She is the subject of a tragedy by Euripides.

Andromeda (*ăn-drŏm'ē-dä*). Daughter of Cepheus, king of Ethiopia. The sea nymphs, offended by her mother, had sent to ravage the coast a sea monster which, according to an oracle of Jupiter Ammon, would not desist until Andromeda had been offered to it as a sacrifice. Perseus beheld the maiden fastened with chains to a rock and the monster rising out of the sea ready to devour her, while her parents stood on the shore in despair. He rushed down upon the monster, struck it a deadly blow, delivered the maiden, and obtained her as his wife.

Angurvadel. The sword of the Norse hero Frithjof, which, inscribed with Runic letters, blazed in time of war, but gleamed with a dim light in time of peace.

Antæus (*ăn-tē'ŭs*). One of the giants, sons of Neptune, whose home was in Libya. His strength was invincible so long as he remained in contact with his mother, the earth, but when he was lifted from it his strength decreased. One of the exploits ascribed to Hercules was his conquest of Antæus, whose weakness he had discovered.

Antigone (*ăn-tĭg'ō-nē*). Daughter of Œdipus, king of Thebes. When Œdipus had put out his eyes and was exiled, she shared his misfortunes and acted as his guide until his death at Colonus. After her return to Thebes one of her brothers, Polynices, leading an attack on Thebes, was slain. Creon, the new king, forbade him burial. Antigone, disobeying the prohibition, was sentenced to be buried alive, but committed suicide in anticipation of the execution.

Anu. The chief of the Babylonian triad of gods, the others being Bel and Ea. He was the king of heaven and the father of the gods. In Hindu mythology, Anu was a son of King Yayati, who cursed him for refusing to bear the burden of his old age.

Aphrodite (*ăf'rō-dī'tē*). The Greek goddess identified by the Romans with Venus. She was said to be the daughter of Zeus, but later poets frequently relate that she was sprung from the foam of the sea, whence they derive her name.

Apis. One of the Egyptian gods worshiped under the form of a man with a bull's head.

Apollo. According to both Greeks and Romans, Apollo was the son of Jupiter and Latona, born on the island Delos. He was regarded as the god of the sciences and the arts, especially poetry, music, and medicine. They ascribed to him the greatest skill in the use of the bow and arrow, which he proved in killing the serpent Pytho, the sons of Niobe, and the Cyclopes. The last achievement incensed Jupiter, and he was banished from Olympus. During his exile Apollo abode as a shepherd with Admetus, king of Thessaly. All sudden deaths were believed to be the effect of his arrows; and with them he sent the plague into the camp of the Greeks before Troy. As he had the power of punishing men, so he was also able to deliver men, if duly propitiated. From his being the god who afforded help, he was the father of Æsculapius, the god of healing. As a god of inspiration and prophecy he gave oracles and communicated this gift to other gods and to men. He was often referred to by his cult name Phœbus.

Arachne (*ä-răk'nē*). A Mæonian maid who, proud of the skill in weaving and embroidery imparted to her by Minerva, ventured to challenge her patron goddess to a trial of skill. Minerva accepted the challenge. Arachne produced a piece of cloth in which the amours of the gods were woven, and, as the goddess could find no fault with it, she tore the work to pieces. Arachne, in despair, tried to hang herself. Minerva, however, loosened the rope and saved her life, but the rope was changed into a cobweb, and Arachne herself, into a spider.

Aralu. The Babylonian underworld. It was described as a melancholy place, where the dead wandered with only clay and dust for food.

Ares (*ā'rēz*). The Greek god of war, identified by the Romans with Mars. He is often represented as the lover of Aphrodite, or Venus.

Arethusa (*ăr'ĕ-thū'sä*). A wood nymph of Elis, in Greece, who, pursued by the river god Alpheus, was changed into a spring and ran under the sea. The waters of this spring, mingling with the river, rose again in the fountain of Arethusa in the island of Ortygia near Syracuse.

Argo. A fifty-oared ship in which Jason and his companions made their voyage to Colchis in search of the golden fleece. This ship was built of pines cut from Mount Pelion, and, although larger than any other previously constructed, it moved lightly and easily, and was therefore called the *Argo*, "swift-sailing." From her name, those who embarked in her were called Argonauts. The mast of the *Argo* was taken from the forest of Dodona, where the oaks were endowed with the power of making predictions; therefore, the ship was regarded as an animated being, in accord with fate, to which a man might commit himself with confidence.

Argonauts (*ăr'gō-nŏts*). The participants in the so-called Argonautic expedition. It was a voyage from Greece to Colchis undertaken by Jason in order to obtain the golden fleece. The task had been imposed upon Jason by his uncle Pelias, in the hope of destroying the hero. Jason, however, invited the most illustrious heroes of Greece to join him, among them Hercules, Castor and Pollux, Peleus, Pirithous, and Theseus. The vessel built for the purpose was named *Argo*. After various adverse events it arrived at Æeta, the capital of Colchis, where Jason, with the help of Medea, was successful in his quest.

Argus. A fabulous being of enormous strength, who had a hundred eyes, of which only two were closed in sleep at the same time. Juno, jealous of Io, whom her husband, Jupiter, loved, changed her into a heifer and set Argus to guard her. Jupiter had Mercury slay him, and Juno placed his hundred eyes in the tail of her favorite bird, the peacock.

Ariadne (*ăr'ĭ-ăd'nē*). Daughter of Minos, second king of Crete, and of Pasiphaë. She fell in love with Theseus, who was shut up in the labyrinth to be devoured by the Minotaur, and gave him a clew of thread by which, after he had killed the monster, he extricated himself from the windings of the labyrinth. He took Ariadne back with him but deserted her on the island of Naxos, where Bacchus found and married her. Bacchus gave her a crown of gems which on her death he placed as a constellation in the sky.

Arion (*ä-rī'ŏn*). A Greek bard, who, while passenger on a ship, was made to leap overboard and leave his money with the crew. He was taken up by dolphins, and carried on their backs safe to land.

Artemis (*ăr'tĕ-mĭs*). Daughter of Zeus and Latona, and twin sister of Apollo. She was the goddess of chastity, the chase, and the woods. Artemis was identified by the Romans with Diana.

Asgard. In Scandinavian mythology Asgard represents the city of the gods, situated at the center of the universe, and accessible only by the bridge Bifröst, or the rainbow.

Astarte (*ăs-tär'tē*). An ancient Syrian deity, noticed in the Old Testament under the name Ashteroth. She was a goddess of love, women, and the moon, and hence corresponds to Aphrodite or Venus.

Atalanta (*ăt'ä-lăn'tä*). A maid of Arcadia with athletic tastes who joined in the Calydonian hunt, and, at the funeral games of Pelias, won the prize in wrestling. Warned not to marry, she offered her hand to any suitor who could overcome her in a race. The penalty of failure was death. Hippomenes won by the strategem of throwing three golden apples before her which she paused to pick up. They were married, but the pair was transformed into lions by Cybele and continued to accompany her.

Aten. The name of the winged solar disk, the worship of which was introduced into Egypt by Amenhotep IV in the 14th century B. C. Hymns addressed to Aten hail him as creator and lord of love. No image of this deity was permitted to be made.

Athena. The Greek goddess of wisdom, identified by the Romans with Minerva. She was claimed by Athens as its guardian deity and in that character was usually known as Pallas Athena.

Atlantis. A mythical island in the West, mentioned by Plato, Pliny, and other ancient writers, and said to have sunk beneath the ocean.

Atlas. One of the Titans, son of Iapetus and Clymene. Being conquered by Jupiter, he was condemned to the labor of bearing on his head and hands the heaven he had attempted to destroy.

Atropos (*ăt'rō-pŏs*). The one of the three Parcæ, or Fates, that cuts the thread of life. Her name signifies "the inexorable one." The other two Fates were Clotho, who spins the thread, and Lachesis, who determines its length. See *Fates*.

Augean (*ô-jē'ăn*) **Stables.** The stables of Augeas, king of Elis, in Greece. In these stables he had kept 3000 oxen, and the stalls had not been cleansed for thirty years. When Hercules was required to cleanse these stables, he caused two rivers to run through them and afterward slew Augeas.

Augurs. Men whose principal business was to observe and interpret the entrails of animals and other phenomena which were regarded by the Romans as omens of the future.

Auræ (*ô'rē*). The breezes, nymphs of the air, a species of sportive, happy beings and well-wishers to mankind. They were represented as winged.

Aurora. The goddess of the morning or the dawn, sometimes described as the goddess of day. She is represented as standing in a magnificent chariot, drawn by winged steeds. A brilliant star sparkles upon her forehead, and from her rosy finger tips drops dew; with one hand she grasps the reins, and she holds in the other a lighted torch.

Avatar (*ăv'ȧ-tär'*). The incarnations or descents of the deity Vishnu, of which nine are believed to be past. The tenth is yet to come when Vishnu will descend from heaven on a white-winged horse, and will introduce on earth a golden age of virtue and peace.

Avernus (*ȧ-vûr'nŭs*). A small, deep lake in Campania, occupying the crater of an extinct volcano, and almost completely shut in by steep and wooded heights. It was supposed to be the entrance to the infernal regions, which were therefore sometimes called Avernus.

Azazel (*ȧ-zā'zĕl*). According to Ewald, a demon belonging to the pre-mosaic religion. Another opinion identifies him with Eblis, or the devil, who refused to prostrate himself before Adam. Milton makes him the standard bearer of the infernal hosts.

Azrael (*ăz'rȧ-ĕl*). In the Jewish and the Mohammedan mythology, the name of an angel who watches over the dying, and separates the soul from the body. It means in Hebrew "help of God."

Baal or **Bel.** The chief god of the Phœnicians and Carthaginians.

Bacchus (*băk'ŭs*). The god of wine; he taught the cultivation of the grape and the preparation of its juice. Greek drama developed from festivals in honor of Dionysus, the name usually given to him by the Greeks.

Balder (*bôl'dẽr*). The god of peace, son of Odin and Frigga. He was killed by the blind war god, but was restored to life at the general request of the gods.

Balmung. In Norse mythology, the sword of Siegfried forged by Wieland, or Völund.

Barguest. A frightful goblin among fairies. It was armed with teeth and claws and was an object of terror in the north of England.

Bast or **Pasht.** A goddess of ancient Egypt, represented as a lion-headed or cat-headed woman and worshiped especially at Bubastis.

Beelzebub (*bē-ĕl'zē-bŭb*). The name of a Moabite or Syrian deity. The name means "god of flies." It came to be applied to the chief of evil spirits.

Befana (*bā-fä'nä*). The fairy of Italian children, who is supposed to fill their stockings with toys on Twelfth Night if they have been good. The name is a juvenile corruption of the word *Epifania*, meaning *Twelfth Night*.

Bellerophon (*bĕ-lĕr'ô-fŏn*). A prince who rode the winged horse, Pegasus, and controlled him with a golden bridle, the gift of Minerva. By aid of Pegasus, he killed the lion-headed monster, the Chimæra.

Bellona. Roman goddess of war. She prepared the chariot of her brother Mars when he was going to war, and appeared in battles armed with a whip and holding a torch.

Belphegor (*bĕl'fē-gôr*). A god of evil, worshiped by the Moabites. He was represented as an archfiend who had been an archangel.

Berenice (*bĕr'ē-nī'sē*). The name of several famous princesses and queens. (1) The wife of Mithridates the Great. He had her killed after his defeat by Lucullus, lest his enemies should capture her. (2) The wife of Ptolemy III, Euergetes. When her husband was absent in a Syrian war, she vowed her beautiful hair to the gods if he should return safe. Accordingly, her hair was cut off and left in the temple of Venus. Soon afterward it disappeared. The astronomer, Conon of Samos, declared it had been wafted to heaven. Hence the constellation *Coma Berenices*, "hair of Berenice," near that of Leo.

Berg Folk. Pagan spirits doomed to live on the Scandinavian hills till the day of redemption.

Bertha. The white lady who guards good German children, but is the terror of the bad, who fear her iron nose and big feet. She corresponds to the Italian Befana. She was often identified also with Frigga or Ostara, goddess of the earth and spring.

Bhima (*bē'mȧ*). In Hindu mythology, son of the wind god, Vayu. He is remarkable for his great size and strength, his voracious appetite, and his fiery temper.

Bifröst (*bēf'rōst*). In Norse mythology, the rainbow bridge between earth and heaven, over which none but the gods could travel.

Bilskirnir. A wonderful palace built by Thor for the use of peasants after death.

Bladud. A mythical king of England, who built the city of Bath, and dedicated the medicinal springs to Minerva.

Blue Jay. In the myths of the Chinook Indians of the Columbia River country, this animal-like god plays a part similar to that of Loki in the Norse tales. He is a mischief-maker. He and his sister Ioi have many adventures among the supernatural beings.

Boreas (*bō'rē-ăs*). The north wind, represented as a son of Astræus and Aurora.

Bragi (*brä'gē*). The Scandinavian god of poetry and eloquence, son of Odin and Frigga. He is represented as an old man with a flowing white beard.

Brahma. The supreme god of the Hindus, represented with four heads and four arms, the source of the universe and of other gods, who will again be absorbed into him. He forms, with Vishnu the preserver and Siva the destroyer, the divine triad.

Bran. An ancient Welsh Celtic god of the underworld. His care was poetry and music. He is later represented as "Bran the Blessed," who first brought the cross from Rome to Britain.

Briareus (*brī-ā'rē-ŭs*). A giant with fifty heads and a hundred hands. He hurled a hundred rocks at Jupiter in a single throw, and Jupiter bound him under Mount Etna with a hundred chains.

Brigit. An ancient Irish Celtic goddess of poetry and prophecy, daughter of the god Dagda the Great. She was later transformed into the female patron saint of Ireland.

Bukadawin. The god of famine among certain North American Indians.

Cacus. A famous robber, son of Vulcan, said to have inhabited a cave on Mt. Aventine, the later site of Rome. He robbed Hercules of some cattle, but Hercules discovered him, killed him, and established on the site of his cave the ox market and altar, "ara maxima," which existed for ages in Rome.

Cadmus (*kăd'mŭs*). A Phœnician hero, son of King Agenor. His father sent him to seek his sister Europa, whom Jupiter in the guise of a bull had carried over the sea on his back. Unable to find her and afraid to return, he was directed by an oracle to build a city and call it Thebes. This he did with the help of the five survivors of the warriors who grew up from a dragon's teeth which Cadmus had planted after taking them from a dragon he had slain. He is said to have introduced the worship of heroes and the use of the alphabet, which at first consisted of sixteen letters. This last tradition expresses the fact that the Greek alphabet was developed from the Phœnician.

Caduceus (*kȧ-dū'sē-ŭs*). The fabled wand carried by Hermes. It was represented as entwined with two serpents and having two wings at the top.

Calchas (*kăl'kăs*). The wisest of the soothsayers among the Greeks at Troy. He died from grief on meeting with a soothsayer who proved wiser than he.

Calliope (*kă-lī'ō-pē*). The Muse who presided over epic poetry. She is generally depicted using a stylus and wax writing tablet, or a scroll.

Callisto. A nymph of Arcadia, whose son Arcas was changed into a bear and placed in the heavens as a constellation.

Calpe. One of the two pillars of Hercules. The other was named Abyla. These two were originally only one mountain, which Hercules tore asunder; he then poured the sea between them. Calpe is now called Gibraltar.

Calypso. One of the daughters of Atlas. When Ulysses was shipwrecked on her coasts, she received him with hospitality. She offered him immortality if he would become her husband, but he refused. After remaining with her seven years, he was summoned by Hermes to continue his voyage homeward.

Camenæ (*kă-mē'nē*). Italian nymphs or fountain deities, identified later by Roman poets with the Greek Muses. Egeria was one of the Camenæ.

Camilla. Virgin queen of the Volscians, poetically described by Virgil as so swift that she could run over a field of corn without bending a blade, or make her way over the sea without wetting her feet.

Cassandra (*kă-săn'drà*). Daughter of Priam and Hecuba. She was passionately loved by Apollo, who, as the price of her love, gave her the gift of prophecy, but, when she deceived him, added the condition that her prophecies should never be believed.

Cassiopeia (*kăs'i-ō-pē'yà*). The mother of Andromeda. Placed at her death in the heavens, she forms a constellation, the chief stars of which suggest by their arrangement the outline of a chair.

Castalia. A fountain on Mount Parnassus, sacred to Apollo and the Muses. Whoever drank of its waters was endowed with the gift of poetry.

Castor and Pollux. Twin brothers, sons of Leda. Mercury carried them to Pallena, where they were educated. As soon as they arrived at manhood, they embarked with Jason in quest of the golden fleece. Pollux was the son of Jupiter; Castor, of Tyndareus. Hence Pollux was immortal, while Castor, like other men, was subject to old age and death.

Cauther. In Mohammedan mythology, the lake of paradise, whose waters are as sweet as honey, as cold as snow, and as clear as crystal; any believer who tastes of them is said to thirst no more.

Cecrops (*sē'krŏps*). The mythical founder of Athens, who is said to have also divided Attica into twelve communities, and to have introduced the first elements of civilized life. He instituted marriage, abolished bloody sacrifices, and taught his subjects how to worship the gods. He is represented with the upper part of his body human and the lower part like that of a dragon.

Centaurs (*sĕn'tôrz*). Monsters, half horse, half human. They are especially celebrated for their contest with the giants in the mountains of Thessaly, and for their assault on the bride at the wedding of Peleus and Thetis. On the latter occasion they were defeated and driven away by the Lapithæ.

Cerberus (*sûr'bĕr-ŭs*). The three-headed dog that keeps the entrance of the infernal regions. He prevents the living from entering and the shades from escaping. Orpheus lulled Cerberus to sleep with his lyre; and the sibyl who conducted Æneas through Hades threw the dog into a sleep also by a cake treated with an opiate.

Ceres (*sē'rēz*). The daughter of Saturn, sister of Jupiter and Neptune. She was the goddess of corn, flowers, and the harvest. She is represented as crowned with poppies and riding in a chariot drawn by dragons. She was the mother of Proserpina, who while gathering flowers was seized by Pluto.

Chaos (*kā'ŏs*). The formless void preceding the genesis of an orderly universe and out of which the gods, men, and all things arose.

Charon (*kā'rŏn*). A god of the infernal regions, son of Nox, "Night," and Erebus. He conducted the souls of the dead in a boat over the rivers Styx and Acheron.

Charybdis (*kà-rĭb'dĭs*). A woman who robbed travelers and was turned by Jupiter into a dangerous whirlpool on the coast of Sicily, opposite Scylla, a six-headed monster which lived in a rock and seized passing sailors. Scylla and Charybdis are generally mentioned together to represent alternative dangers.

Chibiabos. A musician, ruler in the land of spirits, and friend of Hiawatha. Personification of harmony in nature.

Chimæra, Chimera (*kĭ-mē'rà*). A celebrated monster, having the combined semblance of a goat, lion, and dragon, which continually vomited flames. It was destroyed by Bellerophon.

Chiron (*kī'rŏn*). A centaur, son of Saturn and Philyra. He was famous for his knowledge of medicine, and taught mankind the use of plants and herbs.

Chou. An Egyptian god in many respects similar to the Roman Hercules.

Cimmerians (*sĭ-mē'rĭ-ănz*). A half mythical people, first described in the *Odyssey* as dwelling in perpetual gloom beyond the ocean stream. A people with this name was said by the Greeks to live along the Black Sea.

Circe (*sûr'sē*). A sorceress, daughter of Sol and Perse, celebrated for her knowledge of magic and venomous herbs. Ulysses, on his return from the Trojan War, visited her coasts, and his companions were changed by her potions into swine.

Clio (*klī'ō*). The Muse who presided over history.

Clotho (*klō'thō*). The youngest of the three Fates, daughters of Jupiter and Themis, and supposed to preside over the moment of birth. She held the distaff and spun the thread of life.

Cluricaune (*klōō'rĭ-kōn*). An Irish elf, who guarded a hidden treasure.

Clytemnestra (*klī'tĕm-nĕs'trà*). The wife and murderer of Agamemnon.

Clytie (*klī'tē*). A water nymph who loved the sun god Apollo and was changed into a sunflower. In this form, she turns always toward the sun.

Cocytus (*kō-sī'tŭs*). A river of the infernal regions. The unburied dead wander on its banks for 100 years. The name means the river of lamentation. See *Styx*.

Colchis or **Colchos** (*kŏl'kĭs*) (*-kŏs*). A country of Asia, bordering the Black Sea, famous in connection with the expedition of the Argonauts, and as the birthplace of Medea.

Comus (*kō'mŭs*). The god of revelry, presiding over feasts. See Milton's *Comus*.

Concordia (*kŏn-kôr'dĭ-à*). The Roman goddess of peace and concord. She is represented holding a horn of plenty and a scepter budding with fruit.

Consus. An early Italian god of harvests. Mules were under his protection and mule races were held in his honor.

Cora. A name sometimes given to Proserpina.

Coronis (*kō-rō'nĭs*). (1) Mother of Æsculapius by Apollo. (2) A king's daughter, who was transformed into a crow by Minerva when asking for protection from Neptune.

Corybantes (*kŏr'ĭ-băn'tēz*). Priests who served at the worship of Cybele, the mother of the gods, and were in the habit of striking themselves in their religious dances.

Coxcox. The Noah of the Mexican tribes, who, with his wife Xochiquetzal, alone escaped the deluge. They took refuge in a hollow cypress tree which floated until the water subsided and then ran aground on a mountain of Culhuacan. Two of their children, who were taught speech by the Great Spirit, were the ancestors of the Toltecs and the Aztecs.

Coyote (*kī-ō'tē*). See *Italapas*.

Cressida. Daughter of Calchas, the Greek, and beloved by Troilus, son of Priam. They vowed eternal fidelity, and as pledges Troilus gave the maiden a sleeve, while Cressida gave the Trojan prince a glove. Cressida proved false and her name has since stood as a byword for faithlessness.

Creusa. Daughter of Priam and wife of Æneas. She was lost in the city of Troy when her husband escaped from its flames.

Cronus. The youngest of the Titans. He was said to be the son of Uranus and Gæa, "the heavens and the earth," and to have exercised the first government over the universe. His wife was Rhea, who was also his sister. Cronus and his five brothers were called Titans. Rhea and her five sisters were called Titanides. Cronus seized upon the government of the universe by his superiority over his father and brothers, yet pledged himself to rear no male children; accordingly, he is represented as devouring his sons as soon as born. But three of them, Jupiter, Neptune, and Pluto, escaped this fate through the artifice of Rhea, their mother, who gave Cronus stones to devour instead of the children at their birth. Jupiter aided Cronus in recovering his throne, after he had been driven from it by his brothers, the Titans, and bound in Tartarus. But soon Jupiter himself made war upon Cronus and seized the government. See *Saturn*.

Cupid. God of love, son of Jupiter and Venus. He is represented as a winged boy, naked, armed with a bow and arrows, and often with a bandage covering his eyes. He shot his arrows into the hearts of both gods and men, thus infecting them with love. Like all the gods, he put on different forms to suit his plans. He became the husband of Psyche.

Cybele (*sĭb'ē-lē*). A goddess, daughter of Uranus and Terra, and identified by the Romans with Ops, wife of Saturn. On her birth she was exposed on a mountain, where she was tended and fed by wild beasts, receiving the name of Cybele from the mountain. She is represented on a throne with lions at her side. See *Atalanta*.

Cyclopes (*sī'klŏps*). One-eyed giants who forged the thunderbolts of Jove. Homer describes them as wild, insolent, lawless shepherds, who devoured human beings. A later tradition represents them as Vulcan's assistants.

Cyparissus (*sĭp-a-rĭs'ŭs*). A beautiful youth, who, grief-stricken at having inadvertently killed his favorite stag, was metamorphosed into a cypress by Apollo.

Dædalus (*dĕd'a-lŭs*). A great architect and sculptor. He invented the wedge, the ax, the level, and the gimlet, and was the first to use sails. He made himself wings with feathers and wax, and fitted them to his body and to that of his son Icarus. They sailed in the air, but the heat of the sun melted the wax on the wings of Icarus, who flew too high, and he fell into the sea, which after him has been called Icarian.

Dag. In Scandinavian mythology, (1) a god representing day, the son of Nott, "night," and (2) the last survivor of a treacherous race, the Hundings.

Dagan. In Hindu mythology, a god who reconstructed the world when it had been destroyed after creation.

Dagon (*dā'gŏn*). A Syrian divinity who, according to the Bible, had richly adorned temples in several of the Philistine cities. He was a national god of the Philistines, formed in human shape upwards from the waist, his lower extremity resembling that of a fish.

Dahak. In Persian mythology, a wicked deity who is destined to break the chains in which he is bound, and to bring upon men the most terrible calamities. This will occur in the last of the periods of 1000 years into which the cycles of time are divided. After this period the reign of Ormuzd will begin, when men will be good and happy.

Daikoku. A mythical god invoked by Japanese workers. He is represented as holding a full sack which he beats to bring from it all useful articles, and the sack never becomes empty.

Daityas. Hindu titans or demons who made war on the gods and prevented sacrifices to them.

Danaë (*dăn'a-ē*). The daughter of Acrisius, king of Argos, who became by Jupiter the mother of Perseus. An Italian legend related that Danaë came to Italy, built the town of Ardea, and married Pilumnus, by whom she became the mother of Daunus, the ancestor of Turnus.

Danaides (*dă-nā'ĭ-dēz*). The fifty daughters of Danaus, king of Argos, who married the fifty sons of their uncle Ægyptus, and murdered them on their wedding night. They were condemned in Hades to pour water into sieves.

Danu. Among the ancient Irish Celts, the mother of the gods. She was a goddess of fertility and so associated with the underworld.

Daphne. Daughter of the river god Peneus. Apollo courted her, but she fled from him and was, at her own request, turned into a laurel tree.

Daphnis. A Sicilian shepherd, son of Hermes, or Mercury, by a nymph. He was taught by Pan to play on the flute, and was regarded as the inventor of bucolic poetry. A naiad to whom he proved faithless punished him with blindness, whereupon his father, Hermes, translated him to heaven.

Deiphobus (*dē-ĭf'ō-bŭs*). A son of Priam and Hecuba. After the death of Paris, he married Helen, but was betrayed by her to the Greeks. Next to Hector, he was the bravest among the Trojans. On the capture of Troy by the Greeks he was slain and fearfully mangled by Menelaus.

Delius (*dē'lĭ-ŭs*). A name of Apollo, from the island Delos, in which he was born.

Delphi. A town at the foot of Mount Parnassus, famous for its oracle and for a temple of Apollo.

Demeter (*dē-mē'tẽr*). A goddess of the earth, of seed-time, and of harvest. By Zeus she became the mother of Persephone, or Proserpina.

Demogorgon (*dē'mō-gôr'gŏn*). The tyrant genius of the soil or earth, the life and support of plants. He was depicted as an old man covered with moss and was said to live underground. He is a figure of medieval European mythology.

Derceto (*dûr-sē'tō*). A Syrian mermaid goddess who had analogies with Dagon of the Philistines and who was regarded by the Romans as identical with Venus.

Deucalion and Pyrrha (*dū-kā'lĭ-ŏn*) (*pĭr'a*). Jupiter and Neptune once destroyed the race of men with a flood. Only Deucalion and Pyrrha, his wife, escaped, finding refuge on Parnassus. At the behest of an oracle, they took up stones and cast them behind them. These stones took form as a new, hardy race of men and women, who peopled the earth again.

Diana (*dī-ăn'a*). An ancient Italian goddess of light, of virginity, and of childbirth. Identified with Artemis, she became also goddess of the chase. She was often represented as the moon goddess, and, identified with Hecate, as a deity presiding over incantations. Her worship is said to have been introduced at Rome by Servius Tullius, who dedicated a temple to her on the Aventine. As Artemis, she was a daughter of Jupiter, and was born of Latona, or Leto, on the island Delos, at the same time as Apollo.

Dictynna (*dĭk-tĭn'a*). One of the names of the Cretan goddess Britomartis, identified by the Greeks with Artemis.

Dike (*dī'kē*). One of the three guardians of life appointed by Themis, whose names are Eunomia, "order," Dike, "justice," Irene, "peace." Their office was to promote unanimity by the exercise of equity and justice. They likewise stand around the throne of Zeus, and their regular occupation is to open and shut the gates of heaven, and to yoke the steeds to the chariot of the sun.

Dindymus. Mountains between Phrygia and the frontiers of Galatia, near the town Pessinus, sacred to Cybele, the mother of the gods.

Diomedes (*dī'ō-mē'dēz*) or **Diomed.** (1) A Greek hero of the Trojan War, son of Tydeus, and king of Argos. He was a favorite of Minerva, who, according to Homer, encouraged him to attack and wound both Mars and Venus, who were engaged on the side of the Trojans. He survived the siege of Troy, but on his return home found his wife untrue to him. He fled to Italy and remained in exile. (2) The cruel tyrant of Thrace, who fed his mares on the flesh of his guests. He was overcome by Hercules, and was given to the same horses as food.

Dione. The youngest of the Titan sisters, and reputed mother of Venus. The name has also been poetically applied to Venus herself.

Dionysus (*dī'ō-nī'sŭs*). Son of Jupiter and Semele, the daughter of Cadmus. He was the god of wine and is generally represented crowned with vine leaves, drawn in a car by tigers, and accompanied by satyrs and many revelling women, called Bacchantes. See *Bacchus*.

Diræ. The avenging goddesses, or Furies.

Dis. A name sometimes given to Pluto, and hence also to the lower world.

Discordia. A malevolent deity corresponding to the Greek Eris, the goddess of contention. She was driven from heaven by Jupiter because she sowed dissensions among the gods. At the nuptials of Peleus and Thetis she threw an apple among the gods inscribed with the words "For the fairest," which, stirring up a quarrel between Juno, Venus, and Minerva, began the train of events which led to the Trojan War.

Dives (*dēvs*). Demons of Persian mythology. According to the *Koran*, they are ferocious and gigantic spirits under the sovereignty of Eblis.

Dodona. The most ancient oracle in Greece, by which Jupiter used to make known his will. It was said to have been built by Deucalion.

Donar. A name sometimes given to Thor, the thunder god in Norse mythology.

Doris. Daughter of Oceanus and Tethys, wife of her brother Nereus, and mother of the Nereids.

Draco. One of the hounds of Actæon.

Draupnir. The magic ring, symbolic of fertility, which belonged to Odin. It was burned on the funeral pyre of his son Balder.

Droma. The chain forged for the purpose of binding the wolf Fenris, but which he broke. Hence, the proverbial phrase, "to dash out of Droma."

Dryads. Wood nymphs. The dryads were sometimes distinguished from the hamadryads in that the latter were supposed to be attached to some particular tree, with which they came into being, lived, and died, while the former had the care of the woods and trees in general.

Duergar (*dwẽr'gär*). In Norse mythology, dwarfs who dwelt in rocks and hills. They were noted for their strength,

subtlety, magical powers, and skill in metallurgy, and were regarded as the personification of the subterranean powers of nature.

Durga or **Doorga.** A ten-armed goddess worshiped among the Hindus. She was the principal wife of Siva.

Earth-Namer. Earth-namer or Codoyanape, in some Indian legends, is represented as working with Coyote to prepare the earth for the first people. Defeated by the tricky Coyote, he withdrew to the bright Eastern-land after the coming of men. See *Italapas.*

Eblis. The name given by the Arabians to the prince of the apostate angels, whom they represent as exiled to the infernal regions for refusing to worship Adam at the command of God. Eblis alleged, in justification of his refusal, that he himself had been formed of ethereal fire, while Adam was only a creature of clay. See *Azazel.*

Echo. A nymph who engaged the attention of Juno by her never-ceasing talk, meanwhile allowing Jupiter his freedom. Juno found out her trick and punished her by taking away from her all power of speech except repetition of words just spoken by others. Echo loved Narcissus; as her love was not returned, she pined away until nothing remained but her beautiful voice. In Norse mythology, echo is the sound of the dwarfs' voices.

Eckhardt. In German legends, a being who appears on the evening of Maundy Thursday to warn all persons to go home, that they may not be injured by the headless bodies and two-legged horses which traverse the streets on that night.

Egeria (*ê-jē′rĭ-ȧ*). A nymph from whom King Numa Pompilius received his instructions respecting the forms of public worship which he established in Rome.

Egia. One of the nine beautiful giantesses seen by Odin along the seashore, known as wave maidens. Her son became guardian of Bifröst, the rainbow bridge.

Egil (*ā′gĕl*). A giant in Norse mythology. Thor left his goats in the care of Egil while he went to secure a kettle in which to brew ale for the gods.

Eira (*ār′ȧ*). An attendant of the goddess Frigga, and a skillful nurse. She gathered curative herbs and plants and taught the science to women.

Elbegast. King of the dwarfs in Scandinavian mythology, who dwelt in a magnificent underground palace and drew their servants from the earth above.

Eleusinian Mysteries. Secret religious rites performed at Eleusis, near Athens, which later became part of the state religion of Athens. The rites celebrated the earth goddess Demeter, her daughter Persephone, and Iacchus. The initiates obtained, through the rites, both communion with the deities and the assurance of immortality.

Elf. The water sprite, known also as Elb, from which the name of the river Elbe is said to be derived. Elves are more properly known as mountain fairies or those airy creatures that dance on the grass or sit on the leaves of trees and revel in the light of the full moon.

Elivagar (*ĕ-lĭv′ȧ-gär*). In Norse mythology, the name of an ice-filled river in Chaos, flowing from a fountain in the land of mist.

Elysium (*ē-lĭzh′ĭ-ŭm*). The paradise of the Greeks, known also as the islands of the blest: Departed mortals were adjudged to Elysium or to Tartarus by the sentence of Minos and his fellow judges in the "Field of Truth." Elysium is described as abounding in beautiful gardens, meadows, and groves; where birds ever warble; where the river Eridanus winds between banks fringed with laurel, and "divine Lethe" glides through silent valleys; where the air is always pure, and the day serene; where the blessed have their abode of never-ending bliss.

Embla. In Norse mythology, the name of the first woman, so called because the gods made her of an *embla,* "elder," as they made man of an *aske,* "ash."

Enceladus (*ĕn-sĕl′ȧ-dŭs*). A Titan, son of Terra, and the most powerful of all the giants who conspired against Jupiter and attempted to scale heaven. He was struck by Jupiter's thunderbolts and chained beneath Mount Etna.

Endymion. In Greek mythology, the setting sun with which the moon is in love. One of the many renderings of his story is that Endymion was a beautiful youth who fed his flock on Mount Latmus. One clear night, Diana, the moon, looked down and saw him sleeping. The cold heart of the goddess was warmed by his beauty, and she came down to him, kissed him, and watched over him while he slept. Another story was that Jupiter bestowed on him the gift of perpetual youth united with perpetual sleep. One version of this myth made sleep a reward for piety, while another version made it a punishment for presuming to fall in love with Juno.

Enipeus (*ē-nī′pūs*). A fabled river in Thessaly. Poseidon assumed the form of the god of this river in order to obtain possession of Tyro, who was in love with Enipeus. She became the mother of Pelias and Neleus.

Enyo (*ē-nī′ō*). (1) One of the gray maidens, or hoary witches. (2) Daughter of Mars, a goddess of war, who delights in bloodshed and the destruction of towns, and accompanies Mars in battles.

Epaphus. The son of Zeus and Io, born on the river Nile, after the long wanderings of his mother. He became king of Egypt and built Memphis.

Erebus (*ĕr′ē-bŭs*). A name applied to the dark and gloomy space under the earth through which the souls of the dead were obliged to pass on their way to Hades, with which it and Tartarus are often synonymous.

Eris. The goddess of discord; a sister of Mars, and a daughter of Night; identified with the Roman Discordia.

Eros. The son of Aphrodite and Hermes, with whom the Romans identified Cupid. See *Cupid.*

Erytheis or **Erythea** (*ĕr′ĭ-thē′ĭs*) (*-ȧ*). One of the daughters of Night, appointed to guard the golden apples in the garden of the Hesperides.

Esangetuh Emissee. "Master of Breath." A chief deity of the Creek Indians.

Eumæus (*ū-mē′ŭs*). The faithful swineherd of Ulysses, whom Ulysses consulted upon his return to Ithaca.

Eumenides (*ū-mĕn′ĭ-dēz*). A euphemistic name given by the Greeks to the Erinyes, or Furies. They are represented as the daughters of Earth, or of Night, and as fearful winged maidens, with serpents twined in their hair and with blood dripping from their eyes. They dwelt in the depths of Tartarus, dreaded by gods and men.

Euphorbus. The son of Panthous and one of the bravest of the Trojans. He was slain by Menelaus, who dedicated his victim's shield in the temple of Hera near Mycenæ. Pythagoras asserted that he had once been Euphorbus, and in proof of his assertion took down at first sight the shield from the temple of Hera.

Euphrosyne (*ū-frŏs′ĭ-nē*). One of the three Graces. She represented joy, as her sisters stood for splendor and for pleasure.

Europa. Daughter of the Phœnician king Agenor, or, according to the *Iliad,* daughter of Phœnix. Jupiter in the form of a bull carried her on his back across the sea to Crete, where by him she became the mother of Minos, Rhadamanthus, and Sarpedon. See *Cadmus.*

Eurydice (*ū-rĭd′ĭ-sē*). Orpheus's wife, who died from the bite of a serpent. Orpheus, disconsolate at her loss, determined to descend to the lower world and obtain permission for his beloved Eurydice to return to the regions of light. Armed only with his lyre, he entered the realms of Hades and gained an easy admittance to the palace of Pluto. Orpheus was promised she should return on condition that he should not look back till she had reached the upper world. When the musician reached the confines of his journey, he turned his head to see if Eurydice were following, and she was instantly caught back again into Hades.

Eurylochus. One of the companions of Ulysses in his wanderings, and the only one of them who was not changed by Circe into a hog.

Evadne (*ē-vȧd′nē*). Wife of Capaneus, and mother of Sthenelus. Her husband having been killed at the siege of Thebes, she threw herself upon the funeral pile and was consumed with him.

Fafnir. In Scandinavian mythology, the eldest son of the dwarf king Hreidmar. The slaying of Fafnir represented the destruction of the demon of cold or darkness who had stolen the golden light of the sun.

Fahfah. Name given to one of the rivers of paradise in the mythology of the East.

Fata Morgana. In Italian folklore, a wraith who, in the guise of a beautiful woman, lured her pursuers into dangerous spots where they perished.

Fates. In Greek and Roman mythology the Fates are identical with the Parcæ. They were three sisters, daughters of Night, whom Jupiter permitted to decide the fortune and the duration of mortal life. They were viewed as inexorable, and ranked among the inferior divinities of the lower world. They were generally represented as three women, with chaplets made of wool and interwoven with the flowers of the narcissus, wearing long robes, and employed in their works: Clotho with a distaff; Lachesis having near her sometimes several spindles; and Atropos holding a pair of scissors. See *Atropos.*

Fauns. Among the Romans, a class of rural deities corresponding to the Greek satyrs. They were the

demigods of woods and forests and hence included among the so-called "sylvan deities." They are represented with horned heads, sharp-pointed ears, and with their bodies below the waist resembling those of goats.

Felicitas. A symbolical, moral deity of the Romans. She was the personification of good fortune, and is frequently seen on Roman medals, in the form of a matron, with the staff of Mercury and a cornucopia.

Feng. The name taken by Odin in the capacity of wave-stiller. Under this name he teaches mortals to distinguish between good and bad omens and to know the moods of the winds.

Fenrir or **Fenris.** In Scandinavian mythology, the wolf, offspring of Loki, which, because of his sinister growth in size and strength, the gods bound with a magic chain. When he gapes, one jaw touches earth and the other, heaven.

Ferohers (*fĕr-ō'hērz*). The guardian angels in Persian mythology. They were countless in number, and their chief tasks were to ensure the well-being of man.

Feronia. A goddess of fruits, nurseries, and groves among the Romans. She had a very rich temple and a grove consecrated to her. She was honored as the patroness of enfranchised slaves, who ordinarily received their liberty in her temple.

Fire People. A people mentioned in a Pacific Coast Indian legend as possessing fire before other peoples did. Raven stole a baby belonging to them and refused to exchange it for anything less than fire. Finally, the fire people taught him the use of fire.

Fire Spirit. A spirit which, according to certain North American Indian myths, jealously guarded fire. Many people tried to steal the fire from him. Finally, Nanabozho, taking the form of a hare, reached the wigwam of the fire spirit. He succeeded in seizing a firebrand and returned with it to his people. Like Hiawatha, Nanabozho stands in legend as a benefactor of the race.

Flora. The Roman goddess of blossoms and flowers.

Fortitudo. A personification of courage and bravery, worshiped as a goddess by the Romans.

Fortuna. The goddess of chance, to whom was ascribed the allotment of prosperity and adversity among men.

Freki and Geri (*frā'kē* (*gĕr'ē*). The two wolves of Odin, which lie at his feet as he overlooks heaven and earth.

Frey. In Scandinavian mythology, the god of the sun and of rain, and also of fertility and of peace. He was one of the most popular of the Norse divinities. No weapons were ever allowed in Frey's temple, although oxen and horses were sacrificed to him.

Freya. The Scandinavian goddess of beauty and love, sister of Frey, and wife of Odur, who deserted her for a while but was found again by her and won back. Plants were called Freya's hair, and the butterfly, Freya's hen. Her name survives in "Friday."

Frigga. In Scandinavian mythology, the wife of Odin, and so the queen of the gods. She was the mother of Balder, Thor, and others. She sometimes typifies the earth, as Odin does the heavens. She is often confounded erroneously with Freya, in very early stories.

Frodi. The son of Frey, a god of peace. Under his direction two giantesses turned a pair of magic millstones which ground out gold according to his wish and filled his coffers. Excited by greed he forced them to labor, allowing rest only long enough for the singing of one verse. When Frodi himself slept, the giantesses changed their song and proceeded to grind out an army of troops to invade the land. These troops represent the vikings.

Furies. Three divinities of the lower world, whose office it was to torment the guilty in Tartarus, and often to inflict vengeance upon the living who had slain their relatives. They are also known as Erinyes and Eumenides. See *Megæra.*

Fylgie. Guardian spirits treated of in Norse mythology. Besides the Norns or Dises, who were regarded as protective deities, one of the Fylgie was ascribed by the Norsemen to each human being as a guardian spirit to attend him through life.

Galar. One of the dwarfs who, with his fellow dwarf Fialar, slew the giant Kvasir and drained every drop of his blood.

Gangler. The gatekeeper in Odin's palace who gave the explanation of the Norse mythology that it might be recorded.

Ganymede (*găn'ĭ-mēd*). A son of Tros, king of Troy, who, according to Homer, was the most beautiful of all mortals, and was carried off by the gods that he might fill the cup of Zeus, or Jupiter, and live among the immortal gods. Later writers state that Jupiter, in the form of an eagle, carried him away from Mount Ida.

Garm. A fierce dog that kept guard at the entrance of Hel's kingdom, the realm of the dead. He could be appeased by the offering of a Hel-cake, which always appeared in the hand of one who, on earth, had given bread to the needy.

Gemini (*jĕm'ĭ-nī*). A name meaning "the twins," applied to Castor and Pollux and to the constellation formed by them when transported to the heavens to dwell among the stars.

Gerda, Gerdhr, or **Gerth.** Wife of Frey, and daughter of the frost giant, Hymir. She was so beautiful that the brightness of her naked arms illuminated both air and sea. The marriage of Frey and Gerda represented the conquering of winter by the sun god.

Geryon (*jē'rĭ-ŏn*). A monster, said to be the offspring of Chrysaor and Callirrhoë and to have three bodies and three heads. His residence was in the island of Gades, where his numerous flocks were kept by the herdsman Eurythion and guarded by a two-headed dog, called Orthos. The destruction of this monster was one of the twelve labors of Hercules.

Giall (*gāl*). The infernal river of Scandinavian mythology.

Giallar. The bridge of death, over which all must pass.

Giallarhorn, The. Heimdal's horn, the sound of which went out into all worlds whenever he chose to blow it. He blew a long-expected blast as a rallying call to the battle which ended the reign of the gods, Odin, Frey, and Tyr.

Gian ben Gian. King of the Jinn or Genii in Arabian mythology, and founder of the pyramids. He was overthrown by Azazel, or Eblis.

Giants. In Greek mythology, beings of monstrous size, with dragons' tails and fearful countenances. They attempted to storm heaven, being armed with huge rocks and the trunks of trees, but were killed by the gods with the assistance of Hercules, and were buried under Mount Etna and other volcanoes. They probably symbolized the great forces of nature. In Scandinavian mythology they are described as evil genii of various forms and races, enemies of the gods. They dwelt in a territory of their own, called Giant-land. They had the power of assuming divers shapes and of increasing or diminishing their stature at will.

Ginungagap (*gĭn'nōōng-gă-găp'*). In Norse mythology, the vast chaotic gulf of perpetual twilight, which existed before the present world and separated the region of fog from the region of heat. Giants were the first beings who came to life among the icebergs and filled this vast abyss.

Gladsheim. A great hall in the palace of Odin, where were the twelve seats occupied by the gods when holding council.

Glasir. A marvelous grove in the land of Asgard, in which the leaves were all of shimmering red gold.

Glaucus. (1) Son of Hippolytus. Being smothered in a tub of honey, he was restored to life by Æsculapius. (2) A fisherman of Bœotia who became the fisherman's patron deity.

Glendoveer. In Hindu mythology, a kind of sylph, the most lovely of the good spirits.

Glooskap. In an Iroquois legend, a man who fell asleep in the land of the guardian of winter. After six months he awoke and journeyed southward. Finding the little summer-woman, he ran away with her from the summer-land people and came again to the land of the guardian of winter. The old guardian tried once more to put Glooskap into slumber, but the summer-woman used her magic to melt the snow and ice and winter had to flee to the North. Since that time the summer-people journey to the Northland every year.

Gnome (*nōm*). Dwarfs which were supposed to tenant the interior parts of the earth, and in whose charge mines, quarries, etc., were left. Rübezahl, of the German legends, is often cited as a representative of the class.

Goblins and Bogies. Familiar demons of popular superstition which lurk about houses. They are also called hobgoblins.

Golden Apples, The. A great treasure in the garden of the Hesperides watched by a monstrous dragon. Hercules secured them in obedience to the command of Eurystheus.

Golden Fleece. A treasure celebrated in Greek myth. Ino persuaded her husband, Athamas, that his son Phryxus was the cause of a famine which had desolated the land, and he ordered him to be sacrificed to the angry gods. Phryxus

made his escape over sea on a ram which had a golden fleece. When he arrived at Colchis, he sacrificed the ram to Zeus and gave the fleece to King Æetes, who hung it on a sacred oak and set an ever-watchful dragon to guard it. It was afterwards stolen by Jason in his celebrated Argonautic expedition.

Gorgons. Three hideous monsters, whose faces turned to stone whoever looked on them. One of these creatures, Medusa, was slain by Perseus, and the head was presented to Minerva. She attached it to her shield, where the face continued to retain its petrifying power.

Graces. To the retinue of Venus belonged the Graces, servants and companions of the goddess. They were said to be three daughters of Jupiter and Eurynome, or, according to others, of Bacchus and Venus herself. They were honored especially in Greece, and had temples in the principal cities. Altars were often erected to them in the temples of other gods, especially of Mercury, Venus, and the Muses. See *Euphrosyne*.

Great Turtle. According to some North American Indian tribes, the upholder of the world. When earthquakes are felt, Great Turtle is said to be weary or moving his feet.

Grid. Wife of Odin and mother of Vitharr. She lent Thor her girdle, staff, and glove, warning him to beware of treachery when he went to visit the giant Geirrödhr.

Gripir. A horse trainer, servant of Odin, who could foretell events of the future and could teach a young hero all that he might need to know.

Hades. An earlier name for Pluto. Later it was applied to the lower world itself.

Hamadryad. See *Dryads*.

Harmonia. A daughter of Mars and Venus, and wife of Cadmus.

Haroeris. An Egyptian god, whose eyes are the sun and moon.

Harpies. "Robbers" or "spoilers," described by Homer as carrying off persons who had mysteriously disappeared. Hesiod represents them as fair-locked and winged maidens; but subsequent writers describe them as disgusting monsters, birds with the heads of maidens, with long claws, and faces pale from hunger, who tormented an old man, Phineus, by stealing his food as he tried to eat.

Haskah. A thunder god of the Sioux Indians, who used the winds as sticks to beat the thunder-drum.

Hebe (*hē'bē*). The goddess of youth, daughter of Zeus and Hera. She was employed by her mother to prepare her chariot and harness her peacocks, and she was cupbearer to all the gods until, on her marriage with Hercules, Ganymede took over the task.

Hecate (*hĕk'ā-tē*). A goddess of magic and of the lower world. Having powers also on the earth and above it, she was identified not only with Proserpina but also with Diana and Luna. She was worshiped at night and invoked to produce enchantments.

Hector. The most prominent hero of the Trojans in their war with the Greeks, eldest son of Priam and Hecuba, and the husband of Andromache. He slew Patroclus, the friend of Achilles, and thereby roused Achilles to the fight. The other Trojans fled into the city, and Hector alone remained without the walls. But when Achilles approached, Hector's heart failed him, and he too took to flight. Thrice he ran round the city, pursued by Achilles, and fell at last, pierced by Achilles' spear. Achilles tied Hector's body to his chariot and thus dragged him into the camp of the Greeks. At the command of Zeus, he surrendered the body in response to the prayers of Priam, who buried it at Troy with great pomp. Hector is one of the noblest characters depicted in the *Iliad*.

Hecuba (*hĕk'ū-bà*). The second wife of Priam, king of Troy, and the mother of Paris and Hector. After the fall of Troy, she fell into the hands of the Greeks as a slave, and, according to one account, threw herself in despair into the sea.

Heimdal or **Heimdallr.** In Norse tales, a god, the son of nine giantesses. He lived in the celestial fort Himinbiorg, under the farther extremity of the bridge Bifröst, and kept the keys of Asgard. He could see even in sleep, could hear the growing of grass, and even of the wool on a lamb's back. He was appointed to wake the gods with his trumpet at the end of the world.

Hel. The name of the world of the dead and of its goddess, in early Norse mythology. The word means "the coverer or hider." Later myths represented Hel as the abode of all save those who had not fallen by the sword. Under the influence of Christian dogma Hel came to be associated with punishment. The goddess or demon, Hel, was a daughter of Loki.

Helen. A daughter of Jupiter and Leda, and the wife of Menelaus, king of Sparta. She was the most beautiful woman of her age, and chose Menelaus among many suitors. She afterward eloped with Paris, her husband's Trojan guest, and thus brought on the war between the Greeks and Trojans. After the fall of Troy she was restored to Menelaus.

Helenus. Son of Priam and Hecuba, celebrated for his prophetic powers.

Helice. A maid beloved of Zeus, and by jealousy of Hera changed into a she-bear.

Helicon (*hĕl'ĭ-kŏn*). A mountain in Bœotia sacred to the Muses, from which place the fountain Hippocrene flowed. It is part of the Parnassus, a mountain range in Greece.

Helios (*hē'lĭ-ŏs*). The Greek sun god, who rode to his palace in Colchis every night in a golden car furnished with wings. This god gives light to both gods and men. He sees and hears everything and discovers all that is kept secret.

Helle (*hĕl'ē*). Daughter of Athamas and Nephele, and sister of Phrixus. When Phrixus was to be sacrificed, Nephele rescued her two children, who rode away through the air upon the ram with the golden fleece, the gift of Hermes; but Helle fell into the sea. The episode gave the name of the Hellespont to the part of the sea where Helle was drowned. It is now called the Dardanelles.

Hellen. The son of Deucalion and Pyrrha, and father of Æolus, Dorus, and Xuthus. He was king of Phthia in Thessaly, and was succeeded by his son Æolus. He was the mythical ancestor of all the Hellenes.

Hell Shoon. In Icelandic mythology, shoes indispensable for the journey to Valhalla, as the ōbolus was for crossing the Styx.

Helmet of Hades. A helmet worn by Perseus, rendering him invisible, and which, with the winged sandals and magic wallet, he took from certain nymphs who held them in possession. After he had slain Medusa he restored them again, and presented the Gorgon's head to Minerva, who placed it in the middle of her shield.

Hera (*hē'rà*). Greek name for the wife of Zeus or Jupiter, with whom the Romans identified Juno. See *Juno*.

Heraclidæ (*hĕr'ā-klī'dē*). Name given to the descendants of Hercules, who, together with the Dorians, conquered the Peloponnesus eighty years after the destruction of Troy. This legend represents the conquest of the Achæan population by Dorian invaders, who thereafter appeared as the ruling race in the Peloponnesus.

Herculean Knot. A snaky complication on the rod or caduceus of Mercury, adopted by the Grecian brides as the fastening of their woolen girdles. The loosing of the girdle symbolized the surrendering of their virginity.

Hercules (*hûr'kû-lēz*). Son of Jupiter and Alcmene and most famous of the Greek heroes. Wonderful strength was ascribed to him even directly after his birth, when he squeezed to death two serpents sent by Juno to destroy him. Since he was the offspring of her husband's infidelity, Juno compelled him to be subject to the commands of Eurystheus, who imposed upon him many difficult enterprises, known as the "twelve labors" of Hercules. They were as follows: to kill the Nemean lion; to destroy the Lernæan hydra; to catch alive the stag with golden horns; to catch the Erymanthean boar; to cleanse the stables of Augeas; to exterminate the birds of Lake Stymphalus; to bring alive the wild bull of Crete; to seize the man-eating horses of Diomedes; to obtain the girdle of Hippolyta, queen of the Amazons; to destroy the monster Geryon; to plunder the garden of the Hesperides, which was guarded by a sleepless dragon; and to bring from the infernal world the three-headed dog, Cerberus. He accomplished them all successfully, as well as many other exploits ascribed to him, by which he gave proof of his extraordinary strength and exhibited himself as an avenger and deliverer of the oppressed. Such were: his slaying the robber, Cacus; the deliverance of Prometheus, bound to a rock; the killing of Busiris; and the rescue of Alcestis from the infernal world. His last achievement was the destruction of the centaur, Nessus. Nessus dying, gave his poisoned tunic to Deianira, telling her that his blood would preserve her husband's love. Hercules afterwards, receiving it from her and putting it on, suffered such torment that as soon as he slew Nessus he cast himself in despair upon a funeral pile on Mount Œta.

Herla. A mythical king, the supposed leader of the Wild Hunt of Scandinavian mythology. This hunt was known as the Raging Host in Germany and in England as Herlathing.

Hermes (*hûr'mēz*). The Greek god with whom the Romans identified Mercury. In early times he was represented, like Priapus, as a bearded, ithyphallic figure, likenesses of which were erected before private dwellings.

Later, he became beardless, and of a more beautiful form. His business was to carry messages for Zeus, and his pleasure to pursue and woo nymphs.

Hermione (*hẽr-mī'ō-nē*). The beautiful daughter of Menelaus and Helen. She had been promised in marriage to Orestes before the Trojan War, but Menelaus, after his return home, married her to Neoptolemus. She later married Orestes.

Hesperides (*hĕs-pĕr'ĭ-dēz*). The daughters of Hesperus or of Erebus and Nox, who were appointed along with a never-sleeping dragon to watch the golden apples in the garden of the Hesperides in an island beyond Mount Atlas.

Hesperus. A son or brother of Atlas enrolled among the deities after death, and made identical with the Evening Star.

Hestia. The Greek name for Vesta, the goddess of the domestic hearth.

Hippocrene (*hĭp'ō-krēn*). A fountain on Mount Helicon, which sprang up where the winged horse Pegasus pawed the ground. He had been sent up by Poseidon to still the merriment of the Muses, and to accomplish this it was sufficient for him to strike the ground with his hoof. The name means "fountain of the horse."

Hippolyta (*hĭ-pŏl'ĭ-tà*). Queen of the Amazons, and daughter of Mars. It was her girdle that Hercules was required by Eurystheus to obtain. He captured her and brought her to Athens, where he gave her to the ruler, Theseus, as a wife.

Hippolytus. Son of Theseus and Hippolyta; his stepmother, Phædra, loved him but being repulsed accused him before Theseus of an attempt on her chastity. Theseus called down a curse on his head and was heeded by Poseidon, who sent up a great bull and so frightened Hippolytus' horses, as he was driving, that he was killed in the runaway. Artemis, whom he worshiped as a goddess of chastity, later induced Æsculapius to bring him to life and transferred him under the name of Virbius to a grove in Italy.

Hippomenes (*hĭ-pŏm'ĕ-nēz*). Son of Megareus, and great-grandson of Poseidon, or Neptune, who conquered Atalanta in a foot race. He had three golden apples, which he dropped one by one, and which she stopped to pick up. By this delay she lost the race, and was bound to marry Hippomenes. See *Atalanta.*

Hobomoko. An evil spirit known among certain North American Indians.

Hodeken. A famous German kobold, or domestic fairy servant; so called from wearing a little felt hat pulled down over his face.

Hoder. In Norse mythology, a blind god who, at the instigation of Loki, destroyed his brother Balder. He personifies night and darkness, as Balder does light and day.

Hofvarpnir. The fleet steed of Gna, in Scandinavian legend, which traveled through fire and air and enabled this messenger of Frigga to see all that was happening on the earth.

Honir. In Norse tales, a name given to the god of mind or thought.

Horæ or **Hours.** Daughters of Zeus and Themis, the goddesses of the order of nature and of the seasons. They guarded the doors of Olympus and promoted the fertility of the earth.

Horus. The Egyptian god of the sun, who was also worshiped in Greece and at Rome.

Hou Chi. A Chinese divinity, said to have been the founder of the royal house of Chou. He is said to have taught the arts of agriculture to the Chinese. For this service he was deified.

Hugin (*hōōg'ĭn*). One of Odin's two ravens which carried him news from earth, and which, when not thus employed, perched upon his shoulders. The other was called Munin. They were personifications of thought or intellect.

Hugon (*ū'gŏn'*). An evil spirit, in the folklore of France, made use of to frighten children.

Hyacinthus. A youth beloved by Apollo, and accidentally slain by him while playing at quoits. From his blood sprang the flower which bears his name.

Hyades (*hī'à-dēz*). A group of nymphs to whom was given the care of Dionysus, the god of wine and of fertility. They were later placed among the stars. As rainstars, they symbolize nourishing rains.

Hydra. A monstrous serpent. Of especial note was the hydra in the lake Lerna, which was slain by Hercules. It had many heads and when one of these heads was cut off, two others immediately grew in its place, unless the blood of the wound was stopped by fire. Hercules accomplished its destruction by the aid of Iolaus, who applied lighted brands as each head was removed. The blood of the monster formed a poison into which Hercules dipped his arrows, in order to inflict mortal wounds on his enemies.

Hygeia (*hī-jē'yà*). The goddess of health and a daughter of Æsculapius, though some traditions make her the wife of the latter. In works of art she is represented in a long robe, feeding a serpent from a cup.

Hylas. A beautiful boy, beloved by Hercules. He was drawn into a spring by nymphs, who were enamored of him. The story has been treated by Bayard Taylor, and by William Morris in his "Life and Death of Jason."

Hymen or **Hymenæus.** A companion of Venus who presided over marriage.

Hymir. In Scandinavian mythology, the frost giant from whom Thor took and carried off the great kettle called "Mile-deep."

Hyperboreans (*hī'pẽr-bō'rẽ-ănz*). A fabulous people, supposed to live in a state of perfect happiness in a land of perpetual sunshine beyond the caverns of the north wind.

Hyperion. Son of Cœlus and Terra, and, like Apollo, a model of manly beauty. Hyperion was the father of the sun, moon, and dawn, and may be regarded as the original Greek sun god.

Iacchus (*ĭ-ăk'ŭs*). The solemn name of Bacchus in the Eleusinian mysteries, derived from a boisterous song of the same name. In these mysteries Iacchus was regarded as the son of Zeus and Ceres, not of Zeus and Semele.

Iapetus (*ī-ăp'ē-tŭs*). The father of Atlas and ancestor of the human race.

Icarius (*ĭ-kā'rĭ-ŭs*). An Athenian, who hospitably received Dionysus in Attica and was taught the cultivation of the vine.

Icarus (*ĭk'à-rŭs*). See *Dædalus.*

Ida. A mountain range of Mysia in Asia Minor, celebrated in mythology as the scene of the rape of Ganymede and of the judgment of Paris. In Homer, the summit of Ida is the place from which the gods watch the battles in the plain of Troy. It is an ancient seat of the worship of Cybele. A mountain in Crete, known as Mount Ida, was closely connected with the worship of Jupiter.

Idæan Mother. Cybele, who had a temple on Mount Ida in Asia Minor.

Idomeneus (*ĭ-dŏm'ē-nūs*). The heroic leader of the Cretans against Troy. He vowed to sacrifice to Poseidon whatever he should first meet on his landing, if the god would grant him a safe return. This was his own son, whom he accordingly sacrificed. As Crete was thereupon visited by a plague, the Cretans expelled Idomeneus, who went to Italy.

Iduna or **Idun.** Daughter of the dwarf Ivald, and wife of Bragi. She kept in a box the golden apples which the gods tasted as often as they wished to renew their youth. Loki on one occasion stole the box, but the gods compelled him to restore it. Iduna seems to personify that part of the year when the sun is north of the equator. Her apples indicate fruits generally. Loki carries her off to Giant-land, when the sun descends below the equator, and he steals her apples. In time, Iduna makes her escape, in the form of a sparrow, when the sun again rises above the equator and fruits return.

Ifing. In Scandinavian mythology, the great stream, between the earth and the sacred lands, whose waters never froze.

Inachus (*ĭn'à-kŭs*). One of the river gods, a son of Oceanus and Tethys, and father of Phoroneus and of Io. He was the legendary first king of Argos.

Indra. In Hindu mythology, the ever youthful god of the firmament, and the omnipotent ruler of the elements. In the Vedic period of the Hindu religion, he occupied a foremost rank, and, though degraded to an inferior position in the Epic period, he long enjoyed a great legendary popularity. In works of art, he is represented as riding on an elephant.

Io. The daughter of Inachus, beloved by Zeus, and changed by him, because he feared Hera's jealousy, into a heifer. Wandering in this form she crossed the sea named after her, Ionian.

Iolaus (*ī'ō-lā'ŭs*). The son of Automedusa and of Iphicles, who was the half brother of Hercules. Iolaus is known as the latter's faithful companion and charioteer.

Iole (*ī'ō-lē*). The daughter of Eurytus of Œchalia, beloved by Hercules. Eurytus promised his daughter to the man who should conquer him and his sons in shooting with the bow. Hercules defeated them; but Eurytus and

his sons, with the exception of Iphitus, refused to give Iole to the victor, on the ground that he had, in a fit of insanity, murdered his own children.

Ion. The fabulous ancestor of the Ionians, son of Apollo and Creusa, and grandson of Erechtheus. According to some traditions he reigned in Attica.

Ipalnemohuani. The sun god and supreme deity of the Toltecs. Human sacrifices were offered to him.

Iphigenia (*ĭf'ĭ-jē-nī'ā*). A daughter of Agamemnon and Clytemnestra, and sister to Orestes. Iphigenia was about to be sacrificed at Aulis to obtain fair sailing for the expedition against Troy; but she was rescued by Diana, who carried her to the Tauri, where she became a priestess in her temple. She was afterwards recognized by her brother Orestes, who, with his friend Pylades, was wrecked on the Taurian coast and brought, according to local custom, to be sacrificed to Diana as shipwrecked sailors. Iphigenia succeeded in saving them.

Irene (*ī-rēn'*). Goddess of peace, called Pax by the Romans, daughter of Zeus and Themis, and one of the Horæ.

Iris. Name given among the Greeks to the rainbow, as personified and considered a goddess. Her father was said to be Thaumas, and her mother, Electra, one of the daughters of Oceanus. Her residence was near the throne of Juno, whose commands she bore as messenger to the rest of the gods and to mortals. Sometimes, but rarely, she was Jupiter's messenger and was employed even by other deities.

Irus. The beggar of gigantic stature, who kept watch over the suitors of Penelope and carried their messages for them. His real name was Arnæus, but the suitors nicknamed him Irus, by analogy with Iris.

Isis. In Egyptian mythology, the sister-wife of Osiris. She was the type of motherhood and fertility in nature. The Greeks identified her with Demeter. Her worship as a nature goddess, in various forms, spread over most of the ancient world.

Islands of the Blessed. The early Greeks, as we learn from Homer, placed the Elysian fields, into which favored heroes passed without dying, at the extremity of the earth, near the river Oceanus. In poems later than Homer, an island is spoken of as their abode; hence, when certain islands were discovered in the ocean, off the western coast of Africa, the name of *Fortunatæ Insulæ* was applied to them. They are now called the Canary and the Madeira islands.

Ismene (*ĭs-mē'nē*). Daughter of Œdipus and Jocasta. When her sister Antigone was condemned to be buried alive by the order of King Creon for defying his edict and burying her brother Polynices, Ismene declared that she had aided her sister, and requested to be allowed to share the same punishment. Denied this, she is said to have died from grief. The story is told by Sophocles, and the modern artist, Teschendorf, has made a noted picture of the two sisters.

Israfel. Known among Arabians as the angel of music, who possessed the most melodious voice of all God's creatures. It was his duty to sound the resurrection trump and make music for the saints in paradise. Israfel, Gabriel, and Michael were the three angels that warned Abraham of Sodom's destruction.

Italapas, the Coyote. Among the Chinook Indians the Coyote was regarded as a helper of Ikanam, the creator, and as a teacher of men. Among certain Californian tribes, Coyote was a mischievous god.

Ithaca. In Greek mythology, the island kingdom of Ulysses.

Ixion (*ĭk-sī'ŏn*). A fabled king of Thessaly, who became father of the centaurs. The story by which he is most noted runs: When Deioneus demanded of Ixion certain gifts he had promised, Ixion treacherously invited him to a banquet and contrived to make him fall into a pit filled with fire. Zeus pardoned Ixion, but later for an insult to Hera he was chained by his hands and feet to an ever-revolving wheel.

Jamshid (*jăm-shēd'*). King of the genii, who owned a golden cup full of the elixir of life. This cup, hidden by the genii, was said to have been discovered by those who dug the foundations of Persepolis.

Janus. One of the superior gods of the Romans. The myths represent him as reigning over the earliest inhabitants of Italy, where he received Saturn driven from Crete by Jupiter. The two reigned in Italy throughout what was known later as the golden age. To Janus, Numa dedicated that celebrated temple, which was always open in time of war, and was closed with much solemnity whenever there was general peace in the Roman Empire, a thing which happened but three times during 700 years. From this deity the month of January was named, and the first day of each month was sacred to him. He was a god of beginnings, of doors, and perhaps, originally, of light. He was represented with two faces looking in opposite directions.

Jason. The son of Æson, king of Iolcus. Æson appointed his half brother Pelias as guardian to the young Jason, whom Pelias tried to get rid of by sending him to get the golden fleece. Enlisting a number of famous heroes in the quest, Jason set sail on the ship *Argo* from Iolcus and came to King Æetes in Colchis, who promised him the fleece if he would use certain fire-breathing bulls to plow a field. With the help of Medea, the daughter of Æetes, who fell in love with Jason and offered the use of her magic art, he overcame all obstacles and obtained the fleece. Medea fled with him. Later, angered by Jason's intention to take a new wife, she accomplished his death and that of their two children.

Jinn or **Genii.** Fairies in Arabian mythology, the offspring of fire. They were governed by a race of kings named Suleyman, one of whom built the pyramids. Their chief abode is the mountain Kaf, and they appear to men under the forms of serpents, dogs, cats, monsters, or even human beings, and become invisible at pleasure. The evil jinn are ugly, but the good are beautiful. They were created from fire 2000 years before Adam lived.

Jizo. A Japanese Buddhist god. He is represented as a kindly priest, a protector of travelers, women, and children. His image is frequently placed at crossroads.

Jörd (*yērd*). Daughter of Night, wife of Odin, and mother of Thor.

Jove. A form of the name Jupiter.

Juggernaut or **Jagannath** (*jŭg'ĕr-nôt*) (*-ă-năt'*). A Hindu god, worshiped in the town of Puri in Orissa. On festival days the throne of his image is placed on a sixty-foot tower on wheels, which is drawn through the streets. Devout worshipers are said to throw themselves in front of this car to be crushed.

Juno. The Roman goddess of women, who was identified with the Greek goddess Hera. As such she was the wife of Jupiter and queen of heaven. The amours of her husband gave her many occasions for jealousy which she often indulged with vindictive cruelty against his paramours.

Jupiter. The supreme god of the Romans, who was identified with the Greek god Zeus. Both were probably at first gods of light. As identified by poets with Zeus, he ruled over gods and men on his throne in Mount Olympus, but often came down to visit mortals and make love to mortal women. The Capitol at Rome was dedicated to him as guardian of the city. See *Zeus*.

Kama (*kä'mä*). The Hindu god of love. His wife is Rati, "voluptuousness," and he is represented as riding on a sparrow, holding in his hand a bow of flowers and five arrows, each tipped with the bloom of a flower supposed to conquer one of the senses. His power is so much exalted that even the god Brahma is said to succumb to it.

Kami. The gods of ancient Japan. The name, in modern times, designates any saintly person and may also be applied to a prince.

Kaswa. The favorite camel of Mohammed, admitted into the Moslem paradise because it fell on its knees in adoration when the prophet delivered the last clause of the *Koran* to the assembled multitude at Mecca.

Kelpie. In the mythology of Scotland, a spirit of the water seen in the form of a horse, and believed to appear to those who are about to be drowned. Each lake has its kelpie.

Kobold (*kō'bōld*). A house spirit in German folklore. In northern Europe the name is sometimes used in place of elf or dwarf, representing an underground spirit. It is probably the same as the Scotch brownie.

Koppenberg. The hill which miraculously opened to receive the children who followed Odin under the form of the Pied Piper. The rats, which he previously lured into the river and drowned, were the restless souls of the dead, which were thus released.

Krishna. A popular hero-god of the ancient Hindus. He is represented as one of the incarnations, or *avatars*, of Vishnu. One of the stories regarding him relates that, when the people of the earth appealed to Vishnu against the tyranny of the king Kansa, Vishnu took the form of Krishna to destroy the king. Kansa, forewarned, killed all the other children of Vasudeva and Devaki, the parents of Krishna. But Krishna was concealed by a cowherd. He is represented as a beautiful and gifted youth, somewhat like the Greek Apollo.

Kubera (*kōō-bā'rä*). In Hindu mythology, the god of riches, represented as frightfully deformed, and as riding in a car drawn by hobgoblins.

Lachesis (*lăk'ĕ-sĭs*). The one of the three Fates who fixed the length of the thread of life. See *Fates*.

Læding. In Norse mythology, a strong chain with which the wolf Fenris was bound. He easily broke the chain and from this legend has grown the saying, "to get loose out of Læding." A stronger chain, known as Droma, was also broken by Fenris. See *Droma*.

Laertes (*lā-ûr'tēz*). Mythical king of Ithaca and father of Ulysses. Laertes took part in the Calydonian hunt and in the expedition of the Argonauts. He was still alive when Ulysses returned to Ithaca, after the fall of Troy. During the absence of Ulysses he had withdrawn to the country in grief and bowed with age. It was his shroud which Penelope, the wife of Ulysses, was weaving and on the completion of which she promised to choose one of her suitors as husband. But each night she raveled what she had woven in the day.

Læstrygonians (*lēs'trĭ-gō'nĭ-ănz*). A mythical race of giants who lived in Sicily. Ulysses sent two of his men to request that he and his crew might land, but the king ate one and the other fled. The Læstrygonians assembled on the coast and threw stones against Ulysses and his crew. Ulysses escaped after losing many of his companions.

Laius. King of Thebes, son of Labdacus, husband of Jocasta, and father of Œdipus, by whom he was slain.

Lamia (*lā'mĭ-ȧ*). A daughter of Belus, king of Egypt, who, because she was loved by Jupiter, was transformed by the jealous Juno into a monster devouring human flesh. Greek and Roman children were often frightened by stories of her.

Laocoön (*lā-ŏk'ō-ŏn*). Son of Priam, and priest of Apollo. He opposed the reception of the wooden horse into Troy, thinking it some artifice of the deceitful Greeks, whereupon he and his two sons were killed by two monstrous serpents which came from the sea at the instance of Apollo, whom Laocoön had offended by offering sacrifice to Poseidon. The Trojans, however, interpreted the occurrence as evidence that Laocoön should not have opposed taking the horse into the city.

Laodamia (*lā-ō-dā'ȧ-mī'ȧ*). The wife of Protesilaus, who was slain before Troy. She begged to be allowed to converse with her dead husband for only three hours, and her request was granted. Hermes, or Mercury, led Protesilaus back to the upper world; when, at the end of the three hours, Protesilaus died a second time, Laodamia died with him.

Laomedon. The king that built the walls of Troy assisted by Neptune and Apollo, who had displeased Jupiter and were sent to work for wages. Neptune built the walls, while Apollo tended the king's flocks on Mount Ida. When the two gods had done their work, Laomedon refused the reward he had promised and expelled them from his dominions. Neptune sent to ravage the country a sea monster which could be propitiated only by the sacrifice of Laomedon's daughter, Hesione. When she was chained to a rock and the monster came to devour her, Hercules appeared and rescued her.

Lapithæ (*lăp'ĭ-thē*). A mythical people of Thessaly, noted for their defeat of the centaurs at the marriage feast of Peleus and Thetis.

Lares. Those deities which Romans chose as the protectors of their houses or cities and statues of whom were set up over the hearth. Each house chose two gods as its lares.

Latinus. A king of Latium, son of Faunus and of the nymph Marcia. He was the father of Lavinia, whom he gave in marriage to Æneas. Æneas built a town which he called Lavinium, capital of Latium. According to one account, Latinus, after his death, became Jupiter Latiaris, just as Romulus became Quirinus.

Latmus. A mountain in Caria. It was the mythological scene of the story of Selene, or Luna, and Endymion.

Latona. Daughter of Cœus, a Titan, and of Phœbe, and, by Jupiter, the mother of Apollo and Diana. The love of the king of the gods procured for her the hatred of Juno.

Lavinia. The daughter of Latinus and Amata, betrothed to Turnus, but married to Æneas. Æneas founded the town of Lavinium, called after Lavinia.

Leda. The mother of Helen. Jupiter visited her in the form of a swan, and "Leda and the Swan" has been a favorite subject with artists.

Leprechaun (*lĕp'rĕ-kŏn'*). In Irish mythical tales a fairy shoemaker resembling an old man, who resorts to out-of-the-way places, where he is discovered by the noise of his hammer. Besides making shoes, he grinds meal and in other ways assists people who are kind to him. While any one keeps his eye fixed upon him, he cannot escape, but the moment the eye is withdrawn he may vanish.

Lethe (*lē'thē*). The river that separates Hades from the Elysian fields. The souls of the dead drink of this river and straightway forget all their past.

Liber. A name frequently given by the Roman poets to the Greek Bacchus, or Dionysus. But the god Liber and the goddess Libera were ancient Italian divinities, presiding over the cultivation of the vine and the fertility of the fields. Hence they were worshiped in early times in conjunction with Ceres. The vine and ivy and the panther were especially sacred to him, and goats were usually offered in sacrifice to him.

Libertas. The deification of liberty, to whom as a goddess several temples were erected at Rome. She is represented in works of art as a matron wearing a wreath of laurel and holding in her hand the pileus, the cap given to freed slaves as a symbol of their emancipation.

Libitina (*lĭb'ĭ-tī'nȧ*). An ancient goddess of Rome who presided over the burial of the dead. At her temple in Rome everything necessary for funerals was kept, and might be bought or hired for use. As goddess of death she was often identified with Proserpina but, as she had originally been a goddess of gardens and of voluptuous joy, she was sometimes identified with Venus.

Lif (*lēf*). In Norse mythology, the name given to man in the state in which he is to occupy the purified earth when goodness resumes its sway.

Lilinau. In the folklore of certain North American Indians, a woman wooed by a phantom. She followed his green waving plume through the forest and was never seen again.

Lilith (*lĭl'ĭth*). In Hebrew mythology, a female specter who lies in wait for children in order to destroy them. The older traditions tell of Lilith as a former wife of Adam and the mother of demons. Amulets were worn as protection from her powers.

Lofen. The Scandinavian god who guards friendship.

Lofua. The Scandinavian goddess who reconciles lovers.

Loki (*lō'kē*). In Norse mythology, the contriver of all mischief among the gods. He is the father of Fenris the wolf, of the Midgard Serpent, and of Hel, "death."

Lord of Cold Weather. Among the Blackfeet Indians, a tall, old man, who sits and smokes in his white tepee far in the north country.

Lorelei (*lō'rĕ-lī*). In German legend, a bewitching maiden who haunted a rock of the same name on the right bank of the Rhine. She combed her hair with a golden comb, and sang a wild song which enticed fishermen and sailors to destruction on the rocks and rapids at the foot of the precipice. In Norse mythology, Lorelei is represented as immortal, a daughter of the Rhine, and dwelling in the river bed.

Lotis. A nymph, who, to escape the embraces of Priapus, was metamorphosed into a tree, called, after her, "lotus."

Lubins. A species of goblins in Normandy that take the form of wolves and frequent churchyards. They are very timorous and take flight at the slightest noise.

Lucifer (*lū'sĭ-fẽr*). (1) "Light-bearer." The name of the planet Venus, when seen in the morning before sunrise. The equivalent Greek is "Phosphor." The same planet was called "Hesperus," when it appeared in the heavens after sunset. (2) By a false etymology the church fathers connected the Hebrew word for Lucifer with a word meaning "to lament." He thus became the fallen angel who lamented his original glory, which was bright as the morning star, and he was identified with Satan by Dante and Milton, following the earlier writers.

Luna. The daughter of Hyperion and Thea: She was distinct in name, descent, and story, from Diana, who was regarded as goddess of the moon. To Luna was ascribed great influence in relation to the birth of children.

Lycomedes (*lĭk'ō-mē'dēz*). A king in the island of Scyros, to whose court Achilles, disguised as a maiden, was sent by his mother, Thetis, who was anxious to prevent her son from going to the Trojan War.

Mænalus (*mĕn'ȧ-lŭs*). A mountain in Arcadia, extending from Megalopolis to Tegea, celebrated as the favorite haunt of the god Pan.

Mæra. The dog of Icarius. Icarius, having made wine, gave it to some shepherds, who, thinking themselves poisoned, killed him; recovering themselves, they buried him. His daughter Erigone, being shown the spot by his faithful dog Mæra, hanged herself through grief.

Mammon. In demonology, a spirit placed at the head of nine ranks of demons. Also a Syriac word used in the Scriptures to signify either riches or the god of riches. Milton made Mammon one of the fallen angels.

Manes (*mā'nēz*). In Roman mythology, spirits of the dead, which were often supposed to hover about their former abodes and needed to be pacified by ceremonies.

Mani. Name given in ancient Norse mythology to a personification of the moon. He was later known as the son of Mundilfori, and was taken to heaven by the gods to drive the moon-car. He was followed by a wolf, which, when time should be no more, would devour both Mani and Mani's sister Sol.

Manitou. The great spirit of certain North American Indians.

Mars. A Roman god, originally of husbandry and later god of war, in which character he was identified with the Greek Ares. The Romans regarded him as the father of Romulus, and the founder and protector of their nation.

Marsyas. The Phrygian flute player who challenged Apollo to a contest of skill and, being beaten by the god, was flayed alive for his presumption. From his blood arose the river Marsyas. The flute on which Marsyas played was one Athena had thrown away, and, being filled with the breath of the goddess, gave forth such music as enabled him at least to compete with Apollo.

Medea. A daughter of Æetes, skilled in charms and witchcraft. She had scarcely beheld Jason, when, through the influence and disposal of the gods, a tender affection for the hero was raised in her bosom, and soon kindled to a flame of the most violent passion. Jason went to the temple of Hecate to supplicate the mighty goddess, where he was met by Medea. She disclosed her love to him, at the same time promising her assistance in the dangers which threatened him, and offering her help in accomplishing his glorious undertaking, provided he would swear fidelity to her. Jason complied, and Medea, reciprocating the oath, rendered the hero invincible by means of her magical incantations. She was later deserted by him and in revenge slew his children, his intended bride, and his father.

Medusa (*mē-dū'sȧ*). One of the three Gorgons whose hair was entwined with hissing serpents, and whose bodies were covered with impenetrable scales; they had wings, brazen claws, and enormous teeth, and whoever looked upon them was turned to stone. Medusa, who alone of the sisters was mortal, was, according to some legends, at first a beautiful maiden, but her hair was changed into serpents by Athena, or Minerva, in consequence of her having become by Poseidon, or Neptune, the mother of Chrysaor in one of Athena's temples. She was killed by Perseus, and her head was fixed on the shield of Minerva. From her blood sprang the winged horse, Pegasus.

Megæra (*mē-jē'rȧ*). One of the Furies, the author of insanity and murders. The others were: Tisiphone, whose particular work was to originate fatal epidemics and contagion; Alecto, to whom were ascribed the devastations and cruelties of war.

Megingiard (*mĕg'ĭn-gȳrd*). A magic belt worn by the god Thor, which, as it was tightened, rendered its wearer more powerful. The god was accustomed to show his strength by lifting great weights, but on one occasion the belt failed him, when he was challenged to pick up from the ground a cat belonging to a certain giant. He tugged and strained, only to succeed in raising one paw from the floor.

Meleager (*mĕl'ē-ā'jẽr*). Son of the Calydonian king Œneus. He took a prominent part in the Argonautic expedition and distinguished himself among his companions, especially by reason of his skill in throwing the javelin.

Melia (*mē'lĭ-ȧ*). One of the daughters of Oceanus and the mother of Phoroneus, a fabulous king of Argos.

Melicertes (*mĕl'ĭ-sûr'tēz*). A son of the Theban king Athamas by Ino. He was metamorphosed into a sea god.

Melic Nymphs. (*mĕl'ĭk*). Maidens of the ashen spear, sprung from the blood of Uranus. Two of them, Adrastea and Ida, cared for the infant Jupiter in a cave on Mount Ida.

Melissa. A nymph, said to have discovered the use of honey, and from whom bees were said to have received their Greek name.

Melpomene (*mĕl-pŏm'ē-nē*). The Muse of the tragic drama.

Melusina (*mĕl'ū-sē'nȧ*). The most noted among French fairies. She was condemned to become every Saturday a serpent from the waist downward, as a punishment for having, by means of a charm, enclosed her father in a high mountain, in order to avenge an injury her mother had received from him. She married Raymond, count of Toulouse, who in violation of a promise he gave her never to visit her on Saturdays came and saw her during her loathsome transformation. For his breach of faith she left him. The story has analogies with legends of the mermaids, and of Cupid and Psyche.

Memnon. A son of Tithonus and Aurora, and king of Ethiopia. After the fall of Hector, he went to the assistance of his uncle Priam with 10,000 men, and displayed great courage in the defense of Troy, but he was at length slain by Ajax, in single combat, whereupon he was changed into a bird.

Mendes (*mĕn'dēz*). An Egyptian god similar to Pan. He was worshiped in the form of a goat.

Menelaus (*mĕn'ē-lā'ŭs*). A son of Atreus, and younger brother of Agamemnon. He was king of Lacedæmon, and was married to the beautiful Helen, by whom he became the father of Hermione. When Paris seduced and took to Troy his wife Helen, he enlisted the help of Agamemnon, his brother, and many other Greek princes to win back his wife by sacking Troy. In the war Menelaus killed many Trojans, and would have slain Paris also in single combat had not the latter been carried off in a cloud by Venus.

Menœceus (*mē-nē'sūs*). (1) A Theban, grandson of Pentheus, and father of Hipponome, Jocasta, and Creon. (2) Grandson of Menœceus, and son of Creon. When the seven Argive heroes marched against Thebes, he put an end to his life because Tiresias had declared that his death would bring victory to his country.

Mentor. A friend of Ulysses in Ithaca, whose form Minerva assumed in order to give instructions to Ulysses' son Telemachus, whom she accompanied to Pylos and Lacedæmon.

Mephistopheles (*mĕf'ĭs-tŏf'ē-lēz*). One of the seven chief devils in the old demonology, the second of the fallen archangels, and after Satan the most powerful among the infernal legions. He figures in the old legend of Dr. Faustus as the familiar spirit of that magician. To modern readers he is chiefly known as the cold, scoffing, relentless fiend of Goethe's *Faust*, and as the attendant demon in Marlowe's *Faustus*. The name is said to be a corruption of a Greek word meaning "one who hates what is helpful."

Mercury. A Roman god, identified with the Greek Hermes. In Rome, however, he continued to carry a sacred branch as the emblem of peace instead of the caduceus. Like Hermes he was the messenger of Jupiter, the god of eloquence, of gain, and of thievery, and conducted souls to the lower world.

Mermaids (*mûr'mādz*). Wave maidens of medieval folklore. They were generally represented as young and beautiful women, fish-form below the waist, who used their charms to lure men to destruction in the sea. Sometimes they are said to have quit the sea, temporarily acquiring complete human form, and marrying, only to bring disaster upon their husbands and upon themselves.

Meru (*mā'rōō*). In Hindu mythology, a sacred mountain, 80,000 leagues high, situated in the center of the world. It was the abode of Indra, god of the air, and abounded with every charm that can be imagined.

Midas. The king of Phrygia, who restored to Bacchus the god's nurse and preceptor, Silenus, and received as a compensation the power of turning into gold everything he touched. But this proved to be very inconvenient, as it prevented him from eating and drinking, and he prayed that the gift might be revoked. At the command of the god, he washed in the Pactolus, the sands of which became, in consequence, mixed with gold. Another tradition is that, in a musical contest between Pan and Apollo, he gave judgment in favor of the satyr; whereupon Apollo in contempt gave the king a pair of ass's ears. Midas hid them under his Phrygian cap; but his servant, who used to cut his hair, discovered them, and was so pleased with the "joke," which he dared not mention, that he dug a hole in the earth and relieved his mind by whispering in it, "Midas has ass's ears."

Midgard (*mĭd'gärd*). In Scandinavian mythology, the name given to the earth, meaning "middle yard or enclosure." It was formed in the middle of *Ginnungagap*, or "gaping abyss," out of the eyebrows of the giant Ymir and joined to heaven by the rainbow bridge Bifröst. The solid portion of Midgard was surrounded by the giant's blood or sweat, which now formed the ocean, while his bones made the hills, his flat teeth became the cliffs, and his curly hair took the form of the trees and all vegetation.

Midgard Serpent. The great serpent, offspring of Loki, which grew to such a length that it surrounded the earth and bit its tail. Odin cast it into the sea.

Mimir (*mē'mẽr*). In Scandinavian mythology, the god of wisdom. Also god of the ocean, called "Mimir's well," in which wit and wisdom lay hidden, and of which he drank every morning from the Giallarhorn. Odin once drank from this fountain, and by doing so became the wisest of gods and men; but he purchased the privilege and distinction at the cost of one eye, which Mimir exacted from him.

Minerva. Under the name of Minerva among the Romans and of Athena among the Greeks was personified

and deified the idea of intelligence and wisdom. Minerva was a daughter of Jupiter, sprung from his head. The Greeks ascribed to this goddess the invention of many arts and sciences, which had a great influence on their civilization. She was regarded as inventress of the flute, of embroidery and spinning, of the use of the olive, and of various instruments of war; in short, of most works indicating superior intelligence or skill. See *Arachne*.

Minos (*mī'nŏs*). A semimythical king and lawgiver of Crete. In order to avenge the wrong done to his son Androgeos at Athens, he made war against the Athenians, and compelled them to send to Crete every year, as a tribute, seven youths and seven maidens, to be devoured in the labyrinth by the Minctaur.

Minotaur (*mĭn'ō-tôr*). A celebrated monster with the head of a bull and the body of a man, kept by Minos in the famous labyrinth constructed by Dædalus. The monster devoured a tribute of young people from Athens each year until he was slain by Theseus, with the assistance of Ariadne, the daughter of Minos.

Mithra. A Persian deity whose worship spread over western Asia and through the Roman world. This cult was the most formidable rival of early Christianity. Mithra was a god of light, heat, and fertility, a giver of all good things. He was popularly represented as a sun god, and in many respects he resembled Apollo.

Mjöllnir (*myûl'nêr*). In the mythology of Scandinavia, the name of Thor's celebrated hammer — a type of the thunderbolt — which, however far it might be cast, was never lost, as it always returned to his hand. Whenever he wished, it became so small that he could put it in his pocket.

Mnemosyne (*nē-mŏs'ĭ-nē*). Mother of the Muses and goddess of memory. She was courted by Jupiter in the guise of a shepherd.

Moakkibat. A class of angels, according to the Mohammedan mythology. Two angels of this class attend every child of Adam from the cradle to the grave. At sunset they fly up with the record of the deeds done since sunrise. Every good deed is entered ten times by the recording angel on the credit or right side of his ledger, but when an evil deed is reported the angel waits seven hours in the hope that the evildoer may repent.

Mœræ (*mē'rē*). The Greek name for the Fates.

Morpheus (*môr'fūs*). The son of Sleep and the god of dreams. The name signifies the fashioner or molder, because he shapes or forms the dreams which appear to the sleeper.

Mowis. The snow bridegroom who, according to a certain North American Indian tradition, wooed and won a beautiful bride; but, when morning dawned, Mowis left the wigwam and melted into the sunshine. The bride hunted for him night and day in the forests, but never saw him again.

Muses. Nine daughters of Jupiter and Mnemosyne. They were goddesses of poetry, of history, and of other arts and sciences. Calliope was the Muse of eloquence and heroic poetry, and to her the ancients gave precedence; Clio, of history; Erato, of amorous poetry; Euterpe, of music; Melpomene, of tragedy; Polyhymnia, of eloquence and of imitation; Terpsichore, of dancing; Thalia, of comic and lyric poetry; and Urania, of astronomy. Their usual abode was Mount Parnassus in Helicon.

Myrmidons (*mûr'mĭ-dŏnz*). The trusty followers of Achilles. They are said to have inhabited originally the island of Ægina, and to have emigrated with Peleus into Thessaly; but modern critics, on the contrary, suppose that a colony of them emigrated from Thessaly into Ægina. The Myrmidons disappeared from history at a later period. The ancients derived their name either from a mythical ancestor, Myrmidon, son of Zeus and father of Actor and Eurymedusa, or from the ants in Ægina, which were supposed to have been metamorphosed into men in the time of Æacus.

Mysterious Three, The. In Scandinavian mythology, "Har" (the Mighty), the "Like-Mighty," and the "Third Person," who sat on three thrones above the rainbow. Below them ranked the "Æsir," of which Odin was chief, who lived in Asgard between the rainbow and the earth; and below them, the "Vanir," or gods of the ocean, air, and clouds, of which deities Niord was chief.

Naiads (*nā'yădz*). The nymphs of fresh water, whether of rivers, lakes, brooks, or springs. See *Nymphs*.

Nala. A legendary king of India, whose love for Damayanti and whose subsequent misfortunes have supplied subjects for numerous poems.

Nanabozho. A North American Indian hero who, like Hiawatha, showed himself a benefactor of mankind. He stole fire from the fire spirit.

Naraka (*năr'ă-kă*). The hell of the Hindus. It has 28 divisions, in some of which the victims are torn by ravens and owls; in others they are compelled to swallow cakes boiling hot, or are made to walk over burning sands.

Narcissus. The beautiful youth, son of the river god Cephissus and of the sea nymph Liriope. Echo, whose love he refused, died of grief. But Nemesis, to punish him, caused him to see his own image reflected in a fountain, whereupon he became so enamored of it that he gradually pined away, until he was metamorphosed into the flower which bears his name. According to another tradition, Narcissus had a sister of remarkable beauty, to whom he was tenderly attached. She resembled him in features, was similarly attired, and accompanied him in the hunt. She died young, and Narcissus, lamenting her death, frequented a neighboring fountain to gaze upon his own image in its stream. The strong resemblance that he bore to his sister made his own reflection appear to him, as it were, the form of her whom he had lost. The gods looked with pity upon his grief, and changed him to the flower that bears his name.

Nausicaa (*nô-sĭk'ă-ă*). A daughter of Alcinous, king of the Phæacians, and of Arete. She discovered the shipwrecked Odysseus (Ulysses) on the shore and conducted him to the court of her father.

Nectar. Wine conferring immortality, which was, according to Homer, drunk by the gods.

Neleus (*nē'lūs*). Son of Neptune and Tyro, and brother to Pelias. He became king in Peloponnesus; his twelve sons were all killed by Hercules.

Nemean (*nê-mē'ăn*) **Lion.** A monstrous lion, near the forest of Nemea, which wasted the surrounding country and threatened destruction to the herds. Hercules promised to deliver the country of the monster, and Thespius rewarded Hercules by making him his guest so long as the chase lasted. Hercules slew the lion, and thereafter wore its skin as his garment and its head as his helmet.

Nemesis (*nĕm'ê-sĭs*). A Greek goddess, who measured out to mortals happiness and misery, and visited with losses and sufferings all who were blessed with too many gifts of fortune. This is the character in which she appears in the earlier Greek writers; but subsequently she was regarded, like the Erinyes or Furies, as the goddess who punished crimes.

Neoptolemus. The son of Achilles. He was reared in Scyros, in the palace of Lycomedes, and was brought thence by Ulysses, because it had been prophesied that Neoptolemus and Philoctetes were necessary for the capture of Troy. At Troy Neoptolemus showed himself worthy of his great father. He was one of the heroes concealed in the wooden horse, and at the capture of the city he killed Priam, and sacrificed Polyxena to the spirit of his father. He was also called Pyrrhus. See *Pyrrhus*.

Nepenthe (*nê-pĕn'thē*). A care-dispelling drug, which Polydamna, wife of Thonis, king of Egypt, gave to Helen. A drink containing this drug "changed grief to mirth, melancholy to joyfulness, and hatred to love." Homer mentions this drug nepenthe in his *Odyssey*.

Neptune. A Roman god of water, identified with Poseidon, the Greek god of the ocean. To him as god of the ocean, myths assign the following activities: his assistance to Jupiter against the Titans; the building of the walls and ramparts of Troy; the creation and taming of the horse; the raising of the island Delos out of the sea; and the destruction of Hippolytus by a monster sent from the deep. He was feared also as the author of earthquakes and deluges, which he caused or checked at pleasure by his trident.

Nereids (*nē'rê-ĭdz*). Sea nymphs, generally regarded as belonging to the Mediterranean. The chief characteristics of these minor deities of the sea were the power of divination and the ability to change their forms at pleasure. They were daughters of Nereus and Doris, fifty in number, and usually followed in the train of Neptune.

Nereus (*nē'rūs*). A son of Pontus and Gæa, and husband of Doris, by whom he became the father of the fifty Nereids.

Nestor. A son of Neleus and Chloris, and king of Pylos in Triphylia. He took a prominent part in the Trojan War, acting as counselor of the other Grecian chiefs, but he was equally distinguished for his valor in the field of battle. Homer extols his wisdom, justice, bravery, and eloquence. He lived to so great an age that his advice and authority were deemed equal to those of the immortal gods. Hence the name is often found in literature as an appellation denoting wisdom.

Nickar or **Hnickar.** The name assumed by Odin when he impersonated the destroying principle.

Nickneven. A gigantic and malignant female spirit of the old popular Scottish mythology. The hag is rep-

resented as riding at the head of witches and fairies at Halloween.

Nifiheim (*nēv″l-hām*). "Mist home" of old Norse mythology, the region of endless cold and everlasting night, ruled over by Hel, daughter of Loki. It consisted of nine worlds, to which were consigned those who died of disease or of old age. This region existed "from the beginning" in the North, and in the middle of it was the well Hvergelmir, from which flowed twelve rivers.

Nina. The ancient patron goddess of Nineveh. The Babylonian word sign for her name and that of the city meant "house of the fish."

Niobe (*nī′ō-bē*). The daughter of Tantalus and the wife of Amphion, king of Thebes. Niobe offended Latona, the mother of Apollo and Diana, by boasting that she had more children than Latona, and the latter engaged both her children to avenge her; they, by their arrows, slew the seven sons and seven daughters of Niobe, who by grief was changed into stone. She was transported in a whirlwind to the top of Mount Sipylus, where she has ever since remained, her tears flowing unceasingly.

Nisus. A Trojan youth who accompanied Æneas to Italy after the fall of Troy. He is celebrated for his devoted attachment to his friend Euryalus.

Nithhogg (*nēth′hŏg′*). The dragon that gnaws at the root of Yggdrasil, the tree of the universe in Scandinavian mythology.

Nix. Little creatures not unlike the Scotch brownie and German kobold. They wear a red cap, and are ever ready to lend a helping hand to the industrious and thrifty.

Nokomis (*nō-kō′mĭs*). Daughter of the moon in North American Indian myths. Sporting one day with her maidens on a swing made of vine canes, a rival cut the swing, and Nokomis fell to earth, where she gave birth to a daughter named Wenonah. Wenonah later became the mother of Hiawatha.

Norns. The three Fates of Scandinavian mythology, past, present, and future. They spin the events of human life, sitting under the ash tree Yggdrasil, which they carefully tend. Their names are Urd, "the past," Verdandi, "the present," and Skuld, "the future." Besides these three Norns, every human creature has a personal Norn or Fate. The home of the Norns is called in Scandinavian mythology, "Doomstead."

Nox. The goddess of night, considered among the ancients as one of their oldest divinities and worshiped by them with great solemnity. In the temple of Diana, at Ephesus, was a famous statue of her. She became the mother of Æther, "air," and Dies, "day." She is likewise, according to some, the mother of the inexorable Parcæ; of the avenging Nemesis, who punishes hidden crime; of the Furies, who torment the wicked; of Charon, the ferryman of hell; and of the twin brothers, Sleep and Death.

Nymphs. The nymphs of ancient fiction were viewed as holding an intermediate place between men and gods as to the length of life, not being absolutely immortal, yet living a vast length of time. Oceanus was considered as their common father, although the descent of different nymphs varies. Their usual abode was in grottoes. Special groups had their own peculiar duties, each group being distinguished by special names according to the several objects of their patronage, or the regions in which they chiefly resided. Thus, there were the Oreads, or nymphs of the mountains; Naiads, Nereids, and Potamids, nymphs of the fountains, seas, and rivers; Dryads and Hamadryads, nymphs of the woods; Napææ, nymphs of the vales.

Oceanids (*ō-sē′a-nĭdz*). Daughters of Oceanus, sea nymphs said to be 3000 in number.

Oceanus. The god of the river which was thought to surround the whole earth, in early times believed flat and round. He was the son of heaven and earth, the husband of Tethys, and the father of all the river gods and water nymphs. Out of and into this river the sun and the stars were supposed to rise and set; and on its banks were the abodes of the dead.

Odhrerir. In Scandinavian mythology, the name of the cauldron containing mead or nectar made of honey mingled with the blood of Kvasir, wisest of men. This potion conferred wisdom and the poetic faculty on those who drank of it.

Odin. The king of gods and men, and the reputed progenitor of the Scandinavian kings. He corresponds both to the Jupiter and to the Mars of Græco-Roman mythology. As god of war, he held his court in Valhalla, surrounded by all warriors who had fallen in battle, and attended by two wolves, to whom he gave his share of food; for he himself lived on wine alone. On his shoulders he carried two ravens, Hugin, "mind," and Munin, "memory," whom he dispatched every day to bring him news of all that was being done throughout the world. He had three great treasures: Sleipnir, an eight-footed horse of marvelous swiftness; Gungnir, a spear, which never failed to strike what it was aimed at; and Draupnir, a magic ring, which every ninth night dropped eight other rings of equal value. The German tribes worshiped Odin under the name of "Woden."

Odur. In Scandinavian mythology, husband of Freya, whom he deserted. After a long search she found him again and was restored to happiness by his love.

Odysseus (*ō-dĭs′ūs*). Greek form of the name Ulysses.

Œdipus (*ĕd′ĭ-pŭs*). The son of Laius, king of Thebes. Laius, having been warned by an oracle that his throne and life were in danger from this son, gave him immediately after birth to a herdsman to be killed. But the child was saved, and reared by a peasant. Having grown up he ransomed Thebes from the sphinx by answering her riddle, unwittingly killed his own father, and, on becoming king of Thebes, married his father's wife, that is, his own mother, Jocasta. Subsequently discovering his parentage, he destroyed his eyesight and wandered away from Thebes, attended by his daughter Antigone, who remained with him till his death.

Ogre (*ō′gẽr*). In nursery mythology, a giant of very malignant disposition, who lives on human flesh.

Old One. Among the Thompson River Indians, the god who created the earth and taught the people how to hunt and fish and to do all the other things needful for living.

Olympus. A range of mountains in Thessaly, the abode of the gods. A gate of clouds, kept by the goddesses named the Seasons, unfolded to permit the passage of the deities to earth, or to receive them on their return.

Ops. A Roman goddess of plenty, and of fertility, the wife of Saturn, and the patroness of husbandry.

Orestes (*ō-rĕs′tēz*). The son of Agamemnon and Clytemnestra. On the murder of his father by Ægisthus and Clytemnestra, Orestes was saved from the same fate by his sister Electra. She caused him to be secretly carried to Strophius, king of Phocis, who was married to Anaxibia, the sister of Agamemnon. There he formed a close and intimate friendship with the king's son Pylades; and, when he had grown up, he repaired secretly to Argos with his friend, and avenged his father's death by slaying Clytemnestra and Ægisthus. After the murder of his mother he was seized with madness, and fled from land to land, pursued by the Erinyes, or Furies. At length, on the advice of Apollo, he took refuge in the temple of Athena at Athens, where he was acquitted by the court of the Areopagus, which the goddess had appointed to decide his fate.

Orion. A mighty giant and hunter, famous for his beauty. Having come to Chios, he fell in love with Merope, the daughter of Œnopion; his treatment of the maiden so exasperated her father, that, with the assistance of Dionysus, he deprived the giant of his sight. Being informed by an oracle that he should recover his sight if he exposed his eyeballs to the rays of the rising sun, he followed the sound of a Cyclops's hammer, and at Lemnos he found Vulcan, who gave him Cedalion as a guide to the abode of the sun. After the recovery of his sight he lived as a hunter with Artemis, or Diana. Orion was slain by Diana, or, as some say, by Jupiter, and placed among the stars.

Orithyia. A daughter of Erechtheus, beloved by Boreas, who carried her off as she was wandering near the river Ilissus.

Orlog. A god of Norse fable personifying the eternal law of the universe. From his decree there was no appeal.

Ormuzd (*ôr′mŭzd*). In the *Avesta*, called Ahura Mazda (*ä′hōō-rä-mäz′dä*). The name of the supreme deity of the ancient Persians, and of their descendants, the Parsees and Ghebers. He is, according to them, an embodiment of the principle of good, and is in perpetual conflict with Ahriman, the principle of evil. He created the earth, moon, sun, and stars, and continues to regulate their motion. See *Ahriman*.

Orpheus (*ôr′fūs*). The son of Apollo or of Œagrus, a river god, and of Calliope. Presented with the lyre by Apollo, and instructed by the Muses in its use, he enchanted with its music not only the wild beasts, but the trees and rocks upon Olympus, so that they moved from their places to follow the sound of his golden harp. He accompanied the Argonauts in their expedition. After his return, he took up his abode in Thrace, where he married the nymph Eurydice. His wife having died of the bite of a serpent, he followed her into the abodes of Hades. Here his lyre so charmed King Pluto that Eurydice was released from death, but on the condition that Orpheus should not look back until he had reached the earth. He was just about to place his foot on the earth when he turned round, and Eurydice vanished from him in an instant.

Osiris (*ō-sī′rĭs*). An Egyptian god, said to have been the son of Jupiter by Niobe, to have ruled first over the Argives,

and afterwards to have become king of the Egyptians. His wife was Isis, who is by many said to be the same as Io, daughter of Inachus. Osiris was at length slain by Typhon, and his corpse was concealed in a chest and thrown into the Nile. Isis, after much search, by the aid of keen-scented dogs, found the body and placed it in a monument on an island near Memphis. The Egyptians paid divine honor to his memory, and chose the ox to represent him, because, according to one account, a large ox appeared to them after the body of Osiris was interred, or, according to others, because Osiris had instructed them in agriculture. Osiris was generally represented with a cap on his head like a miter, and with two horns; he held a stick in his left hand, and in his right a whip with three thongs. Sometimes he appears with the head of a hawk.

Ostara or **Eastre.** Saxon goddess of spring and returning life. At her festival it was customary to exchange gifts of painted eggs. Christianity adopted the festival as Easter and gave it a new meaning.

Otus. One of the two giants who were usually called the Aloadæ. The other was Ephialtes. The two were renowned for their extraordinary strength and courage.

Pachacamac. The name of an ancient Peruvian god of earthquakes, which were regarded as his voice. The meaning of this name is "earth-generator." He was worshiped as a god of fertility also, and as a civilizer.

Pactolus. The river whose sands turned to gold when Midas by order of Bacchus washed in the waters.

Paimosaid. In certain North American Indian myths, a wandering thief who walks through cornfields about harvest time to pluck the ears of corn.

Palæmon. Son of Ino, originally called Melicertes, until he was made a sea god. The Roman god of harbors, Portunus, was identified with him.

Palamedes (*păl'ă-mē'dēz*). A Greek hero sent by the Greek princes to induce Ulysses to join in the Trojan War, when Ulysses sought to avoid going by pretending insanity. Palamedes soon penetrated the deception, and Ulysses was obliged to join in the war.

Pales (*pā'lēz*). The goddess of shepherds, presiding over cattle and pastures, whose festival, the Palilia, was celebrated on the 21st of April, the anniversary of the day on which Rome was founded. The Palatine hill at Rome was sacred to her. Later the Roman emperors built on it their residence, called the Palatium, from which comes our word palace.

Palladium (*pă-lā'dĭ-ŭm*). A Trojan statue of the goddess Pallas Athena, which represented her as sitting with a spear in her right hand, and in her left a spindle or distaff. It is said to have fallen from heaven near the tent of Ilus at the time when that prince was employed in building the citadel of Troy; and Apollo, by an oracle, declared that the city should never be taken as long as the Palladium was contained within its walls. Ulysses and Diomedes captured the statue for the Greeks and not long afterwards the city was taken.

Pallas. (1) One of the giants. (2) The father of Athena, according to some traditions. (3) Son of Lycaon and grandfather of Evander. (4) Son of Evander and an ally of Æneas.

Pallas Athena (*păl'ăs ă-thē'nă*). See *Athena.*

Pan. The god of shepherds and herdsmen, of groves and fields, and of rural life generally. He was said to be the son of Mercury and Dryope. His favorite residence was in the woods and mountains of Arcadia, where he was frequently heard playing on his pipe or flute of seven reeds, called a syrinx. It was fabled that this pipe was a metamorphosis of a nymph named Syrinx, whom he had loved. His pride in this invention led him into an unlucky contest with Apollo. His festivals were introduced by Evander among the Romans, and by them called Lupercalia. Goats, honey, and milk were the usual offerings to Pan. Pan, like other gods who dwelt in forests, was dreaded by travelers, to whom he sometimes appeared, and whom he startled by his uncanny presence. Hence sudden fright, without any visible cause, was ascribed to Pan and was called a panic. See *Mendes.*

Pandora. The first woman, according to Greek mythology. She was made of clay by Vulcan, and all the gods made presents to her. Venus gave her beauty and the art of pleasing; the Graces gave her the power of captivating; Apollo taught her how to sing; Mercury instructed her in eloquence and brought her to Epimetheus, who made her his wife, forgetting the advice of his brother Prometheus, not to receive gifts that came from Jupiter. In her home she found a box which she was forbidden to open. Disobeying the injunction she allowed to escape from it all the evils of life except hope. According to another version, all the blessings of life escaped from it except hope, which remained to solace mortals.

Parcæ (*pär'sē*). See *Fates.*

Paris. The son of Priam, king of Troy, and of Hecuba; he was also called Alexander. The tradition is that, at the marriage of Peleus and Thetis, the goddess of discord, who had not been invited, showed her displeasure by throwing into the assembly of the gods, who were at the nuptials, a golden apple on which were the words "For the fairest." The apple was claimed by Hera, Aphrodite, and Athena. Zeus ordered Hermes to take the goddesses to Mount Ida, and to intrust the decision of the dispute to the Trojan shepherd Paris. The goddesses accordingly appeared before him. Hera promised him the sovereignty of Asia; Athena, renown in war; and Aphrodite, the fairest of women for his wife. Paris decided in favor of Aphrodite, and gave her the golden apple. Under her protection, Paris sailed to Greece, and was hospitably received in the palace of Menelaus at Sparta. Here he succeeded in carrying off to Troy Helen, the wife of Menelaus, who was the most beautiful woman in the world. Menelaus enlisted the support of many other Greek chieftains and proceeded to besiege Troy. Paris fought with Menelaus before the walls of Troy, and, though defeated, was carried off by Aphrodite. He slew Achilles by wounding him in his heel, where alone he was vulnerable, while Achilles was engaged in a peaceful mission in Troy.

Parnassus. A well-wooded mountain ridge near Delphi in Greece. At its foot grew myrtle, laurel, and olive trees, and, higher up, firs; its summit was covered with snow during the greater part of the year. It contained numerous caves, glens, and romantic ravines and had two summits, one of which was consecrated to Apollo and the Muses, the other to Bacchus. It was anciently called Larnassus, from *larnax*, "an ark," because Deucalion's ark was stranded there after the flood. After the oracle of Delphi was built at its foot it received the name of Parnassus and was celebrated as one of the chief seats of Apollo and the Muses.

Parthenope (*pär-thĕn'ō-pē*). One of the sirens, who threw herself into the sea out of love for Ulysses, and whose dead body was washed ashore on the present site of Naples. Naples itself was anciently called Parthenope, which name was changed to *Neapolis*, "the new city," by a colony of Cumæans.

Pasiphaë. The wife of Minos, king of Crete, and, by a bull, the mother of the Minotaur, to which human captives were given as food.

Patroclus (*pă-trō'klŭs*). The gentle and amiable friend of Achilles in Homer's *Iliad.*

Pauguk. Name given to the great power, death, in the mythology of certain North American Indians.

Paupukkeewis (*pô'pŭk-kē'wĭs*). In North American Indian folklore, a mischievous magician, who, pursued by Hiawatha, went through a series of wonderful transformations in his endeavors to escape, and finally became an eagle.

Pax. The goddess of peace, worshiped in Greece under the name Irene. Pax wore a crown of laurel and held in her hand the branch of an olive tree.

Peboan. In North American Indian folklore, the personification of winter in the form of a great giant who shook the snow from his hair and turned water into stone by his breath.

Pegasus (*pĕg'ă-sŭs*). The winged horse which sprang from the blood of Medusa when her head was struck off by Perseus.

Peleus (*pē'lŭs*). King of the Myrmidons at Phthia in Thessaly. Having, in conjunction with his brother Telamon, murdered his half brother Phocus, he was expelled by Æacus from Ægina, and went to Thessaly. He was purified from the murder by Eurytion, who then gave Peleus his daughter Antigone in marriage, and a third part of his kingdom.

Pelion (*pē'lĭ-ŏn*). A high mountain in Thessaly near whose summit was the cave of the centaur Chiron. The giants, in their war with the gods, are said to have attempted to heap Pelion and Ossa on Olympus, in order to scale heaven.

Pelops (*pē'lŏps*). A Phrygian prince, grandson of Jupiter and son of Tantalus. Expelled from Phrygia, he came to Elis, where he married Hippodamia, daughter of Œnomaus, whom he succeeded on the throne. By means of the wealth he brought with him, his influence became so great in the peninsula that it was called after him the Peloponnese, "the island of Pelops."

Penates (*pē-nā'tēz*). Roman gods who were supposed to preside over the welfare and prosperity of the family. The storehouse, or *penus*, was sacred to them.

Penelope (*pē-nĕl'ō-pē*). The faithful wife of Ulysses, who, being importuned during his long absence by numerous

suitors for her hand, postponed making a decision among them until she should have finished weaving a funeral pall for her father-in-law, Laertes. Every night she secretly unraveled what she had woven by day, and thus put off the suitors till Ulysses returned.

Peri (*pē'rĭ*). In Persian mythology, delicate, gentle, fairylike beings, begotten by fallen spirits. They direct with a wand the pure in mind along the way to heaven. These lovely creatures, according to the *Koran*, are under the sovereignty of Eblis; and Mohammed was sent for their conversion, as well as for that of man.

Perse. A daughter of Oceanus, and wife of Helios (the sun), by whom she became the mother of Æetes, Circe, Pasiphaë, and Perses.

Persephone (*pẽr-sĕf'ō-nē*). The Greek name of Proserpina. Homer describes her as the wife of Hades, or Pluto, and the formidable and majestic queen of the shades, who, with her husband, rules over the souls of the dead.

Perseus (*pûr'sūs*). One of the most distinguished of the early heroes. He was the son of Jupiter and Danaë, and was educated by Polydectes on the island of Seriphus. His chief exploit was the destruction of the Gorgon Medusa, whose head he struck off with a sword given to him by Vulcan. From the blood that fell, sprang the winged horse Pegasus, on which Perseus afterwards passed over many lands. Of his subsequent achievements, the most remarkable were his changing King Atlas into a high rock or mountain by means of Medusa's head, and his deliverance of Andromeda when she was bound and exposed to be devoured by a sea monster.

Phædra (*fē'drȧ*). Daughter of Minos, and wife of Theseus, who, finding her love rejected by her stepson Hippolytus, falsely accused him of making improper advances toward her, and so induced her husband to bring about his son's death.

Phaëthon. A son of Phœbus and Clymene. Anxious to display his skill in horsemanship, he was so presumptuous as to request his father to allow him to drive the chariot of the sun across the heavens for one day. Helios was induced by the entreaties of his son and of Clymene to yield, but the youth, being too weak to check the horses, permitted them to go too close to the earth, thereby scorching it. To save mankind Zeus killed Phaëthon with a thunderbolt, and hurled him down into the river Eridanus. His sisters wept for him until they were metamorphosed into poplars, and their tears became amber.

Phaon. A boatman of Mytilene, ugly in appearance, who once carried Aphrodite across the sea without accepting payment. In return the goddess gave him a box of ointment with which, when he anointed himself, he grew so beautiful that Sappho became enamored of him; but when the ointment had all been used Phaon returned to his former condition, and Sappho, in despair, drowned herself.

Philemon and Baucis (*fĭ-lē'mŏn*) (*bô'sĭs*). An aged couple, who alone in Phrygia honored two travelers with hospitality. The travelers proved to be Jupiter and Mercury in disguise and in acknowledgment of the kindness they had received, they changed into a temple the house of Philemon and Baucis. The two old people were granted the privilege of caring for the temple and of leaving life together. One day, as they stood before the door, they were suddenly transformed into trees, an oak and a linden, which stood side by side.

Philoctetes (*fĭl'ŏk-tē'tēz*). The most celebrated archer in the Trojan War. He was the friend and armor-bearer of Hercules, who bequeathed to him his bow and his poisoned arrows in return for setting fire to the pile on Mount Œta on which Hercules perished.

Philomela (*fĭl'ō-mē'lȧ*). A daughter of Pandion, king of Athens. Her sister Procne had married Tereus, king of Thrace. Becoming tired of her after she had given birth to a son, Itylus, he cut out her tongue and told that she had died. Philomela became his next wife, and, learning the truth from her sister, served up, with her sister's help, the cooked flesh of Itylus for Tereus to eat. The gods in anger turned Philomela into a nightingale, Procne into a swallow, and Tereus into a hawk.

Phœbe. The goddess of the moon, and sister of Phœbus; a name of Diana.

Phœbus. See *Apollo.*

Phœnix. (1) A fabulous bird described as being as large as an eagle. Its head was finely crested with a beautiful plumage, its neck covered with gold-colored feathers, its tail white, and its body purple or crimson. It was said to appear once every 500 years, each bird rising from the ashes of its sire, who voluntarily cremated himself. (2) Father of Europa and reputed ancestor of the Phœnicians.

Phyllis. A daughter of King Sithon of Thrace. She hanged herself, thinking that she was deserted by her lover, Demophon, who had failed to appear on the day appointed for their marriage. She was changed by the gods into an almond tree.

Pirene (*pī-rē'nē*). A celebrated fountain of Corinth, at which Bellerophon is said to have caught the horse Pegasus. It gushed forth from the rock in the Acrocorinthus, was conveyed down the hill by subterraneous conduits, and fell into a marble basin, from which the greater part of the town was supplied with water.

Pleiades (*plē'yȧ-dēz*). The seven daughters of Atlas and Pleione, named Electra, Alcyone, Celæno, Maia, Sterope, Taygeta, and Merope. They were transformed into stars, one of which, Merope, is invisible out of shame, because she alone married a human being. Some call the invisible star "Electra," and say she hides herself from grief for the destruction of the city and royal race of Troy. The name means "sailing stars," because navigation was considered safe after their appearance.

Pluto (*plōō'tō*). A brother of Jupiter and Neptune. He received, as his portion in the division of empire, the infernal regions. His wife was Persephone, or, as the Romans called her, Proserpina, the daughter of Demeter, whom he carried by force from the upper world and made queen of the lower regions. The nymph Mintho, whom he loved, was metamorphosed by Proserpina into the plant called mint; and the nymph Leuce was changed by him after her death into a white poplar. The ensign of his power was a staff, with which, like Hermes, he drove the shades into the lower world. He possessed a helmet which rendered the wearer invisible, and which he sometimes lent to men or to other gods. The Furies were said to be his daughters. Being the king of the lower world, Pluto was regarded as giver of the blessings that come from the earth, such as the metals.

Plutus. The god of riches, and son of Iasion and Demeter. Jupiter blinded him so that he would bestow his gifts irrespective of merit.

Pluvius. A surname of Jupiter among the Romans meaning, "the sender of rain." Sacrifices were offered to him in this capacity during long-protracted droughts.

Podalirius. The son of Æsculapius, and brother of Machaon, with whom he led the Thessalians of Tricca against Troy. He was, like his brother, skilled in the medical art.

Polias. A cult name of Athena at Athens meaning "protectress of the city."

Pollux. A son of Jupiter and Leda, and brother to Castor.

Polydorus. (1) King of Thebes, son of Cadmus and Harmonia, husband of Nycteus, and father of Labdacus. (2) Son of Priam and Hecuba. When Ilium was on the point of falling into the hands of the Greeks, Priam intrusted Polydorus and a large sum of money to Polymnestor, king of the Thracian Chersonesus.

Polyhymnia (*pŏl'ĭ-hĭm'nĭ-ȧ*). See *Muses.*

Polyphemus. A son of Neptune, and one of the Cyclopes who dwelt in Sicily. He was a cruel monster of immense size and strength, and had but one eye, which was in the middle of his forehead. He dwelt in a cave near Mount Etna, and fed his flocks upon the mountain. He fell in love with the nymph Galatea, but, as she rejected him for Acis, he destroyed the latter by crushing him under a huge rock. When Ulysses landed in Sicily, he, with twelve of his companions, was caught in the cave of Polyphemus, and six of the number were eaten by the terrible cannibal. The rest were in expectation of the same fate, but their cunning leader enabled them to escape by contriving to intoxicate Polyphemus, and then destroying his single eye with a firebrand.

Polyxena (*pō-lĭk'sē-nȧ*). The daughter of Priam and Hecuba, beloved by Achilles. She was sacrificed by the Greeks on Achilles' tomb.

Pomona. A nymph at Rome, who presided over gardens and fruit trees.

Ponemah. In North American Indian mythology, the name of the spirit land, to which the souls of the dead go.

Poseidon (*pō-sī'dŏn*). The Greek god of the sea, identified by the Romans with Neptune. He was a brother of Jupiter and Pluto. The palace of Poseidon was in the depth of the sea near Ægæ, where he kept his brazen-hoofed and golden-maned horses. With these horses he used to ride in a chariot over the waves, which became smooth as he approached, while the monsters of the deep played around his chariot. Poseidon, in conjunction with Apollo, is said to have built the walls of Troy for Laomedon.

Priam. King of Troy when that city was sacked by the allied Greeks. His wife's name was Hecuba; she was the mother of nineteen children, the eldest of whom was

Hector. When the Greeks landed on the Trojan coast, Priam was advanced in years and took no active part in the war. Once only did he venture upon the field of battle, to conclude the agreement respecting the single combat between Paris and Menelaus. After the death of Hector, Priam went to the tent of Achilles to ransom his son's body for burial, and obtained it. When the gates of Troy were thrown open by the Greeks concealed in the wooden horse, and the hostile army without was admitted, the aged Priam was slain by Pyrrhus, the son of Achilles.

Priapus. An Italian god of gardens. Images of him were often placed in vineyards or before houses to frighten away thieves.

Procne. See *Philomela.*

Prœtus (*prē'tŭs*). Twin brother of Acrisius and son of Abas. In the dispute between the two brothers for the kingdom of Argos, Prœtus was expelled, whereupon he fled to Iobates in Lycia, and married Antea, the daughter of the latter. With the assistance of Iobates, Prœtus returned to his native land, and Acrisius gave him a share of his kingdom, surrendering to him Tiryns, Midea, and the coast of Argolis.

Prometheus (*prō-mē'thūs*). A son of Iapetus and Clymene, the brother of Epimetheus, and the father of Deucalion. He made men of clay, and animated them by means of fire which he stole from heaven; for this he was chained by Jupiter to Mount Caucasus, where an eagle, or, as some say, a vulture, preyed by day upon his liver, which grew again by night. His name means forethought, and that of his brother, afterthought.

Proserpina (*prō-sûr'pĭ-nâ*). See *Persephone.*

Psyche (*sī'kē*). Psyche was the youngest of the three daughters of a king, and excited by her beauty the jealousy and envy of Venus. In order to avenge herself, the goddess ordered Cupid to inspire Psyche with a love for the most contemptible of all men; but Cupid was so stricken with her beauty that he himself fell in love with her. He accordingly conveyed her to a charming spot, where unseen and unknown he visited her every night, and left her as soon as the day began to dawn. But her jealous sisters made her believe that in the darkness of night she was embracing some hideous monster, and, accordingly, once, while Cupid was asleep, she drew near to him with a lamp, and, to her amazement, beheld the most handsome and the most lovely of the gods. In the excitement of joy and fear, she let fall a drop of hot oil from her lamp upon his shoulder. This awoke Cupid, who censured her for her mistrust and fled. Psyche's happiness was now gone, and, after attempting in vain to throw herself into a river, she wandered about from temple to temple, inquiring after her lover, and at length came to the palace of Venus. There her real sufferings began, for Venus retained her, treated her as a slave, and imposed upon her the hardest and most humiliating labors. Psyche would have perished under the weight of her sufferings had not Cupid, who still loved her in secret, invisibly comforted and assisted her in her toils. With his aid she at last succeeded in overcoming the jealousy and hatred of Venus; she became immortal and was united to him forever. In works of art Psyche is represented as a maiden with the wings of a butterfly. Her name is the Greek word for soul and representations of her frequently have an allegorical meaning based on this fact.

Pukwana. The smoke from the Calumet, or peace pipe, among certain North American Indians. The pipe was made from stone found near the headwaters of the Mississippi at a spot which the Indians agreed to make neutral ground. To apply the stone to any other use than that of pipe making would have been sacrilege in their eyes. From its color, they fancied it to have been made at the great deluge out of the flesh of the perishing Indians.

Pukwudjies. The pygmies of North American Indian folklore, who haunted the woods.

Pygmalion. A grandson of Agenor. He made a beautiful statue with which he fell so deeply in love that Venus, at his earnest petition, gave it life.

Pylades (*pĭl'ă-dēz*). Son of Anaxibia, sister of Agamemnon. His father was king of Phocis, to whose court, after the death of Agamemnon, Orestes was secretly carried. Here Pylades contracted that friendship with Orestes which became proverbial.

Pyramus (*pĭr'ă-mŭs*). The lover of Thisbe, who stabbed himself on account of her supposed death. Thisbe, afterwards, finding the body of her lover under the mulberry tree where he fell, killed herself on the same spot with the same weapon; and the fruit of the mulberry has ever since been as red as blood.

Pyrrhus. A son of Achilles, remarkable for his bravery at the siege of Troy. He was known also as Neoptolemus. He was slain at Delphi, at the request of his own wife, Hermione, who later married his slayer, Orestes.

Pythia (*pĭth'ĭ-ă*). The priestess of Apollo at Delphi. Crowned with laurels she was seated on a tripod and placed over a chasm whence arose a peculiar vapor. As she inhaled the intoxicating fumes, she was thrown into convulsive ravings, which were thought to be an evidence of divine inspiration and were interpreted by priests and conveyed as intelligible, but usually ambiguous, messages to those who came to consult the oracle.

Python (*pī'thŏn*). The monster serpent hatched from the mud of the deluge. He lived in the caves of Mount Parnassus, but was slain by Apollo, who founded the Pythian games in commemoration of his victory and received in consequence the surname Pythius.

Radegaste. In Slavonic mythology, a tutelary god of the Slavs. His head was that of a cow, his breast was covered with a shield, his left hand held a spear, and a cock surmounted his helmet.

Ragnarok (*răg'nâ-rŏk'*). "Twilight of the Gods." The day of doom, when the present world and all its inhabitants will, according to Scandinavian mythology, be annihilated. Vitharr and Vali will survive the conflagration, and reconstruct the universe. After this time the earth or realm will become imperishable and happiness sure.

Rahu (*rä'hōō*). In Hindu mythology, the demon that causes eclipses of the sun and of the moon. One day Rahu stole into heaven to quaff some of the nectar of immortality. He was discovered by the sun and the moon, who informed against him, and Vishnu cut off his head. As he had already taken some of the nectar into his mouth, the head was immortal, and he ever afterwards hunted the sun and the moon, which he caught occasionally, causing eclipses.

Rakshasas (*rŭk'shâ-sâz*). Evil spirits, in Hindu myths, who guard the treasures of Kubera, the god of riches. They haunt cemeteries and devour human corpses, they assume any shape at will, and their strength increases as the day declines. Some are hideously ugly, but others, especially the female spirits, allure by their beauty.

Rama Chandra. The seventh incarnation of Vishnu in Hindu mythology. He is the hero of the *Ramayana.* Rama probably represents the sun, as Sita, his wife, represents the earth, or "the furrow."

Rambha. In Hindu mythology, a nymph born of the churning of the ocean. She is a type of female beauty.

Ravana (*rä'vä-nâ*). According to Hindu mythology, a demon giant with ten faces, who was fastened down between heaven and earth for 10,000 years by Siva's leg for attempting to move the hill of heaven to Ceylon.

Rhadamanthus (*răd'ă-măn'thŭs*). A son of Jupiter and Europa, brother of Minos, and king of Lycia. He was so renowned for his justice and equity, that, after death, he was made one of the three judges in the underworld.

Rhamnusia. A daughter of Nox, and otherwise known as Nemesis.

Rhea. The wife of Cronus and the mother of the gods.

Romulus (*rŏm'ū-lŭs*). The mythical founder of the city of Rome.

Saturn. An ancient Italian deity, identified with the Greek Cronus. His wife was Ops. He was the god of seedtime and harvest and was represented as bearing a sickle or scythe. As he was later confused with the Greek *chronos* "time," Father Time is still represented with a scythe. Before becoming a god he is said to have ruled in Italy during the golden age.

Satyr (*sāt'ẽr*). A sylvan deity, or demigod, represented as a monster, half man and half goat; having horns on his head, a hairy body, and the feet and tail of a goat. The satyrs belong to the train of Bacchus, and are distinguished for lasciviousness and riotousness. Although mortal, they are superior to the cares and sorrows of mortal life.

Scylla (*sĭl'ă*). A maiden whose body Circe, in a fit of jealousy, transformed so that the heads of hideous barking dogs grew about her haunches. She later inhabited the rock opposite the whirlpool Charybdis and lay in wait to snatch sailors from ships which came too near her haunt.

Sedrat (*sĕd'răt*). The lotus tree which stands on the right-hand side of the invisible throne of Allah. Its branches extend wider than the distance between heaven and earth. Its leaves resemble the ears of an elephant. Each seed of its fruit encloses a houri, and two rivers issue from its roots. Numberless birds sing among its branches, and numberless angels rest beneath its shade.

Silenus (*sī-lē'nŭs*). The older satyrs were generally termed sileni; but the one who always accompanied Dionysus and who brought up and instructed him is commonly known as the Silenus. He is represented as a jovial old man, with a bald head, pug nose, and rubicund visage, and generally as intoxicated, riding on an ass or

supported by satyrs. He was fond of music and dancing. It is a peculiar feature in his character that he was an inspired prophet, yet, when he was drunk and asleep he was in the power of mortals, who might compel him to prophesy and sing by surrounding him with chains of flowers.

Silvanus or **Sylvanus** (*sĭl-vā'nŭs*). An Italian deity presiding over woods, forests, and fields.

Sirens. Sea goddesses, said by some to be two in number, by others, three, and even four. Homer mentions but two, and describes them as maidens, dwelling upon an island and detaining with them every voyager who was allured thither by their captivating music. They would have decoyed even Ulysses on his return to Ithaca, had he not commanded his sailors to tie him to the mast and fill their own ears with wax. By others they were described as daughters of the river god Achelous, and companions of Proserpina, after whose seizure they were changed into birds, that they might fly in search of her. In an unhappy contest with the Muses in singing, they lost their wings as a punishment. Others make them sea nymphs, with a form similar to that of the Tritons, with the faces of women and the bodies of flying fish. Their fabled abode was placed by some on an island near Cape Pelorus in Sicily, by others, on the islands or rocks called Sirennusæ, not far from the promontory of Surrentum on the coast of Italy.

Sirius. Known in mythology as the faithful dog of Orion, and set in the heavens as a bright star by Diana when she mourned the display of her archery which caused Orion's death. See *Orion*.

Siva. The third of the great triad of Hindu deities, regarded as the destroyer. See *Vishnu*.

Sol (*sŏl*). Although the Greeks and Romans worshiped Apollo as the god and dispenser of light, and in view of this attribute named him Phœbus, yet they conceived another divinity distinguished from Apollo, especially in the earlier fables, under the literal name applied to designate the sun, viz., Sol, or Helios.

Specter of the Brocken. Among German myths, a singular colossal apparition seen in the clouds at certain times of the day by those who ascend the Brocken, or Blocksberg, the highest of the Harz mountains.

Sphinx. A monster said to be a daughter of Chimæra, and living in the neighborhood of Thebes. Seated on a rock, she put a riddle to every Theban that passed by, and whoever was unable to solve it was killed by the monster. This calamity induced the Thebans to proclaim that whoever should deliver the country of the sphinx should obtain the kingdom and marry the recently widowed Theban queen, Jocasta. The riddle ran as follows: "What is that which has one voice, and at first four feet, then two feet, and at last three feet, and when it has most is weakest?" Œdipus explained the enigma by saying that it was man, who, when an infant, creeps on all fours, when a man, goes on two feet, and, when old, uses a staff, a third foot. The monster immediately flung herself into the sea and perished. The form of the so-called Egyptian sphinxes is that of a winged lion with a human head and bust, always in a lying attitude, whereas the Greek sphinxes are represented in any attitude which might suit the fancy of the artist.

Styx. One of four rivers of the lower world, often called the river of hate, because its name comes from a Greek word meaning "to hate." It was said to flow nine times round the infernal regions. The second river was Acheron, river of woe. The third river, Cocytus, flowed out of the river Styx, and the murmur of its waters, the sound of which resembled howlings, was inexpressibly dismal; Phlegethon, the fourth river, rolls slowly along with waves of fire. As a mythical being, Styx is described as a daughter of Oceanus and Tethys. As a nymph, she dwelt at the entrance of Hades in a lofty grotto which was supported by silver columns. She was the divinity by whom the gods took oath. On such an occasion Iris fetched a cup full of water from the river Styx, and the god confirmed his oath by drinking the draught.

Tantalus. The son of Jupiter and king of Lydia, who, according to some legends, was punished for betraying the secrets of his father. He was placed in a lake whose waters fled from him when he sought to quench his thirst, and amid trees laden with fruit whose boughs avoided every effort he made to seize them. Another version represents him as in dread of a rock hanging over his head and always about to fall.

Tartarus. A dark abyss under the earth in which the Titans were chained when their father feared their strength. The music of Orpheus at one time penetrated its depths and caused the condemned to cease their toil. The name has come to signify the lower regions generally.

Telamon. A son of Æacus and Endeis, and brother of Peleus. Having assisted Peleus in slaying their half brother Phocus, Telamon was expelled from Ægina, and came to Salamis, where he was made king. He afterward became the father of Atlas. Telamon himself was one of the Calydonian hunters and one of the Argonauts. He was also a great friend of Hercules, whom he joined in an expedition against Laomedon of Troy, which city he was the first to enter. Hercules, in return, gave to him Hesione, a daughter of Laomedon.

Telemachus (*tē-lĕm'ă-kŭs*). The son of Ulysses and Penelope. He was an infant when his father went to Troy; when Ulysses had been absent nearly twenty years, Telemachus went to Pylos and Sparta to gather information concerning him. He was hospitably received by Nestor, who sent his own son to conduct Telemachus to Menelaus at Sparta. Menelaus also received him kindly, and communicated to him the prophecy of Proteus concerning Ulysses. From Sparta Telemachus returned home; on his arrival there he found his father, whom he assisted in slaying the suitors. See *Penelope*.

Terpsichore (*tûrp-sĭk'ō-rē*). The muse of dancing and of lyric poetry. The name means "delighting in the dance."

Themis. The goddess of justice and one of the daughters of Uranus and Gæa. To her is ascribed the first uttering of oracles, and also the introduction of sacrifices.

Thersites (*thēr-sī'tēz*). The ugliest and most scurrilous of the Greeks before Troy. He spared, in his revilings, neither prince nor chief, but directed his abuse principally against Achilles and Ulysses. He was slain by Achilles for deriding his grief for Penthesilea. The name is often used to denote a calumniator.

Theseus (*thē'sūs*). An early heroic king of Athens. Of the many adventures of Theseus, one of the most celebrated was his expedition against the Amazons. He is said to have assailed them before they had recovered from the attack of Hercules, and to have carried off their queen, Antiope. The Amazons, in their turn, invaded Attica, and the final battle, in which Theseus overcame them, was fought in the very midst of the city.

Thespian Maids, The. The nine Muses. So called from Thespia, in Bœotia, near Mount Helicon.

Thetis (*thē'tĭs*). A marine divinity, who, like her sisters, the Nereids, dwelt in the depths of the sea with her father Nereus. She there received Dionysus on his flight from Lycurgus, and the god in his gratitude presented her with a golden urn. When Vulcan was thrown down from heaven, he was likewise received by Thetis. Thetis rejected the advances of Zeus, because she had been brought up by Hera, and the god, to avenge himself, decreed that she should marry a mortal. She became the wife of Peleus and the mother of Achilles.

Thisbe. See *Pyramus*.

Thor. In Scandinavian mythology, the eldest son of Odin and Frigga. The strongest and bravest of the gods, he launched the thunder, presided over the air and the seasons, and protected man from lightning and evil spirits. His wife was Sif, "love"; his chariot was drawn by two he-goats; he had a hammer, called *Mjöllnir*, and a belt, *Megingiard*, the wearing of which doubled his strength. His palace, called *Thrudvangr*, contained 540 halls. Thursday is Thor's day.

Thunder Bird. A culture god of the North American Indians, represented as a helper of man, and the personification of thunder and lightning.

Titans. Members of the early régime of Greek gods ruled over by Cronus, who with his adherents was overthrown by Zeus, one of his sons.

Tithonus. A son of Laomedon, king of Troy. He was so beautiful that Aurora became enamored of him, and persuaded the gods to make him immortal; but, as she forgot to ask for eternal youth, he became decrepit and ugly, and was, therefore, changed by her into a cicada.

Tityus (*tĭt'ĭ-ŭs*). A giant, son of Jupiter and Terra. His body was so vast that it covered nine acres of ground. He had dared to offer an insult to Juno and in punishment was chained like Prometheus while a vulture feasted on his liver.

Triton. Son of Neptune, who dwelt with his father and mother in a golden palace at the bottom of the sea. Later writers describe him as riding over the sea on sea horses or other monsters. By a blast on his horn of seashell he roused or calmed the waves.

Trolls (*trōlz*). Dwarfs of Scandinavian mythology, living in hills or mounds; they are represented as stumpy, misshapen, and humpbacked, inclined to thieving, and fond of carrying off children or substituting their own offspring for children of a human mother. They are called

hill people, and are especially averse to noise, from a recollection of the time when Thor used to fling his hammer after them.

Troy. The city on the west coast of Asia Minor made famous by the Trojan War. It was ruled by Priam at the time of the war, and its chief defender was Hector. The attacking Greeks were led by Agamemnon and Menelaus, supported by many heroes, the most famous of whom was Achilles. The city fell after a ten-year siege. Among the inhabitants who escaped was Æneas. After wandering for some years, he settled in Italy and, according to legend, became the founder of the Roman race.

Tyr. In Norse mythology, a warrior deity and the protector of champions and brave men. When the gods wished to bind the wolf Fenris, Tyr put his hand into the demon's mouth as a pledge that the bonds would be removed. But Fenris found that the gods had no intention of keeping their word, and revenged himself in some degree by biting off the hand. Tyr was the son of Odin and brother of Thor.

Ulysses. Called "Odysseus" by the Greeks. One of the principal Greek heroes in the Trojan War, a son of Laertes, or, according to a later tradition, of Sisyphus. He married Penelope, the daughter of Icarius, by whom he became the father of Telemachus. During the siege of Troy he distinguished himself by his valor, prudence, and eloquence, and after the death of Achilles contended for that hero's armor with Telamonian Ajax and gained the prize. He is said by some to have devised the stratagem of the wooden horse. The most celebrated part of his story comes in connection with his ten-year voyage home after the Trojan War. Among his adventures he entered the cave of Polyphemus and escaped with some sheep. One of the gods gave him a bag of winds which should carry him home, but the winds were let loose without his permission and his ships driven to an island inhabited by the sorceress Circe. After many wanderings and strange adventures, he arrived at his home in Ithaca. During his absence his father, Laertes, in grief and old age, had withdrawn into the country, and his mother, Anticles, had died. His wife, Penelope, had been importuned by suitors but had rejected them all. In order that he might not be recognized on his arrival, Athena metamorphosed Ulysses into an unsightly beggar. He was kindly received by Eumæus, the swineherd, to whom he made himself known, and a plan of revenge was resolved on. Penelope, with great difficulty, was made to promise her hand to him who should conquer the others in shooting with the bow of Ulysses. As none of the suitors were able to draw this bow, Ulysses himself took it up, and, directing his arrows against the suitors, slew them all with the help of his son Telemachus, to whom he had previously made himself known. Ulysses now revealed himself to Penelope. The people rose in arms against Ulysses; but Athena, who assumed the appearance of Mentor, brought about a reconciliation.

Valhalla (*văl-hăl'ȧ*). In Scandinavian mythology, the gold and silver palace of Odin, wherein were received the souls of heroes slain in battle. Each morning the heroes went out of the palace and fought until noon. All wounds were then healed, and the heroes, under the presidency of Odin, assembled to feast, being served by the battle maidens, or Valkyries.

Valkyries (*văl-kir'iz*). The battle maidens of Scandinavian mythology. Mounted on swift horses, they rushed into battle with drawn swords and, selecting those destined to death, they conducted them to Valhalla. The number of Valkyries differs greatly according to the various mythologists, and ranges from three to sixteen. They are generally mentioned, however, as being only nine.

Vayu (*vā'yōō*). The spirit of the air in Hindu mythology. His wife Angana was a celestial nymph, who was compelled by a curse to assume the form of a monkey. Their son was the monkey god Hanuman, who led the monkeys in support of the god Rama when the latter was battling to recover his wife Siva from the demon Ravana.

Venus. The Roman goddess of women, identified with the Greek Aphrodite, goddess of beauty and love. She is said to have sprung from the foam of the sea, and to have been immediately carried to the abode of the gods on Olympus, where they were all charmed with her extreme beauty. According to other legends she was the daughter of Jupiter and Dione. Sparrows and doves were customarily yoked to her chariot; the sight of her girdle inspired all hearts with passion for the wearer; and her son Cupid was her attendant and minister. The myrtle was sacred to her. Her favorite residence was at Cyprus. Venus was represented often as the wife of Vulcan and frequently as the paramour of Mars. Among mortal men, she loved Anchises, by whom she became the mother of Æneas, and Adonis, whose untimely death left her inconsolable. One of her tasks was to restore harmonious relations for couples who had quarreled.

Vesta. The Roman goddess of the hearth-fire. Æneas was believed to have brought the eternal fire of Vesta from Troy, along with the images of the penates; the prætors, consuls, and dictators, before entering upon their official functions, sacrificed, not only to the penates, but also to Vesta at Lavinium. Similarly, in the house, sacrifices were offered to Vesta at the hearth, and the common meal eaten about the hearth was regarded as an act of worship for her. At Rome, six maidens were chosen to serve for 30 years as priestesses of Vesta. They were known as vestal virgins and took a vow of chastity, the breaking of which involved the penalty of being buried alive. The duty of the vestal virgins was to tend the sacred fire of the city. If the fire went out as a result of their negligence, the penalty was scourging. This custom was probably a survival from the days when it was difficult to obtain fire and when, consequently, the fire once kindled had to be guarded with the utmost care. The office of vestal virgin was highly honored in Rome and was much sought after by distinguished families.

Vishnu. One of the great deities of the Hindu triad, ranking as the "Preserver," after Brahma, the "Creator," and before Siva, the "Destroyer." It is believed that he has appeared on earth nine times, his tenth *avatar*, or incarnation, having yet to come.

Votán. The deity supposed to have taught the people of Chiapas (Mexico) the arts of civilization.

Vulcan. The Roman god of fire, identified with the Greek Hephæstus. He was the son of Jupiter and Juno and became lame by being thrown out of heaven by Jupiter for taking Juno's part in a quarrel. He wrought skillfully at a forge, where he produced tripods that came and departed automatically and many other wonders, including Pandora, the first woman. Venus is usually represented as his wife. Vulcan is represented in art as a middle-aged man having a beard and unkempt hair. Relay torch races were sometimes held in his honor, probably to symbolize the bringing of fire from heaven to mankind or the transference of the sacred element to replace a fire that had become extinguished. Such ceremonies hark back to a time when fire was difficult to kindle.

Woden. The Anglo-Saxon form of the Scandinavian god Odin. Wednesday is called after him.

Xipe. The Mexican god of sowing and of vegetation. Also the god of the goldsmiths and the silversmiths.

Yacatecutli, "He-who-guides." The Mexican god of commerce. His symbol was a traveler's staff.

Yggdrasil (*ĭg'drȧ-sĭl*). The giant ash tree of Norse mythology. It overspreads the earth and binds earth, hell, and heaven together. From beneath it springs a fountain, and under its branches sit the Norns or Fates.

Ymir (*ē'mẽr*). In Norse mythology, the ancient frost giant. The gods slew him and out of his body formed the earth. From it, too, grew the mighty ash tree, Yggdrasil, which was thought to support the universe.

Zamzam. The sacred well situated in the heart of the city of Mecca. According to Arab tradition, it is the very well that was shown to Hagar when she was wandering with Ishmael in the desert.

Zephyrus. A personification of the west wind. He was the mildest and gentlest of the sylvan deities.

Zethus. One of the twin sons of Antiope and Zeus. See *Amphion*.

Zeus (*zūs*). The greatest of the Olympian gods, father of gods and men, a son of Cronus, or Saturn, and of Rhea. He was identified by the Romans with Jupiter. When Zeus and his brothers distributed among themselves the government of the world by lot, Poseidon obtained the sea; Hades received the lower world; and Zeus, the heavens and the upper regions; but the earth became common to all. According to Homer, Zeus dwelt on Mount Olympus in Thessaly, which was believed to penetrate into heaven itself. By his counsel he managed everything; he founded law and order, so that Dike, Themis, and Nemesis came to be regarded as his assistants. According to his own choice he used to assign good or evil to mortals. Zeus had an ancient oracle at Dodona in Greece, where, by means of speaking oaks, he made known his will to mortals. His wife was Hera. Many stories are told of her jealous pursuit of mortal women who had been loved by Zeus and visited by him, usually in a disguised form. By such unions Zeus became the father of many heroes. Europa, receiving him in the form of a white bull, had several sons by him, one of whom was Minos, the famous lawgiver of Crete. Zeus came to Leda as a swan and by her was the father of Helen and of Pollux. Gaining admittance to Danaë in the form of a shower of gold, he begot Perseus. His greatest son was Hercules, the offspring of Alcmene, to whom Zeus obtained access by impersonating her husband.

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Vorse, Mary Heaton	Mrs. Joseph O'Brien
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Warde, Margaret	Edith Kellogg Dunton
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Yechton, Barbara	Lyda Farrington Krause

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HISTORY

INTRODUCTORY

THE word history is sometimes used to mean all that has happened in the past. In this sense we speak of the history of the earth, of rocks, or of plants, as well as of the history of man. In the narrower sense, however, history is an account of the actions and the fortunes of mankind. Such an account must be based upon reliable records which can be understood and interpreted by the writers of history. The records may be in the form of buildings, products of art, manufactured objects, or writings. They may even be institutions, language, or survivals of customs. But, so long as they throw light upon man's activity in the past, such records are material for the writing of history.

Unfortunately, it has been the exception for people to try consciously to hand down to their successors information about their own day. It often happens that certain records are preserved by the merest chance, while others, which would have been much more valuable, are lost. These conditions, it will be seen, make it a very difficult task to obtain a true picture of a past age, to recover the habits and the customs of a society, to trace the effects of its actions upon later times, and to understand the motives and the feelings of people who ceased to live many years or even centuries ago. Yet these are the things which the writers of history aim to do. To accomplish their purpose, historians have worked out an elaborate science of evidence. The more successful historians have also brought to bear upon the task consummate gifts of art and of understanding.

The Use of History. To study history is to live over again this story of the past, to meet familiarly great men and notable women, and to see the outcome of their actions more clearly than the actors saw it themselves. It is to have at one's disposal authentic facts about the past. More than this, the reading of history enlarges our experience, and enables us to judge of present issues and to forecast the future of situations through our knowledge of similar situations in the past. For these reasons, history is a study of the utmost importance for every one, and especially for citizens of a democracy, who have to make up their minds about issues of government, in order that they may help to determine public policies and actions.

The Task of the Historian. The first requisite for all sound historical writing is the careful establishment of facts. This object is attainable only if the historian has full knowledge of the sources of information in regard to the period to be described. Furthermore, he must possess the gift of critically estimating the value of his sources according to the rules of historical evidence. But something more than mere chronicling of facts is expected of the historian. We look to him for interpretation of movements and of events.

To this task the historian must bring an insight into the motives which actuate men in various situations. He needs a power of discernment in state affairs and a due appreciation of the parts which economic, social, and religious interests play in human affairs. Moreover, the historian should keep himself free from considerations of self-interest, that his interpretation may be objective, reasonable, and as free from bias as is humanly possible. In style, he should be candid and unimpassioned, avoiding both panegyric and satire. To truth alone must he offer sacrifice. He must be fearless, incorruptible, untrammeled, conceding nothing either to hatred or to friendship, a citizen of no city, recognizing no ruler, and setting forth the result of his researches in a diction which the many may understand and the more educated approve. Only by such a method can the integrity of a writer be established and his reputation as a historian be justified.

Earlier Historians. Such demands have not always been met. The earliest historian was probably Herodotus, but he had not learned to test his sources critically. However, Thucydides, another Greek historian, showed a spirit so scientifically rigorous that his work has seldom been equaled. Later Greeks and the Romans, with the possible exception of Tacitus, gave history a vicious turn in the direction of rhetoric, by an excessive interest in style rather than in matter. During the middle ages, histories were seldom more than chronicles, devoid alike of artistic form and of scrupulous care for fact. With the Renaissance and in early modern times an interest in genuine history was roused by controversy over facts connected with religion. The histories in that period were written, however, by people who were familiar with religious wars and with struggles between dynasties, and who were acquainted only with a royalist form of government. These circumstances made it difficult for them either to understand records of democratic institutions in the past or to estimate justly social and economic changes in their own day.

Modern Writing of History. In more recent times a different problem has confronted the historian. Broadening interests in his readers have made it necessary for him to treat more aspects of life, and this means that for the history of the past more material must be collected. In the present also an extraordinarily great amount of material is being produced, largely because of the wide use of the printing press. The result is that sifting and selection of material has become one of the chief tasks of the historian. In fact, the increasing complexity of the historian's work has proceeded to such a point that no one man is equal by himself to the task of writing a comprehensive history of even a short period. All great histories now are corporate undertakings. Historical societies as well as governments encourage the collection of facts; periodicals are published to print what researches, carried on in all parts of the world, succeed in bringing to light; and experts in various fields write the parts of the history with which they are competent to deal.

Prehistory. The life of man on the earth may be divided into two periods: historic and prehistoric. The researches of ethnologists and anthropologists continue to teach us more of prehistoric man, but from this early period few records were left which can be used by historians.

Primitive man's struggle for existence claimed and consumed all his energies, so that he had neither time, inclination, nor faculty to concern himself consciously with works that would long survive his death. Our knowledge of these primitive tribes is drawn from the examination of objects belonging to the ages of stone and of bronze, such

as have been found in caves, mounds, graves, and other places. Man's slow and difficult progress toward civilization is marked by the various tools and weapons which he left behind him. Each step of his labored advance is apparent from the successive improvements in his implements, which show how he passed in turn through the hunting and fishing stage, the pastoral and the agricultural period, onward and upward through the eras of picture writing and of sound writing, of early drawing, of carving, and of painting. At length, in various parts of the world, societies attained to such mastery over the means of life that they could give attention to those improvements in living which would entitle them to be called civilized. At this point, history proper may be said to begin.

Divisions of History. In treating of history, an arbitrary division is commonly made into three periods,—ancient, medieval, and modern.

Ancient history deals with the course of the Eastern and Western civilizations up to 476 A. D., the year in which the last Roman emperor of the West was deposed. The civilizations of the East included Babylonia, Elam, Assyria, Mesopotamia, Egypt, Palestine, Phœnicia, Persia, India, China, and Japan; those of the West were Greece, Carthage, and Rome. India, China, and Japan, though having a historical past corresponding to the period we call ancient, are less intimately connected with European civilization than are the other Oriental nations mentioned, and so are usually treated separately.

The history of the medieval period takes up the story of civilization at the fall of Rome. Throughout the course of a thousand years, it traces the gradual development of the old world into the new. Beginning with the almost complete cessation of governmental authority and of learning, it proceeds to describe the growth and power of Christianity, to narrate the rise of the feudal system, and to reveal the origin of the states which developed into the various nations of today. This era comes to an end with the fall of the Byzantine Empire in 1453.

Modern history may be said to begin with the time of the invention of printing and with the discovery of America. It is largely the story of the internal development and of the outward expansion of nations, together with their conflicts—a story ever lengthening as the improved means of communication bring nations, east and west, into more intimate relations with each other and make the actions and the policies of each people the concern of all.

These divisions have been found useful, but they should not be allowed to obscure the fact that in reality history is continuous, and that, in particular, European and American history exhibits an unbroken chain of development in culture and ideas from the dawn of civilization to the present time. The grand and well ordered empire of Rome passed by insensible degrees into an age of less significance, which, however, served as a period of incubation for the astonishing improvements that were later elaborated in the economic and political organization of modern society.

The Study of History. For various reasons, the history of certain periods or nations may be more attractive or more enlightening to the reader than that of other times and peoples. This fact has led to the placing of a certain emphasis on those eras which show the growth of political power, or which reveal a high development of art, of learning, and of culture. Some ages are of especial interest because we see in them the unfolding of religious ideas or the spread of democratic views and practices; or they may gain significance from the sheer force of great personalities which they produced.

The Hebrews.—In the history of the Hebrews we follow the evolution of an ethical religious faith and the rise of a conception of a just and universal god. We see the worshipers of Jehovah clinging tenaciously to their beliefs in spite of the successive waves of conquest that swept over their heads, and even, by means of their faith, maintaining their identity for 2000 years, though deprived of a national habitation and a government.

Greece.—The history of Greece in the 5th century B. C. shows a people so inspired by an ideal of freedom as to defy a despotic empire of much greater power. This too was a period prolific in inventions, rich in literature and in art—a period which has had something to teach to every nation.

Rome.—The history of Rome, on the other hand, from the Punic wars to the widest extent of the Empire, shows the overmastering power of organization. It describes a time in which was built up a system of law that underlies the legal customs of Western Europe and of Latin America.

The Crusades.—Next come the Crusades. Though the military result was the defeat of the Christian nations and a diminution of their prestige, yet the enterprise widened the horizon of the people of Western Europe, and began for a second time to unite the destinies of Europe and Asia.

The Renaissance.—After the Crusades, we arrive at the period of the Renaissance—the rebirth of literature, art, philosophy, and science. Allied to this was the Reformation, from which dates the origin of the Protestant Church.

The Commonwealth.—One of the most instructive periods is that of the struggle between Parliament and the Stuart monarchs in England during the 17th century. It was in this period that the power of Parliament was first made paramount over the authority of the king.

Medieval France.—A quite different development is seen in the history of France from the time of Charlemagne. In this period France became differentiated from the rest of Europe and passed through a long process of constitutional change, which culminated in the monarchy of Louis XIV.

The Modern World.—Finally, we see history take a new direction as a result of the growth of knowledge and the heightening of the sense of individual human worth, which had been going on ever since the time of the Renaissance. The widespread conviction of the value of personality led to a growth of democratic sentiment and to the overthrow of absolute forms of government. This process was attended with much bloodshed and great violence in the French Revolution, but it proceeded more peacefully in many other countries because of its success in France. In Russia, however, where it met with more determined resistance, it was attended by unprecedented convulsions throughout the fabric of social and political life.

The increase of knowledge led to a few simple inventions which were vastly elaborated and applied widely by means of complex organization. This development occasioned profound changes in the ways in which goods were produced and in which human needs were satisfied. These changes necessitated, for workers, a more rigid routine of life, and thus tended to undo the efforts that had been made in the direction of individual freedom. The impersonal power of the industrial master weighed more heavily upon the workman than the personal authority to which men had formerly been accustomed, so that political agitation came to be overshadowed by industrial conflict. For nations, it often became a matter of life and death to have access to raw materials and markets. Thus a period of desperate attempts to parcel off the productive, but little developed, parts of the world was succeeded by struggles among the strongest nations for the control of markets. These struggles culminated in the World War.

Thus two factors, the impulse toward democratic institutions and the compulsory transformation of the means of livelihood, serve today so to involve in one destiny all the nations of the earth, that in the future the history of one nation cannot be written apart from the history of all.

AMERICAN HISTORY

THE discovery and the colonization of the American continent were immediate consequences of the intellectual movements of the Renaissance and of the political and economic conditions of Western Europe at the close of the 15th century. Europe, by that time, had fairly passed from the middle ages to the modern period. With equal truth it may be said that the creation of the United States of America was one of the first great results of the growth of liberal political thought in Western Europe during the 17th and 18th centuries. A brief survey of the European conditions of these periods is, therefore, a necessary preliminary to the study of American colonial and national history.

European Background of American History. The Renaissance, which had created a new world of literature, painting, sculpture, and architecture, had also prepared the way for scientific discovery. Western Europe was thus made ready to enter upon an era of search for new modes of living and for new lands. The movement toward geographic discovery found its enthusiastic and inspiring apostle in Prince Henry of Portugal.

At the same time, the opening of the modern period was signalized by the appearance of national states—England, France, and Spain being the first to rise from the disorder of medieval feudalism. The emergence of these countries from long periods of war left many adventurous spirits free to engage in voyages of exploration. The ranks of the merchant adventurers, too, were swelled, and the demands of commercial enterprises gave impetus to the search for a new route to the Indies, whence came the goods for the most profitable traffic of the times. Not only were the Western merchants chafing under the large tolls taken by the Italian cities, but the Ottoman conquests had resulted either in the imposition of ruinous exactions upon commerce or in the practical closing of the ancient overland trade routes to the East.

Another important influence was due to the fact that, in England particularly, the 16th century saw a very large increase in population. The industrial and agricultural methods of the time, which had changed but little in many centuries, were proving inadequate to provide for the needs of the people. Moreover, a land system that restricted land ownership to a few was becoming irksome to the common people. These conditions caused thousands to welcome an opportunity for life in a new country.

From Imperialism to Popular Government. The questions as to the character and the rights of the state and as to its relation to the lives and happiness of the people occupied the attention of many European thinkers in the 17th and the 18th century. Moreover, these same centuries had seen in Europe the struggle among the powers to unite large areas into imperial states. But the governing classes and the "benevolent despots" of Europe remained generally indifferent to the intellectual movement of the period, while, among the political leaders in the American colonies, this liberal thought found hospitable minds. The political mission of the united colonies in 1776 was to withdraw from the arena of imperial rivalry, and to initiate a movement which should endow with modern liberal meanings the ideas of the state and of political union of states. The realization of this ideal continues to be the task of the American people.

Early Voyages of Discovery. In the latter half of the 15th century, Portuguese sailors attempted the sea route around the Cape of Good Hope. Numerous scholars, however, had come to believe that the earth was round and that, consequently, the Indies could be reached by sailing directly westward from Europe. The credit for putting these theories to a practical test belongs to Christopher Columbus, a Genoese sailor.

After years of fruitless endeavor to gain a hearing for his proposals, Columbus at length appealed to Isabella, the Spanish queen, through her interest in Christianizing the natives of heathen lands. With her aid, he finally secured three small ships and money with which to fit out his first expedition. Toscanelli, an Italian geographer, probably supplied Columbus with a map, on which Japan was represented in a position about 2500 miles west of the Canary islands. This error of distance was fortunate, for it is doubtful that Columbus could have found the men or the means for an undertaking which was likely to involve a longer time and greater danger than the voyage down the west coast of Africa.

Thus equipped with ships, and thoroughly acquainted, through years of study, with the scientific knowledge of geography and navigation that his age afforded, Columbus sailed westward from Palos, Spain, on August 3, 1492. On October 12, the explorers sighted land, probably one of the Bahama islands, which they called San Salvador. In the belief that they had found the East Indies, they took possession of San Salvador, Hispaniola (Haiti), and other islands in the name of the king of Spain. The report carried home by Columbus in 1493 prompted the sailors of other nations to make similar attempts to reach the East. He himself made three more voyages, in 1493, 1498, and 1502, touching at length the northern coast of the continent of South America. But the significance of his discovery was not appreciated until after his death.

The Portuguese redoubled their efforts, and in 1498 Vasco da Gama actually reached India, following the eastward route, by way of the Cape of Good Hope. Henry VII of England, who had refused the offer of Columbus to sail under the English flag, commissioned John Cabot, another Genoese, to set out in search of a new westward route to the Indies. Cabot sailed from Bristol in 1497, and reached the coasts of Labrador and Newfoundland. England, however, lacked money and ships to follow up the discoveries of John Cabot and his son Sebastian, and American exploration was left for the time to Spain.

In 1513 Balboa crossed the Isthmus of Panama and discovered the Pacific Ocean. Magellan, in 1520, entered the Pacific through the strait, which now bears his name, at the southern end of the American continent, sailed up the west coast of South America, and thence westward to the Philippines, where he met his death. One of his ships, however, finally reached Spain by way of the Cape of Good Hope, thus completing the first circumnavigation of the globe. Magellan had reached the goal in Asia toward which Columbus had sailed, and which he believed he had gained.

Exploration. During the early part of the 16th century, Spain was without a rival in the exploration of America. In 1513 Ponce de León visited Florida. While Cortés and Pizarro were gathering fabulous wealth in Mexico and Peru, other Spaniards, inspired by the hope of similar fortune, led expeditions into the country which now forms the southern part of the United States. De Soto marched inland from Florida and explored the country westward to the Mississippi river and the present state of Arkansas. About the same time, Coronado, in search of the rich cities of Cibola, led an expedition northward from the west coast of Mexico as far as the present state of Kansas. Within the latter half of the century, Spaniards visited points on the Pacific coast northward to the Strait of Juan de Fuca.

Meanwhile, French ambitions had been aroused. In 1493-94, Pope Alexander VI had confirmed to Spain possession of all new lands to the westward of a meridian drawn 370 leagues west of the Cape Verde islands, and to Portugal similar discoveries

east of that line. Ignoring this division, the French king, Francis I, sent an Italian sailor, Verrazano, westward across the Atlantic. He explored the coast in the neighborhood of the present harbor of New York. Ten years later (1535), Jacques Cartier found the entrance to the St. Lawrence river, and sailed up that stream until his further progress was stopped by the rapids which were later called Lachine, or Chinese. Charmed by the beauty of the situation, he gave the name Mount Royal to the eminence which now crowns the city of Montreal.

In the opening years of the reign of Queen Elizabeth, English merchants and sailors, stirred to emulation by the commercial monopoly enjoyed by Spain, and, being in religious and political conflict with that power, began to think of possessing the New World. Their activities took two directions: (1) the search for a passage to India around the northern shore of America; (2) a direct attack on Spanish commerce in the Caribbean. The most valuable immediate results of English attempts to find the northwest passage were the discovery and the exploration of Hudson bay, in whose tributary land basin the powerful Hudson's Bay Company gained its first foothold upon the American continent.

The harrying of Spanish commerce was carried on most effectively by Francis Drake. In 1577 Drake, who had already played the pirate with great success, passed through the Strait of Magellan, took several rich prizes from the Spanish fleets on the west coast of America, and put in at a harbor north of the bay of San Francisco for repairs. Thence he continued his voyage of three years by way of the Cape of Good Hope, around the world to England and to the prize of knighthood (1580).

During this same period, persistent efforts toward more permanent possession and colonization of the New World were made by Englishmen. In 1578, Sir Humphrey Gilbert attempted to colonize Newfoundland. His first expedition failed to reach America, but a second, in 1583, entered St. John's harbor, Newfoundland. The colonists became discouraged, however, and soon returned to England. Sir Walter Raleigh, under a charter obtained from Queen Elizabeth in 1584, made three attempts to settle a colony on Roanoke island, off the coast of that part of Virginia which later was included in North Carolina. All three of his attempts failed, largely because supplies could not be sent from England.

The failures of Gilbert and Raleigh proved that the founding of colonies was too expensive a venture for individuals. Further attempts at settlement were postponed until after the close of the wars with Spain in 1604.

The French, meanwhile, had followed up the explorations of Cartier on the St. Lawrence river. The greatest of the French explorers in the 16th century was Champlain, who pushed boldly westward from Quebec into the interior. He initiated that movement of French missionaries and settlers which at length planted a line of missions, forts, and settlements, stretching from the St. Lawrence west and south through the Mississippi valley to New Orleans.

Colonization. Nevertheless, while their leaders were the boldest and most successful explorers of the time, most of the Frenchmen who came to the New World were little interested in real colonizing. They ignored the advantage which early French discoveries on the middle Atlantic coast would have given them, and pressed back into the interior along the line of the St. Lawrence river. As the Spaniards in the South sought for wealth in the mines, so the Frenchmen in the North developed the fur trade, penetrating very early as far west as Lake Superior and north to Hudson bay.

French colonial government, moreover, was despotic. This governmental policy and the dearth of suitable colonists lost the New World to France. The French claims, which at the opening of the 17th century stretched from the latitude of Philadelphia to that of Quebec, overlapped those of the English. But the only French settlements of importance were made at Port Royal, the present city of Annapolis, Nova Scotia (1604), and at Quebec (1608).

Frenchmen were, however, the first to attempt settlements within the present territory of the United States. In 1562 a group of Huguenots settled at Port Royal on the coast of what is now known as the state of South Carolina. Upon the failure of this colony, they planted another on the St. Johns river in Florida in 1565. The Spanish retaliated by founding St. Augustine in the same year and by then destroying the French colony.

The Spaniards were able rapidly to conquer large and rich territories in Mexico and in South America. Their policy of exploitation reduced to slavery many of the natives, whom they used in working the mines. However, an important feature of Spanish colonization is the fact that Spanish settlers intermarried with the natives and produced a mixed race of people who proved themselves capable of a culture which rivaled that of Spain itself. They built cities, with parks and churches and notable public buildings. They established universities and encouraged literature; the first printing press in North America was set up in Mexico. But the government of the Spanish colonies was military, under governors who carried out instructions from the despotic home government in Spain. Under Spanish rule, neither democracy nor representative government appeared.

The English victory over the Spanish *Armada* in 1588 had so checked the growth of Spanish power that, while Spain was able to keep her colonies in Mexico and South America, she was not able to extend settlements into the northern territory which she had already explored. Moreover, this territory did not appeal to the Spaniards, because it did not appear to be rich in mineral wealth. At the beginning of the 17th century, therefore, the settlement of the eastern coast of North America, between Florida and Nova Scotia, approximately the present Atlantic coast of the United States, was left to the English and the Dutch.

In 1609 Henry Hudson, sailing under the Dutch flag, discovered and explored the Hudson river, and in 1613 a Dutch trading company established a post on the site of the city of New York, calling it New Amsterdam. In 1621 the Dutch West India Company secured the right to colonize in territory adjoining New Amsterdam and the Hudson river. The company granted large estates to patroons, who were given feudal rights over whatever settlers they chose to send out. These settlements remained under Dutch control until 1664, when they were surrendered to the English. Meanwhile, a colony of Swedes and Finns was established at Fort Christina on the present site of Wilmington, Delaware, in 1638, but this territory was seized by the Dutch in 1644, and it passed later, with the other Dutch holdings, to England.

England in the Seventeenth Century. English colonization of America was profoundly influenced by the political and the religious conditions dominant in England in the 17th century. Following the brilliant reign of Elizabeth, which ended in 1603, came the period of the Stuart kings, interrupted by Cromwell and the Commonwealth from 1649 to 1660. The leading political movement of the century arose out of the demand of the middle classes to be heard in affairs of government. It resulted in the temporary overthrow of the Stuarts in 1649 and in the effectual restriction of royal power through the revolution of 1688-89. In the domain of religion, the Puritan movement gathered strength until it controlled the established church of England during the Cromwellian period and, after the Restoration of 1660, maintained itself in the Nonconformist churches, which secured toleration and

political privilege after the revolution of 1688-89. The Puritan and Cavalier migrations to America reflect the influence of these great struggles.

Motives for Colonization. A desire to outdo the Spaniard had been the motive of English explorers in the 16th century. The attempts of such men as Gilbert and Raleigh to establish colonies had been prompted by mixed patriotic, commercial, and religious motives. When, after some disastrous experiments, it became clear that colonization was a business for companies of men who could supply large capital, the commercial motive became supreme. After 1660, the influence of this incentive became noticeable in the grants of territory for commercial purposes, especially in connection with the Carolinas (1663) and, to a less extent, with Georgia and Pennsylvania. It is worthy of note, however, that the religious ideal of Christianizing the natives was never quite lost.

London and Plymouth Companies. In 1606 a group of London merchants formed a company of two divisions,—one called the London Company, the other, the Plymouth Company. Their purpose was to colonize the coast of America between the Spanish claims on the south and the French claims on the north. The London Company was granted a tract of land 100 miles along the coast and extending inland 100 miles, located somewhere between Cape Fear (Carolina) and the Hudson river. The Plymouth Company had a similar grant somewhere between the Potomac and Maine. The result was that the country lying between the Potomac and the Hudson, in which the grants overlapped and which was to go to the company that should first occupy it, was avoided by both companies. The London Company planted a settlement at Jamestown in 1607, and in 1620 the Pilgrims settled at Plymouth, within the Plymouth Company's grant.

Virginia Colonial Government. The first charter granted to the London Company, giving them the privilege of making settlements in Virginia, divided the powers of government between the king and the company, or the proprietors, as the company was called. It conferred no privileges of self-government on the colonists, although it did grant them the privileges of Englishmen, which meant jury trial, the right of habeas corpus, and free speech. The colony at Jamestown was really a great plantation. The colonists were servants and employees of the company. All cultivation of the soil was done in common. Products went into the company's storehouse, from which food and clothing and other articles needed by the settlers were issued to them, and such products as might find ready sale in England were taken for shipment. The profits from these sales went to the members of the company who had invested in the enterprise.

Some changes in the charter were made in 1609 and in 1612. The government was placed in the hands of the company. The first governor was Sir Thomas Dale, a soldier who ruled the colony with an iron hand from 1611 to 1616. Severe martial law was in force during this time, and Dale's governorship was known as the "time of slavery." Whatever his faults of undue severity, Dale maintained order in the colony and made one very important change in the government. This was the allotment of three-acre plots to private holders in 1614.

First Representative Assembly. The year 1618 brought the chief power in the London Company into the hands of Sir Edwin Sandys and the earl of Southampton. These men were Puritans and bitter opponents of King James I and his Stuart policies. They seized the opportunity to grant a larger measure of freedom to the colonists. In 1618 they issued a charter, or contract, and appointed Governor Yeardley to carry out this contract in the colony. The new governor abolished the system of common industry and granted 100-acre tracts to free immigrants. Then he formed an assembly made up of representatives from each plantation. In this act of Governor Yeardley, we see the beginning of representative government in America.

The date of the first meeting of the assembly, or House of Burgesses, as it came to be called, was July 30, 1619. This assembly soon fell into the ways of the English Parliament. It sat for six days and did most of its work in committees. It passed laws, which today would be called "blue laws," against drunkenness, gambling, absence from church, and excess in fine clothing. Although the governor possessed veto power, there was no occasion for its use. But the most important act of the Virginia assembly was that of 1624, which asserted the right of the assembly to control taxation. This right was reasserted upon the appointment of later governors.

The Founding of Maryland. The settlement of the colony of Maryland was due to the enterprise of a Catholic gentleman, George Calvert. Calvert had secured from King James in 1623 a title to Newfoundland, but his attempt to plant a colony there failed on account of the harsh climate of the island. He then petitioned for territory farther south, and Maryland was granted to him. In 1633, after his death, the title was confirmed to his son, Cecil Calvert, second baron of Baltimore. This charter made the baron really a constitutional king over the settlers in the new colony, but it provided for a representative assembly to be composed of freeholders, or freemen.

The Maryland assembly proved to be as progressive and tenacious as the House of Burgesses in Virginia. In 1635 it passed a code of laws, which Calvert vetoed. In 1638 the assembly rejected a code of laws which Calvert presented to it for acceptance; by 1650 it had won the right to initiate legislation.

The most notable feature of the Maryland government was its provision for religious toleration. Catholics were at this period severely persecuted in England, but Calvert secured for his colony the privilege of toleration. An act of the assembly, passed in 1649, declared that all persons professing belief in Jesus Christ should not be molested nor discountenanced for their religion. Although this act excluded Jews, it was far in advance of English practice or that of other English colonies.

New England. The Plymouth Company, formed by gentlemen in the west of England, attempted in 1607 to plant a colony at the mouth of the Kennebec river, but the venture was a failure, and for several years this company did nothing. Then some of its members formed the Council for New England. They did not send out colonists, but granted lands to individuals who would undertake to make settlements. Their policy, however, was unsuccessful. Only seven little settlements were made before 1630, the chief one being at Salem.

The Settlement of Plymouth. Meanwhile, a little band of Separatists,—Puritans who had withdrawn from the Church of England and, because of persecution, had settled at Leyden,—became desirous of leaving Holland and finding more favorable conditions under the English flag. Through the influence of the Puritan members of the London Company, these people secured a grant of land from that company and also obtained a loan of several thousand pounds from a company of London merchants. After many delays, 102 persons embarked on the *Mayflower* at Plymouth, England, in September 1620. Driven out of their course by autumn storms, they landed in America at a point to which Captain John Smith had already given the name of Plymouth. But Plymouth was outside the London Company's territory, and, consequently, the Pilgrims' grant of land was of no value. In this situation, 41 members of the company joined in signing an agreement known as the Mayflower Compact. This agreement bound the signers to co-operate in providing such government as might be necessary

for the colony. The next year (1621) they secured a grant from the Council for New England.

The agreement of the Plymouth colonists with the London merchants provided that industry should be carried on in common for seven years. Supplies were to be sent out from London each year. After two years' trial, Governor Bradford found that the system of common industry was not working well, and he therefore granted parcels of land to individuals for temporary use. Under this new arrangement the colony began to prosper. In 1627 the term of agreement with the London merchants expired. Bradford and a few others assumed the debt of the colony, on condition of being allowed a monopoly of the fur trade. It took them fourteen years to repay the loan.

During the first few years of the Plymouth colony, government was carried on by an assembly which was virtually a town meeting. But as other settlements were formed near by, the need of a different legislature became insistent, and in 1636 a representative assembly was first convened. It provided the first written code of laws in the portion of America that later became the United States. As in other colonies, the franchise was not conferred even upon all freemen. An act of 1671 provided that a voter must give evidence of upholding the orthodox faith. During all this time, the colony of Plymouth had no charter, nor was it ever recognized by the home government. Probably this condition was due to the disturbed state of affairs in England. In 1691, the colony was annexed to Massachusetts.

Colony of Massachusetts Bay. The first settlements around Massachusetts bay were due to the activity of the Dorchester Company, made up of west of England men, who were interested in the fishing trade. A station was established at Cape Ann in 1623, largely through the influence of John White, a member of the company, to provide a home for the extra crews necessary on the fishing vessels. The settlement was moved to Salem in 1628. The Massachusetts Bay Company was formed, and in the following year a large body of settlers was added to the group already at Salem. The danger to English Puritanism, which appeared now in the policy of Charles I, brought a number of the members of the Massachusetts Bay Company to make the famous Cambridge Agreement, by which they secured control of the company and agreed to transfer the charter and all the government of their colonies to America. In this way the commercial company became an organized government and the promoter of the great Puritan migration.

The Puritan Migration. In the course of the next eleven years, during which period no Parliament was summoned in England, 25,000 selected English colonists were transferred to New England at a cost of about $4,000,000. The leader of this movement was John Winthrop. With a company of 2000 he came to Massachusetts in 1630. In this year six new towns were founded in the neighborhood of Massachusetts bay. In 1640, when Parliament was again summoned in England, many colonists returned to the mother country, and New England received very few immigrants until after the American Revolution (1775–82).

Colonial Conditions. In the early years of the 17th century, glowing accounts of the climate and productiveness of the region of English settlement had been carried back to England, and all the early colonists, including the Pilgrims who landed at Plymouth, had visions of rapid rise to wealth. It took but a few years to dissipate these visions and to teach the colonists that they were dealing with a country of greater extremes of climate than they had known in England, and a land whose soil yielded returns only to labor. John Smith, the restless soldier and explorer, when he was president of the council at Jamestown in 1608-09, grappled sternly with this problem. He enforced regulations as to industry and social organization which probably saved the colony from utter extinction within the first three years of its existence.

While the colonists in New England at first drew some profit from the fur trade, they soon learned that the prosperity of the colonies was dependent upon the utilization of the fisheries and upon the cultivation of the soil. They learned from the Indians how to raise Indian corn, or maize, the food which saved the lives of the Pilgrims in the first difficult years of the settlement at Plymouth. Raleigh had brought back to England from Virginia the first tobacco which he had secured from the Indians. The growing of tobacco was for many years discouraged by the London Company, but it formed the basis of the wealth of the colonists in Virginia, as the cultivation of maize gave them their staple food.

The severe climate in New England came near proving fatal to the first settlements. Half of the first company of 102, who landed at Plymouth in the winter of 1620, died before spring. The colony of Jamestown in Virginia was planted on low, unhealthful ground, and in the first year two-thirds of the immigrants perished. It is said that for twenty years each new body of immigrants lost one-half their number within the first season.

Popular Government in New England. The charter of the Massachusetts Bay Company provided that eighteen assistants, freemen of the corporation, should be elected each year, to carry on the government with the governor, but only twelve of the elected assistants came to the colony. These men were all of the rank of English gentlemen and had been made magistrates before leaving England. According to the charter, four general courts were to be held each year for the making of laws. At first, the magistrates—the governor and the assistants—themselves constituted this court. Very soon after the first settlements were made, however, a movement arose for the extension of political power. A group of about 100 settlers demanded a share in the lawmaking, and a considerable number of new freemen were admitted to the corporation. In 1634 a delegation composed of men from each of eight towns met in Boston and asked to see the charter. Out of this action came representative government for the colony. The charter, they found, granted the lawmaking power to the whole body of freemen. The next step was taken by the towns in sending delegates to represent them in the general court. Furthermore, the freemen demanded voting in the general court by ballot instead of by a show of hands. Thus the ballot was introduced into American politics.

It is important to remember that there were in the colony five classes of people: (1) gentlemen, who were addressed as Master; (2) skilled artisans and freeholders, usually addressed as Goodman; (3) unskilled laborers, addressed by their given names; (4) servants; (5) slaves. The three lowest classes were never admitted to political citizenship, while, of the first two, only those who were approved church members were given the franchise.

During the 17th century, about one-fourth of the adult males in the colony of Massachusetts bay could vote. The struggle between the freemen and the assistants continued until, in 1644, the general court was divided into two houses, the Upper House of the Assistants, the Lower House of the Deputies. This was the first two-chamber legislature in America.

Town Government. Meanwhile, new machinery of local government was being contrived in the villages or towns. In these towns the people did not live on widely separated farms or plantations as they did in Virginia, but the houses were grouped closely together in the village, around which lay the farms. The town meeting came into use first in Dorchester and Watertown in 1633. It was a clumsy and often a slow means of government,

but it proved to be the greatest of all schools of political liberty. All residents of the town might attend the town meeting and speak, but only the "inhabitants," that is, the gentlemen, artisans, and freeholders, might vote. Usually, the possession of a certain amount of property was necessary to entitle one to vote in the town meeting. Outside the pale of the governing classes, there was a lower class of "cottagers," made up of strangers and day laborers, to whom the town meeting had not given any rights.

This form of town government became characteristic of New England, and was perhaps the most significant contribution of that section to the practice of government in the United States, just as the county organization was the peculiar contribution of the southern colonies. As the town meeting developed through its appropriateness to the needs of people who lived close together and farmed small areas of land, so the county government flourished in the circumstances arising from the custom of farming large plantations and from the consequent separation of homes in Virginia.

Massachusetts Laws. The colony of Massachusetts did not have a written code of laws until 1641, when, after several years of deliberation, the Body of Liberties was drawn up and adopted by the general court. The government of the colony, while it came gradually to provide a considerable degree of political freedom, never allowed religious liberty. The founders of the colony intended to provide a place where they could practice their own forms of religion and develop a "City of God" after their own pattern. They were acting consistently with their principles when they expelled from the colony Roger Williams and Anne Hutchinson, with their followers.

Rhode Island. Roger Williams opposed the union of church and state as it was practiced in the colony of Massachusetts, and Anne Hutchinson questioned the authority of some of the ministers. Williams escaped to the Narragansett Indians and later founded the colony of Rhode Island. His great purpose was to prove that a colony could be governed successfully while complete religious freedom was allowed to all its citizens. In this experiment he succeeded, being fortunate in getting encouragement both from the Long Parliament in 1644 and from Charles II after the Restoration.

Connecticut. As the founding of Rhode Island was a protest against the lack of democracy in religion in the colony of Massachusetts, so the founding of Connecticut was a protest against the aristocratic tendencies in Massachusetts politics. The inhabitants of Watertown, Dorchester, and Newtown had been leaders in the first opposition to the oligarchy set up by the assistants at the founding of the colony. In 1635, citizens of these towns began the first of those westward migrations which were to mark the next two centuries of American history. They moved into the Connecticut valley and established the towns of Hartford, Wethersfield, and Windsor. In 1639, they drew up a document which may be called the first written constitution in America, the Fundamental Orders. The new colony still maintained control of the churches, but in politics it was far more democratic than the mother colony. Voting was not restricted to church members, but was regulated by the towns until, in 1659, the general court declared that no one could be made a freeman or allowed to vote unless he possessed property to the value of 30 pounds.

New England Confederation. The next stage in the political history of New England was marked by the formation of the New England Confederation in 1643. This provided for a firm and perpetual league of the colonies of Massachusetts, Connecticut, New Haven, and Plymouth. With the restoration of the Stuarts in England in 1660, a new period of colonial history began, which was marked by efforts of the English government to draw the growing colonies into closer relations with the home government. Charles II organized a colonial department under various names. This was a wise act of statesmanship, but it aroused the colonists to greater insistence upon their right of popular government.

British Colonial Policies. During the thirty years from 1660 to 1690, several important changes occurred in the situation of the American colonies. The Dutch and Swedish possessions, which had separated the two large English settlements, were brought under English control, the wealthy colony of Pennsylvania was founded, and the Carolinas, including the territory which later became the colony of Georgia, were added to the English domain. By the year 1690, therefore, England controlled the entire coast from the Penobscot river in the North to the Savannah in the South. During these thirty years the population of the colonies increased from 60,000 to 250,000. Under the advice of his Council for Foreign Plantations, the policy of Charles II took two forms.

Navigation Acts. First came the passage of the Navigation acts, which were designed to hold the trade of the colonies for the mother country. Such a trade policy was in accord with the practices of all the nations of the time, and the English methods were far less oppressive than those of Spain or of France. The first Navigation act provided that all trade with the colonies should be carried in either English or colonial vessels. This was a positive benefit to New England, for it gave the first impetus to the great New England industry of shipbuilding. A later act restricted imports. All goods imported by the colonists had to pass through English ports. This requirement gave rise to smuggling. It is estimated that in the year 1700 one-third of the trade at the port of New York was in smuggled goods.

Colonial Charters. The second part of the policy of Charles II was concerned with controlling more closely the colonies already in existence. It is interesting to note that, in spite of the tyrannical character of the Stuart government in England, very liberal charters were granted to the heretofore unauthorized governments of Connecticut (with New Haven) and Rhode Island. On the other hand, there was continual trouble between the English government and Massachusetts, arising chiefly from the unwillingness of that colony to tolerate churches other than Puritan. So many complaints were made about this denial of civil and religious rights, that Charles sent a commission, in 1664, to hear appeals from the colonial courts. The authority of the commissioners was recognized in Connecticut, Rhode Island, and Plymouth, but the magistrates of Boston forbade recognition of the commissioners, and they were forced to leave the colony without hearing any appeals whatever. Matters dragged on until the year 1684, when the highest English court declared the Massachusetts charter of 1629 forfeited.

Consolidation of Colonies. The next move of the English government was to consolidate New England into one province. This was done by James II, who appointed Sir Edmund Andros governor-general of New England. Andros was already proprietor of New York and New Jersey, and these colonies were consolidated with New England. James struck out of the new charter all provision for any representative government, and made the governor virtually a despot. What would have been eventually the result of continuing this policy we can only imagine, for within three years the revolution of 1688 occurred in England, and in 1689, upon the accession of William III to the English throne, the colonists revived their old governments. The people of Boston and near-by towns seized the fort in the harbor and imprisoned Andros. In 1691

Massachusetts was given a new charter, which provided, among other things, that all Protestants should have religious freedom and that the franchise should be based upon a property qualification. These were important changes from the earlier government of the colony. Maine, Plymouth, and Nova Scotia were included in what was now the royal province of Massachusetts.

Cavalier Migration. During this same period the government of Virginia was subjected to important changes. Between 1650 and 1670 the colony grew rapidly and became very prosperous. A royalist immigration set in, which raised the population of the colony from 15,000 to 40,000. This was the second great colonial migration of the century. Virginia became the land of the Cavaliers. At this time the Lee family, the Masons, and the Washingtons came to Virginia, — families which were later to furnish great leaders of the Revolution. Berkeley was again appointed governor, and the colonial democracy, which had been growing in power, was changed into an oligarchy made up of the governor and a council entirely subservient to him. Under this influence, the franchise was restricted to freeholders, and for a long period even they were practically disfranchised, because, between 1660 and 1676, Berkeley permitted no election for his Cavalier assembly.

Struggles for Popular Government. The local government units in Virginia had been counties and parishes. The parish rendered such social service as taking care of the poor, and sometimes even punished minor offenses. Until 1645 the parish vestry meeting had been opened to all free white males, but in that year the parishes began to elect vestrymen. Berkeley, however, made the vestrymen's office a life position, providing that vacancies were to be filled by the vestrymen themselves. County affairs had been managed by a county court, which was a meeting of all free white males. Under Berkeley, this court was displaced by a board of eight justices, appointed by the governor. Along with these changes went serious abuses in taxation and expenditure. At the same time, Berkeley's government failed to protect the frontier against the Indians.

Out of this situation grew the uprising known as Bacon's Rebellion. As a result of this movement, some of the worst abuses introduced by Berkeley were corrected, but the aristocratic organization in both colonial and local government became permanent in Virginia. In 1686, however, the House of Burgesses, in opposition to Governor Effingham, insisted upon its right to levy taxes in spite of any veto by governor or king. This right was confirmed by William III.

The Carolinas. In response to the interest which some of his courtiers had shown in colonization, Charles II, in 1663, granted to eight proprietors the colony of Carolina. The grant, as amended in 1665, included territory between the parallels of 29° and 36° 30′ north latitude. In the case of this colony, the expected returns from trade were realized. Government of the colony, however, under various methods, including the famous plan drawn up by John Locke, proved difficult. At length, the proprietors were willing to sell their rights to the crown. In 1729 the territory was reorganized into two royal provinces, North Carolina and South Carolina; thus the more democratic northern part of the original colony was separated from the more aristocratic southern portion.

The Colony of Pennsylvania. Pennsylvania was founded as a proprietary colony, but the proprietor, William Penn, a man of large wealth and of great influence at the English court, was a friend to popular government. He had already aided some of his Quaker friends to organize the colony of New Jersey. In 1681 he received a charter for a new colony. This charter provided for religious toleration, for appeal from the colonial courts to the king, and for the right of the colonists to tax themselves. From the first, the population of Pennsylvania differed from that of the other colonies in being at least one-third non-English. It contained large settlements of German Mennonites, Moravians, Amish, and Dunkards, besides some Swedes and Dutch.

Thanks to the wise dealing of Penn, the colony was free from Indian troubles, and the large resources of English and Welsh Quakers saved it from the biting poverty that the other colonies had experienced. Nevertheless, its political history for a number of years was stormy. At length, a new charter was granted in 1701. This has been called one of the most important of American governmental documents, for it was the first written constitution to provide for its own amendment. Under this charter a single house assembly was organized, which could be dissolved only by its own vote.

Government in New York. In the matter of popular government, the colony of New York was distinctly behind its neighboring colonies. During the period of Dutch rule, there was no self-government in the colony except what was insisted upon by English settlers on Long Island. They demanded a measure of self-government from the Dutch director, Stuyvesant, in 1653, but, before any important action was taken, the colony fell into the hands of the English. King Charles gave the province to his brother James, duke of York, with arbitrary power. The insistence of the English towns on Long Island compelled the introduction of a representative assembly in 1682, though the governor of New York still retained more power than the governor in any other of the colonies.

Growth of Population. The period from 1690 to 1760 in America was one of very remarkable growth in wealth and population. At the beginning of this period, the total population of the colonies, including Georgia, was about 250,000; at the end of the period, about 1,600,000. It has been noted already that Pennsylvania had in the beginning a large German population. Many of these Germans had been driven from their homes in South Germany by religious persecution. After 1683, a great many Huguenots, exiled from France by the persecutions of Louis XIV, came to the English colonies. Most of them settled in the Carolinas, but many historic names indicate their presence in the northern colonies also. Among such names are those of Paul Revere, the hero of Lexington, and Peter Faneuil, the builder of Faneuil Hall.

Another large element of the 18th century immigration was made up of the so-called Scotch-Irish, who between 1730 and 1750, it is said, came to America at the rate of 12,000 a year. They settled principally in what was then the back country of Virginia and Pennsylvania. Later, they were in the van of migration across the mountains into the territory of Kentucky and Tennessee. It has been remarked that these people, descendants of Saxon English who had lived for centuries in the Scottish lowlands, were the first of the American colonists to turn their faces away from the Old World, thus marking the real beginnings of America.

Contest for the Continent. During this period, Spain still held a strip of territory in Florida and along the coast of the Gulf of Mexico, and her missionaries were beginning their settlements on the coast of California. She was, however, clearly out of the race for control of the North American continent. The struggle for this lay between England and France. At the close of the 17th century, the English held a narrow domain between the Appalachian mountains and the Atlantic coast and a district around Hudson bay. The French were in control of the St. Lawrence valley. In 1682, moreover, the intrepid La Salle, after having made the long journey from Lake Ontario southwest to the mouth of the Mississippi, had taken possession of the Mississippi valley for the French king, Louis XIV,

COLONIAL WARS

Remote and Immediate Causes: (1) The Colonial wars in America were incidents in the general European wars which involved England and France upon opposite sides. (2) They were immediately occasioned by the unavoidable struggle of the two nations to control the continent of North America.

Historic Name	Chief Battles	Leaders		Victor	Results
		English	French		
King William's War, 1689–97.	Schenectady, Feb. 8, 1690 . .	Colonists	Iberville	French	War terminated by Treaty of Ryswick (1697), each side retaining the territory held prior to the war. French retain Quebec. The "Five Nations" subdued.
	New Eng'nd Massacres, March 1690–97	Colonists	Frontenac	French	
	Siege of Quebec, April 1690 .	Phipps	Frontenac	French	
	Attacks on the "Five Nations," 1693–97	Indians	Frontenac	Indians	
Queen Anne's War, 1702–13.	Deerfield Massacre, Feb. 29, 1704	Colonists	Indians	Indians	Settled by Treaty of Utrecht. Hudson Bay and its borders, Acadia and Newfoundland, ceded to England by France.
	Haverhill Massacre, Aug. 29, 1708	Colonists	Hertel		
	Conquest of Nova Scotia, 1710	Nicholson	Subercase	English	
King George's War, 1744–48.	Capture of Louisburg, June 17, 1745	Pepperell	Duchambon	English	Louisburg was returned to the French by the Treaty of Aix-la-Chapelle, Oct. 7, 1748.
French and Indian War, 1754–63.	Surrender of Fort Necessity, July 4, 1754	Washington	Villiers	French	In 1763, by the Treaty of Paris, France ceded to England, Canada and all her possessions lying east of the Mississippi river; to Spain, New Orleans and all her possessions west of the Mississippi. The transfer from the French to the British of the posts between the Great Lakes and the Ohio river led to a war with the Indian tribes, in which the leading figure was Pontiac. The French and Indian war convinced the colonists of the necessity of union.
	Expedition against Fort Duquesne, July 9, 1755 . . .	Braddock	Beaujeu	French	
	Deportations of Acadians, June 16-17, 1755.				
	Capture of Louisburg, July 26, 1758	Amherst	Drucour	English	
	Capture of Fort Duquesne, Nov. 25, 1758	Forbes	?	English	
	Capture of Fort Niagara, July 1759	Johnson	D'Aubry	English	
	Capture of Fort Ticonderoga, July 26, 1759	Amherst	Bourlamaque	English	
	Capture of Quebec, Sept. 13, 1759	Wolfe	Montcalm	English	

naming it Louisiana. The contest began in the way of peaceful penetration, but the Indians were frequently stirred up by both sides, and between 1689 and 1763 four wars were fought by the contending parties. At length, by the treaty of 1763, at the close of the French and Indian war, France lost Canada and, consequently, her line of outposts in the Mississippi valley. After this event, England's position in America was to depend entirely upon her treatment of the colonies.

Movement toward Self-Government. The defeat of the French in Canada removed from the colonies all feeling of dependence upon England for protection against any foreign power. They were free to insist upon their rights. But, apparently oblivious of this fact, England, in her colonial policy, blundered continuously and stupidly, until the patience of the colonists was exhausted and American independence became a fact. These blunders in the policy of England are clearly revealed in the two fields of industry and politics.

English Restriction on Industry. First, the development of industry in the colonies occasioned several restrictions which were designed to eliminate colonial competition with England. In 1696, colonists were forbidden to export any woolen manufactures. Later acts limited the fabrication of iron products. Even when these restrictions were not burdensome, they gave rise to irritation and to the suspicion that the English government did not look with favor upon the rise of a free people in America.

Political Control. The most important movements of the 18th century, however, were those concerned with the form of colonial government and the control of taxes. The English Board of Trade, which had taken the place of Charles II's Council for Foreign Plantations, found many things to criticize in the conduct of the colonists. The Navigation laws were evaded; smuggling, as well as trade with pirates, was a general practice; and the colonies were notably careless in provision for their own defense. In 1701 a proposal was introduced in Parliament to unite all the colonies in one province. This aroused great opposition in America, and the bill was never passed. Steady progress was made, however, in converting the colonies into royal provinces. Only Connecticut and Rhode Island, at the outbreak of the Revolution, possessed the privilege of electing all branches of their governments. On the whole, in spite of the attempt at greater royal control, and notwithstanding increases in the authority of royal governors, the colonial assemblies maintained their rights of taxation and even somewhat enlarged them. They used without stint their power over the governor through their control of his salary. It was the custom to make the fixing of the governor's salary the last business of the legislative session, a practice which proved effective in preventing a governor from vetoing bills.

Colonial Life. Life in the English colonies during the latter part of the 17th century and during the 18th exhibited great variety in customs and industry. This diversity was due, in the first place, to the variant native characteristics of the different groups of people who made up the colonies, and, in the second place, to the wide range of conditions of soil and climate. In the South, industry was almost entirely agricultural. Tobacco raising was the chief occupation of the people upon large plantations worked by slaves. The Virginia plantation was an industrial unit in itself, and the product of the plantation, mostly tobacco, was loaded on ships at the plantation wharf and sent to England. The ships brought back supplies of various kinds, but most of the clothing and the simpler utensils of the workers on the plantations were made in the plantation shops. Each great farm had its blacksmith and woodworking shops. The mistress of the plantation supervised the spinning and weaving and the preparation and preserving of food.

In the middle colonies, such as Pennsylvania, foodstuffs were raised, and the German colonists maintained, upon a small scale, many industries,

including the manufacture of linen, pottery, and clothing. New England was the real district of the small farm, although its two most characteristic industries were fishing and shipbuilding. New Englanders also carried on a rich trade with the other colonies, and indeed with all parts of the world. The possession of water power to operate sawmills enabled them to build up a particularly large trade in lumber.

Slaves and Servants. There were negro slaves in all the colonies, though in New England most of the labor was free. The middle colonies had a large number of white bond servants, some of whom had sold their time to the extent of from four to seven years as the price of the voyage to America, while others were convicts who had been transported from England. While some of these convicts were of an undesirable class and made much trouble in the colonies, the severe English laws caused the "transportation" of many persons who proved themselves good citizens. One of these, a convicted thief, later became attorney-general of Virginia, and it is said that most of the tutors and teachers in Maryland, just before the Revolution, had come to America under sentence for offenses against English law.

Education. Education in most of the colonies was sadly neglected. Although parents were required by law to have their children taught the rudiments of knowledge, many of them lacked the ability and the time to carry out these requirements. In some parts of the colonies, church schools were established. The wealthy planters of the South employed private tutors for their families. At the very beginning of their history, Massachusetts and Connecticut had established school systems, but the work of these schools was severely limited by the primitive conditions of life and by the poverty of many settlements. The most important service of these early institutions in New England was the preservation of the ideal of an educated citizenship. Nine colleges were established in the colonies in the 17th and the 18th century, up to the period of the Revolution.

Questions of Taxation. The close of the wars with France left the English government with a serious financial problem on its hands. The cost of the wars had been heavy. It seemed that the colonists, who were highly prosperous and had scarcely any public debt, should help to carry the load. Unfortunately for the English government, however, the antagonism of the colonists had already been aroused when, in 1755, the writs of assistance came into use. These were warrants by which an English officer might search any house or place of business, merely upon suspicion that the owner had been trading with the French and furnishing them with supplies. The prevalence of such trade was not denied, but the colonists were alive to the danger which lay in the use of general search warrants. In 1761, when application was made to the superior court of Massachusetts for renewal of the writs of assistance in that colony, James Otis, the advocate-general, resigned his office and opposed the granting of the writs. He lost his case, but his argument opened the whole question of Parliamentary government of the colonies.

The Sugar Act. In 1733 a sugar act had been passed as a part of the Navigation laws, whose purpose was to restrict colonial trade to England. The colonists had never seriously objected to these Navigation laws, and many of the acts had been helpful. But now, in 1764, a new sugar act was passed, not as a trade law, but as a means of taxing the colonies for revenue. The act laid a tax upon sugar imported from the French West Indies, and the tax was made so heavy as practically to stop this very profitable trade of the New England and middle colonies. The tax did not, however, affect the southern colonies, and, therefore, it was not a means of unifying the sentiment of the colonists, as the Stamp act, passed in 1765, proved to be.

The Stamp Act. The English government insisted that it must have revenue and proposed the stamp tax method in 1764, giving the agents of the colonies a year to propose some other means of raising money. But the absence of any general government or central authority in the colonies, as well as the great differences of sentiment among the colonists themselves, made any counter proposal impossible. Protests were sent to the English ministry from all the colonies, but without producing any effect. The law was enacted in March 1765. Opposition to the sugar act had been based upon its interference with trade; it resulted in actual money loss to the colonists. The stamp tax ushered in a new era of opposition, for now the colonists contended against the principle of the tax. They were not concerned with the immediate money burden placed upon them, but with the possible future use of such a tax, if once they permitted the English government to impose it.

Opposition to England. Several of the colonial assemblies passed resolutions, condemning the Stamp act and asserting their right to be taxed only by a body in which they were represented. The most forcible of these resolutions were introduced by Patrick Henry in the Virginia assembly, when he used the expressions, "Cæsar had his Brutus, Charles I his Cromwell, and George III—may profit by their example." At the invitation of the Massachusetts assembly, the Stamp Act Congress met in New York, October 7, 1765. This congress drew up a petition to the British government, together with a statement of the rights and liberties of the colonists. The society of the Sons of Liberty was organized for the purpose of compelling people to comply with the agreements not to import British goods. It was at first a secret society, but later it became public and very effective.

The Townshend Acts. So intense was the opposition that, in 1766, a new ministry secured the repeal of the Stamp act, with the provision, however, that Parliament still retained its authority to tax the colonies. In 1767 the prime minister, Townshend, secured the passage of a series of acts which placed duties on several articles of import into the colonies, among which glass, paper, and tea were included. Previous attempts at taxation had been justified by the plea that money was needed to protect the colonies. The proceeds of the Stamp act had been pledged beforehand for this purpose. Now, however, the revenue from the Townshend duties was to be used for the payment of colonial governors and judges. This proposal struck at the very heart of the independence of colonial assemblies, because the principle was well recognized, that the governor and judge served the party who appointed and paid them. Trials for evasion of the Townshend acts were to be held in courts of admiralty without juries. This again was a violation of a cherished principle in colonial government.

Further Provocation and Controversy. Throughout the three years during which the Townshend acts remained in force, the opposition of the colonists, through their legislatures and by mob violence, never ceased. In 1769 Parliament provided by a treason act that a colonist accused of treason should be taken to England for trial. The assembly of Virginia, which had not been seriously affected by the Townshend acts themselves, was aroused by this violation of the principle of jury trial. It adopted unanimously a resolution condemning both the Townshend laws and the treason act. This was followed by agreements among the colonies not to import merchandise from England until the objectionable acts were repealed. Fuel was added to the flames by the sending of troops to Boston in 1768, to aid the governor in maintaining order. The immediate result of this attempt to

overawe the colonists was a settled hostility between citizens and soldiers, which resulted in the Boston Massacre of 1770.

Committees of Correspondence. The revenue collected under the Townshend acts amounted to about one-tenth of the cost of collecting it. On the day of the Boston Massacre, Lord North moved the repeal of these acts, except that providing a tax on tea. The tea tax was kept as a mark of the supremacy of Parliament. During the next two years, the British ministry persisted in various arbitrary orders which interfered with the liberties of the colonial legislatures. The assemblies protested, and the governors dissolved them. The result was the organization of provisional governments. Under the leadership of Samuel Adams, the towns of Massachusetts organized town committees of correspondence in 1772. Virginia in the following year took a further step, prompted thereto by the incident of the *Gaspee*. English officers had attempted to arrest some Rhode Islanders, suspected of burning the revenue ship *Gaspee*, and to take them to England for trial. On March 12, 1773, the Virginia House of Burgesses appointed a committee for intercolonial correspondence and invited the other colonies to take similar measures.

Boston Tea Party and the First Congress. Meanwhile, the English government attempted to force upon the colonists the tea of the British East India Company. The duty on tea was lowered to such a point that the company could sell it to the colonists more cheaply than they could buy smuggled tea. Under this arrangement, large cargoes were sent to the American ports. At Charleston, South Carolina, the tea was seized and stored. At New York, Annapolis, and Philadelphia, the authorities were compelled to send the tea ships back to England. But a group of the people of Boston held the famous "tea party," when large quantities of tea were thrown from the East India ships into the harbor.

To punish the Bostonians, the English government passed the Boston Port bill in 1774, closing the port to all commerce. This was deemed as harsh a blow as could be delivered to any commercial, maritime town. But the result was that food and supplies were poured in from all parts of the colonies, the merchants of Salem offered Boston merchants the use of their wharves, and the committees of correspondence in the colonies immediately proceeded to consider means of redress. The House of Burgesses in Virginia set apart June 1, 1774, on which day the port bill became effective, as a day of fasting and prayer. The governor dissolved the assembly two days later, but the burgesses met at a tavern, and recommended an annual congress of delegates from all the colonies to consider their united interests. On August 1, at Williamsburg, they appointed delegates to such a congress. Other colonies took similar action, some in the regular assemblies, but many of them in irregular meetings of legislators or citizens. Thus the members of the First Continental Congress were chosen to meet at Philadelphia on September 1, 1774.

Self-Government. English authority had now broken down in the colonies. The colonists were governing themselves through agencies which were really revolutionary legislatures and committees. Actual independence, however, was not yet considered, and the congress which had been called was to be only an informal conference. This was its actual character. Its most important act was to recommend agreements among the colonies neither to import nor to export English goods. This recommendation and others were considered and adopted by the revolutionary bodies in the various colonies. Before its adjournment, the First Continental Congress arranged for calling a second congress to meet in May 1775, if the grievances of the colonies had not been redressed before that time.

Concord and Lexington. Most of the members of the First Continental Congress, in common with the majority of the people in the colonies, believed that a peaceful settlement of the difficulties with England was possible, but, before the second congress met, trouble had broken out in Massachusetts and war had become a fact. The leaders in Massachusetts had organized a revolutionary body called the Provincial Congress, within which was created a committee of safety. This committee, among its varied activities, organized a body of militia called minutemen.

General Howe, who was in command of the British garrison at Boston, planned to arrest John Hancock and Samuel Adams, the leaders of the patriots. For the purpose of seizing the two men and also of destroying some military stores of the patriots at Concord, a force of 800 men was sent out from Boston on the night of April 18, 1775. Warning of this movement was carried through the countryside by Paul Revere and other riders, and, when the British appeared at Lexington on the morning of April 19, they found a small body of minutemen drawn up on the village green. Seven of the patriot force were killed and nine were wounded by the fire of the British troops. Later in the morning, the minutemen made a stand at the North bridge at Concord. The British were forced to retreat, and during the day the militia took revenge in harassing the British column on its march from Concord back to Boston. In this running fight, 273 British and 93 Americans were killed. The result of the day's conflict was to encourage the people in the other colonies to drive out their governors and to proceed more rapidly with the formation of revolutionary congresses and conventions.

The Second Congress. When the Second Continental Congress, composed of representatives from all of the thirteen colonies, met in Philadelphia on May 15, 1775, it had to set about the business of organizing for war. The congress had no formal authority from the colonies, but depended altogether upon their general good will and assent. It must be remembered that the Revolutionary War was not a struggle of united colonists in America against a united England, but rather, in reality, a civil war in the colonies, both sides having sympathizers in the mother country. It is estimated that at least one-third of the colonists were Tories or Loyalists, while many of the other two-thirds were only half-hearted in their support of resistance to English authority. Nevertheless, the Second Continental Congress ordered the colonies to be put into a state of defense, organized a post office, voted to raise an army, appointed George Washington commander in chief, and began to consider Franklin's proposal of a federal constitution.

Bunker Hill. Massachusetts, however, had acted without authority from Congress. Twenty thousand militia laid siege to the British in Boston. Patriots intrenched themselves on Bunker Hill, June 17, 1775, but were driven out by the British. This battle of Bunker Hill, however, was really a victory for the colonists, since it showed that they could fight the British regulars and inflict severe losses upon them. Washington took command of the force of militia intrenched around Boston, and in the early spring of 1776 he fortified Dorchester Heights and compelled the British force of 10,000 to leave the city. Meanwhile, General Montgomery and Benedict Arnold led two small detachments of troops into Canada, but they failed to get the support of the Canadians.

The story of the Revolution from this time forward has two phases. The military history is made up of a long series of conflicts on sea and land, with but few important pitched battles. The civil history is concerned with the struggle of the various colonies to maintain their new governments, to suppress or expel the Tories, and to agree upon a plan of union.

REVOLUTIONARY WAR

Contributing Causes: Unjust Legislation; Taxation without Representation; Infringements of the Rights of the Colonists by Great Britain.

Campaigns	Chief Battles	American		British		Victor	Results
		Leaders	Troops	Leaders	Troops		
Contest for control of Boston.	Lexington and Concord, April 19, 1775	Parker, Heath	500	Smith, Lord Percy	1,700	Amer.	British besieged in Boston after battle of Bunker Hill.
	Bunker Hill, June 17, 1775.	Prescott, Warren	1,500	Howe	2,500	Brit.	
	Dorchester Heights, Mar. 4, 1776	Washington, Thomas	2,500	Howe	10,000	Amer.	Howe and his army evacuate Boston March 17, 1776, leaving guns and supplies.
American invasion of Canada.	Ticonderoga, May 10, 1775.	Ethan Allen	83	Delaplace	48	Amer.	Ticonderoga captured. Fruitless siege of Quebec. Ethan Allen captured. Invaders dispersed.
	Montreal, Nov. 12, 1775	Montgomery	2,000	Carleton	?	Amer.	
	Quebec, Dec. 31, 1775	Arnold	900	Carleton	1,200	Brit.	
Attack on Charleston.	Fort Moultrie, June 28, 1776	Moultrie	435	Clinton	?	Amer.	British abandon the attack and sail for New York.
Struggle for control of the City of New York and for New Jersey.	Long Island, Aug. 27, 1776.	Sullivan, Putnam	5,000	Howe	20,000	Brit.	Americans forced across the Hudson. British occupy New York City. American forces inspired to renewed efforts. British forces evacuate New Jersey.
	Harlem Heights, Sept. 15, 1776	Washington.	12,000	Howe	25,000	Brit.	
	White Plains, Oct. 28, 1776.	Washington.	1,400	Howe	4,000	Brit.	
	Fort Washington, Nov. 16, 1776	Magaw	3,000	Howe	5,000	Brit.	
	Trenton, Dec. 25, 1776	Washington.	2,400	Rall	1,600	Amer.	
	Princeton, Jan. 3, 1777	Washington.	5,000	Mawhood	1,200	Amer.	
British attempt to control the Hudson and to divide the colonies. Burgoyne's invasion from the north.	Ticonderoga, July 6, 1777.	St. Clair	2,500	Burgoyne	7,500	Brit.	Americans control the Hudson valley, New York, and New England. Burgoyne's surrender, Oct. 17, 1777, marks the turning point of the war.
	Oriskany, Aug. 6, 1777	Herkimer	800	St. Leger	1,200	Amer.	
	Bennington, Aug. 16, 1777.	Stark	2,000	Baum	1,200	Amer.	
	Fort Stanwix, Aug. 22, 1777	Arnold	800	St. Leger	?	Amer.	
	Bemis Heights, or Stillwater, Sept. 19, 1777	Gates, Lincoln, Arnold	2,500	Burgoyne	6,000	Amer.	
	Bemis Heights, Oct. 7, 1777	Gates	8,000	Burgoyne	5,000	Amer.	
	Saratoga, Oct. 11–13, 1777.	Gates, Arnold	8,000	Burgoyne	6,000	Amer.	
British attack on Philadelphia.	Brandywine, Sept. 11, 1777.	Washington.	11,000	Howe	17,000	Brit.	Howe's army enters and occupies Philadelphia during the winter.
	Germantown, Oct. 4, 1777.	Washington.	10,000	Howe	15,000	Brit.	
British retreat from Philadelphia, begun June 18, 1778.	Monmouth, June 28, 1778.	Washington.	12,000	Clinton	10,000	Amer.	British return to New York.
Indian massacres.	Wyoming, July 4, 1778	Zeb. Butler	400	Butler	1,100	Brit.	
	Cherry Valley, Nov. 11, 1778	Alden	?	Butler, Brant	800?	Brit.	
Expedition for control of the Western frontier.	Kaskaskia, July 4, 1778	Clark	200	Indians	?	Amer.	Americans establish claim to possession of the Northwest.
	Vincennes, Feb. 14, 1779.	Clark	170	Hamilton	500	Amer.	
Campaign for control of the South by British.	Savannah, Dec. 29, 1778.	R. Howe	900	Campbell	2,000	Brit.	Georgia reduced to submission.
	Savannah, Oct. 9, 1779	Lincoln	4,500	Prevost	2,500	Brit.	
Battle for control of the Hudson.	Stony Point, July 15, 1779.	Wayne	1,200	Clinton	600	Amer.	Continental army encouraged.
Naval operations.	*Bon Homme Richard* and *Serapis*, Sept. 23, 1779	J. Paul Jones		Pearson		Amer.	
American expedition against the Indians.	Newtown (Elmira, N. Y.), Aug. 29, 1779	Sullivan	5,000	Johnson, Brant	1,500	Amer.	"Six Nations" weakened.

REVOLUTIONARY WAR—Con.

Campaigns	Chief Battles	American		British		Victor	Results
		Leaders	Troops	Leaders	Troops		
Campaigns for control of the South; conflict in North and South Carolina.	Charleston, May 12, 1780.	Lincoln . .	3,700	Clinton . .	9,000	Brit.	British in possession of the South.
	Camden, Aug. 16, 1780 .	Gates . . .	3,000	Cornwallis .	2,000	Brit.	
	King's Mountain, Oct. 7, 1780	Shelby . . Sevier . .	1,000	Ferguson . .	1,100	Amer.	
	Cowpens, Jan. 17, 1781 .	Morgan . .	900	Tarleton . .	1,100	Amer.	British forced to retire towards Charleston.
	Guilford Court House, March 15, 1781 . .	Greene . . .	4,400	Cornwallis .	2,200	Brit.	Americans in control of the South.
	Hobkirk's Hill, April 25, 1781	Greene . . .	940	Rawdon . .	900	Brit.	
	Eutaw Springs, Sept. 8, 1781	Greene . . .	2,000	Stuart . . .	2,500	Amer.	
Invasion of Virginia.	Siege of Yorktown; surrender, Oct. 19, 1781 .	Washington Rochambeau De Grasse (navy)	20,000	Cornwallis Graves (navy)	8,000	Amer.	Surrender of Cornwallis. Contest terminated.

Result of War: Preliminary treaty of peace signed at Paris, November 30, 1782. Final and definitive treaty signed at Versailles, September 3, 1783, by which the United States were formally acknowledged by Great Britain to be free, sovereign, and independent. United States territory extended from the Atlantic to the Mississippi, from Florida to Canada.

Independence. Sentiment in favor of independence was crystallized during the spring of 1776 by the publication of Thomas Paine's pamphlet entitled *Common Sense*. Virginia's convention, which met on May 6, 1776, instructed its representatives to move in the Continental Congress for a declaration of independence.

Following instructions, Richard Henry Lee, on June 7, 1776, moved that the united colonies should be free and independent states. The first vote, taken on July 1, showed nine states in favor; on the following day twelve voted yes, and the declaration was adopted on July 4. The delegates from New York did not vote, because they had no instructions from the provisional congress of that colony. New York's approval was given on the 9th of July. On August 2 the official copy was signed by the members of the Congress who were present.

State Constitutions. In reality, the colonies had been acting independently even before the declaration of independence. After the battle of Lexington, several colonies applied to the Congress for advice. The Congress advised New Hampshire to set up such a government as seemed necessary "during the continuance of the present dispute between Great Britain and the colonies." In May 1776, a general resolution was adopted, advising the colonies to form governments for themselves whenever the old government had broken down. Virginia adopted its constitution in June 1776. The first part of this Virginia constitution was a bill of rights, the first document of its kind drawn up in America. This became a model for the bills of rights in the later state constitutions. It stated the rights of man as general principles, rather than as particular privileges, such as that of self-taxation. Jefferson placed similar statements in the Declaration of Independence.

Provisions of First State Constitutions. Several characteristics of these constitutions deserve notice. Some of them were made under the impression that the colonies would remain under the rule of England, but they were all republican in form. They provided for an executive, who was called either governor or president, and for courts and legislatures. The legislatures, however, were given large powers of control over both the executive and the judiciary. Nearly every constitution contained a bill of rights. Several of them had no provision for amendment, although today this is regarded as one of the most important parts of a constitution. All maintained some sort of religious discrimination. Throughout the colonies, the suffrage for local elections was made more general than it had been, but the privilege of voting was still restricted in some way in all the colonies. The most democratic provisions permitted only taxpayers to vote.

Officeholding and Voting. Nor did the privilege of voting carry the privilege of holding office, at least in respect to colonial offices. In North Carolina, to be elected governor, it was required that a man must own real estate to the value of 1000 pounds. In Massachusetts, a member of the lower house of the general court had to own at least 1000 pounds in real estate or 200 pounds in other property; a senator, three times as much. Most of these constitutions were drawn up and adopted by conventions or congresses in the colonies. In Massachusetts, a referendum was demanded, and it was not until 1780 that the constitution of that state was adopted. The mechanics of New York City, who were largely of New England descent, demanded a referendum in New York, but none was ever held.

Military Movements. Meanwhile, the military campaigns were dragging on under most discouraging conditions for Washington and his little army. From the first, the colonies were unwilling to enlist troops for long service. Consequently, the number of troops at Washington's command varied considerably from time to time. The Continental Congress proved weak and undependable in its provision of funds and supplies. This was due in part to the very nature of a government which had no central authority. Washington was continually subject to interference and slights, which he bore with an admirable patience and self-control. He never had more than 40,000 men under arms at one time, and his forces often dwindled to four or five thousand. This condition persisted in a country that might with ease have put 300,000 men in the field. On the other hand, the British had hired 30,000 Hessians for service in the colonies. Both sides enlisted the Indians, but the British had the greater number of them in their service, because both the Iroquois in New York and the Indians of the West recognized that the colonists were their real enemies.

Following the evacuation of Boston in the spring of 1776, the British were defeated in an attempt to take the city of Charleston, South Carolina. In this battle, Sergeant Jasper, by his rescue of the colors of Fort Moultrie, began his brave and romantic career. In August, however, the British landed an army of 25,000 men on Long Island, and the Americans were compelled to withdraw after severe defeats in the battles of Long Island and White Plains. It appears that only the heroic work of Robert Morris, who raised funds on his private credit to supply the army, prevented the collapse

of the Revolution at this point. Washington was able to encourage the patriots by his victories at Trenton and Princeton in the early winter.

In the spring of 1777, the British planned to divide the colonists by bringing a force under General Burgoyne from Canada down Lake Champlain and the Hudson, to be joined by General Howe. Burgoyne advanced and issued very boastful proclamations, but the colonists rallied from all sides. General Howe embarked from New York in August 1777, to attempt the capture of Philadelphia. He defeated Washington at the battle of Brandywine in September. Washington, however, in addition to keeping Howe occupied around Philadelphia, sent men north to Schuyler, who was obstructing Burgoyne's progress, while a body of patriots under General Herkimer defeated a British expedition from Canada at the battle of Oriskany on August 6. Burgoyne was thus deprived of expected help from the West, and, as Clinton failed to move up the Hudson to meet him, while the farmers of Vermont, New Hampshire, and Massachusetts rose to attack him, he was compelled to surrender his entire force at Saratoga in October 1777. This defeat of Burgoyne is generally reckoned as the turning point of the Revolution, because it aroused in the French government sufficient confidence in the colonial cause to prompt the aid which came from France in the next year.

French Alliance. During the winter of 1777, Washington's troops endured great suffering at Valley Forge, while the British held the capital, Philadelphia. Benjamin Franklin secured a treaty of alliance with France early in 1778, and the coming of French forces compelled the English to evacuate Philadelphia. Washington pursued them across New Jersey, but by treachery he was prevented from completely defeating them at Monmouth, and they succeeded in regaining their base at New York City.

War in the South. The war was now transferred in the main to the southern colonies, and became largely a series of raids against towns and countrysides, directed by colonial Loyalists who were familiar with the country. The patriots, Marion and Sumter, maintained a vigorous guerrilla warfare. General Gates was defeated by the British at the battle of Camden in August 1780, but the battle of King's Mountain was won in October by the settlers from west of the mountains.

Surrender of Cornwallis. In 1781 General Nathanael Greene was put in command of the American forces in the South. Cornwallis withdrew into Virginia, and was besieged at Yorktown by Greene and Lafayette. A French fleet blockaded Chesapeake bay and prevented re-enforcements from reaching Cornwallis. Washington, with a French force under Rochambeau, went to the aid of Greene, and Cornwallis was compelled to surrender his whole army, October 19, 1781. His capitulation virtually ended the war.

Efforts at Confederation. The effort to secure a formal union of the states began almost as soon as the Second Continental Congress met, and a plan was at length drawn up and proposed under the title of Articles of Confederation. The ratification of these articles was not completed until 1781, the chief cause of the delay being the questions which arose over the disposition of the western lands. While the war was going on, along the Atlantic seaboard, important events were happening in the West, which affected the negotiations for peace and the whole history of the country thereafter.

Occupation of Western Lands. The territory west of the Allegheny mountains, as far as the Mississippi, formerly in the hands of the French, had come into British possession by the treaty of 1763. After the war with Pontiac in 1763-64, the British government had proclaimed this section closed to settlement and reserved for the Indians. Detroit was made the seat of government for the region. The principal French settlements were at Vincennes on the Wabash river and at Kaskaskia on the Mississippi. The town of Pittsburgh had been founded on the site of Fort Pitt shortly after the close of the French and Indian war. Frontiersmen of Scotch-Irish and of German blood, together with some Huguenots, ignored the British proclamation and crossed the mountains into the western wilderness. In 1774, Parliament, by the Quebec act, united to the Province of Quebec all the region between the Ohio river and the Great Lakes, thus indicating that new colonies were not wanted in that territory.

Kentucky Pioneers. Just as the Revolution was breaking out, Daniel Boone blazed the pack trail, known as the "wilderness road," through the Cumberland gap into Kentucky, and a little later Boonesboro and Harrodsburg were founded. People of this region petitioned Congress to admit them as a fourteenth state of the Confederation, but Virginia organized the country south of the Ohio in 1776 as Kentucky county. Farther south, the Watauga settlement was made, in a region included in North Carolina's western claims.

During the next few years, the frontier was subjected to the horrors of Indian warfare, in spite of the efforts of Congress to placate the Indians. The Iroquois in New York were finally subdued by General Sullivan in 1779.

George Rogers Clark. In 1778-79, George Rogers Clark led a notable expedition down the Ohio river and into the Illinois country, where he took the towns of Kaskaskia, Cahokia, and Vincennes, enlisting the aid of the French residents. Clark had been commissioned by Virginia, and that state now erected the territory between the Ohio and the Mississippi and the Great Lakes into the county of Illinois.

The Confederation. The Articles of Confederation went into effect on March 1, 1781. Congress then proceeded to authorize the survey of the western territory by the Land act of 1785, and the Ordinance of 1787 provided for the government of the Northwest Territory. The disputed lands south of the Ohio river were soon formed into the states of Kentucky and Tennessee.

Despite the late date for the adoption of the Articles of Confederation, Congress, under the necessity of providing for war, had long been acting on the assumption that the articles would certainly be ratified; the executive and judicial offices had already been organized.

Treaty of Peace. It now fell to the United States to conclude a treaty of peace with England. Benjamin Franklin, John Adams, John Jay, and Henry Laurens were appointed to conduct the negotiations. They were instructed, in accordance with the alliance of 1778, to take no step without the approval of the French government, but, when it appeared that the French, owing to Spanish influence, did not desire to make boundary concessions west of the Appalachians, the American envoys agreed to ignore their instructions. As a consequence, they secured a very favorable treaty, which was signed in preliminary form, November 30, 1782. The final treaty was completed in 1783. The United States of America was at last recognized by Great Britain as independent.

Weakness of the Confederation. Very soon the serious weaknesses of the Confederation began to appear. Congress was merely a body of delegates elected by the legislatures of the states. It possessed no adequate powers for dealing with foreign nations; it had no real authority over the people themselves; it could not control commerce either between the states or with foreign countries. Moreover, Congress had no adequate means of raising funds to carry on its work. And, finally, amendment of the Articles of Confederation proved impossible.

Need for Strong Central Government. Washington and other leaders saw the conditions clearly, and urged provision for a stronger government. Not only was the power of Congress at a low ebb, but the rapid changes in state governments had in some cases weakened the authority of the law within the states themselves. The conditions in many places could be described only as anarchy. Both the Confederation and the states were deeply in debt. Both had issued paper money to the extent of many millions of dollars, which had so depreciated that, at the end of the war, one specie dollar would purchase a thousand dollars in the continental currency. In 1786, delegates from several states met at Annapolis to consider questions of common interest. One result of this meeting was a call for the states to elect delegates to a convention for the purpose of revising the Articles of Confederation. All the states except Rhode Island finally sent delegates.

The Constitutional Convention. The convention met in Philadelphia in May 1787. Its members represented the ablest men in America, including such leaders as Benjamin Franklin, Alexander Hamilton, William Patterson of New Jersey, James Wilson of Pennsylvania, John Jay, George Washington, and James Madison. Of these men, Madison probably did the most to secure agreement among the sharply divided parties in the convention. Three great difficulties presented themselves: (1) adjustment of the interests of the small and the large states; (2) treatment of slavery; (3) control over commerce. No more thorough discussion of the fundamentals and details of a great instrument of government has ever occupied the minds of legislators than that which was conducted in Philadelphia between May 25, 1787 and September 17 following, when the Constitution was signed by 39 of the original 55 members of the convention.

Compromises. A series of compromises had made possible the framing of the new constitution. (1) The differences between the small and the large states were reconciled by giving to all the states equal representation in the Senate, and by apportioning membership in the House of Representatives according to the population of each state. (2) The slavery compromise provided that the slave trade should not be prohibited before the year 1808 and also that, in the apportionment of representation and direct taxes according to population, five slaves should count as three free persons. (3) In respect to commerce, Congress was empowered to lay duties upon imports and to regulate interstate commerce, but was forbidden to levy taxes upon exports.

Ratification. There remained the difficult task of getting the Constitution ratified by the states. Its supporters went out to work for its ratification, under the name of Federalists. To their opponents the name Antifederalists was applied. Alexander Hamilton, James Madison, and John Jay published in New York newspapers a series of articles in defense of the Constitution, signed "Federalist." Their discussion was very influential in the campaign which was waged with great bitterness, especially in Massachusetts, Virginia, and New York. The assent of nine states was necessary to adoption, and New Hampshire ratified as the ninth state, May 23, 1788. Others followed, Rhode Island finally in 1790. Certain objections urged by the Antifederalists were removed by the adoption of the first ten amendments (1791), which added to the Constitution a bill of rights.

Population. A glimpse at the diversities of population and at the conditions of intercourse and industry in the United States about the year 1790 helps one to understand some of the difficulties which threatened the new union, as well as the elements of strength which promised well for it. In 1790 the total population of the United States was 3,930,000, excluding 80,000 Indians. Sixty thousand of the inhabitants were free negroes and 700,000 were slaves. In all the states, the English race was predominant. About 300,000 Scotch-Irish were scattered throughout the colonies, chiefly on the frontier. New York had a small Dutch population. Most of the 175,000 Germans lived in Pennsylvania and in the great valley to the southward. There was a small Huguenot group in the Carolinas. Nine-tenths of the people lived in the country. Philadelphia was the largest city, with about 42,000 people, and Louisville on the Ohio river was the town farthest west.

Agriculture. Some changes in agriculture had taken place since the middle of the 18th century. The most valuable crop in 1790 was wheat. Rice was becoming an important crop in the South. Cotton was not yet extensively raised, because of the great expense in the employment of hand labor to separate the fiber from the seed. This situation was changed by Whitney's invention of the cotton gin in 1793. Cotton growing then became profitable.

Manufactures. By the year 1800, manufacturing had increased considerably in the middle and northern states. Philadelphia exported about 300,000 barrels of flour a year. In New England the spinning and weaving industries had not yet developed. There was no power loom in America until 1814, when one was set up at Waltham, Massachusetts, by F. C. Lowell.

Commerce. Large numbers of New Englanders were engaged in the China and East India trade. American inventors had begun to show the ability for which they later became famous. John Fitch ran a steamboat on the Delaware river in 1787. Communication between the colonies was difficult because of the lack of good roads, but between 1790 and 1800 many roads were built from the East across the mountains, and in the eastern parts of the colonies numerous turnpikes or stone roads were constructed. A few canals were built, but, for the most part, such improvements in the means of communication and transport were left to later years.

Culture. The Revolution was followed by rapid extension of education. The Northwest Ordinance had made provision for popular education in the Northwest Territory before that great area had any English inhabitants. This act reflected the interest in education that was general in the colonies. The University of North Carolina, the first state institution of its kind, was founded in 1795. There was as yet no American literature, but several artists, notably John S. Copley and Gilbert Stuart, were very successful. Their work enables us today to be familiar with the faces of most of the leaders of the Revolutionary era. Throughout the states, there were to be found numerous private residences and public buildings of excellent architecture, which perhaps constitute America's best contribution to art, previous to the 19th century.

Political Ideas. The assertions about the rights of men, which had been found in many of the state constitutions and had been put into the Declaration of Independence, were widely discussed, and out of this discussion grew a more humane spirit in the treatment of workers and criminals. In politics, most of the state governments were still aristocratic, though the influence of the Western communities and of Vermont, in which manhood suffrage prevailed, was beginning to make itself felt.

Religion. The moral and religious life of the 18th century in the colonies cannot be said to have been of a high order. After the Revolution, the churches of America began to organize in forms appropriate to the new national life. In 1785 the first general convention of the Protestant Episcopal Church was held. The Methodist Episcopal Church was organized in 1784. The first diocese of the

Roman Catholic Church was established with the appointment of Bishop Carrol (Baltimore) in 1789. In the same year, the Presbyterian synods united in a general assembly of the Presbyterian Church. The Congregational churches in New England had no general government, and they were nearly all supported by taxation. These and several other denominations enjoyed religious freedom, and within a few years the states removed most of the religious qualifications formerly required for voters and officials. In this matter the Federal Constitution had been in advance of the states.

The New National Government. The first presidential election was held in 1788. George Washington was the unanimous choice for president, and John Adams was elected vice president. Congress, meeting in New York City, was organized on April 6, 1789, with Frederick Muhlenberg of Pennsylvania as speaker of the House. The committees of the House of Representatives were at first elected, but after 1790 the speaker was instructed to appoint all committees, and he retained this power until 1911. Washington was inaugurated as president on April 30, 1789. Congress created three executive departments: (1) the department of state; (2) the war department; (3) the treasury department. The office of attorney-general was created and also that of postmaster-general. Washington then formed the chiefs of the departments, with the attorney-general, into an advisory body which came to be called the president's cabinet. He originated the cabinet meeting.

The secretary of the treasury was Alexander Hamilton, and to him is due much of the credit for the successful organizing of the government. He succeeded in maintaining the confidence of the business world by insisting upon the honorable payment of the government's obligation in full, not in depreciated currency. To Hamilton also is to be attributed the plan of chartering the Bank of the United States. The discussion upon this proposal brought about the first clash between Hamilton, who believed in a strong central government, and Jefferson, who argued against what he thought to be an unwarranted extension of the Federal authority. Out of this dispute was to grow within a few years the division of the people into two great parties, the Federalists and the Republicans or Democratic-Republicans.

Foreign Difficulties. The outbreak of the French Revolution brought Washington's administration face to face with a serious foreign problem. Many Americans wanted the United States to support France against the other European powers. The French minister, Genet, violated the privileges of his office by attempting to force Washington into calling an extra session of Congress. Washington stood firmly for neutrality, and issued a proclamation which made it clear that the United States would not take sides. Trouble arose also with England over the rights of American vessels on the high seas, and Congress was on the point of declaring war. Washington, however, sent John Jay to England to negotiate a treaty, by which war with England was averted. In 1795 a treaty with Spain opened the mouth of the Mississippi river to navigation by American boats.

The Presidency of John Adams. With the retirement of Washington, real party struggles began in the United States, but the system of election then in vogue put the two leading presidential candidates into office at once, making the Federalist, Adams, president and the Democratic-Republican, Jefferson, vice president. John Adams was the first president to occupy the White House at Washington (1800).

The new administration was beset with foreign troubles. France had been resentful over the Jay treaty with Great Britain, and the French government warned the American minister, Charles C. Pinckney, to leave Paris. President Adams tried to arrive at an understanding with the French government, but the only result was a demand for bribes. This demand was refused, and for a time America and France were virtually at war. Bonaparte, however, soon came into power in France, and a treaty of peace was negotiated in 1800. The French behavior gave rise to the passage of the Alien and Sedition acts in Congress in 1798. The enforcement of these acts intensified the conflict between the Federalists and the Republicans.

Jefferson's Administration. The most important result of this political situation was the so-called revolution of 1800, when the Republican (Democratic-Republican) candidates, Thomas Jefferson and Aaron Burr, were elected president and vice president respectively. The dispute in this election led to the passing of the 12th amendment, requiring that president and vice president be voted for separately.

Jefferson's administration is notable for two things: (1) the personal influence of the president in the direction of greater democracy in government; (2) the remarkable foresight which he displayed in connection with the purchase of the Louisiana territory and its exploration by Lewis and Clarke. His second term as president was troubled by the conspiracy of Alexander Burr and by the stoppage of American trade, due to the European war measures. Jefferson believed that if American foodstuffs and exports were cut off from Europe, the belligerents would be compelled to make peace. He proposed the Embargo act, with the main result that American ships were tied up at their wharves and American commerce seemed strangled, although Europe did suffer to some extent by the policy.

The War of 1812. Ever since the signing of the Treaty of Paris in 1783, the policy of Great Britain toward American shipping had occasioned friction between the two governments. As the war between Napoleon and the allies dragged on, American commerce was robbed under Napoleonic decrees and English orders in council. The failure of such retaliatory policies as the Embargo act of 1807 and the Nonintercourse acts of 1809 and 1810 became clear, and there grew up in Congress a strong party which favored war against Great Britain. This hostile feeling was intensified by British impressment of American seamen.

The Republican party drew much of its strength from the West, and many Westerners believed it would be easy to strike at England through Canada, although the United States maintained but a small regular army, and had made no provision for a larger one. Finally, war was declared on June 18, 1812. At first the American forces were defeated on land, but American ships won brilliant victories at sea. The year 1813 was less favorable to the American ships, although Perry's victory on Lake Erie opened the way for a campaign in western Canada. In 1814 the British seized Astoria in Oregon, burned public buildings in the city of Washington, and made an attack upon Baltimore. The Americans failed in an attempt to invade Canada, but Andrew Jackson successfully defended his position at New Orleans against the British forces under General Pakenham.

The war had brought no especial credit to either side, but English shipowners were impatient at their losses, and their influence prompted the English government to make a favorable treaty with America. Within the United States, the war had been made the occasion of party conflict. When President Madison called for state troops, Federalist New England refused to send them. The climax of this opposition to the government was the Hartford Convention, the action of which was virtually a threat to withdraw from the Union. But just before the report of this convention was issued, the treaty of peace had been signed at Ghent, December 24, 1814.

WAR OF 1812

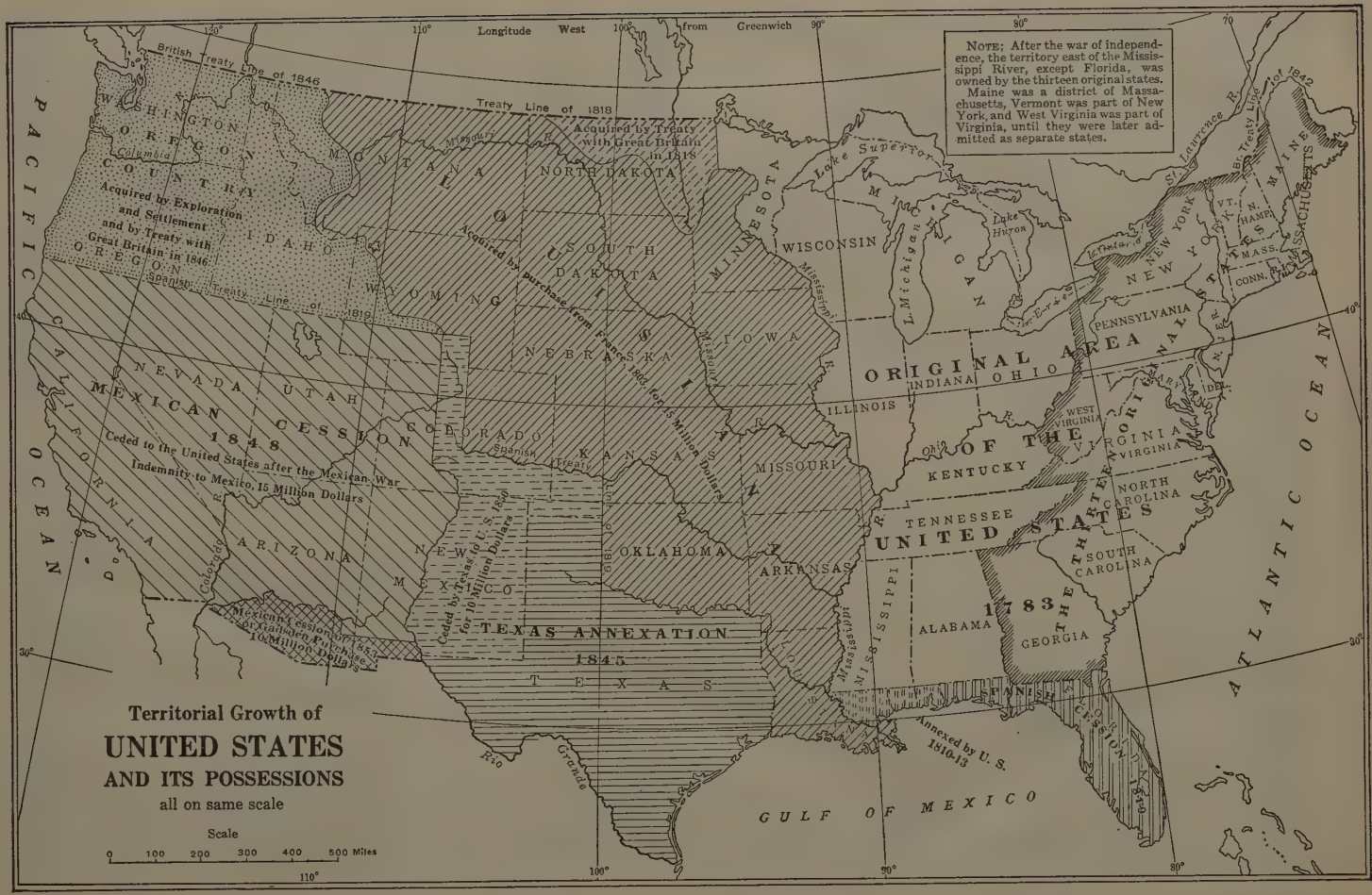
Causes, direct and remote: England's asserted right to search American vessels; Impressment of American seamen; Inciting of Indian hostilities by British agents; Blockades and other arbitrary practices under the British orders in council; Neglect on the part of England to transfer to the United States the posts on the western frontier.

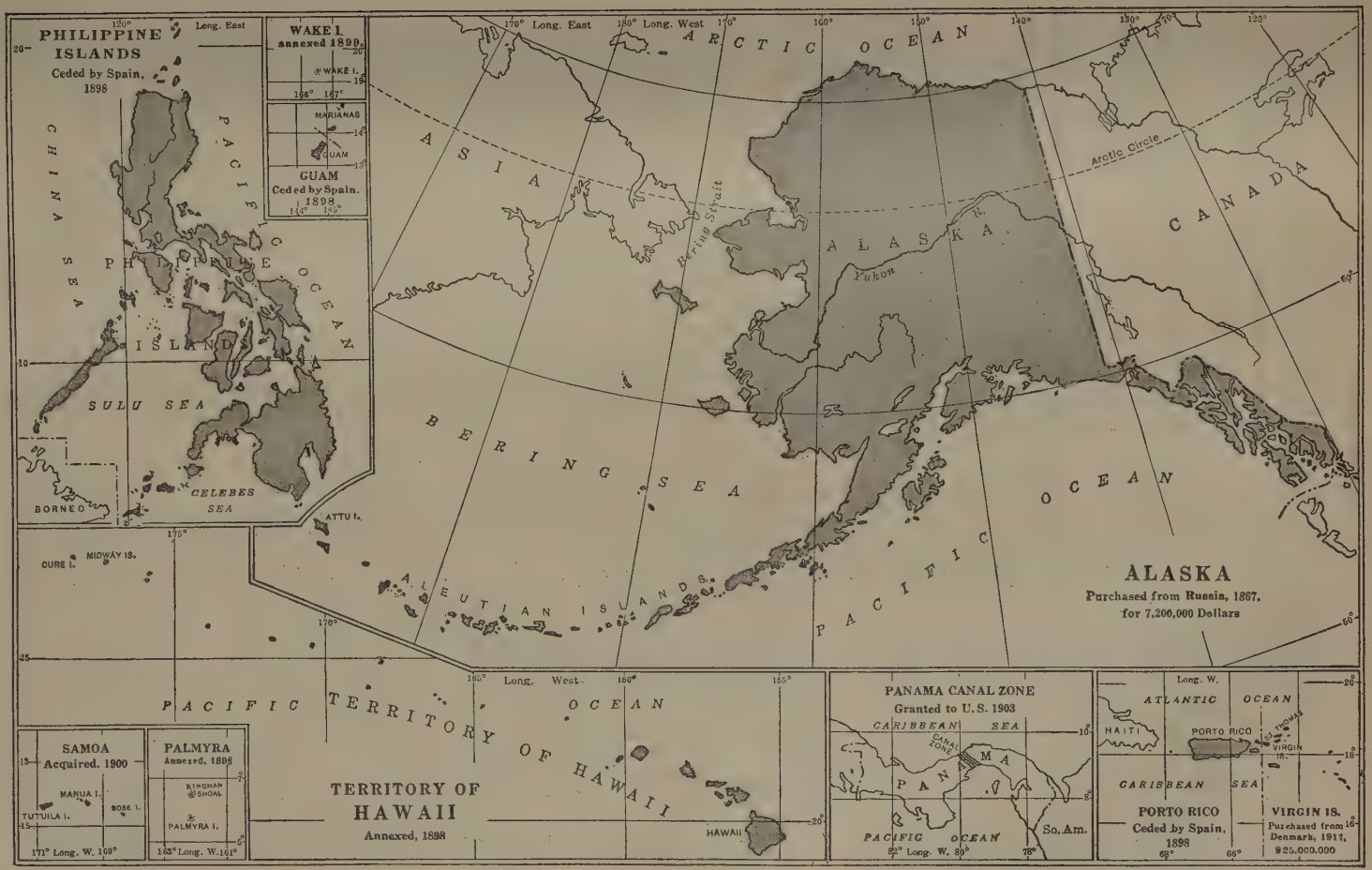
Campaigns	Chief Battles	American		British		Victor	Results
		Leaders	Troops	Leaders	Troops		
On the Canadian frontier.	Fort Dearborn, Aug. 15, 1812	Heald	67	Indians	1,300	Ind.	Americans surrender to British and abandon Michigan territory. Ends first attempt to invade Canada.
	Detroit, Aug. 16, 1812	Hull	1,400	Brock	1,300	Brit.	
	Queenston Heights, Oct. 13, 1812	Van Rensselaer	1,100	Brock	1,500	Brit.	
Harrison in the Northwest and Perry on Lake Erie.	River Raisin, Jan. 22, 1813	Winchester	900	Proctor	1,100	Brit.	Americans regain Michigan territory. British and Indian alliance broken. Tecumseh slain. British fleet on Lake Erie annihilated.
	Fort Meigs, May 5, 1813	Harrison	1,100	Proctor	2,200	Amer.	
	Fort Stephenson, Aug. 2, 1813	Croghan	160	Proctor	391	Amer.	
	Naval Battle of Lake Erie, Sept. 10, 1813	Perry	54 guns	Barclay	63 guns	Amer.	
	The Thames, Oct. 5, 1813.	Harrison	3,500	Proctor / Tecumseh	1,700	Amer.	
Lake Ontario and Niagara frontier.	York, April 27, 1813	Pike	1,600	Sheaffe	600	?	Americans convinced that their troops could successfully cope with trained veterans of Europe.
	Fort George, May 27, 1813.	Chauncey	4,500	Vincent	2,500	?	
	Sackett's Harbor, May 29, 1813	Brown	650	Prevost	800	Amer.	
	Stony Creek, June 6, 1813.	Winder / Chandler	1,400	Vincent	750	Brit.	
	Beaver Dams, June 24, 1813	Boerstler	600	Kerr / Brant	500	Brit.	
	Crystler's Farm, Nov. 11, 1813	Wilkinson	2,000	Morrison	1,000	Brit.	
	Chippewa, July 5, 1814	Brown	3,200	Riall	2,500	Amer.	
	Lundy's Lane, July 25, 1814	Brown	3,100	Drummond	3,500	?	
	Fort Erie, Aug. 15, 1814	Gaines	2,400	Drummond	3,600	Amer.	
	Fort Erie, Sept. 17, 1814	Brown	3,000	Drummond	4,000	Amer.	
Prevost attempts to invade New York via Lake Champlain.	Plattsburg, Sept. 11, 1814.	Macomb	2,000	Prevost	13,000	Amer.	British retreat, leaving northern frontier clear for remainder of the war.
	Lake Champlain, Sept. 11, 1814	MacDonough	14 vessels 86 guns	Downie	16 vessels 92 guns	Amer.	
Destruction of Washington; attack on Baltimore.	Bladensburg, Aug. 24, 1814.	Winder	6,000	Ross	5,000	Brit.	Washington abandoned to the British. British retire to Halifax.
	Fort McHenry, Sept. 13, 1814	Armistead	3,200	Ross	5,000	Amer.	
Jackson's victory at New Orleans.	New Orleans, Jan. 8, 1815.	Jackson	5,500	Pakenham	10,000	Amer.	British withdraw.

ON THE SEA

Location	Date	American		British		Victor
		Vessels	Commanders	Vessels	Commanders	
Off Newfoundland	Aug. 13, 1812	Essex	Porter	Alert	Langharne	Amer.
Off Massachusetts Bay	Aug. 19, 1812	Constitution	Hull	Guerrière	Dacres	Amer.
Off North Carolina	Oct. 18, 1812	Wasp	Jones	Frolic	Whinyates	Amer.
Off Canary Islands	Oct. 25, 1812	United States	Decatur	Macedonian	Carden	Amer.
Off Brazil	Dec. 29, 1812	Constitution	Bainbridge	Java	Lambert	Amer.
Off Demerara	Feb. 24, 1813	Hornet	Lawrence	Peacock	Peake	Amer.
Off Massachusetts coast	June 1, 1813	Chesapeake	Lawrence	Shannon	Broke	Brit.
Off English Channel	Aug. 14, 1813	Argus	Allen	Pelican	Maples	Brit.
Off Maine coast	Sept. 5, 1813	Enterprise	Burrows	Boxer	Blythe	Amer.
At Valparaiso	Mar. 28, 1814	Essex	Porter	Phoebe / Cherub	Hillyar / Tucker	Brit.
In English Channel	June 28, 1814	Wasp	Blakeley	Reindeer	Manners	Amer.
Off Africa	Sept. 1, 1814	Wasp	Blakeley	Avon	Arbuthnot	Amer.
At Fayal, Azores	Sept. 26, 1814	Gen'l Armstrong	Reid	Plantagenet / Carnation / Rota	Floyd / Bentham / Somerville	?
Off Long Island	Jan. 15, 1815	President	Decatur	Endymion / Pomone / Tenedos / Majestic	Hope / Lumly / Parker / Hayes	Brit.
Off Madeira	Feb. 20, 1815	Constitution	Stewart	Cyane / Levant	Falcon / Douglass	Amer.
In South Atlantic	Mar. 23, 1815	Hornet	Biddle	Penguin	Dickenson	Amer.

Results of War: The independence of the United States was definitely insured. Respect for American seamen was fully established. Treaty of Ghent terminated war, Dec. 24, 1814, but did not definitely settle questions of its cause. Owing to lack of facilities for transmission of news, the battle of New Orleans and some naval battles were fought after date of signing the treaty of peace.


Longitude West from Greenwich
NOTE: After the war of independence, the territory east of the Mississippi River, except Florida, was owned by the thirteen original states.
Maine was a district of Massachusetts, Vermont was part of New York, and West Virginia was part of Virginia, until they were later admitted as separate states.
British Treaty Line of 1846
Treaty Line of 1818
Acquired by Treaty with Great Britain in 1818
Acquired by Exploration and Settlement and by Treaty with Great Britain in 1846
Spanish Treaty Line of 1819
Acquired by purchase from France, 1803 for 15 Million Dollars
Ceded by Mexico 1848 for 15 Million Dollars
Ceded by Texas to U.S. 1850 for 10 Million Dollars
Mexican cession of 1853 or Gadsden Purchase 10 Million Dollars
TEXAS ANNEXATION 1845
Annexed by U.S. 1810-13
ORIGINAL AREA OF THE THIRTEEN ORIGINAL STATES
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
Territorial Growth of
UNITED STATES
AND ITS POSSESSIONS
all on same scale
Scale
0 100 200 300 400 500 Miles



THE MATTHEWS-NORTHRUP WORKS, BUFFALO, N.Y.

TERRITORIAL GROWTH OF THE UNITED STATES

Territory	Year Acquired	How Acquired	Occasion of Acquisition	Area in Square Miles	Cost
Original Thirteen States, including claims in the Northwest Territory	1783	. . . . .	. . . . .	892,135	
Louisiana Territory. .	1803	Purchase . .	Negotiations for Purchase of New Orleans. French Offer.	827,987	$15,000,000
West Florida	1810–13	Occupation .	Boundary Dispute	13,435	
Florida	1819	Cession, indemnity	Settlement of Border Troubles	58,666	5,000,000
Texas	1845	Annexation .	Petition of Republic of Texas	389,166	
Oregon Territory . .	1846	Treaty . . .	Settlement of Boundary Dispute	286,541	
Mexican Cession . . .	1848	Cession, indemnity	Close of Mexican War	529,189	15,000,000
Gadsden Purchase . .	1853	Purchase . .	Boundary Dispute	29,670	10,000,000
Alaska	1867	Purchase . .	Pacific Coast Interest in Alaska Fisheries. Russian Offer	590,884	7,200,000
Midway Islands . . .	1867	Annexation .	Fitness for Coaling Station		
Hawaiian Islands. . .	1898	Annexation .	Petition of Hawaiian Government	6,449	
Guam	1898	Annexation .	Close of Spanish War	210	
Palmyra Island . . .	1898	. . . . .	Obtained with Hawaii		
Porto Rico	1898	Cession . .	Close of Spanish War	3,435	
Philippine Islands . .	1898	Cession, indemnity	Close of Spanish War	114,400	20,000,000
Samoan Islands . . .	1899	Annexation .	Treaty with Germany and Great Britain	58	
Add. Philippine Islands	1901	Indemnity .	Boundary Adjustment	68	100,000
Canal Zone	1903	Lease . . .	Canal Construction and Control	436	10,000,000 250,000 annually
Virgin Islands	1917	Purchase . .	Need of Naval Base	149	25,000,000

The Monroe Doctrine. In European affairs, after the close of the Napoleonic wars, there was much unrest and domestic discord, which directly affected the United States chiefly through immigration. But to the southward, throughout the American continent, there was a general movement of revolution in the Spanish colonies, tending toward the establishment of independent republican states. During the administration of President Monroe, Canning, the English prime minister, had suggested that England and the United States should join in preventing the annexation of any American state to Spain, France, or Portugal. The president responded to this suggestion with the famous Monroe Doctrine.

A New National Period. With the close of the War of 1812, a new period opened in American history. This era was to be marked by several notable features: (1) the expansion of United States territory in the West; (2) the beginnings of the slavery dispute; (3) the tariff question; (4) the rise of new political parties; (5) the rise of humanitarian and educational societies and movements.

Expansion. In 1800 the western boundary of the United States was the Mississippi river, access to which from the sea was still controlled by Spain. The western half of the Mississippi valley was claimed by France. Within a few years, New Orleans had passed from Spain to France and from France, together with Louisiana, to the United States. Settlers poured into the valley of the Ohio and began to fill up the Northwest. Ohio was admitted as a state in 1803. The expedition of Lewis and Clark revealed the greatness of the Western country, and John Jacob Astor, a New York merchant, by establishing his trading post at Astoria, began competition in the fur trade with the Hudson's Bay Company.

Both Great Britain and the United States claimed the territory now included in the states of Washington and Oregon. The planting of Indian missions in the valleys of the Columbia and Willamette rivers was followed before 1840 by an immigration of United States citizens. Spain still held the California coast and territory now known as New Mexico and Arizona. The increasing travel, incident to the immigration from all sections of the East into the Mississippi valley, necessitated further building of roads and canals. By the year 1825 the Erie canal was finished from Albany to the Niagara river. The Cumberland road from Maryland westward through Wheeling and Columbus to St. Louis was built about the same time. After 1812, steamers began to appear on the Western rivers.

Slavery. The settlement of the Western country raised at once the question of the extension of slavery. In the Northwest Territory, slavery was forbidden by the Ordinance of 1787, but this prohibition did not extend to the vast lands of the Louisiana Purchase, out of which new states would be formed. The consequent dispute reached its first crisis in 1819 with the discussion over the admission of Missouri, the first state to be formed out of the Louisiana Purchase. The immediate result was the passage of the Missouri Compromise, by which a line was drawn across the Louisiana Purchase, north of which there were to be no slaveholding territories and no slaveholding states except Missouri.

From this time, slavery was a sectional question between the North and the South. States were admitted in such an order as to maintain a kind of balance between the two forces. The general growth of humane sentiment throughout the country gave rise to the formation of antislavery societies and encouraged an increasing agitation of the question. Abolition societies were at first general in both the North and the South, but about the year 1830 those in the South disappeared, and the societies in the North were largely increased in membership and vigor. The second great crisis came in 1850, when the question of admitting California and New Mexico arose. Following the resulting compromise, came the famous Kansas-Nebraska bill.

New Parties. Politically, the period from 1815 to 1860 saw the break-up of the old party alignment of Federalists and Republicans and the formation of new parties. From 1800 to 1828 the government was in the hands of the Republicans (Democratic-Republicans), who gradually, under the stress of expansion and war, adopted the policies of the Federalists to such an extent that the Federalist party disappeared. The administration of Monroe was known as the "era of good feeling." As a matter of fact, it was a time of factional strife.

At the close of Monroe's administration, several candidates for the presidency were put into the field by various means. Nominations were made by some of the state legislatures; other nominations were made by small political groups. John Quincy Adams, now a Republican, although he had begun

his political life as a Federalist, was elected. He represented the old aristocratic line of presidential succession.

New Political Elements. Several conditions in the country contributed to the development of new parties. First, the growth of the West, with its democratic ideas and its popular organization of local government, gave rise to a political group which looked with suspicion on the growing financial interests of the East. In the second place, there had taken place in all the states, since the formation of the Union, a wide extension of the suffrage, which had brought into the ranks of voters the growing class of mechanics in Eastern cities and towns. Moreover, the close of the period of wars in Europe left the industries and commerce of the United States open to a new competition. This situation gave rise to the demand for higher tariffs to protect "infant industries." Upon this question the southern states, which were mainly agricultural, the middle states, in which factories had grown up, and the New England states, interested chiefly in shipping, were divided. And, finally, the question of slavery, in its various phases, was more and more frequently injected into political contests, until, linked with the question of state rights, it finally became the ruling issue in American politics.

Political Leaders. Political organizations were being developed in the states during this period, particularly in New York and Pennsylvania, and these contributed to the general uncertainty of politics during the decade from 1830 to 1840. Several notable leaders came to the front. Henry Clay early became the champion of the protective tariff under the name of the "American system." Daniel Webster at first opposed, and then favored, the tariff. John C. Calhoun of South Carolina, in the beginning a friend of the tariff, soon changed to opposition and became the great exponent of the nullification idea. Andrew Jackson, who belonged by birth to the so-called "poor whites" of the Carolinas, had gone to Tennessee as a young man and had gained prominence in politics and in the military operations of the War of 1812. During the administration of John Quincy Adams, he became the leader of the opposition and of the democratic movement. He was looked upon as the man of the people, and the combination of the South and West elected him president in 1828. His is the first administration controlled by the Democratic party.

The Presidency of Jackson. The two great issues of Jackson's administration were the question of the United States bank and the question of the right of states to nullify tariff acts. He attacked the bank as an instrument of dangerous commercial monopoly and succeeded in destroying it as a government institution. On the question of nullification, he took the position that the Federal Union must be preserved. The tariff which had aroused the opposition of South Carolina was modified, and this issue disappeared. It was in connection with this discussion upon the question of a state's right to nullify Federal acts that the great debate between Daniel Webster of Massachusetts and Senator Hayne of South Carolina took place in 1830. Webster was from this time recognized as the great champion of Federal supremacy.

The Whigs. Between 1830 and 1840 several political groups drew together into a party which took the name of Whigs. They became strong enough to elect William Henry Harrison in 1840 over Martin Van Buren, the Democratic candidate, who had served one term as president. Harrison died very soon after his inauguration, and the vice president, John Tyler, of Virginia, who was not in reality a Whig, began a stormy administration.

Texas and Mexico. The most important issues of the period between 1840 and 1850 grew out of the expansion of the United States toward the west and south. Party strife became especially bitter because of the relationship of this expansion to the Monroe Doctrine and to the extension of slavery. A strong demand arose for the annexation of territory belonging to Mexico, which was now independent of Spain.

A considerable number of Americans had moved into Texas and had set up an independent state in which slavery was legal. A treaty of annexation was proposed in 1844, but it was rejected by the Senate. In the election of that year, Clay was the Whig nominee, opposed to annexation, and James K. Polk was the Democratic nominee, in favor of annexation. Polk was elected. As a consequence, just before the close of Tyler's administration, Texas was annexed by joint resolution of Congress.

In 1846 President Polk settled with England the boundary of the Oregon country and thus completed the adjustment of the boundary between Canada and the United States. Several exploring expeditions, such as that led by John C. Frémont in 1842–45, had been sent by Americans into California, and President Polk was determined that not only Texas but also the remaining Mexican territory north of the line of the Rio Grande, should be taken for the United States. He finally ordered General Taylor to advance into the disputed territory north of the Rio Grande, where Taylor's forces were attacked by the Mexicans. In a message

MEXICAN WAR

Causes: (1) Dispute over the western boundary of Texas; (2) The desire of the United States government to annex the Mexican territory, southwest of the boundary fixed by treaty in 1819, which included the present states of Arizona, Nevada, Utah, New Mexico, and California, with parts of Wyoming and Colorado.

Campaigns	Chief Battles	American		Mexican		Victor	Results
		Leaders	Troops	Leaders	Troops		
Along the Rio Grande.	Palo Alto, May 8, 1846	Taylor	2,000	Arista	6,000	Amer.	
	Resaca de la Palma, May 9, 1846	Taylor	2,200	Arista	6,800	Amer.	
	Monterey, Sept. 20–24, 1846	Taylor	6,600	Ampudia	10,000	Amer.	
	Buena Vista, Feb. 23, 1847.	Taylor	5,000	Santa Anna.	20,000	Amer.	
Expedition from Vera Cruz to the City of Mexico.	Vera Cruz, March 10–25, 1847	Scott	12,000	?	?	Amer.	The Treaty of Guadalupe Hidalgo added 522,568 sq. mi. of territory to the United States, awarding to Mexico payment of $15,000,000. Rio Grande made boundary between Texas and Mexico.
	Cerro Gordo, April 18, 1847	Scott	8,500	Santa Anna.	12,000	Amer.	
	Contreras, Aug. 20, 1847.	Scott	4,500	Valencia. Santa Anna	19,000	Amer.	
	Churubusco, Aug. 20, 1847.	Scott	7,300	Santa Anna.	25,000	Amer.	
	Molino del Rey, Sept. 8, 1847	Scott	3,500	Santa Anna.	10,000	Amer.	
	Chapultepec, Sept. 12-13, 1847	Scott	7,500	Bravo	4,800	Amer.	

to Congress, May 11, 1846, Polk declared that a state of war existed, and Congress passed a declaration of war. The campaign of the American troops was entirely successful. Mexico ceded New Mexico and California and gave up all claim to Texas.

New States and Slavery. These western additions of territory had been reckoned as valuable chiefly for their furs, but the discovery of gold in California revealed far greater wealth in the new territory than anybody had hoped to find there. In 1849, immigrants began to pour into California, and the question of its admission to the Union as a state came to the fore in the administration of Zachary Taylor, who was elected as the Whig candidate in 1848. He encouraged the Californians to adopt a constitution, and determined to bring California into the Union. The miners, who were working with their own hands, declared against slavery in the new constitution.

In 1849 the Union consisted of fifteen slave states and fifteen free states. There was no slave territory ready to be admitted. The annexation of California would give the free states a majority in the Senate. This situation led to the Compromise of 1850, urged by Henry Clay, "the great pacificator." Under this compromise, California came into the Union as a free state, while New Mexico and Utah were organized as territories with the privilege of determining whether they would be slave or free.

Continuance of the Slavery Issue. The Compromise of 1850 failed to settle the great dispute which was gradually dividing the North from the South, and which was raising to national importance an issue in respect to which neither the Democratic nor the Whig party took a decided position. In the election of 1852, Franklin Pierce of New Hampshire, the Democratic candidate, was elected. President Pierce's first step was in pursuit of a policy looking to the annexation of Cuba. This project was viewed with great favor in the South, because Cuba was a rich slave territory. But the scheme failed, largely because of the rise of the Kansas and Nebraska difficulty over slavery. The Missouri Compromise of thirty years before had forbidden slavery in the territory out of which Kansas and Nebraska were to be formed. Stephen A. Douglas, one of the greatest debaters of the day, supported the theory of squatter sovereignty, virtually embodied in the Kansas-Nebraska bill, which would give the settlers in the territories the right to decide whether or not they would have slavery. Settlers from both North and South poured into the country in dispute, and civil war broke out.

The Republican Party. Out of this discussion over the Kansas-Nebraska bill came the new alignment of parties under the names of Republicans and Democrats. In the election of 1856, the Republicans, whose candidate was John C. Frémont, were defeated by the Democrats, and James Buchanan became president. Far more significant than the outcome of this election, however, was the political contest and great debate between Douglas and Lincoln in 1858. The two men were candidates for the senatorship from Illinois. Douglas won the election, but Lincoln had compelled him to announce his Freeport Doctrine, which cost him the support of Southern Democrats. This series of debates was largely influential in making Lincoln the Republican candidate for president in 1860.

Social Movements, 1820–1860. In order to comprehend thoroughly the course of events which, in the period succeeding the War of 1812, gradually brought the states to the verge of civil war, we must take account of the remarkable contemporary growth of enthusiasm for humanitarian and religious reforms in America. The churches in this period began their extensive missionary efforts in the West and in foreign countries. The circuit rider was a common and important figure on the frontier. The Sunday school movement for the education of poor children, which had begun in England, was adopted in America. American missions were started in the Hawaiian islands, in Asia, and in Africa. The churches began also to emphasize social duties and to found many schools and academies. In the Eastern cities, trade-unions began about 1830 to call attention to the cruel conditions of labor for both adults and children in the factories of New England and of the middle states.

Aside from these organized movements, many individual reformers arose, who spent their lives in efforts for better social conditions. Dorothea Dix brought about the establishment of public asylums for the insane. The treatment of prisoners in jails and penitentiaries was generally brutal at the beginning of the 19th century. In 1830 the Eastern penitentiary at Philadelphia marked a great advance in this respect by providing separate cells for prisoners. The harsh laws against poor debtors were modified also in the course of this period.

The great vice of Americans in the colonial period and throughout the early years of the republic was drunkenness. Agitation for reform of drinking customs gave rise to temperance societies in Boston in 1824; in 1840 the Washingtonian societies began in Baltimore the more widespread movement for temperance. The first state prohibition law was adopted in Maine in 1846.

About 1830 the woman's rights movement began. Its first fruits were seen in the founding of good schools and academies for girls. In 1833 Oberlin college opened its doors to women. The demand for woman suffrage was part of this movement, but it was not to attain success for nearly a hundred years.

The idea of popular education was growing. The mechanics' organizations in Eastern cities protested against the prevalent idea of pauper schools to educate the children of those who could not afford private instruction. About 1830 the policy of a general public school system supported by taxation began to gain favor. This entire educational movement was enlarged and vitalized through the lecture tours of such intellectual leaders as Ralph Waldo Emerson and Edward Everett, and by the establishment of "circulating" libraries in many small towns throughout the country.

Economic Progress. American industry had been progressing by leaps and bounds during this period. The great cotton and woolen mills grew up in New England; coal and iron had been discovered in the neighborhood of Pittsburgh; and the beginnings of the giant steel industry were made. Many inventions of labor-saving machinery appeared between 1830 and 1860. By the invention of his reaper in 1831, Cyrus McCormick made possible a revolution in methods of farming. Railroads were built on lines running westward from the Atlantic seaboard and, to a less extent, southward from the Potomac and Ohio rivers. Canals were constructed by states and by private companies. The foundations of many large individual fortunes were laid through the granting of land for railroad building and by the rapid growth of cities. Industry received a severe check in the panic of 1837, but business organization was greatly strengthened through the economic lessons taught by this disaster.

Immigration. The era under review was also a time of great increase in immigration. Between 1820 and 1840, about 600,000 people came from the Old World and were scattered over all sections of the country. Most of the immigrants were English, Scotch, and Irish. After the unsuccessful revolutionary movement of 1848 in Germany, a large German immigration began, which included many highly educated and able men, such as Carl Schurz. Famine conditions in Ireland sent more than a million Irishmen to America between 1845 and 1855. Immigrants of these groups furnished the labor with

which cities, roads, canals, and factories were built, and they occupied much of the new farming land in the West.

The South. Most of this industrial development took place in the North and West, where the laborer was free. In the South, the main change from colonial conditions was the abandonment of much of the worn-out tobacco land of the East and the movement of planters into the black belt of the Carolinas, Georgia, Alabama, and Mississippi, for the raising of cotton. Cotton was the one staple Southern crop, and so much of the land was given up to its production that the South had to draw its food supplies in large amounts from the North.

South and North. Thus, at the opening of the war of secession, the Southern states were behind the North in industrial development and in population. When the crisis came, Maryland, Delaware, Kentucky, and Missouri—all slaveholding states—remained in the Union, and many of the people of eastern Tennessee—descendants of the early English pioneers, and opponents of slavery—were loyal. The South, therefore, entered the war with about 9,000,000 people as opposed to 22,000,000 in the North. It is estimated that the South had 1,300,000 white men available for military service, while the North had 5,500,000, about half of whom were foreign born. The Southern society was aristocratic, and its leaders were generally highly educated men. In the North, democracy, together with popular education, had become more general.

The Election of 1860. The controversy over the Dred Scott decision, the constitutional struggle in Kansas, and the Lincoln-Douglas debates helped to weld together various elements into the new Republican party, as the party of opposition to slavery. Between 1859 and 1861 this party had a small majority in the House of Representatives, but the Senate was strongly Democratic. In February 1860, Jefferson Davis, senator from Mississippi, introduced in the Senate a number of resolutions, which were passed. They declared for the protection of slavery by Congress, for the suppression of abolitionist agitation in the North, and for the sovereignty of the states. This action was interpreted as a notice that the election of an antislavery president would be the signal for possible withdrawal of the Southern states from the Union.

The Democratic party met in a convention at Charleston, South Carolina, in April 1860, and divided upon the policy of extending slavery. A second convention, held at Baltimore, nominated Douglas, while the extreme Southern Democrats nominated John C. Breckinridge, who was at that time vice president. A Constitutional Union party, made up of Southern and Northern Whigs, nominated John Bell of Tennessee. The Republican party, meeting at Chicago in May, nominated Abraham Lincoln.

Lincoln and Secession. Lincoln was elected, although he received a minority of the total popular vote. The Republicans had a majority in every Northern state except California, Oregon, and New Jersey. On the day after the national election, steps were taken in South Carolina to call a secession convention. By unanimous vote, this convention, on December 20, 1860, declared South Carolina no longer a part of the Union. Before the first of February 1861, six other states—Mississippi, Florida, Alabama, Georgia, Louisiana, and Texas—had followed the example of South Carolina. In the month of February, a convention of delegates from six states drew up a provisional constitution for the Confederate States of America, and elected Jefferson Davis president and Alexander H. Stephens vice president. Preparations for war began immediately. Southern citizens resigned their civil and military offices under the United States government, thus demoralizing, to a large degree, the Union army and navy.

The sentiment in the North during these months was divided. Strong pressure was brought by such leaders as Horace Greeley in favor of acquiescing in the action of the Southern states and of recognizing the independent Confederacy. Lincoln was inaugurated on March 4, 1861, and his inaugural address stated clearly his position. He declared himself opposed to interference with the institution of slavery in the states where it existed, but he expressed equal determination to maintain the Union unbroken, and he clearly stated his belief in the utter unwisdom of secession. Lincoln had already lent his aid to efforts at reconciliation, but these efforts had failed, and he now placed upon the South the responsibility for war.

Opening of the War. On April 12, 1861 the Confederate forces began the bombardment of Fort Sumter in Charleston harbor. On April 15, Lincoln issued his call for 75,000 volunteers. The president's stand in his inaugural address and his action in calling for recruits for the army crystallized sentiment in the North as well as in the South. North Carolina and Virginia, Tennessee and Arkansas joined the Confederacy. The two sides stood 22 Union states and 11 Confederate. There was a general belief in the North that the conflict could be ended with one blow. But this opinion reckoned without the gallant spirit and unanimous determination of the Southern people. To the Southern mind, loyalty to the state came first. This ingrained belief accounts for the action of such men as Alexander H. Stephens and Robert E. Lee. Stephens fought against secession in Georgia, but, when once the majority of his fellow citizens of that state had decided against him, he threw in his influence with them. Robert E. Lee, a Virginian, was an officer in the army of the United States and was offered command of the Union armies, but, when Virginia decided for secession, he remained true to his state.

The Opposing Forces. Both sides misjudged and underestimated each other's powers. The men of the South were accustomed to outdoor life, to the use of firearms, and to the management of horses. Their leaders had been trained in their own military schools and at West Point. The South could put a larger proportion of its white men into service, because the labor on the plantations would be done by the slaves. On the other hand, the North had less of military spirit than the South; a larger proportion of its white population was engaged in the labor of farming and in factories. Moreover, its labor at home had to be done by freemen, and, therefore, a smaller proportion could be spared for military service. As a matter of fact, during the war, about nine men out of every ten in the South served in the army, while in the North one man out of two bore arms at some period of the war. Both sides had to put forth tremendous efforts to equip and maintain armies and navies. One very great advantage the North possessed; namely, its factories and its developed resources in coal and iron Added to this was the wide distribution of labor-saving machines on the farms, without which it is doubtful whether the North could have maintained itself throughout the war. One other advantage was that, in the decade between 1850 and 1860, railroad lines had been completed, which bound together the Mississippi valley and the Atlantic seaboard, thus directing the products of the Western farms toward the East, rather than toward the South.

The Siege of the South. The military problem of the war was simple. The Southern armies had to protect a border running from the Potomac river westward across the mountains through Tennessee to the Mississippi river. In order to succeed, they had also to keep communications open through their ports for the shipment of their cotton and for the importation of food supplies and arms. The first task of the Northern army and navy was to draw a line around the Confederate states and, by

means of the armies on the north and west and the navy on the south and east, to isolate the Confederacy from the outside world. In the second place, the Northern armies had to invade the South and defeat the Southern forces on their own territory.

At first, a blockade of the Southern ports was impossible, for the Federal government had only twelve ships at its disposal. But it had shipyards, and blockading squadrons were rapidly gathered until an effective blockade was secured. Cotton was piled up on the wharves of Southern ports, where it became valueless, and food and medicines grew scarce.

War in the West. The northern frontier of the Confederacy was well protected by the mountains of western Virginia, Kentucky, and Tennessee. There were strongly fortified points on the Kentucky and Tennessee rivers and along the Mississippi. But several railroad lines penetrated southward from the Potomac in the East and from Louisville, on the Ohio, in the West. The campaigns of the Northern armies were determined by these approaches. The first three years of the war were consumed by a stubborn struggle in the West for control of the Mississippi and of the railroad lines leading southward into Georgia and Alabama. This struggle was finally won by the Union armies through the capture of Vicksburg and the defeat of General Bragg at Chickamauga and Chattanooga in the summer and fall of 1863.

War in the East. In the East, the better fortune of war was with the Confederate armies commanded by General Lee, until their defeat at the battle of Gettysburg. General Grant was placed in command of the army of the Potomac in the spring of 1864, and for a year the war settled down to a contest between the armies of Lee and Grant in Virginia. The Northern losses were terrific and discouraging. Lee handled his army in masterly fashion, and he surrendered at Appomattox, April 9, 1865, only after his resources in men and equipment were exhausted. The material resources of the South had been seriously crippled by the march of Sherman from Atlanta to Savannah in the fall and winter of 1864.

Reconstruction. Lincoln's diplomacy had already laid the basis for wise reconstruction to follow the war, but his assassination removed the only man who could lead wisely in this process. Andrew Johnson, who became president, lacked the tact and skill to carry out Lincoln's policy, although he set himself to the task. Under Lincoln's plan, the Southern states were viewed as never having been outside the Union. Governors were appointed for the states which recognized the conditions laid down by the president for the restoration of government. Conventions in these states adopted new constitutions, elected legislatures and governors, and ratified the 13th amendment, which abolished slavery. Civil government was then declared to be fully restored.

CIVIL WAR OR WAR OF SECESSION

Causes: (1) The conflict between the North and the South upon the question of slavery; (2) The state rights controversy, involving the right of secession; (3) The lack of understanding between the North and the South, due to differences of economic development.

Campaigns	Chief Battles	Union		Confederate		Victor	Results
		Leaders	Troops	Leaders	Troops		
Opening conflicts.	Fort Sumter, S. C., April 12–14, 1861	Anderson	75	Beauregard	?	Confed.	Both sides realize the seriousness of the conflict and prepare for a long war.
	First Battle of Bull Run (Manassas), Va., July 21, 1861	McDowell	18,000	J. E. Johnston / Beauregard	22,000	Confed.	
	Ball's Bluff, Va., Oct. 21, 1861	Baker	1,700	Evans	1,600	Confed.	
Western campaigns, 1862. To close the northern frontier in Kentucky and Tennessee; to control the Mississippi; to open routes of invasion into the South.	Mill Spring, Ky., Jan. 19-20, 1862	Thomas	4,000	Crittenden	4,000	Union	
	Ft. Henry, Tenn., surrender, Feb. 6, 1862	Grant / Foote(navy)	20,000	Tilghman	4,000	Union	
	Ft. Donelson, Tenn., surrender, Feb. 14–16, 1862.	Grant / Foote(navy)	20,000	Pillow / Floyd / Buckner	14,000	Union	
	Shiloh (Pittsburg Landing), Tenn., April 6-7, 1862	Grant / Buell	38,000	A. S. Johnston / Beauregard	40,000	Union	
	Island No. 10 (Miss. river), surrender, April 7, 1862.	Pope / Foote(navy)	?	Mackall	6,000	Union	Union troops in control of the upper Mississippi and of the Tennessee river.
	Corinth, Miss., Oct. 3-4, 1862	Rosecrans	20,000	Van Dorn / Price	22,000	Union	
	Perryville, Ky., Oct. 8, 1862	Buell	54,000	Bragg	68,000	Union	
Eastern campaigns, 1862.	Yorktown, Va., siege, April 5–May 3, 1862	McClellan	110,000	J. E. Johnston	50,000	Union	
First contest for capture of Richmond. Peninsular campaign.	Williamsburg, Va., May 5, 1862	McClellan	110,000	J. E. Johnston	50,000	Union	
T. J. (Stonewall) Jackson's Valley campaign.	McDowell, Va., (now W. Va.), May 8, 1862	Schenck	2,600	Jackson	?	Union	
	Fair Oaks (Seven Pines), Va., May 31–June 1, 1862	McClellan	51,000	J. E. Johnston	42,000	Union	
	Seven Days' Battles before Richmond, Va., June 25–July 1, 1862	McClellan	92,000	Lee	80,000	Confed.	McClellan retreats to Malvern Hill.

CIVIL WAR OR WAR OF SECESSION—Con.

Campaigns	Chief Battles	Union		Confederate		Victor	Results
		Leaders	Troops	Leaders	Troops		
Shenandoah Valley campaign.	Second Battle of Bull Run, Va., Aug. 28–30, 1862	Pope	65,000	Lee, Jackson	54,000	Confed.	Union armies fail in attempt to capture Richmond.
First Confederate invasion of the North.	Antietam (Sharpsburg), Md., Sept. 16-17, 1862	McClellan	75,000	Lee	40,000	Union	Lee's invasion of the North defeated.
	Fredericksburg, Va., Dec. 13, 1862	Burnside	116,000	Lee	78,000	Confed.	
Coast and Harbors campaign.	Hampton Roads, Va., *Merrimac* and *Monitor*, March 9, 1862	Worden	?	Buchanan	?	Union	
Effort to blockade the Southern ports.	New Orleans, La., surrender, April 29, 1862	Farragut (navy), Butler (army)	11,000	Mitchell (navy), Lovell (army)	?	Union	Effective blockading of Southern commerce assured.
Western campaigns, 1863.	Murfreesboro (Stone River), Tenn., Dec. 31, 1862–Jan. 2, 1863	Rosecrans	43,000	Bragg	37,000	Union	
For control of the Mississippi and to open the way for invasion to Atlanta.	Vicksburg, Miss., surrender, July 4, 1863	Grant, Porter (navy)	75,000	Pemberton	40,000	Union	
J. H. Morgan's raid across the Ohio ended at Salineville, July 26, 1863.	Port Hudson, Miss., July 9, 1863	Banks	13,000	Gardner	6,000	Union	
	Chickamauga, Ga., Sept. 19-20, 1863	Rosecrans, Thomas	57,000	Bragg	71,000	Confed.	Complete control of the Mississippi and of the approaches to Atlanta by Union forces.
	Battle of Chattanooga, Lookout Mountain, Missionary Ridge, Tenn., Nov. 23–25, 1863	Grant, Sherman, Thomas	60,000	Bragg	40,000	Union	
Eastern campaign, 1863.	Knoxville, Tenn., siege, Nov. 17–Dec. 4, 1863	Burnside, Sherman	12,000	Longstreet	20,000	Union	
Second Confederate invasion of the North, "High Tide of the Confederacy."	Chancellorsville, Va., May 1–4, 1863	Hooker	60,000	Lee	40,000	Confed.	Lee's second attempt to invade the North fails.
	Gettysburg, Pa., July 1–3, 1863	Meade	93,000	Lee	70,000	Union	
Western campaign, 1864-65.	Battles before Atlanta, Ga., July 20, 22, 29, 1863	Sherman	112,000 (max'm)	J. E. Johnston, Hood	71,000 (max'm)	Union	Resources of the Confederacy exhausted. J. E. Johnston surrenders to Sherman at Durham Station, N. C., April 26, 1865.
To break the industrial power of the South.	Capture of Atlanta, Sept. 2, 1863.						
Sherman's march through Georgia and the Carolinas.	Savannah, Ga., surrender, Dec. 21, 1864	Sherman	60,000	?	?	Union	
Eastern campaigns, 1864-65.	Battle of the Wilderness, Va., May 5–7, 1864	Grant	116,000 (max'm)	Lee	61,000 (max'm)	?	
Final struggle for control of Richmond.	Spottsylvania Court House, Va., May 8–18, 1864	Grant	66,000	Lee	?	?	
The Valley campaign.	Opequon (Winchester), Va., Sept. 19, and Fisher's Hill, Va., Sept. 22, 1864	Sheridan	43,000 (max'm)	Early	20,000 (max'm)	Union	Fall of Richmond, April 2, 1865.
	Cedar Creek, Va., Oct. 19, 1864	Sheridan	31,000	Early	13,000	Union	
	Cold Harbor, Va., June 3, 1864	Grant	103,000	Lee	78,000	Confed.	Complete defeat of the Confederate armies through exhaustion of man power and supplies. Capital of the Confederacy in Union hands. Lee surrenders at Appomattox C. H., April 9, 1865.
	Petersburg, Va., June 15–18, 1864	Grant	110,000 (max'm)	Lee	66,000 (max'm)	Confed.	
	Siege of Petersburg and Richmond, June 22, 1864–April 2, 1865	Grant	124,000 (max'm)	Lee	57,000 (max'm)	Union	
	Five Forks, Va., March 31, 1865	Sheridan	?	Pickett	?	Union	

Results of the War: The institution of slavery was abolished within the United States. The Union was preserved, and the supremacy of the Federal government over the states was established.

Congressional Policies. Congress, however, was jealous of the power of the president, and a large Northern element became alarmed at the speedy restoration of the Southern states. In 1865 Congress ignored the work of the president and proceeded to treat the Southern states as rebel territory. This movement was led by Charles Sumner, who was determined at all hazards to do justice to the Negro, and Thaddeus Stevens, who was equally determined to establish Republican power in the South through the command of Negro votes. The 14th amendment was passed, and ratification of this was made a condition of the admission of states to the Union.

Then began, in 1867, the passage of a series of reconstruction acts. The former Confederacy was divided into five military districts. The commanders of these districts had supervision of elections. The result was to bring into power a large, ignorant Negro vote. Anarchy and misgovernment grew throughout the South. The legislatures, without competent leadership and largely influenced by the "carpetbaggers" and "scalawags," made enormous appropriations of money and laid heavy taxes, the proceeds of which were largely wasted by irresponsible adventurers. Enormous state debts were piled up. Most of the taxpaying classes were disfranchised, a condition which intensified the general disturbance.

Restoration of the South. The result of thus displacing Lincoln's moderate diplomacy by an arrogant Congressional scheme of reconstruction was to provoke a countermovement on the part of the Southern whites. This movement was prevented from using legal means of redress, and therefore such organizations as the Ku-Klux Klan were resorted to. During the administration of President Grant, the arbitrary means necessary to maintain Southern Republican and Negro influence became more and more distasteful to the president and to the country. Political rights were restored to all save a few ex-Confederates in 1872, and after the election of 1876 President Hayes withdrew the military forces that had been in control of the elections. The abuses which had attended the Ku-Klux Klan subsided, and white rule was established in all the Southern states.

Impeachment of President Johnson. The conflict between Congress and President Johnson grew more and more intense, until impeachment proceedings were brought against the president in 1868. He was acquitted, though by a very narrow margin, and the country was saved this dangerous precedent of removing a president because he disagreed with Congress.

The Presidency of Grant. The most important feature of Grant's first term was an agreement with England for the settlement of the Alabama claims. President Grant was unfortunate in his selection of officials, but he himself was a vigorous foe of abuses, such as the passing of private pension and relief bills and the wholesale removing of civil officers, a practice which had begun in Jackson's time. He secured a civil service act in 1871, but three years later Congress cut off appropriations for its enforcement, and so destroyed its effect. President Grant's second term was a period of humiliation on account of the inefficiency and corruption revealed in the government. Congressmen and officials were found to have been involved in frauds in connection with Indian affairs, in the financing of the Union Pacific railway, and in the Whisky Ring. One result of these revelations was the appearance of a Democratic majority in the House of Representatives in 1874.

Contested Election of 1876. The presidential election of 1876 proved to be a critical event in American history. On the morning after the election, a Democratic victory was announced by newspapers of both parties, but "carpetbagger" governments were still in control in Louisiana, Florida, and South Carolina. From these states and from Oregon, rival electors secured credentials, which threw doubt upon the election. The matter was finally referred to an electoral commission of fifteen, which decided all contests by a strictly party vote in favor of the Republicans. Historians generally remark the notable restraint which characterized the people of the United States in this trying situation. The peaceable settlement of the election dispute furnishes a strong assurance of the strength of popular government.

The New Industrial Period. The ten years following the Civil War constituted a period of very rapid commercial and industrial growth throughout the country. It is true that the South had been ruined and devastated by the war, but one of the most admirable features of American history is the heroic manner in which the Southern people returned after defeat to take up the work of rebuilding their homes and industry and of maintaining their civilization. They still had the soil which produced large cotton crops. Soon Northern and foreign capital began to flow in. This made possible the development of water power by which cotton mills could be operated. Alabama possesses large deposits of iron and coal, and the larger use of these resources in manufacturing was begun. Thus a new industrial era was introduced in the South.

The Northern states had developed industrially and commercially under the stress of war necessities. Railroad building had been pushed westward, initiated by the chartering of the Union Pacific in 1862.

Banking and Currency. This was a period of change in banking conditions, through the extension of the national banking system and the organization of trust companies. Large amounts of money became available for investment in land and for savings in the form of savings bank deposits and of life insurance. Soon after the Civil War, also, a period of speculation set in, which contributed to the bringing on of the panic of 1873. The problem of national currency was difficult after the Civil War, for the greenbacks, or paper money, which had been issued, depreciated in value when the government would not redeem them in gold. But from the government surplus a sum was gradually accumulated in the treasury to redeem the greenbacks, and what is called resumption of specie payment was begun in 1879. About the same time, a demand arose in the West for the restoration of silver coinage, which had been discontinued by act of Congress in 1873. An act providing for a limited coinage of silver was passed in 1878.

Invention and Discovery. The discovery of oil and the invention of new processes for making steel gave rise to the great organizations for producing these two commodities. The inventive genius of Americans, which has been noted before, produced a multitude of new inventions and processes, especially in electricity. The system of making machine parts of standard dimensions led to the specialization and division of labor. The wonders of all this tide of invention and discovery gave occasion for the exposition of 1876 in Philadelphia, where thousands of people saw for the first time the wealth of their own country and of foreign lands. This was also the era of the invention of the telephone and of the rapid extension of the telegraph.

The organization of capital into large units was followed by organizations of labor and by contests between employers and employees, which led to serious disturbances, such as the railroad strike of 1877.

Immigration, which had been checked during the Civil War, was largely increased. Immigrants from Asia as well as from Europe were received. Chinese laborers by the thousand were employed on the new railroads of the West. In 1879, however, a policy of Chinese exclusion was initiated.

Garfield and Civil Service. The election of 1880 placed James A. Garfield in the White House. The Democratic candidate, General Hancock, was supported by the "solid South," the first occasion of a united Southern Democratic vote. Garfield came into conflict with Republican leaders over the distribution of offices, but before he could carry his civil service reform ideas into practice he was shot by a half-crazed office seeker, and died September 19, 1881. The vice president, Chester A. Arthur, succeeded to the presidency, and in 1883 a civil service act was passed, which provided for the classified service and for competitive examinations. President Arthur began the enforcement of this act, the provisions of which have been extended by later administrations.

The Tariff. About this time the tariff question was once more the center of public interest. The financial exigencies of the Civil War period had occasioned the adoption of a very high tariff, the main provisions of which were still in force. Under this system, a surplus accumulated in the national treasury. At length, in 1882, a tariff commission was appointed, and in 1883 some duties were reduced, although the average rate of duty was raised from 43 per cent to 45 per cent.

First Administration of Cleveland. The election of 1884 was notable for the prominence of the civil service reform issue in the campaign and for the consequent "mugwump" movement. James G. Blaine was the Republican candidate, but his record in Congress had made him many enemies within his own party. The Independent Republicans, or "mugwumps," who did not find in their own party a promise of political reform, especially in the matter of the spoils system, supported Grover Cleveland, who became the first Democratic president since Buchanan. The Democratic party was in control of Congress also. Cleveland extended the scope of the classified civil service in the face of intense opposition within his own party. He followed Grant's example in the vetoing of private pension bills and many others which he deemed dangerous. He was especially opposed to what he thought the extravagance of Congress in appropriating large sums for public buildings and harbor improvements and for pensions. Congress at this time undertook to fulfill the promise made to soldiers in the Civil War that their families should not suffer because of their service. But many abuses arose in connection with this policy, through the granting of pensions to those who, under the law, were not entitled to help. Extravagance was encouraged by the fact that there was a surplus in the treasury.

The Presidency of Harrison. Cleveland raised the issue of a lower tariff, or a tariff for revenue only, in the campaign of 1888. The Republicans responded by a platform which declared for high protection as a party policy. The Democrats were defeated, and Benjamin Harrison was elected president. He began his administration with a Republican majority in both houses of Congress. Appropriations for pensions were greatly enlarged, as were expenditures for public buildings, and the building of a new navy was carried forward. In October 1890, the McKinley tariff was passed, which raised the average duty on imports to about 49 per cent. This tariff, however, provided a large free list and arranged for reciprocity treaties with foreign nations.

Second Administration of Cleveland. Under the new tariff, prices on many commodities suddenly rose, and, in 1892, in a campaign waged over the tariff issue, Grover Cleveland was again elected president,—this time with a majority in both houses of Congress during the first two years of his term. Cleveland's second administration was an era of hard times. Government revenues dropped. There were many commercial failures throughout the country, and in the West a new movement for free coinage of silver arose. The Democratic Congress passed a new tariff act, which President Cleveland refused to sign, because it contained so many protective duties. Congress also passed an income tax law, which, in 1895, the supreme court declared unconstitutional. A notable feature of Cleveland's second administration was the stand taken by the president and his secretary of state, Richard Olney, upon the Venezuelan boundary question, in maintaining that the interests of the United States under the Monroe Doctrine were involved in Great Britain's refusal to arbitrate. In the election of 1896 the Democratic party was split on the silver question, and William McKinley, the Republican candidate, was elected by a large plurality over the Democratic candidate, William J. Bryan.

Cities. The period from 1860 to 1885 brought before the American people a new set of problems. The evils in the government of early American cities have already been referred to, but the problems of city government became more and more serious through the growth of great cities in the period following the Civil War. Opportunities for large profits by land investment, as well as through monopolies in city lighting, fuel, and transportation franchises, were seized by unscrupulous financiers. City governments grew so corrupt as to be the shame of the country. The infamous Tweed Ring in New York plundered that city of millions of dollars. Inefficient government prevented most American cities from having adequate water, light, or sewerage systems until after the year 1890. Since that time much has been done to provide efficient systems of city management.

Trusts and Trade-Unions. The second great problem which appeared in this time grew out of the organizing of so-called trusts for the control of certain industries. The evil pointed out in connection with these was that they formed monopolies and were able, at their pleasure, to extort high prices and rates. These abuses grew up especially in connection with the railroads. The movement for more efficient public control of the "common carriers" began. In 1890 the Sherman Antitrust law was passed. Closely related to the rise of huge industrial combinations of capital and to the governmental problems attending this development, were questions connected with the rapid growth of the labor unions and with increasing agitation for the improvement of working conditions. Strikes and tie-ups of railways and manufacturing establishments continued as part of the struggle between labor and capital.

Immigration. In the last quarter of the 19th century, a marked change came about in respect to the nationalities and the numbers of immigrants who came to America. Formerly, the greater proportion of immigrants had come from the north of Europe; about 1880, they began to come from southern and central Europe. A large number of French Canadians also came into the New England states. Numerous laws were passed to control and restrict this immigration, beginning in 1885 with a law against bringing in "contract labor," and another in 1891 to exclude paupers, insane persons, and some other classes. The assassination of President McKinley in 1901 brought about further regulations, designed to exclude such classes as anarchists. With all these restrictions, however, the number of immigrants admitted kept increasing with each year, until, in 1907, and again in 1914, it reached its maximum of well over a million.

World Power. The administration of President McKinley was marked by the outbreak of the war with Spain. The most important question which arose out of this short conflict concerned the disposition of the Philippine Islands. The country was sharply divided over the policy of retaining the islands,—one group favoring it, the other opposing such an "imperial policy." In the end, the Philippines were retained under the control of the United

WAR WITH SPAIN

Causes: (1) Disorders in Cuba under Spanish rule; (2) Destruction of the battleship *Maine* in Havana harbor.

Campaigns	Chief Battles	American		Spanish		Victor	Results
		Leaders	Troops	Leaders	Troops		
In the Philippines.	Manila Bay, May 1, 1898.	Dewey . .	(navy)	Montojo . .	(navy)	Amer.	
	Siege of Manila, July 31–Aug. 13, 1898	Merritt . } Dewey . }	11,000	Jaudenes. .	13,000	Amer.	
		Aguinaldo (insurgents)	12,000				Treaty of peace by which Cuba was freed from Spain; PortoRico,Guam, and the Philippines were ceded to the United States. The United States paid to Spain $20,000,000.
In Cuba.	El Caney and San Juan Hill, June 30, 1898 . .	Shafter . } Wheeler . } Lawton . } Kent . . }	6,600 8,000	Linares . . Toral . . .	500 4,200	Amer.	
	Santiago Harbor, July 3, 1898	Sampson. } Schley. . }	(navy)	Cervera . .	(navy)	Amer.	

States. Another outcome of the war with Spain and the consequent acquisition of the Philippines, together with the annexation of the Hawaiian islands, was the rise of the United States as a world power, with important territorial interests in the Pacific. A practical consequence of this new world position was the employment of American troops in putting down the Boxer Rebellion in 1900 in China.

The New West. No feature of the history of the United States since the Civil War is more important than the building up of the Middle West, the Southwest, and the Far West. During the Civil War a new policy of homesteading was adopted, and after the close of the war great numbers of ex-soldiers took advantage of this act to settle beyond the Mississippi and the Missouri. Gradually, the land was taken up as far as the Rocky Mountain slopes. Several military campaigns were necessary to settle Indian difficulties, as white settlement encroached upon Indian lands. Cattle raising became the great industry upon the plains of the West and Southwest, while the states immediately west of the Mississippi rapidly became the vast granary of the nation.

Several railroad lines were soon completed to the Pacific coast, and a steady tide of migration followed these lines into California, Oregon, and Washington. Out of these newly settled sections, new states were formed after 1888, in which year there were no organized states west of the Rocky mountains except California, Oregon, and Nevada. The last of this great Western territory was erected into states by the admission of New Mexico and Arizona in 1912. The settlement of the West opened up new and large sources of wealth. Mines of lead and silver were discovered in the Black hills and in Colorado; large copper deposits were opened in Montana; and the vast forests of the Pacific coast were made available.

The Presidency of Roosevelt. After the assassination of President McKinley, the vice president, Theodore Roosevelt, came into the presidency. Roosevelt was a courageous and outspoken leader in affairs, a man of large experience in city, state, and national government. His administration was marked by several notable features in the reform of administration and in the extension of governmental powers. He increased the classified civil service list until it included about half the civil employees of the government, and during his administration the consular service was improved by the application of the merit system and by the more general appointment and promotion of experienced men. Roosevelt probably represented the people at large more completely than any president since Jackson, and he acted upon that theory. He used his influence to settle a great coal strike in 1902, and he took an active interest in the direction of prosecution for violations of the Sherman Antitrust act and of other laws dealing with corporations.

Progressive Measures. Probably the most far-reaching influence of the Roosevelt administration is the impulse that the president gave to the conservation of national resources in forests, water power, and other natural forms of wealth. The diplomatic negotiations and the beginning of actual construction in connection with the Panama canal form part of the achievements of Roosevelt's administration. Two very important enlargements of government activity belong to this period: (1) the giving of greater powers to the Interstate Commerce Commission; (2) the extension of government control over the preparation of food products, through what are known as the pure food laws.

Foreign Relations. In international affairs, President Roosevelt brought about the Treaty of Portsmouth between Russia and Japan in 1905. In 1907–09 a fleet of United States battleships made a cruise around the world. American naval prestige was heightened by this demonstration, particularly in respect to the country's preparedness for action in the Pacific. United States delegates to the Hague Conference in 1907 exerted their influence strongly in favor of proposals for world peace. The president also gave some important applications to the Monroe Doctrine, which he interpreted as implying for the United States a kind of police power in the Western world.

The Presidency of Taft. On the expiration of Roosevelt's second term, William H. Taft was elected president. Mr. Taft came into the presidency with a party divided into two sharply opposed factions,—the progressives, who were strong supporters of the policies urged by Roosevelt, and the conservatives, who were definitely opposed to these policies. The first task of the new administration was the revision of the tariff. In the ensuing contest, the president took the ground that the executive should not interfere with the work of the legislative branch of the government. The conservative elements of both parties combined to pass the Payne-Aldrich tariff, and Mr. Taft gave the act his approval, thereby alienating progressive Republicans.

Mr. Taft, nevertheless, by his executive orders and through encouragement of legislation, did much to enforce the conservation policy. To this administration belong also the establishment of the parcel post and the postal savings system. Many treaties of arbitration were negotiated, and the constitutional amendments providing for the Federal income tax and for direct election of senators were submitted to the states by Congress. In 1912, the "standpat" Republicans nominated Mr. Taft, while the progressive Republicans, or Progressives, nominated Theodore Roosevelt, for president. The Republican vote was thus split, and the Democratic candidate, Woodrow Wilson, was elected.

Wilson's Administration. President Wilson's first term was occupied with legislation upon three

principal matters: (1) the tariff,—Congress was called in a special session, and the Underwood tariff, intended to produce revenue and to discourage monopoly, was passed in October 1913; (2) banking,—the discussion of this question resulted in the formation of the Federal Reserve banking system; (3) control of corporations,—the president secured the passing of a law which provided for the Federal Trade Commission, and also the Clayton Antitrust act. These acts marked the climax of attempts at government control of "big business." At the beginning of the administration, Mr. Bryan, as secretary of state, initiated an enlarged program of arbitration treaties.

In 1913, the 16th amendment to the Constitution, authorizing an income tax, was ratified by the states, and the new tariff law included provision for such a tax. The 17th amendment to the Constitution, also ratified in this year, provided for the election of United States senators directly by the voters of the states instead of by the legislatures.

Mexican Troubles. The political and military disturbances in Mexico, consequent upon the overthrow of President Diaz in 1911, proved embarrassing throughout President Wilson's first term. President Taft had maintained a policy of nonintervention, and Mr. Wilson followed his example. He was, however, in sympathy with the Constitutionalists, led by Carranza, and in 1914 he revoked the arms embargo which Mr. Taft had established in 1912. But, when the bandit, Villa, made a raid across the border into Columbus, New Mexico, on March 9, 1916, the president announced that a punitive expedition would be sent into Mexico to put a stop to Villa's operations. The national guard was mobilized and sent to the Mexican border, and General Pershing, with a body of regulars, entered Mexico, in pursuit of Villa. After a vexatious and unsuccessful campaign, the expedition was withdrawn early in 1917.

The World War. In 1914 the World War broke out. Despite the desire of some Americans that the United States should enter the conflict immediately, the government took a position of strict neutrality, which it held for nearly three years. However, during that time, in spite of diplomatic exchanges between the United States and Germany upon the latter country's repeated violations of international and humane obligations, the United States, without any adequate preparation, was being surely drawn into the circle of the war. Germany's decisive act in the matter was the declaration of unrestricted submarine warfare, January 31, 1917.

Startling revelations of German machinations against the United States followed immediately. On February 26 the president asked Congress for specific authority to arm merchant vessels. Opposition in the Senate prevented Congressional action. However, a few days after his second inauguration, the president authorized the mounting of guns on American merchant ships. On April 6, 1917, in response to President Wilson's war message, Congress passed a resolution declaring the existence of a state of war between the United States and the Imperial German Government. See *World War*.

Peace Treaty. On his return from the Peace Conference, President Wilson submitted to the Senate the Peace Treaty, with the League of Nations Covenant. He insisted that the treaty must be ratified as drafted at Paris. Strong opposition developed. The Senate majority determined that certain reservations should be made, especially with respect to Article X of the League Covenant. A deadlock between the president and the Senate resulted. Twice rejected by the Senate, the treaty became a leading issue in the presidential campaign of 1920.

Prohibition and Woman Suffrage. The years 1919 and 1920 are notable for the culmination of two long struggles for reform in the United States. In January 1919 the 18th amendment to the Constitution, forbidding the manufacture and sale of intoxicants for beverage purposes, was ratified. In 1920 the 19th amendment, granting equal suffrage to men and women, became a part of the fundamental law of the nation.

The Presidency of Harding. The Democratic platform of 1920 affirmed adherence to the policy of participation in the League of Nations. The Republican platform, on the other hand, emphatically rejected such an international pact. The sweeping Republican victory at the polls was won upon the general policy suggested by the phrase "a return to normalcy." The election placed Warren G. Harding, of Ohio, in the presidency.

Prominent among the achievements of the new administration was the provision for a bureau of the budget, charged with preparing systematic estimates of income and expenditure. The first general budget was submitted to Congress by President Harding on December 5, 1921. In the same year an international conference was called to consider limitation of armaments. It met at Washington, November 12, 1921. See *Washington Conference*. A treaty of peace with Germany was signed in Berlin on August 25, 1921. In February 1923 the last units of the American force of occupation were withdrawn from the Rhine. President Harding died suddenly on August 2, 1923. Vice President Calvin Coolidge succeeded him.

Coolidge's Administration. Coolidge continued Harding's cabinet but certain irregularities in connection with the leasing of Teapot Dome oil properties to private individuals resulted, on exposure, in the resignation of three cabinet members. The leases were revoked. Nominated as presidential candidate in 1924, Coolidge was elected despite the defection of the progressive wing of the party, which nominated La Follette as its candidate. Coolidge insisted on rigid economy in governmental expenses, which made possible substantial reductions in the income tax rate and a decrease of more than 5 billion dollars in the public debt. Most Allied governments, following the action of Great Britain in 1923, funded their debts to the United States. The terms agreed upon with Great Britain and most of the others called for annual payments at varying rates of interest extending over a period of 62 years.

On May 26, 1924, Coolidge signed an immigration measure which definitely limited immigration to approximately 150,000 annually, the number admissible from each foreign country being determined by the proportion of the United States population having its national origin in that country. The Senate voted in 1926 in favor of adherence to the Permanent Court of International Justice, but with reservations which proved unacceptable to the other members of the court. A multilateral treaty renouncing war as an instrument of national policy was negotiated with the chief nations abroad and was ratified by the United States Senate in 1928. After a disastrous flood in the Mississippi River valley in 1927, 375 million dollars was appropriated for flood control on that river. Other accomplishments of the Coolidge administration include the authorization of the so-called Boulder Dam project on the Colorado river, the active encouragement of civil aviation, and the promotion of industry and business through the department of commerce. Bills for farm relief involving governmental market support of prices were twice vetoed by President Coolidge. A soldier bonus bill was passed over his veto.

Herbert Hoover. Coolidge was succeeded as president in 1929 by Herbert Hoover, candidate for the Republican party. Hoover was pledged to a policy of judicial reform, particularly with a view to the more thorough enforcement of the Prohibition law, the modification of which had been advocated by his Democratic opponent, Alfred E. Smith. A special session of Congress in 1929 passed a census and reapportionment bill and a farm aid bill, the latter setting up a Federal Farm Board for the relief of agriculture.

HISTORICAL STATISTICS OF THE UNITE

Name of State or Territory	Origin and Meaning of Name	Date of Admission or Acquisition	Settlement*			Area in Square Miles	Population When Admitted or Acquired
			Where	When	By Whom		
Alabama	Indian—Here We Rest	1819	Mobile Bay	1702	French	51,998	127,901
Alaska	Indian—Al-ay-ek-sa, meaning Great Land	1867	Kodiak	1783	Russians	590,884	30,000
Arizona	Spanish-Indian—Little Creeks	1912	Tucson	1776	Spanish	113,956	204,354
Arkansas	From a tribe of Indians	1836	Arkansas Post	1685	French	53,335	97,574
California	First used in a Spanish romance, 1510	1850	San Diego	1769	Spanish	158,297	92,597
Canal Zone	Strip of land bordering Panama Canal	1904	Panama	1519	Spanish	436	.....
Colorado	Spanish—Red, or Colored	1876	Auraria	1859	Americans	103,948	39,864
Connecticut	Indian—Long River	1788†	Windsor	1633	English	4,965	237,946
Delaware	Named for Lord Delaware	1787†	Wilmington	1638	Swedes	2,370	59,096
District of Columbia	From poetic name of United States	1791	Georgetown	1695	Scotch and Irish	69¼	.....
Florida	Spanish—Flowery	1845	St. Augustine	1565	Spanish	58,666	87,445
Georgia	Named for George II	1788†	Savannah	1733	English	59,265	82,548
Guam	Spanish Guajan—Juan	1898	.....	1688	Spanish	210	.....
Hawaii	Hawaii—Big Island	1898	Honolulu	1820	Americans	6,449	109,020
Idaho	Indian—Gem of the Mountains	1890	Cœur d'Alene	1842	Americans	83,888	88,548
Illinois	Indian—The Men	1818	Kaskaskia	1700 ?	French	56,665	55,211
Indiana	Indian's Ground	1816	Vincennes	1727	French	36,354	147,178
Iowa	Indian—Drowsy Ones	1846	Dubuque	1833	Americans	56,147	192,214
Kansas	From a tribe of Indians	1861	Leavenworth	1854	Americans	82,158	107,206
Kentucky	Indian—Dark and Bloody Ground or the Prairie	1792	Boonesboro	1775	English	40,598	73,677
Louisiana	Named for Louis XIV	1812	New Orleans	1718	French	48,506	76,556
Maine	The Main Land	1820	Saco, Monhegan	1622 ?	English	33,040	298,335
Maryland	Named for Queen Henrietta Maria	1788†	St. Mary's	1634	English	12,327	319,728
Massachusetts	The Place of Great Hills	1788†	Plymouth	1620	English	8,266	378,787
Michigan	Indian—Great Water or Lake	1837	Sault Ste. Marie	1668	French	57,980	212,267
Minnesota	Indian—Cloudy Water	1858	St. Paul	1838	Americans	84,682	172,023
Mississippi	Indian—Great River, or Father of Waters	1817	Biloxi	1699	French	46,865	75,448
Missouri	Indian—Great Muddy	1821	St. Genevieve	1735	French	69,420	66,586
Montana	Spanish—A Mountain	1889	Yellowstone River	1809	Americans	146,997	142,924
Nebraska	Indian—Shallow Water	1867	Bellevue	1847	Americans	77,520	122,993
Nevada	Spanish—Snow-covered	1864	Genoa	1850	Americans	110,690	42,491
New Hampshire	Hampshire, England	1788†	Portsmouth	1623	English	9,341	141,885
New Jersey	Named in compliment to the governor of Jersey Island	1787†	Elizabethtown	1617	Dutch	8,224	184,139
New Mexico	Mexitl, Aztec war god	1912	San Gabriel	1598	Spanish	122,634	327,301
New York	Named for the duke of York	1788†	New York	1613	Dutch	49,204	340,120
North Carolina	Named for Charles II	1789†	Albemarle Sound	1653	English	52,426	393,751
North Dakota	Indian—Allied	1889	Pembina	1859	Americans	70,837	190,983
Ohio	Indian—Beautiful River	1803	Marietta	1788	Americans	41,040	45,365
Oklahoma	Indian—Land of Red Men	1907	Guthrie	1890	Americans	70,057	1,414,042
Oregon	Spanish—Wild Marjoram	1859	Astoria	1811	Americans	96,699	52,465
Pennsylvania	Latin—Penn's Woodland	1787†	Chester	1638	Swedes	45,126	434,373
Philippine Islands	Named for Philip II	1898	Cebu	1565	Spanish	114,400	7,670,000
Porto Rico	Spanish—Rich Port	1898	Pueblo Viejo	1508	Spanish	3,435	813,937
Rhode Island	Rhodes, an island in the Ægean Sea	1790†	Providence	1636	English	1,248	68,825
Samoan Islands, Tutuila and Manua	From Sa-ia-moa, meaning Sacred to Moa	1899	.....	1830	English	58	5,000
South Carolina	Named for Charles II	1788†	Ashley River	1670	English	30,989	393,751
South Dakota	Indian—Allied	1889	Southeast part	1859	Americans	77,615	348,600
Tennessee	Indian—River with the Great Bend	1796	Watauga	1769	Americans	42,022	35,691
Texas	From tribe of Indians	1845	San Antonio	1692	Spanish	265,896	212,592
Utah	Indian—Mountain Dwellers	1896	Salt Lake City	1847	Americans	84,990	210,779
Vermont	French—Green Mountain	1791	St. Anne	1665	French	9,564	85,425
Virgin Islands	Named in honor of St. Ursula and her companions	1917	St. Croix	1625 ?	Dutch and English	149	26,051
Virginia	Named for Elizabeth, the Virgin Queen	1788†	Jamestown	1607	English	42,627	747,610
Washington	Named for George Washington	1889	Columbia River	1811	English	69,127	357,232
West Virginia	From Virginia	1863	Berkeley County	1726-7	Americans	24,170	442,014
Wisconsin	Indian—Wild Rushing Channel	1848	Green Bay	1745	French	56,066	305,391
Wyoming	Indian—Extensive Plain	1890	Cheyenne	1867	Americans	97,914	62,555

* Exact dates and places of first permanent settlements are frequently difficult to determine; authorities differ.
† Dates of ratification of the Constitution by the Thirteen Original States.
‡ Estimate.

ATES—STATE AND TERRITORIAL

Original Name, or Territory from which Derived	Numbers Furnished for Army and Navy During the World War				Name of State or Territory
	Under Selective Service Act		Volunteers		
	Registrations	Inductions	Army	Navy*	
uisiana and Georgia, Mississippi Territory, Alabama Territory	444,842	64,405	11,705	4,814	Alabama
ssian America	16,061	2,090	163	95	Alaska
xico	94,310	9,580	1,689	1,574	Arizona
uisiana, Louisiana Territory, Missouri Territory, rkansas Territory	365,904	55,419	10,849	4,657	Arkansas
w Albion, Upper California	839,614	79,593	39,675	26,774	California
public of Panama	.....	.....	174	.....	Canal Zone
uisiana and Mexican Cession, Colorado Territory	216,820	25,950	9,088	5,130	Colorado
rth Virginia, New England	374,400	36,010	14,864	11,884	Connecticut
w Sweden, New Netherland, Pennsylvania, Three Lower Counties on the Delaware	55,277	5,527	2,150	1,041	Delaware
nce George's County, Maryland	90,361	11,029	4,567	5,670	District of Columbia
rida Territory	209,248	27,988	7,734	5,334	Florida
e of the Thirteen Original States	549,235	72,383	16,421	8,059	Georgia
n Juan	.....	.....	.....	248	Guam
dwich Islands	71,800	6,008	2,964	381	Hawaii
gon Territory, Washington Territory, Idaho Territory	105,337	13,824	4,603	2,100	Idaho
rthwest Territory, Indiana Territory, Illinois Territory	1,574,877	193,338	66,072	38,393	Illinois
rthwest Territory, Indiana Territory	639,834	77,440	34,664	12,253	Indiana
uisiana, Missouri Territory, Michigan Territory, Visconsin Territory, Iowa Territory	524,456	74,512	25,494	10,597	Iowa
uisiana, Kansas Territory	382,065	49,757	19,080	8,081	Kansas
ginia	486,739	60,617	18,906	8,430	Kentucky
uisiana, Territory of Orleans	392,316	61,623	7,970	7,131	Louisiana
w England, Laconia, and Massachusetts	159,631	17,659	8,333	5,239	Maine
e of the Original States	313,489	36,334	11,429	8,791	Maryland
rth Virginia, New England, Massachusetts Bay	886,728	93,960	44,754	44,385	Massachusetts
rthwest Territory, Indiana Territory, Michigan Territory	873,383	106,802	31,323	16,453	Michigan
uisiana and Northwest Territory, Minnesota Territory	541,607	79,383	19,773	10,863	Minnesota
uisiana and Georgia, Mississippi Territory	344,724	47,319	8,448	4,791	Mississippi
uisiana, Louisiana Territory, Missouri Territory	765,045	104,591	34,020	17,862	Missouri
uisiana, Nebraska Territory, Idaho Territory, Dakota Territory, Montana Territory	201,256	29,446	7,225	2,663	Montana
uisiana, Nebraska Territory	287,414	34,783	14,784	6,138	Nebraska
per California, Utah Territory, Nevada Territory	30,808	3,384	1,582	257	Nevada
rth Virginia, New England, Laconia	95,158	9,665	5,072	2,513	New Hampshire
w Netherland	762,485	78,615	30,050	23,826	New Jersey
xico	81,013	9,508	2,740	1,516	New Mexico
w Netherland	2,511,046	279,875	98,994	75,856	New York
emarle Colony	482,463	62,557	13,845	7,124	North Carolina
uisiana, Minnesota Territory, Nebraska Territory, Dakota Territory	160,292	20,680	6,199	1,692	North Dakota
thwest Territory	1,389,474	154,236	48,850	16,908	Ohio
ian Territory, Oklahoma Territory	435,668	71,926	13,838	6,955	Oklahoma
gon Territory	179,436	19,617	12,312	6,588	Oregon
ginal State	2,069,407	223,122	83,740	37,571	Pennsylvania
hipelago of San Lazarus; Western Islands	.....	.....	19,771	4,785	Philippine Islands
rinquén	240,886	16,901	2,263	418	Porto Rico
rth Virginia, New England, Isles of Rhodes, Providence and Rhode Island Plantations.	134,515	12,554	6,400	7,264	Rhode Island
vigators' Islands	.....	.....	.....	90	Samoan Islands
rteret Colony	307,350	47,341	8,085	5,127	South Carolina
uisiana, Minnesota Territory, Nebraska Territory, Dakota Territory	145,706	22,423	7,357	1,976	South Dakota
rth Carolina, Territory south of the Ohio River	474,347	66,064	16,186	6,184	Tennessee
public of Texas	990,522	127,797	36,224	18,217	Texas
xican Cession, Deseret, Utah Territory	103,052	12,309	4,483	1,955	Utah
w Netherland, New Hampshire Grants	71,484	7,450	3,789	1,603	Vermont
nish West Indies	.....	.....	.....	55	Virgin Islands
th Virginia	465,439	61,878	13,539	11,854	Virginia
gon Territory, Washington Territory	328,466	33,257	13,138	11,887	Washington
ginia	325,266	46,596	9,431	3,203	West Virginia
rthwest Territory, Illinois Territory, Michigan Territory, Wisconsin Territory	586,290	79,012	24,387	13,391	Wisconsin
uisiana and Oregon Territory (chiefly), Nebraska Territory, Dakota Territory, Idaho Territory, Wyoming Territory	59,977	8,790	2,807	668	Wyoming
Totals	24,237,323	2,952,927†	964,003‡	549,314**	

Includes the Naval Reserve Force. † Includes 2,944,357 Army, 1911 Navy, and 6659 Marine Corps. ‡ About 80 per cent of al. Includes Regular Army, National Guard, and Enlisted Reserve Corps. ** Includes 12,493 men obtained under the ective Service act.

AMERICAN FLAGS

The origin of the device of stars and stripes in the flag of the United States has occasioned much discussion. Several theories have been advanced to account for the alternating red and white stripes. Some writers have derived these from the Dutch flag, which had flown over New Netherlands from 1609 to 1664. Others point out that the so-called Union or Grand Union flag, raised at Cambridge, Mass., by General Washington, January 2, 1776, was in all particulars the flag of the British East India Company. It is said that at a dinner in Philadelphia, December 13, 1775, Benjamin Franklin suggested the use of the general design of this flag, which had thirteen alternating red and white stripes, with a union in which appeared the crosses of St. George and St. Andrew on a blue field. The thirteen stripes symbolized the union of the colonies, while the union jack represented their allegiance to Great Britain.

Throughout the Revolution many different colonial and regimental flags were used, in which red and white stripes, stars, and the blue field appear in various combinations. Contemporary prints show the stripes but no stars until the year 1780. It appears, therefore, that the elements which entered into the final design of the national flag were already in common use in the colonies.

The Stars and Stripes. After the declaration of independence, the design of the Grand Union flag was inappropriate. The design of stars and stripes, known as the Betsy Ross flag, was therefore presented to the Congress for consideration. On June 14, 1777, the Continental Congress passed the following resolution: "Resolved, That the flag of the United States be thirteen stripes, alternate red and white, that the union be thirteen stars, white in a blue field, representing a new constellation." But this resolution seems to have been generally disregarded for a long time. A communication from General Washington to the war board in May 1779 contained the statement that "it is not yet settled what is the standard of the United States."

The claim is well established however that a flag of this design of stars and stripes, made of pieces of clothing, was hoisted at Fort Stanwix, called Fort Schuyler at the time, near the present city of Rome, N. Y., in August 1777. The design persisted, both stripes and stars being regarded apparently as representing the thirteen states of the Union.

On January 15, 1794, Congress, in order to adapt the flag to the new number of states, fifteen after the admission of Vermont and Kentucky, enacted "that from and after May 1, 1795, the flag of the United States be fifteen stripes, alternate red and white and the union be fifteen stars, white in a blue field." In 1818 the number of stripes was reduced to the original number, and Congress ordered that the number of stars should correspond to the number of states, a star to be added on the 4th of July next following the admission of a new state.

Various arrangements of the stars were used until 1896, when Secretary of War Daniel Lamont ordered that they should be placed in six rows. An executive order of President Taft, in 1912, fixed the arrangement of stars as six rows of eight stars each, the stars symbolizing the states in the order of their ratification of the Constitution and their admission to the Union, as follows: Delaware, Pennsylvania, New Jersey, Georgia, Connecticut, Massachusetts, Maryland, South Carolina, New Hampshire, Virginia, New York, North Carolina, Rhode Island, Vermont, Kentucky, Tennessee, Ohio, Louisiana, Indiana, Mississippi, Illinois, Alabama, Maine, Missouri, Arkansas, Michigan, Florida, Texas, Iowa, Wisconsin, California, Minnesota, Oregon, Kansas, West Virginia, Nevada, Nebraska, Colorado, North Dakota, South Dakota, Montana, Washington, Idaho, Wyoming, Utah, Oklahoma, New Mexico, Arizona.

The inspiring name of *Old Glory* was given to the American flag by Captain William Driver of Salem, Mass., in 1831. The words were his salute to a beautiful new flag presented to his ship when starting on a voyage around the world.

The symbolic meanings of the colors in the flag are suggested in a "remark" which Will Barton, the designer of the seal of the Confederation, attached to the description of his design in 1782: "White signifies purity, innocence; red, hardiness and valor. Blue is the ground of the American uniform, and this color signifies vigilance, perseverance, and justice."

Instruction in the symbolic and historical meanings of the national banner has come to be recognized as part of the work of every American school. The first recorded raising of the flag over a school, now so general a custom, took place on Catamount hill, Colrain, Mass., in May 1812. A suitable monument marks the site of the old log schoolhouse. June 14, the anniversary of the Congressional adoption of the stars and stripes, is widely observed as Flag Day. In many schools, the following pledge of allegiance, given by teachers and pupils, is a part of the daily program, as well as a part of the Flag Day exercises:

"I pledge allegiance to the flag of the United States of America, and to the republic for which it stands; one nation, indivisible, with liberty and justice for all."

The following flags are famous, and they are interesting either for their relation to the development of the present national flag or for their connection with events in United States history.

Bunker Hill Flags. As early as the year 1737, a recognized flag of the New England colonies had a blue field with a white union quartered by a red cross. Such a flag, with the addition of a green pine tree in the upper inner quarter of the union, was carried at the battle of Bunker Hill. Another flag of the same design, but having a red field, also appears to have been used in that battle. Some authorities say that each of these flags had, on one side, the words "An Appeal to Heaven," on the other, *Qui Transtulit Sustinet*, meaning "He who transplanted us will care for us."

Flag of Lexington and Concord. In the fight at Concord and Lexington, Captain Nathaniel Page, of the Bedford Minutemen, carried a maroon-colored flag, upon which was the motto *Vince Aut Morire*, meaning "Conquer or Die." This flag is preserved in the town of Bedford, Mass., and is known as the Bedford flag.

Rattlesnake Flags. The device of a rattlesnake, usually represented coiled and ready to strike, was popular with the American colonists just before the Revolution. The origin of its significance as an American emblem can only be surmised. The flag of the Culpepper Minutemen carried this symbol, together with the two inscriptions,—"Don't Tread on Me" and "Liberty or Death." It appeared also on a yellow banner presented to Congress by Colonel Gadsden on February 8, 1776.

Crescent Flags. In the southern colonies, during the early part of the Revolution, a blue flag, having in its upper inner corner a white crescent, was popular. The first use of this design as a distinctively American emblem is credited to Colonel William Moultrie, who hoisted a crescent flag over Fort Johnson, on James island, South Carolina, September 13, 1775. The crescent flags sometimes bore the word "Liberty" in white letters. This is said to have been the design of the flag which Sergeant Jasper gallantly replaced on Fort Sullivan during the British attack of June 28, 1776.

Pine Tree Flags. The design of a green pine tree was a favorite emblem in colonial New England. It was used on coins as early as 1652. The Sons of Liberty are said to have unfurled on Harvard College campus in 1770 a plain red flag, upon which










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HISTORIC AMERICA. I

The Mayflower, Plymouth Harbor, 1620.
Old Bridge, Concord, Mass.
Washington Elm, Cambridge, Mass.
Old City Gates, St. Augustine, Fla.
Plymouth Rock under canopy.
Minute Men Memorial, Lexington, Mass.
House of Cornwallis' Surrender, Yorktown, Va.
St. Xavier Mission, Tucson, Ariz.



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HISTORIC AMERICA II

1 Custis-Lee Mansion, Arlington, Va. 2 King's Chapel, Boston. 3 Bunker Hill Monument, Charlestown (Boston), Mass. 4 Faneuil Hall, Boston. 5 Washington Monument, Washington, D. C. 6 Grant's Tomb, New York City. 7 Independence Hall, Philadelphia. 8 Jefferson Davis Mansion, Richmond, Va. 9 Fort Mackinac, Michigan.

later a green pine tree design was sewed. On some New England flags, the tree had a serpent coiled around the trunk. Below the design were the words "Don't Tread on Me," and above was the inscription "An Appeal to Heaven." In 1776 the Massachusetts Council provided that the naval colors of the colony should be a white flag bearing a green pine tree and the inscription "An Appeal to Heaven."

Flag of Philadelphia Light Horse. It is believed that this flag was carried by the troop that escorted General Washington from Philadelphia to New York, in June 1775, when he was on his way to take command of the army at Cambridge. The banner, now in possession of the Philadelphia City Cavalry, derives especial interest from the fact that its canton is formed of thirteen stripes, alternating blue and silver,—probably the earliest use of stripes on an American flag.

The Continental Flag. This name is applied to the flag raised on Prospect Hill, Cambridge, Mass., January 2, 1776, by General Washington. The flag, which was in reality that of the British East India Company, was called also the Grand Union. It contained the thirteen stripes, one for each colony, as in the present flag, but in place of the stars it displayed the crosses of St. George and St. Andrew. This was the first occasion when thirteen alternating stripes of white and of red were made the foundation of the national standard.

The Betsy Ross Flag. This was the first flag combining the stars and stripes. It contained thirteen five-pointed stars arranged in a circle on a blue field. This is said to have been the design authorized for the official flag by the Continental Congress, June 14, 1777. The design was produced by a committee of Congress, consisting of General Washington, Robert Morris, and Colonel George Ross, with the assistance of Mrs. Elizabeth Ross.

The Bennington Flag. This banner was unique among Revolutionary flags. It was made of homespun linen; its union was nine stripes in depth instead of seven; its stars were seven-pointed instead of five-pointed, and they were arranged in an arch rather than in a circle. It was probably made near Bennington and carried into the battle of Bennington by Nathaniel Fillmore, August 16, 1777.

Eutaw Flag. A crimson banner with a romantic history, presented in 1780 to Colonel William A. Washington by Miss Jane Elliott, of South Carolina, whom he later married. It was carried in the battles of Cowpens and Eutaw Springs. Mrs. Washington later presented this flag to the Washington Light Infantry of Charleston, S. C., and it is now in their possession.

Flag of the Bon Homme Richard. It is said that some young women of Portsmouth, N. H., made this flag for Captain John Paul Jones from pieces of their silk gowns. The name of the *Bon Homme Richard* attaches to this flag because of the fact that it was the ensign of that ship in the famous battle with the *Serapis*, September 23, 1779, when Captain Jones captured the *Serapis*, although he lost his own unseaworthy vessel. When the *Bon Homme Richard*, riddled with shot, sank beside the *Serapis*, the flag was still flying at her masthead, as a symbol of the gallant victory her crew had won.

Commodore Perry's Flag. This flag, flown at the battle of Lake Erie, September 10, 1813, contained the words of the dying Lawrence, "Don't give up the ship," which have become the watchword of the American navy.

Flag of Fort McHenry. The flag which waved over the American defenses during the British bombardment on the night of September 13, 1814, inspired the writing of the "Star-Spangled Banner." The pattern of this flag, fifteen stripes and fifteen stars, is that authorized by Congress in 1794.

THE DEMOCRATIC PARTY

The Democratic party had its origin coincidently with the beginning of the republic. Thomas Jefferson was the first leader and spokesman. The elements of the party were in existence when the Constitution was adopted, as, for example, the Constitutionalist party in Pennsylvania. The opponents of the Constitution maintained that the government was being centralized and that it was organized in the interests of the privileged classes. Those who took this position called themselves Antifederalists. By 1792, the term Democratic-Republican party was used. This designation was generally shortened,—members of the party calling themselves "Republican," their opponents applying to them the term "Democratic."

This party was made up of men who, like Jefferson, were theoretical believers in the rights of the people, and of those without wealth or position, many of whom had previously been disfranchised. Jefferson stated their principles as follows: "* * * to maintain the will of the majority. We believed that man was a rational animal endowed by nature with rights and with an innate sense of justice; and that he could be restrained from wrong and protected in right, by moderate powers confided to persons of his own choice, and held to their duties by dependence on their own will."

Early Power and Principles. The "Republican" party opposed the Federalists. In 1792, it carried Congress and numerous local elections, but did not oppose Washington for his second term as president. In 1797, it received 68 electoral votes in comparison with the Federalists' 71, and Jefferson became vice president. The party opposed the Alien and Sedition laws of 1798 as dangerous assertions of power by the central government. It elected Jefferson president and Burr vice president in 1800, and re-elected Jefferson in 1804.

The "Republican" party ceased to oppose the Constitution after the first ten amendments were made. However, it insisted that, in respect to the powers granted to the general government by the Constitution, that instrument should be construed very strictly. In consequence, the party continually opposed such extensions of federal power as were construed by Chief Justice John Marshall to be constitutional.

The elections of 1808 and 1812, when Madison was elected president, indicated general acceptance of the Republican party. The Federalist party nearly disappeared in most of the states, and it ceased to exist as a national body after its futile opposition to the War of 1812. At the close of that conflict, the country was in a strong financial condition. The Republicans accepted the idea of a national government, and the former Federalists generally acted with the only party now in existence. The lack of organized opposition gave to the administration of President Monroe the name "Era of Good Feeling." Monroe was elected president in 1816 and again in 1820; John Quincy Adams, a former Federalist, was elected in 1824.

The Democratic Party of Jackson. Up to this period in American history, nearly every one elected to conspicuous public office, no matter what his belief in the rights, powers, and privileges of the common people, had been a man of wealth, education, and family. From some of the newer districts, however, especially of the West, men who owed little to such advantages had come to Congress. In 1828, Andrew Jackson, a man of this style, was elected to the presidency. His followers were first called "Jackson men" and then "Democrats." Democracy was no longer a theory, but was exemplified. Although the principles of Jefferson continued to be followed, the agents were new.

Jackson, re-elected in 1832, put down nullification, secured a lowering of the tariff, and destroyed the Bank of the United States. Van Buren, his

trusted friend, followed him in the presidency. But, in 1840, after the panic of 1837 had occasioned widespread dissatisfaction with the Democrats, the representative of a new party, the Whigs, was elected.

Democrats and Whigs. Until 1856 the Democrats and Whigs contested the elections. There was no sharp sectional division, but everywhere there were Democratic districts alongside the more conservative or aristocratic regions which voted Whig. In principle, the Democrats opposed high tariffs and Federal aid for internal improvement. After 1840 the Democratic party definitely aligned itself as opposed to interference with slavery.

The Divided Party. The slavery question finally overshadowed all others. It caused a split in Democratic ranks in 1848, when Lewis Cass became the regular Democratic candidate, while anti-slavery Democrats joined with the Free Soilers in supporting Van Buren. In the years from 1852 to 1856, the same issue broke up the Whig party. The new opposition party was called Republican. It drew most of its supporters from the North and West; the Democratic party was strongest in the South.

In 1860 the Democratic party had two candidates, one Northern, one Southern. The Republicans won. The Southern states seceded, but the ensuing Civil War resulted both in the preservation of the Union and in the destruction of slavery. At the end of the struggle, the Northern Democrats were weak and discredited; the Southern Democrats were disfranchised. Not until 1874 was there much chance of victory. In that year the party won in the Congressional elections. In 1876, it won a popular victory for the presidency, but was not awarded the electoral votes by the electoral commission.

Cleveland and Bryan. In the '80's, the question of civil service reform and of reform of the tariff became prominent. In 1884, the Democrats won, largely on these issues. They received a large Republican vote, dubbed Mugwump, made up chiefly of men who feared and disliked Blaine and approved Cleveland's record on civil service. Cleveland was the victor. He was defeated in 1888 only to be elected again in 1892, the only president to be re-elected after an interim. In his second term came financial depression. Dissatisfaction with the capitalists, moneyed interests, banks, and railroads was rife among large sections of the people. Free coinage of silver was seized upon as a method of relief. The silver men, under the lead of William Jennings Bryan, captured the Democratic party, and in the 1896 campaign it included the Silver Republicans and won most of the Western states as well as the South.

But the conservatives or standpatters, especially in the East, went solidly into the Republican party. The term "sound money" won the election for the Republicans in 1896. By 1900, the Spanish American war had been fought, and the demand for the retention of the Philippines was so strong that the anti-imperialistic and free silver platform of the Democrats carried but few states. In 1904, the Democrats swung to a conservative candidate, but the progressive measures adopted by the Republicans gave Roosevelt the victory, and the success of the progressive policy of the Republicans carried the country in 1908.

Wilson and the World War. Between 1908 and 1912, the progressive element revived in the Democratic party, and the Republicans were divided. In the election of 1912, the Republicans split, and Wilson was elected. In a close election in 1916 he was re-elected. In his second administration occurred the participation of the United States in the World War, with the resulting Peace Treaty. The end of the war left a widespread feeling of unrest, and the Democrats were severely defeated in 1920. Some prophesied the dissolution of the party, but in 1928 the Democratic candidate, Alfred E. Smith, received more votes than had ever before been cast for a presidential candidate of that party. Smith favored a modification of the Prohibition law, thereby introducing into the election an issue which tended to break down strictly party lines. He was defeated by Hoover on a platform of "prosperity."

Democratic Principles. In all its history, the party has stood for the rights of the people. It opposed the "rich, the well-born, and the able" in Washington's time; it advocated extension of the suffrage; it opposed the manufacturers and the bankers. It was strong on the frontier and on the farms and among the mechanics. When it became associated with the slave interests, it had an aristocratic element that came to dominate, but when Civil War questions had been settled, the party came back to the principles of its name. Accusations of radicalism in its policies have been made from time to time, but the radicalism of the 1880's and 1890's was largely accepted in the 20th century.

The Democratic party has opposed any loose construction of the Constitution. From the beginning, it claimed that the literal meaning of that instrument must be followed. In its first years, its leaders could see no justification for a national bank, for protective tariffs, or for government interference with state functions. The party believed also in the rights of the states. It expressed that idea vigorously in the Virginia and Kentucky Resolutions of 1798 and 1799 and in its opposition to Federalist and Whig measures. The theory of state rights, followed consistently, led to nullification in 1832, but the party was not then ready to go so far. In 1860, state rights meant that, if interfered with, the state could withdraw from the Union.

In the last three decades there has been much opposition to the increasing power and multiplying functions of the central government. The Democratic party has emphasized this disapproval. Yet, under strong leaders, the party has been vigorous in its national policy. Jefferson, having purchased Louisiana, found the leaders of his party in Congress prepared to surpass him in a broad construction of the Constitution, to justify an act not expressly provided for. This policy of national welfare won popular approval. Jackson, faced by the threat of nullification in South Carolina, declared, "The Federal Union, it must and shall be preserved." Democrats, like Dix, Douglas, Logan, Palmer, and McClellan, emphatically repudiated secession, and fought for the Union. Cleveland and Wilson were strong leaders in "national" policies.

The Party Constituency. In the course of its history, the constituency of the party has changed. There have always been in its ranks, among the wealthy and among men of position, the theoretical or doctrinaire democrats, like Jefferson himself and Gallatin. But the frontier developed men of character who were democratic by nature. Up to the Civil War practically all the immigrants who had escaped from autocracy in Europe were Democrats by instinct. The cities ceased to be controlled by merchants and bankers, and elections were carried by the votes of the masses.

Several changes are notable in the period since the Civil War. The South has become solidly Democratic except in the Appalachian Mountain region. In recent years, immigrants have been distributed among all political parties. The number of independent voters has increased, and they have usually voted for the party with a liberal platform. The economically discontented have seemed to look to the Democratic party for relief, and most third parties of the period have eventually been absorbed by the Democrats,—as the Greenbackers, Grangers, Farmers' Alliance, Populists, Silverites. In the course of its history, the Democratic party has carried every state in the Union in one or more national elections.

THE REPUBLICAN PARTY

The Republican party has been, since 1854, one of the two chief political parties in the United States. It developed out of the political and territorial disputes occasioned by the question of slavery. This question had forced one of the compromises in the formation of the Constitution, but did not appear as a political issue so long as free states and slave states were evenly balanced in the Senate. In 1819, the question of the admission of Missouri arose, because Missouri comprised a part of the new Louisiana territory and, although in the region far enough north to be included in the free states, was proposing to come in as a slave state.

Rise of the Slavery Issue. By Clay's compromise of 1820, Missouri was admitted as a slave state, but slavery was not to exist in the territories north of its southern border. This compromise remained in force for 34 years. In the meantime, abolition societies had grown up in the North, a Free Soil party had been formed to prevent the extension of slavery into the territories, and the slavery question had become political. The Democratic party, under the control of its Southern portion, was definitely committed to noninterference with slavery in the states, and the Whig party was divided, its main body holding to the compromises secured by its great leader, Henry Clay.

In 1854, the Missouri Compromise of 1820 was broken by the Kansas-Nebraska act, which proposed the principle of squatter sovereignty for the territories which were north of the line laid down in 1820 as the dividing line between slave and free regions. The slavery party was strengthened by the Dred Scott decision of 1857.

The opponents of the Kansas-Nebraska act were the Free Soilers, the Northern Democrats, and the Northern Whigs. The Free Soil party, though small, had been fighting for a principle in its opposition to slavery. The Northern Whigs belonged to a national party which had for years carefully refrained from agitating the slavery question, until the Kansas-Nebraska act seemed to repudiate the act of one of their great leaders, Henry Clay, and to arouse the long suppressed antislavery feeling of the North. The Anti-Nebraska Democrats felt that their consciences could not accept a betrayal of the compact of 1820, in favor of the slaveholding aristocracy of the South. Their number was increased in 1858 by anti-Lecompton Democrats who protested against forcing the Lecompton constitution on Kansas. Later, the American or Know-Nothing party of the '50's, which had not been long in existence, and was found chiefly in free states, dissolved. These elements united to form a new party.

The New Party. The Republican party sprang up simultaneously in different states. The date usually given for its founding is June 1854, and the place, Jackson, Michigan. It entered the Congressional campaign of 1854, elected a plurality in the House of Representatives, and, by a combination with the American party, elected the speaker of the House. The Republican strength was in the north Atlantic and north central states.

In the presidential campaign of 1856, the Republicans nominated Frémont for president, and won New England, New York, and the West—114 votes; but Buchanan carried Pennsylvania and the South—174 votes. In the senatorial campaign of 1858 in Illinois, Lincoln and Douglas debated the slavery question, and the issue was clearly defined, with the result that a break between the Northern and the Southern Democrats became inevitable. In 1860, the Republicans, instead of nominating a radical antislavery man, turned to Lincoln. The Democrats split, and the remnant of the Whigs nominated a candidate. Lincoln secured 180 votes against 123 for all others.

War and Reconstruction. The Civil War broke out almost immediately. Lincoln took the ground that the North would fight for the preservation of the Union. The War Democrats supported him, while the abolitionist element in the Republican party tried to urge more rapid action against slavery, and the Peace Democrats favored no action. The Republican party was essentially the antislavery party, and the friend of the Negro, but it needed the support of the former Democrats. In 1864, it called itself the Union party, and the War Democrats continued with the party in the re-election of Lincoln. Opportune war successes helped. The vote was 212 for Lincoln to 21 for McClellan. Lincoln's assassination resulted in Johnson's succession; the extreme antislavery element of the Republicans controlled Congress for four years and opposed the president. The three Civil War amendments to the Constitution were passed, and the control of the Southern states was placed under Northern troops. In 1868, Grant was elected president by the Republicans.

By 1872, the liberal element in the Republican party had become restive under the domination of the extremists, and they broke away, nominating Horace Greeley for president. The Democrats also nominated Greeley, but the vote was 286 for Grant to 63 for his opponent. In 1873, however, came a business panic, and there were political and financial irregularities in Grant's administration, so that the Republicans lost Congress in 1874.

In 1876, the presidential election was disputed. The electoral commission declared Hayes elected by one vote over Tilden. The administration was liberal and was opposed by the Stalwarts. In 1880, the latter desired Grant for a third term, and the fight in the convention resulted in the nomination of Garfield, a "dark horse," who was elected, 214 to 155, but was assassinated a few months after his inauguration.

Tariff and Civil Service Issues. Arthur succeeded, and during his term the tariff and civil service became important issues. By this time the Southern states had become solidly Democratic, as, after the withdrawal of the Federal troops in 1877, the Negroes and the Northerners known as "carpet-baggers" had no more chance to carry the elections. The Republicans still favored "force bills" to preserve the civil rights of the Negroes, but the Southern whites were in control, and, after 1889, wrote into most of the Southern state constitutions "grandfather" clauses which effectually disfranchised the Negroes.

In 1884, the weakness occasioned by the certain loss of the South to the Republicans was aggravated by the movement within the party of those who felt that the high moral plane of the early days of the Republican party had been distinctly lowered, and who favored an exponent of civil service reform in the person of Cleveland. The Republican position upon the tariff question, also, in respect to which the party had succeeded to the earlier position of the Whigs (and their predecessors, the Federalists), in favor of a high tariff for protection of American industries, was alienating a considerable number of voters. The result was that the Republicans lost Congress in 1882 and the presidency in 1884. Blaine was defeated by Cleveland, 182 to 219, although the vote was in doubt until the last moment.

During the next twelve years, when economic and industrial questions were prominent, it was claimed that the Republican party was in the hands of the moneyed classes, including the banks, the railroads, Wall Street, and the manufacturers. In the West, the Farmers' Alliance entered politics, and then the People's party, later called the Populists, arose. These drew votes away from the Republicans. The presidential elections varied. In 1888, Harrison defeated Cleveland, 233 to 168, largely on the issue of the tariff; but in 1892 Cleveland again became president. Changes in the tariff took place in each of these administrations.

Free Silver. In 1893 came a financial depression which, being charged to the Democratic tariff, gave Congress to the Republicans in 1894. Between the election of 1894 and that of 1896, the question of free silver came to the fore as the summing up of the prevailing economic discontent. There were free silver advocates in both parties. The Democrats declared in favor of free and unlimited coinage of silver at the ratio of 16 to 1. The Republicans were not extreme advocates of gold as a single standard, but became known as the "sound money" men, and attracted the conservative economic elements. The Silver Republicans voted with the Democrats, who nominated Bryan, and the Populists nominated the same candidate. The Gold Democrats nominated a ticket of their own, although most of the conservative Democrats voted for McKinley, the Republican nominee.

During McKinley's term, the gold standard was adopted, and the Spanish American war was fought. Out of the war there arose a new issue of imperialism, the main question being the retention of the Philippines. The Republican and the Democratic candidate of 1896 ran again in 1900, and McKinley won, 292 to 155. As a result of the alignment of the parties in 1900, the Republicans became the "standpat," almost reactionary, party.

Conservatives and Progressives. Upon the assassination of McKinley, Roosevelt succeeded to the presidency, and in 1904 he was elected president over Parker. The vote was 336 to 140. In Roosevelt's term the liberal element of the party was in control, and the Republicans favored measures providing for government regulation of industry and demanding the "square deal." In 1908, Taft was elected president, with 321 votes to 162 for Bryan. During his term, the policies pursued with respect to the tariff and conservation of natural resources indicated that the "old guard," "standpat," reactionary element had again secured control of the party. In 1912, the two elements, progressive and conservative, split. The conservatives nominated Taft; the progressives formed a new party, the Progressive, and nominated Roosevelt. Wilson, the Democratic nominee, was elected.

The World War broke out in 1914. In 1916, the Republicans and Progressives united again, but Wilson defeated Hughes, 277 to 254. After the war, the Republicans came into power again in 1920 by a very large majority, with the reactionary element uppermost. In 1924, the progressive group nominated La Follette, but he received only 13 electoral votes. Coolidge in 1924 and Hoover in 1928 continued the succession of Republican presidents.

Republican Principles. Since Civil War days, the chief characteristic of the Republican party has been its support of the broad construction of the Constitution. It has favored high tariffs, Federal aid for internal improvements, such as a Pacific railway, waterways, reclamation, and conservation. Republicans have believed in a strong central government, in distinction from state rights. The party has also, in general, been strong in its foreign policy. It favored the annexation of Hawaii and the retention of the Philippines. It also favored international agreements for the Nicaraguan canal, and later for the Panama canal.

In general, the Republican party has been and is a party of the North and West. The "solid South" is Democratic because of the Negro policy of the Republicans, and, never, since the troops left the South, have the Republicans won any considerable success, except in the border states. The East is much more conservative than the Middle West and the Far West, yet liberal movements within the party have occasionally won successes in the East.

COMPARATIVE PARTY STRENGTH

In the Congresses of the United States since 1854

Congress		President	Democrats		Republicans		Other Parties
			Senate	House	Senate	House	Abbreviations Used: F. L., Farmer-Labor; H, House; Ind., Independent; Pop., Populist; Prog., Progressive; Proh., Prohibition; S, Senate; Soc., Socialist.
34th	1855–1857	Pierce	41	83	16	108	Americans, S, 5; H, 43
35th	1857–1859	Buchanan	38	93	26	113	Americans, S, 2; H, 23. Ind. Dem., H, 8
36th	1859–1861	Buchanan	36	87	26	114	Americans, S, 2; H, 24. Ind. Dem., H, 6
37th	1861–1863	Lincoln	8	43	31	105	Unionists, S, 10; H, 30
38th	1863–1865	Lincoln	12	80	39	103	
39th	1865–1867	Lincoln, Johnson	10	46	42	145	
40th	1867–1869	Johnson	12	48	54	174	
41st	1869–1871	Grant	11	73	61	170	
42d	1871–1873	Grant	17	105	51	133	Liberal Rep., S, 6; H, 5
43d	1873–1875	Grant	19	88	51	198	Liberal Rep., S, 4; H, 5
44th	1875–1877	Grant	29	181	47	107	Ind., H, 3
45th	1877–1879	Hayes	36	156	39	137	Ind., S, 1
46th	1879–1881	Hayes	43	156	33	133	
47th	1881–1883	Garfield, Arthur	37	130	37	152	Ind., S, 2. Greenback, H, 11
48th	1883–1885	Arthur	36	200	40	119	Greenback, H, 6
49th	1885–1887	Cleveland	34	183	42	139	Greenback, H, 3
50th	1887–1889	Cleveland	37	169	39	152	Ind., H, 4
51st	1889–1891	Harrison	37	161	45	169	
52d	1891–1893	Harrison	39	235	47	88	Ind., S, 2. Farmers' Alliance, H, 9
53d	1893–1895	Cleveland	44	218	37	127	Ind., S, 4; H, 11
54th	1895–1897	Cleveland	39	104	43	248	Ind., S, 6; H, 7
55th	1897–1899	McKinley	34	130	47	202	Silver and Pop., S, 8; H, 25
56th	1899–1901	McKinley	26	159	50	189	Silver and Pop., S, 10; H, 8
57th	1901–1903	McKinley Roosevelt	29	151	53	198	Pop. and Ind., S, 8; H, 8
58th	1903–1905	Roosevelt	33	178	57	208	Union Labor, H, 2
59th	1905–1907	Roosevelt	32	136	58	250	
60th	1907–1909	Roosevelt	31	166	60	220	
61st	1909–1911	Taft	32	175	60	214	Unionist, H, 1
62d	1911–1913	Taft	42	227	49	162	Soc., H, 1
63d	1913–1915	Wilson	51	290	45	127	Progressive, H, 18
64th	1915–1917	Wilson	55	230	41	201	Prog., H, 5. Ind., H, 1. Soc., H, 1
65th	1917–1919	Wilson	51	209	42	212	Prog., S, 1; H, 3. Soc., H, 1. Ind., H, 2
66th	1919–1921	Wilson	47	190	49	240	Ind., H, 2. Proh., H, 1
67th	1921–1923	Harding	37	132	59	300	Soc., H, 1
68th	1923–1925	Harding, Coolidge	42	206	53	223	F. L., S, 1; H, 1. Soc., H, 1. Ind., H, 1
69th	1925–1927	Coolidge	39	183	56	247	F. L., S, 1; H, 3. Soc., H, 2
70th	1927–1929	Coolidge	47	195	48	237	F. L., S, 1; H, 2. Soc., H, 1
71st	1929–1931	Hoover	39	185	54	268	F. L., S, 1; H, 1. Not sworn, S, 1

PRESIDENTIAL ELECTIONS

Showing the States Carried by Each Party Since 1852

R, Republican; W, Whig; D, Democratic; U, Union; A, American; P, Populist; Pr., Progressive.

State	1852	1856	1860	1864	1868	1872	1876	1880	1884	1888	1892	1896	1900	1904	1908	1912	1916	1920	1924	1928
Alabama	D	D	D	..	R	R	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Arizona	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	D	D	R	R	R
Arkansas	D	D	D	..	R	R	D	D	D	D	D	D	D	D	D	D	D	D	D	D
California	D	D	R	R	R	R	R	D *g*	R	R	D *h*	R *i*	R	R	R	Pr *n*	D	R	R	R
Colorado	..	..	..	..	..	..	R *a*	R	R	R	P	D	D	R	D	D	D	R	R	R
Connecticut	D	R	R	R	R	R	D	R	D	D	D	R	R	R	R	D	R	R	R	R
Delaware	D	D	D	D	D	R	D	D	D	D	D	R	R	R	R	D	R	R	R	R
Florida	D	D	D	..	R	R	R	D	D	D	D	D	D	D	D	D	D	D	D	R
Georgia	D	D	D	..	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Idaho	..	..	..	..	..	..	..	..	..	..	P	D	D	R	R	D	D	R	R	R
Illinois	D	D	R	R	R	R	R	R	R	R	D	R	R	R	R	D	R	R	R	R
Indiana	D	D	R	R	R	R	D	R	D	R	D	R	R	R	R	D	R	R	R	R
Iowa	D	R	R	R	R	R	R	R	R	R	R	R	R	R	R	D	R	R	R	R
Kansas	..	..	..	R	R	R	R	R	R	R	P	D	R	R	R	D	D	R	R	R
Kentucky	W	D	U	D	D	D	D	D	D	D	D	R *b*	D	D	D	D	D	D	R	R
Louisiana	D	D	D	..	D	R	R	D	D	D	D	D	D	D	D	D	D	D	D	D
Maine	D	R	R	R	R	R	R	R	R	R	R	R	R	R	R	D	R	R	R	R
Maryland	D	A	D	R	D	D	D	D	D	D	D	R	R	D *j*	D *k*	D	D	R	R	R
Massachusetts	W	R	R	R	R	R	R	R	R	R	R	R	R	R	R	D	R	R	R	D
Michigan	D	R	R	R	R	R	R	R	R	R	R *c*	R	R	R	R	Pr	R	R	R	R
Minnesota	..	..	R	R	R	R	R	R	R	R	R	R	R	R	R	Pr	R	R	R	R
Mississippi	D	D	D	..	..	R	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Missouri	D	D	D	R	R	D	D	D	D	D	D	D	D	R	R	D	D	R	R	R
Montana	..	..	..	..	..	..	..	..	..	..	R	D	R	R	R	D	D	R	R	R
Nebraska	..	..	..	..	R	R	R	R	R	R	R	D	R	R	D	D	D	R	R	R
Nevada	..	..	..	R	R	R	R	D	R	R	P	D	D	R	D	D	D	R	R	R
New Hampshire	D	R	R	R	R	R	R	R	R	R	R	R	R	R	R	D	D	R	R	R
New Jersey	D	D	D	D	D	R	D	D	D	D	D	R	R	R	R	D	R	R	R	R
New Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	D	D	R	R	R
New York	D	R	R	R	D	R	D	R	D	R	D	R	R	R	R	D	R	R	R	R
North Carolina	D	D	D	..	R	R	D	D	D	D	D	D	D	D	D	D	D	D	D	R
North Dakota	..	..	..	..	..	..	..	..	..	..	P *d*	R	R	R	R	D	D	R	R	R
Ohio	D	R	R	R	R	R	R	R	R	R	R *e*	R	R	R	R	D	D	R	R	R
Oklahoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	D	D	D	R	D	R
Oregon	..	..	R	R	D	R	R	R	R	R	R *f*	R	R	R	R	D	R	R	R	R
Pennsylvania	D	D	R	R	R	R	R	R	R	R	R	R	R	R	R	Pr	R	R	R	R
Rhode Island	D	R	R	R	R	R	R	R	R	R	R	R	R	R	R	D	R	R	R	D
South Carolina	D	D	D	..	R	R	R	D	D	D	D	D	D	D	D	D	D	D	D	D
South Dakota	..	..	..	..	..	..	..	..	..	..	R	D	R	R	R	Pr	R	R	R	R
Tennessee	W	D	U	..	R	D	D	D	D	D	D	D	D	D	D	D	D	R	D	R
Texas	D	D	D	..	..	D	D	D	D	D	D	D	D	D	D	D	D	D	D	R
Utah	..	..	..	..	..	..	..	..	..	..	..	D	R	R	R	R	D	R	R	R
Vermont	W	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Virginia	D	D	U	..	..	R	D	D	D	D	D	D	D	D	D	D	D	D	D	R
Washington	..	..	..	..	..	..	..	..	..	..	R	D	R	R	R	Pr	D	R	R	R
West Virginia	..	..	..	R	R	R	D	D	D	D	D	R	R	R	R	D	R *q*	R	R	R
Wisconsin	D	R	R	R	R	R	R	R	R	R	D	R	R	R	R	D	R	R	Pr	R
Wyoming	..	..	..	..	..	..	..	..	..	..	R	D	R	R	R	D	D	R	R	R

a Electors chosen by the Legislature. *b* Rep., 12; Dem., 1. *c* Rep., 9; Dem., 5. *d* Rep., 1; Dem., 1. *e* Rep., 22; Dem., 1. *f* Rep., 3; People, 1. *g* Dem., 5; Rep., 1. *h* Dem., 8; Rep., 1. *i* Dem., 1; Rep., 8. *j* Dem., 7; Rep., 1. *k* Dem., 6; Rep., 2. *n* Dem., 2; Prog., 11. *q* Hughes, 7; Wilson, 1.

THE PRESIDENTS OF THE

Name	Born		Parents		Paternal Ancestry
	When	Where	Father	Mother	
1. George Washington	Feb. 22, 1732	Bridge's Creek, Va.	Augustine	Mary Ball	English
2. John Adams	Oct. 30, 1735	Quincy, Mass.*	John	Susanna Boylston	English
3. Thomas Jefferson	Apr. 13, 1743	Shadwell, Va.	Peter	Jane Randolph	Welsh
4. James Madison	Mar. 16, 1751	Port Conway, Va.	James	Nelly Conway	English
5. James Monroe	Apr. 28, 1758	Westmorland Co., Va.	Spence	Eliza Jones	Scotch
6. John Quincy Adams	July 11, 1767	Quincy, Mass.*	John	Abigail Smith	English
7. Andrew Jackson	Mar. 15, 1767	Waxhaw Settl'nt, S.C.†	Andrew	Elizabeth Hutchinson	Scotch-Irish
8. Martin Van Buren	Dec. 5, 1782	Kinderhook, N. Y.	Abraham	Maria Hoes	Dutch
9. William H. Harrison	Feb. 9, 1773	Berkeley, Va.	Benjamin	Elizabeth Bassett	English
10. John Tyler	Mar. 29, 1790	Charles City Co., Va.	John	Mary Armistead	English
11. James K. Polk	Nov. 2, 1795	Mecklenburg Co., N. C.	Samuel	Jane Knox	Scotch-Irish
12. Zachary Taylor	Sept. 24, 1784	Orange Co., Va.	Richard	Sarah Strother	English
13. Millard Fillmore	Jan. 7, 1800	Summer Hill, N. Y.	Nathaniel	Phebe Millard	English
14. Franklin Pierce	Nov. 23, 1804	Hillsborough, N. H.	Benjamin	Anna Kindreck	English
15. James Buchanan	Apr. 23, 1791	Stony Batter, Pa.	James	Elizabeth Speer	Scotch-Irish
16. Abraham Lincoln	Feb. 12, 1809	Nolin Creek, Ky.	Thomas	Nancy Hanks	English
17. Andrew Johnson	Dec. 29, 1808	Raleigh, N. C.	Jacob	Mary M'Donough	English
18. Ulysses S. Grant	Apr. 27, 1822	Point Pleasant, Ohio	Jesse Root	Hannah Simpson	Scotch
19. Rutherford B. Hayes	Oct. 4, 1822	Delaware, Ohio	Rutherford	Sophia Birchard	Scotch
20. James A. Garfield	Nov. 19, 1831	Orange, Ohio	Abram	Eliza Ballou	English
21. Chester A. Arthur	Oct. 5, 1830	Fairfield, Vt.	William	Malvina Stone	Scotch-Irish
22. Grover Cleveland	Mar. 18, 1837	Caldwell, N. J.	Richard F.	Anna Neal	English
23. Benjamin Harrison	Aug. 20, 1833	North Bend, Ohio	John Scott	Elizabeth Irwin	English
24. Grover Cleveland	Mar. 18, 1837	Caldwell, N. J.	Richard F.	Anna Neal	English
25. William McKinley	Jan. 29, 1843	Niles, Ohio	William	Nancy C. Allison	Scotch-Irish
26. Theodore Roosevelt	Oct. 27, 1858	New York City, N. Y.	Theodore	Martha Bullock	Dutch
27. William H. Taft	Sept. 15, 1857	Cincinnati, Ohio	Alphonso	Louise M. Torrey	English
28. Woodrow Wilson	Dec. 28, 1856	Staunton, Va.	Joseph R.	Jessie Woodrow	Scotch-Irish
29. Warren G. Harding	Nov. 2, 1865	Corsica, Ohio	George T.	Phebe E. Dickerson	Scotch-Dutch
30. Calvin Coolidge	July 4, 1872	Plymouth, Vt.	John C.	Victoria J. Moor	English
31. Herbert Hoover	Aug. 10, 1874	West Branch, Iowa	Jesse Clark	Hulda R. Minthorn	German

*Formerly a part of Braintree. †Jackson stated that he had been told this was his birthplace. Some authorities give Mecklenburg county, N. C.

THE PRESIDENTS OF THE

Name	Married	Wife's Name	Children		Inaugurated	Residence When Elected	Age When Inaugurated
			Boys	Girls			
1. George Washington	1759	Mrs. Martha Custis	..	..	1789	Mt. Vernon, Va.	57
2. John Adams	1764	Abigail Smith	3	2	1797	Quincy, Mass.	61
3. Thomas Jefferson	1772	Mrs. Martha Skelton	..	6	1801	Monticello, Va.	57
4. James Madison	1794	Mrs. Dorothy Todd	..	..	1809	Montpelier, Va.	57
5. James Monroe	1786	Eliza Kortwright	..	2	1817	Oakhill, Va.	58
6. John Quincy Adams	1797	Louisa C. Johnson	3	1	1825	Quincy, Mass.	57
7. Andrew Jackson	1791	Mrs. Rachel Robards	..	..	1829	Hermitage, Tenn.	61
8. Martin Van Buren	1807	Hannah Hoes (Goes)	4	..	1837	Kinderhook, N. Y.	54
9. William H. Harrison	1795	Anna Symmes	6	4	1841	North Bend, O.	68
10. John Tyler	1813	Letitia Christian	3	4	1841	Williamsburg, Va.	51
	1844	Julia Gardiner	4	2			
11. James K. Polk	1824	Sarah Childress	..	..	1845	Nashville, Tenn.	49
12. Zachary Taylor	1810	Margaret Smith	1	3	1849	Baton Rouge, La.	64
13. Millard Fillmore	1826	Abigail Powers	1	1	1850	Buffalo, N. Y.	50
	1858	Mrs. Caroline McIntosh	..	..			
14. Franklin Pierce	1834	Jane Means Appleton	3	..	1853	Concord, N. H.	48
15. James Buchanan	....	Unmarried	..	..	1857	Wheatland, Pa.	65
16. Abraham Lincoln	1842	Mary Todd	4	..	1861	Springfield, Ill.	52
17. Andrew Johnson	1827	Eliza McCardle	3	2	1865	Greenville, Tenn.	56
18. Ulysses S. Grant	1848	Julia Dent	3	1	1869	Washington, D. C.	46
19. Rutherford B. Hayes	1852	Lucy Ware Webb	7	1	1877	Fremont, Ohio	54
20. James A. Garfield	1858	Lucretia Rudolph	4	1	1881	Mentor, Ohio	49
21. Chester A. Arthur	1859	Ellen Lewis Herndon	1	1	1881	New York City	50
22. Grover Cleveland	1886	Frances Folsom	2	3	1885	Buffalo, N. Y.	47
23. Benjamin Harrison	1853	Caroline Lavinia Scott	1	1	1889	Indianapolis, Ind.	55
	1896	Mary Scott (Lord) Dimmick	..	1			
24. Grover Cleveland	....	(See above)	..	..	1893	New York City	55
25. William McKinley	1871	Ida Saxton	..	2	1897	Canton, Ohio	54
26. Theo. Roosevelt	1880	Alice Lee	..	1	1901	Oyster Bay, N. Y.	42
	1886	Edith Carow	4	1			
27. William H. Taft	1886	Helen Herron	2	1	1909	Cincinnati, Ohio	51
28. Woodrow Wilson	1885	Helen Louise Axon	..	3	1913	Princeton, N. J.	56
	1915	Mrs. Edith Bolling Galt	..	..			
29. Warren G. Harding	1891	Florence Kling	..	..	1921	Marion, Ohio	55
30. Calvin Coolidge	1905	Grace A. Goodhue	2	..	1923	Northampton, Mass.	51
31. Herbert Hoover	1899	Lou Henry	2	..	1929	Stanford Univ., Cal.	54

UNITED STATES—TABLE I

Father's Business	Educational Advantage	Early Vocation	Politics	Profession	Religious Connections	Name
Planter	Common School	Surveyor	Fed.	Planter	Episcopalian	Washington.
Farmer	Harvard College, 1755	Teacher	Fed.	Lawyer	Unitarian	Adams.
Planter	College of William and Mary, 1762	Lawyer	Rep.	Lawyer	Liberal	Jefferson.
Planter	Princeton College, 1771	Lawyer	Rep.	Lawyer	Episcopalian	Madison.
Planter	Entered College, William and Mary	Lawyer	Rep.	Politician	Episcopalian	Monroe.
Lawyer	Harvard College, 1787	Lawyer	Rep.	Lawyer	Unitarian	Adams, J. Q.
Farmer	Self Taught	Lawyer	Dem.	Lawyer	Presbyterian	Jackson.
Farmer	Academy	Lawyer	Dem.	Lawyer	Reformed Dutch	Van Buren.
Statesman	Entered Hampden-Sidney College	Medicine	Whig	Army	Episcopalian	Harrison.
Jurist	College, William and Mary, 1806	Lawyer	Dem.	Lawyer	Episcopalian	Tyler.
Farmer	University of North Carolina	Lawyer	Dem.	Lawyer	Methodist‡	Polk.
Planter	Common School	Soldier	Whig	Army	Episcopalian	Taylor.
Farmer	Public School	Tailor	Whig	Lawyer	Episcopalian	Fillmore.
Farmer	Bowdoin College, 1824	Lawyer	Dem.	Lawyer	Episcopalian	Pierce.
Merchant	Dickinson College, 1809	Lawyer	Dem.	Lawyer	Presbyterian	Buchanan.
Farmer	Self Taught	Farmer	Rep.	Lawyer	Liberal	Lincoln.
Sexton	Self Taught	Tailor	Rep.	Politician	Liberal	Johnson.
Farmer	West Point Military Academy, 1843	Tanner	Rep.	Army	Methodist	Grant.
Merchant	Kenyon College, Ohio, 1842	Lawyer	Rep.	Lawyer	Methodist	Hayes.
Farmer	Williams College, 1856	Teacher	Rep.	Lawyer	Disciples	Garfield.
Clergyman	Union College, 1848	Teacher	Rep.	Lawyer	Episcopalian	Arthur.
Clergyman	Common School	Teacher	Dem.	Lawyer	Presbyterian	Cleveland.
Farmer	Miami University, Ohio, 1851	Lawyer	Rep.	Lawyer	Presbyterian	Harrison.
Clergyman	Common School	Teacher	Dem.	Lawyer	Presbyterian	Cleveland.
Iron Manfr.	Entered Allegheny College	Lawyer	Rep.	Lawyer	Methodist	McKinley.
Merchant	Harvard	Publicist	Rep.	Publicist	Reformed Dutch	Roosevelt.
Lawyer	Yale, 1878	Lawyer	Rep.	Lawyer	Unitarian	Taft.
Clergyman	Princeton, 1879	Lawyer	Dem.	Teacher	Presbyterian	Wilson.
Physician	Ohio Central College	Editor	Rep.	Publisher	Baptist	Harding.
Farmer	Amherst College, 1895	Lawyer	Rep.	Lawyer	Congregationalist	Coolidge.
Blacksmith	Stanford University, 1895	Engineer	Rep.	Engineer	Quaker	Hoover.

‡ Baptized on death bed by minister of Methodist Episcopal Church, South. His wife was a member of the Presbyterian Church, which he sometimes attended with her.

UNITED STATES—TABLE II

Served as President	Died	Age at Death	Cause of Death	Place of Death	Place of Burial
7 yr., 10 mos., 4 d.	1799	67	Acute laryngitis	Mt. Vernon, Va.	Mt. Vernon, Va.
4 yr.	1826	90	Natural decline	Quincy, Mass.	Quincy, Mass.
8 yr.	1826	83	Chronic diarrhœa	Monticello, Va.	Monticello, Albemarle Co., Va.
8 yr.	1836	85	Natural decline	Montpelier, Va.	Montpelier, Hanover Co., Va.
8 yr.	1831	73	Natural decline	New York City	Originally, N. Y. Removed, 1858, to Hollywood Cemetery, Richmond, Va.
4 yr.	1848	80	Paralysis	Hall of Congress, Washington, D. C.	Unitarian Church, Quincy, Mass.
8 yr.	1845	78	Dropsy	Hermitage, Nashville, Tenn.	Hermitage, Nashville, Tenn.
4 yr.	1862	79	Asthma	Kinderhook, N. Y.	Kinderhook, N. Y.
1 mo.	1841	68	Pleurisy	White House, Washington, D. C.	North Bend, Ohio.
3 yr., 11 mo.	1862	71	Bilious attacks, with bronchitis	Ballard House, Richmond, Va.	Hollywood, Richmond, Va.
4 yr.	1849	53	Chronic diarrhœa	Nashville, Tenn.	Nashville, Tenn.
1 yr., 4 mo., 5 d.	1850	65	Cholera morbus and typhoid fever	White House, Washington, D. C.	Near Louisville, Kentucky.
2 yr., 7 mo., 26 d.	1874	74	Paralysis	Buffalo, N. Y.	Forest Lawn, Buffalo, N. Y.
4 yr.	1869	64	Dropsy and inflammation of stomach	Concord, N. H.	Minot Cemetery, Concord, N. H.
4 yr.	1868	77	Rheumatic gout	Lancaster, Pa.	Woodward Hill Cemetery, Lancaster, Pa.
4 yr., 1 mo., 11 d.	1865	56	Assassinated by Booth	Washington, D. C.	Oak Ridge, Springfield, Ill.
3 yr., 10 mo., 19 d.	1875	66	Paralysis	Greenville, Tenn.	Greenville, Tenn.
3 yr.	1885	63	Cancer of the tongue	Mt. McGregor, N. Y.	Riverside, New York City.
4 yr.	1893	70	Neuralgia of the heart	Fremont, Ohio	Fremont, Ohio.
3½ mo.	1881	49	Assassinated by Guiteau	Elberon, Long Branch, N. J.	Lake View Cemetery, Cleveland, Ohio.
3 yr., 5½ mo.	1886	56	Bright's disease	New York City	Rural Cemetery, Albany, N. Y.
8 yr.	1908	71	Heart failure	Princeton, N. J.	Princeton, N. J.
4 yr.	1901	67	Pneumonia	Indianapolis, Ind.	Crown Hill Cemetery, Indianapolis, Ind.
4 yr., 6 mo., 10 d.	1901	58	Assassinated by Czolgosz	Buffalo, N. Y.	Cemetery, Canton, Ohio.
7 yr., 5 mo., 20 d.	1919	60	Embolism	Oyster Bay, N. Y.	Young's Memorial Cemetery, Oyster Bay, N. Y.
4 yr.					
8 yr.	1924	67	General breakdown	Washington, D. C.	Washington, D. C.
2 yr., 4 mo., 30 d.	1923	57	Apoplexy	San Francisco, Cal.	Marion, Ohio.
5 yr., 7 mo., 1 d.					

VICE PRESIDENTS OF THE UNITED STATES—TABLE I

Name	Born		Parents		Ancestry	Educational Advantages
	When	Where	Father	Mother		
1. John Adams	1735	Quincy, Mass.	John	Susanna Boylston	English	Harvard, 1755.
2. Thomas Jefferson	1743	Shadwell, Va.	Peter	Jane Randolph	Welsh	Wm. and Mary, 1762
3. Aaron Burr	1756	Newark, N. J.	Aaron	Esther Edwards	English	New Jersey, † 1772.
4. George Clinton	1739	Little Britain, N. Y.	Charles	Elizabeth Denniston	English	Academy.
5. Elbridge Gerry	1744	Marblehead, Mass.	Thomas	Elizabeth Greenleaf	English	Harvard, 1762.
6. Daniel D. Tompkins	1774	Scarsdale, N. Y.	Jonathan G.	Sarah Hyatt	English	Columbia, 1795.
7. John C. Calhoun	1782	Little River, S. C.	Patrick	Martha Caldwell	Scotch-Irish	Yale, 1804.
8. Martin Van Buren	1782	Kinderhook, N. Y.	Abraham	Mary Hoes	Dutch	Kinderhook Acad.
9. Richard M. Johnson	1781	Bryant's Station, Ky.	Robert	Jemima Suggett	English	Transylvania.
10. John Tyler	1790	Greenway, Va.	John	Mary Armistead	English	Wm. and Mary, 1807
11. George M. Dallas	1792	Philadelphia, Pa.	Alexander J.	Arabella M. Smith	Scotch-Eng.	New Jersey, † 1810.
12. Millard Fillmore	1800	Summerhill, N. Y.	Nathaniel	Phebe Millard	English	Public School.
13. Wm. Rufus King	1786	Sampson Co., N. C.	William	Margaret Devane	Irish-Hug'n't	Univ. of N. C., 1803
14. John C. Breckinridge	1821	Lexington, Ky.	John C.	Mary C. Smith	Scotch	Centre, 1839.
15. Hannibal Hamlin	1809	Paris, Me.	Cyrus	Anna Livermore	English	Hebron Acad.
16. Andrew Johnson	1808	Raleigh, N. C.	Jacob	Mary McDonough	English	Self-taught.
17. Schuyler Colfax	1823	New York City	Schuyler	Hannah Stryker	Eng.-Dutch	Public School.
18. Henry Wilson*	1812	Farmington, N. H.	Winthrop*	Abigail Witham	Scotch-Irish	Academy.
19. William A. Wheeler	1819	Malone, N. Y.	Almon	Eliza Woodward	English	Vermont.
20. Chester A. Arthur	1830	Fairfield, Vt.	William	Malvina Stone	Scotch-Irish	Union, 1848.
21. Thomas A. Hendricks	1819	Zanesville, O.	John	Jane Thomson	Sc'h-Hug'n't	Hanover, Ind., 1841
22. Levi P. Morton	1824	Shoreham, Vt.	Daniel O.	Lucretia Parsons	English	Shoreham Acad.
23. Adlai E. Stevenson	1835	Christian Co., Ky.	John T.	Eliza Ewing	Scotch-Irish	Centre.
24. Garret A. Hobart	1844	Long Branch, N. J.	Addison W.	Sophia Vanderveer	Eng.-Hug'n't	Rutgers, 1863.
25. Theodore Roosevelt	1858	New York City	Theodore	Martha Bullock	Dutch	Harvard, 1880.
26. Charles W. Fairbanks	1852	Unionville Center, O.	Loriston M.	Mary A. Smith	English	Ohio Wesleyan, 1872
27. James S. Sherman	1855	Utica, N. Y.	Richard U.	Mary F. Sherman	English	Hamilton, 1878.
28. Thomas R. Marshall	1854	N. Manchester, Ind.	Daniel M.	Martha A. Patterson	English	Wabash, 1873.
29. Calvin Coolidge	1872	Plymouth, Vt.	John C.	Victoria J. Moor	English	Amherst, 1895.
30. Charles Gates Dawes	1865	Marietta, O.	Rufus R.	Mary Beman	English	Marietta, 1884.
31. Charles Curtis	1860	Shawnee Co., Kans.	Oran A.	Helen Pappan	Kaw Indian	Public School.

VICE PRESIDENTS OF THE UNITED STATES—TABLE II

Name	Profession	Politics	Served as Vice President		Died	Place of Burial
			Length of Time	Administration of		
1. John Adams (1, 5)	Lawyer	Fed.	7 yr., 10 mo., 4 d. (1789–1797)	Washington	1826	Unitarian Church, Quincy, Mass
2. Thomas Jefferson (1)	Lawyer	Rep.	4 yr. (1797–1801)	Adams, John	1826	Monticello, Va.
3. Aaron Burr	Lawyer	Rep.	4 yr. (1801–1805)	Jefferson	1836	Princeton, N. J.
4. George Clinton (2, 5)	Politician	Rep.	4 yr. (1805–1809)	Jefferson	1812	Congressional Cemetery, Washington, D. C.
			3 yr., 1 mo., 16 d. (1809–1812)	Madison		
5. Elbridge Gerry (2)	Politician	Rep.	1 yr., 8 mo., 19 d. (1813–1814)	Madison	1814	Congressional Cemetery, Washington, D. C.
6. Daniel D. Tompkins (5)	Lawyer	Rep.	8 yr. (1817–1825)	Monroe	1825	Minthorne Vault, St. Mark's Churchyard, New York City
7. John C. Calhoun (3, 5) (2 terms)	Lawyer	Rep.	4 yr. (1825–1829)	Adams, J. Q.	1850	St. Philip's Churchyard, Charleston, S. C.
			3 yr., 9 mo., 24 d. (1829–1832)	Jackson		
8. Martin Van Buren (1)	Lawyer	Dem.	4 yr. (1833–1837)	Jackson	1862	Kinderhook, N. Y.
9. Richard M. Johnson	Lawyer	Dem.	4 yr. (1837–1841)	Van Buren	1850	State, Frankfort, Ky.
10. John Tyler (4)	Lawyer	Dem.	1 mo. (1841)	Harrison	1862	Hollywood, Richmond, Va.
11. George M. Dallas	Lawyer	Dem.	4 yr. (1845–1849)	Polk	1864	Philadelphia, Pa.
12. Millard Fillmore (4)	Lawyer	Whig.	1 yr., 4 mo., 5 d. (1849–1850)	Taylor	1874	Forest Lawn, Buffalo, N. Y.
13. Wm. Rufus King (2)	Lawyer	Dem.	1 mo., 14 d. (1853)	Pierce	1853	Live Oak, Selma, Alabama.
14. John C. Breckinridge	Lawyer	Dem.	4 yr. (1857–1861)	Buchanan	1875	Lexington, Ky.
15. Hannibal Hamlin	Lawyer	Rep.	4 yr. (1861–1865)	Lincoln	1891	Mt. Hope, Bangor, Maine.
16. Andrew Johnson (4)	Politician	Rep.	1 mo., 11 d. (1865)	Lincoln	1875	Greenville, Tenn.
17. Schuyler Colfax	Journalist	Rep.	4 yr. (1869–1873)	Grant	1885	City, South Bend, Ind.
18. Henry Wilson* (2)	Politician	Rep.	2 yr., 8 mo., 18 d. (1873–1875)	Grant	1875	Dell Park, Natick, Mass.
19. William A. Wheeler	Lawyer	Rep.	4 yr. (1877–1881)	Hayes	1887	Morningside, Malone, N. Y.
20. Chester A. Arthur (4)	Lawyer	Rep.	6 mo., 15 d. (Mch. 4–Sept. 19, 1881)	Garfield	1886	Rural, Albany, N. Y.
21. Thomas A. Hendricks (2)	Lawyer	Dem.	8 mo., 21 d. (Mch. 4–Nov. 25, 1885)	Cleveland	1885	Crown Hill, Indianapolis, Ind.
22. Levi P. Morton	Banker	Rep.	4 yr. (1889–1893)	Harrison	1920	Rhinebeck, N. Y.
23. Adlai E. Stevenson	Lawyer	Dem.	4 yr. (1893–1897)	Cleveland	1914	City, Bloomington, Ill.
24. Garret A. Hobart (2)	Banker Lawyer	Rep.	2 yr., 8 mo., 17 d. (1897–1899)	McKinley	1899	Cedar Lawn, Paterson, N. J.
25. Theodore Roosevelt (1, 4)	Publicist	Rep.	6 mo., 10 d. (Mch. 4–Sept. 14, 1901)	McKinley	1919	Young's Memorial Cemetery Oyster Bay, N. Y.
26. Charles W. Fairbanks	Lawyer	Rep.	4 yr. (1905–1909)	Roosevelt	1918	Crown Hill, Indianapolis, Ind
27. James S. Sherman (2)	Lawyer	Rep.	3 yr., 7 mo., 26 d. (1909–1912)	Taft	1912	Forest Hill, Utica, N. Y.
28. Thomas R. Marshall (5)	Lawyer	Dem.	8 yr. (1913–1921)	Wilson	1925	Crown Hill, Indianapolis, Ind.
29. Calvin Coolidge (1, 4)	Lawyer	Rep.	2 yr., 5 mo. (1921–23)	Harding		
30. Charles Gates Dawes	Banker	Rep.	4 yr. (1925–1929)	Coolidge		
31. Charles Curtis	Lawyer	Rep		Hoover		

* Born Jeremiah Jones Colbath, son of Winthrop Colbath; changed his name to Henry Wilson. † Now Princeton.

(1) Vice presidents thus marked were later elected president (Adams, Jefferson, Van Buren, Roosevelt, Coolidge). (2) These vice presidents died while in office (Clinton, Gerry, King, Wilson, Hendricks, Hobart, Sherman). (3) Resigned from office (Calhoun). (4) Succeeded to the presidency at death of president (Tyler, Fillmore, A. Johnson, Arthur, Roosevelt, Coolidge). (5) Elected as vice president two terms (Adams, Clinton, Tompkins, Calhoun, Marshall).



AMERICAN GENERALS AND ADMIRALS

David Glasgow Farragut

Fred Funston
Photo by Harris-Ewing

George Dewey
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William Tecumseh Sherman

Ulysses Simpson Grant

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HISTORIC AMERICA. III

1 The Alamo, San Antonio, Tex. **2** Ancient Church, Pueblo of Acoma, N. M. **3** Statue of Massasoit, Plymouth, Mass. **4** Liberty Bell, Independence Hall, Phila. **5** Old North Church, Boston. **6** Alden House, Duxbury, Mass. **7** Birthplace of John Adams (*left*) and of John Quincy Adams (*right*), Quincy, Mass. **8** Old Custom House, Monterey, Cal. **9** Washington Inn, Valley Forge, Pa.

THE following section deals with topics in the history of the American people, both in regard to the nation's development at home and in regard to its relations with other peoples. Some of these topics have already received mention in the article on the history of the United States but are here treated with greater completeness than is possible in the continuous narrative. The majority of the items, however, are concise accounts of parties, events, and other phases of national life which have not received specific mention in the connected narrative of the country's history, being reserved for a more adequate treatment in special articles.

Abolitionists. The group of Northerners who, in the period from 1830 to 1850, advocated immediate emancipation of slaves without compensation to owners. William Lloyd Garrison was a leading figure in the early period of this movement. Through his militant journal, the *Liberator*, he aroused the North to the moral evil of slavery. To further their aim, Garrison and his associates organized in 1832 the New England Antislavery Society, which in 1833 was expanded into the American Antislavery Society. The purpose of the organization was to establish antislavery societies throughout the country and to spread antislavery propaganda. The society, however, in its beginnings, recognized the Constitutional limitations which prevented the Federal government from interfering with the institution of slavery so far as it existed and remained within the bounds of the particular states.

The abolitionists aroused intense antagonism both in the South and in the North, many Northerners believing that such agitation unnecessarily antagonized the South and endangered the peace and security of the Union. Abolitionist meetings were frequently broken up; Garrison was mobbed; and Lovejoy, a leading abolitionist, was killed. In 1840 the American Antislavery Society split into two factions: the more radical group, which followed Garrison in his extreme views; and the more conservative faction, which formed the Liberty party, and whose purpose was confined to bringing the national government under the control of those opposed to the extension of slavery.

Alabama Claims. A series of claims for indemnity made upon Great Britain by the United States, based upon alleged failure of Great Britain to observe certain obligations of international law. These claims arose chiefly from damages inflicted by vessels in the Confederate service, which vessels had been fitted out or built in English waters. The history of the Confederate cruiser *Alabama* is typical of the more flagrant cases. This vessel was built at Birkenhead, England, and, although the attention of the British government was repeatedly called to suspicious circumstances, "No. 290," as the ship was called, sailed July 29, 1862, without register or clearance papers. After taking on equipment in the Azores from two English vessels, she assumed the name *Alabama* and began her famous career of destruction. She is said to have destroyed 70 vessels, before being sunk by the *Kearsarge*, June 19, 1864.

The determination of the extent to which the government of Great Britain was responsible for the damage inflicted by the *Alabama* and other vessels of similar history was the most important problem of diplomacy resulting from the Civil War. By the Treaty of Washington, 1871, the *Alabama* claims were submitted to the decision of five arbitrators,—one named by England, one by the United States, and one each by the king of Italy, the emperor of Brazil, and the president of Switzerland. The arbitrators met at Geneva, December 15, 1871, and, on September 14, 1872, signed the final award. By unanimous vote, England was adjudged responsible for the depredations of the cruiser *Alabama* and, in full satisfaction of this and all other claims, was directed to pay an indemnity of $15,500,000.

Alamo, Defense of the. In the year 1835, the people of Texas, then a department of the Republic of Mexico, revolted against the Mexican government. Their ultimate purpose was annexation to the United States. In 1836, Santa Anna, with an army of several thousand, undertook to crush the revolution. For a time his campaign was successful. It was the heroic defense of the old fort of the Alamo, at San Antonio, by 183 Texans under W. B. Travis, that inspired the people to successful efforts at resistance.

The little band endured a siege of thirteen days. When all but six of the garrison had been killed, the Mexicans took the place by storm, and the survivors were shot by order of Santa Anna. The war cry of Texas became "Remember the Alamo." The revolutionary forces were largely increased by settlers from the United States, and on April 21, 1836 the Texans, under General Sam Houston, crushed the Mexican force at the battle of San Jacinto.

Alaska Boundary Commission. By a treaty between Great Britain and the United States, signed January 24, 1903, the question of the boundary between Alaska and Canada was submitted to a commission of six jurists, three to be nominated by each side. This boundary had been defined in 1825 by treaty between England and Russia. After the discovery of gold, about 1885, Canada urged that the ten marine leagues measuring the width of the strip of land running from the head of Portland canal to the head of Lynn canal should be reckoned from a line connecting headlands on the ocean. The United States maintained that this distance was to be reckoned from the actual shore line. A majority decision, rendered October 20, 1903, supported the United States contention.

Alaska Purchase. By a treaty between the United States and Russia, in 1867, the latter power surrendered all her possessions on the continent of North America, approximately the present great territory of Alaska, together with the Pribilof islands, in consideration of a payment of $7,200,000.

Albany Regency. The first well organized American political machine. A coterie of Democrats who, from 1820 to 1854, exercised a controlling influence over the politics of the State of New York, and had consequently considerable power in national politics. Their headquarters were at Albany. Chief among this regency were Martin Van Buren and W. L. Marcy.

Alien and Sedition Acts. A series of four acts passed by the Federalist party in Congress in 1798, after the publication of the "X Y Z" letters. The Alien acts (1) raised the residence period for naturalization from five to fourteen years, (2) authorized the president for two years to order out of the country any aliens he might judge dangerous, (3) authorized the president to expel from the country citizens of any nation with which the United States might be at war. The Sedition act provided penalties of fine and imprisonment for combining to oppose governmental measures and for any false, scandalous, or malicious writing against the government or its high officials, with intent to bring them into disrepute. A few prosecutions took place under this Sedition act. The chief importance of these acts is their provoking of the first assertions of the doctrine of state rights. See *Virginia and Kentucky Resolutions*.

Amana (*ăm'ä-nä*) **Society.** A religious community established in 1855 at Amana, Iowa, in which all land and factories are owned by the community, which seeks to practice some principles of communism. The chief interest of the community is the religious society, which was founded by Eberhard Gruber in Württemberg in 1714.

America. This name was first applied, with little warrant, to the continental regions of the western hemisphere by Martin Waldseemüller, a young geographer at Saint-Dié, a town in the Vosges mountains. In a Latin work, *Cosmographiæ Introductio*, which Waldseemüller edited in 1507, he used the name America in honor of Amerigo (Americus) Vespucci, whose narrative of the latter's voyages of discovery to the New World Waldseemüller had read. "Because Americus discovered it," wrote the geographer, "it ought to be called the land of Americus, or America."

America, Discovery of. According to the Norse sagas, the discovery of America should be placed to the credit of the vikings who made five expeditions to the coast between 985 and 1011, the first being that of Eric the Red, who settled in Greenland in 986, and the most famous that of Thorfinn Karlsefne, about 1007. Madoc, a Welsh prince, is said to have established a colony in the Western world in 1170. But the real discovery that opened the continent to colonization was made by Columbus in 1492.

America Act. An act passed by the British Parliament in 1775, consolidating all the previous penal acts relating to the American colonies. It declared that all American vessels were lawful prizes, and that all Americans captured in them, or elsewhere, could be forced to take service against America. Commissioners were appointed to receive the submission of the revolted colonies, but no provisions were made for the redress of grievances.

American Antislavery Society. See *Abolitionists*.

American Customs Act. An act passed by the British Parliament in 1764, levying customs duties on goods imported into the American colonies. These duties were to be levied for the benefit of England, and the proceeds thereof were to be paid into the English treasury. The assertion of this right to tax the colonies for the benefit of the mother country was a main cause of the Revolutionary War.

American Legion. An organization of World War veterans. It sponsored the creation of the United States Veterans' bureau at Washington, and a program for the establishment of government hospitals for the care of the disabled was put into effect. By 1924, approximately $2,045,000,000 had been appropriated for the purpose by the United States government. In 1921, the Legion aided 700,000 veterans then out of work to find employment. A program for the care of war orphans was placed in operation, a permanent footing being supplied by a $5,000,000 endowment raised in 1925. The Legion secured the passage of soldier-bonus laws in the Federal and a number of state legislatures. It led in preparing a code of national flag etiquette. Two years after its organization in 1919, its membership stood at 759,799, although it later fell below 700,000. For an account of its organization, see *American Legion*, page 2047.

American Party. Name adopted in 1854 by a faction of the Whigs who sought to crush the power of the foreign-born in politics, particularly through opposition to the Irish and to the Roman Catholic Church. From about 1835 there had been an organized movement aimed at keeping Roman Catholics out of public office. The early "Native American" movement, which later passed into the "Know-Nothing" movement, was occasioned by the political ascendancy of certain foreign groups in Eastern cities. The so-called American party was formed by the merging of the "Know-Nothings" with a faction of the Whigs. In 1855 the American party swept the elections in New York, Massachusetts, Rhode Island, Connecticut, and New Hampshire, and elected a number of its candidates in other states. In 1856 the party nominated Millard Fillmore for president and Andrew Jackson Donelson for vice president. These nominees were adopted by the Whig party as its candidates. Among the provisions in the platform of the American party were such declarations as the following: "Americans must rule America"; "Native-born citizens should be selected for all state, Federal, and municipal offices." A further provision of the platform was that a residence of 21 years should be required for citizenship in the United States. In 1860 the American party virtually dissolved, and the major part of its members joined the Constitutional Union party.

American Protective Association, "A. P. A." A secret organization formed in 1887. Its avowed purpose was to curb the political power of the Roman Catholic Church, to keep Catholics out of public office, and to protect the public school system from subversion by the Roman Church. The society fell into desuetude soon after its organization. It has, however, been revived in various parts of the country from time to time and has endeavored to make itself felt in local elections in some of the larger municipal centers. At times it has been also a factor of some consequence in state and national elections.

American System. The name applied to the policies advocated by the National Republicans under Clay from 1829 to 1833. Primarily, it designated the policy of a high protective tariff; but it was extended to include the establishment of a national bank and the construction of internal improvements by the Federal government, particularly the construction of national highways.

Annapolis Convention, The. A small conference which met at Annapolis, September 11, 1786, and was attended by delegates from five states, New York, New Jersey, Pennsylvania, Delaware, and Virginia. The meeting was originally suggested for discussion of matters relating to roads for commerce and to uniform duties on imports, but the members found it necessary to consider the entire subject of the weakened Confederation. As a result, they issued a call for a meeting of delegates from all the states, to be held at Philadelphia in the following May. This action brought about the Constitutional Convention of 1787.

Antifederalists. The "small states" party which opposed the adoption of the Constitution, taking their name from their opposition to the group which favored adoption. The Antifederalists became the party of state rights, and consistently opposed the expansion of the powers of the Federal government. After the adoption of the Constitution, this party merged into the Republican, or, as it was later called, the Democratic-Republican, party, under the leadership of Jefferson and Madison.

Anti-Imperialists. The political group which, after the close of the Spanish war in 1898, opposed the retention of the Philippine Islands by the United States. They maintained that holding this territory or any other, on the terms contemplated by the treaty with Spain, would be a violation of the principles and institutions of the United States. The leading figures in this group were Senator George F. Hoar of Massachusetts, Republican, and Senator Arthur P. Gorman of Maryland, Democrat. After the ratification of the treaty which provided for the acquisition of the Philippines, those who sympathized with the antiannexation view organized the Anti-Imperialist League, embracing numerous societies throughout the country, whose purpose was to secure the early recognition of Philippine independence.

Antimasonic Party. A third party which exercised considerable power in state and in national elections from 1828 to 1840. One William Morgan, a resident of Batavia, N. Y., who announced in 1826 that he was about to publish the secrets of the Masonic order, was said to have been abducted and murdered. The popular indignation over the reported outrage crystallized in 1827 into a political

organization opposed to the election of Masons to office.

In the State of New York the party polled a very strong vote in 1830, and in 1831 the movement had spread so far throughout the country that a national nominating convention was called to meet in Philadelphia,—the first meeting of its kind in the United States. The convention named an Antimasonic candidate for the presidency, but his decisive defeat in 1832 marked the end of the movement as a national party. In various states, however, the party continued to exercise a definite influence until 1840.

Anti-Nebraska Men. Whigs and Democrats who in 1854 were opposed to the repeal of the Missouri Compromise and to the extension of slavery to the territories. This group had a large part in forming the Republican party. See *Kansas-Nebraska Bill*.

Antirent Riots. Disturbances attending the movement in New York to abolish certain survivals of feudal land tenure which persisted in the 19th century on the so-called patroon estates along the Hudson river, which were owned by the Van Rensselaers and other families of Dutch origin. The tenants banded together in 1839 to resist the collection of arrears of rents and of other perquisites due the estate owners. A state of virtual rebellion existed in 1844 and 1845. For some years the tenants commanded sufficient votes to make them a force in the legislature, but their real victory was due to a decision of the court of appeals in 1852, which declared that agreements of sale entailing the feudal obligations to which the tenants objected were illegal. Settlements between the landlords and the tenants were accordingly effected, so that the titles to the land were placed on the same basis as that on which land titles elsewhere in the country rested. See *Patroons*.

Antisaloon League. A nonpartisan organization formed in 1893. The purposes of the league were to spread propaganda and to exert a united nonpartisan influence at elections within the major political parties, in order to bring about the eradication of the saloon and the ultimate suppression of the manufacture and sale of intoxicating liquor. After the enactment of prohibition laws in the states, and particularly since the adoption of the 18th amendment, the Antisaloon League has constituted itself a private committee of citizens seeking to aid the authorities in securing the proper enforcement of the prohibition laws.

Anti-Snappers. Supporters of Grover Cleveland, who in 1892 withdrew from the regular state convention of the Democratic party in New York. They held a separate convention and chose delegates to the Democratic national convention to contest the seats of the delegates from the regular state convention, all of whom were opposed to the presidency of Cleveland. See *Snappers*.

Army, The United States. The military history of the United States must take account of the development of the regular army and of the militia. In the colonies, before the Revolution, the volunteer militia gave excellent service in the Indian wars. Not infrequently, as at the defeat of Braddock, they saved the British troops from utter destruction. The minutemen of Massachusetts fought the battles of Concord and Lexington, and, as long as ammunition lasted, held the British regulars at bay on Bunker Hill. Washington, whose military training had been received in the militia of Virginia, took command of an army of the same character at Cambridge in 1775.

But, as the militia was the source of strength at the beginning of the war, it was a source of weakness later on. Washington found the militia difficult to organize into a compact fighting force, and undependable because of the short terms of enlistment and general aversion to military discipline. He urged the formation of an army directly under the authority of the Congress and with an enlistment period of several years.

The nucleus of such a force had been provided for by the Congress on June 14, 1775, when the enlistment of a corps of ten companies of riflemen for one year in the service of the United Colonies was authorized. From this act dates the history of the regular army of the United States. The Continentals were enlisted at first for two years, and later for three years. Washington found the militia effective for short campaigns when they could be assembled rapidly. Their most notable achievement was the defeat of Burgoyne in the fall of 1777. But Washington was embarrassed in long periods of operations because he found it difficult to get for the Continental service the reliable men who were willing to serve for short periods in the militia. The dispute and rivalry which then arose between regulars and militia has never ceased. The states have maintained the militia, now known as the National Guard. The regular army, under Federal control, has provided, in time of war, the nucleus of officers and the skeleton of organization.

In 1802 the Military Academy was established at West Point for the training of officers. The first national militia law was passed by Congress in 1792. It remained in force until 1903, when it was superseded by the Dick law, providing for reorganization of the National Guard. The National Defense act, which supplemented the act of 1903, went into force in 1916, just before the mobilization of the guard on the Mexican border.

In the War of 1812, neither the small force of regulars nor the much larger body of volunteers registered many notable successes. In the early Indian wars, regulars, volunteers, and militia cooperated. The Mexican war was fought by a force of about 100,000, of which approximately 30,000 were regulars, 60,000 were volunteers and rangers, and the remainder were militia. Just before the Civil War, the militia in most of the states had become ineffective. The regular army numbered but 67,000, and resort to calls for volunteers and to draft, or compulsory service, was necessary.

After the Civil War, the Indian campaigns were made the business of detachments of regulars, operating from various frontier military posts. The sudden outbreak of the Spanish war necessitated the mobilization of the National Guard. Neither the regular army nor the guard had been trained or equipped for modern warfare. The consequent wastage of time and of life served to awaken the country partially to the need of modern organization of its military resources. The organization of a special volunteer force to supplement the regulars in the Philippine campaigns was very successful. The next occasion calling for forces outside the regular establishment was the Mexican crisis of 1916. To meet this emergency, the president mobilized the National Guard.

The outbreak of war with Germany found the United States unprepared to participate effectively in extensive military operations. Through unprecedented efforts, by mobilizing of National Guard units, by volunteering, and under the Selective Service act, an army of four million was raised. Half that number of men were transported to France.

As a result of the nation's experience, the United States army now includes the following organizations: (1) the Regular Army; (2) the National Guard while in the service of the United States; (3) the Organized Reserves, including the Officers' Reserve Corps and the Enlisted Reserve Corps. The American people still maintain their historic principle of a small regular army. But recent experience has brought about much improvement in efforts to provide more adequate military and physical training for the great body of citizens who, in times of emergency, must be the nation's chief military dependence.

Bacon's Rebellion. The armed uprising in Virginia in 1676 against the arbitrary, "special

privilege" rule of Governor Berkeley. Its immediate occasion was the governor's failure to authorize protection of the plantations from Indian attacks. Nathaniel Bacon, a young planter, took matters into his own hands, raised a force, and punished the Indians. Berkeley was forced to call a new assembly, which passed several acts, known as Bacon's Laws, restoring a degree of representative government. The sudden death of Bacon robbed the movement of leadership. Berkeley took so fiendish a revenge in executions that Charles II recalled him in disgust.

Barbary War. From the 16th to the 19th century the Barbary states—Morocco, Algiers, Tunis, and Tripoli—carried on systematic piracy and levied blackmail upon the powers that wished to trade in the Mediterranean. The United States paid several millions in tribute and for ransom of prisoners. Finally, in 1815, Commodore Decatur with his fleet forced the rulers of Algiers, Tunis, and Tripoli to give up all claims to payments from the United States and to release Christian prisoners of all nationalities.

Barnburners. A name given by their opponents, the Hunkers, to the antislavery faction of the Democratic party in New York from 1844 to 1848. The name has reference to the faction's indifference to all issues but slavery, which suggested the conduct of the man who is said to have burned his barn to rid it of rats. This faction opposed James K. Polk, the party's presidential candidate in 1844, and in 1848 they nominated for president, Van Buren, who was later nominated by the Free-Soil party. The Barnburners in part joined the Free-Soil party, but many, known later as the Soft-Shell Democrats or merely the Softs, returned to the Democratic ranks. See *Hunkers*.

"Battle above the Clouds," The. Popular name given to a part of the battle of Chattanooga, November 23-24-25, 1863. While General Hooker's troops were ascending the slopes of Lookout mountain on the 24th, a heavy fog hung over them, concealing the battle from the view of troops in the valley.

Bering Sea Controversy. The question as to the right of Canadian sealers to capture seals in Bering Sea (known as pelagic sealing), after being long in dispute, was submitted to arbitration in 1892. The right to conduct land sealing on the Pribilof islands had been leased by the United States to the North American Commercial Company. Pelagic sealing by Canadians and other nationalities involved killing of females and young. This threatened extinction of the seal herd. To prevent this calamity, the United States asserted a claim to the right to control all sealing in Bering Sea. In 1893 the arbitrators decided against this claim, and declared Bering Sea to be open ocean. But, as authorized by the terms of the reference, they made the following regulations: (1) all sealing within sixty maritime miles of the Pribilof islands to be forbidden; (2) a closed time for seals to be established; (3) all sealing vessels to be licensed. These regulations proved worthless. In 1898 Americans were forbidden by law to do pelagic sealing. Finally, in 1911, the United States, Great Britain, Russia, and Japan agreed to suspend pelagic sealing for a period of fifteen years.

Bill of Rights, The. The name given to the first ten amendments to the Constitution, which restrict the power of the Federal government with respect to certain rights of the individual citizen and of the separate states. Precedent for this statement of "rights" was found in the Bill of Rights presented by the English Parliament to William and Mary in 1688. Similar bills or declarations of rights are attached to the constitutions of most of the states of the Union.

Black and Tans. About 1892–96, this name was applied to Southern Republicans who believed in giving to the Negro an equal opportunity with the whites in holding party and political office. They were opposed by the Lily-white Republicans, who favored the exclusion of the Negro from public and party affairs.

Black Hawk War. Two short campaigns in 1831-32 in Illinois. Black Hawk, chief of the Sac Indians, after his tribe had ceded their lands to the United States and moved west of the Mississippi, returned and began massacres of white settlers. He was captured in August 1832. Abraham Lincoln was a captain of militia in the campaign of 1832.

Black Republicans. Name applied by Democrats to members of the newly created Republican party during the years immediately preceding the Civil War, by reason of the new party's apparent solicitude for the interests of the Negro race. Those who thus contemptuously applied the name distinguished the new Republican party from the old Republican or Democratic-Republican party, which had been the predecessor of the Democratic party. Other appellations used of the new party were Negro Worshipers and Abolitionist Republicans.

Black Warrior Case. An incident which almost brought about a war between the United States and Spain in 1854. An American vessel was seized at Havana, Cuba, for alleged violation of customs regulations. The ship and cargo were confiscated despite the protest of the American consul. The United States demanded restoration of the property. Hostilities between the two countries, however, were avoided by the disavowal by Spain of the acts of the Havana officials and by payment of the value of the ship and its cargo to the American owners. The case acquired especial importance from its connection with attempts of filibusters to force the annexation of Cuba to the United States. The entire annexationist movement ceased at about the time of this incident.

Bloody-Shirts. A term applied after the Civil War to those Northerners who, prompted by petty political motives, persisted in denouncing Southerners as traitors to their country, and who, in political parlance, thus sought to keep alive the Southern issue by "waving the bloody shirt."

Blue Laws. Laws which seek to regulate the moral conduct of individuals in the community. Blue was the color adopted by the Scotch Covenanters in the 17th century in England, and it became also the Whig color. The term blue was applied to those who decried the licentious freedom of the Restoration period, and to Puritans in general. In New England it came to be attached to certain rigorous laws, passed at various times and in different colonies, for the regulation of religious and personal conduct. The "blue laws of Connecticut" became proverbial. The title "Blue Laws" seems to have attached to the earliest code of the colony of New Haven (about 1640). The list of 45 such laws, published in 1781, in a *History of Connecticut* by S. A. Peters, a fugitive Tory clergyman, was compiled mostly from the codes of various New England colonies. It did not represent the laws of Connecticut.

Blue Light Federalists. A name applied first to Federalists, and later to all New Englanders who were opposed to the war with England in 1812. The term originated from the charge that blue light signals had been flashed by Federalists at New London in 1813 as a warning to the British, when Commodore Decatur was trying to escape through the blockade.

Booth's Conspiracy. A conspiracy headed by John Wilkes Booth, at the end of the Civil War, having for its object the assassination of the president, the vice president, and members of the cabinet. President Lincoln was shot by Booth on April 14, 1865, and on the same date Seward, the secretary of

state, was wounded by Payne, another of the conspirators. Booth was shot while in hiding. Four of the other conspirators were hanged, the rest being sentenced to various terms of imprisonment.

Border Ruffians. The name applied in Kansas before the Civil War to the lawless element, coming largely from Missouri, which menaced the settlers from the North and attempted to prevent the establishment of a free state government.

Border States. Before the Civil War, this name was applied to the five slave states—Delaware, Maryland, Virginia, Kentucky, and Missouri—bordering on the free states.

Boston Massacre. A conflict of citizens and British soldiers in Boston on the evening of March 5, 1770, in which five persons were killed and six were injured. The affair grew out of the quartering of soldiers on the townspeople for purposes of intimidation. Blame attaches, not to the soldiers, but to the government that made the trouble possible. John Adams and Josiah Quincy volunteered as counsel for the soldiers at their trial. Two were given light punishment, the others were acquitted.

Boston Port Bill. An act passed by the British Parliament in 1774, closing the custom house and port of Boston. It was a measure of retaliation for the action of the inhabitants in preventing the importation of tea by the British East India Company. The bill failed of its purpose through the ready aid given to the city by the rest of the country.

Boston Tea Party. The American colonists had determined not to pay the tea duty imposed by Parliament. On December 16, 1773, the tea ships of the British East India Company, which were lying in Boston harbor, were boarded by a party of men disguised as Indians, who threw into the harbor the entire cargo of the three ships, 342 chests of tea, valued at about £18,000. The immediate result of this action was the passing of the Boston Port bill.

Bounty Jumping. During some periods of the Civil War, the government paid "bounties" to volunteers. Unprincipled men would enlist, go to the front and serve long enough to get the "bounty money," and then desert, afterward re-enlisting at other places under assumed names, thus getting another "bounty." Such men were called "bounty jumpers."

Braddock's Defeat. The utter rout of the combined English and colonial forces under General Edward Braddock by a small body of French and Indians near Fort Duquesne, July 9, 1755. The defeat was due to Braddock's refusal to adopt the methods of frontier warfare, with which he was unfamiliar. English losses were nearly 900 out of 1400. Washington accompanied Braddock as an aide, and he, with Virginia troops, saved the remnant of the retreating army from massacre.

Buck Stove and Range Case. A case important for its bearing on the limitations imposed by law upon the action of labor unions in industrial disputes.

In 1906 the American Federation of Labor, acting in conjunction with the striking employees of the Buck Stove and Range Company, placed on an "unfair list," which was circulated throughout the country, the names of all retailers who sold the company's stoves. The company brought action in the Federal courts to enjoin the federation from circulating the list, on the ground that such action was an unlawful attempt to interfere with the company's business. The injunction was granted on the ground that the federation's action was a "secondary boycott," that is, a boycott not of the company itself, but of those who dealt with the company. See *Danbury Hatters' Case.*

Bucktails. Nickname popularly applied to members of the Tammany Society during its early years, by reason of the buck's tail worn in the hat as a part of the costume of members of the society. The term was later indiscriminately applied to all opponents of Governor Clinton's canal project in New York, since the Tammany men constituted the most aggressive of these opponents.

Bull Moose. Nickname applied to the Progressive party in 1912, the name originating from Theodore Roosevelt's remark upon one occasion: "I feel as fit as a bull moose." The bull moose was taken up as the emblem of the party, and the party itself came to be called popularly the "Bull Moose party."

Burrites (*bûr'its*). Political followers of Aaron Burr, for the most part members of the Tammany Society of New York, who were opposed to the regular or Jeffersonian branch of the Democratic-Republican party.

Butternuts. Northerners who sympathized with the South during the Civil War. The term was suggested by the "butternut" color of the Confederate uniform.

Canadian Fisheries Question. A long-standing dispute between Canada and the United States, dating from the treaty of peace of 1783, which recognized American fishing rights off the coast of Canada. The Americans claimed that this right was inalienable; England, that it was forfeited during the second war. In 1818 a treaty was made by which the Americans were allowed to fish outside the three-mile limit, but friction as to the meaning of "three-mile limit" continued till 1871, when a treaty was signed at Washington giving the two countries reciprocal rights. Canada maintained that her fisheries were more valuable than those off the American coast. In 1877 a commission, which met at Halifax, awarded Canada and Newfoundland $5,500,000 as compensation. The United States abrogated the reciprocity treaty in 1885. The whole question was settled acceptably by an arbitration board appointed by the Hague Tribunal in 1910. This decision cleared up disputed points in the treaty of 1818 and provided a commission to decide future disputes about fishing regulations.

Cannonism. The term applied by Progressive Republicans in 1910–12 to the arbitrary methods of Joseph G. Cannon in his use of the great power of the speaker of the House of Representatives. The Progressives accused him of giving committee appointments only to members who agreed with him, thus directing legislation in the interests of a few people.

Carpetbaggers. A term of opprobrium justly applied to Northern politicians who, after the Civil War, went to the Southern states with no more baggage than a carpetbag, and, by fraud and manipulation of the votes of the newly enfranchised Negro, obtained control of several of the state governments. Through misgovernment by these carpetbaggers, some of the Southern states were run deeply into debt. The term later came to be applied to all whites who sought to enlist the aid of the colored vote in the South.

Chinese Exclusion Acts. In 1881 a treaty was concluded between the United States and China, which gave the United States power to "regulate, limit, or suspend" immigration of Chinese laborers. In 1882 Congress passed an act suspending such immigration for ten years. Similar bills have been passed at ten-year intervals,—a policy which makes the suspension virtually permanent exclusion.

Clintonians (*klĭn-tō'nĭ-ănz*). The political followers of members of the Clinton family, who, together with the Livingston and the Schuyler families, controlled the government of the State of New York from 1777 to 1827. This group formed a powerful support for the Democratic-Republican or Antifederalist party, which secured the election of Jefferson to the presidency in 1800. George Clinton

was elected vice president of the United States in 1804. His nephew, Dewitt Clinton, leading a Republican faction opposed to the Virginian domination of the party, was nominated for the presidency in 1812 and, with Federalist support, unsuccessfully opposed Madison.

Compromise of 1850. The name given to a group of bills passed by Congress in 1850. These measures were modifications of the omnibus bill proposed by Henry Clay. They contained the following provisions: (1) The admission of California as a free state; (2) the organization of Utah and New Mexico, with the question of slavery left to the people of those territories; (3) payment of $10,000,000 to Texas for her claims to portions of New Mexico; (4) prohibition of the slave trade in the District of Columbia; (5) a more drastic fugitive slave law.

Confiscation Acts. During the Civil War, two so-called Confiscation acts were passed by Congress, the first in 1861, and the second in the following year. Under the first act, all property of rebels, used in furthering the rebellion, was subjected to forfeiture or confiscation by the Federal government, the proceeds thereof to be used to support the Northern armies.

By the act of 1862, the penalty of confiscation was extended to cover all property, including slaves, of rebels and of traitors to the Union. Although the validity of the Confiscation acts was never questioned in the courts, they probably were unconstitutional as violative of article I, section IX (III), which forbids the passing of bills of attainder and of *ex post facto* laws.

Congress, Meeting Places of. The First Continental Congress met at Philadelphia in 1774, continuing in session from September 5 to October 26. The Second Continental Congress met at Philadelphia on May 10, 1775; this Congress continued as the national government until 1781. With the ratification of the Articles of Confederation in that year, it became the Congress of the Confederation. From 1775 to 1785 the Congress convened ten times in eight different places, as follows:

Philadelphia, May 10, 1775–December 12, 1776.
Baltimore, December 20, 1776–March 4, 1777.
Philadelphia, March 4, 1777–September 18, 1777.
Lancaster, Pa., September 18, 1777–September 27, 1777.
York, Pa., September 30, 1777–June 27, 1778.
Philadelphia, July 2, 1778–June 21, 1783.
Princeton, N. J., June 30, 1783–November 4, 1783.
Annapolis, Md., November 26, 1783–June 3, 1784.
Trentón, N. J., November 1, 1784–December 24, 1784.
New York, January 11, 1785–November 4, 1785.

Its later sessions in New York were held as follows:

November 7, 1785–November 3, 1786.
November 6, 1786–October 30, 1787.
November 5, 1787–October 21, 1788.

From this time until March 1789, the Confederation Congress was kept alive by the occasional attendance of a few members. The last entry in the journal, March 2, 1789, records the presence of Mr. Philip Pell, from New York.

The first Congress under the Constitution met in New York, March 30, 1789. On June 28, 1790, an act was passed which provided that, from the year 1800, the capital should be established on the Potomac river, at a point between the mouth of the East Branch and that of the Connogocheague. In the intervening ten years the Congress met in Philadelphia. The first session in Washington was opened on November 17, 1800.

Conscience Whigs. A name applied about 1850 to members of the Whig party in New England who felt so strongly upon the subject of the moral evils of slavery that they were willing to sacrifice political office and the interests of their party rather than violate the dictates of their consciences by sanctioning the extension of slavery into Federal territory. Together with the Democratic "Barnburners" of New York, the Conscience Whigs formed the nucleus of the Free-Soil party, which, with further additions, developed into the Republican party. Their opponents in the Whig party were called Cotton Whigs.

Constitutional Union Party. Remnant of the old Whig party, composed largely of Southerners who favored conciliation upon the slavery issue. In 1860 this party nominated an independent national ticket headed by John Bell of Tennessee and by Edward Everett of Massachusetts, upon a colorless, evasive platform of adherence to "the Constitution and the Union" and enforcement of the laws.

Conway Cabal. A petty intrigue against Washington in the year 1777-78. It was headed by General Horatio Gates, Charles Lee, Thomas Mifflin, James Lovell, and Thomas Conway. Their object was to put Gates in Washington's place. They succeeded in having Gates made president of the board of war in November 1777. But his first acts were so inefficient and puerile that he was soon removed, and the cabal broke up.

Copperheads. A term of opprobrium applied by Northerners during the Civil War to fellow Northerners who sympathized with the Southern Confederacy and were suspected of secretly aiding the South. The allusion suggested in the name was to the venomous copperhead snake, which strikes without warning. Some of the partisans of the peace policy wore badges of heads cut from copper cents.

Cotton Whigs. "Old-line" Whigs who preferred to have their party side-step the question of slavery rather than to endanger the integrity of their party and of the Union. They were accused of failing to take a stand in opposition to slavery because of their personal interest in fostering the cotton trade. See *Conscience Whigs*.

Countervailing Legislation. The series of acts passed by Congress at the close of the War of 1812, discriminating against British shipping and commerce in retaliation for the injuries inflicted upon American shipping by the British navigation acts.

Credit Mobilier (*mô-bēl'yēr*). The "inside" construction company formed in 1867 by a group of the leading stockholders of the Union Pacific Railroad Company. The latter company had received from the United States government, in land grants and loans, far more than the cost of the railroad to be built from Omaha to California. The Credit Mobilier was used by the manipulators of the Union Pacific to construct the road at an excessive cost. In this way, both the railroad and the government were defrauded. The participation of congressmen and government officials in the profits of this scheme was the occasion of one of the greatest scandals in American political history.

Crime of '73. The characterization given by the free silver advocates to the demonetization of silver by Congress in 1873. It was alleged that the provision in the act of 1873, which omitted silver from the freely coined metals, was passed surreptitiously and with the design of injuring the farmer and debtor classes of the West and of the South. In fact, no silver had been brought to the mint for coinage for more than twenty years before the act was passed, because, during that period, silver, in relation to gold, was more highly valued for industrial purposes than for coinage at the mint. In providing that silver should no longer be freely coined, therefore, Congress was merely repealing a provision which had been a dead letter for many years. See *Free Silver Movement*.

Custer's Last Fight. The battle of the Little Big Horn, June 25, 1876. General George A. Custer, in command of a cavalry regiment of 600 men, had

been sent in advance of the main body of United States troops in pursuit of Sitting Bull and his band. In the belief that he was attacking only a part of the Indian force, Custer divided his regiment and, with 260 men, attacked the Indian center. Instead of encountering 1000 Indians he found himself surrounded by 5000. The general and every man in his troop were killed. One Indian scout attached to the force is said to have escaped. The field is marked by marble monuments, each placed where a man fell.

Danbury Hatters' Case. The popular name of a case which established the illegality of attempts on the part of labor organizations to destroy the interstate business of a nonunion manufacturer.

The United Hat Makers' Union, supported by the American Federation of Labor, declared a boycott of the products of a firm of hat manufacturers in Danbury, Connecticut, who insisted on maintaining an open shop. The action of the union was declared by the supreme court in 1908 to be a violation of the Sherman Antitrust act. The effect of this decision stood, even after the passage of the Clayton act in 1914, which declared that, if workmen entered into combinations to further their interests by lawful means, such combinations should not be regarded as unlawful.

Dark Horse. One who has not been prominently in the public eye as a candidate, but who is brought forward at the psychological moment as a compromise candidate when a nominating convention has reached a deadlock. Often a so-called "dark horse" is in fact the candidate who has been the favorite of the party manager from the beginning, but for strategic purposes has been held in reserve. Presidents Polk, Pierce, Hayes, Garfield, and Harding were all "dark horse" candidates.

Dartmouth College Case. A celebrated case, in regard to which the supreme court in 1819 handed down a decision, declaring that charters given to private corporations were contracts and, as such, inviolable. The decision also demonstrated for the first time the method by which the sovereignty of the individual states could, through the action of the supreme court, be limited by the Federal Constitution.

The legislature of New Hampshire had attempted to take the control of Dartmouth college out of the hands of the trustees chosen according to its charter and to intrust the college to other trustees chosen by the legislature. The original trustees brought suit against the officers of the new board of trustees, who had obtained possession of the college property. The case for the regularly appointed trustees was argued by Daniel Webster before the supreme court, which decided for the inviolability of the charter. Since this decision, it has been the custom for the states, in granting charters, to insert clauses reserving to the legislature the right of amendment.

Democratic-Republican Party. The name given to the party, at first called Republican, founded by Thomas Jefferson soon after the adoption of the Federal Constitution. The party inherited from the Antifederalists their opposition to a strong centralized government and set its face against the broad-constructionist and nationalist tendencies of Hamilton. Its members sympathized strongly with the French revolutionists and, like them, glorified the rights of man.

The party succeeded in having Jefferson elected to the presidency in 1800. It continued to hold power until 1828, but departed so far from the principles of its founders that after 1816 there was no longer any apparent difference between its position and that of its former opponents, the Federalists, who had long ceased to exist as a separate group. In 1828 the Democratic-Republicans split into two parts: one, under the leadership of Andrew Jackson, called the Democratic party; the other, under the leadership of Clay, which took the appellation of National Republicans. The Democratic party has continued until the present day, but the National Republican party dissolved after the defeat of its ticket in 1832. This Republican party must not be confused with the Republican party which was formed in 1854 on quite different issues and which has continued until the present time.

Deseret (*dĕz'ĕr-ĕt*), **The State of.** The name is from the *Book of Mormon* and means "land of the honeybee." A convention of Mormons in 1849 organized an independent state with this name. Congress refused them recognition and in 1850 organized the territory under the name of Utah.

Donkey, Democratic. Popular symbol of the Democratic party. It was originated by Thomas Nast in a celebrated cartoon published January 15, 1870.

Dorr's Rebellion. An insurrection in Rhode Island, headed by Thomas W. Dorr, 1841-42, having for its object the extension of the suffrage, which, according to the charter of 1663, was restricted to holders of real estate and to their eldest sons. Dorr, chosen governor by an irregular election, seized the statehouse at Providence. His forces, however, were dispersed, and he himself was tried for treason and sentenced to life imprisonment. In 1845 he was released. The movement resulted in the adoption, in 1842, of a constitution providing for extended suffrage.

Doughfaces. A name used by John Randolph in 1820 in reference to the Northerners in Congress who voted with the South on the Missouri Compromise. It was taken up and applied by abolitionists to Northerners with Southern sympathies during the decades preceding the Civil War.

Draft Riots. An outbreak in New York City in 1863, occasioned by resistance to the drafting of New Yorkers into the Union army. The mob held possession of the city for four days, the absence of the militia at the front having left only the police available for the protection of the city. It is estimated that more than 1000 persons were killed, and that damage to the extent of $1,500,000 was done during the riots.

Dred Scott Case. A case of notable importance in American history, decided in 1857 by the supreme court of the United States. Dred Scott, a negro, claimed that, having lived with his owner in a free state, he could not legally be sold back into slavery on his master's death. The action was first brought in the state circuit court of St. Louis county, Missouri, and was later carried to the supreme court. The supreme court decided against Scott, and it was further laid down that he had no standing before the court, as no person who had been a slave, or was the descendant of a slave, could claim rights of citizenship. After the decision, Scott, having been transferred to a new owner, was freed. The utterances of the court with respect to these points were received in the North as challenges from the slave power, and they did much to hasten the crisis of war.

Drys. A name popularly applied to members of the Prohibition party, and later to persons of any political affiliation who advocated the prohibition or restriction of the manufacture and the sale of intoxicating liquor.

El Caney (*ĕl kä-nā'*). A small town located four miles northeast of Santiago de Cuba. It was made famous during the Spanish American war. On July 1, 1898, a force of about 4500 Americans fought a sharp battle here with a force of about 525 Spaniards. The American troops were commanded by General Lawton, while the Spaniards were under the command of General Vara del Rey. The Spanish force was thoroughly intrenched and desperately resisted the attacks of the Americans. The battle

was finally won by the American force, the casualties amounting to more than 400 on each side. The battlefield is now a public reservation owned by the United States.

Elephant, Republican. Symbol of the Republican party, originated by Thomas Nast in a cartoon published November 7, 1874.

Emancipation Proclamation. A first proclamation was issued by President Lincoln on September 22, 1862, announcing that on the first of the following January "all persons held as slaves within any state or designated part of a state the people whereof shall then be in rebellion against the United States, shall be then, thenceforward, and forever free"; and that on that day he would, by proclamation, "designate the states and parts of states, if any, in which the people thereof" should be in "rebellion against the United States." The final emancipation proclamation was issued January 1, 1863.

Embargo Act. An act of Congress, passed December 22, 1807, forbidding any ship to sail with cargo from an American port to any foreign port. It was a reply to the English orders in council and to the Napoleonic decrees, which made lawful prizes of American ships on the high seas. These threatened to destroy American commerce. The embargo, however, served only to bring distress at home. The act was replaced in 1809 by a Non-intercourse act applying only to France and England.

Equal Rights Party. A faction which arose within the Democratic party of New York in 1835. This group opposed the granting of special privileges and exemptions to state banks and to other corporations, in many of which the regular or Tammany leaders of the Democratic party were personally interested. The Equal Rights men were also called "Locofocos." See *Locofocos.*

Era of Good Feeling. The period of Monroe's administration (1816–24), during which there was a truce between Republicans and Federalists. The latter party's doctrines had been adopted in large part by the Republicans (Democratic-Republicans).

Faneuil (*făn"l*) **Hall.** The famous market house and hall in Boston, built and given to the city in 1742 by Peter Faneuil. During the Revolutionary period it was the meeting place of the patriots and came to be called "the cradle of American liberty." In 1805 the hall was enlarged to a capacity of 3000 people. Here the great speakers of the country have been heard, from the days of Webster and Wendell Phillips to our own time.

Farmers' Alliance. A national organization for the bettering of agricultural conditions through social and legislative activity. The first state organization of societies out of which the alliance grew is credited to Texas in 1876. Similar organizations were developing about the same time in the Southern, Western, and Central states. The earlier activity of these alliances was chiefly nonpolitical. In 1887, however, the National Farmers' Alliance was formed, and its energies were directed into political channels, its chief strength being in Kansas and Nebraska. An agreement with the Knights of Labor in 1889 resulted in the formation of the National Farmers' Alliance and Industrial Union. The political phases of this movement were soon transferred to the Populist party. The Farmers' Alliance ceased to be political, but has survived as an agricultural organization. It joined in the Farmers' National Congress of 1914, as a body of about three million farmers.

Federalists. The party of Alexander Hamilton and John Marshall, which favored the creation of a strong national government and urged the adoption of the Federal Constitution. The party drew its supporters from the commercial classes, who looked for a strong government to afford greater security to person and property than the discarded Confederation had supplied, and from other farsighted, patriotic groups, who desired a government that would command international respect and fair treatment. The strength of the party lay mainly in the large states—Massachusetts, New York, Pennsylvania, and, for a time, Virginia. The smaller states feared that they would be eclipsed by the overwhelming influence of the large states in the new Union.

The Federalists were in control of the national government for 12 years—from 1789 to 1801. The death of Alexander Hamilton in 1804 robbed the party of its only great political leader, and its disintegration speedily set in. The Democratic-Republicans, however, during a supremacy which lasted for the next two decades, appropriated the main Federalist principles. The supreme court, too, under the influence of Chief Justice Marshall, continued, until his death in 1835, to exert a dominant nationalist influence in keeping with the principles that had been upheld by the Federalist party. Thus the Federalists, by means of their influence both in the legislature and in the judiciary, impressed themselves deeply on the early history of the country and determined the direction of its subsequent development toward a strongly centralized Federal government.

Federal Republicans. A name applied at different times to two different groups: (1) the followers of George Clinton in New York, who, in 1787, organized to oppose the adoption of the Constitution; (2) the supporters of President Monroe who had formerly been Federalists.

Fiat (*fī'ăt*) **Money Party.** Another name for the Independent National or Greenback party organized in 1874. See *Free Silver Movement, Greenbackism, Greenback Party.*

Fifty-Four Forty or Fight. Slogan of those Americans who from 1842 to 1846 demanded that the boundary line between American and British territory in the Northwest be established at 54° 40′. This was the southern boundary of Alaska, agreed to by Russia and by the United States in 1824. The line between Canada and the United States was in fact established by arbitration at the 49th parallel to a point in the Strait of Georgia, thence through the Haro canal and the Juan de Fuca strait to the Pacific.

Finality (*fī-năl'ĭ-tĭ*) **Men.** A term applied by abolitionists to those Northerners who, in the decade before the Civil War, sought to avert the pending danger to the Union by a "conspiracy of silence" upon the question of slavery. The group received the name in allusion to its contention that the Compromise of 1850 constituted a final solution of the slavery question.

Fire Eaters. The extreme supporters of slavery and of state rights in the South were so called by their political opponents before the Civil War.

Five Nations, The. The five tribes of Indians who formerly ranged the east coast of America, along the Hudson, and as far south as the Delaware. They were always on the English side in the wars with France. The designation included the Mohawks, Oneidas, Onondagas, Cayugas, and Senecas. See *Six Nations.*

Force Bill. The popular name given to several acts of Congress applying to the South: (1) a bill of March 2, 1833, to enforce the tariff law which had been challenged by nullification acts in South Carolina; (2) acts passed in 1870 and 1871 authorizing the president to use troops to protect election places in the South; (3) the Lodge Election bill providing for efficient enforcement of United States election laws, passed by the House July 2, 1890, but defeated in the Senate.

Fort Duquesne (*dōō-kān'*). A colonial fort on the present site of Pittsburgh, at the junction of the Allegheny and Monongahela rivers. The work was begun in 1754 by a party of Virginians sent out by Governor Dinwiddie. They were driven away by French and Indians before completing the fort. It was then finished by the French and named *Du Quesne*. After being burned by the French in 1758, it was rebuilt by the English and named Fort Pitt. Only a blockhouse now remains, preserved by the Daughters of the American Revolution.

Fort Niagara. A masonry fort built by the French governor Vandreuil in 1725-27 at the mouth of the Niagara river, on the American side. Fort Niagara was the most important French military station and trading post on the Great Lakes. The English leader Sir William Johnson captured it in 1759 and there negotiated treaties with numerous Indian tribes. The Wyoming and Cherry Valley expeditions set out from this fort during the Revolutionary War. The British relinquished it to the United States by the Treaty of 1783, but actual evacuation was delayed until 1796. Canadian forces held it in the War of 1812 from December 19, 1813, until March 27, 1815. Through the activities of a patriotic association, the fort was restored in 1928 in its original form from plans preserved in archives at Paris, France.

Fort Sumter. A brick-walled fortification built on a shoal in the narrowest part of the harbor of Charleston, South Carolina. When that state seceded, December 20, 1860, this fort was in process of completion. Guns were being mounted, but no garrison had been assigned to it. On December 26, 1860, Major Anderson, expecting an attack, transferred his 75 men from Fort Moultrie to Fort Sumter. On April 12, 1861, the attack came in a bombardment from the other harbor batteries; on the 14th, Anderson and his little garrison, whose supplies were exhausted, evacuated the place. Not a man had been killed on either side during this engagement, which opened the Civil War.

Freeport Doctrine. Called also "Freeport heresy." The proposal, advocated by Stephen A. Douglas in his debate with Lincoln at Freeport, Ill., in 1858, was that any territory had the right to stamp out slavery by "unfriendly" police laws. It was suggested that this policy would in time do away with the institution of slavery.

Free Silver Movement. An agitation for the free minting of silver with a fixed valuation of sixteen ounces of silver for one of gold. The effect aimed at was a rise in prices of agricultural products and a consequent increase in the ability of farmers in the South and the West to pay off mortgages given when land prices were higher. The movement was supported also by all those interested in the mining of silver in the United States.

The Bland-Allison act of 1878 provided for the coinage of silver dollars in a limited amount, and in 1890 by the Sherman act the purchases of silver were increased and treasury certificates were issued against the silver acquired. In 1893, however, the further purchase of silver was stopped. In 1900, by the Gold Standard act, an adequate reserve of gold was insured to redeem outstanding notes, and thus the coinage of the country was established on a gold basis. The agitation died down as a result of an increase in general prosperity and of a rise in prices occasioned by the greater production of gold.

In the earlier stages of the free silver movement its supporters were not confined to any one party, but in 1891 the Populist party was organized mainly for the purpose of furthering the policy. In 1896 and in 1900 the Democratic party espoused the cause and were joined by the Populists in the support of their presidential candidate, William J. Bryan. He attained to national prominence as the champion of free silver. He was defeated, however, in both elections, and with the passage of the Gold Standard act in 1900 the movement ceased to be a political issue.

Free-Soil Party. A party organized in 1840 by the amalgamation of the Liberty party with Antislavery or Conscience Whigs of New England and Antislavery Democrats, or Barnburners, of New York, upon a platform of opposition to the extension of slavery. By nominating Van Buren, an old-line Democrat, for president in 1848, the new party lost the support of many Antislavery Whigs who otherwise would have joined its ranks. By 1856 the Free-Soil party had practically disintegrated, and the remnant of the party was ready to join with the now swelling number of Antislavery Whigs and Antislavery Democrats of the North, to form the new Republican party, which represented the principles for which the Free-Soilers had stood.

Fries's (*frēs'ĕz*) **Rebellion.** An uprising in Pennsylvania, led by a man named Fries. It was a protest against the tax placed by the Federal government, in July 1798, on slaves and real estate. It was sometimes called the "Window Tax War" because houses were assessed according to the size and number of their windows. President Adams called out troops to suppress the rioters, who, at Bethlehem, had forced a United States marshal to release prisoners. Fries and other leaders were captured. In 1800 President Adams proclaimed an amnesty for all who had participated in the "rebelion."

Fugitive Slave Laws. The fugitive slave law of 1793, amended in 1818, failed to accomplish its purpose because its enforcement was left to the states. Free states refused to carry out the provisions of the law. In the Compromise of 1850 a new law was included, which made it the duty of Federal officers to capture and to return to their owners all fugitive slaves. The slave was denied jury trial, and a citizen who refused to aid an officer was declared guilty of treason. Attempts to enforce the provisions of this act served to arouse more intense opposition in the free states, and its repeal was demanded by the Republican party. The law, which had thus become a leading immediate cause of the Civil War, was repealed in 1864.

Full Dinner Pail. Campaign slogan adopted by the Republican party in 1900 and used occasionally in national campaigns since that time. It symbolized the promise of employment and a fair wage for the laborer, and the outlook of industrial prosperity for the country under a Republican administration.

Gadsden Purchase. The United States purchased from Mexico, for $10,000,000, about 45,000 square miles now forming the southern part of Arizona and New Mexico. This was known as the Gadsden Purchase. It was negotiated by James Gadsden while he was United States minister to Mexico in 1853. This transaction gained immediate importance from the fact that the treaty accompanying it settled questions of boundary and Mexican damage claims, which grew out of the provisions of the Treaty of Guadalupe Hidalgo (1848).

Gag Rules. The name applied to the series of rules adopted by the House of Representatives during the period from 1836 to 1844 to prevent reception of antislavery petitions. John Quincy Adams fought this policy as a violation of the Constitution and finally won his long battle in 1844.

Geneva Award. The decision of the board of five arbitrators appointed by the United States, Great Britain, Italy, Switzerland, and Brazil, in the matter of the Alabama claims. This tribunal met in Geneva, December 15, 1871. In the final award, signed September 14, 1872, allowance was made for an indemnity of $15,500,000, to be paid by Great Britain to the United States. This decision greatly strengthened the principle of arbitration as a means of settling serious international differences. See *Alabama Claims*.

Goldbugs. A nickname applied by the Free Silver partisans in the campaign of 1896 to Democrats and Republicans who favored the single gold monetary standard. See *Free Silver Movement, Populist Party.*

Gold Democrats. "Sound money" Democrats, largely from the Eastern states, who were opposed to the free coinage of silver, and who bolted the regular Democratic national convention in 1896, when William J. Bryan was nominated on a free silver platform. Under the name of the National Democratic party, the Gold Democrats nominated a national ticket of their own, with John M. Palmer for president and Simon Buckner for vice president. The party disappeared upon the passage of the Gold Standard act in 1900.

Grandfather Clauses, The. This name is popularly applied to certain clauses written into the constitutions of some Southern states, providing that certain educational tests for voters shall not apply to white persons whose fathers or grandfathers were voters before the year 1867. The effect of the literacy tests is to decrease the colored vote, while the "grandfather clause" prevents a corresponding decrease of the white vote.

Grand Old Party. Characterization given by Republican campaign orators to the Republican party in 1880. The Democrats derisively abbreviated it to "G. O. P.," in which form it has been given general currency.

Grangers. See *Patrons of Husbandry.*

Greenbackism. A term applied to the doctrine of those who, in the decades following the Civil War, opposed the deflation of the large and unredeemable paper issues of government notes (greenbacks) and advocated the further inflation of the currency. The amount of the notes issued had reached the total of half a billion dollars, but was subsequently considerably reduced. The supporters of the doctrine organized the Independent National or Greenback party in 1874 and, in 1878, succeeded in having a law passed in Congress, which provided that the amount of government notes should not be reduced beyond the point which it had reached at that time. The amount of outstanding government notes stood then at $346,681,016, and, through the renewal of worn-out notes, has remained at the same figure to the present time (1923). The notes were made redeemable in gold in 1879. See *Greenback Party.*

Greenback Labor Party. The name of the party formed in 1878 by the merging of the Greenback party with certain labor groups, who had much in common with the Greenback party, particularly a belief in the desirability of an inflated currency. In 1880 the Greenback Labor party nominated James B. Weaver for president, and in 1884 it nominated Benjamin F. Butler. The party disintegrated soon thereafter, and many of its members joined the Populist party, which was organized in 1891.

Greenback Party. The popular name of the Independent National party, which held its first national convention at Indianapolis in 1874. In 1876 it nominated Peter Cooper for the presidency. The party opposed further retirement of the greenback or paper money issue, which had been authorized during the Civil War but was not redeemable in gold. Hoping thereby to increase the price of farm products, they even advocated the further inflation of the currency. In 1878 the party incorporated with itself certain labor groups and took the name of the Greenback Labor party. See *Greenbackism.*

Green Mountain Boys. An organized band of settlers in Vermont, formed in 1773 to resist the encroachments of the New Yorkers, who claimed Vermont as part of the colony of New York under the charter of Charles II. At the head of a regiment of Green Mountain Boys, Ethan Allen made his famous and effective demand for the surrender of Fort Ticonderoga "in the name of the Great Jehovah and the Continental Congress," May 10, 1775.

Half-Breeds. The name applied in 1877 to President Hayes and those Republicans who supported him in his policy of withdrawing troops from the South, thus permitting Democratic officials to take office. The suggestion in the epithet was that the followers of the president were not "full-blooded" Republicans. The term was applied later (1880) to the New York Republicans who failed to support Senator Conkling.

Halifax Fishery Commission. A commission appointed in 1877 to assess the compensation to be awarded to the British-American colonies, in return for the recognition of American fishing rights in colonial waters. Canada was awarded $4,500,000 and Newfoundland $1,000,000. See *Canadian Fisheries Question.*

Hampton Roads Conference. A conference held on February 3, 1865, on board the ship *River Queen* in Hampton Roads, between President Lincoln and representatives of the Confederacy, with the object of bringing about a suspension of hostilities. The conference was barren of results.

Hard-Shell Democrats. See *Hunkers.*

Hartford Convention. A secret convention of prominent members of the peace party in New England, who, in 1814, objected to the energetic prosecution of the war with England. The chief proposals of those who took part in the convention involved such amendment of the Constitution as would diminish the control of Congress over questions of peace and war.

Hay-Herran Canal Treaty. A treaty between the United States and Colombia, signed January 22, 1903. By this treaty, the United States was to secure a strip of territory six miles wide along the route of the canal, against a payment to Colombia of $10,000,000 and an annual subsidy. This was granted on a lease for a hundred years, renewable at the option of the United States. Colombia failed to ratify the treaty, and within a few months the independent Republic of Panama was set up.

Hearst Party. A name popularly used to designate sometimes the Independence League, organized in New York by William Randolph Hearst in 1905 and extended to Boston, Chicago, and San Francisco, where Mr. Hearst owned influential newspapers. The term was more commonly applied, however, to the national Independence party organized by Mr. Hearst in 1908. See *Independence League.*

"Higher Law," Seward's. A speech delivered by William H. Seward during the debates on the Compromise of 1850 is referred to as Seward's "higher law" speech. He used the following words: "The Constitution devotes the domain to union, to justice, to defense, to welfare, and to liberty. But there is a higher law than the Constitution, which regulates our authority over the domain, and devotes it to the same noble purpose." The South interpreted this to mean that the Constitution, which recognized slavery as existing, was set aside by this "higher law."

Homestead Act. The first of a series of acts and amendments, which make up the national homestead law, was passed by Congress in 1862. This act provided that a tract not exceeding 160 acres of unappropriated portions of the public domain should be given to any head of a family who would live on the tract for five years and improve it. The provisions of the law extend also to any person 21 years of age, who is a citizen of the United States or has filed declaration of his intention to become a citizen. Within ten years, 28 million acres were "homesteaded" under this act. Later

enactments have modified the details of the Homestead act, but the original policy remains unchanged.

Hunkers. A contemptuous name of uncertain origin applied by the Barnburners to the proslavery section of the Democratic party in New York from 1844 to 1848. They supported the party's presidential candidate, James K. Polk, in 1844, and after his election they received most of the offices. After 1848 this section of the party was called the Hard-Shell Democrats or merely the Hards. See *Barnburners.*

Icarian (ī-kā′rĭ-ăn) **Community.** A communistic society founded by Cabet, a Frenchman, in 1849, after the plan set forth in his novel *Voyage en Icarie.* The community was first established in Texas, but later migrated to Nauvoo, Illinois. Cabet himself was expelled from the community in 1856, and soon thereafter the society moved to Iowa, where it continued to exist until about 1895. In 1881, some of the members of the society went to California and there established the Icaria Speranza, a co-operative business association.

Impeachment of President Johnson. As a result of his long quarrel with Congress, the House of Representatives presented articles of impeachment against President Johnson in 1868. The special charge voted upon in the Senate was that the president had tried to remove Secretary Stanton, contrary to the Tenure of Office act passed by Congress over the president's veto. The impeachment failed for lack of one vote to make the two-thirds necessary to convict.

Impressment and Search. Impressment was forcible recruiting for the English navy. Search was the right, claimed by England after the Revolution, to stop American ships and search their crews for English deserters or English citizens liable to naval service. Frequently, Americans were thus impressed along with the real deserters. This practice was one of the occasions of the War of 1812.

Independence League. A political organization initiated by William Randolph Hearst in 1905 in New York City. It extended also for a brief period to Boston, Chicago, and San Francisco. Out of it grew the national Independence party, sometimes called the Hearst party, which held a national convention at Chicago in 1908. Its program called for government ownership of public utilities, for the institution of the referendum and the recall, and for other radical reforms having a popular appeal. The party did not survive the election in 1908, but the league continued its activity in New York during 1909 and 1910.

Independent National Party. An official name adopted by the Greenback party in 1876, when it placed in the field an independent national ticket, headed by Peter Cooper for president. See *Greenback Party.*

Insurgents. Progressive Republicans in the Senate and the House of Representatives who, during the second administration of Roosevelt and the administration of Taft, rebelled against the methods of Speaker Cannon and the control of legislation by conservative Republican leaders in the House and in the Senate. They sought to secure the enactment of progressive measures looking to the more effective government regulation of railways and "big business." In the House the insurgent movement was directed particularly against the powers which, under the rules of that body, had come to be lodged in the speaker; and, in 1910, with the aid of the Democratic members, the House insurgents were successful in bringing about a drastic change in the rules, depriving the speaker of many of the powers which he had previously exercised. Most of the insurgents came from the Middle West, and many of them followed Roosevelt, who had always been in close sympathy with their liberal tendencies, into the Progressive party.

Interstate Commerce Commission, The. A board of five members, created by Congress in 1887 to regulate railway traffic between states. The commission was expected to correct, through its powers of investigation and control, the abuses that had grown up in railroad business. But, by court decisions and new combinations of roads into great systems, its effective power was rapidly taken away. The Hepburn act of 1906 increased the number of members to seven, and gave the commission power to fix "just and reasonable rates." In 1908 Congress added new powers and created the commerce court to hear appeals from the commission. By the Mann-Elkins act of 1910, the authority of the commission was extended over telephone and telegraph companies. Further powers were given to the commission in 1912 and 1913. By the act of the latter year, it was directed to undertake a valuation of railroads. The Transportation act of 1920 made important changes in the scope and methods of the commission's work, especially in regard to the determination of rates for both interstate and intrastate commerce.

Intolerable Acts. A name often applied to four (sometimes five) acts of Parliament, passed in 1774, in retaliation for the destruction of tea in Boston harbor, December 1773: (1) The Boston Port bill, which closed the port of Boston; (2) the Regulating act, which virtually abolished the charter of Massachusetts; (3) the Quebec act, extending the boundary of Quebec to the Ohio river; (4) an act providing that officers or soldiers accused of murder should be tried in England or in some colony other than that in which the murder had been committed; (5, sometimes included) an act compelling citizens to supply with shelter, wood, drink, bedding, soap, and candles, the soldiers quartered among them. See *Boston Port Bill, Boston Tea Party, Quebec Act.*

Ironclad Oath. The oath established by Congress in 1862 for Federal officeholders. It was designed to exclude from office any possible enemy of the Union, and received its name because of its very stringent character. After the close of the war, this oath was required of officeholders in the "reconstructed" states. The act establishing it was repealed in 1871.

Jacksonian Democracy. A term applied to an ideal of popular government to which Andrew Jackson gave expression and which he applied during his presidential term. To its hostility toward aristocracy of all kinds the ideal adds a belief in the capability of the common people to rule by direct participation in government.

The election of Jackson in 1828 was regarded as a triumph for this democratic ideal. It had become politically effective for the first time, through the strong sentiment of equality prevalent in the pioneer communities of the South and the West, and by reason of the general extension of the suffrage in the East, whereby citizens who did not own property were given a direct voice in government.

Jackson Men. Supporters of Andrew Jackson for the presidency during the so-called period of "personal politics" in the United States, from 1822 to 1828. During this period there was but one recognized national political party—the Democratic-Republican party—and such political divisions as existed were based merely upon adherence to one national leader or another. Thus the followers of Clay during this period were called "Clay Men," and the followers of Adams and Calhoun were called "Adams Men" and "Calhounites" respectively.

Jeffersonian Democracy. A term applied to an ideal of popular government advocated by Jefferson. The ideal was based upon faith in the political wisdom of the common people, who could be relied upon to choose those of ability to rule for them. Jeffersonian democracy differs from Jacksonian democracy in that it recognized a natural aristocracy of ability, whereas Jacksonian democracy

emphasized the right of the common people to participate directly in government.

With Jeffersonian democracy was associated an advocacy of a broad sovereignty for the individual states and of a restricted province for the Federal government.

Jeffersonian Republican. A term used to designate the member of the Republican or Democratic-Republican party founded by Thomas Jefferson in the last decade of the 18th century. See *Democratic-Republican Party.*

John Brown's Raid. The seizing of the U. S. arsenal at Harpers Ferry, Va., by John Brown and a company of 22 men, October 16, 1859. The purpose of the raid was to start a slave insurrection. But the slaves did not respond. Brown was captured by U. S. Marines under Colonel Robert E. Lee. He was tried in a Virginia court, convicted of murder and treason, and hanged. Although Brown's whole enterprise was madly fanatical and utterly failed of its immediate aim, yet it did serve his ultimate purpose of furthering the fight against slavery.

Kansas Border Warfare. The armed conflict between slavery and free state settlers in Kansas in 1856. The Kansas-Nebraska bill put into the hands of the settlers the decision as to slavery in the territory. Immigrants poured into the country from both North and South. Rival governments were set up. Elections for the proslavery government were fraudulently carried by raiders from Missouri. In the murder and open warfare that followed, about 200 lives were lost. President Pierce supported the proslavery legislature and broke up the free state government, July 4, 1856.

Kansas-Nebraska Bill. An act of Congress, May 30, 1854, by which Kansas and Nebraska were admitted to the Union as territories. This act was a breach of the Missouri Compromise, as it left to each of the new territories the settlement of the question of slavery within its borders.

Kearneyism (*kär'nĭ-ĭz'm*). The anticapital and anti-Chinese movement started in San Francisco in 1877 by Denis Kearney, the "sand-lot orator." A convention, controlled by Kearney, adopted a new state constitution embodying his principles. But within a year his influence waned as rapidly as it had risen.

King Philip's War. The name given to the series of battles and Indian massacres in New England in 1675-76. The conflict was precipitated by the slaying of an Indian interpreter who had revealed to the Plymouth authorities a plot to exterminate the white settlers. The Indians who, at the instance of King Philip, a son of the great sachem, Massasoit, killed the informer were executed. This action provoked Indian retaliations, which grew into a terrible series of atrocities. The war ended with the killing of King Philip at Bristol, August 12, 1676.

Kitchen Cabinet. The name given by their political opponents to the unofficial advisers of President Andrew Jackson, 1829–37. Among these men, whose influence with the president was believed to be greater than that of his official advisers in the cabinet, were Amos Kendall, Isaac Hill, and General Duff Green.

Knights of Labor. A society for organizing, educating, and directing the power of the industrial masses. It was founded in 1869 at Philadelphia by Uriah S. Stevens, and by 1886 it had grown to a membership of 300,000. Then dissension arose, resulting in the formation of the American Federation of Labor. The society has now fewer than 100,000 members.

Knights of the Golden Circle. A secret political order organized shortly before the Civil War. It was composed of Northerners with proslavery sentiments. It was suspected during the war of secretly aiding, and of negotiating with, the Confederacy. In 1863 the order was dissolved, and its members reorganized, first as the order of American Knights, and later as the Sons of Liberty. At the close of the war a number of the leaders of the order were convicted of treason for their part in the Northwest conspiracy, an attempt to disrupt the North by organizing a confederacy in the Northwest.

Its name has reference to a slaveholding empire which the order hoped to set up, centering in Havana and including the territory within a "golden circle" which should have a radius of 1200 miles.

Know-Nothings. A name given to the members of a secret political organization which had as its purpose the exclusion from political offices of Catholics and of foreign-born citizens. The name arose from the usual reply of members to inquiries about the nature or aims of the organization, "I know nothing about it." The movement, rising soon after 1840, became prominent in 1852, and, being joined in 1854 by a large part of the Northern Whig party, the organization assumed the name of the American party. It held a national convention in 1856 but disintegrated as a national party in the controversies over the slavery question, although in separate states it continued to be a force until 1860. The Know-Nothing movement was closely related in its purposes to the later American Protective Association.

Koszta (*kŏ'stä*) **Incident.** The diplomatic dispute between Austria and the United States in 1853 over the citizenship of Martin Koszta. Koszta, a Hungarian refugee who had taken out first citizenship papers in 1850, was seized at Smyrna by Austrian officers. Instructed by the American minister at Constantinople, Captain Ingraham of the *Saint Louis* demanded surrender of Koszta, who was held on the Austrian ship *Huzar.* His demand was complied with. The Austrian government called upon the United States for apology and satisfaction. But Secretary of State Marcy held that Koszta was an American citizen. Congress awarded Captain Ingraham a medal for his services in the case.

Ku-Klux Klan (*kū'klŭks' klăn*). An organization which was formed in the South after the Civil War, in order to check the threatened Negro supremacy. Its methods involved the terrorizing of Negroes and of white "carpetbaggers" by bands of night riders. It achieved its purpose, but eventually it became so powerful and abuse of power under its name became so flagrant that Congress was influenced to pass the Force bill of 1871. Restoration of political rights to ex-Confederates gave the whites electoral power, and the Klan gradually died out. The name is adapted from Greek *kyklos,* in the sense of "circle" or "society," and from English *clan.* A secret organization of national scope, bearing the name of Ku-Klux Klan, and having headquarters at Atlanta, Ga., was established in 1915.

Labor Party. The first American labor party of national scope, the Labor Reform party, or National Labor Reform party, as it was later called, was organized in 1869 as an outgrowth of the National Labor Union. The party inveighed against both major parties as dominated by the capitalist class, and called upon laborers to unite behind a party of their own which would enact legislation favorable to the laborer. The party advocated a protective tariff imposing a tax on the importation of luxuries only, and also advocated a national, legal tender, paper currency issued by, and under the control of, the national government as the basic currency of the country. In 1872 the National Labor party nominated Charles O'Connor, of New York, as its candidate for president. The party polled comparatively few votes at this election, and in 1878 merged with the Greenback party to form the Greenback Labor party. See *Socialist Labor Party, Union Labor Party, United Labor Party.*

Lewis and Clark Expedition, The. The exploring expedition conducted by Meriwether Lewis, private secretary to President Jefferson, and by Captain William Clark into the Oregon country. The success of this expedition furnished a part of the basis for the claim of the United States to the Oregon territory. The enterprise was due primarily to Jefferson's keen scientific interest in determining the extent and character of the country west of the Mississippi. One of his first acts upon becoming president was to secure from Congress an appropriation for such an exploration. The explorers left River Dubois, near St. Louis, May 14, 1804, and reached the mouth of the Columbia river on November 15, 1805. Beginning the return journey on March 23, 1806, they arrived at St. Louis on September 23 in the same year.

Liberal Republicans. A party which appeared in 1872, caused by a schism in the Republican party. The new party favored removing political disabilities from those who had favored the South in the Civil War and advocated conciliation rather than force in dealing with the defeated states. The ticket adopted was chosen also by the Democrats, but it was defeated, and the party dissolved.

Liberty Bell. This famous bell was originally cast in England in 1752 for the Pennsylvania statehouse. In transport it was so injured that its tone was ruined. It was therefore recast in Philadelphia in 1753, when the words, "Proclaim Liberty throughout the land unto all the inhabitants thereof," were inscribed on it. On July 8, 1776, this injunction was literally carried out when the bell was rung to summon the people of Philadelphia to the first public reading of the Declaration of Independence. During the British occupation of Philadelphia, the bell was hidden in the Delaware river. It was broken while being tolled for the death of Chief Justice Marshall, July 8, 1835. Since 1854 it has rested in the hall of the Old Statehouse on a thirteen-sided pedestal, each side representing one of the original thirteen colonies. In recent years many Americans have had opportunity to see this historic bell when it has been temporarily taken from its home to the various great expositions.

Liberty Party. The name given to a new national party, formed in 1840 by the more conservative abolitionists, who refused to adopt the extreme position of the Garrisonians. Their purpose was to bring about by political means the abolition of slavery in all territory under the jurisdiction of the national government. This party merged with the Free-Soilers in 1848 and with the Republicans in 1856.

Lincoln-Douglas Debates. A series of joint debates to which Abraham Lincoln challenged Stephen A. Douglas in 1858. Lincoln was the Republican candidate for the Senate in Illinois; Douglas, the Democratic candidate. Lincoln's position was antislavery; Douglas championed the Popular Sovereignty doctrine, and won the senatorial election. However, Lincoln's conduct of this discussion helped to make him president.

Little Giants. Political followers of Stephen A. Douglas, who had been nicknamed the "Little Giant," because of his short stature and because of his great mental and oratorical powers.

Locofocos (*lō'kō-fō'kōs*). The nickname given in 1835 to members of the Equal Rights faction of the Democratic party in New York, and later to members of the Democratic party itself. At a meeting in Tammany Hall, October 29, 1835, the Tammany men withdrew, turning off the gas as they left. The Equal Rights party, however, were supplied with candles and "locofoco" matches. The meeting proceeded, and from that time the faction was dubbed by its opponents the "Locofocos." See *Equal Rights Party.*

Louisiana Purchase. In 1803 the United States purchased from France the (then) city of New Orleans and the territory west of the Mississippi, extending to the eastern spurs of the Rocky mountains and to the British frontier on the North. The price paid was $15,000,000.

Lynch Law. Originally, on the western frontier in and after 1819, lynch law was a necessary substitution of an irregular trial for the regular process of law. It is now understood as mob rule and action effecting the summary execution of an offender, without even the form of trial. The most frequent use of it is in the case of Negroes charged with offenses against white women. The origin of the name is uncertain. Charles Lynch of Virginia, through his flogging of Tories during the Revolution, is said to have given his name to the practice. Another explanation is that the Carolina Regulators, about 1770, administered whippings to offenders on Lynch's creek.

McKinley Tariff Act. The high protective tariff act passed by Congress in 1890. William McKinley, as chairman of the Ways and Means committee, was chief sponsor for the bill. It fixed import duties at an average of 49 per cent. Its novel feature was a "reciprocity" provision. See *Reciprocity Treaties.*

Mason and Dixon's Line. The boundary line fixed between the colonies of Pennsylvania and Maryland in 1767; so called from the two English surveyors, Charles Mason and Jeremiah Dixon, who determined the line, thereby ending a long-standing controversy between the two colonies. Later, this line was regarded as the boundary between the free states and the slave states.

Mayflower. The ship of 180 tons which carried the Pilgrims, the first colonists of New England, to the shores of America. This vessel, which had been chartered from her London owner, sailed from Southampton, England, August 5, 1620, in company with the *Speedwell.* The latter ship proved unseaworthy, and both vessels put into the port of Plymouth, whence the *Mayflower* sailed alone on September 17. The original intention had been to reach the mouth of the Hudson river, but the captain of the *Mayflower* laid his course for Cape Cod. Accordingly, the first landing was made near the present site of Provincetown. After some exploration the site of the present town of Plymouth was chosen for the settlement. The landing at this point took place on December 21, 1620. The event is celebrated on Forefathers' Day, December 22.

According to the list of passengers, given by Governor William Bradford, 102 persons, including two children born on shipboard, arrived at Plymouth in the *Mayflower.* While the ship lay in Provincetown harbor, 41 of the men joined in signing the agreement as to the government of the colony, known as the Mayflower Compact. The following is a list of the names signed to this historic document:

Alden, John
Allerton, Isaac
Allerton, John
Billington, John
Bradford, Wm.
Brewster, Wm.
Britteridge, Richard
Brown, Peter
Carver, John
Chilton, James
Clarke, Richard
Cook, Francis
Crackston, John
Doty, Edward
Eaton, Francis
English, Thos.
Fletcher, Moses
Fuller, Edward
Fuller, Samuel
Gardiner, Richard
Goodman, John
Hopkins, Stephen
Howland, John
Lister, Edward
Margeson, Edmond
Martin, Christopher
Mullins, William
Priest, Degory
Ridgedale, John
Rogers, Thomas
Soule, George
Standish, Miles
Tilley, Edward
Tilley, John
Tinker, Thomas
Turner, John
Warren, Richard
White, William
Williams, Thomas
Winslow, Edward
Winslow, Gilbert

Mecklenburg Declaration. A document resembling in its phraseology the Declaration of Independence, and dated May 20, 1775, supposed to record the action of a body of citizens of Mecklenburg county, North Carolina, in declaring their independence of Great Britain. It appears, however, that this document is not well authenticated. Historians regard it as having been written from memory some time after the event it purports to record. The generally accepted facts are that, on the occasion of a militia muster at Charlotte, May 31, 1775, the citizens present, having heard of the conflict at Lexington and Concord, adopted a vigorous set of patriotic resolutions. In effect, they declared all civil and military commissions void and set up a local administration to serve "until laws shall be provided for us by Congress." A copy of this notable document, known as the Mecklenburg Resolves, was sent to England, where it is preserved. The loss by fire of the original copy of the Resolves is supposed to have occasioned the writing of the document known as the Declaration. The variance in date between the two documents is usually ascribed to the difference between the old and the new style of reckoning time. Since 1831, the 20th of May has been a legal holiday in North Carolina.

Middle of the Roaders. Populists who refused to merge with the Democratic party in 1896, preferring to "keep to the middle of the road" as a separate political organization. See *Populist Party*.

Minutemen. The organization of provincial militia in Massachusetts in 1775. They were under the orders of the Committee of Safety, and were so called because they were supposed to be ready to march at a minute's notice. Minutemen met the British at Lexington, April 19, 1775.

Missouri Compromise. An agreement between the slavery and antislavery parties in 1820. The act passed by Congress in 1820, admitting Missouri to statehood, determined that, west of the Mississippi river, slavery should be lawful only south of 36° 30′ north latitude, except in Missouri. This arrangement was maintained until 1854, when it was violated by the admission of Kansas and Nebraska as territories, with the right to decide the slavery question for themselves.

Modoc (*mō′dŏk*) **War.** The conflict between U. S. troops and the Modocs, a warlike tribe of northern California Indians, in 1872-73. Entrenched in the lava beds, the Indians defied the troops, inflicting severe losses and murdering two peace messengers. Finally, their chief, "Captain Jack," was captured and hanged. Part of the tribe were allowed to remain in California; the rest, about 150, were sent to Indian Territory.

Molly Maguires. A secret society which terrorized the mining districts of Pennsylvania from 1867 to 1877. Its object was, apparently, to control the state and municipal politics. In 1877, through informers, its leaders were discovered and convicted, and the organization was broken up. A society of the same name and of similar methods had previously existed in Ireland.

Monitor and Merrimac, Battle of the. The decisive engagement between these two new armored vessels in Hampton Roads, March 9, 1862. The *Merrimac* was a wooden U. S. frigate which had been rebuilt and christened the *Virginia* by the Confederates. The hull was covered with a roofing of iron plates and was equipped with a heavy iron prow for "ramming" enemy vessels. She was expected to break the blockade of Southern ports. On March 8, 1862, this "ironclad" destroyed the Union vessels *Congress* and *Cumberland*.

The *Monitor* was a new type of war vessel, built low in the water, with nothing above the deck but smokestacks and a turret 20 feet in diameter. She was the Northern reply to the Southern challenge of the formidable *Merrimac*. Arriving at Hampton Roads in the night of March 8, before she had been accepted by the government, she engaged the *Merrimac*, or *Virginia*, on the 9th. The Confederate ship, unable to ram or hit with shot the "Yankee cheesebox on a raft," was so seriously damaged by the *Monitor's* 11-inch shells that she withdrew to Norfolk. The battle left the blockade intact and demonstrated the superiority of ironclads over wooden warships.

Monroe Doctrine. A statement of policy in President Monroe's message to Congress in 1823, to the effect that the United States could not regard with indifference any further territorial expansion on the part of European powers on the American continent. The occasion for the pronouncement was the suspected intention of the Holy Alliance to interfere on behalf of Spain in her struggle with her revolted colonies. Various interpretations have been given to this doctrine, some, like that of Mr. Olney, going much further than President Monroe's words warrant. It is now generally held to mean that the United States will consider her interests involved, if any European power seeks territorial aggrandizement in any part of America, or interferes with the internal affairs of any American state.

Morgan's Raid. The marauding expedition of the Confederate general, John H. Morgan, with 2400 men, into Indiana and Ohio, July 2–26, 1863. Morgan had been ordered by General Bragg to destroy railroads and the public works at Louisville. He exceeded his orders and crossed the Ohio into Indiana from Brandenburg, Ky., on July 8-9. The Union general, Hobson, pursued him, and local militia blocked and harried his troops. Near Pomeroy, Ohio, Morgan tried to escape across the Ohio, but he was attacked and lost a third of his force, killed and prisoners. A second attempt to cross the river was checked after a large number of the raiders had succeeded in escaping into Kentucky. Morgan, with the remaining third of his force, started northeast through Athens and Washington counties. He was finally captured, with a small remnant of followers, near New Lisbon.

Mormons. A sect founded in 1830, at Fayette, New York, by Joseph Smith, the son of a Vermont farmer. The Mormons moved westward and, after several years' wanderings, settled on Great Salt lake in 1847, under the leadership of Brigham Young. Their advocacy of polygamy was for a long time a bar to the admission of Utah to the Union, but the enforcement of the Edmunds act of 1882 led to the formal abandonment of polygamy as a tenet by the Mormons in 1890, and Utah was admitted to statehood in 1896.

Mossbacks. The name given during the Civil War to men who hid themselves in swamps and elsewhere to avoid conscription for the Southern army. The fancy was that they would stay hidden till the moss grew on their backs. The name was later applied to extreme conservatives in politics.

Mountain Meadows Massacre. The massacre by Indians, under alleged Mormon leadership, of a party of 140 emigrants, who were crossing Utah on their way to California in 1857. Only 17 children were spared. They were distributed among Mormon families, but were restored to relatives by the U. S. government. The leader of the band, J. D. Lee, an Indian agent, was executed for the crime, in 1877, on the actual site of the massacre.

Mugwumps. A name applied by Blaine supporters to those who, in 1884, supported Cleveland, the Democratic candidate for president, owing to his advocacy of civil service reform. The word later came to be applied to independent voters. It had been used ironically as early as 1832 to mean a person of superior views. In Eliot's Indian Bible the original *mugquomp* meant "big chief" or leader.

Mulligan Letters. A series of letters written by James G. Blaine to a business associate, Warren

Fisher. It was alleged that these letters proved Blaine's share in some corrupt railroad transactions. The letters were presented to a congressional committee by James Mulligan, a clerk employed by Fisher. Blaine obtained possession of the letters, and in a dramatic defense before the House of Representatives, June 5, 1876, read parts of them. He defied the committee to compel him to give them up. The suspicion engendered by the incident was used effectively against him in the campaigns of 1876 and 1884.

Nationalists. Those who, during the period preceding the adoption of the Federal Constitution, favored the creation of a strong national government resting upon proportionate representation, possessing broad national powers, and acting directly upon individuals rather than upon or through the state governments. Their policy was adopted by the Federalist party and was supported by the supreme court decisions in the early decades of the nation's existence. This doctrine of centralization was carried further under the name of the New Nationalism, advocated by Theodore Roosevelt in 1910 and 1911. See *Federalists, New Nationalism.*

National Union Party. See *War Democrats.*

Navy, The United States. To Silas Deane, John Adams, and John Langdon, the phrase "Fathers of Our Navy" has been applied. These three men constituted a committee appointed by the Continental Congress on October 13, 1775, with power to fit out two warships for service against the British. Several small craft had been in use in Boston harbor to prevent the bringing of supplies to the British forces in the city, and, in the summer of 1775, American coasting vessels had captured three British ships. However, it was in January 1776 that Lieutenant John Paul Jones hoisted the first flag unfurled aboard an American warship. On February 17, 1776, the first regular naval expedition under the authority of the United States put to sea under the command of Captain Esek Hopkins. The little fleet was successful in capturing military stores at New Providence in the Bahamas, and arrived in New London, Conn., on April 7, 1776.

In the course of the Revolution, the United States had 64 vessels regularly in commission, including the fleet on Lake Champlain, and the damage they inflicted upon British shipping is reckoned an effective influence in bringing the war to an end. The most romantic and daring exploits were those performed by John Paul Jones. It is said that, at the close of the Revolution, at least two of the American vessels, the *Alliance* and the *Confederacy*, were the equals of any warships afloat. But all vessels were sold or scrapped, so that the new government under the Constitution came into existence without any navy.

The first naval act was passed in 1794, authorizing the construction of six frigates, one of which was the *Constitution*. During the two years of quasi war with France, 1798–1800, the number of vessels was increased, and officers began to build up the system of discipline for which the navy has been famous. At the close of hostilities, the naval force was again depleted. During the war with the Barbary pirates, however, the American navy came into its own. Commodore Edward Preble perfected the system of discipline, and at the close of the conflict the fleet was accorded full formal honors by the warships of other nations.

The War of 1812 was marked by a series of brilliant American naval victories. During the conflict, 23 regularly commissioned vessels were in service, besides numerous privateers. After the Peace of Ghent, the strength of the navy was fixed at 35 ships, frigates, and sloops, with some smaller vessels.

In 1844 the *Princeton*, the first screw steam war vessel ever built, was constructed. The year 1845 saw the establishment of the Naval Academy at Annapolis. In spite of some shipbuilding, the opening of the Civil War found the navy altogether inadequate. In the course of the conflict, a sufficient force was built up, the most important achievement being the building of the *Monitor*, the success of which revolutionized naval architecture.

Again, in the years following the Civil War, the navy was suffered to deteriorate in respect to ships and armament. In the year 1881, it consisted of 13 so-called first-rate ships, all of wood, 20 second-rate ships, all of wood except one, 27 third-rate ships, all wooden except four, some old Civil War monitors, and several old wooden sailing ships, some of which had seen service in 1812. The armament was equally antiquated. Virtually, the United States had no effective navy at all, except in the quality and discipline of its personnel.

In this year, 1881, the program of steel construction for the new navy was laid out. In 1884, the *Dolphin*, the first ship of the steel fleet, was completed. In 1887 the construction of the great naval gun factory at Washington was begun.

The opening of the Spanish war found the country in possession of a fleet adequate to the occasion. Most notable, as a demonstration of this readiness, was the voyage of the *Oregon* from San Francisco to Jupiter Inlet, Fla., where she arrived in condition for service, after having steamed 14,000 miles in 68 days.

In 1906 the United States entered upon an enlarged naval building program. The new policy was signalized by the memorable cruise of the battleship fleet around the world. The fleet put to sea on December 16, 1907, and returned on February 20, 1909. In 1916-17 further expansion of the navy was occasioned by the imminence of war with Germany. During 1917 and 1918 the program was increased on a war scale, until at the close of the war the American navy had a fighting strength of 2,400,000 tons. During the war, the fleets co-operated with those of the other Allies. At the Washington Conference, 1921-22, the United States joined with Great Britain, France, and Japan in an agreement for limitation of naval force.

Newlands Reclamation Act. An act passed by Congress in 1902, which created the U. S. Reclamation Service and provided that the proceeds of the sale of public lands in arid and semiarid states should be devoted to the building of irrigation works. Under the provisions of the Newlands act and the Reclamation Extension act of 1914, the cost of construction is returned by payments from water users, from lessees of oil and other mineral lands, and from land payments of settlers. A revolving fund is thus created for the use of the U. S. Reclamation Service. The service is engaged upon the construction and operation of irrigation works in the 17 arid and semiarid states of the far West. The net cost of construction completed to June 1922 was $135,000,000. On the 33,000 farms irrigated by the service and in the towns connected with the projects, more than 450,000 people are living.

New Nationalism. Name given to the views advanced by Theodore Roosevelt in 1910 and 1911 with respect to the powers of the Federal government. According to this doctrine, the government is looked upon, not as one of limited, delegated powers, but as a sovereign government possessing jurisdiction over all matters with respect to which the Federal government can act more effectively than the states. The field in which these powers were to be immediately exercised was in the national regulation of all corporations doing interstate business. Associated with the theory as to the national scope of the powers of the Federal government was a system of reforms which included the graduated income and inheritance taxes, conservation of natural resources, revision of the banking system, direct primaries, and a strong army and navy. The so-called New Nationalism became a central feature of the platform of the Progressive party.

New Orleans, Battle of. An engagement, January 8, 1815, between the British forces under General Pakenham and the Americans under General Andrew Jackson. The Americans, 5500 in number, were well commanded and thoroughly intrenched at Chalmette, below the city. They repulsed the attack of 10,000 British troops, inflicting a loss of 2000. The battle took place after the signing of the peace treaty at Ghent. Means of communication were few and slow, and the news of the signing of the treaty in December had not reached America. Some authorities believe that, if the transatlantic cable had been in use at the time, not only this battle but the entire War of 1812 would have been avoided.

Nonintercourse Act. An act passed March 1, 1809, forbidding all commerce with France and Great Britain. It was part of a scheme of retaliation against French and British interference with American ships. Enforcement of the law proved impossible.

Nullification, Right of. A constitutional principle asserted by the Southern states before the Civil War, to the effect that "a state under the Constitution retained the right to judge for itself the extent of the powers vested in the Federal government." Under this so-called right of nullification, it was further maintained that if, in the opinion of any state, the Federal government had exceeded its constitutional powers, such state could itself declare that act to be inoperative, and nullify its effect within the borders of that state. The right was first asserted in the Kentucky Resolutions of 1799. The climax of the discussion and also the virtual abandonment of the principle came in 1832 in connection with the protest of South Carolina against the tariff bill passed in that year. The outcome of this contest, which was virtually compromised, left doubtful the decision upon the principle of nullification. However, after 1832 in the Southern states the more fundamental doctrine of state sovereignty displaced the nullification doctrine, until the entire discussion was terminated by the Civil War.

Old Ironsides. A popular name for the 44-gun U. S. frigate *Constitution*. This famous ship was launched October 21, 1797; took part in three bombardments of Tripoli in 1805; in 1812, escaped from a British squadron in July, defeated the frigate *Guerrière* in August, and captured the *Java* in December; took the *Picton* with a convoy in 1814 and the *Cyane* and *Levant* in 1815. She was reported unseaworthy in 1828, but her proposed dismantling was prevented through popular sentiment aroused by O. W. Holmes's "Old Ironsides." Rebuilt in 1833, she was in active service till 1855 and was then used as a training ship, being again partially rebuilt in 1877; crossed the Atlantic for the last time in 1878; and was stored at the Boston Navy yard in 1897. In 1927, she was reconditioned in order to be converted into a U. S. Navy museum afloat.

Omnibus Bill. A name applied to bills covering several different matters, to be voted upon as a whole. The most noted of such bills in American history is that reported out by a compromise committee of the U. S. Senate on May 8, 1850. See *Compromise of 1850*.

Ordinance of 1787. An act of the Congress of the Confederation making provision for the government of the Northwest Territory, providing for religious toleration and popular education, and forbidding slavery in the territory.

Panama Canal Commission. The board of engineers and officials appointed to govern the Canal Zone and to construct the Panama canal. The commission was first organized in May 1904 with Major General Whitfield Davis as chairman. After disagreements and change of plans, Theodore P. Shonts was made chairman of a reorganized body. In 1907, after the adoption of the high-level lock plan, a new commission was formed, made up of government officials, with Lieutenant Colonel George W. Goethals as chairman. This body served until the completion of the canal in 1914, when the commission was abolished.

Pan-American Congress. A congress of the various states of North, of South, and of Central America, organized by James G. Blaine during the term of office of President Harrison, and held at Washington in 1890. Among the subjects discussed were reciprocity treaties, and a uniform standard of coinage, weights, and measures for the American continent. No practical results, however, accrued. Similar congresses were held in 1901 at the City of Mexico, in 1906 at Rio de Janeiro, in 1910 at Buenos Aires, and in 1923 at Santiago, Chile.

Pan-American Union. The name of the international organization formerly known as the International Bureau of the American Republics. The bureau was established in 1890, pursuant to resolutions adopted by the first Pan-American conference, held at Washington in 1889-90. At the fourth conference, in Buenos Aires in 1910, the name of the organization was changed. In the same year the headquarters building of the union was dedicated in Washington. The purpose of the union is to promote better cultural, political, and commercial understanding among the 21 American republics: Argentina, Bolivia, Brazil. Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Salvador, United States, Uruguay, and Venezuela.

The union maintains a staff of specialists, at the head of which is the director general, who publish and distribute information upon the progress and development of the member states. The expenses of the union are defrayed by contributions from the various countries, in proportion to population.

Patrons of Husbandry. A fraternal organization called The National Grange of the Patrons of Husbandry, formed in 1867 for the promotion of agricultural interests in the United States. Between that date and 1876, when the society reached its zenith, the number of lodges or "granges" increased in number from 90 to 19,000. *Grange* means "farm," and the members of the society are known as Grangers. The discussion of political questions was strictly forbidden at their meetings, but, as the organization grew in strength, its members became a considerable political force. The political phases of their activity soon passed to the Farmers' Alliance and later to the Populist party. The Grange was thus freed for its original purpose of social, educational, and industrial influence.

Patroons. A Dutch term meaning "patron" or "protector." It was popularly applied to certain large landholders under Dutch West India Company grants of 1629 and 1640. The grants really gave to any good citizen of the Netherlands feudal authority over large tracts of land bordering the seacoast or navigable streams, on condition of settlement with a colony of fifty or more. Some of the estates thus created along the Hudson river were held until the middle of the 19th century. See *Antirent Riots*.

Payne-Aldrich Tariff. The law enacted by Congress August 5, 1909, providing a comprehensive system of taxes on imports. The bill was severely attacked by its opponents as operating to raise import duties rather than to lower them, contrary to what was deemed to be the public demand. The measure provided also for the creation of a tariff board to advise the president in determining the specific rates, between designated maximums and minimums provided in the act itself, which should be imposed upon certain articles.

Peonage (*pē'ŏn-āj*) **Act.** The law passed by Congress in 1867, forbidding peonage in the states and territories. Peonage is a kind of slavery under which a person is held in debt to another and is forced to labor to pay the debt. From such conditions many abuses have arisen. An investigation by the U. S. commissioner of immigration, authorized in 1908, showed that peonage in various forms existed at that time in almost every state in the Union. Recently, much has been done to correct the evils of the practice and toward abolishing the system itself.

People's Party. Official name of the Populist party. See *Populist Party.*

Personal Liberty Party. An organization formed in New York and Pennsylvania in 1887 for the purpose of obtaining the repeal of laws requiring saloons to be closed on Sundays. The method adopted to achieve this purpose was not to create a separate political party, but to cast the "Personal Liberty" vote solidly for or against the candidates of the regular parties, solely upon the consideration as to whether the candidates favored or opposed the repeal of the Sunday laws.

After the enactment of the prohibition amendment in 1918, various "Personal Liberty" associations were organized with the purpose of obtaining a modification of the Volstead act and, ultimately, the repeal of the amendment.

Philippine Insurrection. The outbreak of Filipinos under Aguinaldo against the American authorities. Manila was attacked February 4, 1899, and fighting continued until the capture of the rebellious leader, Aguinaldo, by General Funston in March 1901. This disturbance was really a continuance of a former insurrection under Spanish rule in 1897, when Aguinaldo, for a payment of 600,000 pesos, agreed to leave the islands.

Pilgrim Fathers. The name applied to the band of English Separatists who became the first colonists of New England. They belonged to a group of dissenters who had previously emigrated to Leyden, in Holland. Preferring to be under the English flag, they founded the settlement of Plymouth, in New England, in 1620. Early New England writers referred to them as "pilgrims and strangers on the earth," and before the end of the 18th century the name Pilgrims had come to signify the original Plymouth colonists.

Platt Amendment. The body of regulations passed by Congress, March 2, 1901, for the government of Cuba. By the terms of this amendment, Cuba agreed (1) to make no agreements with foreign governments contrary to the interests of the United States, (2) to keep its debts within reasonable bounds, (3) to cede lands for United States naval stations, (4) to maintain sanitary conditions in ports. Finally, the United States was given right of occupation to maintain order in the island.

Popular Sovereignty. The doctrine, championed by the Northern element of the Democratic party, and particularly by Stephen A. Douglas, during the period from 1850 to 1854, that the settlers of each Federal territory should determine for themselves whether slavery should be permitted in that territory and also whether that territory should be admitted to the Union as a free or as a slave state. The policy was derisively termed "squatter sovereignty" by its opponents, because, in practice, it left the question of slavery to be decided by "squatters," that is, by individuals who rushed to the territory and took up a temporary residence there for the single and express purpose of affecting the slavery issue within that territory.

The Democratic party, from 1852 to 1856, advocated popular sovereignty as a solution of the slavery question so far as it related to the territories, and the Kansas-Nebraska act embodied an attempt to put that policy into practice. It was upon this issue that Lincoln and Douglas squarely met in the senatorial contest in Illinois in 1858. The Dred Scott decision, rendered by the supreme court in 1857, held, in effect, that the doctrine of popular sovereignty was unconstitutional; that it was beyond the power of Congress and of the government of any territory to exclude slavery from its limits. Despite this decision, however, the Democratic party continued to insist upon that principle as the solution of the slavery question in its relation to the territories, and the doctrine did not disappear from American politics until the problem of slavery itself was wiped out by the Civil War.

Populist Party. The popular name for the People's party, organized in 1891, which drew its support largely from the earlier Farmers' Alliance, from the Greenback party, and from the Union Labor party. The principal policy advocated by the party was the expansion of the currency, especially by the free coinage of silver. This was part of a revolt against the alleged advantages enjoyed by the financiers of the East, by the railroads, and by the capitalists generally. It was expected that the free coinage of silver would offset these advantages by increasing the prices of farm products and by making it easier for farmers to obtain money.

In 1892 the People's party carried four states: Colorado, Nevada, Idaho, and Kansas. In 1894 the party polled nearly two million votes in the Congressional elections. In 1896, however, the Democratic party adopted the chief item of the Populists' program, the unlimited coinage of silver, and the Populists indorsed William J. Bryan, the presidential candidate of the Democratic party. Rather than fuse entirely with the Democrats, however, a majority of the Populists, accepting the name "Middle of the Road" Populists, voted to nominate a vice presidential candidate of their own. After the defeat of Bryan, the Populist party split into the Fusionists, who favored co-operation with the Democrats and with the "Middle of the Road" branch. After the election of 1900, when Bryan, as the candidate for the Democratic party and the Fusion Populists, was again unsuccessful, increasingly conservative control of the Democratic party led the Fusionists to seek union with the "Middle of the Road" Populists. The united party put a presidential candidate in the field in 1904 and again in 1908, but, in the latter year, polling only 29,100. votes, the party ceased to exist. See *Free Silver Movement.*

Privateering (*prī'vă-tēr'ĭng*). The operations of a privately owned and armed vessel which, under permission of a government, makes war on hostile shipping. The permission is in the form of "letters of marque." In the Revolution and in the War of 1812, American privateers inflicted heavy damage on British shipping. In the Civil War the president was given power to commission privateers, but the authority was not used. See *Declaration of Paris.*

Progressive Party. Organized in 1912 as a result of the split in the Republican party between the conservative, "standpat," group and the more liberal or progressive members of the party. The immediate occasion of the formation of the Progressive party was the success of the old-line leaders in controlling the convention party machine and in renominating Taft for the presidency, to the exclusion of Roosevelt. The principles advocated by the Progressive party were fundamentally similar to those which the insurgent group in Congress had advocated during the Roosevelt and Taft administrations. These policies included a greater measure of government control of the railroads and large industrial combinations, a radical reduction of the tariff, adoption of the direct primary, and the initiative and referendum, as well as the application of the recall both to officials and to judicial decisions.

The Progressive party nominated Theodore Roosevelt for president and Senator Hiram Johnson, of California, for vice president. In the election which followed, the Progressive party polled nearly

one million more votes than the Republican party, and its candidates received 88 electoral votes, as against 8 for the Republican ticket. The split in the Republican party enabled the Democratic candidates to win in the election, the combined popular vote of the Republican and Progressive parties exceeding by nearly 1½ million the vote cast for the Democratic ticket. With the return of its leader, Theodore Roosevelt, to the Republican ranks in 1916, the Progressive party rapidly disintegrated, and most of its members found their way back to the Republican fold.

Prohibition Party. The national Prohibition party was organized in 1869 upon a platform advocating the prohibition of the manufacture and sale of intoxicating liquor except for religious and medicinal purposes. In 1872, the party nominated candidates for president and vice president, and it has placed a presidential ticket in the field at every national election since that time. The party polled its largest presidential vote in 1892, when John Bidwell, of California, received 271,000 votes.

The Prohibition party was the first of the regular national parties to advocate woman suffrage. It has also advocated numerous constructive reforms which were later adopted by other parties, and which have since been enacted.

Puritans. The name applied to the group of people within the Established Church of England, in the 16th and 17th centuries, who disapproved of certain usages and ceremonies which were derived from the Roman Catholic Church, and which were being used in the Church of England. Because of their purpose to "purify" the English Church by eliminating these customs, the name Puritan was applied to this party.

Among the Puritans, there were some groups, called Separatists, who withdrew entirely from the state church and set up independent congregations. One such group left England and settled in Holland in 1609, whence a number of them emigrated to America, founding in 1620 the colony at Plymouth. These colonists were later known as the Pilgrims.

The unrelenting persecution visited upon the Puritans by the Stuart kings at length drove most of them out of the Established Church. Many left England altogether. Among these were the Puritans who, in 1630 and later, settled the country around Massachusetts bay, known as Massachusetts Bay Colony. Here they established their churches upon the congregational plan, each church being independent in faith and organization, and having neither priest nor bishop. See *Mayflower*, *Pilgrim Fathers*, *Separatists*.

Quebec Act. An act passed by the British Parliament in 1774 to provide for the government of the Province of Canada, which had come under British authority by the Treaty of Paris in 1763. In this act, three features particularly aroused the attention of the thirteen English colonies: (1) The act extended the boundaries of Quebec to include the territory between the Ohio river and the Great Lakes, westward from the Allegheny mountains to the Mississippi; (2) It established French civil law in the province; (3) It withheld from the inhabitants such representative institutions of government as existed in the English colonies. The English colonists regarded the act as a blow at their free institutions. It was consequently a factor in precipitating the Revolutionary War.

Quids (*kwĭds*). Followers of John Randolph, of Virginia, in Congress, who opposed the policies of the Jeffersonian administration and favored Monroe over Madison to succeed to the presidency. They were the first "third party" in the United States and were called quids from the phrase *tertium quid*, "a third thing," because they supported neither the administration forces nor their Federalist opponents.

Rag Baby. During the currency expansion agitation of the late 70's, this term was applied by the "sound money" advocates to the greenbacks, the government fiat currency issued during the Civil War. The term originated in a series of cartoons by Thomas Nast, published in *Harper's Weekly* in 1876, in which the greenback was depicted as a rag baby.

Rainbow Division, The. The 42d division of the American Expeditionary Force in the World War. The insignia of the division was a rainbow superimposed on a black field. The 42d was made up of National Guard troops drawn from almost all the states of the Union,—hence its name. The last units of the division arrived in France, December 7, 1917, and after a very short term of practice they were put into active service. In the Champagne sector, in the Château-Thierry section, at St. Mihiel, and in the Argonne, the division established a record for brilliant and effective fighting. After the armistice it was made part of the force of German occupation and was stationed at Abrweiler until April 1919.

Readjusters. The name of a faction of the Democratic party in Virginia, formed in 1878. Its main issue was that of a readjustment of the state debt by means of refunding at 3 per cent.

Rum, Romanism, and Rebellion. A phrase used by Reverend Samuel D. Burchard as descriptive of the membership of the Democratic party, at a banquet given on October 30, 1884, in honor of James G. Blaine, the Republican candidate for president. Although the characterization was promptly repudiated by Blaine, during the closing days of the campaign the phrase was actually attributed to him by his opponents, with the result that Irish Catholics as a body voted against him.

Salary Grab. Popular name for an act of Congress of March 4, 1873, which made the salary increase for members of Congress, provided in the general salary act of March 3, effective for the preceding two years. Popular indignation over this attempt to loot the national treasury was so intense that both acts were repealed, except the parts increasing the salaries of the president and of court justices.

Salem Witchcraft. An extraordinary outbreak of the medieval witchcraft superstition occurred in Salem, Massachusetts, in 1692. In the summer of that year, 19 persons were convicted and executed on the charge of exercising witchcraft. It appears that the community had been prepared for such a mania by the attention given to the subject by the Mathers and other clergy. The belief had become prevalent that some evil influences abroad in the colony were responsible for certain military and political disasters. In 1689, Cotton Mather had published his study of the symptoms of two girls upon whose testimony an Irish laundress in Boston had, in the preceding year, been convicted of witchcraft and executed.

The Salem delusion broke out in a village, now Danvers, where several girls who had read some accounts of witchcraft accused various friendless old people of bewitching them. After a time, accusations were lodged against prominent citizens, including even the wife of the governor. The very excess of the proceedings at length produced a revulsion of sentiment, and release of accused people was speedily followed by a return to a healthy attitude of the public mind, and by general disapproval of the ministers and officials who had pressed the charges against innocent victims.

Sand Lotters. Anti-Chinese agitators in California in the 1880's; so called because their regular meeting place was a sand lot in San Francisco. See *Kearneyism*.

San Juan (*săn hwän'*) **Arbitration.** The question as to the ownership of the island of San Juan, lying between Vancouver and the American coast, arose out of the wording of the Treaty of Ghent in 1814,

by which instrument the middle of the channel between Vancouver and the mainland was fixed as the boundary. San Juan being in the middle of the channel, the question of ownership was a doubtful one. Emperor William I of Germany, acting as arbitrator in 1872, decided in favor of the United States.

Scalawags. Nickname applied by Southerners to Southern whites who, like the Northern carpetbaggers after the Civil War, were willing to use the Negro vote to gain political office and political spoils for themselves.

Secession, Ordinance of. The declaration issued by South Carolina, December 20, 1860, dissolving its union with the United States. The other Southern states followed with similar declarations.

Sedition Act. See *Alien and Sedition Acts.*

Seminole (*sĕm'ĭ-nōl*) **War, The.** The longest and most severe conflict between United States forces and the Indians. In 1835, the Seminoles, under their chief, Osceola, refused to cede lands in Florida and to remove to Indian Territory. The war continued until 1842, when the Indians were completely subdued. In 1843, about 4000 were removed to form one of the five nations in Indian Territory. A few of the tribe fled to the Everglades, and there a small number still maintain themselves, unconquered.

Separatists. This was the name which attached to the more radical and democratic groups of Puritans in England, during the reigns of Elizabeth and James I. In obedience to their belief that the English Church had not gone far enough in Protestantism, they withdrew, as many more moderate Puritans were forced later to do, and set up their own independent congregations. To the Separatists belonged the congregation of Scrooby, in Nottinghamshire, some of whom became the Pilgrims of Plymouth. See *Mayflower, Pilgrim Fathers, Puritans.*

Seward Whigs. Members of the Whig party in New York who approved the conduct of Seward, when, as United States senator, he came out flatly in opposition to any further extension of slavery and opposed the Compromise of 1850. This group joined the ranks of the Republican party soon after its formation. See *Silver Grays.*

Shays's Rebellion. A rising in Massachusetts, in 1786-87, headed by an ex-officer named Daniel Shays, in protest against the increasing burdens of court fees, lawsuits, and imprisonment for debt. It was part of the general unrest of the times, due to weaknesses in state governments and in the Confederation. At the head of 1100 men, Shays attacked the Springfield arsenal, December 25, 1787, but his forces were repulsed and scattered. Minor outbreaks occurred in the course of several following months, but the unrest gradually died down. A general amnesty was extended to the leaders. Shays himself was pardoned.

Sheridan's Ride. The famous ride of General Philip H. Sheridan, from Winchester, Va., to Cedar Creek. His army had been surprised and routed, October 19, 1864. When the news reached him, he rode the distance of twenty miles, rallied his retreating forces, and attacked and defeated the Confederates under General Early. This exploit is celebrated in a stirring poem by T. B. Read.

Sherman Silver Act. An act of Congress, passed in 1890, by which the treasury was obliged to purchase, at market price, 4½ million ounces of silver monthly. Treasury notes payable in coin were to be issued against this silver. The act was repealed in 1893.

Sherman's March. The famous march of General William T. Sherman, during the Civil War, through the state of Georgia from Atlanta to Savannah. His purpose, in which General Grant concurred, was to complete the invasion of the South by destroying the sources of Confederate supplies. Before starting on his march, Sherman ordered the evacuation of Atlanta and burned the city. The army left a wide swath of devastation over the entire distance of 300 miles. Sherman entered Savannah on December 23, 1864. This campaign, which really ended only with the surrender of General Johnston at Durham Station, N. C., on April 18, 1865, combined with Grant's victory over Lee to end the Civil War.

Silver Grays. The Whig faction in New York which, in 1850, approved Fillmore's compromise course with respect to slavery and disapproved Seward's unyielding and uncompromising opposition to the extension of slavery.

Silver Party. A name taken by "Silver Republicans," that is, by those Republicans who favored the free coinage of silver, and who, in 1896, having bolted the Republican national convention, held a separate convention under the title of the Silver Party, endorsing Bryan and Sewall, the Democratic candidates. See *Free Silver Movement.*

Six Nations, The. The name by which the Iroquois Indian confederacy was known after the Tuscaroras were united with the original "five nations" in 1722. The confederacy or league was first formed about 1570 among the tribes occupying territory now in northern and northeastern New York. In it were included the Mohawks, Oneidas, Onondagas, Cayugas, and Senecas. The name Iroquois was given them by French explorers. They called themselves "the people of the long house." They extended their authority southward to the Susquehanna and to the Ohio, westward to Lake Michigan, and northward over Upper Canada. The league, which superseded the tribal organization, was a true federal union, providing for a central council at Onondaga and for independence of the tribes in local affairs. For the supervision of conquered and dependent tribes the federal council appointed overseers.

The social organization of the Iroquois was much more highly developed than that of other Indians. The recognition of the mothers was notable. The titles to chiefship, the lands and their products, and the lodges belonged to the mothers. A conference of mothers of the families owning chiefships nominated the chiefs, who were confirmed by the councils.

The Iroquois tribes were agricultural in their occupations. General Sullivan, on his raid into central New York in 1779, found well developed plantations of corn and fruit trees. They were noted also for their skill in building their lodges and fortifications. In the fields of warfare, handicrafts, and government they were the most advanced tribes north of Mexico.

Because of the mistaken policy of the early French explorers, the Iroquois became partisans of the English. During the Revolution the league was neutral, but the tribes, with the exception of the Oneidas and some of the Tuscaroras, sided with the British. Chief Brant, at length, led the Mohawks and Cayugas into Canada, whither parts of the other tribes also went. The Canadian government gave them reservations.

The Iroquois in the United States are now on reservations in New York, except part of the Oneidas in Wisconsin and some Senecas in Oklahoma.

Sixteen to One. A phrase expressive of the ratio at which silver and gold were to be valued by the mint under the bimetallic system, or free coinage of both silver and gold, advocated by the Free Silver men. See *Free Silver Movement.*

Slavocrats (*slāv'ō-krăts*). A term applied, during the abolitionist controversy, to those who approved of the institution of slavery, and even to those who were willing to acquiesce in its continuance and extension. See *Doughfaces.*

Snappers. Machine Democrats in New York who convened at a "snap" convention in 1892 at the call of "Boss" Hill, and who picked a solid anti-Cleveland delegation to the Democratic national convention. See *Anti-Snappers.*

Social Democrats. Original name of the present Socialist party, organized in 1897 by Eugene V. Debs. The ultimate aim of the party was the abolition of the capitalist system by peaceful means, its program resting flatly upon the economic doctrines of Karl Marx. In 1900, with Debs as its candidate for president, it received the support of most of the members of the Socialist Labor party, and after 1900 became known as the Socialist party.

Socialist Labor Party. The name adopted in 1877 by an organization to promote an economic rather than a political program. It adopted a platform of opposition to the capitalist system, and advocated, among other reforms, immediate government ownership and operation of all basic industries, and an elastic paper currency issued and controlled by the government. In 1892, it designated its first national ticket, and has placed in nomination candidates for president and vice president at every election since that time, although it has never polled any considerable number of votes.

In 1900 most of the members of the party joined the ranks of the Social Democratic party, the present Socialist party. The more radical members of the Socialist Labor group, however, continued their separate organization, maintaining their identity as distinct from the Socialist party upon a more thoroughgoing adherence to the Marxian doctrines of economic and social revolution. The Socialist Labor party holds the view that the abolition of private property can be achieved only as the thoroughgoing result of the class war predicted by Marx and through the economic revolution which is to follow in its train; the Socialist party seeks to bring about the Socialist state through the ballot and by means of political changes.

Socialist Party. The party formed in 1900 by the union of the Social Democratic party and most of the members of the Socialist Labor party. The party has advocated, in addition to state ownership of public utilities and of basic industries, the initiative, referendum, and recall, and a strict limitation of the power of the courts, particularly with respect to declaring laws unconstitutional. This party has nominated a national ticket at each presidential election since 1900, Eugene V. Debs being its candidate for president on every occasion except in 1916.

The party showed a steady increase in strength from 1900 to 1912, when nearly 900,000 votes were cast for the Socialist candidates. In the national election of 1916, however, there was a marked falling off in its vote, but in 1920 it polled over 900,000 votes.

Softs. See *Barnburners.*

Solid South. A phrase used to express the consistency of the Southern states in their support of the Democratic party. It appears to have been first applied during the presidential campaign of 1876.

Sons of Liberty. A society of Americans, which arose in New York and Connecticut in 1765, and pledged to work for liberty in the American colonies. After the close of the Revolution, the members became part of the Tammany Society.

Spoils System, The. Popular name for the practice, inaugurated by Andrew Jackson, of turning out officeholders of a preceding administration and of filling their places with political friends. In 1820 a bill had been passed by Congress which provided that many Federal offices should automatically become vacant at the end of a four-year term. The purpose was to provide against "bureaucracy." President Adams (1825–29) made only twelve removals during his term. But this law and the constitutional powers of the president gave Jackson and the new Democratic party a convenient means for punishing enemies and rewarding friends. Their slogan, "To the victors belong the spoils of the enemy," was furnished by Senator Marcy of New York. The spoils system has been the fruitful source of inefficiency and corruption in city and in state as well as in the national government. See *Civil Service.*

Spoliation Claims, French. Claims of American merchants and shipowners against the United States government for damages inflicted by French privateers in 1798-99, when the two countries were virtually at war. No indemnity was ever obtained from France. But descendants of the original claimants continued to press their demands until 1885. At that time the matter was referred to the court of claims, which awarded $4,800,000 in satisfaction of damages.

Squatter Sovereignty. The principle of leaving the slavery question in a state or territory to the decision of the settlers. It was first applied to the districts acquired from Mexico in 1848, on their admission to the Union as territories. It was afterward extended, in spite of the Missouri Compromise, to Kansas and Nebraska in 1854. See *Popular Sovereignty.*

Stalwarts. New York Republicans, led by Senator Conkling, who were opposed to President Garfield in 1881 on the question of civil service reform. Guiteau, the assassin of Garfield, was a Stalwart, and gave as his reason for the crime that he could see no other way to bring about a reunion of the Republican party. The word had come into political use early in the presidency of Hayes, to designate those Republicans who opposed his policy in the Southern states. See *Half-Breeds.*

Stamp Act. An act passed by the British Parliament in 1765, for the purpose of raising revenue from the colonies. It was even more unpopular in America than was the American Customs act, and it proved almost impossible to enforce. It was repealed in 1766.

Standpat Policy. A phrase used to describe the general conservative attitude of the regular or old guard wing of the Republican party in Congress, particularly during the second administration of President Roosevelt and during the administration of President Taft. The term is supposed to have originated in a declaration of Senator Mark Hanna in 1900, to the effect that the Republican party should "stand pat" upon the high protective tariff plank which had served the party well during the previous two and a half decades. The supporters of this policy were called "standpatters." See *Progressive Party.*

Strict Constructionists. A general name applied to all those who advocated a narrow construction of the powers granted to the Federal government by the Constitution. The Antifederalists, the Jeffersonian Republicans, the State Rights men, and the Southern Secessionists were all strict constructionists, believing in a minimum of Federal authority and activity and in a maximum of state rights.

Tammany Hall. A political organization in New York City. It originated in the Society of St. Tammany, founded by William Mooney in 1789 and incorporated in 1805 as a fraternal aid association. Its name is adapted from that of an Indian chief, Tamanend, of the Delaware tribe, famous for his virtues and for his wisdom. The society long affected Indian organization and Indian ceremonies; the building which it leases to the political organization known as Tammany Hall is still frequently called the wigwam.

The society, under the guidance of Aaron Burr, took an interest in politics, and in 1798 threw in its lot with the Democratic-Republicans as opposed to the Federalists and was mainly instrumental in

carrying the State of New York for Jefferson in 1800. It later identified its fortunes with the national Democratic party, which succeeded the Democratic-Republican party, and has claimed ever since to represent the Democrats in New York City.

Tammany Hall as a political organization early became distinct in form from the Society of St. Tammany, yet in reality the control of the political organization has remained in the hands of leaders of the society.

Tammany Hall's political influence was based on its charitable activities and on the advantages that its friends might hope to receive when it was in power. Before 1830 it supported a pure Americanism, but, with the extension of the franchise and with the influx of numerous immigrants, it came later to identify its interests with those of the foreign-born citizens. Its control of the foreign vote and its strongly centralized organization have made it during many years the dominant factor in local politics.

In 1872 William M. Tweed, the "boss," or head, of Tammany Hall, was convicted upon the charge of having stolen many millions of dollars from the city of New York. The unpopularity resulting from this exposure compelled Tammany to relax for a time its political control. Later revelations of improper methods and activities have resulted in temporary reverses for the society, but Tammany has had the vitality to recover its power on each occasion, so that it remains both the oldest and the strongest organization in American civic politics.

Tariff for Revenue Only. Tariff policy advocated by the Democratic party during the period of the tariff controversy from 1876 to 1912. Under this policy, taxes on imports were to be levied only for the purpose of raising revenue to meet the expenses of the government, as distinguished from the Republican policy of a protective tariff, the chief purpose of which was to promote American industry by barring or handicapping foreign competition.

Thirteen States. The thirteen American colonies which became the original thirteen states of the Union were New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia, North Carolina, South Carolina, and Georgia.

Tippecanoe and Tyler Too. Refrain of a campaign ballad composed by A. C. Ross, which became the campaign slogan of the Whigs in the picturesque national campaign of 1840. The Whig candidates in that election were William H. Harrison, who had been nicknamed "Tippecanoe" from the battle in which he first gained national fame, and John Tyler.

Tories. The party in colonial politics which supported the authority of the English king and of the royal government. After the Revolution the Tories disappeared as a political party. Some of those who had belonged to it emigrated to Canada, where they were known as the United Empire Loyalists, while others returned to England. The remainder joined the Nationalists, and later the Federalists, who favored a strong central government which could be relied on to enforce law and order and to protect property rights.

Treaties of United States. The following list includes the most important treaties and agreements between the United States and foreign powers. Besides these major pacts, the United States has entered into many treaties with the Indians. It is also a party to many international agreements upon matters of commerce and trade, as well as to treaties providing for international arbitration. See *Treaties* under *Dictionary of World History*.

1782-83 Treaty of Paris. The treaty with Great Britain which terminated the Revolutionary War and recognized the independence of the United States. The treaty recognized the rights of United States fishermen in Newfoundland waters; it also provided that the Mississippi river, at that time the western boundary of the United States, should be open equally to British and to American navigation.

A preliminary agreement was signed at Paris, November 30, 1782. The definitive treaty was signed, also at Paris, on September 3, 1783. The American negotiators were Benjamin Franklin, John Adams, John Jay, and Henry Laurens.

1794 Jay's Treaty. The treaty between Great Britain and the United States negotiated by John Jay. It provided for the withdrawal of British military posts south of the Canada boundary in the Northeast, and settled certain boundary and financial questions. The assertion in the treaty that a neutral flag did not protect enemy merchandise, as well as its vague recognition of the right of search, aroused opposition. Only Washington's personal influence secured its ratification, June 24, 1795.

1795 Treaty with Spain. An agreement which provided for free navigation of the Mississippi, with privilege of deposit at New Orleans, and established a boundary between the United States and the Spanish possessions on the south.

1803 Louisiana Treaty. The treaty with Napoleon which provided for the purchase of the Louisiana territory. The acquirement of the area included in the purchase price of $15,000,000 more than doubled the area of the United States. See *Louisiana Purchase*.

1814 Treaty of Ghent. A treaty between Great Britain and the United States. It provided (1) for the restoration of all territory seized during the war, except certain islands near Passamaquoddy bay, the disposition of which was referred to a commission; (2) for a commission to settle boundary lines between the United States and Canada; (3) for co-operation between the United States and Great Britain in suppressing the slave trade.

1817 Rush-Bagot Convention. Between Great Britain and the United States. It restricted the building, arming, and use of naval vessels on the Great Lakes.

1818 Convention with Great Britain. This agreement provided for fishing rights off Newfoundland and Labrador, for establishing the boundary line between Canada and the United States, from Lake Superior to the Rockies, on the parallel of 49°, and for joint occupation of the Oregon country.

1819 Treaty with Spain. By this treaty, Spain surrendered all claim to West Florida and ceded East Florida. The United States gave up all claim to Texas and agreed to pay to American citizens claims against Spain to the amount of $5,000,000.

1842 Webster-Ashburton Treaty. The treaty with Great Britain which settled the question as to the boundary between Maine and Canada.

1846 Oregon Boundary Treaty. Negotiated with Great Britain. This treaty settled the question of the boundary between Canada and the United States, from the Rocky mountains westward. The dividing line was fixed at the 49th parallel.

1848 Treaty of Guadalupe Hidalgo. A treaty between the United States and Mexico at the close of the Mexican war. It provided for the cession to the United States of New Mexico and California, in return for a cash payment of $15,000,000. The United States also took over the debts of Mexico to American citizens, amounting to about $3,250,000. The territory acquired by the United States included the present states of Arizona, Nevada, Utah, New Mexico, and California, with parts of Wyoming and Colorado.

1850 Clayton-Bulwer Treaty. A treaty between Great Britain and the United States, providing for joint control of a canal to connect the Atlantic and the Pacific by the Nicaragua or any other route. The treaty stipulated that neither party should erect fortifications on the line of the canal, nor assume any sovereign rights over any portion of Central America. This treaty was abrogated by the Hay-Pauncefote Treaty in 1901.

1854 American-Japanese Treaty. Also called Perry's Treaty. A treaty negotiated between the shogun, for Japan, and Commodore Perry, on behalf of the United States, in 1854, by which Japan opened the ports of Yokohama, Kobe, Nagasaki, and Hakodate to foreign commerce. Foreigners had been excluded from Japan for 216 years before this date, with the exception of the Dutch, who, however, were strictly confined to their factory at Deshima.

1868 Burlingame Treaty. The treaty of the United States with China which first provided for recognition of international law by China. It stipulated certain important reciprocal privileges for the signatories.

1871 Treaty of Washington. A treaty negotiated with Great Britain. It provided for arbitration of the Alabama claims, of the San Juan (Vancouver) boundary question, of British Civil War claims, and of the Nova Scotia fisheries dispute.

1898 Treaty of Paris. The treaty with Spain which terminated the Spanish American war. It provided for the independence of Cuba and for the cession of the Philippines, Guam, and Porto Rico to the United States. The United States paid to Spain, under the treaty, $20,000,000.

1901 Hay-Pauncefote Treaty. A treaty signed November 18, 1901, between Great Britain and the United States, with respect to the Panama canal. This treaty abrogated the Clayton-Bulwer Treaty of 1850. It maintained the general principle of neutralization of the canal, but the United States alone was charged with the maintenance of its neutrality. General rights of control and fortification were left undefined. The United States reserved the right to maintain a military police force along the line of the canal for protective purposes, and it was not required to keep the canal open in time of war.

1903 Hay-Bunau-Varilla Convention. A treaty between the United States and Panama, in lieu of the Hay-Herran convention between the United States and Colombia (1903). It provided that the United States should guarantee the integrity of Panama, and that, for a cash payment of $10,000,000 and annual payments of $250,000, the United States should receive full sovereignty over a strip of land 10 miles wide across the isthmus, within which the interoceanic canal should be constructed.

1921 Peace Treaty with Germany. This treaty provided for peace relations, reserving to the United States any rights and advantages which would have accrued under the Treaty of Versailles, and recognizing that the United States was not bound by any provisions of that treaty relating to the League of Nations.

1921 Four Power Pacific Treaty. A treaty negotiated at Washington with England, Japan, and France. It provided for diplomatic adjustment of disputes occasioned by possessions of these powers in the Pacific.

1922 Five Power Armament Treaty. A treaty negotiated with England, Japan, France, and Italy. It provided for limitation of naval armaments.

1923 North Pacific Fisheries Treaty. The first convention made directly by Canada with the United States. It provided measures for the preservation of the halibut fisheries in the north Pacific Ocean.

Trent Affair. In 1861, Captain Wilkes of the United States sloop *Jacinto* intercepted the British steamer *Trent* at sea and removed two Confederate envoys, Messrs. Mason and Slidell, who were accredited to France. The two men were imprisoned at Boston until January 1, 1862, when they were released, on the protest of the British government. Secretary Seward held the British demand to be a recognition of the American doctrine which denied the right of search. See *Impressment and Search.*

Tuscarora (*tŭs'kà-rō'rà*) **War.** The conflict waged between the Tuscarora Indians and the white settlers on the Roanoke river and Pamlico sound in South Carolina. An expedition made up of colonial troops and friendly Indians defeated the hostile Indians in a battle, January 28, 1712. The remnant of Tuscaroras migrated to the neighborhood of Oneida lake, in New York, afterward joining the Iroquois confederacy.

Tweed Ring. A group of politicians, led by William M. Tweed, the "boss" of Tammany Hall, who in 1871 were shown to have defrauded New York City of many millions of dollars. The disclosures were effected through the activity of the *New York Times, Harper's Weekly,* and a so-called Committee of Seventy. Tweed and Mr. A. O. Hall, mayor of the city, were indicted and convicted of fraud. See *Tammany Hall.*

"Unconditional Surrender." The famous slogan coined by General Grant in 1862, when he demanded, in reply to General Buckner's armistice proposal, the surrender of Fort Donelson on the Tennessee river. The full message was: "No terms except unconditional and immediate surrender can be accepted. I propose to move immediately upon your works."

Underground Railroad, The. Popular name applied to the system used by Northern abolitionists before the Civil War, to aid the escape of fugitive slaves. More than 3000 people had a part in the system, and between 1830 and 1860 at least 60,000 slaves escaped by this route. Once across the border between slave and free states, the slave was sure of secret transportation northward. Many hiding places in houses and in out-of-the-way localities where the fugitives were concealed are still to be seen. If pursuit grew too close, the slaves were helped across the Great Lakes into Canada.

Union Labor Party. A party organized in 1886 by members of the newly developing trade-unions, to further the interests of the laboring class. A national ticket was nominated in 1888. The party was the successor of the Greenback Labor party, and it favored a national greenback currency with free coinage of silver. Other planks in its platform were the state ownership of transportation lines, no monopoly of land, woman suffrage, a graduated income tax, and arbitration in labor troubles. After 1888 the majority of this group joined the Populist party. See *Greenback Labor Party, Populist Party.*

Union Party. See *War Democrats.*

Union Savers. Group of Northerners, including both Whigs and Democrats, who, during the pre-war slavery agitation, placed the preservation of the Union above the question of slavery. They were willing to permit slavery to be extended to the territories, if that should be necessary in order to preserve the Union. Henry Clay and Stephen A. Douglas were typical leaders of this group.

United Labor Party. Organized in 1886 as a result of an independent labor movement. In New York City, with Henry George as its candidate for mayor on a single tax platform, the party came close to scoring a notable victory. In 1888, like the less radical Union Labor party, the party nominated a national ticket. It advocated, besides most of the policies supported by the other labor party, the single tax and the public ownership of land. Most of the members of this party joined the People's or Populist party. See *Populist Party.*

Valley Forge. A village on the Schuylkill river, 24 miles west of Philadelphia, famous for the heroic conduct of Washington, Baron Steuben, and the American army of 11,000 men in the winter of 1777-78. After a masterly campaign, which allowed Howe to occupy Philadelphia but kept him from giving aid to Burgoyne, Washington went into winter quarters at Valley Forge, December 17, 1777. The troops suffered from lack of food and clothes; for the people of the neighboring country were not entirely loyal, and supplies stored near by could not be brought to the camp. A fifth of the army, influenced by the glamour of life among the well-fed British in Philadelphia and by the apparent weakness of Congress, deserted. But the large majority of the troops endured their hardships nobly in the little village of log huts, and Baron Steuben drilled the men into capable soldiers.

Venezuela Boundary Arbitration. In January 1895, Venezuelan troops crossed the Cuyuni river, part of the Schomburgk line, into British Guiana, and hoisted the Venezuelan flag in territory which had been in dispute since 1814. The British government issued an ultimatum, whereupon Venezuela appealed to the United States to intervene, in support of the Monroe doctrine. President Cleveland, under authority of Congress, appointed an American commission to examine into the boundary question. The commission concluded its work when Great Britain and Venezuela agreed in February 1897 to submit their claims to arbitration. The award of the arbitrators was issued in 1899, and practically confirmed the British claim to the Schomburgk line; but it gave to Venezuela, Barima Point, at the mouth of the Orinoco, and a tract of country west of the Wenama river.

Vinland (*vĭn'lănd*) **or Wineland.** The name given to the region on the American continent visited by the Norsemen in the early part of the 11th

century. The leaders of the principal Norse expeditions mentioned in the sagas were Leif and Thorfinn. The latter is said to have established a colony which survived for three years. The location of this settlement has long been debated. Recent studies point to Nova Scotia and to the neighborhood of the St. Lawrence river as the most probable scene of early Norse explorations in America.

Virginia and Kentucky Resolutions. These were passed by the Republican legislatures of the two states in 1798 and 1799 in protest against the Federal Alien and Sedition acts. The Virginia Resolutions asserted the duty of the states to *interpose* when the central government exercised dangerous power. The Kentucky Resolutions of 1799 declared *nullification* by the sovereign states to be a proper action in such a case.

War Democrats. Members of the Democratic party in the North who, at the outbreak of the Civil War, pledged the national government their wholehearted co-operation in the conduct of war and in the effort to preserve the Union. Stephen A. Douglas was the most conspicuous leader of this group in the early period of the war. In a number of state elections and in the national election of 1864, many of these Northern Democrats combined with the Republicans, who, in that year and in the years immediately following, adopted the name of the Union or National Union party. Coalition tickets were nominated, resting upon a platform of prosecution of the war to a successful conclusion.

Wars, American. Since the year 1775, the United States has engaged in six major wars. It is commonly assumed that, aside from these six conflicts, whose total duration was 19 years, the military and naval establishments of the United States have played but an insignificant part in the history of the republic. More careful examination of the record shows, however, that, since the founding of the nation, but few years have passed in which either the army or the navy has not been called into action. During several decades following the establishment of the Federal government, the exercise of military power was necessary to enforce Federal authority within the bounds of various states. Throughout the greater part of the 19th century, troubles with Indian tribes called for almost constant activity of the army. In recent years, disturbances along the Mexican border have necessitated the maintenance of an active force in the Southwest.

The navy, with the marine corps, has been frequently called upon to maintain the authority and prestige of the United States in foreign waters and to protect the interests of American citizens. In recent years it has served actively when the United States has been called upon to intervene in Central American affairs.

Watauga (*wà-tô'gà*) **Articles.** The *Articles of Association* drawn up in 1772 by the settlers on the Watauga, one of the headwaters of the Tennessee river. This settlement had been made in 1769 by emigrants from Virginia, led by James Robertson and John Sevier. Moved by the need for self-protection, the men of the thirteen forts or "stations" organized a local government at Robertson's station in the spring of 1772. They drew up in *articles* the first written constitution "ever adopted west of the mountains, or by a community of American-born freemen." These articles established religious freedom and manhood suffrage. A court of thirteen representatives, one from each station, was chosen, which in turn selected a commission of five to manage the affairs of the colony. After six years of this independent existence, Watauga, in 1778, became Washington county in North Carolina.

Whigs. During the Colonial period of American history, the colonists naturally tended to align themselves politically along the lines which marked political divisions in the mother country. The Whigs among the colonists included those who sought to vest greater authority in the colonial assemblies. The Tories, on the other hand, who desired a strong government which would protect them in the property and special privileges which they had acquired by special grants from the crown, supported the authority of the king and the royal government. With the close of the American Revolution, the Tories and the Whigs disappeared as political divisions in the United States, and in their places arose the Federalist and Antifederalist parties. Those who formerly had aligned themselves with the Whigs split into two groups, some of which joined the Federalist party and others the Antifederalist, later the Democratic-Republican, party.

In 1834, the term Whig came into use again, being adopted by a party composed of various elements, including the former members of the National Republican party. United under the leadership of Henry Clay, this party arose in opposition to the Democratic party under the leadership of Andrew Jackson. The platform of the new Whig party centered about a protective tariff, national internal improvements, and a national bank. In 1840, the Whigs elected their presidential ticket, Harrison and Tyler; they were again successful in 1848, when Taylor and Fillmore were elected. With the increasing tension over the slavery issue and the failure of the Whig party to take a positive stand in opposition to slavery, its strength rapidly diminished, and by 1860 the party had practically dissolved.

Whisky Insurrection. A serious rising in western Pennsylvania in 1794, caused by an attempt of the authorities to suppress illicit distillation, which was rife in that region. Some six or seven thousand insurgents were in arms, and the outbreak was suppressed only after 15,000 militia had been called out.

Wilmot Proviso. An amendment to the bill for the purchase from Mexico in 1846 of California and New Mexico, which under Mexican law were "free" territory. This amendment was proposed by David Wilmot of Pennsylvania. It provided that neither slavery nor involuntary servitude should ever exist in the territory to be acquired. Passed by the House, the amendment was defeated in the Senate. The proviso derives its historical importance from its statement of antislavery principle and from its being a center around which the free state and slave state struggle was waged for several years.

Woman's Rights Party. A group which nominated a presidential ticket in 1884 with Belva A. Lockwood for president and Marietta L. Stow for vice president, on a platform of women's political equality with men. In 1888, the party again designated a presidential ticket, with Mrs. Lockwood for president and Alfred H. Love for vice president.

Wyoming Massacre. During the Revolutionary War, in 1778, the settlement in the Valley of Wyoming, Pennsylvania, was attacked by a body of British soldiers, together with a band of Seneca Indians and some Tories who had been expelled from the valley. Most of the able-bodied men were in the field under Washington, and the remaining settlers had taken refuge in Forty Fort, near Wilkes-Barre. About 400, mostly old men and boys, opposed the British force of 1100. They surrendered after losing two-thirds of their little band. After the surrender many were tortured and killed by the Indians.

X Y Z Mission. An American mission dispatched to France in 1797. Attempts were made to bribe them. In the report of the American commissioners to Congress, the initials, X, Y, Z, were substituted for the real names of the French agents.

Yamassee (*yă'mà-sē*) **War.** A series of Indian outbreaks in South Carolina in 1714-15, in the course of which several hundred white settlers were killed. The Yamassees were driven from South Carolina into Florida, which was Spanish territory. The hostility of these Indians has been credited to Spanish instigation.

HISTORICAL PERIODS, EVENTS, AND MOVEMENTS IN THE NEW WORLD

From the Discovery of America by Columbus to the Settlement of Jamestown—1492–1607

1492 Columbus sails from Palos, Spain, and discovers West India islands.
1493 Columbus, on his second expedition, founds town of Isabella on the island of Haiti.
Cattle first brought to America.
1494 Columbus discovers Jamaica.
1497 John Cabot discovers the North American continent, probably Labrador.
1498 Columbus, on his third voyage, discovers mainland of South America.
Sebastian Cabot explores Atlantic coast, Labrador to Carolina.
1499 Voyage of Amerigo Vespucci to coast of Venezuela.
1500 Cortereal explores Labrador and Newfoundland.
Cabral touches coast of Brazil, and claims the country for Portugal.
Amazon river discovered.
1502 Columbus, on his fourth voyage, explores Panama coast.
1504 French fishermen reach the banks of Newfoundland.
1511 Velásquez subjugates Cuba; Havana founded.
1513 Florida discovered by Ponce de León.
The Pacific Ocean discovered by Vasco de Balboa.
1516 Solis discovers Rio de la Plata.
1517 Cordova rediscovers Yucatan.
1519 Hernando Cortés lands in Mexico; Panama settled.
1520 Magellan sails through the Strait of Magellan.
1521 Cortés captures the City of Mexico.
1524 Verrazano explores Atlantic coast northward from Cape Fear.
1525 Pizarro explores coast of Peru.
1526 Cabot explores in South America for Spain.
1527 Spaniards, under Narváez, land in Florida.
1533 Cuzco conquered by Pizarro.
Lower California discovered by Jiminez.
1534 Jacques Cartier enters Gulf of Saint Lawrence.
1535 Cartier ascends Saint Lawrence river to Montreal.
Lima founded by Pizarro; Buenos Aires, by Mendoza.
1540 Coronado discovers the Grand Canyon of the Colorado and the Pueblos of New Mexico.
California coast explored by Spaniards.
1541 De Soto discovers the Mississippi.
Santiago de Chile founded.
1548 La Paz founded.
1549 Bahia established as capital of Brazil.
1562 Jean Ribault explores coast of Florida.
1565 Saint Augustine, Florida, founded by Menéndez.
1567 Caracas and Rio de Janeiro founded.
1572 Drake makes a voyage to South America.
1576 Frobisher, searching for northwest passage, discovers Frobisher's straits.
1583 Sir Humphrey Gilbert takes possession of Newfoundland.
1584 Raleigh's first expedition lands in Virginia.
First book printed at Lima, Peru.
1585 John Davis discovers Davis strait.
English settlers left on Roanoke island.
1586 Sir Francis Drake visits Roanoke Inlet; burns Saint Augustine.
1587 Virginia Dare, first English child born in America.
1590 English settlement at Roanoke island disappears.
1602 Bartholomew Gosnold discovers Cape Cod.
San Diego bay discovered.
1603 Martin Pring explores New England coast.
Champlain's first voyage up the Saint Lawrence river.
1604 Founding of Port Royal (Annapolis), Nova Scotia.
1605 De Monts takes possession of Maine.

From the Settlement of Jamestown to the Declaration of Independence—1607–1776

	British America	French America	Spanish America
1607	English settlement at Jamestown.		
	First settlement in Maine; lasted one year.	1608. Champlain settles Quebec.	
1609	Second charter of Virginia.	1609. Champlain discovers Lake Champlain.	
	Henry Hudson discovers Hudson river.		
1610	The "starving time" in Virginia.	1610. Discovery of Hudson bay.	1610. León, Nicaragua, established at present site.
		French Jesuits settle at Port Royal.	
1612	Third charter of Virginia, including Bermudas.	1612. Champlain, lieutenant governor of Canada.	
1613	French settlement at Mt. Desert island; destroyed by Virginians.		1613. Dutch settle Demerara.
1614	Fort built by Dutch at Manhattan.		
	Captain John Smith explores New England coast.		
1615	Dutch build Fort Orange (Albany).	1615. Champlain and Le Caron visit the Huron country.	
1619	First colonial assembly in Virginia.		
	Dutch ship brings first slaves to Virginia.		
1620	First women brought to Virginia.		
	Pilgrims land at Plymouth, Mass.		
	Peregrine White, first white child born in New England.		
1621	Death of John Carver, first governor of Plymouth colony; succeeded by William Bradford.	1621. Acadia granted to Sir Wm. Alexander, as Nova Scotia, by James I.	
	Treaty between Plymouth colony and Massasoit.	Newfoundland granted to Lord Baltimore.	
	Dutch West India Company founded.		
1622	Settlement at Portsmouth and Dover, N. H.		
1623	First settlement on Manhattan island.		
1624	Lord Baltimore founds a colony at Ferryland, Newfoundland.		1624. The Dutch capture Bahia.
			1625. The Spanish and Portuguese retake Bahia.
1627	Governor Bradford and associates assume debt of Plymouth colony to London merchants.	1627. Colony of Quebec given to the Hundred Associates.	
1628	Settlement at Salem under John Endicott as governor.	1628. The English take possession of Port Royal.	
1629	The company of Massachusetts bay organized.	1629. Sir David Kirke captures Quebec.	
1630	Settlement of Charlestown and Boston; John Winthrop, governor.		1630. The Dutch capture Pernambuco.
1632	Lord Baltimore receives the grant of Maryland.	1632. Richelieu obtains restoration of Canada and Acadia.	Discovery of silver at Cerro de Pasco.
1634	English Catholics settle at Saint Marys, Maryland.		

From the Settlement of Jamestown to the Declaration of Independence—1607–1776—Con.

	British America	French America	Spanish America
1635	First English settlement of Connecticut.	1635. Death of Champlain.	
1636	Roger Williams settles Rhode Island.		
1637	Pequot war begins in Massachusetts.		
1638	Swedes settle Delaware. Harvard college founded. New Haven settled.		
1639	Printing press established by Stephen Daye at Cambridge, Mass. First constitution of Connecticut.	1639. Jesuit mission at Ste. Marie. Ursuline convent established at Quebec. The French attempt a settlement at Green bay, Wisconsin.	
1642		1642. Montreal founded by Maisonneuve.	
1643	New England Confederation formed.		
1644	Indians massacre 300 colonists in Virginia.	1644. Iroquois attack on Montreal.	
1647	Peter Stuyvesant comes to New Amsterdam as governor.		
1649		1649. Iroquois massacre of Huron Indians.	
1652	Mint established in Boston. Coinage of "Boston shillings."		
1655	Delaware brought under Dutch rule.		
1656	Quakers arrive in Boston; they meet persecution.		
1659		1659. Laval, first bishop of New France.	
1660		1660. Dollard's defense of the Long Sault.	
1662	Connecticut charter granted.	1662. French West India Company grant.	1662. Dutch give up Brazil.
1663	Patent for Carolina colony granted by Charles II. Rhode Island charter granted.	1663. Canada made a royal province. Great earthquakes in Canada.	1663. Grant of Guiana by Charles II to Lord Willoughby.
1664	New Amsterdam surrendered to the English. Grant to duke of York. Name changed to New York.		1665. Saint Augustine pillaged by English buccaneers.
1668		1668. Marquette establishes mission at Sault Sainte Marie.	
1669	Fundamental Constitutions of Carolina.	1669. La Salle sails down the Ohio to Louisville.	
1670	South Carolina settled; Charleston. Hudson's Bay Company founded.	Father Allouez begins a mission at Green bay.	
1671	Mackinac island founded.	1672. Count Frontenac, governor of Canada.	1671. Danes occupy Saint Thomas.
1673		1673. Marquette and Joliet discover the Mississippi.	
1675	King Philip's war in Massachusetts.	Fort Frontenac (Kingston, Ont.) built.	
1676	Nathaniel Bacon's rebellion in Virginia.	1679. La Salle launches the *Griffin* on Niagara river and sails to southern end of Lake Michigan.	
1680	New Hampshire made separate colony.	1680. Discovery of the Mississippi by Hennepin.	
1681	William Penn receives charter for Pennsylvania.		
1682	Founding of Philadelphia.	1682. La Salle descends the Mississippi to the Arkansas, and names the valley Louisiana.	
1683	First assembly in New York under English rule.		
1684	Charter of Massachusetts forfeited.		
1685		1685. French in Texas under La Salle.	1685. Dampier, English buccaneer, sacks León.
1686	Andros appointed governor of New England.		
1689	Andros deposed; former governments resumed. King William's war breaks out.	1689. Iroquois capture Lachine.	
1690	French and Indian massacre of settlers at Schenectady, Salmon Falls, and Casco. Colonial congress called in New York.		
1691	New charter for Massachusetts (Plymouth and Maine included).	1691. Nova Scotia retaken by the French.	
1692	Salem witchcraft. College of William and Mary founded in Virginia.		1693. Gold mining begins in Brazil. 1697. France secures western half of Haiti from Spain.
1698			1698. Scotch attempt a settlement on Isthmus of Panama.
1699		1699. French colony under Iberville at Biloxi, in Louisiana.	
1701	Philadelphia incorporated as a city. Yale college founded.		
1702	Queen Anne's war breaks out.	1702. Biloxi colony moved to Mobile.	
1710		1710. Port Royal captured by English fleet.	
1711-12	Tuscarora Indian war in Carolina.		1711. French capture Rio de Janeiro.
1713		1713. Hudson bay, Nova Scotia, and Newfoundland ceded to England.	
1714-15	Yamassee Indian war in Carolina.		
1718		1718. New Orleans founded.	
1719			1719. French capture Pensacola.
1723			1723. Pensacola restored to Spain.
1726			1726. Spaniards establish themselves at Montevideo.
1729	North and South Carolina separated; become royal provinces.	1729. Massacre of French at Natchez by Indians.	
1732	First stage between Boston and New York.		

From the Settlement of Jamestown to the Declaration of Independence—1607–1776—Con.

	British America	French America	Spanish America
1733	Settlement of Georgia.		
1740			Governor Oglethorpe attacks Florida.
1744	King George's war breaks out.		
1745		Louisburg captured by New England troops and British naval force.	
1748		Louisburg restored to France.	
1749		Fort Rouille (Toronto) built.	
1750	First theater opened in New York.		Treaty between Spain and Portugal marking boundaries in South America.
1753	George Washington sent by Virginia to the Ohio region.		
1754	Albany Congress. French and Indian war begins.	Halifax founded.	
1755	Braddock defeated at Fort Duquesne. Battle of Lake George.	French defeat Braddock near Fort Duquesne.	
1758	Fort Frontenac surrendered to the English.	Louisburg captured by the English.	
1759	Battle of Quebec—Wolfe and Montcalm killed.	Quebec surrenders to the English.	Royal edict expelling Jesuits from Brazil.
1760		Montreal surrendered to the British.	
1761	James Otis argues against writs of assistance in Massachusetts.	Louisiana ceded to Spain.	
1763	Pontiac's war begins.	Nova Scotia and Canada permanently ceded to the British.	Florida ceded to Great Britain. French Guiana colonized. Rio de Janeiro made capital of Brazil.
1764		English settle in New Brunswick.	
1765	Delegates of the colonies assemble in New York to resist the Stamp act.		
1766	Stamp act repealed.		Large colony of Acadians arrive in Louisiana.
1767	Parliament passes Townshend revenue acts.		Jesuits expelled from Spanish America.
1768	British troops arrive in Boston; selectmen refuse quarters for them.		Revolt of the French against Spanish rule in Louisiana.
1769			Spanish missions established in California; San Diego settled; San Francisco bay discovered.
1770	Boston Massacre.		
1772	Destruction of the *Gaspee*.		
1773	Tea thrown overboard in Boston harbor. Virginia appoints committees of correspondence.		Santiago, Guatemala, destroyed by an earthquake.
1774	Boston Port bill. The Continental Congress adopts a declaration of rights.	Passage of the Quebec act.	
1775	Beginning of the Revolutionary War with the battle of Lexington. Battle of Bunker Hill. Washington appointed commander in chief of the American forces.	Gen. Montgomery captures Montreal and Saint John. Death of Montgomery at Quebec and failure of American campaign.	
1776	First Union flag unfurled at Cambridge, Mass. British evacuate Boston. Declaration of Independence adopted by Congress at Philadelphia.		Paraguay placed under the jurisdiction of Buenos Aires. Buenos Aires made capital of the viceroyalty.

From the Declaration of Independence to the Adoption of the Constitution—1776–1789

	United States	Canada	Spanish North America	South America
1777	Landing of Lafayette at Charleston. Battle of Princeton. Battle of Brandywine. British army occupies Philadelphia. Surrender of Burgoyne at Saratoga. Washington and his army at Valley Forge.			Treaty of San Ildefonso, establishing Spanish and Portuguese boundaries in South America.
1778	Treaty of alliance with France. Evacuation of Philadelphia by the British. Battle of Monmouth.	Frederick Haldimand, governor of Canada. *Montreal Gazette* published.		
1779	War in the South. British overrun South Carolina. Stony Point captured by Wayne. Paul Jones gains naval victory over the British off the coast of Scotland.	Library founded at Quebec.	Baton Rouge captured from the British.	
1780	Benedict Arnold bargains treasonably to surrender West Point. Major André hanged as a spy. Battle of King's Mountain, S. C.	Coteau du Sack canal built.		Insurrection of Peruvians under Amaru.
1781	Battles of Cowpens, Guilford Court House, and Eutaw Springs. Cornwallis surrenders at Yorktown. Articles of Confederation ratified.			The English admiral Rodney takes possession of Guiana.

From the Declaration of Independence to the Adoption of the Constitution—1776–1789—Con.

	United States	Canada	Spanish North America	South America
1781	Bank of North America established at Philadelphia.			
1782	Holland recognizes the independence of the United States. Preliminary articles of peace signed at Paris.	1782. United Empire Loyalists settle in Nova Scotia.		1782. France takes Guiana from England.
1783	Denmark, Sweden, Spain, and Russia recognize the independence of the United States. Treaty of peace signed with Great Britain.	1783. Saint John, N. B., founded. Kingston founded. United Empire Loyalists settle in Upper Canada.		1783. Dutch colonies restored to Holland. Spain regains Florida from England.
1784	Connecticut and Rhode Island adopt slave emancipation measures. New Hampshire constitution anti-slavery.	1784. Province of New Brunswick formed.	1784. Island of Saint Bartholomew transferred to Sweden.	
1785	Thomas Jefferson appointed minister to France; John Adams to Great Britain.			
1786	Daniel Shays's rebellion in Massachusetts. Annapolis Convention.			1786. Pacifications of the Negroes and tribes in Dutch Guiana.
1787	Constitutional Convention assembles at Philadelphia; adopts constitution for the United States. Ordinance for Northwest Territory passed by Continental Congress.	1788. King's college, Windsor, Nova Scotia, founded.		

From the Adoption of the Constitution of the United States to the Close of the Civil War—1789–1865

	United States of America	Canada	Spanish and French North America	South America
1789	George Washington, president; John Adams, vice president. First Congress meets in New York. First tariff bill passed.	1789. Sir Alexander Mackenzie discovers Mackenzie river.	1789. Settlers from North Carolina arrive in Louisiana.	
1790	Indian war in Northwest Territory. Census enumeration ordered.			
1791	Bank of the United States established. Vermont admitted as a state.	1791. Quebec divided into Upper and Lower Canada.	1791. Negroes of Haiti revolt against France.	
1792	Corner stone of White House laid. Kentucky admitted as a state. Decimal system of coinage adopted. First mint established at Philadelphia.	1792. First parliaments of Upper and Lower Canada meet.	1792. First refined cane sugar made in Louisiana.	
1793	Whitney invents the cotton gin. Washington receives all the electoral votes for re-election. Corner stone of United States Capitol laid by Washington. Political parties assume names of Republican and Federalist.	1793. Slavery Abolition act passed in Upper Canada.		
1794	First ships of United States Navy authorized. Whisky insurrection in Pennsylvania. Jay's Treaty with England.	1794. Jay's Treaty provides agreements relative to commerce, navigation, and boundary.	1794. Refined sugar produced on commercial scale.	
1795	Antirent troubles in New York.	York founded.	1795. Maroon war in Jamaica.	
1796	Tennessee admitted as a state. Washington issues his Farewell Address.		France secures Spanish portion of Haiti.	1796. Guiana again in British possession.
1797	John Adams, president; Thomas Jefferson, vice president. X Y Z mission to France.	1797. York (Toronto) becomes capital of Upper Canada.		
1798	Alien and Sedition laws passed. Commercial intercourse with France suspended. Naval conflict results.	1798. Northwest Fur Company completes canal at Sault Sainte Marie.		
1798-99	Virginia and Kentucky Resolutions.			
1799	Death of George Washington.			
1800	Capital removed from Philadelphia to Washington.			
1801	Thomas Jefferson, president; Aaron Burr, vice president. Congress establishes the District of Columbia. Tripoli declares war against the United States.		1801. Louisiana transferred to France by Spain. Toussaint L'Ouverture founds republic of Santo Domingo.	1802. The Dutch resume possession of British Guiana.
1803	Louisiana purchased for $15,000,000. Ohio admitted as a state.	1803. Slavery illegal in Lower Canada.	1803. French quit Haiti.	1803. British Guiana finally acquired.
1804	Vice president Burr kills Hamilton in a duel.			
1805	Jefferson, president, 2d term; George Clinton, vice president.			1806. Miranda's expedition against Caracas.

From the Adoption of the Constitution of the United States to the Close of the Civil War—1789–1865—Con.

	United States of America	Canada	Spanish and French North America	South America
				1806-07. Argentina repels two British attacks.
1807	Embargo act passed. Fulton's steamboat *Clermont* steams from New York to Albany.			
1808	Importation of slaves prohibited.		1808. Rebellion against France in Santo Domingo.	1808. Royal family of Portugal arrive in Brazil.
1809	James Madison, president; George Clinton, vice president. Embargo act repealed.	1809. Steamer *Accommodation* arrives at Quebec from Montreal.		1809. Ecuador makes unsuccessful attempt to secure independence.
			1810. Mexican revolt begins under Hidalgo.	1810. Movement for independence begins in Argentina and in Chile.
1811	Trading posts first established among the Indians. Battle of Tippecanoe with Indians. First steamboat on the Ohio.			1811. Paraguay declares its independence. Venezuela proclaims its independence; forms constitution. New Granada declares independence. Spanish defeated in Uruguay.
1812	Louisiana admitted as a state. War declared against Great Britain. American successes at sea: *Constitution* defeats *Guerrière*; *Wasp* defeats *Frolic*; *United States* defeats *Macedonian*; *Constitution* defeats *Java*. Canada invaded unsuccessfully.	1812. Sir George Prevost, governor. Capture of Detroit by General Brock. Battle of Queenston Heights; Americans defeated; Brock killed. Red River settlement, led by Lord Selkirk.		1812. Great earthquake in Caracas. Battle of Tucumán. San Martín begins his revolutionary career.
1813	Perry captures the English fleet on Lake Erie. Madison, president, 2d term; Elbridge Gerry, vice president. Battle of the Thames.	1813. York (Toronto) captured and burned by Americans. American fleet defeated on Lake Ontario.	1813. Mexico declares independence.	1813. Bolivar begins his military career in New Granada.
1814	Battle of Lundy's Lane. British capture and burn Washington. Hartford Convention meets to oppose war. Stonington, Conn., bombarded by British fleet.	Americans defeated at Chrystler's Farm. Buffalo burned by British.	1814. Provisional constitution formed for Mexico. Spain receives Santo Domingo from France.	1814. Chile temporarily reconquered by Spain. Montevideo captured by the revolutionary army of Buenos Aires. French Guiana restored to France by Portugal.
1815	Jackson defeats the British at New Orleans. Treaty of Peace with Great Britain ratified. Algerian war. Decatur negotiates Treaty.			1815. Brazil becomes a kingdom.
1816	Second Bank of the United States chartered. The *Ontario*, first steamboat on Great Lakes. Indiana admitted as a state. American Colonization Society formed; founds Liberia (1822).	1816. Half-breeds assault Fort Douglas in Red River settlement.		1816. Buenos Aires declares its separation from Spain. Francia made perpetual dictator of Paraguay.
1817	James Monroe, president; Daniel D. Tompkins, vice president. Mississippi admitted as a state. First instruction of deaf-mutes in America by T. H. Gallaudet, at Hartford, Conn. Seminole war.	1817. First bank note issued at Montreal.	1817. Unsuccessful insurrection in Mexico ends.	1817. Chileans defeat Spanish. Bolivar leads another revolt in New Granada. Brazilians capture Montevideo.
1818	Illinois admitted as a state. Pensions granted Revolutionary soldiers.	1818. United States and Great Britain make agreement to limit war vessels on Great Lakes.		1818. Chileans declare independence; adopt constitution. O'Higgins, supreme director.
1819	The *Savannah*, the first transatlantic steamship. Alabama admitted as a state. Florida purchased by the United States from Spain. Maine separated from Massachusetts.			1819. New Granada and Venezuela form Republic of Colombia. Bolivar, president.
1820	Maine admitted as a state. Missouri Compromise bill passed.	1820. Earl of Dalhousie, governor.		1820. Revolt in Peru.

From the Adoption of the Constitution of the United States to the Close of the Civil War—1789–1865—Con.

	United States of America	Canada	Mexico, Central America, and West Indies	South America
1821	Monroe, president, 2d term; Tompkins, vice president. Missouri admitted as a state. Andrew Jackson appointed governor of Florida.	1821. McGill college founded.	1821. Mexico becomes independent of Spain. Santo Domingo revolts from Spain. Costa Rica independent.	1821. San Martín, protector of Peru.
1822	Independence of Spanish South American states recognized. Gaslight introduced into Boston.		1822. Mexico, an empire under Iturbide. Costa Rica united to Mexico.	1822. Brazil declares its independence. Pedro I, emperor. Ecuador, freed from Spain, joins Republic of Colombia.
1823	President Monroe proclaims the "Monroe Doctrine."		1823. Federation of Central American states.	
1824	General Lafayette arrives in New York. Protective Tariff law.		1824. Federal republic proclaimed for Mexico.	1824. Bolivar, dictator of Peru. Ayacucho, last battle in wars of independence.
1825	John Quincy Adams, president; John C. Calhoun, vice president. Treaty with Russia ratified. Erie canal finished.			1825. Argentine constitution decreed. Upper Peru, independent, takes the name of Bolivia. Uruguay declares itself independent.
		1826. Canada Company chartered. Bytown (now Ottawa) founded.	1826. First survey for Nicaragua ship canal. Panama congress.	1826. Bolívar renounces dictatorship of Peru. Callao, last Spanish stronghold, surrenders.
1827	First railroad in United States built at Quincy, Mass.	1827. King's college founded at York.	1827. Expulsion of Spaniards from Mexico decreed.	1827. Treaty between Buenos Aires and Brazil, acknowledging independence of Uruguay.
1828	"Tariff of Abominations."			1828. Peru at war with Bolivia and Colombia.
1829	Andrew Jackson, president; John C. Calhoun, vice president.	1829. Welland canal from Port Dalhousie to Port Robinson completed.		1829. Venezuela separates from New Granada.
1830	Great speeches of Webster and Hayne delivered in the United States Senate on "nullification." First steam railroad for passengers opened at Charleston, S. C.			1830. Death of Bolivar. General Flores, first president of Ecuador. Ecuador separates from Colombia; first constitution.
1831	The *Liberator* established by William Lloyd Garrison. First national nominating convention (Antimasonic).			1831. Revolution in Brazil. Abdication of Dom Pedro.
1832	Black Hawk war. Nullification in South Carolina. United States Bank bill vetoed by the president.	1832. Newfoundland obtains a colonial legislature.		1832. Patagonia visited by Charles Darwin, the scientist. Constitution for New Granada, Santander, president.
1833	Jackson, president, 2d term; Martin Van Buren, vice president. Bank deposits removed from the National Bank.	1833. Constitutional government in Newfoundland.	1833. Santa Anna, president of Mexico.	1833. Sixth Chilean constitution formed; still in force.
1834	Whig party first takes its name.			
1835	Seminole war begins.			1835. Rosas becomes supreme ruler in Argentina.
1836	Massacre at the Alamo, Texas. Arkansas admitted as a state. Sam Houston elected president of Texas.	1836. First railway in Canada opened.	1836. Texas declares her independence. Spain and Mexico sign a treaty.	1836. Confederation of Peru and Bolivia under Santa Cruz.
1837	Martin Van Buren, president; Richard M. Johnson, vice president. Great commercial panic. Morse system of telegraphy patented. Lovejoy murdered at Alton, Ill.	1837. Papineau and Mackenzie rebellion.		
1838	*Great Western* and *Sirius* cross the Atlantic.	1838. Canadian rebellion suppressed.	1838. Mexico declares war against France. Slavery abolished in British West Indies.	
1839	Vulcanized rubber patented by Goodyear.	1839. Issuance of Lord Durham's report on Canada.	1839. Termination of the Mexican-French war. Dissolution of Central American Confederation.	1839. Dissolution of Confederation of Peru and Bolivia.

FROM THE ADOPTION OF THE CONSTITUTION OF THE UNITED STATES TO THE CLOSE OF THE CIVIL WAR—1789–1865—CON.

	UNITED STATES OF AMERICA	CANADA	MEXICO, CENTRAL AMERICA, AND WEST INDIES	SOUTH AMERICA
		1840. Upper and Lower Canada reunited.		1840. Death of Francia in Paraguay. Spain acknowledges Ecuador's independence.
1841	William H. Harrison, president; John Tyler, vice president. Harrison dies April 4; John Tyler, president.	1841. First Parliament of Canada meets at Kingston.	1841. Santa Anna, dictator of Mexico.	
1842	Dorr's rebellion in Rhode Island. Webster-Ashburton Treaty with England signed.			1842. Independence of Argentine Republic recognized by Spain. Republic established in Paraguay.
1843	Bunker Hill monument dedicated.	1843. McGill university, Montreal, opened.		
1844	Morse telegraph completed from Baltimore to Washington.	1844. Toronto *Globe* first published.	1844. Dominican Republic set up by revolt from Haiti.	1844. López, president of Paraguay. Spain acknowledges Chilean independence.
1845	James K. Polk, president; George M. Dallas, vice president. Florida admitted as a state. United States Naval Academy established at Annapolis. Texas admitted as a state. Petroleum discovered near Pittsburgh.			1845. England and France blockade Buenos Aires, pending civil war. Venezuela's independence recognized by Spain.
1846	Mexican war begins. Wilmot Proviso. Smithsonian Institution established. Oregon Treaty with Great Britain. Iowa admitted as a state. Elias Howe patents his sewing machine.	1846. Earl of Cathcart, governor.	1846. Gen. Mejía of Mexico issues proclamation of hostility to the United States; War with United States.	1846. Civil war period of 15 years begins in Ecuador. Spain recognizes Bolivian independence.
1847	Settlement on Great Salt lake, Utah, founded by the Mormons.			1847. Slavery prohibited in New Granada.
1848	Gold discovered near Colonia, Cal. Peace signed with Mexico; Acquisition of New Mexico and California. Wisconsin admitted as a state. Corner stone of Washington monument laid.	1848. Responsible government established.	1848. Peace between the United States and Mexico; treaty of Guadalupe Hidalgo.	1848. Belzu, president of Bolivia; liberal policy.
1849	Zachary Taylor, president; Millard Fillmore, vice president. Rush of gold hunters to California begins.		1849. Soulouque, emperor of Haiti.	1849. First export of guano from Peru.
1850	Death of President Taylor, July 9; Millard Fillmore, president. California admitted as a state. Clayton-Bulwer Treaty with Great Britain signed. Fugitive Slave bill passed. Clay's compromise bills passed.	1850. Riots in Montreal; Parliament House burned.	1850. Cuba invaded by American filibusters under López. Spain acknowledges independence of Costa Rica and Nicaragua.	1850. Steamship line from Brazil to Europe inaugurated. Jesuits expelled from New Granada.
1851	Vigilance committee organized in San Francisco.		1851. Second invasion of Cuba; López shot.	1851. Manuel Montt, president of Chile.
1852	United States mint authorized at San Francisco. Deaths of Henry Clay and Daniel Webster.	1852. Laval university chartered.		1852. Slave trade suppressed in Brazil.
1853	Franklin Pierce, president; Wm. Rufus King, vice president. Gadsden Purchase.		1853. Santa Anna again president of Mexico.	1853. Rosas defeated in Argentina.
1854	Treaty between United States and Japan. Kansas-Nebraska bill approved. Ostend Manifesto issued.	1854. First petroleum wells bored. Clergy reserves abolished. Seignioral land tenure abolished.	1854. Carrera proclaimed president for life in Guatemala.	1854. Buenos Aires separates from Argentine confederacy. First railway in Brazil. Slavery abolished in Venezuela.
1855	Completion of Panama railroad.	1855. Suspension bridge at Niagara Falls opened.	1855–60. Central America invaded by American filibusters under Walker.	
1856	Civil strife in Kansas. First Republican national convention.	1856. Grand Trunk railroad opened.		
1857	James Buchanan, president; J. C. Breckinridge, vice president. Dred Scott decision. Great financial panic in United States. First attempt to lay transatlantic cable. First state agricultural college established at Lansing, Mich.	Allan steamship line established.	1857. Mexican constitution established.	1857. Linares, president in Bolivia; in office four years.
1858	Minnesota admitted as a state. Second treaty with China signed. First message over Atlantic cable. Lincoln-Douglas debates in Illinois.	1858. Ottawa made the capital. Decimal system of coinage adopted.	1858. Mexican constitution annulled by church party. Civil war in Mexico. Haiti, a republic.	
1859	Oregon admitted as a state. John Brown's raid.		1859. Juárez of Mexico confiscates church property.	1859. Buenos Aires reunited to Argentine confederacy.

From the Adoption of the Constitution of the United States to the Close of the Civil War—1789–1865—Con.

	United States of America	Confederate States of America	Canada	Mexico, Central America, and West Indies	South America
1860	South Carolina passes ordinance of secession from the Union. Morrill high tariff bill passed.		1860. Prince of Wales visits Canada.		1860. Revolutions and insurrections prevail in Uruguay for next thirty years.
1861	Abraham Lincoln, president; Hannibal Hamlin, vice president. Secession of Mississippi, Florida, Alabama, Georgia, Louisiana, Texas, Virginia, North Carolina, Arkansas, and Tennessee. Attack on Fort Sumter. Kansas admitted as a state. Southern states form a confederacy. McClellan appointed commander in chief. Mason and Slidell taken from British vessel.	1861. Jefferson Davis, president; A. H. Stephens, vice president.	1861. Gold found in Nova Scotia.	1861. Juárez, president of Mexico. Mexican troubles with England, France, and Spain. Dominican Republic united to Spain.	1861. Pérez, president of Chile. In Bolivia, beginning of period of anarchy and loss of prestige. Mosquera, president in New Granada. New Granada becomes United States of Colombia.
1862	Slavery abolished in District of Columbia. Treaty with Great Britain for suppression of slave trade. Congress passes act to prevent polygamy in the territories. Greenbacks first issued. Morrill Land Grant act for agricultural colleges.	1862. Capture of New Orleans by Farragut and Butler. Battle of Fair Oaks. Robert E. Lee in command of Confederate armies. Battles before Richmond. Battle of Fredericksburg. Battle of Murfreesboro.	1862. Macdonald, premier	1862. England and Spain disapprove Mexican monarchy for Maximilian.	1862. General Mitre becomes president of Argentine Republic. The younger López elected president of Paraguay.
1863	Emancipation proclamation. W. Va. admitted as a state. Battle of Gettysburg. Draft riots in New York.	1863. Battle of Chancellorsville. Siege of Vicksburg. Battle of Chickamauga. Battle of Lookout Mountain.		1863. Mexico occupied by the French. Spain acknowledges independence of Guatemala.	1863. Falcon, president of Venezuela.
1864	U. S. Grant, lieutenant general. Fight between *Kearsarge* and *Alabama*. Fugitive Slave law repealed. Premium on gold, 285 per cent. Nevada admitted as a state. President calls for 500,000 volunteers. Additional call for 300,000 volunteers. Modoc Indian war begins.	1864. Grant's Virginia campaign. Battle of the Wilderness. Battle of Spottsylvania Court House. Battle of Cold Harbor. Atlanta campaign. Capture of Mobile. Sherman's march to the sea. Thomas defeats Hood at Nashville.	1864. Confederates in Canada plan raids.	1864. Maximilian, emperor of Mexico.	1864. Paraguayan war.
1865	Lincoln, president, 2d term; Andrew Johnson, vice president. Hampton Roads Conference. President Lincoln shot, April 14; Andrew Johnson, president, April 15. General amnesty proclamation. Habeas Corpus act restored in Northern states. Thirteenth amendment passed, prohibiting slavery.	1865. Confederate Congress adjourns *sine die*. Richmond evacuated by Confederates. Lee surrenders at Appomattox, April 9. Johnston, Morgan, Taylor, and Kirby-Smith surrender. Jefferson Davis captured.	1865. Quebec Resolutions favoring confederation of provinces passed in Quebec legislature.	1865. United States protests against French occupation of Mexico. Insurrection in Jamaica. Spain withdraws from Santo Domingo. Spain recognizes independence of Salvador. Carrera dies in Guatemala.	1865. Agassiz makes scientific expedition up the Amazon. American congress at Lima, Peru. Treaty between Brazil, Uruguay, and Argentina against Paraguay. Four years' war follows. Religious toleration begins in Chile. Chile declares war against Spain.

From the Close of the Civil War, 1865, to the Present Time

	United States of America	Canada	Mexico, Central America, and West Indies	South America
1866	Civil Rights bill passed over president's veto. Atlantic telegraph completed. Shoshone Indian war begins.	1866. Invasion of Canada threatened by Fenians.	1866. Napoleon III agrees with United States to withdraw French troops from Mexico.	1866. Spaniards bombard Valparaíso, Chile. Bolivia cedes territory to Chile.
1867	Nebraska admitted as a state. Alaska transferred by Russia to the United States. Reconstruction acts passed over president's veto.	1867. British North America act forms Dominion of Canada by union of Upper and Lower Canada, Nova Scotia, and New Brunswick. Dominion Day, July 1. Lord Monck, first governor-general of Canada. New Parliament at Ottawa.	1867. Maximilian, Miramón, and Mejía tried in Mexico and shot. Republic re-established in Mexico.	1867. Bolivia cedes territory to Brazil.
1868	President Johnson impeached, tried, and acquitted. Readmission of Southern states to representation in Congress begins. Burlingame Treaty with China signed. Fourteenth amendment adopted.	1868. Agitation against confederation in Nova Scotia. Fenian raid repelled. Sir John Young, governor-general.	1868. Insurrection of Creoles in Cuba under Céspedes; beginning of ten years' war. Santo Domingo negotiates treaty for annexation to the United States.	
1869	U. S. Grant, president; Schuyler Colfax, vice president. Union Pacific and Central Pacific railroads opened for traffic. Financial panic in New York.	1869. Newfoundland refuses to join the Dominion. Hudson's Bay Company territory purchased by the Dominion.	1869. Filibusters again attack Cuba; repelled.	1869. Asunción occupied by allied troops of Argentina, Brazil, and Uruguay.
1870	Northern Pacific railroad begun. Fifteenth amendment ratified.	1870. Rupert's Land made the Province of Manitoba.	1870. Continual insurrections in Cuba.	1870. Guzmán Blanco begins 20 years of power as real ruler of Venezuela. Republican party in Brazil founded. Death of López in Paraguay; constitution. First Peruvian railway opened.
1871	Legal Tender act declared constitutional. "Tweed Ring" in New York exposed. Great fire in Chicago. Treaty of Washington signed with Great Britain.	1871. British Columbia united to the Dominion. Departure of last battalion of Royal troops. Uniformity of currency established.	1871. Juárez, president of Mexico. Insurgents led by Porfirio Diaz. Present constitution of Costa Rica drawn up.	1871. Brazilian law passed for gradual emancipation of slaves.
1872	Geneva award of $15,500,000 made to the United States. Great fire in Boston; loss $80,000,000. Modoc war in California. Grant, president, 2d term; Henry Wilson, vice president.	1872. Lord Dufferin, governor-general.	1872. Death of Juárez in Mexico	
1873	Credit Mobilier investigation by Congress. One-cent postal cards issued. Financial panic sweeps entire country.	1873. Prince Edward Island joins the Dominion.	1873. Slavery abolished in Porto Rico.	1873. Defensive alliance of Peru and Bolivia, against Chile.
1875	Act authorizing the resumption of specie payments, beginning January 1, 1879.	1875. Icelanders settle in Northwest Territories.		1874. Treaty between Bolivia and Chile about Atacama and the nitrate deposits.
1876	Massacre of Custer's troops by Sitting Bull. Centennial exposition at Philadelphia. Colorado admitted as a state.	1876. Intercolonial railway opened from Quebec to Halifax.		1876. Venezuela renounces papal authority. Beginning of Daza's notorious dictatorship in Bolivia.
1877	Electoral commission appointed. Rutherford B. Hayes, president; William A. Wheeler, vice president. Great railroad strike. "Molly Maguires" hanged in Pennsylvania. War with the Nez Percés Indians. Anti-Chinese movement in San Francisco. Edison announces his phonograph.	1877. Great fire at Saint John, New Brunswick. Canadian fisheries award by Halifax commission.	1877. Porfirio Diaz, provisional president of Mexico.	
1878	Bland Silver bill passed over president's veto. Electric lighting introduced by Edison. First telephone exchange established.	1878. Marquis of Lorne, governor-general. Second premiership of Sir John A. Macdonald begins, —Conservative.	1878. Surrender of insurgent government in Cuba.	1878. President Hayes decides El Chaco boundary question in favor of Paraguay.

From the Close of the Civil War, 1865, to the Present Time—Con.

	United States of America	Canada	Mexico, Central America, and West Indies	South America
1879	United States government resumes specie payment. Women permitted to practice before United States courts. French Atlantic cable laid.	1879. Industrial exhibition at Ottawa.		1879. War of the Pacific, between Chile on one side and Peru and Bolivia on the other.
1880	Immigration treaty with China.	1880. Royal Canadian Academy of Arts founded.	1880. Manuel González, president of Mexico.	1880. Buenos Aires made the capital of Argentina. Spain acknowledges Paraguay's independence. Daza deposed in Bolivia; Campero, president.
1881	James A. Garfield, president; Chester A. Arthur, vice president. President Garfield shot, July 2; Chester A. Arthur, president, September 20. International Cotton exposition at Atlanta, Ga.	1881. Contract for Canadian Pacific railway ratified. Last British soldiers leave the Dominion.		1881. Lima occupied by the Chileans. United States mediates in boundary dispute between Chile and Argentina. Spain recognizes Colombia's independence.
1882	Star Route trials begin. War with the Apache Indians. Chinese Exclusion act passed.	1882. Northwest Territory beyond Manitoba divided into Assiniboia, Saskatchewan, Alberta, and Athabaska. First colony of Russians settle in Northwest Territory.	1882. Heureux, president of Dominican Republic. In power 17 years.	
1883	Northern Pacific railroad completed. Opening of the Brooklyn bridge. Pendleton Civil Service act passed.	1883. Conflicts between Catholics and Orangemen in Newfoundland. Standard time adopted. Marquis of Lansdowne, governor-general.	1883. Ancient city discovered in Sonora, Mexico.	1883. Peace treaty signed by Chile and Peru.
1884	Great floods in the Ohio valley. Financial crises in New York.		1884. Porfirio Diaz, president of Mexico (to 1911).	1884. Treaty of Valparaíso, establishing truce between Chile and Bolivia.
1885	Grover Cleveland, president; Thomas A. Hendricks, vice president. Apache war in New Mexico. World's industrial exposition at New Orleans.	1885. The Riel insurrection in Northwest.	1885. Concessions to the Nicaragua canal company granted by Nicaragua.	
1886	Railroad strikes and anarchistic riots. Silver certificates authorized. Bartholdi's Statue of Liberty unveiled.	1886. Fisheries dispute with United States. City of Vancouver founded.	1886. Slavery abolished in Cuba. Present constitution of Salvador adopted.	1886. Balmaceda, president of Chile. Colombia becomes a centralized republic. Politico-religious struggles begin.
1887	Interstate commerce commission created.	1887. Great railway bridge at Lachine completed. Anthracite coal first mined in Canada.		
1888	Chinese immigration further restricted.	1888. Lord Stanley, governor-general.		1888. Slavery totally abolished in Brazil. Colombia allows religious orders to return.
1889	Benjamin Harrison, president; Levi P. Morton, vice president. Johnstown flood. Pan-American congress meets in Washington. North and South Dakota, Washington, and Montana admitted as states. Oklahoma opened for settlement.	1889. Northwest Territories given responsible government.		1889. Revolution at Rio de Janeiro; emperor banished; republic declared.
1890	Idaho and Wyoming admitted as states. People's party convenes at Topeka, Kansas. McKinley tariff goes into effect. Sioux war; Sitting Bull killed.	1890. Dominion Commons passes a resolution of loyalty to Great Britain.		1890. First Brazilian congress meets. Great financial crisis in Argentina.
1891	Lynching of Italians in New Orleans. National People's party organized.	1891. Canadian Pacific railway completed. First Pacific mail steamer arrives at Vancouver from Yokohama. Saint Clair tunnel, connecting Canadian and United States railways, opened.		1891. Civil war in Chile; Jorge Montt becomes president. Mob at Valparaíso assaults United States sailors. Brazilian republican constitution adopted. Fonseca, president.
1892	Bering Sea dispute referred to arbitration.	1892. Dominion discriminates against United States in use of Welland canal.		Mutiny and insurrections. Peixoto becomes president.

FROM THE CLOSE OF THE CIVIL WAR, 1865, TO THE PRESENT TIME—CON.

	UNITED STATES OF AMERICA	CANADA	MEXICO, CENTRAL AMERICA, AND WEST INDIES	SOUTH AMERICA
1893	Grover Cleveland, president; Adlai E. Stevenson, vice president. Columbian exposition opened at Chicago. Parliament of religions at Chicago. Chinese Exclusion bill approved. Great financial depression. Silver Purchase act repealed.	1893. Canal tolls arranged with U. S. Earl of Aberdeen, governor-general. Bering Sea arbitration.	1893. Zelaya elected president of Nicaragua (to 1910).	1893. Insurrections in Argentina. Naval revolt in Brazil.
1894	Wilson tariff bill passed. Coal and railroad strikes. Republic of Hawaii recognized. New treaty with Japan.	1894. Intercolonial Congress opened at Ottawa.	1894. Spain recognizes independence of Honduras.	1894. Moraes, president of Brazil.
1895	Free silver movement an important issue. Special message of the president on the Venezuelan question.	1895. First exhibition in Northwest opened at Regina.	1895. Cuba, in rebellion, demands autonomy from Spain. Weyler issues his famous *reconcentrado* order in Cuba.	1895. Naval revolt in Brazil suppressed. Two treaties about territory between Bolivia and Chile. Venezuela boundary dispute with England.
1896	Treaty with the Choctaw Indians.	1896. Sir Wilfrid Laurier, Liberal, becomes premier.		
1897	William McKinley, president; Garret A. Hobart, vice president. Universal postal congress meets in Washington. Strikes among coal and iron miners. Dingley tariff bill goes into effect.	1897. School question settled in Manitoba. Commission for Yukon gold region appointed.	1897. Weyler recalled from Cuba; Blanco appointed captain general.	1897. Venezuela ratifies boundary treaty with Great Britain.
1898	City government of Greater New York inaugurated. War with Spain. Admiral Dewey destroys the Spanish fleet at Manila. Naval battle at Santiago; destruction of Cervera's fleet. Treaty of Paris: United States acquires sovereignty over Porto Rico and the Philippines. Annexation of Hawaii.	1898. Great influx of miners to Yukon gold region. Earl of Minto, governor-general. Joint high commission meets at Quebec to settle difficulties between Canada and U. S.	1898. United States battleship *Maine* blown up in Havana harbor. Invasion of Cuba and Porto Rico by United States. 1898–1902. Cuba temporarily governed by the United States war department.	1898. Chile and Peru adopt convention in Tacna-Arica controversy. Campos Salles, president of Brazil; financial reforms. First Latin American scientific congress at Buenos Aires.
1899	Aguinaldo foments Philippine war. Appointment of the first Philippine commission. General Wood, governor of Cuba.	1899. Adjournment of the joint high commission.		1899. Venezuelan boundary award by Paris tribunal. Castro in power in Venezuela.
1900	Civil government established in the Philippines under act of Congress. Galveston flood and hurricane. Civil government in Alaska. American forces sent to China.	1900. Great fire in Ottawa. Liberal ministry retains power.	1900. Mexican drainage canal completed.	Revolution in Colombia begins. Pando, a liberal, in power in Bolivia.
1901	McKinley, president, 2d term; Theodore Roosevelt, vice president. Platt amendment relating to Cuban independence passed. President McKinley shot at Buffalo, N. Y., Sept. 6; Theodore Roosevelt, president, September 14. Cuban autonomy granted.	1901. Toronto exhibition opened.	1901. Cuban constitution adopted. Second international American conference, in City of Mexico.	1901. War declared between Venezuela and Colombia. Riesco, a liberal, president of Chile.
1902	President recommends Panama Canal purchase. Civil government established in the Philippines. Decision of United States supreme court in Northern Securities case.	1902. Canadian-Australian cable laid. Treaty between Newfoundland and United States.	1902. Revolution in Santo Domingo. Eruption of Mt. Pelée, Saint-Pierre.	1902. End of revolution in Venezuela. Civil war in Colombia ended. Boundary award on dispute between Argentina and Chile.
1903	Department of commerce and labor. Pacific cable completed. Alaskan boundary dispute decided. Hay-Bunau-Varilla canal treaty with Panama.	1903. Bill providing for new transcontinental railway passed.	1903. West Indian hurricane destroys many lives.	1903. Hay-Herran canal treaty rejected by Colombia. The Republic of Panama proclaimed.
1904	Commercial treaty with China. Arbitration treaty with France. Great fire in Baltimore. Louisiana Purchase exposition at Saint Louis.	1904. Earl Grey, governor-general.		1904. Hague Tribunal awards payments from Venezuela to European powers.
1905	Theodore Roosevelt, president; C. W. Fairbanks, vice president.	1905. Provinces of Alberta and Saskatchewan created.	1905. U. S. establishes financial protectorate over Dominican Republic.	
1906	Destruction of San Francisco by earthquake and fire. Interstate Commerce act. Second occupation of Cuba by U. S.	1906. British preferential tariff debated.	1906. Mexican agreement with U. S. on boundary and irrigation.	1906. Pan-American conference, at Rio de Janeiro. Earthquake at Valparaíso.
1907	Pure Food law becomes effective. Jamestown exposition opened. Oklahoma admitted as a state. Financial panic.	1907. Miners' strikes; anti-Asiatic riots in Vancouver.	1907. Central American conference at Washington.	
1908	General arbitration treaty with France. Conference of governors at the White House, to discuss conservation.	1908. Tercentenary held at Quebec.		1908. Railroad, Guayaquil to Quito, completed.

FROM THE CLOSE OF THE CIVIL WAR, 1865, TO THE PRESENT TIME—CON.

	UNITED STATES OF AMERICA	CANADA	MEXICO, CENTRAL AMERICA, AND WEST INDIES	SOUTH AMERICA
1909	William H. Taft, president; James S. Sherman, vice president. Payne-Aldrich tariff. Alaska-Yukon-Pacific exposition. Peary discovers north pole.	1909. Unusual immigration from the United States begins. Railway development.	1909. Meeting of presidents Taft and Diaz at El Chamizal. Gómez, president of Cuba. U. S. troops withdrawn.	1909. Boundary treaty between Brazil and Peru.
1910	Commerce court created. Postal savings banks established.	1910. Laurier's naval defense bill accepted by Parliament.	1910. President Diaz re-elected.	1910. Hermes da Fonseca, president of Brazil.
1911	Trust trials before United States supreme court; dissolution of Standard Oil company ordered. Arbitration treaties with Great Britain and France.	1911. Duke of Connaught, governor-general. Reciprocity with the U. S. defeated. Borden, Conservative, premier.	1911. Diaz forced to resign. Francisco I. Madero, president.	1911. "Bolivian Congress" of representatives from different South American states.
1912	Formation of Progressive party. Arizona and New Mexico admitted as states.	1912. Conservative emergency naval bill defeated.	1912. Insurrection in Mexico.	1912. Railroad across Andes completed.
1913	Parcel post established. Sixteenth amendment adopted. Woodrow Wilson, president; Thomas R. Marshall, vice president. Seventeenth amendment adopted. California anti-alien land law. Underwood-Simmons tariff law. Glass-Owen currency law.	1913. Unusual prosperity throughout the Dominion. Notable extension of rural free delivery system.	1913. Madero, president of Mexico, forced to resign. Madero is assassinated. Huerta, leader of insurrection in Mexico.	1913. Brazil: Coffee valorization dispute settled with United States. Ex-President Roosevelt visits South America.
1914	Neutrality of United States in European war proclaimed. Nicaragua canal treaty negotiated. Federal Reserve banks established.	1914. Death of Lord Strathcona. *Empress of Ireland* sinks.	1914. Revolution in Haiti. United States troops at Vera Cruz.	1914. "A. B. C." conference concerning Mexico. Panama canal opened to traffic.
1915	Federal trade commission. Pan-American financial conference at Washington. Naval advisory board established. Government railroad in Alaska begun.	1915. Canada sends troops and supplies to Europe.	1915. Carranza recognized president of Mexico.	1915. South American delegates at third Pan-American scientific congress, Washington.
1916	Philippine Independence bill. Military expedition in Mexico. National Guard mobilized. Purchase of Danish islands approved. Workman's Compensation act. Eight-hour Railway Wage law. Canal treaty with Nicaragua ratified.	1916. Duke of Devonshire, governor-general. Prohibition legislation in all provinces.	1916. United States lands marines in Santo Domingo. Villa's raid on Columbus, New Mexico.	1916. Ramón Valdéz chosen president of Panama. Irigoyen elected president of Argentina.
1917	Diplomatic relations with Germany severed. Woodrow Wilson, president, 2d term; T. R. Marshall, vice president. Senate adopts cloture rule. Congress declares war on Germany. Selective Conscription bill. Navy greatly increased. Government takes over railways.	1917. Woman suffrage granted, in limited form. Conservatives win election. Terrific explosion wrecks Halifax. Compulsory military service.	1917. Cuba declares war on Germany. Guatemala, Honduras, Haiti, and Nicaragua end diplomatic relations with Germany.	1917. Brazil declares war on Germany. Argentina, Bolivia, Ecuador, Peru, and Uruguay sever relations with Germany. Guerra elected president of Bolivia.
1918	Federal fuel administration. War Finance Corporation bill. Daylight Saving bill. Man power registration exceeds 23,000,000. Two million American troops overseas. Severe influenza epidemic. American troops in Rhenish Prussia.	1918. Dominion troops win distinction at second battle of the Somme, Quéant, Drocourt, Bourlon Wood, Cambrai, Douai, Valenciennes, and Mons.	1918. Guatemala, Nicaragua, Costa Rica, Honduras, and Haiti declare war on Germany. Mexico severs diplomatic relations with Cuba.	1918. Brazil gives Allies interned German ships. Railroad strike in Argentina. Territorial dispute between Peru and Chile revived.
1919	Death of Theodore Roosevelt. President Wilson heads American delegation to Peace Conference. Prohibition amendment ratified. Peace Treaty and League of Nations rejected by Senate.	1919. Premier Borden represents Dominion at Peace Conference. Death of Laurier.	1919. Mexico and Cuba resume diplomatic relations. Tension over foreign concession in Mexico.	1919. General strike in Argentina. Brazil excludes German banks.
1920	Woman Suffrage amendment ratified. Republican victory in presidential election. Army reorganized. Railways returned to private management following government operation during World War.	1920. Arthur Meighen, Conservative, becomes premier. Prohibition an issue in the provinces.	1920. Carranza assassinated. General Obregon becomes president. Downfall of Cabrera in Guatemala.	1920. In Argentina, the Radicals win in elections. Irigoyen, president. Alessandri, president of Chile; introduces reforms.
1921	Warren G. Harding, president; Calvin Coolidge, vice president. Congress restricts immigration. Agricultural *bloc* in Congress. Washington Conference meets. Peace Treaty with Germany ratified. Peace with Hungary ratified.	1921. Defeat of Conservatives. W. L. M. King becomes premier. Opening of Queenston hydro-electric plant.	1921. Zayas declared president of Cuba. United States plans withdrawal from Santo Domingo.	1921. Saavedra, president of Bolivia.
1922	Four Power Pacific Treaty ratified by the United States. General coal strike. Supreme court declares Federal child labor law unconstitutional. Fordney-McCumber tariff law. Lincoln memorial temple at Washington dedicated.	1922. Coal strike. United Farmers party controls legislatures in Ontario, Alberta, and Manitoba.	1922. Nicaragua, Honduras, and Salvador renew treaty of peace with United States. Growth of labor organizations in Mexico.	1922. Peru and Chile submit Tacna-Arica dispute to arbitration by President Harding. Brazilian centennial exposition at Rio de Janeiro.

FROM THE CLOSE OF THE CIVIL WAR, 1865, TO THE PRESENT TIME—CON.

	UNITED STATES OF AMERICA	CANADA	MEXICO, CENTRAL AMERICA, AND WEST INDIES	SOUTH AMERICA
1923	Last American troops withdrawn from the Rhine. Agreement with Great Britain on funding of British debt to the United States. Large movements of Negro population from the South to the North. First nonstop airplane flight across continent, from New York to San Diego. Large areas of public lands in Oregon opened to settlement by ex-service men. Death of President Harding; Coolidge succeeds to presidency.	1923. First treaty between Canada and the United States signed; trade treaty with Italy; immigration treaty with Japan. George H. Murray, premier of Nova Scotia for 27 years, resigns.	1923. Crowder becomes first ambassador from United States to Cuba. International agreements signed at Washington by Guatemala, Salvador, Honduras, Nicaragua, and Costa Rica. A joint commission in Mexico City discusses resumption of diplomatic relations between U. S. and Mexico.	1923. Fifth Pan-American conference at Santiago, Chile. Delegates from Peru and Chile present the Tacna-Arica controversy before the arbiter, President Harding.
1924	Death of Woodrow Wilson. Lease of oil lands by Navy department cancelled by government. Law passed permanently restricting immigration. Japanese excluded. United States navy fliers encircle globe. Soldier bonus bill passed over the veto of the president. Third party, headed by La Follette, contests presidential election.	1924. Liquor treaty with the United States ratified. Strike of postal employees. Protest entered against taking of water from Great Lakes by Chicago drainage canal.	1924. Calles elected president of Mexico. U. S. troops withdrawn from Dominican Republic.	1924. Constitutional curb placed on power of presidency in Chile. Revolutionary insurrections in Brazil suppressed.
1925	Calvin Coolidge, president; Charles G. Dawes, vice president. Scopes "Evolution Trial" attracts world-wide attention. Italy and Belgium fund debts to the United States. Postal rates increased. Child Labor Amendment to the Constitution fails of necessary ratifications by state legislatures.	1925. General election results in defeat of Liberal party. Premier retains office, governing with help of Progressives. United Church of Canada formed.	1925. Costa Rica announces intention of withdrawing from League of Nations.	1925. Revolution in Ecuador. Boundary dispute among Brazil, Colombia, and Peru settled through United States arbitration. Tacna-Arica commission headed by General Pershing.
1926	Senate votes adherence to World Court but with unacceptable reservations. France negotiates terms for funding debt to United States. North pole reached by U. S. navy airplane from Spitzbergen. Sesquicentennial Exposition, Phila.	1926. First minister plenipotentiary to the United States appointed. Gold standard of currency restored. Liberal government returned to power. W. L. M. King premier. Dukhobor colony sells holdings to return to Russia.	1926. Gen. Chamorro assumes dictatorship in Nicaragua. Church properties seized by Mexican government.	1926. Brazil blocks entry of Germany into League of Nations by insisting on permanent seat on Council.
1927	Disastrous floods in Mississippi River valley and in northern New England states. Lindbergh flies alone from New York to Paris. Naval limitation conference at Geneva with Britain and Japan fails of results. McFadden Banking bill permits chain banking. Federal Radio Commission appointed. Execution of Sacco and Vanzetti arouses protests among radical sympathizers.	1927. Canada elected to League of Nations Council for 3-year term. Canada protests U. S. order classifying as immigrants Canadians who daily cross border to place of employment in the United States.	1927. Mexico officially appropriates petroleum properties; tension continues between church and state; rebellion suppressed. Civil war in Nicaragua. Rival factions compelled to accept U. S. supervision of elections in 1928. Cuba elected to non-permanent seat in Council of League of Nations.	1927. Much progress made in currency and banking reforms. Chile nitrate industry faced with crisis due to new processes of nitrogen fixation. Deportation of radicals from Chile. General progress in currency reforms among South American countries.
1928	Mississippi flood control bill passed. Lindbergh makes good-will flight to various nations of Latin America. President-elect Hoover makes tour of South America. Notable expansion in air transportation.	1928. Canada establishes diplomatic relations with France and Japan.	1928. Pan American conference at Havana. Mexican oil laws modified to remove U. S. objections. Obregon elected president of Mexico; assassinated; Portes Gil becomes president.	1928. Henry Ford obtains large rubber concession in Brazil. Chile and Peru resume diplomatic relations severed in 1911 over Tacna-Arica dispute.
1929	Herbert Hoover, president; Charles Curtis, vice president. Senate ratifies Paris pact for outlawry of war. Naval increase voted by Congress. Census and reapportionment bill passed. Federal farm board established for relief of agriculture. Law enforcement commission selected and begins sittings.	1929. Canadian rum runner *Im Alone* sunk by U. S. coast guard under circumstances resulting in diplomatic protests.	1929. Rebellion suppressed in Mexico; compromise settlement of church and state conflict.	1929. Tacna-Arica dispute settled amicably, Tacna going to Peru and Arica to Chile.



AMERICAN FLAGS

1 Flag of Bunker Hill. 2 Continental Flag. 3 Betsy Ross Flag. 4 Bennington Flag. 5 Flag of the Bon Homme Richard. 6 Flag of Fort McHenry. 7 Old Glory. 8 Stars and Stripes—Present Flag.



FLAGS OF THE BRITISH COMMONWEALTH OF NATIONS

1 Canada. 2 Newfoundland. 3 Great Britain. 4 Irish Free State. 5 Australia. 6 New Zealand. 7 Union of South Africa

THE BRITISH EMPIRE

THE name British Empire designates the group of states, colonies, protectorates, and other dependencies which acknowledge allegiance to the British crown. The kingdom of Great Britain and Northern Ireland, which is the nucleus of the empire, embraces the island of Great Britain and the northern part of Ireland. The island of Great Britain is itself divided into three parts, known as England, Scotland, and Wales. Taken all together, the empire includes about one-fourth of the land area of the earth and comprises approximately one-fourth of the world's population.

The Period of Commercial Foundations. In the historical development of this modern empire, several well marked stages are to be distinguished. The first period, covering the era from the annexation of Newfoundland in 1583 to the Treaty of Paris in 1763, is marked by the predominance of the commercial interest. The impulse to colonization arose from the response of English private enterprise to the challenge of Spanish trade monopoly in the West Indies. This movement led directly to British occupation of many islands among the West Indies and to the establishment of colonies on the coast of North America. In the North, the fishing industry and the fur trade brought English and French into active competition early in the 17th century. A little later in the same century, English merchants entered into rivalry with the Dutch in Asiatic and East Indian trade. Through the last named enterprises, the way was opened for the establishment of English power in India.

At the opening of the 18th century, France had superseded Spain and the Netherlands in the contest and remained as England's chief colonial rival. Out of the consequent struggle, which was ended by the Treaty of Paris in 1763, England won primacy in India and in North America.

A Transition Period. With the growth of the colonies established in North America and with their increasing insistence upon the right of self-government, England's colonial empire assumed a political aspect with which the government was not prepared to deal. Those in power persisted in treating the thirteen American colonies as a source of revenue. This policy resulted in the loss of these states through the American Revolution, 1776–83.

Meanwhile, through exploration and conquest, the British domain was increased by the acquisition of three territories,—Australia, New Zealand, and the Cape of Good Hope.

Period of Political Development. Following the Napoleonic wars, emigration from Great Britain to the colonies was encouraged by governmental policy. With the growth of the colonies came a demand for self-government, insistent and eventually successful. Canada became first a self-governing colony, and later a self-governing dominion. A similar evolution took place in the relations of Great Britain with Australia and with New Zealand.

New Imperial Era. Soon after 1885, a new era of colonial rivalry began. Africa was partitioned and divided among the European powers, Great Britain obtaining an important share of the territory. The African possessions of Great Britain were further augmented by territory obtained from Germany as a result of the World War.

Since the World War, the British Empire has undergone important and significant changes. Self-government has been granted to the Irish Free State. At the same time, the status of the self-governing dominions has become that of virtually independent nations. The organization, therefore, which began as an empire under the control of England is thus in the process of becoming a federated group of national states united, for mutual advantage, under the British crown.

ENGLAND

The British Isles have not been successfully invaded since the Norman Conquest of 1066 A. D., but their early history records a series of settlements by peoples from the continent of Europe. The earliest belong to the age of tradition. Before the Christian era, migrations of tall, fair-haired people largely displaced the aboriginal inhabitants of the islands. One migration brought over a bronze-using folk, probably the ancestors of the Gaels of Scotland and Ireland; another introduced the Brythonic, iron-using race, who gave their name to Britain and occupied the southern part of what is now England, when Cæsar's legions landed in 55 B. C. Greek travelers and traders are supposed to have visited Britain as early as the 4th century B. C., linking its trade with the Greek colony of Massilia (Marseilles). The invasion by the Romans is the first of which a written record exists.

Germanic Tribes Invade Roman Britain. Roman generals and governors extended Roman authority until Agricola, by the year 84 A. D., completed a line of forts between the Forth and the Clyde as a barrier against the Caledonians. Roman colonists settled in the island, built towns around their military camps, connected these with roads, and introduced Roman law and civilization. Christianity likewise spread to this remote province. With the decline of the empire, however, the Roman legions were withdrawn to the continent, and the Britons were unable to defend themselves against the inroads of the barbarians from the North. They are said to have appealed for help to the Saxons, Angles, and Jutes, who lived along the North Sea to the south of Denmark. The response of these German folk developed into the Germanic invasion and settlement of Britain. The Anglo-Saxon chronicles date the principal migration at 449 A. D.

The Jutes were the first to form a settlement, taking possession of part of Kent and the Isle of Wight; but the more extensive conquests of the Saxons in the South and of the Angles in the North gave these two folk the lead. The struggle for occupation continued 150 years; at the end of that time the entire southern part of Britain, with the exception of Strathclyde, Wales, and West Wales (Cornwall), was in the hands of the new German kingdoms.

Before the common struggle with the Britons was settled, the small German kingdoms were at war with one another. In the middle of the 6th century, the West Saxons defeated the Jutes, who were pressing westward from Kent. The West Saxons, turning north, were probably faced by the Angles, already in possession in the valley of the Ouse, and so were diverted westward. They occupied the Severn valley. Meanwhile, in the North and the East, the Angles were making a slow advance. They formed three kingdoms: Mercia, in the upper valley of the Trent; Bernicia and Deira, together called Northumberland, or the country north of the Humber. These kingdoms, with those of the East Saxons, South Saxons, and Jutes, are sometimes called the Saxon Heptarchy; but they never formed such an organization as this name would indicate.

Christianity Established in Kent. While the Saxons and Angles, in the 6th century, were still struggling with the Britons, the men of Kent enjoyed a more settled life and carried on intercourse with the Latinized Gauls of the continent. Toward the end of the century, their king, Ethelbert, had become overlord of all the other kings south of the Humber. He had married a Christian wife, Bertha, daughter of a Frankish king. In 597 came Augustine and a band of Roman missionaries, sent by Pope Gregory. The legal and political changes immediately consequent upon the adoption of Christianity in the Germanic kingdoms in Britain were not

great, but there began a more intimate relation with the continent and its Christian civilization. The introduction of Christian learning and culture, the formation of a written vernacular, and the fusion of the small kingdoms into a single large kingdom may be credited to the influence of the Roman clergy.

Upon the death of Ethelbert, the overlordship that he had maintained passed to the Anglian kings of the North. Northumbria had come under the influence of the Church, through first the Irish, and then the Roman, missionaries, and in the Northumbrian monasteries learning flourished. By the 7th century, the Church had regained all the Saxon kingdoms, which had previously all but obliterated the traces of the earlier British Church. Egbert of Wessex, before his death in 839, united the English kingdoms under his overlordship and may be considered the first king of England.

Danish Incursions. The land, meanwhile, was kept in a state of disturbance by the repeated incursions and attacks of the Danes. About half a century after Egbert's unification of the kingdom, the Danes acquired the mastery of nearly the whole of England. But the genius of Alfred the Great overcame the Danes at Ethandun (878). Guthrum, their king, embraced Christianity, acknowledged the supremacy of the English king, and received a strip of land including Northumbria on the east coast and known as the Danelaw. The two immediate successors of Alfred, Edward (899–925) and Athelstan (925–940), the son and the grandson of Alfred, both vigorous and able rulers, had in turn to direct their arms against these Danes of the Danelaw. The reigns of the next five kings, Edmund, Edred, Edwig, Edgar, and Edward the Martyr, are remarkable chiefly for the influence exerted by Dunstan, who was counselor to Edmund, minister of Edred, treasurer under Edwig, and virtual ruler during the reigns of Edgar and his successor. It was possibly due to Dunstan that from the time of Athelstan until after the death of Edward the Martyr (979) the country had comparative rest from the Danes.

During the 10th century many changes were altering the character of early English government. A feudal system was beginning to appear; the king's authority increased; the folkland was being taken over as the king's personal property; the nobles by birth, or ealdormen, were becoming of less importance in administration than the nobility of thegns, the officers of the king's court. Ethelred (978–1016), who succeeded Edward, was a minor. The government was feeble, and, no united action being taken against the Danes, their incursions became more frequent and destructive. Animosities between the English and the Danes who had settled among them became daily more violent, until a general massacre of the latter took place in 1002. The following year Svend invaded the kingdom with a powerful army and assumed the crown of England. Ethelred was compelled to take refuge in Normandy; though he afterwards returned, he found in Canute an adversary no less formidable than Svend. Ethelred left his kingdom to his son Edmund, who displayed great valor but was compelled to divide his kingdom with Canute. When Edmund died in 1016, the Danes succeeded to the sovereignty of the whole.

Canute (Knut), who espoused the widow of Ethelred that he might reconcile his new subjects, obtained the name of Great, not only on account of his personal qualities, but from the extent of his dominions, since he was master of Denmark and Norway as well as of England. In 1035 he died, and in England the reigns of two other Danish kings, Harold and Harthacnut, lasted till 1042, after which the English line was again restored in the person of Edward the Confessor.

The Norman Conquest. Edward was a weak prince; in the latter years of his reign, he had far less real power than his brother-in-law Harold, son of the great earl Godwine. On Edward's death in 1066, Harold accordingly obtained the crown. He found, however, a formidable opponent in the second cousin of Edward, William of Normandy, who instigated the Danes to invade the northern counties, while he landed in the South. Harold vanquished the Danes and, hastening southward, met the Normans at Senlac, near Hastings. Harold and his two brothers fell, October 14, 1066, and William (1066–87) immediately claimed the crown as lawful king of England. He is known in history as William I, the Conqueror. For some time he conducted the government with great moderation; but, being obliged to reward those who had assisted him, he bestowed the chief offices of the government upon Normans and divided among them a great part of the country. The consequent revolts of the native English were quickly crushed, continental feudalism in a modified form was established, and the English Church came under Norman influence through Lanfranc, archbishop of Canterbury.

At the death of the conqueror in 1087, his desire to have the strongest-willed of his sons rule England resulted in bestowing the throne upon William Rufus. The eldest son, Robert, was given the duchy of Normandy, while the third son, Henry, received a sum of money. The character of William II was vicious, and his rule in England, an unscrupulous tyranny. When, in 1100, he was found dead in the New Forest, with an arrow through his body, he was buried without funeral rites. He was succeeded by his younger brother, Henry, who set out to undo the evils of the previous reign. He allied himself with the English by marrying Eadgyth, or Matilda, a descendant of English kings. He subdued the Norman barons and wrested Normandy from his brother Robert. Henry's power being secured, he entered into a dispute with Anselm, the primate, and with the pope, concerning the right of granting investiture to the clergy. He supported his quarrel with firmness and brought it to a not unfavorable issue. In 1135 he died in Normandy, leaving behind him only a daughter, Matilda.

By the will of Henry I, his daughter Matilda, wife of Geoffrey Plantagenet, count of Anjou, was declared his successor. But Stephen, son of the count of Blois and of Adela, daughter of William the Conqueror, raised an army in Normandy, landed in England, and declared himself king. After years of civil war and bloodshed, an amicable arrangement was brought about, by which it was agreed that Stephen should continue to reign during the remainder of his life, but that he should be succeeded by Henry, son of Matilda and the count of Anjou. Stephen died in 1154, and Henry Plantagenet ascended the throne with the title of Henry II, the first of the Plantagenet, or Angevin, kings. A larger dominion was united under his sway than had been held by any previous sovereign of England, for at the time when he became king of England he was already in possession of Anjou, Normandy, and Aquitaine.

Beginnings of Constitutional Government. Henry II found far less difficulty in restraining the license of his barons than in abridging the special privileges of the clergy, who claimed exemption, not only from the taxes of the state, but also from its courts, and who were supported in their demands by the primate Becket. The king's wishes were formulated in the Constitutions of Clarendon (1164), which were first accepted and then repudiated by the primate. The assassination of Becket by the king's followers placed the king at a moral disadvantage in the struggle; after his conquest of Ireland (1174) he submitted to the Church and did penance at Becket's tomb. Henry contrived to associate the people of England with his new plan of government. The system of frankpledge was revived, trial by jury was sanctioned by the Assize of Clarendon, and the system of itinerant justices, twelve justices on circuit from the king's court, employed by Henry I, was revived. To lessen the power of the nobles he granted charters of incorporation to towns, freeing them from all obligation to

any but himself, thus laying the foundation of a burgher or town class in society.

Richard I, called Cœur de Lion, who in 1189 succeeded his father, Henry II, spent most of his reign away from England. Having gone to Palestine to join in the Third Crusade, he proved himself an intrepid soldier. Returning homeward in disguise through Germany, he was made prisoner by Leopold, duke of Austria, but was ransomed by his English subjects. In the meantime, John, his brother, had aspired to the crown, and hoped, by the assistance of the French, to exclude Richard from his right. Richard's presence for a time restored matters to some appearance of order; but, having undertaken an expedition against France, he received a mortal wound at the siege of Châlus in 1199.

The reigns of Henry II and Richard were marked by an improved government. The kingdom became more orderly; the collection of taxes, more regular. The Church also was in large measure subject to royal control. The towns grew in wealth, and the merchant guilds became powerful. English churchmen promoted learning; in 1186 there were at Oxford faculties in several branches of study. The work of government and the law courts had made a demand for "clerks," that is, men skilled in writing and in law.

Magna Charta. At the death of Richard, John was at once recognized as king of England, and he secured possession of Normandy; but Anjou, Maine, and Touraine acknowledged the claim of Arthur, son of Geoffrey, second son of Henry II. On the death of Arthur, while in John's power, these four French provinces were lost to England. John's opposition to the pope in electing a successor to the see of Canterbury led to the pope's placing the kingdom under an interdict in 1208. On account of the disturbed condition of the nation, John was at last compelled to receive Stephen Langton as archbishop and to accept England as a fief of the papacy (1213). His exactions and misgovernment had equally embroiled him with the nobles. In 1213 they refused to follow him to France, and, on his return, defeated, they at once took measures to secure their own feudal rights and to limit the prerogatives of the crown. King and barons met at Runnymede, and, on June 15, 1215, the great charter (Magna Charta) was signed. It was speedily declared null and void by the pope, and war broke out between John and the barons, who were aided by the French king. In 1216, however, John died, and his turbulent reign was followed by the almost equally disturbed period of Henry III. Up to this time, the barons and the organized townspeople had entrenched themselves in a body of liberties, but no favor was shown the poor. Every town was surrounded by the miserable hovels of the poverty-stricken. It was to minister to these that the Franciscan friars came from Italy in the 13th century.

During the first years of the reign of Henry III, the ability of the earl of Pembroke, who was regent until 1219, retained the kingdom in tranquillity; but, when Henry assumed the reins of government in 1227, he showed himself incapable of ruling. The charter was three times reissued in a modified form, and new privileges were added to it, but the king took no pains to observe its provisions. The struggle over money grants, long maintained in the great council, henceforward called Parliament, reached an acute stage in 1263, when civil war broke out. Simon de Montfort, who had laid the foundations of the House of Commons by summoning representatives of the shire communities to the Mad Parliament of 1258, had by this time engrossed the sole power. He defeated the King and his son Edward at Lewes in 1264, and in his famous Parliament of 1265 he still further widened the representation of the people by summoning to it burgesses from the boroughs as well as knights from the shires. The escape of Prince Edward, however, was followed by the battle of Evesham (1265), at which Earl Simon was defeated and slain; the rest of the reign was undisturbed.

On the death of Henry III, in 1272, Edward I succeeded without opposition. From 1276 to 1284, he was largely occupied in the conquest and annexation of Wales, which had become practically independent during the barons' wars. In 1292, Balliol, whom Edward had decided to be rightful heir to the Scottish throne, did homage for his kingdom to the English king; but when, in 1294, war broke out with France, Scotland also declared war. The Scots were defeated at Dunbar (1296), and the country was placed under an English regent; but the revolt under Wallace (1297) was followed by that of Bruce (1306), and the Scots remained unsubdued.

The First Perfect Parliament. The reign of Edward was distinguished by many legal and legislative reforms, such as the separation of the king's court into the court of exchequer, the court of king's bench, and the court of common pleas. The passage of the statute of mortmain forbade the gift of land to clergy, because they paid no feudal dues. In 1295 the first "perfect parliament" was summoned, the clergy and barons by special writ, the commons by writ to the sheriffs directing the election of two knights from each shire and two burgesses from each borough. Two years later the imposition of taxation without consent of Parliament was forbidden by a special act, *De Tallagio non Concedendo*. The English constitution, in outline, was now complete. The great aim of Edward, however, to include England, Scotland, and Wales in one kingdom proved a failure, and he died in 1307, on an expedition against Robert Bruce.

Edward II made a feeble attempt to carry out his father's last and earnest request to prosecute the war with Scotland, but his army was constantly unsuccessful. At length, in 1314, it received at Bannockburn a defeat from Robert Bruce, which insured the independence of Scotland. The king proved incapable of ruling his baronage; and his consort, a woman of intrigues, joined in the confederacy against him, which resulted in his imprisonment and death in 1327.

Edward III and the French War. The reign of Edward III was as brilliant as that of his father had been the reverse. His main projects were directed against France, the crown of which he claimed in 1328. The victory won by Edward at Crécy (1346), the capture of Calais (1347), and the victory of Poitiers (1356) ultimately led to the Peace of Bretigny in 1360, by which he received all the West of France, on condition of renouncing his claim to the French throne. Before the close of his reign, however, these advantages were all lost, save for a few principal towns on the coast.

A Period of Political and Social Disorder. Edward III was succeeded in 1377 by his grandson Richard II, son of Edward the Black Prince. In 1379 an unjust and oppressive poll tax brought outstanding popular grievances to a head; 100,000 men, so accounts say, under Wat Tyler, marched toward London (1381). Wat Tyler was killed while conferring with the king, but the prudence and courage of Richard appeased the insurgents. Despite his conduct on this occasion, Richard was deficient in the vigor necessary to curb the lawlessness of his nobles. In 1398 he banished his cousin, Henry Bolingbroke; on the death of the latter's father, the duke of Lancaster, Richard unjustly appropriated his cousin's patrimony. To avenge the injustice, Bolingbroke landed in England, during the king's absence in Ireland, and, at the head of an army of malcontents, compelled Richard to surrender. Richard was confined in the Tower, and despite the superior claims of Edmund Mortimer, earl of March, Henry was appointed king (1399), the first of the house of Lancaster. Richard was, in all probability, murdered early in 1400.

The continued struggle of Parliament to retain control of taxation marked the constitutional side

of the reign of Edward III. In 1341 the two houses of Parliament separated, the knights going with the burgesses into a lower house, or House of Commons. Social conditions in this period displayed marked contrasts in the distribution of wealth. On the one hand, the spoils of the French wars brought new luxuries to the nobles and upper classes. Larger and more comfortable houses were built, and the churches became more richly ornamented. On the other hand, the laborers had small share in this gain. When, after their ranks had been thinned by the Black Death, they attempted to secure higher wages, Parliament passed the Statute of Laborers, fixing wages at the old rate.

The manner in which the duke of Lancaster, now Henry IV, acquired the crown rendered his reign turbulent, but the vigor of his administration quelled every insurrection. The most important—that of the Percies of Northumberland, Owen Glendower, and Douglas of Scotland—was crushed by the battle of Shrewsbury (1403). During the reign of Henry IV, the government acquired a legal sanction for burning heretics, under the act *de haeretico comburendo*, passed in the second year of his reign. The act was directed chiefly against the Lollards, as the followers of Wiclif now came to be called. Henry died in 1413, leaving his crown to his son, Henry V, who revived the claim of Edward III to the throne of France in 1415 and invaded that country. The disjointed councils of the French rendered their country an easy prey; the victory of Agincourt was gained in 1415; and, after a second campaign, a peace was concluded at Troyes in 1420, by which Henry received the hand of Katherine, daughter of Charles VI. He was appointed regent of France during the reign of his father-in-law and, on the latter's death, was declared heir to his throne. The two kings, however, died within a few weeks of each other in 1422, and thus, at the age of nine months, the infant son of Henry became king of England and France.

English Defeat in France. England during the reign of Henry VI was subjected, in the first place, to all the confusion incident to a long minority, and afterwards to all the misery of a civil war. Henry allowed himself to be managed by anyone who had the courage to assume the conduct of his affairs, and the influence of his queen, Margaret of Anjou, a woman of uncommon capacity, was of no advantage either to himself or to the realm. In France (1422–53), the English forces lost ground and were finally expelled, Calais alone being retained. The withdrawal was the triumph of an attack begun by the heroic and inspired Joan of Arc, now Saint Joan of Arc since her canonization at the end of the World War. A rebellion under Jack Cade in 1450 was suppressed, only to be followed by more serious trouble. In that year, Richard, duke of York, the father of Edward IV, began to advance his pretensions to the throne which had been so long usurped by the house of Lancaster.

Wars of the Roses. The wars which resulted, called the Wars of the Roses, from the fact that a red rose was the badge of the house of Lancaster and a white one that of the house of York, lasted for thirty years, from the first battle of St. Albans, May 22, 1455, to the battle of Bosworth, August 22, 1485. This period, marked by the rapacity of the great landholders and by ferocious cruelty in the conduct of war, is, in some respects, the darkest in English history. A callous materialism, that found no place for the enthusiasms of Renaissance culture and despised the printing press, ruled the land. Henry VI was twice driven from the throne, in 1461 and in 1471, by Edward of York, whose father had previously been killed in battle in 1460. Edward of York reigned as Edward IV from 1461 till his death in 1483, with a brief interval in 1471. He was succeeded by two other sovereigns of the house of York,—first his son Edward V, who reigned for eleven weeks in 1483, and then his brother Richard III, who reigned from 1483 till 1485. Richard was defeated and slain on Bosworth field by Henry Tudor, of the house of Lancaster, who then became Henry VII.

Henry VII was at this time the representative of the house of Lancaster, and, in order at once to strengthen his own title and to put an end to the rivalry between the houses of York and Lancaster, he married, in 1486, Elizabeth, the sister of Edward V and heiress of the house of York. His reign was disturbed by insurrections attending the impostures of Lambert Simnel (1487), who pretended to be a son of the duke of Clarence, brother of Edward IV, and by the pretensions of Perkin Warbeck (1488), who affirmed that he was the duke of York, younger brother of Edward V; but neither of these disturbances attained any magnitude. The king's worst fault was his avarice, which led him to employ in schemes of extortion such instruments as Empson and Dudley. His administration throughout did much to increase the royal power and to establish order and prosperity. He died in 1509.

Henry VIII; The Reformation. The authority of the English crown, which had been so much extended by Henry VII, was, by his son Henry VIII, exerted in an exacting and capricious manner, though always for national and not merely for selfish ends. The most important event of the reign was undoubtedly the breach with Rome; though this had its official origin rather in Henry's personal caprice and in his relations with the court of Spain than in his conviction of the need of ending the pope's authority in England. Henry had been espoused to Catharine of Spain, the widow of his elder brother, Arthur, who died very shortly after marriage. Henry tired of his queen, who bore him no male heir, and became enamored of one of her maids of honor, Anne Boleyn. He had recourse to the pope, therefore, to dissolve a marriage which had at first been rendered legal only by a papal dispensation; but, failing in his desires, he broke entirely with the Holy See. In 1534 he got himself recognized by act of Parliament as supreme head of the Church of England. He died in 1547 while his court was sharply divided upon the question of further ecclesiastical and doctrinal changes.

In spite of adverse conditions and the lack of Renaissance enthusiasm in England, the new learning had secured a foothold in Oxford. Colet became a leader in the study of Greek. Out of this movement came Tindale's translation of the New Testament. Thomas More founded St. Paul's School in 1510 to give boys an education in the spirit of the new learning. His criticism of the cynical policy of Henry VIII moved him to write his *Utopia*.

Henry was married six times and left three children, each of whom reigned in turn. These were: Mary, by his first wife, Catharine of Aragon; Elizabeth, by his second wife, Anne Boleyn; and Edward, by his third wife, Jane Seymour. Edward, who reigned first, with the title of Edward VI, was nine years of age at the time of his accession, and he died in 1553, when he was only sixteen. His short reign, or rather the government of the earl of Hertford, afterward duke of Somerset, who was appointed regent, was distinguished chiefly by the success which attended the measures of the Protestant reformers. The intrigues of Dudley, duke of Northumberland, caused Lady Jane Grey to be declared Edward's successor; but her reign, if it could be so called, lasted only a few days. Mary, daughter of Henry VIII, was placed on the throne, and Lady Jane Grey and her husband were both executed. Mary, a zealous Catholic, seems to have wished for the crown chiefly to restore papal authority. Persecution of the Protestant reformers drove many for safety to Geneva, to Holland, and to Scotland. Political motives had induced Philip of Spain to marry her; but she could never prevail on her subjects to allow him any share of power. She died in 1558.

The Reign of Elizabeth. Elizabeth, who succeeded her half-sister Mary, was attached to the Protestant faith, and she found little difficulty in re-establishing it in England, accomplishing her end partly by the relentless persecution of Catholics. Having concluded peace with France (1559), Elizabeth set herself to promote the confusion which prevailed in Scotland, to which country her cousin Mary Queen of Scots had returned from France in 1561. Mary was forced to seek asylum under Elizabeth's protection (1568) and, after many years' imprisonment, charged with plot and intrigue, was sent to the scaffold (1587). As a powerful Protestant nation and as a rival of Spain in the New World, England drifted into conflict with that country. The dispersion of the *Armada* (1588) by the English fleet under Howard, Drake, and Hawkins was the most memorable event of an era which first revealed the energy and daring of English seamanship.

Elizabeth's reign was for England a period of unprecedented commercial enterprise. Town industries increased; land that had been enclosed for pasture was turned back to grain production; the food and dwellings of the people improved. Imposing manor houses, often built in the form of the letter E, were erected by the more wealthy landowners. These had chimneys and glass windows, which were novelties. Many might be compared to the palaces of the Italian cities for luxury in service and appointments. Along with material prosperity, came a rich, spontaneous, original literature which of itself makes the Elizabethan era immortal.

The Stuart Struggle with Parliament. Elizabeth was succeeded in 1603 by James VI of Scotland and I of England, son of Mary Queen of Scots and Darnley. His accession to the crown of England in addition to that of Scotland began the union of the two nations. His dissimulation, however, ended in his satisfying neither of the discontented church parties,—the Puritans and the Catholics; and his insistence on his prerogative made his reign an unseemly struggle between the crown and the people. His extravagance kept him in constant disputes with Parliament, which would not grant him the sums he demanded and compelled him to resort to monopolies, loans, benevolences, and other unparliamentary methods. The nation at large, however, continued to prosper through the whole of this inglorious reign. Colonial enterprises in America marked a new departure in trade and in empire building.

Charles I, who succeeded James in 1625, inherited his father's exalted ideas of royal prerogative; his marriage with a Catholic, his arbitrary rule, and his unparliamentary methods of raising money provoked bitter hostility. Under the guidance of Laud and Strafford, partisanship grew inflamed in both Church and State. Civil war broke out at last in 1642 between the king's party and that of the Parliament. The royal government was overthrown, and in 1649 Charles was beheaded.

Cromwell and The Commonwealth. A commonwealth, or republican parliamentary government, was now established, in which the most prominent figure was Oliver Cromwell. Mutinies in the army among Fifth-monarchists and Levellers were subdued by Cromwell and Fairfax; and Cromwell, in a series of masterly movements, subjugated Ireland and gained the important battles of Dunbar and Worcester. At sea, Blake had destroyed the Royalist fleet under Rupert and was engaged in a struggle with the Dutch under Van Tromp. But, within the new government, matters had come to a deadlock. A dissolution of Parliament was necessary, yet Parliament shrank from dissolving itself, and in the meantime the reform of the law, a settlement with regard to the Church, and other important matters remained untouched. In April 1653, Cromwell cut the knot by forcibly ejecting the members and putting the keys of the house in his pocket. From this time, he was practically head of the government, which was vested in a council of thirteen. A Parliament—the Little, or Barebone's, Parliament—was summoned, and in December of the same year Cromwell was installed lord protector of the Commonwealth of England, Scotland, and Ireland. With more than the power of a king, he succeeded in controlling the confusion at home and made his government respected throughout Europe. Cromwell died in 1658, and the brief and feeble protectorate of his son Richard followed.

The Stuart Restoration. There was now a widespread feeling that the country would be better under the old form of monarchy, and Charles II, son of Charles I, was called to the throne by the restoration of 1660. He took complete advantage of the popular reaction against the narrowness and intolerance of Puritanism; later, he even endeavored to carry it to the extreme of establishing the Catholic religion. The promises of religious freedom made by him in the declaration of Breda, before the Restoration, were broken by the Test and Corporation acts, and by the Act of Uniformity, which drove two thousand clergymen from the Church and created the great dissenting or nonconformist movement of modern times. The reaffirmation of the principle of habeas corpus, however, was a most praiseworthy step in the advance of the liberty of the subject.

The society of the court of Charles II was notoriously corrupt and profligate. This condition was reflected in the drama and literature of the period following the Restoration. Commercially, however, this was a prosperous time. More colonies were established in America, and English seaports grew upon the new trade thus built up. Country life remained dull, but London attracted the county families by its gaiety. The coffeehouses of London answered the purpose of informal clubs, promoting a more general political and literary discussion. The Royal Society was founded in 1660. England was hospitable to such foreign painters as Van Dyck, but her own architects designed her buildings, such as the new St. Paul's cathedral. In politics, this period saw the rise of the Whig and Tory parties. Macaulay, in his *History of England*, Chapter III, gives a description of this era; it is one of the most graphic delineations to be found in his writings.

The Revolution of 1688. As Charles II left no legitimate issue, his brother, the duke of York, succeeded him as James II (1685–89). The king's zealous support of Roman Catholicism and his attempts to force the Church and the universities to submission provoked a storm of opposition. Seven prelates were brought to trial for seditious libel, but they were acquitted amid general rejoicing. The whole nation was prepared to welcome any deliverance, and in 1688 William of Orange, husband of James's daughter Mary, was invited to come to England. James fled to France; and a convention settled the crown upon William and Mary. Annexed to this settlement was a declaration of rights, circumscribing the royal prerogative by depriving the king of the right to exercise dispensing power, or to exact money, or to maintain an army without the assent of Parliament. This placed the right of the British sovereign to the throne upon a purely statutory basis. A toleration act, passed in 1689, allowed nonconformists their own chapels and freedom of church worship.

An armed opposition to William lasted for a short time in Scotland but ceased with the fall of Viscount Dundee, the leader of James's adherents; though the struggle was prolonged in Ireland, it was brought to a close before the end of 1691. The following year saw the beginning of the national debt, the exchequer having been drained by the heavy military expenditure. A bill for triennial parliaments was passed in 1694, the year in which Queen Mary died. For a moment after her death, William's popularity was in danger, but his successes at Namur and elsewhere in the campaigns against Louis XIV, with

the obvious exhaustion of France, once more confirmed his power. The Treaty of Ryswick followed in 1697, and the death of James II in exile in 1701 removed a not unimportant source of danger. Early in the following year William also died, and, by the Act of Settlement, Anne succeeded him.

Party and Cabinet Government. Several significant changes in politics and finance belong to William's reign. The Whig Junto, formed to stabilize the House of Commons, was the beginning of the "cabinet." The refusal of Parliament to renew licensing acts in 1695 freed the press from censorship. The great accumulations of capital in London brought about the founding of the Bank of England in 1694.

The closing act of William's reign had been the formation of the Grand Alliance, between England, Holland, and Austria, against Louis XIV. Queen Anne's rule opened with the successes of Marlborough at Blenheim (1704) and Ramillies (1706). Throughout the earlier part of her reign, Marlborough practically ruled the kingdom, the duchess of Marlborough, Sarah Jennings, being the queen's most intimate friend and adviser. From 1707 the history of England becomes the history of Great Britain, the Act of Union passed in that year having merged the parliaments and realms of England and Scotland into a single state. This has proved to be one of the most successful political experiments ever tried.

The wars with France ended in the Treaty of Utrecht in 1713, by which the British right of sovereignty over Hudson Bay Territory, Newfoundland, Acadia, Minorca, and Gibraltar was acknowledged, and the foundation of Great Britain's imperial and colonial power was securely laid. The remainder of Queen Anne's reign was distracted by the never-ending altercations of Whigs and Tories. She died on the 1st of August 1714, and with her ended the line of the Stuarts. The period is notable for the practice of securing skillful controversial writers for both government and opposition. Dean Swift was the ablest Tory writer, Addison the ablest Whig.

At the death of Anne, George I, elector of Hanover, descended from Elizabeth, daughter of James I, ascended the throne of Great Britain, according to the Act of Settlement. The Whigs under this prince regained in the national councils that superiority of which the Tories recently deprived them. Their extreme measures to destroy Tory power provoked retaliation. In 1715 the earl of Mar in Scotland and the earl of Derwentwater in England raised the standard of rebellion and proclaimed the Chevalier St. George, the "Old Pretender," king. But the insurrection, feebly supported by the people, was soon suppressed.

In 1716 the Septennial act was passed, making Parliament of seven instead of three years' duration. In 1720 occurred, after a phenomenal growth, the collapse of the South Sea Company. From this date until 1742 the government was in the hands of Sir Robert Walpole, the first of modern premiers, leading the cabinet and chiefly responsible for its acts. Walpole had great sagacity, prudence, and business ability, and could manage dexterously the king, Parliament, and the people alike. It is true that in the case of Parliament he achieved this by undue influence in elections and a scandalous use of bribery. But the power he thus acquired was, for the most part, wisely used. The failure of the war with Spain, into which he had reluctantly entered, drove him from office, and in 1742 his long ministry came to an end. In 1743, George II, frightened at the danger to Hanover, drew Great Britain into the wars between France, Prussia, and Austria, regarding the succession of the emperor Charles (War of the Austrian Succession). George himself fought at the head of his troops at Dettingen (1743), where he obtained a complete victory over the French. This victory was balanced later on, however, by the defeat at Fontenoy (1745).

The Young Pretender. A fresh attempt was made, while the war was in progress, to restore the Stuart family to the throne. Charles Edward, son of the Old Pretender, having been furnished by France with a small supply of money and arms, landed in the West Highlands in 1745 and was joined by a considerable number of the people. Marching southward with 1500 Highlanders, his forces increasing as he advanced, he entered Edinburgh without opposition; having defeated Sir John Cope near Prestonpans, he marched into England. Finding himself disappointed of expected succors from France, and the English Tories, contrary to his expectations, keeping aloof, he commenced his retreat into Scotland, closely pursued by the king's troops, whom he again defeated at Falkirk. With this victory his good fortune terminated. The duke of Cumberland arrived from the continent and put himself at the head of the forces which were destined to check the rebels. At Culloden, near Inverness, the Young Pretender was completely defeated. After lurking for six months amid the wilds of Inverness-shire, he at length, with much difficulty, escaped to France.

Eighteenth Century Life. During this period came notable changes in religion, philosophy, art, and literature. The 18th century is the Augustan or Classical age, with common sense, skepticism, and a belief in natural law as its chief traits. But, before the middle of the century, a reaction against the skeptical spirit set in. Butler defended Christianity in his *Analogy*. John Wesley led the evangelical religious movement, called Methodism, among the common people. The life of the times was realistically portrayed in the drawings of Hogarth. Fielding and Richardson created the modern, middle class, sentimental novel.

The War of the Austrian Succession, which was the cause of hostilities between the French and the British in India and America as well as in Europe, was terminated by the Treaty of Aix-la-Chapelle in 1748. During most of this period, Pelham and his brother, the duke of Newcastle, had been the ruling ministers; and in their hands the conduct of government reached, for modern times, a very low level of morality and statecraft.

The Seven Years' War. The French, uneasy at the growing colonial power of Great Britain, began after 1748 a determined effort against the British colonies and possessions in North America and in the East Indies. In 1756 fighting became general in the Seven Years' war. Austria and France were allied on the one side, and Prussia and England on the other. The advantage at first lay everywhere with France. But a great war minister, William Pitt, retrieved these early defeats. In 1758 the British made themselves masters of Louisburg, uncovering the approach to the Gulf of St. Lawrence, while the attack made by Wolfe on Quebec in 1759 was completely successful and gave Britain the mastery in Canada. In the same year the British and their allies defeated the French at Minden in Prussia. In the East Indies, the French were even less successful than in America. Clive's victory at Plassey (1757) and Coote's at Wandewash (1760) secured British ascendancy in the East. These successes, together with the naval victories of Hawke and Boscawen, made England the greatest of maritime and colonial powers.

On the accession of George III in 1760, hostilities were still carried on, generally to the advantage of the French as far as the theater of war in Germany was concerned, but still more to their loss in the other quarters of the world; and this notwithstanding the fact that Spain had now joined her forces to those of France. At length the success of the British arms induced France and Spain to accede to terms, and the hard-fought war ended by the Treaty of Paris in 1763. The French relinquished their possessions in North America; Minorca was restored to Britain; in the East Indies, the French got back

their factories and settlements, on condition that they should maintain neither forts nor troops in Bengal; Cuba and Manila were resigned to the Spaniards.

The American Revolution. The close of the Seven Years' war ushered in a new and critical period in the history of the British Empire. The expenses of this war, which had been undertaken partly for the defense of the American colonies against the French, brought the amount of the national debt to more than 132 million pounds. It seemed to the British government to be just that the Americans should be taxed to assist in the payment of the interest. The Americans did not deny the justice of the claim, but replied that if they were to be taxed they had a right to be represented in Parliament, in order that, like other British subjects, they might be taxed only with their own consent. Grenville, then the prime minister, stood to his purpose, however, and introduced a bill for imposing certain stamp duties in the American colonies. The Americans protested and resisted; partly by the influence of the great Pitt, who had steadily opposed the measure, the act was repealed. On the illness of Pitt, now Lord Chatham, in 1767, Townshend became premier and revived the project of taxing the colonies indirectly by imposing duties on tea.

In 1770, Lord North, as Townshend's successor, set himself to carry out his scheme. The result was that in 1775 the thirteen colonies were in a state of rebellion, and a war began, in which both France and Spain joined the revolted colonies. The end was recognition of the independence of the United States. On the American side of this struggle, the great name is that of George Washington. On the British side, the war was unskillfully conducted; though some successes were gained, these were more than counterbalanced by such losses as the capitulation of Burgoyne at Saratoga (1777) and of Cornwallis at Yorktown (1781). Against France and Spain, the British could show such successes as that of Admiral Rodney off Cape St. Vincent (1780), the brilliant defense of Gibraltar by General Eliott (1779–82), and Admiral Rodney's victory over the French fleet in the West Indies (1782). The war closed with the Treaty of Versailles in 1783. Britain finally acquired several West Indian islands; Spain recovered Florida and Minorca; France secured Pondicherry and Chandernagore in India.

Industrial and Political Progress. In England, far-reaching changes were at the same time making their influence felt. In politics, freedom to criticize the king and the government and freedom to report and discuss Parliamentary debates in the press were being recognized. The way was thus prepared for Parliamentary reform. The latter part of the 18th century was a period of great economic progress. Population increased rapidly. Agricultural experiments were carried on; improved methods of farming were introduced; intelligent cattle breeding was undertaken. The invention of the steam engine and of labor-saving machinery brought about those great changes in management of industry, in factory production, and in the relation of labor to capital, known as the Industrial Revolution.

From 1783 to 1801, the government of Great Britain was directed by William Pitt, the younger son of Lord Chatham, who when only 24 years of age was made first lord of the treasury and chancellor of the exchequer. The affairs of Ireland and India and the impeachment of Warren Hastings were among the first subjects that occupied the attention of Pitt's ministry. In 1782, Ireland had been accorded legislative independence. There were thus two separate parliaments in the British Isles until 1800, when Pitt, who had in the interval experienced some of the difficulties arising out of two separate parliaments, contrived their union. Great Britain and Ireland became the United Kingdom, the two houses of lords and houses of commons being merged into the Imperial Parliament.

The Napoleonic Wars. In 1789, the French Revolution began. For a time there was in England general approval of this movement; but as the revolutionaries proceeded to extremes there was a reaction in English feeling, of which Edmund Burke became the exponent. The execution of Louis XVI was followed by the French declaration of war against Great Britain, on February 1, 1793. With one brief interval, the war lasted till 1815. At first, Britain co-operated with Prussia and Austria against France, and successes were gained on sea and on land. Later, the armies of the French Republic were everywhere victorious on the continent. In 1797 Britain stood alone in the conflict and indeed soon found a European coalition formed against her. The war was now largely maritime, and the naval success of Jervis off St. Vincent and of Duncan off Camperdown were followed by the victory of Nelson in Aboukir bay and of Abercromby at Alexandria.

In 1798, a rebellion in Ireland had to be crushed. Peace with France was made in 1802 by the Treaty of Amiens, only to be broken by another declaration of war in 1803, as the ambitious projects of Napoleon became evident. In spite of the efforts of Pitt, who died in 1806, in the way of forming and supporting a new coalition against France, the military genius of Napoleon swept away all opposition on land, though the naval victory of Trafalgar (1805) established England's supremacy on the seas.

Napoleon, who had assumed the title of emperor of the French in 1804, was now virtually the ruler of Europe. He put forth his Berlin Decree (1806), prohibiting all commerce with Great Britain wherever his power reached, set his brother Joseph on the throne of Spain, and occupied Portugal. But the spirit of resistance had now taken deep root in the British people; in 1808, troops were sent into Spain under Sir John Moore, and a year later Wellington, then General Wellesley, landed in Portugal. Then began that famous series of successful operations, the Peninsular war, which drove back the French into their own country and powerfully aided to undermine the fabric of Napoleon's empire.

The other chief European powers having united, Paris was occupied in 1814, Napoleon was deposed and exiled to Elba, and Louis XVIII was placed on the throne of France. Escaping in 1815, Napoleon appeared once more in the field with a large army. Wellington and Blücher hastened to oppose him, and at Waterloo his long career of conquest ended in a crushing defeat. The restoration of Louis followed, and Napoleon was sent to the island of St. Helena. Of her conquests, Britain retained Tobago, St. Lucia, Mauritius, the Cape of Good Hope, Demerara, Essequibo, Berbice, Helgoland, and Malta. Ceylon and Trinidad had been gained in 1802, and Britain emerged from this long struggle with a very great increase of territorial possessions and political importance.

Political and Economic Reform. After the termination of the wars with Napoleon, many things concurred to make a troublous era in the home administration. The new burden of debt which the wars had left on the nation, the bad harvest of 1816, a government which had no idea but that of absolute resistance to all reforms—all these contributed to increase popular discontent. The result was a strong Radical agitation, accompanied often by serious riots throughout the country, more especially in the large towns, and loud demands for reform in Parliament and in the system of representation. The death of George III and the accession of George IV in 1820 made little change in this respect. From 1822 a succession of able statesmen, Canning, Peel, and Huskisson, gave the government a more liberal turn and did much to satisfy the popular demands. The Catholics were admitted to Parliament; political restrictions on Dissenters were removed; and, in the face of a determined opposition, Earl Grey carried the Reform bill of 1832, which gave large manufacturing towns a representation in some proportion to their importance, practically transferring

the basis of political authority from the upper to the middle classes. Similar changes affected all local government. The next great public measure was the abolition of negro slavery in every British possession in 1833. Even more important was the factory act of 1833, which began the correction of abuses in the factory system by limiting the hours of labor for women and children.

William IV died June 20, 1837, and was succeeded by Victoria. The year following is notable as that in which the Chartists began their movement for radical reform, which continued, with popular meetings, presentations of monster petitions, and occasional tumults, till 1848. This same period saw the struggle of the Anti-Corn-Law League (of which Cobden and Bright were the leaders), which was finally successful when Sir Robert Peel, the leader of the Tory party, himself proposed the repeal of the corn duties (1846). The principle of free trade had further success in the repeal of the navigation laws and in the general repeal of import duties made during Lord Aberdeen's ministry (1853).

The Crimean War. In 1852-53, dissension arose between Russia and Turkey, regarding the rights of the Latin and Greek Christians to access to the "holy places" in Palestine. The emperor of Russia, aiming at the possession of Constantinople and finding the concessions made to French devotees a sufficient pretext for war, sent Prince Menshikov to Constantinople to demand redress. Not being satisfied with the response secured, he declared war on Turkey in October 1853. On the plea that it was impossible to leave Russia a free hand in dealing with Turkey or in extending her influence in the Balkans, France and Great Britain formed an alliance against Russia in 1854. A joint invasion of the Crimea followed; Russia was defeated, and peace was signed in 1856 at Paris.

Immediately after the Crimean War came the mutiny of the sepoys in India. In 1858, sovereignty over the East India Company's possessions was transferred by Parliament to the crown. Wars with China (1857 and 1860) opened up five new Chinese ports to trade.

Extension of Suffrage. In 1867, Parliament passed the second Reform bill,—a measure establishing the principle of household suffrage. The act, by extending the franchise to the factory wage earner, made England politically democratic; and it has profoundly influenced all subsequent English history. Disraeli, who soon became official leader of the Conservative party, sought to attach the new voters to the Conservative interest by making the crown and the Church popular, and by a spirited foreign policy. But the next year put the Liberals in power. In 1869, Gladstone passed a bill for the disestablishment of the Irish Church. In 1870, an Irish land bill, for improving the relations between landlord and tenant, became law; and a national system of public elementary education for England was started. Early in 1874, Gladstone dissolved Parliament, and, a large Conservative majority being returned, Disraeli again became premier. His politics followed the lines of the new imperialism, with its interests in India, Africa, and the Near East. The Ashantee war, begun the previous year, ended early in 1874.

In 1876 the title, Empress of India, was added to the titles already held by the queen. During the Russo-Turkish war of 1877-78, Britain remained neutral; but she took an important part in the settlement by the Congress of Berlin and acquired from Turkey the right to occupy and administer Cyprus. Then followed war in Afghanistan, war with the Kafirs of Zululand, and a brief war with the Boers of the Transvaal.

Gladstone and Irish Home Rule. In 1880 Gladstone again became premier. By this time the Irish Nationalists in the House of Commons formed a third party, under the lead of C. S. Parnell. This party worked for Home Rule. Parliament passed another land act for Ireland (1881); an act for putting down crime in Ireland (1882), under which Parnell was arrested and imprisoned in Kilmainham jail; a third reform bill equalizing the borough and county franchise (1884)—all important. The intervention of Britain in Egypt led to the bombardment of Alexandria in July 1882 and the sending of an army into Egypt to quell rebellion. A rising in the Sudan caused British troops to be dispatched to Suakin; but another force, sent by way of the Nile to relieve General Gordon at Khartum, arrived too late for its object, and the Sudan was abandoned temporarily. For a brief period Lord Salisbury was premier in 1885; but in February 1886 he made way for Gladstone. In April, Gladstone proposed the first Home Rule bill, a bill which would establish a separate Irish legislative body. Against this a determined opposition was organized, and the bill was thrown out on its second reading. This gave rise to the Unionist party, which left the Liberals for the Conservatives. The Liberal remnant was mainly Radical and Irish.

Conservative-Unionist Government. A general election followed, in which the new Unionists and Conservatives had a great majority. The Conservative-Unionist party assumed office, with the marquis of Salisbury as head. A criminal law amendment act for Ireland (1887) and a local government act for England (1888) were passed. In 1887 the golden jubilee of the queen was celebrated. The Liberals won in the elections in 1892, Gladstone acting as premier until his retirement, when Lord Rosebery became premier. In 1895 Lord Salisbury, with the Conservative-Unionists, was returned to power. October 11, 1899, war was declared by the Boers of the Transvaal and Orange Free State, who hoped to destroy British paramountcy in South Africa; these states were annexed to the empire in 1900 and made part of the Union of South Africa in 1909. In 1900, a new Parliament was elected, with a slightly increased Conservative majority. Victoria died January 22, 1901, and was succeeded by Edward VII.

In 1902, on Lord Salisbury's retirement, the new ministry was reconstituted, with A. J. Balfour as premier. The Balfour ministry came to grief over Chamberlain's protective tariff controversy. It was succeeded in 1905 by a Liberal ministry headed by Sir Henry Campbell-Bannerman, who, at his death in 1908, was succeeded by Mr. Herbert Asquith.

The Conservative-Unionist, or, more briefly, the Unionist, party, which went out of office in 1905, had, with the slight interval of Liberal government from 1892 to 1895, been in power continuously since 1886. It inaugurated the Irish Land Purchase system, designed to do away with landlords in Ireland by advancing purchase money to peasants to enable them to buy outright the full title to their farms. Peasant proprietorship began a new era in Ireland's economic and social history. The ominous rivalry with Germany indirectly ended the Unionist government, for Mr. Chamberlain's protective tariff, which split the party, cut too deeply across the old free trade prejudices. The Unionists, nevertheless, had already formed the Anglo-Japanese alliance (1902) and had entered into the *Entente Cordiale* with France (1904).

Liberal Government. The Liberal government that came into office in 1905 drew its support from a strong intellectual radical element (Fabian Socialists, etc.) with its views of the "social uplift," discountenanced during the long Unionist ascendancy, also from the new Labor Party, and from the Irish Nationalists. It had to satisfy these three groups and to watch the threatening course of world politics.

The new Radicalism showed itself first in the act for old age pensions paid by the state (1908),—a controversy which marks the end of the Victorian school of Liberalism and the victory of the younger radical thinkers. Lloyd George, as chancellor of the exchequer, next (1909) framed a budget destined to

have important consequences. It embodied a new scheme of taxation bearing heavily upon the "unearned" incomes of the well-to-do. When the House of Lords rejected this budget, a grave constitutional crisis was reached. For years Liberals and Radicals had resented the privileged hereditary position of the Peers and their indifferent rejection of popular measures passed by the Commons. But this was the first case of an entire budget being annulled. A general election (1910) gave popular endorsement to the rejected budget, which the Lords accordingly passed. They then, to ward off the impending crisis, put forward plans which would have modified the composition and privileges of their own house. But the government was bent upon a more radical constitutional alteration. Soon after the death of King Edward (1910) and the accession of George V, Parliament was dissolved, and a general election, largely on the House of Lords question, once more returned the Liberals to office. The Parliament act of 1911 followed,—passed by the Lords only when it was known that the king was prepared to create enough peers to assure its passage. Henceforth, if any measure passed the Commons in three successive sessions, it would become law regardless of the contrary vote of the Lords; at the same time, the duration of Parliament was reduced from seven to five years.

The bill for the disestablishment of the Church in Wales became law in 1914, without the consent of the Lords, after passing the Commons for the third time. The question of women's franchise was settled by the fourth Reform bill of 1918. With certain exceptions, women over thirty years of age were given the Parliamentary vote—a later act enabled them to sit in Parliament—while, by the same bill, the franchise for men approximates to manhood suffrage. At the same time, the Education bill made full time attendance at school compulsory to the age of 14, with compulsory continuation work until the age of 18. The further development of the views of the radical school will probably come from the Labor party, numerically already very strong, and comprising professional men as well as wage earners in its ranks.

Irish Home Rule. It required the new procedure of the Parliament act of 1911 to secure an Irish Home Rule bill. A measure passed the Commons for the third time, in 1914, and became law without the consent of the Lords. Certain counties in Ulster actually prepared for civil war rather than have the measure come into force. When the World War began, the enforcement of the act was suspended, and subsequent events caused it to lapse altogether. The war proved a most troublesome and chaotic period for Ireland, bringing to the surface all the latent antagonism between the two races. A further Home Rule bill, recognizing two separate parts and two separate governments for Ireland, was passed in 1920; but this was generally disregarded. The position of the Nationalists, who still hoped for favorable concessions from the Imperial Parliament, was complicated by the political program of the Sinn Fein, demanding an independent Irish Republic completely detached from the United Kingdom and from the empire. Late in 1921 Lloyd George succeeded in framing a "treaty" which the Imperial Parliament approved. The treaty, on the part of Great Britain, recognized the Irish Free State—the inclusion of the Ulster counties was left to their own consent—and the new Free State was to acquire the status of a self-governing dominion, analogous to that of Canada, within the empire. The treaty was ratified by the Irish representative assembly, the Dail Eireann, January 7, 1922.

The Approach of War. The rivalry with Germany took the direction (1) of a competition in naval armament, and (2) a diplomatic understanding with a group of powers which together should outbalance the Triple Alliance of Germany, Austria, and Italy. The naval competition had begun before 1905; but the victory of the Japanese fleet over the Russian in the battle of Tsushima in that year had demonstrated the advantage of the long range gun. The British admiralty at once laid the keel of the first modern dreadnought, a ship of high speed, with a few guns only and those of the largest caliber. Germany followed suit and took up the challenge which drove both powers to a naval program of overreaching dimensions.

To the alliance with Japan and the entente with France was added (1907) an understanding with Russia. This completed the diplomatic edifice intended to outmatch the German alliance. The main German objective, of which the Constantinople to Bagdad railway was a part, would have given the Central Powers a wide belt of influence and exclusive economic exploitation extending from the North Sea through the Balkan states and Asia Minor to the Persian Gulf, and impinging upon both Russian and English interests in western and central Asia. On the other hand, the French design of rounding out an empire in northwestern Africa by an inclusion of Morocco aroused German resentment. From either quarter, a reason for war might have come.

The annexation of Bosnia and Herzegovina by Austria (1908) found Russia not yet sufficiently recovered from the war with Japan to make this a crucial issue. The annexation was a diplomatic victory for the Central Powers; but it increased the tension between the two rival groups. The sending of the German gunboat *Panther* to Agadir in 1911 brought England at once to the diplomatic support of France, and Germany had to be content to leave France a free hand in Morocco, accepting territorial compensation elsewhere in Africa. The war of Italy against Turkey for territory in North Africa left the two groups of powers undisturbed. But the Balkan wars seemed to tell on the whole against the diplomatic prestige of the German group; and they left Serbia strengthened with Russian support against Austria's advance. While the memory of this diplomatic setback was fresh, the heir to the Austrian throne was assassinated at Sarajevo by Serbian nationalists. This event seemed to Germany to involve a further loss of prestige unless avenged by the complete humiliation of Serbia.

While Russia was mobilizing for the support of Serbia, England tried to have the impending conflict localized, and then to have it made the subject of a general European conference. Failing both, the full implications of the understanding with Russia and with France had to be met. When Germany declared war against Russia and then against France, England took the occasion of the violation of Belgian neutrality to enter the lists against Germany, and the World War had begun.

The World War. England's contribution to the combined operations of the Entente against the Central Powers and their allies was primarily naval. She resisted successfully, although with fearful loss of mercantile tonnage and food supply, the German submarine blockade of the British Isles. Her navy maintained to the end the counter blockade of all the maritime approaches of the Central Powers—a task which the adherence of Italy to the Entente in 1915 made the easier—thus cutting off all sea-borne war supplies and foodstuffs for the enemy. The naval battle of Jutland, the only large open engagement between the two high seas fleets (1916), ended in the safe withdrawal of the German squadrons to cover, whence they never emerged till the surrender after the armistice. After Turkey had joined the Central Powers, with Bulgaria, the attempt to force the Dardanelles, preparatory to taking Constantinople with the army quartered at Gallipoli, was foiled by the Turkish land batteries (1915). But Turkey was despoiled of most of her empire. England successfully defended the Suez canal and Egypt (severed definitely from the Turkish empire and declared a British possession, 1914), secured Jerusalem, and gained Mesopotamia.

England's share in military operations involved unprecedented disturbance of industrial and social activity at home. The small expeditionary force dispatched to France in the first months of the war was augmented by a large force raised through voluntary enlistment. But by 1916 every man, single or married, of military age, was by the conscription acts placed at the disposal of the government. Thus the English army, with a fighting service alone of over 4,000,000 men, assumed the proportions of the huge armies of the continental powers. Women replaced men wherever possible in industry and furnished most of the labor in the munition factories. In the final battle of the war, the English army took a major part in the fighting which broke the German resistance.

Mr. Asquith, as prime minister, gave way to Lloyd George, as the direction of war energies seemed to outgrow the older cabinet organization. Lloyd George, supported by statesmen from both parties (the Coalition), and relying upon a small war cabinet, organized and controlled the services, financial, military, naval, industrial, and rationing, that carried the war to a favorable conclusion. The general election after the armistice continued Lloyd George and the Coalition in office. See *World War.*

Post-War Period. After the armistice and the Treaty of Versailles, the government was faced by the serious task of restoring industry, of devising financial expedients for the enormous war debt, and of tiding over unemployment due to the temporary closing of European and world markets.

Abroad England found herself perhaps the leading power in the League of Nations. Her support of Greek claims against Turkey, sponsored by Lloyd George, led to embarrassment when Greece suffered a crushing defeat in 1922. Lloyd George was compelled to resign and was succeeded by a Conservative government under Bonar Law and later under Stanley Baldwin. In 1923, a Labor government under Ramsay MacDonald held office for 10 months, Baldwin being returned to power again at the end of the year. The Labor government had established trade relations with the Russian soviet government, but these were broken off in 1927 on the ground that Russia was fomenting revolution in England and in outlying British territories, notably in India.

The British government agreed, at the Washington Conference of 1921-22, to a parity of naval strength in capital ships with the United States, the limit for each nation being 525,000 tons. An attempt in 1927 to reach an understanding in regard to cruiser construction failed of results. In 1923, the war debt due to the United States was funded, payment to take place over a period of 62 years. England took a leading part in the principal international agreements aiming at the liquidation of war animosities, notably the Dawes Plan of 1925 and the Locarno treaties of 1927.

England's most serious post-War problem was the stagnation of industry. This was complicated in 1926 by a general strike, the strength of which was quickly broken through concerted popular and governmental action, and by a protracted coal strike. The Labor Disputes bill of 1927 was an outgrowth of these events. The suffrage, which in 1918 had been granted to women over 30 years of age, was extended in 1928 to all women over 21.

The post-War period witnessed important changes in England's relations with other British lands. Ireland was accorded government of her own choice, the Irish Free State becoming a self-governing dominion. The dominions were given separate representation in the League of Nations, England could no longer bind them by treaties without their consent, and several dominions established direct diplomatic relations with other nations. In accordance with recommendations of a conference in 1926, the official subordination of the dominions to the British Parliament was ended, the governors-general becoming representative, not of the British government, but solely of the crown.

SCOTLAND

Scotland in ancient times was known to the Romans as *Caledonia.* Roman legions under Julius Agricola, in the year 80 A. D., subdued all that part of the country south of the Firth of Forth. After their departure in 410, Caledonia gradually came to be peopled by the Picts, the Scots, the Britons, and the Angles. From the fusion of these four races sprang the people of modern Scotland, which later received its present name from the Scots who had arrived thither from Ireland.

Early Scottish Kings. In the year 844, the Scots of Dalriada and the Pictish people were consolidated into one kingdom under Kenneth MacAlpin. The first great battle in Scottish history took place in 937 on English soil between Constantine, king of the Scots, and Athelstan, the Saxon monarch.

In the reign of Malcolm I (943–54), Cumberland was ceded to Scotland by Edmund I of England. Another English province, that of Lothian, in the reign of Edmund II was annexed by Kenneth II of Scotland (971–95). Kenneth III was succeeded in 1005, by Malcolm II, whose death in 1034 ended the male line of Kenneth MacAlpin, the crown going to Duncan, his nephew. Duncan was foully murdered by Macbeth, who made himself king in 1040. The usurper was in turn slain in 1057 by Duncan's son, who ascended the throne as Malcolm III.

Effects of Norman Conquest. The Norman Conquest of England and the marriage of Malcolm with Margaret, sister of Edgar Atheling, could not fail to exercise a lasting influence on the northern kingdom. English civilization was gradually introduced by the assimilation of English customs, manners, and ideas, together with the English language. Malcolm III, one of the most uncompromising foes of England, was eventually killed in 1093 while leading an army against William Rufus.

Of the three sons who succeeded Malcolm III, David I (1124–53) proved the most powerful and capable. To such an extent did Scotland flourish under his rule, that her astounding development excited rivalry and jealousy in England.

English Suzerainty Begun. The English kings now entered upon a deliberate policy of weakening the power of their Scottish contemporaries. In 1173, William the Lion of Scotland, after his defeat in Northumbria, was forced to become a liegeman of Henry II. This English suzerainty, however, was relinquished by Richard Cœur de Lion in 1188.

From 1214 to 1285, under Alexander II and Alexander III, Scotland once more experienced a long period of national progress and prosperity. Alexander III was succeeded by his eight-year-old granddaughter, Margaret, in 1285. The child queen dying suddenly, the vacant throne was disputed among many rivals. Between two of these claimants, John of Baliol and Robert Bruce, Edward I was appointed arbiter. He decided in favor of Baliol, which decision implied once again suzerainty over Scotland.

In 1296, Edward defeated Baliol, who had chafed against his position as vassal, and forced him to abdicate, appointing a governor to administer the Scottish kingdom.

Wallace and Bruce. The Scots under Wallace rose in rebellion and won a decisive victory over the English at Stirling in 1297. The following year Edward again invaded Scotland, and at Falkirk the Scottish forces, after a brave but futile resistance, were broken. Wallace was later betrayed, and after a mock trial was condemned and executed, August 23, 1305.

Soon, however, another champion of the cause of Scotland was found in Robert Bruce, who, in 1314, at Bannockburn, drove the English into headlong flight and thus freed his country from foreign dominance. Bruce reigned fifteen years as Robert I of

Scotland. After a period of civil war, his son, David II, gained the throne in 1342.

Rise of Stuart Dynasty. David died childless, and a new line of Scottish kings began in the person of Robert II, son of Marjorie (daughter of Bruce) and the high steward, from which hereditary office the new dynasty took its name. He was succeeded in 1390 by his son Robert III, and, on the death of the latter in 1406, James I became king, under the regency of the duke of Albany. Internal strife among his turbulent barons led to James's being held captive in England for eighteen years. He was subsequently liberated and crowned at Scone in 1423.

James I proved a capable and gifted monarch, but unfortunately he was assassinated at Perth in 1437, being succeeded by his young son, James II. After a long minority, James assumed the reins of government and showed signs of being a firm and prudent ruler. He was, however, accidentally killed in 1460, and was succeeded by his son James III, who was slain in 1488 at the battle of Sauchieburn. James IV, son and successor of James III, in 1503 married Margaret, daughter of Henry VII of England. When Henry VIII, in 1509, ascended the English throne, border troubles broke out between him and James IV, resulting in the defeat of the latter at Flodden Field (1513).

Mary Queen of Scots. James V, son of James IV, became king in 1513. He made war in turn on England and was defeated at Solway Moss in 1542, dying a few days later on December 14 at Caerlaverock Castle. He was succeeded by his infant daughter, pitifully famous in Scottish history as Mary Queen of Scots. Her unfortunate marriage with Lord Darnley, a worthless ingrate, lost her the support of the Reformed party in Scotland. Helpless and bewildered, she married Bothwell, which still further served to alienate the loyalty of her subjects. She was at length forced to abdicate in favor of her infant son, who, as James VI, under the regency of the earl of Moray, became king in 1567.

After a thwarted attempt to regain her throne, Mary, trusting to the false friendship of Elizabeth, fled to England, where she remained a prisoner for nineteen years. She was at last cruelly beheaded at Fotheringay Castle in 1587, Elizabeth, by her dastardly vacillation, becoming a participant in the crime.

Union of Scotland and England. On the death of Elizabeth, James VI, as nearest heir, succeeded to the English throne in 1603 as James I of England, with the title of King of Great Britain, France, and Ireland. James I died in 1625 and was succeeded by his son Charles I, whose reign was marked by foreign wars and religious dissensions, which resulted in his execution, January 1, 1649. Six days later the Scots proclaimed his son, Charles II, king and invited him to Scotland. On two occasions he was defeated by Cromwell's troops, the second being at Worcester (1651), where his army was completely annihilated. His final overthrow occurred at Dunclog in 1679. Charles II was succeeded at his death in 1685 by his brother James VII of Scotland and II of England. The Revolution of 1688 drove James from his kingdom and in 1689 placed on the throne William and Mary, who were succeeded by Anne in 1702.

Coalescence of Parliaments. Already a spirit of alienation was rife in Scotland, due to commercial jealousy of England. To prevent a more serious estrangement between the two countries, the Scottish and English parliaments in 1707 passed an act by which the two governments were amalgamated into one ruling body.

Subsequent history has shown that the Scottish people have been in no way fallible in the intuition that guided them to the acceptance of a political arrangement which has brought to them such lasting peace and prosperity.

WALES

The earliest inhabitants of Wales were a mixed race of Celtic tribes and pre-Aryan peoples. They are largely represented in the small, dark, dolichocephalic (long-headed) types still to be met with in the coal valley districts of southern Wales. It is interesting to note that this ancient race has been identified with the Basques of northern Spain, and there exists but little doubt that the "small dark" Welshmen, as they are known today, are of the same stock as the original inhabitants of the Spanish peninsula.

The Roman Occupation. The Romans, under Ostorius Scapula and, later, Frontinus, conquered Wales by the year 78 A. D. After an occupation lasting for 360 years, when the Romans left Wales, it was considerably permeated with the civilization of the Empire. At their departure, however, the Welsh gradually resumed their former clan system, together with other Celtic customs, and allowed imperial manners to fall into abeyance.

Origin of the Name. Under two of their wise rulers, Roderick the Great and Howel the Good, they now enjoyed a brief period of national independence. The name they called themselves was that of *Cymri*, signifying "men of the same country," who were federated against the Germanic invaders of England, to whom they were known as Welsh (Wälsch) or aliens.

Saxons and Normans. For over 200 years, the Welsh held out successfully against the incursions of the West Saxons. In 577, however, they were defeated by the Saxons at Deorham near Bath, and again in 613 at Chester. These disasters served to weaken their forces by separating them from their kinsmen in southwest Britain, as well as from those in Cumbria.

From the 5th to the 11th century, the history of Wales is that of a long series of invasions in which the natives were engaged in beating off the Irish pirates from their coasts, and defending themselves against the inroads of the Saxons.

After the Normans had conquered England in 1066, they proceeded to attack Wales, and appeared in Glamorganshire in 1072. By slow degrees, native laws and customs were ousted to give place to Norman usages and to the machinery of feudalism.

Subjugation by Edward I. The action of the Welsh princes, who had sided with the English barons, afforded Edward I of England (1276–84) both excuse and opportunity for marching against Wales and, by making a complete conquest of the entire country, of consolidating the strength of his crown. In order to secure further his success in Wales, Edward erected a number of notable castles, such as those of Carnarvon, Conway, and Harlech, as strongholds against future possible uprisings.

The spirit of antagonism which had long existed between the boroughs of Wales, where English law prevailed, and the county districts, where Welsh law was still in force, at last broke loose at the beginning of the 15th century. Owen Glendower with Henry Hotspur, in 1403, rose in rebellion against the English, but was defeated by Henry IV at Shrewsbury in June of the same year.

Incorporation with England. In 1485, Henry VII, the first Tudor king of England, on his accession to the throne, at once set about ameliorating the administration of justice in Wales, and placed the boroughs and the county districts on an equal footing. His action served to pacificate the Welsh people and to bring about a lasting conciliation, which finally led to the incorporation of the principality of Wales with England in 1536. As a consequence, they became loyal adherents of the British crown and have never since wavered in their allegiance. The Welsh, however, have always retained their spirit of individual nationality, which in great measure has been kept alive by the preservation of their native tongue.

THE BRITISH COMMON-

Countries	Political Character	Form of Government	Executive Authority	Area in Sq. Miles
England	Great Britain and Northern Ireland, represented in Parliament	Constitutional monarchy	King through ministry	50,874
Wales (Great Britain)				7,466
Scotland (Great Britain)				30,405
Northern Ireland (Ulster)		Responsible	King through ministry	5,237
Isle of Man		Representative	Governor	221
Channel Islands		Representative	Lt. Governors	75
Dominions				
Canada	Dominion	Self-governing	Gov.-General	3,684,723
Australia	Commonwealth	Self-governing	Gov.-General	2,974,581
Newfoundland	Dominion	Self-governing	Governor	275,134*
Irish Free State	Free state	Self-governing	Gov.-General	26,592
New Zealand	Dominion	Self-governing	Gov.-General	103,575
Union of South Africa	Legislative union	Self-governing	Gov.-General	472,347
Dependencies and Possessions				
In Europe				
Gibraltar	Crown colony		Governor	2
Malta and Gozo	Colony	Part. representative	Governor	122
In Africa				
Ascension Island	Naval station		Commandant	34
British East Africa				
Kenya	Colony and protec'te	Part. representative	Governor	212,000
Tanganyika	Territory	Mandatory	Governor	365,000
Uganda	Protectorate		Governor	110,300
Zanzibar and Pemba	Protectorate		High com's'n'r	1,020
Mauritius and Dependencies	Colony		Governor	809
Nyasaland	Protectorate		Governor	37,890
Saint Helena	Colony		Governor	47
Seychelles	Colony		Governor	156
Somaliland	Protectorate		Governor	68,000
South Africa				
Basutoland	Territory		Res'd't com's'n'r	11,716
Bechuanaland	Protectorate		Res'd't com's'n'r	275,000
Northern Rhodesia	Colony		Governor	291,000
Southern Rhodesia	Colony	Responsible	Governor	149,000
Swaziland	Protectorate		Res'd't com's'n'r	6,678
Southwest Africa (under Union of South Africa)	Mandate	Mandatory	Administrator	322,400
West Africa				
Gambia	Colony and protec'te		Governor	4,134
Gold Coast; Ashanti and N. Terr.	Colony and protec'te		Governor	80,000
Nigeria	Colony and protec'te		Governor	335,700
Cameroon (British)	Mandate	Mandatory	Gov. of Nigeria	31,000
Sierra Leone	Colony and protec'te		Governor	31,000
Togoland (British)	Colony		Gov. of Gold Coast	12,600
Anglo-Egyptian Sudan	Protectorate		Gov.-General	1,014,000
In Asia				
India and Dependencies	Viceroyalty		Gov.-Gen. in council	1,805,332
Aden, Perim, Socotra, and Kuria Muria Islands	Colony and protec'te	Under Bombay presidency	Polit. resident	9,000
Bahrein Islands	Protectorate	Native	Polit. resident	250
Ceylon	Crown colony		Governor	25,332
Cyprus	Colony		High com's'n'r	3,584
Hongkong	Crown colony		Governor	391
Malay States, Federated	Protectorate		High com's'n'r	27,648
Malay States, Unfederated	Protectorate		Sultan; adviser	23,486
North Borneo	Colony		Governor	31,106
Brunei and Sarawak	Protectorate		Ag't and com's'n'r	46,000
Palestine	Mandate	Mandatory	High com's'n'r	9,000
Straits Settlements	Crown colony		Governor	1,600
Weihaiwei	Leased province		Commissioner	285
In Australasia and Oceania				
Papua (under Australia)	Territory		Lt. Governor	90,540
New Guinea (under Australia)	Territory	Mandatory	Administrator	89,252
Western Samoa (under New Zealand)	Territory	Mandatory	Administrator	1,250
Fiji	Crown colony		Governor	7,083
Nauru	Mandate	Mandatory	Administrator	10
Pacific Islands			High com's'n'r	
Tonga (Friendly Islands)	Protectorate	Repres't and mon'chy	Queen; com's'n'r	385
Gilbert and Ellice Islands	Colony		Res'd't com's'n'r	166
Solomon Islands (British)	Protectorate		Res'd't com's'n'r	11,000
In America				
Bermuda	Colony	Representative	Governor	19
British Guiana	Colony	Part. representative	Governor	89,480
British Honduras	Crown colony		Governor	8,592
Falkland Islands, with So. Georgia	Crown colony		Governor	5,618
West Indies				
Bahamas	Colony	Representative	Governor	4,404
Barbados	Colony	Representative	Governor	166
Jamaica	Colony	Representative	Governor	4,431
Turks, Caicos Islands, etc.			Commissioner	224
Leeward Islands	Colony		Governor	715
Trinidad, with Tobago	Colony		Governor	1,974
Windward Islands	Colony		Gov. and adm's't'rs	516

* Includes Labrador, 232,400 square miles.

WEALTH OF NATIONS

Accession to the Empire		Foreign Trade		Population	Capital	Countries
Method	Date	Imports	Exports			
Conquest	449-1066	. . . . .	. . . . .	35,678,530	. . . . .	England
Conquest	1283	$6,040,319,040	$3,778,445,880	2,206,712	London	Wales
Political union	1603, 1707			4,882,288	. . . . .	Scotland
Conquest, settlement	1172-1494	. . . . .	. . . . .	1,256,322	Belfast	No. Ireland (Ulster)
Purchase	1827	. . . . .	. . . . .	60,238	Douglas	Isle of Man
Thro' duke of Norm'dy	1066	. . . . .	. . . . .	89,614	St. Helier; St. Peterport	Channel Islands
						Dominions
Settlement, conquest	1627-1763	1,315,193,000	1,328,537,000	8,788,483	Ottawa	Canada
Settlement	1788-1828	736,022,700	721,661,400	5,436,794	Canberra	Australia
Treaty, cession	1583	36,406,260	23,590,440	259,358	Saint Johns	Newfoundland
Conquest, treaty	1494, 1922	305,757,180	210,739,320	2,972,802	Dublin	Irish Free State
Settlement, treaty	1840	254,936,160	268,573,320	1,344,384	Wellington	New Zealand
Conquest, treaty	1814-1900	329,464,260	399,462,840	6,928,580	Pretoria	Union of So. Africa
						In Europe
Treaty, cession	1713	. . . . .	. . . . .	20,638	Gibraltar	Gibraltar
Treaty, cession	1814	21,850,560	5,763,960	213,024	Valletta	Malta and Gozo
						In Africa
Occupation	1815	. . . . .	. . . . .	250	Ascension	Ascension Island
Annexation	1920	39,176,460	46,539,360	2,376,000	Nairobi	Br. East Africa
Conquest	1918	13,919,040	14,618,880	4,100,000	Dar-es-Salaam	Kenya
Occupation	1894	. . . . .	. . . . .	3,066,327	Entebbe	Tanganyika
Treaty, cession	1890	8,913,240	9,865,800	200,000	Zanzibar	Uganda
Conquest, cession	1810-1814	20,066,940	14,473,080	385,074	Port Louis	Zanzibar, Pemba
Treaty, cession	1891	2,877,120	2,745,900	1,201,983	Zomba	Mauritius
Conquest	1673	281,880	228,420	3,747	Jamestown	Nyasaland
Treaty, cession	1814	631,800	811,620	24,811	Victoria	Saint Helena
Treaty, cession	1884	1,754,460	1,176,120	300,000	Berbera	Seychelles
						Somaliland
Conquest	1884	4,135,860	3,674,160	498,781	Maseru	South Africa
Conquest	1885-1895	. . . . .	. . . . .	152,983	Mafeking (Cape)	Basutoland
Conquest	1889	6,405,480	2,104,380	931,500	Livingstone	Bechuanaland
Conquest	1889	23,775,120	27,813,780	803,620	Salisbury	No. Rhodesia
Treaty	1894	. . . . .	. . . . .	133,563	Mbabane	So. Rhodesia
Conquest	1920	10,643,400	13,073,400	227,000	Windhoek	Swaziland
						Southwest Africa
						West Africa
Treaty, cession	1807	3,003,480	3,538,080	209,000	Bathurst	Gambia
Treaty, cession	1672	47,545,380	52,925,400	2,078,043	Accra	Gold Coast
Settlement, purchase	1861-1900	79,111,080	84,418,200	18,500,000	Lagos	Nigeria
Conquest, annexation	1916	1,161,540	617,220		Buea	Cameroon *Br*
Treaty, cession	1787	10,585,080	8,850,060	1,541,311	Freetown	Sierra Leone
Conquest	1914	. . . . .	. . . . .	188,265	. . . . .	Togoland *Br.*
Conquest	1899	27,094,500	19,046,340	5,850,000	Khartum	Anglo-Egypt. Sudan
						In Asia
Conquest, cession	1612-1857	1,026,354,240	1,416,850,380	318,942,480	Delhi	India
Cession, settlement	1839-1876	29,524,500	27,434,700	67,000	Aden	Aden, Perim, etc.
Protectorate	1867	8,320,320	4,320,540	110,000	Manama	Bahrein Islands
Treaty, cession	1796-1815	116,761,500	159,607,260	4,504,549	Colombo	Ceylon
Annexation	1914	7,693,380	5,827,140	310,709	Nikosia	Cyprus
Treaty, cession	1842	364,767,300	343,465,920	625,166	Victoria	Hongkong
Treaty, cession	1874-1888	75,796,560	233,284,860	1,324,890	Singapore	Mal. States, Fed.
Treaty, cession	1885-1914	25,276,860	44,415,540	1,123,274	. . . . .	Mal. States, Unfederated
Cession, protectorate	1881-1888	26,462,700	67,281,840	208,183	Sandakan	North Borneo
Treaty, protectorate	1888	. . . . .	. . . . .	625,000	. . . . .	Brunei, Sarawak
Conquest, mandate	1914-1918	38,097,540	7,955,820	757,182	Jerusalem	Palestine
Treaty, cession	1785-1909	763,360,200	702,566,460	881,939	Singapore	Str. Settlements
Treaty, cession	1898	. . . . .	. . . . .	154,416	Weihaiwei	Weihaiwei
						In Australasia
Annexation	1884	2,289,060	3,333,960	276,888	Port Moresby	Papua
Mandate	1920	2,760,480	5,370,300	400,000	Rabaul	New Guinea
Treaty	1919	1,681,560	1,841,940	37,791	Apia	Western Samoa
Cession	1874	6,177,060	10,478,160	157,266	Suva	Fiji
Conquest	1914	311,040	. . . . .	2,129	. . . . .	Nauru
Cession, conquest	1893-1915	. . . . .	. . . . .	265,000	Suva, Fiji	Pacific Islands
Protectorate	1900	. . . . .	. . . . .	23,562	Nukualofa	Tonga
Colony	1892-1915	. . . . .	. . . . .	36,000	Ocean Island	Gilbert & Ellice Is.
Protectorate	1893	. . . . .	. . . . .	150,750	Tulagi	Solomon Is. *Br.*
						In America
Settlement	1612	6,439,500	806,760	20,127	Hamilton	Bermuda
Conquest, cession	1803-1814	14,132,880	15,216,660	297,691	Georgetown	British Guiana
Conquest	1798	4,514,940	3,576,960	45,317	Belize	British Honduras
Treaty, cession	1771	2,595,240	19,026,900	3,271	Port Stanley	Falkland Islands
						West Indies
Settlement	1629	8,558,460	2,337,660	53,031	Nassau	Bahamas
Settlement	1605	11,148,840	6,906,060	156,312	Bridgetown	Barbados
Conquest	1655-1670	27,390,960	19,124,100	858,188	Kingston	Jamaica
Annexation	1765	. . . . .	. . . . .	5,612	. . . . .	Turks, Caicos Is.
Settlement	1623-1659	3,824,820	3,538,080	122,242	Saint Johns	Leeward Islands
Conquest	1797	21,359,700	25,126,200	365,913	Port of Spain	Trinidad
Cession	1763-1783	4,471,200	4,422,600	163,477	Saint George's	Windward Islands

RULERS OF ENGLAND

Name	Lineage	Period of Reign		Birth	Death
	Anglo-Saxon Kings	A. D.	A. D.	A. D.	A. D.
Egbert	First King of all England	827	839	775?	839
Ethelwulf	Son of Egbert	839	857	....	858
Ethelbald	Son of Ethelwulf	857	860	....	860?
Ethelbert	Second son of Ethelwulf	860	866	....	866?
Ethelred I	Third son of Ethelwulf	866	871	....	871
Alfred the Great	Fourth son of Ethelwulf	871	899	849	899
Edward the Elder	Son of Alfred	899	925	870?	925
Athelstan	Eldest son of Edward	925	940	895?	941
Edmund I	Brother of Athelstan	940	946	923	946 or 8
Edred	Brother of Edmund I	946	955	....	955?
Edwy	Son of Edmund I	955	959	939?	959
Edgar	Second son of Edmund I	959	975	943?	975
Edward the Martyr	Son of Edgar	975	978	961?	978
Ethelred II	Half-brother of Edward	978	1016	968	1016
Edmund Ironside	Eldest son of Ethelred	1016	1017	989	1017
	Danish Kings				
Canute	By conquest and election	1017	1035	995	1035
Harold I (Harefoot)	Son of Canute	1035	1040	....	1040
Hardicanute	Another son of Canute	1040	1042	1019	1042
	Saxon Kings				
Edward the Confessor	Son of Ethelred II	1042	1066	1004	1066
Harold II	Brother-in-law of Edward	1066	....	1022	1066
	Norman Kings				
William I	Second cousin to Edward the Confessor; obtained the Crown by conquest	1066	1087	1027	1087
William II	Third son of William I	1087	1100	1056	1100
Henry I	Youngest son of William I	1100	1135	1068	1135
Stephen	Third son of Stephen, Count of Blois	1135	1154	1105	1154
	The Plantagenets				
Henry II	Son of Geoffrey Plantagenet by Matilda, d. of Henry I	1154	1189	1133	1189
Richard I, the Lion-hearted	Eldest surviving son of Henry II	1189	1199	1157	1199
John	Youngest son of Henry II	1199	1216	1166	1216
Henry III.	Eldest son of John	1216	1272	1207	1272
Edward I	Eldest son of Henry III.	1272	1307	1239	1307
Edward II	Eldest surviving son of Edward I	1307	1327	1284	1327
Edward III	Eldest son of Edward II	1327	1377	1312	1377
Richard II	Son of the Black Prince, eldest son of Edward III	1377	1399	1366	1400
	House of Lancaster				
Henry IV	Son of John of Gaunt, fourth son of Edward III	1399	1413	1367	1413
Henry V	Eldest son of Henry IV	1413	1422	1387	1422
Henry VI	Only son of Henry V	1422	1461	1421	1471
	House of York				
Edward IV	His grandfather was Richard, son of Edmund, fifth son of Edward III	1461	1483	1441	1483
Edward V	Eldest son of Edward IV	1483	....	1470	1483
Richard III	Younger brother of Edward IV	1483	1485	1452	1485
	House of Tudor				
Henry VII	Son of Edmund, eldest son of Owen Tudor, by Katharine, widow of Henry V; his mother, Margaret Beaufort, was great-granddaughter of John of Gaunt	1485	1509	1457	1509
Henry VIII	Only surviving son of Henry VII	1509	1547	1491	1547
Edward VI	Son of Henry VIII by Jane Seymour	1547	1553	1537	1553
Mary I	Daughter of Henry VIII by Katharine of Aragon	1553	1558	1516	1558
Elizabeth	Daughter of Henry VIII by Anne Boleyn	1558	1603	1533	1603
	House of Stuart				
James I	Son of Mary Queen of Scots, granddaughter of James IV and Margaret	1603	1625	1566	1625
Charles I	Only surviving son of James I (executed)	1625	1649	1600	1649
Commonwealth and Protectorate	Commonwealth declared May 19				
	Oliver Cromwell, Lord Protector	1649	1658	1599	1658
	Richard Cromwell, third son of Oliver, Lord Protector	1658	1659	1626	1712
Charles II	Eldest son of Charles I	1660	1685	1630	1685
James II	Second son of Charles I	1685	1689	1633	1701
William III and Mary II	Son of William, Prince of Orange, by Mary, daughter of Charles I	1689	1702	1650	1702
	Eldest daughter of James II	1689	1694	1662	1694
Anne	Second daughter of James II	1702	1714	1665	1714
	House of Hanover				
George I	Son of Elector of Hanover, by Sophia, daughter of Elizabeth, daughter of James I	1714	1727	1660	1727
George II	Only son of George I	1727	1760	1683	1760
George III	Grandson of George II	1760	1820	1738	1820
George IV	Eldest son of George III	1820	1830	1762	1830
William IV	Third son of George III.	1830	1837	1765	1837
Victoria	Daughter of Edward, fourth son of George III.	1837	1901	1819	1901
	House of Windsor *				
Edward VII	Son of Victoria	1901	1910	1841	1910
George V	Son of Edward VII.	1910	....	1865	

* Adopted in place of Saxe-Coburg by George V, July 1917.

CANADA

After the voyages of the Norsemen, Bjarni Herjulfson and Leif Ericson, in the 10th century, when, as related in the Norse sagas, they probably explored much of the east coast of Canada, no European for five centuries left evidence of setting foot on the American continent. Impelled by his own surmises as to the longitude of the east coast of Asia, and also by news of the landfall of Columbus, John Cabot, in 1496, obtained a commission from King Henry VII of England for a westward voyage of discovery under the English flag. In the spring of 1497 Cabot sailed from Bristol; on June 24 he sighted land, possibly Cape Breton island. His discovery furnished a ground for England's later claim to North American territory. The English did not follow up the advantage offered by the later explorations of John Cabot and his son Sebastian, doubtless because the reports about the new found land confuted John Cabot's boast that the wealth of Asia should flow into the port of London.

First Explorations and Settlements. By the early 16th century, French fishermen, among others, began to frequent the codbanks off Newfoundland. By sailing around the northern extremity of Newfoundland they discovered the Straits of Belle Isle, and became aware of the vast body of water into which the straits led. It was Jacques Cartier, a sailor of St. Malo in Brittany, who discovered this body of water to be the gulf of a great river, and with this discovery the story of Canadian exploration really begins. In 1534 Cartier sailed into the Gulf of St. Lawrence and took possession of its shores in the name of the French king. On a second voyage, in 1535-36, he ascended the St. Lawrence as far as the rapids by the island of Montreal. Following Cartier, attempts were made by the French to plant colonies along the coast of Acadia and the shores of the Gulf of St. Lawrence (Canada). The penetration and occupation of this latter region awaited the genius and devotion of Samuel Champlain. Champlain made his first voyage to the St. Lawrence in 1603; he began the first permanent settlement at Quebec in 1608. His activities during the next twenty years left an indelible impress upon the fortunes of the French in Canada. To him is due the discovery of Lake Champlain (the link between the St. Lawrence and the Hudson) as well as of Lake Ontario, and the establishment of a trading post at Montreal. But Champlain committed the French to an alliance with the Algonquin and Huron Indians against the more powerful confederacy of the Iroquois, who thus became the allies of the English both in war and in the fur trade. To this alliance is due in some measure the failure of the French to hold their empire in North America.

The conversion and the civilizing of the Indians were undertaken in earnest by the Jesuit fathers, who began their great mission on their arrival in Quebec in 1625. Many suffered martyrdom when their converts, the Hurons, were practically exterminated by the vengeful Iroquois. The Jesuit fathers shared in the exploration of the interior of the continent, where many a distant mission center attests their pious labors; they made the Church the most powerful influence in shaping the history of New France in the 17th and the 18th century.

Government of New France. To correct the abuses attending the early government and commerce of the colony, Richelieu, in 1627, organized the Hundred Associates, a company that controlled New France and enjoyed a monopoly of the fur trade until 1663. In that year Louis XIV constituted Canada a royal province. Its civil government was administered by a governor, an intendant, who was usually a lawyer, and a council. These were all appointed by the crown; no trace of representative government ever appeared in New France, nor, it may be added, was any Huguenot or heretic ever permitted to settle. Sturdy French peasants were encouraged to migrate from France; they brought with them the traditions of the seignioral system of land tenure, which was used in Canada as the basis of land grants.

Large tracts of uncleared land, called seigniories, were bestowed upon seigniors, who thus formed a landed noblesse. The seigniors held their estates by the "tenure of fealty and homage"; they enjoyed social leadership and judicial powers over the tenant farmers under them. The farmers, or habitants, received from their seignior a tenure resting upon payment of small annual rentals in money or in produce, together with the customary seignioral dues. The seigniories, sometimes called côtes, usually had the bank of a river for a base line. Each habitant received a rectangular strip of land running from the river into the woodland behind. The houses, one to each rectangular strip, were built close to the river front; the village bore the appearance of a single line of houses placed at wide intervals instead of a cluster of cottages grouped around a church, as in the European manor or seigniory. Since each habitant was expected to divide his land fairly among his children, the original rectangular farm became subdivided into mere ribbons of land, such as are to be seen today in the St. Lawrence valley. The system with its seignioral dues survived in Lower Canada (Quebec) until 1854, when, by a statute of that year, seignioral rights were terminated and seignioral dues commuted.

English and French Rivalry. In 1689, with the beginning of the world-wide struggle between England and France for maritime and commercial supremacy, the wars of the French and the English colonies for the control of America were opened in earnest. The warfare was carried on by means of cruel, merciless border raids, in which the Indians shared. The Treaty of Utrecht in 1713 gave England Acadia (now the provinces of Nova Scotia and New Brunswick) and recognized the English title to Newfoundland and to Hudson Bay Territory. For the next forty years the French tried to hold the interior country of the Lakes and the Mississippi valley, and to confine the English to the Atlantic seaboard. English pioneers from Virginia and Pennsylvania, pushing west to the Ohio, were checked at the Alleghenies by forces of the French and of the Indians friendly to them. The Iroquois for long held the balance of power, seeing their own safety in the rivalry of the two contending white nations. The Seven Years' war, commencing in the Ohio valley in 1756, turned at the start in favor of the French, until the fall of Louisburg in 1758, and the capture of Quebec by Wolfe in 1759 put an end to French power in America. Canada, as well as all the territory between the Alleghenies and the Mississippi, was given to England by the Treaty of Paris (1763).

An area comprising the portion of the St. Lawrence valley already settled by the French Canadians was erected at the close of the war into the province of Quebec, the Ohio valley and beyond being administered separately as an Indian reservation. The ill-advised attempt to introduce English law and English courts among the French of the new province of Quebec provoked so much discontent that in 1774 the Quebec act restored the old French civil law, at the same time virtually establishing the Roman Catholic Church. Both have helped to perpetuate the French language, which with English is recognized as an official language in the Dominion. The Quebec act also extended the area of the province to include the Indian reservation, which became the Northwest Territory of the United States after the Treaty of 1783. The delimitation of the various portions of the long boundary between Canada and the United States from the Northeast Boundary of 1783, through the adjustment of the 49th parallel, to the Alaska Award of 1903, has been an example of arbitration and treaty negotiation in international disputes.

Growth of the Provinces. The Continental Congress at the outbreak of the American Revolution tried to secure the adherence of the French Canadians of Quebec; but these remained neutral during the struggle. After the independence of the thirteen colonies had been acknowledged, thousands of loyalists—known later as United Empire Loyalists—assisted by the English government, found asylum in Nova Scotia and Quebec. Those who settled in Nova Scotia, being refused adequate representation in the provincial assembly, which had been instituted in 1758, petitioned for a separate government. For them the province of New Brunswick was formed out of the western part of Nova Scotia in 1784. Those taken to Upper Quebec were settled in the vicinity of Lake Ontario. Between them and the French Canadians in the lower part of the province, differences in language, in religion, and in law provoked an estrangement which seemed to make impolitic the further inclusion of the two races under one provincial government. By the Canada act, or the Constitutional act of 1791, Quebec was divided: the French-speaking province took the name of Lower Canada; Upper Canada, with its English-speaking loyalist pioneers, began its separate history under Governor Simcoe. Public land was offered to pioneers upon terms which soon raised their number to 30,000. York, later Toronto, grew up as the center of industry and commerce.

In both provinces, to a governor responsible only to the Colonial office, and to a council appointed by the governor, was added by the Constitutional act an elective assembly. The governor and council together had no means of controlling the assembly; nor had the assembly any means of making the governor and council responsible to its wishes or to the wishes of the people of the province. This fatal adjustment of constitutional machinery precipitated the long struggle for responsible government—a struggle that did not end until provincial assemblies acquired a position and procedure similar to that enjoyed by the British House of Commons.

Expansion and Union. The defense of Canada in the War of 1812 was the first general or "national" venture of the four unrelated provinces; it bore with special hardship, however, upon Upper Canada. At the same time the exploration of the great Northwest, the prairies and the Rocky mountains, as well as the Pacific coast, by Mackenzie and Vancouver, gave the first glimpses of a "national" domain. Lord Selkirk founded the Red River settlement, the beginning of the province of Manitoba, in 1812. Immigration, likewise the concern of all the provinces, had begun to increase through the work of land companies and colonization societies which brought in more than 150,000 people before 1833. But no "national" policy was possible until the issue of responsible government was settled. The question inflamed the politics of both Canadas until, in 1837, the *Patriotes* under L. J. Papineau, in the lower province, and the Reformers under W. L. Mackenzie, in the upper province, set up the flag of revolt. The armed insurrections, slight enough in themselves, were easily suppressed, but they served to direct the attention of the British government to the two difficulties under which the Canadas labored; namely, race friction and irresponsible rule. The government took the momentous step after 1837 of dispatching to Canada as high commissioner the earl of Durham, well known for his great wealth and for his radical opinions. The statesmanlike report, which he and his secretaries prepared, exposed clearly the impolicy of continuing the irresponsible rule of governor and council.

Durham allowed himself to form an adverse judgment upon the special claims of the French Canadians, and he fancied that he could devise a political expedient to bring about their ultimate Anglicization. To this end he proposed the union of the two provinces, carried out by the Union act in 1841. The plan to obliterate the distinctiveness of the French could not in the nature of things be successful, for the inclusion of both races into a single union government merely intensified their mutual hostility, and in the end forced the two races apart, to come together again on the basis of confederation instead of union.

The Union, however, achieved responsible government. To the Assembly of the new government, Upper and Lower Canada each was to send an equal number of representatives, regardless of any differences in the population. While, at the outset, this device served to protect the interests of the English-speaking minority, in the end it turned to their disadvantage when the balance of population stood in their favor. An executive council, or cabinet, chosen by the governor from the Council and the Assembly, made the constitution parliamentary in form. But cabinet responsibility to the Assembly was not actually settled until 1849, when the governor, Lord Elgin, acting in the full spirit of Durham's report, signed a bill granting compensation for losses of property in the rebellion in Lower Canada,—a bill acceptable to the French and to the Reformers, who together had a majority in the Assembly, but extremely distasteful to the "Tories." The signing of this bill marks the supremacy of the Canadian Assembly in its control of the executive. For his action Lord Elgin was stoned at Montreal by a "Tory" mob, which also set fire to the Parliament house. Mob violence prompted the removal of the capital to Bytown, renamed Ottawa, on the Ottawa river, which has since remained the capital.

Confederation. The impracticability of the Union, as seen in the Parliamentary deadlock, and the apprehension that Canada might be involved in the American Civil War, led in 1864 to a convention of delegates from all the provinces, who met in Quebec to confer upon a confederation. Under the guidance of such statesmen as John A. Macdonald, Charles Tupper, George Brown, George E. Cartier, D'Arcy McGee, and others, known as the Fathers of Confederation, a set of resolutions was adopted, which served as the basis of the British North America act passed by the Imperial Parliament in 1867. By this act, the provinces of Upper and Lower Canada, of Nova Scotia, and of New Brunswick were formally confederated into the Dominion of Canada. Newfoundland preferred not to enter the Confederation and still remains a separate part of the empire. Upper Canada became Ontario; Lower Canada took the name of Quebec. The anniversary of confederation, July 1, is Dominion Day, the national political holiday.

The federal constitution provides for a governor-general, a privy council, a Senate, and a House of Commons; the system of executive and legislative procedure follows the English Parliamentary model. In contrast to the Constitution of the United States, the British North America act, in view of the state rights controversy in the United States, accords to the provinces certain specific and explicit rights only, reserving to the Federal government all the general and residuary rights and prerogatives of sovereignty. Constitutional law has been concerned chiefly with the respective powers assigned to the provinces and to the Federal government, the ultimate appeal being to the judicial committee of the privy council at Westminster.

Unifying the Dominion. To give the Dominion its continental scope from ocean to ocean and to unify its widely separated parts was the task of Canadian statesmen in the two decades following 1867. In 1869 the Dominion acquired by purchase from the Hudson's Bay Company its title to the Northwest Territories. Thus the prairies, hitherto guarded as an exclusive preserve for the Indian fur trade, were thrown open to settlers and proved to be among the richest wheat yielding areas of the continent. Railways were to bind together all these distant outlying parts. New Brunswick and Nova Scotia had been influenced to consent to confedera-

tion by an agreement, incorporated in the British North America act, to unite them with Quebec and Ontario by a railway. This promise was fulfilled by the completion of the Intercolonial railway in 1876. After the Oregon boundary had been settled, the Hudson's Bay Company procured the creation of Vancouver island into a crown colony. On the mainland, owing to the discovery of gold in 1856, New Caledonia became a crown colony in 1858, under the name of British Columbia. The union of the two crown colonies under the latter title came in 1866. British Columbia joined the Confederation in 1871. Prince Edward Island agreed to enter the Confederation in 1873.

A serious difficulty in taking over the Northwest was raised by the half-breed and Indian revolt of 1869-70, led by Louis Riel. The trouble arose over the half-breeds' fear that their holdings under the Hudson's Bay title might be disregarded. The disturbance subsided when the new province of Manitoba was taken into the Confederation.

Sir John A. Macdonald headed the first federal cabinet after confederation (1867–73). In this administration, the outstanding disputes between the Dominion and the United States were settled by arbitration or negotiation. The issues involved the Newfoundland and east coast fisheries, the adjustment of the 49th parallel on the Pacific coast, and the losses due to the Fenian raids of 1866 and 1870-71. Macdonald took the first steps toward the construction of the transcontinental railway; but a scandal connected with campaign funds subscribed by a company seeking the charter brought his resignation. The Liberal leader, Alexander Mackenzie, formed a new ministry.

As leader of the Conservative opposition, Macdonald found it opportune to champion the "National Policy" of protection for Canadian industries; in 1878 he was returned to office on this platform. He led the Conservative government from that year until his death in 1891. A protective tariff was established, and, largely as a direct consequence, the Dominion secured the right to negotiate directly her own commercial treaties with foreign states. The first transcontinental railway, the Canadian Pacific, was completed late in 1885. Two others, the Grand Trunk Pacific and the Canadian Northern, later consolidated in the Canadian National system, have been built since. As the Canadian Pacific was being completed, Louis Riel led a second revolt of half-breed settlers in the Saskatchewan valley. This outbreak, easily suppressed by a military force, served to direct public and newspaper attention to the Northwest Territories. Settlers poured in, brought by the railway, and the Territories received representation at Ottawa. The two provinces of Saskatchewan and Alberta were constituted in 1905.

After the death of Sir John A. Macdonald, several Conservative ministries followed in rapid succession. Then the general elections of 1896 brought the Liberals into office under Sir Wilfrid Laurier.

National Development. The period of Liberal government which lasted for fifteen years proved to be a time of rapid economic development, accompanied by signs of a very distinctive national spirit. The sending of a contingent to South Africa during the Boer war showed this. The Laurier government lowered duties on some manufactured goods and instituted a British preference, but still retained the principle of adequate protection for Canadian industries. In 1903 the Alaska boundary dispute and questions relating to the joint use of the Great Lakes and other boundary waters were settled with the United States. The Imperial government left Canada free to reach an agreement with Japan in 1907, upon the restriction of Japanese immigration into the Dominion. Reciprocity with the United States became a major political issue in 1910. Previously, in 1854, the two countries began a reciprocity agreement which continued until the United States abrogated it in 1866. In 1911 the Laurier government took the question to the country at a general election and were defeated. The Conservatives under Sir Robert Borden formed a ministry.

The Borden government, impressed with the need of contributing to the general naval defense of the empire, brought forward in 1912 an emergency measure providing for the building of three dreadnoughts at a cost of $35,000,000. These were to be built in Great Britain and placed by the Dominion at the disposal of the Imperial admiralty. The Liberals insisted upon an exclusively Canadian navy, involving Canadian labor, personnel, and control. The Borden measure passed the Conservative House of Commons but was rejected by the Liberal majority in the Senate. Discussion over the tariff and over government aid for two new transcontinental railways, early in 1914, gave way to the momentous issue of the World War, which was to absorb the entire activity of the Dominion for the next four years.

Canada in the World War. Canada responded instantly and heroically to the challenge of the World War. Her government began to recruit the famous Canadian Expeditionary Force on August 1, 1914. In September 1914 an advance detachment of 33,000 sailed from Quebec,—the vanguard of a general muster of over half a million men. For the duration of the war, Canadian military headquarters kept a steady stream of Canadian troops, supplies, and munitions passing across the Atlantic. See *World War*.

The country came through the war, after a fearful sacrifice of men and money, with something of a new status, both as a dominion within the empire and as a separate nation before the world. Full control of her own foreign policy seemed imperative to many Canadian statesmen. In May 1920, it was agreed as between the Imperial government and the Dominion that Canada might have a diplomatic representative at Washington. The first appointment was made in 1926; and the first American minister to Ottawa was accredited in 1927. Legations to France and Japan were opened in 1928.

Recent Events. In July 1920 Sir Robert Borden resigned the leadership of his party to Mr. Arthur Meighen. The Conservative government incurred criticism for involving the country heavily through the purchase and operation of railways and a government controlled mercantile marine. It faced also the opposition of a new political group known as the Farmers', or Progressive, party. This party called for a reduction of the tariff and thus stood directly opposed to the Conservatives who, on the whole, represented industrial interests. Mr. Meighen's appeal to the country in 1921 brought the Conservatives overwhelming defeat. The Liberal party, led by Mr. W. L. Mackenzie King, and seconded by the Progressives, held the majority in the House. After the general election of 1925, King's majority became insecure, suffering a brief interruption from July 13 to September 25, 1926, when the governor-general entrusted the government to Meighen. A further election in 1926 returned King to office and Meighen resigned his leadership, being succeeded in October 1927 by Mr. R. B. Bennett. The Liberal government completed the consolidation of the national railways.

Following the World War, the question of prohibition was dealt with separately by the several provinces. The majority passed strict prohibitory laws, only to be compelled later by public opinion to alter them radically or repeal them entirely. In 1924 the United Church of Canada was formed, consisting of sections of the Methodist, Presbyterian, and Congregational communions. At the Imperial Conference of 1926 a resolution was adopted to end Canada's official subordination to the British Colonial Office, the Canadian government and the British government agreeing to address each other through their respective prime ministers. In September 1927, Canada was elevated to the Council of the League of Nations, holding the elective seat in that body as trustee of the smaller nations in the League Assembly.

GOVERNORS-GENERAL OF CANADA

Name	Title While in Office	Born	Parents	
			Father	Mother
Sir Charles Stanley	4th Viscount Monck, G. C. M. G.	1819	C. J. K. Monck, 3d Viscount	Bridget Willington
Sir John Young	1st Lord Lisgar, G. C. M. G.	1807	Sir William Young	Lucy Frederick
Frederick T. H. T. Blackwood	The Earl of Dufferin, K. P., K. C. B., G. C. M. G., 1st Marquess of Dufferin and Ava	1828	Price Blackwood, 4th Baron Dufferin	Helen Sheridan
John Douglas S. Campbell	The Marquess of Lorne, K. T., G. C. M. G., 9th Duke of Argyll	1845	George S. Campbell, 8th Duke of Argyll	Elizabeth, dt. 2d Duke of Sutherland
Henry C. K. Fitz-Maurice	The 5th Marquess of Lansdowne, G. C. M. G.	1845	Henry Fitz-Maurice, 4th Marquess of Lansdowne	Emily Jane, dt. Comte de Flahault
Frederick A. Stanley	Lord Stanley of Preston, G. C. B., 16th Earl of Derby	1841	Edward Geoffrey, 14th Earl of Derby	Emma, dt. of 1st Baron Skelmersdale
John C. Gordon	The Earl of Aberdeen, K. T., G. C. M. G., 1st Marquess of Aberdeen and Temair	1847	George J. J. Gordon, 5th Earl of Aberdeen	Mary Baillie
Gilbert J. M. K. Elliot	The 4th Earl of Minto, G. C. M. G.	1845	William H. Elliot, 3d Earl of Minto	Emma, dt. of Sir T. Hislop, Bart.
Albert H. G. Grey	The 4th Earl Grey, G. C. M. G.	1851	Charley Grey, 2d son 2d Earl Grey	Mary, dt. 1st Baron Ponsonby
	Field Marshal His Royal Highness the 1st Duke of Connaught, K. G.	1850	H. R. H. The Prince Consort	H. M. Queen Victoria
Victor C. W. Cavendish	The 9th Duke of Devonshire, K. G., G. C. M. G., G. C. V. O.	1868	Lord Edward Cavendish, 3d son 7th Duke Devon	Lady Blanche, dt. 6th Earl of Carlisle
Julian H. G. Byng	General the 1st Lord Byng of Vimy, G. C. B., G. C. M. G., M. V. O.	1862	George S. Byng, 2d Earl of Strafford	Hon. Harriet, dt. 1st Baron Chesham
Freeman Freeman-Thomas	The 1st Lord Willingdon of Ratton, G. B. E., G. C. S. I., G. C. I. E.	1866	Frederick Freeman Thomas	Mabel, dt. of 1st Viscount Hampden

PREMIERS OF CANADA SINCE

Name	Born		Parents		Religious Connection	Educational Advantages
	When	Where	Father	Mother		
Right Hon. Sir John A. Macdonald	1815	Glasgow, Scotland	Hugh	Helen Shaw	Anglican	Grammar School, Kingston, Ontario
Hon. Alexander Mackenzie	1822	Logierait, Scotland	Alexander	Mary Fleming	Baptist	Parish School
Right Hon. Sir John A. Macdonald (Second Term)	1815	Glasgow, Scotland	Hugh	Helen Shaw	Anglican	Grammar School, Kingston, Ontario
Hon. Sir J. J. C. Abbott	1821	St. Andrews, Quebec	Joseph	Harriet Bradford	Anglican	McGill University
Right Hon. Sir J. S. D. Thompson	1844	Halifax, Nova Scotia	John S.	Charlotte Pottinger	Roman Catholic	Academy, Halifax
Hon. Sir Mackenzie Bowell	1823	Rickinghall, England	John	. . . . .	Methodist	Printer's Apprentice
Hon. Sir Charles Tupper, Bart.	1821	Amherst, Nova Scotia	Charles	Miriam Lockhart	Baptist	Edinburgh University
Right Hon. Sir Wilfrid Laurier	1841	St. Lin, Quebec	Carolus	Mariette Martineau	Roman Catholic	L'Assomption College, McGill University
Right Hon. Sir Robert L. Borden	1854	Grand Pré, Nova Scotia	Andrew	Eunice Laird	Anglican	Academy, Horton, Nova Scotia
Right Hon. Arthur Meighen*	1874	Anderson, Ontario	Joseph	Mary Meighen	Presbyterian	Toronto University
Hon. W. L. Mackenzie King	1874	Kitchener, Ontario	John	Isabel Mackenzie	Presbyterian	Toronto, Chicago, and Harvard Universities

*Besides the term of office here indicated, Meighen was premier from July 13, 1926, following the resignation of Mackenzie King, until after the re-election of King on September 14, 1926.

SINCE CONFEDERATION (1867)

Educational Advantages	Profession	Date Married	Wife's Name	Date of Appointment	Date of Assuming Office	Date of Death
Trinity College, Dublin	Lawyer	1844	Elizabeth, dt. Earl of Rathedown	June 1, 1867	July 1, 1867	Nov. 29, 1894
Eton, Oxford	Lawyer	1835	Adelaide Dalton	Dec. 29, 1868	Feb. 2, 1869	Oct. 6, 1876
Eton, Oxford	Diplomatist	1862	Harriot Hamilton	May 22, 1872	June 25, 1872	Feb. 12, 1902
Eton, St. Andrews, Cambridge	Author, Historian	1871	H. R. H. Princess Louise, 4th dt. Queen Victoria	Oct. 5, 1878	Nov. 25, 1878	May 2, 1914
Eton, Oxford	Statesman, Administrator	1869	Lady Maud Hamilton, dt. 1st Duke of Abercorn	Aug. 18, 1883	Oct. 23, 1883	June 3, 1927
Eton	Army	1864	Lady Constance, dt. 4th Earl of Clarendon	May 1, 1888	June 11, 1888	June 14, 1908
St. Andrews and Oxford	Statesman, Administrator	1877	Hon. Ishbel Marjoribanks, dt. 1st Baron Tweedmouth	May 22, 1893	Sept. 18, 1893	
Eton, Cambridge	Statesman, Administrator	1883	Mary, dt. Gen. Hon. Charley Grey	July 30, 1898	Nov. 12, 1898	Mar. 14, 1914
Harrow, Cambridge	Statesman, Administrator	1877	Alice Holford	Sept. 26, 1904	Dec. 10, 1904	Aug. 29, 1917
Royal Military Academy, Woolwich	. . . . .	1879	H. R. H. the Princess Louise, 3d dt. H. R. H. Prince Frederick Charles of Prussia	Mar. 21, 1911	Oct. 13, 1911	
Eton, Cambridge	Statesman, Administrator	1892	Lady Evelyn Fitz-Maurice, dt. 5th Marquess of Lansdowne	Aug. 19, 1916	Nov. 11, 1916	
. . . . .	Army	1902	Marie, dt. Hon. Sir Richard Moreton	Aug. 2, 1921	Aug. 11, 1921	
Eton, Cambridge	Administrator	1892	Hon. Marie Adelaide, dt. 1st Earl of Brassey	Aug. 5, 1926	Oct. 2, 1926	

CONFEDERATION (1867)

Profession	Date Married	Wife's Name	Party Connection	Appointed	Resigned	Died	Place of Death
Lawyer	1843 1867	Isabella Clark (d. 1857) Agnes Bernard	Conservative	July 1, 1867	Nov. 6, 1873	1891	Ottawa, Ontario
Stonecutter	1853	Helen Neil (d. 1852) Jane Sym	Liberal	Nov. 7, 1873	Oct. 16, 1878	1892	Toronto, Ontario
Lawyer	1843 1867	Isabella Clark (d. 1857) Agnes Bernard	Conservative	Oct. 17, 1878	June 6, 1891 (Died)	1891	Ottawa, Ontario
Lawyer	1849	Mary Bethune	Conservative	June 16, 1891	Dec. 5, 1892	1893	Montreal, Quebec
Lawyer	1871	Annie Affleck	Conservative	Dec. 5, 1892	Dec. 12, 1894 (Died)	1894	Windsor Castle, England
Journalist	1847	Harriet L. Moore	Conservative	Dec. 21, 1894	April 27, 1896	1917	Belleville, Ontario
Physician	1846	Frances Morse	Conservative	May 1, 1896	July 8, 1896	1915	Bexley Heath, England
Lawyer	1868	Zoe Lafontaine	Liberal	July 11, 1896	Oct. 6, 1911	1919	Ottawa, Ontario
Lawyer	1889	Laura Bond	Conservative	Oct. 10, 1911	July 10, 1920		
Lawyer	1904	Isabel Cox	Conservative	July 10, 1920*	Dec. 29, 1921*		
Publicist	. . .	. . . . .	Liberal	Dec. 29, 1921			

DEVELOPMENT OF THE PROVINCES OF CANADA—TABLE I

Province	Origin and Meaning of Name	Area Square Miles	Early Settlements			First Separate Govt.	Entered Confederation
			Where	When	By Whom		
Alberta	In honor of H.R.H., Princess Louise Alberta, dt. of Queen Victoria, wife of marquis of Lorne, governor-general of Canada.	255,285	Ft. la Jonquière (Now Calgary) Ft. Athabaska	1752 1778	Sieur de Niverville Peter Pond	1882	1905
British Columbia	Devised and chosen by Queen Victoria (1858). "Columbia" on many old maps of this region.	355,855	Nootka	1788 1789	Capt. Meares Martinez	1858	1871
Manitoba	From Indian *Manito-Wabo*, meaning "narrows of the Great Spirit," from wind rushing through the narrows.	251,832	Ft. York (Nelson) Ft. Saint Charles Ft. Rouge	1686 1732 1736	Hudson's Bay Company Sieur de la Verendrye	1870	1870
New Brunswick	In honor of English royal family, originally of German line of Brunswick-Luneburg.	27,985	Sainte Croix Port Royal	1604 1605	Sieur de Monts Sieur de Monts	1784	1867
Northwest Terr's: **	From geographical location.	1,309,682	. . . . .	. . .	. . . . .	1876	
Keewatin	Cree for "north wind."	. . .	. . . . .	. . .	. . . . .	1882	
Franklin	After Sir John Franklin.	. . .	. . . . .	. . .	. . . . .	1895	
Mackenzie	After Sir Alexander Mackenzie.	. . .	. . . . .	. . .	. . . . .	1895	
Nova Scotia	New Scotland.	21,428	Port Royal (Annapolis, 1710)	1605	Sieur de Monts	1710† 1713‡	1867
Ontario	After Lake Ontario,—Iroquois and Huron for "the beautiful or the great lake."	407,262	Ft. Rouille (Now Toronto) Ft. Frontenac	1749 1673	French traders Frontenac	1791	1867
Prince Edward Island	In honor of duke of Kent, Edward Augustus, father of Queen Victoria.	2,184	Port la Joie (Charlottetown)	1713	Acadians	1769	1873
Quebec	In Algonquin, Kebec means "narrowing of the waters," referring to narrowing of the Saint Lawrence at the present city of Quebec.	594,434	Tadousac Quebec	1600 1608	Chauvin and Pont-Grave Champlain	1760† 1763‡	1867
Saskatchewan	From the river Saskatchewan. Cree for "rapid river."	251,700	Ft. Cumberland Ft. Chipewyan	1774 1788	Samuel Hearne R. Mackenzie	1882	1905
Yukon	From Yukon river. Yukon is an Indian term for "the river."	207,076	Dawson	1896	Gold seekers	1898	

DEVELOPMENT OF THE PROVINCES OF CANADA—TABLE II

Province	Original Territory or District from which Derived	Population Entering Confederation ††	Pop. 1911	Pop. 1921	Per Cent Increase 1911-1921	Rural and Urban Population 1921	* Largest City and Capital
Alberta	Formerly Alberta and part of Athabaska, Saskatchewan, and Assiniboia, districts of original N. W. Territories.	73,022 (1901)	374,295	588,454	57.22	(R) 365,550 (U) 222,904	Calgary. Edmonton.
British Columbia	Vancouver island and New Caledonia (British Columbia after 1858) joined in 1866.	36,247 (1871)	392,480	524,582	33.66	277,020 247,562	Vancouver. Victoria.
Manitoba	Red River Settlement.	25,228 (1871)	461,394	610,118	32.23	348,502 261,616	Winnipeg.
New Brunswick	Part of Acadia; later, county of Sunbury, Nova Scotia.	252,047 (1861)	351,889	387,876	10.25	263,432 124,444	Saint John. Fredericton.
Northwest Terr's: **	Prince Rupert's Land and Hudson's Bay Co's Territory.	. . . . .	6,507	7,988	22.76	(R) 7,988	Administered from Ottawa. Land Office at Fort Smith.
Keewatin							
Franklin							
Mackenzie							
Nova Scotia	A portion of Acadia.	330,857 (1861)	492,338	523,837	6.40	296,799 227,038	Halifax.
Ontario	Formerly Upper Canada, part of old province of Quebec.	1,396,091 (1861)	2,527,292	2,933,662	16.08	1,226,379 1,707,283	Toronto.
Prince Edward Island	Formerly Isle Saint Jean, attached to Acadia.	94,021 (1871)	93,728	88,615	−5.46	69,522 19,093	Charlottetown.
Quebec	A portion of "Canada" under French rule before 1760.	1,111,566 (1861)	2,005,776	2,361,199	17.72	1,038,630 1,322,569	Montreal. Quebec.
Saskatchewan	From parts of Saskatchewan, Athabaska, and Assiniboia, districts of old Northwest Territories.	91,279 (1901)	492,432	757,510	53.80	538,522 218,958	Regina.
Yukon	Part of old Northwest Territories.	27,219 (1901)	8,512	4,157	−51.16	3,182 975	Dawson.

* Where but one name is given, it indicates both the largest city and the capital; elsewhere, the second name is that of the capital. ** Provisional districts. † Military rule. ‡ Province. †† Figures in parenthesis indicate date of census.



PROMINENT CANADIANS

Robert Laird Borden
Lord Graham
Sir John William Dawson
Lord Strathcona
Sir Wilfrid Laurier
Sir Sandford Fleming
Sir Charles Tupper
Sir Robert Alexander Falconer
Sir John Alexander Macdonald



















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HISTORIC CANADA

1 Church of Sainte Anne de Beaupré, Quebec. 2 Old Church, Grand Pré, N. S. 3 Northwest Mounted Police. 4 Champlain Monument, Quebec. 5 Evangeline Monument, Grand Pré, N. S. 6 Ancient Fort, Annapolis Royal, N. S. 7 Fort Garry, Winnipeg. 8 Martello Tower, Halifax. 9 Old Clock Tower, Halifax.

IRELAND

The history of no other country is so interwoven with mystery and legend as is that of Ireland. To the early classic writers, this island of mists and shadows was known under various names, such as *Ierne* or *Hibernia*, the "Land of Winter," *Ogygia*, the "Distant Land," *Ultima Thule*, the "Farthest Reach," and, to native historians, as *Innisfail*, the "Island of Destiny,"—this last, in the light of Ireland's manifold vicissitudes, perhaps the most appropriate name of all.

Early History. In the Annals of the Four Masters and in the chronicles of Keating, we read of certain tribes and races of people who invaded the island at different remote periods. We are told of the Partholans who came to Ireland about 1484 B. C., and of the Nemedians who succeeded them about 1154 B. C. The Firbolgs next are said to have divided the land into fifths about 738 B. C.; then the Tuatha Dé Danaan (*thōō'ä* THĀ THŌŌN-*ōn'*), or the tribes of the god Danu, about 701 B. C., overcame the Firbolgs; and the Milesians or Scots from Scythia, about 504 B. C., in turn conquered the Tuatha Dé Danaan.

Heremon, who was of Milesian stock, is mentioned about this time as being sole and supreme ruler of Ireland, and he is believed to have been the head of a long line of Milesian monarchs who reigned over the land in unbroken succession down to the time of Roderick O'Connor (1116–98 A. D.), the last of the native Irish kings. But, between Heremon and O'Connor, the long list of kings is so legendary as to be unreliable, and their deeds of prowess often savor more of fiction than of fact. We may except from this judgment, however, Conn of the Hundred Battles in the 1st century after Christ, Cormac, who lived a century later, Tuathal (*tōōl*), who established the royal Feis (*fāsh*) at Tara, Niall of the Nine Hostages, who invaded Britain and scoured the seas off northern Gaul, and Dathi, who in the 5th century lost his life at the foot of the Alps.

Manners, Customs, and Laws. Though the ancient Irish were pagans, they were not barbarians. They were a pastoral people who tilled the land and tended their flocks; their houses were built of wickerwork made of reeds covered with clay. The common dress of the men was the kilt of saffron color, with shirt, tunic, and *brat* (*brŏtth*) or cloak buckled at the shoulder; the women wore a long outer garment reaching to the feet. Writing of their love of music and literature, Dr. Douglas Hyde says: "The love of literature of a traditional type in song, in poem, and in saga was more nearly universal in Ireland than in any other country of Europe." Their marvelous skill as metal workers in bronze, gold, silver, and enamel may be witnessed in the priceless treasures preserved today in the National Museum of Dublin.

An *ardri* (*ŏrd-rē'*), or "high king," ruled over the whole of Ireland, and the kings, princes, and chieftains of the various provinces were subject and paid tribute to him. The laws were made and dispensed by *brehons*, or "judges," who, with the poets and druids, belonged to the royal household. The pagan Irish worshiped the sun as the author of all life and paid an inferior homage to rivers and wells. They also believed in the "good people," or fairies; and the *beanside* (banshee), or "fairy woman," was known to come always to warn them of approaching death.

Dawn of Christianity. It was in such spiritual darkness that St. Patrick found the people of Ireland when he was sent by Pope Celestine to that country in 432 A. D. Forty-four years before, as a youth of sixteen, he had been taken a captive to Ireland and sold as a slave to a druid, with whom he dwelt six years. During his years of servitude, he had learned the Celtic tongue and had become familiar with the druidical rites and ceremonies. Thus equipped, he now began to preach the gospel of Christianity. He appeared before the high king at Tara, where he put the druid priests to confusion, with the result that the ardri and the chief *ollam* (*ŏl'lăv*), or "poet," were then and there converted to the new faith. Thenceforward until his death, which took place at Saul, March 17, 493, Patrick's progress throughout the island was a veritable triumph. Schools and monasteries arose throughout the land, and, from the 5th to the 8th century, Ireland was acknowledged as the center of Western culture, while her monks went forth to found monasteries and new schools of learning in almost every country of Europe.

Invasion of the Danes. But the progress of civilization brought about by religion and learning was fated to be checked at the close of the 8th century by the invasions of the Danes. These ruthless barbarians ravaged and destroyed wherever they went, and everywhere left smoking ruins in their trail to testify how well they had done their work. After 200 years of this career of savagery, they were completely overthrown (1014) at the battle of Clontarf by Brian Boroihme, who paid the price of victory with his life.

Anglo-Norman Period. The death of Brian now became the source of much dissension among the Irish, because of the partition of the land made by him in favor of his three sons. On the pretense of quelling such strife, Henry II sought to gain possession of Ireland. A bull or papal edict, purporting to have been sent by Adrian IV but now generally regarded as fictitious, lent color to his good intentions. In 1172 he arrived in the island and proceeded to divide the country into fiefs, which he gave to the Anglo-Norman knights who, but a few years before, had come to the assistance of MacMurrough, the deposed king of Leinster. For many years thereafter, the history of Ireland is one of plunder and persecution. In 1315, after the battle of Bannockburn, Edward Bruce hastened to the side of the Irish in an attempt to overthrow the English power. Though at first successful, he was slain at Faugart the following year. His gallant example, however, resulted in a general decline of English dominion in Ireland, and the descendants of the Anglo-Norman knights in a short time became *ipsis Hibernis hiberniores*, "more Irish than the Irish themselves." At the dawn of the 16th century, England's thralldom of Ireland might be said to have been on the wane. Unfortunately, as a result of the continuous feuds between the chiefs of Irish descent and those of English descent, lawlessness and irreligion had grown apace.

The Tudor Period. In 1547 the Parliament of Dublin gave Henry VIII the title of king of Ireland and also passed the Act of Supremacy, making him spiritual head of the Irish Church. However, neither clergy nor people could be won from their allegiance to Rome. As a consequence, Henry dissolved the monasteries and confiscated the church lands, large portions of which he divided among the most powerful of the chieftains in order to conciliate them. The religious changes under Edward VI and Mary had little effect on Ireland. Under Mary, the natives of King's county and Queen's county were deprived of their lands and driven from their homes to make room for English colonists. In the reign of Elizabeth, a series of rebellions took place under Shawn O'Neill, Desmond, and Hugh O'Neill, earl of Tyrone. After ten years' fighting, Hugh O'Neill was defeated in 1603, and the whole of the island passed into the hands of the English. No less than 600,000 acres of land belonging to Irish chieftains were divided among English colonists.

Under the Stuarts. In the reign of James I (1603–25) a similar confiscation of land took place, when 800,000 acres of Ulster land became forfeited to the crown and were planted with English

Protestants and Scotch Presbyterians. The policy of spoliation continued under Charles I, when the best lands in Wicklow, Wexford, County Leitrim, West Meath, and Longford were handed over to the English planters. Despairing of redress, the exasperated Irish rose in rebellion under Roderick O'Moore. It was planned by the rebels to take Dublin castle and the chief garrison towns. Their attempt on Dublin castle was frustrated, though they succeeded in capturing many of the towns, and it is said that in the course of the conflict 30,000 of the planters perished. This rebellion has been described by certain writers as the "massacre of 1641," but, according to the English historian Lingard, the appellation is as unjust as it is untrue.

In August 1649, Cromwell landed in Dublin with an army of 10,000 men. He laid siege to Drogheda and put to the sword 2000 Irish soldiers who formed the garrison. A month later a similar slaughter took place at Wexford. Within two years the whole country was subjugated, and the fairest portions of Ulster, Munster, and Leinster were divided among the Cromwellian soldiery. It is estimated that no fewer than 20,000 of the Irish were sold as slaves in America, while 40,000 took up military service in the various armies of Europe. Cromwell died in 1658, and Charles II (1660–85) was restored to the throne. With the best of intentions, he succeeded in doing but little to ameliorate the conditions of the impoverished Irish, except that, by Act of Settlement, 600 of them were restored to their lands.

William of Orange. In the English revolution of 1688, the Catholics of Ireland rallied to the side of James II, while the Protestants supported William of Orange. William crossed over to Ireland in 1689 and defeated the Irish forces under James at the battle of the Boyne, and, in the following year, Limerick, which had been gallantly defended by Sarsfield, capitulated. The treaty that was signed, giving to Catholics the privileges they enjoyed under Charles II, was callously broken, and Limerick came to be known as the "city of the violated treaty." The English Parliament decreed that one million acres of land should be divided among the Protestants, and a cruel code of penal laws was forthwith enacted. Though these laws were directed mainly against Catholics, they proved fatal alike to the Irish Protestants. All Irish trade with the English colonies was prohibited, and commerce and industries, including the great woolen trade which had been built up by Irish Protestants, were deliberately crushed. Thus it was that the best elements of the country were forced to emigrate,—the Catholics to serve in the armies of France and Spain, the Protestants to carry their industries to America. The elaboration of such infamous laws could have no other effect than embittering those against whom they were made. Secret societies sprang up over all the land, and in 1798 a rebellion was organized by the Society of United Irishmen. The peasantry rose in Wexford, but after a gallant fight they were overcome by the British soldiery at the battle of Vinegar Hill.

The Act of Union. The British government under Pitt now decided to unite the English and Irish parliaments. To effect this, $8,000,000 was spent in bribing and in buying up the petty boroughs which held the majority of the seats in the Irish House of Commons. The Act of Union was accordingly proclaimed in 1801.

George III refused to sign a measure introduced by Pitt to emancipate the Catholics of Ireland; thereupon the Catholic Association was inaugurated and, under the leadership of O'Connell, forced the government to bring in an emancipation bill which received the assent of George IV on the 13th of April, 1829. Following this victory, O'Connell founded an association for the repeal of the Union. The government, fearing sedition, suppressed the association.

In 1847-48 Ireland was stricken by an appalling famine due to the failure of the potato crop. Thousands died of hunger, while vast numbers emigrated, especially to America, with hatred for England in their hearts and vengeance on their lips. In 1848 the Young Ireland party made an attempt at revolt, which was immediately crushed and the leaders transported. In 1864 a conspiracy originating with the Fenians, having as its object the separation of England and Ireland, was discovered and likewise suppressed by the British government.

From this time onward there were two views taken among British politicians regarding Ireland, one favoring coercion, the other supporting a policy of conciliation. Gladstone, in 1869, disestablished the Protestant Episcopal Church of Ireland, but he was unable to carry the whole of the Liberal party with him on his Home Rule bill of 1886. Again, in 1892, with a small majority of forty, he failed to force his second Home Rule bill through an antagonistic House of Lords.

In August 1914, the World War broke out. Asquith was now prime minister. He had been elected on a Home Rule platform and had succeeded in placing his Home Rule bill on the statute book. But Ulster had to be reckoned with. Four of the Ulster counties, with Carson at their head, opposed the Act and threatened armed resistance. The government, thus intimidated, showed signs of vacillation, and it was arranged that the Act should not come into force until the termination of the war.

Sinn Fein's Proclamation. But those who knew Ireland from within were aware of two great forces which had long been silently leavening the life of the Irish people socially and intellectually. One of these forces was the Gaelic League, whose main object was the rejuvenation of the national language and the popularizing of all things Gaelic. The other and greater force, which had sprung from the League as a natural growth, was that of Sinn Fein (*shĭng fān*), a society of young Irish intellectuals. They had grown impatient of the Dead Sea fruits of constitutional methods and into the old bottles of Irish politics had poured a new wine. The Sinn Fein, in Easter week of 1916, rose in rebellion against England and proclaimed Ireland a republic.

After a week's severe fighting in Dublin, the republican army was defeated and fifteen of the leaders were executed. But the spirit of Sinn Fein did not die. In the general election of 1918, Sinn Fein swept the Nationalist party out of existence, and the Dail Eireann (THŌ'ĭl ârn) was set up as the one and only parliament of Ireland. Once more they declared Ireland a republic, insisting on their right of self-determination and on that same independence which had been granted to Poland, Lithuania, and Czechoslovakia. Lloyd George took the position of Abraham Lincoln in the American Civil War as a precedent, and declared it was impossible to allow of Ireland's secession. To this, Sinn Fein replied that Ireland had never been willingly a part of the United Kingdom and that there was therefore no question of seceding. Such was the state of affairs in the autumn and winter of 1918 when, in reprisal for the guerrilla tactics of the Irish republican army, the Black and Tans, auxiliary mercenary troops, burned the city of Cork and sacked the town of Balbriggan.

The Irish Free State. At last, after two and a half years of unremittent fighting, outside influence was brought to bear so that a truce was proclaimed and the leaders of the provisional government of Ireland agreed to meet the representatives of the British government. After several months of conference, on December 6, 1921, at a memorable all-night sitting, a treaty was signed in which Ireland was given the status of a Free State in the British Commonwealth, and by which Ulster was left outside its provisions to choose her own path

and destiny under the Ulster Parliament, which had already been opened in state by King George on June 22, 1921. The reign of Dublin castle was at an end. Of that symbol of England's misrule and Ireland's sufferings, nothing now was left but the passing shadow of an unhallowed name. Eamonn de Valera, president of the Irish Republic, dissatisfied with the terms of the treaty, resigned, and Arthur Griffith was elected president of the Irish Free State, with Michael Collins as head of the provisional government.

The republican extremists now, however, became filled with the bitterness of disappointment at what they considered the betrayal of Ireland's cause by the plenipotentiaries who had signed the treaty. They accordingly planned a *coup d'état* by which to overthrow the provisional government. This attempt was for a time averted by the action of Premier Michael Collins, who invited De Valera to form with him a coalition administration. By this arrangement it was hoped that those who had been the strength of the national situation during the past few years might join hands for the good of the country without prejudice to their respective positions.

Winston Churchill, secretary for the colonies, denounced in the British House of Commons this Collins-De Valera agreement and warned the colonial secretary that it was "the intention of the British government to hold Dublin in the event of a republic being set up." This veiled threat put an end to all hopes of a conciliation, and the republican army proceeded to take the field against their former comrades in arms. Michael Collins was hereupon appointed commander in chief of the Irish national forces, as being best able to face the crisis and establish order throughout the land.

The unexpected death of Arthur Griffith, on August 12, 1922, at Dublin, was the first serious blow to the Free State government. More appalling still was the tragedy surrounding the death of Michael Collins, who, ten days later, was killed in ambush at Bandon by republican troops. Guerrilla tactics on the part of the irreconcilables continued unabated. On December 4, the Irish Constitution bill was passed by the British Parliament, and Timothy M. Healy, the veteran Irish Nationalist, was appointed governor-general.

The Dail, as the Irish Parliament is called, on December 6, 1922, elected William Cosgrave president of the executive council. Mr. Cosgrave thereupon nominated his cabinet, which proved to be the same as under the provisional government. There followed the naming of thirty senators by the president, and thirty more were elected by the Dail. The establishment of the Irish Free State as a fact was inaugurated by the lowering of the Union Jack above Dublin castle and by hoisting in its stead the new Irish flag of orange, white, and green. The last British troops sailed from Dublin, December 18, amid scenes of the greatest good-will.

Hostilities between the Constitutional troops and the Republican irreconcilables under De Valera continued into 1923. In May, De Valera issued an order to his forces to cease resistance, and its complete cessation was definitely marked by the release of practically all political prisoners in 1924. The general election of that year resulted in strengthening the hands of the Constitutional party.

The Free State's relation to the British government is similar to that of Canada. A minister to the United States was appointed, and, on September 10, 1924, the Free State became a member of the League of Nations.

The progress of land distribution, begun in 1870 by the British government, was continued. By this system some 400,000 tenants had become owners of their own land, and the conversion of a further 70,000 tenancies into proprietorships was contemplated. Early in 1925, railways formerly operated by 26 companies were consolidated as the Great Southern railway.

AUSTRALIA

The Australian continent was not known to Europeans until after the Portuguese and the Dutch developed trade with the East Indies. The earliest maps of this region of the globe show a blank space where Australia actually lies. But gradually portions of the west coast were sighted and were added piece by piece to the map. Shakspere was alluding to such an addition when in *Twelfth Night* he made Maria say of Malvolio, "He doth smile his face into more lines than are in the new map with the augmentation of the Indies"—the "augmentation" including a portion of the northwest coast of Australia.

Dutch mariners made the principal additions to the world's knowledge of the continent in the 17th century. In 1606, the Dutch yacht *Duyfken*, "Little Dove," examined part of the north coast. After 1611, the west coast was frequently sighted by Dutch vessels; for the Dutch mariners had discovered that, on their voyages to Java, they obtained the aid of strong winds by steering due east for three thousand miles after leaving the Cape of Good Hope, and then striking north. This route brought them close to the Australian coast. But the Dutch never made an attempt to utilize their knowledge either for settlement or for commercial purposes. The natives of Australia were not traders, and the natural wealth of the country was not readily available. The most important of the Dutch voyages was that of Tasman, who in 1642 discovered Van Diemen's Land, now called Tasmania. He also discovered New Zealand, but believed it to be part of a great southern continent, the Terra Australis Incognita of early geographers. It is doubtful whether the Portuguese knew anything of Eastern Australia, though the Spaniard Torres sailed through Torres strait from the New Hebrides in 1606. By the Dutch, Australia was known as The Great Southland, or, more generally, as New Holland.

The English buccaneer, William Dampier, made an acquaintance with New Holland, in two voyages, of 1688 and 1699. But he made a mistake in not approaching the continent across the Pacific, from the east. As he saw only the western coasts, which the Dutch had already explored, he added little to the world's knowledge of Australia, though his narratives of his voyages were unusually picturesque. The voyage which really directed the attention of the English to the possibilities of Australia was that of James Cook in 1770. Cook discovered the entire eastern coast of the continent. He had with him the botanist, Sir Joseph Banks, who was able to speak with authority on the potentialities of the country.

First Settlements. Prior to the separation of the American colonies from the British Empire, it had been the practice to send convicted persons to that quarter of the globe. But after 1776 that policy was no longer possible. As, however, transportation was the punishment imposed for a long list of offenses, it became necessary to find some other place to which convicts might be sent. The first proposal made for the settlement of Australia by people from Great Britain was that the American "loyalists," victims of the War of Independence, should be sent to New South Wales, as Cook had named the eastern half of the continent. The British government, however, was at the time chiefly anxious to find a convenient place for continuing the transportation policy, and determined to use New South Wales for this purpose. The first settlement was made at Port Jackson, where the city of Sydney was founded under the command of Captain Arthur Phillip in 1788.

The settlement at Sydney provided quite sufficient accommodation for the convicts who were sent out from Great Britain, but the activities of French explorers in Australian waters generated the fear that rival settlements would be formed;

and this fear led to the establishment of the first subsidiary colonies in other parts of the continent. Tasmania was occupied in 1803. Settlements were founded in what is now the state of Victoria, and in Western Australia in 1827. Fear of French rivalry was the motive in each of these cases.

Exploration and Industry. Meanwhile, the continent was completely mapped. The southern coast was discovered by Captain Matthew Flinders in 1802, and the same navigator was the first to circumnavigate Australia (1803). Flinders also made the first complete map of the continent, and he it was who gave to it the name Australia.

Inland exploration was mainly promoted by the necessity of finding pasture for sheep and cattle. John Macarthur, a military officer with a genius for improving the breed of domestic animals, imported some merino sheep and crossed them with Indian varieties. He produced a sheep bearing a fleece superior to any which British cloth weavers had known before. Sheep breeding became from about the beginning of the 19th century the principal Australian industry. In search of pasture land, explorers found a way over the extremely difficult barrier of the Blue mountains, rising like a wall at the back of Sydney, in 1813. Thence, extending their researches still farther towards the center of the continent, explorers opened up the watershed of the Murray and Darling rivers, and revealed the richness of the territory of Victoria.

The most important of these inland journeys of exploration were those of Oxley, who opened up the regions watered by the Lachlan and the Macquarie (1817-18); of Hume and Hovell, who explored the country south of the Murray to Port Phillip (1824); of Allan Cunningham, who crossed the Liverpool Range and discovered the Darling Downs, thus making possible the settlement of Queensland (1827); of Charles Sturt, who explored the great rivers Darling and Murray (1828–30); of Mitchell, who found the rich western plains of Victoria (1836); and of J. McDouall Stuart, who crossed the continent from south to north, and set the flag upon the central point of the vast expanse of the interior (1862).

As the first phase of Australian settlement was the convict phase, and the second the pastoral, so gold was the third. Important discoveries of the precious metal were made in 1851-52, at Ballarat and Bendigo. Enormous yields were obtained. In later years the gold discoveries of Western Australia proved to be exceedingly rich.

Colonial Government. The form of government was in the beginning necessarily despotic. But the convict system came to an end when the number of free settlers, attracted by the conditions of life in Australia, outnumbered the involuntary exiles. The transportation system was abolished in 1852, but, at the request of Western Australia, was revived for a few years to provide that state with labor.

From first to last, the convict system brought about 150,000 persons to Australia. Many of these were transported for offenses which would be considered comparatively trivial under the more humane criminal laws of a later age. Very many were youths under twenty-one, who were transported under the theory that their removal from a contaminating environment, together with the provision of opportunities for starting life afresh in a new country, would be morally salutary. There were a few thousand political prisoners, victims of the Irish rising of 1798, of the Chartist troubles of the 19th century, and of disturbances connected with the Industrial Revolution; some thousands also were transported under the extremely harsh game laws of the 18th and early 19th centuries.

The total number transported was small, however, in proportion to those who came voluntarily, attracted to Australia by the conditions of life and work in this country, or assisted to immigrate by the governments of the states, or lured by the richness of the gold fields. Demands for self-government were made from about 1820. A popular element was introduced into the government from 1823, and this element was extended from time to time, until, in 1855, the British government resolved to confer full responsible government upon the Australian colonies. They were thus equipped with legislatures elected by the people on a broad franchise, and with ministries responsible to these legislatures.

The Commonwealth. The six colonies of Australia which existed under responsible government were New South Wales, the oldest of the group, founded 1788; Tasmania, founded 1803; South Australia, founded to demonstrate the soundness of Wakefield's colonization principles in 1836; Victoria, colonized originally by "Squatters," in 1835, but not recognized as a separate colony till separated from New South Wales in 1851; Western Australia, colonized in 1829; and Queensland, which was not proclaimed as a separate state till 1859.

These colonies maintained each a separate political existence and often the rivalry between them was acute. However, it was realized by thoughtful men that the separateness of these communities, scattered over a continent consisting of 2,900,000 square miles, was a source of weakness to Australia as a whole, and a federation movement was started quite soon after responsible government was inaugurated. But the difficulties were great. Each state wished to conserve its own separate interests. Discussion educated the public as to the gain to be attained by union; and, as the outcome of several tentative efforts, a Federal convention in 1897-98 drafted a constitution which was accepted by the people of all the states, and was passed as an act of the Imperial Parliament in 1900. That act was the measure which established the Commonwealth of Australia.

Lord Hopetoun (afterward Lord Linlithgow) was appointed the first governor-general of the new commonwealth. In March 1901, the members of the first Parliament under the new constitution were elected, and the Parliament was opened by the Prince of Wales on May 9 following.

Contemporary Australia. The policy of Australia under the Commonwealth has been directed mainly towards (1) keeping Australia "white," that is, keeping Asiatic and Pacific races out of Australia, in order that the continent may be retained for development by European peoples; (2) developing Australian industries by means of tariff protection; (3) strengthening the defenses of the country by means of a system of compulsory military training, and by providing ships of war to co-operate with the British fleet; (4) providing for the settlement of differences between capital and labor, by means of a court of conciliation and arbitration; (5) strengthening the ties by which Australia is bound to the British Commonwealth of Nations. The participation of Australian troops and ships in the World War was a whole-hearted effort. In the first decade of its existence, the commonwealth adopted the policy of building up an Australian navy to be controlled by Australia in time of peace and to be placed at the service of the empire for war needs. From the outbreak of hostilities in 1914, the fleet rendered effective service under the direction of the British admiralty. Over 300,000 troops from this country fought on the Gallipoli peninsula, in Egypt, in Palestine, and in France. The "Anzac" corps which took part in the Gallipoli enterprise won undying fame. The solution of the commonwealth's post-War economic problems was temporarily retarded by a serious seamen's strike in 1925. Australia continued to co-operate closely with Great Britain in naval affairs, being particularly concerned in the fortification of the British naval base at Singapore.

NEW ZEALAND

The discovery and the naming of the two islands now included in the self-governing dominion of New Zealand is credited to the Dutch navigator, Tasman (1642). So far as is known, no other white man visited the country until Captain Cook arrived in 1769. He made several later visits and mapped the islands. In 1814, the Reverend Samuel Marsden established a mission in the Bay of Islands. Under this influence, the natives, the Maoris, began rapidly to adopt the outward forms of Christianity. At the same time, however, their intertribal wars were made more destructive through their use of fire-arms in place of the clubs and spears they had used before the coming of Europeans. It is estimated that their numbers were decreased by one-fourth within the following twenty years. Between 1830 and 1840, a comparatively peaceful period, large numbers of the Maoris accepted Christianity.

Colonization. Systematic emigration from Europe to New Zealand began in 1839. The first company of English settlers reached Wellington in January 1840, and the English government took formal possession of the islands in the same month. In spite of difficulties with the Maoris and with the home government, the colony, under the leadership of the governor, Sir George Grey, made substantial progress during the next ten years. In 1852 the colonists were granted self-government, and in 1856 the first responsible government came into power.

Several years of war with the Maoris followed, and the settlements in the North Island made little progress. At length, about 1871, a policy of conciliation toward the natives was adopted, provision was made for their education, and they were given representation in the colonial parliament. This peaceful policy ushered in a period of advance in industry and public improvements. Meanwhile, agriculture and sheep raising had made great strides in the South Island.

Political Development. The era of political progress for which New Zealand is famous began with the year 1877. Previous to that year, political power had been in the hands of the landholding and professional classes, under a limited franchise. Under the leadership of Sir George Grey, a popular, democratic party brought about the organization of a national system of public education. This has been developed until New Zealand has a national university with four co-operating colleges and a system of public schools in which elementary education is free and compulsory for children from 7 to 14 years of age. In the secondary and the special schools, the payment of fees is required for advanced instruction. The university is an examining body and conducts no courses of instruction.

In 1890, manhood suffrage was adopted, and, in the year 1893, women were given the ballot. The growth of industries other than farming and grazing gave rise to a notable series of legislative acts for the control of land and public utilities, and for the settlement of labor disputes. This legislation attracted world-wide attention. In 1891 the land tax system was adopted, which lays a tax upon the land rather than on improvements. In 1892 the government began the policy of buying large estates and leasing them for long periods in parcels of 2000 acres or less. Arbitration of labor disputes was made compulsory in 1894. Old age pensions were introduced in 1898, and a minimum wage law was passed in 1899. The leader in these liberal policies was Richard Seddon, a Lancashire mechanic, who was premier from 1893 to his death in 1906. The government of New Zealand has owned the railroads since 1870, and the policy of public ownership and operation has been extended to telegraphs and telephones, and to other utilities of public concern, such as coal mines. Co-operative production and marketing are popular and successful in the dominion.

The progressive policies of the New Zealand government have involved large expenditures for public works and the consequent incurring of a large public debt. But the general prosperity of the country has helped to make popular the governmental management of affairs. At present a more conservative trend is noticeable in legislation, but this does not involve any undoing of the liberal acts already in force.

New Zealand adopted compulsory military training in 1910, and her troops did prompt and notable service in the World War, first in Egypt and at Gallipoli, and, later, on the western front. After the close of the war, the government, by loans and by purchase of large estates, enabled several thousand returned soldiers to settle on farms. This policy has resulted in a large increase in agricultural production.

Chinese and Japanese immigrants are rigorously excluded from the islands. In recent years a carefully restricted policy of state aid for desirable immigrants has brought to New Zealand many settlers from all parts of the British Empire.

UNION OF SOUTH AFRICA

A self-governing dominion within the British Empire, made up of the four colonies, Cape of Good Hope, Natal, Transvaal, and Orange Free State, which, on their union, became provinces of the dominion. It was organized on May 31, 1910. The executive power is vested in a governor-general appointed by the crown, with an executive council. The seat of government is at Pretoria. The legislature, which meets at Cape Town, consists of the Senate and the House of Assembly. The Senate consists of 40 members, 8 appointed by the governor-general and council, 32 elected, 8 from each province, by the legislatures of the provinces. The House of Assembly is made up of 134 elected members, apportioned among the provinces. The term of membership in each house is 10 years.

Railways, customs, ports, and harbors are controlled by the Union and are administered for the benefit of the Consolidated Revenue Fund. The most important industry is agriculture, the principal crop being corn. The World War period, however, gave a great impetus to manufacturing.

Primary and secondary education is in the hands of the different provinces, which support normal colleges and other schools for the training of teachers. Higher institutions, including several universities and colleges, are the concern of the Union department of education, under a minister.

During the World War, the Union supplied troops for European service and also for campaigns in East Africa and in German Southwest Africa.

Cape of Good Hope. The colony of the Cape of Good Hope, or Cape Colony, was first settled by the Dutch in 1652. It remained under the control of the Dutch East India Company until 1795, when it was captured by the British. Under the terms of the Treaty of Amiens (1802), the British forces evacuated the territory in 1803, but reoccupied it in 1805 to prevent its falling into the hands of the French.

Since that date the colony has been British territory, England's possession having been confirmed by treaty, August 13, 1814. By annexation of neighboring areas during the 19th century, the extent of the colony was considerably enlarged.

In 1850, a Parliament, consisting of the governor, a Legislative Council, and a House of Assembly, was granted to the colony, and in 1872 responsible government was provided for. In 1910, the colony was merged in the Union of South Africa as the province of the Cape of Good Hope.

Natal (*nȧ-tăl'*). A South African province, named by Vasco da Gama, who discovered it on Christmas Day, 1497. It was settled by the English in 1824, and later by Boers from Cape Colony. The Boers declared themselves independent, but in 1843 the British reclaimed the territory. It now forms a province of the Union of South Africa.

Orange Free State. A province of the Union of South Africa. The Orange River Colony was settled in 1835-36 by Boers from Cape Colony. The British annexed it in 1848 but recognized its independence as the Orange Free State in 1854. After many years of peaceful development, it joined with the Transvaal against Great Britain in 1899. In 1910 it was finally merged in the South African Union.

Transvaal (*trăns-väl'*). The territory now included in this province of the Union of South Africa was settled by Boers from Cape Colony in 1836-37. In 1852 Great Britain recognized the independence of the Transvaal Republic, but, in 1877, because of financial troubles and difficulties with the natives, it was made a part of the British Empire. The Boers revolted in 1880, and in 1881 and 1884 conventions were signed which recognized the independence of the Transvaal under the name of the South African Republic. Foreign affairs, however, except with reference to Orange Free State, were left in British hands. The discovery of gold and the consequent large influx of English and other "uitlanders" brought about conditions which resulted in the Boer war of 1899–1902. The republic was annexed to the British crown as the Transvaal, and in 1910 it was incorporated in the Union of South Africa.

NEWFOUNDLAND

The dominion of Newfoundland includes the island of Newfoundland and a part of Labrador. It is the oldest of English colonial possessions. The island of Newfoundland was discovered by John Cabot in 1497. Its rich fisheries soon attracted fishermen from Portugal, France, Spain, and the west of England. In 1583, Sir Humphrey Gilbert took formal possession of the island in the name of Queen Elizabeth. The forbidding climate, however, appears to have discouraged colonists, and the attempts at settlement made by Gilbert and other Englishmen proved unsuccessful.

In 1713 France conceded sovereignty of the island to England but reserved fishing rights on the west coast. For more than a century the English government discouraged settlement, and the island was practically governed by the ship captains. However, the number of permanent settlers increased, and in 1832 representative government was granted. The present responsible government was established in 1855. Since that time the population has increased, fishery disputes have been settled, and the building of roads and railways has brought prosperity to the island. In 1918, it was granted the status of a dominion. The area of its Labrador dependency was doubled in 1927 through the favorable outcome of a boundary dispute with Canada.

INDIA

There is no authentic political history of India previous to the expedition of Alexander the Great into the Punjab in 327 B. C. Seleucus, Alexander's successor in Syria (312–280), maintained a limited authority in the Punjab and established relations with Chandragupta, ruler in the Ganges valley, whose dynasty established Buddhism in India. The Greek influence left a deep mark upon the art and science of India. In the 7th and again in the 8th century the Moslems invaded northern India, but they were driven out by the Hindus in 750. Their great invasion, led by Sultan Mahmud of Ghazni, Turkish ruler of Afghanistan, occurred late in the 10th century. In the 12th century, the Afghan Moslems rose to power, and, about the beginning of the 13th century, Delhi became the Mohammedan capital of India. In 1398 the great Mongol conqueror, Timur, or Tamerlane, invaded India, and, in 1526, Baber, a descendant of Timur, established there the Mogul Empire, which, enlarged and consolidated by Akbar the Great (1556–1605), lasted until 1857. The consequence of these invasions is that India is peopled by races speaking 150 different languages and practicing the rites of innumerable religious sects.

Beginning of Western Trade. In 1498 India was first visited by Vasco da Gama. From 1500 to 1600 the Portuguese had a monopoly of Indian trade, but toward the end of the period they aroused a religious struggle of Christian against Mohammedan, and their power declined. In the beginning of the 17th century the Dutch and English drove the Portuguese entirely from the field, and during the 17th century they were rivals, but gradually the Dutch withdrew from the mainland to the East Indian islands. The French, in the 18th century, under the skillful diplomacy of Dupleix, secured great influence in southern India, but in 1761, with the loss of Pondicherry to the British, their power was broken. Pondicherry was finally restored to France in 1815, and that country now holds it as well as Karikal and Yanaon on the eastern coast of India, Mahe on the west coast, and Chandernagore, near Calcutta, while Portugal retains Goa on the western coast.

The British East India Company. The first English trading post was established at Surat (1612–14). For more than a hundred years the British were in India simply as traders, but the decay of the Mogul Empire necessitated military action in self-defense. From the year 1750, however, when the military acquisition of territory began under Lord Clive, a succession of conquests, almost forced upon the British contrary to their inclinations, placed nearly all India under their sway. In 1773, by act of the British Parliament, the three provinces, or presidencies, of Madras, Bombay, and Bengal were placed under the administration of a governor-general, and Calcutta was made the seat of a supreme court of judicature. Hitherto, the affairs of India had been managed by the East India Company, but in 1784 a board of control was appointed by the government, the president of which became secretary of state for India. See *Sepoy Mutiny*.

India under British Sovereignty. In 1858 the direct sovereignty of India and the powers of government hitherto held by the East India Company were vested in the British crown. Since that time the history of India, under successive governors-general, has been marked by slow development in industry and agriculture, extension of education, more settled control of the frontiers, and provision for a wider native share in government. Agitation for self-government and for ultimate independence has increased in late years, and yet India as a whole was loyal to the British Empire during the World War. Following the program initiated by Viscount Morley in 1907, recent acts of Parliament have extended the sphere of local Indian government and provided for the appointment of native Indians to responsible posts. In 1912 the seat of government was transferred from Calcutta to Delhi. The Government of India act of 1919 provided for a commission appointed for ten years, to inquire into the desirability of further extension of self-government. In 1921 Lord Sinha, a distinguished Indian, was appointed first governor of the province of Bihar and Orissa. On February 8, 1921, the first session of the new Legislative Assembly opened at Delhi. It was composed of native Indians elected from 637 constituencies in the districts governed directly by the British. The functions of this body are advisory. Meanwhile a so-called Non-co-operation Movement, led by Mr. Gandhi, arose, which, chiefly by boycotting British goods, aimed at economic and political autonomy. Gandhi was arrested on a charge of sedition and sentenced, in 1922, to six years' imprisonment. The same year a group of nationalists headed by Das formed a party for the purpose of contesting seats in the legislature. This party obtained 50 from a total of 145 seats in the elections of 1923. Gandhi was released from prison in 1924. The development of nationalistic sentiment in India has brought to the surface a hostility between Hindu and Moslem which has frequently broken into open fighting.

LATIN AMERICA

THE history of the countries which occupy the greater part of the North American continent is included in the two preceding sections, which tell the story of the United States and that of the British Empire. To the group of American states lying south of the Rio Grande, the term Latin America is customarily applied, because the languages and cultures of these countries are, in the main, of Latin origin—Spanish, Portuguese, French. Therefore, in this section, historical accounts of the Central and South American republics, as well as of Mexico and the independent states in the West Indies, are brought together under the title of *Latin America.*

Argentina (*är'jĕn-tē'nà*). In the year 1516 Juan Diaz de Solis, searching for a western route for Spanish trade to the East Indies, entered the estuary now known as the river Plata. De Solis and several of his company were killed by the Indians, and the discouraged remainder returned to Spain. In 1526 Sebastian Cabot, in charge of another Spanish expedition, established at the mouth of the Parana the fort Espiritu Santo, and named the estuary, then called Rio Solis, Rio de la Plata, or "silver river," because of the silver utensils he found in the possession of the Indians with whom he traded on the upper Parana. After his return to Spain, the fort was attacked and burned. The next settlement was made in 1535 by a Spanish nobleman, Mendoza, on the present site of the Argentine capital. He named it Santa Maria de Buenos Aires, or "St. Mary of the good breezes." This little town was soon destroyed. But many of the men of the expedition—Germans, French, Belgians, and Italians—remained and intermarried with the natives. These various expeditions had brought a few horses, cattle, and sheep, which formed the nucleus of the great herds of Argentina.

In the later years of the century, other colonies were founded, and, since military means failed to control the Indians, Jesuit missionaries were called upon for this work. They established, and long maintained, many very successful missions among the Guaranies.

Independence.—In 1580 Buenos Aires was re-established. During the next two centuries, immigration was gradual, but many educated liberals fled from oppression in Spain to the colonies on the Plata, and the seeds of independence were sown by books and papers smuggled from France and England. In 1776 the Viceroyalty of Buenos Aires was formed, including the present states of Argentina, Paraguay, Uruguay, and Bolivia. The coming of an English force in 1806 roused the people to their need of self-protection, and, notwithstanding the flight of the Spanish governor, they repelled the attack. Many English prisoners, after the defeat of their forces, remained in the country and helped in the forming and directing of the independent government.

In 1816 a congress at Tucuman proclaimed the independence of the United Provinces of Rio de la Plata. But the union was weak, and years of anarchy followed, relieved by the strong and progressive work of Rivadavia, secretary of the government of Buenos Aires, in founding schools, building public works, and promoting commerce. During this time, however, forces from Argentina aided Chile and Peru to free themselves from Spain, and a war with Brazil resulted in the independence of Uruguay. In 1835 Juan Manuel de Rosas became dictator, and until 1852 his power was absolute. With stern cruelty he maintained a measure of order in Buenos Aires, the other provinces going their own ways, but his tyranny drove many of the industrial and educated classes into exile in Uruguay and Chile. Finally, a concerted effort of men of all the provinces, aided by Brazilian forces, overthrew De Rosas, and in 1853, the Argentine Republic was formed, with a constitution closely resembling that of the United States.

A New Period of Progress.—Immediately, the old jealousy between Buenos Aires and the other provinces broke out, and personal rivalries of military leaders added to the political confusion. A five years' war with Paraguay drew heavily on the resources of the nation; but the leadership of President Mitre strengthened the national spirit. His successor, Sarmiento, elected in 1868, wisely advanced the economic and educational affairs of the nation, and set it on the road to peaceful, democratic progress. Since 1880, in spite of frequent financial troubles and occasional uprisings, the Republic has steadily developed in wealth and political stability. Boundary disputes with Chile have been settled by arbitration.

From a very early period, Argentina has had a large and influential class of liberal, cultured citizens. Education in all grades has received generous government support. The entire school system was reorganized in 1916. In addition to the University of Cordoba, founded in 1613, the country now has three other national and two provincial universities, besides many normal and technical schools. The national government and some of the provinces maintain student scholarships in several countries. Fifty of these scholarships are available in the United States.

In 1915, the first real treaty between Argentina, Brazil, and Chile—the "A B C powers"—was signed, in which they agreed, for a period of five years, to submit all disputes to impartial tribunals before engaging in war. During the World War, the discovery of dispatches from the German minister at Buenos Aires, Count Luxburg, advising that Argentine vessels should be "sunk without trace," led the legislature of Argentina to advise the president to sever diplomatic relations with Germany. President Irigoyen, however, maintained a policy of neutrality. After the close of the war, a marked increase of immigration to Argentina took place, notably from German and Slavic countries.

Bolivia. The territory included in Bolivia was conquered by Pizarro in 1538. He and his successors subdued the Indians so thoroughly that no uprising occurred until 1780. The usual Spanish policy of compelling the Indians to work in the mines rapidly reduced their numbers. From 1809 to 1824 a bloody struggle for independence was waged, and in the latter year the Spanish army was defeated by a Colombian force under General Sucré. On August 6, 1825 the independence of Upper Peru, as the country was then called, was declared, and the Republic of Bolivia was organized five days later. A constitution, drafted by Bolivar, the Liberator, was adopted in 1826. General Sucré was offered the life presidency, but he held office for two years only.

Since 1827 the history of Bolivia has been a story of chronic civil war. In that period it has had 70 presidents and dictators. War with Chile, ended by treaty in 1884, robbed Bolivia of its Pacific seacoast and rich mineral deposits. In 1904, however, by a new agreement, Bolivia obtained access to the coast through Chilean territory and the right to establish customhouses at certain ports. A dispute with Brazil resulted, in 1903, in the cession of 70,000 square miles to that country in return for a small indemnity. The disturbed political condition of the country and lack of capital have retarded the economic development of Bolivia, but a French loan secured in 1910 and the establishment of the Bank of the Bolivian Nation have somewhat bettered conditions. Education is free and compulsory in state-aided schools controlled by the municipalities.

Brazil (*brà-zĭl'*). The name of this South American country is derived from a Portuguese word, *braza*, meaning "live coal," in reference to the color of its dyewoods, the first cargo of which was taken

to Portugal in 1503 by Amerigo Vespucci. He had been sent by the king of Portugal to take possession of the territory discovered by both a Spaniard, Pinzón, and a Portuguese commander, Cabral, in 1500. Vespucci, in 1503, left a small garrison at a point which he named *Todos os Santos*, "All Saints." Portugal was occupied with her Indian and African trade, however, so the settlement of Brazil was left to private grantees to whom were given large areas, called captaincies, with fifty leagues of seacoast each. Much trouble was encountered in dealing with the natives, although a young nobleman, Diogo Alvares (generally known as Caramarú), at Bahia, secured their favor by his enterprise and daring and took daughters of native chiefs as wives. To him, it is said, many of the best families of Bahia trace their ancestry.

The supposed poverty of Brazil spared her from the commercial rivalries of the next 150 years. In 1649 the Brazil Company of Portugal successfully repelled the encroaching Dutch West India Company. About the beginning of the 18th century, diamonds and gold were discovered in the South and West, and labor was withdrawn from the growing sugar industry, to the detriment of the country. Slaves were, at this period, brought in from Africa for plantation work.

Independence.—In 1789 an unsuccessful attempt was made to free the country from Portugal. Independence came finally as an indirect result of the French Revolution; for, in 1807, when Napoleon threatened Portugal, the prince regent, afterward King John, with the royal family, fled to Brazil. John opened Brazilian ports and brought in workmen and manufacturers from northern Europe and England. In 1821 he returned to Portugal, leaving his son, Dom Pedro, in Brazil. The latter proclaimed the independence of Brazil in 1822 and became constitutional emperor, but he lost his popularity, abdicated, and returned to Portugal in 1831. In 1840 his son, then fourteen years old, was declared of age, and in the following year as Dom Pedro II took possession of the throne, which he held until 1889. In that year a peaceful revolution exiled the emperor, and a provisional government was set up under Fonseca. In 1891 a national congress proclaimed the Constitution of the United States of Brazil, with Fonseca as first president. His term of office was of short duration, for, after a few months, he was forced to resign in favor of Peixoto.

Many difficulties faced the new government, the most serious being the disorder attending the final freeing of slaves. The heads of the state frequently resorted to arbitrary measures, and several attempts were made during the period from 1890 to 1900 to restore the monarchy. But the republic has grown continually stronger, boundary disputes have been settled amicably, and progressive democratic institutions adopted. In 1915 Brazil became a party to a treaty of alliance with Chile and Argentina.

In April 1917, Brazil proclaimed her neutrality in the World War, but in May this action was revoked. In October, after many Brazilian vessels had been sunk by Germany, the Congress declared a state of war with that country. The navy of Brazil thereafter co-operated with that of the United States in patrolling South Atlantic waters. The centenary of Brazilian independence was celebrated by an international exposition at Rio de Janeiro in 1922-23.

British Guiana. A British colony on the north coast of South America. This territory was explored by Raleigh and others in the 16th century. During the 17th and the 18th century, it was by turns in the hands of the Dutch, the English, and the French. Treaties of 1814-15 gave to Great Britain the colonies of Essequibo, Demerara, and Berbice, and these were united in 1831. In 1899 a boundary dispute with Venezuela was settled by an international tribunal. Although larger than Kansas, British Guiana has only one-sixth as many people. These represent many nationalities and racial strains, but the English element is, of course, dominant.

Chile (*chē'lā*). In the 16th century, the Araucanians were the chief Indian tribe on the western slope of the Andes, south of the territory of the Incas. The Spaniards sent their first expedition against the Araucanians in 1535, but found them harder than the Incas to subdue. After 17 years of fighting, they obtained sufficient foothold in the country to found Valdivia. Until 1773, however, the Araucanians made good their claim to the southern part of Chile. Meanwhile, slow development of farming and mining had been going on in the colony. Napoleon's invasion of Spain brought to the Chileans their opportunity for independence. The Spanish governor was forced to resign in 1810, and, after eight years of struggle, with the aid of Argentine forces under San Martin, independence was proclaimed in 1818. A constitution was adopted in 1824. This was followed by several others, that of 1833 being in force with modifications made in 1925. It is similar to that of the United States, but provides for a more centralized government with provinces instead of states.

Several internal upheavals have occurred; but the country has been free from these, compared with other South American states. A war begun with Spain in 1865 led to the blockade of the coast by the Spanish fleet and to the bombardment of Valparaiso in 1866. In 1869 the American Minister secured a cessation of active hostilities, although formal peace was not established until 1879. In that year, a war broke out with Bolivia and Peru in reference to the rights of Chile in the mineral district of Atacama. This virtually came to an end in 1881, and the victorious Chileans gained a large accession of territory from both Bolivia and Peru. The dispute over the possession of the provinces of Tacna and Arica, held by Chile, remained to disturb South American politics. In 1929 it was announced that an agreement had been reached according to which the province of Tacna had been assigned to Peru and Arica to Chile.

Recent Political Progress.—In 1885 Balmaceda, for many years a liberal leader, was elected president. Opposition to his proposals of reform in respect to education, relations of church and state, and other internal affairs helped to make him unpopular. This, together with dislike of his dictatorial methods, brought about his overthrow in 1891. The Chilean constitution demanded that both senators and deputies have a fixed yearly income, and that every voter, to be qualified, possess a certain amount of property and be able to read and write. As a consequence, political power was given to but a few. Education has in recent years been systematically organized and has shown signs of steady advance. Serious abuses have existed in the treatment of laborers on the large estates, which include most of the agricultural lands. It was this state of affairs which led to a general strike in 1913, after which most of the causes of dissatisfaction were removed. The constitutional president, Alessandri, was overthrown by a military *coup d' état* in 1924, but, in 1925, Alessandri was invited to return, a different group having seized power. A more liberal constitution came into force in October 1925. Ibanez became president in 1927. He proceeded to suppress Liberal expression of opinion and to exile many leaders of a radical tendency.

Colombia. In 1499 Ojeda and Vespucci explored the north coast of Colombia, and, after Balboa's discovery of the Pacific, settlements were rapidly made on the Isthmus of Panama and along the west coast. Until the beginning of the 19th century this territory was a Spanish possession, known as New Granada. In 1810 the colony revolted, became independent in 1819, and joined with Venezuela and Ecuador, under Bolivar, the

Washington of South America, to form the Republic of Colombia. This union broke up on the death of Bolivar in 1830. The Republic of New Granada was formed in 1831. Civil wars followed, until, in 1863, eight states formed a federal union as the United States of Colombia. This was changed in 1886 into a centralized republic, with the former "states" as provinces. But this policy was unpalatable to the Liberals. A succession of rebellions and civil wars followed, the most serious breaking out in 1899. This extremely costly war raged until 1902 and resulted in the independence of the former province of Panama.

The issue at stake in this conflict was the policy of the government toward the disposal of the rights of the French canal company in Panama. This company had offered its rights to the United States for $40,000,000. A new congress, in August 1903, rejected the Hay-Herran treaty, which provided for construction of the canal by the United States. In November, Panama declared its independence, thus taking the canal question out of Colombia's hands. Colombia continued to insist on indemnity and apology for the alleged part played by the United States in the secession of Panama. Finally, in 1921, the United States Senate ratified a treaty which awarded to Colombia $25,000,000, in return for acknowledgment of the Canal Zone rights of the United States and the independence of Panama.

Costa Rica. A Central American republic lying just north of Panama. The Spanish province of Costa Rica was established in 1540. For 250 years it was reckoned the poorest of Spanish possessions, a condition due to the inroads of Indians and buccaneers. Within the last century it has made great advance in industry and education. Independence of Spanish rule was declared in Costa Rica on Sept. 15, 1821. From 1824 to 1839 it formed part of the Central American union. Since 1839 it has been an independent state. The political life of the country has been comparatively peaceful and its government enlightened. The president is elected for four years. Costa Rica is primarily agricultural, and, by a system of limited holdings, land tenure is almost universal. Country schools which provide instruction in rural industry are a feature of the educational system.

Cuba (*kū'bȧ*). This island, called the "Queen of the Antilles," was discovered by Columbus in 1492, and called by him "the most beautiful land that eyes ever beheld." It was first settled by Spaniards at Baracoa. For two centuries, Cuba, regarded as the "Key of the New World" and the source of fabulous wealth, was in constant danger from French, Dutch, English, and West Indian pirates and buccaneers. Havana was twice burned, first in 1528 and again in 1556. In 1762 the English, under Lord Albemarle, took Havana, which, however, by the Treaty of Paris in the next year, was restored to Spain.

The early 19th century was a period of prosperity in the island, and the Cubans remained loyal to Spain, while other colonies fell away. But, as soon as the great value of her fertile soil was apparent, Cuba began to feel the selfish cruelty of Spanish policy. The captains general were, by the decree of 1825, given absolute power over the lives and property of Cubans. From the rebellion of 1829, through the slave insurrection in 1844 and the Ten Years' war (1868–78), to 1895, the story of Cuba is one of revolts and cruel reprisals. In 1848 the United States offered $100,000,000 to Spain for the island. At that period, the United States government withheld all encouragement of Cuban independence, because the Spanish colonies, on gaining their own freedom, emancipated all slaves, and the slave states of the South feared the effect of Cuban emancipation.

War with Spain.—The insurrection begun in 1895 gained formidable proportions by 1898. The United States battleship *Maine*, while on a friendly visit, was blown up in Havana harbor, February 15, 1898, and, on April 19, the Congress of the United States adopted resolutions declaring Cuba independent. War with Spain began at once. Cervera's Spanish fleet was destroyed at Santiago de Cuba, July 3, and Santiago and its large army were surrendered on July 17. The leading military events of the war, so far as Cuba was concerned, were the fights at El Caney and San Juan, the battle at Santiago, and the destruction of Cervera's fleet. From 1898 to 1902, the island was under United States military governors. During this time financial reforms were introduced, a free school system was organized, the island was freed from the scourge of yellow fever, and the general death rate lowered by modern sanitation. Especially notable improvements were made in the building and beautifying and sanitation of the city of Havana.

Political Reform.—A constitutional convention assembled in November 1900 and adopted a constitution providing for a republican form of government, with a president, vice president, Senate, and House of Representatives. Thereupon, the United States Congress authorized the transfer of the government to the people of Cuba on condition that: (1) No treaty should be made with any other foreign power, impairing the independence of Cuba, or allowing military or naval occupation of the island; (2) the United States should have the right to intervene for the discharge of her obligations under the Treaty of Paris; (3) the United States should have certain naval stations (at Bahia, Honda, and Guantánamo). These conditions were included in the Law of Constitution and confirmed in the permanent treaty between Cuba and the United States, which was signed on May 20, 1902.

The formal transfer of the government to the Cuban authorities then took place. Tomás Estrada Palma was elected president, and Luis Esteves, vice president. An insurrection in 1906 led to American intervention and the appointment of C. E. Magoon as provisional governor. Cuba again became independent in 1909, with José Gomez as president. In 1917, on the eve of the presidential election, a revolt broke out among the troops. At this time, the government, with the moral support of the United States, promptly suppressed the disturbance. In 1922 several important electoral and administrative reforms were effected. The first American ambassador to Cuba was appointed in 1923.

Dominican (*dô-mĭn'ĭ-kăn*) **Republic** or **Santo Domingo** (*săn'tō dô-mĭng'gō*). A state formed in 1844 by separation of the Spanish or eastern section of the island of Haiti from the Republic of Haiti. In 1861 Spain took possession of her former colony, but in 1863 she gave it up in the face of a revolt. The republic has since maintained a troubled existence. In 1907 an agreement between the Dominican Republic and the United States was ratified, under which the latter undertook to collect the customs revenues, assist the Dominican government to maintain peace, and act as intermediary between the republic and its foreign creditors. In 1916, after a series of revolutionary outbreaks, American marines were landed on the island in force, and United States naval and marine officers took charge of the executive posts of the government. Toward the end of 1922, the military governor installed a provisional native government, preliminary to the withdrawal of United States forces, which took place in 1925 after the ratification of treaties for the refunding of Dominican debts. Until these were paid, customs were to be collected by an appointee of the president of the United States.

Dutch Guiana or **Surinam** (*sōō'rĭ-năm'*). A Dutch colony in South America, lying just east of British Guiana. It was first settled by the English in 1652, but, in 1667, by the Treaty of Breda, the colony was transferred to the Dutch. By the same treaty, New Amsterdam (New York) passed to the English.

Ecuador (*ĕk'wà-dôr'*). After the Spanish conquest of the Inca dominions, the kingdom of Quito remained under Spanish rule from 1533 to 1822. It achieved its independence by the battle of Pichincha, May 22, 1822. The territory was incorporated into the Republic of Colombia, on the disruption of which, in 1830, it became an independent republic under the name of Ecuador. But a series of civil broils among rival political leaders and wars with neighboring states ensued, lasting, almost without intermission, for more than twenty years. Since 1850 the political struggle between Clericals and Liberals has been continuous and bitter, and revolutions and insurrections have been numerous. The present constitution, adopted in 1906, is the twelfth set up since 1830; but education is compulsory, art and literature are encouraged, and high ideals of national finance and public credit have been adhered to.

French Guiana. The French colony lying east of Dutch Guiana. It was first settled by the French at Cayenne about 1636, but this settlement was abandoned in 1653. Ten years later a new company took over the venture, but progress was slow in the face of Portuguese attacks. Toward the end of the 18th century, many political prisoners were sent to the colony, and their complaints about the deadly effects of the climate gave the place an evil reputation. The English and Portuguese seized the colony in 1809, but it was restored to France in 1815, and since 1855 that country has used it as a penal colony at a financial loss.

Guatemala. The Central American republic which borders Mexico on the south. From 1524 to 1821 it was a Spanish possession. After a brief period of union with the Mexican empire, its independence of all powers was declared in 1823, and a union was effected with the other new republics of Central America. In 1839 Guatemala seceded from this union and assumed the name Republic of Guatemala on March 21, 1847. Its history has been marked by numerous insurgent movements. In 1917 Señor Manuel Estrada Cabrera was elected for his fourth term of six years as president. Guatemala was first among Central American states to sever diplomatic relations with Germany in 1917 and grant to the United States the use of her ports and railways for defense. In 1920 a revolution overthrew the Cabrera government, and Carlos Herrera became president. Education is free and compulsory. The Spanish language and the Roman Catholic religion prevail.

Haiti (*hā'tĭ*). The island of Haiti, or Santo Domingo, was discovered by Columbus in 1492. The inhabitants were rapidly exterminated by warfare and by the heavy labor imposed by their Spanish masters, who soon began to import Negroes from Africa. French adventurers occupied part of the island early in the 17th century, and the Treaty of Ryswick (1697) assigned the island to France. In 1789, the freedmen of the island began a movement for equal political rights. The French National Assembly granted their request, but a struggle ensued with the great landlords, who were aided by English arms.

At this juncture, Toussaint L'Ouverture took command of the freedmen's forces and drove English and Spanish alike from the island. The French government made him governor. Later, at Napoleon's orders, he was deposed and at length taken prisoner to France. In 1804, Haiti, under General Dessalines, proclaimed its independence. In 1844 the Spanish section of the island set up a separate government, as the Dominican Republic. The later history of Haiti has been a long series of rebellions and revolutions. In 1915, violent disturbances led to intervention by the United States. Under a treaty of that year, the control of customhouses and of a native constabulary, to continue for 20 years, was given to the United States. This arrangement has brought comparative quiet and progress to the republic. See *Dominican Republic.*

Honduras. This republic is the third largest of the Central American states. On its shores, near the present Cape Honduras, Columbus made a landing in 1502. The conquest of the country was completed by Cortés, who came thither from Mexico in 1525. For three centuries the land suffered the usual fate of exploitation under Spanish rule. In 1821, after a successful revolt, Honduras became a part of the Mexican empire. It joined the Central American Confederation in 1823, and became independent in 1839. From 1849 to 1863, it shared in a union with Salvador and Nicaragua. The later history of the republic has been marked by frequent revolutions; those of 1910-11 were the occasion of intervention by the United States. Since 1880 the city of Tegucigalpa has been the capital of the state.

The government operates under a constitution which became effective on January 1, 1895. The congress consists of a single house, the Chamber of Deputies; members are elected for terms of four years, one-half of the membership being chosen every second year. The president is elected for a term of four years, but must not previously have held the office within six months of the beginning of his term. The constitution declares the republic to be a "sacred refuge" for every person fleeing to its territory. All male citizens who are over 18 years of age, if married, or over 21, if unmarried, and who can read and write, are required to vote. The state supports several institutions for secondary and higher education, including five normal schools and the University of Tegucigalpa, but the country as a whole suffers from lack of an adequate system of common schools.

Mexico. Ancient Mexican tradition tells of the passage of numerous tribes from the north to the south across the country and of the establishment of powerful states by some of these peoples. In this shadowy procession the accomplishments of two tribes, the Toltecs and the Aztecs, stand out boldly. The Toltecs, in the course of their migrations, are said to have reached Tulacingo, a little north of the City of Mexico, early in the 8th century. They appear to have been a commercial people who built great cities. Apparently, their government extended its authority over a large territory. Other kindred races shared the land of Mexico with the Toltecs, and all were skillful workers in textiles and metals. They possessed elaborate religious systems, the ceremonies of which centered around many vast temples.

The Aztecs.—After some 400 years, disaster in the shape of civil war and disease overtook the Toltecs. Their traditions and culture were preserved by the Texcocan people, whose city, Texcoco, situated on the lake of the same name, became the most famous center of culture in the later Aztec empire. In government, the Aztecs were the real successors of the Toltecs. They established their capital of Tenochtitlan, or Mexico, "the place of Mexitli," their war god, in the 14th century. The superior ability of their kings brought all central Mexico under the Aztec authority. It was this empire, ruled over by Montezuma (Moctezuma) II, that the Spanish adventurers met with in the beginning of the 16th century.

Cortés, led on by a dream of vast wealth, landed at Vera Cruz in 1519 and started on his daring march toward the Aztec capital. On the way, he recruited a native army from various states tributary to the Aztecs and contrived to so impress the emperor, Montezuma, that he was received into the royal palace. In 1520 he made Montezuma his prisoner. The death of the monarch and the desecration of their shrines roused the Mexicans to an attack on the little band of Spaniards. For a time Cortés and his followers were in desperate straits, but they rallied, and, on August 13, 1521, they captured the

City of Mexico. From that event dates the Spanish rule in Mexico, which continued to the year 1821.

Mexico under Spanish Rule.—The governors and viceroys of New Spain gave to Mexico a government which, in its tyranny, was not very different from the system to which they had been accustomed. The zeal of the churchmen stamped out the horrible practices that had attended the old Aztec worship; but, unfortunately, the system of exploiting the natives destroyed much that was valuable in their ancient culture. Mexico, however, became the most prosperous and progressive of Spain's colonies. The government encouraged settlement, built roads and harbors, and established schools and a university. But the restriction of trade and agriculture, to avoid all competition with Spain, and the enslaving of the natives were evils that far outweighed the good in Spanish government. The vast resources of a country stretching from Panama to Vancouver could never be realized, much less developed, under such a system.

Independence.—The revolt which led to Mexican independence was really opened by the patriot priest, Hidalgo, of Dolores, in 1810. He was defeated and executed, but, in 1821, under General Iturbide, the Spanish power was finally broken. For a brief period Iturbide ruled as emperor. Then followed many years of turmoil, during which the general, Santa Anna, exercised a predominant influence. During his ascendancy, Texas was lost in 1836, and the war with the United States (1846-47) resulted in the further loss of New Mexico and California.

The evils of constant internal warfare were overshadowed for a time when, in 1861, England, France, and Spain sent a fleet to Vera Cruz to compel a settlement of Mexico's foreign debt. This was followed by the French military expedition which placed Maximilian on the throne as emperor of Mexico. Diplomatic warning from the United States, in support of the Monroe Doctrine, moved France to withdraw her troops. Maximilian was captured by revolutionary forces and executed.

The Presidency of Diaz.—The next important period in Mexican history is that covered by the administration of Porfirio Diaz. Except for the presidency of Gonzales (1880–84), Diaz ruled Mexico as a sort of benevolent despot from 1876 to 1911. Diaz reformed the government, introducing an adequate tax system with modern methods of accounting which largely prevented dishonesty among officials. He encouraged public improvements, railroads, and manufactures, and developed the educational system of the country. But numerous abuses, incident to long holding of power by a small group of men, led to severe criticism and active opposition to the Diaz régime. He was compelled to resign in 1911, immediately after the celebration of the 100th anniversary of Mexican independence.

Revolution and Reform.—A period of disorder in Mexico was ushered in by the withdrawal of Diaz. Rival leaders kept the country in a state of civil war. The presidency of Madero was brief. His successor, Huerta, assumed a defiant attitude toward the United States over a demand for reparation for the arrest of American sailors at Tampico in 1914. This led to an attempt at mediation by the "A B C powers," Argentina, Brazil, and Chile, which produced no result. Meanwhile, various revolutionary and bandit forces were active, chiefly those of Carranza and Villa. Raids by the latter's troops into American territory led to the sending of a punitive expedition into Mexico under General Pershing in 1916.

A constituent assembly, directed by Carranza, made radical changes in the constitution of 1857. A revised constitution was put into force, May 1, 1917. It provided for many reforms in the courts, for a minimum wage, and for protection from trusts. It moreover contained stringent measures for the confiscation of all ecclesiastical property and required that thenceforward the clergy of all denominations should be native-born. Carranza was in due course formally elected president.

In 1918 difficulty with Great Britain and the United States arose over the attitude of the Mexican government toward oil holdings operated by foreign companies. The resulting disputes were settled amicably in 1923, and diplomatic relations with the United States were resumed. Carranza was driven from power in 1920 by a revolution, and in 1921 Obregon assumed the presidency. In 1924 a rebellion led by Huerta was subdued by Obregon, who was peacefully succeeded by Calles. Calles pursued a policy of rigid economy and firmly enforced the provisions of the Constitution of 1917. New alien land and petroleum laws went into effect with revisions calculated to satisfy United States objections. The enforcement of the ecclesiastical laws created bitter resentment against Calles and his successor-elect, Obregon. The latter was assassinated in 1928 before taking office. Portes Gil was elected to the presidency by Congress. One of his first tasks was the suppression of a revolt.

Nicaragua (*nĭk'ă-rä'gwă*). The largest Central American republic. The coast of Nicaragua was discovered by Columbus in 1502. Until 1821 the country was a Spanish dependency, but in that year it declared its independence. It formed part of the United Provinces of Central America from 1823 to 1839, when it again assumed independence. Until 1860 the republic was the scene of constant war. In that year William Walker, who had made himself dictator in 1855, was captured and shot. Then followed a long period of peace, broken only in 1893 by a factional struggle for the presidency. In 1909 Zelaya, who had held the presidency since 1894, was forced to resign. The United States in 1911 undertook to supervise the finances of Nicaragua, and in 1916 a canal treaty was ratified which gave the United States the right to construct a canal through the country. A rebellion under Sandino in 1926 led to intervention by United States marines, who supervised a presidential election in 1928.

Panama (*păn'ă-mä'*). Since 1513, when Balboa discovered the Pacific Ocean, Panama, the connecting link between North and South America, has been of great importance as a possible trade route. This peculiar commercial interest made its union with Colombia, both in the Spanish period and later, very insecure. The people attempted to set up an independent republic in 1840 but failed. In 1855 Panama was made a self-governing state dependent upon Colombia, but in 1885 direct government was restored. In 1903 a bloodless revolution secured independence from Colombia.

Paraguay (*păr'ă-gwā*). The territory included in this South American republic was first explored by Sebastian Cabot in 1526. A fort was built on the site of the present capital city of Asunción in 1536. The most notable feature of the Spanish period is the management of the country by the Jesuits from 1609 to 1768. Their mission communities, or *reductions*, were centers of education for the Guaranies, or native Indians. After the overthrow of the Spanish government in 1811, the state was governed by a triumvirate until 1816, when José Gaspar Francia made himself dictator. He ruled until 1840, maintaining a policy of national isolation. Carlos López established another dictatorship in 1844. He was succeeded by his son, Francisco López, whose territorial ambition plunged Paraguay into a disastrous war with Argentina, Brazil, and Uruguay. When the war closed in 1870, Paraguay had lost at least 500,000 men. In more recent years, political revolutions have been rather frequent, a particularly violent succession of conflicts having occurred between 1908 and 1915.

Peru (*pē-rōō'*). A republic on the west coast of South America. Authentic history of this country begins with the coming of the Spaniards under

Pizarro in 1531. They found the land of the Incas engaged in a war between rival chiefs and took advantage of this situation to establish Spanish authority. The conquerors at once began to seize vast quantities of gold and silver and to enslave the natives for work in the mines. This policy aroused protest from the Spanish churchman, Las Casas, and a code of laws was framed in Spain, designed to protect the Indians. In 1551 a viceroy was sent to Peru to enforce these laws. But neither he nor his forty successors were able to prevent merciless exploiting of the natives.

After the first few years of Spanish control, no serious uprising of the Indians occurred until 1780. This rebellion was crushed with great cruelty. The Viceroyalty of Peru included at first all of Spanish South America, but in 1718 New Granada was separated from it, and in 1776 the Viceroyalty of Rio de la Plata was formed, including most of Argentina, Paraguay, Uruguay, and Bolivia.

Independence.—A movement for separation from Spain was started in 1820 under the leadership of General San Martin. Independence was declared at Lima, July 28, 1821. After several years of conflict, the Peruvians, led by General Bolivar, succeeded in defeating the Spanish forces. A constitution was adopted in 1828.

A dispute over the possession of the rich mineral territory of Tarapaca and the provinces Arica and Tacna brought on war with Chile in 1879. The Peruvians were defeated, Chile annexed Tarapaca, and Peru ceded Tacna and Arica to Chile for ten years. Permanent settlement of the dispute, which was to be made by popular vote in the provinces, was delayed, by disputes and disagreements over the conditions of the election, until in 1929 it was announced that an agreement had been reached by which Tacna would go to Peru and Arica to Chile.

The constitution of the republic, as amended in 1920, contains numerous modern social provisions. Elementary education is compulsory, but the law is not enforced. The government maintains numerous high schools and other special and technical schools. The oldest of Peru's four universities, and the oldest in the New World, is the University of San Marcos at Lima, founded in 1551.

Salvador (*săl'vȧ-dōr'*). The smallest and most thickly populated of Central American republics. In Salvador, as in Guatemala, the native Indian blood still predominates, more than a million of the million and a half inhabitants being of mixed or pure Indian ancestry. The country is progressive in government and industry, and, in spite of the practical necessity of providing against destruction by earthquakes, the people try to secure good architectural effects in their buildings. From 1524 until 1821 Salvador was part of the Spanish viceroyalty of Guatemala. After a period of union with Mexico and with the other Central American states, it became independent in 1839. Its constitution has been frequently revised. Education in Salvador is free and compulsory.

Uruguay (*ū'rōō-gwā*). This South American republic lies east of the Uruguay river and north of the river Plata. The district was known in Spanish times as the Banda Oriental, and the official title of the state is *Republica Oriental del Uruguay*, or "Eastern Republic of Uruguay." The native Indians prevented settlement by Europeans until 1624, when the first permanent colony was founded on the Rio Negro. The Portuguese claimed the territory and made numerous settlements, but after a series of conflicts during the 18th century they were compelled to give way to the Spaniards.

Independence.—An English fleet captured the city of Montevideo in 1807 but gave it up after the failure of their attack on Buenos Aires. The people of Uruguay joined the Argentinians in their revolt against Spain in 1810, and the Spanish forces were driven from Montevideo in 1814. Brazil took advantage of Uruguayan weakness following this struggle and annexed the country. A number of patriotic leaders took refuge in Buenos Aires, watching for an opportunity to drive the Brazilians out. Their opportunity came in 1825, and by 1828 the Brazilian forces were finally defeated. The republic was organized in 1830. Its history for many years was one of disorder and conflict between the *Colorado* and *Blanco*, or Colored and White, parties, for the color line between the whites and the people of mixed blood was drawn early. The traditional party names still remain, although their original significance has largely disappeared.

Uruguay, however, in spite of these internal troubles, has attained rank as a progressive state. The constitution was amended in 1917, to provide a more modern organization of government. Much progress has been made recently in education. In Montevideo are numerous special and higher institutions and a university. Practical agriculture is taught in rural schools, and elementary schools for adults have been organized.

Venezuela (*vĕn'ĕ-zwē'lȧ*). A South American republic lying east of Colombia and bordering the Caribbean Sea. The name, meaning "little Venice," was given to the country probably on account of the pile dwellings built by the natives on Lake Maracaibo, which suggested Venice to the early explorers. These natives were living in a savage state when Columbus sailed along the coast in 1498. Settlers were very early attracted to the coast islands by the pearl fisheries, and by 1520 several Spanish colonies had been established on the mainland by Franciscan and Dominican monks. In 1731 most of the territory now known as Venezuela was placed under the authority of a captain general and all of it was so governed after 1777.

Independence.—The first serious revolt against Spanish rule occurred in 1797, but it failed, as did others in the first decade of the 19th century. A Venezuelan congress met and declared independence on July 5, 1811. Several years of intermittent conflict between republican and royalist forces ensued, and it was not until Oct. 8, 1823 that the royalists, who had drawn support largely from the half-breeds, finally surrendered. During this period, Simon Bolivar, a young Venezuelan aristocrat, had launched his great scheme for a Colombian republic, in which Venezuela was included. Venezuela, however, withdrew from the union in 1829, and in 1830 formed an independent republic with its capital at Caracas.

Political Difficulty.—After some years of peace, civil war broke out in 1846 between the Liberal and Conservative parties, which lasted almost continuously until 1870. Since that time several revolutions have marked the transfer of power from one party or dictator to another. Slavery in the republic was abolished in 1854. Two disturbing incidents in the later history of Venezuela took on international importance. The long-standing boundary dispute with Great Britain reached a critical stage in 1886, when the British fortified the mouth of the Orinoco. Settlement by arbitration was secured, at the insistence of the United States, in 1899. The despotic conduct of Cipriano Castro, who secured control of affairs as president in 1900, brought on a blockade of Venezuelan ports by Germany, England, and Italy in 1903, to force payment of Venezuelan indebtedness in Europe. This matter was submitted to the Hague Tribunal and settled in favor of the European claimants in 1904.

Recent Progress.—In the cities of Venezuela much progress has been made in public works and education, but the rural districts are still very backward. In the city of Caracas is a university founded in 1721, besides normal schools and schools of arts and trades for boys and for women. The constitution of Venezuela has been frequently changed since 1830. As last revised in 1914, it provides for a Senate and a Chamber of Deputies, which constitute the National Congress. This body elects the president for a term of seven years.

WORLD HISTORY

The following section brings together, in alphabetical order, historical accounts of the states and nations which have not been included in the preceding separate treatments of American history, of the history of the British Empire, and of that of the Latin American countries. Here are included stories of the origin and progress of existing sovereign states not previously considered, as well as accounts of ancient and medieval states and countries, the stories of which are essential to a comprehensive view of world history. Certain minor divisions and dependencies of present day states, which of themselves have had important careers, also are treated in this connection.

Topics of such particular historical importance and interest as to demand special treatment are discussed farther on in the Dictionary of World History. These include accounts of parties, treaties, alliances, congresses, and especially such notable events as affected at once the history of several countries. In a separate section, beginning on page 513, the distinctive characters, the relationships, and the histories of races and peoples are treated.

The political natures and the governmental organizations of existing states are discussed in the department of Government. Geographical characteristics and relations of countries, which so notably affect the history of nations, will be found in the department of Geography, while, for those commercial and industrial facts and conditions which help to determine the course of history, the reader is referred to the department of Economics.

ABYSSINIA (ETHIOPIA)

Abyssinia (*ăb'ĭ-sĭn'ĭ-ȧ*) is one of the three independent states of Africa, the others being Egypt and Liberia. Its official title, Ethiopia, reverts to the name of the country of which it anciently formed a part, the modern name Abyssinia being a corrupt Portuguese form of the Arabic word *habash* or *habeshi* meaning "mixture," applied in reference to the diverse tribes of the country. Abyssinia has never been subject to any foreign power. Early traditions and some features of the language, known as Amharic, indicate contact with the Jews, and the Queen of Sheba is supposed to have ruled the land in Solomon's time.

In the 4th century, Christianity was introduced, and a bishop, called in the Abyssinian tongue, *Abuna Salamah*, "our father of peace," was consecrated by the patriarch of Alexandria. In spite of efforts to introduce other forms of Christian faith, this original Coptic church rite has been maintained. The abuna is appointed by the Coptic church at Alexandria and shares authority with the native head of the monastic orders.

In the 6th century, the Abyssinians conquered the Yemen, a district of Arabia on the Red Sea, opposite Abyssinian territory, and ruled it as a province for 67 years. The loss of this district to the Mohammedans once more shut Abyssinia off from the outside world and checked the development of its people at the semibarbarous stage that still characterizes them.

Between the 15th and the 19th century several explorers entered the country, and some of them remained because the laws did not permit their leaving. Late in the 19th century, Italy attempted to establish a protectorate over Abyssinia, but after a decisive defeat in 1896 she was compelled to recognize the independence of the country.

The government of Abyssinia is feudal, with the emperor, or negus, at the head and governors in charge of the nine provinces. Menelek, who reigned from 1889 to 1913, was the strongest of recent rulers. Under his authority, boundary treaties were concluded with England, a bank was established, a line of railroad between the Gulf of Aden and his capital, Addis Ababa, was begun (completed in 1917), and commercial treaties were arranged. His daughter Zauditu and her nephew Ras Tafari shared the sovereignty, 1918-28, the latter then becoming emperor. Ras Tafari began a vigorous policy of modernization.

AFGHANISTAN

Afghanistan (*ăf-găn'ĭ-stăn'*), a small Asiatic country, called by the natives Khorassan, lies between Persia and northern India and was among the conquests of Alexander in the 4th century B. C. In succeeding centuries it was the prey of many conquerors. About the middle of the 18th century, Ahmed Shah gave the country an independent status which it has maintained ever since. In 1809 Sujah, grandson of Ahmed, was dethroned and fled to India. Dost Mohammed established partial order in the country, but in 1838 the British government of India attempted to interfere in Afghan affairs, on the ground that Sujah was rightful ruler and Dost Mohammed was intriguing with Russia. This led to ten years of conflict terminating in Dost Mohammed's holding of the throne in friendly relations with the British. Further trouble arose in 1878 over the British demand that a British resident should be received at Kabul as a Russian had been. It was in these Afghan wars that the difficult Khyber pass became famous.

In 1901, the British government acknowledged the independence of Afghanistan, which was later reaffirmed by a definite treaty in November 1921. Afghanistan is backward in the development of industry and transportation. However, some factories for arms and munitions have been erected in Kabul, the capital, also others for the manufacture of silk, camel hair and sheepskin articles, and carpets. Education has advanced markedly in recent years. The government workshops at Kabul provide public education in mechanical method and shop work. Most of the people are diligent cultivators, and all profitable soil is industriously utilized. The roads being generally unsuitable for wheeled traffic, foods are still largely transported by pack animals. See *Afghans*.

ALBANIA

As one of the political results of the Balkan wars, the independent state of Albania was set up in 1912. After a declaration of independence on November 28, the separate existence of the Albanian government was approved on December 20 by a conference of ambassadors held in London. An international commission was appointed to control the Albanian finances for a period of ten years. The crown was accepted by Prince William of Wied. He arrived in Durazzo, the capital of Albania, on March 7, 1914. His government, however, made little headway, and, at the outbreak of the World War, he, with most of the commissioners, fled from the country.

During the war, the Albanian people were divided in their sympathies. The country itself, after varying fortune, fell into the hands of the Italian forces. On June 3, 1917, the Italians proclaimed the independence of Albania under Italian protection. Complete independence of the country was recognized by Italy on August 2, 1920, and in January 1921 Albania was formally admitted into the League of Nations. See *Albanians*.

ALSACE-LORRAINE

Alsace-Lorraine (*ăl-săs' lŏ'rān'*) is the name applied to the combined portions of Alsace and Lorraine, which, after the war of 1870, the German government organized under a single imperial administration. The cession secured by Germany included all of the historic French province of Alsace, except the district around Belfort, and about one-fourth of the old province of Lorraine, a district rich in iron and including the fortified city of Metz.

Until their incorporation in the kingdom of France, the histories of these provinces had been quite distinct. The name Lorraine is derived from Lotharingia, the kingdom of Charlemagne's grandson Lothair. French Lorraine represented a district known in early medieval times as Upper Lorraine, which had been separated from Lower Lorraine—now part of Belgium and the Netherlands—in the middle of the 10th century. Though tributary to the Holy Roman Empire, Upper Lorraine became more and more closely related to France. Ruled by the dukes of Lorraine until the 18th century, it was then for a time in the possession of Stanislas, exking of Poland. At his death in 1766, it passed under the sovereignty of France.

Alsace, a territory lying in the upper Rhine valley, has been, throughout its history, disputed territory. The Romans, on entering Gaul, found this district inhabited by Celtic tribes. The Celts in time were supplanted by the Teutons, and the whole territory gradually came under German sway. From the 7th century, Alsace was governed by petty princes and other dignitaries, later by the dukes of Swabia, and finally by the Habsburgs. Between the years 1648 and 1697, Alsace became partly incorporated with France and was subsequently taken through force of arms by Louis XIV. Accordingly, by the Treaty of Ryswick, 1697, it came entirely under the dominion of France.

The French government made intermittent efforts to amalgamate the Teutonic element in Alsace with that of the French. But it was not until the Revolution that the German and the French peoples of the province were drawn close together in sentiment and sympathy—all classes of the German population becoming thoroughly reconciled to French rule. It is an incident here worthy of recording, that the "Marseillaise" was composed and first sung in the city of Strasbourg.

In 1790, in the process of reorganization of the realm of France in departments, Alsace was divided into the departments of Haut Rhin and Bas Rhin, while Lorraine was distributed among three—Moselle, Meurthe, and Vosges. The cession to Germany included Bas Rhin, most of Haut Rhin, the department of Moselle, and portions of Meurthe and Vosges. For administrative purposes, Germany divided Alsace-Lorraine into three civil districts—Lower Alsace, Upper Alsace, and Lorraine. Members of the legislative body, 58 in number, were elected by popular suffrage. But, at heart, the people in general were strongly opposed to the change in government. More than 150,000 proclaimed their adherence to France, and of this number no less than 50,000 chose exile rather than become German subjects.

For nearly half a century, the possession of Alsace-Lorraine by Germany had been a source of the keenest bitterness and resentment to the French. Neither had this sentiment grown less intense, nor had the loyalty of the people of Alsace-Lorraine become less devoted, at the outbreak of the World War. The Treaty of Versailles, June 28, 1919, provided that Alsace-Lorraine should be surrendered to France. Once again therefore the entire area of Alsace and Lorraine was incorporated into France under the departments of Haut Rhin, Bas Rhin, and Moselle. See *France, Germany.*

ANATOLIA

Anatolia (*ăn'ā-tō'lĭ-ā*), a name of Greek derivation, meaning sunrise, or eastern land, was anciently applied to Asia Minor, the land east of the Ægean Sea. Under the Eastern Empire, it designated one of the three Phrygian provinces. In the Turkish empire, it is applied to virtually all of Asia Minor. The western part of this land, along the Ægean coasts, was the home of early Greek civilization. Here, in the 6th century B. C., arose the famous kingdom of Lydia, ruled by Crœsus. Persia extended its sway to the Ægean, to be superseded by the Macedonian power. Numerous states which arose after the death of Alexander, including the powerful realm of Pontus, succumbed to the advance of Rome in the 2d and the 1st century B. C. The power of the Eastern, or Byzantine, Empire in Asia Minor was shattered by the Turkish attacks begun in the 11th century A. D. Since 1453 the land has been ruled by the Ottoman Turks. After the close of the World War, the Turkish Nationalist movement fixed its political center at Angora in Anatolia.

ANDORRA

Andorra is one of the two oldest and smallest republics in the world, the other being San Marino in Italy. It consists of 6 parishes in the diocese of the Spanish bishop of Urgel, lying in the valleys of the eastern Pyrenees, between France and Spain. Within its 175 square miles of territory, about 5000 people live, 1000 in the capital, Andorra. Charlemagne is said to have rewarded the little state for its help during his campaigns against the Moors by declaring it independent. Similar independence was enjoyed in feudal times by the people of many valleys of the Pyrenees. Fortunately for Andorra, the suzerainty over this territory was, in 1278, divided in perpetuity between the counts of Foix and the bishops of Urgel. The rights of the house of Foix descended to the French crown, and hence Andorra is now under the protection of the government of France and the bishop of Urgel. All citizens from 10 years of age to 60 are liable for military service. Inhabitants speak French and the Catalan dialect of Spanish. In 1928, rights were sold to a syndicate for developing Andorra as a gambling resort and for exploiting its natural resources.

ARABIA

The very extensive territory of the peninsula of Arabia—the name probably meaning "desert"—has never been a political unit. At a very early period it was settled by two groups of Semitic people, one of which occupied the South, the other the North. The people of the South adopted a settled, agricultural life more readily than the northern tribes, and are said to have maintained a kingdom, perhaps that of Yemen, for 2000 years. It was a period of Semitic migrations eastward into Mesopotamia and northward into Syria. The Roman power affected only some portions of the North. In consequence, many sects of early Christians took refuge in Arabia, and from their monasteries many valuable ancient manuscripts have been recovered. The oldest known manuscript of the Bible (4th century) was found in a convent on Mt. Sinai.

With the coming of Mohammed arose the brilliant historic period of the Arabs. From the 7th to the 15th century they swept out in conquest, established many centers of civilization, and contributed to the progress of science and art among the Western nations. But their homeland was still a group of petty states around the interior desert of the peninsula.

In 1517 the Turks subdued Hejaz and Yemen on the Red Sea coast. Oman, on the Persian Gulf, maintained independence except during the 16th century, when for a time it was subject to Portugal. Its later history has been turbulent. It is now independent, but the sultan is pledged to cede no territory to any other power than Great Britain. Since 1839 the district of Aden, in the southwest corner of Arabia, has been a protectorate of Great Britain. In 1916 the Grand Sherif of Mecca, or "Keeper of the Holy Places," proclaimed the independence of Hejaz and assumed the title of king. His troops co-operated with British forces under General Allenby in Syria and penetrated northward as far as Damascus. The king of Hejaz aspired to rule all Arabia but was conquered in 1924 by Ibn Saud, sultan of the Nejd. Saud captured also Jabal Shammar and created the sultanate of Hejaz and the Nejd. It occupies the entire northern portion of the Arabian peninsula from the Red Sea to the Persian gulf. See *Arabians.*

ARMENIA

As a state, Armenia first appears in history in the 6th century B. C., when the Armenian people were freed by Tigranes from the rule of the Assyrians and the Medes. About the beginning of the 2d century B. C., the division of Armenia into Armenia Major, east of the Euphrates, and Armenia Minor, west of the Euphrates, was made. The former was ultimately divided between Turkey, Persia, and Russia. The latter became Turkish territory in 1541.

Nationalist movements in Armenia led to cruel repressions and massacres, none of which exceeded in barbarity the "deportations" by the Turks during the World War. Armenian independence was recognized by the Allies in 1920. On April 2, 1921, Armenia declared itself a soviet republic and, in 1922, united with Georgia and Azerbaijan to form the Transcaucasian Socialist Soviet Republic. See *Armenians.*

ASSYRIA

In ancient history, we hear of Assyria first as a northern province of the Babylonian Empire in the 19th century B. C. It grew in power until about 1100 B. C., when its king, Tiglath-Pileser I, taking advantage of Babylonian troubles with Arabian invaders, made himself master of the empire. After his death, the realm fell apart. In 745 B. C. an adventurer, Pul, who had been a gardener, seized the reins of authority and, as Tiglath-Pileser II, established the strongest empire the world had yet seen. He originated the organization of provinces, to take the place of the earlier principalities.

Sargon II, the next great king, used the favorite plan of the Assyrians for subduing rebellious people, when he carried the tribes of Northern Israel into captivity, 722-723 B. C. Sennacherib, son of Sargon, in the course of extending his power westward, met disaster in a siege of Jerusalem, celebrated in Byron's poem beginning, "The Assyrian came down like a wolf on the fold." His son Esarhaddon conquered Egypt in 672 B. C. But the murderous cruelty and oppressive taxation of this great empire roused hatred among its subject peoples. Egypt and Babylon revolted, the Scythians invaded from the north, and finally the Medes and Babylonians conquered Nineveh, the capital, the very site of which was forgotten until recent years. See *Assyrians.*

AUSTRIA

The history of Austria is chiefly the history of the house of Habsburg. When Rudolf of Habsburg became emperor of Germany, Ottokar, king of Bohemia and duke of Austria, Styria, and Carinthia, refused to take the oath of allegiance. The emperor succeeded in dispossessing Ottokar of his fiefs (1278) and subsequently conferred them on his own sons (1280). Thus the dynasty of Habsburg was founded. In the first half of the 16th century, Duke Ferdinand of Austria was elected king of Hungary by one party; John Zapolya of Transylvania was elected by another. After several wars, in which John was supported by the Turks, Ferdinand came out victorious and united Hungary to Austria. Possessed of a large territory, fertile and densely peopled, the house of Habsburg was for several centuries the richest and most powerful family in Europe. But humiliations came with Napoleon. Driven out of Germany, the emperor Francis assumed, August 11, 1804, the title of emperor of Austria.

After the fall of Napoleon, Austria was restored to its former size, and under the administration of Metternich it also regained its prestige in European politics. But its internal weakness became apparent, first by the revolution of 1848, when only the support of Russia prevented the whole fabric from falling to pieces; again, after the battle of Sadowa, 1866, when, for the second time, it was driven out of Germany and lost its hold on Italy. The empire was then constituted as a double state—Austria and Hungary. In 1878 the administration of Bosnia and Herzegovina was given to Austria. In 1882 the dual kingdom entered into the Triple Alliance with Germany and Italy. Thereafter, the policy of the Habsburg rule became more and more identified with the Hohenzollern ambition for world domination. In 1908 Austria annexed Bosnia and Herzegovina in defiance of Russia. With Germany's support in 1913, Austria, by securing a protectorate over Albania and by denying Serbia access to the sea, prevented the Balkan allies from realizing the fruits of their victory over the Turks.

Francis Ferdinand, Austrian heir apparent, was assassinated at Sarajevo, June 28, 1914. Accusing Serbia of complicity, Austria demanded that Serbia punish the accomplices and suppress anti-Austrian influence. Rejecting Serbia's reply, Austria declared war on Serbia, July 28, 1914. Russian mobilization in behalf of Serbia began at once. Austria declared war on Russia, Aug. 6. Germany supported Austria. Great Britain and France, supporting Russia, declared war upon Austria, Aug. 13.

In June 1918 the Austrian offensive against the Italian armies failed. Following the utter defeat of the Austrian armies by the Italian counterstroke beginning Oct. 24, Austria-Hungary, on Nov. 3, signed terms of truce equivalent to military surrender. On Nov. 11, Charles I abdicated his throne, thereby ending more than 600 years of Habsburg rule. The Republic of Austria was proclaimed on Nov. 12, 1918. A constitution was adopted in November 1920, which provides for a legislature of two houses, a president, and a cabinet. See *Hungary, World War.*

AZERBAIJAN

Azerbaijan (*ä'zĕr-bī-jän'*) is one of the group of states which joined in 1922 to form the Transcaucasian Socialist Soviet Republic, lying between the Caspian Sea and the Black Sea. Unlike its neighbors, Georgia and Armenia, Azerbaijan, previously to 1918, had had no national history. It was declared independent in May 1918. In 1920, a soviet government was organized, with its capital at Baku.

BABYLONIA

At two periods the territory of Babylonia, located in the lower valley of the Tigris and Euphrates, was the center of an empire with the city of Babylon as its capital. The first Babylonian empire was organized from the Mesopotamian states by Hammurabi about 2000 B. C. About 1500 B. C. this empire in its growth came into conflict with Egypt, and later with the increasing power of its rival, Assyria. But the city of Babylon continued to be a center of political power and culture until the 8th century B. C., when it fell before the Assyrians.

The second Babylonian empire arose about 625 B. C., when the people rebelled against Assyrian tyranny and divided the Assyrian dominions with the Medes. This state lasted until 538 B. C., when the Persians captured Babylon. Within this period falls the brilliant reign of Nebuchadnezzar, who rebuilt Babylon with great magnificence and extended his power beyond the bounds of the first empire. In his reign the city of Jerusalem was sacked and many Jews were carried off as captives to Babylon. See *Sumerians.*

BARBARY STATES

The Barbary States are the North African lands of Morocco, Algeria, Tunis, and Tripoli. The name Barbary is derived from the Berbers, who were the earliest known inhabitants of the territory. In the 9th and the 10th century B. C. the Phœnicians colonized northern Africa, their principal city being Carthage. Their state was conquered and the city of Carthage destroyed by the Romans in 146 B. C. North Africa formed one of the most prosperous provinces of the Roman Empire, and the extensive ruins of great Roman towns and public works are still to be seen in many places. With the decline of

the empire, a state of anarchy ensued, and the Vandals found the country an easy prey. The first tide of Mohammedan conquest swept over the country in 647. The Arabs mingled with the Berbers, and the combined races advanced into Spain, where they were known as Moors.

After the expulsion of the Moors from Spain, the fugitives settled on the African coast, and the states there formed became the home of piracy. Spain in the 16th century and France in the 17th made vigorous war on these Barbary pirates, but with little success. During the 18th century all the Christian states were paying tribute to the heads of the Barbary States, which were either independent or nominally under the government of the Turkish sultan. In 1815 the United States forced Algeria, Tripoli, and Tunis to cease attacks on American shipping. England took similar action in 1819. The French established control of Algeria in 1847. Tunis since 1881 and the greater part of Morocco since 1912 have been French protectorates. The Franco-Spanish treaty of 1912 recognized Spanish rights in Morocco, and confirmed Spain in control of a strip of Mediterranean coast about 60 miles wide and 200 miles long. Italy conquered Tripoli and Barca in 1912 and united them in one colony as Libya.

BAVARIA

Bavaria, the second largest state in the German Republic, has long been famous for its literature, art, and music. Its name is derived from the Latin *Boiarii*, the name given to the Germanic tribe that seized the land of the Boii (Bohemia) and drove out the Celtic people of the present Bavarian territory. These Celts were subject to Rome from 15 A. D. to the fall of the Western Empire. The Franks overran the country about the 6th century, and Charlemagne later made it part of his empire. In 1180 an imperial grant placed the count of Wittelsbach in power, and descendants of that family ruled as counts, dukes, and kings until the establishment of the republican Free State of Bavaria in 1918.

Bavaria sided with Napoleon against Austria, and in 1805 he made it a kingdom, a dignity which the king, by adroit changing of sides in 1813, managed to retain. In 1818 a constitution was adopted, but King Louis I was more interested in rebuilding and embellishing his capital, Munich, than in promoting popular liberty. His policy, followed by his successors, made Munich one of the most beautiful cities of Europe and enriched it with art and scientific collections. The year 1848 brought an uprising of the citizens of Munich, who demanded further political reform. Louis abdicated, and his son, Maximilian, acceded to the demands of the people.

In 1866 Bavaria sided with Austria, and after the Prussian victory she was compelled to cede territory to Prussia and form an alliance. This alliance as well as national feeling placed her by the side of Prussia against France in 1870 and brought her into the German Empire. After the collapse of Germany in 1918 a radical government was formed under the leadership of Kurt Eisner, an Independent Socialist.

After the assassination of Eisner by a reactionary army officer, the inability of any one group to maintain a government resulted in a period of great disorder. At length, with the military aid of the central German government, the city of Munich was wrested from the extremists. A moderate coalition government secured the adoption of a new constitution in August 1919.

Further difficulty arose over the continuance of a military organization of "home guards" among the farmers and tradespeople. The reactionary party, which was strong in Bavaria, refused to disarm these troops, on the plea that they were a necessary defense against Bolshevism. This action created great difficulty in the negotiations with the Allies, who demanded fulfillment of the disarmament clause of the peace treaty. See *Germany*.

BELGIUM

The name of this heroic little country comes from that of a division of the ancient Roman province of Gallia Belgica, of which modern Belgium includes only a small part. Throughout the middle ages this name, of which the French form is *Belgique* and the Flemish, *Belgie*, was used locally for the southern provinces of the Netherlands, which remained loyal to Catholicism and Spain when the northern Netherlands attained independence, in 1579, as the United Provinces. This territory, on account of its strategic military position and its agricultural, industrial, and commercial wealth, has been coveted and fought for by all the nations of western Europe. Its history has been colored by the rivalry of the Germanic and Celtic peoples who have occupied it, by their religious differences, and by the conflict of the agricultural interests of the South with the commercial interests of the North.

A Province of Spain and Austria. The earlier history of Belgium belongs to the story of Flanders and the Netherlands in the middle ages. After the successful revolt of the United Provinces in 1579, the duke of Parma diplomatically retained the Belgic provinces for Spain, but the oppressive and bigoted measures of the Spanish government put a blight upon the flourishing industries of the country and drove artisans and merchants to England and to the Dutch Republic. Grass grew in the once busy streets of Ghent and Bruges. From 1598 to 1633, under Archduke Albert and his wife Isabel, daughter of Philip II of Spain, the country was officially independent, but in 1633 it reverted to Spain, and, as the Spanish Netherlands, entered upon a long period of disaster. It was the pawn in the wars of the 17th century. As the battlefield of contending armies, it justified its name, the "cockpit of Europe." France seized much of its territory, and the closing of the Scheldt river to shipping in 1648 shut its cities out from the ocean and commerce.

A brief respite from disaster came when the Bavarian elector, Maximilian Emanuel, an able and enlightened ruler, was made governor in 1692. He endeavored to revive commerce by the building of canals to take the place of the Scheldt river. But at the opening of the 18th century the insatiable ambition of Louis XIV again made the country a battle ground. Louis's desire to annex Belgium was thwarted by the successful campaigns of the English, Dutch, and Austrians, under Marlborough, and the Peace of Utrecht in 1713 gave the country to Austria. For a century it was known as the Austrian Netherlands.

The Belgians were jealous of their local liberties, especially of the right of their own assemblies, or "states," to levy or approve taxes, and the Austrians for a time found their new subjects difficult to rule. But a liberal policy was maintained, first by the archduchess Mary Elizabeth and later by Charles of Lorraine, Austrian governors. The latter was known as the "Good Governor" for his efforts in enlarging the canal system, in developing agriculture, and in providing for education. Among other institutions, he founded the Academy of Science.

Belgian Independence. The victorious armies of the French Revolution brought the Belgians into the Republic in 1794, and until the fall of Napoleon in 1814 they were governed as French people. In 1815 the Congress of Vienna joined the country to Holland in the Kingdom of the Netherlands, a union which, in view of the commercial power of Holland and the industrial resources of Belgium, would seem wise. But the conflicting temper and interests of the two peoples at once became evident. Differences arising from history, religion, and language could not be settled. In spite of real progress and prosperity in this period under the rule of the Dutch king, the Belgians found grievances in the large number of Dutch officeholders, in the regulations set up for education, and in the government's policy of religious toleration. Liberal and Clerical

parties joined in a demand for separate administration of the Belgian provinces. This was finally granted, but not until the extremists had forced a national revolt in 1830.

In 1831, with the approval of a conference of the Powers, called in London, the Belgians adopted a constitution providing for a Senate and a Chamber of Deputies, a ministry responsible to the legislature, and a king with restricted powers. Leopold of Saxe-Coburg was elected king of the Belgians. Belgium was made, by treaty among the powers, an independent, neutral state. Holland, however, withheld assent until 1839, when a final settlement of boundaries was effected.

Political and Economic Progress. The great confidence placed by the people in King Leopold carried Belgium through the revolutionary period of 1848 without disturbance, that year being marked only by an extension of the franchise by lowering the property qualification of voters. This question of the franchise has continued to share with the question of public education the first place in Belgian politics. Several reforms have been effected. In 1892 a system of plural voting was adopted, the right to more than one vote being dependent upon the possession of certain property or educational qualifications. In 1899 the system of proportional representation was put in force. But great inequalities in the suffrage still remained. In 1919 the Parliament ordered elections on a "one man, one vote" basis, and the new Parliament was required to legalize this system of election. Widows of soldiers killed before Jan. 1, 1919, who had not married again, or the mothers of such soldiers, widows or mothers of civilians shot by the enemy, and women who had been imprisoned for patriotic acts, were allowed to vote.

Belgium, in the 19th century, rapidly grew into an industrial country, and about 1886 Socialism became a political force. Frequent strikes led to extension of the suffrage already referred to and to the passing of much progressive legislation, providing, among other things, for industrial councils of employers and workmen, for regulating hours of labor, for old age pensions, and for better education.

At the death of Leopold I in 1865 his son was proclaimed king as Leopold II. The new king proved himself a shrewd business man and an able administrator. His influence was strong in extending Belgian trade, but his chief accomplishment was the acquiring of the Belgian Congo, or Congo Free State. He was succeeded in 1909 by his nephew, Albert I. Before Albert had been five years on the throne, the World War broke out, and the succeeding ordeal proved him a masterful man.

The World War. On Aug. 2, 1914, Germany demanded free passage of German troops through Belgium to attack France. Belgium refused, and a German invasion began in direct violation of Germany's treaty agreement of 1839. Belgian forces, bravely contending, were defeated and compelled to retreat. On Aug. 20 the Germans took Brussels, levying upon it a war tax of $40,000,000. The city of Louvain was burned, Aug. 27. Ghent and other cities were in turn occupied. On Oct. 8 Antwerp fell. Hundreds of thousands of refugees found shelter in England, Holland, France, and America. The remaining population was subjected to barbaric indignities. Cities and towns were fined, and their treasuries looted; the machinery of factories was removed or destroyed, and many citizens were deported to Germany. But the German policy of "frightfulness" failed to crush the national spirit. The army continued to fight heroically in the Allied lines, while the patriotism of the king and the loyalty of the people were unwavering. Finally, in the autumn of 1918 the invaders were forced to withdraw. On Nov. 22 King Albert re-entered Brussels at the head of the victorious army, and Belgium was proclaimed a free and independent nation. The Treaty of Versailles in 1919 abrogated the neutrality treaties of 1839 and provided for new agreements to take their place. After the conclusion of peace, the Belgian people made remarkably rapid progress in the work of reconstruction in their devastated areas. The government formed a defensive alliance with France, and, in 1923, Belgian troops co-operated with French forces in the occupation of the Ruhr. See *Belgian Congo*, *Flanders*, *The Netherlands*, *World War*.

BRITTANY

Brittany is the medieval and popular modern name applied to the district in the northwest peninsula of France, now included in the departments of Finistère, Côtes-du-Nord, Morbihan, Ille-et-Vilaine, and Lower Loire, called in ancient times *Armorica*, meaning "upon the sea." The Romans subdued this territory in 51 B. C. In the 5th century, Celtic people, fleeing before the Anglo-Saxon invasion of Britain, settled a large part of the peninsula. From the name of these people, Britons, came the names Brittany for the country and Bretons for the people. They built up a powerful aristocracy and fought off both Frankish kings and Norman dukes. In the 12th century, however, Conan IV, duke of Brittany, called on Henry II of England for help against rebellious Breton nobles. Henry forced Conan to give his daughter in marriage to Henry's son Geoffrey, who thus became duke of Brittany. But a French line soon succeeded this dynasty, and in 1532 Brittany was annexed to France. The Bretons, however, retained many special rights until the French Revolution.

The Bretons are notably conservative. They cling tenaciously to many local customs and superstitions, and the Celtic language is still the common speech of western Brittany. It is said that here, more than anywhere else in Europe, popular Christianity has borrowed elements from earlier creeds. The country is famous for its ancient folk tales and songs. See *France*.

BULGARIA

The modern kingdom of Bulgaria occupies virtually the territory of the ancient Roman province of Mœsia. In the 4th and 5th centuries A. D., a Slavic people invaded this district, and about a century later came the Bulgars, a people related to the Huns. A mingling of Bulgars and Slavs took place, and these racial elements have since been supplemented by mixture with neighboring peoples. About the middle of the 9th century, Christianity was introduced into the state, which had been growing into power. In addition to religious faith, the Bulgarians in this period borrowed many cultural elements from the Greeks, some of which they later transmitted to Russia.

In the 12th and 13th centuries, the Bulgarian state rose to great power, only to be surpassed by Serbia as the leading Slav state, and to fall a prey to the Ottoman Turks in the latter part of the 14th century. Not until the last quarter of the 19th century did Bulgaria again have a distinct national existence.

A revolt in 1876 against the crushing tyranny of the Turk was put down with the barbarously cruel measures known as the "Bulgarian atrocities." This was the occasion of the Russo-Turkish war of 1877-78, out of which Bulgaria emerged as an autonomous principality, tributary to Turkey. In 1885, through a revolution, Eastern Rumelia was united to Bulgaria. Prince Alexander abdicated in the following year, and in 1887 Prince Ferdinand of Coburg was elected by the people. In spite of opposition on the part of the European powers, Ferdinand, with the aid of his minister, Stambulov, so strengthened his power that, in 1896, he was recognized as prince of Bulgaria.

Under the rule of Ferdinand, the Bulgarian state made rapid progress in economic growth and in military power. In the midst of political disturbances in Turkey in 1908, Ferdinand proclaimed the independence of the Bulgarian kingdom. In 1912,

Bulgaria made common cause with her former enemies—Serbia, Montenegro, and Greece—against the Turk. After the brilliant victory of this first Balkan war, however, the allies fell to quarreling over the spoils, and Bulgaria, in the second Balkan war, lost the greater part of the territory gained in the former conflict.

In 1915 Bulgaria entered the World War on the side of the Central Powers. Betrayed by both her king and her allies, and exhausted in her resources, she surrendered unconditionally to the Allied forces in September 1918. King Ferdinand abdicated, and his son Boris succeeded to the throne. By the Treaty of Neuilly, November 27, 1919, Bulgaria's territory was reduced by cessions to Greece and to Serbia.

BURMA

The large and populous British province on the east coast of the Bay of Bengal. Burmese tradition suggests the immigration of a people from the northwest, about 2000 years ago, who conquered the earlier inhabitants and set up a kingdom. When European traders first entered the country, in the 15th century, the kings of Ava, who traced descent to the early Buddhist rulers of India, were supreme. Toward the close of the 16th century, power passed to the kings of Pegu, a southern capital, but the French and English, who began trading at the delta of the Irrawaddy, early in the 18th century, found a weak government. In 1753-54, Alompra, a village chief of Ava, made himself master of Burma and founded a peculiarly bloodthirsty and cruel dynasty. The last of the line was Theebaw, who was dethroned by the British in 1885 for interfering with a British trading company. England had, in 1853, obtained control of Burma's navigable rivers, by the annexation of Pegu, the southern port of Burma, and, on January 1, 1886, the entire country was proclaimed part of the British Empire. In 1895 it was made a province of India under a lieutenant governor. Since that time steady progress has been made in railroad building and in general economic growth. See *Burmese.*

CEYLON

Ceylon (*sē-lŏn′*) is a British crown colony in the Indian Ocean. The traveler of today in the island of Ceylon may see the ruined remains of temples, monasteries, and palaces of a size and splendor rivaling the structures of ancient Egypt, and gardens and baths as luxurious as those of Rome. The creation of this magnificence was the work of the Singhalese. Vijaya, a prince from the valley of the Ganges, invaded Ceylon in 543 B. C. and established a dynasty. The island was called Lankā in early Sanskrit works, but Vijaya called it Sinhala, and the colonists he brought from the neighboring mainland of India took the name of Sinhalese or Singhalese. In the reign of King Tissa (307 B. C.), Buddhism was made the state religion, and the famous sacred bo tree was planted (288 B. C.). After several centuries of conflict with invading Malabars, another notable era in the history of Ceylon began in 1155 A. D. with the reign of Parakrama, famed for the monuments of architecture he left behind him.

In 1517 the Portuguese established a trading settlement at Colombo, but their greed and cruelty so aroused the Ceylonese that they speedily mastered the use of firearms and successfully resisted the Portuguese encroachments. The Dutch traders entered the island in 1658. In 1796 their settlements were ceded to the English, and in 1801 Ceylon was made a British crown colony. The conquest was completed in 1815 with the exile of the king of Kandy. The chief features of recent history have been the rise of coffee planting and its decline owing to the ravages of a leaf-fungus, the substitution of tea raising, and the growth of the rubber industry. By reason of its wonderful fertility and luxuriant vegetation, Ceylon is known as the "pearl garden of the world." See *Singhalese.*

CHINA

Chinese tradition carries the story of civilization in eastern Asia back to about the year 2852 B.C. The historical period, however, begins in 841 B.C. during the rule of the Chou dynasty (1122-256 B.C.).

The long period of the Chou kings was distinguished by remarkable progress in literature and the arts. It was during the reign of the Chou dynasty that Confucius lived (551-479 B.C.). Luxury and war had brought the Chinese people to a low ebb of moral and political life. The teachings of this great sage, with those of his older contemporary, Lao Tzu, and those of Mencius, a disciple of Confucius, who lived in the 4th and 3d centuries B.C. (372-289), are represented as an unavailing protest against the decay of their times.

The Chou dynasty fell into anarchy and was supplanted by the Ch'in, from which comes the name of China. The Ch'in dynasty abolished feudalism and built the Great Wall, but was short-lived. The Early and Later Han dynasties followed (206 B.C.-220 A.D.). During this period intercourse with Rome began and Buddhism was introduced.

The Golden Age. After a long series of divisions and civil wars, the great T'ang dynasty arose (618-907 A.D.). The empire was extended as far west as the Caspian Sea. Embassies came from Persia, from Tibet, from Annam, and from Japan. Nestorian missionaries introduced Christianity. The Arabs brought in Mohammedanism. The Chinese capital became a center of international influence. Commerce flourished, literature was encouraged, and the invention of printing from movable blocks gave a great impetus to bookmaking. It was the golden age of Chinese poetry and painting. The Sung period (960-1278) was distinguished for its philosophical speculation.

The Mongols, led by Genghis Khan, invaded China and ruled from 1280 to 1368. Marco Polo has described the glorious reign of Kublai Khan. His successors were unequal to the task of ruling so great an empire and soon lost the throne. Dramatic writing characterized the literature of the period.

The Manchus; Relations with the West. The Ming dynasty succeeded. Under its sway modern intercourse with Europe began. The Portuguese discovered the route via the Cape to the Far East and arrived in China in 1516. The Ming dynasty was replaced in 1644 by the Manchus. The mark of their mastery was the requirement that Chinese men should wear the queue. The Manchus adopted the language and general customs of the people they ruled. Russian aggression was stopped. By the treaty of 1689 the Muscovite was compelled to leave the Amur valley.

Gifts sent to the court by Western potentates were considered as tribute, and the refusal of the representatives of these powers to perform the kotow, as China's tributaries did, was regarded as insubordination. To the Europeans, this was an arrogant assumption of superiority, and it was met by an overbearing attitude upon their part.

Growth of Trade; Treaties with Western Powers. In spite of the political friction, trade at Canton flourished. The British East India Company enjoyed the largest share of it. This company was dissolved in 1834. Opium smuggling constituted a good part of the foreign trade. The attempt to suppress this smuggling, added to other causes of friction, brought on war with Great Britain.

The treaty of peace of 1842 and the commercial treaty of 1843 opened five ports to foreign trade and limited Chinese import and export duties to 5 per cent *ad valorem.* The first American treaty, that of 1844, provided definite arrangements for the exercise of extraterritorial jurisdiction.

The seizure of a Chinese vessel in 1856 by the Chinese, on the charge that acts of piracy had been committed by some of the crew, was the occasion of further trouble with Great Britain, for the vessel

had had a British charter and was still flying the British flag. This, with the repeated refusal of the Chinese to revise the treaties and to redress various other grievances, brought on the second war with Great Britain, in which the French joined. It resulted in the revision of the treaties, the legalizing of the opium traffic, diplomatic representation at Peking, and the toleration of Christianity.

The Taiping rebellion had meanwhile been in progress. It was suppressed in great part by the "Ever Victorious Army," which was organized and led by the American general, Frederick Townsend Ward, and, after he had been killed in battle, was commanded for a short time by Charles George Gordon—whence his sobriquet of "Chinese Gordon."

In 1868 the United States entered into a treaty with China to encourage Chinese immigration. It was supplemented in 1880 by another permitting the suspension of labor immigration. In 1894 China agreed to a suspension for ten years. In 1904 China refused to extend the period, and Congress made Chinese coolie exclusion perpetual.

War with Japan. In 1894 Japan forced a war upon China over the control of Korea. China was defeated, and by the treaty of Shimonoseki she recognized the independence of Korea and ceded to Japan the Liaotung Peninsula, Formosa, and the Pescadores. Russia, Germany, and France protested against the Japanese holding of Liaotung and compelled its restoration to China, but they proceeded to take advantage of China's revealed weakness to press their own claims to compensation for their intervention. Russia obtained railway rights in Manchuria; Germany added to her claim that of compensation for the murder of two missionaries and secured the lease of Kiaochow; Russia then demanded and obtained further compensation in the lease of a portion of Liaotung; France secured Kwang-chow Wan; and Britain, to preserve the balance of power, obtained the lease of Weihaiwei and the enlargement of her Hongkong colony. These extorted leases were followed by the assertion, by various powers, of claims to spheres of interest in different regions.

The Boxer Rising. The United States took the position of insisting upon an "open door," or equality of opportunity, in these spheres of interest. The aggressive attitude of the European powers brought on the "Boxer" rising, which at first was a movement directed against the Manchu government because of its supineness, but subsequently was converted into an antiforeign rising.

The suppression of this disturbance brought about a few progressive changes in Chinese administration, which were given further impetus by the Japanese victory over Russia in 1905. Large numbers of Chinese students were sent to Japan, to Europe, and especially to the United States, whose remission of a portion of her share of the Boxer indemnity each year, as it was being paid, provided an annual fund for the American education of Chinese.

The Republic. In 1911 a dispute over the building of a railway by means of a foreign loan was the immediate cause of the revolt that swept the Manchus out of power in 1912. Dr. Sun Yat Sen, who had long worked for this result, became provisional president of the government set up in the South in January 1912. In March, a reconciliation of the North and the South was effected, and Yuan Shih-kai was elected to the office of president.

Yuan's government was republican only in name, and the division between the North and the South grew more pronounced. A threatened establishment of a new monarchy with Yuan as emperor was prevented in 1915 by the warning of Japan, who had never forgotten nor forgiven Yuan since, as imperial resident in Korea in 1894, he had striven to strengthen Chinese power there at the expense of Japanese influence. Yuan Shih-kai died in 1916, and Li Yuan Hung became president. The Parliament, which had been dissolved by Yuan Shih-kai, was reassembled.

China during the World War. Meanwhile, during the World War, Japan, assisted by Great Britain, had taken up the task of eliminating the Germans from their position in Shantung. She pushed her expedition beyond the limits of German occupation and forced demands on China, the acceptance of which gave Japan virtual control over the valuable province of Shantung. In March 1917, at the invitation of the United States, China broke off diplomatic relations with Germany and in the summer declared war.

A secret treaty between Chinese and Japanese militarists had alarmed the Parliament, which for a time refused to declare war. This led to an overthrow of the cabinet and an attempt by a Manchu general to re-establish the Manchu dynasty. Parliament was dissolved, but a portion reassembled at Canton and set up an opposition government. The dynastic movement was suppressed within six days. Representatives of the Canton faction and of the recognized government united in a refusal to sign the Versailles treaty, because it gave to Japan the territorial and economic rights formerly enjoyed by Germany in Shantung. The Shantung question was, at length, satisfactorily adjusted by a treaty between China and Japan signed during the Washington Conference, 1921-22.

Recent Developments. In 1923 Ts'ao K'un was elected president. Sun refused to recognized him. Sun had agreed to receive Russian political and military advisers with arms and money. In 1924 Peking signed a treaty with the Soviet government giving the latter the desired recognition. In the autumn of 1924 a coalition of the "Christian General" Feng, the War Lord of Manchuria, Chang, and Dr. Sun seized Peking, deposed President Ts'ao and made Tuan Chih-jui chief executive. Dr. Sun died March 12, 1925. An international conference on tariff autonomy was held at Peking in October 1925 and one on extraterritoriality in January following. Both conferences were broken up by a rupture of the alliance between the "Christian General" and the War Lord of Manchuria, who drove Feng out of Peking. Chang became dictator. Meantime the Russians at Canton had organized labor and peasant unions and schooled them in Communism and in antiforeign and anti-Christian propaganda. These paved the way for the easy triumph of the Nationalist army, which captured the Wuhan cities in the autumn of 1926 and took Nanking in March 1927. Shanghai had been occupied a few days earlier by another Nationalist force. The capture of Nanking was stained by outrages upon the foreign residents, chiefly Americans. A year later apology was made and duly accepted.

When General Chiang Kai-shek discovered that the Russian advisers of the political committee at Hankow were responsible for the outrages at Nanking, he repudiated the authority of that committee and set up a separate government at Nanking. In June 1927 he formed an alliance with the "Christian General" Feng in the North. Yen Hsi-shan, governor of Shansi, a northern province, joined this alliance. The Russian advisers were forced to leave Hankow, and their followers in south China, charged with Communism, were massacred in large numbers. General Chiang, having thus established himself in control and having secured the aid of his northern allies, moved northward in April 1928.

The Japanese had sent a considerable force into Shantung to protect Japanese lives and property. The Nationalist troops came into collision with them on May 3. Desultory fighting continued for eight days. On May 18 Japan warned both Chinese belligerents against war in Manchuria and later made a futile attempt to prevent the union of Manchuria with Nationalist China. Marshal Chang Tso-lin issued a statement that he had no quarrel with Nationalism and had seized Peking to check Communist activity there. He withdrew from Peking without fighting and the southern forces made no attempt to interfere with this movement. Chang was murdered

by a bomb on his arrival at Mukden June 4. Peking was occupied by the forces of Governor Yen on June 8, 1928.

The Nationalists then removed the capital to Nanking and changed the name of Peking to Peip'ing. The name of the province Chihli was changed to Hopei.

As conceived by the Nationalists, the revolution in China is to consist of three stages. First is the period of military preparation, which is supposed to have ended with the occupation of Peking. The second is the period of tutelage which has followed, during which the Nationalist party will rule the country and instruct the people in self government. The third stage will be the period of parliamentary representation to be established at some future time.

The Nationalist party governs through a party congress, summoned whenever desired by the Central Executive Committee. Under the Central Executive Committee are two councils: one advisory, the other the Council of State. Under the latter are five courts, whose chairman and vice-chairman are chosen from among the sixteen members of the Council of State. One of these courts is the administrative, under which ten ministries carry on the government. No opposition party is tolerated. The apparent multiplicity of councils and ministers is due to the desire to maintain needed checks against the growth of too great power in the hands of one individual. All offices, even those of the legislative body, are appointive.

A number of important national conferences were held in 1928. The National Educational Conference met for two weeks at Nanking in May. An Economic Conference was held at Shanghai in June and a Financial Conference at Nanking in July. The Party Congress was called for January 1929. It approved the plans of the government for the reduction of the military forces, and the decision to suppress poppy culture and the traffic in opium from March 1, 1929. New treaties with the principal powers in 1928 restored tariff autonomy to China. The Nationalist government called in various advisers from Western nations, chiefly with a view to economic reforms.

A great famine, caused by drought and aggravated by the devastation of war, imperiled the lives of tens of millions of Chinese in 1928 and 1929 and called forth generous contributions from the Western World.

CISALPINE REPUBLIC

This name attaches to the short-lived state in northern Italy which Napoleon created in 1797, to include Lombardy, the duchies of Parma and Modena, and some parts of Venetia and the papal states. In 1802 it took the name of the Italian Republic, choosing Napoleon as president; in 1805 Napoleon transformed it into the Kingdom of Italy, with himself as king, a status it held until 1814.

CORSICA

The Mediterranean island of Corsica, famous as the birthplace of Napoleon, received its first civilized colonists in a body of Phocæans from Ionia, who founded the town of Alalia in 560 B. C. These people were followed first by the Etruscans, then by the Carthaginians, and at length by the Romans, who established their power in the island about the middle of the 2d century B. C. In the early Christian centuries, Rome used Corsica as a place of banishment for political offenders, one conspicuous exile being the younger Seneca. After the decline of Rome, the island was the prey of Goths, Vandals, Lombards, Franks, and Moors.

To counteract the feudal anarchy which engulfed the country, a kind of republic, called the Terra di Comune, was set up in the north part of the island in the 11th century. This federation of parishes continued to exist until the French Revolution. Pisans, Genoese, and Aragonese fought for the island during the next four centuries. It is within this long period of anarchy and misgovernment that the vendetta, or blood feud, for which Corsica has been noted, is said to have arisen.

From 1568 until 1729, Corsica, exhausted by war, was peaceful under Genoese control. After another period of disturbance and a bold attempt at independence led by the most famous hero of Corsican freedom, Pasquale Paoli, France completed a conquest of the island in 1770. Paoli led another revolt in 1793, which was followed by a British occupation of two years. Under Bonaparte, French authority was again asserted. Since 1815, Corsica has been a department of France.

CRETE

A large island in the eastern Mediterranean. Extensive remains of palaces recently discovered in the island have established the fact that from about 2800 B. C. it was the seat of a highly developed civilization, to which the name Minoan has been given, after the name of a legendary lawgiver, Minos. By 2000 B. C. Crete exported vases to Egypt. About 1500 B. C. the island established control over the sea as far as Sicily to the west and Canaan to the east. The people were possessed of a system of writing, although, as late as the year 1923, scholars had not been able to decipher it. The ancient Cretans showed much skill in engineering and architecture; and the Greek legends of the labyrinth, from which Theseus could find his way out only by carrying one end of a silk thread given him by Ariadne, seem to find substantial verification in the remains of the elaborate palace in the former city of Cnossus. Carvings and paintings of great refinement have been discovered, such as might do credit to Daedalus, the legendary artificer of the labyrinth. The paintings indicate that bull fighting by young men and young women was a popular amusement. This custom may well have given rise to the story of the Athenians that Crete had once levied on them a tribute of youths and maidens to be devoured by the Minotaur or "bull of Minos." Greek legends made Minos a judge in Hades. The Greek myths regarding Crete, so remarkably confirmed by modern investigation, bear witness to the transmission by Crete to Greece of numerous arts, many of which were derived originally from Egypt.

In early historical times, Crete was conquered by a Greek race and had a government much like Sparta's. It became a great slave market and was a resort for pirates until the Romans conquered it in 67 B. C. The Saracens took it in 823 A. D. Held later by the Venetians, by the Turks from 1669, and claimed by the Greeks since 1830, the island has had an unhappy history of oppression and massacre. In 1912 it was recognized as part of Greece and in the person of Venizelos produced that nation's ablest statesman during the World War.

CZECHOSLOVAKIA

The republic of Czechoslovakia (*chĕK'ô-slô-văk'ĭ-ă*) in central Europe was formed from provinces of the former Austro-Hungarian empire. It came into existence October 28, 1918, when the National Council took over the government of the Czechoslovak countries—Bohemia, Moravia, Slovakia, and Austrian Silesia. Two of these countries, Bohemia and Moravia, before their absorption into the Habsburg empire, had attained independent national status. Slovakia formed an important part of the medieval Great Moravian kingdom.

Bohemia (*bô-hē'mĭ-ă*). A former crownland of the Austro-Hungarian empire. The name means "home of the Boii," but this Celtic tribe occupied the country for only a short time at the beginning of the Christian era, being driven out or killed by the German Marcomanni. In the 6th century, the territory was occupied by a Slavic people, the Czechs, who were converted to Christianity during the 9th century. Various houses of princes and kings ruled these Czechs, until, under Ottokar II,

reigning from 1253 to 1278, the kingdom of Bohemia became a powerful state, extending from the Elbe to the Adriatic. It fell before Emperor Rudolf of Habsburg, and became a crownland of the Austro-Hungarian empire.

In 1348, Emperor Charles IV founded the University of Prague, the first in the old German Empire. Under his successor, Wenceslas, the religious movement led by John Huss and Jerome of Prague took place. After 1526, when Ladislas II, king of both Bohemia and Hungary, lost his life in the battle with the sultan Soliman at Mohács, Bohemia became a possession of the house of Habsburg. It was a center of the Reformation struggle, and the bloodiest battle-ground of the Thirty Years' war, which began with the Defenestration of Prague, when the Hussites threw the burgomaster and other officials from the windows of the city hall upon the spears of the soldiers below.

Moravia (*mô-rā'vĭ-à*). A district conquered by the Slavs in the 6th century A. D. In the 9th century the Moravian princes formed a powerful kingdom, Great Moravia, but the Magyar invasions reduced this territory. In 1029, Moravia was united to Bohemia, and in 1526 it came into the hands of the Austrian monarchs. The country was almost depopulated during the Thirty Years' war.

All of the districts included in Czechoslovakia had been subject to a determined policy of Germanization pursued by the Austrian government, but in the 18th century, in Bohemia and Moravia, a movement arose for the revival of the Czech language. This developed into a political movement for independence in the 19th century, and attained its goal in the formation of the independent republic of Czechoslovakia. On November 14, 1918, the National Assembly met in Prague, declared a republic, and elected Professor T. G. Masaryk its first president. The constitution of the Czechoslovak Republic was adopted on February 29, 1920. It provides for the National Parliament, composed of the Chamber of Deputies, with members elected for six years, and the Senate, the members of which are elected for eight years. All citizens, men and women, over 21 years of age may vote, and all citizens over 30 may hold office.

The coat of arms of the old kingdom of Bohemia was temporarily adopted for the new state of the Czechs and Slovaks. It is worthy of note that so complete is the system of popular and secondary education among the Czechoslovaks that, except in Slovakia, scarcely any illiterates are to be found throughout this new republic. The government of the republic has displayed marked diplomatic skill in foreign relations, and has pursued a strong economic and social policy in the internal affairs of the state. Czechoslovakia is the leading power in the Little Entente, which includes also Jugoslavia and Rumania.

DANZIG

As early as the year 997, Danzig was known as a town of importance. In succeeding centuries, it was held at different times by various states, including Denmark. The Teutonic Knights took possession of the city in 1308. In 1455, having revolted from the Teutonic Knights, it became nominally subject to Poland. It had, however, large privileges, and it was long virtually a free city, governing a considerable extent of neighboring territory, including about thirty villages, a status which was recognized at the first partition of Poland in 1772. In 1793, however, Danzig was annexed to Prussia. After regaining for a time, under Napoleon, its position as a free city, it was returned to Prussia in 1814. By the Treaty of Versailles, Danzig, together with its surrounding territory, was again made a free city, in order to provide a seaport and commercial outlet for Poland. The "free city" includes in its jurisdiction 325 localities, classed as rural communes, estate districts, and cities. See *Danzig* in department of Government.

DENMARK

Upon the Danish peninsula there are many remains which indicate the presence of man in the early Stone age. Norse sagas contain more or less mythical traditions of the movements of tribes in very early ages, but very little is certainly known of Danish affairs before the 9th century A. D. Probably about the 2d century the coast islands had become the home of the Angles, Saxons, and Jutes, who, in the 5th century, began their invasion of Britain, leaving their former territory to the Danes. The latter, in the following centuries, formed parts of the roving bands of Northmen. The monk Ansgar preached Christianity in Denmark in the 9th century, but the conversion of the country took place in the 10th century only after a bitter struggle between adherents of the old and the new faith. King Gorm the Old is said to have been a determined enemy of the Christians.

Svend (Sweyn) I (985 or 986–1014) was the first Danish king to exercise his power in England. Canute, his son, was the great king of both England and Denmark. His death in 1035 was followed by a period of internal dissensions and external wars, which weakened the country and brought about the introduction of a feudal system whence sprang a powerful nobility.

Reigns of the Waldemars. Waldemar I (1157–82), by the help of his minister, Bishop Absalon, subjugated the Wends and forced them to accept Christianity. During the time of Canute VI and in the early part of the reign of Waldemar II, the conquest of Denmark extended so far into German and Wendic lands that the Baltic was little more than an inland Danish sea. Envy and resentment on the part of the German princes, together with the perfidious conduct of his vassals, served to rob Waldemar II of these brilliant conquests. However, this period of the Waldemars was a time of great internal prosperity. National resources were developed, education spread, a vigorous middle class appeared, guilds were founded, and the yeomen were independent.

But the death of Waldemar in 1241 was followed by a century of misrule and inglorious decadence of the authority of the crown. Under Waldemar's great-grandson, Waldemar III (1340–75), Denmark made a quick but transient recovery of the conquests of the older Waldemars, and a system of national law was framed so as to form one thoroughly exhaustive and comprehensive code. This strong monarch revived the Danehof as a popular assembly and sharply curbed the power of the nobles. His daughter, the great Margaret (1375–1412), first as regent for her only and early lost son, Olaf, and later as sole monarch, ruled Denmark, Sweden, and Norway with such consummate tact and with so light yet firm a hand that, for once in the course of their history, the three rival Scandinavian kingdoms were content to act in harmony. Margaret's successor, Erik, for whose sake she had blended the three sovereignties into one, undermined her glorious work with fatal rapidity and was finally deposed by the nobles. The short reign of his nephew, Christopher of Bavaria, is notable for the ascendancy of the nobles and the oppression of the peasants to the point of serfdom.

The Oldenburg Kings. The Danes, on the death of Christopher in 1448, again exercised their long dormant right of election to the throne, and chose for their king Christian of Oldenburg, a descendant of the royal Waldemar family. As Christian I, he founded the Oldenburg line of Danish kings, which continued unbroken until the death of Frederick VII in 1863. Christian was at the same time elected duke of Schleswig and Holstein, and the resulting combined rule became the source of the later Schleswig-Holstein troubles. The insane tyranny of the otherwise able and enlightened Christian II cost him his throne. Denmark chose his uncle, Frederick I, as king, and Sweden became independent under Gustavus Vasa. Christian III (1534–59), in whose

reign Protestantism was established, united the Schleswig-Holstein duchies in perpetuity to the crown. But he and his successor, Frederick II, made trouble by partitioning the duchies among members of their families.

Christian IV (1588–1648) was one of the ablest of Danish rulers. His liberal policy was, however, cramped by the nobles, through whose supineness Denmark and Norway lost some of their provinces to Sweden. During the reign of his son and successor, Frederick III, the last of the old Danish provinces on the eastern side of the sound were lost to Sweden (1658–60). The national abasement which followed led to the rising of the people against the nobles in 1660 and the surrender of the supreme power into the hands of the king. But the common people reaped little benefit from the autocracy they had thus set up. The abolition of serfdom was delayed until the reign of Christian VII. In 1797 it was begun, although the process was not completed until twenty years later. In 1804 the serfs were liberated in the duchies of Schleswig and Holstein.

During the period of the Napoleonic wars, Denmark's attempt to remain neutral brought her into disastrous conflict with England in the battle of Copenhagen (1801), which entailed the loss of her fleet, and in the destructive bombardment of Copenhagen (1807). Her subsequent alliance with Napoleon brought about the loss of Norway by the Peace of Kiel in 1814. After 1830 the discontent and animosity of the Danish and German peoples of Schleswig and Holstein increased and in 1848 broke out into open warfare. The disturbance came to an end in 1851 without settling the difficulty.

Parliamentary Government. Meanwhile, agitation for parliamentary government brought about the adoption of a new constitution in 1849. This provided for a national assembly composed of an upper house, or *Landsthing*, and a lower house, or *Folkething*. The 38 members of the upper house were partly to be appointed by the king, the 114 members of the lower house, elected by the people. But the Germans and other continental powers who had joined in the settlement of the royal succession in 1851 looked upon the new government as too democratic. Repeated futile attempts were made to arrange a constitution that would operate for Denmark and the duchies of Schleswig and Holstein. The matter was finally settled when Prussia and Austria took the duchies in 1864, after Christian IX had come to the throne.

After 1864 Danish history was for a number of years marked by the struggle for supremacy between the Landsthing and the Folkething. The political struggle centered from the first around the question of the control of financial measures. From 1874 to 1894 Estrup, the Conservative premier, was able to maintain his position. However, after his retirement the Radical party gained power. In 1913, after the accession of Christian X (1912), the Folkething narrowed somewhat the king's power and granted suffrage to women. Under the constitutional charter of 1915, universal and equal suffrage has been established and also a system of proportional election. All finance measures must be proposed first to the Folkething.

The past half century has seen a remarkable development of agriculture and commerce in Denmark. Manufacturing is still of minor importance, although several factories have been built up by the government. The land is notable for the home manufactures of the country and village people. The basis of Danish commerce is agriculture and dairying. The Danish farms are practically all small and owned by the farmers, and co-operative societies have done much to promote the prosperity of the farmer by assuring him a market. Nearly a hundred "people's high schools" give instruction in agriculture. The people of Denmark enjoy a strong system of elementary and higher schools, of which the University of Copenhagen is the head. During the World War, Denmark was one of the neutral powers.

EASTERN (BYZANTINE) EMPIRE

Constantine the Great, before his death in 337 A. D., divided the administration of the Roman Empire among his three sons and two nephews. In 395, at the death of Theodosius, this division of administration became a permanent division of the empire into East and West. Arcadius became emperor of the East, with his capital at Byzantium, or Constantinople. This Eastern Empire maintained itself for nearly 1000 years after the fall of the Roman power in the West. Such survival was made possible, despite weak frontiers, by the vast wealth at the command of the Eastern emperors, their strong armies, their despotic government, and the almost impregnable position of the city of Constantinople.

The greatest of the Eastern emperors was Justinian, who ruled from 527 to 565. His most notable work was the codifying of the Roman law. Before his death, his realm reached from Spain to the eastern end of the Black Sea and practically commanded all the shores of the Mediterranean, making it again a "Roman lake."

But the following centuries formed a period of almost continuous struggle against Slavs and other barbarians on the north and west, and Persians, Arabs, and Tatars on the east. In the 11th century the reigning emperor appealed to the Western Christians for help, and their answer was the First Crusade. After the Third Crusade, jealousy of the trade and wealth of Constantinople caused the knights of the Fourth Crusade to attack the Christian city instead of the Moslems and divide its diminished lands among Venetians, Genoese, and other Western peoples. After the crusaders had quarreled over their spoils for half a century, the Eastern throne was established again under the family of the Palæologi, the last of whom, Constantine, died heroically defending his capital against the final, irresistible onslaught of the Turks in 1453.

EGYPT

The earliest empire of the ancient world. Its political history begins with Menes, who reigned probably about 3400 B. C. He consolidated the whole Nile valley into a kingdom, with its capital at Memphis, in Lower Egypt. The next thousand years formed a period of rapid development of civilization. About 3000 B. C. King Cheops erected the Great Pyramid, and later kings followed his example, in building pyramids, temples, and tombs. From about 2400 to about 2000 B. C. the country was ruled by a new line of pharaohs, whose capital was Thebes, in Upper Egypt. This period is called the Middle Kingdom, or, by some, the Feudal age. It was a time of foreign conquest, of extended commerce, and of the development of great economic works, such as the irrigation systems and the canal from the Nile to the Red Sea. The Egyptian power reached into Ethiopia and Syria.

The Empire. About the year 2000 B. C. bands of roving invaders from Arabia established themselves in Egypt, and their chiefs at last ruled the land, from a capital in the delta of the Nile, as the Hyksos, or Shepherd Kings. They are said to have introduced the horse into Egypt. It was during this period that the Hebrews, in a time of famine in Syria, came to Egypt. However, the native monarchs of Thebes drove out the foreigners about 1600 B. C., and for about 500 years maintained a powerful military state. They made conquest of Syria and even had a short period of rule in Babylon. Thus came about the first contact of the two ancient civilizations of Egypt and Mesopotamia. Syria and northern Arabia became the routes of travel and commerce. The last and greatest of the strong pharaohs of this period was Rameses II, who waged war against the Hittites and finally made an alliance with them. Rameses was an ardent patron of architecture, and Thebes in his reign is said to have been the most magnificent city of the age, by reason of its wealth of statuary and the splendor of its temples.

Decline of Egyptian Power. About 1300 B. C. the power of Egypt steadily declined, until in 672 it became subject to Assyria. Early in this period, the Hebrews returned to Canaan, escaping from a weak pharaoh. After twenty years of Assyrian rule, Psammetichus, an aggressive leader of foreign blood, restored the independence of Egypt. His greatest service was in opening the country to travelers and colonists. Greeks thronged to his capital of Sais, and the treasures of Egyptian civilization were passed on to the new nations of the north and west. In the reign of his successor, Necho, about 600 B. C., Egyptian sailors are credited with having sailed around the coasts of Africa.

The Ptolemies. In 525 B. C. Persia conquered Egypt and ruled it until Alexander in 332 B. C. established his Greek empire. Egypt now became a Greek state, many Greeks having been already settled in the country, and the Egyptians were treated as an inferior race. Alexandria was founded as the new Greek capital. On the death of Alexander, his general, Ptolemy, took possession of the throne and became the first ruler of a Greek dynasty that for 300 years made Egypt one of the chief kingdoms of the world. The Ptolemies were magnificent patrons of arts and letters. Theocritus, Callimachus, Euclid the geometrician, the astronomers Eratosthenes and Aratus, with many others, flourished under their rule. But, while the Alexandrian Greeks managed to keep down the native Egyptians, they were themselves sinking under the Romans. Ptolemy Auletes, "the Flute Player" (81–51 B. C.), went to Rome to ask help against his subjects, and the famous Cleopatra maintained her power only through her personal influence with Julius Cæsar and Mark Antony.

Roman Rule. On the defeat of Mark Antony by Augustus, 30 B. C., Egypt became a province of Rome. It was still a Greek state, and Alexandria was the chief seat of Greek learning and science. On the spread of Christianity the old Egyptian doctrines lost their sway. Now arose in Alexandria the Christian catechetical school, which produced Clement and Origen. The sects of Gnostics united astrology and magic with religion. From the school of Alexandria emerged such neoplatonic philosophers as Plotinus and Proclus. Monasteries were built throughout Egypt, Christian monks took the place of the pagan hermits, and the Bible was translated into Coptic.

Mohammedan Conquest. On the division of the Roman Empire, in the time of Theodosius, into the Western and the Eastern Empire, Egypt became a province of the latter and sank deeper and deeper in barbarism and weakness. It was conquered in 640 A. D. by the Saracens under Caliph Omar. As a province of the caliphs it was under the government of the celebrated Abbassides, Haroun-al-Raschid and Al-Mamun, and that of the heroic sultan Saladin. The last dynasty was, however, overthrown by the Mamelukes (1250); and the Mamelukes in their turn were conquered by the Turks (1516-17). The Mamelukes made repeated attempts to cast off the Turkish yoke, and had virtually done so by the end of the 18th century. The French conquered Egypt in 1798 and held it till 1801, when they were driven out by the British.

On the expulsion of the French, a Turkish force under Mehemet Ali Bey took possession of the country. Mehemet Ali was made pasha and administered the country vigorously, greatly extending the Egyptian territories. At length he broke with the Porte, and, after gaining a decisive victory over the Ottoman troops in Syria, in 1839, was acknowledged by the sultan as viceroy of Egypt, with the right of succession. Mehemet Ali died in 1849, having survived his son Ibrahim, who died in 1848. He was succeeded by his grandson Abbas, who, murdered in 1854, was succeeded by his uncle Said, son of Mehemet. Under his rule, railways were opened and the cutting of the Suez canal was commenced. After Said's death, Ismail Pasha, a grandson of Mehemet Ali, obtained the government in 1863. His administration was vigorous but extravagant, and brought the finances of the country into disorder. In 1866, he obtained a royal license from the sultan, granting him the title of khedive. In 1879 he was forced to abdicate, under pressure of the British and French governments, and was replaced by his son Tewfik.

British Influence. In 1882 the "national party" under Arabi Pasha revolted and forced the khedive to flee. On July 11, a British fleet bombarded Alexandria and restored the khedive, and Arabi's forces were totally crushed at Tel el Kebir on September 13. A rebellion in the Sudan, under the leadership of Mohammed Ahmed, the so-called mahdi, now gave the government trouble. In 1883 the mahdi's forces annihilated an Egyptian force under Hicks Pasha in Kordofan. British troops dispatched to Suakin inflicted two severe defeats on the mahdi's followers. The British cabinet resolved to abandon the Sudan; General Gordon was sent to effect the safe withdrawal of the garrisons (1884). However, the mahdi's forces were strong enough to shut the general up in Khartum for nearly a year. He perished (January 1885) before the relief expedition could reach him. Since then Anglo-Egyptian troops have reoccupied it. Prince Abbas Hilmi succeeded as khedive in 1892, the British still retaining control. The predominant position of Great Britain in Egypt was formally recognized by France under the Anglo-French agreement of 1904.

British Protectorate. As a consequence of Great Britain's participation in the World War, Egypt was declared a British protectorate, Dec. 17, 1914. The following day Abbas II was deposed. He was succeeded by Hussein Kemal, with the title of sultan. In 1915 and 1916, British troops prevented the success of Turkish efforts to invade Egypt. In 1917 Hussein Kemal died, and his brother became sultan as Fuad I. In 1919 Viscount Allenby was appointed British high commissioner for Egypt.

Independence. On March 14, 1922 the English House of Commons approved the policy of establishing Egypt as an independent state. Sultan Ahmed Fuad Pasha was proclaimed king on March 16. Under the approved arrangement, England retains the right to protect the Suez canal and enters upon a relationship to Egypt somewhat analogous to that existing between the United States and Cuba.

ESTHONIA

Esthonia is a republic lying north of Latvia and bordering on the Gulf of Finland. From about 1260 to 1560 it was included in a federal republic formed of several Baltic provinces. It then passed to Sweden. In 1710 it was annexed to Russia. On February 24, 1918 Esthonia, made up of three provinces of Russia, declared its independence. A constituent assembly was for a time the supreme governing power. In December 1920 the constitution of the Esthonian Republic went into force.

From November 1918 until February 1920, Esthonia was at war with Soviet Russia. A treaty of peace was signed on February 2, 1920. Since that date, Esthonia has been virtually free from territorial disputes and has become a genuinely self-supporting state.

FINLAND

The country of Finland lies on the northwest border of Russia, along the eastern coast of the Gulf of Bothnia. It is called by the Finns *Suomema*, or "land of marshes." About the middle of the 12th century, the Swedes conquered the pagan tribes of this region and introduced Christianity. The Russians made frequent attempts at the conquest of Finland, and in 1809 it was annexed to Russia as a grand duchy. The Finns always resented Russian

control, even while they were allowed local self-government. They were equally opposed to a dominance of Swedish language and culture in Finland. During the latter part of the 19th century, therefore, they bent their energies to revive and cultivate their own language, and to develop the Finnish state along native democratic lines. In these policies, they were remarkably successful, with the measure of self-government allowed by Russia. But in 1897 a policy of repression and thorough Russification was put into force.

This Russian policy was somewhat modified after the revolution of 1905. But the heavy indemnities demanded by Russia, in lieu of military service, occasioned continual friction. On the outbreak of the Russian revolution in 1917, the Finns declared their independence. A conflict ensued between the lower classes of the townspeople, who formed the Red Guards and sided with the Bolsheviki, and the White Guards, made up of the upper classes and the peasantry. Intervention by Germany enabled the White Guards to triumph. In June 1919, a new constitution was adopted, providing for a single chamber legislature and a president. Education is well provided for in Finland by two universities and a system of public general and special schools.

FIUME

The city of Fiume (*fyōō'mā*) occupies the site of an ancient town of Roman times. From the year 799, the place was under Frankish rule for a long period. Later, it was governed by various feudal lords. In 1471, it passed to the emperor Frederick. From that time until the close of the World War, it lay within the domain of the Austrian empire.

By the Treaty of Rapallo, November 12, 1920, between Italy and Jugoslavia, the independence of the former Austrian city of Fiume was recognized. Equal commercial rights in the port were guaranteed to the Free State of Fiume, to Italy, and to Jugoslavia. Ratifications of the treaty were exchanged in February 1921. The history of the new state, however, was stormy. The government was ousted on March 3, 1922, after much violence on the part of the Fascisti. In response to an appeal from a national committee of defense, the Italian government organized a provisional government and in 1924, by agreement with Jugoslavia, the city was annexed by Italy.

FLANDERS

Flanders was a medieval country of Europe, which comprised the present provinces of East and West Flanders in Belgium, the southern part of the province of Zealand in the Netherlands, and parts of the departments of Nord and Pas-de-Calais, in France. In the division of Charlemagne's empire, Flanders fell to the western Frankish kingdom, or France, while the rest of the country, known later as the Netherlands, went to the kingdom of Lothair. The important history of Flanders begins with Baldwin, called "Iron-arm," who was appointed to defend this Frankish seacoast country against the Northmen in the 9th century. In the 10th century his descendants became counts. They strengthened their position at Bruges, Ypres, Ghent, and other cities by bringing in weavers and laying the foundation of the industrial greatness of those cities. In the 12th century, Count Philip of Alsace further encouraged the growth of the towns by granting them special privileges. The struggles of these "communes" during the next three centuries, to maintain their freedom and political power, forms the most important part of Flemish internal history. They became most powerful in the 14th century, under the leadership of Ghent; but rivalries, especially between Ghent and Bruges, left them at the mercy of their foes. The popular party, called the White Hoods, led by Philip van Artevelde, was defeated by the French forces in 1382. Flanders then became a part of the powerful realm of Burgundy, ruled by Philip the Bold. See *Belgium, France.*

FRANCE

The history of France begins with the peoples who dwelt in Gaul long before the Christian era. The principal racial element of the French nation is Celtic. The Celts appear to have entered the country from the north and to have absorbed the scattered primitive tribes. Although the Gauls had a developed civilization when Cæsar began his conquests (58–51 B. C.), they soon became in language and in institutions as Roman as the Italians. Colonists from Italy, however, affected the Gallic population chiefly in the South.

Rise of the Capetian Dynasty. With the barbarian invasions, Roman Gaul fell away from the Empire and became a group of warring kingdoms. The Franks under Clovis were relatively few in number. So were the Goths and the Burgundians. These tribes were soon assimilated by the older population. When the Frankish empire, which Charlemagne (768–814) had created, fell to pieces in the 9th century, France in the narrower sense took its beginnings under the Capetian dynasty, the first of whose kings, Hugh Capet, was consecrated in 987. The Carolingian empire had fallen because it did not rest upon the solid foundation of an organized administration, an imperial revenue, and a law valid throughout its borders. These had been impossible since the decay of Roman power. For them had been substituted varying codes of local or tribal law, a meager income from landed estates, and a body of officials bound to their chiefs mainly by ties of personal loyalty. What is called "feudal anarchy" was coming into existence. The consequence was that when Hugh Capet ascended the throne he found himself master of only a small territory around Paris and Orleans. The great dukes and counts of Flanders, Burgundy, Aquitaine, Brittany, and Normandy recognized his nominal right to the usual feudal services, but held themselves independent in their own territories. The chief task of the kings from the time of Hugh to the reign of Charles VIII (1483–98) was to strengthen the royal power and unify the realm of France.

Several forces aided the kings in their task. One was the Church, which, in its canon law, reflected the old Roman ideal of universality, and in its principle of authority, the notion of an effective royal power. Another influence in the same direction was the towns, which began to grow strong with the revival of trade in the 12th century, for they were the sworn enemies of the feudal nobles. The Crusades also helped, stimulating a feeling of unity in a common cause. Incidentally they impoverished many noble families which exhausted their resources in distant expeditions. The crusades against the Albigenses in southern France during the reign of Philip Augustus (1180–1223) weakened the nobles of that region and enriched the monarchy. It was the same king who, in his wars with King John of England, annexed Normandy and other important fiefs which had belonged to the English crown. Later kings also, by fortunate marriage alliances, by war, by intrigue, and by purchase, added to the royal domain, until at last this was practically coterminous with the kingdom of France.

Philip Augustus is often styled the founder of the absolute monarchy. He allied himself with the lawyers and the clergy against the nobles. His jurists applied the principles of the old Roman law and provided for appeals from local to royal courts. His grandson Louis IX, or St. Louis, embodied in all his acts so high an ideal of justice that his very name grew to be a symbol of kingly authority. In 1302 a States-General was summoned by Philip IV, including delegates from the "good towns" along with the clergy and the nobles. Originating at the same time as the English Parliament, this assembly failed to develop into a strong representative body, capable of sharing with the king the government of the country.

Medieval Civilization in France. The development of royal power by no means sums up French activity in the middle ages. The breakdown of feudalism carried with it the freedom of the rural classes from serfdom as well as the growth of a flourishing body of merchants and artificers in the towns. Agricultural methods were primitive, but the peasant acquired more permanent tenant rights and began to show that love for the soil which has ever been one of the corner stones of French prosperity. Industry was organized under a guild system which lasted until the Revolution. Artistic skill and creative genius found its noblest manifestations in the cathedrals of Paris, Chartres, Amiens, and Reims, in great town halls and palaces of justice, not to forget the castles of wealthy nobles and the dwellings of merchant princes. A literature arose, first in the Latin tongue, afterward in French. Universities were organized, and Paris took its place as a center of light and learning.

England and France at War. The work of medieval civilization in France was menaced and marred by the Hundred Years' war, a struggle between the English heirs of the Angevin empire and their French rivals. It arose out of a disputed succession, after the death of the three sons of Philip IV without male heirs. A curious survival of Frankish times, the so-called Salic law, was given a new meaning by designing intriguers in order to exclude the daughters of the late kings. From this time forward it became the rule in France that succession was strictly in the male line. Accordingly, the throne passed to Philip VI of Valois, a nephew of Philip IV. But Edward III of England claimed the throne through his mother, a daughter of Philip IV. In reality, the conflict grew out of economic rivalries in Flanders and of the desire of the French kings to seize the fiefs which the English kings still held in France.

The Hundred Years' war was rendered illustrious by battles, Crécy (1346), Poitiers (1356), and Agincourt (1415), in which English bowmen proved more than a match for French knights; by the career of Bertrand du Guesclin, who reduced the English possessions to a few coast towns; and by the heroic conduct of Joan of Arc. Joan, when the English had again overrun the country and had conquered all the region north of the Loire, saved Orleans, conducted Charles VII to Reims for his coronation, and drove the English from half a dozen provinces, only to be captured and burned as a heretic and sorceress at Rouen. Shortly after the death of Joan, the duke of Burgundy, who had been driven into the arms of the English by the murder of his father in a factional struggle, made terms with Charles VII and assisted him in driving the English armies from the country. When the war ended in 1453 Calais alone remained under English control. The devastation of the land by armies and by partisan bands had been terrible. Hundreds of villages were reduced to heaps of ruins, haunted by wild animals. The monarchy, however, emerged stronger than before. The work of consolidating the royal domain went on rapidly under Louis XI, so that when he died the only great independent fief was Brittany. His successor, Charles VIII, secured that province by marriage and completed his father's work by creating a thorough military organization.

Expansion of French Power. The campaigns of Charles VIII in Italy marked the beginning of the French policy of expansion abroad, and the reign of Francis I (1515–47) brought into France from Italy the inspiration of the Renaissance. A new era of art and architecture began, rivaling that of the middle ages. This development, again, was retarded by the religious wars, partly a consequence of the Reformation, partly due to factional conflicts between the powerful house of Guise and Protestant nobles and princes. At this time the real ruler was not one feeble monarch after another, but their mother Catherine de' Medici, widow of Henry II, who made up in unscrupulousness what she lacked in strength. After the massacre of St. Bartholomew (1572) the leadership of the Huguenots passed to Henry of Navarre, a Bourbon prince who came to the throne in 1589 as Henry IV. On the principle that "Paris was well worth a Mass," Henry became a Catholic, thus pacifying his Catholic subjects. Then, in 1598, he issued the Edict of Nantes, which granted religious freedom to the Protestants.

With the religious question settled in such a way as to insure quiet at home and also to encourage the Protestant German states in their contest with the Habsburgs, Henry and his minister, Sully, set about the military and administrative strengthening of the crown, with the purpose of making France the first power in Europe, but in the midst of his work he was struck down by an assassin. Several years of regency under Marie de' Medici and a period of personal rule under Louis XIII followed. The States-General met in 1614 for the last time before 1789. In 1624 Cardinal Richelieu took direction of affairs; during the next sixteen years he crushed the Protestant political power and all Catholic oligarchical tendencies, hopelessly divided the German states, and made France a united nation with a highly centralized government. Cardinal Mazarin continued Richelieu's work and left to Louis XIV the machinery of the personal despotism which that monarch wielded for more than half a century. The policy of all the great French kings since the days of Hugh Capet could be carried no further than the absolutism of the Grand Monarch.

Reign of Louis XIV. With the financial genius of Colbert, the engineering skill of Vauban, the organizing gifts of Louvois, and the military talent of Turenne at his command, Louis was able to secure enormous revenue, to build magnificently, and to wage war splendidly. France advanced her frontier northward and eastward by annexations in the Netherlands, by the conquest of Alsace, and the seizure of Franche-Comté. French explorers and traders in America and India laid the foundations of a great colonial empire. In the arts of civilization, France achieved the leadership of Europe. Domestic and public architecture flourished. Poetry and the drama were adorned by the names of Corneille, Racine, and Molière; prose, by those of Bossuet, La Rochefoucauld, and Saint-Simon. But excessive taxation depleted the resources of the people, unprovoked wars set all the powers of Europe against France, and the bigotry and prodigal luxury of king and court sapped the moral foundations of the national life. Louis XIV left to his infant great-grandson, Louis XV, a decaying power.

The Eighteenth Century. The long and disastrous reign of Louis XV, intelligent, but nonchalant and corrupt, culminated in the loss of Canada and the abandonment of India. The discredit of the government abroad made more insistent the demands for reform at home. The great books of the period belong to the literature of criticism and revolution. Authority in State and Church was undermined. Writers like Montesquieu, Voltaire, Diderot, Rousseau, and Turgot were establishing new principles in public law and social economy. Even the monarchy began to take on the characteristics of a benevolent despotism, and it made belated efforts to correct a vicious system of taxation in which the burden rested mainly upon the industrious peasantry. To break down the dead wall of privilege, a Henry IV was needed, but the successor of Louis XV was his weak-willed, half-educated grandson, the unfortunate Louis XVI. He had no lack of able advisers in such finance ministers as Turgot, Necker, and even Calonne, but he had not the persistence of character to push through their schemes against the opposition of the privileged classes. If the country was to be saved from bankruptcy it was essential to abolish

exemptions from taxation and to demand its proper share from every form of wealth. Upon Calonne's advice, an assembly of the notables was called in 1787, but this body, composed of privileged persons, was frightened at the thought of thoroughgoing reform. At last the king summoned the States-General and recalled Necker, in whom the public had great confidence.

The Revolution. The States-General, which met at Versailles on May 5, 1789, was composed of members elected by the three orders,—nobility, clergy, and commons. The *cahiers*, or "statements," drawn up by each order, gave promise of speedy agreement upon governmental reform, but the nobles and the higher clergy were opposed to the demand of the commons that all three orders should sit together and vote individually. A long deadlock ensued. After a majority of the clergy and many of the nobles had gone over to the side of the third estate, the king intervened with a declaration aimed at the preservation of the distinction between the three orders. Within four days he was obliged to yield and to sanction the union of all the orders in a single National Assembly. Influenced by the reactionary court nobles, he dismissed Necker. He also called several regiments to the neighborhood of Paris and Versailles. Popular suspicion credited the government with a plan to dissolve the National Assembly.

On July 12 Paris rose, and two days later a mob forced the surrender of the Bastille, a royal fortress and prison which seemed to symbolize the despotism of the old régime. Similar scenes of violence spread over France. This strengthened the hands of the reform party in the Assembly and intimidated their opponents. In a night session, on August 4, nobles, clergy, and commons seemed to vie with one another in renouncing every form of privilege. A few days later the Assembly drew up its famous Declaration of the Rights of Man and the Citizen, proclaiming the new gospel of human equality. The king believed the Assembly was going too far, and he determined to check its career with a royal veto. Again he summoned troops to protect himself against an outburst of popular violence. The result in October was the same as that in July. This time a mob led by several thousand women streamed out to Versailles, brought the royal family to Paris, and compelled the king to take up his residence in the Tuileries.

The National Assembly. In the period from October 1789 to June 1791, the National Assembly, also called the Constituent Assembly, carried through constructive reforms which lie at the foundation of modern French life. The country was redistributed into departments, and a uniform system of local government introduced. New courts with a more liberal mode of procedure protected innocence and reduced the expenses of justice. Landed property was freed from feudal dues, and peasant ownership was promoted. The taxes characteristic of the old régime gave place to a new system which distributed the burden fairly. Here the Assembly's fault was failure to secure prompt collection, with the consequence that revenues steadily failed. A more serious mistake was the attempt to reorganize the Church and to free it from papal control. This followed the confiscation or nationalization of the vast ecclesiastical landed estates, in the hope that by their sale the country could be saved from bankruptcy. The plan of issuing land scrip, or assignats based upon the proceeds of the expected sales, led to inflation, which multiplied the difficulties of the government, especially after 1792.

The king was forced to accept the changes which the Assembly made in the Church, but his conscience was so troubled that he lent himself to schemes of counter-revolution. In this pass of affairs, the king and queen made the fatal error of trying to escape from Paris to the frontier, where a zealous royalist, the Marquis de Bouillé, was in command of the army. They were arrested and brought back. This episode gained importance for two reasons: it confirmed popular suspicion of the king's disloyalty to the Constitution; it gave impetus to a hitherto slow movement toward republicanism.

The Legislative Assembly. The National Assembly adjourned on September 30, 1791, to give place to the Legislative Assembly provided for in the Constitution. But, in an excess of disinterestedness, the members passed a "self-denying ordinance," which declared all members of the Constituent Assembly ineligible for membership in either the new Legislative Assembly or the ministry. The new body, therefore, which met on October 1, was made up of inexperienced men and was subject to the vagaries of doctrinaire leaders and the sway of undisciplined groups among its members.

The evils arising from this lack of statesmanlike counsel in the government were increased by the rise of two radical clubs, the Jacobins and the Cordeliers. To these were added a group of ambitious, unpractical republicans in the Assembly, the Girondists. France was still monarchist; the French people did not desire a republic. But radicalism, spurred by the spirit of self-seeking and rivalry, was rapidly moving toward the destruction of the monarchy without being able to provide a stable government to take its place.

On the other hand, the king and the queen were plotting with the émigrés, or royalists who had fled from the country, and Austria had joined with Prussia during the summer of 1791 in a threat of intervention. The Assembly declared war against Francis II of Austria on April 20, 1792. This also involved Prussia by virtue of the alliance between Francis and Frederick William II. Only Robespierre and a few others opposed the move on the ground that war never helped democracy. But the tide of national feeling was running high, and the Jacobins proclaimed the conflict to be one of democracy against autocracy. When, in the late summer, the Prussian army crossed the French frontier, a manifesto was issued which confirmed this Jacobin view. The manifesto demanded the restoration of Louis XVI to complete liberty of action, under penalty of the sack and ruin of Paris. The Jacobins had their reply ready. They engineered a popular uprising, established a Revolutionary Commune in place of the regular city government, and made an assault on the palace of the Tuileries, compelling the king to take refuge in the hall of the Legislative Assembly. Intimidated by this new revolution, the Assembly, reduced to a third of its numbers, called a convention to draft a constitution on republican lines, and proclaimed universal suffrage. A ministry was elected, of which the leading member was Danton. But it was the Commune rather than the national government that seemed to control the course of events. It signalized its bloody career by permitting its Committee of Surveillance to organize a massacre of political prisoners, nobles, and priests. The butchery went on for four days, and more than a thousand persons perished.

The Convention. On September 20 the Convention, the third of the revolutionary assemblies, which was to last for three years, or until October 26, 1795, began its work. On the same day the army of Prussia was defeated at Valmy, more by its own failure to press home its attack than by the strength of the French armies.

The Convention must be recognized as one of the great governmental bodies of history. The bitter party rivalry between Girondists and Jacobins, resulting in the expulsion of the former, the execution of the king, the Terror with its especial ferocity in Lyons and the Vendée—these are incidents in the defensive and constructive work of that body. Terrible as were these excesses, tragic

as was the fate of Madame Roland, the Girondist leader, of Danton, the vigorous compromiser, and of Robespierre, the austere fanatic, such things have not been confined to France of the Revolution.

The first act of the Convention was to declare unanimously that "royalty is abolished in France." Thus almost furtively was the French Republic ushered in. Constitution making was postponed by the bitter struggle between the Girondists, who represented the provinces, and the Jacobins, whose main strength was in Paris. Supported by the Commune, the Jacobins won. The invasion of the Austrian Netherlands and the menace to Holland alarmed the English. The execution of Louis XVI served as the occasion for an outbreak of war, not only with England, but also with Holland and Spain. Soon all Europe seemed united against the regicide republic. The Vendean peasants rose in behalf of king and Church. The Convention met the encircling perils by decreeing universal military service and by organizing a government under a committee of public safety. The opposition was cowed by the threat of trial before a revolutionary tribunal, from whose judgments there was no appeal. Such was the machinery of administration until the danger was past.

The Commune of Paris, led by Marat, forced the Convention to expel the Girondists; they retaliated by arousing a revolt in the departments. The Jacobin Convention hastily prepared a constitution so generous in its democratic provisions that the country ratified it by an overwhelming vote. This took the heart out of the revolt. Having served this purpose, the constitution of 1793 was never put into effect. France had need of a strong government, which was already provided for in the committees and the widely distributed and highly organized Jacobin clubs. The Committee of Public Safety became supreme; its members toiled tremendously. Their method was the appeal to fear, to impress by startling and ruthless action. Carnot raised and equipped a dozen armies, aggregating 750,000 men. Every commander, watched by representatives of the Convention on mission, had the alternative of victory or the guillotine. Under this stimulus, superhuman feats were accomplished. The armies were everywhere victorious against the allies, and civil war was stamped out at home.

Meanwhile, in affairs of peace the Convention wrought greatly. It gave France the metric system of weights and measures; it began the work of codifying the law; it planned an elaborate system of popular education; it created or enlarged many institutions, such as the Polytechnic School of Paris, the Museum of the Louvre, and the National Library. The Convention also devised a new calendar.

The revolutionary tribunal in Paris became increasingly the instrument of the violent elements of the Commune. The success of the Commune, which was wholly antichristian, attained its climax when it set up at Paris in 1793 the worship of Reason. Robespierre condemned this move and a few months later urged the worship of the Supreme Being as the only democratic religion. To enforce this virtuous régime, he seized control of the Tribunal and would have used it to destroy his political enemies, a corrupt group which discredited the Revolution. These men combined to bring about his fall and execution. The power of the Jacobins dwindled, and the Convention in 1795 drew up a new constitution.

The Rise of Napoleon Bonaparte. This third constitution of the Revolution placed the Republic in the hands of property holders, who alone could vote, thus striking a blow at the power of the Paris mob. The Convention added supplementary decrees, in accordance with which two-thirds of the new legislature should be chosen from the membership of the Convention itself. This provoked strong protests, especially in Paris. The conservative elements of the National Guard, with the aid of many royalists, planned an attack upon the Convention. Its defense was undertaken by Barras, one of its members, and he called to his aid an artillery officer, General Napoleon Bonaparte, who had won distinction at the siege of Toulon. Bonaparte turned his cannon upon the advancing insurgent columns, saved the Convention, and at the same time inaugurated a great career.

The time was auspicious for Napoleon. The Terror had robbed France of her natural leaders. The constitution of 1795 provided for a legislative body of two houses, the Council of Five Hundred and the Council of Elders. The executive power was lodged in the Directory composed of five men. Such extreme division of power, with its consequent weakness of decision, made Napoleon's opportunity. After four years of troubled history, the Directory and the Councils reached the verge of collapse. During these same years Napoleon had become the most renowned military commander in Europe. Dispatched to northern Italy in the struggle with Austria, he had won an astonishing series of victories and in 1797 had negotiated the Peace of Campo Formio. One of the consequences was the application in Italy of the French program of reform and the beginnings of the *Risorgimento*. In 1798 he was sent to Egypt, and the luster of Oriental conquest added to his name, although Nelson's destruction of the French fleet at the battle of the Nile deprived France of the fruits of the enterprise. Napoleon now left his army and returned to France. With the opportune and dramatic aid of his brother Lucien, president of the Council of Five Hundred, he executed his famous *coup d'état* in 1799. He dictated a new constitution which provided for three consuls (himself to be first consul with power to initiate all legislation), a tribunate to discuss bills, and a legislative body to vote them.

The Concordat. Now opened the period of the Consulate, a period of reorganization,—administrative, financial, and social. An efficient local government in the departments was put under the control of prefects. The taxes were collected and a bank of France was established. A civil code summed up the legal gains of the citizen during the Revolution, reconciling the new law with the older principles of French jurisprudence. By a concordat the schism, which had vexed the Catholic population since 1791, was brought to an end. New victories over Austria led to the Peace of Lunéville, and even Great Britain saw the necessity of agreeing to a treaty at Amiens in March 1802. All that lacked was political liberty, for the First Consul soon assumed the attitudes of a dictator. With the creation of the Consulate for Life in 1802, France, though still a republic in name, was in fact a monarchy. Two years later Napoleon was declared emperor of the French.

Napoleon, Emperor. Meanwhile, war broke out again with England, which country Napoleon could not reach across the channel. In 1805 the coalition of England, Russia, and Austria was formed against him. He struck at Austria, won the battle of Austerlitz, and dictated the Peace of Pressburg. He then organized the Confederation of the Rhine and destroyed the Holy Roman Empire. In 1806, at Jena and Auerstädt, the Prussian armies crumbled before the French, but the battle of Eylau, February 1807, was a disaster, only partially retrieved by the victory at Friedland in June. Napoleon was satisfied to make the Treaty of Tilsit with Alexander of Russia. England alone remained to be dealt with. The victory of Trafalgar in 1805 had left her supreme on the sea. Napoleon attempted to reach her through his Continental System, that is, by excluding her trade from continental ports and by attacking Portugal, an ally of England, through Spain. But here he went too far in attempting to reduce Spain also. Although he unseated an unpopular Bourbon monarch, he aroused national sentiment which he

found unconquerable. This new power of national feeling was in the end the conqueror's undoing.

Leaving Spain hastily when Austria declared war in 1809, he again brought that power to her knees and dictated the Treaty of Vienna. England still was unconquered, even though her industries were feeling the effect of the continental blockade. In 1809 Napoleon was at the height of his career, but the anticlimax was approaching. The Russian campaign in 1812, ending in disaster and retreat, the battle of Leipzig in October 1813, which was a decisive defeat—these were the signals for the defection of the German states. On March 31, 1814 the allies entered Paris, and Louis XVIII was placed on the throne, reckoning himself to be in the 19th year of his reign, king "by the grace of God." He went too far, however, in ignoring the Revolution and Bonaparte, and the people were soon ready to receive their "emperor" again. But the battle of Waterloo sealed his doom. The Congress of Vienna, which had rearranged the states of Europe, trying vainly to forget the Revolution and Napoleon, had already come to a close.

The Restoration. Under Louis XVIII some beginnings toward a liberal government, such as periodical elections, annual voting of the budget, and liberty of the press, were made. But a reaction set in under Charles X, who attempted a *coup d'état* in 1830. He was defeated, and Louis Philippe of the house of Orleans was placed on the throne, with the title "King of the French," instead of "King of France." During his reign, manufacturing industries grew beyond precedent, and the power of the working classes was thereby increased. Socialist doctrines were widely taught, although they were resolutely opposed by the ministry. But Guizot, the prime minister, made the mistake of governing with too little regard for popular movements.

Revolution and the Second Empire. The storm broke in February 1848. The king abdicated and went into exile in England, and a provisional government was compelled by the workmen of Paris to establish "national workshops" and to guarantee employment. The experiment, never sincerely undertaken, turned out to be merely a scheme for occupying the unemployed, which drained the national treasury. When the National Assembly suddenly closed the shops, Paris was thrown into the hands of mobs of idle, half starved workmen, demanding "bread or lead." The terrible "June days" of 1848, when the military crushed the revolt with great severity, left an evil influence in the labor problem of France. But the peasants of the provinces were not in sympathy with the Paris workmen, and conservative republicans were able to put a new constitution in force. A single chamber legislature and a president, to be chosen by popular vote, were provided for. The election made Louis Napoleon president of the second French Republic, largely through the power of the reactionary royalists, made possible his *coup d'état* of 1851, and brought upon France the disaster of the Second Empire.

The new president was a nephew of Napoleon I. In 1832 he had put forward his claims to the throne of France, but, not meeting with encouragement, he had then retired to England. In 1840 he made a second attempt to seize the crown, but this time he was captured and shut up in a fortress, whence he escaped to England. He continued, however, to ingratiate himself with the people by posing as a democrat,—even professing sympathy with the projects of the socialist leader, Louis Blanc. In 1839 he had published a volume on *Napoleonic Ideas*, in which he represented his uncle as the devoted friend of democracy and a victim of tyrants. Now, on the eve of the election of 1848, he adroitly offered himself as the champion of the working classes, the middle classes, and the army. Elected by an overwhelming majority, he set to work at once to arouse enthusiasm for a restored empire. The Assembly refused to aid him, and on December 2, 1851, the anniversary of the battle of Austerlitz, he dissolved that body. A special election gave him a large vote of approval for this *coup d'état*. Another vote in 1852 approved a decree of the Senate making him emperor.

From 1852 to 1860 Napoleon III wielded a despotic rule, largely through the magic of his name. Yet during this period France made great industrial and scientific advance. Railroads were built, the city of Paris was modernized with broad streets and avenues, and institutions of charity and education multiplied. Little of this is to be credited to the emperor. His one real service to France was the acquisition of Nice and Savoy, and this was the outcome of Cavour's adroit use of Napoleon in driving the Austrians out of Italy. His weakness and indecision allowed a more liberal policy of government after 1860 but left France an easy prey to the Prussians in 1870.

Fall of Napoleon III. The Franco-Prussian war grew out of Napoleon's schemes for annexations on the northeastern frontier of France and Bismarck's conviction that only through a German triumph over the French Empire could the unification of Germany be assured. Bismarck seized the occasion of a dynastic controversy apropos of the succession to the crown of Spain to provoke the struggle. French armies crumbled before the German attack, the emperor was made prisoner, and the Empire collapsed like a house of cards. Léon Gambetta led in the proclamation of a republic in Paris,—he raised armies and prepared to defend the city. But adequate training of the troops was impossible, and after a siege of four months the Germans starved Paris into surrender. Bismarck, by the Treaty of Frankfort, May 10, 1871, forced France to cede Alsace and Lorraine to Germany and to agree to pay an indemnity of one billion dollars within three years.

The Third Republic. In this crisis, as in 1793 and 1848, Paris was the center of a radical movement. The long siege of the city had demoralized industry, and a revolutionary group, later called "communards," formed a commune. Their purpose was to make France a sort of federation of such communes, or city-states. But their ideas were not well received in other cities, and, after the provisional government, headed by Thiers, had made peace with Prussia, the National Assembly, meeting at Versailles, undertook to suppress the Commune. The city underwent a second siege and one of the most terrible weeks of war, arson, and murder in its history.

After Marshal MacMahon announced the complete subduing of Paris, the National Assembly proceeded to the work of forming a constitution. The royalists were in the majority, but they were divided in their allegiance, and the republican minority gained time, during which they gathered strength enough to bring about the formation of the present republic in 1875. The president, MacMahon, and the conservative Senate attempted, in 1877, to check the growth of republican sentiment by dissolving the Chamber of Deputies, but the elections returned an increased republican majority. In 1879 MacMahon resigned. Since that time France has suffered no serious internal disturbance. Two incidents, however, should be mentioned, which threatened for a time to have dangerous outcomes.

The death of Gambetta in 1882 had left the republicans without a great leader, and the party split into factions. In 1887 General Boulanger, a very popular officer, was tempted to use his popularity to overthrow the republic. The law then embodied the system of *scrutin de liste*, that is, a general departmental ticket, instead of election by districts (*scrutin d'arrondissement*). After Boulanger had been chosen by large majorities in several

departments and in Paris, a *coup d'état* was feared, but he hesitated to take advantage of the opportunity. Having been tried for treason, he fled and soon afterward committed suicide. The Dreyfus affair for a time separated the country into the Nationalists, or reactionary party, and an opposing, generally republican, group, called the *bloc*. A strong anticlerical movement was the next phase of the conflict. In 1905 France abrogated the Concordat of 1801 and declared complete separation of Church and State.

Economic and Political Growth. In spite of the seemingly crushing burden of the war indemnity of 1871, France speedily cleared the obligation. The Third Republic has been a period of large development in French industries and commerce. In 1870, French colonial possessions were limited to Algeria, the Senegal region, and some small stations on the Gulf of Guinea in Africa, besides a settlement in Cochin China. These have been largely extended until now France controls in her colonies and dependencies an area about twenty times as large as her home area in Europe.

After the Franco-Prussian war the army had been reorganized upon the principle of universal military service. In 1913, following upon large German military preparations, France made feverish efforts to strengthen her army. Within a few months, French territory was invaded and Europe was plunged into the frightful desolation of a prolonged war, fought chiefly on French soil. See *World War*, page 523.

After the close of the war, French governmental policy was concerned mainly with (1) the problem of security against a renewal of German attack on the Rhine frontier; (2) enforcement of the reparation provisions of the Treaty of Versailles; (3) alliances with the new small states of central Europe; (4) development of French interests in Morocco and the Near East.

For the first decade after the World War the dominating figures in French national life were Raymond Poincaré and Aristide Briand.

Faced with the failure of Germany to meet her reparations payments under the Versailles treaty, Poincaré, as prime minister, seized the Ruhr district in 1922, French and Belgian troops holding it as security for payments due. This was done despite the opposition of Great Britain. The occupation of the Ruhr led directly to the Dawes Plan, an agreement ratified in 1924 which took reparations payments out of the arena of politics. In accordance with this plan, the Ruhr district of Germany was evacuated in 1925, German industry and finance was restored, and payments on account of reparations were begun on a fixed scale.

Poincaré in the meantime was followed by a succession of prime ministers, each of whom failed to meet an economic situation that was verging rapidly toward financial collapse through currency inflation. These difficulties were aggravated by costly wars in Syria and against the Riff tribesmen in Morocco. In 1926 a national ministry was formed under Poincaré, whose prestige made possible a balanced budget. The franc was stabilized. Confidence was restored, and a large gold reserve was built up.

In 1925, Briand, then foreign minister in the cabinet of Painlevé, was able to negotiate with Germany and other interested powers a treaty of security and arbitration, by which war was renounced as a method of settling disputes growing out of the Versailles treaty. Briand continued as foreign minister in succeeding cabinets, making his influence felt for peace throughout Europe, largely through the instrumentality of the League of Nations.

RULERS OF FRANCE

Name	Lineage	Period of Rule		Birth	Death
	THE OLD FRANKISH KINGDOM				
	THE MEROVINGIANS	A. D.	A. D.	A. D.	A. D.
Clodian	King of the Salian Franks	428?	448	?	?
Meroveus	Founder of the Merovingian dynasty	448	456	411?	456
Childeric I	Son of Meroveus; king of the Franks	456	481	?	481
Clovis I	Son of Childeric I	481	511	466?	511
	THE KINGDOM DIVIDED INTO FOUR PARTS				
Childebert I	Son of Clovis I; king of Paris	511	558	495	558
Thierry I	Son of Clovis I; king of Austrasia	511	534	?	534
Clodomir	Son of Clovis I; king of Orleans	511	524	?	524
Clothaire I	Fourth son of Clovis I { king of Soissons	511	558		
	{ sole king	558	561	497	561
	SECOND DIVISION OF THE KINGDOM				
Charibert, Guntram, Chilperic I, Sigebert I	Sons of Clothaire I: King of Paris	561	567	?	567
	King of Orleans and Burgundy	561	593	?	593
	King of Neustria at Soissons	561	584	?	584
	King of Austrasia at Metz	561	575	?	575
Childebert II	Son of Sigebert I; king of Austrasia and Burgundy	575	596	570	596
Clothaire II	Son of Chilperic I; sole king	613	628	584	628
Dagobert I	Son of Clothaire II; sole king	628	638	602	638
Clovis II	Son of Dagobert I	638	656	633	656
Dagobert II	King of Austrasia	656	679	652	679
Clothaire III	King of Neustria	656	670	652?	670?
Childeric II	Son of Clovis II; sole king	670	673	?	673
Thierry III	Son of Clovis II; king of Burgundy	673?	691	652?	691
Clovis III	King of Neustria	691	695	681	695
Childebert III	King of Neustria	695	711	?	?
Dagobert III	King of Neustria	711	715	699	715
Chilperic II	Son of Childeric II	715	720	?	720
Thierry IV	Son of Dagobert III	720	737	712?	737
Childeric III	Son of Chilperic II; deposed by Pepin the Short	742	752	?	755
	THE CAROLINGIANS				
Pepin the Short	Son of Charles Martel	752	768	714?	768
Charlemagne, or Charles the Great	Son of Pepin the Short	768	814	742	814
Louis I, le Débonnaire	Son of Charles the Great	814	840	778	840
Charles the Bald	Younger son of Louis I, le Débonnaire	840	877	823	877
Louis II	Son of Charles the Bald	877	879	846	879
Louis III	Son of Louis II	879	882	863	882

RULERS OF FRANCE—Con.

NAME	LINEAGE	Period of Rule		Birth	Death
		A. D.	A. D.	A. D.	A. D.
Charles the Fat	Son of Louis the German	885	888	832?	888
Count Eudes (Odo)	Elected king at Compiègne	888	893	857?	893
Charles III, the Simple	Son of Louis the Stammerer	893	923	879	929
Raoul (Rudolf of Burgundy)	Elected king by the nobles	923	936	?	936
Louis IV	Son of Charles III, the Simple	936	954	921?	954
Lothair	Son of Louis IV	954	986	941	986
Louis V	Son of Lothair	986	987	966?	987
	THE KINGDOM OF FRANCE				
	HOUSE OF CAPET				
Hugh Capet	Son of Hugh the Great	987	996	939?	996
Robert II	Son of Hugh Capet	996	1031	971?	1031
Henry I	Son of Robert II	1031	1060	1011?	1060
Philip I	Son of Henry I	1060	1108	1052?	1108
Louis VI, the Fat	Son of Philip I	1108	1137	1078?	1137
Louis VII	Son of Louis VI	1137	1180	1120?	1180
Philip II, Augustus	Son of Louis VII	1180	1223	1165	1223
Louis VIII	Son of Philip II, Augustus	1223	1226	1187	1226
Louis IX, or St. Louis	Son of Louis VIII	1226	1270	1215?	1270
Philip III, the Bold	Son of Louis IX	1270	1285	1245	1285
Philip IV, the Fair	Son of Philip III	1285	1314	1268	1314
Louis X	Son of Philip IV	1314	1316	1289	1316
Philip V, the Tall	Second son of Philip IV	1316	1322	1293	1322
Charles IV, the Fair	Youngest son of Philip IV, the Fair	1322	1328	1294	1328
	HOUSE OF VALOIS				
Philip VI of Valois	Son of Count Charles of Valois	1328	1350	1293	1350
John the Good	Son of Philip VI	1350	1364	1319	1364
Charles V, the Wise	Son of John II	1364	1380	1337	1380
Charles VI	Son of Charles V	1380	1422	1368	1422
Charles VII, the Victorious	Son of Charles VI	1422	1461	1403	1461
Louis XI	Son of Charles VII	1461	1483	1423	1483
Charles VIII	Son of Louis XI	1483	1498	1470	1498
Louis XII	A descendant of the younger son of Charles V	1498	1515	1462	1515
Francis I	Son of Charles, count of Angoulême	1515	1547	1494	1547
Henry II	Son of Francis I	1547	1559	1519	1559
Francis II	Eldest son of Henry II	1559	1560	1544	1560
Charles IX	Second son of Henry II	1560	1574	1550	1574
Henry III	Third son of Henry II	1574	1589	1551	1589
	HOUSE OF BOURBON				
Henry IV	Son of Antoine de Bourbon, king of Navarre	1589	1610	1553	1610
Louis XIII	Son of Henry IV	1610	1643	1601	1643
Louis XIV	Son of Louis XIII and Anne of Austria	1643	1715	1638	1715
Louis XV	Great-grandson of Louis XIV	1715	1774	1710	1774
Louis XVI	Grandson of Louis XV	1774	1792	1754	1793
	FROM THE REVOLUTION OF 1792 TO THE FIRST REPUBLIC				
National Convention	First sat September 21, 1792, dissolved October 26, 1795	1792	1795		
Directory nominated	October 27, 1795—November 10, 1799	1795	1799		
	THE CONSULATE				
Bonaparte Cambacérès Lebrun	Elected by the Elders and the Five Hundred	1799	1804	1769 1753 1739	1821 1824 1824
Bonaparte	Elected consul for life	1802			
	THE EMPIRE				
Napoleon I (Bonaparte)	Crowned emperor, December 2, 1804	1804	1814	1769	1821
	THE RESTORATION				
Louis XVIII	Brother of Louis XVI; proclaimed king by the Senate, April 11, 1814	1814	1824	1755	1824
Charles X	Younger brother of Louis XVIII; deposed 1830	1824	1830	1757	1836
	HOUSE OF ORLEANS				
Louis Philippe	Son of Philippe Egalité; abdicated 1848	1830	1848	1773	1850
	THE SECOND REPUBLIC				
Louis Napoleon	Nephew of Napoleon I; elected president	1848	1852	1808	1873
	THE SECOND EMPIRE				
Napoleon III (Louis Napoleon)	Elected emperor; deposed 1870	1852	1870	1808	1873
	THE THIRD REPUBLIC				
Louis Adolphe Thiers	Elected president	1871	1873	1797	1877
Marshal MacMahon	Elected president	1873	1879	1808	1893
Jules Grévy	Elected president	1879	1887	1807	1891
M. F. Sadi Carnot	Elected president	1887	1894	1837	1894
Jean Casimir-Périer	Elected president	1894	1895	1847	1907
François Félix Faure	Elected president	1895	1899	1841	1899
M. Emile Loubet	Elected president	1899	1906	1838	
Clément Armand Fallières	Elected president	1906	1913	1841	
Raymond Poincaré	Elected president	1913	1920	1860	
Paul Deschanel	Elected president, served Feb. 18–Sept. 16	1920	1920	1856	1922
Alexandre Millerand	Elected president, September 23, 1920	1920	1924	1859	
Gaston Doumergue	Elected president, June 13, 1924	1924	....	1863	

GEORGIA

As an independent kingdom in the Caucasus, Georgia, with occasional periods of submission to Turkish and also to Persian power, maintained its existence from the death of Alexander the Great (323 B. C.) to 1801, when it was annexed by Russia. After the Russian revolution, Georgia, in 1918, and the two other states of the Caucasus region, Armenia and Azerbaijan, declared their independence. In 1920-21, each, under pressure from Russia, became a socialist soviet republic. In 1922, the three republics united to form the Transcaucasian Socialist Soviet Republic (Transcaucasia), which subsequently became a constituent part of Soviet Russia. The capital of Georgia is Tiflis, which is also the capital of Transcaucasia.

GERMANY

German history, perhaps better than that of any other country, exemplifies the conflict between internal dissension and the centralizing trend of human governments. In Roman days the country was inhabited by numerous tribes, one of which, the Cherusci, under their Roman-trained prince Arminius, drove the Roman invaders permanently back to the Rhine in the great battle of the Teutoburg Forest, 9 A. D. Other tribes drove the Celts westward or were driven westward by Slavs, Magyars, and Huns. Gradually the Franks, whose name appears in the 3d century as embracing the tribes of northwest Germany, rose to supremacy, enlarging their nominal sway under Charlemagne (768–814) to the Atlantic, the Pyrenees, the Po, the Raab (Hungary), and the Elbe. At the same time, they made Christianity the established religion of the Frankish kingdom, and Charlemagne was crowned by Pope Leo III on Christmas Day 800 as emperor of the Romans. But the expansion was premature: the seeds of decay were sown by Charlemagne himself in the form of (1) excessive secular power granted to the Church, (2) an incipient feudal system, (3) a body of powerful lords restrained only by his personal prestige.

Founding of a German State. German history proper begins with the Treaty of Verdun, 843, in which Charlemagne's grandsons partitioned his empire, conceding to Louis the German the lands east of the Rhine. For the first time a German prince ruled German-speaking tribes. But unity was a different matter. The feudal system made rapid advances under weak rulers, and there were serious internal disturbances, which were terminated only under the Saxon Henry I (919–936), called the Fowler, who was a born statesman and warrior, and who not only established peace within the realm, but did much to insure it against foes from without, defeating the Magyars in 933.

Henry had established a federated state, anticipating German history by a thousand years. His son Otto I (936–973), the Great, reverted to Charlemagne's policy, and, like him, prepared the destruction of his own creation. He increased the number of feudal princes, thus weakening his own control, and created a new power in the prelates. These he expected to be loyal to the crown, as not hereditary; but he had not foreseen the long struggle with the popes. Still more fateful was Otto's conquest of Lombardy in 951 and his coronation in 962 by the pope as head of the Holy Roman Empire. This step awoke no pride in the German people, but rather undermined their allegiance. The country suffered from absenteeism, and it was bled in money and human life for transalpine conquests in which the people had no interest and from which they derived no advantage. Nor was the gift of the imperial crown anything but a curse to the German kings, though they so ardently desired it. The very beginning was ominous. Otto's first Italian expedition resulted in a rebellion in Germany, from which he was saved only by external peril. The German people had now begun to have a consciousness of national life, and all Germany united to crush the Magyars, who thought to take advantage of the internal strife. In a great battle on the Lechfeld near Augsburg in 955, Germany's permanent deliverance from Magyar invasion was secured.

The history of subsequent reigns is largely a reaping of the evil harvest sown by Otto's misguided policies, a record of civil strife and of fruitless and often ignominious conflicts with Italian princes and the popes. The memorable scene at Canossa in 1077, when for three days the emperor Henry IV begged for admission to the pope's presence, has become one of the bywords of history. The struggle over the investitures, settled by the compromise Concordat of Worms in 1122, ended in an empty victory for the emperor.

The Hohenstaufens. One of the most interesting epochs in German history is the period of the Hohenstaufens (1138–1254), two of whom, Frederick I, called Barbarossa, or Redbeard, who died in 1190 by drowning while on a crusade, and Frederick II, his grandson, were among the most brilliant of German kings. It was the golden age of the minnesingers and other court poets, and marked a revival of culture which anticipated the Renaissance, while there were remarkable ideas of religious tolerance in Walther von der Vogelweide and Wolfram von Eschenbach. The Wartburg castle and many splendid cathedrals prove the wealth and good taste of the time. It was then that the cities made their great growth, partly owing to Barbarossa's policy, and the famous Hansa was only one of many leagues of cities. It was a time of great men and great ideas, of dramatic contrasts of character and opinion.

Important political changes took place. Prussia was conquered for Christianity by the Teutonic Order. The German kings, straining for world empire, lost control of Poland, Denmark, Burgundy, Prussia, and Schleswig-Holstein. Power passed more and more into the hands of the German princes, seven of whom now came to form the electoral college, which chose the successive emperors. These rulers, requiring powerful support for their foreign ventures, increased the control of the nobles, repressed the cities, and thus retarded for generations the development of a united nation.

The House of Habsburg. The Habsburgs, who came to the throne with the election of Rudolf in 1273, thus ending the Great Interregnum, pursued the same policies. Ambitious for their family rather than for Germany, they did indeed establish a powerful Austrian dynasty, but the fortunes of Germany sank to their lowest level under Frederick III (1440–93), who lost all influence at home and abroad, and for thirty years never attended the imperial diet. Wars were waged all over the land without interference, the most important being a four years' war between a league of cities and a number of princes, in which the victory of the latter was disastrous to German unity.

Frederick's son Maximilian I (1459–1519) ascended the throne in 1486, and gave the empire an authority in Europe which it had not had for centuries. Germany was as feeble as ever, but Maximilian was by inheritance and intermarriage one of the most powerful princes of Europe. His reign marks the end of the middle ages. Gunpowder destroyed the feudal system, through the development of mercenaries. The invention of printing, the discovery of America, the revival of learning, the recognition of peaceful industry as a higher ideal than warfare—these changed the face of the world. And the medieval relation of State and Church was about to undergo the fiery trial of the Reformation.

The Reformation; Thirty Years' War. Outwardly, the struggle began in Germany when Luther nailed to the church door at Wittenberg his 95 theses against the indulgences; inwardly, it had long been preparing, and was doubtless inevitable. The religious schism soon invaded the field of politics, and the princes were divided, the Protestants forming the Schmalkaldic League. The hostility maintained toward the League by Charles V (1520–58),

Maximilian's brilliant grandson, finally led to his crushing victory over it at Mühlberg in 1547; but the movement went on. The Peace of Augsburg (1555) secured freedom of worship; sectarian friction produced the strife of the Counter Reformation under Rudolf II (1576–1612); both parties prepared for war. A dispute over the succession to the throne of Bohemia precipitated the most devastating conflict Europe had known since **the middle ages**—the Thirty Years' war.

Germany suffered most. Plundering armies crossed and recrossed her; industry and trade were crippled; she lost three-fourths of her population, and the remainder were crushed by taxes; the solid middle classes were wiped out; the empire disintegrated. In the final peace, Switzerland, the Netherlands, Alsace, and other territory left the empire, which had fallen apart into a loose confederation of petty states.

The Rise of Prussia. It was reserved for Prussia to weld the fragments into a new and more powerful state. In the 15th century a Hohenzollern had received the March of Brandenburg; a series of able descendants gradually built up a considerable province. Prussia's greatness, however, begins with Frederick I; he laid the foundations of the military system, and saved the money to run it. His son, Frederick the Great (1740–86), had the genius to employ his heritage, and the ambition to increase it. No sooner had he ascended the throne than he advanced a claim of the house of Brandenburg to the Silesian principalities, and when Maria Theresa (1740–80) of Austria—which had tried to weaken Prussia's growing power—rejected the claim, he promptly seized the disputed territory. This seizure was confirmed, after the War of the Austrian Succession (1741–45) had ended in the recognition of Maria Theresa's husband, Francis I, as emperor, in the Peace of Dresden (1745). But Austria was still resentful, and the issue was finally fought out in the Seven Years' war (1756–63), in which Frederick's extraordinary military genius triumphed over apparently irresistible coalitions. Prussia was now a military power of the first rank, and in the foundation of the Princes' League (1785) assumed for the first time a leadership in German affairs.

This initial movement toward a union of the North German states was halted for many years by the French Revolution and the Napoleonic wars. Divided, Germany was an easy prey for the conqueror and lay helpless before him until 1813, when the war of liberation, in which Russia, Austria, and England participated, finally terminated his sway in the great battles at Leipzig and Waterloo (1815).

At the Congress of Vienna (1815) a German Confederation was formed, with Austria as president of the federal diet. Constant agitation for the recognition of popular sovereignty, encouraged by the Parisian revolutions of 1830 and 1848, led to constitutional government in several German states, and to the attempt to set up a federal constitution. The crown of the empire was indeed offered to Frederick William IV of Prussia, but on condition that the Prussian state should be broken up into its several provinces. To this the interests of Prussia were utterly opposed, and the entire plan met with shipwreck.

Founding of the German Empire. Enmity to Austria had already borne fruit in her exclusion from the new constitutional state; and when, after the Schleswig-Holstein campaign of 1864, Prussia and Austria could not agree on the partition of the acquired territory, the step to armed conflict was not great. Hence the war of 1866, in which Austria was decisively defeated, and which resulted in the formation of the North German Confederation. Neither Austria nor the South German states were members, but the latter had formed with Prussia a secret offensive-defensive alliance. The time was nearly ripe for a closer union of the German states, and it was a sudden political crisis that made it possible. The war of 1866 had brought Germany and France near to the breaking point, for the insensate ambition of Napoleon III saw a threat to his power in the imminent union of the German people. A point of honor, arising out of the disputed succession to the Spanish throne, led to a declaration of war in 1870, in which, however, Napoleon found himself opposed both by the North German Confederation and by the South German states, whereas neither Austria nor Italy was ready for war. The struggle was brief, and in 1871 William I of Prussia was proclaimed German emperor.

Industrial and Social Progress. Germany now entered upon a long period of peaceful growth, marked at the same time by extraordinary industrial activity. France had been compelled to pay as indemnity the enormous sum—as it was then considered—of five billion francs; and the investment of this money in Germany resulted in a fever of speculative enterprise in every direction. At the same time there were profound social changes going on. The rise of the industrial magnate had done two things: it had weakened the power of the old landed gentry (Junker); and it had developed a new class, the proletariat. Thence originated the spectacular rise to power of the Socialists, who, despite measures designed to limit their voting strength, rapidly grew to such proportions as a political party that they had to be seriously reckoned with. Only the astute policy of Bismarck, the "iron chancellor," prevented grave disturbances. His plan was, essentially, to steal the thunder of the Socialists by putting into effect the reforms which they advocated.

Less easily managed was the restlessness of the German people under the steadily increasing military expenditure of the government. But the Germans, as we have seen, are naturally warlike; they are also naturally ambitious. Until 1871 there had been a German people, but no German nation. Now they suddenly found themselves in the limelight of the world. German manufactures went into every land; German science became recognized as unexcelled if not unequaled; students from all countries came to learn of the professors in the German universities, in philology and literature, in science and medicine.

International Rivalry. It was not hard to suggest to this newly self-conscious nation an ideal of military prominence, if not of world domination, and such a program appealed to the young kaiser, William II, who ascended the Prussian throne in 1888. Gradually the entire foreign policy was shaped along lines of power and military action. The army was steadily strengthened, its organization improved; presently a navy came to the fore. And the German people approved, for they were convinced that their national life was threatened.

The European situation had indeed grown more and more tense. The Triple Alliance (1882), between Germany, Austria, and Italy, was balanced in 1892 by a similar understanding between France, which wanted revenge for the loss of Alsace-Lorraine (1871), and Russia, which had become estranged from Germany. The age-long desire of Russia to play a dominant rôle in the Balkans and to gain control of Constantinople threatened to force a conflict with Austria, which would bring in Germany.

Meanwhile, Great Britain also had been drifting into the hostile camp. In the year 1884 Germany had inaugurated a colonial policy which eventually led to the development of a large navy. In this step England saw a menace and a challenge which she could not ignore. The lifeblood of England is overseas commerce; her food is largely imported in ships; a naval blockade could starve her out in three months. Vainly she attempted to secure Germany's consent to a halt in the race of armaments. And Germany's attitude toward the efforts for international peace, signalized by the Hague Conferences, served to strengthen the suspicion that she was bent upon war. In another respect also Germany had

crossed the lines of English policy. William II had cultivated the friendship of Turkey with a view to securing valuable concessions in Asia, the fruit of which was to be the famous "Berlin to Bagdad" railway, with its allied plans that threatened to imperil British interests in the Orient.

It was natural, then, that England should begin to feel a community of interest with France, one of the first fruits of which was the agreement of 1904 with respect to Morocco. Germany felt in this a blow at her commercial interests there, and forced the conference at Algeciras (1906) to grant her recognition as the price of peace. But Europe had now heard the rattling of the German sword, and plot and counterplot followed on each other's heels. The next dispute that threatened the peace of Europe arose from the annexation of Bosnia and Herzegovina by Austria in 1908. Serbia protested, and Russia supported the protest, but finally withdrew her opposition, feeling herself weakened by the disastrous war with Japan (1906), and hence not yet ready to try conclusions with the powerful military machine of Germany. Nevertheless, she remained secretly unreconciled, and proceeded on her part with military preparations.

Preparation for War. By this time Germany had become the most efficient military power the world has ever seen. So great was the organized concentration of all the resources of the state, that one might compare the nation to a single huge battering-ram, with every ounce of national strength contributing to its driving power. Moreover, the entire population was thoroughly conscious of this incomparable might.

Such was the situation when, in June 1914, the Austrian heir apparent and his wife were assassinated in the streets of the Bosnian capital. Within two months the pent-up enmities of western Europe had burst forth into armed conflict and produced the greatest war of recorded history. (See *World War*).

The German Republic. One of the most dramatic events attending the armistice was the German revolution of November 9, 1918. The disaffection on Germany's "home front," as von Hindenburg called it, had reached the point of open rebellion. The kaiser, forced to abdicate, fled to Holland, and within a short time every hereditary ruler in Germany had abdicated or had been deposed. For a time there was great confusion; then the political common sense of the German people found expression in new forms of organization. A temporary government provided for a constituent convention, which met at Weimar early in 1919; attempts of the radicals to nullify the labors of the convention (Spartacan revolts in Berlin, January and March 1919, communist revolt in Munich, April) were boldly and successfully crushed. On July 31, 1919, the new German constitution was adopted in the National Assembly by a vote of 262 to 76, only the extremists of both parties voting against it, representing a persistent but slowly dwindling opposition to the new republican régime. The military party made several attempts to overthrow the republic. That led by Kapp in 1920 held Berlin for five days but was defeated by means of a general strike. In 1923, a monarchist insurrection broke out in Bavaria, led by Hitler and Ludendorff, but met with no better success, the two leaders being made prisoners.

Much of the success with which the new republican government of Germany met the difficulties that threatened its stability at first was due to the good sense and statesmanship of the first president, Friedrich Ebert, originally a saddler by trade, a socialist in politics, and a representative of the lower middle class which had risen to power in post-war Germany. Ebert's presidency justified the faith he had inspired. His government weathered not only the separatist agitations in Bavaria and the Rhineland and the bitter opposition of the extremists among both radicals and conservatives but also the grave crises with which Germany was confronted in her international relations. Ebert's death in February 1925 did not affect the equilibrium of the now well-established republic, and the election on April 26, 1925, of Paul von Hindenburg as the second president is generally conceded to insure the permanence of the republican government.

Reparations, the Ruhr, and the Dawes Plan. Germany's superb economic organization, rendered even more self-sufficient by the war-time blockade, enabled her to meet in part the economic demands of the Treaty of Versailles. Yet she was in an anomalous situation, which could not remain permanent. Her vast issues of paper money, partly necessitated by the financing of the reparations, steadily depressed the value of the mark and brought about a complete disorganization of her financial system. Eventually, Germany must in any case have failed to make the payments demanded of her, for her gold reserves were depleted, her raw materials could only be exported to a limited extent, and her manufactured goods, including ships, were not acceptable to the Allied powers. Her ability to pay the reparations assessed, however, as well as the amount already paid on that account, were the subject of wide and violent disagreement.

The reparations commission, despite British opposition, declared Germany in "voluntary default" on deliveries of coal and wood under the Treaty of Versailles, and French and Belgian troops marched into the Ruhr valley on January 10, 1923. At first proclaimed as a civil procedure to force Germany to meet the reparations payments, the occupation soon took on a purely military character. Protesting that the action was illegal, Germany promptly announced that she neither would nor could make further payments either in money or in kind, so long as her chief industrial district was under alien control. After a prolonged deadlock, deliveries in kind were resumed under short-term agreements with German industrial leaders. In the meantime, Germany had outlined a new proposal, pledging railway and industrial property and certain taxes to reparation payments. She agreed also to submit to a determination, by an international commission, of her ability to pay.

Out of this proposal grew the Dawes reparation plan, which did much to remove the question of reparations from the realm of political controversy. The plan was accepted by both Germany and France and the last French troops had left the Ruhr district by August 1, 1925. The operation of the plan has been facilitated by the restoration of a sound currency through the establishment of the Rentenbank in October 1923. This bank issued rentenmarks on the pre-war basis of 4.20 to the dollar. The previous currency, which, through inflation, had become worthless, was declared null and void.

Germany's Position in Europe. Despite her losses in territory (26,000 sq. mi.) and population (7,000,000) as a result of the war, Germany is still one of the strongest nations on the continent of Europe. Her greatest assets now, as during the preceding fifty years, are her unequaled power of industry, her scientific genius, and her national pride. The moral isolation that lamed her after the war is gradually yielding to saner counsels. She has herself contributed to this result by her loyal co-operation in the operation of the Dawes plan, by her acceptance of the principles laid down in the "Locarno Pact" (October 1925), and by her declared policy of seeking her ends through peaceful means and, in particular, through the League of Nations.

Germany's first attempt to enter the League of Nations was frustrated, but she was finally admitted in September 1926. Her desire to rectify her eastern boundaries brings her into conflict with Polish interests; her desire to unite with Austria meets with the determined opposition of France and Italy. The old militaristic spirit, however, has definitely passed.

RULERS OF GERMANY

Name	Lineage	Period of Rule		Birth	Death
	CAROLINGIAN EMPERORS				
Louis the German	Son of Emperor Louis I. He is regarded as the founder of the German Empire. Kingdom divided on death of Louis the German.	A. D. 843	A. D. 876	A. D. 804?	A. D. 876
Charles the Fat	Son of Louis the German; sole king through death of his brothers, Carloman and Louis; crowned emperor 881	876	887	832	888
Arnulf of Carinthia	Illegitimate son of Carloman; elected by the nobles	887	899	850?	899
Louis the Child	Son of Emperor Arnulf	899	911	893	911
	HOUSE OF FRANCONIA				
Conrad I	Duke of Franconia, elected king of Germany	911	918	?	918
	HOUSE OF SAXONY				
Henry I, the Fowler	Son of the duke of Saxony	919	936	876	936
Otto the Great	Son of Henry I; crowned emperor 962	936	973	912	973
Otto II	Son of Otto I	973	983	955	983
Otto III	Son of Otto II	983	1002	980	1002
Henry II, the Saint	Son of Henry the Quarrelsome of Bavaria	1002	1024	972?	1024
	SALIAN OR FRANCONIAN EMPERORS				
Conrad II	Crowned emperor 1027	1024	1039	990?	1039
Henry III	Son of Conrad II	1039	1056	1017	1056
Henry IV	Son of Henry III	1056	1106	1050	1106
Henry V	Son of Henry IV	1106	1125	1081	1125
	HOUSE OF SAXONY				
Lothair II	Crowned emperor 1133	1125	1137	1060?	1137
	THE HOHENSTAUFENS				
Conrad III	Duke of Franconia	1138	1152	1093	1152
Frederick I, Barbarossa	Nephew of Conrad III; crowned emperor 1155	1152	1190	1121?	1190
Henry VI	Son of Frederick Barbarossa; crowned emperor 1191	1190	1197	1165	1197
Otto IV (Double Election)	Son of Henry the Lion; crowned emperor 1209	1198	1215	1174	1218
Philip of Swabia (Double Election)		1198	1208	1177?	1208
Frederick II	Son of Henry VI; crowned emperor 1220	1215	1250	1194	1250
Conrad IV	King of Germany, not emperor	1250	1254	1228	1254
An Interregnum		1254	1273		
	HOUSE OF HABSBURG				
Rudolf I	Son of Albert IV, count of Habsburg	1273	1291	1218	1291
	HOUSE OF NASSAU				
Adolphus	Elected king of Germany and deposed	1291	1298	1252?	1298
	HOUSE OF AUSTRIA				
Albert I	Eldest son of Rudolf I	1298	1308	1250?	1308
	HOUSE OF LUXEMBURG				
Henry VII	Son of the count of Luxemburg, crowned emperor 1312	1308	1313	1262	1313
	HOUSE OF BAVARIA				
Louis IV (Double Election)	Son of the duke of Bavaria	1314	1347	1286?	1347
Frederick the Fair (Double Election)	Son of Albert I; minority choice	1314	1330	1286?	1330
	HOUSE OF LUXEMBURG				
Charles IV	Son of John of Luxemburg; crowned emperor 1355	1347	1378	1316	1378
Wenceslas	Son of Charles IV; elected king of Romans 1376, deposed from German throne	1378	1400	1361	1419
	HOUSE OF PALATINATE				
Rupert	Elector of the Palatinate	1400	1410	1352	1410
	HOUSE OF LUXEMBURG				
Sigismund	Son of Charles IV; crowned emperor 1433	1411	1437	1368	1437
	HOUSE OF HABSBURG				
Albert II	Son-in-law of Sigismund	1438	1439	1397	1439
Frederick IV	Son of Ernest, duke of Austria; crowned emperor (Frederick III) 1452	1440	1493	1415	1493
Maximilian I	Son of Frederick IV	1493	1519	1459	1519
Charles V	Son of Philip of Burgundy	1519	1556	1500	1558
Ferdinand I	Younger brother of Charles V	1556	1564	1503	1564
Maximilian II	Son of Ferdinand I	1564	1576	1527	1576
Rudolf II	Son of Maximilian II	1576	1612	1552	1612
Matthias	Younger son of Maximilian II	1612	1619	1557	1619
Ferdinand II	Son of Charles, duke of Styria	1619	1637	1578	1637
Ferdinand III	Son of Ferdinand II	1637	1657	1608	1657
Leopold I	Second son of Ferdinand III	1658	1705	1640	1705
Joseph I	Son of Leopold I	1705	1711	1678	1711
Charles VI	Son of Leopold I	1711	1740	1685	1740
	HOUSE OF BAVARIA				
Charles VII	Elector of Bavaria	1742	1745	1697	1745

RULERS OF GERMANY—Con.

Name	Lineage	Period of Rule		Birth	Death
	HOUSE OF LORRAINE	A. D.	A. D.	A. D.	A. D.
Francis I	Son of Leopold, duke of Lorraine	1745	1765	1708	1765
Joseph II	Son of Francis I	1765	1790	1741	1790
Leopold II	Third son of Francis I	1790	1792	1747	1792
Francis II	Son of Leopold II	1792	1806	1768	1835
	THE CONFEDERATION OF THE RHINE	1806	1815		
	THE GERMAN CONFEDERATION	1815	1866		
	THE NORTH GERMAN CONFEDERATION	1866	1871		
	THE HOUSE OF HOHENZOLLERN				
William I	Second son of Frederick William III of Prussia	1871	1888	1797	1888
Frederick III	Son of William I	1888	1888	1831	1888
William II	Son of Frederick III and grandson of William I	1888	1918	1859	
	GERMAN REPUBLIC				
Friedrich Ebert	Chosen provisionally, later elected president	1918	1925	1871	1925
Paul von Hindenburg	Elected president	1925		1847	

GREECE

The history of Greece is the story of a group of tiny states which grew up as independent units and resisted to the end any plan of federation among themselves. Consequently, Greece never became a military power which could present a united front to the world, and her greatness did not lie in the field of political organization. Yet, despite the serious menace of foreign invaders and devastating wars between the states themselves, these states maintained their independence long enough to produce works of literature; philosophy, art, and architecture, which have been the priceless heritage of later civilizations.

The Coming of the Hellenes. Greece was occupied by the Hellenes, an Indo-European people, at some time after 2000 B. C. They came as undeveloped tribes in search of homes, and immediately demolished an earlier civilization which had flourished in the prehistoric period, established themselves as masters of the entire peninsula, and made it their home henceforth, while the earlier occupants were entirely driven out or annihilated. This was probably accomplished by a gradual process covering several hundred years; for the Hellenic people comprised different groups, who may be supposed to have swept down into the peninsula in successive waves. These groups were closely related to one another but showed different characteristics. They were known in later times, when the Greeks were reconstructing their own ancient history, as Achæans, Æolians, Dorians, and Ionians, and, with the development of the Hellenic civilization, the special characteristics of each group produced a peculiar culture easily distinguishable from that of the other groups.

The Hellenes, thus established in a permanent home, began immediately to display the vigor and aggressiveness of a virile race. They soon spread over the neighboring islands of the Ægean, and then passed over these as by stepping-stones to the western coast of Asia Minor and to Crete. The sea was their highway and they became essentially a seafaring people. They developed a vigorous commerce and were ultimately competing for the markets of the Mediterranean with the Phœnicians, whose powerful colony, Carthage, was dominant for a time in the West.

Greek Colonization. There followed a period of colonization which cannot be defined as to its beginning, but it was over by the end of the 6th century B. C. The colonies were founded as private enterprises by groups who were led to leave their native homes, sometimes through dissatisfaction with political conditions, sometimes through lack of land or by economic distress; they were not in the first instance commercial enterprises. The colonies thus established became independent units, but each maintained a close association with the mother state, reproducing its polity in a foreign land. Of course the colonies carried with them and preserved the Greek language and culture.

In this way colonies were sent to the shores of the Black Sea, to Egypt, to southern Italy, and to Sicily. A few of the important Greek colonies were: Byzantium (modern Constantinople), founded by Megarians in 660 B. C.; Naucratis, "Mistress of Ships," in Egypt, founded by Milesians about 640 B. C.; Cyrene on the northern coast of Africa, founded by Therans about ten years later; Syracuse in Sicily, founded by Corinthians in the 8th century B. C.; and Croton in southern Italy, founded by Achæans about 700 B. C. These and many other colonies were important trading centers for Greek commerce.

The large cluster of colonies established in southern Italy gave a distinctive character to this district, which was called by the Romans *Magna Græcia*. This was to the Greeks a land of promise and opportunity such as the American "great West" has been. Here wealth was accumulated in great abundance, and the colony of Sybaris came to be spoken of as typifying extravagance and luxurious living. It was from these particular colonies that the first gleams of Greek culture began to reach the vigorous Roman people, and hence came the mellowing influence which was destined to make over the Roman character and bring about Rome's willing acknowledgment of the supremacy of Greece in the world of the spirit.

Greek Division and Unity. The segregation of the Greeks into tiny political units was brought about, first and chiefly, by the character of the people themselves and, secondly, by the nature of the country in which they settled. The Greek was by instinct strongly individualistic, thoroughly devoted to the interests of his family and immediate community, but inclined to be jealous and suspicious of those not so closely connected with him, even though they might be Greeks like himself. He was also ready to defend his own views, with prolonged argument if necessary, and unwilling to let any other man do his thinking for him. The land of Greece, on the other hand, with its endless succession of mountains and narrow valleys, each with a limited area of arable land, made isolation natural and easy, and strongly encouraged—nay, almost made inevitable—the formation of small units which came to have a sense of independence and self-sufficiency.

Yet the centrifugal tendency was not the only one at work. The Greeks were led by a sort of national pride to designate all who were not Greeks as "barbarians," or people without the pale. This term was at first used without the opprobrium now attaching to the word, but it soon came to have a distinct suggestion of inferiority, and finally it indicated downright contempt. Then the songs of Homer, which were known and sung throughout Greece, strongly encouraged the same feeling; for in them the Greek states were represented as fighting together against

a foreign power. Furthermore, the religious worship of the Greeks was, broadly speaking, the same; and so they came together at stated intervals to honor special divinities in great festivals which assumed a national character. Such festivals were held at Olympia and at Nemea, in honor of Zeus, at Delphi, in honor of Apollo, and at the Isthmus, in honor of Poseidon. While these festivals were going on, it was customary to observe a religious truce throughout Greece. Mention may also be made of a council or league of several states in northern Greece, called the Amphictyonic League, which met primarily to discuss and settle questions pertaining to religious matters, and which naturally fostered a close bond of sympathy between all the participating states.

The City-State. The political unit throughout Greece was the *polis*, or "city-state," an independent organization composed usually of the inhabitants of a single small town. Occasionally, a town associated neighboring villages with itself in a small federation; this was done by Athens with the country villages of Attica, and by Sparta with those of Laconia. The population of these city-states was astonishingly small, and this characteristic remained one of the determining factors in Greek political development. The typical city-state of early times was ruled by a king, and this was doubtless the only form of government known in Greece during several centuries, after the tribal organization was outgrown and before the time when the record of Greek history commences, about the 8th century B. C.

At this time we find a state of political unrest prevalent throughout the land, for the reigning families were being overthrown in many of the states. The power was being taken over by small groups of nobles, or by individuals who succeeded for a time in getting sufficient support to maintain themselves supreme; in the former case the government came to be called an *oligarchy*, in the latter, a *tyranny*. Many of the tyrants were men of real ability and proved to be excellent rulers.

The spirit of political unrest, however, did not always lead to violence. In some states men of conspicuous wisdom and integrity were designated to draw up and codify a new system of laws. Such a service was rendered by Draco, and later by Solon, at Athens, and by Pittacus at Mytilene. This, of course, implies that writing was by this time in common use throughout Greece. The alphabet had been adopted from the Phœnicians at some time after 1000 B. C.

Government in Athens. The fortunes of the city-state of Athens may be considered typical of what was taking place throughout Greece prior to the end of the 6th century B. C. The early Athenian monarchy was gradually transformed into an aristarchy, which finally gave place to a pure democracy. This was accomplished as follows: First, the king's power was curtailed by the introduction of two new magistrates, the *polemarch* and the *archon*, elected by the people. Later, the kingship became elective, and six new magistrates were added, making the "nine archons." Meanwhile, unfavorable economic conditions were causing distress among the common people. The introduction of money to replace the old system of barter produced serious disturbance in the economic development of Athens, as it did in all Greece. The first coinage is said to have come into the Greek world from the wealthy kingdom of Lydia in Asia Minor in the 7th century B. C. This and other causes brought about a situation which demanded a remedy, and Draco was appointed an extraordinary legislator (*thesmothetes*) and commissioned to draw up a new code of laws. This he did in 621 B. C., but the penalties imposed by his laws for wrongdoing were so severe that it was found difficult to use his code; in later times an Athenian orator said that Draco's laws were written in blood, not in ink.

About thirty years later Solon was chosen to perfect the work of Draco. He undertook his task with a statesman's skill and was remarkably successful. By his social legislation he relieved the poor of their unbearable burdens, and by his political reforms he erected the framework of the Athenian democracy, making the people the sovereign power of the state, with complete control over all their executives, and giving all free men some degree of right as citizens.

The Athenian democracy, however, was not even yet fully established. Party strife continued, and Pisistratus, a popular and successful general, backed by the discontented element of the population, was able to grasp the supreme power. He proved himself a wise and able ruler; for he kept the form of the constitution laid down by Solon, while holding the guiding power in his own hands. The diversity and importance of the various enterprises carried on by Athens during his rule bear testimony to his tireless activity. Among these, may be mentioned the re-editing of the poems of Homer, the foundation of a huge temple of Olympian Zeus,—which had to await the wealth of a Roman emperor to bring it to completion,—the establishment of the great annual festival of "Dionysus in the City," in which tragedy, one of the richest fruits of the Greek genius, was performed, and the prosecution of successful military operations on the Hellespont.

The rule of Pisistratus was carried on by his sons after his death, until the tyranny was brought to an end, with the help of Sparta, in 510 B. C., and the descendants of Pisistratus were forever debarred by law from the rights of citizenship. Athens now began her career as a democracy, first modifying the constitution of Solon by the reforms of Cleisthenes, which provided for a new and more satisfactory grouping of the citizens.

Sparta and Other States. The other states had meanwhile been working out practicable constitutions, each in its own way. In contrast to the pure democracy finally achieved by Athens, a constitution of a strangely mixed character was adopted in Sparta. Here there were two hereditary kings, holding office for life, and a board of five ephors, elected annually; these ephors exercised most of the important civil functions which had belonged to the kings, and represented the common people as against the nobility. The senate or *Gerusia*, however, was composed of nobles and naturally represented the interests of that class. The Spartans had grown to be a conservative people devoted to a strict military discipline—in fact, a military state composed of a limited number of free warriors imposed upon a larger number of serfs or *helots*. The strictness of the Spartan discipline, which has become proverbial, did indeed produce a remarkably efficient corps of fighting men, but it repressed rather than encouraged the free development of the individual citizen.

Thus, by the end of the 6th century B. C., all the Greek states had passed through the period of political readjustment, and, temporarily at least, tyrannies were at an end. The period under discussion had witnessed notable achievement in many fields of activity. There had been great commercial expansion, as noted above, with marked progress in local industry, and real achievement in architecture and in literature. Indeed, the Greeks had by this time attained a high level of culture which marked them out as a peculiarly gifted people.

Religious Conceptions. The Greek had been wrestling also with the problems of life as expressed in his religion. The old anthropomorphic gods of Homer, whose writings were to the Greeks almost sacred, were little better than humans and had ceased to fulfill the ideal of an awakening age, and a more spiritual interpretation of godhead than that found in Homer was coming to be adopted by thoughtful men. Yet the outward form of the old polytheistic religion remained, with its temples, its priests, and its ritual worship.

A widespread yearning for immortality is evidenced by the prominence of societies which gave promise of this boon to mortals. The Eleusinian

Mysteries, a kind of Passion Play of the sorrows of Demeter, were open to all, even the humblest. Here great numbers found comfort in the hope of salvation and purification from the sins of the world. There was also the Orphic Sect, of widespread influence, and, in southern Italy, Pythagoras had founded his brotherhood.

On the other hand, many had been turning to seek a rationalistic explanation of the universe, as a protest against the mysticism of such bodies as the Orphic Sect. This movement grew up in Ionia in Asia Minor, and it was here that Greece was saved from the tyranny of religion interpreted by a priestly class. Beginning with crude speculations upon the nature of the material composition of the world, and progressing very slowly at first, a succession of serious and able men prepared the way for the great achievement of Greek philosophy in the 5th and the 4th century B. C. Thales, the pioneer of this movement, proposed that water is the primary element of all things.

Athens, Sparta, Thebes. At the beginning of the 5th century B. C., the important Greek states were related as follows: Sparta, with her wonderfully efficient army and her iron discipline, was unquestioned leader in the Peloponnesus, having come to overshadow Argos, whose ancient importance was waning. This pre-eminent position of Sparta placed her automatically at the head of a kind of league of Peloponnesian states. Even Athens, as we have seen, was indebted to Sparta for deliverance from her tyrants, and was for a time strongly under her influence. Athens, at the head of the federation of the villages of Attica, had outstripped her near-by rivals and held a secure and easily defended position as a sea power. The rival of Athens on the north was Thebes, the dominant power in Bœotia.

Persian Wars. At this time a new age dawned on Greece. The expanding Persian power was turning toward European conquest. Meanwhile the Athenians had sent aid to the Ionian cities in Asia Minor during a revolt against Persian rule. With this revolt crushed, Darius planned to punish Athens. His first expedition, in 492 B. C., was destroyed by storms, but two years later he sent a fleet and an army across the Ægean, which landed on the plain of Marathon, about twenty-five miles distant from Athens. His forces were guided by Hippias, son of Pisistratus, former tyrant of Athens. The Greeks, remembering the terrible Persian punishment of Asiatic cities, were panic-stricken. But Miltiades, who was familiar with Persian methods of warfare, roused their courage by his confident plans for meeting the invader, and under his leadership the Greek citizen-soldiers, with their spears, broke the attack of the Persian bowmen. The Persians fled, leaving 6000 dead on the field, while the Greek loss was only about 200. The grateful Athenians, who had borne the brunt of the battle almost without assistance, raised a memorial mound, which may still be seen on the field of Marathon.

Ten years passed, and Xerxes, son of Darius, in 480 B. C., entered Greece with an army of overwhelming size, accompanied by a great fleet. Sparta, on this occasion, stood solidly with Athens, and the Persian advance was opposed at strategic points on land and sea. Treachery, however, enabled Xerxes to enter by the pass of Thermopylæ—but only over the dead bodies of the heroic Leonidas and his loyal band of Spartans. Athens was burned. But the Athenians, wisely advised by Themistocles, had built a navy, and in the strait of Salamis they crushed the Persian fleet. The next year, 479 B. C., the remnant of Xerxes' army was defeated by the Greek spearmen at Platæa. Never again did a Persian army enter Greece. In the West also, the year 480 B. C. saw the Hellenic world freed from an Asiatic menace through the overwhelming defeat of the Carthaginians by the Greeks of Syracuse.

The generous co-operation of Athens and Sparta ceased, unfortunately, as soon as the danger was passed, and the old spirit of jealous rivalry again manifested itself. The Spartans looked with apprehension upon the energetic preparations of Athens to meet another possible emergency; sullen distrust and mutual suspicions prepared the way for the internecine struggle which was destined to ruin the fairest city of Greece.

The Athenian Empire. The Athenians, led by Themistocles, rebuilt their city with strong fortifications and improved and protected the harbor of the Piræus. Next, in order to secure complete protection against the menace of Persia, they organized the Confederacy of Delos, whose guiding spirit was Aristides, known as "The Just." This was a union of Athens with the Greek cities of Asia Minor and the Ægean islands and was at first a purely co-operative league. Its name arose from the fact that its treasury was located on the island of Delos under the protection of Apollo. The allies at first contributed ships, with which Cimon, son of Miltiades, freed the entire Asia Minor coast from Persian control, as far as the mouth of the Black Sea. Under his leadership, Athens gradually brought the states of the league into the position of dependencies, while maintaining friendship with Sparta. In 454 B. C. the transfer of the treasury to Athens marked the beginning of the Athenian "empire." But Cimon's policy of co-operation with Sparta was unpopular with the radical, democratic party at Athens, and he was ostracized.

At this period most of the offices of the Athenian democracy were filled by lot; hence the men selected were often inefficient. But the ten generals were elected by the votes of the people, an arrangement which gave a single powerful man his opportunity to direct the state. For about thirty years this position in the Athenian state was maintained by Pericles. His supremacy coincided with the most brilliant era of Athenian culture, though this period was marred by the first of those contests with Sparta which finally resulted in the complete ruin of Athenian political power.

The Periclean Age. Pericles' ambitious plan of establishing an Athenian land empire led to conflict with Sparta, and after years of fruitless struggle the so-called Thirty Years' Truce, in 445 B. C., restored the *status quo*. Both sides were exhausted. Meanwhile Athens had carried on a disastrous campaign against the Persians in Egypt. The next fifteen years in Athens are known as the Periclean age. Commerce brought the wealth of the world to the port of the Piræus. Tribute from allied and subject cities filled the public treasury. Rich citizens and the state lavished money without stint upon festivals and public buildings. Sculptors and architects of genius were employed to raise statues and temples in honor of the gods and of great men, and to express in marble the beauty and dignity of the human form. Contests and public prizes stimulated poets and dramatists. The democracy, by opening offices to all save the poorest citizens, encouraged a keen interest in politics. Schools flourished, oratory became a fine art, and the sophists, disturbers though they were, challenged the skill of the cleverest by the subtleties of their art of dialectics. Athens had become the center of Greek culture, and her influence extended far beyond the limits of Greece.

The Fall of Athens. But the other cities of Greece were jealous and hostile, and in 431 B. C. the truce of 445 B. C. was broken. The armies of Sparta, Thebes, and Corinth, with their allies, entered Attica and devastated the country about Athens. The people who were thus driven within the city were stricken with a plague due to crowded, unsanitary conditions. Pericles fell a victim to the disease, and Athens, lacking capable leadership, was thrown into confusion. The war continued for ten years. Athens managed to maintain control of the sea, and in 421 B. C. a truce of fifty years was arranged. But this peace failed to settle any real issue or to check the brutal passions that the war had aroused.

At this stage of affairs, Alcibiades, a high-spirited young man of remarkable ability, rose to power as champion of those opposed to the peace party in Athens. He incited the Athenians to undertake an expedition against the Corinthian city of Syracuse in Sicily, 415 B. C. But Alcibiades, who sailed as a general with the expedition, found himself recalled to Athens to answer a charge of impiety. He promptly deserted to Sparta. By his advice a Spartan general and a few troops were sent to Syracuse. The Athenian fleet and army were annihilated, 413 B. C., and the Spartans, who had been making annual invasions of Attica during the early years of the war, now definitely locked her within her walls by occupying the fortress of Decelea, a few miles to the north. For ten years the city held out, though forced to see her flourishing farms devastated and to import all supplies by sea. At length, in the battle of Ægospotami, 405 B. C., the entire Athenian fleet was captured or destroyed by the Spartans, and Athens, faced by starvation, surrendered. Her fortifications were leveled, and she was forced to recognize the supremacy of Sparta. After enduring a reign of terror carried out under Spartan protection, her democratic constitution was again restored, but her strength was broken.

Sparta and Thebes. There followed a dreary period of negotiations with Persia, both Athens and Sparta bidding in turn for an alliance which would gain the support of Persian gold. The King's Peace, 387 B. C., gave Greek leadership to Sparta. She had won her final battle with Athens by means of Persian funds, under the guise of champion of the free Greek cities. Now she revealed her purposes by overturning every democratic government and establishing in each state an oppressive and irresponsible Spartan governor supported by a garrison of Spartan soldiers. On a fateful night, a young Theban noble entered Thebes with a band of followers, killed the leaders of the oligarchic party, and forced the Spartan garrison to an ignominious surrender. Pelopidas and his friend, Epaminondas, thus challenged Sparta and made Thebes, for a few years, supreme in Greece. Epaminondas, who gave evidence of possessing a high type of statesmanship, was killed at the battle of Mantinea in 362 B. C.

It is worth noting that, even during the stress of her life-and-death struggle with Sparta, Athens had still been able to continue the work on the noble buildings which crown her acropolis. The shameless mismanagement of Athenian affairs after the death of Pericles had been subjected to the biting satire of Aristophanes, the dramatist, and the sophists had been ably and fearlessly met by the challenge of Socrates. The story of the nations was being completed by Herodotus the very year in which Pericles succumbed to the plague, and Thucydides was engaged in setting forth in his history the lessons of the Greek wars while the greatest of them was actually in progress. In the years after the war, Plato, a pupil of Socrates, wrote of the ideal city-state, but he failed to see the larger problem of statesmanship, the union of cities. Isocrates, understanding the weakness of the Greek policies, pleaded for united action against the foreigner, and Xenophon endeavored to rouse Greek patriotism through his story of the Ten Thousand. But Greece was not to see political unity realized until her many quarreling states were welded into a dependency by the Macedonian power.

Alexander the Great. Macedonia, peopled by a race which was Greek in language as well as in blood, had been slowly assimilating the culture of its southern neighbors since the period of the Persian wars. In 360 B. C., Philip, a man of Greek education and military experience, came to the throne. He at once adopted a policy of Macedonian expansion. The battle of Chæronea in 338 B. C. gave him control of all Greece except Sparta. Death cut short his ambitious plan of invading Persia, but he left to his son Alexander a remarkable body of trained and devoted councilors and officers. Alexander, however, coming to the throne at the age of twenty, was soon to display a genius that outshone them all. He had been taught by Aristotle, who not only instructed him in history and science but also fired his imagination with the vision of a world empire resting on the firm basis of Greek culture and Greek traditions and headed by Macedonia.

In 334 B. C., after crushing a rebellion at Thebes, Alexander crossed the Hellespont and began the march which was to make his dream a reality. During the next twelve years he led his armies along the ancient highways of Asia, subjugating the cities which had been seats of civilization from hoary antiquity. He conquered Egypt, where he founded the great city of Alexandria, and penetrated the trackless desert as far as the shrine of Ammon, in order to win assurance from the god himself that he was, in very truth, son of Ammon; here he stood on the confines of the Carthaginian empire. His eastward march carried him into India, and only the restlessness of his army drew him back from the valley of the Ganges. In Babylon he made his capital with the magnificence of an Eastern potentate, and in that ancient city of the marshes, fever struck him down. He had brought Greek culture to the East; the Hellenistic age, which he ushered in, saw this culture thriving in many flourishing cities, from his own Alexandria in Egypt to the central plains of Asia.

The Greco-Roman World. But, if this age Hellenized the East, it also Orientalized the West. Oriental ideas of religion and statecraft found their way into the thinking and practice of the Greeks and of the Romans as well; for, although Alexander did not march into the West, Rome had long been under the spell of Greek influence. The religious cults of the Egyptian Isis and the Persian Mithra became widely popular in the Roman world, which was soon to include Greece among its provinces. Likewise, the Romans became acquainted with the notion of the divine character and right of kings, which may be traced to Alexander's practice of having himself proclaimed the son of Zeus. This may have seemed to him necessary in order to sustain his great authority, but it must be said that his assumption of divine right alienated loyal followers from him and, in the end, proved disastrous to his plans.

The death of Alexander destroyed the last hope of a unified Greek empire. Within a generation the vast realm he had conquered was divided among three of his generals. Macedonia and Greece fell to Antigonus; Syria, to Seleucus; and Egypt, to Ptolemy. One more attempt was made by a group of states in the Peloponnesus to assert Greek independence. But this Achæan League, as it was called, though led by able and patriotic men, was only partially and temporarily successful. For 150 years, under the Ptolemies, Alexandria was the center of that later widespread Greek civilization known as Hellenism. Here the Hebrew Old Testament was translated into Greek. The Museum of Alexandria was in effect a great state university. The schools of Alexandria were rivaled by those of Pergamum and of Rhodes; but it was an age of scholarship rather than of creative activity.

The strife and internal weakness of the Greek kingdoms left by Alexander gave Rome an opportunity to extend her power over all the East and to hammer the Greco-Roman world into a stable empire, a realm of Greek culture and Roman law.

Modern Greece. Greece was merged in the Eastern or Byzantine Empire when the Roman world was divided, and, after the fall of Constantinople in 1453, it became a part of the Turkish empire. From the 4th century B. C. until 1821, when the Greeks rose in revolt against the Turkish power, they were at no time a free people. During the 18th century an intellectual revival had taken place in Greece, and this had aroused national pride and brought about a restoration of the Greek language. This

revival of a national consciousness in Greece had stirred the interest of enlightened people in all the nations of the West. Many notable men from western Europe joined the Greek army, among them Lord Byron, who gave his life for the cause; and when, after five years of cruel struggle, the cause of Greek independence seemed all but lost, England, France, and Russia intervened. By the Treaty of Adrianople in 1829, the Turks were obliged to acknowledge Greek independence, which was guaranteed by the three powers. In 1833, Otto of Bavaria became king of the new Christian state of Greece. The country was poor, it had been devastated by war, and its people were untrained in popular government. The presence of German officers made Otto's administration unpopular, but during his reign some beginnings were made in the political education of the people and in the organization of government.

Otto was driven from the throne in 1862, and in 1863 a brother of the Danish king succeeded him as George I. England strengthened his hands by the cession of the Ionian islands in 1864. In this same year a new constitution established a legislature, the *Boule*, elected by universal suffrage. Thessaly was ceded by Turkey in 1881, but, after a war with the latter in 1897, a portion of this region became lost to Greece. King George joined Montenegro, Serbia, and Bulgaria against Turkey in 1912. As a result of this, Greece materially enlarged her territories, Crete, long a cause of strife, being among her new acquisitions. The war with Bulgaria in 1913 brought still more land into the Greek kingdom. George I was assassinated in March 1913.

At the outbreak of the World War, the Greek prime minister, Venizelos, supported the cause of the Allies against the wishes of King Constantine, whose sympathies favored Germany. Venizelos was compelled to resign, Oct. 7, 1915. In October of 1916 he set up a provisional government at Saloniki, which was recognized by the Allies. After great pressure on the part of the Allies, Constantine abdicated on June 11, 1917, and his son Alexander ascended the throne. Venizelos now brought Greece officially into the war on the side of the Allies, and Greek troops took part in the Balkan campaign of 1918. The Treaty of Sèvres, which was never fully ratified, gave to Greece important accessions of territory. Venizelos, however, defeated at the polls, left the country. On King Alexander's death, Constantine was recalled. This act estranged the Allies, who consented to a revision of the Treaty of Sèvres. Constantine took the field to enforce against the Turks the favorable arrangements previously agreed to, but suffered a crushing defeat in September 1922. Greece was obliged to sign the humiliating peace of Lausanne in 1923, by which Turkey recovered her control of Constantinople and the Anatolian coast of the Ægean. Over 1,500,000 Greeks were expelled from Turkey and settled in Greece. Constantine was forced to abdicate a second time and a number of his officials were executed. His successor, George II, was later compelled to leave the country and, on May 1, 1924, a republic was proclaimed. In 1925 Pangalos, backed by the army and navy, forced the resignation of the regularly elected premier and assumed office himself. He was forcibly supplanted in 1926, and constitutional government was restored.

GREENLAND

The discovery of Greenland is credited to the Norwegian, Eric the Red, who is said to have spent three years on the coast of the country (982–985). Within the next few years, several Norwegian settlements were made. These colonies, of which only a few ruins and tombstones remain, had originally a republican organization, such as prevailed in Iceland, but, like the latter country, they fell under the authority of the Norwegian kings about the middle of the 13th century. Christianity had already been established about the year 1000.

During the 15th and 16th centuries, Greenland disappeared from history, and, in 1585, the explorer John Davis found only Eskimos on the coast. After a lapse of 150 years, Hans Egede, a Norwegian clergyman, established a Lutheran mission settlement near Godthaab, under the authority of the king of Denmark. The religious and educational work thus begun among the natives is still conducted by the Danish government. Greenland, like Iceland, was left in Danish hands at the separation of Norway and Denmark in 1814.

Since 1774, trade with Greenland has been a Danish royal monopoly. Commerce and the administration of the various colonies, of which there are about sixty, is in the hands of the Greenland commission. The system is cited as an admirable example of colonial management for the benefit of the native population, which in recent years has been steadily increasing.

HOLLAND

Holland is the popular name for the Kingdom of the Netherlands. Properly, the name applies to the medieval county of Holland, now represented by the provinces of North and South Holland, in the Netherlands. Holland was one of the provinces which in 1579 joined in the Union of Utrecht. See *Netherlands*.

HOLY ROMAN EMPIRE

The Roman Empire succeeded the republic and began its history with the rule of Augustus Cæsar in 29 B. C. After the death of Theodosius the Great in 395 A. D., the Western Roman Empire was separated from the Eastern, sometimes called the Byzantine, or Greek, Empire. Owing to the frequent incursions of the barbarians, the two empires became riven asunder. The Eastern Roman Empire lasted until the fall of Constantinople in 1453 A. D.; the Western had come to an end as early as 476 A. D. In the year 800, Charlemagne at Rome inaugurated anew this Western empire as the Holy Roman Empire and was crowned as its first emperor by Leo III. After the extinction of the Carolingian line, there ensued a period of feudal disturbance, when the empire existed only in name. The title of emperor was, however, again given substance by Otto I, king of the East Franks. At the invitation of the pope, he entered Italy with his victorious armies, and at Rome in 962 was crowned emperor. The Saxon line of emperors, founded by Otto, gave place in 1024 to the Franconian line, begun by Conrad II. In the reign of Henry IV (1056–1106) began the momentous contest for supremacy between the emperors and the popes.

On the death of Henry V in 1125, the imperial office became elective, the first elected emperor being Lothair II. In 1356, the emperor Charles IV promulgated the Golden Bull, which determined the imperial electors.

In 1273 Rudolf, the first emperor of the house of Habsburg, was elected, and from 1438 the succeeding emperors belonged to this house. Not until 1806, when the Empire was broken up by Napoleon, did Francis II relinquish his title as emperor of the Holy Roman Empire. See *Austria*, *Italy*, *Spain*.

HUNGARY

Hungary, a country in which the Magyar race is dominant, regained its independence as a result of the World War. The Magyars, an Asiatic people of Turanian race, allied to the Finns and the Turks, dwelt in what is now southern Russia before they descended, under Arpád, into the plain of the Danube, toward the end of the 9th century, and conquered the whole of Hungary and Transylvania. During the first half of the 10th century their invasions and incursions spread terror throughout Germany, France, and Italy; but at length their total defeat by Otto I of Germany put an end to their maraudings, and under their native Arpád dynasty they settled down to learn agriculture and the arts

of peace. Stephen I (997–1038) was the first who was successful in extending Christianity generally among the Hungarians; and he was rewarded with a crown from Pope Sylvester II and the title "apostolic king" (1000). Stephen encouraged learning and literature, and under him Latin became not only the official language of the government, but the vehicle of Hungarian civilization, which it unfortunately continued to be for the next 800 years.

About the end of the 11th century the boundaries of Hungary were extended by the conquest of Croatia, Slavonia, and Dalmatia. In the 12th century the Hungarians first attained, through French connections, a certain refinement of life and manners. About the middle of the 13th century, King Bela induced many Germans to settle in the country, which had been depopulated by Mongol invasions. With Andrew III (1290–1301) the male line of the Arpád dynasty ceased, and the sovereignty now became dependent upon an electorate. Charles Robert of Anjou was the first to be thus chosen (1309). Louis I (1342–82) added Poland, Red Russia, Moldavia, and a part of Serbia to his kingdom.

Decline of the Kingdom. From the accession of Sigismund, elected emperor of the Holy Roman Empire, dates the beginning of the decline of Hungary. His reign (1387–1437) was marked by the Turkish invasion and the Hussite war. He nevertheless introduced various reforms and founded an academy at Buda. Matthias Corvinus (1458–90), surnamed the Great, combining the talents of diplomatist and general, proved successful against his enemies at home and abroad, and his name has been handed down in history as that of a just and firm ruler. He was an ardent patron of learning, and he founded a university at Pest.

During the early 16th century, domestic troubles and the rapacity of the magnates brought the power of Hungary to a low pass, and the battle of Mohács (1526) reduced a part of the country to a Turkish province. The rest was left to the opposing claims of Ferdinand of Austria and John Zapolya. Eventually, with the aid of the Protestants, the quarrel was settled in favor of Ferdinand, who was proclaimed king of Hungary. In 1687 the sovereignty was made hereditary and remained until 1918 under the scepter of the Habsburgs. In 1686 Leopold I took Buda and recovered most of Hungary and Transylvania from the Turks. In 1723 Charles VI, by a decree known as the Pragmatic Sanction, secured from his several hereditary states their promise of allegiance at his death to his daughter, Maria Theresa. In this way the Hungarian crown passed to the female descendants of the house of Habsburg. Charles died in 1740, and the loyalty of the Hungarians to his daughter was at once proved by the support they gave her in her struggle against the encroachments of Frederick of Prussia and the insidious designs of France.

Movement for Independence. Despite the War of the Austrian Succession, Maria Theresa did much for the improvement of Hungary, particularly in the founding of schools and colleges. Her son and successor, Joseph II (1780–90), in his zeal for an ideal enlightened despotism, tried to break down all the ancient Magyar institutions of self-government. Opposition to this policy was increased by his edict of 1784, making German the official language. However, on the advent of the French Revolution and during the wars that ensued, the Hungarians once more played a prominent part in support of the Habsburg crown. Leopold II (1790–92) had revived the power of the Hungarian diet. But the Revolution had given an impetus to ideas of national and popular rights, which the Hungarians, long stifled under the Germanic traditions and tendencies of their rulers, were among the first to feel. For a time, Francis I and Metternich stood stiffly out against all concessions, and tried to govern by pure absolutism, but they ended by summoning a new diet in 1823, controlled by Magyars.

Succeeding diets made new demands in the direction of religious equality, popular suffrage, and abrogation of the privileges of the nobles. The Austrian government attempted to repress the Hungarian national movement by imprisoning Deák, Kossuth, and other leaders. But the diet of 1839 demanded the release of political prisoners, made Magyar the official language, and freed the peasants' lands from feudal dues. The struggle continued till 1848, when the French Revolution of that year gave the impulse for a similar rising in Vienna.

The Dual Empire. Prince Metternich fled to London, and the Viennese court made a formal concession of all important demands; but at once the government began secretly to work against their being put in operation. The dependencies of the Hungarian crown—the Croats and the Wallachians of Transylvania—were privately encouraged to revolt, and in December of the same year an Austrian army took the field with the avowed object of annihilating the independence of Hungary; but a series of pitched battles resulted on the whole so much in favor of the Hungarians that Austria was obliged to call for the aid of Russia, which was at once granted. After a heroic struggle, the Hungarians had to succumb. But the struggle was continued in the form of a constitutional agitation, and at last, when the battle of Sadowa, in 1866, separated Austria from Germany, Austria, left face to face with a nation almost as powerful and numerous as itself, felt compelled to submit. In 1867 a separate constitution and administration for Hungary were decreed, and on June 8 the emperor and empress were crowned king and queen of Hungary.

The dualism of the Austrian empire was thus finally constituted. But Hungary itself was made up of people of several races, the Slavs constituting more than half of the population, although the Magyars, or rather the Magyar nobles, alone held political power. About 1875 this ruling class began a policy of "Magyarizing" the entire state through manipulating the suffrage laws and insisting on the universal use of the Magyar language. Until the outbreak of the World War, this policy was a source of increasing bitterness among the Hungarians.

Hungary and the World War. At the opening of the war (1914) Hungary, under Magyar leadership, rallied to the support of Austria and Germany, the Magyars regarding the struggle as a Hungarian war, out of which they would reap huge benefit. In the collapse of 1918, however, the Slav population went to the new states of Czechoslovakia and Jugoslavia, the Rumanians to an enlarged Rumania, leaving what is practically a Magyar state, still called Hungary, or Magyaria, of about half the area of the old Hungary. See *World War*.

In November 1918, Hungary proclaimed the Hungarian People's Republic, with a single chamber, the National Assembly, and with Count Karolyi as provisional president. This government lasted until March 1919, when a Soviet administration, under Bela Kun, was set up. A Socialist government succeeded the Soviet, and, after an interim of several months, Admiral Nicholaus von Horthy was elected regent, March 1, 1920, by the National Assembly, which granted him royal rights, except that his approval is not necessary to legislation.

In 1921, Charles IV, the former emperor of Austria-Hungary, made two attempts to gain possession of the Hungarian throne. He was finally defeated in October and exiled to Funchal in Madeira, where he died in April 1922. On October 13, 1921, an agreement between Austria and Hungary was announced for the settlement of the disputed possession of the Burgenland, which had been transferred by the Allies to Austria. A plebiscite in Oedenburg was favorable to Hungary. This district was, with the approval of the Conference of Ambassadors, given over to Hungary, while the rest of the Burgenland went to Austria, January 1, 1922. Strong reactionary movements in Hungary followed this division.

ICELAND

Though the Culdees, an ancient order of Irish monks, are said to have settled in Iceland as early as 795 A. D., it was not until between 870 and 930 that Iceland was discovered and colonized by the Norsemen, or Scandinavian vikings. The earliest immigrants came in three successive movements,—from Norway, then from the Norse kingdom of Dublin, the Orkneys, and the Hebrides, and, latest, again from the kingdom of Norway. Christianity established itself about the year 1000.

In the beginning the government of Iceland was a species of aristocratic republic made up of small landowners whose laws were framed and sanctioned by a national assembly called the *Althing*, which met once a year in summer time. But, between the years 1262 and 1271, a period of internecine strife brought the island under the sway of the Norwegian kings. From 1280, Iceland, through the union of the Scandinavian crowns, became a dependency of the Danish crown, though it was not until a century later (1388) that it was constituted such by law.

This medieval period under foreign rule saw a sad decline in the spirit and enterprise of the Icelandic people. The Black Plague decimated the population. Ancient arts and crafts perished, and song and story languished. The Reformation kindled anew the intellectual life of the country, but this wrought little change in the economic state of the people. Moreover, throughout the 16th and 17th centuries the island was the prey of pirates and buccaneers. In the 18th century there fell disaster in the form of plagues of smallpox, famines, and volcanic eruptions, which caused the death of about a fourth of the population.

The early decades of the 19th century brought better fortune to Iceland. The intellectual movement that was stirring Europe touched the Icelandic people through an effort at popular education. When Norway was separated from Denmark in 1814, Iceland remained a dependency of the latter kingdom. A struggle for more liberal government soon began. In 1874 a measure of limited home rule was secured, followed in 1903 by provision for responsible government. At length, in 1918, Denmark, through an act of union, recognized the independent sovereignty of Iceland, the two countries continuing their union only in the fact of having one king.

ITALY

The history of ancient Italy is the story of Rome down to 476, when Odoacer, the strongest of the German generals in Italy, having deposed the boy-emperor Romulus Augustulus, made himself master of the western half of the Roman Empire. In 493, however, he was overthrown by Theodoric, leader of the invading Ostrogoths (East Goths), a powerful and able man who established himself as king and ruled until his death in 526. The strong and statesmanlike policy of Theodoric seemed to promise order and the preservation of the remnants of ancient Italian civilization. But, just after his death, Justinian succeeded to the throne of the Eastern Empire, and he sent his general, Belisarius, to conquer the Goths. They were so completely defeated that they withdrew from Italy, and but meager accounts of them have been left to history.

The Lombard Supremacy. After the death of Justinian (565), his successors at Constantinople were unable effectively to protect their reconquest of the Western Empire, of which they lost a great part to the invading Lombards, who in 568 poured from the north over the Alps into the plain of northern Italy, which still bears the name of Lombardy. Originating from near the Baltic, these barbarians, unlike the Ostrogoths, had had little intercourse with the Empire and were consequently far less civilized. Their leader, Alboin, who came to a violent end in 573, was in no way comparable to Theodoric. Though the Lombards overran the North and strips of territory down the center of Italy without meeting serious resistance, they lacked military and administrative capacity—as well as control of the seas—to complete the conquest of the peninsula. Their kingdom, which endured two centuries (568–774), consisted of a loose confederation of over thirty duchies which the central authority at Pavia was too weak to weld together.

The period of the Lombard domination is noteworthy for the rise of the power of the papacy, especially in the time of Gregory the Great, bishop of Rome from 590 to 604, under whom was begun the conversion of the heathen Germanic tribes who had conquered Britain. The term "pope" (father), formerly the title of every Christian bishop, came to be applied exclusively to the successor of St. Peter; and as the bond between Rome and the Eastern Empire gradually weakened, the people of Rome came to look for protection more and more to the pope as their temporal as well as spiritual ruler.

The final rupture between Constantinople and Rome occurred following a rebellion in Italy, supported by the pope, against the image-breaking decree promulgated by the emperor Leo III in 726. In this strife the Lombards intervened in the hope of completing their conquest of Italy. They captured Ravenna and the coast cities that had been held by the Eastern Empire, and threatened Rome; but their king, Liutprand, out of deference to Pope Gregory II, desisted from an attempt on the city, and even presented the pope with some conquered towns, thus laying the foundation of papal temporal sovereignty, which was to have a profound influence on the history of Italy.

Overthrow of the Lombards. From this time on, the popes worked steadily and successfully to undermine the Lombard power. In 754, ten years after Liutprand's death, Pope Stephen II crossed the Alps and appealed in person to Pepin, the first king of the Franks of the Carolingian line, for aid against the Lombard king, Aistulf, who was threatening Rome. In requital for being anointed king of the Franks by the pope, Pepin twice made war on Aistulf, forcing him to surrender his conquest of the same coast cities that had been taken 26 years before by Liutprand, and handing them over to the pope, whose temporal sovereignty was thus notably increased.

Twenty years later, Pepin's son Charles, known to history as Charlemagne, for a personal grudge against Desiderius, then king of the Lombards and his own father-in-law, and in response to an appeal from the pope, led his army into Italy and made an end of the Lombard rule. In view of his great power in Italy, Gaul, and Germany, it seemed very natural and wise that the pope, on Christmas Day in the year 800, should crown him emperor of the Romans. This act, however, was to bring Italy little good, as it was the origin of frequent and far-reaching struggles between emperors and popes over supremacy of authority. For a time Italy found herself in close relationship with northern Europe, but the Treaty of Mersen in 870 established her once more as the Kingdom of Italy, and for many centuries this ancient land, the center of the Christian Church, was the battle-ground of her own jealous cities and of contending foreign armies. Southern Italy and Sicily were overrun by the Byzantines, Lombards, and Saracens, until the Normans drove them out in the 11th century and established the rich and strong Kingdom of the Two Sicilies.

In 962 Otto the Great, who had subdued the rebellious Lombards in the North, was crowned emperor, and later the rise of the Norman power in the South, the strengthening of the papal states, and the growth of the city-states, such as Florence and Venice, practically displaced the imperial authority. The northern Italian cities formed the Lombard League and successfully opposed the attempts of Emperor Frederick Barbarossa (reigned 1152–90) to establish his authority over their local affairs.

Italian City-States. These Italian cities were usually governed by an oligarchy composed of the wealthier citizens. They were continually at war with each other. But, in spite of all their disorder, they grew rich and powerful. Venice and Florence achieved rank among the important states of Europe. In the 14th and the 15th century, Italian cities became the centers of the revival of art and learning known as the Renaissance.

At the beginning of the 14th century the kingdom of Naples occupied southern Italy, the papal states extended in a diagonal band across the center of the peninsula, and the North was divided among the city-states. The greatest of these were Venice and Florence. Most of the cities fell at one time or another into the control of despots. Venice was a city of merchants, ruled by an aristocracy; Florence was a republic, but its government came to be directed by the family of the Medici. Rome was governed by the popes, and after the return of the papacy from Avignon (1417) they rebuilt the city and employed the greatest artists and architects of the time to adorn their capital with splendid buildings, paintings, and sculptures.

Period of Foreign Rule. The latter years of the 15th century mark the beginning of the long series of struggles of France, Spain, and Germany in the peninsula. Naples and Sicily were in the hands of the Spanish kings of Aragon. Charles VIII of France determined to seize the Spanish territory and, if possible, unite Italy under his authority. But, after a campaign in which he lost but one battle, he was compelled to withdraw. His successors, Louis XII and Francis I, endeavored to extend the French power in Italy, and protracted warfare ensued, especially between Francis I and the emperor Charles V, in which Francis I was repeatedly worsted. By the Peace of Cambrai in 1529 the Habsburgs secured a grip upon Italy that was not broken until the establishment of the Kingdom of Italy in the 19th century. The most important result of these campaigns, however, was the revelation of the treasures of Italian learning and art to the northern nations.

In the course of the struggle between France and Austria in the 17th century and the early part of the 18th, the house of Savoy secured Sardinia, and the duke of Savoy took the title of king of Sardinia. From the growth of this power in Piedmont sprang the modern national strength of Italy.

Napoleon in Italy. After the French Revolution, the French armies entered Italy and drove the Austrians out of the North, leaving them, however, in possession of Venice, where the ancient republican government was destroyed. The French set up the Cisalpine, Ligurian, Roman, and Parthenopean republics. But the democratic movements which were thus encouraged received sharp repression from Napoleon when he was firmly in power. He took for himself the iron crown of Lombardy and gave Naples first to his brother Joseph and later to Joachim Murat. Rome became part of the French Empire. After the fall of Napoleon, the Congress of Vienna restored, with few changes, the 18th century order.

Struggle for Italian Freedom. The despotisms maintained in Italy by Austria and the Holy Alliance met with continued opposition from patriotic Italians throughout the first half of the 19th century. The ideal of a unified and independent Italy, as preached by a group of notable and devoted men, gained more and more adherents. The strong movement toward the realization of this ideal began with the accession of Charles Albert to the throne of Sardinia in 1831. Mazzini called upon the new monarch to lead in the liberation of Italy. The liberal movement was given a strong impulse by the reforms introduced in the papal states by a new pope, Pius IX. In 1848 numerous uprisings throughout Italy secured constitutions in several states, and Charles Albert undertook a campaign against the Austrians in Lombardy. In this and in a second campaign, in 1849, he was defeated. Following this disaster, he abdicated in favor of his son, Victor Emmanuel II. Meanwhile, the people of Rome, led by Mazzini and Garibaldi, had abolished the temporal rule of the pope and set up a republic. This was overthrown by the French. The kingdom of Sardinia, now under a liberal constitution, became the rallying point for the party of United Italy. The statesmanship of Cavour (1810–61), the prime minister of Sardinia, secured attention to the claims of Italy in the Congress of Paris in 1856, on account of the help given by Sardinian troops in the Crimean war.

In 1858 Cavour secured the aid of Napoleon III in an attempt to drive the Austrians from Lombardy. After the victories of Magenta and Solferino (1859), Napoleon suddenly weakened and signed the preliminary treaty of Villafranca. However, in spite of Napoleon's lapse, Piedmont had acquired Lombardy. Soon the duchies of Tuscany, Parma, and Modena, and the papal state of Romagna united with Piedmont. On April 2, 1860 a parliament of the enlarged kingdom met at Turin.

On May 5, 1860 Garibaldi, already the popular hero of Italy, whose name was worth an army, embarked from Genoa with a thousand men for the conquest of Sicily and Naples. This was one of the most audacious and brilliant exploits of modern history. On September 6 Garibaldi, with a few companions, entered Naples by rail. The king had fled. Victor Emmanuel entered the city on Nov. 7. On the 18th of February 1861 a parliament representing all Italy, except Venetia and Rome, met at Turin, and the title of king of Italy was bestowed on Victor Emmanuel. Austria, crippled by her disastrous war with Prussia in 1866, was forced to yield Venice to Italy in that year, and when, in 1870, the French, at war with Prussia, withdrew their garrison from Rome, the sole support of the temporal rule of the popes was gone, and Italy could at last claim the Eternal City for her capital. The dream of a united Italy was now realized.

The Kingdom of United Italy. Many serious problems confronted the new state. The people, more than 75 per cent of whom were illiterate, had to be educated. A compulsory education law was passed in 1877, and since that time the percentage of illiteracy has been largely reduced. In 1881 and again in 1912 the suffrage was greatly extended; in 1920 it was made universal for men and women. Relations with the pope were difficult. The Law of Papal Guarantees, passed in 1871, gave the pope sovereignty over certain parts of the city of Rome and an annual grant of money. This arrangement was never accepted by the pope in its original form. In 1882 Italy joined the Triple Alliance. This entailed large expenditures for army and navy, and the financial problems of the country, already difficult, were further disturbed. In 1885 she embarked upon a colonial policy and became involved in a disastrous war with Abyssinia. Popular discontent increased under heavy taxation. In July 1900 King Humbert was assassinated, and Victor Emmanuel III came to the throne in a spirit that has done much to brighten Italian prospects.

Great increase of population and consequent emigration to other countries turned the attention of the Italian government to the acquisition of colonies. In 1912, after a war with Turkey, Italy acquired Tripoli and twelve Ægean islands. She long looked upon the region around the city of Trent, Trieste, and Istria as properly Italian territory, *Italia Irredenta*, or "unredeemed Italy." On the outbreak of the World War, Italy remained neutral until May 1915, when she repudiated her treaty of alliance with Austria and entered the war on the side of the Allies. By the Treaty of St. Germain her territory was greatly enlarged at the expense of Austria, practically all of "unredeemed Italy" coming under Italian government.

The years 1920 and 1921 were marked by conflicts between the extreme communist and the nationalist groups which took the name of Fascisti. In several

districts a "dictatorship of the proletariat" had been set up. The Fascisti, deeming government measures insufficient, undertook by force to suppress the communist movement. In this movement they were completely successful. Led by Mussolini, the Fascisti executed a *coup d'état* on October 30, 1922, taking control of the government. This control was strengthened by ruthless suppression of opposition, becoming in effect a despotism. In 1929 an agreement was made with the pope assigning him sovereignty in a portion of Rome, known as Vatican City. The pope received also a financial settlement. The Catholic religion was to be taught in Italian schools, and the canon law in regard to marriages was to be enforced in Italy.

JAPAN

Early Japanese history is interwoven with myths and legends. Tradition says that Jimmu Tenno set up his government near the present Kyoto in 660 B. C. Modern historians place the event about the beginning of the Christian era. Koreans were the civilizers of Japan. Confucianism is thought to have been introduced about 415 A. D.; Buddhism, in 552. In 604 the earliest Japanese laws were written in Chinese. The government was modeled upon that of China.

Medieval Government. From the middle of the 8th century onward, the country was governed by military families or by armed monastic communities, whose heads exercised a regency, while the emperor, often a minor, was a mere figurehead.

Near the end of the 16th century, Nobunaga attempted to subjugate the armed Buddhist communities. He was assassinated. Hideyoshi followed and established peace. About 1600, Iyeyasu established a feudal government, known as the Tokugawa Shogunate, with its capital at Yedo, the present Tokyo. Nominally, the shogun was appointed by the emperor, but the emperor could not remove or punish him, so long as the shogun's family possessed the power. On the other hand, the shogun sometimes removed and exiled an emperor.

Early Relations with Western Nations. It was during the 16th century, too, that Europeans made their first acquaintance with Japan. Mendez Pinto, a Portuguese, was shipwrecked on the coast of Japan in 1542. This led to a visit by St. Francis Xavier in 1549. Thousands of Japanese became Christians. Missionaries and merchants of various nationalities followed the Portuguese. Much rivalry was created. Religious jealousy mingled with political intrigue and the strife of feudal clans. Hideyoshi, moved in part, perhaps, by the fear of foreign domination, sought to banish the missionaries. The attempt failed, and in 1596 the authorities, in order to terrify the Christians, seized several of them, together with a number of missionaries, and crucified them at Nagasaki. This persecution led to a rebellion of the Christians, which was punished in 1606 by an edict forbidding the exercise of the Christian religion. Another Christian conspiracy in 1611 brought about the expulsion of the missionaries in 1614. In 1636 an edict excluding all foreigners and prohibiting all intercourse with foreign countries was issued.

One exception was made,—the Dutch, who had no missionaries, were allowed to leave twenty men on a small island in Nagasaki harbor. For more than 200 years the gates of Japan remained closed to the world. No communication with other countries was allowed except through the occasional visit of a Dutch or Chinese vessel. This exception, however, permitted a little knowledge of the West to filter in. The Dutch also translated some medical and scientific works into Japanese, and this in a slight measure prepared the way for the introduction of Western civilization.

Commercial Treaties. In 1852 the American government, in order to secure the protection of American sailors shipwrecked on the coasts of Japan, and in the hope of opening ports where American vessels might obtain supplies, sent Commodore Perry to Japan to attempt to establish treaty relations. He arrived in Japan in July 1853 and delivered the president's letter to the shogun. In February 1854 he returned for a reply, and in March that year signed the treaty that opened Shimoda and Hakodate to the use of American vessels. A commercial treaty between the two countries was signed in 1858. The example of the United States was followed by other countries.

The signing of the treaties by the shogun provided a rallying cry for the clans that opposed the Tokugawa Shogunate. A civil war was followed in 1867 by the restoration of the emperor to real power and by the removal of the capital from Kyoto to Tokyo in 1868.

Modern Progress. In 1871 feudalism was abolished. Western laws and military organization were introduced. Teachers from America and Europe were invited to establish schools. A constitution was proclaimed in 1889, and the first Parliament assembled in 1890. The suffrage, at first limited to a few, is now the right of all males 25 years of age or over in Japan proper. Present agitation seeks the vote for women. Parliament is unable to legislate over the imperial veto.

The extraterritorial jurisdiction enjoyed by foreign powers over their nationals resident in Japan was surrendered in 1899. Tariff autonomy was not fully recovered until 1911. These two accomplishments were perhaps aided by Japan's triumph over China in the war of 1894-95. This war resulted in the acquisition by Japan of Formosa and the Pescadores and the recognition of the independence of Korea.

Russian intrigue in Korea led in 1904 to war with Russia, which secured for Japan a protectorate over Korea and the transfer to herself of Russian leases of railways and ports in southern Manchuria, together with certain mining rights. In 1910 Japan annexed Korea.

Japan in the World War. During the World War, Japan, assisted by Great Britain, expelled the Germans from Kiaochow, leased territory in China, and took possession of the former German rights in the province of Shantung. The Treaty of Versailles, which transferred these rights to Japan, was never signed by China, and the Shantung question remained unsettled until the meeting of the Washington Conference, when, on February 4, 1922, Japan agreed in a treaty with China to withdraw from that province. This withdrawal was accomplished in December 1922.

The World War gave Japan also a mandate over the islands north of the equator, formerly belonging to Germany. The mandate was not recognized by the United States until the Treaty of Yap was signed on February 11, 1922, in which Japan acknowledged certain American rights in Yap.

In 1918, Japan, with the other Allied and associated powers, sent troops into Siberia to protect their interests jeopardized through the Russian Revolution. In reprisal for the massacre of several hundred Japanese in Nikolaevsk in the autumn of 1920, Japan occupied several cities in the lower Amur valley and established civil government over all northern Sakhalin, which belongs to Russia. The last detachment of Japanese troops was withdrawn from northern Sakhalin on May 20, 1925.

Recent Developments. The Anglo-Japanese defensive alliance of 1902 was replaced in 1922 by an agreement between the United States, Great Britain, France, and Japan to respect one another's rights in their insular possessions in the Pacific. In 1924 the Japanese Diet abolished the dual nationality of Japanese born in foreign lands, thereby removing a serious objection in certain countries to Japanese immigration.

A serious earthquake, resulting in great loss of life and enormous destruction of property occurred September 1, 1923. Losses resulting from this, together with post-War economic unsettlement, were assigned as causes of a financial crisis in 1927, which was attended by the failure of 36 banks.

The emperor, Hirohito, succeeded to the throne on Dec. 25, 1926. The first parliamentary election under the new manhood suffrage act was held in February 1928. Several labor and peasants' parties participated. Three of these, charged with communistic activity, were suppressed, and membership in Communist organizations was made a capital crime.

Troops sent to Shantung to protect Japanese lives and property came into collision with Nationalist forces at Tsinan on May 3, 1928. The disorders lasted nine days. Both Japan and China made representations to the League of Nations. On May 18, 1928, Japan warned both parties to the civil war in China that hostilities would not be permitted within the boundaries of Manchuria. Subsequently Japan made ineffective efforts to prevent the union of Manchuria with Nationalist China. These acts led to a boycott by Chinese of trade with Japan.

JAVA

The modern inhabitants of the island of Java are said to be the highest type of Malays in the East Indies. They are, however, inferior in culture to their ancestors, whose skill in building appears in the ruins of magnificent temples and other public monuments. Such structures as the temple at Boro Buddur, said to be the largest Buddhist temple in the world, tell an interesting story of the early Hindu period. In the 15th century the Mohammedans completed the conquest of the island, having previously displaced the worship of Brahma and Buddha.

The Portuguese were the first Europeans to settle in Java, in the year 1511. However, in 1595 they were driven out by the Dutch, who had established numerous trading stations in the coast towns. For a hundred years, Dutch occupation was confined to forts and small areas, but in the beginning of the 18th century a period of expansion began. In 1745, Dutch authority was dominant over the entire northeast coast. The kingdom of Bantam was subdued in 1808. From 1811 to 1818, the British were in possession of Java. By the middle of the 19th century, however, Dutch authority in the island was thoroughly established. Since 1870 an enlightened colonial policy has been pursued, which has improved the condition of the natives through education and better agricultural methods and has largely benefited Holland itself. See *Netherlands*.

THE JEWS

The word *Jew*, derived from *Judah*, designates the Hebrew people as a religious group, a church, in contrast to the terms Israel and Israelites, which designate them as a racial and national group. The Hebrew people, like all the kindred Semites, were cradled in the Arabian desert. They migrated thence in small tribal groups between the 15th and 12th centuries B. C. and settled in Palestine. In this movement, Moses and Joshua were the main figures. Moses led a few small tribes forth from Egypt, where they had been dwelling, federated them with other small tribes of the desert, established for them the worship of Yahwe, founded certain legal institutions that became the nucleus of the later Israelite law code, and settled his followers in southern Palestine. Joshua was the leader of another group of tribes that settled in the central part of Palestine.

The Early Kingdom of Israel. There the Israelite tribes encountered powerful enemies, especially the Philistines. After a century-long struggle with them, Israel finally triumphed about 1000 B. C., chiefly through the able leadership of David. This struggle welded the originally independent tribes into one compact nation with many national traditions. Among these was the tradition of the descent of all the Israelite tribes from one common ancestor, Abraham, and his descendants, Isaac and Jacob. Many legends and traditions about these prehistoric figures are recorded in the book of Genesis. Some may possess a slight basis of historic truth, but otherwise all the narratives of Genesis are purely legendary. Furthermore, the historic figures of Moses and Joshua have been enveloped in legend, until the true story of these men and their times is involved in obscurity.

Israel's real history begins with the entrance of the tribes into Palestine. But we tread firm historical ground only when we reach the time of David. After his conquest of the Philistines, David subdued the surrounding nations. His empire was consolidated by his son Solomon. But a rebellion of the northern tribes, provoked by an obnoxious system of taxation, immediately after Solomon's death in 932 B. C., divided his dominion into the Northern and Southern kingdoms, called Israel and Judah respectively.

Northern and Southern Kingdoms. The Northern Kingdom lasted until 722 B. C., when the Assyrians destroyed the capital, Samaria, and deported a considerable number of people. These mixed eventually with other Eastern nations and disappeared. Tradition speaks of them, though incorrectly, as the Ten Lost Tribes. The Southern Kingdom endured until overthrown by the Babylonians in 586 B. C. Many of the people were carried away to exile in Babylonia, while others, among them the prophet Jeremiah, fled to Egypt.

The Prophets. But, while Israel's national existence was brief and ill-starred, during this period the beginning of Israel's chief contribution to human civilization was made. Amos, Hosea, Isaiah, Jeremiah, and their fellow-prophets gave to the old tribal and national religion a significant reinterpretation. They conceived of Yahwe, or Jehovah, as the word is usually but mistakenly pronounced, as Creator of the entire universe, the loving Father of mankind; all men, God's children, therefore, they regarded as brothers, forming one human family. They denounced idolatry, immorality, and social injustice, and proclaimed that above all else God desires that men do justice, love mercy, and walk humbly with Him. They thus established the eternal, universal foundations of true religion, ethical monotheism, a universalistic conception of both God and man, and justice and love as the basic forces of human conduct.

The Return from Exile. Cyrus, founder of the Persian empire, permitted the exiles in Babylonia to return to Palestine in 536 B. C., undoubtedly for political reasons. But only a comparatively few did so, and that no longer as an independent nation, Israel, but solely as a religious community. Henceforth they are known as Jews. Under Ezra and Nehemiah, Judaism was definitely established. From 536 B. C. on, the Jews of Palestine were successively vassals of Persia, Alexander the Great, Egypt, and Syria. During this entire period, with the exception of the short reign of Alexander, increasing political oppression and religious persecution were their lot.

The Dispersion. Finally, in 166 B. C., under the Maccabees, they revolted against Syria, and through marvelous heroism against tremendous odds they regained independence and set up their own kings, the Asmonean dynasty. But this new independent Jewish state was short-lived. It crumbled with the conquest of Syria by Pompey in 63 B. C. For a while it continued as a Roman vassal under a semi-Jewish dynasty, Herod and his successors. During this period Jesus of Nazareth lived and worked and Christianity arose. Finally, in 70 A. D., after a heroic but fruitless defense, the Romans under Titus captured Jerusalem, destroyed the Temple, massacred thousands of Jews, and sold other thousands as slaves throughout the world.

The nation Israel was destroyed forever. A heroic attempt to regain independence under Bar-Cochba in 132–135 A. D. shattered miserably. Hadrian completed Titus's work of dispersion. Since then the Jews have lived scattered throughout the world, a religious people and naught else.

During the next two centuries the interest of the Jews remaining in Palestine centered in their religion. About the year 200 the *Mishna*, an extensive legal code, was compiled, and about 330 the *Palestinian Talmud*. At nearly the same time Constantine closed the great rabbinical schools; with this event, Jewish life and history in Palestine practically ceased.

Since the Babylonian Exile a large Jewish population had flourished in Babylonia. This now became the chief center of Jewish life and thought. There the *Babylonian Talmud* was compiled about 550. Under the Mohammedan rulers the lot of the Jews improved materially.

The Jews in Europe. But, with the decadence of Mohammedan power in the East, the center of Jewish life gradually shifted to Europe, particularly to Spain, where Jews attained great influence in both learning and commerce, and occasionally even became royal counselors. In southern Russia in the 7th century the entire Tatar kingdom of the Chazars was converted to Judaism. During this period Jewish scholars translated much of Arabic literature into European languages, thus communicating Arabic science and philosophy to Europe, and thereby contributing mightily to the Renaissance.

The religious zeal and bigotry fostered by the Crusades reacted unhappily upon the Jews. Increasing oppression became their lot. They were successively banished from England, France, Spain, Portugal, and many of the small German states. However, Italy, Poland, Turkey, and especially Holland granted them refuge. Cromwell finally permitted them to return to England. In Holland, Baruch Spinoza, the Jew, laid the foundations of modern philosophy.

Since the French Revolution the Jews have gradually gained political freedom in practically all the European countries, Russia having been the last to grant it, and Rumania alone still withholding it. In England and in Italy, particularly, Jews have risen to high offices of state, one Jew having become lord chief justice of England, and others prime ministers of Italy.

The Jews in America. Already in the 17th century, Jews sought in America a refuge from European persecution. The first notable migration was that of a group from Brazil to New Amsterdam, in 1654, while that colony was under Dutch rule. A little later, a number of Jews settled in Newport, R. I., under the conditions of liberal religious toleration which prevailed in that colony. There were Jewish settlements in other colonies, before the Revolution, but the number of Jews in America increased very slowly before 1800. Jewish immigration in the 19th century, however, developed so rapidly that today over 3,000,000 of the 14,000,000 Jews in the world reside in the United States. From the Revolution to the present day, they have had an honorable record for loyal citizenship and patriotic service.

Every Jewish synagogue is autonomous, and a wide variety of doctrine and ceremonial exists among the Jews of different countries. American Jews may be grouped, broadly, as Orthodox and Reform. They have numerous schools and seminaries, publish many periodicals in both English and Hebrew, and their social and charitable organizations are effective and well supported.

Zionism. An interesting recent development in world Judaism is Zionism. In general it is a plan to establish an autonomous Jewish state in Palestine. It has a twofold source, the ancient dream of a restored Israel and the need of an asylum for oppressed Jews. A Zionist Organization was founded in 1897, under the leadership of Theodore Herzl. Its aim was, with the consent of other governments, to secure from Turkey a charter for the Jewish colonization of Palestine *en masse*. To many, however, this aim appeared remote or impossible of attainment. Accordingly a party of so-called practical Zionists pressed for an immediate beginning of gradual settlement in Palestine, in order thereby eventually to bring about a Jewish majority in the population of the country and Jewish control of its religious, cultural, and economic development. A number of other parties, with somewhat variant programs, likewise sprang up within the Zionist movement.

Balfour Declaration. On November 2, 1917, Lord Balfour issued the following statement on behalf of the British government: "His Majesty's government view with favour the establishment in Palestine of a national home for the Jewish people, and will use their best endeavours to facilitate the achievement of this object, it being clearly understood that nothing shall be done which will prejudice the civil and religious rights of existing non-Jewish communities in Palestine or the rights and political status enjoyed by Jews in any other country."

A mandate for Palestine was assigned to Great Britain after the World War, and, in 1923, effect was given to the Balfour Declaration. The Zionist Organization was recognized as the official body to advise and co-operate with the mandatory government in matters affecting Jewish interests. Hebrew, along with English and Arabic, was declared an official language of the country. Despite some opposition on the part of the native Arab inhabitants, the Jewish population increased rapidly, from about 55,000 in 1917 to about 150,000 in 1927. Jewish agricultural colonies were organized in all parts of the country and Jewish schools were built. A Hebrew university on Mount Scopus, Jerusalem, was opened on April 1, 1925. Tell Aviv, a city whose entire population is Jewish, arose in the vicinity of Jaffa.

Jewish opinion throughout the world is more or less divided on the questions of the nationalistic program of Zionism and of the economic soundness of its scheme of Jewish colonization of Palestine. Through the so-called Jewish Agency, however, organized in 1925-27, plans were perfected for the increased co-operation of the Zionist and non-Zionist forces, particularly in America, looking toward the furtherance of the Zionist economic program.

DISTRIBUTION OF JEWISH POPULATION

BY COUNTRIES

Abyssinia	50,000	Italy	50,000
Afghanistan	18,135	Jugoslavia	64,159
Algeria	100,000	Latvia	95,675
Arabia	25,000	Libya	20,000
Argentina	200,000	Lithuania	155,125
Australia	21,615	Mexico	16,000
Austria	350,000	Morocco	135,512
Belgium	44,000	Netherlands	150,000
Brazil	21,000	Palestine	157,800
Bulgaria	43,232	Persia	40,000
Canada	126,196	Poland	2,854,776
China	12,000	Rumania	900,000
Cuba	8,200	Russia	2,782,000
Czechoslovakia	354,342	South Africa	62,103
Danzig	9,239	Spain	4,000
Egypt	59,581	Syria and Lebanon	35,000
France	200,000	Switzerland	20,979
Germany	615,000	Tangier	12,000
Great Britain	297 000	Tunisia	65,000
Greece	125,000	Turkey	190,000
Hungary	473,310	United States	3,600,800
India	21,778	Other Countries	52,623
Iraq	87,488		
		Total	14,725,668

BY CONTINENTS

America, North	3,754,021	Asia	594,438
America, South	225,344	Africa	506,182
Europe	9,621,111	Australasia	24,572
		Total	14,725,668

JUGOSLAVIA

The southern European state of Jugoslavia (*yōō'gō-slāv'ĭ-ä*) is officially known as the Kingdom of the Serbs, Croats, and Slovenes. It was constituted in December 1918 by the union of the kingdom of Serbia with certain Croatian, Slovenian, and other Slav provinces of the former Austro-Hungarian empire. In March 1921, Montenegro joined the new state. A constitution, which provides for a parliamentary and hereditary monarchy, was put into effect on June 28, 1921. It was suspended in 1929 by King Alexander, who made himself dictator. The vexed question as to the boundary between Jugoslavia and the Italian territory on the eastern side of the Adriatic was finally settled in 1924, when the disputed city of Fiume was assigned to Italy. Of the constituent parts of the state of Jugoslavia, Serbia and Montenegro had previously achieved an independent status.

Serbia (*sĕr'bĭ-ä*). From the 7th to the 11th century the Serbs enjoyed virtual self-government in the Roman province of Mœsia in the northwestern part of the Balkan peninsula. When the Byzantine government attempted to place some restrictions on them, they revolted under their grand shupon, or patriarch, Michael, who took the title of king and made a successful fight for independence. By the middle of the 14th century the Serbian empire included Bosnia, Albania, Macedonia, Thessaly, and part of Bulgaria, and reached to Attica and the Peloponnesus. But the Serbian power fell before the Turks, who completed their conquest in 1459. Many of the people were forced to emigrate; the rest were compelled to accept Islamism or were reduced to slavery. Bands of the Serbian aristocracy withdrew to the mountains where they maintained their independence. For centuries these mountaineers carried on a sort of guerrilla warfare against the Turks. In 1804 a revolt broke out, led by George Petrovitch, known as Kara George. The uprising was crushed, but during the 19th century the Serbians gradually won a measure of self-government under constitutional forms. The independence of Serbia was recognized by the Congress of Berlin (1878), and in 1882 it became a kingdom.

In 1893 Alexander I came to the throne. He began at once to assume the rôle of autocrat. In April 1903 he abrogated the constitution and made changes of law and ministry. This policy exasperated the liberal party. On June 11 the king, the queen, and about fifty others were assassinated. Peter, a grandson of Kara George, was made king.

Serbian national ambitions now brought the country into frequently strained relations with Austria and Turkey. Through the Balkan wars (1912-13) Serbia doubled her territory. But Serbian hatred of Austria was increased by the refusal of the latter to allow Serbia a port on the Adriatic. On June 28, 1914, Archduke Ferdinand, heir to the Austrian throne, was assassinated in Bosnia by Serb nationalist conspirators. Austrian demands on Serbia for reparation clearly involved violation of the country's sovereignty, and, in spite of Serbia's practical acceptance of the terms, her refusal of abject surrender was made by Germany and Austria the occasion for war. In 1915, Austrian and Bulgarian troops drove the Serbian army and large numbers of the civilian population from the country in one of the saddest retreats of history. In November 1918, however, the Serbs again occupied their capital, Belgrade.

Montenegro (*mŏn'tē-nē'grō*). Formerly a principality on the eastern shore of the Adriatic Sea, and united to the Serbian kingdom from 1159 to 1356. After the defeat of the Serbs by the Turks at Kossovo in 1389, the Montenegrins, in their mountain fastnesses, began in turn their long struggle with the same enemies. In 1484 Ivan the Black withdrew with his people to the mountain village of Cetinje, founded a monastery, and created a bishopric. In 1696 the offices of prince and bishop, or *vladika*, were combined under the title of vladika. The last and greatest ruler to hold this title was Peter II (1830–51). Danilo I took the title of prince. In 1878 the independence of Montenegro was recognized by the Treaty of Berlin. On Nov. 29, 1918 the National Skupshtina deposed King Nicholas, who had reigned since Aug. 28, 1860, and a decision was made to unite Montenegro with Serbia.

KOREA (CHOSEN)

Tradition carries the story of the Asiatic country of Korea (*kō-rē'ä*) back to about 1122 B. C., when Ki-tse is said to have founded a state. The first authentic date marks the annexation of the country to China in 108 B. C. About 960 A. D. a period of great prosperity and progress began, which continued for several centuries. Art, religion, literary forms, and governmental methods were borrowed from China. In 1392 Buddhism was displaced in favor of Confucianism. In the 16th century the Japanese, led by Hideyoshi, the Japanese regent, occupied much territory for a time, being driven out finally by Chinese forces. Early in the 17th century the rising Manchu power overran the country and exacted tribute, which was afterward paid annually to the Manchu rulers of China until 1894.

Until very recently, most of our scanty knowledge of Korea was obtained from the narratives of Dutch sailors who were wrecked on the Korean coast in 1653 and detained in the country some years. For Korea was determined to seclude herself from the world. This persistent policy of isolation, the desire to be let alone by the *So Yang Saram*, "men from the Western Ocean," consecrated by time, became, in fact, a sort of Korean religion. From 1835 till 1860, several intrepid and devoted French missionaries contrived to find shelter, and, in spite of incessant persecutions, the Christian community, founded in the 18th century, continued to increase. In 1864 a violent reactionist was made regent, in the minority of the king, and he encouraged the persecution of Christians and the extermination of foreigners. The massacre of several missionaries, in 1866, led to an unsuccessful invasion of Korea by a small French force. Nor did two successive American expeditions, provoked by attack on an American vessel, succeed in breaking down the barriers that separated the Koreans from the rest of the world.

In 1876, however, Korea made a treaty with Japan, and, later on, through Admiral Shufeldt, with the United States,—followed by others with England, Russia, France, Germany, and Italy. After Japan's victory over China, in 1895, Korea's independence was recognized by both powers. In 1907, pursuant to the recognition of Japan's interests by the Treaty of Portsmouth, Korea practically passed under a Japanese protectorate and in 1910 was annexed to that empire, under the ancient name of Chosen. Since 1919 Korea is treated as an integral part of the Japanese empire, Koreans being on the same footing as Japanese. See *Japan*.

LATVIA

A republic of northern Europe, situated in the basin of the Dvina river and bordering the Gulf of Riga. It includes practically all the territory of the former Russian province of Courland. The inhabitants are chiefly Letts. From about 1260 to 1560, Courland formed part of a federal republic organized by the Teutonic Knights among the Baltic provinces. Then, until 1795, it was an independent duchy tributary to the kingdom of Poland. In 1795 it joined Russia. On November 18, 1918 the Free State of Latvia was proclaimed. A period of conflict with combined Russian and German forces and also with Bolshevik armies followed. At length, with British and Esthonian aid, the country was freed from both bands of invaders, and, on August 11, 1920, a peace treaty with Russia was signed.

A constituent assembly, which was convened on May 1, 1920, formed a coalition government and adopted a constitution. In April 1923 a final boundary agreement between Russia and Latvia was signed.

LIBERIA

Liberia is an independent Negro republic on the west coast of Africa. It had its origin in the plan of the American Colonization Society, founded in 1817, to colonize free Negroes from the United States. The name is derived from the Latin word *liber*, meaning "free." Settlement of the territory acquired by the Society began in 1822, and in 1838 a government called the Commonwealth of Liberia was organized. The independent Republic of Liberia was established in 1847. The entire population numbers over two million; 50,000 are civilized and Christians, and use English as their common language. Of these, 12,000 claim to be Americo-Liberians. Only persons of Negro blood may become citizens. In 1917 Liberia declared war on Germany and aided the Allies by sending several hundred laborers to France.

LIECHTENSTEIN

Liechtenstein (*lĭĸ'tĕn-shtīn*) is a principality lying between Austria and Switzerland. It consists of territory which came into the possession of the house of Liechtenstein at the beginning of the 18th century, and it was made a principality by the emperor Karl VI in 1719. From 1815 to 1866 it formed part of the German Confederation. Later it was practically a dependency of Austria, but in 1918 the Diet resolved to establish independence. In 1921 an agreement was reached under which Switzerland manages the postal system and telegraph lines of the principality, which is included in the Swiss customs union.

LITHUANIA

The Baltic republic of Lithuania (*lĭth'ū-ā'nĭ-ā*) lies between Latvia, Poland, and East Prussia. In the 11th century, the Lithuanians were tributary to Russia, but under Ringold and his successors, in the 13th century, they became independent. Eventually the Lithuanian power extended to the Black Sea. In the 14th century, by a royal marriage, Poland was united to Lithuania. A closer political union was effected in 1569. But the forces of disunion in the combined states were very strong, and, in the partitions of Poland, in the late 18th century, Lithuania was divided between Russia and Prussia. The independence of Lithuania was declared on February 16, 1918. A constitution, declaring the state to be a democratic republic, was adopted June 2, 1920.

The seat of government was located at Vilna, but, when the Poles occupied that city, Kovno became the Lithuanian capital. Vilna was awarded to Poland by the League of Nations in 1923. The Baltic port of Memel, placed by the Allied Powers under the control of a commission, was seized by Lithuania in 1923. Her title to it was confirmed by the League of Nations the same year.

LUXEMBURG

Luxemburg (*lŭk'sĕm-bûrg*) is a grand duchy bordering France, Belgium, and Germany. It was made a duchy within the German Empire by Charles IV in 1354. In 1814 it was raised to a grand duchy under the king of Holland but passed to the duke of Nassau in 1890. It was included in the German Confederation from 1815 to 1866. The Treaty of London in 1867 declared Luxemburg neutral territory and guaranteed its independence. It was overrun by Germany in 1914, but United States troops entered the city of Luxemburg, Nov. 22, 1918. The peace treaty of 1919 made the duchy independent. On May 1, 1922, a customs union with Belgium went into effect.

MONACO

Monaco (*mŏn'ā-kō*) is the smallest principality in Europe, about 8 square miles in area. It borders the Mediterranean and on the landward side is entirely surrounded by French territory. The name is said to come from the Greek *Mónoikos*, a cult name for Hercules, who was worshiped here by the Greeks. The reigning prince is a descendant of the ancient Genoese Grimaldi family, with whom Monaco has been associated since the 10th century. The principality was placed under the protection of the kingdom of Sardinia in 1814, but in 1848 this protectorate ended. Monaco, though Italian in language, is now practically under French control. In 1911 a constitution displaced the former absolute rule of the prince. The principality issues its own postage stamps. Its state expenses are paid by the income from the gambling concessions of Monte Carlo.

MOROCCO

The state of Morocco, sultanate and French protectorate of northwest Africa, is called by its inhabitants *Moghreh-el-Aksa*, meaning "The Extreme West." This country in ancient times was called Mauretania and its people, Mauri. Its early history is included in that of the Barbary States. In the 11th century a chief of the Morabites, or Marabouts, a warlike Berber sect, was proclaimed sovereign. Several dynasties followed, the present one being founded in 1648.

A war with Spain in 1859-60 resulted in the cession of land to Spain and the payment of a large indemnity. In 1894 occurred the Perdicaris incident, when an American citizen, Ion Perdicaris, was seized and held for ransom by Rais-Uli, a Moroccan chief. Perdicaris was released after pressure by the United States and European powers. But the occurance revealed the weakness of the sultan. The country, except Tangier and the Spanish zone along the coast, has been since 1912 a French protectorate. About 30,000 Moors fought with the Allies in Europe during the World War. Spanish and French hold on Morocco was threatened, 1921-25, by Riff tribesmen under Abd-el-Krim. He was defeated and captured in 1926.

The sultanate in Morocco is elective, but only members of the reigning family are eligible. Each sultan is expected to designate his choice of a successor from among the members of the family. Usually, this person is elected, since he probably has control of military forces and the royal treasure. Once elected, he is an absolute ruler, though he must now respect the advice of the French resident-general. See *Agadir Affair*, *Algeciras Conference*, *Moors*, *Riff*.

THE NETHERLANDS

The northern European kingdom popularly called Holland. Originally, the name, meaning "low countries," applied to all the territory now included in Holland, Belgium, and northeastern France. Julius Cæsar found this country peopled by the Frisii in the north, the Batavi in the center along the lower Rhine, and the Belgæ in the south. Cæsar brought the Gallic Belgæ into subjection to Rome, but the Germanic tribes of the Batavi and the Frisii resisted Roman conquest somewhat longer. They finally made peace and were recognized as allies. The low-lying territory of the Batavi between the Waal and the Rhine, known as the "island of the Batavians," was long an important outpost of the empire. Batavian soldiers served in Roman armies and formed a large part of the Prætorian guard. By the end of the 3d century, when the Franks began their inroads, the Batavi, as well as the other tribes within the Roman frontier, had become Romanized. But the Frisii, or Frisians, allied with the Saxons, held the seacoast from the Scheldt to the Ems in defiance of the Franks, until the time of Charlemagne. They resisted Christianization as well as Frankish conquest, and their conversion was finally as much the

result of armed compulsion as the outcome of missionary zeal.

The division of Charlemagne's empire in 843 gave the part of the Netherlands east of the Scheldt river to Lothair, to be known as Lothair's kingdom, or *Lotharii Regnum*, whence comes the name Lorraine. It finally passed to the East Frankish power, and in 953 Otto the Great transferred it to Bruno, archbishop of Cologne. Bruno divided his lands into Upper and Lower Lorraine, giving the charge of the latter to Godfrey of Verdun. This territory, difficult of access, far removed from both French and German seats of government, but open to the ravages of the Northmen on its rivers and coast line, now became for two centuries the scene of pirate raids and petty dynastic struggles.

Rise of Free Cities. At the close of the 11th century, stable government began in these feudal states, and then the Crusades opened a new era. The soldiers of the Netherlands distinguished themselves with a valor equal to that which had made their ancestors famous in Roman times. New avenues of trade were opened up, and the cities of the Low Countries began their wonderful growth in industry and commerce. Free cities and communes, governed by burgomasters and sworn councilors, flourished as practically self-governing republics. This development was slower in the North than in the South. The charters of the free cities of Holland and Zealand date from the 13th century, while those of the communes of Flanders date from the 12th. The latter also came earlier into conflict with the dukes of the great Burgundian power. In the 15th century the house of Burgundy brought all the Netherlands under its control; but lack of statesmanship wrecked the promising schemes of Duke Charles the Bold, and in 1477 the marriage of his daughter Mary to Maximilian of Austria threw the Netherlands into the power of the Habsburgs.

Period of Spanish Rule. In February 1477, the provinces secured Mary's signature to the Great Privilege, a charter confirming their political rights and local liberties. Her grandson, who in 1519 became emperor as Charles V, was born and brought up in the Netherlands, and his policy, administered first through his aunt, Margaret, and later through his sister, Mary, was moderate and progressive. But the notable spread of Protestantism, especially in the northern provinces, moved him to severe measures of restraint. His son, Philip II, a thorough Spaniard, who lacked sympathy with the Netherlands, used every means at his command to suppress both civil and religious liberty. By the year 1566 the most violent passions had been aroused, and fanatical mobs, called iconoclasts or "image breakers," spread ruin among the churches and religious houses. In 1567 Philip sent the duke of Alva to curb the disturbance with Spanish and Italian troops. Six years of pitiless, bloody severity served to bring him the curses of the Netherlands as well as the disfavor of Philip, and he was compelled to resign in 1573.

The most important result of Alva's rule was the revolt of the northern, Protestant provinces under the leadership of William of Orange. Their struggle for independence is one of the most splendid episodes in history. Again and again they cut their dikes and flooded hard-won land to baffle the foreign troops. The University of Leyden is a memorial founded in 1574 by the province of Holland in honor of the deliverance of the city of Leyden, accomplished by the help of a great flood over the broken dikes. In 1576 the southern provinces, terrified by the outrages of the mutinous Spanish troops, joined with the northern provinces in the Pacification of Ghent. But the policy of Alessandro Farnese won the southern, Catholic provinces back to Spain, and in January 1579 Holland, Zealand, Utrecht, Gelderland, Friesland, Overyssel, and Gröningen bound themselves together in the Union of Utrecht, thus founding the modern state of the Netherlands.

Independence of Dutch Republic. William, called "the Silent," was murdered in 1584, but the struggle was continued by his son, Maurice of Nassau, stadholder of Holland and Zealand. The merchants of these two provinces had prospered and achieved a Dutch supremacy in trade, which continued through the 17th century. They had no other thought but that of independence. In 1609 a twelve years' truce was concluded with Spain, but not until the close of the Thirty Years' war was the independence of the United Provinces finally recognized. During this time the Union was a confederacy of sovereign states, among which Holland was leader. In 1651 the office of stadholder was abolished, and the head of the Union was called the grand pensionary. For twenty years this office was held by the statesmanlike John de Witt; but in 1672, when Louis XIV attacked the Netherlands, the prince of Orange, afterward William III of England, was made stadholder and captain general. His diplomacy and military genius made possible a successful resistance to the plans of Louis.

The Kingdom of the Netherlands. During the 18th century the United Netherlands, or Dutch Republic, played a secondary rôle among the nations, and internal government with the old machinery was becoming more and more difficult when the French Revolution broke out. In 1795, under French direction, the Batavian Republic was organized on the wreck of the United Netherlands. In 1806 Napoleon made the country a kingdom, and in 1810 he incorporated it in the French Empire. The Congress of Vienna united it with Belgium in the Kingdom of the Netherlands, but the Belgians withdrew in 1830. Since the final adjustment of Dutch and Belgian boundary disputes in 1839, the Kingdom of the Netherlands, except for colonial wars in Sumatra, has had a steady, peaceful development. The people are devoted to the royal house of Orange, to which Queen Wilhelmina belongs.

The people of the United Netherlands, under their old republican, stadholder system of government, had been pioneers in many features of modern democracy. The ideas of a written constitution and a state-supported school system are rightly credited to them. Religious toleration made the Netherlands the refuge for the persecuted of all nations in the 17th century. The rights of the provincial states and the States-General had been jealously guarded. The Fundamental Law of 1815, however, quite in the spirit of the Congress of Vienna, provided for a constitutional monarchy in which the king was more powerful than the Parliament, or States-General, which could not originate or amend legislation. The personal, autocratic rule thus permitted was one cause of the Belgian separation of 1830. In 1848 the law was changed to make the upper house of the Parliament elective by the provinces, the lower elective by the people, and a ministry responsible to the Parliament was provided for. Later changes have extended the suffrage. An electoral reform act passed in 1917 provided for universal suffrage.

Agriculture and dairying are the principal industries of the kingdom, and, as in Denmark, co-operative organizations, aided by the government, have contributed largely to their growth. The colonial possessions of the Netherlands are extensive and valuable in both the East and the West Indies.

The Dutch people played a memorable part during the World War. Their situation made the maintenance of neutrality peculiarly difficult. They maintained an army of 300,000 men to guard their frontiers and to prevent the use of the Scheldt by belligerents. In addition they gave asylum to more than a million Belgians, and the government granted the Belgian Relief Commission free use of railroads and telegraphs.

Among recent government provisions for the larger development and the adequate protection of the Dutch East Indies are the establishment of direct wireless communication and increase of naval strength.

NORWAY

The Norwegian people are mainly descended from a tall, blond Teutonic race which probably entered the Scandinavian peninsula in the late Stone age. A slight mixture with a shorter, dark type seems to have occurred very early. But the development of this sturdy, virile people was never affected by the waves of migration that swept over the continent of Europe. For many centuries they have been remarkable for their manly vigor and love of independent country life, characteristics which they still possess.

Like the other Scandinavian peoples, the Norwegians have a long legendary story preserved in sagas. But the authentic history of Norway begins in the latter part of the 9th century A. D. in the time of Harold Fairhair, who united the petty tribal kingdoms under his authority and died about 933. This was the period of the Norse sea rovers. Contact with the more civilized peoples of Europe resulted in the establishment of Christianity in Norway in the 10th and the 11th century. Olaf the Saint, who was a zealous apostle of the new faith, ruled the turbulent chieftains from 1015 to 1028. He was slain in 1030 in war with rebellious subjects who invited Canute of Denmark and England to come to their aid. Olaf's son, Magnus I, recovered the throne from Canute's son Svein in 1035, and henceforth, till 1319, Norway continued to be governed by its own native kings.

Union with Sweden and Denmark. During this period the country was prosperous. The small landholders gained political control, and Norse colonies were established in Iceland and Greenland. The death of Hakon V in 1319, without male heirs, threw the election of a new king into the hands of the National Assembly, who, after many discussions, made choice of Magnus VII of Sweden, the son of Hakon's daughter. He was in turn succeeded by his son Hakon and his grandson Olaf V, who, having been elected king of Denmark in 1375, became ruler of the sister Scandinavian kingdoms on the death of his father in 1380. This young king, who exercised only a nominal sway under the guidance of his mother, Queen Margaret, heiress of Waldemar IV of Denmark, died without issue in 1387. Margaret's love of power and capacity for government brought about her election to the triple throne of the Scandinavian lands, and from this period till 1814 Norway continued united with Denmark.

While Norway shared in the general fortunes of Denmark, it retained its own constitutional mode of government and exercised its right of electing its monarchs. After a time, like the sister kingdom, it agreed of its own free will to relinquish this privilege in favor of hereditary succession to the throne. The Napoleonic crisis may be said to have severed this union, which had existed for more than 400 years; for Denmark, after having given unequivocal proofs of adhesion to the cause of Napoleon, was compelled, after his defeat, to purchase peace at the cost of sovereignty over Norway. Crippled in her resources and almost bankrupt, she saw herself constrained to sign the Treaty of Kiel in 1814, by which it was stipulated by the allied powers that she should resign Norway to Sweden, receiving in return, by way of indemnity, some portion of Swedish Pomerania and the island of Rügen, which were subsequently exchanged with Prussia for Lauenburg.

Union of Norway and Sweden. The Norwegians, having refused to admit the validity of the Treaty of Kiel, nominated Prince Christian, heir presumptive to the throne of Denmark, as regent and subsequently king of Norway. This nomination was made by the Constitutional Assembly, which also drew up a constitution based on the French constitution of 1791. These measures found, however, neither supporters nor sympathizers among the other nations. With the sanction of the great allied powers, Charles John Bernadotte, crown prince of Sweden, led an army into Norway and, after taking Frederikstad and Frederikshald, threatened Christiania. Norway, being utterly destitute of the means necessary for prosecuting a war, accepted union with Sweden on the basis of equality of the two kingdoms. It was agreed that Norway should retain the newly promulgated constitution and enjoy full liberty and independence within its own boundaries. These conditions were agreed to and strictly maintained, a few unimportant alterations in the constitution, necessitated by the altered conditions of the new union, being the only changes introduced in the machinery of government.

Independence of Norway. The growth of parliamentary government brought about a desire on the part of the parliaments of both Sweden and Norway to control the king's selection of ministers and his foreign policy. This condition kept alive Norwegian impatience with the union. Besides, Sweden was aristocratic, while Norway was strongly democratic. In spite of the royal veto the Norwegian Parliament abolished the orders of nobility in that country. Meanwhile, Norway became prosperous and developed a large commerce. This led to demand for a separate consular service. After several years of dispute, the Norwegians declared the union with Sweden dissolved in 1905. Their decision was confirmed by the Treaty of Karlstad, and Prince Charles of Denmark was chosen king of Norway as Hakon VII. Since 1913 the women of Norway have had the right of suffrage in national elections, and since 1915 they have been eligible to membership in the council of state.

PARTHIA

Parthia is the name of the ancient empire of the Parthians, a people related to the Mongols. Their original territory lay to the southeast of the Caspian Sea. They were conquered by Cyrus the Great of Persia in the 6th century B. C., but in 250 B. C. they revolted. From that time the empire of Parthia was rapidly extended as far as the Euphrates and Indus. It successfully repelled Roman attacks until 217 A. D., when, after the battle of Nisibis, both sides were ready to make peace. In 226 the Parthian empire, weakened by factional conflicts, passed to the Persian dynasty of the Sassanidæ.

PERSIA

The ancient Persians were an Aryan people who occupied territory to the east of the Persian Gulf and were for a time subject first to Assyria and then to Media. In 553 B. C., under the leadership of Cyrus the Great, they revolted against the Medes. Three years later, after the capture of the Median capital, Ecbatana, the union of the Persians and Medes was made the beginning of the Persian empire.

The Reign of Cyrus. Cyrus pushed the boundaries of his domain westward to the Mediterranean and the Ægean coasts, eastward almost to the Indus. He subdued Babylonia and Lydia. The return of the exiled Jews to Palestine was part of his scheme to have loyal colonists on the western borders of his empire. His successor, Cambyses (529–522 B. C.), brought Egypt within his control, and Darius the Great (521–485 B. C.) added Macedonia and Thrace in Europe and the Punjab in India to the Persian dominions. Darius organized the civil government of the vast empire under satraps, or governors, thus separating the civil from the military authority in each province. He built splendid roads, the most important of which, the Royal Road from Susa, the capital, to Sardis in Lydia, was 1500 miles long. The inns along these roads were post stations. Government couriers traveled from Susa to Sardis by relays of horses, within a week. "Nothing mortal is more swift than these messengers," wrote Herodotus. Darius had some reason for the inscription, which still survives, "the great king, king of kings, king of countries, king of all men."

Greco-Persian Wars. But the "great king," with his formidable masses of soldiery, met a new type of foe when he attempted to push his conquests farther into Europe. The Athenians, realizing the danger in the Persian advance, gave aid to the Ionian cities of Asia Minor in a revolt (499–493 B. C.). Darius crushed this rebellion and then set out to punish the Athenians. But at the battle of Marathon in 490 B. C. the Greeks, under Miltiades, gave the Persian forces a defeat that sent them back to Asia. Ten years later, Xerxes bridged the Hellespont with boats and built a canal through the promontory of Mt. Athos. Treachery alone gave his troops access to Greece through Thermopylæ, but the Greek fleet practically destroyed the Persian fleet in the strait between the island of Salamis and Attica. A land battle at Platæa and a naval engagement at Mycale, in 479 B. C., compelled the final withdrawal of the Persians from Greece.

After Alexander's Conquest. One hundred and fifty years later the Persian empire yielded to Alexander, and at his death in 323 B. C. the greater part of it came under the family of the Seleucidæ. The Parthians ruled it for a time, until the dynasty of the Sassanidæ restored a large degree of Persian power about 226 A. D. This new Persian kingdom was long the chief foe of the Byzantine Empire. In the 7th century the Mohammedan conquests engulfed Persia; between the 11th and the 16th century the land was held by various dynasties of the Seljuk Turks and the Mongols. From 1501 to 1722 the Sufi dynasty, a native Persian family descended from the ancient Sassanidæ, ruled Persia. The 18th century was for the most part a period of alternating anarchy and tyranny under Afghan rulers, though Karim Khan (1755–79) maintained for a time a strong and respected authority.

Modern Persia. The 19th century in Persia opened in the reign of Agha Mohammed, founder of the Kajar dynasty, who was one of the most cruel of tyrants. Under his successor the period of modern official relations with Russia and Great Britain began. In 1888 the first railway in Persia was opened, and some encouragement to industry and modern commerce seemed possible at that time. But all internal interests of the country were subordinated to the conflict of English and Russian influence.

In the year 1906 the first national assembly convened and a constitution was signed by Mohammed Ali Shah. But in 1908 he abolished the constitution, and in the following year the Nationalist party deposed him and proclaimed his son, Ahmed Mirza, as sultan. An Anglo-Russian treaty in 1907 divided Persia into three "spheres of influence," the north to be Russian, the southeast, English, the remaining section to be neutral. The finances of the country were chaotic, and in 1911 Mr. Morgan Shuster, an American, was selected to take control. His vigorous administration of eight months resulted in his dismissal under pressure from Russia. Anarchy increased, and at the opening of the World War, although Persia was neutral, German agents fomented uprisings. A British force was organized in 1916, which did much to restore order. Famine conditions were relieved in 1917-18 by the American Committee for Armenian and Syrian Relief.

An agreement between Great Britain and Persia, made in 1919, provided recognition of Persian independence and English assistance in government and finance. The agreement was repudiated by the Persian government in 1921. A treaty with Russia was later signed, renewing diplomatic relations and giving Persia control of the Russian Discount and Land bank. A constituent assembly in 1925 placed the government in the hands of a hereditary shah. Under authority of the Persian parliament, Dr. A. C. Millspaugh, formerly of the United States Department of State, administered the finances of Persia from 1922 to 1927.

PHŒNICIA

The ancient country of Phœnicia (*fê-nĭsh'ĭ-ă*) comprised a strip of land about 120 miles long and hardly more than 12 miles wide, between the Lebanon mountains and the eastern shore of the Mediterranean. The Phœnicians were probably a Semitic people, related therefore to the Hebrews. The name by which they are known is of Greek origin, derived perhaps from *phoinix*, the Greek name for the purple or crimson dye for which Phœnicia was famous.

Our earliest acquaintance with Phœnicia comes through records of Egyptian control from 1600 to 1300 B. C. The city of Sidon then became powerful and withstood the advance of the Israelites. Tyre assumed leadership about 1250 B. C. and held it for nearly 400 years. It was Hiram, king of Tyre, who furnished Solomon with ships, workmen, and building materials.

The forests of Phœnicia supplied excellent wood for shipbuilding, and its coast furnished good harbors. Under these conditions, with the smallness of the country, the Phœnicians became the greatest sailors and traders of the ancient world. They supplied ships to Egypt, and Phœnician vessels and sailors made up the sea forces with which Darius and Xerxes attacked Greece. It is probable that there were Phœnician colonies on the Ægean islands as early as 1500 B. C. By 1100 B. C. Phœnician ships had passed Gibraltar, and the coasts of Europe and Africa were dotted with colonies and trading posts. Cadiz in Spain, mentioned in the Old Testament as Tarshish, and Carthage, later a great maritime power, were Phœnician colonies.

Phœnician traders brought tin from Cornwall in England, silver from Spain, linen from Egypt, and copper from Cyprus. Phœnician mechanics knew how to work the metals skillfully and how to dye cloth in the purple hue so highly prized among the ancients, while Phœnician scholars gave to the Western peoples a simplified alphabet.

Assyria broke the power of Tyre in the 9th century B. C. Control by Egypt and Babylon followed, and under the Persians Tyre became important again as the center of their sea power. After a memorable siege in 332 B. C., in which Alexander captured the city of Tyre, the history of Phœnicia came to an end.

POLAND

The republic of Poland is a Slavic state created at the close of the World War.

Formerly, Poland was an important kingdom of Europe, with its capital at Krakow from about 1320 to the reign of Sigismund III (1587–1632), when it was removed to Warsaw. At the period of its greatest extent, previous to 1660, it had an area of about 375,000 square miles, extending northward to the Baltic Sea and the Gulf of Riga, westward to Brandenburg, southward to Hungary and almost to the Crimea, and eastward throughout most of the basin of the Dnieper.

Poland was a state of much influence and promise until it was weakened by serious factional troubles in the 18th century and fell a prey to the more powerful neighboring states of Russia, Prussia, and Austria. In 1772, 1793, and 1795 occurred the three successive partitions of Poland whereby all the territory of the kingdom was divided among these three great powers. Napoleon, in return for military support, promised to reconstruct an independent Poland, but accomplished little.

At the outbreak of the World War in 1914, about six-sevenths of this area was comprised in Russia, including Russian Poland, Lithuania, Volhynia, and a major part of Little Russia, Livonia, and Courland. The portion of Poland which belonged to Austria comprised the crownland of Galicia. The portion belonging to Prussia comprised Posen, West Prussia, and Ermland, in what is now known as East Prussia.

In November 1918 the independence of Poland was proclaimed at Warsaw, and the powers signatory to the Treaty of Versailles guaranteed the independ-

ence of the new state, within the limits of the 18th-century Polish Commonwealth. The success of Polish claims at the Paris peace conference was due in no small part to the diplomacy of the pianist Paderewski, who became the first prime minister. Poland attacked Russia in 1919 but in turn was invaded in 1920 by Russian forces, which were turned back with French aid when near Warsaw. The Treaty of Riga, in October 1920, terminated hostilities and increased Poland's territory by about one-third at the expense of Russia. An insurgent Polish army seized Vilna, the capital of Lithuania, in 1920. It later withdrew, but the city was re-occupied by Poland in 1922 after a plebiscite favorable to Poland and was awarded to her in 1923 by the League of Nations. A republican constitution was adopted in 1921. General Pilsudski, the hero of the war with Russia, made himself dictator in 1926.

PORTUGAL

The Portuguese people are descended originally from the ancient Iberians, who occupied the country when Carthaginian and Greek settlers appeared on the west coast of the Iberian peninsula. The Romans conquered the country, and they were followed by the Visigoths and the Moors. The Moorish domination thoroughly transformed the life and manners of the people. The Portuguese of today bear traces of the mixture of all these bloods, and also of the negro strain introduced by the importation of slaves in the 15th century.

At the end of the 11th century, Portugal, then called Portucalia from the old Roman name of Oporto, *Portus Cale*, was an obscure fief of the kingdom of León. In 1095 Alfonso VI gave this fief to Henry of Burgundy, one of the northern adventurers who came to Spain to fight the Moors. Henry extended the boundaries of his realm, and his son, Alfonso I, became the first king of Portugal. Within the next two centuries, despite wars with the Moors and opposition from the pope, the boundaries of the kingdom were extended to their present limits, and Portugal became a power in Europe. The 13th century saw the end of war with the Mohammedans, and an era of prosperity and organization of government began in the 14th century. King Ferdinand, who came to the throne in 1367, was successful in correcting the abuses of the corrupt court and making war with Spain. On his death in 1383, the legitimate Burgundian line ended. In 1385 John I was chosen by the Cortes. His protracted reign is notable chiefly for the beginning of the long series of Portuguese discoveries and explorations inaugurated by his son, Prince Henry the Navigator.

The voyages of Portuguese sailors led to the building of a great commercial empire. Portugal secured possession of Madeira and the Azores, a part of Morocco, the Cape Verde islands, and the Guinea Coast. At the close of the 15th century, Vasco da Gama discovered the route to India by way of the Cape of Good Hope. The opening of the 16th century saw the establishment of Portuguese settlements in Brazil, India, Malacca, and the Sunda islands. Portugal then ranked as one of the strongest European states. But her decline was at hand, and was hastened by policies of bigoted oppression and tyranny at home and in the colonies. The Jews, who controlled the wealth of Portugal, were expelled, and other emigration weakened the state. In 1580 Philip II became king of Portugal, and the country was the victim of his imperial schemes. He robbed her to pay for his campaigns in the Netherlands; and the English, Dutch, and French avenged themselves on her colonies.

After sixty years of the Spanish tyranny, John, duke of Braganza, established a new Portuguese dynasty. In the course of the next century, Portugal established close commercial relations with England. In the 18th century, she experienced a period of great progress, broken only by the sad disaster of the Lisbon earthquake, November 1755, in which 40,000 persons perished.

Portugal's friendship with England brought her into the wars following the French Revolution. In 1807, at the approach of the armies of Napoleon, the regent, Prince John, transferred his government to Brazil. He returned to Portugal in 1821, although he had reigned as king of Portugal and Brazil since 1816, when the English forces had expelled the French invaders.

The 19th century was a period of almost continual struggle between the party of absolute monarchy and the friends of constitutional government. The reign of Carlos I, which began in 1889, was a period of demoralization. He and his son, the crown prince, were assassinated in Lisbon, Feb. 1, 1908. Prince Manuel came to the throne, but in 1910 he was deposed. A republican government was then set up, which survived several stormy crises but was at length overthrown by a military *coup d'état* in 1926.

During the World War, Portugal complied with her treaty obligations in support of England. After a series of disputes over interned shipping, Germany having declared war against her, Portugal entered the conflict actively on the side of the Allies.

PROVENCE

Provence (*prô'väNs'*) is the district of southeastern France which corresponds roughly to the ancient Roman province, *Provincia Romana*, whence the name. This province was organized in the 2d century B. C., after the Greek city of Massilia (Marseilles) had appealed to the Romans for protection against the invading Ligures. In the first four Christian centuries the province was the seat of a rich and cultured life which centered at Arles and Marseilles. Many interesting remains of this Roman period, such as the theater at Arles, are still preserved. Provence was the field of the conflict between Cæsar and Pompey, and between the Franks and the Saracens. It became a part of France under Louis XI. In the 12th and the 13th century Provence was the seat of a splendid poetic literature, and the Provençal dialect still persists, in both speech and writing.

ROME

The Roman Empire was built on the foundation of a strong local state in Italy. The geography of the peninsula and its ethnographic condition in the early period would scarcely have led us to predict a united Italy. The peninsula is not compact, but long and narrow. The Alps with their many easy passes set up no barrier to the north; a long coast line and frequent harbors along the southern coasts tempted immigrants from overseas. When recorded history begins, then, we are not surprised to find Italy occupied by six or seven peoples of entirely different racial stocks. The most important of these peoples were the Italians, who had entered the peninsula by a land route, and the Greeks and Etruscans, who had come by sea. The Etruscans held north central Italy; the Italians, the central and southwestern part of the peninsula; while the Greeks settled along the southern coast. The factors which gave unity to Italy and in the end made Rome mistress of the Western world were: the sturdiness of the Italic peoples; the strength of their compact political organization, when pitted against the lack of political unity which their principal rivals, the Greeks and Etruscans, showed; the convenient position of Rome near the center of the peninsula and on a navigable river; and the position of the broad fertile strip of Italy west of the Apennines, with the more important harbors on the western coast.

The Latin People. The people who were to build the Roman state were tribes of Indo-European stock, who very early descended through the Alpine passes into the valley of the Po and thence spread into the highlands of the East and the plains of the West and South. The tribes who occupied *Latium*, or the "flat lands" to the south of the Tiber, were the Latins, a hardy race. They were neighbors of

the Etruscans, who lived north of the Tiber. From these people the Latins acquired many of the arts of civilization, but they were at the same time forced to defend themselves against the encroachments of the Etruscans and against the Sabines, a highland people in the upper valley of the Tiber. Perhaps it was this situation which brought about the formation of the Latin League, a union of several settlements whose peoples met annually at the town of Alba Longa, where there was a temple of Jupiter. His worship brought the tribes together.

At a ford of the Tiber, near the Palatine mount, was an ancient market, where the Latin peasants came to purchase the wares of the Etruscan merchants. Here the rude Latins had their first glimpse of the civilization and industry of the East, for the Etruscans did business with Greek and probably with Phœnician merchants. By this route too the alphabet may have come to the Latins, as they learned to spell out the accounts and invoices of traders. The earliest settlement to which we may properly give the name Rome was made on the Palatine and the neighboring hills, with its stronghold on the Capitoline. Recent excavations carry the foundation of the city back to a very early date; the Romans fixed 753 B. C. as the year of its founding, and they dated events from that year. The population of the early city was probably made up of Latins, Etruscans, and Sabines, but the Latins predominated.

The Early Latin Republic. For a time this Latin state was ruled by kings, assisted by a council of old men (*senes*), or a senate, but toward the close of the 6th century B. C. the monarchy was displaced by a republic. At the head of the state were two consuls, elected for a year. In an emergency, supreme power was sometimes granted to a single official, who was called a dictator. The two annually elected officials were chosen from among the patricians, as the governing class was called, and they did not treat the plebeians, or common people, fairly. With the establishment of the republic, therefore, began a struggle on the part of the plebeians to compel the patricians to grant them a share in the government. This contest lasted for more than two centuries. The first step in the progress of the plebeians was the election of tribunes of the people. The persons of these officers, ten of whom were elected annually, were declared inviolate, and they were given the power of vetoing any act of a magistrate that seemed to bear too hard upon a citizen. A long step toward securing the rights of the average citizen was taken in 449 B. C., when the laws, which previously had been known to the priests only, were codified, engraved on twelve bronze tablets, and set up in the Forum where they could be read by anyone. In course of time, these laws were developed into a system which has proved one of the richest legacies left to the world by the Romans.

By the middle of the 3d century B. C., the plebeians had won the right to hold the highest offices of the state and had attained equality with the patricians before the law. The republic was really what the words *res publica* implied,—an "affair of the people." Yet the popular assembly never had the right of discussion. It could only vote *yes* or *no* upon measures proposed by the magistrates; debate was reserved to the Senate, which, throughout the period of the republic, in the main, guided the state wisely.

Besides the tribunes and consuls, ancient Rome had also prætors, who served as judges; quæstors, who had charge of the treasury; and censors, whose business it was originally to take a census of the people and assess the taxes. The office of censor grew in importance, and after a time the censors assumed the power of expelling senators for immorality and of depriving citizens of their votes because of misconduct. These offices are interesting, not only for their original character in the republic, but also because the Roman emperors acquired their power by assuming the functions of some of them, and because the old Roman titles appear frequently in modern history, as in France and in the Latin states of South America.

Growth of the Roman State. The task of the Senate and the consuls in the growing Roman state was not an easy one. While the struggle for democracy within the republic was going on, constant warfare was the price of safety from attacks by the Etruscans and the neighboring highland tribes. In the midst of all this, the Gauls, in the early part of the 4th century, captured and burned the city of Rome. But when this danger had passed, the Roman armies pursued the business of conquest until, by the year 338 B. C., when Greece was surrendering her freedom to Philip of Macedon, Rome was supreme in Latium and had extended her power over southern Etruria. The beginning of the 3d century B. C. saw her victory over the Samnites in the South, and, in 264 B. C., Roman arms had triumphed over the Greek cities in the extreme South, or Magna Græcia. Italy was united, from the Strait of Messina on the south to the Arno and Rubicon rivers on the north.

Citizenship and Colonies. A new problem in government now presented itself to the Romans. The idea of citizenship was at this time confined to residence in Rome or the near-by territory. All elections were held in the city, and election days were numerous. Consequently, even those who held Roman citizenship but lived at a distance from Rome found attendance upon elections impossible. It thus came about that, even while Roman conquests were confined to Italy, elections and legislation were controlled by the Roman populace. This defect in the Roman system was never wholly corrected, and it led to grave evils. It might have been remedied by the introduction of a representative system. This concession, however, the city of Rome was unwilling to make. But immediate trouble was avoided by allowing the conquered peoples to manage their own local affairs, and by demanding only that they should furnish soldiers for the Roman armies in time of war. The loyalty of the new territory in Italy was secured by the planting of Latin and Roman colonies at various points. The Latin colonists were mainly poor plebeians and veterans who wanted their own farms. Although possessing the private rights of Roman citizens, they had not yet acquired the right to vote and hold office, whereas these rights and privileges were possessed by the members of the Roman colonies, who were able to exercise political power by going to Rome. Both classes of colonies, however, were loyal to Rome and served to spread Roman customs and the Latin language throughout Italy. Moreover, what was quite as important as anything else, the agricultural development of the land was assured through these farmer settlements.

These colonies were connected by splendid roads, which served both as a means of rapid military movements and, since they were free to the public, as arteries of trade and routes of travel. In later centuries this admirable system of roads was extended throughout the empire, from Britain to Asia Minor, and so well were the highways built that many stretches of them are even now in good condition. By such means, the people of Italy were brought to feel their national unity, even though they belonged to many separate tribes and spoke widely differing dialects and languages.

The long wars which had resulted in making Rome mistress of Italy had developed the Roman citizen army into a military machine of wonderful efficiency. The basis of it was the legion, in which all citizens from 17 to 46 years of age were liable to service. Added to this was a body of auxiliaries, recruited from the subject states. The severe discipline of these troops, their open order of fighting, and the skillful use of reserves carried the Roman standards to victory.

Rome and Carthage. Such was the preparation of the Roman state for its life and death struggle with its greatest rival, the commercial Carthaginian power. The first stage of this long contest was the fight for Sicily, begun in 264 B. C. The Romans remedied their one weakness, lack of sea power, by building a navy, with which in 241 B. C. they won a complete victory. During the next twenty years they prepared for a second contest by subjugating the Gauls in the Po valley and by seizing Sardinia and Corsica, while the Carthaginians were making good their losses by developing the resources of Spain. In the summer of 218 B. C. the Carthaginian commander, Hannibal, carried the war into Italy by successfully leading his army from Spain through Gaul and over the Alps. At first the rapid movements of this great captain took the Romans by surprise. They appointed Quintus Fabius Maximus dictator. He earned the title of "delayer" through his policy of avoiding a direct conflict until he could drill his troops. The Romans were impatient of delay, and the new consuls of 216 B. C., yielding to the popular demand for speedy action, joined battle with the numerically inferior force of Hannibal at Cannæ. They were disastrously defeated, and 35,000 of the 50,000 men who made up their army were killed or captured. For nearly fifteen years Hannibal maintained himself in Italy with forces inferior to those of the Romans, but he failed to arouse the Italians to revolt, and when, in 202 B. C., he was summoned to Africa, which Publius Scipio had invaded after driving the Carthaginians from Spain, he was defeated on the field of Zama. Carthage became a dependent ally of Rome, and Rome's political supremacy was assured.

But Carthage still remained a dangerous rival of Rome. For fifty years the Romans watched the city's growth and then determined to destroy it. In 146 B. C., after a heroic defense of three years, an adopted grandson of the conqueror of Zama carried out the order of the Senate to burn the city and declared its site accursed.

The difficult task of subjugating Spain was completed in 133 B. C., and all of the peninsula except the mountainous northwest part became gradually and thoroughly Romanized; a few years later the strip of southern Gaul, or France, which connects Italy with Spain, was made Roman territory. In 121 B. C., Rome had conquered Italy and the adjacent islands of Sicily, Sardinia, and Corsica, southern Gaul, Spain, and northern Africa. In other words, she was mistress of the western Mediterranean. In the eastern Mediterranean, Rome became involved in quarrels with Macedonia and Syria in the early part of the 2d century, and by 133 B. C. she had annexed Macedonia and the western portion of Asia Minor.

Economic Problems. As the domain of the republic became imperial in extent, it appeared that the old plan of making allies and citizens of conquered tribes, which had worked so well in Italy, was difficult to apply on distant and barbarous frontiers. Rome, therefore, began the policy of making provinces of the conquered lands outside of Italy, and of requiring them to pay tribute. The result was that these provinces were, in many instances, treated as mere opportunities for plunder. But the consequences of the vast influx of wealth from this new territory to Rome were even more disastrous for the city than for the provinces. The gulf between the rich, to whom the power and wealth of conquest went, and the citizen farmers, who fought the battles, became wider. Cheap wheat from the new provinces flooded the market of Italy, and the small farmer was forced to sell his land to the great landholder who could work it with slaves. These landless folk flocked to Rome, and they, with the quickly enfranchised slaves, who had been brought in great numbers to Italy as a result of the long wars, made up the Roman mob which was to be for centuries a constant menace to the peace of the city. Thus, while the richer classes of Italy were appropriating the wealth of the Mediterranean world and assimilating the culture of Greece, a difficult social problem arose in the state.

The Gracchi. The first serious attempt to meet this situation was made by the tribune Tiberius Gracchus, in 133 B. C. He proposed that the government should reclaim from the great landlords a part of the public lands and divide it into small holdings to be given to poor citizens. He even wanted to use public funds to stock these little farms. Tiberius at length secured the passing of a law covering these points, but the violent means used by him, added to the hatred aroused by his plan among the rich landholders, brought about his assassination and the repeal of the measure. Ten years later, Gaius Gracchus, the younger brother of Tiberius, was elected a tribune of the people. The means he took to carry out the reforms which he had in mind combined good and bad elements. His first move was to secure a law permitting sale of grain from the public storehouses to citizens at half the market price. This led directly to plain charity and disaster, but it gave Gaius the political support of the needy. He then projected a system of roads and began a policy of establishing colonies of poor citizens in the provinces. Here were the beginnings of wise policies, but the next measure proposed, although equally wise, proved his undoing. He wanted to bestow citizenship upon the people of the Latin colonies. But the Roman populace saw in this a possible curtailment of their privileges. They refused to re-elect him to the tribunate, and he was killed in an ensuing riot.

The Movement toward Monarchy. The work of the Gracchi had begun the revolution that was finally to make one man supreme in the Roman state. One element of weakness in their plans lay in their entire dependence upon the fickle, ignorant, selfish Roman populace. Later, men with trained legions at their command were able to master the mob and use it for their own purposes.

At the beginning of the 1st century B. C. the struggle between the aristocracy and the democracy centered around Marius and Sulla. Marius was of peasant birth, but his military ability, signalized in his victory over Jugurtha in Africa, in 105, and over the Germans, in 102 B. C., gave him great influence with the people. Sulla was a noble, who won his early military honors in the Social war (90–88 B. C.), a contest through which all Italians won Roman citizenship. Later he carried on a successful war against Mithridates in Syria. While he was in the East, the democratic faction, under Marius, was supreme in Rome, where it carried out a campaign of terror against the aristocrats. Marius died suddenly, and Sulla returned to defeat the democrats and wreak a bloody vengeance on their leaders. He ruled as "Perpetual Dictator" for three years.

The next stage in the march of the Roman state toward monarchy was marked by the ascendancy of Pompey, a friend of Sulla. He had won military laurels in Spain, in campaigns against the Mediterranean pirates, and in the final subjugation of Mithridates. He annexed Syria to the Roman domain and returned to Rome in 62 B. C. Three other men were also to be reckoned with in Rome. They were men of different types. Cicero was the leading lawyer of his day, champion of the Senate and of the traditions of the republic. Julius Cæsar was a young politician, popular with the masses because of his oratory and his lavish expenditure for public shows. When his own fortune was exhausted, the wealthy Crassus came to his aid. Cæsar and Crassus made a private compact with Pompey, known as the First Triumvirate. They were masters of Rome. But Cæsar was more daring and able than his colleagues, and fortune favored him. While he was engaged in the conquest of

Gaul, Crassus met defeat at the hands of the Parthians at Carrhæ in Mesopotamia.

Julius Cæsar. Pompey, fearful of Cæsar's ambition for despotic power, now sided with Cicero and the Senate. Cæsar was summoned to return to Rome without his army; his reply was the crossing of the Rubicon with his troops. Taken unawares, Pompey, with what forces he could collect, withdrew to Greece. Cæsar, after a brief campaign in Spain, followed and defeated him at Pharsalus in 48 B. C. Two years sufficed to subdue revolts in Egypt, Asia, and Africa. In 46 B. C., Cæsar returned to Rome. He now began a series of wise political and economic reforms. He struck at the worst abuses of public charity, reformed the system of tax collection, planned foreign colonies for landless Italians, and began the extension of Roman citizenship. But his political and personal enemies formed a conspiracy against him and brought about his death in 44 B. C.

The Rise of Octavius. Then followed a desperate struggle for power between the senatorial party, led by Cicero, Brutus, and Cassius, and the opposition, under the Triumvirs,—Antony, Octavius, and Lepidus. The battle of Philippi, in 42 B. C., put an end to the hopes of the senatorial oligarchy and the republicans. Of the three new masters of the Roman world, Lepidus, a weak man, quickly dropped out of sight; Antony was defeated at Actium, and the reins of power came into the hands of Octavius. But Octavius took care that the old governmental forms should be preserved. The Senate gave him the title of *Augustus*, "the majestic"; he called himself *Princeps*, "the first citizen"; his command of the army carried the title of *Imperator*, "commander." Here are the origins of modern royal titles, to which we may add Octavius' family name of *Cæsar*. Augustus, as he is known, held the tribunate, which gave him large authority in Rome, and he had the proconsul's power on the frontiers and in the provinces. In this way the new government was linked with the old.

The Early Empire. The reigns of Augustus and his successors to the year 180 A. D. cover the period of the Early Empire, the time of Rome's greatness. Except on the frontiers of the empire, the reign of Augustus was a period of general peace. The emperor gave his personal attention to the problems of ruling. He made the Rhine the boundary of the empire on the north; the Euphrates, on the east. He built splendid structures in Rome; he constructed long stretches of roadway in the provinces; and he made life and property more secure throughout the empire.

With few exceptions, the emperors of the first two centuries were able men, great builders, and strong administrators. The list includes Claudius, Vespasian, Trajan, Hadrian, and Marcus Aurelius. In the reign of Claudius the conquest of Britain was begun, a difficult task, which was not completed until the end of the 1st century A. D., after which time, for 300 years, Britain was a Roman province. Vespasian rescued the Roman state from the anarchy which threatened after the death of Nero. During his reign, his son Titus captured Jerusalem, 70 A. D. Trajan, one of the so-called "good emperors," pushed the frontiers of the empire to their extreme limit, but his conquest of the Tigris-Euphrates valley was abandoned by Hadrian, who found the difficulties of administration too great in so distant a province. With the reign of Marcus Aurelius, the philosopher-emperor, the barbarians began to show the growing strength that was at last to break through the Roman barriers.

Civic Life in the Empire. But the real story of this great period is to be read in the traces of Roman life that still remain in all parts of the wide territory that became the home of the Roman citizen. Massive and beautiful ruins of cities in Syria, in Dalmatia, in Africa, Spain, France, Germany, and England testify to a wealthy and luxurious civilization that appropriated the traditions and genius of its predecessors in sculpture and architecture. The rich commerce which sustained this civilization entered splendidly improved ports and passed over a vast system of paved roads. In hundreds of free, self-governing cities a vigorous political life developed, which left to medieval and modern times a lasting tradition of free local government. In these cities the industries were carried on largely by free workmen who were organized in guilds. Art and literature were cultivated, and the Latin language became the common tongue of the Western world. Roman law was supreme and became the basis of the modern legal systems of western Europe. With all this greatness, however, there grew up the social, political, and religious evils that accompany the rise of a luxury-loving society. Wealth was concentrated in the hands of a few. Cities grew at the expense of the country, and their citizens were divided into the very rich and the very poor.

The Later Empire. The period of the Later Empire extends from the year 180 to the year 395, when, on the death of Theodosius, the empire was divided. The first half of this period was marked by civil wars provoked by the strife of rival claimants for the imperial throne. Emperors were made and unmade by the legionaries from Rome or the provinces. This internal trouble was made more serious by the constant attacks of the northern barbarians and the Persians. Diocletian (284–305 A. D.) undertook to reorganize the government. He associated with himself a trusted officer, Maximian. Each was called *Augustus* and had all the honors of emperor. Diocletian ruled the East; Maximian, the West. Each *Augustus* selected a younger associate, or *Cæsar*, to aid him. The civil and the military authority were separated, and the empire was divided into more than one hundred provinces. By these means, Diocletian hoped to hold in check ambitious aspirants for the throne. His system prolonged the existence of the empire, but along with it went absolutism and all the old strife as to the succession.

Constantine, a man of ability in war and statecraft, became sole master of the empire in 324. He made his reign of thirteen years memorable by the recognition of Christianity and by moving his capital to the ancient Greek town of Byzantium, which became Constantinople, or the "city of Constantine." Both of these acts were founded upon good reasons of state. Byzantium was a better military center than Rome from which to repel the barbarian attacks, and it was well adapted to connect the eastern and western halves of the empire.

The death of Constantine, however, was the signal for another period of disorder in the empire. The barbarians were crowding in along the Danube and the Rhine, and the interests of the eastern and western parts of the empire were driving Rome and Constantinople farther apart. The slave system and childlessness sapped the vitality of the population. The Roman armies lacked free men. Expenses of government increased faster than revenues. The Roman Empire faced bankruptcy.

Rise of Christianity. Christianity, the latest of the religious faiths to come out of the East, in its principles and practice was not in perfect harmony with the religious and social conditions of the time. The Christians refused to worship the emperor or to share in any of the customary pagan rites. Their conduct brought many years of persecution until at last the emperor Constantine himself accepted Christianity. Slowly the new faith triumphed inside the empire over the old paganism and the newer Oriental faiths, such as the popular cult of Mithra. Christian missionaries had made converts among the Germans, so that the Roman world passed to their hands with less disturbance than otherwise would have occurred.

Germanic Invasions; Fall of Rome. A peaceful mingling of Romans and Germans was going on along the Danube, when the Huns suddenly appeared. The Germanic Visigoths were allowed refuge on the Roman side of the Danube. Here Roman officials robbed and persecuted them until they revolted. At the battle of Adrianople in 378 A. D. they overthrew the emperor Valens and his legions. They had now learned their power, and after the death of Theodosius in 395 the great Gothic invasion of Greece and Italy began. In 410 the Goths captured the city of Rome itself. Four years earlier a vast body of Germans had crossed the Rhine. A few years later (429–439) the Vandals conquered North Africa, and by the middle of the century the Angles and Saxons were masters of Britain, while the Franks controlled Gaul. The Huns were beaten back at the battle of the Mauric plains in 451 by a union of Romans and Germans. But in 455 the Vandals sacked the city of Rome. The government of the West by the Romans was now a thing of history. German officers made and unmade puppet emperors. The last claimant to the imperial throne was the boy, Romulus, nicknamed *Augustulus*, "the little Augustus." He was dethroned, and the German troops made Odoacer king. The date of his accession is sometimes taken to mark the end of the Roman Empire in the West, but no line can be drawn to mark the end of the old world and the beginning of the new. The new rulers of Italy, of Gaul, and of Spain still thought of their authority as coming from Rome. Roman law was followed, and the Latin language was still spoken for many centuries throughout the West.

ROMAN EMPERORS

Name	Lineage	Period of Rule		Birth	Death
	THE CÆSARS	B. C.	A. D.	B. C.	A. D.
Augustus (Octavian)	The title of Augustus conferred by the Senate	27	14	63	14
		A. D.			
Tiberius	Stepson of Augustus	14	37	42	37
				A. D.	
Caligula	Youngest son of Germanicus, nephew of Tiberius	37	41	12	41
				B. C.	
Claudius	Son of Drusus, stepson of Augustus	41	54	10	54
				A. D.	
Nero	Adopted son of his stepfather Claudius	54	68	37	68
				B. C.	
Galba	Was proclaimed emperor	68	69	5	69
				A. D.	
Otho	Was proclaimed emperor	69	....	32	69
Vitellius	Was proclaimed emperor	69	....	15	69
Vespasian	Was proclaimed emperor	69	79	9	79
Titus	Son of Vespasian	79	81	41	81
Domitian	Second son of Vespasian	81	96	51	96
	THE FIVE GOOD EMPERORS				
Nerva	Was proclaimed emperor	96	98	32	98
Trajan	Adopted son of Nerva	98	117	53	117
Hadrian	Nephew of Trajan	117	138	76	138
Antoninus Pius	Adopted son of Hadrian	138	161	86	161
Marcus Aurelius Antoninus	Nephew and adopted son of Antoninus Pius	161	180	121	180
	THE PERIOD OF MILITARY DESPOTISM				
Commodus	Son of Marcus Aurelius	180	192	161	192
Pertinax	Was proclaimed emperor	193	....	126	193
Didius Julianus	Was proclaimed emperor	193	....	?	193
Septimius Severus	Was proclaimed emperor	193	211	146	211
Caracalla	Son of Septimius Severus	212	217	188	217
Macrinus	Was proclaimed emperor	217	218?	164	218
Elagabalus	First cousin of Caracalla	218	222	205?	222
Alexander Severus	Cousin of Elagabalus, by whom he was adopted	222	235	205	235
Maximin	Was proclaimed emperor by his soldiers on the Rhine	235	238	?	238
Gordianus I	Was elevated by insurgents in Africa	238	....	158	238
Gordianus II	Son and associate of Gordianus I	238	....	192	238
Pupienus and Balbinus	Were appointed by the Senate	238	....	?	238
Gordianus III	Grandson of Gordianus I	238	244	224?	244
Philip	Murdered Gordianus III and usurped the throne	244	249	?	249
Decius	Was proclaimed emperor by the army	249	251	?	251
Gallus	Was elected emperor by Senate and soldiers	251	253	?	253?
Æmilianus		253	....	208?	254
Valerian		253	260	?	269
Gallienus	Son of Valerian	260	268	?	268
Claudius II		268	270	214	270
Aurelian	Was designated by Claudius	270	275	212	275
Tacitus	Was chosen by the Senate	275	276	200	276
Florian	Was proclaimed emperor	276	....	?	?
Probus	Was chosen by the army	276	282	?	282
Carus	Was elevated to throne by soldiers	282	283	222	283
Carinus and Numerian	Elder son of Carus Son of Carus	283	284	? ?	285 ?
Diocletian and Maximian	Was proclaimed emperor by the army Was made Augustus by Diocletian	284 286	305	245	313 310
Constantius I	Nephew of Claudius II; Had been Cæsars under the Augusti, Diocletian and Maximian	305	306	250?	306
Galerius		305	306	?	311
Constantine the Great	Eldest son of Augustus Constantius I	306	337	274	337
Constantine II	Eldest son of Constantine the Great		340	312?	340
Constans	Youngest son of Constantine the Great	337	350	320?	350
Constantius II	Second son of Constantine the Great		361	317	361
Julian the Apostate	Cousin of Constantius II, was proclaimed emperor by his soldiers	361	363	331	363
Jovian	Was elevated to the throne by the army	363	364	332	364

ROMAN EMPERORS—Con.

Name	Lineage	Period of Rule		Birth	Death
	ROMAN EMPERORS OF THE WEST	A. D.	A. D.	A. D.	A. D.
Valentinian I	Was proclaimed emperor by the army	364	375	321	375
Gratian	Son of Valentinian I	375	383	359	383
Valentinian II	Son of Valentinian I	375	392	372	392
Theodosius the Great	Was called by Gratian to share the empire[a] — In the East	379			
	— In East and West	392	395	346	395
Honorius	Second son of Theodosius	395	423	384	423
Valentinian III	Grandnephew of Valentinian II	425	455	419?	455
Maximus	By force of arms	455	....	395?	455
Avitus		455	456	?	456
Majorian	Was elected by Ricimer	457	461	?	461
Severus	Was raised to imperial dignity by Ricimer	461	465	?	465
Anthemius	Was made emperor through influence of Leo I.	467	472	?	?
Olybrius	Was made emperor by Ricimer	472	473	?	?
Glycerius	Was proclaimed emperor	473	....	?	?
Nepos	Was proclaimed emperor by order of Leo I	474	475	?	480
Romulus Augustulus	Son of Orestes	475	476	?	?

Augustulus was deposed and banished by Odoacer, who thus put an end to the line of Western Roman emperors.

RUMANIA

Rumania (*rōō-mā'nĭ-ȧ*) is a kingdom of southeastern Europe, bordering on the Black Sea. In ancient times this country was peopled by the Dacians, who were conquered by Trajan about 101 A. D. Roman colonists were introduced, and Dacia was made a Roman province in 106. As an outpost of the empire, Dacia was for several centuries a battle-ground of invading barbarians. Toward the end of the 13th century the principality of Wallachia was founded, and about the middle of the 14th century, Moldavia. In the 16th century both of these principalities were forced to acknowledge Turkish sovereignty. Toward the latter part of the 18th century a uniform administration for the two districts was introduced by the Turks, and in 1861 they were united under the ancient name of Rumania. Prince Alexander John Cuza was chosen as head of this union. His period of rule introduced several reforms, such as the abolition of forced labor among the peasants and the extension of suffrage, but his despotic methods forced his abdication in 1866. Prince Charles of Hohenzollern was then elected. The independence of Rumania was recognized by the Congress of Berlin in 1878, and in 1881 the country was made a kingdom. The new crown for the king was made of steel from Turkish cannon captured at the battle of Plevna.

Rumania took no part in the first Balkan war in 1912-13, but she secured additional territory through the second Balkan war of Serbia, Greece, and Rumania against Bulgaria. In 1914 Ferdinand became king on the death of his uncle. Rumania was drawn into the World War on the side of the Allies, but was compelled to make terms with Germany in 1918, greatly to her disadvantage. The peace treaty of 1919 increased her territory to about twice its pre-war area, the most important addition being Bessarabia, Bukowina, and Transylvania.

Rumania is an agricultural country with very rich soil and fine grazing lands. The ownership of land has been one of its chief political problems. Recent legislation has divided among the peasants all estates of more than 1335 acres. The government is a constitutional monarchy. Much progress has been made in free public education. In March 1923 a new constitution for the enlarged kingdom of Rumania was adopted. It provided for the nationalization of oil and other mineral resources and for the taking over of woodlands for government forest preserves. King Ferdinand died in 1927. His son Carol had renounced his claim to the crown, which was conferred on Carol's infant son Michael, a regency council acting for the sovereign during his minority. An uprising of peasants in 1928 brought the National Peasant party into power, supplanting the Liberal party, which, under the Bratianu family, had exercised a virtual dictatorship for nearly 50 years. See *Rumanians*.

RUSSIA

The story of Russia begins with the coming of the Norseman, Rurik, with a body of followers, to Novgorod in 862 A. D. The Norsemen, or Varangians, set up an orderly government among the warring Slavic tribes and, moving southward to Kiev, opened the country to trade and to the influence of Mediterranean civilization. By the middle of the 10th century, the Norsemen and the Slavs had become thoroughly united. One must not, however, judge that the Norsemen were more than a very small minority. Their influence helped the formation of early Russia, and even named the country, but the native race and culture always predominated. Under Vladimir the Great, Russian authority was extended in all directions. Vladimir was converted to Greek Christianity, and in 988 he and his followers were baptized.

The Tatar Conquest. During the next two centuries, Russia was a field of conflict among petty states. The land was therefore an easy prey to the Mongols in the 13th century. Despite the heroic resistance of the Russian princes, the superior numbers and generalship of the Mongols enabled them to take complete mastery of Russia in 1238. This Tatar conquest cut Russia off from contact with the Western nations of Europe for 300 years; the Renaissance and the Reformation, which remolded the rest of Europe, she did not share in. The conquerors appear to have been content to exact tribute from Russia. They did not interfere seriously with the language or customs of the Russians, but nevertheless they introduced many Oriental elements into Russian life.

The 14th century saw the rise of the principality of Muscovy, with its capital at Moscow. This state attained a position of supremacy among the Russians in the 15th century, and the grand prince, Ivan the Great (1462–1505), united the rival principalities and threw off the Tatar yoke. Under his son, Ivan the Terrible, the boyars, or nobles, were reduced to submission, western Siberia was conquered, and trade with England was opened up. Ivan took the title of czar. After the death of his grandson, Feodor, a long period of strife resulted in the choice of Czar Michael Romanov, the first of the dynasty that ruled until 1917.

Peter the Great; Catherine II. Modern Russian history begins with the accession of Peter the Great in 1689. He was a man of restless energy, and he attempted to modernize and Westernize Russia by main force. He enlarged his territory, built a new capital, Saint Petersburg, on land taken from the Swedes, and introduced Western industry and customs. After Peter's death, his schemes fell into abeyance until the vigorous and unscrupulous Catherine II came to the throne in 1762. In her reign of more than thirty years, she improved

governmental methods, encouraged modern industry, and established schools. She directed the division of Poland and secured the Crimea from Turkey.

Extension of Russian Power. Czar Alexander I (1801–25) opened his reign by freeing the serfs in the Baltic provinces, but he later receded from his liberal position. In 1807 Alexander made the famous Treaty of Tilsit with Napoleon, in consequence of which he was able to take Finland from Sweden in 1809 and to wrest much territory from Turkey. The reign of his successor, Nicholas I (1825–55), was marked by the beginnings of the liberal movement in Russia and by a succession of wars with Turkey. Russian defeat of the Turkish fleet at Navarino in 1827 aided materially the cause of Greek independence. In 1832, after crushing a revolt in Poland, Nicholas began a policy of repression in that country.

Reform; Reaction; Nihilism. The liberal reform movement in Russia received great encouragement from the early policies of Alexander II (1855–81). Serfdom was abolished in 1861. Reforms in the administration of justice were introduced. But the period of vast extension of Russian power in Asia was marked by reaction at home. The government's repressive measures provoked nihilist activity. Alexander was killed by a bomb, March 13, 1881. His son, Alexander III (1881–94), pursued a reactionary policy. Repression of liberals and persecution of the Jews in Russia accompanied imperial policies in Asia. Nicholas II (1894–1917) continued the blind policy of his father. Intervention in the Chinese-Japanese war (1894-95) gave Russia possession of Port Arthur, and absorption of Manchuria followed the Boxer troubles of 1900.

Meanwhile, the large increase of manufacturing in Russia had been adding new elements to the revolutionary forces. The workers learned from Western factory managers and superintendents the superior conditions of their class in other countries. The government had tried to meet this rising tide of revolution by various kinds of paternalistic laws and by stirring up hatred between races in the empire. The trouble reached a climax in 1904 and 1905. The crushing defeat of Russian armies and fleets by Japan had clearly revealed the corruption of the government. In the midst of a series of strikes and riots, a congress of delegates from the zemstvos, or provincial assemblies, met in Petrograd and formulated demands for political and industrial reform. On Jan. 22, 1905, a large number of Petrograd workers, who had been organized in labor unions with the consent of the government, assembled in front of the Winter Palace to submit their grievances to the czar. They were fired upon by the soldiers, and several hundred were killed. The result of this "Bloody" Sunday was an outbreak of strikes in all industrial centers.

The Duma. At length, on October 30, 1905, the czar issued a manifesto which announced the speedy establishment of a representative assembly, the Duma, and real participation of the people in the government. But this announcement was immediately followed by a reign of terror, in which the people, and especially the Jews, were made to feel the iron hand of the autocracy. The first Duma met in the Winter Palace at Saint Petersburg on May 10, 1906. But this body and its successors found the imperial government unprepared to further any genuine reform. The following years, up to 1914, formed a period of virtual deadlock between the reactionary court party and the liberals, who were, by changed electoral laws, virtually excluded from even the Duma.

Upon the outbreak of war in the summer of 1914, the Russian people rallied to the support of the government. For a time the government held out promises of progressive reform, but military successes were accompanied by reactionary programs. When, in the summer of 1915, the government stood in need of popular support, a large progressive party in the Duma demanded a ministry responsible to that body. This demand was answered by a proroguing of the Duma.

Evidence of the same government corruption and traitorous intrigue that had been so disastrous in 1904-05 now began to accumulate. At the same time, the people, providing war supplies and hospitals through their zemstvos and municipal organizations, were learning their strength. The inevitable result was revolution, which broke out in 1917. The czar abdicated, and a government by an executive committee of the Duma was attempted.

The Bolsheviki. Alexander Kerensky, a Socialist leader, was made minister of war and marine. He soon became premier. But his efforts to keep Russia in the war were opposed by the extreme radicals, or Bolsheviki, led by Nicolai Lenine and Leon Trotzky. In November 1917, the All-Russian Congress of Workmen's and Soldiers' Delegates made Lenine the premier, and Trotzky the foreign minister, of the Soviet Republic. On March 3, 1918, Lenine's envoys signed a peace with Germany at Brest-Litovsk. The Bolshevik government was set up at Moscow, and Trotzky, with his armies, proceeded to the task of suppressing rebellion and attempts at independence in the Ukraine and the Baltic provinces. A socialist scheme of ownership and management of land and industry was next drawn up. The avowed purpose of the Bolsheviki to support propaganda for the proletariat revolution in other countries led the Entente Allies and the United States to maintain troops in Russia, to support various anti-Bolshevik movements, and to refuse to trade with the Russians. Eventually all the anti-Bolshevik enterprises collapsed.

The government of Russia was dominated by the personality of Lenine until his death in 1924. Private property and the right to trade were at first abolished by decree, enforced by the notorious *cheka*, a species of court whose purpose was to uphold Bolshevik authority by terror. The peasants, however, who had recently seized the land, had no intention of relinquishing it and refused to raise surplus grain to be confiscated by government agents. Economic maladjustment and widespread famine ensued and led to the development of a so-called new economic policy. Trade was permitted to individuals, although the government remained the chief property holder and trader. A sound currency replaced the paper currency, which had become worthless. Economic recovery proceeded apace.

The Third International. Russia's foreign relations were based on the theory of world revolution, the Bolshevik party regarding itself as a branch of the so-called Third International. This organization, formally founded at Moscow in 1919, aims at fomenting movements in every country that may lead toward a dictatorship of the proletariat. It ignores national and racial barriers. This dual aspect of the Russian government gave it a powerful influence with Oriental and colonial peoples and made it distrusted by the Western powers. Great Britain established diplomatic relations with Russia in 1921 but severed them in 1927 because of persistent Russian attempts to subvert British authority.

After Lenine's death, Russian opinion became more and more divided on the relative value of fomenting world revolution and entering into helpful economic relations with other countries. Trotzky, who favored more unreservedly the policy of world revolution, was gradually forced out of important offices and, in 1927, was expelled from the executive body of the Third International.

The revolution introduced drastic social changes, notably a new marriage code based on equality of men and women in (1) contracting and dissolving marriage by consent and (2) in financial responsibility for the support of children. The concept of illegitimacy in relation to children was abolished.

RULERS OF RUSSIA

Name	Lineage	Period of Rule		Birth	Death
	HOUSE OF RURIK	A. D.	A. D.	A. D.	A. D.
Ivan III, the Great	Grand Duke of Moscow	1462	1505	1440	1505
Vasily IV	Son of Ivan the Great	1505	1533	?	?
Ivan IV, the Terrible	Son of Vasily IV, assumed title of czar	1533	1584	1530	1584
Feodor I	Son of Ivan the Terrible	1584	1598	1557	1598
Boris Godounov	Brother-in-law of Feodor, was elected to the throne	1598	1604	1552	1605
Demetrius	Usurped the throne (The "Time of Troubles")	1604	1606	?	1606
Zuiski (Vasily V)		1606	1610	?	?
An Interregnum		1610	1613		
	HOUSE OF ROMANOV				
Michael Romanov	Unanimously elected czar	1613	1645	?	1645
Alexis	Grandson of Czar Michael Romanov	1645	1676	1629	1676
Feodor II	Eldest son of Alexis	1676	1682	1656	1682
Ivan V and Peter the Great	Half brothers, sons of Alexis. Sophia Alexeyevna, sister of Ivan, ruled as regent	1682	1689	1666	1696
Peter the Great	Son of Alexis	1689	1725	1672	1725
Catherine I	Was married to Peter the Great in 1711	1725	1727	?	1727
Peter II	Grandson of Peter the Great	1727	1730	1715	1730
Anna	Daughter of Ivan V	1730	1740	1693	1740
Ivan VI	Grandnephew of Anna	1740	1741	1740	1764
Elizabeth	Daughter of Peter the Great	1741	1762	1709	1762
Peter III	Grandson of Peter the Great	1762	....	1728	1762
Catherine II	Wife of Peter III	1762	1796	1729	1796
Paul I	Son of Peter III	1796	1801	1754	1801
Alexander I	Son of Paul I	1801	1825	1777	1825
Nicholas I	Third son of Paul I	1825	1855	1796	1855
Alexander II	Son of Nicholas I	1855	1881	1818	1881
Alexander III	Son of Alexander II	1881	1894	1845	1894
Nicholas II	Son of Alexander III	1894	1917	1868	1918
	FEDERAL SOVIET REPUBLIC				
Nicolai Lenine	Chosen president of Council	1917	1924	1870	1924
A. I. Rykov	Chosen president of Council	1924	....	1882	

SAN MARINO

The little independent state of San Marino (*săn mă-rē'nō*), lying in the Apennines near the Adriatic coast in northeastern Italy, is the smallest republic in the world and claims to be the oldest independent state in Europe. The city of San Marino is said to have been founded in the 4th century. In 1631 Pope Urban VIII formally acknowledged the independence of the state, which has an area of about 38 square miles. Undisturbed by Napoleon, its sentimental interest probably saved it from union with Italy in 1860-61. The government is in the hands of a Great Council, whose sixty members are elected by popular vote. From this council two are chosen every six months to act as regents. They share executive power with an executive council of twelve, chosen annually. The population of San Marino in 1920 was 12,027. Its chief exports are wine, cattle, and stone. The state has no public debt.

SAXONY

The name of Saxony was anciently applied to the entire northwestern district of Germany, extending from the Zuider Zee to the present neighborhood of Cassel and Magdeburg. By scattering the Saxons, who resisted bitterly, and by bringing in Frankish colonists, Charlemagne finally subdued the country. In the 10th century, Duke Henry of Saxony became king of Germany, and his son, Otto the Great, was crowned Roman emperor. The territory of Saxony was frequently changed during the following centuries. In 1485 the domain was divided between Elector Ernst and Duke Albert, the latter becoming the founder of the royal house of Saxony, which ruled until 1918. Frederick the Wise (1486–1525), son of Ernst, was the friend and protector of Luther. Frederick Augustus III was made king by Napoleon, and Saxony became the scene of Napoleon's struggle with the allies in 1813. In the Austro-Prussian war of 1866 Saxony sided with Austria and was compelled at the close of the war to join the North German Confederation. On November 9, 1918 Saxony was proclaimed a republic. It is included in the federal German republic. See *Germany*.

SIAM

Siam (*sī-ăm'*) is the only independent country on the peninsula of Indo-China. It is governed as an absolute monarchy. The king is assisted by a cabinet of nine ministers, most of whom belong to the royal family. Each minister controls a department, in which foreign advisers are employed. Siam is called by the Siamese *Muang-Thai*, meaning "country of the free." The authentic history of the country begins with the year 1350, when the old capital, Ayuthia, was founded. An English ship visited this city in 1612, and a few years later the first Portuguese missionaries arrived. A Greek, Constantine Phaulcon, became prime minister and developed intercourse with European nations. In the 18th century the capital was transferred to Bangkok for commercial reasons. Siam declared war against Germany in 1917.

Within recent years many excellent features of Western civilization have been introduced into Siam. The administration of the courts has been improved with the aid of an American Adviser in Foreign Affairs, a British Judicial Adviser, and a French Legislative Adviser. Education has been for centuries in the hands of the Buddhist priests, but normal and technical schools have been established by the government in Bangkok.

SIBERIA

Early Russian chronicles record expeditions into Siberia before the end of the 15th century, but the conquest of this vast Asiatic territory was not begun until the last quarter of the 16th century. In 1579 the family of Strogonov, traders in eastern Russia, sent a force of about 800 men under the outlaw Yermak into western Siberia. Yermak captured Sibir, the Tatar capital, and, by the gift of the newly conquered empire to the czar, won for himself imperial pardon.

In the course of the 17th century, Russian traders and explorers penetrated eastward as far as Kamchatka, and all of northern Siberia was brought under Russian authority. The Russian advance had, however, generally avoided the more thickly settled and hostile southern area. In 1689, by the

Treaty of Nerchinsk with China, further Russian occupation of the Amur valley was barred. For more than a century and a half after this date, Russian interest was directed westward, though European explorers and scientists pursued their study of Siberia throughout the 18th century. In 1710, Peter the Great began the practice of exiling political offenders to Siberia, and from the first part of the 19th century the country became notorious for its prison camps of exiled Russian criminals.

About the middle of the 19th century, the eastward movement of Russian power began once more. In 1847, General Muraviev was appointed governor-general of eastern Siberia. He concluded with China the convention of Aigun, by which the Amur river was made the boundary between the two countries. In 1860, Vladivostok was founded. The building of the Trans-Siberian railway, to connect Moscow with Russia's distant Pacific port, was begun in 1891. The succeeding Russian advance brought about the conflict with Japan in the first decade of the 20th century.

After the revolution in Russia in 1917 and the signing of the Treaty of Brest-Litovsk with Germany in 1918, Siberia became the scene of widespread and confused fighting between Bolshevik and anti-Bolshevik forces. The conflict was intensified by the presence of large bodies of German and Austrian prisoners of war, and about 50,000 Czechoslovaks who had deserted from the Austrian armies. Allied forces entered Siberia in 1918, but all of these were withdrawn between 1919 and 1922. Of the numerous states and governments that were set up in Siberia during this period, all have joined Soviet Russia. The Far Eastern Republic became the Far Eastern Region in December 1922.

SICILY

Recorded history of the island of Sicily begins with the establishment of the Greek city of Naxos in 735 B. C. This, with other Greek colonies established in the course of the following two centuries, became the center of thriving commerce. From the year 536 B. C. until the period of the Punic wars, Greeks and Carthaginians contended for mastery in the island. In 210 B. C., however, Sicily became the first of the Roman provinces.

During the middle ages, Goths, Byzantines, and Saracens in succession held sway. At length, in the year 1090, the Normans made conquest of the land, and Roger II became king of Sicily in 1130. From the close of the 13th century until the Treaty of Utrecht in 1713, Sicily was ruled by princes of Aragon and by the Spanish crown. In 1734, under Don Carlos, the Kingdom of the Two Sicilies arose, uniting Naples and Sicily under a Bourbon dynasty. Garibaldi's bold expedition in 1860 opened the way for the union of Sicily with the kingdom of Italy in 1861.

SPAIN

The original inhabitants of the Spanish peninsula, which was known to the Greeks and Romans as Hispania or Iberia, were probably a primitive race called Iberians. Upon these a host of Celts are supposed to have descended from the Pyrenees. The two races mingled and formed the mixed nation of the Celtiberians. About the middle of the 3d century B. C. the Carthaginians, deprived by Rome of their trading posts in Sicily and Sardinia, began to develop Iberia as a source of wealth and soldiers, and an extensive tract of territory was brought under subjection to Carthage by Hamilcar Barca, who is said to have founded the city of Barcelona.

Roman, Gothic, and Moorish Rule. The Romans had driven the Carthaginians from the peninsula in 206 B. C., and the country was erected into a Roman province. From this time until the end of the 2d century A. D., the condition of Spain was eminently prosperous. Everywhere throughout the country, Roman towns sprang up, and numerous aqueducts, bridges, and amphitheaters were built. Spain was for three centuries the richest province of the Roman Empire. Its fertile grainfields fed the imperial city, and its mines yielded enormous wealth. Many of the leading men of the later empire, in politics, military life, and literature, were natives of Spain.

In 409 A. D. hordes of barbarians, Alans, Vandals, and Suevi, crossed the Pyrenees and swept over the peninsula. About 412 the Visigoths invaded the country as agents of the weakened Roman government. After the fall of the Western Empire they maintained a show of authority with a monarchy organized in imitation of the Roman system. But they fell an easy prey to the Mohammedan invasion, and in 711–714 the Moors obtained mastery of nearly the whole of Spain. Under the Ommiad dynasty Spanish civilization far surpassed that of other European states. Systems of irrigation made a garden out of desert areas. Learning and literature were highly developed in great universities.

Castile and Aragon United. In 1031, however, the realm split into several small kingdoms, and the Christian kings of Castile, Aragon, and Navarre quickly took advantage of the divisions among the Moors to break their power. Ferdinand II, the last sovereign of Aragon, married Isabella, queen of Castile, in 1469. By the conquest of Granada in 1492 and that of Navarre in 1512, they united all the states of Spain under their joint rule.

It was under the auspices of the united kingdoms of Castile and Aragon, and especially under the protection of Queen Isabella, that Columbus started on his voyages of discovery, which laid the foundation for Spain's vast empire in the three Americas.

The kingdoms of Castile and Aragon had developed in the direction of constitutional government, with much power in the hands of the estates of the realm, or the Cortes. But Ferdinand and Isabella used the Cortes and other councils for their own purposes. At the great Cortes of Toledo in 1480 far-reaching reform and organization of the government were undertaken, the Inquisition was firmly established, and oppressive measures were adopted against the Jews. The free growth of industry, religion, and national life was checked by a vast system of taxation, supervision, and espionage.

Period of the Empire. At the death of Ferdinand in 1516, all Spain came under the single rule of his daughter Juana, called "the mad." But her son, the Habsburg Charles I, who in 1519 became emperor as Charles V, seized the throne, and Spain was dragged into the great scheme for aggrandizing the house of Austria. Charles V gave little attention to Spain, except as it served to supply him with treasure out of the newly acquired American territories. He even acknowledged the claim of the Cortes to the right of granting taxes, although he got what he wanted by bribery. Under his son, Philip II, the country was the victim of the worst vices of a bigoted absolutism. Its resources were exhausted in futile wars with every power of Europe. Spanish ships and soldiers won glory at the battle of Lepanto against the Turks, but the Protestant Netherlands were lost, the *Armada* was destroyed, and oppressive taxation served only to pile up disaster.

In 1680, the royal orders and laws relative to the Spanish colonies in America were compiled in the famous *Recopilación de las leyes de Indias*, "Laws of the Indies," a system of laws admirable so far as it went, and remarkably enlightened in its day. The system fundamentally failed, however, in looking upon the American possessions as a vast estate, closed to all the world and exploited only by Spain under a régime of the narrowest overlordship and the most exclusive of monopolies.

A Period of Decline. The reigns of Philip III and Philip IV witnessed a fearful acceleration in the national decline. That of Charles II was still more unfortunate, and his death was the occasion of the War of the Spanish Succession. Philip V was the

first of the Bourbon dynasty who occupied the throne of Spain. Under Charles III (1759–88), one of the "enlightened despots" of the 18th century, a great industrial revival began, and for a time trade and commerce showed signs of returning activity. But, even though "enlightened," Charles III was a despot, and no sound national growth could come from his policy.

During the inglorious reign of Charles VI (1788–1808), a war broke out with Britain, which was productive of nothing but disaster to the Spaniards; and, by the pressure of the French, another arose in 1805 and was attended with similar ill success.

Charles's eldest son ascended the throne as Ferdinand VII. Forced by Napoleon to resign all claims to the Spanish crown, Ferdinand became a prisoner of the French, and Joseph, the brother of the French emperor, was declared king of Spain and the Indies. But before this time an armed resistance had been organized throughout the whole country. The various provinces elected juntas, or councils, consisting of the most influential inhabitants of the respective neighborhoods, and it was their business to administer local rule. The Supreme Council of Seville declared war against Napoleon and France in 1808. England, on solicitation, made peace with Spain, recognized Ferdinand VII as king, and sent an army to aid the Spanish insurrection. After many bloody campaigns the French were driven from the country.

Efforts toward Liberal Reform. The Cortes in 1812, during the absence of Ferdinand, had adopted a liberal constitution, but on his return this was abolished and the old abuses restored. But the struggle against tyranny, already on the road to success in her New World colonies, had now really begun in Spain. A revolution in 1820 formulated a remarkably liberal constitution, but a French invasion suppressed the movement. The only reform which survived was the abolition of the Inquisition.

The later history of Spain is a continual struggle between the advocates of a liberal, constitutional government and the adherents of the old absolutist and clerical party. Of the latter group, the extremists were the Carlists who, on the death of Ferdinand VII in 1833, supported Don Carlos in opposition to Isabella, for whom Queen Maria Christina was ruling as regent. Civil war broke out and the Carlists were defeated. The absolutists then aligned themselves with the queen regent and later with Queen Isabella, who was declared of age in 1843.

The attempt to enforce an absolutist government provoked further liberal agitation, and in 1868 Isabella was compelled to flee from the kingdom. A liberal monarchical constitution was formulated, and in 1870 Amadeus, duke of Aosta, was induced to take the crown. But the chief supporter of the new government, Prim, had been assassinated, and after a troublous reign the king abdicated in 1873. A republic was then declared and Castelar was made president. But his course displeased the radicals. After his resignation Alfonso XII, son of Isabella, was proclaimed king. The new government had the support of all parties except the Carlists. Recent movements toward reform have been carried on within the monarchy.

A measure of parliamentary government was attained, but its effectiveness was rendered futile by an unfortunate political compromise whereby Liberals and Conservatives were to alternate in power as a matter of form rather than in response to an active public opinion.

Recent Events. Alfonso XIII came to the throne in 1902, after a long regency. During the World War Spain maintained her neutrality, which strengthened her economic position. In 1921 the government was faced by a serious revolt of the Riff tribes in Spanish Morocco. Increased tax burdens necessitated by the Moroccan adventure paralyzed progress at home and created grave industrial disturbances in the northern districts. Growing irritation with political misrule precipitated a bloodless military revolt headed by General Primo de Rivera, who, with the consent of the king, created a military directorate and became sole dictator. Under his rule the constitution was suspended, parliament dissolved, most officials of the old régime removed, and a rigid censorship of the press and of public utterance established. By the end of 1925 the military directorate had been replaced by a civilian cabinet with Primo de Rivera as prime minister. The dictatorship remained, but a gradual return to constitutionality was promised. The new administration was thus committed to a program of political and economic reform. All these incidents are significant of the development of genuine prosperity, marked by growth of population and a great increase in the material wealth of the country.

SWEDEN

When Sweden first appears in history, the country is inhabited by numerous tribes, kindred in origin but politically separate. Two principal groups are recognizable, Goths in the South and Swedes in the North. Ingiald Hrada, the last ruler of the old royal family of the Ynglingar, who drew their origin from Njord, sought to establish a single government in Sweden and perished in the attempt. Erik Edmundsson acquired the sovereignty of the whole of Sweden about 829. The dawn of Swedish history now begins. Efforts to introduce Christianity were made as early as 829, but it was not until the year 1000 that Olaf Sköttkonung, the Lapp king, was baptized. Erik undertook a crusade against the pagan Finns, compelled them to submit to baptism, and established Swedish settlements among them. He thus laid the foundations of the union of Finland with Sweden.

Growth of Swedish Power. The murder of Erik in 1160 by the Danish prince, Magnus Henriksen, who had made an unprovoked attack upon the Swedish king, was the beginning of a long series of troubles. In 1389 the throne was offered by the Swedish nobles to Margaret, queen of Denmark and Norway, who threw an army into Sweden, defeated the Swedish king, Albert of Mecklenburg, and, by the Union of Calmar, in 1397, brought Sweden under the same scepter with Denmark and Norway. In 1523 Sweden emancipated itself from the union with Denmark, which had become hateful to the Swedes, and rewarded its deliverer, the young Gustavus Vasa, by electing him king. Gustavus Vasa, on his death in 1560, left to his successor a hereditary and well-organized kingdom, a full exchequer, a standing army, and a well-appointed navy. Sigismund, grandson of Vasa, who had been elected king of Poland through the influence of his Polish mother, was compelled in 1599 to resign the throne to his uncle Charles, who was crowned as Charles IX in 1604. He renewed the policies of his great father, Gustavus Vasa, developing the power of the burghers at the expense of the aristocracy. He encouraged commerce and reorganized the legal system of the country.

The deposition of Sigismund gave rise to the Swedo-Polish War of Succession; on the death of Charles IX in 1611, his son, the great Gustavus Adolphus, found himself involved in hostilities with Russia, Poland, and Denmark. The young king soon concluded treaties of peace with his northern neighbors and placed the internal affairs of his kingdom in order. Although he ranks as one of the greatest military commanders of his age, the extraordinary number of benefits which he conferred on the administrative system of Sweden entitles him to still greater renown as the benefactor of his native country.

After the death of Gustavus, his great minister, Oxenstierna, ably directed the government during the minority of Christina, his daughter. Sweden became the leading power of northern Europe. The reign of Christina, however, was disastrous. Charles X was occupied in wars against Poland and

Denmark. The southern Swedish provinces, Danish up to that time (1658), were acquired by him. The long rule of his son, Charles XI (1660–97), was characterized by success abroad and the augmentation of the regal power. The military genius of Charles XII brought the climax of Swedish power, but his vast schemes of conquest left the country overburdened with debt. The male line of the Vasas expired with his death in 1718. His sister and her husband, Frederick of Hesse-Cassel, were called to the throne by election. During their reign the government was really in the hands of the nobles, who were divided into rival factions,—the Hats, or French party, and the Caps, or Russian party.

Union of Sweden and Norway. The weak Adolphus Frederick of Holstein-Gottorp, who was called to the throne on the death of Frederick in 1751, did little to retrieve the evil fortunes of the state; but his son, Gustavus III (1771–92), skillfully recovered the lost power of the crown. Gustavus IV was forcibly deposed in 1809 and obliged to renounce the crown in favor of his uncle, Charles XIII. The dominant party in Sweden, in order to win the favor of Napoleon, elected General Bernadotte to the rank of crown prince. Sweden's steady support of the allies against the French emperor, secured to her the promise of Norway, which, however, resulted in a purely personal union of the two kingdoms. Under the administration of Bernadotte, who in 1818 succeeded to the throne as Charles XIV John, the united kingdoms of Sweden and Norway made great advances in material prosperity and in political and intellectual development. Although the nation at large entertained very little personal regard for their alien sovereign, his son and successor, Oscar (1844–59), and his grandsons, Charles XV and Oscar II, the latter of whom came to the throne in 1872, so identified themselves with their subjects that the Bernadotte dynasty secured the loyal affections of the Swedish people.

Sweden, a Separate Kingdom. In the latter part of the 19th century serious difficulty arose between Norway and Sweden, owing to the desire of the former for a consular service of her own. In 1905 the two nations separated, and Oscar II continued monarch of Sweden until his death, December 8, 1907, when he was succeeded by his oldest son, Gustavus V. In 1909 manhood suffrage was introduced for elections to the lower house of the Parliament. Now there is in Sweden, as in Denmark and in Norway, universal and equal suffrage. During the World War, Sweden, like Norway and Denmark, maintained a neutral position.

SWITZERLAND

When the Romans began their conquest of Gaul (about 58 B. C.), they found in the Alpine territory two peoples, the Helvetians and the Rhætians. The country was conquered and connected with Italy by roads, and it became the center of a flourishing trade. About 400 A. D. the barbarian invasions brought the Burgundians and Alemanni into the country. They in turn were subdued by the Franks. The Burgundians accepted Christianity about the end of the 5th century, but the Alemanni retained their paganism until a group of Irish missionaries succeeded in converting them in the 7th century.

After the downfall of the kingdom of Burgundy, the entire country fell to the control of Germany and so became a part of the Holy Roman Empire. Switzerland remained a stronghold of feudalism for several centuries. Under the rule of the dukes of Zähringen in the 12th century, the Swiss towns grew very prosperous, and in the 13th century, when the Habsburgs were the most powerful among the princes of the country, many of the towns and some of the cantons obtained imperial charters of liberties. The three forest cantons, Uri, Schwyz, and Unterwalden, formed a league in 1291 to resist the tyranny of the Habsburgs. Allied with Zurich, the confederation fought and won the battle of Morgarten in 1315, thus securing their independence from Austria. The cantons of Glarus and Zug joined the confederation, which, with this added strength, defeated the Austrians at Sempach in 1386 and at Näfels in 1388. Early in the 15th century the cantons took the offensive, and a series of conflicts with Austria and Burgundy enlarged their territory and won them recognition from the states of Europe. Swiss independence was formally confirmed by the Peace of Westphalia in 1648.

Swiss mercenaries had long been famous in the armies of Europe, and in the 16th and the 17th century they played a large part in the European wars, especially in Italy and France. In 1516 an alliance was concluded with France, which lasted until the French Revolution. During these two centuries Switzerland was rent by civil and religious dissension.

The 18th century was a period of remarkable advance in Swiss agriculture and industry. Swiss scientists and scholars became famous. But the old struggle between the privileged aristocracy and the growing democratic element of the population continued. In 1798, under French direction, the Helvetic Republic was organized. This was changed to a confederation of cantons by Napoleon in 1803. A period of quiet and prosperity followed, and the Congress of Vienna in 1814-15 recognized the independence of the Swiss and guaranteed the perpetual neutrality of their state.

The 19th century was a period of steady advance in Swiss economic and political life. The confederacy and the cantons in 1848 finally became purely republican. Later revisions of the constitution have enlarged the powers of the central government, improved the educational system, and strengthened the machinery of the democracy. The Swiss use of the initiative and referendum in politics and Swiss army organization have drawn the attention of the world.

The World War placed Switzerland in a trying position. She maintained her neutrality, kept her army on a war footing, and served as a refuge for wounded prisoners and exiles.

TRANSJORDANIA

An Arab state lying east of the Jordan river, extending eastward to the frontier of Mesopotamia, and south to Hejaz and Nejd. This territory, with a population numbering somewhat less than 500,000, is included in the British mandate of Palestine. Subject to the obligations of Great Britain under the mandate, the British high commissioner, on May 25, 1923, recognized the independent administration of Transjordania.

TURKEY

The name commonly applied to the Ottoman empire and the republic which succeeded it. In the Turkish language, *Turk* means "a rustic or clown" and is applied to the Turkomans of central Asia. The ruling people of the Ottoman empire called themselves Osmanli, from a chieftain, Osman or Othman, who established himself in western Asia Minor at the beginning of the 14th century. This Osman and his followers were the decendants of emigrants from central Asia, who, nearly a hundred years earlier, had sought safety among the Seljuk Turks from the advance of the Mongol conqueror, Genghis Khan. The Seljuks granted the newcomers land in Phrygia and converted them to the faith of Islam. But the Seljuk power declined, and the new Ottoman state rose in its place.

Ottoman Conquests. The first expansion of the Ottomans was westward. They mastered all the northwest coast of Asia Minor and crossed into Europe, where they seized Gallipoli and Adrianople. They closed steadily in on the Roman Empire of the East, until it had shrunk, in 1400, to the city of Constantinople and the small neighboring district of Thrace, Macedonia, and part of Greece. In 1389

the Turks had broken the Serbian power at the battle of Kossovo and had then made conquest of Bulgaria. They were now the first military power in Europe; their disciplined Janizaries, inspired by fanatic zeal, were irresistible. Macedonia, Hungary, and Greece were rapidly conquered, and in 1453 the city of Constantinople, deserted and weakened through the commercial jealousy of Western Christians, fell before the Mohammedan onslaught. The Turks moved their capital from Adrianople to Constantinople and proceeded to consolidate their European dominion. The Tatar khan of the Crimea became a vassal of the sultan. Albania, which had long held out, was at last subdued, and before the close of the 15th century the conquest of Otranto gave the Ottomans a foothold in Italy. Only Montenegro remained unconquered.

Selim I (1512–20) led the Ottoman arms in triumph through Syria to Persia, into Egypt, and down the western border of Arabia, where he assumed the power of the caliphs at Mecca. Under his successor, Soliman the Magnificent (1520–66), the height of the Ottoman power was reached. In his reign Belgrade was taken (1521), the island of Rhodes was captured (1522), the Hungarian power was broken at the battle of Mohács (1526), and in 1529 Vienna was besieged, a large part of Hungary being made a Turkish province. Algeria had already become tributary to the sultan, and Tripoli was taken in 1561. The Turks ruled the Mediterranean.

Decline of Turkish Power. But Western Christendom was now thoroughly alarmed. The pope, Venice, and Spain formed a Holy League, and, although Cyprus had fallen into the hands of the Turks, their sea power was broken by the defeat of Lepanto, off the coast of Greece. The decline of the Ottoman empire dates from this, the greatest naval battle the world had witnessed since the time of the Romans and Carthaginians. The rise of the Persian power checked the Ottoman advance in the East. The Polish monarch, John Sobieski, in 1683 turned back the Moslem force from Vienna, and in 1695 Peter the Great took up the Russian contest with Turkey, which was to last, with varying fortune, until the World War. In 1774 Russia secured the Crimea and other Tatar lands on the Black Sea; she was granted free navigation of Turkish waters and also a protectorate over Moldavia and Wallachia. The 19th century was a period of steady loss of territory. In 1854 only the intervention of England and France, who feared Russia, saved the Turks from being driven out of Europe. They were again saved from Russian destruction by the Congress of Berlin in 1878.

The Treaty of Paris in 1856, by which the Western Powers guaranteed the integrity of Turkey, was followed by the sultan's proclamation of civil rights to all races and creeds in the empire, and in 1876 a parliamentary constitution was proclaimed. But the real Turkish policy of persecution and massacre of non-Moslem peoples was carried out. The slaughter of Christians in Lebanon in 1860 and the Armenian atrocities in 1895-96 aroused angry but empty protests, significantly barren in results.

The Young Turks. At the opening of the 20th century, Turkey was rent by disorders and revolts in Europe and Arabia. In 1908 the Young Turk party, headed by men who had studied in Western universities, proclaimed the restoration of the constitution of 1876. In 1909 Sultan Abdul Hamid was deposed and Mohammed V was enthroned. But this widely-heralded "reform" movement proved to be only a transfer of tyranny from one group to another. The extermination of all peoples other than Ottomans within the empire soon appeared as the real policy of the Young Turks. Armenian atrocities before and during the World War appear as the characteristic conduct of the Turkish government toward non-Moslems. The Balkan wars of 1912-13 materially cut down Turkish territory in Europe. Italy in 1912 seized Tripoli, in Africa.

The World War. The World War revealed Turkey as the tool of Germany. Turkish troops successfully repelled Allied attacks on the Dardanelles, but the army, despite German leadership, was disastrously beaten in Palestine and Mesopotamia.

The Treaty of Sèvres between the Entente Allies and Turkey was signed by the Turkish representatives on August 10, 1920. The terms of this treaty left to the Turks in Europe only Constantinople and a small neighboring territory. Smyrna was placed under Greek control; Konia, given to Italy; and Cilicia, assigned to France. Armenia and Kurdistan were declared independent.

The Republic. This treaty was never ratified by Turkey. A strong nationalist movement began, led by Mustapha Kemal Pasha. A government was set up at Angora, which demanded modification of the treaty. The Greeks had been intrusted with the enforcement of the treaty terms in Smyrna and its neighboring territory, but when Constantine was recalled to the Greek throne in December 1920 the Allies evinced a disposition to withdraw support. They agreed to a settlement more favorable to Turkey. Greece dissented but, in August 1922, suffered a disastrous defeat at the hands of the Turks, who captured Smyrna. Kemal demanded the restoration of Smyrna, Constantinople, and the territory of Thrace east of the Maritza river. These demands were acceded to in the treaty of Mudania, October 11, 1922.

With their prestige enhanced by victory, the Nationalist leaders abolished the office of sultan. A new constitution was adopted. Turkey became a republic with Mustapha Kemal Pasha as the first president clothed with wide powers.

Kemal proceeded to modernize Turkey. Polygamy was forbidden. The law of the Koran was replaced by a civil code. The wearing of the fez, with its religious associations, was prohibited. Education was secularized. Arabic letters were replaced by the Latin alphabet, in which the whole population was given instruction. Railroad building and irrigation projects were undertaken with vigor.

UKRAINE

The soviet republic of Ukraine (*ū'krān*) includes a large territory which, before the World War, was divided between Russia and Austria. The history of this area as a distinct and, at times independent, state dates back to the 9th century, when the city of Kiev was made the center of a government. After the Tatar invasions of the 13th century, the country was for 200 years a part of the Lithuanian state. In the 16th century it was incorporated with Poland, but in the middle of the 17th century the Ukrainians revolted from the Polish power, and, by the Treaty of Pereyaslavl, the greater part of Ukraine was joined to the territory of the Muscovite czars. The western portion of Ukraine passed later to Austria. After the close of the World War, both Russian and Austrian Ukraine declared their independence. A union of the two was effected in 1919, and in 1920 a soviet government was established. It joined the Soviet Union in 1923, thereby becoming a part of Russia.

VATICAN CITY

This papal territory of about 106 acres within the city of Rome was created in 1929 by an agreement between Pope Pius XI and Mussolini, dictator of Italy. When Italy took over the Papal States in 1871, the pope, by the so-called Law of Guarantees, was voted an annuity of $645,000. This was never accepted. As a further mark of protest against the arrangement, the pope never left the Vatican. The arrangement of 1929 involved a payment to the pope of about $90,000,000. Canon law in regard to marriage was recognized in Italy, and the teaching of the Catholic religion was made compulsory in Italian schools.

ANCIENT CITIES

In the course of the centuries, the various races and tribes of the world's population have shifted from region to region, and, as a result, many cities, once busy and prosperous, have become as so many desert places of the earth. Such migrations have been due to various causes. A change in the character of the climate in a certain territory may have made it impossible for the people to earn their livelihood as previously they had done, or it may be that the resources of the land had become exhausted. An old-time channel of trade had perhaps been blocked up by processes of nature or by an enemy, or a new and better route had been discovered. Again, entire peoples are known to have been put to the sword, and cities have been buried in volcanic eruptions which effectively concealed all traces of human habitation.

Numbers of cities have without doubt thus perished and utterly vanished from human memory, leaving no clue nor sign by which they might be traced. Some, however, have been found accidentally; others have been unearthed after systematic excavations by archeologists. Large sums of money are spent each year in such quests and in clearing away *débris* in the search for these ruins of ancient times. Now and again, on the site of a former metropolis stands some small modern town or village, and its citizens move and live all unwittingly amid the imposing reminders of other and glorious days.

The past of these bygone cities makes a melancholy yet fascinating story, reminding us of the instability of the greatest works of man, and awakening in us engrossing speculations upon the lives, manners, and customs of these vanished populations.

Abydos (*ă-bī'dŏs*). (1) The town in Asia Minor at the narrowest part of the Hellespont, where Xerxes built his bridge in 480 B. C. (2) A very ancient city of Upper Egypt, which was in ruins at the beginning of the Christian era. Seti I and Rameses II here built magnificent temples to Osiris. In these were found the famous tablets of Abydos, containing lists of Egyptian kings.

Antioch (*ăn'tĭ-ŏk*). This ancient capital of the Greek kings of Syria, on the Orontes, 21 miles from the sea, was built by Seleucus Nicator about 300 B. C. and named for his father. As a point of trade exchange between the caravans from the East and the Mediterranean shipping from the West, it became wealthy, and both Greeks and Romans so adorned it with public buildings that it was called the "Queen of the East." Here the disciples of Jesus were first called Christians. The modern Antioch, or Antakieh, is a small city with but little manufacturing and trade.

Baalbec (*bāl'bĕk*), "City of Baal," the sun god, called Heliopolis by the Greeks. A ruined city on the slope of the Antilibanus mountains, about forty miles northwest of Damascus. It was a very ancient center of sun-worship, and in Greek and Roman times it became the most splendid of Syrian cities. Massive blocks of limestone and fragments of richly ornamented columns now mark the site of a great temple of the sun, built by Romans about 150 A. D. Pillaged by Arabs, Tatars, and Turks, and ruined by earthquakes, the city survives merely as a small village.

Babylon (*băb'ĭ-lŏn*). The ancient capital of Babylonia. The name probably means "gate of the gods." Already in existence in the time of Sargon, about 2800 B. C., the city grew in importance until Hammurabi made it his capital, about 2100 B. C. It was several times destroyed and rebuilt. Nebuchadnezzar enlarged it and brought it to its greatest splendor. Excavations in several mounds and villages, mostly on the east bank of the Euphrates, have recently revealed this city of Nebuchadnezzar (605–562), as well as scanty remains of earlier periods.

Carthage (*kär'thăj*). An ancient Phœnician city in northern Africa, near the site of the modern Tunis. Probably it was originally founded in the 9th century B. C. as a trading post for Tyre and Utica. It grew in commercial power, extending its authority westward to the Atlantic and establishing trade in Sardinia, Gaul, Spain, and Britain. Conflict with Rome arose in the 3d century B. C. and, after the three Punic wars, it was utterly destroyed in 146 B. C. Carthage left no records of its own history. It was rebuilt by Augustus, and was for several centuries a great Roman city. In Christian times it was the seat of a bishop. Only a few ruins and small villages now mark its site. Recent excavations by French archeologists have revealed important remains dating from the earliest period of the city, which throw much light upon its culture.

Corinth. An ancient city of Greece, situated between the gulfs of Corinth and Ægina. It became proverbial for its luxuries and pleasures. Its fountains, statues, theaters, and other buildings were of a design which created the order of architecture known by its name. The Romans destroyed the city in 146 B. C., but Julius Cæsar rebuilt it in 46 B. C. St. Paul addressed his *Epistles to the Corinthians* to a Christian community which formed in Corinth under his ministrations. New Corinth was built on a site three miles distant, after an earthquake had destroyed the old city in 1858.

Ephesus (*ĕf'ê-sŭs*). The origin of this Ionic city of Asia Minor is lost in mythology. It was situated in Lydia, near the mouth of the river Cayster, at the western end of a great Asiatic trade route. Under the Romans, it was the capital of the Province of Asia and a prosperous trade center. Its greatest fame arose from its temple of Diana. St. Paul spent three years in the city, and the church of Ephesus was important in early Christian history. Several times destroyed and rebuilt, it sank to small importance in the middle ages. Recent excavations have uncovered the Roman city.

Gaza (*gā'zà*). An ancient Syrian town, situated near the seacoast, about fifty miles southwest of Jerusalem. The ancient city, which Herodotus regarded as equal in importance to Sardis, was a border fortress and a commercial center because of its position at the junction of trade routes between Egypt, Arabia, and Syria. The earliest notice of the place is in the Tel-el-Amarna letters, one of which was written by the local governor to his superiors in Egypt. The Israelite king, Hezekiah, held Gaza for a short time, but surrendered it to Assyria. It withstood a siege of five months by Alexander the Great. In 96 B. C. it was totally destroyed by Alexander Jannæus. Aulus Gabinius rebuilt the city on a new site in 57 B. C., the old location being spoken of as Desert Gaza. Gaza was famous for the long and bitter struggle to substitute Christianity for the local worship of *Marna*, "Lord." In 402, the new faith triumphed. The modern town is called Ghuzzeh.

Herculaneum (*hĕr'kû-lā'nê-ŭm*). A Roman city, situated about five miles southeast of Naples. In the eruption of Vesuvius, 79 A. D., it was buried under volcanic mud and lava. The site was forgotten, until in 1738 the digging of a well in the village of Portici uncovered its ancient theater. Later excavations have brought to light many relics of the city's life.

Jerusalem (*jê-roō'sà-lĕm*), "City of Peace." The Holy City, situated on a group of hills 33 miles east of Jaffa on the Mediterranean. The place is first noticed in history in the Tel-el-Amarna tablets, about 1400 B. C., as a small hill-fort, capital of the "land of Jerusalem." Somewhat later, David made this natural fortress the center of his kingdom. In succeeding centuries its fortunes varied. In the time of Jesus, it was tributary to Rome. After a revolt of the Jews, the city was subjected to a terribly cruel siege and destroyed in 70 A. D. Hadrian rebuilt it, and Constantine, at the suggestion of his mother, built there the Church of the Holy Sepulchre. From 637 to 1099 the city was in Moslem hands. Then for a century it was the center of a Christian monarchy. In 1187 Saladin retook the city, and it remained under Mohammedan rule until 1917, when it surrendered to the British forces.

Khatti (*kà'tĭ*). The remains of this ancient capital of the Hittite empire were recently discovered near the village of Boghoz Keui in central Asia Minor. In the 13th century B. C., Khatti was a walled city, with imposing temples and palaces. On this site, many clay tablets have been found, containing royal correspondence with the kings of Assyria, Babylon, and Egypt.

Memphis (*mĕm'fĭs*). A city of ancient Egypt, said to have been built by Menes, first king of Egypt. It was for a time the capital of Egypt, and, in the 6th century B. C., the chief commercial city. In the 7th century A. D., it was destroyed by the Arabs. The site of its ruins is the village of Metrahineh, twelve miles south of Cairo.

Mycenæ (*mī-sē'nê*). An ancient Greek city, on a steep hill six miles northeast of Argos. It was the home of Agamemnon before the Trojan war. Excavations begun by Schliemann in 1876 have revealed, through the relics recovered in this city, the life of the period of Greek civilization called, after the city, Mycenean.

Nineveh (*nĭn'ê-vĕ*). One of the ancient capitals of Assyria, first made important by Sennacherib, 705–681 B. C. It was destroyed about 606 B. C. by Babylonians and Medes. The site of the city is the present village of Kuoyinjik, opposite Mosul. Excavations by Layard and later explorers have uncovered splendid palaces, temples, and libraries in the mounds of this district. The name Nineveh may have been applied to a group of cities, which would account for the great size attributed to Nineveh by ancient writers.

Palmyra (*păl-mī'rȧ*), "City of Palms." A ruined city situated in an oasis of the Syrian desert, about 140 miles northeast of Damascus. It was enlarged by Solomon in the 10th century B. C. as an outpost of the kingdom of Israel. It is most famous as the residence of Zenobia, "Queen of the East," in whose reign the city was besieged and destroyed by Aurelian, 273 A. D.

Pergamum (*pĕr'gȧ-mŭm*). A city of Asia Minor, on the north bank of the Caicus, fifteen miles from the sea, the site of the modern Bergama. From the beginning of the 3d century B. C., it was famous for its library, second only to that of Alexandria, for its architecture, and for its manufacture of tapestries and pottery. Parchment (*Pergamenta Charta*) derives its name from the city. The church at Pergamum was one of the seven addressed in the Book of Revelation.

Persepolis (*pĕr-sĕp'ô-lĭs*), "City of the Persians." The capital of ancient Persia, most famous under Darius and Xerxes. The citadel was destroyed by Alexander about 330 B. C., but the rest of the city was important for two centuries more. The ruins of Persepolis, in the mountain-rimmed plain near the junction of the Kur and Polvar rivers, are among the most extensive and important remains of the ancient world.

Petra (*pē'trȧ*). A ruined city of the land of Edom in northern Arabia. It was an important station on the caravan route from Syria to Arabia until the 4th century A. D., when it suddenly disappeared from history. It was rediscovered in 1812. Upon the face of near-by cliffs are carvings of entrances to temples and tombs, the interiors of which are merely caves in the rocks. An amphitheater, a palace, and a convent are among the ruined remains of the city.

Pompeii (*pŏm-pā'yē*). The ancient city, about twelve miles southeast of Naples, destroyed in the eruption of Vesuvius, 79 A. D. At this time it was covered by ashes and pumice in such a way that the entire city was preserved almost intact. For two centuries it had been a favorite seacoast resort for the Romans.

Sardis (*sär'dĭs*). The ancient capital of Lydia, in Asia Minor. Through its market place flowed the river Pactolus. Once the center of a rich trade, and the residence of Crœsus, nothing remains on its site today but a village and some mounds. Recent excavations conducted by Americans have uncovered a great temple of Artemis, of the 4th century A. D., and many inscriptions in the Lydian language.

Sidon (*sī'dŏn*). "Fishingtown." One of the chief commercial cities of ancient Phœnicia, situated on the coast midway between Tyre and Beirut. It is now called Saida. Many allusions to the city are found in Homer and in the Old Testament. It was famous for its manufacture of glass, linen, and purple dye. Many notable remains of the city's splendor have been found, among them a collection of sarcophagi from the best period of Greek art.

Susa (*sōō'sȧ*). A city, originally under Babylonian rule, which came under Persian authority in the time of Cyrus and was made a splendid capital. From Susa to Sardis, in Asia Minor, ran a royal road, 1500 miles in length. In the middle ages the city was still noted for its manufacture of sugar. It is mentioned in the Old Testament as Susa or Shushan, in connection with Esther and Daniel. From the ruins of the place, which lie in southern Persia about fifty miles west of Shuster, many inscriptions and remains of ancient art and building have been recovered.

Tarsus (*tär'sŭs*). An ancient city of Asia Minor, in Roman times the capital of the province of Cilicia. Some traditions ascribed its foundation to the Assyrian king, Sardanapalus. It was, however, very early colonized by Greeks, and Greek writers speak of it as an important and wealthy city. The situation of Tarsus, on the river Cydnus, placed it in the path of armies of conquest from the time of Cyrus to the ages of Alexander and the Cæsars. Under the Romans, the inhabitants of Tarsus enjoyed Roman citizenship and the city rivaled Alexandria as a center of culture. St. Paul proudly claimed it as his native city. After its capture by the Saracens in 640 A. D., it lost its former importance. Modern Tarsus is but a small town in the Turkish province of Adana.

Thamugas. A Roman city in Algeria, founded in 100 A. D. by the order of the emperor Trajan. It was partially destroyed by the Vandals in the 5th century but was later repopulated and, after a century of prosperity, was destroyed by the Arabs in 647. Its site, now called Timgad, preserves many interesting ruins: a theater, a basilica, a library, a temple of Jupiter Capitolinus, and, most magnificent of all, a triumphal arch of Trajan. There is also a bath house, the extensive floor of which exhibits an admirable mosaic pavement. Inscriptions in Latin indicate that the Christians of the city were persecuted and that some of them underwent martyrdom.

Thebes (*thēbz*). Egypt. A city, about 350 miles southeast of the modern city of Cairo, which was the capital of ancient Egypt between the 16th and 12th and, again, in the 7th century B. C. It fell into insignificance later, and an earthquake, in 27 B. C., completed its ruin. Its remains, recently discovered near the villages of Karnak and Luxor, bear witness to its former magnificence and splendor, and include colossal statues, palaces and tombs of kings, and temples sacred to Ammon and to other gods. The most notable recent discovery near Thebes was the uncovering of the tomb of Tutankhamen, in the valley of the Tombs of the Kings. See *Egypt*.

Thebes. Greece. A city of Bœotia, probably one of the earliest centers of population in Greece. It owed its chief importance throughout its history to its strength as a fortress. Tradition ascribed the building of the first citadel, the Cadmeia, to Cadmus. In the 6th century B. C. the Thebans adopted a hostile attitude toward the Athenians. The outbreak of the Persian wars found them on the side of Sparta, but their ruling aristocracy soon went over to the Persians. In the Peloponnesian war Thebes fought on the side of Sparta, but in the early part of the 4th century B. C. the two cities were almost continuously at war with each other. At length, under the leadership of Epaminondas and Pelopidas, Thebes attained for a short period (371–362) to the position of the chief power in Greece, but speedily lost it after the death of Epaminondas. The resistance of the Thebans to the Macedonian and the Roman power brought severe reprisals upon the city. It sank into an insignificance relieved only by a transitory prosperity in the 11th and 12th centuries A. D., and was finally destroyed by the Catalans in 1311.

Ancient Thebes is most interesting, however, as the city of the poet Pindar and the painter Aristides, and for the cycles of story, rivaling those of Troy, which centered around it. Five chief cycles are distinguished: (1) the stories of Cadmus; (2) those of Amphion and the building of the wall of seven gates; (3) those of the house of Laius, including the legends of Œdipus; (4) the coming of Dionysus; (5) the labors of Heracles (Hercules). The city thus left its permanent impress upon Greek literature.

Troy. A city on the coast of Asia Minor, about three and a half miles from the Dardanelles. Troy was the most famous city of Greek legend, having been celebrated in the first instance by Homer in the *Iliad* as the prize of the Trojan war. The site is now known as Hissarlik. In 1870, Schliemann began a series of excavations there, which have revealed the remains of nine successive settlements made upon the spot. The sixth one is believed to be the city described by Homer, on account of the similarity of its remains to those found at Mycenæ. The other settlements range from a village of the Stone age to a Greco-Roman town which rose into prominence after 334 B. C. This last town passed under Roman protection in 189 B. C. and was honored as the city from which came Æneas, a reputed ancestor of the Romans. Augustus rebuilt a marble temple of Athena originally erected by the Greek general Lysimachus. Constantine considered making it the seat of his new capital. In 1306, the Turks plundered the city, which, since that time, has lain in ruins.

Tyre. The famous city of ancient Phœnicia. It attained its greatest glory under Hiram, in the 10th century B. C. It was celebrated by ancient poets for the beauty of its scenery, and its harbors were among the wonders of the world. The basis of its commerce, which reached all countries, was its dyed woolens. This trade it continued, though in diminished volume, until the 16th century A. D., when the discovery of the sea route to the East diverted trade from its old courses. The city was for centuries the prize of contending armies, from the Egyptians to the Christian crusaders. A small town, called Sûr, now occupies the ruins of the ancient city.

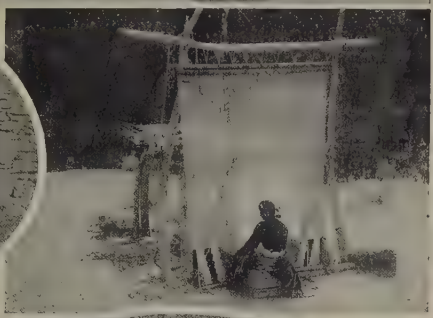
Ur (*ûr*). The Bible story of Abraham mentions Ur of the Chaldees as the Mesopotamian home of the patriarch. The site of this ancient city bears the modern name of Mughair, meaning pitch-built and given in allusion to the large quantities of pitch which were used in the construction of its earliest buildings. The city, which stood about 140 miles southeast of Babylon, was the chief center of the worship of the moon god Sin. The ruins of the famous zikkurat, or stage tower, still rise impressively above the surrounding plain.

Recent excavations have revealed successive reconstructions of walls and temples, made in various periods from the 30th to the 4th century B. C. The earliest remains, however, which are of unbaked clay bricks, indicate Sumerian construction antedating by many centuries the year 3000 B. C. Conspicuous among the reconstructions is that carried out by Nebuchadnezzar, in which the early form of the temple of Sin was, for the first time, radically altered. The historical record of the city is now complete from about 2300 B. C. to about 400 B. C., when, under Persian rule, Zoroastrianism displaced the city's ancient religious cult and effected the destruction of its temples.













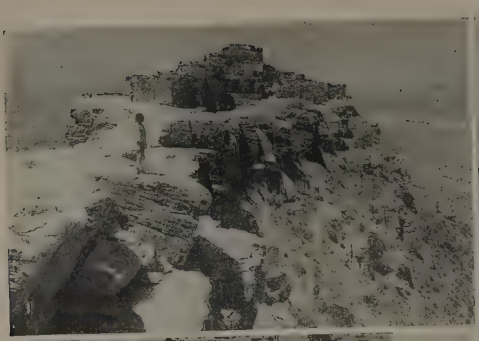




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AMERICAN INDIANS. I

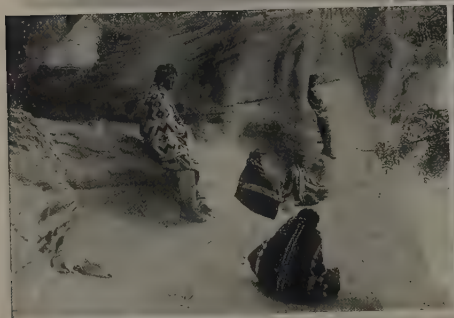
1 Navajo Family and Dwelling (Hogan), Arizona. 2 Zuñi Village, New Mexico. 3 Hopi Basket Weavers, Arizona. 4 Navajo Girl Weaving Rugs. 5 Pueblo Indians Making Pottery, New Mexico. 6 Zuñi Jewel-maker Grinding Turquoise. 7 The Pueblo of Taos, New Mexico 8 Children of Taos

















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AMERICAN INDIANS. II

1 Hopi Dwellings, Walpi, Ariz. 2 Hopi Indians. 3 Hopi Dancer. 4 Blackfeet Indians, Mont. 5 Navajo Indians, Ariz. 6 Typical Pueblo Indians, New Mex. 7 Relics of the Cliff Dwellers. 8 Sun Temple, Mesa Verde, Colo.

RACES AND PEOPLES

MEN that have lived, or are living, on the earth may be readily divided, on the basis of striking physical characteristics, into large groups, called races. Skeletons, or parts of skeletons, dating from prehistoric times, have been found, which, in the skillful hands of scientists, have established the existence of such races. In some cases, indeed, we have only a part of one skeleton upon which to base our knowledge of a distinctive group. In historic times, however, we may distinguish not only races, characterized by physical differences, but peoples,—groups which are marked off from each other to some degree by less obvious variations of physical characteristics but mainly by cultural differences, that is, by divergences of language, customs, and institutions.

PREHISTORIC RACES

The most striking archeological discoveries of the 19th century were due to the unearthing of the remains of men who lived in the very remote past. Mounds of shells, bones, and other *débris*, called in Europe *kitchen middens* and, in America, *shell heaps*, have yielded evidence of the existence of very early tribes; but, besides these, skeletons have been found which appear to belong to manlike creatures of a different and more primitive build.

While archeologists found and interpreted such remains, geologists established the fact that the earth passed through four glacial periods, in which the polar ice sheet moved far southward. These periods were of great duration and were separated by warmer periods, called interglacial ages. It was during the second of these ages that what is regarded as the earliest human type arose, the so-called Heidelberg men. In the third interglacial age, appeared a race known as the Piltdown men. Toward the close of that era, we find the Neanderthal men. After the last glacial period various races made their appearance. The course of their fortunes and the development of their arts can be traced with a measure of certainty by the implements and the weapons which they left behind them. The order in which they flourished, however, is still obscure.

Cave Men, or **Cave Dwellers.** Men of the fourth, and last, glacial period. The period in which they flourished is called *Mousterian*, from Le Moustier, in southern France, where many remains belonging to the age have been discovered. The remains are found in caves, and occur in accumulations, sometimes 30 feet deep, made up of successive layers which record the occupancy of different generations. It is thought that the men of this period made their dwellings in caves on account of the intense cold which prevailed during the epoch.

Cro-Magnon (*krō′mă′nyŏN′*) **Man.** The first true man, dating from the postglacial period. This race has been called Cro-Magnard, because in the cave of Cro-Magnon, France, were discovered the first remains of the race—the skeletons of a woman, a child, and three men. They indicate a tall people with broad faces, prominent noses, and very large brains. In fact, the brain capacity of the woman found is greater than that of the average man living today.

The Cro-Magnards, like the Neanderthal men, used stone for making implements, but, besides this, they employed horn and bone for making fishhooks and as material upon which designs were drawn. Caves, in which these men frequently lived, contain many other marks of artistic activity, such as drawings and paintings of animals, and little images fashioned out of ivory or sometimes out of soapstone. There is evidence for supposing that these pictures and images were regarded as a magical means of obtaining power over the animals represented. The people of this race sometimes built timber houses roofed with hides which they obtained by hunting, but, like all other paleolithic races, that is, races of the Old Stone age, they had not learned to make pottery.

Grimaldi (*grē-măl′dē*) **Men.** A type of men known by skeletons which were found in a cave at Grimaldi, on the Italian coast of the Mediterranean, near the border between France and Italy. These remains indicate men characterized by a negroid type of physique and belonging to the same general period as the Cro-Magnon men.

Heidelberg (*hī′dĕl-bûrg′*) **Man.** The man, or manlike creature, whose jawbone was found in 1907 about 80 feet below the surface of a sand pit near Heidelberg, Germany. Anthropologists place the time of this creature's life at the second interglacial period, possibly 200,000 years ago. The jawbone is manlike, although it bears no trace of a chin. The teeth, which are remarkably well preserved, are unmistakably of human type.

Java Man. The earliest manlike animal known to science. Its scientific name, Pithecanthropus erectus, means erect ape-man. Remains of the Java man were found first at Trinil, Java, in 1892 and consisted of the top of a skull, some teeth, and a thigh bone. A complete skull was discovered at the same place in 1926. This creature is believed to have lived before the first Ice age, several hundred thousand years ago.

Lake Dwellers. Men of prehistoric, and also of historic, times, who built their huts on piles driven into the beds of lakes. Probably the chief motive of the builders was to secure an easily defensible situation. The most noted remains of such communities are those discovered in Switzerland in 1854. In that year, and again in 1921, very low water levels permitted the examination of the ancient village foundations. There, as well as in similar lake villages in Scotland and Ireland, many utensils of wood, of bone, and of earthenware, also pieces of garments and of nets, have been recovered.

There are many such lake villages even today. This fact accounts for the name of a South American country. The lake dwellings were so numerous on Lake Maracaibo when it was first seen by its white discoverers that the country received from them the name of Venezuela, or Little Venice.

Mound Builders. The Stone Age people who built the extensive earthworks found in the Mississippi valley of North America and southward as far as Peru. The purpose of these mounds is still a matter of dispute. Many small conical mounds are supposed to have been used as altars. Mounds which were used as burial places are numerous; in some cases they contain single graves; in others the mound holds several separate tombs; while in still others large collections of bones are found.

Because of their location and form, several extensive mound structures may be looked upon as defensive works. Among these, the most famous is the Great Serpent mound in Adams county, Ohio. Here what have been walls extend in the form of a partially coiled serpent for a length of 1350 feet. On the banks of the Miami river in Warren county, Ohio, is a structure of earthen walls enclosing an area of about 100 acres, to which the name Fort Ancient has been given.

The great Cahokia mound, in Madison county, Illinois, 17 acres in extent at its base and having an extreme height of 100 feet, was apparently at the center of extensive groups of smaller mounds. The Etowah mound in Bartow county, Georgia, is similarly situated.

In the state of Wisconsin are found the most extensive remains of mounds. These are constructed in the forms of eagles, bears, serpents, and other animals, which probably represent various tribal totems, and were connected with the religious beliefs and ceremonies of the builders.

It used to be thought that the Mound Builders were an earlier agricultural and highly civilized race which the nomadic Indians exterminated. But it is generally held now that they were not conquered by, but were the ancestors of, the historic Indian tribes. Some Indian tribes were found occupying the sites of mounds as late as a century after the discovery of America by Europeans.

Neanderthal (*nā-ăn′dĕr-tăl′*) **Man.** The name given to the race that inhabited Europe near the close of the third interglacial period. Human remains of this period were discovered in 1856, near Dusseldorf, Germany, in Neanderthal, after which this type of human being has been named. The bony structure as preserved indicates that this creature could not hold his head erect, and that his thumb was not as flexible as the true human thumb. The formation of his head and jaws makes it appear unlikely that he had a language. However, he used fire, and, as he made rough stone implements, he may be regarded as the earliest representative of the Stone age. He lived in caves, probably for shelter against the increasing rigors of the climate as the last glacial age approached.

Piltdown Man or **Sub-Man.** The name given to the creature, otherwise known as Eoanthropus, "dawn-man," some pieces of whose skull were found in a gravel pit at Piltdown in Sussex, England, in 1907. The gravel deposit in which the skull was found belongs to the third interglacial period, which means that the skull is from 50,000 to 100,000 years old. This skull is of a much less definitely human character than is the jaw of the more ancient Heidelberg man.

HISTORIC RACES AND PEOPLES

It has been customary for anthropologists, that is, for those who make a study of the natural history of mankind, to distinguish, on the basis of color, five, or sometimes four, races, as follows: Caucasian (white); Negro (black); Indian (red); Mongolian (yellow); and Malay (brown). The last is sometimes included with the Mongolian. More recently, however, anthropologists have attempted to base distinctions of race on differences in the size and the proportions of skulls and on other physical differences found to follow these, such as the shape of the cross section of the hair and the composition of the blood. These attempts have resulted in a division into the dolichocephalous (long-skulled) and the brachycephalous (short-skulled) races.

The term race is often popularly applied to groups which are properly designated as peoples. Ethnologists, however, that is, those who devote themselves to the study of peoples, classify a group as a people when its distinguishing characteristics are cultural rather than physical. So it often happens that a people will include individuals of different or of mixed races. Moreover, since differences between groups are often vague, a third term, family, has come into use, which is intermediate between race and people. We find peoples grouped into families, which may be regarded roughly as branches of the race, as the Aryans are said to be a branch of the Caucasian race. Peoples and families, however, and even races, have tended to unite and fuse by intermarriage so as to produce new groups. As a result, an account of races and peoples is necessarily complex. Nevertheless, the characteristics of the various groups do persist in a surprising manner, even over a great many centuries, so that a knowledge of the racial origin of a nation is often helpful in understanding its qualities.

Afghans (*ăf′gănz*). The native Iranic people of Afghanistan. The Afghans are Caucasian in physical type and Mohammedan in religion. In language they are related to the Persians and to the northern Hindus. The origin of the Afghans is obscure, some writers supposing that they are descended from the soldiers of Alexander the Great, and others affirming that the Copts or the Chaldeans were their ancestors. The Afghans themselves hold that they are in Jewish descent, but there is no trace of Israelite origin of the Afghan language. As a race they are handsome and athletic, with fair complexions, aquiline features, and long, flowing beards. Familiar with the art of war from youth, the Afghan makes a valiant soldier. The present day Afghans are firm in the belief that they will become a great and powerful nation. See *Afghanistan*.

Albanians (*ăl-bā′nĭ-ănz*). The aboriginal people of Albania, on the southwest coast of the Balkan peninsula, where they have lived since very ancient times. They are probably descendants of the earliest Aryan immigrants into Europe. Their language seems to be Aryan, resembling the Slavic rather than the Greek. The Albanians are very backward in culture, having scarcely any literature, and their rate of illiteracy is one of the highest in Europe. Physically, they are tall and muscular, with rather blond and regular features which clearly show their Caucasian origin. Their chief distinction in history is the persistence with which they have maintained their customs, characteristics, and independence. The Moslems overran Albania in 1468, but their rule over the Albanians was only nominal even in the larger towns. While the Albanians are brave, they are somewhat turbulent in spirit and are warriors rather than workers. It is estimated that they number about 1,200,000. Of this number, some 250,000 are resident in eastern Greece and perhaps 100,000 in southern Italy and Sicily, where they colonized many centuries ago. In religion, about two-thirds of the Albanians are Mohammedans; the remainder belong chiefly to the Catholic and the Greek faith. See *Albania*.

Algerians (*ăl-jē′rĭ-ănz*). Natives of Algiers; a geographical term and not the name of a distinct race. About two-thirds of the population of Algiers are Berbers and one-third are Arabs. The former are the original inhabitants of the country; they speak their native language but write with Arabic characters. The Arab population is mostly nomadic, although a few are settled in villages along the coast. In the Algerian towns the population is largely Moorish.

AMERICAN INDIANS

Christopher Columbus gave the name Indians to the natives of America, because he thought he had reached India from Europe by the western route. The opinion is now very widely held that the Indians are the descendants of people who migrated from Asia at a very early period. In the course of many centuries they spread over the American continents and, under widely differing conditions, developed a great variety of manners and customs. At the time of Columbus some peoples in South and Central America had advanced to a level of culture approaching that of ancient Egypt or Babylon. Over the greater part of the northern continent, however, the natives were still in the Stone age. They lived in wigwams or log huts. Many still subsisted by hunting, although a few tribes had made notable progress in agriculture, especially in growing such crops as maize, tobacco, peanuts, and cotton; some of the Iroquois even planted fruit trees. They had no domesticated animals except the dog.

Indians of the United States and Canada. The Indians of the United States and Canada varied greatly in appearance, in degree of culture, and in habits. They used no less than 200 distinct languages. Apart from the short, fair Eskimos of the north, however, most of them were tall, bronze-colored, having black hair, high cheek bones, and little or no beard. Their weapons were bows and arrows, and axes, spears, or knives of stone or of bone. After the coming of Europeans, guns and other iron instruments were employed. For money, strings of shell beads, called wampum, were often used. Among some tribes there was a belief in a great spirit and in a future life spent in a "happy hunting ground." A confidence in the efficacy of magic was very widespread. There was little writing, although some tribes, like the Delawares, had a picture script to record their history and myths. On the plains an elaborate sign language was developed for intertribal communication. The Cherokees alone had a literature written in an alphabet of their own invention. There were many rich mythologies, however, handed down by word of mouth.

Social customs varied widely. In most tribes, affairs of common interest were managed by a chief, or sachem, advised by a council of elders. Women were highly respected in some tribes; in others they had scarcely any rights. Slavery, in the sense of the right of life and death over others, was rare, although it existed in some cases. Burial, cremation, and exposure were all used in different localities as means of disposing of the dead. Various games, such as lacrosse, football of a certain type, and hunt-the-button, were played by some tribes.

It is estimated that at the time of the discovery of the continent there were upwards of a thousand tribes in North America. A complete enumeration of these would be plainly impossible. A large number have not survived, and even those which are still known as tribes no longer inhabit the regions they once did, but are brought together into reservations or even divided up among different reservations. Most of the larger tribes, however, survive in the general regions over which they once ruled.

Tribal Groups and Cultures.—The land lying both north and south of the Great Lakes and extending from the Mississippi river to the Atlantic coast was formerly inhabited by numerous tribes described by the general name of Algonquin. They included, among others, the Delawares and the Mohicans. The Algonquins to the north lived by hunting and fishing, while those to the south of the Lakes harvested wild rice and other grains, and made pottery.

The Iroquois, sometimes called the Five Nations, or, later, the Six Nations, inhabited what is now the state of New York and southern Ontario. Their agriculture was more intensive, and their manufacture of pottery was more skillful than that found among the Algonquins. They comprised the Mohawks, the Oneidas, the Cayugas, the Senecas, the Onondagas, and, later, the Tuscaroras. Organized into a "league of nations," they waged war systematically against their enemies.

South of the Algonquins and occupying territory which extended from the Carolinas and Georgia to Texas and Arkansas, dwelt a group of tribes of which the more important were the Creeks, the Choctaws, the Cherokees, and the Seminoles. They lived in permanent villages, cultivated the soil, made pottery, and even wove cloth. Among them the Busk, or corn dance ceremony, was most fully developed.

The Indians of the Mississippi plain were hunters, living principally on buffalo meat. They housed themselves in tepees and did not cultivate the soil. Before the 17th century, when horses were introduced, the dog, which they used as a beast of burden, was their only domesticated animal. In the northeastern part of the plain lived the Crees, the Chippewas, and the Ojibwas; in the eastern part were the Omahas and the Wichitas; and in the center dwelt the Sioux, the Assiniboins, and the Dakotahs.

Among the Pueblo Indians, inhabiting the southwestern part of the continent, were the Apache tribe and the

Navajos, who became famous for their blankets. Others in this region, who did not belong to the Pueblo tribes, were noted for their basket weaving, but in general were inferior in culture, neither producing as skillful pottery nor living in permanent dwellings. Certain Pueblo Indians used to build stone and mortar dwellings in cliffs as a protection against the fiercer Apaches and Navajos. This fact gave rise to the belief in a prehistoric race of "Cliff Dwellers." Many Pueblo tribes are made up of remnants of different stocks which have come together through migrations. These movements of tribes account for the many ruins of abandoned villages in the southwestern United States.

The California Indians, the so-called Diggers, represent the most primitive form of historic American culture. They subsisted on roots and acorns; they made neither pottery, baskets, nor cloth; and they had only the most rudimentary social and political organization. The chief tribes were the Washos, the Yumans, and the Maidu.

The tribes of the northwestern states and of British Columbia, on the other hand, showed great skill in woodwork and developed a system of barter and of credit, with which was connected the so-called potlatch. This was a festive occasion on which each family displayed all its wealth and even gave away much of it in a spirit of extravagant generosity. They lived in houses built of planks and erected totem poles of carved wood. Among the more prominent tribes were the Bannocks, the Snakes, and the Flatheads.

In the north Pacific area lived a number of tribes, including the Bellacoolas and the Chinooks. The Chippewas, the Slaveys, and other tribes in the Mackenzie area are still little molested by white men, but they live under hard conditions of climate. The caribou provides their principal food, as well as the material for their clothing and tents.

In the arctic region, the Eskimos maintain a precarious existence, depending for food mainly on the seal, which they hunt from skin boats when the water is open, and at other times from sleds drawn by dogs. Their numbers are small in relation to the immense stretch of land over which they range, but they have shown extraordinary persistence in maintaining their language and habits. They are thought to be connected racially with the Algonquins.

Political and Economic Status of the Indian.—The number of Indians in North America about the year 1492 has been estimated by James Mooney, United States government expert, at 1,115,000, but this conclusion is questionable. The number steadily decreased until about 1900, but since that date an increase in the Indian population has been recorded, so that in 1921 it stood at approximately 460,000 for the whole continent.

The United States government dealt with the Indians by treaties up to 1878, and after that by congressional enactments. The Indians surrendered their lands and were settled on reservations as wards of the government. Many of them still live under these conditions, possession of land being a right of the tribe as a whole. Their affairs are supervised by the office of the commissioner of Indian affairs, which, created in 1832, has broadened its activities until now it interests itself in the health, the education, and other aspects of the welfare of the natives. In 1887 the government made it possible for Indians to accept individual allotments of land formerly held by the whole tribe, and so to become American citizens, yet without losing their tribal affiliations. By 1924, two-thirds of the Indians had become citizens, and, in that year, citizenship was conferred on all non-citizen Indians born in the United States.

In Canada, the government each year pays a certain amount of money, known as "treaty money," and distributes a certain amount of provisions to every Indian on a reservation, in accordance with treaties made originally with the various tribes. Industrial schools, also, are provided by the government and are maintained by religious organizations. These schools may be attended without charge by Indian children, in order that the children may receive a training which will enable them to earn a living outside the reservation and so attain to privileges of citizenship.

Study of Indian History and Culture.—The study of the North American Indians has proceeded rather slowly. However, there are several valuable exhibits of Indian history and culture, notably, in the Peabody Museum (Cambridge), the American Museum of Natural History (New York), the Academy of Sciences and the free Museum of Arts and Sciences (Philadelphia), the Field Museum (Chicago), and the Royal Ontario Museum of Archeology (Toronto). Besides these, the Museum of the American Indian was opened in New York in 1922, devoted exclusively to the promotion of a knowledge of the aboriginal inhabitants of the continent. In California a considerable amount of information regarding early California Indians is spread by the famous annual Mission Play, which commemorates the missionary endeavors of Father Junípero Serra, carried on among these Indians in the 18th century. See *California Missions.*

The following tables exhibit the present distribution and the money incomes of the Indians in the United States and Canada:

INDIANS OF THE UNITED STATES

State	Area of Indian Lands Acres	Income of Indians Dollars	Population (1920)
Alaska	. . . .	. . . .	18,398
Arizona	18,653,014	5,482,039	42,400
California	517,118	1,586,226	16,241
Colorado	468,874	153,264	796
Florida	23,542	5,900	454
Idaho	682,939	1,491,630	4,048
Iowa	3,251	58,667	345
Kansas	272,519	629,086	1,466
Michigan	153,418	63,789	7,510
Minnesota	1,508,553	2,313,449	12,681
Montana	6,053,673	4,290,484	12,374
Nebraska	359,542	1,021,234	2,461
Nevada	740,635	609,133	5,900
New Mexico	4,697,224	2,196,417	21,530
New York	87,677	33,198	6,432
North Carolina	63,211	198,042	8,268
North Dakota	2,105,320	1,586,205	9,018
Oklahoma	19,551,890	39,393,608	119,255
Oregon	1,718,006	1,739,595	6,629
South Dakota	6,685,734	4,331,940	23,010
Utah	1,641,307	400,148	3,057
Washington	2,718,886	2,408,685	11,114
Wisconsin	590,111	1,646,960	10,319
Wyoming	2,102,286	886,536	1,748
All Other States	. . . .	. . . .	9,281
Total	71,398,730	72,526,235	354,735

INDIANS OF CANADA

Province	Area of Indian Lands Acres	Income of Indians Dollars	Population*
Alberta	1,307,346	1,060,892	14,557
British Columbia	731,090	2,842,909	22,377
Manitoba	401,937	765,144	13,869
New Brunswick	20,782	62,456	1,331
Northwest Territories	. . . .	. . . .	3,873
Nova Scotia	21,730	164,313	2,048
Ontario	1,025,411	3,230,133	26,436
Prince Edward Island	1,527	13,100	235
Quebec	158,767	1,110,259	11,566
Saskatchewan	1,173,888	1,421,344	12,914
Yukon	. . . .	. . . .	1,390
Total	4,842,478	10,670,550	110,596

*Statistics of 1921.

Central and South American Indians. In Central and South America an even greater variety of culture is found than in North America. At the time of the discovery of the New World the Aztecs in Mexico had developed a political organization and an architecture of a fairly high order, while the Cariban tribe still practiced cannibalism. In fact, one of the companions of Amerigo Vespucci was overpowered by some women of this tribe and was eaten. Certain tribes on the Amazon are "lake dwellers," living in huts built on piles driven into the bed of the river. Many of the Arawakan tribes were good agriculturists when discovered. They made pottery, worked in stone and gold, and used cotton. From them, white people have adopted the use of the hammock and of tobacco. A large number of languages were spoken, from which a considerable number of words have been taken over into English and naturalized, such as: cannibal, coca, condor, hammock, hurricane, maize, potato, quinine, and tobacco. A curious custom, known as the *couvade*, is found among some tribes, according to which, when a child is born, the father takes to his bed as though he himself had suffered the pains of childbirth.

When America was discovered, these Indians had no iron implements, but silver and gold were very abundant. This condition invited conquests; the Spaniards, and later the Portuguese, waged wars with the natives for many decades and eventually established colonies. Over against the attempts at extermination, however, should be set the work of the missions, which aimed at Christianization. In the present population of the South American continent the Indian element is racially dominant instead of being negligible, as it is in North America.

For those Indians of Mexico and of Central and South America who developed distinct civilizations, see *Aztecs, Incas, Mayas, Toltecs.*

Angles (*ăng'g'lz*). A tribe originally from northern Germany, which, along with part of the Saxons, effected a settlement in England in the 5th century A. D. The Angles gave their name to the country.

Arabians (*ā-rā'bĭ-ănz*) or **Arabs** (*ăr'ăbz*). The Semitic people inhabiting Arabia and large portions of neighboring countries. Under the one name are included the settled Arabs and the wandering Bedouin tribes of the desert. After their adoption of Mohammedanism in the 7th century A. D., they spread far from the country which bears their name and settled in distant portions of Africa and Asia and also penetrated into Europe. Through the *Koran* they have given their language to vast populations of the Mohammedan faith. With the Persians, the Arabs took a leading part in developing Moslem civilization. They promoted commerce and geographical exploration, created a new order of architecture, and made the products of Greek culture accessible to European nations. During the middle ages the Arabs were far in advance of the rest of the world in the cultivation of the sciences, philosophy, literature, and art. As a race, they show great absorptive power, and, when intermingled with conquered or converted peoples, have impressed their characteristics upon these to a remarkable extent. While Syrians and Moors have long used the Arabic language, they are not Arabian in origin. The true Arab population of Arabia is between three and one-half and five millions. A much larger number live in northern Africa. See *Arabia*.

Armenians (*ăr-mē'nĭ-ănz*). The Aryan people who conquered the country of Armenia in the 7th century B. C. They mingled to some extent with the earlier inhabitants and also with the Persians; consequently, among modern Armenians there are great differences of physical type. Generally, they have swarthy complexions and dark eyes and hair, and Armenian women are noted for their delicate and regular features. The sturdy character of these people has enabled them to survive centuries of oppression and misrule. The Church of Armenia, established about 301 by Bishop Gregory the Illuminator, may be said to have been the first national Christian church. Since the Council of Chalcedon in 451, whose decrees it refused to acknowledge, the Church of Armenia has been independent of the Eastern Church and has had as its head the Catholicos, whose see is at a monastery near Erivan in Russia. The Armenian patriarch, however, residing at Constantinople, is the head of the Armenian Church in Turkey and is equal in importance to the Catholicos.

On account of their religious faith, the Armenians have been systematically persecuted by the Turks, and much of the ignorance and superstition to be found among the peasantry may be attributed to the persistently cruel treatment meted out to them by their inhuman tyrants. A deliberate plan of the Turkish government to exterminate the Armenians was set on foot at the beginning of the World War, and it is estimated that more than a million perished in this series of massacres. But the race, everywhere, shows a high capacity for education and culture, and many Armenians who have emigrated to different parts of Europe and America have proved this by their success, not only in industry and business, but also in the wider fields of art and learning.

Aryans (*ăr'yănz*). A family of peoples assumed to be of kindred race because their languages show common characteristics. The original home of the race is thought to have been either northern Europe or Asia. They had already domesticated the horse by 2500 B. C., at which time they first appear in history. Their descendants include the people of India, of Greece, of Italy, and of Albania, together with the Celtic, the Germanic, the Anglo-Saxon, and the Scandinavian peoples, and also the northern Russians or Slavs. The race is often known as Indo-European or Indo-Germanic.

Assyrians (*ă-sĭr'ĭ-ănz*). A Semitic people, calling themselves Assur, who, about 2000 B. C., settled in the valley of the Tigris, north of Babylonia. Here they occupied a former Hittite stronghold, built up a power which became a rival of Babylon, and finally gave the name of Assyria to the entire Tigris-Euphrates valley. The Assyrians were a strong, warlike people, speaking a language similar to that of the Babylonians, but lacking their capacity for culture. Their history was one of ruthless, cruel conquest and tyranny.

Aztecs (*ăz'tĕks*). The tribe or group of tribes that ruled southern Mexico at the time of the Spanish conquest in 1521. The name is derived from *Aztlan*, meaning "heron-place," "white place," or "seacoast," the earlier home of this people, which probably was located on the west coast of Mexico. Properly, the Aztecs, or "heron clan," were the tribe that built Tenochtitlan, now the City of Mexico. The name, however, is extended to include the seven tribes of the surrounding territory, which formed the Aztec Confederacy, and, more loosely, to designate all the ancient semicivilized tribes of central and southern Mexico and their modern descendants.

When Cortés came to Mexico, the Aztecs had been in power for two or three centuries. They had developed, in some respects, a high order of civilization. Their capital, Tenochtitlan, was a strong stone city, with palaces, baths and fountains, and an elaborate system of canals. They held regular weekly markets, in which trade was carried on by barter. Their temples were built in a form much like the Egyptian pyramids, and they showed great skill in agriculture and in industrial arts, especially metal working.

The Aztec tribe was organized in twenty clans, which were grouped in four phratries, or wards of the city. The supreme government was a council of twenty, the executive power being placed in the hands of two magistrates, one for civil, the other for military affairs. The council was called "speech-place," which is the literal meaning of our word parliament.

Yet, the purpose of all the Aztec organization seems to have been, not government, but the exacting of plunder and tribute from other tribes. Besides, with all their culture, the Aztecs were cannibals, and their religious rites called for human sacrifices of the most revolting character. The modern Aztecs, however, living in the neighborhood of the City of Mexico, are a quiet, peaceable people. They still retain their ancient language, but they have lost all the other features of ancient Aztec culture. See *Mexico*.

Bantus (*băn'tōōz*). The sturdy group of African tribes, including the Kafirs, Zulus, and Bechuanas, living in Central and South Africa, who speak dialects of one language called Bantu. They are agriculturists, living in settled communities, most of the field work being done by the women, while the men hunt and care for the herds. They do good work in wood, metals, and pottery.

Basques (*băsks*). A remarkable and very ancient people inhabiting the Pyrenees of northern Spain and southwestern France. They are believed to be a fragment, perhaps the only distinct remnant, of the pre-Aryan race, or aboriginal people of Europe. The Basque tongue is the only non-Aryan language of western Europe. Formerly, it was thought to point to a Mongolian origin for this people, but recent investigations indicate connections with the Berbers of northern Africa, who are of Hamitic stock. The Basques are not now easily distinguishable in appearance from their Spanish and French neighbors, though they still speak their own strange language and adhere to their peculiar customs and laws.

Since the dawn of history the Basques have formed small exclusive republics ruled by duly elected chiefs, under their own special laws, with fierce independence and great patriotic pride. Although the Basques of Spain have not contributed in any prominent way to the country's history, their national code has been respected by every ruler. At all times they have constituted a sort of realm within the realm, having their own special parliament, tariffs and tolls, and, until recently, their own army and police; collecting their own taxes and paying a fixed annual levy or tribute to the Spanish government.

While, on the whole, the Basques are not keen minded or progressive, illiteracy is rare among them, and they possess many admirable traits. They are faithful and honest and show marked kindness and hospitality to strangers. It is said that no people on earth are prouder than the Basques, but they have no aristocracy among them, and no one will acknowledge a superior.

About a half million Basques still remain, chiefly on the Spanish side of the Pyrenees. Only about 150,000 now live in Gascony, the French province formerly called Vasconia after them. It is estimated that during the latter half of the 19th century 200,000 Basques emigrated to South America.

Bedouins (*bĕd'ōō-ĭnz*). See *Arabians*.

Belgæ (*bĕl'jē*). The northernmost group of Celtic tribes which inhabited ancient Gaul. The Belgæ occupied the country between the Seine, Marne, and Moselle rivers and the ocean, which includes modern Belgium, together with portions of Holland and northern France. Some of the Belgæ settled in Kent and Sussex in southern Britain. In 57 B. C., Julius Cæsar conquered the Belgæ in a long, hard campaign, though part of the tribes revolted later. According to Cæsar, the Belgæ were the bravest of all the Gauls. See *Belgium*.

Belgians (*bĕl'jĭ-ănz*). The name applied to natives or citizens of Belgium, but not the name of a distinct race. Southern Belgians, for the most part, are Walloons, and northern Belgians are Flemish. See *Walloons*, *Flanders*.

Bengalese (*bĕn'gă-lēz'*). The principal race inhabiting Bengal, British India. Their language, a modern Hindu tongue called Bengali, is now spoken by a population of some 45 million. On account of their unusually broad heads, the Bengalese are thought to contain an admixture of Mongolian stock.

Berbers (*bûr'bĕrz*). The most important native people of northwest Africa, scattered over the whole space between Egypt and the shores of the Atlantic. The Berbers

are of Hamitic origin and number at least 7,000,000 in Morocco and Algeria and 500,000 in Tripoli and Tunis. Physically, they are of middle height with brown or nearly black complexion. They are usually thin but strong and muscular, and their bodies are beautifully formed. Although illiterate, they are remarkably industrious, usually honest in their dealings, and of high natural intelligence. By working native iron they make various implements and utensils, including gun barrels, knives, and swords. The tribes of the plains breed sheep, cattle, goats, asses, and mules. The Berbers are Mohammedan in religion, and their language is said to be related to the Semitic group.

Bohemians. See *Czechs.*

Boii (*bō'ī-ī*). A Celtic people, who emigrated from transalpine Gaul into Italy, where they occupied the old seat of the Umbrians, between the Po and the Apennines. In 283 B. C. the Boii were defeated by the Romans at the Vadimonian lake, and thereafter they prolonged, through numerous campaigns, especially in support of Hannibal, but sometimes single-handed, their resistance to the Roman arms, till their complete defeat by Scipio Nasica, 191 B. C. They were subsequently compelled to recross the Alps, and dwelt for more than a century in a part of modern Bohemia, which derives its name from them, but they were ultimately exterminated by the Dacians. See *Bohemia.*

Brachycephalous (*brăk'ĭ-sĕf'ă-lŭs*) **Peoples.** "Short-skulled peoples." People characterized by broad skulls. The term is more specifically applied to a race thought by some anthropologists to have originated in southern Europe or in Asia. The individuals are, in general, darker and shorter than those of the race in the North with opposite characteristics, called the dolichocephalous or long-skulled race.

Bretons. About the 6th century B. C., the Celts of Gaul invaded Britain and, coalescing with the Iberians, founded the states later overthrown by the Romans. Upon the invasion of the Anglo-Saxons between the 5th and 6th centuries A. D., the British Celts who fled from England to avoid the Saxon domination crossed to the northwest of France and founded the Celtic state of Brittany, then called Armorica. These Celts are the direct ancestors of the modern Bretons, whose language is closely allied to the Welsh and the now extinct Cornish languages. It is spoken by over 1¼ million persons. Of its four dialects *León* is the purest and *Cornuallais* the most widely spread. See *Brittany.*

Britons. A people, largely of Celtic origin, who inhabited England at the time of Julius Cæsar's visit. They had a highly developed druidic religion. Young men in Gaul who wished to be priests were sent to Britain to be educated.

Burmese (*bûr'mēz'*). The principal native race of British Burma. The Burmese are Mongolian in origin, and their language is related to the Indo-Chinese of farther India. They are generally a well-formed race, with skin of a rich brown hue, black hair, and black eyes; the men are fond of athletics. The dress of the common people is a strip of cotton or silk cloth wound about the body. They are fond of personal decorations in bright colors, and expert native jewelers supply the demand for gold and silver ornaments. Their festivals are many and are celebrated with games, pageants, and plays. Life is very easy in their friendly climate, and the people are inclined to enjoy it as much as possible. They are Buddhists in religion, and Burma is rich in shrines and temples. In the temple schools all Burmese boys are educated. Travelers seem to find the romance suggested by the name of the Burmese capital, Mandalay, actually present in the country. See *Burma.*

Bushmen. A group of very primitive peoples of southern Africa, who live a wandering life in the desert and obtain their food by hunting.

Catalans (*kăt'ă-lănz*) or **Catalonians** (*kăt'ă-lō'nĭ-ănz*). The people inhabiting Catalonia, the northeastern division of Spain. They extend northward over the Spanish boundary into France, and their language, called Catalan, is distinct from both the Provençal of southern France and the Castilian of Spain. Castilians can understand the speech of Portuguese more easily than that of Catalans, and the rapid enunciation of the Catalan adds to the difficulty. The Catalans are the most energetic, industrious, and intelligent people of Spain.

Caucasian (*kô-kā'shăn*) **Race.** This name is applied to a large group of white peoples, including the most highly civilized nations. It was first used in the belief that the highest type of this race was to be found among the people of the Caucasus mountains. Most Europeans (excluding Turks, Hungarians, and Finns), the Hindus, Persians, Arabs, Hebrews, and ancient Phœnicians come under this classification.

Celts (*sĕlts*). A vague term which names the large group of peoples, of mixed race but using a common language, whose early home, about 1000 B. C., was in the upper valleys of the Rhine and the Danube. From this center they spread west, south, and east, one branch becoming the Galatians of Asia Minor, another, the Gauls of western Europe. In Italy, as early as the 4th century B. C., they made large settlements in the valley of the Po, a region from which afterward came Virgil, Catullus, and other men of note in Latin letters. In the East, they served as mercenaries in Africa and Asia. They were known to the ancients by many different names, and there seem to have been two distinct physical types among them, one tall and fair, the other short and dark. On the continent, the Celts succumbed to Roman and Germanic conquest. At the present day, they are represented most conspicuously by the Irish, the Welsh, and the Highland Scotch.

Chinese. In common use, the name of the native inhabitants of the country of China. The Chinese, properly, are the product of the fusion of several primitive races, most of which were Mongolian. Their traditions tell us that the original Chinese nation occupied a small territory near the present city of Si-an-fu, and that they extended their rule by peaceful and warlike means to the west and south. In general, the Chinese show the low stature, the square and flattened face, and markedly uniform expression of the Mongolians, but various types appear in the northern, central, and southern parts of the country. Yet, with many differences of disposition and wide variations of dialect, the Chinese show several uniform qualities which mark them as one people. They are courteous, peace loving, practical, temperate, and generally unimaginative, and they are highly endowed with the power of memory.

The heart of the Chinese social and religious life is filial piety, the worship of ancestors. The care of the dead seems often to be of more importance than provision for the living. In houses of the wealthier classes, rooms are set apart for tablets inscribed with the names of deceased ancestors, and ceremonies, prescribed by the classic Book of Rites, are performed before these. Indeed, the daily life of the Chinese, particularly of the upper classes, is a matter of minutely ordered etiquette.

Although the Chinese are not inclined to outdoor sports, especially vigorous athletics, they are fond of the theater and various entertainments given by traveling showmen. But in these tastes they are changing through contact with Western nations. They are adopting Western clothing, and foot binding and the wearing of the queue have been discarded. See *China.*

Circassians (*sēr-kăsh'ănz*). The name applied to the group of people inhabiting the northwestern part of the Caucasus. Their name for themselves is *Adighe*; the Turks and Russians call them *Tcherkasses*, or "brigands." Both Circassian men and women are noted for physical beauty, and many Circassian girls have entered the Turkish harems. After the Russian conquest of their territory, in 1864, several hundred thousand of them emigrated. The remainder, about 150,000, have largely lost their racial purity. Among the upper classes, Mohammedanism is the chief religion; among the lower classes, this is mixed with primitive heathen superstitions.

Copts. The Egyptian Christians who separated from the Church in the 5th century upon the question of the "nature" of Christ. In language and blood they were pure Egyptian. Although they rarely intermarried with their Moslem conquerors, and have preserved their religion and manners, they have been reduced by centuries of oppression almost to the state of a degraded class. They still maintain schools, and they use the Coptic language in their church services. The men are employed chiefly as clerks and secretaries. They wear a black turban and usually a dark robe, but in general customs they do not differ from their countrymen of other faiths. See *Egypt.*

Cossacks (*kŏs'ăks*). The inhabitants of the southern and eastern frontiers of Russia. The most important of these communities were those of the Dnieper and the Don. They retained a certain degree of independence with a kind of democratic government, at the head of which was their "hetman," until the reign of Catherine II. In lieu of taxes, they supplied the Russian empire with a most valuable military force of cavalry and scouts. In 1918 the Cossacks proclaimed the new Republic of the Don, but they were later overrun by the Soviet forces.

Croatians (*krō-ā'shănz*). A southern Slavic people whose language differs but slightly from that of the Serbians, with whom they are commonly grouped, as Serbo-Croatians. The Croatians are most numerous in Croatia, Slavonia, Dalmatia, and Bosnia, former provinces of the Austrian empire, now included in Jugoslavia, or the Kingdom of the Serbs, Croats, and Slovenes.

Czechs (*chĕks*). A northern group of the Slavic peoples, who were living in Bohemia, Moravia, and Austrian Silesia, as early as the 5th century. Their struggle against Habsburg tyranny started the Thirty Years' war. After

the French Revolution they began a revival of their literature, a movement which became political in 1848. The Czechs united in 1918 with their neighbors, the Slovaks, in forming a new republic, Czechoslovakia.

Danes. A northern tribe which, in the 5th century A. D., drove the Saxons and the Angles from Jutland and from the adjacent islands. Most of them remained in the country which has become Denmark, but others settled in England in the 9th and the 10th century.

Dolichocephalous (*dŏl'ĭ-kō-sĕf'ăl-ŭs*) **Peoples.** "Long-skulled peoples." A term specifically applied to the long-skulled race coming from northern Europe, tall and fair-haired. They are thought to be characterized by a more independent spirit than the broad-skulled peoples of the South. See *Brachycephalous Peoples.*

Dravidians (*drȧ-vĭd'ĭ-ănz*). The non-Aryan people who inhabit the southern part of India and Ceylon. They occupied the country before the coming of the Aryans. Their languages, of which there are a dozen, belong to the Turanian group. Some of the tribes are of a very low type of civilization, but the Tamils and Telugus have attained a high culture and produced excellent literature and architecture. The religion of the Dravidians varies from rude nature worship to a borrowed Islamism or Hinduism. See *Ceylon, India.*

Egyptians (*ē-jĭp'shănz*). The ancient Egyptians maintained that they were a race of pure blood, native to the Nile valley, without foreign mixture. Modern study confirms this belief. They belonged to the Hamitic branch of the Caucasian or white race, and the modern *fellah,* or peasant, of Egypt is said to represent the ancient type with remarkable purity. The Egyptian language is in many points similar to the Semitic tongues, a fact for which no satisfactory explanation has been made. See *Egypt.*

Eskimos (*ĕs'kĭ-mōz*). The race inhabiting the arctic regions of America and the extreme northeastern part of Asia. They call themselves *Innuit,* or "men." The Algonquin Indians dubbed them *Eskimo,* or "raw fish eaters." They are believed to be of the same stock as the North American Indians and to have migrated from the north Atlantic coast to the districts they now occupy. The language used by widely separated groups of this people is remarkably uniform. In stature the Eskimos are about 5 feet in height, well built, and usually fat. Where they have not been in contact with the white race, they use the tools and weapons of the later Stone age. Their skill in carving fishbones is remarkable. They are hunters, and the seal supplies them with food, clothing, boats, shelter, light, and heat. Their shelters are tents for summer and huts for winter. The latter are built of wood by some tribes; by others, of stone chinked with moss and snow. The clothing of both men and women consists of boots, trousers, and a hooded jacket. They believe in demons of the sea and try to gain the favor of these mysterious beings.

Ethiopians (*ē'thĭ-ō'pĭ-ănz*). The ancestors of the present-day Abyssinians. They were Semites who migrated from southern Arabia about the 5th or 4th century B. C. and were in no way related to the Negro race, to which, through a mistaken identification, the name has been frequently applied.

Etruscans (*ē-trŭs'kănz*). An early people who inhabited Italy north of the Tiber, but whose culture and language were distinct from those of other Italian peoples. By some they are thought to have come from Asia Minor. They developed a considerable commerce and at one time conquered Rome. The inscriptions left by them have not yet been deciphered.

Fellahs (*fĕl'ȧz*) or **Fellahin** (*fĕl'ȧ-hēn'*). The name by which the settled, agricultural Arab tribes are known, in contrast to the wandering Bedouins. It is more familiar as applied to a class of agricultural laborers or peasants of Egypt and Palestine. They represent the ancient Egyptians in physical form and features. In temperament they are peaceful and unprogressive.

Filipinos (*fĭl'ĭ-pē'nōz*). The Malay inhabitants of the Philippine Islands. The earliest occupants of the islands are thought to have been the Negritos, or pygmy Negroes, about 25,000 of whom are still found in the interior of Luzon. At some remote period there occurred a series of Malay migrations. These immigrants scattered over the islands in small groups with different dialects and local customs. Like their modern descendants, such as the Igorots, they were head-hunters and warriors. In the northern highlands of Luzon, some of them developed a remarkable system of irrigated mountain terraces, on which they grow rice. Probably they brought with them a knowledge of ironworking.

Later Malay migrations brought the people represented by the three most important tribes of the present time, Visayans, Tagalogs, and Ilocanos, to whom the name Filipinos is often restricted. Of these, the Tagalogs, who are the most numerous of the inhabitants of Manila, central Luzon, and Mindanao, are the most highly civilized group. The Moros of the southern islands are Mohammedan Malays who followed the other migrations. Since the beginning of the Spanish occupation of the Philippines, intermarriage of Filipinos with Spaniards, Chinese, and Mexicans has produced a large group of mixed blood, called *mestizos,* who are the leaders in government and business.

The Filipinos of today present all stages of civilization, from the primitive life of the wild mountain tribes to the town and village communities where schools have been established. Most of the Filipinos are Christians. The schools introduced by the Americans, the cost of which has been borne by the Filipinos themselves, have done much to spread a knowledge of reading and writing and to develop habits of industry. See *Philippine Islands.*

Finns. A people racially related to the Mongols, the Magyars, and the ancient Scythians, inhabiting Finland, formerly a grand duchy of Russia. Their ancient home is thought to have been in the Ural mountains and the neighborhood of the Caspian Sea. From here they were driven northward about the beginning of the Christian era. They are a sturdy people of high mental and moral development. More than 90 per cent of the adult population of Finland, it is said, can read and write. The Finns speak a highly developed language, in which numerous ancient and modern works have been written. From their famous epic, the *Kalevala,* Longfellow borrowed the meter for "Hiawatha." They are a remarkably serious people, lacking any expression of joy, even in their music. See *Finland.*

Franks. A group of Germanic tribes which from the 3d century was allied with the Romans and which, after the overthrow of the Empire, conquered Gaul. The Franks established a kingdom there under Clovis, and gave their name to the country which we now call France.

Frisians (*frĭzh'ănz*). An ancient Germanic people, who inhabited the extreme northwest of Germany, between the mouths of the Rhine and Ems, and were subjected to the Roman power under Drusus. They were subdued by the Franks, and, on the division of the Carlovingian empire, their country was divided into West Frisia (West Friesland) and East Frisia (East Friesland). The language of the Frisians is closely akin to the Anglo-Saxon. Our knowledge of the old Frisian is derived from certain collections of laws, called the "Asegabuch," composed about 1200. Modern Frisian is split into many dialects, but the greater part of its literature is written in West Frisian.

Gauls. See *Celts.*

Goths. A powerful German people, who originally dwelt on the Prussian coast of the Baltic, at the mouth of the Vistula, but afterwards migrated to the south. About the beginning of the 3d century we find them separated into two great divisions, the Ostrogoths or Eastern Goths, and the Visigoths or Western Goths. The meaning of *Goth* is said to be "nobly born."

Gypsies. The name given in England to the wandering tribes that since the beginning of the 15th century have been scattered over Europe. They were supposed by the English to be Egyptians. In France the gypsies are called *Bohémiens,* from the belief that they were originally Hussites driven from Bohemia. Scholars now believe that the Gypsies are remnants of a tribe from India. Their language is undoubtedly derived from Sanskrit, though it is mixed with many words from other languages. They call themselves *Roma,* and their language *Romany.* For several centuries they were a source of trouble in Europe because of their wandering and thieving habits, though they were protected in Scotland by royal authority.

Hamites (*hăm'īts*). A branch of the Caucasian race, thought to have inhabited northern Africa and to have been the ancestors of the Egyptians, the Berbers, and others. The name was chosen because the race was supposed to have been descended from Noah's son Ham.

Helvetii (*hĕl-vē'shĭ-ī*) or **Helvetians** (*hĕl-vē'shănz*). An ancient Celtic people who, in the 1st century B. C., lived in the country between the Rhone and Rhine, and between the Jura mountains and the Rhætian Alps. Their territory was somewhat smaller than modern Switzerland. Cæsar opposed their migration into Gaul and drove them back into their mountains, with great slaughter. In the reign of Vitellius they were again mercilessly attacked. After this they disappeared from history.

Hindus (*hĭn'dōōz*). This name is commonly applied to all the inhabitants of India, but it properly names only the Aryan people of the north central portion of the peninsula. At a very early period, this people descended into India from the northwest and crowded the inhabitants, known as the Tamils, toward the south. The religion of the Hindus is the ancient Brahmanism, which dates from the period of the *Vedas.* See *India.*

Hottentots (*hŏt''n-tŏts*). The aboriginal race of South Africa. They are thought to be an ancient mixture of the

Bantus and the Bushmen. When the Dutch first settled at the Cape of Good Hope, the Hottentots occupied a large territory and had large herds of cattle. This race has now become much degenerated. The people are of low stature, with yellow wrinkled skin, small broad noses, high cheek bones, and tufty hair. When past their youth they become more repulsive in appearance by reason of curvature of the spine. They are fairly gifted intellectually and in disposition are said to be cheerful and happy-go-lucky.

Huns. A people, probably of Mongolian origin, who are first noticed in history about 375 A. D., when they moved westward into the Danube valley. A half century later they became the terror of Europe. Under their vigorous leader, Attila, whose boast it was that grass never grew again where his horse's hoofs had trod, they swept across the Rhine, burning and devastating. Their host included conquered Ostrogoths and many other tribes. The Romans and their allies, the Visigoths, Burgundians, and Franks, met and defeated the Huns at the battle of Châlons in 451. Within a few years they withdrew to Asia or mixed with their conquered tribes, leaving only their name as the synonym for barbarous cruelty. See *Hungary*.

Incas (*ĭng'kăz*). A civilized people formerly inhabiting the country which now is Peru. They were subjugated and almost exterminated by the Spaniards in the 16th century. Our knowledge of the people is derived mainly from accounts left by their conquerors and from buildings and monuments which the Incas constructed.

Their buildings were often of immense size, and showed that the builders possessed a rare skill in the cutting and fitting of stone. The Incas were superior to their European conquerors in engineering and in agriculture. A literature had been developed, by which the native history and traditions were preserved. Dramas, also, were acted before the royal court.

Indians. See *American Indians*.

Iranians (*ĭ-rā'nĭ-ănz*). A branch of the Aryan peoples. They are represented now principally by the Persians, by the Kurds, and by part of the inhabitants of Afghanistan and of Turkestan.

Irish. The name applied generally to the people of Ireland. In the population of the island, however, are included three physical types: (1) a short, dark-haired type, representing the primitive race; (2) a taller, blond type, representing the Tuatha De Danaan (tribe of the goddess Danu) of Irish tradition; (3) the Celtic, which is the dominating Irish type of the present day, representing that of a people who conquered the island probably within historic times. Included also in the term Irish is the large population in the East and North of Ireland, made up of descendants of English and Scotch settlers. Large numbers of Irish have emigrated to all parts of the world, particularly to Canada and the United States. See *Celts, Ireland*.

Japanese. The modern Japanese people are a mingled race of at least three strains which appear quite distinctly in various groups of the population. The Ainus are usually regarded as the aborigines of Japan. They are of short, thickset build and have much hair on the face and body. This type is most frequent in the northern part of the empire. A Malayan element is present also, most noticeably in central and eastern Japan. The dominant type, however, is Korean-Manchu, of Mongolian origin, characterized by more slender build and greater height.

Physically, the Japanese are capable of great endurance, a quality which has been developed through the hard conditions of life among great numbers of the people. In character, the Japanese are frugal, obedient to authority, and altruistic. They are intellectually quick and eager, and possess marked powers of imitation.

Kafirs (*kă'fẽrz*). The word is Arabic, meaning "unbeliever." The Kafirs are the principal native race of South Africa. They are a branch of the Bantus and include the Zulus. In stature and shape of head they are more like Europeans than like Negroes. Their chief occupation is cattle raising. They are of peaceful character, and some of them have become somewhat civilized.

Kalmucks (*kăl'mŭks*). A nomadic Mongol race of fearless horsemen and soldiers, Buddhists in religion, who inhabit parts of China, Siberia, and Russia. Although of small stature, for centuries they have been notorious as quarrelsome warriors.

Kirghiz (*kĭr-gēz'*). A nomadic Turkish-Tatar people who inhabit the steppes, or vast tracts of land, between the lower Volga and the Caspian Sea on the west and the Altai mountains on the east. They are divided into hordes, the Great Horde, the Middle Horde, and the Little Horde. Their food is chiefly mutton and horseflesh, with kumiss, or fermented mare's milk. They live in hemispherical tents made of felt stretched over a frame of boughs, and manufacture woolen cloth, carpets, and leather goods, which they trade for cutlery and silks.

Kurds (*kōōrdz*). A people of Iranian race who occupy Kurdistan, partly in Asiatic Turkey and partly in Persia. They are a brave, freedom-loving folk, but are not inclined to industry. The nomad Kurds live in tents of black skins, while the settled communities use low houses with flat wooden roofs. The Kurdish women have more freedom than most Oriental women; the girls are married, upon payment of a dower, at ten or twelve years of age. The men shave their heads and faces, leaving only a mustache, though old men wear full beards. They have been known in history since the time of ancient Assyria. In religion they are mostly Mohammedans.

Lapps (*lăps*). The non-Aryan people, closely related to the Finns, who inhabit the forbidding arctic shores of Europe from Norway to the White Sea. They are the shortest people of Europe, ranging from four to five feet in height. Though not very muscular they are capable of bearing great fatigue. Their only source of wealth is their herds of reindeer, which give them food, clothing, and means of travel. They profess Christianity but preserve many old pagan superstitions.

Lithuanians (*lĭth'ū-ā'nĭ-ănz*) and **Letts.** Two related groups of Aryan people, neither Slav nor German, inhabiting a small territory bordering the Baltic Sea and the Gulf of Riga, formerly included in Russia and East Prussia. The date of their migration to their present home is not known. In the 13th and the 14th century the Lithuanians built up a large independent state, and for several centuries these two peoples have maintained their ancient customs and language against tyrannical pressure from Slavs and Germans. Many of both peoples have emigrated to the United States. Until the 18th century they had no native written literature, but they possessed many songs, celebrating every phase of life except war. Recently, a modest beginning in literature has been made. The Lithuanian language is reckoned by scholars the oldest of living tongues. It closely resembles Sanskrit and has remarkable likenesses to Greek and Latin. Lettish is in some points more primitive than Lithuanian. See *Lithuania*.

Lombards (*lŏm'bẽrdz*) or **Longobardi** (*lŏng'gō-bär'dī*). A Germanic people, originally from the region of the lower Elbe river, not very numerous, but of distinguished valor, who played an important part in the early history of Europe. The name may have been given with reference to their long beards. About the 2d century they seem to have begun to leave their original district and to have fought their way south and east till they came in close contact with the Eastern Roman Empire on the Danube and adopted an Arian form of Christianity. After having been for some time tributary to the Heruli, they raised themselves upon the ruins of their power and of that of the Gepidæ, shortly after the middle of the 6th century, to the position of masters of Pannonia and became one of the most wealthy and powerful nations in that part of the world. Under their king, Alboin, they invaded and conquered the northern and central parts of Italy (568–572). The conversion of the Arian Lombards to the orthodox faith was brought about by the policy of Gregory the Great and the zeal of Theodolinda, wife of Authari and subsequently of his successor, Agilulf (590–615). Charlemagne put an end to the Lombard kingdom in 774. The name remains in modern Lombardy. See *Italy*.

Magyars (*măd'yŏrz*). This remarkable people are compactly settled in the central part of Hungary, which they invaded at the close of the 9th century. They are strikingly handsome and well developed, their beauty being of an Oriental type with somewhat prominent semi-Tatar cheek bones. Their language, known as Finno-Turki or Finno-Ugric, they have preserved intact for over a thousand years. It is written in Roman letters, with certain distinguishing signs, and is noted for its harmonious vowel sounds. The Magyars are of Tatar descent and are renowned for their passionate patriotism. See *Hungary*.

Malays (*mā-lāz'*). A brown-skinned race resembling physically the Mongolians of eastern Asia, but differing from them in language, and now found in the Malay peninsula, the East Indies, the Philippines, and other Pacific islands. Their original home was probably Sumatra. They are of a spirited and warlike disposition, and in the 13th century they controlled an empire with its capital on the Malay peninsula. Europeans and Americans have forced them to give up piracy, and they are now separate tribes with little unity. The Malays of the forests are superior craftsmen, and they are notable for their sense of loyalty and honor.

Manchus (*măn-chōōz'*). The Tatar people who overran China in the 12th century and again in the 17th, establishing the dynasty which ruled the country until the establishment of the republic in 1912. The queue was formerly a symbol of the subjection of the Chinese to the Manchus. They are now a small minority in China. See *China, Chinese*.

Maoris (*mä'ô-rĭz*). The natives of New Zealand, who probably displaced a still earlier people when they migrated from their own early home, which their tradition says was Hawaiki, perhaps Hawaii or Samoa. They are tall of stature, vigorous, and athletic, and are ranked among the bravest and most warlike peoples of the earth. They are noted for their marvelous wood carving, their elaborate tattooing, and their poetic nature lore. Their religious hymns of great beauty and antiquity have been translated by many eminent anthologists. Most of the Maoris now profess the Christian religion, but they have always resisted British rule over them. Numbers of them fought side by side with the Allies in the great World War. See *New Zealand, Polynesians.*

Mayas (*mä'yăz*). A group of tribes living in Mexico. They developed a high stage of civilization, which was already in its decline at the time of the invasion of the Spaniards.

They built large cities and durable buildings, including temples, market places, palaces, and ball courts. They also constructed paved highways and artificial reservoirs to conserve water for use during the dry season. The structure of their language was simple, and their speech has shown great vitality in competition with European languages. They had a system of writing which is the only known example of that stage of language development in which signs for objects or for ideas are being replaced by signs to represent sounds. It was in use long before the beginning of the Christian era. These remarkable people had devised a system of chronology so accurate that no one day could be confused with another over a period of 370,000 years. Their calendar was perfected on December 10, 580 B. C. on the basis of records begun on August 6, 613 B. C. It assigned 3373 B. C. as the zero year, that is, as the beginning of the world's past. It was used for 2000 years up to the time of the Spanish conquest of Central America.

Medes (*mēdz*). See *Persia.*

Mongolians (*mŏng-gō'lĭ-ănz*). The name applied to the inhabitants of eastern and northern Asia. This race includes the Mongols, natives of Mongolia and the Chinese, Japanese, Burmese, Tatars, and Turks. Closely related to these are the Magyars, Finns, and Lapps of Europe.

Mongols (*mŏng'gŏlz*). The natives of Mongolia, a country of Asia, since the 17th century tributary to China, lying between that country and Siberia and extending from eastern Turkestan to Manchuria. Cattle raising and transportation of goods are their chief occupations. The most important tribe is that of the Khalkhas in northern Mongolia. Within the limits of the districts into which their country is divided, they are nomads, moving about in search of pastures for their herds, and living in *yourtes,* or circular tents of felt laid over a light framework. Among their marriage customs, the primitive capturing of the wife still persists. In history, the one great performance of the Mongols was the conquering of an empire, in the 13th century, which reached from northern China into Russia. Their leader was Jenghis Khan, "the most powerful prince." About 1259 Kublai Khan made Peking his capital. Marco Polo, the celebrated Venetian traveler, when but a boy of 17, was received into favor by the emperor and was employed by him (1275–92) on important missions throughout various parts of the empire. See *China.*

Moors (*mŏŏrz*). The people of Morocco, where the Arab conquerors of the 7th century mixed with the natives of the Roman province of Mauretania. The Spaniards called the invaders of Spain in the 8th century, Moors, and the term was loosely extended to all Mohammedans of northern Africa. See *Morocco, Spain.*

Moravians (*mô-rā'vĭ-ănz*). A Slavic people who in the 6th century displaced Germanic tribes in the valley of the Morava river, south of Silesia. In the mild climate of their district, they have a wide variety of agricultural products, and their flocks produce a fine quality of wool. In religion they are mostly Roman Catholic. After the World War they were included in the republic of Czechoslovakia. See *Moravia.*

Negritos (*nê-grē'tōz*). The name means "little negroes." It was given by the Spaniards to the pygmy negroid race of the Philippines. They are probably the aboriginal people of these islands. Other groups of them are found in the Andaman islands and on the Malay peninsula. They are usually about 4 feet, 6 inches in height, their skin is a very dark, coppery brown, and their hair thick and bushy. They wear only a girdle about the waist. Their intelligence is of a very low grade, and their habits are those of nomad savages. See *Filipinos.*

Negroes. The name generally applied to the variety of the human race characterized by dark skin, woolly hair, and long heads. These people are most numerous in Africa, but are also widely dispersed over the world. Many different types of the race are to be found, the purest type being represented, it is said, by the Sudanese. The wide distribution of Negroes throughout the world is due chiefly to the prevalence of the slave trade in both ancient and modern times.

The transportation of Negro slaves to America began with the early voyages of Spanish explorers. The greater number of these slaves were brought from all parts of Africa, although some were trained artisans and agriculturists from Spain. Negroes accompanied the Spanish expeditions into western America, and it is said that one, Estevancio, led the first party of Spaniards into the district now included in the state of Arizona. There is a substantial percentage of Negro blood in the population of Brazil.

In the population of the independent state of Abyssinia there is a strong Negro element, but the only African state ruled by Negroes is Liberia. In the New World is the Negro republic of Haiti. The most highly civilized and progressive group of Negroes are those of the United States. With few exceptions, they are the descendants of slaves held in the various states before the Civil War.

The first Negroes were brought to Virginia in 1619. By gradual steps, in the course of the 17th century, Negro slavery became a recognized institution in the American colonies. In 1710, there were in the United States about 750,000 Negroes, of whom 60,000 were free; in 1860, about 4,400,000, of whom about 490,000 were free; in 1920, approximately 11,000,000.

The notable progress of the American Negroes since the Civil War may be judged by the development of means and methods of education among them and by their economic advance. Before the war, some public and private schools for Negroes had been established. In 1861, the foundations of the great Hampton Institute were laid by the American Missionary Association. Emancipation, however, precipitated a crisis, which was rendered yet more serious by the constitutional amendments which gave citizenship and suffrage to the Negro. Soon after the close of the war, various individuals, churches, and other agencies, directed and financed by whites, attacked the problem.

The greatest service of the schools thus established was to start the Negro upon the way to self-help by preparing Negro teachers and other leaders. At the present time, with the aid of various educational foundations for the support of both public and private schools, Negroes and whites are co-operating in an increasing number of enterprises to meet the diverse needs of the colored people. The greatest leader who has yet arisen among the Negroes themselves was Booker T. Washington, the founder of Tuskegee Normal and Industrial Institute. It is largely due to his influence that the Negro educational program is today so comprehensive, including trade and technical as well as cultural subjects.

In business and industry, many Negroes have led their people in substantial progress. At the close of the Civil War, about 4000 Negroes were engaged independently in various trades and industries. In 1917 approximately 50,000 Negro business enterprises were in operation, doing an annual business of 1½ billion dollars. In 1922 there were 74 Negro banks with resources of 20 million dollars, and Negro insurance companies had policies in force aggregating 100 million dollars. The value of property owned by Negroes is estimated at 1½ billion dollars.

Negroes have entered all the professions. Their work in medicine has been most notable. More than a hundred hospitals and training schools for nurses are now operated for colored people in the United States. Most of these institutions are controlled and directed by Negroes. About 400 periodicals are now published by and for Negroes. Half of these are newspapers; the remainder are magazines devoted to general literature or to the especial interests of the colored race.

Normans, Northmen, or **Norsemen.** The sea rovers from Scandinavia who, in the early middle ages, ravaged the coasts of England, Germany, and France and established themselves in various parts of western Europe and Russia. They were called Danes in England, where they gained a foothold in the 9th century, after having previously made settlements in Ireland. In the 11th century, Canute and two successors ruled England for about 25 years.

Meanwhile, other bands had settled in northern France and compelled the French king to give his daughter in marriage to Rollo, their chieftain. Rollo embraced Christianity and became Robert, first duke of Normandy. The name Normans is usually restricted to these settlers in France, who assimilated the culture, language, religion, and manners of the Frankish kingdom. William, duke of Normandy, led the Normans into England in 1066. Mention should be made also of the expeditions of Leif and other Norsemen to the American coast early in the 11th century.

In 1059 Robert Guiscard, a Norman noble, became duke of Apulia and Calabria in Italy, and his brother Roger conquered Sicily. In the 12th century the Norman kingdom of Sicily attained great importance, especially in connection with the Crusades.

The vikings of the West seem to have been mostly Danes and Norwegians. The Swedish Norsemen directed their energies toward the eastern Baltic lands. Rurik founded a kingdom at Novgorod about 862, and bodies of Norsemen, united with their Slavic subjects, even penetrated Persia. They frequently menaced the Byzantine capital, Constantinople. Other bands of these Scandinavian warriors are said to have served in the bodyguard of Byzantine emperors from the 9th to the 12th century. See *England*, page 430a; *Normandy*, page 571; *Russia*, page 504c.

Parsis, or **Parsees** (*pär'sēz*). The modern followers of Zorastrianism, which was the ancient religion of Persia. They are popularly called "fire worshipers," but to this designation they strongly object, since the fire to them is simply one of the emblems of the power of Ormuzd. Their beliefs have changed somewhat since ancient times, but they are still scrupulously careful about purification. The elements, earth, fire, water, must not be defiled by dead matter. Hence they expose their dead on *dakhmas*, or "towers of silence," to be devoured by vultures. They are believers in one god and in a life after death.

After the Mohammedan invasion of Persia in the 7th century, several bands of Zoroastrians emigrated to India, and from these have sprung the Parsi communities of present day India. They are most numerous in the vicinity of Bombay. Almost all are well to do. They are leaders among Oriental peoples in education, and their community life is notable for its high moral character.

Philistines (*fĭ-lĭs'tĭnz*). A non-Semitic people who are believed to have come originally from Crete. They settled in Palestine and waged more or less continuous warfare with the Israelites for several centuries.

Picts. The early inhabitants of the northern part of Great Britain. They were called Caledonians by the Romans, the name Picts being given later because of their custom of painting the skin. The origin of this people is uncertain. They carried on continual warfare with the Romans, who built long walls to keep them out of the southern provinces. In the 7th century the Saxons came into conflict with them. After their conversion to Christianity, their king, Angus MacFergus, ruled all Scotland for a period in the early part of the 8th century. About the beginning of the 9th century, they disappeared as a separate people, leaving no literature and but scanty traces of their language.

Polynesians. The name applied to the brown race whose principal habitat includes the most easterly of the three groups of Pacific islands. Their physical characteristics, as well as their language, distinctly mark them off from the Malays and other races of the southern Pacific region. In stature they are reckoned by many authorities as the tallest people in the world, with an average height of 5 feet, 10 inches. They are well proportioned; their features are regular and often of a distinct beauty; their eyes are invariably black; their hair, black or dark brown and either smooth or curly. In personal habits they are cleanly, neat, and orderly. Where they have not adopted European dress, the men wear a loin cloth, while the women's dress consists of a petticoat of leaves and, sometimes, a covering for the shoulders.

The temperament of the Polynesians varies from apathetic, under the enervating conditions of climate in most of the islands, to a more energetic type in regions where harder conditions prevail. Essentially they are a remarkably cheerful race. They possess a well developed body of historic legends of which their orators make lavish and impressive use.

Ethnologists now believe that the earliest home of this race was in some part of southern Asia, whence they migrated to the East Indian islands. They were skillful shipbuilders and navigators, and, when hard pressed by a Malay migration, they sought new homes farther to the west. Some scholars suggest that they are of Aryan stock, but this point is still in dispute. Polynesian traditions indicate that the migration to the Pacific islands took place about the beginning of the Christian era, and suggest that the Polynesians made their home first in Samoa.

Since their first contact with Europeans, a variety of causes has brought about a great decrease in their numbers. Of late years, however, this decimation seems to have been checked, and it appears not improbable that many groups of the Polynesians will make marked progress in civilization. See *Hawaii, Maoris, Samoans.*

Pygmies (*pĭg'mĭz*). Human tribes among whom the average height of males is regularly not more than 4 feet, 11 inches are called pygmies. The existence of such tribes was alluded to by Homer and affirmed by Herodotus, but was treated for many centuries as a myth. Du Chaillu, the French explorer, early in the 18th century, reported finding them on the west coast of Africa, and Stanley encountered them on his journey in 1887–89. He reported at least two distinct physical types, one more highly developed in the human scale than the other. A pygmy boy and girl joined his expedition as servants. Later explorers, engineers, and traders in Central Africa have found these little people in the jungles. Those that have been most closely observed are a woolly-haired people of Negro features and a dark olive skin. They are well proportioned and have remarkable muscular development. The women average about 3 feet, 11 inches in height, and the men range from 3 to 6 inches taller. They are a very shy folk, living in small, leaf-covered huts in the jungles around the villages of the larger Bantu Negroes. Their weapons are bows and arrows. When they hunt, they tip these arrows with a paralyzing poison, so that the small birds and animals which they shoot may be captured. This game they trade to the larger tribes for vegetables and fruit.

Other so-called pygmy tribes are found in the Malay peninsula and the East Indies, the Philippines, and India, but most of these are of mixed breeds and vary greatly in height.

Rumanians (*rōō-mā'nĭ-ănz*). A people of mixed race who, since the 12th century, have occupied the territory north of the lower Danube and the slopes of the Transylvanian Alps. Most of them now live in the kingdom of Rumania, although there are scattered communities throughout the Balkans. They speak a Romance language which closely resembles the Latin. Scholars now believe that the Roman colonists of the Province of Dacia, established along the lower Danube by Trajan, withdrew to the Illyrian coast before the inroads of barbarians, but later re-entered the Danube country, preserving their Latin speech in spite of mingling with Slavic, Greek, and Turkish peoples. See *Rumania.*

Ruthenians (*rōō-thē'nĭ-ănz*). A group of Slavic tribes inhabiting eastern Galicia and Bukowina on the eastern slope of the Carpathian mountains. They belong by race to the "Little Russians" of the Ukraine. Their name is a German form of Ukrainians. For centuries they have been the victims of Russian, Polish, and Austrian oppression, the peasants being reduced to a wretched state of serfdom.

Samoans (*sä-mō'ănz*). The Polynesian inhabitants of the Samoan Islands in the South Pacific. They are recognized as the best representatives of the remarkable and interesting Polynesian race, and their traditions hold that these islands were the center from which the race spread to other Pacific islands. The Samoans have long been famous as sailors and boat builders, and they have many legends and tales of great beauty and interest. They are a folk of splendid physical build, showing marked likenesses to the Caucasian type. Practically all are now Christians, and they have shown keen appreciation of the education offered by the mission schools. See *Polynesians.*

Saracens (*săr'ă-sĕnz*). A name derived from an Arabic word meaning "rise." It was applied in the 1st century A. D. to a tribe in northwestern Arabia. Later, the name was used by medieval writers to designate all Mohammedans.

Saxons. A Germanic people first heard of in the 2d century as inhabiting what is now southern Denmark. They migrated southward, subdued all northwestern Germany, and invaded the Roman Empire. In the 5th century they invaded Normandy, and, in that and the next century, many settled in England. The Saxon strain is very prominent in the modern population both of Germany and of England.

Scots or **Scotch.** Scotland takes its name from a group of Gaelic invaders, called Scots or Dalriads, who came from Ireland in the 3d or the 4th century A. D. The strongest of the earlier inhabitants were the Picts, also a Celtic people. The Angles, or English, early established a kingdom in southern Scotland, and Scandinavian immigrants were mingled with these people of the Lowlands as well as with the Highlanders. In many parts of North and West Scotland, known as the Highlands, a Gaelic tongue is spoken; the dialect of the South and East Lowlands is a mixture of English and Scandinavian speech. See *Picts*; also *Scotland*, page 438c.

Scythians (*sĭth'ĭ-ănz*). An ancient nomadic warrior people, famous as horsemen and bowmen, who inhabited what is now southwestern Russia. Herodotus and other Greek writers describe this wandering tribe and their life in tent-covered wagons. They were conquered by neighboring tribes, and disappeared from European history in the 2d century B. C. The name Scythian was later used loosely for any northern and central Asiatic tribes.

Semites (*sĕm'īts*). A dark-skinned branch of the Caucasian race. It includes the Jews and the Arabians among modern peoples and, among ancient nations, the Assyrians and the Phœnicians. The name is so applied because of the traditional belief, without historical foundation, that this race was descended from Noah's son Shem.

Serbians, or **Serbs.** The group of southern Slavic peoples who occupy the former kingdom of Serbia and neighboring lands of Croatia, Bosnia, and Dalmatia. They joined with the Croats and Slovenes in 1918 to form the

Kingdom of the Serbs, Croats, and Slovenes. The term Serbo-Croatian is frequently used to include the Serbs and Croats, who differ only slightly in language. The Croats are Roman Catholics, while the Serbs are mostly of the Greek Catholic faith. An interesting national characteristic of the Serbs is the love of all classes for their legends, ballads, and romances about old national heroes. See *Croatians*, *Jugoslavia*.

Serbo-Croatian (*sĕr'bō-krō-ā'shăn*). The name applied to the Slavic language which, with slight variations, is common to the Serbs and Croats. The Croats use the Latin alphabet, while the Serbs use the Cyrillic, a modified and enlarged form of the Greek, adapted to sounds of the Slavic speech. The term is used also to designate the two peoples, who are of the same stock, although they were separated politically for centuries until united in 1918 in the Slavic state of Jugoslavia, or the Kingdom of the Serbs, Croats, and Slovenes.

Sicilians (*sĭ-sĭl'ĭ-ănz*). The earliest known inhabitants of Sicily were the Siculi, who gave their name to the island. In historic times, Phœnicians, Greeks, Romans, Saracens, Normans, Germans, French, and Italians have at different times ruled and colonized Sicily. The Sicilians have long had an unenviable reputation for turbulence and violence, a temper probably the result of centuries of backward economic and social conditions due to the repeated struggles of many nations for possession of the island.

Singhalese, Cingalese (*sĭng'gā-lēz'*) **or Ceylonese** (*sĕ'lŏn-ēz'*). Descendants of immigrants to Ceylon, in the 6th century B. C., from Hindustan, now represented in the island by two groups. The Singhalese of the coast are a mild-mannered race. In stature they are below middle size, their features are rather finely molded, and their skin is of a light or dark bronze hue. The men wear their long, black hair fastened on top of the head with a shell comb. The Singhalese of the interior are a more handsome, manly race of higher intelligence. The classical writings of the Singhalese are in Pali or Sanskrit; their colloquial language is Aryan, closely related to Pali, but mixed with many foreign words. In religion, they are divided between Buddhism, Brahmanism, and Christianity.

Slavs (*slävz*). The name of the group of Aryan peoples to be found in eastern and central Europe. Their early home seems to have been along the Baltic, northeast of the Carpathian mountains. From this district, two principal migrations took place. One movement toward the south and west, beginning in the 4th century, carried the Slavs into Bohemia and western Hungary, across the Danube, and as far as the shores of the Adriatic. A little later, other tribes moved in a northeasterly direction, and they became the nucleus of the Russian people. The group of Slavic peoples now includes the Russians, Bulgarians, Serbians, Croatians, Slovenians, Czechs (Bohemians and Moravians), Slovaks, and Poles. The origin of the name Slav is not known. The word slave is said to have come into use when the Germans sold Slavonic captives in the markets. Of the primitive culture of the Slavs, we have but scanty information. Christianity made rapid progress among them, and traces of their pagan religion were all but obliterated. Their mythology of lesser deities and spirits was, however, very full and rich. The social organization of the early Slavs, who were a peaceful, agricultural people, was patriarchal. This system later merged into a type of communal government.

Slovaks (*slō-văks'*). The Slavic people who for several centuries maintained an independent kingdom on the south side of the Carpathians and in the 9th century formed the basis of the Moravian state. Conquered by the Magyars, many of them became scattered over Hungary. After the World War they united with the Czechs in the republic of Czechoslovakia. The Slovak dialect possesses numerous very beautiful popular songs, many of which have been collected and published. See *Czechs*, *Czechoslovakia*.

Slovenians (*slō-vē'nĭ-ănz*) **or Slovenes** (*slō-vēnz'*). The Slavic people who, from the 6th century, have lived in the southern districts of the former Austrian empire, reaching to the Adriatic. Most of them have been included in the new state of Jugoslavia. They possess in their language some of the earliest Slavic writings. Their name is a survival of the ancient name for Slavs, and probably means "speaking," or "those who speak," as the ancient Slavs called foreigners "the dumb," that is, those not speaking the Slavic language.

Sumerians (*sū-mē'rĭ-ănz*). The earliest known occupants of the lower Mesopotamian valley. They were a non-Semitic people who probably came from the north; they developed a high civilization and used the cuneiform system of writing. They were later absorbed by the Semitic peoples who founded the Babylonian state. The word Sumerian is thought to refer to the marshy, "reedy" landscape of the country, which is called Shinar in the Bible.

Syrians (*sĭr'ĭ-ănz*). The people of ancient Syria were mainly of the Semitic race, the Semite stock having succeeded in absorbing those stocks which preceded or came later among them, such as the Philistines and the Hittites. The modern Syrians are, for the most part, descendants of the ancient Syrians, Arabs, Turks, Greeks, and Jews, with an admixture of Romans and Christian crusaders. They are generally an intelligent people with a marked power of appropriating foreign ideas. The old enterprising Phœnician spirit is strong among the people of the north Syrian coast. Many Syrian merchants, settled in the cities of Europe and America, are zealous in promoting the trade and industry of their native land.

Tatars (*tă'tärz*) or **Tartars** (*tär'tärz*). The true Tatars appear to have been a tribe of Mongols who lived in the 9th century along the upper Amur river in Asia. They later formed part of the horde led by Jenghis Khan, and the name came to be applied to all Mongols. Their fierceness is said to have given rise to the notion that they came from Tartarus, or hell; hence the familiar name for them, Tartars. See *China*, page 466d; *Russia*, page 504d.

Toltecs (*tŏl'tĕks*). An Indian tribe that is believed to have occupied parts of central Mexico before the coming of the Aztecs, or from the 7th to the 11th century. Probably they came from the country farther north, and after being driven from Mexico some of them may have settled in Guatemala. Their history is legendary, some ethnologists denying that they ever existed. Archeologists apply the term more generally to the race whose civilization preceded the Mayas. See *Mexico*, page 458d; *Mayas*, page 520.

Vandals (*văn'dălz*). A people closely related to the Goths, who, during the first four Christian centuries, moved southward from their early home along the southern shore of the Baltic Sea, then westward into Gaul. They swept through Spain in the 5th century and established a kingdom in northern Africa, thence invading Italy. They were overthrown in 534 by the troops of Justinian, under Belisarius. Later, they were converted from Arianism to the orthodox Catholic faith. Their reputed cruelty and destructive methods in warfare gave us the word vandal. See *Rome*, page 503a.

Visigoths (*vĭz'ĭ-gŏths*). The West Goths, who, at the first approach of the Huns in the Danube valley in the 4th century, were allowed by the Romans to settle in Roman territory south of the Danube. Having learned their power in battle with the Roman legions, they moved westward through Greece to the valley of the Po. In 410 they conquered and plundered the city of Rome, sparing the churches at the command of Alaric, their young leader. After his death in southern Italy, they moved into Gaul and northern Spain, founding a Visigothic kingdom with its capital at Toulouse. Under their great king Theodoric, they aided in defeating Attila and the Huns in 451. But the Franks drove them from Gaul in 507. They re-established themselves in Spain, with a capital at Toledo. When the Arabs invaded and seized the greater part of Spain in the 8th century, the Visigoths retired to the mountains in Asturia and Galicia, whence their descendants issued to drive out the Arabs and to found the modern states of Spain and Portugal. See *Rome*, *Spain*.

Walloons (*wŏ-lōonz'*). The modern descendants of the ancient Belgæ mentioned by Cæsar, occupying the southern part of Belgium and some districts in France. Their mother tongue is a French dialect. The name Walloons, which means "strangers," was given them by the Dutch, when in 1567 large numbers of the Protestant population fled to Holland. From there, a company of them emigrated to America in 1624, settling on the Hudson, near Albany, and on the Delaware, near Gloucester, N. J., the first white people to till the soil of New Netherlands. The Walloons resemble the French in physical type; they are more vivacious and industrious than their northern neighbors, the Flemish, but not so conspicuous for artistic works. See *Belgians*, *Belgium*.

Welsh. The Celtic people of Wales. They are the descendants of the Brythonic Celts who occupied Britain when the Anglo-Saxons entered the island. They are most closely related to the Celtic people of Brittany. See *Bretons*, *Wales*.

Zulus (*zōō'lōōz*). The remarkable Kafir tribes who now occupy a district in the northeast part of Natal, South Africa. They are chiefly herdsmen, but they also raise crops of millet, corn, sweet potatoes, and tobacco. They are of fine physical build and are formidable soldiers. Their dwellings are thatched and plastered huts of beehive form, which they arrange in a circular group, or kraal, with their cattle in the center. At the beginning of the 19th century, they controlled, by a splendid military organization, a large part of southeast Africa, and they maintained their independence until after their conflicts with the British in 1883-84. In 1887 the British annexed all their territory.

THE WORLD WAR

THE immediate occasion of the World War of 1914–18 was the assassination of a Habsburg prince in a remote city of Austria-Hungary, but the real causes lay far deeper. Generations must pass before the historian can state them with absolute completeness and give to each its proper weight, but as to the main factors that produced the mighty struggle there is already no doubt.

Magnitude of the War. There have been other world wars, such, for example, as the Seven Years' war of 1756–63, and other conflicts that perhaps will bulk larger in their ultimate influence upon the lives, habits, and thoughts of mankind, but in sheer magnitude the struggle of 1914–18 dwarfed every one that had gone before. It involved every continent. It affected in some vital way every leading nation and most of the smaller ones. In the end it embattled twenty-eight nations. These embraced more than nine-tenths of the entire population of the globe!

Its battle lines flamed on Arctic marshes, in snowy mountain passes, in African jungles, in Asian deserts, in Italian valleys, and in the fair fields of France. The blood of its combatants was commingled in the farthest seas. Its heroes fought in the sky, in moving forts, in caverns of the earth, and beneath the waters of the ocean. Under its banners were arrayed soldiers from every race—the white, the yellow, the brown, the red, and the black.

The German Pre-War Policy. In the very nature of the case, the interplay of causes, motives, and issues involved was exceedingly complex. Racial rivalry was one of the causes of the war, and in its earliest phase the conflict was in a measure due to a clash of Pan-German and Pan-Slavic ambitions in the region of the Balkans. This partly explains why, when war broke out between Austria-Hungary and Serbia, Germany sided with the former and Russia with the latter. But the World War was far more than a mere conflict of Teuton and Slav, and the historian must seek many other causes to explain why hostilities spread from nation to nation until most of the known world was involved in the bloodiest conflict of the ages.

In the final analysis the main responsibility for the war rests upon the houses of Hohenzollern and Habsburg—two medieval anachronisms in a modern world—upon the war lords surrounding them, and lastly upon their deluded subjects. The Habsburgs were a decaying family, whose glories were chiefly in the past, but the Hohenzollerns were still vigorous and aggressive and had never been more powerful. Within less than half a century they had waged, as kings of Prussia, three wars, none of which had been costly in blood and treasure, and all of which had been profitable. They and their subjects had come to consider it an axiom that war pays.

Yet, mighty as was Germany's power, Germans were not content with their position in the world. Studying how they had attained a high destiny in the past, they asked themselves why they might not attain a still higher destiny in the future. To spread German "*kultur*" and German rule became the ardent desire of millions of Germans. And as a policy of "blood and iron" had proved successful in the past, they believed it would also serve as the key to the future. Not all Germans took this view, but a large proportion did; their rulers did.

Many writers emphasized Germany's need of expansion to furnish an outlet for her population and energies. Not a few openly proclaimed that this expansion must be obtained by conquest. Great efforts were made to prevent German emigrants to other countries forgetting their loyalty to the Fatherland. In 1913 a law was even passed whereby a German resident in another country might become a citizen of that country and yet retain his German citizenship! This astonishing law was based upon the idea that such an emigrant would put his loyalty to the Fatherland above his loyalty to his adopted country, in spite of the most solemn of oaths.

Alliances with other powers were builded to strengthen the German position. The Dual Alliance of 1879 with Austria-Hungary was broadened in 1882 into the Triple Alliance by the inclusion of Italy. Austria-Hungary became in time little more than a satellite revolving about the German planet, but the interests of Italy clashed with Teutonic ambitions in the Balkans, and ultimately Italy stood aside and threw in her lot with the enemies of the Hohenzollerns and the Habsburgs. Much attention was paid to cultivating friendly relations with Turkey, and these efforts proved fruitful.

Germany expected to strike quickly and to win overwhelming victory before the other powers were prepared to resist. By exacting staggering indemnities from conquered nations, she planned to transform war costs into handsome profits with which to extend still further her rule of blood and iron.

The war began as a conflict between Austria-Hungary and Serbia. Russia, for racial reasons and because her own interests in the Balkans were endangered, went to the assistance of Serbia, while Germany aided Austria-Hungary. Why did France and Great Britain, remote from the first scene of conflict and having few immediate interests in that region, become involved?

French and German Antagonism. Although this feeling dated back for many generations, we need not look beyond the Franco-Prussian war of 1870–71. Ever since the humiliating defeat suffered by France in that conflict, her people had dreamed of revenge and of regaining the lost provinces of Alsace and Lorraine, but as years passed the population of Germany had become so much greater than that of France that many Frenchmen had come to realize that a war with Germany would be too unequal to be attempted unaided. Most Frenchmen, in fact, were more fearful of fresh German aggressions than hopeful of ever bringing about the cherished *revanche;* and French military and naval preparations had come to be of a defensive rather than of an aggressive character. The Germans, on the other hand, had ceased to fear France, but many had come to believe that when a favorable opportunity arose she should be attacked again, despoiled of her colonies and of more of her home territory, and reduced to impotence.

Germany and Great Britain. In the last analysis, the hostile rivalry that ultimately developed between the two peoples arose out of the fact that one was already what the other wished to become. The British had entered early into the work of empire building and had arrived. The Germans entered the race very late, at a time when most of the richest regions in the world had already been acquired by others. The Germans viewed with jealous eyes the vast British possessions and came to consider the British Empire as their chief obstacle on the road toward world dominion. Having already acquired all that she desired, Great Britain coveted nothing that Germany possessed, but in course of time she came to have an uneasy feeling that Germany was becoming a menace to her position in the world. The kaiser's telegram of congratulation to President Kruger at the time of the Jameson raid into the Transvaal, the enormous expansion of the German navy, the rapid development of German foreign commerce and merchant marine, Germany's aggressive policy throughout the world, and the open declaration by some Germans that a war with Great Britain was not only inevitable but desirable,—all tended to deepen British distrust.

THE WORLD WAR IN OUTLINE

Remote Causes: Racial rivalry between Slav and Teuton in Balkans; German ambition for world aggrandizement; interlocking of national interests. Immediate Causes: Extreme Austrian demands on Serbia arising from murder of Archduke Ferdinand; Russian support of Serbia; German support of Austria; French alliance with Russia; German invasion of Belgium; British support of Belgium and France; Japanese alliance with Britain; Turkish, Bulgarian, Italian, and Rumanian hope of advantage; American defense of rights at sea.

	Western Front	Eastern Front	Italy and Balkans	Turkey; Other Regions	High Seas
1914					
July			Austrians invade Serbia; defeated.		
Aug.	Germans invade Belgium; Defeat French at Charleroi; British retreat from Mons.	Russians invade Austria, E. Prussia; routed at Tannenberg.		British seize German island colonies; also Togoland.	Brit. victory at Helgoland Bight.
Sept.	First Battle of Marne; Germans retreat to Aisne R.; capture Maubeuge	Russians capture Lemberg; besiege Przemysl; defeated at Masurian Lakes.	Serbs invade Austria; are forced back.	Japanese capture Shantung from Germany.	German submarines sink three British cruisers; one dreadnought.
Oct.	and Antwerp. Battle of Yser. First Battle of Ypres.				
Nov.	Trench warfare begins on Western Front.	Przemysl relieved; again besieged.	Austrians invade Serbia.	Turkey joins Central Powers.	German victory off Coronel, Chile.
Dec.			Austrians capture Belgrade.	British take S. W. Africa and Cameroons.	British victory at Falkland Islands.
1915					
Jan.			Austrians expelled from Serbia.		British victory at Dogger Bank.
		Russ. defeated at Masurian Lakes.			
Feb.				Turks routed at Suez.	
Mar.	Battle of Neuve Chapelle.	Russ. take Przemysl.			
Apr.	Second Battle of Ypres; Germans use poison gas.			Allied troops land at Gallipoli.	
May	Zeppelins bomb London.	Battle of Dunajec; Russ. lose 750,000 prisoners.	Italy joins Allies.		*Lusitania* torpedoed by German submarine.
June		Germans take Lemberg, Przemysl, Warsaw, Kovno, Grodno, Vilna.	Battle of Isonzo 1.	British take Imara and An Nasiriya.	
July			Battle of Isonzo 2.	Allied defeat at Gallipoli.	
Aug.					
Sept.	Battles of Loos, Champagne; local Allied gains.		Battle of Isonzo 3.	British capture Kut-el-Amara.	
Oct.			Bulgaria enters war. Battle of Isonzo 4.	British defeated at Ctesiphon; Allies abandon Gallipoli.	
Nov.			Serb army routed.	British clear Sinai desert of Turks.	
Dec.				Russ. take Erzerum.	
1916					
Jan.					
Feb.	Battle of Verdun begins.				
Mar.		Russians repulsed at Lake Naroch.	Battle of Isonzo 5.	British lose Kut.	
Apr.				Russ. take Trebizond.	
May			Battle of Asiago; Austrians capture 45,000 Italians.		Battle of Jutland; German fleet escapes.
June		Battle of Lutzk; Russ. take 400,000 prisoners.	Battle of Isonzo 6.		
July	Battle of Somme begins; British gain ground.		Allies retake Monastir.		
Aug.		Rumania joins Allies; invades Austria.	Ital. take Gorizia.		
Sept.	British use tanks.	Rumania invaded; army routed.	Battle of Isonzo 7.		
Oct.	Battle of Verdun ends; French regain lost ground.		Battle of Isonzo 8.		
Nov.		Germans capture Bucharest.	Battle of Isonzo 9.		
1917					
Jan.					
Feb.				British retake Kut.	Germans begin unrestricted submarine warfare; U. S. enters war; huge shipping losses by Allies, exceeding 500,000 tons per month.
Mar.	Germans withdraw to Hindenburg line.	Russian Revolution; army weakens.		British capture Bagdad.	
Apr.	Canadians take Vimy Ridge;				
May	French gains in Champagne.		Battle of Isonzo 10.		
June	Battle of Messines.		Greece joins Allies.		
July	3d Battle of Ypres begins. First American troops reach Paris.	"Kerensky off'sive" Russ. line crumbles.			
Aug.		Battle of Marasesti; Rumanians defend positions.			
Sept.			Battle of Isonzo 11.		
Oct.					
Nov.	3d Battle of Ypres ends with British gains.	Russia and Rumania forced to make peace with Central Powers.	Ital. defeated at Caporetto; lose 260,000 prisoners; retreat to Piave R.	British capture Beersheba; Allies take German E. Africa.	
	Battle of Cambrai; local British gains.				
Dec.				Brit. take Jerusalem.	
1918					
Jan.	Germans transfer troops from Eastern to Western Front.				Scotland, Norway linked by mine barrage laid by Amer. Navy.
Feb.					
Mar.	Battle of St. Quentin; Germ. take 90,000 prisoners; penetrate Allied lines 38 miles deep.				Brit. block sub. bases, Ostend, Zeebrugge.
Apr.	Battle of Lys; Germans take 30,000 prisoners.				
May	Americans capture Cantigny.				
June	Battle of Soissons-Reims. German drive toward Paris halted near Chateau-Thierry.		Austr. drive over Piave R. checked.		Over 300,000 American troops transported to France in month; over 2,000,000 during War.
July	Second Battle of Marne; Allies check Germ. in Champagne; attack; take 30,000 prisoners.				
Aug.	Battle of Amiens; Allies take 40,000 prisoners. Battle of Bapaume-Peronne; Allies take 35,000 prisoners.				
Sept.	Brit. break Hindenburg line; take 36,000 pris. Amer. take St. Mihiel, 16,000 prisoners. Battle of Meuse-Argonne; Amer. break Germ. line.		Allies rout Bulgarian army.	Brit. destroy Turkish armies in Palestine, Mesopotamia; capture Damascus, Mosul.	
Oct.	French offensive on whole front; Belgians recover large territory; take 20,000 prisoners.		Battle of Vittorio Veneto; Ital. rout Austrians; capture over 300,000.		
Nov.	General Allied advance; Americans enter Sedan. Armistice signed, November 11.				German fleet surrenders.

Fear of German aggression resulted in a great increase in the British navy and also brought about an important diplomatic revolution. For centuries Great Britain and France had been rivals, often to the point of bitter warfare, but common dread of Germany led, about 1904, to the forming of the *Entente Cordiale* between the two nations. In 1891, as a makeweight against the Triple Alliance, France and Russia had formed the Dual Alliance. Differences between Great Britain and Russia were now composed, and the *Entente Cordiale* was broadened into the Triple Entente. The main object of this Triple Entente, which was an "understanding" rather than a formal alliance, was undoubtedly to restrain German aggressions; it was defensive rather than offensive in character, but the Germans called it an "encirclement" and grew restive against what one of their prominent publicists called "the bars and bolts which other people are forging for us."

In 1905, and again in 1911, Germany and France almost came to blows over Moroccan affairs. German aggressiveness on these occasions revived French hostility, which had shown some signs of abating; and in the last crisis France, backed by Great Britain, displayed a firmness that caused Germany to abate some of her pretensions. German militarists felt, in fact, that German prestige had suffered. A decided increase in the strength of the German army soon followed.

The Balkan Wars. The conflicts of 1912 and 1913 among the Balkan states also very markedly diminished Teutonic prestige in that region. In the first of these conflicts Turkey, which was regarded as a potential Teutonic ally, was defeated; and in the second, Bulgaria, which likewise had the sympathy of Vienna and Berlin, met with disaster. Serbia, which had long been a stumbling block in the way of the realization of Teutonic aspirations in the Balkans, emerged from these conflicts almost doubled in size and bitter against Austria-Hungary for having prevented her obtaining a port on the Adriatic. A general European war was narrowly averted at this time, largely through the energetic efforts of Sir Edward Grey, British minister of foreign affairs. Austria was anxious to administer to Serbia the chastisement she actually undertook to inflict the following year and seems to have refrained chiefly because Italy, a fellow member of the Triple Alliance, refused to countenance such action.

The relations of Austria-Hungary and Serbia had long been unfriendly. In Vienna and Berlin, Serbia was considered as an obstacle in the way of realizing Teutonic aspirations, while Serbians dreamed of freeing the millions of people of their own race who languished under the Austro-Hungarian yoke.

The Immediate Occasion of the War. On June 23, 1914, Archduke Francis Ferdinand, heir apparent to the Habsburg thrones, and his morganatic wife were assassinated while on a visit to Serajevo, the capital of Bosnia. Those immediately engaged in the murder owed allegiance to the Habsburg dynasty, but they were of Serbian blood, and investigation showed that they belonged to a powerful Pan-Serbian society called the Narodna Odbrana,—that, in fact, some Serbians, including an underofficer in the Serbian army, were engaged in the plot.

Although the Serbian government promptly expressed its disapproval of the act, the Austro-Hungarian government seized upon the situation as an opportunity to humiliate Serbia and to restore Teutonic prestige in the Balkans. On the 23d of July, Austria-Hungary dispatched an ultimatum charging the Serbian government with virtual complicity in the murder and making demands which no nation could fully meet without a partial surrender of its independence. Serbia's reply to these formidable demands must be given "at the latest by 6 o'clock on Saturday evening, the 25th of July," that is, in 48 hours.

From the outset the dangerous possibilities of the situation were apparent in European chancelleries, and both before and after the sending of the ultimatum Great Britain, France, and Russia worked to prevent war, Sir Edward Grey, the British foreign minister, being particularly active in this respect. Emperor William of Germany pretended to be anxious for peace but hypocritically pursued a course that made a general war inevitable. In her reply (July 25th) Serbia conceded all the Austrian demands that did not involve her sovereignty, and offered, in case her answer was not deemed satisfactory, to submit the controversy to The Hague Tribunal or to a council of the powers. But Serbia stood in the way of the realization of Teutonic ambitions in the Balkans and the Orient, so the Austro-Hungarian government rejected her answer, broke off diplomatic relations, and on the 28th declared war.

Russia had made no secret of her determination not to permit Serbia to be crushed and on July 29 ordered partial mobilization of her forces. Germany had already secretly made war preparations, and on the 31st sent to Russia an ultimatum demanding that her war measures cease within twelve hours. The same day the German ambassador at Paris demanded to know by one o'clock the next day what the attitude of France would be in case of a war between Germany and Russia. No formal answer to this question, however, was ever asked or given. On August 1 Germany declared war against Russia. The same day France ordered mobilization to begin the next day. On the 3d, Germany declared war against France.

The attitude of Great Britain now became all important. The Teutons hoped and expected her to remain neutral. She was under no formal, written obligations to go to the assistance of her associates in the Triple Entente. A certain moral obligation existed, however. Furthermore, it would have been fatal to the last degree for her to have permitted the Central Powers to crush Russia and France, for undoubtedly her turn would have come next. On August 2 Sir Edward Grey assured the French government "that, if the German fleet comes into the Channel or through the North Sea to undertake hostile operations against French coasts or shipping, the British fleet will give all the protection in its power."

British doubts as to what course to pursue were speedily resolved by Germany's violation of the neutrality of Belgium. It had long been the plan of the German military leaders, in case of a war with Russia and France, to throw practically all their forces against France and endeavor to defeat her before the slow-moving Russians could get their armies mobilized. But along their eastern frontier the French had constructed a powerful system of defenses, and the Germans were well aware that to break through would be costly in time and blood, if not altogether impossible. The Germans determined, therefore, to go through Belgium and attack France along a frontier that had few fortifications. It was true that the "perpetual neutrality" of Belgium had been solemnly guaranteed by the five great powers that were now going to war, but the German war lords were willing to sacrifice anything for the sake of success. In explaining to the Reichstag Germany's course in the matter, Chancellor von Bethmann-Hollweg admitted "the wrong" but said, "We are now in a state of necessity, and necessity knows no law." On August 2 the Germans demanded the right to cross Belgium, alleging that France intended to march through the country to attack Germany, and promising that if no resistance was offered, Germany would guarantee her possessions and independence and would pay an indemnity for any damage done. But brave little Belgium replied (August 3) that she would defend her neutrality against all who tried to violate it, and King Albert addressed to Great Britain a "supreme appeal" to safeguard the integrity of his country. The German decision to invade Belgium swept away all British doubts. On August 4 Sir Edward Grey sent an ultimatum to Berlin demanding that

Germany should immediately promise to respect the neutrality of Belgium. The German chancellor expressed regret that Great Britain should go to war "just for a word . . . just for a scrap of paper," but he refused to give the promise. German troops had, in fact, already crossed the Belgian frontier. Great Britain declared war on Germany the same night.

Little Montenegro declared war against Austria-Hungary on August 8 and against Germany the following day. Italy, although a member of the Triple Alliance, announced that she considered that her allies were the aggressors in the conflict and that, as the terms of the alliance provided only for defensive warfare, she would remain neutral. The following spring she entered the conflict on the side of the Entente.

Comparison of the Combatants. In area, population, and wealth the Entente Powers were decidedly superior to the Central Powers. Their European population alone amounted to a grand total of about 240 millions, which was double the population of the Central Powers, while the population of their colonies was many times as great. Their combined wealth was also about double that of their enemies.

In preparations for war on land, however, the Central Powers enjoyed a marked superiority, though this was in training and equipment rather than in numbers. The German army, with a peace strength of 870,000 and a war strength of 5,400,000, was the mightiest military machine the world had ever beheld. The Austro-Hungarian army, with a peace strength of 436,000 and a war strength of 3,600,000, was far inferior to the German army but was still formidable. On the Allied side, the Russian army, with a peace strength of 1,384,000 and a war strength of 5,400,000, was the most numerous—exceeding in this respect even that of Germany—but the French army, with a peace strength of 790,000 and a war strength of 5,300,000, was much more efficient and was not greatly surpassed either in numbers or real strength by that of Germany. The armies of Serbia, Montenegro, and Belgium were comparatively negligible; Great Britain's regular forces amounted to only 137,000 men, in addition to which she had 251,000 territorials, comparable to American militia, besides considerable colonial forces.

The Teutonic powers possessed an immense military advantage because of their central position. Because of it they could fight on interior lines, and by using their network of strategic railways they could rapidly concentrate their troops wherever needed. It was exceedingly difficult, on the other hand, for the French to re-enforce the Russians or for the Russians to re-enforce the French.

The German navy was greatly superior to the combined naval forces of France and Russia, and Austria-Hungary also had a considerable number of powerful ships. Had Great Britain stood aside, as the Teutonic war lords had hoped and expected, there can be no doubt that the Central Powers would have controlled the seas, thus isolating France and Russia from each other, and that on land the Teutonic armies would have won a speedy victory.

But the entrance of Great Britain utterly changed the outlook. She brought into the conflict immense wealth, the greatest colonial empire the world had known, and the mightiest fleet ever built. For many years it had been her policy to maintain a navy superior to that which any two powers combined could bring against her. The muzzle energy of the great guns on her battleships of later types was almost double that of the German battleships of corresponding types, while if the older battleships of both nations were taken into consideration the superiority was even greater. Furthermore, the combined fleets of France and Russia were much superior to that of Austria-Hungary.

Students of naval affairs in neutral countries were almost unanimous in the belief that the Entente nations would control the seas at the beginning of the war, and keen students of history, men who understood the vital part played in past world wars by sea power, predicted that in the end, no matter what victories they might gain on land, the Central Powers would lose unless they could in some way wrest control of the seas from their enemies. To accomplish this the Teutons based large hopes upon their submarines.

The Invasion of Belgium and France. The Teutonic war lords realized that their best chance of winning lay in making the war a short one. Owing to inadequate railway facilities and to other reasons, it was known that the mobilization of Russia's immense forces must necessarily be slow. As already stated, the Teutons planned, therefore, to throw an immense army against France, through Belgium and Luxemburg, the latter also a neutral state, and crush her before Russia could be ready to effect a diversion in her behalf. Practically the whole of the great German war machine was to be employed in this stupendous effort. To the Austro-Hungarian forces and to a few German army corps, mostly of inferior character, was left the task of holding the Muscovites in check until France had been beaten to her knees.

The first German troops to enter Belgium crossed the frontier on August 3. It was the German hope that the Belgians would at most offer only a nominal resistance, but in this they were disappointed. Before any important progress could be made it was necessary to capture the city of Liege, whose forts commanded the railway lines that must be used in any invasion of France from the northeast. Attempts to capture the place by storm were defeated, but by the use of immensely powerful howitzers the Germans succeeded in a few days in breaking the ring of forts and in taking the city, though one fort held out until the 17th. Long before the last fort fell, German forces pushed on past Liege toward the heart of Belgium, driving the little Belgian army before them. Brussels was captured on the 20th, and the main Belgian army, instead of retreating toward the French frontier, moved northward and took up a position about the fortified city of Antwerp. German forces were detached to keep this army in check, but the main armies moved southward like an avalanche toward the French frontier.

While the Germans were pouring across the Belgian plain the French had attempted an invasion of Alsace and Lorraine. At first they met with some successes, but the French army under General de Castelnau was badly defeated August 20–24 in Lorraine, and within a few days the French troops had retired from Alsace and Lorraine, except a small portion of Alsace in the region of the southern Vosges passes.

All thoughts now had to be turned to preserving France against the German avalanche. Against the northern barrier fortresses, through Luxemburg and Belgium, there poured the mightiest host that had ever gone to war. The strength of the movement through Belgium had been underestimated by General Joffre, the French commander in chief, and to meet it he had in position along the Franco-Belgian frontier only the three French armies of Generals Lanrezac, Langle de Cary, and Ruffey, while a British expeditionary force of two army corps and a considerable force of cavalry under Field Marshal Sir John French was taking position on the French left.

The Allies placed great hopes upon the resistance which they expected would be made by Namur, a strongly fortified town just north of the border, but the forts about the city were unable long to hold out against the storm of heavy shells that were poured upon them from the mighty German 21-, 28-, and 42-centimeter howitzers. One fort resisted until the 25th of August, but by the 23d the invaders had won control of the passages over the Meuse and Sambre. Some of the garrison of Namur

managed to escape and were later transferred by sea to the main Belgian army at Antwerp.

In a bitter three days' battle about Charleroi, the army of General Lanrezac was defeated by superior German forces and had to retreat hastily to avoid complete disaster. Meanwhile the little British army around Mons had become engaged with the German right wing under General von Kluck. The British were greatly outnumbered, but they managed to hold their own and to inflict heavy losses upon the enemy until word came that the French army on their right had withdrawn and that a German force was moving around the British left in order to take them in the rear. On the 24th a retreat was begun, and this difficult movement was executed with great address, largely through the skillful management of the corps commanders, Generals Haig and Smith-Dorrien.

The German hosts exultantly pursued the retreating French and British, making use of motor cycles, bicycles, motor cars, and motor trucks, and moving with a speed hitherto unequaled in warfare. Every day and every hour there was bitter fighting, and repeatedly the French and British were on the verge of disaster, but always by splendid fighting they managed to hold the pursuers in check until precious hours could be won for withdrawal.

Crowds of terror-stricken civilians fled before the German advance, spreading far and wide the bitter news that the enemy was coming. On August 27 it was announced that the French government had been reconstituted on a war basis, with strong men of every party in it. General Galliéni, a man of remarkable energy, was appointed military governor of Paris, and preparations for a siege were hurriedly made. On the 30th a German airplane circled over the city and dropped five bombs and messages to the effect that the city must surrender. The government was hastily removed to Bordeaux, and a large part of the civil population fled from the city. Despite the German successes, however, the French were determined to fight to the bitter end, and the fact that Great Britain was on their side did wonders to uphold their morale.

At this stage of the campaign the German armies were confident that victory was in their grasp. In reality, as they were presently to discover, their situation was much less favorable than they supposed. The French and the British had, it is true, suffered some serious reverses, but their long retreat had been part of the strategy of General Joffre, who was determined not to fight the great battle upon which the fate of France depended until the time was ripe and he was on ground he had chosen.

Meanwhile the French and British armies on the northern front fell back southward, pivoting on the great fortress of Verdun—swinging back upon Paris like a door, and ultimately swinging a little past. In the time thus gained, Joffre formed two new armies, the Ninth under General Ferdinand Foch, to withstand any German attempt to break the Allied center, and the Sixth about Paris under General Manoury. Happily the eastern fortress barrier, though hard pressed, stood firm.

On the 4th of September a detachment of the German right wing under von Kluck reached a point only 17 miles from Paris, but, instead of attempting to besiege the city, the Germans turned southeastward after the retreating Allied armies, which they properly considered to be their first objectives, for if these were decisively beaten Paris and all of France would be at the invaders' mercy.

First Battle of the Marne. By September 5 General Joffre knew that the time had come to make the final stand. On that day he issued an appeal to his soldiers, reminding them that the fate of France hung upon the impending battle and imploring them when they could no longer advance to die where they stood rather than retreat. On the following day the French and British armies from Paris to Verdun, on a front of about 180 miles, turned upon the invaders and began the battle of the Marne, the most stupendous conflict that had ever been fought in all the annals of warfare.

For four days the outcome hung in the balance. The main effort of the French was directed to defeating and rolling up the German right wing under von Kluck, that of the Germans to breaking through the French center. The German attack was met by the French Ninth Army under Foch, the most determined and resourceful of all the Allied generals. At one time his position was desperate, but he refused to admit defeat and at the crisis of the battle launched an attack that hurled the Imperial Guard into the marshes of St. Gond. A French division, finding a gap in the German front, marched through and thus imperiled the whole German line. Meanwhile, the Fifth French Army under d'Espérey and the Sixth French Army under Manoury fought a desperate battle with von Kluck. Though outnumbered and caught at a disadvantage, von Kluck fought so resolutely that the French advance in that quarter of the field was arrested, but through the energetic efforts of General Galliéni a reserve French corps was hurried to the front in taxicabs, and this re-enforcement, together with the advance of the British across the Marne, decided the issue. Military students are still in doubt as to which of the Allied successes was the determining factor, but, at all events, the whole German host west of Verdun was forced to retreat.

The retreat was managed with great skill. The German losses in prisoners and guns were comparatively small, and the invaders managed presently to take up positions behind the river Aisne, whence all the Allied efforts to dislodge them failed. Nevertheless, the great German bid for a speedy victory had failed; the Allies had won time to organize their resources; and the battle of the Marne will always be considered the turning point in the war and will take its place as one of the great decisive conflicts of history.

While the battle of the Marne was still raging, the Germans captured the great fortress of Maubeuge, with about 40,000 prisoners. While their main forces were intrenching themselves securely behind the Aisne, an army abundantly supplied with heavy artillery moved against the Belgian army in Antwerp. The ring of forts about the city was soon breached, and on October 9 the city itself surrendered, but most of the army succeeded in escaping toward Dunkirk and Calais.

Meanwhile the British and French on the one side and the Germans on the other had been extending their lines toward the North Sea. Soon after the fall of Antwerp the Germans concentrated an immense force and began a determined drive to capture the Channel ports of Dunkirk and Calais. They were opposed by the British army, which had been transferred to Flanders, and which was re-enforced by fresh troops from home and from India, by the remnant of the Belgian army under King Albert, and by increasing French forces. The work of synchronizing these diverse forces was intrusted to General Foch. Repeatedly the Allied situation seemed almost hopeless, and the Germans, who fought at times under the kaiser's own eyes, pushed forward with desperation and with almost utter disregard of their lives. But after six weeks of desperate fighting, the battle finally died down, with the Allies still holding a small section of southwestern Belgium.

The battle in the west now resolved itself into a warfare of trenches, with each side holding a front of more than 400 miles from Switzerland to the North Sea. Until almost the end of the war, despite daily fighting and some stupendous efforts by either side to break the opposing line, this condition of stalemate was to continue.

First Battles on the Eastern Fronts. Meanwhile, great events had been taking place on the eastern front. Although the main Teutonic effort had been in the west, the Central Powers at the outset attempted an offensive against Russia. As only a few German army corps of indifferent quality were available, the main part in this attempt was played by Austria-Hungary. The Germans seized a strip of territory to the east of Silesia, while the Austro-Hungarians massed about a million men in Galicia and undertook an invasion of Poland from the southwest.

But the Russians managed to mobilize their forces more rapidly than had generally been considered possible. Under the skilled generalship of the Russian commander in chief, the grand duke Nicholas, immense forces were hurled against the Austrians in Galicia, while by way of diversion in favor of hard-pressed France, two armies totaling about 250,000 men undertook an invasion of East Prussia.

Comparatively few German troops were available to oppose this invasion, and for a time the Russians carried all before them. About the time that the German armies in the west were driving the French and British back from Charleroi and Mons, their weakened forces in the east were being defeated at Gumbinnen and elsewhere, and German civilians were flying westward before the hordes of the czar. To hold the Russians in check, several army corps were hastily detached from the western front and were hurried to meet the Muscovites. It is now generally recognized that the German high command made a serious military blunder in so doing and that, had the German leaders at the battle of the Marne been able to throw into the balance the corps which had been sent eastward, they might have won a great victory.

To command the German forces in East Prussia a new general was selected, General Paul von Hindenburg, a veteran of the wars of 1866 and 1870. The new leader had made a careful study of the country which he was now called upon to defend, and he enjoyed the assistance of a capable chief of staff, General von Ludendorff. In an incredibly short time von Hindenburg massed a considerable force in front of the southern Russian army, which was commanded by General Sansonov, and on August 26 began what is generally known as the battle of Tannenberg. Von Hindenburg's plan was masterly, resembling that of Hannibal at Cannæ. After four days of fighting, the Russians attempted to retreat, but they were hopelessly involved in a labyrinth of lakes and swamps, and their army was almost annihilated. The Germans claimed to have captured 90,000 unwounded and 30,000 wounded prisoners, besides hundreds of cannon and vast stores of war material. The northern Russian army under General Rennenkampf was forced to raise the siege of Königsberg and retreat in haste to Russian soil. Practically all East Prussia was freed from the invaders, and the German people, still confident of success in the west, were intoxicated with the news from Tannenberg, which was proclaimed another Sedan. In a few days von Hindenburg became the great hero of the war, a position he continued to hold until the end of the conflict.

Meanwhile a vast and complicated conflict was being fought out in southern Poland and Galicia. In a series of bloody battles about Tarnopol, Halicz, Lublin, Rawa-Ruska, and other places, the outnumbered Austro-Hungarians were badly defeated. Lemberg was captured, and by September 16 the Russians claimed to have taken 250,000 prisoners, besides immense quantities of supplies and great numbers of cannon and machine guns. Siege was laid to Przemysl, and swarms of Cossacks, entering the passes of the Carpathians, threatened to invade Hungary.

The blow dealt Austria-Hungary at this time was a staggering one and might have proved fatal had not the Germans rendered aid. Leaving a few army corps to hold Rennenkampf in check, von Hindenburg transferred large forces through Silesia to the region of Kalisz and forced the Russians to withdraw toward Ivangorod, while the Austrians moving forward from Krakow succeeded in raising the siege of Przemysl. By a sudden dash the Germans almost captured Warsaw, which was saved only by the opportune arrival of some Siberian troops and of the Corps de la Garde, which was hurried up from Ivangorod. Again assuming the offensive, the Russians drove von Hindenburg back toward Silesia and the Austrians to Krakow and again laid siege to Przemysl. To effect a diversion in behalf of their western allies, who were hard pressed in Flanders, the Russians also attempted a new invasion of East Prussia. Late in November, von Hindenburg again attempted to capture Warsaw, but after confused and bitter fighting and enormous losses on both sides he was held in check before the strong Bzura-Rawka line. In the same period Austrian efforts to raise the siege of Przemysl were foiled. In February 1915 von Hindenburg again evolved a brilliant stroke. By using strategic railways and automobiles he suddenly concentrated about 200,000 men in East Prussia and fell like a thunderbolt upon the inferior Russian army under General Sievers. In this conflict, known as the battle of the Masurian Lakes, the Russians were almost annihilated and suffered losses almost equal to those at Tannenberg. The Germans next attempted an invasion of Poland from the north, but, aided by the great barrier fortresses of Ossowetz and Grodno, the Russians were able to repel the invaders after bitter fighting.

Meanwhile the Russians had continued to besiege the great fortress camp of Przemysl in Galicia. Repeated Austrian efforts to relieve the fortress were foiled. By March 22 the position of the beleaguered army had become so desperate that General Kusmanek surrendered the fortress to General Ivanov, who commanded the besiegers. The prisoners taken numbered over 119,000, the greatest number that had ever surrendered at one time in warfare. The grand duke Nicholas followed up this great victory by a drive designed to capture the passes of the Carpathians, and bloody fighting followed amid the snows of the high mountains.

In the first days of the war, Austro-Hungarian forces had bombarded Belgrade and had speedily begun an invasion of Serbia. But after overrunning part of the little kingdom, they were defeated along the heights of Tzer, at Shabat, and near Losnitza, and were driven headlong across the Danube. The Serbians, aided by the Montenegrins, soon after began an invasion of Bosnia. The military leaders of the dual monarchy gathered a more powerful army and again attempted the conquest of Serbia. Belgrade was taken, and by the beginning of December 1914 the fate of the little kingdom seemed sealed. But an opportune raid of the Russians into Hungary forced the Austrian commanders to recall large forces to meet this new menace, and aged King Peter led his troops to victory after victory. Within two weeks not a living invader remained in Serbia except as a prisoner.

On the Seas. As was generally expected by naval experts, the control of the high seas was immediately seized by the Entente Allies. German and Austrian merchant ships either sought safety in home ports or in those of neutral powers or were captured by the enemy. In the Mediterranean the Austrian navy took refuge in home ports on the Adriatic, while the German protected cruiser *Breslau* and the giant battle cruiser *Goeben* managed to evade French and British pursuers and steamed up the Dardanelles and through the Sea of Marmora to Constantinople, where they played an important part in bringing Turkey into the war on the Teutonic side.

Just before the war began, the main British battle fleet had assembled at Spithead for maneuvers. The fact that most of the British fighting strength was thus gathered in one great unit was most opportune, for it prevented the Germans from attacking their enemy in detail. Instead, the German fleet retired to that section of the North Sea that lies behind the fortified island of Helgoland, and there, protected by mine fields and the heavy guns of their land forts, they were safe from attack. Thanks to the Kiel canal, they were also able to retain command of the Baltic Sea. The strategic importance of this canal can hardly be overemphasized. In some respects it doubled the strength of the German navy. Through it they could speedily shift their fleet from the North Sea to the Baltic and back again. In case the British should enter the Baltic with their whole fighting strength, the Germans could issue from behind Helgoland, bombard British coast towns, cut communications with France, and spread destruction far and wide. In case the British should divide their fleet and send half into the Baltic and keep half in the North Sea, the Germans could, by using the canal, concentrate their whole force against either division and obtain an excellent opportunity for beating their enemies in detail.

At the outbreak of the war there were in various parts of the world scattered German naval vessels that began at once to prey upon Allied commerce. The most famous of these ships was the cruiser *Emden*, which in three months' time captured over a score of merchant vessels, most of which she destroyed, and also sank a small Russian cruiser and a French torpedo boat. On November 9, 1914, however, she attempted to destroy a wireless station on one of the Cocos islands, when a much more powerful Australian cruiser, the *Sydney*, appeared, and, in the fight that followed, the *Emden* was so badly battered that she was run ashore on North Keeling island in a sinking condition. A party of Germans that had landed to destroy the wireless station managed to escape in a small boat; after many adventures they reached Arabia and thence made their way to Constantinople.

Another German cruiser in the Indian Ocean, namely the *Königsberg*, was ultimately forced to take refuge in the Rufiji river, in German East Africa, and there she was destroyed by British monitors. The swift cruiser *Karlsruhe* worked havoc among Allied shipping in the West Indies and off the coast of South America, but she was presently destroyed by an accidental explosion. Other German commerce raiders had more or less destructive careers, but all of them were ultimately destroyed or were forced to enter neutral ports or to return home. A few raiders managed to pass through the British cordon in the North Sea and to effect much destruction; the most notable of these was the *Moewe*.

The most important German naval force outside European waters at the outbreak of the war was that in the Pacific, commanded by Admiral Count von Spee. Early in October von Spee bombarded Papeete on the French island of Tahiti, and thence steamed for the South American coast, where he destroyed a number of Allied merchant vessels. On November 1, a British squadron of four vessels, the armored cruisers *Good Hope* and *Monmouth*, the light cruiser *Glasgow*, and the armed liner *Otranto*, met the German squadron off Coronel, Chile. The German squadron consisted of the armored cruisers *Scharnhorst* and *Gneisenau*, the light cruisers *Dresden*, *Nürnberg*, and *Leipsic*, and the armed liner *Prinz Eitel Friedrich*. The German force was decidedly stronger in gun power, but the British commander, Vice Admiral Sir Christopher Cradock, decided to give battle. In a long range fight the German vessels, almost without injury to themselves, succeeded in sinking the *Good Hope* and the *Monmouth*, and not a man on board either ship was saved. The *Glasgow* and the *Otranto*, favored by darkness, succeeded in escaping.

The German victory caused great elation in Germany and corresponding depression in Great Britain. To retrieve the disaster, the British admiralty hurriedly sent a powerful squadron southward under command of Vice Admiral Sturdee. On December 8, this squadron, consisting of two giant battle cruisers, the *Invincible* and the *Inflexible*, two armored cruisers, and some lighter cruisers, reached Port Stanley in the Falkland Islands. The British expected a long and arduous chase after von Spee's ships, but the very next morning the German ships, unaware of their danger, appeared off the harbor. The British issued forth, and, in a running fight, all of the German ships were sunk except the light cruiser *Dresden*, which a few weeks later was destroyed near the island of Juan Fernandez in the Pacific.

Events in the North Sea. Many short-sighted people supposed that the British battle fleet would attempt to attack the German fleet at its base behind mine fields and protected by the heavy guns of forts. Such an attack would, of course, have been madness. The British were keenly aware that to lose command of the sea meant absolute disaster and the breaking up of their far-flung empire. They were careful, therefore, not to risk their fleet in any rash undertakings, and contented themselves with keeping the German fleet from seeking the high seas.

As for the Germans, they hoped that by drawing the vessels of their enemies to attack fortresses, by sinking others by floating mines or submarines, or by bombs from Zeppelins, they might ultimately whittle down their strength to such a point that their own navy might be able to defeat them.

At first their campaign of attrition was somewhat encouraging. In the very first days of the war they began to sow the high seas with floating mines, a measure that was directly contrary to international law. The Allies and neutral powers protested, but the Germans persisted in laying more mines, and the Allies were ultimately forced to follow their example. Scores of neutral merchantmen were sunk by such mines in the course of the war, as well as many warships on both sides. The greatest British loss of this kind occurred on October 27, 1914, when the British dreadnought *Audacious* was sunk by a mine off the northeast coast of Ireland. This was the only dreadnought lost by the British in the whole course of the war.

As a weapon against warships the Zeppelins proved practically useless, but the German submarines were much more effective. On September 22, 1914, three British armored cruisers of 12,000 tons each, the *Aboukir*, *Cressy*, and the *Hogue*, were sunk by one submarine, the *U-9*, commanded by Captain Lieutenant Otto Weddigen. This was the greatest exploit of the kind during the whole war. Weddigen, in the *U-29*, in the following March attacked the British Grand Fleet off Cromarty, Scotland, but the submarine was rammed by the battleship *Dreadnought*, and there was not a single survivor. German submarine commanders subsequently scored occasional successes against Allied warships, but were never able seriously to threaten Allied command of the seas.

The first important naval battle of the war took place on August 28, 1914, in Helgoland Bight. The action at first was between light vessels, but the opportune arrival of Vice Admiral Sir David Beatty with heavy battle cruisers enabled the British to win a considerable victory, the German losses amounting to three light cruisers and a destroyer. For some weeks thereafter the German above-water ships in the North Sea acted with great caution, but the slow progress of the submarine campaign and the destruction of the *Emden* and of von Spee's squadron caused such depression in Germany that, on November 13 and December 16, 1914, a German squadron carried out raids

against the English coast and bombarded the unprotected towns of Yarmouth, Scarborough, Hartlepool, and Whitby, killing more than a hundred men, women, and children, and escaping unscathed.

On the night of the 23d of the following January a German squadron of three battle cruisers, an armored cruiser, six light cruisers, and some destroyers set out across the North Sea on a similar raid, but next morning off the Dogger Bank they fell in with the powerful British First Battle Cruiser squadron, consisting of five battle cruisers and many lighter vessels and commanded by Vice Admiral Beatty. The Germans fled homeward as fast as their ships could steam, but the pursuers caught up with the big armored cruiser *Blücher*, of 15,550 tons, and sent her to the bottom. The British losses were slight.

For many months thereafter the Germans made no more attempts to come out into the open seas with their above-water ships. Their submarines and mine-layers continued their activities, but as time passed it became increasingly apparent that the German policy of whittling down the British navy until it was no stronger than their own was doomed to failure. English shipyards were so active that the construction of new warships much more than made good all naval losses.

The Allied Blockade. Meanwhile the Allies sought to make use of their sea power to destroy the trade of the Central Powers with the rest of the world. The right of a belligerent under international law to blockade another, provided a real and not a "paper" blockade was maintained, was beyond question; it had proved, for example, one of the most effective weapons used by the American Federal government in the war against the Confederacy. However, there were many obstacles in the way of a complete realization of this Allied desire. The entrance of Italy into the war in the spring of 1915 considerably simplified this Allied blockade problem, but the Teutons were still able to carry on trade with neighboring neutral states—Switzerland, Holland, and Denmark, and also with Sweden and Norway across the Baltic Sea, which was under German control. The quantity of goods that could be obtained from all of these neutral states combined was, of course, comparatively small, but an effort quickly developed to land goods from other countries in the ports of these neutral states and thence to send them to the Central Powers.

At first the Entente nations did not attempt to exclude all articles from the Central Powers but limited their efforts to certain "contraband" articles of a distinctly warlike nature. In deference to public opinion in the United States, cotton, for example, was long allowed to go in, though it was largely used in the manufacture of military clothing and also of explosives. Early in the war, however, the Entente Powers began to extend the list of contraband articles and to seize them, at times, even though they were consigned to a neutral port. In justification of this course they alleged the enemy destination of such articles, and could cite as a precedent the policy of the United States during the Civil War, of seizing articles consigned to Mexican ports but destined for the Confederacy.

For some months, food was not considered contraband, although the importance of making it so was apparent by reason of the fact that the Central Powers did not produce sufficient supplies for their own needs. Late in January 1915, however, the German government confiscated all supplies of grain and flour in the empire and thus gave their enemies a pretext for declaring all food contraband, on the theory that it now became impossible to distinguish food destined for the armies from food destined for the civil population.

In the hope of embroiling the United States in the controversy, Germans contrived to have a ship of American register, the *Wilhelmina*, sail with foodstuffs from New York for Hamburg. The ship took refuge from a storm in the port of Falmouth, and the British requisitioned the cargo but paid for it at Hamburg prices. The Germans raised a great uproar over this case and over the whole Allied blockade policy, which, they alleged, was designed to starve the civilian population of the Central Powers. The spokesmen of the Allies defended their blockade policy and pointed out that the Germans had not hesitated to starve women and children when they besieged Paris in 1870-71. The hollowness of German protests was revealed also by the fact that on January 28, 1915, before the Allies had made food contraband, a German raider, the *Prinz Eitel Friedrich*, had deliberately sunk an American sailing vessel, the *William P. Frye*, which was carrying a cargo of wheat consigned "to order" at Queenstown, Falmouth, or Portsmouth in England.

On February 4, five days before the British seized the *Wilhelmina*, but, seven days after the sinking of the *Frye*, the German government announced that, by way of retaliation against the British policy, all waters about the British Isles would be treated as within the "zone of war" and that "all enemy merchant vessels encountered in these waters will be destroyed, even if it will not always be possible to save their crews and passengers." Warning was also given that neutral vessels entering the zone would be in grave danger

It was a well established principle of international law that merchant vessels captured by a belligerent must not be sunk unless the safety of passengers and crew was first provided for. It was clear that the German above-water ships could not be used to enforce the decree and that the Teutonic war lords intended to employ their submarines, which, from their very nature, could rarely provide such safety. What the decree meant, therefore, was that thereafter any vessel, neutral or otherwise and no matter what its errand, that entered the war zone would be liable to be sunk and its passengers and crews killed or drowned.

Neutral nations protested against the decree, but the Germans persisted in their lawless course and sank many vessels, including the *Lusitania*. The history of the controversy that ensued is set forth in the history of the United States, and the revival of the policy in 1917 ultimately led the United States to enter the war.

On March 11, 1915, by way of retaliation for the German submarine decree, the British government issued an Order in Council establishing a virtual blockade of Germany, although the word "blockade" was not used. Thereafter all goods of every kind were to be kept out of Germany, and neutral goods destined for Germany, if not contraband, were, when seized, to be purchased by the captors instead of confiscated. All German goods wherever found were to be confiscated.

It was never possible to enforce this blockade absolutely, and many ways were found of evading it, but, by pressure upon neutral states that were neighbors of Germany and Austria-Hungary and by various other means, the Entente Allies were ultimately able to destroy by far the greater part of the foreign trade of the Central Powers. This blockade contributed immensely to ultimate Allied success.

Their control of the high seas enabled the Allies to conquer the German colonies. Japan declared war on Germany on August 23, 1914, and, though her army and navy played no large part in the war, a Japanese expedition, aided by a small British contingent, landed in Shantung and captured the German fortress of Tsing-Tao (November 7, 1914). Japanese warships also captured the Caroline Islands and other German possessions in that region, while Australasian forces took German Samoa, New Guinea, and other islands in that part of the world. In Africa the French and British speedily overran Togoland and, by February 1916,

completed the conquest of Kamerun. In South Africa dissatisfied Boers attempted a revolt against British rule but were soon put down. An expedition from South Africa, led by Premier Botha, with General Jan C. Smuts as second in command, invaded German Southwest Africa and conquered it. In German East Africa more resistance was encountered, but early in 1916 General Smuts took command of the British forces, which were largely composed of Boers, and presently overran most of the colony. A small German force managed, however, to hold out until the end of the war.

Turkey Enters the War. It now becomes necessary to explain briefly the entrance of Turkey into the war. By treaties signed in 1856 and 1879, warships were forbidden to enter the Dardanelles except by special permission of the sultan, but, as we have seen, German influence at Constantinople was sufficient to enable the cruisers *Breslau* and *Goeben* to take refuge there and thus escape the British vessels that were in pursuit. Under the rules of international law the two vessels must either leave within 24 hours or else be interned for the rest of the war. Instead, the Turkish government announced that it had "purchased" the two cruisers to replace two dreadnoughts that were building in England and that had been requisitioned by the British government. The right of Great Britain to do this under international law was beyond question, but the act angered many Turks, who wished the vessels for use in a war that seemed to be impending with Greece. Turkey's right to buy the German cruisers, on the other hand, had no basis in international law, but the sale was, in reality, fictitious and was part of a plot between German agents and partisans of Germany in the Turkish government. The cruisers were given Turkish names, but the German officers and crews continued to man the ships.

Many of the Turks and some members of the cabinet desired to preserve Turkish neutrality, but they were overborne by the war party, particularly by Enver Pasha, the minister of war. Although protesting against the purchase of the cruisers, the ministers of the Entente Powers sought to avoid bringing matters to a crisis. Finally, however, the *Goeben* and the *Breslau*, with a few Turkish torpedo boats, executed a raid, October 29, 1914, on Odessa and other Russian ports, bombarded them, and sank or damaged several Russian vessels. Formal warfare quickly followed.

The entrance of Turkey into the war greatly strengthened the Central Powers. Her navy, it is true, was small and inefficient, while her treasury was practically bankrupt; but her army, under Teutonic management, was capable of being expanded into a formidable force, while her geographical position was a fact of even more vital importance. By land her armies would be able to attack the Russians in Transcaucasia and the British in Egypt and to threaten the interest of both nations in Persia; while by her control of the Dardanelles and the Bosporus she could effectually prevent southern Russia from sending wheat and other products to neutral or Allied markets and could bar the allies of Russia from using that route to furnish war materials.

Warfare with Russia in the Transcaucasus region began immediately and continued with varying fortunes until Russia withdrew from the war three years later. As speedily as possible the Turks also, under Teutonic inspiration, attempted to capture the Suez canal and thus sever one of the main arteries of the British Empire. Early in February 1915 a Turkish army succeeded in reaching the canal, and a small detachment actually crossed it; but the assailants were badly defeated by British military and naval forces. The canal continued to be in some danger, however, for two years longer.

The importance of dealing Turkey a mortal blow and of opening the Dardanelles and Bosporus so that communication could be effected with southern Russia was apparent to good strategists everywhere, but in their efforts in that direction the Allies displayed fatal procrastination. They maintained a close blockade of the Dardanelles, and, in December 1914, the British submarine *B-11* penetrated through the Turkish mine field into the Sea of Marmora and torpedoed and sunk the old Turkish battleship *Messudieh*. Obviously the kind of attack most likely to result in the opening of the straits would be a joint expedition by sea and land, but Earl Kitchener, the British secretary of war, displayed strange blindness in the matter. In January 1915, he told the war council that no troops were available for the enterprise, and on February 20 he countermanded the sending of the Twenty-Ninth Division, but did not inform the first lord of the admiralty of the decision, so that three weeks of valuable time was lost.

The Gallipoli Campaign. On February 19 the Anglo-French fleet began to bombard the Turkish forts at the mouth of the Dardanelles and in a few days reduced them to ruins. But no troops were ready to co-operate in the attack, while the fleet acted so deliberately that a month passed before an attack was made upon the main defenses at the Narrows, a dozen miles up. The Turks were thus enabled to strengthen their defenses and to obtain more German gunners, and, when the attack was finally made on March 18, three of the vessels were sunk and others were damaged. Even then, had Vice Admiral de Robeck displayed the decision of a Nelson or a Farragut, he could have won through, for the Turks had nearly exhausted their heavy shells and could have offered little more resistance. But in this case, as in many others early in the war, the Allies displayed a caution that was to cost them bitterly in the future. It is hardly too much to say that if the Allied fleets had captured Constantinople at this time the war would have been shortened by at least two years.

After the failure of March 18 the Allies decided that a land force must be sent out. More valuable time was lost, and this time was put to good use by the Turks and their Teutonic allies. It was at first intended that Russian ships and troops should co-operate by attacking the Bosporus, and it was hoped that Greece might be induced to enter the war and send an army through Thrace. But early in May the Teutons launched a great offensive against Russia, and thereafter the Russians were too busily occupied at home to send the expedition; while in Greece the influence of King Constantine, a brother-in-law of Kaiser Wilhelm, balked the efforts of Premier Venizelos to lead Greece into the war on the side of the Entente.

It was not until April 25, more than two months after the first bombardment of the Turkish forts, that the Allies were ready to attempt a landing. About 45,000 troops were used in the effort, but unfortunately most of them were raw Australians and New Zealanders, men brave to rashness but not yet the effective soldiers the survivors later became; in addition, there were some French colonial troops. These last effected a landing on the Asiatic coast but were unable to hold their position and had to be withdrawn. In spite of determined Turkish resistance, the British troops managed to seize and hold positions at the tip of the Gallipoli peninsula and also at Gaba Tepe, farther up the coast on the same peninsula. Heavy losses attended all these efforts, and the landing parties were not able to do much more than hold their positions against the constantly increasing swarms of Turks.

Late in May a German submarine appeared in the Dardanelles, and in two days' time sank the British pre-dreadnought battleships *Triumph* and *Majestic*. Thereafter the Allied fleet was unable to lend as much assistance as hitherto. More troops were sent out from time to time, and in an attack made on June 4 more territory was won, but nothing vital was gained. For many weeks the troops continued to hold their positions, exposed to constant

fire from the enemy and suffering also from the ravages of disease. On August 4, after the arrival of heavy re-enforcements, a new landing was attempted at Suvla bay, and attacks were made from the other positions. The attempt at Suvla bay was deplorably managed, and immense losses were suffered without any corresponding advantages being gained. Farther south in the Gaba Tepe region—generally called the "Anzac" sector, from the initials of "Australian-New Zealand Army Corps"—gallant fighting almost won a great victory. A regiment of Gurkhas from India actually reached the top of Chanak Bahr, a ridge from which they could look down upon the Turkish forts at the Narrows. If this position could have been held, guns could have been mounted there that would have reduced the Turkish defenses, and the fleet could have passed through to capture Constantinople. But a supporting brigade lost its way, and the Gurkhas were finally driven from the ridge.

This failure doomed the enterprise. The Allies held their positions for months longer, but the entrance of Bulgaria into the war and the conquest of Serbia enabled the Teutonic allies of Turkey to come to her assistance, and it became clear that no hope of opening the straits remained. The Suvla Bay and Anzac positions were evacuated in December 1915 and that on the tip of the peninsula in the following January. Thus ended one of the most disastrous enterprises in the history of warfare. The Allied losses in killed, wounded, captured, dead of disease, and invalided home amounted to more than 230,000 men, the British losses alone being 198,000.

Under the pretext that Armenians were aiding the Russians, systematic deportations of these unhappy people were carried out by order of the Turkish government. Many Armenians were murdered outright, others died as a result of hardships and the brutalities of their captors, while great numbers of women and girls were forced into Turkish harems. In all, probably 700,000 Armenians perished.

Italy Declares War. The accession of Turkey to the Teutonic side was counterbalanced in the spring of 1915 by the entrance of Italy into the war. The old hatred of Austria still persisted in that country, and a strong desire existed to free the Italians who still languished under the Habsburg yoke. In extended negotiations Austria-Hungary offered to make certain concessions to Italy, but these fell short of meeting Italian demands, and Italy began hostilities against the dual monarchy on May 24, 1915.

Italy brought to the side of the Entente a navy that was considerably more powerful than that of Austria and an army that consisted of about 1,200,000 fully trained men, about 800,000 partly trained men, and about 1,000,000 untrained men that would be available for service. Owing to the mountainous character of the country along the border between the two nations, however, the Italians were long unable to bring their full strength to bear. They had first to conquer a part of the Trentino in order to guard their rear against a sudden attack from the north, and some weeks passed before they were able to undertake their main movement eastward toward Trieste. Desperate fighting took place along the line of the Isonzo river, and, though the Italians made some progress, the natural obstacles encountered aided the Austro-Hungarians so much that by the end of 1915 nothing decisive had been accomplished.

Upon the outbreak of the war, the British dominions rallied to the support of the motherland in a most remarkable manner. Canada, Australia, New Zealand, and India sent large forces to European battlefields, while troops from South Africa were mainly instrumental in the conquest of German Southwest Africa and East Africa. For the most part, however, the colonial troops at the beginning of the campaign of 1915 were comparatively untrained and hence lacked much of being the efficient fighters they later became. Great Britain's trained army had in large measure been sacrificed in the effort to check the Germans in the early months of the war, and the volunteers raised at home were, like the colonials, still comparatively raw men. Upon France, therefore, still fell the main burden of meeting the Germans on the western front, and, having suffered enormous losses, France was unable to produce an army adequate to driving the Germans out of their defensive lines. As for Russia, she had accomplished much, especially against Austria, and by her opportune invasion of East Prussia, disastrous though it proved, she had probably saved her allies in the west from destruction. But Russia also had suffered great losses, and her supplies of munitions were inadequate to her needs.

The Great Drive Against Russia. For the campaign of 1915 the Teutonic powers made great preparations; Germany especially, thanks to the care with which she had organized for war purposes, was able to display almost superhuman efforts. In this campaign the Teutonic leaders reversed their program of the previous year; accepting the defensive in the west, they launched a great offensive in the east, designed to free Austrian Galicia, to conquer Russian Poland, to destroy the Russian army, and thus to eliminate Russia from the war.

Marshal von Hindenburg was to attack Poland from the northwest; General von Mackensen with some German troops and aided by the Austro-Hungarians, who were now really under German direction, was to defeat the Russians in Galicia and then invade Poland from the south. And the direction of the campaigns everywhere was under control of the German general staff, at the head of which was General von Falkenhayn, who had succeeded General von Moltke after the German defeats on the western front.

On a comparatively narrow front near the Dunajec river in Galicia, von Mackensen concentrated hundreds of thousands of men and about 2000 guns. On the morning of May 2 the guns opened against the Russian line a devastating bombardment. After four hours the firing ceased, the infantry moved forward and easily broke through the Russian line, taking thousands of prisoners. Into the gap thus formed, von Mackensen poured immense forces, enlarging it and creating increasing demoralization among the enemy.

Weakened by their prodigious efforts of the last few months and far inferior to the Teutons in artillery, the Russians were unable to withstand the blows of this gigantic battering ram. With the power of an avalanche the Teutonic phalanx fought its way eastward and in a few weeks retook Przemysl and Lemberg and practically all of Austrian Galicia, together with immense quantities of booty and hundreds of thousands of prisoners.

Meanwhile, in the north, von Hindenburg had taken Libau and had overrun a large part of Courland. All was ready for the great campaign against Poland, whose position was compared to a nut in the grasp of a giant nutcracker. In defending Poland the Russians were aided by great fortresses such as Ossowetz, Novo Georgievsk, and Ivangorod; but they were handicapped by their lack of adequate supplies of artillery, shells, and other munitions. The war had already shown that infantry, no matter how brave, were practically helpless against an enemy that enjoyed a great superiority in artillery. By skillful use of their superiority in this respect the Teutons were able, despite some checks, to beat back the Russians on both sides of the great salient. Finally, after suffering enormous losses in killed, wounded, and prisoners, Grand Duke Nicholas, in order to save his whole army from capture, was forced to evacuate Poland. Warsaw was occupied by the victors on August 5, and the fortress of Novo Georgievsk fell on August 20. Some military observers expected that the

Russians would be able to make a stand on a line running through Brest-Litovsk, Osowiec, and Kovno, but Kovno was taken by storm, and the great retreat, the greatest in military history, had to continue. Grand Duke Nicholas retired from the Russian command, being sent to the Caucasus, where he later won laurels by victories over the Turks; and the czar himself assumed nominal command, the real direction, however, being exercised by General Alexieff. The Teutons took Vilna, but their efforts to capture Dvinsk and Riga were foiled by stiffening Russian resistance. The Russians even launched an offensive in Galicia and elsewhere along the southern front, and the Teutonic cause was given a severe check in that quarter. It had been supposed by many neutral observers that the Teutons would attempt to push on to Petrograd and Moscow, but this was not a part of their plan.

In this great campaign Russia had lost vast territories, and over a million of her soldiers had been killed, wounded, or taken. The disaster was staggering, but Russia stubbornly refused to listen to offers of peace. With the financial aid of her allies and with munitions furnished by Great Britain, France, and Japan, and by her own factories, she was able to make one more real campaign and to contribute thereby to the ultimate defeat of the Central Powers.

The Conquest of Serbia and Montenegro. The Teutonic victories in Russia made a profound impression throughout the world and particularly in the Near East. In October 1915 Bulgaria threw in her lot with the Central Powers and attacked Serbia from the rear. Greece was bound by treaty to go to Serbia's assistance in case of such an attack, but her pro-German king, Constantine, succeeded in driving from power Premier Venizelos, who wished to fulfill his country's treaty obligations. A strong army under General von Mackensen invaded Serbia from the north, recaptured Belgrade, and drove the Serbians southward before them. The allies of Serbia procrastinated as usual, and, too late, landed an army at Saloniki. Late in October the Bulgarian and Teutonic armies joined hands in eastern Serbia, and both Serbia and Montenegro were speedily conquered. Fragments of the defeated Serbian and Montenegrin armies succeeded in escaping through the mountains of Albania and were transported on Allied ships to Saloniki, Corfu, and other places. Much of Albania was overrun by the Teutons, but the complete conquest of the country was prevented by an Italian army. The Allies concentrated large forces at Saloniki and managed to retain that important strategic position.

Through the conquest of Serbia the Teutons opened a way by which to aid hard-pressed Turkey, and trains loaded with munitions were soon running to Constantinople. The Allied attempt to open the Dardanelles became a hopeless undertaking, and the Gallipoli peninsula was evacuated, as already related. In their rejoicings the victorious Teutons pictured the speedy completion of the Berlin to Bagdad railway. Oriental trade was to take the place of that destroyed by the blockade, the Suez canal was to be cut, Persia was to be overrun, India was to be invaded. But in the Near East, as elsewhere, the last word had not yet been said by the war god.

On the western front the deadlock that had begun after the repulse of the Germans in Flanders continued throughout 1915. In the second week of March, General French concentrated more than 300 cannon in front of the German lines in the region of Neuve Chapelle, and after the German positions had been subjected to a heavy bombardment, in which more shells were fired than in the whole of the Boer war, the British infantry charged and captured positions to a depth of about a mile on a front of three miles. The British were unable to follow up this initial success, however, and their losses were heavy, amounting to almost 13,000 men.

New Horrors of Warfare. Although the Germans made their main effort of this year in the east, they launched on April 22 a considerable offensive against the British lines in the neighborhood of Ypres. In this attack they made use of poison gas for the first time and so successfully that a French colonial division that was holding a position near Langemarck abandoned its lines and fled, leaving a gap in the line into which the Germans poured heavy forces. The situation was critical; there was danger that the Germans might effect a complete break through and throw the whole British army back in disorder against the sea. But a division of Canadian troops, although comparatively new to warfare, fought gallantly, and, despite the diabolical gas, succeeded in checking the German advance. The fame of the Canadian troops went round the world, nor was this the last of their brilliant exploits.

The use of poison gas in warfare was prohibited by international law, but this was only another instance of German "frightfulness." The sinking of the *Lusitania* came a fortnight after and merely increased the horror of the world at German methods of warfare. They had continued to mistreat the civilian population in the occupied portions of Belgium and France, and the horrors of their rule in Poland can never be adequately told. Their artillery had wantonly bombarded the cathedral of Reims and had practically ruined what by many people was considered the most beautiful building in the world. Their submarines torpedoed merchant vessels and destroyed the lives of hundreds, and ultimately of tens of thousands, of civilians, including women and children. In the early months of the war their Zeppelins and airplanes dropped bombs upon the city of Antwerp and other places, although this, too, was directly contrary to the rules of civilized warfare.

Unable to reach Great Britain by sea, they attempted to wreak their vengeance on the British by raids through the air. The German people had been led to believe that their Zeppelins would be able to accomplish great deeds against the British fleet, and, though this expectation had not been realized, they still looked forward with eagerness to aerial raids against England, and particularly against London.

As early as December 1914 two German airplanes flew up the Thames river, but they met a hot reception, and the body of one of the aviators was subsequently found floating in the river. On the night of the 19th of the following month dirigibles dropped bombs on Yarmouth, King's Lynn, and other places on the east coast, killing four persons and injuring others. In the middle of April there were two big raids, one over the Tyne district and the other over places a short distance east of London. Subsequently there were raids on Ramsgate and Southend, and finally, on the night of the last day of May, the Zeppelins reached London and dropped nearly a hundred incendiary bombs, which destroyed considerable property and killed four persons. Early in June there were two raids on east coast towns, in the last of which 26 people were killed and 40 injured.

The Germans pretended that great damage to military and naval works resulted from these raids, but, in reality, they were barbarous attacks upon unprotected cities, and nearly all the victims were civilians, a large number of them women and children. The Zeppelins necessarily operated from a great height, and, owing to the darkening of the towns when an attack began, the Germans had very little idea as to where they dropped their bombs. For a time the raids were a very safe sport for the raiders, but on June 7 Lieutenant Reginald Warneford, a Canadian aviator, caught one of the returning Zeppelins near Ghent in Belgium and dropped a bomb upon it that blew it up. Every one of the 28 members of the crew lost their lives. Notwithstanding this disaster, the Germans carried out several other raids before the end of the year.

In legitimate warfare, dirigibles proved of comparatively little value, but the use of airplanes expanded with astonishing rapidity. New types of planes were developed by the various belligerents, and the exigencies of warfare soon revealed needs in the air not unlike those upon the water. Within a comparatively short time there were fighting planes, observation planes, bombing planes—a type for each particular kind of work. By far the most important use to which planes were put was that of scouting and observation work, that is, the spying out of the location of the enemy's batteries, his movement of troops, and the directing of artillery work. Considerable use for observation purposes was also made of balloons. At first the only weapons the aviators carried were rifles or pistols, but soon many of the planes were armed with machine guns and ultimately some of the largest carried small cannon. Battles between airplanes became increasingly common, and these battles, fought often at great heights, formed the most spectacular feature of the World War. In course of time whole squadrons of planes would set out on raids; ultimately, battles in which scores of planes were engaged became common. Types of aircraft improved so rapidly that a plane that was the last word in aircraft construction one day might be wholly obsolete a few months later.

The Deadlock on the Western Front. During the greater part of the campaign of 1915 the French and British attempted no great offensives but confined their efforts to what Marshal Joffre called "nibbling." In April the French endeavored to erase the salient which the invaders had driven to St. Mihiel, south of Verdun, but after weeks of bitter effort the French had to admit defeat. On May 9 they began a more determined effort against a powerful series of German trenches and fortifications north of Arras, known as "The Labyrinth," and ultimately succeeded in capturing these works.

The comparative inaction of the French and British on the west front in the spring and summer of 1915 was due partly to the fact that the British army was not yet large enough to attempt operations on a grand scale but partly also to lack of sufficient shells, particularly of high-explosive shells. It had become apparent that only by the expenditure of shells on a scale hitherto undreamed of could the Allies hope to break the German lines. The French were handicapped in the production of shells by their loss to the enemy of some of their chief industrial districts, while in Great Britain production moved slowly because of lack of sufficient machinery and still more because of the slowness with which the military authorities at home realized the need of shells in vast numbers. In May, however, a coalition ministry was formed, and David Lloyd George, who had shown great skill as chancellor of the exchequer, became the head of the new department of munitions. He threw himself with characteristic energy into the work of producing guns and shells, for, as he truly said, "What you spare in money you spill in blood."

Late in September the British and French began the most serious offensive they had yet undertaken. Many parts of the German lines from Switzerland to the North Sea were subjected to bombardments, but the Allies ultimately concentrated most heavily upon a sector in Champagne, upon a second in Artois, and upon a third near Ypres. This cannonade, or "drum fire" as it was coming to be called, exceeded in fierceness anything the world had yet seen, and in places it was continued, without intermission, for 72 hours. In addition, the Allies, in imitation of their enemies, made considerable use of gas. On the morning of September 25 the Allies delivered assaults in great force in each of the sectors named. The German front line had been so badly battered that in most places it was mastered with comparative ease. Beyond, however, the Germans held with great determination, and for days a bloody confusion of attack and counter-attack followed. Ultimately the Allies won and held some ground near Ypres and more in Artois, while in Champagne, where the main attack was made, the French took two lines of German trenches on a front of seven miles and to a depth of about two miles. One brigade actually broke through the last defenses, but its success could not be followed up. The British captured over 3000 prisoners and about 25 guns; the French, 25,000 unwounded prisoners and 150 guns; and the total German losses were estimated by the French at 120,000. The Allied losses, however, were enormous and probably exceeded those of the Germans. The offensive had failed to accomplish all that had been hoped for, and pessimists who had been saying that the Germans could never be driven from their lines were more than ever confirmed in their view. Subsequently Lloyd George declared that with three times as many shells twenty times as much could have been accomplished.

For months thereafter, though there was much sporadic fighting in which both sides lost heavily, neither side attempted to break the deadlock in the west. During the winter of 1915-16 all the belligerents feverishly prepared for the coming struggles of 1916. In Great Britain a mighty campaign was waged for recruits, and by spring there were four million men under arms beneath the Union Jack. Vast sums were expended by the Allies in obtaining munitions of war in neutral countries, especially in the United States, where the manufacture of war supplies attained unheard-of proportions. The Central Powers were able to obtain some war materials from neighboring neutrals, especially iron from Sweden, but, prevented by the blockade from trading with the United States, they protested that our supplying their enemies with munitions constituted a violation of neutrality, and, whenever possible, their secret agents blew up American munition factories and placed bombs on ships.

Belgian Relief. Early in the war it became apparent that millions of people in the conquered portions of Belgium and France would starve if something was not done to provide them with food. The Central Powers had not the food to supply their own needs and, in fact, seized much of what little their victims had. Largely through the efforts of Americans, there was presently formed the Commission for Relief in Belgium, and Herbert C. Hoover, an American of great tact and executive ability, became the director. Up to America's entrance into the war the commission expended about $250,000,000 in relief work in Belgium and northern France. About ten millions of this money was raised in the United States; about twenty millions by private subscription in other countries; the rest was loaned to Belgium by Great Britain and France. After the United States became a belligerent the work was continued under Spanish auspices. Large sums were also expended in other countries. Millions of lives were undoubtedly saved, but, despite all that could be done, millions of other persons perished, especially in Poland, Serbia, and Armenia.

The Drive against Verdun. At the beginning of the campaign of 1916 the Germans again turned their main attention to the western front. Resolved to "bleed France white" and force her to accept peace, they launched late in February a tremendous offensive against the great armed camp of Verdun. After a preliminary bombardment, which again set a new record in the number of shells used, the Germans launched infantry attacks that swept over the French front lines, which had been practically leveled by the avalanche of high-explosive shells, and captured many thousands of prisoners. The blow was so heavy that for a time it seemed that the French must give up Verdun, but ultimately General Joffre and his advisers decided to hold the place at any cost, partly because to lose it would have a depressing effect upon Allied morale.

For months thereafter the bitter battle continued. Each side made use of thousands of cannon, many

of them of the largest calibers known to warfare. Attack was succeeded by counter-attack; tens of thousands, even hundreds of thousands, fell on each side; Verdun was battered until it was little more than a heap of ruins. Week after week the Germans forged slowly forward against the bitterest resistance of the French, whose watchword was "They shall not pass." Night and day the roar of the great guns was practically incessant, and on each side re-enforcements were brought up to be fed into the fiery furnace. Late in June the Germans, having captured Douaumont, Vaux, and other outer fortresses, made a supreme effort to break down the French resistance. They took and, after repeatedly losing it again, they held Fort Thiaumont, and early in July they got within a thousand yards of Fort Souville, the key to the French position, only three miles from Verdun. But events elsewhere now compelled them to abandon the attempt, and thus ended one of the bloodiest battles in all human history.

In the following October and December, in two carefully prepared attacks, in which artillery work synchronized in wonderful harmony with the infantry advance, General Nivelle recaptured almost all the ground that had been lost, and took more than 16,000 Germans.

Late in April, while the attack against Verdun was at its height, Great Britain was startled by the outbreak of a rebellion in Ireland. An attempt was made to land arms in Ireland from a German vessel flying the Norwegian flag, but the attempt failed, and the vessel was sunk by her own crew. At the same time Sir Roger Casement, an Irishman who had been in Germany, landed from a submarine that had escorted the munition ship, but he was captured, taken to London, and was ultimately hanged for treason. On the day after Easter the Sinn Feiners, as the revolutionary party was called, rose in various parts of Ireland. They were speedily put down, though in Dublin it was accomplished only after considerable loss of life and much damage to property. More than a dozen of the rebel leaders were condemned to death and were executed, while others received prison sentences.

The Battle of Jutland. On the last day of May the main fleets of Great Britain and Germany at last met in battle. Shortly after two o'clock on that day a portion of the British fleet, consisting chiefly of six battle cruisers and four swift superdreadnoughts of the *Queen Elizabeth* class, sighted, in the North Sea to the westward of Jutland, Vice Admiral von Hipper's German squadron consisting of five battle cruisers and other smaller vessels. At this time the main British battle fleet, commanded by Admiral Jellicoe, was about seventy miles to the northward. The German cruiser squadron constituted the advance guard of the main German High Seas Fleet, which was about sixty miles to the southward. Beatty instantly sought to attack von Hipper's squadron, which turned southward toward the main German fleet. A running fight ensued, the range at which fire was first opened by the heavy ships being approximately nine miles. Two of the British battle cruisers, the *Indefatigable* and the *Queen Mary*, hit by heavy shells, blew up, causing the death of more than a thousand men and diminishing the size of the British navy by about 46,000 tons. Beatty then had only four battle cruisers to von Hipper's five, but his four swift superdreadnoughts drew up and with their powerful long range guns inflicted fearful punishment on the Germans. Presently the main German fleet was sighted, and Beatty turned back northward, hoping to draw the Germans into battle with the main British fleet, which had been informed by wireless of what was happening and was moving southward as fast as steam could drive it. The Germans pursued and, in the running fight that followed, von Hipper's flagship, the battle cruiser *Luetzow* of 28,000 tons, received such injuries that von Hipper had to transfer his flag to the *Von Moltke*. The *Luetzow* subsequently sank.

A little after six o'clock Jellicoe's fleet was sighted by Beatty's cruisers. The van of Jellicoe's fleet, consisting of a cruiser squadron, rashly threw itself into the fight at comparatively short range, and the battle cruiser *Invincible*, of 17,250 tons, and other smaller vessels were sunk by the German shells. At this juncture, however, the main British Grand Fleet came into action, and the tremendous fire from the great guns of the British dreadnoughts inflicted immense damage upon the inferior German fleet. Had a few hours of daylight remained, probably few of the main German ships would ever have reached a home port, but the light was already failing and night was at hand. Realizing his peril, Admiral von Scheer sent his destroyers against the enemy, and all the German ships near the front of the line launched their torpedoes at the British. The larger British ships were forced to sheer away, and, before they could join battle again effectively, darkness had fallen. In the night much confused fighting took place, especially between destroyers. The British commander sought to place his fleet between the Germans and their home ports, but in the darkness the Germans managed to escape.

Both sides claimed the victory. The British admitted a loss of three battle cruisers, three armored cruisers, and eight destroyers, with a total tonnage of 114,110. The Germans at first denied having suffered any losses of consequence, but it is now known that they lost one battle cruiser, a small battleship, four light cruisers, and five destroyers, with a total tonnage of 63,015. Many of the German ships were also so badly battered that months passed before they could be made ready for service again. In a sense, this fight, the mightiest in all naval annals, was a drawn battle, but the advantage lay with the British, for they continued to hold command of the sea, and the German fleet never again ventured to challenge their supremacy. It is beyond question, however, that the Germans fought skillfully and that they deserved praise for managing to inflict upon a superior force greater loss than they received and also for their success in escaping from a dangerous situation. The German ships showed themselves able to withstand heavier battering without sinking than did the British ships, while the German shells had a delay-action fuse that ensured the shells bursting inside the armor of the British ships instead of outside, as was often the case when British shells struck thick armor. The German long range, high angle fire was also very effective, especially against the British cruisers, whose decks had insufficient armor protection.

Only seven days after the battle of Jutland, or Horn Reef, as the great sea fight was called, the British armored cruiser *Hampshire*, which was carrying Secretary of War Kitchener to Russia, struck a German mine off the coast of one of the Orkney islands, and all on board except eleven men perished. Kitchener's tragic death created a great impression throughout the world, for, though it was beginning to be apparent that he had made serious mistakes in his conduct of the war office, he still enjoyed the confidence of most Englishmen. His great work was the raising and training of the new British army, which was soon to strike its first heavy blow. To fill the vacancy created by his death the government turned to the most energetic British statesman of the day, David Lloyd George.

The Italian and Russian Fronts in 1916. In the middle of May 1916, the Austro-Hungarians launched in the Trentino a great offensive which they hoped would result in their breaking through into the Lombard plain, the capture of Milan and Venice, and the enveloping of the Italian main army along the Isonzo front in a great cataclysmic disaster. In this offensive they used about 2000 cannon, many of them of large caliber, and the preliminary bombardment was so terrific that, when the infantry moved forward on May 15, they won much ground and captured thousands of Italians. The victors systematically followed up this initial

success and on the 18th succeeded in crossing the frontier into Italy. By the end of the month they had taken two or three hundred cannon and over 30,000 prisoners and had advanced so far that the whole Italian army was in peril.

Once more, however, the Russians made an effective diversion in behalf of their hard-pressed western allies. Under the leadership of General Brusilov, the Russians on June 2 began a heavy bombardment along much of the southern half of the eastern front. After two days of artillery preparation the Russian infantry "waves" "went over the top," and in two days they captured 25,000 prisoners and great numbers of cannon. On the 7th they took the great fortress of Lutzk with more than 10,000 prisoners, and three days later the town and fortress of Dubno. The whole Austrian line in the east crumbled, Bukowina was overrun, and in a short time the number of prisoners captured by the Russians passed 100,000. The dual monarchy had to suspend its drive against Italy and hurriedly transport troops from that front to meet the victorious Muscovites. Germany also had to send aid to her endangered ally, and this caused a slackening in her own offensive against Verdun. For many weeks the Russians sought to take Lemberg and Kovel, but by throwing great forces into the fight the Germans were able to foil the Russian effort, though only after enormous losses on both sides.

Thanks to this opportune Russian diversion, the Italians were able to take the offensive in the Trentino and soon regained most of the ground they had lost. Throughout the year they continued to pound away at the almost impregnable Austrian defenses in the Isonzo region. Early in August they captured Gorizia with 15,000 prisoners, and for a time it appeared that they might be able to sweep on to Trieste and even break through the mountains into the plains and strike at Vienna. But the opposition they encountered proved too strong and presently a state of virtual deadlock was again reached.

The Battle of the Somme. For months the British army in France, now under the command of General Haig, had been systematically preparing to launch a great offensive. When the German attack on Verdun began, Haig, although not yet ready, offered to attack at once, but Joffre, though hard pressed, told him to wait until he was better prepared; instead, the British took over many miles of front in Artois, thus relieving French troops for use at Verdun.

On June 24 the British artillery began a terrific bombardment of the German lines, and continued it until the morning of July 1, when British and French infantry attacked on a front of over twenty miles in the region of the Somme river. The French carried the German first line all along their front, dug themselves in, and steadily smashed their way forward toward their objective, the town of Peronne. In ten days they captured 12,000 prisoners and 85 guns. In places, the British were held up by the German fortifications, but, in spite of enormous losses, they continued to attack, and by July 6 had captured many fortified villages and other strong points with 6000 prisoners.

Thus began the stupendous conflict known as the battle of the Somme. The Germans brought up hundreds of thousands of men and thousands of guns to check the drive. For weeks and months the offensive continued. To pound unceasingly was the Allied policy, and their attack reminded the observer of the mighty blows of a steam hammer. After winning a position the Allies would consolidate it and would bring forward their artillery in order to bombard the next strong point or line of trenches they desired to take. The Germans themselves concentrated an immense number of guns and rarely allowed a position to pass from their hands without making counter-attacks. Aloft, hundreds of battles were fought for the control of the air, for it was vitally necessary for effective artillery work in so flat a country to have aerial observers to report the fall of shells, so that the aim of the guns could be corrected. The expenditure of shells exceeded even that at Verdun, and the country for miles and miles was transformed into a barren wilderness of shell craters. In an attack on September 15 the British for the first time made use of "tanks,"—armored cars mounted on caterpillar tractors. The smaller tanks were armed only with machine guns; the larger ones, with small pieces of artillery, as well as with machine guns. The tanks proved able to move through barbed wire entanglements, to cross trenches, to push down walls and even trees, and were especially helpful in destroying machine gun "nests." They spread terror among the Germans and proved, on the whole, so successful that they assumed greater and greater importance as the war progressed, and they ultimately became a main factor in the final decision.

Late in November the coming of wet, wintry weather brought the great conflict to a pause. In the course of it the Allies had captured considerable territory and over 73,000 Germans, besides more than 300 guns and much other war material. Hundreds of thousands of other Germans had been killed or wounded. The Allied losses, however, probably reached half a million, the larger share falling upon the British, who had borne the brunt of the offensive. Although they had not effected a break through nor forced the Germans to make a general retreat, the Allies contended that they had worn down the German strength and had paved the way for later victory. As the advantage of attrition lay upon the side of the more populous Allies, there was an element of truth in this claim.

The Defeat of Rumania. Meanwhile Rumania had entered the war on the side of the Entente. On August 28, 1916, she declared war against Austria-Hungary, and hostilities with the other Central Powers soon followed. At first the Rumanians won considerable successes in Transylvania, but they were not sufficiently supported by their allies, and a movement northward from Saloniki was not pushed vigorously, perhaps because of fear that Greece would attack the Allied army in the rear. Bulgarian, Turkish, Austro-Hungarian, and German forces, led by such redoubtable generals as von Mackensen and von Falkenhayn, attacked Rumania from the north, west, and south, captured the capital, and overran two-thirds of the country. Ultimately, powerful Russian re-enforcements arrived, and the invaders were finally checked on a line running along the lower Sereth river and thence northeastward to the Carpathians. By these victories the Central Powers won large stretches of rich agricultural lands and also a great oil producing region. The retiring Rumanians and their allies destroyed great quantities of grain and wrecked much of the machinery used in oil production, but during the remainder of the war the Teutons were able to draw from Rumania large quantities of food and much gasoline and petroleum to eke out their scanty supplies.

Throughout 1916 and 1917 the Central Powers, by their harsh treatment of conquered populations, by their submarine outrages, and by their aerial raids against unfortified towns, continued to arouse horrified protest in neutral countries. Their aerial raids, however, became increasingly dangerous to those taking part in them. Repeatedly Zeppelins were brought down over England. The last Zeppelin raid of consequence took place on the night of October 19, 1916. Out of a dozen of the monster craft, five were brought down, while others were damaged. It was clear that the lighter-than-air airship was a failure in warfare, and thereafter the Germans made use almost exclusively of airplanes. For a long time the Allies refrained from bombing German cities, but finally, in the autumn of 1917, they were forced to adopt a policy of retaliation, and during the next twelve months scores of German cities were repaid, with interest, for the horrors that had been perpetrated in England and France.

The Rumanian fiasco created much dissatisfaction in Allied countries and was instrumental in bringing about cabinet changes in both France and Great Britain. In the latter country there had long been a growing feeling that Asquith lacked the decision and energy that were requisite in a prime minister in such a crisis, and toward the end of the year he was forced to resign. He was succeeded by that bundle of dynamic Welsh energy, David Lloyd George. In the same period both France and Great Britain created war councils in the hope of securing better conduct of war affairs. In France, General Joffre, worn out by the burdens he had borne, resigned the chief command and was succeeded by General Nivelle, to whose success in recapturing the ground lost near Verdun reference has already been made.

Peace Discussions. The Central Powers made the most of their Rumanian victories, both to encourage their own people and to impress their enemies with the idea that Teutonic arms were invincible. On December 12, 1916, they created a world-wide sensation by announcing a willingness to enter into peace negotiations, but their language was vainglorious, and, though no terms were mentioned, it was clear that they would expect large concessions. Lloyd George and other Allied leaders made statements in which they declared their unwillingness to treat unless the Central Powers were ready to make reparation for the past and furnish adequate security for the future. In many quarters the Teutonic proposal was characterized as a "sham proposal" and a "war maneuver." In their statement the Central Powers had disclaimed "before humanity and history" responsibility for the continuance of the war, and it is now clear that they intended, in case the peace effort failed, to make it an excuse for a resumption of their campaign of submarine "frightfulness" against merchant ships.

On December 18, President Wilson, in a note to all the belligerents, asked them to state the terms upon which the war might be concluded. The Allies replied by giving specific terms including the restoration of Belgium, Serbia, and Montenegro, the evacuation of invaded territories, and the expulsion of Turkey from Europe; but the reply of the Central Powers was evasive and general, and did little more than propose the speedy assembling of a peace conference. On January 22, President Wilson delivered before the Senate a homily on world peace and the methods of obtaining it. He favored the creation of a "League of Peace" but explained that the existing war must first be ended. There must be "a peace without victory," for "only a peace between equals can last." There must also be "freedom of the seas," limitation of armaments, and avoidance of "entangling alliances."

The United States Enters the War. Nine days later the German government suddenly announced that the next day they would resume the use of unlimited submarine warfare against merchant ships. "Barred zones," into which even neutral ships would not be allowed to enter, were created in the Mediterranean, off the western coast of France, and around Great Britain; but, as a special concession, the United States was to be permitted, under certain restrictions, to send one ship a week to Falmouth in southern England.

In the words of Gerard, the American ambassador to Berlin, "The Germans believed that President Wilson had been elected by a mandate to keep out of war at any cost and that America could be insulted, flouted, and humiliated with impunity." For two years they had cajoled the American government with promises that had frequently been broken and that were now completely swept aside. They expected that the United States would not go beyond windy protests or breaking diplomatic relations. Furthermore, they knew that even if the United States went to war it was unprepared and that more than a year must pass before America could become a real factor in the fight on land. Within that time they hoped to win the war by bringing Great Britain to her knees through the use of submarines.

Greatly shocked by the turn affairs had taken, President Wilson, after three days' deliberation, decided to break off diplomatic relations with Germany, and this was done on February 3. In explaining his course before Congress he declared that he could not believe that Germany would carry out her ruthless naval program, but that, if she did so and American ships and American lives were indeed sacrificed, he would again appear before Congress and ask for means to protect "our seamen and our people in the prosecution of their peaceful and legitimate errands on the high seas."

Despite this implied threat, Germany persisted in her lawless course, and her submarines sank large numbers of enemy and neutral ships, often with great loss of life. Some violations of American rights soon occurred, though none of so clear-cut a character that the president chose to consider it an "overt act." On February 26 he again appeared before Congress and announced that he deemed it desirable for the United States to adopt an attitude of "armed neutrality," and he asked Congress to give him express authority to arm American merchantmen. The same day word reached Washington that as a result of the sinking of the British passenger ship *Laconia*, torpedoed without warning off the Irish coast, three Americans, two of them women, had lost their lives. A few days later an intercepted dispatch was published which showed that Zimmerman, the German foreign minister, was seeking to stir up Mexico and Japan to attack the United States. A bill empowering the President to arm merchantmen and appropriating $100,000,000 for this and kindred purposes passed the House by 403 to 13, but in the Senate a small number of pacifists and pro-Germans filibustered against the measure, and the session closed before a vote could be taken.

Early in March the President called the new Congress to meet in special session on April 16, and on March 12 he announced that, without specific authorization, he had decided to place naval guns and crews on merchantmen sailing to the war zone. The instructions to the crews were to fire at German submarines on sight.

Meanwhile the submarines had been working great havoc. Neutral ships, hospital ships, Belgian relief ships, even six Dutch grain-laden vessels whose safety the Germans had guaranteed, were indiscriminately torpedoed and sent to the bottom. The Germans claimed that during February they had sunk 292 hostile and 76 neutral ships of a total gross tonnage of 781,500. The British admitted a total loss of only 490,000 tons, but even these figures were startling, and worse was to come in the next two months. It was clear that the situation was full of dire peril to the Allies and even to the United States.

In the third week of March it became known in the United States that three American ships had been torpedoed and sunk and that American lives had been sacrificed. By this time President Wilson realized that his policy of "armed neutrality" did not meet the needs of the case, and he therefore summoned Congress to meet two weeks earlier in order "to consider grave matters of international policy." Pacifists and pro-Germans made a last effort to keep America out of the war but failed. The president appeared before Congress on the evening of its assemblage, April 2, and delivered a war message. He stated that the recent course of the German government constituted "a warfare against mankind." Armed neutrality had proved ineffectual, and he asked Congress to recognize that war had been thrust upon the United States by the acts of the German government and to take the

necessary steps to force the German government to terms and end the conflict. Resolutions to that effect passed the Senate on the night of the 4-5th of April and the House on the early morning of the 6th. The same day, the president signed the resolutions, and America and Germany were formally at war.

Relations with Austria-Hungary had long been strained, and in September 1915 the United States had demanded and secured the recall of Constantine Dumba, the Austro-Hungarian ambassador, for attempting to stir up strikes in American munition factories. Diplomatic relations were severed by the dual monarchy on April 8, but war was not formally declared until the 7th of the following December, the declaration being made by the United States. Turkey severed relations on April 17, but a state of war was never declared. Diplomatic relations between the United States and Bulgaria were continued throughout the conflict.

American Preparations. The Central Powers tried to make light of America's entry into the conflict, but it greatly heartened the Entente Powers and put on their side the resources of potentially the most powerful nation in the world. Furthermore, it encouraged several other nations, such as China, Brazil, Panama, Cuba, and Bolivia, to break relations with Germany or to declare war against her.

Commissions from Great Britain and France speedily visited the United States to arrange plans of co-operation. The British commission was headed by Foreign Secretary Balfour; the French, by ex-Premier Viviani and Marshal Joffre. Both commissions were greeted with great enthusiasm in their tours about the country. Commissions from other Entente countries later visited the United States.

Within less than three weeks after the declaration of war Congress appropriated seven billion dollars for war purposes. Subsequently other immense appropriations were made. A policy of advancing loans to our Allies was at once adopted, and by the close of hostilities about eight billion dollars had been so advanced. In May, Congress passed and the president signed a Selective Service bill, and under this and subsequent extensions all male persons not alien enemies, between the ages of 21 and 45, were required to register. Certain classes of persons were expressly exempted from service, but, from among those remaining, about 3,000,000 soldiers and sailors were obtained. Some hundreds of thousands, also, volunteered.

To obtain money with which to conduct the war, Congress enacted special tax legislation and authorized the issuance of certificates of indebtedness, war savings certificates, better known as thrift stamps, and government bonds. By far the largest sum was realized from the sale of bonds, of which five great issues were floated. The first liberty loan was announced on May 14, 1917. It bore interest at 3½ per cent payable semiannually. It was for $2,000,000,000. Over 4,000,000 persons subscribed for a total of $3,035,226,850, but only the original amount was allotted. The second liberty loan, $3,000,000,000, was offered on the 1st of the following October; the rate was fixed at 4 per cent; nearly 10,000,000 persons subscribed a total of $4,617,532,300; and the government accepted one-half the excess. A third liberty loan of $3,000,000,000 was offered on April 6, 1918, at a rate of 4¼ per cent; there were over 18,000,000 subscriptions for a total of $4,176,516,850. A fourth liberty loan was floated in the autumn of 1918 in the midst of Allied victories; the offering was for $6,000,000,000 at 4¼ per cent; there were 22,000,000 subscriptions for a total of $6,989,047,000, making it the greatest financial operation of the kind in the history of the world. Soon after the armistice was signed a fifth loan, called the victory loan, was floated; the sum asked was $4,500,000,000; there were about 12,000,000 subscriptions for a total of $5,249,908,300.

As no adequate preparations had been made for war, the country was faced with the greatest task of improvisation in its history, and it became necessary to pour out money in floods hitherto undreamed of. Between April 5, 1917, and June 30, 1919, 35 billion dollars were expended, which was several billions more than had been spent for all purposes from the beginning of the Revolution down to 1917. Of this sum, however, nine billions were advanced to our allies in the conflict. The production of artillery, rifles, machine guns, warships, merchant ships, airplanes, and all other kinds of munitions of war was undertaken on a vast scale. In some lines commendable progress was made; in others there were grave shortcomings; and scandals connected with the production of airplanes and other articles aroused great indignation. Owing to slowness in production, it was necessary to obtain from the French and the British most of the machine guns, airplanes, tanks, cannon, shells, and poison gas used by our forces.

Work of the American Navy. Shortly before the United States entered the war, Vice Admiral William S. Sims, a highly talented officer, was sent to England to arrange co-operation of American naval forces with those of the Allies. On his arrival in London he found a very pessimistic spirit prevailing, owing to the activities of the submarines, which were sinking so many vessels that, in secret, many Britons were in a state of despair. Sims later charged that the American naval department was slow to carry out his recommendations and to get our forces into the fight against the U-boats, and he declared that procrastination in this matter helped to prolong the war. However, the American navy took over the work of patrolling a large part of the Atlantic, thus freeing British ships for use in the North Sea and in waters close at home, and early in May 1917 six destroyers were sent to British waters, and soon after their arrival took up antisubmarine work. Later their number was considerably increased, and many cruisers, converted yachts, and specially constructed submarine "chasers" were also sent abroad. In December 1917 a squadron of four dreadnoughts (a fifth was later added) was sent over under command of Rear Admiral Hugh Rodman and joined the British Grand Fleet, being present at the final surrender of the German fleet. Two other battleships were sent over in the early summer of 1918 and operated from a base in Ireland, helping to protect convoys and to guard against enemy raiders. An immense amount of work was done in convoying ships across the Atlantic and through the war zone. Within the war zone, however, according to Admiral Sims, the American antisubmarine craft engaged amounted to only about 3 per cent of the total Allied effort.

The greatest loss suffered by the American navy during the war was the sinking of the armored cruiser *San Diego*, which struck (July 1918) a German mine laid by a submarine off Long Island. One destroyer, the *Jacob Jones*, was sunk (December 6, 1917) by a submarine in European waters, and another destroyer, the *Cassin*, was hit (October 16, 1917) by a torpedo but managed to reach port. Some smaller patrol craft also were sunk by submarines, and two destroyers, the *Chauncey* and the *Shaw*, were lost in collisions. A considerable number of armed merchant vessels and transports were sunk in the course of the war, though in some instances vessels of these classes succeeded in beating off their assailants.

On November 24, 1917, the destroyers *Fanning* and *Nicholson* damaged a submarine so badly with depth bombs that the submarine came to the surface, and the crew surrendered. The German captain, however, opened the sea valves, and the submarine sank before it could be captured. In several other conflicts of American craft with U-boats it was practically certain that the submarines were destroyed, while in many others they were probably damaged or destroyed.

Through American initiative, and mainly through American efforts, a great mine field was laid between the coast of Norway and the Orkney islands, in order to bar the egress of German submarines from the North Sea by the northern route. In all, about 70,000 mines were planted, of which about four-fifths were American. This mine barrage made the task of German submarines' getting out into the Atlantic exceedingly dangerous, and it is believed that several U-boats were destroyed in attempting to pass through.

American Troops sent to France. As the American regular army, on April 1, 1917, numbered less than 128,000 men, it was clear that at least a year must pass before American troops in considerable numbers could play a part in the war. However, the French commission urged that at least some American troops should be sent to France as speedily as possible for the sake of the effect on Allied morale, and the Washington government decided that it should be done. To command the overseas force, the president selected Major General John J. Pershing, the officer who had led the expedition into Mexico after Villa. General Pershing and his staff sailed from New York harbor late in May and reached Liverpool on June 8. In both England and France he was received with high honors. Late in June the first contingent of troops landed at St. Nazaire, and on the 4th of July a battalion marched through Paris, being greeted with indescribable enthusiasm. The American troops were soon transferred to training bases in Lorraine, and General Pershing and his assistants settled down to the stupendous work of preparing for American participation on a grand scale.

French and British Offensives of 1917. During the first two months of 1917 the French and British on the western front made great preparations for an offensive which they intended to launch as soon as the weather would permit. Aware of what was impending, General von Hindenburg, who in the previous summer had succeeded von Falkenhayn as supreme German commander, systematically evacuated over a thousand square miles of occupied French territory in the region of the Somme, and fell back to an immensely strong zone of defense that came to be known as the Hindenburg Line. In their retirement the Germans reduced the region virtually to a desert by destroying the towns and villages, blowing up the bridges, cutting down the fruit trees, and even poisoning the wells.

By this retirement the Allied plans were interfered with, but the offensive was not given up. On April 9 the British launched a great attack in the region where the new German line joined the old, namely, about Lens and Arras. Canadian troops carried Vimy Ridge, a position of great importance, and much progress was made elsewhere; by the end of April nearly 20,000 Germans and nearly 300 cannon had been captured. On April 16 the French, now commanded by General Nivelle, struck a tremendous blow against the German line in front of Reims. By the end of the month the French had taken over 20,000 prisoners and nearly 200 cannon, but they had failed to compel a general German retirement and had suffered such immense losses that the offensive was given up. General Nivelle was succeeded by General Petain, while General Foch became chief of staff.

In the following October the French struck a heavy blow in the region northeast of Soissons, taking over 8000 prisoners and 70 cannon, and forcing the Germans to evacuate the Chemin des Dames. On June 7 the British, with some French assistance, launched a great offensive against the German positions in Flanders. For months the guns thundered unceasingly, and division after division of brave men were thrown into the shambles by either side. No bitterer battle was fought during the whole war, and on either side the losses mounted into the hundreds of thousands. When autumn rains finally put an end to the titanic conflict, the British had captured over 30,000 prisoners, had taken Messines Ridge and all except the northern part of Passchendaele Ridge, and had driven a salient into the German lines from which, it was expected, they could launch their offensive in 1918. The main Allied gain, however, lay in the fact that the German losses in this great Flanders battle contributed to the final breakdown the following year.

The Russian Revolution. Allied hopes for final victory in 1917 had been frustrated by events in Russia. In March a revolution broke out, which resulted in the deposition of the czar and the establishment of a republic. Moderate revolutionists, who favored continuing the war, at first managed to control, but the Soviets, or councils of workmen's and soldiers' delegates, who desired more radical measures and a speedy peace, constantly increased in power. German secret agents cunningly took advantage of the situation to stir up strife and to break down the morale of the Russian army. Through the eloquence of Minister of War Kerensky the Russian forces were galvanized in July into undertaking an offensive in Galicia. At first they carried all before them and took thousands of prisoners, but they speedily became demoralized, and what promised to be a victorious offensive was speedily transformed into a disgraceful rout. The Germans followed up their victory by capturing the city of Riga, with many prisoners and immense booty. For a time Kerensky held control as a virtual dictator, but in November the radical revolutionists, or Bolsheviki, under such leaders as Lenine and Trotzky, seized control. They not only carried through a complete economic and social revolution but, on December 15, 1917, signed an armistice with the Central Powers. The Russian armies were now completely demoralized, and, in the following March, Russia was compelled to accept the humiliating treaty of Brest-Litovsk. In the following July the captive czar and all his family were barbarously murdered at Ekaterinburg in the Urals by the Bolshevists. The withdrawal of Russia from the war forced Rumania to make peace on harsh terms.

The breakdown of Russia enabled the Germans, even in 1917, to concentrate most of their forces on the western front. As America was not yet ready to take part in the war in a large way, it became increasingly apparent, especially after the failure of Kerensky's effort, that the Teutons would probably once more be able to seize the initiative in the west. Large forces of men and guns were transferred to Flanders to hold the British in check, and a grand drive was prepared against Italy.

The Italian Disaster. During the spring, summer, and early fall, the Italians had continued to make slow progress, despite bitter resistance and great natural obstacles, and had managed to force their way across the Isonzo and to capture several strong Austrian positions. They had failed, however, to take sufficient precautions against a counter-attack. On October 24 the Austro-Hungarians and some German divisions launched a sudden offensive against their unwary foe. German shock troops broke through the Italian lines in the region of Caporetto. To escape complete disaster the whole Italian line in the east had to retreat, and in many places the retreat degenerated into a disastrous rout. By November 1 Berlin claimed the capture of a total of 180,000 prisoners and 1500 guns. Venice, Milan, and the whole of the Lombard plain were in grave danger. But in this crisis, one of the gravest of the war, Italian patriotism rose magnificently. General Diaz, who succeeded General Cadorna, took up a position behind the Piave river, and the arrival of French and British troops helped to save the situation. The Teutons launched a new attack from the Trentino in order to turn the Piave line, but after bitter fighting among the mountains it was

finally checked. The Italian defeat had, however, been one of the most disastrous of the war. They had lost practically all the territory won in three hard campaigns; northeastern Italy was overrun; and the enemy had taken a quarter of a million prisoners, about 2500 guns, and vast stores of shells and other munitions. The Italian situation continued to be grave until near the end of the war.

Partly to prevent the Germans from sending any more troops against the Italians, the British Third Army under General Byng, on November 20, launched a sudden attack on the German lines in front of Cambrai. The attack was made without any preliminary artillery preparation, but a great number of tanks were used to break through the barbed wire entanglements and destroy machine gun nests. The Germans were taken completely by surprise and at first offered little resistance. In the first day the British advanced in places a distance of five miles, taking many guns and thousands of prisoners, and got within three miles of the great German base at Cambrai. But the Allies had not sufficient reserves with which to follow up the success, and it was not followed by a general offensive. On November 30 the Germans launched a powerful counter-attack, recovered about a third of the ground lost, and took 9000 prisoners and 166 cannon. The main importance of the battle was that it convinced the Allies of the possibilities of tanks, and great numbers were ordered built for use in 1918.

Campaign in Mesopotamia and Palestine. Thus, largely because of the Russian collapse, the Allied hope of victory in 1917 had not been realized. In some important fields of action their arms had met with disaster, and only in Mesopotamia and Palestine could they point to really notable successes. Late in 1914 an expedition, composed mainly of troops from India, had landed at the head of the Persian gulf, and, after several victories, this force, which had been considerably enlarged, managed to fight its way in November 1915 almost to Bagdad. In a battle at Ctesiphon, however, it was opposed by numerically superior forces, and had to retreat down the Tigris river to Kut-el-Amara, where, despite the efforts of a relieving army, it was forced to surrender (April 29, 1916). In the following December the relieving army, commanded by General Maude and increased to over a hundred thousand men, again assumed the offensive in Mesopotamia, recaptured Kut-el-Amara, and after decisive victories entered the city of Bagdad, March 11, 1917.

Meanwhile the British had encouraged the Arabs in Arabia to revolt against the Turks, the revolt being headed by Grand Sherif Hussein Ben Ali of Mecca. Largely through the energy and leadership of a young British archeologist named Lawrence, the rebels rendered great services to the Allies during the remainder of the war.

In March 1917 a British army pushing northward from the Isthmus of Suez defeated a Turkish force of 20,000 near the ancient city of Gaza. Scarcity of water and transport difficulties delayed further operations for a time, but in October General Sir Edmund Allenby, who had distinguished himself in France, took command and began an active campaign, and in December, for the first time since the Crusades, the flag of a Christian nation floated over the holy city of Jerusalem and the tomb of the Savior.

By these victories in Mesopotamia and Palestine, British prestige in the Orient was restored, and heavy blows were struck at Turkish power.

In Greece, also, affairs had taken a turn more favorable to the Allies. In September 1916 a Bulgarian army had seized the town of Kavala and other places in eastern Greece, and, in obedience to orders from Athens, the Greek troops had made no resistance and had been taken prisoners. Soon thereafter ex-Premier Venizelos and Admiral Condouriotis began a revolutionary movement in Crete and established a provisional government, which won over other islands and most of the Greek fleet, and entered the war on the side of the Entente. In June 1917, the Allies compelled King Constantine to resign in favor of his second son, Prince Alexander. Venizelos once more became premier, and Greece soon threw down the gage of battle to the Central Powers.

The Great German Offensive of 1918. During the winter of 1917-18 both Teutonic and Allied leaders made pronouncements with regard to peace, but their views as to terms differed so widely that it was clear that the war must go on. Meanwhile the Germans made preparations to launch a stupendous blow which they hoped would bring them victory before America could take a real part in the war. By almost superhuman efforts they managed to assemble on the western front forces that were superior in numbers to those of the Allies. The place selected for the offensive was in the region between Arras and La Fere. At five o'clock on the morning of March 21 the Germans began a terrific bombardment on a front of about sixty miles. Thousands of guns were used; millions of projectiles were fired; the British trenches and battery positions were subjected to a frightful storm of high-explosive shells and were drenched with poison gas; and roads, villages, and concentration points for a distance of more than twenty miles back of the front line were searched out by high-velocity guns of large caliber.

After four hours of this hurricane fire the German infantry moved forward to the attack, taking with them every weapon that Teutonic military ingenuity had been able to evolve. The British, greatly outnumbered, fought valiantly but were unable to withstand the blow. The Fifth British Army, which stood in the pathway of the offensive, was practically cut to pieces. In a few days the victorious Germans had regained practically all the territory they had lost as a result of the battle of the Somme and in their strategic retreat of 1917. At one time it seemed probable that the Germans would be able to separate the British from the French and to defeat each in detail. The whole world watched the titanic struggle with bated breath. France was in greater danger than at any time since the battle of the Marne. Paris was subjected to repeated air raids and was bombarded by super-guns concealed in the forest of St. Gobain at the unheard-of distance of 74 miles; hundreds of thousands of people left the capital and took refuge in more remote provinces.

But the British Third Army under Byng held like a wall before Arras, containing the flood on the north, while hastily gathered French forces, after bloody fighting, dammed it on the south. The French and British joined hands once more, and the Germans, worn out by their gigantic efforts, failed to reach the vitally important town of Amiens.

By the end of the first week in April the lines seemed once more to be acquiring stability, but before the Allies could launch a counter-attack Ludendorff and Hindenburg delivered (April 9) another great blow against the British lines in Flanders. The Germans broke through a portion of the line held by a Portuguese division, and, thrusting fiercely forward, hurled back the British on both sides of the gap, capturing many prisoners and guns. They took the Passchendaele and Messines ridges, Armentieres, and Kemmel Hill, and threatened Ypres, which to the British line symbolized what Verdun did to the French. There was grave danger that the whole British army might be hurled back in irretrievable disaster upon the Channel, but the dogged fighting qualities of the British soldiers and the opportune arrival of French re-enforcements once more brought the assailants to a pause.

The Germans had won two great tactical victories, had taken more than a hundred thousand prisoners and vast quantities of war material, and

had brought the Allied cause to the brink of disaster, but they had failed in their main purpose of striking a decisive blow that would end the war. In this respect their efforts had resulted in a strategic defeat.

Foch Becomes Commander in Chief. From the Allied point of view the German offensive had been productive of at least one good result. Hitherto in the war their activities had been greatly hampered by lack of united command. Repeated efforts had been made to secure closer co-operation between their forces, and after the Italian disaster a Supreme War Council had been created. But this was not enough. On March 27, in the midst of the first German offensive, British and French representatives met and gave the supreme command to Ferdinand Foch. On the next day General Pershing tendered his forces to Foch, and ultimately the great Frenchman became generalissimo of all the Allied armies on all fronts.

At the time Pershing made his tender there were less than 370,000 American troops in Europe, of whom about half were noncombatants. Four divisions had had some training in quiet sectors, but American participation in the fighting had been almost wholly confined to meeting petty German raids. The First Division was now sent to the active front near Montdidier, and, at the urgent request of the French and British leaders, great efforts were concentrated upon bringing more American troops over. Owing to the submarines there was a scarcity of ships, but Great Britain threw her commerce to the winds in order to release ships for this purpose, and American ships, especially former German and Austrian liners that had been seized in American ports, were able to play a big part. In April 120,072 men embarked for France; in May 247,714; in June 280,434; in July 311,359; in August 286,375; in September 259,670; in October 184,063; in November 12,124. The American and British navies convoyed the transports so effectively that during the war only 396 American soldiers were lost as a result of submarine activities.

Most of the American troops thus transported were not yet adequately trained, and, as the work of organizing them into a separate army was certain to take a long time, a policy of brigading them with the French and British was at first pursued. Furthermore, owing to delays in the production of such articles at home, it was necessary to depend almost wholly upon the French and British for airplanes, tanks, artillery, and shells.

The Final German Efforts. On May 27 the Germans launched a new offensive on a thirty-mile front between Reims and Soissons. The Allies were taken by surprise, and with comparatively slight losses the Teutons recaptured the Chemin des Dames Ridge and drove a deep salient to the river Marne, taking great numbers of prisoners and guns.

On the day after the Germans launched this offensive, the American First Division under Major General Bullard captured the town of Cantigny near the apex of the Amiens salient, inflicting upon the Germans losses estimated at 1500. This was the first considerable operation in which American troops were engaged, but the Second and Third divisions were now sent to the Marne front in the Chateau-Thierry region and helped to bring the German drive to a pause. Not content with merely holding their positions, the Second Division retook Boureches, Belleau Wood, and Vaux, and in the fighting for Belleau Wood a brigade of marines won great distinction. Meanwhile, French troops in the region of Compiegne had defeated with great slaughter a German effort to connect the Marne salient with that driven toward Amiens.

By July 1 the Germans claimed to have captured, since the launching of their March offensive, 191,454 unwounded prisoners and over 2000 cannon, but they had failed to obtain the decisive victory they had hoped to win. Owing to the rapid arrival of American troops, the "rifle strength" of the Allies on the western front had passed that of the Germans. Furthermore, in a new offensive at Cantigny and by an exploit at Hamel, American troops had added to the confidence inspired by their previous workmanlike behavior, and the Allied chieftains began to feel that it would be safe to make use of them in a larger way.

In the middle of June the Austro-Hungarians launched a long-impending offensive against the Italians but were decisively repulsed, and this fortunate outcome greatly simplified General Foch's problem. Even more encouraging was the fact that the Allied counter-submarine campaign was proving more and more successful. The number of vessels sunk was steadily decreasing, and more tons of shipping were being built by the United States and Great Britain than were being sunk by the enemy. It was becoming clear that the submarines could not win the war; it was equally clear that, owing to the coming of American reserves, the chance for decisive German victory on land was steadily diminishing. Military considerations demanded that the Germans must either retire from the salients they had driven into the Allied lines or else move forward, and as a retirement would be a confession to the people at home that the great effort had failed, the Teutonic chieftains decided upon one more effort.

The sector chosen for the attack was the Reims salient, and the Germans planned to attack on a great front from Chateau-Thierry almost to the Argonne Forest. But the Allied leaders divined the German plan and concentrated great numbers of troops and guns to meet it. When the attack came on the morning of July 15, the Allies, by using a "yielding defense," stopped the German drive in most places after inflicting great losses. Some German divisions forced their way over the river Marne, but on the sector held by the American Third and Twenty-eighth divisions determined counter-attacks speedily hurled the assailants back across the river. By the end of the third day of battle it was evident that the drive was doomed to failure.

The Allies Assume the Offensive. The time had come for which Foch had long been waiting. At dawn of the 18th he struck a mighty counter blow on the western side of the Marne salient. The American First and Second divisions participated in the initial attack, and others were soon thrown into the fight. There was no preliminary artillery preparation, but the troops charged behind a rolling barrage and were aided by many tanks. The surprise was complete. By nightfall the invaders had been hurled back several miles and had lost thousands of prisoners. The Allies attacked the salient from three sides, and after many days of bloody fighting the Germans were driven back over the Ourcq river and then over the Vesle. More than 30,000 Germans, 700 cannon, and vast quantities of war material were taken. The American First and Second divisions alone captured 7000 prisoners and over 100 guns.

On August 8 a new offensive was launched against the salient projecting toward Amiens. The Canadian army formed the center of this attack and made a greater advance on the first day than was accomplished by any other army on the western front in the campaign of 1918. In a book written later by General Ludendorff, he spoke of this as "Germany's Black Day." In less than a week, 40,000 Germans and hundreds of guns were taken, and the victors were still relentlessly pushing after the enemy.

"To make war is to attack" had long been General Foch's maxim. He followed up these initial successes by raining blow after blow upon his bewildered enemy. Hardly a day passed in which the Allies did not win some notable victory, and by the middle of September the Germans had

been driven back virtually to the old Hindenburg Line, from which they had launched their offensive in the spring. But in two months they had lost nearly 200,000 prisoners, immense numbers in killed and wounded, over 2000 pieces of artillery, and vast quantities of war material.

In these operations American troops fighting with the French and British armies played a glorious part, and General Pershing with a newly organized army performed a notable exploit by taking the St. Mihiel salient northeast of Verdun. Careful preparations were made, and an army of about 600,000 was concentrated for the purpose. This army included some French troops, and both the French and the British lent many cannon, airplanes, and tanks. The bombardment was opened on the night of September 11, and next morning the troops "went over the top." Forty-eight hours later the salient was only a memory. Sixteen thousand prisoners, 443 cannon, and much war material were among the fruits of victory. In the words of Pershing: "The Allies found they had a formidable army to aid them, and the enemy learned finally that he had one to reckon with."

Bulgaria and Turkey Beaten. While the news of this American victory was still reverberating around the world, General Franchet d'Espérey, commander of the Allied army in the Balkans, began a sudden offensive northward from Saloniki. In a few days the lines of the enemy were broken, and Bulgaria, threatened with annihilation, signed (September 30) an armistice which was practically an unconditional surrender. Bulgaria's withdrawal from the war isolated Turkey once more from her Teutonic allies, and rendered probable the early re-entrance of Rumania. Northward into their desolated homeland swarmed the exultant Serbians, driving their hated enemies before them and threatening to invade the dual monarchy from the southward.

On September 19, General Allenby launched a blow at the Turkish army in Palestine and in a few days practically annihilated it, taking 75,000 prisoners and 360 cannon. The victors took Damascus, and in the middle of October they reached Aleppo and cut the Berlin to Bagdad railway, thereby isolating the Turkish army in Mesopotamia, which on October 30 surrendered to the British army under General Marshall. On the same day the Turkish government bowed to the inevitable and withdrew from the war.

The Battle of the Hindenburg Line. In the last days of September the Allies on the western front began an epic assault on the Hindenburg Line. Belgian, British, and French troops under King Albert took the offensive in Flanders, British and French armies thundered against the zone of defenses in front of St. Quentin and Laon, and a great American army, aided by French troops on their left, began a drive down the valley of the Meuse river. In the first week King Albert's army captured over 12,000 prisoners and hundreds of guns. The German lines were broken; Dixmude, Lens, Armentieres, and the great city of Lille were taken; and in the middle of October the Germans evacuated the Belgian coast and fell back toward Brussels, closely pursued by their exultant enemies.

Meanwhile, British, Canadian, and Australian troops, aided by the 30th and 27th divisions of Americans, steadily battered their way through the immensely strong zone of defenses in front of Cambrai and St. Quentin. Tanks and artillery were used in great profusion, and defensive works were taken that had once been considered impregnable. In the second week of October, Haig's forces finally burst through the German system of defenses. Cambrai and St. Quentin fell, and, to save themselves from complete disaster, the Germans were compelled to sacrifice many of their best troops in bloody counter-attacks. Of all the great hammer strokes that won the war this was the mightiest.

In front of the Americans and French in the region of the Meuse lay the rugged Argonne Forest and three German zones of defense. The Germans were not expecting an offensive in this quarter, and at first their lines were lightly held. An initial attack was made on September 26. The French forces, operating on the west side of the Argonne Forest, made good progress the first day; on the east side the Americans advanced in places for six or seven miles, but strong resistance encountered at Montfaucon and elsewhere prevented them from breaking completely through the first zone of defense, and assaulting the second, before the Germans could bring up reserves. The attack was continued the next two days against increasingly strong resistance, due to the arrival of German re-enforcements; Montfaucon and other strong points were taken, and in the three days about 10,000 Germans were captured.

Thus began the bloodiest battle in American history, a conflict comparable to that in the Wilderness in Civil War days, but on a larger scale and much more prolonged. Both sides constantly threw fresh divisions into the fray, and every day bitter but confused fighting took place. German machine-gunners fought for every foot of ground and exacted a heavy toll from the Americans, most of whom were taking part in their first great battle. The American losses were enormous, but the troops from beyond the seas fought with a dogged determination to win through at any cost. By October 10, with French assistance, they had cleared the Argonne Forest of the enemy. The great obstacle before them now was the powerful German line known as the Kriemhilde Stellung. The Germans realized the vital necessity of holding this line and threw into the fight all the troops they could spare, but their last reserve division had been sent into battle; and some of their divisions had been so weakened that they were reduced to two or three thousand fighting men. Despite this lack of troops, the German positions were so strong that the defenders were able to offer formidable resistance. For many days the assailants battered away with artillery fire and persistent infantry attacks, and the whole battle zone was an inferno of shells, machine guns, and deadly gas; but Pershing knew that to break through, even at tremendous cost, would be far the cheapest in the end, and he fed division after division into the fiery furnace.

By the end of October the Americans were through the Kriemhilde zone of defense, and on November 1 the final advance was begun. The third German line, the so-called Freya Stellung, was incomplete, and it was mastered with comparative ease. On November 6 the Rainbow Division reached a point on the Meuse opposite Sedan. The Americans had now attained their objective—the railways running through Sedan and Mezieres. In the words of General Pershing: "The strategical goal which was our highest hope was gained. We had cut the enemy's main line of communications, and nothing but surrender or an armistice could save his army from complete disaster."

The total number of Americans engaged in the Meuse-Argonne offensive has been estimated at 631,000, the French at 138,000, making a total of 769,000. The Germans made use of 46 divisions, and their total number has been estimated as high as 396,000, but it was probably smaller. In the battle the Americans had taken 16,059 prisoners and 468 guns; their own losses in killed, wounded, and missing exceeded 100,000.

During the whole campaign the Americans captured about 44,000 prisoners and 1400 guns, howitzers, and trench mortars. In all, 2,034,000 American soldiers reached France, and of these 1,390,000 saw more or less active service at the front. In all, 29 divisions took part in active combat service, of which seven were Regular Army divisions, 11 were organized from the National Guard, and 11 were made up of National Army troops.

The Americans were undoubtedly the decisive factor in winning victory; without their aid the war might have been lost. It would be a serious mistake, however, to assume that the Americans were entitled to the sole credit. All the Allied armies aided in achieving the great consummation. Even in the campaign of 1918 the French and British losses were much heavier than those of the Americans, and each of them captured more prisoners and guns. The British alone, for example, captured on the west front, during 1918, 201,000 prisoners and 2350 cannon.

Great credit is also due to the Canadians. Their troops performed some of the most brilliant exploits of the whole war, and no other soldiers were more dreaded by the Germans.

They broke through the Hindenburg Line between Queant and Drocourt. In this victory and the one near Amiens mentioned above their casualties were numerous but were exceeded by the number of prisoners which they captured. On Oct. 9 they took Cambrai and on Nov. 2, Valenciennes. A few hours before the armistice became effective, Canadian troops entered Mons, from which the British expeditionary force had begun its retreat before the on-pouring flood of Germans in the last week of August 1914.

In the whole war nearly 600,000 Canadians, 7 per cent of the population, served in the army, nearly all by voluntary enlistment. The financial cost was met largely by internal popular loans, amounting in all to $2,202,762,250 and subscribed for by well over a million persons. At the same time, special taxes were imposed calculated to retire these extraordinary loans and maintain the country's credit. Nearly 1000 ships were built during the war in Canadian shipyards for Canada or her allies. The losses in men during the war were approximately equal to those of the United States. The Canadian army captured 45,000 prisoners and retook 130 towns. A Canadian aviator, Colonel William Avery Bishop, of Ontario, won the greatest number of victories credited to any "ace" in the whole war.

On October 24 General Diaz's army, composed of 51 Italian, three British, two French, and one Czechoslovak divisions, and one American regiment, assumed the offensive in the Trentino and along the Piave river against the Austro-Hungarians and speedily achieved one of the most overwhelming victories of the whole war. Three hundred thousand prisoners and 5000 guns were taken, and the remnants of the defeated army were nothing more than disorganized mobs fleeing wildly for safety. Revolutions broke out in Hungary and Austria, and the emperor Charles, the last of the Habsburgs, was forced to abdicate. On November 3, military representatives of the falling dual monarchy signed in the field an armistice that amounted practically to a complete capitulation.

The War Ended. With her last ally gone, Germany stood alone, facing a world of determined enemies. Before the end of September the German high command had realized that peace must be made, and, on October 4, Prince Maximilian of Baden, who had recently become imperial chancellor, sent to President Wilson a request for an armistice. Exchange of notes continued for more than a month; meanwhile the German armies were driven back, and the allies of Germany retired from the conflict. On the last day of October a mutiny began in the German fleet. In a few days uprisings took place in Berlin and elsewhere. Emperor William and the crown prince fled to Holland. On November 8 German representatives met Marshal Foch and other Allied representatives in a railway car near Rethondes, and, at five o'clock on the morning of the 11th, signed an armistice to take effect six hours later. Fighting ceased just in time to prevent Foch from launching, with French and American forces, a great offensive eastward upon the German lines in Lorraine.

In the negotiations leading up to the armistice, the Germans had agreed to accept as a basis for peace the program set forth by President Wilson in an address to Congress on January 8, 1918, and in later pronouncements, particularly in a speech of September 27. In his address of January 8 the president had stated fourteen points which he considered essentials. These included "open covenants of peace openly arrived at" and no secret diplomacy in the future; freedom of the seas in both peace and war; reduction of armaments; evacuation of all territory conquered by the Central Powers, with reparation and restoration of Belgium, Serbia, etc.; Alsace and Lorraine to be returned to France; readjustment of the frontiers of Italy along lines of nationality; an independent Poland; and the formation of an association of nations to safeguard the independence and territorial integrity of both great and small states. The European allies of the United States had, however, reserved complete freedom of action on the matter of "the freedom of the seas" and had insisted that the sweeping stipulation that "invaded territories must be restored as well as evacuated" must be interpreted to mean "that compensation will be made by Germany for all damage done to the civilian population of the Allies and their property by the aggression of Germany by land, by sea, and by the air." In addition to these terms, the Germans were required by the armistice to surrender 5000 cannon, 25,000 machine guns, 1700 airplanes, all the German submarines, and practically all their above-water navy. All of Germany west of the Rhine was to be occupied by Allied troops, a neutral zone ten kilometers wide was to be drawn on the east bank, and the Allies were to have bridgeheads east of the river at Mayence, Coblenz, and Cologne.

Treaty Negotiations. The opening session of the peace conference was held at Versailles near Paris on January 18, 1919. The representatives of the five chief Allied and associated powers constituted the main body of the conference. The smaller Allied states were also represented but were accorded little part in making decisions, most of which were arrived at in secret conclave by the leaders of the great states. The victors proceeded on the theory that the vanquished should have no part in formulating the terms; representatives of the vanquished were, in fact, not allowed to come to Paris until the treaty was ready.

The document containing the terms fixed upon for Germany was delivered to the German delegates on May 7. In Germany it was considered a "monstrous document," but the victors would consent to only a few modifications, and the vanquished, being powerless to resist, were obliged to accept it, the actual signing taking place on June 28, the fifth anniversary of the assassination of the archduke Francis Ferdinand. Under it Germany gave up all her colonies, ceded Alsace and Lorraine to France and a small strip of territory to Belgium, and consented that the Sarre (Saar) Basin, with its rich iron and coal mines, should be internationalized for fifteen years, after which the inhabitants were to be given the right to decide as to their future. Plebiscites were to be held in Schleswig, Silesia, and parts of East Prussia to determine the future political affiliation of these regions, and the port of Danzig was to be internationalized. The German army was to be reduced to 100,000 men, the German navy, to six battleships, six light cruisers, and some smaller vessels. The fortifications of Helgoland were to be destroyed, and the Kiel canal must be opened to all nations. Germany accepted responsibility for all damages done to the Allies and their peoples and agreed to reimburse civilians for their losses and to restore the devastated regions in Belgium, France, and elsewhere. She also agreed to the trial of the kaiser and other Germans accused of offenses against international morality and the laws of war.

Subsequently it was found difficult to enforce all the provisions of the treaty, and some modifications

were made. For example, it became manifest that it would be impossible for Germany to make good all the damages done by her, and the total amount was reduced. Holland, also, refused to give up the kaiser, while the German government, on the plea that public sentiment would not permit the surrender of alleged offenders, obtained the concession that the accused should be tried before a German federal court at Leipzig. Some were, in fact, thus tried, but very few were convicted and punished.

Treaties were later concluded with Bulgaria, Austria, and Turkey. Bulgaria was compelled to surrender territory and to pay an indemnity. Parts of the old dual monarchy were ceded to Italy, Rumania, and Poland; Hungary and Czechoslovakia were recognized as independent republics; the regions chiefly inhabited by Jugoslavs were united with Serbia and Montenegro into a greater Serbia, now the Kingdom of the Serbs, Croats, and Slovenes. Of Austria proper there remained only about 32,000 square miles, with a population of 6,000,000 or 7,000,000, chiefly of German blood. A republican form of government was adopted.

The Turkish treaty reduced the domains of the sultan to Constantinople and a small region round about it and to part of Asia Minor. An international force was to be maintained at Constantinople, and the Dardanelles and the Bosporus were neutralized. Arabia was to be independent; Mesopotamia and Palestine were to be under British control; Thrace and the region about Smyrna, under that of Greece; and France and Italy were given spheres of influence in Syria and Anatolia respectively. The mandate over Armenia was offered to the United States, but Congress declined it.

Russian and Turkish Affairs. Unfortunately the conference was unable to bring peace everywhere to a distracted world. At the time of the signing of the German treaty a score of other wars, or conflicts amounting to a state of war, were still raging. For example, Poland was fighting the Ruthenians, the Ukrainians, the Germans, the Jugoslavs, and the Russian Bolshevists.

In Russia the Allies lent assistance to the opponents of the Bolshevists, but all counter-revolutionary movements ultimately failed. The Bolshevists sought to spread their program over all the world, and for a time it seemed that they might succeed in some countries. In Hungary, for example, the Bolshevist party managed to secure control but presently fell from power. In Germany the Spartacans, as they were called, started a number of uprisings but were invariably defeated; the same fate met two revolts begun by the reactionary elements.

In the summer of 1920, the Russian Bolshevist armies defeated the Poles and pushed westward toward Warsaw. But the courage of the Poles rose to meet the crisis, and France sent more than a thousand officers, headed by General Weygand, to their assistance. At an opportune moment the Polish armies assumed the offensive and won an overwhelming victory. Early in October an armistice was signed at Riga, embodying terms satisfactory to Poland.

The Bolshevist regime, dedicated to an experiment in communism on a scale never before witnessed, consolidated its position as a class dictatorship by means of a Revolutionary court and the army. It survived widespread famine and acute industrial disorganization.

Turkish Nationalists refused to accept the terms imposed upon their country, and one of their leaders, Mustapha Kemal, assembled a large army in Asia Minor. Allied jealousies also complicated the Turkish situation. The main burden of opposing the Nationalists was assumed by the Greeks, who overran Thrace in the summer of 1920, and in 1921 conducted a successful offensive against the Nationalists in Asia Minor, but in 1922 the Greeks were defeated and driven out of Asia Minor. The Turks subsequently obtained much more favorable terms than those first offered.

America Rejects the League of Nations. In the United States a bitter political struggle developed over the peace treaty. To be ratified, the treaty had to receive a two-thirds majority in the Senate. A majority of the Senate were Republicans, and in that body, as well as among the people at large, there existed a great deal of hostility toward President Wilson. Special objection was made to Article X of the Covenant, which bound members of the League "to respect and preserve as against external aggression the territorial integrity and existing political independence of all members of the League." In an effort to win popular support for the treaty and the League, President Wilson set out (September 1919) on a tour of the country, but on the way back from the Pacific coast he had an apoplectic stroke and was forced to return to Washington, where for months he was confined to the White House unable to attend to any but the most urgent public business. Meanwhile the Senate adopted a number of reservations to the Covenant, including one which provided that the United States assumed no obligation to use its military or naval forces or otherwise aid to enforce Article X unless Congress should by act or joint resolution so direct. In defense of this reservation its supporters pointed to the constitutional clause that provides that only Congress can declare war. All attempts to secure ratification of the treaty, with or without reservations, failed (November 1919, March 1920). The Senate also refused to ratify an agreement by which the United States and Great Britain bound themselves to go to the assistance of France in case of unprovoked attack by Germany. A joint resolution declaring the war at an end was passed by both houses, but the president vetoed it (May 27, 1920). President Wilson asked for "a great and solemn referendum" upon the question of the League of Nations in the presidential election, but the issue was not clearly drawn in the campaign, being overshadowed by public discontent with Democratic rule. As a result, the Republican candidate, Warren G. Harding of Ohio, was elected president by the unprecedented plurality of almost 7,000,000 votes. Under his administration a new treaty embodying many of the terms of the Versailles Treaty but omitting the League of Nations Covenant was negotiated with Germany and was ratified by the Senate. On November 11, 1921, exactly three years after the close of hostilities, the two governments exchanged ratifications. On the following day an international conference for the limitation of armaments was opened at Washington.

Results of the War. Three famous royal houses, the Romanovs, the Habsburgs, and the Hohenzollerns, were swept from their thrones. King Ferdinand of Bulgaria, some of the petty German rulers, and King Constantine of Greece also lost their crowns, but upon the death of his son Alexander, as a result of the bite of a pet monkey, Constantine was recalled (December 1920), and Venizelos went into exile. Ex-Emperor Charles, the last of the Habsburgs, twice attempted to regain his dominions, but in each instance he failed, and he and his family were sent to Madeira off the west coast of Africa.

The Habsburg dominions were broken into fragments. Three republics—Hungary (later declared a monarchy), Austria, and Czechoslovakia—arose from the ruins, while portions were incorporated with Italy, Rumania, Poland, and Jugoslavia. Germany lost Alsace-Lorraine to France, a small district to Belgium, part of Schleswig to Denmark, large territories in the east to Poland, and all of her colonies, amounting to more than a million square miles. Bulgaria lost territory, and of the once vast dominions of the sultan nothing remained save a small tract of land about Constantinople and part of Asia Minor. Heavy indemnities were saddled upon all the vanquished peoples.

Russia, which entered the war on the side of the Entente but withdrew from the conflict before vic-

tory was won, fell into the clutches of the communistic Bolshevists and drifted into economic ruin. On her western border new states were created or old ones were restored: Finland, Esthonia, Lithuania, and Poland,—all republics.

The victors saved the world from a military despotism, and some of them enlarged their territorial domains, but the condition of many of them was little better than that of the vanquished. All that took a real part in the conflict emerged from it bearing immense burdens of debt beyond anything of which the world had hitherto dreamed. Russia and Germany found it necessary to repudiate their national currencies. Hungary and Austria were in scarcely less difficult situations. Even France and Italy failed to stabilize their currencies until these had dwindled to a mere fraction of their pre-War values. Great Britain was least affected financially, but her economic recovery was slow and halting.

The net result of the disorganization and economic losses of the chief belligerents was a shift in balance of strength from Europe to America. The United States became a creditor nation instead of a debtor nation. Governmental debts alone due from European nations to the United States totaled approximately 10 billion dollars. According to agreements negotiated with the individual debtor governments, these amounts were to be paid off in a period of about 60 years. The Allied powers expected to obtain the funds for payment from the indemnity imposed on Germany.

When the war first broke out, it was widely heralded, in H. G. Wells's vivid phrase, as a war to end war. This opinion, of course, on sober reflection, was seen to be a product of exaggerated idealistic enthusiasm, but in no period of the world's history has there existed such a widespread popular conviction of the futility of war or so comprehensive a system of organizations for postponing or preventing war as arose after the great conflict. This development was due in part, doubtless, to the exhaustion which follows any protracted war of nations, and was the more marked in proportion as the World War exceeded earlier conflicts in the extent to which it drew on the resources and life blood of humanity. It was due also, however, according to many observers, to a realization that mechanical science and chemistry had advanced to a point which would make a war in the future incomparably more costly in human lives; indeed, would forebode the suicide of civilization itself.

Among the organizations formed for the purpose of eliminating or curbing war in the settlement of international disputes, the most important is the League of Nations, with the Permanent Court of International Justice. President Wilson was responsible for the founding of the League; Elihu Root is generally recognized as the man who was chiefly responsible for removing the obstacles to the organization of the World Court. Significant also of the world's trend of opinion in regard to war is the Paris Pact, a multilateral agreement renouncing war as an instrument of national policy. A more complete account of these and other important international agreements of the post-War period will be found on pages 547-550.

Statistics. The World War was so vast and complicated that exact statistics regarding some of its aspects can never be compiled. Below, however, are presented the most trustworthy facts and figures now obtainable.

DECLARATIONS OF WAR

The following list gives the dates of the various declarations of war by the principal belligerents in the conflict. By reason of the form in which some declarations were made, authorities differ as to the exact day in certain cases. The dates here given are based upon agreement of the best available sources of information.

Austria against Belgium	Aug. 27, 1914
Austria against Japan	Aug. 25, 1914
Austria against Russia	Aug. 6, 1914
Austria against Serbia	July 28, 1914
Brazil against Germany	Oct. 26, 1917
Bulgaria against Serbia	Oct. 14, 1915
China against Austria	Aug. 14, 1917
China against Germany	Aug. 14, 1917
Costa Rica against Germany	May 23, 1918
Cuba against Austria	Dec. 12, 1917
Cuba against Germany	Apr. 7, 1917
France against Austria	Aug. 13, 1914
France against Bulgaria	Oct. 16, 1915
France against Germany	Aug. 3, 1914
France against Turkey	Nov. 5, 1914
Germany against Belgium	Aug. 4, 1914
Germany against France	Aug. 3, 1914
Germany against Portugal	Mar. 9, 1916
Germany against Rumania	Sept. 14, 1916
Germany against Russia	Aug. 1, 1914
Great Britain against Austria	Aug. 13, 1914
Great Britain against Bulgaria	Oct. 15, 1915
Great Britain against Germany	Aug. 4, 1914
Great Britain against Turkey	Nov. 5, 1914
Greece (Prov. Govt.) against Bulgaria	Nov. 23, 1916
Greece against Bulgaria	July 2, 1917
Greece (Prov. Govt.) against Germany	Nov. 23, 1916
Greece against Germany	July 2, 1917
Guatemala against Germany	Apr. 21, 1918
Haiti against Germany	July 15, 1918
Honduras against Germany	July 19, 1918
Italy against Austria	May 23, 1915
Italy against Bulgaria	Oct. 19, 1915
Italy against Germany	Aug. 27, 1916
Italy against Turkey	Aug. 21, 1915
Japan against Germany	Aug. 23, 1914
Liberia against Germany	Aug. 4, 1917
Montenegro against Austria	Aug. 8, 1914
Montenegro against Germany	Aug. 9, 1914
Nicaragua against Germany	May 6, 1918
Panama against Austria	Dec. 10, 1917
Panama against Germany	Apr. 7, 1917
Rumania against Austria	Aug. 27, 1916
Russia against Bulgaria	Oct. 19, 1915
Russia against Germany	Aug. 7, 1914
Russia against Turkey	Nov. 5, 1914
San Marino against Austria	May 24, 1915
Serbia against Bulgaria	Oct. 19, 1915
Serbia against Germany	Aug. 6, 1914
Serbia against Turkey	Dec. 2, 1914
Siam against Austria	July 22, 1917
Siam against Germany	July 22, 1917
The Hejaz (Arabia) against Central Powers	June 9, 1916
Turkey against Allies	Nov. 23, 1914
Turkey against Rumania	Aug. 29, 1916
United States against Austria	Dec. 7, 1917
United States against Germany	Apr. 6, 1917

SEVERANCE OF DIPLOMATIC RELATIONS

The following nations severed diplomatic relations at different times in the course of the war, but did not actually declare war on each other.

Austria—Portugal	Greece—Turkey
Bolivia—Germany	Peru—Germany
Ecuador—Germany	Santo Domingo—Germany
Egypt—Germany	Turkey—United States
Greece—Austria	Uruguay—Germany

ARMIES OF THE ALLIES AND THE CENTRAL POWERS

The average number of men under arms during the war has been estimated at 20,000,000, and the total number mobilized at 59,176,864.

Of the Allied nations, Belgium mobilized 267,000, the British Empire 7,500,000, France 7,500,000, Greece 230,000, Italy 5,500,000, Japan 800,000, Montenegro 50,000, Portugal 100,000, Rumania 750,000, Russia 12,000,000, Serbia 707,343, the United States 4,272,521, a total of 39,676,864.

Of the Central Powers, Austria-Hungary mobilized 6,500,000, Bulgaria 400,000, Germany 11,000,000, Turkey 1,600,000,—a total of 19,500,000.

THE COST OF THE WAR

In any estimate of the cost of war, several different factors must be considered. There is first the item of direct money expenditure by the belligerents. This appears in the increased taxes and loans of governments, and its total amount can be stated with approximate accuracy. A second factor is the expenditure by charitable societies and governments

for the relief of suffering due to the war. This sum also can be determined approximately. Then there is the loss of economic production, due to the withdrawal of great numbers of men from industry, which can only be roughly estimated. Similarly, the value of property destroyed can be stated with but fair accuracy.

Of far greater import, however, are the costs of war in terms of the destruction of human life and the crippling of human productive power, through wounds and disease. One method of representing a part of this loss is to estimate in money terms the value of an individual as "social capital." Such an estimate is given in the tables below. It must be remembered, however, that this is but a rough method of stating concretely a part of the social consequences of a war. The figures given in the following tables represent the best estimates of competent authorities upon the World War.

Professor E. L. Bogart of the University of Illinois, in a book entitled *War Costs and Their Financing*, estimates the direct expenditures in the war and its indirect costs as follows:

DIRECT EXPENDITURE

Great Britain	$44,029,011,868
United States	32,080,266,968
Canada	1,665,576,032
Australia	1,423,208,040
New Zealand	378,750,000
South African Union	300,000,000
India	601,279,000
Crown Colonies and Dependencies	125,000,000
France	25,812,782,800
Russia in Europe	22,593,950,000
Italy	12,313,998,000
Belgium	1,154,467,914
Serbia	399,400,000
Rumania	1,600,000,000
Greece	270,000,000
Japan	40,000,000
Other Entente Allies	500,000,000
Total Expenditures by Entente Allies	$145,287,690,622
Germany	$40,150,000,000
Austria-Hungary	20,622,960,600
Turkey	1,430,000,000
Bulgaria	815,200,000
Total Expenditures by Central Powers	$63,018,160,600
Grand total of all direct expenditures	$208,305,851,222
Deduct for duplications in the way of loans by one state to another	22,072,214,125
Net Total of Direct Expenditures	$186,233,637,097

INDIRECT COSTS

In this table, the value of human lives lost is based upon a capitalized value of individuals, varying for different nations, from $2020 for Russia to $4720 for the United States. It is assumed that the civilian loss of life was equal to that in the armies.

Value of Human Lives Lost	
Soldiers	$33,551,276,280
Civilians	33,551,276,280
Value of Property Lost	
On land	29,960,000,000
On sea	6,800,000,000
Loss in Production during the War	45,000,000,000
War Relief	1,000,000,000
Cost to Neutral Nations	1,750,000,000
Total of Indirect Costs	$151,612,552,560
Net Total of Direct Expenditures	186,233,637,097
Grand Total	$337,846,189,657

POPULATION LOSSES

According to figures compiled in Sweden by the Society for the Study of the Social Consequences of the War, the cost of the war in Europe in terms of human lives may be estimated as follows:

	Decline in Births	Rise in Deaths	Total Losses in Population	War Casualties
Austria-Hungary	3,800,000	2,000,000	5,800,000	1,500,000
France	1,500,000	1,840,000	3,340,000	1,400,000
Germany	3,600,000	2,700,000	6,300,000	2,000,000
Great Britain	850,000	1,000,000	1,850,000	800,000
Italy	1,400,000	880,000	2,280,000	600,000
European Russia	8,300,000	4,700,000	13,000,000	2,500,000
Belgium	175,000	200,000	375,000	115,000
Bulgaria	115,000	120,000	235,000	54,000
Rumania	150,000	360,000	510,000	159,000
Serbia	320,000	1,330,000	1,650,000	690,000
Total	20,210,000	15,130,000	35,340,000	9,818,000

COSTS OF RECENT WARS

The following table presents an instructive comparison between the direct costs of the World War and those of the principal conflicts waged in the course of the preceding century.

Wars	Days of Conflict	Loss of Life	Direct Cost
Napoleonic, 1790–1815	9,000	2,100,000	$3,070,000,000
Crimean, 1854–1856	730	785,000	1,700,000,000
American Civil War, 1861–1865	1,350	656,000	7,000,000,000
Franco-Prussian, 1870–1871	210	280,000	3,210,000,000
Boer, 1899–1902	995	9,800	1,250,000,000
Russo-Japanese, 1904–1905	548	160,000	2,100,000,000
Total	12,833	3,990,800	$18,330,000,000
World War, 1914–1918	1,563	9,818,000	$186,233,637,097

CASUALTIES IN THE UNITED STATES ARMY AND NAVY DURING THE WORLD WAR

Cause of Death	Foreign			Domestic			Grand Total		
	Officers	Enlisted Men	Total	Officers	Enlisted Men	Total	Officers	Enlisted Men	Aggregate
Killed in action	1,618	35,193	36,811	....	5	5	1,618	35,198	36,816
Died of wounds received in action	603	13,108	13,711	1	44	45	604	13,152	13,756
Died of disease	609	23,091	23,700	1,037	37,369	38,406	1,646	60,460	62,106
Died of accident	355	2,203	2,558	357	1,535	1,892	712	3,738	4,450
Drowned	17	308	325	13	372	385	30	680	710
Suicide	60	237	297	75	598	673	135	835	970
Murder or homicide	6	152	158	13	146	159	19	298	317
Executed	.....	11	11	....	24	24	....	35	35
Other causes	1	120	121	2	154	156	3	274	277
Totals	3,269	74,423	77,692	1,498	40,247	41,745	4,767	114,670	119,437
Total wounded	7,292	190,657	197,949	....	.....	.....	7,292	190,657	197,949
Grand total died and wounded *	10,561	265,080	275,641	1,498	40,247	41,745	12,059	305,327	317,386

Casualties in the Navy and Marine Corps: Killed in action, 3129; Died of disease, 6600; Wounded in action, 10,789. The Marine Corps lost 2707 killed in action; the Navy, 422.

* Note.—The figures given in the above table represent the latest available government statistics. As in the case of casualty statistics of other wars, however, they are subject to correction in detail.

POST-WAR CONFERENCES AND AGREEMENTS

After the close of the World War, difficult economic, political and territorial questions gave occasion for several international conferences. Organization of the League of Nations and of the Court of International Justice were responses to the world-wide demand for effective means of preventing war. In the following pages, these topics are given special treatment. The article upon the World War, with those upon the various countries, will furnish the reader with the background of this post-war period.

THE PEACE CONFERENCE

The conference, assembled for the purpose of effecting settlement of the military, territorial, and economic questions arising out of the World War, held its first session in Paris on January 18, 1919. It was continued in existence until January 21, 1920. The treaty with Germany was signed on June 28, 1919. With this event, the main task of the conference was concluded. The principal representatives left Paris almost immediately. The work that still remained was placed in the hands of the various foreign ministers and of the commissions for which the conference had provided. The last important event in the history of the conference was the final exchange of treaty ratifications on January 10, 1920, by which the state of war, except for the United States, was formally ended.

According to the plans arranged after the armistice of November 11, 1918, at meetings of premiers and ambassadors, the main body of the conference consisted of representatives of the five chief Allied and associated powers—France, Great Britain, the United States, Italy, and Japan. This body was at first the Council of Ten, made up of the three premiers—M. Clemenceau of France, Mr. Lloyd George of Great Britain, Sig. Orlando of Italy—Marquis Saonji of Japan, President Wilson, and the five foreign ministers—M. Pichon of France, Mr. Balfour of England, Baron Sonnino of Italy, Baron Makino of Japan, Mr. Lansing of the United States. This Council of Ten, however, soon gave way to the Supreme Council of Four—the three premiers and President Wilson, the so-called Big Four—and a subordinate council made up of the five foreign ministers. The Japanese representative did not claim his place on the Supreme Council, except when matters of Japanese interest were under discussion. Immediately attached to the chief delegations were groups of advisers and experts, to whom matters of detail were referred for investigation and report.

Representatives of other Allied powers, and of neutral powers as well, were summoned only for consideration of questions involving their especial interests. No representatives of enemy powers were admitted. The Allied belligerents and all powers that had severed diplomatic relations with Germany were admitted to the plenary sessions.

Three especially important commissions were appointed early in the course of the conference: (1) an economic commission, whose most pressing task was to provide for the distribution of food supplies to various needy sections of Europe, of which work Herbert Hoover took immediate charge; (2) a labor commission, whose main work was the outlining of plans for an international labor conference and a permanent labor bureau; (3) the central territorial commission, which co-ordinated the work of several special commissions, to whom were referred questions of boundary adjustments.

The conclusions and settlements at which the conference could arrive were conditioned by the following facts: (1) the existence of numerous treaties and agreements among the Allies, to which the crises of four years of war had given rise; (2) President Wilson's statement of his fourteen points, four principles, and five particulars; (3) the aspirations of various minor national groups for separate political status.

The most important of the Allied agreements were: (1) the Treaty of London, which embodied the terms upon which Italy had joined the Allies; (2) the agreements between England and France with regard to their territorial interests in the Near East; (3) the agreement by which Great Britain, France, and Italy supported Japan's claims to Shantung.

In respect to the fourteen points, the armistice agreement with Germany had committed the Allies to the making of a peace "on the terms of peace laid down in the president's address to Congress and the principles enunciated in his subsequent addresses." The Allies had, however, made two important reservations in their acceptance of these principles, with reference to (a) the freedom of the seas, and (b) the meaning of the term "restoration," defining this as "compensation for all damage done to the civilian population of the Allies and their property by the aggression of Germany by land, by sea, and from the air."

The problems arising from the formation of new states and from the apportionment of disputed territory among them jeopardized more than once the entire work of the conference. President Wilson's principle of self-determination, though formally accepted, proved difficult of application in many cases. In consequence, many territorial questions had to be left unsettled.

The capital questions which came before the conference and occasioned the most serious debate were: (1) the Covenant of the League of Nations; (2) the question of guarantees; (3) the possession of the Saar valley; (4) reparations; (5) the Polish question; (6) the disposition of Shantung; (7) Italian claims, especially in regard to Fiume.

LEAGUE OF NATIONS

During the World War, the necessity for an association of nations, to settle controversies threatening the peace of the world, was voiced at frequent intervals. Premier Asquith of Great Britain made one of the first official utterances to this effect. The United States possessed strong advocates of an organization to avoid war, and also of the judicial settlement of international disputes. President Wilson, in Number 14 of his famous "Points," appealed for a "league of nations." Thus, the delegates to the Peace Conference at Paris in 1919 were generally receptive to such a plan, and several brought concrete suggestions.

Organization. The Covenant of the League of Nations was adopted by the conference April 28, and became binding, upon the powers ratifying the treaty with Germany, on January 10, 1920. The Covenant provides an organization designed to embrace eventually all independent states and self-governing dominions. The organization consists of three parts: a Council; an Assembly; and a permanent secretariat.

The Council. The Council is composed of representatives of the British Empire, France, Italy, Japan, and six (originally four) other member nations, designated from time to time through election by the Assembly. The Covenant provided a place for the United States as one of the five permanent members of the Council. This place remains unoccupied, by reason of the American rejection of the plan. The Council meets at least annually and may deal with any matter affecting the peace of the world. Its first meeting was held January 16, 1920.

The Assembly. The Assembly is made up of representatives of nations which are members of the League. It has power to deal with any matter within the sphere of action of the League, or affecting the peace of the world. Each power is entitled to at most three delegates but to only one vote. Since five of the British dominions and colonies were

given membership, the British Empire may cast six votes in the Assembly. At the seat of the League, in Geneva, Switzerland, the Assembly holds annual meetings, opening on the first Monday of September.

The Secretariat. The secretariat of the League is established at the headquarters of the League in the city of Geneva. It consists of the secretary general and the necessary staff of secretaries and advisers. The secretariat prepares schedules of work for the meetings of the Assembly and of the Council and conducts the official correspondence of the League.

Program of the League. The nations which are members of the League agree to respect and preserve, as against external aggression, the territorial integrity and existing political independence of all members. They are further pledged to submit, either to arbitration or to inquiry by the League, any disputes likely to lead to a rupture of friendly relations.

The Covenant also provides for the registration, with the permanent secretariat, of all treaties between states; for issuing commissions to administer territory under mandate; and for the taking over by the League of all international bureaus, with the consent of the states establishing them. The Covenant provided also for the establishment of the Permanent Court of International Justice at The Hague. Amendments to the Covenant can take effect only when ratified by all members of the League represented in the Council and by a majority of the members whose representatives compose the Assembly.

Member Nations. At the first meeting of the Assembly, November 15, 1920, 42 states and self-governing dominions were members of the League. In 1929, there were 54 members. These were Albania, Argentina, Australia, Austria, Belgium, Bolivia, Bulgaria, Canada, Chile, China, Colombia, Cuba, Czechoslovakia, Denmark, Dominican Republic, Esthonia, Ethiopia, Finland, France, Germany, Great Britain, Greece, Guatemala, Haiti, Honduras, Hungary, India, Irish Free State, Italy, Japan, Jugoslavia, Latvia, Liberia, Lithuania, Luxemburg, Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Persia, Peru, Poland, Portugal, Rumania, Salvador, Siam, South Africa, Spain, Sweden, Switzerland, Uruguay, Venezuela. Nonmembers are Afghanistan, Costa Rica, Ecuador, Egypt, Hejaz and the Nejd, Russia, United States, and Turkey.

The United States and the League. President Wilson, who represented the United States at the Peace Conference, was an active promoter of the League, and, by his insistence, the Covenant was made an integral part of the Treaty of Versailles, fixing the conditions of peace with Germany. Upon his presentation of this treaty to the Senate for ratification, serious objections were raised. The most important of these were: (1) the perpetually binding character of the treaty, no method being provided for retirement of a state from the League; (2) the impairment of the fundamental principle of American foreign policy known as the Monroe Doctrine; (3) the guarantee to Japan of rights in the Chinese province of Shantung; (4) the apparent undue representation of the British Empire in the League by the inclusion within the Assembly of Canada, Australia, New Zealand, Union of South Africa, and the Indian Empire; (5) the guarantee to respect and preserve against external aggression the territorial integrity and existing political independence of all members of the League. This provision, embraced in Article X, was declared by President Wilson to be the "heart of the Covenant" and incapable of amendment without destroying the purpose of the instrument. Reservations embracing these and some minor points were framed by the Senate, and the ensuing deadlock between the president and the Senate led to the rejection of the entire treaty.

The Work of the League. Among the political undertakings of the League were the government of the Saar basin through an international commission, the protection of Danzig, the regulation of traffic on the Danube, the supervision of a corridor giving Bulgaria access to the Ægean Sea at Kavala, Greece, and the settlement of the following problems: the Aland Islands dispute between Finland and Sweden, the Vilna dispute between Lithuania and Poland, the division of Upper Silesia between Germany and Poland, the Albanian-Jugoslav boundary dispute, and the division of Teschen between Poland and Czechoslovakia. The League of Nations was responsible also for the financial rehabilitation of Austria and Hungary and took an important part in settling the problem of the Greek refugees expelled from Turkey. Due to the League's initiative, action has been taken toward the codification of international law, the control of epidemic diseases, the simplification of passport regulations, improvement of laboring conditions, the international cooperation of scholars, disarmament, and the control of traffic in arms, narcotics, and women. Funds for a new building were voted in 1925.

MANDATES

A mandate is primarily an order or commission involving an obligation or trust. By Roman law, a mandate was a contract for the gratuitous management of business for another.

Politically, the term "mandate" was devised by the Peace Conference of 1919, as a system of trusteeship for the government and development of dependent peoples wrested from the possession of Germany and from the Ottoman empire. Certain reasons stood in the way of the outright cession of these territories to the victorious states. In the first place, the military occupation of colonial territory of the defeated enemy, at the end of the war, did not of itself constitute a right to its permanent acquisition. In the second place, a widely felt sensitiveness for the rights of these dependent peoples recommended an Allied responsibility for their future handling. In the third place, certain countries, like the United States, while not wishing to acquire responsibility for additional colonial territory, were highly interested in preserving the "open door" in all such territory surrendered to the victors by the common enemy. Governments stood committed to advance the interests of dependent peoples rather than their own commerce or their privileges of exploitation.

Obstacles. It was to meet this situation that the trust, called a mandate, was proposed. The establishment of the principle met with difficulty by reason of secret treaties between the Allies, under which, in the event of victory, certain acquisitions of territory were to go to Great Britain, France, Italy, and Japan. As a result, the principle of trusteeship was not fully recognized by the Peace Conference, and compromises were agreed upon. The Covenant of the League of Nations recognized three classes of dependent territory, characterized by different degrees of cultivation and political capacity in their populations. In accepting mandates over these countries, mandatary states are bound to adopt a humane treatment of the natives and to forward their general development. The principle of the "open door," or freedom of trade and industrial development for all nations on an equal basis, was in part surrendered.

Allocation of Mandates. On May 16, 1919, President Wilson, Premier Lloyd George, and M. Clemenceau agreed to allot to Great Britain, German East Africa; to the Union of South Africa, German Southwest Africa; to New Zealand, German Samoa; to Australia, German New Guinea, the Bismarck archipelago and adjoining islands; and to Japan, the former German islands north of the equator, with the exception of the Island of Nauru, which was allotted to Great Britain. At this same

meeting, Great Britain and France undertook to reach an agreement as to the division between them of the German colonies of Togoland and Cameroon, a purpose which they accomplished, July 10, 1919. France, in these latter territories, sought the right to raise native troops for service in France, a policy seemingly inconsistent with the idea of a mandate. Belgium protested the award of all of German East Africa to Great Britain, and, by negotiation with Great Britain, secured the addition of two districts of that territory to her own central African possessions.

An allocation of territories of the Ottoman empire was accomplished at the conference of San Remo, April 18 to 25, 1919, where the representatives of Great Britain and France agreed that the former power should receive Mesopotamia and Palestine, and the latter, Syria and Lebanon. A subsequent agreement, at Paris, December 23, 1920, transferred a portion of Syria to the British mandate of Palestine, and France received, as a consideration, a share in oil land concessions in Mesopotamia, and other advantages.

The United States and the Mandates. The failure of the United States to ratify the Covenant of the League of Nations and become a member of the League left this country without a representative in the ultimate determinations of mandates. The government, however, on February 21, 1921, sent a protest to the League of Nations, and, in the following April, a protest to the principal Allied powers, expressing disapproval of the allocation of the island of Yap to Japan, on the ground that this country had never consented to the inclusion of that island in the Japanese mandate. In the second note, referred to above, Secretary Hughes took the stand that neither these powers nor the League of Nations had a right to award or define a mandate without the consent of the United States, which had been a participant in the war and was thereby entitled to be consulted upon the disposition of enemy territory. The note declared that the United States would regard as invalid all titles to mandates bestowed without its consent.

February 11, 1922, the United States and Japan signed a treaty in which the United States recognized the mandate of Japan over Yap, but secured equal privileges for the use of this island for electrical communications, and a guarantee that no military or naval base should be established, nor fortification erected, in this territory.

A proposal was made by the principal Allied powers that the United States accept a mandate over Armenia. An American military commission was sent to investigate conditions in that country and President Wilson recommended to Congress the acceptance of this responsibility. Congress, however, refused to assume the Armenian mandate. As a result of these incidents, the United States has had a very small part in the disposition of the territory taken from the defeated enemies, and has acquired no new interest nor responsibility. The affirmation, however, that the United States is interested in these mandated territories, both from the standpoint of the policies therein pursued, and from considerations of its own economic interest, stands without abatement.

PERMANENT COURT OF INTERNATIONAL JUSTICE (WORLD COURT)

The establishment of an international court for the adjudication of disputes between nations was provided for by the Peace Conference of 1919. The idea of such a tribunal was not new, however. At the suggestion of Elihu Root, then secretary of state of the United States, a plan for an international court was laid before the second Hague Conference in 1907. In 1910, an arrangement, to which the United States, France, Germany, and Great Britain were parties, was negotiated in Paris, looking toward the establishment of a Court of Arbitral Justice The outbreak of the World War nullified the steps which had been taken to put this agreement into effect.

A plan for an international court was included in the American draft of the Covenant for the League of Nations. By Article XIV of the Covenant, the Council of the League was charged with the preparation of plans for such a court. Early in 1920, the Council appointed a committee of jurists to formulate a plan of organization for a court that should be competent to hear and determine any disputes submitted to it and to give advisory opinion upon any dispute referred to it by the Council or by the Assembly of the League. With some modifications, the plan prepared by this committee was adopted by the unanimous vote of the Assembly of the League of Nations, December 13, 1920, subject to ratification by the states represented in the League.

Organization. As constituted by the statute of the League of Nations, the Permanent Court of International Justice consists of 15 members, of whom 11 are judges and 4 are deputy judges, elected for a term of nine years by the Assembly and Council of the League of Nations, from a list of names nominated by the panels of jurists from which members are appointed to the Permanent Court of Arbitration at The Hague. If a nation is not a member of the "Hague Court," it may appoint a group of jurists to make nominations. The court sits at The Hague in annual session, commencing on June 15. Each session lasts as long as is deemed necessary to finish the cases on the list. The yearly salary of each regular judge varies from $6030 to $14,070 according to the length of the session. In addition, provision is made for traveling, living, and duty allowances for all judges while they are actually engaged in the duties of the court. The court elects its own president and vice president and appoints its own registrar. Nine judges or deputy judges constitute a quorum. The president and the registrar are required to live permanently at The Hague.

Jurisdiction. For trial of international disputes, the court is open to members of the League and to states mentioned in the annex to the Covenant of the League. The plan for the court provides that states ratifying its constitution may recognize as compulsory the jurisdiction of the court in any or all of the following classes of legal disputes: (a) the interpretation of treaties; (b) questions of international law; (c) the existence of any fact which, if established, constitutes a breach of international obligations; (d) reparation for such a breach. Over 45 nations, including Great Britain, France, Italy, and Japan, have accepted this compulsory feature.

The court, in making its awards, is to apply the principles of international conventions, international law, general principles of law recognized by civilized nations, and, as a subsidiary means of determining the rules of international law, the teachings of the most highly qualified publicists of various nations. A majority of the court may render a decision. There is no provision for appeal from a decision of the tribunal, but, on the submission of new evidence, a review of the judgment is allowed. The court is empowered to give advisory opinions upon the written request of the council or the assembly of the League of Nations.

WASHINGTON CONFERENCE

On July 11, 1921, the Congress of the United States, by an amendment to the naval appropriations bill, authorized President Harding to arrange for an international conference upon limitation of armaments. The president, on August 11, 1921, issued formal invitations to Great Britain, France, Italy, Japan, and China; later, to Belgium, the Netherlands, and Portugal. The conference assembled in Washington on November 12, 1921, and terminated its deliberations on February 6, 1922.

Agreement upon any limitation of military armaments proved impossible, and restriction of naval forces was virtually confined to placing limitations upon the building of capital ships. Seven treaties, with numerous attendant resolutions, embodied the results of the work of the conference:—

1. A *Five-Power Naval Treaty*, by which the capital ship strength of the United States and Great Britain was fixed at 525,000 tons each, that of Japan at 315,000 tons, that of France and Italy at 175,000 tons each.

2. A *Five-Power Treaty upon the Use of Submarines and Noxious Gases in War*, adopted in lieu of specific limitation upon numbers of submarines and upon military armament. This agreement was signed by representatives of the United States, Great Britain, France. Japan, and Italy.

3. A *Four-Power Treaty*, between the United States, Great Britain, Japan, and France, with respect to insular possessions and insular dominions in the Pacific.

4. A *Four-Power Treaty*, supplementary to (3), which so defined "insular" as specifically to exempt the principal islands of Japan from the scope of the treaty.

5. A *Nine-Power Treaty*, with reference to Chinese affairs. This treaty was signed by representatives of the United States, Great Britain, Japan, France, Italy, Belgium, the Netherlands, Portugal, and China. It provided essentially for recognition of the territorial integrity of China and for an open-door policy in respect to economic rights and privileges.

6. A *Nine-Power Treaty*, negotiated between the powers signatory to (5), with respect to adjustment and regulation of Chinese customs tariffs.

7. The *Shantung Treaty*, between China and Japan, which provided for the restoration to China of the territory in Shantung occupied by Japan and for the withdrawal of Japanese military forces. This agreement was fulfilled during the year 1922.

LAUSANNE CONFERENCES

Following the defeat of the Greek forces in Asia Minor in August and September of 1922, representatives of Great Britain, France, and Turkey signed at Mudania, Turkey, an armistice which the Greek representative accepted. Settlement of the questions at issue in the Near East was left to be considered at a later conference, which opened at Lausanne, Switzerland, on November 20, 1922. The principal parties to the conference were Great Britain, France, and Italy on one side, and Turkey on the other. Greece and Russia, as interested nations, were represented.

Substantial agreement was reached by the members of this conference upon the opening of the Dardanelles to the ships of all nations. The general policy of exchange of the Greek population of Turkey for the Turkish population of Greece was also agreed upon. Disagreement on various other points, however, led to the postponement, in February 1923, of further negotiations until April 22, when a second conference was convened at Lausanne. Turkish sovereignty over Constantinople was recognized.

On July 24, 1923, a treaty was signed which was a substantial victory for Turkey. It omitted mention of the Ottoman foreign debt; it returned Eastern Thrace to Turkey; and by its terms the Allies yielded largely to Turkish demands as to control of concessions and extraterritorial privileges.

DAWES PLAN

This agreement regarding the manner of payment and collection of reparations due from Germany was signed in London on August 30, 1924, by representatives of Germany and the Allied powers. It was based on the report of a committee of ten appointed on December 27, 1923, by the Reparations Commission. The appointment of this committee, which acted under the chairmanship of Charles Gates Dawes, was the outgrowth of the occupation of the Ruhr by France and Belgium, begun on January 11, 1924. Through French pressure, Germany offered to mortgage her railways and other industries as security for reparation payments and to submit to an international commission the question of her ability to pay.

The Dawes committee presented its report on April 9, 1924. The chief provisions of the report were: (1) Germany should meet her reparation obligations to the full extend of her capacity; (2) the payments, 1000 million gold marks for the first year, should rise to 2500 million annually for the next four and to still higher figures thereafter if this appeared justified by her prosperity as measured by a carefully devised economic index; (3) these charges should be defrayed from taxation and from a mortgage placed on the industries of the country; (4) a foreign loan of 800,000,000 gold marks should be placed at Germany's disposal for use as a gold reserve and to meet immediate obligations; (5) a bank of issue under international management should be established, charged with stabilizing the currency and with receiving all reparations payments and making payment to creditor nations, provided such payment could be made without demoralizing exchange; (6) the Ruhr district should be evacuated by French and Belgian forces.

The Dawes Plan did not set a figure for the total amount of reparations which Germany should pay. A committee of experts, including the Americans Owen D. Young and J. P. Morgan, met in 1929 to agree, if possible, on recommendations covering this and other important points.

LOCARNO CONFERENCE AND TREATIES

At Locarno, Italy, on October 5, 1925, representatives of Great Britain, France, Italy, Belgium, Germany, Poland, and Czechoslovakia met for the purpose of insuring mutual security from war. As a result, the Rhine Security Pact was agreed to by Germany, Great Britain, France, Italy, and Belgium. It binds the signatories to accept the existing frontiers established by the Versailles treaty and to the demilitarization of the Rhineland. Germany and France, and Germany and Belgium mutually undertook not to attack each other, but to submit possible disputes to judicial decision, to arbitration by a permanent conciliation commission, or to decision by the council of the League of Nations. A similar treaty of security and arbitration was negotiated between Germany and Czechoslovakia. These treaties, initialed at Locarno on October 16, 1925, signed in London on December 1, 1925, and subsequently ratified by the powers concerned, were to go into effect when Germany was admitted to the League of Nations.

PARIS PACT

This treaty, known also as the Briand-Kellogg peace treaty, grew out of an original proposal of April 1927 by Aristide Briand, foreign minister of France, that France and the United States should agree mutually to outlaw war as a means of settling their disputes. Secretary of State Frank B. Kellogg proposed that the treaty be multilateral. This proposal was accepted. Fifteen nations were to be original signatories, and all other nations were also to be invited to be parties to the treaty. The pact was signed in Paris on August 27, 1928, by representatives of the following fifteen nations: United States, France, Great Britain, Germany, Italy, Japan, Irish Free State, Canada, Australia, New Zealand, South Africa, India, Belgium, Czechoslovakia, and Poland.

By this pact, the contracting parties condemn recourse to war for the solution of international controversies and renounce it as an instrument of national policy in their relations with one another. They further agree that the settlement of all disputes arising among them shall never be sought except by pacific means.

IMPORTANT WARS OF HISTORY

Time	Name and Results	Leading Battles	Chief Leaders
B. C.			
2750	Triumph of Semitic invaders over people of the Mesopotamian valley.	. . . . .	Sargon of Accad.
2200	Amorite kings conquer Babylon, Sumer, and Accad.		
1600	Egyptians make conquest of western Asia.		
14th to 12th century	Hittites and Hebrews conquer and occupy the Asiatic realms of the Egyptians.		
1300–1000	Greeks conquer the Ægean lands.	Siege of Troy.	
13th century	Hittite empire overthrown by Indo-European invaders.		
750–700	Assyrian kings become masters of western Asia.	. . . . .	Sargon II.
606	Assyrian empire overthrown by the Chaldeans.		
550–525	Persian Conquests. Persia supreme in western Asia and in Egypt.	. . . . .	Cyrus; Cambyses.
500–479	Greco-Persian Wars. Greece successfully resists Persian invasion.	Marathon; Thermopylæ; Salamis; Platæa; Mycale.	Miltiades; Leonidas; Themistocles; Pausanius; Xerxes; Darius.
431–404	Peloponnesian War. Athens conquered by Sparta.	Mytilene; Platæa; Sphacteria; Amphipolis.	Pericles; Alcibiades; Lysander.
343–290	Samnite Wars. Romans conquer Samnites.	Caudine Forks; Sentinum.	Fabius Maximus; Gaius Pontius.
334–323	Wars of Alexander the Great. Greek forces conquer Persia and Egypt.	Granicus; Issus; Arbela.	Alexander the Great; Darius.
264–146	Punic Wars. Romans destroy Carthage.	Ticinus; Trebia; Thrasymenus; Cannæ; Metaurus; Zama.	Fabius; Scipio; Hannibal.
200–146	Greco-Roman War. Greece subdued by Rome.	Cynoscephalæ; Pydna.	Flaminius; Æmilius Paulus; Mummius; Perseus.
112–106	Jugurthine War. Romans conquer Numidia.	Muthul; Cirta.	Jugurtha; Metellus; Marius.
90–88	Roman Social War. Right of Roman citizenship granted the Italian allies.	. . . . .	Sulla.
88–65	Mithridatic Wars. Mithridates, king of Pontus, defeated.	Chæronea; Orchomenus.	Lucullus; Pompey; Sulla; Mithridates; Archelaus.
73–71	Gladiatorial War. Gladiators defeated.	Petelia.	Spartacus; Crassus.
58–51	Gallic War. Gauls conquered by Cæsar.	Bibracte (Autun); Alesia (Alise Sainte-Reine).	Cæsar; Ariovistus; Vercingetorix.
50–31	Roman Civil War. Roman Empire established.	Pharsalus; Thapsus; Munda; Philippi; Actium.	Cæsar; Pompey; Brutus; Cassius; Antony; Augustus.
A. D.			
70	Jewish-Roman War. Jerusalem taken; temple destroyed.	Siege of Jerusalem.	Titus.
101–106	Dacian War. Country beyond Danube conquered.	. . . . .	Trajan; Decebalus.
400–493	Barbarian Wars. Teutonic hordes capture Rome, ravage Italy, and displace Roman emperors.	Sack of Rome; East Gothic kingdom set up.	Alaric; Genseric; Attila; Theodoric.
709–1492	Saracen Conquests. The Saracens occupy northern Africa and Spain; defeated in France; driven from Spain.	Xerez; Tours; Tarifa; Granada.	Musa; Tarik; Charles Martel; Cid Campeador.
1095–1291	The Crusades. Christians capture Palestine and set up the feudal kingdom of Jerusalem, but are finally repulsed.	Siege of Jerusalem; Acre.	Godfrey of Bouillon; Conrad III; Louis VII; Frederick II; Philip Augustus; Richard the Lion-Hearted; Louis IX; Edward I; Saladin.
13th century	Mongol Conquests, from southern Russia eastward to China.	Wahlstatt.	Batu; Henry the Pious.
1337–1453	Hundred Years' War. England lost all her possessions in France except Calais.	Crécy; Calais; Poitiers; Agincourt.	Edward III of England; Edward the Black Prince; Henry V of England; Joan of Arc.
1386–1388	Austro-Swiss War. Independence of Switzerland.	Sempach; Näfels.	Arnold von Winkelried; Leopold of Austria.
1419–1436	Hussite War. Religious toleration secured.	Deutsch-Brod; Böhmisch-Brod.	John Ziska; Sigismund.
1455–1485	Wars of the Roses. House of York supplants that of Lancaster on English throne.	St. Albans; Bloreheath; Wakefield; Towton; Barnet; Tewksbury.	Richard, duke of York; Edward, duke of York; Earl of Warwick; Queen Margaret; Henry VI.
1526–1565	Mogul Conquest of India.	Panipat; Talikota; Sikri.	Baber; Akbar; Vijayanagar.
1562–1598	French Civil Wars. Edict of Nantes, Protestant toleration.	Dreux; St.-Denis; Jarnac; Moncontour; Ivry.	Duke of Anjou; Henry III; Henry IV; Prince de Condé.
1567–1609	Spanish-Netherlands War. Independence of the Netherlands achieved.	Zutphen; Nieuport; various sieges and naval conflicts.	William of Orange; Maurice of Nassau; Duke of Alva; Alexander Farnese, duke of Parma.
1616	Invasion of China by Manchu Tatars.		
1618–1648	Thirty Years' War. Religious freedom secured in Germany.	Dessau; Leipzig; Lech; Lützen; Nördlingen.	Gustavus Adolphus; Wallenstein; Tilly; Turenne.

IMPORTANT WARS OF HISTORY—Con.

Time	Name and Results	Leading Battles	Chief Leaders
A. D.			
1642–1653	English Civil War. English Commonwealth established.	Edgehill; Marston Moor; Naseby; Worcester.	Prince Rupert; Fairfax; Charles I; Cromwell.
1700–1709	Swedish-Russian War. Defeat of Charles XII.	Narva; Pultowa (Poltava).	Charles XII of Sweden; Peter the Great.
1701–1714	Spanish Succession. French and Spanish crowns disunited. Protestant succession in England recognized.	Blenheim; Ramillies; Turin; Oudenarde; Malplaquet.	Duke of Marlborough; Prince Eugene; Marshals Tallard and Villars.
1740–1748	Austrian Succession. Many previous treaties affirmed; Maria Theresa, empress of Austria.	Dettingen; Fontenoy; Piacenza.	Marshal Saxe; George II of England; Duke of Cumberland.
1756–1763	Seven Years' War. Prussia gains high rank as military state.	Prague; Kolin; Rossbach; Minden; Torgau; Freiberg; Kunersdorf.	Marshal Daun; Frederick the Great.
1775–1783	American Revolutionary War. The United States achieve their independence.	Bunker Hill; Saratoga; Monmouth; Yorktown.	Washington; Greene; Burgoyne; Cornwallis; Clinton; Howe; Lafayette; Gates.
1789–1799	French Revolution. Bourbons defeated. Republic established, followed by *coup d'état* of Bonaparte.	Valmy; Jemappes; Wattignies; Lodi; Arcole.	Kellerman; Dumouriez; Jourdan; Moreau; Bonaparte.
1800–1815	Napoleonic Wars. France advances to the first place in Europe, and falls with Napoleon.	Marengo; Trafalgar; Austerlitz; Jena; Eylau; Friedland; Wagram; Borodino; Leipzig; Waterloo.	Napoleon; Wellington; Nelson; Blücher; Alexander I; Francis I; Frederick William III; Ney.
1812–1815	War of 1812. The United States entirely independent of Great Britain.	Lake Erie; New Orleans.	Perry; Cockburn; Ross; Jackson; McDonough.
1821–1829	War for Greek Independence. Greece independent of Turkey.	Missolonghi; Navarino.	Kanaris; Byron; Ibrahim Pasha; Marco Bozzaris; Prince Ypsilanti.
1846–1848	Mexican War. Boundary between the United States and Mexico fixed.	Buena Vista; Cerro Gordo; Capture of Mexico City.	Taylor; Scott; Santa Anna.
1854–1856	Crimean War. Independence of Turkey guaranteed. Peace of Paris.	Alma; Balaklava; Inkerman; Malakov.	Lord Raglan; St.-Arnaud; Prince Menshikov; Canrobert.
1859–1861	Italian War. Victor Emmanuel becomes king of united Italy.	Magenta; Solferino; Castelfidardo; Gaëta.	Napoleon III; Victor Emmanuel; Francis Joseph; Garibaldi.
1861–1865	American Civil War. Abolition of slavery; preservation of the Union.	Bull Run; Shiloh; Seven Days; Antietam; Murfreesboro; Chancellorsville; Vicksburg; Gettysburg; Chickamauga; Chattanooga; Atlanta; Wilderness.	McClellan; Grant; Sherman; Sheridan; Jackson; Thomas; Lee; J. E. Johnston; Meade.
1866	Seven Weeks' War. Prussia defeats Austria and unifies Germany.	Langensalza; Königgrätz (Sadowa).	Benedek; William I; von Moltke.
1870–1871	Franco-Prussian War. Paris taken and Alsace and Lorraine added to German Empire.	Wörth; Gravelotte; Sedan; Metz; Capture of Paris.	William I; von Moltke; Frederick; Frederick Charles; Napoleon III; MacMahon; Bazaine.
1877–1878	Russo-Turkish War. Rumania, Serbia, and Montenegro become independent of Turkey. Treaty of Berlin.	Shipka Pass; Kars; Plevna.	Grand Duke Nicholas; Gurko; Skobelev; Totleben; Osman Pasha; Mukhtar Pasha.
1894–1895	Chinese-Japanese War. Indemnity to Japan; independence of Korea.	Occupation of Korea by Japanese; Port Arthur; Weihaiwei; Niuchuang.	Prince Oyama; Prince Arisugawa; Prince Komatsu.
1898	Spanish-American War. End of Spanish rule in America; Cuba independent; Porto Rico and Philippines pass to the United States.	Manila Bay; Santiago; San Juan; El Caney.	Dewey; Schley; Sampson; Montojo; Cervera; Shafter; Toral.
1899–1902	South African War. Annexation of Transvaal and Orange River colony to British Empire.	Kimberley; Ladysmith; Mafeking; Pretoria.	Joubert; De Wet; Botha; De la Rey; French; White; Buller; Kitchener; Roberts.
1904–1905	Russo-Japanese War. Mutual concessions, confirmed by Treaty of Portsmouth. Japan a world power.	Yalu; Liaoyang; Shaho; Siege of Port Arthur; Mukden; Battle of the Japan Sea.	Makarov; Kuropatkin; Limevitch; Stoessel; Prince Oyama; Kuroki; Togo; Kamimura; Rojestvensky; Nogi; Oku.
1911–1912	Turco-Italian War. Tripoli ceded to Italy.	Bengazi; Derna; Tobruk; Hodeida.	Aubry; Enver Bey; Farrabelli.
1912–1913	Balkan Wars. Turkey loses much territory in Europe.	Scutari; Saloniki; Lule-Burgas; Monastir; Adrianople.	Putnik; Nazim Pasha; Zekki Pasha; Savov; Kleomenes; Hassan Tahsi; Enver Bey; Yankovitch.
1914–1918	The World War. Downfall of the Romanov, Hohenzollern, and Habsburg dynasties. Remaking of the map of Europe. Establishment of several new republican states. Movement toward self-determination of small states accelerated. Social and economic exhaustion of Europe.	Liége; Marne; Aisne; Tannenberg; Ypres; Gallipoli; Verdun; Jutland; Isonzo; Champagne; Somme; Vimy Ridge; Caporetto; Cambrai; Erzerum; Chateau-Thierry; St. Quentin; St. Mihiel; Argonne; Samaria; Piave.	Foch; Joffre; Pétain; Castelnau; Gallieni; D'Esperey; Mangin; Gouraud; Haig; French; Allenby; Byng; Horne; Maude; Beatty; Jellicoe; Pershing; Sims; Cadorna; Diaz; Brusilov; Grand Duke Nicholas; Hindenburg; Falkenhayn; Kluck; Mackensen; Ludendorff; Auffenburg; Dankl.

THE following section deals with topics of world history which do not specifically concern the United States. These topics as a rule have respect to countries whose histories are to be found in the preceding sections. The topics are of such a nature, however, that they can be dealt with more satisfactorily in separate articles. In some cases, this situation is due to the fact that the topic concerns several countries; in other cases, an adequate treatment of a certain phase of a national history would be impossible without unduly interrupting the connected narrative of the country's development. Such topics have therefore received special treatment in accordance with their interest and importance.

Abbassides, The (*ă-băs'ĭ-dēz*). The most famous dynasty of Mohammedan caliphs, taking its name from Abbas, the uncle of Mohammed. This family reigned in Bagdad from 750 until 1058, when the temporal power as monarchs was taken from it, though for 200 years following this date the caliphs were recognized as the spiritual heads of Islam. The greatest glory of the dynasty was the reign of Haroun-al-Raschid, 786–809, the contemporary and admirer of Charlemagne. The wealth and luxury of this period are celebrated in many stories of the *Arabian Nights*. Haroun-al-Raschid became a prince of romance, and Bagdad a synonym for courtly splendor. In the following reign, science and philosophy which enriched Europe were cultivated. But underneath the splendid surface were poverty and injustice which weakened the state and made it an easy prey to the invader. In 1258 the Abbassides were driven out of Bagdad by the Mongols, who burned the city. From 1258 to 1517 the Abbassides maintained a limited power in Egypt, when the last of the line was taken captive by the Turkish sultan, Selim I. See *Egypt*.

A. B. C. Powers. An expression which came into general use about 1914-15, to designate the group of three principal South American powers, Argentina, Brazil, and Chile. In the former year, these powers joined in a diplomatic effort to mediate in the difficulties between Mexico and the United States. In 1915, they concluded among themselves a group of treaties of peace and arbitration. See *Argentina, Brazil, Chile*.

Abdication. The renunciation of an office. Strictly this term is applied to the giving up of crown and authority by sovereign rulers of states, or by occupants of the papal throne. Various influences have prompted historic abdications. Sometimes the only motive has been the desire of the monarch to escape the cares of state; more often, however, compulsion, rebellion, or conquest has rendered such an act imperative. It is worthy of note that, though despotic or absolute monarchs are free to hand over the cares of state to another at any time they will, the situation is different in a limited monarchy. The king of England, for example, cannot lawfully abdicate without the consent of Parliament, the government of that country being in the nature of a constitutional contract between king and people.

In the following list are enumerated most of the important abdications recorded in history, including those within our own time which have resulted from the universal cataclysm due to the World War.

Diocletian	305
Maximian	305
Richard II of England	1399
Amadeus VIII of Savoy	1449
Charles V of the Holy Roman Empire	1556
Christina of Sweden	1654
Augustus of Poland	1706
Philip V of Spain	1724
Victor Amadeus II of Sardinia	1730
Stanislaus Leszczynski (of Poland)	1735
Poniatowski Leszczynski (of Poland)	1795
Charles Emmanuel II of Sardinia	1802
Charles IV of Spain	1808
Louis Bonaparte of Holland	1810
Napoleon	1814 and 1815
Victor Emmanuel I of Sardinia	1821
Charles X of France	1830
William I of the Netherlands	1840
Ferdinand of Austria	1848
Ludwig of Bavaria	1848
Louis Philippe of France	1848
Charles Albert of Sardinia	1849
Amadeus of Spain	1873
Alexander of Bulgaria	1886
Milan I of Serbia	1889
Dom Pedro of Brazil	1889
Hsuan-Tung, emperor of China	1912
Nicholas II of Russia	1917
William II, emperor of Germany	1918
Duke of Brunswick	November 9, 1918
King of Württemberg	November 10, 1918
King of Saxony	November 11, 1918
Grand Duke of Oldenburg	November 11, 1918
Charles, emperor of Austria	November 12, 1918
Prince of Reuss	November 12, 1918
Grand Duke of Saxe-Weimar	November 13, 1918
Prince Lippe-Detmold	November 13, 1918
Prince of Waldeck-Pyrmont	November 14, 1918
Duke of Anhalt	November 14, 1918
King of Bavaria	November 16, 1918
Grand Duke of Baden	November 17, 1918
Duke of Saxe-Coburg	November 17, 1918
Grand Duke of Mecklenburg-Schwerin	November 17, 1918
Constantine of Greece, June 12, 1917, and Sept. 27, 1922	

Popes who have abdicated:

Marcellinus	308
Liberius	366
Benedict IX	1044
Gregory VI	1046
St. Celestine V	1294
Gregory XII	1415

Abencerrages (*ă-bĕn'sĕ-rā'jēz*). This celebrated family of Moors held pride of place among Oriental races as being of pure Arab descent. They were famous in Granada in the 15th century and figured prominently in Spanish romance, especially in the many accounts given of their massacre by the Zegris, inveterate rivals of that period. Accused by the latter of an intrigue against Abdallah, king of Granada, the Abencerrages were decoyed into the Alhambra, where 36 of their number were mercilessly put to the sword by their insatiate foes.

Achæan (*ă-kē'ăn*) **League, The.** This confederacy of Greek city-states of the Peloponnesus has been called "the most remarkable federal union in history before the founding of the United States of America." About 280 B. C. four little towns on the south shore of the Gulf of Corinth revived an ancient confederacy that had been destroyed by the Macedonian conquerors. Soon other towns joined in driving out the Macedonian tyrants. Within a few years the league included most of the cities of the Peloponnesus in its federal assembly, in which all citizens of the cities who chose to attend had a voice and a vote. For a hundred years, in spite of the narrow aristocratic power allowed by the character of the assembly, and in the face of a struggle with Sparta and Macedonia, the league gave good government to its citizens. It was finally dissolved after the capture and destruction of Corinth by the Romans in 146 B. C. See *Greece*.

Adscriptus Glebæ (*ăd'skrĭp'tŭs glē'bē*). This Latin phrase means "bound" or "attached to the soil." An adscript was, in feudal times, a serf. He was regarded as an implement or chattel on his master's estate and in this sense belonged, or was attached to, the land. So true was this, that, on the transfer of an estate from one ownership to another, the new owner claimed as a right the serfs who were working on the estate at the time of purchase or transfer.

Afrikander. The Dutch name for African. Commonly used of native whites of Dutch or Huguenot ancestry in South Africa.

Afrikander Bond. In 1882 a political league, or association, known as the "Afrikander Bond," was inaugurated by the Boers of South Africa for the furtherance of Afrikander influence together with the federation of the states and British colonies as an independent nation. Mr. Hofmeyr, a member of the Cape ministry, was its moving spirit. It was in reality an appeal rather to Boer patriotism than to that of the colonists in general. The association, which during the Boer war manifested open signs of disloyalty to British rule, ceased to exist on the conclusion of hostilities in 1902. See *England, Union of South Africa.*

Agadir (*ă-gȧ-dēr'*) **Affair.** The agreement reached at Algeciras did not settle the Moroccan question. New disturbances led the French to occupy Feż. The Germans declared that this was a step toward the "Tunisification," or French absorption, of Morocco, and sent the gunboat *Panther* to Agadir, a port in southern Morocco, intending to demand a share in the territory or compensation elsewhere. War between Germany and France, supported by England, was narrowly avoided through an agreement by which Germany recognized French rights in Morocco in exchange for the cession of extensive territories in the French Congo, November 1911. See *Algeciras Conference.*

Albigenses (*ăl'bĭ-jĕn'sēz*). A name given to a sect also called Catharists, or "the pure," which taught a Manichean dualism, the conflict of two principles, good and evil. Triumph of the "good" was sought through extreme asceticism. The center of the heresy was in Languedoc, and it took its name from the city of Albi. In an endeavor to suppress the heresy, Innocent III sent legates in 1203 to southern France. One of them was assassinated, and the pope organized a crusade against the Albigenses. Its leader was Simon de Montfort, and he and his followers seemed chiefly anxious to conquer rich estates in the South. The final result was to bring southern France under royal control.

Algeciras (*ăl'jĕ-sē'rȧs*) **Conference.** A conference of nations interested in the settlement of the Moroccan question raised by Germany. Under a weak sultan, lawlessness was rampant in Morocco. France, to safeguard large loans and to carry forward a policy of "peaceful penetration," suggested reforms. At this juncture, in 1905, the German emperor visited Tangier and announced in a spectacular manner his determination to defend Moroccan independence. The sultan now rejected the French scheme of reform, and the Germans demanded that the whole question be referred to an international conference. The results of the conference, Jan. 16 to April 7, 1906, were a practical victory for France. French influence was made dominating in Moroccan finance, and a mixed French and Spanish police system was set up. See *Agadir Affair.*

Amphictyonic (*ăm-fĭk'tĭ-ŏn'ĭk*) **League, The.** This name means "league of neighbors." In ancient Greece, before 500 B. C., there were several such leagues formed for the protection of various shrines and temples. The chief of these was the Delphic Amphictyony, or "The Amphictyonic League," which included in its council delegates from all the important states and represented a religious union of the Greek people. Its original purpose was the care of the temple at Delphi; but its council also laid down rules for more humane warfare, for instance, forbidding the cutting off of a town's water supply in war or peace. This was a first step in international law. The Amphictyonic League continued to exercise great religious and political sway as late as the 3d century A. D. See *Greece.*

Annus Mirabilis, "Wonderful Year." A phrase applied to various noted years in history. It gave the title to Dryden's poem, in which are commemorated the two English victories over the Dutch in 1666 and the Great Fire of London in the same year.

Armada, The. A Spanish word, meaning "armed force," but applied especially to the great naval expedition sent against England by Philip of Spain in 1588 and decisively defeated by the English fleet and the storms of the North Sea. Philip's purpose was three-fold: to suppress English Protestantism, to stop English piracy in Spanish America, and to prevent English aid from reaching the rebellious Netherlanders. When, after long delays in storms, the vast Spanish fleet appeared in the English channel, it numbered 120 ships, carrying 20,000 soldiers and 8000 sailors, besides the galley slaves. But Philip, whose policy suppressed invention in his own dominions, had failed to reckon with the superior intelligence of the Englishmen and also with their patriotism. Catholic and Protestant had united in a supreme effort to build up the depleted English navy. The Spanish ships, built after an old, high, unwieldy type, to carry many soldiers for fighting at close quarters, were no match for the new English vessels, built to sail swiftly and to carry heavier guns. The English commanders, Lord Howard, Drake, Hawkins, and Frobisher, allowed the *Armada* to pass Plymouth, July 21, 1588. Then, with a favoring southwest wind, they followed, and, in a series of sharp attacks at long and short range, so harried and crippled the Spaniards that on the 27th of July they anchored off Calais. Here eight fire ships were sent into the midst of the unwieldy floating castles, and they were compelled to put to sea. On the following day, off Gravelines, the helpless *Armada* was riddled by English shot. The wind rose to a storm which drove pursuers and pursued northward past the coasts of Holland, where the waiting prince of Parma saw his hope of transporting his army to England vanish. The Spanish admiral, the duke of Sidonia, himself utterly unpracticed in seafaring, saw his only chance of escape around the north of Scotland. Storm and wreck followed him into the Atlantic. Of the "invincible *Armada*" but 54 battered hulks were finally anchored in Santander bay. See *England.*

Armenian Massacres. By the Treaty of Berlin in 1878, the sultan of Turkey promised reforms in the government of Armenia; but these promises were not kept, and revolutionary movements arose among the oppressed people. In 1895 the Kurds, called in to police the country, carried on brutal massacres. Protests by England, France, and Russia were ignored. In 1909 at Adana and in Cilicia and northern Syria 30,000 Armenians were killed. It is estimated that, between April 1915 and January 1922, through a Turkish policy of extermination, nearly a million Armenians were massacred. See *Turkey, World War.*

Assassins or **Hashisheens.** A fanatical military order instituted in Persia about 1090 by Hassan ben Sabah. They migrated to Syria and settled in the mountains of Lebanon, whence the name of their chief, who was known as "the Old Man of the Mountain." The secret murders they committed, in obedience to this chief, made them notorious. Their religion was a mixture of Mohammedanism, Judaism, and Christianity. They believed the Holy Spirit dwelt in their leader, and so they obeyed his orders as coming direct from God. For two centuries they were the terror of the surrounding nations. They fought, 50,000 strong, against the crusaders and became a formidable obstacle to the success of the Christian armies. They were at length overcome by the sultan Bibars in 1272.

Austrian Succession, War of. In 1740 Charles VI, Habsburg emperor, died without male heirs. Frederick II (the Great) seized Silesia. Other countries hastened to help divide the Austrian realms. Maria Theresa, daughter of Charles, loyally supported by her subjects and later aided by England and Holland, succeeded in preventing any losses of territory besides Silesia. Out of this war, ended by the Peace of Aix-la-Chapelle in 1748,

grew the rivalry of Prussia and Austria in Germany and that of England and France in America. See *Hungary*, page 488b; *Pragmatic Sanction*, page 574.

Avignon (*ȧ'vē'nyôn'*) **Captivity.** The period of 70 years during which the popes were forced to reside at Avignon, on the southeastern border of medieval France. The influence of the French kings in the affairs of the papacy seemed so predominant that, when the Hundred Years' war broke out, England distrusted the popes as tools of the enemy. This humiliating sojourn lasted from the papacy of Clement V, 1309, until that of Gregory XI, 1377. It is known also as the Babylonian Captivity, the period of exile approximating to that of the Jews in the time of Nebuchadnezzar.

Babington Plot. A plot set on foot in 1585 by a number of young Catholic noblemen at court, acting, it is alleged, under the instructions of a Jesuit named Ballard. Letters secured by Walsingham, secretary of state and head of the secret service, were said to have proved Mary Stuart's complicity in the plot. Babington and his companions were condemned to death, Mary also being subsequently tried and executed for her part in this conspiracy.

Bagdad Railway. Before the World War, the plans of the German government involved extension of control over territory and trade in the Near East. One of the chief means of maintaining German predominance in this territory was the project of a German controlled railway from the Ægean Sea to the Persian gulf. Together with the railway lines from Berlin to Constantinople, this formed the famous Berlin to Bagdad route. The first concessions were obtained by Baron Marschall von Bieberstein in 1888. Work on various sections of the route was carried forward until 1914, when negotiations for the last portion, from Bagdad to Basra on the Persian gulf, were interrupted by the World War. This stretch was completed by the British during the war. Since the Armistice part of the remaining 325 miles of road has been completed. Control, however, is no longer in German hands.

Balaklava (*bȧ'lȧ-klȧ'vȧ*). The name of this little Russian seaport in the Crimea is famous because of two exploits of British troops in the battle of Balaklava, Oct. 25, 1854. A brigade of heavy cavalry, in a brilliant charge, repulsed a huge mass of Russian horsemen. More famous is the charge of the brigade of light cavalry, "the light brigade." A vague order to retake some guns was misunderstood, and the brigade, under Lord Cardigan, rode against the very center of the Russian army. Few escaped from the ensuing slaughter. "It is magnificent," said a French officer, "but it is not war."

Balance of Power. The name at first given to that relation of European states in which no one country is strong enough to threaten the safety of its neighbors. From the close of the religious struggle of the Thirty Years' war in 1648 to the World War, 1914–18, the chief concern of European diplomacy was the maintaining of the "balance of power." The advocacy of disarmament aims at bringing about an adjustment of power, not only among the sovereign states of Europe, but also among those throughout the rest of the civilized world, so that no one state can be in a position to menace or dominate another. See *Disarmament*.

Balkan League, The. An alliance formed in 1912 by Bulgaria, Serbia, Greece, and Montenegro for the purpose of action against Turkey. It lasted barely a year, being broken in the bloody dispute which arose among the allies after their complete defeat of the Turk in 1913. See *Greece*, *Turkey*.

Barmecides. A wealthy Persian family who furnished viziers to Haroun-al-Raschid and to former caliphs of Bagdad; so called from their founder Barmek. Jaffar became the favorite vizier of the caliph, and, by his magnificent services and patronage of the arts, reflected great glory on his master's reign. Through jealousy or suspicion or both, Jaffar fell into disgrace with Haroun-al-Raschid, who without apparent reason put him to death in 802, together with nearly all of the Barmecide family.

Bashi-Bazouks (*bȧsh'ĭ-bȧ-zo͞oks'*). Irregular troops or volunteers attached to the Turkish army and noted for their wildness and cruelty. As a rule, they are mounted and serve for their maintenance without pay; this deficiency, however, they rectify by acts of pillage. Their services are also used by the municipal authorities, who often detail them to escort travelers wishing to explore the country. Such services are by no means inexpensive, as the Bashi-Bazouks expect not only to be fed well, but to be rewarded generously. Their uniform being that of tatterdemalions, they are called *Bashi-Bazouks*, which signifies "disorderly appearance."

Bastille (*bȧs-tēl'*), **Destruction of the.** The famous fortress of the Bastille once flanked the city gate of St. Antoine, Paris. Its construction was begun, under Charles V, by the provost Hugh Aubriot in 1370 and was completed in 1382. It became in a short time a prison of state and held within its walls, among other illustrious victims, such men as Jacques d'Armagnac, "The Man with the Iron Mask," Voltaire, and Lally-Tollendal. Its terrors reached their climax during the ministry of Richelieu, 1624–42. In the reign of Louis XI, cages of iron had been built, and the vaults beneath the towers, being on a level with the water in the moat, were the object of especial dread. For the populace, the Bastille stood as the symbol of royal despotism.

Louis XVI, June 23, 1789, had declared certain recent acts of the third estate of the National Assembly to be unconstitutional. He sent Brézé, his master of ceremonies, to bid the members withdraw from the hall of the Convention. Mirabeau, a French noble who had been chosen a deputy by the third estate, exclaimed with passion, "Go tell your master we are here by the will of the people and shall leave only at the point of the bayonet!" A few days later foreign mercenaries appeared in Paris. The Assembly sent to the king, demanding their removal. Louis replied by dismissing Necker, a minister favorable to reform and trusted by the people. Camille Desmoulins, a young journalist, announced the news in public on July 12. Paris was all aflame. Two days later, July 14, the populace, re-enforced by companies of French Guards, attacked the ancient monument of tyranny. De Launay, the commander, offered to surrender. When the doors of the fortress were thrown open, the mob seized him and a few of the Swiss Guards and murdered them. The heads of De Launay and Major de Losme of the Swiss were mounted on pikes and carried about the city. The walls of the grim fortress were later pulled down, so that not "one stone was left upon another." The fall of the Bastille is one of the most dramatic events in modern history. Its anniversary is celebrated in France as the chief national holiday and as the day when a new era of liberty dawned for the people and an end was put to the *ancien régime*. It is interesting to note that Lafayette sent the key of the fortress to Washington "because the principles of America it was that opened the Bastille." This relic may still be seen at Mt. Vernon.

Bath, Order of the. An order of knighthood, founded by Henry IV in 1399. From the time of Charles I it lapsed, until revived by George I in 1725 as a military order, which it remained until 1845. It was then established on its present basis with a military and a civil division.

BATTLES OF THE WORLD, DECISIVE

1. Marathon, Sept., 490 B. C. A small Greek army, commanded by Miltiades, defeated a much larger Persian force. The Persians were compelled to retreat into Asia.

2. Syracuse, 413 B. C. The besieged Syracusans turned upon and almost completely destroyed the invading Athenian forces.

3. Arbela, Oct. 1, 331 B. C. The Greeks, led by Alexander the Great, defeated the Persian armies of Darius and overthrew the Persian power.

4. Metaurus, 207 B. C. The Carthaginians, led by Hasdrubal, the brother of Hannibal, were defeated by the Romans under the command of Marcus Livius and Claudius Nero.

5. Teutoburg, 9 (?) A. D. The Roman legions, led by Varus, were defeated by the Germans under Arminius. This victory freed Germany permanently from the Roman power.

6. Châlons, 451 A. D. The Romans and their allies, the Visigoths, led by Aëtius, defeated the Huns and their Ostrogoth and other allies, led by Attila, compelling them to retire into Pannonia.

7. Tours, 732 A. D. The Franks under Charles Martel won a great victory over the invading hosts of the Saracens, led by Abderrahman. This conflict, which checked the Mohammedan invasion of western Europe, is known also as the battle of Poitiers.

8. Hastings, October 14, 1066. The Norman invaders defeated the Saxons. King Harold of England lost his life, and the kingdom passed to William, duke of Normandy.

9. Orleans, May 8, 1429. The siege of Orleans by the English was raised by the French, led by Joan of Arc. This victory insured the final defeat of the English invaders of France.

10. Defeat of the Spanish Armada, July 20–29, 1588. The Spanish fleet was almost completely destroyed by the British fleet and by severe storms.

11. Blenheim, Aug. 13, 1704. The French and Bavarians were defeated by the English under the duke of Marlborough, aided by their allies led by Prince Eugene.

12. Pultowa, July 8, 1709. Charles XII of Sweden was completely defeated by the Russians under Czar Peter the Great.

13. Quebec, Fall of, Sept. 17, 1759. After an extended siege and after the battle on the Heights of Abraham, where the English under Wolfe defeated the French under Montcalm, the French surrendered the city.

14. Saratoga, Oct. 7, 1777. The British army under General Burgoyne was utterly defeated by the Americans. The entire force was surrendered on Oct. 17 to the American commander, General Gates.

15. Valmy, Sept. 20, 1792. The French forces, commanded by Kellermann, defeated the Prussians, commanded by the duke of Brunswick.

16. Waterloo, June 18, 1815. Napoleon and his French forces were finally defeated by the British and their allies under the duke of Wellington.

17. Gettysburg, July 1–3, 1863. The Confederate troops under Lee were defeated by the Federals under Meade. Confederate invasion of the North was proved impossible.

18. Vicksburg, The Fall of, July 4, 1863. The capture of this stronghold by Grant, in command of the Federal army, gave command of the Mississippi to the North and cut the Confederacy in two. The Confederate general, Pemberton, surrendered after a long siege.

19. Sedan, Sept. 1, 1870. Defeat of the French forces by the Germans compelled the surrender of the French army in Sedan and of Emperor Napoleon III.

20. Tsushima, or **The Sea of Japan,** May 27-28, 1905. The Japanese fleet, under Admiral Togo, utterly defeated the Russian, under Rojestvensky. The battle decided the imperial position of Japan and checked Russian ambition in the Far East.

21. The Marne, First Battle of, Sept. 6–9, 1914. Decisive defeat of the Germans by the French and English. This battle shattered German hopes of a speedy victory and drove them to trench warfare.

22. Jutland, May 31, 1916. This engagement between the British and German fleets confirmed the British control of the seas during the World War.

Bayonne (*bà'yôn'*) **Decree.** A decree issued by Napoleon in 1808, ordering that all foreign vessels then in French ports and under the American flag should be seized. The ground was that American vessels were held in American ports by the embargo then in force, and that vessels carrying the American flag were English vessels in disguise. See *Embargo Act.*

Belgian Congo. Formerly the Congo Free State. The experiment in government known as the Congo Free State owed its existence to the ambition and force of character of a single individual, Leopold II, king of the Belgians. It dated its formal inclusion among the independent states of the world from 1885, when Leopold became its head. In 1876, Leopold, with the co-operation of several European governments, formed the International African Association to promote the exploration and colonization of Africa. He then secured the famous African explorer, Henry M. Stanley, to explore the Congo region, and Stanley was active in founding stations and in making treaties with various chiefs. After numerous powers had recognized the independent Congo Free State, an international conference at Berlin declared the state neutral and open to the trade of all nations. Leopold was recognized as the personal sovereign. Governmental abuses which arose under this régime aroused international protest. In 1908 the country was annexed by Belgium, and since that time it has been governed as a colony under the title of the Belgian Congo.

Belgian Neutrality Treaty. The Treaty of London, 1839, signed by Austria, Belgium, France, Great Britain, Prussia, and Russia, guaranteed the perpetual neutrality of Belgium. This neutrality being threatened by the Franco-Prussian war in 1870, special agreements were signed by Great Britain with France and Germany respectively, by which the belligerents agreed to respect the neutrality of Belgium according to the treaty of 1839. In 1914, Germany violated the treaty obligation.

Berlin Decree. A decree issued by Napoleon in 1806, proclaiming the continental blockade.

BISHOPS AND POPES OF ROME

The word pope is derived from an ecclesiastical Latin word *papa,* meaning "father," applied in the early Christian centuries as a term of respect to clergy of high rank, especially bishops. By the 5th century, the title had come to be applied almost altogether to the bishop of Rome, and from the 11th century it has been claimed exclusively for him as the sovereign pontiff of the Roman Catholic Church.

Primarily the pope, as the successor of Saint Peter, is the bishop of Rome. The actual predominance of Rome over other episcopal sees was, as early as the 1st century, acknowledged by the then universal church. This supremacy, through a gradual process extending over several centuries, grew and expanded with the natural development of the Christian Church. The council of Chalcedon in 451 accepted as authoritative the profession of faith proposed by Leo I. The pontificates of Gregory the Great (590–604), Gregory VII (1073–85), and Innocent III (1198–1216) mark important stages in the growth of the papal power.

Electors. Early accounts of elections indicate that for several centuries the right of choosing bishops and the early popes was shared by both the clerical and the lay members of the Christian community of Rome and of its neighboring territory. After the election had come to be a concern of the entire Church, the possession of the right was restricted, until at length, in the 12th century, it came to be confined to the college of cardinals. The body which today exercises the right of electing the pope is called the conclave. It includes all cardinals of the world.

The Conclave. The word conclave formerly signified a room which might be locked, and is often applied to the apartments in which the papal electoral body meets, as well as to the assemblage itself. The cardinals are required to live in entire seclusion from the outside world during the period necessary to secure the election of a new pope. For this purpose, after the death of a pope, a portion of the Vatican adjoining the Sistine Chapel is walled off and divided into apartments of three or four rooms each. In these live the cardinals, each of whom may be accompanied by a secretary and a servant, who are called conclavists.

Method of Election. The conclave opens officially the evening of the fifteenth day after the pontiff's death. On the morning of the sixteenth day, the cardinals assemble for the actual balloting in the Sistine Chapel. The voting is by secret ballot, and for an election a two-thirds vote is required.

Two ballots are taken each day, in the morning and in the evening, until an election is secured. After each ballot, the votes are burned. If no election has taken place, damp straw is mixed with the paper, and the resulting dark smoke, the famous *sfumata*, from the chimney, informs the people waiting outside that a new pope has not yet been chosen. When the new pope has been chosen, the paper ballots alone are burned without the straw and a white almost invisible smoke from the chimney notifies the populace that the pope at last has been elected.

Installation. When a candidate has received the necessary two-thirds vote, the doors of the chapel are opened. Upon formal inquiry by the presiding dean as to whether the newly chosen pontiff is willing to accept the burden of the papacy, the pope-elect duly declares his assent and announces the name by which he desires to be known. He is then clothed in the papal vestments, and receives the first homage of the cardinals. Following this ceremony occurs the public announcement of the election. On the election of Pius XI in 1922, this proclamation, for the first time since 1870, was made from the gallery of Saint Peter's. The pope's jurisdiction begins with his election, but he dates his pontificate from the following Sunday or holyday upon which the formal coronation takes place.

The following list contains the names, with the dates of their pontificates, of the pontiffs who have occupied the chair of Saint Peter. The list will be found especially valuable for reference in connection with the study of the various periods of European history.

Pontiff	Pontificate	
	First Century	
	A. D.	A. D.
1 Saint Peter		67(?)
2 Saint Linus	67	79(?)
3 Saint Anacletus	79	90(?)
4 Saint Clement I	90	99(?)
	Second Century	
5 Saint Evaristus	99	107(?)
6 Saint Alexander I	107	116(?)
7 Saint Sixtus I	116	125(?)
8 Saint Telesphorus	125	136(?)
9 Saint Hyginus	136	140(?)
10 Saint Pius I	140	154(?)
11 Saint Anicetus	154	165(?)
12 Saint Soter	165	174
13 Saint Eleutherius	174	189
14 Saint Victor I	189	198
15 Saint Zephyrinus	198	217
	Third Century	
16 Calixtus I	217	222
17 Urban I	222	230
18 Saint Pontian	230	235
19 Saint Anterus	235	236
20 Saint Fabian	236	250
21 Cornelius	251	253
22 Saint Lucius I	253	254
23 Saint Stephen I	254	257
24 Saint Sixtus II	257	258
25 Saint Dionysius	259	268
26 Saint Felix I	269	274
27 Saint Eutychianus	275	283
28 Saint Caius	283	296
	Fourth Century	
29 Saint Marcellinus	296	304
30 Saint Marcellus I	308	309
31 Saint Eusebius	309 (310)	
32 Saint Miltiades	311	314
33 Saint Silvester I	314	335
34 Saint Mark	336	
35 Saint Julius I	337	352
36 Liberius	352	366
37 Saint Damasus I	366	384
38 Saint Siricius	384	398
39 Saint Anastasius I	398	401

Pontiff	Pontificate	
	Fifth Century	
	A. D.	A. D.
40 Innocent I	402	417
41 Saint Zosimus	417	418
42 Saint Boniface I	418	422
43 Saint Celestine I	422	432
44 Saint Sixtus III	432	440
45 Saint Leo I, "The Great"	440	461
46 Saint Hilarius	461	468
47 Saint Simplicius	468	483
48 Saint Felix III	483	492
49 Saint Gelasius I	492	496
50 Anastasius II	496	498
	Sixth Century	
51 Saint Symmachus	498	514
52 Saint Hormisdas	514	523
53 Saint John I	523	526
54 Felix IV	526	530
55 Boniface II	530	532
56 John II	533	535
57 Saint Agapetus I	535	536
58 Saint Silverius	536	538(?)
59 Vigilius	538(?)	555
60 Pelagius I	556	561
61 John III	561	574
62 Benedict I	575	579
63 Pelagius II	579	590
	Seventh Century	
64 Saint Gregory I, "The Great"	590	604
65 Sabinianus	604	606
66 Boniface III	607	
67 Saint Boniface IV	608	615
68 Saint Deusdedit	615	618
69 Boniface V	619	625
70 Honorius I	625	638
71 Severinus	638	640
72 John IV	640	642
73 Theodore I	642	649
74 Saint Martin I	649	655
75 Saint Eugenius I	654	657
76 Saint Vitalianus	657	672
77 Saint Adeodatus	672	676
78 Donus	676	678
79 Saint Agatho	678	681
80 Saint Leo II	682	683
81 Saint Benedict II	684	685
82 John V	685	686
83 Conon	686	687
	Eighth Century	
84 Saint Sergius I	687	701
85 John VI	701	705
86 John VII	705	707
87 Sisinnius	708	
88 Constantine	708	715
89 Saint Gregory II	715	731
90 Saint Gregory III	731	741
91 Saint Zacharias	741	752
92 Stephen III	752	757
93 Paul I	757	767
94 Stephen IV	768	772
95 Adrian I	772	795
	Ninth Century	
96 Saint Leo III	795	816
97 Stephen V	816	817
98 Paschal I	817	824
99 Eugenius II	824	827
100 Valentine	827	
101 Gregory IV	827	844
102 Sergius II	844	847
103 Saint Leo IV	847	855
104 Benedict III	855	858
105 Saint Nicholas I	858	867
106 Adrian II	867	872
107 John VIII	872	882
108 Marinus I	882	884
109 Saint Adrian III	884	885
110 Stephen VI	885	891
111 Formosus	891	896
112 Boniface VI	896	
113 Stephen VII	896	897
114 Romanus	897	
115 Theodore II	897	
116 John IX	898	900
	Tenth Century	
117 Benedict IV	900	903
118 Leo V	903	
119 Christopher	903	904
120 Sergius III	904	911

	Pontiff	Pontificate	
		Tenth Century—Con.	
		A. D.	A. D.
121	Anastasius III	911	913
122	Lando	913	914
123	John X	914	928
124	Leo VI	928	
125	Stephen VIII	928	931
126	John XI	931	936
127	Leo VII	936	939
128	Stephen IX	939	942
129	Marinus II	942	946
130	Agapetus II	946	955
131	John XII	955	964
132	Leo VIII	963	965
133	Benedict V	964	
134	John XIII	965	972
135	Benedict VI	973	974
136	Benedict VII	974	983
137	John XIV	983	984
138	Boniface VII	984	985
139	John XV	985	996
140	Gregory V	996	999
		Eleventh Century	
141	Silvester II	999	1003
142	John XVII	1003	
143	John XVIII	1003	1009
144	Sergius IV	1009	1012
145	Benedict VIII	1012	1024
146	John XIX	1024	1032
147	Benedict IX	1032	1045
148	Gregory VI	1045	1046
149	Clement II	1046	1047
150	Damasus II	1048	
151	Saint Leo IX	1049	1054
152	Victor II	1055	1057
153	Stephen X	1057	1058
154	Benedict X	1058	1059
155	Nicholas II	1059	1061
156	Alexander II	1061	1073
157	Saint Gregory VII	1073	1085
158	Victor III, Blessed	1087	1087
159	Urban II, Blessed	1088	1099
		Twelfth Century	
160	Paschal II	1099	1118
161	Gelasius II	1118	1119
162	Calixtus II	1119	1124
163	Honorius II	1124	1130
164	Innocent II	1130	1143
165	Celestine II	1143	1144
166	Lucius II	1144	1145
167	Eugenius III, Blessed	1145	1153
168	Anastasius IV	1153	1154
169	Adrian IV	1154	1159
170	Alexander III	1159	1181
171	Lucius III	1181	1185
172	Urban III	1185	1187
173	Gregory VIII	1187	
174	Clement III	1187	1191
175	Celestine III	1191	1198
		Thirteenth Century	
176	Innocent III	1198	1216
177	Honorius III	1216	1227
178	Gregory IX	1227	1241
179	Celestine IV	1241	
180	Innocent IV	1243	1254
181	Alexander IV	1254	1261
182	Urban IV	1261	1264
183	Clement IV	1265	1268
184	Gregory X	1271	1276
185	Innocent V, Blessed	1276	
186	Adrian V	1276	
187	John XXI	1276	1277
188	Nicholas III	1277	1280
189	Martin IV	1281	1285
190	Honorius IV	1285	1287
191	Nicholas IV	1288	1292
192	Saint Celestine V	1294	
193	Boniface VIII	1294	1303
		Fourteenth Century	
194	Benedict XI	1303	1304
195	Clement V	1305	1314
196	John XXII	1316	1334
197	Benedict XII	1334	1342
198	Clement VI	1342	1352
199	Innocent VI	1352	1362
200	Urban V, Blessed	1362	1370
201	Gregory XI	1370	1378
202	Urban VI	1378	1389
203	Boniface IX	1389	1404

	Pontiff	Pontificate	
		Fifteenth Century	
		A. D.	A. D.
204	Innocent VII	1404	1406
205	Gregory XII	1406	1415
206	Alexander V	1409	1410
207	John XXIII	1410	1415
208	Martin V	1417	1431
209	Eugenius IV	1431	1447
210	Nicholas V	1447	1455
211	Calixtus III	1455	1458
212	Pius II	1458	1464
213	Paul II	1464	1471
214	Sixtus IV	1471	1484
215	Innocent VIII	1484	1492
216	Alexander VI	1492	1503
		Sixteenth Century	
217	Pius III	1503	
218	Julius II	1503	1513
219	Leo X	1513	1521
220	Adrian VI	1522	1523
221	Clement VII	1523	1534
222	Paul III	1534	1549
223	Julius III	1550	1555
224	Marcellus II	1555	
225	Paul IV	1555	1559
226	Pius IV	1559	1565
227	Saint Pius V	1566	1572
228	Gregory XIII	1572	1585
229	Sixtus V	1585	1590
230	Urban VII	1590	
231	Gregory XIV	1590	1591
232	Innocent IX	1591	
233	Clement VIII	1592	1605
		Seventeenth Century	
234	Leo XI	1605	
235	Paul V	1605	1621
236	Gregory XV	1621	1623
237	Urban VIII	1623	1644
238	Innocent X	1644	1655
239	Alexander VII	1655	1667
240	Clement IX	1667	1669
241	Clement X	1670	1676
242	Innocent XI	1676	1689
243	Alexander VIII	1689	1691
244	Innocent XII	1691	1700
		Eighteenth Century	
245	Clement XI	1700	1721
246	Innocent XIII	1721	1724
247	Benedict XIII	1724	1730
248	Clement XII	1730	1740
249	Benedict XIV	1740	1758
250	Clement XIII	1758	1769
251	Clement XIV	1769	1774
252	Pius VI	1775	1799
		Nineteenth Century	
253	Pius VII	1800	1823
254	Leo XII	1823	1829
255	Pius VIII	1829	1830
256	Gregory XVI	1831	1846
257	Pius IX	1846	1878
258	Leo XIII	1878	1903
		Twentieth Century	
259	Pius X	1903	1914
260	Benedict XV	1914	1922
261	Pius XI	1922	

Black Death. One of the most famous and most destructive plagues of history. Spreading westward from Asia, it swept away from one-third to one-half the population of Europe in the years 1347–50. The disease was named from the black spots that appeared on the bodies of those afflicted. It may have been similar to what is now called "bubonic plague."

Black Hole of Calcutta. A small cell, intended for two or three men, in the East India Company's citadel, Fort William. The story told by the commandant, J. Z. Holwell, is that the subahdar of Bengal, who stormed the fort, June 20, 1756, had his guards drive all the white inmates of the fort, 146 in number, into this almost airless room where they were left overnight to die of suffocation. Only 23 were alive in the morning. Recent studies have seriously discredited this story. Some authorities maintain that only nine men, East India Company officers, were imprisoned, two of whom died of wounds.

Boers (*bōōrz*). The Dutch colonists in South Africa. Boer is a Dutch word meaning peasant or farmer. The Boers first settled in Cape Colony in 1652. Through a century and a half of pioneer life, these people maintained a stern type of Calvinistic faith which intensified their severe exclusiveness. Besides, they firmly believed in their right to enslave the native peoples. When the colony was finally ceded to Great Britain in 1815, the policies of the new government in respect to the natives roused the opposition of the Boers. In 1835 they started the Great Trek, or migration, to the Orange River district, where they settled in the Orange Free State. Later, a large body moved beyond the Vaal, where they organized the Transvaal Republic. Here, under the presidency of Paul Kruger, elected in 1883, they maintained a stubborn independence until the victory of the British in the Boer war. Since that time, through the statesmanship of such men as Lord Milner, General Botha, and General Smuts, the reconciliation of Boers and English has progressed rapidly inside the Union of South Africa.

Bolsheviki (*bŏl'shĕ-vē-kē'*; *bŏl'shĕ-vē'kē*). The name applied to the majority party at the second congress of the Russian Socialist party in 1903, as opposed to the Mensheviki, or minority. The name is derived from the Russian word for majority. The party stood for an application of communism and its program called for the capture of the means of production by the proletariat, by force if necessary, the proletariat continuing to exercise a dictatorship over society.

The Russian revolution of March 1917 gave the Bolsheviki an unrivaled opportunity for carrying their program into effect. Under the ruthless leadership of Lenine, the government was seized in November of the same year and all means of production, including the land, were declared to be property of the state. The most acute economic distress as well as widespread famine ensued, forcing a modification of this system in the direction of capitalistic production. Lenine's hopes for a world-wide revolution in favor of communism were doomed by this economic failure within his own country. See *Russia*, page 505c.

Botany Bay. A small inlet on the coast of New South Wales, where the first convict establishment was formed in 1788. Later in the same year the penal settlement was removed to Port Jackson, but the name Botany bay was constantly used, generically, for the convict settlements in Australia. Captain Cook, in 1770, gave the bay its present name on account of the many strange plants he found there.

Bourbon Family. Members of this royal line have governed France, Spain, the Two Sicilies, Lucca, and Parma. The family is traced to Robert of Clermont, youngest son of Louis IX, but the name comes from Louis, duke of Bourbon, who died in 1341. French kings of this house were Henry IV, Louis XIII, XIV, XV, XVI, XVII, XVIII, and Charles X.

Boxer Uprising. The patriotic, antiforeign demonstration in China in 1900 led by the Chinese secret society called "The Fist of Righteous Harmony" or, popularly, "Boxers." The outbreak was precipitated by the foreign occupation of Chinese ports,—Kiaochow by Germany, Port Arthur by Russia, Weihaiwei by England, and Kwang-chow by France. The government failed to control the insurgents, and the warships of the powers, except the United States, intensified the antiforeign feeling of the Chinese by bombarding the forts at Taku. The foreign legations at Peking were besieged, and finally a relief force of Japanese, Russian, British, French, German, and American troops, commanded by Count Waldersee, advanced on the capital and relieved the legations on August 14. The 9th regiment, United States army, suffered heavy losses, including its colonel and several other officers. Military operations continued until the spring of 1901. An indemnity of $333,000,000 was imposed on China by the allied powers, the United States later resigning claim to its share. See *China*.

Boycotting. A system of reprisals organized in 1880 by the Land League in Ireland in return for the harsh treatment of tenants by landowners and their agents. It took its name from one Captain James Boycott, a landlord of Mayo. The victim of boycotting was cut off from the social and commercial life of the community, being permitted neither to buy nor to sell, and those attempting to deal with him were treated in like manner. The weapon has been put to frequent use in labor disputes.

Brest-Litovsk (*brĕst'lyĕ-tôfsk'*), **Treaty of.** The treaty of peace concluded March 3, 1918, between Germany and the Bolsheviki, by which Germany was to gain control of Finland, the Baltic provinces, Lithuania, Poland, and the Ukraine, and direction of Russian industry. Although never enforced, it enabled the Germans to transfer troops to the western front at a critical moment of the World War. See *World War*, page 539b.

British Commonwealth of Nations. This term was used officially for the first time in the text of the Irish Free State treaty of 1921. It relates to the self-governing dominions within the British Empire. These comprise Canada, Australia, Irish Free State, South Africa, New Zealand, and Newfoundland. The Imperial Conference of 1926 furthered the notion of sovereignty as pertaining to this group. It agreed to a resolution according to which their prime ministers, instead of reporting to the secretary of state for the colonies, were to communicate with the prime minister of Great Britain, thus recognizing a virtual partnership within a Commonwealth in lieu of the old and virtually long discarded colonial-imperial connection. As a consequence, the dominions may enter severally into diplomatic relations with foreign states; yet the written constitution of each dominion is still in form an act of the British Parliament, which can be altered only by an amending act through the same authority, and the court of final appeal for each dominion remains the judicial committee of the British Privy Council See pages 440-441.

Buccaneers. An association of sea rovers formed about 1525, to harry the Spanish possessions in South America and prey upon their commerce. They were of various nationalities, but chiefly English and French, their most famous leaders being Montbars, known as the Exterminator, and Henry Morgan, afterwards Sir Henry and deputy-governor of Jamaica. Under the latter leader they crossed the isthmus and sacked the city of Panama in 1671, and for years they paralyzed the Spanish trade, both in the Caribbean Sea and in the Pacific. They ceased to exist as an association early in the 18th century, but some of them continued careers of indiscriminate piracy for many years longer. The name is said to be derived from *buccan*, which in the Caribbean islands meant to dry meat on a frame, or *buccan*, over smoke. The early French adventurers adopted this custom.

Bulgarian Atrocities. A rising of the Mohammedan inhabitants of Bulgaria, assisted by the Bashi-Bazouks, or Turkish Irregulars, against the Christians in 1876. Thousands of Christians were massacred and horrible cruelties were perpetrated, though it is held by some authorities that the stories told were grossly exaggerated. Turkey refused redress, and Russia consequently declared war in the following year.

Burgundy. The name is derived from the Burgundians, a Teutonic people who settled in eastern Gaul in the 5th century. In 1361 the duchy of Burgundy, of which the chief town was Dijon, became a possession of the French crown. It was conferred upon Philip the Bold. He and his vigorous descendants enlarged their territories until, in the

15th century, Burgundy was one of the most important European states, controlling the rich territories and cities of the Low Countries, now Holland and Belgium. Duke Charles the Bold successfully maintained his position against the scheming Louis XI, until he was slain at the battle of Nancy in 1477. The Burgundian realms were then divided between France and Austria, since the Habsburg Maximilian had married Mary, daughter and sole heir of Charles.

Cahiers de Doléances (*kȧ'yā' dĕ dō'lā'ȧns'*). "Documents of Grievances." These documents contained representations of grievances and demands made by the people. They were signed and laid before the king of France in 1789 by the deputies of the States-General. The principal demands were: suppression of the sale of public offices; the abrogation of judicial power claimed by the owners of certain hereditary estates, who acted as resident magistrates; the repeal of the gabelle, an iniquitous tax on salt; the abolition of the corvée, which exacted free labor from the peasant on the part of the landowner; the suppression of the militia ballot; religious toleration; and better conditions for the clergy.

Caliphate of Cordova. The powerful western dynasty of caliphs. After the decisive battle of Tours in 732, Cordova became the capital of Moorish Spain. Abderrahman, one of the family of Ommiad caliphs of Damascus, who had escaped the massacre inflicted on his house by the rival Abbassides, founded there a new caliphate. Under this powerful dynasty, the caliphate of Cordova became, in culture, wealth, and splendor, the formidable rival of the Abbasside caliphate at Bagdad. The division thus made in the world of Islam relieved Europe from the threatened danger of Mohammedan conquest. See *Abbassides*, *Arabs*, *Moors*, *Spain*.

Canossa. The castle of Matilda of Tuscany, where Gregory VII was staying when the emperor Henry IV made a pilgrimage to Italy, in 1077, to make his submission to the pope, who had excommunicated him. He was treated in the most humiliating fashion by Gregory, who left him for three days in the snow in the courtyard of the castle before consenting to receive him. It is to this incident that Bismarck referred in the famous phrase, *Nach Canossa gehen wir nicht*, "We are not going to Canossa," uttered in the Reichstag in 1872, during the *Kulturkampf*. See *Germany*.

Capetian Dynasty. The remarkable line of kings who ruled France from the election of Hugh Capet in 987 to the fall of Louis Philippe in 1848. The real father of the line was Robert the Strong, said to have been the son of a butcher in Paris. He and his son Odo held the Northmen back from Paris and central France. Odo was chosen king in 887, and in 987 his grandnephew Hugh was made king when the Carolingian line had died out. The name *Capet* comes from Hugh's custom of wearing an abbot's *cape*. The first break in the direct line of descent came with the accession of Philip VI (of Valois) in 1328. The houses of Valois, Bourbon, and Orleans were branches of the Capetian family. See *France*.

Carolingian or **Carlovingian Dynasty.** The second dynasty of the Frankish kings. The name is derived from the Latin *Carolus* (Charles), the name of Charles Martel or of Charles the Great. The first king of the line was Pepin the Short, son of Charles Martel, who deposed the Merovingian king in 751. Charles the Great, or Charlemagne, the greatest of the family, reigned from 768 to 814. His successors were weak, and the line died out with Louis V in 987. See *France*.

Casa Blanca Case. In 1907, the French Engineering Company was engaged in constructing a railway in Morocco. Over the protest of the native population, the company ran the railway through a Moorish cemetery at Casa Blanca. An uprising of the natives followed and a number of French workmen were killed. The French government then demanded certain assurances of the native princes of Morocco. A conference of interested European powers was held, and an agreement was reached in 1906, known as the Act of Algeciras, which, in effect, gave to France authority to maintain order in Morocco.

From that time on, Morocco became a storm center of European politics. Germany took a strong stand against the arrangement of Algeciras, which seemed to be the opening wedge leading to French control in North Africa. In 1911, Germany sent a warship to Agadir and war was with difficulty avoided. Thanks to England's support, France was able to obtain from Germany, in 1912, recognition of her rights in Morocco. Germany felt this as a humiliation and immediately increased her army. The incident was, thus, one of the causes of the World War.

Cavaliers. Royalist sympathizers in England and in the American Colonies during the reigns of Charles I and Charles II. See *Roundheads*.

Cawnpore or **Cawnpur, Massacre of.** The massacre by Nana Sahib of the English garrison in Cawnpore, during the Indian mutiny of 1857. The garrison had surrendered under a pledge of being permitted to retire unharmed. Of those massacred, 560 were women and children. See *India*, *Sepoy Mutiny*.

Chaldea (*kăl-dē'ȧ*). The most ancient name of the territory in the lower Tigris and Euphrates valley, practically identical with Babylonia. About 2800 B. C. it became the center of an empire under Sargon, king of Accad. His power extended into the northern Mesopotamian valley and westward to the Mediterranean, but after his death this empire broke up. New Arabian invaders entered Chaldea and made Babylon their capital. They continued to spread Chaldean culture, traditions, and the cuneiform (wedge-shape) system of writing over all western Asia.

Chartist Movement, The, or **Chartism.** A radical reform movement in England in the period from 1838 to 1848. The name arose from the National or People's Charter drawn up by a group of members of Parliament and workingmen, which demanded universal suffrage and salaries for members of Parliament. The causes of the movement were the failure of the Reform bill of 1832 to include the working classes in its benefits and the terrible misery and want among these classes. The movement continued, with various attempts to secure Parliamentary action and with frequent riots, until 1848, when some improvements in working conditions and a period of cheaper food following the repeal of the corn laws robbed it of its strength. See *England*.

Children's Crusade. This tragic incident of the period of the Crusades has been the theme of sober history and of legend. The facts are established that thousands of children and youths—their numbers being estimated at from 50,000 to 90,000—inspired apparently by the crusading spirit of the times, left their homes in the year 1212 and marched in many bands toward the Mediterranean ports of embarkation for the Holy Land. The leaders in France and Germany were two peasant boys. Some of the bands were accompanied by a few older persons, who in most cases appear to have preyed upon the children rather than to have protected them. The fate of the young crusaders is obscure. Some returned sadly to their homes, but many lost their lives. Some are said to have been lost at sea; others, sold into slavery.

Cinque (*sĭngk*) **Ports.** The ancient name of five English Channel ports, Sandwich, Dover, Hythe, Romney, and Hastings, to which later two more,

Winchelsea and Rye, were added. *Cinque* is the Old French word for "five." These towns were granted certain independent privileges by the early Norman kings, in return for which their chief service was to furnish ships and sailors to the king, England having no regular navy before the reign of Henry VII (1485–1509). The ancient privileges have been abolished; but the office of warden, or governor, of the Cinque Ports still remains, a sinecure with a salary of £3000 a year.

Clan-na-Gael (*klăn'nà-gāl'*). An Irish secret society, an offshoot of the Fenians, formed in 1881. It was composed of the extreme physical force men among the Fenians and was known also as the United Brotherhood. See *England, Fenians, Ireland.*

Cockpit of Europe. The name given to Belgium on account of the numerous important battles which have been fought there. See *Belgium.*

Code Napoleon. The code of law issued by Napoleon in 1804. It was based on the old French law, with such alterations as had been rendered necessary by the Revolution, and on certain new provisions, introduced by Napoleon, notably those relating to the law of succession and to the marriage law. For the purpose of this codification, which remains the law of France, he called to his councils the most eminent French lawyers, irrespective of party,—among others Tronchet, Cambacérès, Portalis, and Roederer.

Code of Justinian. The systematic body or code of Roman law prepared by a commission of lawyers appointed by the emperor Justinian (527–565). This code, called the *Corpus Juris Civilis*, or "Body of Civil Law," became the basis of nearly all modern European legal systems. Its principles influenced the common law of England, which has prevailed also in the United States. See *Rome.*

Commune, Paris. An outbreak of the extreme revolutionary party in Paris in 1871 (March 18–May 27), after the National Assembly, which met at Bordeaux, had agreed to peace with the victorious Germans, ceding Alsace and Lorraine, and had decided to transfer its sittings to Versailles rather than to Paris. The radical Parisians accused the Assembly of being monarchist and of the design of overthrowing the republic constituted the September previous. Among the revolutionaries were leading socialists and representatives of the *Internationale.* One of the leading projects was to grant autonomy to the communes, or city governments, uniting them by a loose tie to the central government. Among their leaders were Delescluze, Félix Pyat, Paschal Grousset, Raoul Rigault, and General Cluseret. Thiers, who had been chosen head of the executive in the new government, reorganized the army and prepared to capture Paris. The Germans still occupied the forts on the northern side of the city, for the Peace of Frankfort was not signed until May 18. In the struggle that followed, neither side gave quarter. The *Communards* even put to death the hostages they had seized, including the archbishop of Paris. In the final week, when Paris was attacked street by street, they burned many great public buildings, including the palace of the Tuileries and the Hôtel de Ville. Thousands of those who were captured by the national troops were shot without a trial. Others were tried and executed, and still others were exiled. For years the socialist party remained without leaders.

Concert of Europe. A diplomatic term long applied to the idea of European powers acting as a unit. Such a concert of princes was set up after the Congress of Vienna in 1815. This broke down before the rise of national ambitions. The ideal expressed in the phrase is a vague foreshadowing of a league of nations. See *Congress of Vienna*; *France*; also *Concert of Powers*, under department of Government.

Concordat (*kŏn-kôr'dăt*), **French.** An agreement entered into in 1801, but abrogated in 1905, between Napoleon and the pope, providing for the re-establishment of the French Catholic Church, which had been disrupted during the Revolution. Roman Catholicism was declared to be the religion of the majority of the French nation. It was agreed, among other provisions, that bishops were to be nominated by the government, but consecrated by the pope. The nomination of parish priests was vested in the bishops, the government having a right of veto. The state undertook to see that adequate stipends were provided for the clergy, to replace the ancient revenues which had been confiscated during the Revolution. See *France.*

Concordat of Worms. The agreement reached in 1122 between the German emperor, Henry V, and the pope upon the old dispute over the appointment and investiture of bishops. It provided that bishops should be elected by the clergy and consecrated by the pope, but that the emperor might veto any election, since he was to invest the bishop with the episcopal lands. See *Germany.*

Condottieri (*kôn'dôt-tyâr'ē*). Soldiers of fortune who hired themselves out to the various petty states of Italy during the wars of the 14th and the 15th century. Their contests came to be bloodless, because each side wanted only to take prisoners for the sake of ransom money to be exacted.

Confederation of the Rhine. A league of German states, at first chiefly southern but finally including all, save Prussia and Austria, with Napoleon as "protector," formed in 1806. These states were permitted to absorb many of their smaller neighbors by a process known as "mediatization." They withdrew from the Holy Roman Empire, which then came to an end. Together with the "secularizations" in 1803, which destroyed the independence of 112 ecclesiastical, city, and other small states, the annexations of 1806 marked the beginning of unification in Germany. The Confederation was broken up in 1813 by the defeat of Napoleon at Leipzig. See *France, Germany.*

Congress of Berlin. A congress held at Berlin in 1878, after the conclusion of the Russo-Turkish war. The outcome of the congress was a treaty which modified the terms of the Treaty of San Stefano. Rumania, Serbia, and Montenegro were made independent states, Montenegro also obtaining a port on the Adriatic. The northern portion of Bulgaria was made a self-governing state, under the suzerainty of the Porte, and the southern portion, known as Eastern Rumelia, remained Turkish territory, but under a Christian governor. Austria was to administer Bosnia and Herzegovina; Rumania returned a portion of Bessarabia to Russia, while, in Asia, Turkey ceded Ardalian, Kars, and Batum to Russia. The action of the congress prevented the formation of a strong Slav state in the Balkans and kept Russia out of the Mediterranean. It is of this treaty that Lord Beaconsfield used the famous phrase "We have brought back peace with honor." In 1909 Great Britain, Germany, France, and Russia consented to Austria's annexation of Bosnia and Herzegovina. See *World War.*

Congress of Vienna, The. The congress of all the sovereigns of Europe, called after the fall of Napoleon by the four powers allied against him. It met in Vienna in November 1814, and completed its work in June 1815, after the final defeat of Napoleon at Waterloo. The general purpose of the congress was to restore all "legitimate" princes and kings, as nearly as possible, to the power they enjoyed before the French Revolution. The interests and desires of nations and peoples had no place in the plans of this great reactionary congress. All republics, old and new, except Switzerland, were given to monarchs. The 12 states of Italy and the 38 of Germany were restored to their old ruling families. Holland, with Belgium unwillingly added,

was made the Kingdom of the Netherlands. Territory west of the Rhine, taken from France, was divided between Bavaria and Prussia. To Austria went Venice in exchange for Belgium. Russia took the kingdom of Poland and also secured Finland from Sweden, which as compensation received Norway (formerly Danish). Prussia, with half of Saxony and land west of the Rhine as her share of the spoils, was set on the road to German leadership. England obtained some colonial territory, including Cape Colony and Ceylon.

But the congress did some constructive work. At the suggestion of England, it declared against the slave trade. It also declared that navigable rivers flowing through or between different countries should be open to all commerce, and it guaranteed the neutrality of Switzerland.

Conservatives, English. One of the two great political parties of Great Britain. This party has usually been regarded as opposed to radical change or innovation of any character in government, and particularly to the liberal, socializing movements which seek to increase the political power of the masses, to ameliorate their conditions, and to mitigate the effects of the uneven distribution of wealth. The party has in the past drawn most of its strength from the so-called "landed aristocracy," and other landed interests of England. It is the direct successor to the Tory party of the 18th and early 19th centuries, the name Conservative having been substituted for the older name Tory soon after the Reform act of 1832. Although the Conservative has traditionally been regarded as the party of reaction, yet under the leadership of Disraeli in 1867, and of Salisbury in 1884, this party was responsible for the extension of the franchise to the great mass of the English people. In recent years, the Conservative party has been regarded as the party of Imperialism, standing for the extension and strengthening of the British Empire.

Constitutions of Clarendon. A body of 16 regulations drawn up at the Great Council summoned by Henry II of England to meet at Clarendon in 1164. These regulations were intended to settle points in dispute between king and clergy. They specified, among other things, that clergy accused of civil crime should be turned over to the civil courts for punishment. Archbishop Thomas Becket refused to sign the document. After Becket's murder, Henry, in 1172, seeking reconciliation with the pope, renounced the Constitutions. But some of their provisions remained in force as permanent gains to the civil power in England. See *England*.

Corn Laws. English laws regulating grain imports. In 1815, in the midst of agricultural and industrial depression following the end of the Napoleonic wars, a Parliament made up of landowners passed a law forbidding the importation of corn (wheat) unless the price should rise to 80 shillings a quarter. The price, however, went down. This law was amended from time to time, to provide heavy import duties whenever the English harvest was good, in order to keep prices up. In 1838 an Anti-Corn-Law League was organized, which worked for the repeal of the corn laws. No action was secured until, under the stimulus of the Irish famine in 1845-46, a repeal bill introduced by the prime minister, Sir Robert Peel, was passed in 1846. This act is an important incident in the long controversy between protectionists and free traders. See *Chartist Movement*, *England*, *Ireland*.

Corvée (*kôr'vā'*). Enforced labor on the roads and other public works, exacted from the French peasants before the Revolution. Distinction should be made between the "royal" corvée, which exacted from 8 to 40 days of labor on the high roads, and the "seignioral" corvée, or services claimed by the lords. The latter had nearly disappeared by the 18th century. The same system prevailed in Egypt prior to the English occupation.

Coup d'Etat (*kōō dā'tä'*). There is no English equivalent for this term. It means the sudden overthrow of government by force and the consequent seizure of state and power. (1) The most remarkable example of this in history is the *coup d'état* of Napoleon I. The government of France from 1795 to 1799 was known as the Directory. It had proved corrupt and incompetent. Napoleon, now the idol of France by reason of his successful campaigns, saw his opportunity. With the aid of Abbé Sieyès, a statesman who planned a change in the constitution, Napoleon overthrew the Directory on the 18th of Brumaire (November 9, 1799). The plan of Sieyès was adopted but with drastic amendments dictated by Napoleon. Napoleon was chosen first consul and given the substance of power, his two colleagues being merely consultative. In 1802 he was made consul for life and on May 18, 1804, was proclaimed emperor of the French.

(2) Half a century later a similar *coup d'état* was made by Louis Napoleon Bonaparte, nephew of Napoleon I. Louis conceived the idea that he had a right to rule over France. The revolution of 1848 gave him the opportunity of offering his services to that country. He knew the name he bore was one to conjure with. He became a candidate for the presidency and was elected with an overwhelming majority in December of the same year. He had taken an oath to uphold the Republic. On Dec. 2, 1851, he broke this oath. In the early hours of the morning he had the civil and military leaders who might prove obstacles to his plans arrested. These were afterwards imprisoned or exiled. He next proclaimed martial law throughout France and instituted a plebiscite. The French people were to register their vote on the question of the re-establishment of the imperial dignity. The people proved willing to make the experiment, and on Dec. 2, 1852, Louis Napoleon Bonaparte, having skillfully maneuvered his *coup d'état*, was proclaimed emperor of France under the name of Napoleon III.

Curfew. From *couvre feu*, meaning "cover fire." The famous enactment of William the Conqueror, ordering all persons in the country districts to be in their houses, with all lights extinguished, by eight o'clock in winter and by sunset in summer. It was presumably designed to prevent secret meetings and conspiracies directed against the king, of which there were many, owing to his unpopularity with the Saxon element of the population.

Declaration of London. A set of rules formulated by an international conference at London in 1909, designed to govern the naval prize court established at The Hague in 1907. The Declaration was never accepted by a sufficient number of nations to put it in force. Many of its provisions were obsolete,—cotton, for example, a constituent of modern explosives, being declared never contraband. At the outbreak of the World War, Great Britain announced that the Declaration would be adhered to by the Allies. But under the stress of actual war conditions the provisions of the Declaration of London broke down completely. See *World War*, page 530b.

Declaration of Paris. A formal statement of rules governing naval warfare, drawn up by the powers that signed the Treaty of Paris in 1856 after the close of the Crimean war. These rules abolished privateering; established the protection of enemy goods, except contraband, by a neutral flag, the protection of neutral goods, except contraband, by an enemy flag; and declared that blockades, to be binding, must actually be effectively maintained by naval force. The United States, not having a strong navy, maintained that in war she would be dependent upon privateers, and therefore did not adopt the Declaration.

Disarmament. The abandonment of huge naval and military establishments or the radical reduction of them by international agreement was discussed

at the Congress of Vienna in 1815. But the state of European affairs in the later 19th century, especially after 1859, brought about compulsory military service and increase of armaments. The Hague Conference of 1899 failed to make any progress in the matter, chiefly because of the opposition of Germany. The Hague Conference of 1907 recommended "serious examination of this question." After the close of the World War, the enormous economic burden of war debts and of increasing expenditures for naval and military establishments forced the great nations to consider means of reducing armaments. See *Washington Conference.*

Divine Right. The patriarchal theory or doctrine that neither kings nor their heirs for any reason whatsoever can forfeit their right to the throne and to the obedience of their people. Under this theory, the king is the direct representative of God and can do no wrong. This doctrine was promulgated and reached its climax in England in the Stuart times, but it was set aside at the accession of William III as king of Great Britain and Ireland in 1688.

Domesday Book. A book containing a written synopsis in Latin of the census of the population, lands, and live stock of England, compiled under the direction of William the Conqueror and completed in 1086. The work forms the most valuable existing source of facts about early English history.

Draco, Laws of. In the latter part of the 7th century B. C., the people of Athens, suffering under the unjust administration of justice by the ruling class of nobles, demanded a written code. An Athenian named Draco was employed to draw up such a body of laws. The severity of these laws, under which the penalty for most offenses was death, gave rise to the saying that the Draconian code was written, "not in ink, but in blood." Draconian has become a synonym for severe or harsh.

Drang nach Osten. A German phrase meaning "push toward the East." It was originally applied to the eastward extension of German power over Slavic and Baltic territory. Its most important meaning, however, is that steady extension of German and Austrian influence in the Balkans and in Asia Minor which brought on the World War.

Dreyfus (*drā'fŭs'*) **Affair.** The imprisonment and persecution of Alfred Dreyfus, member of a wealthy Jewish family and an officer on the general staff of the French army. He was charged in 1894 with revealing military secrets to a foreign government, condemned, and sent to Devil's island for life. New evidence was discovered in 1896, pointing to another officer, Esterhazy, as the real traitor. A new court-martial in 1899 again condemned Dreyfus, but this time to only ten years' imprisonment. President Loubet gave him a full pardon. The Court of Cassation reviewed the case in 1906, declared the court-martial verdict in error, and Dreyfus was restored to the army and promoted. The whole affair was really the climax of anti-Semitism in France.

Druids (*drōō'ĭdz*). The powerful order of priests and judges who ruled the Celtic peoples of Gaul, Britain, and Ireland. The institution of druidism was probably common to all the Celts, but the best description of it is that given by Cæsar, who observed it in Gaul. The druids gathered youths about them for oral instruction, as they never committed their secret lore to writing. The oak and the mistletoe were sacred among the druids, and their ceremonies were frequently performed in oak groves. They used their influence against the Romans, but they were finally driven to the island of Anglesey and subdued in 78 A. D.

Dual Citizenship. A condition which grows out of the two common ways of reckoning citizenship: (1) according to the place of one's birth, (2) according to the citizenship of one's father. Thus a person born of a French father in the United States might be held to be a citizen both of France and of the United States. The German law of 1913 encouraged a pernicious form of dual citizenship by allowing Germans to hold citizenship both in Germany and in the country of their residence.

Dual Monarchy. The name used to describe the organization of the empire of Austria-Hungary from 1867 to 1918. The two states stood on a plane of complete equality, the emperor of Austria being king of Hungary. Although each had its own Parliament, there was a joint ministry of three departments—foreign affairs, war, and finance. The ablest foreign ministers of the empire were Hungarians.

Dukhobors (*dōō-kŏ-bôrz'*). A Russian religious sect, founded about the middle of the 18th century at Kharkov. Their principal tenet is that Christ was only human, not divine, and that at certain periods He reappears in mortals. They reject the need of rulers, priests, or churches, and have no confession, images (*icons*), or marriage ceremonies. They are opposed to all violence and refuse to make use of the labor of animals. Driven out of Russia, many of the Dukhobors emigrated to western Canada. Conflict with authorities, chiefly over educational regulations, led this group in 1926 to sell the 50,000 acres they had acquired, in order to return to Russia.

East India Company, British. "The Governor and Company of merchants trading to the East Indies," chartered in 1600, became in time incorporated with several other important companies and in 1660 was known as "The United Company of Merchants Trading to the East Indies." It is usually referred to as the British East India Company.

In 1612 it obtained from the rajah of Delhi the privilege of establishing a factory at Surat, which was regarded as the chief British station in India until a later organization at Bombay. By a charter of Charles II in 1661, it was empowered to sign treaties, make peace or war with infidels, erect fortifications, acquire territory, and exercise civil jurisdiction. In 1668 it secured a grant of the Island of Bombay, and in 1675 established a factory in Bengal which paved the way to the foundation of Calcutta. A dispute with the rajah of Tanjore in 1749 resulted in a series of territorial acquisitions which became the nucleus of the British Empire in India. A board of control was eventually set up by Parliament in 1784, and in 1858 the company gave over the reins of government to the British crown. See *England, India.*

East India Company, Dutch. A company formed by the union of several small trading companies, March 20, 1602. The government granted it a charter, by which it was given the monopoly of trade on the farther side of the Strait of Magellan and of the Cape of Good Hope. It was also given the right to establish factories, build fortresses, employ soldiers, and make alliances in the name of the States-General. In 1619 it established the colony of Batavia in Java; within less than half a century it became the principal trading power in Ceylon, Sumatra, and Borneo, and possessed flourishing colonies in South Africa. In 1795 the company became insolvent, and its territories were handed over to the state.

Elamites (*ē'lăm-īts*). The ancient people who inhabited the plateau and plain east of the lower Tigris and north of the Persian gulf. The name is derived from the Assyrian word for "highlands." The race to which they belonged is not known. They maintained a long struggle against the Babylonians and Assyrians. The latter finally subdued the Elamite state in 642 B. C. Later references to Elam are uncertain, the word sometimes meaning Persia.

Electors. In the Holy Roman Empire, a body of German princes, originally seven in number, with whom, from the 13th to the beginning of the 19th century, rested the election of the emperor.

Emancipation Act. For many years the English courts of law strongly held that slavery should not be allowed to exist in any part of the British dominions and that in tolerating it the prestige of England suffered. Two of the greatest pleaders in the cause of the slave were Sir Thomas Buxton and Zachary Macaulay, father of the historian. In 1833, Colonial Secretary Stanley came into office. A man of great ability and ardent temperament, he set to work to master the details of this crying injustice. In the space of three weeks he introduced into Parliament a bill for the complete abolition of slavery, which was immediately passed. All children under six and those born after the passing of the act thenceforward were free. All others ceased to be slaves, but were to remain as apprentices to their masters for a period of twelve years. The slave owners were indemnified for their loss in the sum of $100,000,000. Though they showed dissatisfaction with this amount, they were forced to accept it. The system of apprenticeship proved, after four years, to be unsatisfactory and so was abandoned. See *Slavery*, page 578.

Emigrés (*ā'mē'grā'*). The name given to the French aristocracy, or, more accurately, to the partisans of the *ancien régime*, or royalists, who were forced to fly from France during the French Revolution. The émigrés, in order to crush the Revolution, appealed to other European powers to send armies into France. For this, the Legislative Assembly and the Convention passed measures of reprisal against the émigrés, whereby their lands and estates became forfeit to the Republic.

Entente Powers or **Triple Entente** (*äN'täNt'*). England, France, and Russia, who, before the opening of the World War, had concluded an *entente* or "understanding" among themselves with respect to a common defensive attitude toward the Triple Alliance,—Germany, Italy, and Austria. This Triple Entente was not an alliance. It was composed of two "ententes." The first was negotiated in 1904 between England and France, in order to bring to an end controversies chiefly in relation to Egypt and Morocco. The second was between England and Russia, in 1907, and centered in Asiatic questions, marking out for the two powers spheres of interest in Persia. France was already bound to Russia by a military alliance. For this reason, when Germany declared war against Russia in 1914, France was necessarily involved. The obligations of England, on the other hand, were principally moral. See *Triple Alliance*, *World War*.

Fabian Society of Socialists. One of the most important socialistic societies in England, organized in London in 1884. It derives its name from Fabius, the Roman general, who hoped to conquer "by delaying," and supports meliorative tendencies rather than revolution.

Fascism (*fäs'ĭz'm*). A political party and governmental régime of contemporary Italy. Founded by Benito Mussolini at Milan in 1919, the movement was inspired by an exalted patriotism. Its members banded themselves together to crush communistic outbreaks and other disruptive factors in Italian life. Its expanding influence enabled Mussolini, at the head of his armed followers, to take control of the Italian parliament on October 28, 1922. The party's control of the government was maintained by drastic action but it won popular justification through the vigorous means taken to strengthen the economic and political condition of the country and to suppress class conflict.

Fashoda (*fă-shō'dă*) **Question.** Commercial and colonial jealousies between France and England in 1898 led to a French general's hoisting of the French ensign over Fashoda, which Great Britain regarded as within her particular zone of influence. English armies had for two years been engaged in a campaign against the Khalifa for the recovery of the Sudan. Their commander, General Kitchener, invited Marchand to withdraw. Marchand refusing, the matter was referred to London and Paris. France acquiesced in the wishes of England. On April 8, 1904, an agreement was signed between the two countries, each acknowledging the other's rights in Morocco and in Egypt. This friendly understanding came to be known as the *Entente Cordiale*. See *Entente Powers*.

Fenians. The members of an Irish revolutionary society, started in Paris in 1848. Their avowed object was the fomenting of disturbances in Ireland, to make the government of that country by England impossible. The leader was James Stephens. The Fenians in the United States attempted raids into Canada in 1866, 1870, and 1871. In 1867 a general rising in Ireland was planned. These projects were all anticipated or promptly suppressed.

Feudalism. The system of land tenure and personal relationships prevailing throughout Europe especially from the 9th to the 13th century. Its activating cause was the need of protection, which could no longer be secured by governmental authority. The base of the structure was the fief, a body of land which a tenant held from his lord who protected him in return for certain feudal services, such as aid in war. The tenant was thus also a vassal. The lord exercised judicial and many other rights over his tenants, who often became virtually his subjects. The tenant might also, if holding a large tract of land, grant parts of it to others, who would be his tenants and vassals and to whom he stood in the relation of lord.

Feuillants (*fū'yäN'*). The moderate monarchist party in the period of the French Revolution. It was formed by those who, in 1791, seceded from the Jacobin club, in which the republican element had gained the ascendancy. It ceased to exist in 1792.

Field of the Cloth of Gold. The meeting place of Henry VIII and Francis I, in the valley of Ardres on the border of the territory of Calais. This meeting, which took place in 1520, was arranged by Francis with the object of securing the friendship of Henry and detaching him from the Spanish alliance. The name arose from the magnificence of the display on both sides. No political result followed.

Flagellants (*flăj'ĕ-lănts*). A sect which appeared in Europe at various times during the middle ages. They looked upon scourging as the only means of avoiding the divine punishment for sin. The most notable outbreaks of this fanaticism occurred in Italy in 1260, and in Hungary during the terror occasioned by the Black Death in 1348. This later manifestation of unreasoning zeal spread, with the plague, over the whole of Europe. See *Black Death*.

Flodden Field. Name of a battle fought near the hamlet of Flodden in Northumberland, Sept. 9, 1513, between the Scots and the English, in which the Scottish king, James IV, was defeated and slain by the earl of Surrey.

Franco-Prussian War. The conflict between France and Prussia in 1870-71. The immediate occasion of the war was the election of a Hohenzollern prince to the throne of Spain. The chief military events were the siege of Metz and the siege of Strasbourg, in August and September 1870; the fall of Sedan on September 1, 1870; and the siege of Paris, September 19, 1870 to January 28, 1871. After the fall of Sedan, a republic was proclaimed at Paris, and a provisional government undertook the défense of the city. The close of the war saw the founding of the new German Empire. See *Alsace-Lorraine*, *France*, *Germany*.

Francs-Tireurs (*frän'tē'rûr'*). As the name implies, an independent band of "free-shooters," composed of French peasants who at first fought alone a guerrilla warfare against the Germans in the Franco-Prussian war of 1870. When captured, they were usually shot by the enemy as brigands. Later in the campaign they were organized by the French military authorities and used as a corps of detached light troops engaged in forays, skirmishes, and such minor actions. Thenceforward they were recognized by the Germans as lawful belligerents. See *Franco-Prussian War.*

Freedom of the Seas. This phrase means, in general, the right of the ships of any nation to free use of the highways of the sea. In particular it has come to mean: (1) that the jurisdiction of a government extends to a distance of three nautical miles beyond its coast line and no farther; (2) that neutral ships are not liable to capture on the high seas by belligerents in time of war; (3) that, in time of war, private property, unless contraband or destined for a blockaded port, is not liable to seizure. See *World War.*

Free Imperial Cities. Certain towns in Germany that owed allegiance to no sovereign prince except the emperor. They exercised sovereign powers within their own limits and sent representatives to the Imperial Diet. In 1790 they were 51 in number. Until the dismemberment of the German Empire at the close of the World War, Lübeck, Bremen, and Hamburg still retained the privilege of sending representatives to the Reichstag and the Bundesrath. Each is now a "free state and city" within the German Republic. See *Germany.*

Fronde (*frôNd*). The name given to the civil war which broke out in France, 1648–53, between the party of the court (Anne of Austria and Mazarin) and the parlement of Paris. The Fronde originated in the deplorable financial policy of Mazarin and passed through two phases. The first was known as the Old Fronde, in which the parlement, allied to Condé and Cardinal de Retz, played the principal rôle. The most notable incidents under its short régime were the arrest of Counselor Broussel, the setting up of barricades by the people of Paris, and the withdrawal of the court to Saint Germain. During the second phase, with the title of the Young Fronde or Fronde des Princes, Condé, Beaufort, and Madame de Longueville, with the secret support of Spain, gave battle to the royal troops under Turenne at Bléneau and Porte St. Antoine. Turenne proved superior on both occasions, and the revolt was crushed in 1653. The Old Fronde lasted from 1648 to 1649; the Young Fronde, from 1649 to 1653. The word *fronde* means a "sling," used sometimes by the small boys of Paris against the police. The adversaries of Mazarin had been called *frondeurs,* or "slingers," by a French humorist; hence the application.

Geneva Convention. An agreement made by the representatives of the great European powers at Geneva in 1864, by which were established more humane regulations regarding the sick and the wounded in war and also the status of those who attend them. Ambulances and military hospitals are regarded as neutral, as are physicians, chaplains, nurses, and the ambulance corps. In 1868, a second conference at Geneva supplemented the former one and partly applied its principles to naval warfare. The agreement received the sanction of all the European powers at the time, also that of the United States and of many other countries.

Germany, Unification of. The North German Confederation, which embraced the 22 states north of the river Main, was the work of Bismarck. The inclusion of the south German states was yet necessary to the perfect unification of Germany. Since Napoleon III was known to be averse to this plan, Bismarck deemed a war with France a necessary contingency. In this instance, it would seem "the wish was father to the thought," for on July 5, 1870, the rest of Europe woke to the fact that France and Prussia were at war. Germany emerged as victor from the series of campaigns. While the war was being waged, negotiations had been carried on between Prussia and the south German states. Accordingly, treaties were signed and the confederation widened so as to include all the German states. Thus was brought about the complete unification of Germany, and Bismarck's lifelong dream was realized. Berlin became the capital of a federal empire, and on Jan. 18, 1871, in the royal palace of Versailles, William I was proclaimed emperor of Germany.

Golconda. A ruined city in the Nizam's dominions, seven miles northwest of Hyderabad. It is celebrated for its fortress and for the mausoleums of its ancient kings. The diamonds cut and polished in Golconda were once world renowned. From 1512 it was the seat of a powerful government until it was taken by Aurungzebe in 1687 and made a Mogul province. See *Moguls.*

Golden Bull (Germany). So called from the golden seal with which it was stamped. The Golden Bull was an imperial edict issued in 1356 by the emperor Charles IV, which fixed the form and places of the imperial election and coronation. It also determined the privileges and duties of the electors. This electoral constitution continued unaltered until the extinction of the Holy Roman Empire in 1806.

Good Parliament. A Parliament of Edward III which met in 1376. The Commons refused to grant supply till an account of receipts and expenditures had been placed before them. Edward's brother Lancaster sought to intimidate the Parliament but failed. The Commons secured a new Council, from which Lancaster was debarred and in which William of Wykeham was included. They then proceeded to impeach, before the House of Lords, Lyons and Latimer on the charge of embezzlement of the king's revenue. Both were sentenced to imprisonment on the charge. These two cases form the first instance of the accusation of political offenders by the Commons before the House of Lords. See *England.*

Guelphs (*gwĕlfs*) and **Ghibellines** (*gĭb'ĕl-ĭnz*). The names of two celebrated political factions in the middle ages. The Guelphs were the popular party in Italy, and ranged on the side of the pope. The Ghibellines formed the imperial and aristocratic party, and were opposed to the Guelphs. In 1140 the two factions engaged in civil war. The imperialists besieged the town of Weinsberg, and the papal party under Welf VI endeavored to beat them back. In the course of the battle the family names of "Welf" and "Waiblingen" became the respective rallying cries of the contestants. The Guelphs were defeated in the battle of Weinsberg, and, though the quarrel between the two parties ceased in Germany, it was continued for other reasons in Italy, and the two names were used until the beginning of the 16th century to designate the two antagonistic factions. The usual writing of the names is the Italianized form. See *Italy.*

Gunpowder Plot. This was a plot engineered by a Catholic named Robert Catesby, in 1604, to blow up king, lords, and commons at the opening of Parliament. Both the Catholics and the Puritans of the time had appealed to James I for better treatment. They were being fined for recusancy, that is, for refusing to attend the services of the established form of worship. James remitted the fines for recusancy, but banished the Catholic priests from London. Thereupon, Catesby determined upon destroying the powers that dealt so harshly with his coreligionists. He communicated his plans to Guy Fawkes, a cool and intrepid soldier in Flanders. Fawkes favored them and came to England. By accident, the conspirators found that a

cellar ran beneath both houses of Parliament. Into this they managed to convey barrels of gunpowder, and the mine was laid for the second session of Parliament on Nov. 5, 1605. However, the plot was doomed to failure. One of the conspirators in fear betrayed the secret, and Fawkes was seized in the very act of setting the fuse to the powder. He, with those of his companions who were captured, was forthwith executed, and the persecution of the Catholics waxed stronger than before. See *England.*

Habeas Corpus Act. The Latin term is an injunction, meaning "Have thou the body" (in court). The act was passed by the Parliament of England during the reign of Charles II, 1679. The "habeas corpus" is a common law writ, or mandate, issued by a judge on the petition of some friend of an accused person detained in prison or in any other way deprived of liberty. It calls upon the jailer to bring such a person actually into court at a specified time, in order that his case may be examined and judgment passed. Moreover, any accused person held in prison too long without a hearing can claim a writ of habeas corpus to be issued in his behalf, in order to force his accusers to show cause why he should be detained longer in custody. The habeas corpus acts of the United States and of Canada follow lines similar to those of the English statute.

Hague Peace Conferences. Meetings of representatives of leading nations of the world, to consider means for arresting the danger of war and for mitigating the burdens of armaments. Two conferences have been held at The Hague in Holland. The first was convened, at the suggestion of Czar Nicholas of Russia, in 1899. It formulated regulations for more humane conduct of warfare and established an international tribunal to which nations might submit their disputes for arbitration. The second Hague Conference met in 1907, at the suggestion of the United States. This Conference enlarged somewhat the work of the first Conference. But neither body was able to adopt any resolution either for disarmament or for limiting of armaments.

Hanseatic League. A federation of northern German cities, formed in the 13th century for mutual protection and assistance, particularly in trade. The immediate cause of this famous and powerful organization was the insecurity of trade routes. The princes and states of the time were unable to afford protection against the pirates and robbers on sea and land. The alliance of the towns of Hamburg and Lübeck, about the middle of the 13th century, is regarded as the beginning of the confederacy, to which the name *Hansa,* meaning "league," was later applied. The organization at the height of its prosperity, in the 14th and 15th centuries, included about ninety cities and towns. It passed out of existence about the middle of the 17th century. See *Venice and the Hanse,* page 1200b.

Hearth Money. A tax laid in England on hearths. It was first levied in 1663. Each hearth in every house that paid church and poor rates was taxed at the rate of two shillings. This tax, known also as chimney money, was repealed in the reign of William and Mary, 1689.

Hegira or **Hejira** (*hĕj'ĭ-rà*). An Arabic word meaning "departure." It is used to designate the flight of Mohammed from Mecca to Medina in 622. Mohammed sought to persuade his countrymen to forsake idolatry. They rose in anger against him, and he was forced to flee for his life to Medina. The Mohammedan calendar is dated from this flight, as that of the Christians is dated from the birth of Christ. See *Arabia, Arabians.*

Heptarchy. A government of seven rulers; a union of seven territories. In Saxon times in England seven small kingdoms or principalities were established, known as Northumbria, East Anglia, Mercia, Kent, Sussex, Essex, and Wessex. The number of these tribal divisions was not constant. Feuds and struggles between rival princes at times merged one principality into another. Egbert, who was king of the West Saxons, 802–839, is said to have made himself Bretwalda or overlord of the British. It was this, no doubt, that gave the 16th century historians the idea that the seven Angle and Saxon kingdoms were really a monarchy ruled by one supreme king; hence they introduced the word *heptarchy* into their writings to convey this conception. Though the designation is questionable, it seems to have been preserved as a matter of convenience. See *England.*

Hindenburg Line. A system of elaborate entrenchments on the western front in the World War. It was established by Hindenburg, commander in chief of the German field forces, after the fighting on the Somme in 1916. These entrenchments took approximately the shape of a crescent whose arc swept from the North Sea, between Nieuport and Westende, until it reached the banks of the Aisne river on the south. At the northern horn of the crescent stood what was known as the *"Wotan" line,* the middle of the crescent was occupied by the *"Siegfried" line,* and at the southern horn was placed the *"Albrecht" line.*

The Allied front opposed to the Hindenburg line was divided into three sections: a British front from the North Sea to the Oise river, a distance of 125 miles; a French front from the Oise to Verdun, about 150 miles; and an American front from Verdun to the Swiss frontier—the latter known as the Lorraine front. The supposedly impregnable German defense was first penetrated by Australian troops, May 3, 1917. On September 29, 1918, the Siegfried line was broken at the famous tunnel sector, near Cambrai, by American troops acting with British and Australian forces. See *World War.*

Hinterland Doctrine. After the explorations of Livingstone and Stanley, Africa no longer remained an "unknown land." Upon various pretexts, European powers appropriated large areas to themselves. Germany, to make secure and to enlarge her new acquisitions, enunciated in 1883 a doctrine by which the possession of a stretch of coast line carried with it the right to the territory lying inland. This doctrine maintained that no other country could annex such territory.

Hittites. A people primarily of Indo-European stock. Their original home was in central Asia Minor, whence they gradually pushed southward, invading Babylonia about 2000 B. C. and conquering northern Mesopotamia, Syria, and Palestine. In the 14th century B. C., they were driven from Palestine by the Egyptians, with whom, after an indecisive battle at Kadesh in Syria, they concluded a treaty, the oldest written treaty in history. Hittite dominion over Syria lasted until the 8th century B. C., when this country too was conquered by Assyria. A century later they had disappeared from history. Little was known about the Hittites until quite recently. Excavations, begun by Winckler, a German scholar, in 1905, at Boghaz-Köi on the Halys river, the site of the ancient Hittite capital, yielded about 10,000 baked clay tablets, with writing practically identical with Babylonian cuneiform, but in an unknown language. The key to this was discovered by Hrozný, a Czechoslovakian Assyriologist, in 1915.

Hohenstaufen Dynasty. The line of emperors who ruled Germany from 1138 to 1254. They were distinguished for patronage of commerce and the arts. The greatest of the family were Frederick Barbarossa (1152–90) and Frederick II (1215–50).

Hohenzollern Family. A family of German princes tracing descent from Thassilo, count of Zollern, who, in the 8th century, founded a castle on the Zollern hill in the Swabian Alps. In 1415 Frederick VI of the younger line of Hohenzollern

was made elector of Brandenburg. He thus became the founder of the former royal house of Prussia. See *Germany, World War.*

Holy Alliance. An alliance formed between Russia, Austria, and Prussia in September 1815, by which the three sovereigns undertook that for the future their policy, both domestic and foreign, should be guided solely by the precepts of the Christian religion. In reality, it was regarded by those powers who were asked for their approval as a huge farce and one of dubious taste. But the name was too good to be ignored; and Russia, Austria, and Prussia came to be known as the "holy allies." The alliance aimed at stemming the tide of political liberty, set flowing by the French Revolution. The threatened interference of this alliance in the quarrel between Spain and her American colonies provoked the enunciation of the Monroe Doctrine in 1823. See *Monroe Doctrine.*

Holy Sepulcher, Knights of the. The Turks had secured dominion over the Holy Land. Pilgrims to the holy places had been tortured and put to death by these fierce Mohammedan warriors. Under Pope Urban II, a military order, Knights of the Holy Sepulcher, was instituted by Godfrey de Bouillon in 1099 to watch the sepulcher of Christ and protect the pilgrims. The knights fought their way through Asia Minor and took the Holy City by storm. Godfrey was made its king but refused to be crowned. "Why wear a crown of gold," he said, "when my Savior wore one of thorns?"

Hudson's Bay Company. A British joint-stock association chartered in 1670 by Charles II. It was given vast tracts of territory and exclusive trade rights throughout what is now Canada. It engaged exclusively in the skin and fur trade with the North American Indians. The company spread a chain of forts and trading posts from the Atlantic to the Pacific and exercised complete legislative and executive power within these precincts. By the Indians it was looked upon as more powerful than any nation. It played a prominent part in the disputes between the United States and Great Britain over the northwest boundary. In 1869 it sold its territorial rights to the Dominion of Canada, but it still operates as a trading company. See *Canada.*

Huguenots (*hū'gē-nŏts*). The name given to the French Protestants in the 16th and the 17th century. Huguenot is said to be derived from the German word *Eidgenoss*, a "confederate by oath," or perhaps from the name of Hugues, one of their leaders. Under Francis I and his successors, the Huguenots were welded together in a kind of politico-religious unity. Under Condé and Admiral Coligny they fought several wars against the Catholics. When, by the revocation of the Edict of Nantes, they were deprived of religious liberty, they left France in vast numbers. Thousands of them emigrated to England, Holland, and other Protestant countries. Many settled in America, especially in South Carolina.

Hundred Years' War. The name given to the series of wars between England and France from 1337 to 1453, due in part to the claim of the English kings to the French throne. The English won three great battles,—Crécy, 1346, Poitiers, 1356, and Agincourt, 1415,—but finally lost all their French possessions except Calais, which they retained till 1558.

Hussites. The followers of John Huss, a native of Bohemia and rector of the University of Prague, 1402-03. The writings of Wiclif had attracted him, and he spread the Wiclifite doctrine among the people. He attacked the abuses of the clergy and expressed opposition to the pope's supremacy. Alexander V excommunicated him, but this sentence failed to quench his ardor. He was finally cited before the Council of Constance, which condemned him as a heretic in 1415. The emperor Sigismund, who had granted Huss safe-conduct, violated his word and allowed him to be burned at the stake. The flames that burned Huss set all Bohemia on fire. The Hussites looked upon him as a national hero and made his martyrdom the signal for rebellion against the Holy Roman Empire. Under the leadership of John Ziska, they began a long series of wars against Sigismund and his successors, which came to an end only in the year 1471. A part of the Hussites returned at length to the Catholic faith. From those who remained Protestants the groups of Bohemian Brethren and Moravian Brethren later developed.

Hustings. The name of a court of limited jurisdiction which at one time sat in London. Before the English Ballot act of 1872, this court was the place where members of Parliament were usually nominated, the method of nomination being by a speech made from the platform of the court. From this custom, the term "hustings" came to be applied to any stump speech or organized canvassing for votes in a political campaign.

Imperial Federation. The policy within the British Empire of closely uniting the mother country and the colonies for defense and trade, while at the same time maintaining the self-governing character of each colony. The Imperial Federation League was formed in 1884, and in 1897 the practice of holding conferences of prime ministers and delegates from the colonies in London was begun. The united action of the colonies at the outbreak of war in 1914 is pointed out as a result of this policy. These conferences of premiers are now held every four years.

Inquisition. Tribunals established in the middle ages and in still later times, for the seeking out and for the punishment of heretics, were designated by this name. The condemnation of heretics was entrusted to the Lombard bishops in 1183 by the Council of Verona, which may be said to have laid the foundation of the Inquisition. If a heretic refused to renounce his heresy, the ecclesiastical authorities handed him over to the civil authorities to be dealt with. This institution was first put into effect in Languedoc against the Albigenses. It then spread, little by little, over the Christian world. In France, however, it played a small part. Spain and Italy were the countries in which the majority of cases were brought before the papal inquisitors. Used during its earlier stages against secret Judaism and secret Mohammedanism, it served also to repress all those who dissented from Catholic doctrine.

Viewed in the eyes of the 20th century, the Inquisition was the most intolerant, biased, and unjust institution in history. In view of the intimate union of Church and State, however, which formerly existed, heresy was naturally regarded as a crime punishable by the State and with the severe penalties then customarily inflicted on criminals of every type. The number of those who were put to death by the inquisitorial courts has frequently been exaggerated. The sentences passed by the courts tended in later centuries to take the form of excommunication.

Irish Nationalists. Irish members of the House of Commons who formed an independent group for the purpose of using their strength in Parliament to further the cause of home rule for Ireland.

Italia Irredenta (*ē-tăl'yä ēr'rā-dĕn'tä*). A name meaning "unredeemed Italy." It was applied after 1870 to Trieste and the Trentino, territories mainly Italian in population but under Austrian rule. The peace treaty of 1919 gave these territories to Italy.

Italy, Unification of. Italy was being torn to pieces by conflicting political parties, each of which sought to bring about her unification in its own especial way. In 1849 Victor Emmanuel succeeded to the throne of Sardinia. The unification of Italy was also his dream. He chose Cavour, one of the most distinguished statesmen of Europe, to be his prime minister. Cavour set to work to bring about the realization of his master's vision. In 1854 the Crimean war broke out, and at once Cavour signed

an alliance with France and England and sent troops to their aid. In 1859 Victor Emmanuel managed to bring about a war with Austria. France came to his aid and helped to defeat the Austrians at Magenta. Lombardy was then ceded to Victor Emmanuel by Austria. In 1860 Parma, Modena, and Tuscany declared for the expulsion of their respective rulers and for annexation to the kingdom of Sardinia, which accordingly was brought about. The Romagna repudiated the temporal rule of the pope and in due course was joined to Sardinia. The Two Sicilies, the Marches, and Umbria next followed. In 1861 Victor Emmanuel declared himself king of Italy. In 1866 he joined Prussia in a new war against Austria and secured Venetia. In 1870 the complete union of Italy was effected by the taking of Rome, the last of the papal territories. See *Italy*.

Jacobins (*jăk'ô-bĭnz*). The most famous of the political clubs of the French Revolution, so called because originally its members met in a Jacobin monastery. They were the most radical of all the revolutionists. The political party of which the Jacobins were members was the Mountain. From its use at this period, the name Jacobin has come to denote any extreme radical wing of politics.

Jacobites (*jăk'ô-bīts*). A name given to the adherents of James II after his forced abdication, and in general to the supporters of the claim of the Stuarts after the revolution of 1688. See *England*.

Jameson Raid. Various causes led up to this notorious raid. The uitlanders, or foreigners, at work in the gold mines of the South African Republic, sought equal rights of citizenship with the Boers. The Boers, in turn, suspected British control, north and west of the Transvaal, and likewise rejected the British claim of suzerainty. Rhodes, premier of Cape Colony, planned to place the Dutch states under British rule, and connived at a conspiracy of the uitlanders to raid Johannesburg. To this end he sent troops under Jameson to take that city. The Boers routed the invaders, captured Jameson, and handed him over to the British authorities, who, disclaiming the raid, sentenced Jameson to six months' imprisonment. See *Boers*, *Transvaal*, *Union of South Africa*.

Janizaries (*jăn'ĭ-zâ-rĭz*). A military force established in the 14th century by the Turkish sultan Orkhan and further developed by Amurath I. They were recruited from Christian youths captured in war, who were brought up in Mohammedan faith and trained to arms. It was their boast that they had never fled in battle. They finally became ungovernable, and, after a revolt, the corps was abolished in 1826. The name means "new troops."

Jingoes. The nickname given in England to the supporters and enthusiasts of Lord Beaconsfield, who sent a fleet to Turkish waters to oppose Russia's advance on Constantinople in 1878. Originally a jocular oath, "By Jingo" came into popular vogue when used by "The Great Macdermott" in a famous music hall song.

Junius, Letters of. This remarkable series of political letters, to the number of 69, were written under the mysterious pen name of "Junius," and appeared at intervals between Jan. 21, 1769, and Jan. 21, 1772, in the pages of the *Public Advertiser*, the most popular newspaper in Great Britain at the time. Masterly in style, they attacked all the leading characters of the government, not excepting royalty itself. The authorship of the "Letters of Junius" has been attributed to no fewer than 50 different persons, but it is now generally accepted that they were written by Sir Philip Francis.

Junkers (*yŏŏng'kĕrz*). The name applied to the arrogant, reactionary class of Prussian landowning nobility. From their feudal spirit and ideals the Prussian army officer took his peculiar haughty air of superiority.

Jutland, The Battle of. The decisive naval engagement of the World War, fought in the North Sea on the night of May 31–June 1, 1916. The English losses were 6014 killed and drowned and 674 wounded. The German losses were reported to be 3076, of which number 2000 were drowned. But the German navy undertook no further action during the war chiefly because of the destruction of morale resulting from this battle. See page 535.

Kenya. A British crown colony of central east Africa. Prior to 1920, the territory was a protectorate under the name of British East Africa. Although traversed by the equator, the country has, in part, an altitude sufficiently great to make its climate suitable for white settlers.

The district was subject to Arab control from the 8th century. In 1887, it came within the British sphere of influence and, in 1903, was opened for European settlement. A civilized community rapidly grew up, the citizens of which, in 1916-17, took an active part in the conquest of German East Africa. In 1920, the protectorate became a colony. The administration, being in the hands of European settlers, discriminated against settlers from India, who numbered about 40,000 in comparison with some 10,000 of the white race. The resulting dispute led to the adoption of a new constitution in 1925, by which the non-European population was given representation but not control.

Ket's Rebellion. During the reign of Edward VI, the gentry had enriched themselves at the expense of both the clergy and the poor, whose claims had been contemptuously set aside. A tanner named Ket raised the standard of rebellion on Mousehold hill near Norwich, and commanded his followers to pull down the enclosures on all estates. The earl of Warwick, supported by German and Italian mercenaries, quelled the rising with great slaughter. Ket, with several other leaders, was captured and hanged.

Knights Templars. A military and religious order founded at Jerusalem in 1118 for the protection of pilgrims and for the protection of the Holy Sepulcher. It was confirmed by Honorius II in 1128. The members took their name from the site of Solomon's temple, on which their headquarters were located. They were bound by vows of chastity and poverty. After the conquest of Palestine by the Saracens, the Knights Templars spread over Europe and received donations in wealth and lands. They soon became a great political power; consequently, their enemies accused them of heresy and other crimes. Finally the order was proscribed by Clement V in 1312, and its property was confiscated. For Masonic order of Knights Templars, see *Masons, Free and Accepted*, page 2051.

Kulturkampf (*kŏŏl-tōor'kämpf'*). "Battle for civilization." The name given by Virchow to the struggle between the German government and the Catholic Church which arose about 1870. German Catholicism, being regarded as an anti-national influence, met Bismarck's hostility by organizing the Catholic, or Center, party. When certain Catholics refused to accept the doctrine of papal infallibility, declared by the Vatican Council of 1870, and were excommunicated, Bismarck, supported by Liberal and Radical parties, intervened in behalf of the dissentients. The Jesuits were expelled, and the so-called Falk or May laws, 1873–75, resulted in the suppression of religious orders. Most of these laws were repealed in 1878–87, due to the growing power of the Center party, whose support Bismarck wished in order to check the rise of socialism.

Labor Party, British. In 1900, a committee was formed for the purpose of enlisting support, by the labor vote, of parliamentary candidates known to be favorable to the interests of labor. The success of these tactics led to the organization of the Labor party in 1906. In 1923, with 191 members and passive support from the Liberal party, it took over the government for the first time.

Laissez Faire (*lĕ'sā' fâr'*). A phrase used in economics to deprecate any sort of governmental interference in trade, commerce, or manufactures. The expression in full, *Laissez faire, laissez aller*, means that anyone should be allowed to make what he likes and as he likes, without minute government regulations; that all trades should be open to everybody; and that the transit of goods should be free from all taxes and from other such regulations. It is the opposite of "Colbertism." It is in effect the motto of the free traders of the present day.

Land League. This Irish organization was founded in 1879 by Michael Davitt, a member of the British Parliament and a bitter opponent of English rule in Ireland. In October of the same year, Parnell was elected its president. The League became a powerful weapon aimed at the rack-renters as the landlords of that period were called. Its main objects were the reduction of the rents of small farmers and tenant-laborers. It was met by truculent and stubborn opposition on the part of the landlords. Agrarian crimes followed, and the league was suppressed in 1881. By the Wyndham act of 1903 most of the claims insisted on by the Land League were granted. See *England, Ireland.*

Last Battle. The battle of Culloden, 1746, between Charles Edward, the Young Pretender, and the duke of Cumberland; so called by reason of its being the last battle fought on British soil.

Legitimists. The supporters of the claims of the elder branch of the Bourbon dynasty to the throne of France. As partisans of Charles X, king of France (1824–30), and of his family, they were known as Carlists. On the death of the Comte de Chambord, last of the French Bourbons, most of the Legitimists gave their adhesion to the Orleans branch, a few only, who were called *Blancs d'Espagne*, choosing to transfer their allegiance to the Spanish claimants represented by the family of General de Bourbon. See *Spain.*

Letters of Marque. A license or commission granted by a government to a private individual, to fit out an armed vessel for the purpose of cruising at sea as a privateer and capturing the enemy's ships and merchandise. Such acts were formerly not regarded as piracy. Letters of marque were condemned and abolished by the powers that signed the Treaty of Paris in 1856, and they are no longer recognized by civilized powers. See *Declaration of Paris.*

Lettres de Cachet (*lĕt'r' dĕ kà'shĕ'*). Letters, or warrants, bearing the royal seal. Before the French Revolution, French monarchs often issued such letters, containing arbitrary orders for the imprisonment, without trial, of certain persons who might be regarded as obnoxious to the court. These warrants were used also to protect family honor or to discipline unruly sons like the Comte de Mirabeau.

Liberals, British. With the transformation of English political parties and political institutions that accompanied the important political and industrial reforms of 1832 and the period that followed, the Whigs, the more progressive English party, gradually assumed the name Liberals, and the Tories, the name Conservatives. The Liberals have traditionally been the party of peace, anti-imperialism, free trade, and social reforms. See *Whigs, Conservatives.*

Liberal Unionists. Faction of the Liberal party in England, which, under the leadership of Joseph Chamberlain, refused to support Gladstone's Irish Home Rule bill in 1886 and formed an independent group which finally merged into the Conservative party.

Liberum Veto (*lĭb'ĕ-rŭm vē'tō*). In the ancient diet, or state assembly, of Poland, before any measure of legislation could be passed, complete unanimity among the members was required. Any one member could veto any proposition under discussion and so prevent its passage into law. This extraordinary right was called the *liberum veto.*

Little Entente. A name commonly applied to the series of agreements among Czechoslovakia, Jugoslavia, Rumania, and Poland, which followed the convention signed on August 13, 1920, between the first two of these powers. Edward Benes, foreign minister of Czechoslovakia, was the leading spirit of the Entente. Its purpose was mutual protection and it served powerfully to support the interests of France against those of Germany. It has opposed consistently the union of Austria with Germany.

Lollards. A nickname given to the followers of Wiclif about the year 1381. Calling themselves "poor preachers," they attacked the abuses of the wealthy religious orders and some of the most vital teachings of the Church. In the reign of Henry V, 1414, a plot against the life of the king was traced to some of the Lollards, and as a consequence many of them were hanged or sent to the stake. Those who escaped were forced to live in the larger cities, where they are reputed to have paved the way for the reformed doctrines in the reign of Henry VIII.

Long Parliament. The Parliament which assembled Nov. 3, 1640, in the reign of Charles I. It lasted till 1653, when, reduced to sixty members, it became known as the Rump and was forcibly dissolved by Cromwell. See *England*, page 433b.

Mad Parliament. The Parliament held in 1258 to settle the differences between Henry III and his barons, and so called, in derision, by the adherents of the king. It drew up the Provisions of Oxford, by which an advisory council of fifteen was to meet twelve representatives of the barons thrice a year for consultation. This plan operated until the rising of the barons in 1263, under Simon de Montfort.

Madras (*mà-drâs'*) **Mutiny.** This mutiny, among the officers in the Madras army of the East India Company, arose from the action of the directors, who sought to deprive the officers of certain perquisites which had been looked upon as rights. Sir George Barlow made an appeal to the sepoys, who took the side of the authorities, so that the officers were forced to submit. Twenty-one of the ringleaders were punished, the rest of the mutineers being allowed to resume their duties.

Maffia (*mäf'fē-ä*). An Italian secret society which attains its ends by assassination and murder. The murder of Notarbartolo, deputy of Palermo, in 1899, forced the Italian government to institute a close investigation, which led to the temporary suppression of the maffia in Italy. Many atrocities in the United States, notably in New Orleans in 1890, have been traced to the activities of this ruthless gang. Its strength is said to have been broken through the conviction, in 1928, of 214 members of the organization in Italy.

Magdeburg, Sack of. The Thirty Years' war (1618–48) began in Germany with the rising of the Protestant nobility against the emperor Matthias, a Catholic. Henceforward, it might be said, religion was made a pretext in Europe for incessant warfare, in which neither side gave quarter to the other. An instance of this ruthless fighting was the sack of Magdeburg in 1629, when nearly the entire population of this Protestant town was put to the sword by the troops under the Austrian general Tilly.

Magna Charta (*măg'nà kär'tà*). The great charter which the English barons forced King John to sign at Runnymede, June 15, 1215. It was an amplification of a previous charter signed by Henry I a century before, and included certain rights and privileges, which in the course of time had come into existence. It was the foundation of the personal liberty of the English people. It limited the feudal obligations of the barons and others

toward the crown, restricted the powers of sheriffs and other legal officers, and gave to any accused person the right to be tried by his peers. See *England*.

Mahdi. The last *imam*, or spiritual leader of the faithful, expected by the Mohammedans. This title has been taken by several leaders of Moslem sects, notably by Mohammed Ahmed, who in 1885 captured Khartum and put to death General Gordon, who was then Egyptian governor of that region. See *England*.

Majuba Hill. Gladstone, in 1880, had denounced the annexation of the Transvaal by the English government under Disraeli. But, before he could alter the government's policy, the Boers rose in revolt and defeated a detachment of British troops at Majuba hill, Feb. 7, 1881. The name became a battle cry of the English, during the Boer war of 1899–1902. The disgrace of Majuba hill was wiped out, in some degree, by the surrender of the Boers at Paardeburg in 1900.

Malta. The island of Malta has been recognized since very ancient times as an important strategic base in the Mediterranean. Architectural remains bear testimony to the presence of civilized peoples in Malta in the third millennium B. C. The Phœnicians, who long occupied the island, were displaced by the Greeks in the 8th century B. C. Malta was later a stronghold of the Carthaginians and of the Romans. It was on this island that the apostle Paul, on his journey from Cæsarea to Rome, suffered shipwreck. The Arabs were in possession from about 870 to 1190. From 1530 until 1798, Malta was controlled by the Knights of Saint John, who waged war against the Turks and the Barbary pirates. The knights surrendered to Napoleon in 1798. Since 1814, Malta has been a British possession.

Mamelukes. A corps of Turko-Egyptian cavalry formed originally from slaves who had been sold by Jenghis Khan to the Egyptian sultan in the 13th century. Becoming powerful, they established their own government by appointing one of their leaders sultan in 1251. This government was overthrown by Selim I of Turkey, who took Cairo, their capital, by storm in 1517. The Mamelukes, however, remained attached to the Egyptian army until 1811. They were defeated by Bonaparte at the battle of the Pyramids in 1798. See *Egypt*.

Manchester Massacre. An attack made by a body of cavalry under orders to disperse a mass meeting in St. Peter's Field, Manchester, England, in connection with the Reform agitation in 1819. A few persons were killed and hundreds were injured. This affair was, afterwards, fancifully known as the Peterloo or Manchester massacre.

Mandarins. The term is properly applied only to officials called *kwan* by the Chinese. There are nine grades of kwan, and a distinguishing colored button or stone set in the hat is worn by each to denote the particular grade to which the wearer belongs. The word probably comes from the Sanskrit and signifies "a counselor."

Mestizos (*mĕs-tē'zōz*). In Spanish America and in the Philippines, this name is applied to persons of mixed blood; especially the offspring of a European or person of European stock and an East Indian, a Negro, a Malay, or other person of dark non-European stock. Often in the Philippine Islands, the term is applied to those of Chinese and native blood.

Métayage (*mĕ-tā'yâj*). The system of cultivating land for a share of its yield, carried out in France before the days of the Revolution. The tenant was supplied with stock, seed, and implements, receiving in return for his labor one-half of the produce. This system was once common in England, and it is still found in Italy and in certain districts of the United States.

Mississippi Bubble. A speculative scheme, projected by John Law in Paris about 1717. Well known in the financial world as an ardent advocate of paper money, Law in 1716 founded the Banque Générale and began to carry out his views regarding this form of currency. So successful was he, at first, that the French government granted him control of the trade with Canada and the Mississippi country. For a while his "system" prospered and large fortunes were made. But the overissue of paper money proved his undoing; this, together with government hostility, brought about the inevitable collapse, which left France on the verge of bankruptcy and thousands of families in financial ruin.

Mogul. The word is the same as *Mongol*. The moguls, or "great moguls," were the descendants and successors of the Mongol conqueror, Timur, or Tamerlane. They ruled India from 1526 to 1765, when their power was subordinated to English authority. See *India*.

Molly Maguires. Members of a secret society in Ireland, formed in 1843 to intimidate law officers and prevent the service of writs. Their name came from an Irish rebel leader in 1641, and from the fact that they wore women's attire as a disguise. A similar Irish association was organized in the coal districts of Pennsylvania against the mine owners in 1854, which, after a series of many crimes, was at length vigorously suppressed in 1877.

Moros (*mō'rōz*). A group of Mohammedan Malays inhabiting the southwestern part of the Philippines, chiefly the Sulu archipelago and the islands of Palawan and Mindanao. Their social and legal customs are interpretations of the *Koran*. Polygamy and slavery were formerly established customs among them, and their piracy was long a source of trouble. Since the United States took over the islands, a Moro province has been organized, education has been introduced, slavery has been abolished, and the natives have been disarmed.

Mountain (La Montagne). A name given to the extreme revolutionary faction in the National Convention during the French Revolution. It was so called because the Jacobins, with Robespierre and Danton at their head, occupied the upper tiers of seats at the left in the Convention. The "mountain" came to an end soon after the fall of Robespierre in 1794.

Nations, Battle of the. The battle of Leipzig, Oct. 16, 17, 18, 1813. Five nations were represented. The armies of France met the combined forces of Prussia, Russia, Austria, and Sweden. The battle was followed by the retreat of the French, under Napoleon. See *France*.

Neutrality, Neutralization. In times of widespread war, the states which desire to avoid becoming involved in the conflict may issue proclamations of neutrality. Under such conditions, the status of a neutral country is one which a nation claims for itself. On the other hand, neutrality may be imposed upon a minor power. The most interesting example of this is the neutralization of Belgium, agreed to and guaranteed by all the great powers in the treaty of 1839. The geographical position of Belgium rendered her attitude so important, equally to Great Britain, France, and Germany, that none of the great powers would risk the possibility of her making an alliance with one of them. Consequently, they jointly made it impossible for her to conclude any treaty. The treaty of 1839 held good until Germany disregarded its provisions in 1914.

Nihilists. Members of a great revolutionary party organized in Russia as early as 1818, to whom the term "nihilists" was first applied in 1860 by Turgenev, the Russian novelist. Their aim was the emancipation of the serfs and the setting up of constitutional government in place of despotic rule.

In 1870 the nihilists advocated socialistic propaganda. They held that social conditions were so bad that they could not be remedied and therefore must be destroyed.

The Russian government sought to crush the movement with an iron hand, many persons being imprisoned or exiled to Siberia. Reprisals on the part of the nihilists followed, culminating in the assassination of Alexander II in 1881. For many years after this event, nihilism appeared to lie dormant and inactive, but in 1917 it was discovered that its spirit had spread throughout Russia, not only among the working classes, but also among members of the aristocracy and of the army. The recent revolutions in Russia have resulted in freeing the nihilists from the dread of former oppression. Indeed it would seem that their mantle has fallen on the shoulders of the Bolsheviki, who have willingly imbibed their doctrines. See *Bolsheviki, Russia.*

Nîmes (*nēm*), **Pacification of.** The proclamation of an edict at Nîmes in 1629, confirming the religious freedom of the Huguenots who had been defeated the previous year at the siege of La Rochelle. While it endorsed the Edict of Nantes, it left the Huguenots a powerless and unarmed political party, without rights or privileges as citizens. As a result, the Huguenot League in a short time was disbanded.

"No Bishop, No King." Utterance credited to James I, in criticism of the self-governing organization of the Presbyterian and Independent churches. The phrase involves recognition of the kinship between revolt against the authority of an established head of the church and revolt against the authority of a single monarch in the state. Events proved the truth of James's prophesy. The democratic organization of Presbyterian and Independent churches gave substance and currency to the principle of self-government, which, carried over into the organization of the state, resulted in the English Revolution of 1649, the decapitation of Charles I, and the founding of the English Commonwealth. The later Revolution of 1688 and the American Revolution were likewise, in no inconsiderable degree, the product of the democratic spirit fostered by the self-governing organization of the Independent churches.

Noche Triste (*nō'chā trēs'tā*). The "mournful" or "disastrous night" of June 30, 1520, when the Spanish conquerors of Mexico were well-nigh annihilated. On the death of the friendly disposed chieftain Montezuma, Cortés, fearing violence from the natives, decided to withdraw secretly from Mexico City. His intentions, however, had been anticipated; for he and his troops were met by the natives at the pass of Tlacopan. A terrible slaughter followed, in which the Spaniards lost 450 of their own men together with 4000 Indians who fought with them as allies. Most of the rich plunder they had secured and the costly treasures given them by Montezuma were sunk in the lake and never after recovered. See *Mexico.*

Normandy. The district of northern France, bordering on the English channel, and now included in the departments of Seine-Inférieure, Eure, Orne, Calvados, and Manche. The name Normandy comes from the Normans, or Northmen, who conquered the territory in the 10th century. In 1066 William II, duke of Normandy, became William I of England and united the two realms. The French regained Normandy in 1204 and held it until 1417. Then the English recovered it and maintained their authority until 1450, when Charles VII finally seized it for the French. Small remnants of the old province, the Channel islands, still belong to England. In them much of the old customary law of Normandy is in force, and many of the people continue to speak the old Norman French tongue. See *England, Normans.*

North German Confederation, The. This union of all the German states north of the river Main was formed in 1867, after the close of the Austro-Prussian, or Seven Weeks', war. It was Bismarck's creation. A legislature of two houses, the Bundesrath and the Reichstag, was provided for. The members of the Bundesrath were appointed by the sovereigns of the states, and Prussia had 17 out of the total of 43 votes. The members of the Reichstag were elected by the people. The Confederation gave way, in 1871, to the German Empire. See *Germany.*

Olympiad (*ô-lĭm'pĭ-ăd*). In ancient Greece, the interval of four years between successive celebrations of the Olympic games. Said to have been used first by the historian Timæus as a unit for computing time. The year 776 B. C., when Corœbus won the foot race, was taken as the first year of the first Olympiad. The use of this system ceased with the abolition of the Olympic games in 394 A. D.

Open-Door Policy. The arrangement with respect to Chinese commerce, supported by general consent rather than by special treaties of the nations, under which all nations shall be allowed to trade in China upon equal terms. The policy is opposed to that of special "spheres of influence." The policy has gained larger importance since the close of the World War, through the question of applying it to the various "mandatories" or protectorates created by the League of Nations. See *China, Washington Conference.*

Opium War. This war (1840–42) between Great Britain and China was precipitated by the attempt of the Chinese government to stop the importation of opium, which was being smuggled into China by British merchants. It ended in the Treaty of Nanking, by which Hongkong was ceded to Great Britain, while Canton, Amoy, Foochow, Nangpo, and Shanghai were opened as treaty ports, thus giving a free hand to the opium merchants for their illegal traffic. See *China.*

Orangemen. A secret politico-religious society founded by Ulster Protestants in 1795 to uphold Protestant ascendancy against Catholic influence in the government of Ireland. Lodges or branches of this society are to be found throughout the British Empire and in many parts of the United States. The name was given them by the Catholics of Ireland on account of the Protestant support of the cause of William III, prince of Orange, in the revolution of 1688.

Ordeal, Trial by. This ancient method of determining the guilt or innocence of a person by putting him to painful or dangerous tests was supposed to be under divine control and intervention. It formed a part of judicial procedure in Europe as late as the 13th century. One of the severest of these tests was that by which the accused person was forced to walk blindfolded over red-hot plowshares. If he escaped injury, he was adjudged innocent. Other kinds of trial by ordeal were those by battle, by water, and by the drawing of lots. Such trials were condemned by the Church in 1215 and were abolished in England in the same year, with the exception of the ordeal by battle.

Orders in Council, 1807. These were specific orders made in Council and promulgated by the British government, as a reply to Napoleon's Berlin Decree, establishing a blockade on the continent. They prohibited any neutral from trading directly with France or with her allies. All goods were to be landed in England for the payment of duty and were then to be re-exported according to English regulations. These orders had an especially serious effect on American commerce, and the irritation they caused was, without doubt, one of the chief causes of the War of 1812. See *Berlin Decree.*

Organizer of Victory. The popular title of Lazare Nicolas Marguerite Carnot, noted French statesman, strategist, and scientist, whose services as war minister (1793–95) were marked with great distinction and success. He became governor of Antwerp in 1814 and was minister of the interior under Napoleon in 1815. He was born at Nolay, Burgundy, France, May 13, 1753, and died at Magdeburg, Prussia, Aug. 2, 1823.

Outlawry. In early days, outlawry was a declaration of hostility by the community against one who defied its constituted authority. The goods of such a person were forfeit, and he was liable to be killed at sight. Later, it became a mere process by which the criminal was brought within the jurisdiction of the courts. After the 13th century the wanton killing of the outlaw was forbidden. Outlawry is now practically abolished in England and is completely obsolete in the United States.

Oxford Movement. This was a movement to counteract the liberalism and rationalism toward which the clergy of the Church of England, at the time, were tending. It originated at Oxford university in 1833 in an endeavor to bring the Anglican Church back to the principles of the early Christianity of the Fathers. Its fundamental principles were laid down in a series of ninety pamphlets known as "Tracts for the Times." These tracts, contributed mainly by Newman, Pusey, Froude, and Isaac Williams, set forth the necessity of a visible church with sacraments and theological dogmas, and they supported the contention that this church is based upon unbroken apostolic succession and includes the Anglican Church. Tract No. 90, written by Newman, declared that the Thirty-nine Articles might be so interpreted as to be consistent with the doctrines of the Council of Trent. It caused a great sensation among the Anglican bishops and was condemned by them in 1841. Newman, with several other leading tractarians, thereupon entered the Church of Rome.

Palestine (*păl'ĕs-tīn*). Previously to the 16th century B. C., it appears that Palestine was subject to the power of Babylon. Babylonian culture persisted even when the territory was mastered for a time by the Amorites. Early Egyptian records disclose the fact that the peoples of Canaan, as Palestine was at that time called, had commercial relations with Egypt. Canaan was conquered by the Egyptian king, Thothmes III, in the first half of the 15th century B. C.

The period of Egyptian supremacy was interrupted for some time by the inroads of the Hittites from the north. About 1350 B. C., however, the power of Egypt was again dominant in Canaan. It was within the following two centuries that the country was subjected to invasion by the Israelites, the Semitic race whose achievements lend to Canaan its chief historic interest.

For a brief period in the 10th century B. C., the entire land of Canaan, with some adjacent territory, was brought under the power of the independent kingdom of Israel and was ruled by David and by his successor, Solomon. The subsequent division of the realm between northern Israel and Judah left the land an easy prey to the Assyrian and the Babylonian empire. The northern kingdom fell in 722 B. C., and the southern, Judah, in 586 B. C. The inhabitants of the latter kingdom, known as Jews, were taken as captives to Babylon. Being permitted by Cyrus, the Persian, to return in 536, they became the nucleus of a small Jewish community in the land which their fathers had ruled.

The conquests of Alexander, at the end of the 4th century B. C., brought a strong Greek influence to bear on the country. Many places, such as Samaria, became virtually Macedonian cities. After the death of Alexander, Palestine passed first under the control of the Ptolemies of Egypt, and, later, in 197 B. C., it came into the power of Antiochus of Syria. In 168 B. C., the Jews, led by the Maccabean princes, threw off the tyranny of the Syrian ruler and set up an independent state extending throughout southern Palestine from the river Jordan to the sea.

In 63 B. C., internal strife opened the way for intervention and conquest by the Romans. A revolt of the Jews in 66-67 A. D. resulted in the destruction of Jerusalem (70 A. D.). A second rebellion, in 132–135 A. D., terminated in the final dispersion of the people.

For a brief period in the early part of the 7th century, Palestine was under Persian control. In 636, Jerusalem surrendered to Mohammedan armies under Omar, whose name has been perpetuated in a famous mosque on the site of the Jewish temple.

Toward the end of the 11th century, Palestine became the goal of the crusaders, who, in 1099, established in the Holy Land the Latin kingdom of Jerusalem. This kingdom lasted barely a century. The country remained in the hands of Mohammedan powers until it was conquered by Allied troops in 1918. Palestine was assigned by the League of Nations as a mandate to Great Britain, under whose protection settlements of Jews were planted in the country by the Zionist organization.

Panama Scandal. The estimate for the building of the Panama canal was given by De Lesseps, the French engineer, as $169,000,000. The French Panama Company was accordingly formed, shares were taken rapidly throughout France and elsewhere, and the work was begun in 1881. In 1889 the company declared itself bankrupt, and an investigation followed. It was found that of the 54 miles only 12 had been finished, and that no less than $260,000,000 had been expended. The directors of the company, including De Lesseps and his son, were tried and found guilty,—some of bribery, others of misuse of the company's funds. This great scandal was called by the Parisians *La Lessive du Panama*—"the Panama dirty linen." In 1904, the United States acquired by purchase the rights of the French company and undertook to build the canal. See *Colombia, Panama Canal.*

Pan-Germanism. A movement in Germany which developed in 1894 into the Pan-German League. The purposes of the league were stated in 1903 as (1) the strengthening of German national self-consciousness, (2) the education of German youth in German ideals, (3) the uniting of all Germans wherever they resided, (4) the furthering of German colonization.

Pan-Slavism. A Russian movement having for its ideal the confederation of all the Slavic nations under the leadership of Russia. The natural conflict of this policy with the designs of Turkey and those of Germany had much to do with precipitating the World War.

Partition of New World, Papal. Pope Alexander VI, in order to prevent disputes between the Spaniards and the Portuguese in regard to their discoveries in the East Indies and the West Indies, established, in 1493, a line of demarcation which was to serve as a permanent division between the claims of the two rival powers. The pope had already confirmed Portugal in her claims to the islands and countries of Africa which she had discovered. Spain asked for a similar confirmation of her claims in the West. Accordingly, the pope drew upon the map a line from the north to the south pole, at a distance 100 leagues west of the Azores, and decreed that the newly discovered lands west of that line should belong to the Spaniards, and those east of it to the Portuguese. Portugal, however, proved dissatisfied with this arrangement, and, therefore, by the Treaty of Tordesillas in 1494, another line 370 leagues west of the Cape Verde islands was substituted. By the new adjustment, Portugal eventually obtained possession of Brazil.

Some modern writers suggest that this procedure on the part of the pope was an act of audacious

assurance. In justice to Alexander VI, however, it should be stated that his action was prompted by a spirit of even-handed justice and was one of truly peaceful import rather than of usurpation and ambition (*Discovery of America*, John Fiske, ch. VI, vol. I; *Civiltà Cattolica*, 1865, I, 665–680). Further, the pope's claim to the right of giving away heathen lands was indubitably based on the fictitious "Donation of Constantine," fabricated between the years 750 and 850.

This document was certainly accepted as genuine during the second half of the 9th century, and it obtained wider circulation by its incorporation with the False Decretals, a series of forgeries by one Isidore Mercator, between 847 and 852. The first pope who relied and acted upon the "Donation" was Leo IX (1049–54), who granted to the Normans their conquests in Sicily and Calabria. Urban II also (1093–99), on the strength of its authenticity, supported his suzerainty over the island of Corsica, and on the same grounds Adrian IV is said to have authorized Henry II of England in 1164 to invade and conquer Ireland.

Ecclesiastical writers of the 11th and 12th centuries in defense of the papacy, as well as popes Innocent III, Gregory IX, and Innocent IV, took the authenticity of the "Donation" for granted, and accordingly quoted it to confirm what they wrote. Stranger still, the medieval adversaries of the pope never denied its validity, but only endeavored to expose false interpretations based upon it.

In a word, the authenticity of this document was doubted by no one before the 15th century. It was highly esteemed in the Greek East, the Greeks claiming for the bishop of New Rome (Constantinople) honorary rights similar to those enjoyed by the bishop of Old Rome. In the West, long after its authenticity was disputed, its validity was upheld by the majority of jurists and canonists, who quoted it as authoritative throughout the 16th century. Even though Cardinal Baronius and later historians acknowledged it to be a forgery, they nevertheless brought forward authorities for its support, especially in regard to the imperial donations. In later times, even this claim has been abandoned and the whole constitution rightly considered in all senses a forgery.

It is clear from this review of the facts that the act of Pope Alexander VI, as well as the petitions of the Spanish and Portuguese, was actuated by a reliance upon the authenticity of a document which only later was found to be null and void. Further, it should be remembered that in the countries of Europe, which at the time were Catholic, the doctrine of the sovereign temporal dominion of the pope was very generally accepted.

Patricians and Plebeians. The two classes of citizens in ancient Rome. The struggles of the plebeians to gain social and political rights mark the early history of the republic. The patricians were the descendants or adopted members of the original ruling *gentes* or "clans." The heads of these clans were called *patres*, or "fathers," hence the word "patricians." The plebeians, from *plebs*, or "multitude," were mostly small landowners of the country near Rome. See *Rome*.

Peace of Portsmouth. The peace treaty which closed the Russo-Japanese war was signed at Portsmouth, N. H., September 5, 1905. The envoys of Japan and Russia had been brought together through the mediation of President Roosevelt. The treaty provided for (1) a Japanese guardianship of Korea, (2) evacuation of Manchuria by both powers, (3) transfer of Russian rights at Port Arthur to Japan, (4) division of the Manchurian railway between Japan and Russia.

Peasant War, The Great. The most important of a series of peasant uprisings in the 16th century. This revolt spread, in 1525, from the southern Black Forest through Austria, Alsace, and the lower Rhine. At first, the peasants were under the leadership of Götz von Berlichingen, who finally deserted them. He was succeeded by an Anabaptist fanatic named Münzer, who, with vast numbers of his admirers, played the leading part in this most bloody insurrection. After issuing a manifesto, in which they set forth their demands, they finally proclaimed a community of goods. None of their demands was granted. Münzer was captured at Frankenhausen and was executed. The rebellion, quelled with unheard-of cruelty, left the peasants in a worse condition than they were in before.

Peking, Treaty of. This treaty, signed Oct. 24, 1860, by China, Great Britain, and France, ratified that of Tientsin, made the year previous. It also imposed upon the Chinese the payment of a large indemnity for insults offered to the plenipotentiaries on their way to Peking. Moreover, it stipulated that Christianity was to be tolerated, that the Chinese tariff should be revised, and that, in the future, ambassadors should reside in Peking.

Peninsular War, The. Sometimes called the War of Spanish Independence. A series of campaigns conducted from 1808 to 1814 by the English, Spanish, and Portuguese against the French forces in Spain. The English general, Wellington, had succeeded in driving the French from Spain at the time of Napoleon's abdication, April 6, 1814. See *England*, *France*, *Spain*.

Pericles (*pĕr'ĭ-klēz*), **The Age of.** The period in the 5th century B. C. in which Athens reached its highest point of achievement in democratic government, in literature, and in art. The era takes its name from Pericles, who from about 461 to 429 was the most influential leader in Athens. Some historians reckon this entire period as the age of Pericles; others restrict the term to the fifteen years, 445–431, when Pericles was sole ruler of the Athenian democracy. During this latter period Pericles brought about the adornment of Athens with statues and public buildings, including the Parthenon and other structures on the Acropolis, which reflect the greatest glory upon his age. See *Greece*.

Personal Union. Where two countries are united, not organically or politically, but through the person of their common ruler, their relation is a personal union. Such was the union of England and Scotland from 1603 to 1707. Other instances are the following: From 1815 until 1831 the czar of Russia was king of Poland; the king of the Netherlands was also grand duke of Luxemburg (1814–90); the king of Denmark was, for several centuries, duke of Schleswig and Holstein (see *Seven Weeks' War*); in 1920, Iceland ceased to be a Danish possession, and assumed the status of a personal union by electing the king of Denmark as her king.

Peter's Pence. Voluntary contributions sent from all over the world by members of the Catholic Church, for the use of the pope. It serves not only as maintenance of the papal household, but also for the multitudinous expenses of the Vatican, a great portion of these funds going to the support of Catholic missions abroad. It is said that the largest donations come from the United States, France, and Ireland. Peter's pence dates its origin to Offa, king of Mercia, in the 8th century, and had then for its object the establishment and the upkeep of a Saxon college in Rome.

Physiocrat. A follower of the 18th century school of economic thought which maintained that land is the sole source of national prosperity, and that wealth itself consisted of nothing more than raw materials and other products of the soil. The farmer, under the physiocratic doctrine, was the only productive worker in the state; the merchant, capitalist, and town laborer were in large measure looked upon as parasites who added nothing at all to the total production of the state. The founder of this school of thought was a Frenchman, François Quesnay.

A corollary of the central principle of the physiocratic theory was that all revenues required by the state should be derived from a single, direct tax upon the land—that being the only true resource of the nation. Likewise, the *laissez-faire* doctrine was approved, according to which the state should not interfere with the natural economic and social evolution of the community.

Plantagenets (*plăn-tăj'ĕ-nĕts*). The ruling house in England from the accession of Henry II in 1154 to the accession of Henry VII in 1485. Matilda, daughter of Henry I, married Geoffrey, count of Anjou, and Henry II was the child of this marriage. Geoffrey, it is said, usually wore in his cap a sprig of broom, or *plante de genêt*, whence arose the family name.

Plebiscite (*plĕb'ĭ-sĭt*). An expression of the will of the whole people, sought in ratification or disapproval of a particular measure, already decided upon, but regarding which their elected representatives hesitate to act. It is of French usage and was adopted by Napoleon III in 1851, when he referred to the French people the question of his assuming the imperial dignity. In recent times an appeal to this method has been frequently advocated. The Treaty of Versailles, 1919, provided for plebiscites to determine finally the control of certain districts formerly under German rule. See *Poland, Schleswig-Holstein Question, Silesia, World War.*

Poland, First Partition of. By a mutual arrangement in 1772, between Catherine of Russia, Maria Theresa of Austria, and Frederick of Prussia, the following division of Poland was made: Russia received the eastern part of Lithuania; Austria, East Galicia and Lodomeria; Prussia, Polish Prussia (except Danzig, Thorn, and Ermeland) and the Netze district. The exertions of these powers to preserve the Polish constitution, after such high-handed confiscation, ended in anarchy and fostered rebellion. See *Poland.*

Poland, Second Partition of. At the close of the Polish civil war in 1793, Russia and Prussia invaded Poland and extorted new cessions. Russia took the remaining part of Lithuania, together with Volhynia and Podolia; Prussia took Danzig, Thorn, and the whole of Great Poland. In addition to this, Russia forced the Poles to a *treaty of union*, by which the former received: (1) free entry for her troops into Poland; (2) the conduct of all future wars; (3) the right of confirming all foreign treaties made by Poland. All this ruthless treatment and appropriation led to the famous revolution in Poland the following year, under the leadership of Kosciusko. See *Lithuania, Poland.*

Poland, Third Partition of. The remaining territories of Poland were divided between Prussia, Austria, and Russia in 1795, after the defeat of Kosciusko. By the three partitions, the following increase of territory had been acquired:

Russia,	181,000 sq. mi.,	6,000,000 inhabitants
Austria,	45,000 sq. mi.,	3,700,000 inhabitants
Prussia,	57,000 sq. mi.,	2,500,000 inhabitants.

Popes. See *Bishops and Popes of Rome.*

Popish Plot. In August 1678, there appeared in England an adventurer of the name of Titus Oates, who sought to make profit out of the prevailing distrust of the English people for Charles II. Oates had adopted various religions and had actually been a Jesuit lay brother in Spain, where he had been expelled by that society for drunkenness and worse. He announced the existence of a great "popish plot," which proved to be a tissue of lies and absurdities. Nevertheless, the populace was more than inclined to believe him. Shortly after his "revelations," Sir Edmund Berry Godfrey, before whom Oates had made his depositions, was murdered. All London became inflamed, and the Catholics were at once accused of the crime. A new test act was hurriedly passed, excluding all Catholics from Parliament, and five Catholic peers were sent to the Tower. Coleman, secretary to the duchess of York, was tried for treason and was executed.

Pragmatic (*prăg-măt'ĭk*) **Sanction.** An edict upon important state business, issued by the head of the state and formerly regarded as an unchangeable part of the fundamental law of a country. The most important of such papers in European history is that published in 1713 by the Holy Roman emperor, Charles VI. Having no son, Charles VI, by this instrument, settled his dominions on his daughter Maria Theresa. He induced most of the European sovereigns to guarantee it; but Charles Albert, elector of Bavaria, the next heir to his dominions, refused. This caused the War of the Austrian Succession after the death of the emperor in 1740. Bavaria finally acknowledged the pragmatic sanction in the Peace of Füssen (1745). See *Austrian Succession, War of; Hungary.*

Prague, Peace of. The name applied to two important treaties. (1) A treaty signed in 1635, to which the various sovereign states of Germany were parties. By it the following provisions were made: The elector of Saxony was to receive Lusatia, and his son August, the archbishopric of Magdeburg for life. The hereditary right of Austria to Bohemia was to be recognized and Pomerania given to the elector of Brandenburg. Certain ecclesiastical estates, confiscated before the Convention of Passau and now at the disposal of the emperor, were to be retained by the present possessor forever. Common cause was to be made in driving out the Swedes from Germany, and religious freedom was to be allowed to Lutherans alone. (2) The treaty between Prussia and Austria, Aug. 23, 1866. It closed the Seven Weeks' war. Austria recognized the dissolution of the German Confederation, the reorganization of Germany to the exclusion of Austria herself, and the annexations contemplated by Prussia. See *Germany.*

Pride's Purge. The name given to the act of Colonel Pride and his troopers, who forcibly ejected from the House of Parliament, in 1648, the Presbyterian majority of the Long Parliament, who favored reconciliation with the king, Charles I. The remaining members, sixty in number, came to be known as the Rump Parliament and were made to serve the purposes of the army. See *Rump Parliament.*

Primogeniture (*prī'mō-jĕn'ĭ-tûr*). The law or custom, still in force in Great Britain, by which all real estate descends to the oldest son of a man who dies without making a will. The custom derives historical importance from its effect upon succession to the throne or to titles of nobility.

Quietists. A body or sect of religious mystics, whose system was based on the withdrawal of the mind from all worldly matters and its constant employment in the passive contemplation of God and His attributes. They held that no actual spiritual works were necessary. This system was first set forth by Miguel de Molinos, a Spanish priest living in Rome. His views were opposed by the Jesuits, and he was condemned by the inquisition. About 1680 Quietism came into vogue among certain devotees in France, under the guidance of Madame Guyon. The great Fénélon, for a time, fell under its sway and incurred the displeasure of Rome.

Reconcentrados. The noncombatants of the rural districts of Cuba during the rebellion of 1895–98. For the convenience of military administration under General Weyler, they were forced to abandon their homes and, for the most part, concentrate in camps, where, as a result of government neglect, a great number died of famine and disease.

Red River Rebellion. A rising, in 1869, of the half-breed settlers in the valley of the Red River of the North, as a protest against the transfer of this settlement to the new province of Manitoba. The rebels, led by Riel, became a serious menace. Sir Garnet Wolseley was sent against them the following year and succeeded in quelling the insurrection. Riel escaped, but, leading a later rebellion in 1885, he was captured and executed. See *Canada, Riel's Rebellion.*

Reformation, The. The name applied to the religious movement in the 16th century, to which the Protestant Church traces its origin. As a result of this revolution, several European states renounced their adherence to the Roman Catholic Church and adopted some form of Protestant belief and organization. John Huss of Bohemia and John Wiclif in England, who belong to the 14th century, are regarded as forerunners of the Reformation, but Germany was the scene of the first decisive action. Here the movement began in 1517 with Martin Luther's attack on what he called the sale of indulgences. He was excommunicated and in 1521 placed by the Diet of Worms under imperial ban. Other leaders of the revolt on the continent were Zwingli in Zurich and Calvin in Geneva. In England, the direct separation from the Roman Church was brought about by Henry VIII. In its main phases, the Reformation movement was virtually completed by the end of the 16th century. See *Germany, Thirty Years' War.*

Reform Bills, English. The Reform bill of 1832 provided for more equitable representation of boroughs and towns in Parliament and extended the suffrage. Its provisions as to redistribution and the franchise, however, still left the larger share of political power in the hands of the landowning classes. The Reform bill of 1867, introduced by Disraeli, provided further extension of suffrage, so that workingmen in large towns were given the ballot. The third Reform act of 1884 gave suffrage to counties on the terms given to boroughs in 1867, and so divided constituencies that, with few exceptions, but one member of Parliament is now elected by each constituency. See *England.*

Regicides. The name given by the supporters of Charles I to the members of the high court of justice, before whom the king was arraigned on the charge of treason and by whom he was found guilty and was sentenced to death in 1649. See *England.*

Renaissance or **Renascence, The.** The name signifies the period of transition, in western Europe, from the middle ages to modern times. With the meaning "re-birth," it is associated with the brilliancy of Petrarch and that of the classic scholars of the 14th century in Italy, where it led to great advances in expressional painting and sculpture and to a return to classical design and form in architecture. The glorious works of such men as Michelangelo, Brunelleschi, Leonardo da Vinci, Raphael, Correggio, Titian, and others testify to what heights this movement rose toward the end of the 15th and early in the 16th century.

The renewal of relations between Italy and Constantinople, due to the menace of Turkish advance at the close of the 14th century, brought the Byzantine scholars, with the literature of Greece, into Italy, and further stimulated the free spirit of the Renaissance in the culture of art and letters, which spread rapidly throughout the rest of Europe. Such momentous events, too, as the invention of printing, the discovery of America and of the sea route around Africa, added a new impetus to this great revival and conduced to wonderful expansion in every branch of trade, industry, and commerce.

Reptile Fund. A name given in Germany to a Prussian fund, held as indemnity for the deposed king of Hanover, the interest on which fund was payable to the king for the loss of his sovereign rights. A part of this fund, it was said, was diverted by Bismarck to subsidize certain journals in the interest of the government.

Revolution of February 1848. The French Revolution which overthrew the government of Louis Philippe drove him into exile, and established the Second Republic. Its effects were felt in other countries in Europe; for risings followed quickly in Germany, Italy, Belgium, and elsewhere.

Rhodesia (*rō-dē'zhĭ-ȧ*), **Northern.** The African territory under British control, lying between the Belgian Congo and the Zambezi river. Governed by the British South Africa Company from 1889, it was taken over by the British government in 1924. Its affairs are administered by a governor and an executive council.

Rhodesia, Southern. The colony which includes the British territory between the Zambezi river and the Transvaal province. Formerly under the government of the British South Africa Company, the colony was granted responsible government under the British crown in 1923.

Riel's Rebellion. This was a rising of Indian half-breeds in Saskatchewan, Canada, in 1885. They were led by Louis Riel, who had been at the head of a similar rebellion, which took place in the valley of the Red River of the North in 1869. It was suppressed by the Canadian militia under Middlelow, Riel being captured and executed. See *Red River Rebellion*; also *Canada*, page 445a.

Riff. This mountainous district adjacent to Spanish Morocco in northwestern Africa was the scene of repeated attacks by natives under Raisuli against Spanish outposts prior to 1921. In that and the following year, Abd-el-Krim led the native troops to further victories, threatening Spain's hold over the protectorate. In 1925 Abd-el-Krim attacked French Morocco, but after initial successes was driven into the Spanish zone. As a result of concerted attacks of French and Spanish troops in 1926, the native forces took refuge in the Atlas mountains, and Abd-el-Krim surrendered to the French.

Romanovs (*rō-mä'nŏfs*). The reigning family in Russia from the accession of Michael Feodorovich Romanov, founder of the family, in 1613, to the deposition of Nicholas II in 1917. Through the grandmother of Michael, the family is connected with the line of Rurik, the Scandinavian ruler of Novgorod in the 9th century.

Roundheads. Nickname given to the Anti-Royalist party in England during the period of the Civil War and the Commonwealth, so-called because of their Puritan custom of wearing the hair closely cut, as distinguished from the Cavalier habit of wearing the hair in long flowing locks. The Roundheads were the immediate precursors of the Whigs, as the liberal party in English politics. The term was also sometimes applied to members of the Whig party by their opponents.

Rump Parliament. The name given to the 60 members of the Long Parliament left sitting after "Pride's purge." Having been expelled by Cromwell in 1653, they were recalled to the House in 1659, their number now reduced to 42, only to be once more turned out by Monk in the following year. Thus did the Long Parliament, after various vicissitudes, at last come to an end. See *Pride's Purge.*

Rye House Plot. A plot hatched in 1683 by the Whigs to kill Charles II and the duke of York. It owed its name to a farmhouse in Hertfordshire, the supposed meeting place of the conspirators. Lord Russell and Algernon Sidney, said to be the ringleaders, were tried and executed.

Ryswick, Treaty of. A treaty signed at a village of this name near The Hague, Sept. 21, 1697, between France on the one side and England, Holland, and Spain on the other. Its chief provisions were: (1) France acknowledged William III

as king of England and Anne his lawful successor, thus abandoning the cause of James. All conquests in Catalonia were restored to Spain as well as those in the Spanish Netherlands, with the exception of 82 places. (2) The Dutch restored Pondicherry in India to the French, receiving commercial privileges in return. (3) England and France mutually restored conquests in America. The treaty was ratified a month later by the emperor Leopold, when France ceded all the annexed territories except Alsace and restored to the duke of Lorraine most of his dominions. See *England*.

Salic Law. A code of laws relating to crimes, civil injuries, and inheritance of estates among the Salian or Merovingian Franks. It was compiled, probably, toward the end of the 5th century. By the Salic law, "no portion of Salic land shall come to a woman; but the whole inheritance of the land shall come to the male sex." The reason for this exclusion was, it is said, that certain military duties attached to the possession of land at that time. By the arbitrary application of this law to the succession to the crown, women were excluded from the throne of France in the 14th century; and it is in this sense that the term "Salic law" is commonly used. In medieval France great fiefs were held by women, and the "law" would have had no application to the royal domain and the crown, save for intrigues which followed the death of the sons of Philip IV without male issue. The same principle was successfully used by Philip of Valois, who became Philip VI. It was partly involved in his conflict with Edward III of England and in similar conflicts in Spain from 1714 to 1830. See *England*, *France*, *Hundred Years' War*.

Sanctuary. The protection afforded to criminals, debtors, and others, from the ordinary operation of the law, by reason of the sacred character of the place to which they fled, such as a church or abbey. From the days of Constantine, in many Catholic countries, certain churches were set aside and privileged as asylums for those escaping from the hands of justice. In England down to the Reformation, any person who sought refuge in such a place was immune from the law—except in the case of sacrilege or treason—if, within forty days, he showed signs of repentance and expressed his willingness to go into exile. Sanctuary for crime was abolished by James I; but sanctuaries for debtors continued to exist in and around London till 1697, the most noted of these being that of Whitefriars, near the Temple, which claimed this privilege to a much later date. The Abbey of Holyrood in Scotland still retains the right of giving sanctuary; but, since the abolition of imprisonment for debt, the need for seeking it no longer exists.

San Salvador. A little island of the Bahama group, West Indies, known also as Watling's island. This probably is the island upon which Columbus made his first landing in the New World, October 12, 1492, and to which he gave the name of San Salvador.

Sans-Culottes (*sănz'kû-lŏts'*). Literally, "without breeches." An opprobrious name given by the aristocrats during the French Revolution to the advanced republicans and to the Paris mob in general, who stormed the Bastille. It appears to have been a name willingly assumed, as many of the revolutionaries had, in contempt, discarded the knee breeches affected by the royalists and now wore trousers, to be distinguished from those they execrated.

Saragossa (*să'rà-gŏs'à*). A city of northeastern Spain, situated on the Ebro river. It rises picturesquely on a fertile plain, a cluster of castles and palaces. Saragossa was one of the first Spanish cities to adopt Christianity. In 1808-09 the French besieged the city, which resolutely resisted, the siege costing 60,000 lives. The citadel was formerly the palace of the kings of Aragon and the headquarters of the Inquisition.

Sarajevo (*sà'rà-yâ-vô*). The capital of Bosnia, Jugoslavia, formerly in Austrian territory. Survivals of past Turkish domination remain in its numerous mosques. The town was the scene, on June 28, 1914, of the assassination of the Austrian archduke, Francis Ferdinand, and his consort, a deed which precipitated the World War.

Sardinia, Kingdom of. An old-time dynasty, restored in 1720, when Austria ceded Sardinia to the duchy of Savoy. It comprised principally Savoy, Piedmont, and the island of Sardinia, and became the nucleus of the present kingdom of Italy. King Charles Albert, being defeated in a war with Austria in 1848-49, abdicated in favor of Victor Emmanuel. Cavour was then appointed premier. He sought for and achieved the unification of Italy. Emilia, Tuscany, the papal states, and Naples were, in turn, annexed in 1860, and in the following year Victor Emmanuel assumed the title of king of Italy. See *Italy*.

Sassanidæ (*să-săn'ĭ-dē*) or **Sassanids** (*săs'à-nĭdz*). A strong Persian dynasty named from Sassan, the grandfather of Ardeshir, or Artaxerxes, the founder of the dynasty. In 226 Ardeshir overthrew the Parthian rule. He revived the Zoroastrian religion, and began the extension and strengthening of his realm which was continued by his successors. The last of the line, Isdegerd III, was defeated by the caliph Omar in 641 at the battle of Nehavend, and in 651 was murdered. The caliphs thereafter ruled Persia. See *Parthians*, *Persia*.

Scapa Flow. An enclosed water area in the Orkneys, off the north coast of Scotland, between the islands of Mainland and Hoy. Scapa Flow became of note during the World War of 1914–18 as the base of the British fleet. In 1919, it was the scene of the scuttling of the German fleet, which lay anchored there after its surrender to the Allies.

Schism (*sĭz'm*) **of the East, The Great.** Called also the Eastern Schism. The severance of the Greek from the Roman Church in the 9th century. It began by a dispute over what is known as the *Filioque* clause, inserted in the Nicene Creed in 589, affirming that the Holy Ghost proceeds from the Father *and the Son*. The Greek theologians raised doctrinal difficulties on this point and denied such procession of the Holy Ghost. In this way a bitter and endless controversy arose between the two great churches. To this dispute was added the high-handed action of the emperor Michael III in 857, who intruded Photius into the see of Constantinople in place of Ignatius, the rightful patriarch, thereby overriding the papal jurisdiction. Still further differences arising between Pope Leo IX and Patriarch Michael Cerularius in 1054, the Greeks were at length cut off from communion with the Church of Rome.

Schism of the West, The Great. After the return of the papal court from Avignon to Rome and the death of Gregory XI (1378), an Italian was elected his successor as Urban VI. The French cardinals refused to acknowledge him and named Clement VII as their choice. This scandal of two rival popes lasted nearly forty years. It was finally quelled in 1417 by the deposition of no less than three phantom popes and the election of Martin V. It is known as the Great Schism of the West.

Schleswig-Holstein Question. From 1386, when the two duchies, Schleswig and Holstein, came under one government, to 1850, their political relations formed a vexed question. Schleswig was mostly Danish in population; Holstein, mostly German. Holstein was a member of the German Confederation, Schleswig was not. The Germans in Schleswig sought to induce the Danes to enter the

Confederation; but the latter resented such attempts and in 1863 declared Schleswig incorporated in Denmark. In the quarrel that ensued, Bismarck saw the means of possible aggrandizement for Prussia and for later differences with Austria. He invited Austria to co-operate with him in settling the Schleswig-Holstein entanglement. War was declared by the two powers against Denmark, which, being defeated, was forced to cede the two duchies to her joint conquerors. These, in turn, now disputed as to the disposition of their spoils. This was the opportunity for which Bismarck had planned. Accordingly, in 1866, he forced Austria into war. It took but seven weeks for Prussia to overthrow her unyielding rival; as a result the duchies of Schleswig and Holstein were annexed and incorporated in the Prussian kingdom. After the World War, a plebiscite provided for by the peace treaty gave North Schleswig to Denmark, South Schleswig and Holstein to Germany. See *Denmark, Plebiscite, World War.*

Scutage, "Shield Money." This was a tax first levied by Henry II in 1159. The owner of every knight's fee or shield (*scutum*) was obliged to pay a sum of money known as scutage, or escuage, in lieu of personal service. The feudal vassals were bound to but forty days' foreign service, whereas Henry needed a standing army in Europe to defend his continental possessions against the king of France. By this levy, he was enabled to hire mercenaries abroad, and the vassals were saved from taking part in quarrels in which they took no interest.

Sebastopol (*sē-bās'tō-pōl*). A seaport in southern Russia, on the Black Sea. The town submitted to a memorable siege in the Crimean war of 1854-55, being beleaguered by the British, French, and Turks for eleven months, the Russians finally yielding. Sebastopol was virtually created anew after the ruin wrought by the conflict. In the World War it was a Russian naval base. Later, its occupation by the Bolsheviki marked the end of their successful campaign against the insurrection led by General Wrangel, who fled from Sebastopol in a French warship.

Seleucidæ (*sē-lū'sĭ-dē*). The dynasty of kings descended from Seleucus who, after the death of Alexander, came into possession of the satrapy of Babylon in 323 B. C. He assumed the kingship of territory reaching from the Euphrates to the Indus and later conquered Syria and Asia Minor. The later kings of the dynasty gradually lost power and territory until the last, Asiaticus, was conquered by Pompey in 64 B. C.

Sepoy Mutiny, The. In the history of India in modern times no episode has attracted so much attention, or has been so long remembered, as the sepoy mutiny of 1857. It was popularly believed to have been caused by the refusal of sepoys, or native soldiers, to use cartridges that were greased with pork or beef fat, the muzzle-loading rifles requiring the soldier to bite off the end of the cartridge. But this was only incidental. There was evidently a carefully laid plot, with powerful influence behind it. The revolt spread through the greater part of India, the principal leader being Nana Sahib, rajah of Bithoor. His grievance was that the East India Company, which virtually ruled India, had stopped the pension that was granted to his family and had refused to let him, an adopted son, inherit lands. Among the other leaders was the ranee, or princess, of Jhansi, who appeared in the field at the head of two mutinous regiments. She fought ferociously and was killed at Gwalior in the last great battle. There were sieges at Lucknow, Bithoor, Cawnpore, Gwalior, Delhi, and at other towns; and there were fearful massacres by the natives, with terrible vengeance by the British. Two generals, Lawrence and Havelock, died in the war. Sir Colin Campbell, general in chief, defeated Nana Sahib at Cawnpore and then, with increased forces, conquered the other bands of mutineers, destroyed many forts, and disarmed the people. More than 1,300,000 arms were surrendered. Hindu astrologers had predicted that the rule of the East India Company would end on the centenary of the battle of Plassy, which was fought in June, 1757. See *East India Company, British; India.*

Serfs, Russian. Formerly, nine-tenths of the agricultural land of Russia was owned by the imperial family and by the Russian nobility. It was tilled by the millions of people known as serfs, whose condition was little better than that of slaves. They were attached to the soil by what was known as seignioral prescriptive right, that is to say, they were bound to cultivate the land for the owner, from the fact that they were born or lived on the estate.

Alexander II began in 1859 to free the crown serfs. In 1861 he issued an edict of emancipation which abolished serfdom throughout the empire and won for him the title of "Czar Liberator." But it brought neither peace nor prosperity. The peasants found that they were worse off than in pre-emancipation days and were paying the landlords, through the state, more than the land given them was worth. The following fifty years saw the steady growth of unrest and dissatisfaction, ending in the most appalling tragedies that modern times have ever witnessed. See *Russia.*

Seven Years' War. One of the most important wars, in its far-reaching effects, of the 18th century. It was waged (1756–63) between Frederick the Great of Prussia and the allied forces of Austria, France, Russia, Saxony, and Sweden. Frederick received naval and financial aid from England and had the support of Hanoverian troops. It is referred to, also, as the third Silesian war. In 1762 Peter III of Russia made alliance with Frederick and supported him until the end of the struggle. In close conjunction with the Seven Years' war was the conflict between France and England, 1754–63, ending in the Peace of Paris and leaving the British triumphant in North America and in India. Through this series of conflicts, Prussia was raised to the rank of a first-class power, and England expanded her colonial empire. See *American History, Canada, England.*

Shantung (*shän'tŏŏng'*). This historic province of China embraces an area of about 56,000 square miles in the peninsula lying between the Gulf of Chihli and the Yellow Sea. Here live approximately 26 million people in one of the most densely populated districts of the world. Shantung is famous as the birthplace of the Chinese sages, Mencius and Confucius. The loftiest mountain in the province, Tai-shan, near the western boundary, has for centuries been a sacred place of pilgrimage.

The Boxer rebellion centered in Shantung. In 1897-98, Germany secured a lease of the port of Kiaochow, with some inland territory and valuable mining concessions in this province, as indemnity for the killing of German missionaries. Early in the World War, Japan seized Kiaochow, and by the Treaty of Versailles she was confirmed in the possession of all rights and concessions which Germany had held. To this arrangement China refused to subscribe, and, by a treaty negotiated at Washington in 1922, Japan surrendered these privileges to China. Japanese forces were withdrawn from Shantung in December 1922. See *China, Washington Conference, World War.*

Shimonoseki (*shē'mō-nō-sā'kē*), **Treaty of.** The Chinese, defeated by Japan in the Chinese-Japanese war and alarmed for the safety of Peking, agreed to make peace and signed the Treaty of Shimonoseki, April 17, 1895. By the terms of this treaty, China ceded Port Arthur, the Liaotung peninsula, the island of Formosa, and the Pescadores islands to Japan, agreeing to pay also an indemnity of about

$300,000,000. Moreover, China recognized the independence of Korea. But Japan was, in the end, deprived of the most coveted fruits of her victory. She was forced, by Russia, France, and Germany, to surrender the Liaotung peninsula on the ground that Japanese possession of Port Arthur would be a menace to the peace of the Far East. See *China, Japan, Russia.*

Sicilian Vespers. A name given to the great massacre of the French in Sicily, which began at Palermo on Easter Sunday (1282) at the hour of vespers. The Sicilians were driven to this act of vengeance by the unspeakable cruelties of the French, under Charles of Anjou. The result was the expulsion of Charles and the introduction of Spanish rule in the island.

Sikhs (*sēks*). A religious sect constituting the greater part of the population of the Punjab in India. The sect, founded about 1500 by Nanak Shah, profess belief in the unity of the Godhead and in human brotherhood. The name *sikhs* means "disciples." They were organized into a military force by Guru Govind in the latter part of the 17th century, for defense against the Mohammedans and various other religious groups. This force was called the *khalsa*, and every member received the title of *singh*, meaning "lion," hence "noble." Overcome by the Mohammedans after the death of Guru Govind (1708), the sikhs lived in separate communities until they were united under Ranjit Singh in 1792. As a military organization they were crushed by the British in 1849, but they have since proved a valuable asset to the British army in India. They number about 3,000,000 and are chiefly an agricultural people.

Silesia (*sī-lē'shĭ-ă*). This coveted industrial territory of central Europe has never enjoyed more than a temporary independence, but it has played an important part in the history of Austria, Germany, and Poland. In the 10th century, it first appears in history, occupied by Slavonic clans. One of these tribes took its name from the Zlenz mountain, and from this source the modern name Silesia is derived.

About the year 1000, the Silesian lands were incorporated into the kingdom of Poland, but through various partitions the country had, by 1201, become entirely separate from Polish dominions. It was in the middle of the 12th century that the practical division of the district into Upper Silesia and Lower Silesia was brought about. After 1163, the dukes of these two territories began to invite German colonists to settle in their domains. As a result of this policy, both Upper and Lower Silesia, by the end of the 13th century, had become virtually German lands. This period is notable for the rise of the great Silesian industries of mining and weaving. The strength of these realms is indicated also by the fact that Henry II, duke of Lower Silesia, was able to turn back the Mongol invasion at the battle of Liegnitz (Wahlstatt) in 1241.

The Silesian nobility, however, followed a practice of dividing their lands among their heirs, a policy which resulted in so weakening the political power of each prince that all were glad to seek the protection of the kings of Bohemia. For a short period in the 15th century, the Silesians enjoyed virtual autonomy under Bohemian rule, but, with the rise of a more vigorous policy in the Bohemian state, Silesian administration passed finally into foreign hands, soon falling to the control of the Habsburgs.

During the Thirty Years' war, Silesia shared the fate of Bohemia, in devastation, in ruin of industries, and in decimated population. In 1741, Maria Theresa of Austria was forced to cede Lower Silesia to Frederick of Prussia. In 1742, Frederick wrested from her control Upper Silesia also, except a small group of provinces, known down to the World War as Austrian Silesia.

At the close of the World War, Austrian Silesia was incorporated in the republic of Czechoslovakia. The new state of Poland laid claim to Upper Silesia, which had been a part of the German empire. The Treaty of Versailles provided for a plebiscite to determine the question. The plebiscite was held in March 1920, and, upon the general basis of the distribution of German and Polish majorities, a commission of the League of Nations, in 1921, divided Upper Silesia between Germany and Poland.

Slavery. The system of holding certain persons as the property of other persons to whose will they are wholly bound. Slavery was practiced among all ancient peoples, and in Christian Europe the slave trade did not begin to decline until the 13th century. In the 16th, 17th, and 18th centuries, both Christians and Mohammedans engaged in the African negro slave trade. The Portuguese landed the first shipment of negro slaves to the New World in Santo Domingo in 1503. The first shipload of slaves brought into the British American colonies arrived at Jamestown in 1619.

Great Britain abolished slavery in her colonies in 1833, Sweden took similar action in 1846, France in 1848, Holland in 1859, the United States in 1863, Brazil in 1871, Porto Rico in 1873, and Cuba in 1880. Slaveholding, though officially prohibited, still exists in many Mohammedan countries and in some Portuguese colonies. See *American History, Emancipation Act, England.*

Solon, Laws of. In 594 and 593 B. C. Solon, already famous as poet, philosopher, and general, was made archon of the city of Athens, with power to make new laws and to remodel the government. In the first year of his archonship, Solon made several changes in the laws relating to property: (1) Tenants were given full ownership of land which they had tilled for nobles; (2) All debts were canceled; (3) Athenians enslaved in Attica were freed; (4) Enslavement of Athenians was made illegal; (5) The amount of land to be owned by any one person was limited. In his second year Solon created a senate, enlarged the assembly, introduced coinage, required each father to teach his son a trade, and restricted the public appearance of women. See *Greece.*

South Sea Bubble. A financial scheme which was launched in 1711 and which collapsed in 1720. The national debt of England had been causing anxiety to politicians. Accordingly, a bill was passed, enabling those to whom the nation owed money to take shares in the South Sea Company, in place of their claims upon the nation. All classes were under the delusion that the wealth of Spanish America, with which the company proposed to trade, was so enormous that they would be enriched beyond expectation. The madness of speculation spread like an epidemic. Landlords, clergymen, and widows hastened to invest their savings in the South Sea Company. But Spain's refusal to enter into commercial relations with England had rendered the privileges of the company worthless. The result was disaster, which brought appalling distress to thousands of impoverished families in England. See *England.*

Spanish Succession, War of the. A war (1702–14) arising out of disputes regarding succession to the Spanish crown. Charles II of Spain, dying childless, left by will the whole of his dominions to Philip of Anjou, the grandson of Louis XIV of France. Louis, setting aside the Treaty of Partition, which he had made with William III, chose to follow out the will and proceeded to support the claims of his grandson. The Grand Alliance of England, Holland, and the Holy Roman Empire was thereupon formed to oppose his designs. A series of bloody campaigns ensued, lasting nearly ten years. Marlborough fought in Flanders, while Archduke Charles overran Spain. The war came to an end

with the Treaty of Rastatt and Baden in 1714, by which Philip was recognized as king of Spain, under the title of Philip V.

Sphere of Influence. A region in which some foreign state claims superior rights as against all other outside powers, hoping eventually to convert this right into supreme control. Morocco was a French sphere of influence before it became in large part a French protectorate. Manchuria is generally regarded as a Japanese sphere of influence. But the term is also more loosely used. The Caribbean, for example, is sometimes spoken of as a "sphere of influence" of the United States.

Star Chamber, Court of. So called, either from the decorations of the roof, or because it had been the safe-room where formerly Jewish bonds, or "starres," were kept. It was established by Henry II to put an end to the tyrannous power of the feudal nobles. Its results were excellent. Wealthy landowners—the terror of their neighbors—who frequently bribed juries and sent retainers to punish those who had displeased them, were brought to Westminster before a court, which meted out strict justice. The greatest merit of this court was that it acted independently of juries, which in those days dared not give verdicts according to conscience. Later, in the time of Charles I, the power of the Star Chamber became a mere instrument of vindictive suppression and the court was at last abolished in 1641.

States-General (France). The name given to the legislative assembly in France, before the Revolution, consisting of the nobles, clergy, and commons. It is said to have been first summoned in 1302 by Philip the Fair. Sessions were rare, and none were summoned between 1614 and 1789.

Sublime Porte. The name adopted by Western nations to designate the Turkish government at Constantinople. In allusion to the ancient Eastern custom of administering justice at a gate of a city or of a palace, the Ottoman rulers referred to their court as "the lofty gate." The equivalent Turkish phrase was translated into French, the language of diplomacy, and hence into English as Sublime Porte.

Submarine Warfare. The indiscriminate and inhumane use of the submarine, or U-boat, as an instrument of warfare by Germany was a main cause of America's entering the World War. After various experiments with the submarine in attacking British warships, the German navy under von Tirpitz began, January 31, 1915, to destroy without warning British merchant and cargo ships. This policy was followed by the war zone decree of February 4, 1915, and reached its full development on May 7, 1915, when the passenger vessel *Lusitania* was sunk with a loss of 114 American lives. Owing to the protests of the United States, Germany later made some pretense of curbing the activities of the U-boats, but on February 1, 1917, the German government inaugurated a new policy of sinking all ships found within the waters around the Allied countries.

The four chief counts against German submarine warfare were: (1) for the belligerent right of capture, it invariably substituted the practice of outright destruction; (2) from the procedure of capture, it eliminated the essential steps of visit and search, with the result that destruction was carried out with little or no warning to the victims, as in the *Lusitania* incident; (3) for the duty of the captor to put those on board the captured vessel into a safe place before destroying it, it substituted "the poor measure of safety" of intrusting them to the mercy of wind and wave in small boats many miles from land, as in the case of the *Belgian Prince*; (4) being in itself a lawless practice, it left any vessel, neutral or enemy, passenger or freight, at the mercy of any brutal or heartless or cowardly commander of a submarine. See *World War*.

Suttee (*sŭ-tē'*). A Hindu woman who cremates herself on the funeral pile of her husband; also the act of cremation itself. This dread custom is now practically obsolete in India, having been made illegal by the British government in 1829, under Lord William Bentinck.

Taiping (*tī'pĭng'*) **Rebellion.** A rebellion instigated in southern China, in 1850, by Hung-siu-tsuen, who pretended he was divinely inspired to overthrow the Manchu dynasty and to set up in its place the *Taiping Chao*, or "Great-Peace" dynasty. He promulgated a vague form of Christianity, in which God was called the "Heavenly Father," and Christ, the "Heavenly Elder Brother." Discarding the queue, the insurrectionists went with unshaven heads and flowing locks and were known as the "long-haired rebels." They made many daring attacks on different cities, but were at length overcome in 1864 by forces under the command of Charles George Gordon, known afterwards as Chinese Gordon. See *China*.

Tatar or **Tartar Invasion.** Russia, located on the borders of Asia, fell an easy prey to the Tatars, or Mongols, of the East. In 1237 the successors of Jenghis Khan swept resistlessly over the Russian lands. In a short time the greater part of the country was in their hands, and, after subjugating the people, they obliged them to pay tribute and to furnish soldiers for the Tatar armies. For 250 years the Tatars ruled Russia and to some extent "orientalized" it; but they did not interfere with the religion, laws, and customs of her people. Toward the end of this period, in 1462, Russia under Ivan the Great found herself strong enough to throw off the Mongol yoke. See *Mongols, Russia*.

Terror, Reign of. That period of the French Revolution, between September 1793 and July 1794, when fear was an instrument of government. France was then battling a coalition of all Europe and was at the same time torn by bitter civil strife. The dominant party, of which Robespierre is the best-known member, believed itself justified in obtaining unity of action by literally destroying the opposition. The revolutionary tribunal and the guillotine were the instruments. The government was, however, not responsible for all the atrocities which characterized the time. The deeds of a Carrier at Nantes or of a Fouché at Lyons shocked even Robespierre himself. In Paris about 3000 persons were executed, and no fewer than 15,000 perished in other parts of France. See *France, French Revolution*.

Terrorists. The extreme revolutionary mob of Paris in 1848. Imbued with advanced socialistic ideas, they sought to end their real and imaginary wrongs by the spoliation of the rich. They refused to work and proceeded to set up a revolutionary government at the Hôtel de Ville, but they were overpowered by the garde mobile.

Teutonic Knights. A military and religious order, similar to that of the Templars, established at Acre in 1190 as a brotherhood of German crusaders. It became a political rival of the Knights Templars and Hospitalers, excelling them in lands and riches and winning great prestige in its conquest of the heathen Prussians. The order was dissolved by Napoleon in 1809, but up to a recent period a branch of it existed in Austria, as a semireligious knighthood, devoted especially to ambulance service. See *Germany*.

Thirty Years' War. This religious and political war began in 1618 with the rising of the Protestant nobility of Bohemia against Matthias, their king, who was also emperor. Matthias having died, the following year the nobles sought to depose Ferdinand, his successor, and elected Frederick, the Calvinist son-in-law of James II, to the imperial throne, taking up arms in his support. In 1620 Frederick was defeated at the battle of the White

Mountain near Prague, and driven from Bohemia. France, Spain, Sweden, and England became involved in this prolonged war, which was brought to an end in 1648 by the Peace of Westphalia. See *Germany*.

Thugs. A fraternity of religious fanatics in India, who worshiped the terrible goddess Kali, to whom it had long been the custom to make bloody sacrifices. From plunder of the property of their victims, murdered by strangling, the thugs derived their support. They were suppressed by the British government, 1830–40, though occasional instances of their peculiar methods serve to show that the thugs are not yet quite extinct.

Tiers Etat (*tyâr' zā'tà'*). In France, the "third estate," or that portion of the nation which was not included in the nobility nor in the clergy. It included the landholding peasantry. In the last States-General (1789) they struggled fiercely for power equal to that of the two privileged classes of nobles and clergy. The "third estate" succeeded at length in reorganizing all the deputies of the three orders as a single National Assembly. They had 600 deputies, equal to the number for the other two orders together, so that with the aid of the minor clergy and the liberal nobles they now took the lead. See *France*.

Tilsit, Treaty of. A treaty between France on the one side and Russia and Prussia on the other. Napoleon and Alexander met on a raft on the river Memel, June 25, 1807. Napoleon dictated the terms, according to which (1) the grand duchy of Warsaw was created out of parts of Prussia; (2) a part of Prussia was ceded to Russia; (3) Danzig was made free; (4) the region on the left bank of the Elbe was ceded to Napoleon; (5) the Confederation of the Rhine was recognized, and Joseph, Louis, and Jerome Bonaparte were acknowledged as kings of Naples, Holland, and Westphalia respectively; (6) Prussian harbors were closed to the British, the Prussian army was reduced to 42,000, and Prussia was to pay large indemnities and be reduced to a second-rate power. See *France, Russia*.

Toleration Act. An act passed in 1689, during the reign of William and Mary, by which Protestant dissenters from the Church of England were given the legal right to worship publicly in their own chapels. They were, however, bound to take the oaths of supremacy and allegiance and to repudiate the doctrine of transubstantiation. See *England*.

Tories, British. After the English revolution of 1688-89, two distinct parties with opposite political views came into existence—the Whigs and the Tories. The Whigs stood for the supremacy of Parliament as against the authority of the king, and for a more liberal, more democratic view of social, economic, and public questions. The Tories, on the other hand, stood for the continuance of the broad royal powers of the Stuart monarchs. When, after a long period of Whig supremacy, George III placed Lord North in power in 1770, the Tory principle of the supremacy of the king in the choice of ministers was put into effect. The period from 1783 to 1794 saw the Tories in power, led by Pitt, and opposed to the landholding group of Whigs. From 1794 until 1830, the Tories and the great Whig landowners were generally united in opposition to popular reform. In 1830, the name Conservative was suggested as a substitute for Tory and was generally used after 1832.

Torres Vedras (*tōr'rĕsh vā'drăsh*), **Lines of.** The fortifications which extended from near the old town of Torres Vedras to the banks of the Tagus. The Anglo-Portuguese armies under Wellington defended these lines against the French led by Masséna, during the winter of 1810-11, and checked their advance toward Lisbon. The longest of the three lines of defense, protecting 500 square miles of territory, measured 29 miles.

Treaties. Treaties are formal written agreements between independent states, with reference to political, commercial, or territorial relations, or other matters of common concern. The constitution and laws of each state determine what authorities shall negotiate treaties. The following are the most important treaties recorded in medieval and modern times. See *Treaties of United States*.

843 Treaty of Verdun. Between Lothair, Louis, and Charles the Bald. It divided Charlemagne's empire among these three grandsons of Charlemagne. To Louis was given the land east of the Rhine; to Charles, the country west of the Rhone and the Meuse; to Lothair, the strip between, including most of Italy.

911 (?) **Treaty of St. Clair-sur-Epte.** Between Rollo the Northman and Charles the Simple of France. The Northmen were granted a permanent possession of territory along the Seine, later known as Normandy, and feudal sovereignty over Brittany.

1122 Concordat of Worms. Between the emperor (Henry V) and the pope (Calixtus II). It settled by compromise the dispute over investitures.

1183 Peace of Constance. Between Frederick Barbarossa and the Lombard cities. The emperor renounced all royal privileges and rights in the cities, and acknowledged their right to raise armies and to manage their own local affairs. The cities recognized the overlordship of the emperor by an annual money payment.

1360 Brétigny. Between England and France. Closed first period of Hundred Years' war. Edward III renounced claim to French crown, and received sovereignty over Aquitaine, Ponthieu, Guisnes, and Calais.

1397 Union of Calmar. Between Denmark, Sweden, and Norway. United the three kingdoms under Queen Margaret of Denmark.

1420 Peace of Troyes. Between England, France, and Burgundy. Henry V of England married Katherine, daughter of Charles VI of France, and became regent and heir to the French throne.

1466 Second Peace of Thorn. Between Poland and Teutonic Knights. West Prussia and Ermeland were ceded to Poland. The Knights retained East Prussia as a Polish fief.

1508 League of Cambrai. Between Pope Julius II, Emperor Maximilian, Louis XII of France, and Ferdinand of Spain, against Venice.

1529 Peace of Cambrai. Between Francis I and Charles V. Called *Paix des Dames* because negotiated by Margaret of Austria and Louise of Savoy. Francis paid two million crowns and gave up claim to Italy, Artois, and Flanders. Charles temporarily gave up claim to Burgundy and released the French princes, held as hostages since 1526 (Peace of Madrid).

1552 Convention of Passau. Provided for free exercise of religion by adherents of the Confession of Augsburg until the next diet.

1555 Peace of Augsburg. Granted to the territorial princes and the free cities, adhering to Augsburg Confession, freedom of worship and right to introduce the Reformation in their territories.

1576 Pacification of Ghent. Treaty between the provinces of the Netherlands, whereby they united to drive the Spaniards from the country.

1579 Union of Utrecht. The seven northern Netherlands provinces united and declared their independence of Spain.

1632 Treaty of St. Germain. Between France and England. Canada, Acadia, and New France were ceded to France.

1648 Peace of Westphalia. Between France, Sweden, and the Estates of the Empire. Closed the Thirty Years' war.

1659 Peace of the Pyrenees. Between France and Spain. France received some territory. Louis XIV married Maria Theresa, eldest daughter of Philip IV of Spain. She renounced all claim upon her Spanish inheritance, in consideration of a dowry of 500,000 crowns to be paid by Spain. England received the town of Dunkirk by this peace.

1660 Peace of Copenhagen. Between Denmark and Sweden. Denmark surrendered the southern part of the Scandinavian peninsula.

1667 Treaties of Breda. Between England, Holland, France, and Denmark. France was given Acadia; England received Antigua, Montserrat, and English St. Christopher's; Holland retained Surinam; England, New Amsterdam. The treaty provided that goods brought down the Rhine could be shipped to England in Dutch vessels.

1668 Peace of Aix-la-Chapelle. The formation of the Triple Alliance forced Louis XIV to sign this peace, thereby ending his war with Spain. Burgundy was restored to Spain by Louis in return for 12 fortified frontier towns.

1678-79 Peace of Nimwegen. A series of treaties: between Holland and France; Spain and France; the emperor (Holy Roman Empire), France, and Sweden; Holland and Sweden; France and Denmark; Denmark and Sweden. Holland received its entire territory back on condition of neutrality. Spain and France exchanged large cessions of territory.

1679 Peace of Saint-Germain-en-Laye. Between Louis XIV and the elector of Brandenburg. The elector surrendered his Pomeranian conquests to Sweden.

1686 League of Augsburg. Signed by the emperor, the kings of Spain and Sweden, the electors of Bavaria, Saxony, and the Palatinate. Directed against Louis XIV of France.

1697 Peace of Ryswick. Between France and the allied powers,—England, Spain, Holland, and the Holy Roman Empire. Two treaties, providing, among other things, for general restoration of conquests, recognition of William III as king of England and of Anne as his successor. France was given permanent possession of Alsace.

1699 Peace of Karlowitz. Between Turkey and the allies,—Austria, Poland, and Venice. Turkey and Austria divided the territory of Hungary and Transylvania. Venice received Morea (the Peloponnesus).

1713 Peace of Utrecht. Between France and the allies,—England, Holland, Savoy, Prussia, and Portugal. Ended the War of the Spanish Succession. The separate treaties recognized the Protestant succession in England and provided for separation of the crowns of France and Spain. England received Gibraltar, and Sicily was given to Savoy.

1714 Peace of Rastatt and Baden. Between France and the emperor and the Holy Roman Empire. A separate peace by which Austria received the Spanish Netherlands.

1718-19 Quadruple Alliance. Between Great Britain, France, the emperor, and Holland. Designed to maintain the Peace of Utrecht. Spain was forced out of Sicily and Sardinia; Savoy exchanged Sicily for Sardinia.

1721 Peace of Nystad. Between Sweden and Russia. Cession of some territory on the part of Sweden. Russia restored Finland and paid indemnity.

1738 Peace of Vienna. Between France and Austria. Ended the War of the Polish Succession. Provided for French possession of Lorraine; for cession of Naples and Sicily from Austria to Spain; for French guarantee of the Pragmatic Sanction.

1742 Peace of Breslau. Between Maria Theresa of Austria and Frederick II of Prussia. Closed First Silesian war. Frederick withdrew from alliance against Maria Theresa; he received Upper and Lower Silesia from Austria.

1748 Peace of Aix-la-Chapelle. Between Austria, supported by Holland and England, and Prussia, associated with France and Spain. Silesia was confirmed to Prussia; the Pragmatic Sanction was sustained in Austria.

1763 Peace of Paris. Between Great Britain, France, Spain, and Portugal. Canada was ceded to Great Britain by France; Florida to England by Spain; Louisiana to Spain by France (treaty of 1762). This peace, with the Treaty of Hubertusburg, closed Seven Years' war.

1763 Treaty of Hubertusburg. Between Austria and Prussia. Ratified Treaty of Breslau.

1774 Treaty of Kutchuk-Kainardji. Between Turkey and Russia. Brought Tatars under Russian influence; gave Russia a powerful position on the Black Sea.

1783 Treaty of Versailles. Between Great Britain, France, and Spain. Great Britain ceded Tobago to France and Florida to Spain.

1795 Peace of Basel. Between France and Prussia and between France and Spain. France was given temporary possession of the left bank of the Rhine, which Prussia, in secret treaty, agreed should be permanent.

1797 Treaty of Tolentino. Between the pope and the French Republic. The pope ceded the Romagna, Bologna, and Ferrara.

1797 Treaty of Campoformio. Between France and Austria. Provided for convening of Congress of Rastatt. Gave France the Austrian Belgian provinces and most of the left bank of the Rhine. Austria received Venice and other territory.

1797-99 Congress of Rastatt. Between France and the Holy Roman Empire. Fruitless negotiations.

1801 Concordat. Between Napoleon I and Pius VII. Provided that French bishops and archbishops should be appointed and supported by the government and confirmed by the pope.

1801 Peace of Lunéville. Between France, Austria, Spain, and the Holy Roman Empire. The Empire virtually abolished. Treaty of Campoformio confirmed. Left bank of Rhine given to France. Louisiana ceded to France by Spain.

1802 Treaty of Amiens. Between Great Britain, Holland (the Batavian Republic), France, and Spain. England surrendered all conquests to France; Spain ceded Trinidad to England; Holland ceded Ceylon to England.

1805 Treaty of Pressburg. Between France and Austria. Austria made large cessions to France and to the kingdom of Italy, recognizing Napoleon as king of Italy. Bavaria and Württemberg recognized as kingdoms.

1805 Treaty of Schönbrunn. Between Napoleon and Prussia. Prussia ceded Cleves, Ansbach, and Neuchâtel to France, on the promise of receiving Hanover in exchange.

1807 Peace of Tilsit. Treaties between France and Russia, and between France and Prussia. Provided large cessions of territory and payment of indemnities by Prussia, and for alliance between France and Russia.

1809 Peace of Vienna. Between Napoleon and Francis I of Austria. Signed at Schönbrunn. Austria ceded 32,000 square miles of territory.

1814 Peace of Kiel. Between Denmark, Sweden, and England. Denmark surrendered Norway. Sweden ceded western Pomerania and Rügen to Denmark. England retained Helgoland.

1814-15 Peace of Paris. Between France and the Coalition. By the treaty of 1814 France retained her general boundaries of 1792, paid no indemnities, and retained captured art treasures. By the treaty of 1815, she was reduced to her boundaries of 1790, an indemnity of 700 million francs was exacted, and art treasures were reclaimed. Louis XVIII made king.

1829 Peace of Adrianople. Between Russia and Turkey. Russian conquests in Turkey surrendered. Recognition by Turkey of the independence of Greece.

1839 Treaty of London. Between Great Britain, Austria, France, Prussia, Russia, and the Netherlands. Regulated position of Belgium (neutralized) in international law.

1842 Treaty of Nanking. Between Great Britain and China. Closed the Opium war. Hongkong ceded to England. Several treaty ports opened.

1856 Treaty of Paris. Between Russia, Turkey, England, France, Sardinia, Austria, and Prussia. Ended the Crimean war. Declaration signed with respect to privateering, blockades, and contraband.

1859 Treaty of Zürich. Between Austria and France and Sardinia. Sardinia received the greater part of Lombardy. Italy was to be a confederation under the honorary presidency of the pope. Treaty provisions soon overridden.

1860 Peace of Peking. Between China and the Western Powers. Ratified the Treaty of Tientsin (1858) and imposed indemnity on China.

1865 Convention of Gastein. Between Prussia and Austria. Provided for control of the duchies of Schleswig and Holstein.

1866 Peace of Prague. Between Prussia and Austria. Closed the Austro-Prussian (Seven Weeks') war. Austria separated from reorganized Germany. Prussian territory largely increased. Venice ceded to Italy.

1871 Convention and Preliminary Treaty of Versailles. Between France and Germany. Provided for cession of Alsace and German Lorraine to Germany and for payment of large indemnity by France.

1871 Peace of Frankfort-on-Main. Final settlement which ended the Franco-Prussian war.

1878 Treaty of San Stefano. Between Russia and Turkey. Closed Russo-Turkish war. Provided for large cessions of Turkish territory to Montenegro, Serbia, Rumania, Bulgaria, and Russia.

1878 Treaty of Berlin. Between Great Britain, Germany, France, Austria, Russia, Turkey. Called to consider Eastern Question. Declared inoperative most of the terms of San Stefano.

1882 Triple Alliance. Between Austria, Germany, and Italy.

1891 Dual Alliance. Between Russia and France. Served to counterbalance the Triple Alliance, formed by Germany, Austria, and Italy.

1895 Treaty of Shimonoseki. Between Japan and China. China acknowledged independence of Korea and ceded Formosa, the Pescadores, and Liaotung peninsula to Japan, besides paying a large indemnity. Cession of Liaotung later exchanged for larger indemnity.

1902 Anglo-Japanese Treaty. A defensive alliance between Japan and Great Britain. Provided mutual aid in case of attack by more than one outside power.

1905 Treaty of Portsmouth. Between Japan and Russia. Russia acknowledged Japan's paramount interest in Korea; transferred lease of Port Arthur to Japan. Both powers were to evacuate Manchuria and restore it to China.

1907 Triple Entente. Treaty between England and France in 1904; between England and Russia in 1907. A diplomatic understanding which developed into the alliance of 1914.

1912 Treaty of Lausanne. Between Italy and Turkey. Closed Turco-Italian war. Tripoli was ceded to Italy.

1913 Treaty of London. Between Balkan states and Turkey. Provided for restriction of Turkey to Constantinople and small adjoining territory. Redistributed conquered Balkan territory.

1913 Treaty of Bucharest. Between Balkan states. Ended second Balkan war. Serbia, Greece, Rumania, and Turkey enlarged at expense of Bulgaria.

1918 Treaty of Brest-Litovsk. Between Germany and Russia. Ended hostilities between the two countries.

1919 Paris-Versailles Treaty. Between the Entente Allies and Germany. Marked the close of the World War. Provided for cession of Alsace and Lorraine to France. Indemnity imposed on Germany.

1919 Treaty of St. Germain. Between Entente Allies and Austria. Provided for greatly reduced Austrian boundaries.

1921 Four-Power Pacific Treaty. Between the United States, Japan, Great Britain, and France. See *Washington Conference.*

1922 Five-Power Treaties. Between the United States, Great Britain, France, Japan, and Italy, providing for limitation of armament. See *Washington Conference.*

1922 Nine-Power Treaties. Between the United States, Great Britain, France, Japan, Italy, Holland, Belgium, China, and Portugal, providing for adjustment of Chinese tariffs and for the open-door policy in China. See *Washington Conference.*

1923 Treaty of Lausanne. Between Turkey and Greece, Great Britain, France, Italy, and Rumania, defining limits of Turkish territory.

1925 Locarno Treaties. Between France, Germany, Great Britain, Belgium, and Italy, demilitarizing the Rhineland and providing for peaceful settlement of disputes; between Germany, Czechoslovakia, and Poland providing for peaceful settlement of disputes.

1928 Pact of Paris. Between 15 leading nations as original signatories, most other nations later adhering. Renounced war as an instrument of national policy in dealing with parties to the treaty.

Trek (*trĕk*), **Great.** A variety of causes led to this emigration of Dutch settlers from Cape Colony in 1835–40, chief among which were: (1) the dispute as to whether English or the Boer dialect should be the official language of the Colony; (2) the abolition of negro slavery by the British. The Boers abandoned their homes and moved into Natal. This emigration is known as the Great Trek. In 1843 the British claimed rights over Natal, and once more the Boers trekked and founded the Orange Free State and the Transvaal.

Triple Alliance. In 1879 Germany and Austria formed an alliance by which they bound themselves "to lend each other reciprocal aid with their whole military force and to conclude no peace, except conjointly and in agreement." It was aimed particularly against Russia and, in a lesser degree, against France. In 1882 Italy became a party to this alliance, which then became known as the Triple Alliance. It was several times renewed, the last occasion being in 1912. In 1915 Italy declared the alliance dissolved, holding Germany and Austria to be aggressors in the hostilities of 1914.

Trojan War. A conflict between the ancient Greeks and the people of the city-state of Troy, on the coast of Asia Minor. Concerning this war, only the vague traditions and hero tales found in the Homeric poems have survived. Modern excavations on the site of Troy have disclosed a ruined city of the 12th century B. C., which is generally presumed to be the Troy or Ilion to which Homer's *Iliad* refers.

Not a few scholars believe that the poetic story of a ten years' struggle, a part of which is told in the *Iliad*, rests upon a basis of fact. Several theories as to the causes of this ancient war have been proposed. It has been suggested that the stealing of Helen by Paris represents a settled Trojan practice of stealing Greek women. The Greeks were therefore bent upon avenging, not one, but many offenses. Another theory, which has gained some adherents, is that the expedition of the Achæans against Troy was a campaign to seize the Trojan territory and thereby gain control of the important trade route through the Dardanelles into the Black Sea. The fact of repeated destruction of early cities on the site of Troy is urged in support of this latter view.

Tyrol or **Tirol** (*tĭr'ŏl*). An Alpine district which was formerly a crownland of Austria. By the peace treaty of 1919 the northern part of the district was included in Austria as North Tyrol, while the southern part was given to Italy.

Ukase (*ū-kās'*). In Russia, under the monarchy, the public proclamation, or edict, of the czar, bearing the imperial seal and having the force of law. The whole system of Russian government was based on such absolutism, which in time became the curse of the nation and the cause of the downfall of the monarchy.

Ulster Massacre. Repressive measures against the Catholics and the influx of fresh colonists from England, to oust the Irish more completely from the land, led to this fateful massacre in 1641. The Irish, impatient of promised amelioration, attempted to seize Dublin. This plot being frustrated, they turned savagely on the English and Scottish colony in Ulster and put to death, indiscriminately, many thousands of the inhabitants. See *Ireland.*

Ultramontanes. Formerly this term applied to the members of a schismatic body, for instance, those of the Gallican Church who were opposed to papal supremacy. It is now used to designate any party that upholds the papal claim to temporal power, such as the Catholic party in Germany under Doctor Windthorst during the Kulturkampf. See *Kulturkampf.*

Union Jack. The national ensign of Great Britain and Ireland. The flag is composed of the red cross of St. George on a white field (England), the white X-shaped cross of St. Andrew on a blue field (Scotland), and the red X-shaped cross of St. Patrick on a white field (Ireland). The application of the term "Union Jack" to the national ensign, or Union flag, is an extension of its use by sailors to signify a small flag of like design used as a signal flag, and also flown at the bowsprits of men-of-war and from the mainmast by an admiral of the fleet. Usage, however, seems to have sanctioned the misnomer.

Unspeakable Turk. A phrase applied to the Ottoman empire. Its first use is credited to Thomas Carlyle in a public letter in 1877.

Utrecht, Treaty of. A treaty signed in 1713 between Louis XIV and the allies, England and Holland, at the close of the War of the Spanish Succession. By its terms, Spain and the Indies were to remain under Philip V, who renounced all claim to the throne of France. Sicily was to go to the duke of Savoy, who was to be known as king of Sicily; Naples, Milan, and the Netherlands were to be given to Charles VI; the Dutch were allowed to garrison the southern frontier of the late Spanish Netherlands; France recognized Anne

and the Protestant succession in England. The greatest beneficiary of the treaty was England. She retained Gibraltar, Minorca, and in America acquired Hudson Bay territory, Nova Scotia, Newfoundland, and the French part of St. Christopher in the West Indies. Spain also granted her the right of importing slaves into the Spanish colonies and of sending goods to Panama for the Spanish colonists. See *England*.

Vassalage. In the middle ages, the tie between the tenant and the lord from whom he held his land or estate was known as vassalage. Every holder of land was the vassal of some lord. The vassal owed to his lord civil and sometimes military services, also payments of money. In return for such services the lord was bound to protect the life and property of his vassals—in those days no trivial undertaking. All below the king, down to the lesser knights, were regarded as vassals and owed fealty to their immediate superiors.

Vendée, Wars of the. At the period of the French Revolution, the western district of France called La Vendée, with neighboring territories, was inhabited chiefly by a peasant population, among whom the ideas of the Revolution found little acceptance. When, in 1793, a conscription was decreed throughout France, the Vendéan peasants, fond of their old institutions, rose in revolt. Some of the émigrés took advantage of the ensuing conflict to land in France. By the end of the year 1793, however, the republican armies had suppressed the revolt. A policy of conciliation was then followed until the last remnants of the uprising were quelled in 1796. See *Emigrés, France*.

Vikings (*vī'kĭngz*). The name applied to members of the bands of Norse sea rovers who harried the northern coasts of Europe from the 8th to the 10th century. The word means "those who lurk in bays and come out for plunder," *vik* being an Icelandic word for "bay." The period of two centuries during which the Norsemen were most active on the sea is commonly known as the Viking age. In the earlier part of this period, they appear as occasional marauders on the coasts of England and France, their first recorded expedition being one to the coast of Dorsetshire in 789. Their usual method was to make sudden attacks upon a coast in the summer months. After a few seasons, they would prepare for more permanent conquest of a district by "wintering" in it. Then, upon a period of strife, amalgamation with the native people usually ensued. See *Normans*.

Villafranca, Armistice of. After the defeat of Austria by Piedmont and France at Solferino and Magenta, Napoleon III, without consulting his ally, concluded a truce with Austria. By the terms it was agreed: that Lombardy should be ceded to Piedmont; that Austria was to retain Venetia; that the Italian states were to form a federation; and that the rulers of Tuscany and Modena were to be returned to their duchies. The disloyalty of Napoleon toward his ally, as it appeared in this action, caused the indignant resignation of Cavour. The terms of the armistice were never enforced. Nor indeed were the people of Italy prepared to observe them, as they were determined that nothing should prevent them from reaching their goal, which was the unification of Italy. See *Italy*.

Waldenses. The followers of Peter Waldo, who was a Lyons merchant about 1160. Though they did not seek to set up a new religion, they objected to certain doctrines of the Church, such as the Mass and the praying to saints. They advocated the charity and the poverty of the Apostles and held that the Bible was the only guide to the religious life. They spread from France through many countries in Europe, but exerted no great influence as reformers. They survived much persecution and are still to be found as a Protestant sect in Italy and in other parts of Europe.

Wergild (*wûr'gĭld'*). Among the Anglo-Saxons and other Teutonic races, the money compensation that had to be paid by a murderer to the relatives of his victim in order to avoid a blood feud, or vendetta. Acceptance of the wergild was at first optional, then it became compulsory. Later, it could not be demanded, nor the feud waged, the slayer being left to public justice.

Westminster Confession. The confession of faith framed by Presbyterian and Calvinistic divines at the Westminster Assembly, whose sessions lasted from 1643 to 1649. The confession was mainly an exposition of the Calvinistic doctrine.

Westphalia, Treaty of. This treaty, signed in 1648 by France, Sweden, and Germany, put an end to the Thirty Years' war. It provided that each reigning prince should be free to choose Catholicism, Lutheranism, or Calvinism as the religion of his subjects. In Germany, Protestantism was recognized as the state religion, but provision was made for equal representation of Catholicism in the German diet. The independence of Holland and Switzerland was acknowledged; France acquired Alsace; Sweden secured Bremen, North Pomerania, and Stettin. With this treaty the period of religious wars in Europe ceased.

Whigs, English. One of the two great English parties from the English Revolution of 1688 until about 1835, when the name Liberals gradually replaced the name Whigs. The Whigs were the anti-Court, anti-Clerical party as distinguished from the Tories who tended to support the old privileges of the king and clergy. From 1714 to 1761, the Whigs were continuously in power, and it was during this period that the cabinet system of England developed into its present form. The Whigs displaced the Tories in 1830 and carried through the reform measures of that period. See *Tories*.

Witenagemot (*wĭt'ĕ-nà-gĕ-mōt'*). In Anglo-Saxon times, the king sought the advice and consent of a body of thegns, nobles, bishops, and abbots, which was known as the *Witenagemot*, or "Assembly of Wise Men." This assembly served as a court of appeal, and, within certain limitations, it could elect or depose a monarch. After the Norman Conquest it still continued to meet under the name of the Great Council, and in the reign of Henry III became transformed into a national parliament representing the people.

Worms, Diet of. An assembly held at the city of Worms in 1521, before which Luther was summoned to answer the accusation of heresy made against him. He refused to retract any of his writings or teachings and was ordered to return to Wittenberg to await the imperial edict. The elector of Saxony, who feared for Luther the fate of Huss, had him conducted in secret to the castle of Wartburg, where he spent a year in translating the New Testament. He then returned to Wittenberg, where he died 24 years later.

Young Italy. A society of enthusiastic Italian republicans led by Giuseppe Mazzini. Formed in 1831, the organization reached the climax of its activity in the unsuccessful invasion of Savoy, under Mazzini, in 1834. This society served, not only to inspire Italian patriotism, but also to arouse the youth of other European nations to progressive political ideals.

Zollverein (*tsôl'fĕr-īn'*). A union of German states for the purpose of establishing and maintaining uniform rates of duty on imports from foreign countries and of free trade among themselves. It was inaugurated under the auspices of Prussia in 1834. The growth and success of this economic system contributed much to the political unification of Germany.

PERIODS, EVENTS, AND MOVEMENTS OF WORLD HISTORY

In the preceding pages, the stories of the rise and progress of the states and nations of the world are recounted at some length. Moreover, many special topics, including notable movements, parties, periods, and events of international importance, are treated succinctly in the Dictionary of World History. To complete this plan, and still further to unify the treatment of the subject, the entire course of world history is graphically presented in the following comparative summary of outstanding facts in the story of mankind. The chronological outline histories of the nations are arranged in parallel columns in order to facilitate the attainment of *comparative view* that is so important in the study of history.

Progress in civilization and in political and social development has not been uniform among the nations. In a comparative chart, the occasional long blank spaces in a column, parallel with other quite crowded columns, are instructive. They frequently mark the shallows and the backwaters in the stream of history, telling a story of the persistence of primitive culture, of political stagnation, or of subordination to foreign invaders.

Besides being a convenient source of information, this chart furnishes a study plan for fixing in the memory *related* events and dates, thus supplementing the preceding historical narratives. In this connection, two features especially distinguish this plan: (1) The entries in the column of Arts of Civilization summarize, in its varied phases, the advance of human culture; (2) the distinctive character of modern history since 1815 finds emphasis in the column of International Affairs.

A similar chart, covering the history of the United States and the other American nations, will be found at the close of the section devoted to American history.

Prehistoric Man in Europe

About 50,000 years ago Early Stone Age	Beginning of 3d warm period. Climate grows warm.	Men are hunters. They know the use of fire.	First stone tools. Use of the first hatchet. Flint chipped by pounding.
Middle Stone Age	Beginning of 4th glacial period. Climate grows cold. Reindeer are plentiful.	Men are still hunters. They begin to live in caves. Clothing of skin sewed with bone needles. Cave walls decorated with drawings. Dead buried under family hearth.	Flint tools sharpened by pressing along edge with hard bone. Ivory tools. Weapons of bone, wood, and flint. Bone whistles.
Late Stone Age About 10,000 B. C. Period Begins	Beginning of 4th warm period (which includes present time).	Men hunt; women learn to plant seed and to harvest. Wooden dwellings along streams. Pile dwellings in Swiss lakes. Agriculture leads to permanent settlements. Towns. Primitive commerce. Wars among communities. Rise of nomad tribes, herdsmen, in country east of the Danube.	Polished flint and stone tools. Tools ground on whetstones. Earliest use of the plow. Pottery made.
Period closes about 3000 B. C.	Metals (copper) discovered, probably in peninsula of Sinai, as early as 4000 B. C.; introduced in southeastern Europe about 3000 B. C.; in Britain about 2000 B. C. Bronze age begins.		

From Earliest Records to the Eighth Century B. C.

B. C.	Asia	Europe	Egypt
			4241. Solar calendar adopted; earliest dated event in history.
4000	Sumerians in Babylonia. Cuneiform writing in use.		4000. By this date copper tools and hieroglyphic writing were in use. Before 3500, Egyptians had an alphabet of 24 letters.
			3400. Two kingdoms of Upper and Lower Egypt united.
			3400–2400. "Old Kingdom" period; capital at Memphis.
			3050 (about). Earliest stone masonry.
3000	By this time, the Sumerians had built a civilized state in Babylonia.	3000 (about). Ægeans use metal tools and weapons. Rise of Cretan civilization.	3000–2500. Age of pyramid building.
			3000. Book of the Dead already venerable.
3000 (about)	Canaanites settling in Palestine.		
	Nineveh a trading city.		Egyptians have seagoing ships.
3050–2750 (about)	Age of Sumerian city-states in Babylonia.		Great progress in woodworking, paper making, weaving, glassmaking, metal working, pottery, and painting.
2800 (about)	Sargon I builds a strong Babylonian kingdom (Akkad).		
2500	Parent people of Indo-Europeans living on steppes east of Caspian Sea. They have the horse, domestic oxen, and wheeled carts.		Portrait sculpture.
		2200. Egyptian influence in Crete.	
2150 (about)	Hammurabi makes Babylon the center of a powerful state.		
2000 (about)	Hittites (in Asia Minor) use hieroglyphic writing.	2000 (about). Indo-Europeans in the Balkan peninsula. Bronze and copper in use in Norse countries.	2000. Egyptian mathematics well developed.
	Light-skinned Indo-Europeans settle in the Punjab. Establishment of Vedic culture.		2000–1500 (about). Feudal Age in Egypt.
			1800 (about). The Hyksos gain control of Egypt.
	Barbarian Kassites from the East conquer Babylonia. They introduce the horse, the training of which they learned from Indo-European tribes of the North.	1700. Cretan influence in Greece.	1700 (about). Horse introduced. Cliff tombs. Oldest libraries found in tombs of nobles.

B. C. — From Earliest Records to the Eighth Century B. C.—Con.

Asia	Europe	Egypt
		Development of literature and government, religion, and ideas of social justice and kindness.
1600 (about) Feudal system extended throughout China.	1600–1100. Cretan (Ægean) civilization at its height.	
1400 (?) Hindu kingdoms established on the Ganges.		1580–1150. Egypt a world power. Period of the New Kingdom. Development of monotheism in religion.
1400 (about) Hebrews and Arameans settle in Syria and Palestine.		
1200 (about) Exodus of Hebrews from Egypt, led by Moses.	1200. Rise of Mycenæ and Tiryns in Greece.	
	1193–1184. Conquest and destruction of Troy.	
1140–1040 (about) Era of the Judges in Israel.		1180–1050. Decline of the New Kingdom.
1025 (about) Reign of Saul in Israel.	1100–750 (about). Homeric Age in Greece, Asia Minor, Ægean islands.	
1010–975 Reign of David; kingdom of Israel at its zenith.		
1000 (about) Ionians settle in Asia Minor.		
1000 (about) Phœnicians become powerful.		
975–935 (about) Reign of Solomon in Palestine.		
935 Israel divided into northern kingdom (Israel) and southern kingdom (Judah).		926. Shishak, king of Egypt, invades Palestine.
10th Century Alphabet, without vowel signs, in use by Phœnicians.	900–700. Greek epic poetry is at its zenith. Age of Homer.	
860–825 Shalmaneser II, a great warrior, reigns in Assyria and makes conquests in western Asia. He defeats Ahab, king of Israel, and his allies in battle of Karkar (854).	820 (?). Lycurgus introduces many reforms in Sparta.	814 (?). Carthage founded.

B. C. — From the Eighth Century B. C. to the Greco-Persian Wars, About 490 B. C.

Arts of Civilization	Judah	Israel	Asia and Africa	Europe
8th Cent. Coinage in Lydia. Period of the great writing prophets in Judah and Israel.				
		782–741. Reign of Jeroboam II. Period of Amos and Hosea.		
776 Olympic games. Beginning of first Olympiad.				
763 A solar eclipse recorded in this year; it determines dates in Assyrian chronology.				753. Building of Rome (legend).
			745. Pul, or Tiglath-Pileser II, seizes the throne of Assyria.	
	740–701. Period of the ministry of Isaiah.	734–732. Pekah, king of Israel, is deposed and slain. Hoshea appointed in his place.	732. Damascus taken by Tiglath-Pileser.	734. Syracuse and Corcyra are founded by the Corinthians.
	728–697. Hezekiah, king; abolishes idolatry; makes alliance with Egypt.	722. Samaria taken by the Assyrians. End of the kingdom of Israel.	722. Sargon II, king of Assyria, takes Samaria and carries the Ten Tribes into captivity.	721. Sybaris founded in Magna Græcia by Achæans.
	Sennacherib invades Judah. His army destroyed by pestilence.	705. Sennacherib, king of Nineveh.		
700 (about) Writing common among the Greeks.				
700–460 Lyric poetry flourishes in Greece.	697–642. Manasseh, king; carried to Babylon; afterward restored to throne.	681. Babylon and Nineveh are united under Esarhaddon.		678. Argæus, first king of Macedon.
Spherical form of the earth and true cause of lunar eclipses taught by Thales, who also discovered the electricity of amber.			Egypt	665. First naval battle recorded in history, between the Corinthians and Corcyræans.
		660. First mikado of Japan, named Jimmu Tenno.	660 (about). Psammetichus, king of Egypt. Memphis becomes the capital.	
		657. Byzantium founded.		645. Second Messenian war in Greece.
				629. Periander rules Corinth.
	622 (about). Religious reform. Prophet Jeremiah.	624. Greeks from Thera found a new colony in Libya, named Cyrene.		
621 Draconian code formulated.	621. Book of Deuteronomy discovered at Jerusalem.			

From the Eighth Century B. C. to the Greco-Persian Wars, About 490 B. C.—Con.

B. C.	Arts of Civilization	Judah	Babylonia	Egypt	Europe
610	Pharaoh Necho begins a canal between the Mediterranean and Red Sea. Many lives lost in the attempt. He also sent out a Phœnician fleet which circumnavigated Africa.	609. Battle of Megiddo. Judah subject to Egypt. 605. Battle of Carchemish; Judah subject to Babylon.	606. Nineveh a second time destroyed. 605. Nebuchadnezzar defeats Necho of Egypt; invades Judea. Battle of Carchemish.	609. Pharaoh Necho, king of Egypt.	
6th Cent.	Taoism, a system of philosophy, founded in China by Lao Tzu. Written laws in existence in Crete.				600 (about). Foundation of Massilia (Marseilles).
594	Solon's code supersedes that of Draco in Athens.				594. Solon, archon of Athens.
586?	Pythian games established at Delphi.	586. Captivity of Judah completed. Jerusalem destroyed. Jews carried to Babylon. Prophet Ezekiel.		589 (about). Pharaoh-Hophra, king of Egypt.	
582?	Establishment of Nemean games in Greece.				
578	Money coined at Rome by Servius Tullius. (Legend)		573. Nebuchadnezzar takes Tyre.	569. Amasis, king of Egypt, makes alliance with Greece.	578. Servius Tullius, king of Rome. (Legend)
		Persia			
		558. Persian Empire founded by Cyrus.	562. Crœsus, king of Lydia, subjects Asia Minor.	568. Egypt invaded by Nebuchadnezzar.	600–500 (about). Etruscans supreme in Italy.
557	Gautama Buddha is born.		556–539. Nabonidus rules in Babylon.		
551 (about)	Era of Confucian philosophy in China.	546. Cyrus conquers Lydia. 539. Cyrus takes Babylon. 537. Jews returned to Palestine; Zerubbabel, leader.			**Rome, Etc.**
		529. Death of Cyrus; Cambyses, king of Persia.			534–510. Tarquin the Proud, king. 530. Cadiz built by the Carthaginians
			Greece		
			527. Pisistratus dies.		
525–456	Æschylus, greatest of the Greek tragic poets; won thirteen contests; defeated in 468 by Sophocles.	525. Cambyses conquers Egypt and makes it a Persian province. Psammetichus, last king of Egypt. 522–486. Darius I, king of Persia. 516. Second temple at Jerusalem completed.		525. Egypt becomes a Persian province.	
				Macedonia	
		508 (about). Darius conquers the Punjab.	510. Followers of Pisistratus expelled; democracy established at Athens.		509 (about). The Tarquins expelled from Rome. Patrician commonwealth established. Brutus and Collatinus, first consuls.
500 (about)	Voyage of Hanno, a Carthaginian, down west coast of Africa.				
500–406	Tragedy flourishes at Athens.				
5th Cent.	Use of water clock in Greece. Hippocrates begins development of medical science.	499 (about). The Ionians revolt and burn Sardis.		498. Alexander I rules in Macedonia.	Roman treaty with Carthage. 496. Romans win battle at Lake Regillus.
		494. The Persians destroy Miletus.			494. Tribunes of the people chosen. 491. Coriolanus banished.

B. C.	From the Battle of Marathon to the Death of Alexander the Great—B. C. 490–323				
	Arts of Civilization	Persia	Greece	Macedonia	Rome, Etc
		490. Darius sends an army into Greece.	490. Battle of Marathon. Persians under Datis defeated (Sept. 12).		
		486. Xerxes, king of Persia.	483. Aristides banished.		486. Agrarian riots at Rome; the patricians kill Spurius Cassius.
		481. Expedition of Xerxes into Greece; destroys Athens.	480. Battle of Thermopylæ. Battle of Salamis and defeat of Persians.		480. Carthaginians defeated. Hamilcar killed in battle.
			479. Battle of Platæa; Persian fleet destroyed at Mycale.		
			478–477. Themistocles rebuilds Athens.		
477	Death of Buddha; first Buddhistic council held at Rajagriha.		477. Sparta assumes conduct of war.		
469	Socrates born.				
		465. Xerxes assassinated. Artaxerxes I, king.	461. Pericles impresses himself upon Greek affairs.		460 (about). Cincinnatus, consul.
		458. Ezra arrives at Jerusalem.	457–455. Sparta wars on Athens.		458 (about). Cincinnatus, dictator.
456	Æschylus dies at Gela in Sicily.		456. Long walls of Athens completed.	454. Perdiccas II reigns in Macedonia.	
	The Secular games instituted at Rome.				450 (about). Laws of the 12 tables.
446	Herodotus, the historian, in Athens.		446. First Peloponnesian war ended.		
438	The Parthenon completed at Athens.	445. Nehemiah comes on a mission to Jerusalem. Walls of Jerusalem rebuilt by Nehemiah.	431. Second Peloponnesian war begun.		
429	Birth of Plato.		429. Death of Pericles.		
427	Aristophanes produces first comedy at Athens.		415. Expedition against Syracuse.		
			413. Expedition ends in failure.	413. Archelaus, patron of learning, seizes the throne and kills Perdiccas.	413. Egypt regains independence.
			411. Athens governed by the "400." Alliance of Sparta with Persia.		
			409. Capture of Byzantium by Athenians.		
			404. Surrender of Athens and end of war.		
399	Death of Socrates.	401. Cyrus the Younger defeated. Retreat of the 10,000 under Xenophon.		399. Archelaus murdered. The Illyrians invade Macedonia.	
				394–370. Reign of Amyntas.	
390	Inauguration of Capitoline games at Rome.	387. Greek cities of Asia made tributary to Persia.			390. Rome destroyed by the Gauls.
383	Birth of Demosthenes.				
377	Second Buddhistic council assembles at Vesali.				376. War between patricians and plebeians. Lucius Sextus, first plebeian consul.
			371. Battle of Leuctra. Predominance of Thebes.		371. Curule magistrates appointed.
			362. Battle of Mantinea; death of Epaminondas; end of Theban power. Decline of Greek city-states.	359. Philip II, king; institutes the Macedonian phalanx; defeats the Athenians.	367. Licinian laws passed after ten-year struggle; patricians and plebeians are granted equal rights.
				356. Philip II conquers Thrace and Illyria. Birth of Alexander the Great.	
354	Demosthenes makes his first appearance in public in an affair of state.				

From the Battle of Marathon to the Death of Alexander the Great—B. C. 490–323—Con.

B. C.	Arts of Civilization	Persia	Greece	Macedonia	Rome, Etc.
351	Demosthenes delivers the first of his orations, known afterward as "Philippics."				348. Commercial treaty between Rome and Carthage.
347	Plato dies.				
344 (about)	The philosophers, Zeno and Epicurus, flourish.	344. Aristotle visits Mytilene.		341. War against the Athenians.	343. Samnian war; continued fifty-three years.
			339. War with Macedonia.	338. Athenians and Thebans defeated at Chæronea.	340. War with the Latins. They obtain rights of Roman citizens.
		336. Darius III, king.	336. Philip slain. Thebes destroyed.	336. Alexander the Great succeeds to the throne.	337. First plebeian prætor.
			335. Greeks conquered by Alexander the Great.	335. Alexander the Great conquers Greeks and leads army against Persians.	
		334. Alexander the Great invades Persia.		334. Alexander the Great invades Persia; defeats Darius at the Granicus.	
				333. Battle of Issus.	
		331. Battle of Arbela.		332. Egypt conquered by Alexander; Alexandria built.	332. Roman treaty with Alexander of Epirus.
		330. Darius III murdered. Alexander founds the Grecian, or Macedonian, monarchy.	330. Æschines, the orator, banished. 324. Demosthenes banished.	327. Alexander invades India.	
323	Aristotle founds Lyceum in Athens.			323. Ptolemy I restores the independence of Egypt. Alexander the Great dies in Babylonia.	

From the Death of Alexander the Great to the Roman Conquest of Carthage and Corinth—B. C. 323–146

B. C.	Arts of Civilization	Rome, Etc.	Macedonia	Greece	Asia Minor, Syria, Judea, India, China	Egypt, Carthage
322	Demosthenes dies at Calauria; Aristotle dies at Chalcis.	321. Roman army surrenders to the Samnites.				
		319. Samnites defeated at Luceria.	319. Cassander assumes the throne of Macedon.	319. Polyperchon succeeds Antipater.	320 (about). Founding of empire of Magadha in India.	320 (about). Ptolemy I, called Soter, makes a military expedition into Palestine; takes Jerusalem.
				318 (about). Birth of Pyrrhus II, greatest hero of his time.		
				317. Demetrius Phalereus governs Athens.		317–275. Wars between the Sicilian Greeks and the Carthaginians.
				315. Cassander rebuilds Thebes.	315 (about). Maurya dynasty founded in India by Chandragupta.	
312	Appian Way begun by Appius Claudius.	312. War with the Etruscans.			312. Seleucus I retakes Babylon and restores its independence.	
300 (about)	Euclid, the celebrated mathematician, writes on geometry. The Indian epic *Ramayana* composed.	287. Law of Hortensius, by which the decrees of the people had the force of those of the senate.	288. Lysimachus, king of Thrace, subdues Macedonia.	294. Demetrius murders King Alexander and seizes throne of Macedon.	301. Battle of Ipsus, Alexander's empire divided anew into four parts: Syria, Macedon, Greece, Egypt.	

B. C.	From the Death of Alexander the Great to the Roman Conquest of Carthage and Corinth—B. C. 323–146—Con.					
	Arts of Civilization	Rome, Etc.	Macedonia	Greece	Asia Minor, Syria, Judea, India, China	Egypt, Carthage
285 (about)	Science and literature flourish at the Museum of Alexandria. The work of translating the Hebrew Scriptures into Greek for the Jews at Alexandria is begun. Era of bucolic poetry. Theocritus writes his famous idyls.	280. Pyrrhus in Italy. 280–275. The Tarentine war. 275. Pyrrhus defeated by the Romans at Beneventum; date of Rome's supremacy.	281. Pyrrhus of Epirus aids Tarentum in Italy. 274. Pyrrhus invades Macedonia, defeats Antigonus, and is proclaimed king. 272. Antigonus restored.	280. The Achæan League formed. 278. Invasion by the Gauls, who are routed by the Greeks at Delphi.	285. The Scythians invade Bosporus. 281. Antiochus Soter succeeds Seleucus in Syria. 278. Settlement of Gauls in Asia Minor. Later they became the Galatians.	285. Ptolemy Philadelphus, king of Egypt. 283. Death of Ptolemy Soter. 276. A Carthaginian fleet defeats Pyrrhus of Epirus.
270	Epicurus, the philosopher, dies.					
269 (about)	Silver money first coined at Rome.	266. Rome mistress of all Italy.	268. Second incursion of the Gauls.	268. Athens taken by Antigonus.		
263	Aristarchus teaches that the earth moves around the sun.	264. First Punic war begun.	250. Parthia revolts from Macedon.	255. Athens joins the Achæan League.	260. Asoka, the king of Magadha, brings northern India beneath his rule.	
246 (?)	The building of the Great Wall of China begun under the emperor Chi Hwang-ti.	241. End of first Punic war.			246 (?). Chi Hwang-ti first autocratic emperor of China; destroys feudalism and extends empire to its modern limit. 246. Death of Antiochus II. 226. Seleucus III, king of Syria.	246. Ptolemy Euergetes subdues Syria.
224 (about)	Archimedes makes known his discoveries in mechanics.	225. The Gauls repulsed in Italy.			223. Death of Asoka, king of Magadha. 222. Antiochus the Great, king of Syria.	221. Ptolemy Philopator, king.
		219. Hannibal takes Saguntum and crosses the Alps. 218. Second Punic war. Hannibal defeats the Romans at the Ticinus and the Trebia. 216. Varro at Cannæ totally defeated by Hannibal. 214. First Macedonian war.	220. Philip V assists the Achæans against the Ætolians. 217. Philip V makes peace with the Ætolians at Naupactus. 214. Alliance of Philip and Hannibal.	220. The Social war begins, between Achæan and Ætolian leagues.	219. War between Antiochus and Ptolemy. 217. Ptolemy defeats Antiochus at Raphia.	
213	Burning of the books by Chi Hwang-ti, the Chinese emperor.					
206	Revival of classics and general learning in China.	206. Carthaginians driven out of Spain.		206. Spartans defeated at Mantinea.	206. Founding of Han dynasty of China.	205. Ptolemy Epiphanes, king.
204	Death of Livius Andronicus who translated the *Odyssey*; first of Latin dramatic writers.	202. Hannibal defeated by Scipio at Zama in Africa. End of war.				

From the Death of Alexander the Great to the Roman Conquest of Carthage and Corinth—B. C. 323–146—Con.

B. C.	Arts of Civilization	Rome, Etc.	Macedonia	Greece	Asia Minor, Syria, Judea, India, China		Egypt, Carthage
						Syria / Judea	
204—con.	The Great Wall of China completed.	201. Second Macedonian war. 190. Rome shatters power of Syria.	201. Second war with Rome. 197. Philip V defeated at Cynoscephalæ.	198. Achæan League makes first treaty with Rome. Achæans and Spartans join the Romans against Macedon.	198. Jews assist Antiochus in expelling the Egyptian troops from Jerusalem. 190. Scipio Africanus defeats Antiochus at Magnesia. 187. Antiochus killed. Syria becomes temporarily a Roman province.		198. Egypt loses her Syrian possessions.
184	Death of Plautus, foremost among the early Roman writers of comedy.		179. Reign of Perseus.		187. Seleucus IV, king.		182. Ptolemy Philometor, king.
169	Death of Ennius, first of the great Roman epic poets.		171. Third war with Rome.		175. Antiochus IV, king.	170. Jerusalem plundered by Antiochus Epiphanes.	175. Cato's embassy to Carthage.
166	Book of Daniel probably written in this year.		168. Perseus defeated at Pydna.	167. Romans enter Achæa.		168. Jews persecuted by Antiochus; the temple of Jerusalem defiled. 165. Judas Maccabeus expels the Syrians. 161. Treaty with Romans.	
156 (about)	Paper made in China.						
149	Death of Cato the Censor, historian and economist.	149. Third Punic war begins. 146. Conquest of Carthage and Corinth. Greece annexed to the Roman Empire.	146. Macedonia becomes a Roman province.	146. Corinth destroyed by the Romans. Greece becomes a Roman province under the name Achæa.			150. Massinissa defeats the Carthaginians. 146. Carthage destroyed by the Romans. Ptolemy Physcon becomes sole king of Egypt.

From the Roman Conquest of Carthage and Corinth to the Birth of Christ—B. C. 146–4

B. C.	Arts of Civilization	Rome, Etc.	Syria	Judea	Egypt, Carthage
			139–129. Antiochus VII, king.	135–105. John Hyrcanus reigns as prince and high priest in Jerusalem.	
		133. Spain becomes a Roman province. 123. Caius Gracchus, tribune, endeavors to follow out constitutional reforms advocated by his brother; is killed. 113. First great migration of the German nations.			130. Physcon driven from his throne for cruelty.
104	A new calendar is adopted in China on the calculations of Ssu-ma Ch'ien; the Chinese date their chronology from this epoch.	102. Battle of Aquæ Sextiæ. Marius defeats Teutones. 101. Battle of Vercellæ. Marius defeats the Cimbri. 100. Birth of Julius Cæsar.		104. War with Egypt.	107. Alexander I, king of Egypt.
91	First comprehensive history of China written by Ssu-ma Ch'ien.	91–88. Social war in Italy.			

From the Roman Conquest of Carthage and Corinth to the Birth of Christ—B. C. 146–4—Con.

B. C.	Arts of Civilization	Rome, Etc.	Syria	Judea	Egypt, Carthage
88	Texts of Buddha transferred to Pali writing in Ceylon.	88. War with Pontus. 82. Sulla defeats Marius and is created dictator.			81. Alexander II, king of Egypt. 80. Ptolemy Auletes, king.
			66. Mithridates, the Parthian emperor, defeated by Pompey.		
		64. Syria becomes a Roman province.	64. Syria passes under Rome.		
		63. Cicero, consul. Catiline's conspiracy detected and suppressed by Cicero.		63. Judea a Roman province.	
		60. First triumvirate,—Pompey, Crassus, and Cæsar. 59. Cæsar, consul.			
55	Death of Lucretius Carus, poet and philosopher.	55. Cæsar passes the Rhine, defeats the Germans and Gauls, and invades Britain. 53. Crassus defeated and killed in Parthia.			55. Auletes restored.
		51. Cæsar completes conquest of Gaul, which becomes a Roman province.			51. Cleopatra driven from throne of Egypt.
		49. Civil war between Cæsar and Pompey. Pompey defeated; Cæsar, dictator. 48. Battle of Pharsalus—Pompey defeated by Cæsar. Death of Pompey in Egypt.			
47	Library at Alexandria said to have been destroyed.	47. Cæsar takes Alexandria and conquers Egypt.			47. Cleopatra, with her brother, Ptolemy XV, on throne of Egypt.
45	Cæsar reforms the calendar by introducing the solar for the lunar year.	44. Cæsar assassinated. Antony, master of Rome. 43. Second triumvirate,—Octavius Cæsar, Mark Antony, and Lepidus. 42. Battle of Philippi; defeat and death of Brutus and Cassius.			46. The African war.
39 (?)	Pollio founds first public library at Rome.	31. Battle of Actium. Antony defeated. Octavius, master of Roman world.			31. Defeat at Actium.
		27. Titles of Augustus and Emperor conferred on Octavius for ten years.			30. Suicide of Antony and Cleopatra. Egypt passes to Rome.
		19. Conquest of Spain completed. Death of Virgil. 15. Austria and other territory conquered by Drusus is added to the Empire.			
8	Calendar corrected by Augustus.	4 or 6 (about). Birth of Christ.			

From the Birth of Christ to the Fall of Rome—B. C. 4–A. D. 476

A. D.	Arts of Civilization	Development of Christianity	The Roman Empire
			6. Romans abandon Germany. 14. Augustus dies at Nola; is succeeded by Tiberius as emperor.
		29. Crucifixion of Jesus.	29. Agrippina banished. 37. Tiberius succeeded by Caligula, noted for his profligacy. 41. Claudius, emperor.
		44–66. Judea under the Roman procurators.	
46	Birth of Plutarch, Greek biographer and moralist.	47–48. Paul's first missionary tour; into Asia Minor.	46. Thrace becomes a Roman province. 47. The Romans subjugate southern Britain. 48. Claudius orders a census to be taken.
50 (about)	Development of realistic sculpture in Rome.	49–52. Paul's second missionary tour; reaches Athens and Corinth. 52–56. Paul's third missionary tour; long residence at Ephesus.	49. He expels the Jews from Rome. Builds a camp on the site of London. 51. Caractacus, king of the Britons, is brought to Rome in chains. 54. Nero, emperor; a profligate and tyrant.
		59 or 60. Paul a prisoner in Rome.	
		64 or 65. Martyrdom of Paul and Peter.	61. Revolt of the Britons under Queen Boadicea. 64. Nero sets fire to Rome; accuses Christians. 68. Galba, emperor. 69. Otho, emperor. Vitellius defeats Otho. Vespasian defeats Vitellius.
		70. Destruction of Jerusalem by Titus.	70. Vespasian, emperor.

A. D.	From the Birth of Christ to the Fall of Rome—B. C. 4–A. D. 476—Con.		
	Arts of Civilization	Development of Christianity	The Roman Empire
75	Vespasian undertakes the building of the Colosseum.		
78	Era of Shalivahana, or Shaka, in India.		78. Agricola, governor of Britain; completes conquest as far north as Scottish Highlands.
			79. Titus, emperor. Pompeii and Herculaneum destroyed by Vesuvius.
	Jurisprudence flourishes.		81. Domitian, emperor.
	Forum built.	95. Persecution of the Christians by Domitian.	
	Pillar of Trajan, and Baths.		96. Nerva, emperor.
	Bridge built over the Danube.	107. Persecution by Trajan.	98. Trajan, emperor; Roman Empire at its greatest extent.
	Silver Age of Roman literature.	118. Persecution by Hadrian.	117. Hadrian, emperor; makes a journey through the provinces; visits Britain and builds there a wall from the Tyne to Solway Firth; builds a wall from the Rhine to the Danube.
130 (about)	Great buildings of Palmyra.	134. Heresy of Marcion.	
	The Pantheon built at Rome.		138. Antoninus, emperor.
			145–152. Antoninus defeats the Moors, Jews, and Brigantes.
		150. Canon of Scriptures fixed about this time.	Antoninus partly stops the persecution of the Christians.
			161. Marcus Aurelius, emperor.
166 (?)	Apuleius writes the *Golden Ass*, one of the earliest romances.		166. Very destructive Asiatic plague in the empire.
			191. Rome nearly destroyed by fire.
			193. Septimius Severus, emperor. A vigorous ruler. Emperors (to 284) appointed by the army.
			194. Septimius Severus besieges Byzantium.
		202. Persecution under Severus.	
			208. Severus builds the wall of Severus in Britain.
			226. Artaxerxes begins the new kingdom of Persia.
			232. Persian war.
		235. Persecution under Maximinus.	
			240 (about). The Franks appear in history.
			248. Celebration of 1000th anniversary of the founding of Rome.
		250. Persecution of the Christians.	253–268. Goths invade Asia Minor and Greece.
			261. Sapor, the Persian, takes Antioch.
		262. Paul, bishop of Samosata, denies the divinity of Jesus Christ.	264. Alliance with Odenathus, king of Palmyra, who is succeeded by his wife Zenobia, who reigns with the titles of "Augusta" and "Queen of the East."
			270. Aurelian, a great warrior, becomes emperor.
			271. Aurelian defeats the Alemanni.
		272. Persecution of Christians under Aurelian.	272. Zenobia conquers Egypt.
			273. Aurelian reduces Palmyra and takes Queen Zenobia prisoner.
			274. Franks, Spain, and Britain reduced to obedience.
			275. Aurelian killed near Byzantium.
			276. Great wall around Rome completed.
		277. The emperor Probus expels the Germans from Gaul.	
		283 (about). Religious ceremonies multiplied. Pagan rites imitated by the Christians.	284. Diocletian, emperor.
		296. Monks in Spain and Egypt.	296. Diocletian divides the empire among four assistant rulers.
		303. Persecution under Diocletian.	
305 (about)	Constantine's Basilica built at Rome.		305. Diocletian and Maximian resign the empire to Constantius and Galerius.
		311. Galerius recognizes Christianity.	
		313. Edict of Milan proclaims religious toleration.	324. Constantine the Great, first Christian emperor.
		325. Council of Nicæa.	
			330. Founding of Constantinople.
			337. Death of Constantine; accession of his three sons to the empire.
		339. Persecution of Christians in Persia.	364. Death of Jovian; accession of Valentinian and Valens, under whom the empire is divided.

	Western Empire	Eastern Empire
	364. Valentinian, emperor.	364. Valens, emperor.
	368. The Picts and Scots invade Britain, but are defeated by Theodosius.	
373. Bible translated into Gothic language. Death of Athanasius.	375. Valentinian gains victory over the Germans.	
		376. Hungary, ancient Pannonia, invaded by the Huns, from whom it is named.
379. Prerogatives of the Roman See much enlarged.		379. Theodosius the Great becomes emperor; a zealous supporter of Christianity.

A. D. — From the Birth of Christ to the Fall of Rome—B. C. 4–A. D. 476—Con.

	Arts of Civilization	Development of Christianity	Western Empire	Eastern Empire
		381. Second general Council of Constantinople.		
382	St. Jerome revises the Latin version of the New Testament at Rome.	384. Symmachus pleads in the Roman Senate for paganism against St. Ambrose.	388. St. Patrick taken captive to Ireland by Niall of the Nine Hostages.	388. Theodosius defeats Maximus, the tyrant of the Western Empire.
		392. St. Chrysostom, patriarch of Constantinople.	392. Theodosius becomes sole emperor of the East and West.	
394	Olympian games abolished.		394. Final division of empire between the sons of Theodosius.	
			401. Europe overrun by the Visigoths.	
			406–409. Vandals allowed to settle in Spain and Gaul.	408. Theodosius II, a child, emperor.
			410. The Goths under Alaric sack and burn Rome.	410. Honorius abdicates his kingship of Britain.
			412. Rise of the Vandal power in Spain.	
			413. Burgundian kingdom begun near the Rhine.	
		416. The Pelagian heresy condemned.		414. Regency of the emperor's sister, Pulcheria.
420	St. Jerome dies, after completing translation of the Bible (Vulgate).		420. The Franks form a kingdom, under Pharamond, on the lower Rhine.	420. Persian war.
			425. Valentinian III, emperor.	
426	St. Augustine of Hippo publishes his famous work *De Civitate Dei*, "The City of God."	431. Third general Council at Ephesus.		425. University of Constantinople organized.
		432. St. Patrick preaches the Gospel in Ireland.		
		435. Nestorianism prevails in the East.		
			439. The Vandals, under Genseric, form Kingdom of Africa, take Carthage, and plunder Italy.	
		443. The Manichean books burned in Rome.		442. Thrace invaded by Attila.
		447. Eutyches asserts the existence of only one nature in Jesus Christ.		
450	Establishment of Buddhism in Burma.	451. Fourth general Council at Chalcedon.	449–455. Arrival of Saxons in Britain.	450. Marcian, emperor.
			451. Battle of Châlons. Attila driven back east of Rhine.	
			452. City of Venice founded.	
			455. Rome plundered by Vandals.	457–461. War with the Goths.
			458. Franks, under Childeric I, conquer as far as the Loire and take Paris.	457–484. Peroz rules in Persia.
		465–476. Oligarchy of the bishops of Rome, Constantinople, Alexandria, Antioch, and Jerusalem. The Church now begins to assume a political aspect.	466–483. The Visigoths under Eric establish their kingdom in Spain.	
473	Topography of Japan written for the first time by Ki no Tsuno no Sukune.		476. Odoacer, king of the Heruli, takes Rome and founds a short-lived kingdom lasting fourteen years. With him ends the Roman Empire and ancient history in Europe.	474. Zeno, emperor; a turbulent reign marked by debauchery and conspiracies.

A. D. — From the Fall of Rome to the Division of the Western Empire—A. D. 476–843

	Arts of Civilization	The Eastern Empire	Great Britain and Ireland	Italy and the Church	France
	Fifth Century				
		477. A rising in Constantinople.	477. Saxons win foothold in Sussex. Followed by other Saxons (Wessex and Essex) and by Angles.	482. Christians persecuted by the Vandals.	481. Clovis I, founder of the French monarchy.
		488. Theodoric, chief of the Ostrogoths, invades Italy.	491. Capture of Anderida by Ella, king of the South Saxons.		486. Battle of Soissons gained by Clovis.
493	Theodoric gives new impetus to architecture in Italy. Beautiful buildings at Ravenna.			493. Italy conquered by Theodoric, chief of the Ostrogoths.	

A. D.	From the Fall of Rome to the Division of the Western Empire—A. D. 476–843—Con.				
	Arts of Civilization	The Eastern Empire	Great Britain and Ireland	Italy and the Church	France
			495. Beginning of the kingdom of Wessex, under Cerdic and Cymric.		496. Clovis baptized. Christianity introduced into France.
	Sixth Century				
	Cassiodorus (490–580), in his library and monastery, encourages learning.	503–505. War with Persia.		510. Boethius becomes consul at Rome.	510. Clovis makes Paris his capital.
524 (about)	*Consolations of Philosophy* by Boethius.		520. Battle of Mt. Badon. West Saxons defeated by Britons.	524. Boethius put to death by Theodoric.	
		527. Justinian I begins a brilliant reign over the Eastern, or Byzantine, Empire.		526. Death of Theodoric.	
		528. Belisarius, the famous general, defeats the Persians.			
531	Khosru I, king of Persia, great patron of learning.			529. Order of the Benedictine monks instituted at Monte Cassino, near Naples.	
532	The Christian era proposed and introduced by Dionysius, a monk.	533. Belisarius defeats the Vandals in Africa.			
	Completion of Justinian's code.	534. Belisarius takes possession of Africa, Sardinia, and Balearic Isles.			534. Burgundy conquered by the Franks.
	Manufacture of silk introduced from China into Europe by monks.	535. Belisarius subdues Sicily.			
		536. Belisarius takes Naples and Rome.		536. Italy conquered by Belisarius, for Justinian.	536. Ostrogoths surrender their possessions in Gaul to the Franks.
537	Church of Santa Sophia at Constantinople completed.			539. Milan ravaged by the Goths.	
			547. Ida, king of Bernicia.		
	Alexander of Tralles, a noted physician, teaches prevention of disease as important part of physician's work.	548–553. Italy governed by Greek Exarchs.			
		552. Narses overthrows Totila. End of Ostrogothic kingdom.	552. Cymric, king of West Saxons, captures Sorbiodunum. Master of Salisbury plain.		557. Church of St. Germain des Prés built at Paris.
	St. Benedict establishes his "rule," enjoining both labor and prayer. The Benedictines begin important work in agriculture and industry.	558. A plague extends over Europe and Asia and lasts about fifty years.	Union of Celtic tribes, under name of Cymry, or Comrades.		558. Clothaire I, king; unites Franks into a kingdom. 561. Clothaire dies; kingdom again broken up into petty states.
		570. Birth of Mohammed.		568. Italy conquered by the Lombards.	
			593. Ethelbert, king of Kent, gains the ascendancy.	590. Gregory the Great, bishop of Rome. Beginning of the papacy.	
				597. St. Augustine goes as missionary to Britain; made first archbishop of Canterbury.	
	Seventh Century				
600	First code of English laws drawn up by Ethelbert.	602. Invasion of the Persians.	600 (about). St. Paul's church founded by Ethelbert of Kent.	608 (about). The Pantheon of Rome dedicated to Christianity.	613. Clothaire II, king. Franks again united under one king.
	Literature and learning fostered in English abbeys of Whitby and Glastonbury.	610. Heraclius takes Constantinople, kills Phocas, the emperor, and makes himself king.			
	Rise of Mohammedanism.	614. Jerusalem taken by the Persians.	St. Peter's (1050, Westminster Abbey) founded by Sebert of Essex.		
	Islamism and the power of the caliphs established in the East. In the caliphs were united the highest spiritual and regal authority.	622. The Hegira, or Mohammed's flight, from Mecca to Medina.		625–640. Churches of Jerusalem, Antioch, and Alexandria lost to the Christian world by the sweep of Mohammedanism.	
		632. Death of Mohammed.	626. Edwin of Northumbria, overlord of English kingdoms.		630 (about). Dagobert I builds the church of St. Denis, the sepulture of the French kings.
633 (about)	Isidore of Seville encourages learning in the West.				
		636. Omar, caliph, takes Jerusalem.			
			664. Synod of Whitby; triumph of Roman over Celtic Church.		

A. D.	From the Fall of Rome to the Division of the Western Empire—A. D. 476–843—Con.				
	Arts of Civilization	The Eastern Empire	Great Britain and Ireland	Italy and the Church	France
633 (about)–con.	Arts and crafts encouraged by Dagobert I, Frankish king.	673. Siege of Constantinople by the Saracens, whose fleet is destroyed by the Greek fire of Callinicus.	673. First English church council at Hertford.		
	Appreciation of art and literature preserved in Ravenna.	680. First kingdom of Bulgaria founded.	688–726. Ine, king of Wessex.	680. The sixth general Council called at Constantinople.	687. Pepin d'Heristal, mayor of the palace.
	Eighth Century	698. Carthage destroyed by the Saracens, and the north coast of Africa subjugated.			
		709. North Africa subdued by the Saracens.			
		711. Saracens cross over to Spain.			
	Charlemagne's schools provide for women as well as men.	717. Leo III, emperor.			714. Charles Martel, mayor of the palace.
		718. The Saracens invest Constantinople, by land and sea. City saved by Greek fire.			725. Charles Martel subdues Bavaria.
	Charlemagne founds hospitals.			726. The emperor Leo forbids image worship.	732. Charles Martel defeats the Saracens at battle of Tours.
	Three great scholars of the 8th century: Bede, John of Damascus, Vergilius of Salzburg.	746–747. A plague in Constantinople.	735. Death of the Venerable Bede.		
				751. The pope dethrones Childeric, king of France, by a papal decree.	751. End of Merovingian line of French kings. Pepin the Short, first of the Carolingian line.
				754. Pepin aids Pope Stephen III against the Lombards.	
	Golden period of learning in Arabia under Caliph Haroun-al-Raschid and Caliph Al-Mamun.	755–775. Constantine V wars with the Bulgarians.			
		762 (about). Caliph Al-Mansur builds Bagdad and makes it his capital.	757. Offa of Mercia begins his reign.	756. Donation of Pepin. Foundation of Papal States.	
	Foundation of schools in monasteries and cathedrals by Charlemagne.	783. The Empire makes peace with the Arabs.			771. Charlemagne becomes sole ruler of Franks.
			787. First recorded invasion of the Danes—the sea kings and vikings.	787. Seventh general Council of Nicæa.	
	Ninth Century				
	Agriculture and horticulture encouraged by Charlemagne; both flourish in Spain under the caliphs.			800. Charlemagne reforms the Church. Many bishoprics founded.	800. Charlemagne founds the new Western Empire and is crowned at Rome, emperor of the Romans.
		812. Peace between Michael I and Charlemagne.			801. Charlemagne receives an embassy from Haroun-al-Raschid.
	Rapid growth of feudal system.				814. Death of Charlemagne. His son, Louis the Pious, succeeds him.
		816. A council condemns the worship of images.	815–823. Egbert, king of Wessex, conquers the Britons in Cornwall.		
827 (about)	Arabian geographers calculate size of earth.	827. Arabia begins conquest of Sicily.	827. The Anglo-Saxon kingdoms acknowledge Egbert, king of Wessex, as suzerain or overlord.	827–865. Christianity carried to Denmark and Sweden.	
		829. Theophilus, emperor.			
	John Scotus Erigena, great scholar of the century.		839. Death of Egbert, king of the West Saxons, who had become overlord of the other kingdoms.		840. Louis the Debonair dies; his three sons fight for the possession of the kingdom.
			Ethelwulf, king.		841–844. The Northmen take Rouen and Nantes and advance to Toulouse.
		842. Theodora restores image worship.	About this time, Kenneth MacAlpin unites Picts and Scots in one kingdom.		
					843. Treaty of Verdun. Charles I, king of France. Louis I, king of Germany. Lothair, king of Italy.
	Venetians become a great merchant people. Architecture encouraged in Venice. St. Mark's cathedral built.				

A. D.	From the Division of the Western Empire to the Norman Conquest of England—A. D. 843–1066			
	Arts of Civilization	Italy and the Church	Eastern Empire	The British Isles
		844. Ignatius, patriarch of Constantinople.	844 (about). Decline of the caliphate begins. Frequent wars between the Greeks and the Saracens.	
		846. The Saracens destroy the Venetian fleet and besiege Rome.		
		850. Persecution of the Christians in Spain.		851. Danes capture and sack Canterbury and London.
				855. Danes begin to settle in England.
		860. The False Decretals brought to Rome.		
866 (about)	Bible translated into Slavonian.	866. Schism of the Greeks begins.	866. Synod of Constantinople. Break between Eastern and Western Church.	866–870. Danish conquest of Northumbria.
			867. Basil inaugurates the Macedonian dynasty.	
	Alfred gives great encouragement to literature and learning in England; founds schools; codifies English law.	869. Eighth Council at Constantinople.		871. Alfred the Great becomes king of Wessex.
		877. Arabs take Syracuse.		
				878. Alfred defeats the Danes. Treaty of Chippenham. Danes retain eastern and northern England.
882	First mention of episcopal school at Paris,—later became university.		886. Leo VI, emperor.	886. Danes surrender London to Alfred.
	The Moors in Spain promote architecture and adorn their cities with rich buildings.		890. Southern Italy subject to the Greek Empire. Seat of power at Bari.	
	Cordova, in Spain, becomes famous as a center of science, learning, industry, and commerce.	911 (about). The Normans in France embrace Christianity.	907. Russian expedition under Oleg against Constantinople.	899 (?). Edward the Elder succeeds Alfred. At his death in 925 he was overlord of all the kingdoms.
	The figures of arithmetic brought into Europe by the Saracens.			
		921 (about). The Bohemians adopt Christianity.	919. Romanus, general of the fleet, usurps the empire and rules with his three sons.	
	Linens and woolens manufactured in Flanders.			925. Athelstan, king.
	Printing in use in China.			
932	Confucian Canon printed.			
	Hroswitha, the nun at Gandersheim, writes comedies to counteract evil influence of classical plays.			937. Athelstan defeats the northern king at Brunanburh.
			941. Romanus gains a naval victory over the Russians.	943. Malcolm I, king of Scotland.
		955. Baptism of Olga; conversion of Russia to Christianity.		955. Dunstan, abbot of Glastonbury, rises to great power.
		959. St. Dunstan, archbishop of Canterbury, attempts to reform the Church.	959. Emperor Romanus II.	
		962. Otto crowned emperor of the Romans by Pope John XII. Holy Roman Empire of the German Nation.	966. Miecislas, king of Poland, becomes a Christian.	
			969. The Fatimites subjugate Egypt.	
980	Birth of Avicenna, Arabic writer on medicine.			984. Renewed Danish invasions.

A. D.	From the Division of the Western Empire to the Norman Conquest of England—A. D. 843–1066				
	France	Germany	Spain	Russia	Lesser Countries
		843. Louis I, king.			
845	Northmen take Rouen and sack Paris.				
847	Defense against the inroads of the Northmen occasions the Edict of Mersen, which required every man to have a feudal lord.	847. Raid of the Northmen up the Elbe as far as Hamburg.	850 (about). Under Abderrahman II and his successors, caliphate of Cordova enters period of weakness.		
857	Charles the Bald and Lothair II unite against the Northmen.	855. Louis II becomes king.			
858	Louis of Germany makes war on Charles and Lothair, and is defeated.	860. Peace between Louis and Charles of France.		860. Russian campaign against Constantinople.	860. Gorm unites Jutland and the Danish Isles and becomes king of Denmark.
					861 (about). Iceland discovered.
			866. Alfonso the Great becomes king of Asturia, the Christian monarchy in Spain, afterward called León.	862. Rurik the Northman, grand duke of Novgorod.	
870	Lorraine divided between France and Germany by Treaty of Mersen.				
			873. Sancho Iñigo, count of Navarre.		872. Harold, first king of Norway.
876	First settlement of Northmen in France.	876. Charles the Fat, emperor 880–888.			874. Northmen colonize Iceland.
879	Louis III and Carloman reign jointly.				
		881. Treaty of Elslan with the invading Danes.			
885	Paris besieged by Northmen; city defended by Count Odo; Charles the Fat buys off the besiegers.	887. Arnulf, emperor.			889 (about). Arpád lays the foundation of Hungary.
898	Charles III, sole king.				
		899. Invasion by the Hungarians.	905. Kingdom of Navarre founded.	907. Oleg invades the Greek Empire.	
911	The Northmen, under Rollo, establish themselves in Normandy.	911. Conrad I, king. Carolingian dynasty becomes extinct.	910. Kingdom of León founded by Garcia.		
		919. Henry the Fowler, king.	912. Abderrahman III begins to reign in Cordova, introducing the golden age of Arabian power in Spain.		
923	Civil wars.				
936	Louis IV, son of Charles the Simple, king.	936. Otto the Great becomes king.	939. Ramiro, king of León, defeats the Moors at Simancas.		933. The union of the two Burgundies, forming the kingdom of Arles, which lasted a century.
		950. Bohemia annexed.			951. Decay of Saracen power begins.
954	Louis confers the dukedoms of Burgundy and Aquitaine on Hugh the Great.		955. Sancho I, king of León.	957. Swatoslav, king of Russia.	955. Otto overcomes the Hungarians on the Lech.
		962. Beginning of the Holy Roman Empire. Crowning of Otto.			
		978. Otto at war with Lothair.	976. Hisham II, caliph of Cordova.	980. Vladimir the Great, the first Christian ruler.	
986	Louis V, last of the Carolingians.				

From the Division of the Western Empire to the Norman Conquest of England—A. D. 843–1066—Con.

A. D.	Arts of Civilization	Italy and the Church	Eastern Empire	The British Isles
		989. Greek Christianity propagated in Russia by Vladimir.		
		993. First canonization of saints.		994. Olaf Trygvasson and Svend attack London.
997	Venice under the doges dominates the Mediterranean and with Genoa rises to great importance in commerce.	999. Hungary becomes a fief of the Church.	996. War with Bulgaria.	
	Eleventh Century			
	Firdousi, the Persian Homer, flourishes (940?–1020).		1001. Invasion of India by Mahmud of Ghazni.	1002. Massacre of the Danes in England.
				1002–14. Brian Boroihme, sole ruler of Ireland.
	Great activity in the repairing and rebuilding of churches. Rise of the Romanesque style of architecture.			1005. Scotland ruled by Malcolm II.
				1013. Danes, under Svend, become masters of England.
				1016. Edmund Ironside fights six battles with Canute, king of the Danes, with whom he divides the kingdom.
	Foundation of University of Salerno; a famous medical school was chief department. Teachers in this school, famous surgeons. Both women and men admitted.	1024. John XIX, pope.	1018. Bulgaria reduced to a Grecian province.	Edmund dies, leaving Canute sole ruler.
	Truce of God, forbidding warfare on certain days and at certain seasons, an effort toward peace in this disturbed century.			1034. Duncan, king of Scotland.
				1040. Macbeth murders Duncan and usurps the throne.
	Lanfranc and Queen Matilda famous for their establishment of hospitals.	1041. Normans establish power in Apulia.	1042. First invasion of the Seljuk Turks.	1042. The Saxon line restored under Edward the Confessor.
		1049. Leo IX, the first pope to keep an army.	1043. The Russians invade Thrace with 100,000 men and are repulsed by the Greeks.	1051. William, duke of Normandy, visits England.
	Anselm, great scholar of this century.	1054. Excommunication of the patriarch of Constantinople and the Greeks.	1054. Theodora, last of the Macedonian dynasty.	
		1059. Quarrel between the popes and the German emperors. Robert Guiscard, duke of Apulia.	1058. Supremacy of the Seljuk Turks.	1066. Harold II, king, killed at the battle of Hastings. William the Conqueror, king. End of the Anglo-Saxon line.

From the Norman Conquest of England to the Fall of the Eastern Empire—A. D. 1066–1453

A. D.	Arts of Civilization	Italy and the Church	Eastern Empire	The British Isles
	Margaret of Scotland, wife of Malcolm III, does much to refine manners and secure justice for the poor.	The papacy at the height of its power. College of Cardinals founded by Nicholas II for the election of the popes.		1070. Lanfranc, archbishop of Canterbury.
		1073. Quarrel of Pope Gregory VII (Hildebrand) with the emperor Henry IV.	1071. Emperor Romanus IV defeated and taken prisoner by the Turks. Turks seize Asia Minor; Normans take Bari, last Greek possession in Italy.	1071 (about). Feudal system introduced.
		1074. Celibacy of the clergy decreed at a council summoned by Pope Gregory VII.	1074. Syria and Palestine subdued by Melek Shah.	
		1075. The pope sends legates to the various courts of Europe.		1075. Rebellion of the Norman earls against William.
		1077. Submission of Henry IV to the pope at Canossa.		

From the Division of the Western Empire to the Norman Conquest of England—A. D. 843–1066—Con.

A. D.	France	Germany	Spain	Russia	Lesser Countries
987	Hugh Capet, king, and founder of the Capetian line of French kings.				
996	Robert II succeeds his father on the throne.		999. Alfonso V, king of León.		994. Svend I of Denmark invades England.
1000	The end of the world expected; consequent religious excitement.	1002. Henry II, emperor.			1000 (about). Hungary a kingdom under its first hereditary king, St. Stephen.
				1015. Death of Vladimir.	1014. Canute II, king of Denmark.
					1017. Canute supreme in England.
				1019. Yaroslav rules Russia.	
		1024. Conrad II, first of the Franconian line.	1020 (about). Rise of burgher class.		1028. Norway conquered by Canute. Danish ascendancy.
1031	Henry I, king.		1031. Ommiad dynasty ends with death of Hisham III of Cordova.		
1034	Burgundy annexed.		1033. Sancho the Great of Navarre constitutes Castile a kingdom.		
		1039. Henry III becomes emperor.	1035. Ramiro I, king of Aragon.		
		1041. Henry III defeats the Bohemians and Hungarians. Truce of God proclaimed.			
		1054. Henry III causes his son, Henry, to be proclaimed king of the Romans. This title was applied for several centuries to the emperor's eldest son		1054. Russia violently dismembered. Civil wars and great distress.	1055. The Turks reduce Bagdad and overturn the empire of the caliphs.
1066	William, duke of Normandy, claims the crown of England and wars on Harold to obtain it.				

From the Norman Conquest of England to the Fall of the Eastern Empire—A. D. 1066–1453

A. D.	France	Germany	Spain	Russia	Lesser Countries
					1067. Polish conquests in Russia.
					1069. Olaf III, king of Norway.
					1070. Bergen, Norway, built.
			1072. Alfonso VI, king of Castile and León.		
1073	Maine conquered by William, king of England.	1073. Revolt of the Saxons.			
			1074–99. Time of Rodrigo Díaz, "the Cid."		
1079	Birth of Abélard.	1077–80. Civil war in Germany.			

A. D.	From the Norman Conquest of England to the Fall of the Eastern Empire—A. D. 1066–1453—Con.			
	Arts of Civilization	Italy and the Church	Eastern Empire	The British Isles
			1081. Alexius I (Comnenus), emperor. 1082. Robert Guiscard invades the empire and defeats Alexius.	
	Omar Khayyam, poet-astronomer of Persia, corrects the calendar.	1084. Triumph of Henry IV over Gregory. The order of the Carthusians instituted by Bruno.	1084. After the capture of Jerusalem by the Turks, the Christian pilgrims are insulted and oppressed, which gives rise to the Crusades.	1087. William invades France and is killed at Mantes. 1093. Malcolm III of Scotland invades England and is slain near Alnwick castle.
		1095. Peter the Hermit preaches against the Turks. 1096. The First Crusade.		
			1099. Jerusalem taken by Godfrey. Battle of Ascalon and defeat of the Turks. 1104. Battle of Acre.	1100. Henry I, king of England, unites the Normans and Saxons. 1107. Henry's quarrel with Anselm ended.
			1109. Tripoli taken by crusaders.	
1118	Knights Templars instituted.		1118. John Comnenus reforms the manners of his people.	
	Scholastic philosophy reaches a high point under Abélard.	1123. First Lateran, or ninth general, Council.	1124. Tyre taken by crusaders.	1124. David I promotes civilization in Scotland.
		1127. Pope Honorius II makes war against Roger, king of Sicily.		
		1139. Second Lateran, or tenth general, Council. Senate revived in Rome.	1143. Manuel Comnenus, emperor.	
	Age of cathedral building.	1147. The Second Crusade.		
	Rise of the Gothic style.			
	Colleges of theology, philosophy, and law at Paris. Woolen manufactories established in England.	1154. Pope Adrian IV, an Englishman.		1154. Henry II, king of England; also possessed more than half of France. 1155–64. Ascendancy of Thomas Becket, archbishop of Canterbury.
		1167. Rome taken by Frederick Barbarossa. League of Lombard cities formed.		1170. Becket assassinated at the instigation of Henry II.
		1172. Grand Council of Venice formed.	1171–74. War between Venice and the Eastern Empire. Venetians keep their commercial privileges. 1175. Saladin founds the Sultanate of Egypt.	1171. Henry invades Ireland.
		1178. Renewed activity of the Waldenses, forerunners of Protestantism. 1179. Third Lateran, or eleventh general, Council. Waldensian teaching forbidden.	1185. Dynasty of the Comneni overthrown.	1188. Collection of the Saladin Tithe. Beginning of taxation on movable goods.
		1189. The Third Crusade.		1189. Richard I engages in the Third Crusade.
				1193. John attempts to seize the crown in the absence of Richard.

A. D.	From the Norman Conquest of England to the Fall of the Eastern Empire—A. D. 1066–1453—Con.				
	France	Germany	Spain	Russia	Lesser Countries
		1080. Henry degrades the pope and triumphs.			
			1085. Toledo taken from the Moors by Alfonso.		1084. Bohemia made a kingdom by Henry IV of Germany.
		1090–1100. The popes continue their struggle against the Empire.			1090. Sicily taken from the Saracens by Roger the Norman.
			1094. Pedro I, king of Navarre and Aragon.		
			1095. Conquest of Valencia by the Cid.		
1096	Many French noblemen take part in the First Crusade.				
1100 (about)	Rise of the troubadours in Provence.			1100 (about). Many ephemeral principalities contend for supremacy in Russia.	
			1104. Alfonso I, king of Navarre and Aragon.		
1108	Abbé Suger, minister to Louis VI of France.				
		1111. Henry V enters Italy and compels the pope, who is his prisoner, to crown him.			
		1114. Henry V marries Matilda of England.	1118. Alfonso captures Saragossa.		1119. Charles the Good becomes count of Flanders.
		1125. Lothair II opposed by Conrad and Frederick, duke of Swabia.			
		1138. Dissensions of the Guelphs and Ghibellines break out.	1139. Battle of Ourique. Alfonso, duke of Portugal, defeats Saracens and Moors and becomes first king of Portugal.		1139. Pope Innocent compelled to recognize the kingdom of Sicily and southern Italy, under Roger.
1147	Louis VII joins the Second Crusade.			1147. Moscow founded.	1150–1162. Erik the Saint, king of Sweden; Christianity introduced.
		1152. Frederick Barbarossa, emperor of Germany and Italy.			
			1157. Castile and León divided.		
1159	War with the English.			1158. Riga on the Baltic founded.	
		1169. Frederick's son, Henry, crowned king of the Romans. This title afterward implied the right to the imperial throne.	1169. Towns send representatives to the Cortes of Castile.	1169. Final overthrow of Kiev.	1167. League of the Italian cities.
1170	Rise of the Waldenses.				1171. Saladin, sultan of Egypt, extends his dominions; conquers Syria, Assyria, and Arabia.
		1174. Frederick's fifth expedition into Italy.			
		1176. Frederick defeated at the battle of Legnano.			
		1183. The Peace of Constance re-establishes the independence of the Italian republics.			
			1188. Alfonso IX, king of León.		1187. Saladin directs all his efforts against the crusaders; takes Jerusalem.
1190	Philip Augustus, one of the leaders of the Third Crusade.	1190. Henry VI, emperor, and king of Italy.			1191. Battle of Ascalon. Saladin defeated.
					1193. Death of Saladin.

A. D.	From the Norman Conquest of England to the Fall of the Eastern Empire—A. D. 1066–1453—Con.			
	Arts of Civilization	Italy and the Church	Eastern Empire	The British Isles
		1202. The Fourth Crusade. Constantinople taken.	1204. The crusaders plunder Constantinople.	1199. John, king of England.
	Period of the troubadours in France; the minstrels in England; minnesingers in Germany.	1215. Fourth Lateran Council, against the Albigenses. 1217. The Crusade of Andrew II of Hungary.		1215. Magna Charta signed at Runnymede. 1216. Henry III, king.
1222	University of Padua founded.			
	Architecture, and arts and crafts flourish in western Europe.	1226. The Lombard League renewed to resist Frederick. 1228–1270. Fifth, Sixth, and Seventh crusades.		
1229	University of Cambridge, England, founded. Rise of strong guilds of artisans.	1229. Papal troops defeat Frederick's army and occupy the mainland part of the Kingdom of the Two Sicilies.	1229. Frederick II occupies Jerusalem, which is ceded to the Christians by the sultan of Egypt.	1236. Henry marries Eleanor of Provence.
1239 (about)	Coal mining begun at Newcastle-upon-Tyne.			
		1243. Struggle of Pope Innocent IV with Emperor Frederick.		
1250 (about)	Roger Bacon describes principle of the telescope.			1254. Knights of the shires in Parliament. 1258. Famous "mad" Parliament at Oxford.
			1261. Emperor Michael Palæologus recovers Constantinople.	1265. First regular Parliament. Civil war.
	Literature and science flourish in Spain under Alfonso the Learned.	1267. Dominion of Italy passes to the pope.		1272–1307. Reign of Edward I.
		1274. Fourteenth general Council at Lyons.		
1280	Institution of the three great courts of law in England.			1276. War between England and Wales. 1283. England and Wales united.
			1288 (about). Osman establishes an independent rule in the north of Asia Minor.	1291-92. Robert Bruce and John Balliol contend for the crown of Scotland.
	Cimabue, the first of modern painters at Florence.	1296. Struggle of the Church with France. Bull *Clericis Laicos* forbids ecclesiastics to pay taxes to the civil power.		1296. Scotland submits to England.
	Roger Bacon makes many scientific discoveries.		1299 (about). Osman invades Nicomedia; establishes the Ottoman empire.	1297. Scotland rebels. War between England and Scotland follows.
	Fourteenth Century			
1300 (about)	Beginning of the Renaissance or revival of learning. Indian spinning wheel introduced into Europe. Knives made in England at Sheffield.			
1301	Duns Scotus becomes professor of theology at Oxford.			
		1303. Papal power declines.	Genoese control trade of Black Sea.	
				1304. Scotland conquered by Edward I. 1306. Robert Bruce proclaimed king of Scotland. War with England continued.
		1309. Seat of the popes transferred to Avignon. 1311. General Council at Vienna. 1312. Knights Templars condemned by the Council of Vienna.		
				1314. Bruce defeats the English at Bannockburn, June 24.

A. D.	From the Norman Conquest of England to the Fall of the Eastern Empire—A. D. 1066–1453—Con.				
	France	Germany	Spain	Russia	Lesser Countries
1204	Normandy reunited to France.				
1207	Albigensian crusade begun.				1206 (about). Jenghis Khan subdues the north of China.
		1215. Frederick II, crowned emperor.	1212. The Christians gain the battle of Las Navas de Tolosa.		
			1217. Ferdinand, king of Castile.		1216 (about). Tartary overrun by Jenghis Khan.
1223	Louis VIII conducts crusade against the Albigenses.				1222. Hungarian liberty assured by charter of Andrew II.
1226	Louis IX, king.	1226. Frederick grants Prussian territory to Teutonic Knights.		1224. Mongolian invasion, known as the "Golden Horde."	
		1230. Teutonic Knights begin to settle in Prussia.	1230. Castile and León united by Ferdinand III, who takes large territory from the Moors.	1237. Second Mongolian invasion. Moscow burned.	
				1238. Russian independence overthrown by the Tatars.	1241. Mongolian invasion of Europe under Batu Khan.
1248	Louis IX leads the Sixth Crusade.	1250. Conrad IV, emperor.	1250–1282. Alfonso the Learned, king of León and Castile.	Khan of Kiptchak, grand duke.	
					1258. Mongols overthrow caliphate of Bagdad.
1270	Louis IX sets out on the Last Crusade.				1267 (about). Kublai Khan builds Peking and makes it his capital.
		1273. Rudolf, emperor, founds house of Habsburg.			
1276	France at war with Castile.		1274. Crown of Navarre passes to France.	Khan of Kiptchak wields strong rule in Russia.	
		1291. League of Swiss cantons formed.	1291. James II, king of Aragon.		1290. Wenceslas, king of Bohemia, takes Cracow.
1294	English fiefs in France declared forfeited.				
			1296. Ferdinand IV, king of Castile. Period of anarchy.		
1297	Invasion of Flanders.	1298. Adolphus, emperor, deposed and Albert I enthroned.			1299 (about). Foundation of the Ottoman empire.
				1300. Kremlin built.	
1302	First convocation of the States-General in France.				
1304	War with Flanders.				
					1307. Swiss republic founded.
		1308. Henry of Luxemburg, emperor.			
		1309. Swiss Confederacy recognized by the emperor.			
			1312. Alfonso XI, king of Castile and León.		
1315	Edict for the enfranchisement of slaves.	1314. Louis of Bavaria and Frederick of Austria contend for the crown.			

A. D.	From the Norman Conquest of England to the Fall of the Eastern Empire—A. D. 1066–1453—Con.			
	Arts of Civilization	Italy and the Church	Eastern Empire	The British Isles
1318	Dante completes *Divina Commedia*; dies 1321.			
			1321. Civil war in the Eastern Empire between the emperor and his grandson.	
			1326. Orkhan, sultan of the Turks, makes Brusa his capital.	1328. Peace. Independence of Scotland.
		Struggle in Rome between the Colonna and the Orsini.		1337. Struggle for the French crown begins.
1340	Chaucer, father of English poetry, born in London.			
1340 (?)	Coal used in iron smelting in Belgium.			1346. Battle of Crécy.
1347	First recorded importation of wheat into England.	1347. Democracy in Rome under Rienzi, last of the tribunes.		1348. The plague of the Black Death sweeps over Europe, lasting four years.
1352	Library of St. Mark's in Venice, founded by gifts from Petrarch.	1354. Rienzi killed; papal dominion restored.	1355. John Palæologus, emperor.	1356. Edward, the Black Prince, wins the battle of Poitiers.
			1373. Treaty with Amurath, the Ottoman emperor.	
		1377. Papal court re-established at Rome; end of the "Babylonian Captivity."		1376. Death of the Black Prince.
		1378. Schism of the West; Pope Urban VI acknowledged in England; Clement VII in France, Spain, and Scotland.		1381. Peasants' Revolt.
				1385. The Scots, assisted by France, invade England.
			1389. Bajazet, sultan of the Turks.	
				1399. Henry IV, king. House of Lancaster begins.
1400 (about)	Wood engraving.			
1400	Chaucer dies.			
1401	Bank of Barcelona (earliest existing) founded.			
			1402. Bajazet defeated and made prisoner by Timur at the battle of Angora.	1406. James I, king of Scotland.
		1409. The Council of Pisa.		
		1414. Council of Constance.		1414. Henry V claims the French crown.
		1415-16. Huss and Jerome burned for heresy.		1415. Henry V gains the battle of Agincourt.
		1417. Schism of the West ended by election of Pope Martin V.		
			1419. The Portuguese explore the Madeira Islands under the patronage of Henry the Navigator.	1422. Death of Henry V. Accession of Henry VI. War with France.
			1425. Emperor John VII visits Italy to obtain help against the Turks.	
1436	First public library in Italy, at Florence; gift of Niccolo Niccoli.			
			1444. Vladislas, king of Poland, defeated and killed by the Turks.	1444. Truce with France.
1447	Vatican library founded.	1447. Congress by which the liberties of the German Church are compromised.	1448. Constantine XI, last of the Greek emperors.	1445. Marriage of Henry to Margaret of Anjou.
1450 (about)	Gutenberg invents printing with metal types.			
1450	The Renaissance, at first a literary revival, now extends to art in general, particularly architecture, which is influenced throughout central and western Europe.		1453. Siege and capture of Constantinople by the Turks, ending the Eastern Empire.	1450. Insurrection of Jack Cade. Richard, duke of York, claims the throne.

FROM THE NORMAN CONQUEST OF ENGLAND TO THE FALL OF THE EASTERN EMPIRE—A. D. 1066–1453—CON.

A. D.	FRANCE	GERMANY	SPAIN	RUSSIA	LESSER COUNTRIES
1316	Philip V succeeds by virtue of the Salic law, now first established.			1318. Finland invaded by Russians.	1319. The oligarchy of Venice established.
		1322. Frederick of Austria defeated.			
1337	War with England.		1340. Moors defeated near Tarifa.		1336. Timur (Tamerlane) born at Kesh, Tartary.
				1346. Novgorod at height of its commercial importance.	
1356	King John defeated and taken prisoner at Poitiers.	1356. Promulgation of the Golden Bull.			1355. Establishment of the Ottomans in Europe.
1360	John regains his liberty; cedes much territory to England.		1365. War between Navarre and France.		1369. Timur makes Samarkand the capital of his new empire.
		1378. Wenceslas, king of Bohemia, emperor.			
1380	Charles VI, king.			1380. Tatar war. Dimitri Ivanovitch checks Tatars at the Don.	
1382	Defeat of the Flemings at Roosebec. Victory of nobles over the cities.			1382. Moscow burned.	
1386	Fruitless attempt to invade England.				1389. Swiss force the Habsburgs to make a truce.
		1394. The emperor imprisoned at Prague.		1395. Timur invades Russia. Russia under the Mongol Tatars until 1480.	1398. Invasion of India by Timur.
		1400. Rupert, Count Palatine, emperor.			
			1406. John II, king of Castile.		
1410	Civil war between Orleans and Burgundy.			1410. Battle of Tannenberg. Poles and Lithuanians defeat Teutonic Knights.	
1415	French defeated by the English at Agincourt.	1411. Sigismund, king of Hungary, emperor.			
			1416. Alfonso V, king of Aragon and Sicily.		
1422	Henry VI, proclaimed at Paris, king of France and England.				1419–27. The Hussite war in Bohemia.
1429	Orleans saved by Joan of Arc. Charles VII crowned at Reims.			1429. Founding of Solovetski monastery on White Sea.	
1431	Joan of Arc burned.				
		1438. Albert II, first emperor of the house of Habsburg.			1437–38. Rise of Portugal.
1453	End of the Hundred Years' War.	1453. Austria made a hereditary duchy by Emperor Frederick III.			

A. D.	From the Fall of the Eastern Empire to the Close of the Thirty Years' War—A. D. 1453–1648				
	Arts of Civilization	Italy and the Church	Great Britain	Germany	Spain and Portugal
			1455. Wars of the Roses begin.		1454. Henry IV, king of Castile.
		1458. The French rule in Genoa.			
1460 (about)	Copperplate engraving.		1461. Edward IV, king. House of York.	1462. Civil war in Germany.	
		1463. War of Venice with the Turks.			
		1469. Lorenzo de' Medici succeeds Piero at Florence.	1470. Henry VI restored by Warwick; dies 1471.		1469. Marriage of Ferdinand of Aragon with Isabella of Castile.
		1471. Sixtus IV, pope.			
1474	First book printed in England by Caxton.				
1477	Watches made at Nuremberg.		1475. Edward IV invades France; signs seven year truce with Louis XI.	1477. Marriage of Maximilian and Mary of Burgundy.	1479. Union of Castile and Aragon.
			1483–1485. Richard III, king.		
1488	Bartholomew Diaz, a Portuguese, discovers the Cape of Good Hope.				1491. Conquest of Granada by Spaniards.
1492	Discovery of America by Columbus begins era of discovery.	1492. Alexander VI, pope.	1492. Henry VII invades France.	1493. Maximilian I, emperor.	1492. The Jews are expelled from Spain.
1500 (about)	Clocks first used in astronomy.				1498. Vasco da Gama reaches India via Cape of Good Hope.
1506	First stone laid for St. Peter's church at Rome.	1504. Naples annexed to the Spanish crown. Julius II, pope.	1509. Henry VIII, king.		
			1512. War with France.	1512. Maximilian divides the empire into 10 administrative circles.	
		1513. Pope Leo X, patron of literature and the arts.	1513. Battle of Flodden; James IV of Scotland killed.		
1516	Juan Diaz de Solis discovers the river La Plata; declares the country Spanish possession.		1515. Wolsey, chancellor and cardinal.	1517. Beginning of the Reformation; Luther's theses at Wittenberg.	1516. Charles, king of all Spain and the Netherlands. (As emperor, Charles V.)
				1519. Charles V, emperor.	
1520	Fernando Magellan navigates the straits between Tierra del Fuego and Patagonia.	1520. Pope Leo X excommunicates Luther.	1520. Francis I of France and Henry VIII meet on the Field of the Cloth of Gold near Guînes.	1521. Diet of Worms.	
		1525. Spanish ascendancy by the victory of Pavia.		1525. German Peasants' war.	1525. Charles V defeats French and Italians at Pavia.
1530 (about)	"Saxony" flax wheel in Nuremberg.			1529. Turks invade Germany; besiege Vienna.	
1533'	Flax growing ordered by law in England.		1531. The English clergy acknowledge Henry as head of the Church.		
		1540. Order of Jesuits founded by Loyola.	1534. Henry excommunicated by the pope.	1542–54. War with France.	1540. Lisbon, the market of the world.
		1545. Council of Trent.	1544. Invasion of France.		
1547	First China orange tree brought to Europe by Portuguese. Rude carriages used in France.	1550. Julius III, pope.	1547. Formal establishment of Protestantism. Edward VI, king.	1552. Treaty of Passau secures religious liberty to the Protestants.	
			1553. Mary, queen of England.	1553. Michael Servetus, Spanish philosopher, burned at Geneva.	
			1554. Lady Jane Grey executed.		
			1555. Persecution of the Protestants.	1556. Charles V abdicates.	
			1558. Elizabeth, queen. Rise of the Puritans.		

A. D.	From the Fall of the Eastern Empire to the Close of the Thirty Years' War—A. D. 1453–1648				
	France	Russia	Scandinavia	Ottoman Empire	Lesser Countries
					1454. Poland's independence confirmed by diet of Petrekin.
				1456. War with Hungary.	1458. Hungary vigorous under Matthias Corvinus.
1461	Louis XI, king.			1460. Greece subjected to the Turks.	
		1462. Ivan III founds czardom of Muscovy.			
					1466. Prussia a fief of Poland.
					1468. Uzun Hassan, master of Persia.
			1470. Sten Sture, regent of Sweden.		
		1472. Ivan marries Sophia, niece of the Greek emperor.			
1474	War between France and Burgundy.				
1477	Artois and Burgundy united to France.	1479. Great invasion of the Tatars.			
		1480. Power of the Tatars overthrown.		1480. Otranto taken.	
			1481. Hans, king of Denmark, partially acknowledged in Sweden.	1481. Bajazet II, sultan.	
					1485. Matthias of Hungary takes Vienna.
1491	Brittany united to the crown.				
1498	Louis XII, king.				
1499	Conquest of Milan.				1499. Swiss independence acknowledged by the Empire.
					1506. Poland under Sigismund the Great.
1510	Council of Tours.				
				1512. Accession of Selim I.	
			1513. Christian II, king of Norway and Denmark.	1514. Persians defeated; Kurdistan added to the empire.	
1515	Francis I invades Italy.			1517. Selim conquers Egypt.	
			1520. Christian, king of Sweden.	1520. Soliman the Magnificent, sultan.	1519–21. Spaniards, under Cortés, conquer Mexico.
1521	Long conflict with the Habsburgs begins.		1523. Gustavus Vasa, king of Sweden.		
1525	Francis defeated and taken prisoner at Pavia.		Union of Calmar dissolved.	1526. Invasion of Hungary.	
				1529. Invasion of Germany. Siege of Vienna.	
		1533. Accession of Ivan the Terrible.			1533. Pizarro conquers Peru.
					1545. Mines at Potosi discovered.
1547	Henry II, king; Catherine de' Medici, queen.	1547. Ivan the Terrible takes the title of Czar.		1551. Tripoli taken.	
					1556. Akbar raises the Indian empire to its greatest splendor.

A. D.	From the Fall of the Eastern Empire to the Close of the Thirty Years' War—A. D. 1453–1648—Con.				
	Arts of Civilization	Italy and the Church	Great Britain	Germany	Spain and Portugal
		1559. Termination of French wars in Italy.			
1562	Tusser's *Five Hundred Points of Husbandry.*			1564. Maximilian II, emperor.	1564. Settlement of the Philippines.
					1567. Duke of Alva, governor of the Netherlands.
		1569. Florence becomes capital of grand duchy of Tuscany.	1568. Mary Queen of Scots takes refuge in England and is made captive by Elizabeth.		
		1570. The Catholics and Huguenots sign a treaty of peace at St. Germain.			
					1571. Battle of Lepanto. Turks defeated by the Holy League under John of Austria.
					1572. Crown of Poland becomes elective.
1576	Martin Frobisher, an Englishman, sets out to explore a northwest passage to India.			1576. Rudolf II, king of Bohemia and Hungary, emperor.	
1580	Coarse white paper made in England.				1580. Portugal passes under Spanish dominion.
1582	Pope Gregory XIII reforms the calendar, changing Oct. 5 to Oct. 15.	1585. Pope Sixtus V restores the Vatican library.	1587. Execution of Mary Queen of Scots.		
1588	First English work on shorthand published by Doctor Timothy Bright.		1588. Spanish *Armada* destroyed.		
1600	Gilbert generates electricity by rubbing substances other than amber.		1600. British East India Company chartered.		
			1603. Union of England and Scotland under James I. Tudor dynasty in England ends.		
			1605. Guy Fawkes's plot to blow up Parliament.		
1608	Telescopes manufactured in Holland.			1608. Protestant union under Frederick the Elector.	
1609–18	Kepler announces laws of planetary motions.				1609. Expulsion of the Moors.
1614	Lord John Napier invents system of logarithms.				
1616	William Harvey, famous physician, demonstrates the circulation of the blood.		1618. Sir Francis Bacon, lord chancellor.	1618. Thirty Years' War begins.	
	Death of Shakspere, April 23.		1620. Pilgrims sail in *Mayflower.*	1620. Battle of Prague.	1621. Dutch war.
			1625. Charles I, king.		1625. Naval war with England.
		1626. St. Peter's dedicated.	1627. War with France.		
				1628. Victories of Wallenstein.	
				1632. Battle of Lützen.	
1635	French Academy of Arts and Sciences founded at Paris.		1638. Abolition of the episcopacy in Scotland; publication of the National Covenant.		
	First Irish theater opened at Dublin.				
1639	Transit of Venus first recorded by Horrocks.				
			1640. Short Parliament. Long Parliament.		
1641	Descartes enunciates his system of philosophy.	1641. War between Pope Urban VIII and the Italian princes.			1640. Portugal regains independence.
1642	Van Diemen's Land and New Zealand discovered by Tasman, a Dutchman.		1642. Civil war and revolution.		

A. D.	From the Fall of the Eastern Empire to the Close of the Thirty Years' War—A. D. 1453–1648—Con.				
	France	Russia	Scandinavia	Ottoman Empire	Lesser Countries
				Military power of the Turks at its greatest height under Soliman.	
1562	Religious liberty granted to the Huguenots. Huguenot wars.		1560. Eric XIV, king of Sweden. 1563. Seven Years' War between Sweden and Denmark begins.	1566. Selim II, emperor.	1566. The Compromise, a league of nobles against the Inquisition in the Netherlands.
		1571. Russia devastated by the Tatars and Moscow burned.	1570. Peace of Stettin.	1571. Turks defeated at battle of Lepanto.	
1572	Massacre of St. Bartholomew.				
1574	Henry III, king.			1574. Amurath III, emperor	
1576	The Catholic League.	1578. Alliance of Sweden and Poland against Russia.			1579. Beginning of the republic in Holland.
					1585. Persia acquires great power under Abbas the Great.
1588	Revolt of Paris.		1588. Christian IV, king of Denmark.		
1589	House of Bourbon begins with Henry IV.			1589. Revolt of the Janizaries.	
1590	Siege of Paris raised by the Spaniards.				
1598	Edict of Nantes—toleration granted to the Protestants.	1598. Boris Godounov begins a new dynasty.		1595. Power in Hungary declines; revolt of Wallachia.	1601 Portuguese expedition reaches Australia.
					1605. Jehangir, Mogul emperor of India.
1610	Assassination of Henry IV. Louis XIII, king.				1609. First envoy of the British East India Company sent to India.
1614	Last assembly of the States-General before French Revolution.	1613. Michael Feodorovich, czar, founds the house of Romanov.	1611. Gustavus Adolphus, king of Sweden. War between Sweden and Denmark. 1617. Sweden dominates the North.		
				1620. War with Poland.	
1624	Ministry of Cardinal Richelieu begins.				
1627	War with England over the Huguenots.				
		1632. War with Poland.	1632. Christina, queen of Sweden; Oxenstierna, regent.		
1638	Invasion of Spain.			1638. Final and greatest expedition against Persia.	
					1639. Great naval victory of the Dutch admiral, Van Tromp, over the Spanish fleet in the Downs.
1640	Turin taken by the French.				1640. Madras, India, founded.
1642	Death of Richelieu.				

A. D.	From the Fall of the Eastern Empire to the Close of the Thirty Years' War—A. D. 1453–1648—Con.				
	Arts of Civilization	Italy and the Church	Great Britain	Germany	Spain and Portugal
1643	The barometer invented by Torricelli.				1643. The colonies of New England form a union.
1647	Society of Friends founded by George Fox.	1647. Revolt of Naples under Masaniello.	1648. Second civil war.	1648. Peace of Westphalia. End of Thirty Years' War. The balance of power in Europe practically established by this treaty.	

A. D.	From the Close of the Thirty Years' War to the Beginning of the French Revolution—A. D. 1648–1789				
	Arts of Civilization	Italy and the Church	Great Britain	Germany	Spain and Portugal
1650	First coffeehouse in England.		1649. Commonwealth under Cromwell. 1652. War with Holland. 1653. Cromwell, lord protector.		
				1658. Leopold I, emperor.	1654. Brazil recovered from the Dutch.
			1660. Charles II, king. Restoration of Stuarts.		1660. Portugal makes alliance with England.
1662	Coffee introduced into France.				
1663	First newspaper in England, *Public Intelligence.*				
1667	First designs drawn for Gobelin tapestry.		1666. Great fire in London. St. Paul's rebuilt by Sir Christopher Wren.		
1669	British East India Company first import tea.		1668. Triple Alliance of England, Sweden, and Holland against France.		
				1674. War of Austria and France.	1673. War with France to protect Holland.
		1676. Messina revolts in favor of the French; blockaded by the Dutch and Spanish fleets.	1678 (about). Rise of the Whigs and Tories. 1679. Habeas corpus act passed.		
1681	Canal of Languedoc completed.			1680. Part of Alsace seized by France.	
1684	Newton announces theory of gravitation.			1683. Siege of Vienna by the Turks and Hungarians.	
			1685. James II, king.		
			1688. Revolution.	1687. Joseph I, king of Hungary.	
		1689. Alexander VIII, pope.	1689. William III, king, and Mary II, queen.		1689. Revolt in Catalonia in favor of France.
1690	Manufacture of paper for writing and printing encouraged by law in England.	1693. Battle of Marsaglia.	1690. Battle of the Boyne. James defeated. 1694. Bank of England chartered.	1690. Joseph I elected king of the Romans.	1691. Incursion of the French into Aragon.
1696	Hoste writes on science of shipbuilding.		1697. Peace of Ryswick.	1697. Victory of Prince Eugene over Sultan Mustapha at Zenta.	
1698	Linen manufacture established in northern Ireland.			1701. Prussia made a kingdom. Hohenzollern dynasty established.	1700. Philip V, king of Spain.
		1702. Battle of Luzzara between French under Vendôme and the Imperialists.	1702. Queen Anne. War against France and Spain. 1704. Gibraltar taken by English.		
		1706. French driven from Italy by Prince Eugene.			1705. Barcelona taken by the allies.

A. D.	From the Fall of the Eastern Empire to the Close of the Thirty Years' War—A. D. 1453–1648—Con.				
	France	Russia	Scandinavia	Ottoman Empire	Lesser Countries
1643	Louis XIV, king.	1645. Era of progress begins with reign of Czar Alexis.	1645. Peace between Sweden and Denmark.	1645. War with Venice.	
1648	Wars of the Fronde.				1648. Independence of the Republic of the United Provinces.

A. D.	From the Close of the Thirty Years' War to the Beginning of the French Revolution—A. D. 1648–1789				
	France	Russia	Scandinavia	Ottoman Empire	Lesser Countries
1649	Siege of Paris.				
1653	Mazarin enters Paris in triumph.	1654. Russian victories in Poland.	1657. War between Denmark and Sweden.	1657. Leopold I of Germany becomes king of Hungary.	1653. John de Witt, grand pensionary of Holland.
1659	Peace of the Pyrenees.		1660. Peace of Copenhagen and Oliva.	1661. War with Austria.	1661. Bombay ceded to England.
				1663. Invasion of Hungary.	
1667	War with Spain over possession of the Spanish Netherlands.			1664. Germans win the battle of St. Gotthard.	
1672	War with Holland.	1671. The Cossacks subjugated.		1672. Invasion of Poland.	1674. Sobieski, king of Poland.
1678	Peace with Holland and Spain restores tranquillity to Europe. France the most formidable power in Europe.		1680. Diet of Stockholm.	1678. First war with Russia.	
		1682. Ivan and Peter, czars.		1682. War with Austria. 1683. Defeat at Vienna.	
1685	Revocation of the Edict of Nantes.				
				1687. Revolution in Constantinople, Soliman II, sultan.	
1688	Louis declares war against the Empire and the United Provinces.	1689. Peter the Great, czar.		1689. Recovery of Belgrade from the Austrians.	1689 (about). Mogul power at its height in India.
			1693. The king of Sweden declared absolute.		
					1695. Brussels bombarded by the French.
1697	General Peace of Ryswick between France and the Allies.		1697. Charles XII begins to reign.		
		1700. Peter the Great wars with the northern powers.	1700. Defeat of the Russians at Narva.	1699. Peace of Karlowitz. The Ottoman power broken.	
1702	Invasion of Holland. Revolt of the Camisards (Protestants).	1703. Petrograd founded.	1702–08. Charles XII sweeps Poland and Russia.	1703. Mustapha II deposed by the Janizaries.	
1704	Defeat at Blenheim.				1704. Stanislas I, king of Poland.
			1705. Denmark joins Russo-Polish alliance.		

A. D.	From the Close of the Thirty Years' War to the Beginning of the French Revolution—A. D. 1648–1789—Con.				
	Arts of Civilization	Italy and the Church	Great Britain	Germany	Spain and Portugal
		1707. All Spanish possessions in Italy abandoned.	1707. Act of union of England and Scotland. First united Parliament of Great Britain meets.		
1710	First "self-acting steam engine" patented by Thomas Newcomen.		1713. Peace of Utrecht. England acquires large American possessions. 1714. Accession of George I. Beginning of the house of Hanover.	1711. Charles VI, emperor.	
		1718. Sicily invaded by the Spanish.	1720. South Sea Bubble.	1718. Quadruple Alliance against Spain.	
1721	Inoculation for smallpox introduced into England.				
				1725. Alliance of Spain and Austria.	1725. Alliance with Austria.
		1730. Clement XII, pope.	1727. George II, king of England.		
1731	An early book on farming: Tull's *Horse-Hoeing Husbandry.*			1733. War of the Polish Succession.	1734. Conquest of Sicily and Naples by Don Carlos.
1735	Linnæus publishes his *Systema Naturæ.*		1739. War with Spain.	1740. War of the Austrian Succession. Maria Theresa succeeds to the hereditary states.	
		1744. Italy invaded by the French and Spaniards.			
			1745. The Young Pretender in Scotland.	1745. Francis I, husband of Maria Theresa, emperor.	
1747	Franklin announces single fluid theory of electricity.	1746. French and Spaniards driven from Lombardy.			1746. Ferdinand VI, king of Spain.
1752	Franklin demonstrates identity of electricity and lightning.		1760. Accession of George III. 1763. Peace of Paris.	1756. Seven Years' War—Austria and France against Prussia and England.	
1767	Hargreaves builds a spinning jenny.				1767. Jesuits expelled from Spain.
1769	Arkwright builds a spinning mill.				
1773	First regular academy for deaf-mutes (in Great Britain) opened in Edinburgh.	1773. Jesuit order suppressed.	1775. War with the American colonies. 1776. British army takes possession of New York. Hessians hired for service in America. City of London remonstrates against American war.		
1780	Sunday schools organized at Gloucester, England, by Robert Raikes.			1778. War of the Bavarian Succession. Bavaria seized by Germany.	
1781	Watt first patents a double steam engine.		1781. Surrender of Cornwallis at Yorktown.		
1782	Montgolfier successfully uses heated air balloons.		1783. Treaty of Versailles with United States.		
1787	Society for the Suppression of the Slave Trade founded.		1786. Impeachment of Warren Hastings.		1788. Charles IV, king of Spain.

A. D.	From the Close of the Thirty Years' War to the Beginning of the French Revolution—A. D. 1648–1789—Con.				
	France	Russia	Scandinavia	Ottoman Empire	Lesser Countries
		1708. Revolt of the Cossack Mazeppa. Charles XII of Sweden invades Russia.			
		1709. Charles is defeated at Pultowa.		1710. The sultan declares war on Russia.	
1713	Peace of Utrecht—perpetual separation of the crowns of France and Spain.		1714. Charles returns to Sweden.		
1715	Louis XV, king (Regency till 1723).	1716. Finland conquered.			1715. Treaty of Antwerp with Austria. "Barrier Treaty."
1718	The Quadruple Alliance against Spain.	1720. Treaty of Stockholm between Sweden and Russia.	1718. Charles invades Norway and is killed at the siege of Frederikshald.	1717. Turks lose Belgrade.	
		1721. Peter assumes the title "Emperor of all the Russias."	1721. Peace of Nystadt between Sweden and Russia.		
1724	Congress of Cambrai.	1725. Catherine I, empress.		1723. Turks and Russians attempt to dismember Persia.	1724–32. Jesuits expelled from China.
		1726. Alliance with Austria.			
		1730. Death of Peter II, last of the male line of Romanovs.	1730. Christian VI, king of Denmark.		
1733	The Polish succession involves France in war.			1734. Turks driven from Persia by Nadir Shah.	1733. Frederick Augustus II, king of Poland.
					1739. India invaded by Nadir, shah of Persia, who takes Delhi.
			1742. Swedes driven out of Finland.		
1744	War with England and Austria.				
				1745. Defeat of the Turks at Kars.	
1747	War with Holland.				1746–49. Hostilities between the French and English in India.
					1756. Calcutta taken by the nabob of Bengal.
1760	Loss of all Canada.	1762. Catherine II reigns.			
1764	Dissolution of Jesuit order.				1765. Establishment of the English in India.
					1766. Power of the Mamelukes revived in Egypt under Ali Bey.
		1768. War with the Ottoman empire.			
1770	Marriage of the Dauphin to Marie Antoinette.	1772. First partition of Poland.	1772. Despotism reestablished in Sweden by Gustavus III.		
		1773. Revolts of the Cossacks.			
1774	Louis XVI, king.				1774. Warren Hastings, first governor-general of India.
1776	Franklin in Paris.				
1778	Alliance with America.				
				1783. The Crimea annexed to Russia.	
		1787. War with the Turks.		1787. Disastrous war with Austria and Russia.	
1789	The States-General meets at Versailles.				

A. D.	From the Beginning of the French Revolution to the World War—A. D. 1789–1914				
	Arts of Civilization	Italy and the Church	Great Britain	Germany	Spain and Portugal
1792	First use of gas for illuminating.		1793. First coalition against France.	1792. War with France.	
1796		1796-97. Napoleon's Italian campaign.		1797. Napoleon's Austrian campaign.	
1798	Invention of lithography.	1798. Roman Republic proclaimed by the French.	1798. Nelson destroys French fleet at battle of the Nile. 1799. Second coalition against France.		
1801			1801. Union of England and Ireland.		
1802	Thomas Wedgwood publishes account of photographic experiments.	1802. Napoleon, president of the Italian Republic.			
1803	Fulton's steamboat *Clermont* operated on the Seine.		1803. Successful war in India.		
1805		1805. Napoleon crowned king of Italy.	1805. Napoleon defeated at Trafalgar.	1805. Battle of Austerlitz. 1806. Confederation of the Rhine. End of the Holy Roman Empire.	1805. Battle of Trafalgar.
1808		1808. Rome annexed by Napoleon to the Kingdom of Italy.		1809. Peace of Vienna.	1808. Madrid taken by the French. Joseph Bonaparte, king.
1812			1812. War with the United States.	1812. Austria in alliance with France against Russia.	1812. Battle of Salamanca.
1814	Steam cylinder printing press first used for *London Times*.	1814. Fall of Napoleon. Kingdom ceases.			1814. Ferdinand VII restored.
1815			1815. British defeated at New Orleans. Wellington victorious at Waterloo.	1815. Congress of Vienna.	
	Arts of Civilization	International Affairs	Great Britain	Prussia	Austria
1815		1815. Congress of Vienna. Holy Alliance. Abolition of slave trade. Grouping of Central European states.	1816. Bombardment of Algiers. The Dey compelled to abolish slavery.		
1818		1818. Great Lakes naval agreement between United States and Great Britain.		1818. The Zollverein policy initiated.	
1819	The steamship *Savannah* makes the first trip across the Atlantic.		1820. Accession of George IV.		
1821	Electromagnetism discovered.	1821. Conference of monarchs at Laibach.			
1822	Hieroglyphics deciphered by Champollion.	1823. Proclamation of Monroe Doctrine.	1823. Catholic Association formed in Ireland.		
1824	Inland navigation stimulated in the United States.				
1825	Steam navigation on the Rhine. Vast increase in periodical literature in England, France, Germany, United States, etc. First passenger railway, opened between Stockton and Darlington, England.		1826. England and Russia sign agreement for settlement of Greek question.	1826. Austria and Prussia oppose English-Russian mediation in Greece.	

From the Beginning of the French Revolution to the World War—A. D. 1789–1914

A. D.	France	Russia	Scandinavia	Ottoman Empire	Lesser Countries
1789	National Assembly adopts Declaration of the Rights of Man.				
1792	War with Germany. France declared a republic.		1792. Gustavus III assassinated. Gustavus IV, king.		
1793	Reign of Terror.	1793. Second partition of Poland.			1794. Polish revolt at Cracow.
1795	Napoleon Bonaparte commands the army.	1795. Final partition of Poland.			
1796	War in Italy.	1796. Unsuccessful war with Persia.			
1797	Napoleon in Austria.				
1798	Expedition to Egypt.			1798. Turkey joins coalition against France.	1798. Swiss revolution. Helvetian Republic declared.
1799	Swiss campaign.				
1800	Battle of Marengo.				
1801		1801. Alexander, czar.	1801. Denmark and Sweden accede to the alliance between England and Russia.		
1802	Napoleon made consul for life; president of the Italian Republic.				
1803	War with England.			1803. Insurrection of Mamelukes at Cairo.	
1804	Napoleon I, emperor of the French.				
1805	Battle of Austerlitz.	1805. Russia joins the coalition against France.			1806. Louis Napoleon, king of Holland.
1807	War with Russia. Invasion of Portugal.	1807. Treaty of Tilsit.	1808. Finland invaded by the Russians.		1807. Duchy of Warsaw formed.
1809	Battle of Wagram.		1809. Charles XIII, king of Sweden.	1809. Russians defeated at Silistria.	
1810	Continental peace except with Spain.				
1812	Russian campaign.	1812. Invasion by Napoleon. Moscow burned.		1809–12. War with Russia. 1813. Serbia invaded by Turkish army.	1812. American war with England.
1814	Allies enter Paris. House of Bourbon restored; Louis XVIII, king.		1814. Union of Sweden and Norway as two kingdoms under one monarch.	1814. Malta falls to England.	
1815	The Hundred Days. Battle of Waterloo and defeat of Napoleon. Abdication of Napoleon. Napoleon banished to St. Helena.	1815. The Holy Alliance formed.			1815. William I, king of the Netherlands.

	France	Spain and Portugal	Italy and Greece	Russia	Lesser Countries
		1816. Union of Portugal and Brazil under John VI. 1817. Slave trade abolished.	1816. Kingdom of Two Sicilies restored.	1815. Poland united to Russia.	1816. Lord Amherst's unsuccessful mission to China.
1818	France joins the Holy Alliance.				1818. The Mahratta power completely overthrown in India by the British.
			1821. Austrian invasion of Italy. 1822. Greek revolution. Declaration of Independence.		
1824	Charles X, king.	1823. Constitutional movement in Spain crushed.			
			1825. Death of Ferdinand IV of Naples, after reign of 66 years.	1826. Nicholas I crowned at Moscow. War against Persia.	1826. Missolonghi taken by the Turks. Athens taken by the Turks.

A. D.	From the Beginning of the French Revolution to the World War—A. D. 1789–1914—Con.				
	Arts of Civilization	International Affairs	Great Britain	Prussia	Austria
1827	Improved cylinder printing press, *London Times*, 5000 impressions per hour.	1827. Treaty of nations with respect to Greece. 1828. Independence of Uruguay.	1828. Wellington ministry. Irish disturbances. 1830. William IV, king.		
1831	Reaper invented. Dynamo electric machine.	1831. Adjustment of northeast boundary of United States. Belgian independence and neutrality agreed to by the powers.	1832. Reform bills passed. 1834. Difficulties with China. Robert Peel, premier.	1834. Zollverein includes most of the German states.	1831. Austria interferes in Italian affairs. 1835. Ferdinand I, emperor.
1837	Morse patents his telegraph. Wheatstone's telegraph patented in England.	1839. Dutch and Belgian boundary dispute settled.	1837. Difficulties in Canada. Victoria, queen.		1838. Commercial treaty with England.
1842	Ether as an anesthetic.		1840–42. War with China over the opium trade.	1840. Frederick William IV, king.	
1844	First telegraphic message, Washington, Baltimore.				
1845	Earl Rosse's telescope completed. Gutta-percha used.				
1846	Howe's sewing machine patented.	1846. Oregon boundary treaty.	1846. Repeal of the corn laws.		1846. Austria takes possession of Cracow.
1847	Great canal from Durance to Marseilles completed. Railroad building in Germany.		1846–47. Severe famine in Ireland.		
1848	Girard College opened.	1848. Treaty of Guadalupe Hidalgo between Mexico and United States. Revolutionary disturbance in Europe.	1848. Civil war in Ireland. Habeas corpus act suspended.	1848. Insurrection in Berlin.	1848. Revolution in Hungary and Austria. Francis Joseph, emperor.
1849	Magnetic clock invented by Doctor Locke of Cincinnati.		1849. Punjab annexed to England.	1849. The king declines the imperial crown. Armistice between Prussia and Denmark.	1849. New constitution promulgated.
1850	Tubular bridge in Anglesey, England. The Peking *Monitor*, a newspaper, printed in China. Woman's Rights convention at Worcester, Mass.		1850. The war in Lahore ended.	1850. Treaty of peace with Denmark. New constitution for Prussia.	
1851	Railway between Moscow and Petrograd opened. Cable across the English Channel.	1851. International exhibition at London.			1851. Louis Kossuth sentenced to death at Pest.
1853	First Norwegian railway opened.				
1854	First railway in Brazil.	1854. Commercial treaty between the United States and Japan. France, England, Sardinia, Russia, Turkey in Crimean War.	1854. Crimean War. Treaty of alliance with France.	1854. Treaty with Austria, offensive and defensive.	1854. Alliance with England and France.
1855	Panama railway completed. Bessemer's steel process patented.				
1856	Submarine telegraph laid from Cape Breton to Newfoundland.	1856. Close of Crimean War. Treaty of Paris.	1856. British fleet bombards and partially destroys Canton, China.		1856. Hungarians granted amnesty.
1857	Peabody Institute founded at Baltimore.		1857. Rebellion in India begins. King of Delhi proclaimed sovereign of India.		
1858	*Great Eastern* launched. Boston Public Library opened.	1858. Laying of Atlantic cable.			

A. D.	From the Beginning of the French Revolution to the World War—A. D. 1789–1914—Con.				
	France	Spain and Portugal	Italy and Greece	Russia	Lesser Countries
1830	Revolution and abdication of Charles X. Louis Philippe, king. Algiers taken by the French.			1830-31. Polish insurrections.	1830. Polish struggles for nationality begin.
1831	Abolition of hereditary peerage in France.	1833. Isabella II, queen of Spain. 1834. The Carlist war.	1832. Kingdom of Greece founded.	1832. Poland made part of empire. Trade treaty with United States.	1831. Leopold I, king of the Belgians. 1833. Portugal, a constitutional monarchy.
1836	Insurrection attempted by Louis Napoleon at Strasbourg.	1836. The monasteries in Spain dissolved.			
1838	Death of Talleyrand.				1839. Turkey at war with Egypt.
		1841–42. Insurrection in Barcelona.			1840. William I abdicates as king of Holland. 1842. Insurrection in India.
1844	War with Morocco.		1843. King Otto of Greece compelled to accept a constitution.	1844. Emperor visits England.	
		1846. Marriage of Isabella to the Duke of Cadiz. Civil war in Portugal.			1847. Soulouque, president of Haiti.
1848	Abdication of Louis Philippe, and a republic proclaimed. Louis Napoleon, president. Bloody insurrection in Paris.		1848. Rising of the great Italian cities in revolution. Roman republic proclaimed. 1849. Victor Emmanuel, king of Sardinia.	1849. Russia aids Austria in subduing Hungary.	1848. Holland receives a new constitution. Hungary given an independent ministry.
1850	Jerome Bonaparte, marshal of France. Death of Louis Philippe.			1850. Harbor of Sebastopol completed.	1850. Death of Emperor Tau-Kwang of China. Battle of Idstedt, Denmark. Outbreak of Taiping rebellion.
1851	Louis Napoleon elected president for ten years (*coup d'état*).	1851. Death of Godoy, "prince of peace."			1851. Discovery of gold in Australia.
1852	Louis Napoleon declared emperor as Napoleon III.			1853. War begins with Turkey.	1852. Buenos Aires taken by the liberating army.
1854	Crimean War. Allies victorious at Inkerman.	1854. Military insurrection under O'Donnell.	1854. Sardinia takes part in the Crimean War.	1854. War with France and England. Siege of Sebastopol. Battle of Balaklava. 1855. Alexander II, emperor.	War between Turkey and Montenegro. 1855. Santa Anna abdicates the presidency of Mexico.
1856	Peace with Russia.			1856. Evacuation of the Crimea.	
					1857. Mexican constitution promulgated.
				1858. Partial emancipation of the serfs.	1858. Massacre of Christians in Turkey. Suez railroad completed.

A. D.	From the Beginning of the French Revolution to the World War—A. D. 1789–1914—Con.				
	Arts of Civilization	International Affairs	Great Britain	Prussia	Austria
1859	Storage, or secondary, battery.	1859. India and England connected by telegraph.			1859. War with France and Sardinia.
1860	Ammonia absorption ice machine.				Peace after battle of Solferino.
1861	Passenger elevator.		1861. Death of Prince Albert.	1861. William I, king.	1861. New constitution for the Austrian monarchy.
1863	Abolition of slavery in the U. S.			1862. Bismarck, premier.	
	Pneumatic pianoforte player (first to strike keys by pneumatic pockets).	1864. Convention (International) for telegraph to U. S. Geneva convention (Red Cross).		1864. War with Denmark.	1864. Alliance with Prussia against Denmark.
1865	Antiseptic surgery.	International Workingmen's Association.	1865. Fenian outbreaks in Ireland.		
1866	Open-hearth steel process.	1866. Atlantic telegraph successfully completed. Latin union formed.		1866. Prussia wars on Austria; Battle of Sadowa; Hanover annexed.	1866. War with Prussia and Italy.
		1867. International exposition at Paris.	1867. Passage of Reform bill.	1867. First parliament of the North German Confederation.	1867. Autonomy for Hungary announced. Emperor crowned king of Hungary.
1868	First practical typewriting machine.	1868. Burlingame Treaty (United States and China).			
1869	French Atlantic telegraph completed.	Suez canal formally opened.			
1870	Railway from Calcutta to Bombay. Mount Cenis tunnel boring completed.		1870. Irish Land act passed.	1870. War with France.	1870. Concordat with Rome suspended.
				Germany	
		1871. Treaty of Washington between United States and Great Britain; provides for arbitration.		1871. William I, of Prussia, emperor. 1874. Kulturkampf laws against Catholics.	1871. New German Empire recognized.
1873	Japan adopts European calendar.				
		1875. Formation of International Bureau of Weights and Measures.	1875. Purchase of Suez Canal shares from khedive of Egypt.		
1876	Centennial Exposition at Philadelphia. Telephone invented by Bell.				
1877	Four cycle gas engine invented.		1877. Queen Victoria proclaimed empress of India.		
		1878. Congress of Berlin.			1878. Occupation of Bosnia and Herzegovina.
1879	Edison's incandescent electric lamp.				
1882	Tuberculosis bacillus isolated.	1882. Triple Alliance formed.	1882. Control of Egypt secured.	1882. German Colonial Society founded.	
	Hydrophobia bacillus isolated.	1883. International society founded for protection of industrial property.			
1884	Rotary steam turbine.				
1885	Linotype machine. Revised version of the Old Testament published.	1885. International exhibition of art and industries at Antwerp.	1885. Khartum captured by the Mahdi. Death of Gordon.		
		1887. Convention of Bern.	1887. Queen's jubilee.		
1888	Pasteur discovers cure for hydrophobia.	International copyright agreement.	1889. Great labor strikes.	1888. Frederick III, William II, emperors.	
		1890. Agreement for repression of slave trade in Africa.	1890. Stanley returns from Africa.	1890. Bismarck dismissed.	
1891	Carborundum.	1891. Renewal of Triple Alliance.			
1892	Color photography.		1892. Gladstone's fourth premiership.		
1893	Electrical measurements established.	1893. World's Columbian Exposition at Chicago.	1893. Bering Sea arbitration.	1893. Anti-Jesuit law repealed.	
		1894. War between China and Japan.	1894. Manchester ship canal opened.		1894. Commercial treaty with Russia.
1895	Lick refracting telescope made by Clark.			1896. New civil code completed.	1896. Archduke Karl Ludwig, heir to the throne, dies.
	Discovery of X-rays.				
		1897. Universal postal congress.	1897. Queen's diamond jubilee celebrated.		
1898	Reform edict issued in China.	1898. Pope offers mediation in Cuba.	1898. Irish local government bill passed. Death of Gladstone.	1898. Emperor visits Jerusalem.	1898. Assassination of the empress.
	Discovery of radium.				

A. D.	From the Beginning of the French Revolution to the World War—A. D. 1789–1914—Con.				
	France	Spain and Portugal	Italy and Greece	Russia	Lesser Countries
1859	War of France and Sardinia against Austria.	1859. War with Morocco.	1859. War between Austria and Italy.		
1860	Commercial treaty with England. Savoy and Nice surrendered to France by Sardinia. Colonial expansion in West Africa.	1860. Defeat of the Moors.	1860. Sicily and Naples annexed to Sardinia. 1861. Victor Emmanuel, king of Italy. Death of Cavour. 1862. Insurrection in Greece.	1861. Emancipation of serfs completed.	1861. Canton restored to the Chinese by the French and English.
1863	The French occupy Mexico.				
1864	Maximilian proclaimed emperor of Mexico.	1864. Rupture with Peru.	1864. Ionian Isles made over to Greece.	1864. Emigration of Caucasian tribes into Turkey.	1864. Nanking, China, taken by Gordon for the Imperialists. End of Taiping rebellion.
1865	Death of Proudhon. Bismarck visits Napoleon.	1865. Dispute with Chile. 1866. Military insurrection headed by General Prim.	1865. Florence made capital of Italy. 1866. Austrian war. Venetia proclaimed a part of Italy.	1866. Inauguration of trial by jury. War with Bokhara.	1866. Valparaiso bombarded by Spanish fleet.
		1867. Death of Marshal O'Donnell. 1868. Queen deposed.	1867. Garibaldi and the Papal States. Second attempt to take Rome.	1867. Russian America (Alaska) sold to the United States.	1867. City of Mexico evacuated by French. Execution of Maximilian in Mexico. Egypt declared by the sultan to be a separate sovereignty.
1870	New liberal constitution approved by a plebiscite. War with Prussia.	1870. Amadeus, king of Spain.			
1871	Capitulation of Paris. Peace ratified.	1871. Sagasta, minister.	1871. Rome made capital of Italy.	1871. Telegraph between Russia and Japan.	1871. Abolition of Feudalism in Japan.
1874	New electoral law. Endeavor to establish monarchy.	1874. Alfonso XII, king.			
1876	Large republican gains in elections.	1875. Civil war.			
				1877. War against Turkey.	
1879	Jules Grévy, president.		1878. Humbert, king. Leo XIII, pope.	1878. Spread of nihilism.	1878. Montenegro, Serbia, and Rumania, independent.
1881	Protectorate over Tunis.	1881. Sagasta, minister.		1881. Alexander III, czar.	1882. Beginning of Pan-Islam movement in Turkey.
1883	Madagascar occupied.				
1884	War with China.				
1885	Death of Victor Hugo.		1885. War with Abyssinia.	1885. Kronstadt canal opened.	
1887	Boulanger incident. Military scandals.		1887. Failure of Abyssinian expedition.	1887. Czar forbids real estate holding by foreigners.	
1890	War with Dahomey.	1890. Castillo, premier.		1890–92. Famine throughout the country.	1890. First Japanese parliament opened.
1892	Panama scandals.				
		1893. War with Morocco.	1893. Pope's jubilee (Leo XIII).		
1894	Casimir-Périer, president. Dreyfus tried; imprisoned.			1894. Nicholas II, czar.	1895. Federation act of Australia approved.
			1896. Peace with Abyssinia.		1896. Jameson raid in South Africa.
1897	Fashoda Incident.	1897. Assassination of Castillo.			1897. Turko-Grecian war.
1898	Review of Dreyfus case.	1898. Spanish-American war.		1898. Port Arthur leased from China.	1898. Hawaii annexed to U. S. Wilhelmina, queen of Holland.

From the Beginning of the French Revolution to the World War—A. D. 1789–1914—Con.

A. D.	Arts of Civilization	International Affairs	Great Britain	Germany	Austria
1900	Opening of the Elbe and Trave canal, Germany.	1899. First Hague conference. "Open door" policy for China declared by U. S.	1899. The Boer war in South Africa begins.	1900. Abolition of Roman law. New civil code goes into effect.	1900. Marriage of Francis Ferdinand.
1902	First wireless message across the Atlantic.	1902. Venezuelan claims of European powers arbitrated.	1901. Death of Victoria; Edward VII king. 1902. Japanese alliance. End of Boer war.		1902. Triple Alliance renewed.
1903	Completion of the Pacific cable.	1903. Canal treaty with Panama.	1903. King visits Italy, Portugal, and France.		
1904	New York subway opened.		1904. Younghusband enters Tibet.		
1905	Power plants erected at Niagara Falls. Simplon tunnel.	1905. Norway and Sweden separate. 1906. Algeciras conference.	1906. Militant agitation for woman suffrage begun.	1905. Moroccan intervention.	1905. Treaty with Germany.
1907	*Lusitania's* first voyage.	1907. Second Hague conference.		1907. William II in London.	1907. Universal suffrage bill.
1909	Discovery of north pole announced.		1908. Asquith, prime minister.		1908. Bosnia and Herzegovina acquired.
1910	Woman's suffrage movement grows.		Old Age Pension act passed.		
1911	Amundsen discovers south pole.	1911. Atlantic fisheries dispute between U. S. and Great Britain settled by Hague Tribunal. Moroccan trouble. Agadir affair.	1911. Coronation of George V.	1911. Moroccan disagreement.	1911. Austria increases army.
1912	*Titanic* disaster. Scott at south pole.		1912. Minimum wage bill.		
1913	Wireless messages across Atlantic.				

From the Beginning of the World War, 1914, to the Present Time

A. D.	Arts of Civilization	International Affairs	Great Britain	Germany	Austria
1914	First important use of airplanes in warfare.	1914. World War. U. S. proclaims neutrality. Panama canal opened.	1914. Welsh disestablishment bill passed. Irish home rule bill, law. War with Germany.	1914. War with Russia, France, Belgium, England, Serbia, Japan.	1914. Assassination of Francis Ferdinand and wife.
1915	Voice transmitted by wireless telephone from Arlington, Va., to Honolulu, 4900 miles.	1915. Belgian relief under commission directed by Herbert Hoover.	1915. War continues. New coalition ministry.	1915. Germany declares waters around British Isles war zone. War with Italy.	1915. Przemysl taken by Russians. Italy declares war on Austria-Hungary.
1916	Marseilles-Rhone canal completed. Alaskan railway building.	1916. United States sends peace note to warring nations.	1916. Compulsory military service bill. Lloyd George, prime minister.	1916. Siege of Verdun fails. Rumania conquered. Proposes peace conference.	1916. Death of Emperor Francis Joseph. Charles I, emperor.
1917	Food production increased in belligerent countries by public instruction and control.	1917. United States enters World War. 1918. Armistice following military collapse of Central Powers, Nov. 11.	1917. Imperial war cabinet. 1918. Suffrage granted to women.	1917. Use of submarines increased. 1918. Treaty of Brest-Litovsk with Russia.	1917. German-Slav dissension. 1918. Breakdown of the dual monarchy.
1919	Airplane flight across Atlantic.	1919. Paris Peace Conference.		1919. Ebert elected president.	1919. Treaty of Saint Germain.
1920	Notable progress in flood protection projects in United States.	1920. Versailles Peace Treaty in effect. League of Nations holds first meetings.	1920. Continued industrial disturbances. Rebellion in Ireland.	1920. Industrial unrest. Communist uprising.	1920. Czechoslovakia in defensive alliance with Jugoslavia forms nucleus of Little Entente.
1921	Great extension in use of radiotelephone. Second Simplon tunnel completed. Michelson measures diameter of stars Betelgeuse and Antares.	1921. Continued difficulties between Germany and the Allies over reparations payments. Arms conference meets at Washington.	1921. Imperial Conference of Premiers at London. Prince of Wales visits India. Establishment of Irish Free State approved by Parliament.	1921. Trials of war criminals at Leipzig. Ludendorff conducts reactionary militarist campaign.	1921. Rumania joins Little Entente, which prevents ex-Emperor Charles from regaining throne of Hungary.
1922	Radio broadcasting daily feature in many cities. Einstein relativity theory confirmed by solar eclipse observations in Australia.	1922. Washington Conference adopts several treaties. First meeting of World Court. Peace treaties between U. S. and Germany and Hungary.	1922. Gandhi, in India, imprisoned for sedition. Irish Free State established. Independence of Egypt recognized. Premier Lloyd George resigns. Bonar Law succeeds him.	1922. Treaty of Rapallo with Russia. Foreign minister Rathenau assassinated. Germany in default of reparations payments.	1922. Swiss reject capital levy. Anthony Svehla, an Agrarian, becomes premier in Czechoslovakia. Hungary abolishes secret voting.

From the Beginning of the French Revolution to the World War—A. D. 1789–1914—Con.

A. D.	France	Spain and Portugal	Italy and Greece	Russia	Lesser Countries
1899	Loubet, president.		1900. Victor Emmanuel III, king.	1901. Tolstóy excommunicated.	1900. Outbreak of the Boxers in China. 1901. Submission of China to the allied powers.
		1902. Alfonso XIII, king.			
1903	Dreyfus declared innocent.		1903. Accession of Pope Pius X. 1904. General strike in Italy.	1904. War with Japan. 1905. Constitution granted. 1906. First Russian Duma opens.	1903. Peter I, king of Serbia.
1907	French occupation of Morocco.	1908. Manuel II, king of Portugal.	1907. Italo-Argentine treaty.		1909. Abdication of Abdul Hamid II.
1910	Railway strike suppressed.	1910. Portugal a republic.	1910. New Greek constitution. 1911. Italo-Turkish war.	1910. Cholera epidemic. 1911. Treaty of 1832 abrogated by U. S.	1910. Japan annexes Korea. 1911. Diaz overthrown in Mexico.
1912	Morocco made a protectorate.	1912. Franco-Spanish treaty.	1912. Balkan war.	1912. Russia increases navy.	1912. China a republic. War in the Balkans.
1913	M. Poincaré, president.	1913. Attempts on life of Alfonso XIII.	1913. Constantine, king of Greece.	1913. Serf class abolished.	1913. Balkan war closes.

From the Beginning of the World War, 1914, to the Present Time

A. D.	France	Spain and Portugal	Italy and Greece	Russia	Lesser Countries
1914	War with Germany, Austria, Turkey. Battle of the Marne. Battle of the Aisne.	1914. Spain and Portugal neutral in European war.	1914. Italy proclaims her neutrality.	1914. War with Germany, Austria, Turkey.	1914. Chinese parliament dissolved. New constitution for China. Japan seizes Kiaochow.
1915	War continues. War with Bulgaria.	1915. Revolution in Portugal. Spanish cabinet resigns.	1915. Italy at war with Austria, Germany, Turkey, Bulgaria.	1915. War continues. Evacuation of Warsaw. War with Bulgaria.	1915. Allies attack Dardanelles. Massacre of 800,000 Armenians. Bulgaria makes war on Serbia.
1916	$15,000,000 loan from New York financiers. Siege of Verdun successfully resisted. Battle of the Somme. Nivelle, field-commander.	1916. Portugal seizes Austrian and German vessels. War on Portugal declared by Germany.	1916. Italian troops in the Balkans. Italians capture Gorizia. Provisional government in Greece. 1917. King Constantine of Greece abdicates.	1916. Russians capture Erzerum, Turkey. Brusilov regains territory in Galicia. 1917. Monarchy ended. Soviet Republic established.	1916. Allies withdraw from Dardanelles. Rumania at war with Teutonic powers. China again a republic. Denmark ratifies sale of Danish West Indies to the United States.
1918	Foch, generalissimo.				
1919	Electoral reform act.	1919. Spain joins League of Nations.	1919. D'Annunzio enters Fiume.	1919. Bolshevists defeat all invaders.	1919. Paderewski ministry in Poland.
1920	Serious railroad strike. Fiftieth anniversary of Republic. Millerand elected president.	1920. In Portugal, former king, Manuel II, renounces claim to the throne.	1920. *Greece:* Constantine recalled by plebiscite. *Italy:* Strong agrarian and socialist movements.	1920. Bolsheviki defeat General Wrangel. Attempted invasion of Poland repelled.	1920. *Turkey:* Treaty of Sèvres signed. Nationalist movement in Asia Minor.
1921	Briand, prime minister, succeeding Leygues. France supports Turkey against Greece in the Near East. Briand attends Washington Conference.	1921. Spanish troops defeated in Morocco. Premier Dato assassinated. Señor Allende-Salazar forms new government.	1921. *Italy:* Fascisti movement against the socialists. *Greece:* King Constantine leads Greek army against Turks in Asia Minor.	1921. Breakdown of Bolshevist industrial scheme. Famine conditions widespread. Government accepts American relief services.	1921. Non-co-operation movement under Gandhi in India. Mining and oil rights exempted from government appropriation in Mexico. Famine in China.
1922	Poincaré succeeds Briand as premier. Stinnes-Lubersac agreement for handling reparations payments in materials.	1922. Moors on the Riff coast resist Spanish troops successfully. Portugal has nine ministries within the year.	1922. Greeks defeated. Fascisti gain control of government in Italy. Benito Mussolini, premier of Italy. Pope Benedict XV succeeded by Pius XI.	1922. Commercial treaties with Germany and Italy. Conflict between the government and the Church.	1922. Civil war in China. Japan completes evacuation of Shantung province. Turkish National Assembly at Angora deposes the sultan. Poland takes Vilna from Lithuania.

A D.	From the Beginning of the World War, 1914, to the Present Time—Con.				
	Arts of Civilization	International Affairs	Great Britain	Germany	Central Europe
1923	Holland establishes wireless service with Java, 7500 miles. Shandaken tunnel, at New York City, completed. First transcontinental air mail service inaugurated by United States government. Discovery of successful treatment for diabetes by insulin.	1923. Austro-Hungarian dispute over Burgenland arbitrated. Treaty between Jugoslavia and Italy upon Dalmatian dispute. Turkish-Allied Treaty of Lausanne replaces Sèvres Treaty. Naval Limitation and Pacific treaties ratified.	1923. Bonar Law succeeded by Stanley Baldwin as premier. War debt to United States funded. Development of great naval base at Singapore announced. De Valera summons republicans to cease fighting the Irish Free State.	1923. Part of Rhineland occupied by France. Passive resistance to the French occupation of the Ruhr. Chancellor Cuno succeeded by Streseman. The mark continues to fall in value.	1923. Commercial agreement between Jugoslavia and Poland. Liechtenstein enters customs union with Switzerland. Czechoslovakia and Rumania sign a defensive military treaty. Legitimists plot to restore Hapsburgs to Hungarian throne.
1924	Flettner, of Germany, invents rotor ship. U. S. navy fliers encircle globe.	1924. Dawes Reparations Plan adopted by the Reparations Commission and accepted by the powers concerned.	1924. Labor government in power; recognizes Russian Soviet government; after defeat, is succeeded by Conservative government under Baldwin. Disturbances in India subside.	1924. Moderate parties maintain power in elections. Evacuation of Ruhr by French and Belgians begun. Currency stabilized.	1924. Czechoslovakia concludes treaties of amity with Italy and France.
1925	Discovery by Millikan of rays having a penetrating power 500 times as great as that of X-rays. Body of Tutankhamen disinterred. Discovery of phototelegraphy.	1925. Locarno treaties for replacement of war by arbitration among European powers ratified, to come into effect on Germany's admission to League of Nations. Greece ceases hostilities against Bulgaria on demand of League of Nations.	1925. Government restores gold standard of currency. Coal mine operators subsidized to avoid strike due to cut in wages.	1925. President Ebert's death followed by election of Hindenburg. Occupation of certain Rhineland cities relinquished by French.	1925. Deportation of German nationals from Polish portion of Upper Silesia and of Polish nationals from German portion.
1926	North Pole reached by airplane and dirigible, the latter crossing from Spitzbergen to Alaska. Production of "Coolidge" rays.	1926. Arms traffic treaty signed by 32 nations at Geneva.	1926. General strike called to support miners, who struck on withdrawal of government subsidy to coal mines.	1926. Germany admitted to League of Nations. Neutrality Treaty with Russia negotiated.	1926. General Pilsudski overthrows Polish government with the help of the army; makes himself dictator.
1927	Transatlantic radiotelephone service inaugurated. Television demonstrated. First solo transatlantic flight, by Lindbergh.	1927. Ineffectual disarmament conference between United States, Great Britain, Japan. Poland-Lithuania break averted through League of Nations.	1927. Rupture of trade relations with Russia. Naval program cut despite failure of disarmament conference. Irish Free State floats first loan in New York. Britain recognizes independence of Iraq.	1927. Continued progress in industrial expansion; leads in forming international trusts.	1927. Serious labor riots in Vienna suppressed. Treaty between Jugoslavia and France.
1928	Turkey adopts Latin alphabet. Louvain library dedicated. Direct telephone communication established between League of Nations and practically all nations of world. Invention of teletypesetter.	1928. Signing of multilateral treaty for outlawry of war. Threatened Bolivia-Paraguay war averted through League and Pan-Amer. Conference.	1928. Continued depression in Coal mining industry. Simon Commission on Indian home rule.	1928. Government upheld in general election; chancellor advocates union with Austria.	1928. Polish elections strengthen Pilsudski. Seizure of arms consigned to Hungary arouses concern. Peasant party wins power in Rumania.
1929	International expositions at Barcelona, Seville.	1929. Young committee revises Dawes Plan, fixing total of reparations payments.	1929. First election under universal adult suffrage. Labor party wins plurality. MacDonald premier.	1929. Serious Communist riots in Berlin suppressed by police.	1929. King of Jugoslavia becomes dictator.

A. D.	From the Beginning of the World War, 1914, to the Present Time—Con.				
	France	Spain and Portugal	Italy and Greece	Russia	Lesser Countries
1923	French and Belgian troops occupy the Ruhr valley. Pacific and Naval Limitation treaties ratified. France tightens hold on Ruhr and meets sabotage with severe measures; demands complete cessation of passive resistance before discussion of settlement.	1923. Spanish campaigns in Morocco declared successful. Extensive industrial disturbances in Spain.	1923. Violent eruption of Mt. Etna. Italian parliament ratifies armament limitation treaties negotiated at Washington. Fascist reorganization of army, under General Diaz.	1923. Grain shipments from Russia arouse criticism. American relief commission terminates its work in Russia. Harvest promises a grain surplus. Diplomatic differences with Great Britain adjusted.	1923. Improved economic conditions in Austria, under League of Nations commission. Memel assigned to Lithuania by council of ambassadors. Premier Stambulisky of Bulgaria assassinated. Li Yuan Hung, president of China, compelled to resign on return of Sun Yat Sen to Hongkong.
1924	Poincaré defeated. Succeeded by Herriot, who adopts more conciliatory tone in international relations.	1924. Continued hostilities in Spanish Morocco.	1924. Greece proclaimed a republic. Fiume annexed to Italy by agreement with Jugoslavia.	1924. Lenine dies and is succeeded by Rykov. Trotzky loses power in government. Prohibition repealed.	1924. Turkish nationalist government abolishes the caliphate and declares for a republic. Disastrous earthquake in Japan. Japanese immigrants barred from the United States.
1925	France involved in wars with native tribes in Morocco and Syria. Financial difficulties occasion several ministerial crises. Evacuation of the Ruhr completed.	1925. General Rivera assumes title of premier, relinquishing that of dictator. General growth of prosperity in Spain and Portugal.	1925. General Pangalos seizes Greek premiership. Italian war debt to the United States funded. Marked economic recovery of Italy under Fascist direction.	1925. Treaty with Japan, by which Japan withdrew troops from northern Sakhalin, receiving economic concessions.	1925. Chinese tariff autonomy granted. Tacna-Arica plebiscite commission headed by General Pershing. Turkey refuses to accept adjudication of Mosul boundary dispute with Great Britain by League of Nations. Communist organizations in Bulgaria suppressed.
1926	War debt to United States funded. French victorious over Riff tribesmen. Poincaré forms national government; succeeds in passing legislation for balancing the budget.	1926. Rivera proclaims end of parliamentarianism and adoption of popular referendum. Republican régime in Portugal overthrown.	1926. Attempted assassination of Mussolini. Italian colonial expansion contemplated. Greece returns to constitutional government.	1926. Communistic practices greatly modified to secure co-operation of peasants.	1926. General Chang in China seizes Peking. Poland and Rumania sign 5-year mutual guarantee treaty. Mosul boundary dispute settled by agreement between Turkey and Great Britain.
1927	Trade treaty with Germany leads to protests from U. S. and to negotiations for a similar treaty. Treaties of arbitration with Jugoslavia and Rumania.	1927. Rivera summons national assembly, as a step toward constitutional government; it acts in advisory capacity only.	1927. Italian treaty with Albania arouses apprehension of Jugoslavia. Italian electoral laws revised to increase power of Mussolini.	1927. Defeat of revolutionary efforts in Europe and China. Trade relations severed by Great Britain; diplomatic relations, by China.	1927. Continued civil war in China. Dispute over succession to Rumanian throne following the death of King Ferdinand. Financial panic in Japan; Hirohito crowned emperor.
1928	Poincaré returned to power by large majority. France on gold standard.	1928. American and British loans for stabilizing exchange.	1928. Italian parliament replaced by chamber nominated by Fascisti. Venizelos again premier of Greece. Italo-Greek treaty of friendship.	1928. Stalin succeeds in banishing opponents; renews war on private property among peasants.	1928. Albania becomes kingdom. First Japanese elections under manhood suffrage. Famine in China; Chiang-Kai-shek becomes president.
1929	Death of Marshal Foch.	1929. Attempted revolution suppressed.	1929. Temporal power of Pope restored by Mussolini.	1929. Trotsky exiled.	1929. China enacts first national tariff. Tacna-Arica dispute reported settled.

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Central and South America . . . W. R. Shepherd
History of the Latin American Nations, W. S. Robertson
The Argentine Republic . . . . . Pierre Denis
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The Saracens . . . . . Arthur Gilman
An Outline History of China . . . . H. H. Gowen
China's Story . . . . . W. E. Griffis
Japan in History, Folk Lore, and Art, W. E. Griffis
An Introduction to the History of Japan, K. Hara
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SPHINX AND PYRAMIDS
ARCH OF TITUS ROME
EIFFEL TOWER PARIS
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MOSQUE OF SULTAN KAIT BEY CAIRO
ST. MARKS VENICE
NIAGARA FALLS
MT. CERVIN OR MATTERHORN AND LAKE RIFFEL
SKY LINE NEW YORK
HARBOR OF RIO DE JANEIRO

GEOGRAPHY AND TRAVEL

INTRODUCTORY

THE word geography comes from *ge* and *grapho*, two Greek words which, in combination, mean a description of the earth. Geography differs from geology and other sciences of the earth in the fact that geography studies the earth as the abode of mankind. It is closely related, in certain of its aspects, to the sciences of economics, history, astronomy, botany, zoology, and meteorology.

Divisions. Geography is usually classified, on the basis of its subject matter, into mathematical geography, physical geography, or physiography, and biological geography. Mathematical geography concerns the size, shape, and movements of the earth; physical geography deals with the layers of the earth's surface—land, sea, and air; and biological geography studies the life conditions of plants and animals, on the one hand, and of man on the other.

The geography of man discusses the races of mankind and their distribution throughout the earth; it discusses also density of population and the various types of human occupation—fishing, hunting, pasturing, agriculture, mining, manufacture, and commerce. That part of human geography which is concerned with man's industries is classified as economic, or commercial, geography. The study of mankind by countries is known as political geography.

Development of Geography. Nearly all parts of the world have been inhabited by men from very early times and, consequently, have been known in a certain sense. Such knowledge, however, does not constitute geography. The science of geography begins only when people attempt to describe by word or chart the relations of one part of the earth's surface to other parts.

The earliest attempts at geographical description are lost in antiquity. The most ancient extant map of the world is one sketched on a clay tablet, which was discovered in Babylon and is believed to date from the 8th century B. C. This map shows the earth as flat and circular, surrounded by a river, which the Greeks called Ocean.

Advance in geographical knowledge has been due mainly to the enterprise of the white race. The rate of advance, however, has been highly irregular. Three chief periods of progress may be roughly distinguished: first, that of ancient Greece, when the first serious attempts were made to describe and to explain scientifically the varied conditions of different localities; secondly, the age of discovery, from the 15th to the 19th century, when the main features of the earth were finally learned; and, lastly, the modern scientific period, more or less overlapping the second in time and continuing to the present, when the utmost resources of science have been systematically utilized to chart and to describe every part of the earth's surface. This last period has been marked also by an unprecedented measure of success in explaining the *causes* of geographical phenomena.

Modern Geography. As a systematic science, geography is of comparatively recent origin. Its foundation is due in large part to Alexander von Humboldt, a German scholar who was born in 1769. Numerous societies have since been organized for the encouragement of exploration and observation and for the publication of scientific results. The earliest of these associations was the Geographical Society of Paris, founded in 1821. The most important one in Europe is the Royal Geographic Society, established at London in 1830. Connected with it have been such distinguished travelers as Livingstone, Stanley, Speke, Wallace, and Nansen.

In the United States, the earliest of such organizations was the American Geographical Society, founded at New York in 1852. The National Geographic Society, with headquarters in Washington, was formed in 1888. Having more than 1 million members, it is numerically the strongest scientific society in the world. By means of a daily school bulletin for teachers and of a daily news bulletin for the press, this society has contributed greatly to the spread of geographical knowledge in America.

The governments of many countries maintain departments charged with the surveying and the systematic description of their territory. Among the more important government projects of this character in recent years have been those undertaken by Denmark in Greenland, by Canada in the arctic regions, and by the United States, not only on the American continent, but also in the Philippines and in other dependencies. The United States government also published in 1923 the results of a survey covering a portion of the bed of the Atlantic Ocean. The United States Geographic Board has undertaken the task of making consistent and authoritative decisions regarding the spelling of geographical names and regarding the correct application of the names to places in all parts of the world.

Geography in Schools. In the Renaissance period, geography was taught chiefly as an aid to the understanding of Greek and Roman writers. The study was confined, therefore, to the world as known in the classical period.

The first modern geography in English which was written explicitly for use in schools appeared in 1746. It was called *Introduction to Geography* and was published in England by J. Cowley, "geographer to his Majesty." The first professor of geography in an American university was Arnold Henry Guyot, who was appointed to a chair at Princeton university in 1854.

The study of geography has long held an important place in the public schools of America. The manner of teaching the subject, however, has changed considerably in the past 70 years. The major emphasis was first placed on the facts of political geography. More especially in the years following 1890, physical geography received greater attention. In the past decade, the study of "home geography" has been favored, chiefly as a means of making pupils familiar with geographical causes operating in their own neighborhood; this familiarity in turn has enabled them to see how larger regions of the earth are affected by the same causes. In the higher grades, commercial geography, coordinated with physical geography, has been stressed as a factor in understanding the causes of economic and commercial development.

Value of the Study. A knowledge of geography is necessary for the intelligent reading of newspapers and of books. Such knowledge enables one, as a

citizen, to form sounder opinions of the foreign countries with which our government has relations or with which our merchants deal. The study may also impart a new interest to the materials which we handle, enabling us to picture, more or less accurately, the distant scenes from which have come our tin, cork, rubber, tea, chocolate, and other articles of common use.

Geography is, to a large extent, the study of causes. To learn many facts, more or less isolated, about countries, rivers, cities, and peoples has its value. It is more enlightening, however, to understand the *causes* behind the facts; to know, for example, *why* Arizona is dry, *why* northern Europe is warmer than Labrador, and *why* Chicago has grown up where it is. Familiarity with the reasons lying behind such facts gives us a new interest also in the conditions of our own locality.

Travel. Improved means of transportation within the past century have made it possible for hundreds now to travel for each one that did so in earlier times. Travel has become a new form of enjoyment and a new means of instruction. The novelty of unfamiliar scenes, the glamor of places famous in history, the fascination of nature in its most charming or its most desolate aspects, engage the mind and bring home to it the varied panorama of the great world in which we live.

Geography a Substitute for Travel. Many people, however, lack the financial means and the leisure necessary for extensive travel. For such people, geography provides the nearest equivalent of travel. By the printed word and by picture, one may visit the most interesting and the most remote parts of the world. He may see the head-hunters of Borneo, the crowded cities of China, the treeless steppes of central Asia, or the jungles of the Amazon, inhabited by naked savages. Under the guidance of what he reads, he may take a trip to the "land of the midnight sun," and he may enjoy the beauties of Yellowstone park or of Paris.

Plan of Department of Geography. In the following pages, the geography of the world is treated by continents. This plan has at least two distinct advantages over an alphabetic arrangement of geographical topics. In the first place, it is possible in this way to bring into strong relief the contrast between the continents. Secondly, the reader is enabled to obtain a single view of each continent as a whole. There are certain aspects of geography which cannot be classified under continents. Such, for example, are the oceans, the zones, and the movements of the earth. A treatment of these general facts concerning the earth precedes the description of the continents.

Treatment of Countries. Following the general account of each continent, the countries and other political divisions within it are described in more detail. For the United States, the treatment has been made regional, each subdivision consisting of a group of states having a common geographic character. Moreover, information regarding the individual states has been grouped in several tables, carefully prepared with a view to conciseness, ease of visualization, and facility for comparison.

Cities and Other Points of Interest. The description of countries or other divisions is followed by sections in which, under alphabetic arrangement, the cities, towns, and other places of interest are each accorded a special treatment. In the selection of such places, the guiding principle has been the importance of the place and its interest to the general reader. The lists contain the capitals of all countries as well as those of the American states and of the Canadian provinces. The list contains also the important cities in all parts of the world. In the United States and Canada, all cities above 50,000 are specially described. A very large number of other places are included. Some of these are smaller towns notable for historic reasons, such as Mount Vernon or Ypres. Other towns are chosen because their names have become associated with a particular industry, such as Waltham, Mass., or Limoges, France. Many places are described which are not incorporated settlements. These include such features as Pikes peak, Mammoth cave, and Lincoln highway in America or Belleau woods and the Riviera in Europe. An instructive section has been added also on the meanings of place names.

Scope. In mere extent of text, this department far exceeds the volume of the average school geography, being more thorough in treating each subject and more inclusive in the selection of topics, especially topics that have recently become important. The point of especial distinction, however, is the addition of material having a travel interest. The study of geography is thereby made more entertaining and far more helpful to the student.

Purposes. The department of geography is not intended to be used as a textbook for the schoolroom. It is too complete for that purpose. On the other hand, it does not purport to describe every place, without exception, which appears on the map. In other words, it is not an atlas or a gazetteer. Consequently, it is neither dry nor mechanical. It is much more than a textbook or an atlas.

This treatment of geography has three principal purposes. In the first place, it contains a rich store of supplementary material both for the student and for the teacher of geography. Secondly, when used in connection with the test questions, it provides an extremely valuable aid for any person desiring systematically to study geography by himself. Lastly, it is an excellent source of general information for all ages and all classes of people.

Statistics. The figures published in this department have been prepared with unusual care. Those representing factors which constantly change, such as population and trade, are based, in all cases, on the latest official bulletins.

It is a fact that even in statistics representing such constant factors as the length of coast lines and areas of districts adjoining the sea, a considerable divergence often appears among geographical authorities. Such differences are frequently due to methods of measurement. A coast line, for example, may be surveyed from headland to headland, and the result obtained may be much less than the total arrived at by including all the insignificant inlets. Somewhat similar difficulties arise in statistics regarding lengths of rivers, heights of mountains, and many other such measurements.

These difficulties, however, detract nothing from the real value of statistics, which is to enable the reader to make comparisons. For ordinary purposes, it is of no significance whether Mount Everest is 29,000 or 29,002 feet high or whether Mount McKinley is exactly 20,300 feet in altitude. The essential value of the figures is in showing that Mount Everest is about 9000 feet higher than Mount McKinley. In spite of such considerations, however, the statistics in this department represent the most painstaking efforts to reconcile authorities where they differ and to attain a degree of accuracy that is not to be found in any similar material in print.

Maps. Geographical position has been indicated throughout the text with a view to enabling the reader, by consulting the pertinent maps, to see at a glance the location of the principal places. The maps have been recently prepared, and, as far as possible, they take into account the numerous changes that have occurred since the World War.

Spelling of Names. The form of the names in the text has been made, in most instances, to conform with the spelling adopted by the United States Geographic Board. Names not yet made the subject of decisions by this board follow the spelling of the National Geographic Society, or, failing authority from either source, they conform to Webster's *Gazetteer*.

GEOGRAPHICAL DISCOVERY

Ancient ideas of the earth were vastly different from those of the present day. One of the earliest concepts of the earth is that revealed by the Homeric poems, written about 1000 B. C. In these poems, the earth is supposed to be a circular disk surrounded by a river, which was called Ocean.

Phœnicians. Such early views were probably based on the reports of the Phœnicians, who were the earliest navigators known to history. From these people, too, in all likelihood, came the information which the Hebrews had regarding such distant points as those called, in Hebrew literature, Gomer, Sinim, Cush, Sheba, Ophir, and Tarshish. Gomer is believed to mean the northern shores of the Black Sea; Sinim is conjectured to be southern Egypt; Cush is identified with Abyssinia; Sheba, with Yemen in southwestern Arabia; Ophir is placed in southeastern Africa; and Tarshish, in southeastern Spain.

Africa was circumnavigated as early as 600 B. C. by a Phœnician expedition. This expedition was dispatched by Necho, king of Egypt, with orders to sail through the Red Sea into the Indian Ocean and around Africa. After three years, the ships returned by way of the Strait of Gibraltar and the Mediterranean Sea.

Greeks. The earlier Greek geographers, Hecatæus and Herodotus, both of the 5th century B. C., did not advance beyond the idea of the earth conceived of as a disk. Hecatæus in his *Periodos*, "Trip around the World," and Herodotus in his *Histories*, added immensely to the available knowledge of different lands and peoples, each writer having traveled over most of the world as then known.

Aristotle, living in the 4th century B. C., has the honor of being the first to demonstrate that the world is a sphere. He based his proof on two facts which could be tested by observation: first, that the shadow of the earth thrown on the moon during an eclipse is always circular; and, secondly, that the horizon always retreats as the observer advances. To Aristotle also is due the division of the earth into a torrid zone bounded by two temperate zones with a frigid zone surrounding each pole.

It was in this period that maps of the world first showed the land surface of the earth surrounded by a wide expanse of sea instead of by a river. The name Ocean, which formerly designated the river, was applied to this sea. The sea was believed to extend around the globe, bathing on every side the great land mass in the eastern hemisphere. Our modern sense of ocean, as one of the major divisions of the water surface of the earth, arose since the 15th century, when it was learned that the universal sea was divided into parts by the continent of America and by other land areas previously unknown.

The inclination of the earth to the plane of its orbit was first measured by Eratosthenes, who lived in the 3d century B. C. His result was correct within 23 minutes of the angle as determined by the most accurate modern instruments. Eratosthenes also calculated the size of the earth and devised a system of indicating geographical position by drawing two lines of reference, one from east to west and the other from north to south. The location of any place could thus be indicated by giving its distance north or south of the one line and east or west of the other line.

The lines of reference drawn on the earth by Eratosthenes suggested to Hipparchus of Nicæa, in the 2d century B. C., the idea of drawing a series of circles of latitude and longitude. One circle was drawn for each degree on the earth's surface. In the 2d century A. D., Ptolemy, a Greek of Alexandria, compiled a work on geography which embraced all that was known of the earth until his day. This work formed the starting point of modern geography.

According to Ptolemy's geography, Africa extended southward and eastward, eventually joining Asia. The two continents thus enclosed the Indian Ocean. The farthest land to the north was called Thule, probably the Shetland islands. Something also was known of the Baltic Sea, western Russia, the great plains of Asia, and even the distant countries of China and Japan.

Romans. The Romans did little in the field of scientific geography. For the purpose of conquest and organization, however, surveys were made of practically all the territory surrounding the Mediterranean Sea, as well as of France, part of Britain, and Asia Minor. Nero dispatched an expedition in search of the source of the Nile river about 60 A. D. In the 6th century A. D., Justinian sent two monks to China, who returned with eggs of the silkworm concealed in a hollow cane. The culture of the silkworm was thus introduced into Europe.

Middle Ages. With the general decline of learning after the downfall of Rome, Ptolemy's work was forgotten in Europe, and people reverted to a primitive conception of the earth, believing it to be flat. Maps of this period frequently show Jerusalem as the center of the terrestrial disk.

The Arabs, however, translated Ptolemy's work into their own language, keeping alive a knowledge of geography as it had been developed. Arab astronomers measured a degree of latitude on the plains of Mesopotamia, deducing from it the approximate size of the earth. Prominent among Arabian books of travel was the *Meadows of Gold*, written by Masudi about 950 A. D. It contained geographical observations collected by its author, who, with this purpose in view, traversed all the countries lying between China and Spain. Ptolemy's geography became known to Europe by translation into Latin from the Arabic and later from the original Greek text.

Earliest Modern Discoveries. Before the period of the Renaissance, a number of notable voyages and discoveries were recorded. Greenland was sighted by Northmen in the 9th century, and, in the following century, men of the same race landed on the coast of North America. Little geographic interest, however, was aroused by these discoveries or by the trips of monks to remote parts of Asia and of Africa in search of a mythical Christian kingdom, ruled over by Prester John. The travels of Marco Polo, however, in the 14th century, did much to stimulate interest in distant lands. He visited the Far East, where he ruled a province of China for three years. A golden statue of him in a great temple at Soochow, China, still bears witness to his former influence in the Orient.

Age of Discovery. The 15th and the 16th century were distinguished by extraordinary activity in exploration. The previous invention of the mariner's compass did much to facilitate the sea voyages of the period.

Portuguese sailors discovered the Madeira islands and, by 1482, had sailed south as far as the Congo river. In 1486, a Portuguese ship sighted the Cape of Good Hope, and, 11 years later, Vasco da Gama doubled the cape and finally reached India.

In 1492, Columbus, sailing west, discovered the New World and thereby revolutionized the prevailing conception of the earth. Within 30 years from his historic landing on San Salvador island, the whole east coast of America from Greenland to Cape Horn had been explored, and the globe had been circumnavigated. Before the middle of the 16th century, America's west coast had been explored as far north as San Francisco bay, and Spanish colonists had settled in various parts of South America. On the other side of the world, progress had been made in knowledge of countries whose coasts were bathed by the Indian Ocean, including

Arabia, East Africa, India, and the great Malay archipelago. Apart from the Portuguese and the Spaniards, the nations most active in discovery at this period were the English, the Dutch, and the French.

The 17th and the 18th century witnessed the discovery of Australia, Tasmania, and New Zealand. Captain Cook, an English navigator, in the last quarter of the 18th century, explored widely in the Pacific Ocean, adding Hawaii and numerous other islands to the known world.

The task of geographical discovery was completed in the 19th and the 20th century. The chief accomplishments in this period were the exploration of Africa; the forcing of a passage by water northwest of America and of a passage through the ice-bound seas northeast of Asia; and, finally, the discovery of the north and south poles. The exploration of Africa is described in the section devoted to that continent.

Polar Exploration. Repeated efforts were made, from the 16th century on, to sail around North America's northern boundary. It was thought for many years that North America terminated in a northern cape, just as South America tapers to a cape at its southern extremity. As no such cape was found in the north, many later geographers believed that North America extended in an unbroken land mass to the north pole. The overland journeys of Hearne and Mackenzie, however, refuted that error and proved that an ocean washed the northern limits of the western continent.

Among the navigators who tried to effect this northwest passage from the Atlantic to the Pacific Ocean were Davis, Hudson, Baffin, Scoresby, Parry, Ross, and Franklin. They made notable discoveries but failed in their chief object. McClure, in 1853, after a 3-year cruise, finally forced a passage through the ice floes of the Arctic archipelago and entered Bering Sea and the Pacific Ocean. The northeastern passage, connecting the ocean north of Siberia with the Pacific Ocean, was first effected by Nordenskjöld. Setting out from Sweden in 1879, he sailed northeastward and circumnavigated Asia and Europe.

The quest for the north pole engaged many explorers during the latter half of the 19th century. These include Greely, Nansen, and the duke of Abruzzi. The goal was actually reached, however, by Peary, who, on April 7, 1909, raised the American flag over the north pole.

For centuries it had been believed that a great continent existed at the south pole. Land was first found in the south polar region by Captain Palmer, an American officer who landed there in 1820. This land was further explored by Bellingshausen, Biscoe, Weddell, Ross, Dumont d'Urville, and Borchgrevink. The pole was finally reached by the Norwegian explorer Amundsen, who arrived there on December 14, 1911, just five weeks before Captain Scott, an Englishman. While returning, Captain Scott perished a few miles from a relief station.

Recent Geographical Research. With the finding of the two poles, the age of discovery came to an end. Much remains to be done, however, in the investigation of regions already known in outline.

Among the principal parts of the world still needing to be surveyed and charted are the continent of Antarctica, central Asia, the Sahara desert, Arabia, northern Siberia, and the arctic regions. Some of these areas have been visited and described in part by scientists or travelers in recent years.

In 1926, successful flights were made over the north pole by both airplane and dirigible. Commander Richard E. Byrd in 1928 fitted out an expedition for the systematic exploration of Antarctica. In comparison with any previous geographical expedition, it was by far the best equipped for carrying out its purpose. It was the first also to remain in daily communication with civilization through radio.

DATES OF GEOGRAPHICAL DISCOVERIES*

	B. C.
Phœnicians circumnavigate Africa	600
Himilco, Carthaginian merchant, at Ierne (Ireland)	500
Hanno, Carthaginian navigator, off Sierra Leone, Africa	470
Alexander the Great in the Punjab, India	327
Nearchus, Greek general, in the Indian Ocean	325
Pytheas of Marseilles at Ultima Thule (Shetland Islands)	320
Megasthenes, Greek ambassador, reaches Patna, India	300
Eudoxus, Greek sailor, crosses the Arabian Sea	118
Julius Cæsar in England	55
	A. D.
Cosmas Indicopleustes, Egyptian merchant, in India	550
Suleiman, Arab trader, voyages to China	850
Ottar, Norwegian explorer, rounds the North Cape, Europe	852
Sindbad the Sailor on the coast of India	9th c.
Al Masudi, Arab traveler, in China	920
Iceland colonized from Norway	930
Eric the Red colonizes Greenland	982
Bjarni Herjulfson, Icelander, visits Labrador	986
Benjamin of Tudela, Spanish traveler, visits India	1160–73
Friar John of Carpini, visits Karakorum, Asia	1246
Rubruquis, Flemish traveler, explores the Caspian Sea	1247
Marco Polo, the Venetian, at the Court of Kublai Khan, China	1270
Fr. Odoric, of Pordenone, Italian monk, enters Lhasa, Tibet	1320
Ibn Batuta, the Arab traveler, reaches Quiloa, E. Africa	1329
Ibn Batuta visits Timbuktu and the Niger River	1350
Clavijo, a Spanish knight, ambassador at Samarkand	1405
Zarco, Portuguese navigator, sights the Madeira Islands	1418
Conti, Italian traveler, explores southern China	1440
Cintra, Portuguese navigator, at Sierra Leone, Africa	1462
Cão, Portuguese navigator, discovers the Congo River, Africa	1484
Bartholomew Diaz, Portuguese navigator, doubles the Cape of Good Hope, South Africa	1486
Covilhão, Portuguese ambassador, penetrates into Abyssinia	1490
Columbus, Italian navigator, discovers San Salvador Islands, West Indies	1492
Vasco da Gama, Portuguese navigator, voyages to India by the Cape route	1497
John Cabot, Italian navigator in English service, lands on coast of North America	1497
Vespucci, Italian navigator, coasts along North American and South American shores†	1497–1503
Cabral, Portuguese explorer, discovers South America	1500
Pinzon, Spanish navigator, at the mouth of the Amazon, South America	1500
Columbus sights Central America	1502
Varthema, Italian traveler, visits the sacred city of Mecca	1503
Serrão, Portuguese sailor, reaches the Molucca Islands by way of India	1512
Balboa, Spanish explorer, discovers the Pacific Ocean	1513
Ponce de Leon, Spanish explorer, traverses Florida	1513
Solis, Spanish navigator, ascends the La Plata River, South America	1516
Grijalva, Spanish navigator, touches coast of Mexico	1518
Cortés, Spanish adventurer, in central Mexico	1518
Expedition of Magellan circumnavigates the globe	1521–22
Pizarro, Spanish adventurer, in Peru	1532
Cartier, French navigator, in the Gulf of St. Lawrence	1534
Coronado, Spanish explorer, marches from Mexico through Arizona and New Mexico to Kansas	1539–42
Alarcon, Spanish explorer, reaches the Colorado River, U. S.	1540
Cardenas, Spanish explorer, at the Grand Canyon, Arizona	1540
Valdivia, Spanish soldier, reaches Western Patagonia	1540

* Dates for ancient and medieval discoveries in various instances are only approximate.

† According to his narratives, the trustworthiness of which is disputed.

	A. D.
De Soto, Spanish explorer, discovers the Mississippi River	1541
Orellana, Spanish explorer, descends the Amazon	1541
Cabrillo, Portuguese navigator, on California coast	1542
St. Francis Xavier, Spanish Jesuit missionary, visits Japan	1549
Chancellor, English navigator, reaches the White Sea, Russia	1553
Willoughby, English navigator, sights Nova Zembla	1553
Gaetano, Spanish navigator, lands on the Hawaiian Islands	1555
Jenkinson, English traveler, reaches Persia	1561
Frobisher, English navigator, in Frobisher Bay, Arctic North America	1576
Davis, English navigator, in Davis Strait, Arctic North America	1587
Barentz, Dutch navigator, at Spitzbergen, Arctic Europe	1594
Western Australia sighted by Portuguese sailors	1601
Gosnold, English navigator, at Cape Cod, United States	1602
Göes, a native of the Azores, traverses Central Asia	1603–05
Champlain, French explorer, on Maine coast, United States	1604
Torres, Spanish navigator, in New Guinea	1606
Smith, English colonist, in Chesapeake Bay	1608
Hudson, English navigator, ascends Hudson River to present site of Albany	1609
Champlain, French colonizer, discovers Lake Champlain	1609
Hudson, English navigator, discovers Hudson Bay, Canada	1610
Baffin, English navigator, in Baffin Bay	1616
Hartog, Dutch navigator, on the Australian coast	1616
Schouten, Dutch navigator, discovers Cape Horn, South America	1616
Nicolet, French voyager, reaches Lake Michigan	1634
Tasman, Dutch navigator, at Tasmania	1642
Deshnev, Russian navigator, sights Bering Strait	1648
Fr. Menard, French missionary, reaches Lake Superior	1660
Marquette and Joliet, French explorers, reach the Arkansas River	1673
Fr. Hennepin, Flemish missionary, at Niagara Falls, Canada	1678
Fr. Hennepin, at St. Anthony Falls, U. S.	1680
La Salle, French explorer, descends the Mississippi	1682
Fr. Kino, Spanish Jesuit, discovers the Casa Grande ruins, U. S.	1694
Bering, Danish navigator, in Bering Strait	1728
Gwosdef, Russian sailor, lands on the Alaskan coast	1731
Verendrye, French explorer, reaches the Rocky Mountains	1740
Karstens Niebuhr, German traveler, explores Arabia	1761–67
Bruce, Scotch traveler, on the Blue Nile, Abyssinia	1768–73
Hearne, English traveler, discovers Great Slave Lake	1772
Cook, English navigator, first to cross the Antarctic circle	1773
Cook, English navigator, explores the Hawaiian Islands	1774–79
Peter Pond, Canadian explorer, reaches Lake Athabaska	1778
La Perouse, French navigator, explores eastern coast of Asia	1787
Mackenzie, Scotch explorer, discovers the Mackenzie River, Canada	1789
Gray, American navigator, ascends the Columbia River, U. S.	1792
Mungo Park on the Gambia river, West Africa	1795
Humboldt, German scientist, explores South America	1799
Lewis and Clark explore the northwestern United States	1804–06
Colter, American trapper, discovers Yellowstone Park, U. S.	1807
Hutchins, American pioneer hunter, discovers the Mammoth Cave, United States	1809
Bellingshausen, Russian navigator, on the Antarctic continent	1821
Clapperton and Denham, English travelers, cross the Sahara	1822
James Bridger, American explorer, discovers Great Salt Lake, United States	1824
Sturt, English explorer, traverses Australia	1828
Ross, English navigator, in Boothia Felix, Arctic North America	1831
Schoolcraft, American scientist, discovers Lake Itasca	1832
Wilkes, American navigator, on the Antarctic continent	1840
Abbé Huc travels in Tibet	1844
Krapf and Rebmann, German missionaries, at Mt. Kilimanjaro, East Africa	1848
McClure, Irish navigator, achieves the Northwest Passage, Arctic Ocean	1851
Boling, American soldier, visits the Yosemite, U. S.	1851
Livingstone, Scottish missionary, discovers Zambesi River	1851–56
Kane, American explorer, on Grinnell Land, Arctic North America	1853
Livingstone, Scottish missionary, at Victoria Falls, Africa	1855
Barth, German traveler, explores the Sudan	1856
Burton and Speke, English explorers, discover Lake Tanganyika, Africa	1858
Speke, English explorer, discovers Victoria Nyanza, Africa	1858
Burke and Wills, Irish explorers, cross Australia from south to north	1860–61
Richthofen, German scientist, explores China	1868–72
Przhevalski, Russian traveler, crosses Mongolia	1871–73
Stanley, American explorer, traces the course of the Congo	1876–77
Nordenskjöld, Swedish explorer, accomplishes the Northeast Passage, Arctic Ocean	1878–79
Borchgrevink, Norwegian explorer, at the South Magnetic Pole, Antarctic continent	1899
Hedin, Swedish scientist, explores Central Asia	1890–1908
Peary, American naval officer, proves the insular character of Greenland	1892
Peary discovers the North Pole	1909
Roald Amundsen, Norwegian navigator, discovers the South Pole	1911

GENERAL FACTS ABOUT THE EARTH

The earth, or globe, is an oblate spheroid; that is, a sphere slightly flattened at two opposite points, called the poles. The two poles are the ends of the axis about which the globe rotates. The north pole is in the Arctic Ocean. The south pole is in the continent of Antarctica, which, directly at the pole, reaches an elevation of about 10,000 feet.

In order to make it possible to describe the exact location of any place on the earth, geographers have drawn around the globe certain circles, to which the position of any point may be referred. The equator is such a circle, encompassing the earth equidistant from the poles. Other circles are drawn parallel to the equator, dividing the distance between the equator and each pole into 90 equal parts. These circles are called parallels of latitude, and the distance between successive circles is called a degree. A degree (°) of latitude measures about 69 miles. Parallels of latitude are numbered from the equator north and south. Thus the north pole lies at 90° north latitude, and the south pole is at 90° south latitude. In passing from the north pole to the south pole, a traveler would traverse 180° of latitude and, in completing the circuit of the earth, he would pass through a total of 360° of latitude.

A second series of circles, 180 in number, is drawn about the earth, each circle passing through both poles. That half of each circle which extends from one pole to the other is called a meridian of longitude. Since each circle consists of 2 meridians, the 180 circles comprise a total of 360 meridians. Meridians are distant from each other about 69 miles at the equator. As one approaches the poles, however, the distance between two successive meridians decreases. Thus a degree of longitude is not constant, but varies from about 69 miles at the equator to zero at the poles. Meridians of longitude are numbered east and west from the meridian passing through Greenwich, England. The 180th meridian of east longitude coincides with the 180th meridian of west longitude, this meridian being the meridian in the western hemisphere corresponding to the Greenwich meridian in the eastern hemisphere.

The rotation of the earth takes place from west to east—the direction opposite to that in which the hands of a clock move. This movement of the earth causes the alternation of day and night.

A second movement of the globe is its revolution about the sun. The revolution takes place in an almost circular orbit. The earth's axis is not perpendicular to the plane of this orbit, but is inclined 23½° away from the perpendicular. To this inclination are due the varying lengths of day and night at different latitudes and in different seasons and also most of the seasonal variations in temperature. It provides the basis also for the division of the earth into zones, or "belts."

The boundaries of the zones are determined by the noonday inclination of the sun's rays to the surface of each zone. Thus the Torrid Zone comprises that part of the earth over which, at some time of the year, the sun is directly overhead. This zone extends for 23½° of latitude north and 23½° of latitude south of the equator, so that it has a total width of 47° of latitude. The North Frigid Zone and the South Frigid Zone, each of which extends 23½° of latitude from the poles toward the equator, comprise those parts of the earth in which, at some time in the year, the sun does not rise above the horizon at noon. Of the two remaining zones,—the North Temperate Zone and the South Temperate Zone,—each occupies 43° of latitude. In these zones, the sun never stands directly overhead and never remains for a whole day beneath the horizon. The variations of temperature between the different seasons are least in the Torrid Zone and are greatest in the two frigid zones.

The Torrid Zone is divided from the North Temperate Zone by the circle called the Tropic of Cancer and from the South Temperate Zone by the Tropic of Capricorn. The North Temperate Zone is separated from the North Frigid Zone by the Arctic circle. The corresponding line of division between the South Temperate Zone and the South Frigid Zone is called the Antarctic circle.

The following statistics regarding the earth are based on the latest research and are the nearest available approximations to the actual facts.

Equatorial diameter (miles)	7,926.6
Polar diameter (miles)	7,899.9
Circumference at the equator (miles)	24,901.7
Meridional circumference (miles)	24,859.4
Area of land surface approximately (square miles)	54,000,000
Area of water surface approximately (square miles)	143,000,000
Total area of the earth's surface approximately (square miles)	197,000,000
Volume of the earth (cubic miles)	259,900,000,000
Mean density of the earth	5.53
Density of water	1.00
Density of surface rock	2.72
Density at the earth's center	10.87
Pressure at earth's center (tons per square inch)	22,500
Weight of the earth (tons)	6,592,000,000,000,000,000,000
(Six sextillion five hundred ninety-two quintillion tons)	

CONTINENTS, AREA AND POPULATION

The following table gives the area and the population of each of the continents, as estimated by the latest reliable authorities.

In the present state of geographical knowledge, it is impossible to obtain exact and strictly accurate statistics covering such large divisions of land as the continents. Even for North America, Europe, and Australia, all of which are inhabited by civilized peoples, no complete measurement of the area has been made. Only small parts of South America, Asia, and Africa have been surveyed. Consequently, it is impossible to obtain more than a careful estimate of the extent of land surface in each continent.

In arriving at the figures for population, somewhat similar difficulties have been encountered. It still remains impossible to obtain exact statistics for the number of inhabitants in large parts of Asia and of Africa. Official estimates have been utilized for these regions. In all places where regular censuses are taken, the figures here given are based on the latest returns except in a few instances, in which the most recent official estimates are used.

Name	Area Sq. Miles	Population
North America	8,500,000	150,000,000
South America	7,500,000	66,000,000
Europe	3,900,000	445,000,000
Asia	17,200,000	1,040,000,000
Africa	11,500,000	130,000,000
Australia (incl. N. Zealand)	3,000,000	7,000,000
Antarctica	2,400,000	none
Total	54,000,000	1,838,000,000

OCEANS, AREA AND DEPTH

Authorities differ widely in their estimates of the areas of oceans. This is owing in part to the absence of definite boundaries for separating the oceans. It is due also to the fact that, while some authorities include with the oceans various inland seas, such as the Mediterranean or Hudson bay, others exclude them.

Name	Estimated Area Sq. Miles	Greatest Depth Feet	Mean Depth Feet
Arctic	4,000,000	13,120	3,840
Atlantic	34,000,000	27,972	12,660
Indian	28,000,000	22,968	12,888
Pacific	71,000,000	34,416	13,440
Southern or Antarctic	6,000,000	13,932	

HIGHEST, LOWEST, AND MEAN ALTITUDES OF THE CONTINENTS

The following table gives the highest and the lowest point in each of the continents. It will be observed from the figures given that the highest part of the land surface of the earth is the peak of Mount Everest, 29,141 feet above the sea, and the lowest point is the shore of the Dead Sea, which is 1293 feet below the level of the ocean. The land elevation of the world, therefore, varies within the limit of 30,434 feet, or about 5.8 miles. The figures for the mean elevations of the continents are approximations, being the latest estimates published by the United States Geological Survey.

Continent	Mean Elevation * (feet)	Highest Point		Lowest Point	
		Name	Above Sea Level (feet)	Name	Below Sea Level (feet)
North America	1,300	Mount McKinley, Alaska	20,300	Death Valley, Cal.	276
South America	1,300	Mt. Aconcagua, Chile-Arg.	23,080	Sea level	....
Europe	980	Mt. Elbruz, Caucasus Mts.	18,465	Caspian Sea, Russia	86
Asia	1,600	Mt. Everest, India	29,141	Dead Sea, Palestine	1,293
Africa	1,600	Kibo Peak, (Kilimanjaro) Tanganyika	19,456	Libyan Desert	440
Australia	800	Mt. Kosciusko, N. S. W.	7,323	Lake Eyre, South Aust.	38

* Approximate.

NORTH AMERICA

THE land mass of the western hemisphere with the adjacent islands is called America. The name was given in honor of Amerigo Vespucci, an Italian navigator who is said to have visited South America in 1499. It is often styled the New World because of its discovery and settlement in modern times by peoples from the eastern hemisphere, now commonly spoken of as the Old World.

Extent of America. The mainland extending from Alaska in the northwest and from Boothia Felix in the northeast to the south end of Patagonia is about 8700 miles long. This immense length is prolonged to about 9600 miles by the vast archipelago north of Hudson bay and by the island of Tierra del Fuego south of Patagonia. Cape Columbia in Grant Land and Cape Morris Jesup in Peary Land are within 450 miles of the north pole. Cape Horn, the southernmost point of Tierra del Fuego, is 2350 miles from the south pole. Greenland belongs to America, but Iceland, though partly in the western hemisphere, is associated with Europe. The area of America, including islands, is about 16 million square miles.

The Two Continents Compared. America comprises the two continents of North America and South America. These are connected by the narrow Isthmus of Panama. Each continent, like Africa, bears some resemblance to a triangle, the base, or shortest line, being along the northern border, and the apex, at the southern end. The climates, however, of the corresponding parts of the two continents are reversed. The northern part of North America is polar in character, while the northern part of South America is tropical. The physical features of America are displayed on a gigantic scale. There are great rivers, fresh-water lakes that are veritable inland seas, long, lofty ranges of mountains, and vast plains.

North America and South America alike have a chain of mountains extending from north to south along their western sides. Moreover, each continent has a broad central plain and a low eastern mountain range, and both continents have magnificent rivers affording access far into the interior. Vast, unbroken plains and immense forests are other characteristic features common to the two continents.

Extent of North America. The name, North America, is assumed by most geographers to mean all the continent, and all the outlying islands, north of the narrowest part of the Isthmus of Panama. Thus defined, North America includes Central America, Mexico, the West Indies, the United States, Canada, Alaska, and Greenland. For convenience of reference, Central America is often regarded as a separate section of the western hemisphere. The area of North America, including islands, is about nine million square miles.

Oceans and Coasts. North America's shores are washed by the waters of three oceans—the Arctic on the north, the Atlantic on the east, and the Pacific on the west. On the south, the Gulf of Mexico and the Caribbean Sea are large bodies of water also associated with North America. Deep indentations mark the Atlantic coast and form many excellent harbors. The Pacific coast, for the most part, is without sheltered bays, and, in consequence, has fewer seaports.

Surface Features. Two mountain systems dominate the surface of the continent. On the east side is the Appalachian system. This is a series of worn-down mountains, very old geologically, which stretch from the coast plain of the Gulf of Mexico northeast to Labrador. On the west side of the continent rise the lofty ranges of the great Cordilleran system. These massive, rugged mountains are of relatively recent geological formation.

Cordilleran System. As a whole, this system extends in a northwest direction from Central America to the northern shores of Alaska. The most important ranges are the Sierra Madre of Mexico and the Rockies of the western United States, Canada, and Alaska. Between the Rocky mountains proper and the Pacific Ocean lie the Sierra Nevada of California, the Cascades of Oregon and Washington, the Selkirks of British Columbia, and the Coast ranges. Each of more than 30 peaks of the Rocky Mountain chain is over 14,000 feet high. Mt. Whitney, with an altitude of 14,501 feet, in California, is the highest peak in the continental United States. Mt. Logan, 19,850 feet high, in Yukon Territory, is the loftiest summit in Canada. Mt. McKinley, with a height of 20,300 feet, in Alaska, is the culminating point of North America.

Between the Appalachian system in the east and the Rocky Mountain system in the west lie the great medial plains. These occupy a central depression extending from the Arctic Ocean to the Gulf of Mexico. In this vast valley are situated Hudson bay, the Great Lakes, and the drainage basins of many large rivers.

Appalachian System. The Appalachian Mountain system, which trends generally northeast and southwest, consists of numerous ranges. Among these are the Great Smoky, the Allegheny, the Blue Ridge, the Catskill, the Adirondack, the Green, and the White mountains in the United States and the Notre Dame mountains in Quebec. The loftiest summit is Mt. Mitchell, 6711 feet high, in North Carolina.

Great Basin. A vast plateau, called the Great Basin, with an elevation of from 5000 to 7000 feet, lies between the lofty Wasatch range of eastern Utah and the still higher Sierra Nevada of eastern California. In this arid region, rivers disappear in sandy wastes or flow into saline marshes and salt lakes. North of the Great Basin is the less elevated and more fertile Columbia River plateau, situated between the Rockies and the Cascades. Between the Rocky mountains and the Coast ranges of Canada, a somewhat lower plateau, called the Northern Interior plateau, extends northwest to Alaska where it joins the Yukon plateau named for the great river which drains it.

Colorado Plateau. South of the Great Basin is an immense elevated tract called the Colorado plateau. This forms a plain that extends far into Mexico but attains its widest development in the southwestern United States. Much of this vast highland is from 7000 to 9000 feet above sea level. In it the Colorado river and its tributaries have carved the most stupendous examples of erosion in the world.

Mexican Plateau. This is the southeastern continuation of the great Colorado plateau. In shape, the Mexican plateau, called also the plain of Anahuac, resembles a broad wedge, with its widest portion adjoining the southwestern United States and with its narrowest portion extending to southern Mexico.

This interior plain is bordered both on the east and on the west by high ranges of the Sierra Madre, those on the west having an average elevation of 10,000 feet. On either side, the mountain slopes which face toward the sea are usually very steep and precipitous, while those which face inland toward the plateau are, for the most part, much more gentle.

The Mexican plateau increases in elevation southward, rising from about 3500 feet above sea level, opposite western Texas, to 9000 feet around the southern border. In the high southern portion lies the famous "valley of Mexico," containing Lake Tezcuco, on the shores of which were built the ancient Aztec capital and the present city of Mexico.

Medial Plains. Because of their immense extent in the northern part of the continent, the medial plains are sometimes called the Arctic valley. The width of this region, measured from the highlands of Labrador to the Rockies of northern Alberta, is fully 2000 miles. Between the Allegheny mountains of Pennsylvania and the Rocky mountains of Colorado, the plains region is about 1400 miles wide. This central depression extends south from the Arctic Ocean to the Gulf of Mexico, a distance of about 3000 miles. In this vast interior portion of the continent lie the drainage basins of large river systems. The most important of these are the Mississippi-Missouri draining into the Gulf of Mexico, the Saint Lawrence flowing into the Atlantic Ocean, the Nelson-Saskatchewan emptying into Hudson bay, and the Mackenzie-Athabaska with outlet to the Arctic Ocean. The total area drained by the four systems is about three million square miles.

Rivers. Numerous navigable rivers afford entrance to the interior of the continent. The Mackenzie and the Yukon, flowing into northern waters, are icebound during the greater part of the year. The Saint Lawrence, which flows into the Gulf of Saint Lawrence, is likewise frozen during the winter months. But portions of the Hudson, the Delaware, the mighty Mississippi with many important tributaries, are open practically all the year, as are also the navigable parts of the Rio Grande, the Colorado, the Sacramento, the Columbia, and numerous lesser streams. These provide transportation for much inland commerce and some furnish water for irrigation purposes.

Lakes. Besides the five Great Lakes in the east central part of the continent, there are several other large lakes. Of these, the most important are Great Bear lake, Great Slave lake, and lakes Winnipeg and Athabaska, situated in central and northwestern Canada. In the western United States is Great Salt lake. This is a relic of a former sea which, in geological times, occupied a large part of the Great Basin.

Glaciers. The most extensive remnants of the ice age on the mainland of North America are found in the coastal mountains of Alaska. Some of the great glaciers in the region bordering on the Gulf of Alaska are hundreds of square miles in extent. These continental glaciers, however, are very small when compared with the immense ice sheet that covers the greater part of Greenland. The higher mountains from Colorado and California northwestward to Alaska contain many glaciers.

Volcanoes. In North America, as in South America, there are extensive volcanic areas in the great mountain system bordering on the Pacific coast. Central America contains many active volcanoes, among the most noted of which are Coseguina, Izalco, Cerro Quemado, Santa Maria, Fuego, and Agua. On the Mexican plateau are situated some of the world's most gigantic volcanic mountains, as, for example, Orizaba, altitude 18,250 feet, and Popocatepetl, with an elevation of 17,876 feet. A short distance west of the plateau is Colima, a very active volcano, which rises to a height of about 13,000 feet. Another noted Mexican volcano is Jorullo.

In the United States, Lassen peak, in California, is the only active volcano. The Cascade range has many volcanic peaks but only a few display signs of volcanic activity. Mt. Saint Helens and Mt. Baker, both in the state of Washington, are said to have been in eruption between 1840 and 1850. Mt. Hood, in Oregon, exhales volcanic vapors. Of volcanic origin also are Mt. Shasta and Mt. Rainier, which rank among the grandest peaks of the continent. In the Rocky mountains, there are but few volcanic peaks, but evidence of volcanic activity is very marked in the geysers and in other wonderful features of Yellowstone national park.

Alaska contains numerous volcanoes, some of which are very active. These are found along the coast ranges of southern Alaska and in the Aleutian islands. Among the more noted of the active or the recently active volcanoes on the mainland are Mt. Fairweather, Mt. Wrangell, and Mt. Katmai. The Aleutian volcanic belt is a narrow chain of islands extending westward from the Alaskan peninsula for a distance of more than 1500 miles. Some 25 of these islands contain one or more volcanoes, either active or only recently extinct. On Unimak island, near the southern mainland, is Mt. Shishaldin, with a symmetrical cone rivaling that of Fuji, Japan, in graceful contour.

Climate. In so vast a continent, extending through 75 degrees of latitude, great variations of climate naturally occur. In the far north, arctic severity rules, while in southern Mexico and Central America the climate is tropical. Most of the central portion of the continent has a temperate climate. However, a marked difference exists between the temperatures of parts of the Atlantic and of the Pacific coast having the same latitude. The climate of Washington or of Oregon, on the Pacific coast, is much milder than the climate of Maine or of Massachusetts, which are Atlantic coast states situated in nearly the same latitudes.

In July, a great inland area in North America becomes much warmer than the waters on the east and west coasts. Compared with the weather then prevailing on the oceans, the summer heat of eastern North America is excessive. Moreover, the winter cold is severer than in European countries of the same latitude. For example, in January, Labrador is 40° F. colder than northern Germany.

As the great interior plain has no mountain ranges crossing it, cold winds from the north sometimes sweep unimpeded far to the south, suddenly causing a fall of many degrees in temperature. Occasionally, these winds destroy early plantings or belated harvests as far south as Texas. In the plains region east of the Rocky mountains, a drop of 110° F. within 48 hours has been recorded. Such great changes of temperature are unknown on the Pacific coast. In the eastern part of the continent, quick changes of temperature occur, especially in winter, but are much less extreme than in the Great Plains region.

Rainfall. Along the Gulf coast from 50 inches to 55 inches of rain fall every year. At some points near the Gulf of Mexico, the annual rainfall exceeds 60 inches. A rainfall of 80 inches in a year is not uncommon in the Puget Sound region, and in some localities on the northern Pacific coast the annual precipitation is more than 100 inches. From Manitoba and central Kansas eastward the annual rainfall averages about 35 inches. On the high plains immediately east of the Rocky mountains, the rainfall seldom exceeds 20 inches annually. In Wyoming west of the Rockies and in Nevada, the rainfall is rarely more than 10 inches. Arizona and southern California contain limited areas which are practically rainless.

Minerals. In mineral wealth, North America leads all the other continents. Gold, silver, iron, copper, lead, zinc, nickel, coal, and other minerals are produced in immense quantities. The continent is the world's chief source of petroleum. Large quantities of natural gas occur in many widely separated regions.

Flora. The flora of the temperate regions of North America is remarkable for the great number of species of trees which it contains. Forests, whose acreage totals hundreds of millions, yield enormous quantities of hard and of soft wood timber. The lowland flora of the North American countries which lie south of the United States is characterized by a profusion of tropical flowers, vines, and trees. Mexican and Central American forests produce mahogany, rosewood, ebony, and other fine cabinet woods. The plant life of the Pacific coast region differs in a marked degree from that of the eastern

part of the continent. The pines, spruces, firs, and redwoods of the Pacific slope have no equals in size elsewhere in America. In bulk, the gigantic sequoias or "big trees" of California surpass all other known trees.

Fauna. Many of the animals native to North America closely resemble those found in the temperate parts of Europe and Asia. The bird fauna, for example, is strikingly similar. But the mocking bird, catbird, Baltimore oriole, wild turkey, turkey buzzard, bobolink, sage grouse, and various humming birds represent species found only in America. North America has various other distinctive animals which do not occur in the Old World. Among these are the American bison, popularly called buffalo, the grizzly bear, musk ox, bighorn sheep, Rocky Mountain goat, pronghorn, rattlesnake, Gila monster, and prairie dog.

GREENLAND

The largest island in the world, with the exception of Australia. The island lies northeast of Canada, from which it is separated by Baffin bay and Davis strait. It is almost wholly within the North Frigid Zone and stretches to a point within 450 miles of the north pole. Its estimated area is 825,000 square miles, and it has a maximum length north and south of 1400 miles, with a maximum width of 690 miles.

Physical Features. Greenland is bordered by a rocky shore rising abruptly several hundred feet above the water and cut by numerous deep fiords. The surface is a plateau having an average elevation of about 4500 feet but reaching, at a few points, an altitude of 10,000 feet. Spreading over about 85 per cent of the island's area is a covering of perpetual ice. This inland ice buries far below it all but the highest mountains, thereby affording an excellent example of such conditions as prevailed in the ice age. The ice constitutes a huge glacier flowing slowly toward the coasts. Each year it discharges into the ocean icebergs estimated to weigh in the aggregate more than one billion tons. The interior of Greenland contains one of the coldest areas on the globe. In severity of climate, it competes with a corresponding area in Siberia, where a temperature of 92° below zero has been recorded.

Area of Habitation. The southwest part of Greenland has a coastal strip which, in the summer, is covered with green lichens, trailing plants, and berries. The musk ox, white bear, wolf, arctic fox, and many varieties of birds subsist there.

This coastal strip has been settled by Danes and is a colony of Denmark. About 98 per cent of the 14,355 inhabitants are Eskimos, who, although professing Christianity, still adhere to many of their pagan customs. Apart from the mining of cryolite by an American firm, the only industries are fishing and hunting. Whale oil, seal oil, skins, and eider down are exported. The trade is a monopoly of the Danish government.

Greenland was so named by Eric the Red, a Norseman who voyaged along the coast about 982 A. D. It was colonized by Scandinavians in the same century. Between 1410 and 1721, however, the island was neglected, and the European settlers disappeared, probably by intermarriage with the Eskimos. The present colony was planted in the 18th century. The largest settlement is Sydproven, with a population in 1921 of 901.

HUDSON BAY

A large inland sea, situated in northeastern North America, and connected with the Atlantic Ocean by Hudson strait. From Fox channel, at the north, to the southern end of James bay, at the south, Hudson bay is about 1300 miles in length. In its main body, it is about 600 miles wide. It lies wholly within the Dominion of Canada, in a region of rigorous climate.

Area and Depth. The area of Hudson bay, estimated at 475,000 square miles, is about three times that of the Baltic Sea, and approximately half that of the Mediterranean. In its main portion, the bay varies in depth from 400 to 600 feet. The southern extension, called James bay, is very shallow except in the center.

Tides and Currents. On the extreme north, Hudson bay communicates with the Arctic Ocean through Fury and Hecla strait and the Gulf of Boothia. From this passage Hudson bay receives much arctic ice. In Fox channel the tide rises 40 feet, producing a strong current by which thick ice floes are driven southward into Hudson strait, where they menace navigation.

Character of Shores. The eastern shore, called the East Main, and the western shore north of Churchill are, for the most part, rocky and fringed with numerous small islands. The western shore is called the West Main. From Churchill southward it is low and flat. A low divide separates the drainage basin of Hudson bay from the two other great drainage basins of Canada, namely, the Mackenzie and the Saint Lawrence.

Tributary Rivers. The most important river system tributary to Hudson bay is the Nelson-Saskatchewan. Within this great drainage system lie the chief wheat producing areas of Manitoba, Saskatchewan, and Alberta. The system includes also the Red River of the North, which drains parts of North Dakota, South Dakota, and Minnesota, in the United States. This river flows north into Lake Winnipeg, the outlet of which is the Nelson river. The Nelson river empties its waters into Hudson bay at Port Nelson on the southwest coast.

Second in importance among tributaries is the Churchill river, which enters the bay at Churchill, about 125 miles northwest of Port Nelson. Its deep, capacious mouth forms the best harbor on the entire coast of Hudson bay. Among other affluents are the Albany river, on the southwest, flowing into James bay, and the Big, the Moose, and the Rupert river entering from the east shore. The total area of the Hudson Bay drainage basin is estimated at 1,486,000 square miles, or about one-half of the entire mainland of Canada.

Fisheries and Fur Trade. Hudson bay contains extensive and valuable fisheries. American whaling vessels often winter at Marble island in the northwest part of the bay, and the cod fisheries extend into Hudson strait. The Hudson's Bay Company has several stations, called factories, at various points on the coast. Of these, York Factory, at the mouth of Hayes river, is the leading trading post. For more than 200 years a cargo of valuable furs has been shipped annually from York Factory to England.

East and west of the northern part of Hudson bay are the Barren Grounds. These are dreary wastes where only stunted forms of vegetable life exist. But this desolate region is the feeding ground of caribou and musk oxen, and of various smaller animals hunted for their fur.

Commercial Importance. From Montreal and from Port Nelson the sailing distance to Liverpool is practically the same. Much of the grain produced in the Canadian Northwest is shipped to Montreal by way of Winnipeg and the Great Lakes. The distance from Winnipeg to Liverpool, by way of Port Nelson or Churchill, is more than 500 miles shorter than by way of Montreal. From Edmonton to Liverpool, by way of Hudson Bay ports, the distance is more than 1000 miles less than by way of Winnipeg and Montreal.

Other conditions being equal, it would be cheaper to export grain to Europe by way of Hudson bay. In such case, the hinterland of Port Nelson and of Churchill would include the greater part of the prairie provinces. But, while neither Hudson bay nor Hudson strait is ever entirely frozen over, there is great danger to navigation from floating ice during the greater part of the year. For sailing ships, the season for safe navigation is from about July 15 to October 1.

THE GREAT LAKES

A chain of large fresh-water lakes, situated in the east central part of North America. They include lakes Superior, Huron, Michigan, Erie, and Ontario, and form a part of the boundary between the United States and Canada. None lies entirely within the territory of either country except Lake Michigan, which is situated wholly within the United States.

Area and Drainage Basin. The combined area of these lakes is about 94,600 square miles and constitutes the largest body of fresh water in the world. The land area in their drainage basins exceeds 185,000 square miles. No large river arising in the land flows into any of the Great Lakes; but the Saint Lawrence, the stream through which the system finally drains into the Atlantic, is one of the great rivers of the continent. The depressions occupied by the Great Lakes system are separated by low ridges from two other large drainage systems. One of these, lying on the north, drains into Hudson bay; the other, lying on the south and the west, drains through the Mississippi River system into the Gulf of Mexico.

Outlets and Connections. Lake Superior, situated at the head of the great chain, is the largest and deepest of the series. It empties through the Saint Marys river, 55 miles long, into Lake Huron. At Saint Marys rapids, called also Sault Sainte Marie, and the Soo, the river falls about 20 feet. The Sault Sainte Marie canals and locks, built on both the Canadian and the American side, permit deep-water navigation around these rapids. They form one of the most important artificial waterways in the world.

The outlet of Lake Michigan is the Strait of Mackinac, which empties into Lake Huron at a point near the mouth of the Saint Marys river. Lake Huron drains into Lake Erie through the Saint Clair river, 42 miles long; Saint Clair lake, 29 miles long; and the Detroit river, 28 miles long. Lake Erie empties into Lake Ontario through the Niagara river, 26 miles long. In its course between the two lakes, the Niagara river makes a descent of 326 feet, half of which occurs in one sheer drop at Niagara falls, the most noted of the world's great cataracts.

In order to establish navigation between Lake Erie and Lake Ontario, the Welland canal, 26 miles long, with an elaborate system of locks, was completed in 1833. This connected Port Colborne, on Lake Erie, with Port Dalhousie on Lake Ontario. In 1912, enlargements were begun, which are designed to transform this early Canadian waterway into a modern ship canal.

Lake Ontario drains through the Saint Lawrence river, about 750 miles long, into the Atlantic Ocean. In various rapids between the outlet of Lake Ontario and Montreal, the Saint Lawrence river descends nearly to sea level. As Lake Superior, with an altitude of 602 feet, is only 30 feet higher than Lake Erie, it will be seen that most of the descent to sea level is made in the Niagara and Saint Lawrence rivers between Buffalo and Montreal. Despite the rapids, the Saint Lawrence is navigable for downstream boats, including passenger steamers, but a series of canals has been constructed on the Canadian side to permit of upstream navigation.

The total length of the Great Lakes-Saint Lawrence water system is about 2200 miles. From Duluth to Buffalo the sailing distance is 997 miles; from Chicago to Buffalo, 929 miles; from Duluth to Ogdensburg, 1235 miles; and from Duluth to Montreal, 1350 miles.

Commercial Importance. In the industrial and commercial development of the eastern United States and Canada, the Great Lakes have been a factor of immense importance. For the early explorers, these lakes, with their river connections, furnished easy routes to the unknown interior. They also afforded avenues through which settlers reached the productive lands adjoining their waters. Later, these inland waterways provided efficient transportation of farm, forest, and mineral products throughout a vast region rich in natural resources. Thus the Great Lakes have contributed in a marked degree to the industrial supremacy of the United States. For example, the rapid development of the immense iron ore resources of the Lake Superior region was made possible by cheap water transportation.

From the times of the French-Canadian fur traders, with their flotillas of birch-bark canoes, the Great Lakes have been a water highway between eastern and western Canada. Down this waterway float much of Canada's huge surplus of wheat for export and also flour, iron, and lumber in vast quantities. In the opposite direction go coal and those manufactured articles for which the West exchanges its products with the East.

At Buffalo, on Lake Erie, is the western terminus of the New York State Barge canal. This gives the Great Lakes a very important connection with the seaboard by way of the Mohawk and the Hudson river to New York harbor. With no increase in capacity, the barge canal is capable of transporting every year millions of tons of grain and other staple products from the lake region to tidewater.

Magnitude of Lake Traffic. The total population of the eight American states and of the Canadian province bordering on the Great Lakes exceeds 45 million. The three largest inland cities of the New World are situated on their shores. In volume, the lake traffic is enormous. The tonnage passing annually through the Detroit river exceeds that which enters and clears in the foreign trade of both the Atlantic and the Pacific ports of the United States. The yearly traffic through the Sault Sainte Marie canal around Saint Marys falls is greater in point of tonnage than that of any other artificial waterway.

THE GREAT LAKES

Item	Superior	Michigan	Huron	Erie	Ontario
Latitude, north	46° 30′ – 49° 00′	41° 37′ – 46° 06′	46° 00′ – 43° 00′	41° 23′ – 42° 53′	43° 10′ – 44° 10′
Longitude, west	84° 30′ – 92° 06′	84° 45′ – 88° 00′	80° 00′ – 84° 45′	78° 50′ – 83° 30′	76° 10′ – 79° 53′
Elevation above sea level in feet	602.3	581.2	581.2	572.5	246.2
Greatest length in miles	360	307	206	241	193
Greatest breadth in miles	160	118	101	57	53
Maximum depth in feet	1,012	870	750	210	738
Area in square miles	32,060	22,336	22,978	9,968	7,243
Length of coast line in miles	1,500	745	1,165	657	540
Drainage basin in square miles	44,074	43,463	49,300	24,605	25,737
United States shore line in miles (approx.)	735	1,200	470	350	230
Boundary line in miles	280	None	220	250	160
Outlet	St. Marys River	Str. of Mackinac	St. Clair River	Niagara River	St. Lawrence River
Discoverers or early explorers	Brulé	Nicolet	Brulé and Le Caron	Chaumonot and Brébeuf	Champlain
Date of exploration or discovery	1622	1634	1615	1640	1615
Largest port	Duluth	Chicago	Bay City	Cleveland	Toronto

THE UNITED STATES

The United States, a Federal republic, occupies the central part of North America, and extends from the Atlantic Ocean to the Pacific and from Canada to Mexico. The area of the continental United States, including Alaska, almost equals the area of Europe. Besides Alaska, the republic possesses various island dependencies. See *Territorial Growth of the United States*.

LENGTH OF U. S. COAST LINE BY CHIEF DIVISIONS

Division	Mainland	Islands	Total
Atlantic coast	5,565	6,114	11,679
Gulf coast	3,641	2,777	6,418
Pacific coast	2,730	1,035	3,765
Total	11,936	9,926	21,862

Character of Coasts. In the northeast, the Atlantic shore is rugged and has numerous inlets, but south of New York bay the coast belt is flat, sandy, and in only a few places rises more than 100 feet above the sea. Numerous lagoons, reefs, keys, and sandbars render the Gulf coast dangerous to navigation. Most of the Pacific shore is bold and rocky, San Francisco bay and Puget sound being the only important indentations. On the northern border are the Great Lakes—Superior, Huron, Michigan, Erie, and Ontario.

LENGTH OF COAST LINE OF THE UNITED STATES BY STATES

(Tidal Shore Line, Unit Measure 1 Statute Mile)

State	Mainland	Islands	Total
Alabama	174	117	291
California	1,264	291	1,555
Connecticut	126	18	144
Delaware	140	14	154
Florida—Atlantic	714	507	1,221
Florida—Gulf	1,273	1,257	2,530
Georgia	166	727	893
Louisiana	1,122	591	1,713
Maine	558	761	1,319
Maryland	770	275	1,045
Massachusetts	421	250	671
Mississippi	99	103	202
New Hampshire	15	5	20
New Jersey	392	368	760
New York	31	798	829
North Carolina	1,040	831	1,871
Oregon	429	60	489
Pennsylvania	13	...	13
Rhode Island	118	100	218
South Carolina	281	960	1,241
Texas	973	709	1,682
Virginia	780	500	1,280
Washington	1,037	684	1,721
Total	11,936	9,926	21,862

Surface Features. Dominant physical features of the republic are the Appalachian Mountain system along the Atlantic side with a lowland between the mountains and the ocean; the great Rocky Mountain system in the west, extending nearly north and south; and the vast valley between these highlands.

Other important physical features are the Sierra Nevada, the Cascade, and the Coast ranges, situated between the Rocky mountains and the Pacific Ocean; the vast desert area, called the Great Basin, lying between the Rockies and the Sierra Nevada; and the narrow fertile valleys, extending north and south, between the Sierra Nevada and the Coast ranges. Flanking the Great Basin on the east and the south are the lofty plateaus of Utah and Arizona. To the north of the Great Basin lies the less elevated Columbia River plateau.

Mountains and Plateaus. The high plateaus and mountain ranges of the western United States are a part of the great Cordilleran system which dominates the whole western side of North America. This system extends entirely across the United States from Mexico to Canada, through New Mexico, Colorado, Wyoming, and Montana, and throughout the region between these states and the Pacific Ocean. Measured from the eastern base of the Rockies, across Colorado, Utah, Nevada, and California, to the western base of the Coast ranges, the Cordilleran system is about 1000 miles in breadth.

The northern section of this western mountain region, particularly the Columbia River plateau, contains more extinct volcanoes than are found in any other equal area in the world. Here lavas, from ancient fissure eruptions, overspread an area of 200,000 square miles.

Scenery. The sublimity of the scenery of the western mountains is celebrated. The Yosemite falls of the Merced river in the Sierra Nevada are the highest in the world. In grandeur the Shoshone falls of the Snake river in southern Idaho rival Niagara. No Alpine lakes surpass Crater lake and Lake Tahoe in scenic beauty. The wonderlands of the globe, Yellowstone national park and Glacier park, are in the Rocky Mountain country. The Grand Canyon, nature's most marvelous example of erosion, traverses the high plateau of northwestern Arizona.

Mississippi Basin. The vast valley between the Rocky mountains and the Appalachians, called the Mississippi basin, is chiefly a grassy plain, mostly treeless, rising gently from the Gulf of Mexico toward Canada and also toward the highlands east and west. Through this basin the great Mississippi river, rising near the Canada border, flows southward into the Gulf of Mexico. In the south-central part of the valley is the only elevated section. This is the Ozark plateau, mostly from 800 feet to 1000 feet above the sea, but with summits in Arkansas which reach an elevation of 2800 feet.

About one-half the total area of the United States lies within the Mississippi basin. This basin, on account of the great fertility of its central and its eastern parts, is the most important agricultural region of the globe. Much of the western part, known as the Great Plains, with an elevation of 6000 feet in some places, has only a light rainfall. This region affords excellent natural pasturage, and, when irrigated, the soil is very productive.

Drainage Systems. The drainage waters of the United States find their way into the adjoining oceans chiefly through streams grouped in four general drainage systems, namely, the Atlantic, the Gulf, the Great Lakes, and the Pacific. Parts of North Dakota, South Dakota, and Minnesota, however, are drained by the Red River of the North, whose waters, joining those of the Nelson-Saskatchewan, flow into Hudson bay. Of the river systems, the Mississippi-Missouri, with numerous tributaries, is by far the largest. Other important large river systems are the Rio Grande, the Colorado, and the Columbia.

Climate and Rainfall. Situated within the Temperate Zone, but covering a vast area having lowlands and highlands, the United States has many varieties of climate. In general, however, the climate is that which normally prevails in temperate regions, though subject to greater extremes than those which occur in Europe. Intense heat prevails in the southwest deserts in summer. In the northwest, in winter, the mercury falls below −40° F. But the dryness of the air in these regions renders endurable extremes of both heat and cold. Within the same degrees of latitude, the Pacific coast is much warmer than the Atlantic coast. Over the central and eastern portions of the country, the climate is continental.

HIGHEST AND LOWEST POINTS AND AVERAGE ELEVATION

United States and Possessions

State or Possession	Highest Point			Lowest Point			Mean Elevation (feet)
	Name	County	Elevation (feet)	Name	County	Elevation (feet)	
Alabama	Cheaha Mt.	Clay-Talladega	2,407	Gulf of Mexico		S. l.*	500
Alaska	Mt. McKinley		20,300	Pacific Ocean		S. l.	
Arizona	San Francisco Pk.	Coconino	12,611	Colorado River	Yuma	100	4,100
Arkansas	Blue Mountain / Magazine Mt.	Polk-Scott / Logan	2,800 / 2,800	Ouachita River	Ashley-Union	55	650
California	Mount Whitney	Inyo-Tulare	14,501	Death Valley	Inyo	−276†	2,900
Canal Zone	Cerro Galera	S. W. part of Zone	1,223	Pacific Ocean		S. l.	
Colorado	Mount Elbert	Lake	14,420	Arkansas River	Prowers	3,350	6,800
Connecticut	Bear Mountain	Litchfield	2,355	Long Is. Sound		S. l.	500
Delaware	Centerville	New Castle	440	Atlantic Ocean		S. l.	60
Dist. Columbia	Tenleytown	Northwest part	420	Potomac River		S. l.	150
Florida	Iron Mountain	Polk	325	Atlantic Ocean		S. l.	100
Georgia	Brasstown Bald	Towns-Union	4,768	Atlantic Ocean		S. l.	600
Guam	Mt. Jumullong Manglo		1,290	Pacific Ocean		S. l.	
Hawaii	Mauna Kea	Hawaii	13,823	Pacific Ocean		S. l.	
Idaho	Hyndman Peak	Blaine-Custer	12,078	Snake River	Nez Percé	720	5,000
Illinois	Charles Mound	Jo Daviess	1,241	Mississippi R.	Alexander	279	600
Indiana	Carlos	Randolph	1,210	Ohio River	Vanderburg	316	700
Iowa	North boundary	Osceola	1,600	Mississippi R.	Lee	477	1,100
Kansas	West boundary	Greeley-Wallace	4,135	Verdigris R.	Montgomery	700	2,000
Kentucky	Big Black Mt.	Harlan	4,150	Mississippi R.	Fulton	257	750
Louisiana	N. W. part of Co.	Claiborne	400	Gulf of Mexico		S. l.	100
Maine	Mt. Katahdin	Piscataquis	5,273	Atlantic Ocean		S. l.	600
Maryland	Backbone Mt.	Garrett	3,340	Atlantic Ocean		S. l.	350
Massachusetts	Mount Greylock	Berkshire	3,505	Atlantic Ocean		S. l.	500
Michigan	Porcupine Mts.	Ontonagon	2,023	Lake Erie		573	900
Minnesota	Mesabi Range	St. Louis	1,920	Lake Superior		602	1,200
Mississippi	Near Iuka	Tishomingo	780	Gulf of Mexico		S. l.	300
Missouri	Taum Sauk Mt.	Iron	1,750	St. Francis R.	Dunklin	230	800
Montana	Granite Peak	Carbon	12,850	Kootenai River	Flathead	1,800	3,400
Nebraska	S. W. part of Co.	Banner	5,350	S. E. part of Co.	Richardson	825	2,600
Nevada	Boundary Peak	Esmeralda	13,145	Colorado River	Clark	470	5,500
New Hampshire	Mt. Washington	Coos	6,288	Atlantic Ocean		S. l.	1,000
New Jersey	High Point	Sussex	1,805	Atlantic Ocean		S. l.	250
New Mexico	N. Truchas Peak	Rio Arriba	13,306	Red Bluff	Eddy	2,876	5,700
New York	Mount Marcy	Essex	5,344	Atlantic Ocean		S. l.	900
North Carolina	Mount Mitchell	Yancey	6,711	Atlantic Ocean		S. l.	700
North Dakota	Black Butte	Slope	3,468	Pembina	Pembina	790	1,900
Ohio	Bellefontaine ‡	Logan	1,550	Ohio River	Hamilton	425	850
Oklahoma	Black Mesa	Cimarron	4,800	Red River	McCurtain	300	1,300
Oregon	Mount Hood	Clackamas	11,253	Pacific Ocean		S. l.	3,300
Pennsylvania	Negro Mountain	Somerset	3,213	Delaware River		S. l.	1,100
Philippine Is.	Mount Apo	Mindanao Is.	9,610	Pacific Ocean		S. l.	
Porto Rico	Luquillo Mts.	Humacao	3,532	Atlantic Ocean		S. l.	
Rhode Island	Durfee Hill	Providence	805	Atlantic Ocean		S. l.	200
Samoa	Lata	Tau Island	3,056	Pacific Ocean		S. l.	
South Carolina	Sassafras Mt.	Pickens	3,548	Atlantic Ocean		S. l.	350
South Dakota	Harney Peak	Pennington	7,242	Big Stone Lake	Roberts	962	2,200
Tennessee	Clingmans Dome	Sevier	6,644	Mississippi R.	Shelby	182	900
Texas	El Capitan	Culberson	9,020	Gulf of Mexico		S. l.	1,700
Utah	Kings Peaks	Wasatch	13,498	Beaverdam Crk.	Washington	2,000	6,100
Vermont	Mt. Mansfield	Chittenden-Lamoille	4,393	Lake Champlain	Franklin	95	1,000
Virginia	Mount Rogers	Crayson-Smyth	5,719	Atlantic Ocean		S. l.	950
Virgin Islands	Crown Hill	Is. of St. Thomas	1,550	Atlantic Ocean		S. l.	
Washington	Mt. Rainier	Pierce	14,408	Pacific Ocean		S. l.	1,700
West Virginia	Spruce Knob	Pendleton	4,860	Potomac River	Jefferson	240	1,500
Wisconsin	Rib Hill	Marathon	1,940	Lake Michigan		582	1,050
Wyoming	Gannett Peak	Fremont	13,785	Belle Fourche R.	Crook	3,100	6,700
United States ††	Mount Whitney	Inyo-Tulare, Cal.	14,501	Death Valley	Inyo, Cal.	−276†	2,500

* Sea level. † Below sea level. ‡ In the vicinity of. †† Exclusive of Alaska.

The rainfall varies greatly in different sections. The northwest Pacific coast and the Gulf coast have a heavy annual rainfall. In the central Mississippi valley the rainfall is ample for crop production. Around the Great Lakes the precipitation is moderate, but sufficient for agriculture. Tornadoes occur from the Great Plains eastward, but are most destructive in the lower Mississippi valley. Tropical hurricanes, sweeping northward from the Gulf of Mexico, sometimes cause serious damage along the coast from Texas to Florida.

Minerals. No other country in the world is so rich in minerals. Coal, iron ores, lead, zinc, silver, tungsten, gold, quicksilver, and copper are mined. Petroleum, natural gas, clays, cement, building stone, sulphur, lime, salt, slate, and other minerals are also produced in the United States. The mineral industry has developed with extraordinary rapidity. In 1870, the value of mineral products was about $200,000,000; in 1900, $1,109,000,000; and, in 1926, $6,262,000,000. See *Mineral Products of the United States*, page 1322.

Vegetation. A wide range of climatic conditions, many different soils, and a surface diversified with mountains and valleys produce a varied vegetation. Plants characteristic of the North Temperate Zone are well represented, and there are also many species peculiar to the United States. Large forests are found in the extreme northwest and also in the southern, north central, and eastern states. It is estimated that there are at least 150 species of trees of industrial importance.

The central and eastern United States has many forests containing oaks, elms, maples, chestnuts, hickories, ashes, walnuts, and other well-known species. Characteristic trees of the South are pal-

mettoes, magnolias, tulip trees, sour gums, and yellow pines. Cypresses are abundant in the southern swamps. In the Great Lakes region, firs, pines, spruces, and larches abound. Pines, spruces, and junipers are common in the Rocky Mountain region and yuccas and cactuses in the southwestern deserts.

Cone-bearing trees attain their greatest development in the Pacific Coast region. Gigantic sequoias, believed to be the largest and the oldest of living plants, form groves in the Sierra Nevada. These remarkable trees are unknown elsewhere on the globe. Douglas firs, true firs, and various pines, cedars, hemlocks, and spruces also attain immense size, the Douglas fir and the sugar pine ranking with the sequoias among the great trees of the continent. There are many species of native grasses suitable for fattening live stock. Numerous kinds of berries, various species of nut trees, and hundreds of varieties of wild flowers are also found.

The original forests of the United States covered about 820 million acres and contained, it is estimated, over five trillion board feet of lumber. In 1921, there remained 463 million acres of forested land, containing slightly more than two trillion board feet. The annual growth of forest timber is only about one-quarter of the amount consumed. The United States Bureau of Forestry is endeavoring to conserve the country's valuable timber resources and to grow new forests in suitable regions.

Animal Life. With the exception of arctic and tropical species, practically all the larger animals native to North America are found in the United States. Among grazing mammals now occurring wild are the moose, the wapiti or American elk, the bighorn, the Rocky Mountain goat, the pronghorn or American antelope, and various species of deer. Among native flesh-eating mammals are the black and the grizzly bear, the timber wolf, coyote, fox, puma, lynx, wolverene, raccoon, and cacomistle. Other interesting mammals are the beaver, porcupine, opossum, muskrat, woodchuck, badger, prairie dog, peccary, armadillo, numerous rabbits, hares, and squirrels, and various small fur-bearers, such as the skunk, mink, and ermine. The manatee or sea cow is found in Florida waters, and sea lions occur on the Pacific coast.

The birds are represented by several hundred species. Among game birds, the more highly prized are the partridge, sage hen, prairie hen, and other species of grouse; the mallard, teal, canvasback, and other kinds of ducks; the wild turkey, bobwhite, plumed quail, woodcock, and various kinds of geese, rails, plover, and snipe. Typical song birds are the robin, mockingbird, brown thrasher, wood thrush, bluebird, cardinal, goldfinch, and catbird; also several species of orioles, grosbeaks, and wrens. The birds of prey include the bald eagle (the American national emblem), the golden eagle, and numerous hawks, buzzards, owls, and vultures. Among birds of prey, the huge California vulture ranks second in size only to the condor of the Andes.

Of the large reptiles, the alligator is the best-known, though a true crocodile occurs in Florida. Numerous sea turtles, fresh-water terrapins, and land tortoises are found. The so-called horned toad, the chuckwalla, and the Gila monster are peculiar kinds of lizards inhabiting southwestern deserts. There are numerous species of snakes, but only the rattlesnakes, the copperhead, the water moccasin, and a few other species are venomous.

Both the coastal and the inland waters abound in fish. Cod, halibut, mackerel, bluefish, tuna, and many other valuable food fishes are taken in large quantities by the fisheries. Many inland streams teem with salmon, trout, shad, catfish, and sturgeon. In the larger lakes, various food fishes, such as whitefish, lake trout, ciscoes, bass, pike, and perch, occur in immense numbers. Along the north Atlantic coast, oysters and lobsters abound, the annual catch being one of the most valuable of American fisheries.

Manufacturing. In manufacturing, the United States surpasses all other countries. Immense natural resources—minerals, timber, water power, hydroelectric power—and an ample supply of skilled labor enable the republic to produce, year after year, a vast, varied, and increasing output of manufactures. In 1860, the total value of manufactures was less than 2 billion dollars; in 1925, it exceeded 62 billion dollars.

Commerce. The rapid development of the three great industries, mining, agriculture, and manufacturing, produced an equally rapid increase in railroad construction and also gave rise to an enormous foreign trade. The commerce of the United States is sure to increase to still greater dimensions because, in addition to its immense trade with countries in the temperate zones, the imports from tropical or subtropical countries are increasing. Rubber, tea, coffee, cacao, sugar, raw cotton, raw silk, tin, hides, nitrates, and gums come from countries lying within the Torrid Zone or near it. In 1860, the total foreign commerce of the United States was valued at about 700 million; in 1920, at about 13 billion. See *Growth of the United States, 1820–1920.*

GEOGRAPHICAL FACTS ABOUT THE UNITED STATES

The land area of the United States is 2,973,774 square miles.

The water area, exclusive of the Great Lakes, is 53,015 square miles.

The most northern point of the United States is in Minnesota, latitude 49° 23′ N. and longitude 95° 9′ W.

The most southern point of continental United States is Cape Sable, Florida, latitude 25° 7′ N. and longitude 81° 5′ W. Hence Cape Sable is 49 miles farther south than the extreme southern point of Texas.

The most eastern point of the United States is West Quoddy Head, a Maine cape which projects into the Atlantic Ocean. This headland is in longitude 66° 57′ W. and latitude 44° 49′ N.

The most western point is Cape Alva in Washington. This cape, which projects into the Pacific Ocean, is in longitude 124° 45′ W. and in latitude 48° 10′ N.

The longest distance in a straight line from north to south is measured from the boundary between Canada and the United States, the 49th parallel of latitude, to the southernmost point of Texas—1598 miles.

The shortest distance from the Atlantic to the Pacific is a straight line drawn from a point near Charleston, South Carolina, to a point near San Diego, California. This distance is 2152 miles.

The longest distance in a straight line from the Atlantic to the Pacific is measured from West Quoddy Head to a point near Yaquina Head, an Oregon cape projecting into the Pacific Ocean. These points are 2807 miles apart.

The length of the boundary of the United States, as given by the United States Coast and Geodetic Survey, is 10,758 miles, divided as follows: Atlantic Ocean, 1883; Gulf of Mexico, 1639; Pacific Ocean, 1316; Mexico, 1975; Canada, 3898.

In the continental United States the temperature has fallen as low as 60° below zero in northern Montana and has risen as high as 134° in the shade in Death valley, California.

The annual rainfall on the north shore of the Gulf of Mexico exceeds 60 inches. Around Puget sound it reaches 100 inches. In the vicinity of the Great Lakes it ranges between 30 and 35 inches. At the eastern base of the Rocky mountains it is about 15 inches. In the deserts of the Great Basin it is usually less than 10 inches. At Yuma, in southwestern Arizona, it is only 3 inches.

The average yearly rainfall over all the continental United States equals 1300 cubic miles. This quantity of rain water would weigh six trillion tons.

The geographic center of the United States is a point near Lebanon in Smith county, Kansas, latitude 39° 50′ N., longitude 98° 35′ W.

The center of population in the United States in 1920 was at a point 8.3 miles southeast of Spencer, Owen county, Indiana, latitude 39° 10′ N., longitude 86° 43′ W. Thus the center of population was then about 630 miles to the east and about 45 miles to the south of the geographic center.

The highest peak in the United States, including all territories, is the Alaskan mountain, Mt. McKinley, 20,300 feet.

The state having the lowest average elevation is Delaware. Its surface, if leveled, would be only 60 feet above the sea. Colorado has the highest average elevation, 6800 feet.

NATIONAL PARKS

Name	Location	Area Sq. Mi.	Established	Distinctive Characteristics
Bryce Canyon	Utah	22	1924 1928	Fantastically eroded pinnacles. Extraordinary exhibit of vivid coloring of earth's materials.
Crater Lake	Oregon	249	1902	Lake of extraordinary blue in crater of extinct volcano. No known inlet or outlet. Sidewalls 1000 feet high. Fine fishing.
General Grant	California	4	1890	Created to preserve the celebrated General Grant Tree, 35 feet in diameter.
Glacier	Northwestern Montana	1534	1910	Mountain region, 250 glacier-fed lakes of romantic beauty, 60 glaciers. Precipices thousands of feet high. Trout fishing.
Grand Canyon	North central Arizona	1009	1908 1919 1927 1928	Greatest example of erosion and most wonderful scenic spectacle in the world. The stupendous gorge, of which the park embraces a portion unequaled in grandeur, is more than 200 miles long, from 4000 to 6000 feet deep, and from 1 or 2 to 15 miles wide.
Grand Teton	Wyoming	150	1929	Picturesque mountains in a great "dude ranch" district.
Hawaii	Hawaiian Islands	248	1916 1922 1928	Kilauea, Mauna Loa, largest active volcanoes in the world. Haleakala, 10,000 feet high; has gorgeous tropical forests, mahogany groves, and lava caves.
Hot Springs	Arkansas	1½	1832	Forty-six hot springs possessing curative properties.
Lafayette	Maine Coast	12	1916 1919	Group of beautiful high hills on Mount Desert Island.
Lassen Volcanic	Northern California	124	1916 1928	Lassen Peak, 10,577 feet in altitude. Only active volcano in continental United States. Hot springs; mud geysers; ice caves; majestic canyons.
Mesa Verde	Southwestern Colorado	77	1906 1913	Best preserved prehistoric cliff dwellings in United States.
Mount McKinley	South central Alaska	2645	1917 1922	Highest mountain in North America (altitude 20,300 feet). Higher above surrounding country than any other mountain in world.
Mount Rainier	West central Washington	325	1899 1926	Forty-eight square miles of glacier, 50 to 500 feet thick. Immense fields of wild flowers.
Platt	Southern Oklahoma	1⅓	1902 1904 1906	Numerous well-known medicinal springs.
Rocky Mountain	North middle Colorado	378	1915 1926	Heart of the Rockies; snow-topped range; peaks 11,000 to 14,250 feet high; sublime scenery.
Sequoia	California	604	1890 1926	The Big Tree National Park; 12,000 sequoia trees ranging from 10 to 36 feet in diameter; towering mountain ranges; startling precipices.
Sullys Hill	North Dakota	1⅕	1904	Beautiful small park with wood, streams, and lake; important wild-animal preserve.
Wind Cave	South Dakota	17	1903	Cavern having miles of galleries and numerous chambers containing many peculiar geological formations.
Yellowstone	Wyoming, Montana, and Idaho	3348	1872	More geysers than in all rest of world; boiling springs; mud volcanoes; petrified forests; Grand Canyon of the Yellowstone; waterfalls; vast wilderness inhabited by deer, elk, bison, bear, mountain sheep, and other wild animals.
Yosemite	California	1126	1890 1928	Valley of world famed beauty; lofty cliffs; romantic vistas; waterfalls of extraordinary height; many snow-crowned peaks; good trout fishing.
Zion	Southwestern Utah	120	1909 1918 1919	Magnificent gorge (Zion canyon), depth from 800 to 2000 feet, with precipitous walls of great beauty; picturesque scenery.

Parks and Monuments. The Federal government, most of the state governments, and many municipalities of the United States have set aside tracts of land reserved for public recreation and enjoyment. These aim to preserve areas of scenic, historic, or scientific interest, as well as to provide playgrounds for the people and, in some instances, to conserve forest growth and wild animal life. Practically all are easily accessible for automobiles.

National parks are under the management of the National Park Service. They are usually larger than national monuments, which are under the supervision of the Interior, Agricultural, and War departments. National monuments are established by proclamation of the president. In 1929, there were in the United States 20 national parks and 70 national monuments comprising a total area of 4,341,220 acres.

Besides national parks and monuments, there were, in 1929, about 360 state parks, having an area of nearly 2,740,000 acres; also 228 state forests, many of them equipped as recreation grounds, having a total extent of 3,236,048 acres. More than one-third of this state forest area was in Pennsylvania. Game preserves, located in 14 states, numbered 91, with an area of 500,106 acres. Municipal and county forests and parks had a total area of 726,577 acres. The aggregate extent of these various types of national, state, and municipal playgrounds was approximately 11,550,000 acres.

STATE PARKS*

State	No.	Acres	State	No.	Acres	State	No.	Acres
Arkansas	1	1,128	Kentucky	4	2,236	Ohio	16	30,500
California	7	14,130	Massachusetts	7	13,023	Oregon	25	963
Connecticut	36	7,695	Michigan	66	41,415	Pennsylvania	5	9,664
Florida	1	4,000	Minnesota	16	38,291	South Dakota	1	125,000
Idaho	3	8,890	Missouri	12	36,695	Washington	18	12,816
Illinois	8	2,477	Nebraska	8	1,673	Wisconsin	8	85,240
Indiana	8	6,990	New Jersey	5	12,436	Wyoming	2	1,080
Iowa	38	7,336	New York	56	2,269,752			
Kansas	5	3,577	North Carolina	3	1,640			
Total							359	2,738,647

*Based on information published by the National Conference on State Parks, 1929.

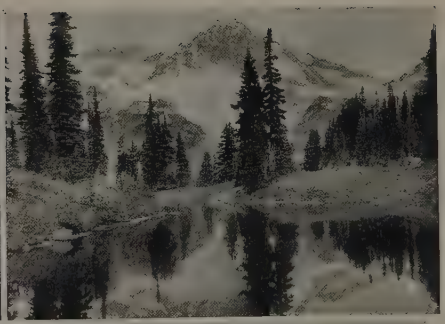


Photos from Brown Bros., New York

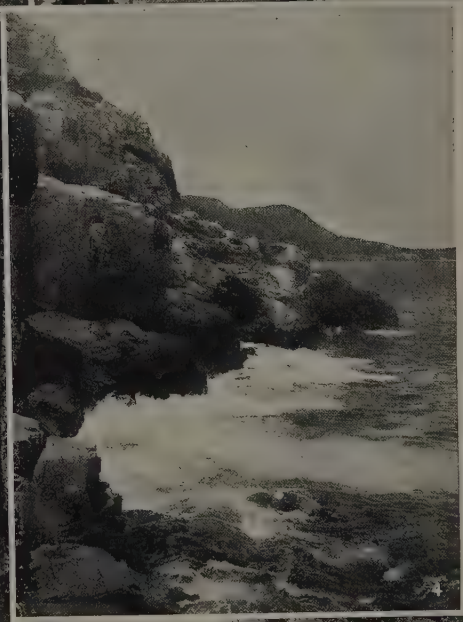
NATIONAL PARKS. I

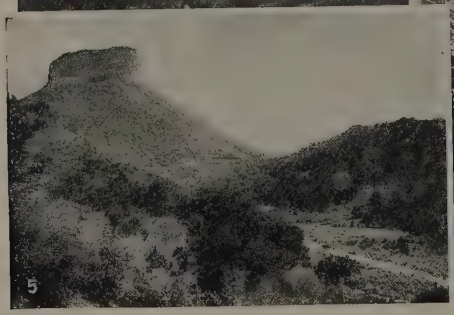
1 The Three Patriarchs, Zion National Park. 2 Zion Canyon, Zion National Park. 3 Taylor Peak, Rocky Mountain National Park. 4 Bluebird Lake, Rocky Mountain National Park. 5 Granite Park, Glacier National Park. 6 Gould Mountain, Glacier National Park.













Photos from Brown Bros., New York

NATIONAL PARKS. II

1 Summit of Mt. Rainier, Mt. Rainier National Park. 2 Mirror Lake, Mt. Rainier National Park. 3 On Evelyn's Mile, Lafayette National Park. 4 Otter Cliffs, Lafayette National Park. 5 Lookout Mt., Mesa Verde National Park. 6 Spruce Tree House, Mesa Verde National Park.

NATIONAL MONUMENTS*

Name	Location	Present Area (Acres)	Established	Distinctive Characteristics
Antietam Battlefield	Maryland	40	1890	Scene of one of the greatest battles of the Civil War.
Aztec Ruins	N. Mex.	17.2	1923	Pueblo ruins, about 500 in number.
Bandelier	N. Mex.	22,075	1916	Vast ruins of prehistoric cliff dwellings, with artificial caves.
Big Hole Battlefield	Montana	5	1910	Scene, in 1877, of a notable defeat of the Nez Percé Indians.
Cabrillo	Calif.	.5	1913	Juan Rodriguez Cabrillo first sighted land here Sept. 28, 1542.
Capulin Mountain	N. Mex.	681	1916	Cinder cone of geologically recent formation.
Carlsbad Cave	N. Mex.	719	1923	Limestone cave, believed to be largest discovered.
Casa Grande	Arizona	472	1889	Buildings of a prehistoric race. Ruins discovered in 1694.
Castle Pinckney	S. Car.	3.5	1924	Fortification built 1810 to replace a Revolutionary fort.
Chaco Canyon	N. Mex.	21,509	1907	Numerous ruins of cliff dwellings, including communal houses.
Chalmette	Louisiana	17.5	1907	Commemorates battle of New Orleans, Jan. 8, 1815.
Chickamauga and Chattanooga	Ga.–Tenn.	6,535	1890	Beautiful scenic park, embracing battlefields of Chickamauga, Missionary Ridge, and other Conflicts of the Civil War, 1863.
Chiricahua	Arizona	4,480	1924	Natural rock formations in Coronado national forest.
Colorado	Colo.	13,883	1911	Many lofty monoliths; unusual scenic beauty.
Craters of the Moon	Idaho	51,200	1924	Volcanic region with weird landscape effects.
Devils Postpile	Calif.	800	1911	Spectacular six-sided aggregation of basaltic columns.
Devils Tower	Wyoming	1,152	1906	Natural rock tower of volcanic origin, 1200 feet high.
Dinosaur	Utah	80	1915	Deposits of fossil animal remains of great scientific interest.
El Morro	N. Mex.	240	1906	Rock containing inscriptions cut by early Spanish explorers.
Fort McHenry	Maryland	47	1925	Scene of an early battle of the Civil War, 1861.
Fort Marion	Florida	18	1924	Fort built by Spaniards in 1656.
Fort Matanzas	Florida	1	1924	Relic of Spanish invasion.
Fort Niagara	New York	.007	1925	Site of cross erected by Father Millett in 1688.
Fort Pulaski	Georgia	20	1924	Fort built 1810 to replace Fort Greene dating from the Revolutionary War.
Fort Wood	N. Y. City	2.5	1924	Site of the Statue of Liberty.
Fossil Cycad	S. Dakota	320	1922	Area rich in fossil plants.
Fredericksburg and Spotsylvania	Virginia	‡	1927	Scene of battles in Civil War.
Gettysburg	Penn.	2,530	1895	Beautiful natural park. Scene of great Civil War combat, 1863.
Gila Cliff Dwellings	N. Mex.	160	1907	Highly interesting remains of cliff dwellings.
Glacier Bay	Alaska	†1,820	1925	Tidewater glaciers of first rank.
Gran Quivira	N. Mex.	560	1909	Important relic of Spanish missions in the United States.
Guilford Courthouse	N. Car.	131	1917	Near Greensboro. Scene of great battle of the Revolution, 1781.
Hovenweep	Utah—Col.	286	1923	Groups of prehistoric towers and pueblo ruins.
Jewel Cave	S. Dakota	1,280	1908	Vast limestone cavern of extraordinary beauty.
Katmai	Alaska	†1,700	1918	Volcanic phenomena; "Valley of Ten Thousand Smokes."
Lava Beds	Calif.	45,967	1925	Ice caves. Battleground Modoc Indian War, 1873.
Lehman Caves	Nevada	593	1922	Limestone caverns of much beauty and scientific interest.
Lewis & Clark Cavern	Montana	160	1908	Immense limestone cavern; magnificent stalactites.
Lincoln's Birthplace	Kentucky	110	1916	Contains log cabin where Abraham Lincoln was born.
Meriwether Lewis	Tennessee	50	1925	Contains grave of Lewis of Lewis and Clark expedition.
Montezuma Castle	Arizona	160	1906	Prehistoric cliff-dwelling in the face of a high cliff.
Moores Creek	N. Car.	30	1926	Scene of a memorable battle of the Revolutionary War.
Mound City Group	Ohio	57	1923	Prehistoric mounds in Camp Sheridan military reservation.
Mount Olympus	Wash.	299,370	1909	Many glaciers; breeding ground of the Olympic elk.
Muir Woods	Calif.	426	1908	Noted redwood grove; located 7 miles from San Francisco.
Natural Bridges	Utah	2,740	1908	Three natural bridges, largest 222 feet high, 65 feet thick at top of arch; arch is 28 feet wide; span 261 feet.
Navajo	Arizona	360	1909	Numerous ancient pueblos, or ruins of cliff dwellings.
Old Kasaan	Alaska	38	1916	Abandoned Indian village.
Oregon Caves	Oregon	480	1909	Vast caves of dazzling whiteness popularly called "Marble Halls." Hundreds of galleries worn through white limestone.
Papago Saguaro	Arizona	1,940	1914	Desert flora; pictographs; curious rock formations.
Petersburg	Virginia	185	1926	Scene of Civil War conflicts.
Petrified Forest	Arizona	25.625	1906	Petrified trees; one forms a natural bridge.
Pinnacles	Calif.	2,980	1908	Many spirelike rock formations, 600 to 1000 feet high.
Pipe Spring	Arizona	40	1923	Spring of pure water in desert region.
Rainbow Bridge	Utah	160	1910	Natural bridge 309 feet above water; span is 278 feet.
Scotts Bluff	Nebraska	1,894	1919	Many early pioneer trails passed over this natural monument.
Shiloh	Tenn.	3,546	1894	Embraces the battlefield of Shiloh, near Pittsburg Landing.
Shoshone Cavern	Wyoming	210	1909	Cavern of great extent; near Cody.
Sitka	Alaska	57	1910	Park of great natural beauty, scene of massacre of Russians by Indians. Contains 16 totem poles of native workmanship.
Stones River	Tennessee	‡	1927	Scene of Civil War battle, Dec. 31, 1862-Jan. 2, 1863.
Timpanogo's Cave	Utah	250	1922	Limestone cavern.
Tonto	Arizona	640	1907	Cliff dwellings in an unusually good state of preservation.
Tumacacori	Arizona	10	1908	Rebuilt ruin of a very early Franciscan mission.
Verendrye	N. Dakota	253	1917	Includes Crowhigh Butte, from which Verendrye first beheld territory beyond Missouri river.
Vicksburg	Miss.	1,323	1899	Scene of the siege and surrender of Vicksburg, 1863.
Walnut Canyon	Arizona	960	1915	Cliff dwellings of much scientific and popular interest.
Wheeler	Colo.	300	1908	Extinct volcano of great geological value. Strange erosion.
White Plains Battlefield	New York	None	1926	Tablet marking position of Washington's army.
Wupatki	Arizona	2,234	1924	Prehistoric dwellings of ancestors of Hopi Indians.
Yucca House	Colo.	9.6	1919	Relics of a prehistoric people.

* Includes national military parks. † Square miles. ‡ Area undetermined.

NEW ENGLAND STATES

The New England states, comprising Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, are situated in the northeastern part of the United States. The total area of these six states, 66,424 square miles, is less than the area of Oklahoma, 70,057 square miles, while the total population, 7,400,909, is more than three times the population of that state, 2,028,283.

Surface. The principal upland regions of New England are the old, worn-down White mountains in New Hampshire, the Green mountains in Vermont, and the Berkshire Hills in Massachusetts. Numerous harbors, formed from submerged valleys, indent the coast. Northern New England has many small lakes noted for scenic beauty. The Rangeley lakes in Maine and lakes Sunapee and Winnepesaukee in New Hampshire are popular summer resorts.

Rivers. New England is well watered. Many of the rivers are broken by falls or rapids, and some of these furnish hydroelectric power. The Connecticut, Penobscot, Kennebec, Mystic, Charles, and Thames are navigable for steamers. The Merrimac is said to turn more factory wheels than any other stream in the world.

Climate. The climate is continental. Winter, a very cold season, is rendered more unpleasant by the humidity of the air. Northeast winds passing over the cold Labrador current flowing along the New England shore are chilled and, blowing inland, bring heavy snows in winter and cause fogs and cold rains in summer. The southeast winds are much milder, as they sweep over warm ocean currents from the Gulf of Mexico.

Minerals. New England has but little mineral wealth. Building stones, feldspars, and various clays are found. Granite, basalt, marble, and slate are the chief quarry products, and rank in importance in the order named. Among these states, Vermont stands first in total value of quarry products, with Massachusetts second, and New Hampshire third. Besides leading in the production of granite, Vermont quarries large quantities of slate and much beautiful marble. In each of the New England states, except Connecticut in which basalt leads, granite is the most valuable quarry product.

Fisheries. Fishing early became a prominent industry, the nearness of rich fishing grounds attracting a large class of workers. Cod, halibut, mackerel, swordfish, haddock, hake, herring, and pollock are the principal catches. Oysters, clams, crabs, lobsters, and shrimps form important items in the total annual value of the fisheries. Menhaden are taken in immense quantities for oil and fertilizing material. In amount and value of sea fish taken, Massachusetts ranks as the leading state in the Union.

Forests. Forests still cover large tracts of land in this section, especially in Maine, New Hampshire, and Vermont. The pine is the most common tree. Spruce is cut in Maine for making paper and wood pulp, the principal manufactures of the state. Maine was once the chief timber producing state in the Union, and it still ships considerable lumber to foreign countries. The United States government has set apart a large tract in the White Mountain region as a forest reservation.

Agriculture. Much of New England is stony and difficult to cultivate, and abandoned farms are not uncommon. The Connecticut valley, however, has very fertile soil, and there is also considerable good farm land in the valleys of several smaller rivers. Hay is the chief crop. Potatoes, rye, corn, and oats are also raised. Connecticut Valley tobacco ranks second only to Cuban tobacco. Dairying is an important occupation, especially in Vermont. Market gardening for the cities has become a profitable industry in recent years. Apples, pears, and cherries are the chief orchard fruits.

Manufacturing. In all these states, manufacturing is the principal occupation. Hundreds of different articles are made. Among the chief products are cottons, woolens, metal wares, boots and shoes, leather, paper, brass goods, machinery, electrical apparatus, clothing, rubber goods, barbed wire, carpets, and refined sugar. Every city in this division is a manufacturing center. Shipbuilding, once an important industry, has declined greatly since steel took the place of wood in the construction of seagoing vessels.

Many western states have counties each larger than southern New England. This section lacks coal, iron, copper, lead, zinc, timber, wool, cotton, hides—in short, all the basic materials of industrial work in mill, factory, or machine shop. Yet the intelligence, skill, energy, and inventiveness of its people have made southern New England the greatest center of diversified manufacturing in the Union. Massachusetts is a striking example. Forty-three states exceed it in area. It has a barren soil and an inhospitable climate. Yet in population it stands sixth among the states, and its enormous manufacturing output gives it still higher rank in commerce and in wealth.

Commerce. The seaboard states have a large commerce, both domestic and foreign, and the harbors of their important ports are crowded with shipping at all times of the year. Manufactures constitute the bulk of the exports; the imports consist mainly of raw materials from various parts of the globe. The West India trade—a trade long associated with New England merchants—is very valuable. Numerous railroads link this section with the rest of the Union; and trolley lines and surfaced highways facilitate inland traffic. The principal ports are Boston, Mass., Portland, Me., Providence, R. I., Portsmouth, N. H., and New Haven, Conn.

MIDDLE ATLANTIC STATES

Because of their medial position with reference to the seaboard, and on account of a general similarity in surface features, the states of New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and West Virginia are generally grouped together. The first four have been called the "Middle" states and the last three have been placed with "South Atlantic" or "Southern" states. By some, the first three are styled "Middle Atlantic" while all the others are called "South Atlantic" states.

The total area of the states comprising this group is less than one-sixteenth of the entire area of the country. Yet these seven states have one-fourth of the population, own more than one-third of the manufacturing capital, and contain nearly two-fifths of the wage earners of the United States. Favorable geographical conditions have fostered the remarkable economic growth shown by these figures.

Surface. The Appalachian Mountain system extends across this group of states from northeast to southwest, and the coastal plain gradually widens southward. On the west side of the mountains is the Allegheny plateau. It is a rugged area, sloping toward the Mississippi, and is but thinly populated. Numerous bays and inlets indent the Atlantic coast, and several of them form excellent harbors.

The coastal plain is low and sandy, and much of it is bordered by swamps. Some of the rivers are navigable and add greatly to the transportation facilities of the region. Among the more important tidal streams are the Hudson, the Delaware, the Patapsco, and the James. The Ohio river on the west is a great artery of interstate trade. The shores of Chesapeake bay are dotted with ports actively engaged in coastwise traffic.

GROWTH OF THE UNITED STATES IN POPULATION, 1820-1920

STATE	Population 1820	Population 1850	Population 1880	Population 1910	Population 1920	% of inc. 1910–20	Rank	Largest City
Alabama	127,901	771,623	1,262,505	2,138,093	2,348,174	9.8	18	Birmingham
Arizona	.....	.....	40,440	204,354	334,162	63.5	45	Phoenix
Arkansas	14,273	209,897	802,525	1,574,449	1,752,204	11.3	25	Little Rock
California	.....	92,597	864,694	2,377,549	3,426,861	44.1	8	Los Angeles
Colorado	.....	.....	194,327	799,024	939,629	17.6	33	Denver
Connecticut	275,248	370,792	622,700	1,114,756	1,380,631	23.9	29	New Haven
Delaware	72,749	91,532	146,608	202,322	223,003	10.2	46	Wilmington
Dist. Columbia	33,039	51,687	177,624	331,069	437,571	32.2	..	Washington
Florida	.....	87,445	269,493	752,619	968,470	28.7	32	Jacksonville
Georgia	340,989	906,185	1,542,180	2,609,121	2,895,832	11.0	12	Atlanta
Idaho	.....	.....	32,610	325,594	431,866	32.6	42	Boise City
Illinois	55,211	851,470	3,077,871	5,638,591	6,485,280	15.0	3	Chicago
Indiana	147,178	988,416	1,978,301	2,700,876	2,930,390	8.5	11	Indianapolis
Iowa	.....	192,214	1,624,615	2,224,771	2,404,021	8.1	16	Des Moines
Kansas	.....	.....	996,096	1,690,949	1,769,257	4.6	24	Kansas City
Kentucky	564,317	982,405	1,648,690	2,289,905	2,416,630	5.5	15	Louisville
Louisiana	153,407	517,762	939,946	1,656,388	1,798,509	8.6	22	New Orleans
Maine	298,335	583,169	648,936	742,371	768,014	3.5	35	Portland
Maryland	407,350	583,034	934,943	1,295,346	1,449,661	11.9	28	Baltimore
Massachusetts	523,287	994,514	1,783,085	3,366,416	3,852,356	14.4	6	Boston
Michigan	8,896	397,654	1,636,937	2,810,173	3,668,412	30.5	7	Detroit
Minnesota	.....	6,077	780,773	2,075,708	2,387,125	15.0	17	Minneapolis
Mississippi	75,448	606,526	1,131,597	1,797,114	1,790,618	-0.4*	23	Meridian
Missouri	66,586	682,044	2,168,380	3,293,335	3,404,055	3.4	9	St. Louis
Montana	.....	.....	39,159	376,053	548,889	46.0	39	Butte
Nebraska	.....	.....	452,402	1,192,214	1,296,372	8.7	31	Omaha
Nevada	.....	.....	62,266	81,875	77,407	-5.5	48	Reno
New Hampshire	244,161	317,976	346,991	430,572	443,083	2.9	41	Manchester
New Jersey	277,575	489,555	1,131,116	2,537,167	3,155,900	24.4	10	Newark
New Mexico	.....	61,547	119,565	327,301	360,350	10.1	43	Albuquerque
New York	1,372,812	3,097,394	5,082,871	9,113,614	10,385,227	14.0	1	New York
North Carolina	638,829	869,039	1,399,750	2,206,287	2,559,123	16.0	14	Winston-Salem
North Dakota	.....	.....	.....	577,056	646,872	12.1	36	Fargo
Ohio	581,434	1,980,329	3,198,062	4,767,121	5,759,394	20.8	4	Cleveland
Oklahoma	.....	.....	.....	1,657,155	2,028,283	22.4	21	Oklahoma City
Oregon	.....	13,294	174,768	672,765	783,389	16.4	34	Portland
Pennsylvania	1,049,458	2,311,786	4,282,891	7,665,111	8,720,017	13.8	2	Philadelphia
Rhode Island	83,059	147,545	276,531	542,610	604,397	11.4	38	Providence
South Carolina	502,741	668,507	995,577	1,515,400	1,683,724	11.1	26	Charleston
South Dakota	.....	.....	135,177	583,888	636,547	9.0	37	Sioux Falls
Tennessee	422,823	1,002,717	1,542,359	2,184,789	2,337,885	7.0	19	Memphis
Texas	.....	212,592	1,591,749	3,896,542	4,663,228	19.7	5	San Antonio
Utah	.....	11,380	143,963	373,351	449,396	20.4	40	Salt Lake City
Vermont	235,981	314,120	332,286	355,956	352,428	-1.0	44	Burlington
Virginia	1,065,366	1,421,661	1,512,565	2,061,612	2,309,187	12.0	20	Richmond
Washington	.....	.....	75,116	1,141,990	1,356,621	18.8	30	Seattle
West Virginia	.....	.....	618,457	1,221,119	1,463,701	19.9	27	Wheeling
Wisconsin	.....	305,391	1,315,497	2,333,860	2,632,067	12.8	13	Milwaukee
Wyoming	.....	.....	20,789	145,965	194,402	33.2	47	Cheyenne
Total	9,638,453	23,191,876	50,155,783	91,972,266	105,710,620	14.9		

* Minus signs denote decreases.

Climate. Between the northern and southern limits of this division the distance is nearly 600 miles. This distance, together with variations in surface features, causes marked differences in the climatic conditions of the northern and southern parts. In northern New York the mean winter temperature is 17° F.; in southern Virginia, 35° F. The summer temperature averages 60° F. along the northern boundary of this group of states and 75° F. along the southern. The fruit belt of western New York owes its favorable climate to the equalizing influence of Lake Erie and Lake Ontario. The Gulf Stream passes near the Virginia coast and moderates the winds blowing from the ocean. In all the states of this division the rainfall is amply sufficient for farming.

Mining. Iron is found in all the states except Delaware. Enormous quantities of coal are mined in Pennsylvania, West Virginia, Maryland, and Virginia. Petroleum, first discovered in Pennsylvania in 1859, is produced in that state, in New York, and in West Virginia. Natural gas, piped from the gas fields, is utilized for heating and lighting in many cities.

Their vast supplies of coal, iron, petroleum, and natural gas, the basic materials of industrial wealth, have enabled these states to lead the nation in various steel and iron manufactures.

Forests. Northern New York is well forested, and much forest land in the Adirondack region is under the protection of the state. In the Appalachians, the United States government has reserved extensive forested tracts. Hemlock is the principal timber cut in New York and Pennsylvania. Spruce for making wood pulp is obtained chiefly in New York and in West Virginia. Oak, maple, poplar, walnut, and other broad-leaved trees are common in all these states. Yellow pine is an important source of lumber in Virginia, and cypress and cedar are found in the coastal swamps. The hardwoods produced in this group of states come mostly from West Virginia.

Agriculture. In these states, agriculture has always been an important industry. There is much fertile soil, and large crops of grains, potatoes, apples, peaches, pears, grapes, and strawberries are grown. Virginia ranks as one of the leading tobacco states. Peanuts also form an important crop in that state. Buckwheat is grown extensively in Pennsylvania and in New York. Peas, corn, tomatoes, berries, and orchard fruits are canned in enormous quantities. Market gardening is a profitable occupation near the large centers of population Much attention is paid to dairying, especially in New York. The annual output of butter and cheese is very large. Vast quantities of milk are supplied to the great cities in this section. Besides cattle, the other large farm animals most commonly reared are horses, sheep, and hogs. Poultry raising is an important industry.

Fisheries. Fishing is an occupation of great importance. Oysters form the most valuable single item. Shad, bluefish, and mackerel are taken in the

bays and rivers. Lakes Erie and Ontario furnish large quantities of lake trout, pike, ciscoes, and other food fish.

Manufacturing. In this section, manufacturing is the foremost industry. New York, called the Empire State, ranks first in the Union in manufacturing as well as in population, wealth, and commerce. Of its long list of diversified manufactures, the most valuable single industrial product is wearing apparel. Other important manufactures of this division of states are iron and steel wares, foundry and machine shop products, chemicals, woolen goods, silk, glass, and leather goods. Oil refining is the leading industry in New Jersey.

Commerce. The commercial supremacy of this group of states arises from favoring geographic conditions and from abundant transportation facilities. Two-thirds of the foreign commerce of the United States passes through New York, Philadelphia, Baltimore, and other ports of this division. Unsurpassed facilities for collecting raw materials and for distributing manufactured goods account for the growth of the larger industrial cities. Equal facilities for gathering and for distributing exports have made several cities great seaports.

The Great Lakes aid the growth of the Middle Atlantic states by furnishing a waterway for transporting raw materials needed in many industries. Of high value also are the Hudson and Mohawk valleys. These furnish easy routes of rail, river, and canal communication between the Atlantic seaboard and the West. The New York State Barge canal connects the Hudson river with the Great Lakes. The Allegheny and Monongahela rivers, uniting to form the Ohio, afford water transportation between this group of states and the central and southern parts of the United States.

CENTRAL STATES

The large division of the Union called the Central states consists of Kentucky, Ohio, Indiana, Illinois, Michigan, Wisconsin, Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, and Kansas.

Surface. Prairies occupy a large part of this division. They are level or gently rolling and for the most part are covered with a rich dark soil. On such plains modern farm machinery can be used to great advantage; hence the central and eastern parts have become the chief agricultural regions of the United States.

Along the western border there is considerable highland, including the Black Hills, noted for their gold mines. In the southwest corner of South Dakota are the famous Bad Lands. These consist of a maze of ridges and pinnacles of sandstone; the soil is mostly bare clay of different colors, and the whole region is very difficult of travel.

Rivers. Most of this division is drained by the Mississippi and its affluents. Six of the states, however, border on the Great Lakes and are in part in the Saint Lawrence basin. Some streams in Minnesota, North Dakota, and South Dakota flow into the Red River of the North. Hence the waters of the Central states find their way into the Atlantic through the Gulf of Mexico, the Saint Lawrence gulf, and Hudson bay. Besides the hundreds of streams that water this vast valley, there are thousands of small lakes that dot the surface, especially in Minnesota and in North Dakota. The principal rivers navigable by steamboats are the Mississippi, Missouri, Ohio, Wabash, Illinois, and Red River of the North.

Climate. In the north, the winter is long and extremely cold weather prevails, while the summers are short and hot. Along the southern border, in Kentucky, Missouri, and Kansas, the climate is milder. Snow seldom falls there and never stays on the ground long. The rainfall is sufficient for farming over all this division, except in the extreme western plains.

Minerals. This group of states is very rich in mineral wealth. Coal is mined extensively in Kentucky, Iowa, Indiana, Ohio, Kansas, and Illinois, the last ranking third among the coal producing states of the Union. Petroleum wells are in operation in Kentucky, Indiana, Kansas, and Illinois. Natural gas is produced in several states, notably in Illinois and Indiana. Gold, silver, lead, zinc, potter's clays, building stone, gypsum, asbestos, and graphite are obtained. Michigan has long been noted for its yield of copper and salt. In Minnesota and Michigan there are vast deposits of iron ore. Because of this supply, made available by cheap transportation, great centers of the iron industry have been developed on lakes Michigan and Erie.

Forests. Michigan, Wisconsin, and Minnesota, once leaders in the cutting of timber, are still important producers of lumber and pulp wood. Pine for lumber and spruce and hemlock for pulp wood are the principal items in the annual timber cut. Despite the destruction of the chief forests, large woodlands still exist in several of the states, and forest industries furnish employment for many workers.

Agriculture. Every crop known to the temperate zones can be grown in this division. Hundreds of millions of bushels of corn, oats, barley, rye, and wheat are raised annually. Hay, potatoes, vegetables, and orchard fruits are important crops. Tobacco is cultivated in the eastern part of this division. Kentucky is the leading state in the Union in tobacco production. Sugar beets are grown in ten states in this group; Michigan, Nebraska, and Ohio lead in sugar beet production. Flax is grown in the northwest. No other section of equal area on the globe rivals the central Mississippi valley in agricultural productiveness. Even on the higher western plains, abundant harvests are reaped wherever the land is irrigated.

Live Stock. Cattle, horses, mules, and hogs (fattened on corn) are raised in immense numbers. Sheep are reared in every state, and the annual wool clip totals about one-third of that of the entire United States. Dairy interests, already very large, are becoming increasingly valuable. Butter, cheese, and condensed milk from this division now go to all parts of the civilized world. Poultry farming is a profitable occupation.

Manufacturing. The range in manufacturing is exceedingly extensive. In several states the manufactures surpass in value the farm products. More automobiles are made in this division than in all the rest of the world. Meat packing is so vast an industry that it influences prices in every city in the United States. Much of the world's supply of flour is milled in these states.

The iron and steel interests, concentrated in centers of industry in northern Ohio, Indiana, and Illinois, employ many thousands of workers. The yearly output of refined petroleum represents many millions of dollars. Glass, furniture, wearing apparel, foundry and machine shop products, pottery, lumber, agricultural implements, tobacco goods, chemicals, metal wares, farm machinery, boots and shoes, beet sugar, paints and varnishes are other products whose aggregate output is enormous.

Fisheries. The Great Lakes supply annually over 100 million pounds of fish. Whitefish, ciscoes or lake herring, and lake trout constitute the principal catch. The frozen fish industry has become extensive.

Commerce. The states in this division have excellent railway facilities. Within their borders are operated more than 100,000 miles of railways, or about two-fifths of the entire railway mileage of the United States. The Ohio river and the Mississippi

river are important arteries of commerce. Fleets of steamers, handling an enormous tonnage, ply on the Great Lakes. In connection with the lake traffic, the New York State Barge canal is used to transport various raw materials to the Hudson river, which serves as the final link in an all-water connection with the seaboard. But by far the larger part of the foreign shipments reach the great eastern seaports, New York, Boston, Philadelphia, and Baltimore, by railroad.

SOUTHERN STATES

Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas comprise the Southern states.

This division of the Union is bounded on the north by the Middle Atlantic states and by the Central states; on the east by the Atlantic Ocean; on the south by the Gulf of Mexico and Mexico; and on the west by New Mexico. The shortest distance between the extreme eastern and western limits is about 1700 miles. The width from north to south varies from about 425 to 850 miles. The total area of these eleven states is 780,025 square miles, or more than one-fourth of the area of the continental United States. For convenience of reference this division is treated in two sections—an eastern section and a western.

EASTERN SECTION

North Carolina, South Carolina, Tennessee, Georgia, Florida, Alabama, and Mississippi constitute the eastern section of the Southern states.

Surface. The Appalachian Mountain system, occupying much of this section and broadening out in the north, reaches its highest point in Mt. Mitchell, 6711 feet high, in North Carolina. Southward the mountains diminish in height until, in Alabama, they become low hills. All Florida and Mississippi, and parts of North Carolina, South Carolina, Georgia, and Alabama, are in the coastal plain. The principal rivers, including the Mississippi, Savannah, Saint John's, and Cape Fear, are navigable for steamers.

Climate and Rainfall. Along the Gulf coast, a region of heavy rains, the temperature averages about 85° F. in summer and 50° F. in winter. On the Atlantic shore, the climate is almost as warm, though not so humid. The climate of the upland districts is cool and bracing. Flowers bloom the year round in the more southern section, and the mildness of the climate draws numerous visitors to the winter resorts along both the Atlantic and the Gulf coast. From 40 inches to 60 inches of rain a year falls in the seaboard districts.

Minerals. Coal and iron ore are mined in Tennessee and Alabama, and mica in North Carolina. Tennessee produces excellent marble. Granite, limestone, and sandstone are abundant. Florida has large deposits of phosphate rock. In all these states there are numerous beds of potter's clay and other minor minerals.

Forests. Forests overspread thousands of square miles, the trees including yellow pine, cypress, hickory, ash, maple, and other hardwoods. In size and variety of species the forest trees of this section exceed those of all other parts of the Union, except the Pacific states. Lumbering is an important industry in many sections.

Agriculture. The chief occupation is farming. All the crops of the Temperate Zone can be grown in these states. Cotton is the most valuable single crop. Sea-island cotton is grown along the Atlantic coast. Millions of acres are devoted to corn and tobacco. Oats, white potatoes, peanuts, sweet potatoes, hay, wheat, and fruits are also widely cultivated. Rice is raised in the coast belt. Apples, plums, pears, watermelons, strawberries, peaches, and grapes grow in abundance. Southern Florida produces pineapples, figs, oranges, grapefruit, avocados, guavas, and other subtropical fruits. Garden vegetables are grown extensively for northern markets. Many thousands of bushels of strawberries are shipped north every spring by fast-freight trains. Similarly, oranges, grapefruit, and various vegetables are sent in winter.

Fisheries. Oysters are obtained along the Atlantic shore. Bluefish, mullet, shad, mackerel, kingfish, tarpon, and other sea fish are caught. Valuable fisheries, including sponge fishing, are established on the Florida coast.

Stock Raising. Hogs, horses, mules, sheep, and cattle are raised in every state. Dairying has become an important industry. Milk, butter, and cheese are produced in large quantities.

Manufacturing. Manufacturing is developing rapidly in this section. Among the important industrial products are cotton textiles, cottonseed oil, cottonseed cake, lumber, iron and steel, tobacco goods, and naval stores. Cigars and cigarettes are made in great quantities in North Carolina and in Florida. In recent years, cotton mills have increased rapidly in number, and cotton goods now form the leading industrial product. North Carolina is second only to Massachusetts in cotton manufacturing. Flour milling and woodworking are valuable industrial interests. Iron and steel products are made in Tennessee and in Alabama. The canning of fruits and vegetables is a growing industry in all these states. In this group, Georgia, Tennessee, and Alabama lead in manufactures in the order named. Among important industrial centers are Atlanta, Ga., Birmingham, Ala., Winston-Salem, N. C., Memphis, Tenn., and Nashville, Tenn.

Commerce. Much merchandise for export is shipped down the Mississippi to New Orleans, where it is transferred to seagoing vessels. Portions of other rivers are utilized to some extent as inland waterways. Cotton is the largest export of this section. Pine lumber, phosphate rock, and naval stores are also sent abroad in large quantities. There are ample facilities for transportation by rail to all parts of the Union. The principal seaports serving these states are Wilmington, N. C., Charleston, S. C., Savannah, Ga., Jacksonville, Fla., Tampa, Fla., Pensacola, Fla., Mobile, Ala., and New Orleans, La.

WESTERN SECTION

Arkansas, Louisiana, Texas, and Oklahoma form the western section of the Southern states.

Surface. The northeastern part of this section is included in the Ozark plateau. This upland extends into the northern part of Arkansas and into the eastern part of Oklahoma. Louisiana and southeastern Texas lie in the coastal plain. The elevated western parts of Texas and Oklahoma form the southern extension of the Great Plains. The principal rivers are the Mississippi, Red, Brazos, Sabine, Trinity, and Colorado. All these drain into the Gulf of Mexico.

Climate and Rainfall. An abundant rainfall occurs over the eastern and southern parts of this section, while on the western side, which is mostly an elevated plain, the rainfall seldom exceeds 20 inches annually. The extreme southwest is dry. The summers are long and hot, but the Gulf winds lower the temperature, and winter is a pleasant season.

Agriculture. Agriculture is the chief source of wealth. Rich soil and favorable climate make it possible to grow in this section any crop of the Temperate Zone. Cotton is the principal crop. Other important products are rice, corn, potatoes, sweet potatoes, hay, wheat, tobacco, and numerous fruits.

Vegetables are grown in enormous quantities for the northern markets. Louisiana is the leading state in sugar production. Texas is a large producer in several lines of agriculture. It is easily the first state in cotton. Texas also leads all the other states in value of crops produced. These frequently approximate a billion dollars in total value.

Lumbering. There are great forests of pine and cypress in the coastal plain and immense forests of hardwoods in high lands in the interior. This section is one of the chief timber regions of the country. Louisiana is the second state in the Union in lumber production.

Minerals. Sulphur mining is important in Louisiana and Texas. These states now furnish the world's chief supply of sulphur. Bauxite, the most valuable ore of aluminum, is obtained in Arkansas. In Oklahoma, Texas, and Louisiana, immense quantities of petroleum and natural gas are found. The Oklahoma oil field yields a very substantial proportion of the annual output of the petroleum of the United States. Beds of rock salt are worked in both Louisiana and Texas. Manganese, potter's clay, quicksilver, coal, and copper are other valuable minerals obtained in this section. Building stone is abundant in all the states.

Stock Raising. The farm animals reared in this section bring enormous sums annually. Texas is the chief cattle raising state. Mules, horses, hogs, and sheep also are raised in great numbers. Texas ranks as one of the foremost wool producing states. The wool clip of Texas normally exceeds 25 million pounds annually.

Manufacturing. The principal manufactures of this section are petroleum products, lumber, refined sugar, packed meats, flour, cottonseed oil, and cottonseed cake. The manufacture of ice is a growing industry. Louisiana leads the group in the refining of cane sugar and in rice polishing, rice and sugar cane being distinctive crops of that state. Oklahoma ranks highest in the production of flour. Texas leads in manufactures, and is followed by Louisiana, Oklahoma, and Arkansas in the order named.

Commerce. The eastern part of the section has ample transportation facilities, and the thinly populated western section is crossed by numerous railways. Railroads connect all the commercial centers with the large cities east and north, and the rivers furnish hundreds of miles of waterways navigable for steamboats. The chief seaports are New Orleans, La., and Galveston and Port Arthur, Texas. Important inland cities are Little Rock, Ark., Shreveport, La., Oklahoma City and Tulsa, Okla., Dallas, Fort Worth, Houston, San Antonio, and El Paso, Texas.

PUBLIC LAND, 1926

Areas Unappropriated and Unreserved

State	Surveyed Acreage	Unsurveyed Acreage	Total Acreage
Alabama	30,020	2,240	32,260
Arizona	8,978,665	9,112,046	18,090,711
Arkansas	221,316	.....	221,316
California	14,951,844	5,715,587	20,667,431
Colorado	6,437,997	960,410	7,398,407
Florida	3,418	1,040	4,458
Idaho	8,876,277	2,114,193	10,990,470
Louisiana	9,597	.....	9,597
Minnesota	250,256	.....	250,256
Montana	6,426,824	270,100	6,696,924
Nebraska	32,611	.....	32,611
Nevada	31,184,663	22,741,030	53,925,693
New Mexico	14,783,889	1,615,142	16,399,031
North Dakota	133,237	.....	133,237
Oklahoma	28,772	.....	28,772
Oregon	13,050,967	205,463	13,256,430
South Dakota	300,956	.....	300,956
Utah	13,411,358	13,460,860	26,872,218
Washington	886,783	9,424	896,207
Wyoming	19,138,284	711,478	19,849,762
Total	139,137,734	56,919,013	196,056,747

PLATEAU STATES

The Plateau states division of the Union is composed of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. These states cover more than 850,000 square miles, or more than one-fourth of the total area of the United States. Idaho, the smallest state in the group, is larger than all the New England states combined.

Surface. This division embraces most of the region occupied by the Rocky Mountain system in the continental United States. The surface is mainly a series of plateaus surmounted by lofty ranges, which attain their greatest height in Colorado. The mean or average elevation of the Plateau states is approximately 5300 feet, or slightly more than one mile, above sea level. Colorado and Wyoming have the highest average elevation; Montana and Arizona, the lowest. In all of the states there are mountains which rise above 12,000 feet. Peaks more than 13,000 feet high are found in Nevada, New Mexico, Utah, and Wyoming. In Colorado, many summits rise above 14,000 feet.

In geological times, this vast upland was a scene of tremendous volcanic action. There are many extinct volcanoes, and ancient lava beds cover many thousand square miles. The great geysers of Yellowstone park are situated in a volcanic region.

Rivers. The Plateau states are drained chiefly by streams belonging to two great drainage systems, the Gulf and the Pacific. Important rivers whose waters reach the Gulf of Mexico are the Rio Grande, the Arkansas, the Platte, the Yellowstone, and the Missouri. The principal rivers whose waters finally flow into the Pacific are the Colorado, Green, Grand, Snake, and Clark Fork. The Green and the Grand are affluents of the Colorado; the Snake and Clark Fork are tributaries of the Columbia.

The streams of the Great Basin, a very dry region comprising much of western Utah and nearly all of Nevada, usually flow only during the brief rainy season. They either disappear in sandy valleys or discharge their scanty waters into alkaline lakes having no outlet. The Humboldt, the largest river in Nevada, flows nearly across the state from east to west. It empties into the Humboldt and the Carson sinks where its waters evaporate, leaving alkaline deposits. Similarly, the Sevier river, the longest stream in western Utah, flows into the salty Sevier lake. The Weber, the Bear, and the Jordan are small rivers which empty into Great Salt lake.

Climate. Because of a wide range in latitude, great variations in altitude, and marked diversity of surface features, the Plateau states have many varieties of climate. On the highest mountains, arctic conditions prevail. In the elevated plains at the base of the mountains there are severe extremes of heat and cold. In the far southwest are some of the hottest desert areas known.

The widest extremes of temperature are observed on the high plains of Montana, flanking the eastern base of the Rockies. Here temperatures ranging from about 60° below zero in winter to 108° above zero in summer have been noted. In southwestern Arizona, near the Mexican border, summer temperatures of 120° have been recorded, but in winter the thermometer rarely falls below freezing. The climate of the various interior parts of the Plateau states is similar, but with less pronounced extremes.

A noteworthy feature of the climate of the plateau region is the great daily variation in temperature which takes place, especially in summer. No matter how warm the days, the nights are almost invariably cool, even in the hottest deserts.

Strong winds, which prevail in many sections, often exercise a marked influence on the climate. A well-known example is the so-called chinook, a warm wind which, sweeping down the eastern slope of the Rockies and far out on the adjacent plains, sometimes melts heavy snowfalls within a few hours.

Notwithstanding severe extremes, the climate of the Plateau states is dry and invigorating, and, on the whole, unusually salubrious.

Rainfall. On one-fifth of the United States the rainfall is so light that agriculture cannot be successfully carried on without irrigation. Most of the dry area is in this division. Because of scanty rainfall, all these states have tracts of true desert. Thousands of square miles also are covered with alkali deposits. These dreary wastes have often no vegetation whatever. In other sections, the traveler may ride for hours over dusty plains, with yuccas, cactuses, greasewoods, or sagebrushes the only conspicuous plants in sight. These require but very little moisture.

Forests. In all of the Plateau states, forests are found on the slopes of the mountains. The trees are generally pines, spruces, firs, and other conifers. About one-sixth of the total area is more or less wooded. In each state there are large forested districts under government protection. These reserves, some 90 in all, are known as national forests. Their total area, about 138,000 square miles, is greater than that of any state in the group except Montana. Among the Plateau states, Idaho, with nearly 30,000 square miles of protected woodlands, has the greatest area in national forests. Montana ranks second, with Colorado, Arizona, New Mexico, Wyoming, and Utah following in the order named. Nevada, with reserves of 7775 square miles, ranks last. See *Forests, U. S. National*, page 1308.

Minerals. The Plateau states are exceedingly rich in mineral wealth. Among important mineral productions are gold, silver, copper, coal, petroleum, lead, tungsten, uranium, vanadium, gems, and precious stones. In gold production, Colorado and Arizona rank highest in the group. Utah, Montana, Idaho, and Nevada are the chief producers of silver in the United States. In copper production, Arizona stands first, while Utah and Montana also rank among the most important copper producing states of the Union. Colorado, Wyoming, Utah, and New Mexico have valuable coal deposits. Wyoming contains rich petroleum fields. Colorado and Utah have important deposits of uranium and vanadium minerals, and Nevada and Colorado stand first in the production of tungsten.

Agriculture. Dry farming is successfully practiced in some districts, but dependence is placed chiefly upon irrigated land. This will grow most of the standard crops of the temperate zones. Wheat, barley, oats, potatoes, and sugar beets are raised. Alfalfa is a highly profitable crop, several harvests being reaped in a year. Truck farm products, as Colorado and Arizona melons, bring high prices in eastern markets. Apple culture has become a valuable pursuit in Montana and Idaho. Peaches are grown in Colorado and Utah. In the southwest, the hot climate fosters the growth of dates, olives, figs, oranges, and other subtropical fruits. Egyptian or long-staple cotton has become a leading crop in Arizona.

Government irrigation work has already reclaimed millions of acres of arid land. Farms of irrigated soil are small, and intensive agriculture is practiced. Improved land in farms comprises about one-twentieth of the total area. Montana has the largest acreage of crop land, Colorado stands second, and Idaho is third.

Stock Raising. For many years, stock raising has been an important industry in this division, and much capital is invested in the rearing of cattle, sheep, and horses. These rank in value in the order named. The annual wool clip of these states amounts to about two-fifths of that of the entire United States. Native grasses afford excellent pasturage, and, in the southern and central parts, farm animals feed in the open all the year round. Large numbers of cattle are sent to Omaha, Kansas City, Chicago, and other meat packing centers, where they are slaughtered, the meat being packed and distributed largely in refrigerator cars.

Manufacturing. Copper, lead, refined ores, flour, beet sugar, butter, condensed milk, dressed meat, canned vegetables, railroad cars, foundry materials, and lumber are the principal industrial products of the Plateau states. Manufacturing to supply local needs is increasing. Immense water power is available for future development. In 1925, Colorado stood first among these states in value of manufactures; Montana was second, Utah third, and Arizona fourth.

Commerce. Railroads afford ready transportation to all parts of the Union. Several transcontinental lines cross this section, and there are numerous local lines. Mine products, lumber, cattle, cotton, and fruits form the chief items of outgoing shipment. These are sent both to the East and to the West chiefly in exchange for manufactures and other staples which the plateau region does not as yet produce.

PACIFIC STATES

California, Oregon, and Washington constitute the Pacific states.

Surface. No other equal area in the continental United States displays such diversity in surface features as does this division. In its mountain ranges are found the highest peaks, and in its deserts occur the lowest depressions. The rivers plunge down from alpine valleys over the highest known waterfalls. Here also is the only active volcano in the country.

The Sierra Nevada range extends nearly north and south through eastern California and, under the name of the Cascade range, continues northward through Oregon and Washington. Near the Pacific shore, the Coast ranges traverse these states from north to south. Between the Sierra Nevada and the Coast ranges lies the great central valley of California. This is about 50 miles wide and 400 miles long and is remarkably fertile. In the southern part, irrigation is needed for successful farming. Farther north are the Columbia, Willamette, and Puget Sound valleys, all having soil of great fertility.

The extensive region lying east of the Sierra Nevada and the Cascades is mostly a barren desert. An exception is the fertile district situated between the Columbia and Snake rivers. A highland, largely of volcanic origin, known as the Columbia River plateau, occupies much of eastern Oregon and Washington. Parts of California adjacent to Nevada form the western rim of the Great Basin. East of the southernmost extensions of the Sierra Nevada and bordering on Arizona are the Mohave desert and the Colorado desert. On the Pacific side of the Sierra Madre, San Bernardino, and other ranges that form the western borders of these deserts, lies the valley of southern California, a coastal plain of remarkable productiveness under irrigation.

Rivers. The Columbia, which rises in Canada, is the only large navigable river in the Pacific states. Together with its tributaries, the most important of which are the Snake and the Willamette, the Columbia drains the greater part of Oregon and Washington. Next in importance are the Sacramento and the San Joaquin. The lower portions of each of these streams are navigable. These two rivers, with their affluents, drain the great central valley of California. There are numerous smaller streams, many of which are broken by rapids or falls. Some of these furnish hydroelectric power. Numerous streams supply water for mining and for irrigation purposes.

Climate. The great length of this division and its intersection by several mountain ranges result in many varieties of climate. These range from the very wet to the very dry, and from the arctic cold of high mountain tops to the torrid heat of California's southeastern deserts. Owing to the moderating influence of winds from the ocean, a mild climate prevails along the entire Pacific shore. This

RANK OF THE STATES IN POPULATION, 1790-1920

State	1790	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920
Alabama	..	..	..	19	15	12	12	13	16	17	17	18	18	18
Arizona	..	..	..	..	..	..	..	..	46	44	47	47	46	46
Arkansas	..	..	26	26	28	25	26	25	26	25	24	25	25	25
California	..	..	..	..	..	..	29	26	24	24	22	21	12	8
Colorado	..	..	..	..	..	..	..	38	41	35	31	32	32	33
Connecticut	8	8	9	14	16	20	21	24	25	28	29	29	31	29
Delaware	16	17	19	22	24	26	30	32	35	38	43	45	47	47
District of Columbia	..	19	22	25	25	28	33	35	34	36	40	41	43	42
Florida	..	..	..	..	26	27	31	31	33	34	32	33	33	32
Georgia	13	12	11	11	10	9	9	11	12	13	12	11	10	12
Idaho	..	..	..	..	..	..	..	..	44	46	46	46	45	43
Illinois	..	..	24	24	20	14	11	4	4	4	3	3	3	3
Indiana	..	21	21	18	13	10	7	6	6	6	8	8	9	11
Iowa	..	..	..	..	..	29	27	20	11	10	10	10	15	16
Kansas	..	..	..	..	..	..	..	33	29	20	19	22	22	24
Kentucky	14	9	7	6	6	6	8	9	8	8	11	12	14	15
Louisiana	..	..	18	17	19	19	18	17	21	22	25	23	24	22
Maine	11	14	14	12	12	13	16	22	23	27	30	31	34	35
Maryland	6	7	8	10	11	15	17	19	20	23	27	26	27	28
Massachusetts	4	5	5	7	8	8	6	7	7	7	6	7	6	6
Michigan	..	..	25	27	27	23	20	16	13	9	9	9	8	7
Minnesota	..	..	..	..	..	..	36	30	28	26	20	19	19	17
Mississippi	..	20	20	21	22	17	15	14	18	18	21	20	21	23
Missouri	..	..	23	23	21	16	13	8	5	5	5	5	7	9
Montana	..	..	..	..	..	..	..	..	43	45	45	43	40	39
Nebraska	..	..	..	..	..	..	..	39	36	30	26	27	29	31
Nevada	..	..	..	..	..	..	..	41	40	43	49	49	49	49
New Hampshire	10	11	16	15	18	22	22	27	31	31	33	37	39	41
New Jersey	9	10	12	13	14	18	19	21	17	19	18	16	11	10
New Mexico	..	..	..	..	..	..	32	34	37	41	44	44	44	44
New York	5	3	2	1	1	1	1	1	1	1	1	1	1	1
North Carolina	3	4	4	4	5	7	10	12	14	15	16	15	16	14
North Dakota	..	..	..	..	..	..	..	42	45	40	42	40	37	36
Ohio	..	18	13	5	4	3	3	3	3	3	4	4	4	4
Oklahoma	..	..	..	..	..	..	..	..	..	..	39	30	23	21
Oregon	..	..	..	..	..	..	34	36	38	37	38	36	35	34
Pennsylvania	2	2	3	3	2	2	2	2	2	2	2	2	2	2
Rhode Island	15	16	17	20	23	24	28	29	32	33	36	35	38	38
South Carolina	7	6	6	8	9	11	14	18	22	21	23	24	26	26
South Dakota	..	..	..	..	..	..	..	..	..	..	35	38	36	37
Tennessee	17	15	10	9	7	5	5	10	9	12	13	14	17	19
Texas	.	..	..	..	..	..	25	23	19	11	7	6	5	5
Utah	..	..	..	..	..	..	35	37	39	39	41	42	41	40
Vermont	12	13	15	16	17	21	23	28	30	32	37	39	42	45
Virginia	1	1	1	2	3	4	4	5	10	14	15	17	20	20
Washington	..	..	..	..	..	..	..	40	42	42	34	34	30	30
West Virginia	..	..	..	..	..	..	..	..	27	29	28	28	28	27
Wisconsin	..	..	..	..	..	30	24	15	15	16	14	13	13	13
Wyoming	..	..	..	..	..	..	..	..	47	47	48	48	48	48

coastal climate ranges from subtropical and dry in southern California to temperate and moist in the Puget Sound region.

Rainfall. In western Washington, the rainfall over the valleys averages 65 inches a year and, in the mountain districts, reaches 100 inches. Western Oregon also has a heavy rainfall. But in the eastern sections of both states less than 20 inches of rain falls annually. In parts of the Colorado desert near the Arizona boundary, the average yearly rainfall is less than three inches.

Summer is a dry season in this division, and the winters are wet. In summer, trays of fruits are left outdoors, day and night, to dry, the drying period often lasting several weeks. Abundant rain falls in northern California, but, in the southern part of the state, irrigation is essential for crop raising.

Minerals. Gold was discovered in California in 1848, and since then the state has yielded every year millions of dollars' worth of this precious metal. Though gold is now mined in several other states, California still leads in gold production.

At least 50 other minerals of high commercial value are found in this division. Among them are silver, lead, copper, bismuth, manganese, quicksilver, tungsten, chromium, zinc, magnesite, lithium, and arsenic. The southeastern deserts of California contain immense deposits of borax. Coal of good quality is mined in Washington. Building stone is quarried in all the states. But the most important product is petroleum. California's output of crude petroleum is worth more than the yield of all her mines.

Forests. The coniferous forests of the Pacific states are the noblest in the world. In variety of species, in yield of merchantable timber, and in size, age, and beauty of trees, they are unsurpassed. Oregon and western Washington constitute the most important lumber region in the United States.

The heavy rainfall of the coast districts promotes forest growth. West of the Cascades the Douglas fir attains immense size. In dense, nearly pure forests, this tree covers large areas, and furnishes more than half of the available timber. Large spruces, cedars, and hemlocks also abound. East of the Cascades, western yellow pine and sugar pine are valuable timber trees, the former ranking second in importance to the Douglas fir.

The redwood, a magnificent conifer of the northern California coast, supplies excellent building material. Along the western slopes of the Sierra Nevada there are groves of giant sequoias, the most ancient and massive trees known. Many species of broad-leaved or deciduous trees are found, but native hard woods are of minor importance. In the plains districts of California, various species of eucalyptus, natives of Australia, are planted for quick timber and for shade.

Agriculture and Horticulture. Farming is the chief industry in the Pacific states. Because of wide diversity in soil and climate, a greater variety of agricultural products is grown than in any other equal area in the United States.

In most of the large valleys of Washington, western Oregon, and north central California, sufficient rain falls to insure good harvests. In southern California and in the more arid parts of Oregon and

Washington, irrigation is necessary. Among the principal crops are wheat, barley, oats, hay, alfalfa, potatoes, sugar beets, cotton, rice, beans, corn, and numerous fruits and vegetables. In total value the fruits outrank all the other agricultural products of this division. Next to fruits, wheat is the most important single crop, ranking first in value of all crops in Washington, second in Oregon, and third in California. Among hay and fodder crops, alfalfa leads. Although unsuited to the climate, corn, the great staple of the Central states, is grown to a limited extent.

California's great wheat ranches are disappearing, but intensive agriculture, especially fruit growing in connection with irrigation, is making notable progress. All of the Pacific states are famous for their fruits. Apples grown in the Hood River valley in Oregon and in the Yakima district in Washington command high prices in eastern markets. Along the Willamette river thousands of acres are planted with apple, peach, pear, and plum trees. In western Oregon, loganberry culture is an extensive industry.

California ranks as the foremost fruit producing state in the Union. Contrary to general opinion in the eastern states, most of this state's great fruit harvest consists of the orchard and vineyard fruits of temperate latitudes,—apples, apricots, cherries, grapes, peaches, pears, plums, and prunes. The best varieties of the European grape flourish, and large quantities of grape juice and raisins are produced. The growing of citrous fruits is a large industry in southern California. From its extensive groves thousands of carloads of oranges, lemons, and grapefruit are shipped to the eastern states every year. Almonds, figs, olives, English walnuts, and melons are grown in large quantities. Among less common fruits whose cultivation has been recently established are the avocado, cherimoya, date, and feijoa.

Irrigation. By irrigation many arid areas in the Pacific states have been turned into highly productive lands. A half century ago southern California was mostly a dreary waste. Much that was then desert is now covered with groves of oranges and other fruits, or with fields of grain, alfalfa, melons, or cotton. In no other part of the United States is irrigation so extensively established or devoted to the production of such an immense variety of crops. California leads all the states of the Union in acreage under irrigation and in value of crops produced on irrigated land.

Animal Industry. Large areas in the drier sections are devoted to the raising of cattle and sheep. About one-sixth of the entire wool clip of the United States is produced in the Pacific states. Dairying is a profitable industry. Poultry raising is important, and in some localities, as at Petaluma, California, it has become highly specialized. In the production of honey California usually leads all the other states.

Fisheries. Salmon is the most valuable fish. Puget sound and the Columbia river are the principal salmon fishing grounds. Millions of pounds of salmon are canned every year and exported to all parts of the world. Fresh salmon are also shipped in refrigerator cars to all the large cities of the Union. Halibut, tuna, herring, and other valuable food fish are taken along the Pacific coast.

Manufacturing. In the Pacific states, manufacturing ranks second only to agriculture in importance. Among the chief manufactures are lumber, canned fruits, refined petroleum, flour, packed meats, and dairy products. Other important products of manufacture are refined sugar, canned fish, and mining machinery.

Manufacturing has been greatly stimulated by the extensive development of hydroelectric power, especially in California and Washington. Particularly since 1910, this factor has been one of rapidly increasing importance in the industry of the Pacific Coast. In southern California many factories use crude petroleum for fuel. In 1925, lumber, flour, slaughtering and meat packing, and paper and wood pulp were the leading products of manufacture in Washington; lumber and flour led in Oregon; and petroleum products, canned fruits, and meat products ranked in the order named in California. In total value of manufactures, California stood eighth among the states of the Union.

Commerce. The Pacific states occupy a geographical position of great commercial advantage. They have fine harbors on the Pacific Ocean and an immense hinterland whose products of farm, forest, and mine are increasing every year. A great trade is carried on through Puget Sound ports. The Panama canal has brought Europe and the Atlantic states much nearer to this division and thereby stimulated its commerce with those older manufacturing parts of the world. Since 1910 the trade of the Pacific states with China, Japan, the Philippines, Hawaii, New Zealand, Australia, and South America has made a marked gain.

TWENTY-FIVE LARGEST CITIES OF THE UNITED STATES

With Statistics Showing Growth 1820–1920

City and Rank	Population 1820	Population 1840	Population 1860	Population 1880	Population 1890	Population 1900	Population 1910	Population 1920
1. New York, N. Y.*	152,056	391,114	1,174,779	1,911,698	2,507,414	3,437,202	4,766,883	5,620,048
2. Chicago, Ill.	.....	4,470	109,260	503,185	1,099,850	1,698,575	2,185,283	2,701,705
3. Philadelphia, Pa.	63,802	93,665	565,529	847,170	1,046,964	1,293,697	1,549,008	1,823,779
4. Detroit, Mich.	1,422	9,102	45,619	116,340	205,876	285,704	465,766	993,678
5. Cleveland, Ohio	.....	6,071	43,417	160,146	261,353	381,768	560,663	796,841
6. St. Louis, Mo.	.....	16,469	160,773	350,518	451,770	575,238	687,029	772,897
7. Boston, Mass.	43,298	93,383	177,840	362,839	448,477	560,892	670,585	748,060
8. Baltimore, Md.	62,738	102,313	212,418	332,313	434,439	508,957	558,485	733,826
9. Pittsburgh, Pa.	7,248	31,204	77,923	235,071	343,904	451,512	533,905	588,343
10. Los Angeles, Cal.	.....	.....	4,385	11,183	50,395	102,479	319,198	576,673
11. Buffalo, N. Y.	2,095	18,213	81,129	155,134	255,664	352,387	423,715	506,775
12. San Francisco, Cal.	.....	.....	56,802	233,959	298,997	342,782	416,912	506,676
13. Milwaukee, Wis.	.....	1,712	45,246	115,587	204,468	285,315	373,857	457,147
14. Washington, D. C.	13,247	23,364	61,122	177,624	230,392	278,718	331,069	437,571
15. Newark, N. J.	.....	17,290	71,941	136,508	181,830	246,070	347,469	414,524
16. Cincinnati, Ohio	9,642	46,338	161,044	255,139	296,908	325,902	363,591	401,247
17. New Orleans, La.	27,176	102,193	168,675	216,090	242,039	287,104	339,075	387,219
18. Minneapolis, Minn.	.....	.....	2,564	46,887	164,738	202,718	301,408	380,582
19. Kansas City, Mo.	.....	.....	4,418	55,785	132,716	163,752	248,381	324,410
20. Seattle, Wash.	.....	.....	.....	3,533	42,837	80,671	237,194	315,312
21. Indianapolis, Ind.	.....	2,692	18,611	75,056	105,436	169,164	233,650	314,194
22. Jersey City, N. J.	.....	3,072	29,226	120,722	163,003	206,433	267,779	298,103
23. Rochester, N. Y.	.....	20,191	48,204	89,366	133,896	162,608	218,149	295,750
24. Portland, Oreg.	.....	.....	2,874	17,577	46,385	90,426	207,214	258,288
25. Denver, Colo.	.....	.....	.....	35,629	106,713	133,859	213,381	256,491

* Population of the city as now constituted.

GROWTH OF THE

In Area, Population, Wealth, Agriculture, Com

Item	1820	1830	1840	1850	1860
Area, Population, Wealth, and Debt:					
Area . . . . . Sq. mi.	1,792,223	1,792,223	1,792,223	2,997,119	3,026,789
Population	9,638,453	12,866,020	17,069,453	23,191,876	31,443,321
Wealth . . . . . $	.....	.....	.....	7,135,780,000	16,159,616,000
Wealth per capita . . . . . $	.....	.....	.....	307.69	513.93
Debt, national . . . . . $	91,015,566	48,565,406	3,573,343	63,452,773	59,964,402
Debt, per capita . . . . . $	9.44	3.77	.21	2.74	1.91
Interest on debt . . . . . $	5,151,004	1,912,575	174,598	3,782,393	3,443,687
Agriculture:					
Farms, number of	.....	.....	.....	1,449,073	2,044,077
Persons engaged in agriculture . . . . No.	.....	.....	.....	.....	.....
Value farms and farm property . . . . $	.....	.....	.....	3,967,343,580	7,980,493,063
Value farm products . . . . . $	.....	.....	.....	.....	.....
Wheat produced . . . . . bu.	.....	.....	84,823,272	100,485,943	173,104,924
Corn produced . . . . . bu.	.....	.....	377,531,875	592,071,104	838,792,740
Cotton produced . . . . . 500 lb. bales	334,728	732,218	1,347,640	2,136,083	3,841,416
Sugar (cane) produced . . . . . lbs.			120,851,074	247,577,000	230,982,000
Sugar (beet) produced . . . . . lbs.					
Farm animals, value . . . . . $	.....	.....	.....	544,180,516	1,089,329,915
Wool produced . . . . . lbs.	.....	.....	35,802,114	52,516,959	60,264,913
Mineral Production:					
Gold, value of . . . . . $	73,112	564,950	11,697,829	50,000,000	46,000,000
Silver, value of . . . . . $		253,400	252,300	50,900	156,800
Coal . . . . . tons	3,080	285,779	1,848,249	6,266,233	13,044,680
Petroleum . . . . . gals.					21,000,000
Iron ore . . . . . tons	.....	.....	.....	.....	.....
Pig iron . . . . . tons	20,000	165,000	286,903	563,755	821,223
Steel . . . . . tons	.....	.....	.....	.....	.....
Copper . . . . . tons	.....	.....	100	650	7,200
Total minerals . . . . . $	.....	.....	.....	.....	.....
Manufactures:					
Establishments . . . . . No.	.....	.....	.....	123,025	140,433
Officials, clerks . . . . . No.	.....	.....	.....	.....	.....
Salaries paid . . . . . $	.....	.....	.....	.....	.....
Wage earners . . . . . No.	.....	.....	.....	957,059	1,311,246
Wages paid . . . . . $	.....	.....	.....	236,755,464	378,878,966
Cost of materials . . . . . $	.....	.....	.....	555,123,822	1,031,605,092
Products, value of . . . . . $	.....	.....	.....	1,019,106,616	1,885,861,676
Iron and steel manufactures . . . . . $	.....	.....	.....	.....	.....
Cotton manufactures . . . . . $	.....	.....	46,350,453	61,869,184	115,681,774
Wool manufactures . . . . . $	.....	.....	.....	48,608,779	73,454,000
Transportation:					
Vessels built . . . . . tons	51,394	58,560	121,203	279,255	214,797
Vessels, foreign trade . . . . . tons	620,102	577,268	899,765	1,585,711	2,546,237
Vessels, coastwise trade . . . . . tons	660,065	614,508	1,280,999	1,949,743	2,807,631
Vessels, Great Lakes trade . . . . . tons	3,500	11,106	54,199	198,266	467,774
Railways . . . . . miles		23	2,818	9,021	30,626
Electric railways . . . . . miles					

* The information herein given has been derived from the Statistical Abstract of the United States and other authoritativ sources. For various items satisfactory statistics covering some dates are unavailable. In such cases the spaces are marked wit leaders, thus..... In other cases, such as petroleum, the telephone, or beet sugar, in which the subject in question had not ye been discovered, invented, or brought to substantial production or use, the space corresponding to the date is left blank. Th statistics of manufactures from 1880 to 1920, inclusive, are those of the decennial censuses, but, in each case, the figures are thos of the preceding year, 1879, 1889, 1899, 1909, and 1919.

NITED STATES, 1820-1920

rce, Industry, and Important Productions*

1870	1880	1890	1900	1910	1920
3,026,789	3,026,789	3,026,789	3,026,789	3,026,789	3,026,789
38,558,371	50,155,783	62,947,714	75,994,575	91,972,266	105,710,620
30,068,518,000	43,642,000,000	65,037,091,000	88,517,307,000	187,739,071,090 (a)	290,000,000,000 (b)
779.83	870.20	1,035.57	1,164.79	1,965.00 (a)	2,689.34 (b)
2,331,169,956	1,919,326,747	890,784,370	1,107,711,257	1,046,449,185	24,330,889,731
60.46	38.27	14.13	14.55	11.34	228.64
118,784,960	79,633,981	29,417,603	33,545,130	21,275,602	1,016,592,219
2,659,985	4,008,907	4,564,641	5,737,372	6,361,502	6,448,343
5,922,471	7,713,875	8,565,926	10,381,765	12,659,203	10,661,410
8,944,857,749	12,180,501,538	16,082,267,689	20,439,901,164	40,991,449,090	77,924,100,338
1,958,030,927	2,212,540,927	2,460,107,454	4,717,069,973	8,498,311,413	21,425,623,614
235,884,700	498,549,868	399,262,000	522,229,505	635,121,000	833,027,000
1,094,255,000	1,717,434,543	1,489,970,000	2,105,102,516	2,886,260,000	3,208,584,000
4,024,527	6,356,998	8,562,089	10,123,027	11,608,616	13,439,603
87,043,000	178,872,000	301,284,395	322,549,011	750,400,000	241,998,400
806,000	2,688,000	4,934,720	163,458,075	1,024,938,000	1,452,902,000
1,518,465,000	1,576,917,556	2,418,766,028	2,228,123,134	5,138,486,000	8,165,194,000
162,000,000	232,500,000	276,000,000	288,636,621	321,362,750	277,905,000
50,000,000	36,000,000	32,845,000	79,171,000	96,269,100	51,186,900
16,434,000	34,717,000	57,242,100	35,741,100	30,854,500	60,801,955
29,496,054	63,822,830	140,866,931	240,789,310	447,853,909	587,331,190
220,951,290	1,104,017,166	1,924,590,024	2,672,062,218	8,801,404,416	18,622,884,000
3,031,891	7,120,362	16,036,043	27,553,161	56,889,734	69,558,000
1,665,179	3,835,191	9,202,703	13,789,242	27,303,567	36,925,987
68,750	1,247,335	4,277,071	10,188,329	26,094,919	42,132,934
12,600	27,000	115,966	270,588	482,214	539,759
218,598,994	364,928,298	606,476,380	1,107,031,392	1,991,216,220	6,707,000,000
	253,852	355,405	207,514	268,491	290,105
.....		461,001	364,120	790,267	1,447,227
.....	.....	391,984,660	380,771,321	938,574,967	2,892,371,494
.....	2,732,595	4,251,535	4,712,763	6,615,046	9,096,372
.....	947,953,795	1,891,209,696	2,008,361,119	3,427,037,884	10,533,600,340
.....	3,396,823,549	5,162,013,878	6,575,851,491	12,142,790,878	37,376,380,283
.....	5,369,579,191	9,372,378,843	11,406,926,701	20,672,051,870	62,418,078,773
.....	296,557,685	478,687,519	803,968,273	1,377,151,817	3,623,368,934
.....	192,090,110	267,981,724	339,200,320	628,391,813	2,195,565,881
.....	238,085,686	270,527,511	296,990,484	507,166,710	1,234,657,092
276,953	157,409	294,122	393,790	342,068	3,880,639
1,516,800	1,352,810	946,695	826,694	791,825	9,928,595
2,729,707	2,715,224	3,477,802	4,338,145	6,716,257	6,395,429
684,704	605,102	1,063,063	1,565,587	2,895,102	3,138,690
52,922	93,267	167,191	198,964	249,992	264,021
		5,783	16,645	30,437	47,555

(a) 1912. (b) Estimate of Prof. David Friday. (c) 1902. (d) 1912. (e) Exclusive of rural delivery routes. (f) Includes food
mals. (g) Includes foodstuffs partly, as well as wholly, manufactured. (h) Includes manufactures ready for consumption and
nufactures for further use in manufacturing. (i) Ordinary disbursements which include disbursements for war, navy, Indians,
sions, payment for interest, and "civil and miscellaneous," but do not include payments for Panama canal, public debt, special
poses, or postal service.

GROWTH OF THE

In Area, Population, Wealth, Agriculture, Com

Item	1820	1830	1840	1850	1860
TRANSPORTATION—Con.					
Automobiles manufactured . . . . . No.					
Automobiles in use . . . . . No.					
COMMUNICATION:					
Post Offices . . . . . No.	4,500	8,450	13,468	18,417	28,498
Post Routes (*e*) . . . . . miles	72,492	115,176	155,739	178,672	240,594
Telegraphs . . . . . miles of line				.....	.....
Telephones . . . . . No. stations					
COMMERCE:					
Imports, merchandise, total . . . . . $	54,520,834	62,720,956	98,258,706	173,509,526	353,616,119
Imports, free . . . . . $	.....	4,590,281	48,313,391	18,081,590	73,741,479
Imports, dutiable . . . . . $	.....	58,130,675	49,945,315	155,427,936	279,874,640
Imports, per cent free	.....	7.32	49.17	10.42	20.85
Imports, per capita . . . . . $	7.71	4.87	5.76	7.48	11.25
Imports, agricultural . . . . . $	.....	.....	.....	.....	129,816,165
Imports, foodstuffs (crude) (*f*) . . . . . $	6,081,641	7,382,274	15,273,321	18,011,659	45,743,826
Imports, foodstuffs (manufactured) (*g*) . $	10,820,814	9,653,971	15,188,845	21,465,776	59,837,674
Imports, raw material for manufacturing. $	1,983,706	4,214,825	11,510,245	11,711,266	39,691,797
Imports, manufactures (*h*) . . . . . $	35,077,964	40,887,323	55,659,201	121,475,651	207,028,294
Imports, sugar . . . . . lbs.	.....	86,490,113	120,940,747	218,430,764	694,838,197
Imports, coffee . . . . . lbs.	.....	51,488,248	94,996,095	145,272,687	202,144,733
Imports, tea . . . . . lbs.	.....	8,609,415	20,006,595	29,872,654	31,696,657
Imports, wool (raw) . . . . . lbs.	.....	669,883	9,898,740	18,695,294	26,282,955
Imports, cotton (raw) . . . . . lbs.	.....	415,307	2,774,722	269,114	2,005,529
Imports, raw silk . . . . . lbs.					
Imports, rubber (crude) . . . . . lbs.					
Exports, domestic, total . . . . . $	51,683,640	58,524,878	111,660,561	134,900,233	316,242,423
Exports, agricultural . . . . . $	.....	.....	.....	.....	260,280,413
Exports, foodstuffs (crude) (*f*) . . . . . $	2,474,822	2,724,181	4,564,532	7,535,764	12,166,447
Exports, foodstuffs (manufactured) (*g*) . $	10,085,366	9,556,992	15,936,108	20,017,162	38,624,949
Exports, raw materials for manufacturing $	31,246,382	36,482,266	75,488,421	83,984,707	216,009,648
Exports, manufactures (*h*) . . . . . $	7,792,544	9,579,295	15,425,180	23,223,106	48,453,008
Exports, iron and steel manufactures . . $	46,552	322,747	1,127,877	1,953,702	5,870,114
Exports, meat and meat products . . . $	.....	.....	.....	.....	14,224,412
Exports, wheat . . . . . $	16,603	46,176	1,635,483	643,745	4,076,704
Exports, wheat flour . . . . . $	5,296,664	6,085,953	10,143,615	7,098,570	15,448,507
Exports, cotton, quantity . . . . . lbs.	127,860,152	298,459,102	743,941,061	635,381,604	1,767,686,338
Exports, cotton, value . . . . . $	22,308,667	29,674,883	63,870,307	71,984,616	191,806,555
FINANCE:					
Money in circulation . . . . . $	67,100,000	87,344,295	186,305,488	278,761,982	435,407,252
Circulation per capita . . . . . $	6.96	6.78	10.91	12.02	13.85
Government receipts . . . . . $	17,840,670	24,844,117	19,480,115	43,592,889	56,054,600
Receipts per capita . . . . . $	1.85	1.93	1.14	1.88	1.78
Customs . . . . . $	15,005,612	21,922,391	13,499,502	39,668,686	53,187,512
Internal Revenue . . . . . $	106,261	12,161	1,682		
Government disbursements (*i*) . . . . . $	18,285,535	15,142,108	24,314,518	40,948,383	63,200,876
Disbursements per capita . . . . . $	1.90	1.18	1.42	1.77	2.01
Disbursements, war . . . . . $	2,630,392	4,767,129	7,095,267	9,687,025	16,472,203
Disbursements, navy . . . . . $	4,387,990	3,239,429	6,113,897	7,904,725	11,514,650
Pensions paid . . . . . $	3,208,376	1,363,297	2,603,562	1,866,886	1,100,802
Pensioners . . . . . No.					

* The information herein given has been derived from the Statistical Abstract of the United States and other authoritativ sources. For various items satisfactory statistics covering some dates are unavailable. In such cases the spaces are marked wit leaders, thus..... In other cases, such as petroleum, the telephone, or beet sugar, in which the subject in question had not y been discovered, invented, or brought to substantial production or use, the space corresponding to the date is left blank. Th statistics of manufactures from 1880 to 1920, inclusive, are those of the decennial censuses, but, in each case, the figures are thos of the preceding year, 1879, 1889, 1899, 1909, and 1919.

NITED STATES, 1820-1920—Con.

ce, Industry, and Important Productions*

1870	1880	1890	1900	1910	1920
			3,700 (c)	127,731 (d)	1,974,016
			5,000	501,000	9,231,941
28,492	42,989	62,401	76,688	59,580	52,638
231,232	343,888	427,990	500,990	447,998	435,342
.....	85,645	183,917	192,705	214,360	246,214
	47,880	227,857	1,355,911	7,635,367	13,329,379
435,958,408	667,954,746	789,310,409	849,941,184	1,556,947,430	5,238,352,114
20,140,786	208,301,863	265,668,629	367,236,866	755,311,396	3,405,233,003
415,817,622	459,652,883	523,641,780	482,704,318	801,636,034	1,833,119,111
4.62	31.19	33.66	43.21	48.51	65.01
11.06	12.51	12.14	10.91	16.52	47.22
191,559,361	314,617,480	384,100,435	420,139,288	87,509,115	3,011,368,157
54,081,091	100,297,040	128,480,142	97,916,293	144,776,636	577,626,948
96,081,635	118,125,216	133,332,031	133,027,374	181,566,572	1,238,138,941
55,615,202	131,861,617	170,637,250	276,241,152	566,270,770	1,751,893,014
229,183,959	307,366,921	347,609,661	337,348,386	652,861,740	1,679,228,466
1,196,773,569	1,829,291,684	2,934,011,560	4,018,086,530	4,094,545,936	8,073,759,849
235,256,574	446,850,727	499,159,120	787,991,911	873,983,689	1,417,063,513
47,408,481	72,162,936	83,886,829	84,845,107	85,626,370	97,826,106
49,230,199	128,131,747	105,431,285	155,928,455	263,928,232	259,617,641
1,698,133	3,547,792	8,606,049	67,398,521	86,037,691	299,994,378
583,589	2,562,236	7,510,440	13,073,718	23,457,223	30,058,374
9,624,098	16,826,099	33,842,374	49,377,138	101,044,681	566,546,136
376,616,473	823,946,353	845,293,828	1,370,763,571	1,710,083,998	8,080,480,821
296,962,357	694,315,497	634,855,869	844,616,530	871,158,425	3,466,619,819
41,852,630	266,108,950	132,073,183	225,906,246	109,828,320	917,990,828
50,919,666	193,352,723	224,756,580	319,696,334	259,259,654	1,116,605,173
213,439,991	238,787,934	304,566,922	325,244,296	565,934,957	1,870,767,054
70,040,845	121,818,298	178,982,042	485,022,156	766,981,245	4,163,354,637
13,483,163	14,716,524	25,542,208	121,913,548	179,133,186	1,112,835,237
21,396,050	113,769,604	123,880,422	175,226,535	128,382,362	463,256,758
47,171,229	190,546,305	45,275,906	73,237,080	47,806,598	596,975,396
21,169,593	35,333,197	57,036,168	67,760,886	47,621,467	224,472,448
958,558,523	1,822,061,114	2,471,799,853	3,100,583,188	3,206,708,226	3,179,313,336
227,027,624	211,535,905	250,968,792	241,832,737	450,447,243	1,136,408,916
676,284,427	973,382,228	1,429,251,270	2,055,150,997	3,102,355,605	6,103,055,087
17.51	19.41	22.82	26.93	34.33	57.35
395,959,834	333,526,501	403,080,983	567,240,852	675,511,715	6,704,414,438
10.26	6.65	6.43	7.43	7.48	63.00
194,538,374	186,522,065	229,668,585	233,164,871	333,683,445	323,536,559
184,899,756	124,009,374	142,606,706	295,327,927	289,933,519	5,399,149,245
293,657,005	264,847,637	297,736,487	487,713,792	659,705,391	6,141,745,240
7.61	5.28	4.75	6.39	7.30	57.72
57,655,675	38,116,916	44,582,838	134,774,768	155,911,706	1,094,834,202
21,780,230	13,536,985	22,006,206	55,953,078	123,173,717	629,893,116
28,340,202	56,777,174	106,936,855	140,877,316	160,696,416	213,344,204
198,686	250,802	537,944	993,529	921,083	592,190

(a) 1912. (b) Estimate of Prof. David Friday. (c) 1902. (d) 1912. (e) Exclusive of rural delivery routes. (f) Includes food mals. (g) Includes foodstuffs partly, as well as wholly, manufactured. (h) Includes manufactures ready for consumption and nufactures for further use in manufacturing. (i) Ordinary disbursements which include disbursements for war, navy, Indians, sions, payment for interest, and "civil and miscellaneous," but do not include payments for Panama canal, public debt, special poses, or postal service.

TRAVEL DISTANCES BETWEEN IMPORTANT CENTERS IN THE UNITED STATES

	Atlanta, Ga.	Baltimore, Md.	Boston, Mass.	Buffalo, N. Y.	Chicago, Ill.	Cincinnati, O.	Cleveland, O.	Denver, Colo.	Detroit, Mich.	Galveston, Tex.	*Havana, Cuba via Tampa	*Honolulu, H. I. via San Francisco	Indianapolis, Ind.	Jacksonville, Fla.	Kansas City, Mo.	Little Rock, Ark.	Los Angeles, Cal.	*Manila, Ph. Is. via San Fran. and Honolulu	Minneapolis, Minn.	Nashville, Tenn.	New Orleans, La.	New York, N. Y.	Omaha, Neb.	Philadelphia, Pa.	Pittsburgh, Pa.	Portland, Me.	Portland, Ore.	Saint Louis, Mo.	*Salt Lake City, Utah	San Francisco, Cal.	*San Juan, P. R. via New York or Tampa	Seattle, Wash.	*Sitka, Alaska via Seattle	Washington, D. C.
Atlanta, Ga.		689	1108	933	733	488	750	1529	748	912	921	4846	598	331	889	551	2496	10786	1141	288	493	876	1025	784	799	1217	2810	611	2052	2808	2275	2939	4057	649
Baltimore, Md.	689		419	396	797	593	446	1831	617	1577	1610	5134	703	795	1210	1104	2990	9901	1205	811	1158	187	1285	95	314	528	3050	932	2297	3068	1586	2995	4345	40
Boston, Mass.	1108	419		498	1033	943	681	2067	750	1996	1800	5363	965	1214	1484	1566	3264	11281	1441	1243	1577	232	1521	324	673	109	3286	1217	2526	3304	1628	3231	4129	459
Buffalo, N. Y.	933	396	498		525	445	183	1559	252	1583	1802	4865	467	1191	969	1068	2749	10783	933	745	1281	396	1013	416	272	607	2778	719	2028	2796	1795	2723	3631	436
Chicago, Ill.	733	797	1033	525		285	357	1034	272	1148	1621	4352	184	1088	451	633	2231	10258	408	445	930	909	488	817	468	1142	2253	284	1515	2271	2208	2198	3118	787
Cincinnati, O.	488	593	943	445	285		262	1257	260	1157	1408	4582	110	822	617	627	2397	10473	693	300	836	751	773	660	311	1052	2538	339	1745	2556	2149	2483	3402	553
Cleveland, O.	750	446	681	183	357	262		1391	171	1400	1671	4691	284	1084	757	885	2537	10592	765	562	1098	579	845	487	135	790	2610	536	1854	2628	1970	2555	3457	437
Denver, Colo.	1529	1831	2067	1559	1034	1257	1391		1306	1146	2447	3531	1159	1869	636	1094	1422	8298	919	1241	1349	1943	538	1851	1502	2176	1376	918	620	1374	3334	1559	2399	1810
Detroit, Mich.	748	617	750	252	272	260	171	1306		1352	1680	4624	276	1082	715	837	2495	10525	680	560	1096	648	760	668	318	859	2525	488	1787	2543	2036	2470	3390	608
Galveston, Tex.	912	1577	1996	1583	1148	1157	1400	1146	1352		1104	4255	1105	1031	806	515	1698	9022	1306	895	419	1764	1000	1672	1476	2105	2522	864	1743	2173	3127	2827	3522	1537
*Havana, Cuba via Tampa	921	1610	1800	1802	1621	1408	1671	2447	1680	1104		5319	1469	561	1704	1347	2693	10023	2102	1209	692	1567	2000	1475	1642	1729	3775	1532	2545	3887	978	3611	4043	1340
*Honolulu, H. I. via San Francisco	4846	5134	5363	4865	4352	4582	4691	3531	4624	4255	5319		4471	5179	4060	4328	2564	4767	4221	4713	4564	5261	3864	5169	4820	5501	2863	4278	2911	2418	8751	3050	3982	5122
Indianapolis, Ind.	598	703	965	467	184	110	284	1159	276	1105	1469	4471		932	519	590	2299	10359	592	298	899	812	672	720	371	1074	2437	241	1698	2455	2226	2382	3310	663
Jacksonville, Fla.	331	795	1214	1191	1088	822	1084	1869	1082	1031	561	5179	932		1233	882	2615	9946	1496	643	612	982	1380	890	1057	1323	3165	966	2376	3058	1151	3294	4148	755
Kansas City, Mo.	889	1210	1484	969	451	617	757	636	715	806	1704	4060	519	1233		527	1780	9956	500	601	868	1331	194	1239	890	1593	1979	278	1260	1977	2759	2050	2995	1170
Little Rock, Ark.	551	1104	1566	1068	633	627	885	1094	837	515	1347	4328	590	882	527		1818	10216	937	365	471	1291	721	1199	961	1675	2506	349	1700	2293	2690	2577	3480	1064
Los Angeles, Cal.	2496	2990	3264	2749	2231	2397	2537	1422	2495	1698	2693	2564	2299	2615	1780	1818		7331	2202	2198	2003	3111	1821	3019	2670	3373	1129	2058	784	475	4463	1312	2273	2950
*Manila, Ph. Is. via San Fran. & Honolulu	10786	9901	11281	10783	10258	10473	10592	8298	10525	9022	10023	4767	10359	9946	9956	10216	7331		10076	10601	10465	11073	8631	11075	10726	11389	7630	9045	8799	7893	12565	8936	8160	10951
Minneapolis, Minn.	1141	1205	1441	933	408	693	765	919	680	1306	2102	4221	592	1496	500	937	2202	10076		853	1306	1317	381	1225	876	1550	1815	588	1384	2164	2729	1774	2697	1195
Nashville, Tenn.	288	811	1243	745	445	300	562	1241	560	895	1209	4713	298	643	601	365	2198	10601	853		623	998	737	906	611	1352	2522	323	2065	2520	2349	2651	3583	771
New Orleans, La.	493	1158	1577	1281	930	836	1098	1349	1096	419	692	4564	899	612	868	471	2003	10465	1306	623		1345	1062	1253	1147	1686	2725	718	1950	2446	1566	2918	3729	1118
New York, N. Y.	876	187	232	396	909	751	579	1943	648	1764	1567	5261	812	982	1331	1291	3111	11073	1317	998	1345		1397	92	441	341	3162	1053	2434	3180	1559	3107	4027	227
Omaha, Neb.	1025	1285	1521	1013	488	773	845	538	760	1000	2000	3864	672	1380	194	721	1821	8631	381	737	1062	1397		1305	956	1630	1785	414	1027	1783	2796	1909	2799	1275
Philadelphia, Pa.	784	95	324	416	817	660	487	1851	668	1672	1475	5169	720	890	1239	1199	3019	11075	1225	906	1253	92	1305		349	433	3070	961	2332	3088	1490	3015	3935	135
Pittsburgh, Pa.	799	314	673	272	468	311	135	1502	318	1476	1642	4820	371	1057	890	961	2670	10726	876	611	1147	441	956	349		782	2721	612	1983	2739	1839	2666	3586	302
Portland, Me.	1217	528	109	607	1142	1052	790	2176	859	2105	1729	5501	1074	1323	1593	1675	3373	11389	1550	1352	1686	341	1630	433	782		3395	1326	2765	3413	1740	3340	4257	568
Portland, Ore.	2810	3050	3286	2778	2253	2538	2610	1376	2525	2522	3775	2863	2437	3165	1979	2506	1129	7630	1815	2522	2725	3162	1785	3070	2721	3395		2199	887	772	4571	183	1119	3040
Saint Louis, Mo.	611	932	1217	719	284	339	536	918	488	864	1532	4278	241	966	278	349	2058	9045	588	323	718	1053	414	961	612	1326	2109		1441	2197	2458	2328	3213	892
*Salt Lake City, Utah	2052	2297	2526	2028	1515	1745	1854	620	1787	1743	2545	2911	1698	2376	1260	1700	784	8799	1384	2065	1950	2434	1027	2332	1983	2765	887	1441		820	3823	980	1912	2312
San Francisco, Cal.	2808	3068	3304	2796	2271	2556	2628	1374	2543	2173	3887	2418	2455	3058	1977	2293	475	7893	2164	2520	2446	3180	1783	3088	2739	3413	772	2197	820		6660	955	1302	3058
*San Juan, P. R. via New York or Tampa	2275	1586	1628	1795	2208	2149	1970	3334	2036	3127	978	8751	2226	1151	2759	2690	4463	12565	2729	2349	1566	1559	2796	1490	1839	1740	4571	2458	3823	6660		4494	5426	1626
Seattle, Wash.	2939	2995	3231	2723	2198	2483	2555	1559	2470	2827	3611	3050	2382	3294	2050	2577	1312	8936	1774	2651	2918	3107	1909	3015	2666	3340	183	2328	980	955	4494		932	2985
*Sitka, Alaska via Seattle	4057	4345	4129	3631	3118	3402	3457	2399	3390	3522	4043	3982	3310	4148	2995	3480	2273	8160	2697	3583	3729	4027	2799	3935	3586	4257	1119	3213	1912	1302	5426	932		3888
Washington, D. C.	649	40	459	436	787	553	437	1810	608	1537	1340	5122	663	755	1170	1064	2950	10951	1195	771	1118	227	1275	135	302	568	3040	892	2312	3058	1626	2985	3888	

UNITED STATES DEPENDENCIES

BEGINNING with the purchase of Alaska in 1867, the United States has come into control of a considerable number of dependencies. Named in the order of their acquisition, they are as follows: Alaska, Midway islands, Hawaiian islands, Guam, Palmyra, Porto Rico, Philippine Islands, American Samoa, the Canal Zone, and Virgin islands. Midway islands and Palmyra have been incorporated with the Hawaiian islands to form the territory of Hawaii. The official designation of "territory" has been given also to Alaska. The Canal Zone will be found treated under *Panama Canal Zone*.

The American dependencies all lie in or near the tropics, with the exception of Alaska, a large part of which falls within the Arctic circle. The total area of these dependencies is about 716,000 square miles, and the total population is nearly 12 million. For historical data, see *Historical Growth of the United States*, page 372.

LENGTH OF COAST LINE OF UNITED STATES DEPENDENCIES

DEPENDENCY	Mainland	Islands	Total
Alaska	6,542 *	8,590 *	15,132 *
Guam	...	...	92
Hawaiian Islands	...	...	842
Panama Canal Zone	29	4	33
Philippine Islands	...	...	10,850 *
Porto Rico	...	...	412
U. S. Samoan Islands	...	...	91 *
Virgin Islands	...	...	164
Total	6,571	8,594	27,616

* Tidal shore line, unit measure 3 statute miles.

ALASKA

The largest territorial possession of the United States, situated in the extreme northwestern part of North America. All of Alaska lies to the north and to the west of the United States. Its northernmost point is about 1450 miles farther north than its southernmost point. From its easternmost point to its westernmost point, Alaska extends through a distance greater than that from New York to San Francisco.

Area and Location. Alaska embraces three distinct regions—the main territory, the panhandle, or southeastern Alaska, and the Aleutian islands.

The main territory comprises all of continental North America lying west of the 141st meridian of west longitude. It is bounded on the east by Canada, on the north by the Arctic Ocean, on the west by the Arctic Ocean, Bering strait, and Bering Sea, and on the south by the Pacific Ocean and the Gulf of Alaska. The panhandle of southeastern Alaska consists of a narrow fringe of mainland and various islands along the coast, between British Columbia and the Pacific Ocean, extending from Cape Muzon and the Portland canal, at the extreme south, northward to Mount Saint Elias, where the panhandle joins the main territory.

The Aleutian islands extend westward from the southwestern part of the main territory, as far as, and including, Attu, off the coast of Asia. Various islands in Bering Sea near the American mainland, including the Pribilof and the Saint Lawrence islands, also belong to Alaska.

The area of Alaska, about 590,000 square miles, is nearly one-fifth that of the continental United States, or about one-third larger than all of the Atlantic states from Maine to Florida.

Surface. There are four distinct natural surface divisions in the mainland of Alaska. From south to north, these are the Pacific Mountain system, the Central Plateau region, the Rocky Mountain system, and the Arctic Slope region.

The Pacific Mountain system comprises the Coast, the Mount Saint Elias, the Aleutian, and the Alaska ranges. These form great barrier walls along and near the southern shores. This rugged highland contains the loftiest mountains of the continent, culminating in Mount McKinley, in the Alaska range, the highest peak in North America.

East and north of these majestic ranges is the great central plateau, drained chiefly by the Yukon river. This plateau extends entirely across Alaska from east to west. North of it, the Rocky Mountain system, which crosses the international boundary about 100 miles north of the Arctic circle, extends westerly across Alaska nearly to the Arctic Ocean. North of the Rockies is the Arctic Slope, a barren, featureless, coastal plain.

For about 1000 miles southwestward from the Alaska peninsula extends the Aleutian archipelago which consists of about 70 treeless islands and numerous islets, mostly uninhabited.

Volcanoes. The Aleutian range, in the Alaska peninsula, contains a group of active volcanoes, which, in some respects, are the most remarkable in the world. The eruption of Katmai in this group, in 1912, was one of the most violent volcanic outbursts recorded in modern times. Katmai and its vicinity, including the famous "Valley of Ten Thousand Smokes," have been made a national monument. There are volcanic areas in the Alaska range, in the Saint Elias range, and in the Aleutian archipelago.

Glaciers. The mountains bordering on the Gulf of Alaska are covered with perpetual snow. From their slopes, immense glaciers, which increase in size from Glacier bay northward, extend down to the sea. On the shores between Glacier bay and Kenai peninsula are found nine-tenths of the permanent ice fields on the mainland of the continent. Here are some 25 active glaciers which discharge their slowly flowing ice into the sea. Among the most noted is the Muir glacier, which has a seaward face 3 miles wide and 300 feet high. The greatest example of all is the Malaspina glacier, 1200 square miles in extent, which rests on the southern slope of Mount Saint Elias and reaches the ocean at Icy cape.

Rivers. The chief river in Alaska is the Yukon, the largest American river emptying into the Pacific Ocean. This magnificent river, some 2300 miles long, is formed by the confluence of streams having their headwaters in British Columbia. It flows northward in Yukon territory, and, about midway on the international boundary, enters Alaska. At the northernmost point in its bow-shaped course of about 1500 miles from the Canada boundary to Bering Sea, the Yukon swings slightly north of the Arctic circle. Its chief tributaries are the Tanana, the Porcupine, and the Koyukuk. Other important Alaskan rivers are the Kuskokwim, the Copper, and the Susitna.

Scenery. Alaska, with its great mountains, volcanoes, glaciers, and rivers, is noted for the magnificence of its scenery. The Portland canal, Chatham strait, and the Lynn canal, in southeastern Alaska, surrounded by snow-capped mountains rising above immense forests, rank among the finest scenic waterways in the world. Around the Gulf of Alaska, the coast is indented with deep bays resembling the noted fiords of Norway. Mount McKinley national park, which includes the great mountain, affords some of the grandest mountain views on the continent.

Climate. The panhandle region, lying between British Columbia and the Pacific Ocean, has a mild climate, with heavy rainfall, similar to that of the northwest coast of the United States. The rainfall varies from 80 to 130 inches and the temperature rarely falls below zero or rises above 75°. The coast

region northward in the vicinity of Cook inlet and Kodiak island is slightly colder, with somewhat less rainfall. In the great interior valley of the Yukon, the climate is semiarid, with great extremes of heat and cold. The Arctic coast has a frigid climate, with low average temperature and scant rainfall. The Aleutian islands are exceedingly wet and foggy.

Vegetation. The southern coastal region is heavily forested and contains much valuable timber, chiefly Sitka spruce and hemlock. The Tongass national forest comprises southeastern Alaska, and the Chugatch national forest extends from Controller bay to Cook inlet. Extensive forests of spruce and tamarack, interspersed with poplar, aspen, white birch, and alder, occur along numerous watercourses in the Yukon valley. In the remaining portions of Alaska, there are but few trees. The Alaska peninsula and the Aleutian islands are grasslands. The coastal region of Bering Sea and the Arctic Ocean is covered with tundra.

Animal Life. Alaska is rich in animal life, especially in game animals, fur bearing animals, and in food fishes. Among the larger land animals are moose, caribou, deer, bighorn, and mountain goat. There are also several species of bear, including the polar bear, the rare glacial bear, and the great Kodiak bear. The reindeer, introduced from Siberia to provide food for the native Indians, now abounds in great herds. It is reared like cattle, and reindeer meat is an article of export to the United States. In the coastal waters are found the walrus, the hair seal, and various whales. The fur bearing animals include the fur seal, sea otter, beaver, ermine, mink, marten, and wolverene. Salmon, cod, halibut, and herring are immensely abundant in Alaskan waters.

Minerals. Alaska possesses vast mineral resources, most of which are undeveloped. The most important mineral products are gold, copper, and coal. Many other valuable metals and minerals are found, among which are silver, lead, antimony, tin, tungsten, platinum, quicksilver, and marble.

Gold has been found chiefly in the Juneau district, the Copper River district, the Yukon valley, and in the Seward peninsula, or Nome region. Rich deposits of copper occur in the coast region from Mount Saint Elias to Cook inlet. Extensive coal fields are found in widely separated districts from southern Alaska to the Arctic coast. It is estimated that more than 12,000 square miles are underlaid with coal deposits ranging in quality from anthracite to lignite. Petroleum fields have been discovered near Controller bay and also on the Alaska peninsula.

Transportation. The development of Alaska's immense resources awaits the establishment of quick and cheap transportation. The coasts have many good harbors, and the Yukon and other rivers provide some 3000 miles of inland waterways. But the water routes are long, are open only in summer, and do not reach some of the most important districts. Short railways have been built in connection with mining enterprises, but they were not constructed as correlated parts of a railway system designed to serve the needs of the whole territory.

The United States government has, however, completed a railway, some 470 miles long, from Seward, on the Gulf of Alaska, to Fairbanks, at the head of deep water navigation on the Tanana river, the chief tributary of the Yukon. This connects the southern coast with the great interior valley and may be used as a trunk line from which to build needed extensions. Side lines have already been constructed to important coal fields.

Commerce and Industry. The industries of Alaska are chiefly in connection with mining, fisheries, and the fur trade, with a limited amount of lumbering. The principal exports are canned salmon, copper ore, gold, and furs. Among the most important imports are foodstuffs, clothing, and machinery. The notable growth of Alaskan commerce is shown in the accompanying table.

Fisheries. The salmon fisheries of Alaska are the most valuable in the world. Next in importance to salmon are herring, halibut, clams, and shrimps. In 1925, the value of fishery products shipped to the United States from Alaska was nearly three times that of the copper and of the gold combined.

GROWTH OF ALASKAN COMMERCE

Imports and Exports of Merchandise, 1880–1925

Year Ended	Imports*			Exports		
	From United States	From Other Countries	Total	To United States	To Other Countries	Total
June 30:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1880	463,000	3,032	466,032	.....	31,543	.....
1885	853,000	8,944	861,944	.....	24,468	.....
1890	1,897,000	24,577	1,921,577	.....	4,682	.....
1895	3,017,000	55,850	3,072,850	.....	11,520	.....
1900	18,463,000	385,317	18,848,317	.....	566,347	.....
1905	11,504,255	1,450,910	12,955,165	10,801,446	1,088,165	11,889,611
1907	18,402,765	1,134,191	19,536,956	12,155,198	1,489,686	13,644,884
1908	16,577,903	776,974	17,354,877	10,967,777	1,857,905	12,825,682
1909	17,762,600	647,331	18,409,931	13,110,910	961,101	14,072,011
1910	18,670,339	619,348	19,289,687	12,440,380	1,168,014	13,608,394
1911	16,205,730	706,171	16,911,901	14,055,329	1,136,745	15,192,074
1912	19,417,227	563,503	19,980,730	21,778,064	1,010,072	22,788,136
1913	20,827,262	982,271	21,809,533	24,634,987	1,477,991	26,112,978
1914	22,461,723	567,399	23,029,122	21,817,408	1,124,239	22,941,647
1915	21,260,042	640,886	21,900,928	27,442,335	1,001,389	28,443,724
1916	27,086,288	1,066,612	28,152,900	49,468,186	1,426,362	50,894,548
1917	38,992,049	1,469,524	40,461,573	60,773,859	2,474,894	63,248,753
1918	44,280,075	967,532	45,247,607	71,595,414	2,462,470	74,057,884
Dec. 31:						
1918 (6 mo.)	11,678,122	863,515	12,541,637	62,992,202	763,285	63,755,487
1919	37,476,232	1,449,362	38,925,594	60,479,543	1,542,249	62,021,797
1920	36,876,855	1,512,118	38,388,973	60,939,061	1,530,035	62,469,096
1921	19,274,215	935,013	20,209,228	36,916,924	1,445,042	38,361,966
1922	26,777,806	870,927	27,648,733	51,082,995	1,371,490	52,454,485
1923	30,631,366	514,466	31,145,832	53,761,494	1,325,773	55,087,267
1924	32,046,273	529,618	32,575,891	54,974,168	1,351,380	56,325,548
1925	32,352,530	846,981	33,199,511	55,434,210	901,543	56,335,753

* From 1880 to 1900, unofficial estimates of the value of merchandise shipped from Pacific Coast ports to Alaska; from 1905 to 1925, official figures of shipments to Alaska. Where figures are omitted for imports or exports, statistics are not available.

Mining. From 1880, when gold was first extensively mined at Juneau, to the close of 1926, Alaska had produced gold to a total value of about 372 million dollars. During most of this period, gold was the chief mineral product. Beginning with 1911, copper mining was developed on a large scale, and, within a few years, the copper produced surpassed the gold in value. Other noteworthy products of Alaska mines include silver, coal, lead ore, tin ore, gypsum, and marble. Petroleum is produced in limited quantities.

PRODUCTION OF GOLD IN ALASKA

Year Ended	Shipments to United States	Year Ended	Shipments to United States
June 30:		Dec. 31:	
1905	$ 9,059,023	1918 (6 mos.)	$ 6,671,848
1910	18,393,128	1919	8,015,005
1911	15,153,671	1920	6,543,313
1912	17,250,019	1921	8,975,540
1913	14,576,015	1922	7,422,367
1914	12,291,672	1923	5,985,314
1915	15,348,666	1924	6,285,724
1916	16,195,635	1925	6,226,600
1917	15,409,529	1926	6,620,000
1918	12,416,660		

Furs. Next in value below fishery and mineral products are furs. The most important land furs include red fox, white fox, blue fox, ermine, lynx, marten, mink, muskrat, and land otter. Fur farming, especially with foxes, is carried on to some extent. The fur seal herds, on the Pribilof islands, increased, under government supervision, from 215,000 animals in 1912 to more than 750,000 in 1926. The total value of furs shipped from Alaska in 1926 exceeded 3 million dollars.

Agriculture. Owing chiefly to the shortness of the growing season, agriculture is successful only in limited areas and to a moderate degree. Vegetables are the most important products. These are grown in favored ground in the valleys of the Susitna, the Koyukuk, the Copper, and the Tanana rivers. Hay, barley, and hardy fruits are also produced. Grazing and dairying are carried on in Kodiak island and other grassland districts. Reindeer thrive in moss covered and lichen covered areas. The government maintains four agricultural experimental stations,—a nursery at Sitka, a grain farm at Rampart, a dairy at Kodiak, and a demonstration farm at Fairbanks.

Population. In 1920, the population of the territory was about 55,000, of whom nearly 28,000 were whites and more than 26,000 were Indians, the small remainder being chiefly Japanese and Negroes. The Indians of Alaska belong mainly to four great stocks—the Eskimos, the Aleuts, the Athapascans, and the Tlingits. The Eskimos, about 13,700 in number, live near the seashore, chiefly along Bering Sea and the Arctic Ocean. Some 4600 Indians of Athapascan stock are found in the interior Yukon valley and southward to the Pacific. More than 5000 Indians, principally of Tlingit stock, inhabit southeastern Alaska, or the panhandle region, and about 2900 Aleuts dwell in the Aleutian islands.

Juneau, the capital and largest town, had, in 1920, a population of 3058. Other important towns are Ketchikan, Fairbanks, and Sitka.

History. In 1741, Bering, a Russian navigator, explored the coast of Alaska. Kodiak island was discovered in 1761 by the Russians, who made a settlement there in 1783. Captain James Cook, in 1778, and Vancouver, in 1793-94, made extensive coastal surveys. Sitka, founded in 1804, became the capital of the Russian territory. The Russians, who were engaged chiefly in fur sealing, did not extensively explore the interior.

In 1867, the United States purchased Alaska from Russia for the sum of $7,200,000—about $12 per square mile, or less than 2 cents an acre.

Preceding the discovery of the gold fields, there was little development, except in connection with the fur trade. Important events in the recent history of Alaska were the fur seal arbitration of 1893, the great gold rush of 1898, the settlement of the Alaska-Canada boundary dispute in 1904, and the construction of the government railway from Seward to Fairbanks, 1916–23.

During the World War, the white population of Alaska declined, but, following the completion of important portions of the government railway and the return of stable conditions, development was again stimulated. To aid further in this direction, President Harding, just before his death in 1923, made a memorable visit to Alaska.

AMERICAN SAMOA

A group of four inhabited and several uninhabited islands in the south Pacific Ocean, about 4200 miles southwest of San Francisco and about 2000 miles east of Australia. The inhabited islands are Tutuila, Tau, and those of the Manua group—Ofu and Olosega. The total area of the group is 58 square miles.

The islands are largely mountainous in character, but much of the soil is extremely fertile. The moist tropical climate of the islands fosters a luxuriant vegetation. Agriculture is the principal occupation and is carried on mainly by family groups, each of which is directed and ruled by a patriarch, or *matai*. The chief products include copra, taro, breadfruit, yams, pineapples, oranges, and bananas. Copra is the only article exported.

The only large port of American Samoa is Pagopago. It is a United States naval station under a commandant, who acts also as governor of the islands. The population in 1920 was 8058. Of the adult population, 96 per cent were able to read and write either Samoan or English. Schools were established in Samoan villages by Christian missionaries as early as 1830.

This group of islands came under American sovereignty in 1899 as the result of a treaty with Great Britain and Germany. Since the establishment of American control, the islands have made substantial gains n population and in social welfare.

GUAM

The largest and most southerly of the Marianas islands, which are known also as the Ladrone islands. It is situated in the Pacific Ocean about 1700 miles east of Manila and some 3800 miles west by south of Honolulu.

The island of Guam is about 30 miles long, and varies in breadth from 4 to 8½ miles, its estimated area being 210 square miles. It is mountainous in the south but plateau-like in the north and is crossed near the central line by a low ridge of hills. Broken coral reefs fringe the shore.

There are only two seasons—a wet season and a dry one. Though the temperature averages 81° F. the year round, the climate is healthful. The soil is fertile, well watered, and yields abundant crops of copra, the chief export, and cacao, coffee, corn, rice, and tobacco. Agana, the capital, is the chief city. Piti, near the harbor of Apra, is the port of entry.

As the island is under the jurisdiction of the United States navy department, the governor is a naval officer. He has full executive, legislative, and judicial powers. The natives are of a mixed race, called Chamorros, with the Malayan strain predominating. Chamorro, the native language, and also Spanish and English are spoken.

Guam was discovered in 1521 by Magellan. In 1565, the Spanish took possession of the island. It remained under Spanish rule until 1898, when, as a result of the Spanish American war, it was ceded to the United States. Because of its location, Guam is an important naval station for vessels sailing to and from the Philippines. Population, 1926, 16,159.

HAWAII

A territory of the United States consisting of a chain of nine inhabited and several uninhabited islands in the mid-Pacific Ocean. The chief islands are about 2100 miles southwest of San Francisco and approximately 3400 miles southeast of Yokohama, Japan.

Palmyra island, 1½ miles in area, lying about 700 miles south of the main group, is officially included in the territory. The extreme northwestern islets of the group are called the Midway islands or Ocean Midway, being about halfway between Asia and North America. They are protected by outlying coral reefs and are inhabited only by the employees of a United States cable station there.

The following table gives the area in square miles and the population, for 1920, of the chief islands and of the whole group:

Island	Area	Population
Hawaii	4,015	64,895
Maui	1,182	36,080
Kauai	641	29,247
Oahu	600	123,496
Others	11	2,194
Total	6,449	255,912

The islands of Hawaii are of volcanic origin. Their surface is mountainous, reaching, in Mauna Kea, "White Mountain," a maximum altitude of 13,823 feet. This peak and Mauna Loa (13,675 feet), both in the island of Hawaii, are higher than any other mountain in the islands of the Pacific Ocean. Mauna Loa, "Long Mountain," shares with the near-by mountain of Kilauea the distinction of having one of the largest craters in the world. That of Kilauea is about 8 miles in circumference and is the seat of unceasing volcanic activity.

The climate of the Hawaiian islands is delightfully equable, the maximum recorded temperature being 89° F. and the minimum, 54° F. Northeast trade winds blow prevailingly for about 10 months in the year. On account of the mountainous character of the islands, much of the moisture in the winds is precipitated, falling mainly on the northeastern side of each island. As a result, the opposite side has insufficient rainfall and frequently suffers from drought.

The soil along the coastal lowlands and in many valleys is very fertile and supports a flourishing agriculture of a tropical type. The staple crops are pineapples and sugar cane. Large quantities of cane sugar and of pineapples are shipped, principally to the United States. Other products exported include coffee, honey, hides, sisal hemp, bananas, rice, wool, tobacco, and cotton. The accompanying table indicates the remarkable growth of Hawaiian commerce.

Honolulu, on Oahu island, is the capital and chief port of Hawaii. The population of the territory has a mixed character. More than half are Japanese and Chinese. Of white inhabitants, there are about 60,000, less than one-fourth of the total. The aborigines, of pure or mixed race, number approximately 40,000. A similar complexity characterizes the language and the religion of the territory. The aborigines are mainly Protestant Christians, although some of their pagan beliefs and customs survive. The Hawaiian natives belong to the Malayan race. When discovered, they ranked high among their kindred of the Malay archipelago in mental ability, having a well developed political system and a literature.

The Hawaiian islands were first made known to the world by Captain James Cook, who discovered them in 1778. He called them Sandwich islands after the earl of Sandwich. At that time, each island had its king, who exercised authority by a species of feudal organization. In 1790, Kamehameha, one of the kings, extended his sway over the entire group of islands. His successor, being opposed by those who upheld the native worship, abolished the old religion. The way was thereby opened for the Christianization of the islanders, to whom missionaries from the United States were sent as early as 1820. Schools were opened and the foundations were laid for the system of universal, compulsory education which is now established there.

In 1842, the kingdom of Hawaii was recognized by the United States. An internal struggle for constitutional rights arose and lasted, with interruptions, until 1893, when the reigning queen, Liliuokalani, was deposed. An appeal for annexation to the United States was made, but it was rejected by President Cleveland. A second appeal, made to President McKinley, resulted in the approval by Congress, July 7, 1898, of a treaty of annexation. In 1900, the islands were formally organized into the territory of Hawaii, and a territorial governor was appointed by the president.

On Kealakekua bay, Hawaii island, stands an obelisk commemorating Captain Cook, who was slain at that point by natives in 1779.

GROWTH OF HAWAIIAN COMMERCE

Imports and Exports of Merchandise, 1901–1925

Year Ended	Imports*			Exports		
	From United States	From Other Countries	Total	To United States	To Other Countries	Total
June 30:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1901	.....	2,835,278	.....	27,903,058	120,211	28,023,269
1905	11,753,180	3,014,964	14,768,144	36,112,055	59,541	36,171,596
1908	15,038,155	4,682,399	19,720,554	41,640,505	597,640	42,238,145
1909	17,780,778	4,033,574	21,814,352	40,432,945	84,152	40,517,097
1910	20,560,101	4,606,334	25,166,435	46,183,265	306,763	46,490,028
1911	21,925,177	5,190,449	27,115,626	41,207,651	730,642	41,938,293
1912	24,652,905	5,598,444	30,251,349	55,076,070	373,273	55,449,343
1913	30,646,089	6,873,531	37,519,620	42,713,184	758,646	43,471,830
1914	25,773,412	6,282,558	32,055,970	40,678,580	915,245	41,593,825
1915	25,004,764	5,716,023	30,720,787	62,087,250	377,509	62,464,759
1916	31,127,577	6,068,529	37,196,106	64,438,297	226,747	64,665,044
1917	44,330,475	6,482,951	50,813,426	73,174,343	923,747	74,098,090
1918	43,646,515	6,807,048	50,453,563	79,392,926	1,553,700	80,946,626
Dec. 31:						
1918 (6 mo.)	19,061,246	5,476,008	24,537,254	42,224,209	4,152,299	46,376,508
1919	49,983,869	8,980,704	58,964,573	98,363,015	4,702,103	103,065,118
1920	74,052,453	12,284,592	86,337,045	192,383,185	3,437,699	195,820,884
1921	64,446,173	9,529,755	73,975,928	71,669,115	1,350,483	73,019,598
1922	53,585,740	7,496,913	61,082,653	73,431,301	1,257,268	74,688,569
1923	66,421,393	8,684,804	75,106,197	101,085,642	1,581,164	102,666,806
1924	69,767,693	8,884,223	78,651,916	108,473,292	1,415,911	109,889,203
1925	72,952,949	10,829,509	83,782,458	102,780,509	1,844,782	104,625,291

* Statistics of imports from the United States for 1901 not available.

PHILIPPINE ISLANDS

An island group forming the most northern division of the great Malay archipelago. The Philippines lie southeast of China, about 500 miles from its coast, and are bounded on the north and the east by the Pacific Ocean, on the south by the Celebes Sea, and on the west by the South China Sea. The group is situated north of the equator but entirely within the tropics. It extends north and south for a distance of 1150 miles and east and west for a distance of 650 miles.

Area and Population. There are upwards of 7000 islands and islets, of which only 466 have areas of one square mile or over. Luzon, with an area of approximately 40,800 square miles, and Mindanao, with an area of about 36,900 square miles, rank among the large islands of the world. These two islands contain about 70 per cent of the total land area of the group.

Besides the two largest islands, there are 9 others of importance. Their names and approximate areas in square miles are as follows: Samar, 5100; Negros, 4900; Palawan, 4500; Panay, 4450; Mindoro, 3800; Leyte, 2800; Cebu, 1700; Bohol, 1550; and Masbate, 1250. The total area of the entire Philippine group is approximately 114,400 square miles. The population of the islands, according to the Philippine official census of 1918, was 10,314,310. Manila, the capital and largest city, had a population of 283,613. The area and population of the various provinces and also the population of the largest cities are given in the accompanying tables.

PHILIPPINE ISLANDS
AREA AND POPULATION OF PROVINCES

Province	Area Sq. Miles	Population 1903	Population 1918
Abra	1,475	51,860	71,721
Agusan	4,294	*	44,358
Albay	1,543	240,326	321,745
Antique	1,011	134,166	159,644
Bataan	480	46,787	58,380
Batanes	74	†	8,214
Batangas	1,270	257,715	340,195
Bohol	1,536	269,223	359,600
Bukidnon	3,871	‡	47,811
Bulacan	1,007	223,742	248,863
Cagayan	3,007	156,239	199,938
Camarines Norte	779	239,405	50,822
Camarines Sur	2,072		220,525
Capiz	1,710	230,721	292,496
Cavite	464	134,779	157,347
Cebu	1,867	653,727	857,410
Cotabato	9,620	125,875	169,191
Davao	7,486	65,496	119,304
Ilocos Norte	1,293	178,995	218,951
Ilocos Sur	442	187,411	217,410
Iloilo	2,040	410,315	508,272
Isabela	4,052	76,431	112,965
Laguna	722	148,606	195,371
Lanao	2,439	‡	94,946
La Union	350	137,839	160,575
Leyte	3,005	388,922	597,995
Marinduque	356	51,674	56,876
Mindoro	3,928	39,582	73,822
Misamis	1,030	175,683	198,981
Mountain	6,428	95,495	244,561
Nueva Ecija	2,069	134,147	227,636
Nueva Vizcaya	3,530	62,541	35,819
Occidental Negros	3,125	308,272	397,325
Oriental Negros	1,902	201,494	272,236
Palawan	5,619	35,696	69,061
Pampanga	823	223,754	257,641
Pangasinan	1,944	397,902	567,734
Rizal	899	150,923	230,205
Romblon	505	52,848	64,576
Samar	5,234	266,237	380,211
Sorsogon	2,274	164,170	245,696
Sulu	1,082	90,539	167,975
Surigao	2,889	115,112	122,022
Tarlac	1,178	135,107	172,022
Tayabas	3,839	153,065	211,596
Zambales	1,421	104,549	83,620
Zamboanga	6,383	98,078	147,991
Baguio (City of)	19	.....	5,462
Manila (City of)	14	219,928	283,613
Philippine Islands	114,400	7,635,426	10,350,730

* Formerly included in the province of Suriago.
† Formerly part of the province of Cagayan.
‡ Formerly included in the provinces of Misamis and Cotobato.

TEN LARGEST CITIES, PHILIPPINE ISLANDS

City and Province	Population 1903	Population 1918
Albay, Albay	14,049	53,105
Argao, Cebu	35,448	39,114
Batangas, Batangas	33,131	41,182
Cebu, Cebu	31,079	65,300
Iloilo, Iloilo	19,054	49,808
Laoag, Ilocos Norte	34,454	38,294
Lipa, Batangas	37,934	46,677
Manila	219,928	283,613
Ormoc, Leyte	16,126	38,247
San Carlos, Occidental Negros	9,749	41,820

Surface and Origin. The islands of the Philippine archipelago are largely volcanic. There are 12 volcanoes which have been more or less active in modern times, and slight earthquakes are of frequent occurrence. The islands are traversed by irregular mountain ranges, the main ridges of which extend usually in a north-and-south direction. In Luzon, the mountains rise to heights of from 3500 to 4500 feet. Mount Apo, in southern Mindanao, with an elevation of 9610 feet, is the highest peak in the Philippines. But comparatively little of the surface is level, and much of it lies at considerable elevations above the sea.

Rivers and Lakes. In the larger islands, there are extensive drainage systems. The Cagayan river, in Luzon, 220 miles in length, with a drainage basin of some 10,000 square miles, is the largest river in the Philippines. Other important rivers in Luzon are the Agno, the Pampanga, and the Pasig, all of which are navigable to some extent for small vessels. In Mindanao, the Cotobato and the Agusan are the chief rivers. There are numerous small lakes in various islands, the largest of which are Laguna de Bay and Bombon in Luzon, and Buluan, Liguasan, and Lanao in Mindanao.

Climate. By reason of their location, the Philippine Islands have a warm climate. From about the first of November to the last of June, the northeast trade wind prevails. During this period, the eastern coasts have a heavy rainfall, while the interior parts and the western coasts are dry. From July to October, inclusive, the southwest monsoon prevails. This produces a rainy season throughout the greater part of the islands, though the eastern coasts are comparatively dry.

At Manila, the mean temperature for January is 77°, and for June it is 82°. The mean yearly rainfall varies from 40 inches to 120 inches, according to location. At Manila, it is about 75 inches. As in other eastern tropical regions, violent cyclonic storms of wind and rain, known as typhoons or *baguios*, sometimes cause extensive destruction of life and property.

Minerals. The islands, though not rich in mineral wealth, contain varied and valuable deposits, most of which await development. For hundreds of years, placer gold has been obtained in small quantities. Since the introduction of American mining methods, the yield of gold has been substantially increased. There are large beds of lignite; and silver, copper, and iron ores are found. Among other minerals which occur in the islands are asbestos, salt, sulphur, gypsum, petroleum, and various building stones.

Vegetation. The plant life of the islands is exceedingly luxuriant and varied. The flora is distinctly tropical in character, and is especially rich in trees. Magnificent primeval forests cover more

than half the archipelago. According to the Philippine bureau of forestry, more than 700 species of commercially useful trees have been found in the forests. Dyewoods, wild rubber, and gutta-percha trees, cedars, ebonies, various palms, and many other valuable trees occur.

The most valuable native plant is that which yields the fiber called manila hemp. This is a wild plantain, which, in appearance, closely resembles the edible banana. The valuable coconut palm and the useful bamboo grow in all the islands, as does also the nipa palm, prized as a source of sugar. The banyan is common and attains immense size. Tamarind, mango, and wild orange trees flourish, and, in the southern islands, cinnamon, clove, and pepper occur in the wild state. Various other native trees and shrubs yield rattans, nuts, resins, gums, spices, oils, cabinet woods, and numerous minor forest products. Important cultivated plants successfully grown in the islands include rice, sugar, tobacco, coffee, cacao, Indian corn, or maize, and sweet potatoes.

Animal Life. The Philippines are poor in native mammals but rich in birds. The timarau, a ruminant related to the water buffalo, is the largest native mammal. Monkeys, deer, wild hogs, civet cats, and fruit bats are found. There are various smaller mammals, including a pygmy squirrel no larger than a mouse. Humped cattle are reared for their flesh and hides, and the carabao, or water buffalo, is everywhere used as a draft animal and as a beast of burden.

There are about 700 species of birds, about half of which are found only in the Philippines. Parrots, parrakeets, cockatoos, firebirds, fairy bluebirds, sunbirds, and other bright-hued tropical birds abound in the forests. There are also jungle fowl, beautifully colored wild pigeons, snipe, plover, and other game birds.

Crocodiles, pythons, and venomous snakes are common. Flying lizards, geckos, iguanas, and turtles are found in all the larger islands.

Commerce. In 1900, the islands had only 120 miles of railway. During the American occupation, the railroad mileage has been increased tenfold. About 6000 miles of highway have also been constructed. The economic development of the Philippines has been greatly aided by these increased facilities for transportation. Interisland and foreign commerce has advanced by leaps and bounds since the American flag was raised in Manila. The principal exports are manila hemp, sugar, coconut oil, tobacco goods, and copra. Among the principal imports are cotton goods, iron and steel wares, and foodstuffs. Manila, Iloilo, Cebu, and Zamboanga are the chief seaports. The remarkable growth of Philippine commerce is shown in the accompanying table.

Agriculture. The soil is exceedingly fertile, but as yet less than half the arable land is under cultivation. Among the chief crops grown are corn, rice, manila hemp, coconuts, sugar, tobacco, and maguey. Rice is the staple food crop, and mangoes and bananas are extensively cultivated. Many millions of coconuts are annually consumed for food and much dried coconut meat, the copra of commerce, is exported.

Manufacturing. Tobacco goods, especially cigars and cigarettes, are important manufactured products. Household industries are encouraged by the government, and the Filipinos show skill and artistic taste in the making of embroideries, textiles, hats, baskets, and matting. Lumber working is a rapidly growing industry, a large variety of hard woods, suitable for general construction work, being readily obtainable. Since the erection of oil mills in several of the islands, the extraction of oil from coconut meat has become a leading industry.

People. About 90 per cent of the inhabitants are of the Malay race and profess Christianity. The remainder are largely Mohammedans and pagan wild tribes living in the mountains. The original inhabitants were the Negritos, a small, semisavage people, of whom about 25,000 remain in the islands. The Mohammedan Malays, called Moros by the Spaniards, are found in the southern portions of the archipelago. The Igorrotes, formerly fierce headhunters, live in the mountains, where they cover vast slopes with terraces in which they raise rice by irrigation.

Education. Since the American occupation, there has been great progress in education. Elementary instruction is free, secular, and coeducational. Large numbers of native Filipino teachers have been trained in normal schools established for their instruction. There are numerous schools for industrial education giving instruction in agriculture, commerce, domestic science, needlework, and various other arts. Many high schools, in various cities, and the University of the Philippines, at Manila, furnish opportunities for advanced education.

History. The Philippine Islands were discovered in 1521 by the Portuguese navigator Magellan. In 1542, a Spanish exploring expedition named the group in honor of Prince Philip, later Philip II of Spain. The Spanish began the permanent conquest of the islands in 1565, founding the city of Manila in 1571. The Spanish missionaries extensively Chris-

GROWTH OF PHILIPPINE COMMERCE

Imports and Exports of Merchandise, 1905–1925

Year Ended	Imports			Exports		
	From United States	From Other Countries	Total	To United States	To Other Countries	Total
June 30:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1905	5,761,498	25,114,852	30,876,350	15,668,026	16,684,589	32,352,615
1910	10,775,301	26,292,329	37,067,630	18,741,771	21,122,398	39,864,169
1912	20,604,155	33,945,825	54,549,980	21,517,777	28,802,059	50,319,836
1913	25,387,085	30,940,498	56,327,583	19,848,885	33,834,441	53,683,326
1914	28,571,821	27,439,749	56,011,570	22,047,105	29,190,943	51,238,048
1915	22,394,381	22,085,480	44,479,861	23,001,275	27,913,786	50,915,061
1916	23,804,367	22,169,258	45,973,625	28,638,526	32,825,505	61,464,031
1917	27,516,556	24,466,722	51,983,278	43,125,393	28,589,982	71,715,375
1918	49,799,229	33,964,061	83,763,290	77,010,233	39,604,378	116,614,611
Dec. 31:						
1918 (6mo.)	31,949,240	21,671,502	53,620,742	50,920,499	24,518,860	75,439,359
1919	75,491,415	43,147,637	118,639,052	56,453,173	56,664,660	113,117,833
1920	92,289,778	57,148,505	149,438,283	105,216,263	45,907,503	151,123,766
1921	74,130,015	41,708,599	115,838,614	50,356,793	37,758,530	88,115,323
1922	47,738,326	32,459,319	80,197,645	64,111,601	31,471,697	95,583,298
1923	50,352,535	37,447,212	87,799,747	85,047,023	35,705,967	120,752,990
1924	60,399,380	47,611,515	108,010,895	97,313,903	38,030,760	135,344,663
1925	69,297,583	50,435,251	119,732,834	109,044,942	39,832,263	148,877,205



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SCENES IN UNITED STATES POSSESSIONS. I

1 Mt. McKinley, Alaska. 2 Reindeer in Alaska. 3 Royal Palms, Samoa. 4 Totem Poles, Alaska. 5 Saint Thomas, Virgin Is. 6 Pali Road, Hawaii. 7 Government Building, Honolulu. 8 Private Residence, Honolulu. 9 Pineapple Fields, Hawaii.



Photos from Publishers' Photo Service

SCENES IN UNITED STATES POSSESSIONS. II

1 Native Houses, Manila. 2 University of the Philippines, Manila. 3 Country Landscape, Porto Rico. 4 Opening Coconuts, Philippines. 5 Terraced Rice Fields, Philippines. 6 Modern Highway, Philippines. 7 Carabao Cart, Philippines. 8 Rural School, Porto Rico. 9 San Juan, Porto Rico. 10 Village Street, Guam.

tianized the inhabitants, who constitute the only large body of Asiatic people permanently converted to Christianity in modern times.

The islands remained under Spanish rule until 1898, when, as a result of the Spanish American war, they were ceded to the United States. In 1899, an extensive insurrection of the Filipinos broke out. Aguinaldo, the leader of the rebellion, was captured in 1901, and, in 1902, the insurrection was formally proclaimed at an end. Since the establishment of orderly government under the direction of an American governor-general, the Filipinos have made notable progress in education, agriculture, commerce, and civic development.

PORTO RICO

A West India island lying about 70 miles east of Haiti and 1425 miles southeast of New York. The island is about 100 miles long and from 30 to 40 miles wide, and has about three times the area of the state of Rhode Island.

The climate of Porto Rico is regarded as the most healthful in the tropics of the western hemisphere. Through the middle of the island, a broken range of mountains extends from east to west, their altitude varying from about 2000 feet to that of the culminating peak of El Yunque, 3532 feet high. These mountains are clothed to their summits with luxuriant vegetation. The coast belt is a broad, level alluvial plain. The soil is exceedingly fertile and, as the population is dense, most of the arable land is under cultivation.

On the eastern and on the northern slopes of the mountains there is abundant rainfall, the average yearly precipitation being 65 inches. But, in the southern part of the island, irrigation is required in some districts, as the mountains intercept much of the moisture in the trade winds. Porto Rico is noted for its fine forest trees. Palms, Spanish cedar, ebony, mahogany, ausubo, laurel, sandalwood, and dyewoods abound.

The mineral resources of Porto Rico, so far as developed, consist chiefly of limestone and volcanic bowlders, used in building; various clays, used in making brick and pottery; and gypsum, used for stucco, plaster, and fertilizer. Deposits of marble and lignite occur, and along the south coast there are extensive phosphate beds. Gold, copper ore, iron ore, and the ores of various other metals have been found in small quantities but, as yet, the character and extent of the island's metallic resources are largely unknown.

Agriculture is the chief industry. In 1920, the cultivated land comprised 2,022,404 acres, divided into 41,078 holdings. In that year, the total value of all farm property was $151,283,818. Among the island's principal products are sugar, tobacco, coffee, grapefruit, oranges, pineapples, and other tropical fruits. Sugar is the chief export, and tobacco and coffee are also important. In 1925, the island sent abroad more than 570,000 tons of sugar, valued at $53,261,895. This one product amounted to 53 per cent of all the exports. In 1899, before the introduction of American methods of sugar growing, the total quantity of sugar produced was only 35,000 tons. Manufacturing as yet is limited, tobacco goods forming the chief product. Less important are coffee cleaning and the manufacture of clothing.

The principal cities and seaports, with their respective populations in 1920, are San Juan, the capital, on the north coast, 71,443; Ponce, on the south coast, 41,561; and Mayaguez, on the west coast, 19,069. The harbor at San Juan, which has been extensively improved by the United States government, is one of the best in the West Indies. A railroad, built near the coast, almost completely encircles the island, and there are branches into the interior. Surfaced highways, of which more than 1100 miles have been constructed, facilitate transportation in various parts of the island.

Under the reorganized school system, education is free and compulsory. There are upwards of 2000 school buildings, with more than 225,000 pupils enrolled. There is also a well distributed system of night schools and kindergartens. The University of Porto Rico, at Rio Piedras, is open to both men and women. The percentage of illiteracy, which, in 1899, was 83 per cent, had decreased by 1920 to 55 per cent. The white population is increasing and the mulatto population, now about 25 per cent of the whole, is decreasing.

Porto Rico was discovered in 1493 by Columbus. The first settlement was made at Pueblo Viejo in 1508 by Ponce de Leon, who, in 1509, was appointed governor by King Ferdinand of Spain. Although attacked at various times by the English and the Dutch, Porto Rico remained in the possession of Spain until 1898, when, at the close of the Spanish American war, it was ceded to the United States. Since the establishment of American methods of agriculture, American public schools, improved highways and railways, and various civic improvements, Porto Rico has made remarkable progress. Population, 1920, 1,297,772.

GROWTH OF PORTO RICAN COMMERCE

Imports and Exports of Merchandise, 1900–1925

Year Ended	Imports			Exports		
	From United States	From Other Countries	Total	To United States	To Other Countries	Total
June 30:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1900	3,286,168	1,965,289	5,251,457	2,477,480	1,833,796	4,311,276
1905	13,974,070	2,562,189	16,536,259	15,633,145	3,076,420	18,709,565
1908	22,677,376	3,148,289	25,825,665	25,891,261	4,753,209	30,644,470
1909	23,618,545	2,925,781	26,544,326	26,394,312	3,996,913	30,391,225
1910	27,097,654	3,537,201	30,634,855	32,095,897	5,864,617	37,960,514
1911	34,671,958	4,115,039	38,786,997	34,765,409	5,152,958	39,918,367
1912	38,470,963	4,501,928	42,972,891	42,873,401	6,832,012	49,705,413
1913	33,155,005	3,745,057	36,900,062	40,538,623	8,564,942	49,103,565
1914	32,568,368	3,838,419	36,406,787	34,423,180	8,679,582	43,102,762
1915	30,929,831	2,954,465	33,884,296	42,311,920	7,044,987	49,356,907
1916	35,892,515	3,058,400	38,950,915	60,952,758	5,634,937	66,587,695
1917	49,539,249	4,005,975	53,545,224	73,115,224	7,855,680	80,970,904
1918	58,945,758	4,443,524	63,389,282	65,515,650	8,753,450	74,269,100
Dec. 31: 1918 (6 mo.)	25,668,096	1,796,219	27,464,315	31,333,827	3,733,065	35,066,892
1919	67,799,541	5,261,052	73,060,593	78,320,180	11,075,625	89,395,805
1920	121,561,574	7,512,404	129,073,978	158,322,083	16,346,697	174,668,780
1921	60,977,112	7,377,251	68,354,363	71,987,716	6,753,990	78,741,706
1922	57,968,112	6,849,098	64,817,210	60,105,155	5,012,292	65,117,447
1923	76,919,616	7,547,504	84,467,120	80,303,272	5,768,723	86,071,995
1924	78,412,003	9,337,444	87,749,447	77,330,748	7,397,792	84,728,540
1925	78,078,579	11,620,875	89,699,454	92,679,754	7,053,295	99,733,049

VIRGIN ISLANDS

A group of some 50 tropical islands and islets formerly called the Danish West Indies. They lie about 40 miles due east of Porto Rico. The total area of the group is about 149 square miles, of which 132 is comprised in the three largest islands—Saint Thomas, Saint John, and Saint Croix (Santa Cruz). Almost all the inhabitants are Negroes or mulattoes.

Saint Thomas is the best known of the islands because its principal town, Saint Thomas, population 7747, is located on one of the finest harbors in the West Indies. The surface of the island is rugged and elevated, and the soil is poor. The exports are principally bay rum and hides. Most of the imports are foodstuffs and wearing apparel. The area of the island is about 28 square miles. Population, 1917, 10,191.

Saint Croix, the largest, wealthiest, and most thickly populated of the islands, lies about 40 miles southeast of Saint Thomas, and has two well-known towns, Frederiksted (Westend), with a population of 3144, and Christiansted (Bassin), having a population of 4574. The latter was the capital of the islands under Danish rule. Sugar cane is the chief crop. Long-staple cotton is grown, and cattle are raised. The area of the island is about 84 square miles; population, 1917, 14,901.

Saint John, the smallest of the three main islands, grows bay leaves for the distillation of bay oil and also has a considerable acreage devoted to cotton, sugar cane, and tobacco. The entire population is considered rural. The area of Saint John is about 20 square miles; population, 959.

The Virgin islands were discovered in 1494 by Columbus. Saint Thomas was first colonized in 1672 by the Danes. Saint Croix, first occupied in 1625 by Dutch and English settlers, came into the possession of Denmark in 1733. With the exception of two periods—1801-02 and 1807–15—during the Napoleonic wars, when they were seized and held by the English, most of the islands were under the Danish flag for a period of 245 years. In 1917, upon payment of $25,000,000, they came into the possession of the United States by purchase.

During the days of sailing ships, especially about 1820, Saint Thomas was a supply point of great importance in the West Indian trade. Before the abolition of slavery, in 1848, in the islands, sugar growing was a substantial industry. With the decline of the sugar industry, the population decreased, falling gradually from about 40,000 in 1850 to about 26,000 when the United States took possession in 1917.

The value of the Virgin islands now lies chiefly in their geographic location and their exceptionally fine harbor facilities. Their situation with reference to the Panama canal makes Saint Thomas of great strategic importance as a naval base and as a coaling station.

GROWTH OF THE AMERICAN DEPENDENCIES

With the exception of Alaska, all of the most important dependencies of the United States came under its control at about the beginning of the present century. The Philippines, Porto Rico, and Guam were acquired at the close of the Spanish American war in 1898. American Samoa was secured by treaty in 1899, and Hawaii was annexed in 1900. Although acquired by purchase some 30 years earlier, Alaska remained largely an unexplored wilderness until after the gold rush in 1898. Its period of development, therefore, began practically at the same time as that of the other large dependencies.

From the beginning, the chief aims pursued in the administration of these dependencies have been the maintenance of stable government and the continuous improvement of social and economic conditions. The latter aim has included the building of railroads, highways, and waterways, the construction of harbor facilities, the introduction of modern methods of agriculture, and the founding of various manufactures. Most important of all, it has included also the extension of American education as rapidly as possible to all classes of the people by means of free public schools.

The substantial economic progress made during the period of American control is indicated in the foregoing tables giving the growth of Alaskan, Hawaiian, Philippine, and Porto Rican commerce within the period 1900–25. These tables show that the products exported from Alaska rose in value from about 12 million dollars in 1905 to more than 56 million dollars in 1925, an increase of more than 360 per cent. The growth of Hawaiian commerce for the period 1905–25 is likewise impressive. In 1905, Hawaii exported products valued at 36 millions and imported merchandise valued at about 15 millions. In 1925, the exports had risen to more than 104 millions and the imports to nearly 84 millions, a gain for exports and imports combined of about 270 per cent.

In the case of the Philippines, the combined exports and imports rose from about 63 millions in 1905 to more than 268 millions in 1925, showing a fourfold gain in 20 years. Porto Rico made the most striking advance. During 25 years of progress under American methods, the value of products of the island sold abroad increased 23-fold and the value of goods brought into the country, chiefly from the United States, increased 17-fold.

During the period of American control, each of the more populous dependencies—Hawaii, Porto Rico, and the Philippines—has made substantial gains in population. Guam and American Samoa, among the lesser dependencies, likewise showed a marked growth. Important factors contributing to this increase were a more ample and uniform food supply, especially in the Philippines, and also improved sanitary conditions, resulting from the adoption of modern methods of combating disease.

This great gain in material and physical welfare in the various dependencies is attributable, in very large measure, to the remarkable advances made in education. In Porto Rico, about 10 times as many pupils were attending public schools in 1926 as in 1899. In Hawaii, the attendance at public schools trebled between 1910 and 1925. In the Philippines, from 1903 to 1925, the enrollment of public school pupils rose from about 150,000 to more than 1,100,000. Moreover, in each of the larger dependencies, institutions for higher education have been established and advanced instruction is being given to increasing numbers of students.

An instructive illustration of the American policy is seen in results attained in Alaska. In 1885, the direction of the education and welfare of the Indians in the territory was assigned to the United States bureau of education. This involved far more than academic instruction in the schoolroom. The first task was to teach the fundamentals of sanitary living. The Alaskan natives, especially the Eskimos, lived largely by hunting and fishing. Because of their migratory habits, it was difficult to carry to them effective means of civilization.

It was therefore proposed, in 1889, to import domestic reindeer from Siberia and to establish reindeer raising as an industry among the Alaskan natives. This would provide them an assured means of support, and, in time, would change them from a nomadic to a pastoral people. Between 1892 and 1902, some 1300 reindeer were imported. Young Eskimos, after being taught how to care for the animals, were permitted to establish herds. As a result, there were, in 1927, at least 500,000 reindeer in Alaska, and, of these, two-thirds were owned by natives. In the meantime, schools, largely industrial in character, were established, hospitals and other medical relief were provided, and more sanitary means of living were maintained. In 1926, there were 86 schools in operation, with a total enrollment of 3700.

IN the selection of topics for this section of American geography, the following considerations have governed:

Capital Cities. All capitals of states, territories, and dependencies of the United States are given an item because of their political importance.

Largest Cities. All cities of the United States and dependencies, having, in 1920, a population of 50,000 and upwards, are arbitrarily included on account of size.

Smaller Cities and Places. Various cities and towns with a population of less than 50,000 have been included for specific reasons. Among these are Gettysburg, Plymouth, and Ticonderoga, which were selected because of historical interest. Certain cities and towns were selected because of some feature of travel interest at or near the place; for example, Adamana, Grand Junction, and Twin Falls. Other cities, such as Butte, Cohoes, Hibbing, Riverside, and Winston-Salem, are included because they are leading centers in some important economic enterprise. Still others have been selected primarily because they are seats of universities, colleges, or other important educational institutions. Examples of this kind are Ann Arbor, Ithaca, Oberlin, and Princeton.

Again, the more important Indian towns of the Southwest have been given brief treatment. Among these are the pueblos of Isleta, Laguna, Walpi, and Zuni. Selections of summer, winter, and health resorts have been made, including such places as Lake Placid, Manitou, Palm Beach, Santa Barbara, Hot Springs, and Mount Clemens. Of the less populous Western states, the largest and, usually, the second and the third largest cities have been included; as, for example, Albuquerque and Reno.

In the United States, there are more than 1300 cities and towns which have a population of from 5000 to 50,000. Moreover, there are upwards of 1300 towns of from 2500 to 5000 inhabitants. It is manifestly impossible, in a section of this kind, to give descriptions of *all* of these places. Those selected, however, are the most noted and the most interesting of this great group of towns and cities.

Cities whose population in 1920 exceeded a half million, and also the city of Washington, have been given special topical treatment. The descriptive matter is divided into topics and the topics are given separate subheadings. The treatment follows a simple, uniform plan, beginning with a description of the site of the city, then describing streets, parks, buildings, educational institutions, industries, and other leading features, and ending with important points concerning its history.

Scenic and Travel Interest. Among topics of scenic and travel interest, will be found descriptions of some of the most noted features of the continent, including mountains, lakes, deserts, islands, waterfalls, gorges, cliffs, and caves. Examples of the mountains are Mount Rainier, Mount Shasta, Lassen peak, and Mount Washington. The lakes include Lake Champlain, Lake George, Itasca lake, and Lake Tahoe. Among the deserts described are Death Valley, the Mohave, the Colorado, and the Painted desert. Representative of the other scenic features mentioned above are Niagara falls, Luray Cavern, Mammoth Cave, and the Palisades.

Numerous features, combining both scenic and historic interest, include Harpers Ferry, Lookout Mountain, Stone Mountain, and Starved Rock. Various special regions, such as the Cotton Belt, the Corn Belt, the Wheat Belt, the Citrous Belt, the Blue-Grass Region, and the Inland Empire, are also described. Although the numerous national parks and national monuments are given tabular treatment elsewhere, some of the most noted are described in greater detail in this section; as, for example, Yellowstone park and the Grand Canyon.

Aberdeen (*ăb'ẽr-dēn'*). The second largest city of South Dakota, situated in the northern part of the state, about 125 miles northeast of Pierre. Aberdeen is the commercial center of a rich agricultural district, producing large crops of wheat, flax, hay, and potatoes. Its industries include flour milling and the manufacture of machinery. The city is the seat of Northern State teachers college. Aberdeen was incorporated as a city in 1882. Population, 1920, 14,537.

Aberdeen. A city of western Washington, on Gray's harbor, 50 miles west of Olympia. Aberdeen is a timber, dairy, and agricultural center, with lumber mills, fish-curing houses, canning establishments, and pulp and paper mills. It has steamship communication with the Pacific ports. Population, 1920, 15,337.

Acoma (*ä'kō-mä*). An Indian pueblo situated on a rocky mesa 350 feet high, about 70 miles west of Albuquerque, New Mexico. Visited in 1540 by members of Coronado's exploring party, Acoma is said to be the oldest continuously occupied town in the United States. Franciscan missionaries labored in Acoma as early as 1629 and later established San Estevan mission. The inhabitants speak the Keresan language. Population, about 700.

Adamana (*ă'dă-mă'nă*). A small village on the Santa Fe railway in eastern Arizona. From this point the celebrated "petrified forests" are most conveniently reached. Of the three forests which together constitute the Petrified Forest national monument, two lie at distances of from 6 to 9 miles south of Adamana. Here some thousands of acres are covered with fragments of petrified wood and with wonderfully preserved fossil tree trunks, many of which are 4 feet in diameter. One of these large mineralized trunks, by spanning a ravine 45 feet wide, forms a natural bridge.

The third forest, usually called "Rainbow Forest," is more readily reached by automobile road from Holbrook, a railway town 20 miles west of Adamana. In this petrified forest there are several hundred whole trees, some of which are more than 200 feet long and 6 feet in diameter, all partially embedded in the ground. These are the remains of great cone-bearing trees that grew in geological times. They are of many kinds, most of them closely related to the araucaria or Norfolk Island pine, now widely grown as an ornamental tree.

While the remains of fossilized trees near Adamana are among the most extensive known, there are other noteworthy petrified forests in various parts of the West. The fossil forest in the vicinity of Napa, California, is noted for its immense tree trunks. The Bad Lands of the upper Missouri River region abound in petrified trees, and in Yellowstone park there are numerous fossil tree trunks, some of which stand erect. See *Yellowstone Park, Bad Lands.*

Agana (*ä-gän'yä*). The capital and chief town of Guam, situated on the west coast of the island. It is the seat of a United States naval station and contains an arsenal, a public market, and various churches and schools. The people are engaged principally in simple trades and in local agriculture. Nine-tenths of the inhabitants are natives of mixed Malayan stock, called Chamorros. Population, 1920, 7432.

Akron. A rubber manufacturing city of Ohio, so named because it was believed to occupy the highest point of land in the state. The name is a Greek word, meaning "summit." Akron lies 35 miles southeast of Cleveland, with a grain producing country to the south and a rich dairy country to the north.

Akron was formerly noted for its clay products and cereal mills. With the rise of the automobile industry, however, the city became the center of the world's most extensive manufacture of automobile tires and of rubber goods in general. It produces also fishing tackle, zinc oxide, machine shop products, sulphur, and salt.

Within the city there are 26 beautiful parks; these cover a total area of 475 acres. A concrete bridge, 190 feet high, spans the Cuyahoga river within the city. The chief educational institution is the University of Akron, maintained by the city. During the decade 1910–20, the city's population more than tripled. Population, 1920, 208,435.

Alameda (*ăl'ä-mä'dä*; *-mē'dä*). A city of California, situated on the east side of San Francisco bay, opposite San Francisco and directly south of Oakland, with which it is connected by the Estuary Tube. Alameda is a beautiful residential city, with numerous fine streets and homes. It also maintains substantial industries, among which are potteries, shipbuilding, and the manufacture of motors, pumps, engines, airplanes, and lumber. Population, 1920, 28,806.

Albany. The capital of New York State, picturesquely situated on the west bank of the Hudson river, near the head of tidewater, 145 miles north of New York City.

Albany is an important terminus of the state's barge canal system, which connects the Great Lakes and also the Saint Lawrence river with tidewater. Because of its very extensive railway connections, the city is one of the leading transfer points in the United States for passenger, express, and mail traffic. The city's manufactures are extensive and varied. Among the chief products are car heaters and other metal wares, clothing, knit goods, flour, printing, railway car repairing, meat packing products, embossed dominoes, and felts.

Albany is said to be the second oldest permanent settlement within the limits of the thirteen colonies, the first settlers being mainly Dutch. The city was Burgoyne's objective before the battle of Saratoga and was the scene of the outbreak of the Antirent War in 1839.

The city occupies a commanding site, affording superb views of the Hudson river and its valley. There are many fine streets, among the most important of which are Broadway, Pearl, and State streets. Washington park, the largest unit in the city's park system, is noted for its natural beauty.

The most imposing building is the State capitol, which, since its commencement in 1871, has cost over 29 million dollars. This magnificent structure, 400 feet long and 300 feet wide, is built of Maine granite in the Renaissance style. It contains a staircase said to be the finest in the world.

Among other noteworthy buildings are: the State Education building; the Delaware & Hudson building; the new junior high school; the Albany Institute and Historical and Art Society; the old Schuyler Mansion, dedicated in 1917 as a historical monument; and Saint Peter's church, an excellent example of the French Gothic type of architecture. The law and the medical department of Union university, Schenectady, and also a State Teachers' college are located in Albany. Population, 1920, 113,344.

Albay (*äl-bī'*). The chief city of the province of Albay, in southeastern Luzon, Philippine Islands. The city is located on the eastern coast, some 250 miles southeast of Manila, and has a good harbor. It is situated in a mountainous but exceedingly fertile region, containing coal, iron, gold, and other mineral resources. The comparatively small province of Albay produces a substantial part of the manila hemp grown in Luzon, and this fiber is the city's most important export. Other industries include the production of coconut oil and shipbuilding. Albay is one of the most rapidly growing cities of the Philippines. Population in 1903, 14,049; in 1918, 53,105.

Albuquerque (*ăl'bû-kûr'kē*). The largest city of New Mexico, on the Rio Grande river, slightly northwest of the center of the state. It lies at an elevation of 5000 feet, in a bracing, sunshiny climate, and is a noted health resort. The old town, founded in 1701 by the Spanish, remains as a division of the modern city, which dates from 1880.

Albuquerque is the trade center of a large mining and ranching district, and is the principal market for Indian blankets. There are various local industries, including lumber mills, flour mills, foundries, and railroad shops. The University of New Mexico and a government Indian school are located here. The more notable structures include a Federal building and the Harvey Indian Museum. Features of interest in the vicinity are the ancient church of San Felipe de Neri, built in 1735, and the Isleta Indian pueblo. Population, 1920, 15,157.

Allentown. An important silk manufacturing city of Pennsylvania, 55 miles north of Philadelphia. Besides silk making, Allentown maintains important iron, furniture, and dyeing industries. It is also interested commercially in many large Portland cement mills situated in the surrounding district. The city is the seat of the famous "Allentown Fair." During the Revolutionary War, the Liberty Bell was concealed in one of the city's churches to prevent its capture by the British. The educational institutions include Muhlenberg college and the Allentown college for women. Population, 1920, 73,502.

Altoona. A railroad city of central Pennsylvania, picturesquely situated in a mountainous district about 120 miles east of Pittsburgh. The major industry is railway shop construction and repairs, enormous car shops of the Pennsylvania railroad being located in the city. Population, 1920, 60,331.

Anaconda. A mining city of western Montana, 26 miles west of Butte. Anaconda was founded in 1884 and is noted for its immense copper-smelting works, which have a daily capacity of many thousand tons. Population, 11,668.

Annapolis. The capital of Maryland, situated on the right bank of the Severn river, near the center of the western coast of Chesapeake bay. The city was first settled in 1649, and was called Providence. In 1694, it was named after Queen Anne and was made the capital of the colony of Maryland. The first Federal Constitutional Convention met in Annapolis in 1786. The city is the seat of the United States Naval Academy, on which the government has spent $15,000,000 for buildings and grounds since its organization in 1845, and of Saint John's college, founded in 1696. The industries include an oyster packing plant. Population, 1920, 11,214.

Ann Arbor. A city of southeastern Michigan, on the Huron river, about 40 miles west of Detroit. While Ann Arbor is the trade center of a rich farming district and has substantial local industries, it is most widely known as the seat of the University of Michigan, one of the leading state universities. The city was founded in 1824, and the university was opened in 1837. Population, 1920, 19,516.

Asbury Park. A city of New Jersey, on the Atlantic Ocean, about 40 miles south of New York City. Asbury Park is noted chiefly as a seaside resort and residential city. It has, however, various local industries, including the manufacture of stereoscopic instruments, pearl buttons, gold pens, and leather goods. Population, 1920, 12,400.

Asheville. A city noted as both a summer and a winter resort, situated picturesquely in a mountainous region of North Carolina near the western extremity of the state. Fruits and tobacco are grown in the vicinity. Its industries produce furniture, leather, mica, cotton yarn, and blankets. Population, 1920, 28,504.

Astoria. A port of northwestern Oregon, located on the Columbia river, about 10 miles from its mouth. It is noted chiefly for the catching and canning of salmon on an immense scale. Other industries include lumber mills, flour mills, and creameries. Astoria has river and rail transportation to Portland and also considerable ocean commerce, with exports of lumber, grain, fish, and flour. Astoria was named for John Jacob Astor, who founded it in 1811. It was largely destroyed by fire in 1922 and has since been rebuilt in a more modern style. Population, 1920, 14,027.

Athens. A city of northern Georgia, on the Oconee river, some 70 miles northeast of Atlanta. Water power, derived from the river, is utilized in woolen and cotton mills, hosiery and fertilizer factories, and various other industries. Athens is a noted educational center and is sometimes styled the "classic city of the South." Its leading institutions include the University of Georgia, the State normal school, the State agricultural college, the Lucy Cobb institute, the Knox institute, and Jeruel academy. Population, 1920, 16,748.

Atlanta. The capital and largest city of Georgia, situated in the north central part of the state, about 290 miles by rail northwest of Savannah.

The ridge on which the city is built is a part of a watershed dividing streams that flow into the Atlantic from those that flow into the Gulf of Mexico. The city lies about 1050 feet above sea level, an elevation higher than that of any city of equal or greater size east of Denver. The Chattahoochee river, flowing within 8 miles of the city, is the source of its water supply and hydroelectric power.

Atlanta is admirably, though somewhat irregularly, laid out, and contains many beautiful avenues and streets. Peachtree and West Peachtree streets, Pace's Ferry road, and Ponce de Leon avenue are fine residence streets, and Druid Hills and Ansley park are beautiful residence sections. The city covers about 32 square miles, and includes a park system embracing a total area of more than 850 acres and containing 18 parks and playgrounds. In Grant park there is a great cycloramic painting of the battle of Atlanta. About 15 miles to the east of Atlanta is situated Stone Mountain, on the face of which is a huge sculptured memorial to the valor of the Confederate soldiers. The commercial district contains many notable buildings, giving the city a metropolitan aspect. Among these are the State capitol, the Federal building, the Terminal station, the Federal Reserve bank, and numerous imposing office buildings.

Atlanta is a prominent educational center and contains many widely known institutions of learning. Among the leading institutions of higher learning are the Georgia school of technology, Emory university, Oglethorpe university, and Columbia theological seminary. The institutions for women include Agnes Scott college, Woodberry hall, and Washington seminary. Among the institutions for Negroes are Atlanta, Clark, Spelman, and Morris Brown universities, Morehouse college, and Gamma theological seminary. There are excellent libraries, and the city is one of the chief centers of printing and publishing in the South.

Because of its advantageous situation and excellent railway facilities, Atlanta has become the chief inland commercial city of the cotton states. It is the distributing center for a large region and has developed extensive industries, ranking first in the state in manufactures. The leading products include cotton mill products, confectionery and ice cream, furniture, mattresses and bed springs, lumber, clothing, and fertilizers. The city is a leading mule market and conducts a large wholesale and retail merchandising trade.

The growth of Atlanta dates from the building of the first railroads in northern Georgia. The site was settled about 1839. In 1843 it was incorporated as Marthasville. This name was changed to Atlanta in 1845, and in 1847 a city charter was granted. Because of its location, it was one of the most important cities of the Confederacy, and in 1864 was the objective of General Sherman's campaign from Chattanooga. The battle of Atlanta and other severe engagements were fought near the city, which was finally taken by the Union forces and largely destroyed. It was quickly rebuilt after the war and grew rapidly. In 1878, it was made the capital of the state. During 1895-96, the Cotton States and International exposition was held at Atlanta. Population, 1920, 200,616.

Atlantic City. An all-year seaside resort on Absecon Beach, a sandy island off the southeastern mainland of New Jersey, about 60 miles southeast of Philadelphia. There are about 1200 hotels for the accommodation of visitors, the number of which often exceeds 15 million annually. The attractions include many miles of beaches, six large recreation piers, and the "Board Walk," a magnificent promenade, 60 feet wide, extending along the ocean front for a distance of eight miles. Permanent population, 1920, 50,707.

Augusta. The capital of Maine, situated on both banks of the Kennebec river, about 40 miles from its mouth. The State capitol is a handsome structure, built of granite quarried locally. The Maine Insane hospital and a United States arsenal are situated in Augusta. Excellent water and rail transportation facilities have made the city the trade center of a large district. Water power is available for several manufacturing establishments, the most extensive of which are cotton mills. Population, 1920, 14,114.

Augusta. A commercial and manufacturing city of eastern Georgia, located at the head of navigation on the Savannah river, about 132 miles northwest of Savannah. Augusta is the trade center of a rich agricultural district and one of the leading cotton markets in the United States. Water power and hydroelectric power are extensively used in the city's substantial industries, the chief of which are the manufacture of cotton goods and cottonseed products. Other manufactures include brick, furniture, lumber, fertilizers, and foundry products. A United States arsenal is located there. Augusta was established in 1735, and for a time during and after the Revolutionary War was the capital of Georgia. Population, 1920, 52,548.

Ausable (*ô-sā'b'l*) **Chasm.** A narrow gorge of great scenic attractiveness, situated in northeastern New York, about midway between the Adirondacks and Lake Champlain. The rocks forming the walls are of hard Potsdam sandstone, traversed by numerous fault lines or displacements. Through these the Ausable river has worn a zigzag course about 2 miles long and, in places, 175 feet deep.

Austin. The capital of Texas, picturesquely located on the north side of the Colorado river, in the south central part of the state. The State capitol, situated in the ten-acre Capitol square, is one of the largest in the country. Austin is the seat of the University of Texas and of a number of denominational schools and academies.

Above the city an immense dam has been built to provide water supply and power. This dam creates an artificial lake 29 miles long, known as Lake Austin. The industries include oil refining and the manufacture of various products, such as lumber, furniture, truck bodies, oil engines, flour, and leather goods. The city is the center of a considerable wholesale and shipping business, and carries on an extensive trade in agricultural products, wool, and live stock.

Settled in 1838, it was at first called Waterloo, but in 1839 was incorporated and renamed for S. F. Austin, the "Father of Texas." Population, 1920, 34,876.

BALTIMORE. The principal city of Maryland, the eighth in population in the United States, and the largest on the Atlantic seaboard south of Philadelphia. It is situated on the estuary of the Patapsco river, 14 miles from Chesapeake bay and about 200 miles by navigable channel from the Atlantic. Washington, D. C., lies about 40 miles southwest, and Philadelphia, 97 miles to the northeast.

Streets and Buildings. The principal thoroughfares are Baltimore, Fayette, Pratt, and Lexington streets running east and west, and Charles, Saint Paul, Calvert, Gay, and Harvard streets extending north and south. Many of the public buildings are noted for size and architectural beauty. Among these are the Peabody institute, the Roman Catholic cathedral, the First Presbyterian church, the Enoch Pratt free library, the Walters art gallery, the city hall, the Federal building, and the Masonic temple.

Parks and Monuments. Many fine parks are scattered throughout the city. Of these, Druid Hill park is the largest and finest. Other noteworthy parks are Clifton, Patterson, Carroll, Herring Run, and Gwynn's Falls. A statue of Columbus, unveiled in 1792, the first in any American city to be dedicated to the great discoverer, stands on the grounds of the Ready school. Mount Vernon Place, the nominal center of the city, is the site of the Washington Monument, a stately column of marble 164 feet high. This monument, the corner stone of which was laid July 4, 1815, was the first erected by any city in memory of George Washington, and gave to Baltimore her designation as the "monumental city." In Westminster cemetery, one of the oldest and smallest in Baltimore, is buried Edgar Allan Poe.

Educational Institutions. Baltimore is the seat of Johns Hopkins university, a leading institution of higher learning. Connected with it is the widely known Johns Hopkins hospital and the Johns Hopkins medical school. Among other important educational establishments are the University of Maryland, Baltimore college of dental surgery, Goucher college for women, Loyola college, Morgan college, and Notre Dame institute. The Peabody institute contains a valuable historical library.

Transportation. In its magnificent system of railroads, its excellent harbor, and its extensive docks, Baltimore has every facility for railway and overseas transportation. Baltimore harbor, with a minimum depth of 35 feet, is capable of accommodating the largest ocean steamers, and vessels belonging to numerous transatlantic lines call regularly at this port. Ocean steamers load and unload directly from and into railroad cars at the piers.

Commerce. Baltimore is the chief mercantile and jobbing city of the south Atlantic states and ranks as one of the leading export and import centers of the country. It exports immense quantities of corn, wheat, and other grains; also flour, cotton, tobacco, coal, and copper. Among the articles of import are woods, bananas, pineapples, and sugar. There is also an extensive coastwise trade.

Manufactures. As an industrial center, Baltimore has made notable progress, especially since 1900. According to the census of 1920, it ranked seventh among cities of the United States in total value of manufactures produced. The principal industries are the manufacture of clothing (its largest single product); the production of refined copper, tin plate, and sheet iron; and the manufacture of boots and shoes, flour, fertilizers, machinery, and metallic wares. There are also large establishments for canning fruits and for packing meat and oysters. The cotton-duck mills, which produce the greater part of the sail-duck made in the United States, give employment to several thousand persons.

Baltimore owes its commanding position as regards manufactures to its comparative nearness to the cotton belt of the South, to the coal-, iron-, and timber-producing districts of the interior, and to the grain growing sections of the West. This advantageous location affords cheap and easy access to the raw materials of industry.

History. The first settlement within the present limits of the city was made in 1662. The city was founded in 1729 and was incorporated in 1796. At the time of the American Revolution and especially during the Napoleonic wars, Baltimore attained prominence as a seaport. Its fame was spread throughout the world by its fast-sailing ships called "Baltimore clippers." During an unsuccessful attack by the British on Ft. McHenry, which guarded the city, Francis Scott Key, in 1814, wrote the "Star-spangled Banner."

Baltimore was the first American city to be lighted by gas (1821). The construction of the first important line of railway in the United States, the Baltimore and Ohio railroad, was begun in Baltimore in 1828. Here, also, the first iron steamship was built. In 1844, the first electric telegraph line ever operated was strung between Baltimore and Washington. The first complete, practical electric street railway in the world was installed in Baltimore in 1888.

In 1904, the whole business section was ravaged by fire, with a property loss exceeding $125,000,000. The destroyed area was soon rebuilt with wider streets and finer structures. The waters of Loch Raven, impounded by a dam, provide the city's water supply. Population, 1920, 733,826.

Bar Harbor. A summer resort in Maine, on the east shore of Mount Desert island, which lies near the center of the state's coast line. Bar Harbor is partially within Lafayette national park. The scenery in the vicinity is enriched by mountains, by numerous small inlets on the coast, and by many picturesque lakes. Population, 1920, 3622.

Baton Rouge (*bát'ŭn rōōzh'*). The capital of Louisiana, located on the east bank of the Mississippi river, about 80 miles northwest of New Orleans. The city occupies a picturesque site on the river bluff, and is the seat of the State university and other state educational institutions. By reason of its fine harbor, Baton Rouge carries on an extensive shipping trade. Its manufacturing interests include box factories, brick factories, cottonseed oil and lumber mills, and a large oil refinery. Population, 1920, 21,782.

Battle Creek. A city of south central Michigan, situated about midway between Detroit and Chicago. The city lies in the center of a rich agricultural region and has become noted for its manufacture of cereals. The Battle Creek sanitarium is visited by thousands of persons yearly. Population, 1920, 36,164.

Bay City. A city of eastern Michigan, on the Saginaw river, some 4 miles from Lake Huron and about 110 miles northwest of Detroit. Bay City has excellent transportation facilities, both by rail and by water, the river being navigable for the largest lake vessels. In the vicinity there are important coal mines and salt works. The surrounding farming district produces immense crops of sugar beets. Among the principal manufacturing establishments are beet sugar refineries, soda ash works, machine shops, and woodworking factories. The port carries on a large traffic in timber, wood products, coal, salt, and sugar. First settled in 1831, Bay City was incorporated in 1859 and received its charter in 1865. Population, 1920, 47,554.

Bayonne (*bā'yōn'*). An industrial city of New Jersey, situated on New York harbor 7 miles southwest of New York City. Bayonne contains large coal shipping docks and is an important center for the refining of petroleum. It is the terminal of oil pipe lines leading to New York and other eastern cities. Population, 1920, 76,754.

Beaumont (*bō'mŏnt*). A port of southeastern Texas, on the Neches river, about 80 miles northeast of Houston. Beaumont is the center of an important rice growing district, and there are important oil fields and large pine and cypress forests in the vicinity. The chief industries are oil refining and the cleaning and the marketing of rice. Population, 1920, 40,422.

Bellingham. A port of northwestern Washington, located on a natural harbor on Bellingham bay. It is the commercial center of an extensive agricultural and lumbering region. Salmon fishing is an important industry. The leading manufacturing establishments include lumber mills, salmon and fruit canneries, and cement and sugar beet factories. The city is the seat of the State normal school. Population, 1920, 25,585.

Berkeley (*bûrk'lĭ*). A city of California, situated on San Francisco bay opposite the Golden Gate and adjoining Oakland, which lies to the south. Berkeley's beautiful site overlooking the bay and the equable climate unite to make the city highly attractive from a residential point of view.

Berkeley is the seat of the University of California, the largest of the state universities, and one of the great educational institutions of the country. Excellent transportation facilities and low priced electrical power have favored the development of various industries. The manufactures include canned fruits, chemicals, airplane motors, knit goods, leather products, paints, and steam pumps.

Berkeley was first settled in 1868, and was incorporated as a town in 1878. It was named after Bishop Berkeley, the noted British philosopher and author of the saying, "Westward the course of empire takes its way." Population, 1920, 56,036.

Bethlehem (*bĕth'lê-hĕm*; *-lê-ĕm*). A manufacturing city of eastern Pennsylvania, situated on the Lehigh river, about 45 miles north of Philadelphia. Among the leading industrial establishments are iron and steel works, flour, silk, and knitting mills, and radio, electrical equipment, cigar, and furniture factories. Founded in 1741 by Moravians, Bethlehem is the center of the Moravian sect in America and contains the Moravian college. The city celebrates an annual musical festival which is sometimes styled the American Bayreuth. Bethlehem is also the seat of Lehigh university. Population, 1920, 50,358.

Binghamton. A manufacturing city of south central New York, about 115 miles southwest of Albany. Binghamton is picturesquely situated at the junction of the Susquehanna and Chenango rivers, which are here crossed by various bridges. The city is made attractive by fine parks, the larger of which are Ross, Ely, and O'Neil parks, and by beautiful drives. The city's industries are extensive and varied, the more prominent ones including the manufacture of cigars, of silk goods, and of shoes. The first settlement on the site of the city, made in 1787, was known as Chenango Point. In 1800 this was renamed Binghamton, which was incorporated as a village in 1834 and became a city in 1867. Population, 1920, 66,800.

Birmingham. The largest city of Alabama, slightly north of the center of the state. The city was named after Birmingham, England, in allusion to the proximity of rich deposits of iron. Being situated in the midst of immense coal deposits also, Birmingham has risen to high rank among the iron and steel producing centers of the country. Steel and steel products and coke account for a high percentage of the city's extensive output of manufactures, although in recent years the industries of Birmingham have become considerably diversified. The city is served by nine railroad systems, and the tonnage of its freight is said to be greater than that of all the rest of the South combined. Birmingham is also the trade center of a large and highly productive agricultural district.

The city is substantially and handsomely built, and has many fine streets, beautiful residences, and imposing public buildings, and also numerous commercial structures of the skyscraper type. The municipal park system contains upwards of 34 public parks. Among the most prominent of these are Wilson, North Birmingham, East Lake, Lake View, and Highland parks.

Birmingham is a notable product of the industrial transformation that has taken place in the South since the Civil War. In 1870, the site of the city was a cotton field. In 1871, following the discovery of valuable coal and iron ore deposits in the vicinity, a land company founded Birmingham. Growth at first was slow, but the population rose from about 3000 in 1880 to more than 26,000 in 1890. Since the latter date, Birmingham has enjoyed remarkable growth. Population, 1920, 178,806.

Bismarck (*bĭz'märk*). The capital of North Dakota, situated on the east bank of the Missouri river, slightly southwest of the center of the state. The most notable buildings in the city and vicinity are the State capitol and Fort Abraham Lincoln. The Missouri river is spanned here by a vehicular bridge. Creameries and nurseries are representative of the city's industries. Population, 1920, 7122.

Black Hills. A picturesque, mountainous region in South Dakota and northeastern Wyoming. Its 6000 square miles are rich in minerals, particularly gold, and embrace the Black Hills national forest (970 square miles) and Custer state park (168 square miles). The highest point is Harney peak (7216 feet). On Mount Rushmore was begun in 1927 a huge memorial depicting in colossal sculpture the figures of Washington, Jefferson, Lincoln, and Roosevelt.

Black Rock Desert. A dreary waste fully 70 miles long and in some places 20 miles wide, extending northeast from Pyramid lake in northwestern Nevada. This area, which embraces nearly 1000 square miles, is an alkaline flat or sink, practically devoid of vegetation. In summer, it is a barren plain covered with dun-colored, alkaline dust which is blown into vast clouds by the wind. During winter, portions are covered with shallow water, whence the name "mud lake," sometimes applied to the region.

Blue-Grass Region. A district in central Kentucky, lying between the low plains of the west and the mountains on the east. This region is devoted largely to stock raising and is famous for its thoroughbred horses. It is so named because of the prevalence and fine quality of its blue-grass pastures, which are a common feature of the landscape.

Boise (*boi'zā*). The capital of Idaho, located on the Boise river in the southwestern quarter of the state. The surrounding country is rich in minerals and in agricultural products, and the city is an important inland wool market. The varied industries utilize hydroelectric power from the celebrated Arrow Rock dam, constructed 26 miles distant from the city and having a height of 349 feet. Boise is unique among cities in possessing a natural supply of hot water from a flowing well. This is used for heating houses and for supplying the city's large indoor swimming pool. Population, 1920, 21,393.

BOSTON (*bŏs'tŭn*). The capital of Massachusetts, the chief city of New England, and the seventh in population in the United States, is situated on Boston bay, at the mouth of the Charles and the Mystic river, about 230 miles northeast of New York City.

Site. The original site of Boston was a peninsula marked by three historic hills, Beacon hill, Copp's hill, and Fort hill, and contained about 780 acres. By leveling portions of the hills and by filling in various inlets and tidal marshes, this original area was gradually expanded to 1800 acres. To this, various adjoining districts have been added, including Dorchester, Charlestown, West Roxbury, Brighton, and Hyde Park, until the city now contains an area of more than 30,000 acres, or about 50 square miles.

Metropolitan District. Modern Boston consists of the city proper and of the populous metropolitan district of which it is the center. The cities of Somerville and Cambridge extend almost to the heart of Boston, and the fine suburb of Brookline lies almost wholly within the city. These are closely surrounded by other large suburban communities. The population of the metropolitan district, lying within 10 miles of the center of Boston, exceeds 1,800,000. The center of population in the state of Massachusetts lies within the metropolitan district.

Streets. The narrow, irregular streets, characteristic of the old town, now form but a small section of the North End, mainly an Italian center. The modern city contains about 600 miles of paved streets, which, in the newer districts, are handsomely laid out. Beacon street, rich in historic associations, and Commonwealth avenue, one of the finest boulevards in America, are representative of Boston's finest residential avenues. Washington, Tremont, and Boylston streets constitute the center of retail trade, and State street is the financial center—the "Wall Street" of Boston.

Parks. Boston ranks high among American cities in the development of parks and playgrounds. This has two distinct phases, municipal and metropolitan. The municipal park system covers 3500 acres, or more than one-tenth of the city's total area. It embraces the historic Common, 48 acres in extent, set aside in 1634, now in the heart of the city, and includes a chain of parks in various other sections, connected by beautiful parkways. These almost encircle the city, beginning with the Charles River esplanade and continuing to Marine park in South Boston. Among the more noteworthy of these are Olmstead park, Jamaica pond, the Arnold arboretum, and Franklin park with a large zoological garden.

The Metropolitan parks district includes, with Boston, about 40 municipalities. These are administered by a state commission. The Metropolitan parks plan includes such reservations as the Middlesex Fells, 1900 acres; the Blue Hills, 4900 acres; Stony Brook Woods, 460 acres; and Lynn Woods, 2000 acres. With these are grouped also Revere beach, Nantasket beach, and improvements along the Charles, Mystic, and Neponset rivers. The scheme embraces reservations with connecting parkways covering upwards of 10,000 acres.

Monuments. Boston is noted for its monuments and statues, embracing some of the finest sculptural work in America. The most striking is Bunker Hill monument, a granite obelisk, about 220 feet high, in Charlestown. In the Common is the great army and navy memorial, by Milmore, and the monument commemorating the Boston Massacre, by Kraus. In the Public Gardens is an equestrian statue of Washington, by Ball; a statue of W. E. Channing, by Herbert Adams; of Edward Everett Hale, by B. R. Pratt; and the Ether monument, commemorating Dr. W. T. G. Morton's discovery, by J. Q. A. Ward. Facing the capitol is the impressive Shaw memorial by Saint Gaudens. At Trinity church there is a statue of Philips Brooks, also by Saint Gaudens. In the Fenway is the John Boyle O'Reilly memorial, by D. C. French.

Buildings. The newer portions of Boston contain some of the finest examples of modern architecture in the United States. Among many notable buildings may be mentioned the capitol, the public library, Trinity church, Holy Cross cathedral, the First Church of Christ Scientist, the museum of fine arts, and the Harvard medical and dental schools. The customhouse, with a tower 505 feet high, is one of the landmarks of the city.

Educational Institutions. Boston is unsurpassed as an educational center. Among its leading institutions are Boston university, Boston college, Simmons college, the New England conservatory of music, the Harvard medical and dental schools, and the art school in connection with the museum of fine arts. Harvard university, Radcliffe college, and the Massachusetts institute of technology are located across the Charles river in Cambridge. Tufts college, Wellesley college, and other noted institutions are in near-by suburbs. Boston is the home of many important historic, scientific, literary, and musical societies. The Boston Symphony Orchestra is one of the leading organizations of its kind.

Transportation. In large measure, Boston owes its commercial prominence to excellent transportation facilities. It is situated on a fine harbor, with steamer connections to leading American and foreign ports, and is the chief railway center of New England. Local transportation includes both elevated railways and subways and an immense system of street railways with extensive suburban connections.

Commerce. Boston is the chief seaport of New England, and one of the foremost in the United States. The exports are chiefly provisions and manufactures of cotton, wool, leather, iron and steel, and rubber. Among the principal imports are wool, cotton, fibers, sugar, hides, tea, tin, wood products, and chinaware. There is an extensive coastwise trade, and the city has become the leading fish market in the United States. Among the world's wool markets, Boston ranks second only to London. As a chief distributing point for New England, Boston conducts an enormous wholesale trade. The city is also the center of immense mining, railway, and insurance interests.

Manufactures. As a manufacturing center, Boston ranks ninth among the cities of the United States. While no single industry predominates, the city is a leading center for the manufacture of boots and shoes, pianos and organs, clothing, confectionery, cocoa products, books and printing, textile machinery, edge tools, and numerous specialties.

Points of Interest. Boston, with its environs, offers the traveler an immense number of points of historic and literary interest. Many of the more famous of the earlier buildings have been carefully preserved. Among these are Christ church (Old North), dating from 1723, Faneuil hall, the Old statehouse, King's chapel, and the Old South meetinghouse. Bunker Hill monument, and the navy yard, in which lies the famous frigate *Constitution*, "Old Ironsides," are within the city. In the environs to the northwest are Concord and Lexington, and farther away to the southeast are Plymouth and Plymouth rock.

Many great writers and scientists lived in or near Boston, including Longfellow, Lowell, Emerson, Holmes, Hawthorne, Parkman, Prescott, Motley, and Agassiz. Numerous homes and other places of interest connected with the lives of these men are readily accessible.

History. In a large sense, the history of Boston is the history of New England. Founded in 1630 by Puritans under the leadership of Governor John Winthrop, it was made the capital of the Massachusetts Bay Colony, and has since remained the dominant center of New England. In 1704 the *Boston News Letter*, the first regular newspaper printed in America, began publication. In 1765 began the resistance to the Stamp act, which culminated in the Revolution. In 1770 occurred the "Boston Massacre," and, in 1773, the famous "Boston Tea Party." At the beginning of the Revolution, Boston was occupied by British troops who defeated the colonists at the battle of Bunker Hill, 1775, but early in 1776 Washington forced the British to evacuate the town. Boston received its charter as a city in 1822. About 1830 the city became the center of the Abolitionist movement. During the greater part of the 19th century, Boston was regarded as the literary center of America. Population, 1920, 748,060.

Boulder. A city of northern Colorado, 30 miles northwest of Denver, at the foot of the Rocky mountains. It is the center of a farming, stock raising, and mining region, and its industrial establishments include flour mills, lumber mills, ore sampling works, and manufactories of clay and kaolin products. There is a public park embracing 2200 acres, and Boulder canyon possesses great scenic interest. The city is a noted summer and health resort, and is the seat of the University of Colorado. Population, 1920, 11,006.

Bridgeport. The chief manufacturing city of Connecticut, situated in the southwestern part of the state on a natural harbor of Long Island sound. The city is noted for the great diversity of its manufactures, which include machine tools, sewing machines, corsets, phonographs, plated ware, firearms, ordnance, ammunition, clothing, hats, silk goods, typewriters, and numerous other products. Bridgeport first attained importance as the seat of the manufacture of sewing machines and as the headquarters of Barnum's circus. The park system includes the beautiful Seaside park with its two-mile boulevard along the sea wall. Population, 1920, 143,555.

Brockton. A manufacturing city of eastern Massachusetts, about 20 miles south of Boston. Brockton is one of the largest shoe manufacturing centers in the United States. Other industries include the manufacture of elastic goods, shoe machinery, shoe blacking, nails, and tools. Brockton was settled in 1700, became a town in 1821, and received its charter as a city in 1881. Population, 66,254.

Brookline. A town of eastern Massachusetts, on the Charles river, about 3 miles west of Boston. Brookline is chiefly a residential place and ranks among the most beautiful and wealthy suburban towns in America. It produces some manufactures, among which may be mentioned marine compasses and other scientific instruments. Population, 1920, 37,748.

Brooklyn. See *New York*.

BUFFALO (*bŭf'ā-lō*). The second largest city of New York and the eleventh largest in the United States, situated at the eastern end of Lake Erie, about 22 miles south of Niagara Falls. Buffalo occupies a commanding site facing westward on Lake Erie and the Niagara river, and southward to the valley of Buffalo creek.

Streets and Buildings. The city is regularly laid out, with mostly broad streets crossing each other usually at right angles. There are, however, several great diagonal thoroughfares radiating from the commercial center. Main street, the chief business thoroughfare, extends northeasterly from its foot at the lake front. From Main street, Broadway, Seneca street, Genesee street, and other important thoroughfares reach into the densely populated district of the east side. Similarly, Niagara street extends from Main street northwesterly along the lake and river.

The fine residential sections, which are among the most beautiful in America, lie in the northwestern and in the northern parts of the city. Delaware avenue, with its handsome mansions, ranks high among the residential streets of the country. Other noteworthy residential streets are Linwood and Richmond avenues, lined with magnificent elms, Summer, West Ferry, and North streets, Lincoln parkway; and Depew avenue in the Central Park district.

Buffalo is substantially built and contains many fine edifices. Among these are the Federal building, an impressive granite structure in the French Romanesque style; the city hall and county courthouse, also of granite, and surmounted by a tower 245 feet high; the State teachers college;

the 174th Infantry and the 106th Field Artillery armories; the Buffalo Historical Society building; the Albright art gallery, an excellent example of refined classical architecture; and Saint Joseph's cathedral. In the adjoining suburb of Lackawanna is the beautiful church of Our Lady of Victory, a national shrine of the Roman Catholic Church.

Parks and Monuments. The municipal park system consists of a chain of parks and parkways which nearly encircle the city, covering in all an area of more than 1200 acres. In these are golf links, lakes and ponds, and numerous other facilities for recreation. Delaware park, with an artistic blending of lake, field, and natural forest, ranks scenically among the leading American parks. The Front, a beautiful plot of 45 acres, overlooks the outlet of Lake Erie into the Niagara river. Other recreational areas are Humboldt, South, and Cazenovia parks.

The principal public memorials are the McKinley monument in Niagara square and the Soldiers' and Sailors' monument in Lafayette square. In Forest Lawn cemetery, there are monuments in memory of the Indian chief Red Jacket and of President Fillmore.

Educational Institutions. The chief educational institutions are the University of Buffalo, containing a well-known law and medical school, Canisius college, D'Youville college, a State teachers college, and the Fine Arts academy connected with the Albright art gallery.

Transportation. Buffalo's unique situation on the Great Lakes, combined with highly developed transportation facilities, gives the city its rank as a world port. The harbor, protected by an immense breakwater, is one of the best on the Great Lakes. The New York State barge canal forms a continuous water route to the Hudson river. The Welland canal, 20 miles northwest of Buffalo, gives water connection with Lake Ontario and the Saint Lawrence river. Ferry service, a railroad bridge, and the Peace bridge for general traffic connect the city with Canada. Moreover, Buffalo is one of the most important railway centers east of Chicago. Thus, by rail as well as by water, Buffalo is on the direct line of communication between the lake ports and the Atlantic seaboard.

Commerce. In tonnage and in extent of traffic, Buffalo ranks with the leading American and European ports. The water-borne traffic from the West consists principally of grain, iron ore, flour, and general merchandise. Wheat is the chief commodity received, with iron ore second, the two constituting more than half of the total. The water-borne traffic to the West is comprised mostly of manufactured goods, sugar, and anthracite. The total value of goods entering and leaving the port exceeds a half billion dollars annually. Besides this large lake and barge canal traffic, immense quantities of merchandise are received and distributed by rail. The city is an important center for the transshipment of grain, its grain elevators having a capacity of about 30 million bushels. Buffalo is also the general trade and wholesale distributing center of a large and highly populous region.

Manufactures. In manufactures, Buffalo ranks eighth among the cities of the United States. The city's industries are extensive and varied and their growth has been substantial and enduring. The production of iron and steel and various iron and steel products constitutes the chief industry, with flour milling and meat packing next in importance. Among other noteworthy manufactures are automobiles, rubber tires, food preparations, books, linseed oil, furniture, soap, finished leather, dyes and other coal-tar products. Buffalo owes its eminence in manufactures to hydroelectric power, derived from Niagara falls; to large supplies of natural gas, and other readily available fuel; and to unexcelled transportation advantages for the distribution of its products.

Points of Interest. The pre-eminent feature of scenic interest in the vicinity of Buffalo is Niagara falls. This great cataract is most conveniently reached from Buffalo and is visited annually by scores of thousands. There are also many points of historical interest in connection with the early settlement of the Niagara frontier and of the conflict with the British and Indians in the war of 1812–15.

History. La Salle visited the site of Buffalo as early as 1679. The first white settlement was made about 1788 by Indian traders. In 1801-02, a village called New Amsterdam was laid out at the mouth of Buffalo creek. This village was incorporated and renamed Buffalo in 1810. Three years later it was captured and practically destroyed by the British. It was rebuilt but grew slowly until the completion of the Erie canal in 1825. Since that date, Buffalo's progress has been continuous and substantial. In 1832, Buffalo received its charter as a city. The first grain elevator in the world was built in Buffalo in 1843. The city has given to the United States two presidents, Millard Fillmore and Grover Cleveland. In 1901, the Pan-American exposition was held at Buffalo. Population, 1920, 506,775.

Burlington. A city of Vermont, located at the approximate center of the east shore of Lake Champlain. Burlington is a large lumber market, being the port of entry for much lumber imported from Canada. In the vicinity are large quarries of marble and limestone. The city is the seat of the University of Vermont and of the State agricultural college. Greenmount cemetery contains the grave of Colonel Ethan Allen. Population, 1920, 22,779.

Butte (*būt*). A mining city of southwestern Montana, situated in a mountainous region at an elevation of 5800 feet above the sea. Butte is the center of an extremely rich copper mining region. The famous Anaconda mine, said to be the largest copper mine in the world, and many other valuable mining properties are located within a radius of a few miles. Copper is the principal product, though gold, silver, lead, and zinc are obtained. The total annual mineral output is estimated at upwards of $60,000,000. The city supports various minor industries, has an extensive local trade, and is the seat of the Montana school of mines. Population, 1920 census, 41,611.

Cambridge. A city of Massachusetts, situated on the Charles river opposite Boston. Cambridge is exceedingly rich in historical, literary, and educational associations.

The Washington elm, under which Washington took command of the American army, stood in Cambridge until 1923, when it was blown down. Elmwood park commemorates the home of James Russell Lowell. Other illustrious figures once resident in Cambridge include Henry Wadsworth Longfellow, Oliver Wendell Holmes, Louis Agassiz, and John Fiske. The city is the seat of Harvard university, the oldest university in the United States, of Radcliffe college, of the Massachusetts institute of technology, and of the Andover theological seminary. A beautiful system of parks includes nearly the entire river front and extends around the manufacturing district.

The city has numerous important industries, among which are printing and publishing, and the manufacture of electrical machinery, rubber goods, structural ironwork, steam pumps, chemicals, pianos, and organs.

Cambridge was settled in 1630 by Governor Winthrop and others as Newe Towne. In 1638, Newe Towne was renamed Cambridge; in the same year, Harvard college (founded in 1636) was opened. In 1639, the first printing press in English-speaking North America was set up in Cambridge. Population, 1920, 109,694.

Camden. A city of southwestern New Jersey, located on the east bank of the Delaware river, opposite Philadelphia. The city occupies a level site, covering an area of about 7 square miles. The park system contains Forest Hill park and many small parked squares. Among the city's leading industries are shipbuilding and the manufacture of leather, phonographs, canned soups, and worsted goods. Other important manufactures include iron and steel forgings, foundry products, knit goods, millinery and lace, linoleum, chemicals, and steel pens. In the suburbs are immense market gardens. The city is connected with Philadelphia by steam ferries and by two bridges, one of which, on its completion in 1926, was the greatest suspension bridge in the world. First settled by Quakers, Camden was organized and named in 1773 and became a city in 1828. Population, 1920, 116,309.

Canton. An industrial and manufacturing city of northeastern Ohio, situated in a rich agricultural district. The manufacture of iron and steel products constitutes the leading industry. Canton was the home and burial place of President McKinley, in honor of whom a handsome national memorial has been erected on Monument hill. Population, 1920, 87,091.

Carson City. The capital of Nevada, picturesquely located near the foot of the Sierra Nevada, about 12 miles from Lake Tahoe. It contains the capitol, a Federal building, and a branch of the United States mint. In the vicinity are the state penitentiary and a government Indian school. Population, 1920, 1685.

Casa Grande (*kä'sä grän'dä*). The remains of a prehistoric building, situated near the south bank of the Gila river, about 12 miles west of Florence, Arizona, and at a somewhat greater distance from Casa Grande railway station. The first known white man to visit this impressive structure, now preserved as a national monument, was Father Kino, a Jesuit missionary. In 1694, he said Mass in one of its rooms.

The space enclosed by the walls now standing measures about 43 by 59 feet. The height of the walls indicates that there were at least three stories and in each story there were various rooms. This structure is only one of many blocks of buildings which formerly existed in the vicinity. Their site is indicated by mounds of débris.

Casa Grande stood within a walled enclosure about 420 feet long and 220 feet wide. The walls of the building are of a fawn color, slightly tinged with red. Externally they are rough and very much eroded. The interior walls, however, are smoothly plastered. The structure is built

of a natural cement, called *caliche* by the Mexicans, composed of lime, earth, and pebbles. This was made into blocks which were laid in courses.

The age of these ruins is unknown, but it is believed that the settlements on their site were older than most of the present pueblos or cliff dwellings of the Southwest.

Casper. A city in east central Wyoming, on the North Platte river, 150 miles northwest of Cheyenne. It is the site of Fort Caspar, and has extensive commercial interests in the cattle, sheep, wool, and petroleum produced in the surrounding districts. Population, 1920, 11,447.

Castle Gate. The entrance to Price River canyon in central Utah, about 115 miles southeast of Salt Lake City. This gatelike passage is formed by two immense pinnacles of sandstone, 450 to 500 feet in height. These rise sheer from the narrow canyon bed, barely leaving room for the railway and the river to pass. The castellated form and striking coloration of this rocky portal make Castle Gate a feature of unusual scenic interest.

Catskill Mountains. A group of mountains in the southeastern portion of New York State about 100 miles north of New York City. The system is about 50 miles long, north and south, and has a breadth of some 30 miles. The highest peak is Slide mountain, 4204 feet in elevation. In order to supply New York City with water, two creeks on the southern slopes of the Catskills have been impounded: the Esopus by the Ashokan dam and the Scholarie by the Gilboa dam. From the resulting reservoirs, which communicate by the 18-mile Shandaken tunnel, water is conveyed to New York City by the Catskill aqueduct, which includes a 17-mile tunnel.

Cebu (*sā-bōō'*). The capital of the island province of Cebu and the second largest city in the Philippines. It is situated on a good harbor, about 350 miles southeast of Manila, with which it has steamer connections. Cebu is the commercial center of the Visayan islands and of Mindanao, and has an extensive trade in copra, coconut oil, Manila hemp, tobacco, sugar, and rice. The city, which is regarded as the oldest in the Philippines, was the capital of the islands, 1565–71. It is well built, with wide streets, and contains an episcopal palace and the Cathedral of San Nicolas. Magellan, the discoverer of the Philippines, landed on Cebu in 1521, and was killed shortly after in a battle with the natives on Mactan, an island east of the city. Population, 1918, 65,300.

Cedar Rapids. A manufacturing city and railway center of east central Iowa, situated on the Cedar river, 220 miles west of Chicago. Among the chief industries are flour milling, meat packing, railway car repairing, and the manufacture of wagons, pumps, windmills, furniture, and agricultural implements. In total value of manufactures, Cedar Rapids ranks second among the cities of the state. The city is the mercantile center for a rich agricultural region, and enjoys an extensive wholesale trade. The first settlement was made in 1845 at the rapids of the Cedar river. These furnish the water power which has been an important factor in the city's growth. Cedar Rapids is the seat of Coe college. Population, 1920 census, 45,566.

Champlain, Lake. An important lake, lying between New York and Vermont, draining through the Richelieu river into the Saint Lawrence. Lake Champlain is about 110 miles long and, at its broadest northern portion, about 13 miles wide. It has a total area of about 600 square miles, two-thirds of which is in Vermont. Its greatest depth is about 300 feet, and it is navigable for the largest vessels.

Lake Champlain is connected with the Hudson river by a canal from Whitehall and serves as a most useful link in New York's extensive system of inland waterways. Among the towns along its shores are Rouse Point, Plattsburg, Port Henry, Crown Point, and Whitehall in New York, and Burlington in Vermont.

Discovered by Champlain in 1609, the lake and its environs became the scene of many stirring events in the French and Indian war and in the Revolutionary War. The decisive naval battle of Lake Champlain was fought off Plattsburg in 1814.

Charleston. The chief city and seaport of South Carolina, situated 7 miles from the ocean on a peninsula between the Ashley and Cooper rivers. The estuary of these rivers forms a fine landlocked harbor—one of the deepest and most spacious on the Atlantic coast.

The attractive appearance of the city is enhanced by such features as Washington park, with its pre-Revolutionary statue of William Pitt; Hampton park; the customhouse, built of white marble at a cost of $3,400,000; White Point Gardens; and the Esplanade, comprised of the Battery and the Boulevard.

Among the chief industries of Charleston are the manufacture of fertilizers, of lumber, and of textiles. There are large oil refineries and storage tank farms. In recent years the city has made scientific efforts to realize the possibilities arising from the natural advantages of Charleston as a seaport. It has repurchased a large part of its waterfront and established a port utilities commission. Leading articles of export are cotton, lumber, tobacco, and vegetables. From Charleston, in 1784, was sent the first bale of cotton exported from the United States to Europe. Although possessing an excellent harbor, the sea-borne commerce of Charleston developed slowly until about 1920. Since that date, it has made notable growth, the total imports and exports, foreign and coastwise, increasing about twofold from 1921 to 1926.

The vicinity of Charleston was the scene of the earliest attempts at colonization in South Carolina. A temporary settlement was made by the French in 1562. The first permanent settlement on the present site of the city was made by English colonists about 1682, who were joined in 1686 by groups of Huguenot refugees. In 1755, a colony of 2000 deported Acadians settled in Charleston, further re-enforcing the French element which strongly influenced the character of the city and of the state.

During the American Revolution, Charleston was captured by the British. The city suffered immense damage in the final campaign of the Civil War in 1865. On August 31, 1886, a heavy earthquake caused great destruction of life and property. After each period of devastation, the city was rebuilt more substantially than before.

Despite calamities and the changes imposed by modern progress, Charleston has preserved, to a remarkable degree, her interesting historic places and features. These admirably illustrate the various periods of American life from 1700 to the present day. Charleston's historic and architectural charm has been described as a "lingering fragrance."

Possessing a well equipped navy yard, Charleston is a naval base of great strategic importance. The system of harbor defenses includes Fort Sumter, whose bombardment in 1861 was the beginning of the war between the North and the South.

Among the city's leading educational institutions are the College of Charleston, the Medical College of the State of South Carolina, and the Citadel, or State military college. Population, 1920 census, 67,957.

Charleston. The capital of West Virginia, built at the confluence of the Elk and the Kanawha river toward the western end of the state. Charleston is a distributing point for coal, salt, and hard wood. The city has numerous industries, the more important establishments being the government armor-plate, gun-forging, and projectile plants, sheet glass plants, and an ax factory which ranks among the largest in the world. In the vicinity are extensive deposits of oil and of natural gas. The principal buildings include the State capitol near which is a fine monument erected to the memory of Stonewall Jackson. Charleston was incorporated in 1794, and became the capital of the state in 1870. Population, 1920, 39,608.

Charlotte (*shär'lŏt*). A cotton manufacturing city of North Carolina, located in the rich cotton growing district of the southwestern part of the state. The city has a monument erected to the memory of those who, at Charlotte in 1775, signed the Mecklenburg Declaration of Independence. The leading educational institution is Queen's college. Population, 1920, 46,338.

Charlotte Amalie (*shär'lŏt' ä-mä'lē-ē*). See *Saint Thomas.*

Charlottesville (*shär'lŏts-vĭl*). A city of central Virginia, built on the Rivanna river, about 70 miles northwest of Richmond. Charlottesville is the seat of the University of Virginia. This was founded by Thomas Jefferson, whose home at Monticello is only 3 miles distant. The city is beautifully located in a rich agricultural and fruit growing region and has various local industries. It was settled in 1744, and the vicinity abounds in historical associations connected with the period of the Revolutionary War. Population, 1920, 10,688. See *Monticello.*

Chattanooga (*chăt'ä-nōō'gä*). A railroad center and manufacturing city of southeastern Tennessee, situated on the south bank of the Tennessee river. Near-by deposits of coal and iron together with abundant hydroelectric power facilitate the operation of many industries. Of these, the most important are the manufacture of steel, of steel products, and of cotton goods. Near the city stands Lookout mountain, from whose summit seven states can be seen. Several important battles of the Civil War were fought in the vicinity of Chattanooga. The educational institutions include the University of Chattanooga and the Chattanooga college of law. Population, 1920, 57,895.

Chautauqua (*shä-tô'kwä*) **Lake.** A small lake in the extreme southwestern part of New York. It is about 18 miles long and 2 miles wide, and drains through Conewango creek into the Allegheny river. It lies about 1300 feet above sea level, and 730 feet above Lake Erie, which is only a few miles distant but separated by a range of hills. Chautauqua lake is noted for its beautiful surroundings and for the widely known Chautauqua summer school located on its banks.

Chelsea (*chĕl'sē*). A city of eastern Massachusetts, situated on the Mystic river, about 3 miles northeast of Boston. While chiefly a place of suburban residences, Chelsea has substantial industries. These include the manufacture of rubber, leather, and brass goods, pottery, tiles, and lithographs. First settled in 1626, as Winnisimmet, Chelsea was incorporated under its present name in 1638. In 1908, a great fire destroyed a large portion of the city. The devastated area, however, was rapidly rebuilt. Population, 1920, 43,184.

Chester. A manufacturing city of southeastern Pennsylvania, located on the Delaware river, about 13 miles southwest of Philadelphia. The chief industrial interests include steel products and cotton goods. The city has three parks, also the Deshong Memorial grounds. It is the seat of Crozier theological seminary. Chester was first settled about 1640 by Swedes. Of historic interest are the city hall, built in 1724, and the house of William Penn. Population, 1920, 58,030.

Cheyenne (*shī-ĕn'*). The capital of Wyoming, situated in the southeast part of the state, 110 miles north of Denver. The city was founded in 1867 by engineers of the Union Pacific railroad, which has since maintained work and repair shops in Cheyenne. Because of its central location in an extensive stock growing section, the city is an important shipping point for beef cattle and for sheep. Among the chief buildings are the State capitol, the Federal building, and the governor's mansion. A three-mile boulevard extends from the city to Fort Russell, an important government military post. There are many attractive streets and parks, the latter covering 800 acres. Population, 1920, 13,829.

CHICAGO. The chief city of Illinois, the metropolis of the Middle Western states, and the second most populous city in the western hemisphere. It is situated on the southwestern shore of Lake Michigan and on the Indiana boundary, about 185 miles northeast of Springfield, the capital of the state.

SITE. Chicago occupies a remarkably level site, extending along the lake shore for 24½ miles. The city extends inland, at its widest point, for a distance of about 10 miles and embraces a total area of some 209 square miles.

By the Chicago river, a small stream, and by its two branches, the city is divided into three principal districts. The branches of the river unite about a mile west of the lake and approximately midway between the north and the south boundaries of the city. The district lying north of the river and the north branch is called the North Side; that lying south of the river and the south branch is called the South Side; and the much larger district lying west of the two branches is known as the West Side.

STREETS. With few exceptions, Chicago's streets cross at right angles and in east-and-west and in north-and-south directions. Chicago is noted for its exceedingly long and straight streets. Many continue in a direct line for from 5 to 10 or more miles. Some, as, for example, Western avenue and Halstead street, extend without deviation for practically the entire length of the city, a distance of more than 25 miles.

The chief commercial and mercantile center lies south of the river between its south branch and the lake. Here, in an area approximately a mile square, are found most of Chicago's great public edifices, office buildings, and department stores. These are grouped chiefly within the so-called "loop," a section surrounded by elevated railroads. State street contains the great department stores, and, with Wabash and Michigan avenues, constitutes the chief shopping district. LaSalle street, the center of the financial district, is sometimes styled the "Wall Street" of Chicago. Wells street is the principal center of the wholesale trade. The most notable street of the commercial district is Michigan avenue, the first street west of the lake. For more than a mile this overlooks Grant park, and its massive buildings, when viewed from Lake Michigan, dominate the city's sky line. On the west side are the city's famous stockyards and a 17 million dollar produce terminal.

From the loop district or near it, several great thoroughfares, each several miles long, run diagonally to various quarters of the city. Among these are Cottage Grove, Archer, and Milwaukee avenues, extending southeast, southwest, and northwest, respectively. Various boulevards, connecting the parks, serve also as thoroughfares, and, along these, in each side of the city, are fine residence sections. Among important residential streets, containing numerous palatial homes, are Lake Shore drive, Michigan avenue, and Drexel and Grand boulevards.

BUILDINGS. Near the center of the business district is the magnificent county courthouse and city hall. This is a twin structure of limestone and granite, built in the French Renaissance style. The Federal building, one of the largest structures erected by the United States government outside of Washington, covers an entire city square, about 320 by 400 feet. It is built of granite, 16 stories high, and is surmounted by a massive dome nearly 300 feet high. The Field museum, on the lake front, erected at a cost of $8,000,000, ranks among the finest museum buildings of the world. Among other notable structures are the public library, the great stadium, in Grant park, and the Municipal pier, the Wrigley building, and the Tribune tower.

PARKS AND MONUMENTS. Chicago has a magnificent park system embracing about 40 parks with a total area of more than 4600 acres. These are connected by a system of boulevards and parkways, aggregating over 70 miles in length. The circuit through the park system affords one of the finest drives in America. The larger units of the system are Lincoln, Humboldt, Garfield, Douglas, Marquette, Washington, Jackson, and Grant parks. Among the parkways and drives which link these units in one organic whole are Lake Shore drive, Sheridan road, and Diversey avenue, in the North Side; Humboldt, Jackson, and Washington boulevards, in the West Side; and Michigan avenue, Grand, Drexel, and Garfield boulevards, in the South Side.

Grant park, on the lake, in front of the business district, contains the Art institute, and the fine fountain of the "Great Lakes" by Lorado Taft. Lincoln park contains a large conservatory and zoological garden and notable statues of Grant and Lincoln, the latter an impressive work by Saint Gaudens.

Jackson park, the largest of all, overlooks the lake on the South Side. Along the Midway plaisance, connecting Jackson and Washington parks, are the buildings of the University of Chicago. In this plaisance is the impressive sculptural group entitled the "Fountain of Time," by Lorado Taft.

Besides the extensive recreation grounds within the city, a metropolitan park district has been created outside of the city. For the purpose of establishing an outer ring of parks, several large forested areas, aggregating more than 37,800 acres, have been purchased.

EDUCATIONAL INSTITUTIONS. Chicago is one of the important educational centers of the country. It is the seat of the University of Chicago, noted for its large post-graduate school. Northwestern university, in the adjoining suburb of Evanston, has most of its professional departments in the city. Other important institutions are Loyola university, De Paul university, the Armour institute of technology, the Lewis institute, and the art school in connection with the Art institute.

TRANSPORTATION. Chicago is the chief railway center of America, being the terminus of railway systems embracing about half the total railway mileage of the country. No railroad runs through Chicago, for all of the more than 30 lines, radiating to all parts of the United States, have terminals in the city. The business district is surrounded by a ring of great passenger stations. Outside of these are immense freight depots. A belt line around the city connects the different railroads, forming a complete transfer system.

Chicago has also the advantage of inland water transportation, and ranks as one of the chief ports on the Great Lakes. There is a well protected harbor, with docking facilities furnished by the Municipal pier. The river and its branches have been deepened so that an immense tonnage, greater than that passing through the Suez canal, is handled at wharves within the city. By the construction of the Chicago drainage canal, whereby the waters of the river are made to flow outward from the lake into the Des Plaines river, an all-water route to the Mississippi and to the Gulf of Mexico has been made possible.

Local transportation is served by an extensive system of elevated electric railways and by an immense network of surface trolley lines. The elevated railways radiate from the central loop in the commercial district to all sides of the city. In addition, there is an extensive system of motor bus transportation. Chicago is served also by a large number of suburban electric lines. A unique feature of local transportation is a large system of freight tunnels, or subways, aggregating 60 miles in length, constructed beneath the business district.

COMMERCE. Chicago owes its supreme position in American inland commerce to superior advantages of location and to marvelously developed facilities for transportation. It is situated at the crossroads between the populous industrial sections of the northeastern states and the rich agricultural districts of the Mississippi valley and the great Northwest. The city is the center of shipment of western produce to the East and of eastern manufactures to the West. It is the greatest distributing point in the United States for dry goods, foodstuffs, clothing, household articles, and general merchandise. Chicago is the world's greatest live stock market and ranks among the leading markets of the globe for grain, hides, and lumber. In Chicago was developed the now extensive business of mail order merchandising.

MANUFACTURES. Chicago is the industrial as well as the commercial metropolis of the Mississippi Valley region. Among American cities, it stands second only to New York

in value of manufactures. Chicago's manufactures normally exceed 3½ billion dollars in value, or more than two-thirds that of New York's manufactures. Chicago is the world's greatest meat packing center, and leads the country in the manufacture of farm implements, farm machinery, and railroad cars. Its other industries are extensive and exceedingly varied.

HISTORY. In 1803, John Kinzie, the first American settler, built a house on the north bank of the river. In 1804, Fort Dearborn was erected. During the War of 1812, this fort was captured and the settlers massacred by the Indians. Fort Dearborn was reconstructed in 1816, but the village around it grew very slowly until the building of the Illinois and Michigan canal in 1830.

In 1837, with a population of 4170, Chicago was incorporated as a city. In 1852, the first railway from the East reached Chicago. Following this event the city's growth was rapid, rising from 28,000 in 1850 to 109,000 in 1860, and to 298,000 in 1870. Since 1870, Chicago has increased in population at the rate of more than a half million in each decade.

In 1871 occurred the "great fire," the most appalling disaster that as yet had befallen an American city. Within a few years the devastated areas were rebuilt and made more substantial than before. The subsequent progress of the city has been uninterrupted. In 1893 was held the World's Columbian exposition, erected at a cost of about 43 million dollars and attended by more than 27 million visitors. Population, 1920, 2,701,705.

Chicopee. A manufacturing city of southwestern Massachusetts, located on the Connecticut river, at the mouth of the Chicopee, about 4 miles north of Springfield. Abundant water power is furnished by the Chicopee river for the city's varied and extensive industries. These include the manufacture of firearms, cotton and knit goods, bronze statuary, knitting machines, rubber goods, athletic goods, regalia, swords, and many other articles. Population, 1920, 36,214.

Cincinnati (*sĭn'sĭ-năt'ĭ*). The second largest city in Ohio, situated on the north bank of the Ohio river, 120 miles southwest of Columbus and 270 miles southeast of Chicago.

Cincinnati is environed by a semicircular range of high hills. From the river bank, it rises in two great terraces or steps, finally reaching a height of 450 feet above the river. Several fine bridges connect the city with Covington, Newport, Ludlow, and other towns on the Kentucky side. The picturesque residence sections of Mount Auburn, Mount Adams, Fairview, Avondale, College Hill, and Clifton are reached by electric railway lines and by splendid highways. Interurban electric railways render numerous surrounding villages and towns easy of access.

Among the more notable buildings are the post office, the public library, the music hall, the county courthouse, the Union Central Life building (34 stories), and Saint Peter's Cathedral. Of public monuments, the most artistic are the Tyler-Davidson Fountain, in Fountain square, and the Lincoln statue, in Lytle park. The extensive park system includes Mount Airy Forest, Eden park, Burnet Woods, Ault, Mount Echo, and various smaller parks.

The city has been long known as an educational, art, and musical center. Among the leading institutions are the University of Cincinnati, the first municipal university in the United States; the Ohio Mechanics' institute; the Art School and Art Museum, in Eden park; Saint Xavier college; Hebrew Union college; and Lane theological seminary. For many years the May Musical Festivals, held biennially, have been an indispensable feature of the city's cultural life. The widely known Cincinnati Symphony Orchestra is a well-endowed, permanent organization.

Cincinnati ranks high as a manufacturing city, and owes much of its success as such to its advantageous location midway on the great Ohio river. In addition, the city has the service of several trunk lines of railway, one of which, the Cincinnati Southern, 338 miles long, is owned by the municipality itself. The total output of manufactures normally amounts to half a billion dollars. The more important products include machine tools, clothing, boots and shoes, meat products, machinery, engines, safes, soaps, printing, paints, furniture, radios, and pottery. For many years the city has been celebrated for the fine wares produced at the Rookwood Pottery Works.

In 1788, a village called Losantiville was laid out on the present site of the city. The name of this village was changed in 1790 to Cincinnati, which, in 1802, became incorporated as a town. Its steady growth and development dates from 1816, when steam navigation was inaugurated on the Ohio river. Cincinnati was incorporated as a city in 1819. Few large cities in the United States have a larger proportion of native-born inhabitants. Population, 1920, 401,247.

Citrous (*sĭt'rŭs*) **Belt.** The name applied to those parts of the states of California and Florida in which the leading citrous fruits—oranges, lemons, and grapefruit—are chiefly produced. Many counties in various parts of California grow oranges on a small scale. But, according to the census of 1920, more than 95 per cent of the state's commercial crop of all citrous fruits was grown in seven counties in the southern part of the state. These are Los Angeles, San Bernardino, Orange, Tulare, Riverside, Ventura, and San Diego counties. Santa Barbara county is becoming an important producer of lemons, and, farther north in the state, Fresno, Sacramento, Butte, Tehama, and Glenn counties market substantial quantities of oranges.

The citrous belt of Florida comprises about 15 counties in the central part of the peninsular portion. It extends across the state from the Gulf of Mexico to the Atlantic Ocean, its center lying a short distance north of Tampa. In this belt the chief citrous fruits produced are oranges and grapefruit. According to the 1920 census, the counties leading in the production of oranges were Polk, Orange, De Soto, Brevard, Lake, Hillsborough, Volusia, and Pinellas. These counties produced about two-thirds of the total orange crop of the state. The counties leading in the production of grapefruit were Polk, Manatee, Pinellas, Lee, De Soto, and Saint Lucie. These five counties produced about two-thirds of Florida's total yield of grapefruit.

California produces practically all of the lemons, about 78 per cent of the oranges, and some 12 per cent of the grapefruit grown in the United States. Florida grows more than 85 per cent of the grapefruit and about 22 per cent of the oranges produced in the country.

Clarksburg. A manufacturing city and trade center in the north central part of West Virginia. It is situated in the midst of rich gas, coal, and oil fields, and is known as the "Fuel City." Clarksburg was founded in 1782 and is the birthplace of Stonewall Jackson. Population, 1920, 27,869.

CLEVELAND. The chief city of Ohio and the fifth largest in the United States, situated on Lake Erie at the mouth of the Cuyahoga river. It is located in the northeastern part of the state, about 625 miles by rail northwest of New York, and some 360 miles east of Chicago.

SITE. Cleveland occupies a beautiful site on elevated ground sloping gently toward the lake, along which it has a frontage of 12 miles. The city is divided unequally by the windings of the Cuyahoga river into a larger portion on the east side and a smaller portion on the west side. The highest point reaches an elevation of about 300 feet above the level of the lake; the lowest points are in the valley of the river and along the lake shore. Immense viaducts, spanning the deep valley of the river, connect the eastern and the western sections. Among the most notable of these are the High Level bridge and the Abbey Street, the Clark Avenue, and the Harvard-Denison viaducts.

STREETS AND BUILDINGS. Cleveland is well laid out with many broad, well shaded streets and handsome boulevards. At the intersection of Superior avenue and Ontario street, in the heart of the city, is the Public square. From this and from Ontario street, which extends north and south, all the principal east side streets diverge. There are also streets connecting with the great viaducts leading to the west side of the city. From the southeast corner of the Public square extends Euclid avenue, once one of the most famous residential streets in America, but now largely absorbed in the ever-expanding business district.

The chief business section extends from the lower part of the river eastward along Superior avenue and along Euclid avenue to the vicinity of 22d street. The manufacturing districts are mostly along the lake front, in the low flat valley of the river, and along various lines of railway. Among the fine residential streets are Bellflower road, Clifton, East, and Lake Shore boulevards, Magnolia and Juniper drives, East 115th street, and the beautiful boulevards of Euclid Heights and Shaker Heights.

A notable architectural feature in the heart of the city is the array of buildings forming the "Municipal Group," or civic center. The project, designed by leading American architects, includes the erection of structures of beautiful and harmonious architecture on a T-shaped tract of land, known as the Mall. The buildings, completed, or to be completed, include the county courthouse, the city hall, the Federal building, the criminal courts building, the auditorium, and the public library. The city is noted for its superb office buildings. Among noteworthy structures are the museum of art, the auditorium, the Keith building, Federal Reserve bank, and, adjoining Public square, the Union station with its associated buildings, including the 708-foot Terminal Tower building, the Medical Arts building, and the Builders Exchange.

PARKS AND MONUMENTS. Cleveland's public park system covers a total area of more than 2400 acres and includes upwards of 40 miles of connecting boulevards. Important units in the park system are Gordon, Edgewater, Brookside, Garfield, Monumental, Washington, Rockefeller, Wade, and Woodland Hills parks. The noted amusement parks are Euclid Beach and Luna. Among attractive

drives are Euclid avenue, Lake avenue, and Clifton boulevard. Several of the parks contain notable monuments or are adorned with fine pieces of sculpture. Gordon park, on the lake front, contains a statue of Commodore Perry. In Wade park are located the Goethe-Schiller monument and the art museum. The most notable monument in the city is the impressive Garfield memorial, situated on a commanding eminence in Lake View cemetery.

Educational Institutions. Cleveland is the seat of Western Reserve university, with which are affiliated Cleveland college and the Cleveland school of education. Prominent among the city's other educational institutions are the Case School of Applied Science, the museum of art, and the museum of natural history.

Transportation. The harbor, which is protected by an immense breakwater, nearly 6 miles long, is one of the most spacious on the Great Lakes. There is a total lake frontage of more than 14 miles, and the Cuyahoga river is also lined with docks. These are equipped with unexcelled facilities for handling iron ore, coal, and lumber, and there is ample dockage at special piers for the extensive Detroit and Buffalo passenger service. Cleveland is also one of the great railway centers of the country, with direct lines to most of the leading cities of the United States.

Commerce. Cleveland owes its commanding position in commerce and industry to superior advantages of location. It is situated at the economic focus for the assembly of the raw materials of iron and steel. Within a short distance to the southeast lie iron mines, limestone quarries, and immense coal fields. From the northwest, by cheap all-water transportation, are received enormous supplies of Lake Superior iron ore. In consequence, the city's railways and lake steamer lines handle an immense tonnage of raw materials and distribute manufactured products valued at hundreds of millions of dollars. It is estimated that the total shipments handled at Cleveland aggregate in value more than a billion dollars annually.

Manufactures. Cleveland is one of the great manufacturing centers of America. It ranks fifth among the cities of the United States, being surpassed only by New York, Chicago, Philadelphia, and Detroit. While there is an immense diversity of manufactures, the chief industries are concerned with the manufacture of iron and steel, and of iron and steel products, such as structural iron, bridges, wire, and hardware. Other important manufactures are automobiles, packed meats, clothing, rubber goods, steel ships, electrical machinery, and refined petroleum. The Standard Oil Company, which began its operations in Cleveland, has immense refineries in the city. Cleveland leads all other cities of the Great Lakes in building steel ships, and is one of the greatest wire manufacturing centers in the world.

History. Cleveland was laid out in 1796 and was incorporated in 1814. In 1818, the first newspaper began publication. The Ohio canal was opened to Akron in 1827, and in 1832 was completed to the Ohio river. This greatly stimulated the growth of Cleveland, which received its city charter in 1836. Since the discovery of iron ore in the Lake Superior region and the construction of the first railroads, 1850–60, Cleveland's growth has been rapid and continuous. Population, 1920, 796,841.

Cohoes (*kō-hōz'*). A manufacturing city of eastern New York, located on the Hudson river and the State barge canal, at the mouth of the Mohawk river, about 9 miles north of Albany. Abundant water power and hydroelectric power have led to the development of extensive industries. Cohoes leads all other cities of the United States in the manufacture of knit underwear. Other industries include tube works, ax factories, shirt and collar factories, box factories, foundries, and various other manufacturing establishments. Population, 22,987.

Colorado Desert. An arid region in southeastern California. It is separated from the Mohave desert, which lies to the north, by the San Bernardino and the Chocolate ranges, and is bounded on the south by the San Jacinto, the Santa Rosa, and the Superstition mountains.

From the eastern entrance of San Gorgonio pass, the desert extends to the Colorado river, from which it takes its name. It is more than 100 miles long, in some places more than 20 miles wide, and covers an area of about 2000 square miles. Much of this region lies below the sea level. The lowest portion is known as the Salton Sink. In this lies the salt lake, called the Salton Sea, the surface of which is about 260 feet lower than that of the Gulf of California. Parts of the desert show traces of volcanic activity, and there are mud volcanoes and numerous thermal springs.

As in the case of the Mohave desert and Death valley, lofty mountain ranges on the west cut off the vapor-laden breezes from the Pacific. Consequently, the Colorado desert is a region of extreme aridity,—in fact, one of the driest and hottest in the world. The normal rainfall ranges from 3 to 4 inches, and summer temperatures as high as 130° have been recorded.

The scanty vegetation is typical of southwestern deserts. It includes the creosote bush, mesquite, cat's-claw, smoke tree, paloverde, and numerous kinds of cactus, such as the cholla, bisnaga, and saguaro. In the spring the desert wild flowers present a scene of surpassing beauty. In a few canyons around the western end of this desert are the only known groves of the native American fan palm, or Washington palm, now widely cultivated as an ornamental tree on the Pacific coast. Among characteristic desert animals are the chuckwalla lizard and the sidewinder or horned rattlesnake.

Wherever irrigation is practicable, much of this seemingly worthless desert will produce immense crops of fruits, alfalfa, cotton, and grains. In consequence, prosperous towns and agricultural communities are springing up in various parts. As late as 1900, the now rich and populous Imperial valley was a barren waste forming the southeastern arm of the Colorado desert. In many points this Californian desert resembles Arabia or Egypt. Here, as in those ancient countries, the date palm, long-fiber cotton, and alfalfa flourish. The Colorado desert is traversed from end to end by the Southern Pacific railway, and by the Los Angeles-Yuma and other automobile highways. See *Mohave Desert, Palm Canyon, Salton Sea.*

Colorado Springs. A city of central Colorado, situated near the eastern base of Pikes peak at an elevation of 6000 feet above the sea. The city is a noted health and pleasure resort and has a beautiful system of parks, covering some 3000 acres. Among places of historic and scenic interest in the vicinity are Pikes peak, Ute Pass highway, the Garden of the Gods, Glen Eyrie, Cave of the Winds, Manitou springs, and Phantom Cliff canyon. The city is the seat of Colorado college. The industries are largely confined to the manufacture of pottery and the reduction of ores, chiefly gold. Population, 1920, 30,105.

Columbia. The capital of South Carolina, situated near the center of the state on the high eastern bank of the Congaree river. The State capitol, built of granite at a cost of $4,000,000, is modeled after the national Capitol. Radiating from the capitol are four wide, well shaded avenues. The most important industry is the manufacture of cotton. Electricity is provided by hydroelectric stations, which utilize a 31-foot fall in the Congaree river. The city is the seat of the University of South Carolina, of the Southern Lutheran theological seminary, and of Benedict college. The site of Columbia was settled about 1700; it was chosen for the capital, and the town was laid out in 1786. The legislature first met there in 1790. Population, 1920, 37,524.

Columbia River Highway. An important scenic highway constructed along the south side of the Columbia river in Oregon. It extends west from Portland through Astoria to Seaside on the Pacific Ocean, and east from Portland to Hood River, northeast of Mount Hood, a total distance of about 150 miles. This magnificent highway, 18 feet wide with no grades exceeding 5 per cent, skirts the Columbia river by running around mountains, over hills, through tunnels, across viaducts, and along embankments.

An object of its construction was to reveal to the traveler the great natural beauty of the region. At some points the highway reaches a height of 700 feet above the river, affording magnificent views. The highway passes near many beautiful cataracts, running immediately beside the celebrated Multnomah falls, 607 feet high, and so close to Horse Tail falls that the spray keeps the roadway moist. A feature of the highway is its numerous concrete bridges of pleasing architectural design. Some of these are more than 300 feet long and one viaduct exceeds 800 feet in length.

Columbus. A city of Georgia, situated on the Chattahoochee river, on the western border of the state, about 95 miles southwest of Atlanta. Columbus is the trade center of a large agricultural district devoted to growing live stock, cotton, corn, wheat, and peanuts. The city has extensive manufacturing industries, largely operated by hydroelectric power developed by the river. Among the leading manufacturing establishments are cotton mills, iron and steel mills, cottonseed oil mills, fertilizer factories, peanut factories, and agricultural implement works. Population, 1920, 31,125.

Columbus. The capital and third largest city of Ohio, located in the central part of the state, about 135 miles southwest of Cleveland. Surrounded by a productive agricultural region and by rich coal, iron, and natural gas fields, the city has developed into an important industrial and commercial center. The leading manufactures include agricultural, electrical, mill, and mining machinery, steel and steel products, boots and shoes, piano stools, drugs, and oleomargarine. The output of industrial products in the latest census year exceeded 185 million dollars in value. The city is served by nine trunk line railroads.

Columbus is laid out in a form somewhat resembling a Maltese cross. Parks and public grounds cover more than 1100 acres. Columbus is the seat of Ohio State university, which has an exceptionally beautiful campus. Other edu-

cational institutions are the Capital university, Saint Mary's of the Springs, the Josephinum college, and the Columbus art school. The State capitol, built in the Doric type of architecture, is the most impressive of many fine buildings throughout the city. Near the capitol stands a group of statues representing distinguished Americans, the group being known as "Ohio's Jewels." Bordering the beautiful civic center is the American Insurance Union Citadel, an imposing office building 555 feet in height.

The first permanent settlement on the present site of the city was made in 1797. Columbus was laid out and was made the capital of the state in 1812. In 1816, the legislature first met in Columbus. Population, 1920, 237,031.

Concord (*kŏng'kŏrd*). A town of Massachusetts, rich in historical and literary interest, situated some 20 miles northwest of Boston. Concord was founded in 1635. It was the British objective in the battle of Lexington, and became the scene of the first armed conflict of the Revolution. The battle of Concord began at the Old North bridge. Here, April 19, 1775, the "embattled farmers fired the shot heard round the world." The town contains various memorials of the struggle, the most notable of which is the statue of "The Minute Man." Concord is celebrated also as the home of a number of distinguished figures in American literature, including Emerson, Hawthorne, Thoreau, and Louisa M. Alcott. Population, 1920, 6461.

Concord. The capital of New Hampshire, built on the banks of the Merrimac river, about 75 miles northwest of Boston. Having an abundance of water power, Concord has developed important manufactories of carriages, shoes, leather goods, silverware, and machine shop products. In the vicinity are extensive quarries of the fine-grained white granite from which the impressive State capitol is built. The site was settled in 1725 by whites who called their village Pennacock. In 1733, the village was incorporated as the town of Rumford. This later was named Concord, which became a city in 1853. Population, 1920, 22,167.

Coney Island. A narrow island five miles in length, situated at the southwestern point of Long Island, near the entrance to New York harbor. The island is the most extensive and popular summer resort in the immediate neighborhood of New York. Coney Island is divided into four well-defined districts: West Brighton, which is provided with numerous popular means of amusement; Brighton Beach, containing a race track; Manhattan Beach, which is partly residential; and Sea Gate, the home station of the Atlantic Yacht Club.

Continental Divide. The crest or height of land in the United States which separates the waters draining into the Atlantic Ocean from those draining into the Pacific, is called the Continental Divide. This extends from the Mexican boundary northward across western New Mexico and then somewhat eastward to Rocky Mountain national park in north central Colorado, its easternmost point. Thence the "great divide" trends northwest through northern Colorado and western Wyoming to Yellowstone national park. Continuing westward and northward across Montana, it passes through Glacier national park to the Canadian boundary. In some parts of its course, the Continental Divide is at the crest of the loftiest ranges; in others, it is on gently rolling uplands at the summit of high plateaus, usually 7000 feet or more above sea level.

Corn Belt. The name given to the fertile region in the east central United States which is largely devoted to the growing of corn. The most productive area embraces western Ohio, Indiana, Illinois, Iowa, Missouri, eastern Nebraska, eastern Kansas, and southeastern South Dakota. Adjoining parts of Kentucky, northern Oklahoma, and southern Minnesota, which produce large yields of corn, are usually considered as belonging to the Corn Belt. More than half of the corn crop of the United States is grown in this central zone. The two most productive states, Iowa and Illinois, usually contribute about one-fourth of the nation's total yield of corn. No other corn-growing region in the world approaches the Corn Belt in productiveness.

Cotton Belt. The name given to the extensive region in the southern United States in which the immense cotton crop is produced. This includes a broad, exceedingly fertile belt, extending from eastern North Carolina to west central Texas.

The northern boundary is approximately the line of 77° mean summer temperature, along which there is an average growing season, free from frost, of about 200 days. The southern boundary is determined largely by the amount of autumn rainfall. As wet weather interferes with picking and damages the lint, cotton is not extensively grown in the districts bordering on the Atlantic Ocean and the Gulf of Mexico where the autumn rainfall exceeds 11 inches. The southern boundary, however, is moving northward, for the reason that the milder winter and longer growing season near the Gulf permit increased injury by the boll weevil.

The zone of greatest productivity embraces eastern North Carolina, most of South Carolina, Georgia, Alabama, and Mississippi, parts of Arkansas, western Tennessee, northern Louisiana, and southern Oklahoma, and much of the northeastern half of Texas. Texas, Georgia, and South Carolina are the leading states. The Cotton Belt produces about three-fifths of the world's supply of cotton.

Council Bluffs. A railroad, manufacturing, and commercial city of southwestern Iowa, located on the Missouri river opposite Omaha, Nebraska. For the most part, the city, which is well laid out, lies upon a plain largely surrounded by lofty bluffs. There are several parks, of which the chief one is Fairmount. Three miles south of the city, but reached by electric railways, lies Lake Manawa, a popular summer resort. Railroads, and vehicle bridges over the Missouri river, and also electric lines, connect the city with Omaha. Council Bluffs is noted as one of the largest trade centers in the world for the distribution of agricultural implements. There is also an extensive trade in farm produce. The name Council Bluffs is said to have been given because of the council held at this point in 1804 between the Indians and the explorers Lewis and Clark. Population, 1920, 36,162.

Covington. The second largest city of Kentucky, situated on the Ohio river, opposite Cincinnati. Covington occupies a beautiful site, partly surrounded by lofty hills, and contains many fine streets and homes. It has excellent transportation facilities by rail and by river, and is connected with Cincinnati by a handsome suspension bridge. While largely residential, Covington has substantial industries. These include meat packing, railway car construction, and the manufacture of tobacco, clothing, cordage, hardware, and structural iron. Covington was settled in 1812, and became a city in 1834. Population, 1920, 57,121.

Crater Mound. A remarkable geological formation in central Arizona, about 40 miles southeast of Flagstaff. First known as Coon butte and later as Meteorite mountain, Crater mound ranks as one of the most mysterious geological features of the West.

Viewed from the Santa Fe railway, which passes some miles to the north, it appears as a low ridge. Upon close approach, this ridge is found to be circular in form and to enclose an immense crater-like hole or depression 4000 feet in diameter and 600 feet deep. The encircling ridge, 100 to 150 feet in height, is composed of fragments of rock and sand blown up from the hole. The beds of rocks in the walls of the hole are limestone above and sandstone below, both more or less upturned near the hole and in part considerably shattered.

The cause of this great hole has never been ascertained. The occurrence of many small masses of meteoric iron in the vicinity suggested that it was made by the impact of an immense meteor. But a shaft 200 feet deep sunk into the floor of the hole and many test borings showed that the underlying sandstones have not been disturbed. Further, delicate tests with the magnetic needle have failed to indicate the presence of a body of metallic iron.

Another view is that this so-called crater was produced by an explosion of steam from volcanic sources below, that this steam accumulated in the porous sandstone and finally attained a pressure sufficient to blow off the overlying layers of rock.

Crawford Notch. A picturesque gorge between Mount Webster and Mount Willey, in the White mountains of New Hampshire. In a narrow passage, at an elevation of about 1900 feet, the Saco river traverses the Notch, which is notable for its fine rock scenery.

Cumberland. A city of western Maryland, situated on the Potomac river, about 155 miles northwest of Baltimore. Cumberland is located in a mountainous region near important coal fields. It ships immense quantities of semibituminous coal, highly valued for steaming purposes, and has other extensive industries. Among the principal manufacturing establishments are railway repair shops, rubber tire, cellulose, glass, and tin plate factories, brick and dye works, and silk, flour, and lumber mills. Population, 1920, 29,837.

Currecanti Needle. One of the striking scenic features of the Black Canyon or Grand Gorge of the Gunnison river, in southwestern Colorado. It is a massive pinnacle of highly colored rock, hundreds of feet in height, and tapering at the top to a somewhat pointed spire, whence the name "needle."

Dallas. The second largest city of Texas, located on Trinity river, in the northeastern part of the state, about 185 miles northeast of Austin. Dallas is located in an exceedingly fertile agricultural region, the chief cotton growing district of the state. The city has become the largest inland cotton market in the United States, and the leading wholesale and jobbing center southwest of Saint Louis. Dallas is the chief distributing point in the Southwest for farm implements and automobiles. In manufactures,

Dallas ranks first among the cities of the state. The principal industries include meat packing, printing and publishing, and the manufacture of cotton ginning machinery, cottonseed oil, saddlery, harnesses, and cotton goods.

The city's parks embrace an area of more than 400 acres, and there are extensive boulevards and drives. The state fair, held annually in the city, sometimes attracts more than a million visitors. The city is the seat of the Southern Methodist university, Dallas university, and Baylor medical college. Dallas was settled in 1841 and chartered as a city in 1856. Population, 1920, 158,976.

Davenport. A commercial and manufacturing city of eastern Iowa, beautifully situated on the slope of a steep bluff of the Mississippi river, opposite Rock Island, Illinois. The chief industries include flour milling and the manufacture of freight cars and foundry products. An extensive business is carried on in flour and grain, by river as well as by rail transportation. The river at Davenport is spanned by two fine bridges, the cost of which aggregated about $2,000,000. The city has a municipal art gallery and a public museum. It is the seat of the Palmer School of Chiropractic. Founded in 1835, Davenport was incorporated as a town in 1838, and received its charter as a city in 1851. Population, 1920, 56,727.

Dayton. A manufacturing city of southwestern Ohio, situated on both banks of the Miami river, about 50 miles northeast of Cincinnati. Among the leading manufactured products are cash registers, computing scales, envelopes, electrical refrigeration machinery, and automobile accessories. A great contribution to the city's prestige has been made by the airplane industry, founded by the Wright brothers. Wright field accommodates the experimental laboratories of the United States air corps.

Dayton was settled in 1796, was incorporated in 1805, and received its charter as a city in 1841. In 1913 a disastrous flood caused great destruction of property and loss of life. The devastated sections have been rebuilt, and a system of five reservoirs, costing $35,000,000, has been constructed, constituting one of the world's largest flood prevention projects. Population, 1920, 152,559.

Death Valley. An extremely arid desert in eastern California, near the Nevada boundary, containing the lowest point of dry land in the United States. The name was given by a survivor of a party of 30 "forty-niners," most of whom perished of thirst in its sands. It lies in a north-and-south direction, is about 150 miles long, and varies in width from less than 10 miles to about 20 miles. On the west it is bordered by the high Panamint range; on the east it is flanked by the Funeral, the Black, and the Grapevine mountains. The lowest point in Death valley is 276 feet below sea level. In a direct line, this lowest point is less than 80 miles east of Mt. Whitney, 14,501 feet high, the loftiest peak in the United States.

The valley is in the sink of the Amargosa river, a stream that is dry for the greater part of the year throughout much of its course. The eastern side of the valley was formerly the bed of a salt lake. In the entire area, drinkable water can be obtained in only a few places. The salty bottom of the valley is destitute of vegetation, but the bordering slopes have a sparse growth of desert shrubs. The annual rainfall is about 4 or 5 inches; the average humidity is very low,—no dew ever forming, and the summer temperatures, reaching 134°, being the hottest authentically recorded in America. See *Colorado Desert*, *Mohave Desert*.

Decatur (*dē-kā'tŭr*). A city of central Illinois, located near the Sangamon river, about 40 miles east of Springfield. Decatur lies in a highly productive corn belt and carries on a large trade in grain, live stock, coal, and manufactured goods. The city's chief industrial establishments include railway shops, iron works, and the manufacture of gas and plumbing fixtures. Decatur is the seat of James Millikin university. Recreation is afforded by Lake Decatur, 15 miles long, formed by a dam across Sangamon river. Population, 1920, 43,818.

Delaware Water Gap. A picturesque gap and narrow gorge in the Kittatinny range, near Stroudsburg, Pa., on the borders of Pennsylvania and New Jersey. The steep sides of the mountain here rise to an elevation of 1400 feet above the Delaware river, which flows through the gap.

Denver. The capital and chief commercial city of Colorado. It is situated at the junction of Cherry creek and South Platte river. The site, which has an altitude of one mile above the level of the sea, slopes back from both banks of the river and commands a magnificent view of the Rocky mountains. Denver is the largest city between the Missouri river and the Pacific coast. It is also one of the most important railway centers of the West, to which fact, in great measure, it owes its growth and prosperity.

The city is handsomely planned and contains many fine public buildings and substantial private residences. Among the former may be noted the State capitol, the auditorium, the civic center, and the United States mint. Some of the principal educational institutions are the University of Denver, Sacred Heart college, Westminster college, and Colorado Woman's college. The City park, which covers 390 acres, has a zoological garden, a lake, a museum, aviary, and speedway. The park system, including about 30 parks in all, is one of the finest in the United States and is supplemented by a system of municipal mountain parks in the vicinity.

Denver is the principal center of mercantile supply for the agricultural, stock raising, and mining districts of Colorado and New Mexico. It has extensive mining interests. The chief industries include meat packing, flour milling, railway car construction, printing and publishing, and the manufacture of iron and steel products, structural iron, clothing, paints, automobile accessories, and chemicals. Population, 1920, 256,491.

Des Moinės (*dē moin'*). The capital and largest city of Iowa, built on both banks of the Des Moines river, in the central part of the state. Des Moines is the commercial center of an exceedingly fertile farming region, with which it carries on an extensive marketing and wholesale trade. Surrounded by rich coal beds, the city has developed numerous and varied industries prominent among which is the production of automobiles and parts. Many important farm journals and other publications are printed in Des Moines, which is also the center of large insurance interests.

Chief among many imposing public buildings is the capitol, built on a slight eminence, and approached by Capitol Extension park. Adjoining this park is the fine State Historical building. The city's park system includes 19 parks and covers 970 acres. To this total may be added the 600 acres comprising the State fairgrounds. Des Moines is the seat of Drake university and Des Moines university.

Des Moines is pre-eminently a city of homes, and, in percentage of home-ownership by its residents, stands in the front rank among the cities of the country. By reason of its central location, together with ample hotel and auditorium facilities, Des Moines is a favorite meeting place for conventions and entertains annually many thousands of visiting delegates.

Around Fort Des Moines, which was established in 1843, settlers, in 1846, built a village. This village was incorporated in 1851 as the town of Fort Des Moines. In 1856, the town was made the capital of the state. In the following year, it was chartered as the city of Des Moines. Population, 1920, 126,468.

DETROIT. The chief city of Michigan and the fourth most populous in the United States, situated on the Detroit river, 18 miles from Lake Erie. It lies some 90 miles southeast of Lansing, the capital of the state, and is about 250 miles west of Buffalo and 285 miles east of Chicago. The city occupies a nearly level but gently rising site, extending some 11 miles along the river front, and containing an area of about 85 square miles.

Streets and Buildings. The city is regularly laid out, with wide streets, most of which cross at right angles on the checkerboard plan. There are, however, several broad avenues, 100 to 200 feet wide, which radiate from the Campus Martius and the Grand Circus in the heart of the city. Woodward avenue, one of the most important commercial and residential streets, passes through both the Campus Martius and the Grand Circus, and divides the city into two nearly equal parts. Important thoroughfares extending diagonally are Michigan Grand River, and Gratiot avenues.

The commercial district is located mainly around and near the Grand Circus and the Campus Martius. The former is a small, semicircular park, and the latter is a large plaza. These are situated near each other and give an air of openness and spaciousness to the business center of the city. Griswold street, lined with great office buildings and banking houses, is the "Wall Street" of Detroit.

The outer portions of the great radiating avenues, especially Woodward avenue toward Palmer park, and also Lafayette avenue and Fort street, extend through fine residence sections.

The chief public buildings are located on or near the Campus Martius. Within it is the Michigan Soldiers' and Sailors' monument, facing the city hall. Near by is the county courthouse, the largest public building in the city. Numerous great office buildings, of the finest modern type, are built around portions of the Grand Circus. Among many notable buildings may be mentioned the General Motors building, the Fisher building, the Federal building, the Board of Commerce, the Michigan Central station, the Masonic temple, the Ford, Penobscot, Stroh, First National Bank, Dime Bank, and Majestic buildings, the public library, and the new museum of art.

Parks and Boulevards. The municipal system contains upwards of 50 parks, embracing an area of about 2000 acres. The most notable of these is the island park, Belle Isle, with an area of 707 acres. This lies opposite the eastern part of the city, with which it is connected by a bridge. Another noted recreation ground is Palmer park, 141 acres, on Woodward avenue, about 6 miles north of the city hall. In addition to the numerous small parks, many triangles at

diagonal street intersections have been improved and ornamented, and there are numerous boulevards and drives. Grand boulevard, a parkway 150 feet wide and 12 miles long, encircles the heart of the city from the Belle Isle bridge on the east to the foot of Twenty-second street on the west.

Educational Institutions. Detroit is the seat of Detroit university, the College of the City of Detroit, the Detroit college of law, the Michigan college of medicine, the Michigan State auto school, and various other educational institutions. The University of Michigan is situated at Ann Arbor, only a short distance west, and there is a State normal school at Ypsilanti, still nearer the city.

Transportation. The city owes its greatness, in a large part, to unique advantages in transportation both by lake and by rail. It is situated midway on the inland waterway system of the Great Lakes. The deep Detroit river, sometimes called the "Dardanelles of America," affords a spacious harbor, accommodating the largest lake vessels. There is a numerous passenger fleet, and the city is a port of call for all steamers from Buffalo to the upper lakes. The tonnage passing through the Detroit river is more than double that passing through the Suez canal, and is immensely greater than the tonnage arriving at and leaving any seaport in the world.

Besides its notable advantages of water transportation, Detroit is an important railroad center, and is served by many far-reaching railway systems. There is an extensive interurban electric railway service, and local transportation is effected by a comprehensive system of municipally owned street railways.

Commerce. Enormous quantities of iron ore, copper products, grain, and coal are handled by the lake traffic. There is a large export trade to Canada and Europe, chiefly foodstuffs, automobiles, and steel products. The city is the commercial center of a great interior district with which it carries on an immense distributing trade. In addition, it ships the products of its vast industries to all parts of the country.

Manufactures. Detroit is the greatest automobile manufacturing center in the world. Its phenomenal growth between 1910 and 1920 corresponded with the vast development of the automobile industry. In value of manufactures, Detroit stands fourth among the cities of the United States. The greater part of this production is automobiles and automobile accessories and parts. There are numerous other substantial industries. Detroit is a leading center for the manufacture of air craft, brass and bronze products, adding machines, stoves and furnaces, malleable iron, and aluminum castings. Other important manufactures include railway cars, machine tools, electrical apparatus, stoves, drugs, chemicals, engines, paint, tobacco, and rubber goods.

History. The first settlement at Detroit was made in 1701 by Cadillac, the French governor of Michillimackinac, who built Fort Pontchartrain. During the French and Indian war, this was captured, 1760, by the British. The first act of Pontiac's conspiracy, 1763, was an unsuccessful attempt to seize this important fort. Detroit was incorporated in 1802 and became the capital of Michigan territory in 1805. In 1812, William Hull surrendered the town to the British, who evacuated it the following year.

Detroit was chartered as a city in 1824, continued as the capital of the territory until 1835, and was the capital of the state, 1835–47. Its growth until 1910 was continuous and substantial. In the decade 1910–20, the city more than doubled in population and more than quadrupled in value of manufactures. Population, 1910, 465,766; 1920, 993,678.

Diablo (*dē-ä'blō*; *dī-äb'lō*), **Mount.** A mountain of west central California, situated on the edge of the great interior valley, about 30 miles air-line distance nearly due east of San Francisco. Its general domelike outline and isolated position have given the erroneous impression that Mount Diablo is an old volcano. It is, in fact, the higher portion of a great overturned arch or anticline of sedimentary rocks.

Because of its visibility for long distances in many directions, Mount Diablo has been a noted landmark since the days of the "forty-niners." Through it run the meridian and the base line from which the land surveys of a large part of California are reckoned. While of moderate height, the elevation being 3849 feet, its unique situation makes it one of the finest scenic viewpoints in the state. From its top, on a clear morning, the summits of the Sierra Nevada can be traced for 200 miles. Lassen peak is often visible and sometimes Mount Shasta can be seen. Mount Diablo is readily reached, from Oakland and other places in the vicinity, by automobile roads.

Dismal Swamp, Great. A tract of marshy land in southeastern Virginia and northeastern North Carolina. It begins a short distance south of Norfolk, Virginia, extends southward for about 30 miles, and embraces a total area of some 750 square miles. Near its center is Lake Drummond, about 2 miles in diameter and very shallow. The remainder of the swamp is covered, for the most part, with heavy timber and a thick tangled undergrowth. By means of a canal cut through the swamp, vessels are enabled to pass between Albemarle sound and Chesapeake bay. The swamp originally contained an area of about 2200 square miles, but much of it has been reclaimed and placed under cultivation.

Dover. The capital of Delaware, located slightly north of the center of the state. Dover is surrounded by a rich fruit growing country, the chief crops being apples and peaches. The principal industry is the canning of plum pudding and other foods. There is an impressive State capitol and a handsome monument erected to the memory of Cæsar Rodney, one of the signers of the Declaration of Independence. Silver Lake park and Dover Green are other features of interest. Dover was laid out in 1717 and became the capital of Delaware in 1777. Population, 1920, 3720.

Dubuque (*dŭ-būk'*). A city of northeastern Iowa, built on the west bank of the Mississippi river, about 200 miles northeast of Des Moines. Dubuque lies in a fertile farming district and the surrounding region is rich in lead and zinc deposits. In addition to large zinc works, Dubuque has substantial manufacturing industries, and is the center of a large marketing and distributing trade by river and by rail. The city is situated partly on a terrace 20 feet above the river and partly on a hill, which rises to a height of 200 feet.

Among the notable features are Eagle Point park and a monument of Julien Dubuque, who settled on the site of the city in 1788. The first permanent settlement dates from 1833. The village was incorporated as a town in 1837, and, in 1840, was chartered as a city. The educational institutions include Columbia college, Mount Saint Joseph college, and the University of Dubuque. Population, 1920, 39,141.

Duluth. An important lake port and the third largest city of Minnesota. It is built on steep and picturesque slopes overlooking a fine natural harbor at the western end of Lake Superior. Drawing on the rich agricultural and iron mining regions of the Northwest, and enjoying the advantages of exceptional railroad and port facilities, Duluth handles an annual tonnage of grain and iron ore of stupendous proportions. The city is also a great coal distributing point. Hydroelectric power, available in abundance, contributes to a large industrial activity, which includes the manufacture of steel, wood products, clothing, matches, cement, and flour.

The city's natural beauty is enhanced by 106 miles of scenic drives, by 2500 acres of parks, and by facilities for summer and for winter sports. Population, 1920, 98,917.

East Orange. A city of northeastern New Jersey, adjoining Newark, and about 12 miles west of New York City. East Orange is mainly residential, being populated largely by persons doing business in New York and Newark. The city has wide, well shaded streets, and contains many attractive homes and public buildings. There are substantial industries and the chief manufactures include electrical machinery, druggists' preparations, brass products, and knit goods. East Orange was separated from Orange in 1863 and became a city in 1899. Population, 1920, 50,710.

East Saint Louis (*lōō'ĭs*; *lōō'ĭ*). A city of southwestern Illinois, built on the east bank of the Mississippi river, opposite Saint Louis. The city is an important railway and manufacturing center. It is also a leading market and distributing point for live stock, especially horses and mules. Among the cities of the state, East Saint Louis ranks third in value of manufactures. The leading industries include meat packing, flour milling, railway car construction, and the manufacture of iron and steel products, locomotives, food preparations, baking powder, glass, paints, chemicals, and refined petroleum. East Saint Louis was incorporated in 1861 and became a city in 1865. Population, 1920, 66,767.

Elgin. A city of northeastern Illinois, located on the Fox river, about 35 miles west of Chicago. Elgin's two outstanding industries, for which the city is widely noted, are the manufacture of watches and of butter. Other manufactures include pipe organs, silverware, and condensed milk. The city is the seat of two well-known academies,—Elgin and Saint Mary's. Population, 1920, 27,454.

Elizabeth. A manufacturing and suburban residential city of New Jersey, lying 12 miles southwest of New York City. Among important industries are oil refining, shipbuilding, and the manufacture of sewing machines, chemicals, and electrical machinery. Elizabeth was settled in 1664 and still preserves many examples of colonial architecture. From 1755 to 1757 the city was the capital of New Jersey. Population, 1920, 95,783.

Elmira. A city of south central New York, built on both banks of the Chemung river, about 150 miles southeast of Buffalo. Elmira is well built and contains many fine streets, residences, and public buildings. It is the trade

center of a large farming and dairying district and has extensive manufacturing interests. The more important industries include steel bridge plants and the manufacture of valves, shoes, fire engines, silk and knit goods, and automobile parts. The city is the seat of Elmira college. Population, 1920, 45,393.

El Paso (*ĕl păs'ō*). An important railway center and manufacturing and commercial city of western Texas, about 1200 miles by rail from New Orleans and 800 miles from Los Angeles. El Paso is situated on the Rio Grande river, opposite Ciudad Juarez, and is the largest city on the Mexican border.

The chief industries include smelting, flour milling, railway car repairing, wood finishing, box making, meat packing, cotton milling, and canning. The city has extensive wholesale and jobbing establishments, and carries on a substantial trade in copper, silver, lead, wool, hides, and live stock. Trade with Mexico amounts to many millions of dollars annually.

Located at an elevation of about 3800 feet in a region of almost perennial sunshine, El Paso has become a noted health resort. Much of the surrounding district is irrigated by the great Elephant Butte dam, and produces large crops of grains, fruits, vegetables, and cotton, which are marketed chiefly through El Paso.

The first settlement was made in 1829, the town was incorporated in 1869, and since 1880 has made rapid growth. Population, 1920 census, 77,560.

Enchanted Mesa (*mā'sā*). A remarkable castle-like rock or, more accurately speaking, a butte, situated near the Indian pueblo of Acoma in west central New Mexico. It is an immense mass of buff sandstone, with perpendicular sides, rising boldly from an arid plain. In shape it is elongated, the length measuring about 2000 feet and the width from 100 to 350 feet. At the base there is a sloping heap of rock débris, 100 to 200 feet high, above which towers the vertical wall to an elevation of 430 feet above the plain. The nearly level summit consists of a layer of hard rock on which grow a few stunted junipers.

The neighboring Indians, who call it Katzimo, regard this rock with superstitious awe. The evidences of former human occupation are very slight, but, according to traditions current among the Acoma Indians, their remote ancestors inhabited a pueblo built upon the flat-topped summit.

Erie. A manufacturing city of northeastern Pennsylvania, situated on a large natural harbor on Lake Erie. The harbor is protected by Presque Isle, a peninsula about 6 miles long and a mile wide. There is a considerable lake commerce; the leading articles of shipment include lumber, coal, iron ore, petroleum, fresh-water fish, and manufactured goods. Among the city's varied manufactures are foundry and machine shop products, engines, silk goods, and washing machines. Erie has several parks, one of which, near the harbor entrance, is the site of an old French fort, erected in 1749. The original site is now occupied by a blockhouse, built by the state in order to commemorate Anthony Wayne, who died at the old fort in 1796. In the War of 1812, Erie was Commodore Perry's headquarters. Population, 1920, 93,372.

Eugene (*ū-jēn'*). A city of western Oregon, located at the head of navigation on the Willamette river, about 60 miles south of Salem. It is the commercial center of an extensive farming and stock raising region, and its industries include flour mills, lumber mills, woolen mills, and ironworks. Eugene was first settled in 1864 and is the seat of the University of Oregon. Population, 1920, 10,593.

Evanston. A city of northeastern Illinois, situated on Lake Michigan 12 miles north of Chicago, of which it is a residential suburb. Evanston is the seat of Northwestern university and of the Dearborn observatory. It is also the national headquarters of the Women's Christian Temperance Union. Population, 1920, 37,234.

Evansville. A manufacturing and commercial city of southwestern Indiana on the Ohio river, about 150 miles southwest of Indianapolis. The city is pleasantly situated on a high bank of the river and has many fine parks, streets, and drives. It is surrounded by a rich agricultural district, and within the vicinity of the city are numerous coal mines. The chief industries include the manufacture of flour, furniture, and cigars, and there is an extensive trade in coal, hardwood lumber, and agricultural products. Founded in 1816 by General R. M. Evans, Evansville became a city in 1847. Population, 1920, 85,264.

Everett. A city of eastern Massachusetts, located on the Mystic river, about 3 miles north of Boston. While mainly a residential suburb, containing many fine streets and homes, Everett is also the seat of important industries. Among these are the manufacture of coke, chemicals, leather goods, tools, trunks, and structural iron. Everett was settled in 1643, but until 1873 was known as South Malden. In 1892, it was chartered as a city. Population, 1920, 40,120.

Everett. A city of northwestern Washington, with a good harbor on Puget sound, about 30 miles north of Seattle. The surrounding region is heavily timbered, and there are extensive agricultural, mining, and fishing interests. With these, the various enterprises of the city are chiefly connected. Among leading industries are the manufacture of shingles, lumber, and paper and the canning of salmon, fruit, and vegetables. Population, 1920, 27,644.

Everglades. An immense marshy tract in southern Florida, covering an area about 140 miles long and 50 miles wide. Drainage canals have been cut through various parts of the swamp, and some of the higher portions have been rendered suitable for agriculture. It is estimated that some 5000 square miles may eventually be reclaimed.

Fairbanks. A city of Alaska located on the Tanana river, practically at the head of navigation. It is the terminus of the government railway from the coast, and is the commercial center of an extensive gold mining district. Population, 1920, 1155.

Fall River. A manufacturing city and seaport of southeastern Massachusetts. It is built on the shore of Mount Hope bay, at the mouth of Taunton river, about 50 miles south of Boston. There is a good harbor, with regular steamer service to New York, Philadelphia, and other Atlantic ports. Excellent water power for the city's extensive industries is furnished by the Fall river, which here makes a descent of about 130 feet in half a mile.

Fall River is one of the chief centers in the United States for the manufacture of cotton goods, and is noted for its immense textile mills. Other important industries include the dyeing and finishing of textiles, and the manufacture of fur goods, cordage, and men's hats.

The city is well laid out and substantially built. Many of the buildings are constructed of fine red granite quarried in the vicinity. There are several parks, with beautiful drives to the suburbs. The Bradford Durfee textile school, supported by the state, furnishes courses of instruction pertaining to the textile industry. Population, 1920, 120,485.

Fargo. The largest city of North Dakota, situated on the Red river, somewhat south of the center of the state near the Minnesota boundary. Fargo is the commercial center of a large wheat growing region, and is a leading distributing point for farm implements. It is the seat of the State agricultural college and other educational institutions. There are a number of fine parks and several beautiful drives. Population, 1920, 21,961.

Finger Lakes. The name given to a group of beautiful lakes in west central New York. These lakes, which are long, narrow, and somewhat finger-like in shape, were formed by the blocking up of deep river valleys with glacial materials. They lie somewhat parallel to each other, extend in a general north and south direction, and give a distinctive character to a fine scenic region.

The largest are lakes Seneca and Cayuga, each of which is about 40 miles long and from 2 to 3 miles wide. Others of the group are lakes Canandaigua, Owasco, Skaneateles, and Otisco. Oneida lake, northeast of Syracuse, and Lake George, in eastern New York, are of similar formation.

Fitchburg. A manufacturing city of northeastern Massachusetts, built on a branch of the Nashua river, about 40 miles northwest of Boston. Fitchburg is attractively located and has many fine homes, public buildings, and parks. The city's extensive manufactures include cotton and woolen goods, paper, saws, firearms, bicycles, and many other articles. The city is the seat of a State normal school. Fitchburg was settled in 1719, was incorporated in 1764, and became a city in 1872. Population, 1920, 41,029.

Flagstaff. A town of north central Arizona, picturesquely located at an altitude of 7000 feet, near the southern base of the San Francisco mountains. It is the commercial center of a lumbering, mining, and stock raising district, has large lumber mills, and carries on a trade in Indian curios and blankets.

By reason of its fine climate and varied scenic attractions, Flagstaff is also a tourists' resort. Ten miles north is San Francisco mountain, 12,611 feet high, the loftiest peak in the state. The trip to its summit can be made over the San Francisco mountain boulevard. This great mountain, itself an extinct volcano, is the center of an extensive region largely covered with ancient lavas and interspersed with numerous cinder cones. One of the most conspicuous of the latter is Sunset peak, a large cone tipped with bright red cinders which give it the appearance of being illumined by the setting sun.

About 8 miles east of Flagstaff are the remarkable sink holes in the Kaibab limestone known as the "Bottomless Pits." In the near vicinity also is the Walnut Canyon national monument containing prehistoric cliff dwellings.

Flagstaff is the seat of a State teachers college; and Lowell observatory, widely known for investigations made there on Mars, is situated on a high mesa near the town. Population, 1920, 3186.

Flint. A manufacturing city of southeastern Michigan, situated on the river of the same name, about 70 miles northwest of Detroit. Flint is one of the leading centers of the automobile industry in the United States. Among the cities of Michigan, it ranks second only to Detroit in the value of its manufactures. These consist chiefly of automobiles, automobile accessories, and parts, and, in 1925, reached a total value of 423 million dollars. Population, 1920, 91,599.

Fort Wayne. A railroad center and manufacturing city of northeastern Indiana. It is built at the confluence of the St. Joseph and the St. Mary's river, which here join to form the Maumee river. Car shops, car wheel works, foundries, organ and piano works, hosiery mills, clothing, motor truck, and enamelled wire factories, electrical machinery works, and oil tank shops are among the chief industrial interests. The city encloses the site of a fort built in 1794 by Anthony Wayne, to whom a monument has been erected. Population, 1920, 86,549.

Fort Worth. An important commercial city and railway center of northeastern Texas, situated in the midst of a rich agricultural and oil producing territory. The city is one of the great cattle markets of the United States and one of the world's greatest petroleum pipe-line centers. Nineteen railways enter the city, and car shop construction and repairs constitute one of the largest industries. Other manufactures include textiles, cement, and cottonseed products.

The city has 31 parks, covering 3034 acres. The educational institutions include the Texas Christian university and the Texas Woman's college. Population, 1920, 106,482.

Franconia Notch. A narrow picturesque passage in the Franconia range of the White mountains in New Hampshire, through which the Pemigewasset river flows. Entering the notch from the east is a narrow passage excavated in the rock, called the "flume." Near by is the "great stone face" celebrated by Hawthorne.

Frankfort. The capital of Kentucky, situated on the Kentucky river, in the rich "Blue-Grass region" somewhat northwest of the center of the state. Provided by the river with water power, the city numbers among its industries the manufacture of flour, of lumber, and of shoes. Many thoroughbred trotting horses are raised in the vicinity. The various state buildings include the capitol, a State arsenal, and a State normal school (colored).

Frankfort was founded in 1786, and, in 1792, when it had a population of less than 500, was made the capital of the state. The city contains the grave of Daniel Boone and is rich in historical associations. Population, 1920, 9805.

Fresno (*frĕz'nō*). A city of south central California, situated in the irrigated portion of the fertile San Joaquin valley, about 200 miles southeast of San Francisco. Fresno county, of which the city is the commercial center, is one of the most highly productive fruit growing districts of the continent.

According to the 1920 census, this county is the leading peach growing, grape growing, and raisin producing county in America. It outranked every other county of California in total value of fruits and nuts produced, and was second only to Los Angeles county in the total value of all crops. Its grape yield, amounting to nearly a billion pounds, was nearly half the entire crop of the state and was more than twice that of the whole United States, exclusive of California. The peach crop of Fresno county, about one-third that of all California, exceeded that of any other single state in the Union. The county stands second in the state in the production of hay and alfalfa. Besides these leading crops, many subtropical fruits and various vegetables are grown.

The industrial and commercial activities of the city, which has grown rapidly with the development of irrigation, are centered chiefly upon handling and marketing the county's staple productions. Places of interest in the vicinity are King's River canyon, Roeding park, and Kearney park, the last an irrigated experimental farm belonging to the University of California. Population, 1920, 45,086.

Galveston. The world's largest cotton and sulphur port, situated in southeastern Texas. It is built on the east end of Galveston island between Galveston bay on the north and the Gulf of Mexico on the south.

The excellent natural harbor facilities have been further improved at vast expense, and the port has been fortified by modern coast defensive works. Since a disastrous flood, caused by a hurricane in 1900, the level of the city has been raised, a sea wall has been built along the shore facing the Gulf, and a two-mile causeway has been constructed joining the city with the mainland. The city has four public parks. A hard, level beach provides a 38-mile natural speedway, on which automobile races are held during the annual Cotton carnival. The medical school of the University of Texas is situated in the city. In 1901, Galveston adopted the commission form of government which has since been widely adopted by other American cities. Population, 1920, 44,255.

Garden of the Gods. A small region of about 500 acres, near Colorado Springs, Colorado, noted for its curiously shaped rock formations and for its magnificent views of Pikes peak. By the action of wind and water, the red and the white sandstone strata have here been worn into many grotesque shapes. To these, various fanciful names have been given, such as "Cathedral Spires," "Balanced Rock," "Siamese Twins," and the "Seal and the Bear." The gateway to these interesting examples of erosion consists of two massive pinnacles of red rock, 300 feet high, which, at their bases, leave barely room for a vehicle to pass between them.

Gary (*gā'rĭ*). A steel manufacturing city of northwestern Indiana, at the southern end of Lake Michigan, about 25 miles southeast of Chicago. The city was founded in 1906 and is virtually the creation of the United States Steel Corporation. It contains immense steel works, some of which are the largest of their kind. The so-called Gary plan of elementary education originated in the public schools of the city. Population, 1920, 55,378.

Gettysburg. A town of southern Pennsylvania, located about 35 miles southwest of Harrisburg. Gettysburg occupies a picturesque site in a hilly but fertile farming country. There are several small industries and a substantial local trade. The town is the seat of Gettysburg college and of a theological school and contains about 4400 inhabitants.

In the vicinity was fought, July 1–3, 1863, one of the most decisive battles of the Civil War. Here the Union army under General Meade defeated the Confederate forces under General Lee. The entire battlefield, comprising 2530 acres, has been converted into a national monument, in which memorial structures mark the sites of particular actions which took place during the conflict. On Cemetery hill is the National cemetery, dedicated by Abraham Lincoln in his famous Gettysburg address.

Gloucester (*glŏs'tẽr*). A seaport of northeastern Massachusetts, built on the south side of the Cape Ann peninsula, about 30 miles northeast of Boston. The city is an important fishing port, with a large fleet engaged in taking cod, haddock, halibut, herring, and mackerel. There are various other industries, largely connected with the fisheries. By reason of its picturesque location, quaint, old-fashioned streets, and interesting historic associations, the city is a favorite travel and summer resort, especially for artists. Gloucester was founded in 1623, was incorporated in 1642, and became a city in 1874. Population, 1920, 22,947.

Gloversville. A city of east central New York, noted as the chief glove manufacturing center in the United States. Its factories, together with those of the neighboring town of Johnstown, produce a substantial percentage of the gloves made in the country. The leather glove industry is said to have been first introduced into the United States by Sir William Johnson, who, in 1760, settled several families of Scotch glove makers on his lands near the site of Gloversville. Population, 1920, 22,075.

Grand Canyon of the Colorado. The most magnificent scenic spectacle of its kind in the world. This immense gorge, the greatest example of stream erosion known, has been cut by the Colorado river in the high plateau of northern Arizona. The deeper portion is more than 200 miles long; its vast chasms range from 4000 to 6000 feet in depth from the uppermost rim to the river; and its width from rim to rim varies from 1 to 20 miles.

The canyon consists of two distinct parts: the broad, outer, upper portion, which has been eroded through stratified rocks; and the narrow, inner, lower portion, which has been worn down through unstratified rocks. The outer or upper walls are carved in alternating layers of limestones, sandstones, and shales. These descend in successive benches or escarpments, displaying a multitude of beautifully castellated, temple-like forms, banded in splendid colors, and finally reach the top of the gloomy inner gorge. This is irregularly cut in tough dark granite, and, at its bottom, extending usually from wall to wall, flows the foaming, torrential river.

The descent throughout the entire length of the canyon is so great that the river is broken into many rapids and semirapids. These, rushing between almost vertical walls of rock, make navigation, even for the staunchest boats, exceedingly dangerous. The force of the current is such that it rolls great bowlders along the bottom of the narrow channel, and, at some points, the noise of their grinding in the rocky river bed can be heard above the roaring of the waters.

The most impressive portion of the canyon is included in Grand Canyon national park. Its area, 958 square miles, embraces 56 miles of the Grand Canyon, stretching from east to west from its beginning at the mouth of the Little Colorado river. From rim to rim this part of the canyon is from 8 to 20 miles wide; it is more than a mile deep measured from the north rim, which averages nearly 1000 feet higher than the south rim. The eastern boundary includes the lofty, richly colored walls east of which lies the Painted

desert. The western boundary of the park includes the broad Cataract canyon, entering from the south. In this tributary canyon is the Havasupai Indian reservation and a group of five waterfalls.

The south rim of the canyon is accessible by a branch railway which runs 64 miles north from Williams, Arizona. The station at the rim is about 6850 feet above sea level. There are also automobile roads from Williams and Flagstaff. At this point on the rim the canyon may be visited every day in the year, and there are excellent accommodations for travelers. Many fine views on the rim are reached by motor roads, including Grandview, the most famous of all, and Desert View, looking eastward over the Painted desert. There are two well-constructed trails for making on muleback the interesting descent from the rim to the river: Bright Angel trail, which is more commonly used, starts from El Tovar hotel; Hermit trail, longer and more beautiful, descends Hermit canyon, about 7 miles west of El Tovar.

The north rim is reached by motor roads from various railway points in Utah. Special tours by auto stages are arranged so as to include visits to Bryce canyon and Zion national park. Camps are maintained for tourists. At Bright Angel point, opposite El Tovar, the north rim is about 8150 feet above sea level. Motor roads and trails lead to many points which afford fascinating views of the canyon at its deepest, of the desert plateau in which it is carved, and of the volcanic mountains which overlook it on the southeast.

The first white man to see the Grand Canyon was Cardenas, a member of Coronado's party, who, in 1540, visited the south rim. The first successful passage of the Grand Canyon by boat was made in 1869 by Major John Wesley Powell.

Grand Junction. A city of southwestern Colorado, 200 miles southwest of Denver, at the junction of the Colorado and the Gunnison river. It is the commercial center of a fertile farming and fruit growing district, watered by a large irrigation canal. The city lies 4560 feet above sea level, and is surrounded by some of the most noted scenic points in Colorado, notably Unaweep canyon, Colorado national monument, and Grand Mesa. Population, 1920, 8665.

Grand Rapids. The second largest city of Michigan, built on both banks of the Grand river, about 150 miles northwest of Detroit. The city takes its name from the rapids of the river, which here descends 18 feet in about a mile, furnishing extensive water power. While maintaining numerous important industries, Grand Rapids is noted chiefly as a center for the manufacture of furniture. Although exceeded in volume by New York and Chicago, Grand Rapids is distinguished for the design, quality, and finish of its product. In the heart of the city there are large exposition buildings for the display of samples of furniture. These are inspected by numerous buyers from all parts of the United States and from abroad, who assemble in the city for this purpose semiannually.

Among other leading manufactures are automobile parts, roofing materials, phonographs, carpet sweepers, knit goods, house furnishings, plumbers' supplies, and gypsum plasters. The city is well laid out, and has numerous fine streets, parks, residences, and public buildings. Grand Rapids was settled in 1833, became a village in 1838, and a city in 1850. Population, 1920, 137,634.

Great Falls. The leading manufacturing city of Montana, picturesquely situated at the Great Falls of the Missouri river, about 100 miles north of Helena. The development of immense water power in the center of a rich mining and agricultural region has been the chief factor in the growth of the city's manufactures.

Among the leading industrial establishments are copper reduction works, smelting and refining works, flour and cereal mills, and factories for making beet sugar, furniture, and agricultural implements. A notable feature in connection with the smelting industry is a smokestack 500 feet high, a structure exceeded in height by comparatively few buildings in the United States. The city is also an important market for wool, shipping several million pounds annually. The municipal park system embraces 7 parks with a total area of 600 acres. Population, 1920, 24,121.

Greeley. A city of northern Colorado, 50 miles north of Denver, on the Cache la Poudre river. It is situated in a fertile agricultural district and makes extensive shipments of beet sugar, potatoes, wheat, flour, and live stock. The place was settled in 1870 by the "Greeley Colony," named after Horace Greeley, and composed mainly of New England people. By establishing irrigation, these pioneers transformed an almost barren wilderness into a highly productive region. Greeley is the seat of the State teachers' college. Population, 1920, 10,958.

Greenville. A city of northwestern South Carolina, built on the banks of the Reedy river, about 100 miles northwest of Columbia. Greenville is an important textile manufacturing center and contains many large cotton mills. Other industrial establishments include foundries, dye works, and cigar and furniture factories. Greenville is the seat of Furman university and Greenville Woman's college. Population, 1920, 23,127.

Greylock, Mount. The highest summit in Massachusetts, situated in the Berkshire hills, on the western border of the state, about 5 miles southwest of North Adams. The broad, flat top, which rises to an elevation of 3500 feet, is accessible by carriage road and by many beautiful trails. A tract of about 8000 acres on the upper part of the mountain has been purchased by the state for a permanent park.

Hagerstown. A city of western Maryland, built on Antietam creek, about 70 miles northwest of Baltimore. Hagerstown is the trade center for a large agricultural district and has extensive and varied industries. The city's manufacturing establishments include foundries, cement and flour mills, pipe organ and sash factories, tanneries, woodworking shops, and knitting mills. In the vicinity are Fort Frederick and the battlefields of Antietam and Gettysburg. Population, 1920, 28,064.

Hamilton. A manufacturing city of southwestern Ohio, built on both banks of the Miami river, about 25 miles north of Cincinnati. Machinery, machine tools, office fixtures, safes and bank vaults, paper, woolen goods, and engines are among the products extensively manufactured. The city is said to have been the first in the country to own its waterworks, gas plant, and electric light plant. Population, 1920, 39,675.

Hamtramck (*hăm-trăm'ĭk*). A city of southeastern Michigan, existing as an island municipality within the city of Detroit. Hamtramck owes its rapid growth to the immense development of automobile industries during the decade of 1910–20. The city has extensive manufactures of automobile accessories, iron and aluminum castings, wheels, radiators, brass goods, and paints. Population, 1910, 3559; 1920, 48,615.

Hannibal. A city of northeastern Missouri, situated on the Mississippi river, about 120 miles above Saint Louis. It is the trade center of an agricultural district, and there are coal mines in the vicinity. The chief manufactures include Portland cement, lime, structural steel, and foundry products. Hannibal was settled in 1819 and became incorporated in 1839. During boyhood, Mark Twain lived in Hannibal, and his early home is the property of the city. Population, 1920, 19,306.

Harpers Ferry. A historic town on the extreme eastern border of West Virginia, about 55 miles northwest of Washington. It occupies a site of remarkable scenic beauty at the junction of the Shenandoah and Potomac rivers, at the point where the latter stream flows through a gap in the Blue Ridge mountains. Here, in 1859, John Brown attempted his famous raid. During the Civil War, the town was alternately in the possession of the Union and of the Confederate forces. Population, 1920, 713.

Harrisburg. The capital of Pennsylvania, situated on the Susquehanna river, in the southeastern part of the state. The city is noted for its diversified manufactures, chiefly of steel and of steel products, and for the extensive railway roundhouses, repair shops, and freight yards.

The most beautiful of the city's fine buildings is the State capitol. This impressive edifice, constructed of steel and faced with granite and marble, and decorated with elaborate sculptures, was erected at a cost of $13,000,000. Since 1900, extensive civic improvements have won for Harrisburg the sobriquet of the "Model City." The park system covers 1000 acres, of which 146 acres are laid out as boulevards and 666 acres are included in the picturesque Wildwood park. A part of the park system borders on the Susquehanna, and includes a beautiful riverside park and boulevard.

Harrisburg was named for John Harris, an English trader, who settled on its site in 1719. It was incorporated in 1791, and in 1812 became the capital of the state. Population, 1920, 75,917.

Hartford. The capital of Connecticut, built on the west bank of the Connecticut river, in the north central part of the state. The city occupies a commanding site on rolling ground, affording fine views of the Connecticut valley.

Hartford is admirably laid out, with wide, well shaded streets, and a number of beautiful parks and boulevards. The city is noted for its artistic homes and for its excellent public buildings, which, architecturally, rank among the finest in New England. The most notable structure is the State capitol, in Bushnell park, to which an impressive approach is provided by the Soldiers' and Sailors' Memorial bridge and arch. The Bulkeley memorial bridge, over the Connecticut river, ranks as one of the finest in the country.

In value of manufactures, Hartford ranks fourth among the cities of the state. Its important industries include the manufacture of firearms, typewriters, sewing machines, and various other iron and steel products. For a long period,

Hartford has been one of the leading insurance centers of the country. The Travelers Insurance building has a tower 527 feet in height. Hartford is the seat of Trinity college and other educational institutions.

The first white settlement on the site of Hartford was made in 1633. At Hartford, in 1639, were drawn up and adopted the "Fundamental Orders of Connecticut," said to be the first written constitution of modern times. In 1687 occurred the attempt of Governor Andros to seize the charter of the colony, and its alleged concealment in the famous "Charter Oak." Hartford was the capital of Connecticut colony until 1701, when it was made joint capital with New Haven. In 1873, Hartford became the sole capital of the state. Population, 1920, 138,036.

Haverhill (*hā'vēr-ĭl*). A manufacturing city of northeastern Massachusetts, built on both banks of the Merrimac river, about 30 miles north of Boston. Haverhill is one of the chief centers in the United States for the manufacture of boots and shoes. About seven-eighths of the city's extensive manufactures consist of products connected with this industry. The city was settled in 1640-41 and almost since its founding has been noted for the manufacture of shoes. It now makes about one-sixth of all the women's shoes produced in the United States. The city is beautifully situated and is well laid out. It contains many fine parks, lakes, and drives; also many handsome residences and public buildings. Population, 1920, 53,884.

Helena (*hĕl'ĕ-nȧ*). The capital of Montana, situated in the west central part of the state. The city overlooks an arable valley, the scene of extensive cattle raising, and is surrounded by a mountainous region, rich in gold and other valuable metals. Helena was founded by mining prospectors in 1864 and was incorporated in 1881. Over 25 million dollars in gold were taken out of the ground on which the business section of the city now stands. The industries include important zinc reduction works.

The per capita wealth of the inhabitants is very high and is reflected in the many fine residences of the city. Among the chief buildings are the State capitol, the Federal building, Shrine and Consistory temples, Montana Life building, and Saint Helena cathedral. Many points of scenic interest exist in the neighborhood, notably the "Gates of the Mountains," named by Lewis and Clark in 1805. The educational institutions include the Intermountain Union and Mount St. Charles colleges. Population, 1920, 12,037.

Hibbing. A mining village of northeastern Minnesota, located near the Mesaba Iron Ore range, about 80 miles northwest of Duluth. From the vicinity of Hibbing comes a large proportion of all the iron ore produced in the United States. Within 10 miles, there are upwards of 40 mines, one of which is the largest open-pit iron ore mine in the world. Population, 1920, 15,089.

Hoboken (*hō'bō-kĕn*). A coal shipping and manufacturing city of northeastern New Jersey. It is situated on the Hudson river opposite New York, with which the city is connected by passenger tubes, ferries, and the Holland vehicular tunnel. Hoboken is a large seaport, and is the terminus of several important transatlantic steamship lines. Its industrial output includes lead pencils, foundry products, measuring instruments, electric equipment, and ships. The city is the seat of the Stevens institute of technology, which stands opposite Hudson park. The first steam-propelled ferryboat was invented and put in operation at Hoboken. Population, 1920, 68,166.

Hodgenville. A town of central Kentucky, the county seat of Larue county. It is situated about 50 miles almost due south of Louisville in a fertile region devoted to growing grain, tobacco, and live stock. The town is noted as the birthplace of Abraham Lincoln. On Lincoln farm, about 3 miles distant, there is a beautiful memorial building. In this is preserved the remains of the log cabin in which the great emancipator was born. Population, 1920, 1100.

Holy Cross, Mountain of the. A high peak of the Rockies, 30 miles northwest of Leadville, Colorado. The emblem from which this mountain takes its name appears about midsummer. At that time the snow has melted from the higher slopes and ridges and is retained only in two deep canyons, which, by their intersection, form an immense cross high up on the side of the mountain. This white cross remains in view until late autumn, when the entire crest is again covered with snow. This noted mountain is one of more than 30 peaks in Colorado which exceed an elevation of 14,000 feet.

Holyoke (*hōl'yōk*). A manufacturing city of southwestern Massachusetts, built on both banks of the Connecticut river, about 75 miles southwest of Boston. Immense water power, derived from falls in the river, is utilized in the city's extensive industries. These are concerned chiefly with the manufacture of paper, paper products, and textiles. Holyoke is one of the largest producers of fine writing papers and envelopes in the United States. Because of the number and size of its mills, it has long been styled the "Paper City."

The total value of the city's paper products is, however, exceeded by that of its textile products. These include cotton and woolen goods, thread, knit goods, alpaca, and silk. Among other important manufactures are machinery, blank books, and school supplies. Mount Tom, Mount Holyoke, and other points of interest in the vicinity are reached by electric cars. Population, 1920, 60,203.

Homestead. A manufacturing city of western Pennsylvania, located on the Monongahela river, about 7 miles southeast of Pittsburgh. Its chief manufactures are open-hearth and Bessemer steel, and its vast steel plants rank among the largest in the country. At one time, Andrew Carnegie was the chief owner of these immense works. Homestead was settled in 1871 and in 1880 was incorporated. Population, 1920, 20,452.

Honolulu (*hŏ'nō-lōō'lōō*). The capital and chief commercial center of the Hawaiian islands, situated on a good harbor on the south coast of Oahu. Honolulu is noted for its delightful climate and for its luxuriant tropical gardens. It possesses fine clean streets, spacious open squares, and many handsome public buildings. These include colleges, schools, hospitals, banks, and a public library.

Among the city's representative industries are pineapple canneries, sugar factories, iron foundries, artificial ice plants, and rice mills. The native population is industrious and self-supporting. Honolulu occupies a vantage ground of immense importance on the trade routes of the Pacific, and, from a strategic point of view, is of great value as a naval station of the United States. Honolulu harbor was discovered in 1794. The modern town was founded in 1816, and in 1820 it was made the capital of the islands. The population is composed of a mixture of various races and nationalities in approximately the following proportions: Hawaiians 25 per cent, Caucasian-Hawaiians 8 per cent, Japanese 25 per cent, Chinese 17 per cent, Portuguese 10 per cent, other Caucasians 15 per cent. Population, 1920, 83,327.

Hood, Mount. A peak of the Cascade range in northern Oregon, about 50 miles east of Portland. It is of volcanic origin and rises symmetrically to a height of 11,225 feet, the loftiest elevation in the state. The lower slopes are forested but the peak is snow capped and there are glaciers on the upper slopes. An automobile road leads from the railway station at Hood River to Cloud Cap Inn, near the snow line. From this point the glaciers are readily accessible. The summit, which may be ascended without serious difficulty, commands magnificent views of the Columbia River valley and also of many great peaks of the Cascades, including mounts Rainier, Saint Helens, Adams, and Jefferson.

Hood River. A town of northern Oregon on the Columbia river, about 65 miles east of Portland. It is the trade center and shipping point of the Hood River valley, which extends southward 20 miles to Mt. Hood. This valley, protected by Cascade ranges and provided with a constant flow of water, is excellently adapted to fruit growing. Hood River strawberries are famed throughout the Northwest, and Hood River apples command maximum prices in New York and London markets. Population, 1920, 3195.

Hoquiam (*hō'kwĭ-ăm*). A city of western Washington, situated on Gray's harbor, about 90 miles by rail southwest of Tacoma. Possessing a fine harbor, Hoquiam is an important shipping point for lumber, pulpwood, canned salmon, clams, and fruit. The industries include lumber mills and canneries. Population, 1920, 10,058.

Hot Springs. A noted health and travel resort, located in western Arkansas, about 55 miles southwest of Little Rock. The city is picturesquely situated in a narrow valley sheltered by two ridges of the Ozark mountains. It lies adjacent to Hot Springs national park, celebrated for its numerous hot springs having valuable medicinal properties. There are numerous large hotels, sanitariums, and sumptuous bathhouses. A feature of interest is the magnificent Army and Navy hospital on Hot Spring mountain. Population, 1920, 11,695.

Houston (*hūs'tŭn*). A manufacturing city, railway center, and port of southeastern Texas. It is located about 50 miles northwest of Galveston, on a sluggish stream known as Buffalo bayou. This has been widened and deepened into a canal called the Houston ship channel, which permits large ocean steamers to reach the city's wharves.

Houston is the commercial center of a rich agricultural and lumbering region and is an important distributing point for raw materials. The city is one of the greatest cotton markets and ports in the South, and has extensive oil and lumber interests. In manufactures, Houston ranks among the first cities of the state. Its varied industries include numerous lumber, flour, and rice mills, cottonseed oil and sugar refineries, fertilizer plants, and railway car shops.

The city is admirably laid out, with wide, shaded streets, beautiful parks, handsome residences, and imposing public

and commercial buildings. The Esperon building of 32 stories is one of the tallest in the South. Houston is the seat of Rice institute and has a magnificent museum of fine arts. Houston was settled immediately after the battle of San Jacinto, which was fought near its site in 1836. It was incorporated in 1837, and in 1840 became the capital of the former republic of Texas. Population, 1920, 138,276.

Huntington. A commercial and industrial city situated on the Ohio river, in the extreme western part of West Virginia. Among its leading industrial establishments are railway car shops, foundry and machine shops, clay works, lumber and textile mills, and glass factories. The city is the seat of the State normal school. Population, 1920, 50,177.

Iloilo (*ē'lō-ē'lō*). The capital of the province of Iloilo in the island of Panay, Philippines. It is located on an excellent harbor, and, next to Manila, it is one of the chief commercial centers of the Philippine Islands. Among the local industries are the manufacture of piña (pineapple fiber), hats, machinery, and vehicles. The chief export is sugar; other exports include tobacco, rice, copra, coconut oil, and manila hemp. Population in 1903, 19,054; in 1918, 49,808.

Imperial Valley. A former desert area in southeastern California, which has been made remarkably productive by irrigation. It lies east and south of the Salton Sea and extends southward to the Mexican border. The improved district is about 40 miles long, with a maximum breadth of 30 miles, and embraces a total area of about 400,000 acres. Previously to 1900, it was a part of the Colorado desert—a hot, arid, barren waste in which neither man nor beast could live. The average annual rainfall is from 3 to 4 inches, and, in the summer, temperatures range from 100° to 120°, rarely falling below 70°. The unusual dryness of the air makes these extremes of heat endurable, and sunstroke is practically unknown.

Water for irrigation is taken from the Colorado river near Yuma, and conducted through a long semicircular course, 60 miles of which are in Mexico, to the south end of the valley. Thence it is distributed in a network of waterways covering the district. The soil is largely composed of the silts of an ancient delta of the Colorado river. It is of unmatched and seemingly of inexhaustible fertility. Owing to the warm climate and almost continuous sunshine, the growing season is not only very long but also very rapid. By rotation, two or more crops a year are often produced from the same field. As many as 10 separate cuttings of alfalfa are made in a single year, and, of these, at least 6 are usually commercially profitable.

The Imperial valley has become widely noted for the production of long-staple cotton of unexcelled quality. The district produces also immense quantities of melons, lettuce, asparagus, onions, grapes, oranges, and various other vegetables and fruits. Date culture on a commercial scale is becoming established.

In 1910, the district under irrigation contained fully 10,000 inhabitants and included 6 newly incorporated towns. With its water system effectively established, the valley developed with still greater rapidity. In 1920, the population had increased to 40,000 and included the thriving towns of Calexico, El Centro, and Brawley, each with more than 5000 inhabitants. For the year 1919, the agricultural and live stock products of the Imperial valley exceeded $25,000,000 in value.

Indianapolis. The capital and largest city of Indiana, situated on the White river, near the center of the state, about 185 miles southeast of Chicago. In population, transportation facilities, and volume of business transacted, Indianapolis is the largest inland city of the United States not located on a navigable body of water.

The city occupies a nearly level site, is regularly laid out, for the most part with broad streets, and is substantially and handsomely built. Indianapolis, preeminently a city of homes, is widely noted for its advantages as a residential city. The principal business streets are Ohio, Market, Washington, Maryland, and Georgia, all running east and west, and Capitol, Illinois, Meridian, Pennsylvania, and Delaware streets, running north and south. In addition to these, radiating from the circular Monument place in the heart of the city, there are four diagonal avenues—Massachusetts, Indiana, Virginia, and Kentucky—extending to the four corners of the city. The finest residence sections include portions of Delaware, Meridian, and Pennsylvania streets, Washington boulevard, and Maple road; also Woodruff place, Morton place, Meridian Heights, and Irvington.

The park system, which embraces a total area of more than 1700 acres, contains 16 parks. Of these, Riverside park, the largest, covering some 936 acres, extends along both banks of the White river for a distance of about 5 miles. The Soldiers' and Sailors' monument, in Monument place, a lofty shaft of stone and bronze, 285 feet high and richly decorated with sculptures, is one of the notable military memorials in America. Among numerous fine buildings are the capitol, the Federal building, the Riley public library, Christ church, and the Herron art institute. A beautiful World War memorial, costing 10 million dollars, houses the national headquarters of the American Legion. The city is the seat of Butler college, the Indiana University school of medicine, the Indiana dental college, the Indiana law school, and the Benjamin Harrison law school.

Indianapolis owes its prominence largely to three important advantages. First, it is the center of a large and highly productive agricultural region; second, it lies near immense supplies of coal, insuring cheap fuel; and third, it possesses unusually excellent transportation facilities. The city is served by numerous railways radiating in all directions, and is the center of one of the most extensive interurban electric railway systems in the United States. A feature for which the city is widely noted is the Indianapolis motor speedway. The city conducts an immense wholesale trade, and has extensive manufactures. Among the chief industries are meat packing and the manufacture of automobiles and accessories, iron and steel products, starch, flour, drugs, furniture, wagons, lumber products, and electrical machinery.

The site on which the city is located was selected for the state capital and named Indianapolis in 1821. The legislature first met there in 1825. Population, 1920, 314,194.

Inland Empire. A name popularly given to a rich agricultural, stock raising, and mining region of the northwestern United States, lying between the Rocky and the Cascade mountains. It embraces a considerable part of the Columbia River plateau, including eastern Washington, northeastern Oregon, the northern part or "panhandle" of Idaho, and the extreme western part of Montana. The chief railway and commercial center in this large region is Spokane. Other important cities and towns are Walla Walla, Washington; Pendleton, Oregon; Lewiston and Coeur d'Alene, Idaho; and Missoula and Kalispell, Montana.

Isleta (*ēs-lā'tä*). An Indian town situated on the west bank of the Rio Grande river, about 10 miles south of Albuquerque, New Mexico. The inhabitants, who are of Tanoan Indian stock, retain much of their aboriginal culture and social organization. They are peaceable, industrious, and self-supporting. By primitive means of irrigation, they produce from an arid soil excellent crops of corn, fruits, and vegetables. Population, about 1000.

Itasca (*ī-tăs'kä*), **Lake.** A small lake in north central Minnesota. It consists of three long narrow arms, from the northern one of which emerges the Mississippi river. The region immediately surrounding the lake, embracing an area of 22,000 acres, has been made a state park. Its waters abound in many kinds of fish; beavers are abundant, and a band of elks has been established in the park.

Ithaca. A city of west central New York, located at the south end of Cayuga lake, about 40 miles south of Syracuse. While the city conducts a substantial trade and maintains various local industries, it is noted chiefly as the seat of Cornell university, with which is connected the New York State agricultural college. This important educational institution occupies a magnificent campus on East Hill, an eminence rising about 400 feet above the lake and lower city, and commanding unexcelled views of a highly picturesque region. Ithaca was founded in 1789, and was chartered as a city in 1888. Population, 1920, 17,004.

Jackson. A city of southern Michigan, built on both banks of the Grand river, about 70 miles west of Detroit. Jackson is an important railway center, and is situated in the midst of a rich agricultural region. It carries on an extensive trade in grain, fruit, and vegetables, and has substantial industries. The city's manufactures include automobile accessories, motors, oil stoves, corsets, underwear, Portland cement, and various other products. Jackson was settled in 1829, became a village in 1843, and a city in 1857. Population, 1920, 48,374.

Jackson. The capital of Mississippi, located on the Pearl river, about 40 miles east of Vicksburg. Possessing both railway and water transportation, Jackson has become a commercial center for agricultural and manufactured products, with an extensive trade in cotton. The chief local industries include cottonseed oil mills, foundries, lumber mills, and woodworking shops. Among the prominent public buildings are the capitol, the State library, and the Carnegie library. Jackson is the seat of Millsaps college, Bellhaven college, and the James observatory.

In 1821, the site of Jackson was chosen for the state capital, and in 1822 the town was laid out. During the Civil War, Jackson was the scene of many conflicts, and in 1864 was largely destroyed by General Sherman. Population, 1920, 22,817.

Jackson. A city of western Tennessee, about 80 miles northeast of Memphis. Jackson is the trade center of a rich farming and fruit growing district, is an important cotton and fruit market, and has substantial local industries. Among the city's manufactures are engines and

boilers, cotton goods, cottonseed oil, lumber, and furniture. Jackson is the seat of Union university and of the State experimental college. Population, 1920, 18,860.

Jacksonville. The largest city and chief commercial center of Florida, situated on Saint Johns river, about 27 miles from its mouth. It has an excellent harbor, with a 30-foot channel to the ocean, and carries on an extensive coastwise and foreign trade in lumber, cotton, phosphates, fruits, and vegetables. The leading industries include shipbuilding and the manufacture of fertilizers, lumber, cigars, and naval stores; also fruit packing, crab meat packing, and spice milling.

The city's streets, parks, and private residences are rendered notably attractive by the luxuriance of semi-tropical vegetation. By reason of its mild climate and nearby ocean beaches, Jacksonville is a favorite winter resort. Population, 1920, 91,558.

Jamestown. A manufacturing city of western New York, about 70 miles southwest of Buffalo. Jamestown occupies a picturesque, hilly site on the outlet of Chautauqua lake, with abundant water power. It is one of the leading centers for the manufacture of furniture. Other important industries include woolen and silk mills, lumber and woodworking mills, metal furniture shops, and factories for making automobile parts. The city is also an important dairy center. Population, 1920, 38,917.

Jamestown. The first permanent English settlement in the United States. It was founded in 1607 on the banks of the James river, in Virginia, about 32 miles above its mouth, and nearly opposite the present town of Williamsburg. The first legislative assembly held in America met at Jamestown in 1619, and here, in the same year, slaves were first introduced into the territory of the original thirteen colonies.

During Bacon's rebellion, 1676, Jamestown was burned to the ground. It was rebuilt and remained the capital of Virginia until 1698, when it was again destroyed by fire and was never reconstructed. The site of the settlement, originally a peninsula, later became an island. This is in the possession of a society for the preservation of Virginia antiquities. Of the former town, there remain only the ruins of one dwelling and of a church built about 1680. Near these is the site of the Jamestown Tercentennial exposition, held in 1907.

Jefferson City. The capital of Missouri, situated on the south bank of the Missouri river, about 110 miles west of Saint Louis. The city is a trade and commercial center of a rich farming district and contains large railway shops. The chief manufacturing interests include shoe factories, flour mills, machine shops, and foundries. A fine steel bridge spans the Missouri at Jefferson City. Among prominent buildings are the State capitol, erected at a cost of $4,215,000, the State supreme courthouse, and the executive mansion. The site was chosen for the state capital in 1821, the town was laid out in 1822, and the legislature first met here in 1826. Population, 1920, 14,490.

Jersey City. The second largest city of New Jersey, built on the west bank of the Hudson river. It occupies an area of 19.2 square miles and lies directly opposite the lower end of New York City, with which it is connected by four tubes under the Hudson, the Holland vehicular tunnel, and numerous ferries.

Jersey City is the terminus of a large number of railroads, which link it with the South and West. As a shipping and receiving port it is probably second in importance only to New York. Among the chief of its numerous and varied manufactures are electrical and scientific apparatus, railway locomotives and cars, electrical machinery, crucibles, jewelry, musical instruments, soap, and tobacco. It contains immense sugar refineries, grain elevators, and meat packing establishments.

The city has many notable public buildings and several parks. The Hudson boulevard, a magnificent promenade 19 miles long and 100 feet wide, follows the crest of Bergen hill, extends past West Side park, and gives a splendid view of the river and upper New York. Population, 1920, 298,103.

Johnstown. A manufacturing city in southwestern Pennsylvania, about 80 miles east of Pittsburgh. Johnstown is located in a picturesque valley at the foot of the Allegheny mountains, in a rich coal mining and iron producing region.

The city is one of the leading centers in the state for the manufacture of iron and steel products and contains immense steel mills and iron plate factories. On May 31, 1889, as a result of a flood caused by the bursting of a dam on the south fork of the Conemaugh river, Johnstown was largely destroyed and 2000 lives were lost. Prompt outside aid was extended, and the city was soon rebuilt and its industries re-established. Population, 1920, 67,327.

Joliet (*jō'lĭ-ĕt*). A manufacturing city of northeastern Illinois, situated on the Des Plaines river, about 40 miles southwest of Chicago. Water power from the river is utilized in its extensive industries. Its great steel industry has given it the name of "The Steel City," and its immense steel works rank among the largest of their kind in the country. It is also noted for its quarries of fine building stone, known as Joliet limestone. Population, 1920, 38,442.

Juneau (*jōō'nō*). The territorial capital of Alaska, and the supply center of mining, fishing, and lumbering camps. It is situated on a good harbor on the Lynn canal, in the "panhandle" portion of southeastern Alaska. Huge quantities of salmon, halibut, and other fish are shipped, mainly to the United States. A decline in gold mining has been accompanied by a growth of the pulp and lumber industry. Population, 1920, 3058.

Kalamazoo. A railway and manufacturing center of southwestern Michigan, situated in a rich agricultural district. The principal industries include celery and peppermint growing, and the manufacture of paper, paper boxes, machinery, stoves, drugs, and water heaters. The city is the seat of Kalamazoo college and Western State teachers college. Population, 1920, 48,487.

Kansas City. The largest city of Kansas, built on both banks of the Kansas river at its junction with the Missouri. It lies adjacent to Kansas City, Missouri, with which communication is facilitated by a two-mile intercity viaduct. It is the second greatest live stock market and meat packing center in the United States. Its stockyards handle several million head of live stock yearly and there are immense meat packing establishments. Flour milling is second in importance among the city's extensive industries, which include petroleum refining, soap making, car repairing, and the manufacture of structural ironwork, boxes, chemicals, cooperage, and fertilizers. Population, 1920, 101,177.

Kansas City. The second largest city of Missouri, situated on the western border of the state, about 280 miles west of Saint Louis. It occupies a commanding site on the south bank of the Missouri river, at its junction with the Kansas river. Kansas City, Missouri, and Kansas City, Kansas, though separate in municipal government, form a continuous settlement, which, industrially and commercially, is a single city. The state boundary line passes through this densely populated district, leaving the seat of the two major industries—meat packing and flour milling—largely in the state of Kansas, but the greater part of the population in Missouri.

Kansas City owes its commercial importance to its situation in the midst of an extremely rich agricultural country, in a position favorable for the distribution of manufactured goods. The city is especially noted as a market and wholesaling center, standing first in America as a distributing point for agricultural implements, hay, and lumber. The city ranks second only to Chicago as a railroad center. It is also the second largest horse and mule market in the country. In addition to its meat packing and flour milling interests, Kansas City has important industries, including oil refining, flour milling, and the manufacture of structural steel, automobiles, awnings, paints, and clothing, and handles immense quantities of provisions, fruit, lumber, and coal.

The city is built on three different levels, in a landscape made picturesque by high bluffs. Parks totaling 3300 acres are connected by about 100 miles of boulevards. The shaft of the Liberty memorial, 218 feet high, is designed to show a pillar of cloud by day and a pillar of fire by night. Population, 1920, 324,410.

Katahdin (*kă-tā'dĭn*), **Mount.** The highest mountain in Maine, located in Piscataquis county, slightly northeast of the center of the state. It rises to an elevation of about 5200 feet, with precipitous slopes and massive cliffs of richly colored granite. The bare summit furnishes a grand view of central Maine, embracing forests, rivers, lakes, and mountains.

Kenosha (*kē-nō'shă*). A manufacturing city of southeastern Wisconsin, overlooking a fine harbor on Lake Michigan, 34 miles south of Milwaukee. The city's extensive industries include large establishments for the manufacture of automobiles, iron beds, leather, stockings, underwear, furniture, typewriters, and numerous other articles. In total value of manufactures, Kenosha ranks third among the cities of the state. Population, 1920, 40,472.

Key West. The southernmost city of the United States, situated on Key West island, one of the Florida Keys. This small coral island lies in the Gulf of Mexico, about 50 miles southwest of Cape Sable, Florida. It is connected with the mainland by a unique "seagoing" railway and oversea highway built, in part, upon the chain of low islands, of which Key West is the terminal, and, in part, upon huge concrete causeways connecting the islands. There is a fine harbor, with regular steamer service to New York, Havana, Galveston, and other important ports; also a ferry service for transporting railroad cars to Havana. A United States naval station and an army post are located here.

Key West has many fine streets and residences, set in luxuriant tropical vegetation, and is a popular tourist resort. There are large shipping interests and important fisheries, but by far the greatest local industry is the manufacture of cigars, for which the city is widely famous. Population, 1920, 18,749.

Knoxville. An industrial and educational center in eastern Tennessee, built on the north bank of the Tennessee river, about 160 miles east of Nashville. It lies in a rich coal mining, iron producing, and marble quarrying region, with which it conducts an extensive trade. Knoxville ranks fourth among the cities of the state in manufactures. Its leading industrial establishments include marble works, ironworks, knitting mills, cotton mills, dye works, flour mills, machine shops, and meat packing houses. The city is the seat of the University of Tennessee and the State agricultural college. Population, 1920, 77,818.

Laguna (*lä-gōō'nä*). The second largest Indian pueblo in New Mexico, located near the San Jose river, in an arid desert, 67 miles west of Albuquerque. The inhabitants, who are of Keresan stock, are industrious and self-supporting. By primitive methods of irrigation, they produce crops sufficient for their needs. Wool growing is carried on to some extent. Population, about 1450.

Lake Geneva. A summer resort town of southern Wisconsin, situated on a lake of the same name, about 40 miles southwest of Milwaukee. The lake is a fine body of water, 9 miles long and from 1 to 3 miles wide. Many residents of Chicago have villas on its shores. The town is the seat of a large sanitarium and a military school. Near by is Yerkes observatory, containing the great Yerkes 40-inch refracting telescope. Population, 1920, 2632.

Lake George. A small lake in eastern New York, one of the most picturesquely beautiful in America. It is fed chiefly by cold springs, and its waters flow into Lake Champlain through a series of cascades, with one abrupt fall of 30 feet at Ticonderoga. The lake, which is about 30 miles long, contains about 200 miniature islands. In Colonial and Revolutionary days, the immediate region was the scene of many events of great importance and abounds in historic landmarks and associations.

Lake Mohonk (*mō-hŏngk'*). A popular summer resort, charmingly situated on a small lake of the same name in the Catskill mountains, of Ulster county, about 75 miles north of New York City. Lake Mohonk is noted also as the seat of a long series of annual conferences on international arbitration, the first of which was held in 1895.

Lake Placid. A beautiful small lake in the Adirondacks of northeastern New York. It is situated at the foot of Whiteface mountain, some 10 miles northeast of Mount Marcy. The lake lies at an altitude of about 2000 feet in one of the most charming scenic regions in the eastern United States. The town of Lake Placid, located on its banks, is a noted summer resort.

Lancaster. A city of southeastern Pennsylvania, about 70 miles west of Philadelphia. Lancaster is the trade center of one of the most productive tobacco and grain growing counties in the United States, and has varied and extensive industries. It is noted for its output of watches, umbrellas, locks, linoleum, cork, silk goods, cotton goods, and leather. Franklin and Marshall college, Franklin and Marshall preparatory school, and other educational institutions are located here. At Millersville, in the near vicinity, there is a large state normal school. Lancaster was first settled about 1717 and became a city in 1818. It was the home of James Buchanan, the 15th president of the United States. Population, 1920, 53,150.

Lansing. The capital of Michigan, built at the junction of the Grand and Cedar rivers, about 85 miles northwest of Detroit. Water power derived from these streams has been utilized in the development of the city's extensive industries. In the value of manufactures, Lansing stands fourth among the cities of the state. Of its industries, the manufacture of automobiles is by far the most important. Other manufactures are gas and steam engines, lumber products, machine shop products, flour, and beet sugar. Among important public buildings are the capitol, the State library, and various state institutions. East Lansing is the seat of the State college of agriculture and applied science. Lansing was settled in 1837, was laid out for the capital in 1847, and became a city in 1869. Population, 1920, 57,327.

Lassen Peak. A volcanic mountain in northern California, situated at the south end of the Cascade range, about 135 miles north of Sacramento. It stands at the extreme southwestern border of the great ancient lava beds which cover more than 200,000 square miles in the Columbia River plateau. Lavas from its own prehistoric eruptions are abundant. The peak, in which there is an extensive crater, rises to an elevation of about 10,500 feet.

Long inactive and regarded as extinct, Lassen peak in 1914 suddenly began to emit immense clouds of steam and smoke. Since that outburst, there have been hundreds of eruptions, mostly of a moderate character. Some, however, have been accompanied by the ejection of mud lavas and hot gases, causing extensive destruction in adjacent forests. An area of 124 square miles surrounding and including Lassen peak has been created a national volcanic park. In this are smaller volcanoes, lava fields, cinder cones, fumaroles, hot springs, solfataras, boiling lakes, and other features characteristic of a volcanic region.

Lawrence. A city in eastern Kansas, on both banks of the Kansas river, about 40 miles west of Kansas City. Lawrence is the trade center of a rich agricultural region and has various local industries, including flour mills, box factories, nurseries, and canning works. It is the seat of the University of Kansas, and the Haskell institute for Indians is also located here. Founded in 1854 by settlers from the East, Lawrence was the first of the Kansas Free State towns, and became an antislavery stronghold. It was sacked by a band of border ruffians from Missouri in 1856, though stubbornly defended by John Brown and his sons. In 1863, Quantrell, the Confederate raider, attacked the town, killing more than 100 of its citizens. Population, 1920, 12,456.

Lawrence. A manufacturing city of northeastern Massachusetts, built on both sides of the Merrimac river, about 26 miles north of Boston. The Merrimac falls of the river at this point played an important part in building up the city's industries, but their requirements have vastly outgrown this source of power. In the production of worsted cloth, Lawrence leads all other cities of the United States. Here are located the huge mills of the American Woolen company as well as the Pacific and Arlington mills. Other noteworthy manufactures include foundry and machine shop products, shoes, and paper. Population, 1920, 94,270.

Leadville. A mining city of central Colorado, located near the Continental Divide, at an elevation of 10,200 feet. First settled by gold prospectors in 1860, it was a prosperous gold mining center for a few years until the deposits at that time known were exhausted. Thereupon the place was practically abandoned. In 1877, exceedingly rich lead and silver ore bodies were discovered. As a result, the population, which had declined to about 300, increased to more than 6000 in 1878, and to about 35,000 in 1879. For a time thereafter, Leadville held first place in the United States in lead and silver production. During the period 1879–1905, the total value of its mineral output exceeded $325,000,000. But, notwithstanding the discovery of additional gold deposits beneath the city itself, the total mineral production has declined to a small fraction of its former value. The population has likewise decreased, though the city remains the trade center of an extensive mining district. Population, 1920, 4959.

Lewiston. A leading manufacturing city of Maine, built on the east bank of the Androscoggin river, about 35 miles north of Portland. The river here falls 60 feet, furnishing immense hydroelectric power which is utilized in the city's extensive industries. The chief manufacturing establishments are cotton and woolen mills; lesser industries include leather belting factories, dye works, and bleacheries. The city is the seat of Bates college. Population, 1920, 31,791.

Lexington. The chief city of the "Blue-Grass region," situated about 80 miles southeast of Louisville, Kentucky. It is located in a highly productive agricultural and stock raising district, with which it carries on an extensive trade. It is an important market for grain, loose leaf tobacco, and live stock, especially horses. The local manufactures include saddlery, harnesses, flour, canned goods, lumber, and wagons. Lexington is the seat of Kentucky university, Transylvania university, Sayre college, and other educational institutions. By reason of its educational facilities, the city has been called the "Athens of the South." Henry Clay lived in Lexington from 1797 until his death. Population, 1920, 41,534.

Lexington. A town of northeastern Massachusetts, situated about 12 miles northwest of Boston. The town embraces an agricultural district in which are located the villages of Lexington, East Lexington, and North Lexington. Lexington village, now chiefly residential, is noted as the scene of the first conflict between the colonists and the British in the Revolutionary War. In the village and its vicinity are many points of great historic interest. Among these are the first battle ground of the Revolution; numerous houses, taverns, and other buildings associated with the conflict; and various monuments in commemoration of the men and of the events that made Lexington famous.

Lexington was settled about 1642 and for some 50 years was known as Cambridge Farms. In 1839, the first normal school in the United States was opened in Lexington. Population, 1920, 6350.

Lima. A city of western Ohio, located on the Ottawa river, about 80 miles south of Toledo. Lima is located in the center of the Ohio oil field, from which large quantities of

oil are annually shipped. Among the chief industrial establishments are locomotive and car works, petroleum refineries, and railroad shops. Population, 1920, 41,326.

Lincoln. The capital and second largest city of Nebraska, situated on a gently sloping site, about 55 miles southwest of Omaha. It is the center of a highly productive agricultural and stock raising section, with which it carries on an extensive trade. The local industrial establishments include printing and publishing works, packing houses, canning factories, machine shops, potteries, carriage works, and various other manufactories. The city is regularly laid out, with wide streets, and contains many important public buildings, the most imposing of which is the new capitol.

Lincoln is the seat of the State university and agricultural college and of Cotner university. Nebraska Wesleyan university is in a suburb, University Place. The first permanent settlement on the site of the city was made in 1856, and in 1864 a village was laid out, called Lancaster. This, in 1867, was selected for the state capital and renamed Lincoln. Population, 1920, 54,948.

Lincoln Highway. A road extending entirely across the northern United States and named in honor of Abraham Lincoln. It was laid out in 1913 with the purpose of establishing a modern vehicular highway, national in character and free to the public at all points, connecting New York and San Francisco.

The route, about 3300 miles long, crosses 11 states, passing through many important cities and towns. Among the chief of these are Jersey City, Newark, and Trenton, New Jersey; Philadelphia, Lancaster, York, Chambersburg, and Pittsburgh, Pennsylvania; East Liverpool, Canton, Mansfield, and Lima, Ohio; Fort Wayne, Elkhart, South Bend, and Valparaiso, Indiana; Chicago Heights, Aurora, Geneva, Rochelle, and Dixon, Illinois; Clinton, Cedar Rapids, Marshalltown, Jefferson, and Council Bluffs, Iowa; Omaha, Columbus, Grand Island, Kearney, and North Platte, Nebraska; Cheyenne, Laramie, Medicine Bow, Rawlins, Rock Springs, and Evanston, Wyoming; Salt Lake City, Garfield, Tooele, and Ibapah, Utah; Ely, Eureka, Carson City, and Reno, Nevada; and Truckee, Placerville, Sacramento, Stockton, and Oakland, California.

The Lincoln highway is distinctively marked with a red, white, and blue marker bearing a blue letter "L" on a white field. Throughout its entire length the highest types of roadway construction are represented, including concrete, brick, bituminous, macadam, and graded gravel. Within fifteen years from the inception of the project, the eastern section, including about 1100 miles of roadway between the Hudson and the Mississippi, had been practically completed. West of the Mississippi, extensive portions were finished, and the unimproved sections, limited to the desert regions of Utah, were passable during the greater part of the year. About 100 million dollars had been spent on it by 1928.

This great national highway possesses numberless features of great historic and scenic interest and is traversed annually by thousands of tourists. For map showing chief national highways of the United States, see page 696.

Little Rock. The capital and largest city of Arkansas, on the south side of the Arkansas river, near the center of the state. The name has reference to a bold cliff rising 50 feet above the river at this point. The city is situated near the foothills of the Ozark mountains in a rich lumbering and cotton growing district, of which it is the commercial center. The chief industries include the manufacture of cottonseed oil and of lumber products.

There are many fine public buildings, among which is the new capitol, built of native Arkansas marble. The park system covers 400 acres. Because of the profusion of roses in its well kept gardens, Little Rock is called the "City of Roses." Big Rock, an eminence 500 feet high, 8 miles distant, is the site of Camp Pike, an army post. The city is the seat of Little Rock college and of the law and medical departments of the University of Arkansas. Population, 1920, 65,142.

Lockport. A city of western New York, situated on the State Barge canal, 26 miles north by east of Buffalo and in the center of the highly productive Niagara fruit belt. It occupies a commanding though somewhat uneven site, part of the city being built on a sloping terrace known as "Mountain Ridge." At this point the canal drops some 60 feet, from the level of Lake Erie to that of the Genesee river, by massive locks of masonry, and is crossed by one of the widest bridges in the world. The varied industries include numerous manufactures, notably automobile parts and pulpwood products, a large trade in fruit and grain, and extensive quarries of limestone for building. Lockport was chartered as a city in 1865. Population, 1920, 21,308.

Logan. A city of northern Utah, on Logan river, about 70 miles north of Salt Lake City. Logan is the commercial center of the Cache valley, a rich agricultural district, with some mineral deposits. Its industrial establishments include knitting mills, lumber mills, flour mills, a condensed milk plant, and a beet sugar factory. Among educational institutions are the state agricultural college and Logan academy. Population, 1920, 9439.

Long Beach. A tourist resort and city on the southern coast of California, about 20 miles south of Los Angeles. It is beautifully located, looking out on the harbor of San Pedro, while the beach from which it takes its name is one of the finest along the Pacific coast. It is connected by steamer with Catalina island. Its harbor has been elaborately improved and accommodates a large trade in fruit, canned fish, petroleum, and lumber, the last two being the chief products of the city's industry. Petroleum is used as fuel for Long Beach's electric generating plant, one of the largest on the continent. Population, 1920, 55,593.

Lookout Mountain. A steep ridge which rises to an elevation of 2100 feet, overlooking the city of Chattanooga, Tennessee. This rocky height was the scene of the famous battle of the Civil War, sometimes called the "Battle above the Clouds." The summit commands a superb view of the Tennessee river and its valley, the city of Chattanooga, and the surrounding mountainous region.

LOS ANGELES (*lōs ăng'gĕl-ĕs; lōs ăn'jĕl-ĕs*). The chief commercial center of southern California and the most populous city in the western United States. Los Angeles is situated on the Pacific coast, about 475 miles southeast of San Francisco and about 10 miles south of the Sierra Madre mountains. Through it passes the Los Angeles river, a dry bed in summer but a considerable stream in winter.

SITE. The city lies, for the most part, in a gently sloping plain, with an average elevation of about 270 feet. The site is fairly level, though there are a few steep eminences, and the northern suburbs extend into the foothills. Originally, the city embraced an area of 36 square miles; but, with numerous additions, including extensions to the ocean and taking in San Pedro harbor, the total area exceeds 441 square miles.

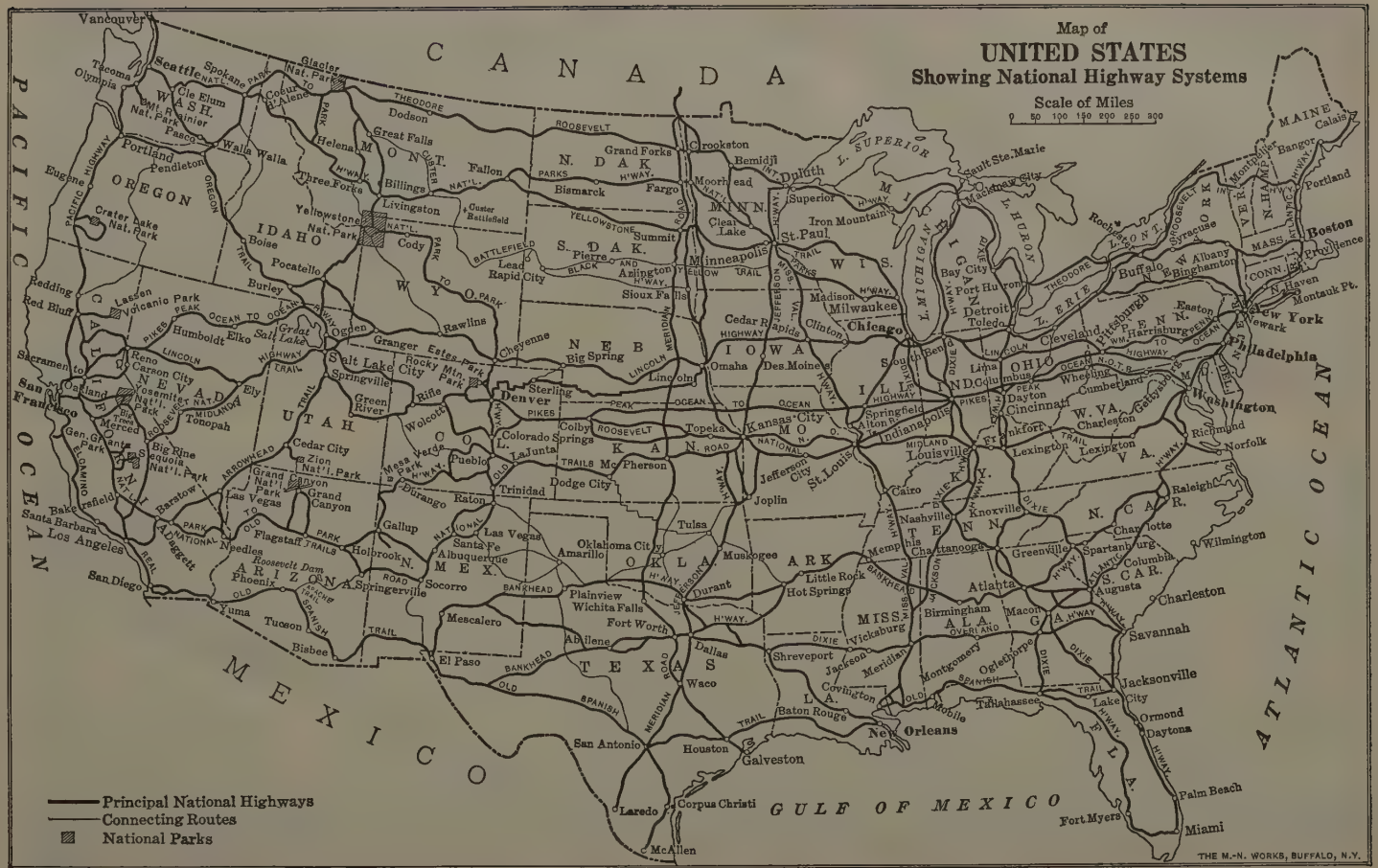
STREETS AND BUILDINGS. The city is regularly laid out, with wide, straight streets, and an extensive system of boulevards and drives. Main, Spring, Broadway, and Hill are important thoroughfares in the commercial section, which is dominated by immense office buildings and department stores. The railway terminals and manufacturing districts lie chiefly to the east and south of the business center, while the large and handsomely built residence sections flank it on the west and north. White is the prevailing color of all buildings and preserves its freshness because there is but little smoke. Los Angeles is preeminently a city of beautiful homes, with the Mission style of architecture, adopted from the Spanish, and the bungalow as characteristic types. The broad avenues and spacious grounds are luxuriant with evergreen foliage and a profusion of flowers which bloom throughout the year. Orange trees, palms, eucalyptus, camphor trees, pepper trees, araucarias, acacias, and many other subtropical trees and shrubs border the boulevards and adorn the plazas and parks.

PARKS AND BOULEVARDS. There are some 66 public parks embracing a total area of more than 4884 acres. Among the more noteworthy of these are Griffith, Elysian, Westlake, Lincoln, Echo, Hollenbeck, Exposition, Central, and Plaza parks. Griffith park, a hilly, wooded tract of 3751 acres, is one of the largest municipally-owned parks in the United States. Many handsome boulevards and driveways connect the parks with various parts of the city and with fine scenic roads to the surrounding region.

EDUCATIONAL INSTITUTIONS. Los Angeles is the seat of the University of Southern California, Occidental college, McClay college of theology, Saint Vincent's college, and the Southern branch of the University of California.

TRANSPORTATION. Los Angeles owes its great growth in part to unusually complete transportation facilities. The city contains terminals of three transcontinental railways and has a capacious harbor for coastwise and foreign shipping in its municipally-owned wharves at San Pedro. It is connected with the surrounding country by a large system of electric interurban railway lines, some of which have four tracks and reach towns 60 miles distant. Well paved public highways form a huge network over country districts in all directions. These serve as thoroughfares for extensive, regularly operated systems of autobuses and autotrucks for transporting passengers and produce to and from the city.

COMMERCE. Los Angeles is the commercial center of the far Southwest and has extensive fruit growing, petroleum producing, manufacturing, and shipping interests. It is a general market for one of the most productive horticultural and agricultural sections of the country. Among leading products handled are oranges, lemons, walnuts, olives, vegetables, beet sugar, beans, cereals, and cotton. Citrous fruits and petroleum are the chief products of the immediate district. There is also a substantial coastwise and foreign shipping trade.


Map of
UNITED STATES
Showing National Highway Systems
Scale of Miles
0 50 100 150 200 250 300
CANADA
MEXICO
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
Principal National Highways
Connecting Routes
National Parks
THE M.-N. WORKS, BUFFALO, N.Y.

MANUFACTURES. By reason of cheap fuel, in the form of crude petroleum, and abundant hydroelectric power derived from streams in the mountains, Los Angeles has become an important manufacturing city. The value of its industrial output increased fourfold between 1914 and 1923. Important manufactures include petroleum and metal products, lumber, packed meats and other food products, women's clothing, and furniture. The subdivision of the city known as Hollywood has become famous as the chief center of the moving picture industry in America.

FEATURES OF INTEREST. With its picturesque setting between the mountains and the sea, its numerous historic associations, and its many attractive suburbs, Los Angeles presents an immense number of points of interest. Among those within the city may be mentioned the Old Plaza church, Chinatown, and Sonora Town. In the near vicinity are San Gabriel Mission, Mount Lowe, and Mount Wilson observatory. Attractive beach resorts include Santa Monica, Venice, Redondo Beach, Long Beach, and Santa Catalina island. Interesting suburban cities include Pasadena, Riverside, Alhambra, Universal City, and Glendale, while farther away but easily accessible are Whittier, Orange, Pomona, and San Bernardino.

HISTORY. In 1781, Los Angeles was settled by Spanish colonists from Mexico who named it *Pueblo de Nuestra Senora la Reina de Los Angeles* (City of Our Lady the Queen of the Angels). Until its final capture in 1847 by United States troops under General Philip Kearny, it served alternately with Monterey as capital of the Mexican province of California.

Los Angeles was chartered as a city in 1850, and attained its first railway connection with San Francisco in 1876. Following the completion, in 1885, of the Santa Fe railway, giving direct access to the East, the growth of Los Angeles was rapid, and, since 1900, it has been remarkable.

The genial climate, the great fertility of the surrounding region under irrigation, and large local supplies of natural gas and petroleum have been influential factors in this development. Two important municipal achievements have also contributed substantially to its rise as a great city. The first was the extension, in 1909, of the city to the ocean at San Pedro, making possible the establishment of a commodious, municipally controlled harbor. The second was the completion, in 1913, at a cost of $25,000,000, of a great aqueduct from the slopes of Mount Whitney in the Sierra Nevada, across the Mohave desert, and through the Sierra Madre range, by tunnel, to the city. The population in 1920 was 576,673. The following years witnessed a most phenomenal growth of the city's population, which was credibly estimated to have passed 1,000,000 by 1926.

Louisville (*lōō'ĭs-vĭl*; *lōō'ĭ-vĭl*). The chief city of Kentucky, located on the south bank of the Ohio river, about 65 miles west of Frankfort. Louisville occupies a commanding site opposite the rapids or "falls" of the river, which here descends 26 feet in 2 miles. The city is admirably laid out, with broad streets and beautiful parks, and contains many fine public and commercial buildings.

The city's park system includes Shawnee park on the west, Cherokee park on the east, Iroquois park on the south, and various smaller parks. Cherokee park, 409 acres, is cut into picturesque ravines by Beargrass creek. Iroquois park, the largest, 676 acres, rises to eminences of nearly 300 feet, affording superb views of the city and of the river.

Louisville has excellent transportation facilities, both by rail and by river, and is the commercial center of a large and highly productive agricultural region. The city is the greatest loose leaf tobacco market in the world, and has extensive manufacturing industries. Its leading manufactures include tobacco, cement, wagons, plows, leather, and packed meats. The city is the seat of the University of Louisville, a municipal university, the Jefferson law school, and of various other educational institutions.

The first settlement at Louisville was made in 1778, a town was laid out and named in 1779, and in 1828 became a city. Louisville's early growth was greatly stimulated by the establishment, in 1811, of steam navigation on the Ohio river, and especially by the completion, in 1830, of the Louisville and Portland canal around the rapids. The first railway, connecting the city with the interior of the state, was finished in 1851. Near the city is the old home and the grave of Zachary Taylor. Population, 1920, 234,891.

Lowell. A textile manufacturing city of northeastern Massachusetts, situated at the junction of the Merrimac and Concord rivers, about 25 miles northwest of Boston. Immense water power from falls in the rivers is utilized in its extensive industries, the chief of which is the manufacture of cotton goods. Other important industrial establishments include hosiery mills, machine shops, dyeing and finishing shops, woolen and worsted mills, and shoe factories. The city is the seat of a State normal school, the Lowell textile school, and other educational institutions. Population, 1920, 112,759.

Lowe, Mount. A peak of the Sierra Madre in southern California. It is situated some 15 miles in direct line northeast of Los Angeles and rises to an elevation of 5650 feet above sea level. An electric scenic railway ascends almost to the summit, which affords superb views of the surrounding region.

Luray Cavern. A remarkable cave, situated near the town of Luray, Virginia, about 90 miles northwest of Richmond. It underlies an area of more than 100 acres in the foothills of the Blue Ridge mountains. In this vast cavern there are numerous galleries, rising above one another in tiers to a height of nearly 300 feet. In some of these, streams and small bodies of water are found; others contain stalactites and stalagmites of great size and unusual beauty of coloration. The cavern, which was discovered in 1878, is lighted by electricity and traversed by paths making its exploration easy for visitors.

Lynchburg. A city of central Virginia, on the James river, about 125 miles southwest of Richmond. The city is picturesquely located, sloping in steep terraces upward from the river, with the Blue Ridge and the Peaks of Otter as background. It is situated in a tobacco, iron, and coal producing district, of which it is the trade center. Excellent water power is utilized in various local industries, among the chief of which are the manufacture of shoes and clothing. During the Civil War, Lynchburg was used as a base of supplies for the Confederate army. Population, 1920, 30,070.

Lynn. A manufacturing city of eastern Massachusetts, located about 10 miles northeast of Boston. The city is beautifully situated and admirably laid out. The commercial and industrial districts extend for about 3 miles along Massachusetts bay, while the residential sections occupy the higher portions overlooking the harbor. There is a fine boulevard along the ocean front and a superb park, called Lynn Woods, containing 2000 acres.

Lynn is one of the chief centers in the United States for the manufacture of women's and children's shoes. The city has other important industries, and ranks sixth in manufactures among the cities of the state. Besides shoes, the principal products include electrical machinery, finished leather, adhesives, boxes, and proprietary medicines. Lynn was settled in 1629 but was known as Saugus until 1637, when it was given its present name. Its great shoe industry had its beginnings about 1750. Population, 1920, 99,148.

McKeesport. A manufacturing city of Pennsylvania, on the Monongahela river, 14 miles southeast of Pittsburgh. Advantageously situated in a region rich in bituminous coal, iron, and natural gas, the city has become a leading center for the manufacture of iron and steel. It possesses one of the greatest steel tube and iron pipe works in the world, which has earned for it the name of the "Tube City." Among other large industrial establishments are tin plate works and blast furnaces. Population, 1920, 46,781.

Macon (*mā'kŏn*). A city of central Georgia, built at the head of navigation on the Ocmulgee river, about 80 miles southeast of Atlanta. Macon is the commercial center of a highly productive farming and fruit district, and is a leading market for cotton and peaches. Hydroelectric power, derived from the river, is utilized in the city's extensive industries. Among the cities of the state, Macon ranks high in value of manufactures. These include cotton and knit goods, cottonseed oil and cottonseed cake, brick, tile, lumber, flour, fertilizers, foundry and machine shop products, and packed meats.

The city is the seat of Mercer university, Mount de Sales academy, and Wesleyan female college. Macon was first settled in 1822 and was incorporated as a city in 1832. Population, 1920, 52,995.

Madison. The capital of Wisconsin, situated in the south central part of the state. The city occupies a picturesque site between lakes Mendota and Monona, in the so-called "Four-Lakes region." It is surrounded by a rich agricultural district, of which it is the trade and industrial center. Among its industrial products are dry cell batteries, machine tools, lubricators, and shoes. Madison is noted for its beautiful parks, wide, heavily shaded streets, and scenic lake shore drives. There are many fine public buildings, the most imposing of which is the capitol, built of granite in the Renaissance style.

The city is the seat of the University of Wisconsin, which occupies a magnificent campus, more than a mile in length, bordering on Lake Mendota. The site of Madison was chosen for the state capital in 1836, and the first buildings were erected on it in 1837. Population, 1920, 38,378.

Malden. A city of eastern Massachusetts, built on the Malden river, about 5 miles north of Boston. Malden is noted for its extensive manufactures of rubber boots and shoes, and contains some of the largest rubber shoe factories in the United States. Among numerous other manufactures may be mentioned boot and shoe lasts, cords and tassels,

cotton goods, hosiery, emery paper, and picture molding. Malden was first settled in 1641, was incorporated in 1649, and was chartered as a city in 1881. Population, 49,103.

Mammoth Cave. The largest known cavern in the world, situated near the Green river, about 100 miles south of Louisville, Kentucky. It is located in a region which abounds in large caverns, and whose surface is marked by thousands of sink holes. Through these depressions, drainage waters find their way to underground streams whose solvent and erosive action has largely produced the caves.

Mammoth cave is a complex series of caverns, including more than 200 so-called rooms, chambers, domes, pits, abysses, grottoes, avenues, and galleries, which extend for 9 miles underground. In the lower portions, there are rivers, waterfalls, and small lakes. Among the most interesting features are the vast pits or domes, which are caverns of unusual height. The largest of these, called the Chief City, is 450 feet long and 130 feet wide. Stella, Mammoth, and Gorin domes are each about 250 feet high.

Cleveland avenue, which extends for fully 2 miles, presents wonderful displays of crystals and incrustations. Stalactites and stalagmites in a great variety of grotesque shapes, many of which resemble architectural forms, contribute also to the unusual scenery of the cavern. When the incrustations are covered with crystals, as in Star Chamber, their sparkling effect when the cavern is lighted is impressive. Among the larger bodies of water within the cavern are the so-called Dead Sea, the Styx, Lethe lake, Roaring river, and Echo river. The latter stream is three-fourths of a mile long, and has an underground connection with Green river.

In the waters of the cave are 2 species of blind fish. These, together with crayfish and a few insects, make up the animal life. The temperature remains almost constant at about 54°. The cavern was discovered in 1809 by a hunter named Hutchins. While privately owned, the cave has been made accessible to travelers, who visit it in large numbers.

Manchester. The principal manufacturing center of New Hampshire, built on the Merrimac river, about 18 miles south of Concord. A fall of some 50 feet in the river, formerly used as direct water power, now provides one of the units in a superpower system. The city's extensive industrial output includes cotton textiles, worsted dress goods, rayon mixtures, shoes, and cigars. The city has many fine municipal buildings and educational institutions. Population, 1920, 78,384.

Manila. The capital and chief city of the Philippine Islands, situated on the west coast of the island of Luzon. The city has a frontage of 4 miles on Manila bay, and is divided into two parts by the Pasig river. On the south side of the river is the ancient Spanish town with the cathedral, monastic buildings, and numerous quaint Spanish houses; also the principal residential section, hospitals, and government buildings. On the north side is Binondo, containing the principal shopping and financial district. This modern portion contains many fine public buildings. In it lie the Escolta, the city's busiest thoroughfare, and the Rosario, noted for its Chinese shops.

Manila is important chiefly for its foreign and coastwise commerce. It is the world's greatest shipping market for hemp; other leading exports are sugar, copra, and tobacco. Its imports are mostly foodstuffs, textiles, and a great variety of manufactured articles. Among the principal manufactures are cigars, hemp braid, hats, coconut oil, and dried coconut.

The Spanish city of Manila was founded in 1571. In 1898, Admiral Dewey destroyed a Spanish fleet in Manila bay. Since the cession of the Philippine Islands to the United States by Spain, the progress of Manila, commercially and educationally, has been both remarkable and rapid. Population, 1918 census, 283,613.

Manitou (*măn'ĭ-tōō*). A health and pleasure resort, located at the foot of Pikes peak, 6 miles northwest of Colorado Springs, Colorado. The town lies at an elevation of about 6300 feet in a region noted for picturesque scenery. The numerous features of interest in the locality include Pikes Peak cog railway, the Cave of the Winds, Soda Springs park, the Garden of the Gods, and various canyons, waterfalls, and scenic drives. The famous radioactive mineral springs flow at the rate of a quarter million gallons daily. The summer population is estmated at 25,000. Resident population, 1920 census, 1129.

Marcy, Mount. The loftiest summit of the Adirondack mountains and the highest peak in the state of New York. It is situated about 10 miles south of Lake Placid, and 30 miles southwest of Lake Champlain. It is a dome-shaped mountain rising to an elevation of 5344 feet. The slopes, except near the summit, are generally wooded. The summit and a portion of the upper northern slope are above timber line. The vegetation above the zone of trees consists of dwarfed and stunted heaths and willows and other plants peculiar to an arctic-alpine vegetation.

From the crest of Mount Marcy, panoramic views of the entire Adirondack region may be obtained. Lake Tear of the Clouds, usually regarded as the main source of the Hudson river, lies at an elevation of 4300 feet, immediately southwest of the mountain. Theodore Roosevelt was in camp at the summit of Mount Marcy when summoned to take the oath of office as president in 1901.

Marion. A city of central Ohio, situated about 50 miles north of Columbus, in a rich agricultural and quarrying region. The city's extensive industries include the manufacture of steam shovels, threshers, steel products, lime, and silk goods. There are several large limestone quarries in the outskirts of the city. Marion has many fine streets and buildings. The city is noted chiefly as the home and burial place of Warren G. Harding, who was engaged in business there from 1884 until he assumed the presidency of the United States in 1921. Population, 1920, 27,891.

Memphis. The chief city of Tennessee, built on the east bank of the Mississippi river, about 210 miles southwest of Nashville. The city occupies an undulating site, on Chickasaw bluff, about 450 miles by river south of Saint Louis and 740 miles by river north of New Orleans.

At Memphis, the river is spanned by two immense cantilever bridges, and railways radiate from the city in all directions. Because of its advantageous situation at the head of deep water navigation on the Mississippi river, in a rich agricultural and lumbering region, Memphis has become an important marketing, manufacturing, and distributing center. It is the chief center of hardwood lumber production in the United States, and is one of the principal inland cotton markets of the South. It also ranks as one of the leading horse and mule markets in the country. The city's varied and extensive industries include the manufacture of cottonseed oil and cake, food preparations, lumber, cooperage, carriages and wagons, window screens, flavoring extracts, and patent medicines.

Memphis is regularly laid out, with wide, well shaded streets and handsome residences, and contains many excellent public and commercial buildings. The city's magnificent park system, connected by a boulevard 11 miles long, is one of the finest in the South. This system forms a continuous belt around three sides of the city, and covers a total area of more than 1200 acres. Important units are Riverside park, 427 acres, and Overton park, 335 acres, the latter containing an art gallery and a large zoological garden.

The city is the seat of the medical department of the University of Tennessee and of a State normal school. Memphis was laid out in 1818 by General Andrew Jackson and associates. It was incorporated in 1826, and, in 1849, received its charter as a city. Population, 1920, 162,351.

Meridian. The largest city of Mississippi, situated in the east central part of the state. It is surrounded by a rich cotton and vegetable growing district, of which it is the market center. The principal industries include the manufacture of cottonseed oil, cotton gins, furniture, foundry products, and fertilizer. Meridian contains many fine municipal buildings and educational institutions. Population, 1920, 23,399.

Miami (*mī-ăm'ĭ*). A commercial city and noted winter resort of southeastern Florida, beautifully located at the mouth of the Miami river on the Atlantic coast, about 365 miles south of Jacksonville.

The city lies only about 150 miles north of the tropics, in a region of luxuriant vegetation, producing grapefruit, oranges, limes, guavas, pineapples, avocadoes, coconuts, and other subtropical fruits. There are large sugar mills, extensive fisheries, and various other industries. Miami has steamer connections with Havana, Nassau, and San Juan, and it is an important shipping center for fruit and winter vegetables to northern markets.

In 1896, Miami was made the terminus of the Florida East Coast railway, which was later extended "overseas" to Key West. Since that date, the growth of Miami has been remarkable, earning for it the title of the "Magic City." It is celebrated for its fine hotels and varied pleasure attractions and for its many delightful boulevards and drives. Its 27-story city hall is one of the tallest buildings in the South. Population, 1920, 29,571; credibly estimated to exceed 100,000 by 1928.

Milwaukee. The chief city of Wisconsin, and the fourteenth in population in the United States, situated on Lake Michigan, about 90 miles north of Chicago. The city occupies a commanding site, overlooking a beautiful bay, at the confluence of three small rivers—the Milwaukee, the Menomonee, and the Kinnickinnic. The bay, protected by a long breakwater, together with the deepened channels of the rivers, and various canals, provide harborage for the city's extensive shipping trade, which handles an immense tonnage of coal, grain, and other articles. The transportation facilities include several railroads and steamship lines, and also a daily car ferry service which transports railroad trains to the east shore of Lake Michigan.

Milwaukee is one of the leading industrial centers of the country, ranking tenth among the cities of the United

States in value of manufactures. These include a great variety of products, among the most important of which are leather, packed meats, metal wares, electrical supplies, railway cars, steam engines, boots and shoes, and knit goods.

The city is regularly laid out, and its park system includes more than 35 parks, embracing about 1000 acres. Among these are Juneau and Lake parks, picturesquely situated on the lake shore; Mitchell park, noted for its floral displays; Washington park, containing a zoological garden; and Lincoln park, the largest of all. The finest residence section occupies the bluffs, 150 feet high, overlooking the lower city and the lake. Notably impressive is Lake Shore drive, which passes through the northern suburbs of the city. There are many imposing buildings, among which are the city hall, the Federal building, the public library, the auditorium, and the art gallery.

Milwaukee was formerly called the "German Athens of America," and is the seat of many educational institutions, including Marquette university, Concordia college, Downer college, and a State normal school. Father Marquette and Joliet visited the site of Milwaukee in 1673. The first permanent settlement dates from 1818. The village was organized in 1837, and, in 1845, became a city. During its early period, the population was largely composed of Germans. Later, these became far outnumbered by people from other European countries, chiefly Poles, Russians, Austrians, Czechoslovaks, Jugoslavs, and Italians. In 1920, less than 9 per cent of the inhabitants of the city were German born. Population, 1920, 457,147.

Minneapolis. The chief city of Minnesota, built on both banks of the Mississippi river, at Saint Anthony's falls. Immediately below lies Saint Paul, which adjoins Minneapolis, the two municipalities being popularly known as the "Twin Cities."

Minneapolis attained industrial and commercial importance primarily by reason of the immense water power derived from the falls. This was first utilized principally in sawmills and flour mills. Until about 1870, lumber was the leading product, but since that date the milling of grain has become the pre-eminent industry. The value of its flour and gristmill products entitles Minneapolis to first rank among flour producing cities. One of the great mills situated around Saint Anthony's falls is the largest single flour mill in the world. Other important manufactures are linseed oil, cereal foods, agricultural implements, machinery, knit goods, and dairy products.

The city is served by 29 railroads and stands at the head of navigation on the Mississippi river. By reason of its extensive transportation facilities, Minneapolis has become the wholesale distributing center for the Northwest. It is also one of the chief primary wheat markets of the country, with elevators capable of storing more than 50 million bushels of grain.

Minneapolis is predominantly a city of homes, with wide, well shaded streets, handsome residences, charming parks, and beautiful drives. The park system, which includes Lake Calhoun, Lake Harriet, and several smaller lakes, covers more than 4700 acres. By means of canals connecting several lakes, a scenic waterway 9 miles long has been made available for canoes and launches. Minnehaha park contains the beautiful Minnehaha ("laughing water") falls, immortalized by Longfellow.

There are many notable buildings, among them the public library, the city hall, the art institute, the Pro-cathedral, Saint Mark's church, Hennepin Avenue Methodist church, and a 3-million dollar auditorium. A feature of the city is the large number of handsome bridges across the Mississippi river. The city is the seat of the University of Minnesota, Minnesota college, De La Salle institute, Augsburg seminary, and the MacPhail and Minneapolis schools of music. The Minneapolis Symphony Orchestra has won wide recognition.

Father Hennepin, a French missionary, discovered and named the Falls of Saint Anthony in 1680. In 1766, the site of the city was visited by Jonathan Carver, an American traveler, and, in 1805, by Lieutenant Z. M. Pike, who purchased the site of Fort Pike from the Indians. Fort Saint Anthony, later called Fort Snelling, was established in 1819. The first sawmill at the falls was erected in 1822 to provide lumber for the fort. The village of Saint Anthony, on the east side of the river, was incorporated in 1855, and Minneapolis, on the west side, in 1856. In 1872, the two places were united. Population, 1920, 380,582.

Missoula (*mĭ-zōō'lā*). A city of western Montana, on the Clark Fork river, about 125 miles by rail northwest of Helena. It is the distributing center for a large farming and fruit growing, lumbering, and mining region, and is the seat of the University of Montana. The extensive Flathead Indian reservation lies to the north of the city. Population, 1920, 12,668.

Mitchell, Mount. The highest point in the state of North Carolina, and the loftiest summit of the eastern United States. It is a massive, dome-shaped mountain, sometimes called Black Dome, rising to an elevation of 6711 feet, with many high cliffs and precipitous slopes. It is named for Elisha Mitchell, a distinguished scientist who lost his life while attempting, in 1857, to scale the mountain. His remains are buried at the top of the mountain. A large tract of land, including the summit and surrounding spruce forests, has been created a state park, which provides accommodations for travelers.

Mobile. The second largest city and only seaport in Alabama, located on Mobile bay, about 26 miles north of the Gulf of Mexico. It is a leading cotton market and has varied industries, among them shipbuilding, cotton and lumber mills, and seafood canneries. The harbor has been elaborately improved, and the bay is spanned by the Cochrane bridge, costing about 10 million dollars. The chief exports include logs, hewn timber, pine lumber, rosin, cotton, and cotton products; the leading imports are usually bananas, pineapples, sisal, potash, and asphalt. There is also an extensive local trade in vegetables, fish, and oysters.

The city has broad, regular streets, shaded with live oaks and magnolias and lined with beautiful residences, many of which are in the colonial style. Mobile was founded in 1702 by the French. Later, it was in the possession of the English, the Spanish, and again of the French. It became a part of the United States by the Louisiana Purchase in 1803. Population, 1920, 60,777.

Mohave (*mō-hä'vā*) **Desert.** A desert of southeastern California, situated chiefly within the boundaries of San Bernardino county and embracing an area of about 15,000 square miles. It lies south and east of the Tehachapi mountains and north of the Sierra Madre and the San Bernardino mountains. These high ranges intercept the moisture-laden winds from the Pacific, and, in consequence, the Mohave is an exceedingly arid region. The average annual rainfall is only 5 or 6 inches, and the temperature in summer sometimes reaches 120°.

The surface is that of a more or less elevated plateau, broken by numerous small mountains, with intervening valleys and plains. From an elevation of about 4000 feet on the west, this plateau slopes down to 1500 feet elevation or less toward its eastern border. Much of the southwestern portion drains into the Mohave river, which, after flowing in a definite channel for some 50 miles, entirely disappears in valley sands to the eastward.

For the most part, the Mohave desert presents an aspect of extreme barrenness and desolation. The smaller mountains are mostly jagged masses of naked rock. Many plains are interspersed with saline sinks and dried-up lakes. Some of the valleys are covered with dark-colored sheets of anciently erupted lavas. These volcanic areas also contain numerous cinder cones and small craters.

Vegetation is everywhere scant, and many alkaline and rocky wastes are practically devoid of plant life. In the low plains, the creosote bush is a characteristic shrub, while in the higher portions the weirdly-branching Joshua tree, a kind of yucca, is a striking object in the landscape. Many species of cactus and various other desert plants are found, such as the mesquite, cat's-claw, and paloverde. For a few weeks following the brief winter rains, millions of acres in the Mohave fairly blaze with the brilliant hues of desert annuals. These bloom in indescribable profusion but wither and disappear soon after the rains cease.

There are valuable mineral deposits, and, where water for irrigation is available, a few small areas yield good crops. The Santa Fe and the Salt Lake railway cross this desert, as do several well constructed automobile highways. See *Colorado Desert*.

Moline. A city of western Illinois, built at the junction of the Rock and the Mississippi river, about 180 miles southwest of Chicago. The city of Rock Island adjoins Moline on the west, and across the Mississippi river from Rock Island is Davenport, Iowa. These three cities are closely connected by electric lines, bridges, and ferries, and are locally styled the "Tri-city." Their combined population exceeds 120,000. Moline is noted for the manufacture of plows, corn planters, and wagons. Among other important products are tractors, harvesters, boilers, elevators, scales, organs, and various iron and steel products. Features of interest in the vicinity are the Black Hawk watch tower and the United States arsenal on Rock island. Population, 1920, 30,734.

Monadnock, Mount. A noted mountain of southwestern New Hampshire, situated about 10 miles southeast of Keene. It is a bold granitic peak with precipitous walls and extremely rugged contour, rising to an elevation of 3186 feet. Because of its isolated position and unusual form, it is one of the most impressive mountains in New England.

Monterey (*mŏn'tĕ-rā'*). A noted seaside resort of the California coast, about 125 miles south of San Francisco. Monterey occupies a charming site on a fine harbor, facing the beautiful bay of Monterey, and, in addition to its scenic and climatic attractions, possesses features of great historic interest. Here, in 1770, Father Junípero Serra, the famous Spanish missionary to the Indians, established the mission

of San Carlos Borromeo. After more than 75 years of Spanish and Mexican occupation, the American flag was run up at Monterey in 1846, and, in 1847, it became the capital of the military government of California. The chief industries are fishing and sardine packing.

Among numerous features of interest are the Presidio church, the Carmel mission, the old customhouse, the old capitol building, and the celebrated 17-mile drive. Other points worthy of mention are the former home of Robert Louis Stevenson, the artist colony and resort at Carmel-by-the-Sea, and the grove of ancient trees, of a species not known to occur native elsewhere in the world, now confined to a small area on Cypress point. Population, 1920, 5479.

Montgomery. The capital of Alabama, on the Alabama river, slightly southeast of the geographical center of the state. It is surrounded by a highly productive grain, fruit, vegetable, and cotton growing region, for which it is the central market. Hydroelectric power is available for the city's growing industries, which include car shops, foundries, cottonseed oil factories, and fertilizer plants. The city is one of the leading wholesale grocery markets in the South.

There are many fine public buildings, including the capitol, the city hall, and the government building. The city is the seat of a State normal school and of theWoman's College of Alabama. Montgomery was founded in 1817, and, in 1846, was made the state capital. In 1861, the government of the Southern Confederacy was organized at Montgomery, which was made its first capital. Population, 1920, 43,464.

Monticello. The residence and estate of Thomas Jefferson, situated in Albemarle county, Virginia, about 3 miles east of Charlottesville. Standing on the summit of a hill (whence the name Monticello, "little mountain"), it commands an extensive view of the surrounding country and, for a long period, was regarded as one of the most elegant and picturesque residences in the South. It was constructed from designs made by Jefferson himself, was first occupied in 1770, and remained the home of the great commoner for 56 years. In 1926, it was purchased by patriotic admirers of Jefferson for $500,000 and presented to the nation.

Montpelier (*mŏnt-pēl'yēr*). The capital of Vermont, located in the north central part of the state. It is the center of an agricultural district and there are many valuable granite quarries in the vicinity. The finest building is the capitol, a granite structure surmounted by a handsome dome. Among its notable institutions are the State library, the Wood art gallery, and Montpelier seminary. The town was first settled in 1787, and, in 1805, was selected as the capital of the state. Population, 1920, 7125.

Moundsville. A city of West Virginia, on the Ohio river about 11 miles south of Wheeling. It is the center of an important agricultural, coal mining, and oil producing district and has varied local industries. Moundsville is noted for a huge, prehistoric mound, a famous relic of the Mound Builders, after which the city is named. Population, 1920, 10,669.

Mount Clemens. A city and health resort situated on the Clinton river, about 20 miles northeast of Detroit, Michigan. It has numerous medicinal springs which attract thousands of persons suffering from chronic ailments. Its parks, drives, and well shaded streets, together with fine churches and schools, increase the city's attractiveness. The surrounding country is devoted to farming and there are various local industries. Population, 1920, 9483.

Mount Rubidoux. A bold rocky summit rising abruptly from the Santa Ana valley at Riverside, California. At its crest is a cross dedicated to the memory of Father Junípero Serra, the heroic Franciscan missionary to the Indians. A feature of special interest connected with this small mountain is the impressive service which is held on its summit each Easter Sunday at sunrise.

Mount Tom. A small mountain which rises precipitously in the Connecticut valley, opposite Mount Holyoke and about 4 miles south of Northampton. The summit, 1200 feet high, is reached by an incline railroad and affords exceptionally fine views of the surrounding region. A tract of 1700 acres on the mountain has been created a state park.

Mount Vernon. A residential city bordering on the Bronx river and adjoining the northeast section of New York City. Mount Vernon occupies an attractive site, and has wide, well shaded streets and handsome lawns and gardens. While a large portion of the city is restricted to residential purposes, there are several important industrial establishments and a considerable local trade. Population, 1920, 42,726.

Mount Vernon. The home and burial place of George Washington, situated on the right bank of the Potomac river, in Fairfax county, Virginia, 15 miles south of the national capital. Located on an eminence 200 feet high, the mansion house commands a beautiful view of the river. It is constructed of wood, 2 stories high, 96 feet long, and 30 feet deep, with a high piazza along the front, and is painted white to resemble stone. The main part was built in 1743 by Lawrence Washington, Washington's elder brother, who named it in honor of Admiral Vernon of the British navy. Upon the death of his brother Lawrence, in 1752, the estate came into the hands of George Washington, who added the wings to the house.

In 1858, a tract of 200 acres of the original estate, including the mansion and the brick tomb containing the remains of George and Martha Washington, came into the possession of an association which holds it in trust as a shrine of national interest. The six rooms on the ground floor contain many objects of historic value, including the key to the French Bastille, and various pieces of furniture used by the family.

Muscle Shoals. A series of shallow rapids in the Tennessee river where the stream has a fall of about 134 feet within 37 miles. The shoals terminate just above Florence, in northwestern Alabama. They form the one interruption to navigation of the river within the state.

A canal around the rapids was opened in 1890. In 1918, further development was undertaken by the Federal government for the purpose of improving navigation, generating electric power, and manufacturing a part of the nitrates urgently needed for explosives during the World War.

The complete project called for the construction of three dams with the necessary locks, a hydroelectric power house, a steam power plant, a cyanamid process nitrate plant capable of an annual production of 110,000 tons of ammonium nitrate, and a smaller, synthetic nitrate plant.

During the war, and for some time afterwards, construction went forward rapidly. The synthetic nitrate plant was put into experimental operation, while the larger plant was practically ready to begin production, using current generated by steam. These nitrate factories comprise one of the largest chemical plants in the country.

In the spring of 1921, when the hydroelectric power project had been about one-third completed, at a cost of more than 15 million dollars, Congress refused further appropriations. Construction therefore came to a halt. Somewhat later, funds were made available to the war department so that work was resumed on the great Wilson dam, which, in volume, is one of the largest in the world.

The question of how best to utilize the costly property now became of national importance, not only because of the large sum of money involved, but because nitrates and nitric acid are equally as necessary for agricultural and industrial purposes as they are for ammunition. Any domestic source of these important products reduces in an equivalent amount the dependency of the United States upon the nitrate beds of Chile, whence practically all of our supply has been obtained.

Efforts were made by the government to obtain from various commercial interests, offers for the purchase or rental of the plant. Several such propositions were submitted, of which that made by Henry Ford received by far the greatest amount of consideration. It was later withdrawn. See *Ammonia, Cyanamid, Fertilizers.*

Muskogee (*mŭs-kō'gē*). A city of eastern Oklahoma, situated in the valley of the Arkansas river, about 130 miles east of Oklahoma City. Muskogee is the trade center of a rich agricultural region devoted to the production of cotton, wheat, fruits, and vegetables, and to cattle raising. It has, in addition, large supplies of petroleum and natural gas. Its manufactured products include oil well supplies and refined petroleum. There are many fine public buildings and several educational institutions. Population, 1920, 30,277.

Nashville. The capital and second largest city of Tennessee, built on both banks of the Cumberland river, in the north central part of the state. Nashville is situated in a productive agricultural and lumbering region, near extensive coal fields, and has excellent railway and steamboat transportation. These advantages have contributed to make it an important commercial and manufacturing city. It carries on an extensive wholesaling trade, and, in manufactures, ranks second only to Memphis among the cities of the state. Its leading industries include flour milling, lumber milling, printing and publishing, meat packing, and the manufacture of food products, cotton goods, rayon, clothing, fertilizers, stoves, tobacco, and furniture.

Nashville occupies a hilly site, with eminences commanding fine views. On the most lofty hill, stands, like the Acropolis at Athens, the imposing State capitol. The streets are wide and well shaded. The city has 24 parks and playgrounds, including Centennial park, where stands an exact replica of the famous Parthenon in Athens, Greece. Other impressive buildings include the War memorial, the Vanderbilt hospital and medical school, and the Scottish Rite Temple.

The city is the seat of Vanderbilt university, Roger Williams university, Walden university, Fiske university, Ward-Belmont college, the George Peabody college for teachers, and various other educational institutions.

The first settlement on the site of Nashville was made in 1780, and, in 1806, the city received its municipal charter. During 1812–15, it was the seat of the state legislature. In 1843, it was made the permanent capital of the state. In the park surrounding the State capitol is the tomb of James K. Polk. The Hermitage, the former home of Andrew Jackson, is about 10 miles east of the city. In 1864, one of the great battles of the Civil War was fought in the environs of Nashville. Population, 1920, 118,342.

Newark. The largest city of New Jersey, situated on the Passaic river and Newark bay, about 8 miles west of New York City, with which it is connected by several railways, an electric high speed line, and a highway leading to the Holland vehicular tunnel.

The city extends some 3 miles along the west shore of Newark bay and about 7 miles up the west bank of the Passaic river, from its mouth in Newark bay to the suburb of Belleville. The site of the city occupies an area of about 24 square miles. For a mile inland from the water front, the surface is fairly level and it then rises gently in a series of plateaus.

Immediately adjoining the city on the north, west, and southwest is a group of smaller municipalities, including Belleville, Bloomfield, East Orange, Orange, West Orange, South Orange, and Irvington. Opposite Newark, on the east bank of the Passaic, are East Newark, Harrison, and Kearney. These and other suburbs are intimately connected with the city and, with it, form a greater Newark whose total population exceeds 900,000.

The port of Newark has been enlarged by the construction of a 31-foot channel, 600 feet wide, extending 7000 feet inland. Because of favorable location and fine transportation facilities, Newark has become a great manufacturing center, sometimes styled the "Birmingham of America," ranking fourteenth in value of manufactures among the cities of the United States. Its industries are unusually numerous and varied. Among important products are patent leather, jewelry, electrical machinery, radios, chemicals, paints, varnishes, cotton goods, refined copper, and steel ships. The city is noted for the strength of its financial institutions and is the headquarters of some of the largest life insurance and fire insurance companies in America.

Newark is a city of fine buildings, wide streets, and spacious parks. Among its more noted buildings are the public library, the county courthouse, city hall, Federal building, and the Roman Catholic cathedral. Newark was settled in 1666 by Puritans from Connecticut. It was first called Milford but was soon after given its present name. In 1836, it was chartered as a city. Population, 1920, 414,524.

New Bedford. A seaport and manufacturing city of Massachusetts, situated on the Acushnet river, at its mouth in Buzzards bay, about 55 miles south of Boston. New Bedford was formerly the principal whaling port in the world. Since the decline of the whaling industry, it has become the leading city in the United States in the manufacture of cotton yarn and cotton cloth. Its mills contain more than 50,000 looms and operate some three million spindles, about one-tenth of the whole number in the United States. Less important industries include the manufacture of silk goods, fine tools, sperm and whale oil, shoes, rope cordage, and paper goods. New Bedford was settled in 1652, on land purchased from Massasoit by a company from Plymouth. Population, 1920, 121,217.

New Britain. A manufacturing city of Connecticut, situated in the central part of the state, about 10 miles southwest of Hartford. Because of its extensive production of cutlery, edged tools, and other kinds of hardware, New Britain is sometimes styled the "Hardware City." Other important manufactures include stamped ware, hosiery and knit goods, and machine shop products. The city is the seat of a State normal school. New Britain was settled in 1687 but remained a part of Berlin until 1850, when it was incorporated as a town. In 1871, New Britain received its charter as a city. Population, 1920, 59,316.

New Castle. A manufacturing city of western Pennsylvania, built at the junction of the Shenango and the Neshannock rivers, about 50 miles northwest of Pittsburgh. The city's extensive manufacturing establishments include blast furnaces, iron foundries, steel mills, tin plate works, and machine shops. New Castle is situated in a fertile agricultural district, rich in coal, iron ore, and other valuable mineral deposits. Population, 1920, 44,938.

New Haven. The largest city of Connecticut, built on an inlet of Long Island sound, about 70 miles northeast of New York City. It occupies a level site partly enclosed by a range of precipitous hills, from 300 to 400 feet high. While a commercial city with extensive shipping interests, the leading industry is manufacturing. In its exceedingly varied industries, there are more than 600 separate manufacturing establishments. Among important manufactures are firearms, clocks, rubber goods, jewelry, musical instruments, electrical machinery, and an immense variety of iron and steel goods.

The city is well laid out with many imposing public buildings, beautiful parks, and broad, shaded streets. Because of the great number of elms formerly planted in the older sections, New Haven has been called the "City of Elms." It is the seat of Yale university, founded at Saybrook in 1701 and removed to New Haven in 1716. The Harkness memorial tower at Yale is one of the finest Gothic towers erected in modern times. The first settlement, made by a company of Puritans in 1638, was known as Quinnipiac, but in 1640 it was renamed New Haven. The city is the burial place of S. F. B. Morse, Eli Whitney, Noah Webster, and other noted men. Population, 1920, 162,537.

New Orleans (*ôr'lê-ănz*). The chief city of Louisiana, the commercial metropolis of the Gulf states, and, after New York City, one of the greatest centers of domestic and foreign trade in the United States. It is situated on the east bank of the Mississippi river 110 miles above its mouth in the Gulf of Mexico.

The city originally was built along the bend of the river in a semicircular curve and became known as the "Crescent City"; later, its growth up the river followed a backward curve toward Lake Borgne and Lake Pontchartrain, which was spanned in 1928 by a concrete highway bridge 5¾ miles in length.

New Orleans is connected with nearly all the important ports of the world by direct steamship lines, the markets of Asia and western South America being accessible through the Panama canal. The city forms the gateway to the Mississippi valley, the greatest agricultural region in the world. It has one of the safest harbors in existence, with a deep water canal from the river through the city to Lake Pontchartrain. More than 100 steamers from 400 to 500 feet in length can be berthed along six miles of steel docks. Besides public wharves, grain elevators, and coal tipples, the port facilities include also a municipally owned and operated belt line railway.

New Orleans is a leading market for cotton, sugar, molasses, coffee, rice, burlaps, cigars, nitrate, sulphur, timber, and cereals, these products being its principal exports. It is, moreover, one of the principal manufacturing cities in the South.

The parks of New Orleans cover more than 700 acres, the most notable being Audubon park and City park. They are ornamented with palms, live oaks, magnolias, and a profusion of subtropical shrubs and flowers. The newer residential districts have broad streets, spacious grounds, handsome gardens, and pretentious houses. The old French quarter is a city by itself, with narrow streets lined with rows of quaint old dwellings, built a hundred years ago in the style of the houses of southern Europe. The famous Mardi Gras carnival, held yearly, is another heritage of the Latin Old World.

Among the buildings of historic interest are the Cabildo, the old archbishop's palace, and the Saint Louis Cathedral, one of the best-known churches in the United States. The principal educational institutions are Tulane university and Newcomb Memorial college for women.

New Orleans was founded by the French in 1718, and came into the possession of the United States with the Louisiana Purchase of 1803, of which territory it was the capital. It remained the capital of the state of Louisiana until 1849. Population, 1920, 387,219.

Newport. A city and seaside resort of Rhode Island. It has a fine harbor which serves as a naval base for the United States Atlantic fleet. Its palatial private residences, public buildings, parks, fountains, and old-time historic structures render it one of the most attractive cities in the country. In Touro park is the old Stone Mill, or "Round Tower," mentioned by Longfellow in his "Skeleton in Armor." There are various local industries, including manufactures of furniture and brass goods, and extensive fisheries. Population, 1920, 30,255.

Newport News. A city in Virginia, situated on the north side of Hampton Roads near the mouth of the James river, about 12 miles northwest of Norfolk. Newport News is one of the leading ports of the Southern states and an important coaling station. It has extensive shipbuilding yards, dry docks, ironworks, grain elevators, and knitting mills, and is the center of much agricultural and fishing trade. It possesses several fine parks and public buildings, including a national soldiers' home. Hampton Roads off Newport News was the scene of the famous battle between the *Monitor* and the *Merrimac* in 1862. Population, 1920, 35,596.

Newton (*nū'tŭn*). A city of eastern Massachusetts, built on the Charles river, about 7 miles west of Boston. Newton is chiefly a residential city but maintains substantial industries. The city is admirably laid out, with fine streets, parks, and drives, and contains many beautiful homes. Among the city's manufacturing establishments are silk mills, printing works, worsted mills, curtain factories, and rubber works. The city is the seat of Boston college, Newton theological seminary, and other educational institutions. Newton was settled in 1631 as a part of

Cambridge. In 1688, it was made a separate town, called New Cambridge, but, in 1692, it received its present name. In 1873, Newton became a city. Population, 1920, 46,054.

NEW YORK. The chief city of the state of New York, the commercial metropolis of the United States, and the most populous city in the western hemisphere. It is situated on New York bay at the mouth of the Hudson river, about 205 miles in direct line northeast of the national capital at Washington.

SITE. No metropolis in the world is more strikingly or more beautifully situated than is the city of New York. It is built on three islands, Manhattan, Staten, and Long Island, with a portion on the adjacent mainland, called the Bronx.

The Hudson river, here nearly a mile wide, sweeps majestically down the western side of Manhattan and pours its vast waters into the landlocked harbor of New York bay at the south end of the island. The bay is connected with the ocean by a mile-wide channel running between Long Island on the east and Staten on the west. Between the Bronx and Manhattan is the Harlem river which is connected with the Hudson by Spuyten Duyvil creek. Separating Manhattan and the Bronx from Long Island is East river, properly an arm of Long Island sound.

On the west bank of the Hudson, opposite the upper part of the city, the picturesque Palisades tower to a height of from 300 to 400 feet. The surface of the various divisions of the city is fairly level but rises in some parts, as in upper Manhattan, to commanding elevations affording magnificent views of the city and the harbor.

MAIN DIVISIONS. Originally, the city was confined to Manhattan island. This is 13½ miles long, with a maximum width of 2¼ miles and an area of about 22 square miles. In addition to Manhattan, Greater New York, by consolidation, has since come to embrace Staten island, called Richmond, with an area of about 60 square miles; the western end of Long Island, known as Brooklyn, 80 square miles; an adjoining part of Long Island, known as Queens, 120 square miles; and the portion of the mainland known as the Bronx, 40 square miles. Each of these divisions includes several small adjacent islands. Officially, New York consists of five boroughs, Manhattan, Brooklyn, Queens, Richmond, and the Bronx, and contains a total area of some 325 square miles.

Manhattan is the heart of New York and contains its great commercial, financial, and mercantile institutions, and also its famous museums, libraries, cathedrals, railway stations, and imposing residences. Brooklyn is a residential district with a large number of industrial establishments. Staten island is mainly residential, with an increasing number of industries; the Bronx is also chiefly residential, while Queens, containing more than a third of the total area of Greater New York, is the "home" borough. Long Island City, in Queens borough, is its industrial center, while the remainder of the borough is principally a district of suburban homes.

STREETS AND AVENUES. In the older portions of various divisions of the city there are narrow, short, irregular streets. The newer sections, however, have been admirably planned, and contain many magnificent thoroughfares.

At the south end of Manhattan, the streets are cramped and irregular, but, north of Washington square, they conform to the gridiron system of crossing at right angles. The great, long north-and-south streets, usually 100 feet wide, running lengthwise of the island, are called avenues. The shorter east-and-west thoroughfares, mostly 60 feet wide, are called streets. Differing from the plan of most American cities, the blocks are solid, having practically no alleys.

An exception to this regular street plan is Broadway, the "greatest street in the world." This noted thoroughfare runs diagonally through the city, in a northwesterly direction, from the Battery, at the sea front, to the extreme northern boundary, a distance of about 16 miles. It traverses the entire length of Manhattan island and continues through the Bronx into Yonkers, completely changing its character in the different portions of the city through which it passes.

Equally famous with Broadway is Fifth avenue, the most beautiful thoroughfare in the city, and one of the finest streets in the world. It begins at Washington arch, about a quarter of a mile west of Broadway, and extends northward for 6 miles, crossing to the east of Broadway at 23d street. Throughout this distance it is lined with fashionable shops, beautiful churches, elegant clubs, immense hotels, and palatial residences.

Other beautiful streets are Morningside drive, which passes Saint John's cathedral; and Riverside drive along the Hudson, passing Grant's tomb and commanding excellent views of the Palisades.

Beginning at Trinity church on Broadway and extending eastward to East river is Wall Street, long the money center of America and, since the World War, the financial center of the world.

In Brooklyn, Ocean parkway and Flatbush avenue are magnificent drives; Northern boulevard, Queens boulevard, and Hillside avenue, in Queens, are noteworthy thoroughfares.

PARKS. Lying in the center of Manhattan island is Central park, one of the most beautiful pleasure grounds in the world. On its eastern border is the magnificent Metropolitan museum of art, and on the west side is the great American museum of natural history. This spacious park embraces 800 acres, is largely forested, and contains a reservoir, many small lakes, and scores of miles of charming drives, roadways, and footpaths. In it are located the Obelisk, or Cleopatra's Needle, and many fine works of sculpture.

Other important parks are Prospect park, Brooklyn, with an area of 526 acres, noted for the natural beauty of its wooded hills and broad meadows; Bronx park, with an area of 719 acres, containing superb zoological and botanical gardens; Van Cortlandt park, embracing 1132 acres and containing immense recreation grounds; and Pelham Bay park, containing 1756 acres, with a shore line of 9 miles.

MONUMENTS. In New York are many of the most noted monuments, memorials, and other fine sculptural works of America. The famous Statue of Liberty, designed by Bartholdi and presented to the American people by the French nation, stands on Bedloe's or Liberty island in New York bay. Grant's tomb, a mausoleum of great dignity, overlooks the Hudson from Riverside park, as does the beautiful Soldiers' and Sailors' monument from Riverside drive. At the entrance to Prospect park, Brooklyn, there is an imposing memorial arch, surmounted by a large quadriga by Macmonnies, erected in honor of the soldiers and sailors of the Civil War.

On the Plaza, at the southeast corner of Central park, stands an impressive equestrian statue of General Sherman by Saint-Gaudens. By the same noted sculptor is the fine statue of Peter Cooper, at Cooper Union, and the noble monument to David Farragut, in Madison square.

BUILDINGS. New York excels all other cities in the size, height, elegance, and costliness of its buildings. These include immense commercial structures, towering temples of finance, imposing public edifices, monumental railway stations, beautiful cathedrals and churches, magnificent apartment houses, and palatial residences. There is a greater number of large and costly buildings on Manhattan island than upon any other equal area on the globe. For miles, the buildings contain from 12 to 30 or more stories, rising from 200 to 500 feet in height, with some towering higher than the pyramids or the loftiest cathedrals. From the harbor or from the New Jersey shore, the sky line of lower Manhattan is one of the most impressive sights in the world.

Among the large number of great commercial structures may be mentioned the Equitable building, containing 37 stories and reaching a height of 485 feet; the Singer building, of 41 stories and rising 612 feet; the City Investing building, 34 stories, with a height of 486 feet; the Whitehall building, 32 stories and 424 feet high; the Bankers' Trust building, 39 stories and attaining a height of 539 feet; the Metropolitan building, 50 stories and 700 feet high; and the Woolworth building, 55 stories, more than 790 feet high, and, when built, the tallest and architecturally the most beautiful commercial structure ever erected.

Prominent among public edifices is the new Municipal building, 41 stories high, covering two city blocks, and surmounted by a tower and statue which rise to a height of 560 feet. Among structures noted for their excellence of architecture are the marble Stock Exchange, the New York Clearing House, the granite and marble Chamber of Commerce, the Hall of Records, the Madison Square Garden, the Tiffany building, and the New York Public library.

The Grand Central station and the Pennsylvania station are each great achievements of architectural and engineering skill. Other notable buildings include the Metropolitan museum of art, the American museum of natural history, the Columbia University library, and the Eighth Regiment armory.

Among hundreds of beautiful churches may be mentioned Saint Patrick's cathedral, built of white marble with spires rising 332 feet. This ranks among the finest Gothic structures in America. Other noteworthy churches are the partially completed cathedral of Saint John the Divine, Saint Thomas's church, Saint Bartholomew's church, the Temple Emanu-El, and the great church of Saint Paul the Apostle.

INTERCOMMUNICATION. East river is spanned by five monumental bridges, ranking among the largest in the world. Three of these—Brooklyn bridge, Manhattan bridge, and Williamsburgh bridge—connecting New York and Brooklyn, are suspension bridges. The Queensboro bridge, connecting New York and Queens, is a massive cantilever structure. Hellgate bridge, an immense steel

arch, connects the Bronx with Queens and provides direct rail connection between New England and the West, through Queens and the Pennsylvania terminal in Manhattan.

An extensive ferry service and two pairs of subway tunnels for electric cars connect Manhattan with Brooklyn, and two pairs also connect Manhattan with Queens. The Holland vehicular tunnel, under the Hudson river, connecting the city of New York with Jersey City, was completed in 1927 at a cost of about 48 million dollars.

The principal transportation systems connecting the various parts of the city are the subway lines. Running north and south in the narrow island of Manhattan, there are two 4-track subway lines, both of which continue under the East river to Brooklyn where they connect with steam and electric rapid transit to all parts of Long Island. The Long Island railroad transports more commuting passengers than any other railroad in the world.

Besides the subways, Manhattan has four north-and-south systems of elevated electric railways, an immense number of surface electric lines, supplemented by double-deck motor bus lines. The movement of travel over these lines amounts to more than three million passengers daily.

Educational Institutions. New York is the seat of two great universities, Columbia university, on Cathedral Heights, and New York university in the Bronx, overlooking the Harlem river. With the former is affiliated Barnard college, the Teachers' college, and the Horace Mann school. Connected with New York university is the Hall of Fame for noted Americans.

Among many other prominent educational institutions are the College of the City of New York, Hunter college, Manhattan college, Saint John's college at Fordham, the College of Saint Francis Xavier, Cooper Union, the College of Physicians and Surgeons, the medical school of Cornell university, and the Rockefeller institute for medical research. Of great influence in the educational life of the city are the public library, with more than 40 branches, the Metropolitan museum of art, the American museum of natural history, and the Brooklyn institute of arts and sciences. The medical center in the Bronx, overlooking the Hudson river, takes the first place among institutions of the kind throughout the world.

Transportation. New York bay, nearly enclosed by islands, forms one of the finest harbors in the world. The city of New York, built around it, has a total water front of some 575 miles, of which more than 100 miles are occupied by docks. About 100 ocean steamship lines, affording service to all parts of the world, have headquarters in New York. Some 40 lines of river and coastwise steamers likewise operate from the port. New York has water connections to the Great Lakes through the Hudson river and the State barge canal. The great railway systems of the New England and the Middle Atlantic states, and also various western railroads, have terminals, either within the city or across the Hudson on the New Jersey shore. The Pennsylvania railway is connected with New York City by tunnels under the Hudson river.

Commerce. New York's commercial supremacy is owing to its magnificent harbor facilities and to its geographical location. The largest ships are accommodated at its wharves, and railway and inland water routes afford quick collection and distribution of goods throughout the richest and most populous region in America. The commerce of New York is several times greater than that of any other port in the New World, and, in value, usually embraces about one-half the total imports and exports of the United States. The volume of the coastwise trade usually greatly exceeds that of the foreign trade. The wholesale and jobbing trade is enormous, as is also the distribution of the city's immense manufactures.

Finance. Since the World War, New York has become the dominant money center of the world, with annual banking transactions aggregating some 200 billion dollars. Here are located the greatest financial institutions of the country, including powerful banks, trust companies, and insurance companies, the New York clearing house, the stock exchange, the cotton exchange, and casualty, credit, fidelity, and surety companies.

Manufactures. In value, the manufactures of the metropolis exceed those of any other manufacturing center in America. Usually about one-tenth of the total manufactures of the United States is produced in New York City. This supremacy is owing to an immense volume of light manufacturing, for the most part carried on in small factories. The industries are exceedingly diversified, including some 30,000 establishments and representing about 90 per cent of all the industries listed in the country. The largest single product is clothing; more than half of the clothing worn in the United States is made in the city. The second largest industry is the printing and publishing of newspapers, magazines, periodicals, and books. Other important industries are meat packing, sugar refining, petroleum refining, and the manufacture of millinery, lace, fur goods, jewelry, tobacco, drugs, and machinery.

History. In 1609, Henry Hudson, employed by the Dutch, sailed up the river which bears his name. Dutch fur traders began operations along the Hudson in 1613 and soon after built a fort, near which the first white settlement developed. The first permanent colonists, mostly Walloons, arrived in 1624. Peter Minuit, in 1626, bought Manhattan island from its Indian owners for $24, and named the settlement New Amsterdam. There were difficulties with the Indians, but, under the rule of Peter Stuyvesant, 1647–64, the settlement grew to a village of 1000 inhabitants.

In 1664, New Amsterdam was captured by the English, who renamed it New York. Despite political conflicts, the town in 1700 had increased to 5000 inhabitants, about half Dutch and half English. During the Revolutionary War, British armies occupied the town for 7 years, 1776–83. In this unfortunate period, New York lost about half its inhabitants and was largely destroyed by fire. Within 8 years, however, the population trebled, commerce revived, and for a year and a half, 1789-90, New York was the capital of the Federal government. Washington, the first president of the United States, was inaugurated, April 30, 1789, in Federal hall in Wall street.

The completion of the Erie canal in 1825, furnishing a waterway from the Hudson to the Great Lakes, made New York the gateway for the commerce of the rapidly developing nation. This so accelerated the city's growth that, in 1835, New York numbered 200,000 inhabitants. The first railway to the Great Lakes was completed in 1851, and thenceforward the history of New York is a record of continuous and monumental growth.

More recent achievements were the consolidation of the five boroughs into Greater New York, the construction of the subway system with tunnels under East river and the Hudson, and the completion of the gigantic Catskill aqueduct, insuring an adequate water supply to the expanding metropolis. In 1927, construction was begun on a suspension bridge across the Hudson river, which, on completion, will be by far the greatest in the world. Population, 1920, 5,620,048.

Niagara Falls. The grandest cataract in America and the second largest in the world, situated about 22 miles north of Buffalo, New York. The Niagara river in its northerly course of over 26 miles descends 326 feet from the level of Lake Erie to that of Lake Ontario. By far the greater part of this descent occurs at the falls and at the rapids immediately above and below them. For the first 2 miles after leaving Lake Erie the river is troubled and rapid. It then expands into a broad, placid stream, from 1 to 2 miles wide, and encircles several islands.

After flowing nearly 20 miles and descending only about 20 feet, the river suddenly narrows and enters a series of beautiful rapids. In about a half mile the river descends 52 feet, in seething, boiling torrents and eddies in which the whole surface is torn and tossed into white spray. The waters then reach the edge of an abrupt declivity, the Niagara escarpment, and make a sudden plunge to the bottom of an immense gorge. A short distance above the brink of the falls, Goat island separates the river into two unequal streams. The narrow, shallower one, on the American side, discharges over the American fall, 167 feet in height and 1060 feet wide. The main part of the river swings to the west of Goat island and discharges over the Canadian or Horseshoe fall, 158 feet high, with a deep retreating curve in the center and measuring about 2500 feet along the crest.

The water flowing over the American fall is from 1 to 4 feet deep, but that plunging over the Horseshoe fall is estimated at about 20 feet in depth. The main cataract carries over fully 90 per cent of the water, while the American fall discharges only about 10 per cent. The volume of flow does not vary greatly and is normally about 500,000 tons of water a minute.

The edge of the American fall is receding at a rate estimated at from 2 to 7 inches a year. Measurements by the United States Geological Survey indicate that the Horseshoe fall has been receding at the rate of about 5 feet a year for nearly a century. Since the Civil War, the main fall has worn back about 335 feet.

For about 7 miles below the foot of the falls, the river descends between nearly perpendicular cliffs, 200 to 300 feet high, through a series of magnificent rapids. This is the famous Niagara gorge, which is second in grandeur and scenic interest only to the majestic cataract itself. In width, the gorge varies from 1700 feet, opposite the American fall, to 700 feet, opposite the Whirlpool. The river at the bottom of the gorge is considerably narrower, with depths believed to range from 100 to 500 feet, and with a speed through the greater rapids estimated at 30 miles an hour.

About 3 miles below the falls the river rushes into the Whirlpool. This is a huge circular indentation worn into the Canadian side of the river and surrounded by walls 300 feet high. The river plunges into this great excavation in a northwesterly direction and is forced to leave it in a northeasterly direction, forming one of the most impressive maelstroms in the world.

At the end of the gorge, near Lewiston, the river again widens and flows tranquilly for about 7 miles to its mouth in Lake Ontario.

Niagara falls is the most accessible to the traveler of any of the great cataracts. There is frequent steam and electric railway service from Buffalo, and practically all trains stop at the falls. Fine parks, with many conveniences for the public, have been established on both sides of the river. There is a bridge to Goat island, and the entire gorge is encircled with a scenic electric railway. This follows the top of the gorge on the Canadian side and the brink of the river in the gorge on the American side, affording both panoramic and intimate views. An aerial cable tramway spans the chasm over the Whirlpool, giving a unique view of this natural wonder.

While several early French missionaries, visiting the Niagara region, wrote accounts of the falls received from the Indians, the first white man to see, describe, and depict the great cataract was Father Hennepin, who accompanied La Salle to the Niagara frontier in 1678. French domination of the region continued until 1759, when Fort Niagara was surrendered to the British. The region was controlled by the British until 1796—13 years after the close of the Revolution—and was the scene of many conflicts during the War of 1812.

Niagara Falls. A manufacturing city of western New York, situated on the Niagara river at the falls from which it takes its name. By utilizing immense power generated at the cataract, the city has developed extensive manufactories and has become an important center of electrochemical industry. Among the leading manufactures are chemicals, electrical machinery, aluminum ware, carborundum and other abrasives, paper and wood pulp, flour, shredded wheat biscuit, plated silverware, roofing materials, and metallurgical products.

By means of tunnels, water is conveyed from the river above the upper rapids to hydroelectric generators placed near the level of the river below the cataract. After passing through the turbines connected with the generators, the water is then discharged into the gorge below the falls. By thus diverting a small fraction of the great volume of water in the river and utilizing the power developed by a drop of about 200 feet, electricity in immense quantities is developed. This is used, not only in many local manufactories, but is also extensively distributed for industrial purposes to Buffalo, Rochester, Syracuse, and many other cities. The city of Niagara Falls ranks as one of the chief centers of the United States for the distribution of electric power.

On account of the falls, which rank among the world's greatest scenic wonders, the city is visited yearly by tens of thousands of travelers. Niagara Falls and Suspension Bridge, formerly two villages, were, in 1892, united as the city of Niagara Falls. The adjacent village of La Salle was added in 1927. Population, 1920, 50,760.

Nogales (*nō-gä'lĕs*). A city on the southern boundary of Arizona, about 70 miles south of Tucson. A street constitutes the line separating it from the Mexican city of the same name. Nogales is the trade center of a mining and grazing district and is an inland gateway to the western coast of Mexico. A feature of historical interest in the vicinity is the ruin of the Tumacacori Mission. This was founded about 1687 by Father Kino, a Jesuit missionary, was taken charge of by Franciscan fathers in 1769, and is now a national monument. Population, 1920, 5199.

Norfolk. The principal seaport and second largest city of Virginia, situated on the Elizabeth river, Hampton Roads, and Chesapeake bay. It has regular communication with European and American ports, and inland water connections by means of the Dismal Swamp and the Albemarle and Chesapeake canals.

Norfolk, together with Portsmouth, forms the largest naval station in the Union. The harbor is capable of giving anchorage to the largest class of vessels. Its defenses are Fort Monroe, Fort Wool, and Fort Story. It is, moreover, one of the largest coaling stations in the world.

The port carries an extensive shipping trade in cotton, tobacco, lumber, corn, cattle, horses, fish, oysters, fruits, vegetables, and peanuts. The principal manufactures include fertilizers, agricultural implements, lumber, cotton and silk goods, flour, roasted peanuts, and iron goods.

Among the public buildings may be noted the customhouse, the city hall, and the cotton exchange. The educational establishments include Norfolk academy, Norfolk Mission college, and St. Joseph's Colored school. Norfolk was first settled in 1682, incorporated as a borough in 1736, and chartered as a city in 1835. Population, 1920, 115,777.

Oakland. The third largest city of California, situated on the mainland shore of San Francisco bay, about 6 miles east of San Francisco. Oakland occupies a site of great natural beauty, somewhat in the form of an amphitheater with its lower level portion adjoining the bay.

The city is served by three transcontinental railroads and has a spacious harbor for ocean-going vessels, with 25 miles of deep water frontage. Its 825-acre airport is the western terminus of the transcontinental air mail service. It is the natural outlet for the great agricultural and fruit growing valleys of California—the Sacramento and San Joaquin. The city is located near the terminals of pipe lines from vast oil fields, and readily secures low-priced fuel for its thriving industries. It is the largest automobile manufacturing center and one of the greatest distributing centers for hydroelectric power in the West. Other important industries are canning, flour milling, and the manufacture of machinery and of cotton goods.

Oakland possesses many fine buildings, among which are the city hall and the municipal auditorium. It is the seat of Mills college. Features of interest include Lakeside park, Lake Merritt, Foothill boulevard, Skyline boulevard, Tunnel road, and the Dimond Canyon road leading to the home of the late Joaquin Miller. Connected with the public school system is Chabot observatory, equipped with a 20-inch refracting telescope. The Pacific Coast terminus of the Lincoln highway is at Oakland. First settled in 1820, Oakland was incorporated in 1852 and in 1854 became a city. Population, 1920, 216,261.

Oberlin. A town of northeastern Ohio, situated about 35 miles southwest of Cleveland. While it conducts a substantial trade with the surrounding agricultural districts and has local industries, it is chiefly noted as the seat of Oberlin college. The town is well laid out, with broad, shady streets and fine residences. Population, 1920, 4236.

Ogden. The second largest city of Utah, situated at the junction of the Ogden and Weber rivers, at the foot of the Wasatch mountains, about 35 miles north of Salt Lake City. It is noted for its picturesque scenery and is the distributing center of a productive agricultural, fruit growing, and stock raising district. Electricity for light, heat, and industrial purposes is supplied to the city by the waterfalls from surrounding canyons. Meat packing, fruit and vegetable canning, and the manufacture of beet sugar and flour are among the chief industries. Ogden was founded in 1848 and in 1850, under the direction of Brigham Young, was laid out as a city. Population, 1920, 32,804.

Oklahoma City. The capital of Oklahoma, situated on the north branch of the Canadian river in the central part of the state. Lying in the midst of a rich oil producing, agricultural, and stock raising country, the city has developed important wholesale and distributing interests. Among the leading industries are oil refining, flour milling, and meat packing. The city was granted its charter in 1891 and was chosen as capital of Oklahoma in 1910. The capitol is a beautiful structure, built in the Ionic style of architecture. Oklahoma City has grown very rapidly, from 10,037 in 1900 to 91,295 in 1920. Its population was credibly estimated to exceed 140,000 in 1927.

Old Point Comfort. A favorite watering place in Virginia, situated on a neck of land where Hampton Roads at the mouth of the James river joins Chesapeake bay. The climate is delightful, and the excellent facilities for bathing, boating, and fishing, together with the attractions of picturesque scenery, have won for Old Point Comfort high rank among health and pleasure resorts.

Olympia. The capital of the state of Washington, situated on the southernmost inlet of Puget sound. The city is the port for a district rich in lumber and in agricultural products. Large quantities of fruit, fish, clams, and oysters are shipped. Manufacturing interests are promoted by the abundant water power available, the chief industry being the production of lumber. The noteworthy buildings include the capitol, the Federal building, and the Temple of Justice, the latter costing about $1,000,000. The first settlement was made at Olympia in 1845. The town was laid out in 1851, and became the territorial capital in 1853. Population, 1920, 7795.

Omaha. The chief city of Nebraska, situated on a commanding site on the west bank of the Missouri river, opposite Council Bluffs, Iowa.

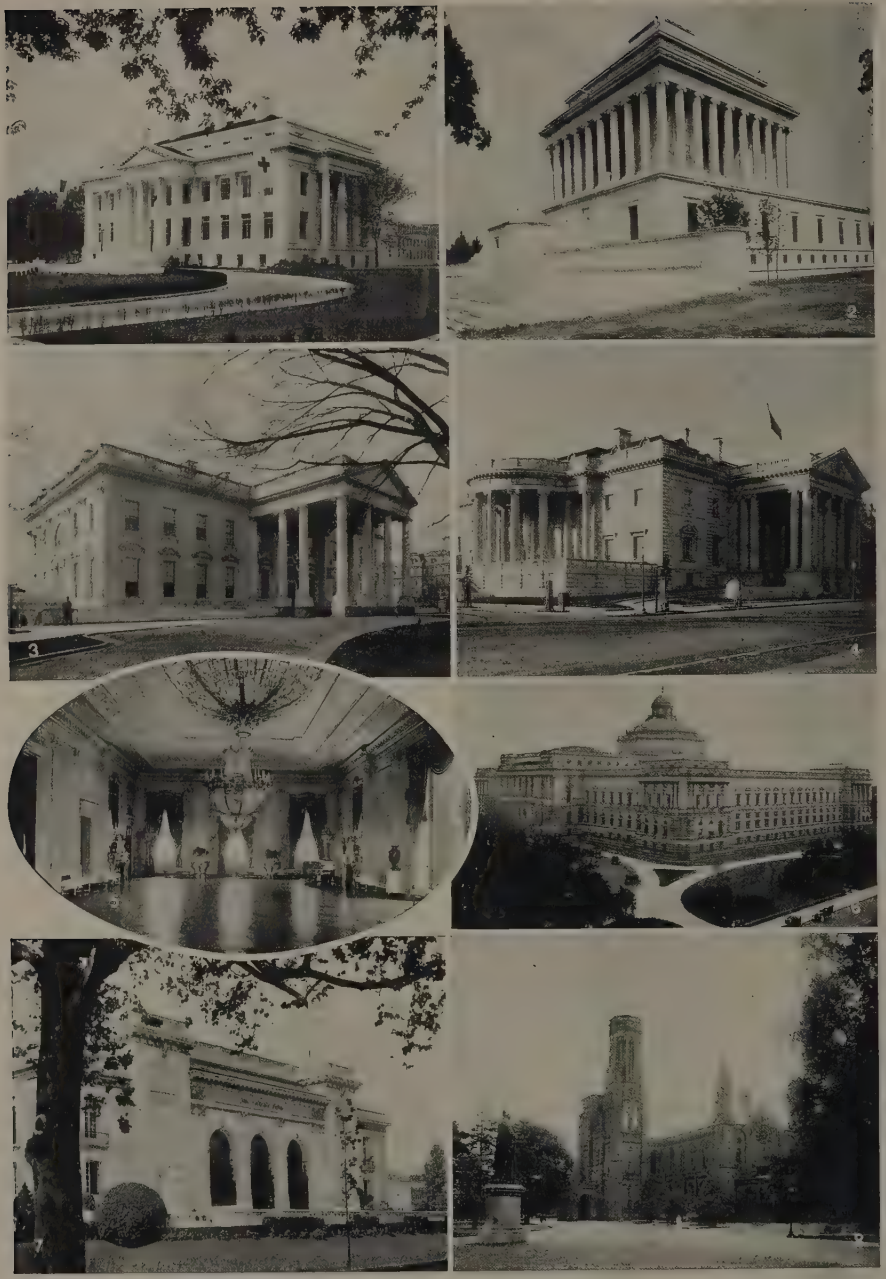
Omaha owes its position as the commercial and manufacturing metropolis of the state to the fact that it is one of the greatest gateways of the West, having all the facilities of transportation afforded by several great railroad systems. The industries of the city, especially those based on agricultural products, are enormous. No city of its size in the country handles a greater volume of business. Its live stock market is the second in the world, while its creameries and macaroni factories are among the largest in the country. It is one of the greatest meat packing centers in the United States. Other industries and manufactures include ore smelting and refining, railway car repairing, flour, steam engines, general machinery, poultry supplies, and dairy equipment.

Omaha has some 3600 acres of parks and many fine public buildings. Among the city's numerous educational institutions may be mentioned the University of Omaha, Creighton university, and the medical college of the University



SCENIC LAKES OF NORTH AMERICA

1 Lake McDermott, Glacier National Park; *copyright by Ewing Galloway.* 2 Emerald Bay, Lake Tahoe, California; *copyright by Ewing Galloway.* 3 Lake Ellen Wilson, Glacier National Park; *copyright by R. E. Marble.* 4 Crater Lake, Oregon; *photo from Brown Bros.* 5 Lake Louise, Canadian Rockies; *copyright by Ewing Galloway.* 6 Mirror Lake, New York; *copyright by Ewing Galloway.*



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NOTED BUILDINGS IN WASHINGTON

1 National American Red Cross. 2 Scottish Rite Temple. 3 White House. 4 Continental Memorial Hall, D. A. R. 5 East Room, White House. 6 Congressional Library. 7 Pan-American Building. 8 Smithsonian Institution.

of Nebraska. From 1854, the date of the first permanent settlement, to 1867, Omaha was the capital of Nebraska. Population, 1920, 191,601.

Oshkosh. A city of eastern Wisconsin, situated on the western shore of Lake Winnebago, about 75 miles north of Milwaukee. It is located in a once densely wooded region, and the lumber industry is still the leading commercial interest of the city. Other industries include the manufacture of matches, typewriters, furniture, overalls, and automobiles. Oshkosh is a well-known pleasure resort. Lake Winnebago is noted for its game fishing; yachting in the summer and ice boating in the winter are favorite sports. Population, 1920, 33,162.

Oswego. A city of north central New York, situated on Lake Ontario, at the mouth of the Oswego river. It has an excellent harbor and is the terminus of a northern extension of the State barge canal. The chief commodities handled in its extensive commerce are coal, pulpwood, and general merchandise. Hydroelectric power, derived from the falls of the river, is utilized in the city's substantial industries. Among the leading manufactures are paper bags, building board, boilers, pumps, matches, knit goods, shade cloth, and car springs. The city is made singularly attractive by spacious parks, fine lake and river drives, and handsome residences. It is the seat of a State normal school. Population, 1920, 23,626.

Pagopago (*păng'ō-păng'ō*). A fine natural harbor on the south coast of the island of Tutuila, American Samoa. On this harbor are situated the village of Pagopago and the American naval station, through which American Samoa is governed. In 1872, the harbor was ceded by native rulers to the United States as a naval and coaling station and, in 1900, by the terms of a treaty with Great Britain and Germany, it was annexed, together with Tutuila and the other islands comprising American Samoa. Pagopago is populated almost entirely by native Polynesians. The chief commercial product of the island is copra. This is exported, and sold by the United States government for the benefit of the natives. Population of villages on harbor, 1926, 2011.

Painted Desert. An area of plateaus and low mesas in north central Arizona. It extends from the top of the Marble canyon of the Colorado river southeastward along the east side of the valley of the Little Colorado for about 100 miles, varying in width from 15 to 40 miles. At the south, it ends near the Santa Fe railway, which crosses it between Holbrook and Winslow. This desert lies at an altitude of about 5000 feet and has an exceedingly arid climate. In consequence, vegetation is so scant that vast areas of rocks are bare or very nearly so. These rocks, mostly Triassic shales and sandstones, exhibit a great variety of colors, including red, pink, purple, chocolate, lavender, pale green, and gray, whence the name "painted."

Situated on the margin of this desert, about 60 miles north of Winslow, are the seven villages of the Hopi Indians, the best known of which are Walpi and Oraibi. These pueblos are picturesquely built on cliffs which project from a high plateau of sandstone. See *Walpi*.

Palisades, The. The name given to a series of massive cliffs on the west bank of the Hudson river. From near Haverstraw, New York, these extend south to Weehawken, New Jersey, a distance of about 30 miles. For the most part, these precipitous cliffs rise almost directly from the water's edge, varying in height from 200 to 550 feet. They consist of basaltic trap rock or diabase, which exhibits marked columnar effects, forming a striking feature in the beautiful scenery of the lower Hudson. The Palisades Interstate park, a tract covering more than 36,000 acres in New York and New Jersey, embraces some of the finest portions of the Palisades.

Palm Beach. A noted winter resort on the southeast coast of Florida, about 300 miles south of Jacksonville. It is situated on Lake Worth, opposite West Palm Beach, the nearest railway town. Its delightful climate, together with its bathing, boating, and fishing facilities, makes Palm Beach one of the most desirable of pleasure haunts. Palatial hotels, spacious parks, and golf links attract thousands of visitors. Permanent population, 1920, 1135; winter population 6000–7000.

Palm Canyon. A narrow, rocky gorge opening upon the extreme western end of the Colorado desert, at the southeastern base of San Jacinto mountain, about 7 miles south of Palm Springs, California. Near the mouth of this canyon, growing along the small watercourse at its bottom, is one of the largest existing groves of the stately Washington palm. This grove contains a large number of trees from 40 to 60 feet high. Their brilliant green foliage makes a striking contrast with the arid, barren rocks forming the canyon walls.

This handsome fan palm, now widely cultivated for ornament, is found native in only a few desert localities in southern California and adjacent Mexico. Most of these places are inaccessible for the ordinary traveler. Palm canyon, however, is easily reached by automobile from Whitewater railway station or from Palm Springs which is on the desert highway between San Gorgonio pass and the Imperial valley.

Palm canyon lies in the Aguas Calientes Indian reservation, but Congress, in 1922, authorized the purchase, under certain conditions, of 1600 acres in Palm canyon and in two near-by canyons. When these conditions are met, this area, containing the main grove and other fine specimens of these magnificent trees, will be preserved as a national monument. See *Colorado Desert, Palms.*

Pasadena. A residential city and widely known winter resort of southern California, situated about 10 miles northeast of Los Angeles. It occupies a beautiful site near the foot of the Sierra Madre, in a region luxuriant with palms, orange groves, eucalyptus, and other subtropical vegetation. The city is noted for its spacious streets and avenues, fine public buildings, and handsome residences, and is the seat of numerous educational institutions, including the California institute of technology.

Among the many features of interest within or near the city are the Huntington library and art gallery, Pasadena art institute, the Rose Bowl, Mount Wilson observatory, Mount Lowe, Busch gardens, San Gabriel mission, and a mile-long avenue of deodars known as "the street of the Christmas trees." The city is widely known for its annual festival, called the "Tournament of Roses," celebrated on New Year's Day. In 1874, a colony from Indianapolis, Ind., settled on the site of Pasadena and began raising fruit; in 1886, Pasadena received its charter as a city. Population, 1920, 45,354.

Passaic (*pă-sā'ĭk*). A manufacturing city of New Jersey, situated on the Passaic river, about 12 miles northwest of New York City. Water power derived from the falls of the river is utilized in the city's extensive industries. The chief industry is the manufacture of woolen and worsted goods, with cotton goods second in importance. Passaic is said to make one-third of the handkerchiefs produced in the United States. Other important industrial establishments include silk mills, rubber, metal, and dye works, and bleacheries. Population, 1920, 63,841.

Paterson. The third largest city of New Jersey, located on the Passaic river, about 16 miles northwest of New York City. Immense water power, derived from Passaic falls, 50 feet in height, is utilized in the city's numerous industries. Paterson is the leading producer of silk fabrics and sewing silks in the United States. It has also extensive cotton and woolen mills, dyeing and finishing establishments, cordage factories, machine shops, and locomotive works.

Paterson owes the beginnings of its great industrial growth to the "Society for Establishing Useful Manufactures," promoted largely through the efforts of Alexander Hamilton, in 1791, when he was secretary of the treasury. In 1792, the site, "by the Great Falls of the Passaic," was chosen for the location of the mills which were to be used in bringing about the commercial independence of the United States from Europe. At first, cotton and paper mills were established, but later these were largely superseded by silk works and other factories. Population, 1920, 135,875.

Pawtucket. The second largest city of Rhode Island, built on both banks of the Pawtucket river, about 4 miles northeast of Providence. Pawtucket falls, 50 feet high, provide abundant water power, which is utilized in the city's varied and extensive industries. The city was the birthplace of the cotton goods industry of the United States. The original mill, founded by Samuel Slater in 1790, is still standing.

Pawtucket is a leading producer of cotton goods. Its other manufactures include silk, woolen cloth, tire fabric, lace, webbing fabrics, yarn, thread, knitted underwear, and hosiery. There are also large dyeing and bleaching works, electrical machinery works, and iron and steel shops. Fine parks and public squares, together with imposing bridges across the river, serve to make Pawtucket an attractive city. Population, 1920, 64,248.

Pendleton. A city of northeastern Oregon, on the Umatilla river, about 200 miles east of Portland. Pendleton is the supply center for the Umatilla irrigation district and has an extensive trade in grain, fruit, and live stock. Hydroelectric power is extensively used in the city's manufactories, which include flour mills, woolen mills, planing mills, and machine shops. Pendleton has become widely known through its annual exhibition festival "The Round-Up." Population, 1920, 7387.

Pensacola. A seaport of Florida, situated on Pensacola bay, 10 miles north of the Gulf of Mexico. It has a fine landlocked harbor and conducts an extensive domestic trade, shipping large quantities of lumber, fish, hides, cotton, wool, coal, and grain. The local industries include lumber mills, cotton presses, and fertilizer works. The city was settled by Spaniards in 1696, and passed into the possession of the United States in 1821. Population, 1920, 31,035.


125°
120°
115°
110°
105°
100°
45°
40°
35°
Longitude
DOMINION
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
WASHINGTON
OREGON
IDAHO
MONTANA
NORTH DAKOTA
MINNESOTA
WYOMING
SOUTH DAKOTA
NEBRASKA
NEVADA
UTAH
COLORADO
KANSAS
CALIFORNIA
ARIZONA
NEW MEXICO
OKLAHOMA
TEXAS
MEXICO
PACIFIC OCEAN
GULF OF MEXICO
BERING SEA
ARCTIC OCEAN
ASIA
ALASKA
GULF OF ALASKA
ALEUTIAN ISLANDS
Scale of Statute Miles
Western portion of ALEUTIAN ISLANDS
Vancouver
Victoria
Seattle
Portland
Spokane
Tacoma
Olympia
Salem
Eugene
Astoria
Calgary
Edmonton
Lethbridge
Medicine Hat
Regina
Saskatoon
Moose Jaw
Winnipeg
Brandon
Minneapolis
St. Paul
Duluth
Fargo
Grand Forks
Bismarck
Minot
Williston
Great Falls
Helena
Butte
Missoula
Billings
Miles City
Glendive
Havre
Kalispell
Lewistown
Harlowton
Livingston
Bozeman
Yellowstone Nat. Park
Cody
Sheridan
Buffalo
Aladdin
Lead
Rapid City
Pierre
Huron
Sioux Falls
Yankton
Omaha
Lincoln
Grand Island
North Platte
Kearney
Hastings
Alliance
Chadron
Scottsbluff
Cheyenne
Laramie
Rawlins
Rock Springs
Evanston
Green River
Casper
Douglas
Lander
Thermopolis
Riverton
Fremont L.
Jackson L.
Grand Teton Nat. Park
Yellowstone Nat. Park
Idaho Falls
Blackfoot
Pocatello
Twin Falls
Boise
Nampa
Caldwell
Weiser
Ontario
Baker
La Grande
Pendleton
The Dalles
Hood River
Mt. Hood
Mt. Adams
Mt. Rainier
Mt. Baker
Mt. Shasta
Mt. Thielsen
Crater Lake Nat. Park
Klamath Falls
Medford
Grants Pass
Roseburg
Coos Bay
Eureka
Redding
Lassen Peak
Chico
Oroville
Marysville
Sacramento
Stockton
Modesto
Merced
Fresno
Hanford
Visalia
Tulare
Porterville
Kings Canyon Nat. Park
Sequoia Nat. Park
Yosemite Nat. Park
Oakland
San Francisco
San Jose
Santa Cruz
Monterey
Salinas
Paso Robles
San Luis Obispo
Guadalupe
Pt. Conception
Santa Barbara
Santa Maria
Lompoc
Ventura
Los Angeles
Pasadena
Long Beach
Santa Ana
Anaheim
San Bernardino
Redlands
Riverside
Pomona
Orange
Newport
Santa Catalina Island
San Clemente Island
San Diego
Coronado
Tijuana
El Centro
Salton Sea
Brawley
Imperial
Calexico
Mexicali
Yuma
Gila Bend
Ajo
Sonoyta
Lower California
Gulf of California
Phoenix
Tempe
Mesa
Florence
Casa Grande
Maricopa
Tucson
Nogales
Benson
Bisbee
Douglas
Agua Prieta
Globe
Miami
Clifton
Morenci
Safford
Solomon
Willcox
Winkelman
Oracle
Kingman
Williams
Grand Canyon
Grand Canyon Nat. Park
Flagstaff
Winslow
Holbrook
Gallup
Navajo
Zuni
Jerome
Prescott
Ash Fork
Seligman
Needles
Barstow
Mojave
Bakersfield
Delano
Tehachapi
Lone Pine
Mt. Whitney
Death Valley
Owens Lake
Mono Lake
Tonopah
Goldfield
Caliente
Las Vegas
Boulder City
Hoover Dam
Lake Mead
Overton
St. George
Zion Nat. Park
Cedar City
Parowan
Beaver
Milford
Lund
Delta
Fillmore
Nephi
Provo
Salt Lake City
Great Salt Lake
Great Salt Lake Desert
Ogden
Brigham
Logan
Tooele
Wendover
Grantsville
Eureka
Ely
Pioche
Caliente
Elko
Wells
Carlin
Battle Mountain
Lovelocks
Winnemucca
Humboldt R.
Carson City
Virginia City
Reno
Fallon
Austin
Eureka
Palisade
Grand Junction
Glenwood Springs
Aspen
Leadville
Buena Vista
Salida
Pueblo
Canon City
Colorado Springs
Cripple Creek
Manitou
Denver
Boulder
Longmont
Greeley
Fort Collins
Brush
Fort Morgan
Julesburg
Sterling
Limon
Colby
Oakley
Hays
Salina
Manhattan
Topeka
Lawrence
Kansas City
Atchison
St. Joseph
Omaha
Dodge City
Great Bend
Hutchinson
Scott City
Garden City
Liberal
Elkhart
Trinidad
Raton
Las Vegas
Santa Fe
Albuquerque
Los Lunas
Socorro
Magdalena
Carrizozo
Alamogordo
Roswell
Carlsbad
Las Cruces
El Paso
Ciudad Juarez
Deming
Silver City
Lordsburg
Rincon
Hatch
Tucumcari
Clovis
Portales
Hereford
Amarillo
Canadian
Pampa
Borger
Dalhart
Clayton
Des Moines
Woodward
Enid
Oklahoma City
Guthrie
Shawnee
Chickasha
Lawton
Ardmore
Wichita Falls
Gainesville
Denison
Sherman
Red R.
Quanah
Childress
Vernon
Abilene
Sweetwater
Midland
Odessa
Big Spring
Lubbock
Plainview
Tulia
Cisco
Eastland
Ranger
Fort Worth
Dallas
Waco
Temple
Taylor
Austin
Brenham
Bryan
Houston
Galveston
Beaumont
Port Arthur
Orange
Lake Charles
Brownwood
San Angelo
Sierra Blanca
Pecos
Alpine
Marfa
Presidio
Del Rio
Eagle Pass
Spofford
San Antonio
Kerrville
Hondo
Uvalde
Sabinal
Alice
Laredo
Corpus Christi
Rockport
Aransas Pass
Kingsville
Harlingen
Brownsville
Matamoros
Monterey
Mexico
Nuevo Laredo
Monclova
Sierra Mojada
Chihuahua
Aguascalientes
San Luis Potosi
Tampico
Victoria
Yorkton
Virden
Arcola
Estevan
Kenmare
Minot
Devils Lake
Grafton
Drake
Carrington
Wadsworth
Jamestown
Valley City
Fargo
Wahpeton
Fairmont
Wishek
Oakes
Glenham
Aberdeen
Redfield
Watertown
Huron
Madison
Mitchell
Chamberlain
Pierre
Fort Pierre
Rapid City
Lead
Deadwood
Spearfish
Sturgis
Belle Fourche
Edgemont
Hot Springs
Custer
Crawford
Valentine
Niobrara
Orin Jct.
Douglas
Casper
Lander
Riverton
Shoshoni
Thermopolis
Worland
Basin
Cody
Yellowstone Nat. Park
Gardiner
Livingston
Bozeman
Big Timber
Red Lodge
Billings
Hardin
Lewistown
Harlowton
Roundup
Miles City
Forsyth
Glasgow
Wolf Point
Havre
Shelby
Cut Bank
Conrad
Great Falls
Helena
Deer Lodge
Anaconda
Butte
Dillon
Whitehall
Three Forks
Bozeman
Missoula
Hamilton
Stevensville
Kalispell
Whitefish
Libby
Troy
Bonners Ferry
Sandpoint
Coeur d'Alene
Kellogg
Wallace
Moscow
Lewiston
Clarkston
Pullman
Colfax
Walla Walla
Pasco
Kennewick
Yakima
Ellensburg
Wenatchee
Chelan
Okanogan
Penticton
Kamloops
Nelson
Trail
Rossland
Kaslo
Slocan
New Denver
Revelstoke
Golden
Banff
Lake Louise
Jasper
Edmonton
Wetaskiwin
Camrose
Lloydminster
Battleford
North Battleford
Prince Albert
Melfort
Yorkton
Melville
Regina
Moose Jaw
Swift Current
Maple Creek
Medicine Hat
Lethbridge
Cardston
Fort Macleod
Pincher Creek
Crowsnest
Fernie
Cranbrook
Kimberley
Invermere
Golden
Revelstoke
Vernon
Kelowna
Penticton
Princeton
Hope
Chilliwack
Abbotsford
New Westminster
Vancouver
Victoria
Nanaimo
Courtenay
Campbell River
Port Alberni
Ucluelet
Tofino
Queen Charlotte Is.
Prince Rupert
Skeena R.
Terrace
Kitimat
Hazelton
Smithers
Prince George
Quesnel
Williams Lake
Ashcroft
Lillooet
Pemberton
Squamish
Whistler
Powell River
Sechelt
Gibsons
Port Mellon
Howe Sound
Bella Coola
Dean Channel
Ocean Falls
Namu
Butedale
Queen Charlotte Sound
Hecate Strait
Dixon Entrance
Ketchikan
Wrangell
Petersburg
Juneau
Skagway
Haines
Yakutat
Cordova
Valdez
Seward
Kodiak Island
Anchorage
Matanuska
Palmer
Wasilla
Talkeetna
Mt. McKinley
Mt. St. Elias
Fairbanks
Dawson
Eagle
Tanana
Rampart House
Fort Yukon
Arctic Circle
Kotzebue
Nome
St. Michael
St. Lawrence Island
Nunivak I.
Yukon R.
Kuskokwim R.
Bristol Bay
Unga
Sanak I.
Unalaska
Dutch Harbor
Aleutian Islands
Alaska Peninsula
Romanzof Mts.
Point Barrow
Arctic Ocean
Asia
Bering Sea
Pacific Ocean
Gulf of Alaska
Queen Charlotte Is.
Alexander Archipelago
Prince of Wales I.
St. James Mission
Port Simpson
Metlakatla


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West from 90° Greenwich 85° 80°
CANADA
UNITED STATES
GULF OF MEXICO
ATLANTIC OCEAN
BAHAMA ISLANDS
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Hudson Bay
Gulf of St. Lawrence
Florida Bay
Cape San Blas
Cape Hatteras
Cape Lookout
Cape Fear
Cape Charles
Atlantic City
Cape May
Long Island
Key West
Havana
Matanzas
Pinar del Rio
Isle of Pines
Cienfuegos
Santo Espiritu
Gibara
Manzanillo
Santiago
Nassau
Eleuthera I.
Andros Islands
Great Abaco I.
Great Bahama I.
Palm Beach
Miami
Jacksonville
Charleston
Savannah
Wilmington
Norfolk
Richmond
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Grand Rapids
Saginaw
Flint
Port Huron
Sarnia
Windsor
Hamilton
Kingston
Montreal
Quebec
Three Rivers
Sorel
St. Hyacinthe
Lake Nipigon
Lake Temiskaming
Lake Nipissing
Lake Timiskaming
Sault Ste. Marie
Sudbury
North Bay
Pembroke
Renfrew
Ottawa
Brockville
Belleville
Peterboro
Barrie
Orillia
Collingwood
Owen Sound
Georgian Bay
Parry Sound
Muskoka Wharf
Muskoka Lakes
Gravenhurst
Bracebridge
Huntsville
Port Arthur
Fort William
Isle Royale
Michipicoten
Pangasunin
Nipigon
Lake Superior
Lake Michigan
Lake Huron
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Port Huron
Sarnia
Windsor
Hamilton
Kingston
Montreal
Quebec
Three Rivers
Sorel
St. Hyacinthe

Peoria (*pē-ō'ri-ȧ*). A manufacturing city of Illinois, built on the west bank of the Illinois river, 160 miles southwest of Chicago. Peoria is the commercial center of a rich agricultural district, in close proximity to large coal fields. The city's varied and extensive manufactures include agricultural implements, food products, paper goods, stoves, barrels, woven wire fence, cordage, washing machines, stock foods, and chemicals. There are numerous fine parks, drives, and public buildings. The city is the seat of Bradley polytechnic institute and other educational institutions. Population, 1920, 76,121.

Pepin (*pē'pĭn*) **Lake.** An expansion of the upper Mississippi river, situated in a fine scenic region, about 30 miles south of Saint Paul, Minnesota. The lake is about 30 miles long and from 1 to 2 miles wide. It is surrounded by imposing bluffs of limestone, rising about 400 feet above the water and carved by erosion into many remarkable shapes. The town of Red Wing is situated at the northern end of the lake.

Perth Amboy. A city of eastern New Jersey, located on Raritan bay, about 20 miles southwest of New York City. Perth Amboy, by reason of its good harbor, has extensive shipping interests, and is an important commercial and industrial center. Among the chief industries are chemical works, metal refineries, and the manufacture of clothing and hats. The city is connected with South Amboy by a 10-million dollar bridge and with Staten island by a bridge completed in 1928 at a cost of 16 million dollars. Perth Amboy was settled in 1683, and, for a long period, was the capital of New Jersey province. It became a city in 1718. Population, 1920, 41,707.

Petersburg. A city of southeastern Virginia, situated on the south bank of the Appomattox river, 20 miles south of Richmond. The falls of the river furnish abundant water power which is utilized by various manufacturing plants. Its chief industries consist of the manufacture of silk, flour, machinery, trunks, and agricultural implements. The city is located in an extensive tobacco growing region at the northern end of the peanut belt, and carries on a substantial trade in these products. Petersburg is noted as a charming residential city, with well kept parks and handsome municipal buildings. A bridge over the Appomattox was opened in 1925. Population, 1920, 31,012.

Petrified Forests. See *Adamana*.

PHILADELPHIA. The chief city of Pennsylvania, and the third most populous in the United States. It is situated at the junction of the Schuylkill and the Delaware river, some 50 miles from the mouth of the Delaware, and nearly 100 miles by water from the Atlantic Ocean.

Site. From the confluence of the rivers, Philadelphia extends northerly along the Schuylkill for more than 20 miles and northeasterly along the Delaware for nearly the same distance, and has an irregular northern boundary. The site embraces a total area of about 130 square miles. At the south, between the two rivers, the surface is low and flat. The old city was laid out on this level peninsula. This section is now the business center.

To the north, the surface rises, culminating in Chestnut hill, 430 feet high, and other similar eminences. The factory districts were developed in this northern area, with Germantown, now within the city limits, occupying the heights above them. West of the Schuylkill, the surface is rolling, rising to elevations of 100 feet in the residential districts, and to 200 feet in Fairmount park. This part of the city began as a suburb and remains chiefly a residential district. The principal sections of the city are Overbrook, Roxborough, Germantown, Manayunk, Tioga, Frankford, Kensington, Torrisdale, Haddington, and Tacony.

Streets. Philadelphia was the first modern city to be laid out on the gridiron plan, with broad, long, straight streets, intersecting at right angles, and with small parks and squares located at suitable intervals. This general rectangular plan was followed in the layout for upper Manhattan in New York City, and has since largely guided American city planning.

Market street, extending east and west, is a leading commercial thoroughfare. On this street are the city hall, the Pennsylvania station, the Reading station, and the post office. Chestnut street, also an important business thoroughfare, parallels Market street, immediately to the south. Other noteworthy east-and-west streets are Walnut, Locust, Spruce, and Pine.

Broad street, one of the greatest streets of America, bisects the city from north to south. From League Island park, at the southern boundary of the city, Broad street, 113 feet wide, extends due north, for about 12 miles, to the northern boundary. It crosses Market street at Penn square and the city hall. Many north-and-south streets are named by numbers beginning at the Delaware river. The diagonal streets, which are few in number, are usually called avenues. Besides Penn square and Independence square, the most centrally located squares are Washington, Franklin, Rittenhouse, and Logan.

Parks and Monuments. The city park system, including numerous parks, squares, and parkways, embraces an area of about 6000 acres. The finest unit is Fairmount park, containing some 3500 acres along the Schuylkill river, and connected with the city hall by the magnificent Parkway. Wissahickon drive, 6 miles in length, along Wissahickon creek in Fairmount park, is regarded as one of the finest scenic drives within the limits of an American city. Among other important parks are League Island park, 300 acres; Pennypack park, 726 acres; Tacony park, 250 acres; Cobb's Creek park, 288 acres; Hunting park, 86 acres; Bernholme park, 69 acres; Whitehall commons, 35 acres; Bartram's garden, 27 acres; and the Cope arboretum, 22 acres. Roosevelt boulevard, 300 feet wide, which leaves Broad street at Hunting Park avenue, is a part of the national Lincoln highway.

Important monuments are the Soldiers' and Sailors' memorial in Fairmount park, and the imposing Washington monument at the main entrance to the park. Noted statues within the commercial district are: of Washington, in front of Independence hall; of Franklin, at the post office; and of Girard, Muhlenberg, Leidy, and McClellan, on the city hall plaza. On the plaza stands also Saint-Gaudens's statue of "The Pilgrim." Other noteworthy sculptural works in various parts of the city are Thorn's "Tam o'Shanter," Wolff's "Wounded Lioness," Remington's "Cowboy," and statues of Lincoln, Grant, Meade, Garfield, Columbus, Goethe, Schiller, Humboldt, and Joan of Arc.

Buildings. The monumental city hall, an immense marble structure, is about 470 feet square, and covers 4½ acres. The tower, some 548 feet high, is surmounted by a colossal statue of William Penn.

Among the older buildings, Christ church and Independence hall exemplify the Colonial style of architecture, the buildings of Girard college illustrate the Neo-Greek style, and Saint Mark's church is an example of the Gothic.

The chief Federal buildings are the United States mint, one of the greatest in the world; the post office, and the customhouse. Other noteworthy structures include the Pennsylvania station, the Reading terminal, the Municipal art gallery on an eminence at the end of the Parkway, the Art club, and the public library. Among numerous fine commercial buildings may be mentioned the Girard Trust, the Drexel, the Curtis, the Land Title and Trust, the Bell Telephone, the Arcade, the Widener, the Atlantic, the Morris, and the North American buildings, and the Wanamaker department store. A stadium, seating 50,000 people, is a legacy of the Sesquicentennial exposition, held in 1926 in south Philadelphia.

To a much larger extent than the residents of other great American cities, Philadelphians own their homes. There are practically no tenement houses and but few apartment buildings. The numerous suburbs are noted for their beautiful homes.

Historic Structures. No city in the United States, except Boston, has preserved a larger number of important buildings associated with the early history of the nation. Chief among these is Independence hall, built 1729–34, America's most famous landmark. In this notable building, the second and the third Continental Congress met; here Washington was chosen commander in chief; in it the Declaration of Independence was signed; and from its tower the Liberty bell, still preserved in the building, pealed forth the notes which "proclaimed liberty throughout all the land."

To the west of Independence hall is Congress hall, where the United States Congress met from 1790 to 1800, and where George Washington, in 1793, and John Adams, in 1797, were inaugurated. East of Independence hall is the old city hall, first occupied in 1791, now used as a historical museum. The three buildings—Independence hall, Congress hall, and the old city hall—form what is known as the State House group in Independence square. This famous square is situated on Chestnut street between Fifth street and Sixth street.

In the same vicinity is Carpenter's hall, where, in 1774, the first Continental Congress met, and where, in 1787, the Constitutional convention framed the Constitution of the United States. In Arch street stands the home of Betsy Ross, who, according to popular belief, made the first American flag.

Among historic churches are Old Swedes' church, built 1698–1700; Christ church, begun in 1727; Old Saint Joseph's church, dating from 1729; and Saint Mary's church, built in 1762.

The Penn mansion, built in 1682, was the first brick house erected in Philadelphia. It originally stood between Market and Chestnut streets, in the heart of the city. With the encroachment of great business structures, it was taken down and carefully re-erected in Fairmount park.

Educational Institutions. Philadelphia is the seat of the University of Pennsylvania. It is also a noted center of medical education. Among its prominent medical schools are the Jefferson, the Hahnemann, the Woman's medical college, and the medical department of the university.

There are also large schools of dentistry and of pharmacy. Other noteworthy institutions are the Drexel institute, the schools of the Pennsylvania academy of fine arts, the Franklin institute, the Spring Garden institute, Temple university, Girard college, La Salle college, Saint Joseph's college, the William Penn Charter school, founded in 1701, and the Germantown academy. In near-by suburbs are Bryn Mawr, Haverford, Villa Nova, and Swarthmore colleges, Ogontz school, and Overbrook seminary.

TRANSPORTATION. Although ships from its wharves sail nearly 100 miles before entering the ocean, Philadelphia is an important seaport. The city has more than 35 miles of water front on the Delaware river, which admits the passage of ocean-going ships. The Schuylkill is also navigable. The port is served by many transatlantic and coastwise steamer lines.

Philadelphia is also a great railroad center, with a huge network of lines extending, not only into the near-by coal and iron districts, but also into the Ohio and the Mississippi valley and into the South. The city is served chiefly by the Pennsylvania, the Reading, and the Baltimore and Ohio systems, and has the most direct connections with the Middle West of any great Atlantic port.

Local transportation consists of an immense system of surface electric railways, supplemented by both subway and elevated high-speed lines, together with an extensive steam and electric suburban service. Among recent improvements in the system is the construction of a subway beneath Broad street.

Of numerous fine bridges, the most noteworthy are the Fairmount Avenue bridge, a double-deck truss structure completed in 1895, and the great Philadelphia-Camden bridge, over the Delaware river, which was completed in 1926 at a cost of about 29 million dollars.

COMMERCE. Philadelphia's high rank as a commercial city is primarily owing to its importance as a port; and its favorable location near vast supplies of raw materials has led to the development of immense industries. The city ranks among the leading ports of the United States in the value of its foreign commerce, and conducts a large coastwise trade, especially in oil and coal.

MANUFACTURES. Three factors have made Philadelphia a great manufacturing center—nearness to the sources of raw materials, its advantageous situation as the natural outlet of great coal and iron fields, and excellent transportation facilities. In total value of manufactured products, Philadelphia is surpassed only by New York and Chicago among American cities.

The city contains the largest shipbuilding plant and the largest locomotive works in the United States. A Philadelphia structural iron plant built the great Nile bridge below Khartum and the immense cantilever bridge at Quebec. The city leads in the quantity of rolling mill, foundry, and machine shop products, and in the manufacture of hats and hosiery. In the production of woolen and worsted goods, leather goods, carpets, and saws, in the printing and publishing of books, newspapers, and periodicals, and in sugar refining, Philadelphia ranks among the chief manufacturing centers of the country.

HISTORY. The earliest settlement within the limits of Philadelphia was made in 1636 by a company of Swedes. Late in 1681, William Markham, deputy governor for William Penn, organized an English settlement, and, in 1682, under Penn's supervision, the city was laid out and named. In 1683, a colony of Germans, invited by Penn, settled at Germantown, now a part of the city. In 1723, Benjamin Franklin came to Philadelphia, and in 1729 began the publication of the *Pennsylvania Gazette*. Philadelphia took a leading part in resisting British aggression, and the most important official events of the Revolutionary War occurred in the city. The battle of Germantown was fought in 1777. Philadelphia was occupied by British armies, 1777-78, while Washington's army was at Valley Forge.

Philadelphia was the capital of Pennsylvania from 1683 to 1799, was the seat of the Federal government, 1790–1800, and was the financial center of the country until 1836. The first daily newspaper in the United States, the *Pennsylvania Packet*, appeared in Philadelphia in 1784. The Centennial exposition, celebrating the centenary of American independence, was held in Fairmount park in 1876. Philadelphia is called the "Quaker City" and also the "City of Brotherly Love." Population, 1920, 1,823,779.

Phoenix. The capital and largest city of Arizona, in the south central part of the state, about 450 miles east of Los Angeles. Phoenix is the commercial center of the Salt River valley, the most productive agricultural region in the state. Since the immense extension of irrigation following the construction of the Roosevelt dam, the city has grown rapidly. Its chief business activities are in connection with the varied products of the surrounding district. Among these are Egyptian cotton, alfalfa, cereals, oranges, grapefruit, figs, olives, cantaloupes, strawberries, and vegetables.

According to the census of 1920, the total value of the crops produced in Maricopa county, of which Phoenix is the county seat, was almost twice that of all the remainder of the state. There are some mining and stock growing interests.

The city lies in a wide, irrigated plain. The broad streets and spacious parks are ornamented with palms and other subtropical plants. Prominent public buildings are the capitol and the Carnegie library. By reason of its dry, salubrious climate, Phoenix is an important winter resort. In the vicinity are numerous points of interest, including Cactus park, hieroglyphic rocks, and the ruins of Aztec community houses. Phoenix was settled in 1870 and became the capital of the territory in 1889. Population, 1920, 29,053.

Piedmont. The name used in the United States to designate that part of the Atlantic plain which lies between the low, flat coastal plain and the true Appalachian highland. It consists chiefly of rolling, rugged lands with deeply eroded valleys. The rocks are a harder formation than those underlying the coastal plain. In consequence, there is a definite line of escarpments, over which most of the rivers descend in rapids or cataracts. This is known as the "fall line." The Piedmont plain reaches its greatest extent in Virginia, South Carolina, and North Carolina, being about 300 miles wide in the latter state. The whole area is a rich agricultural and manufacturing district.

Pierre (*pēr*). The capital of South Dakota, situated on the Missouri river in the central part of the state. It is located in an agricultural and stock raising district and is an important cattle shipping center. Besides the capitol, Pierre has the State library, an industrial school for Indians, and a fine Federal building. Fort Pierre, established in 1832, was for many years the chief fur trading post of the Upper Missouri River country. Pierre was laid out in 1880 and was incorporated in 1883. Population, 1920, 3656.

Pikes Peak. A celebrated mountain in Colorado, 14,108 feet high, situated in the easternmost range of the Rockies immediately west of Colorado Springs. It was discovered in 1806 by General Zebulon M. Pike of the United States army, and was first successfully ascended in 1819 by Major S. H. Long. In 1891, a cogwheel railway was completed to the summit, which is now reached also by a well constructed automobile road.

While not the highest mountain in Colorado, Pikes peak is one of the most majestic and imposing. Pine and spruce forests cover the slopes to an elevation of about 11,700 feet, above which there is a fringe of beautiful alpine flowering plants bordering the snow. The summit consists of bare granite rocks. The view from the top is one of unusual magnificence, including rugged mountains, vast plains, and numerous lakes and rivers in a landscape which extends 100 miles in all directions.

Pinehurst. A noted winter resort of southern North Carolina, about 60 miles southwest of Raleigh. It is 125 miles from the seacoast and 18 hours ride by rail from New York City, and possesses a mild and equable climate. It was founded as a winter resort in 1895 by James W. Tufts, of Boston, and is famous for the beauty and excellence of its parks, golf links, courts, and other facilities for recreation. The permanent residential population is about 300, but the winter visitors number 2000 or more annually.

PITTSBURGH. The second largest city of Pennsylvania and the ninth largest in the United States. It is situated at the junction of the Monongahela and Allegheny rivers, which here unite to form the Ohio. Pittsburgh lies in the southwestern part of the state, about 340 miles west of Philadelphia, and 430 miles west of New York.

SITE. Pittsburgh occupies the most irregular and uneven site of any on which a great American city is built. The three rivers flow through deep narrow valleys and the highlands bordering upon them are broken into a large number of hills. These rise to heights of from 500 to 750 feet above the rivers and are separated by great ravines.

The Monongahela river, from the southeast, is joined by the Allegheny, from the northeast, and the Ohio river, formed by their union, flows northwesterly to the city limits. The chief business district and the greater part of the city lies between the Monongahela and the Allegheny. West of the Allegheny and north of the Ohio is the section which, before annexation, constituted the city of Allegheny. South of the Monongahela and the Ohio are the districts known as the South Side, Allentown, Mount Washington, Duquesne Heights, and the West End.

By annexation, there have been absorbed into the city more than 40 boroughs and townships. The names of many of these are still in common use locally, as, for example, Esplen, Beltzhoover, Seraden, and Spring Garden.

STREETS AND BUILDINGS. The narrow streets of the older districts still remain, but, in the newer and much larger sections, Pittsburgh is a distinctly modern city. Fifth and Sixth avenues, and Wood, Market, Federal, and Smithfield streets are important thoroughfares. Diamond street and Oliver avenue are new thoroughfares; Penn


160°
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140°
130°
120°
110°
100°
65°
60°
55°
50°
45°
120°
115°
110°
105°
100°
95°
Beaufort Sea
Mackenzie Bay
ALASKA
Yukon
Yukon R.
Fairbanks
Circle City
Fort Yukon
Eagle City
Dawson
Klondike R.
Ft. Reliance
Stewart R.
Fort Selkirk
Macmillan R.
Pelly R.
Lewes R.
White R.
Chilkoot Pass
Chilkat
Skagway
Taku Inlet
Yakutat Bay
Mt. St. Elias
Mt. Logan
Mt. Wrangell
Copper R.
Tanana R.
Koyukuk R.
Porcupine R.
Boundary
Dease R.
Liard R.
Fort Liard
Fort Simpson
Fort Wrigley
Fort Norman
Fort Good Hope
Old Fort Good Hope
Fort McPherson
Peel R.
Rocky Mts.
YUKON
MACKENZIE
NORTHWEST
TERRITORIES
Great Bear L.
Great Slave L.
Great Slave Lake
Fort Resolution
Fort Providence
Fort Smith
Slave R.
Mackenzie R.
Hay R.
Peace R.
Fort Chipewyan
Lake Athabasca
Athabasca R.
Athabasca
Grand Rapids
Wollaston L.
Reindeer or Caribou Mts.
Ste. Anne
Fond du Lac
Black R.
Mason R.
Rocky R.
Deh Cho
Arrowhead
Franklin Mts.
Fabre Range
Keith Arm
Point Lake
Burnt Lake
Beechey L.
Clinton Colden L.
Aberdeen L.
Back R.
Baker L.
L. Garry
L. Pelly
L. Dubawnt
Kamilukuna L.
Angikuni L.
Mayuse R.
Eskimo Lakes
Anderson R.
Horton R.
Coronation Gulf
Bathurst Inlet
Wellington Channel
Victoria Land
Prince Albert Land
Prince Albert Sound
Melville Sound
Parry Islands
Prince Patrick I.
Melville I.
Bathurst I.
Cornwallis I.
Princess of Wales I.
Banks Island
Nelson Head
Baring Land
Collinson Inlet
Minto Inlet
Franklin Bay
Darnley Bay
Dolphin and Union Strait
Cape Parry
Cape Bathurst
C. Krusenstern
C. Hope
C. Baring
C. Bathurst
Floating Wood
Old Fort Reliance
Fort Reliance
Fort Confidence
Fort Enterprise
Fort Franklin
Fort Keith
Fort Norman
Fort Simpson
Fort Wrigley
Fort Providence
Fort Liard
Fort Nelson
Fort St. John
Fort Fraser
Fort George
Fort Grahame
Fort Ware
Fort Selkirk
Fort Yukon
Fort Hope
Fort Macpherson
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PACIFIC
OCEAN
BRITISH
COLUMBIA
Queen Charlotte Islands
Dixon Entrance
Hecate Strait
Queen Charlotte Sound
Graham I.
Prince of Wales I.
Sitka
Baranof I.
Christian Sound
Chatham Strait
Frederick Sound
Stephens Passage
Taku Inlet
Glacier Bay
Taylor Bay
Chilkoot Inlet
Chilkat
Skagway
Taku Inlet
Yakutat Bay
Mt. St. Elias
Mt. Logan
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Great Bear L.
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Peace R.
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Lake Athabasca
Athabasca R.
Athabasca
Grand Rapids
Wollaston L.
Reindeer or Caribou Mts.
Ste. Anne
Fond du Lac
Black R.
Mason R.
Rocky R.
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Arrowhead
Franklin Mts.
Fabre Range
Keith Arm
Point Lake
Burnt Lake
Beechey L.
Clinton Colden L.
Aberdeen L.
Back R.
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L. Garry
L. Pelly
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Kamilukuna L.
Angikuni L.
Mayuse R.
Eskimo Lakes
Anderson R.
Horton R.
Coronation Gulf
Bathurst Inlet
Wellington Channel
Victoria Land
Prince Albert Land
Prince Albert Sound
Melville Sound
Parry Islands
Prince Patrick I.
Melville I.
Bathurst I.
Cornwallis I.
Princess of Wales I.
Banks Island
Nelson Head
Baring Land
Collinson Inlet
Minto Inlet
Franklin Bay
Darnley Bay
Dolphin and Union Strait
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SASKATCHEWAN
MANITOBA
Peace River
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Fort Tongass
Fort Taku
Vancouver
Victoria
Vancouver Island
Strait of Juan de Fuca
Cape Flattery
Seattle
Tacoma
Olympia
WASHINGTON
Portland
Columbia R.
Willamette R.
OREGON
Salem
Eugene
Roseburg
Coos Bay
Cape Blanco
Klamath R.
Klamath Falls
Crater Lake
Rogue R.
Medford
Grants Pass
Oregon Caves
Siskiyou Mts.
Mt. Shasta
CALIFORNIA
Redding
Sacramento
Oakland
San Francisco
Carson City
NEVADA
Reno
Winnemucca
Humboldt R.
Humboldt Lake
Pyramid Lake
Truckee R.
Lake Tahoe
Virginia City
Carson R.
Walker R.
Walker Lake
Mono Lake
Owens Lake
Death Valley
Panamint Range
Inyo Range
Sierra Nevada
Mt. Whitney
Mt. Shasta
Mt. Lassen
Mt. Hood
Mt. Rainier
Mt. Baker
Mt. Adams
Mt. St. Helens
Mt. Jefferson
Mt. Thielsen
Mt. Pitt
Mt. McLoughlin
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Mt. San Gorgonio
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Mt. Pinos
Mt. Abel
Edmonton
Calgary
Lethbridge
Medicine Hat
Swift Current
Regina
Moose Jaw
Prince Albert
Saskatoon
Battleford
Big River
Ryley
Wetaskiwin
Strathcona
Leduc
Stettler
Munson
Innisfail
Red Deer
Olds
Didsbury
Carstairs
Crossfield
Airdrie
Cochrane
Banff
Canmore
Exshaw
Morley
Gleichen
Bassano
Brooks
Suffield
Medicine Hat
Redcliff
Maple Creek
Gull Lake
Shaunavon
Eastend
Wood Mountain
Assiniboia
Moose Jaw
Regina
Qu'Appelle
Indian Head
Broadview
Grenfell
Wolseley
Whitewood
Moosomin
Virden
Brandon
Portage la Prairie
Winnipeg
Selkirk
Stonewall
Gimli
Lake Winnipeg
Lake Manitoba
Lake Winnipegosis
Lake of the Woods
Rainy Lake
Rainy River
Kenora
Dryden
Ignace
Sioux Lookout
Red Lake
Pine Portage
Fort Frances
Rainy River
Rainy Lake


Comparative Area
PENNSYLVANIA
45,126 Square Miles.
DOMINION OF
CANADA
and NEWFOUNDLAND
Prepared especially for
The Frontier Press Company
SCALE OF STATUTE MILES.
0 100 200 300
KILOMETERS.
0 100 200 300 400
Country Capital thus:
Province Capital thus.
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BAFFIN BAY
DAVIS STRAIT
GREENLAND
(To Denmark)
Egedes Land
Denmark Str.
ICELAND
ARCTIC OCEAN
ATLANTIC OCEAN
Hudson Strait
Hudson Bay
LABRADOR
Gulf of St. Lawrence
NEWFOUNDLAND
Baffin Island
Southampton Island
Melville Pen.
Cockburn Island
Devon
Ellesmere Island
Prince Edward Island
Anticosti
Belle Isle
Cape Breton I.
Sable I.
Boston
New York
Buffalo
Detroit
Cleveland
Chicago
Toronto
Montreal
Ottawa
Quebec
Halifax
Hudson Bay
James Bay
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Greenwich
80°
75°
70°
65°
60°
55°
50°
45°
40°

avenue and lower Liberty avenue contain important retail stores, and Fourth avenue is the "Wall Street" of Pittsburgh. The most costly residences are found chiefly in the Bellefield, Shadyside, East Liberty, Homewood, and Squirrel Hill districts.

By reason of its extremely hilly site, Pittsburgh has perhaps more bridges and viaducts than any other city in the world. The city owns and maintains over 125, including the Liberty bridge, which connects the business section with the South Hills district via the Liberty tubes. These are twin tubes 5714 feet long and cost nearly $6,000,000 to construct. The Bloomfield bridge, spanning a deep valley between Herron Hill and the Bloomfield district, is nearly a mile long. The Larimer Avenue viaduct is one of the largest single-arch concrete bridges on the continent. Many inclined planes have been built to carry passengers and vehicles to higher levels. The Mount Washington incline lifts passengers 400 feet above the level of the old city to newer portions on the heights.

The commercial district is noted for its many fine office buildings of the skyscraper type. The city contains also many other imposing structures. Among these are the courthouse, the Federal building, Saint Paul's cathedral, and Trinity church.

Parks. The municipal park system includes 26 parks, covering a total area of more than 1680 acres. Of these, the finest is Schenley park containing the Carnegie institute and library, and the Phipps conservatory. Highland park commands a superb panoramic view of the Allegheny valley. In this park, which contains a large zoological garden, there is a statue to Stephen C. Foster, author of "Old Folks at Home," who was born and lived in Pittsburgh. At the entrance of Riverview park is the Allegheny observatory. Other noteworthy parks are McKinley, Grandview, and Allegheny. Highland and Schenley parks are connected by Washington boulevard.

Public Institutions. Foremost among the public institutions of Pittsburgh are the magnificent buildings of the Carnegie Institute, which includes library, museum, art gallery, and music hall. The museums, together with a music hall, are located in the central library building at Schenley park. This beautiful structure, which covers nearly 6 acres, is built in the Italian Renaissance style. Memorial hall, containing a war museum and a large auditorium, is a notable structure. The Cathedral of Learning, a 29-story building costing 6 million dollars, is the most impressive of the buildings of the University of Pittsburgh.

Education. The chief educational institutions of the city are the University of Pittsburgh, the Pennsylvania college for women, the Mellon institute of industrial research, the Allegheny observatory, Western theological seminary, and the great Carnegie institute of technology, maintained by the Carnegie Foundations.

Transportation. Transportation, provided by the rivers and by railroads, and abundant fuel, in the form of coal, petroleum, and natural gas from near-by fields, are some of the factors which have made the city of Pittsburgh one of the greatest workshops in the world. The rivers afford connections with an immense system of inland waterways, including, not only those of the state, but also those of the Middle West and South. There is an extensive river traffic between Pittsburgh and Cincinnati, Saint Louis, and New Orleans. The city is served by some 14 different railways, and is within a night's railway ride of half of the population of the United States. Owing to the character of the commodities handled, largely coal, ores, and iron and steel products, the tonnage handled at Pittsburgh greatly exceeds that of any other city in the world.

Manufactures. Pittsburgh, long known as the "Steel City," is one of the leading centers of the world for the manufacture of iron and steel. About three-tenths of the pig iron and four-tenths of all the steel made in the western hemisphere is produced in the Pittsburgh district. Pittsburgh leads all other cities in the manufacture of steel rails, pressed steel cars, and pressed steel plates for shipbuilding. The city is also the chief center in the country for the manufacture of plate glass, window glass, and bottles, and produces a high quality of optical glass. Other important manufactures include aluminum wares, corks and cork products, pickles, bronze and copper wares, refined petroleum, and automobiles.

History. In colonial times, the vicinity of Pittsburgh was the scene of many struggles with the French and Indians. In 1753, the site of Pittsburgh was visited by George Washington who regarded it "extremely well situated for a fort." The French and Indians, however, drove off the Virginians, and built Fort Duquesne. Endeavoring, in 1755, to capture it, Braddock, with a strong British force, met disastrous defeat. In 1758, General Forbes, marching from Philadelphia, took the fort, and, at Washington's suggestion, renamed it in honor of William Pitt. The Block House, built in 1759, the oldest building in the city, is preserved as a relic of colonial days. Pittsburgh was laid out in 1784, was incorporated in 1794, and became a city in 1816. Population, 1920, 588,343.

Pittsfield. A city of western Massachusetts, situated in the Berkshire valley, near Pontoosuck lake, with a background of fine mountain scenery. It is the largest city in the Berkshire Hills region, and is particularly noted for its wide, shaded streets, fine public buildings, and historic tradition. Its museum of natural history and fine arts contains a sled used by Peary in his trip to the north pole and the "one hoss shay," made famous by Oliver Wendell Holmes's poem. Holmes and Longfellow resided for a time at Pittsfield, and H. W. Shaw ("Josh Billings") lived near by. The city's industries produce electrical and other machinery, textiles, machine tools, silk, and fine stationery. Population, 1920, 41,763.

Plymouth. A city on Plymouth harbor, Massachusetts, about 37 miles southeast of Boston. Founded by the Pilgrim Fathers in 1620, it is the oldest town in New England. Plymouth Rock, on which the Pilgrims are said to have landed, is preserved under a beautiful canopy. Pilgrim hall contains many interesting relics and historical paintings. The city is a port of entry, has varied local manufactures, and ships large quantities of cranberries grown in the vicinity. Population, 1920, 13,045.

Pocatello (*pō'kă-tĕl'ō*). A city of southeastern Idaho, about 170 miles north of Salt Lake City, Utah. Pocatello is situated in an arid volcanic region which has been reclaimed for agriculture by irrigation. The city carries on an extensive trade in mining products, live stock, and farm products. It contains large railway shops, machine shops, and stockyards. Population, 1920, 15,001.

Pontiac. A city of southeastern Michigan, on the Clinton river, about 25 miles northwest of Detroit. Pontiac is the trade center of a rich farming and dairying region, and has developed extensive industries. In manufactures, it ranks fourth among the cities of the state. The chief manufactures include automobiles, automobile accessories and parts, paints and varnishes, drop forgings, tools, machine shop products, and interior finish and other woodwork. Pontiac was settled in 1818, was incorporated in 1837, and, in 1861, was chartered as a city. Population, 1920, 34,273.

Port Arthur. A seaport of southeastern Texas, situated on Sabine lake, about 15 miles from the Gulf of Mexico. Port Arthur is one of the largest oil refining centers in the United States. It also has rice milling and fruit handling interests. Since the completion of the Port Arthur ship canal, affording passage for large ocean vessels to its fine landlocked harbor, Port Arthur has become a leading port, accommodating a large foreign and domestic commerce. Population, 1920, 22,251.

Portland. The commercial metropolis of Maine, located on Casco bay, 108 miles northeast of Boston. Portland is an important seaport and possesses one of the finest harbors on the Atlantic coast. It occupies a picturesque site, with handsome buildings and streets closely bordered with trees. Its industries are extensive and varied, including iron forging, cod and mackerel fishing, the canning of fish and of vegetables, and lumber milling. Population, 1920, 69,272.

Portland. The chief city of Oregon, situated on the Willamette river, about 12 miles from its junction with the Columbia, and approximately 100 miles by water from the Pacific Ocean. It occupies a commanding site on the sloping banks of the river, with the snow-capped peaks of Mount Hood, Saint Helens, and Mount Adams in the background to the eastward.

Portland owes its growth and importance to great natural advantages of situation. It is surrounded by highly fertile valleys and heavily timbered mountains, and has an excellent fresh-water harbor accommodating the largest sea going freight ships. From its docks, ships sail to the Orient, to San Francisco, Puget sound, and Alaska, and, by way of the Panama canal, to ports of the eastern United States and Europe. The exports consist mainly of grain, flour, lumber, and salmon.

In manufactures, Portland ranks among the leading cities of the Pacific states, its favorable situation enabling it to utilize vast resources of hydroelectric power, as well as natural gas. Among important manufactures are lumber, pulp, paper, textiles, clothing, automobile tires, and flour. The city's industries include also fruit canning and meat packing.

The city contains many imposing public buildings, including an auditorium seating 5500 and a stadium to seat 25,000, and is noted for its fine residences. It is the seat of Reed college and several other educational institutions. Among features of interest are Council Crest, affording a panoramic view of the city and its surroundings; Terwilliger boulevard on the west side of the city; Willamette boulevard on the east side; Washington park, containing a fine statue of Sacagawea; and Peninsula park, noted for

its roses and sunken gardens. The environs of the city are reached by numerous scenic roads, including the famous Columbia River highway, which extends 120 miles east, and 110 miles west to the sea. Portland is called the "Rose City." Its Rose Festival is a beautiful annual pageant.

Settlers from New England founded the city in 1843, naming it after Portland, Maine. Population, 1920, 258,288. See *Columbia River Highway*.

Portsmouth (*pōrts'mŭth*). The only seaport of New Hampshire, built near the mouth of the Piscataqua river, opposite the Maine boundary, about 60 miles north of Boston. The city carries on a substantial coastwise trade, especially in coal, and has various local manufactures. Portsmouth was settled in 1623, and incorporated in 1653. It is a quiet city with a quaint, old-fashioned appearance, and contains many fine colonial houses rich in historic and literary interest. The city was the birthplace of Thomas Bailey Aldrich and many other noted men. The Portsmouth navy yard, on an island in the river, is situated within the boundaries of Maine. In 1905, the Treaty of Portsmouth, ending the Russo-Japanese war, was signed in the "Peace Building" on Leavey's island. Population, 1920, 13,569.

Portsmouth. A city of southern Ohio, built on the north bank of the Ohio river, at the mouth of the Scioto river, about 80 miles south of Columbus. The city is located in an agricultural and mining region, of which it is the commercial center. In the vicinity are valuable deposits of fire clay, which is extensively manufactured into brick. Other important manufactures are steel and lumber products, shoes, and furniture. Portsmouth was founded in 1803 and became a city in 1814. In the Scioto valley, north of the city, are interesting remains of the ancient Mound Builders. Population, 1920, 33,011.

Portsmouth. A seaport of southeastern Virginia, occupying the mainland side of the important harbor of Norfolk-Portsmouth. Here the larger railway systems of the South have deep-water terminals and are connected with Norfolk, just across the harbor, by passenger and railroad car ferries. An immense tonnage, both foreign and domestic, passes through the port of Norfolk-Portsmouth. This consists chiefly of cotton, coal, lumber, fruits, vegetables, oysters, fertilizers, grain, and peanuts. This port is the greatest peanut market in the world. There are extensive and growing industries, including railroad shops, fertilizer works, barrel factories, cottonseed oil mills, and lumber mills.

A few blocks south of the center of Portsmouth is the navy yard, officially known as the Norfolk navy yard. This occupies 350 acres, contains immense dry docks, and is the most important naval establishment in the United States. Population, 1920, 54,387.

Poughkeepsie (*pō-kĭp'sĭ*). A city in New York State on the east bank of the Hudson river, about 75 miles north of New York City. It is picturesquely situated on high ground commanding a fine view of the Hudson river, which is here crossed by a magnificent cantilever bridge. The city conducts an extensive local trade, has substantial industries, and considerable river commerce. The chief manufactures include farm machinery and implements, automobiles, buttons, and cigars. Poughkeepsie is the seat of Vassar college, of Glen Eden seminary, and of other important institutions. Population, 1920, 35,000.

Princeton. A university town of central New Jersey, about 50 miles southwest of New York City. Founded in 1696, Princeton remained a straggling village until the College of New Jersey, now Princeton university, was removed, in 1756, from Newark to Princeton. It soon became a center of higher education and has remained distinctly a university town. Early in 1777, the battle of Princeton was fought in the vicinity. From June to November, 1783, Congress sat in Princeton. The town is built on an elevated site, commanding fine views of the surrounding country. It has broad, well shaded streets, and the architecture of its colonial period has been largely preserved. In 1922, the "Battle Monument to George Washington," an impressive sculptural work by Frederick Macmonnies, was unveiled. Besides the university, Princeton is also the seat of Princeton theological seminary and other educational institutions. Grover Cleveland, twice elected president of the United States, is buried at Princeton. Population, 1920, 5917.

Providence. The capital of Rhode Island, and the second largest city of New England. It is situated on Narragansett bay, about 45 miles southwest of Boston. The city has excellent railway facilities and a fine harbor, with direct steamer service to New York, Philadelphia, Baltimore, and Norfolk.

While maintaining a substantial coastwise shipping trade, Providence is pre-eminently an industrial city, with extensive and varied manufactures. It is a leading center for the manufacture of jewelry, and for similar articles requiring a high degree of artistic skill. Among other important industrial products are silverware, steel tools, wood screws, files, cotton, woolen, and silk goods, hosiery, suspenders and elastic goods, shoe and corset laces, steam engines, textile machinery, and electrical supplies.

The city is substantially built, and contains many fine parks and public buildings, including an imposing civic center. Brown university, chartered in 1764, and other important institutions are located in the city. Providence was founded and named in 1636 by Roger Williams, and here, in 1638, he organized the first Baptist church in America. Population, 1920, 237,595.

Provo. A city of north central Utah, picturesquely situated in a fertile valley at the foot of the Wasatch mountains, 40 miles south of Salt Lake City. Provo is the trade center of a rich district devoted to agriculture, fruit growing, and stock raising, and is the seat of Brigham Young university. Population, 1920, 10,303.

Pueblo (*pwĕb'lō*). The second largest commercial and industrial city in Colorado, located on the Arkansas river, about 120 miles south of Denver. Pueblo has immense iron and steel works, smelting furnaces, and foundries, and is conveniently near a region rich in coal and oil. The city has also various other manufactories and extensive stockyards. There are many fine public buildings, the State mineral palace and park, and several noteworthy educational institutions. Population, 1920, 43,050.

Quincy (*kwĭn'zĭ*). A manufacturing city of western Illinois, on the Mississippi river, about 110 miles northwest of Saint Louis. Built on the sides of a limestone bluff, Quincy overlooks an enchanting panorama of river, valley, and surrounding hills. The city is the commercial center of a rich agricultural region, and its chief industries include flour mills, machine shops, foundries, and the manufacture of agricultural implements, machinery, power pumps, incubators, and elevators. There are numerous fine parks, boulevards, and public buildings. Population, 1920, 35,978.

Quincy (*kwĭn'zĭ*). A city of eastern Massachusetts, situated on Quincy bay, about 8 miles south of Boston. While essentially a residential suburb of Boston, Quincy has a large granite quarrying industry, and also shipyards, engine works, brass and iron works, rivet mills, and electrical goods factories. The city contains many fine streets, and homes, and the park system covers more than 2500 acres.

Settled in 1625 as Mount Wollaston, Quincy ranks among the oldest permanent settlements in New England. Until 1792, when the community was incorporated under its present name, it was a part of Braintree. The first railway in New England was constructed here 1826-27 to transport granite used in building Bunker Hill monument. Quincy enjoys the distinction of being the birthplace of two presidents, John Adams and John Quincy Adams, and also of John Hancock. Population, 1920, 47,876.

Racine. A manufacturing city of southeastern Wisconsin, located on a fine harbor on Lake Michigan, about 65 miles north of Chicago. In value of its manufactures, Racine ranks second only to Milwaukee among the cities of the state, and is noted especially for the manufacture of thrashing machines and farm implements. Other important manufactures include automobile parts, machine shop products, boots and shoes, furniture, hardware, and lumber products. It has several fine parks, many handsome public buildings, and is the seat of Racine college. Population, 1920, 58,593.

Rainier (*rā-nēr'*), **Mount.** The loftiest peak in the Cascade range, situated in southwestern Washington about 50 miles southeast of Tacoma. It rises to an elevation of 14,408 feet, overtopping all other summits in the Pacific states except Mount Whitney in California.

Like Fuji in Japan, Mount Rainier rises majestically in graceful lines that proclaim its volcanic origin. Its summit lies in perpetual snow and on its upper slopes there are numerous glaciers. These are from 50 to 500 feet thick and cover a total area of about 50 square miles, the largest expanse of ice fields around any single mountain in the country. Some of these glaciers are from 4 to 6 miles long, and in size and beauty rival those of the Alps.

The lower slopes of the mountain are clothed with luxuriant forests, containing trees of unusual size. Above the forests, which extend to an elevation of about 7000 feet, are many picturesque mountain meadows. In summer, these bear a profusion of beautiful alpine flowers that follow the retreating snow banks almost up to the line of perpetual frost. The summit rises about 8000 feet above the general level of the Cascades and affords excellent views of the Puget Sound region. In order to preserve its fine scenic features and make them readily accessible to the traveler, Mount Rainier, in 1899, was created a national park.

Raleigh (*rô'lĭ*). The capital of North Carolina, situated in the central part of the state. Raleigh is a large cotton and tobacco market and has varied industries, the manufacture of cotton goods being among the more important. The city contains some 13 park areas, including Pullen park, a 74-acre semiforest tract of exceptional beauty. Among the more notable buildings are the state capitol on


LINCOLN SEA
GRANT LAND
GRINNELL LAND
HALL LD.
WASHINGTON LAND
INGLEFIELD LAND
C. Alexander
PRINCE GUSTAV ADOLPH LAND
AXEL HEIBERG ISLAND
EUREKA SD.
EUREKA
O. McClintock
PR. PATRICK ISLAND
RINGNES IS.
NORTH LINCOLN
GRINNELL LAND
ARCTIC OCEAN
Prince Alfred C.
C. Lisburne
Kotzebue Sound
BERING STRAIT
Pt. Barrow
Pt. of Wales
ASIA
BERING SEA
St. Lawrence
Norton Sd.
Romanof
Yukon
Kuskokwim
ALASKA
ARCTIC CIRCLE
TO UNITED STATES
Fairbanks
Mt. McKinley
Dawson
Klondike R.
Copper R.
Yukon R.
Seward
Mt. Fairweather
White Horse
Mt. St. Elias
Skagway
Juneau
Sitka
Pr. Rupert
Queen Charlotte Is.
C. Scott
Vancouver
Victoria
Seattle
Tacoma
Olympia
Astoria
Portland
Mt. Hood
Walla Walla
Spokane
Missoula
Helena
Yellowstone R.
Missouri R.
Devil L.
Bismarck
Grand Forks
Winnipeg
Brandon
Portage la Prairie
Lake of the Woods
Port Arthur
Duluth
Lake Superior
Sault Ste. Marie
Lake Michigan
Chicago
Milwaukee
Detroit
Buffalo
Toronto
Ottawa
Montreal
Quebec
Portland
Boston
New York
Albany
Rochester
Niagara Falls
Cleveland
Pittsburg
Philadelphia
Washington
Baltimore
Richmond
Norfolk
Cincinnati
Louisville
Nashville
Memphis
Atlanta
Charleston
Savannah
Jacksonville
Tampa
Key West
Mobile
New Orleans
Galveston
Houston
Dallas
Fort Worth
Austin
San Antonio
El Paso
Albuquerque
Santa Fe
Denver
Colorado Springs
Pueblo
Cheyenne
Omaha
Kansas City
St. Louis
Chicago
Minneapolis
St. Paul
Duluth
Fargo
Bismarck
Pierre
Sioux Falls
Des Moines
Davenport
Rock Island
Peoria
Springfield
Indianapolis
Columbus
Cleveland
Toledo
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Grand Rapids
Lansing
Saginaw
Bay City
Flint
Port Huron
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Portland
Boston
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Rochester
Niagara Falls
Buffalo
Toronto


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UNITED STATES
MEXICO
CENTRAL AMERICA
WEST INDIES
GREATER ANTILLES
GULF OF MEXICO
CARIBBEAN SEA
PACIFIC OCEAN
ATLANTIC OCEAN
Longitude 100° West from 95° Greenwich
120° 115° 110° 105° 90° 85° 75° 70°
35° 30° 25° 20° 15° 10°
TROPIC OF CANCER
Rio Grande
Colorado R.
Mississippi R.
Missouri R.
Ohio R.
Columbia R.
Yukon R.
Mackenzie R.
Hudson R.
Great Slave L.
Great Bear L.
Great Salt L.
Lake Winnipeg
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Lake Winnipegosis
Lake Manitoba
Lake Athabasca
Lake Winnipeg
Lake Nipigon
Lake Michikamau
Lake Mistassini
Lake St. John
Lake Champlain
Lake Nipissing
Lake Timiskaming
Lake Abitibi
Lake Temiscamingue
Lake Kamanistiquia
Lake Manicouagan
Lake Saint John
Lake Saint Clair
Lake Saint Francis
Lake Saint Louis
Lake Saint Peter
Lake Saint Joseph
Lake Saint Charles
Lake Saint Lawrence

grounds covering four acres, the Federal Post Office and Court building, the state agricultural building, Sir Walter hotel, and Christ church. Raleigh is the seat of North Carolina college of agriculture and engineering, the State museum of natural history, Meredith college, and Shaw university. The site of the city was selected for the state capital in 1792, and the city was founded in the same year. Population, 1920, 24,418.

Reading (*red'ing*). A city of southeastern Pennsylvania, on the Schuylkill river, about 50 miles northwest of Philadelphia. Situated in a rich agricultural region and near large fields of anthracite coal and iron ore, Reading possesses unusual commercial and industrial advantages. The chief industry is the manufacture of iron and steel, with knit goods second in importance. Other industries include railway car shops, machine shops, and the manufacture of shoes, tobacco, automobile parts, paints, and confectionery.

Reading occupies a picturesque site between the base of Mount Penn and the Schuylkill river. The streets are regularly laid out, and there are many fine parks and public buildings. The summits of Mount Penn, to the east, and the Neversink mountains, to the south, both rise to elevations of about 800 feet and command magnificent views. The city was laid out in 1748 in accordance with the plans of Thomas and Richard Penn, sons of William Penn. The early inhabitants were mostly German, and Pennsylvania German ("Dutch") is still spoken in the surrounding country. Population, 1920, 107,784.

Redlands. A city of southern California, picturesquely situated in the foothills of the San Bernardino mountains, about 65 miles southeast of Los Angeles. Redlands is a noted residential city, health resort, and educational center, in the heart of an immensely productive orange growing district. Smiley Heights, one of the city's numerous parks, affords a magnificent view of the surrounding region, embracing orange and lemon groves, grain fields, forests, and snow-capped mountains. The city is the seat of the University of Redlands. Population, 1920, 9571.

Reno. The chief commercial and industrial city of Nevada, located near the western boundary of the state, about 30 miles northwest of Carson City. Reno lies in a sheltered valley near the eastern base of the Sierra Nevada at an elevation of 4500 feet. It is on the Truckee river, which feeds the Truckee-Carson canal, a government irrigation project which waters more than 100,000 acres. The city is the distributing center of an extensive region devoted to mining, farming, and stock raising. Among the industrial establishments are ore reduction works, flour mills, lumber mills, and large railway shops. The University of Nevada and other important institutions are located here. Population, 1920, 12,016.

Richmond. The capital and largest city of Virginia, located at the head of navigation on the James river, about 100 miles almost directly south of Washington. Richmond is an important railway center, and has direct steamer connections with Atlantic coast ports. It is a leading tobacco market and one of the chief manufacturing centers of the South, utilizing extensive water power derived from the falls of the river. The foremost industry is the manufacture of tobacco in various forms. Second in importance are manufactures of iron and steel, including locomotives, agricultural implements, and machine shop products.

The city occupies a commanding site, covering seven hills, and is sometimes styled the "Modern Rome." It is regularly laid out, rising in terraces from the river. There are many beautiful parks and imposing public buildings. Among the most noteworthy of the latter is the capitol, designed after the Maison Carrée at Nimes, France, and built 1785–92. The city possesses many fine monumental and sculptural works, including the Washington monument at Capitol square, and a statue of Washington by Houdon, of R. E. Lee, by Mercier, and of Stonewall Jackson, by Foley.

Richmond is exceedingly rich in historic associations, and in colonial days, like Boston in New England, it played a prominent part in shaping the destinies of the country. In Saint John's Episcopal church, in March 1775, Patrick Henry made his noted speech containing the famous exclamation, "Give me liberty or give me death!" From May 8, 1861 to April 2, 1865, it was the capital of the Confederate states. The executive mansion, occupied by Jefferson Davis, 1862–65, has been transformed into a Confederate museum. The former residence of John Marshall, built in 1795, still stands, and the Lee mansion, occupied by General R. E. Lee's family during the Civil War, is occupied by the Virginia Historical Society. Richmond was established as a town in 1733, and chartered as a city in 1782. Population, 1920, 171,667.

Riverside. An important orange growing center of southern California, situated on the Santa Ana river, about 55 miles east of Los Angeles. Riverside occupies a gently sloping site and is noted for its wide, luxuriantly shaded streets and beautiful homes. Many handsome avenues and driveways lead into the surrounding orange groves, alfalfa fields, and fig orchards. Among these may be mentioned Magnolia avenue, a parkway 10 miles long, Victoria avenue, and Huntington boulevard. The city conducts a substantial local trade, has large Portland cement works, and ships annually from its warehouses many thousand carloads of oranges. Riverside is widely known for its unique hotel, Glenwood Mission inn. This contains a treasure house of interesting exhibits of historic value connected with the early Mission days of California. Population, 1920, 19,341.

Roanoke. An industrial city of southwestern Virginia on the Roanoke river, about 140 miles west of Richmond. The city is located in a picturesque valley between the Blue Ridge and the Allegheny mountains. It is the commercial center of an iron producing and stock raising district, with which it conducts a large trade. As a center for the distribution of electric power, it affords ample facilities for the development of the city's extensive industries, which include iron and steel works, bridge works, car shops, flour mills, cordage works, and clothing factories. It has one of the largest rayon mills in the country. In the vicinity are mineral springs of high medicinal value. The city with its environs is widely known as a health resort. Population, 1920, 50,842.

Rochester. A city of southeastern Minnesota, on the Zumbro river, about 90 miles southeast of Saint Paul. It is the trade center of a rich agricultural district and has substantial industries, including flour mills, jewelry works, and camera factories. The city is the seat of Saint Mary's hospital and of the world-famous Mayo clinic, founded by the distinguished surgeons, Charles and William Mayo. It is estimated that each year 70,000 persons visit Rochester for medical examinations and treatment. Population, 1920, 13,722.

Rochester. A city of west central New York, built on both banks of the Genesee river, at the Genesee falls, and extending to Lake Ontario. Rochester ranks third in population, and third also in manufactures, among the cities of the state. Factors which have contributed to its eminence as an industrial center are abundant water power, derived from the falls of the river, and excellent transportation facilities afforded by Lake Ontario, the State barge canal, numerous steam railways, and electric and bus interurban lines. It has a port on Lake Ontario and a subway utilizing the abandoned bed of a canal.

The city's extensive manufactures embrace more than 350 different commodities. These are produced in upwards of 1700 factories and consist largely of articles requiring the employment of a high degree of mechanical skill. Rochester leads the world in the production of cameras and photographic supplies. Among other important manufactures are men's clothing, boots and shoes, cutlery, machine tools, electrical machinery, optical instruments, thermometers, flour, canned fruits, furniture, and refined petroleum. Rochester stands first among the cities of the United States as a nursery-garden and seed-distributing center.

Rochester occupies a nearly level site and is divided into two almost equal parts by the Genesee river, which is spanned by 12 bridges, some of which are 200 feet high. In the center of the city is the Upper falls, 96 feet in height; below them the river flows in a deep gorge to the Lower falls, 80 feet high. There are many fine streets and avenues, and the residential sections are especially attractive. The park system, covering about 1650 acres, is one of the most beautiful in America.

The city is the seat of the University of Rochester, Saint Bernard's seminary, the Mechanic's institute, and other important educational institutions, and affords exceptional advantages for the study of art and music, the latter particularly at the Eastman school of music.

First permanently settled in 1812, Rochester was incorporated as a village in 1817 and chartered as a city in 1834. The completion, in 1825, of the Erie canal greatly stimulated the city's growth. During the early period, when the Genesee valley was the chief wheat belt of the country, Rochester was known as the "Flour City." With the decline of milling and the rise of the nursery industry this sobriquet was changed to the "Flower City." Since the development of its great camera and photographic supply business, it has been styled the "Kodak City." Population, 1920, 295,750.

Rockford. A manufacturing city of Illinois, on the Rock river, about 90 miles northwest of Chicago. Abundant water power, furnished by a great dam in the river, is utilized in its large and varied industries. Among these are the manufacture of machine tools, farm implements, furniture, hosiery, saddlery, sewing machines, and pianos. Rockford ranks fifth in manufactures among the cities of Illinois. The city is the seat of Rockford college. First settled in 1834, Rockford was chartered as a city in 1852. Population, 1920, 65,651.

Rock Island. A city of western Illinois, on the Mississippi river, adjoining Moline, and opposite Davenport, Iowa, with which it is connected by bridges. The city takes its name from an island in the river opposite the upper section of the town. Abundant water power, provided by a

government dam, has aided in the development of the city's substantial industries, which include the manufacture of agricultural implements, lumber, stoves, paint, building material, and plumbing supplies. An immense government arsenal, the most extensive in the United States, is located on the island. The three cities, Rock Island, Moline, and Davenport, are sometimes styled the "Tri-Cities" or the "Triplets." Rock Island was settled in 1826 and chartered as a city in 1849. Population, 1920, 35,177.

Royal Gorge. The deepest part of the Grand Canyon of the Arkansas river. It is situated in central Colorado, 45 miles west of Pueblo. The entire canyon, about 8 miles long, has precipitous walls of eroded granite which rise to an immense height. In the portion a mile and a half long called the Royal Gorge, these titanic walls tower almost perpendicularly 2600 feet above the foaming torrent of the river. At the narrowest part, the stream fills the canyon nearly from wall to wall, and the railway passes through it over a bridge hung from transverse girders mortised into the rocks of both sides of the canyon. This picturesque passage is the gateway to western Colorado.

Sacramento. The capital of California, located on the Sacramento river 90 miles northeast of San Francisco. Sacramento lies in the midst of a very rich farming and fruit growing region, and the most important of the city's varied industries is the canning of fruit. Among the other industrial establishments are large railroad shops; flour, rice, and lumber mills; and meat packing houses. The city is built on the site of Sutter's Fort, the first settlement in California reached by the gold seekers of 1849 and 1850. The fort has been rebuilt and is preserved for its historic interest.

The handsome capitol, completed in 1869, and two recent state buildings form a striking 8-million dollar group in a beautiful 38-acre park in the center of the city. Sacramento was incorporated in 1849 and became the state capital in 1854. Population, 1920, 65,908.

Sagamore Hill. The country estate and residence of Theodore Roosevelt, situated near the town of Oyster Bay, on the northern shore of Long Island, about 30 miles northeast of New York City. The substantial but unostentatious house stands on high ground and commands a charming view. For many years it was the cherished home of the great champion of the strenuous life and the Mecca of his admiring friends. Following his death in 1919, it became the residence of his son, Theodore Roosevelt. Young's Memorial cemetery, which contains the grave of the former president, is also situated at the town of Oyster Bay.

Saginaw. A city of southeastern Michigan, built at the head of navigation on the Saginaw river, about 100 miles northwest of Detroit. The city lies in rich coal and oil fields and has immense supplies of hydroelectric power. There are many salt wells in the vicinity. Its industries produce, among other commodities, automobiles and parts, foundry and machine shop products, furniture, phonographs, coal, beet sugar, and oil. Saginaw has extensive car shops. There are several fine parks, and many handsome public buildings, including hospitals and educational institutions. Population, 1920, 61,903.

Saint Augustine (*ô'gŭs-tēn'*). The oldest city in the United States, situated on the east coast of Florida, about 30 miles southeast of Jacksonville. Saint Augustine was founded in 1565 by the Spanish under Pedro Menendez de Aviles, sent by Philip II of Spain. With the exception of 20 years, 1763–83, when it was in the hands of the British, Saint Augustine remained a Spanish city until 1821, when the United States acquired Florida by treaty and cession. In the old part of the town, the quaint, narrow streets are lined with ancient houses built of the shell material known as coquina. Many of these houses have overhanging balconies and are set amid gardens luxuriant with semitropical vegetation.

Among the many historic buildings are Fort Marion, the oldest fort in the United States, begun in 1656; the remodeled governor's palace; and the famous city gates. Saint Augustine is a noted winter resort and contains many fine hotels. Among these are the Alcazar and the palatial Ponce de Leon hotel, built in the Spanish Renaissance style. Population, 1920, 6192.

Saint Joseph. The third largest city of Missouri, built on the east bank of the Missouri river, about 60 miles north of Kansas City. The city lies picturesquely along the bluffs of the river. It is the center of a rich agricultural region with which it carries on a large merchandising and marketing trade. Saint Joseph is one of the leading live stock markets of the country, and contains several great meat packing establishments. Its chief manufactures are packing-house products and flour and gristmill products. Other important manufactures include clothing, candy, shoes, harness leather, and furniture. Saint Joseph was first settled in 1826 by Joseph Robidoux, a French fur trader; it was incorporated in 1845 and became a city in 1851. Population, 1920, 77,939.

SAINT LOUIS (*lōō'ĭs; lōō'ī*). The chief city of Missouri, and the sixth largest in the United States, situated on the Mississippi river, about 20 miles below the mouth of the Missouri. Chicago lies about 280 miles to the northeast, Kansas City about the same distance west, Minneapolis about 600 miles north, and New Orleans about 700 miles south, of the city.

Site. Saint Louis occupies a commanding site, rising in a succession of gently sloping hills and depressions, each ridge toward the west ascending higher and finally reaching, at the western limits, an elevation of some 200 feet above the river. The boundaries are two curved lines, the crescent-like bend of the Mississippi on the east and an arbitrary boundary on the west. The total frontage on the river is more than 19 miles, the length of the western boundary is about 21 miles, and the maximum width is nearly 7 miles. The total area slightly exceeds 61 square miles.

Streets and Buildings. In the small, older portion of the city, the streets are narrow and more or less irregular. The modern parts of the city have been laid out, wherever possible, with wide streets, crossing at right angles, and in north-and-south and east-and-west directions.

Important east-and-west thoroughfares are Washington avenue, Locust street, and Olive street, with Easton avenue to the north. Lindell boulevard, diverging from Olive street near Grand boulevard, is the chief east-and-west boulevard. Chouteau avenue runs also east-and-west through the city to Forest park. Broadway follows the curve of the Mississippi from the extreme south to the northern limit of the city. Grand boulevard and King's highway are important north-and-south boulevards, extending also the full length of the city. The Union boulevard route forms another extensive north-and-south boulevard, as does the Skinker and McCausland-River des Peres drive, skirting the western limits of the city.

Diagonal thoroughfares from the business center to the city boundaries are provided for over Twelfth street and Gravois avenue to the southwest, and over Twelfth street and Natural Bridge avenue to the northwest.

The Old cathedral on Walnut street is the most noteworthy example of the French period in the history of Saint Louis. Among the many notable modern buildings are the city hall, which resembles an old French hôtel de ville; the Union station, in Renaissance style; the buildings of Washington university, in Tudor Gothic style; the public library, built of Maine granite in the early Italian Renaissance style, and the art museum and the Jefferson memorial, in the classic style. Other noteworthy structures are the immense Saint Louis cathedral, distinctly Romanesque; the Protestant Episcopal cathedral, in modified Gothic; and the impressive Shaare Emeth synagogue. A group of imposing buildings on Lindell boulevard includes the Masonic temple, the Shriners' Moolah temple, and the Scottish Rite cathedral. The tallest buildings include the civic courthouse and the 31-story Southwestern Bell Telephone building.

No city in America excels Saint Louis in the beauty of its exclusive residential districts, called "places." In these are magnificent homes with spacious grounds reflecting the highest skill of the architect and the landscape gardener. Washington Terrace, Westmoreland, Kingsbury, and Portland rank among the most noted of the places. Other fine residence sections are found in Compton Heights, Hortense place, Parkview, and in Hillcrest, and also along Forsythe and Lindell boulevards.

Saint Louis is distinctively a city of brick, and, with few exceptions, even the most elaborate mansions are built of this material. Owing to comparative cheapness of local building materials, especially brick and limestone, a very large percentage of the inhabitants of the city live in separate homes.

Civic Improvements. A unique recreation facility is the Open Air Municipal theater, with a seating capacity of 9500, located in Forest park. In 1923, a ten-year program of civic improvement, secured by an approved bond issue of 87 million dollars, was entered upon by the city. These improvements included the erection of an auditorium and other municipal buildings, forming a civic center on a memorial plaza, occupying 9 city blocks in the downtown section. This scheme of improvements comprised also the widening of important streets and the construction of an enlarged system of waterworks. All of these municipal betterments were evolved under the provisions of a comprehensive zoning law.

Parks. The city has 65 parks, covering an area of more than 2700 acres. Forest park, the largest, containing 1381 acres, lies almost directly west of the business center. Other important recreation grounds are the Missouri botanical garden, Tower Grove, O'Fallon, Carondelet, and Lafayette parks. Several of the parks are ornamented with noteworthy works of sculpture. There are fine statues of Shakspere, Columbus, Humboldt, Schiller, Thomas Jefferson, and of Saint Louis, the crusader king of France, for whom the city was named.


Caribbean Sea
Atlantic Ocean
Pacific Ocean
Longitude West from Greenwich
EQUATOR
VENEZUELA
COLOMBIA
ECUADOR
PERU
BOLIVIA
BRAZIL
BRITISH GUIANA
DUTCH GUIANA (Surinam)
FRENCH GUIANA (Cayenne)
PARAGUAY
CHILE
Port of Spain
TRINIDAD (Brit.)
CURAÇAO (Dutch)
Georgetown
Paramaribo
Cayenne
Bogotá
Caracas
Quito
Lima
La Paz
Cochabamba
Sucre
Asuncion
Santiago
Buenos Aires
Montevideo
Rio de Janeiro
São Paulo
Pernambuco (Recife)
Bahia (São Salvador da Bahia)
Pará or Tocantins
Amazon R.
Rio Negro
Rio Branco
Rio Purus
Rio Juruá
Rio Javary
Rio Ucayali
Rio Madeira
Rio Tapajoz
Rio Xingu
Rio Tocantins
Rio Araguaya
Rio Paraguay
Rio Paraná
Rio Tiete
Rio São Francisco
Rio Grande
Rio Doce
Rio Jequitinhonha
Rio Pardo
Rio de Contas
Rio Parahiba
Rio Parnahiba
Rio Itapicurú
Rio Mearim
Rio Gurupy
Rio Tapajos
Rio Trombetas
Rio Nhamundá
Rio Jamundá
Rio Uatumá
Rio Jauaperi
Rio Branco
Rio Uraricuera
Rio Tacutu
Rio Mahu
Rio Corentyne
Rio Essequibo
Rio Demerara
Rio Berbice
Rio Pomeroon
Rio Waini
Rio Barima
Rio Orinoco
Rio Meta
Rio Guaviare
Rio Inirida
Rio Vichada
Rio Arauca
Rio Cauca
Rio Magdalena
Rio Sinu
Rio Atrato
Rio Napo
Rio Pastaza
Rio Morona
Rio Santiago
Rio Huallaga
Rio Ucayali
Rio Pachitea
Rio Beni
Rio Mamoré
Rio Guaporé
Rio Madre de Dios
Rio Pilcomayo
Rio Bermejo
Rio Salado
Rio Colorado
Rio Negro
Rio Chubut
Rio Deseado
Rio Santa Cruz
Rio Gallegos
Rio Chico
Rio Grande
Rio Negro
Rio Uruguay
Rio Ibicuy
Rio Tercero
Rio Dulce



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Educational Institutions. Among the leading educational institutions are Washington university, Saint Louis university, and the Christian Brothers college. The Missouri botanical garden, founded by Henry Shaw and usually called Shaw's garden, is now maintained for the public. It contains a fine arboretum and a collection of native and foreign plants, especially orchids, rivaling in number and variety those of the Kew gardens in London.

Transportation. Two great advantages have made Saint Louis pre-eminent as a commercial and industrial center. The first is its location in the heart of the great Mississippi valley, the most fertile agricultural region in the world. The second lies in its unsurpassed facilities for transportation. The Mississippi river barge line handles an immense tonnage passing between Saint Paul and Minneapolis on the north and New Orleans on the south, and a great network of railways radiates from Saint Louis throughout an immensely productive region. During the city's earlier history, river transportation was all important, but between 1870 and 1890 railways largely superseded the rivers.

Commerce. Saint Louis is the most important distributing center of the Mississippi valley, handling products representing the entire country. It is a great grain, live stock, horse, tobacco, and wool market and conducts an immense wholesaling trade, especially in dry goods, hardware, boots and shoes, lumber, groceries, drugs, woodenware, and electrical machinery.

Manufactures. In value of manufactures, Saint Louis stands sixth among the cities of the United States. Its extensive industries embrace the manufacture of an exceedingly wide range of products. It is one of the greatest shoe manufacturing centers of the United States and ranks among the leading cities of the country in the manufacture of tobacco. Other important manufactures include packed meats, coke, blast furnace, foundry, machine shop, and rolling mill products, refined petroleum, clothing, chemicals, medicinal compounds, locomotive parts, railway supplies, railway and street cars, jute goods, hot-air furnaces, stoves, clay products, automobiles, and furniture.

History. Saint Louis was established in 1764 as a fur trading station by Pierre Laclède Liguest, assisted by Auguste Chouteau. Though under the control of Spain from 1770 to 1804, the place remained essentially French. In 1804, Saint Louis came into the possession of the United States by the Louisiana Purchase. The first newspaper was published in 1808, and, with the arrival of the first steamboat in 1815, a new era in the history of Saint Louis was opened. From 1840 to 1880, it passed 38 other American cities in population, and was passed by only one—Chicago. In 1904, the Louisiana Purchase exposition was held in the city, and, in 1914, a great historic pageant and masque was presented in Forest park. A feature of interest is the annual festival of the Veiled Prophet, somewhat similar to the Mardi Gras of New Orleans. Population, 1920, 772,897.

Saint Paul. The capital and second largest city of Minnesota, built on both banks of the Mississippi river, immediately below Minneapolis. A part of the western boundary of Saint Paul is contiguous with the eastern limits of Minneapolis, but the commercial centers of the two municipalities, often styled the "Twin Cities," are about 10 miles apart.

The city is built chiefly on the left or east bank of the Mississippi, and occupies three terraces, rising in all from 100 to 200 feet above the river. The lowest section contains railway yards, stock yards, wholesale houses, and factories. Lying above this, on the middle terrace, is the commercial district and a part of the residential section. On the uppermost terrace, crowning the highest bluffs, is the fine residence section; Summit Avenue boulevard, 200 feet wide and extending along the heights for 2½ miles, is a noted residential street.

Saint Paul is admirably laid out, with many handsome streets, boulevards, and drives, and has a park system widely known for its scenic beauty. The various parks, playgrounds, and connecting boulevards cover a total area of more than 2000 acres. In Como and Phalen parks there are picturesque lakes. Indian Mound park affords unsurpassed views of the Mississippi river.

Foremost among the city's notable buildings is the beautiful State capitol, constructed of marble and granite and containing many fine sculptural and mural decorations. Other fine structures are the Roman Catholic cathedral, the Hill Memorial library, the Minnesota Historical building, and the Union railway station.

Within the city are several important educational institutions, including Hamline university, Macalester college, Concordia college, Saint Thomas college, and the Saint Paul college of law.

Saint Paul enjoys exceptional transportation facilities, both by rail and by river, and is one of the great wholesale and jobbing centers of the country, with a total annual trade exceeding 500 million dollars. The city is also an important stock market, and, in manufactures, ranks second among the cities of the state. Prominent among the city's manufactures are railway cars, boots and shoes, fur goods, refrigerators, cordage and twine, law books, grass carpets and matting, butter, and packed meats.

Settled in 1839, Saint Paul was made the territorial capital in 1849, and, upon the admission of Minnesota, in 1858, was made the capital of the state. From about 1870, following the extensive building of railways and the settlement of the Northwest, the growth of the city has been continuous and substantial. Population, 1920, 234,698.

Saint Petersburg. A summer and winter resort of western Florida, about 20 miles southwest of Tampa. The city is charmingly situated on Tampa bay on the peninsula, separating that bay from the Gulf of Mexico. The city is visited annually by immense numbers of winter residents, pleasure seekers, and health seekers, and the winter population is estimated to exceed 150,000. Permanent population, 1920, 14,237.

Saint Thomas. The capital of the Virgin islands, on the southern side of the island of Saint Thomas, about 40 miles east of Porto Rico and 1440 miles southeast of New York. Situated on Saint Thomas harbor, one of the finest in the Antilles, it commands strategically the important Virgin Passage. It has a large coaling and fuel oil station. Population, 1917 census, 7747.

Salem. A city of eastern Massachusetts, built on a peninsula between two inlets of the Atlantic Ocean, about 14 miles northeast of Boston. Though irregularly laid out, Salem occupies an attractive site, with a fine drive along the north shore, and contains several beautiful parks. There are several very early colonial houses, numerous old mansions, dating from the period of the city's commercial supremacy, and many fine modern homes.

From early colonial years until about 1860, Salem was an important trading port. With the advent of steam navigation, its foreign commerce was largely transferred to Boston. The city still maintains an extensive coastwise trade, especially in coal. The substantial manufactures include cotton goods, machinery, games, and shoes.

Salem is the seat of the Essex institute, the Athenæum, the Peabody academy of science, and a State normal school. Founded in 1626, Salem is one of the oldest cities of New England, and is rich in historical associations. In 1692, it was the scene of the Salem witchcraft delusion. Many early dwellings are well preserved, as, for example, Hawthorne's birthplace, Witch house, and the House of Seven Gables. Population, 1920, 42,529.

Salem. The capital of Oregon, situated on the Willamette river in the northwestern portion of the state. Salem is the trade center of a fertile agricultural region; the industrial interests center about hop products, peppermint oil, linen, and fruit canning. Wide streets and two public parks enhance the appearance of the city. Among the principal buildings are the capitol, the Federal building, and the Supreme Court building. The city is the seat of Willamette university and of various state institutions. Salem was settled in 1840, was incorporated in 1853, and became the state capital in 1860. Population, 1920, 17,679.

Salt Lake City. The capital of Utah, the chief commercial city between Denver and San Francisco, and the converging point for east and west air traffic. The city is magnificently situated at the western base of the Wasatch mountains, at an elevation of about 4300 feet above the sea, some 12 miles southeast of Great Salt lake. It occupies a gently sloping site at the edge of a wide plain made highly fertile by irrigation. A noteworthy feature of the city is its unusually wide streets, at the sides of many of which run conduits bringing water from the mountains for freshening the vegetation of parks, lawns, and gardens.

Salt Lake City is the distributing center for a vast and rich region devoted to mining, stock raising, and agriculture. There are important mining interests, with large smelters and mineral mills in the city and vicinity. The city's industrial establishments include also flour mills, woolen mills, ironworks, beet sugar and canning factories, and manufactories of shoes, cereals, candy, and salt.

In the heart of the city is Temple square, containing the famous Mormon tabernacle, a huge oval building capable of seating 8000 people; the impressive granite temple which took 40 years to erect (1853–93); and the large assembly hall built to accommodate 3000 persons. Among other fine buildings are the State capitol and Saint Mary's of the Wasatch. The city is the seat of the University of Utah, a state normal school, and several other educational institutions.

Among points of interest are Fort Douglas, which overlooks the city from an eminence on the east, Saltair beach on the shore of the lake, and the great Bingham copper mine to the southwest, reached by a scenic railway.

Salt Lake City was founded by Brigham Young, the leader of a party of Mormons who arrived in the valley in 1847, and it has since been the headquarters of the Church of Jesus Christ of Latter-Day Saints. About 40 per cent of the people now living in the city are Latter-Day Saints, who have more than 40 places of worship in the city. Population, 1920, 118,110.

Salton Sea. A brackish lake in the central depression of the Colorado desert in southeastern California. Prior to 1905, this was a salt marsh interspersed with shallow saline ponds and lakes, covering an area about 30 miles long and 12 miles wide, with the surface lying about 280 feet below sea level. During the spring rains, however, the lake usually expanded into a body of water occupying an area of some 60 or 70 square miles, which, with the coming of the dry season, rapidly receded.

In 1905 and 1906, by an accidental inflow of water from the Colorado river, through defective irrigation canals, this watery marsh expanded into a lake 40 miles long, from 10 to 16 miles wide, and 90 feet deep, covering in all some 515 square miles. At its greatest height, the surface of the lake was only 194 feet below sea level. The rising waters overwhelmed villages, farms, factories, and railways.

After the inflow of water from the Colorado river was stopped in 1907, the lake receded as a result of evaporation until, by 1920, it covered only 265 square miles. Its surface was then approximately 250 feet below sea level. Since that time it has remained fairly stable, due to the inflow of natural drainage and a large volume of seepage and waste water from the irrigated lands in the Imperial valley.

San Antonio. The oldest and largest city of Texas, situated on a river of the same name, 80 miles southwest of Austin. San Antonio is noted for its delightful and healthful climate and is the pleasure resort of thousands of visitors. On all sides are spacious parks, luxuriant gardens, and an abundance of subtropical foliage and flowers. San Pedro park, with its picturesque live oaks and its famous springs, is the original site of the Indian settlement of San Antonio. Many of the old buildings, especially the Alamo and San Fernando cathedral, are full of historical interest.

San Antonio is the commercial center of a large agricultural and stock raising region, and is an important cattle, horse, and mule market. It has substantial and growing industries which include flour mills, oil mills, refineries, foundries, packing houses, and cement works.

The first permanent settlement was established in 1718 with the founding of the mission of San Antonio de Valero and the presidio of San Antonio de Bexar. In 1809 this settlement became a city. San Antonio was the scene of stirring events in the early history of Texas. Since 1878, when the first railway reached the city, its growth has been rapid. Population, 1920, 161,379.

San Bernardino (*săn bûr'năr-dē'nō*). A commercial and industrial city of southern California, about 60 miles east of Los Angeles. San Bernardino is situated in a beautiful valley surrounded by snow-capped mountains, near the entrance of the Cajon pass into the Mohave desert. It is the trade center of a rich irrigated district devoted chiefly to growing citrous fruits. Its industrial establishments include large railroad shops, foundries, machine shops, and planing mills. First settled by Mormons in 1851, San Bernardino was incorporated as a town in 1868 and, in 1886, was chartered as a city. Population, 1920, 18,721. See *Citrous Belt.*

San Diego (*dē-ă'gō*). A city and port of southern California with an excellent harbor on San Diego bay, about 125 miles southeast of Los Angeles. The climate is mild and remarkably equable. Subtropical fruits, especially the lemon, orange, olive, and fig, flourish in the surrounding district. Among leading industries are flour milling, fish canning, meat packing, and the handling of fruits and fruit products. The manufactures include also confectionery, paint, macaroni, onyx products, and airplanes and equipment. There is a growing foreign trade; the chief exports include fruits, honey, cotton, hides, and wool.

San Diego is a United States naval base and has an elaborately improved harbor. It is also an important aeronautical center. The city possesses many fine parks, Balboa park alone having an area of 1400 acres. In it are located two notable museums. Among the city's more elaborate structures are the Spreckels building and the San Diego Trust and Savings Bank building. By reason of its climate and location, San Diego is a prominent health and travel resort. Among local points of interest are Coronado beach, Fort Rosecrans, Point Loma, and La Jolla caves. Population, 1920, 74,683.

SAN FRANCISCO. The principal seaport and manufacturing city of the Pacific coast of America, and second only to Los Angeles in population among the cities of the Pacific states. San Francisco is situated about 600 miles northwest of San Diego and approximately 865 miles by water south of Seattle.

SITE. San Francisco occupies a magnificent site overlooking one of the finest natural harbors in the world. The city is built on the northern end of a semimountainous peninsula lying between the ocean on the west and San Francisco bay on the east. The site, though generally sloping toward the east, is irregular, and embraces many bold hills, of which the highest, Twin Peaks, 925 feet high, separate the business district from the newer residential sections. The entrance from the ocean to the bay is through the Golden Gate, a narrow, rock-bound waterway whose attractive setting recalls Constantinople and Gibraltar.

STREETS AND BUILDINGS. In general, the streets of the city are broad and straight, in some cases leading directly up steep hills. The chief commercial thoroughfare is Market street, 120 feet wide and 3½ miles long, extending southwest from Union Ferry station on the bay. The next most noted thoroughfare is Van Ness avenue, which runs north from Market street near the Civic Center. Among other important streets are Kearney, Geary, Sutter, Post, and Stockton. The district bounded approximately by Kearney and Stockton streets and by California and Pacific avenues, in the heart of the commercial section, is Chinatown, long a picturesque feature of the city. The level section south of Market street contains the manufacturing district. Along the steep thoroughfares north of Market street are built the great office buildings and department stores, and to the west on the higher hills are the finest residential parts of the city.

Of many imposing public buildings, the most important are those of the group forming the Civic Center, including the city hall, the public library, and the auditorium. Other notable buildings are the post office, the United States mint, and the Union Ferry building. Among the larger office buildings are the Southern Pacific building, the Federal Reserve bank, the Russ building, 30 stories high, the Standard Oil building, 22 stories high, the Hobart building, 21 stories high, and the Claus Spreckles building, 19 stories high, which withstood the ravages of the great fire of 1906.

PARKS AND BOULEVARDS. The municipal park system includes more than 30 parks, with a total area of about 1400 acres. The chief of these, Golden Gate park, covering 1013 acres, extends from near the center of the city west to the ocean. The principal points of scenic and historic interest are reached by an extensive system of boulevards and driveways. Those passing through the Presidio and Lincoln park give fine views of the Golden Gate. These lead also past Sutro baths and the Cliff House to the Great highway which runs close to the ocean for 3 miles. The historic Mission road, the city's oldest thoroughfare, has been modernized. A boulevard extends to the top of Twin Peaks, whose lofty crest affords a splendid panoramic view of the city and its surroundings.

EDUCATIONAL INSTITUTIONS. Among the important educational and scientific institutions are the Memorial museum, the California school of fine arts, the Mechanics institute, the School of mechanical arts, the Cogswell polytechnic institute, and the Lux school of industry. The University of California is at Berkeley, across the bay; in San Francisco are located the affiliated colleges, which include the departments of medicine, dentistry, and pharmacy. Leland Stanford university is at Palo Alto, 33 miles distant.

TRANSPORTATION. The harbor of San Francisco, completely sheltered from the sea by coastal hills, is one of the largest and safest on the globe. It has extensive docks, and is equipped with dry docks and other facilities for the care of vessels. The city is connected, by regular lines of steamships, with all ports on the Pacific coast of North and South America, with Atlantic seaports by way of the Panama canal, and with Hawaii, the Philippines, Australia, China, and Japan.

San Francisco is the terminus of the Southern Pacific railway from New Orleans. Oakland, on the eastern side of the bay, is the terminus of three transcontinental systems, and both passenger and freight connection with San Francisco across the bay is afforded by a ferry service and the Dumbarton bridge. Two systems of street railways, one municipally owned and operated, provide local transportation.

COMMERCE. In foreign commerce, San Francisco ranks among the chief seaports of the country. The leading articles of export usually include canned fruits, canned salmon, raw cotton, iron and steel manufactures, grain, and fuel oils. Among the principal imports are rice, sugar, coffee, copra, and tin. The city also conducts an extensive coastwise commerce with other ports of the United States, and much Western produce is collected at San Francisco for distribution by rail.

FINANCE. San Francisco is the financial center of the Pacific coast. It is noted for the size and strength of its banking institutions, and is the headquarters of two of the largest banking organizations in America.

MANUFACTURES. San Francisco is one of the leading cities of the western United States in the total value of manufactured products. Crude petroleum, piped from vast oil fields, is extensively used for fuel. Among important industries are sugar refining, meat packing, shipbuilding, coffee roasting, fruit canning, oil refining, flour milling, and the manufacture of mining machinery, tinware, clothing, and furniture.


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Prepared especially for
The Frontier Press Company
Scale of Statute Miles.
0 100 200 300 400 500
Kilometers.
0 100 200 300 400 500 600 700 800
Capital Cities:
Railroads:
Canals:
Comparative Area.
PENN.
45,126 Square Miles.
Longitude West from Greenwich
Jan Mayen Land
North Cape (Horn)
Denmark Strait
ICELAND
Langanes
Cape Horn
ARCTIC CIRCLE
Norwegian Sea
Faroe Islands
Thorshavn
Shetland Islands
Mainland
Orkney Islands
Pentland Firth
Wick
Hebrides or Western Isles
C. Wrath
Stromness
Lewis
Skye
Mull
Oban
Inverness
Aberdeen
Dundee
Perth
Edinburgh
Glasgow
Stirling
Paisley
Ayr
Dumfries
SCOTLAND
Battray Head
Patterhead
Moray Firth
Firth of Forth
North Sea
British Isles
IRELAND
Belfast
Dublin
Limerick
Shannon
Valentia I.
Galway
Sligo
Donegal
C. Clear
Queenstown
Cork
Waterford
Wexford
Irish Sea
Liverpool
Manchester
Leeds
Hull
Sheffield
Nottingham
Lincoln
Norwich
Yarmouth
Newcastle
Sunderland
Middlesbrough
Lancaster
Preston
Carlisle
Barrow
Holyhead
Anglesey
Chester
Shrewsbury
Birmingham
Wolverhampton
Coventry
Leicester
Derby
Stafford
WALES
ENGLAND
GREAT BRITAIN
The Wash
Helder
Amsterdam
Rotterdam
The Hague
NETHERLANDS
Utrecht
Arnhem
Groningen
Emden
Bremen
Hamburg
Lübeck
Kiel
Flensburg
Helgoland
Wilhelmshaven
Oldenburg
Osnabrück
Münster
Hannover
Braunschweig
Magdeburg
Berlin
Potsdam
Stettin
Danzig
Posen
Breslau
Dresden
Leipzig
Chemnitz
Zwickau
Plauen
Hof
Nürnberg
Bamberg
Würzburg
Frankfurt
Mainz
Wiesbaden
Koblenz
Cologne
Aachen
Düsseldorf
Essen
Dortmund
Bielefeld
Minden
Kassel
Fulda
Eisenach
Erfurt
Gotha
Weimar
Halle
Dessau
Cottbus
Frankfurt
Posen
GERMANY
Skagerrack
Kristiansand
Stavanger
Bergen
Haugesund
Bokn fjord
Ekersund
Lindesnes (The Naze)
Arendal
Grimstad
Egersund
Flekkefjord
Mandal
Farsund
Lillesand
Tvedestrand
Arendal
Risör
Skien
Larvik
Sandefjord
Tönsberg
Horten
Drammen
Kongsberg
Hönefoss
Kongsvinger
Eidsvold
Lillehammer
Gudbrandsdal
Dovrefjeld
Romsdal
Nordfjord
Sognefjord
Florö
Vossevangen
Hardanger fjord
Hardanger
Odde
Kristiansand
Molde
Aalesund
Trondhjem
Stören
Levanger
Namsos
Grong
Mosjöen
Mo
Bodö
Vesteralen
Lofoten
Vestvaagö
Lango
Andenes
Hammerfest
Tromsö
Vardö
Kirkenes
Vadsö
Bergen
Haugesund
Stavanger
Ekersund
Egersund
Flekkefjord
Farsund
Lindesnes
Mandal
Arendal
Grimstad


Longitude 30° East from Greenwich 35°
40°
45°
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Features of Interest. Among many noteworthy places of interest within the city and its environs are the Presidio, a large military reservation; Telegraph hill, Russian hill, and Twin Peaks, affording excellent views; Chinatown, with its Oriental character and aspect; the ocean shore at Cliff House; the celebrated Seal rocks, Mission Dolores, Mount Tamalpais and Muir Woods, north of the Golden Gate; Angel, Alcatraz, and other islands, and the neighboring cities of Oakland, Berkeley, and Alameda.

History. The site of San Francisco was visited in 1769 by Spaniards who called the place Yerba Buena. The first settlement began in 1776 with the establishment of Mission Dolores. In 1846, the United States took possession of California, and, in 1847, the name of the town was changed to San Francisco. Following the discovery of gold in California in 1848, the development of the town was spectacular, and, in 1850, it became a city. In 1862, telegraphic communication with the East was established, and, in 1869, the first transcontinental railway was completed. The most momentous event in the history of San Francisco was the earthquake of April 18, 1906, followed by a tremendous conflagration which almost totally destroyed the buildings on an area of about 5 square miles, including the chief commercial and residential districts. Notwithstanding this enormous loss, the devastated area was rapidly rebuilt, and the city reconstructed on a grander and more substantial scale. Population, 1920, 506,676.

San Jose (*săn hō-sā'*). A city of west central California, situated in the beautiful and fertile Santa Clara valley, 47 miles southeast of San Francisco. It is in the midst of an important fruit growing region, and its principal commercial and industrial interests are connected with the cultivation of deciduous fruits. Santa Clara county, of which San Jose is the commercial center, produces about two-fifths of the total prune crop of California. San Jose is noted for its salubrious climate and delightful gardens. It possesses, moreover, many fine buildings, including the State teachers' college and other educational institutions. Lick observatory, situated on Mount Hamilton, about 25 miles east of the city, attracts many visitors. Population, 1920, 39,642.

San Juan (*săn hwän'*). The capital city and chief seaport of Porto Rico. It is built on two small islands, San Juan and Santurce, connected by five modern bridges. Santurce communicates with the mainland by the bridge of Martin Peña. It possesses an excellent harbor and several fine plazas and gardens. The chief industry is the manufacture of tobacco and the handling of sugar, grapefruit, pineapples, and other fruits.

San Juan was founded about 1519 by Ponce de Leon. The main part of the city is surrounded by medieval ramparts. Morro Castle, built in 1584, as a part of the city's defenses, stands on a promontory to the west. San Juan came into the possession of the United States by cession at the close of the Spanish American war. Population, 1920, 71,443.

Santa Barbara (*săn'tà bär'bà-rà*). A city of southern California, situated on Santa Barbara channel, about 90 miles northwest of Los Angeles. Santa Barbara lies in a beautiful valley opening southward to the sea, but encircled on the north and east by the Santa Ynez mountains. Closely paralleling the shore, the high coast range extends for many miles in an east-and-west direction, resulting in a remarkably mild and salubrious climate. The city is in the midst of an important farming, lemon growing, walnut growing, and stock raising region. A large proportion of the lima beans grown for market in the United States are produced in this district.

The Santa Barbara mission, founded in 1786, stands in the northern part of the city, and is still occupied by Franciscan monks. Santa Barbara is widely known for its attractive buildings in Spanish architecture. It is a noted all-year resort. Following a destructive earthquake in 1925, the city was handsomely rebuilt. Excellent roads in the vicinity afford fine views of the city, the channel, and the outlying islands. Population, 1920, 19,441.

Santa Catalina (*kăt'à-lē'nà*). An island of southern California, separated from the mainland of Los Angeles county by San Pedro channel, some 20 miles wide. Santa Catalina is about 25 miles long and the average width is about 4 miles. The surface is semimountainous with bold, rocky coasts and numerous, more or less wooded, gorges. Many interesting trees, shrubs, and other plants grow on the island, some of which do not occur elsewhere. The clear waters, remarkable for the beauty and variety of their marine life, are famous game-fishing grounds. Sea lions inhabit the south coast; flying fish are numerous in the channel, and whales are sometimes seen. The only town, Avalon, population in 1920, 586, is a noted resort.

Santa Fe (*săn'tà fā'*). The capital of New Mexico, situated in the north central part of the state. First established in 1605, Santa Fe has ever since been the capital of New Mexico. The city was taken from Mexico by the United States in 1846. Stock raising is the main industry of the surrounding district. Indian pottery in large quantities is made by the Pueblo Indians.

The older part of the city has narrow, crooked streets with houses made of adobe or sun-dried brick. There are many buildings of historic interest: the Palace, beside a central plaza, where the Mexican governors resided; San Miguel church; the capitol; and the State art museum, built in a mission style of architecture. In the vicinity are many remains of the cave and cliff dwellings of the Pueblo Indians. Population, 1920, 7236.

Santa Monica. A city of southern California, on the Pacific Ocean, about 15 miles west of Los Angeles. By reason of its excellent bathing beaches and boating facilities, Santa Monica is a popular seaside resort. Other features include the Palisades park and various amusement piers. Many people prominent in motion pictures have their residences here. Its chief industry is fishing. Population, 1920, 15,252.

Saratoga Springs. A city and famous watering place of eastern New York, situated about 40 miles almost directly north of Albany. It is noted for its numerous medicinal springs which have made it one of the most attractive health resorts in America. There are commodious hotels and bathhouses, polo grounds, race tracks, golf links, and many other facilities for recreation.

In 1909, the state of New York established a reservation of 550 acres, including 122 natural springs, for the purpose of ensuring a continuous flow of these curative waters for the benefit of the public. Thousands of persons visit the city each year to use the waters and baths. For about 100 years, these waters have been bottled and shipped to various parts of the world.

Saratoga Springs was founded in 1789. The Saratoga battlefield, the scene of Burgoyne's surrender, is located 12 miles east of the city. Population, 1920, 13,181.

Sault Sainte Marie (*sōō' sânt mā-rē'*). A city of northern Michigan, on the Saint Mary's river, and opposite a town of the same name in Ontario. At this point are the famous rapids (the *Sault* or "rapids" of Saint Mary), which make navigation impossible for lake vessels. However, between Lake Superior and Lake Huron, navigation has been made possible for ships of the heaviest tonnage by an extensive system of canals and locks. Some 25,000 ships, carrying about 100 million tons of freight, pass through this waterway every year. Immense hydroelectric power, generated at the rapids, is utilized in the city's growing industries, the chief of which are the manufacture of calcium carbide and leather. Other manufactories include planing, paper, and woolen mills, and machine shops. Population, 1920, 12,096.

Savannah. The second largest city of Georgia, situated on the Savannah river, about 18 miles from the sea. It occupies a fine level site and has an excellent harbor. Savannah is the chief cotton port on the Atlantic coast of the United States, and has also large exports of lumber, fertilizers, tobacco, and naval stores. It has extensive industries, which include the manufacture of cottonseed oils, fertilizers, foundry and machine shop products, cloth bags, and furniture. Savannah is noted for its well shaded streets and for its beautiful parks and gardens luxuriant with subtropical vegetation. The city was founded in 1733 and received its municipal charter in 1789. During the Revolutionary War it was captured by the British, and in the Civil War it was the objective of Sherman's march to the sea. Population, 1920, 83,252.

Schenectady. A city of eastern New York, located on the Mohawk river and the State barge canal, about 16 miles northwest of Albany. The older parts of the city are built along the river, but the more modern sections occupy the surrounding hills. Schenectady is unique among American cities of its size in that about 90 per cent of the persons employed in the city are engaged in the two leading industries, the building of locomotives and the manufacture of electrical machinery, apparatus, and supplies. A favorite local slogan is "Schenectady hauls and lights the world." In total value of manufactures, Schenectady ranks sixth among the cities of New York State.

Schenectady was settled in 1661 and chartered as a town in 1798. In 1690, an attacking force of French and Indians massacred most of the inhabitants. The city is the seat of Union college, the second college incorporated in the state. Population, 1920, 88,723.

Scranton. The third largest city of Pennsylvania, situated on the Lackawanna river, about 105 miles northwest of Philadelphia. Scranton occupies an undulating site surrounded by low mountains. It is the richest coal mining city in the world, being the center of the chief anthracite producing region of the United States. There are many collieries within the city, and more than 20 million tons of coal are mined in the district annually.

Scranton is also a leading silk manufacturing center, and its other noteworthy industries include the manufacture of locomotives, iron and steel goods, knit goods, cotton lace, women's clothing, phonograph records, and buttons. The

fine parks and the lake resorts in the near-by mountains make the city and its environs attractive. Scranton was founded in 1840, incorporated as a borough in 1854, and was chartered as a city in 1866. Population, 1920, 137,783.

Seattle. The chief city of Washington, and the second largest seaport of the Pacific states. It is built on the hilly eastern shore of Puget sound, about 865 miles by water north of San Francisco. The city occupies a commanding site between the Cascade and the Olympic range, with Puget sound forming its western front, and Lake Washington lying on its eastern border.

Surrounded by a tributary region rich in timber, fisheries, minerals, and agricultural resources, and possessing exceptional facilities for transportation, Seattle has become one of the foremost commercial centers of the Pacific coast. It is the terminal point of several transcontinental railroads and has regular steamship connections with all parts of the world by way of the Panama canal and the transpacific routes. In addition to other fine harbor facilities, a ship canal, 8½ miles long, situated wholly within the city, connects Puget sound with Lake Washington. The leading exports of the port are wheat, flour, lumber, refined copper, and fish; the imports are chiefly silk, rice, tea, coffee, sugar, copper ore, furs, and various Oriental products.

Owing to abundant and inexpensive hydroelectric power, derived from various waterfalls in near-by mountains, Seattle has developed extensive manufactures. The leading industries include flour milling, shipbuilding, meat packing, and the manufacture of lumber and wood products, iron and steel products, and machinery. The fishery interests of Alaska and Puget sound are largely centralized in Seattle which handles enormous quantities of canned salmon and other preserved fish. Gold from Alaska enters the country chiefly by way of this port.

Seattle contains many noteworthy buildings, among which are the Cathedral of Saint James, the public library, Providence hospital, and the Smith building, 42 stories high. The park and boulevard system embraces more than 1800 acres and includes upwards of 30 miles of scenic boulevards. The latter afford magnificent views of Mount Rainier and other snow-capped peaks of the Cascades. The campus of the University of Washington, covering 355 acres and situated between lakes Union and Washington, lies entirely within the city.

Seattle, named for a local Indian chief, was first settled in 1852. It was incorporated in 1865, and, in 1869, was chartered as a city. Population, 1920, 315,312.

Shasta, Mount. A majestic peak in the Sierra Nevada mountains of northern California, situated about 40 miles south of the Oregon boundary. This great mountain, one of the most imposing on the continent, is an extinct volcanic cone which rises to an elevation of 14,380 feet. The summit is continuously covered with snow, and on the north slope there are several glaciers. About 1400 feet below the summit there is a crater nearly 4000 feet in diameter and about 2500 feet deep.

Although regarded as extinct, Mount Shasta still shows vestiges of volcanic activity. At the summit there is a sulphurous fumarole which emits hot gases, and on the north slope there is another similar opening. During one of the prehistoric eruptions of Mount Shasta, a stream of lava flowed down its southern slope, entered the channel of the Sacramento river, and followed the bed of that stream for a distance of 50 miles.

The influence of temperature and moisture upon the distribution of plant life is well illustrated in the strong contrast between the vegetation of Mount Shasta and that of Shasta valley. The summit of the mountain is devoid of vegetation because of cold; the Shasta valley, 10 miles distant, is treeless because of a lack of moisture. Between these extremes lies the great forest belt of Mount Shasta. In this heavily forested area the different species of trees are arranged in zones, according to the requirements of each species as regards temperature and moisture. For example, yellow pine and sugar pine predominate in the Transition zone at the foot of the mountain; Shasta fir in the Canadian zone midway on the slope; and whitebark pine in the Hudsonian zone, immediately below the upper limit of trees, at about 9500 feet altitude. Small alpine plants are found as high as 13,000 feet.

Mount Shasta may be ascended with little difficulty. From Sisson railway station, a good trail, about 6 miles in length, leads to Timberline camp. From this camp, the summit may be reached and the return journey made to Sisson in a single day.

While the glaciers of Mount Shasta are smaller than those of Mount Rainier, and the charming mountain meadows found on the latter peak are wanting, the view from the summit of Mount Shasta is unsurpassed by that from any peak in the Cascade range.

Sheboygan (*shē-boi'găn*). A city of eastern Wisconsin, situated on Lake Michigan, about 50 miles north of Milwaukee. The city is the trade center of a farming and dairying region and is especially noted for the extensive manufacture of chairs. Other industries include the manufacture of furniture, leather, and enameled ware. There are fishing interests, and a state fish hatchery is located here. Population, 1920, 30,955.

Sheridan. A mining and trade center of northern Wyoming. It is an important shipping point for farm products and live stock, and also for coal, which is mined extensively in the neighborhood. The Indian battles of Wolf Creek, Massacre Hill, and Great Wagon Box were fought in the vicinity, 1865–67. Population, 1920, 9175.

Shoshone (*shō-shō'nē*) **Falls.** A great cataract of the Snake river, in southern Idaho, about 120 miles southeast of Boise. This magnificent waterfall is exceeded in grandeur, in the United States, only by Niagara and by the falls in the Yosemite valley. After coursing through a rocky canyon, some 1200 feet in depth, the deep river, here nearly 800 feet wide, first descends about 30 feet through several rocky channels. The waters then unite and the full volume of the river, in a single sheet, plunges over a precipice, about 200 feet high, into the bottom of a narrow gorge. The cataract is easily reached from Twin Falls, about 5 miles distant.

Shreveport. The second largest city of Louisiana, on the Red river, in the northwestern part of the state, about 300 miles from New Orleans. The city has excellent railway facilities and is the commercial center of a large region, rich in oil, gas, lumber, and agricultural and truck-farming products. There is an extensive trade in cotton, corn, peanuts, fruit, and live stock. The local industries include lumber, cotton, and cottonseed oil mills, glassworks, foundries, machine shops, and oil refineries. Population, 1920, 43,874.

Sioux (*sōō*) **City.** The second largest city of Iowa, located on the Missouri river, about 155 miles northwest of Des Moines. Sioux City occupies a commanding site embracing parts of the river valley and the encircling bluffs. It is the commercial center of a highly productive agricultural region and has extensive wholesaling and shipping interests. The city is one of the important live stock markets of the country and has large meat packing establishments, creameries, and numerous other substantial industries. In total value of manufactured products, Sioux City ranks first among the cities of the state. There are many fine streets and public buildings, and the municipal park system covers an area of about 2000 acres.

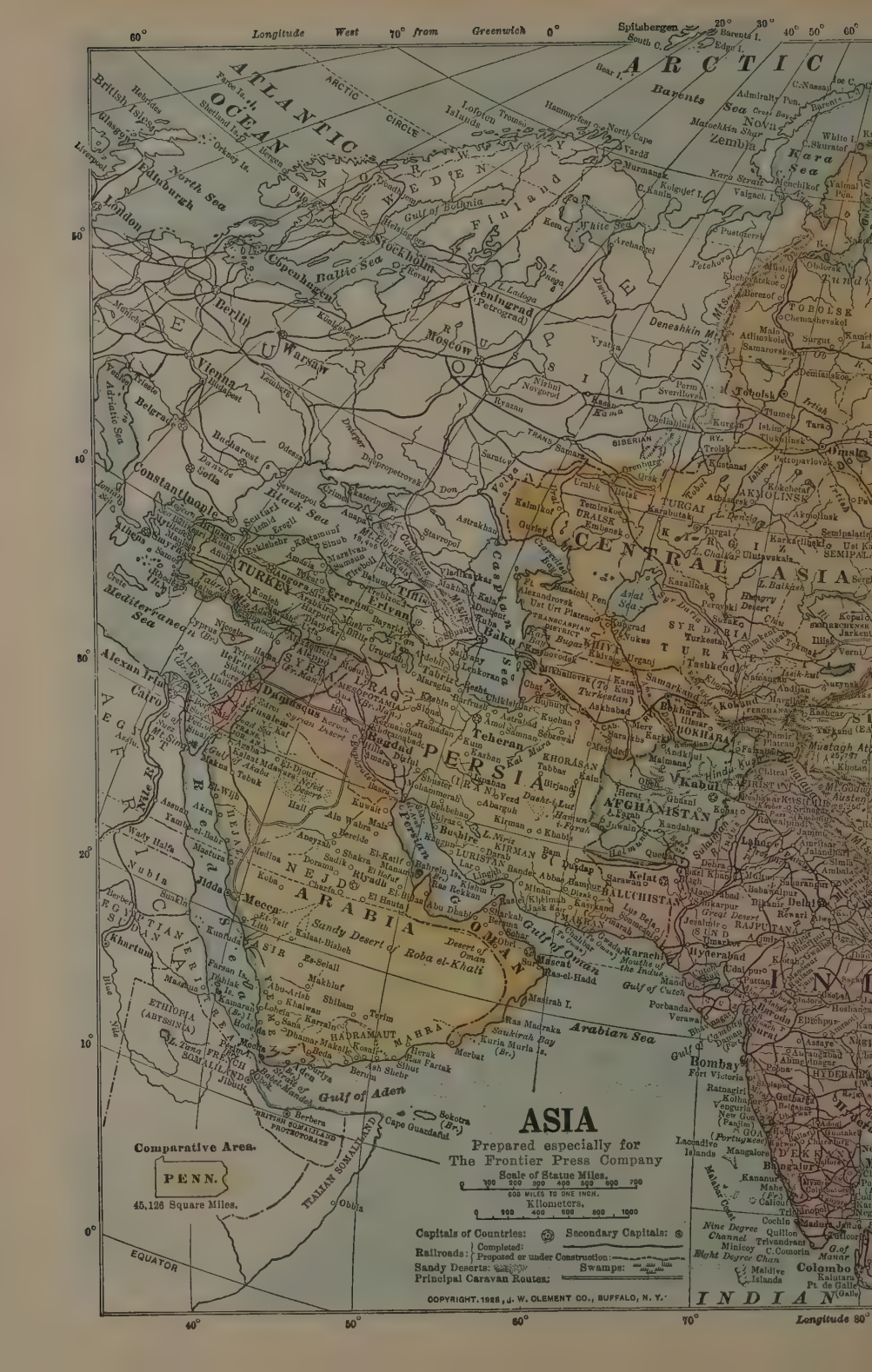
Sioux City was founded in 1849 as an outfitting station for expeditions to the Black Hills, and received its municipal charter in 1857. It is the seat of Morningside college and of Trinity college. Population, 1920, 71,227.

Sioux Falls. The largest city of South Dakota, on the Big Sioux river, about 320 miles southwest of Minneapolis. The river here falls nearly 100 feet, furnishing abundant hydroelectric power for various industries. In the vicinity there are extensive beds of quartzite, usually called jasper or red granite. Many buildings, both public and private, are built of this native pink stone, which renders the appearance of the city remarkably attractive. Meat packing, stone quarrying, and flour milling are among the chief industries. Population, 1920, 25,202.

Sitka. A city and United States naval station of southeastern Alaska, on the west coast of Baranof island. Mining, lumbering, and salmon canning are the chief industries of the town. Though located in a high northern latitude, the winters are not severe, and the general climate is healthful. Sitka was founded by the Russians in 1799 under the name of New Archangel, and later became the capital of the Russian territory of Alaska. From 1867 until 1906, Sitka was the capital of the United States territory of Alaska. Population, 1920, 1175.

Somerville. A residential city of eastern Massachusetts, on the Mystic river, two miles northwest of Boston. It is built on a series of hills and has many historic associations connected with the War of Independence. Paul Revere on his memorable ride passed through Somerville along a road now known as Broadway. Prospect Hill is said to be the scene of the first unfurling of the American flag. Meat packing, railway car repairing, furniture making, and the manufacture of paper bags are among the city's leading industries. Population, 1920, 93,091.

South Bend. A city of northern Indiana, built at the south bend of the Saint Joseph river, about 85 miles east of Chicago. South Bend has excellent railway facilities, is the commercial center of a rich agricultural and peppermint growing district, and has developed extensive manufacturing industries. The city contains large automobile factories, plow factories, and wagon works. Other important manufactures include farm implements, lathes, bait, knit goods, roofing, men's clothing, sewing machine parts, stoves, electrical machinery, street lighting equipment, and watches. South Bend was laid out in 1831 and, in 1835, was incorporated. The University of Notre Dame is situated in the environs of the city. Population, 1920, 70,983.


ASIA
Prepared especially for
The Frontier Press Company
Scale of Statue Miles.
0 100 200 300 400 500 600 700
600 MILES TO ONE INCH.
Kilometers.
0 200 400 600 800 1000
Capitals of Countries:
Secondary Capitals:
Railroads: Completed:
Proposed or under Construction:
Sandy Deserts:
Swamps:
Principal Caravan Routes:
Comparative Area.
PENN.
45,128 Square Miles.
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Longitude West 70° from Greenwich 0°
Longitude 80°
ARCTIC OCEAN
ATLANTIC OCEAN
INDIAN
EUROPE
ASIA
CENTRAL ASIA
ARABIA
PERSIA
AFGHANISTAN
BALUCHISTAN
TURKEY
SYRIA
IRAQ
EGYPT
Arabian Sea
Gulf of Aden
Gulf of Oman
Mediterranean Sea
Black Sea
Caspian Sea
Aral Sea
Baltic Sea
North Sea
Red Sea
Persian Gulf
EQUATOR


100° 110° 120° 130° 140° 150° Long. 160° East from 170° Greenwich 180 70°
East Cape
St. Lawrence (To U.S.)
C. Chukotskii
60°
Bering Sea
Sea of Okhotsk
Kamchatka
Sakhalin Island
Hokkaido
Honshu or Nippon
Japan Sea
Yellow Sea
Eastern Sea
Shanghai
Hankow
Peking
Tientsin
Port Arthur
Dairen
Seoul
Fusan
Tokyo
Yokohama
Osaka
Kobe
Nagasaki
Kagoshima
Liu-kiu Islands
Formosa
Taihoku
Takao
Amoy
Swatow
Canton
Hongkong
Victoria
Macao
Hainan
Hue
Saigon
Bangkok
Mandalay
Rangoon
Calcutta
Andaman Islands
Port Blair
Nicobar Islands
Ten Degree Channel
Sambrero Channel
Malacca Strait
Singapore
Johore
Penang
Achin
Sumatra
Borneo
Celebes
Sulu Sea
Mindoro Strait
Manila
Philippine Islands
Luzon I.
Mindanao I.
Palawan I.
Balabac I.
Labuan
Brunei
Sarawak
Celebes Sea
Moluccas or Spice Is.
New Guinea
Gulf of Tomini
Equator
Tropic of Cancer
Pacific Ocean
Empire of Japan
Mongolia
Manchuria
Chinese Empire
Republic of China
Tibet
Siam
Indo-China
Federated Malay States
Straits Settlements
Tundra
Arctic Circle
Yablonoi Mts.
Stanovoi Mts.
Verkhoyansk Mts.
Aldan Mts.
Jugur Mts.
Kuen-lun Mts.
Nan-shan Mts.
Himalaya Mts.
Great Wall
Gobi Desert
Lake Baikal
Yenisei R.
Lena R.
Amur R.
Yangtse R.
Hoang R.
Mekong R.
Irrawaddy R.
Salween R.
Brahmaputra R.
Ganges R.
Indus R.
Tarim R.
Yarkand R.
Kashgar
Khotan
Lhasa
Irkutsk
Yakutsk
Verkhoyansk
Omsk
Tomsk
Semipalatinsk
Tashkent
Samarkand
Bokhara
Khiva
Orenburg
Kazan
Moscow
St. Petersburg
Archangel
Vologda
Perm
Ekaterinburg
Tobolsk
Barnaul
Irkutsk
Chita
Blagovestchensk
Khabarovsk
Nikolaevsk
Vladivostok
Port Arthur
Dairen
Tientsin
Peking
Kalgan
Urga
Kobdo
Hami
Turfan
Kashgar
Yarkand
Khotan
Leh
Srinagar
Simla
Delhi
Agra
Allahabad
Lucknow
Cawnpore
Benares
Patna
Calcutta
Darjeeling
Gaya
Mandalay
Rangoon
Bassein
Akyab
Myitkyina
Bhamo
Lashio
Kengtung
Chiengmai
Bangkok
Korat
Ubon
Pakse
Saigon
Phnom Penh
Battambang
Hue
Tourane
Hanoi
Haiphong
Lang Son
Pakhoi
Kiungchow
Hainan
Macao
Hongkong
Swatow
Amoy
Foochow
Wenchow
Ningpo
Shanghai
Nanking
Hankow
Ichang
Shasi
Changsha
Kiukiang
Wuchang
Yochow
Kiukiang
Anking
Wuhu
Chinkiang
Soochow
Nanking
Tsinan
Chefoo
Weihaiwei
Kiaochow
Tsingtao
Tientsin
Peking
Paotingfu
Taiyuanfu
Hankow
Siangtan
Changsha
Kweiyang
Yunnanfu
Tengyueh
Bhamo
Myitkyina

Southern Pines. A noted winter resort of North Carolina, situated about 5 miles east of Pinehurst, and some 60 miles southwest of Raleigh. It is located in a fruit growing region, producing berries, peaches, and grapes. By reason of its mild and equable climate, it is a favorite place of winter residence for people from the Northern states. Population, 1920, 743.

Spartanburg. An industrial city of South Carolina, about 100 miles northwest of Columbia. It is located in a rich cotton growing section, and has large cotton and textile mills, car repair shops, bleaching and creosoting plants, fertilizer works, and other factories. It is the seat of Wofford college for men and Converse college for women. The site of Camp Wadsworth, established by the Federal government during the World War, has been utilized for suburban and industrial development. Population, 1920, 22,638.

Spokane (*spō'kăn'*). The second largest city of Washington, located near the eastern border of the state. It occupies a picturesque site at the falls of the Spokane river, which provide immense water power for manufacturing purposes. Served by five transcontinental railroads, Spokane has become the chief industrial city of the rich mining, lumbering, stock raising, and agricultural region known as the "Inland Empire." Among important manufactures are flour, lumber and timber products, wooden boxes, packed meats, and structural ironwork. The city has a system of beautiful parks embracing an area of more than 2200 acres and is the seat of several educational institutions. Fort Wright, a government military post, is located in the immediate vicinity. The first settlement at Spokane was made in 1872 and, in 1881, the city was incorporated. Population, 1920, 104,437. See *Inland Empire*.

Springfield. The capital of Illinois, situated in the south central part of the state, 185 miles south of Chicago. The city is the center of a highly productive agricultural and coal mining district and has extensive manufacturing interests. Its industries include watchmaking and the manufacture of electrical apparatus, agricultural implements, and road grading machinery. The capitol, erected at a cost of $4,500,000, is built in the neoclassic style of architecture and surmounted by a lofty dome.

Among the points of historic interest are the former residence of President Lincoln and the Lincoln national monument. The mausoleum in the latter contains the remains of the president. Springfield was first settled in 1819 and was made the capital of Illinois in 1837. Population, 1920, 59,183.

Springfield. A city of southwestern Massachusetts, built on the Connecticut river, about 100 miles southwest of Boston. In appearance, Springfield is one of the most attractive cities in New England. It occupies a site of great natural beauty on the east bank of the river, and possesses many fine public buildings. Among the most impressive of these is the municipal group, including the administration building, the auditorium, and the campanile. The top of the campanile, 300 feet high, affords a magnificent view of the Connecticut valley. Other noteworthy structures are the public library, the art museum, the science museum, and the United States armory.

There are several fine parks, some of which are adorned with notable statuary, including the famous statue of "The Puritan" by Saint Gaudens. An interesting feature is a magnificent bridge spanning the Connecticut river, completed in 1922. Springfield is the seat of the American International college and the Y. M. C. A. training college.

The industries of the city are extensive and varied. Among the principal manufactures are firearms, bicycles and motor cycles, chemicals, envelopes, electrical machinery, automobiles, brass and bronze products, printing and publishing products, cotton and knit goods.

Springfield was first settled in 1636 and was called Agawam. It assumed its present name in 1640 and, in 1852, was chartered as a city. The city was the center of hostilities in King Philip's war, 1675, and was the scene of various conflicts which took place during Shays's rebellion, 1786-87. Population, 1920, 129,614.

Springfield. A city of southwestern Missouri, located on a plateau in the Ozark mountains, about 240 miles southwest of Saint Louis. The city is the commercial center of a large farming, fruit growing, lumbering, and mining district, with which it carries on an extensive trade. It has large interests connected with the mining and marketing of lead and zinc. The leading industrial establishments include railway shops, ironworks, machine shops, and factories for making wagons, carriages, agricultural implements, and furniture. In value of manufactures, Springfield ranks fourth among the cities of the state.

The city is picturesquely situated, has many handsome parks, streets, and buildings, and is the seat of Drury college. Springfield was laid out in 1843 and, in 1847, was chartered as a city. Population, 1920, 39,631.

Springfield. A city of southwestern Ohio, on the Mad river, 45 miles west of Columbus. It is the trade center of a rich agricultural region and has developed extensive and varied industries. Among its chief manufactures are agricultural implements, gas and steam engines, musical instruments, printing and publishing, and electrical machinery. There are many noteworthy public buildings, and the city is enriched with numerous parks and recreation grounds. Springfield is the seat of Wittenberg college. The first settlement in the vicinity was made in 1799; the town of Springfield was incorporated in 1827 and, in 1850, was chartered as a city. Population, 1920, 60,840.

Stamford. A manufacturing and residential city of southwestern Connecticut, situated on Long Island sound, 33 miles from New York City. Stamford is noted especially for the manufacture of locks and hardware. Other important products are automobile parts, chocolate products, electric motors, furniture, embroidery materials, oil burners, engines, and chemicals. The city was first settled in 1641 by a colony from New Haven, became a borough in 1830, and, in 1894, was chartered as a city. Population, 1920, 35,096.

Starved Rock. A perpendicular cliff of white sandstone, on the south bank of the Illinois river, near the town of Utica, about 90 miles southwest of Chicago. This cliff overhangs the water's edge and rises sheer to a height of about 160 feet. The walls of the fortress-like rock slope precipitously in all directions, and the top is reached by a single narrow rocky stairway. The flat summit, comprising an area of about half an acre, commands an excellent view of the fertile river valley, bordered by wooded hills and grassy slopes.

This almost inaccessible rock was the scene of many interesting events in the early history of Illinois. In 1673, Father Marquette and Joliet spent many weeks at Kaskaskia, the great village of the Illini Indians, in the valley near the rock. In 1681, La Salle and Tonti built a palisaded stronghold on the top of the rock, which they named Fort Saint Louis.

About 1770 occurred the tragic events which gave the cliff its present name. Here perished by starvation the last remnant of the once powerful Illini tribe. At a council at Cahokia, Pontiac, the famous chief of the Ottawas, was stabbed to death by an Illini warrior. Pontiac's followers swore a war of extinction against the Illini, finally entrapping the last survivors of the tribe in this natural fortress. An area of more than 900 acres, including Starved Rock and other historic points, has been created a state park.

Stockton. An industrial and commercial city of central California, situated 78 miles east of San Francisco at the head of navigation on the San Joaquin river. Stockton has important fruit, grain, and live stock interests. Leading manufactures include cereal products, harvesters, reclamation machinery, motor trucks, canned goods, and paper products. Stockton is the seat of the College of the Pacific. The settlement which became Stockton was founded in 1847 and was an outfitting point for miners during the gold rush. Population, 1920, 40,296.

Stone Mountain. A huge, dome-shaped hill of granite, located near the town of the same name, about 15 miles east of Atlanta, Georgia. It rises about 1000 feet above the surrounding country and covers an area of some 2 square miles. Except for a few hollows where shrubs and trees take root, the surface throughout is naked rock. An electric railway reaches its base, and a path leads to the summit.

At the base of the northern slope there is an almost vertical cliff, about 800 feet high and 5000 feet long. The face of this great cliff is to be transformed into a Confederate memorial by chiseling in bold relief several hundred figures to typify the army of the Confederacy. Directly beneath the sculpture a vast memorial hall is to be created in the solid rock, bearing the inscription, in six languages, "To the Valor of the Southern Soldiers."

Superior. A city of northwestern Wisconsin, situated on Lake Superior and lying adjacent to Duluth, Minnesota. Possessing a fine harbor and excellent railway facilities, Superior shares with Duluth the advantages of location at the head of navigation on the Great Lakes. The city ships large quantities of iron ore and grain by water and receives coal to be distributed by rail to inland districts. Among the chief industries are lumber and flour mills, iron and steel works, and shipyards. Superior is the seat of a State normal school.

The early explorers, Radisson and Groseilliers, are supposed to have made their headquarters on the site of Superior in 1661. The explorer Du L'Hut, after whom Duluth was named, established a trading post here about 1680. Superior was laid out as a town in 1853 and, in 1889, was chartered as a city. Population, 1920, 39,671.

Syracuse. The fourth largest city of New York State, located in the central part of the state, almost exactly midway between Albany and Buffalo, being about 150 miles

from either of these cities. It occupies a fine, gently undulating site on Onondaga lake, 35 miles south of Lake Ontario.

Syracuse owes its prominence as a commercial and industrial city to its central location in a highly productive region and to its superior transportation facilities. It is served by numerous railways which radiate in all directions and by the State Barge Canal system, which affords water transportation north to Lake Ontario, west to Lake Erie, and east to the Hudson river. The city has extensive shipping interests and conducts a large wholesale trade.

In value of manufactures, Syracuse is exceeded only by New York, Buffalo, and Rochester, among the cities of the state. There are upwards of 750 industrial establishments, producing a great variety of articles. Among important manufactures are typewriters, automobiles, soda ash, tool steel, candles, agricultural implements, clothing, chemicals, pottery, and washing machines. The manufacture of salt, formerly the chief industry, is no longer carried on within the limits of the city.

The commercial district is substantially built, largely of brick and of the native Onondaga limestone, and contains many imposing buildings. The residential sections are noted for their broad, well shaded streets, and handsome residences and grounds. James street ranks among the most attractive residential avenues of the country. There are about 60 public parks, ranging in size from small plots at street intersections to spacious tracts, such as Burnet park, on the west, covering 120 acres. Lincoln park, on the east, affords a beautiful view of the city and its environs.

The city is the seat of Syracuse university, with which is connected the State college of forestry. Another institution, located permanently at Syracuse, is the State fair, managed by the State Fair commission.

The site of Syracuse originally belonged to the Onondaga Indians, whose survivors occupy a small reservation south of the city. The salt springs, long known to the Indians, became known to white settlers in 1789. The first settlement on the present site of the city was made about 1805. This was named Syracuse in 1819, was incorporated a village in 1825, and was chartered as a city in 1847. Population, 1920, 171,717.

Tacoma (*tȧ-kō′mȧ*). A city and port of western Washington, built on a fine harbor on Puget sound, about 30 miles south of Seattle. It occupies a commanding site, rising to an elevation of several hundred feet overlooking the sound, in a beautiful scenic region between the Olympic and the Cascade mountains. Mount Rainier, known also by its Indian name Tacoma, lies about 50 miles southeast.

The city has a substantial wholesale trade, large manufacturing industries, and an extensive coastwise and foreign commerce. The leading manufactures include lumber, flour, furniture, and machine shop products. Tacoma contains many fine public buildings, has several picturesque parks, in all covering 1200 acres, and is the seat of numerous educational institutions. Old Tacoma, founded in 1868, and New Tacoma, founded in 1873, were united in 1883 to form Tacoma. Population, 1920, 96,965.

Tahoe (*tȧ′hō*; *tȧ′hō*), **Lake.** A beautiful lake, situated at the eastern base of the Sierra Nevada, at an elevation of about 6275 feet above sea level. The boundary line between California and Nevada passes through the lake, which lies about 85 miles (direct) northeast of Sacramento and 12 miles west of Carson City. It is about 20 miles long and from 8 to 12 miles wide, with an extreme depth exceeding 1650 feet. Its remarkably clear waters are discharged through the Truckee river, which flows eastward into Pyramid lake, in Nevada. By reason of its picturesque surroundings and fine climate, Lake Tahoe is a favorite summer resort.

Tallahassee. The capital of Florida, located in the northwestern part of the state. It lies in a cotton, tobacco, and fruit growing district of which it is the trade center. The local industries include the manufacture of lumber and foundry, machine shop, and marble products. The city is located on a series of hills, with wide, well shaded streets. Among the principal buildings are the State capitol, the Federal building, and the county courthouse. When virtually uninhabited, Tallahassee, in 1824, was chosen by the United States government as the capital of the territory of Florida, and it remained the capital upon the admission of Florida as a state in 1845. Population, 1920, 5637.

Tamalpais (*tăm′ȧl-pīs′*), **Mount.** A mountain in the Coast range of California, situated on the Marin peninsula, about 15 miles in direct line northwest of San Francisco. The triple summit, about 2600 feet high and reached by a scenic railway, affords unsurpassed views of the surrounding region. The magnificent perspective includes the long inland extensions of San Francisco bay, numerous cities and towns on its shores, an immense array of encircling mountains, and the vast Pacific.

To the south are the Golden Gate, the city of San Francisco, and, far beyond them, Mount Hamilton, 4444 feet high, on which the Lick observatory is situated. To the east is San Francisco bay, with Oakland, Berkeley, and other cities on its eastern shore. Beyond these are the Contra Costa hills and Mount Diablo, the latter rising nearly 4000 feet high. Close by to the north is the reservoir called Lake Lagunitos, and in the distance are ridge after ridge of the Coast range. On the west is the ocean and the rocky Farallon islands, lying far out at sea. Within walking distance from West peak is Muir Woods, with its superb forest of sequoias, many of which are 300 feet high.

Tampa. A tobacco manufacturing city and winter resort of west central Florida, located at the head of Tampa bay, an inlet of the Gulf of Mexico. The city has a good harbor and is served by various steamer lines. A large part of the world's supply of Havana cigars is manufactured at Tampa. Other industries include car shops and cement mills. Phosphate fertilizers, fruits, turpentine, rosin, and fish are exported in large quantities. Among the features of the city are the semitropical plant park, the annual South-Florida midwinter fair, and the 19-story Floridan hotel. Davis island, a fine residential district, is a result of a great dredging and reclamation project. Population, 1920, 51,608.

Taos (*tă′ŏs*). An Indian pueblo of northern New Mexico, built near the Rio Grande river, about 50 miles north of Santa Fe. The inhabitants are of Tanoan Indian stock. Like all pueblo dwellers, the people of Taos are industrious and self-supporting. Population, about 500.

Terre Haute (*tĕr′ē hōt′*). A railroad center and manufacturing city of west central Indiana, picturesquely situated on a high bank of the Wabash river, about 75 miles southwest of Indianapolis. The city is the commercial center of a rich agricultural and coal mining district. Among the chief industries are railway car shops, glassworks, paper mills, clothing factories, wagon works, iron and steel works, and rolling mills. The city has many fine parks and public buildings and is the seat of the Rose polytechnic institute. Population, 1920, 66,083.

Thousand Islands. A numerous group of islands in the Saint Lawrence river, located immediately northeast of Lake Ontario. They are situated in an expansion of the river, 40 miles long and from 3 to 7 miles wide. Some of the islands are many acres in extent, but many are mere rocky islets. A large number belong to Canada, and others are a part of the State of New York. Their attractive scenic setting, together with their cool climate, make the Thousand islands an ideal place for summer recreation.

Ticonderoga. A village of northeastern New York, situated on the creek connecting Lake George with Lake Champlain, about 95 miles north of Albany. Because of its many associations with the French and Indian war and the Revolutionary War, Ticonderoga and its environs possess great historic interest. At this point, the French erected, in 1755, a fort which they called Fort Carillon. In 1757, this was heavily garrisoned by Montcalm, but, in 1759, it was taken by the English under General Amherst.

In the Revolutionary War, this stronghold, renamed Fort Ticonderoga, was captured from the English by Ethan Allen and his "Green Mountain Boys." Later, it was retaken by Burgoyne and held until his surrender. After the Revolutionary War, the fort fell into disuse but has since been restored and contains a valuable museum. Population, 1920, 2102.

Toledo. The third largest city of Ohio, located on the northern border of the state, about 95 miles west of Cleveland. It occupies both banks of the Maumee river at its mouth in an inlet of Lake Erie.

Toledo owes its commercial and industrial prominence to its advantageous location at the head of direct water transportation to the East and to its superior railway facilities. It is surrounded by a rich agricultural region, with which it maintains an extensive wholesale and marketing trade. It is one of the largest distributing points on the Great Lakes for soft coal, and handles also at its docks immense quantities of iron ore and lumber. It is an important primary market for winter wheat and stands first in the world as a market for clover seed.

Toledo ranks in manufactures among the leading cities of the state. There are more than 550 industrial establishments; their chief products include automobiles, iron and steel, refined petroleum, bottle making machines, plate and cut glass, electrical machinery, ships, scales, tents and awnings, ducking and belting, and wagons.

There are many notable public buildings, among which are the post office, the auditorium, and the museum of art. The park system, covering more than 1500 acres, includes several large parks and some 45 smaller parks, squares, and triangular spaces. The larger parks, charmingly situated on the banks of the river, are connected by boulevards. Among noteworthy educational institutions is Toledo university, maintained by the city. Toledo was founded in 1833 by the consolidation of two earlier settlements, and received its city charter in 1846. Population, 1920, 243,164.


AFRICA
Prepared especially for
The Frontier Press Company
Capitals thus: ⊙ Railroads { Finished / Proposed
Canals thus:
Scale of Statute Miles.
0 100 200 300 400 500 600 700 800 900 1000
630 MILES TO ONE INCH.
Kilometers.
0 200 400 600 800 1000
British
Portuguese
French
Spanish
Italian
Belgian
Independent States
COPYRIGHT, 1928, J. W. CLEMENT CO., BUFFALO, N. Y.
1.22
40° 30° 20° 10° 0° 10°
Longitude 20° West from 10° Greenwich
PORTUGAL
Lisbon
SPAIN
Azores (Port.)
Madeira Islands (Port.)
Canary Islands (Sp.)
MOROCCO
ALGERIA
TUNISIA
SOUTHERN ALGERIA
Desert of Igidi or Gidi
RIO DE ORO
MAURITANIA
FRENCH WEST AFRICA
Timbuktu
UPPER SENEGAL AND NIGER
SENEGAL
UPPER VOLTA
Cape Verde Islands (Port.)
Dakar
St. Louis
GAMBIA
Bathurst
PORTUGUESE GUINEA
FRENCH GUINEA
SIERRA LEONE
Freetown
LIBERIA
Monrovia
Grand Bassa
IVORY COAST
GOLD COAST
ASHANTI
Kumasi
TOGO
DAHOMEY
Abomey
NIGERIA
Lagos
Benin
Zungeru
Kano
Sokoto
Gando
Zaria
Bida
Yola
Adamawa
CAMEROONS
Fr. Cameroon Mt.
Dunia
Bight of Biafra
I. Fernando Po (Sp.)
Mouths of the Niger
Gulf of Guinea
EQUATOR
ATLANTIC
OCEAN
St. Thomas I. (Port.)
Annobon I. (Sp.)
Princes I. (Port.)
Libreville
FRENCH CONGO
Brazzaville
Loango
Pointe Noire
Kabinda (Port.)
Banana
Boma
Ambriz
Loanda
Novo Redondo
Benguela
Mossamedes
Cape Frio
Damaraland
Ugabmund
Swakopmund
Walris Bay
TROPIC OF CAPRICORN
Angra Pequena
Port Nolloth
Cape of Good Hope
Ascension I. (Br.)
St. Helena (Br.)
Tuniis
Algiers
Tripoli
Fez
Sahara
Timbuktu
Air
Agades
Kukawa
Machina
Lake Chad
Tuside Mts.
Ahaggar
Hoggar
Tibesti Mts.
Aozou
Kufra
Darfur
Wadai
Abeshr
Wadai
Kanem
Bornu
Lake Chad
Gulf of Sidra
Tripoli
Ghadames
Ghat
Murzuk
Sebha
Tummo Mts.
Tropic of Cancer
Equator


80°
40°
50°
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Caspian Sea
Bokhara
Tabriz
Teheran
Kabul
Herat
AFGHANISTAN
PERSIA
TURKEY
Smyrna
Athens
Crete
Cyprus (Br.)
SYRIA (Fr. Man.)
Beirut
Damascus
Bagdad
IRAQ (MESOPOTAMIA)
Euphrates R.
Tigris R.
Br. Mar.
Alexandria
Jerusalem
PALESTINE
Isthmus of Suez (Br. Man.)
Basra
ASIA
INDIA
Cairo
Suez
Sinai Pen.
EGYPT
Nile R.
Red Sea
NEJD
Persian Gulf
Kelat
BALUCHISTAN
Gulf of Oman
Karachi
Medina
Yambo-el-Bahr
Muscat
OMAN
ARABIA
Arabian Sea
Halfa
Korosko
Nubian Desert
Abu Hamed
Jidda
Mecca
Suna
Port Sudan
ASIR
Suakin
Marsa Hali
El-Ordeb
NUBIA
Berber
Debbo
Atbara
ANGLO-EGYPTIAN SUDAN
Omdurman
Khartum
Kassala
Asmara
ERITREA
Massawa
YEMEN
Sana
Makalle
Mocha
Perim I. (Br.)
Aden
Gulf of Aden
Socotra (Brit.)
Kobelo
El-Fasher
El-Obeid
Darfur
Kordofan
Sennar
Gondar
Adua
Aualo
Sokota
FRENCH SOMALILAND
Obok
Djibuti
Zeila
Benter Ziada
C. Guardafui
Hafun
Berbera
Shakka
Fashoda
Mbita
Magdala
Baso
Ankober
Ankober
BRITISH SOMALILAND PROTECTORATE
Wau
Shambe
Gore
ETHIOPIA (ABYSSINIA)
Addis Ahgha
Kine
Obbia
Mongalla
Gondokoro
Lake Rudolf
Stefanie L.
Baringo
Doruma
Jaddo
Amadi
Wadelai
UGANDA
Lake Albert
Lugh
Mogadisho
ITALIAN SOMALILAND
KENYA COLONY
Mt. Kenya
Moenge
Ruwenzori Mts.
Entebbe
Stanleyville
Kismayu
EQUATOR
Port Durnford
INDIAN OCEAN
Victoria L.
Nairobi
Lake Edward
Kirundu
Albert L.
Lake Kivu
Belgian Mandated
Mt. Kilimanjaro
Lamu
Formosa Bay
Malindi
Mombasa
Pemba I.
Zanzibar I.
Zanzibar
Dar-es-Salaam
Mafia I.
Seychelles Is. (Brit.)
Amirante Is. (Fr.)
TANGANYIKA TERRITORY
Tanga
Pangani
Bagamoyo
Tabora
Kongolo
Lake Tanganyika
Albertville
Baudouinville
Bukama
Elisabethville
KATANGA
Kilwa Kivinje
Kilwa Kisiwani
Aldabra Is. (Br.)
Lindi
Mikindani
C. Delgado
Lake Nyasa
Mokojo
Comoro Is. (Fr.)
Amber Diego Suares (Antsirane)
Chitambo
Porto Amelia
Hellville
NORTHERN RHODESIA
Broken Hill
Mozambique
Majunga
Mauritsara
Zambesi R.
Tete
Zumbo
Parapato
C. St. Andrew
Livingstone
Salisbury
Kilimane
Mouths of the Zambesi
Mananara
R. Ste. Marie
Fenerive
Tamatave
SOUTHERN RHODESIA
Chinde
Maintirano
Antananarivo
Rodriguez I.
Sofala
Beira
Ambato
Betafo
Marosika
Port Louis
Mauritius I.
St. Denis (Brit.)
Bulawayo
Matabeleland
Chlioane
Channel
Masindrano
Reunion I. (Fr.)
Palachwe
Shoshong
Tuléar
Ambaby
Molopolole
Mafeking
Benanoromana
TRANSVAAL
Pretoria
Inhambane
Johannesburg
Lourenco Marques
Delagoa Bay
C. Ste. Marie
Andrakala
Barberton
Zululand
Ladysmith
ORANGE FREE STATE
NATAL
Pietermaritzburg
Durban
Colesberg
Kokstad
Umtata
East London
Grahamstown
Port Alfred
Port Elizabeth
Cape St. Francis
Comparative Area
PENN.
45,126 Square Miles.
Longitude 50° East from 60° Greenwich

Topeka. The capital and third largest city of Kansas, situated on Kansas river about 65 miles west of Kansas City. It is an important railroad center, being served by five railroad systems and having the extensive car shops of the Santa Fe railroad. An outstanding industry is the publication of farm journals which circulate widely throughout the Middle West. Flour milling and the manufacture of butter are other important industrial interests. The chief educational institution is Washburn college.

Topeka was laid out in 1854 as one of the "free state" towns. In 1856 an antislavery convention there adopted the Topeka constitution, establishing a Topeka government, which was broken up by Federal troops. It became a city in 1857 and capital of the state in 1861. Population, 1920, 50,022.

Trenton. The capital of New Jersey, built on the eastern bank of the Delaware river, at the head of tidewater navigation, about 30 miles northeast of Philadelphia. Proximity to the coal fields of Pennsylvania and to the markets of New York has contributed to its growth as an industrial center. Among its extensive and varied manufactures, the most noted is that of pottery, which ranks among the finest produced in the United States. Other important industries include the manufacture of wire cables, bridge sections, engines, electric lamps, rubber products, and linoleum.

The city is regularly laid out with many fine public buildings and residences. Among the more notable public buildings are the State capitol, the Federal building, the courthouse, the public library, and the State normal school. A landmark of historic interest is Battle Monument surmounted by a colossal statue of Washington, which commemorates his command on the battlefield of Trenton. Trenton was chartered as a city in 1792. Population, 1920, 119,289.

Troy. A manufacturing city of east central New York. It is situated six miles north of Albany at the head of tidewater navigation on the Hudson river and at the point where the river is joined by the State barge canal. Troy is the chief center of the collar and cuff industry, manufacturing about nine-tenths of the collars and cuffs made in the United States. It is noted also for the manufacture of laundry machinery, valves, bells, engineering instruments, and horseshoes. The chief educational institutions include the Rensselaer polytechnic institute, the Emma Willard school, and the Russell Sage college.

The vicinity of Troy was the scene of internecine struggles between the Mohawk and the Mohegan Indians, and during the Revolutionary War was the theater of stirring activities in resisting Burgoyne's invasion. Troy was incorporated as a village in 1794 and was chartered as a city in 1816. Population, 1920, 72,013.

Tucson (*tōō-sŏn′*). The second largest city of Arizona, situated in the southern part of the state, about 65 miles north of the Mexican border. It is the commercial center of a large district devoted to mining, farming, and stock raising. The local industries include ice factories, brickworks, and extensive railway shops. Tucson is the seat of the University of Arizona, the Desert botanical laboratory of the Carnegie institution, and other educational institutions. The warm, dry climate makes it a tourist and health center. A large desert sanatorium is located here. Population, 1920, 20,292.

Tulsa. One of the two largest cities of Oklahoma, on the Arkansas river, about 100 miles northeast of Oklahoma City. Tulsa is situated in one of the richest oil and natural gas fields in America. To the immense development of these resources, the city owes its remarkably rapid growth. More than 500 operating and refining oil companies are located in the city. The surrounding district also contains valuable deposits of coal.

The city is the trade center of a large outlying region devoted to farming, stock raising, and dairying, and, by reason of cheap and abundant fuel, has developed substantial industries. Among the chief of these are oil refining, coal mining and marketing, flour and lumber milling, and the manufacture of boilers, tools, stoves, and glass.

Tulsa occupies a fine, gently rolling site, and is well laid out, with many beautiful parks, boulevards, and handsome homes built by fortunes made in the oil fields. The business district is noted for its impressive array of modern office buildings, including the 21-story Philtower building and the 27-story tower of the Exchange National Bank building. The city is the seat of Tulsa university. Tulsa was founded in 1887 and was first chartered as a city in 1902. Population in 1900, 7298; in 1920, 72,075; credibly estimated to have passed 135,000 by 1928.

Union City. A city of eastern New Jersey, adjoining Hoboken and Jersey City. It was formed in 1925 by a consolidation of the old towns of West Hoboken and Union. Weehawken, adjoining Union City on the east and fronting on the Hudson river, is the railroad terminal and port. Union City is a residential place for persons employed in New York City and Jersey City. It has also many local industries, including the manufacture of embroidery, silk, cement products, and rubber goods. Population, on basis of 1920 census, 60,725.

Utica. A city of central New York, situated on the Mohawk river and the State barge canal, about 95 miles west of Albany. Utica is the commercial center of a rich dairy-farming district and has developed extensive industries. The city is widely known for the excellence of its woolen, cotton, and knit goods, and of its hot-air furnaces and ventilating apparatus. Other important manufactures are men's clothing, iron and steel forgings, iron beds and bed springs, air compressors, and fire-fighting apparatus. Dairy products are shipped in large quantities, and roses are extensively grown for the New York markets.

Utica is an important railway center and transfer point, and is often called the "Gateway to the Adirondacks." It occupies a beautiful site, is well laid out, and contains many fine public buildings and residences. One of the more prominent buildings is the Munson-Williams Memorial, the home of the Oneida Historical Society. Utica was incorporated in 1798. Population, 1920, 94,156.

Vallejo (*vă-lā′hō*; *-lā′ō*). A city of western California, located on an arm of San Pablo bay, opposite Mare island, about 25 miles northeast of San Francisco. Mare Island navy yard, employing several thousand men, contributes substantially to the commerce of the city. Vallejo was founded in 1851 and was planned as the future capital of the state. The legislature held sessions in Vallejo, 1851–53. Population, 1920, 21,107.

Valley Forge. A village on the Schuylkill river, in eastern Pennsylvania, about 24 miles west of Philadelphia. Valley Forge is famous as the place where Washington and the Colonial army of about 11,000 men endured terrible privations during the severe winter of 1777-78. The field with the trenches thrown up by the "ragged Continentals" remains substantially unchanged, and the old stone house where Washington made his headquarters still stands. An area of about 750 acres, including the old camp site, has been transformed into Valley Forge Memorial park.

Vancouver. A city of southwestern Washington, on the Columbia river, about 8 miles north of Portland, Oregon. The chief manufactures include lumber, linen, pulp and paper, canned fruit, metal castings, and machine shop products. A long interstate bridge over the Columbia river connects Vancouver with Oregon. Vancouver was established in 1828 by the Hudson's Bay Company and was incorporated in 1858. Population, 1920, 12,637.

Vicksburg. The third largest city of Mississippi, situated on the Mississippi river, about 45 miles west of Jackson. Vicksburg is attractively located on a high bluff and is an important river port with a large shipping trade in cotton. The chief manufacturing establishments include cottonseed oil mills, planing mills, foundries, furniture factories, canning establishments, and railway shops.

Vicksburg was incorporated in 1840 and came into great prominence during the Civil War. Its capture by the Union forces after a bitterly fought campaign was one of the decisive events of the great struggle between the North and the South. The Vicksburg National Military park, containing about 1300 acres and 30 miles of driveways with many monuments, restores the battle ground as it was in 1863. Population, 1920, 18,072.

Waco. A city of east central Texas, on the Brazos river, about 95 miles northeast of Austin. Waco is the trade and shipping center of a rich agricultural region. The city is a leading cotton market for the interior of the state and has substantial industries. The principal manufactures are textiles, twine, woodwork, tents, awnings, camp furniture, and pickles. Waco is the seat of Baylor university. The Texas Cotton Palace exposition is an important institution. Population, 1920, 38,500.

Walla Walla. A city of southeastern Washington, situated near the Oregon boundary. Walla Walla is the trade center of a fertile agricultural district with extensive dairy interests. The manufactures include farm machinery, flour, and lumber. The city is the seat of Whitman college and Walla Walla college. Six miles west is the monument erected to the memory of the martyred pioneer, Marcus Whitman. Population, 1920, 15,503.

Walpi. A Hopi Indian village built on a lofty mesa, several hundred feet high, overlooking an arid desert in north central Arizona. The inhabitants are among the most interesting of the Pueblo tribes. These peaceful village dwellers steadfastly adhere to their aboriginal culture and ancient customs. Their houses are solidly constructed of adobe or of stone set in clay mortar, with square rooms and flat roofs. Through the roofs, trapdoors with ladders give access to the interior, the outer walls being often without door or window, as a precaution against attack.

The elaborate ceremonials of the Hopi people include the celebrated snake dance, in which the performers carry

living rattlesnakes. The Hopi are industrious farmers, and maintain abundant stores of corn, beans, and vegetables. They also weave excellent blankets and baskets and display great skill as potters and wood carvers. The village, which is the largest of seven peopled by the tribe, contains only a few hundred inhabitants.

Waltham (*wŏl'thăm*). A city of eastern Massachusetts, situated on the Charles river, about 10 miles west of Boston. Waltham is noted chiefly for the manufacture of watches. Here was made the first successful attempt to manufacture watch movements, on an extensive scale, by machinery. These works now constitute the largest watch factory of its kind in the world. Other manufactures include cotton goods, men's clothing, saddlery, emery wheels, and furniture.

A point of interest is Norumbega tower, named in allusion to a fabulous city said by early explorers to be located in New England. Waltham was incorporated in 1738 and was chartered as a city in 1884. Population, 1920, 30,915.

WASHINGTON (*wŏsh'ĭng-tŭn*). The capital of the United States, situated on the left bank of the Potomac river, about 100 miles from its mouth. Washington is coextensive with the District of Columbia and owes its site and its importance to the fact that it is the administrative, legislative, and judicial center of the nation.

Site and Plan. The site was chosen by a commission headed by George Washington, and the city was planned by L'Enfant, a noted French engineer. Congress transferred its sittings from Philadelphia to the new capital in 1800. The city was captured and burned in 1814 by the British. At the time of the Civil War, it was fortified and made the headquarters of the Northern army. Following 1871, important improvements were made in the city, mainly in accordance with the original plan drawn up by L'Enfant. In 1901, further improvements were made. In 1924, a city planning commission was created, which was empowered to proceed with a 50-million dollar Federal building program.

From 1802 until 1871, Washington's affairs were managed, under a charter, by its own citizens. In 1871, however, the charter was revoked, and the city was placed directly under the management of the Federal government. Residents have no voice either in civic or national government.

Area and Surface. The District of Columbia is about 70 square miles in area, including 10 square miles of water surface. The city proper covers something over 10 square miles, more than half of which is used for streets and parks. The surface, on the whole, is gently undulating and the elevation of the land in the District varies within a range of approximately 400 feet.

Streets. The streets are laid out on a rectangular plan modified by a system of 26 avenues, which intersect the streets at different angles. A number of avenues converge on the two focal points of the city, namely, the Capitol and the executive mansion, or White House. The streets and avenues are from 80 to 160 feet in width, many of them adorned on each side with a double row of trees.

Parks and Malls. In a central square stands a lofty monument erected to the memory of George Washington. Extending north, east, and west from this square are long, parklike areas, or malls. The north mall leads to the White House; the area to the east is the approach to the Capitol; and to the west of the monument stretches a vista terminating in the Lincoln memorial. Small parks and open squares or circles are found in various parts of the city and are usually dignified by the presence of statues or monuments. Potomac park consists of about 740 acres of land which has been largely reclaimed from the Potomac river. Rock Creek park, covering approximately 1600 acres, is a hilly tract of great natural beauty.

Monuments. The monuments and buildings of Washington befit the dignity of the national capital. The Washington monument, already mentioned, is a majestic obelisk 555 feet in height. The stately Lincoln memorial takes the form of a Greek temple of the Doric order. It is surrounded by a peristyle of 36 columns, one for each of the states of the Union at the time of Lincoln's presidency. In the interior is a statue, heroic in size, of the martyred president.

Buildings. The buildings of Washington, which are among the most beautiful in America, are characterized in general by the neoclassical type of architecture. The Capitol, a magnificent structure of the Corinthian order, having two immense wings and surmounted by a beautiful dome, occupies a commanding position on an eminence east of the Mall. From every direction, the towering dome of the Capitol is the first intimation of one's approach to the city. The White House exhibits a pleasing and noble simplicity. The Library of Congress, containing one of the world's largest collections of books, is an imposing structure in the Renaissance style. The Treasury, like the Lincoln memorial, is an example of pure Greek architecture.

Among many other notable buildings are the State, War, and Navy building, the Smithsonian Institution, the National Museum, the Corcoran Art Gallery, the Red Cross building, Continental Memorial Hall, the National Academy of Sciences building, the Pan-American building, the Scottish Rite Temple, the Carnegie Institution, the Bureau of Engraving and Printing, the U. S. Chamber of Commerce building, and the immense Union railway station.

Commerce. The industries of Washington are devoted largely to the service of the government and to the supplying of local needs. The city's mercantile business, however, is very extensive. The city is entered by eight railroads and enjoys a steamship service on the river. The street railway trolley wires are laid underground within the city proper.

Educational Institutions. The institutions of learning and research are numerous. They include the George Washington university, the Catholic University of America, the American university, the Smithsonian institution, the Carnegie Institution of Washington, the United States Naval observatory, Georgetown university, and Gallaudet college. The Washington Academy of Sciences has its headquarters in the city and serves as a "federal head" for many learned societies.

Points of Interest. The city and its environs are rich in historical associations. Mount Vernon, the home of Washington, lies on the right bank of the river, about 15 miles below the city. Opposite the city, in Virginia, is Arlington national cemetery, containing a beautiful memorial amphitheater and the grave of the nation's Unknown Soldier. During the Civil War, Washington was encircled with a ring of 68 forts. These have since been unoccupied, except Fort Myer on Arlington Heights, opposite the city. The drill grounds of this fort were the scene of the first public airplane flights made by the Wright brothers. Population, 1920, 437,571.

Washington, Mount. The highest peak in the White mountains of New Hampshire, and the loftiest summit in the northeastern United States. It rises from the massive Presidential range, in the central part of the White Mountain group, and reaches an elevation of 6288 feet. It lies east of Crawford Notch and is about 140 miles almost directly north of Boston.

The mountain is composed chiefly of granite. The east and north sides are gashed with deep gorges and the west slope is precipitous. The rocky summit, which rises many hundred feet above timber line, has a scant covering of alpine vegetation; the lower slopes are extensively forested. Trails, highways, and a rack-and-pinion railroad make it easy for travelers to reach the summit, on which are located a government meteorological station and a commodious hotel.

Waterbury. A city of southwestern Connecticut, on the Naugatuck river, about 35 miles southwest of Hartford. Excellent water power has contributed largely to the city's industrial prominence. Waterbury is the leading center for the manufacture of brass ware in the United States, and is often styled the "Brass City." It is noted also for the production of clocks and watches. In value of manufactures, Waterbury ranks among the first two or three cities of the state. The city occupies a hilly site and contains several parks of great natural beauty. Population, 1920, 91,715.

Watkins Glen. A narrow gorge of unusual scenic beauty, situated near the village of Watkins, New York, not far from the head of Seneca lake, and about 20 miles north of Elmira. Through this chasm, which, in places, is 300 feet deep, a narrow stream flows over a series of charming cascades and rapids. The rocks, which are Devonian shales, were worn into deep gorges by glacial ice.

West Hoboken. See *Union City*.

West Point. A strong military post and noted military educational center in New York State. It occupies a picturesque site on the west bank of the Hudson river, about 50 miles north of New York City. The government reservation, including Constitution island, covers 3574 acres and is the seat of the United States Military Academy. Among many fine buildings and monuments are Memorial Hall, containing trophies of war, and a handsome equestrian statue of George Washington. West Point was a position of great strategic importance in the Revolutionary War. Benedict Arnold plotted, while in command here, to betray it to the British, but this result was prevented by the timely discovery of the plot.

Wheat Belt. The name applied to the section of the United States in which more than two-thirds of the nation's wheat crop is grown. In reality, there are two wheat belts, the winter wheat belt and the spring wheat belt.

The winter wheat belt lies mostly south of the central corn belt, portions of which it overlaps. The chief producing area for winter wheat includes southern Nebraska, central Kansas, western Oklahoma, northern Texas, nearly all of Missouri, Illinois, Indiana, and Ohio, and a part of southern Pennsylvania.

The spring wheat belt lies almost entirely to the north of the corn belt, and is comprised chiefly in the states of


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Atlantic Ocean
Antarctic Ocean
ASIA
AUSTRALIA
NORTH AMERICA
SOUTH AMERICA
EUROPE
AFRICA
ANTARCTIC CIRCLE
ARCTIC CIRCLE
TROPIC OF CANCER
EQUATOR
TROPIC OF CAPRICORN
Scale of English Statute Miles at different Latitudes
Longitude East from Greenwich
Longitude West


Grant Land
Grinnell Land
Peary Land
Franz Josef Land
SPITSBERGEN
King Charles Islands
Barents Sea
Great Ice Cape
GREENLAND
Arctic Ocean
Cape York
Nova Zembla
Kara Sea
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Athens
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Kabul
Atlantic Ocean
Bermudas (Br.)
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ALGERIA
TUNIS
Tripoli
SYRIA
Jerusalem
PERSIA
CHINESE REPUBLIC
Bahama Is. (Br.)
Canary Is. (Spain)
Spanish Ter.
LIBYA
Cairo
EGYPT
Bahrein Is. (Br.)
Kelat
Delhi
Lucknow
Cape Blanc
SAHARA
Mecca
Muscat
Daman (Port.)
Calcutta
WEST INDIES
Porto Rico (U.S.)
St. Thomas (U.S.)
Cape Verde Islands (Port.)
C.Verde
Timbuktu
FRENCH WEST AFRICA
Senegal
ARABIA
ERITREA
Aden (Br.)
Arabian Sea
Goa (Port.)
Bombay
Bay of Bengal
Madras
Ceylon
Colombo
Maldive Is. (Br.)
Laccadive Is. (Br.)
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Guardafui
Cape Verde
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Portuguese Guinea
French Guinea
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Trinidad (Br.)
Georgetown
Paramaribo
Cayenne
VENEZUELA
COLOMBIA
BOLIVIA
GUIANA
Palmas
Fernando Po
Gulf of Guinea
Congo R.
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Lake Victoria
KENYA
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Rio de la Plata
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ARGENTINA
Crozet Is.
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Sandwich Group
South Shetland Is. (Br.)
South Orkney Is.
Ocean
Graham Land
Alexander Land
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Longitude East from Greenwich
75° 60° 45° 30° 15° 0° 15° 30° 45° 60° 75° 90°
80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30° 40° 50° 60° 70°

North Dakota, South Dakota, and Minnesota. Outside of these three states, the most important district devoted to the production of spring wheat is eastern Washington.

Wheeling. The largest city of West Virginia, located on the Ohio river, in the northern "panhandle," about 65 miles southwest of Pittsburgh, Pennsylvania. Wheeling owes its industrial and commercial importance to large supplies of natural gas, to extensive near-by coal fields, and to abundant raw material, made available by excellent facilities for transportation, both by rail and by water. There are more than 200 manufacturing establishments in Wheeling, and the total value of its products is greater than that of any other city in the state. The leading manufactures include iron and steel products, pottery, glass, tobacco, and lumber. There are also print works, packing houses, tanneries, and large proprietary remedy works.

The city occupies an excellent site, rising gradually from the river, and contains many fine streets and public buildings. Among interesting features are the combined courthouse and city hall (formerly the State capitol), the government building, the Roman Catholic cathedral, the Market auditorium, and Wheeling park. Wheeling island, a beautiful residential section, is connected with the main part of the city by a historic suspension bridge. The West Virginia State fair is held at Wheeling.

The first settlement on the site of Wheeling was made in 1769 by Ebenezer Zane. Fort Henry, named for Patrick Henry, was built in 1774 and, during the Revolutionary War, was repeatedly, but unsuccessfully, attacked by the Indians and the British. Wheeling was incorporated in 1795 and was chartered as a city in 1836. From 1863 to 1870, and again from 1875 to 1885, Wheeling was the capital of the state. Population, 1920, 56,208.

Whiteface, Mount. One of the highest and most symmetrical peaks of the Adirondacks, situated about 15 miles north of Mount Marcy, in northeastern New York. Whiteface rises to an elevation of about 4875 feet and its narrow, rocky summit commands a wonderful view of the entire Adirondack region. On clear days, the maze of mountains and lakes lying to the west and Lake Champlain and the rivers lying to the east appear spread out as if on a map. Sometimes the distant Green mountains in Vermont and even the Saint Lawrence river may be seen.

White Sulphur Springs. A health and pleasure resort of southeastern West Virginia, situated in a picturesque mountain region not far from the Virginia border. The district is noted for its numerous mineral springs, and its fame as a watering place dates from the period of the Revolutionary War.

Whitney, Mount. The highest peak in the United States, excluding Alaska. It is situated in the main range of the Sierra Nevada, in eastern California, and is surrounded by a region of unusual scenic magnificence. Its eastern slope rises precipitously nearly 11,000 feet above Owens valley, and the peak itself towers to an elevation of 14,501 feet above sea level. An interesting fact is that the lowest land in North America, Death valley, much of which is below sea level, lies in direct line less than 80 miles east of this gigantic mountain.

Unlike Mount Shasta and Mount Rainier, its greatest rivals among the mountains of the Pacific states, Mount Whitney is not a volcanic peak built up by ancient volcanic eruptions. While on its slopes there is extensive evidence of former glacial action, no glaciers now exist on Mount Whitney. Permanent snow and ice are confined to the upper northern slopes. The peak may be ascended with comparative ease, and extensive scientific observations have been carried on at its summit.

Wichita (*wich'i-tô*). The second largest city of Kansas, situated on the Arkansas river, in the southern part of the state, about 160 miles southwest of Topeka. Wichita is located in the fertile Arkansas valley and is the commercial center of a region devoted to the production of wheat, oats, corn, Kaffir corn, broom corn, alfalfa, cattle, hogs, and poultry. There are also extensive oil fields in the vicinity.

The city's extensive industries are largely in connection with handling the products of the surrounding districts. Wichita has a large wholesale trade and is one of the chief distributing points in the Southwest. It is the leading broom corn market of the world and an important flour milling and meat packing center. Other leading industries include railway car construction and repairing, printing and publishing, and the manufacture of airplanes, farm implements, rubber tires, and stoves.

The city occupies an excellent site, is regularly laid out, and there are many fine streets, parks, and public buildings. Wichita is the seat of the Friends university and the University of Wichita. The city was settled in 1870 and incorporated in 1871. Population, 1920, 72,217.

Wichita Falls. A city of northern Texas, on the Wichita river, about 110 miles northwest of Fort Worth. Wichita Falls is the distributing center for a large agricultural and stock raising region, and is the metropolis of a rich petroleum oil field. Its principal manufactures are window glass, auto trucks, flour, and oil well machinery. Wichita Falls was settled in 1882 and was chartered as a city in 1884. Population, 1920, 40,079.

Wilkes-Barre. (*wilks' băr'i*). A city of northeastern Pennsylvania, on the Susquehanna river, about 100 miles northwest of Philadelphia. It is situated in the picturesque Wyoming valley and is in the center of one of the richest anthracite coal fields in the world. The value of its coal production is said to be greater than that of the gold in the United States including Alaska.

Wilkes-Barre possesses some of the most extensive lace and silk mills in the country, and manufactures locomotives, boilers, mining machinery, insulated wire, and wire rope. The city has handsome public buildings, and many fine streets, parks, and recreation grounds.

Wilkes-Barre was settled in 1769 by people from New England, and named in honor of John Wilkes and Isaac Barre, members of the British Parliament. It was the scene of desperate struggles with the British and Indians during the Revolutionary War. The city is noted as the birthplace of the anthracite coal industry. Here "stone coal," as it was early called, was first used for domestic purposes. Population, 1920, 73,833.

Wilmington. The chief city of Delaware, located on the Delaware river, at its junction with Brandywine creek, about 27 miles southwest of Philadelphia.

The favorable location, excellent transportation facilities, nearness to the great coal fields and to the sources of raw material, together with water power furnished by the Brandywine, have combined to make the city an important manufacturing center. The leading industry is the manufacture of finished leather, the city being the morocco center of the country. Other important industries are the manufacture of steam railway cars, paper, fiber products, machine shop products, and shipbuilding. Immense powder and dye mills, located across the river in New Jersey, contribute substantially to the city's trade.

The town was founded in 1638 by Swedes and was known by various names. It was incorporated in 1739, received the name of Wilmington in 1745, and, in 1832, was chartered as a city. Population, 1920, 110,168.

Wilmington. The chief port of North Carolina, situated on the Cape Fear river, 30 miles from its mouth. Wilmington has an excellent harbor, accommodating large seagoing vessels, and is an important commercial city with an extensive shipping trade, especially in cotton. The city is located in a highly productive agricultural district, of which it is the mercantile center. The chief industries include the manufacture of fertilizers, lumber, petroleum and concrete products, cotton goods, and boxes.

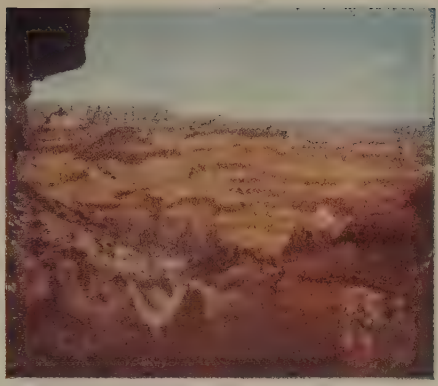
Wilmington was first settled in 1730 and incorporated in 1739. Here, in 1765, was the first armed resistance to the British Stamp act. In 1781-82, the place was occupied by the British. During the Civil War, the port was the chief gateway between the South and foreign nations. It was the principal resort of the blockade runners. Population, 1920, 33,372.

Wilson, Mount. A peak in the Sierra Madre range of southern California, about 10 miles northeast of Pasadena. On its summit, which rises to an elevation of 5750 feet, is the Mount Wilson observatory, containing the famous Hooker 100-inch reflecting telescope and other powerful instruments for astronomical research. An automobile road leads from Pasadena to the summit, which affords excellent views of the surrounding region.

Winston-Salem. A twin city of North Carolina, the most populous in the state, situated about 115 miles west of Raleigh. It is located in a region noted for tobacco growing, and has become the most important center for the manufacture of tobacco in the United States. Its immense factories are said to turn out more manufactured tobacco products than those of any other city in the world. In value of manufactures, Winston-Salem greatly outranks all other cities of North Carolina.

The business and industrial establishments are, for the most part, centered in Winston, while Salem is chiefly residential and noted for its historic interest. The city is the seat of Salem college for young women and the Slater industrial and normal school. Salem was founded in 1766 by Moravians and long remained under the direct control of the Moravian church. Winston was founded in 1851 and received its municipal charter in 1899. The two communities had separate municipal governments long after they were considered a unit by railway and postal authorities. They were consolidated in 1913. Population, 1920. 48,395.

Woonsocket (*wōōn'sŏk'ĕt*). The third largest city of Rhode Island, on the Blackstone river, about 16 miles northwest of Providence. Woonsocket is the seat of extensive manufactures, among the most important of which are cottons, woolens, worsteds, rubber boots and shoes, and wringing machines. It is the seat of Mount Saint Charles





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SCENIC AMERICA. I—NATIONAL PARKS

Grand Canyon, Arizona, from Grand View Point
Canyon of the Yellowstone
Lower Falls, Yellowstone
Grand Canyon, Arizona, from Hance's Point
El Capitan, Yosemite
Glacier Point, Yosemite













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SCENIC AMERICA. II—EASTERN AND SOUTHERN SCENES

Bald Face Mountain, N. C.
Ausable Chasm, N. Y.
Moccasin Bend, from Lookout Mt., Tenn.

Blue Mountain, Adirondacks
Haines Falls, Catskills
Tomoka River, Florida

college, Saint Ann's academy, and the Harris Institute library. Woonsocket is a consolidation of several factory villages, and the first village called Woonsocket is not included within the present city, which was incorporated in 1888. Population, 1920, 43,496.

Worcester (*wŏŏs'tẽr*). The second largest city of Massachusetts, built on both banks of the Blackstone river, about 45 miles southwest of Boston. The city occupies a picturesque site covering the river valley and a number of the surrounding hills.

Worcester is pre-eminently a manufacturing city, and is noted for the number and variety of its industries. Among noteworthy manufacturing establishments are immense wire factories, belt factories, envelope factories, ground stone plants, and loom works. Other important manufactures are machine tools, steel products, carpets, leather goods, steam and electric cars, shoes, women's clothing, corsets, firearms, musical instruments, and electrical machinery.

The city is admirably laid out, has many beautiful streets, parks, and public buildings, and ranks high among the cities of the state in general civic improvements. There are 17 public parks, covering a total area of some 1100 acres, and the playgrounds occupy 74 acres. Among noteworthy buildings are the city hall, the Federal building, the courthouse, Mechanic's hall, and the Masonic temple.

Worcester is the seat of Clark university, Holy Cross college, Assumption college, Worcester polytechnic institute, and a State normal school. There is an excellent art museum, with an endowment of $4,000,000. The library of the American Antiquarian Society, founded in 1812, is rich in historical material, and the Worcester musical festival, held annually, is one of the most important institutions of its kind in the United States.

First settled in 1672, Worcester was twice abandoned because of the hostility of the Indians, especially during King Philip's war. It was incorporated in 1722 and was chartered as a city in 1848. Within the vicinity of Worcester were born Eli Whitney, inventor of the cotton gin; Erastus Bigelow, inventor of the carpet-weaving machine; Elias Howe, inventor of the sewing machine; Lucius Knowles, who perfected the modern power loom; and George Bancroft, the historian. Population, 1922, 179,754.

Wyandotte Cave. A natural formation in Crawford county, southern Indiana, five miles northeast of Leavenworth. It is second in size to Mammoth cave and has a greater number and variety of stalactites and stalagmites than any other known cave in the United States. Besides the numerous chambers and galleries, the 23 miles of the cave that have been explored contain Monument "mountain," rising 175 feet from the floor, and the Pillar of the Constitution, a large stalagmite 30 feet high and 75 feet in circumference.

Yakima (*yăk'ĭ-mȧ*). A city of central Washington, situated about 160 miles southeast of Seattle. Yakima, formerly called North Yakima, is the commercial center of the Yakima valley. This valley contains one of the largest areas of irrigated land in the western United States and is widely noted for the excellent apples and other fine fruits which it produces. The city's chief industrial establishments include fruit canneries, fruit packing houses, flour mills, and lumber mills. Population, 1920, 18,539.

YELLOWSTONE PARK. The largest national park in the United States, situated mainly in northwestern Wyoming but encroaching slightly upon adjoining portions of Montana and Idaho. It is approximately 62 miles long and 54 miles wide, and covers an area of 3348 square miles. Of this area, 3114 square miles are in Wyoming, 198 square miles are in Montana, and 36 square miles are in Idaho.

Rivers and Lakes. Within the limits of the park are the headwaters of several large rivers, including the Yellowstone, the Snake, the Lewis, the Madison, and the Shoshone. The Continental Divide, passing through the park from southeast to northwest, marks the line of separation of the waters draining into the Atlantic from those flowing into the Pacific. There are also numerous lakes, the largest of which is Yellowstone lake, some 20 miles long and from about 5 to 15 miles wide. Below timber line, the less precipitous mountains, as well as the more level portions of the park, are beautifully forested with pine, spruce, and other evergreen trees.

Surface and Origin. The central part of the park is essentially a high plateau, lying at an average elevation of about 8000 feet above sea level. Except on its southwestern border, this plateau is surrounded by massive, snow-capped mountains, whose culminating peaks and ridges rise from 2000 to 4000 feet above the enclosed table-land.

In its origin, the whole region is volcanic. Not only the encircling mountains but also the interior plains are made up of volcanic ash and lava, ejected in some former geologic age from far below the surface. Striking evidences of this are seen in the black glass of Obsidian cliff, in the contorted lavas along the road near the summit of Mount Washburn, and in the fused, highly colored sands composing the walls of Yellowstone canyon.

Scenic Features. The entire park is a scenic wonderland. Its chief features are the geysers, which are the greatest in the world; the Grand Canyon of the Yellowstone, which, in beauty though not in size, rivals the Grand Canyon of the Colorado; Yellowstone falls, ranking among the finest of American cataracts; and the remarkable fossil forests along the Lamar river.

Geysers. There are five active geyser basins—the Norris, the Upper, the Lower, the Heart Lake, and the Shoshone—all lying in the west and south central parts of the park. The numerous geysers in these various fields differ greatly in size, character, and action. Some, as, for example, Old Faithful, spout at nearly regular intervals, longer or shorter, while others are exceedingly irregular. Some burst upward to a great height, displaying immense power; others shoot tiny streams at various angles, or bubble and foam while in eruption.

Hot Springs. Besides the geysers, there are marvelously colored hot springs, mud volcanoes, and other strange and wonderful formations. At Mammoth Hot Springs, and also at Norris and at Thumb, the hot water has brought to the surface immense quantities of white mineral deposits. These have built up high terraces containing beautifully incrusted basins, over the edges of which the hot water pours. Microscopic plants, growing on the edges and on the sides of these basins, color them with brilliant hues of pink, red, and bluish gray. The surface of many hot springs appears brilliantly colored, and the deeper pools in the terraces are often intensely green.

Grand Canyon and Falls. Because of the vivid coloration of its walls, in some places 2000 feet high, the Grand Canyon of the Yellowstone is a scenic feature of the first order. The colors vary from pearly white and pale lemon to orange, pink, and crimson. With the deep green of the forest above, these give a beautiful setting to the Yellowstone falls, which are twice as high as Niagara. The view of the canyon and of the cataract is one of the most impressive in America.

Fossil Forests. The fossil forests along the Lamar river contain many petrified tree trunks which stand upright in the faces of nearly vertical cliffs that rise to a height of nearly 2000 feet above the valley floor. These petrified trunks are found at different depths, indicating a succession of forests, which, from time to time, have been overwhelmed, like Pompeii, with volcanic materials.

Animal Life. The park is a great wild-animal refuge or natural zoological garden. It contains protected herds of elk, moose, deer, antelope, and American bison. There are also numerous groups of brown, cinnamon, and grizzly bears, some of which have become remarkably tame and friendly. Yellowstone lake and the other waters of the park abound in trout.

Accessibility. Yellowstone park is reached by rail at Gardiner, Montana, on the north, and also at West Yellowstone, Montana, on the west. The eastern entrance to the park is reached by auto stage from Cody, Wyoming, 55 miles distant. The southern or Snake River entrance is reached by an auto road from the main north-and-south highway in Idaho. This turns eastward at Saint Anthony, crosses the famous Teton mountains and the Jackson Hole country, and thence proceeds northward to the park. The southern entrance may be reached also by various auto routes leading northward from the Lincoln highway in southern Wyoming.

Travel Facilities. Automobile roads and trails reach all the important features of the park. There are hotels, camps, stores, auto-transportation lines, and various other facilities and accommodations for travelers. The various park utilities are operated during the tourist season, which extends usually from June 20 to September 20.

Yonkers. A residential and manufacturing city of southeastern New York, on the Hudson river, 14 miles north of the center of New York City. It is magnificently situated along the east bank of the Hudson river, its site rising in a gradual slope to an elevation of 400 feet, from which may be obtained splendid views of the river and of the towering Palisades.

Of the many and varied industries of Yonkers, the principal are sugar refining, carpet weaving, and the manufacture of machine shop products, elevators, electric motors, drugs, women's clothing, and rubber goods. In total value of manufactures, Yonkers ranks fifth among the cities of the state.

Yonkers was founded about 1646 and incorporated in 1788. The northern portion was chartered as a city in 1872; the southern portion was annexed to New York City in 1874. Population, 1920, 100,176.

York. A manufacturing and commercial center of southeastern Pennsylvania, about 25 miles south of Harrisburg. York is situated in the midst of a highly productive agricultural district with which it conducts an extensive trade. Its chief industries are the manufacture of foundry and machine products and of cigars. Other manufactures include agricultural implements, pianos, cigar boxes, silk goods, and hosiery.

York was first permanently settled in 1735 by a German colony. It was laid out in 1741 by the sons of William Penn, was incorporated in 1787, and received its city charter in 1887. In 1777-78, the Continental Congress held sessions in York while the British were occupying Philadelphia. Population, 1920, 47,512.

Yorktown. A village of southeastern Virginia, situated on an arm of Chesapeake bay, about 70 miles southeast of Richmond. Yorktown is famous as the scene of the surrender, October 19, 1781, of the British army, by Lord Cornwallis. This virtually ended the Revolutionary War, and there is an impressive monument commemorating the event. During the Civil War, there was a second siege of Yorktown. In 1862, General G. B. McClellan, with a large Union army, besieged the place and compelled its evacuation by the Confederate forces under General J. E. Johnston. On the principal street of the village stands the oldest customhouse in the United States. Population, 1920, 155.

YOSEMITE (*yō-sĕm'ĭ-tē*) **PARK.** A national park, containing some of the most magnificent scenery in America. It lies immediately west of the summit of the Sierra Nevada, in central California, about 160 miles east of San Francisco.

Area and Surface. The park occupies a mountainous tract, some 50 miles long, north and south, with an extreme width, east and west, of about 35 miles, the whole embracing an area of 1125 square miles. This region, in general, slopes to the west, and is traversed by two main rivers, the Merced and the Tuolumne, and by their numerous tributaries.

The surface varies from deep valley floors on the west, which lie at an elevation of less than 4000 feet above the sea, to snow-capped peaks which tower to heights of 13,000 feet, along the eastern boundary. Extensive areas are covered with noble forests of immense evergreen trees. These are interspersed with charming mountain meadows and many beautiful lakes. There are innumerable canyons, gorges, and narrow valleys, with rushing streams, cascades, and cataracts, fed, in large part, from the glaciers and snow fields on the higher mountains.

The surface features that give to the park its most striking character were mainly formed by glacial action and by river erosion. These natural agencies, working through long periods of geological time, have produced the deepest valleys and the highest waterfalls on the continent.

Scenic Features. Like Yellowstone park, the Yosemite region presents a long succession of scenic wonders. The chief of these are included in the celebrated Yosemite valley, in the Tuolumne canyon with the Hetch Hetchy, and in the famous Mariposa grove of "big trees."

Yosemite Valley. This incomparable valley is about 7 miles long, with an average width of about a mile. Through the bottom of this valley, the Merced river flows. On either side, the valley is bordered with a succession of vast cliffs and lofty granite domes which rise almost vertically to immense heights. Among the most noted of these massive rock formations, with the heights of their summits above the valley floor, are: Cathedral Rocks, 2591 feet; El Capitan, 3604 feet; Sentinel Dome, 4157 feet; Half Dome, 4892 feet; and Clouds Rest, 5964 feet.

Waterfalls. Over the edges of towering precipices in the rock walls that enclose the Yosemite valley, plunge some of the most remarkable cataracts known. The Upper Yosemite fall drops 1430 feet in one sheer descent, a height equal to about 9 Niagaras. Immediately below this upper fall, the Bridal Veil fall has a drop of 620 feet more, a height of nearly 4 Niagaras. Just beneath the Bridal Veil, the Lower Yosemite fall takes a plunge of 320 feet, or 2 Niagaras more. These three falls, which are parts of one great cataract, make a drop of 2370 feet before their waters reach the Merced river. Vernal falls has a height of 320 feet; Illouette falls, 370 feet; and Nevada falls, 594 feet. The Ribbon falls, the highest of all, drops 1612 feet sheer, a straight fall about ten times as great as that of Niagara. Nowhere else in the world is there such an array of stupendous waterfalls.

Tuolumne Valley. With the opening of roads and trails, making this region of the park accessible, the fine scenic features of the Tuolumne basin are also becoming celebrated. These include the beautiful Hetch Hetchy valley, the Grand Canyon of the Tuolumne, and the remarkable Waterwheel falls, in which enormous arcs of water are flung from 50 to 80 feet into the air.

Big Trees. The greatest grove of giant sequoias outside of Sequoia national park is the Mariposa grove on the southern border of Yosemite park. The monster tree of this grove is the Grizzly Giant, whose girth is 93 feet, whose diameter is 29½ feet, and whose height is 204 feet. In massiveness, this immense tree is exceeded only by the General Sherman tree, 36½ feet in diameter and 280 feet high, in Sequoia national park, and by the General Grant tree, 35 feet in diameter and 264 feet high, in General Grant national park. Other noted trees in the Mariposa grove are the Washington tree, slightly smaller than the Grizzly Giant; the Columbia tree, 294 feet high; and the Wawona tree, through the trunk of which runs an automobile road 26 feet wide. There are two minor sequoia groves in the park—the Merced and the Tuolumne.

Accessibility. Yosemite park is reached by rail to El Portal, near the western boundary of the park, and thence by automobile into the Yosemite valley. The park is reached also from Merced by auto stage to Mariposa and Wawona, thence to the Mariposa grove of "big trees," and into the Yosemite valley. It may be reached by auto roads from various other points, and the traveler usually has his choice of leaving by one of various routes other than the one by which he entered. The Tioga road, which crosses the park from east to west, forms a link in a fine scenic highway across the Sierras to Lake Tahoe. The Yosemite valley is the northern terminus of the John Muir trail, built southward along the crest of the Sierras.

Travel Facilities. Automobile roads and trails have been built to the chief places of interest. There are hotels, camps, stores, auto-transportation lines, saddle horses, camping and hiking equipment, and various other facilities and accommodations for travelers. Yosemite valley is always open and may be reached by way of El Portal throughout the year. The regular tourist season extends from May 1 to November 1, though the higher mountain roads usually are not open until midsummer.

Youngstown. A city of northeastern Ohio, on the Mahoning river, about 65 miles southeast of Cleveland. Youngstown owes its importance as a steel manufacturing center to its advantageous situation near necessary raw materials and to excellent transportation facilities, by rail and canal. In the vicinity are iron and coal mines and limestone quarries. Iron ore from Minnesota is available with a short haul from lake ports.

The city's chief industrial establishments are its immense blast furnaces, steel works, and rolling mills. Other manufactures include many subsidiary steel products, such as steel rails, steel pipes, and engine boilers; also tin plate, coke, rubber goods, oilcloth, gaslight mantles, and electrical machinery. Youngstown ranks fifth among the cities of the state in manufactures. The Youngstown steel district, which includes works in the Mahoning, Shenango, and Beaver valleys, produces about one-sixth of all the pig iron and about one-eighth of all the steel made in the United States.

Youngstown was settled in 1796, was incorporated in 1848, and received its city charter in 1867. A blast furnace was built in 1805 and a rolling mill was erected in 1845. Population, 1920, 132,358.

Yuma. A city of southwestern Arizona, built on the east bank of the Colorado river, at the mouth of the Gila, about 7 miles from the Mexican boundary. The surrounding region is remarkable for its almost continuous sunshine and for the extreme dryness of its climate. The annual rainfall of 3.13 inches at Yuma is the lowest recorded at any station of the United States weather bureau. Summer temperatures of 110° to 120° in the shade are recorded. Yet, owing to the low humidity, sunstroke is practically unknown. Yuma was established in 1700 by Spanish missionaries. It is the trade center of a mining district in which increasing quantities of field crops and fruit are produced through the development of irrigation. Population, 1920, 4237.

Zanesville. A city in Ohio, located on the Muskingum river at the mouth of the Licking, 59 miles east of Columbus. Zanesville occupies an attractive site, surrounded by lofty hills. It is well planned, with fine broad streets and several spacious parks. It is also well provided with educational institutions, including a Carnegie library. Its varied industries include the manufacture of pottery, glass, brick, tiles, marble, and lumber. From its large pottery production it is sometimes known as the "Clay City."

Zanesville was founded in 1799 by Ebenezer Zane and others, and, during 1810–12, it was the capital of the state. It was incorporated in 1814 and was chartered as a city in 1850. Population, 1920, 29,569.

Zuñi (*zōō'nyē*; *sōō'-*). The largest of the Pueblo Indian villages, situated near the western boundary of New Mexico, about 40 miles south of Gallup. The inhabitants, who possess a distinct language, call themselves Ashiwi. They are descendants of the people of "Cibola," mentioned by the earliest Spanish explorers.

Like Pueblo Indians generally, the Zuñi people are peace loving, devoted chiefly to agriculture, and adhere with great tenacity to their ancient culture and customs. In the construction of their adobe and stone houses, in their methods of irrigation and agriculture, in weaving, in pottery making, and in other arts, as well as in their elaborate ceremonials, they closely resemble the other village-dwelling Indians of the Southwest.

The Spaniards first visited the Zuñi people in 1539 but were driven away. Later, Spanish missionaries gained considerable influence with them. Population, about 1700.

CITIES AND OTHER INCORPORATED PLACES IN THE UNITED STATES HAVING A POPULATION OF 5000 AND UPWARDS, 1920

City	Pop. 1920	% of Inc. 1910–20*
Aberdeen, S. Dak.	14,537	35.2
Aberdeen, Wash.	15,337	12.3
Abilene, Tex.	10,274	11.6
Abington, Mass.	5,787	6.1
Ada, Okla.	8,012	84.2
Adams, Mass.	12,967	−0.5
Adrian, Mich.	11,878	10.4
Agawam, Mass.	5,023	43.5
Akron, Ohio	208,435	201.8
Alabama City, Ala.	5,432	25.9
Alameda, Cal.	28,806	23.2
Albany, Ala.	7,652	25.1
Albany, Ga.	11,555	41.1
Albany, N. Y.	113,344	13.1
Albert Lea, Minn.	8,056	30.1
Albia, Iowa	5,067	2.0
Albion, Mich.	8,354	43.2
Albuquerque, N. Mex.	15,157	37.5
Alexandria, La.	17,510	56.2
Alexandria, Va.	18,060	17.8
Alhambra, Cal.	9,096	81.2
Allentown, Pa.	73,502	41.6
Alliance, Ohio	21,603	43.2
Alma, Mich.	7,542	173.6
Alpena, Mich.	11,101	−12.6
Alton, Ill.	24,682	40.8
Altoona, Pa.	60,331	15.7
Amarillo, Tex.	15,494	55.6
Ambridge, Pa.	12,730	144.6
Americus, Ga.	9,010	11.7
Ames, Iowa	6,270	48.5
Amesbury, Mass.	10,036	1.4
Amherst, Mass.	5,550	8.6
Amsterdam, N. Y.	33,524	7.2
Anaconda, Mont.	11,668	15.1
Anacortes, Wash.	5,284	26.8
Anaheim, Cal.	5,526	110.3
Anderson, Ind.	29,767	32.4
Anderson, S. C.	10,570	9.5
Andover, Mass.	8,268	13.2
Annapolis, Md.	11,214	30.3
Ann Arbor, Mich.	19,516	31.7
Anniston, Ala.	17,734	38.6
Ansonia, Conn.	17,643	16.4
Antigo, Wis.	8,451	17.4
Appleton, Wis.	19,561	16.6
Archbald, Pa.	8,603	19.6
Ardmore, Okla.	14,181	64.6
Arkansas City, Kans.	11,253	49.9
Arlington, Mass.	18,665	66.8
Arnold, Pa.	6,120	236.6
Asbury Park, N. J.	12,400	22.2
Asheville, N. C.	28,504	51.9
Ashland, Ky.	14,729	69.5
Ashland, Ohio	9,249	36.1
Ashland, Pa.	6,666	−2.8
Ashland, Wis.	11,334	−2.2
Ashley, Pa.	6,520	16.4
Ashtabula, Ohio	22,082	20.9
Astoria, Oreg.	14,027	46.1
Atchison, Kans.	12,630	−23.1
Athens, Ga.	16,748	12.3
Athens, Ohio	6,418	17.5
Athol, Mass.	9,792	14.7
Atlanta, Ga.	200,616	29.6
Atlantic, Iowa	5,329	16.9
Atlantic City, N. J.	50,707	9.9
Attleboro, Mass.	19,731	21.7
Auburn, Me.	16,985	12.8
Auburn, N. Y.	36,192	4.4
Augusta, Ga.	52,548	28.0
Augusta, Me.	14,114	6.8
Aurora, Ill.	36,397	22.1
Austin, Minn.	10,118	45.4
Austin, Tex.	34,876	16.8
Avalon, Pa.	5,277	22.2
Baker, Oreg.	7,729	14.6
Bakersfield, Cal.	18,638	46.4
Baltimore, Md.	733,826	31.4
Bangor, Me.	25,978	4.7
Bangor, Pa.	5,402	0.6
Baraboo, Wis.	5,538	−12.4
Barberton, Ohio	18,811	99.9
Barre, Vt.	10,008	−6.8
Bartlesville, Okla.	14,417	133.2
Batavia, N. Y.	13,541	16.6
Bath, Me.	14,731	56.8
Baton Rouge, La.	21,782	46.2
Battle Creek, Mich.	36,164	43.1
Bay City, Mich.	47,554	5.3
Bayonne, N. J.	76,754	38.2
Beacon, N. Y.†	10,996	3.5
Beardstown, Ill.	7,111	16.4
Beatrice, Nebr.	9,664	3.3
Beaumont, Tex.	40,422	95.8
Beaver Dam, Wis.	7,992	18.3
Beaver Falls, Pa.	12,802	5.0
Bedford, Ind.	9,076	4.1
Belfast, Me.	5,083	10.1
Bellaire, Ohio	15,061	16.3
Bellefontaine, Ohio	9,336	13.3
Belleville, Ill.	24,823	17.5
Belleville, N. J.	15,660	——
Bellevue, Ky.	7,379	10.4
Bellevue, Ohio	5,776	10.9
Bellevue, Pa.	8,198	29.7
Bellingham, Wash.	25,585	5.3
Belmont, Mass.	10,749	93.9
Beloit, Wis.	21,284	40.7
Belton, Tex.	5,098	22.4
Belvidere, Ill.	7,804	7.6
Bemidji, Minn.	7,086	39.0
Bend, Oreg.	5,415	910.3
Bennington, Vt.	7,230	16.4
Benton, Ill.	7,201	169.2
Benton Harbor, Mich.	12,233	33.2
Berkeley, Cal.	56,036	38.6
Berlin, N. H.	16,104	36.7
Berwick, Pa.	12,181	127.4
Berwyn, Ill.	14,150	142.3
Bessemer, Ala.	18,674	71.9
Bessemer, Mich.	5,482	19.6
Bethlehem, Pa.	50,358	292.3
Beverly, Mass.	22,561	21.0
Bicknell, Ind.	7,635	173.3
Biddeford, Me.	18,008	5.4
Billings, Mont.	15,100	50.5
Biloxi, Miss.	10,937	35.9
Binghamton, N. Y.	66,800	37.9
Birmingham, Ala.	178,806	34.8
Bisbee, Ariz.	9,205	2.1
Bismarck, N. Dak.	7,122	30.8
Blackwell, Okla.	7,174	119.7
Blakely, Pa.	6,564	22.8
Bloomfield, N. J.	22,019	46.1
Bloomington, Ill.	28,725	11.5
Bloomington, Ind.	11,595	31.2
Bloomsburg, Pa.	7,819	5.5
Bluefield, W. Va.	15,282	36.6
Blue Island, Ill.	11,424	42.0
Bluffton, Ind.	5,391	8.1
Blytheville, Ark.	6,447	67.5
Bogalusa, La.	8,245	——
Boise, Idaho	21,393	23.2
Bonham, Tex.	6,008	24.0
Boone, Iowa	12,451	20.3
Boonton, N. J.	5,372	9.0
Boston, Mass.	748,060	11.6
Boulder, Colo.	11,006	15.4
Boundbrook, N. J.	5,906	48.8
Bowling Green, Ky.	9,638	5.1
Bowling Green, Ohio	5,788	10.8
Bozeman, Mont.	6,183	21.1
Braddock, Pa.	20,879	7.9
Bradford, Pa.	15,525	6.7
Brainerd, Minn.	9,591	12.5
Braintree, Mass.	10,580	31.2
Brattleboro, Vt.	7,324	12.4
Brawley, Cal.	5,389	511.7
Brazil, Ind.	9,293	−0.5
Bremerton, Wash.	8,918	198.0
Brenham, Tex.	5,066	7.4
Brewer, Me.	6,064	7.0
Bridgeport, Conn.	143,555	40.7
Bridgeton, N. J.	14,323	0.8
Bridgewater, Mass.	8,438	9.8
Brigham, Utah	5,282	43.3
Bristol, Conn.	20,620	116.4
Bristol, Pa.	10,273	11.0
Bristol, R. I.	11,375	32.8
Bristol, Tenn.	8,047	12.6
Bristol, Va.	6,729	7.7
Brockton, Mass.	66,254	16.5
Brookfield, Mo.	6,304	9.7
Brookline, Mass.‡	37,748	35.8
Brownsville, Tex.	11,791	12.1
Brownwood, Tex.	8,223	18.0
Brunswick, Ga.	14,413	41.6
Brunswick, Me.	5,784	8.3
Bryan, Tex.	6,307	52.6
Bucyrus, Ohio	10,425	28.4
Buffalo, N. Y.	506,775	19.6
Burkburnett, Tex.	5,300	——
Burley, Idaho	5,408	——
Burlington, Iowa	24,057	−1.1
Burlington, N. C.	5,952	23.8
Burlington, N. J.	9,049	8.6
Burlington, Vt.	22,779	11.3
Burrillville, R. I.	8,606	9.2
Butler, Pa.	23,778	14.7
Butte, Mont.	41,611	6.2
Cadillac, Mich.	9,750	16.4
Cairo, Ill.	15,203	4.5
Calais, Me.	6,084	−0.5
Caldwell, Idaho	5,106	44.1
Calexico, Cal.	6,223	680.8
Cambridge, Md.	7,467	16.5
Cambridge, Mass.	109,694	4.6
Cambridge, Ohio	13,104	15.7
Camden, N. J.	116,309	23.0
Canandaigua, N. Y.	7,356	1.9
Canonsburg, Pa.	10,632	173.2
Canton, Ill.	10,928	4.5
Canton, Mass.	5,945	23.9
Canton, Ohio	87,091	73.4
Cape Girardeau, Mo.	10,252	21.0
Carbondale, Ill.	6,267	15.8
Carbondale, Pa.	18,640	9.4
Carlinville, Ill.	5,212	44.1
Carlisle, Pa.	10,916	5.9
Carnegie, Pa.	11,516	15.1
Carrick, Pa.	10,504	71.7
Carthage, Mo.	10,068	6.2
Casper, Wyo.	11,447	333.8
Cedar Falls, Iowa	6,316	26.0
Cedar Rapids, Iowa	45,566	38.9
Centerville, Iowa	8,468	22.3
Central Falls, R. I.	24,174	6.2
Centralia, Ill.	12,491	29.0
Centralia, Wash.	7,549	3.3
Chambersburg, Pa.	13,171	11.6
Champaign, Ill.	15,873	27.8
Chanute, Kans.	10,286	10.9
Chariton, Iowa	5,175	36.4
Charleroi, Pa.	11,516	19.8
Charles City, Iowa	7,350	24.7
Charleston, Ill.	6,615	12.4
Charleston, S. C.	67,957	15.5
Charleston, W. Va.	39,608	72.2
Charlotte, Mich.	5,126	4.9
Charlotte, N. C.	46,338	36.2
Charlottesville, Va.	10,688	58.0
Chattanooga, Tenn.	57,895	29.8
Cheboygan, Mich.	5,642	−17.7
Chelmsford, Mass.	5,682	13.4
Chelsea, Mass.	43,184	33.1
Cherokee, Iowa	5,824	19.2
Chester, Pa.	58,030	50.6
Chester, S. C.	5,557	16.9
Cheyenne, Wyo.	13,829	22.2
Chicago, Ill.	2,701,705	23.6
Chicago Heights, Ill.	19,653	35.3
Chickasha, Okla.	10,179	−1.4
Chico, Cal.	9,339	149.0

* A minus sign denotes decrease; a dash in place of figures indicates that no figures were given in the 1910 Census.
† Fishkill Landing and Matteawan villages were consolidated and incorporated as Beacon city in 1913.
‡ Not incorporated.

CITIES AND OTHER INCORPORATED PLACES IN THE UNITED STATES HAVING A POPULATION OF 5000 AND UPWARDS, 1920—Con.

City	Pop. 1920	% of Inc. 1910–20*
Chicopee, Mass.	36,214	42.6
Childress, Tex.	5,003	31.0
Chillicothe, Mo.	6,772	4.2
Chillicothe, Ohio	15,831	9.1
Chippewa Falls, Wis.	9,130	2.7
Chisholm, Minn.	9,039	17.6
Cicero, Ill.	44,995	209.1
Cincinnati, Ohio	401,247	10.4
Circleville, Ohio	7,049	4.5
Cisco, Tex.	7,422	208.0
Clairton, Pa.	6,264	88.3
Claremont, N. H.	9,524	26.5
Clarksburg, W. Va.	27,869	202.9
Clarksdale, Miss.	7,552	85.1
Clarksville, Tenn.	8,110	–5.1
Clearfield, Pa.	8,529	24.5
Cleburne, Tex.	12,820	23.7
Cleveland, Ohio	796,841	42.1
Cleveland, Tenn.	6,522	17.5
Cleveland Heights, Ohio	15,236	415.6
Cliffside Park, N. J.	5,709	68.2
Clifton, N. J.	26,470	——
Clifton Forge, Va.	6,164	7.2
Clinton, Ill.	5,898	14.2
Clinton, Ind.	10,962	76.0
Clinton, Iowa	24,151	–5.6
Clinton, Mass.	12,979	–0.7
Clinton, Mo.	5,098	2.1
Cloquet, Minn.	5,127	–27.1
Coaldale, Pa.	6,336	22.9
Coatesville, Pa.	14,515	31.0
Coeur d' Alene, Idaho	6,447	–11.2
Coffeyville, Kans.	13,452	6.0
Cohoes, N. Y.	22,987	–7.0
Coldwater, Mich.	6,114	2.8
Collingswood, N. J.	8,714	81.7
Collinsville, Ill.	9,753	30.4
Colorado Springs, Colo.	30,105	3.5
Columbia, Mo.	10,392	7.6
Columbia, Pa.	10,836	–5.4
Columbia, S. C.	37,524	42.6
Columbia, Tenn.	5,526	–4.0
Columbus, Ga.	31,125	51.4
Columbus, Ind.	8,990	2.0
Columbus, Miss.	10,501	16.8
Columbus, Nebr.	5,410	7.9
Columbus, Ohio	237,031	30.6
Concord, Mass.	6,461	0.6
Concord, N. C.	9,903	13.6
Concord, N. H.	22,167	3.1
Conneaut, Ohio	9,343	12.3
Connellsville, Pa.	13,804	7.5
Connersville, Ind.	9,901	28.0
Conshohocken, Pa.	8,481	13.4
Coraopolis, Pa.	6,162	17.3
Cordele, Ga.	6,538	11.1
Corinth, Miss.	5,498	9.5
Corning, N. Y.	15,820	15.2
Corpus Christi, Tex.	10,522	28.0
Corry, Pa.	7,228	20.6
Corsicana, Tex.	11,356	16.5
Cortland, N. Y.	13,294	15.6
Corvallis, Oreg.	5,752	26.4
Coshocton, Ohio	10,847	13.0
Council Bluffs, Iowa	36,162	23.5
Coventry, R. I.	5,670	–3.0
Covington, Ky.	57,121	7.2
Covington, Va.	5,623	32.8
Crafton, Pa.	5,954	29.9
Cranston, R. I.	29,407	39.3
Crawfordsville, Ind.	10,139	8.2
Creston, Iowa	8,034	16.0
Crookston, Minn.	6,825	–9.7
Crowley, La.	6,108	19.8
Cudahy, Wis.	6,725	82.2
Cumberland, Md.	29,837	36.6
Cumberland, R. I.	10,077	–0.3
Cushing, Okla.	6,326	490.1
Cuyahoga Falls, Ohio	10,200	153.7
Dallas, Tex.	158,976	72.6
Dalton, Ga.	5,222	–1.9
Danbury, Conn.	18,943	–6.4
Danvers, Mass.	11,108	18.1
Danville, Ill.	33,776	21.2
Danville, Ky.	5,099	–5.9
Danville, Pa.	6,952	–7.5
Danville, Va.	21,539	13.2
Darby, Pa.	7,922	25.6
Dartmouth, Mass.	6,493	48.3
Davenport, Iowa	56,727	31.8
Dayton, Ky.	7,646	9.6
Dayton, Ohio	152,559	30.9
Daytona, Fla.	5,445	76.7
Decatur, Ga.	6,150	149.4
Decatur, Ill.	43,818	40.7
Dedham, Mass.	10,792	16.2
Defiance, Ohio	8,876	21.1
De Kalb, Ill.	7,871	–2.9
Delaware, Ohio	8,756	–3.5
Delphos, Ohio	5,745	14.0
Del Rio, Tex.	10,589	——
Denison, Tex.	17,065	25.2
Dennison, Ohio	5,524	37.8
Denton, Tex.	7,626	61.2
Denver, Colo.	256,491	20.2
De Pere, Wis.	5,165	15.4
Depew, N. Y.	5,850	49.2
Derby, Conn.	11,238	25.0
Derry, N. H.	5,382	5.1
Des Moines, Iowa	126,468	46.4
De Soto, Mo.	5,003	6.0
Detroit, Mich.	993,678	113.3
Devils Lake, N. Dak.	5,140	–0.3
Dickson City, Pa.	11,049	18.4
Dixon, Ill.	8,191	13.5
Dodge City, Kans.	5,061	57.5
Donora, Pa.	14,131	72.9
Dormont, Pa.	6,455	478.9
Dorranceton, Pa.	6,334	56.5
Dothan, Ala.	10,034	43.0
Douglas, Ariz.	9,916	54.0
Dover, N. H.	13,029	–1.6
Dover, N. J.	9,803	31.3
Dover, Ohio	8,101	22.4
Dowagiac, Mich.	5,440	6.9
Dracut, Mass.	5,280	52.6
Drumright, Okla.	6,460	——
Dublin, Ga.	7,707	33.0
Du Bois, Pa.	13,681	8.4
Dubuque, Iowa	39,141	1.7
Duluth, Minn.	98,917	26.1
Dunkirk, N. Y.	19,336	12.3
Dunmore, Pa.	20,250	15.0
Duquesne, Pa.	19,011	20.9
Duquoin, Ill.	7,285	33.6
Durant, Okla.	7,340	37.7
Durham, N. C.	21,719	19.1
Duryea, Pa.	7,776	3.9
Dyersburg, Tenn.	6,444	55.3
Eagle Pass, Tex.	5,765	63.0
East Chicago, Ind.	35,967	88.3
East Cleveland, Ohio	27,292	197.3
East Conemaugh, Pa.	5,256	4.2
Easthampton, Mass.	11,261	32.1
Eastland, Tex.	9,368	995.7
East Liverpool, Ohio	21,411	5.0
East Moline, Ill.	8,675	225.5
Easton, Mass.	5,041	–1.9
Easton, Pa.	33,813	18.5
East Orange, N. J.	50,710	47.5
East Palestine, Ohio	5,750	62.6
East Pittsburgh, Pa.	6,527	16.2
East Point, Ga.	5,241	42.3
East Providence, R. I.	21,793	37.9
East Rutherford, N. J.	5,463	27.8
East St. Louis, Ill.	66,767	14.0
East Youngstown, Ohio	11,237	126.0
Eau Claire, Wis.	20,906	14.2
Edwardsville, Ill.	5,336	6.4
Edwardsville, Pa.	9,027	7.4
Elberton, Ga.	6,475	–0.1
El Centro, Cal.	5,464	239.4
Eldorado, Ill.	5,004	48.7
Eldorado, Kans.	10,995	251.4
Elgin, Ill.	27,454	5.7
Elizabeth, N. J.	95,783	30.5
Elizabeth City, N. C.	8,925	6
Elkhart, Ind.	24,277	25
Elkins, W. Va.	6,788	29
Ellwood City, Pa.	8,958	129
Elmira, N. Y.	45,393	22
El Paso, Tex.	77,560	97
El Reno, Okla.	7,737	–1
Elwood, Ind.	10,790	–2
Elyria, Ohio	20,474	38
Emporia, Kans.	11,273	24
Endicott, N. Y.	9,500	294
Englewood, N. J.	11,627	17
Enid, Okla.	16,576	20
Ennis, Tex.	7,224	27
Erie, Pa.	93,372	40
Escanaba, Mich.	13,103	–0
Etna, Pa.	6,341	8
Eugene, Oreg.	10,593	17
Eureka, Cal.	12,923	9
Evanston, Ill.	37,234	49
Evansville, Ind.	85,264	22
Eveleth, Minn.	7,205	2
Everett, Mass.	40,120	19
Everett, Wash.	27,644	11
Fairbury, Nebr.	5,454	3
Fairfield, Ala.	5,003	——
Fairfield, Iowa	5,948	19
Fairhaven, Mass.	7,291	42
Fairmont, W. Va.	17,851	83
Fall River, Mass.	120,485	1
Fargo, N. Dak.	21,961	53
Faribault, Minn.	11,089	23
Farrell, Pa.	15,586	53
Fayetteville, Ark.	5,362	19
Fayetteville, N. C.	8,877	26
Fergus Falls, Minn.	7,581	10
Fernandina, Fla.	5,457	56
Findlay, Ohio	17,021	14
Fitchburg, Mass.	41,029	8
Fitzgerald, Ga.	6,870	18
Flint, Mich.	91,599	137
Florence, Ala.	10,529	57
Florence, S. C.	10,968	55
Fond du Lac, Wis.	23,427	24
Ford City, Pa.	5,605	15
Forest City, Pa.	6,004	4
Forest Park, Ill.	10,768	63
Fort Collins, Colo.	8,755	6
Fort Dodge, Iowa	19,347	24
Fort Lee, N. J.	5,761	28
Fort Madison, Iowa	12,066	35
Fort Scott, Kans.	10,693	2
Fort Smith, Ark.	28,870	20
Fort Thomas, Ky.	5,028	——
Fort Wayne, Ind.	86,549	35
Fort Worth, Tex.	106,482	45
Fostoria, Ohio	9,987	4
Frackville, Pa.	5,590	79
Framingham, Mass.	17,033	31
Frankfort, Ind.	11,585	34
Frankfort, Ky.	9,805	–6
Franklin, Mass.	6,497	15
Franklin, N. H.	6,318	3
Franklin, Pa.	9,970	2
Frederick, Md.	11,066	6
Fredericksburg, Va.	5,882	0
Fredonia, N. Y.	6,051	14
Freeland, Pa.	6,666	7
Freeport, Ill.	19,669	12
Freeport, N. Y.	8,599	77
Fremont, Nebr.	9,605	10
Fremont, Ohio	12,468	25
Fresno, Cal.	45,086	81
Frostburg, Md.	6,017	–0
Fulton, Mo.	5,595	7
Fulton, N. Y.	13,043	24
Gadsden, Ala.	14,737	39
Gaffney, S. C.	5,065	6
Gainesville, Fla.	6,860	–14
Gainesville, Ga.	6,272	5
Gainesville, Tex.	8,648	13
Galesburg, Ill.	23,834	7

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City	Pop. 1920	% of Inc. 1910–20*	City	Pop. 1920	% of Inc. 1910–20*	City	Pop. 1920	% of Inc. 1910–20*
Galion, Ohio	7,374	2.2	Henderson, Ky.	12,169	6.3	Kansas City, Kans.	101,177	22.9
Gallipolis, Ohio	6,070	9.2	Henderson, N. C.	5,222	16.0	Kansas City, Mo	324,410	30.6
Galveston, Tex.	44,255	19.7	Henryetta, Okla.	5,889	252.4	Kaukauna, Wis.	5,951	26.2
Gardiner, Me.	5,475	3.1	Herkimer, N. Y.	10,453	39.0	Kearney, Nebr.	7,702	24.2
Gardner, Mass.	16,971	15.5	Herrin, Ill.	10,986	60.1	Kearny, N. J.	26,724	43.2
Garfield, N. J.	19,381	89.8	Hibbing, Minn.	15,089	70.8	Keene, N. H.	11,210	11.3
Gary, Ind.	55,378	229.6	Hickory, N. C.	5,076	36.6	Kendallville, Ind.	5,273	5.9
Gastonia, N. C.	12,871	123.5	Highland Park, Ill.	6,167	46.5	Kenmore, Ohio	12,683	712.5
Geneva, N. Y.	14,648	17.7	Highland Park, Mich.	46,499	1028.6	Kenosha, Wis.	40,472	89.4
Girard, Ohio	6,556	75.5	High Point, N. C.	14,302	50.2	Kent, Ohio	7,070	57.5
Glassport, Pa.	6,959	25.6	Hillsboro, Ill.	5,074	48.2	Kenton, Ohio	7,690	7.0
Glen Cove, N. Y.	8,664	——	Hillsboro, Tex.	6,952	13.7	Keokuk, Iowa	14,423	3.0
Glendale, Cal.	13,536	392.9	Hillsdale, Mich.	5,476	9.5	Kewanee, Ill.	16,026	72.2
Glens Falls, N. Y.	16,638	9.2	Hingham, Mass.	5,604	12.9	Keyser, W. Va.	6,003	62.0
Globe, Ariz.	7,044	−0.6	Hoboken, N. J.	68,166	−3.1	Key West, Fla.	18,749	−6.0
Gloucester, Mass.	22,947	−5.9	Holland, Mich.	12,183	16.1	Kingsport, Tenn.	5,692	——
Gloucester, N. J.	12,162	28.5	Holyoke, Mass	60,203	4.3	Kingston, N. Y.	26,688	3.0
Gloversville, N. Y.	22,075	6.9	Homestead, Pa.	20,452	9.3	Kingston, Pa.	8,952	38.8
Goldsboro, N. C.	11,296	85.0	Hoopeston, Ill.	5,451	16.0	Kinston, N. C.	9,771	39.7
Goshen, Ind.	9,525	11.9	Hopkinsville, Ky.	9,696	2.9	Kirksville, Mo.	7,213	13.6
Grafton, Mass.	6,887	20.7	Hoquiam, Wash.	10,058	23.1	Kittanning, Pa.	7,153	65.9
Grafton, W. Va.	8,517	12.6	Hornell, N. Y.	15,025	10.3	Knoxville, Pa.	7,201	27.4
Grand Forks, N. Dak.	14,010	12.3	Hot Springs, Ark.	11,695	−19.0	Knoxville, Tenn.	77,818	114.1
Grand Haven, Mich.	7,205	23.0	Houma, La.	5,160	2.7	Kokomo, Ind.	30,067	76.8
Grand Island, Nebr.	13,947	35.1	Houston, Tex.	138,276	75.5			
Grand Junction, Colo.	8,665	11.7	Hudson, Mass.	7,607	12.8	**Lackawanna, N. Y.**	17,918	23.2
Grand Rapids, Mich.	137,634	22.3	Hudson, N. Y.	11,745	2.9	Laconia, N. H.	10,897	7.0
Granite City, Ill.	14,757	49.0	Hudson Falls, N. Y.	5,761	11.0	La Crosse, Wis.	30,421	(4)
Great Barrington, Mass.	6,315	6.6	Hugo, Okla.	6,368	39.0	Lafayette, Ind.	22,486	12.0
Great Falls, Mont.	24,121	72.9	Huntingdon, Pa.	7,051	2.8	Lafayette, La.	7,855	22.9
Greeley, Colo.	10,958	34.0	Huntington, Ind.	14,000	36.3	La Grande, Oreg.	6,913	42.7
Green Bay, Wis.	31,017	22.9	Huntington, W. Va.	50,177	61.0	Lagrange, Ga.	17,038	205.0
Greenfield, Mass.	15,462	48.3	Huntsville, Ala.	8,018	5.3	La Grange, Ill.	6,525	23.5
Greensboro, N. C.	19,861	25.0	Huron, S. Dak.	8,302	43.4	Lake Charles, La.	13,088	14.3
Greensburg, Ind.	5,345	−1.4	Hutchinson, Kans.	23,298	42.4	Lakeland, Fla.	7,062	89.9
Greensburg, Pa.	15,033	15.5				Lakewood, Ohio	41,732	174.9
Greenville, Miss.	11,560	20.3	**Idaho Falls, Idaho**	8,064	67.1	Lancaster, N. Y.	6,059	38.8
Greenville, N. C.	5,772	40.7	Ilion, N. Y.	10,169	54.4	Lancaster, Ohio	14,706	12.3
Greenville, Ohio	7,104	13.9	Independence, Kans.	11,920	13.7	Lancaster, Pa.	53,150	12.5
Greenville, Pa.	8,101	37.1	Independence, Mo.	11,686	18.5	Lansford, Pa.	9,625	15.7
Greenville, S. C.	23,127	46.9	Indiana, Pa.	7,043	22.5	Lansing, Mich.	57,327	83.6
Greenville, Tex.	12,384	39.9	Indianapolis, Ind.	314,194	34.5	Laporte, Ind.	15,158	44.0
Greenwich, Conn.	5,939	52.8	Iola, Kans.	8,513	−5.7	Laramie, Wyo.	6,301	−23.5
Greenwood, Miss.	7,793	33.5	Ionia, Mich.	6,935	37.9	Laredo, Tex	22,710	52.9
Greenwood, S. C.	8,703	31.6	Iowa City, Iowa	11,267	11.7	Larksville, Pa.	9,438	1.6
Gretna, La.	7,197	——	Ipswich, Mass.	6,201	7.3	La Salle, Ill.	13,050	13.1
Griffin, Ga.	8,240	10.2	Iron Mountain, Mich.	8,251	−10.5	Latrobe, Pa.	9,484	8.1
Grinnell, Iowa	5,362	6.5	Ironton, Ohio	14,007	6.5	Laurel, Miss.	13,037	54.0
Gulfport, Miss.	8,157	27.7	Ironwood, Mich.	15,739	22.8	Laurium, Mich.	6,696	−21.6
Guthrie, Okla.	11,757	0.9	Irvington, N. J.	25,480	114.5	Lawrence, Kans.	12,456	0.7
Guttenberg, N. J.	6,726	19.1	Ishpeming, Mich.	10,500	−15.6	Lawrence, Mass.	94,270	9.8
			Ithaca, N. Y.	17,004	14.9	Lawrenceville, Ill.	5,080	57.0
Hackensack, N. J.	17,667	25.7				Lawton, Okla.	8,930	14.7
Haddonfield, N. J.	5,646	36.3	**Jackson, Mich.**	48,374	53.9	Lead, S. Dak.	5,013	−40.3
Hagerstown, Md.	28,064	70.0	Jackson, Miss.	22,817	7.3	Leavenworth, Kans.	16,912	−12.7
Hamilton, Ohio	39,675	12.5	Jackson, Ohio	5,842	6.8	Lebanon, Ind.	6,257	14.3
Hammond, Ind.	36,004	72.1	Jackson, Tenn.	18,860	19.5	Lebanon, N. H.	6,162	7.8
Hammonton, N. J.	6,417	26.1	Jacksonville, Fla.	91,558	58.7	Lebanon, Pa.	24,043	28.1
Hampton, Va.	6,138	11.5	Jacksonville, Ill.	15,713	2.5	Lehighton, Pa.	6,102	14.8
Hamtramck, Mich.	48,615	1266.0	Jamestown, N. Dak.	6,627	52.1	Leominster, Mass.	19,744	12.3
Hancock, Mich	7,527	−16.2	Jamestown, N. Y.	38,917	24.3	Lewiston, Idaho	6,574	8.8
Hanford, Cal.	5,888	21.9	Janesville, Wis.	18,293	31.7	Lewiston, Me.	31,791	21.1
Hannibal, Mo.	19,306	5.3	Jeannette, Pa.	10,627	31.6	Lewistown, Mont.	6,120	104.5
Hanover, Pa.	8,664	22.8	Jefferson City, Mo.	14,490	22.3	Lewistown, Pa.	9,849	20.6
Harrisburg, Ill.	7,125	34.2	Jeffersonville, Ind.	10,098	−3.0	Lexington, Ky.	41,534	18.3
Harrisburg, Pa.	75,917	18.3	Jersey City, N. J.	298,103	11.3	Lexington, Mass.	6,350	29.1
Harrison, N. J.	15,721	8.4	Jersey Shore, Pa.	6,103	13.4	Lexington, N. C.	5,254	26.2
Harrisonburg, Va.	5,875	20.4	Johnsonburg, Pa.	5,400	24.6	Lima, Ohio	41,326	35.5
Hartford, Conn.	138,036	39.6	Johnson City, N. Y.	8,587	127.5	Lincoln, Ill.	11,882	9.1
Hartford City, Ind.	6,183	−0.1	Johnson City, Tenn.	12,442	46.3	Lincoln, Nebr.	54,948	25.0
Harvey, Ill.	9,216	27.5	Johnston City, Ill.	7,137	119.7	Lincoln, R. I.	9,543	−2.9
Hastings, Mich.	5,132	17.1	Johnston, R. I.	6,855	15.5	Linton, Ind.	5,856	−1.0
Hastings, Nebr.	11,647	24.7	Johnstown, N. Y.	10,908	4.4	Litchfield, Ill.	6,215	4.1
Hastings upon Hudson, N. Y.	5,526	21.4	Johnstown, Pa.	67,327	21.3	Little Falls, Minn.	5,500	−9.5
			Joliet, Ill.	38,442	10.9	Little Falls, N. Y.	13,029	6.2
Hattiesburg, Miss.	13,270	13.1	Jonesboro, Ark.	9,384	31.7	Little Rock, Ark.	65,142	41.8
Haverhill, Mass.	53,884	22.1	Joplin, Mo.	29,902	−6.8	Livingston, Mont.	6,311	17.8
Haverstraw, N. Y.	5,226	−7.8	Junction City, Kans.	7,533	34.6	Lock Haven, Pa.	8,557	10.1
Havre, Mont.	5,429	49.8	Juniata, Pa.	7,660	44.9	Lockport, N. Y.	21,308	18.6
Hawthorne, N. J.	5,135	51.0				Lodi, N. J.	8,175	97.6
Hazleton, Pa.	32,277	26.8	**Kalamazoo, Mich.**	48,487	22.9	Logan, Ohio	5,493	13.3
Helena, Ark.	9,112	3.9	Kalispell, Mont.	5,147	−7.2	Logan, Utah	9,439	25.5
Helena, Mont.	12,037	−3.8	Kane, Pa.	7,283	9.9	Logansport, Ind.	21,626	13.5
Hempstead, N. Y.	6,382	28.6	Kankakee, Ill.	16,753	19.8	Long Beach, Cal.	55,593	212.2

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Long Branch, N. J.	13,521	1.7	Miami, Okla.	6,802	134.0	New Albany, Ind.	22,992	11.5
Longmont, Colo.	5,848	37.4	Michigan City, Ind.	19,457	2.3	Newark, N. J.	414,524	19.3
Longview, Tex.	5,713	10.8	Middleboro, Mass.	8,453	2.9	Newark, N. Y.	6,964	11.8
Lorain, Ohio	37,295	29.1	Middlesboro, Ky.	8,041	10.1	Newark, Ohio	26,718	5.2
Los Angeles, Cal.	576,673	80.7	Middletown, Conn.	13,638	15.1	New Bedford, Mass.	121,217	25.4
Louisville, Ky.	234,891	4.9	Middletown, N. Y.	18,420	20.3	New Bern, N. C.	12,198	22.5
Loveland, Colo.	5,065	38.7	Middletown, Ohio	23,594	79.4	Newberry, S. C.	5,894	17.2
Lowell, Mass.	112,759	6.1	Middletown, Pa.	5,920	10.2	New Brighton, Pa.	9,361	12.4
Ludington, Mich.	8,810	−3.5	Midland, Mich.	5,483	117.0	New Britain, Conn.	59,316	35.1
Ludlow, Mass.	7,470	51.0	Midland, Pa.	5,452	338.3	New Brunswick, N. J.	32,779	40.2
Luzerne, Pa.	5,998	10.5	Miles City, Mont.	7,937	69.0	Newburgh, N. Y.	30,366	9.2
Lynchburg, Va.	30,070	2.0	Milford, Mass.	13,471	3.2	Newburyport, Mass.	15,618	4.5
Lynn, Mass.	99,148	11.0	Millbury, Mass.	5,653	19.3	Newcastle, Ind.	14,458	53.1
			Millvale, Pa.	8,031	2.2	New Castle, Pa.	44,938	23.9
McAlester, Okla.	12,095	−6.6	Millville, N. J.	14,691	18.0	New Haven, Conn.	162,537	21.7
McAllen, Tex.	5,331	——	Milton, Mass.	9,382	18.4	New Iberia, La.	6,278	−16.3
McComb, Miss.	7,775	24.7	Milton, Pa.	8,638	15.8	New Kensington, Pa.	11,987	55.5
McKeesport, Pa.	46,781	9.6	Milwaukee, Wis.	457,147	22.3	New London, Conn.	25,688	30.7
McKees Rocks, Pa.	16,713	13.7	Minden, La.	6,105	103.4	Newnan, Ga.	7,037	26.8
McKinney, Tex.	6,677	41.6	Mineral Wells, Tex.	7,890	99.7	New Orleans, La.	387,219	14.2
Macomb, Ill.	6,714	16.3	Minersville, Pa.	7,845	8.4	New Philadelphia, Ohio	10,718	25.5
Macon, Ga.	52,995	30.3	Minneapolis, Minn.	380,582	26.3	Newport, Ky.	29,317	−3.3
Madison, Ind.	6,711	−3.2	Minot, N. Dak.	10,476	69.3	Newport, R. I.	30,255	11.4
Madison, N. J.	5,523	18.6	Mishawaka, Ind.	15,195	27.8	Newport News, Va.	35,596	76.2
Madison, Wis.	38,378	50.3	Missoula, Mont.	12,668	−1.6	New Rochelle, N. Y.	36,213	25.4
Madisonville, Ky.	5,030	1.3	Mitchell, S. Dak.	8,478	30.1	Newton, Iowa	6,627	43.6
Mahanoy City, Pa.	15,599	−2.1	Moberly, Mo.	12,808	17.3	Newton, Kans.	9,781	24.4
Malden, Mass.	49,103	10.6	Mobile, Ala.	60,777	18.0	Newton, Mass.	46,054	15.7
Malone, N. Y.	7,556	16.8	Modesto, Cal.	9,241	129.1	New Ulm, Minn.	6,745	19.4
Mamaroneck, N. Y.	6,571	15.3	Moline, Ill.	30,734	27.0	New York, N. Y.	5,620,048	17.9
Manchester, N. H.	78,384	11.9	Monessen, Pa.	18,179	54.4	Niagara Falls, N. Y.	50,760	66.7
Manhattan, Kans.	7,989	39.6	Monmouth, Ill.	8,116	−11.1	Niles, Mich.	7,311	41.8
Manistee, Mich.	9,694	−21.7	Monongahela, Pa.	8,688	14.3	Niles, Ohio	13,080	56.4
Manistique, Mich.	6,380	35.1	Monroe, La.	12,675	24.2	Nogales, Ariz.	5,199	48.0
Manitowoc, Wis.	17,563	34.8	Monroe, Mich.	11,573	67.9	Norfolk, Nebr.	8,634	43.3
Mankato, Minn.	12,469	20.3	Monrovia, Cal.	5,480	53.2	Norfolk, Va.	115,777	71.6
Mansfield, Mass.	6,255	20.7	Montague, Mass.	7,675	11.8	Normal, Ill.	5,143	27.8
Mansfield, Ohio	27,824	34.0	Montclair, N. J.	28,810	33.7	Norman, Okla.	5,004	34.4
Maplewood, Mo.	7,431	49.3	Monterey, Cal.	5,479	11.3	Norristown, Pa.	32,319	15.9
Marblehead, Mass.	7,324	−0.2	Montgomery, Ala.	43,464	14.0	North Adams, Mass.	22,282	1.2
Marcus Hook, Pa.	5,324	238.5	Montpelier, Vt.	7,125	−9.3	Northampton, Mass.	21,951	13.0
Marianna, Ark.	5,074	5.5	Moorhead, Minn.	5,720	18.2	Northampton, Pa.	9,349	7.1
Marietta, Ga.	6,190	4.1	Morgan City, La.	5,429	−0.9	North Andover, Mass.	6,265	13.3
Marietta, Ohio	15,140	17.2	Morgantown, W. Va.	12,127	32.5	North Attleboro, Mass.	9,238	−3.4
Marinette, Wis.	13,610	−6.8	Morristown, N. J.	12,548	0.3	North Braddock, Pa.	14,928	26.3
Marion, Ill.	9,582	35.1	Morristown, Tenn.	5,875	46.6	Northbridge, Mass.	10,174	15.5
Marion, Ind.	23,747	22.7	Moultrie, Ga.	6,789	102.7	North Chicago, Ill.	5,839	76.6
Marion, Ohio	27,891	53.0	Moundsville, W. Va.	10,669	19.6	North Little Rock, Ark.	14,048	26.1
Marlboro, Mass.	15,028	3.1	Mount Carmel, Ill.	7,456	7.5	North Plainfield, N. J.	6,916	13.1
Marquette, Mich.	12,718	10.6	Mount Carmel, Pa.	17,469	−0.4	North Platte, Nebr.	10,466	118.4
Marshall, Mo.	5,200	6.8	Mount Clemens, Mich.	9,488	23.1	North Providence, R. I.	7,697	42.4
Marshall, Tex.	14,271	24.6	Mount Oliver, Pa.	5,575	31.5	North Tarrytown, N.Y.	5,927	9.3
Marshalltown, Iowa	15,731	17.6	Mount Pleasant, Pa.	5,862	0.9	North Tonawanda, N. Y.	15,482	29.5
Marshfield, Wis.	7,394	27.9	Mount Vernon, Ill.	9,815	22.6	Norwalk, Conn.	27,743	299.0
Martinsburg, W. Va.	12,515	17.0	Mount Vernon, Ind.	5,284	−5.0	Norwalk, Ohio	7,379	−6.1
Martins Ferry, Ohio	11,634	27.4	Mount Vernon, N. Y.	42,726	38.2	Norwich, Conn.	22,304	9.5
Marysville, Cal.	5,461	0.6	Mount Vernon, Ohio	9,237	1.7	Norwich, N. Y.	8,268	11.4
Mason City, Iowa	20,065	78.7	Muncie, Ind.	36,524	52.2	Norwood, Mass.	12,627	57.6
Massena, N. Y.	5,993	103.1	Munhall, Pa.	6,418	23.8	Norwood, Ohio	24,966	54.3
Massillon, Ohio	17,428	25.6	Munising, Mich.	5,037	70.6	Nutley, N. J.	9,421	56.8
Mattoon, Ill.	13,552	18.3	Murfreesboro, Tenn.	5,367	14.7			
Mayfield, Ky.	6,583	11.3	Murphysboro, Ill.	10,703	43.0			
Maynard, Mass.	7,086	10.9	Muscatine, Iowa	16,068	−0.7	**Oakland, Cal.**	216,261	44.0
Maysville, Ky.	6,107	−0.6	Muskegon, Mich.	36,570	52.0	Oak Park, Ill.	39,858	105.0
Maywood, Ill.	12,072	50.3	Muskegon Heights, Mich.	9,514	463.0	Oelwein, Iowa	7,455	23.7
Meadville, Pa.	14,568	14.0	Muskogee, Okla.	30,277	19.8	Ogden, Utah	32,804	28.2
Mechanicville, N. Y.	8,166	23.1				Ogdensburg, N. Y.	14,609	−8.3
Medford, Mass.	39,038	68.6				Oil City, Pa.	21,274	35.9
Medford, Oreg.	5,756	−34.9	**Nampa, Idaho**	7,621	81.2	Oklahoma City, Okla.	91,295	42.2
Medina, N. Y.	6,011	5.8	Nanticoke, Pa.	22,614	19.8	Okmulgee, Okla.	17,430	317.4
Melrose, Mass.	18,204	15.8	Nanty Glo, Pa.	5,028	——	Old Forge, Pa.	12,237	8.1
Melrose Park, Ill.	7,147	48.7	Napa, Cal.	6,757	16.7	Old Town, Me.	6,956	10.1
Memphis, Tenn.	162,351	23.8	Nashua, N. H.	28,379	9.1	Olean, N. Y.	20,506	39.1
Menasha, Wis.	7,214	18.6	Nashville, Tenn.	118,342	7.2	Olympia, Wash.	7,795	11.4
Menominee, Mich.	8,907	−15.2	Natchez, Miss.	12,608	6.9	Olyphant, Pa.	10,236	20.4
Menomonie, Wis.	5,104	1.4	Natick, Mass.	10,907	10.6	Omaha, Nebr.	191,601	54.4
Meriden, Conn.	29,867	9.5	Naugatuck, Conn.	15,051	18.3	Oneida, N. Y.	10,541	26.7
Meridian, Miss.	23,399	0.5	Navasota, Tex.	5,060	54.1	Oneonta, N. Y.	11,582	22.0
Merrill, Wis.	8,068	−7.1	Nebraska City, Nebr.	6,279	14.4	Ontario, Cal.	7,280	70.3
Methuen, Mass.	15,189	32.7	Needham, Mass.	7,012	39.5	Orange, Mass.	5,393	2.1
Metropolis, Ill.	5,055	8.6	Neenah, Wis.	7,171	25.1	Orange, N. J.	33,268	12.3
Mexico, Mo.	6,013	1.2	Negaunee, Mich.	7,419	−12.3	Orange, Tex.	9,212	66.7
Miami, Ariz.	6,689	——	Nelsonville, Ohio	6,440	5.9	Orangeburg, S. C.	7,290	23.4
Miami, Fla.	29,571	440.5	Nevada, Mo.	7,139	−0.5	Oregon City, Oreg.	5,686	32.6

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CITIES AND OTHER INCORPORATED PLACES IN THE UNITED STATES HAVING A POPULATION OF 5000 AND UPWARDS, 1920—Con.

City	Pop. 1920	% of Inc. 1910–20*
Orlando, Fla.	9,282	138.4
Oshkosh, Wis.	33,162	0.3
Oskaloosa, Iowa	9,427	−0.4
Ossining, N. Y.	10,739	−6.5
Oswego, N. Y.	23,626	1.1
Ottawa, Ill.	10,816	13.4
Ottawa, Kans.	9,018	17.9
Ottumwa, Iowa	23,003	4.5
Owatonna, Minn.	7,252	28.2
Owensboro, Ky.	17,424	8.8
Owosso, Mich.	12,575	30.5
Paducah, Ky.	24,735	8.7
Painesville, Ohio	7,272	32.2
Palatka, Fla.	5,102	35.0
Palestine, Tex.	11,039	5.3
Palmer, Mass.	9,896	14.9
Palmerton, Pa.	7,168	—
Palo Alto, Cal.	5,900	31.5
Pana, Ill.	6,122	1.1
Paragould, Ark.	6,306	20.2
Paris, Ill.	7,985	4.2
Paris, Ky.	6,310	7.7
Paris, Tex.	15,040	33.5
Parkersburg, W. Va.	20,050	12.4
Parsons, Kans.	16,028	28.6
Parsons, Pa.	5,628	29.7
Pasadena, Cal.	45,354	49.7
Pascagoula, Miss.	6,082	80.0
Passaic, N. J.	63,841	16.6
Paterson, N. J.	135,875	8.2
Pawhuska, Okla.	6,414	131.1
Pawtucket, R. I.	64,248	24.5
Peabody, Mass.	19,552	24.4
Peekskill, N. Y.	15,868	4.1
Pekin, Ill.	12,086	22.1
Pendleton, Oreg.	7,387	65.6
Pennsgrove, N. J.	6,060	186.1
Pensacola, Fla.	31,035	35.0
Peoria, Ill.	76,121	13.7
Perry, Iowa	5,642	21.9
Perth Amboy, N. J.	41,707	29.8
Peru, Ill.	8,869	11.1
Peru, Ind.	12,410	13.7
Petaluma, Cal.	6,226	5.9
Petersburg, Va.	31,012	28.5
Petoskey, Mich.	5,064	6.0
Phenix City, Ala.	5,432	19.3
Philadelphia, Pa.	1,823,779	17.7
Phillipsburg, N. J.	16,923	21.7
Phoenix, Ariz.	29,053	160.9
Phoenixville, Pa.	10,484	−2.4
Picher, Okla.	9,676	—
Pine Bluff, Ark.	19,280	27.7
Piqua, Ohio	15,044	12.4
Pitcairn, Pa.	5,738	15.3
Pittsburg, Kans.	18,052	22.3
Pittsburgh, Pa.	588,343	10.2
Pittsfield, Mass.	41,763	30.0
Pittston, Pa.	18,497	13.7
Plainfield, N. J.	27,700	34.8
Plattsburg, N. Y.	10,909	−2.1
Pleasantville, N. J.	5,887	34.1
Plymouth, Mass.	13,045	7.4
Plymouth, Pa.	16,500	−2.9
Pocatello, Idaho	15,001	64.7
Pomona, Cal.	13,505	32.3
Ponca City, Okla.	7,051	179.7
Pontiac, Ill.	6,664	9.4
Pontiac, Mich.	34,273	135.8
Poplar Bluff, Mo.	8,042	16.3
Portage, Wis.	5,582	2.6
Port Angeles, Wash.	5,351	134.1
Port Arthur, Tex.	22,251	190.4
Port Chester, N. Y.	16,573	29.4
Port Huron, Mich.	25,944	37.5
Port Jervis, N. Y.	10,171	6.3
Portland, Ind.	5,958	16.1
Portland, Me.	69,272	18.3
Portland, Oreg.	258,288	24.6
Portsmouth, N. H.	13,569	20.4
Portsmouth, Ohio	33,011	40.6
Portsmouth, Va.	54,387	63.9
Pottstown, Pa.	17,431	11.7
Pottsville, Pa.	21,876	8.1
Poughkeepsie, N. Y.	35,000	25.3
Pratt, Kans.	5,183	57.0
Prescott, Ariz.	5,010	−1.6
Princeton, Ind.	7,132	10.6
Princeton, N. J.	5,917	15.2
Princeton, W. Va.	6,224	105.6
Providence, R. I.	237,595	5.9
Provo, Utah	10,303	15.4
Pueblo, Colo.	43,050	3.1
Pulaski, Va.	5,282	9.9
Punxsutawney, Pa.	10,311	13.8
Putnam, Conn.	7,711	16.2
Puyallup, Wash.	6,323	39.2
Quincy, Ill.	35,978	−1.7
Quincy, Mass.	47,876	46.7
Racine, Wis.	58,593	54.2
Rahway, N. J.	11,042	18.3
Raleigh, N. C.	24,418	27.1
Ranger, Tex.	16,205	—
Rankin, Pa.	7,301	20.8
Rapid City, S. Dak.	5,777	49.9
Raton, N. Mex.	5,544	22.1
Ravenna, Ohio	7,219	36.0
Reading, Mass.	7,439	27.9
Reading, Pa.	107,784	12.2
Red Bank, N. J.	9,251	25.0
Redlands, Cal.	9,571	−8.4
Red Oak, Iowa	5,578	15.5
Red Wing, Minn.	8,637	−4.5
Reidsville, N. C.	5,333	10.5
Reno, Nev.	12,016	10.6
Renovo, Pa.	5,877	27.2
Rensselaer, N. Y.	10,823	1.0
Revere, Mass.	28,823	58.2
Rhinelander, Wis.	6,654	18.0
Richmond, Cal.	16,843	147.6
Richmond, Ind.	26,765	19.9
Richmond, Ky.	5,622	5.3
Richmond, Va.	171,667	34.5
Ridgefield Park, N. J.	8,575	90.0
Ridgewood, N. J.	7,580	40.7
Ridgway, Pa.	6,037	11.6
River Rouge, Mich.	9,822	135.9
Riverside, Cal.	19,341	27.1
Roanoke, Va.	50,842	45.8
Rochester, Minn.	13,722	74.9
Rochester, N. H.	9,673	9.1
Rochester, N. Y.	295,750	35.6
Rochester, Pa.	6,957	17.9
Rockford, Ill.	65,651	44.6
Rock Hill, S. C.	8,809	22.1
Rock Island, Ill.	35,177	44.6
Rockland, Me.	8,109	−0.8
Rockland, Mass.	7,544	8.9
Rock Springs, Wyo.	6,456	11.7
Rockville, Conn.	7,726	−3.1
Rockville Center, N. Y.	6,262	70.8
Rocky Mount, N. C.	12,742	58.3
Rome, Ga.	13,252	9.5
Rome, N. Y.	26,341	28.5
Roosevelt, N. J.	11,047	90.9
Rosedale, Kans.	7,674	28.8
Roselle, N. J.	5,737	110.5
Roselle Park, N. J.	5,438	73.3
Roswell, N. Mex.	7,033	14.0
Royal Oak, Mich.	6,007	460.9
Rumford Falls, Me.	7,016	29.3
Rushville, Ind.	5,498	11.6
Rutherford, N. J.	9,497	34.8
Rutland, Vt.	14,954	10.4
Rye, N. Y.	5,308	33.9
Saco, Me.	6,817	3.6
Sacramento, Cal.	65,908	47.5
Saginaw, Mich.	61,903	22.6
St. Albans, Vt.	7,588	18.9
St. Augustine, Fla.	6,192	12.7
St. Bernard, Ohio	6,312	26.2
St. Charles, Mo.	8,503	−9.9
St. Clair (Allegheny Co.), Pa.	6,585	16.8
St. Clair (Schuylkill Co.), Pa.	6,495	0.6
St. Cloud, Minn.	15,873	49.7
St. Johnsbury, Vt.	7,164	7.0
St. Joseph, Mich.	7,251	22.2
St. Joseph, Mo.	77,939	0.7
St. Louis, Mo.	772,897	12.5
St. Marys, Ohio	5,679	−0.9
St. Marys, Pa.	6,967	9.8
St. Paul, Minn.	234,698	9.3
St. Petersburg, Fla.	14,237	245.0
Salamanca, N. Y.	9,276	60.2
Salem, Mass.	42,529	−2.7
Salem, N. J.	7,435	12.4
Salem, Ohio	10,305	15.2
Salem, Oreg.	17,679	25.4
Salina, Kans.	15,085	55.7
Salisbury, Md.	7,553	12.9
Salisbury, N. C.	13,884	94.1
Salt Lake City, Utah	118,110	27.3
San Angelo, Tex.	10,050	−2.6
San Antonio, Tex.	161,379	67.0
San Benito, Tex.	5,070	—
San Bernardino, Cal.	18,721	46.5
San Diego, Cal.	74,683	88.7
Sandusky, Ohio	22,897	14.5
Sanford, Fla.	5,588	56.5
San Francisco, Cal.	506,676	21.5
San Jose, Cal.	39,642	37.0
San Leandro, Cal.	5,703	64.3
San Luis Obispo, Cal.	5,895	14.3
San Mateo, Cal.	5,979	36.4
San Rafael, Cal.	5,512	−7.1
Santa Ana, Cal.	15,485	83.7
Santa Barbara, Cal.	19,441	66.7
Santa Clara, Cal.	5,220	20.1
Santa Cruz, Cal.	10,917	−2.1
Santa Fe, N. Mex.	7,236	42.7
Santa Monica, Cal.	15,252	94.4
Santa Rosa, Cal.	8,758	12.0
Sapulpa, Okla.	11,634	40.5
Saranac Lake, N. Y.	5,174	3.8
Saratoga Springs, N. Y.	13,181	3.8
Saugus, Mass.	10,874	35.1
Sault Ste. Marie, Mich.	12,096	−4.1
Savanna, Ill.	5,237	41.9
Savannah, Ga.	83,252	28.0
Sayre, Pa.	8,078	35.7
Schenectady, N. Y.	88,723	21.8
Schuylkill Haven, Pa.	5,437	14.5
Scottdale, Pa.	5,768	5.7
Scottsbluff, Nebr.	6,912	295.9
Scranton, Pa.	137,783	6.1
Seattle, Wash.	315,312	32.9
Secaucus, N. J.	5,423	14.4
Sedalia, Mo.	21,144	18.6
Selma, Ala.	15,589	14.2
Seneca Falls, N. Y.	6,389	−3.0
Seymour, Ind.	7,348	16.5
Shamokin, Pa.	21,204	8.2
Sharon, Pa.	21,747	42.4
Sharpsburg, Pa.	8,921	9.4
Shawnee, Okla.	15,348	23.0
Sheboygan, Wis.	30,955	17.3
Sheffield, Ala.	6,682	37.3
Shelby, Ohio	5,578	13.8
Shelbyville, Ind.	9,701	2.1
Shelton, Conn.	9,475	97.1
Shenandoah, Iowa	5,255	5.6
Shenandoah, Pa.	24,726	−4.1
Sheridan, Wyo.	9,175	9.1
Sherman, Tex.	15,031	21.1
Shreveport, La.	43,874	56.6
Sidney, Ohio	8,590	30.0
Sioux City, Iowa	71,227	48.9
Sioux Falls, S. Dak.	25,202	78.8
Solvay, N. Y.	7,352	43.1
Somersworth, N. H.	6,688	−0.2
Somerville, Mass.	93,091	20.5
Somerville, N. J.	6,718	32.8
South Amboy, N. J.	7,897	12.7
South Bend, Ind.	70,983	32.2
Southbridge, Mass.	14,245	13.1
South Hadley, Mass.	5,527	12.9

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City	Pop. 1920	% of Inc. 1910–20*
Southington, Conn.	5,085	36.9
South Kingstown, R. I.	5,181	0.1
South Milwaukee, Wis.	7,598	24.7
South Norfolk, Va.	7,724	——
South Orange, N. J.	7,274	21.0
South Pasadena, Cal.	7,652	64.6
South Portland, Me.	9,254	23.9
South River, N. J.	6,596	38.2
South St. Paul, Minn.	6,860	52.1
Spartanburg, S. C.	22,638	29.2
Spencer, Mass.	5,930	–12.0
Spokane, Wash.	104,437	**
Springfield, Ill.	59,183	14.5
Springfield, Mass.	129,614	45.8
Springfield, Mo.	39,631	12.6
Springfield, Ohio	60,840	29.7
Springfield, Vt.	5,283	62.6
Spring Valley, Ill.	6,493	–7.7
Stamford, Conn.	35,096	39.6
Statesville, N. C.	7,895	71.7
Staunton, Ill.	6,027	19.4
Staunton, Va.	10,623	0.2
Steelton, Pa.	13,428	–5.7
Sterling, Colo.	6,415	110.7
Sterling, Ill.	8,182	9.6
Steubenville, Ohio	28,508	27.3
Stevens Point, Wis.	11,371	30.8
Stillwater, Minn.	7,735	–24.2
Stockton, Cal.	40,296	73.3
Stoneham, Mass.	7,873	11.0
Stoughton, Mass.	6,865	8.7
Stoughton, Wis.	5,101	7.1
Streator, Ill.	14,779	3.7
Stroudsburg, Pa.	5,278	20.5
Struthers, Ohio	5,847	73.5
Sturgis, Mich.	5,995	64.9
Suffolk, Va.	9,123	30.2
Sulphur Springs, Tex.	5,558	7.9
Summit, N. J.	10,174	35.7
Summit Hill, Pa.	5,499	30.6
Sumter, S. C.	9,508	17.3
Sunbury, Pa.	15,721	14.2
Superior, Wis.	39,671	–1.8
Swampscott, Mass.	8,101	30.6
Swissvale, Pa.	10,908	47.8
Swoyersville, Pa.	6,876	27.4
Syracuse, N. Y.	171,717	25.1
Tacoma, Wash.	96,965	15.8
Talladega, Ala.	6,546	11.8
Tallahassee, Fla.	5,637	12.3
Tamaqua, Pa.	12,363	30.7
Tampa, Fla.	51,608	36.6
Tarentum, Pa.	8,925	20.4
Tarrytown, N. Y.	5,807	3.7
Taunton, Mass.	37,137	8.4
Taylor, Pa.	9,876	9.0
Taylor, Tex.	5,965	12.3
Taylorville, Ill.	5,806	6.6
Temple, Tex.	11,033	0.4
Terre Haute, Ind.	66,083	13.6
Terrell, Tex.	8,349	18.4
Texarkana, Ark. ‡	8,257	46.0
Texarkana, Tex. ‡	11,480	17.3
The Dalles, Oreg.	5,807	19.0
Thomasville, Ga.	8,196	21.8
Thomasville, N. C.	5,676	46.4
Three Rivers, Mich.	5,209	2.7
Throop, Pa.	6,672	30.0
Tiffin, Ohio	14,375	20.9
Titusville, Pa.	8,432	–1.2
Toledo, Ohio	243,164	44.3
Tonawanda, N. Y.	10,068	21.4
Topeka, Kans.	50,022	14.5
Torrington, Conn.	20,623	33.2
Traverse City, Mich.	10,925	–9.8
Trenton, Mo.	6,951	22.9
Trenton, N. J.	119,289	23.2
Trinidad, Colo.	10,906	6.9
Troy, Ala.	5,696	14.8
Troy, N. Y.	72,013	–6.2
Troy, Ohio	7,260	18.6
Tucson, Ariz.	20,292	53.8
Tulsa, Okla.	72,075	296.4
Tupelo, Miss.	5,055	30.2
Turtle Creek, Pa.	8,138	62.9
Tuscaloosa, Ala.	11,996	42.7
Twin Falls, Idaho	8,324	58.3
Two Rivers, Wis.	7,305	50.6
Tyler, Tex.	12,085	16.2
Tyrone, Pa.	9,084	26.6
Uhrichsville, Ohio	6,428	35.3
Union, N. J.	20,651	–1.8
Union, S. C.	6,141	9.2
Uniontown, Pa.	15,692	17.6
University, Mo.	6,792	181.0
Urbana, Ill.	10,244	24.2
Urbana, Ohio	7,621	–1.5
Utica, N. Y.	94,156	26.5
Uxbridge, Mass.	5,384	15.3
Valdosta, Ga.	10,783	40.8
Vallejo, Cal.	21,107	86.1
Valparaiso, Ind.	6,518	–6.7
Van Buren, Ark.	5,224	34.7
Vancouver, Wash.	12,637	35.9
Vandergrift, Pa.	9,531	145.9
Van Wert, Ohio	8,100	13.2
Venice, Cal.	10,385	233.0
Vernon, Tex.	5,142	60.9
Vicksburg, Miss.	18,072	–13.2
Victoria, Tex.	5,957	62.2
Vincennes, Ind.	17,160	15.2
Vineland, N. J.	6,799	28.7
Vinita, Okla.	5,010	22.7
Virginia, Minn.	14,022	33.9
Visalia, Cal.	5,753	26.4
Wabash, Ind.	9,872	13.6
Waco, Tex.	38,500	45.7
Wakefield, Mass.	13,025	14.2
Walden, N. Y.	5,493	37.2
Walla Walla, Wash.	15,503	–19.9
Wallingford, Conn.	9,648	11.0
Wallington, N. J.	5,715	65.7
Walpole, Mass.	5,446	11.3
Waltham, Mass.	30,915	11.1
Wapakoneta, Ohio	5,295	–1.0
Ware, Mass.	8,525	–2.8
Warren, Ohio	27,050	144.1
Warren, Pa.	14,272	28.8
Warren, R. I.	7,841	19.1
Warsaw, Ind.	5,478	23.7
Warwick, R. I.	13,481	–49.4
Washington, D. C.	437,571	32.2
Washington, Ind.	8,743	11.3
Washington, N. C.	6,314	1.7
Washington, Pa.	21,480	14.4
Washington Court House, Ohio	7,962	9.4
Waterbury, Conn.	91,715	25.4
Waterloo, Iowa	36,230	35.7
Watertown, Mass.	21,457	66.7
Watertown, N. Y.	31,285	17.0
Watertown, S. Dak.	9,400	34.1
Watertown, Wis.	9,299	5.3
Waterville, Me.	13,351	16.5
Watervliet, N. Y.	16,073	6.6
Watsonville, Cal.	5,013	12.8
Waukegan, Ill.	19,226	19.6
Waukesha, Wis.	12,558	43.7
Wausau, Wis.	18,661	12.7
Wauwatosa, Wis.	5,818	73.9
Waverly, N. Y.	5,270	8.5
Waxahachie, Tex.	7,958	28.3
Waycross, Ga.	18,068	24.7
Waynesboro, Pa.	9,720	35.0
Weatherford, Tex.	6,203	22.3
Webb City, Mo.	7,807	–33.9
Webster, Mass.	13,258	15.2
Webster City, Iowa	5,657	8.6
Webster Groves, Mo.	9,474	33.8
Wellesley, Mass.	6,224	15.0
Wellington, Kans.	7,048	0
Wellston, Ohio	6,687	–2
Wellsville, Ohio	8,849	13
Wenatchee, Wash.	6,324	56
West Allis, Wis.	13,745	106
Westboro, Mass.	5,789	6
Westbrook, Me.	9,453	14
West Chester, Pa.	11,717	–0
Westerly, R. I.	9,952	14
Westfield, Mass.	18,604	15
Westfield, N. J.	9,063	41
West Frankfort, Ill.	8,478	301
West Hammond, Ill.	7,492	51
West Hazleton, Pa.	5,854	24
West Helena, Ark.	6,226	—
West Hoboken, N. J.	40,074	13
West New York, N. J.	29,926	120
Weston, W. Va.	5,701	157
West Orange, N. J.	15,573	41
West Palm Beach, Fla.	8,659	396
West Park, Ohio	8,581	169
West Pittston, Pa.	6,968	1
West Springfield, Mass.	13,443	45
West Tampa, Fla.	8,463	2
West Warwick, R. I.	15,461	—
Weymouth, Mass.	15,057	16
Wheeling, W. Va.	56,208	35
Whitehall, N. Y.	5,258	6
White Plains, N. Y.	21,031	31
Whiting, Ind.	10,145	54
Whitman, Mass.	7,147	–2
Whittier, Cal.	7,997	75
Wichita, Kans.	72,217	37
Wichita Falls, Tex.	40,079	388
Wilkinsburg, Pa.	24,403	29
Wilkes-Barre, Pa.	73,833	10
Williamson, W. Va.	6,819	91
Williamsport, Pa.	36,198	13
Willimantic, Conn.	12,330	9
Willmar, Minn.	5,892	42
Wilmerding, Pa.	6,441	5
Wilmette, Ill.	7,814	58
Wilmington, Del.	110,168	26
Wilmington, N. C.	33,372	29
Wilmington, Ohio	5,037	12
Wilson, N. C.	10,612	58
Winchendon, Mass.	5,904	4
Winchester, Ky.	8,333	16
Winchester, Mass.	10,485	12
Winchester, Va.	6,883	17
Windber, Pa.	9,462	18
Windfield, Kans.	7,933	18
Winnetka, Ill.	6,694	111
Winona, Minn.	19,143	3
Winsted, Conn.	8,248	6
Winston-Salem, N. C.	48,395	113
Winthrop, Mass.	15,455	52
Winton, Pa.	7,583	43
Wisconsin Rapids, Wis.	7,243	11
Woburn, Mass.	16,574	8
Woodbury, N. J.	5,801	25
Woodlawn, Pa.	12,495	795
Woodstock, Ill.	5,523	27
Woonsocket, R. I.	43,496	14
Wooster, Ohio	8,204	33
Worcester, Mass.	179,754	23
Wyandotte, Mich.	13,851	67
Xenia, Ohio	9,110	4
Yakima, Wash.	18,539	31
Yankton, S. Dak.	5,024	32
Yazoo, Miss.	5,244	–22
Yoakum, Tex.	6,184	32
Yonkers, N. Y.	100,176	25
York, Nebr.	5,388	–13
York, Pa.	47,512	6
Youngstown, Ohio	132,358	67
Ypsilanti, Mich.	7,413	19
Zanesville, Ohio	29,569	5
Zion, Ill.	5,580	16

* A minus sign denotes decrease; a dash in place of figures indicates that no figures were given in the 1910 Census.
** Less than one-tenth of one per cent.
‡ Combined population of Texarkana city, in Miller County, Ark., and Bowie County, Texas: 19,737 in 1920; 15,445 in 1910













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SCENIC AMERICA. III—TRAVEL INTEREST SCENES

Fort Snelling, Minn.
Grand River Canyon, Colo.
Ruins of Ft. Frederick, Crown Point, N. Y.
Harpers Ferry, W. Va.
Currecanti Needle, Colo.
Ft. Marion, St. Augustine, Fla.













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SCENES IN CANADA

Cape Trinity, Saguenay River, Quebec
Twin Falls, Yoho Park, B. C.
Cascade Mt., Banff, Alta.
The Citadel, Quebec
Takakkaw Falls, Yoho Park, B. C.
Massive Range, Canadian Rockies

CANADA

THE Dominion of Canada comprises all North America north of the United States, except Alaska, Newfoundland, Labrador, Greenland, and the islands of Saint Pierre and Miquelon. It is a self-governing British dominion.

Size. Canada, having an area of 3,684,723 square miles, covers a surface nearly as large as Europe and larger than the United States, excluding Alaska. The country measures from east to west at its widest extent more than 3000 miles and from north to south about 1600 miles. A number of islands, which are territory of the Dominion, lie off the northeastern coast. The most northerly island extends to a latitude of 85° N. A large inland sea, connected with the north Atlantic Ocean by Hudson strait, extends into the country from the northeast a distance of about 600 miles. Canada's southern boundary follows the 49th parallel of latitude from the western coast eastward to the Lake of the Woods. Inclining slightly southward to Lake Superior, it passes through the Great Lakes and part of the Saint Lawrence river, which it leaves at the 45th parallel. It then runs with an irregular course eastward to the Atlantic Ocean.

Topography. Canada may be divided into five natural divisions, based on the character of the land surface. These divisions are commonly called (1) the Acadian or Appalachian region, (2) the Canadian shield or Laurentian plateau, (3) the Saint Lawrence lowlands, (4) the great plains, and (5) the Cordilleran region.

1. The Acadian or Appalachian region embraces southeastern Quebec and the maritime provinces. This region is the extension into Canada of the Appalachian mountains of the United States. In Canada the mountains are worn down and, consequently, form a highland rather than a mountainous country.

2. The Canadian shield or Laurentian plateau is a huge V-shaped area of 2½ million square miles, which encloses Hudson bay at its center. It forms practically all of northern Canada, and comprises the area lying northeast of a line drawn from the Mackenzie River delta to the Lake of the Woods and northwest of a line which passes thence north of the Saint Lawrence River basin. Its southern and Atlantic borders are elevated and outwardly steep, forming the Laurentian mountains. From this outer rim its surface slopes gradually to its low center, Hudson bay. The western portion inclines similarly from an elevated rim toward Hudson bay and the Arctic Ocean. In detail, the surface of the plateau is often broken and rocky. Characteristic of it are the innumerable lakes of widely varying magnitude joined by short river stretches with frequent rapids and falls. Apart from the Great Lakes, there are 9 lakes more than 100 miles long and over 30 with a length of 50 miles. These features of the surface are due, in large part, to the action of glaciers which formerly covered the country.

3. The Saint Lawrence lowlands, which run from Lake Huron down the Saint Lawrence valley between the Laurentian plateau and the Acadian highlands, are a northeasterly extension of the central plain of North America drained by the Mississippi valley. Like other portions of this plain, the Saint Lawrence lowlands consist throughout of excellent farm land. This is the most fully developed region of Canada, sustaining more than half the country's population.

4. The great plains form a northern extension of the topographical division which occupies all North America within the limits of the Appalachian mountains, the Canadian shield, and the Rocky mountains. At the international boundary line, this division has a width of 800 miles, but becomes narrower farther north. For 300 miles north of the boundary the region is prairie, but beyond this latitude it is forested. In the southern portion, traversed by the railway lines, three prairie steppes are clearly marked: an eastern steppe, the basin of the Red river, lying between the Canadian shield and the Manitoba escarpment and having an elevation of 800 feet above the sea; a central steppe, between this escarpment and the Missouri coteau, with an elevation of from 1600 feet in the east to about 2500 feet in the west; and a western steppe, rising to a height of 3000 or 4000 feet, which extends from the Missouri coteau to the Rockies.

5. The Cordilleran region, about 500 miles broad, is made up of a succession of mountain ranges running parallel to the Pacific coast and of the well marked longitudinal valleys which separate the ranges. In the south, where the mountains have been adequately explored, the district falls into three subdivisions: (1) an eastern group of mountain systems, consisting of the Rocky mountains, the Selkirk system, and the Columbian mountains, or Gold ranges; (2) the interior plateaus; (3) the coastal mountains, consisting of the Coast range and the Vancouver range, the latter being in places submerged. In the south the Rocky mountains are the highest, but in the north the coastal mountains far exceed them, the Saint Elias range reaching an altitude in Canada of almost 20,000 feet. In the wide valleys and in the interior plateaus, there is much fertile soil.

HIGHEST AND LOWEST POINTS, PROVINCES OF CANADA

Province	Highest Point		Elevation (feet)	Lowest Point		Elevation (feet)
	Name	Locality		Name	Locality	
Alberta	Mt. Columbia	Rocky Mts.	12,294	Slave river	Northern boundary	568
British Columbia	Mt. Fairweather	St. Elias Range	15,287	Pacific Ocean	Western coast	S. l.*
Manitoba	Duck Mt.	Roblin Co.	2,727	Hudson Bay	N. E. coast	S. l.
New Brunswick	Carleton Mt.	Northumberland Co.	2,716	Bay of Fundy	S. and E. coasts	S. l.
				Gulf of St. Lawrence		
Nova Scotia	North Cape Plateau	Victoria Co.	1,500	Atlantic Ocean	All coasts	S. l.
Ontario	Tiptop Hill	Thunder Bay Dist.	2,120	Hudson Bay	Northern coast	S. l.
Prince Edward Island	Fredericton Station	Queens County	306	Gulf of St. Lawrence	All coasts	S. l.
Quebec	Mount Jacques Cartier	Gaspé Co.	4,230	Gulf of St. Lawrence	S.E. and W. coasts	S. l.
				Hudson Bay		
Saskatchewan	Cypress Hills	Cypress County	4,544	Lake Athabaska	N. W. part	697
Yukon	Mt. Logan	St. Elias Range	19,850	Arctic Ocean	Northern coast	S. l.

* Sea level.

Climate. Canada covers so many degrees of latitude and possesses such vast areas of highland and lowland that it has many varieties of climate. Over the larger part of the Dominion, especially over the great interior plain, a continental climate prevails, the temperature in Fort Simpson, for example, varying from a recorded minimum of 73° below zero to 101° above. In other sections, however, the extremes of heat and cold are modified by the presence of vast bodies of water, as the Atlantic Ocean, the Pacific Ocean, the Great Lakes, and Hudson bay.

In the maritime provinces, spring is retarded by the presence of the cold arctic current on the Atlantic coast. The summer climate, however, is equable and the autumn is long and open. British Columbia has one of the finest climates in North America. At New Westminster the mean temperature of the coldest month is 36° F. and that of the hottest is 58° F. The lowest recorded temperature of Vancouver is only 2° lower than that of San Antonio, Texas. The recorded rainfall reaches a higher figure on the Pacific coast than in any other part of Canada. The region of the Great Lakes has a temperate climate with a fairly high precipitation. The interior plains have a comparatively dry climate, but fortunately the precipitation occurs mainly in the summer, when it can be of value for agriculture. The summers in this region are hot. The summer isotherm of 62°, starting at Boston, crosses the Red river in latitude 50° N. and curves northwest to 60° north latitude at the Mackenzie river. In the arctic regions, the summers are warm and similar in length to those in other parts, but the winters are long and severe, the seasons of spring and autumn being almost eliminated.

Waterways. The rivers of Canada are of exceptional magnitude and number. They belong to four large drainage basins: (1) the Atlantic, including the Saint John, the Saint Lawrence and its tributaries, and the Hamilton; (2) the Hudson bay, including the Moose, the Albany, the Nelson and its tributary,—the Saskatchewan,—the Churchill, and many others; (3) the Arctic, including the Banks, the Coppermine, and the Mackenzie with its tributaries—the Liard, the Peace, and the Athabaska; (4) the Pacific, including the Columbia, the Fraser, the Skeena, the Stikine, and the Yukon, the last emptying into Bering Sea.

Rimming the outer border of the Laurentian plateau are the greatest lakes of the world, the lakes of the Saint Lawrence system—Lake Ontario, Lake Erie, Lake Huron, and Lake Superior. Other large lakes of Canada are Lake Winnipeg, Lake Athabaska, Great Slave lake, and Great Bear lake.

The Great Lakes system is the waterway of the most importance for transportation, although the Nelson-Saskatchewan river, flowing into Hudson bay, and the Mackenzie-Athabaska river, flowing into the Arctic Ocean, were well traveled water highways known to fur traders long before settlements had advanced as far west as Lake Ontario.

By means of enlarging the channel of the Saint Lawrence river, the Dominion government has made it possible for ocean steamers to reach Montreal, which is situated at a distance of 700 miles from the Atlantic Ocean. By the further construction of 117.2 miles of canals, an uninterrupted communication by water has been established from the head of Lake Superior to the Atlantic Ocean, an aggregate distance of 1594 miles.

There are six canal systems in connection with the Saint Lawrence and Great Lakes waterways. The total cost to the government for construction and improvement up to the beginning of 1927 was $175,812,316. The systems embrace the canals: (1) between Port Arthur or Fort William and Montreal; (2) from Montreal to the international boundary near Lake Champlain; (3) from Montreal to Ottawa; (4) from Ottawa to Kingston and Perth; (5) from Trenton on Lake Ontario to Lake Huron (not completed); and (6) from the Atlantic to the Bras d'Or lakes, Cape Breton.

Minerals. From the point of view of minerals, Canada may be divided into four great areas: (1) the maritime provinces; (2) Ontario and Quebec; (3) the prairie provinces; and (4) British Columbia.

The chief minerals of the maritime provinces are coal and iron, mined mostly in Nova Scotia. Gypsum is found also and is shipped to the United States to be refined.

The mineral deposits of Ontario and Quebec have been very incompletely prospected. Copper, silver, and, more recently, gold have been produced in abundance from northern Ontario. Most of the world's supply of nickel and of cobalt comes from Ontario, while Quebec is the world's chief source of asbestos. Oil and gas are found in southern Ontario.

PRINCIPAL PRODUCTIONS OF CANADA

Showing Value and Rank by Provinces, 1925

Province	Field Crops	Farm Live Stock	Dairy Products	Fisheries	Mineral Products	Lumber*	Wood Pulp	Total Manufactures
Alberta . . $	194,356,000	97,162,000	8,188,104	458,504	25,318,866	996,593	. . . .	75,113,517
Rank	3	4	3	9	3	7	. . . .	5
British Columbia, $	18,909,000	17,916,000	4,789,158	22,414,618	64,485,242	53,851,612	7,527,631	218,775,835†
Rank	7	7	6	1	2	1	3	3
Manitoba . . $	115,436,000	54,401,000	8,092,802	1,466,939	2,276,759	2,427,421	. . . .	124,145,763
Rank	5	5	4	7	6	6	. . . .	4
New Brunswick, $	25,681,100	15,640,000	1,442,613	4,798,589	1,743,858	14,648,407	7,499,460	70,374,660
Rank	6	8	8	3	8	4	4	6
Nova Scotia, $	18,885,400	18,449,000	2,878,005	10,213,779	17,625,612	3,043,069	1,140,023	65,033,701
Rank	8	6	7	2	5	5	5	7
Ontario . . $	250,465,600	228,302,000	73,751,526	3,436,412	87,980,436	36,141,672	33,559,038	1,527,154,660
Rank	2	1	1	4	1	2	2	1
Prince Edward Island, $	15,416,800	8,957,000	1,107,803	1,598,119	. . . .	131,853	. . . .	4,290,149
Rank	9	9	9	6	. . . .	9	. . . .	9
Quebec . . . $	150,253,000	128,852,000	30,658,717	3,044,919	24,284,527	22,802,029	50,490,231	820,563,757
Rank	4	3	2	5	4	3	1	2
Saskatchewan,$	363,992,000	134,608,000	7,373,498	494,882	1,076,392	371,189	. . . .	40,093,273
Rank	1	2	5	8	9	8	. . . .	8
Yukon Territory, $	. . . . .	. . . . .	. . . .	15,370	1,791,641	. . . .	. . . .	. . . .
Rank	. . . . .	. . . . .	. . . .	10	7	. . . .	. . . .	. . . .
Total $	1,153,394,900	704,287,000	138,282,226	47,942,131	226,583,333	134,413,845	100,216,383	2,945,545,315

* Includes lath and shingles. † Includes Yukon Territory.

The prairie provinces, more particularly Alberta, have large deposits of coal, being credited with more than 80 per cent of Canada's coal reserves. Natural gas is found extensively in Alberta.

In British Columbia, copper, coal, gold, silver, lead, and zinc are mined in important quantities.

The mineral resources of the northern parts are known to be very great, but, apart from the production of gold and silver in the Yukon, their development awaits further prospecting and the investment of capital.

Flora. In Ontario and Quebec, south of a line running from Georgian bay to Montreal, the flora is of a southern forest type. North of this line to latitude 50°, from the Gulf of Saint Lawrence to Manitoba, a Temperate Zone forest type prevails. In Manitoba the forest disappears, giving place to the prairie grasses and herbage. Prairie vegetation spreads west as far as the foothills of the Rockies. Farther north, along a line drawn from latitude 55° on the Athabaska river to the south end of Lake Winnipeg, the prairie gradually gives place to the northern forest.

This northern forest belt extends from the Atlantic Ocean and the Gulf of Saint Lawrence to the Rockies. It covers all the country, extending from the temperate forest and the prairies northward as far as the Barren Grounds. In its southern half, this area is densely forested, but in the northern half the forest gradually becomes more open and the trees become smaller. The line between the forest and the Barren Grounds runs from Richards island in the Arctic Ocean to the general region of Churchill on Hudson bay, and from Richmond gulf on the east side of the bay to Ungava bay. In the Barren Grounds, the subsoil is permanently frozen. Saxifrages, lichens, and mosses are the outstanding forms of vegetation, trees having vanished or occurring only in the form of small shrubs. This vegetation, however, affords food to numerous caribou and musk oxen.

In the Cordilleran belt, the flora varies according to climatic conditions. It is characterized by a tropical luxuriance on the coast and on the western slopes of the high ranges, but, in the dry areas east of the ranges, it takes on forms typical of the American desert. The Temperate Zone vegetation of the low valleys is replaced by arctic types above the tree line on the mountains.

Forests and Lumbering. Canada's forests cover 942,000 square miles, or one-fourth of the country's total surface. They are included more or less roughly in three areas: (1) the giant fir forest of the Rocky mountains and the Pacific coast; (2) the northern coniferous forest, lying between the prairies and the Barren Grounds; and (3) the deciduous, hardwood forest, extending from Lake Huron through southern Ontario and southern Quebec to New Brunswick and the Atlantic coast.

The chief timber trees of the Pacific coast area are Douglas fir, red cedar, Alaska pine, Sitka spruce, and Engelmann spruce. The dominant types of the northern forest include white spruce, balsam fir, tamarack, and black spruce. The more valuable trees of the southeastern forest area are yellow birch, white pine, red pine, eastern cedar, maple, elm, ash, oak, and hickory.

The forests of Canada are owned mainly by the Dominion government and by provincial governments. Leases are extended to lumber or pulp companies to cut the timber, usually with the condition that the logs be sawed or manufactured into pulp in Canada.

The products of the forest which represented the largest value in 1920 were lumber, firewood, and pulp wood, respectively. A large part of the lumber and pulp wood or paper manufactured from pulp wood is exported to the United States.

The forests are guarded by government appointed agents against fire and wanton destruction. Reforestation is carried on under scientific management. The Dominion government has set aside 34,000 square miles as forest reserves, in addition to which, areas have been similarly reserved by different provincial governments.

Fauna. The fauna of Canada resembles that of northern Europe. The carnivora are represented by several species of the weasel family, such as the ermine, the marten, and the mink. The lynx, bear, fox, wolf, and skunk are common at a distance from the settled districts. In the prairie provinces, small rodents, called gophers, are so numerous as to constitute a pest. The beaver is a characteristic Canadian animal and has been adopted, along with the maple leaf, as a national emblem. Otters and muskrats are numerous. Caribou range over the northern plains, which are also the habitat of the unique musk ox, an animal almost as large as the domesticated ox but having a close resemblance to the sheep. Moose and deer are found in the forested areas, and goats, sheep, and grizzly bears make the mountains their habitat. White bears, seals, and walruses are common along the northern coasts. Snakes are rare except in the extreme south.

Buffaloes formerly existed in enormous herds on the inland plains but are now confined almost entirely to two herds enclosed in government reserves, one called Buffalo park, near Wainwright, Alberta, and the other near Lamont, Alberta, called Elk Island park. In 1922 the former herd contained about 7000 animals, and the latter, about 270. The government also has three antelope reserves in the prairie provinces.

Fur Bearing Animals. The animals which provided the largest aggregate value in pelts during the year 1921 were the beaver, the muskrat, and the marten. The breeding of the silver fox on fur farms is successfully carried on, chiefly in Prince Edward Island.

The fur trade constituted Canada's earliest commercial interest. It was formerly a monopoly of the Hudson's Bay Company, which controlled most of the northwest region until 1859. The company still has the largest share of Canada's fur trade, maintaining posts throughout the vast territory of the north.

Fisheries. Canada's sea fishing waters, including bays and inlets, total over 200,000 square miles. Conservation methods to protect the Dominion's immensely valuable fishing industry have been adopted both by the Federal government and by provincial governments. It is officially estimated that the government hatcheries plant annually in suitable waters about two billion fish fry. About 90,000 workers are employed in Canada's fish industries.

Salmon are taken on the Pacific coast; lobsters are obtained in diminishing quantities from the shore waters of the maritime provinces and of Quebec. Herrings are caught both on the Atlantic coast and on the Pacific coast. Hake, pollock, mackerel, and paddock are products of Atlantic deep-sea fishing. Halibut were formerly plentiful in Atlantic waters, but they now come mostly from the Pacific coast. British Columbia and New Brunswick have developed sardine canning industries. In the Pacific Coast waters, are found the eulachon, or candlefish. Smelts are also abundant there as well as along the shores of the maritime provinces. Alaska black cod is highly prized but is not plentiful.

Prince Edward Island Malpeque oysters were formerly famous for size and quality, but the beds have been greatly depleted as a result of overfishing and of disease. Clams are found on the coasts of both oceans. Vancouver Island sends out annually a small fleet of whalers that find profitable employment in the north Pacific. Large quantities of fresh-water fishes are taken, such as perch, bass, pickerel, pike, tullibee, and whitefish, the last constituting the most valuable food fish obtained from the Great Lakes.

GROWTH OF CANADA, 1871-1921

Item	1871	1881	1891	1901	1911	1921
Population	3,485,761	4,324,810	4,833,239	5,371,315	7,206,643	8,788,483
Immigration	27,773	47,991	82,165	49,149	311,084	148,477
Agriculture:						
Wheat bu.	16,723,873	32,350,269	42,212,811	55,572,368	215,851,300	300,858,100
Oats bu.	42,489,453	70,493,131	83,428,202	151,497,407	348,187,600	426,232,900
Barley bu.	11,496,038	16,844,868	17,209,989	22,224,366	40,641,000	59,709,100
Corn bu.	3,802,830	9,025,142	10,711,380	25,875,919	18,772,700	14,904,000
Potatoes bu.	47,330,187	55,268,790	53,490,857	55,362,635	66,023,000	107,346,000
Hay and Clover tons	3,818,641	5,055,810	7,693,733	7,852,731	12,694,000	11,366,100
Horses no.	836,743	1,059,358	1,470,572	1,577,493	2,266,400	3,813,921
Cattle no.	2,624,290	3,514,989	4,120,586	5,576,451	7,086,600	10,206,205
Sheep no.	3,155,509	3,048,678	2,563,781	2,510,239	2,389,300	3,675,860
Swine no.	. . . . .	. . . . .	14,105,102	17,922,658	2,792,200	3,904,895
Cheese lbs.	4,984,843	3,184,996	6,267,203	220,833,269	199,904,205	161,062,626
Butter lbs.	74,190,584	102,545,169	111,577,210	141,409,815	64,489,398	122,776,580
Fisheries:						
Total value $	7,573,199	15,817,162	18,977,878	25,737,154	29,965,433	34,931,935
Minerals:						
Total production $	. . . . .	10,221,255(1)	18,976,616	65,797,911	103,220,994	172,430,648
Gold oz.	105,187	63,524	45,018	1,167,216	473,159	926,329
Silver oz.	. . . . .	355,083(2)	414,523	5,539,192	32,559,044	13,490,747
Copper lbs.	. . . . .	3,505,000(1)	9,529,401	37,827,019	55,648,011	47,620,820
Lead lbs.	. . . . .	204,800(1)	88,665	51,900,958	23,784,969	66,679,592
Nickel lbs.	. . . . .	839,477	4,035,347	9,189,047	34,098,744	19,293,060
Pig Iron tons	. . . . .	24,827(2)	23,891	274,376	917,535	665,676
Coal tons	1,063,742(3)	1,537,106	3,577,749	6,486,325	11,323,388	15,057,495
Cement bbl.	. . . . .	69,843(2)	93,479	450,394	5,692,915	5,752,885
Manufactures:						
Capital $	77,964,020	164,957,423	353,213,000	446,916,487	1,247,583,609	3,230,686,368(4)
Employees no.	187,942	254,894	272,033	339,173	515,203	682,434(4)
Salaries and Wages $	40,851,009	59,401,702	79,234,311	113,249,350	241,008,416	689,435,709(4)
Products $	221,617,773	309,731,867	368,696,723	481,053,375	1,165,975,639	3,520,731,589(4)
Commerce:						
Exports $	74,173,618	98,290,823	98,417,296	196,487,632	297,196,365	1,189,163,701
Imports $	96,092,971	105,330,840	119,967,638	190,415,525	472,247,540	1,240,158,882
Exports, Domestic—						
Wheat bu.	1,748,977	2,523,673	2,108,216	9,739,758	45,802,115	129,215,157
Wheat flour bbl.	306,339	439,728	296,784	1,118,700	3,049,046	6,017,032
Oats bu.	542,386	2,926,532	260,569	8,155,063	5,431,662	14,321,048
Hay tons	23,487	168,381	65,083	252,977	326,132	179,398
Bacon lbs.	10,344,400	9,785,089	7,150,756	103,020,661	56,068,607	98,233,800
Butter lbs.	15,439,266	17,649,491	3,768,101	16,335,528	3,142,682	9,739,414
Cheese lbs.	8,271,439	49,255,523	106,202,140	195,926,397	181,895,724	133,620,340
Fisheries $	3,994,275	6,867,715	9,715,401	10,720,352	15,675,544	33,662,751
Forest products $	24,459,877	24,960,012	24,282,015	30,009,857	45,439,057	105,325,375(5)
Manufactures $	2,432,750	3,075,095	6,296,249	16,012,208	35,283,118	403,132,161(5)
Mineral products $	2,841,124	2,767,829	5,784,143	40,367,683	42,787,561	62,316,304(5)
Imports—						
Agricultural $	. . . . .	. . . . .	. . . . .	17,813,186	35,304,683	289,623,345(6)
Animal products $	. . . . .	. . . . .	. . . . .	12,068,321	23,258,364	65,478,869(6)
Fisheries $	. . . . .	. . . . .	. . . . .	972,939	1,995,091	3,947,608(6)
Forest products $	. . . . .	. . . . .	. . . . .	3,549,927	12,873,875	19,024,778(6)
Manufactures $	. . . . .	. . . . .	. . . . .	116,108,373	310,514,144	600,690,564(6)
Mineral products $	. . . . .	. . . . .	. . . . .	16,363,494	44,020,074	161,393,718(6)
Transportation:						
Steam Railways mi.	2,695	7,331	13,838	18,140	25,400	39,841
Electric Railways mi.	. . . . .	. . . . .	. . . . .	553	1,224	1,687
Shipping, seagoing, entered and cleared tons	5,116,033	8,104,337	10,695,196	14,543,062	22,297,186	24,916,729
Communication:						
Telegraphs, government mi.	. . . . .	1,947	2,699	5,744	8,446	11,207
Telegraphs, others mi.	. . . . .	. . . . .	27,866	30,194	33,905	41,621
Postal revenue $	803,637	1,344,970	2,515,823	3,421,192	9,146,952	26,331,119
Postal expenditure $	994,876	1,876,658	3,161,676	3,837,376	7,954,223	24,661,262
Postal, money orders issued $	4,546,434	7,725,212	12,478,178	17,956,258	70,614,862	173,523,322
Finance:						
Revenue $	19,335,561	29,635,298	38,579,311	52,514,701	117,780,410	434,386,537
Expenditures $	15,623,082	25,502,554	36,343,568	46,866,368	87,774,198	361,118,145
Gross debt $	115,492,683	199,861,537	289,899,229	354,732,433	474,941,487	2,902,482,117
Net debt $	77,706,518	155,395,780	237,809,030	268,480,004	340,042,052	2,340,878,983
Chartered Banks, deposits (6) $	56,287,391	94,346,481	148,396,968	349,573,327	980,433,788	2,264,586,736
Savings Banks, deposits $	10,336,009	23,522,560	50,382,258	75,174,054	92,864,717	97,737,583

(1) 1886. (2) 1887. (3) 1874. (4) 1919. (5) 1920. (6) Approximate figures, for purposes of comparison only; the statistics given in the 1921 census were prepared according to an entirely different classification of these items.

Agriculture. The land in Canada which, under present conditions, is of value for agriculture, has been estimated by a Dominion royal commission at 689,062 square miles. Less than one-sixth of this area is as yet under field crops. It is comprised mainly in a section lying north of the American border and extending across the country from east to west with a width of several hundred miles. The section includes, however, certain portions which are incapable of being cultivated. A large part of northern Ontario is rocky, and in British Columbia the fertile land is confined mainly to the valleys and the seacoast districts.

The agricultural land in the maritime provinces and in the Saint Lawrence lowlands has long been cultivated, so that its production is greater than that of the vaster but more sparsely settled areas of the northwestern provinces. In the latter provinces immense stretches of rich soil suitable for general farming and for grazing have, in comparatively recent times, been opened for settlement by the construction of railroads. Even as far north as the Peace River country in northwestern Alberta, the land is well suited for mixed farming.

Field Crops. The principal field crop in the prairie provinces is wheat, a large part of which is exported. Oats are grown in approximately the same amount as in the east. Hay and potatoes are important crops, especially in eastern Canada. Other field crops include barley, turnips, and corn, the last grown principally in Ontario.

Irrigation. The need for irrigation is confined to southwestern Alberta and to the dry belt of southern British Columbia. Several hundred miles of ditches and canals have been constructed under government supervision. Among the larger projects is one involving the reclamation of three million acres along the Canadian Pacific railway between Calgary and Medicine Hat, and another, affecting a somewhat similar area south of Lethbridge in Alberta.

Horticulture. Fruit growing is a prominent industry in Nova Scotia, where apples of a high quality are produced in abundance. In Quebec, the eastern townships grow the largest amount of fruit. Ontario, particularly the section bordering Lake Erie, is the most productive fruit center in the Dominion. Peaches, tomatoes, melons, and grapes, in addition to such Temperate Zone fruits as pears, apples, plums, and berries, are raised in large quantities. British Columbia apples have a wide reputation, and all other Temperate Zone fruits thrive in the mild climate of that province.

Live Stock. Stock raising is still an exclusive occupation in some parts of Alberta, Saskatchewan, and British Columbia, but elsewhere it is made a part of mixed farming. Over six million acres were under grazing leases in 1920. Specialization in stock raising, just as in grain growing, is being superseded by mixed farming. This change, however, has resulted in an increase rather than in a decrease of the number of live stock raised.

Dairying is an important industry, Canada being one of the largest exporters of cheese in the world. The factory system has been adopted in all the provinces. The production of creamery butter in 1921 was valued at more than 45 million dollars. Experimental farms distributed across the continent are maintained by the Dominion government.

Manufacturing. Industrial development has proceeded rapidly in Canada during recent years, partly as a result of the increased availability of cheap hydroelectric power. This expansion has been largely confined to the older provinces. Ontario ranks highest in manufacturing, Quebec comes next, and British Columbia takes the third place. Montreal heads the list of industrial cities with Toronto a close second, Hamilton, Winnipeg, and Vancouver following in the order named. The industrial output exhibits a wide variety of products, the most important of which is newsprint paper, in the production of which Canada leads the world. Flour manufacture, meat packing, sawmill operations, and textile manufacture follow in the order named. Canada is the fourth largest manufacturer of rubber products in the world.

Water Power. The water power available in Canada is enormously extensive, the total available for electric generation being estimated at 33,113,200 horse power at ordinary 6 months flow. Over 70 per cent of all power used in Canada is in the form of electricity, and of this about 99 per cent is generated by water power. This situation is due chiefly to the fact that water power is available close to the centers of population. In per capita use of electricity Canada leads the world, employing, in 1926, about 818 horse power per capita, as compared with 585 for Switzerland and 442 for the United States.

Railroads. There are in Canada over 39,000 miles of railroad in operation, of which the government owns more than 20,000 miles. Three transcontinental lines span the country from east to west. These railroads serve to open up new territory for settlement and to bind together the provinces. By them, also, the route from Liverpool to the Orient is made 1000 miles shorter than the route via New York and San Francisco. In this manner, the transcontinental lines provide a convenient highway between England and the eastern parts of the British Empire. Canadian railroads also handle a large traffic between Canada and the United States.

Shipping. The principal seaports of Canada include Montreal, Vancouver, Victoria, Halifax, Saint John, Sydney, and Quebec. The countries with which Canada has the heaviest sea-borne commerce are the United States, Japan, and Great Britain. The shipping on the Great Lakes is heavy, the traffic consisting mainly of grain, lumber, and ores passing east and of coal and manufactures going west.

Banking System. Commerce in Canada is facilitated by a banking system carefully regulated by the government. A characteristic feature of the system is the fact that the banks are few but each one has many branches. In 1928, there were 11 Canadian banks, operating 4061 branches in Canada and 191 branches in foreign countries. All Canadian paper currency in denominations of five dollars or over consists of notes issued by banks. This currency is ultimately redeemable by the government.

Population and Language. More than one-half of the population of Canada is of British descent; about one-third is composed of the descendants of French colonists. In the prairie provinces large numbers of Americans have settled as well as a certain proportion of people from continental Europe. The majority of the latter, however, live in the industrial centers. There are more than 100,000 American Indians, mostly on reserves. The total population in 1921 was 8,788,483.

French shares with English the status of an official language in Canada. Its use is confined mainly to Quebec and to a few French settlements in other provinces.

Education. Instruction in elementary schools is free and compulsory, the requirements varying slightly in the different provinces. As a rule, the provinces provide for uniformity in the training of teachers, in the use of textbooks, and in the grading of pupils. In several provinces there are separate schools for Catholic and for Protestant children. Schools are maintained by funds from the province, the municipality, and the school district. There are 23 universities, a number of colleges under denominational control, and many high-grade technical and agricultural schools.

CANADA, GROWTH OF PROVINCES IN POPULATION, 1871-1921

Province	Population					
	1871	1881	1891	1901	1911	1921
Alberta	.....	.....	.....	73,022	374,295	588,454
British Columbia	36,247	49,459	98,173	178,657	392,480	524,582
Manitoba	25,228	62,260	152,506	255,211	461,394	610,118
New Brunswick	285,594	321,233	321,263	331,120	351,889	387,876
Northwest Territories *	48,000	56,446	98,967	20,129	6,507	7,988
Nova Scotia	387,800	440,572	450,396	459,574	492,338	523,837
Ontario	1,620,851	1,926,922	2,114,321	2,182,947	2,527,292	2,933,662
Prince Edward Island	94,021	108,891	109,078	103,259	93,728	88,615
Quebec	1,191,516	1,359,027	1,488,535	1,648,898	2,005,776	2,361,199
Royal Canadian Navy	.....	.....	.....	.....	.....	485
Saskatchewan	.....	.....	.....	91,279	492,432	757,510
Yukon Territory	.....	.....	.....	27,219	8,512	4,157
Total	3,689,257	4,324,810	4,833,239	5,371,315	7,206,643	8,788,483

* The decrease shown in the population of the Northwest Territories after 1891 is due to the separation therefrom of vast areas to form Alberta, Saskatchewan, and the Yukon Territory, and to extend the boundaries of Quebec, Ontario, and Manitoba.

PROVINCES

Canada is divided into nine organized provinces and four territories. The provinces, enumerated from east to west, are Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia. The territories are Franklin, Keewatin, Mackenzie, and the Yukon. Franklin, Keewatin, and Mackenzie are often referred to as the Northwest Territories.

Alberta. A province of Canada, situated between British Columbia on the west and Saskatchewan on the east and stretching from the American border about 750 miles north to the 60th parallel of north latitude. The southwestern border follows the summit of the Rocky mountains, thereby leaving in Alberta the western mountain slope and the foothills. From the foothills in the southern portion of the province, a plain slopes eastward, forming a part of the Saskatchewan River basin. The northern part of the province consists of a plain of northern drainage, belonging to the Mackenzie-Athabaska basin. A fringe on the extreme south drains into the Missouri river. The elevation varies from over 12,000 feet in the Rocky mountains to little more than 560 feet in the north. Except in the south, Alberta is well watered by numerous rivers, large and small. Lakes abound in the central and northern parts. The area of the province is 255,285 square miles.

The climate of Alberta is continental, involving great extremes of temperature. The air is dry and healthful. In southern Alberta the chinook winds, descending from the ridge of the Rocky mountains, often clear the ground rapidly of snow in the early spring, thus reviving the grasses which serve as sustenance for the large herds of cattle raised in the province.

A dark mold, mostly humus, overlying a clay subsoil, covers the surface of Alberta from six inches to several feet in depth. Such a soil, being exceedingly fertile and at the same time capable of retaining a large amount of moisture, supports a highly developed agricultural industry. Wheat and oats are the principal crops. Mixed farming has tended in recent years to replace specialized grain growing, with the result that potatoes, dairy products, flax, sheep, hogs, and poultry contribute a considerable amount to the total of the agricultural production.

In the southwest of the province, there is an area which requires irrigation in order to insure crops. Over 5400 miles of irrigation canals and ditches have been constructed.

The mineral resources of Alberta are of considerable importance. Immense areas of lignite and of a high grade bituminous coal have been discovered. Anthracite coal is also mined. The output of all kinds of coal amounts normally to over six million tons, a total exceeded by none of the other provinces. Petroleum and natural gas have been found both in the northern and in the southern part, particularly in Turner valley near Calgary.

Besides the two transcontinental railways, which, with their numerous branches, serve the better developed and settled southern portion of Alberta, lines have been constructed from Edmonton northward, one to the Peace River district and another to the Athabaska river.

The capital of Alberta is Edmonton, in which is located the University of Alberta, supported by the province. The largest city is Calgary. The chief industries are those related to agriculture, such as meat packing. Population, 1921, 588,454.

British Columbia. The most western province of Canada, extending from the international boundary line to latitude 60°. The province is bounded on the east by Alberta; the western boundary is the Pacific Ocean, for a distance of 500 miles, and, for an additional 600 miles, the province borders on the coast strip of Alaska. British Columbia includes Vancouver island, the Queen Charlotte islands, and numerous other islands off the Pacific coast. The area is 355,855 square miles.

With the exception of a portion of the Peace River country in the northeast, the whole of British Columbia lies within the Cordilleran mountainous belt. Between the ranges, and occasionally cutting through them, are deep fertile valleys. The stretch of land lying between the coastal mountains and the next important range to the east constitutes an interior plateau having much agricultural or grazing land.

A submergence of the coast has resulted in an archipelago of innumerable islands, deep sounds, and fiords, many of them excellent harbors. As a result, the province has a coast line of 7000 miles. Of the rivers, the Fraser, 800 miles long, is the largest. The Columbia river rises in British Columbia and has a course of 500 miles before crossing the boundary line. Beautiful fiordlike lakes are a feature of many of the valleys. The islands and the coast region have a mild climate, rainy in winter but dry in summer. The interior plateaus, being dry, are subject to greater extremes of temperature. The comparative lack of moisture on the interior plateaus is due to the fact that the winds from the west, being chilled in rising over the mountains, lose much of their moisture by precipitation. After passing the summits, they descend, thereby becoming heated and capable of absorbing more moisture. For this reason, the district immediately east of the mountains is dry, and irrigation may be necessary for successful cultivation.

British Columbia has one of the greatest forests of merchantable timber in North America, besides

millions of acres of pulp wood yet untouched. Douglas fir, cedar, spruce, western hemlock, larch, and pine attain an unusual diameter and height. Logs 30 feet in girth are not uncommon. In value of output lumbering ranks highest among the industries of the province, providing support for two-fifths of the population and entitling British Columbia to the first place among the lumber producing provinces of the Dominion. The pulp industry, also, is rapidly growing.

In the fishing industry, British Columbia likewise ranks first among the provinces, supplying 47 per cent of the Canadian production. The salmon fisheries are the most important, and have given rise to a large salmon canning industry. Halibut, herring, and black cod form a considerable part of the annual catch.

The discovery of gold in 1858 in the Fraser River district was the occasion for the earliest settlements in British Columbia. The mineral production since that time has continued to be important, copper, gold, coal, silver, lead, and zinc being among the more valuable products of the industry. The province mined one-fifth of the Dominion's mineral output by value in 1920. A considerable amount of coal is shipped to the western United States.

In recent years agriculture, fruit growing, stock raising, dairying, and poultry raising have made rapid advances, the combined value of their products now ranking second only to lumbering among the primary industries. The chief fruits include apples, grapes, peaches, apricots, plums, strawberries, and cherries. British Columbia apples won 17 prizes in the Crystal Palace apple show at London in 1921.

British Columbia has a native supply of coal and of iron, and the province is favorably situated for shipping goods to the markets of Australia, of South America, and of Asia. Mainly as a result of these facts, manufacturing has become important, entitling British Columbia to the third place in regard to industrial output among the provinces of the Dominion. Since the opening of the Panama canal, Vancouver and Prince Rupert have become important ports for the shipment of grain and other commodities. The province is crossed by three transcontinental railway lines terminating at ice-free ports. The per capita railway mileage and the per capita production of British Columbia are exceeded by those of few, if indeed of any country.

The public school system is nonsectarian. Instruction must be given in English. The provincial university, called the University of British Columbia, is situated at Vancouver, which is the largest city of the province. The capital is Victoria, situated on Vancouver Island. Population, 1921, 524,582.

Keewatin (*kē-wä'tĭn*), **Mackenzie, Franklin.** Three divisions, each known as a provisional district, formed on January 1, 1920, out of the vast Northwest Territories. The total area of these districts is 1,309,682 square miles, of which 1,258,217 square miles are land and 51,465 square miles are water. In 1921, the population numbered 7988, mostly Indians and half-breeds.

The land is a rolling plain. The principal lakes are Great Bear lake and Great Slave lake, both in Mackenzie; the largest river, the Mackenzie, flows for most of its course through that district, emptying into Mackenzie bay, an arm of the Arctic Ocean. Furs are obtained in all the districts, and minerals—gold, copper, lead, and coal—have been found. On the banks of the middle course of the Mackenzie river, petroleum was discovered in 1922.

In the southern part of these districts, oats, barley, and garden vegetables are successfully raised. The fauna includes moose, bears, caribou, musk oxen, beavers, wolves, and many smaller fur bearing animals. Fish abound in the rivers and lakes. Whitefish form a large part of the food of the inhabitants. The government is carried on under the direction of a commissioner, aided by a deputy commissioner and five councilors.

Manitoba (*măn'ĭ-tō'bä*). A province of Canada, situated in the south central part of the Dominion between Ontario and Saskatchewan, stretching about 750 miles northward from the American border to 60° north latitude. The eastern boundary follows the 95th meridian about 275 miles northward, then cuts across at an angle of about 45° to Hudson bay, so that the northeastern part of the province has a coast line on the bay. In the southern part, the drainage is from the southeast and the west to Lake Manitoba and Lake Winnipeg and thence northeast by the Nelson river to Hudson bay. In the north, the Churchill River basin drains eastward into Hudson bay. The area of the province is 251,832 square miles.

A large part of the soil is alluvial, a vast lake having occupied the southern part of the province in geological times. This alluvium, a black loam of great fertility, has a very high content of potash, nitrogen, and phosphoric acid, and is, therefore, peculiarly well adapted to the growth of cereals. The southeastern part of the province is rocky and slopes rapidly from the highlands of northern Ontario. This fact has made possible the development, on the Winnipeg river, of large quantities of hydroelectric power.

The climate is continental, the winters being severe and the summers warm in the day but cool at night. The air is dry and healthful. The precipitation averages about 20 inches, most of which falls during the summer. The soil formation, moreover, favors the retention of moisture.

The chief primary industry of Manitoba is agriculture. The growing season has a duration of from 85 to 105 days. This period, however, by reason of the long, bright summer days, is sufficient to ripen a hard type of spring wheat which holds a position in the world's markets second to none. Thrashing is done in the field directly from the shock. Oats, barley, and potatoes are grown also in considerable quantities. The dairy products of Manitoba are important and a great deal of butter and cheese are shipped. Stock and swine are raised.

Manufacturing in Manitoba has been promoted by the availability of cheap hydroelectric power. In the value of industrial output, the province normally ranks fourth in the Dominion.

Fishing is carried on in the lakes, and frozen whitefish is exported in quantity to the United States. Limestone is quarried for building purposes. The forested areas of the north and southeast provide spruce, which is made into lumber, and a great deal of tamarack and birch, which, in the absence of cheap coal, is used as fuel.

The capital and largest city of Manitoba is Winnipeg, which is also the seat of the provincial university. The first permanent settlement was made in 1812 in the Red River district by a company of Scotch colonists. A unique feature of Manitoba's winter life is the annual dog derby, a race in which various dog teams compete on a course some 200 miles in length. Population, 1921, 610,118.

New Brunswick. A maritime province in the southeastern part of Canada, having an eastern coast line on the Gulf of Saint Lawrence and a southeastern coast line on the Bay of Fundy. Maine lies to the southwest of the province, and Quebec, to the northwest. The total coast line is 500 miles long and is indented with many fine harbors. Most of the surface is an undulating plain, lying between the low hills which, in the south, skirt the Bay of Fundy and the subdued mountains of the northwestern portion of the province. The area is 27,985 square miles.

A number of navigable rivers traverse the province: the Saint John flows southward into the Bay of Fundy; the Mirimichi and Restigouche follow an eastward course into the Gulf of Saint Lawrence. At Grand Rapids the Saint John river, leaping over a precipice of 58 feet into a gorge, forms a waterfall of remarkable beauty. At the river's mouth in Saint John's harbor, occurs the famous "reversing falls."

CANADIAN NATIONAL PARKS AND RESERVES

Name	Location	Area Sq. Miles	Established	Distinctive Characteristics
SCENIC AND RECREATIONAL PARKS:				
Rocky Mountains Park, Banff	Alberta	2,751	1885	Ideal mountain playground containing the two famous resorts, Banff and Lake Louise, with much of finest scenery of east slope of Central Rockies.
Yoho Park	British Columbia	476	1886	Rugged scenery of west slope of Rockies; precipitous peaks, many with permanent ice caps or glaciers; wonderful Yoho valley with falls over 1200 feet in height; natural bridge; Emerald lake, and lakes O'Hara and McArthur.
Glacier Park	British Columbia	468	1886	Summit of the Selkirks; one of the best centers for alpine climbers and students of glacier formations; Illecillewaet and Asulkan valleys and glaciers; Nakimu caves; Marion lake; Rogers and Baloo passes.
Revelstoke Park	British Columbia	100	1914	Panoramic views of Columbia and Illecillewaet valleys, Clach-na-Coodin ice field, lakes Eva and Millar.
Kootenay Park	British Columbia	587	1920	Wonderful mountain scenery, historic rivers, towering canyons, Briscoe range, Ice lake, Sinclair canyon, and Radium Hot Springs. Bear, deer, caribou, and sheep.
Jasper Park	Northern Alberta	5,380	1907	Immense mountain wilderness, rich in historic associations. Unclimbed peaks, glaciers, snow fields, canyons, innumerable lakes of wonderful coloring. Athabaska valley, Maligne lake, gorge and canyon, Mt. Edith Cavell, Miette Hot Springs, Mt. Robson. Big game sanctuary.
Waterton Lakes Park	Southern Alberta, adjoining U. S. Glacier Park	220	1895	Mountains noted for beauty of coloring; lovely lakes, waterfalls, and snow peaks; excellent trout fishing; favorite camping resort.
Saint Lawrence Islands	Ontario	160*	1904	Fourteen islands and one mainland reservation among the Thousand Islands of the Saint Lawrence river, including Broder island, opposite Morrisburg; equipped for the use of summer campers and visitors.
Pt. Pelee Park	Lake Erie, Ontario	4	1918	Most southerly point in Canada; northern limit of many migratory birds; summer resort and bird reserve; unique fauna and flora.
Vidal's Point Park	Saskatchewan	17.2*	1921	Recreational area on Lake Katepwa.
Prince Albert Park	Saskatchewan	1,337	1927	Scenic and recreational reserve and wild life sanctuary, 30 miles north of Prince Albert.
ANIMAL PARKS AND RESERVES:				
Buffalo Park	Near Wainwright, Alberta	161.5	1908	Fenced enclosure, home of the Government's great buffalo herd—7000 buffalo; also moose, elk, deer, yak, and catalo.
Elk Island Park	Near Lamont, Alberta	51	1911	Smaller fenced enclosure, contains about 270 buffalo; also moose, elk, and deer.
Menissawok Antelope Park	Saskatchewan	17	1922	Antelope reserve.
Nemiskam Antelope reserve	Southern Alberta	8.5	1922	Fenced reserve containing about 130 antelope.
Wewaskesy Antelope Park reserve	Saskatchewan	54	1922	Antelope reserve.
HISTORIC PARKS:				
Fort Anne	Nova Scotia	31.25*	1917	Fort Annapolis Royal played an important part in early history of Canada; it was the center of the fiercely contested struggle between France and England for the possession of the continent.
Fort Howe	New Brunswick	19*	1924	Associated with earliest history of province. Site of landing of the United Empire Loyalists.

* Acres.

New Brunswick's climate is subject to extremes. The thermometer has ranged from 95° F. in summer to −30° F. in winter. The winter begins early in December and lasts until the end of March. Along the Bay of Fundy, dense fogs often arise and extend inland a distance of from 15 to 20 miles. The rainfall averages 40 inches yearly, and the snowfall 88 inches.

Agriculture is the leading industry. The principal crops are hay, potatoes, oats, and turnips. Orcharding is important, apples forming the most valuable item. There are numerous cheese factories and creameries. Most of their products are exported to England. The province has much fertile land which has not yet been occupied.

Forests cover a large part of New Brunswick. Lumbering is the second industry in value, entitling the province to the fourth place in the Dominion in regard to lumber production. Spruce, pine, fir, maple, hemlock, birch, beech, ash, and elm are among the principal timber trees. At present, spruce is the principal commercial wood and is exported in immense quantities.

The fisheries are very valuable, entitling New Brunswick to the third place among the provinces. Oysters, lobsters, herring, codfish, haddock, and smelts are caught. The canning of lobsters and oysters and the curing of codfish are important industries.

The principal manufactured products include lumber, woodenware, wood pulp, boots and shoes, paper, cottons and woolens, nails, mill machinery, and leather.

Saint John, the largest city, is an ice-free harbor at which two transcontinental railways reach tidewater. The province has three universities.

New Brunswick, first occupied by the French in 1639, formed for many years a part of the French colony of Acadia, which included also what is now Nova Scotia. On coming into British possession, the colony received English and Scottish settlers. At the close of the American Revolution, a large number of loyalists from the United States settled near Saint John. In 1784, New Brunswick became a separate province. Population, 1921, 387,876.

Nova Scotia. A maritime province in the extreme southeast of Canada, consisting of a narrow peninsula and of the island of Cape Breton. The greatest length is 350 miles and the greatest breadth, 100 miles. The area of the province is 21,428 square miles.

The main peninsula is a long highland cut by transverse valleys. An important longitudinal valley, the Annapolis valley, runs parallel to the Bay of Fundy, being separated from it by a narrow ridge known as North mountain. The seacoast line is 1500 miles in length, and is indented by several inlets which form excellent harbors. The rivers are numerous but short.

Bras d'Or lake in Cape Breton is a magnificent landlocked body of salt water. It has become a popular resort for wealthy summer residents. Minas basin, the east arm of the Bay of Fundy, penetrates 60 miles inland. Here the tides, rising some 50 feet, rush in with great force, forming "bores."

Nova Scotia has a healthful climate, with a mean summer temperature of 65° F. and a mean winter temperature of 25° F. Winter weather is variable, and spring is late. The annual precipitation amounts to about 45 inches.

Agriculture is the chief occupation, hay, potatoes, turnips, and oats constituting the principal crops. Fruit growing, dairying, and stock raising are important. The Annapolis valley has been described as "Great Britain's apple orchard."

Coal is mined extensively in Cape Breton island and in the northern part of the mainland. Copper, tungsten, lead, gold, and manganese are found, and there are enormous beds of iron ore. Gypsum occurs in immense masses. Nova Scotia normally ranks fifth among the provinces of Canada in mineral output.

The fisheries of Nova Scotia are among the most productive in the world. The annual value is second only to that of British Columbia, among the Canadian provinces. Mackerel, cod, herring, haddock, and lobsters abound in the coast waters. Lobster canning has become a large industry.

Products manufactured in the province include iron and steel products, cotton and woolen goods, boots and shoes, machinery, farm implements, furniture, paper, sugar, condensed milk, and vehicles. Wood pulp is an important export. Lumbering was formerly the chief industry and is still important.

The province is well supplied with railroads, the Intercolonial being the principal line. Shipping is important, especially in winter, when navigation on the Saint Lawrence is closed. There are four universities. The capital and largest city is Halifax.

Discovered by Cabot in 1497, the country was settled in 1604 by the French, who called it Acadia. It became British in 1713. The expulsion of the Acadians from their homes in 1755 by the British military authorities inspired Longfellow's celebrated poem, *Evangeline*. The peninsula was first colonized under British rule by New England planters, and, after the American Revolution, thousands of loyalists settled in Acadia. Scottish immigrants, who began to arrive about the same time, gave the province its name and its dominant cultural characteristics. Population, 1921, 523,837.

Ontario. The most populous and most wealthy province of Canada. It is situated in the southeast of Canada, between Quebec and Manitoba and between the international boundary and Hudson bay. The province consists of a large northern area joined to a smaller but populous southern area by a narrow neck between Georgian bay and the Quebec border. The southern portion is part of the Saint Lawrence lowlands, belonging to the Saint Lawrence River basin. This basin is separated by a flat and ill marked watershed, called the height of land, from the Laurentian plateau, which is an area of southern drainage sloping toward Hudson bay. The bulk of the population is to be found in the lowlands, where the soil is adapted to agriculture. The northern country is rocky, and much of it is covered with forests. The province is well watered by lakes and rivers. The area is 402,262 square miles.

Since Ontario extends from Hudson bay to Lake Erie, a distance of about 1000 miles, there is considerable climatic variation. Extreme cold in winter is experienced about the watershed. The southern part, however, has a much milder climate, while the climatic severity of the northern section is tempered by the lowness of its altitude and by the proximity of Hudson bay. In northern Ontario, the vegetation has a distinctly subarctic character, but in the peninsular district the trees and soft-stemmed plants resemble those in that part of the United States adjoining the Great Lakes. Otters, beavers, skunks, minks, foxes, and other fur bearing animals are still trapped in the north. There are found also moose, caribou, wolves, and bears.

In value of mineral production, Ontario leads all the other provinces. The chief products mined are gold, silver, nickel, copper, cobalt, lead, iron, and arsenic. Nickel and cobalt are distinctive of Ontario's mineral output, being produced in no other part of the world in similar quantities. In the lowlands, gypsum, salt, petroleum, natural gas, and cement materials are obtained.

Farming is the most important primary industry. In value of field crops, Ontario ranks second among the provinces of Canada. The land under cultivation is almost entirely in the lowlands, although agriculture is practicable in parts of the Laurentian plateau, including the clay belt in northern Ontario, through which the Canadian National railway has been constructed. Oats, wheat, barley, and corn are the chief grains. Minor crops are peas, rye, sugar beets, tobacco, potatoes, and turnips. About half the fruit raised in Canada is produced by

Ontario. Approximately one million barrels of apples of the high grade are annually shipped to Europe. Similarly, in the output of dairy products and in the number of live stock owned, the province holds the leading position.

In lumbering, Ontario yields the first place to British Columbia, and, in the production of pulp wood, the province ranks second to Quebec. Immense forests cover almost one-fourth of the area of the province. Spruce, pine, and poplar are the principal woods cut, although maple, birch, and elm are also found over considerable areas. Oak and hickory occur in the more southern parts.

The Great Lakes fisheries employ hundreds of vessels. Trout, whitefish, pickerel, and fresh-water herring form most of the catch, a part of which is canned for market.

Ontario is Canada's most highly developed industrial section, manufacturing industries supporting nearly one-half the population. Hydroelectric power is available in large quantities due mainly to the development of the water power of Niagara falls. The manufactures of the province include machinery, electrical equipment, farm implements, ironware, railroad rolling stock, vehicles, metals and alloys, leather, furniture, paper, soap, boots and shoes, sewing machines, woodenware, and textiles. Milling, fruit canning, and meat packing employ many thousands of hands. There are 11,000 miles of railway in the province and over a hundred miles of canals navigable by steamers.

Ontario has seven universities, besides a number of church and technical colleges and agricultural schools. The province was formerly called Upper Canada. Its population was considerably augmented by the United Empire Loyalists, British sympathizers who left the United States at the close of the Revolutionary War. The capital and largest city is Toronto. The province also contains Ottawa, the capital of the Dominion. Population, 1921, 2,933,662.

Prince Edward Island. An island province of Canada, situated in the southern part of the Gulf of Saint Lawrence. Prince Edward Island is the smallest and most densely populated province of the Dominion. The island is about 145 miles long and varies in width from 5 miles to 34 miles. The coast line is a succession of bays and headlands. The surface is gently undulating, the greatest height being about 306 feet. The area is 2184 square miles.

Due to the influence of the surrounding sea, the province is singularly free from extremes of heat and cold. Fogs are less frequent than on the mainland. The soil is fertile and produces, besides other crops, hay, potatoes, oats, and turnips.

The fisheries provide employment for a large part of the population. Lobsters and oysters of superior quality are canned for market. Cod, herring, hake, and mackerel are also taken.

Dairying receives much attention, and the island's creameries and cheese factories export large quantities of their products. Rivaling it in importance is the production of poultry and eggs. In recent years, silver fox farming has developed into a highly important industry.

Leather, condensed milk, and cheese are among the manufactures. These are limited mostly to supplying local demands.

A railroad traverses the island, and, by means of its three branches, connects the principal towns. Good automobile highways extend in all directions. There is steamship connection between the island and the mainland across Northumberland strait as well as between Pictou, Nova Scotia, and Charlottetown. Ice breaking steamers are employed during the winter to keep open the lanes of ferry navigation.

Prince Edward Island attracts many summer residents by its pleasant summer climate and its facilities for surf bathing. Higher education is furnished by two colleges. Charlottetown, the capital, is the largest city.

The island was settled by French from Cape Breton but during the Seven Years' war was seized by the British, who expelled the French settlers. The present population is almost entirely of Scotch, English, and Irish ancestry. Population, 1921, 88,615.

Quebec. A province in eastern Canada, lying between the Gulf of Saint Lawrence on the east and Hudson bay and Ontario on the west and extending north about 1200 miles from the international boundary to Hudson strait and the Atlantic coastal strip known as Labrador. Quebec is the oldest as well as the largest province in the Dominion and was formerly known as Lower Canada. Its area is 594,434 square miles.

The surface is diversified. Except for a narrow strip along the Saint Lawrence river, the whole northern part of the province belongs to the Canadian shield with a drainage toward Hudson bay. To the south of the river rise the Notre Dame mountains, a continuation of the Appalachian system. Anticosti island may be regarded as a continuation of the Saint Lawrence lowlands. In the southern part, the soil is a rich loam, well adapted for grains and root crops. Forests overspread much of the province, particularly the northern section as far as the Barren Grounds, which extend over the northwestern extremity.

The climate of Quebec is continental in severity, partly on account of the influence of cold arctic currents and of winds blowing above them and passing over the land. The air is dry, clear, and bracing.

The mining industry of Quebec is confined mainly to the eastern townships and to the district along the Ottawa river. Asbestos is a distinctive product, Quebec supplying 80 per cent of the world's market. Other products are copper, gold, chromic iron, cement, magnesite, mica, graphite, apatite, marble, serpentine, roofing slates, and building stone. Iron ore is distributed throughout the province. More adequate prospecting of the great Laurentian plateau holds out promise of disclosing in Quebec mineral resources as rich as those which, in the same plateau, have served to make the mining interests of Ontario paramount in the Dominion.

The lumber industry has always been of great importance in Quebec, which contains millions of acres covered with commercial timber. The lumber and the pulp industry yield approximately the same returns as in Ontario.

Agriculture and dairying form the chief occupations. The principal crops are hay, oats, and potatoes. Quebec is a close second to Ontario in the production of creamery butter and of factory cheese. Cattle are exported to Europe. A typical Canadian industry, the making of maple sirup and of maple sugar, centers in this province.

The seacoast fisheries yield cod, mackerel, and lobsters as the principal items of the catch. Large amounts of salt fish are exported.

Quebec ranks second to Ontario as a manufacturing province. Wood pulp, timber products, machinery, cottons and woolens, refined sugar, leather, and boots and shoes are included among the principal manufactures. Hydroelectric power plants in operation in 1926 utilized 1,700,000 horse power. In the Saint Maurice river not far from Quebec City is installed one of the largest hydroelectric plants in the world. The available water power in Quebec exceeds that in any other province of Canada.

Elementary instruction is free. Catholics and Protestants have separate schools. There are three universities in the province and several agricultural, technical, and trade schools. The capital is Quebec. The largest city is Montreal, which is also one of the largest wheat shipping ports of the world, in spite of the fact that it is icebound during the winter.

Most of the people are descendants of early French settlers, and in most of the rural districts French is the language in common use. Roman Catholicism is the predominant religion. Population, 1921, 2,361,199.

Saskatchewan (*săs-kăch'ĕ-wŏn*). A province of Canada, situated in the south central part of the country between Manitoba and Alberta and extending from the international boundary about 750 miles north to latitude 60° N. The southern half belongs to the great central plains region; the northern portion is part of the Laurentian plateau. South of the North Saskatchewan and of the Saskatchewan river, the surface is prairie, but north of these rivers the province is heavily forested with spruce, pine, tamarack, poplar, and birch. The eastern portion of the prairie belongs to the second prairie steppe; the western section forms a part of the third steppe, which angles across the province and stretches in rolling plains through Alberta to the Rocky mountains. On the plains, the soil is a rich loam. Excepting for the southwestern section, the province is well watered with rivers and lakes, which are especially numerous in the Laurentian area, in the northern and central parts. The surface covers 251,700 square miles.

On account of Saskatchewan's great length, there is a considerable diversity of climate and of temperature. The southern third has a moderate and changeable climate. The western portion of this section is dry, being subject to the warm chinook winds, and requires irrigation; the eastern part has more moisture and a steadier winter. The central third has a steady winter and a greater precipitation. The climate of the northern region is of a continental severity.

Agriculture is the great, almost the exclusive, industry of Saskatchewan. In point of wheat production in Canada, the province holds the first place. Its fields are free from rust and from insect pests which attack wheat. In the production of oats and of flaxseed, Saskatchewan normally ranks first or near the first among the provinces. Mixed farming is increasing in the south. In the north, too, cattle raising is gradually giving place to mixed farming. Dairying is encouraged by the government, especially through the improvement of breeds of stock. Agricultural products are marketed by means of more than 6000 miles of railway, which have been constructed in the province. A government experimental farm, with headquarters at Indian Head, has performed valuable services in the agricultural development of Saskatchewan.

With the exception of certain beds of lignite coal, mineral deposits have not been developed. Manufacturing, too, has received little attention, the more profitable occupation of agriculture and of stock raising having absorbed the energies of the people. There are, however, many small manufacturing establishments that supply local demands. The forested areas of the north have been drawn upon to a considerable extent for timber, chiefly for use in making railway ties. At the head of the educational institutions, is the University of Saskatchewan, which has several affiliated colleges. The capital and largest city is Regina. Other cities of importance include Moosejaw, Prince Albert, and Saskatoon, the last-mentioned city being the seat of the provincial university. Population, 1921, 757,510.

Yukon. A territory in the northwest of Canada between British Columbia and the Arctic Ocean. Ranges of the Rocky Mountain system traverse the northeastern portion of the territory, and are separated by the Yukon River basin from the Coast range and the Saint Elias range in the southwest. The Yukon River basin is a plateau country with a general slope toward the northwest. In the extreme southwest, Mt. Logan, the highest peak in Canada, reaches an elevation of 19,850 feet. The area of the territory is 207,076 square miles.

Winter begins in October, and the ground remains frozen till late in April. The air is dry and healthful. In summer the days are long and warm, the thermometer sometimes registering 95° F. The rainfall of the plateau country averages about 15 inches yearly.

Steamers ply on the Yukon river from the Bering Sea to the railway terminal at White Horse. Forests cover much of the south and the east, the principal trees being spruce, balsam, poplar, birch, and black pine. Big game, as moose, caribou, mountain sheep, and bear, are abundant. The fur-bearing animals include lynxes, wolverenes, martens, and foxes.

Mining is the principal occupation, gold and silver being the chief products. From 1895 to 1926 the value of the gold output was $207,000,000. The annual yield has greatly diminished, causing a decline in population from 27,219 in 1901 to 4157 in 1921. The development of a rich silver district, however, has more recently caused a fresh influx of settlers.

A railroad connects White Horse on the upper Yukon with Skagway in Alaska. Some of the hardier crops, as barley, oats, rye, potatoes, and turnips, are grown, and, in sheltered valleys, peas, cabbages, lettuce, and other garden vegetables thrive. Dawson, in the west central section, is the capital of the territory and is the center of the Klondike gold region.

TWENTY-FIVE LARGEST CITIES OF CANADA

Showing Growth 1871–1921

City	Province	Population					
		1871	1881	1891	1901	1911	1921
Montreal	Quebec	115,000	155,238	219,216	328,172	490,504	618,506
Toronto	Ontario	59,000	96,196	181,215	209,892	381,833	521,893
Winnipeg	Manitoba	241	7,985	25,639	42,340	136,035	179,087
Vancouver	British Columbia	.....	.....	13,709	27,010	100,401	117,217
Hamilton	Ontario	26,880	36,661	48,959	52,634	81,969	114,151
Ottawa	Ontario	24,141	31,307	44,154	59,928	87,062	107,843
Quebec	Quebec	59,699	62,446	63,090	68,840	78,710	95,193
Calgary	Alberta	.....	.....	3,876	4,392	43,704	63,305
London	Ontario	18,000	26,266	31,977	37,976	46,300	60,959
Edmonton	Alberta	.....	.....	.....	4,176	31,064	58,821
Halifax	Nova Scotia	29,582	36,100	38,437	40,832	46,619	58,372
St. John	New Brunswick	41,325	41,353	39,179	40,711	42,511	47,166
Victoria	British Columbia	3,270	5,925	16,841	20,919	31,660	38,727
Windsor	Ontario	4,253	6,561	10,322	12,153	17,829	38,591
Regina	Saskatchewan	.....	.....	.....	2,249	30,213	34,432
Brantford	Ontario	8,107	9,616	12,753	16,619	23,132	29,440
Saskatoon	Saskatchewan	.....	.....	.....	113	12,004	25,739
Verdun	Quebec	.....	.....	296	1,898	11,629	25,001
Hull	Quebec	3,800	6,890	11,264	13,993	18,222	24,117
Sherbrooke	Quebec	4,432	7,227	10,110	11,765	16,405	23,515
Sydney	Nova Scotia	.....	1,480	2,427	9,909	17,723	22,545
Three Rivers	Quebec	7,570	8,670	8,334	9,981	13,691	22,367
Kitchener	Ontario	2,743	4,054	7,425	9,747	15,196	21,763
Kingston	Ontario	12,407	14,091	19,263	17,961	18,874	21,753
Sault Ste. Marie	Ontario	879	780	2,414	7,169	14,920	21,092

CITIES, TOWNS, AND OTHER POINTS OF INTEREST

From the point of view of the traveler, Canada may be divided into several districts, in each of which the various summer resorts and other points of interest may be visited conveniently on a single trip. The maritime provinces form one such region. The Saint Lawrence River district and the Great Lakes, including the Thousand islands and Niagara falls, constitute a second division. The Muskoka lakes and Georgian bay form a third. The prairie provinces are the fourth. The last, and in many respects the grandest, is the region of the mountains in Alberta and British Columbia.

The Maritime Provinces. Charlottetown in Prince Edward Island has attractive beaches on its harbor formed by three confluent tidal rivers. The beaches on the north shore of the island are famous.

Cape Breton island has an inland salt lake called Bras d'Or and, on the east coast, Louisburg, which recalls the French domination of Acadia. Nova Scotia preserves at Grand Pre, south of the Minas basin, the memory of the Acadian village immortalized by Longfellow. A short distance west is Wolfeville, a popular summer resort. Sixty-five miles farther by railroad is Annapolis, of interest as a summer resort and as one of the oldest towns in Canada, having been founded in 1604 under the name of Port Royal. The environs of the old fort have been formed into a national park under the name of Fort Anne. Thirty-six miles south by motor car brings one to the beautiful Kedgemakooge lake. Digby, situated at the entrance of a narrow inlet on the northwest coast, affords an opportunity for summer diversions to large numbers of summer residents. Smith's cove and Sandy cove in the vicinity are popular bathing beaches. Near the neck of Nova Scotia at Joggin Mines, not far from the head of Chignecto bay, are the famous fossil forests celebrated by geologists.

The interior of New Brunswick is covered with forests abounding in game and has a network of rivers from which salmon and trout may be caught in abundance. Near Saint John are the famous "reversing falls" and the Fort Howe national park. Off the southwest coast are Grand Manan island and Campobello island, which contain many beautiful summer homes.

The St. Lawrence and the Great Lakes. Going up the Saint Lawrence river, one sees such summer resorts as Metis, Rimouski, Bic, Cacouna, and Riviere du Loup on the south side and, on the north, above the mouth of the Saguenay river, Murray bay, often called the Newport of Canada. The gloomy grandeur of the Saguenay river and the beauty of Lake Saint John attract many visitors. The village of Sainte Anne de Beaupre, lying 20 miles east of Quebec City, has become famous as the "shrine of miracles." The whole region about Quebec has many points of historic interest. The Montmorency falls near Quebec and the Lachine rapids above Montreal are notable features of the district. The so-called Thousand islands, consisting of 1692 islands between Prescott and Kingston, form a veritable scenic wonderland. Many of these islands have been beautified at great expense. Fourteen of the islands with a mainland reservation have been constituted a national park and have been equipped with facilities for accommodating visitors and campers.

Numerous resorts are to be found on the shores of Lake Ontario and of Lake Erie, the more notable being the islands in front of Toronto harbor; Sunnyside, a pleasure ground of Toronto, elaborately equipped much after the fashion of Atlantic City; Grimsby beach, popular with the inhabitants of Hamilton; Crystal beach on Lake Erie, much frequented by the citizens of Buffalo; Port Stanley, south of London; and Rondeau park in Kent county. The point of greatest interest, however, is the Niagara falls. A magnificent hotel stands overlooking the Horseshoe falls, as the Canadian side of the cataract is called.

Muskoka and Georgian Bay. The part of Ontario lying between Lake Simcoe and Lake Nipissing and extending from the numerous islands of Georgian bay east as far as the Rideau river is extremely rich in beautiful scenery and possesses numerous facilities for providing summer residents and other visitors with the characteristic pleasures of a northern summer spent near the water.

A few of the larger summer resorts are to be found near Wiarton, Owen Sound, Meaford, Collingwood, Penetang, and Parry Sound on Georgian bay and, on the interior lakes of the Muskoka region, near Orillia, Lindsay, Bobcaygeon, Kawartha park, Lakefield, Point au Baril, and Bala, the last being a distributing point for summer supplies to the residents about Lake Muskoka, Lake Rosseau, and Lake Joseph. An area of more than 2000 square miles has been set aside by the government of Ontario to be preserved in its wild state under the name of Algonquin park.

The surface of this general region is rocky and wooded in part and is checkered by networks of rivers and lakes, which afford excellent opportunities for canoeing and for fishing. The islands in the various bodies of water may be numbered by the thousands. Many of the lakes have sandy beaches. Hunting in certain seasons is permitted in the northern part of the province.

The Prairie Region. The lakes in the railroad belt of the prairie provinces are popular as summer resorts. Kenora on the Lake of the Woods and Victoria beach and Winnipeg beach on Lake Winnipeg are much frequented by the inhabitants of Manitoba. Fort Garry, in Winnipeg, now surrounded by a small civic park, is a reminder of the days of the Riel rebellion. Last Mountain lake and Qu'Appelle lake in Saskatchewan are visited as summer resorts. Near Wainwright, Alberta, is situated Buffalo park, which has the world's largest herd of buffaloes.

Rocky Mountain Region. The Canadian part of the Cordilleran range contains some of the finest scenery in the world, largely made accessible through the enterprise of the government and of the railways.

Banff, picturesquely situated in Rocky Mountains national park on the eastern mountain slope, affords numerous forms of recreation and is in a district which presents such points of interest as the hot sulphur springs, Bow falls, many rocks of strange formation, and glacier fed lakes. The most beautiful of the lakes is Lake Louise, enclosed by gigantic pine-clad mountains. The Canadian Pacific château overlooks the lake, and trails lead up to the near-by glaciers and mountain peaks. A thousand feet above Lake Louise, lie Lake Agnes and Mirror lake, often called the lakes above the clouds. The Alpine clubhouse, situated in Banff, is the headquarters for the Canadian Alpine club. Banff also has a government museum. Yoho park adjoins the Rocky Mountains national park at the continental divide. At a distance of seven miles from Field, on the railway, is Lake Emerald.

Glacier national park lies among the Selkirk mountains. Its majestic peaks, great snowfields, and immense glaciers combine to form the most impressive alpine scenery. This park includes the remarkable Nakimu caves, extraordinary subterranean caverns caused by erosion. The roar of hidden cataracts resounds within their weirdly variegated walls of rock. Mount Revelstoke park is a smaller park at the summit of Mount Revelstoke, which affords an excellent panoramic view of the Columbia River valley.

North of the four parks mentioned, which are served by the Canadian Pacific railway, lies Jasper park, an area of 5300 square miles on the eastern mountain slope, situated about the pass traversed by the Canadian National railway. This picturesque and rugged district has many peaks, hitherto unscaled, and numerous yawning canyons. On the western side of the continental divide is Mount Robson, which reaches an altitude of 13,700 feet.

Brandon. A commercial and railway city of southwestern Manitoba. The city has a college affiliated with McMaster university at Toronto. A Dominion experimental farm and an Indian industrial school are located in the vicinity. Population, 1921, 15,397.

Brantford. A manufacturing city of southern Ontario, situated about 20 miles west of Lake Ontario's western extremity. One of the leading industries is the manufacture of agricultural implements. The provincial institute for the education of the blind is situated in the city. Alexander Graham Bell, the inventor of the telephone, resided near Brantford in 1870 and 1871. Population, 1921, 29,440.

Calgary (*kăl'gā-rĭ*). A commercial and railroad city in the southern part of Alberta, picturesquely situated at the junction of the Bow river and the Elbow river. It is the gateway to Banff and the Canadian Rockies, the mountains, 80 miles distant, being visible on clear days.

Calgary is the trading center of a large agricultural and grazing region. Within 40 miles of it are the Turner Valley oil and gas fields. Oil refining is an important industry. Among the city's manufactures are flour and cereal foods, meat packing products, metal wares, leather goods, and farm implements. Shops of the Canadian Pacific railway, located in the city, provide employment for large numbers of workers. Manufacturing industries utilize electric power developed from the Bow river.

The more imposing buildings are constructed of sandstone quarried in the vicinity. The city has an institute of technology and art. Calgary was incorporated as a city in 1894. Population, 1921, 63,305.

Charlottetown. The capital of Prince Edward Island, occupying a high site at the head of Hillsborough bay at the junction of three tidal rivers. The city has an excellent harbor. The fisheries are extensive. Manufacturing interests include iron founding, pork packing, lobster and oyster canning, and the manufacture of brooms. Charlottetown has two colleges and several fine public buildings.

The city was founded in 1756 by French settlers but passed to Great Britain with the cession of Canada in 1763. Two American privateers raided the town in 1775; but the property seized was returned, and the prisoners were restored to their homes by order of General Washington. Population, 1921, 11,202.

Cobalt. A mining town of Ontario, situated beside Lake Timiskaming on the upper Ottawa river. Cobalt is the center of one of the richest silver producing regions in the world. The world's supply of cobalt comes mainly from the district. Population, 1921, 4449.

Dawson. The capital of Yukon territory, located in the west central part of the territory on the Yukon river just below the Klondike. At the height of the Klondike's gold-mining prosperity, Dawson had a population of over 20,000; but, when the rich claims in the district were worked out, the number of inhabitants decreased greatly. The name commemorates Dr. G. M. Dawson, the geologist, who first reported on the gold prospects of the district.

Edmonton. The capital of Alberta, a commercial and railroad city lying in parklike country in the central part of the province, and occupying a picturesque site on the high banks of the North Saskatchewan river.

The city is served by thirteen lines of railway, and is a market and distributing point for a rich agricultural and grazing country in the vicinity and for the Peace River district to the north. Coal, found in abundance within the city and in the neighborhood, is utilized for manufacturing. The chief industries include meat packing, flour milling, and the manufacture of lumber and of clothing.

Edmonton is regularly laid out with wide streets crossing at right angles. The river is spanned by a bridge more than a mile long and 200 feet above the level of the water. The more imposing structures include the Parliament buildings, constructed of limestone quarried in the province, the Macdonald hotel, and the Arts and Medical buildings on the 250-acre campus of the University of Alberta. Population, 1921, 58,821.

Fort William. A transshipping point and flour milling city of northwestern Ontario, situated on Thunder bay in Lake Superior at the head of Canadian navigation in the Great Lakes. It is the Great Lakes terminal of Canada's transcontinental railway systems. The city has a storage capacity for more than 50 million bushels of grain. Along with Port Arthur, three miles distant, it is the most important grain shipping port in the world. It is also a large pulp and paper manufacturing center, being abundantly supplied with hydroelectric power. Population, 1921, 20,541.

Fredericton. The capital of New Brunswick, situated in the southwest part of the province at the head of navigation for large ships in the Saint John river, about 84 miles from its mouth. The leading industries include the manufacture of lumber, machine shop products, and boots and shoes. The chief edifices include the Parliament buildings, government house, and the legislative library. Fredericton is the seat of the University of New Brunswick. Population, 1921, 8114.

Halifax. The capital of Nova Scotia, located on a natural harbor at the center of the southeast coast of the province. Halifax is an important naval base, an ice-free port, and the winter terminus of several steamship lines. The Canadian National railways also use the city as their eastern terminus. The steamship and railway terminal facilities are among the finest on the continent.

The chief interests of Halifax include transportation and shipping, fisheries, and manufacturing. The foreign trade of the port normally approximates 140 million dollars in value. Fish cured in the city are extensively exported to the West Indies and to South America. The leading industries are car shop production, sugar refining, and the manufacture of leather goods and of textiles.

The northwest arm of the harbor is used as a pleasure resort by citizens of Halifax. The educational institutions include Dalhousie university, Presbyterian college, Technical college, and Holy Heart theological college. On December 6, 1917, a collision between two vessels, one loaded with ammunition, caused an explosion that destroyed the north part of the city, killing 1158 persons and injuring 4000 others. Population, 1921, 58,372.

Hamilton. A manufacturing and railroad city and port of southern Ontario, situated on Burlington bay, a natural harbor at the extreme western end of Lake Ontario. The Niagara escarpment, a height of land passing through the city, imparts a picturesque effect, which is further enhanced by the presence of numerous shade trees.

Hydroelectric power is available for industrial use from Decew falls and at Niagara falls. The value of Hamilton's industrial output entitles it to the rank of third among Canadian manufacturing cities. The chief manufactures include iron and steel products, agricultural implements, electrical equipment, glass, and textiles.

Hamilton has numerous parks, the finest of which are Dundurn, Gage, Victoria, and Gore. Hamilton beach, Grimsby beach, and many other summer resorts are located in the vicinity. The courthouse and the county buildings are among the finest in Canada. The educational institutions include a normal school and a technical school. Population, 1921, 114,151.

Hull. A lumber and manufacturing city of southwestern Quebec, on the Ottawa river opposite the city of Ottawa, with which Hull is connected by two bridges. Pulp wood, matches, paper, and other wood products are among the chief items of manufacture. The city has a fine park. Population, 1921, 24,117.

Kingston. A city of Ontario, situated at the northeastern extremity of Lake Ontario, where the waters of the lake enter the Saint Lawrence river. The city's manufactures include locomotives, textiles, flour, and leather goods. A natural harbor and excellent railway facilities make Kingston an important point for the transshipping of grain. The Rideau canal connects the city with Ottawa.

Kingston is the seat of Queen's university and of the Royal Military college. The university buildings on a beautiful campus, the Roman Catholic and the Anglican cathedral, the streets adorned with numerous shade trees, and several parks make Kingston an attractive city. Numerous limestone buildings give a characteristic effect to the architecture. The historic associations of the city are emphasized by the elaborate fortifications, including the fort and martello towers, which command the harbor and the entrance to the canal.

Kingston was founded in 1673 by Frontenac and La Salle and formed one of the chief French centers of authority and trade with the West. It became the center of loyalist settlements in the West after the Revolutionary War. It was a British naval and military base, until the treaty by which the United States and Great Britain abolished naval establishments on the lakes. From 1841 to 1844 Kingston was the capital of the United Provinces of Upper and Lower Canada. Population, 1921, 21,753.

Kitchener. A prosperous manufacturing city in Waterloo county, southern Ontario. The chief manufactures include furniture, rubber goods, and foundry products. The city is the seat of Saint Jerome college and has a large park. Kitchener was formerly called Berlin. Population, 1921, 21,763.

Klondike. A gold mining district in the Yukon Territory near the center of the Alaskan boundary. It covers an area of about 800 square miles. The principal settlement became notable for the discovery of gold there in 1896, since which time it has yielded about 207 million dollars worth of the metal.

London. A commercial, manufacturing, educational, and ecclesiastical center of southwestern Ontario. The city is situated midway between Toronto and Detroit in a rich agricultural district. The chief industrial interests include railway rolling stock, stoves, machinery, textiles, foodstuffs, electrical refrigerators, and household appliances. The city is the seat of the University of Western Ontario. London was founded in 1826. Population, 1921, 60,959.

Moncton. A manufacturing, railroad, and lumbering city of southeastern New Brunswick, standing at the head of navigation on the Petitcodiac river. Moncton is the headquarters for the Atlantic division of the Canadian National railways. The city has two parks. Population, 1921, 17,488.

Montreal. The largest city of Canada, situated in south central Quebec on Montreal island at the confluence of the Saint Lawrence river and the Ottawa river. Montreal stands at the head of ocean navigation, which is blocked above Montreal by the Lachine rapids. The rapids, however, in addition to falls situated in the vicinity, afford the means of an extensive development of hydroelectric power used for industrial and for other purposes.

Montreal is one of the largest grain shipping ports in the world, having elevators and terminal facilities of extraordinary magnitude. In total tonnage entered and cleared and in the value of its foreign trade, it ranks among the greatest ports on the American continent. The city is the headquarters of the Canadian transcontinental railways, which maintain enormous shops there. Montreal is also the financial center of Canada. The annual industrial output is approximately the same as that of Toronto, the two cities ranking first in the Dominion. The chief industries, in addition to car shop operations, include the refining of sugar and the manufacture of boots and shoes, flour, cement, tobacco, iron and steel products, textiles, furniture, and vehicles. The river at Montreal is spanned by several bridges, of which the Victoria bridge cost more than $6,000,000. A tunnel has been constructed by the Canadian National railway through Mount Royal.

Towering above the city is Mount Royal, reserved as a public park. The city has a number of public squares adorned with imposing monuments. Victoria square stands in the center of the city. Place d'Armes fronts several fine buildings, including the head office of the Bank of Montreal and the parish church of Notre Dame, the latter being one of the largest churches in America. On Dominion square is built the Catholic cathedral of Saint James, a modified reproduction of Saint Peter's at Rome

and having a dome which is a conspicuous feature of the city. Saint Helen's island is an attractive park.

Montreal is the seat of McGill university, Montreal university, and a number of colleges. A majority of the population is bilingual. About one-half the inhabitants are of French descent. The prevailing religion is Catholicism.

Montreal was founded in 1642 by Maisonneuve as a religious colony; but, as the outpost of civilization at the door of the Iroquois country, it became a military post, fur trading center, and base for explorations. Population, 1921, 618,506.

Moose Jaw. A commercial and manufacturing city of south central Saskatchewan, the center of a rich mixed farming district. The city has large stockyards. The industries include meat packing, flour milling, foundry production, and brick making. Population, 1921, 19,285.

New Westminster. A lumber and fishing city of southwestern British Columbia, situated on the Fraser river about 16 miles from its mouth. The city is the center of the salmon fisheries, numerous large canneries being located in the vicinity. Ocean ships ascend the river to New Westminster for cargoes of lumber, which is very extensively manufactured in the city. Population, 1921, 14,495.

Niagara Falls. A city of Ontario on the Niagara river beside the cataract. Hydroelectric power developed at and near the city totals about 1,000,000 horse power, half of which is provided by the Chippewa Power canal, opened in 1922. The city commands a magnificent view of the Horseshoe falls and the American falls from the beautiful provincial park, named after Queen Victoria. Seven trunk lines of railway converge to enter the United States. The chief manufactures include abrasives, cereals, insulators, and metal products. Population, 1921, 14,764.

Ottawa. The capital of Canada, lying in southeastern Ontario and picturesquely situated on the high southern bank of the Ottawa river about 120 miles above its mouth at Montreal. The river, following a winding course between wooded banks and dropping 40 feet at the magnificent Chaudiere falls, presents a beautiful view from Parliament Hill, upon which stand the Parliament buildings. The city is joined by a number of bridges with Hull, a prosperous industrial city, which is practically a suburb of Ottawa.

The Parliament building, including the legislative halls and the library, is an imposing structure in the Italian-Gothic style of architecture. Other notable buildings include the Cathedral of Notre Dame, Christ Church Cathedral, Rideau Hall, Victoria Museum, the Astronomical Observatory, and the Château Laurier, the last being a palatial hotel operated by the Canadian National railways. The educational institutions include the University of Ottawa and several colleges. The city has a number of fine parks connected by a driveway of more than 30 miles in length encircling the city.

Ottawa is one of the greatest lumbering centers of Canada. Hydroelectric power is provided in abundance by the Chaudiere falls and by other falls and rapids which, within a radius of 45 miles, serve to place about one million horse power at the disposal of the city's industries.

Ottawa was formerly called Bytown in honor of its founder, the engineer in charge of the construction of Rideau canal, which provides direct communication by water between the Ottawa river and Lake Ontario. The settlement was chartered as a city under the name of Ottawa in 1854 and was selected as the capital of Canada in 1858. Population, 1921, 107,843.

Port Arthur. A transshipping point and shipbuilding city of northwestern Ontario, on Lake Superior at the head of Canadian navigation on the Great Lakes. With Fort William it forms the greatest grain port in the world. Population, 1921, 14,886.

Prince Albert. A distributing point and commercial city of Central Saskatchewan, beautifully situated on the wooded banks of the North Saskatchewan river. The industries include meat packing, flour milling, and the operation of creameries. Population, 1921, 7558.

Prince Rupert. A seaport of west central British Columbia, situated on a natural harbor formed by an inlet of the Pacific Ocean. Prince Rupert forms the western terminus of the Canadian National railways and ships great quantities of halibut and of grain. Population, 1921, 6393.

Quebec. The capital of the province of Quebec, picturesquely situated on a bold promontory at the head of the Saint Lawrence estuary. The city was founded by Champlain in 1608 and was long the center of exploration and of government by the French in the northern part of the continent. In 1759, as a result of the battle of the Plains of Abraham, the city, along with the rest of French Canada, fell into the hands of the British. It was unsuccessfully attacked in 1775 by an American force under Montgomery.

The city's importance was due partly to its strong natural defenses and partly to its strategical position, which commanded the entrance to the river leading to the interior of the continent. Quebec is still the point of entry for immigrants from Europe and is the terminus of larger ocean liners. The chief industrial interests include iron castings, boots and shoes, woolens, lumber, and paper. Hydroelectric power is available from the Falls of Montmorency, seven miles distant. The Saint Lawrence river is crossed at Quebec by a bridge which has one of the longest spans in the world.

The appearance of Quebec reflects the history of the city. The highest point, Cape Diamond, is 333 feet above the river and is crowned by a citadel within a walled enclosure covering 40 acres. On these defensive works over 30 million dollars were spent in the early decades of the 19th century. The upper town, containing the citadel, is used as a residential district and has many of the finer churches and public buildings. It is reached from the other division of the city, called the lower town, by roads cut in the rock, by flights of steps, and by an elevator. The streets of the lower town are narrow and winding, and recall the appearance of certain provincial towns of France.

The city's most noteworthy edifices include the Parliament buildings; Château Frontenac; the church of Notre Dame des Victoires, built in 1688; the handsome Franciscan convent; the Ursuline convent, which contains the remains of Montcalm; the Anglican cathedral; and the Catholic cathedral built in 1647, which contained many valuable pictures and relics. The last-named building was burned in 1922 but steps were immediately taken to rebuild it. There are numerous statues and monuments of historic interest. In the governor's garden, stands a plain granite column erected to the memory of Wolfe and of Montcalm, both generals having fallen in action at the battle which decided the city's fate.

Quebec is the seat of Laval university, which was chartered by Queen Victoria and Pope Pius IX and is an outgrowth of the Grand Seminary founded in 1663. In the immediate vicinity are Battlefield park, Wolfe's cove, the Shrine of Sainte Anne de Beaupré, and many other points of interest. The city has a literary and historical society founded in 1824. The great majority of the population are of French descent, and the prevailing religion is Catholicism. Population, 1921, 95,193.

Regina. The capital and largest city of Saskatchewan, lying in the south central part of the province. Regina was formerly the capital of the Northwest Territories, and is still the headquarters of the Royal Canadian Mounted police.

Regina is the distributing point for a vast agricultural and stock raising territory and has an enormous trade in farming implements. Pork packing and oil refining are some of the city's industries. A district one mile long and one-half of a mile wide in the heart of the city has been reserved for wholesale houses and for manufacturing concerns.

Regina is regularly laid out with streets intersecting at right angles. There are several parks and recreation grounds, and four colleges. The finest structure is the Parliament building, erected at a cost of more than $2,000,000. Regina was founded in 1883. Population, 1921, 34,432.

Saint Boniface. A suburb of Winnipeg. Its cathedral is one of the most magnificent in Canada. The inhabitants are largely of French descent. Saint Boniface is the birthplace and burial place of Louis Riel. Population, 1921, 12,821.

Sainte Anne de Beaupre (*sănt ăn dĕ bō'prā'*). A village and famous pilgrim resort 20 miles east of Quebec. A shrine was founded there about 1620 by Breton sailors in gratitude to Sainte Anne for their escape from imminent shipwreck. A chapel was built in 1658, on which occasion a devout inhabitant of Beaupre who suffered from rheumatism, after laying three stones on the foundation, found himself cured. This occurrence was the first of many instances of miraculous healing credited to the saint at the shrine. In 1676 the chapel was superseded by a church, which was replaced by a much larger one in 1876. Sacred relics were brought to it, and it was made the repository for numerous bandages and crutches discarded by cured cripples. In 1922 the building was destroyed by fire, but the sacred relics were saved. Steps were immediately taken looking to the erection of a new church, which should be one of the finest in Canada. The shrine is annually visited by pilgrims numbering upward of 150,000.

Saint John. The largest city of New Brunswick, situated at the mouth of the Saint John river on the Bay of Fundy. In the vicinity is the noted "reversing falls," spanned by a steel arch bridge, the arch being among the longest of its kind. Saint John is the Atlantic terminus of the Canadian Pacific and Canadian National railways. Its harbor, owned by the Canadian government, is ice free and ample for the accommodation of the largest ships. It has one of the greatest dry docks in the world and handles a large grain and miscellaneous commerce. The manufactures include pulp, sugar, lumber, brushes, brass valves, boxes, nails, pottery, and cotton goods.

The customhouse is a remarkably fine edifice. The parks and public gardens cover more than 500 acres. The city was founded by United Empire Loyalists, who left the United States in 1783. Two years later the city received its charter of incorporation, which is the oldest in Canada. Saint John was also the first city in the Dominion to adopt the commission form of government. Population, 1921, 47,166.

Saskatoon (*săs'kà-tōōn'*). A commercial city and distributing point of Saskatchewan, situated on the Saskatchewan river about 200 miles south of the geographical center of the province. Saskatoon is the midwestern headquarters of the Canadian National railways. The industrial interests include flour, tractors, garments, and machine shop products. The city is the seat of the University of Saskatchewan, the Agricultural college, and the provincial experimental farm. Population, 1921, 25,739.

Sault Sainte Marie (*sōō' sânt mà-rē'*). A manufacturing city of Ontario, situated on the Saint Mary's river and on the Sault Sainte Marie canal. The city is connected with Sault Sainte Marie, Michigan, by a bridge one mile in length and by a ferry service. A power canal makes water power available for the city's industries, which include pulp and steel manufacturing, car shop operations, and lumber milling. Population, 1921, 21,092.

Sherbrooke. A manufacturing city of southeastern Quebec. Among the varied industries, the largest is the manufacture of woolens. Population, 1921, 23,515.

Sudbury. A mining town, situated north of Georgian bay. It is noted for its large mines that supply the bulk of the world's nickel. Population, 1921, 8621.

Sydney. A city in northeastern Nova Scotia, situated on a natural harbor to the east of Cape Breton island. Sydney is noted as a center for coal mining and for the manufacture of steel. Population, 1921, 22,545.

Thetford Mines. A mining town about 75 miles south of Quebec City, noted, along with Black lake in the vicinity, as a center of the district which produces most of the world's supply of commercial asbestos. Population, 1921, 7886.

Toronto. The capital and largest city of Ontario, situated on the northwestern shore of Lake Ontario. The city has a natural harbor, which in recent years has been greatly enlarged and improved. The city owns about 2000 acres of waterfront, largely reclaimed land.

As an industrial, railroad, financial, and commercial center, Toronto ranks with Montreal as the most important in Canada. The chief products of manufacture include lumber, agricultural implements, automobiles, car shop products, packed meats, and iron castings. The Toronto hydroelectric system is one of the largest municipal supply undertakings on the continent of America.

The city rises from the shore to an elevation of about 220 feet. This variation in level lends itself to the construction of many beautiful driveways and boulevards, connecting a large number of picturesque parks, the greatest of which is High park. Near this park at Sunnyside on the lake shore, the city has built a pleasure resort, which is among the most elaborate in America.

In Queen's park is situated the Parliament building, constructed of red sandstone in the Romanesque style of architecture. In the vicinity stand the numerous buildings of the University of Toronto, among which Hart House, built in the Norman style of architecture at a cost of about $1,500,000, is one of the finest university buildings on the continent. The city hall is a notable structure in the Renaissance style. Among numerous other beautiful buildings are University college, Osgoode Hall, Trinity college, an Anglican cathedral in the Early English style, a Catholic cathedral of the Gothic type, and the Timothy Eaton Memorial church.

Toronto's educational institutions are numerous. The University of Toronto consists of a large number of colleges and professional schools. Other institutions of learning and of art include McMaster university, the Royal Ontario Museum of Archeology, and an art gallery called the Grange. The main branch of the public library houses the valuable Robertson historical and ornithological collection.

An annual institution of note is the Toronto exhibition, held in the exhibition grounds, which are equipped for the purpose by many elaborate buildings. The visitors exceed one million in number yearly.

Toronto was founded in 1749 and, under the name of York, became the capital of Upper Canada in 1793. York was captured by the Americans in 1813. In 1834 the place was incorporated as a city under the name of Toronto, which is an Indian word for "place of meeting." Population, 1921, 521,893.

Vancouver. The largest city of British Columbia, situated at the southwest extremity of the mainland on Burrard inlet, a deep arm of the Strait of Georgia. The harbor is one of the finest on the globe and has helped to place Vancouver among the leading ports of the continent. Among its exports is grain consigned to Europe via the Panama canal. Vancouver is the western terminus of the Canadian Pacific railway and of the Canadian National railway. It is the commercial metropolis of British Columbia and the center of the great lumbering interests of the province. Other important industries include furniture making, sugar refining, fish and fruit canning, and jute manufacturing. There are large shipbuilding yards, foundries, and machine shops.

Vancouver's places of recreation include a number of bathing beaches and the magnificent Stanley park, a partly cleared forest area of 1000 acres situated on a cape and surrounded by a 9-mile driveway along the shore. Among the more noteworthy structures are the general hospital, the courthouse, and the Vancouver and Georgia hotels. The city is the seat of the University of British Columbia.

Vancouver was named after Capt. George Vancouver, a British naval officer, and was incorporated in 1886 with a population of 600. Population, 1921, 117,217.

Victoria. The capital of British Columbia, occupying the extreme southeastern point of Vancouver Island on the Strait of Juan de Fuca. Possessing a commodious harbor, and being advantageously located from a commercial standpoint, Victoria ranks as one of the four largest ports of Canada. Canadian Pacific steamers to Japan, China, and Australia make the city a port of call. Victoria's industrial establishments include lumber mills, furniture factories, iron foundries, boot and shoe factories, soap factories, chemical works, and salmon canneries. There is a large shipbuilding yard.

The city has fine streets with many beautiful residences, and its delightful climate and beautiful environment attract numerous summer visitors. Beacon Hill park is the city's chief recreation ground. The provincial Parliament buildings of gray stone are of high architectural merit. Adjoining Victoria is Esquimalt, the British naval base and dockyard now maintained by Canada.

Fort Victoria was erected on the present site of the city in 1843 as a trading post of the Hudson's Bay Company. The place was incorporated as Victoria in 1862 and became the capital of British Columbia in 1868. The inhabitants are predominantly of British birth or descent. Population, 1921, 38,727.

Windsor. A manufacturing city of southwestern Ontario, situated on the Detroit river opposite the city of Detroit. It is the largest of the so-called Border Cities which form one of the chief centers of the Canadian automobile industry. The other municipalities in the group are Riverside, Ford, Walkerville, and Sandwich. Population of Windsor, 1921, 38,591.

Winnipeg. The capital of Manitoba, located in the southern part of the province at the junction of the Red and the Assiniboine river. Winnipeg occupies, in respect to Canadian commerce, a strategic position, comparable to that of Chicago. All traffic passing between the eastern and the western part of Canada is routed through Winnipeg. The city is served by the Canadian transcontinental railways, by a number of American lines, and by many railroads radiating throughout the rich agricultural district in which it is situated. The car shops in the city are very extensive. The wholesale and mail order trade is enormous. The city is the largest cash grain market in the world. The live stock interests are also very important.

Winnipeg ranks among the leading manufacturing cities of Canada, partly by reason of the availability of cheap hydroelectric power, which is developed from the Winnipeg River rapids. Among the chief industrial products are flour, packed meats, agricultural implements, pulp, paper, and lumber.

The growth of Winnipeg has been very rapid. The city is well planned. Portage avenue, one of the chief business thoroughfares, is among the widest streets of the Dominion. There are several beautiful parks, of which the Fort Garry park has the greatest historic interest and City park, lying in a suburb and containing a zoological garden, is the largest. Winnipeg's water supply is brought by an aqueduct a distance of nearly 100 miles from a lake lying within the border of Ontario. Among a number of imposing buildings, including a fine Gothic cathedral, the outstanding structure is the provincial Parliament building, or capitol, constructed in the Greek style and surmounted by a beautiful dome. The cost was approximately $8,000,000.

Winnipeg is the seat of the University of Manitoba and of four colleges affiliated with the university. The institutions of higher education include also a law school and a medical school.

In 1733, on the site now occupied by Winnipeg, the French explorer, Verandrye, built Fort Rouge, a name now used to designate a favorite residential section of the city. In 1821, the Hudson's Bay Company built Fort Garry. The population in 1870 was 250. In 1873 the place was incorporated and the name was changed from Fort Garry to Winnipeg. Population, exclusive of suburbs, 1921, 179,087.

CITIES AND TOWNS IN CANADA HAVING A POPULATION UPWARDS OF 5000, CENSUS OF 1921

City or Town	Pop. 1921	% of Inc. 1911–21*	City or Town	Pop. 1921	% of Inc. 1911–21*	City or Town	Pop. 1921	% of Inc. 1911–21*
Amherst, N. S.	9,998	11.4	Levis, Que.	10,470	20.3	St. Catharines, Ont.	19,881	59.3
Barrie, Ont.	6,936	8.0	Lindsay, Ont.	7,620	9.4	St. Hyacinthe, Que.	10,859	10.8
Belleville, Ont.	12,206	23.6	London, Ont.	60,959	31.7	St. Jerome, Que.	5,491	58.1
Brandon, Man.	15,397	11.3	Magog, Que.	5,159	29.6	St. John, N. B.	47,166	11.0
Brantford, Ont.	29,440	27.3	Medicine Hat, Alta.	9,634	71.8	St. Johns, Que.	7,734	31.0
Brockville, Ont.	10,043	7.1	Midland, Ont.	7,016	50.5	St. Thomas, Ont.	16,026	14.0
Calgary, Alta.	63,305	44.9	Moncton, N. B.	17,488	54.2	Sarnia, Ont.	14,877	49.6
Campbellton, N. B.	5,570	45.9	Montreal, Que.	618,506	26.1	Saskatoon, Sask.	25,739	114.4
Cap de la Madeline, Que.	6,738	220.7	Moose Jaw, Sask.	19,285	39.5	Sault Ste. Marie, Ont.	21,092	41.4
Charlottetown & Royalty, P. E. I.	12,347	10.2	Nanaimo & suburbs, B. C.	9,088	9.4	Shawinigan Falls, Que.	10,625	149.1
Chatham, Ont.	13,256	23.1	Nelson, B. C.	5,230	16.8	Sherbrooke, Que.	23,515	43.3
Chicoutimi, Que.	8,937	52.0	New Glasgow, N. S.	8,974	40.6	Smith Falls, Ont.	6,790	6.6
Cobourg, Ont.	5,327	5.0	New Waterford, N. S.	5,615	†	Sorel, Que.	8,174	–2.9
Collingwood, Ont.	5,882	–17.0	New Westminster, B. C.	14,495	9.8	Springhill, N. S.	5,681	–.6
Cornwall, Ont.	7,419	12.4	Niagara Falls, Ont.	14,764	59.6	Stellarton, N. S.	5,312	35.9
Dartmouth, N. S.	7,899	56.2	North Bay, Ont.	10,692	38.2	Stratford, Ont.	16,094	24.3
Eastview, Ont.	5,324	68.0	North Sydney, N. S.	6,585	21.5	Sudbury, Ont.	8,621	107.7
Edmonton, Alta.	58,821	89.4	North Vancouver, B. C.	7,652	–6.6	Sydney, N. S.	22,545	27.2
Ford City, Ont.	5,870	†	Orillia, Ont.	8,774	28.5	Sydney Mines, N. S.	8,327	11.5
Fort William, Ont.	20,541	24.5	Oshawa, Ont.	11,940	60.6	Thetford Mines, Que.	7,886	8.6
Fredericton, N. B.	8,114	12.6	Ottawa, Ont.	107,843	23.9	Three Rivers, Que.	22,367	63.4
Galt, Ont.	13,216	28.3	Outremont, Que.	13,249	174.9	Toronto, Ont.	521,893	36.7
Glace Bay, N. S.	17,007	26.9	Owen Sound, Ont.	12,190	–2.9	Trenton, Ont.	5,902	48.0
Granby, Que.	6,785	42.8	Pembroke, Ont.	7,875	40.0	Truro, N. S.	7,562	23.8
Grand' Mere, Que.	7,631	59.5	Peterborough, Ont.	20,994	14.3	Valleyfield, Que.	9,215	–2.5
Guelph, Ont.	18,128	19.5	Portage la Prairie, Man.	6,766	14.8	Vancouver, B. C.	117,217	16.7
Halifax, N. S.	58,372	25.2	Port Arthur, Ont.	14,886	32.7	Verdun, Que.	25,001	115.0
Hamilton, Ont.	114,151	39.3	Preston, Ont.	5,423	39.7	Victoria, B. C.	38,727	22.3
Hawkesbury, Ont.	5,544	26.0	Prince Albert, Sask.	7,558	20.9	Walkerville, Ont.	7,059	113.8
Hull, Que.	24,117	32.4	Prince Rupert, B. C.	6,393	52.8	Waterloo, Ont.	5,883	35.0
Ingersoll, Ont.	5,150	8.1	Quebec, Que.	95,193	20.9	Welland, Ont.	8,654	62.7
Joliette, Que.	9,113	43.6	Regina, Sask.	34,432	14.0	Westmount, Que.	17,593	20.7
Kenora, Ont.	5,407	–12.2	Riviere du Loup, Que.	7,703	13.7	Windsor, Ont.	38,591	116.5
Kingston, Ont.	21,753	15.3	St. Boniface, Man.	12,821	71.3	Winnipeg, Man.	179,087	31.6
Kitchener, Ont.	21,763	43.2				Woodstock, Ont.	9,935	6.6
Lachine, Que.	15,404	31.8				Yarmouth, N. S.	7,073	7.2
La Tuque, Que.	5,603	91.0				Yorkton, Sask.	5,151	123.1
Lethbridge, Alta.	11,097	22.8						

* A minus sign denotes decrease. † No census figures for 1911.

NEWFOUNDLAND

A British dominion, consisting of the island of Newfoundland, lying across the mouth of the Gulf of Saint Lawrence, and a portion of the Labrador peninsula. Being situated 1640 miles west of Ireland, Newfoundland commands the shortest route from North America to Europe.

Contour. The island has an area of 42,734 square miles. In form it resembles a triangle with approximately equal sides of about 325 miles in length. The coasts are, in general, high and rocky, indented by innumerable fiords. Newfoundland's Labrador territory covers about 232,400 square miles, comprising the land draining into the Atlantic. Of this, 112,400 square miles came to Newfoundland in 1927 through the favorable outcome of a boundary dispute. Its value lies in the coast fisheries, in pulpwood, and in potential hydro-electric development.

Surface and Climate. The interior of Newfoundland is an undulating plain, interrupted by a few isolated peaks and rising on the northwest to a ridge of hills, called Long range. From this ridge eastward flows Exploits river, the country's longest stream. The Humber river has cut its way westward through Long range and flows into the Gulf of Saint Lawrence. The rivers are not navigable.

The climate is subject to less extreme variations of temperature than those occurring in any part of the interior of Canada. The mean temperature is lowered by the proximity of the arctic current, which brings melting icebergs from the north and occasions dense fogs along the coasts.

Flora and Fauna. Large portions of the island consist of marshes and of rocky soil supporting lichens and low shrubs of pine and of larch. The river valleys, however, contain large tracts of arable land and extensive areas heavily forested with conifers, birch, and red maple. The wild animals include the black bear, the wolf, the beaver, the deer, and the fox. The Newfoundland dog was developed by a cross between European species and a woolly-coated dog used by the Indians of Labrador.

Industries. Nearly seven-eighths of Newfoundland's population is supported by the fisheries. Three-quarters of the exports in 1920 were codfish products. Herring, lobsters, and seals are also obtained.

The most important manufactures are pulp and paper, which are exported mainly to England. A very small fraction of the arable land is cultivated, in spite of the steps taken by the government to encourage agriculture. The chief crops are potatoes and turnips. Iron and copper are mined.

Inhabitants. The population of Newfoundland in 1920 was 259,358, concentrated mainly in the coast region of the southeast. Labrador had, in 1919, a population of 3647, mostly Indians. Nearly all the inhabitants of the island are of British descent, and the majority are Protestants. The schools are denominational, the school funds being divided according to the number of pupils of each denomination. Higher education is provided by four colleges. The unit of currency is the dollar.

The government has its seat in Saint Johns, the metropolis and chief port of the country. The city, lying in the southeastern extremity of the island, is picturesquely located on a landlocked harbor accessible through a narrow passage between high, rocky cliffs. The fishing, industrial, and educational interests of Newfoundland center in the city. The population of Saint Johns in 1921 was 37,047.

MEXICO

A federal republic of North America, lying south of the United States and extending southeast to Guatemala. The outline of the country resembles a cornucopia modified by two irregularities,—the peninsula of Yucatan in the southeast and the peninsula of Lower California in the northwest. Its area is 765,623 square miles, about half of which is in the Torrid Zone. Its maximum length is over 1900 miles, and its width varies from 1833 miles, along the northern boundary, to 134 miles, at the Isthmus of Tehuantepec. The coast line on the Gulf of Mexico and the Caribbean Sea measures 1727 miles, while the coast line on the Pacific Ocean and on the Gulf of California has a total length of 4574 miles.

Surface and Drainage. The greater part of Mexico consists of a central plateau, called the *tierras templadas*, having an elevation of from 3000 to 8000 feet. It is flanked on the east by a high range of mountains called the Sierra Madre Oriental. At the Isthmus of Tehuantepec, this range converges with the Sierra Madre Occidental, which flanks the central plateau on the west. The mountains of the Isthmus of Tehuantepec belong to the Central American system. The lofty areas above an altitude of 8000 feet are known as the *tierras frias*. On each side of the country, lowlands, or *tierras calientes*, form a fringe between the coast and the mountain range. The peninsula of Yucatan is, for the most part, a low, sandy plain. Lower California is mountainous and consists of a southern extension of the Sierra Nevada range.

The central plateau is of volcanic origin and the sierras contain a large number of volcanoes. The highest, Orizaba, has not been active since the 16th century. Its elevation is 18,250 feet. Popocatepetl, "Smoky Mountain," and Iztaccihuatl, "White Woman," are extinct. Violent earthquakes are frequent. In 1920, in the Orizaba Volcano district, about 3000 people were killed by seismic disturbances and ten towns were partially or wholly destroyed.

The drainage system of Mexico is simple. The central plateau has a number of lakes but no large rivers. Several short streams flow from the mountain ranges into the sea. The Rio Grande, on the northern border, receives little water from the Mexican side. No river of Mexico is navigable throughout the year.

Climate and Flora. The *tierras calientes*, on the east, being subject to great heat and a heavy rainfall, are unhealthful. They support a luxuriant tropical vegetation. The banana, coconut, pineapple, pomegranate, vanilla, cacao, and ginger are produced in abundance. Sisal hemp is grown in Yucatan and is exported in large quantities to the United States to be used in the manufacture of rope. Mexico's forest areas, which are estimated to cover 44 million acres, are mainly in the lowlands. Mahogany, ebony, rosewood, and rubber are among the more valuable products of the tropical forests. The Pacific lowlands are arid in the north but have a more copious rainfall in the south.

The plateau has a temperate climate and is well adapted for the cultivation of cotton, tobacco, coffee, rice, sugar cane, corn, wheat, and potatoes. The rainfall in general is light but varies considerably in different parts. The north portion is dry; the cactus appears as a characteristic plant, and irrigation is necessary for successful agriculture. In some parts, however, two or three crops a year may be raised. The forest areas of the plateau contain oak, myrtle, fir, spruce, and pine. The higher mountain regions support an alpine flora.

Animal Life. The lowlands are the habitat of monkeys, pumas, jaguars, ocelots, sloths, armadillos, parrots, parrakeets, humming birds, alligators, venomous snakes, and many other animals characteristic of a tropical fauna. The wolf, coyote, otter, and deer are found in the central plateau.

Minerals and Mining. The mineral resources of Mexico make her potentially one of the richest countries in the world. Mining is the chief industry, and petroleum is the chief product, 163 million barrels having been obtained in 1920. Gold, silver, copper, lead, zinc, antimony, tungsten, molybdenum, mercury, and opals are exported. It is estimated that Mexican mines have yielded three billion dollars worth of silver. The country ranks next to the United States as the world's greatest copper producing country. Near the city of Durango is a large hill, the Cerro de Mercado, composed almost entirely of pure iron ore. Lack of transportation facilities and of adequate capital has retarded the exploitation of these vast mineral deposits.

Other Industries. The agricultural methods employed in Mexico are primitive. About two-thirds of the 30 million acres under cultivation require irrigation. The normal annual production of the largest crop, corn, is about 100 million bushels. The agave is cultivated for its fibers, used in rope making, and for its leaves, with which houses are thatched. The area employed for grazing purposes is about four times that devoted to agriculture. Many tropical fruits are grown on plantations, including oranges, alligator pears, custard apples, and chichopoxtle, the last being a new fruit yielding a valuable lubricating oil. Manufacturing is increasing. Mexican tobacco products are exported, but textiles, hardware, and most other industrial products are imported. The country has over 9000 miles of railway. The chief ports are Vera Cruz and Tampico, both on the Gulf of Mexico.

Inhabitants. The population of Mexico is 14,278,574. Of this number about half are mestizos and the rest are pure Indians and whites, the latter mainly of Spanish descent. The language is Spanish, and the prevailing religion is Roman Catholicism. Elementary education is free and compulsory. The chief cities, in addition to those described below, include Monterrey (88,454), Leon (53,633), Torreon (50,902), Aguascalientes (48,014), and Saltillo (40,451). The country is divided into 28 states, 2 territories, and 1 federal district, the areas and populations of which are given in the following table:

MEXICO

States and Territories	Area Square Miles	Population 1921
Aguascalientes	2,969	107,581
Campeche	18,089	70,830
Chiapas	27,527	421,890
Chihuahua	90,036	401,649
Coahuila	63,786	394,341
Colima	2,272	91,848
Durango	42,272	336,561
Federal District	578	906,063
Guanajuato	10,950	863,683
Guerrero	25,279	561,382
Hidalgo	8,637	627,991
Jalisco	33,492	1,199,325
Lower California	58,338	69,160
Mexico	9,230	876,576
Michoacan	22,621	935,561
Morelos	1,895	103,959
Nayarit	10,953	147,048
Nuevo Leon	25,032	334,680
Oaxaca	35,689	991,103
Puebla	12,992	1,024,492
Queretaro	4,493	221,557
Quintana Roo	19,270	10,966
San Luis Potosi	24,004	446,588
Sinaloa	27,557	342,561
Sonora	76,633	277,718
Tabasco	10,374	178,389
Tamaulipas	30,831	287,957
Tlaxcala	1,534	178,615
Veracruz	27,880	1,169,559
Yucatan	15,939	324,408
Zacatecas	24,471	373,356
Marian Islands	. . . . .	677
	765,623	14,278,574

Guadalajara (*gwä'тнä-lä-hä'rä*). The second largest city of Mexico, situated about 150 miles inland from the center of the country's Pacific coast. The climate is agreeable, the range of the temperature being limited to a few degrees. Guadalajara is an important mining center. The large waterfall of Juanacatlan near by furnishes electric power for street railroads, city lighting, and manufacturing. Among the manufactures are cotton goods, art pottery, tiles, leather articles, and cordage.

The city is well built and has spacious streets and several large parks embellished with fountains and statues. The principal building, the cathedral, noted for its ornamentation and magnificent interior, contains one of Murillo's masterpieces. Aqueducts, eight miles long, bring water to the city. In 1912 an earthquake rendered homeless 10,000 of the inhabitants. Population, about 120,000.

Mexico. The capital and largest city of Mexico. It is situated somewhat southeast of the geographic center of the country at an elevation of 7415 feet. Majestic, snow-crowned mountains encircle the city, presenting a scene of surpassing grandeur. The climate is delightful; the air is dry, and the range of temperature seldom exceeds 15°, the average for the year being about 58° F.

Mexico City is the social, literary, financial, and industrial center of the country. Manufactures include textiles, leather, boots and shoes, tobacco products, and furniture. There is a large colony of Americans in the capital.

The city is regularly laid out with wide, well paved streets, shaded boulevards, numerous parks and driveways embellished with statues and monuments, and several ornate squares, the largest of which is the Plaza Mayor. Fronting this square is the great cathedral, a magnificent structure in the Spanish Renaissance type of architecture. Its foundations were laid in 1573 on the site of an Aztec temple. A splendid national museum contains numerous priceless relics of the Aztec civilization. Three miles outside the city is the executive mansion, Chapultepec castle, situated on a hill which has a monument commemorating those who, in 1848, gave their lives in its defense against the American army of invasion. Twelve miles south of the city stands San Cuicuilco, a lava hill from which was excavated a circular mound made by a prehistoric race. The mound, which is constructed of unhewn lava blocks, is estimated to be from 2000 to 7000 years old. It is 52 feet in height and has a diameter of 420 feet at the base.

The houses of Mexico City are, for the most part, of one story, being in an area liable to earthquake shocks. In 1629, 30,000 inhabitants of the city were drowned by a flood due to the overflow of Lake Tezcuco in the vicinity. To prevent a recurrence of the disaster, a tunnel six miles long was built to carry off the surplus water of the lake and discharge it into a 43-mile canal connecting with a river of the Gulf drainage system. Mexico City was founded by Cortés in 1521 on the site of the Aztec town Tenochtitlan, which had been destroyed by the Spaniards. Population, 1921, 615,367.

Puebla (*pwä'blä*). An important city of Mexico, situated in the vicinity of several of the highest mountains in the country about 60 miles southeast of Mexico City. The city has extensive cotton manufacturing interests. Onyx articles, made from the stone quarried near by, form an important article of export.

The city is well built and has all modern improvements. Besides several professional schools, there are three libraries, an imposing cathedral of Spanish architecture, an art gallery, a museum, an observatory, and many other institutions of note. A short distance from the city are the famous mineral springs of Tehuacan and the prehistoric pyramid of Cholula. The city was founded by the Franciscans in 1532. It was captured by the Americans in 1847 and was taken by the French in 1863. Population, 1921, 95,535.

Tampico (*tăm-pē'kō*). The second largest port of Mexico, occupying a low, unhealthful site on the Panuco river near its mouth in the Gulf of Mexico. Petroleum is produced in large quantities in the vicinity and forms the chief article of export. Ores, hides, wood, wool, and hemp are also exported; manufactured goods, mainly from the United States, are imported. Population, about 36,000.

Vera Cruz. The most important seaport of Mexico, situated on the Bay of Campeche, an arm of the Gulf of Mexico. An enervating climate and the prevalence of yellow fever once gave Vera Cruz the name of the City of the Dead. Modern sanitation measures, however, have completely transformed living conditions.

Twenty-five million dollars have been spent on the improvement of the harbor. On a reef near its entrance stands the fortress of San Juan de Ulua. The exports consist chiefly of ore, chicle, dyewoods, and hides, and the imports include textiles, hardware, and other manufactured goods. Fishing is carried on extensively, and there is a considerable manufacturing industry. The city was held several months in 1914 by forces of the United States government. Population, 1921, 54,225.

CENTRAL AMERICA

A geographical term used to designate the neck of land which connects North America and South America. It stretches in a southeast and northwest direction, lies entirely within the Torrid Zone, and comprises the area between the Isthmus of Tehuantepec, in southern Mexico, on the north, and the Isthmus of Panama, immediately north of Colombia, in the south. Its area is approximately 200,000 square miles. Its width varies from about 30 miles at the Isthmus of Panama to 450 miles in southern Mexico.

Surface. The southwestern coast of Central America is skirted by a broken chain of mountains, which reach a maximum elevation of 13,000 feet. Their formation is distinct from that of the Rocky mountains and of the Andes range. Volcanic eruptions and violent earthquakes are very frequent. The largest interruption of the mountainous highlands is the basin of Lake Nicaragua, which has a water area in excess of 3500 square miles. The northeastern side of the isthmus slopes gradually toward the sea and has a fertile and well watered soil.

Climate and Flora. The climate varies, according to elevation, from a tropical heat to an arctic rigor. The lava areas are extremely fertile and, where the climate is favorable, produce coffee, sugar, corn, pineapple, bananas, and other products of tropical agriculture. The forests of the lowland are rich in dyewoods and valuable cabinet woods. The higher districts have a characteristic temperate-zone and alpine flora.

Inhabitants. The total population is estimated at more than 5,500,000, mostly of Indian and Spanish blood. The majority live on the southwestern coastal area. Agriculture is the chief occupation, although vast mineral and forest resources await development. Textiles and other manufactured goods are imported. More than 80 per cent of the trade is with the United States. Few good roads exist. There are in operation, however, three interoceanic railways. Furthermore, an intercontinental or Pan-American railway is projected, which would connect the United States with Colombia.

Politically, Central America comprises the countries lying between Mexico and Colombia. Apart from the Panama Canal Zone and the crown colony of British Honduras, they consist of six independent republics—Guatemala, Honduras, Salvador, Nicaragua, Costa Rica, and Panama. Roman Catholicism is the prevailing religion and Spanish is the common language. The general level of education is low, and the inhabitants are not characterized by the energy noticeable among most temperate zone peoples.

British Honduras (*hŏn-dōō'răs*). A British crown colony in Central America, bordering on the Caribbean Sea, Mexico, and Guatemala. Its area is 8592 square miles. Most of the surface is covered with tropical forests yielding mahogany, chicle, and logwood. Bananas and coconuts are also exported in considerable quantities. The coast is low, marshy, and unhealthful. The population in 1921 was 45,317, of which about 2 per cent were white, the remainder being chiefly of negro and Indian blood. The capital is Belize. The control of the colony was long disputed by Spain and was not finally secured by Great Britain until 1836.

Costa Rica (*kŏs'tà rē'kà*). A country occupying the section of Central America between Nicaragua and Panama. The area is about 23,000 square miles, a large part of which is an irregular table-land in which some mountain peaks attain an altitude of more than 10,000 feet. Many mountains are volcanic and have caused a considerable loss of life.

Coffee is the staple product of the subtropical plateau, but cacao, tobacco, and sugar are also

grown and exported. Costa Rica is one of the chief banana producing countries of the world. The fruit is grown extensively in the hot, tropical lowlands, from which also a considerable amount of hardwood and rubber are obtained. The industry second in importance is mining, the chief minerals being gold, silver, and manganese. Live stock is raised in the elevated regions.

The population in 1920 was 468,373, of whom a large proportion were of Spanish origin. The people are industrious and claim to have more school teachers than soldiers. The capital is San Jose. The name of the country means rich coast and was given to the district in 1502 by Christopher Columbus.

Guatemala (*gwä'tä-mä'lä*). The second largest and the most populous country of Central America, lying between Mexico and the republic of Honduras. Its area is 48,290 square miles. A mountain ridge, which includes a number of volcanoes, divides the long eastern slope from the narrower but more thickly populated Pacific drainage area. Lake Peten, in the northern part of the country, is noted for being the habitat of 30 species of fish not found elsewhere.

The hot lowlands in the north and east are unhealthful but produce large crops of cacao, sugar cane, and bananas. The dense forests of the valleys yield valuable hardwoods, chicle, and rubber. The staple export of the country, however, is coffee, grown principally on the rich, volcanic soil of the plateau and the western slope. Two annual crops of wheat and three of corn are raised in this district. At the higher altitudes, apples and potatoes are grown and many cattle are raised.

The population of Guatemala is 2,004,900, more than half of whom are pure Indians. The owners of the coffee plantations are in large part Germans. Guatemala is the capital and lies on the interoceanic railway which connects Punto Barrios, the port on the Gulf of Honduras, with San Jose and other ports on the Pacific coast.

Honduras. A country of Central America, lying between Guatemala and Nicaragua, with a coast line of 400 miles on the Caribbean Sea. The southwestern boundary is Salvador and the Gulf of Fonseca, an inlet of the Pacific Ocean. The surface covers 44,275 square miles, the greater part of which is a plateau ranging in elevation from 5000 to 10,000 feet.

The hot, malarial coastal region produces the bulk of the country's staple export—bananas. Coconuts are grown there also, and, farther inland, large crops of sugar, tobacco, and coffee are produced. Corn is cultivated as the chief article of domestic consumption. Stock raising is one of the principal industries. The dense forests of the coast area and of the valleys yield rubber, dyewoods, and medicinal plants. Cigars and Panama hats are manufactured for export.

The mineral resources of the country are extensive but are little developed. The total length of railways does not exceed 500 miles. The capital, Tegucigalpa, is the only seat of national government in the western hemisphere which is not connected with its port by railroad.

The population of the country is 662,422. A region in the eastern portion of the country, called La Mosquita, is still unexplored, and the uncivilized natives speak a language of their own.

Nicaragua (*nĭk'ä-rä'gwä*). The largest country of Central America, situated at the center of the intercontinental neck. Its surface is mountainous in the northern and western part, where there are several volcanoes. The eastern section is low, and, in the south, there is a depression forming the basin of Lake Nicaragua, Central America's largest inland body of water. The area of the country is 51,660 square miles.

Most of the population is found in the fertile, volcanic valleys of the uplands on the western side of the country. The chief agricultural products are coffee and corn. Cattle are raised and the export of hides is a considerable item in the foreign trade. Bananas, cacao, cotton, tobacco, and rice are cultivated in the lowlands. Forest industries rank second in importance, timber, dyewoods, gums, oils, fibers, and rubber being obtained on both coasts of the country. Gold and silver are mined. The chief manufactures are Panama hats and cigars.

The population of Nicaragua in 1920 was 638,119, composed almost entirely of Indians, mestizos, and Negroes. The capital is Managua, and the largest city is Leon. The Pacific Coast ports of Corinto and San Juan del Sur handle most of the foreign trade. In 1916 the United States purchased from Nicaragua the right to build an interoceanic canal through the country.

Panama (*păn'ä-mä'*). The most eastern country of Central America, stretching from Costa Rica about 480 miles east to Colombia. It occupies the narrowest part of the intercontinental neck and is divided into two parts by the Panama Canal Zone, ten miles in width, which belongs to the United States. The area of the country is 32,380 square miles.

Panama is traversed by two broken mountain chains, which are overgrown with dense forests containing rubber trees and valuable hardwoods. Bananas and coconuts are produced in the hot lowlands, and sugar cane, coffee, cacao, and tobacco are grown at higher altitudes. A considerable number of cattle are raised, and hides form a valuable article of export.

The population of Panama, exclusive of the Canal Zone, is 434,208. The city of Panama, which is the seat of government, is located in the Canal Zone, without, however, being politically a part of it. Having its independence guaranteed by the United States, Panama is relieved of the burden of supporting an army or a navy.

Panama Canal Zone. A strip of land ten miles in width, through the center of which runs the Panama canal. The Canal Zone divides the Republic of Panama into two parts.

The zone was obtained in 1903 from the Republic of Panama for the sum of ten million dollars with an annual rental of $250,000. Its affairs are administered by a commission appointed by the United States government. A railroad connects the two terminals of the canal—Balboa, the Pacific port, and Cristobal, on the Caribbean sea. Population, 1920, 22,858. See *Panama Canal.*

Salvador. The smallest but, next to Guatemala, the most populous republic of Central America, situated southwest of Honduras with a coast line on the Pacific Ocean. Its area is 13,176 square miles.

There is a level coastal strip which rises, farther inland, to a mountainous plateau containing a number of active volcanoes. One of these, called the Izalco, or "lighthouse," began to rise from the plateau about a century ago and, by means of its own lava, has reached the height of a mile. San Salvador, the capital of the country, has been destroyed three times by eruptions of the volcanic mountain bearing the same name.

The volcanic area is extremely fertile and produces large crops of coffee, sugar, tobacco, and cacao. Rubber, balsam, and hardwoods are the principal forest products sent abroad. Cattle are raised extensively and hides are exported. The more important minerals obtained include gold and silver.

The population is estimated at 1,526,000. The chief seaports, La Libertad and Acajutla, are connected with the capital by a section of the republic's 300 miles of railway.

Belize (*bĕ-lēz'*). The capital and chief seaport of British Honduras, situated at the mouth of the Belize river near the center of the colony's seacoast. The climate is hot and unhealthful. The exports go mainly to the United States and consist chiefly of mahogany, chicle, logwood, and bananas. Population, 1921, 12,661.

Guatemala. The capital of the country of the same name. Guatemala is an inland commercial city, situated in the southern part of the country about 85 miles from the Pacific coast on a plateau 5000 feet above the sea. A large part of its trade is in coffee. The city has various professional schools, a university, and a cathedral, which is the seat of the archbishop of all Central America, except Panama. Guatemala has been destroyed three times by earthquakes, most recently in 1917. Population, 1921, 91,330.

Leon (*lā-ōn'*). The metropolis of Nicaragua and formerly its capital, situated about 15 miles from the coast in the western portion of the country. It has an admirable cathedral built in the Renaissance style, and is the seat of a university. Population, 38,318.

Managua (*mä-nä'gwä*). The capital and second city of Nicaragua, situated about 25 miles inland from the center of the state's Pacific coast line. It is a commercial center for the marketing of coffee grown in the region. The city is the seat of the Central University of Nicaragua. The low houses are a reminder that the city lies in an area subject to violent earthquakes. Population, 1920, 27,839.

Panama. The capital of the Republic of Panama, situated at the head of Panama bay near the southern terminus of the Panama canal. Geographically, Panama is located in the Panama Canal Zone, but politically it is a part of the Republic of Panama. The United States government, however, was authorized in 1903 to carry out improvements in sanitation.

Panama, founded by Pedro Arias in 1519, was one of the first European settlements in the western hemisphere. It was long the capital and Pacific metropolis of Spain's vast possessions in America. Population, 1920, 66,851.

San Jose (*sän hō-sā'*). The capital of Costa Rica, situated in a rich coffee growing region. The city is regularly built and has broad streets, fronted for the most part by one-story brick houses. The principal buildings include the national palace, the university, and the national theater, the last erected in the style of the Library of Congress at a cost of about $1,000,000. Population, 1920, 38,930.

San Salvador. The capital and largest city of Salvador, situated in a fertile valley about 25 miles from the coast. It is about three miles from the volcano of San Salvador, which destroyed most of the city in 1919. The houses are surrounded by open ground and are built low in order to minimize the danger during possible earthquakes. The city carries on an active trade in tobacco, and other products of the region. It has a university, a national library, and a fine botanical garden. Salvador is one of the oldest settlements of the western hemisphere, being founded in 1528 by Alvarado. Population, 80,900.

Tegucigalpa (*tā-gōō'sē-gäl'pä*) The capital of Honduras, situated in the southern part of the country about 50 miles from San Lorenzo, its port on the Gulf of Fonseca. It has no railway communication with other cities. The agricultural and mining interests of the surrounding region center in the city, which is also the seat of a national university and of several colleges. Tegucigalpa was formerly an Aztec city. It was made the capital of Honduras in 1880. Population, 1920, 38,950.

THE WEST INDIES

A large group of islands lying between North America and South America and forming the barrier between the Atlantic Ocean and the Caribbean Sea. They stretch in a great curve from Florida east and south to the mouth of the Orinoco river in Venezuela. Their total area is about 92,000 square miles, and they support a population slightly in excess of six million. Most of the islands are rocky. They receive copious rain, brought principally in the summer by the northeast trade winds, which at times develop into destructive hurricanes.

The largest island is Cuba, which, like the two republics on the island of Haiti, is an independent country. Porto Rico belongs to the United States. The other islands are dependencies of European countries. Most of them owe allegiance to Great Britain and are customarily described by the term British West Indies. The Netherlands and France control the remainder. Some distance to the north of the West Indies lie the Bermuda islands, which are possessions of Great Britain.

Cuba, Haiti, Jamaica, and Porto Rico are sometimes referred to as the Greater Antilles, and the other West India islands, except the Bahamas, as the Lesser Antilles. Antilles is an Anglicized plural of Antilia, a name given on early maps to a mythical island in the Atlantic Ocean.

British West Indies. A term applied to the islands of the West Indies which are dependencies of Great Britain. For administrative purposes, they are divided into the following five groups: the Bahamas, Barbados, Jamaica and its dependencies, the Leeward islands, and the Windward islands. Trinidad and Tobago are sometimes added as a sixth group, but their proximity to South America makes it more natural to count them as insular parts of that continent. The total area of the islands is estimated at 12,000 square miles.

The chief occupation of the inhabitants is agriculture, although valuable hardwoods are to be found in the forested areas. English is the common language, and English currency is used. The population is about 1,700,000, mostly of Negro blood.

Bahama Islands. A group of low islands in the British West Indies, extending from a point near the east coast of Florida, in a general direction parallel with the Cuban coast, to within 100 miles of the island of Haiti. While the group includes several hundred islands, only twenty have permanent settlements. These twenty cover an area of 4404 square miles. The population consists mainly of Negroes and, in 1921, amounted to 53,031. The islands constitute a colony, with a capital at Nassau in New Providence island. The staple products of the colony are sponges and sisal hemp. Pineapples, both fresh and canned, oranges, and tomatoes are also exported. Two-thirds of the commerce is with the United States.

Barbados. The most easterly of the West India islands. The climate is healthful, fever being almost unknown. About two-thirds of its area of 166 square miles is under cultivation. The crop of paramount importance in Barbados is sugar, which is exported chiefly to Canada and the United States. About 1000 people are engaged in the fisheries.

The population, estimated in 1920 at 156,318, is denser than that of any other island of its size in the world; about 2 per cent are white. Washington's visit to Barbados in 1751 was the only foreign journey he ever made.

The capital and seaport is Bridgetown. Its houses are built of coral rock and of wood. Population, 16,648.

Jamaica. The largest island of the British West Indies, lying about 100 miles south of the eastern end of Cuba. Its area is 4431 square miles. To it are attached, for administrative purposes, a number of small islands, covering a total area of 224 square miles. Jamaica is traversed by low hills, which, at the eastern end, culminate in the Blue mountains with a maximum altitude of 7362 feet.

The chief exports of Jamaica are sugar, logwood and logwood extract, coconuts, cocoa, and rum. Textiles and flour are imported. The population is 858,188, of which about 2 per cent are white. The prevailing religion is Protestantism.

The capital and chief port is Kingston, situated on a landlocked harbor on the southeast coast of the island. The city is well built. It has modern improvements and attractive suburbs. In one of its old parish churches stands the tomb of Admiral Benbow, an English seaman who distinguished himself in a battle with a French fleet in 1702. In 1907, Kingston was almost entirely destroyed by an earthquake. Population, 1921, 62,707.

Leeward Islands. A group of West India islands forming a chain which begins to the east of Porto Rico and curves southeast to the island of Saint Lucia. The majority of the islands are British. France, however, controls Guadeloupe, Martinique, Saint Bartholomew, and part of Saint Martin. The remainder of Saint Martin and the islands of Saint Eustatius and Saba belong to the Netherlands. The British dependencies are Antigua, Dominica, British Virgin islands, Saint Kitts, Montserrat, Barduda, Redonda, Sombrero, Nevis, and Anguilla. The British islands form one colony, having its seat of government at Saint John in the island of Antigua. The islands of the colony cover an approximate area of 715 square miles and support a population, principally Negroes, amounting to 122,242. The chief articles of export are cotton, sugar, molasses, cocoa, limes, and coconuts. The name was given in allusion to the fact that the islands are not swept by the northeast trade winds to so great a degree as are the Windward islands to the south.

Windward Islands. A group of British West India islands forming the eastern barrier of the Caribbean Sea. The chief islands are Grenada, Saint Vincent, and Saint Lucia, having a total area of 516 square miles and an approximate population of 165,000. The three islands have separate administrative bodies. The products include excellent grades of cotton and of arrowroot; also sugar, cocoa, lime juice, and spices. Most of the trade is with Great Britain.

Bermuda Islands. A group of low coral islands belonging to Great Britain, about 880 miles due east of Charleston, South Carolina, and 699 miles from New York. Twenty of the 300 islands are inhabited. They supported in 1920, on an area of 19 square miles, a population of 20,127, about one-third of whom were white. The chief exports are lilies

and onions, sent almost entirely to the United States. Hamilton, situated on Bermuda island, is the capital and an important British naval base. The climate is genial and attracts numerous visitors from the United States and from Great Britain. The islands are named after the Spaniard, Bermudez, who discovered them in 1515. They were first settled in the 17th century by the Englishman, Somers, after whom they are sometimes called the Somers islands.

Cuba. The largest island of the West Indies, which, with the Isle of Pines and smaller adjacent islands, constitutes the independent republic of Cuba. Cuba is in the Torrid Zone and lies 92 miles south of Key West in Florida, the most southern town of the United States. The island has an average width of 50 miles and stretches about 730 miles in a general east and west direction. Its area is 44,164 square miles.

The surface of Cuba is in general low and undulating. Hills border the northern coast and in the southeast a short range of mountains, the Sierra Maestra, skirts the sea and reaches at one point an elevation of 8320 feet. The rivers are short. Many of them, however, are noted for disappearing throughout part of their courses. The Moa cascade in eastern Cuba is formed by a river which drops 300 feet into a cave. A number of springs of fresh water are found in the sea rising through the salt water. These springs are believed to be emerging rivers which disappeared inland.

The climate of Cuba is hot and moist. Recent improvements in sanitation have virtually banished yellow fever, which formerly afflicted the inhabitants as a yearly epidemic. The soil is rich and supports a luxuriant vegetation. Palms and valuable hardwood trees flourish in forests covering nearly half the island. Bananas and other tropical fruits provide food for the inhabitants and are exported in great quantities. The fauna includes the tarantula, chameleon, scorpion, vulture, scavenger buzzard, and, among the numerous species of snakes, a boa, which often attains a length of 18 feet. The rare insectivore, the almiqui, is indigenous to the island. Alligators infest the waters. Coral insects have produced coral reefs about the coasts in such number as to render navigation dangerous in many parts.

The chief industry of Cuba is the cultivation of sugar cane and of tobacco. Cuba is the chief source of America's sugar supply and leads the world in the production of sugar cane, the output in 1920 being valued at more than one billion dollars. Live stock is raised, and mining is carried on to a limited degree. Manufacturing is almost entirely confined to the refining of sugar and the production of tobacco goods. Sponge fishing provides occupation for part of the inhabitants of the southwestern coast. The island has about 3200 miles of railroad, including 2790 miles belonging to sugar estates. Most of the mileage has narrow gauge tracks.

The population of Cuba is 2,889,004, mostly of Negro origin. Spanish is the prevailing language, and the official religion is Roman Catholicism. Elementary education is free and obligatory. There are also normal schools, vocational schools, and a national university. The capital, largest city, and chief port is Havana.

Havana. The capital of Cuba, situated on an excellent natural harbor on the northern coast. The city lies directly south of Florida. Havana is the chief commercial city of the West Indies. It is the focus of Cuba's enormous trade in sugar and in tobacco, and has tobacco factories which are among the largest in the world.

The older section of the city, lying between the harbor and the sea, has narrow, irregular streets. The newer parts have wide, asphalt-paved streets and contain picturesque parks and promenades adorned with shade trees. The most attractive street is the Prado, which has in the center a parkway shaded by laurels and palms. Most of the public buildings are of limestone. They include the Tacon theater, which is one of the largest playhouses in the western hemisphere, and the cathedral, which is said to have contained the remains of Columbus from 1796 to 1898. The city is a popular winter resort for Americans. The chief educational institutions include the University of Havana and the Jesuit College of Belen.

The harbor is equipped with three forts of obsolete construction. In 1898 the American battleship, the *Maine*, was blown up in the harbor. After the expulsion of the Spaniards in 1899, a program of improvements in sanitation was carried out which freed the city from the pestilential scourges to which it was formerly subject. Havana was founded in 1519. Population, 363,506.

Camaguey (*kä'mä-gwā'*). The largest inland city of Cuba, situated in the midst of rich savannas somewhat east of the center of the island. Its port, Nuevitas, located about 50 miles northeast on the Atlantic coast, is the outlet for the products of the live stock industry centering in the city. The sugar interests of Camaguey are also considerable.

Founded in 1516, the city retains an antiquated appearance with narrow, winding streets and poor houses. During the American occupation of Cuba, good water was provided by means of artesian wells and a drainage system was introduced. The city is sometimes known as Puerto Principe. Population, 98,193.

Cienfuegos (*syĕn-fwā'gōs*). A seaport of Cuba, situated on a landlocked harbor near the center of the island's southern coast. The commerce consists largely of sugar exports to the United States. Population, 95,865.

Matanzas (*mä-tän'zäs*). A city on the northern coast of Cuba, 55 miles east of Havana. It has tobacco factories, distilleries, and iron foundries, and ranks next to Havana in the export of sugar and tobacco. Population, 62,638.

Santiago de Cuba (*sän'tē-ä'gō dā kōō'bä*). A city of southeastern Cuba, situated on a deep, landlocked harbor on the Caribbean Sea. The port is the outlet for the tobacco raised in the district, for forest products, and for iron, manganese, and copper ores. In the Spanish American war, Spain's fleet under Cervera took refuge in Santiago harbor and was destroyed while attempting to escape. The city was founded in 1514 by Diego Velasquez. Population, 70,232.

Haiti. The second largest island of the West Indies, a short distance southeast of Cuba. The island has an area of 29,536 square miles, with a maximum length of 405 miles and a maximum width of 165 miles. The surface is rugged and contains three mountain ranges running east and west. The highest peak is Loma Tina, which reaches an altitude of 10,300 feet. The southeast part of the island consists of flat grasslands, or llanos, which provide rich pasturage. Haiti has a large salt lake, called Enrequillo, and a number of hot mineral springs.

The mountains are rich in undeveloped mineral deposits. An abundant rainfall fosters a luxuriant vegetation—valuable hardwood trees in the tropical forests and, in the cultivated areas, abundant crops of coffee, cacao, cotton, tobacco, and sugar. Coffee is the chief export.

The island is divided between two republics, Haiti and the Dominican Republic, which have a total population of about 3,500,000. It was called Espanola after its discovery on December 6, 1492, and is now sometimes known as Santo Domingo.

Haiti. A Negro republic occupying the western third of the island of Haiti. Its area is 10,204 square miles. Most of the inhabitants live in the hot, unhealthful lowlands, and the death rate is high. The chief industry is the cultivation of coffee and other products of tropical agriculture. The mineral and forest wealth is little developed.

The population is estimated at 2,500,000, of whom about 90 per cent have no admixture of white blood. The spoken language is a corrupt dialect of French known as Creole French. The official religion is Roman Catholicism, although in many parts forms of African religion survive, as in the barbaric rites of Voodoo worship.

The capital and largest city is Port-au-Prince, situated at the head of the Bay of Haiti. The town is poorly built and has a low unhealthful location. It has a university, created in 1921. Port-au-Prince is sometimes called Port Républicain. Population, about 120,000.

Dominican Republic. A republic of the West Indies, occupying the eastern two-thirds of the island of Haiti. Its surface, covering 19,332 square miles, rises in the interior to an elevation which culminates in Mount Loma Tina, the highest peak in the West Indies.

The chief industry is agriculture; sugar, cocoa, coffee, and tobacco are exported, mainly to the United States. Stock raising is an occupation of importance. The forest and mineral resources are extensive but are little developed.

The population in 1921 amounted to 897,405, mostly of Negro origin. The common language is Spanish, and Roman Catholicism is the prevailing religion. Customs collections since 1907 and the general administration of the country since 1916 have been in the hands of the United States.

The capital is Santo Domingo, a name sometimes given also to the country. The city is situated near the center of the republic's southern coast. The streets are regularly laid out but are unpaved. Santo Domingo had a cathedral, in which the bones of Christopher Columbus were entombed from 1542 to 1796, and a statue of him stands in the public square. The city was founded in 1496 by the brother of the great discoverer, and, after Isabella on the northern coast, it is the oldest European settlement in the western hemisphere. Population, 1921, 45,021.

Curaçao (*kōō'rä-sä'ō*). A political name applied to a Dutch colony which comprises two groups of islands in the West Indies. Curaçao, the largest island, and two others lie about 40 miles off the northwestern coast of Venezuela, while the remaining three form part of the Leeward islands southeast of Porto Rico. The total area of the colony is 403 square miles, and the population in 1922 amounted to 54,963. The chief industry is oil refining. These islands are sometimes included, along with Dutch Guiana, under the term Dutch West Indies.

IMPORTANT STATISTICS OF LEADING COUNTRIES

Country	Area in Square Miles	Population	Population per Square Mile	Capital	Largest City
Abyssinia	350,000	11,500,000	32.9	Addis Ababa	Addis Ababa
Afghanistan	245,000	6,380,500	26.0	Kabul	Herat
Albania	17,374	831,877	47.9	Tirana	Scutari
Argentina	1,153,119	8,698,516	7.5	Buenos Aires	Buenos Aires
Australia	2,974,581	5,436,794	1.8	Canberra	Sydney
Austria	32,352	6,428,336	198.7	Vienna	Vienna
Belgium	11,752	7,478,840	636.4	Brussels	Brussels
Bolivia	514,155	2,889,970	5.6	La Paz	La Paz
Brazil	3,275,510	30,635,605	9.4	Rio de Janeiro	Rio de Janeiro
Bulgaria	39,841	5,483,125	137.4	Sofia	Sofia
Canada	3,684,723	8,788,483	2.4	Ottawa	Montreal
Chile	289,828	3,754,723	13.0	Santiago	Santiago
China	4,277,170	318,653,000	74.5	Peking	Shanghai
Colombia	440,846	5,855,077	13.3	Bogota	Bogota
Costa Rica	23,000	468,373	20.4	San Jose	San Jose
Cuba	44,164	2,889,004	65.4	Havana	Havana
Czechoslovakia	54,241	13,610,405	250.9	Prague	Prague
Denmark	16,568	3,434,555	207.3	Copenhagen	Copenhagen
Ecuador	220,502	2,000,000	9.1	Quito	Guayaquil
Egypt	383,000	14,168,756	44.8	Cairo	Cairo
Esthonia	16,955	1,109,479	65.4	Reval	Reval
Finland	132,510	3,366,507	25.4	Helsingfors	Helsingfors
France	212,659	40,743,851	191.6	Paris	Paris
Germany	180,976	62,348,782	344.5	Berlin	Berlin
Great Britain *	94,008	44,051,530	468.6	London	London
Greece	41,933	5,536,375	132.0	Athens	Athens
Guatemala	48,290	2,004,900	41.5	Guatemala	Guatemala
Haiti	10,204	2,500,000	245.0	Port au Prince	Port au Prince
Hejaz and the Nejd	170,000†	900,000†	5.3†	Riyadh	Mecca
Honduras	44,275	662,422	15.0	Tegucigalpa	Tegucigalpa
Hungary	35,790	7,945,878	222.0	Budapest	Budapest
Iceland	39,709	94,679	2.4	Reykjavik	Reykjavik
Indian Empire	1,805,332	318,942,480	176.7	Delhi	Calcutta
Irish Free State	26,592	2,972,802	111.8	Dublin	Dublin
Italy	117,982	38,835,941	329.2	Rome	Naples
Japanese Empire	260,707	83,455,137	320.1	Tokyo	Osaka
Jugoslavia	96,134	12,017,323	125.0	Belgrade	Belgrade
Latvia	24,440	1,844,805	75.5	Riga	Riga
Liberia	40,000	1,500,000	37.5	Monrovia	Monrovia
Lithuania	59,633	2,293,100	38.5	Kovno	Kovno
Mexico	765,623	14,278,574	18.6	Mexico	Mexico
Netherlands	12,582	6,865,314	545.6	The Hague	Amsterdam
Newfoundland	275,134	259,358	6.1‡	St. Johns	St. Johns
New Zealand	103,575	1,344,384	13.0	Wellington	Auckland
Nicaragua	51,660	638,119	12.4	Managua	Leon
Norway	124,964	2,649,775	21.2	Oslo	Oslo
Panama	32,380	434,208	13.4	Panama	Panama
Paraguay	75,673	1,000,000	13.2	Asuncion	Asuncion
Persia	628,000	9,000,000	14.3	Teheran	Teheran
Peru	722,461	5,500,000	7.6	Lima	Lima
Poland	146,821	27,092,025	184.5	Warsaw	Warsaw
Portugal	35,490	6,000,000	169.1	Lisbon	Lisbon
Rumania	122,282	17,393,149	142.2	Bucharest	Bucharest
Russia	8,186,144	139,753,900	17.1	Moscow	Moscow
Salvador	13,176	1,526,000	115.8	San Salvador	San Salvador
Santo Domingo	19,332	897,405	46.4	Santo Domingo	Santo Domingo
Siam	194,580	9,221,000	47.4	Bangkok	Bangkok
Spain	194,800	21,347,335	109.6	Madrid	Madrid
Sweden	173,035	5,954,316	34.4	Stockholm	Stockholm
Switzerland	15,975	3,880,320	242.9	Bern	Zurich
Turkey	494,538	13,357,000	27.0	Angora	Constantinople
United States	3,026,789	105,710,620	34.9	Washington	New York
Uruguay	72,153	1,494,953	20.7	Montevideo	Montevideo
Venezuela	398,594	2,411,952	8.1	Caracas	Caracas

* Includes Northern Ireland. † Statistics relate to Hejaz only. ‡ Excludes Labrador, area 232,400 square miles.

SOUTH AMERICA

THE southern continent of the western hemisphere, situated, for the most part, south of the equator. It lies east of a line drawn directly south from Florida and extends east to a point about 1000 miles west of Africa's most western meridian. South America is joined to North America by a narrow isthmus, called Central America. The continent extends north and south a distance of about 4550 miles and has a maximum width of approximately 3200 miles. The area is slightly less than that of North America, being commonly estimated at 7,500,000 square miles.

Contour. In outline, the continent has a general resemblance to a triangle. It is widest in the north and tapers in the south to a point several hundred miles farther south than any other large body of habitable land in the world. The coast line is simple, having no major indentations, such as Hudson bay in North America. There are, however, many small inlets, especially on the southwest coast of Chile, two large estuaries, that of the Amazon river and of the Plata river, and a number of bays and gulfs, of which the principal ones are: the Gulf of Guayaquil, Golfo Corcovado, and Golfo de Penas on the west; Bayia Grande, Gulf of Saint George, Golfo de San Matias, and Bahia Blanca, on the southeast; and on the north the Gulf of Paria and the Gulf of Maracaibo, the latter being connected with the inland sea, Lake Maracaibo.

Surface and Drainage. Along the western side of the continent extends a continuous mountain system, known as the Cordillera of the Andes. This system differs from the Rocky Mountain system of North America in being higher and in containing a large number of volcanoes. Numerous short rivers flow down the narrow west incline of the Andes into the Pacific Ocean. On the east, the mountains slope rapidly down to three great plains drained by three of the greatest rivers of the world. The most northerly plain is the basin of the Orinoco river, a level, grass-covered stretch called the llanos. Separated from it by the plateau of Guiana are the silvas, the vast forested plain of the Amazon valley. The llanos and the silvas drain to the east. The third great plain drains to the south. It is the basin of the Plata-Parana, consisting of undulating tracts, called pampas, adapted to pasturage.

The pampas are separated from the Amazon valley by a low plateau, which, extending westward, branches into a subdued mountain range skirting the Atlantic coast northeast almost to the Amazon and southwest to the mouth of the Plata. This range is cut in the north by a valley through which flows the Francisco river. South of the Plata-Parana river several streams drain into the Atlantic from the eastern slope of the Andes mountains. The largest of these are the Colorado river, the Rio Negro, and the Chubut river.

Islands. A number of islands are reckoned with the continent. In the southwest, numerous small islands are formed by the partially submerged Andes range. The group of islands at the extreme south is called the Archipelago of Tierra del Fuego and is separated from the continent by Magellan strait. Cape Horn is the most southerly of these islands and forms the most southerly point of the continent. The Galapagos islands lie about 600 miles off the Ecuador coast. The island of Trinidad is close to the delta of the Orinoco river. The Falkland islands are situated about 350 miles east of the continent at its southern extremity.

Climate. The greater part of South America lies within the tropics. Over this region the moist trade winds blow westward from the Atlantic, providing the country with a copious rainfall as far west as the Andes range. Impinging on the mountains, the winds rise and become cooled, thereby losing their moisture, which is precipitated as rain. They descend as hot, dry winds on the Pacific Coast region, in which, consequently, desert conditions prevail. The Atacama desert in northern Chile is said to be the driest area in the world. Farther south, moist winds blow from the Pacific, giving the western slope of the Andes mountains a heavy rainfall and rendering the pampas to the east a semi-desert country.

South America does not experience such extremes of temperature as does North America, except on the mountains. The temperature in the moist Amazon valley is consistently high, varying little from about 80° F. The southwestern coast similarly has a fairly constant temperature, but the dry region of the western coast and that of the pampas show greater variation. The mean winter temperature in parts of the south falls to 35° F. The hottest mean midsummer temperature is 85° F. and is found in northern Argentina. The higher mountain peaks, however, are snow-capped even under an equatorial sun.

Flora. The hot, moist region at the extreme north of the continent has a characteristic tropical vegetation. Palms, bamboos, and tree ferns are predominant, giving place to conifers on the mountains and to tall grass in the Orinoco River basin. The silvas of the Amazon valley form the largest heavily forested area in the world. The pampas are luxuriantly grassed in their northern portions, but in the south the aridity occasions a stunted vegetable growth. The potato is indigenous to the continent, which is also the world's chief source of coffee. Rubber and quinine come from the tropical forests, and the Temperate Zone region is one of the world's principal wheat growing and stock raising areas.

Fauna. The animal life of South America includes a number of characteristic species. Among them are alpacas, vicuñas, llamas, condors, tapirs, and a number of toothless quadrupeds—sloths, anteaters, armadillos, and bloodsucking bats. Llamas are used as beasts of burden in the mountains, and alpacas provide a superior quality of wool. Birds of brilliant plumage abound in the tropical regions; many monkeys and reptiles and innumerable species of insects and of fish are found, especially in the Amazon basin. The electric eel and the caribe, a savage fish, are among the more noteworthy.

Minerals. The mineral resources of the continent, although great, have been very imperfectly developed, largely on account of difficulties of transportation and of climate. The Cordillera of the Andes contains the bulk of such minerals, although many are found in the Brazilian plateau. Silver and gold were produced extensively before Europeans came to South America. Brazil was long the chief source of diamonds, and Chile exports nitrates to all parts of the world. Colombia is the source of the best emeralds. South America is also the chief source of monazite and of vanadium.

Inhabitants. The population of South America is estimated at 66 million. The largest city is Buenos Aires, with a population of 1,692,327. The majority of the continent's inhabitants are mestizos, who are a mixture of white races with native Indians. Possibly one-fifth are pure Indians. Those of unmixed European origin are comparatively few, although they predominate in Argentina and comprise almost the whole of the population in Uruguay. Pure Indians predominate in Paraguay and in Bolivia. Negroes and mulattoes are numerous in Brazil, where the white race introduced slaves from Africa. Germans and Italians have immigrated in considerable numbers to Argentina and Brazil.

Most of the inhabitants speak Spanish, being descended from Spaniards, except in Brazil, where the European strain in the population is Portuguese and the Portuguese language is spoken. The Catholic religion prevails throughout the continent.

The upper classes in all the countries are well educated, having a culture akin to that of Spain and France. The level of education for the whole population, however, is considerably lower than that of North America.

The Andes Mountains. The system of mountains running north and south on South America's western border. This system, wide and high in the northern and central part, where it divides into three chains, becomes narrower toward the south and gradually sinks to the level of the sea at the continent's southern extremity. The highest peak is Aconcagua, in west central Argentina, which reaches a height of 23,080 feet. Mount Huascaran has an elevation of 22,051 feet. Several of the world's gigantic volcanoes belong to the Andes mountains, such as Chimborazo, Cotopaxi, Antisana, and Misti. Glaciers are found on the tall peaks, even those within the equitorial regions.

The continent's largest lake and one of the highest in the world, Lake Titicaca, lies among the Andes mountains at a level of 12,645 feet above the sea. The lake, which has no outlet, has an area of 3200 square miles and a maximum depth of more than 700 feet. Near its shores, there are many ruins of temples and other relics of a former civilization.

The Amazon River. The largest and one of the longest rivers of the world, draining a tropical basin in South America eastward from the Andes mountains and emptying into the Atlantic Ocean through an estuary which expands to a width of 150 miles. The river has several tributaries which are themselves among the major rivers of the world. The Rio Negro is the largest affluent on the north; on the south the chief tributaries are the Purus, the Tapajoz, the Xingu, the Araguaya, and the Madeira, the last of which has an affluent explored by Theodore Roosevelt and named, after him, the Roosevelt river.

The Amazon river is navigable for ocean steamers over a distance of 2300 miles, and 486 miles farther for smaller vessels. The river system affords navigable waterways of 27,000 miles.

Rising tides produce large tidal waves, or bores, which rush up the river with a loud roar and often endanger shipping. The effect of the river's current can be detected 200 miles out at sea. In the flood season the river rises 30 to 40 feet in some parts, inundating the banks for several months of the year.

Plata-Parana. The second largest river system of South America, consisting of the Parana river and the Uruguay river, which unite their streams in the Rio de la Plata, "Silver river," an estuary conducting the water of the system to the Atlantic Ocean, about 20° of latitude north of Cape Horn. The basin has a southern drainage, sloping from the Brazil plateau in the north. The estuary is 135 miles wide at its outlet. The Plata-Parana stream measures altogether about 2300 miles, of which about 1200 miles are navigable. The chief tributary is the Paraguay river, which flows into the Parana.

Orinoco River. One of the three large rivers of South America, draining a tropical territory in the northern part of the continent. The river rises in the highland between Venezuela and Colombia. After traversing immense flat, treeless plains in a course running first west, then north, and finally east, the river winds through a dense tropical forest area and empties into the Atlantic Ocean through several mouths forming a delta south of the island of Trinidad. About 150 miles from its source the river discharges part of its water into the Rio Negro, an affluent of the Amazon river. The Orinoco river is navigable to a cataract 870 miles from its mouth. Its tributaries are very numerous, the chief navigable ones being the Guaviare, the Meta, and the Apure. The system has 4300 miles of navigable streams. See *Venezuela*.

POLITICAL DIVISIONS

The mainland of South America contains ten independent countries and three colonies. The independent countries are Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, and Venezuela. Each is a Federal republic. The country with the largest area is Brazil and the smallest is Uruguay. The colonies are called British Guiana, Dutch Guiana, and French Guiana. Among the islands, Trinidad and the Falkland islands are British dependencies. The Galapagos islands belong to Ecuador.

Argentina. The most highly developed country of South America and second largest in area, occupying the greater part of the southern portion of the continent. The country has an Atlantic seaboard of 1565 miles and a western land boundary of about 3000 miles, following the continental watershed formed by the Andes. Argentina measures about 2285 miles from north to south and has a maximum width of 930 miles, with an area of 1,153,119 square miles.

The country is drained in the north by the Plata-Parana river. In the south the surface slopes from the ridge of the Andes toward the Atlantic Ocean. The climate varies from the tropical warmth in the low plains of the north, where 120° F. has been recorded, to the more moderate conditions existing in the south, where 3° F. is the lowest temperature officially noted. The rainfall decreases from the eastern coast to the base of the Andes mountains.

The flora of Argentina shows variations following the differences in climate. In the partly unexplored tropical forests of the north, algaroba trees are especially numerous, and many medicinal shrubs and other plants abound, including the *yerba maté*, or Paraguay tea plant. The mountains are wooded, those around the Strait of Magellan and Tierra del Fuego being covered with immense forests of beech. The pampas are treeless but are covered with grass. Such tropical and subtropical fruits as oranges, lemons, grapes, and peaches are grown. The animals characteristic of Argentina include the viscacha and the hare of Patagonia.

The chief industries of Argentina are grazing and agriculture, for which the extensive pampas are admirably suited. Wheat and corn are the most valuable crops. In flaxseed production, Argentina leads the world. Grain and meat form more than 75 per cent of the exports. Lumbering and mining are carried on to some extent. The Rivadavia oil fields yielded 1,300,000 barrels of petroleum in 1921. The imports consist mainly of foodstuffs, textiles, and other manufactured goods. The bulk of the foreign trade is with Great Britain and the United States. There are more than 23,000 miles of railway, a greater mileage than that of any other South American country.

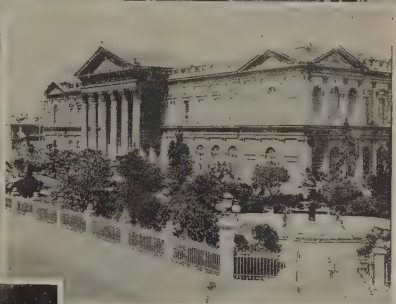
Argentina is divided into 14 provinces, 10 territories and 1 federal district. The capital and largest city is Buenos Aires, which is also the largest city in South America. The country has received a great many European immigrants in recent decades, principally from Italy, Spain, and Germany. The Indian strain in the population is comparatively slight. The population in 1921 was 8,698,516.

Bolivia. An inland country in the west central part of South America. The southwestern border follows the ridge of the western range of the Andean Cordillera, which in this section spreads out into the Bolivian plateau and occupies nearly half the surface of Bolivia. The average elevation of the plateau is 12,000 feet, but it contains some of the highest peaks of the continent, such as Illimani, Sorata, Cerro de Potosi, and Licancaur. In this plateau lies the lofty Lake Titicaca, with which is connected Lake Aullagas. East of the plateau, the surface slopes down in vast undulating plains toward the Amazon River valley in the north and, in the south, toward the llanos of the Parana River basin. The area of the country is 514,155 square miles.



















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SOUTH AMERICA

1 View in Rio de Janeiro. **2** Montevideo, Uruguay. **3** Art Museum, Buenos Aires. **4** Chamber of Deputies, Santiago, Chile. **5** The Christ of the Andes, Chile-Argentina. **6** Peace Monument, Rio de Janeiro. **7** Centenary Monument, Buenos Aires. **8** Straw Boats, Lake Titicaca, Bolivia. **9** Ancient Incan Fortress, Peru.



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COFFEE INDUSTRY

1 Port of Santos, Brazil. **2** Coffee Plantation, Brazil. **3** Coffee Berries. **4** Gathering Coffee, Brazil. **5** Basins for Macerating Coffee Berries. **6** Drying Coffee; *copyright by Underwood & Underwood.* **7** Further Drying Coffee. **8** Heaps of Dried Coffee; *copyright by Keystone View Co.*

Bolivia is entirely in the Torrid Zone, but the climate of the upland is of an almost arctic severity. Parts of this plateau support grazing flocks of sheep, llamas, and alpacas, but it is for the most part arid and of value only for its minerals. The fertile eastern slope of the Cordillera, being warmer and well watered, produces wheat, corn, barley, peaches, grapes, and figs. The lowlands support a tropical vegetation. Coffee, cacao, rice, sugar cane, and medicinal plants are cultivated, and vast forests yield rosewood, mahogany, ebony, cedar, and rubber, the last being produced in quantities which entitle Bolivia to rank next to Brazil as a rubber exporting country.

Bolivia's principal industry is mining, and the principal mineral product is tin, in the export of which Bolivia ranks second among the countries of the world. Silver, gold, and copper are also mined in large quantities, and wolfram, vanadium, bismuth, lead, zinc, salt, and antimony are obtained in smaller amounts. Potosi, where the tin and silver mining interests center, is the highest city in the world, having an elevation of 14,350 feet. At such an altitude, operations can be carried on only by the natives.

Railroad transportation is limited by the natural obstacles in the way of construction. Some 1500 miles of track, however, are in operation. Llamas are used for carrying light loads over mountainous districts. Manufactured goods, such as textiles and hardware, are obtained by importation.

The majority of the inhabitants live on the eastern slopes of the mountains. About one-half are pure Indians, and the white race forms about 12 per cent of the total of 2,889,970. La Paz is the largest city and the seat of Congress, and Sucre is the statutory capital and seat of the supreme court. The country possesses many impressive remains of a vanished civilization. Bolivia was deprived of access to the sea by a disastrous war with Chile which ended in 1883.

Brazil. The largest country of South America, occupying the entire east central part of the continent and having a westward extension which reaches almost to the Andes mountains. The country's maximum extent north and south is 2660 miles and east and west it measures about 2700 miles, with a total area of 3,275,510 square miles, exceeding that of continental United States.

In the north the climate is moist and tropical in character, while toward the south it becomes more temperate and the rainfall is lighter. The northern region is drained by the Amazon river, south of which lies one of the world's largest unexplored forest areas. The eastern part of the country is a highland through which the river Francisco flows, and the southern district is drained by the Uruguay river and by the upper reaches of the Parana River system.

The mineral resources of Brazil are very great but are largely undeveloped. The production of gold and of diamonds was formerly of great importance. The Morro Velho gold mine, having a depth of 7000 feet in 1922, is one of the deepest mines in the world. The deposits of iron are very extensive. Brazil provides the greater part of the world's supply of monazite.

The tropical flora of Brazil includes trees producing an extraordinary variety of useful and of ornamental woods, 200 different kinds of timber having been shown at the national exhibition in Rio de Janeiro in 1922. These woods include mahogany, rosewood, brazilwood, and logwood. The rubber tree and the pine are among those of the greatest commercial value. The rank forests of the Amazon basin abound in brilliantly colored flowers and in countless monkeys, lizards, fish, gaudy butterflies, and other tropical animals. The portions of the country farther south are suitable for agriculture, and produce a large amount of coffee, sugar, cocoa, tobacco, and cotton. About four-fifths of the world's supply of coffee comes from Brazil. The value of the coffee exported in 1926 was about 350 million dollars. The country was formerly the world's chief source of rubber. There are large areas of pasturage, on which immense numbers of live stock are raised.

Brazil exports mainly the products of the forest and farm, and imports manufactured goods. The textile industry, however, has received a considerable development in the country. There are also many mills for the manufacture of silk, woolen, and jute goods, and many tobacco factories and sugar refineries. About one-third of the foreign trade is with the United States. More than 17,000 miles of railroad have been constructed.

The population of Brazil in 1920 was 30,635,605, making the country the most populous in the western hemisphere after the United States. Many Negroes and about 600,000 Indians live in the Amazon valley. In the south there are a number of settlements of Germans, of Spaniards, and of Italians. The majority of the inhabitants, however, are of Portuguese origin, and the language of the country is Portuguese.

Politically, the country consists of 20 loosely federated states, 1 federal district, and 1 territory. The most populous and most prosperous states are Bahia, Minas Geraes, and Sao Paulo, all bordering on the central part of the southeastern coast. These states produce the bulk of the minerals, coffee, sugar, cotton, and live stock. The most extensive state is Amazonas, occupying the upper Amazon valley. From it come most of the valuable woods. The capital and largest city of the country is Rio de Janeiro. The port Pernambuco, on the eastern coast, is nearer to Lisbon than to New York.

British Guiana. A British colony of continental South America, lying between Venezuela and Dutch Guiana near the center of the continent's northeastern coast line. Its area is 89,480 square miles. The interior is covered with dense forests as far as the highlands in the southwest. The rivers are not navigable, except for short distances, because of rapids and falls. In the Potaro river are the famous Kaieteur falls, having a drop of about 800 feet. The coast district, about 40 miles wide, is low, and part of it is protected by dikes. It is very fertile and produces large crops of sugar cane, rice, and coconuts. Gold and diamonds are mined in the highlands. About half the exports go to Canada.

The climate, being hot and moist, is unhealthful for Europeans, who compose about 4000 of the colony's total population of 297,691. About 125,000 are East Indians, who were brought in to work on the plantations. The capital is Georgetown. England's sovereignty over the colony was disputed by the Dutch and the French until 1815, when the territory finally passed into her possession. The Venezuelan boundary was fixed after a dispute arbitrated in 1899 by jurists of Great Britain and of the United States.

Chile (*chĕ'lā*). A country of South America, lying on the western coast and extending, with an average width of about 87 miles, from the southern extremity of the continent northward about 2700 miles to Peru. The area is estimated at 289,828 square miles. The eastern boundary follows in general the ridge of the Andes mountains.

A high plateau rises abruptly from the sea along the greater part of the coast, leaving a lofty plain between the sea and the foot of the Andes. There is a gentle slope from the north to the south. The rivers are short and drain into the Pacific Ocean. A number of natural harbors are found among the fiordlike indentations and the numerous islands of the southern coast. The country is subject to severe earthquakes followed usually by destructive tidal waves. One of the most disastrous occurred in 1922. In 1751, the former city of Concepcion was sunk in the Pacific Ocean.

The climate of Chili is hot and extremely arid in the north, where a whole year often passes without rain. The central region, having a more moderate

temperature and a greater precipitation, supports a flourishing agricultural industry and contains most of the population. In the south the increased rainfall permits the growth of forests of beech, cypress, and oak, the last of which has been introduced from abroad. In the extreme south the growth of the trees is stunted by the prevailing low temperatures.

The northern third of Chile is the world's chief source of nitrate of soda, which is used as a mineral fertilizer and in the production of explosives and of most of the world's supply of iodine. Copper, gold, silver, and some coal are also mined. The mineral exports in 1920 amounted to more than 200 million dollars. The bulk of the country's revenue is provided by an excise tax on nitrate exports.

Agriculture provides employment for about half the population. The principal crops are grapes and wheat. Stock raising also is important. The government is largely controlled by wealthy owners of agricultural land. Most of the textiles and other manufactured goods consumed are imported. The United States and Great Britain receive most of the foreign trade.

Chile has a railway constructed from the northern to the southern part of the country, a distance of 2862 miles. South America's only transcontinental railway traverses Chile, parts of it climbing grades of a steepness nowhere else attempted by railroad engineers. The total length of railways is nearly 6000 miles, more than half being owned by the government.

The population of Chile in 1920 was 3,754,723, of which about one-fourth were of Spanish descent. The influence of the Church is greater than in most other countries of the continent. Chile has a powerful fleet and is politically one of the three strongest countries of South America. The capital and largest city is Santiago. Valparaiso is the chief port.

Colombia. A country of South America, occupying the extreme northwestern part of the continent. Colombia borders on the Pacific Ocean for a distance of about 500 miles and on the Caribbean Sea for 700 miles. Its area is 440,846 square miles.

The country is traversed from northeast to southwest by the Cordillera of the Andes, which here consists of a western, a central, and an eastern range separated by fertile plateaus. The eastern slope of the Cordillera drains in the north into the basin of the Orinoco river and, farther south, into the basin of the Amazon river. The central plateaus drain northward by the Magdalena River system into the Caribbean Sea. The western slope of the Cordillera has a number of short rivers emptying into the Pacific Ocean. The Magdalena river is navigable for steamers to La Dorada, a point about 560 miles above its mouth.

The climate of Colombia varies from the intense tropical heat of the coast regions, the valleys, and the llanos, to the temperate conditions of the plateaus and the mountains. There are two wet seasons and two dry seasons over most of the country. The llanos, however, have two seasons only.

The rainfall there is deficient and does not permit the growth of trees. The west coast, however, has a large rainfall. The mountain sides are covered with forests of a tropical character, containing, among many other varieties of plants, the wax palm, the rubber tree, and several species of cinchonas.

The mineral wealth of Colombia is great. Gold, platinum, copper, and emeralds are exported, the last being produced in Colombia in greater quantities than in the rest of the world. The salt mines are a government monopoly and provide a considerable part of the national revenue.

The chief industries are agriculture and stock raising. Temperate zone cereals are grown on the plateaus, and coffee, sugar, bananas, and cocoa are produced in the valleys and the lower regions. Panama hats are produced extensively, although the industry is not centralized in factories. Coffee and hides are the principal articles of export; the imports are largely textiles and foodstuffs. The bulk of the foreign trade is with the United States. The mountainous surface of the country and the prevalence of tropical forests make transportation difficult except on the rivers.

Colombia is divided into 14 departments, 3 intendancies, and 6 commissaries. The capital and largest city is Bogota. The population of the country in 1920 was 5,855,077.

Dutch Guiana. A colony in continental South America belonging to the Netherlands, situated at the center of the continent's northeast coast between British Guiana and French Guiana. Its area is 46,060 square miles.

The cultivated area is confined to a coastal strip about 20 miles in width, the interior region being covered with a dense tropical forest as far as the highlands of the southeast. The chief agricultural products are rice, sugar, cacao, coffee, and bananas. Gold is exported also, much of it obtained from alluvium.

The population is 113,181, and consists largely of Negroes and people of East Indian origin, who were brought in to work on the plantations. The capital is Paramaribo. The official name of Dutch Guiana is Surinam, a corruption of Surreyham, which was the original designation given in honor of the Earl of Surrey. The colony was originally an English settlement. After changing hands several times, it finally passed to the Netherlands in 1815.

Ecuador. A country in the northwest portion of South America, bordering on the Pacific Ocean and stretching south from Colombia to Peru. Its area is 220,502 square miles. Ecuador's coast line is broken by the Gulf of Guayaquil, the only large inlet on the south side of the continent.

The country is traversed from north to south by two ranges of the Andean Cordillera. Between the ranges lies a plateau, which has an average elevation of 9000 feet but in the south falls to a level of about 2000 feet. This plateau contains most of the cultivated land and has a delightful climate. The mountain ranges have many peaks of exceptional height, including Cotopaxi, the world's loftiest active volcano.

The coastal strip in Ecuador is not an arid waste, as in Peru and northern Chile, but is a stretch of tropical jungle with an excessive rainfall. Dense forests are found on the mountain slopes both on the west and on the east of the Cordillera. The east slope gives rise to several navigable rivers of the Amazon basin. One of the largest is the Napo, down which the explorer Orellana sailed in 1541 to the mouth of the Amazon river.

The immense virgin forests of Ecuador yield rubber, ivory nuts, dyewoods, cinchona bark, and many valuable kinds of cabinet wood. The distinctive products of the country, however, are cocoa and toquilla. The latter is the fabric from which Panama hats are made. It is shipped extensively to Colombia where the actual weaving is an important industry. Other products of the tropical agriculture pursued on the coastal strip are coffee, tobacco, and sugar. In the plateau, hay, cereal crops, and fruits and vegetables of a temperate zone character are cultivated, and cattle are raised in large numbers. Alligator skins are exported. Gold is produced to a certain extent, and silver, copper, iron, and petroleum have been found. The principal imports are textiles, foodstuffs, and hardware.

The population is about two million, the great majority of whom are of Indian origin. The country is in a backward state of development, having few good roads and little more than 400 miles of railroad. The coinage of the country is minted in England, the United States, and Peru. The country owns the Galapagos, or "turtle," islands, lying 750 miles to the west. The capital of Ecuador is Quito and the principal seaport and largest city is Guayaquil. The name of the country is the Spanish word for equator.

French Guiana. A French colony and penal settlement in continental South America, bounded by the Atlantic Ocean, Brazil, and Dutch Guiana. The area is about 32,000 square miles. Placer gold mining is the chief industry, although silver, iron, and phosphates are also obtained. Rice, corn, cacao, coffee, and tobacco are grown to a limited extent in the fertile coastal strip. The forests of the interior are rich in valuable hardwoods. The timber, however, is procurable with difficulty on account of the absence of railroads and of navigable rivers. The inhabitants number about 44,200, including a penal population of nearly 4000. The capital and chief port is Cayenne. France was confirmed in the possession of the colony in 1815.

Paraguay. An inland country of central South America, bounded by Brazil, Argentina, and Bolivia. Paraguay is a low-lying country situated between the Parana river and the Paraguay river, with the exception of a district to the northwest in the Chaco plain, the title to which is disputed with Bolivia. The area of the country is 75,673 square miles.

Apart from the disputed territory, which is subject to alternate floods and droughts, the climate is delightful for the greater part of the year. During the three hottest months, however, the temperature not infrequently rises above 100° F. The rainfall is moderate, but sufficient to foster the growth of dense forests, and rich groves of tropical fruit, particularly oranges, bananas, and lemons. Fine cabinet timbers, dyewoods, drugs, gums, and oils are obtainable from the forests on the hills and in the valleys of the northeast part of the country. Occasional stretches of savannas afford rich pasturage, and flat marshes in the south are adapted to rice culture.

The chief cultivated plants are orange and other tropical fruit trees, corn, sugar cane, rice, tobacco, and cotton. Agricultural methods, however, are still primitive. *Yerba maté*, or Paraguay tea, found wild in great abundance and also cultivated to some extent, is exported to other parts of the continent. Stock raising is the second industry of the country. Iron, copper, manganese, and marble are to be found in the northeast of the country, but they are not mined extensively.

The transportation facilities of Paraguay are deficient. The roads are for the most part mere bullock tracks and the railroad mileage is small. The country has access to the sea only by river navigation through Argentina and by a railroad service to Buenos Aires. The chief exports are Paraguay tea, oranges, tobacco, beef, hides, and petit grain oil. Textiles, hardware, foodstuffs, drugs, and wine are the principal imports.

The population of Paraguay is about one million, a very small proportion of whom are white, these being mainly Italian and German immigrants. The settlements are largely confined to the vicinity of the Paraguay river. About one-seventh of the inhabitants are pure Indians, not yet civilized, and the native Guarani language is more widely used than Spanish. The percentage of illiteracy is high. The capital, chief port, and largest city is Asuncion. Paraguay has suffered much from foreign oppression, native tyranny, and devastating wars.

Peru. A country of west central South America, bordering on the Pacific Ocean and stretching northward from Chile to Ecuador. Its area is 722,461 square miles.

Peru is traversed from north to south by the Cordillera of the Andes, which, under the name of the Sierra or uplands, constitutes one of the three physiographical divisions of the country. The uplands consist of three ranges, ill defined in parts, and of the intervening plateaus. There are several large volcanoes in this region and violent earthquakes are not uncommon. The rainfall is unevenly distributed.

Between the foothills of the Andes and the Pacific Ocean is a dry coastal strip averaging about 30 miles in width. This strip is cut by several rivers, which foster vegetation along their banks and afford means of irrigation. The civilization of the country centers about these rivers. Sloping eastward from the uplands is the Montana, a forest area with a heavy rainfall, in which the Amazon River system takes its rise.

Peru lies wholly within the Torrid Zone. The climate is not oppressively hot, however, except in the eastern valleys and lowlands. The greater part of the Sierra enjoys an equable temperature, and the heat of the coastal strip is moderated by the antarctic currents. Dense fogs frequently hang over the coast.

The eastern part of the Montana, being hot and well watered, supports a tropical vegetation. The cinchona tree is native to Peru and rubber trees grow in abundance but are comparatively inaccessible. Peru is the chief source of the coca shrub, from which cocaine is obtained.

The watered sections of the Sierra and of the coastal area produce sugar and cotton, the two principal exports of the country. Other agricultural products include tobacco, grapes, palms, cocoa, coffee, corn, and wheat. A large number of sheep are raised in the Sierra, and wool, taken in part from sheep but to a great extent from llamas and alpacas, is exported in large quantities. The llama is the principal beast of burden. Mules are used extensively for traveling, the railway mileage being small on account of the mountainous character of the country. The various lines embrace about 2000 miles of track.

Mining ranks second to agriculture among the industries. The chief minerals are copper, petroleum, and silver, but more than half the world's supply of vanadium comes from Peru. The chief manufactures are sugar and cocaine, other necessary industrial products, such as textiles and lumber, being imported. Wheat and coal are also brought into the country. Most of the foreign trade is with the United States, Great Britain, and Chile.

Peru is the seat of the vanished civilization of the Incas and still contains many monuments of their industry and power. More than half of the present population is of pure Indian blood, the pure whites numbering about 13 per cent of the total, which is estimated at 5,550,000. The capital and largest city is Lima. The chief port is Callao on the Pacific Ocean. The steamship service between Peruvian and Bolivian ports on Lake Titicaca is unique in operating at an altitude unequalled on any other navigable body of water. Iquitos, on the upper reaches of the Amazon river, has steamer connections with the Atlantic Ocean, 2500 miles distant.

Uruguay. A country of South America, situated south of Brazil between the Atlantic Ocean and the Uruguay river. The southern coast line is on the Rio de la Plata. Having an area of 72,153 square miles, Uruguay is the smallest of the South American countries.

The surface is rolling and has several chains of hills reaching a maximum elevation of 2000 feet. The climate is equable in the south, but in the north it becomes continental, admitting of greater heat in the summer and of occasional frosts in the winter. The northern hills and valleys are covered with a subtropical forest, while the south and east form extensive fertile plains suited for agriculture and for stock raising. Deer, otters, wild hogs, and wildcats are indigenous. Rheas, or American ostriches, are found; and fur seals, protected by the government, inhabit Lobas island and Castillos island near the coast. There are also storks, swans, cranes, and wild turkeys.

Stock raising is the principal industry of Uruguay, animal products forming nearly nine-tenths of the exports. Wheat, oats, flaxseed, and grapes are also grown and exported. Less than 4 per cent of the country's area, however, is devoted to agriculture, in spite of the fact that the government encourages the industry by supporting agricultural schools. Hailstorms, destructive hurricanes, and

occasional droughts occur as factors unfavorable to the raising of crops.

Gold mines are worked, and there are deposits of copper, iron, and manganese. Coal and petroleum have recently been discovered. Manufactures are very slightly developed, the population relying on importation for such industrial products as textiles and hardware. The United States, Great Britain, and France have the largest share of the foreign trade. Transportation in Uruguay is facilitated by several hundred miles of navigable river streams and by more than 1700 miles of railway.

The population of Uruguay is 1,494,953, of whom about nine-tenths are of European descent, mainly Spaniards and Italians. The earliest settlements were made by Spaniards in 1624 on the Rio Negro, a tributary of the Uruguay river. The capital, foreign port, and largest city is Montevideo.

Venezuela. The most northern country of South America, having a northern coast line of about 1700 miles on the Caribbean Sea and a land boundary separating the country from British Guiana, Brazil, and Colombia. Its area, including that of a large number of islands off the north coast, is 398,594 square miles.

Apart from the small basin of Lake Maracaibo in the northwest, Venezuela is drained by the Orinoco River system. This system flows eastward from the Andes mountains between the Guiana highlands to the south and a northeastern extension of the Andes mountains on the north, and enters the sea through a large estuary overgrown with a mangrove swamp. The upper portion of the river system traverses the llanos. The affluents of the Orinoco are numerous and, with the main stream, provide the country with about 4000 miles of navigable waterways.

The climate in the lower levels of Venezuela is tropical but becomes temperate in the highlands and frigid on the higher mountain peaks. The rainfall is copious in the east and in the northwestern parts near the mountains. On the llanos the comparative dryness during one season of the year prevents the growth of trees.

The flora of the eastern lowlands and of the better watered territory in the northwest consists of tropical forests similar to those of the Amazon valley. The forests include many plants from which are available such products as rubber, vanilla, brazil nuts, dyewoods, and drugs. Grasses form the characteristic vegetation of the llanos. The fauna of Venezuela is tropical and rich, and includes such species as the howling monkey, the spectacled bear, the vampire bat, the flamingo and numerous other brilliantly colored but usually songless birds, the anaconda and many other snakes, a frog with a voice resembling a human shout, the electric eel, and the caribe.

Venezuela is rich in minerals. Those produced in any considerable quantity, however, are confined to gold, salt, petroleum, and asphalt, the last being found in lakes containing extensive remains of prehistoric animals. Pearl fishing is an industry on a number of islands off the north coast.

In the northern and western parts of Venezuela, where most of the population is concentrated, agriculture is carried on, the chief products being coffee, sugar, and cocoa. Grazing is the chief industry on the llanos. There are few manufactures. Most of the foreign trade is with the United States.

The name Venezuela is Italian, meaning Little Venice. It was given by early Italian explorers who found, on Lake Maracaibo, an Indian tribe inhabiting huts which were supported by piles driven into the bed of the lake. Reminded of Venice, they gave the region the name which is now applied to the country.

Venezuela is divided into 20 states, 2 territories, and a federal district. The capital and largest city is Caracas. The population in 1920 was 2,411,952, of which the pure whites numbered about 10 per cent.

CHIEF CITIES AND OTHER PLACES OF INTEREST IN SOUTH AMERICA

The preceding articles on South America deal with the larger features of the continent. Other points of interest, including the principal cities, the national capitals, the trade centers, certain islands, and regions of especial note are covered in the section that follows.

Asuncion (*ä-sōōn′syōn′*). The capital and metropolis of Paraguay, situated on the east bank of the Paraguay river in the west central part of the country. The city is the port and trading center of Paraguay, and is connected by railroad with Buenos Aires. It has foundries, shipyards, and distilleries. The exports include Paraguay tea and lace, the latter a beautiful product of the industry of civilized Indian women. Population, 1920, 99,836.

Bahia (*bä-ē′ä*). A city of east central Brazil, picturesquely situated on a high peninsula which partly encloses an excellent natural harbor. Bahia, also called Sao Salvador, is a notable port, shipping coffee, sugar, cotton, and other products raised in the state. The manufactures are varied, the principal one being cotton cloth. The city is also the supply base for boots and shoes. Bahia was formerly the center of the world's largest diamond trade.

The lower part of the city, devoted to commerce, has narrow streets. The upper, or residential, part is accessible by hydraulic elevators and is attractively built. The churches are very numerous. The cathedral of the archbishop of Brazil is situated in Bahia and is one of the finest basilicas in Brazil. The city has a university, a medical college, and a museum. The culture of seedless oranges was introduced into the United States from Bahia.

The site of Bahia is said to have been visited in 1503 by Amerigo Vespucci. Founded in 1510 by Correa, a Portuguese navigator, the city was the capital of Brazil until 1763. Population, 1920, 283,422.

Barranquilla (*bär′rän-kēl′yä*). The chief port of Colombia, situated on the Magdalena river about 7½ miles from its mouth. The mouth of the river is not navigable. Traffic borne down the river to Barranquilla for export, therefore, is sent by rail to Puerto Colombia, a seaport on the Caribbean Sea. Population, 64,543.

Bogota (*bō′gō-tä′*). The capital and largest city of Colombia, situated near the geographical center of the country on a fertile table-land at an elevation of about 8700 feet above the sea. There are many mountains in the vicinity and the mining interests of the city are considerable, the government's salt mines being a short distance north of the city. Coal, iron, and manganese mines lie to the north and east.

The more important edifices of Bogota include the government buildings and the cathedral, the latter being a structure in the Corinthian style of architecture. The city is the seat of the national university, of three endowed colleges, and of a museum containing many relics of the civilization of the Incas. The streets are narrow but well paved. Population, about 160,000.

Buenos Aires (*bwā′nōs ī′rās*; *bō′nŭs ā′rĭz*). The capital of Argentina and the largest city in South America, situated on the south shore of the estuary of the Rio de la Plata about 170 miles from the Atlantic Ocean.

Buenos Aires handles the bulk of Argentina's foreign commerce and is one of the largest ports of the world, the harbor having been improved at a cost of about 50 million dollars. Near the wharves is the central fruit market, one of the largest warehouses in the world. The manufacturing industries produce mainly for home consumption. The city contains the residences of a large number of the country's wealthy owners of farming and grazing land.

The oldest part of Buenos Aires has narrow streets. The city is divided from east to west by the magnificent Avenida de Mayo, which is 100 feet wide and connects two beautiful squares. At the eastern end lies the Plaza de Mayo, having an area of more than four acres and fronted by several imposing buildings, including the executive palace and the cathedral. At the western end, the view terminates in the House of Congress, erected at a cost of $6,000,000. The office of the newspaper *La Prensa* is one of the most handsome buildings of the city and is dedicated to social services of various kinds.

Buenos Aires has a system of 79 parks and squares, which cover a total area of 2320 acres. Numerous monuments have been erected in the city, including a statue of George Washington set up in Palmero park by American residents of the city. The chief educational institution is the University of Buenos Aires.

Buenos Aires was founded by Pedro de Mendoza in 1535. It was destroyed by the Indians and was re-established in 1580 by Juan de Garay, the governor of Paraguay. The city has grown very rapidly in the past half century. Population, 1,676,041.

Callao (*kāl-yä'ō*). The principal seaport of Peru, situated on an island-sheltered bay near the center of the country's Pacific coast line. The city is connected by a railroad and by a trolley line with Lima, distant seven miles inland. The chief exports are sugar, cotton, cocaine, minerals, and wool. In 1746 the former city of Callao was submerged with all its inhabitants, and on calm days the ruins are still distinguishable under the water. Population, 1920, 52,843.

Cape Horn. The most southerly point of South America. The name is applied to a small, rocky island and to the most southerly point of the island, a headland having a height of 600 feet. The cape was discovered by the Dutch navigator, Schouten, who named it after Hoorn, his native town in the Netherlands.

Caracas (*kä-rä'käs*). The capital and largest city of Venezuela, occupying a mountainous site 7 miles from La Guaira, a port near the center of the country's northern coast. The city is an important exporting center for cocoa, coffee, tobacco, and other products of the country. Its principal square contains a large statue of Bolivar. The capitol building covers an area of two acres. The city has all modern improvements. An earthquake in 1812 killed more than 12,000 inhabitants. Population, 1920, 92,212.

Cayenne (*kā-ĕn'*; *kī-ĕn'*). A fortified seaport, the capital of the colony of French Guiana. The town is built on a low island between the Cayenne river and the Mahury river. The harbor is insecure and shallow. The streets are well paved and regularly laid out, but the climate is hot and unhealthful. Sugar, gold, hides, woods, spices, and cacao are the principal exports. Thirty miles northwest is the Isle du Diable, "Devil's island," where Captain Dreyfus was imprisoned from 1894 to 1899. Population, 13,527.

Christ of the Andes. A bronze statue of Christ on the border of Chile and Argentina erected to commemorate the peaceful settlement in 1902 of a boundary dispute between the two countries. The statue, more than twice life-size, stands on a pedestal roughhewn from the natural rock near the summit of the Cumbre pass in the Andes at an altitude of 12,796 feet. It was cast from bronze obtained by melting cannon.

Cordoba (*kôr'dō-bä*). A commercial city of central Argentina, situated on the Rio Primero, about 400 miles northwest of Buenos Aires. Live stock, wool, and hides are shipped from this city. Cordoba has a cathedral, a massive Jesuit church, a national observatory, two national colleges, and a university, the last founded in 1613. The city dates back to the year 1573. For many years it was the head of the Jesuit missions in South America. Population, about 160,000.

Easter Island. An island possession of Chile, lying about 2000 miles to the west in the Pacific Ocean. It contains a number of colossal stone images made, apparently, by a race which has disappeared and left no other record of its existence.

Falkland Islands. A group of about 100 small islands, forming a British crown colony situated in the south Atlantic Ocean, about 300 miles east of the Strait of Magellan. Only two of the islands are inhabited—East Falkland, with an area of 3000 square miles, and West Falkland, having 2300 square miles of surface.

The surface of the larger islands is treeless. Sheep farming was formerly the chief industry, but in recent years whaling has become more important. The climate is equable but cool and damp. South Georgia, the South Orkneys, the South Shetlands, the Sandwich group, and Graham's Land, all lying some hundreds of miles to the southeast, are regarded as dependencies of the Falkland islands. In 1920 the population of the islands was 3271. The capital is Stanley, East Falkland. During the World War, a British fleet defeated a German fleet near these islands.

Galapagos (*gä-lä'pä-gôs*) **Islands.** A group of small volcanic islands, sometimes called the Colon archipelago, lying about 600 miles west of the coast of Ecuador. They have an estimated area of 2400 square miles and a population of about 400. Politically, they are a dependency of Ecuador. Sugar cane is the chief crop.

The name means turtle islands, and was given because of the prevalence of large turtles described in 1858 by Darwin as capable of carrying several men on their backs. The flora and fauna are distinctive, about one-half of the species of plants being found nowhere else.

Georgetown. The capital and seaport of British Guiana, situated near the center of the colony's coast line. The city lies at the mouth of the Demarara river, which can be entered, however, by boats of light draft only. The chief exports are sugar, rice, coconuts, gold, and diamonds. The streets cross each other at right angles. Some are 100 feet wide and have, in the center, canals leading to the roadways. Most of the better residences are surrounded by private groves of palms and other forest trees. Water is obtained from artesian wells. Population, 53,422.

Guayaquil (*gwī'ä-kēl'*). The largest city and chief port of Ecuador, situated on the Guayas river about 30 miles from its mouth in the Gulf of Guayaquil. The principal export is cocoa. The climate is hot and unhealthful. Manufactures, including lumber, machine shop products, and artificial ice, are mainly for local consumption. Population, about 100,000.

Juan Fernandez Island. An island possession of Chile in the Pacific Ocean, lying 400 miles west of Valparaiso. Alexander Selkirk lived here in solitude for four years. This fact is said to have suggested to Defoe the theme of *Robinson Crusoe*.

La Paz (*lä päs'*). The largest city of Bolivia and the seat of Congress, situated in the west central part of the country about 40 miles southeast of Lake Titicaca. The city has an elevation of 12,470 feet and is flanked by ranges of the Andes mountains. It is connected with the sea by two railroads, terminating at ports in Chile. The inhabitants are mostly Indians, and a large proportion of the houses are built of clay. The streets are narrow and irregular. There are, however, two fine public promenades, a university, and a museum containing a valuable collection of Inca antiquities. Population, estimated in 1918, 107,252.

Lima (*lē'mä*). The capital of Peru. It is situated in the west central part of the country on the Rimac river seven miles from Callao, its port, with which it is connected by two railroads, one on each side of the river. Lima is connected also with Concepcion, a trade center on the eastern slope of the Andes, by a railroad which, at one point, is 15,000 feet above the sea. Earthquakes have several times destroyed large parts of the city.

There are several beautiful squares and promenades lined with trees and flowering plants and ornamented with statues and fountains. The University of San Marcos, founded here in 1551, is the oldest university in the western hemisphere. Of the numerous churches, the largest and finest one is the cathedral. It contains the tomb of Pizarro, the founder of the city. The manufactures include pottery, copper and iron wares, stamped leather, and furniture.

During the war between Chile and Peru, the Chileans held Lima from 1879 to 1881 and in that time destroyed the national library and many monuments, statues, and other works of art. This city was the home of Saint Rose of Lima, the first native inhabitant of the Americas to be canonized. Population, 176,467.

Magallanes (*mä'gäl-yä'näs*). The most southerly city in the world, a port in southern Chile on the Strait of Magellan. Formerly known as Punta Arenas, it is a port of call and a coaling station for steamers passing through the strait and has a trade in wool, skins, and beef. Population, about 4000.

Manaos (*mä-nä'ôs*). A city of Brazil on the Rio Negro, 12 miles above its junction with the Amazon and about 1000 miles from the Atlantic. Manaos is the trading metropolis of the upper Amazon valley, upon which it draws for such articles of export as rubber, brazil nuts, and dyewoods. The city is well built and has a good harbor, accessible to ocean steamers. Manaos became the capital of the state of Amazonas in 1852. Population, 75,704.

Montevideo (*mŏn'tē-vĭd'ē-ō*). The capital and chief city of Uruguay, situated on a chain of hills overlooking a harbor on the north side of the Rio de la Plata. The harbor has been improved so that it will accommodate all but the largest ocean steamers.

The principal streets are wide and straight, and the city bears, in general, a European appearance, having all the modern municipal improvements and many fine residences. The Cagancha plaza and the Solis theater are among its more notable features. An equable climate makes possible an extensive cultivation of roses.

The city is cosmopolitan and handles all the foreign trade of the country. The chief industries are those connected with stock raising—the drying and packing of meats, and creamery and tannery operations. Montevideo is the seat of a military college and of the University of Uruguay. The name is a corruption of *montem video*, "I see the mountain," said in allusion to the Cerro, a picturesque mountain on the opposite side of the city's harbor. Population, 1923, 350,956.

Para (*pä-rä'*). A seaport of northeastern Brazil, situated on the Rio Para about 85 miles from the Atlantic Ocean. Para is one of the largest rubber exporting points in the world and is the headquarters for the navigation on the Amazon. Other exports include cocoa, rice, cotton, and various forest products of the Amazon valley. The city is officially called Belem. Population, 275,167.

Paramaribo (*pär'ä-mär^{e}ĭ-bō*). The capital of Dutch Guiana, situated at the head of navigation on the Surinam river 16 miles from its mouth in the Atlantic Ocean. The climate is very hot, the mean yearly temperature being over 80° F. The town has regularly laid out streets, shaded by

tamarind and orange trees and bordered by well built houses. A commodious harbor lined with wharves enables the town to handle the colony's commerce, most of which is with the Netherlands, Great Britain, and the United States. The chief exports are rice, sugar, rum, coffee, bananas, and gold. Population, 1920, 50,560.

Patagonia. A name formerly applied to the portion of South America stretching from the Strait of Magellan about 1200 miles north to the latitude of the Rio Negro. It was claimed both by Argentina and by Chile, and was divided between them in 1881 by a line of demarcation following the ridge of the Andes mountains. From that time the name has been restricted to southern Argentina, the part of the disputed territory sloping in terraces eastward from the mountains to the Atlantic Ocean.

Pernambuco (*pĕr'năm-bōō'kō*). A commercial city and port of Brazil, situated on the Atlantic coast at the extreme eastern point of the continent. The harbor is protected from the sea by a long reef and by a breakwater constructed at a cost of about 28 million dollars. Its distance from Lisbon is less than that between New York and Lisbon. The chief articles of export include sugar and cotton. The imports are mainly foodstuffs, textiles, and iron products.

The city consists of three parts, one built on a peninsula, one on an island, and a third, a pleasant residential section on the continent. Pernambuco is therefore often called the Venice of South America. The climate is tropical.

The city has many fine churches and a celebrated law school. In population and wealth it ranks third among the cities of Brazil. The name Recife, "reef," is also used to designate Pernambuco. The first settlement on the site was made in 1535 by Pereira, a Portuguese adventurer. Population, 238,843.

Port of Spain. The capital of Trinidad and Tobago, situated in the northwest extremity of Trinidad. It has a fine harbor, and a large part of the products of the Orinoco basin are shipped from the port. The streets are wide and there are a number of fine residences and public buildings; also a university and a botanical garden. The name is an inheritance of Spanish rule in Trinidad. Population, 70,146.

Punta Arenas (*pōōn'tä ä-rā'näs*). See *Magallanes.*

Quito (*kē'tō*). The capital of Ecuador, situated in a mountainous plateau somewhat north of the country's geographical center and about 114 miles from the Pacific Ocean. The city is less than ten miles south of the equator, but its climate is rendered equable by its elevation of 9000 feet. It is built at the foot of a volcano and is traversed by two deep ravines. The streets are steep.

Quito was very difficult of access until the completion in 1903 of a railroad connecting the city with tidewater near Guayaquil. There is a university, an astronomical observatory, and a botanical garden which has the distinction of being the highest in the world. Quito was the central town of an ancient Indian nation until it was taken by the Incas in 1470. It was captured from the Incas by the Spaniards in 1534. Estimated population, 81,000.

Rio de Janeiro (*rē'ō dā zhä-nā'rō*). The capital and largest city of Brazil, situated on a natural harbor near the center of the country's southeastern coast. Spurs from near-by mountains penetrate into the heart of the city, which spreads into the valleys and up the hillsides. Sugar-loaf peak rises abruptly above the city.

The interests of Rio de Janeiro are chiefly commercial. The leading export is coffee and the principal imports include cereals, coal, textiles, and machinery. Manufactures are confined mainly to textiles and flour. The city is also the headquarters of the Brazilian fleet.

Many of the streets in the older section of Rio de Janeiro are too narrow for wheeled vehicles. The newer portions, however, have wide, well paved avenues adorned with tall palm trees. On the Avenida Presidente Wilson, stands a colossal bronze figure, representing Amicitia, "friendship," which was presented in 1922 by the government of the United States on the occasion of the World's Fair, held at Rio de Janeiro in celebration of the centennial of Brazilian independence. At the base of the pedestal are four statues representing Washington, Lincoln, Bonifacio, and Branco.

There are several fine parks and squares. The Praça 15 de Novembro is surrounded by imposing buildings, among which are the Senate house and the city hall. In the neighborhood is the former Imperial palace, occupied from 1808 to 1821 by the court of Portugal and now used as a national museum. Other institutions of education and research include the national library, the botanical garden, the historical and geographic institute, the observatory, and the University of Rio de Janeiro, the last having been opened in 1920.

Rio de Janeiro was founded by Portuguese colonists in 1567 and became the capital of Brazil in 1762. Population, 1,157,873.

Rosario (*rō-sär'rē-ō*). A commercial city of Argentina, situated on the left bank of the Parana river, about 230 miles above Buenos Aires. Rosario is the trade center for northern Argentina, being served by six railroads which connect at the city with ocean steamers. The chief exports are wheat and animal products, and the imports consist mainly of manufactured goods, mostly textiles. The city has modern improvements and attractive residential districts. Population, about 265,000.

Santiago (*sän'tē-ä'gō*). The capital and largest city of Chile, situated near the center of the country about 50 miles from the Pacific coast. The city lies at the northern edge of a rich agricultural district for which it is a distributing point and market.

Santiago's location is highly picturesque by reason of the surrounding mountains. A rock within the city, over 200 feet in height, once used as a citadel and a refuge from attacking Indians, is now a park, irrigated and supporting a luxuriant growth of vegetation. The city is traversed by a wide, ornate boulevard, the Avenida de las Delicias, which has a width of more than 300 feet.

Among the city's more impressive buildings are the exposition palace, the hall of Congress, the municipal theater, the cathedral, and the university building. At the head of the institutions of education and research stand the University of Chile and the agricultural school farm, an institution which embraces a zoological garden, a museum of natural history, and various schools for teaching different branches of rural industry. The city was founded in 1541 by Pedro de Valdivia. Population, 507,296.

Santos (*sän'tōōsh*). A large seaport of Brazil, situated on Santos bay on the Atlantic coast about 200 miles southwest of Rio de Janeiro. Santos is the world's largest coffee shipping port, being the outlet for the coffee collected at Sao Paulo. Population, 80,931.

Sao Paulo (*soun pou'lōō*). The capital of the state of Sao Paulo, Brazil, situated in the southeastern part of the state 25 miles inland from Santos, its port on the Atlantic Ocean. The city is the headquarters of the country's vast coffee industry. The coffee is transported from the plantations by a network of railroads leading to Sao Paulo, whence it is sent on by rail to Santos.

Among the more imposing buildings are the cathedral, the government building, and the Ypiranga palace, erected to commemorate Brazil's declaration of independence. The city has a modern appearance, having grown very rapidly in the decades following 1900, when numerous immigrants were attracted to it. Population, 579,033.

Sucre (*sōō'krā*). The statutory capital of Bolivia and the seat of the supreme court, picturesquely situated on a wide plateau about 150 miles south of the country's geographical center. The city is a trade center for a rich agricultural and mining region and has rail connection with La Paz, and with Mollendo and Antofagasta on the Pacific coast. Sucre is the seat of an archbishop and has a normal school and an ancient university. Since 1898 Congress has met at La Paz. The city is 9328 feet above the level of the sea. Population, estimated in 1918, 29,686.

Tobago. An island situated 22 miles northwest of Trinidad and incorporated with it, for purposes of administration, to form the British colony of Trinidad and Tobago. Its area is 114 square miles and its population is 23,390. The chief products are cacao and coconuts. The island is frequently visited by tourists.

Trinidad. An island dependency of Great Britain, lying in the Atlantic Ocean, about ten miles off the northeast coast of Venezuela near the delta of the Orinoco river. Its area is 1863 square miles. The interior is a series of rolling, well watered plains, partly covered by magnificent forests of palms, breadfruits, tamarinds, and bamboo trees. The climate is malarious, except on the low mountain ranges, which parallel the north and the south coast.

The most valuable products include sugar, cocoa, petroleum, and asphalt. The asphalt comes partly from a reservoir of the mineral covering an area of 114 acres and known as Pitch lake. The island's trade is principally with Great Britain and the United States.

Negroes and people of East Indian origin make up the majority of the population, which amounts to about 345,000. The capital is Port of Spain. The island belonged to Spain from the time of its discovery by Columbus until 1802, when it was ceded to Great Britain. For administrative purposes it is combined with Tobago, an island to the northeast, to form the colony of Trinidad and Tobago.

Valparaiso (*väl'pä-rī'sō*). The chief seaport of Chile, situated on a bay at the approximate center of Chile's coast line. The port is strongly fortified. The chief imports are textiles and other manufactured goods. The leading articles of export include agricultural products and Chile saltpeter. Its trade increased considerably as a result of the opening of the Panama canal.

The city was one of the first in South America to introduce such modern improvements as the use of street cars, of gas, and of aqueducts for the water supply. There are a number of wide streets and a fine square adorned with many statues. Population, 1920, 182,242.

EUROPE

THE continent consisting of the northwestern portion of the vast land surface in the eastern hemisphere. Europe may be regarded as a western peninsula of Asia, from which it is divided, more or less arbitrarily, by the Ural mountains, the Caspian Sea, the Caucasus mountains, the Black Sea, the Bosporus strait, the Sea of Marmora, the Dardanelles strait, and the Ægean Sea. To the south of Europe lies the Mediterranean Sea, which separates the continent from Africa. This inland sea communicates with the Atlantic Ocean by the Strait of Gibraltar, where Europe's most southern point, Cape Tarifa, is no more than nine miles from Africa's northern extremity. The continent is bounded by the Atlantic Ocean on the west and by the Arctic Ocean on the north. The continental part of Europe, as distinct from the islands, is often referred to as "the continent" by people in the British isles and in America.

Size. With the exception of Australia, Europe is the smallest of the continents, covering about 3,900,000 square miles, or very little more than the area of the United States and Alaska. It includes, with all its outlying islands, little more than 7 per cent of the total land surface of the globe. Its greatest length from east to west is 3300 miles, and its maximum extent north and south is about 2400 miles.

Outline and Islands. Europe has a contour diversified by so many irregularities, great and small, that the coast line, winding about all the indentations of the mainland and of the chief islands, has a length of nearly 48,000 miles. The islands and peninsulas, occupying about one-third of the total area of the continent, partially enclose a number of large gulfs and inland seas. Thus, while the small inlets provide numerous harbors, the inland seas make all parts of the continent comparatively easy of access from the sea.

In the extreme northeast, the islands of Nova Zembla separate the Kara Sea from Barents Sea, the latter being shut off from the Arctic Ocean by the islands of Spitsbergen. From the southwest corner of Barents Sea, a strait, called the Gorlo, leads into the White Sea, a three-pronged gulf sheltered behind the Kola peninsula. The Kola peninsula is, itself, part of the huge Scandinavian peninsula, which encloses the Baltic Sea and its three major inlets, the Gulf of Bothnia, the Gulf of Finland, and the Gulf of Riga. The Scandinavian peninsula trends in a general southwestern direction and terminates in two diverging extensions, which open like jaws above the peninsula of Jutland and are separated from it by two straits, the Kattegat and the Skagerrack. The Jutland peninsula and part of the Scandinavian peninsula form the eastern shore of the North Sea, which, stretching westward to the British Isles, has a southwestern outlet through the English channel to the Atlantic Ocean. The British Isles consist of two principal islands, Great Britain and Ireland, separated by the Irish Sea. Dunmore Head on the southwestern coast of Ireland is the most westerly point of Europe. The Bay of Biscay is the only large western inlet.

The southern coast has three major peninsulas—the Iberian peninsula, Italy, and the Balkan peninsula. Between the Iberian peninsula and Italy, in the Mediterranean Sea, lie the Balearic islands, and the three islands—Corsica, Sardinia, and Sicily—which, with Italy, enclose the Tyrrhenian Sea. The Gulf of Taranto stretches inland between the toe and the heel of the bootlike peninsula of Italy, and the whole peninsula is separated by the Adriatic Sea from the Balkan peninsula, which, on its eastern side, is washed by the Ægean Sea, the Black Sea, and the smaller bodies of water connecting the two. The Ægean Sea is dotted with small islands, most of which cluster in archipelagoes known as the Cyclades and the Sporades.

At a distance from the continent, about 700 miles northwest of the Scandinavian peninsula, lies the large mountainous island of Iceland.

Surface. The average elevation of Europe is less than that of any other continent except Australia. The highest point is Mount Elbruz, in the Caucasus range, the peak of which reaches a height of 18,465 feet. Marked changes in land level at the coast have been observed within historical times. The land about the Gulf of Bothnia has risen, and the southern shore of the North Sea has subsided. On the eastern side of the Adriatic Sea near modern Rovigno, the island town of Cissa, which was flourishing in the 7th century, is now 85 feet below the sea.

Apart from the Ural and the Caucasus range, there are two chief systems of mountains in Europe—the Kiolen range, forming a longitudinal ridge in the Scandinavian peninsula, and an irregular group of ranges trending in a general east and west direction across southern Europe. This latter group consists of the Pyrenees range, which cuts across the neck of the peninsula of Spain; the Alps, forming a central highland north of Italy; the Apennines, extending to the southern extremity of Italy and finding a continuation in the mountainous regions of Sicily; the Carpathian mountains, extending northeast of the Alps for some distance and then turning southeast toward the Black Sea; the Pindus range, which forms the backbone of Greece; and the Balkan mountains passing eastward north of the Ægean Sea. Other mountainous regions are Iceland, Scotland, and Spain.

Volcanic activity is confined to Iceland and to the Mediterranean region and is most marked in southern Italy, Sicily, and the adjacent islands. Here are situated Mount Stromboli, Mount Etna, and Mount Vesuvius, the last being notable for the eruption which, in 79 A. D., buried the cities of Herculaneum and Pompeii.

A large part of Europe's area consists of fertile plains. Western and northern France, northern Germany, and almost the whole of European Russia constitute what is sometimes called the Great Lowland Plain. Other plains are the Central Plain, occupying Ireland and England; the Plain of Lombardy, south of the Alps; the Hungarian Plain, hemmed in by the Carpathian mountains and by the highland extending from the Alps southeastward into Greece; and the Wallachian Plain, between the southern Carpathians and the Black Sea.

Drainage. Of the many rivers of Europe, only one, the Volga, is more than 2000 miles in length, and, of the others, only the Danube, the Dnieper, and the Don exceed a length of 1000 miles. With few exceptions, however, the rivers admit of navigation. Thus the rivers, as well as the irregular outline, contribute toward making the interior of the continent readily accessible from the coasts.

The chief rivers draining northward, named in order from east to west, are the Pechora, the Dvina, the Duna, the Vistula, the Oder, the Elbe, the Rhine, and the Seine. The Loire and the Gironde River system flow westward into the Bay of Biscay. The plateau of Spain is drained toward the Atlantic Ocean by the Douro, the Tagus, the Guadiana, and the Guadalquivir and, toward the Mediterranean Sea, by the Jucar and the Ebro river. Of the rivers of southern drainage, the Rhone flows into the Golfe du Lion, an inlet of the Mediterranean Sea; the Po, into the Adriatic Sea; the Danube, the Dniester, and the Dnieper, into the Black Sea; the Don, into the Sea of Azof, a northern inlet of the Black Sea; and the Volga, into the Caspian Sea.

Fresh-water lakes are particularly numerous in three regions—the highlands of the Alps, the British isles, and the territory east and northwest of the Baltic Sea. The last-mentioned region contains by far the most lakes, including the two largest of the continent—Ladoga and Onega.

Climate. Europe lies almost entirely in the temperate zone, a small portion only projecting into the arctic region. The northern part, however, has a warmer climate than other regions of the same latitude on account of warm ocean currents which wash its shores. The southern limit of drift ice from the polar regions nowhere approaches within 50 miles of the Scandinavian peninsula. The northern interior plains, however, suffer much greater extremes of temperature than those occurring near the coast. The southern part of Europe has a subtropical climate.

Europe is the only continent which has no desert region. Warm, moisture-laden winds blow prevailingly from the southwest. In the absence of a mountain wall running north and south, these winds are able to carry their moisture far inland, instead of being intercepted and losing it by precipitation near the coast.

Plant and Animal Life. There are three chief plant regions in Europe—the arctic, possessing scanty vegetation; the intermediate, comprising forest areas,—largely coniferous,—and level steppes which resemble the North American plains; and, lastly, the Mediterranean region in the south. The last is noted for the great variety and economic importance of its flora.

Next to Asia, Europe has contributed to the human race more cultivated plants than any other continent. The more important include, among the grains, oats and rye; among the vegetables, asparagus, beet, cabbage, carrot, endive, horseradish, lettuce, pea, and turnip; the forage plants, clover and timothy; and such fruits as the currant, gooseberry, and fig.

The fauna likewise is rich. It has a general similarity to that of North America. The characteristic mammals include the bear, lynx, badger, wolf, fox, otter, marten, ermine, polecat, squirrel, hedgehog, and rabbit. The desman and chamois are peculiar to the continent. In the south, the fallow deer, ibex, alpine marmot, and civet are found. Of the domesticated animals, Europe is the original home of the goose, pigeon, rabbit, reindeer, and swan.

Minerals. The geology of Europe reveals an immense wealth of mineral resources. Coal and iron are produced in the greatest aggregate value. The chief coal fields are those in Great Britain, in Upper Silesia, in the Ruhr district in Germany, in northeastern France, and in Russia. The Lorraine district in France, the Saar valley in Germany, and northern and central England are the most important iron producing regions. Spain and Upper Silesia produce the world's chief supply of zinc, as Russia normally does of platinum. Spain, Jugoslavia, and Italy supply the world's market for quicksilver. Other mineral products of the continent include salt, sulphur, gold, silver, lead, tin, copper, and marble.

Industries. Agriculture is still the principal occupation of Europe, although the continent contains several of the most thoroughly industrialized countries in the world. The agricultural products are, in the main, such as are grown in North America, but, in quantity, they are insufficient for the needs of the continent. The deficiency is supplied by importation from all parts of the world.

Inhabitants. Human habitation in Europe is very ancient. In various districts, remains of prehistoric men have been found, the earliest going back probably 200,000 years to the second interglacial period.

The present inhabitants, numbering about 445 million, are almost entirely confined to the white race. They are believed to have arrived in successive migrations from Asia. It is in Europe, however, that these peoples have attained to the development in government, art, science, and industry which has made the history of Europe substantially the history of civilization.

POLITICAL DIVISIONS

Europe has more independent countries than any other continent. They comprise Albania, Andorra, Austria, Belgium, Bulgaria, Czechoslovakia, Danzig, Denmark, Esthonia, Finland, France, Germany, Great Britain and Northern Ireland, Greece, Hungary, Iceland, Irish Free State, Italy, Jugoslavia, Latvia, Liechtenstein, Lithuania, Luxemburg, Monaco, the Netherlands, Norway, Poland, Portugal, Rumania, Russia, San Marino, Spain, Sweden, Switzerland, and Vatican City.

Of these divisions, the Irish Free State is a self-governing dominion of the British Empire. Its geography, along with that of Northern Ireland, is treated under the head of Ireland. Danzig is a free city under the protection of the League of Nations. Vatican City is 106 acres of papal territory within the city of Rome. Andorra is a mountainous, pastoral country between France and Spain; Luxemburg is surrounded by France, Germany, and Belgium; and Liechtenstein is a small principality hemmed in by Austria and Switzerland. These countries, as well as San Marino, an ancient state surrounded by Italian territory in the northeastern part of the peninsula, will be found described from a geographical point of view in the departments of history and government.

In addition to the independent states, there is a territory north of the Sea of Marmora forming part of Turkey. Gibraltar, a bold promontory near the southern extremity of the Iberian peninsula, and the island of Malta and of Gozo, lying in the Mediterranean Sea south of Sicily, are dependencies of Great Britain.

Albania. A mountainous country on the west of the Balkan peninsula with a coast line on the Adriatic Sea. Albania's surface covers about 17,374 square miles according to official estimates based on the boundaries as determined in 1925. Even the most fertile land, which lies mainly along the seashore, is very inadequately cultivated. The population, estimated at 830,000, is still largely under a tribal organization and supports itself mainly by a primitive type of agriculture. About two-thirds are Moslems, the remainder being Roman or Greek Catholics. Tirana is the provisional capital; Scutari, the largest city, has about 32,000 inhabitants.

Austria. An inland republic of central Europe, bounded on the north by Germany and Czechoslovakia and on the remaining sides by Hungary, Jugoslavia, Italy, and Switzerland. The western part, known as the Tyrol, is a mountainous region, widely celebrated for its bold, picturesque scenery. In the north, Austria is traversed by the Danube river, which provides a navigable waterway several hundred miles in length.

On an area of 32,352 square miles, Austria supports a population numbered in 1920 at 6,428,336. In spite of the predominance of agriculture among the industries, the country is obliged to import grain. The chief exports are lumber, iron ore, fruits, beet sugar, paper, furniture, and chemicals. The manufactures include pianos, automobiles, and textiles.

The constitution of the country provides for complete freedom of religion. About 94 per cent of the inhabitants are Roman Catholic. There is a system of compulsory elementary education. The largest of the three state universities is situated in the capital, Vienna (pop., 1,841,326), a city which has for centuries been a center of learning and of art. Other important cities are Graz (157,644), Lienz (94,072), and Innsbruck (55,650).

Belgium. A small, densely populated kingdom of Europe with a northwestern coast line on the North Sea. The country is bounded by France on the southwest, by Luxemburg and Germany on the east, and by the Netherlands on the north. Its area is 11,752 square miles, on which a population of 7,478,840 supports itself. Belgium, therefore, with

about 636 inhabitants to the square mile, is the most densely populated country on the earth.

Nearly all the surface of Belgium is arable and is intensively cultivated. The country is also industrially one of the most highly developed in the world, being favored in this respect by the occurrence of coal and of iron deposits in close proximity to each other. Zinc is another metal produced extensively. The chief manufactures include textiles and laces, automobiles and other steel products, glass, and beet sugar. These products rank in the same order by value in the country's exports. Other articles shipped abroad in important quantities are chemical products, coal, hides, zinc, and flax.

Two languages are spoken in Belgium—French in the south by the Walloons, a people of Celtic origin, and Flemish in the north by the Flemings, who are of the Teutonic race. The majority of the inhabitants professing a religion are Roman Catholics. Of the country's four universities, Louvain is the most celebrated. The capital and largest city is Brussels. Other cities of note are Antwerp, Ghent, Liege, and Ostend.

Bulgaria. A mountainous kingdom of south eastern Europe with an eastern coast line on the Black Sea. Bulgaria lies between Rumania on the north and Greece on the south and stretches westward to the borders of Jugoslavia. Its area is 39,841 square miles.

The Balkan mountains divide southern Bulgaria from the northern zone, in which a cool climate and a fertile soil foster agriculture of a temperate zone type. In the warmer region south of the mountains, fruits, rice, and various flowers, especially roses, are cultivated extensively. The perfume attar of roses is a distinctively Bulgarian product. Apart from it, the chief exports are tobacco, corn, hides, and wheat. The Danube river, which constitutes the northern border of Bulgaria, provides, with its affluents, important water highways for trade.

Agriculture of various kinds engages the activities of about two-thirds of Bulgaria's population, which, in 1926, amounted to 5,483,125. The prevailing religion is Greek Catholicism. Elementary instruction is free and obligatory. There is one university, which is situated in Sofia, the capital and largest city of the country. The following table shows the chief cities with their populations in 1926:

City	Population	City	Population
Sofia	213,120	Rustchuk	45,672
Philippopolis	84,891	Sliven	29,280
Varna	60,761	Plevna	29,058

Czechoslovakia (*chĕk'ô-slô-vāk'ĭ-ā*). An inland republic of central Europe. The country is narrow and elongated, lying in a general east and west direction. The western part projects into Germany. Poland lies to the north of the country and Austria, Hungary, and Rumania are its immediate neighbors to the south. The northeastern boundary follows the ridge of the Carpathian mountains, which, near the center of the country, send a spur southward. This spur divides the western section, inhabited by the Czechs and consisting of the provinces of Bohemia, Moravia, and Silesia, from the eastern part, in which the Slovaks dwell. The area of the country is 54,241 square miles.

In wealth of natural resources and in industrial development, Czechoslovakia is the most favorably situated of the countries formed at the dissolution of the former Austro-Hungarian empire. About one-third of its area is covered with valuable forests. The soil is fertile and supports an extensive and intensive agriculture, the chief crops being potatoes, sugar beets, wheat, rye, barley, oats, and hops. Large quantities of temperate zone fruits are shipped abroad. The coal deposits are extensive and provide a large surplus for export. Gold, silver, copper, lead, and rock salt are also found. The textile, porcelain, glass, furniture, sugar, chemical, and metal factories of the republic, place Czechoslovakia among the more important manufacturing countries of Europe. Transportation is provided by the Elbe river in the north, by the Danube river in the south, and by nearly 9000 miles of railway.

The population is 13,610,405, of whom about 6,000,000 are Czechs, 3,700,000 are Germans, and 1,700,000 are Slovaks. Approximately 85 per cent of the inhabitants are Roman Catholics in spite of the fact that the provinces of Bohemia and Moravia constituted one of the earliest centers of Protestantism. The Moravian church in America was founded by emigrants from this region. There is practically no illiteracy, except in the one province of Slovakia. The country has 4 universities, 4 technical high schools, and nearly 200 agricultural schools. The capital and largest city is Prague. Other cities of note include Brunn, Pressburg, and Pilsen.

Danzig (*dän'tsĭk*). A free city under the protection of the League of Nations. It is situated about the mouth of the Vistula river on the Gulf of Danzig, a southern inlet of the Baltic Sea. Within its area of 754 square miles it includes the incorporated district of Danzig, several other cities, and a number of rural municipalities, the total population being about 384,000. Danzig is the maritime outlet for the grain, sugar, lumber, and other products of Poland and of East Prussia.

The industrial establishments of the incorporated district include sugar refineries, machine shops, flour mills, distilleries, breweries, rolling mills, and shipyards. There are also enormous granaries for the accommodation of the vast stores of grain exported. Danzig was formerly a part of Prussia and was strongly fortified. The Hohe Thor, "High Gate," the only part of its former walls still standing, is built in the style of a Roman triumphal arch. Among the many fine specimens of antique architecture is the large Church of Saint Mary, begun in 1343, which contains the celebrated painting "The Last Judgment," attributed to Memling. Population, 226,000.

Denmark. A small kingdom of northern Europe, consisting of the greater part of the Jutland peninsula and of several adjacent islands, the largest of which are Zealand and Funen. The Faroe islands, lying nearly midway between Scotland and Iceland, are administratively a part of Denmark. The total area of the country is 16,568 square miles. Greenland is a colony of Denmark. Iceland is an autonomous state under the Danish monarchy and is subject to Danish control in foreign affairs.

The surface of continental Denmark is a low rolling plain nowhere exceeding 570 feet in altitude. Sand dunes fringe much of the coast line, often extending five or six miles inland. Considerable areas of peat bog provide fuel for the inhabitants. Forests, mainly of beech trees, cover about 750 square miles. Apart from lumbering, the principal industries are agriculture, dairying, and fishing. The value of the annual catch of fish is considerably in excess of ten million dollars. There is no country in the world where mixed farming is carried on with more scientific skill than in Denmark. The farms are small. Butter, eggs, and bacon account for considerably more than half the exports. The farm produce is marketed largely by co-operative societies. Copenhagen porcelain is a distinctive product of the country's manufacturing industry.

The population of Denmark is 3,434,555, most of whom are Lutheran Protestants in religion. Illiteracy is virtually nonexistent, elementary education having been obligatory since 1814. The University of Copenhagen stands at the head of the educational system, which is of the most enlightened type and is well adapted to the agricultural interests of the people. The capital, Copenhagen, is situated on the island of Zealand. With a population of 731,496, it contains more than one-fifth of the

inhabitants of the country. Other cities are Aarhus (76,226), Odense (52,376), and Aalborg (42,819).

A territory known as Northern Schleswig was added to Denmark in 1920 as a result of the Treaty of Versailles This territory had been wrested from the Danes by Germany in 1864.

Esthonia (*ĕs-thō'nĭ-ȧ*). An agricultural country of northern Europe, republican in government, with a coast line on the Gulf of Finland in the north and on the Baltic Sea in the west. Esthonia was formerly a province of Russia. Its area is 16,955 square miles, and the population is 1,109,479.

Much of the surface is forested, and there are large areas of bog and of heath. The climate is severe. The chief crops are rye, barley, potatoes, and wheat. Timber leads the articles of export, the other principal items being potatoes, paper, flax, and meat.

Esthonia is a Protestant country, five-sixths of the total population being Lutherans. There are very few illiterate adults. Dorpat university, founded in 1632, was reopened in 1919, and, in 1921, had nearly 3000 students. The capital of Esthonia is Reval, which has a population of 123,496. Yurief, or Dorpat, with 50,000 inhabitants, is the second largest city.

Finland. One of the most northern countries of Europe, lying between the Gulf of Finland and the Gulf of Bothnia and extending northward almost entirely across the neck of the Scandinavian peninsula. The Aland islands off the southern coast are governed as part of Finland. About one-fourth of the country's 132,510 square miles of surface is within the Arctic circle. In the north, mountains rise to a height of 4000 feet, but the remainder of the country is, for the most part, a plateau having an average elevation of about 500 feet. The numerous lakes of glacial formation, which occupy 11 per cent of the area of the country, have won for Finland the name of "the land of the thousand lakes."

Although agriculture employs more workers, the industry whose products account for almost the whole of the country's export trade is lumbering. Nearly two-thirds of the country is covered with pine forests.

The population of Finland is 3,366,507. Lutheran Protestantism is the prevailing religion. The country has a well developed system of elementary, secondary, technical, and higher education, at the head of which stand two universities. The capital and largest city is Helsingfors, a city of 197,848 inhabitants, situated in the southern extremity of the country. Other important towns are Abo (58,367), Tammerfors (47,830), and Viborg (30,071).

The inhabitants of Finland are mostly of the Finnic race, which is believed to have occupied formerly the whole of northern Asia and northeastern Europe. They are, in general, tall with flaxen hair and blue eyes.

France. A republic of western Europe, bounded on the north by the English channel and on the west by the Bay of Biscay. On the south, France is separated from Spain by the Pyrenees mountains and has a southern coast line on the Mediterranean Sea. On the east and northeast, France adjoins Italy, Switzerland, Germany, Luxemburg, and Belgium. The island of Corsica in the Mediterranean Sea is politically a part of France. The coast line of the country is nearly 2000 miles in length, but, being either sandy or high and rocky, it affords few good harbors. The total area of the republic is 212,659 square miles.

The most elevated part of France is in the southeast, where the Jura mountains and the Alps divide the country from Switzerland and Italy. Mount Blanc, an Alpine mountain within the French border, is the second highest peak in Europe, having an altitude of 15,781 feet. The lower, forest-clad Vosges ridge farther north separates Alsace from the rest of France. These mountain groups form the eastern side of the Rhone-Saone River valley, which is flanked on the west by the Cevennes mountains. The Rhone, rising in Switzerland and being augmented by the Saone river, flows southward into the Mediterranean Sea. The Saone river is connected by a canal with the upper reaches of the Seine river, which, with its tributaries,—the Marne and the Oise,—drains northward into the English channel. The other chief rivers of France flow westward and empty into the Bay of Biscay. They are the Loire, to the north, and, farther south, the Garonne and the Dordogne, which mingle their waters in the broad estuary called the Gironde river.

The principal rivers are all more or less navigable and afford shelter for such seaports as Havre and Rouen on the Seine, Saint Nazaire and Nantes on the Loire, and Bordeaux on the Garonne. The rivers as highways of inland commerce are supplemented by numerous canals.

France has considerable deposits of coal centering around Valenciennes near the northeastern border. The mines of this region were wrecked by the Germans during the World War, and since that time the French have operated the German coal mines in the Saar basin. France controls nearly twice as much iron as any other European country, the mines being located in Lorraine, from which nearly one-quarter of the world's supply of iron ore is obtained. Other minerals produced in important quantities include lead, zinc, silver, copper, tin, antimony, salt, potash, manganese, arsenic, and gold.

Of the surface of France, about one-seventh is forested, and approximately three-quarters is devoted to agriculture and grazing. Wheat, rye, oats, corn, sugar beets, and potatoes are the leading crops. The average farm covers about 17 acres of ground. In the south, the climate is subtropical and fosters the cultivation of olives, peaches, apricots, oranges, mandarins, lemons, walnuts, and almonds. Apples, pears, cherries, plums, and berries are also produced in important quantities. The abundance of grapes grown in France enables her to rank as the leading wine producing country of the world. The cultivation of silkworms is an important industry in the south.

The fisheries of France are among the more important in the world. Large fleets are sent each year to catch cod about Newfoundland and about Saint Pierre and Miquelon, which lie off the south shore of Newfoundland. These two small islands constitute the sole remaining part of France's former empire in North America. Sardines are caught on France's northwestern coast and anchovies and tunny fish are obtained from the Mediterranean Sea.

The textile industries of France are famous the world over. The city of Lyon is the greatest silk center in Europe. Rouen, on the Seine river, is noted for its cotton cloth made mainly from cotton grown in the United States. A large wool industry flourishes in the northeast. Paris is the seat of manufacture for the most costly products, including tapestries, shawls, jewelry, watches, and scientific instruments. Other manufactured products include fine leather goods, the exquisite porcelains of Sevres and of Limoges, cut glass, pottery, perfumes, and similar articles requiring skill and taste for their production. France ranks third among European countries in extent of water power available for manufacturing.

The population of France is 40,743,851. The great majority of those professing a religion are Roman Catholics. Illiteracy is almost unknown. At the head of the educational system stand 16 universities, of which the University of Paris is the most notable. Apart from Paris, the capital, the great emporiums of trade include Lyon, Lille, Saint Etienne, Toulouse, Strasbourg, and Reims. The more attractive maritime ports are Marseille, Bordeaux, Le Havre, and Cette. The larger cities with their populations in 1926 are:

City	Population	City	Population
Paris	2,871,429	Toulouse	180,771
Marseille	652,196	Strasbourg	174,492
Lyon	570,840	Le Havre	158,022
Bordeaux	256,026	Rouen	122,898
Lille	201,921	Roubaix	117,209
St. Etienne	193,737	Toulon	115,120
Nantes	184,509	Nancy	114,491
Nice	184,441	Reims	100,998

France controls a colonial empire second only to that of Great Britain. Its total area is officially estimated at 3,958,626 square miles, excluding the Sahara desert in Africa. Over 3,500,000 sq. mi. of this total is in Africa, the remainder being chiefly in Asia. French territory in the western hemisphere includes French Guiana, in South America; Guadeloupe and Martinique, islands of the West Indies; and Saint Pierre and Miquelon, islands off the south coast of Newfoundland. The total population of the colonies is about 55,000,000, of which the African portion supports approximately 40,000,000. Practically all have a tropical climate, and France's trade with them embraces imports of such tropical products as palm and olive oil, fruit, rice, rubber, sugar, cotton, teakwood, gums, tea, and coffee. Phosphate is an important product of French Morocco. French colonial administration has been conspicuously successful in North Africa. Plans for a trans-Saharan railway have been officially approved. See *French Africa*, page 818; *French Dependencies* in Asia, page 808; *French Guiana*, page 771.

Germany. A populous commercial and agricultural country, republican in government, situated in north central Europe with a short coast line on the North Sea and a longer one on the Baltic Sea. A part of Germany, called East Prussia, having a coast line on the Baltic Sea, is separated from the rest of the country by the "corridor" which gives Poland access to the sea. The total area of the country is 180,976 square miles.

The northern portion of Germany forms part of the Great Northern Lowlands and is, for the most part, flat. Its soil is not very fertile, and forests alternate with heaths, morasses, and small, shallow lakes. Central Germany may be described as hilly; its soil is fertile and its scenery is often picturesque. The greater part of southern Germany is occupied by the plateau of Bavaria. This plateau rises about 1600 feet above the sea level and increases in elevation toward the west, where it forms the Black Forest range, which reaches a maximum altitude of 9725 feet in the Zug Spitze. The mountains of Germany as a rule are worn low and are clothed with beautiful forests, about two-thirds of which consist of coniferous trees.

Apart from the South, which is traversed by the upper reaches of the Danube river flowing from west to east, Germany is drained northward by five rivers, all of which are navigable. The Rhine, lying farthest to the west, rises in the Swiss Alps. Most of its course is in Germany, but its several mouths are situated in the Netherlands. The other rivers are the Ems,—which receives an intermittent flow from the Rhine,—the Weser, the Elbe, and the Oder. The Rhine is connected by canals with the Danube and with the Rhone river.

The mineral deposits of Germany are among the richest in Europe. The coal mines are chiefly in the Saar valley adjoining Lorraine and in the Ruhr valley farther north. The Saar mines, however, were assigned to France by the Treaty of Versailles to be operated for 15 years. The Ruhr mines form the nucleus of Germany's richest industrial district. The remaining coal field of greatest value is in the Erzgebirge range adjoining Czechoslovakia in the east, where zinc and iron are also obtained. Silver and copper are mined in the Harz mountains, a low, isolated range in central Germany. Germany produces the bulk of the world's supply of potash. Other minerals which are obtained in exportable quantities include cobalt, arsenic, sulphur, saltpeter, alum, gypsum, bismuth, pumice stone, slate, ocher, emery, and vitriol. The Baltic shore of East Prussia is the world's chief source of amber.

Northern Germany is, agriculturally, the most productive part of the country. Potatoes, which are a staple food of the people, form the leading crop, hay ranking second in value of production. Other crops are wheat, sugar beets, rye, oats, barley, tobacco, and flax. The valley of the Rhine produces large amounts of grapes, from which the famous Rhenish wine is made. Hops, grown in abundance, mainly in Bavaria, are used in the manufacture of beer. Permission to carry on lumbering operations involves the obligation to reforest the land, tree for tree. Although about one-fourth of Germany's surface is covered with forest, the consumption of lumber was so great before the World War that the commodity was imported in large quantities, chiefly from the countries bordering on the Baltic Sea.

Germany has in the past 50 years shown the most rapid industrial development of any country in the world. The chief industries are the manufacture of iron and steel products, of cotton, woolen, and linen textiles, of glass, porcelain, dyes, toys, earthenware, clocks, furniture, sugar, and liquor. German industry has shown an especial aptitude for the making of machinery and of toys. In no country has the centralization of industrial control been carried further. This has been accomplished through the creation of trusts controlling large numbers of related industries.

The population of Germany is 62,348,782, of whom about two-thirds are classified as Protestants, living mainly in the north. The prevalent religion of southern Germany is Catholic. The German educational system has long been known as one of the most efficient in the world. There are 23 universities and numerous technical and agricultural schools, besides secondary schools of two types—*Bürgerschulen*, which prepare students for business life, and *Gymnasien*, which lead to the professions.

Germany is divided into 18 states, the 5 largest of which, with the area and the population of each, are given in the following table:

State	Area Sq. Miles	Population 1925	Location in Country
Prussia	112,628	38,054,172	north
Bavaria	29,343	7,379,594	southeast
Wurttemberg	7,532	2,579,453	south
Baden	5,819	2,312,462	southwest
Saxony	5,789	4,996,138	east

The capital and largest city of the republic is Berlin. The leading cities with their populations according to the most recent census are as follows:

City	Population	City	Population
Berlin	4,013,588	Halle	193,722
Hamburg	1,079,092	Barmen	187,239
Cologne	698,064	Altona	185,135
Munich	680,704	Cassel	171,483
Leipzig	679,322	Elberfeld	167,025
Dresden	618,684	Augsburg	165,522
Breslau	554,801	Bochum	156,762
Essen	468,696	Aachen	155,222
Frankfort	461,849	Brunswick	146,654
Dusseldorf	431,096	Karlsruhe	145,694
Hanover	422,435	Erfurt	134,973
Nuremberg	392,494	Krefeld	130,425
Stuttgart	341,461	Mulheim	127,195
Chemnitz	331,641	Hamborn	126,043
Dortmund	320,256	Saarbrucken	125,800
Bremen	294,966	Lubeck	120,788
Magdeburg	292,296	Munchen-Gladbach	115,066
Konigsberg	279,880	Plauen	111,398
Duisburg	271,790	Mainz	108,552
Stettin	253,727	Munster	105,889
Mannheim	247,486	Oberhausen	105,121
Kiel	213,587	Wiesbaden	102,557
Gelsenkirchen	207,153	Ludwigshafen	101,869

Gibraltar (*jĭ-brôl'tĕr*). A rocky promontory near the southern point of the Iberian peninsula and commanding the western entrance to the Mediterranean Sea. It is a colonial possession of Great Britain. It covers about two square miles and consists mainly of a fortified rock, 1439 feet high, at the foot of which is the town of Gibraltar with about 25,000 inhabitants. The fortress was obtained by Great Britain from Spain in 1713. From 1779 to 1783, it withstood a siege of 3 years, 7 months, and 12 days at the hands of a Spanish fleet.

Great Britain. An island kingdom lying north and slightly west of France and separated from it by the English channel, which narrows from a maximum width of 150 miles near the west end to a neck in the east, 21 miles wide, called the Strait of Dover. Geographically, the term Great Britain has reference to the one large island divided, for historical reasons, into England and Wales in the south and Scotland in the north. As a political division, however, Great Britain, officially known as the Kingdom of Great Britain and Northern Ireland, includes also Northern Ireland, the Orkney islands, the Shetland islands, and the Hebrides,—three groups lying north of Scotland,—the Scilly islands and the Isle of Wight in the south, and nearly 800 smaller islands. The Isle of Man in the Irish Sea and the Channel islands,—Guernsey, Jersey, and their dependency, Sark island,—are not subject to British legislation unless specifically designated in particular enactments. The area and the population of Great Britain and of its principal divisions are given in the table of *The British Commonwealth of Nations*.

The island of Great Britain is about 700 miles long from north to south, and its width varies from 280 miles in the extreme south to 30 miles in northern Scotland, where Dornoch Firth and Loch Broom penetrate deeply into the land from opposite sides of the island. The coast line is well in excess of 4000 miles, being deeply indented by the estuaries of tidal rivers and, especially in northern and western Scotland, by deep, rocky fiords. The chief of these inlets on the eastern side, named from south to north, are the estuary of the Thames, the Wash, the Humber River estuary, the Firth of Forth, the Firth of Tay, Moray firth, and Dornoch firth. On the western side, the principal inlets are Bristol channel, Cardigan bay, the Dee River and the Mersey River estuary, Morecambe bay, Solway firth, the Firth of Clyde, and the Firth of Lorne with its continuation known as Loch Linnhe.

The seas surrounding Great Britain are shallow, rarely exceeding 300 feet in depth. This circumstance has the effect of protecting the island from the cold arctic currents, so that the country enjoys a climate much milder than that in corresponding latitudes of America. The shallow waters provide a feeding ground for fish, thereby supporting fisheries of great value.

England. A division of Great Britain comprising most of the southern part of the island and divided from Scotland on the north by a low ridge, called the Cheviot hills. The maximum length of England is 425 miles, and the width varies from 280 miles to 62 miles. The surface is, in general, a rolling plain, rising in the north to the low mountains in Derbyshire, Yorkshire, Westmoreland, and Cumberland. In the northwest is the "lake district," where occur the largest lake and the highest mountain in England—Lake Windermere, 10½ miles long, and Sca Fell, 3210 feet high. The chief rivers flowing into the North Sea on the east are the Thames, the Humber, the Tees, and the Tyne. Those flowing west include the Severn, Dee, and Mersey.

England is the largest coal exporting country in the world. The richest coal fields are located in the region of Newcastle in northeastern England and in an area 100 to 150 miles farther south, where the proximity of large iron deposits has resulted in the growth of such huge manufacturing cities as Sheffield and Birmingham. In production of iron, England holds the third place, ranking next to the United States and France. Her manufactures, however, require the importation of additional ore, which comes mainly from Spain and Sweden. The southwestern extremity of England has been the chief European source of tin since the days of the Phœnicians. Lead and zinc are mined in the northeast.

About 5 per cent of England is covered with forests, of which certain tracts, such as Epping forest near London, were formerly set aside as royal deer forests. Epping forest is now open to the public as a park. The greater part of the country's surface is fertile, and, being tilled according to the most advanced methods, it is highly productive. The well kept farmhouses and comfortable cottages, which everywhere meet the eye, give an air of neatness and beauty, distinctive of rural England. The live stock of England and of Great Britain generally is of a superior quality. No country has produced more standard breeds of domestic animals.

England was the first country in the world to become industrialized and still remains one of the greatest manufacturing nations. In the making of cutlery and other steel products and of cotton, woolen, and linen textiles, England is excelled by no other country. The shipbuilding industry of Great Britain, favored by the numerous harbors of the island, is likewise unsurpassed. British ships do a large part of the carrying trade of the world. The foreign trade of the country, including that of the crown colonies, is slightly greater than that of its nearest competitor, the United States. The total length of canals is about 3700 miles, and of railways, nearly 20,000 miles.

The population of England is about 95 per cent Protestant, the majority belonging to the Anglican, or Protestant Episcopal, Church, which is the "established church" of the country. No civil disabilities, however, attach to any British subject on account of religion. The outstanding universities of England are Oxford, Cambridge, and the University of London. Illiteracy is almost unknown. By an act passed in 1918, part time attendance at free continuation schools is required of all people up to 16 years of age, and, when the necessary facilities are provided, the age limit is extended to 18 years.

London, the capital of Great Britain, is the largest city in the world. The chief cities with their populations in 1921 are given in the following table:

City	Population	City	Population
London	7,476,168	Sunderland	159,100
Birmingham	919,438	Tottenham	146,695
Liverpool	803,118	Birkenhead	145,592
Manchester	730,551	Oldham	145,001
Sheffield	490,724	East Ham	143,304
Leeds	458,320	Brighton	142,427
Bristol	377,061	Middlesbrough	131,103
West Ham	300,905	Derby	129,836
Hull	287,013	Leyton	128,432
Bradford	285,979	Coventry	128,205
Newcastle	274,955	Walthamstow	127,441
Nottingham	262,658	Blackburn	126,630
Portsmouth	247,343	Gateshead	124,514
Stoke-on-Trent	240,440	Stockport	123,315
Leicester	234,190	Norwich	120,653
Salford	234,150	Preston	117,426
Plymouth	209,857	South Shields	116,667
Croydon	190,887	Huddersfield	110,120
Bolton	178,678	Southend	106,021
Willesden	165,669	St. Helens	102,675
Southampton	160,997	Wolverhampton	102,373

Wales. The roughly rectangular land projection west of England, which lies between the Irish Sea on the north and Bristol channel on the south. Its surface is more mountainous than that of England, the highest peak being Mount Snowdon, 3590 feet in altitude. Wales contains some of the most valuable coal beds in Great Britain, and its largest city, Cardiff, exports more coal than any other city of the world. The inhabitants are of Celtic origin

rather than Germanic, and about 40 per cent of them can still speak the native Welsh language. In religion, most of the Welsh are nonconformists, principally Methodists and Presbyterians.

Scotland. The portion of Great Britain north of the Cheviot hills. It is, in general, a more mountainous country than England. The chief rivers flowing to the east are the Tweed, the Forth, and the Tay. The Clyde is the only important river draining westward. Scotland has many beautiful lakes, of which Loch Lomond, 24 miles long, is the largest. The country is divisible, by the nature of its surface, into the highlands of the north, the central lowlands, and the southern uplands.

The highlands of Scotland occupy nearly half the country. They are remarkable for their mountainous masses, which are especially rugged along the western coast. The region is cut into two parts by the Great Glen of Scotland, a depression in which lie the elongated lakes, Loch Ness and Loch Lochy. These have been connected and made part of the Caledonian canal, which provides a waterway from Moray firth in the east to the Firth of Lorne in the west. Southwest of the Great Glen are the Grampian hills, which culminate in Ben Nevis near the center of the western coast. This mountain, having an altitude of 4400 feet, is the highest peak in Great Britain.

The southern uplands constitute a region of low mountains, none exceeding 3000 feet in height. Between them and the highlands of the north lies a fertile plain, which supports a dense population and flourishing industries.

The minerals of Scotland include coal, iron, and oil shale. Of the last named, Scotland produces about 80 per cent of the world's supply. Agriculture in Scotland is often handicapped by an excessive rainfall. Of the chief crops,—oats, barley, turnips, and potatoes,—oats are grown in the most important quantities. The southern uplands are excellently adapted to grazing, and sheep are raised in large numbers. Cheviot sheep and the Ayrshire, Galloway, Polled Angus, and Jersey cattle were first bred in Scotland, while the Shetland breed of ponies originated in the Shetland islands lying to the northeast.

The industries of Scotland are similar to those of England, consisting chiefly of textiles, steel products, and shipbuilding. At Glasgow on the Clyde are located the world's largest shipbuilding yards. Most of the Cunard liners have been built in these yards. The country is noted also for its production of whisky and of preserved fruits.

Scotland is the original home of Presbyterianism, the form of Protestantism professed by the established church of Scotland. The Roman Catholic Church is relatively stronger than in England. There are four universities in the country—Edinburgh, Glasgow, Aberdeen, and Saint Andrews. Scotland enjoys the same system of continuation schools as that described under *England*. The county authorities are empowered to provide educational books for the use of the adult population. The Gaelic language is still spoken in parts of Scotland, those able to understand the language numbering about 4 per cent of the total population.

Three-quarters of Scotland's 4,882,288 inhabitants live in towns or cities. The largest urban center is Glasgow. Edinburgh is the seat of the supreme court, Scotland having courts and a system of law differing from those of England and based on French models. The chief cities with their populations in 1921 are as follows:

City	Population	City	Population
Glasgow . . .	1,034,069	Aberdeen . . .	158,969
Edinburgh . .	420,281	Paisley	84,837
Dundee	168,217	Greenoch . . .	81,120

Greece. A maritime kingdom occupying the southern part of the Balkan peninsula and including about 500 near-by islands, of which Crete is the largest. The shores of the mainland are bold, rocky, and deeply indented. The Gulf of Ægina, stretching inland from the east, is connected by a canal with the Gulf of Corinth, which is an inland continuation of the Gulf of Patras on the west coast. The resulting peninsula, called the Peloponnese in ancient times, is now known as Morea. The total area of the country is about 41,933 square miles.

About four-fifths of the surface of the mainland is crumpled by a complex system of mountains, which divide the surface into a number of small plains. The chief range, running north and south, is called the Pindus. The highest peak is Mount Olympus, in northern Greece, which has an altitude of 9794 feet. Mount Parnassus, celebrated in literature as the home of the Muses, is 8070 feet high. It is situated just north of the Gulf of Corinth and is now known as Mount Liakura. The progressive deforestation which has taken place in Greece is believed to have made the country drier than it formerly was. The climate is otherwise marked by intensity of heat in the summers and occasionally by severe cold in the winters.

The small plains of Greece provide the major part of the arable land. Agriculture, though practicable on only one-fifth of the country's surface and though carried on by primitive methods, is nevertheless the leading industry of the country. By the draining of Lake Copais in central Greece, about 53,000 acres were reclaimed in 1894. The chief crops are olives, wheat, grapes, corn, currants, figs, tobacco, oranges, lemons, barley, and oats. Currants constitute a distinctive product. The English word currant is a corruption of Corinth, the name of a Greek city from which the fruit is exported. Other industries are the raising of sheep and of goats. Lignite, magnesite, iron, salt, lead, emery, and zinc are mined. Slag from the silver mines at Laurium is being worked over for lead that the ancient Athenians failed to extract.

The Greeks are a commercial people. Along with the manufacture of textiles, leather, and soap, shipbuilding ranks high among the industries. Shipping is very extensive. The Greek trader has for more than 2500 years been found everywhere throughout the Levant, as the countries washed by the eastern Mediterranean Sea are sometimes called. The major part of the country's commerce is with Great Britain and the United States.

Most of Greece's 5,536,375 inhabitants profess the Greek Catholic faith. The spoken language, known as Romaic, is related to ancient Greek much as Italian is related to Latin; the literary language, however, is much closer to classical Greek. Athens is the capital and largest city of Greece, its population in 1920 being 292,991. Other notable cities are Saloniki (170,321), Piræus, the port of Athens (131,170), and Patras (52,174). Elementary education is nominally obligatory, but the percentage of illiteracy is high. There are government commercial schools and two universities at Athens, where also schools of archeology are maintained by American, British, French, Italian, and German learned societies. The Greek ministry of education is charged with the duty of conserving, repairing, and excavating ancient monuments.

The most notable architectural monuments of Greece date back more than 2000 years. Many of the finest buildings have been seriously mutilated, but some remain almost complete and still retain the dignity of their former state. Apart from Athens, the places containing the more interesting ruins are Olympia, Delphi, and Mycenæ.

Hungary. An inland agricultural country in the eastern part of central Europe. It is bounded by Austria on the west, by Czechoslovakia on the north, by Rumania on the east, and by Jugoslavia on the south. Its surface, covering 35,790 square miles, is

a fertile plain watered by the Danube river, which, with its tributaries, provides 687 miles of navigable waterways. Lake Balaton in western Hungary, being 50 miles long, is the largest lake in central Europe.

The chief crops raised in Hungary are corn, wheat, sugar beets, barley, rye, oats, grapes, and tobacco. Most of the industries are those based on agriculture, such as flour milling and sugar refining. There are also iron and steel works. Hard and soft coal are mined. Forests cover about 6 per cent of the surface. Important quantities of fish are obtained from Lake Balaton and from the rivers.

The population of Hungary is 7,945,878, of whom the majority are Roman Catholics. There is a well developed educational system, embracing ten different types of schools. The four universities of the country are supported by the government, which is organized as a constitutional monarchy. The capital and largest city is Budapest (1,184,616). Other important cities are Szegedin (109,896) and Debreczen (103,228). Hungarians are sometimes called Magyars, in allusion to their origin as an Asiatic race which invaded Europe in the 10th century.

Iceland. An island state situated in the north Atlantic Ocean about 500 miles northwest of Scotland and 150 miles southeast of Greenland. The Arctic circle touches the most northern point of the island. The cold is not extreme, however, being moderated by the proximity of the ocean.

Almost the whole of Iceland's 39,709 square miles of surface is of volcanic origin, magnificent as scenery but unproductive. The ice-strewn plateaus, of which the island consists, average more than 2000 feet in altitude. The most celebrated of the island's 100 volcanoes is the Hecla, 5110 feet in height. The Great Geyser is 60 feet in diameter and, at intervals of several hours, projects immense quantities of hot water about 150 feet into the air. About one-eighth of the island is covered by glaciers.

Nearly all the inhabitants of Iceland are dependent for their living on agriculture, stock raising, or fishing. Less than 1 per cent of the island is cultivated. The chief crops are hay, potatoes, and turnips. The exports consist almost entirely of live stock, mainly sheep and horses, and of fish and fish products. Trade is mainly with Great Britain and the United States.

The population of Iceland is 94,679. The national church is Lutheran. There is a complete system of education culminating in a university situated at Reykjavik, the capital of the country. The government is democratic, based on universal suffrage. Iceland was a colony of Denmark until 1918. Since that time, the island has been independent, acknowledging, however, the Danish king as king of Iceland and intrusting to Denmark the conduct of foreign affairs.

Ireland. The large island lying immediately west of Great Britain and separated from it by the Irish Sea, which is connected with the Atlantic Ocean by Saint George's channel and by North channel. In the narrowest part of North channel, Ireland is separated from Great Britain by 14 miles. The area of the island is about 32,500 square miles. It has a maximum length of 300 miles and a maximum width of 180 miles. Politically, the island is divided into two parts. The Irish Free State, a self-governing British dominion, occupies the whole island except a comparatively small district in the north. This district, under the name of Northern Ireland, constitutes a division of the Kingdom of Great Britain and Northern Ireland. For the area and the population of the Irish Free State and of Northern Ireland, see the table of *The British Commonwealth of Nations*. Between 1851 and 1921, 4,338,199 Irish emigrated to other countries, by far the greatest number having settled in the United States. The Irish are Celtic in race. About 13 per cent of the island's inhabitants can speak the native Irish language.

About two-fifths of Ireland's surface consists of bog. Most of the remainder is fertile. The humidity of the climate and the equability of the temperature foster a verdant clothing of vegetation, which has earned for Ireland the name of the "emerald isle." The island is drained by the Shannon river, which, having a course of 240 miles, is the longest river in the British Isles. The enchanting and romantic scenery of the lakes of Killarney in the south attract visitors from all parts of the world.

THE IRISH FREE STATE. This portion of Ireland is predominantly agricultural in its interests, being Great Britain's most important single source of foodstuffs. Marketing is accomplished largely through co-operative societies. The chief crops are potatoes, oats, turnips, barley, and wheat. Dairying and stock raising form an important part of the farm operations. There are also valuable sea and fresh-water fisheries, the catches including salmon, mackerel, cod, and herring.

The population of the Free State is predominantly Roman Catholic. At the head of the educational system stand two universities, both situated in Dublin, the capital and largest city of the country. Other cities of note include Cork and Limerick.

CATHOLICS AND PROTESTANTS IN IRELAND

PROVINCES AND COUNTIES	Protestant Population	Catholic Population	Per Cent Catholic
CONNAUGHT			
Galway	4,304	177,920	97.64
Leitrim	5,423	58,159	91.47
Mayo	4,108	188,069	97.86
Roscommon	2,225	91,731	97.63
Sligo	6,920	72,125	91.24
Total	22,980	588,004	96.24
LEINSTER			
Carlow	3,935	32,317	89.15
Dublin	50,022	122,372	70.99
Dublin Co. Bor.	51,432	253,730	83.13
Kildare	11,943	54,684	82.07
Kilkenny	3,769	71,193	94.97
King's	5,654	51,178	90.05
Longford	3,523	40,297	91.96
Louth	5,362	58,303	91.58
Meath	4,431	60,660	93.19
Queen's	6,149	48,480	88.74
Westmeath	5,207	54,779	91.32
Wexford	7,860	94,413	92.31
Wicklow	12,712	47,999	79.06
Total	171,999	990,405	85.20
MUNSTER			
Clare	1,932	102,300	98.14
Cork	26,976	288,455	91.45
Cork Co. Bor.	8,859	67,814	88.44
Kerry	4,362	155,322	97.26
Limerick	3,049	101,502	97.08
Limerick Co. Bor.	3,653	34,865	90.52
Tipperary	8,277	144,156	94.57
Waterford	2,442	54,060	95.68
Waterford Co. Bor.	2,133	25,331	92.23
Total	61,683	973,805	94.04
ULSTER			
Antrim (1)	154,113	39,751	20.50
Belfast Co. Bor.	293,704	93,243	24.10
Armagh (1)	65,765	54,526	45.33
Cavan	16,902	74,271	81.46
Donegal	35,516	133,021	78.93
Down (1)	139,818	64,485	31.56
Fermanagh (1)	27,096	34,740	56.18
Londonderry (1)	58,367	41,478	41.54
Londonderry Co. Bor.	17,857	22,923	56.21
Monaghan	18,092	53,363	74.68
Tyrone (1)	63,650	79,015	51.39
Total	890,880	690,816	43.67
Total	1,147,542	3,243,030	73.86

(1) Parliament county.

Northern Ireland. In addition to agriculture and fishing, the northern division of Ireland has a large manufacturing industry. This industry, which has been developed in spite of the lack of coal and of iron in the island, consists chiefly of shipbuilding, distilling, and the manufacture of linen and of other textiles.

The prevailing religion of Northern Ireland is Protestantism. The educational system is distinct from that of the other divisions of the United Kingdom. Belfast, the largest city, is the seat of a university and of the legislature and the judiciary of Northern Ireland. Londonderry is another important center of manufacture and of trade.

Italy. A kingdom occupying the large boot-shaped peninsula of southern Europe. Italy includes also Sicily, Sardinia, Elba, and about 70 smaller islands in the surrounding seas. The land boundary at the north follows, in a roughly semicircular course, a mountain wall, which separates Italy from France, Switzerland, Austria, and Jugoslavia. To the east of the mainland lies the Adriatic Sea, at the head of which is the Gulf of Venice. The sea narrows toward the south to the Strait of Otranto, 45 miles wide at its narrowest point. Italy's western coast is washed by the Tyrrhenian Sea and by the Ligurian Sea, the latter having a broad northern inlet called the Gulf of Genoa. On the south, Italy is bounded by the Ionian Sea with its inlet, the Gulf of Taranto. The "toe" of Italy is separated from Sicily by the Strait of Messina, which has a minimum width of two miles. The mainland of Italy has an average width of about 100 miles and a maximum length of 780 miles. The total area of the country is 117,982 square miles.

Italy is mountainous and includes the only part of the European mainland which contains active volcanoes. Spurs of the Alps mountains, extending into Italy from the northern mountain wall, form the beautiful scenery of the celebrated Italian Tyrol. The range of the Apennines passes from the Gulf of Genoa to the southern extremity of the mainland. Vesuvius, a mountain of the latter range, Etna on Sicily, and Stromboli on one of the Lipari islands, north of Sicily, are volcanoes which are seldom quiescent. An earthquake at Calabria, southern Italy, in 1783, destroyed 100,000 lives, and another, about the Strait of Messina in 1908, resulted in the death of some 96,000 people.

The most important river of Italy is the Po, which drains the fertile, well watered plain of Lombardy in the north and discharges near the head of the Adriatic Sea. The Tiber, which empties into the sea near the center of the western coast, is richer in historical associations. The mineral resources of Italy are comparatively small. The chief products are sulphur, marble, petroleum, quicksilver, copper, zinc, and iron. The fisheries employ more than 150,000 workers.

The leading industry of Italy is agriculture. The climate, ranging from subarctic in the Alps to subtropical in the south, permits the cultivation of such varied crops as wheat, corn, potatoes, sugar beets, oats, grapes, olives, rice, beans, barley, and rye. Northern Italy is the most productive region, being cultivated by the most improved methods, while in the south the peasants are unprogressive and poor. Silk culture is also a considerable industry. The chief manufacturing centers are in the north, where water power is available. The principal products include textiles, lace, straw hats, leather goods, glass, pottery, perfumes, chemicals, and paper. Among the distinctive products of Italian craftsmanship are cameos and marble statuettes.

The population of Italy is 38,835,941. The prevailing religion is Roman Catholicism. Elementary instruction is compulsory in the lower grades only. Considerably more than half the population in southern Italy are illiterate, but, in the north, the percentage of illiteracy falls to about 11. Higher education, however, has received much attention. Italy has 21 universities, many of them among the oldest in Europe. In addition, there are many technical colleges, art schools, and learned societies. Everywhere throughout Italy are to be found monuments, more or less ruined, which bear witness to the fact that Italy was the chief center of European civilization from the 2d century B. C. to the 16th century A. D.

Rome is the capital of Italy, and Naples is the largest city. The population of Italian cities is increased by the large number of people who merely reside in the city but obtain their livelihoods by cultivating land in the surrounding rural sections. The chief cities with their populations are given in the following table:

City	Population	City	Population
Naples	780,220	Trieste	238,655
Milan	718,304	Bologna	210,969
Rome	691,314	Messina	176,794
Turin	502,274	Venice	171,665
Palermo	400,348	Bari	131,143
Genoa	300,784	Leghorn	114,813
Catania	255,394	Padua	112,021
Florence	253,565	Ferrara	107,618

Jugoslavia (*yōō'gō-slävʹĭ-ä*). A kingdom of southern Europe with a southwestern coast line on the Adriatic Sea. On the land side, the country adjoins Italy, Austria, Hungary, Rumania, Bulgaria, Greece, and Albania. Its area is 96,134 square miles.

Much of the coast is rocky and precipitous, rising inland to a mountainous plateau covering the western and southern part of the country. The eastern portion of the country contains a southern spur from the Carpathian mountains. The greater part of the surface is drained toward the east and the north by the Drave, the Save, and the Morava river, which empty into the Danube. The Danube river, traversing the northern part of Jugoslavia and forming part of the country's Rumanian boundary, cuts through the eastern mountain barrier at the Iron Gate. The Iron Gate is a mountain pass through which the river formerly rushed over a plateau of rock 1400 feet wide. This point has been made navigable by extensive blasting at a cost of more than ten million dollars. The river valleys provide most of the country's arable land. Nearly one-half of the surface of Jugoslavia is covered with forest. The chief minerals are coal, lignite, iron, copper, lead, zinc, gold, salt, and cement.

The most important industry is agriculture. The crops produced in the greatest amount are wheat, corn, potatoes, barley, oats, sugar beets, tobacco, and temperate zone fruits. Silk culture employs many people. Large numbers of swine are fattened on the beech nuts and the acorns of the wooded land, while cattle and sheep graze on the higher mountain slopes. Flour milling, sugar refining, carpet weaving, tanning, and pottery are the most important industries. The commerce of Jugoslavia is carried on mainly with Austria and Italy.

The inhabitants of Jugoslavia, numbering, in 1920, 12,017,323, are divided among three chief forms of religion, Greek Catholic, Roman Catholic, and Moslem. There are three universities. Belgrade is the capital and largest city, with a population of 120,000. Since nearly every peasant has a small tract of land and is not allowed to sell it, there is no pauperism as the word is understood in America.

Latvia. A republic of northern Europe, having a coast line on the eastern side of the Baltic Sea and on the Gulf of Riga. Latvia lies between Esthonia on the north and Lithuania on the south with an eastern limit bordering on Russia and on Poland. Its surface, 24,440 square miles in area, is level for the most part and is dotted with lakes. It is drained by the Duna river.

The chief industries of Latvia are agriculture, stock raising, lumbering, and fishing. Flax and

timber are exported, and linen, cotton goods, and furniture are manufactured.

A majority of Latvia's 1,844,805 inhabitants are Protestants, although there is a strong Catholic minority. The only university is situated at Riga (337,700), the capital, largest city, and chief port of the country. Riga and the two other ports—Libau (60,762) and Windau (10,000)—are served by the main lines of three Russian railways.

Lithuania (*lĭth'ū-ā'nĭ-ā*). An agricultural country of northern Europe, republican in government, bounded on the north by Latvia, on the east and the south by Poland, and on the west by Poland, East Prussia, and the Baltic Sea. The chief river is the Niemen. The country, 59,633 square miles in area, has extensive forests, the products of which are exported in quantity, together with corn, hams, poultry, dairy products, flax, hides, and wool.

The population, numbered at 2,293,100, is predominantly Roman Catholic. A university was opened in 1922 at Kovno, the capital and largest city, which has a population of 94,405. Vilna, the former capital, was taken by Poland in 1922. The Baltic coast city of Memel, which, in 1919, was ceded by Germany to the Allies, was handed over to Lithuania in 1923 as a seaport.

Monaco (*mŏn'ā-kō*). One of the smallest states in Europe. Monaco is a constitutional monarchy, lying in southeastern France and bordering on the Mediterranean Sea. The surface, eight square miles in area, is mountainous and highly picturesque. The chief occupation of the 23,000 inhabitants is to provide accommodation and entertainment for the visitors who, in numbers exceeding 1,500,000 each year, are attracted by this famous winter resort and gambling center. The principality is occupied in the west by the capital, Monaco, which adjoins a village contiguous to the chief city, Monte Carlo, at the east of the country.

Netherlands, The. A kingdom of northwestern Europe, roughly triangular in shape, with a northwestern coast line on the North Sea. The country, sometimes called Holland after the name of two of its provinces, borders on Belgium to the south and Germany on the east. No point in it is more than 120 miles from the sea, which forms more than one-half the total of its boundary. Its seacoast is 465 miles in length.

The surface of the Netherlands, 12,582 square miles in area, is, in large part, too low for natural drainage, portions of it being from 16 to 20 feet below the level of the sea. A large, shallow gulf, called Zuider Zee, stretches inland from the North Sea. This inlet was formed in the 13th century, when the ocean broke over the lowlands from the former coast, now marked by the Friesian islands, and, flooding the lowlands, mingled its waters with those of an inland lake. The reclamation of Zuider Zee was begun in 1920 and constitutes the most ambitious project of its kind in the world. It involves the recovery of 500,000 acres of arable land, nearly one-tenth of the present land surface of the country. Haarlem lake, the draining of which was completed in 1852, yielded 40,000 acres of land now inhabited by some 12,000 people.

Part of the coast is bordered by sand dunes, which keep out the sea from the lowlands. In other parts, artificial embankments, or dikes, are erected for that purpose. In the interior of the country, also, such dikes are used to enclose swampy land, from which the water is pumped by windmills, leaving the soil of these so-called "polders" available for cultivation.

The Netherlands has a network of river mouths, through which the Rhine, the Meuse, and the Scheldt river discharge their waters. These rivers are supplemented as trade highways by some 2000 miles of canals, which, both in mileage and in utility, vie in importance with the railroads. More than 50,000 people live on barges which ply along the waterways.

The distinctive products of the Netherlands are cheese, butter, margarine, and flower bulbs. About one-third of the land area is arable. It produces, among other crops, rye, oats, potatoes, sugar beets, flax, and barley. Dairying is one of the leading occupations of the country. The Holstein breed of cattle, developed first in Holland, is one of the best milk producing varieties in the world. Herring and oysters are the chief products of the deep-sea fisheries, which formerly constituted the foundation of the country's wealth. The industries include shipbuilding, diamond polishing, the manufacture of textiles and of pottery, and the refining of sugar, of cocoa, and of chocolate. Much of the raw materials for the industries is obtained from the country's rich colonial possessions, which, including the Dutch East Indies and certain islands of the West Indies, cover an area more than 50 times as great as that of the Netherlands.

The majority of the 6,865,314 inhabitants of the Netherlands are Protestants, but there is a strong Catholic minority. Both Churches, as well as the Jewish religious bodies, receive grants from the government. Illiteracy is virtually unknown. The educational system provides widely different kinds of training. There are four state universities. Amsterdam was formerly the capital and is still the scene of the royal coronation. The seat of government, however, is The Hague. The following table gives the chief cities with their populations in 1921:

City	Population	City	Population
Amsterdam . .	647,427	Haarlem . . .	77,327
Rotterdam . .	516,271	Arnheim . . .	71,599
The Hague . .	354,987	Nimwegen . .	66,911
Utrecht	140,309	Leiden	65,694
Groningen . .	90,778	Tilburg . . .	63,111

Norway. A kingdom of northern Europe, occupying that portion of the Scandinavian peninsula which lies west and north of the ridge of the Kiolen mountains. The country extends 300 miles within the Arctic circle to a latitude farther north than that of any other part of the European mainland. Norway possesses as a dependency the Spitsbergen islands, a coal producing archipelago which is situated some 600 miles north of the country's northern extremity and stretches to a point about 650 miles from the north pole. The area of the archipelago is estimated at 25,000 square miles.

The surface of Norway, 124,964 square miles in area, is mountainous and, for the most part, barren. About one-fifth is covered with forests, mainly of pine and fir. The arable portion comprises a scant 4 per cent of the total area. The coast line is cut by deep, picturesque fiords, and is fringed by some 150,000 islands, the larger ones being in the north.

The climate is moderated by the warm ocean currents which flow past the coast. The Arctic coast settlement, Hammerfest, which is the most northern town in the world, has a mean winter temperature higher than that of New York. Numerous summer tourists visit the country, attracted by Norway's scenic beauty and by the spectacle of the "midnight sun." In the north, the sun never sets between the middle of May and the last of July.

The chief occupations of Norway's inhabitants are lumbering and fishing. Herring, cod, mackerel, salmon, whale, walrus, seal, and lobsters form the most valuable part of the catch. The merchant marine of Norway ranks, in tonnage, among the great commercial fleets of the world. The manufacturing industries of the country are largely dependent on water power, which is available in great abundance. The most important industrial products are pulp, paper, and chemicals.

The population of Norway, amounting to 2,649,775, is almost entirely Protestant in religion. The

Lutheran Church is endowed by the state. Education is obligatory and illiteracy is almost unknown. The one university is situated in Oslo (258,483), the capital and largest city. Other large cities include Bergen (91,443), Trondhjem (55,030), and Stavanger (43,778).

Poland. A republic of east central Europe, lying between Russia on the east and Germany on the west. On the south, Poland adjoins Czechoslovakia and Rumania. A northeastern arm stretches around Esthonia to the borders of Latvia and, in the northwest, a Polish "corridor" to the Baltic Sea divides East Prussia from the rest of Germany.

Poland covers an area of 146,821 square miles. Apart from the Carpathian foothills in the south with a maximum elevation of 2000 feet, the surface is a gently undulating plain, most of which is drained northward by the Vistula river and its tributaries. In the central eastern part, however, a large area of lakes, marshes, and meadowland is drained eastward by the Pripet river, the largest tributary of the Dnieper.

Poland is primarily an agricultural country, about 30 per cent of its surface being cultivated. The chief crops are rye, potatoes, oats, wheat, barley, sugar beets, hemp, hops, and tobacco. The mineral wealth of Poland is considerable, consisting mainly of coal, iron, petroleum, and salt. The manufacture of linen and other textiles, of steel, and of paper and paper bags are the leading industries. The country has 9849 miles of railway and 1875 miles of navigable waterways. The Niemen river, part of which flows through Poland, has been internationalized as far south as Grodno and forms an outlet to the Baltic Sea for Polish commerce. A more important outlet is through Danzig, which is joined with Poland in a common customs union.

The population of Poland is 27,092,025. Roman Catholicism is the prevailing religion, but there are strong minorities of Greek Catholics, Jews, and Protestants. Three of Poland's five universities were founded prior to 1700. There are also a number of technical schools and academies for science and for fine arts. The capital and largest city is Warsaw. Other cities of note are Lodz, Lemberg, Krakow, and Posen.

Portugal. A republic occupying the most western part of the Iberian peninsula and washed on the south and on the west by the Atlantic Ocean. On the land side, to the north and the east, Portugal adjoins Spain. The area of Portugal is given as 35,490 square miles, little more than half of which is productive.

The country is traversed from east to west near its center by the Tagus river, the estuary of which forms one of the best harbors in the world. North of the river, the surface is a mountainous plateau, which is crossed by the deep, gorgelike bed of the Douro river. On the left of the Tagus river, a plain stretches southward to an irregular group of mountains in the southwestern extremity of the country. Between this group and a mountain ridge on the eastern border, the Guadiana river, rising in Spain, flows south to the Atlantic Ocean.

About 17 per cent of Portugal's surface is forested, mainly with pines, chestnuts, oaks, and cork trees. Cork is one of the chief sources of the national wealth. The acorns of the oak forests serve to fatten large herds of swine. The central part of the country produces enormous amounts of grapes, from which is made port wine, so called from Oporto, its point of export. In the south, olives, figs, oranges, lemons, and other tropical fruits are grown. Products of the fisheries—sardines and tunny fish—form, next to rawhides, the principal article of export. The mineral wealth is considerable but is inadequately developed. Wolfram, iron, copper, manganese, antimony, lead, tin, and gold are found. A characteristic industry is the manufacture of porcelain tiles. Paper, textiles, and embroidery are also made.

The population of Portugal is about 6,000,000. There is freedom of worship, but Roman Catholicism prevails almost to the exclusion of any other religion. Elementary education is compulsory and, since Portugal became a republic in 1910, has been rigorously enforced. There are three universities and several schools of technology and of art. The two principal cities are Lisbon—the capital—and Oporto. Portugal has a treaty of alliance with England, which, dating from 1703, is the oldest existing alliance in European history.

Rumania. A kingdom of southeastern Europe with an eastern coast line on the Black Sea. Russia, Poland, and Czechoslovakia are its immediate neighbors to the north; Hungary and Jugoslavia, to the west; and Bulgaria, to the south. The area of the country is 122,282 square miles.

Rumania is divided into an eastern and a western part by the Carpathian mountains, which, in Rumania, trend south and southwest. This ridge is often known as the Transylvanian Alps, and the western part of the country is known as Transylvania. The remainder of the country is a plain drained by the Danube. This river has 595 miles of its course in Rumania and along the southern border. After being joined by the Pruth, its great tributary from the north, the Danube empties through several mouths into the Black Sea. Navigation on the Danube is controlled by a European commission in order to protect the rights of other nations, whose foreign commerce on the river must pass through Rumania.

About four-fifths of the inhabitants of Rumania support themselves by stock raising and by agriculture of the usual temperate zone type, corn and wheat being the leading crops. Rumania is, next to Russia, the most important oil producing country of Europe. Apart from cereals, oil is the leading export. Other minerals obtained are lignite, iron, copper, and salt, the mining of the last being a government monopoly. Flour milling, brewing, and distilling are the chief industrial interests. Trade is mainly in the hands of Jews and of foreigners. Apart from oil, the leading exports are grain, salt, timber, and hides.

The predominant religion of Rumania's 17,393,149 people is Greek Catholic, with fairly strong minorities of Roman Catholics, Protestants, and Jews. There is said to be a larger proportion of Jews in Rumania than in any other country. More than half the population is illiterate. There are four universities in the country. As a result of the World War, the size of Rumania was more than doubled. The territories added to the old Rumania were Transylvania, Bessarabia, Banat, Crisana, Maramuresh, and Bukowina.

Bucharest is the capital and largest city of Rumania. The chief cities with their populations are given in the following table:

City	Population	City	Population
Bucharest	308,987	Izmail	85,600
Kashinef	114,100	Jassy	76,120
Czernowitz	87,128	Galatz	73,512

Russia. A union of soviet republics occupying all of eastern Europe and covering nearly half the total area of the continent. The union embraces also Siberia and certain other regions of Asia. The area of European Russia is 1,570,000 square miles. Its surface is a vast rolling plain, which rises, in the Ural mountains on the east, to an altitude of about 8000 feet and, at Mount Elbruz in the Caucasus range, to a maximum height of 18,465 feet. Almost the whole surface, however, is less than 600 feet above the sea.

Extreme cold in winter and extreme heat in summer constitute a general characteristic of Russia's climate. The Valdai hills in the west central part of the country form the chief watershed

and give rise to the Don, the Dnieper, and the Volga, all flowing southward. The Dvina, the Neva, and the Volkhof are the most important rivers of northern drainage. The Volga river is navigable for 1800 miles. Canals join the principal rivers, making a system of navigable waterways having a total length of more than 50,000 miles. The northern region abounds in lakes of glacial formation. Lake Ladoga on the border of Finland, with an area of 7000 square miles, is the largest lake in Europe.

Russia, in spite of its great size, is an isolated country. Before the construction, in 1915, of a railroad to the ice-free port of Kola near the Murman coast in the extreme north, Russia's only ocean port was Archangel, on the White Sea, which was icebound for a considerable part of the year. The Caspian Sea in the southeast has no outlet, and the Black Sea and the Baltic Sea have outlets under the control of foreign powers.

On historical and racial grounds, Russia is sometimes divided into Great Russia, White Russia, and Little Russia, or the Ukraine. The Ukraine occupies the southwestern part of European Russia; to the north of the Ukraine lies White Russia; and, to the east and north of White Russia, Great Russia extends from the upper courses of the Don river northward to the Arctic Ocean.

The chief occupations of the Russian people are agriculture and stock raising, about 80 per cent of the population being classified as rural. Russia shares with the United States the distinction of being one of the two largest producers of wheat. In the production of barley, rye, and flax, Russia leads the world; she is second in the production of oats. Other important crops are hemp, sugar beets, rice, and tobacco. The richest soil lies in the so-called black earth belt, which extends from the Carpathian mountains through the Ukraine in southern Russia to the borders of Siberia. In the raising of horses, Russia holds first place, and the farm animals produced there exceed in number those produced in any other European country.

As a result of the World War and the revolution of 1917, the economic life of Russia suffered a virtual collapse on a scale never before known in recorded history. Typical of the general decline of industry are the figures for coal production, which had stood at 27,814,544 tons in 1913, but fell to 6,506,384 tons in 1920. The manufacture of yarns, chemicals, agricultural implements, and many other products fell to less than one-tenth the normal volume. In general, production, largely under the system of government ownership and operation, had returned to its pre-War level by 1927. Vigorous steps have been taken to modernize methods of agriculture and industry, and to develop the hydroelectric resources of the country, of which the potential horse power is estimated at about 65 million.

From the forests of the north come lumber, pulp, tar, turpentine, resin, and fur. There are important fisheries in the Arctic Ocean and in the seas. The fisheries of the Volga river and of the Caspian Sea supply most of the sturgeon, whose eggs are salted and made into Russian caviar. From the Ural mountains comes 95 per cent of the world's supply of platinum; and one of the chief sources of manganese is southern Russia, where there are also very rich deposits of coal and of iron. Russia stands first among European nations in the production of petroleum. About 47,000 miles of railroad are open to traffic, the most important line being the Trans-Siberian railway, 5481 miles in length, which connects Leningrad with Vladivostok, on the Sea of Japan.

The population of European Russia is about 100,000,000. The great majority of those professing religion belong to the Greek Orthodox Church. Following the revolution in 1917, an ambitious and comprehensive system of education was inaugurated. Attendance at school was made compulsory for children, and adult education was encouraged. In 1928, Russia had over 150 institutions of higher learning. Marriage and divorce depend solely on the consent of the parties. A characteristic Russian utensil is the samovar, used for making tea. The capital and largest city of Russia is Moscow.

The following table shows the population in 1926 of the chief cities in European Russia:

City	Population	City	Population
Moscow . . .	2,018,286	Rostov on Don	304,812
Leningrad . .	1,611,102	Saratov . . .	211,756
Kiev	493,873	Ekaterinoslav	187,644
Odessa. . . .	411,416	Nizni-Novgorod .	181,189
Kharkov . .	409,505	Kazan . . .	174,732

For Asiatic Russia, see *Russia in Asia*, page 810.

Spain. A kingdom in southwestern Europe, occupying about four-fifths of the Iberian peninsula. It is separated from France on the northeast by the Pyrenees mountains and, in the southwestern part of the peninsula, surrounds Portugal on the land side. Spain is otherwise bounded by the Atlantic Ocean and the Mediterranean Sea, which are connected, at the southern extremity of the country, by the Strait of Gibraltar. Spain has an area of 194,800 square miles. It extends north and south 540 miles and, east and west, about 620 miles.

Next to Switzerland, Spain has the most elevated surface in continental Europe. Most of the interior is a table-land varying from 2000 to 3000 feet above the sea level. It is divided irregularly by low mountain ranges, of which the Cantabrian mountains parallel the northern seacoast, the Sierra Nevada range skirts the Mediterranean coast, and the Sierra Morena trend east and west in the interior. Of Spain's rivers, the Douro, the Tagus, and the Guadiana have their mouths in Portugal. The Guadalquivir flows east and south into the Atlantic Ocean, while the Jucar and the Ebro empty into the Mediterranean Sea. The Guadalquivir and the Ebro are the only rivers which admit of navigation.

In the interior, the rainfall is light, and the climate is harsh, with cold winters and hot summers. The northern coast has the heaviest rainfall in Europe, and the southern coast has the warmest winter climate of any part of the continent. About one-sixth of the acreage is under forest, the more characteristic trees being the Spanish chestnut and the cork oak.

The leading occupations of the people are agriculture, grazing, fruit culture, mining, fishing, and manufacturing. Cereal crops are raised especially in the north and include, in order of importance, wheat, barley, rye, corn, and oats. Huge flocks of sheep and of goats graze on the dry, treeless plateau, where esparto grass is a characteristic type of vegetation. From this plant, rope and paper are made. In the southern part, which is known as Andalusia, grapes, oranges, olives, figs, peaches, dates, and other tropical fruits are grown in abundance.

Spain is one of the chief wine producing countries of Europe. Mulberries are cultivated as a food for silkworms. Valencia in the south is the chief center of the Spanish silk industry. Raisins form a considerable item of export. Saffron and licorice are distinctive products of the region.

The mineral resources of Spain are greater than those of any other European country, but they are inadequately exploited. In spite of very rich coal deposits, the imports of coal are considerable. Iron ore is extensively exported. Spain is the chief European source of lead. Rich copper deposits have long been mined by foreign capital. The quicksilver production is second only to that of the United States. Salt and zinc are also produced in important quantities. The fisheries employ over 100,000 workers, the chief catches being sardines, tunny fish, and cod. Manufacturing is little developed. One of the chief products is cork, made from the bark of the cork oaks. The preserving of fish, the refining of sugar, and the manufacture of textiles, glass, leather, and paper are other important industries.

The population of Spain is 21,347,335, practically all of whom are adherents of the Roman Catholic Church. The Basques, living near the head of the Bay of Biscay and numbering about 400,000, are believed to be descendants of a pre-Aryan people known to the Romans under the name of Iberians. Spain has also some 50,000 gypsies. About three-quarters of the population are illiterate. There are 11 universities. The capital and largest city is Madrid (751,352). Other important urban centers are Barcelona (710,335), Valencia (243,783), Seville (205,527), Malaga (150,584), Murcia (141,175), Saragossa (141,350), Bilbao (112,819), and Granada (103,368).

Spain was formerly one of the chief centers of Roman civilization. Bullfighting, the most popular national diversion, is a survival of the ancient Roman wild beast shows.

Sweden. A kingdom of northern Europe, occupying the eastern and larger part of the Scandinavian peninsula. The country is 950 miles long and tapers to a blunt point at the north and at the south. It is bounded on the west by Norway and the Kattegat, and, on the east, by the Baltic Sea, the Gulf of Bothnia, and Finland. Its average width is about 190 miles, and its surface covers 173,035 square miles. The country includes many adjacent islands, the largest being Gottland and Oland.

Sweden is mountainous in the west, but the remainder of the country is flat. Most of the rivers are fed by lakes at the base of the Kiolen mountains, which form the greater part of the Norwegian boundary. Toward the south, four large lakes occur,—Vanern, Vattern, Malaren, and Hjalmaren,—of which Lake Vanern is the third largest in Europe. The first two are part of the Gota Canal system, which, connecting the Baltic Sea with the Kattegat, forms one of the chief arteries of Swedish commerce. The climate of Sweden is cold in winter and hot in summer, the other seasons being very short.

The most southern part of the country, known as Gotaland, is the richest agricultural and industrial region and is the center of the shipping interests. North of Gotaland lies Svealand, the center of the political and intellectual life of the country. Norrland, stretching to the northern extremity of Sweden, furnishes minerals and timber.

About one-half of the population of Sweden is supported by agriculture. Roots, hay, oats, and rye are the leading crops. Timber is one of the chief sources of Sweden's wealth, and the lumber and pulp wood manufactures hold the leading place among the industries. The iron of Sweden is of a particularly high grade. Manganese, lead, and zinc are also mined. The industries suffer from lack of coal, being compelled to utilize charcoal or hydro-electric power. The output of manufactured goods, however, has steadily increased. Most of Sweden's trade is with Great Britain and Germany.

The population of Sweden is 5,954,316. Lutheran Protestantism is the established form of religion. There is an excellent system of education, at the head of which are two universities. Illiteracy is almost unknown. The capital and largest city is Stockholm. Other cities of note are Goteborg and Malmo.

Switzerland. A mountainous inland republic of south central Europe, bounded on the north and east by Germany and Austria, on the west by France, and on the south by Italy. The surface of Switzerland, 15,975 square miles in area, has a greater average elevation than any other European country and contains the headwaters of four great European river systems,—the Rhine, the Rhone, the Po, and the Danube.

The northwestern half of the country is a rolling plateau hedged, near the northwestern border, by the Jura mountains. It drains northward toward the Rhine river and contains the lakes of Neuchatel, Bienne, Zurich, Lucerne, Thun, and Constance. The southeastern half is a region of picturesque mountains that has long been famous for its scenic beauty. The Southern Alps form much of the southern border of the country. Here are found the highest mountains, including Monte Rosa, 15,217 feet in height; Matterhorn, a towering pyramid of solid rock 14,782 feet high; Simplon, with an elevation of 11,117; Saint Bernard, 8110 feet high, near which the Saint Bernard breed of dogs was developed, the animals being used to help in the rescue of travelers lost in the snow. This range descends on the north to the valley in which the Rhone river rises and, flowing westward, broadens into Switzerland's largest body of water, the Lake of Geneva. At the southeastern border lies Lake Maggiore, which has a southern drainage into the Po river.

South of the Rhone valley rise the irregular Burnese Alps, the highest peak of which is the Jungfrau, "The Maiden," so called from the blush which suffuses its snowy peak at sundown. Its height is 13,670 feet.

The mountains of Switzerland are cut by some 40 passes, and over 1000 glaciers furrow the rocky slopes. The mountains are burrowed by several railroad tunnels, that at Mount Simplon, 12½ miles in length, being the longest in the world. A warm wind, known as the foehn, often, in the spring, melts the snow and ice with such rapidity as to cause avalanches.

Partly as a protection against avalanches, the forests of the country, covering about one-sixth of the republic's area, are carefully guarded by the government. Maples, oaks, and chestnuts flourish at the lower levels. Higher up occur birches, and still higher, firs, pines, and larches. In this region, the characteristic alpine animals, the chamois and the ibex, may be seen. The edelweiss and certain other flowering plants grow almost as far up the mountain side as the summer snow line.

The entertainment of tourists vies with agriculture, dairying, and manufacturing as the chief occupation of the inhabitants. Grapes, rye, barley, potatoes, oats, flax, hemp, and tobacco are grown in the valleys and on the plains, while the mountain sides provide abundant pasturage for cattle, goats, horses, and sheep. Swiss cheese forms, along with Swiss clocks, watches, and Swiss chocolate, one of the more distinctive products of the country. Silks, cotton goods, embroidery, carved wood, dyes, and pottery are other manufactures of note.

The inhabitants of Switzerland, 3,880,320 in number, are a unit neither in race, language, nor religion. German, French, and Italian are spoken. Illiteracy, however, is virtually nonexistent. The Protestants are slightly more numerous than the Catholics. Higher education is cared for by seven universities, of which the one at Zurich was founded as early as 1460. A distinctive type of dwelling is used in Switzerland, known as the chalet. It is characterized normally by a projecting roof under which are placed balconies and staircases.

Bern is the capital of Switzerland, and Zurich is the largest city. Geneva has been chosen as the capital of the League of Nations. The following table gives the largest cities with the population of each.

City	Population	City	Population
Zurich	207,161	Lausanne	68,533
Basel	135,976	Winterthur	49,969
Geneva	135,059	Lucerne	44,029
Bern	104,626	La Chaux de Fonds	37,708
Saint Gallen	70,437	Bienne	34,599

Turkey. The European territory of Turkey consists of the territory north of the Sea of Marmora extending to the borders of Bulgaria and of Greece. It includes Adrianople and the important city of Constantinople. Constantinople is treated among the cities of Europe, but the geography of Turkey is dealt with under *Asia*, page 811.

CITIES AND OTHER POINTS OF TRAVEL INTEREST

The cities of Europe are distinguished by the richness of their historic associations, and, in many cases, by the wealth of their artistic adornment. Some of them, such as Athens and Rome, still preserve the visible evidences of the brilliant civilization which flourished in the southern part of the continent as early as 600 B. C. In others, the remains of outstanding interest are medieval structures—sublime cathedrals, or castles and dungeons of more sinister memories. Cities of southern Spain tell of Mohammedan enterprise; those of Italy remind us of the flowering of art known as the Renaissance; while the industrial cities of northern Europe often afford a curious blending of old interests and of new.

Greater local security and changed methods of warfare are reflected in the crumbling walls which in some cities still remain standing. In others, bulwarks, no longer necessary for defense, have been replaced by boulevards encircling the older parts of the cities.

The scenic beauties of Europe are not only grand in themselves but have the prestige that comes from centuries of description by travelers. The Alps have given us the term alpine, applicable to mountainous scenery of impressive beauty. The natural charm of the pleasure resorts is supplemented by all the attractions that can be suggested by ingenuity aiming to please vast numbers of tourists. The more noteworthy of these resorts are described in the following section, along with the cities and other places of especial interest on the continent.

Alps. An irregular mountain system of south central Europe, occupying most of Switzerland and parts of France, Italy, Austria, and Germany. The system is 600 miles in length and has a width varying from 75 to 150 miles. It covers an area of about 85,000 square miles. The highest point is reached by Mont Blanc, 15,781 feet high. Other notable peaks with their heights are Monte Rosa, 15,217; Mischabel, 14,941; Lyskamm, 14,889; Weisshorn, 14,803; Matterhorn, 14,782; Grand Combin, 14,164; Finsteraarhorn, 14,026; Aletschhorn, 13,720; and Jungfrau, 13,670.

The glaciers of the Alps number about 1200 and cover an area of 1600 square miles. The largest, called the Aletsch, has an area of 50 square miles. Other well-known Alpine glaciers are the Unteraar, the Gorner, the Viesch, the Mer de Glace, and the Miage, the last two being on Mont Blanc. The glaciers give rise to a number of mountain lakes, several of which have become proverbial for their beauty. The chief ones are Lucerne, Geneva, Como, Garda, and Maggiore.

The Alps are cut by many passes, of which the more important are the Great Saint Bernard pass; the Brenner pass, through which a railroad has been constructed; and Simplon, Saint Gothard, and Mont Cenis, at each of which the mountain is pierced by a railroad tunnel.

In addition to these four railroads, which cross the Alps, numerous lines run to scenic points in the mountains. Many of the Alpine automobile roads are marvels of engineering skill. The Swiss Alps and the Tyrol, a picturesque district partly in Austria and partly in Italy, are among the most popular regions. The accessibility of the more beautiful parts of the ranges and the facilities provided for ease and comfort in travel combine to make the Alps the most attractive region of the world for the lover of mountain scenery. See *Switzerland.*

Amerongen (*ä'mĕr-ŏng'ĕn*). A village in the central part of the Netherlands. Amerongen is notable chiefly as the place of refuge to which Kaiser Wilhelm II of Germany fled in 1918, when he abdicated his throne on the outbreak of the German revolution.

Amiens (F. *à'myăN'*; E. *ăm'ĭ-ĕnz*). A cathedral city of northeastern France, lying about 80 miles north of Paris. The Cathedral of Amiens, for magnificence and for richness of decoration, is not surpassed by any other Gothic building of the world. The city has important textile manufacturing interests. During the World War, Amiens was made the headquarters of the British armies in France. Population, 1921, 92,780.

Amsterdam. The largest city and the statutory capital of the Netherlands, although the actual seat of government is The Hague. Amsterdam occupies a low site at the southwestern extremity of the Zuider Zee and is connected with tidewater by the North Sea canal. The numerous canals, which divide the city into some 90 islands connected by almost 300 bridges, have given rise to the city's characterization as "the Venice of the North." Amsterdam's defenses consist of dikes, by the opening of which the whole district may be flooded.

The city is named after a dam built in 1240 across the river Amstel. Part of the site originally occupied by this dam is now the central square of the city and is called the Dam. From it the principal streets radiate in a semicircle. Near by stand the New Church and the Royal Palace. In the former, a Gothic structure dating from 1408, the sovereigns of the Netherlands are crowned. The Royal Palace, belonging to the city, is the residence of the country's sovereigns when they are guests of Amsterdam. The Ryks, or State Museum, contains a number of paintings by Rembrandt, who, with the philosopher Spinoza, was among Amsterdam's most famous citizens. The city maintains a municipal abattoir, theater, pawnshop, and museum.

Amsterdam is the chief center of Dutch industry, commerce, and finance. Its diamond cutting factories are the largest in the world. There are also sugar refineries, and factories for making silk, rope, dyes, chemicals, and gold and silver plate. The city has an extensive trade in the tropical products which come from the Dutch East Indies. The bank of the Netherlands, situated in Amsterdam, is one of the leading financial institutions of Europe. The city is the seat of the University of Amsterdam and is the headquarters of the National Academy of Arts, the Royal Academy of Sciences, and the Royal Dutch Geographic Society. Amsterdam's botanical gardens are among the foremost in Europe. Population, 1921, 647,427.

Antwerp. A large city of Belgium, situated on the Scheldt river about 50 miles from its mouth in the North Sea. The river, 2200 feet wide at this point, provides Antwerp with one of the best harbors in the world. By means of three miles of granite quays, equipped with all modern appliances, the port handles merchandise often exceeding an annual total of one billion dollars. Besides its commerce, Antwerp is important for diamond cutting, sugar refining, and the manufacture of liquors, textiles, and cigars.

The most conspicuous building in the city is the Cathedral of Notre Dame, the construction of which was begun in the 14th century. It has a tower 400 feet high and contains three celebrated paintings by Rubens, whose tomb is contained in the splendid Church of Saint James. The richly decorated town hall was built in the 16th century. The art gallery contains a priceless collection of masterpieces by Rubens and Van Dyck, the latter having been born in the city. The Steen, part of an old castle dating from the 10th century, was formerly the seat of the Inquisition, but is now used as an archeological museum. Fine boulevards follow the line of the old city walls.

The city has had a stormy history. Founded in the 8th century, it had become, by the 16th century, the financial center of Europe and one of the chief commercial cities of the world. It was destroyed by the Spaniards in 1576. Napoleon revived the city. By improving its harbor, he hoped eventually to make Antwerp a rival of London. In 1914, its fortifications were considered among the strongest in Europe, but the German forces, attacking with heavy artillery, experienced little difficulty in taking the city. Population, 1922, 304,124.

Appian (*ăp'ĭ-ăn*) **Way.** A Roman road running from Rome to Brindisi in southern Italy. Begun in 312 B. C. by Appius Claudius as a public work, it is still in use over a considerable portion of its course. For many miles from Rome it is bordered by ancient tombs and the ruins of monumental buildings.

Arcadia. An inland district of the peninsula of Morea in Greece. Its ancient inhabitants long retained their primitive customs, unaffected by the Dorians who invaded the peninsula in the 12th century B. C. A pastoral poetry arose there in the last centuries of the pre-Christian era and gave support to a literary tradition, which represented Arcadia as a land of primitive simplicity and idyllic happiness.

Argonne Forest. A rocky wooded area northwest of Verdun in northeastern France. It was the scene, in September and October 1918, of one of the bloodiest battles ever waged by American troops. The capture of this forest by the Americans threatened the line of retreat of the German army.

Arras (*ă'răs'*). A city of northeastern France, about 100 miles north of Paris. During most of the World War, the territory near Arras served as a pivotal position for the German defense lines. It was, therefore, the scene of many bloody battles, including a British attack in September 1918 which had much to do with causing the military collapse of the German armies. In the middle ages, the city was noted for its weaving of large figured tapestries. Such a fabric is called an arras after the name of the city. Population, about 25,000.

ATHENS. The capital and largest city of Greece, situated in the southeastern portion of the country about five miles from the port of Piræus on the eastern shore of the Gulf of Ægina. The city stands in a plain surrounded on three sides by mountains. Athens is a financial, railroad, and commercial city of importance, but its industrial interests center chiefly in Piræus, where there are establishments for manufacturing silk, cotton, and leather. Near Piræus lies Phalerum, the sea resort of Athens. Athens is named after Athena, the ancient Greek goddess of wisdom.

The Modern City. For several centuries following 500 B. C., Athens was the intellectual and artistic center of the civilized world and, architecturally, was one of the most beautiful cities on the earth. After many centuries of misfortunes, it was finally reduced to a Turkish village. When, however, in 1832, Greece became independent, Athens was chosen to be its capital and was rebuilt as a modern city.

The Square of Harmony forms a center from which radiate wide boulevards, two of them ending in Constitution square—the site of the royal palace and gardens. Between the two squares stand the government offices, the buildings of the Academy of Sciences, the National university, the National library, and the archeological colleges supported by societies in the United States, Great Britain, France, Italy, and Germany. Other notable modern structures include the Parliament buildings, the Palace of Justice, and the National Archeological Museum, the last housing a priceless collection of Greek antiquities. The city contains also the University of Athens and, among the private residences, a fine mansion built by Schliemann, the discoverer of the site of ancient Troy. There is a large stadium, in which the Olympic games were held in 1896.

The white marble, which is used in most of the public edifices, imparts to the city's architecture a distinctive and impressive brilliancy. The marble used in the ancient buildings has, through age, become tinged with a russet hue.

Ancient Buildings. The ancient city centered about a flat-topped hill, called the Acropolis. This hill is surrounded by a wall and contains four beautiful structures: the Propylæa, a building of mixed Doric and Ionic style, which serves as a stately entrance to the enclosure; the Temple of Victory, a small Ionic edifice beside the Propylæa; the Parthenon, which is the classic example of a pure Doric temple and is justly famed as one of the world's most beautiful buildings; and, finally, the Erechtheum, known best for its Porch of the Maidens, in which the columns take the form of Greek maidens, often called Caryatids. These four buildings were all erected in the 5th century B. C., but they still preserve much of their original impressiveness.

The chief of the ancient buildings outside the Acropolis are the arch of Hadrian, the Theseum, the open-air theater of Dionysus, the Temple of Zeus, the Tower of the Winds, and the monument of Lysicrates, the last being the earliest extant example of the Corinthian style. The Theseum is the best preserved of the ancient Greek structures. Of the 104 Corinthian columns of the Temple of Zeus, each of them 56 feet in height, only 15 remain erect today.

These ruined structures are the original models for the Greek style of architecture as it has been revived in recent times and employed in the erection of many modern buildings. Population of Athens, 1920, 292,991.

Athos (*ăth'ŏs*). A mountain of northern Greece, 6350 feet high, occupying the extremity of a peninsula in the northern part of the Ægean Sea. In ancient times it was noted as the scene of the shipwreck of Xerxes' fleet, which sailed to attack Greece in 492 B. C. Since the 9th century A. D., the mountain has been occupied by a group of fortified monasteries, now 20 in number. The control of the mountain was handed over by the Byzantine emperors to the monasteries, which have continued to exercise their rights of self-government to the present day. Under a constitution dated in 1045 A. D., women and female animals are excluded from the holy mountain. The monks, numbering about 9000, support themselves by agriculture, fishing, and various handicrafts.

Avignon (*à'vē'nyôN'*). A town of southeastern France, situated on the Rhone river about 30 miles from the Mediterranean Sea. Avignon is notable as the former residence of the popes, who made it their seat from 1309 to 1376. The city is built on a wall-girdled height, from the summit of which rise the cathedral and the impressive mass of the old papal palace. Population, about 50,000.

Barcelona. The chief manufacturing center and, with the exception of Madrid, the largest city of Spain, located near the northeastern extremity of the country on the Mediterranean Sea. The city has a fine harbor and ranks as the second seaport in Spain. It is the commercial center of a well cultivated fruit growing district. The chief manufactures are cotton, silk, and woolen goods, lace, leather, machinery, furniture, dyes, soaps, and drugs. Fruit, wine, olive oil, as well as manufactured goods, are among its exports.

The city dates from the 3d century B. C., when it was founded by the Carthaginian Hamilcar Barca, after whom it was called Barcino. From the 2d century A. D., the city has, in spite of varying fortunes, remained one of the chief commercial cities of southern Europe.

The older part of the city was formerly surrounded by walls, which have since been replaced by promenades. This section has, in general, narrow, irregular streets. Its chief thoroughfare, however, the Rambla, which connects it with the "new town," has a handsome promenade on which are situated many of the principal buildings of the city, including one of the finest theaters in Spain. At the highest point of the Rambla stands a famous 13th century cathedral in Spanish Gothic style. The "new town" is regularly laid out and has all modern improvements. The chief educational institution is the University of Barcelona. Population, 1921, 710,335.

Belfast. The capital and metropolis of Northern Ireland, situated on a small inlet in the northeastern part of the island. The city has an excellent harbor and contains immense shipyards, in which most of the White Star liners have been built. In addition to the linen textile industry, the manufacturing interests include the making of rope, liquors, tobacco goods, machine shop products, flour, and chemicals.

Belfast was incorporated as a city in 1888. It is the seat of Queen's university and Campbell college and has several fine churches, an art gallery, and a museum. Population 1926, 415,007.

Belgrade (*bĕl'grād'*). The capital and largest city of Jugoslavia, situated near the center of the country's northeastern boundary at the confluence of the Save and the Danube river. Belgrade is an important railway junction and is the chief trade center of the country. The city is modern in appearance and has several institutions for higher education, including a university, a national library, a museum, and an academy of sciences. There are several fine Greek Catholic churches. Prior to its capture by the Austrians on Oct. 9, 1915, Belgrade was the capital of Serbia. Population, 120,000.

Belleau (*bĕl'ō'*) **Woods.** A forest of northeastern France, 5 miles northwest of Chateau Thierry and about 42 miles east of Paris. It is celebrated for a bitterly contested battle waged there in June 1918, when American marines and regulars dislodged a strongly entrenched German force and captured the village of Bouresches, 2 miles south of the woods. The battle ground was subsequently purchased by an American organization and, in 1923, was dedicated as a permanent memorial to the Americans who fell there.

Bergen (*bûr'gĕn*). A seaport and codfish market on the southwestern coast of Norway. Bergen's fish exports are nearly half those of all Norway. The chief manufactures are barrels and ships. The buildings include a naval academy, an observatory, and a fishery museum. The city maintains a noted marine biological station and is annually the scene of an international fishermen's fair. Bergen was the birthplace of Edvard Grieg, the musician. Population, 1920, 91,443.

BERLIN. The capital of Germany and the largest city of continental Europe. It is situated somewhat northeast of the geographical center of the country, having a central location between the Elbe and the Oder river, with both of which it is connected by canals. The city is 177 miles southeast of Hamburg by rail and is connected with the Baltic port of Stettin by a barge canal 85 miles in length. The Spree river flows through the center of the city.

Commerce and Industry. Berlin has grown, in the past half century, with a rapidity exceeded by no other city of the world. It is the distributing point for a vast inland trade, being served by 12 trunk railroads and several waterways. The more important industries include cloth printing and the manufacture of locomotives, machinery, and other steel products, of electrical apparatus, dynamos, dyestuffs, porcelain, musical instruments, railroad cars, toys, bronzes, women's clothing, and liquors.

Municipal Improvements. Berlin maintains an employment agency, a savings bank, and a pawnshop, has free hospitals and public bathing establishments, and owns the gas plant and the water system. Sewage is conveyed by pressure pipes to the country in order to fertilize the soil of farms belonging to the city. Municipal meat markets supply the retail market with meat, which comes, duly inspected, from the municipal stockyards and slaughterhouses.

Streets, Buildings, and Monuments. Berlin is essentially a modern city. Streets regularly laid out and flanked by handsome residences combine with numerous squares, parks, playgrounds, monuments, fashionable promenades, and splendid public buildings to render Berlin one of the most imposing cities of the world.

Berlin's most famous boulevard is Unter den Linden, so called from the double rows of lime, or linden, trees with

which it is adorned. The street is 196 feet wide and leads from the former imperial palace, with its 600 rooms, to the Brandenburg Gate. The latter is a triumphal arch, built in imitation of the Propylæa at Athens and surmounted by a colossal bronze car of victory. On the boulevard is situated, among many other impressive buildings, the palace of William I, opposite which stands a celebrated equestrian statue of Frederick the Great. The Brandenburg Gate leads into the Tiergarten, a magnificent park of 600 acres, which contains one of the largest zoological gardens in the world. It is crossed by the Siegesallee, "Avenue of Victory," which is adorned by 32 marble groups commemorating rulers of Brandenburg and of Prussia. The Lutheran cathedral, der Dom, has a dome rising 380 feet above the street. The Reichstag building, erected in the Italian Renaissance style and surmounted by a huge glass dome, is probably the city's most imposing structure. Other noteworthy buildings include several museums, the National Gallery, and the Royal Theater, the last two built in the Greek style of architecture.

Educational Institutions. Berlin is the chief intellectual center of Germany. The University of Berlin, founded in 1810, has numbered among its teachers Hegel, Fichte, Grimm, Niebuhr, Lipsius, Mommsen, and Einstein. Besides numerous technical institutions, there are free astronomical observatories, academies of art and of music, public libraries, botanical gardens, and many learned societies. The royal library contains over 1,000,000 volumes. Population, 1925, 4,013,588.

Bern. The capital and fourth largest city of Switzerland. The city is in the northwestern part of the republic and is picturesquely situated on a rocky bluff surrounded on three sides by the river Aar, a tributary of the Rhine. The name Bern is a corruption of the German word for bears, a number of the animals having been slain on the site when Bern was founded in 1191. A den of tame bears is maintained by the city, which has adopted the bear as its emblem.

Bern is a great industrial center, noted for its manufacture of woolens, linens, cottons, silk stuffs, watches, clocks, toys, scientific instruments, and chocolate. The chief edifices are the magnificent Parliament building and a Gothic cathedral, begun in 1421 but not completed until 1894. Population, 1920, 104,626.

Bingen (*bĭng'ĕn*). A town on the west bank of the Rhine river in Germany, 17 miles west of Mainz. Like many other towns on the Rhine, it has several picturesque ruins of feudal castles, the most notable of which is the Mouse Tower. This tower stands on a rock in the mid-channel of the river. In it, Archbishop Hatto is said to have been devoured by mice in 969 A. D. Population, about 10,000.

Birmingham. The second largest city of England, situated near the geographic center of the country. Being in close proximity to rich coal fields and large iron deposits, it was known for its iron products as early as the 16th century, and it has since become famous for its steel manufactures. Other industrial products include glass, jewelry, chemicals, automobiles, railroad cars, plated articles, and hydraulic presses.

Birmingham has led the cities of England in municipal improvements. There are 17 parks and recreation grounds. An excellent school system provides elementary education, while museums, libraries, art galleries, botanical gardens, technical colleges, and an amply endowed university afford means for higher study. James Watt, John Bright, and Joseph Chamberlain are some of the distinguished names connected with the city. Population, 1921, 919,438.

Bologna (*bō-lōn'yä*). A city of northern Italy, located in a fertile plain at the foot of the Apennine mountains, almost midway between the Gulf of Genoa and the Gulf of Venice. It is an important railroad junction and has a large trade and extensive manufactures. The products for which the city is especially noted are macaroni, Bologna sausages, liquors, and canned fruit.

Bologna is believed to have been founded in the 8th century B. C. It figures in the career of Hannibal, Alaric, Charlemagne, and Napoleon. The city uses an aqueduct built by Augustus Cæsar. By a popular vote in 1860, Bologna became a part of the kingdom of Italy.

There are some 130 churches, several dating from the 11th century. One of the most noted is the San Domenico, where lies the body of Saint Dominic, the founder of the Dominican order. Bologna's art treasures include Raphael's portrait of Saint Cecilia. Two leaning towers survive from among 180 which Bologna possessed in the middle ages. One of the two is 163 feet high and inclines 10 feet from the perpendicular. The University of Bologna is the oldest existing university in Europe. Founded in the 11th century, it became famous as a law school and in 1262 had about 10,000 students, among whom were Dante and Petrarch. Galvani, one of the earliest investigators of electricity, was born in Bologna and lectured in the university. Population, 1921, 210,969.

Bonn (*bŏn*). A university city of central eastern Germany, beautifully situated on the Rhine river. The river is here spanned by a steel bridge, the central arch of which is 614 feet in length. The University of Bonn, second only to that of Berlin among German universities, occupies the former palace of the electors of Cologne. The city also has a venerable cathedral and a Beethoven museum, the latter containing relics of the famous musician, who was born in the city. The principal manufactures are porcelain and stoneware. Population, 1925, 89,569.

Bordeaux (*bôr'dō'*). A commercial city of southwestern France, situated on the Garonne river at the point where it widens to form the Gironde river. It is connected by canal with the Mediterranean Sea. The chief article of export is wine, besides which hides, sugar, rice, cotton and woolen cloth, salt fish, and fruit are shipped abroad, mainly to South America. The city's industries include shipbuilding, sugar refining, and the manufacture of textiles, casks, liquors, chemicals, carpets, and pottery. Bordeaux is an important center for fishing fleets which annually visit the shores of Newfoundland and of Iceland.

The University of Bordeaux was founded in 1441. Among the more notable buildings of the city are the Grand Theater, the Church of Saint Croix, Saint Michael's Church, and the Cathedral of Saint André, the last dating from the 11th century. Montesquieu, Montaigne, and Rosa Bonheur were residents of Bordeaux.

Bordeaux was used as a port of disembarkation by the American forces during the World War. For a short period in 1914, it became the seat of the French government when Paris was menaced. Population, 1926, 256,026.

Boulogne (F. *bōō'lŏn'y'*; E. *bōō-lōn'*). A fortified seaport of northeastern France, situated at the eastern extremity of the English channel. The city is the chief French station of the North Sea fisheries. It consists of a lower town,—the business part close to the harbor,—and an upper town built on a hill, from which, on clear days, the English coast may be seen. As a center for passenger traffic with England, Boulogne rivals Calais. During the World War, many American troopships landed their passengers in Boulogne. Population, 1921, 68,008.

Bradford. A manufacturing city in the north central part of England, the chief center in England for the manufacture of woolen textiles, and the leading wool market of the world. Silks, velvets, and foundry products are also manufactured. Bradford is substantially built, mainly of stone. Among the public buildings are Saint Peter's Church, the Mechanics Institute, the large, covered markets, and the Cartwright Memorial Hall, erected in memory of the inventor of the power loom. Population, 285,979.

Bremen (E. *brĕm'ĕn*; G. *brā'mĕn*). The second largest seaport of Germany. It lies in the northwestern part of the country on both banks of the Weser river. The "old town" on the right bank is the business district, while the "new town" on the left is a well built residential section. Prior to the World War, the bulk of Bremen's commerce was with the United States. The chief industrial products include ships, iron castings, machinery, refined sugar, tobacco, and cordage. The city is the headquarters of the North German Lloyd Steamship Company.

Bremen is the capital of a small state of the same name, which retained its rights of self-government when it entered the German Empire. Population, 1925, 294,966.

Breslau (*brĕs'lou*). An important commercial and manufacturing city of central eastern Germany, situated on both banks of the Oder river, about 20 miles from the border of Poland. It has a large trade in raw materials and holds three annual fairs. The chief manufactures are textiles, lace, jewelry, steel products, and chemicals. Breslau consists of an old town surrounded by five modern suburbs. One of the most notable buildings is the Protestant church founded in 1250 and dedicated to Saint Elizabeth. It has a steeple 300 feet high. The city is of Polish origin. Population, 1925, 554,801.

Brest. A strongly fortified seaport and one of the chief naval stations of France, located on a wide rock-bound harbor at the northwestern extremity of France. Most of the working population are engaged in industries related to naval maintenance. Between the town and the harbor mouth, the Cours d'Ajot, one of the finest promenades in Europe, skirts the shore. Brest was one of the principal ports used by the American Expeditionary Forces in the World War. A telegraph cable connects the city with Duxbury, Mass. Population, 1921, 73,960.

Brighton. The most celebrated seaside resort in England, situated on the English channel, 51 miles due south of London. A magnificent 4-mile promenade and driveway with two fine piers borders the coast. The most noteworthy building is the Royal Pavilion, in Oriental style, occupied by George IV and succeeding British sovereigns. The city also has a famous aquarium. Population, 1921, 142,427.

Bristol. A maritime city of southwestern England, situated seven miles south of the estuary of the Severn, with which it is connected by the navigable river Avon. The city has long been noted for its extensive commerce and for its glassworks, potteries, soap works, tanneries, tobacco factories, and shipyards. In the shipyards of Bristol was built, in 1838, the *Great Western*, the first steamship to engage in a regular transatlantic carrying trade.

Bristol is the seat of Bristol university and of two colleges. Besides libraries, museums, and art galleries, the city contains a number of medieval churches, of which the finest architecturally is that of Saint Mary Redcliffe, dating from the 14th century. From Bristol came the first settlers of Newfoundland as well as the island's discoverer, John Cabot. The city was at one time the residence of Southey and of Coleridge. Population, 1921, 377,061.

Bruges (E. *brōō'jĕz*; F. *brüzh*). A decadent commercial city of western Belgium. Prior to the 16th century, Bruges was a flourishing center of woolen manufacturing. Among the many medieval structures which the city has preserved from its more prosperous days are the Church of Notre Dame and les Halles, the Market Hall, whose tower, 352 feet in height, contains a chime of 48 bells. This tower was celebrated by Longfellow in his poem "The Belfry of Bruges." The port of Bruges is Zeebrugge, 8 miles distant, which was a German submarine base during the World War. The name of the city means bridges and was applied in allusion to the 54 bridges constructed across the numerous canals which intersect the city. Population, 1922, 52,723.

Brunn (*brŭn*). An important commercial city of west central Czechoslovakia. Its manufactures include woolen goods, hardware, leather, and machinery. Brunn has several churches of attractive medieval architecture and a beautiful synagogue built in the Saracenic style. The city is a trading center for a thickly populated district. Population, 1921, 221,422.

Brussels. The capital and largest city of Belgium, situated in the central part of the kingdom. It consists of an upper town,—the new and fashionable quarter,—and the lower, or old, town, which is devoted to commerce and industry.

Its magnificent boulevards, beautiful squares and parks, and imposing buildings make Brussels one of the most beautiful cities of Europe. The more notable buildings include the Hôtel de Ville, with its open-stonework spire, 374 feet high, and the sumptuous Greco-Roman Palais de Justice. The Church of Sainte Gudule, begun in 1220, is celebrated for its marvelous stained-glass windows. The royal library, the museums, and the art galleries contain many masterpieces of Flemish painters. The University of Brussels is one of the very few European universities which have been founded without the co-operation of church or state. The city has numerous schools and scientific societies.

Brussels suffered severely from the German occupation during the World War. Since that time, however, its industries have resumed their production of Brussels lace, carpets, furniture, steam engines, and other articles manufactured before the war. The city is also the railroad center of the country. Population, 1922, 775,039.

Bucharest (*bōō'kä-rĕst'*, *bū'-*). The capital and largest city of Rumania, located in the central southern part of the country. Bucharest has an extensive commerce in petroleum, cereals, and timber. The industries include oil refining and the manufacture of flour, liquors, chemicals, and brick.

The city's chief attractions are the splendid public gardens and the bright cupolas of the numerous Greek Catholic churches. Among the more imposing structures are the Royal Palace, the National university, the Palace of Justice, and several fine monuments. The customs of the inhabitants exhibit a blending of Oriental and Western influences. The name Bucharest is a corruption of a Rumanian word meaning city of joy. Population, 308,987.

Budapest (*bōō'dä-pĕst'*). The capital and largest city of Hungary, situated in the central northern part of the country on the banks of the Danube river. Budapest comprises the former city of Buda on the right bank and of Pest on the left bank. The two are connected by six bridges, including two suspension bridges which are among the longest in Europe.

Buda, the older section, which was founded by the Romans in the 2d century A. D., is built on two hills and contains the royal castle, the government offices, and the former residences of the aristocracy. The newer town, Pest, founded by the Huns under Attila in the 5th century A. D., is built on a low plain. Pest is the commercial, industrial, and intellectual center of the city. It contains a park 1000 acres in extent with a charming lake. At the park entrance, there is an artesian well 3000 feet deep which yields 260,000 gallons of hot water daily. Pest also contains the new Parliament buildings, the University of Hungary, the National Theater, the Industrial Museum, and numerous other notable buildings.

Budapest is one of the great flour milling centers of the world. It contains some of the largest electrical works of Europe, in which were planned the first successful underground trolley lines. Other manufactures include machinery, agricultural implements, chemicals, carriages, cutlery, glass, porcelain, leather, liquor, and musical and scientific instruments. The city's commercial interests are of even greater importance. Budapest is the railroad center of Hungary and is further served by the Danube, the chief waterway of the country. The principal exports are grains, wine, wool, cattle, and flour. Population, 1921, 1,184,616.

Cadiz (*kā'dĭz*). An Atlantic port on the south coast of Spain. Cadiz is one of the most ancient cities in Europe. Founded by the Phœnicians, 1100 B. C., Cadiz was captured in turn by the Carthaginians, Romans, Goths, Moors, and Spaniards. The town is still protected by walls and fortresses. When Spain was mistress of most of the New World, Cadiz was the emporium of American commerce and was a city of vast wealth and importance. Today its trade is small, the exports being principally salt, wines, olive oil, and fruits. Population, 1921, 76,818.

Calais (*kăl'ā*; *kăl'ĭs*). A strongly fortified port of northeastern France, situated on the Strait of Dover near its narrowest part. Calais is the chief point of disembarkation for travelers from England, being only 21 miles from the English coast. It has considerable commercial, manufacturing, and shipbuilding interests.

Calais was held by England from 1347 to 1558. During the World War, the port was virtually placed at the disposal of Great Britain in order to facilitate the transfer of men and munitions to France. Population, 1921, 73,001.

Cambrai (*kän'brĕ'*). An industrial town of northeastern France, noted for its manufacture of linen and of cotton textiles. The city has given its name to the fabric known as cambric.

In the vicinity of Cambrai, on Nov. 20, 1917, was fought the battle in which tanks were first used on a large scale. Population, about 22,000.

Canterbury. A cathedral city in the southeast of England, lying south of the Thames and about 56 miles east of London. Christchurch Cathedral is the crowning architectural feature of the city. The Archbishop of Canterbury is, next to the king, the highest official of the Anglican Church. Among the distinguished Catholic archbishops who, prior to the Reformation, presided over the see, were Saint Augustine, Lanfranc, Anselm, and Thomas à Becket, the one last mentioned having been murdered in the cathedral. The building contains, among other tombs, that of Henry IV and of the Black Prince. The city has many interesting ruins, including those of Canterbury castle, a fortress of Norman construction. A public drinking fountain commemorates Marlowe, who was a native of Canterbury. Population, about 25,000.

Cantigny (*kän'tēn'y'*). A village of northeastern France, 18 miles south of Amiens. On May 28, 1918, it was the scene of the first American offensive in the World War.

Capri (*kä'prē*). A beautiful, rocky island at the entrance of the gulf of Naples, visited annually by more than 30,000 tourists. Its area is nearly 6 square miles, and its highest point is approximately 2000 feet above the sea. One of its most remarkable features is the Blue grotto, the roof and sides of which are composed mostly of stalactites. The grotto is on the coast and is called blue because the light, refracted in passing through the water at the cave's mouth, causes the interior of the grotto to appear blue.

Capri was anciently famous for the palace there to which the Roman emperor Tiberius retired in order to spend his last years in pleasures. It had also a large Roman lighthouse, the remains of which are still visible. A more recent ruin is that of Barbarossa, a castle named after a pirate who partially destroyed it in 1544. Population, about 5000.

Cardiff. The principal seaport and largest city of Wales, situated at the southeastern extremity of the principality near the northern coast of Bristol channel. The city is the largest coal exporting port in Europe and ranks among the largest ports of England in its total shipping tonnage. Besides coal, its chief exports are iron and steel products, machinery, railroad cars, and vehicles. Its docks cover more than 200 acres, and there are 7 miles of wharves. Cardiff is the seat of University College of South Wales. Population, 1921, 200,262.

Carfin. A village of southern Scotland in Lanark county, notable for a grotto to which many thousand pilgrimages are made annually by pious Catholics. In this grotto, miraculous cures are said to be performed, comparable to those at Lourdes, France.

Carrara (*kär-rä'rä*). A city of northern Italy celebrated for its marble quarries. It is situated 3 miles inland from the eastern extremity of the Gulf of Genoa in a valley surrounded by marble hills. Most of the city's buildings are of marble, and there is a museum containing numerous statues and Roman antiquities discovered in the vicinity. Population, about 50,000.

Cartagena. A Mediterranean port and strong naval station in the southeastern part of Spain. The chief industries are tunny fishing, shipbuilding, lead smelting, glass blowing, ironworking, and the manufacture of cordage and of other esparto grass products. The city is well built and is still surrounded by walls.

The name Cartagena means daughter of Carthage. The city was founded about 243 B. C. by Hasdrubal, a Carthaginian general, who called the city *Carthago Nova*, "New Carthage." It was captured by the Romans in 210 B. C. and afterward was occupied successively by the Vandals, Moors, Spaniards, English, and French. Population, 1921, 96,891.

Catania (*kä-tä'nyä*). An Italian city on the eastern coast of Sicily, situated at the southeastern base of Mount Etna. The city has broad, well kept streets and many fine public buildings. A large trade in agricultural products is carried on in Catania, and there are important manufactures of linen, cotton, silk goods, and art objects of lava, wood, and marble. The chief attraction is Mount Etna. The city contains the remains of an ancient theater.

Catania was founded by Greeks in 729 B. C. and was held successively by the Carthaginians, Romans, Goths, Saracens, Normans, and the rulers of Aragon, from whom it passed to Italy. Population, 1922, 255,394.

Channel Islands. Three islands,—Jersey, Guernsey, and Sark,—lying in the English channel near the northwestern coast of France. They are dependencies of Great Britain, having belonged originally to the Normans who conquered England in 1066. The islands are rocky but have many beautiful wooded valleys. About one-half their 75 square miles of surface is arable.

The Channel islands are much frequented by tourists. Jersey contains a gorge more than 1000 feet deep in the cliffs at Crabbe. Other features of the islands include a picturesque natural archway of rock on Dixcart bay; a feudal manor house at Samares, dating from the 11th or 12th century; and Mousterian caves which, when explored recently, exhibited the remains of Neanderthal men, of the woolly rhinoceros, the cave hyena, and other animals now extinct. The state of New Jersey was named after the island of Jersey. Population, 1921, 89,614.

Chateau Thierry (*shä'tō' tyĕ'rē'*). A town in the northeast part of France, on the Marne river 47 miles east and slightly north of Paris. At this point, in June 1918, American troops engaged German forces advancing toward Paris and effectively checked their progress. Several weeks later, a general counter attack swept the Germans back a distance of many miles. The town is named after a castle in the neighborhood, which was built by Charles Martel for the Frankish king Thierry IV. On July 15, 1923, a monument commemorating the American victory was erected in a square of the town, renamed United States place. Population, about 12,000.

Chemnitz (*kĕm'nĭts*). The chief industrial city of the German state of Saxony. The city is situated at the base of the Erzgebirge mountains about 20 miles from the border of Czechoslovakia. The principal manufactures include iron and steel products, textiles, hosiery, carpets, chemicals, dyestuffs, and vehicles. Chemnitz has a varied but unbroken history as an industrial city extending from the 13th century until the present. Population, 1925, 331,641.

Cherbourg (*shĕr'bōōr'*). A strongly fortified French naval station near the center of the country's northern coast on the English channel. It was from this port that the Confederate cruiser, the *Alabama*, was forced by the French authorities to put out to sea before it was sunk by the United States vessel, the *Kearsarge*. Population, about 45,000.

Christiania (*krĭs-tĭ-ä'nē-ä*). The capital and largest city of Norway, situated at the head of Christiania fiord in the southeastern extremity of the country. The city is the trade center for southern Norway and has large shipyards and important manufactures of woolens, matches, pulp, and nails.

Christiania is surrounded on the land side by picturesque hills. The chief edifices are the Parliament buildings, the National Theater, the University of Christiania, the Museum of Art, and a historical museum. In 1924, the city's name was changed to Oslo, that by which it was originally known. Population, 1920, 258,483.

Coblenz. A commercial and manufacturing city of western Germany, beautifully situated at the confluence of the Moselle and the Rhine river. It was formerly protected by a system of four forts, including Ehrenbreitstein on the opposite bank. After the World War, however, the fortifications were demolished, and the city was held, until 1923, by the American army of occupation.

Coblenz has an active trade in grain. Its manufactures consist mainly of Moselle wine, ships, hats, machinery, pianos, and lacquered wares. The finest edifice is the government building, in which are centered the administrative activities of the province of Rhenish Prussia. Saint Castor's church, founded in 836, ranks among the oldest in Germany. Population, 1925, 58,161.

Cologne (*kō-lōn'*). A large commercial and manufacturing city of central western Germany, beautifully located on the left bank of the Rhine river. *Eau de Cologne* is a distinctive product. The chief manufactures are leather goods, chemicals, starch, textiles, rubber goods, machinery, metal wares, beet sugar, tobacco products, and furniture.

The outstanding feature of Cologne's architecture is the Gothic cathedral, begun in 1248 and completed in 1880. Two of its towers rise to a height of 512 feet. It has a colossal bell, one of the largest in the world. This bell was hung in 1923, replacing a former one, which was destroyed during the World War. The Church of Saint Ursula is reported to contain the bones of 11,000 British virgins who were massacred near Cologne on their way to Rome. In allusion to this tradition, Columbus applied the name Virgin islands to that West Indies group.

Cologne was founded in the 1st century A. D. under the name of Colonia Agrippina, of which its modern name is a corruption. Rubens, the painter, lived in the city, and one of the local churches contains the tomb of John Duns Scotus. Population, 1925, 698,064.

CONSTANTINOPLE. The largest city of Turkey. It is built on a peninsula on the northern side of the Bosporus strait at its outlet into the Sea of Marmora. Constantinople occupies a key position, commanding a vast commerce between the East and the West. It has an excellent natural harbor in the Golden Horn, a northwestern inlet of Bosporus strait.

Constantinople is often referred to as Stamboul or as the Sublime Porte. Stamboul properly applies to the Turkish section, which is the oldest part of the city. The Sublime Porte is a French term meaning the lofty gate and referred formerly to an elaborate entrance into the enclosure containing the government buildings. This name was used to designate Constantinople as a political capital.

HISTORY. The city was founded in the 6th century B. C. by Greek colonists, who gave it the name Byzantium. In 330 A. D., Constantine the Great made it the capital of the Roman Empire, changing its name to Constantinople. Taken by the Turks in 1453, the city became the capital of the Ottoman empire and the residence of the head of the Moslem religion. In 1920, however, the Turkish Nationalists revolted, choosing as their capital Angora, in Asia Minor. Constantinople was occupied by the Angora authorities in 1922.

PLAN. Stamboul, or the Turkish section, has a typically Asiatic character, being surrounded by walls, now partly ruined, and having unimproved, crooked streets, picturesque mosques, and extensive, colorful bazaars. There are two suburbs—Galata, the foreign business quarter, built mainly of stone; and Pera, a modern residential section of the foreign inhabitants, which is separated from Stamboul by the Golden Horn. The finest street in the city is the Grande Rue, in Pera, which is lined with fashionable shops and large hotels.

BUILDINGS. The most notable buildings of Constantinople are the mosques. Saint Sophia, originally built by Justinian as a church, but later converted by the Turks into a mosque, is one of the most celebrated edifices of the world. The Suleymanieh Mosque is the city's outstanding example of genuine Turkish architecture.

Secular buildings of historic interest include the Castle of the Seven Towers, once used as a state prison; the hippodrome, completed by Constantine; and the old seraglio, now transformed into a museum, in which is stored an extremely valuable collection of Greek antiquities. The Galata tower, 150 feet high, serves as a fire signal station. Water for the city's use is conveyed long distances by aqueducts, some of which date from the 3d century A. D., and is held in reservoirs until required. One of these reservoirs is covered with a roof supported by 420 marble columns and is said to be the largest work of its kind in the world.

INDUSTRY. Large manufacturing establishments in Constantinople are few in number, producing mainly ironwares, leather articles, tobacco goods, and fezzes. The handmade products, however, are important both in variety and in quantity. The chief exports of the city are carpets and rugs, lambskins and wool, attar of roses, embroidery, and filigree work. Population, about 1,000,000.

Copenhagen (*kō'pĕn-hā'gĕn*). The capital and largest city of Denmark, situated on a deep, safe, and capacious harbor on the northeast shore of the island of Zealand. Across the harbor, on the island of Amager, is the modern suburb of Christianshavn. Copenhagen commands the sea highway from the Baltic to the North Sea and was at one time the chief distributing mart of the Baltic trade. To offset the advantages given by the Kiel canal to Germany's seaports, Copenhagen, in 1894, made part of its harbor a free port. Shipbuilding is the chief industry. Among the manufactures are agricultural machines, porcelains, textiles, sugar, watches, and chemicals.

A characteristic feature of Copenhagen is the large number of spires, which occur on many public buildings as well as on the churches. The Church of Our Redeemer has a winding staircase built outside the spire 295 feet to its top. Copenhagen is the seat of the University of Copenhagen and is the headquarters of many learned societies. The Thorvaldsen Museum contains over 300 works executed by Thorvaldsen, Denmark's greatest sculptor. Hans Christian Andersen was one of the city's most distinguished residents. Population with suburbs, 731,496.

Cordoba (*kôr'dô-vä*). An inland city of southern Spain, located on the Guadalquivir river. The city was founded by the Phœnicians and attained to considerable importance under the Romans. It later became the metropolis of the Moors in Spain and, from the 9th to the 12th century, was one of the greatest centers of commerce in the world. The Mosque of Cordoba, now used as a Catholic cathedral, is the most magnificent example of Mohammedan architecture in Europe. The city is now in decline, its manufactures being confined largely to hats, paper, silk, and cordovan leather. The last named article obtained its name from Cordoba. Cordoba was the birthplace of the Roman poet Lucan, of the two Senecas, and of the Arab philosopher Averroës. Population, 1921, 73,710.

Cork. A port of central southern Ireland, situated on a capacious natural harbor formed by the estuary of the River Lee. It has a lower harbor, Queenstown, located at the river's mouth. A heavy trade in foodstuffs is carried on with England. The city's chief manufactures are leather, liquors, metal wares, and linen and woolen textiles.

Among the finest buildings are the Anglican and the Catholic cathedral, both dedicated to Saint Finn Barr, who founded the city in 622 A. D. The Church of Saint Anne Shandon has a notable peal of bells. Other features of the city are University college, a school of science and of agriculture, and a public park, 240 acres in extent. Population, 1926, 78,468.

Coventry. An industrial city of central England, noted for its manufacture of automobiles, ribbons, artificial silk, telephone equipment, and electric motors. Coventry is a very old town and was for centuries the scene of an annual pageant commemorating the ride of Lady Godiva. According to tradition, she agreed to ride naked through the streets in order to save the citizens from certain exactions, her husband, Earl Leofric, having demanded this action as a condition of relieving the townspeople. The pageant was last celebrated in 1887. Saint Mary's Hall, built in 1450, is one of the finest examples of ornamental architecture in England. Population, 1921, 128,205.

Czernowitz (*chĕr'nô-vits*). A city of Rumania, situated on the right bank of the river Pruth, in the northern part of the kingdom. Its growth has been rapid in the past 50 years. The city has machine shops, sawmills, and breweries, and is the seat of an active transit trade in wool, lumber, cattle, and farm products.

Czernowitz has a mixed population, about one-half being Germans. The other half is composed of Jews, Rumanians, Poles, Armenians, Gypsies, Ruthenians, and other races. The city is the seat of Francis Joseph university. The archbishop's palace is a remarkably fine example of Byzantine architecture. Before the World War, Czernowitz was a city of Austria-Hungary. Population, about 90,000.

Dardanelles. A narrow channel, 42 miles long and 1 to 5 miles wide, joining the Sea of Marmora and the Ægean Sea. The territory about the strait, affording an excellent defense of Constantinople from the West, was the scene of a costly offensive against Turkey during the World War. It has since been placed under the control of an Allied commission.

The ancient name of the Dardanelles was Hellespont, across which, in spite of its strong current, the mythical Leander is said to have swum each evening to visit Hero. Lord Byron swam the Hellespont at the point where Xerxes crossed it in 480 B. C.

Dortmund (*dôrt'mōōnt*). A railway center and manufacturing city of central western Germany in the northern part of the Ruhr district. Located in the midst of rich coal mines, the city has become an important point for the manufacture of steel products, flour, lumber, and liquors. Since 1900, its population has more than doubled, standing, according to the 1925 census, at 320,256.

Dover. A heavily fortified port and favorite summer resort of England, situated at the southeastern extremity of the country. White chalk cliffs tower nearly 400 feet above the harbor, and, on clear days, afford a view of the opposite coast of France, 21 miles distant. The chief industrial products are ships, sails, rope, and flour. Population, 1921, 42,672.

Dresden. An industrial city of central eastern Germany near the border of Czechoslovakia. It is situated on the Elbe river and is an important railway center for Germany and the rest of central Europe. The chief manufactures include pianos, confectionery, silverware, jewelry, chemicals, glassware, and metal goods. Dresden china is made at Meissen, a suburb.

Dresden is one of the most important art centers of Europe. Its art gallery, the Zwinger, contains Raphael's "Sistine Madonna," Correggio's "Holy Night," and many other masterpieces. The city also has two royal theaters, many minor theaters and music halls, and an orchestra famous throughout the world. Sculptural monuments and beautiful fountains adorn the city in great profusion. The Brühl Terrace and the Grosser Garten are famous pleasure grounds. The Royal Palace is the most notable building. Dresden is the capital of the German state of Saxony. Population, 1925, 618,684.

Dublin. The capital and largest city of the Irish Free State, situated on an inlet near the center of Ireland's eastern coast. A large part of the country's exported foodstuffs are handled through the port of Dublin. Liquors are made in considerable quantity.

Dublin as a whole, with its fine bay, wide streets, spacious squares, magnificent 2000-acre park, massive public buildings, and beautiful suburbs, is one of the handsomest capitals in Europe. Christ Church, in Early English Gothic style, was begun in 1038 by a Danish king of Dublin. Saint Patrick's Cathedral is about 700 years old. The city has statues of O'Connell, Burke, Goldsmith, and many other famous Irishmen. The University of Dublin is the chief educational institution. Population, 1926, 419,156.

Duisburg (*dūs'bōōrĸ*). A manufacturing city of central western Germany, in the Ruhr district. Its quays, built along canals and on the Rhine and the Ruhr river, are said to constitute the largest river harbor in the world. The chief commodities handled are coal and the products of the city's industries—iron and steel products, chemicals, liquors, asphalt, varnish, furniture, and tobacco. Population, 1925, 271,790.

Dusseldorf (*dūs'ĕl-dôrf*). A manufacturing city of western Germany, situated on the right bank of the Rhine at the influx of the Dussel river. The harbor is spacious and well equipped, and there is a large export trade. The city has great iron and steel industries and textile manufactures. Chemicals, tobacco goods, chocolate, beer, paper, glass, and musical instruments are also made.

Dusseldorf has wide, regularly laid out streets and spacious squares, and is noted for its numerous garden grounds embellished with fountains and statues. The Hofgarten is regarded as the finest public garden in Germany. The city has long possessed importance, also, as an art center, having been the focus of the so-called Dusseldorf school of painting. The Art Academy is an imposing building in the Renaissance style with a façade 520 feet long. Among its paintings is the "Assumption" by Rubens and a Madonna by Bellini. Population, 1925, 431,096.

Edinburgh (*ĕd"n-bŭr-ô*). The second largest city of Scotland. It is built near the south shore of the Firth of Forth, which is here spanned by a bridge 1½ miles in length. Edinburgh is the seat of the supreme court of Scotland and was the seat of government before the country united politically with England. The chief industries include printing and publishing, and the manufacture of liquors, leather, flour, and rubber goods.

Edinburgh consists of an old and a new section. Through the latter runs the magnificent Princes street, one of the finest thoroughfares in Europe. Near it stands the beautiful Scottish American war memorial. Among the city's points of interest are Holyrood Palace; Saint Giles Church, which has a memorial tablet to R. L. Stevenson designed by Saint-Gaudens; a magnificent monument to Sir Walter Scott; a small Greek temple erected to the memory of Robert Burns; and Calton cemetery, which contains a statue of Abraham Lincoln with a freed slave kneeling at his feet. Edinburgh has a handsome library donated by Andrew Carnegie. There are numerous educational institutions, the most famous of which is the University of Edinburgh. The predominance of literary elements in the city's population, combined with its picturesque location, has won for it the name of "modern Athens."

The city was named after Edwin, king of Northumbria, who seized it in the 7th century A. D. and built a fortress on Castle rock, a precipitous height which dominates the city. The Royal Castle now stands on the site of Edwin's fortress. Population, 1921, 420,281.

Essen. A steel manufacturing city of western Germany, situated in the Ruhr district and surrounded by rich coal and iron deposits. The recent industrial growth of the city is due mainly to the activities of the Krupp corporation. The town, however, traces its origin to 873 A. D., when construction began on the cathedral, which is one of the oldest churches in Germany. The city was occupied by the French army in 1923. Population, 1925, 468,696.

Etna. The largest active volcano in Europe. It is an isolated mountain, 10,758 feet high, in northeastern Sicily near Catania and has a base 90 miles in circumference. On its eastern side is a former crater, now a vast amphitheater with nearly precipitous sides 3000 feet in height.

The first recorded eruption of Etna was in the 8th century B. C. Another, occurring in 477 B. C., is graphically described in Æschylus' *Prometheus Bound*. Later eruptions of a violent character took place in 1169, 1527, 1669, 1693, 1852, 1864, 1879, 1911, and 1923. In that of 1669, more than 20,000 people were killed, and the eruption of 1693 resulted in the destruction of a still greater number of lives. An observatory and a house for the convenience of travelers have been erected near the chief crater. A large part of the world's supply of sulphur came formerly from Mount Etna.

Fingal's Cave. A remarkable cave of basalt formation, on Staffa, a small island off the central western coast of Scotland. The cave extends from the shore a distance of 227 feet within a rocky height and has an arch 66 feet high. The color effects of the columnar basalt formation are no less striking than the weird sounds produced by the action of wind and wave as they play upon the opening of the huge cave.

Florence. A city of north central Italy, lying in a fertile valley near the Apennine mountains. Florence is, next to Rome, the most celebrated Italian city, being noted for its illustrious history and for its art treasures.

The Cathedral of Florence is the city's outstanding structure. Begun in 1298, it occupied about 200 years in construction. Its dome was planned by Brunelleschi. The bell tower of the cathedral was built by Giotto. This tower and the bronze doors of the baptistery, designed by Ghiberti, have enjoyed renown for centuries. The Franciscan church Santa Croce contains the tombs of Galileo, Michelangelo, Machiavelli, and many other distinguished men. The picture galleries contain some of the best works of Titian, Andrea del Sarto, Botticelli, Rubens, Raphael, and other great painters. Among the notable statues are the "Venus de' Medici," the "Dancing Faun," and the "Knife Grinder."

The city has famous academies of art, a museum of natural history, a university, a botanical garden, a large astronomical observatory, and a number of libraries, chief of which is the Laurentian library founded by Lorenzo de' Medici. Florence was the birthplace of Dante and of Florence Nightingale.

The industries of the city include the manufacture of silks, glassware, porcelain, and objects of art, especially mosaics, wood carvings, stained glass, and jewelry. Florence was founded in the 2d century B. C., but the period of its greatest prosperity was in the 13th century A. D., when it was an independent city-state. Population, 1922, 253,565.

Flushing. A strongly fortified Dutch seaport, built on an island at the western extremity of the Netherlands. There is a large passenger traffic between Flushing and English ports. The city was the birthplace of Admiral de Ruyter, one of Holland's greatest naval heroes. Population, 1920, 22,511.

Folkestone. An ancient town and seaport of southeastern England, situated on the Strait of Dover. Folkestone has daily steamer communication with Boulogne in France and is also popular as a summer resort. Harvey, the discoverer of the circulation of the blood, was born in this city. Population, 37,571.

Frankfort. A city of west central Germany, situated on the Main river, an eastern tributary of the Rhine. Frankfort is noted as a financial and mercantile center, and has important literary and historical associations. The chief manufactures are electrical goods, machinery, dyes, tobacco, and carpets.

Among the features of the city are the family house of the Rothschilds, the house where Goethe was born, the Goethe Museum, the Saint Bartholemew Cathedral, the Staedel Art Institute, the Municipal Historical Museum, and the large monument to Gutenberg, the inventor of movable type. Frankfort was formerly the electoral city of the Holy Roman Empire, and, after 1816, the German Parliament held its sessions there. Population, 1925, 461,849.

Freiburg (*frī'bŏŏrĸ*). A city in the southwestern extremity of Germany, noted for its magnificent Gothic cathedral. This edifice, built of red sandstone, was begun in 1122 and was completed in 1513. It is admired for the delicate symmetry shown in its design as well as for its splendid tower, which is 386 feet high. Population, 1925, 90,475.

Geneva. A beautiful city of western Switzerland, situated at the lower end of Lake Geneva where its waters flow into the Rhone river. The city covers two islands in the river, one of which, called Rousseau's island, is a public pleasure ground commemorating the revolutionary writer, who was a native of the city. The left bank of the river is occupied by the old city and the business section, while, on the right bank, is the quarter called Saint Gervais, mainly residential in character. The latter district contains numerous hotels for the accommodation of the many tourists who enter Switzerland by way of Geneva.

The University of Geneva was originally founded as an academy in 1559 by Calvin, who made Geneva the chief center of Protestantism in the 16th century. Swiss heroes of the Reformation are further commemorated in Geneva by a recently erected monument entitled the "Wall of the Reformers." The manufactures of the city consist principally of clocks, watches, jewelry, enameled ware, and scientific instruments. Geneva is the headquarters of the League of Nations and has been the scene of many international conferences, including the *Alabama* arbitration. The city is predominantly French in language and culture. Population, 1921, 135,059.

Genoa (*jĕn'ō-ä*). A commercial city of northeastern Italy, picturesquely situated at the head of the Gulf of Genoa. The city is strongly fortified against attacks by sea or land. Rail connections render it the sea outlet for much of the foreign trade of northern Italy, Switzerland, and southern Germany. The manufactures include silks, velvets, ribbons, hats, paper, and flour, and the city is also noted for its production of works of art in gold, silver, ivory, alabaster, and coral.

Among the notable examples of Genoa's many fine edifices are the ducal palaces, the residences of the doges in the days of the city's independence; the Cathedral of San Lorenzo, containing what is said to be the Holy Grail; the Church of Santissima Annunziata; and the Teatro Carlo Felice. The last named edifice was built in 1828 and ranks among the largest theaters in Italy. Genoa has an imposing sculptural group in honor of Columbus, who was a native of the city. Population, 1922, 300,784.

Ghent. A city of western Belgium, located on the Scheldt river and connected with the North Sea by a ship canal. The city is divided into islands by smaller canals, which are spanned by numerous bridges. The older part of Ghent has narrow, gloomy streets, but the newer part is laid out with wide avenues, flanked by fine houses.

Ghent contains the Cathedral of Saint Bavon, in which is the celebrated "Adoration of the Magi" by Van Eyck. There is also a great walled and moated nunnery, which, since its foundation in the 13th century, has been known for the production of exquisite lace. Ghent's principal manufactures are cotton and linen textiles, leather, and refined sugar, and the city has an active export trade in flowers. The emperor Charles V was born in Ghent, where, also, was signed the treaty which closed the War of 1812. Population, 1922, 165,287.

Giant's Causeway. A line of three perpendicular cliffs on the northeastern coast of Ireland. According to a legend, they were the beginning of a causeway to be built by giants across the channel to Scotland. They are formed of vertical basalt columns, mainly hexagonal in form and fitting closely together. The three cliffs are called the Little Causeway, the Middle Causeway, and the Grand Causeway. The last has a width of 60 to 120 feet and extends about 500 feet into the sea. On the Middle Causeway is the famous "wishing chair." The vicinity abounds in special points of interest, such as an amphitheater of natural formation and ruined castles perched on the top of isolated crags.

Glasgow. The second largest city in Great Britain, situated on the Clyde river somewhat southwest of the geographical center of Scotland. Its harbor has been elaborately improved at the cost of 40 million dollars and has some 8 miles of quays. Glasgow's shipyards are the largest in the world. The industrial development is due partly to the city's location in the midst of extensive deposits of coal and of iron. The chief manufactures, apart from ships, comprise iron and steel products, textiles, coal, paper, chemicals, and whisky.

Glasgow is conspicuous for its successful management of civic operations and improvements, which include the erection of large numbers of modern apartment houses. There are many institutions for technical and higher education, of which the most important is the University of Glasgow. The municipal art gallery contains the finest collection of paintings in Great Britain outside of London, including Whistler's portrait of Carlyle. Saint Mungo's Cathedral, built between 1197 and 1446, is a beautiful example of Early English architecture. It stands on the site of a church erected in the 6th century by Saint Mungo, the patron saint of Glasgow. Population, 1921, 1,034,069.

Goteborg (*yū't'ĕ-bôr'y'*). The second largest city of Sweden, situated in the southwestern part of the country at the mouth of the Gota river, which discharges into the Kattegat. The town was founded in 1618 by Gustavus Adolphus, but, in consequence of numerous fires, it has been largely rebuilt in recent times. It has numerous fine buildings and broad, well shaded streets, those near the river having canals running through their centers. Favored by an excellent harbor open all the year round, Goteborg conducts much of the country's foreign commerce. The industries comprise shipbuilding, textile weaving, ironworking, sugar refining, fishing, and brewing. Population, 227,343.

Granada. An inland city of southeastern Spain, lying at the base of the Sierra Nevada about 40 miles from the Mediterranean coast. The city, having been formerly one

of the chief centers of Moorish civilization in Spain, has a partially Oriental appearance. The residential section of the Moorish nobility is now in ruins and is occupied largely by gypsies. Granada's outstanding edifice is the Alhambra, a magnificent Moorish palace celebrated in America by Washington Irving's book *The Alhambra*. The cathedral, begun in 1529, commemorates the reconquest of Spain by the Christian powers. Granada has a university founded in 1531 by the emperor Charles V.

The city is in a fertile district containing groves of orange, lemon, and fig trees. Its manufactures include textiles, paper, leather, flour, macaroni, chocolate, and soap. Population, 1921, 103,368.

Gratz. A commercial and industrial city of southeastern Austria, situated in a beautiful valley at the eastern extremity of the Alps mountains. The principal architectural attractions include a Gothic cathedral dedicated to Saint Ogidius and noted for its exquisite stained-glass windows, a mausoleum containing the remains of Emperor Ferdinand II, and the parish church, which, built in 1520, is adorned with an altarpiece by Tintoretto. Gratz has a university, founded in 1573.

A rich coal district is near the city. The manufactures comprise iron and steel goods, optical instruments, chemicals, paper, and lithographs. Gratz is an important railroad center and is the trade outlet for southern Austria. Nine-tenths of the inhabitants are German in race and Roman Catholic in religion. Population, 1920, 157,644.

Hague, The. The capital of the Netherlands, situated in the southwestern part of the kingdom about two miles from the North Sea. The city is chiefly occupied with the business of governing, although there are manufactures of gold and silver lace, jewelry, and articles of iron, brass, and copper.

The Hague has broad, shaded streets, intersected by picturesque canals and lined by many fine edifices. One of the most noted buildings is the Mauritshuis, which contains masterpieces by Rembrandt, Rubens, Van Dyck, and others. The city is the headquarters of the International Court of Arbitration. This court sits in the Peace Palace, which was erected in 1913, partly through the generosity of Andrew Carnegie. Other features of the city are the royal library, the various government buildings, Willem's park, and the royal villa Huis-ten-Bosch, "House in the Woods," which stands in the suburbs amid the magnificent forests separating the city from its seaside resort, Scheveningen. Population, 1921, 354,987.

Hamburg. The second largest city of Germany and, before the World War, the third largest seaport in the world. Located in northwestern Germany due south of the Baltic peninsula, it is connected with Cuxhaven on the North Sea, 75 miles distant, by the navigable Elbe river. Hamburg's two harbors are on two small lakes made by damming the Alster, a stream flowing through the city. The docks are among the best equipped in the world. Hamburg is one of the chief coffee markets of the world and handles immense quantities of wool, grain, cotton, ironware, tobacco, coal, and paper. It is also the headquarters of the Hamburg-American steamship line. The chief manufactures include ships, tobacco products, liquors, sugar, flour, chocolate, furniture, and musical instruments.

Hamburg was one of the principal cities of the Hanseatic League in the 13th century. In 1842, a large part of the city was destroyed by fire and was since rebuilt in a modern fashion. As a memorial of the fire, the Church of Saint Nicholas was erected, with a spire rising 482 feet above the ground. Hagenbeck's private zoological gardens contain one of the largest collections of wild animals in captivity. The city is the capital of the state of Hamburg, some 160 square miles in area, which has self-governing rights within the German republic. Population of city, 1925, 1,079,092.

Hammerfest. The most northerly incorporated town in the world, situated on an island off the northern coast of Norway 300 miles north of the Arctic circle. The inhabitants support themselves by fishing, raising reindeer, and entertaining tourists, large numbers of whom annually visit the town in order to view the spectacle of the midnight sun. The sun does not set on Hammerfest from May 13 to July 29. Population, about 3000.

Hanover. An industrial city of north central Germany, about 150 miles west of Berlin. The leading manufactures are iron and steel products, musical instruments, oilcloth, liquors, chemicals, and leather. Among the features of Hanover are the city forest, lying in the suburbs and containing a zoological garden; the Grosse Garten, a pleasure ground richly adorned with statuary; Herrenhausen Castle; the Marktkirche, a 14th century church with a tower 300 feet high; and a veterinary school founded by George III of England.

Hanover was formerly the capital of the Kingdom of Hanover, a state which, from 1714 until 1837, had the same rulers as England. Population, 1925, 422,435.

Havre, (Le) (E. *hä'vẽr*; F. *lẽ äv'r'*). One of the largest seaports of France, situated at the mouth of the Seine river near the center of the country's northern coast. Its exports are mainly silk and cotton goods. The manufactures include chemicals, glass, liquor, ships, and guns.

The importance of Havre dates from 1517, when the improvement of its harbor was begun. During the World War, the city was temporarily made the seat of the Belgian government. Population, 1926, 158,022.

Heidelberg. A university town of Baden in southwestern Germany. The university was founded in 1385 and numbers among its graduates Melanchthon, Gervinus, Kuno Fischer, and Bunsen. The town has an ancient castle, which contains in its cellar a cask with a capacity of 46,732 gallons. Near Heidelberg, in 1907, the lower jawbone of a prehistoric man was found, and the city has given its name to the racial type which, on the basis of this bone, is believed to have existed some 200,000 years ago. Population, 1925, 73,034.

Helgoland (*hĕl'gō-länt'*). A small rocky island, one-fourth of one square mile in area, situated at the southeastern extremity of the North Sea. Acquired by Germany from Great Britain in 1890, it was strongly fortified, and served during the World War as a naval base, protecting the west end of the Kiel canal. The fortifications were dismantled according to the terms of the Treaty of Versailles. The island has been reduced, by the action of the waves, to one-fifth the size which it had in early historical times.

Helsingfors (*hĕl'sĭng-fôrs'*). The capital and largest city of Finland, located in the south part of the country on a peninsula projecting into the Gulf of Finland. The city is strongly fortified. It is regularly laid out and has many fine buildings and handsome parks adorned with monuments. The University of Helsingfors was originally founded at Abo in 1640 and was moved to Helsingfors in 1827. Helsingfors is the chief industrial city of Finland and has a considerable commerce in timber, paper, and dairy products. Population, 1920, 197,848.

Hull. A large seaport of central eastern England, situated at the mouth of the Hull river in the estuary of the Humber. The full name of the city is Kingston-upon-Hull. It is the chief outlet for most of England's exports to Denmark, Norway, and Sweden. Its docks cover 200 acres. The city has extensive fishing interests, and its manufactures comprise iron goods, engines, ships, chemicals, sugar, and leather. William Wilberforce was a native of Hull. Population, 1921, 287,013.

Jena (*yā'nä*). A university town of east central Germany. The university, founded in 1558, has numbered among its professors Humboldt, Hegel, Fichte, Schiller, Haeckel, and Eucken. Goethe resided here at one time. The city is also noted for its production of lenses. Jena was the scene of a disastrous German defeat in the Napoleonic wars. Population, 1925, 52,649.

Karlsbad (G. *kärls'bät*; E. *kärls'băd*). One of the most celebrated fashionable watering places of Europe, situated at the western extremity of Czechoslovakia. It is famous for its hot mineral springs, the daily flow of which is estimated at 2 million gallons, the temperature varying from 47° to 167° F. The name means Charles's Bath and was given in allusion to the fact that Charles IV of France, by bathing here, cured the wounds which he received in the battle of Crecy in 1347.

The principal buildings of Karlsbad are an iron and glass structure, called the Sprudel colonnade, and an edifice in the Greek style, called the Muhlbrunnen colonnade, which has 103 monolithic columns. The resort is visited annually by upwards of 65,000 guests. The permanent population of the town is about 18,000.

Kiel (*kēl*). A city of central northern Germany, formerly the chief naval station of the country. It is beautifully situated on a western arm of the Baltic Sea, which constitutes a commodious natural harbor. This harbor is connected with the North Sea by the Kaiser Wilhelm ship canal. Besides industries connected with shipbuilding, Kiel possesses iron foundries, flour and oil mills, and brickyards. Population, 1925, 213,587.

Kiev (*kē'yĕf*). One of the oldest cities in Russia, attractively situated amid wooded hills on the Dnieper river in the southwestern part of the country. The Dnieper is here spanned by a suspension bridge, 3510 feet long. In the upper town is the famous Petchersk monastery, which is visited annually by large numbers of pilgrims. The city has numerous churches, whose gilded cupolas, seen at a distance, impart to it an almost Oriental effect.

Christianity was first preached in Russia at Kiev, which has long been the chief eastern center of the Greek Catholic religion. There is a large trade in flax, wool, wine, cattle, timber, grain, and fruits. The manufactures include sugar, hardware, tobacco goods, machinery, chemicals, and paper. Population officially estimated in 1926 at 494,000.

Konigsberg (*kū'nĭgs-bĕrg*). A city of East Prussia, Germany, lying on the river Pregel, about 4 miles from its mouth in the Frisches bay, a southern inlet of the Baltic Sea. Prior to the World War the city was a strong naval and military fortress. Its manufactures include locomotives, heavy machinery, chemicals, leather, sugar, malt liquors, and pianos. Amber articles constitute a distinctive product. The University of Konigsberg was founded in 1544. Kant, who was born in Konigsberg in 1724, was a member of the university's professorial staff. Population, 1925, 279,880.

Kovno (*kŏv'nô*). The capital of Lithuania, situated near the center of the country on the river Niemen. The government of Lithuania was transferred there when Poland seized Vilna, the former capital, and, following a plebiscite, was upheld in its possession by the League of Nations in 1923. The city is the center of an agricultural district and ships a considerable amount of grain. Population, 94,405.

Krakow (*krā'kō*). A city of southwestern Poland, situated at the head of navigation on the Vistula river. Krakow was the capital of Poland from 1320 to 1609. Favored by its position as a river port and railroad terminal, Krakow has become the trade center of a large territory. The city was founded in 700 A. D. by the Polish duke of Krak. Population, 1921, 181,700.

Lapland. An area of indefinite extent at the northern extremity of Europe. The region has no separate political existence, but includes parts of Norway, Sweden, Finland, and Russia. Reindeer provide sustenance, clothing, and transportation to the inhabitants. The people are called Lapps. They belong to an Asiatic race and average about 5 feet in height.

Lausanne (*lō'zăn'*). A city of western Switzerland, built on five hills rising from the north shore of Lake Geneva. The city is a railroad and educational center and has a large tourist trade. The manufactures include chocolate, machinery, tobacco goods, and sugar.

The Protestant Cathedral of Notre Dame is the city's most notable church. It dates from the 13th century and was intimately associated with the rise of Protestantism. The University of Lausanne, founded as an academy in 1537, was one of the first schools established for the training of Protestant ministers. The city was the scene of two notable conferences of Allied representatives in 1922 and 1923. The language of the citizens is French. Gibbon wrote most of his *Decline and Fall of the Roman Empire* while a resident of Lausanne. Population, 1921, 68,533.

Leeds. A woolen and steel manufacturing city of north central England. The woolen industries especially have been famous for centuries. The chief products of the city, apart from textiles and steel, include machinery, engines, agricultural implements, shoes, glassware, artificial silk, pottery, and ready-made clothing.

In the midst of the factory district stand the celebrated ruins of Kirkstall Abbey, founded in the 12th century. The city also has a fine university and is noted for a great music festival held every three years. Population, 1921, 458,320.

Leghorn. A seaport and commercial city of northwestern Italy, situated on a spacious, improved harbor on the northeastern coast of the Ligurian Sea. The industries include shipbuilding and the manufacture of copper and brass products, coral ornaments, glass, porcelain, chemicals, electrical apparatus, and flour. The city is noted also as a summer resort. The architectural monuments are comparatively few, the most notable being the cathedral, dating from the 17th century. There is a handsome synagogue founded in 1581. Population, 1922, 114,813.

Leicester (*lĕs'tẽr*). A manufacturing city of central England, about 100 miles northwest of London. The chief industrial products are woolen hosiery, boots and shoes, bricks, and dyes. The city lies in a rich coal mining and sheep raising district.

Leicester is a progressive municipality, providing adequately for the health, education, and recreation of its inhabitants. Saint Nicholas church was constructed partly of bricks taken from a Roman wall in the vicinity. The assize court of Leicester is held in a building which was formerly the banquet hall of a Norman castle. Population, 1921, 234,190.

Leiden. A city of the Netherlands about 10 miles east of The Hague and 6 miles inland from the North Sea. It has a famous university founded in 1575 by William of Orange. Leiden is also known as the birthplace of Rembrandt and as the city which received the persecuted English emigrants, some of whom sailed later in the *Mayflower* to Plymouth, Massachusetts. Population, 1921, 65,694.

Leipzig (E. *līp'sĭg;* G. *līp'tsĭk*). A city of east central Germany, noted as the chief center of the country's publishing industry. There are about 1000 establishments engaged in the business. The city is also a world market for furs, which, along with glass, cloth, and leather, are sold in great quantities at fairs, three of which are held each year.

Leipzig has a famous university, founded in 1409. There are numerous museums, the museum of the book trade being the best of its kind in the world. Other features of the city are the Supreme Court building, the Booksellers' Exchange, the Crystal Palace, the Royal Academy of Plastic Arts, the Conservatory of Music, and Auerbach's cellar, the last having been represented by Goethe as the scene of part of his *Faust*. Near Leipzig, in 1813, was fought the battle in which Napoleon was defeated prior to his banishment to Elba. Population, 1925, 679,322.

Lemberg. A city of southeastern Poland, almost surrounded by strongly fortified hills. It is the seat of three archbishops and has three cathedrals—a Roman Catholic, an Armenian, and a Greek Catholic. The city is well built and has many educational institutions, chief of which is the University of Lemberg, founded in 1784.

Lemberg has numerous manufactures, including ironwares, musical instruments, bricks, flour, and spirits, and conducts a large trade in linen, flax, hemp, and wool. The Fair of the Three Kings is held here each January. Population, 1921, 219,193.

Leningrad (*lĕn'ĭn-grăd*). See *Petrograd*.

Liege (*lē-ĕzh'*). The chief manufacturing city of Belgium, situated amid rich coal mines in the eastern part of the country and built on both banks of the Meuse river. The chief industrial products are guns, steam engines, machinery, hardware, and textiles. The city has numerous educational institutions, including Liege university, the museum of which contains the skeletons of many prehistoric animals found in the vicinity.

Liege is the center of the Walloon culture, akin to the French. A chapel built in the 6th century furnished the nucleus about which the city began to grow. The German attack on the strong fortresses in the neighborhood was the first battle in the World War. Population, 1922, 165,136.

Lille (*lēl*). A large industrial city in the northeastern extremity of France, connected by a canal with the North Sea, 30 miles distant. The chief manufactures are linen and cotton textiles, locomotives, structural steel, sugar, chemicals, tobacco, and soap. Lisle thread derives its name from the city.

The city is modern in appearance and well built. Its features include the Church of Saint Maurice, the Palais des Beaux Arts with its extremely valuable collection of paintings, and Lille university, at which Pasteur was a professor. Lille suffered severely during the World War, part of the laboring population having been deported to work in German factories. Population, 1926, 201,921.

Limerick. A port of southwestern Ireland at the head of the Shannon estuary. Butter and condensed milk are the most important exports. The industries include flour milling, the curing of bacon, and the manufacture of lace, fishhooks, leather, and clothing. Limerick is an ancient city, known to Greek geographers as Regia. It has given its name to the type of nonsense verse known as a limerick. Population, 1926, 39,690.

Limoges (*lē'mōzh'*). An old city of France, situated somewhat southwest of the geographical center of the country. It is famous for its porcelain industry, Limoges china being known in all parts of the world. Other important industries are printing and the manufacture of liquors, leather goods, hats, and gloves. The city has a museum of ancient pottery. Every seventh year, the Fête d'Ostension is celebrated to commemorate a plague, which, in the 10th century, destroyed 40,000 people. Limoges was the ancient capital of Limousin, a former French province, which gave its name to the limousine. Population, 1921, 90,187.

Lisbon. The capital and largest city of Portugal, beautifully situated at the head of the Tagus estuary about seven miles from its mouth in the Atlantic Ocean. Its harbor has few superiors and facilitates a large commerce. The city has manufactures of cork, textiles, pottery, paper, chemicals, sugar, iron castings, and machine-shop products.

Although founded by the Phœnicians, Lisbon has a modern appearance, having been almost entirely rebuilt after the earthquake and tidal wave which, in 1755, destroyed most of the city and took nearly 40,000 lives. Between the terraced levels of the city, elevators carry people up and down. The Avenue of Liberty, 300 feet wide with a double row of shade trees down the middle, commemorates the freeing of Portugal from Spain in 1640. Other features of the city include the Botanical Garden, the Estrella Garden, the Estrella Church, a university, and numerous other educational and scientific institutions. Camoëns and Vasco da Gama were born in Lisbon. Population, 1920, 489,667.

Liverpool. The third largest city of England, situated near the center of the country's western coast on the northeastern side of the Mersey River estuary. Among British cities, its total commerce is second only to that of London, while its foreign trade exceeds London's by a considerable margin, giving it the distinction of having the

largest foreign commerce of any city in the world. The harbor has been elaborately improved. By a system of locks, the water level of the inner harbor is rendered independent of the tides. Docks cover an area of 660 acres, and there are about 40 miles of quays. The storage facilities include a 13-story tobacco warehouse with 36 acres of floor space. There are also installations for storing over 100,000 tons of oil and spirits in bulk.

Liverpool is connected with Birkenhead on the opposite side of the Mersey river by a railway tunnel nearly a mile long and a vehicular tunnel which ranks with the greatest in the world. Beneath the city, also, there are five tunnels used by railroads. Liverpool university is widely known for its school of tropical medicine. One of the most noteworthy of the city's buildings is Saint George's Hall, a structure of the Corinthian order, erected with the proceeds of dock profits. The cathedral, begun in 1904, is designed to be the largest in England. Liverpool was the first city in England to provide municipal baths, having maintained such establishments since 1794. Population, 1921, 802,940.

Lodz. The second largest city of Poland, located in the west central part of the country. Since 1870, Lodz has become, largely through the activity of Germans, the chief center of the textile industry in Poland. Population, 451,813.

LONDON. The capital of Great Britain and Northern Ireland, the commercial, financial, artistic, and intellectual center of the kingdom, and the largest city in the world. It is situated in southeastern England on both banks of the Thames river about 60 miles from its mouth in the North Sea. London consists of three parts: "the City," a space one square mile in area, surrounded by walls; the County of London; and the "Outer Ring," or metropolitan district. The whole constitutes Greater London, which covers an area of 693 square miles lying within a radius of 15 miles from Charing Cross, a central point within "the City."

COMMERCE. London handles one-third of Great Britain's commerce. The docks cover about 650 acres, and the quays have a total length of 28 miles. Each dock is an interior basin accessible by means of a lock. The port officials and their staffs are accommodated in a domed edifice completed in 1922 at a cost of ten million dollars. London's foreign commerce amounts to nearly four billion dollars annually. Products handled by the port come from all parts of the world and exhibit an extraordinary variety. Wool represents the greatest bulk.

INDUSTRY. London easily leads all other cities of Great Britain in the aggregate value of manufactures. The clothing industries engage the greatest number of workers. Other important manufactures are furniture, machinery, silks, and leather products. Printing and bookbinding employ nearly 50,000 persons. The industrial establishments are mainly confined to the eastern and southern parts of the city.

TRANSPORTATION. All the trunk railway lines of England converge in London, which is, also, connected with European points by airplane service. Electric railways operate subways, or "tubes," and cross beneath the river by means of tunnels. The river is spanned by numerous bridges, of which the London bridge, Tower bridge, Blackfriars bridge, and Westminster bridge are among the more noteworthy.

STREETS. The thoroughfares of London are not laid out on straight lines but parallel the winding of the Thames river. The more famous streets include a popular promenade along the Thames embankment; Lombard street, the financial center of the city; Fleet street and Paternoster row, both devoted to printing and bookselling; Whitehall street and Downing street, where the government offices are located; Haymarket, a street of theaters and cafes; the Strand, an avenue of retail stores, hotels, and places of amusement; Regent street, recently reconstructed with handsome shops; Piccadilly, lined with fashionable residences; and Bond street, noted for its jewelry shops.

SQUARES, PARKS, AND MONUMENTS. Charing Cross, standing in the center of Greater London, is named after a memorial cross erected in 1290 by Edward I in the former village of Charing. The cross has disappeared, and its place has, since 1675, been occupied by a statue of Charles I. Popularly, the name is associated with a near-by railroad station, in the courtyard of which stands a modern reproduction of the cross.

Trafalgar square contains a lofty column in memory of Nelson and a statue of Washington, the latter a gift from the state of Virginia in 1922. Hyde park with the adjoining Kensington gardens covers 630 acres and contains a large statue of the duke of Wellington and the national monument to Queen Victoria. Whitehall has a magnificent cenotaph erected "To the Glorious Dead," a memorial to the English soldiers who fell in the World War. In Regent park is located one of the greatest zoological gardens in the world. Other pleasure grounds include Saint James park and Epping forest, the latter being a tract of 5600 acres northeast of London purchased by the city and thrown open to the citizens.

BUILDINGS. The Tower of London, erected by William the Conqueror, stands guard over the eastern entrance of "the City." Formerly used as a prison, it serves now chiefly as a museum and contains the crown jewels of the British sovereigns. The Houses of Parliament, known as Westminster Palace, cover 8 acres on the bank of the Thames river. The building has 1100 rooms and two towers, one with an altitude of 340 feet. The other is 318 feet high and contains a clock which rings "Big Ben," a famous bell weighing 13 tons. Saint Paul's Cathedral, planned by Sir Christopher Wren, is surmounted by a dome which reaches a point 364 feet above the street.

Westminster Abbey, dating from 1220, is the coronation church of the British sovereigns. It has a length of 531 feet, a width of 203 feet, and a tower rising 225 feet above the ground. The building is the burial place of many of the country's rulers, and has monuments to famous British warriors and statesmen. The "Poets' Corner," in the south transept, contains the tombs of most of England's great writers from Chaucer to John Ruskin.

Among the other notable buildings and institutions of the city are the British Museum, which contains four million volumes and priceless treasures of ancient art and antiquities; the Bank of England building, covering four acres of ground; the Greenwich Observatory, from the meridian of which nearly all geographers calculate longitude; the South Kensington Museum, where classes are conducted in art and in industrial sciences; the Temple, a group of buildings long known as the residences of law students; and the People's Palace, used for recreation and for education of the poorer classes. London university comprises upwards of 30 different colleges located in various parts of the city.

London has many reminders of America. A statue of Lincoln faces Westminster Abbey, and within the famous edifice is a bust of Longfellow and a window and tablet to Lowell. John Harvard, the founder of Harvard university, was baptized in Southwark's cathedral. John Quincy Adams was married in All Hallows church, where, too, William Penn was baptized. Theodore Roosevelt's second marriage was solemnized in Saint George's church, Hanover square. In Saint Margaret's church, Americans have installed a beautiful window to the memory of Phillips Brooks, Episcopal bishop of Massachusetts. Pocahontas is commemorated by a window in a small Gravesend church, where she was buried in 1617. Christ church has a Lincoln tower with the Stars and Stripes cut in the stone. In Westminster Abbey, a tablet was erected in 1923 commemorating Walter Hines Page, American ambassador to Great Britain during the years of the World War.

GOVERNMENT. Greater London has no mayor, but, in most matters, is directly under the control of Parliament. "The City," however, is nominally independent even of the sovereign, who may not enter until he receives the key of admission from the lord mayor. London county consists of a large number of boroughs, each having its mayor and alderman.

HISTORY. London is first mentioned in history by the Romans, who built walls about the city. It was later burned by the British queen Boadicea, sacked by the Danes, and later was taken by William the Conqueror, who granted the city its charter. In 1666, the Great Fire destroyed four-fifths of the buildings. In 1851, the first international industrial exhibition took place in London. Population, 1921, 7,476,168.

Lourdes (*lōōrd*). A town of southwestern France, situated at the foot of the Pyrenees mountains and about 80 miles from the head of the Bay of Biscay. It is one of the chief places of Catholic pilgrimage in Europe, being visited annually by upward of 600,000 people.

The fame of Lourdes dates from 1858, when the Virgin appeared to a young girl, Bernadette Soubirous. The grotto near which the apparition took place is now surmounted by the magnificent Church of the Rosary, containing a shrine dedicated to the Virgin, "Our Lady of Lourdes." The church contains numerous crutches, tablets, and gifts, which memorialize cures credited to the Virgin. A near-by spring, which appeared at the time of the apparition, is diverted into several basins, in which the pilgrims bathe. On August 20, each year, a national pilgrimage takes place accompanied with religious ceremonies and a torchlight procession.

The inhabitants of Lourdes are economically dependent on the pilgrims. The chief products are souvenirs. Population, about 9000.

Louvain. A city of central Belgium, formerly the center of a thriving textile industry. In recent times, the city has been chiefly noted for the University of Louvain, founded in 1425-26, and for several fine buildings, a number of which were burned while the city was under German occupation during the World War. A new library building, erected mainly by American generosity, was dedicated in 1928. Population, 1922, 39,255.

Lucerne. A city of north central Switzerland, having a location of rare beauty at the northwestern extremity of the Lake of Lucerne. The inhabitants are occupied chiefly in providing accommodation and services for tourists, who throng the city's 70 hotels in numbers exceeding an annual total of 140,000. The most noted memorial of the town is the famous "Lion of Lucerne." It is in a near-by grotto and consists of a colossal figure of a lion transfixed by a spear but still defending the lilies of France. The figure is carved from the solid rock and was executed in memory of the 781 Swiss guards of Louis XVI, who were slain in 1792 during the attack on the Tuileries in Paris. Population, 1921, 44,029.

Lyon. A commercial and manufacturing city of France, situated southeast of the country's geographical center at the junction of the Rhone and the Saone river. The rivers are crossed by 24 bridges, one of which, opened in 1918, is called President Wilson bridge.

Industrially, Lyon is second only to Paris among the cities of France and is the foremost silk manufacturing city of the world. Other important products include chemicals, machinery, automobiles, leather, jewelry, and tobacco goods.

Lyon's importance dates from the period of the Roman republic. The ruins of a Roman bath and of a Roman theater still remain. The city's oldest edifice, the Church of Saint Martin d'Ainay, utilizes several columns of a Roman temple which formerly occupied the site. The Cathedral of Saint Jean, begun in 1110, is one of the finest examples of early Gothic in France. Other notable structures are the Hôtel de Ville, the Bourse, and the Palais des Arts. The University of Lyon ranks next to that of Paris among French universities in number of students. The Roman emperors Claudius and Caracalla were born in Lugdunum, as Lyon was called by the Romans. Population, 1926, 570,840.

Madrid. The capital of Spain, situated 2100 feet above sea level on a plateau near the center of the kingdom. The city is occupied chiefly with governmental, educational, and artistic activities. Since 1890, however, manufactures have increased greatly and now include leather, chocolate, tobacco, shoes, furniture, and carpet.

Madrid centers about a plaza lined with impressive buildings. The ten most important streets radiate from this plaza. The magnificent Paseo, traversing the city in a north and south direction and ornamented with four to six rows of trees and with numerous monuments, is one of the finest promenades in the world. The Royal Palace, built of granite and white marble, stands on a hill which overlooks the city from the west. The adjoining armories contain the armor of Columbus and that of Cortés. Other features of the city are the National library, the University of Madrid, a magnificent bull ring seating over 13,000 persons, and the National art gallery, the last containing, next to the Louvre, the world's most valuable collection of paintings. Population, 1921, 751,352.

Maelstrom (*māl'strŏm*). A celebrated tidal eddy, occurring between two small islands at the western end of the Lofoten group off Norway's northwestern coast. The eddy is caused by the tidewaters passing through a narrow channel between the ocean and Vestfjord. The Maelstrom was memorialized by Schiller in his poem "The Diver." This and other literary accounts, however, have greatly exaggerated the violence of the eddy. When the current flows fastest and the wind blows directly against it, the sea for miles around becomes so agitated that small vessels cannot survive in it. Ordinarily it may be traversed without danger.

Magdeburg (G. *măg'dĕ-bo͝orĸ*; E. *măg'dē-bûrg*). A commercial city of north central Germany and the capital of the state of Saxony, situated on the Elbe river 88 miles southwest of Berlin. The chief manufactures include steel products, sugar, chemicals, tobacco goods, ribbons, gloves, and leather. The city is strongly fortified. The old royal palace is now used as a museum. Magdeburg was the birthplace of Otto von Guericke, the inventor of the air pump. The city sided with the Protestant powers during the Thirty Years' war and, in 1631, was sacked and burned, 30,000 of the inhabitants being put to the sword. Population, 1925, 292,296.

Malaga (S. *mä'lä-gä*; E. *măl'ä-gä*). An ancient city of southern Spain, picturesquely located on a fine harbor opening into the Mediterranean Sea. A mountain range surrounds the town on three sides. The principal architectural feature is the vast cathedral dominating the whole view of the city from the sea. Malaga is known for Malaga wine, grapes, and raisins. The site was first settled by Phœnicians. Population, 1921, 150,584.

Malmo (*mälm'ö'*). A seaport of southern Sweden, situated on The Sound opposite Copenhagen. Malmo is an important railroad terminal and manufacturing center and has grown rapidly in recent years. Among its industrial products are iron castings, railroad cars, and textiles. The city has a large artificial harbor and exports much farm produce. Population, 1922, 113,602.

Manchester. A manufacturing city and third largest port of England, lying about 200 miles northwest of London and 35 miles inland from the western seaboard. It is connected with the sea by the Manchester ship canal, which was the first ship canal to be built in England.

Manchester is the largest cotton manufacturing city in the world and the center of one of the world's greatest industrial areas. Besides cotton, the manufactures include structural steel, electrical machinery, chemicals, glass, paper, rubber, and silk. The city has 1600 acres devoted to parks. Victoria University of Manchester is the city's leading educational institution.

The more important buildings include the town hall, a Gothic structure costing over five million dollars; the Royal Exchange; The Royal Institution, an art gallery in the Doric style; Free Trade Hall; and Ship Canal House, the tallest commercial building, constructed on American design. Population, 1921, 730,551.

Mannheim (*măn'hīm*). A manufacturing city of southwestern Germany, situated at the confluence of the Rhine and the Neckar river, 43 miles south of Frankfort. Mannheim is said to be the most regularly built city on the continent of Europe. It consists of 136 square sections, the whole surrounded by a semicircular boulevard, known as the Ring Strasse. Outside the semicircle are numerous suburbs. The outstanding building of the city is a palace, which has a front of over 1700 feet.

Mannheim's commerce consists chiefly of grain, coal, petroleum, tobacco, sugar, and ironware. The manufactures include machinery, celluloid, carpets, chemicals, furniture, glass, and leather goods. Population, 1925, 247,486.

Marseille (*mär'sā'y'*). The second largest city of France and the republic's principal seaport, located in the southeastern part of the country on an inlet of the Mediterranean Sea. Southwest of the harbor lies the islet Chateau d'If, celebrated in Dumas's *Count of Monte Cristo*.

Marseille's trade is largely with eastern countries and with the French territory in northern Africa. It consists mainly of woolen goods, ribbons, sugar, and wines. The city has large shipyards and factories for making soap, vegetable oils, and numerous other products.

The national anthem of France, "The Marseillaise," received its name in Paris when a battalion of Marseillais, or citizens of Marseille, sang the song at the storming of the Tuileries. Massilia was the name given to the city by the Romans when the settlement was already many centuries old, having been founded by Phœnicians prior to 600 B. C. It was the home of Pytheas, a Greek explorer who visited Britain in the 4th century B. C. The city's importance in modern times dates from 1848, when the surrounding region was irrigated by a canal from the Durance river about 100 miles distant. Marseille has the finest modern cathedral in France. Population, 1926, 652,196.

Metz. One of the strongest fortresses in France, situated on the Moselle river in Lorraine. Metz was taken by Germany from France in 1871 and was restored to France as a result of the World War. The city has a large Gothic cathedral founded in 1332. The principal manufactures are textiles. Population, 1921, 62,311.

Milan (*mĭl'ăn; mĭ-lăn'*). The second largest city of Italy. It lies in the northwestern part of the country about 40 miles from the border of Switzerland. Milan is the chief financial center of Italy and ranks high as an industrial community and as a seat of art and learning. The more important manufactures include locomotives, automobiles, electrical supplies, and rubber articles. The silk, printing, and furniture making trades of Italy are centered in the city.

The Cathedral of Milan, dating from 1386, is the third largest in Europe. Built of white marble, it is 486 feet long and 356 feet high. It contains 3000 statues, and its stained-glass windows are said to be the largest in the world. The edifice has a capacity for 40,000 people. Other features of the city are the Church of Sant' Ambrogio, dating from the 4th century A. D.; the former convent of Santa Maria delle Grazie, which contains Leonardo da Vinci's "Last Supper"; the Brera Palace, one of the finest picture galleries in Italy; the Teatro della Scala, the second largest opera house in Europe; and a celebrated archeological museum.

Milan was captured from the Gauls by the Romans in 222 B. C. It has frequently been sacked and burned, but its position at the northern entrance to Italy has insured its continued importance as a commercial city. Population, 1922, 718,304.

Monte Carlo. A city in the principality of Monaco, beautifully situated on a sheltered bay in the Mediterranean coast. Monte Carlo is best known for its Casino, a palatial building on a promontory in the east of the city. It is the chief fashionable gambling resort of Europe. The principal games played are roulette and *trente et quarante*, "thirty

and forty." In the latter game, the minimum stake is 20 francs and the maximum is 12,000, while, for roulette, the stakes may range from 5 francs to 6000. Tickets are obtained free, and playing takes place between 11:30 A. M. and 11:30 P. M. The inhabitants of Monaco are not allowed to participate.

Adjoining the Casino is the *tir aux pigeons*, "pigeon shooting range," where expert marksmen compete in shooting pigeons released for the purpose. A prize of 20,000 francs is offered for a competition held each January. The population of the city is about 10,000.

MOSCOW (*mŏs'kō*). The capital and chief manufacturing city of Russia, situated somewhat north of the geographical center of the country's European territory. Its leading manufactures are textiles, metal products, and chemicals. Built at the intersection of six important highways, the city has long been an important market for grain, hemp, oil, tea, sugar, hides, wool, timber, metals, drugs, and silk.

THE KREMLIN. The outstanding feature of Moscow is the Kremlin, or citadel. The Kremlin is an almost triangular enclosure surrounded by walls about 1½ miles in length. Within the walls, which are surmounted by 18 towers and pierced by 5 gates, stand two palaces and several cathedrals. The Great Palace is of white stone and has a gilt cupola. The Palace of the Patriarch contains one of the most valuable libraries in Russia. The churches include the Cathedral of the Assumption, in which the Russian sovereigns were crowned; the Cathedral of Saint Michael, the former burial place of the country's monarchs; and the Cathedral of the Ascension, the floor of which is made of semiprecious stones. The cathedrals exhibit many brilliantly colored cupolas culminating in crosses.

Other points of interest in the Kremlin are the Tower of Ivan the Great, which is 322 feet high and contains 34 bells with a total weight of 290 tons; several monasteries of considerable antiquity; and the Czar Bell, cast in 1733, which is the largest bell in the world. It weighs 220 tons and measures 22 feet in diameter and 19 feet 3 inches in height. The bell was never hung, having been cracked by a fire before it left the foundry.

OTHER FEATURES. The Red square in Moscow has been repeatedly used as a camp by Mongolian armies which have from time to time besieged the Kremlin. Facing the Red square is the Cathedral of Vasili the Beatified, which, for mixture of style, for color, and for architectural lines, has few equals in the world. The Church of the Savior commemorates the destruction of Napoleon's invading army in 1812. The Greek Monastery of Saint Nicholas is notable as being the first school established in Russia for classical education. The city has famous theaters and many educational institutions, the most important of which is the University of Moscow.

HISTORY. The earliest reference to Moscow dates from 1147. It was made the capital of Russia, and, in spite of many sieges, conflagrations, and pestilences, it remained the seat of government until 1712, when Saint Petersburg, later called Petrograd, became the capital. In 1812, the Russians burned the city in order to deprive Napoleon of a winter base. In 1918, Moscow was again made the capital of Russia. Population, 1926, 2,018,286.

Munich (*mū'nĭk*). The fourth largest city of Germany and the capital of the state of Bavaria, situated near the southern extremity of the country on the Isar river, a tributary of the Danube.

Largely through the effort of King Ludwig I of Bavaria, Munich became, in the 19th century, one of the best built cities of Europe and, architecturally, one of the most beautiful. It is lavishly adorned by numerous squares and pleasure gardens and by buildings constructed in the leading styles. The English Garden, a park of 500 acres adorned with small temples and towers, was designed by Count Rumford, a native of Massachusetts. Other features of the city are the former Royal Palace, the National Theater, the Art Union, numerous museums, and the Old Castle, the last dating from 1253. The art collections in Munich are among the richest on the continent, and the annual exhibition of painting and sculpture held at the Crystal Palace is an event of importance. The University of Munich is one of the leading educational institutions of Germany.

Apart from art and education, the great industry of Munich is the brewing of beer. Other products of the city's workmanship are bronze founding, glass staining, silversmiths' work, wood carving, and lithographing. Railway machinery, wall paper, gloves, and artificial flowers are also made. Population, 1925, 680,704.

Nantes (E. *nănts*; F. *nänt*). A seaport of northwestern France, located at the head of the Loire River estuary and about 50 miles from the sea. The industries include the canning of sardines, sugar refining, shipbuilding, and the manufacture of iron products and of tobacco goods. In history, the city is known for the Edict of Nantes, by which, in 1598, Henry IV granted toleration to the Huguenots. Population, 1926, 184,509.

Naples. The largest city of Italy, situated near the central part of the kingdom on the Bay of Naples, which opens into the Tyrrhenian Sea. On one side of the bay rises Mt. Vesuvius, and on the other side is the picturesque height of Posilipo. The city has a safe and deep harbor. It is an important naval station and commercial emporium and possesses numerous industrial establishments. The manufactures include steel products, textiles, glass, macaroni, and chemicals. The port is a noted embarkation point for emigrants.

Naples is visited yearly by upwards of 30,000 tourists. Its features include the cathedral, built in 1272; the National museum, containing a priceless collection of antiquities, most notably those obtained from the excavated site of Pompeii and of Herculaneum; the San Carlo opera house, one of the largest in Europe; the most complete marine aquarium in the world; and the University of Naples, founded in 1224. Naples was originally a Greek colony, established about 450 B. C. under the name of Neapolis, "New City." Population, 1922, 780,220.

Newcastle. One of the largest coal exporting cities of Great Britain, situated in northeastern England on the Tyne river 8 miles from its mouth in the North Sea. Quays and factories line both banks of the river for a distance of 10 miles. There are also large shipbuilding yards and locomotive, engineering, and ordnance works. Other industrial products include Portland cement, chemicals, grindstones, and refined lead.

Newcastle was the site of a Roman fort built to defend the eastern end of the wall that Hadrian constructed across Britain. The city was named from a castle built here in the 11th century by Robert, the son of William the Conqueror. Population, 1921, 274,955.

Nottingham. A manufacturing city of central England, 125 miles northwest of London. It is built on the slope and at the foot of a rocky eminence, which is crowned by an ancient castle, now used as a museum. Nottingham college is on a fine 220-acre campus, called Highfields. The chief manufactures include lace, hosiery, clothing, machinery, tobacco, and bicycles. Population, 1921, 262,658.

Nuremberg. A city of south central Germany, noted especially for its manufacture of toys and of electrical machinery. Other industrial products include lead pencils and locomotives.

The city retains a medieval appearance, due to its narrow, winding streets and to its houses with projecting upper stories. The old city walls still stand. Nuremberg is the seat of the National Germanic museum, which houses the largest collection of German antiquities in existence. Hans Sachs and the artist Dürer were born in the city. Watches were first made here, being known as "Nuremberg eggs." Air guns and geographical globes are also claimed as Nuremberg inventions. Population, 1925, 392,494.

Oberammergau (*ō'bĕr-ăm'ĕr-gou'*). A village in the extreme south of Germany, celebrated for the Passion play, which takes place there once in each ten years, the most recent performance having been given in 1922. The play represents the crucifixion and the ascension of Jesus. It takes place each Sunday during the summer on a large wooden stage open to the sky, and it usually lasts eight hours. The performance was originally undertaken in fulfillment of a vow made in 1633 by the villagers, who thereby expressed their gratitude for the cessation of an epidemic of the plague.

Odessa. A city of southwestern Russia, situated on the north shore of the Black Sea. Its commodious harbor is divided by moles into six ports. Odessa became great as the point of export for vast quantities of grain, wool, sugar, and lumber. About one-third of the inhabitants are Jews.

Odessa was founded in 1794 by Catherine the Great of Russia as a stepping-stone to Constantinople. Her memory is preserved by a statue on the famous boulevard of Nicholayevsky. The city is well built and is adorned by many pleasure grounds and fine buildings, among which the Imperial Palace is especially conspicuous. Population officially estimated in 1926 at 411,000.

Olympia. A plain in the western part of the Morea peninsula, Greece. It contains many ruins, including those of a temple of Zeus and of a stadium in which the Olympic games were originally held. In ancient times, the temple of Zeus contained a colossal statue of this god, the work of Phidias. Carved in ivory and embellished with gold, this statue was accounted one of the seven wonders of the ancient world.

Oporto. A city of northwestern Portugal, beautifully situated on both banks of the Douro river about 3 miles from its mouth in the Atlantic Ocean. The river is spanned by several bridges, one of which, having an arch of 560 feet, is counted among the great bridges of the world. Manufacturing is the most prominent industry. The city's products include leather, woolens, pottery, corks, hats, and tobacco. Prominent among the exports is port wine, which received its name from Oporto. Population, 1920, 203,199.

Oslo. See *Christiania.*

Ostend (*ŏst-ĕnd'*). A fashionable summer resort of northern Belgium, on the North Sea. The city is also a well-known gateway to continental Europe for travelers from England. During the World War, Germany used Ostend as a naval base. Population, 1922, 45,345.

Oxford. A university city of England, with a population, in 1921, of 57,052. It is situated about 50 miles northwest of London. The city is the seat of Oxford university, which was founded as early as the 12th century. This university is of especial interest to the English-speaking world on account of the Rhodes scholarships tenable at Oxford and open to students from the British dominions and the United States. The Bodleian library, connected with the university, is one of the world's richest collections of early printed books and of ancient manuscripts. Women were first admitted to degrees in the year 1920.

The university consists of a federation of 21 colleges, each with its own government and teaching staff. Degrees are granted, not by the individual colleges, but by the university. The following table gives the name of each of the colleges with its date of incorporation:

University	1249
Merton	1264
Balliol	1266
Exeter	1314 and 1566
Oriel	1326
Queen's	1340
New	1379
Lincoln	1427
All Souls'	1437
St. Mary Magdalen (pron. *Maudlin*)	1474
Brazenose	1509
Corpus Christi	1516
Christ Church	1525
Trinity	1555
St. John's	1555
Jesus	1571
Wadham	1613
Pembroke	1624
Worcester	1714
Keble	1868
Hertford	1874

Palermo. An Italian seaport, located on the northwest coast of Sicily. The exports are mainly oranges, lemons, dried fruits, oils, sulphur, and wines. Tunny fishing and shipbuilding are the chief industries. The city ranks third among the seaports of Italy.

Palermo has many architectural monuments dating from the periods when Sicily was held successively by the Saracens, the Normans, and the Spaniards. The city was founded by the Phœnicians and was captured in 254 B. C. by the Romans, who called it Panormus. Population, 1922, 400,348.

PARIS. The capital of France and the fourth largest city in the world, situated on both banks of the Seine river about 110 miles from its mouth in the English channel. Paris is the commercial, artistic, and intellectual center of France and is generally acknowledged to be the most beautiful city in the world.

Streets and Boulevards. The streets of Paris do not follow any unified plan. There are, however, several systems of magnificent boulevards. Boulevard is a French word originally meaning bulwark. As the old walls encircling Paris were from time to time torn down to be replaced by others embracing a larger circle, the site of the demolished walls was converted into beautiful driveways, to which the term boulevard was still applied. The boulevards of Paris, consist of several concentric systems of roughly circular courses, having their common center in the Ile de la Cité, an island in the Seine river. The longest and most recent of these boulevards owes its origin to the leveling of the 22-mile wall which, until 1919, encircled the city.

Paris is traversed from north to south by an irregular thoroughfare, which, like all the longer streets and boulevards of Paris, is known by different names in different sections of its course. The more important portions of the thoroughfare are called the Boulevard de Sebastople and the Rue Saint Michel. The latter section passes through the so-called Latin quarter, a district south of the Seine inhabited mainly by students and given its name when university lectures were delivered in Latin.

A straighter thoroughfare crosses the city from east to west on the north side of the Seine river. This thoroughfare, which passes many of the most famous squares, gardens, and buildings of Paris, is known, in different sections, under six different names. The more noteworthy sections are the Rue de Rivoli, the Avenue des Champs Elysées, and the Avenue de la Grande Armée. Other famous streets of Paris are Saint Germain, Rue Royal, and Rue du Faubourg Saint Honoré.

Squares, Parks, and Monuments. On the north bank of the Seine, near the center of the city, lie the famous gardens of the Tuileries, a 75-acre park ornamented with numerous statues. It adjoins the Place de la Concorde, which is adorned by sculptured fountains and by a huge obelisk brought by Napoleon from Luxor, Egypt. The adjacent Champs Elysées, "Elysian Fields," contain the Grand Palais built in 1718. Farther to the west lies the Place de l'Etoile, which contains the world's largest triumphal arch. From this square radiate twelve avenues, including the Rue du Bois de Boulogne, which leads to the beautiful 2100-acre park in the suburbs called the Bois de Boulogne. A southeastern suburb contains the Bois de Vincennes, an ornamental park with an area of 2300 acres.

Other notable squares and parks of Paris are the Luxembourg gardens, laid out in the 17th century; the Jardin des Plantes, 58 acres in area, where the principal scientific museums of the city are located; the Place de Rivoli with an equestrian statue of Joan of Arc; the Place de la République; the Place d'Iena, containing a large statue of George Washington; the Place de la Bastille, near the site of the historic prison of the same name; the Place de Vendôme, which has a brazen column made by melting 1200 cannon captured by Napoleon; the Square des Innocents, where stands the famous sculptured Fontaine des Innocents; the Place des Etats-Unis, in which stands a bronze monument erected in 1923 to the memory of American volunteers who fought in French armies during the World War; and the Champ de Mars, in which the Eiffel Tower rises to a height of 984 feet. This tower, which is made of steel, is the highest structure reared by man. It is named from Alexandre Eiffel, the engineer who constructed it as a feature of the Paris International exposition in 1889.

Buildings. The Ile de la Cite in the Seine contains three remarkable buildings: the Hôtel Dieu, which, founded in 600 A. D., is said to be one of the oldest hospitals in Europe; the Palais de Justice, architecturally one of the finest structures in Paris; and the Cathedral of Notre Dame, the construction of which was begun in 1163. A few of the other great edifices of Paris are the Louvre, which houses the richest collection of art in the world; the palace of the Luxembourg, which contains the world's greatest collection of contemporary art, the American exhibits ranking second in number after the French; the Grand Opéra, one of the most beautiful theaters in the world; the government buildings, fronting the Seine embankment and known as the Quai d'Orsay; the Palais de l'Elysée, where the president of France resides; the Bibliotheque Nationale, a library second only to the British museum in the value of its collections; the Panthéon, where many of France's most notable citizens have been buried; the Church of the Madeleine, built by Napoleon in the Greek style as a "temple of glory"; and the Hôtel des Invalides, which contains Napoleon's tomb. The railway car in which the armistice was signed on November 11, 1918, was housed in the Hôtel des Invalides until 1927, when it was transferred to a special shelter in Compeigne woods.

Other Features. Paris has been described by a German writer as the most strongly fortified city in the world. It is protected by a system of modern forts built outside the city limits. No other city of the world makes a feature of its sewers. Those of Paris, 9 to 20 feet in diameter and nearly 700 miles in length, are kept so clean and are so well ventilated that there is a regular tourist route through the system by boat and electric car. The University of Paris, which includes the Sorbonne, is one of the oldest and most famous educational institutions in Europe.

Commerce and Industry. Paris is the largest industrial and commercial center in France, and has a world-wide reputation for the manufacture of articles of taste and elegance, such as gold and silver ornaments, furniture, scientific instruments, toys, and perfumes. These industries, as well as the clothing industry of Paris, which largely sets the standard for the Western world in women's apparel, are carried on mainly in small establishments. The manufacture of machinery, railroad supplies, chemicals, beer, porcelain, and leather is centralized in larger factories.

Paris was one of the first cities of the world to establish large departmental stores, the better known ones being the Louvre and the Bon Marché. The banks of the Seine are lined with docks over which passes a volume of trade exceeding annually one billion dollars in value. There are more than 65 public markets in the city, the largest of which is the Halles Centrales, a steel and glass structure covering 10 acres. The stock exchange of Paris is called the Bourse, a term later applied to the corresponding institutions in other continental capitals.

History. Paris was known to Julius Cæsar, about 50 B. C., as Lutetia. It was then the chief city of the tribe of the Parisii, from whom the city, in the 4th century A. D., adopted the name Paris. In the 10th century, it became the capital of the French monarchy. Paris suffered from an English conquest during the Hundred Years' war and endured several disastrous sieges, the last at the hands of the Germans in 1871. Henry of Navarre, Louis XIV, Napoleon Bonaparte, and Napoleon III contributed most

















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SCENES IN EUROPE. I

1 St. Paul's Cathedral, London. 2 Palace of Justice, Brussels. 3 Windsor Castle, England. 4 L'Opera, Paris. 5 Midnight Sun, Norway. 6 Canal and Street, Copenhagen. 7 Lakes of Killarney, Ireland. 8 Muckross Abbey, Ireland.



Photos for Nos. 4, 6, 7, and 8 copyright by Keystone View Co.; other photos from Publishers' Photo Service.

SCENES IN EUROPE. II

1 Aarburg Castle, Switzerland. 2 Matterhorn, Switzerland. 3 Amalfi, Italy. 4 Leaning Tower, Pisa, Italy. 5 Alcazar, Segovia, Spain. 6 Mosque of the Seven Minarets, Constantinople. 7 Rialto Bridge, Venice. 8 Parliament Building, Berlin. 9 Sanct Ulrich, Tyrol.

toward the improvement and adornment of the city, thereby making Paris not only a symbol for light-hearted enjoyment, but entitling it also to the claim of being the chief focus of European civilization. Population, 1926, 2,871,429.

Petrograd (E. *pĕt'rō-grăd*; R. *pyĕ'trŏ-grät'*). One of the largest cities of Russia, situated at the head of the Gulf of Finland on the delta of the Neva river. The port and fortress of the city is Kronstadt, situated on an island 31 miles to the west in the Gulf of Finland.

Petrograd, formerly called Saint Petersburg, was the creation of Peter the Great of Russia, who built it at enormous cost of labor and of life, in order to obtain communication with Western Europe. He populated it, in part, by compelling his wealthier subjects to spend a portion of each year in the city.

From the Admiralty, in the center of Petrograd, radiate three great avenues, one of which—Nevsky Prospekt—ranks among the finest streets in Europe. Near the Admiralty stands the Winter Palace, which is the largest palace on the continent. It is connected by a gallery with the Hermitage, which houses an art collection of rare value. Across the Neva river from the palace is situated the prison of Saint Peter and Saint Paul, infamous for the many political prisoners formerly confined within its walls. Other features of Petrograd are the Kazan cathedral, the University of Petrograd, and Saint Isaac's cathedral. Before the last named stands a colossal statue of Peter the Great.

Petrograd was formerly the capital and the greatest commercial and industrial city of Russia, being the outlet for enormous exports of wheat. In 1918, the national government was removed to Moscow. The city's industries became paralyzed as a result of the Bolshevist revolution, the population falling from 2,318,645 in 1915 to about 1,000,000 in 1921. Its name was changed to Leningrad in 1924. Population, 1926 census, 1,611,102.

Pisa (*pē'zä*; *pē'zä*). A town of northern Italy, 11 miles northeast of Leghorn. Pisa is principally noted for a leaning tower, 179 feet in height, which inclines 16½ feet from the perpendicular. The tower is built entirely of white marble with walls 13 feet thick at the base. Its construction was begun in 1174, and it was originally intended as a bell tower for the white marble cathedral near by. Within the past century, the inclination of the tower has increased one foot.

Pisa was formerly notable for the victory which its citizens won over the invading Saracens in the 11th century. In the 13th century, it controlled an extensive territory and had a population of 150,000. In recent centuries it has declined in importance, but its walls and its citadel still stand. The only large industry is the manufacture of cotton textiles. Pisa was the birthplace of Galileo, who used the tower in experiments to determine the velocity of falling bodies. Population, 1922, 67,752.

Plymouth. A naval station and seaport of southwestern England. Situated on a commodious harbor, Plymouth has a large commerce. Apart from naval equipment, the chief manufactures are chemicals. Sir Francis Drake set out from Plymouth for his voyage around the world. The town has a *Mayflower* commemoration stone, which records the fact that Plymouth was the last point touched by the Pilgrim Fathers on their way to America. Facing the waterfront is the Hoe, one of the finest pleasure grounds in Europe. Population, 1921, 209,857.

Portsmouth (*pōrts'mŭth*). A seaport and the chief naval arsenal of Great Britain, situated on Portsea, a small island separated by a creek from the south coast of England. Portsmouth has the most complete fortifications in Britain. Its harbor lies close to Spithead, a capacious naval anchorage in the shelter of the Isle of Wight. The government dockyard covers about 300 acres.

The principal industries of the city are connected with the naval establishment. There is considerable traffic in timber, coal, cattle, and agricultural produce. Portchester castle, a ruined Norman fortress to the north of the harbor, occupies the site of the Roman Portus Magnus, "Great Port." Charles Dickens and George Meredith were natives of the city. Population, 1921, 247,343.

Potsdam. A city of Germany 17 miles southwest of Berlin, chiefly noted as the former residence of the German emperors. It is beautifully situated amid numerous lakes and is embellished by royal palaces, luxurious gardens, fountains, and statues. Population, 1925, 64,093.

Prague (*prāg*). The capital of Czechoslovakia, situated in the western part of the country on both banks of the Moldau river, a tributary of the Elbe. Its manufacturing establishments, located mostly in the suburbs, produce railway cars, steel products, leather goods, sugar, cottons, and furniture. Prague is the focus for the rail and river trade of western Czechoslovakia.

The most impressive edifice of Prague is the ancient palace of Hradcany, adjoining which is the Cathedral of Saint Vitus, where the Bohemian kings used to be crowned. The University of Prague, founded in 1348, had, as one of its earliest graduates, John Huss, famous as a martyr to Protestantism. Prominent features of the city are the Charles bridge, 546 yards long, spanning the Moldau and ornamented with two medieval towers and with many statues of saints; the 14th century Tyn church; and a famous clock, one of the oldest in Europe, having, for figures, representations of Jesus and his apostles. Population, 1921, 676,476.

Ravenna. An ancient city of northern Italy, lying 45 miles east of Bologna and 6 miles inland from the northwestern extremity of the Adriatic Sea. In the 1st century B. C., Ravenna was a naval base and seaport. Subsequent changes in the coast line, which left Ravenna an inland city, diminished its importance. Wine, silk, and lace are its chief products.

Reminiscences of Ravenna's former greatness are the Church of Sant' Orso, which, although largely rebuilt since, dates back to Roman times; twelve basilicas used as churches and erected between the 5th and the 8th century; a two-storied mausoleum of Theodoric, the Ostrogothic king who subjected Ravenna to a 3-year siege; the tomb of Dante, who died in the city in 1321; and the column of Gaston de Foix, a French general who defeated the Spanish and papal army at the battle of Ravenna in 1512. Population, 1922, 72,023.

Reims (E. *rēmz*; F. *rănz*). A cathedral city of northeastern France, lying about 80 miles east of Paris. The Cathedral of Reims, in which the French kings used to be crowned, was built between 1212 and 1430 and was considered to be the finest example of Gothic architecture in the world. During the World War, however, the structure suffered irreparable damage. Reims is also noted for its wines. Population, 1926, 100,998.

Reval (*rĕv'ăl*). The capital and largest city of Esthonia, situated in the northwest part of the country on a southern inlet of the Gulf of Finland. It has a commodious harbor and exports grain, meats, flax, and timber. The city was founded in the 13th century and became prosperous as a member of the Hanseatic League. It has a guild house containing a valuable collection of Baltic antiquities. Reval is sometimes called Tallinn. Population, 1922, 123,496.

Reykjavik (*rā'kyä-vēk'*). The capital and largest city of Iceland, located on the island's southwest coast. The city has a university; also a museum containing a collection of Icelandic antiquities. Population, 1920, 17,678.

Riga. The capital and largest city of Latvia, situated on the Duna river about 10 miles above its mouth at the head of the Gulf of Riga. By means of canals connecting the Duna with the Volga and with the Dnieper river, Riga has access to the timber-, grain-, and flax-producing regions of Russia. The chief manufactures are machinery and railway cars. Saint Peter's church is notable for its lofty spire, which rises 440 feet above the street. Riga was founded in 1201 and became important as a member of the Hanseatic League. Nearly half the inhabitants are German. Population, 1925, 337,700.

Riviera (*rē-vyä'rä*). A popular name for the narrow but beautiful coast line of Italy and France, mainly about the Gulf of Genoa. Its mild climate, charming subtropical vegetation, and vistas of rare attractiveness make it one of the most popular parts of Europe for winter tourists. The chief resorts along the Riviera are Cannes, Nice, Mentone, Monte Carlo, and San Remo.

ROME. The capital of Italy and, historically, the most famous city in the world. Rome is situated on both banks of the Tiber river about 15 miles above its mouth in the Tyrrhenian Sea near the center of Italy's western coast. The traditional date of the founding of Rome is April 21, 753 B. C. April 21 is still celebrated annually in Rome as the anniversary of the city's origin. Rome was successively the head of the Roman Republic, the Roman Empire, and the western branch of the Catholic Church. In 1871, it became the capital of the Kingdom of Italy. This long career of uninterrupted greatness has earned for Rome the title of "the eternal city." In 1929, a tract of 106 acres within the city was granted the status of an independent state under papal rule. It is known as Vatican City. This area is in the northwestern section of Rome and includes the former site of Nero's gardens.

THE MODERN CITY. The Tiber, meandering through the city, divides the more populous eastern part from the western section. The eastern part comprises the Campus Martius, "Field of Mars," and the seven hills of ancient Rome—the Capitoline, Palatine, Aventine, Quirinal, Viminal, Esquiline, and Cælian. The western section consists of the hill anciently known as the Janiculum and of the eminence on which the Vatican is situated. The river is spanned by ten bridges, three being of ancient construction. Rome is 15 miles in circumference and is surrounded by a brick wall 55 feet high, constructed mainly by Aurelian about 275 A. D. The wall is pierced by 12 gates. The Porta del Popolo in the north opens upon a road anciently called

the Flaminian way, while the Appian way, leading to Brindisi in southeastern Italy, leaves the city through a southern gate.

Streets and Monuments. The streets are irregular in plan. From the Plaza del Popolo in the north of the city three important thoroughfares diverge—the Corso, the Ripetta, and the Babuino. The Corso terminates at the Piazza di Venezia at the Capitoline hill, which has a colossal monument to Victor Emmanuel II. The Piazza del Campidoglio is adorned by a large statue of Marcus Aurelius, the Roman emperor who erected the so-called Antonine column, which stands in the Piazza Colonna on the Corso. An obelisk, 104 feet high, brought from Heliopolis, Egypt, has been placed in the Piazza di San Giovanni. Garibaldi, the liberator of modern Italy, is memorialized by a huge equestrian statue on the Janiculum hill. An equestrian statue of Victor Emanuel II in a magnificent setting towers above the Piazza Venetia. The Fontana Trevi is among the grandest of the city's many sculptured fountains.

Modern Buildings. The most famous structures associated with modern Rome are those within Vatican City, notably the Vatican and Saint Peter's Church. The Vatican, or papal residence, consists of a group of palaces, covering 13½ acres and containing about 1100 rooms. It houses a library, museum, and picture gallery, each of inestimable value. The decorations of the Vatican were executed by the best artists of the Renaissance, including Raphael and Michelangelo. Saint Peter's Church is generally admitted to be the world's largest and grandest church. Its construction occupied 126 years. The building is 727 feet in length and is surmounted by a huge dome, which rises to a height of 405 feet above the level of the beautiful colonnaded court before the church's entrance.

Other notable buildings of modern Rome include the Quirinal palace, where the Italian sovereigns reside; the Villa Medici, housing the French Academy of Art; the Santa Pudenziana, the oldest church in Rome; and the palaces called Doria, Ruspoli, Corsini, Orsini, Giustiniani, Altieri, Cicciaporci, Farnese, Berberini, and Colonna. On the Capitoline hill are three palaces appropriated for the assemblies of the magistrates, for the observatory, and for the fine arts collection. There are several palaces, which, being surrounded by extensive gardens, are called villas. The most notable of these is the Villa Borghese, the gardens of which form the most fashionable promenade in the city.

Educational Institutions. Rome is the seat of the University of Rome, founded in 1244. In addition to the Vatican library and the 10 public libraries, there are the libraries called Nazionale Centrale, Casanatense, and Angelica, and the libraries of the Barberini and of the Corsini palace. No city of the world has richer collections of Roman antiquities and of Renaissance art. The United States and several European countries maintain archeological schools in the city.

Ancient Buildings. The level of the ancient city of Rome is, except where excavated, from 20 to 60 feet below the level of the present city. Within the past century, a considerable portion of the ruins have been uncovered. These ruins include temples, palaces, public halls, theaters, baths, porticoes, and monuments and indicate that, in the first centuries of the Christian era, Rome was a still more impressive city than it is today.

The best preserved ancient building is the Pantheon, now used as a church, which has a dome larger than that of Saint Peter's Church. The Colosseum had a seating capacity of 45,000. The outer wall alone is said to have cost the equivalent of 50 million dollars to construct. The Forum has been despoiled of most of the palatial buildings, the 1200 marble columns, and the 1000 colossal statues which once adorned its 25 acres of surface. Other impressive ruins are the Mausoleum of Hadrian, used for 15 centuries as the fortress of medieval Rome; the triumphal arches of Titus, Severus, and Constantine; and the baths of Caracalla and of Diocletian, those of the latter having originally covered nearly 9 acres. The outlines of the Circus Maximus are still traceable—a building capable of seating 260,000 spectators.

One of the stateliest buildings of ancient Rome was the residence of the emperors on the Palatine hill. It was called the Palatium, a name from which the word palace is derived. The great drains of ancient Rome are still in use today. Dating from early Christian times are the catacombs, underground passages used as places of burial and of refuge by the persecuted Christians. About 40 groups of these have been found, having a total length of nearly 500 miles.

Industries. Manufacturing in Rome is unimportant, being confined mainly to silks, cameos, gloves, mosaics, jewelry, and artificial flowers. There is a considerable commerce, Rome being the chief railroad center of Italy. The population in 1922 was 691,314. The city is said to have had almost 2,000,000 inhabitants in the days of the Empire.

Rotterdam. The chief commercial port of the Netherlands, situated in the western part of the country, about 10 miles southeast of The Hague. It is on the Meuse river 15 miles above its mouth in the North Sea. The leading articles of commerce are coffee, tea, tobacco, flour, sugar, spices, coal, oil, and foodstuffs. The most important manufactures are ships, refined sugar, margarine, paint, ropes, and leather.

A labyrinth of tree-bordered canals runs through the city, and most houses are built on piles on account of the city's low site. Rotterdam was the birthplace of Erasmus, a statue of whom constitutes one of the city's chief monuments. Population, 1921, 516,271.

Rouen (*rwăn*). A commercial and manufacturing city of northern France on the Seine river, about 70 miles northwest of Paris. Ocean-going ships ascend the river to Rouen. The industrial products include textiles, machinery, and refined oil. The Cathedral of Rouen has a spire 485 feet in altitude, said to be the highest in France. The Place du Vieux Marché is adorned by a statue of Joan of Arc, who, in 1402, was burned there at the stake. Population, 1926, 122,898.

RUHR (*rōōr*), **THE.** An irregularly oval strip of land in northwestern Germany, extending eastward from the Rhine for about 40 miles along both sides of the Ruhr river. It was held by French and Belgian troops from January 1923 to July 1925 as a means of collecting reparations from Germany.

Although this district, having an area of about 400 square miles, covers less than one-fourth of 1 per cent of Germany's total surface, it includes the great industrial centers of Essen, Dortmund, Bochum, Gelsenkirchen, Mulheim, Oberhausen, Duisburg, and Ruhrort. It is the heart of Germany's industrial organization. Containing less than one-thirtieth of Germany's population, it gave employment, before the World War, to about one-fourth of all the factory workers in the country.

Resources. The reason for this great concentration of industry in the Ruhr is to be found chiefly in the rich coal mines, together with excellent facilities for transportation by rail and by water. In 1913, the Ruhr produced 60 per cent of Germany's coal supply. After the control of the Saar basin passed to France, this figure probably reached 80 per cent. It is estimated that the present annual production of 100 million tons of coal can be continued for more than 350 years. From the Ruhr also comes five-sixths of Germany's production of the coal tar, which is an essential element in the operation of the great German dye and fine chemical industries.

About one-third of Germany's supply of pig iron is made in the Ruhr from ore brought in from other parts of the country and from France. The railway mileage of the Ruhr district amounts to only one-eighth of the total for all Germany, but this portion carries approximately three-fourths of the entire railroad tonnage.

Saint Gallen (*sânt găl'ĕn*). A city of northeastern Switzerland, situated 12 miles from the south shore of the Lake of Constance. The city is the highest in Europe, having an elevation of 2196 feet above the sea. Its ancient Benedictine monastery, an architectural masterpiece which is now used for government offices, was founded by the Irish missionary Saint Gall, who settled here in 614. Population, 1921, 70,437.

Saint Mihiel (*săn' mē'yĕl'*). A town of northeastern France, situated on the Meuse river 23 miles southeast of Verdun. The capture of Saint Mihiel and the annihilation of the German salient about the town in September 1918 constituted the first military operation carried out independently by the American army in France during the World War. Population, about 6000.

Saint Nazaire (*săn' nà'zâr'*). A seaport on the northern bank of the Loire River estuary in northwestern France. It has large shipyards and steel works. During the World War, Saint Nazaire was placed at the disposal of the Americans, to be used as a point of disembarkation. The harbor was considerably improved by American engineers during this period. Population, about 38,000.

Salford. A suburb of Manchester, in west central England. Salford is older than Manchester, however, having been incorporated in 1844, 9 years before Manchester became a city. Several railway viaducts and 16 bridges, built across the small river Irwell, connect Salford with Manchester. Peel park is the finest of the city's four parks, which cover a total area of 83 acres. Population, 1921, 234,150.

Saloniki (E. *săl'lō-nē'kē*; Gr. *săl'lō-nyē'kē*). A city of northern Greece, the second largest in the kingdom, situated at the head of Saloniki bay, a northern inlet of the Ægean Sea. Saloniki, having a capacious, improved harbor, is the sea outlet for Bulgarian and Jugoslavian products. Among the squalid houses which fill most of the city arise lofty spires and minarets, and numerous ruins dating from Greek, Roman, and Byzantine times.

Saloniki was founded in 315 B. C. and has been held successively by Macedonia, Rome, the Byzantine Empire, Turkey, and Greece. It was formerly known as Thessalonica and was the seat of an early church, to which Saint Paul addressed two epistles. During the World War, Saloniki was held as a base by Allied troops. Population, 1920, 170,321.

Serajevo (*sĕr'ä-yä-vō*). A city of Jugoslavia, 122 miles southwest of Belgrade. It is partially Oriental in appearance, having an extensive bazaar, but, in recent decades, many modern improvements have been introduced. The picturesque ruins of a 13th century castle crown the heights above the city. The chief industries are the manufacture of metal ware, silk weaving, and the making of pottery. There are valuable iron mines in the vicinity. At Serajevo in 1914, Franz Ferdinand, heir to the throne of Austria-Hungary, was assassinated. This crime led to the outbreak of the World War. Population, about 50,000.

Seville (*sĕv'ĭl; sĕ-vĭl'*). A city and port of southwestern Spain, situated on the Guadalquivir river, about 50 miles above its mouth in the Atlantic Ocean. Seville was an important center of the Moorish civilization in Spain. The Alcazar, now partly in ruins, was a Moorish royal palace, second in grandeur only to the Alhambra at Granada. The Cathedral of Seville, one of the largest Gothic churches in the world, retained, as a belfry, the Giralda tower, erected by the Moors. This cathedral is said to contain the remains of Christopher Columbus and of his two sons. Other notable structures include the Moorish Renaissance palace of the duke of Medinaceli; the Museum of Painting, which houses the largest collection of the masterpieces of Murillo, a native of Seville; the buildings of the University of Seville, founded in 1502; a tobacco factory covering 6 acres; and a bull ring with a seating capacity of 12,000.

Seville was a prosperous seaport in Roman times. It had a monopoly of trade with America for a considerable period. The chief articles of trade at the present time are metals, fruits, cork, grain, and glazed tiles, the last being manufactured in Triana, a suburb which has been known for the industry since the beginning of the Christian era. Population, 1921, 205,527.

Sheffield. An industrial city of north central England about 30 miles east of Manchester. It is noted for its manufacture of cutlery, armor plate, artillery, scientific instruments, and other steel products. The famous silver Sheffield plate is no longer made, the process being a lost art, but a high quality of silverware is made by a new process. Sheffield university was founded in 1905 by a local steel manufacturer. Population, 1921, 490,724.

Sofia (*sō'fē-yä; sō-fē'ä*). The capital and largest city of Bulgaria, situated at an altitude of 1800 feet in the western part of the country. Sofia is the commercial and industrial center of Bulgaria and is connected by rail with Vienna, Saloniki, and Constantinople. It has an important export trade in agricultural products and attar of roses. The city has been largely rebuilt since 1878. Its principal features include famous baths with hot springs; the ruined Sofia Mosque; and the University of Sofia, founded in 1888. Population, 1926, 213,120.

Spa (*spä; spȧ*). A famous watering place and town in central eastern Belgium. Its mineral springs are said to be the oldest in Europe, having been discovered in 1326. The town has been a fashionable resort for centuries. The principal buildings are the Casino and the Pouhon. Population, about 9,000.

Stettin (*shtĕ-tēn'*). A seaport and manufacturing city of northeastern Germany, built on both banks of the Oder river, 17 miles from its mouth in an inlet of the Baltic Sea. The largest industries are shipbuilding and the manufacture of clothing. Other products are cement, locomotives, sewing machines, and glass. The chief exports are grain, spirits, lumber, sugar, and cement. Population, 1925, 253,727.

Stockholm. The capital and largest city of Sweden, situated on a group of hilly islands and peninsulas at Lake Malaren's outlet into the Baltic Sea. Surrounding forests advance almost to the city's confines. On account of the varied levels prevailing in different parts of the city, tunnels and elevators are utilized by the citizens in passing from one part to another. Stockholm's capacious harbor facilitates a large commerce. The chief manufactures are ships, iron and steel products, leather, textiles, and pottery.

The features of the city include the Royal Palace; Saint Nicholas Church, where the Swedish sovereigns are crowned; the city hall, one of the finest modern structures in Europe; Skansen, a 70-acre park illustrating the fauna, flora, and peasant customs of various parts of Sweden; an equestrian statue of Gustavus Adolphus; and a colossal bronze figure of Linnæus. Population, 1922, 422,042.

Stoke on Trent. A manufacturing city of central England, about 30 miles south of Manchester, noted chiefly for its porcelain and pottery industry. Other industrial products are iron, machinery, and bricks. The principal public buildings are the town hall, New Market hall, and Minton Memorial building. Population, 1921, 240,440.

Stuttgart. A well built and beautiful city of southwestern Germany. Stuttgart is the capital of the German state of Wurttemberg. The city's finest structures center about a large square, called the Schlossplatz. There are exceptionally valuable collections of paintings and of antiquities in the city.

Stuttgart is the chief printing and book publishing city of South Germany. The industrial products include furniture, carriages, paper, leather, chemicals, tobacco goods, and textiles. Population, 1925, 341,461.

Tallinn. See *Reval*.

Tirana (*tē-rä'nä*). The capital of Albania, situated in the west central part of the country about 20 miles inland from Durazzo on the Adriatic coast. It is a picturesque town with many mosques, bazaars, and olive groves. Most of the inhabitants are Moslems. Population, about 12,000.

Turin (*tū'rĭn; tū-rĭn'*). A commercial and manufacturing city of northwestern Italy, situated on the Po river within view of the Alps. It is about 70 miles inland from the Gulf of Genoa and 40 miles from the French border. Turin is the center of the automobile industry in Italy. Other manufactures are machinery, cotton, silk, rayon, leather, and chemicals. Hydroelectric power for the industries is generated from near-by mountain torrents.

Turin is the only large Italian city having streets laid out on a rectangular plan. Among the features of the city are the Piazza Castello, the chief square of Turin; the palace and park once occupied by the rulers of Piedmont; the Palazzo Carignano, in which the Italian Parliament met from 1860 to 1864; and an imposing monument of Cavour, one of the liberators of Italy. The University of Turin was founded in 1405. Population, 1922, 502,274.

Valencia (*vä-lĕn'shĭ-ä; -shä*). A Mediterranean seaport of Spain near the center of the country's eastern coast. The older part of the city has narrow, winding streets, while the new portion is laid out with wide thoroughfares and well shaded squares. Its features include the cathedral La Seo, with a splendid octagonal tower; the University of Valencia, founded in 1411; the Silk Exchange, a beautiful Gothic structure; the Plaza de Toros, a richly ornamented bull ring, said to be the best in Spain.

The commerce of Valencia consists principally of rice, fruits, silk, wine, and olive oil. The manufactures include tobacco, metal and leather products, glazed tiles, and textiles of silk and of linen. Valencia was formerly under the control of the Moors. Population, 1921, 243,783.

Vatican City. See *Rome*.

Venice. A seaport of northeastern Italy, situated on 120 small islands at the head of the Adriatic Sea. Some 150 canals serve as streets, spanned by 400 bridges. Houses are built on piles. At times, winds cause the water to submerge, at high tide, even the main squares of the city.

Venice is said to have been founded in 452 A. D. by refugees in flight before Attila the Hun. It became prosperous by trading with the East and with the crusaders. The city's importance declined with the fall of Constantinople, but was revived when the Suez canal opened up a Mediterranean route to Asia.

Venice's greatest building, the Cathedral of Saint Mark, dating from 1047 A. D., resembles the Church, now the Mosque, of Saint Sophia in Constantinople. It is surmounted by five Oriental domes and contains four gilded, bronze lions, taken originally from Nero's triumphal arch in Rome. The bell tower of the church, standing separate from the main structure, is 322 feet high. Its construction was begun in 874 A. D. The tower collapsed in 1902 but has since been restored. The Doge's Palace, the building of which occupied the two centuries following 1301, is one of the most picturesque buildings in the world.

Among the many other features of this unique and beautiful city are the Royal Palace; a curious clock tower, built in 1496, upon which two colossal bronze figures strike the hours on a large bell; the Bridge of Sighs, connecting the Doge's Palace with a prison; the Rialto, a marble bridge, on which are situated many busy shops; numerous churches and art galleries containing rich collections of paintings by Italian masters, including many by Titian, a native of Venice; and the museum of the city's arsenal, which exhibits a model of the *Bucentaur*. This was the ship from which, each year, the doge of Venice cast a ring into the Adriatic, thereby representing symbolically the marriage of Venice with the sea.

Venice manufactures heavy machinery, clocks, cotton and woolen goods, glassware, lace, brocades, tapestry, wood carvings, and jewelry. The city is a first-class naval station and has an excellent harbor. Population, 1922, 171,665.

Verdun (*vĕr'dŭN'*). A strongly fortified town of northeastern France, about 140 miles east of Paris. It was the objective of desperate German attacks in 1916 and 1917,

which, for bitterness and carnage, were unequaled by any other conflict of the World War. The French army retained its hold on the town. Population, about 15,000.

Verona (*vĕ-rō'nȧ*). A fortified city of northern Italy, lying 71 miles west of Venice. It has an important trade with Switzerland, Austria, and Germany in wines, fruits, rice, and marble. The chief manufactures are cotton, paper, flour, and nails.

Verona was a Gallic town before it passed into the hands of the Romans in 89 B. C. From the Roman period dates the amphitheater, still in use, which the emperor Diocletian built. It is about 500 feet long and 160 feet high with accommodation for 20,000 people. Numerous weather-stained palaces of white marble, mostly built in the period of the Renaissance, give to certain parts of the city an air of sumptuous decay. The most conspicuous of these palaces is the Palazzo del Consiglio, which contains the statues of ancient Romans born in Verona, including Catullus, Cornelius Nepos, Pliny the Younger, and Vitruvius. Population, 1922, 92,413.

Versailles (F. *vĕr'sȧ'y'*; E. *vĕr-sālz'*). A city of north central France, situated about 12 miles southwest of Paris. Versailles is chiefly noted for its palace and park of unparalleled magnificence.

The palace dates mainly from 1661, being mostly the work of Louis XIV. It consists of a central block, surrounding three sides of a large court, and of two immense wings, each enclosing two or more courts. The total length of the building with its dependencies is nearly one-half mile. It houses a picture gallery upon which alone Louis XIV spent 5 million dollars. The total cost of the palace is not known, as the king burned the accounts in order to hide the extent of his expenditures. The play of colored lights in the evening upon the waters of the sculptured fountains within the gardens constitutes a spectacle of rare beauty. An apartment of the palace, called the Hall of Mirrors, was the scene, in 1871, of the coronation of William I as emperor of Germany. In the same hall, in 1919, the representatives of Germany subscribed to the Treaty of Versailles. Population of city, 1921, 64,753.

Vesuvius. An active volcano of Italy, 4260 feet high, near the Bay of Naples and about 10 miles from the city of that name. Prior to 79 A. D., it was not known that the mountain was volcanic. In that year, however, the top of the mountain blew off and ashes, stones, and mud were ejected, burying the Roman cities of Pompeii and Herculaneum in 20 feet of débris. The elder Pliny perished in this eruption, of which the younger Pliny left a detailed description. No lava was ejected in historical times earlier than 1066. Other eruptions occurred in the years 203, 472, 512, 685, 983, 1631, 1822, 1855, 1865, 1872, 1878, 1880, 1895, and 1906. A railroad, built to the edge of the crater, enables visitors to obtain an excellent view of the volcano.

VIENNA. The capital and largest city of Austria, situated in the northeastern part of the country on the south bank of the Danube river. Vienna was the capital of the former empire of Austria-Hungary and, since the 13th century, has been the chief artistic and cultural center of east central Europe.

Boulevards and Parks. The most notable driveway of Vienna is the Ringstrasse, which follows the line of old fortifications, demolished in 1858. It separates the old, inner city from the more modern portions. The Prater, a 2000-acre park, is the largest of the many ornamented open spaces which, in the aggregate, cover more than 50 per cent of Vienna's surface. Other noteworthy parks are the Hofgarten, the Volksgarten, the Town park, the Augarten, and the Belvedere park.

Buildings. The Cathedral of Saint Stephen is the most famous structure in Austria. It was founded in 1144 and has great catacombs beneath it. The cross on its steeple attains a height of 441 feet. Other great buildings are the Imperial opera house, one of the most superb art temples of Europe; the stately Grecian Houses of Parliament; the lavishly decorated Gothic city hall; the Imperial Palace; and the Votivkirche. Most of the inhabitants live in apartment houses, some of which are built on a magnificent scale, adorned with painting and sculpture. An allegorical monument of unusual beauty, standing 69 feet high, has been erected in the center of the shopping district to commemorate the cessation of the great plague of 1679.

Institutions of Art and Education. The University of Vienna, founded in 1365, enjoys a world-wide reputation. The most notable of the many public and private museums of Vienna is the Imperial Art-History museum, which contains an extraordinarily rich collection of ancient and medieval antiquities and numerous masterpieces of art, embracing nearly every school in the world. Vienna has also several famous schools of music and was the residence of Haydn, Mozart, Beethoven, Schubert, Johann Strauss, and other great musicians.

Industries. The manufactures of Vienna include jewelry, ornaments of gold and silver, musical and optical instruments, leather goods, furniture, machinery, textiles, and chemicals. A large commerce in corn, flour, cattle, wine, and sugar is facilitated by a network of railways centering in the city and by the navigable Danube river.

History. Under the name of Vindobona, Vienna was a city of strategical importance to the Romans. It was taken successively by the Huns, the Avars, and the Franks; attained to prosperity in supplying the needs of the crusaders; and, in 1296, became the residence of the Habsburg emperors. Vienna was besieged by the Turks in 1529 and, again, in 1683, but on neither occasion was the city taken. The treaty of peace following the Napoleonic wars was drawn up by a congress sitting in Vienna.

The city's population was 2,031,498 in 1910. As a result of the World War and of internal disturbances growing out of it, this figure fell, by 1921, to 1,841,326.

Vilna (*vĭl'nȧ*). A city of northeastern Poland, situated on the navigable river Vilia, a tributary of the Niemen. Vilna is an old city, irregularly laid out. The city is a railroad center and has a large trade in timber and grain. The more noteworthy buildings include the former governor's palace and two cathedrals. Population, about 215,000.

Vimy Ridge. An elevated region of northeastern France, 100 miles north of Paris and about 4 miles northeast of Arras. In May 1917, it was the scene of one of the most bitterly contested struggles in which Canadian troops were engaged during the World War. The ridge had been strongly fortified by the Germans but was relinquished as a result of the battle.

Warsaw. The capital and largest city of Poland, situated on the left bank of the Vistula river slightly northwest of the geographical center of the country. The old part of Warsaw has many dark, narrow, and squalid lanes, but the new section is quite modern, with wide streets flanked by rows of fine buildings. There are numerous squares, parks, and public gardens. The city has over 30 Catholic and 7 Russian churches, the Catholic Cathedral of Saint John being the largest. Iron bridges connect the city with the prosperous suburb of Praga on the opposite bank of the Vistula.

Among the manufactures are textiles, metal wares, tobacco articles, malt liquors, chemicals, and furniture. Small factories and home industries give employment to many thousands. Warsaw is the commercial emporium of the republic and has a large commerce by rail and boat. Population, 1921, 931,176.

West Ham. A residential and manufacturing suburb of London, England. It lies to the east of the metropolis, from which it is separated by the Lea river. The suburb is well provided with all the improvements and advantages associated with the most modern cities. Population, 1921, 300,905.

Windsor. A town of southeastern England, on the Thames river about 21 miles west of London. Its interest lies chiefly in its parks and its castle, which, since before the time of William the Conqueror, have been a favorite retreat of the English monarchs.

Windsor Castle covers 12 acres of ground in the Home park, which is about 4 miles in circumference. A tree-lined avenue connects this park with the Great park, which has a circuit of 18 miles. The castle, consisting of numerous chapels, cloisters, and apartments, is dominated by the Round Tower, which was built by Edward III. The Van Dyke room contains a priceless art collection. About one-half mile from the castle stands Frogmore, a handsome mausoleum of Queen Victoria and her husband. Adjoining the Thames river are Alexandria gardens. Population, about 21,000.

Ypres (*ē'pr'*). A town of western Belgium about 20 miles from the North Sea. It was the scene of a large number of battles in the World War, being held by the British armies in the face of the most desperate German attacks, made over a period of four years. One of the chief squares contains a monument erected by the Canadian government as a memorial to Canadian soldiers who perished in the sanguinary conflicts near Ypres. The town had a population of about 20,000 before the war but was almost obliterated as a result of military operations.

Zurich (*zōō'rĭk*). The largest city of Switzerland, beautifully situated in the northern part of the country on both banks of the Limmat river as it issues from Lake Zurich. In the older quarter, the streets are narrow, but the newer section is very attractively laid out, its main thoroughfare being a broad boulevard lined with shops comparing well with those of Paris. Zurich is the seat of the Swiss National museum, of the University of Zurich, and of several splendid medieval churches and monasteries. The cathedral known as the Grosse Münster, founded in the 11th century, had Zwingli as one of its pastors.

Zurich is the financial center of Switzerland. Its manufactures include silks, cottons, machinery, paper, and musical instruments. The predominant language and culture of the city is German. Population, 1921, 207,161.

















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TEA INDUSTRY

1 In Shidzuoka, a Japanese Tea Center. 2 Tea House Girls, Japan. 3 Gathering Tea, Ceylon. 4 Tea Pickers, Japan. 5 Steaming Tea, Japan. 6 Firing Room, Japanese Tea Factory. 7 Sifting, Cleaning, and Sorting Tea. 8 Wrapping Packages of Tea.















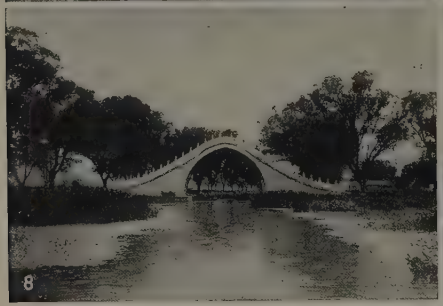




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ASIA

1 Great Wall of China. 2 Taj Mahal, Agra, India. 3 On the Ganges, India. 4 Japanese Garden. 5 Symbolizing the Deaf, Dumb, and Blind God, Japan. 6 Sail Boats on the Yangtze, China. 7 Village Street, Korea. 8 Marble Bridge, Peking, China. 9 Kiyomizu Temple, Kyoto, Japan.

ASIA

THE largest and the most populous of the continents. It lies entirely in the northern hemisphere and, beginning near the equator, stretches 5270 miles northward to a point within 800 miles of the north pole. Its maximum extent east and west is 6820 miles. Having an area of 17,200,000 square miles, it occupies nearly one-third of the land surface of the globe and is larger than North America and South America combined.

With the exception of Europe on the northwest and of the narrow Isthmus of Suez, Asia is entirely surrounded by water. It has the Arctic Ocean on the north, the Pacific Ocean on the east, and the Indian Ocean on the south. In the southwest, the continent is divided from Africa by a line passing through the Isthmus of Suez, the Red Sea, and the Gulf of Aden. At the northeast extremity, Asia is separated from North America by Bering strait, a neck of water less than 40 miles in width at its narrowest point. The coast line of the continent aggregates about 33,000 miles.

Outline and Islands. The line of demarcation on land between Asia and Europe follows roughly the Ural mountains and the Caucasus mountains. The remainder of the western boundary passes through the Caspian Sea and through the three seas which wash the shores of Asia Minor, the continent's farthest westward extension. These three seas are the Black Sea, the Ægean Sea, and the Mediterranean Sea. The Black Sea and the Ægean Sea are connected by the small Sea of Marmora, which communicates with the Black Sea by the Bosporus strait and with the Ægean Sea by the Dardanelles strait.

The coast line has many irregularities. Those on the north are mainly the enlarged mouths of rivers, the only major inlet being Nordenskjöld Sea. On the south, however, there are three large peninsulas separated by two deep indentations. Between Arabia, the most western peninsula, and India, in the center, lies the Arabian Sea, which has two important inlets, each connected by a strait with an inland sea. The Gulf of Aden in the west is joined to the Red Sea by the strait of Bab el Mandeb, and the Gulf of Oman at the north of the Arabian Sea communicates by the strait of Ormuz with the Persian gulf. The third great peninsula is Indo-China with its southern extension known as the Malay peninsula. It is separated from India by the Bay of Bengal.

The eastern coast is notable for a series of deep inlets and for an irregular chain of islands stretching from the north to the south. This configuration results in a number of island-bound seas. Bering Sea at the north is confined by the Aleutian islands, which are geographically a part of Alaska. South of Kamchatka peninsula lies the Sea of Okhotsk. The Sea of Japan is enclosed by Sakhalin island and by the islands of Japan, which stretch southwestward toward the southern end of the peninsula of Chosen. The Yellow Sea and the China Sea extend southward to the Taiwan strait, as the channel is called which lies between the island of Formosa and the mainland. The South China Sea, bounded on the east and south by the Philippine Islands and by Borneo, has two large inlets, the Gulf of Tonkin and the Gulf of Siam.

South and east of the continent lies, in an elongated cluster, the largest group of islands in the world. This group, known as the Malay archipelago, extends as far as Australia. This archipelago, together with the numerous smaller islands which continue to dot the Pacific for more than 2000 miles still farther east, is sometimes embraced under the term Oceania. The only other large island off the southern coast is Ceylon, near the southern tip of India. The New Siberian islands and Wrangell island lie well within the Arctic circle to the north.

Surface. Asia is believed to have the greatest mean elevation of any of the continents, its surface being, on the average, more than 1600 feet above the sea. Moreover, the continent contains the highest mountain, the highest plateau, the most extensive lowland, the lowest lake, and the deepest lake, in the world.

About 2000 miles north of the southern tip of India lies the plateau of Pamir, often called the roof of the world. This plateau, 11,000 feet in height, forms a central point from which mountain chains radiate, most of them trending in a general east and west direction.

The highest range is that of the Himalaya mountains, curving from the Pamir plateau to the south and east, where it forms a northern wall of India. Mount Everest, in this range, is the highest peak in the world, having a height of 29,141 feet.

North of the Himalaya mountains lies the world's highest plateau, Tibet, which has an elevation ranging from 9000 to 17,000 feet. The region is volcanic. In 1920, a violent earthquake shook a large area in its northeastern part, causing the death of about 100,000 people. To the north of the plateau of Tibet lies, at a lower level, the plateau of Mongolia, separated from Tibet by the Kuenlun mountains. The plateau of Mongolia is confined on the northwest side by an irregular group of mountain ranges stretching northeast from the Pamir plateau. Among these mountains lies the deepest body of fresh water in the world, Lake Baikal, in which soundings of 5280 feet have been taken. Both the plateau of Tibet and the plateau of Mongolia widen toward the east and eventually slope downward to the plains of China in the south and, farther north, to the plains of Manchuria.

Westward from the Pamir plateau, a broad mountainous highland stretches to the extreme western part of the continent in Asia Minor. This region contains the lofty Hindu Kush range and, farther west, Mount Ararat, on which Noah's ark is said to have landed. The highland slopes, on the south, down to the plains of Mesopotamia, which drain toward the Persian gulf. South and west of this drainage basin rises the plateau which occupies the greater part of the Arabian peninsula. The northwestern extremity of the plateau falls rapidly to a basin of inland drainage, which constitutes the most remarkable depression on the face of the earth. The lowest point is occupied by the Dead Sea, the surface of which is almost 1300 feet below the level of the sea.

To the north of Asia's great central highland lies the world's vastest plain. Occupying the whole northern part of the continent, it is sometimes called the Great Northern Lowland. Most of it inclines in steppes very gently toward the north, but in the southwest there is an area of inland drainage, part of which slopes toward the Caspian Sea and part toward the Aral Sea.

To the south of the Himalaya mountains lie the plains of India. These plains rise on the southern side to a table-land of moderate height, sometimes called the Deccan. On the east, the plains are confined by a number of mountain ridges, which constitute a southern spur from the plateau of Tibet. These mountains lose themselves in the plains of Indo-China and in the Malay peninsula.

The plateau of Mongolia sends a similar spur to the northeast, known as the Stanovoi mountains, which stretch as far as Bering strait. From this extreme northern point, a partly submerged mountain chain passes south through the ocean, emerging in various places to form the numerous islands off the east coast. Many of these mountains, particularly those in Japan, are actively volcanic.

Drainage. The great central highlands of Asia feed six rivers which exceed 2000 miles in length. Two of them, the Yangtze and the Yenisei, rank among the six longest rivers of the world.

The Ob river, the Yenisei river, and the Lena river are the largest of the streams which take their rise in these highlands and wind slowly through the immense steppes down to broad estuaries at the Arctic Ocean. Their lower courses are icebound eight months in the year. For 100 miles above the mouth of the Lena lies a stretch of frozen silt in which are embedded the remains of numerous mammoths and of other animals which were engulfed in quagmire thousands of years ago.

The three greatest rivers flowing to the east are the Amur, the Hwang, and the Yangtze. Each follows a long, meandering course in the central plateau before descending to the plains and emptying into the waters of the Pacific Ocean. Destructive annual floods frequently follow the melting of the upland snows, particularly in the Hwang river in China, which for that reason is often called "China's sorrow."

The southeastern spur of the plateau of Tibet gives rise to three rivers of southern drainage. Named in order from east to west, they are the Mekong river, the Salwin river, and the Irrawaddy river. The Ganges river and the Brahmaputra river both rise in the Himalaya mountains and mingle their waters in a common delta at the head of the Bay of Bengal. The Brahmaputra river flows eastward along the northern edge of the Himalayas in the plateau of Tibet and, bending southward and westward, passes through a plain which has a heavier rainfall than any other region of the world. The Ganges throughout most of its course flows eastward. The Indus river rises to the north of the Himalaya mountains and, passing around the western end of the range, empties into the Arabian Sea.

The plains of Mesopotamia are drained toward the Persian gulf by the Tigris river, which is joined about 100 miles above its mouth by the celebrated Euphrates river. The Ural river flows into the northern end of the Caspian Sea. The Caspian Sea has no outlet but is itself 86 feet below the level of the ocean. The Aral Sea is the center of another basin of interior drainage. Such basins cover, in Asia, a larger area than in any other continent.

Climate. On account of its range of latitude and of altitude, Asia is subject to a great variety of climate. In the interior of Siberia, temperatures of 92° below zero have been recorded, although in summer on the Arctic coast the thermometer sometimes registers 100°. The hottest part of the continent is in Arabia, where the temperature has reached 120° F. and the average for the year is 93°.

While parts of Assam, in the basin of the Brahmaputra river, have a rainfall of about 500 inches, the rainfall of Asia as a whole is scanty. An arid desert, in which the annual precipitation is less than 10 inches, extends in a broad sweep through the center of the continent from east to west. Beginning with the desert of Gobi in the plateau of Mongolia, it passes through Turkestan, Persia, and Arabia. Siberia also has a light rainfall. Japan, the plains of China and of Indo-China, the Malay peninsula, and eastern and southern India have a copious and, in parts, an excessive precipitation.

Vegetation. Asia is the original source of more of our important economic plants than all other parts of the world combined. From it come wheat, barley, sugar cane, alfalfa, cotton, flax, jute, hemp, tea; such fruits as the apple, cherry, peach, prune, apricot, banana, olive, orange, lemon, grapefruit, date, and pomegranate; and, in the list of vegetables, the radish, cucumber, muskmelon, onion, parsnip, rhubarb, spinach, and eggplant.

Northern Siberia from east to west contains a strip of tundra, or frozen desert, stretching 150 to 500 miles southward from the Arctic Ocean. In this tundra, a permanently frozen subsoil permits the growth of few plants other than mosses and lichens. Coniferous forests and, farther south, forests of deciduous trees cover the steppes. South of the forests lies an immense belt of treeless plains covered with grass. The grass is replaced by a desert flora toward the arid zone of central Asia.

In the regions of copious rainfall, the plant life is extraordinarily rich, India having more species than any other region of equal area in the world. The sacred peepul and the banyan tree, plants producing ginger, members of the pea family, medicinal plants, orchids, gourds, figs, timber trees, gum producing trees, sago palms, bamboos, and teak are representative of the rich flora south of the Himalaya mountains. On these mountains grow magnolias and large rhododendrons; higher up, pines are found, and also the deodar, a species of cedar similar to that growing on Mount Lebanon in southwestern Asia. The better watered parts of Arabia still produce, in limited amounts, the spices and fragrant plants which, in earlier days, won for the peninsula the poetic characterization of "Araby the blest."

Animal Life. Asia is the original home of most of the world's domesticated animals, including the horse, ox, sheep, pig, goat, camel, chicken, and goose. The humped ox, the water buffalo, and the yak are used as draft animals by the inhabitants of the continent. The elephant of Asia, unlike the African elephant, is easily domesticated.

The Himalaya mountains form a barrier north of which the climate is unfavorable to animal life. In the north, however, bears, foxes, and wolves are found, as well as other wild animals which inhabit the corresponding latitudes of Europe. South of the barrier, the fauna is extremely rich. Nearly all the families of tropical birds are represented. India is the home of the tiger. There are several species of the rhinoceros. In Java, an island of the Malay archipelago, was discovered the skeleton of the so-called pithecanthropus, an animal intermediate in structure between the ape and true man.

Minerals. The natural resources of Asia have been very inadequately explored. There is reason to believe, however, that the continent is extremely rich in minerals. Coal and iron exist in large quantities in China, and petroleum is obtained in quantity from Persia and Mesopotamia. Most of the world's supply of tin comes from the Malay peninsula and the islands lying near it.

Inhabitants. It is generally acknowledged that Asia is the original home of the human race. The present inhabitants, including those of Malaysia, are estimated to number 1040 million.

The yellow race comprises about seven-tenths of the total population of the continent. This race, together with the brown race, occupying the peninsula and the archipelago of Malay, is usually considered most distinctive of Asia. About one-tenth of the population, however, consists of Caucasians, people of the white race, living in Siberia, India, and southwest Asia. From these regions, the Caucasians emigrated at an early period, spreading over northern Africa and Europe, whence they came later to America. The aborigines of America are believed to have reached the western hemisphere by way of northeastern Asia. The Negritos of the Philippine Islands and other scattered tribes are the only remaining representatives of the black race in Asia.

Religion. The most widely embraced religions of Asia today are Buddhism, Confucianism, Mohammedanism, Hinduism, Taoism, and Shintoism. Buddhism, Confucianism, and Taoism center principally in China. Shintoism is the chief religion of Japan. In India, Hinduism competes with Mohammedanism, which is the dominant religion of southwestern Asia. Christianity is strongest in northwestern Asia, chiefly Siberia, and in the islands of the Malay archipelago, in many of which it dominates to the virtual exclusion of others. It has also obtained a substantial footing in China, Japan, and India.

POLITICAL DIVISIONS

The independent countries of Asia embrace Japan, China, Turkey, Persia, Afghanistan, Iraq, and Siam. As a result of the World War, independence was granted to a number of states in Arabia, which had previously been under the sovereignty of Turkey. Russia is in part an Asiatic power, her Asiatic territory being about three times as extensive as European Russia.

Of outside powers, Great Britain has by far the greatest territorial interests in Asia. Most of her dependencies are grouped under the empire of India, but many others lie in various parts of the continent. The Netherlands and France have important possessions in Asia, while the United States controls the Philippine Islands and Guam. Papua and part of New Guinea are subject to Australian jurisdiction, and Western Samoa is held as a mandate by New Zealand. Portugal governs a few insignificant possessions in different parts of the continent.

Afghanistan. An inland country of southern Asia, hemmed in by India, Persia, and Turkestan. Its area is about 245,000 square miles. The surface is, for the most part, a dry, mountainous plateau. It is traversed by the Hindu Kush and by other ranges, which in some places attain a height in excess of 17,000 feet.

The mountain sides are partially clothed by forests of cedar, pine, walnut, and other trees; and the valleys, sometimes with the help of irrigation, support semiannual crops of cereals and a great variety of fruits. Wheat, rice, and mutton are the staple foods. Sheep raising is one of the chief occupations. The flocks include a native sheep with a very large tail. The extraordinary size of the tail is caused by the development of fat upon which the animal may draw for sustenance when fodder is scarce.

The population of Afghanistan is about 6,380,500, some of whom belong to tribes virtually independent of the central government. The ruler, called the amir, exercises an authority unlimited by any constitution. The capital is Kabul, a city of about 150,000 inhabitants, which is an important center of caravan trade with India and with central Asia. There are no railroads in Afghanistan. Herat, in the northwestern part of the country, contains the ruins of many fine buildings erected by Timur, the great Mogul warrior who overran Asia in the 14th century.

Arabia. The large peninsula in southwestern Asia, having an area of about 1,200,000 square miles. Most of its surface is a sandy, arid waste, uninhabitable except by wandering tribes of Bedouins. Nedj and Jebel Shammar in the interior are recognized as autonomous political units. Around the outer fringe of the peninsula, there are a number of more or less independent Arab states. Hejaz, Asir, and Yemen border on the Red Sea; Hadramaut has a coast line on the Arabian Sea; Oman extends around the southeastern corner of the peninsula, bordering the Arabian Sea, the Gulf of Oman, and the Persian gulf. Hasa and Koweit lie along the Persian gulf. The exports are unimportant and are confined mainly to coffee, hides, and wool. Hejaz contains Mecca and Medina, two cities sacred in the eyes of the Mohammedan world. The independent countries of Arabia are all monarchies, ruled by kings, emirs, or sultans. The total population of the peninsula is estimated at 4 or 5 million.

British Dependencies. Apart from India, the territories of Asia under British control are the Malay states, the Straits Settlements, Ceylon, Hongkong, Cyprus, Fiji, and a number of other small dependencies. Palestine has been allotted to Great Britain as a mandate. The New Hebrides in the Malay archipelago, lying east of Australia, are under the joint administration of Great Britain and France. For the capital, area, and population of each dependency and mandate see the table of *The British Commonwealth of Nations.*

The Malay states, ten in number, occupy the southern half of the Malay peninsula. Five are federated, forming a British protectorate, and the remainder have no official political relation with each other. The country is hot and copiously watered, supporting tropical forests and jungles. These states are the world's chief source of tin. Other products are gold, timber, rubber, and gums.

The Straits Settlements consist of a number of small islands off the south of the Malay peninsula, together with a small part of the mainland of the peninsula. Rubber, spices, and tapioca are grown, and tin is mined in considerable quantities.

Ceylon is a fertile, well watered island near the southern extremity of India. The surface is mainly an undulating plain, about one-fifth being mountainous and covered with forests. The island is famous for gems and tea, although in 1920 the exports of rubber exceeded in value any other article shipped abroad. Other products are coconuts, cinnamon, and cocoa.

Hongkong is a small rocky island off the southeastern coast of China near the mouth of the Canton river in the South China Sea. See *Victoria.*

Cyprus is an island in the northeastern part of the Mediterranean Sea. Most of the inhabitants are Christians. Agriculture is the predominant industry. The chief exports are carob beans, wine, and tropical fruits. The island anciently produced copper. Its name was used by the Greeks to designate the metal and is the origin of the English word.

Fiji is a crown colony, consisting of about 250 islands in the south Pacific Ocean some 1500 miles east of Australia. The larger islands are mountainous. The inhabitants support themselves mainly by tropical agriculture, the chief products including sugar, coconuts, rice, rubber, bananas, maize, and beans. The annual exports normally exceed $10,000,000 in value. A large share in the government is conceded to the natives.

Palestine, situated on the southeastern coast of the Mediterranean Sea, is a country of 9000 square miles bounded north by Syria and south by Hejaz and Egypt. About half of its surface is adapted for agriculture, most of this land being in a plain bordering the sea. The chief exportable product is oranges, grown mainly about the Mediterranean port Jaffa. Salt and potash are obtained from the waters of the Dead Sea, which lies at the eastern part of the country in the so-called Great Rift. The Jordan river provides power for an important hydroelectric development. Manufacturing has expanded markedly as a result of recent Jewish enterprise, and includes the making of bricks, vegetable oil, flour, soap, cement, furniture, and matches. The capital of Palestine is Jerusalem, where a Hebrew university was opened in 1925. The total population is 757,182, of whom 83,784 are Jews.

The other British dependencies in Asia are as follows: North Borneo, in the Malay archipelago, to which are attached, for administrative purposes, the island of Brunei and of Sarawak; Bahrein islands in the Persian gulf, noted for their pearl fisheries; and Aden, a small volcanic district of southwest Arabia, to which are attached politically Perim near the coast, the Kuria Muria islands off the coast of southwestern Oman, and Socotra, an island usually regarded as a part of Africa. The district of Weihaiwei, situated on the south side of the entrance to the Gulf of Chihli from the Yellow Sea, is leased from the Chinese government. Its eventual restoration to China was promised at the Washington Conference of 1922.

China. The immense, roughly triangular country is eastern Asia, lying between Asiatic Russia on the northwest and India and French Indo-China on the southwest. It is about 3000 miles from east to west, and its maximum extent from north to south is 2400 miles. The area of China is 4,277,170 square miles.

Two-thirds of the territory of China is inhabited by less than 4 per cent of the population. This sparsely settled part, occupied mainly by uncivilized tribes, consists of the lofty, mountainous plateau of Tibet, the desert plateau of Mongolia, the arid depression of inland drainage known as Chinese Turkestan, and the undeveloped northeastern province of Manchuria. The remainder of the country embraces the extremely fertile eastern plains, watered by three great rivers, the Hwang, the Yangtze, and the West river.

The deposits of coal, of iron, and of copper in China are among the richest in the world. More than one-half of the world's supply of antimony comes from China. The proximity of the coal and the iron deposits in the northeastern district of Shan-si has resulted in a large steel industry. The manufacture of porcelain, centering since 220 A. D. in Ching-teh-chen, a city of about 300,000 inhabitants, is still a distinctive industry of the country. Lacquered ware and textiles of silk and of cotton are other native manufactures for which China has long been noted.

The chief occupation of the Chinese, however, is agriculture, which is carried on more intensively than anywhere else in the world. The farms are small and the methods are not the most improved, but, in the arable districts, no land is left uncultivated. The soil is very fertile, and irrigation by canals and by irrigation wheels or even by hand is employed where necessary. Rotation of crops has been practiced for centuries. The chief crops include rice, corn, tobacco, tea, cotton, and sugar cane, the last three being grown in the southern part of the country. The mulberry tree is cultivated largely for the silkworms which feed on it and from which silk is obtained. Silk is by far the most valuable article of export, beans, cotton, and tea following in the order named. Pigs are raised everywhere in China, and pig's bristles have become an important article of export.

By 1922, over 8000 miles of railroad had been constructed in China. The so-called Grand canal, running from the city of Hangchow a distance of 600 miles north to the Gulf of Chihli, was built 2500 years ago. Parts of it are choked with silt, but steps have been taken for dredging the channel. The roads are adapted for porters and for wheelbarrows rather than for wagons. Two-wheeled carts, drawn by coolies and known as jinrikishas, are used almost universally for travel. A large part of the country's transportation is provided by the rivers, along which ply numerous "junks" and other boats. Thousands of people live on the rivers in house boats, which are often equipped with gardens made in soil laid on the floors of the boats.

The population of China is estimated at 318,653,000. The chief religions are Buddhism, Confucianism, and Taoism, most of the inhabitants professing and practicing all three. There are about eight million Mohammedans. The Christians number less than 1 per cent of the total. Chinese civilization is ancient and distinctive. Veneration of parents is a cardinal principle of the religion, the law, and the social customs. The form of government is republican, but the central authority is not effectively enforced over the governors who rule the individual provinces. In education and in social and economic organization, China is in a period of transition.

The capital of China is Peking. The largest city is Shanghai, near the center of the coast line, having a population estimated at 1,538,500. Other cities of importance include Hankow, Foochow, Canton, Changsha, Soochow, Chungking, Amoy, and Wenchow.

Various foreign countries have acquired authority in different parts of China. Japan rules Port Arthur and exercises an economic control over much of Manchuria. Great Britain owns the island of Hongkong and holds Weihaiwei, on the Yellow Sea, under a lease. France has important economic interests in southern China.

Dutch East Indies. A name applied to the part of the Malay archipelago which belongs to the Netherlands. The larger islands include Java, Sumatra, Madura, and Celebes. Borneo and New Guinea are each in part under the control of the Netherlands. The northern portion of Borneo, however, is a colony of Great Britain, while eastern New Guinea is a mandate of Australia. The total area of the Dutch East Indies is estimated at 733,642 square miles.

The islands are fertile, warm, and well watered. They show an extraordinary degree of productivity, the exports in 1920 being valued at nearly one billion dollars. Rice, corn, cassava, tea, sugar, quinine, coffee, rubber, tobacco, indigo, copra, and tin are the chief products. Coal is mined also, the annual production exceeding one million tons.

The population amounts to approximately 50 million, mainly Polynesian in type. Of this number, the island of Java has about 35 million. It is, therefore, one of the three most populous islands of the world. Its beauty and tropical luxuriance have won for it the characterization of the "pearl of the East Indies." Among the more noteworthy forest trees are the teak and the upas. The latter was formerly believed to be poisonous, and to cause the death of all plant and animal life in its vicinity. Many of the inhabitants are still organized in uncivilized tribes. The prevailing religion is Mohammedanism. Ruins of magnificent Buddhist temples, however, attest the former prevalence of Buddhism. At Boro Budor in Java stands one of the architectural marvels of the world, the largest and one of the most elaborate Buddhist temples in existence. Java contains Batavia, the capital of the Dutch East Indies.

French Dependencies. The Asiatic possessions of France on the mainland consist of French Indo-China and five small colonies in India: Pondicherry, Karikal, Chandernagore, Mahe, and Yanaon. Among the islands, France rules New Caledonia, Tahiti, and a large number of smaller islands in the Malay archipelago. She also holds a mandate over Syria, shares with Great Britain a protectorate over New Hebrides, and leases Kwang-chow Wan, a territory of 200 square miles on the coast of China.

French Indo-China occupies most of the large southeastern peninsula of Asia. Its area is 256,878 square miles. The surface is traversed by mountain ranges in the east but is low in the west, where the rich, copiously watered soil supports a flourishing agriculture. Rice is the chief crop and forms about 70 per cent of the country's exports. Other important exports are rubber, sugar, cotton, and pepper. Coffee and tea are also grown, and teakwood is obtained from the dense tropical forests that cover the mountains. The population in 1921 was 19,747,431, including about 23,700 Europeans. Buddhism is the prevailing religion. The capital is Hanoi, a city of about 90,000 inhabitants. The chief port, Saigon, is a French naval base.

The five colonies in India cover less than 200 square miles and have a population of 265,200. These colonies form the sole remaining portion of a one-time pretentious French empire in India.

New Caledonia, Tahiti, and the other islands of French Oceania cover an estimated area of 9194 square miles and support a population of about 81,200, mainly Polynesians. The smaller islands include the Isle of Pines, the Wallis archipelago, the Loyalty islands, the Huon islands, Moorea, and the Marquezas islands. The capital of New Caledonia is Noumea, which has about 10,000 inhabitants. The New Hebrides have an area of 5500 square miles and a population of about 60,000. The chief products of these island groups are nickel, corn, coconuts, coffee, rubber, vanilla, and preserved meats. There is a penal settlement on New Caledonia, which continued to receive convicts from France until 1896.

Syria is situated at the eastern end of the Mediterranean Sea, south of Turkey, west of Mesopotamia, and north of Palestine and the Arabian desert. Its area is about 60,000 square miles, and the population is estimated at three million. Agriculture and stock raising are the principal industries. The crops of the greatest value are wheat, barley, durra, sesame, peas, grapes, and tobacco. Raw silk heads the list of exports. Other products shipped abroad include live stock, fruits, soap, wool, tobacco, and sesame. The largest city is Damascus, which alternates annually with Aleppo as the seat of government. Beirut and Alexandretta are the chief seaports.

India. A large country in south central Asia more or less completely under British rule. There are in all about 700 native states, some of which are under the authority of the 15 organized administrative areas, or provinces. Other native states are outside the jurisdiction of the provinces. Their relations with the British authorities vary greatly. Nepal and Bhutan, situated in the Himalaya Mountain region, although nominally independent, are sufficiently under the influence of Great Britain to be classified as parts of India. Other semi-independent units include Baluchistan in the west and the tribes of Burma in the east.

The area of India totals 1,805,332 square miles, including the near-by islands with the exception of Ceylon. Three insignificant colonies on the west coast are owned by Portugal, and France has five small dependencies in India.

India has a northern mountain wall, south of which the surface falls to a great plain, arid in the extreme west but copiously watered in the central and eastern regions. Through this plain pass the Indus river and the Ganges river, the latter being joined at its delta by the Brahmaputra river. An upland stretches from the plain to the southern extremity of the peninsula of India. From the head of the Bay of Bengal, a mountain barrier runs north to the Himalaya mountains and divides the rest of India from Burma. Burma is a rich, wild country, being cut, in a north and south direction, by several mountain ridges separated by extraordinarily fertile and well watered valleys.

The central plains of India are the hottest part of the country. The eastern regions and a strip along the western coast have a heavy rainfall, confined mainly to the rainy season—June to November. The northwestern section is dry, but the land is productive under irrigation, upon projects for which nearly 200 million dollars have been spent. Here, in 1915, an irrigation canal was opened, which waters 2,500,000 acres and is perhaps the greatest work of its kind in the world. A magnificent marble dam, which required 10 years to build, was constructed by a native prince in Rajputana, following a famine of great severity in 1661.

The vegetable and animal life of India is extremely rich, comprising nearly all the tropical species of the continent. Elephants are still found wild in northern Burma. Venomous snakes are numerous, and every year their human victims are numbered by the thousand. Man-eating tigers have been known to cause whole villages to be deserted. Crocodiles infest the malarial swamps at the mouths of the large rivers. A species of loud-voiced lizard abounds in all the moister regions.

More than two-thirds of the population of India supports itself by agriculture and stock raising. Rice, wheat, jute, cotton, and tea are the chief crops. The live stock consists mainly of humped oxen, buffaloes, sheep, and goats. Buffaloes are far more numerous as beasts of burden than are horses, donkeys, or camels.

After agriculture, the most important occupation in India is the manufacture of textiles, which, with other manufacturing industries, affords a living for about 11 per cent of the population. Of the minerals, coal is mined to the greatest value, gold, petroleum, manganese, and salt following in the order named. Salt mining is a government monopoly. The chief exports are jute, cotton, rice, wheat, tea, hides, lac, wool, opium, and metals. By far the most of the foreign trade is with Great Britain.

The population of India is about 320 million. Of these, 217 million are Hindus, 66 million are Mohammedans, 10 million are Buddhists. About 1 per cent of the total are Christians. More than 50 different languages are spoken, English being familiar to about 1,700,000 of the inhabitants. The proportion of illiteracy in the population is very high.

The capital of India is Delhi, and the largest city is Calcutta. Other important cities are Bombay, Madras, Hyderabad, Rangoon, and Lucknow.

Iraq. Formerly known as Mesopotamia, this country stretches northwest from the Persian Gulf to Turkey and Syria. It lies between Persia and Arabia, and comprises the valleys of the Tigris and Euphrates rivers. Its area is 143,250 square miles. The soil is rich, but requires irrigation. Dates, cotton, and wheat are the chief crops; petroleum the principal mineral product. The population of Iraq in 1920 was 2,849,282, mainly Arabs and Kurds. Its capital is Bagdad.

Japan. An ancient empire, consisting of a chain of mountainous islands off the eastern coast of Asia together with Chosen, or Korea, the southern half of Sakhalin island, and Kwantung on the Chinese mainland. The largest island is called Honshu, or Hondo. To the north lies Hokkaido, or Yezo. The other three, lying to the south, are Shikoku, Kyushu, and Taiwan, or Formosa. The total area of the empire is 260,707 square miles, of which Honshu covers 86,775.

The islands of Japan, being the projecting portions of an immense submarine mountain range, have a mountainous surface, traversed from end to end by a high ridge. Numerous spurs from the mountains, descending to the coasts, result in a highly irregular coast line. There is, consequently, an abundance of good harbors, most of which are on the Pacific side.

The highest mountain in Honshu is Fuji, which reaches an altitude of 12,395 feet. This peak is exceeded in height, however, by Mount Morrison in Formosa, which is 14,300 feet high. There is probably no region of its size in the world which has so many active volcanoes and is subject to such violent earthquakes as Japan. The largest active volcanic peak is Asama in central Honshu, which has a crater 600 to 800 feet deep with absolutely perpendicular sides. Fuji and many other peaks are regarded as sacred and are made the center of pilgrimages. Hot springs abound in the country.

The climate of Japan varies from subarctic to subtropical conditions. The cold northwestern winds from Siberia bring heavy snows in winter on the western side of the northern islands. Farther south, and more especially on the eastern side, the ocean exerts a moderating influence on the temperature and provides a copious rainfall. Violent and destructive windstorms, known as typhoons, usually mark the end of the hot, moist summers.

Japan has a very rich flora. The forests contain such trees as bamboos, camphor trees, oaks, maples, walnuts, laurels, and willows. The cultivation of flowering plants is very extensive, the Japanese being noted for their appreciation of floral beauty. Their national emblem is the chrysanthemum.

The animals include bears, monkeys, hares, wild boars, deer, foxes, wildcats, and pheasants. The buffalo is used for food and for plowing. The crane is considered sacred, being regarded as a symbol of longevity. The silkworm and numerous kinds of fish are of great economic importance.

The minerals of Japan produced in the most important quantities are coal and copper. Gold, silver, and petroleum are obtained, and iron is mined on the islands but not in sufficient amount to supply the empire's demand.

The chief industries are agriculture, fishing, and manufacturing. Land cultivation is carried on intensively over the small arable portions of the

principal islands. In Chosen, model farms have been established by the government, and every inducement has been given for the cultivation of the land by improved methods. The fisheries support nearly one million workers. Rice, fish, wheat, barley, rye, and poultry provide the staple foods of Japan. The product representing the greatest export value is silk, Japan supplying 60 per cent of the United States silk market. Among the manufactures, the textile industry and shipbuilding are the most important. Other manufactures are steel, paper, matches, toys, and lacquered ware. Formosa produces the bulk of the world's camphor obtained from trees. The jinrikisha is widely employed for travel.

The population of the Japanese empire in 1925 was 83,455,137. There is complete freedom of religion. The chief forms are Shintoism and Buddhism. Elementary education is compulsory. In 1923 there were 16 universities in the empire. Japan has an ancient and virile civilization, and, alone among the peoples of Asia, has shown herself the equal of the Western nations in energy and enterprise.

The capital, Tokyo, is exceeded in size by Osaka, the principal port. Other important cities are Kobe, Kyoto, Nagoya, Yokohama, and Nagasaki. The government is a constitutional monarchy under an emperor. The name applied by the Japanese to their country is Nippon.

Persia. An independent country of southwestern Asia, lying between the Persian gulf on the south and the Caspian Sea on the north and stretching eastward from Mesopotamia to Afghanistan and India. Its surface, covering about 628,000 square miles, is a high plateau rimmed by mountains on every side except the east. Many of the mountains are volcanic, including the country's highest peak, Mount Demavend, which has an altitude of 18,500 feet.

A narrow plain on the southern coast of the Caspian Sea has a heavy rainfall and supports a luxuriant vegetation. Nearly all the remainder of the country is dry and barren. Persia has given its name to the peach, the English word being a corruption of the Latin word for Persian. The chief products of the country include petroleum, cotton, tobacco, rice, silk, wool, gums, fruits, opium, cereals, and the famous Persian rugs, the last being made entirely on looms operated by hand. Petroleum accounts for about half the total value of the exports. The development of Persia is handicapped by a serious lack of transportation facilities. There are fifteen regular trade routes, along which goods are carried by caravan.

The estimated population of Persia is 9,000,000. Of this number, about one-third lead a nomadic life. Most of the inhabitants are Mohammedans, although there is a group of about 10,000 Parsis, or Ghebers, adherents of the ancient Persian religion that flourished as early as the 6th century B. C. The main body of the sect was forced by persecution to take refuge in India. Teheran is the capital and largest city of Persia, and the chief port is Bushire, a city of about 20,000 people, on the Persian gulf.

Portuguese Dependencies. Portugal has five small colonies in Asia—Goa, Daman, Diu island, Macao, and part of Timor island. The first three, lying on the western coast of India, produce salt and manganese. Macao is an island off the southeastern coast of China. Its trade is mainly of a transient nature and is handled by Chinese. The northeastern part of Timor in the Malay archipelago is Portuguese and produces coffee, sandalwood, copra, and wax.

Russia in Asia. Russian territory in Asia covers nearly 6 million square miles with a population estimated at 28 million. Politically, this area consists of a considerable number of divisions bound to the Union of Russian Soviet Republics in varying degrees of closeness. From a geographical point of view, however, it may be considered under the three chief heads of Siberia, including the Far Eastern Region; Central Asia, including Kirghiz, Turkestan, and Usbek (Bokhara and Khiva); and Transcaucasia, a name applied to the federated soviet republics of Armenia, Azerbaijan, and Georgia.

Siberia occupies the whole of northern Asia and covers an area of 4,210,420 square miles. The drainage is northward to the Arctic Ocean. The climate in general is severe and the summers, though hot, are very short. The territory supports about 10 million inhabitants, or little more than two persons to the square mile. The Asiatic and the European races are mingled and, to some extent, blended in the population. In the northeast, certain tribes are found who are akin to the Indians of North America. Almost the sole occupations of the Siberians are agriculture and grazing. The chief cities include Vladivostok, Irkutsk, and Omsk.

Central Asia constitutes a large, arid region stretching east from the Caspian Sea to China and north from Afghanistan to Siberia. Its area is about 1,500,000 square miles. In the south lies a wild mountainous country, part of which is known as the Pamir plateau. Except in the extreme northeast, the drainage is inland to the Aral Sea and to the Caspian Sea. Agriculture and grazing are carried on in the oases and in certain irrigated sections of the south. The population is 12,250,104, most of whom are Asiatic in race and Mohammedan in religion. Samarkand in southern Turkestan was formerly the capital of the empire built up by Timur in the 14th century. Bokhara, the chief city of Usbek, has a population of 75,000. It was once a famous center of Mohammedan learning and still has many schools and mosques, including a cupola-topped tower 210 feet in height.

Transcaucasia is a dry mountainous region stretching from the Black Sea to the Caspian Sea on the southwestern side of the Caucasus mountains. Its area is approximately 75,000 square miles and supports a population estimated to exceed 6 million. Of great importance is the petroleum industry, which centers about Baku in Azerbaijan, a city of 250,000 inhabitants. Most of the oil from this region is shipped through the Black Sea port of Batum. Tiflis in Georgia is the capital of that republic and also of the Transcaucasian Federation of Soviet Republics.

Siam. An independent kingdom of southeastern Asia, bounded by India on the west and by French Indo-China on the north and east. It has a southern coast line on the Gulf of Siam. The area of the country is 194,580 square miles.

The richest part of Siam is the wet, tropical valley of the Menam river. This river valley lies between a western mountain wall and a central plateau that divides the Menam River basin from the western reaches of the Mekong River system. The valley produces valuable timber and dyewoods. Agriculture is carried on intensively. Rice is the national food and is the staple article of export. The live stock of the country consists mainly of oxen and buffaloes but includes several thousand elephants. The white elephant, really a light ashy gray in color, is considered sacred by the inhabitants. Tin is the chief mineral produced on a commercial scale. The greater part of the trade is in the hands of foreigners, more especially of Chinese.

The population of Siam is estimated at 9,221,000. Buddhism is the prevailing religion. Siam has, in recent years, introduced many of the methods of Western civilization, having employed the services of European and American advisers in finance, education, drainage, and many other departments. The king is assisted in governing by a legislative council appointed by the monarch. The capital is Bangkok, through which nearly all the foreign trade of Siam passes.

Turkey. An independent country occupying the whole of Asia Minor and extending eastward to Armenia and Persia. It includes also a number of islands off the coast and a small district of Europe, in which the city of Constantinople is situated. Asiatic Turkey is sometimes called Anatolia, "the land of the rising sun."

The surface of Asiatic Turkey covers about 400,000 square miles. It consists mainly of a plateau, which, in the west and in the north, is fertile and luxuriantly clothed with vegetation. The central part is hot and dry.

The chief occupation is agriculture, but the methods employed are primitive and the industry is burdened by an oppressive system of collecting taxes. Tobacco, cereals, cotton, figs, grapes, and olives are the chief products of the soil. Silk, carpets, gums, and drugs are among the exports. The mineral wealth is considerable but is undeveloped. Manufactures are of little importance and are confined mostly to handmade articles, including rugs and copper utensils.

The population is about 12 million. The seat of government is Angora, an inland city of about 75,000 people. The surrounding region is the native habitat of the Angora goat and of the Angora cat, both of which are known for their long, soft hair. In the interior district of Cappadocia are found primitive tribes living in certain high, conical rocks of peculiar formation, which have been hollowed and made habitable. The chief seaport in Asiatic Turkey is Smyrna.

CITIES AND OTHER POINTS OF TRAVEL INTEREST

The antiquity of human habitation in Asia is reflected by the many ruined monuments of former empires and by the aspect of the present day cities. The latter are often surrounded by walls, which, in earlier days, served for defense.

The most elaborate buildings are not those devoted to commerce or to education and science but are chiefly temples. In Mohammedan countries, the temples are called mosques and are known by their characteristically-shaped minarets. In eastern Asia, the pagoda type prevails, in which the edges of the roof, depressed in the center and rising at the ends, recall the sagging top of a tent. In both cases, the roofs are conspicuous at a distance by reason of the bright-colored, glazed tiles with which they are covered. The religious interests, which, in Asia, usually predominate over all others, center about numerous shrines. Many of these shrines are hidden away among the picturesque wildernesses of the continent, but they are none the less made the goal of numerous pilgrimages by devout worshipers.

The streets of Asiatic cities are in general narrow, crooked, and dirty. The houses are small and poorly built. Provision for drainage and disposal of waste is most primitive. In certain cities, however, there are foreign districts, which present a striking contrast to the native section of each city in street building and in sanitation. Other cities, such as those of Japan, have already grappled with their civic problems in a progressive spirit, adapting Western ideas to their own needs.

The costumes of the inhabitants of Asia vary widely. The interior tribes of Burma and of the Indo-China peninsula are clad in nothing but an apron. In China, the women usually wear trousers and the men wear skirts, both sexes having a full-sleeved jacket to cover the upper part of the body. A wide use is made of silk fabric there as well as in Japan, where the kimono is a national article of dress. A characteristic part of the Mohammedan costume among men is the turban, a cap about which is wound a scarf of cotton or linen. The inhabitants of Siberia and of the cold plateaus of central Asia wrap themselves thickly in clothes more nearly resembling the Western type.

Agra (*ä'grä*). A walled city of northern central India. The Mogul emperors left in Agra several monuments of striking magnificence, including the Taj Mahal, "Gem of Buildings," a white marble mausoleum, the construction of which is said to have engaged 20,000 workmen for 22 years. The city has a large trade. Its industries include gem setting and inlaid mosaic work. Population, 1921, 185,946.

Amernath. A cave in the Himalaya mountains near the extreme northern border of India. In the cave stands the sacred symbol of the god Siva, which is the object of pilgrimages from all parts of India.

Angora. The capital of Turkey, officially chosen as such in 1923, replacing Constantinople. It was rapidly transformed from an Oriental hamlet in a malarial plain to a modern city with sanitary improvements and well laid out streets. Railroads connecting with other parts of the country were constructed, electric power was provided, and manufacturing industries arose, notably for producing tiles and cotton and linen textiles. A park was laid out, and attractive government buildings were erected. Population, 1926, about 75,000.

Bagdad. The capital of Iraq, situated on the Tigris river near the geographic center of the country. Like many other Oriental cities, Bagdad has a striking appearance at a distance, but the streets are narrow, unpaved, and dirty. There are many ruined mosques, monuments of the city's former splendor. Bagdad is said at one time to have had two million inhabitants. It was, in the 8th century, the capital of the caliphate of Haroun-al-Raschid, a hero of the *Arabian Nights*. Population, about 250,000.

Bangkok. The capital and chief seaport of Siam, located on the Menam river about 25 miles from its mouth in the Gulf of Siam. Its industrial establishments include large lumber and rice mills. The streets are intersected by small canals, on which many people dwell in house boats. Most residences are built of bamboo. The city is made attractive by numerous beautiful gardens and tall palm trees. Palaces and gorgeously colored temples present a romantic contrast to the up-to-date public utilities, with which the city is equipped. Population, estimated at 931,000.

Batavia. The capital of the Dutch East Indies, situated on the north coast of Java island. It forms the chief outlet for the numerous products of the Dutch East Indies. The European section, in the higher, more healthful part, contains the Museum of the Batavian Society of Arts and Sciences, a beautiful structure in the Greek style which houses the largest collection of Javanese art in existence. The city has a parade ground one square mile in extent. The word Batavia is the Latin name for the region now occupied by the Netherlands. Population, about 140,000, of whom about 9500 are Europeans or Americans.

Beirut (*bā'rōōt'*). A Mediterranean seaport and the capital of Syria. Beirut is mentioned as a commercial city in Egyptian records dating from 1500 B. C. It now serves as the main portal for the commerce of Damascus and Aleppo, with which it is connected by rail. Beirut has an American mission school and is the center of Arabic Bible publishing in Asia. Population, estimated at 180,000.

Bethlehem. A town of Palestine about five miles southwest of Jerusalem. Its chief center of interest is the basilica of Constantine, built in the 4th century at the spot where Jesus was believed to have been born. A chapel near by commemorates Jerome, the author of the Vulgate edition of the Bible, who resided and died in Bethlehem. Population, about 8000.

Bombay. A large seaport of India, situated on a small island near the center of the empire's southwest coast. By reason of its industrial development and of its modern improvements, Bombay is the most European in appearance of the cities of India. It has one of the six federal universities of the country. The characteristic Oriental features remain, however, in much of the city, where decorated houses, tea shops, bazaars, and temples bear witness to the more ancient civilization of the Hindus. Bombay was the birthplace of Rudyard Kipling. Population, 1921, 1,175,914.

Calcutta. The largest city and, until 1911, the capital, of India, located about 85 miles from the sea at the west of the enormous delta of the Ganges river. Calcutta is the terminus of many railroads and canals and handles about one-third of the entire foreign trade of India. The European section has numerous splendid buildings. Cotton mills, sugar refineries, sawmills, silk mills, flour mills, and shipbuilding yards are among the more important industrial establishments.

The city is memorable for "the black hole of Calcutta," a small dungeon in which a company of English were suffocated by a native prince. This incident led to the British conquest of India. Thackeray, the novelist, was born in Calcutta. Population, 1921, 1,327,547.

Canton. A commercial city of southeastern China, situated about 70 miles northwest of the island of Hongkong. The city is one of the chief centers of the Chinese silk trade. The industries include the manufacture of paper, lacquered wares, textiles, and glass, and the painting of porcelain.

The city is surrounded by a brick wall and partitioned by a cross wall into the old town and the new town. Many of the inhabitants live on house boats. Among the pagodas of Canton is one covering an area of seven acres. There is a Mohammedan mosque dating from the 9th century. Population, estimated at 1,367,000.

Chinese Wall. The most gigantic defensive work in existence, consisting of a wall more than 1500 miles in length, which was begun by the rulers of China in the 3d century B. C. and received its last addition in the 16th century A. D. A part, now destroyed, began near the Gulf of Liaotung in northeast China. The wall follows a general western direction along the southern border of Mongolia. The average height is about 22 feet. The base is from 15 to 25 feet wide, narrowing to 12 feet at the top. Its course passes through valleys and over mountains irrespective of the difficulties of construction.

Colombo. The capital of Ceylon, situated on the eastern coast of the island. The city was founded by the Portuguese in 1517 and was named in honor of Columbus. The European section is well built and modern in appearance. Population, 1921, 244,100.

Damascus. A large city of Syria and one of the few very ancient cities of the Mediterranean region which have survived until the present day. It is situated in a fertile region 53 miles southeast of its port, Beirut, on the Mediterranean coast. At the time of the Crusades, Damascus produced a famous type of ornamented steel, which has given the name damascening to modern steel etching.

The city has been often destroyed and rebuilt. The Ommiad, the largest of the city's 200 mosques, was formerly a church, which had earlier replaced a temple said to have contained the head of John the Baptist. Damascus, on account of its beautiful surroundings, is believed to have been the model for the paradise described in the *Koran*. The city contains the burial place of Fatima, the only child of Mohammed. Population, estimated at 170,000.

Delhi (*dĕl'ē*). The capital of India, situated in the north central part of the country. Delhi was formerly the largest city of India. The Mogul emperors made it their capital, and erected many fine buildings, the ruins of which still attest their original grandeur. The Great Mosque, built in 1650, still stands, and is regarded by Mohammedans as one of the wonders of the world. In the vicinity of the city is the Kutb Minar, a tower 238 feet high built of stone, ranging in color from red at the bottom to orange at the top.

The transfer of the seat of government from Calcutta to Delhi in 1911 was the occasion for the building of a new and beautiful division of the city. This centers about Raisina, a hill six miles south of the walls of old Delhi, with which it is connected by broad, tree-lined avenues. Over 150 million dollars had been spent by 1927 on this city building project, which is the most magnificent the Orient has witnessed in modern times. Population, 1921, 303,148.

Hangchow (*hăng'chō'*). A city of China near the center of the country's eastern coast and standing at the head of Hangchow bay, an inlet of the China Sea. The city is near the southern terminus of the Grand canal, which serves as an artery of the commerce centering in the city. The chief manufactures are silk and fans.

Hangchow is one of the best-built cities of China. It is surrounded by a massive wall, 12 miles in circuit. The western part of this wall is washed by West lake, a beautiful sheet of water 8 miles in circumference dotted with islands on which are built monasteries, memorial halls, and shrines. To the west of the lake are numerous Buddhist temples, to which tens of thousands of pilgrims repair daily. Population with suburbs, about 730,000.

Hankow (*hăn'kō'*). The chief commercial emporium of China, standing at the head of ocean navigation on the Yangtze river about 680 miles from its mouth in the China Sea. The city contains large iron and steel works, which utilize the extensive iron and coal deposits in the vicinity. Cotton goods, flour, and leather are also manufactured. The chief exports of the city are black tea, wood oil, and sesamum seed. A section of the city is set aside for foreign residents. Two-thirds of the city was burned in 1912 during the revolutionary disturbances in China. The population, including that of the suburbs, is estimated at 1,500,000.

Irkutsk (*ĭr-kōōtsk'*). A commercial city of south central Siberia, situated near the south end of Lake Baikal. It has normally a large caravan trade from Mongolia and is one of the three important points on the Asiatic section of the Trans-Siberian railroad. The articles of commerce include tea, silk, porcelain, dried fruit, fur, and fossil ivory. Population, estimated at 130,000.

Jerusalem. The capital of Palestine, located at an elevation of 2500 feet between the Mediterranean Sea and the north end of the Dead Sea. In certain medieval maps, Jerusalem used to be marked as the center of the world. About it has centered the devotion of Christians, Mohammedans, and Jews. A Hebrew university was opened there in 1925.

The city is surrounded by ravines on three sides. The water and drainage facilities have been greatly improved since the city was occupied by the British in 1918. The streets are narrow, crooked, and dirty. The most prominent building of the city is the Mosque of Omar, standing on the site of Solomon's temple. The Church of the Holy Sepulchre and the Via Dolorosa are of interest for their connection with the crucifixion of Jesus. Population, 1922, 62,678.

Keijo. A city of the Japanese empire, situated near the center of the west coast of Chosen, of which it is the chief port and the capital. It is connected with the Trans-Siberian railroad. Silk, tobacco, mats, paper, and fans are made in the city. Keijo is often known as Seoul. Population, 1925, 297,465.

Kobe (*kō'bĕ*). A seaport and the third largest city of Japan, situated on the southern coast of Honshu island. It is the chief center of Japan's silk export trade. Prominent among the industrial establishments is an imperial shipbuilding yard. Population, 1925, 644,212.

Kyoto (*kyō'tō*). An inland commercial and industrial city of Japan, situated near the southern coast of Honshu island. Kyoto was formerly the capital of Japan and bears evidence of the fact in the regularity of its plan and in its magnificent monuments and temples. Its industries include the manufacture of porcelain, brocade, toys, metal products, and silk fabrics. The city is the seat of an imperial university. Population, 1925, 679,963.

Lassa (*lăs'ä*). The sacred city of the Lamaists, members of a widespread, ascetic sect of Buddhism. The city is situated in south central Tibet on a plateau having an altitude of 11,830 feet. Being forbidden to the uninitiated, Lassa was seen by no more than three Europeans before 1904, when the British forced an entrance. Just outside the city stands a most imposing residence of the head of the religious sect. Thousands of people each year make a pilgrimage to a life-sized image of Buddha standing in the chief temple. Monastic institutions house some 16,000 initiates. The remaining inhabitants, about two-thirds women, number approximately 10,000.

Madras. The third largest city of India, situated on the southeastern coast of the country. The chief industry is the manufacture of cotton goods. The city contains an ornamental park, many fine buildings and monuments, an observatory, museums, a university, and a number of colleges. Population, 1921, 526,911.

Mandalay. A city of central Burma, India, standing on the Irrawaddy river. There are a number of Buddhistic shrines, the most remarkable of which is the Kuthodaw, a square surrounded by 450 pagodas. Within each pagoda is inscribed a part of the Buddhist scriptures, the aggregate of the inscriptions constituting the whole of the sacred writings. A walled section of the city encloses Fort Dufferin, formerly a royal palace. Population, 1921, 147,429.

Mecca. The most sacred city of the Mohammedans and the capital of Hejaz and the Nejd, situated in a barren valley in the southern part of the country. It is about 50 miles inland from Jidda, its port on the Red Sea. Most of the inhabitants find support from lodging the pilgrims who, in numbers exceeding 100,000 annually, flock here from all parts of the Mohammedan world to visit the Sacred Mosque, which marks the birthplace of Mohammed. Different countries keep in Mecca agents charged with the entertainment and instruction of any of their countrymen who arrive as pilgrims. Population, about 70,000.

Medina. An inland city of central Hejaz, sacred to the adherents of Mohammedanism. Mohammed's flight there from Mecca in 622 A. D. marks the year in which the Mohammedan calendar begins. The prophet died in Medina, and a large mausoleum, said to contain his undecayed body, attracts numerous pilgrims. Population, about 15,000.

Mukden (*mōōk'dĕn'*). A city of southern Manchuria, China, located about 150 miles north of the Yellow Sea. It is a railroad junction and a point of convergence of several caravan routes. Near the city are the tombs of the Manchu emperors, who, in the 17th century, made Mukden their capital. Huge stone elephants stand on guard over the tombs. In the vicinity of Mukden was fought the decisive battle of the Russo-Japanese war. Population, estimated at 158,000.

Nagasaki (*nä'gä-sä'kē*). A commercial city of southwestern Japan, situated on the island of Kiushu. It has a capacious harbor, a large shipbuilding yard, and important marine engine works. Nagasaki was, prior to 1854, the only city of Japan open to foreign trade. Population, 1925, 189,071.

Nazareth. A town of northwestern Palestine, about 20 miles from the Mediterranean seacoast. It is memorable among Christians as the early residence of Jesus. A richly decorated basilica, the Church of the Annunciation, stands on what is said to be the site of the residence of Mary, the mother of Jesus, her house having been miraculously transported to Loreto, Italy. The town was captured from the Turks by Australian cavalry in 1918. Population, about 11,000.

Omsk. A city of southwestern Siberia on the Trans-Siberian railroad. It is a noted trading center for wheat and for dairy products. Population, 1926, 161,475.

Osaka (*ō'zä'kä*). The largest city of Japan, situated on Osaka bay in the southern part of the island of Honshu. Being intersected by the Yodo river and by numerous canals spanned by hundreds of bridges, the city has been styled the Venice of the East. Ironworks and a large government mint are among the more important industries. The city is regularly laid out and contains many notable temples. Population, 1925, 2,114,804.

Peking. The northern capital of China, about 80 miles west of the Gulf of Chihli, an inlet of the Yellow Sea.

Peking consists of an old city and a new city, usually called the outer city and the inner city. Each is surrounded by a wall, which, in one section, separates the two cities. The new city is larger and more populous. The old city contains a walled imperial city, within which lies the "purple forbidden city," the former palace and court of the emperor. These divisions are now traversed by a broad thoroughfare which passes through Peking from north to south.

The finest building in the old city is the famous Temple of Heaven. To the west of the city, on the so-called Mountain of Ten Thousand Ancients, stands the emperor's summer palace, near which, upon a lagoon, floats a marble boat, built as a pleasure house. The grounds contain the celebrated camel back bridge, and near by is a pagoda built of porcelain.

The city is connected by railroad with Russia. There are three universities, a number of technical and professional schools, and the oldest observatory in the world. Most of its equipment was removed to Berlin in 1900, but its restoration was stipulated by the Treaty of Versailles. Population, about 1,000,000.

Pichola. A small lake near Udaipur in central west India. Each of two small islands in the lake is enclosed by marble walls, within which is erected a marble palace. These marble palaces were built by rulers of Rajputana and exhibit a grace and elegance which are equaled in very few of the great buildings of the world.

Rangoon. A leading port of India, located in southern Burma about 21 miles from the Gulf of Martaban. The chief industrial establishments include lumber, rice, and oil mills, the products of which are exported in large quantities. Rangoon has a Buddhist pagoda, 370 feet high and covered with gold leaf, the foundation of which is said to have been laid in 588 B. C. This pagoda, called the Shoay Dagon, contains objects sacred to Buddhists and is annually visited by thousands of pilgrims. A university is situated in the city. Population, 1921, 339,527.

Shanghai. A large port and commercial city of east central China, situated on a small river about 12 miles from its mouth in the estuary of the Yangtze river. The chief manufactures of Shanghai are textiles and flour. In a suburb are located shipyards, dry docks, foundries, and engineering works. Shanghai is the chief center for printing in China. The well built foreign section, which has a promenade and a park along the river front, contains about 6000 English-speaking residents. The total population of the city is estimated at 1,538,500.

Singapore. The capital and chief port of the Straits Settlements, situated on the island of Singapore off the southern extremity of the Malay peninsula. The city is the smelting center for the immense amount of tin mined in the surrounding regions. More than half the block tin of the world is shipped from the port. Singapore is a British naval station of the first class and is strongly fortified. Population, 1921, 423,767.

Smyrna. A seaport and commercial city of west central Turkey, standing at the head of the Gulf of Smyrna, an inlet of the Ægean Sea. The rugs for which Smyrna is famous are made, for the most part, in the surrounding towns. Other articles of trade are silks, cottons, opium, olive oil, gums, and figs. Smyrna is connected by railroad with Constantinople.

Smyrna was assigned to the Greeks as a mandate in 1920. In 1922 the Greeks were driven out, and the city was put to flames. Population, estimated at 200,000.

Srinagar (*srē'nä-gŭr'*). The capital of the native kingdom of Kashmir in the northern extremity of India. In the picturesque scenery of the surrounding country was located the "Vale of Cashmere," celebrated in Moore's poem entitled *Lalla Rookh*.

Tai Shan. A sacred mountain about 120 miles southwest of the Gulf of Chihli, an inlet of the Yellow Sea. On its summit are several temples, beneath one of which Confucius is said to have been buried. Each year during February and March as many as 10,000 pilgrims in a single day ascend to the summit, 4700 feet in height. The ascent is facilitated by a six-mile mountain road, paved and provided with steps in the more precipitous stages.

Teheran (*tĕ-h'rän'*). The capital of Persia, lying on an elevated plain in the north central part of the country about 66 miles south of the Caspian Sea. Manufactures include rugs, silks, cotton goods, and ironware. It has a citadel, called the Ark, within which is the handsome palace of the shah. Population, about 350,000.

Tiflis. The capital and largest city of Transcaucasia, situated midway between the Black Sea and the Caspian Sea. It is the distributing center for the country and contains a church said to date from the 5th century. Population, 1926, 282,918.

Tokyo. The capital and second largest city of Japan. It stands at the head of Tokyo bay near the center of the eastern coast of Honshu island.

The city was largely destroyed in 1923 by earthquake and fire, which laid waste 25 square miles. This catastrophe provided the opportunity for rebuilding according to modern plans. The streets were widened, at the cost of moving some 200,000 houses; sewers were installed; public school playgrounds were enlarged; and a subway for rapid transit was constructed. In use of electricity, Tokyo compares favorably with many western cities.

The chief of the city's many parks is called Tukiage, which contains the palace of the emperor built in a mixed Japanese and European style of architecture. The University of Tokyo is an institution of higher learning of the most advanced type. The eastern portion of the city contains regions known to visitors for their display of flowers. Here, too, is the temple of E-ko-in, where matches are held in jujutsu, the type of wrestling for which Japan has become known. Industries are carried on mainly in the suburbs. In order to obviate the danger of earthquakes, buildings are low or else of re-enforced concrete construction. Population, 1925, 1,995,567.

Trans-Siberian Railroad. A railway line passing through southern Siberia and connecting European Russia with Vladivostok on the Sea of Japan. About 4500 miles of the road is in Siberia. Its cost was over 172 million dollars. The construction, occupying 11 years, was completed in 1902. The line provided the sole means of importation for Russia during the World War when her European ports were icebound.

Victoria. The capital of the British island of Hongkong, by which name it is sometimes called. Victoria is a free port and the center of British commerce with China and Japan. Its total trade in 1920 amounted to nearly 1½ billion dollars. The city is also an important British naval station. The population of the island of Hongkong in 1921 was 625,166, all but 12,856 being Chinese.

Vladivostok (*vlä'dyĭ-vŏs-tŏk'*). The chief Pacific Ocean port of Russia and the eastern terminus of the Trans-Siberian railroad. The city is situated in the extreme southeastern part of Siberia, in the vicinity of valuable iron deposits. Most of the commerce is in the hands of Chinese. Population, 1926, 102,454.

Wrangell (*răng'gĕl*) **Island.** An island in the Arctic Ocean about 110 miles north of Siberia and 400 miles northwest of Bering strait. It is about 80 miles long and 35 miles broad and has a rugged surface with a maximum elevation of 2000 feet. The island is named after Baron Wrangel, a Russian navigator who went in search of land in that vicinity in 1821. It was claimed for Great Britain in 1849, for the United States in 1881 by Hooper, and, as the former claims had lapsed because of a failure to occupy the island, it was claimed in 1921 for Canada by a party under Crawford. This party, consisting of one Canadian and three Americans, was stranded on the island and a relief expedition, sent in 1923, arrived only to find that the whole party had perished.

Yokohama. The chief seaport of Japan, situated on Tokyo bay near the center of the western coast of Honshu island. The harbor is elaborately improved. The city is of recent growth, having sprung up in the past 60 years as a result of foreign commerce. The chief export is silk. Yokohama was the first Japanese port open to foreigners and it is still the headquarters for most tourists who visit Japan. It suffered a major disaster in 1923, when earthquake, fire, and flood wiped out a large part of the city. Population, 1925, 405,888.

COMMERCE OF PRINCIPAL WORLD PORTS*

Country and Port	Year	Vessel Tonnage †		Imports‡	Exports‡	Total Commerce
		Entered	Cleared			
				Dollars	Dollars	Dollars
Africa						
Egypt:						
Alexandria	1926	4,643,717	4,671,861	210,823,096	203,164,833	413,987,929
America						
Argentina:						
Buenos Aires	1921	4,381,200	.....	199,400,000	187,498,000	386,898,000
Brazil:						
Rio de Janeiro	1925	9,348,804	9,389,657	169,062,720	83,600,988	252,663,708
Santos	1925	6,599,412	6,641,280	156,973,008	267,441,934	424,414,942
Canada:						
Montreal	1926	3,658,461	3,715,639	192,662,298	238,553,379	431,215,677
Chile:						
Antofagasta	1925	1,620,817	1,274,691	20,905,662	48,926,983	69,832,645
Iquique	1925	1,522,795	1,319,052	11,838,310	44,281,237	56,119,547
Valparaiso	1925	1,357,451	1,165,663	76,399,330	5,015,497	81,414,827
Cuba:						
Havana	1926	6,862,132	6,619,165	181,081,456	61,879,622	242,961,078
Mexico:						
Tampico	1925	6,513,886	6,367,831	32,997,889	198,044,933	231,042,822
Vera Cruz	1925	811,114	595,048	53,122,963	35,700,881	88,823,844
Peru:						
Callao	1926	2,620,016	2,624,069	40,622,047	23,277,070	63,899,117
United States:						
Baltimore	1926	4,132,000	3,767,000	106,241,000	129,348,000	235,589,000
Boston	1926	3,783,000	2,511,000	305,879,000	41,283,000	347,162,000
Buffalo	1926	3,087,000	1,407,000	125,668,000	191,676,000	317,344,000
Galveston	1926	2,373,000	3,410,000	38,906,000	533,825,000	572,731,000
New Orleans	1926	5,421,000	4,843,000	238,805,000	413,793,000	652,598,000
New York	1926	20,575,000	20,427,000	2,224,964,000	1,662,538,000	3,887,502,000
Philadelphia	1926	3,134,000	2,354,000	195,823,000	97,005,000	292,828,000
San Francisco	1926	1,759,000	2,125,000	210,139,000	186,773,000	396,912,000
Seattle	1926	5,536,000	6,031,000	261,880,000	147,570,000	409,450,000
Uruguay:						
Montevideo	1924	10,273,065	10,217,422	49,029,767	72,602,084	121,631,851
Asia						
British Colonies:						
Bombay	1926	2,452,221	1,949,108	288,099,605	373,455,134	661,554,739
Calcutta	1925	1,510,723	2,231,330	287,985,399	469,739,004	757,724,403
Hong Kong	1924	17,442,412	17,797,426	318,710,746	281,251,565	599,962,311
Singapore	1925	12,014,767	11,989,959	549,162,077	485,852,811	1,035,014,888
China:						
Canton	1926	5,324,322**	.....	50,985,814	34,329,061	85,314,875
Shanghai	1926	33,323,429**	.....	452,785,552	274,682,054	727,467,606
Tientsin	1926	4,825,775**	.....	64,078,029	46,006,340	110,084,369
Japan:						
Kobe	1926	13,598,100	13,529,067	495,899,434	320,737,383	816,636,817
Osaka	1926	5,063,344	4,879,823	132,402,909	197,079,077	329,481,986
Yokohama	1926	9,515,476	9,322,154	301,398,229	358,281,599	659,679,828
Philippine Islands:						
Manila	1926	3,454,158	2,790,349	153,321,782	75,066,507	228,388,289
Europe						
Belgium:						
Antwerp	1924	18,980,939††	19,233,824††	701,712,784	580,472,714	1,282,185,498
France:						
Bordeaux	1924	2,723,222	2,047,241	109,741,335	101,613,511	211,354,846
Havre	1924	4,844,873	4,768,147	357,671,389	243,447,182	601,118,571
Marseille	1924	9,195,290	9,228,304	293,921,388	377,116,370	671,037,758
Germany:						
Bremen	1926	3,379,000	3,700,000	2,212,996‡‡	2,482,752‡‡	4,695,748‡‡
Hamburg	1926	15,730,000	15,947,000	10,253,418‡‡	10,016,495‡‡	20,269,913‡‡
Italy:						
Genoa	1926	4,250,779	3,800,101	4,001,798‡‡	320,599‡‡	4,322,397‡‡
Naples	1926	2,447,804	2,351,934	872,168‡‡	98,288‡‡	970,456‡‡
Russia:						
Leningrad		.....	.....	.....	.....	.....
Spain:						
Barcelona	1918	712,000	936,000	65,541,000	73,602,000	139,143,000
United Kingdom:						
Glasgow	1925	4,119,668	4,979,966	166,403,839	256,167,174	422,571,013
Hull	1925	4,768,911	4,260,854	363,408,404	192,328,210	555,736,614
Liverpool	1925	13,590,951	12,687,494	1,381,905,880	1,417,369,240	2,799,275,120
London	1925	18,251,969	16,107,060	2,405,047,368	1,194,614,168	3,599,661,536
Manchester	1925	3,069,819	2,582,782	347,036,660	211,425,350	558,462,010
Southampton	1925	9,274,060	9,263,653	211,501,416	238,055,421	449,556,837
Oceania						
Australia:						
Melbourne	1925	642,868	.....	249,931,047	164,932,501	414,863,548
Sydney	1925	1,240,271	.....	301,669,849	271,825,461	573,495,310

* From latest available statistics from Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, covering the information given for the years 1924, 1925, and 1926. For Barcelona and Buenos Aires, the most recent authoritative figures are for the earlier years specified. Items left blank indicate statistics not obtainable. † Entrances and clearances of vessels engaged in foreign trade in net registered tons. ‡ Values reduced to United States money at average exchange rates. ** Entered and cleared. †† Figures in net tons by Moorsom measurements; about 10 per cent larger than standard net tonnage. ‡‡ Merchandise in tons of 2240 pounds.

AFRICA

THE second largest continent of the world, situated in the eastern hemisphere south of Europe and southwest of Asia, with which it is connected by the Isthmus of Suez. Apart from this isthmus, 75 miles wide at its narrowest part, the continent is entirely surrounded by water. It is separated from Europe by the Mediterranean Sea, an inland body of water which narrows to a width of nine miles at the Strait of Gibraltar. Between Africa and Asia, lie the Red Sea and the Gulf of Aden connected by the Strait of Bab el Mandeb. The Atlantic Ocean on the west and the Indian Ocean on the east meet at the southern point of the continent.

Africa lies farther to the north than South America. In length, the continent is almost equally divided between the northern and the southern hemisphere. On account of its shape, however, about two-thirds of Africa's surface lies north of the equator. Its most northern point is in the latitude of Washington, D. C., and it extends nearly 5000 miles south to the approximate latitude of Buenos Aires. It has an area of about 11,500,000 square miles, being about 1⅓ times as large as North America and second only to Asia in extent.

Outline. As in the case of South America, the maximum width of the continent is in the north. By reason of a huge western extension, Africa attains a width of 4600 miles, just 400 miles less than its length. Between the western extension and the southern portion of the continent, lies the Gulf of Guinea. The only other major indentation is the Gulf of Sidra near the center of the northern coast. On the eastern coast, Somaliland projects as a cape, separating the Gulf of Aden from the Indian Ocean. The coast line is remarkably regular and, consequently, affords very few good harbors.

Africa is notable for its lack of important islands. Most of the smaller ones are of volcanic origin, and Madagascar, the one large island of the continent, does not belong to the same land formation. Madagascar lies about 300 miles off the southeastern coast. The smaller islands include Madeira islands, Canary islands, Cape Verde islands, Ascension island, and Saint Helena island, all of which are off the west coast. To the east of the continent lie Zanzibar, Mauritius island, and Socotra island.

Surface. Africa is, for the most part, a plateau surrounded by a very narrow strip of coastal lowlands. The southern and the eastern parts of the plateau are higher than the western and the northern parts. The latter contain certain sections, in the interior of the Sahara desert, where the elevation is that of the sea level or even less. The continent has no central highland comparable to the region of the Rocky mountains in North America.

In the extreme southern part of the continent, a ridge rims the plateau, rising, on the eastern side, to a height of nearly 9000 feet. The east central part of the continent consists of a wide, irregular highland cut longitudinally by the so-called Great Rift valley, which contains lakes rivaling in size the Great Lakes of North America. Lake Victoria is the largest, being second only to Lake Superior in area. Lake Tanganyika, farther south, is the longest lake in the world, having a length of 400 miles. Lake Nyasa, the most southern of the group, has the extraordinary depth of 2580 feet. In this region are to be found also the highest mountains of the continent, usually rising abruptly from the surface of the plateau. Mount Kibo, situated about 200 miles south of the equator and 200 miles from the east coast, reaches an altitude of 19,456 feet. Mount Kenia and Ruwenzori mountain are other notable peaks of the district. Continuing northward, the highland narrows to form the lofty, mountainous region of Abyssinia. An elevated ridge skirts the Red Sea as far as the Isthmus of Suez.

The mean level of the northern and the western parts of Africa is below 2000 feet. Isolated mountain ridges, however, occur in various parts. The highest is the Atlas range at the extreme northwest, running parallel with the coast and attaining to an altitude of 14,000 feet. A broken range trends in a northwest and southeast direction across part of the north central region of the continent. Other noteworthy elevations are found near the northern coast of the Gulf of Guinea.

Drainage. The absence in Africa of a pronounced continental divide has had the effect of producing two kinds of rivers. Those on the outer slopes of the continental plateau are short and rapid, while those rising in the interior follow a long, winding, inland course. Then, penetrating the mountain rim, they make their way over cataracts and through narrow channels to the sea, where a sand bar is often formed by sediment carried down the stream. Rivers which have not sufficient volume to enable them to cut their way to the sea form basins of inland drainage. In no case is there a large navigable waterway by which easy access may be had to the interior of the continent. It is due especially to this fact and to the scarcity of harbors that the exploration of Africa has been deferred until recent decades.

The four largest rivers of Africa are the Nile, the Congo, the Niger, and the Zambezi. The basins of inland drainage, which occupy more than three million square miles in northern Africa, are usually too arid to give rise to large bodies of water. There is a notable exception, however, in the case of Lake Chad.

The Nile is, next to the Mississippi-Missouri, the longest river of the world. Rising in a stream that flows into Lake Victoria, it wends its way northward, and, after passing over six cataracts and traversing a distance of 4000 miles, it empties through a large delta by seven mouths into the Mediterranean Sea. Its lower course lies through the desert region of Egypt, a strip of which it renders productive by means of its annual flood. The river is navigable about 590 miles above its delta to the foot of the first cataract at Assuan and, with interruptions, for a distance of 1550 miles farther toward the source.

The Congo river is the second river of the world in volume of water discharged and in the area of its basin. By means of numerous tributaries, of which the Ubangi is the largest, the Congo drains a tropical basin of central Africa in a general westward direction and discharges its waters into the Atlantic Ocean through a mouth ten miles in width. Its eastern reaches, affluents of Lake Tanganyika, are within a few miles of the source of the Nile. The river admits of navigation, with some interruptions, for a distance of 2000 miles above its mouth.

The Niger river offers greater facilities for navigation than any other river of Africa. It drains a comparatively low plain in Africa's westward extension. Rising within a few hundred miles of the Atlantic coast, it flows inland toward the northeast, then, bending southeast, it follows a meandering course to an immense delta on the Gulf of Guinea.

The Zambezi river rises on a ridge near the west coast of southern Africa, and flows eastward across the continent to Mozambique channel. Near the middle of its course, it plunges over Victoria falls, the greatest cataract in the world. Here, over a width of a mile, the river drops 343 feet. During the flood season, the volume of water going over the falls is greater than that of the Niagara cataract. Below the falls a dense vapor rises, which has suggested for it a native name meaning thundering smoke.

Southern Africa contains two other rivers of note—the Limpopo river, flowing into the Indian Ocean, and the Orange river, draining westward to the Atlantic Ocean.

Lake Chad, situated about 850 miles northeast of the head of the Gulf of Guinea, has no outlet. During the rainy season, it occupies an area of about 40,000 square miles, but, being very shallow, it diminishes during the dry season to one-sixth of this area. It is said to be drying up, just as other lakes of the Sahara Desert region have done in the past, leaving "salt pans" as evidence of their former existence.

Climate. Africa extends almost equal distances north and south of the equator. It is, therefore, subject to a smaller variation in temperature than any other large division of land. At the extreme north and at the extreme south, there are belts of temperate or subtropical climate. Between these limits the heat is greater, although, on account of the elevation, the highest temperatures are not recorded at the equator but in the lower parts of the great Sahara desert.

The rainfall is greatest in the basin of the Congo. On each side of this equatorial belt of abundant and well distributed rainfall, stretches a zone in which the rainfall is seasonal, a short, wet season being followed by a long, dry one. These two zones pass gradually into the two great desert areas of the continent, Kalahari desert in southern Africa and the Sahara desert in the north. Beyond these arid regions, in the extreme north and in the extreme south of Africa, there are narrow coastal lowlands having a moderate, or even a copious, rainfall.

The Sahara Desert is the largest continuous arid region of the world. Its area, about 3,500,000 square miles, is larger than that of the United States. It occupies all that part of northern Africa from the Atlas mountains on the northwest to the midcourse of the Nile river on the southeast. It is a part of the dry belt stretching across Asia and Africa, the aridity of which is caused mainly by the trade winds. The small amount of rain which does fall occurs in one season only and, as a rule, sinks immediately into the sand to issue here and there as springs. These springs foster islets of vegetation, known as oases, which are estimated to cover one-fortieth of the desert's surface A considerable portion of the surface exhibits a rocky formation, especially where the desert is partially traversed by a broken range of mountains. The remainder is a shifting, sandy waste, swept by scorching winds. These winds, called simooms, frequently attain to a great violence and carry clouds of sand dense enough to suffocate men or animals caught without shelter. There are several depressions in the Sahara desert which are lower than sea level. They are usually salt marshes or oases rendered productive by springs from the surrounding hills. The deepest of these depressions is estimated to be 440 feet below the level of the sea.

Vegetation. The plant life of Africa varies in a manner determined mainly by the rainfall. The extreme northern section has a flora resembling that of Europe. The forests in this part consist largely of oaks, while the olive, vine, fig, and the cereals of Europe thrive. The extreme southern region, being comparatively isolated, has a characteristic vegetation marked by the prevalence of heaths and of other plants producing brilliant flowers. Forests are scarce, but there is abundant pasturage for sheep.

The deserts have little vegetation. Thorny acacias, however, and stunted plant forms occur, except on the shifting dunes. In the northern part of the Sahara desert, the esparto, or alpha, covers considerable areas. The date palm is found in dense groves at the oases and in the valley of the Nile river. The regions of seasonal rainfall are broad, grassy plains, or savannas, which stretch over most of Africa between the semiarid land bordering the deserts. Here grow the baobab, or monkey-bread tree, a candelabra-like euphorbia, and the watermelon, all characteristically African forms of vegetation. The equatorial belt, except in the eastern highlands, is covered with dense tropical forests. These forests contain an immense variety of trees, including the wine palm, the oil palm, the silk-cotton tree, and the camwood, besides ebony, mahogany, and many other valuable cabinet wood trees.

Forests are found also in parts of the eastern coast and on the sides of mountains where the temperature is equable and the rainfall is well distributed throughout the year. On the mountain sides and extending above the true forests are thickets of bamboos, replaced still higher by tree lobelias and by shrubby senecios.

Among the native cultivated plants are yams, sweet potatoes, bananas, peanuts, and millet. Manioc and Indian corn have been introduced and are used as staple foods by the inhabitants. Along the Gulf of Guinea coast, cacao is cultivated more extensively than anywhere else in the world. Coffee is a native African plant, having received its name from Kaffa, a district in the east central part of the continent.

Animals. Africa is the home of many distinctive types of animals, including a number of large mammals. The giraffe, okapi, hippopotamus, gorilla, and chimpanzee are among the more notable of African mammals which occur nowhere else. Lions, leopards, two-horned rhinoceroses, zebras, antelopes, and African buffaloes are representative of the large animals which attract hunters. The conservation of such animals was, in 1900, made the subject of an international conference, as a result of which game preserve areas were established in British Africa, Somaliland, and other countries. The African elephant is hunted for its ivory tusks, which for centuries have been brought from the interior of Africa by caravans and still constitute one of the characteristic commercial products of the continent. The guinea fowl and several species of hyenas are native to the continent.

The ostrich is found in the drier regions. In South Africa, it is reared on farms for the sake of its feathers. Other birds of note are the honey guide,—so called because of its peculiar habit of leading its pursuers to beehives,—the marabou stork, and the secretary bird, the last named being valued for its practice of feeding on serpents. Our domesticated parrot is a native of Africa, where its flesh is sought as a food by the natives. Crocodiles are found in the large rivers and in the tropical lakes. The insects are numerous. They include the formidable white ant and the deadly tsetse fly. One species of the latter has a bite fatal to cattle, and another species is a carrier of the sleeping sickness, which, for the white race, makes the greater part of equatorial Africa the most unhealthful region of the world.

A European type of fauna characterizes the extreme north, where the bear, the jackal, and the fox are found. The wild ass of east central Africa is said to be the ancestor of the domesticated ass. Camels were introduced very early into the northern desert regions from Asia. In Egypt, the inhabitants anciently regarded as sacred the ibis, the crocodile, and the cat, the last being an ancestor of our domestic cat. Cattle, sheep, and goats are raised where the climate and the vegetation are suitable.

Minerals. Africa produces nearly all of the world's supply of diamonds and more than one-third of the world's yearly output of gold. South Africa is the region most productive of both minerals, although gold is also obtained from the Gulf of Guinea region and elsewhere. Some of the richest copper deposits in the world exist west of the great interior lakes, and iron has from the earliest times been obtained and worked by the natives. Salt is abundant.

Inhabitants. The most northern and the most southern regions of Africa are the only parts inhabited by societies of a civilized type. The remainder contains a variety of races differing in origin, language, appearance, and in means of subsistence.

The Pygmies of the equatorial forests and the Bushmen of the southern arid districts are believed to represent the earliest African races extant. They live by hunting; their dwellings are of the most primitive type. The Hottentots stand, in culture, as in location, between the Bushmen and the Bantus. The Bantus constitute the southern half of a negroid race which inhabits most of Africa from the region of the great lakes northward to the Sahara desert. The Bantus have a greater unity of language than the true Negroes. Both practice a primitive form of agriculture, with which the Bantus combine stock raising where the climate and the insects permit. The Bantus drink milk and live in round huts, while the Negroes have rectangular huts and use bark instead of skins for clothing. The native iron industry is widespread, some authorities even believing the use of iron to have originated from the African races. For some centuries, the Negro races formed the chief source of slaves. They were taken to various Mohammedan countries and, especially, to America, where, after the abolition of slavery, they continued to thrive. The West Indies, in fact, contains, with the exception of Liberia, the only Negro state which is still an independent country, namely, Haiti.

North of the true Negroes, the population has a miscellaneous complexion, consisting of races which are not aboriginal inhabitants of the continent. These races include Europeans, Arabs, Turks, Berbers, Hamites, Semites, and Libyans.

The total population of the continent is estimated at 130 million. The majority live under tribal organizations of a more despotic character than those found among the American Indians. Slavery persists in some sections. Polygamy is widespread. Magic is a powerful influence in the native religions. It is estimated that less than half the population has been affected by religions of foreign origin. Of this proportion by far the most are Mohammedans. The Christian population is believed to be less than 4 per cent of the total, even with the inclusion of the members of the Coptic sect, a heretical form of Christianity which arose in northern Africa in the 4th century.

Discovery. The valley of the Nile river was the seat of what is perhaps the world's earliest civilization. The interior of the continent, however, remained unknown until the 19th century and the work of exploration is still far from completion.

As early as the 7th or 6th century B. C. a Phœnician ship sailed around Africa. The possibility of circumnavigation, however, was forgotten until 1486, when the Cape of Good Hope was rounded by Diaz.

Numerous early attempts were made to penetrate the interior of Africa. Herodotus in the 5th century B. C. and a party sent out by Nero in the 1st century A. D. tried to solve one of the standing riddles of the ancient world by tracing the Nile river to its source. The solution was delayed, however, until the year 1876, when the explorations of Colonel Speke and of many others enabled geographers to fix with certainty the origin of the Nile. The first European to cross Africa from ocean to ocean was David Livingstone, who completed the journey in 1856. More recently, our knowledge of the "dark continent" has been increased by missionaries and by international commissions, the latter being sent in for the purpose of fixing boundary lines between spheres of influence claimed by various European powers.

The Sahara desert, which for centuries constituted an effective barrier to travel into central Africa from the north, is still one of the least-known parts of the world. A new map of this region was published in 1923 by the French government, by whom an expedition had been sent out previously to make a survey of the region. Floyd Gibbons, a correspondent of the *Chicago Tribune*, made a journey through this desert from end to end in 1923.

POLITICAL DIVISIONS

The last quarter of the 19th century witnessed the partition of Africa into protectorates and colonies of various nations of Europe. Great Britain, France, Germany, Italy, Portugal, Spain, and Belgium were the most active in the division. As a result of the World War, the German portions were transferred to other powers. Egypt, formerly under British rule was granted independence by an act passed in 1922. Other independent countries are Abyssinia and Liberia. The Union of South Africa is an autonomous British dominion.

Abyssinia. An independent country of east central Africa, having an area of 350,000 square miles. The country has no coast line, communication with Jibuti, on the Gulf of Aden, being provided by a French railroad, of which 495 miles are in Abyssinia.

The population is of Semitic origin and is estimated at 11,500,000, of whom the majority are Mohammedans. The ruling class, however, consists of Coptic Christians. Domestic slavery is a recognized institution, although traffic in slaves is prohibited. The chief occupations are stock raising, beekeeping, and the cultivation of grains, fruits, and coffee. Caravans do a large trade in the high, mountainous region of the interior. The foreign commerce is small and is carried on mainly with Great Britain and the United States. Domestic trade frequently takes the form of barter, although silver and copper coins are in use and bars of rock salt are also accepted as money. Abyssinia's capital is Addis Ababa, a collection of villages. The country is also called Ethiopia.

Belgian Congo. Belgium's only African possession, a colony occupying a large part of central Africa and having access to the sea by means of a coast line on the estuary of the Congo river. Its area is 909,654 square miles, supporting a native population of about 8,500,000. The European inhabitants in 1925 numbered 12,795.

The colony occupies the greater part of the Congo River basin and has a moist, tropical climate. Most of its area is covered by dense forests, in which live many of the Pygmy tribes. Rubber, nuts, palm oil, resin, and cocoa are the chief products of the country. Cattle thrive in the eastern highlands, but elsewhere the tsetse fly abounds, the bite of which is fatal to the live stock. Gold, diamonds, and, more especially, copper exist in great abundance, and, in 1920, ores of the two metals were exported in important quantities. Practically all the world's radium comes from Belgian Congo. Most of the trade is with Great Britain. The capital and chief port is Leopoldville, on the estuary of the Congo. This city lies on the transcontinental water and rail route connecting with Dar-es Salaam on the Indian Ocean.

British Africa. British colonies in Africa, while not larger, are nevertheless richer than the African possessions of any other nation. If Egypt, over which Great Britain has special rights, and the Union of South Africa are included, British territory extends from the northeastern extremity of Africa throughout the whole length of the continent on the eastern side to the Cape of Good Hope at the extreme south. An all-British railway is planned, which, upon completion, will traverse this territory from Cairo in the north to Cape Town in the south. Various sections of this "Cape to Cairo" railway are already constructed.

The colonies and protectorates within this African belt of British territory are as follows, given in order from north to south: Anglo-Egyptian Sudan, Uganda, Kenya, Tanganyika, Northern Rhodesia, Nyasaland, Southern Rhodesia, Bechuanaland, Swaziland, and Basutoland. For the area, population, and capital of each of the divisions of British Africa see the table of the *British Commonwealth of Nations*.

Great Britain possesses, to the east of the central belt, the Somaliland Protectorate on the Gulf of Aden; Socotra, an island about 180 miles east of the Somaliland peninsula; Zanzibar and Pemba, two fertile coral islands about 20 miles off the center of Tanganyika's coast; the Seychelles, a fertile, well watered group of 90 islands, about 900 miles east of Zanzibar; and Mauritius, a sugar producing island, lying some 500 miles east of Madagascar. The British territory in the west of the continent embraces British Cameroon and Nigeria, at the head of the Gulf of Guinea; British Togoland and Gold Coast, on the northern shore of the Gulf of Guinea; Ashanti and the Northern Territories, lying directly north of Gold Coast; Sierra Leone, lying farther west on the Atlantic coast; Gambia, a narrow British wedge stretching back from an Atlantic seacoast into French West Africa; Ascension island, lying 1600 miles southwest of Nigeria; and Saint Helena, the lonely island where Napoleon spent his last days, 1050 miles off the coast of South West Africa.

The commercial products drawn from these numerous regions exhibit a great diversity. The Anglo-Egyptian Sudan produces most of the world's supply of gum arabic. Live stock products, cotton, cocoa, gold, rubber, palm tree products, ivory, spices, tropical fruits, and coconuts are prominent among the exports. The actual production, however, is negligible compared with the value of products which, in time, the territories may be made to yield.

The total area of British Africa is 3,831,831 square miles, upon which lives a population estimated at 49,700,588. From these totals are excluded the Union of South Africa and the territory of South West Africa, held by the Union under a mandate.

Egypt. An independent country, situated in the extreme northeast of Africa. Its area is about 383,000 square miles, most of which is arid and unproductive. The population, numbering 14,168,756 in 1927, is almost entirely concentrated in the fertile valley of the Nile river, and is devoted principally to agriculture. The chief crop is cotton, in the production of which Egypt ranks third among the countries of the world. The cotton exports in 1921 were valued at about 140 million dollars. The papyrus plant of Egypt was used in the making of paper more than 4000 years ago. Today, however, Egypt imports practically all her paper.

The productivity of the Nile River valley is due to the annual flooding of the river banks. The area of cultivation has been greatly extended by the construction of irrigation works, consisting of canals, of several barrages, and of the great Assuan and Sennar dams, each over a mile in length.

Southern Egypt has a dry, healthful climate, which makes it desirable as a resort for tourists. A further attraction is found in the pyramids, the sphinx, various tombs, and other remains of the ancient civilization of the Nile. The northeastern extremity of the country has one of the world's two most celebrated ship canals, the Suez, which connects the Mediterranean Sea with the Red Sea.

The native inhabitants are called fellahs. They are mostly Mohammedan in religion. A sect of Christians, called the Copts, traces its ecclesiastical origin back to the 4th century.

French Africa. The French colonial empire in Africa exceeds in area the African possessions of any other country. It occupies a huge block of territory, comprising nearly the whole of Africa's western extension and stretching as far east as the upper reaches of the Nile system and as far south as the Congo river. In addition, France governs the island of Madagascar and French Somaliland, a small territory at the head of the Gulf of Aden. The extensive territory in the west is divisible into three regions. These are the northern Berber states, the southeastern section, called French Equatorial Africa, and the remainder, called French West Africa.

The northern section, embracing Tunis, Algeria, and Morocco, is geographically akin to Europe. The chief exports are wine, olive oil, cork, timber, grains, eggs, fish, and fruits. The native population consists of Arabs and Berbers, and there are several Moslem universities. French, Arabic, Berber, and Spanish are spoken.

French Equatorial Africa, formerly called the French Congo, is drained by the northwestern affluents of a part of the Congo river. To the colony is attached French Cameroon, held as a mandate.

French West Africa consists of eight colonies and one mandate, having as a hinterland the great Sahara desert. They occupy most of the basin of the Niger river. Agriculture and cattle raising are the principal industries of the colonies, although some minerals are produced. The chief exports are palm oil, palm nuts, rubber, cacao, cotton, timber, peanuts, hides, gums, and cattle. The total railroad mileage in 1922 amounted to 1658. In charge of the whole region is a governor-general, who is represented by a lieutenant-governor in each colony.

France's island possessions in Africa include Madagascar, to which are attached, for administrative purposes, Mayotta, the Cormoro, and other islands. Reunion and a few smaller islands are also under French administration. Agriculture and cattle raising are the principal industries, although gold, silver, iron, and other minerals are produced. The chief exports are gold, cattle, bark, manioc, hides, rice, and rubber.

The following table shows the divisions of French Africa with the capital, area, and approximate population of each. The subdivisions of each group are arranged according to geographic position from west to east.

Division	Seat of Government	Area	Population
Berber states:			
Morocco, French	Rabat	219,540	5,400,000
Algeria	Algiers	222,180	5,802,464
Tunis	Tunis	50,000	2,095,090
French West Africa:	Dakar		
Mauretania	Saint Louis	347,400	261,746
Senegal	Saint Louis	74,112	1,225,523
French Guinea	Konakry	95,218	1,875,996
French Sudan	Bamako	617,600	2,474,589
Ivory Coast	Bingerville	121,976	1,545,680
Upper Volta	Ouagadougou	154,400	2,974,142
Togoland (mandate)	Lome	21,200	800,000
Dahomey	Porto Novo	42,460	842,243
Territory of the Niger	Zinder	347,400	1,084,043
Sahara desert*		1,500,000	450,000
French Equatorial Africa	Brazzaville	982,049	6,370,000
Cameroon (mandate)	Yaounde	166,489	2,750,000
French Somaliland	Jibuti	5,790	208,000
Madagascar	Antananarivo	228,000	3,613,341
Reunion	Saint-Denis	970	173,190
Total		5,196,784	39,946,047

* Portion not included in other dependencies.

Italian Africa. Italy has three African dependencies—Italian Libya, Eritrea, and Somaliland Protectorate.

Italian Libya, formerly called Tripoli, lies directly across the Mediterranean Sea from Italy. It has an area of 406,000 square miles, occupied by about one million inhabitants. The section along the sea and the oases farther inland yield dates, olives, figs, and other characteristic products of northern Africa. The colony is directly under the administration of the Italian secretary for the colonies. The largest city is Tripoli, with a population of about 73,000.

Eritrea is a strip of land along the southwestern coast of the Red Sea. It has an area of 45,800 square miles and a population of 405,681. Cattle raising is the chief occupation. The capital is Asmara.

Italian Somaliland lies along the coast of the Indian Ocean and stretches from the Gulf of Aden south to the British colony of Kenya. Its area is 139,430 square miles, and it has a population of about 650,000. Stock raising and agriculture are the chief industries. The capital is Mogadishu.

Liberia. A Negro republic, occupying the southwestern extremity of Africa's western extension. The area is about 40,000 square miles, supporting a population estimated at more than 1,500,000. The low, unhealthful coast regions are inhabited by the more progressive part of the population, including about 12,000 descendants of freed slaves from the United States; the interior is occupied by uncivilized tribes. With the exception of Haiti, in the West Indies, Liberia is the only independent Negro country in the world. The capital is Monrovia.

Portuguese Africa. The continental empire of Portugal in Africa consists of three colonies. Portuguese Guinea is near the extreme western part of the continent. Angola, on the Atlantic coast, and Mozambique, fronting the Indian Ocean, are in South Africa, separated from each other by the British territory of Northern Rhodesia. Rubber and palm oil are exported from Portuguese Guinea and from Angola, the latter producing also coffee and dried fish. Sugar is exported from Mozambique. Part of Mozambique is governed by a commercial company holding a royal charter that gives sovereign rights to the holder until 1941.

Among the islands of Africa, the Cape Verde group, Saint Thomas, and Prince's island are Portuguese dependencies. The Madeira islands are governed as a province of Portugal. Saint Thomas and Prince's island produce a large proportion of the world's supply of cocoa.

The following table gives the capital, the area, and the population of each of the divisions of Portuguese Africa:

Division	Capital	Area	Population
Madeira islands	Funchal	314	170,000
Cape Verde islands	Praia	1,480	149,793
Portuguese Guinea	Bolama	13,940	289,000
Prince's island and Saint Thomas	Saint Thomas	360	58,907
Angola	Loanda	484,800	2,124,361
Mozambique	Lourenco Marques	428,132	3,120,000
Total		929,026	5,912,061

South West Africa. The region, about 322,400 square miles in area, lying on the Atlantic coast of Africa north of the Union of South Africa and attached to the Union as a mandate of the League of Nations. It is arid or semiarid. The staple industry is the production of diamonds, which are found in alluvial deposits along the coast. The population is estimated at 227,000.

Spanish Africa. The possessions of Spain in Africa consist of two sections of Morocco, called Spanish Morocco and Ifni; the Rio de Oro on the Atlantic coast to the southwest of Morocco; Rio Muni, or Spanish Guinea, on the eastern coast of the Gulf of Guinea; and the Canary islands, which, for administrative purposes, are regarded as a part of Spain. These islands are partly European in flora. They produce three or four crops of grain and fruit annually. The canary bird is a native of the group. The island of Fernando Po, which, politically, forms a part of Rio Muni and contains its capital, is one of the most fertile spots on the west coast of Africa. Spanish Morocco has not yet been completely occupied by Spain on account of the hostility of the natives, who, in 1921, inflicted a disastrous defeat on the Spaniards.

The following table gives the capital, the area, and the population of each of the political divisions of Spain's possessions in Africa.

Division	Capital	Area	Population
Spanish Morocco		7,700	600,000
Ifni		965	20,000
Rio de Oro	Villa Cisneros	109,200	495
Rio Muni with islands	Santa Isabel	9,484	91,090
Canary islands	Santa Cruz de Tenerife	2,810	503,151
Total		130,159	1,214,736

Union of South Africa. A self-governing British dominion at the southern extremity of Africa. Its area is estimated at 472,347 square miles. The territory surrounds the British protectorate of Basutoland and almost surrounds Swaziland. To the northwest lies South West Africa, which has been assigned to the Union as a mandate from the League of Nations. South West Africa had formerly been a German colony. Its conquest by an army from South Africa constituted one of the campaigns of the World War.

The surface is, for the most part, a high plateau, interrupted by isolated flat-topped hills called kopjes. The plateau slopes rapidly down near the coasts. A ridge, low in the west, passes around the southern and eastern parts of the plateau, reaching its highest point in the east central region of the country. This eastern ridge is the divide separating a large number of short rivers, draining toward the east and the south, from the Orange river, which flows westward across the country and empties into the Atlantic Ocean. Farther north, the Limpopo river rises on the interior plateau and makes its way north of the eastern ridge; then, turning southeast, it flows into the Indian Ocean. These two rivers serve as the greater part of the northern boundary of the country.

The climate of South Africa is warm, and the soil is fertile. The precipitation varies greatly, being nearly 50 inches on the southeastern coast and falling to less than 3 inches farther north on the western coast. In the western part of the country, semiarid conditions prevail, and grazing rather than agriculture is the principal industry. Wool is one of the chief exports, and about half the world's supply of mohair comes from the Union. Corn and wheat, however, are also grown, and such products of subtropical agriculture as cotton, tea, and sugar cane are raised in the lower and moister coastal regions. The operation of ostrich farms constitutes a distinctive and important industry. Much trade is still carried on by barter with the natives, from whom the white traders obtain ostrich feathers, gold dust, ivory, and hides.

The exports of the greatest value are the products of the mining industry. South Africa is the world's chief source of diamonds and is by far the greatest gold producing region of the world. The output of gold is several times that of the United States, the country which ranks second to South Africa. Other minerals obtained in important quantities include coal, tin, and copper.

The population in 1921 was 6,928,580, of whom 1,519,488 were white. About one-half those of the white race are of Dutch descent. The religion is predominantly Protestant. There are three universities. Most of the country's 9559 miles of railway is owned by the government.

South Africa is divided into four provinces. Cape of Good Hope is in the extreme south, and Transvaal, on the eastern side of the country, lies farthest north. Between the two lie the inland province, called Orange Free State, and Natal, which borders on the Indian Ocean. The center of governmental administration is Pretoria, but the legislature sits at Cape Town, which is the terminus of the partially constructed "Cape to Cairo" railway. The largest city is Johannesburg, situated in the Witwatersrand, among the richest gold mines of the world. Kimberley is the chief center of the diamond mining industry.

CITIES AND OTHER POINTS OF TRAVEL INTEREST

Africa has a relatively small number of cities. This fact is due to the primitive economic conditions prevailing throughout most of the continent, nearly all the inhabitants being engaged in agriculture or hunting.

The valley of the lower Nile, however, was the seat of one of the world's earliest civilizations. It still contains the largest cities of Africa and many of the most interesting ruins in the world. The only other cities of any considerable size are in South Africa, where European settlers have built up a civilization of the characteristic Western type.

The following section contains descriptions of the principal cities and of other places in the continent which merit especial attention.

Alexandria. The chief seaport of Egypt, situated at the west of the Nile delta. The city has an Arab quarter with Oriental bazaars, a large European quarter, and an industrial district with asphalt works and oil, rice, and paper mills. The chief exports are cotton, grain, rice, and sugar.

Alexandria was founded in 332 B. C. by Alexander the Great and was, for several centuries, the chief commercial city of the world. In ancient times, its harbor was famous for the Lighthouse of Pharos, a huge structure completed in 282 B. C. and regarded as one of the seven wonders of the ancient world. This lighthouse was destroyed by an earthquake in 1303. Alexandria was long a center of Greek culture and contained the most valuable library of Greek books in the world. Near the palace and temple of the emperors stood two obelisks, erected by Julius Cæsar in honor of Cleopatra and known as Cleopatra's needles. One of these obelisks was removed to New York City in 1881, and the other was taken to London three years earlier.

In the 7th century, Alexandria was captured and sacked by the Arabs. Its importance in modern times dates from the construction of the Suez canal. Population, 1927, 578,314.

Algiers. The seaport and largest city of Algeria and the seat of the French administration there. It lies near the center of the country's Mediterranean coast. The lower part has been recently built under French direction. With its modern hotels, spacious squares, and ornamented parks, it presents a marked contrast to the narrow streets and characteristic mosques of the Moorish section. The city has a university of the European type and is a favorite resort of tourists.

Algiers is one of the most important coaling stations on the Mediterranean Sea. It has an important trade, mainly with France. The chief exports are wine, fruits, olive oil, and cork. Population, 1926, 226,218.

Cairo (*kī'rō*). The capital of Egypt and the largest city of Africa, situated on the Nile river about 100 miles from its outlet in the Mediterranean Sea. The city is an important center of caravan trade, receiving ivory, ostrich feathers, and hides brought from the interior of Africa.

Cairo's Oriental quarter is poorly built, with crooked, unpaved streets. The modern portion centers about a 20-acre park, called the Place Ezbekieh. This part is well laid out and has many impressive buildings.

Chief of the numerous sacred edifices of Cairo is the Sultan Hassan Mosque, which is regarded as the finest example of the Byzantine-Arabian architecture in existence. The El Azhar university, situated in the city, holds the leading place among the world's institutions for Mohammedan education. Cairo's site covers the remains of many cities that had fallen into ruins before the founding of the present city in 968 A. D. Population, 1927, 1,059,824, including some 10,000 English speaking residents.

Cape Town. The legislative capital of South Africa, occupying a picturesque site on the southwestern coast of the Union. It stands at the head of Table bay, an inlet of the Atlantic Ocean. The city and several beautiful suburbs extend along a narrow coastal strip between the water and a group of precipitous mountains.

Cape Town is the chief seaport of South Africa, the exports ranking highest in value being diamonds and bar gold. Among the notable features of the city are the Parliament buildings; the public library; a 14-acre botanical garden; the Cape observatory; and the Castle. The last-named edifice was built as a defensive work in 1666, 14 years after the founding of a Dutch colony on the present site of the city. Cape Town passed into the hands of the English in 1806. Population, 1921, 207,404.

Giza (*gē'zē*). A village of Egypt about three miles from Cairo. It is notable for the pyramids which stand in the vicinity. The largest was erected by Cheops, an Egyptian king who lived about 3000 B. C. According to Herodotus, 100,000 men were employed for 20 years in building it, while 10 years were occupied in transporting the stones. It is about 480 feet in height with a base 764 feet square. The pyramid is believed to have been originally encased with marble. Since 1000 A. D., however, the exterior stones have been removed, leaving visible a structure of rough limestone blocks forming steps with a platform of considerable area at the top. This pyramid was one of the seven wonders of the ancient world and is the only one of the seven still in existence. Two other major pyramids and nearly 40 minor ones are included among the pyramids of Giza. They were intended to serve as tombs for their builders.

The great sphinx is located in the approach to Giza, where it might serve to frighten evil spirits away from the pyramid tombs near by. The sphinx is an image of the head of the god Harmachis attached to the body of a lion. The whole figure is 66 feet high and about 172 feet long and is carved out of the solid rock.

Johannesburg (*yō-hăn'ĕs-bûrg*). The largest city and commercial metropolis of South Africa, lying in the south central part of the Transvaal province. The city was founded in 1886 and owes its importance to its location on the Witwatersrand, in the midst of the richest gold field in the world. Johannesburg is regularly laid out and well built, presenting a more completely modern appearance than any other city on the continent of Africa. It contains the University of the Witwatersrand.

Johannesburg was the center of the agitation which resulted in the Boer war. The days of the Boer régime are recalled by a dismantled fortress overlooking the city and by a monument, which stands in a near-by field, commemorating the Boer declaration of independence in 1880. The city was occupied by the British in 1900. Population, 1921, 288,131.

Karnak (*kär'năk*). A village of Egypt on the right bank of the Nile river about 400 miles above Cairo, famed for its ruins of ancient Egyptian temples. The chief one is the temple of the god Ammon. It was erected about 4000 years ago and is the largest temple in the world. There is comfortable standing room for as many as 90 people on the top of many of the columns still erect.

Luxor. A village of Egypt near the Nile river a short distance southwest of Karnak and about 400 miles above Cairo. Luxor is known for the numerous tombs near by, which contain the mummies and treasures of ancient Egyptian monarchs. These treasures, which were intended to serve the spirits of their deceased owners, amount to millions of dollars in value. The tombs are hewn in the rock and usually have, on their walls, elaborate carvings, which have done much toward the unfolding of early Egyptian history. One of the more remarkable of such tombs was that of Tutankhamen, discovered by Lord Carnarvan in 1922. It was especially rich in articles of furniture inlaid with ivory and with precious metals.

In Luxor stand two colossal statues, one of which is said to represent the god Memnon. It is a Roman restoration of a former statue, which, before its destruction by an earthquake, is said to have given forth a sound each morning when struck by the rays of the rising sun. Most of the extant Egyptian temples are grouped about Luxor and the neighboring village of Karnak. See *Karnak*.

Port Said (*pōrt sā-ēd'*). A seaport of Egypt at the Mediterranean end of the Suez canal. It has an export trade in cotton and is an important coaling station. Its features include a large lighthouse, whose light is visible 24 miles out at sea, and a colossal statue of De Lesseps, the French engineer under whose direction the Suez canal was constructed. Population, 1927, 103,223.

Pretoria. The administrative capital of the Union of South Africa. It is an inland city, situated in the northeastern part of the Union in the Transvaal province. Its streets are broad and regularly laid out. The outstanding architectural feature of the city is the large group of government offices. They are in the Renaissance style of architecture and have a central tower surmounted by a statue of Liberty. Pretoria is the seat of Transvaal University college. Population, 1921, 74,052.

Timbuktu (*tĭm-bŭk'tōō*). An inland city of French West Africa near the southern border of the Sahara desert and on the edge of the marshes of the Niger river. The city is the focus of the caravan trade of an immense territory. Commerce is carried on largely by barter, the chief articles of exchange being gold, ivory, wax, salt, hardware, beads, and cloth.

Timbuktu has a large Mohammedan library and several mosques of striking appearance. These buildings date from a period before the 19th century, having been erected when the town was one of the principal centers of Mohammedan influence in Africa. The city was first visited by Europeans in 1826, and it passed into the hands of the French in 1894. Timbuktu's population has declined greatly in recent years and now stands at about 7000.

















Photos for Nos. 1, 5, and 8 from Brown Bros.; photos for Nos. 2, 3, 4, 6, and 7 from Publishers' Photo Service.

AFRICA

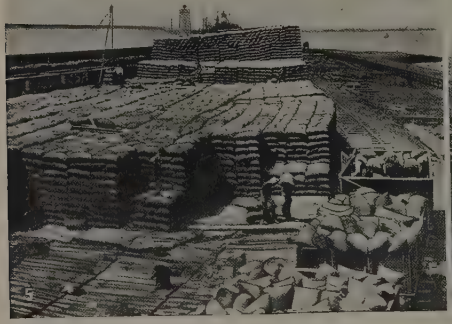
1 Sahara Desert. 2 The Citadel, Cairo. 3 Pyramids, Egypt. 4 Algiers, City and Harbor. 5 Ivory for Shipment, Belgian Congo. 6 Making Bark Cloth, Uganda. 7 Ostrich Farm, Cape of Good Hope. 8 Town Hall, Durban, Natal.













Photos from Brown Bros.

AUSTRALIA

1 Public Buildings, Adelaide, South Australia. 2 Railway Bridge, Hawkesbury River, near Sydney, N. S. W. 3 Sampling Wool in Warehouse, Sydney, N. S. W. 4 Collins Street, Melbourne, Victoria. 5 Wheat Awaiting Shipment, Melbourne, Victoria. 6 Sydney, N. S. W., from the Harbor.

AUSTRALIA

An island continent lying southeast of Asia between the Indian and the Pacific Ocean. The western portion of Australia forms one of the oldest land surfaces of the globe. The continent is about one-fourth less in area than Europe, but is nearly as large as the continental United States and, with the exception of Antarctica, is the only continent lying wholly in the southern hemisphere. Australia is 1800 miles from Asia, 4500 miles from Africa, 6300 miles from South America, 6700 miles from the United States, and 11,000 miles from England. The island lies between 10° 39′ and 39° 11′ south latitude and between 113° 5′ and 153° 16′ east longitude, and from east to west is 2400 miles long and from north to south, 1971 miles. The total area is 2,974,581 square miles, of which 1,149,320 square miles, or about five-thirteenths, are within the Torrid Zone. The population in 1921 was 5,436,794.

Surface. Strong contrast in elevation above sea level is strikingly absent in Australia. The highest point is Mount Kosciusko, which has an elevation of 7323 feet. The greater part of Western Australia consists of a low plateau averaging about 1000 feet in height. This plateau extends eastward into South Australia and Northern Territory. To the eastward of this plateau lie the lowlands of the Lake Eyre and Murray River basins. Along the eastern coast of the continent the land rises to an average elevation of from two to three thousand feet, forming the Great Dividing range. This range extends practically the full length of the eastern coast. At the southern end of the coast, the range turns westward and disappears in western Victoria. The most elevated area, the Australian Alps, is in the southeastern part of the continent, near the border of New South Wales and of Victoria. The low-lying coastal strip is very narrow along eastern Australia, but it widens about the Gulf of Carpentaria in the north and around Western Australia. The main watershed of the continent is formed by the Great Dividing range, from which practically all the rivers of importance rise. The country around Lake Eyre is a basin of internal drainage. The West Australian plateau is an arid region with only a few short streams flowing down the western scarp.

Climate. The climate of northern Australia is tropical, and the mean annual temperature rises in places to 85° F. The range of temperature in the interior is very great. In central Australia, heavy frosts occur at night during the winter, while in summer the temperature in the shade may rise above 130° F. The southern part of Australia lies within the South Temperate Zone and near the south coast the mean annual temperature is about 60° F. In summer, the southern coastal areas are tempered by sea breezes, but are subject to extremely sudden changes of temperature. Hot north winds from the interior may be replaced by cold south winds, the thermometer showing a fall of 20° or more in about 20 minutes. These southerly changes rarely occur in the inland districts, and within 100 miles of the coast the temperature at midday may rise to 100° F. or over for days or even for weeks.

Snow may lie for months on the higher portion of the Australian Alps, but over the greater part of the continent snow is rarely, if ever, seen.

Rainfall. A line running generally from Sharks' bay on the west coast to Sydney on the southeast coast divides the northern area of summer rains from the southern area of winter rains. In the winter months, June to September, areas of low pressure move northward from the antarctic region to a latitude sufficiently low to bring rain to Tasmania and the southern projections of the continent. In the summer, however, these areas do not move so far to the north. As a result, summer rains seldom occur, except on the west coast of Tasmania. In summer, the thermal equator is over northern Australia, and the northwest monsoons bring rain to the northern coast line, January and February being the wettest months. Monsoonal tongues sometimes extend southward as far as northern Victoria and produce extremely useful rains.

The rainfall in the remaining portion of Australia is governed mainly by the southeast trade winds. These winds bring summer and autumn rains to the eastern coast. The greater part of the moisture is deposited on the eastern highlands. The trade winds pass on as dry winds and, becoming heated, absorb moisture rapidly, thereby causing the aridity which characterizes large parts of central and western Australia. Cairns, on the northeast coast, receives over 100 inches per annum, while a large portion of the interior receives less than 10 inches. Wheat may be grown in some areas in the south, which have about 10 inches of rain, because the rain that does fall comes at the right time.

The rains of northern and of southern Australia are fairly reliable, but the central area shows great variation, and disastrous droughts sometimes occur over a large portion of the continent. During such drought periods, there is an immense loss of cattle and sheep, as it is impossible, under present conditions of transportation, to move the vast numbers of stock to the better-watered areas. Artesian wells have improved conditions somewhat by affording a supply of drinking water for the stock; but unfortunately the water is not suitable for irrigation.

Irrigation. Owing to the small rainfall over large portions of Australia, irrigation is impracticable except in limited areas, such as the Murray River basin. In recent years considerable areas in northern Victoria and southwestern New South Wales have been irrigated either by gravity channels or from pumping stations. The Goulburn valley is served from the Waranga basin. Water for the Mildura and Red Cliff fruit growing settlements is pumped from the Murray river.

Rivers. The interior of the continent being dry, there are comparatively few rivers. Australia has no snow fields from which they may be fed. Of the streams flowing into the Pacific, the Burdekin and the Fitzroy are the largest. They drain, each, an area of about 55,000 square miles. The chief river of the north, the Roper, flowing into the Gulf of Carpentaria, is navigable for 75 miles from its mouth. The largest river system is the Murray with its tributaries—the Darling, the Murrumbidgee, and the Lachlan. These rivers drain south Queensland, western New South Wales, and northern Victoria. There are other streams, such as Cooper's creek, which, in time of abnormal rains, carry enormous volumes of water inland to lakes which have no outlet, such as Lake Eyre, Lake Gairdner, and Lake Frome. Generally, however, these streams contain water in their upper courses only, because, by evaporation and soakage, the water is lost, and the remainder of their channels is marked by occasional water holes, which also dry up in time of drought.

On the east, north, and west coasts, short rivers flow from the mountain slopes to the sea. But there are no long navigable waterways penetrating far into the interior, like the Mississippi in North America and the Nile in Africa. Hence the development of the continent has been much retarded.

Minerals. Australia is fairly rich in mineral resources. Gold, discovered here in 1851, has yielded the most valuable returns. In the early days most of the gold was obtained from alluvial deposits or gold placers. Deep leads or deeply buried alluvial deposits also gave splendid returns. When the

alluvial areas were worked out, the miners turned their attention to the quartz reefs from which the alluvial gold had been derived, and more costly methods of winning the gold were introduced. Copper, tin, lead, silver, zinc, manganese, antimony, wolfram, and bismuth have been mined, and important deposits of such minerals as gypsum and phosphates are being worked.

Precious stones, including diamond, sapphire, topaz, and opal, are found. Agates are fairly abundant.

Black coal occurs in large areas in eastern Australia and in Tasmania. Western Australia draws its supply largely from the Collie coal field, situated in the state. Thick seams of brown coal occur in southeastern Australia, especially near Morwell in Victoria. Building stones have been quarried in all the states.

MINERAL PRODUCTION

ITEM	Value 1919	Value 1924
	£	£
Gold	5,455,000	3,143,830
Silver and Lead	1,922,000*	4,381,062
Copper	1,892,000	935,115
Tin	1,050,000	740,927
Coal	6,761,000	11,574,454
Other Minerals	2,645,000	3,870,526
Total	19,725,000	24,645,914

Total mineral production, 1851–1924 £1,081,000,000
Total gold production, 1851–1924 . . . £619,159,653
Total gold production, 1924, fine oz. . . . 675,937

* Value abnormally low on account of strike at Broken Hill, N. S. W. More representative are figures for 1918, when silver and lead output was worth £6,104,977.

Vegetation. The continent has over 7000 species of plants found nowhere else in the world. Many of them have fossil representatives in America and in Europe. Characteristically Australian are the gum trees, or eucalyptus, and the acacias. Eucalypts number over 230 species and are found in all places capable of supporting vegetation. Some are only a few feet in height, as the mallee and snow gum; some rival California's giant sequoias. Oil is secreted in the leaves of numerous species, and a gumlike resin exudes from the trees when the bark is injured. Some of the most durable timber known is furnished by various eucalypts, as the jarrah, red gum, and ironbark.

Much sunshine and too little rain compel many Australian trees to hang their leaves vertically, only the edges being turned to the sun. By this means the amount of evaporation from the leaves is diminished. The eucalypts are evergreens, but in many cases they shed their bark. The acacias, or wattles, constitute another important group, the members of which vary, according to their environment, from small shrubs to trees 100 to 150 feet in height. The bark of some varieties is used for tanning. The golden wattle is regarded as Australia's national flower.

Other forms of natural vegetation include the grass tree, resembling a tall stump from which grass sprouts at the top; tree ferns as large as palm trees; the banksia or Australian honeysuckle; and the native cherry, noted for having the stone outside the fruit.

Fodder Plants. Many acacias provide fodder for sheep and cattle. Other shrublike fodder plants, growing in the dry interior, are saltbushes, cotton bushes, and bluebushes. Australia's saltbushes have proved so valuable as sheep foodplants that they have been introduced into the arid regions of the southwestern United States.

Timber. Forest areas occupy 92,500,000 acres, which is about one-twentieth of the surface of Australia. Of this total, 17,672,000 acres are held as timber reserves. Soft woods, such as kauri pine, red cedar, silky oak, and Queensland maple, are found in the tropical forests of Queensland. Murray pine and Huon pine, the latter growing in Tasmania, are other important soft woods. The hard woods include many species of eucalypts, such as ironbark, red gum, gray box, yellow box, blue gum, and stringybark. These grow mainly on the highlands of eastern and southeastern Australia. Jarrah and kauri flourish in southwestern Australia. Blackwood, a species of acacia, is used extensively for furniture.

Grassland. The eastern half of the interior is a vast sheep pasturing country, though the rainfall is light. The soil is rich alluvium, and in good seasons grass is abundant. In time of drought the grass dries and is scattered by the wind, leaving the land perfectly bare. When the drought breaks, the grass springs up and grows with great rapidity. European fodder grasses have been planted over considerable areas. Farther west, plants needing but little water, wattles and saltbushes, mallee and mulga scrub, and the wiry spinifex, or porcupine grass, cover a large part of Australia's semidesert.

Jungles. In the northern part of Australia, a region of tropical heat and of heavy rains, there are found, in all the lowland districts, dense forests containing eucalypts, bamboos, palm trees, beautiful orchids with singular flowers, and gigantic lilies six to eight feet high, bearing dark red blossoms. Such jungle growth is variously known as bush, brush, or scrub. The term "bush" is frequently applied to any area in which the natural trees have not been cleared off to any extent.

Fauna. The fauna of Australia is quite distinct from that of the northern hemisphere. It is most closely related to that of South America. The characteristic mammalian forms are the marsupials, which, with few exceptions, are found elsewhere only in the fossil state. The higher mammals are represented only by the dingo, or native dog, probably introduced by the aborigines, and by a few rodents. The marsupials, or pouched animals, include the kangaroo and the wallaby, which are typically Australian. Other forms are the wombats, bandicoots, opossums, or possums, and the native bear, or koala. The Tasmanian wolf and Tasmanian devil are marsupials now confined to Tasmania. Outside the Australian area the only living pouched animals are the Patagonian opossumrat and the North American opossum. The Monotremes, which are the lowest order of the mammals, have no living representatives outside Australia. The Australian forms include the duck-billed platypus and the echidna, or anteater. Both are egg laying forms and constitute a link between the mammals of today and the great reptile family from which the birds and mammals have developed.

Among the more remarkable birds are the emu, cassowary, kookaburra (laughing jackass or giant kingfisher), native turkey, black swan, lyre bird, and bower bird. Brilliant plumaged parrots and the yellow-crested cockatoo are abundant.

Two species of crocodiles are found in north Queensland. The largest lizard is called the "iguana" or "goanna" and may reach a length of 5 feet. Snakes, both venomous and nonvenomous, are fairly abundant.

Fish. Excellent food fish of many kinds abound in Australian coastal waters and in most of the rivers. The remarkable ceratodus or lungfish occurs in the Burnett and the Mary river in Queensland. Several species of European fish have been acclimatized. Trout may now be caught in a number of the mountain streams.

Pearling. Pearl fishing is a lucrative occupation off the northern and northwestern coasts of the continent. Some of the nearer pearl-oyster banks, however, have been practically exhausted, owing to persistent gathering of the shellfish and failure to allow the beds time enough to restock.

Sheep Raising. Gold brought Australia into the circle of the nations, but her greatest source of wealth is her merino sheep. Sheep raising is the continent's main industry. Pasturage for sheep is less dependent on rainfall than is pasture for cattle; sheep thrive where cattle would starve. Australian wool is the thickest and finest in the world. Hence wool growing is a profitable industry in the east central part of Australia. Wire fencing is used to enclose the "stations" or "runs" on which sheep are grazed. Merino sheep, improved wonderfully from the old Spanish stock, form the largest flocks. The stations vary greatly in size and in the number of sheep carried. Many of the very large stations have been subdivided, but recently, in the Riverina, there was one station which carried 150,000 sheep.

Large cattle stations are situated in the northern parts of Australia, especially Queensland. Dairy farms are abundant in the well watered districts of eastern and southern Australia. Horses and pigs are also raised.

ANIMAL INDUSTRY

ITEM	Season 1919-20	Season 1924-25
Cattle, No.	12,711,000	13,309,473
Horses, No.	2,421,000	2,292,050
Pigs, No.	696,000	980,009
Sheep, No.	75,554,000	93,154,953
Butter produced, lbs.	165,648,791	313,952,291
Wool produced, lbs.	663,249,000	729,242,550
Wool exported:		
Unwashed, lbs.	552,307,700	489,669,907
Scoured, lbs.	91,050,000	43,312,217
Sheepskins exported, £	2,585,171	3,773,328
Tallow exported, £	2,855,602	1,703,308
Frozen meat exported, £	9,026,051	6,135,069

Agriculture. The area under cultivation in Australia is gradually extending. In the southern coastal regions the rainfall is generally good; and oats, barley, maize, and lucerne are the principal crops. Apples, pears, peaches, and other such fruits are largely grown. Inland, wheat is extensively cultivated, the area under cultivation increasing as means of communication are improved. Apples, oranges, lemons, peaches, apricots, grapes, and currants are readily grown in the irrigation areas. In the coast regions of Queensland, sugar cane, bananas, pineapples, and other tropical fruits are cultivated. Rice, cotton, and tobacco have been grown in various portions of the Commonwealth.

Manufacturing. Manufacturing is rapidly developing. Flour, woolen goods, leather, boots and shoes, furniture, iron and steel goods are among the products made for home consumption; and an export trade in manufactured articles is gradually developing.

VALUE OF CHIEF CLASSES OF PRODUCTS

ITEM	Value 1919	Value 1924
	£	£
Agricultural	72,234,000	107,096,000
Pastoral	109,062,000	121,891,000
Dairying, Poultry, and Bee-Farming	38,830,000	45,190,000
Forests and Fisheries	10,170,000	12,357,000
Mining	19,725,000	24,646,000
Manufacturing	98,162,000	137,977,000
Total	348,183,000	449,157,000

Commerce. Imports are principally European manufactures. Most of the trade is with Great Britain. Australia exports more wool than any other country. Among the other exports are wheat, butter, hides, tallow, and dressed meats, comprising chiefly beef, mutton, and rabbit. Summer dairy products, shipped on fast steamers with cold-storage chambers, reach Great Britain in a few weeks when the cows in that country are housed for the winter.

Canada and New Zealand are linked by cable with Australia. Most of the foreign capital invested in Australia is British. The country has over 21,000 miles of railway, nearly all owned by the state governments. The telephone and telegraph are Federal property.

The New Capital. In 1911, the Commonwealth acquired from New South Wales an area of approximately 912 square miles to be used as a Federal district. An additional area of 28 square miles on Jervis bay was obtained in 1917 to be used as a naval station. This Federal district was named Canberra. Building operations began in 1923, and the Australian parliament convened there for the first time in May 1927.

Inhabitants. The population of Australia in 1921 was 5,436,794. Protestants constitute the larger proportion of the inhabitants, but there is an influential Catholic minority. The Federal constitution forbids the establishment of any state-supported religion. In all parts of the Commonwealth, education is free, secular, and obligatory. Illiteracy is virtually unknown. The population is almost entirely of British origin, less than 3 per cent being of any other extraction. These figures do not include the aborigines, or "blackfellows," who are people of the Stone Age grade. They have Negroid features, but their hair is wavy, and ethnologists do not class these savages with any of the African races.

Name. The continent was formerly called New Holland. *Australia*, from the Latin word for southern, was suggested by Captain Matthew Flinders (1774–1814), an English navigator, who had explored the southern part of the island. The name came into use in 1817.

STATES OF THE COMMONWEALTH

The Commonwealth of Australia, a self-governing British dominion, was formed on January 1, 1901. It consists of six states—New South Wales, Queensland, South Australia, Tasmania, Victoria, and Western Australia; one territory—the Northern Territory; and a Federal district. The following section contains a description of the states and of the Northern Territory.

New South Wales. A state lying in southeastern Australia. The Great Dividing range extends along the east side of the state at a distance of 20 miles to 100 miles from the sea. On the west of the mountains is magnificent pastoral country, which gradually gives place to arid conditions farther inland.

On the coast strip, the rainfall varies from 40 inches to 70 inches a year, but in the western region the average rainfall is less than 10 inches. Droughts occur more or less periodically on the western plains. In time of abnormal rains, however, the flood waters of the streams may cover the country for miles on both sides of their courses. In recent times rain water reservoirs and artesian wells have rendered droughts less to be dreaded. Snow falls in the highlands, but is almost unknown on the coast. In summer the coastal districts have a muggy heat and thunderstorms are frequent. In the interior, especially in drought time, the temperature at midday is often well over 100° F. in the shade, but, as a rule, the nights are moderately cool. The Murray river forms most of the southern boundary of New South Wales. This stream and its tributaries, the Darling and Murrumbidgee, are [illegible] gable for small vessels during a portion of [illegible] The streams flowing to the east are short [illegible] drowned estuaries form good harbors.

The vegetation includes many species [illegible] in other parts of the world. The northern [illegible] areas contain subtropical forests of [illegible] cedar. Along the highland and western [illegible] forests of eucalypts (ironbark, gray [illegible] bark, etc.). Red gum and Murray [illegible]

AUSTRALIA, STATISTICS OF

State	Dimensions		Area Sq. Miles	Coast Line Miles	Capital	Pop. of Capital 1921
	N. to S.	E. to W.				
New South Wales	600	500	309,432	700	Sydney	899,099
Victoria	250	480	87,884	680	Melbourne	766,506
South Australia	880	754	380,070	1540	Adelaide	255,481
Queensland	1250	950	670,500	3000	Brisbane	210,032
Tasmania	180	190	26,215	900	Hobart	52,391
Western Australia	1480	1000	975,920	4350	Perth	154,866
Northern Territory	900	560	523,620	1040	Darwin	1,398
Federal District	40	30	940	None	Canberra	352

Population of the States

State	Census, 1921				Census 1911	Increase 1911–1921
	Males	Females	Total	Per 100 Sq. Miles		
New South Wales	1,071,058	1,028,705	2,099,763	679	1,646,734	453,029
Victoria	754,629	776,900	1,531,529	1743	1,315,551	215,978
South Australia	248,293	247,043	495,336	130	408,558	86,778
Queensland	399,610	358,024	757,634	113	605,813	151,821
Tasmania	107,767	106,110	213,877	816	191,211	22,666
Western Australia	177,013	155,200	332,213	34	282,114	50,099
Northern Territory	2,821	1,049	3,870	0.7	3,310	560
Federal District	1,567	1,005	2,572	273	1,714	858
The Commonwealth	2,762,758	2,674,036	5,436,794	183	4,455,005	981,789

Growth in Population, 1871 to 1921

Year	Males	Females	Total	Decennial Increase	Net Immigration	
					Period	Immigrants
1871*	902,494	745,262	1,647,756	302,171	1861–1871	166,565
1881	1,214,913	1,035,281	2,250,194	552,155	1871–1881	191,804
1891	1,704,039	1,470,353	3,174,392	924,198	1881–1891	382,741
1901	1,977,928	1,795,873	3,773,801	599,409	1891–1901	24,879
1911	2,313,035	2,141,970	4,455,005	681,204	1901–1911	40,485
1921	2,762,758	2,674,036	5,436,794	981,789	1911–1921	208,592

*Dec. 31, 1870.

Movement of the Population—Marriages, Births, and Deaths

Year	Births	Deaths,	Natural Increase	Net Immigration*	Total Increase	Marriages
1915	134,871	52,782	82,089	−74,322†	7,767	45,224
1920	136,406	56,289	80,117	27,779	107,896	51,552
1921	136,198	54,076	82,122	15,654	97,776	46,869
1922	137,496	51,311	86,185	38,023	124,208	44,731
1923	135,222	56,236	78,986	37,540	116,526	44,541
1924	134,927	54,980	79,947	43,749	123,696	45,869
1925	135,792	54,568	81,224	37,357	118,581	46,899

* Refers to the total oversea arrivals from places outside the Commonwealth diminished by the total oversea departures to places outside the Commonwealth.
† An excess of oversea departures, due to the movement of troops taking part in the World War.

Agricultural Production

Crop	Total Acreage		Total Yield		Yield Per Acre	
	Season 1919-1920	Season 1924-1925	Season 1919-1920	Season 1924-1925	Season 1919-1920	Season 1924-1925
	Acres	Acres	Bushels	Bushels	Bushels	Bushels
Wheat	6,419,160	10,824,966	45,975,000	164,558,734	7.16	15.20
Oats	1,068,296	1,165,127	12,556,000	19,393,737	11.75	16.65
Barley	267,309	260,248	4,288,000 *	5,006,231	16.04	19.47
Maize	265,469	398,949	6,764,000	12,432,037	25.48	31.16
			Tons	Tons	Tons	Tons
Hay	3,126,000	3,026,405	2,987,000	4,068,419	0.96	1.34
Potatoes	115,400	138,776	298,600	332,125	2.59	2.39
Sugar Cane *	159,037	273,512	1,350,081	3,400,319	15.05‡	19.38‡
Sugar Beets *	1,000	1,897	13,000†	24,468	12.11	12.90
Grapes	73,326	114,394	139,000**	.....	2.34‡	.....
			Gallons	Gallons	Gallons	
	.....	.....	7,649,404	13,299,290	129.37	.....
			Pounds	Pounds	Pounds	Pounds
	166	35,000	57,065	18,322,103	343.77	523.49
			Value £	Value £	Value £	Value £
arden Fruits	272,000	276,904	5,819,000	7,417,336	21.8.0	28.0.0
	1,401,237	564,924	2,627,051	2,309,322	1.17.6	4.1.9
	13,296,000	17,278,191	72,202,000	107,096,000	.....	.....

ue of the output of cane and beet sugar factories in 1919-20 was £4,308,976; in 1924-25, £11,760,046.
he sugar manufactured was 1551 tons. ‡ Tons per acre of productive crop. ** Including 52,530 tons fo
cres of productive vines.

the Murray river. Mulga and other dwarf acacias are the prevailing forms of vegetation in the arid west.

Insect pests are numerous, and lizards and venomous snakes are common in the regions known as "bush," from which the trees and scrub have not been cleared. Food fishes are plentiful in the coast waters. Mammals are represented by kangaroos, duckbills, and echidnas. The camel has been acclimatized. Rabbits, introduced from Europe some years ago, multiplied with extraordinary rapidity and soon became a serious danger to the farmer and to the sheep grower. Wire netting has restricted the range of the animals, and battues, or drives, have somewhat reduced their number.

New South Wales is rich in minerals. Gold, silver, lead, tin, antimony, manganese, bismuth, copper, and other minerals are mined. Coal has been traced in an area of over 24,000 square miles. Asbestos, zinc, mercury, cobalt, alum, graphite, and kaolin have been discovered in payable quantities. Building stone abounds. Iron ore from South Australia is smelted at Newcastle, New South Wales. Precious stones, as diamond, opal, and topaz, occur. The Blue mountains yield rich kerosene shale.

New South Wales is a great pastoral country, and supports about 40,000,000 sheep, mostly merinos. These are fed on the rich grasses found in the plateaus west of the Great Dividing range.

The principal agricultural crops are wheat, maize, barley, oats, potatoes, lucerne, tobacco, sugar cane, and grapes. All the fruits that grow in Europe thrive here.

Manufactures comprise flour, distilled and malt liquors, leather, textiles, furniture, cheese, and earthenware. Shipbuilding has recently undergone rapid development.

Besides Sydney, the state has a number of prosperous cities: Newcastle, the center of the coal mining industry and of steel manufacturing; Broken Hill, a great mining town with silver, zinc, and lead interests; and Tarnworth, Bathurst, Goulburn, Wagga, and Albury—all mercantile centers and trade-distributing points for farming or pastoral districts.

Over 3800 miles of railroad are in operation. The chief exports are wool, wheat, frozen meat, dairy produce, tallow, hide, zinc, lead, silver, copper, and tin. Imports include iron wares, clothing, cottons, and woolens. Most of the trade is with Great Britain.

There is no state religion. All children between the ages of 6 and 14 years are required to attend school. Instruction is free in the state primary schools. Scholarships and bursaries provide free education at secondary schools and at the university. The principal secondary schools are denominational, and fees are charged. The University of Sydney, maintained partly by the state and partly by private endowment, confers degrees in arts, science, medicine, engineering, and other branches of learning.

Queensland. A state of the Commonwealth of Australia, occupying the northeast part of the continent. The northern half of the state is in the Torrid Zone. Queensland has a shore line of 3000 miles with many inlets and bays that facilitate commerce. The Great Dividing range runs almost parallel with the east coast, and on it most of the state's numerous rivers rise. Mountain spurs extend toward the sea. In the valleys, thus partly enclosed, the soil is very fertile. The elevated grasslands west of the Great Dividing range, extending to the dry, desolate "Never, Never Country," are occupied by pastoralists with immense herds of sheep and cattle.

Queensland receives its principal rainfall during the summer months, December to February. The winter climate is exceptionally agreeable. In summer the coastal regions are extremely humid, and hot nights follow hot, muggy days. Inland, the air is dry and bracing in the winter, with cold nights; but very high shade temperatures, exceeding at times 120° F., are recorded in the summer. The rainfall varies. In the coastal regions, an annual rainfall of 100 inches may be recorded; but west of the Great Dividing range the precipitation gradually decreases and the annual rainfall often amounts to less than 10 inches in the extreme west.

Queensland's vegetation is tropical, especially in the north, where jungles, Malaysian in character, cover hundreds of square miles. Much of the state is still overspread with natural forest. This furnishes valuable timbers, such as cedar, kauri, pine, silky oak, and maple.

Queensland is noted for its vast sheep runs and cattle stations. Horses and swine are also raised. Sugar cane, bananas, and other tropical products are cultivated along the coastal areas. Wheat is extensively grown on the Darling Downs west of Brisbane.

Besides the capital, Brisbane, the state has several other flourishing cities, including Rockhampton, Townsville, Maryborough, Gympie, Ipswich, Toowoomba, and Charters Towers.

Education is free, secular, and compulsory. There is no state religion. The University of Queensland was opened in 1911.

The Moreton Bay district, the northern part of New South Wales, was, in 1859, officially proclaimed the colony of Queensland.

South Australia. A state in the southern part of Australia. The Flinders range, extending northward from the Gulf of St. Vincent, divides the state lengthwise. Large sections of the western and northern parts are desert, but most of the southeast is fertile land, easily cultivated.

Except for the Murray, which flows through the southeastern corner, there is no river of importance in the state. Several saline lakes—Eyre, Torrens, Gairdner, Blanche, Frome, Island—are the largest sheets of water in the continent. These lakes vary in size with the amount of the rainfall, their beds frequently being reduced to dry, salt plains.

During the summer months, November to March, hot winds blow from the interior, and the maximum temperature in the coastal areas frequently exceeds 100° F.; but the purity and dryness of the air prevent the heat from being oppressive. Frosts occur on the high plains in the north. In the desert interior, thermometers have registered 175° F. in the sun and 135° F. in the shade.

A rain record kept during 62 years at Adelaide, the capital, showed the average annual rainfall there to be 21.03 inches. This figure is somewhat higher than that of the mean yearly rainfall for all the agricultural territory of the state.

Of the live stock, sheep constitute by far the largest number. The dry interior can be used only for grazing. Cattle stations of immense area are situated in the Cooper's Creek district and in good seasons they carry large herds. There are about 200,000 horses in South Australia. Pigs and goats are also reared.

South Australia's chief mineral product is copper. Gold, silver, lead, manganese, iron, bismuth, coal, and salt are also found but are not mined in large quantities.

Manufacturing is increasing slowly, being somewhat retarded by the fact that coal has to be imported and that no water power is available. Dairy produce, especially butter, is being produced in increasing quantities.

In the extreme southeast corner is the productive and interesting Mount Gambier district, with its wealth of vegetation, native wells, stalactitic caverns, extinct craters, and beautiful crater lakes.

On the northern plain, grass may fail through lack of rain yet abundant fodder shrubs give sustenance to sheep, and artesian wells furnish a constant supply of water.

Of the total area of the state about one-third is farmed or grazed. The production of wheat is so large that the state is called the "granary of Australia." Other crops are hay, oats, barley, and potatoes. Garden vegetables grow well in this state.

Oranges, lemons, almonds, olives, and European orchard fruits are grown successfully. Fruit drying is a profitable industry. Vine culture is an important and progressive agricultural interest, and considerable attention is paid to the drying of grapes into currants or raisins. Millions of gallons of wine are pressed yearly. Irrigation has greatly enhanced agricultural production, especially in the Murray valley.

Besides the capital, Adelaide, the other important cities are Moonta, Port Pirie, Port Augusta, and Gawler.

Education, provided by the state, is free and is obligatory on children 6 to 14 years of age. It is also secular but does not exclude the Bible. The University of Adelaide is state endowed and is open to women.

South Australia was proclaimed a British province in 1836 and became a crown colony in 1841.

Tasmania. An island state of the Commonwealth of Australia bounded north by Bass strait, and east, west, and south by the Southern Ocean. Tasmania's surface consists mostly of undulating forested plains and of table-lands with numerous low mountains. The island is a land of mountains, glens, and valleys with numerous streams and lakes. Cradle mountain, having an elevation of 5069 feet, is the culminating point of the surface. There are numerous rivers, the Derwent and Tamar being the most important.

The lakes of Tasmania are picturesquely situated on an extensive central plateau, elevated about 3000 feet above sea level. Great lake is about 90 miles in circumference.

Tasmania's climate is mild, genial, and healthful, the hot summer winds and the droughts of Australia being unknown. Snow is very rarely seen, except on the mountain tops. Much more rain falls on the western side of the island than on the eastern. The average rainfall varies from 20 inches to 100 inches annually in different parts. At Hobart, the capital, the mean annual temperature is 55° F.

Eucalypts, magnificent tree ferns, the fragrant wattle, valuable blackwoods, Huon pines, and King William pines are types of the island's vegetation.

Like the plants, most of the animals of Tasmania are identical in kind with those of the continent. But nine marsupials are peculiar to the island, including the Tasmanian devil and the hyena-like native tiger, or thylacine. Of the 46 species of mammals, the duck-billed platypus is the most remarkable. There are 187 species of birds, but very few are limited to Tasmania. Most of the snakes are venomous. Lizards are abundant. Fishes, sea and fresh water, number 213 species, about one-third being good food fish. Trout, salmon, and salmon trout have been successfully acclimatized.

Copper, lead, silver, gold, zinc, wolfram, scheelite, and osmiridium are obtained in the island. Coal is mined in sufficient quantity to supply all domestic needs. Iron ore occurs in large masses, but has not been worked. Tasmania, like Australia, yields sapphires, topazes, cat's-eyes, and zircons.

For many years, sheep raising was the main industry, and the annual wool clip is still a valuable contribution to the island's wealth. In late years, however, farming has become more important. Oats, wheat, barley, peas, hay, and potatoes are the principal crops. Orchards have greatly increased in number, and Tasmanian apples command high prices in European markets. Fruit culture is the chief agricultural industry of the island.

Sheep form the larger part of the island's total of live stock, the rest including cattle, horses, and pigs.

Manufacturing establishments comprise fruit canneries, metal ore refineries, breweries, carbide works, and woolen mills. Tasmanian blankets are noted for their high quality. The government has provided for the development of cheap hydroelectric power for manufacturing purposes. It is estimated that the Great lake alone will supply 70,000 horse power.

Tasmania's commerce is mainly with Australia and Great Britain.

Elementary education is free, secular, and compulsory. Secondary education is also provided free by the state. The University of Tasmania and a technical school are located at Hobart.

About four-fifths of the population are Protestants, the remaining one-fifth comprising various other religious bodies, Catholics predominating.

The island, discovered in 1642 by Tasman, was named Van Diemen's Land in honor of the Dutch governor of the East Indies. The first settlement, a penal colony, was made in 1804, but, penal transportation having been abolished, the name Tasmania was given the island in 1853.

Besides Hobart, the capital, other important towns are Launceston, Burnie, Queenstown, and Zeehan.

Victoria. An Australian state occupying the southeast part of the continent. It is traversed by the Great Dividing range, composed here of a number of smaller ranges. In the east rise the Australian Alps. The Murray forms the northern boundary of the state and has many Victorian affluents. On the south, Victoria is washed by Bass strait and the Pacific Ocean. South Australia forms the western boundary. The coast line is estimated to be 680 miles in length.

Victoria has a more temperate climate than any of the other states. The coastal districts have an abundant rainfall and do not suffer great extremes of temperature. Hot north winds from the interior, frequently dust laden, are a disagreeable feature, but they do not last long, being succeeded shortly by cool breezes from the south. North of the Main Divide there is a much greater range of temperature; hot days followed by fairly hot nights may continue for weeks without cessation. In the highlands of central and northeastern Victoria, cool nights are experienced even after extremely hot days.

Gold is the chief mineral, and Victoria, though yielding the precious metal constantly since 1851, still contributes yearly a large share of Australia's huge gold output. Black coal is obtained from South Gippsland. Brown coal will soon be extensively used for generating electricity. Antimony, wolfram, and tin are mined, but the production of the last two is small.

The greater part of Victoria is splendidly grassed, but harsh spiny grass and mallee scrub, a dwarf eucalypt, cover the arid regions of the northwest. Forests in the southeastern part, the productive Gippsland district, contain eucalypts rivaled only by the gigantic sequoias of California. A eucalypt found prostrate measured 470 feet in length, and 81 feet in circumference near the roots. In the narrow valleys, the gorges, and the ravines of the mountainous region, tree ferns, acacias, and gum trees flourish, forming dense groves unrivaled outside the tropics. The she-oak occurs frequently. There are numerous varieties of wattle, the bark of most of which, especially of the black wattle, is valuable for tanning. Heath and grass trees are plentiful on the sandy plains.

Kangaroos, wallabies, wombats, bandicoots, opossums, kangaroo rats, and the native bear, a small harmless animal, were once numerous, but, with the advance of settlement, they are gradually disappearing. Sanctuaries, such as Wilson's Promontory, have been set aside, so that these interesting species may not become extinct. Immense flocks of parrots, parakeets, and cockatoos, the last having orange or crimson crests, are found in the forests. Ducks, quail, snipe, eagles, hawks, turkeys, pigeons, magpies, plover, and the giant kingfisher, sometimes called the laughing jackass, abound. There are numerous species of snakes, practically all of them being venomous.

The principal occupations are sheep raising and mining, but increased attention has been paid in late years to agriculture, and farm products now

constitute a larger source of wealth in Victoria than in any other Australian state. Wheat is the principal grain. Hay, oats, barley, and potatoes are other important crops. Grapes are grown in immense quantities and pressed into wine. Intensive fruit growing has made considerable progress along the banks of the Murray river. In recent years, dairying has become an important industry.

Manufacturing is mainly limited to supplying local needs. A great deal of harvest machinery, however, is exported.

The railroads are state property; about 4300 miles of railway were in operation in 1926.

There is no established church. Elementary instruction is compulsory between the ages of 6 and 14. Secondary education is partly controlled by the state, which maintains numerous technical and high schools. There are also private schools, primary and secondary. The big public schools are denominational, and are maintained by the churches. The University of Melbourne receives an annual grant from the state, and provides training in arts, science, education, engineering, medicine, agriculture, dentistry, and veterinary science.

The principal exports are wool, wheat, butter, hides, tallow, live stock, and dressed meats. The imports include iron and steel wares, machines, textiles, apparel, and tea.

Besides the capital, Melbourne, the other important cities are Ballarat, Bendigo (Sandhurst), and Geelong.

The first permanent settlement within the limits of the present state of Victoria was made at Port Phillip in 1835. In 1851, the Port Phillip district was constituted the colony of Victoria.

Western Australia. A state of the Commonwealth of Australia, comprising all the continent west of 129° east longitude. Its greatest length, from its extreme northern point, Cape Londonderry, to its extreme southern point, Peak Head, is 1480 miles, and its breadth, from the extreme western point, Steep Point, near Dirk Hartog's island, to the 129th meridian, is about 1000 miles.

A strip of lowlands from 50 to 100 miles wide runs along the coast rising inland to a low plateau from 1000 to 2000 feet high. The so-called mountains along the coast are really the scarp of this plateau. On the table-land are some notable elevations, the highest peak in the state being Mount Bruce with an elevation of 4024 feet. The surface of the plateau is in part sand dunes and in part clayey soil. The greater part of the interior is desert with but little vegetation, except acacia scrub and porcupine grass.

The only permanent watercourses are a few streams flowing down the western scarp into the Indian Ocean. The most important of these streams is the Swan, the others becoming a string of water holes in the dry season. There are numerous shallow depressions covered with salt and only rarely containing water, which is always saline.

The northern portion is within the tropics. The extreme north has a plentiful summer rainfall; southward the rainfall becomes scanty and the summer heat is intense. At Marble Bar in 1902 the maximum temperature reached 100° F. or over for 64 consecutive days. The central area, especially toward the east, has an annual rainfall of less than 10 inches and is useless even for pastoral pursuits. The southeastern area is within the Temperate Zone, and has a milder climate and a fair winter rainfall.

Gold is the principal mineral. Seams of good coal have been worked for years. The state produces tin, lead, copper, manganese, and antimony. Iron ores occur in immense lodes. Lack of water hampers mining. Water is brought in pipes for 300 miles to some of the gold fields. Storage tanks are utilized to remedy the lack of rivers and of springs in the mining regions.

Plant life is varied. In the southwest, there are vast forests of excellent timber, including the paper bark, wandoo, sandalwood, banksia, karri, York gum, blackbutt, red gum, tuart, and jarrah, or Australian mahogany, a wood which resists the attacks even of the toredo and of the ant. In 1925-26, about 252 million feet of timber were cut.

The fauna resembles that of other Australian states. Trepang, or *bêche de mer*, is an export.

The Kimberley district in the northwest is a splendid pastoral area, and contains numerous cattle stations. Sheep are reared in considerable numbers in the central and southern portion, but the land is poor in many areas and will carry only one sheep to two or more acres. Horses, goats, mules, and pigs are also raised.

There is as yet but little manufacturing. The principal exports include gold, silver, wool, hides, timber, wheat, fruit, and pearls.

Most of the railroad lines are government owned. Education is free and is compulsory on all children of 6 to 16 years of age. The School of Mines at Kalgoorlie and a university at Perth provide higher education.

Permanent colonizing began with the founding of the Swan River settlements, Fremantle and Perth, in 1829. Responsible government was granted in 1890. Besides Perth, the capital, other growing cities are Fremantle (the chief seaport), Boulder, Claremont, Midland Junction, Albany, Coolgardie, Kalgoorlie, Geraldton, Northam, Collie, and Bunbury. Broome, the principal port of the northwest, has an excellent harbor and is the center of the pearling industry.

The Northern Territory. A territory of the Australian Commonwealth, bounded on the north by the Arafura Sea, on the east by the 138th meridian of east longitude, on the south by the 26th parallel of south latitude, and on the west by the 129th meridian of east longitude. From north to south the territory is about 900 miles long, and from east to west, 560 miles. The length of the coast line is 1040 miles.

In the northern part, a watershed divides the rivers winding down to the sea from the rivers that flow south and disappear in the sandy soil. Some of the streams reaching the sea are navigable for a number of miles. These rivers teem with fish. There are several good harbors, the best being Port Darwin.

Most of the interior is a table-land rising gradually from the coast to an elevation of about 1700 feet. This highland contains many thousands of square miles of excellent pasturage.

Just south of the Tropic of Capricorn several short mountain ranges extend in a generally east-and-west direction. Ice often forms on them at night, though the temperature of the following day may rise to 175° F. in the sun. For hundreds of miles around these ranges the soil is sandy, and the rainfall is very light. The drovers taking cattle to the south must rely for water on artesian bores, although there are several short rivers that lose themselves in the dreary wastes of sand. Between this mountainous region and the highlands in the north, there is an immense arid area unpopulated except by aboriginals, or "blackfellows." These number about 20,000.

The Northern Territory, lying wholly within the tropics, has but two seasons—a wet season, from November to April, and a dry season, from May to October. January and February are the wettest months. Plowing is impossible during the wet season, and traveling on foot becomes extremely difficult.

Vegetation is varied and exuberant along the coast, where fresh water is abundant the year round; but inland the rainfall is too scanty to permit a rich plant life. Pines are the most important timber trees. Mangroves fringe the swampy seashore.

The fauna resembles that of the other mainland states, marsupials being the most common. Birds, tortoises, frogs, crocodiles, and snakes, some of the last being venomous, are abundant. Insect pests, as

mosquitoes and sand flies, are found everywhere. Beetles, the white ant, and butterflies of brilliant coloring are extremely numerous.

Very little is known about the mineral resources. Gold, tin, copper, silver, lead, and wolfram are mined. Pearl fishing in the coast waters is an active industry.

Agriculture is not important. But experiments indicate that most products of the Torrid and of the Temperate Zone can be grown successfully. The natural grasses provide nutritious food; and there are many large cattle stations, especially on the low-lying plateau known as the Barkly table-land. Camels are largely used for transport.

The Northern Territory, after forming a part of New South Wales, was, in 1863, annexed to South Australia, and, in 1911, was transferred to the Commonwealth.

PRINCIPAL CITIES

The following section contains a brief description of the chief cities of Australia, including each of the state or territorial capitals. The population of Australia shows a marked tendency to concentrate in the cities, the five largest of which contain about 45 per cent of the total inhabitants of the country.

Adelaide. The capital of South Australia, situated in the southern part of the state on the Torrens river, about six miles from its mouth in the Gulf of St. Vincent. A dam here forms the river into a lake a mile and a quarter long. The city stands on a wide plain near the base of the Mt. Lofty range and is divided by the Torrens into South Adelaide and North Adelaide. The former section, which includes the city proper, has most of the business houses. Adelaide is noted for its wide, handsome streets. These cross one another at right angles, and many of them are lined with shade trees. A belt of reserved park land almost surrounds the town.

Among the noteworthy public buildings are the Anglican and the Catholic cathedral, the Parliament house, the post office, the town hall, the South Australian public library, and the art gallery. The botanic garden covers four acres. There are 1751 acres of public parks. Adelaide maintains a municipal abattoir, owns the lighting plant and the tramways, and also conducts the business of the port. The city has a school of mines and industries, a meteorological observatory, and is the see of a Roman Catholic and of an Anglican bishop. The University of Adelaide, opened in 1876, offers the usual university curriculum, and also maintains a school of engineering, a school of commerce, and a large music department.

The manufactures comprise iron wares, leather, woolens, pottery, starch, soap, flour, and malt liquors. Adelaide is the trade emporium of South Australia and has a large commerce. Port Adelaide, the seaport of the city, is about 7 miles distant by rail. It is the seat of considerable manufacturing; is a port of call for vessels from Europe; and is connected by railway with the principal cities of the Commonwealth. Near by is the summer resort of Glenelg.

Adelaide was founded in 1836 and was named in honor of Queen Adelaide, consort of King William IV of England. Population, 1921, 255,481.

Ballarat. A prosperous inland city of Victoria, Australia, the center of a rich gold yielding district. It was the finding of gold nuggets near the present site of Ballarat in 1851 that started the rush of gold seekers into Australia. At Bakery Hill, there was found, in 1858, a nugget that was sold for about $50,000.

Ballarat is situated on a plain 1416 feet above the sea and is divided by the Yarrowee creek into Ballarat East and Ballarat West. The industries include iron founding, flour milling, textile weaving, brewing, and liquor distilling. The city is the see of a Roman Catholic and of an Anglican bishop. Population, 1921, 38,500.

Brisbane. The capital of Queensland, Australia, situated in the southeastern part of the state on the Brisbane river, about 25 miles from Moreton bay. Brisbane is the center of commerce and of manufacturing for southern Queensland. It has many fine buildings, including the Parliament house, town hall, post office, museum, customhouse, the Catholic and the Anglican cathedral. There are several parks and a large botanic garden.

Steamers ascend the river and berth at the wharves. There is a regular steamer communication with other ports in Australia and with the chief ports of Europe, and of the United States. Among the manufacturing establishments are flour mills, tobacco factories, breweries, tanneries, and shoe factories. Coal is mined in the vicinity.

The climate is healthful though the mean yearly temperature is 68.9° F. in the shade. Higher education is afforded by a technical college, the Brisbane grammar school, and a university, established in 1910.

Brisbane was founded in 1824 and was made a penal settlement by Sir Thomas Brisbane, governor of New South Wales. This settlement was abandoned in 1839. In 1859, Brisbane was re-established as a town and became capital of the newly formed colony of Queensland. It was proclaimed a city in 1925. Population, 1921, 210,032.

Canberra (*kăn'bĕr-ă*). The capital of Australia. It is a Federal territory, 912 square miles in area, situated about 150 miles southwest of Sydney and 60 miles inland from the east coast of Australia. The town is built on the Molongola river and is picturesquely surrounded by mountains. It was laid out by W. Burley Griffin, of Chicago, whose plans were adjudged best in a world-wide competition. These plans call for streets in concentric circles with radiating avenues. A port on Jervis bay, 70 miles to the northeast, is reckoned as part of Canberra. Population, 1925, about 4000.

Darwin. A coast town in and the government seat of the Northern Territory, Australia. Darwin occupies a site about 80 feet above high watermark, overlooking Port Darwin, a deep, spacious harbor. Just outside the town are the Darwin botanical gardens.

Darwin is the terminus of the overland telegraph and of the cable to Java and Singapore. The town is also the coast terminal of a railroad which, running to Katherine, 200 miles inland, is destined to meet the railroad to be constructed north across the country from Oodnadatta. Population, 1921, 1398.

Hobart. The capital of the Australian island state of Tasmania. The city is situated on the Derwent estuary. The harbor is safe for vessels of the largest size, and has modern wharf accommodations. Hobart's streets are wide and regular, and its public buildings compare favorably with those of much larger cities. Especially noteworthy are the post office, the palatial Government house, the houses of Parliament, the Anglican and the Catholic cathedral, and the great Baptist tabernacle. Franklin square contains a statue of Sir John Franklin, the celebrated Arctic explorer, who was governor of Tasmania from 1837 to 1843.

The manufactures include woolens, hats, flour, pottery, leather, and jam.

Most of the exports consist of fruits, hops, grain, wool, and timber. Many Australian visitors are attracted to Hobart by the cool and invigorating climate. The city is the seat of the University of Tasmania.

Hobart was founded in 1804 and was named Hobart Town in honor of Lord Hobart, then secretary of state for the colonies. In 1881 the name was changed to Hobart. Population (with suburbs), 1921, 52,391.

Melbourne. The capital of Victoria, on the Yarra Yarra river about two miles from its mouth in Hobson's bay, an arm of the Port Phillip inlet. The river is navigable by vessels drawing less than 22 feet of water, but large steamers usually anchor in the bay at Port Melbourne.

The city has wide, well paved streets, which intersect at right angles, numerous beautiful parks, and fine buildings. In recent years systematic tree planting on the river banks and on the sides of the principal thoroughfares has greatly improved the city's appearance. The Flemington race course near the city is said to be the best in the world. Melbourne has a national art gallery, a museum of natural history, zoological and botanical gardens, and an observatory. Parliament house, the public library, and Government house are magnificent edifices of stone.

The city is the see of a Roman Catholic archbishop and of an Anglican archbishop. St. Patrick's cathedral, Gothic in style, is the most conspicuous ecclesiastical edifice in the city. The University of Melbourne, with its imposing Wilson Hall and its four affiliated colleges—Trinity (Anglican), Queen's (Wesleyan), Ormond (Presbyterian), and Newman (Catholic),—stands in the foremost rank of higher institutions of learning. Ormond college is a remarkably fine structure.

Melbourne has large docks. Served by regular steamer communication with ports in Asia, Europe, and America, the city is a great emporium of foreign commerce. Railroads connect it with all the chief cities in Australia, and its interstate trade is enormous.

The climate is agreeable and healthful. The mean temperature of the hottest month, January, is 67.4° F.

Melbourne was founded in 1835 and was named after Lord Melbourne, the prime minister of England at that time. For many years Melbourne was the most important city in Australasia and grew so rapidly that it was called "Marvelous Melbourne." From 1901 to 1925 it served as the temporary capital of the Commonwealth. Population, 1921, 766,506.

Perth. The capital of Western Australia, occupying a picturesque site in the southwestern part of the state on Melville water, an expansion of the Swan river. The city

is 12 miles by rail from its port, Fremantle, a town at the mouth of the river on the Indian Ocean. Perth is the smallest of the Australian capitals, but it has all the modern municipal improvements.

Most of the business buildings are of red brick. King's park, on the outskirts of the city, contains about 1200 acres and possesses much unique natural beauty. Several beautiful smaller parks and squares embellish the city. The mint is a massive edifice of freestone. A Roman Catholic and an Anglican cathedral, a fine Wesleyan church, a town hall built by convict labor, a public library, an observatory, a music hall, and the governor's palace are some of the prominent buildings. The University of Perth was founded in 1912.

The city has an agreeable climate, the mean yearly temperature being 64.1° F. and the average annual rainfall, 33 inches. Perth was founded in 1829 and chartered in 1880. Since then the city has grown rapidly in population and in wealth. Population, 1921, 154,866.

Sydney. The largest and oldest city in Australia and the capital of New South Wales. Sydney is picturesquely situated on Port Jackson, a magnificent expanse of water, which forms a landlocked harbor extending 20 miles inland. The water in the harbor is deep enough to permit ocean-going ships to dock at the wharves and quays. Favored by this advantage, the city has become a naval station of the first rank.

The streets are wide, and, in the newer sections, are regularly laid out. Sandstone quarries in the vicinity have furnished the stone for many of the buildings. There are numerous handsome squares and parks.

Sydney has an enormous commerce. The harbor is crowded with shipping from foreign ports, and the staple Australian products are exported in immense quantities. Favored by the proximity of vast coal deposits, Sydney is also a manufacturing city. Cars, locomotives, hardware, foundry and machine shop products, clothing, boots and shoes, textiles, machinery, and malt and distilled liquors are some of the manufactures. An annual sheep show is an event of great commercial importance. Railway lines extend in several directions into the interior, and other lines connect the city with all the chief seaports of the Commonwealth.

Adjoining Victoria park stands the sumptuous main edifice of the University of Sydney with the Macleay museum of natural history. Among other prominent public buildings are the national art gallery, the Australian museum, and the town hall, a magnificent structure with an audience room containing one of the largest organs in the world. Several learned societies have their headquarters in Sydney. The botanical gardens, extensive and very beautiful, have few superiors anywhere.

The city's mean annual temperature is about 63.1° F., which is nearly the same as the average yearly temperature of Lisbon. Sydney was founded in 1788 by Captain Arthur Phillip, who had been sent by the British government to select a site for a colony. Population, 1921, 899,099.

NEW ZEALAND

A British dominion consisting of two large islands to which are attached politically a number of small islands lying at some distance from the main group. The Dominion of New Zealand is situated in the south Pacific Ocean about 1200 miles east of Australia. It lies 7000 miles almost due south from Alaska and is 4000 miles west of the coast of Chile. It is 5400 miles by direct route from San Francisco. The two large islands are called North island and South island and are separated by Cook strait, which has a width varying from 16 to 90 miles. The two islands lie entirely in the South Temperate Zone and form a group stretching about 1000 miles in a general northeast and southwest direction and having a maximum width of 180 miles. The total area of the dominion is 103,575 square miles.

North Island. The northern portion of the dominion has an area of 44,144 square miles. It is 515 miles long, and its greatest breadth is 180 miles. The island may be likened to an inverted shoe the toe of which is a long irregular peninsula extending to the northwest. This peninsula is attached to the rest of the island by a narrow isthmus, consisting of a neck six miles in width separating Hauraki gulf on the east from Manukau harbor on the west. The arch of the shoe is represented by the Bay of Plenty in the north. The only remaining inlet of any considerable size is Hawke bay on the east. North island has the two best ports of New Zealand, Port Nicholson in the south and Waitemata at the isthmus in the northwest.

Most of the surface is gently undulating with low, heavily forested hills. A volcanic area, beginning in the south, passes through the center of the island as far as the Bay of Plenty. Much of this region will not support grasses, but trees cover parts of it. It occupies the southern extension of the island from coast to coast, but, where the width of the island increases, a fertile area spreads out on each side and runs along each coast in a belt averaging about 40 miles in width. These tracts are well adapted for grazing. The northwestern peninsula is in large part covered with a heavy clay, which yields returns only in response to intensive cultivation. The peninsula has areas of rich alluvium, however, in which the mangrove, the orange tree, various palms, and the giant kauri pine flourish. The partially fossilized resin of this pine is excavated and exported in quantity to be used in the manufacture of varnish and of linoleum.

The volcanic area of North island contains many notable features. The highest volcano is Mount Ruapehu, which has an altitude of 9715 feet. It is situated about 20 miles southwest of Lake Taupo, New Zealand's largest inland body of water. Stretching north from the mountain is a region of about 5000 square miles abounding in hot springs, geysers, pools of boiling mud, and colored lakelets. This region formerly contained a famous series of pink and white terraces of volcanic formation. In 1886, however, they were blown up in an eruption which tore a chasm in the earth nine miles in length. Farther south, on Cook strait, stands one of the most beautiful mountains of the island, Mount Egmont, an extinct volcano 8340 feet in height.

The rivers of the island are short. The longest is the Waikato river, which drains the waters of Lake Taupo northward to an outlet on the west coast. It is navigable for 70 miles of its course, but it shares with nearly all the other rivers of New Zealand the disadvantage of having at its mouth a bar which obstructs navigation.

South Island. The southern portion of the dominion is slightly larger than the northern, having an area of 58,120 square miles. Off its southern coast, and separated by Foveaux strait, lies Steward island, which has an area of 665 square miles. The length of South island is 530 miles. It has a fairly uniform breadth of about 100 miles.

The outstanding feature of the surface is a mountain range called the Southern Alps, which runs from end to end near the western coast of the island. The mountains reach a maximum elevation at Mount Cook, which has an altitude of 12,349 feet. The scenic grandeur of the region is comparable to that of the European Alps. On the western slope, many glaciers flow down to the edge of the coniferous forests which cover a large part of the mountain sides. East of the divide are several long glacial lakes. The largest, Lake Wakatipu, has a depth of more than 1500 feet, and its wild, mountainous surroundings impart to it a beauty rivaling that of Lake Lucerne in Switzerland. The eastern slope descends to a plateau flanked on the east by a ridge of mountains passing through the center of the island. East of this ridge the land inclines toward the sea in grassy terraces, which provide the largest stretch of arable land in New Zealand.

Other Islands. New Zealand controls a number of islands in the south Pacific Ocean. They have a total area of about 1000 square miles and a population estimated in 1921 at 13,654. The more important of these islands are: Cook islands, about 1500 miles northeast of North island; Chatham islands, about 350 miles east of South island; Auckland islands, 200 miles south of the dominion. The Auckland islands, and many others dependent upon New Zealand, are uninhabited. The Cook islands support about 13,000 inhabitants, mainly of Polynesian race, who export tropical fruits and coffee. New

Zealand also holds a mandate over the territory of Western Samoa, a group of fertile islands 1000 miles to the north, supporting a population numbered in 1921 at 40,231. Their area is about 1050 square miles.

Climate. The prevailing winds of New Zealand blow from the west. They carry sufficient moisture to foster everywhere on the islands a vegetation of a uniform greenness that recalls the verdure of Ireland. In South island, where the mountains reach a greater height, much of the moisture is precipitated as rain on the plateau, and the warm, dry winds, descending from the elevated regions into the eastern plains, occasionally cause droughts of sufficient duration to injure the crops. Except in the mountains, the dominion is free from severe frosts, while in North island, where two-thirds of the population is concentrated, the climate is subtropical. Tempering breezes, however, blow incessantly from the ocean; yellow fever is unknown, and there are few mosquitoes or other pests usually found in subtropical regions. As a result, the mortality rate of New Zealand is one of the lowest in the world.

Flora and Fauna. The most characteristic plant of New Zealand is the fern, which flourishes in great variety everywhere. The so-called tree fern often reaches a height of 40 feet. About two-thirds of the indigenous species of vegetation are found nowhere else, and most of the others resemble those of Australia. The eucalyptus and acacia, however, which predominate in Australia, are not found in New Zealand. The nikau palm occurs even on South island, which is the southern limit for true palms. The kauri pine, the beech, and many other hardwood trees formerly covered much of the dominion's surface. Phormium, or New Zealand flax, is the dominion's outstanding contribution to the economic plants of the world. The fiber is used for binder twine and ropes. The cultivation of phormium has been introduced into Ireland, America, and several other regions of the earth. A noticeable feature of New Zealand's flora is the comparative absence of brilliant flowers.

New Zealand has not a single indigenous mammal. The dog and the rat, however, were brought by Polynesian settlers, and wild pigs, rabbits, and many other forms of animal life have been introduced by Europeans. There are no snakes, but there are a few lizards peculiar to the country. The dominion is the sole habitat of many species of birds, including the kiwi, or apteryx, a wingless and tailless bird the size of a hen. The kiwi is related to the moa, a bird which was formerly very numerous in New Zealand but which has been exterminated within the past few centuries.

Stock Raising. The bulk of New Zealand's wealth is derived from sheep and cattle. The wool clip normally amounts to more than 200 million pounds, approximately 25 to 30 per cent of that of Australia. Sheep skins to the value of 10 to 15 million dollars are exported annually. Frozen meat exports are valued at more than 50 million dollars, and 60 to 80 million dollars worth of butter and cheese is shipped. The stock is carried and fattened mainly on cultivated grasses, although in North island most of the pasturage is unplowed.

Agriculture. The greater part of the land sown to field crops is in South island. The produce, absorbed almost entirely by the domestic market, consists principally of wheat, oats, barley, and potatoes. Grain growing is not a specialized occupation, but is carried on along with stock raising. About three-quarters of New Zealand's surface is said to be capable of successful cultivation.

Mining. The four minerals produced in quantity by New Zealand are coal, gold, kauri gum, and silver. Most of the coal is mined in South island, but very little is sent out of the dominion. Gold is found in both islands, and heads the list of mineral exports.

Manufacturing and Trade. The chief manufactures of New Zealand are connected with stock raising and dairying. After meat packing and the making of dairy products, the most important industries are tanning, lumber mill operations, printing, and the manufacture of flour, of textiles, and of metal products. Industrial disputes in the dominion are settled by compulsory arbitration.

Most of the trade is with Great Britain. Australia and the United States rank next in order. The exports normally amount to 225 to 300 million dollars in value, most of which is represented by the products of New Zealand's characteristic industry, the raising of sheep and other live stock. The imports usually approximate the same value as the exports, the chief articles being iron and steel products, textiles, motor cars, oils, clothing, paper, and tobacco products.

Internal Communications. New Zealand has about 3300 miles of railroads, practically the entire mileage being owned and operated by the government. The greater part of the mileage is on South island. The telephone and the telegraph system are also under government ownership.

Inhabitants. The aborigines of New Zealand are called Maoris, a Polynesian people which is believed to have displaced an earlier race some six centuries ago. In their uncivilized state, they were polygamous, and occasionally indulged in cannibal feasts. Among them, it was supposed that the seat of the soul was the left eye. In warlike arts, wood carving, dyeing, and tattooing, they had developed a considerable skill. After a desperate resistance to the British settlers, they accepted the religion and the manner of life of the newcomers. In 1926, the Maoris in the dominion numbered 62,781.

The white population of New Zealand in 1926 was 1,344,384, nearly all of whom were of British descent. Of the total, 831,748 resided in North island, while South island and the dependencies, exclusive of Western Samoa, had 512,636. The capital is Wellington and the largest city is Auckland, both of which are in North island.

The dominion has an excellent educational system, at the head of which stands the University of New Zealand with four affiliated colleges. The university is not a teaching body. It has the power of granting degrees and is charged with conducting the examination of students prepared by the colleges. Nearly half the population are members or adherents of the English Church. The Catholics number about 14 per cent of the total.

New Zealand is divided into nine provincial districts, of which the areas and the populations in 1926 are given in the following table:

Provincial District	Area Sq. Miles	Population 1926
North island:		
Auckland	25,364	424,925
Hawke's Bay	4,241	67,653
Taranaki	3,732	65,569
Wellington	10,807	273,601
South island:		
Canterbury	13,858	213,746
Marlborough	4,225	18,568
Nelson	10,875	50,545
Otago	25,592*	214,752
Westland	4,881	15,025
Total	103,575	1,344,384

* Includes area of outlying islands except Western Samoa.

Auckland. The largest city of New Zealand, beautifully situated on a cluster of extinct volcanoes at the neck of the northwestern peninsula of North island. The isthmus is six miles in width, thus providing the city with two natural harbors, one on each side of the isthmus. The eastern harbor is protected by a volcanic cone rising to a height of 1000 feet. This harbor has been elaborately improved and is

the point of export for kauri gum and a large part of the lumber shipped abroad. The chief industries include shipbuilding, sugar refining, and the manufacture of rope and of machine shop products.

Auckland is the seat of Auckland University College and has an art gallery, a library with a valuable collection of rare manuscripts, and a museum containing many Maori relics. The mountain sides in the vicinity are terraced by former Maori fortifications. The Domain, one of the four parks of the city, contains a fine botanical garden. Auckland was until 1865 the capital of New Zealand. Population, 1926, 192,176.

Christchurch. The capital of the provincial district of Canterbury and the third largest city of New Zealand, situated near the center of the eastern coast of South island on the Avon river seven miles from its mouth. The city lies on a fertile plain and is the center of the surrounding agricultural and grazing interests. Frozen meats, wool, and lumber are exported. The chief manufactures include agricultural machinery, leather goods, furniture, and clothing.

Christchurch was founded by the "Canterbury pilgrims," a group of churchmen who left England about 1849. Many of the streets are named after English dioceses. Canterbury college is the leading educational institution. The Anglican cathedral with its dominating spire is the finest piece of church architecture in New Zealand. A museum contains numerous remains of the moa, an extinct wingless bird peculiar to New Zealand. Population, 1926, 118,408.

Dunedin. The capital of the provincial district of Otago, situated on Otago harbor, an inlet on the southeastern coast of South island. The chief exports are wool, frozen meat, and gold. Dunedin is the seat of Otago college, the largest institution for higher education in New Zealand. Population, 1926, 85,103.

Invercargill (*in'vĕr-kär'gĭl*). A port and city at the southern extremity of South island. Invercargill is the regular starting point for journeys to Lake Wakatipu and other glacial lakes of the Southern Alps. Population, 1926, 21,862.

Wanganui (*wŏ'ngä-nōō-ē*). The principal port on the west coast of North island, lying about 120 miles north of Wellington. It is regularly laid out at the foot of low hills, from the summit of which may be seen the snow-clad volcano of Mount Ruapehu. Wanganui is the export center for a pastoral and agricultural region. A monument in the beautiful Moutoa gardens commemorates a battle fought with the natives in 1864. Population, 1926, 26,130.

Wellington. The capital and second largest city of New Zealand, situated at the geographical center of the Dominion, on a mountainous site at the southern end of North island. It fronts on Lambton harbor, the most commodious in New Zealand. The port is equipped with modern facilities for handling the city's extensive commerce, which includes a large export trade in wool, meat, hides, skins, butter, cheese, and hemp. Wellington's manufactures embrace chiefly packed meats, woolen goods, soap, matches, rope, and brick. Printing and the assembling of motor vehicles are other important industries.

The government and principal office buildings are substantial, modern structures. The city has a university, two museums, an art gallery, and a Dominion research laboratory. Besides 1613 acres of parks and reserves in the city, Wellington owns a 970-acre belt of grazing land, accessible to the public, and a seaside resort on Days bay, known as Williams park. The 30-mile drive around the Wellington waterfront is one of the finest scenic routes in Oceania. Population, 1926, 121,324.

GREAT CITIES OF THE WORLD

Name of City	Country	Population	Name of City	Country	Population
Alexandria	Egypt	578,314	London (Registration)	England	4,483,249
Amoy	China	400,000	London (Greater)	England	7,476,168
Amsterdam	Netherlands	647,427	Los Angeles	United States	576,673
Baltimore	United States	733,826	Lyon	France	570,840
Bangkok*	Siam	931,171	Madras	India	526,911
Barcelona	Spain	710,335	Madrid	Spain	751,352
Belfast	Ireland	415,007	Manchester	England	730,551
Berlin (Greater)	Germany	4,013,588	Marseille	France	652,196
Birmingham	England	919,438	Melbourne (Greater)	Australia	766,506
Bombay	India	1,175,914	Mexico City	Mexico	615,367
Boston	United States	748,060	Milan	Italy	718,304
Breslau	Germany	554,801	Milwaukee	United States	457,147
Brussels	Belgium	775,039	Montreal	Canada	618,506
Budapest	Hungary	1,184,616	Moscow	Russia	2,018,286
Buenos Aires	Argentina	1,676,041	Munich	Germany	680,704
Buffalo	United States	506,775	Nagoya	Japan	768,558
Cairo	Egypt	1,059,824	Nanking	China	902,441
Calcutta (Greater)	India	1,327,547	Naples	Italy	780,220
Canton	China	1,367,000	Newark, N. J.	United States	414,524
Changsha	China	1,271,903	New York	United States	5,620,048
Chicago	United States	2,701,705	Ningpo	China	627,000
Chinkiang	China	477,591	Odessa	Russia	411,000
Chungking	China	1,011,597	Osaka	Japan	2,114,804
Cincinnati	United States	401,247	Palermo	Italy	400,348
Cleveland	United States	796,841	Paris	France	2,871,429
Cologne	Germany	698,064	Peking (Greater)	China	1,300,000
Constantinople	Turkey	1,000,000	Philadelphia	United States	1,823,779
Copenhagen	Denmark	731,496	Pittsburgh	United States	588,343
Detroit	United States	993,678	Prague	Czechoslovakia	676,476
Dresden	Germany	618,684	Rio de Janeiro	Brazil	1,157,873
Dublin	Ireland	419,156	Rome	Italy	691,341
Dusseldorf	Germany	431,096	Rotterdam	Netherlands	516,271
Edinburgh	Scotland	420,281	Saint Louis	United States	772,897
Essen	Germany	468,696	San Francisco	United States	506,676
Foochow	China	1,491,143	Santiago	Chile	507,296
Frankfort on Main	Germany	461,849	Sao Paulo	Brazil	579,033
Glasgow	Scotland	1,034,069	Shanghai	China	1,538,500
Hamburg	Germany	1,079,092	Sheffield	England	490,724
Hangchow	China	729,948	Singapore	Straits Set.	423,768
Hankow	China	1,500,000	Soochow	China	1,027,091
Hongkong	China	625,166	Stockholm	Sweden	422,042
Hyderábád	India	404,187	Sydney (Greater)	Australia	899,099
Kiev	Russia	494,000	Tientsin	China	838,629
Kiungchow	China	586,870	Tokyo	Japan	1,995,567
Kobe	Japan	644,212	Toronto	Canada	521,893
Kyoto	Japan	679,963	Turin	Italy	502,274
Leeds	England	458,320	Vienna	Austria	1,841,326
Leipzig	Germany	679,322	Warsaw	Poland	931,176
Leningrad	Russia	1,611,102	Washington	United States	437,571
Lisbon	Portugal	480,667	Wenchow	China	400,000
Liverpool	England	803,118	Yokohama	Japan	405,888
Lodz	Poland	451,813			

* Includes all of Krung Tep (Bangkok) district.

ANTARCTICA

The continent occupying the greater part of the South Frigid Zone. Its area is about equal to that of Australia. The continent lies 500 miles south of the southern tip of South America. Its distance from Australia is 2000 miles; from New Zealand, 1600 miles; and from South Africa, 2300 miles. The chief interest in the continent has been due to the fact that the south pole is situated near the center of this land mass.

The surface of Antarctica is high and mountainous. The south pole is in a plateau, about 10,000 feet high, around which rise a number of peaks exceeding 15,000 feet in altitude. Nearly all the surface is covered by a sheet of ice, 2000 feet thick in places and split here and there by great chasms. On the side nearest New Zealand, the so-called Great Ice Barrier extends along the coast for about 400 miles. This ice wall rises abruptly from the ocean to a height of from 100 to 400 feet. In winter, the whole continent is surrounded by a wide belt of frozen ocean. During the summer, this breaks up into floating pack ice, which often extends for hundreds of miles from land.

Antarctica is uninhabited. The flora is confined to lichens and mosses which, in the brief summer, may be found attached to the few bits of exposed rock and soil. Penguins, petrels, seals, and sea lions are the principal forms of animal life existing on the continent.

All expeditions in search of the south pole have landed on the side nearest New Zealand, because, on that side, the Ross Sea extends as a deep gulf into the land, thereby considerably shortening the overland distance to the pole. Near this sea is the volcanic Mount Erebus. The land west of Ross Sea is called South Victoria land, and that to the east of the sea is King Edward VII land. A lofty range of mountains rising from the sea on the side nearest South America has been named the Antarctic Andes. Gales of great violence sweep northward over the continent almost continuously from the region of the south pole. Temperatures lower than 70° below zero have been recorded by explorers.

Discovery. The more recent voyages undertaken for discovery and research in Antarctica were a Japanese expedition under Shirase, which set out in 1910; the expedition of Amundsen, which reached the south pole on December 14, 1911; that of Captain Scott, who arrived at the pole on January 18, 1912; an Australian expedition under Mawson, which, in the years 1911-14, collected much valuable information regarding the climatic conditions and the surface of the continent; Shackleton's two parties which set out in 1914 in the *Endurance* and the *Aurora*; and Byrd's famous expedition which set out in 1928 with elaborate equipment for surveying the south polar region.

SEAS AND OTHER BODIES OF SALT WATER

Name	Location	Area Sq. Miles
Adriatic Sea	Southern Europe	60,000
Ægean Sea	Southeastern Europe	70,000
Albemarle Sound	North Carolina	495
Baffin Bay	Canada-Greenland	200,000
Baltic Sea	Northwestern Europe	160,000
Bass Strait	Australia-Tasmania	32,000
Bay of Biscay	France-Spain	160,000
Bay of Fundy	New Brunswick-Nova Scotia	6,300
Bering Sea	Alaska-Siberia	878,000
Black Sea	Southeastern Europe	165,000
Buzzards Bay	Massachusetts	235
Caribbean Sea	Central America-South America-West Indies	750,000
Chesapeake Bay	Maryland-Virginia	6,000
China Sea, East	China-Japan	480,000
Delaware Bay	Delaware-New Jersey	1,000
English Channel	England-France	30,000
Gulf of Aden	Arabia-Somaliland	85,000
Gulf of Bothnia	Sweden-Finland	43,000
Gulf of California	Northwestern Mexico	64,000

SEAS AND OTHER BODIES OF SALT WATER—Con.

Name	Location	Area Sq. Miles
Gulf of Carpentaria	Northern Australia	120,000
Gulf of Finland	Finland-Esthonia, Europe	15,000
Gulf of Mexico	United States-Mexico-Cuba	700,000
Gulf of Riga	Esthonia-Latvia, Europe	7,000
Gulf of St. Lawrence	Canada-Newfoundland	75,000
Gulf of Siam	French Indo-China-Malay Peninsula	100,000
Gulf of Tonkin	China-French Indo-China	45,000
Hudson Bay	Northeastern Canada	470,000
Irish Sea	Ireland-Great Britain	75,000
Japan Sea	Japan-Korea	400,000
Long Island Sound	Connecticut-Long Island	1,500
Mediterranean Sea	Europe-Asia-Africa	1,145,000
Mozambique Chan.	Mozambique-Madagascar	430,000
Narragansett Bay	Rhode Island	140
North Sea	Great Britain-Continental Europe	220,000
Okhotsk Sea	Eastern Siberia	580,000
Persian Gulf	Persia-Arabia	89,000
Puget Sound	Washington	2,000
Red Sea	S. W. Asia-N. E. Africa	177,000
St. George's Channel	Ireland-Wales	8,000
San Francisco Bay	California	350
Sea of Marmora	European Turkey-Asiatic Turkey	4,500
Skagerrak	Denmark-Norway	12,000
Strait of Magellan	Southern Chile-Tierra del Fuego	2,000
White Sea	Northeastern Russia	45,000
Yellow Sea	China-Korea-Southern Japan	240,000

NOTED WATERFALLS

Name	Location	Height (feet)
Bridal Veil	Yosemite, Cal.	620
Gastein	Austria	480
Gavarnie	Pyrenees	1,385
Grand Falls	Labrador	316
Great Falls	Montana	526
Great Falls	Potomac River	35
Great Umgeni	Natal	364
Harsprang	Sweden	110
Iguassu	Argentina	215
Illilouette	Yosemite, Cal.	370
Juanacatlan	Mexico	70
Kaieteur Fall	British Guiana	741
Kar Kloof	Natal	350
Krimmler	Austria	1,300
Kukenaam	Guiana	1,500
Minnehaha	Minnesota	60
Montmorency	Quebec	265
Multnomah	Oregon	607
Nevada Falls	California	594
Niagara Falls	New York	167
Portage Falls	Portage, N. Y.	110
Rhine Falls	Schaffhausen	710
Ribbon Falls	Yosemite, Cal.	1,612
Roraima	Guiana	2,000
Ruikanfos	Norway	805
St. Anthony	Minnesota	50
Seculéjo	Pyrenees Mts.	820
Sellesche	Switzerland	128
Seneca Falls	New York	50
Shoshone	Idaho	210
Skykjefos	Norway	660
Snoqualmie	Washington	267
Staubbach	Switzerland	870
Sutherland	New Zealand	1,904
Takakkow	British Columbia	1,400
Taughannock	New York	215
Tequendama	Colombia, S. Am.	475
Terni	Italy	650
Trollhattan	Sweden	108
Twin Falls	British Columbia	400
Vernal Fall	California	320
Victoria	Africa	343
Voringsfos	Norway	520
Widow's Tears	Yosemite, Cal.	1,170
Yellowstone (2 falls)	Wyoming	420
Upper	Wyoming	110
Lower	Wyoming	310
Yosemite (3 falls)	California	2,370
Upper	California	1,430
Middle	California	620
Lower	California	320

NOTED MOUNTAINS AND VOLCANOES

The following list is a selection representative of important mountains. It contains one or more of the higher peaks in various regions of the world, includes some of the greatest volcanic mountains, and embraces also a number of the most active volcanoes. All volcanic mountains, including extinct, quiescent, and active volcanoes, are in italics; some of the more active volcanoes are indicated by an asterisk thus, *Stromboli**.

Name of Mountain or Peak	Location	Height Feet
Aconcagua	Chile-Argentina	23,080
Adams	Washington	12,307
Altar	Ecuador	17,730
Antisana	Ecuador	19,260
Apo	Philippine Is.	9,610
Ararat	Turkey	17,212
Arequipa (Misti)	Peru	20,013
*Asama**	Japan	8,280
*Aso-San**	Japan	5,545
Baker	Washington	10,837
*Bandai-San**	Japan	6,035
Ben Nevis	Scotland	4,406
Blackburn	Alaska	16,140
Bruce	Australia	4,024
Cayambi	Ecuador	19,186
Cenis, Mt.	France	11,755
Chimborazo	Ecuador	20,498
Chinati Peak	Texas	7,730
Clingmans Dome	Tennessee	6,644
*Colima**	Mexico	13,000
Cook	New Zealand	12,349
Coseguina	Nicaragua	3,830
*Cotopaxi**	Ecuador	19,613
Cradle	Australia	5,069
Crillon	Alaska	15,900
Demavend	Persia	18,500
Dhawalaghiri	Nepal, Asia	26,826
Elbert	Colorado	14,420
Elbruz	Russia	18,465
Elgon	Uganda, Africa	14,140
*Erebus**	Antarctica	12,370
*Etna**	Sicily	10,758
Everest	Nepal, Asia	29,141
*Fuego**	Guatemala	12,579
Fuji	Japan	12,395
Galdhöppigen	Norway	8,399
Gannett Peak	Wyoming	13,785
Godwin-Austen	Kashmir, India	28,250
Haleakala	Hawaii	10,032
*Hecla**	Iceland	5,110
Hermon	Palestine	9,050
Holy Cross	Colorado	14,170
Hood	Oregon	11,225
Hooker	Canada	10,505
Huascaran	Peru	22,051
Hyndman Peak	Idaho	12,078
Illimani	Bolivia	21,192
*Izalco**	Salvador	6,000
Iztaccihuatl	Mexico	16,960
Jorullo	Mexico	4,265
Jungfrau	Switzerland	13,670
Kanchanjanga	Sikkim-Nepal, Asia	28,156
Katahdin	Maine	5,273
*Katmai**	Alaska	7,500
Kenia	East Africa	17,191
Kibo Peak (Kilimanjaro)	East Africa	19,456
*Kilauea**	Hawaii	4,000
Kings Peak	Utah	13,498
Korintje	Sumatra	12,480
Kosciusko	Australia	7,323
*Lassen**	California	10,577
Lebanon	Syria	10,050
Llullaillaco	Chile	20,598
Logan, Mt.	Yukon, Canada	19,850
Loma Tina	Haiti	10,300
Long's Peak	Colorado	14,271
McKinley	Alaska	20,300
Maipu	Chile-Argentina	17,576
Marcy	New York	5,344
Matterhorn	Switzerland	14,782
Mauna Kea	Hawaii	13,823
*Mauna Loa**	Hawaii	13,675
Mercedario	Argentina	22,300
Miltsin	Morocco	11,400
Mitchell	North Carolina	6,711
Mont Blanc	France	15,781
Monte Rosa	Italy	15,217
Morrison	Formosa, Japan	14,300
Mount of Olives	Palestine	2,723
North Truchas Peak	New Mexico	13,306
Olympus	Greece	9,794

NOTED MOUNTAINS AND VOLCANOES—Con.

Name of Mountain or Peak	Location	Height Feet
Orizaba	Mexico	18,250
Parnassus	Greece	8,070
Peaks of Otter	Virginia	4,001
*Pelée**	Martinique, W. I.	4,300
Perdu, Mont	France	10,994
Perote, Cofre de	Mexico	13,419
Pico, Peak of	Azores	7,613
Pikes Peak	Colorado	14,108
Popocatepetl	Mexico	17,876
Rainier	Washington	14,408
Rogers	Virginia	5,719
Roraima	Venezuela	8,740
Ruapehu	New Zealand	9,715
Ruwenzori	Uganda, Africa	16,800
Sahama	Bolivia	21,047
Saint Bernard	Switzerland	8,110
Saint Elias	Alaska	18,024
Saint Gotthard	Switzerland	10,490
Saint Helens	Washington	9,697
San Francisco	Arizona	12,611
*Sangai**	Ecuador	17,464
San José	Chile	20,020
*San Miguel**	Salvador	7,120
Santa Fé (Baldy Peak)	New Mexico	12,623
Shasta	California	14,380
Simplon	Switzerland	11,117
Sinai, Mt.	Arabia	8,593
Sir Donald	British Columbia, Can.	10,808
Sir Sandford	British Columbia, Can.	11,590
Skaptar Jokull (Laki)	Iceland	2,790
Snehaetta	Norway	7,615
Snowdon	Wales	3,560
Sorata	Bolivia	21,500
*Soufrière, La**	St. Vincent, W. I.	3,700
Spruce Knob	West Virginia	4,860
*Stromboli**	Lipari Is. N. of Sicily	3,040
Tahiti, Peak of	Friendly Is.	7,349
Teneriffe	Canary Is.	12,190
Terror	Antarctica	10,900
Tolima	Colombia	18,325
Toluca	Mexico	14,950
*Tunguragua**	Ecuador	16,690
Tupungato	Chile	22,329
Vancouver	Alaska	15,666
*Vesuvius**	Italy	4,260
Washington	New Hampshire	6,288
Wheeler Peak	Nevada	13,058
Whitney	California	14,501
Wrangell	Alaska	17,500

IMPORTANT MOUNTAIN PASSES

Pass	Location	Altitude (feet)
Alpine	Colorado	13,550
Argentine	Colorado	13,286
Athabaska	Alberta	6,025
Bolan	Baluchistan	5,880
Brenner	Austrian Alps	4,588
Cajon	California	3,820
Chilkat	Yukon	4,950
Chilkoot	Alaska	3,500
Cottonwood	Colorado	13,500
Crowsnest	Alberta	4,330
Fremont	Colorado	11,313
Glorieta	New Mexico	7,421
Kearsage	Sierra Nevada	12,000
Khyber	Afghanistan	3,373
Kicking Horse	Alberta	5,332
Kootenay (North)	Alberta	6,774
Kootenay (South)	Alberta	7,100
Marshall	Colorado	10,841
Raton	New Mexico	7,608
Rogers	British Columbia	4,340
St. Bernard, Great	Swiss Alps	8,100
St. Gotthard	Swiss Alps	6,936
San Gorgonio	California	2,559
Shipka	Bulgaria	4,300
Simplon	Swiss Alps	6,595
Simpson	Alberta	6,650
Siskiyou	Oregon	4,125
Tehachapi	California	3,963
Tennessee	Colorado	10,418
Truckee	California	5,818
Uspallata (Cumbre)	Chile	12,340
Vermilion	Alberta	5,264
White Pass	Alaska	2,600
Yellowhead (Tete Jaune)	Alberta	3,738

PRINCIPAL ISLANDS

Name	Location	Dependency, Territory, or part of	Discovery, Conquest, or Settlement		Area Sq. Mi.	Population	Chief City or Town
			By Whom †	Date			
Aleutian	Bering S.-Pac. O.	Alaska	Russians	1741	6,391	1,080	Unalaska
Azores	Atl. O. W. of Port.	Portugal	Cabral, *P.*	1432	922	242,613	Ponta Delgada
Bahama	Atl. O. E. of Fla.	Great Britain	Columbus, *S.*	1492	4,404	53,031	Nassau
Balearic	Mediterranean S.	Spain	Romans	123‡	1,935	338,894	Palma
Barbados	West Indies	Great Britain	British	1625	166	155,820	Bridgetown
Bermuda	West Indies	Great Britain	Bermudez, *S.*	1522	19	20,127	Hamilton
Borneo	East Indies	Gr. Brit. and Neth.	De Gomez, *P.*	1518	237,916	2,072,100	Sandakan
Bornholm	Baltic Sea	Denmark	Norse	B.C.?	210	41,364	Rönne
Canary Is.	Atl. O. W. of Afr.	Spain	French	1334	2,810	503,151	Las Palmas
Cape Breton	Atl. O.-G. of St. Lawr.	Nova Scotia	Cabot, *E.*	1497	3,120	131,495	Sydney
Cape Verde	Atl. O. W. of Afr.	Portugal	Cadamosta, *P.*	1456	1,480	149,793	Praia
Celebes	East Indies	Netherlands	Portuguese	1512	72,679	3,108,337	Makassar
Ceylon	Ind. O. S. of India	Great Britain	Portuguese	1505	25,332	4,504,549	Colombo
Channel Is.	English Channel	Great Britain	Breton Celts	B.C.	75	89,614	St. Helier
Corsica	Mediterranean S.	France	Phocaeans	560‡	3,367	281,959	Ajaccio
Cuba	West Indies	Cuba*	Columbus, *S.*	1492	44,164	2,889,004	Havana
Cyprus	Mediterranean S.	Great Britain	Egyptians	1500‡	3,584	310,709	Nicosia
Easter	S. Pacific Ocean	Chile	Roggeveen, *D.*	1722	45	100	
Elba	Mediterranean S.	Italy	Romans	B.C.	85	25,480	Porto Ferrajo
Falkland Is.	Atlantic O.	Great Britain	Davis, *E.*	1592	5,618	3,271	Stanley
Faroe	N. Atlantic O.	Denmark	Norwegians	9th c.	540	21,364	Thorshavn
Fernando Po	G. of Guinea, Afr.	Spain	Portuguese	1486	1,185	12,108	Santa Isabel
Fiji	S. Pacific Ocean	Great Britain	Tasman, *D.*	1643	7,083	157,266	Suva
Gottland	Baltic Sea	Sweden	Swedes	9th c.	1,220	56,235	Wisby
Great Britain	Atl. O.-North Sea	Great Britain	Romans	55‡	88,745	42,767,530	London
Greenland	Arctic O.	Denmark	Norwegians	982	825,000	14,355	Sydproven
Guadeloupe	West Indies	France	Columbus, *S.*	1493	688	229,839	Pointe-à-Pitre
Guam	East Indies	United States	Magellan, *P.*	1521	210	16,159	Agana
Haiti	West Indies	Haiti*-S. Domingo*	Columbus, *S.*	1492	29,536	3,500,000	Port-au-Prince
Hawaiian Is.	Pacific Ocean	United States	Jas. Cook, *E.*	1778	6,449	255,912	Honolulu
Hebrides	Atl. O.-The Minch	Great Britain	Norw. vikings	6th c.	2,812	78,947	Rothesay
Iceland	No. Atlantic O.	Denmark	Norwegians	860	39,709	94,679	Reykjavik
Ireland	Irish S.-Atl. O.	Great Britain	Ancient Celts	B.C.	31,829	4,229,124	Dublin
Isle of Man	Irish Sea	Great Britain	Ancient Celts	B.C.	227	60,238	Douglas
Isle of Pines	Caribbean Sea	Cuba	Columbus, *S.*	1494	90	3,300	Nueva Gona
Isle of Wight	English Channel	Great Britain	Romans	43	145	94,697	Newport
Jamaica	West Indies	Great Britain	Columbus, *S.*	1494	4,431	858,188	Kingston
Japan	S. of Japan-Pac. O.	Japan*	Portuguese	1542	148,756	55,961,140	Osaka
Java	East Indies	Netherlands	Portuguese	1511	50,557	35,017,204	Batavia
Jersey	English Channel	Great Britain	Bretons	B.C.	45	49,494	St. Helier
Kodiak	Gulf of Alaska	Alaska	Russians	1763	36,000	1,500	Karluk
Long Island	Long Is. So.-Atl. O.	New York	Hudson, *E.*	1609	1,682	2,723,914	Brooklyn
Luzon	Philippine Is.	United States	Portuguese	1521	40,814	5,000,000	Manila
Madagascar	Ind. O. E. of Afr.	France	Portuguese	1506	228,000	3,613,341	Antananarivo
Madeira	Atl. O. W. of Afr.	Portugal	Portuguese	1419	314	169,777	Funchal
Madura	East Indies	Netherlands	Dutch	1747	1,770	1,843,601	Bankalan
Malta	Mediterranean S.	Great Britain	Phœnicians	1000‡	91	228,534	Valletta
Marthas Vineyard	Vineyard So.-Atlantic O.	Massachusetts	Gosnold, *E.*	1602	107	4,372	Edgartown
Martinique	West Indies	France	Spanish	1493	385	244,439	Fort-de-France
Mauritius	Ind. O. E. of Afr.	France	Portuguese	1505	720	385,074	Port Louis
Nantucket	Atlantic O.	Massachusetts	Gosnold, *E.*	1602	51	2,797	Nantucket
New Caledonia	Oceania	France	Jas. Cook, *E.*	1774	7,650	50,608	Noumea
Newfoundland	Atlantic O.	Great Britain	Cabot, *E.*	1497	42,734	259,358	St. Johns
New Guinea	East Indies	Neth.-Gr. Brit.-Australia	Portuguese	1526	321,232	822,348	Madang
New Zealand	Tasman S.-S. Pac. O.	Great Britain	Tasman, *D.*	1642	103,575	1,344,384	Auckland
Nova Zembla	Barents S.-Kava S.	Russia	English	1556	35,000	100	
Orkney	Atlantic Ocean	Scotland	Ancient Picts	B.C.?	390	24,109	Kirkwall
Philippines	East Indies	United States	Magellan, *P.*	1521	114,400	10,350,330	Manila
Porto Rico	West Indies	United States	Columbus, *S.*	1493	3,435	1,297,772	San Juan
Prince Edward	G. of St. Lawrence	Canada	Cabot, *E.*	1497	2,184	88,615	Charlottetown
Queen Charlotte	Hecate St.-Pac. O.	Brit. Columbia	Jas. Cook, *E.*	1778	5,100	700	
Reunion	Ind. O. E. of Afr.	France	Portuguese	1513	970	173,190	St. Dennis
Saint Helena	S. Atl. O. W. of Afr.	Great Britain	Portuguese	1502	47	3,747	Jamestown
Sakhalin	Okhotsk S.	Japan-Russia	Dutch	1650	24,560	140,000	
Samoa, Amer.	S. Pacific Ocean	United States	Roggoveen, *D.*	1722	58	8,056	Pagopago
Santa Catalina	G. of St. Catalina	California	Cabrillo, *P.*	1542	85	634	Avalon
Sardinia	Mediterranean S.	Italy	Carthaginians	500‡	9,299	866,681	Cagliara
Shetland	Atl. O.-North Sea	Scotland	Ancient Picts	B.C.?	566	25,520	Lerwick
Sicily	Mediterranean S.	Italy	Phœnicians	1000‡	9,935	4,132,156	Palermo
Spitzbergen	Arctic Ocean	Norway	Barents, *D.*	1596	25,000	1,000	
Sumatra	East Indies	Netherlands	Portuguese	1508	163,138	5,852,135	Padang
Taiwan**	China Sea	Japan	Portuguese	1590	13,944	3,654,398	Taihoku
Tasmania	Bass St.-Ant. O.	Australia	Tasman, *D.*	1642	26,215	213,877	Hobart
Tierra del Fuego	St. of Magellan-Antarctic O.	Chile-Argentina	Magellan, *P.*	1520	19,299	2,500	Ushuaia
Tobago	West Indies	Great Britain	Columbus, *S.*	1498	114	23,390	Scarborough
Trinidad	West Indies	Great Britain	Columbus, *S.*	1498	1,863	342,523	Port-of-Spain
Unalaska	Bering S.-Pac. O.	Alaska	Russians	1741	800	400	Unalaska
Vancouver	St. of Georgia-Pac. O.	Brit. Columbia	Vancouver, *E.*	1792	16,400	110,568	Victoria
Virgin Is.	West Indies	United States	Columbus, *S.*	1493	132	26,051	St. Thomas
Zanzibar	Ind. O. E. of Afr.	Great Britain	Egyptians	B.C.	640	113,624	Zanzibar

* Independent state. † Capital letters in italics, following names, indicate nationality of the discovery, thus *D.* signifies Dutch; *E.*, English; *P.*, Portuguese; *S.*, Spanish. ‡ Before Christ. ** Formerly Formosa.

IMPORTANT RIVERS

Name	Location	Length Miles	Drainage Basin Sq. Miles	Outlet	Largest City or Town on Banks
Amazon	South America	3,400	2,500,000	Atlantic Ocean	Pará
Amur	Northeastern Asia	2,700	780,000	Sakhalin Gulf	Blagovieschtchensk
Arkansas	United States	2,000	189,000	Mississippi R.	Wichita
Assiniboine	Manitoba-Saskatchewan	450	52,600	Red R. of North	Winnipeg
Athabaska	Alberta	765	58,910	Lake Athabasca	Athabaska
Brahmaputra	India	1,800	425,000	Bay of Bengal	Dibrughur
Clyde	Scotland	100	1,480	Irish Sea	Glasgow
Colorado	United States-Mexico	2,000	250,000	G. of Cal.	Yuma
Columbia	Canada-United States	1,400	298,000	Pacific Ocean	Vancouver, Wash.
Congo	W. Equat. Africa	3,000	1,500,000	Atlantic Ocean	Boma
Connecticut	New England	350	11,000	Long Is. Sound	Hartford
Cumberland	S. E. United States	688	18,000	Ohio River	Nashville
Danube	Southeastern Europe	1,750	300,000	Black Sea	Vienna
Darling	Australia	1,160	200,000	Murray River	Bourke
Delaware	E. United States	360	12,012	Delaware Bay	Philadelphia
Dnieper	S. European Russia	1,400	202,000	Black Sea	Kiev
Don	S. E. European Russia	1,300	166,000	Sea of Azov	Rostov
Douro	Spain-Portugal	500	37,500	Atlantic Ocean	Toro
Dvina	Latvia-Russia	1,000	140,000	White Sea	Archangel
Ebro	Spain	470	30,000	Mediterranean Sea	Saragossa
Elbe	Germany	700	55,000	North Sea	Hamburg
Euphrates	Mesopotamia, W. Asia	1,700	260,000	Persian Gulf	Basra
Fraser	British Columbia	750	91,700	Strait of Georgia	New Westminster
Ganges	India	1,500	400,000	Bay of Bengal	Cawnpore
Hudson	New York	300	13,000	New York Bay	New York
Hwang	China	2,600	400,000	Gulf of Pechili	Lanchow
Indus	India	1,800	372,000	Arabian Sea	Hyderabad
Irrawaddy	India	1,250	158,000	Bay of Bengal	Mandalay
Jordan	Palestine, S. W. Asia	200	1,500	Dead Sea	
Kuskokwim	Alaska	700	50,000	Bering Sea	
Lena	Siberia	2,800	900,000	Arctic Ocean	Yakutsk
Loire	France	650	45,000	Bay of Biscay	Nantes
Mackenzie	N. W. Terr., Canada	2,525	680,000	Arctic Ocean	Ft. Providence
Marne	France	325	4,894	Seine	Chalôns-sur-Marne
Mekong	Indo-China	2,600	280,000	South China Sea	Pnompenh
Meuse	Belgium-France	575	12,740	North Sea	Liege
Mississippi	United States	2,500	725,000	Gulf of Mexico	Saint Louis
Missouri	United States	3,000	525,000	Mississippi R.	Kansas City
Missouri-Mississippi*	United States-Canada	4,200	1,250,000	Gulf of Mexico	Saint Louis
Murray	Australia	1,450	270,000	Indian Ocean	Kapunda
Nelson*	Canada	1,660	370,000	Hudson Bay	Port Nelson
Niger	Western Africa	2,600	600,000	Gulf of Guinea	Asaba
Nile	Cent. and N. E. Africa	4,000	1,100,000	Mediterranean Sea	Cairo
Ob	N. W. Siberia	2,500	1,125,200	Gulf of Ob	Barnaul
Oder	Germany	560	43,000	Baltic Sea	Breslau
Ohio	Eastern United States	975	214,000	Mississippi R.	Pittsburgh
Orange	Southeastern Africa	1,300	400,000	Atlantic Ocean	Hopetown
Orinoco	South America	1,500	368,000	Atlantic Ocean	Ciudad Bolivar
Ottawa	Ontario-Quebec	685	86,000	St. Lawrence R.	Ottawa
Peace	British Columbia-Alberta	1,065	117,000	Slave River	Peace River
Plata-Parana	South America	2,500	1,200,000	Atlantic Ocean	Rosario
Po	Italy	420	27,000	Adriatic Sea	Turin
Potomac	Eastern United States	450	15,000	Chesapeake Bay	Washington
Red	Texas-Arkansas	1,200	90,000	Mississippi R.	Shreveport
Red River of the North	United States-Canada	545	63,400	Lake Winnipeg	Winnipeg
Rhine	N. W. Europe	800	75,000	North Sea	Cologne
Rhone	France	500	38,000	Mediterranean Sea	Lyon
Rio Grande	S. W. United States	2,000	240,000	Gulf of Mexico	El Paso
Sacramento	California	400	27,100	Suisun Bay	Sacramento
Saguenay	Quebec, Canada	405	35,900	St. Lawrence	Chicoutimi
St. Lawrence	United States-Canada	750	500,000	Gulf of St. Law.	Montreal
San Francisco	Eastern Brazil	1,800	200,000	Atlantic Ocean	Penedo
San Joaquin	California	350	30,000	Sacramento R.	Stockton
Seine	France	480	30,000	English Channel	Paris
Shannon	Ireland	250	4,500	Atlantic Ocean	Limerick
Susquehanna	N. E. United States	500		Chesapeake Bay	Harrisburg
Tagus	Portugal	565	31,850	Atlantic Ocean	Lisbon
Tennessee	S. E. United States	1,200	44,000	Ohio River	Knoxville
Thames	England	215	6,000	North Sea	London
Tiber	Italy	240	6,840	Mediterranean	Rome
Ural	Russia	1,400	85,000	Caspian Sea	Orenburg
Vistula	Poland-Danzig	650	76,000	Baltic Sea	Warsaw
Volga	Russia	2,300	563,300	Caspian Sea	Saratov
Weser	Germany	300	18,530	North Sea	Bremen
Yangtze	China	3,300	650,000	East China Sea	Nanking
Yenisei	Mongolia-Siberia	3,000	1,000,000	Arctic Ocean	Krasnoyarsk
Yukon	Alaska-Canada	2,300	330,000	Bering Sea	Dawson
Zambezi	South Africa	2,200	600,000	Indian Ocean	Livingstone

* River system.

WORLD TRAVEL DISTANCES

The chief ports of the world are named in alphabetical order across the top and down the sides of the tables. The distance between any two ports will be found at the intersection of the two columns which contain the names of the selected ports. Thus the distance from Baltimore to Bombay is given as 8431, and the small "s" shows that the route is via Suez Canal. Distances are for full-powered steam vessels reckoned in nautical miles.

	Amsterdam	Antwerp	Barbados	Belfast	Bombay	Boston	Bremen	Buenos Aires	Cape Town	Cherbourg	Genoa	Glasgow	Hamburg	Havana	Havre	Hongkong	Liverpool	London	Melbourne	New Orleans	New York	Plymouth, Eng.	Rio de Janeiro	San Francisco	Shanghai	Singapore	Southampton	Valparaiso	Yokohama
Amsterdam	.....	135	3877	733	s 6336	3164	272	6370	6193	303	2237	818	290	4335	267	9764	711	201	11,131	4837	3346	385	5280	P 8135	10,507	S 8324	277	P 7473	11,226
Antwerp	135	.....	3841	697	s 6300	3128	357	6334	6157	267	2201	782	385	4299	231	9728	675	180	11,095	4801	3310	349	5244	P 8099	10,471	8288	238	P 7437	11,190
Baltimore	3696	3672	1853	3204	s 8431	674	3851	5945	6913	3357	4343	3322	3934	1107	3478	P 11,618	3393	3627	P 10,319	1632	410	3319	4844	P 5189	P 10,576	S 10,419	3383	P 4560	9725
Barbados	3877	3841	.....	3637	s 8199	1880	4090	4169	5284	3596	4100	3719	4108	1472	3662	P 10,589	3627	3801	S 9214	2051	1825	3503	3079	P 4542	P 9937	S 10,187	3622	P 3880	8967
Belfast	733	697	3637	.....	6245	2730	880	6271	6089	459	2146	113	891	3899	528	9673	137	663	P 11,040	4401	2912	360	5168	P 7860	P 10,535	S 8233	488	P 7198	S 11,135
Bermuda	3248	3112	1222	2958	7876	707	3459	5175	6181	2967	3771	2885	3477	1158	3033	P 11,052	2945	3172	P 9677	1643	699	2851	4094	P 5005	P 10,400	S 9864	2956	P 5343	P 9430
Bombay	s 6336	s 6300	s 8199	6245	.....	7962	6549	C 8349	4749	6040	4473	6327	6567	s 9000	6115	4090	6223	6260	6535	9502	8153	5997	C 7824	9780	4633	2452	6090	M 9875	5352
Boston	3164	3128	1880	2730	s 7962	.....	3377	5804	6776	2883	3863	2777	3395	1422	2949	11,390	2854	3088	P 10,162	1924	379	2791	4714	P 5490	P 10,885	S 9950	2909	P 4828	P 9915
Bremen	272	357	4090	880	6549	3377	.....	6583	6406	513	2450	922	171	4548	480	9977	924	409	S 11,344	5050	3559	598	5501	P 8348	P 10,720	8537	479	P 7686	S 11,439
Buenos Aires	6370	6334	4169	6271	C 8349	5804	6583	.....	3778	6074	6130	6350	6601	5669	6151	C 10,643	6258	6294	9099	6255	5838	6029	1135	M 7536	C 11,386	9376	6124	M 2766	C 12,105
Cape Town	6193	6157	5284	6089	4604	6776	6406	3778	.....	5897	5972	6168	6424	6716	5966	6898	6076	6117	5814	7347	6795	5852	3267	P 9727	7641	S 5631	5947	5447	8360
Charleston	3846	3810	1630	3561	s 8388	845	4059	5790	6828	3565	4459	3498	4077	605	3631	P 10,930	3548	3770	P 9555	1107	614	3473	4700	P 4883	P 10,278	S 10,546	3591	P 4221	P 9308
Cherbourg	303	267	3596	459	6040	2883	513	6074	5897	.....	1941	544	531	4029	71	S 9468	437	227	10,835	4531	3065	108	4984	P 7854	10,211	8028	83	P 7192	S 10,930
Colon	4818	4782	1225	4543	s 9283	2173	5031	5318	6410	4537	5184	4625	5049	987	4603	P 9364	4530	4742	P 7989	1380	1972	4445	4228	P 3317	P 8712	S 11,271	4563	P 2655	P 7742
Constantinople	2898	3158	5057	3103	3837	4820	3407	7381	s 6137	2898	1312	3185	3425	5852	2975	P 7266	3081	3118	P 8633	6354	5011	2855	5997	P 9464	8009	S 5826	2948	P 9583	P 8728
Galveston	5031	4995	2240	4595	9696	2118	5244	6378	7470	4725	5591	4641	5262	765	4816	P 10,864	4719	4955	P 9489	380	1893	4658	5288	P 4817	P 10,212	S 11,678	4776	P 4155	P 9242
Genoa	2237	2201	4100	2146	4473	3863	2450	6130	5972	1941	.....	2228	2468	4895	2018	7901	2124	2161	9268	5397	4054	1898	5040	P 8501	8644	6461	1991	P 7839	S 9363
Gibraltar	1389	1353	3252	1298	4953	3015	1602	5282	5124	1093	854	1380	1620	4047	1162	S 8381	1276	1313	9748	4549	3206	1050	4192	P 7653	9124	6941	1143	P 6991	S 9843
Glasgow	818	782	3719	113	6327	2777	922	6350	6168	544	2228	.....	1049	3945	610	9755	210	745	11,122	4447	2959	442	5158	P 7942	10,498	8315	570	P 7280	S 11,217
Hamburg	290	385	4108	891	6567	3395	171	6601	6424	531	2468	1049	.....	4566	498	9995	942	427	11,362	5068	3577	616	5519	P 8366	10,738	8555	497	P 7704	S 11,457
Havana	4335	4299	1472	3899	s 9000	1422	4548	5669	6716	4029	4895	3945	4566	.....	4120	P 10,351	4023	4259	P 8976	597	1197	3962	4579	P 4304	9699	S 10,982	4080	P 3642	P 5022
Havre	267	231	3662	528	6115	2949	480	6151	5966	71	2018	610	498	4120	.....	9537	503	194	10,904	4622	3131	175	5061	P 7920	10,280	8097	105	P 7258	11,999
Hongkong	9764	9728	P 10,589	9673	4090	11,390	9977	C 10,643	6898	S 9468	7901	9755	9995	P 10,351	9537	.....	9651	9688	5031	P 10,744	P 11,336	P 9425	C 10,118	6041	853	1440	S 9518	10,536	1580
Honolulu	P 9569	P 9533	P 5976	P 9294	8375	P 6924	P 9782	M 7709	M 10,390	P 9288	P 9935	P 9376	P 9800	P 5738	P 9354	P 4858	P 9281	P 9493	4916	P 6131	P 6723	P 9196	M 8587	2089	4333	5925	P 9314	5916	3445
Jamaica	4314	4278	1040	4039	s 8844	1658	4527	5166	6260	4033	4739	4121	4545	716	4099	P 9914	4026	4238	P 8539	1115	1457	3941	4076	P 3867	P 9262	S 10,826	4059	P 3205	P 8292
Lisbon	1111	1087	3085	1020	5249	2797	1324	5304	5148	815	1150	1102	1342	4174	884	8677	998	1035	10,044	4676	3025	770	4214	P 7597	S 9420	7237	865	P 6935	10,139

two columns which contain the names of the selected ports. Thus the distance from Manila to Havana is given as 10,420, and the small "P" shows that the route is via Panama Canal. Distances are for full-powered steam vessels reckoned in nautical miles.

	Amsterdam	Antwerp	Barbados	Belfast	Bombay	Boston	Bremen	Buenos Aires	Cape Town	Cherbourg	Genoa	Glasgow	Hamburg	Havana	Havre	Hongkong	Liverpool	London	Melbourne	New Orleans	New York	Plymouth, Eng.	Rio de Janeiro	San Francisco	Shanghai	Singapore	Southampton	Valparaiso	Yokohama
Liverpool	711	675	3624	137	6223	2854	924	6258	6076	437	2124	210	942	4023	503	9651	.....	638	11,018 S	4525	3036	345	5158	7847 P	10,394 S	8211	463	7185 P	11,113 S
London	201	180	3801 P	663	6260	3088 S	409 S	6294 C	6117	227	2161	745	427	4259 P	194	9688	638 S	.....	11,055 T	4761 P	3270	309	5204 C	8059 P	10,437 S	8248 S	201	7397 P	11,150 S
Manila	9667	9631	10,658 P	9576 S	3793	11,293 P	9880 S	10,546 C	6801	9371 S	7804	9658	9898	10,420 P	9440 P	640	9554 S	9591 S	4511 T	10,813 P	11,405 P	9328 S	10,021 C	6238	1130	1435 S	9421 S	10,406	1768
Melbourne	11,131	11,095	9214 P	11,040 S	6535	10,162 P	11,344 S	9099	5814	10,335 S	9268	11,122	11,362	12,512 C	8976 P	5031 S	11,018 S	11,055	.....	9369 P	9961 P	10,792 S	8827	6966 P	5234 S	3823 S	10,885	6280 P	4875 P
Montreal	3317	3281	2715	2645	8141	1222	3530	6421	7108	3036	4042	2693	3548	2475	3102	11,569 P	2760	3241	11,132 P	2977	1451	2944	5331	6460 P	11,855 P	10,129 S	3062	5798 P	10,885 P
New Orleans	4837	4801	2115	4401	9502	1924	5050	6255	7347	4531	5397	4447	5068	597	4622	10,744 P	4525	4761	9369 P	.....	1699	4464	5160	4697 P	10,092 P	11,484 S	4582	4035 P	9122 P
Newport News	3514	3478	1699	3080	8307	550	3727	5774	6789	3233	4208	3126	3745	988	3299	11,136 P	3204	3438	9761 P	1490	286	3141	4590	5089 P	10,484 P	10,295 S	3259	4427 P	9514 P
New York	3346 P	3310 P	1825 P	2912 P	8153 P	379 P	3559 P	5838 M	6995 P	3065 P	4054 P	2959 P	3577 P	1227 P	3131 P	11,336 P	3053 P	3270 P	9961 P	1699 P	..... P	2973 P	4748 P	5289 P	10,684 P	10,141 M	3091 P	4627 P	9714 P
Panama	4858	4822	1265	4583	9323 S	2213	5071	5280	6450	4577	5224	4665	5089	1027	4643	9324 C	4570	4782	7949 C	1420	2012	4485	4268	3277 P	8672 P	13,405 S	4603	2615 P	7702 P
Para	4319	4193 K	1142	4056	8262	2943	4442	3235 K	4330	3933	4163	4138	4460	2577	4010 K	11,204 KS	4043	4153 K	10,120 P	3136	2915	3883	2145	5621 P	11,016 P	10,250 S	3983	4959 P	10,006 P
Petrograd	1070	1165	4888	1606	7353	4052	951	7381	7204	1311	3248	1648	860	5346	1275	10,755 P	1716	1207	12,142 P	5848	4234	1396	6299	9209 P	11,518 S	9335 S	1277	8547 P	12,237 P
Philadelphia	3482	3446	1828	3048	8284	517	3694	5870	6861	3201	4185	3094	3712	1158	3267	11,302 P	3172	3406	9927 P	1660	234	3109	4782	5255 P	12,455 S	10,272 S	3227	4593 P	9680 P
Plymouth	385	349	3594	360	5997	2791	598	6029	5852	108	1898	442	616	3962	175	9425 S	345	309	10,792 P	4464	2973	.....	4939	7762 P	10,168 S	7985 S	129	7100 P	10,887 P
Portland, Me.	3086	3050	1927	2652	7912	98	3299	5849	6787	2805	3807	2698	3317	1470	2871	11,334 C	2776	3010	10,210 P	1972	427	2713	4759	5538 P	12,077 C	9894 C	2831	4876 M	9963 C
Rio de Janeiro	5280	5244	3079	5168	7824	4714	5501	1135	3265	4984	5040	5250	5519	4579	5061	11,118 P	5158	5204	8827 P	5160	4748	4939	.....	7545 P	10,861 P	8851 P	5034	3644 P	11,580 P
St. Thomas	3846 P	3810 P	440 P	3586 P	8265	1516 P	4059 P	4629 P	5708 P	3570 P	4160 P	3668 P	4077 P	1040 P	3639 P	10,384 P	3573 P	3770 P	9009 P	1590 P	1435 P	3473 P	3539 P	4337 P	9722 P	10,247 P	3591 P	3675 P	8722 P
San Francisco	8135	8099	4542	7860	9780	5490 P	8348 P	7536 P	9727	7854 P	8501 P	7942 P	8366 P	4304 P	7920 P	6041 P	7847 P	8059 P	6966 P	4697 P	5289 P	7762 P	7545 P	..... P	5491 P	7330 P	7880 P	5140 P	4791 P
San Juan	3867	3831	502	3600	8307	1480	4080	4694	5773	3583	4202	3681	4098	975	3652	10,364 P	3588	3791	8989 P	1525	1428	3494	3604	4317 P	9712 P	10,289 P	3612 P	3655 P	8702 P
Savannah	3916 P	3880 P	1648 P	3443 P	8640 P	928 P	4129 P	5820 M	6860 P	3684 P	4535 P	3489 P	4147 P	634 P	3701 P	10,927 P	3618 P	3840 P	12,650 P	1136 P	695 P	3543 P	4730 P	4880 P	10,275 P	10,622 P	3661 P	4218 P	9265 P
Seattle	8914	8878	5321	8639	9515	6269 S	9127	8315 C	10,506	8633 S	9280	8721	9145 S	5083 S	8699	5779	8626 S	8838	7326 P	5476 P	6068 P	8541 P	8324 C	799	5209	7068 P	8659	5917	4259
Shanghai	10,507	10,471	12,370	10,535	4633	12,133 S	10,720	11,380 C	7641	10,211	8644	10,498	10,738	13,165 S	10,280	853	10,394 S	10,437	5234 P	10,092 S	10,684 P	10,168 S	10,861 C	5491	.....	2183 M	10,267	10,266 M	1030
Singapore	8324	8288	10,187	8233	2450	9950 S	8537	9376	5631	8028	6461	8315	8555	10,982	8097	1440 S	8211	8248	3823 S	11,484 S	10,141	7985	8851	7330 P	2183 S	.....	8078	10,899 P	2902
Southampton	277	238	3622	488	6090	2909	479	6124	5947	83	1991	570	497	4080	105	9518	463	201	10,885	4582	3091	129	5034	7880 P	10,261 S	8078	.....	7218 P	10,980
Suez	3376 P	3340 P	5239 P	3285 P	2960 M	5002 P	3589 P	8154 M	5259 M	3080 P	1513 P	3367 P	3607 P	6034 P	3157 P	6388 P	3263 P	3300 P	7755 P	6536 P	5193 P	3037 P	6179 M	12,278	7131	4948 M	3130 P	9768	7850
Valparaiso	7473	7437	3880 P	7198	9875	4828 P	7686	2766 C	5447	7192	7839	7280	7704	3642 P	7258	10,536	7185	7397	6280	4035 P	4627 P	7100	3644 C	5138	10,266	10,899	7218	.....	9339
Yokohama	11,226	11,190	8967	11,135	5352	9915 P	11,439	12,105	8360	10,930	9363	11,217	11,457	9122 P	10,999	1580	11,113	11,150	4875	9122 P	9714	10,887	11,580	4791	1030	2902	10,980	9339	.....

K, via Kiel Canal. P, via Panama Canal. S, via Suez Canal. C, via Cape Town. M, via Strait of Magellan. H, via Cape Horn. T, via Torres Strait.

PRINCIPAL FRESH-WATER LAKES

Name	Location	Area Sq. Miles	Elevation Above Sea Level	Depth	Discovery or Early Exploration	
					By Whom	Date
			Feet	Feet		
Albert	Central Africa	1,800	2,100	20	Speke and Grant	1862
Athabasca	Alberta	2,842	697	Shallow	Hearne	1771
Baikal	Eastern Siberia, Asia	13,200	1,500	5,280		
Bangweulu	Central Africa	1,670	3,700	15	Livingstone	1868
Cayuga	New York	75	381	400		
Chad	French Sahara-Nigeria	10,000	850	20	Denham and Clapperton	1823
Champlain	New York	750	93	600	Champlain	1609
Chapala	Mexico	1,400	6,000			
Chautauqua	New York	35	1,300		La Salle	1669
Como	Italy	55½	650	1,365	Mentioned by Virgil	30 B. C.
Constance	Switz.-Ger.-Aust.	208	1,309	827	Lake Dwellers	Stone Age
Crater	Oregon	20	6,177	2,001	Hillman	1853
Edward	Central Africa	1,500	3,000		Stanley	1876
Erie	United States-Canada	9,968	573	210	Chaumont and Brebeuf	1640
Garda	Italy	189	216	1,916	Described by Virgil	35 B. C.
Gatun	Panama, Cent. Amer.	164	85			
Geneva	Switzerland-France	225	1,230	1,095	Lake Dwellers	Stone Age
George	New York	50	323	400	Friar Jogues	1642
Great Bear	N. W. Terr., Canada	11,821	200	270		
Great Slave	N. W. Terr., Canada	10,719	391	650	Hearne	1771
Huron	United States-Canada	22,978	581	750	Brulé and Le Caron	1615
Itasca	Minnesota	2	1,457	50	Schoolcraft	1832
Ladoga	European Russia	7,000	55	730		
Lake of the Woods	Ontario-Manitoba	1,851	979		De Noyon	1688
Lucerne	Switzerland	49	1,435	700	Scene of Tell legends	
Maggiore	Italy	82	636	1,220	*L. Verbanus* of Romans	B. C.
Managua	Nicaragua, Cent. Amer.	560	154	Unknown	Cordoba	1522
Michigan	United States	22,336	581	870	Nicolet	1634
Mweru	Belg. Congo-Rhodesia	1,700	3,189		Livingstone	1867
Neuchatel	Switzerland	90	1,420	472	Lake Dwellers	Stone Age
Nicaragua	Nicaragua, Cent. Amer.	3,000	106	260	Cordoba	1522
Nipigon	Ontario	1,730	850			
Nipissing	Ontario	330	640		Brulé and Le Caron	1615
Nyasa	Equatorial Africa	14,200	1,645	2,580	Livingstone	1859
Onega	European Russia	3,764	125	400		
Ontario	United States-Canada	7,243	246	738	Champlain	1615
Rangeley	Maine	80	1,350			
Reindeer	Manitoba-Saskatchewan	2,437	1,150			
Rudolf	Equatorial Africa	3,500	1,250		Count Teleki	1888
Seneca	New York	75	445	630		
Simcoe	Ontario	271	130		Champlain	1615
Superior	United States-Canada	32,060	602	1,012	Brulé	1622
Tahoe	California	200	6,275	1,650	John C. Fremont	1844
Tanganyika	Equatorial Africa	12,700	2,600	2,000	Speke and Burton	1858
Tezcuco	Mexico	85	7,300	2	Cortes	1519
Titicaca	Bolivia-Peru	3,200	12,500	900	Ancient Incas	
Victoria	Equatorial Africa	27,000	3,775	270	Speke	1858
Winnepesaukee	New Hampshire	178	475	300	Edward Johnson and Simon Willard	1652
Winnipeg	Manitoba	9,460	710	70	Verendrye	1733
Winnipegosis	Manitoba	2,086	828	40	Verendrye	1739
Yellowstone	Wyoming	140	7,740	300	Colter	1807

PRINCIPAL SALT-WATER LAKES

Name	Area Square Miles	Location	Elevation Above Sea Level*	Depth
			Feet	Feet
Aral, Sea of	26,200	Kirghis-Khiva, W. Asiatic Russia	155	220
Balkash	8,600	Russian Central Asia	780	135
Caspian Sea	170,000	S. E. Europe-Western Asia	−86	3,000
Dead Sea	340	Palestine, S. W. Asia	−1,293	1,280
Eyre	3,600	South Australia	−35	Shallow
Great Salt Lake	1,750	Utah, W. United States	4,218	40
Issyk-Kul	2,230	Asiatic Russia	5,400	Unknown
Kuku-nor	2,300	Central China	10,000	Unknown
Maracaibo†	8,000	Venezuela, South America	Sea level	500
Salton Sea	266	S. E. California, North America	−280‡†	Shallow
Urumia	1,795	Azerbaijan, S. W. Asia	4,100	40
Van	1,400	Armenia, S. W. Asia	5,214	Unknown

* A minus sign indicates below sea level. † Partially fresh. ‡ Approximate level before the inflow from the Colorado river in 1905-06.

MEANINGS OF PLACE NAMES

MANY interesting stories lie hidden in the names of places. These stories are usually concealed from the average reader, by reason of the fact that the original names are from languages that are unknown to him. Balearic, for example, applied to islands in the Mediterranean Sea, is derived from the Greek word *ballein*, meaning hurl, and commemorates the islanders' prowess with the sling. The Latin name Mediterranean, meaning In the Midst of the Earth, recalls the days when the known world was confined to the territory encircling that sea.

Other names contain picturesque descriptions. Such, for instance, is Boise, a river and a city of Idaho. This French word, meaning wooded, describes the forest-clad banks of the stream on which the city is built.

In some cases, the descriptions have ceased to be applicable. Thus Key West, a corruption of Spanish words meaning Bone Reef, referred to bones formerly found on the island and believed to be remains of earlier inhabitants.

The following pages explain the origin and meaning of a large number of such place names, selected from all parts of the world. The majority, however, are names of places in America, where Indian words have been used so extensively to designate places and localities.

But many of the Indian languages are no longer spoken. Moreover, there is no complete dictionary of Indian terms, even for the dialects that are still in use. As a result, the meanings of many Indian names have been lost beyond all hope of recovery. Those that *are* known, however, are seen to be highly descriptive and helpfully informative. When once interpreted, these meanings add a new interest to the places to which these various names have been given.

Meanings of the names of American states will be found on page 382; those of the Canadian provinces, on page 448.

Aalborg (*ôl'bôrg*). Danish for Eel town. A city in northern Denmark on a fiord, where eels may be caught in considerable numbers.

Aberdeen (*ăb'ẽr-dēn'*). A city of Scotland, anciently called Aberdon, from the Celtic *aber*, "river mouth," and Don, the river at whose mouth the city is situated.

Abyssinia (*ăb'ĭ-sĭn'ĭ-ȧ*). A country of Africa, named from the Arabic *habish*, "mixed"; hence "the country of the mixed races."

Acadia. Name originally given to Nova Scotia, from *akade*, a Micmac Indian word meaning plenty.

Acropolis. The citadel at Athens, Greece, so named from *akron*, "height," and *polis*, "city"; hence "the city on the height." It contains the Parthenon and other beautiful buildings.

Adrianople (*ā'drĭ-ȧn-ō'p'l*; *ā'drĭ-*). City of European Turkey, named from Hadrian, a Roman emperor, and Greek *polis*, "city."

Adriatic (*ā'drē-ăt'ĭk*; *ād'rĭ-*) **Sea.** Indicates the Sea of Adrian, or Hadrian, a Roman emperor.

Akron. City in Ohio, believed to occupy the highest ground in the northern part of the state. Also other places named for the same reason. The word is Greek, meaning summit.

Alameda (*ăl'ȧ-mā'dȧ*; *-mē'dȧ*). County and city in California and town in New Mexico. The word is Spanish for grove of poplar trees.

Alamo (*ă'lȧ-mō*). A village in California and many other places named from the historic fort in Texas, so called from a Spanish word meaning poplar.

Alaska. Territory of the United States. An Indian word meaning great country. After purchase by the United States, the names of Walrussia, American Siberia, Zero islands, and Polario were suggested, but Alaska was adopted in accordance with a proposition of Charles Sumner.

Albuquerque (*ăl'bû-kûr'kē*). City of New Mexico. The name is a corruption from Alburquerque, a governor of New Spain.

Alcazar (*ăl-kă'zär*). From the Arabic *al qasr*, "the palace." The palace of the Moorish kings and later of Spanish royalty at Seville, Spain.

Aleutian (*ȧ-lū'shăn*; *ȧ-lōō'-*). Islands in the north Pacific Ocean, named from Russian *aleut*, "bald rock."

Alexandria. An Egyptian city, named after its founder, Alexander the Great.

Algiers (*ăl-jērz'*). City in northern Africa. From the Arabic *al-jaza'ir*, "the islands," referring to islands in the adjacent bay.

Alhambra (*ăl-hăm'brȧ*). From the Arabic *al-hamra*, "red." A great palace at Granada, Spain. It is surrounded by a red brick wall.

Allegan (*ăl'ē-găn*). A town of Michigan at the head of navigation on Kalamazoo river. Its name is derived from the French *allée*, "passage."

Allegheny (*ăl'ē-gā'nĭ*). River and county in Pennsylvania and mountains in eastern United States. An Indian word, most generally believed to be from *oolhikhanna*, "the fairest river."

All Saints Bay. In eastern Brazil. Discovered by Vespucci on the Feast of All Saints in 1503.

Alps. Mountains of central Europe, named from the Celtic *alp*, "high," or, according to others, from the Latin *albus*, "white," in allusion to the snow-capped peaks.

Altai (*ăl-tī'*). A mountain range in central Asia. Altai is a Tartaric corruption of the Mongolian *altain ula*, "golden mountain." Gold dust is obtained there.

Altoona. City in Pennsylvania, so named because of its high situation in the Allegheny mountains; also town in Iowa, situated on the highest point between the Des Moines and Mississippi rivers. Altoona is a derivative of the Latin word *altus*, "high."

Amagansett (*ăm'ȧ-găn'sĕt*). Village on Long Island, N. Y. The name is a Montauk Indian word for fishing place.

America. From Amerigo Vespucci, sometimes spelled Vespucius, who landed on the western continent south of the equator in 1499. His name was first given to the continent by a German geographer, Martin Waldseemüller, who published an account of the four voyages of Vespucci, at Frankfort, Germany, in 1507.

Amiens (F. *ȧ'myăN'*; E. *ăm'ĭ-ĕnz*). French city on the Somme river, anciently the capital of the Ambiani, "Dwellers by the Water," from whom the city took its name.

Amiskwi. A peak of the Canadian Rockies. The name is Cree Indian for Beaver.

Andalusia (*ăn'dȧ-lōō'shĭ-ȧ*). Name for southern Spain, which was called by the Moors *Belad-al-Andalus*, "Land of the Andalus, or Vandals," a people formerly dwelling there.

Andes. Mountains of South America. The name is variously derived from the Anti tribe in Peru or from the Peruvian *anta*, "copper," copper ore being abundant in the Peruvian Andes.

Androscoggin (*ăn'drŏs-kŏg'ĭn*). River in Maine and New Hampshire and county in Maine. As a compliment to Sir Edmund Andros, the name was changed from the original Indian form, Ammoscoggin. The earlier name is said to mean a Fishing Place for Alewives or Fish Spearing.

Annapolis. A city in Maryland and seat of U. S. Naval Academy, named for Queen Anne of England and from the Greek word *polis*, "city."

Antarctic (*ănt-ärk'tĭk*) **Ocean.** Denotes the ocean *anti*, "against" or "opposite to," the Arctic Ocean.

Antwerp. A city of Belgium on the Scheldt river, named from Old German *aent werf*, "on the wharf." Some authorities derive it from Dutch *hand-werpen*, "hand throwing," in allusion to the practice of a noted robber, who threw into the Scheldt river hands severed from his prisoners.

Apalachicola (*ăp'ȧ-lăch'ĭ-kō'lȧ*) **River, Fla.** From an Indian town, Apalatichikoli, "Those on the Other Side."

Appalachian (*ăp'ȧ-lăch'ĭ-ȧn*; *-lā'chĭ-ȧn*) **Mountains.** In eastern United States. They were so called by De Soto after the Apalachee Indians.

Appomattox (*ăp'ŏ-măt'ŭks*). River, county, and village in Virginia. An Indian word, meaning a tobacco-plant country. The village was the scene of the surrender that ended the Civil War.

Arabia. A peninsula of southwestern Asia. The name is derived from a Semitic word for desert.

Arctic (*ärk'tĭk*). Derived from the Greek *arctos*, "bear," referring to the constellation of that name in the northern sky.

Areopagus (*ăr'ē-ŏp'ȧ-gŭs*). A hill west of the Acropolis in Athens, Greece. The name is from the Greek *Areios pagos*, "Mars' hill," Ares, or Mars, being the god of war among the Greeks.

Argentina. South American republic, named from Latin *argentum*, "silver."

Arles (*ärlz*; F., *ärl*). A city of southern France, anciently known as Arelate, from the Celtic *arlaeth*, "on the marsh." It is on the delta of the Rhone river.

Aroostook (*ă-rōōs'tōōk*). River and county in Maine. An Indian word, meaning good river.

Ascension Island. Southwest of Africa, discovered by the Portuguese on Ascension Day, 1501.

Asia (*ā'shȧ*; *-zhȧ*). From the Sanskrit *ushas*, signifying land of the dawn.

Atchafalaya (*ăch'ȧ-fȧ-lī'ȧ*) **River, La.** From Choctaw Indian *hucha*, "river," and *falaya*, "long"; hence "Long river."

Athens. The capital of Greece, named in honor of Athene, the goddess of wisdom. Also cities in Georgia and Ohio.

Atlantic Ocean. Named from the mythical island of Atlantis, believed by the Greeks to have lain west of the Strait of Gibraltar and to have been submerged during prehistoric times.

Augusta. A city in Maine, named for the English princess Augusta Charlotte, eldest granddaughter of George II. Also a city in Georgia.

Aurora (*ô-rō'rȧ*). Cities of Illinois, Indiana, and Missouri and villages of Nebraska, New York, and Ontario. The word is Latin for dawn.

Austerlitz (*ôs'tĕr-lĭts*). A town in Czechoslovakia, the scene of a decisive battle in 1805. From German *ost*, "east," and Littawa, the river on which Austerlitz is situated; hence, "the east town on the Littawa."

Austria. A country of Europe. The English name is a Latin translation of the German, *Osterreich*, "Eastern Empire."

Aztec. Village in San Juan county, New Mexico, named for an Indian tribe of Mexico. The word is said to mean place of the heron.

Balearic (*bȧl'ē-ăr'ĭk*) **Islands.** East of Spain. From Greek *ballein*, "to hurl"; so called because of the islanders' skill in the use of the sling.

Balkan (*bôl-kăn'*; *bôl'kăn*). Mountainous peninsula of southeastern Europe. From Turkish *balkh*, "high ridge."

Baltic. Sea in northern Europe, named from Swedish *balt*, "a strait"; hence "a sea having many straits." The irregular shape of the sea gives rise to a number of narrow channels.

Baltimore. County and city in Maryland, named for Cecil Calvert, Lord Baltimore, who settled the colony in 1635.

Banbury (*băn'bĕr-ĭ*). A town in England, situated 22 miles north of Oxford. Its Old English name was Berenburig, "Bera's fort."

Bangor (*băn'gôr*). City of Maine, so called from a hymn tune of that name. Previously, the locality was known as Sunbury.

Barbados. (*bär;bā'dōz*). West Indian islands, named from the Latin *barba*, "beard," in allusion to the bearded fig trees abounding there.

Barcelona. A city of Spain, called after the Carthaginian, Hamilcar Barca, who founded it.

Batavia. A city in Java and towns in New York and Illinois. It is the Latin designation for the territory now called the Netherlands.

Baton Rouge (*băt'ŭn rōōzh*). City in Louisiana. The name is French, meaning Red Staff.

Bayeux (*bä'yŭ'*). French town, so called from Bajoccas, a Celtic tribe name, meaning Great Conquerors.

Bellefontaine (*bĕl-fŏn'tān*; *-foun'-*). A city of Ohio, given a French name meaning Beautiful Fountain, in allusion to the beautiful springs in the vicinity.

Belle Isle. French for Beautiful Island. A strait and island northwest of Newfoundland and an island in Detroit river.

Belleville. Cities in Illinois and Ontario. In French, the name means Beautiful City.

Bering (*bē'rĭng*). Strait north of Alaska, named after the Russian navigator who discovered it in 1728.

Berkshire. County in Massachusetts, named after one in England. The name is from *barruc*, "polled oak," under which public deliberations of the shire were anciently held.

Berlin. Capital of Germany. Berlin is variously explained as from the Wendish *berle*, "uncultivated ground," *barlin*, "a shelter," or *brlyina*, "pool," the original site having been marshy.

Bermudas. Islands in the Atlantic Ocean, named for their discoverer, Juan Bermudez.

Bethlehem (*bĕth'lê-hĕm*; *-lê-ĕm*). A village in Palestine. The name is from the Syrian *beit el lehm*, "house of bread," alluding to the productive region about the town.

Biscay (*bĭs'kȧ*). Bay of western Europe, named from the Basques dwelling on its southern coast.

Boise (*boi'zā*). The capital of Idaho on the Boise river, so called from the French *boisé*, "wooded."

Bokhara (*bō-kȧ'rȧ*). A state and city in central Asia, named from Mongolian *bukhar*, "church." It has numerous mosques, or Mohammedan churches.

Bolivia. South American country, so called in honor of Bolivar, "the liberator."

Bombay (*bŏm-bā'*). City of India, named for an Indian goddess *Bambai*, but understood by the Portuguese as *Buon bahia*, "Good bay." It has an excellent natural harbor.

Borgne (*bôrn*) **Lake, La.** French, meaning "blind of one eye." The legendary account of the name is that a cyclops was met on its shores, a cyclops being a giant of Greek myth having one eye, which was put out by Ulysses.

Bosporus (*bŏs'pō-rŭs*). A Greek term composed of *bous*, "ox," and *poros*, "ford," alluding to the Greek legend that when *Io* was transformed into a cow she forded this strait of southeastern Europe.

Boston (*bŏs'tŭn*). Capital of Massachusetts, called after Boston, England, whose name is a corruption of Botolph's town, Saint Botolph having founded an abbey there.

Brahmaputra (*brä'mȧ-pōō'trȧ*). River of India. The name, of Sanskrit origin, means Offspring of Brahma, a Hindu god.

Brandenburg (*brän'dĕn-bōōrĸ*). A district of Prussia, Germany, anciently called Branneborch, a name of Slavic origin, meaning Forest fortress.

Brazil. Named for the color of its dyewoods, from Portuguese *braza*, "a live coal."

Brazos (*brä'zōs*) **River, Texas.** Called Brazos de Dios, "Arm of God," by Spaniards. A Spanish mission, which had been established on the river bank, was, in the absence of guards, destroyed by Indians. The guards, returning, found many bodies of their friends floating in the river. Discerning no mark of violence, they attributed the destruction to a miracle performed by the "arm of God."

Bristol. A city of Rhode Island, so called from Bristol, England. The name is derived from Anglo-Saxon *Briegstow*, "Place at the Bridge." The English city is at the junction of two small rivers.

Brooklyn. Borough of the city of New York. It is named from Breuckelen, a village in Holland. The Dutch name signifies broken land.

Bruges (*brōōzh*; F. *brüzh*). City of Belgium, named for its many bridges from Dutch *brugge*, "bridge."

Brussels. Belgian city named from German *bruch*, "marsh," and Latin *sella*, "seat"; hence "the site on the marsh." Part of the city is on low ground.

Budapest (*bōō'dȧ-pĕst'*). The capital of Hungary. The city consists of two parts—Buda, named for Buda, the brother of Attila the Hun, and Pest, so called from the Old Slavic *pesti*, "oven"; a limekiln having stood on the present site of Pest.

Buenos Aires (*bwā'nōs ī'rās*; *bō'nŭs ā'rĭz*). Capital of Argentina. Its name is Spanish for Good Breezes, given on account of the city's favorable location for the enjoyment of the sea air.

Butte (*būt*). City in Montana, named from a bare hill, or butte, overlooking the place. Butte is a naturalized French word, meaning small knoll.

Cadillac. A city in Michigan, named for La Motte Cadillac, who established a fort there in 1701.

Cadiz (*kā'dĭz*). City of southern Spain, named by the Phœnicians Gadir, "Fortress." "G" and "C" were frequently interchanged in the earlier forms of the alphabet. Cadiz is on an easily defensible peninsula.

Cairo (*kī'rō*). The capital of Egypt; also (pron. *kā'rō*) a city of southern Illinois and a village in the Catskill mountains. The name is a corruption of Arabic Alkahirah, "Victorious," and was given to Cairo, Egypt, because Kahir (Mars), the planet of victory, was visible on the night when the city was founded.

Calumet (*kăl'ŭ-mĕt*). River in Illinois and Indiana, county and village in Wisconsin, and seven other places in the country. The word is Indian for pipe of peace.

Canada. Probably derived from the Indian word *kanata*, "a collection of wigwams."

Canandaigua (*kăn'dăn-dā'gwȧ*). Lake town in New York and village in Michigan. The word is Indian, meaning a chosen spot. Others derive the word from *cahnandahgwah*, "sleeping beauty."

Canaveral (*kă-năv'ĕr-ăl*) **Cape, Fla.** A Spanish name, meaning the land of the rose tree.

Candia (*kăn'dĭ-ă*). An alternative name of the Mediterranean island of Crete. It is from the Arabic *khandae*, "island of trenches," probably in allusion to the isolated valleys of the island's mountainous surface.

Canterbury. Name of an English city and of a district in New Zealand, meaning Kentish men's town from Anglo-Saxon *Cantwar*, "Kentish man," and *burh*, town.

Capri (*kă'prē*). An island in the Mediterranean Sea near Naples. Its name signifies Goat island, from the Latin *caper*, "goat."

Caribbean Sea. So called from the Caribs, a fierce tribe whose name, by corruption, has given us the word cannibal.

Carpathians (*kär-pā'thĭ-ănz*). Mountains in east central Europe. The name is derived from Karpa, the local name of the main chain, which is explained by the Slavonic root *chrb*, signifying ridge.

Carthage. Towns in Missouri, Illinois, New York, and Ohio, named from an ancient African city. The word is said to have come from Phœnician Kerethhadeshoth, "New City."

Casa Grande (*kä'sä grän'dā*). Prehistoric ruins found in New Mexico. The name is Spanish for Great House.

Casco Bay, Me. From an Italian word, meaning crane; hence "Crane Bay."

Catawissa River, Pa. From the Delaware Indian word *gattawissa*, "getting fat."

Catskill. Name of a small river and of mountains in New York. Catskill is Dutch, meaning Cat, or Panther, creek; from *kat*, "cat or panther," and *kill*, "stream." Panthers are said to have abounded formerly in the district.

Cayuga. Lake and county in New York and county in Ontario, called after an Indian tribe, whose native name was Give-w-qweh-o-no, "People of the Mucky Lake."

Cazenovia (*kăz'ē-nō'vĭ-ă*). Lake and town in Madison county, New York, named for Cazenove, a general agent of the Holland Land Company.

Ceylon (*sē-lŏn'*). An island of the Indian Ocean. The Hindu form of the name is Silan, derived from *sinha*, "lion"; hence "land of lions." The lion is not now found in the island.

Chattahoochee (*chăt'ă-hōō'chē*) **River, Ga.** Translated Painted Stone, from the Indian *chateo*, "stone," *hoche*, "marked."

Chattanooga (*chăt'ă-nōō'gă*). City in Tennessee and creek in Georgia, named from a Cherokee Indian word, meaning crow's nest or eagle's nest.

Chaudiere (*shō'dyâr'*). A river in Quebec and Maine and a falls in the Ottawa river. The word is French for caldron, referring to the water beneath the semicircular falls.

Chautauqua (*shă-tô'kwă*). A village and lake in western New York. The name is Indian and is variously interpreted to mean foggy place, bag tied in the middle, place where a child was washed away, where the fish was taken out, and place of easy death.

Cheapside. A thoroughfare of London, so named for its passing a *cheap*, as markets were formerly called in England.

Cheboygan (*shĕ-boi'găn*). River, county, and city in Michigan. Cheboygan is Indian and is variously interpreted as from *chabwegan*, "a place of ore," or from *che*, "great," and *poygan*, "pipe"; hence "Great Pipe."

Chenango (*shĕ-năng'gō*) **River, N. Y.** From an Iroquois word, *ochenung*, "bull thistles."

Chesapeake (*chĕs'ă-pēk*). Bay in Maryland, which gives its name to several places in the country. The name is Indian, variously explained as meaning salty pond, great waters, mother of waters, and country on a great river.

Chester, Caster, Cester. Name terminations derived from the Latin *castra*, "camp."

Chesuncook (*chĕ-sŭn'kōōk*) **Lake, Me.** Indian word meaning goose place, from *chesunk*, "a goose," and *auke*, "a place."

Cheyenne (*shī-ĕn'*). City in Wyoming and several small places named for an Indian tribe. The word is probably a corruption of the French *chien*, "dog," applied to the tribe as a translation of a native word.

Chicago (*shĭ-kô'gō*). City and river in Illinois. The name is probably from the Indian word *cheecagua*, "strong chiefs." Other derivations have connected it with words for wild onion or skunk.

Chickahominy (*chĭk'ă-hŏm'ĭ-nĭ*). Name of a river in Virginia, said to be derived from the Indian word *checahaminend*, "land of much grain." Another derivation is from *tschikene-mahoni*, "a lick frequented by turkeys."

Chickamauga (*chĭk'ă-mô'gă*) **River, Tenn.** From a Cherokee Indian word, meaning river of death.

Chicopee (*chĭk'ô-pē*) **River, Mass.** An Indian word, meaning the birch-bark place.

Chile (*chĕ'lā*). A South American country, named from Indian *chili*, "cold," in allusion to the climate on the mountains which occupy much of the country.

Chillicothe (*chĭl'ĭ-kŏth'ē*). Cities in Ohio and Illinois and towns in Iowa and Missouri, so called from an Indian tribe. The word means town.

Chippewa. River in Wisconsin and counties in Michigan, Minnesota, and Wisconsin, named from an Indian tribe. Chippewa is a variant form of *ojibwa*, "puckered moccasins."

Christmas Island. In the Indian Ocean. Discovered Christmas 1777; hence the name.

Cimarron (*sĭm'ă-rŏn'*) **River, Okla.** A name of Spanish derivation, meaning Wild.

Cincinnati (*sĭn'sĭ-năt'ĭ*). City in Ohio, named in honor of the Roman patriot Cincinnatus.

Circleville. A city of Ohio, named from its original location within a circular Indian mound.

Cleveland, Ohio. Named for General Moses Cleaveland. The first "a" was omitted by example of the town's first newspaper, which adopted the shorter form of the name for typographical convenience.

Cochituate (*kō-chĭt'ū-āt*) **Lake, Mass.** Indian word, meaning land near a waterfall.

Coeur d'Alene (*kûr dă-lān'*). Lake and town in Idaho. The expression is French for needle heart and was earlier applied to a tribe of Indians.

Cohasset (*kō-hăs'ĕt*). A village in Massachusetts. Cohasset is Indian, signifying a place of pines.

Cohoes (*kō-hōz'*). A city in New York. The name is a corruption of Iroquois *gahaoose*, "shipwrecked canoe."

Colon (*kō-lŏn'*). Seaport at the Atlantic end of Panama canal. Colon is the Italian form of Columbus.

Colorado (*kŏl'ō-rä'dō*) **River.** "Red river." A Spanish name, applied for the color of its waters.

Conemaugh (*kŏn'ĕ-mô'*) **River, Pa.** An Indian name, meaning otter creek.

Copenhagen (*kō'pĕn-hā'gĕn*). The capital of Denmark, called in Danish Kobenhavn, "Merchants' Haven."

Cornwall. A county of England. Cornwall is a corruption of the Anglo-Saxon Cornweallas, connected with Cornubia, "Horn-shaped land," the Latin name for the district, and the Welch *weallas*, "strangers"; hence "Horn-shaped land of strangers."

Corsica. A Mediterranean island, said to be named from a Phœnician word for wooded.

Coshocton (*kō-shŏk'tŭn*). County and village in Ohio, named from the Indian town of Goshocking. The word is said to mean habitation of owls.

Costa Rica (*kŏs'tä rē'kä*). Name of a Central American country, meaning, in Spanish, Rich Coast.

Cotswold (*kŏts'wōld*) **Hills.** In England. So called from Anglo-Saxon *cot*, "hut," and *wold*, "meadow"; hence "a village meadow."

Coventry. An English city. Its name is derived from Anglo-Saxon *cofa*, "cove," and *treo*, "tree"; hence "Cove Tree." An erroneous popular explanation gives the name as a corruption of Convent Town.

Cuba. An island of the West Indies. Cuba is said to be a West Indian word for district. The complete Indian designation of the island was Cubanacan, *nacan* meaning central.

Cumberland. A name derived from Early English *combe*, "valley," and applied to an English county, a city of Maryland, and numerous other places. The English county is in the hilliest part of the country.

Cuzco (*kōōs'kō*). A department of Peru. The name is from Indian *quichua*, "navel," since the district was central to the Inca empire, which formerly occupied territory now called Peru.

Dahlonega (*dă-lŏn'ĕ-gă*). A village of Georgia, so called from the Indian *taulawneca*, "yellow wampum," gold having been discovered here.

Delhi (*dĕl'ē*). Capital of India, said to be named from the Sanskrit, *dahal*, "a quagmire." Others derive it from Old Hindu *dil*, "eminence." The modern city is on two rocky elevations, but the ancient city included a low area along the bank of the river Jumna.

Des Moines (*dĕ moin'*). A city in Iowa on the Des Moines river. The name is French, meaning Of the Monks and was associated with Trappist monks dwelling near by. The word Moines is said to have been originally Moins, a French corruption of the Indian *mikonang*, "road," the river being called Riviere des Moins, "River of the Roads."

Detroit. A city of Michigan on the Detroit river. Détroit is the French word for strait.

Dnieper (*nē'pĕr*). A European river, formerly called Danapris, a name derived from Slavic *dan*, "river," and *apris*, "northern"; hence "Northern River."

Dniester (*nēs'tĕr*). A European river. Dniester means Southern River, being derived from the Slavic *dan*, "river," and *aster*, "southern."

Dover. The name of an English port on the Strait of Dover, probably derived from the Welch *dwfr*, "water." Also the capital of Delaware and a city in New Hampshire.

Dublin. The capital of the Irish Free State. The Irish form of the name, Dubh-linn, means Black Pool, in allusion to a near-by bog.

Easter Island. In the south Pacific Ocean, so called from its discovery on Easter Sunday, 1722.

Ecuador. Name of a South American country, meaning, in Spanish, Equator. The equator passes through the country.

Egypt. Country of Africa. The modern name is derived from the Hellenic form Aiguptos, which the Greeks fancifully derived from *aia*, "land," and *guptos*, "vulture"; hence, "Land of Vultures."

England. The Anglo-Saxon form was Engla-land, "Land of the Angles," a Germanic race which settled in the country in the 8th century.

Erie. One of the Great Lakes. Erie, meaning Wild Cat, formerly designated an Indian tribe, now extinct.

Erzerum (*ĕrz'rōōm*). An Asiatic city, named from Arabic *arazi*, "lands," and *Rum*, "Roman"; hence Roman lands. This district was formerly held by Byzantines, often called Romans.

Espiritu Santo (*ĕs-pē'rē-tōō sănt'tōō*). A state of Brazil. Its name is Portuguese, meaning Holy Spirit.

Estremadura (*ĕs'trā-mā-dōō'rā*). A province of Portugal. The word is Portuguese and Spanish for frontier and was earlier applied to a province of Spain forming the southwestern limit of the kingdom.

Ethiopia. A term sometimes used to designate Abyssinia. It was applied to Africa south of Egypt by the Greeks, who derived it from *aitho*, "burn," and *ops*, "face," the inhabitants having faces supposedly blackened by the sun.

Etna. Volcanic mountain in Sicily. The name is Greek, derived from *aitho*, "burn."

Euphrates (*ū-frā'tēz*). A large river in Mesopotamia. The name is a Greek adaptation of the Old Persian *Ufratu*, meaning Broad river.

Europe. Originally derived from the Old Assyrian *ereb*, "the sunset, or west." The word Europe is a Greek adaptation.

Euxine (*ūk'sĭn*). The name formerly applied to the Black Sea, derived from Greek *euxeinos*, "hospitable." The name embodies a hope rather than a description.

Finisterre (*fĭn'ĭs-târ'*). A cape of northwestern Spain. Finisterre means Land's End, from Latin *finis*, "end," and *terræ*, "of the land."

Florence. A city of Italy. The English form is a translation of the Italian name Firenze, "Flourishing."

Fond du Lac (*fŏn' dōō lăk'*). City of Wisconsin at the outlet of Winnebago lake. Fond du Lac is French for Foot of the Lake.

Fontainebleau (*fôn'tĕn'blō'*). A town of France 35 miles southeast of Paris, the site of a beautiful palace and ornamental gardens. The name is a corruption of *fontaine de bel eau*, "fountain of beautiful water."

Formosa. An island east of China. Formosa is Portuguese for beautiful.

Fuji (*fōō'jē*). A famous mountain of Japan. Its name means Peerless.

Galena. Mining cities in Illinois and Kansas, named from the Latin *galena*, "lead ore."

Galilee. A sea and, formerly, the northern portion of Palestine. Galilee is derived from the Hebrew *galil*, "circuit," the Jews being in the habit of passing around the district instead of through it, because it was inhabited partly by Gentiles.

Gallipolis (*găl'ĭ-pō-lēs'*). A city of Ohio, settled by French, who gave it a name derived from the Greek *Gallos*, "a Gaul, or Frenchman," and *polis*, "city." Literally, "French city."

Ganges. A river of India, named from the Sanskrit word *ganga*, "stream."

Gasconade (*găs'kō-nād'*) **River, Mo.** The French word *gasconnade* means a boaster and was probably applied on account of the noisy rapids in the river's upper course.

Geneva. City of Switzerland. The name is probably from Celtic *genava*, "jaws," applied in allusion to the shape of two islands in the city.

Germany. A country of Europe. It is derived from a Celtic word meaning mountaineers, and was applied originally to the inhabitants of the mountainous country of the Ardennes in France.

Gibraltar. A strait south of Spain and a near-by British fortress. Gibraltar is from the Moorish Jebel al Tarik, "Mountain of Tarik," Tarik being the general who led the Moors into Spain in 711 A. D.

Gila (*hē'lä*) **River, Ariz.** The name is a corruption of the Spanish *guija*, "gravel," given in allusion to the nature of the river bed.

Glasgow. City of Scotland. Glasgow is variously explained as from Gaelic *clais-dhu*, "black ravine"; *glaisedhu*, "black brook"; or as a Gaelic name given to Saint Kentigern, the city's patron saint.

Granada. A city of Spain. Granada is the Spanish word for pomegranate. The city was built on four hills and so reminded its founders of a pomegranate, which also shows a division into four parts.

Grand Manan (*mā-năn'*) **Islands, Me.** The name is from French *grand*, "great," and Indian *munnohan*, "island."

Grand Pre (*grăN' prā'*). Name of a Nova Scotia village, meaning, in French, Great Meadow.

Greece. A European country. Greece comes from the Latin Græcia, which was applied by the Romans to the inhabitants of Hellas, as the Greeks have always called their country. The Latin word is derived from Graii, the name of an early people living on the west coast of Greece.

Guatemala (*gwä'tā-mä'lä*). A country of Central America. The name is said to be a rendering of the Mexican *quahtemali*, "a decayed log" and to have been given by Mexican Indians who, accompanying Alvarado, found a decayed tree near an ancient palace, thought to be the center of the country.

Hackensack. A village of New Jersey on the Hackensack river. The name comes from the Indian *haucquansauk*, "hook mouth," applied to the river in allusion to the meandering of its lower course.

Haiti. A mountainous island and country of the West Indies. Haiti is a Carib Indian word, indicating mountainous country.

Harz (*härts*) **Mountains.** In central Germany. The earlier name was Hart, Old Saxon for Forest. The modern name is popularly connected with the German *harz*, "resin."

Havana. The capital of Cuba and a city in Illinois. The word is Spanish for harbor.

Havre (*hă'vĕr*). A French seaport. Havre is the French word for harbor.

Helgoland (*hĕl'gō-lănt'*). A North Sea island. Helgoland is Danish for Holy Land, probably given because Saint Willibrord preached on the island when introducing Christianity into northern Europe.

Henlopen (*hĕn-lō'pĕn*) **Cape, Del.** From Dutch *hinlopen*, "to run in," having reference to the entrance of a bay near by.

Herculaneum. An ancient city of Italy, buried by the eruption of Vesuvius in 79 A. D. The name means City of Hercules.

Himalaya (*hĭ-mä'lä-yä*). Mountains in Asia. Himalaya means Abode of Snow, being derived from the Sanskrit *hima*, "snow," and *alaya*, "abode." The higher peaks are always snow-capped.

Holland. Provinces of the Netherlands. The name is derived from the Dutch *holtland*, "woodland," the region having formerly been well wooded.

Honeyville. A village of Utah. Honeyville is a euphonious contraction for Hunsackerville, Hunsacker having been the original settler.

Hongkong. "Fragrant Streams." An island southeast of China near the mouth of the West river.

Housac (*hōō'săk*). River in Massachusetts, New York, and Vermont. Housac is derived from the Mohican Indian *wudjoo*, "mountain," and *azhubic*, "rock"; hence "Mountain Rock river."

Hopatcong (*hō-păt'kŏng*). Lake in New Jersey. The name is Indian, said to mean stone over water, being given because of a causeway which connected an island with the shore.

Housatonic (*hōō'sa-tŏn'ĭk*). River of Massachusetts and Connecticut. The word is said to mean proud river flowing through the rocks, being derived from the Indian *wassa*, "proud," *aton*, "stream," and *azhubic* (shortened to *ic*), "rock."

Hungabee. A peak of the Canadian Rockies. Hungabee is Indian for chieftain.

Huron. One of the Great Lakes, called after an Indian tribe. Huron is variously derived from the Indian words *ohkwe honwe*, "true men," or from *irri roron*, "cat tribe."

Indianapolis. The capital of Indiana. The name consists of that of the state with the addition of the Greek *polis*, "city."

Innsbruck (*ĭns'brōōk*). Name of an Austrian city, meaning bridge over the river Inn.

Isle of Man. In the Irish Sea. The name is adapted from the Manx word *mannin*, "middle."

Itasca (*ī-tăs'kă*). County and lake in Minnesota, named from a portion of the barbarous Latin phrase *veritas caput*, "true head," the lake being near the head of the Mississippi river.

Ithaca. City in New York and village in Michigan, named for the native island of Ulysses, as described in the *Odyssey* of Homer.

Jaffa (*jă'fă*; *jăf'ă*). A seaport of Palestine. Jaffa is derived from the Semitic *yapho*, "beauty."

Jamaica. A west Indian island and a city of Long Island, N. Y. The name is derived from the Indian *haymaca*, "island of fountains," being given because the island is copiously watered.

Japan. A European corruption of the native name Nippon, "Rising Sun." Marco Polo called the country Zipangu, from which the form Japan arose.

Java (*jä'vă*). Island of the Malay archipelago, said to be named from the Sanskrit *yava*, "millet."

Jerusalem. City of Palestine. The Babylonian form of its name was Urusalim, "City of Peace."

Jordan. River of Palestine, Utah, and Nova Scotia. The Hebrew name Yarden means Descender.

Juniata (*jōō'nĭ-ăt'ă*) **River, Pa.** Named from a tribe of Indians that inhabited its banks. The root of the word is said to mean a stone.

Kaffraria (*kă-frā'rĭ-ă*). The region of South Africa inhabited by the Kafirs, natives so called from the Arabic word *kafir*, "unbeliever."

Kalamazoo. A city and river in Michigan. Kalamazoo is Indian and is variously explained as meaning beautiful water or boiling water or as derived from *negikanamazo*, "otter tail."

Katahdin (*kă-tä'dĭn*). Name of a mountain in Maine, derived from Indian *katahdu*, "great mountain."

Kearsarge (*kēr'särj*), **Mt., N. H.** A derivative of the Indian *keas*, "high," *auke*, "place." The name was also borne by a famous battleship.

Kennebec (*kĕn'ē-bĕk'*) **River, Me.** From the Indian *quinninippiohke*, "long place of water."

Kenosha (*kē-nō'shă*). A city of Wisconsin. The name is from the Algonquin Indian *kenosa*, said to mean long fish, or pike, probably in allusion to the fishing in the adjacent waters of Lake Michigan.

Keokuk (*kē'ō-kŭk*). City in Iowa, named for an Indian chief, the word meaning watchful fox.

Keweenaw (*kē'wē-nô*) **Point, Mich.** So called from the Indian word *kewauenau*, "portage," it being easier for canoeists to effect a portage across the point than to paddle around it.

Key West. City in Florida. Key West is a corruption of *Cayo Hueso*, Spanish for Bone Reef. The reef when discovered contained bones, supposed to be those of the aboriginal inhabitants.

Kiskiminitas (*kĭs-kĭ-mĭn'ĭ-tăs*) **River, Pa.** From the Indian kithanne, "place of the largest stream."

Kitchener. City in Ontario. The former name was Berlin, which was changed during the World War to Kitchener, commemorating Lord Kitchener.

Kittatinny (*kĭt'ă-tĭn'ĭ*) **Mountains, Pa.** From the Indian name Kitadini, "Largest Mountain."

Kokomo. A city of Indiana. Kokomo is Indian, meaning Young Grandmother.

Labrador (*lăb'rä-dōr'*; *lăb'rä-dôr*). Peninsula of Canada. The name is said to be derived from the Portuguese *lavradores*, "laborers," an early navigator having brought 57 natives to Lisbon as laborers.

Lachine (*lă-shēn'*). City of Quebec, named from rapids in the Saint Lawrence river. La Chine is French for China and was applied by early explorers, who believed they had reached Asia.

Lackawanna (*lăk'ă-wŏn'ă*) **Creek, Pa.** Said to be derived from the Delaware Indian words *lechau hanne*, "the stream that forks."

La Crosse (*lă krŏs'*). City in Wisconsin, the site of which had been a favorite place with the Indians for playing the game of lacrosse. The game was called *la crosse* by the French.

Ladrones (*lă-drōnz'*). Islands in the north Pacific Ocean. Ladrones is the Spanish word for thieves and was given by Magellan when, on landing there in 1520, he was robbed by the natives.

Lamoille (*lă-moil'*) **River, Vt.** A corruption of the French *la mouette*, "the gull."

La Paz (*lă päs'*). A city of Bolivia. Translated, this Spanish name signifies Peace.

La Porte. City in Indiana. La Porte is French for The Door and is said to have referred to an opening connecting two prairies otherwise separated by forest.

Las Vegas (*lăs vā'găs*). Town in New Mexico. The name is Spanish for The Meadows.

Lehigh River, Pa. Corruption of the Delaware Indian word *lechau*, "a fork," the stream being one of the forks of the Delaware river.

Lemberg (*lĕm'bĕrg*). A city of Poland, named Leopolis in honor of a Ruthenian prince Leo. Lemberg, the English form, is a corruption of Leonberg, "Leo's city," berg being employed instead of the Greek *polis*, "city." The name Leo means Lion.

Levant (*lē-vănt'*). A term of Latin or French origin meaning sunrise or east and applied to the countries bordering the eastern Mediterranean Sea.

Liberia (*lī bē'rĭ-ă*). Country of Africa, settled by emancipated American slaves. Liberia, derived from Latin *liber*, "free," means Land of the Free.

Lille (*lēl*). City of northeastern France. Lille is a corruption of the earlier L'Isle, "The Island," alluding to an island in the stream on which the city is situated.

Lisbon. Capital of Portugal. It was formerly called Olispo, said to contain the Phœnician *hippo*, "fortress."

Litchfield. A city of Illinois and a village of Connecticut. The name is borrowed from Lichfield, England, an Old English name, meaning Field of the Dead.

Llano Estacado (*lă'nō ĕs'tă-kä'dō*). Plateau in Texas and New Mexico. The name is Spanish for Staked Plain, being given in allusion to the stakelike boles of the yucca plant growing there.

Lombardy (*lŏm'bär-dĭ*; *lŭm'-*). A province of Italy, named from the early inhabitants, who were called by the Romans Longobardi, probably "Long Beards."

London. Capital of Great Britain. London is said to be derived from the Old British *lyn*, "lake," and *din*, "town"; hence "Lake Town."

Los Angeles (*lōs ăng'gĕl-ĕs*; *lŏs ăn'jĕl-ĕs*). City of California. Los Angeles is Spanish, meaning The Angels.

Lucerne (*lū-sûrn'*). City of Switzerland, named from Latin *lucerna*, "beacon," one having been formerly placed on a tower in the river Reuss.

Lucknow (*lŭk'nou'*). City of India. Lucknow is a corruption of the native name Lakshmanauti, "Fortunate."

Luxor. An Egyptian village, the scene of magnificent ruins. Luxor is an Anglicized form of the Arabic name El Kasur, "The Palaces."

Lycoming (*lī-kŏm'ĭng*) **River, Pa.** Derived from Indian *legawi hanne*, "sandy stream."

Lynn. A city of Massachusetts, named from Lynn, England. The word is Old British for lake.

Macao (*mă-kä'ō*). A Portuguese city in China. Macao is probably a corruption of Amangao, "Gulf of the Goddess Ama," from *gao*, "gulf."

Mackinac (*măk'ĭ-nô*). Name of city in Michigan, derived from the Indian *michilimackinac*, "island of the great turtle," or, in other dialects, "island of the giant fairies."

Madeira (*mă-dē'rä*). Islands in the Atlantic Ocean and a tributary of the Amazon. Madeira is a Portuguese word meaning forest.

Madrid. Capital of Spain, named from Arabic *madarat*, "town."

Maelstrom (*māl'strŏm*). A celebrated whirlpool off the coast of Norway. The name is from Norwegian *mala*, "grind," and *straum*, "stream"; hence "Grinding Stream."

Mahoning River, Pa. Derived from the Delaware Indian word *mahonink*, "at the lick," a lick being a spot where salt is found on the surface of the ground, to which wild animals resort to lick it up.

Malta (*môl'tă*). A Mediterranean island. Malta is said to be of Phœnician origin, meaning refuge.

Manayunk (*măn-ă-yŭngk'*). A suburb of Philadelphia, named from Indian *menetunk*, "place for drinking liquor."

Manchuria (*măn-chōō'rĭ-ȧ*). Part of China, so called from the dynasty of the Manchus, "The Pure Ones."

Mandalay (*măn'dȧ-lā*; *măn'dȧ-lā'*). City of Burma, India, named from the Poli word *mandala*, "flat plain." It is in the broad valley of the Irrawaddy river.

Manhattan. An island in New York. The name is Indian, said by some authorities to mean "little island"; by others, "the people of the whirlpool," referring to Hell Gate. Another authority gives its origin from the word *manna ha ta*, "place of drunkenness," Henry Hudson, as the story goes, having, in 1609, taken some chiefs into his cabin and made them drunk.

Manila. The capital of the Philippines. It is named from the native word *maynila*, designating a shrub formerly common on the site.

Manitou (*măn'ĭ-tōō*). A name applied to a Colorado pleasure resort and other localities. It is an Indian word for spirit.

Mankato (*măn-kā'tō*). A city in Minnesota. The name is Indian for Green Earth.

Marmora (*mär'mō-rȧ*). A sea, southeast of Europe, named from Latin *marmor*, "marble," the sea containing an island with extensive marble quarries.

Marne (*märn*). River in France. The Latin form of its name was Matrona, "Matron."

Matanzas (*mȧ-tän'zȧs*) **Inlet, Fla.** Spanish for massacre, applied by Menendes to commemorate his destruction of Ribaut's company.

Mauch Chunk (*môk chŭngk*). Village in Pennsylvania. The word is Indian, variously interpreted to mean on the mountain or bear's cave.

Mediterranean Sea. Between Europe and Africa and so named from Latin *medius*, "mid" and *terra*, "earth"; hence "In the Midst of the Earth," this sea occupying the center of the world as known when the name was given.

Memphis. A city of Tennessee, named after the ancient Memphis, Egypt. The Egyptian name of the city was Mennufer, "City of the Good."

Menasha (*mē-năsh'ȧ*). A city of Wisconsin. The word is Indian for thorn.

Mendota (*měn-dō'tȧ*). A city of Illinois, village of Minnesota, and lake of Wisconsin, named after an Indian tribe. The word means mouth, the tribe having formerly lived at the mouth of the Minnesota river.

Menominee (*mē-nŏm'ĭ-nē*) **River, Wis.** From an Indian tribe, the Menominees, a name derived from *monomonic*, "wild rice," which is said to have been cultivated by the tribe.

Merrimack (*mĕr'ĭ-măk*). River, county, and town in New Hampshire. Merrimack has an Indian origin and is said to mean sturgeon or swift water. As used of localities in other states, the word is spelled without the final "k."

Mesa Verde (*mā'sȧ vâr'dā*). A plateau and national park in Arizona. Mesa Verde is Spanish for Green Table-land.

Mesopotamia. A mandated territory of Asia. Mesopotamia means Between the Rivers, having been formerly applied to the region between the Euphrates and the Tigris river. The word is derived from the Greek *mesos*, "middle," and *potamos*, "river."

Mexico. A word derived from Mexitl, a form of the name of the Aztec war god.

Miami (*mī-ăm'ĭ*). Cities in Florida and Oklahoma and a town in Arizona named after the Maumees, an Indian tribe. The word is variously explained to mean mother or pigeon.

Michigan. One of the Great Lakes, named from the Algonquin Indian words *michi*, "great," and *guma*, "water"; hence "Great Water."

Milan (*mĭl'ăn*; *mĭ-lăn'*). City of Italy, called by the Romans Mediolanum, from Latin *medius*, "middle," and from *lanum*, believed equivalent to Latin *planum*, "plain"; hence "In the Midst of the Plain."

Milwaukee. A city and river of Wisconsin, said to be named from the Algonquin *minwaukee*, "rich country."

Minneapolis. Metropolis of Minnesota, named from the Dakota Indian words *minni*, "water," and *ha*, "curling," and from the Greek *polis*, "city." Minneapolis, therefore, means City of the Curling Water and was applied in allusion to Saint Anthony falls in the city.

Minnehaha River, Minn. An Indian name said to mean Laughing, or Curling, Water. The river has a cascade with a fall of about 60 feet.

Minnewanka. Lake in Rocky Mountains park, Canada. Minnewanka is an Indian word meaning lake of the water spirit.

Minorca (*mĭ-nôr'kȧ*). A Mediterranean island, having a name derived from Latin *minor*, "smaller." A near-by island is called Majorca, from *major*, "larger."

Mississippi. River and state, so called from the Algonquin Indian *missi sepe*, "father of waters."

Missouri (*mĭ-sōō'rĭ*; *mĭ-zōō'rĭ*). River and state, named from the Algonquin *mis*, "great," and the Dakota *souri*, "muddy"; hence Great Muddy.

Mobile (*mō-bēl'*). City of Alabama, at the delta of the Mobile river, so called from Maubila, an Indian village formerly on the river.

Mohawk. River in New York. The name is that of an Indian tribe and is said to be derived from the native word *mahaqua*, "bear."

Mohegan (*mō-hē'găn*) **Lake, N. Y.** From a tribe of Indians whose name was from *maingan*, "wolf."

Monadnock (*mō-năd'nŏk*). A mountain in New Hampshire. Monadnock is Indian, variously explained to mean spirit place, difficult, or silver mountain.

Monocacy (*mō-nŏk'ȧ-sĭ*) **River, Md.** From the Indian name Menagassi, "Creek of Many Bends."

Monongahela (*mō-nŏng'gȧ-hē'lȧ*). City and river of Pennsylvania, so called from the Indian word *menawngihella* said to mean falling-in bank.

Mont Blanc (*mŏN' blĂN'*). Highest peak of the Alps. The name is French for White mountain.

Monte Rosa (*mōn'tā rō'zā*). Name of an Alpine peak, meaning, in Italian, Rosy mountain.

Montreal. City in Quebec. Montreal is a corruption of Mont Royal, the French designation of a hill partly covered by the city.

Moscow (*mŏs'kō*). Capital of Russia. The word comes from Moskva, the name of a river signifying, in Finnic, Place for Washing.

Munich (*mū'nĭk*). A city of Germany. The name means Monk and was given because of a monastery formerly standing on the site.

Muskegon (*mŭs-kē'gŭn*) **River, Mich.** From the Indian name, meaning Plenty of Fish.

Muskingum (*mŭs-kĭng'gŭm*). River and county in Ohio. Muskingum is Indian, meaning Moose-eye river.

Nakimu. Caves in the Canadian Rockies, designated by this Indian word for grumbling. The caves contain noisy waterfalls.

Nanaimo (*nȧ-nī'mō*). A city of British Columbia. Nanaimo is an Indian word for sturgeon.

Nantucket. Island and county in Massachusetts. This name is said to be of Indian origin, meaning Far Away.

Naples. A city of Italy. Naples is a corruption of Neapolis, "New city," from the Greek *nea*, "new," and *polis*, "city."

Narragansett. Summer resort in Rhode Island. An Anglicization of the Indian name of a tribe, Naiagansett, "People of the Point."

Nashua (*năsh'ū-ȧ*). City in New Hampshire on the river Nashua, having an Indian name meaning Between.

Natal (*nȧ-tăl'*). Province of South Africa, so called because the region was discovered on the Feast of the Nativity, 1497, *natalis* being the Latin word for birthday.

Natchez (*năch'ĕz*). City in Mississippi, named for an Indian tribe, the word meaning hurrying men.

Naugatuck (*nô'gȧ-tŭk*). A village in Connecticut. Naugatuck is of Indian origin and is variously explained to mean Point between Rivers or One Tree.

Nauvoo (*nô-vōō'*). City in Illinois, named in obedience to a revelation reported by Joseph Smith, one of its Mormon founders.

Netherlands. A country of Europe, partly below sea level. The name means Low Lands.

Neversink River. Two small streams in New York and in New Jersey. Neversink is said to be derived from the Indian *newa sink*, "mad river."

Niagara (*nī-ăg'ȧ-rȧ*). Name of a river and a famous cataract, explained by the Indian word *neagara*, "neck," in allusion to the river as a narrow strait connecting Lake Erie and Lake Ontario. Others derive the word from *oniawgarah*, "thunder of waters," referring to the cataract.

Nile. A river of Africa. The English designation is from the Greek *Neilos*, which probably represents the Phœnician name *Nahal*, "Stream."

Niobrara (*nī'ō-brâr'ȧ*) **River, Neb.** "The Broad Water," derived from the Indian *ni*, "water," and *abrara*, "wide."

Normandy. Name applied to part of northern France. An earlier form was Normannia or Northmannia, "Land of the Northmen."

Norwalk. A city in Connecticut, named from the Indian *nayaug*, "middle land."

Nova Zembla. Island group north of Russia. The name means New Land, derived from Latin *nova*, "new," and Russian *zembla*, "land."

Ochlockonee (*ŏk'lŏk'ŏ-nē*) **River, Fla.** A Seminole Indian name, meaning Yellow Water.

Ocmulgee (*ŏk-mŭl'gē*) **River, Ga.** From the Creek Indian *oko mulgi*, "turbulent stream."

Oconee (*ō-kō'nē*) **River, Ga.** Oconee is a Seminole Indian word, meaning water course.

Okeechobee (*ō'kē-chō'bē*) **Lake, Fla.** "Grassy lake." A Seminole Indian name.

Okefenokee (*ō'kē-fē-nō'kē*) **Swamp, Ga.** From the Choctaw word *okefinocau*, "quivering water."

Oklawaha (*ŏk'lä-wō'hô*) **River, Fla.** From the Seminole Indian language, meaning Muddy Place.

Omaha (*ō'mä-hô'*). City in Nebraska, named from an Indian word meaning up-stream. The designation formerly applied to an Indian tribe, who were thus referred to as the Up-stream people.

Oneida Lake, N. Y. From the name of an Indian tribe, meaning Beacon Stone.

Onondaga (*ŏn'ŏn-dô'gà*) **Lake, N. Y.** From an Indian tribe, the name meaning Place of the Hills.

Ontario. "Beautiful lake." One of the Great Lakes; also a province of Canada. The word is Indian.

Opelika (*ŏp'ē-lī'kà*). A village in Alabama, named from the Indian *opilualaikata*, "large swamp."

Orkney Isles. North of Scotland. Orkney is from Irish *orc*, "porpoise."

Orleans (*ôr'lā'ănz'*). A city of France. The name is a corruption of the Latin Aurelianensis, "Aurelian's City," named after the Roman emperor Aurelian.

Osage River, Mo. An Indian word, interpreted to mean strong.

Oswego. City and river of New York. Oswego is from the Iroquois *oswageh*, "flowing out," alluding to the river.

Ottawa. The capital of Canada, on the Ottawa river. The name is derived from the Indian *adawe*, "trade." Also cities in Illinois and Kansas.

Owego. City in New York so called from the Delaware Indian *ahwaga*, "where the valley widens."

Ozark. Low mountains of the central United States. Ozark is said to be a corruption of the French *aux arcs*, "with bows," descriptive of the inhabitants.

Pacific Ocean. The name means Peaceful, being given by Magellan, who first traversed the ocean, probably entering it when it was calm.

Palo Alto (*pă'lō ăl'tō*; *pāl'ō ăl'tō*). Town in California. Palo Alto is Spanish, meaning High Timber, the site being heavily wooded in earlier days.

Panama (*păn'ä-mä'*). Central American country, a gulf, an isthmus, and a famous canal. The word is Indian, being variously explained to mean butterfly or mudfish.

Papua (*pă'pōō-ä*; *păp'ŭ-ä*). Part of New Guinea, an island north of Australia. The word is derived from Malay *papuwah*, "woolly," and was applied in allusion to the hair of the natives.

Pasadena. City in California. Pasadena is Indian, said to mean Crown of the Valley.

Passaic (*pă-sā'ĭk*). City in New Jersey, on the Passaic river. An Indian name, explained either as meaning Peace or as derived from *passajeek*, "valley," in allusion to the river.

Passamaquoddy (*păs'ä-mà-kwŏd'ĭ*). Bay on the coast of Maine. An Indian word, meaning pollock ground.

Passumpsic (*pă-sŭmp'sĭk*) **River, Vt.** This word is Indian, meaning much clear river.

Patagonia. Name given to southern Argentina, said to be derived from the Spanish *patagon*, "large foot" and applied because of the large footprints of the inhabitants. It is also explained as from the Indian *patacuna*, "terraces." The land slopes in terraces eastward from the Andes mountains.

Patapsco (*pà-tăpsˊkō*) **River, Md.** From the Indian name Patapsqui, "Black Water."

Pecos (*pā'kōs*) **River, Tex.** Named by the Spaniards from *pecoso*, "freckled," a local suggestion in the appearance of its waters.

Peking (*pē'kĭng'*). The capital of China. The name means, in Chinese, Northern Capital. Also city of Illinois, named for the Chinese city.

Pembina (*pĕm'bĭ-nà*; *-nô*). Name of a village in North Dakota, contracted from the Ojibway *anepeminam*, a species of cranberry growing there.

Pend Oreille (*pĕnd ô-rĕl'*) **Lake, Idaho.** French word meaning earring, suggested by the lake's shape.

Penobscot. A bay, river, and village in Maine. The name is from the Indian *penobskeag*, "rocky place."

Pensacola. City and bay in Florida, named from an extinct tribe of Indians, the Panshaoklas, "Hair People."

Peoria (*pē-ō'rĭ-ä*). City in Illinois, named from an Indian tribe. The word means place of fat beasts.

Pernambuco (*pĕr'nämˊ-bōō'kō*). City of Brazil. The name means, in Portuguese, Mouth of Hell and was given in allusion to the violent surf near by.

Persepolis (*pĕr-sĕp'ô-lĭs*). The Greek designation of a city of ancient Persia, meaning Persian city.

Persia (*pûr'shà*; *pûr'zhà*). Country of Asia. Persia is from *parsa*, probably a Semitic term for horsemen.

Philadelphia. A city of Pennsylvania, whose name is derived from two Greek words *philia*, "love," and *adelphos*, "brother"; hence "Brotherly Love." It expresses an ideal of its Quaker founders.

Pinole (*pĭ-nō'lâ*). A village of California, so named from a Spanish term for parched grain.

Piscataqua (*pĭs-kăt'ä-kwà*) **River, N. H.** From the Indian *piscataquanke*, "a great deer place."

Plata, Rio de la (*rē'ō dā lä plä'tä*). South American river. "River of Silver," so called by the Spaniards.

Platte (*plăt*). A river in Nebraska, Colorado, and Wyoming. Platte is French, meaning Calm.

Pocomoke (*pō'kō-mōk*) **River, Md.** From its Indian name Pockhammokik, "Broken by Knolls," probably referring to the surrounding country.

Point Pinos (*pē'nōs*), **Cal.** Originally named Punta de Pinos, Spanish for Point of Pines.

Poland. Country of Europe. The name means Land of Plains, from Slavonic *pole*, "plain."

Porto Rico. An island of the West Indies, given a Spanish name, meaning Rich Port.

Potomac. River in the United States. The name is Indian and is variously explained as meaning Place of the Burning Pine or as from *potowmak*, "they come by water."

Potsdam. Suburb of Berlin, Germany. Potsdam is a corruption of the Slavonic Poddubami, "Under the Oaks."

Poughkeepsie (*pō-kĭp'sĭ*). A city in New York, named from a near-by waterfall, Peoghkepsingh, which signifies a place where the water breaks through.

Prague. The capital of Czechoslovakia. The Czech form of the name is Praha, meaning threshold, and having reference to a reef of rocks in the bed of the Moldau river, on which the city is located.

Prairie du Chien (*prā'rĭ dŏō shēn'*). A city in Wisconsin, having a French name, which means Dog Prairie.

Provence (*prô'vănsˊ*). A region of southeastern France. Provence is derived from Latin *provincia*, "province." It was the first Roman province in Gaul, and anciently was called Provincia Romana.

Prussia. A state of Germany, whose inhabitants were formerly called, in Lettish, Pruzzi, "Neighbors."

Pueblo (*pwĕb'lō*). A city in Colorado, named from a Spanish word meaning village. The word was earlier applied to a tribe of Indians who, unlike other tribes, built permanent homes.

Punjab (*pŭn-jäbˊ*). "Five Rivers." A province of India, through which flow five tributaries of the Indus—Jhelam, Chenab, Ravi, Sutlej, and Beas.

Punta Arenas (*pōōn'tä ä-rā'näs*). A seaport of Porto Rico and a town of Chile, both appropriately given this Spanish name, meaning Sandy Point.

Quebec. Province, city, and river of Canada. Quebec is variously explained as from Quebesq, a village of Brittany, or from an Algonquin term meaning beware of the rock.

Quinsigamond (*kwĭn-sĭg'ä-mŏnd*) **Lake, Mass.** Indian name, meaning Fishing Place for Pickerel.

Rangoon. City of Burma, India. The name is derived from the Burmese *ran kun*, "end of the war" and was given by Alompra, the founder of a native dynasty, after he had conquered a rival established at Pegu.

Rapidan (*răp'ĭ-dănˊ*) **River, N. C.** A corruption of Rapid Anne.

Rappahannock River, Va. From Indian *lappihanne*, "river of quick, rising water."

Regina (*rē-jī'nà*). Capital of Saskatchewan. *Regina* is the Latin word for queen.

Rhine. A river of Germany. Its name is connected with the root of German *rennen*, "flow."

Rhodes. An island in the Mediterranean Sea, named from the Greek *rhodon*, "rose."

Rideau (*rē′dō′*). A river and canal in Ontario. Rideau is French, meaning Curtain, and alludes to the appearance of a waterfall on the river.

Rio de Janeiro (*rē′ō dā zhà-nā′rō*). Capital of Brazil, on the bay of Rio de Janeiro, "River of January," so called by its Portuguese discoverers, who, on January 1, 1502, entered the bay, supposing it to be a river.

Rio Grande (*rē′ō grän′dā*). River between Mexico and the United States. The name is Spanish for Great River.

Riviere du Loup (*rē′vyâr′ dōō lōō*). A city and a river of Quebec. A French term, meaning Wolf river.

Roanoke. A city in Virginia, named from the Indian *roenoke*, a word for shell, or wampum.

Rockaway. Village in New York, named from the Indian word *ackewek*, "bushy."

Rodeo (*rō-dā′ō*). A village of California. The name is Spanish for Round Up, given at a time when the station was a cattle shipping point.

Rumania. A country of Europe. Rumania is a corruption of the Latin Romania, "Country of the Romans," the region having been anciently settled by Romans.

Sabine (*sà-bēn′*) **River, La.** Said to have been so named in allusion to the Roman story of the rape of the Sabine women, because the early French voyagers there carried off Indian women as wives.

Saco (*sō′kō*). River and city in Maine, named from an Indian word *sauk*, "pouring out."

Sacramento. Capital of California on Sacramento river. The word is Spanish for sacrament.

Sag Harbor. Village in New York. Sag is a shortened form of Sagaponack, an Indian name meaning Place Where Groundnuts Grow.

Saginaw. City in Michigan on Saginaw river. The name is said to be derived from the Indian *sauk sachoon*, "pouring out at the mouth."

Sahara (*sà-hä′rà*). Desert in Africa. Sahara is an Arabic word for desert.

Salem. City in Massachusetts. The name is a shortened form of Jerusalem, "City of Peace." Salem by itself means Peace.

Sandusky. City in Ohio. Sandusky is variously explained as from the Indian *sanduste*, "large pools of water," or as given for Jonathan Sandousky, a Polish trader.

Sandwich Islands. Former designation of Hawaii. The name commemorates Lord Sandwich, formerly of the British Admiralty.

San Francisco. City of California. The name is Spanish for Saint Francis.

San Salvador (*săn săl′và-dōr′*). Designation applied by Columbus to the first land sighted by him in America. The place is now believed to be Watling island, or Guanahani. San Salvador means Holy Savior.

Santa Cruz. City of California. A Spanish expression, meaning Holy Cross.

Santa Fe. City in New Mexico. The name is Spanish for Holy Faith.

Santiago (*săn′tē-ä′gō*). The capital of Chile. Santiago is a Spanish form for Saint James.

Saragossa (*sä′rà-gŏs′sà*). A city of Spain. Saragossa is a corruption of the city's Roman name, Cæsarea Augusta, "City of Cæsar Augustus," a Roman emperor.

Saranac. A village in New York, on the Saranac river, so called from an Indian word meaning river that flows under a rock.

Saratoga Springs. Summer resort in New York. The name is said to mean Sparkling Place, from Indian *assarat*, "sparkling," and *oga*, "place."

Sarawak (*sä-rä′wäk*). District in North Borneo, named from Malay *sarakaw*, "cove."

Saskatchewan (*săs-kăch′ĕ-wŏn*). A river and province in western Canada. Saskatchewan is Indian and is said to mean Swift river.

Saugatuck (*sô′gà-tŭk′*). A village in Connecticut, on the Saugatuck river. The name is derived from the Indian *sauketuck*, "at the mouth of the tidal stream."

Sault Sainte Marie (*sōō′ sânt mà-rē′*). Cities of Michigan and Ontario. Sault is a French word for cascade. Hence "Cascade of Saint Mary."

Savannah. City and river of the southeastern United States. The name is of Indian origin and means grassy plain, alluding to the surrounding country.

Saxony. A state of Germany, named for the Saxons, so called from the *seax*, as they designated the sword which they carried.

Scandinavia. A peninsula of northern Europe. The word is explained as "Land of Darkness," derived from the Teutonic *skadino*, "dark." Northern Scandinavia has, in winter, a night which lasts for several months.

Schoharie (*skō-hâr′ĭ*). A village in New York, on a stream of that name, which is a corruption of the Indian *towosshoher*, "driftwood."

Schroon (*skrōōn*) **Lake, N. Y.** Variously explained as from Scharon, adopted in honor of the duchess of Scharon, favorite of Louis XIV, or from an Indian word meaning child of the mountain.

Schuylkill (*skōōl′kĭl*) **River, Pa.** From the Dutch *schuylen kill*, "hidden creek."

Scioto (*sī-ō′tō*) **River, Ohio.** Shawnoese Indian word, meaning hairy. Its waters at flood were said to have been filled with hairs, attributed to the herds of deer bathing when shedding their coats.

Scutari (*skōō′tà-rē*). City in Turkey. The name is from the Turkish *uskudar*, "messenger," the city having been a station for couriers. Also a city of Albania.

Seattle. City in Washington, named for the chief of the Duwamish Indians, *See-aa-thl*.

Sebago (*sē-bā′gō*) **Pond, Me.** From an Indian word meaning great water.

Sebastopol. City of southern Russia, named from the Greek *sebastos*, "august," and *polis*, "city"; hence "August City."

Sheboygan (*shē-boi′găn*) **River, Mich.** From the Indian *showbwawaygum*, "a stream that comes from the ground."

Shenandoah. A tributary of the Potomac river. Its name is Indian and is variously explained to mean Sprucy stream, Hillside stream, or Daughter of the Stars.

Shrewsbury River, N. J. From a town of England. Its early name was Scrobbesbuhr, which, in Anglo-Saxon, signifies Underbrush town.

Sierra Nevada. Mountains of Spain and of California. Sierra Nevada is Spanish for Snow mountains. Sierra is a Spanish word meaning saw. It is applied also to a mountain range, the peaks of which show analogy to the teeth of a saw.

Sinai (*sī′nī; sī′nā-ī*). A mountain of Asia, named for Sin, the Babylonian moon god.

Singapore (*sĭng′gà-pōr′*). A city of southeastern Asia. The earlier form of the name was Simhapura, Sanskrit for Lion city.

Sing Sing. The name of the state prison near the village of Ossining, New York, and, until 1901, the name of the village. It appears to have been named from the Sin Sincks Indians, formerly located near by.

Skagerrack (*sgäg′ĕr-räk*). A strait of northern Europe. Skagerrack means Rocky Cape channel, being derived from the Danish *skaqi*, "promontory," and *rack*, "channel."

Skaneateles (*skăn′ĕ-ăt′lĕs*). A village and a lake in New York. The name is Indian for Long lake, given in allusion to the long and narrow shape of the lake.

Spain. Country of Europe. Spain is derived originally from the Greek Hispania, an alternate form of Hesperia, "Land of the West."

Spitzbergen. Island group north of Norway. The name is Dutch for Sharp-peaked mountains.

Spokane (*spō′kăn′*). City of Washington. Spokane is of Indian origin, meaning Children of the Sun.

Spuyten Duyvil (*spī′tĕn dī′vĭl*). "Spitting Devil." A channel in Manhattan island, so called by the Dutch.

Stockholm. The capital of Sweden. The older form of the name, Stakholm, was a compound of the Swedish *stak*, "sound," and *holm*, "island," meaning Island in the Sound. The city is built mainly on islands in a strait.

Sudan (*sōō′dăn′; sōō-dăn′*). Name of a portion of northeastern Africa, being Arabic for The Blacks.

Suez (*sōō-ĕz′; sōō′ĕz*). A town, isthmus, and canal in Egypt. The name comes from Suweis, part of the Arabic designation of a fortified well, some distance from the town.

Sunapee (*sŭn′à-pē*). Lake in New Hampshire, named from the Indian word *shehunknippe*, "wild goose pond."

Superior. One of the Great Lakes. Superior is Latin, meaning Higher.

Susa (*sōō′sà*). A city of ancient Persia. The name is from the Persian *shushan*, "lilies."

Susquehanna. Village and river in Pennsylvania, so called from the Indian *suckahanne*, "water."

Suwannee (*sōō-wŏ′nē*). Towns and rivers in Florida and in Georgia. The word is Indian, said to be from *sawani*, "echo river."

Syria. A district of western Asia. Syria is derived from Assyria, a lengthened form of Assur, "Water Bank." Assur was situated on the Tigris river.

Tacoma. City in Washington. The name means Big Snow mountain and was borne by an Indian chief, after whom the city was called.

Tagus (*tā'gŭs*). River in Iberian peninsula, Europe. The word goes back to a Phœnician name meaning Fish river.

Tahlequah (*tä'lĕ-kwä'*). City in Oklahoma. Tahlequah is derived from the Cherokee Indian *talikwa*, said to mean place of two large towns.

Tallahassee (*tăl'ă-hăs'ē*). Capital of Florida, so called from an Indian word meaning old town.

Tallahatchie (*tăl'ă-hăch'ē*). County in Mississippi, named from Tallahatchie river. The word is Indian for River of the Rock.

Tallapoosa (*tăl'ă-pōō'să*). River in Georgia and Alabama, giving its name to a county in Alabama and to a city in Georgia. Tallapoosa is Indian, variously explained to mean Swift Current or Stranger.

Tarragona (*tăr'ră-gō'nă*). City of Spain. The earlier form was Tarraco, from the Phœnician *tarchon*, "citadel."

Tarrytown. Village in New York. The origin of the name is found in the Dutch *terwen*, "wheat."

Tay. River in Scotland. Tay is derived from the Pictish *tau*, "tranquil."

Tennessee. Tributary of the Ohio river in the United States. The name is of Indian origin, said to mean Curved Spoon, probably in allusion to the course of the river.

Terre Haute (*tĕr'ĕ hōt'*). City in Indiana, built upon a bank 60 feet above the river. Terre Haute is French for High Land.

Texarkana. A town on the line between Texas and Arkansas; hence the name. It belongs officially to Arkansas.

Thames (*tĕmz*). A large river in England; also rivers in Ontario and Connecticut. The name is of Celtic origin, meaning Broad river.

Thebes (*thēbz*). Two ancient cities, in Greece and Egypt. The origin of the Greek name is from *teba*, "hill"; the name of the Egyptian city is from *t' ape*, "the capital."

Thermopylæ (*thĕr-mŏp'ĭ-lē*). A mountain pass in Greece. Thermopylæ means Pass of the Hot Springs, from the Greek *thermos*, "hot," and *pylæ*, "pass." The hot springs have disappeared since ancient times.

Tibet (*tĭ-bĕt'*; *tĭb'ĕt*). A district of China. Tibet is said to be a corruption of Thupo, "High Country."

Ticonderoga (*tī-kŏn'dĕr-ō'gă*). Village in New York, named from the Indian *cheonderaga*, "brawling water," referring to the noise of a near-by cataract.

Tien Shan (*tĭ-ĕn' shän'*). "Celestial mountain." A range on the western border of China.

Tierra del Fuego (*tyĕr'ră dĕl fwā'gō*). South American archipelago. The Spaniards applied this designation, meaning Land of Fire, because the Indian inhabitants used fires at night for signals.

Tigris. A river of Mesopotamia. Tigris is derived from Old Persian *tigra*, "arrow."

Tippecanoe River, Ind. From the Indian name of a fish living in this stream, "the long-lipped pike," or "buffalo fish."

Tokyo (*tō'kē-ō*). The capital of Japan, on the east side of Honshu island. Tokyo means Eastern Capital.

Tombigbee. River in Mississippi and Alabama, named from the Choctaw Indian *itimbibikpi*, "undertaker."

Topeka. Capital of Kansas. Topeka is from the Indian word *topeakae*, "a good place to dig potatoes."

Toronto (*tō-rŏn'tō*). Capital of Ontario. The name is a Huron word for place of meeting.

Tortugas (*tŏr-tōō'găz*) **Islands, Fla.** A Spanish word meaning tortoise, probably used as a designation because of the number of the animals found there.

Trebizond (*trĕb'ĭ-zŏnd'*). Name of a Turkish city, derived from Greek *trapeza*, "table." The city is on a table-land.

Trinidad. Island of South America. The name is Spanish for Trinity, being given because the first view of it, when discovered, revealed three mountain peaks.

Tucson (*tōō-sŏn'*). City of Arizona. Tucson is from the Indian *stynk son*, "black base," applied in allusion to the color of the lowest rock layer of a near-by mountain.

Tulare (*tōō-lär'ā*) **Lake, Cal.** From *tule*, Spanish for bulrush, that plant being common on its shores.

Turin (*tū'rĭn*; *tū-rĭn'*). A city of Italy. The name in Italian, *Torino*, goes back to a Celtic word *tors*, "hills," and means City of the Hill-dwellers.

Tuscaloosa (*tŭs'kă-lōō'să*). City in Alabama, called after an Indian chief, the name meaning Black Warrior.

Tuskegee (*tŭs-kē'gē*). Town in Alabama, so designated probably from the Indian *taskialgi*, "warriors."

Tuxedo (*tŭk-sē'dō*). Settlement in New York. The name is said to be derived from the Indian *p'tauk seet tough*, "place of bears."

Ukraine (*ū'krān*). District of Russia, called in Russian Ukraina, "Borderland." It was formerly part of Poland and bordered on Russia.

Umbagog (*ŭm-bā'gŏg*). Lake lying partly in New Hampshire and partly in Maine. Umbagog is Indian and is variously explained to mean Doubled Up, Clear Lake, or Near-by lake.

Urbana (*ûr-băn'ă*). Cities in Illinois and Ohio. Urbana is a form of the Latin *urbanus*, "refined."

Uruguay (*ū'rōō-gwā*; *ōō'rōō-gwī'*). South American country and river. The name means Bird's Tail, derived from Guarani Indian *uru*, "bird," and *guay*, "tail," and was applied in allusion to a falls on the river, which spread out like a bird's tail.

Valenciennes (F. *vä'läN'syĕn'*; E. *vă-lĕn'sĭ-ĕnz'*). City of France, said to have been called after the Roman emperor Valentinian. The name means Powerful.

Volga (*vŏl'gă*). The greatest European river, called Volga from the Old Slavonic *wolkoi*, "great."

Wabash. Counties in Indiana and Illinois, river flowing through both states, and city in Indiana. The word is Indian, explained as from *unabache*, "cloud borne by an equinoctial wind," or as meaning white water.

Wales. Part of Great Britain. Wales is derived from Anglo-Saxon *wealas*, "foreigners."

Walla Walla. City in Washington on a river of the same name. Walla Walla is Indian for Many Waters.

Wastach. A river in Rocky Mountains park, Canada. The name is Indian for Beautiful.

Watervliet (*wô'tĕr-vlēt'*). "Flowing Stream." A city in New York, named by the Dutch.

Weehawken (*wē-hô'kĕn*). Village in New Jersey, named from Indian *weachin*, "maize lands."

Wetterhorn (*vĕt'ĕr-hôrn'*). A mountain of Switzerland. Wetterhorn means Storm Peak.

Wheeling. City in West Virginia, named from Indian *weal ink*, "place of a human head," in reference to a white man's head placed on a pole there by the Indians.

Willamette (*wĭ-lăm'ĕt*). River in Oregon, named from Indian *wallamet*, "running water."

Windsor (*wĭn'zĕr*). Cities in England, the United States, and Canada. Windsor is a contraction of the Anglo-Saxon *windlesofra*, probably meaning place by the winding shore.

Winnepesaukee (*wĭn'ē-pē-sô'kē*). Lake in New Hampshire. The name is Indian, meaning Good Water Discharge, or, according to others, Beautiful Highland lake.

Winnipeg. Capital of Manitoba; also a lake in that province. Winnipeg is Algonquin Indian for Muddy Water, referring to the lake.

Winona. City in Minnesota. Indian for First Born Daughter.

Wissahickon (*wĭs-ă-hĭk'ŏn*) **Creek, Pa.** From the Indian word *misamekhan*, "catfish stream."

Yangtze (*yăng'tsē'*). A large river of China. The name means Son of the Sea.

Yankton. City in South Dakota, named from Indian *eyank ton wah*, "people of the sacred lake."

Yazoo (*yăz'ōō*). Town and river in Mississippi. The name means River of Death, being of Indian origin.

Yoho. A valley and national park in the Canadian Rockies. The word is Cree Indian, meaning Wonderful.

Yosemite (*yō-sĕm'ĭ-tē*). A valley and national park in California, named from the Indian *osamit*, "grizzly bear."

Youghiogheny (*yŏk'ô-gā'nĭ*) **River, Pa.** From Indian *yukwiakhanna*, "meandering stream."

Ypsilanti (*ĭp'sĭ-lăn'tĭ*). City in Michigan, named for a Greek prince.

Yukness. A mountain of the Canadian Rockies. Yukness is derived from a Sioux Indian word for sharpened as with a knife.

Zambezi (*zăm-bā'zē*; *zăm-bē'zĭ*). A large river of Africa. Zambezi is a native word for great river.

Zanzibar (*zăn'zĭ-bär'*; *zăn'zĭ-bär'*). An island of Africa. The name is a Portuguese form of the Persian Zangibar, "Land of the Blacks."

Zealand. An island of Denmark. Zealand means Sea Land.

Zuider Zee (*zī'dĕr zē'*). A southern arm of the North Sea in the Netherlands. The name is Dutch for South Sea.

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TEST QUESTIONS

Give the derivation of the word geography. State the name and the subject matter of each of the principal divisions into which the science of geography is classified 639

With what shape is the earth represented in the earliest existing map of the world? 639

Characterize the three chief periods of geographical progress. Describe some modern agencies for increasing and for spreading the knowledge of geography 639

State four benefits that may be derived from the study of geography 639–640

Who were the earliest navigators known to history? Name a notable discovery made by them 641

Mention six Greek geographers and state the chief contributions made by each to the science of geography 641

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To what part of the earth is the name America applied? In whose honor was it so named? Explain the use of the term New World . . 645

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What oceans and other bodies of salt water border the shores of North America? Describe the character of the North American coasts. On which coast are the harbors most numerous? 645

What great mountain systems form the chief surface features of the North American continent? Locate these systems and indicate the extent of each. Name the highest mountain peak in North America 645

Describe the Great Basin, the Colorado plateau, the Mexican plateau. What noted valley lies in the Mexican plateau? 645

Give the location and extent of the Medial plains. By what important river systems are these plains drained? 646

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Describe briefly the fisheries of New England. Which state stands first in value of sea fish taken? 654

What is the leading occupation of the people of New England? Mention ten important products of New England factories. Give four reasons for the success of New England as a manufacturing region. Compare Massachusetts with other states of the Union with respect to manufactures and commerce . . 654

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Name the states usually called the Middle Atlantic states. Which of these are sometimes called the Middle states? 654

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Describe in general the surface of the Middle Atlantic states. Through what part of this group does the Appalachian Mountain system extend? Describe the coastal plain. Name four important tidal rivers found in this group. What large river on the west serves as an interior waterway? 654

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State the chief occupation of the people of the Southern states. What is the most valuable crop produced in the Southern states? What fruits does southern Florida produce? Which of the Southern states leads in cotton growing? in sugar production? in cattle raising? in wool production? 657–658

Estimate the importance of stock raising in the eastern section; in the western. Name the chief animal products of each section . 657–658

State the principal manufactures of the eastern section. Name the three states which lead in manufactures. Which states in this group lead in the manufacture of iron and steel? of cotton goods? of tobacco? 657

What are the chief manufactures of the western section? Which of these states leads in manufactures? 658

What are the chief articles of export of the Southern states? Name the principal seaports of each section 657–658

Plateau States

Name the Plateau states. Describe their surface. Which state has the highest elevation above sea level? the lowest? Which contains the highest mountains? 658

By what drainage systems are the states in this division drained? Name four important rivers in each system 658

Describe the climate of the different parts of this region, stating reasons for the great diversity. Which parts are hottest? which are coldest? Why does each of these states contain tracts of desert? Describe these desert areas 658–659

In what locations are the forests in these states found? Of what trees do they chiefly consist? How many national forests are located in these states? State their total area 659

State the chief mineral productions of this region. Name the states which lead in the production of gold; of silver; of copper; of tungsten 659

By what methods is agriculture carried on in the Plateau states? What are the chief crops produced? In what states or sections are apples grown? melons? long staple cotton? . 659

State the importance of stock raising in these states. Name the most important animals reared. What proportion of the total wool clip of the United States do these states produce? 659

Pacific States

Name the states which form this group. Describe in general their surface. Name and locate three important mountain ranges. Mention five important valleys noted for their fertility 659

Name the chief navigable rivers of the Pacific states. Name three important uses of the rivers of the Pacific states 659

Describe the climate of the Pacific states, giving its chief characteristics. What sections receive the greatest rainfall? the least? . . 659–660

Name important mineral products of the Pacific states. Indicate the present rank of California among the states in gold production . 660

For what characteristics are the forests of the Pacific states noted? In which of the states is the most important lumber region located?. 660
State the importance of agriculture in the Pacific states. Mention leading crops. What class of crops outranks all others in value? 660–661
Which of these states leads in fruit production? Of what classes of fruits does this state's production chiefly consist? In what district are citrous fruits extensively grown? Of what three kinds of fruits does this production principally consist? 661
Discuss the value and extent of irrigation in the Pacific states. What is the position of California as regards irrigation?. 661
State the value of the fisheries in these states. Where are the principal fishing grounds? Name the most important food fish taken. . 661
Point out factors that have stimulated manufacturing in the Pacific states. Name the chief classes of manufactured products. Describe the commerce of the Pacific states. Indicate the value of the Panama canal to this region 661

UNITED STATES DEPENDENCIES

Name the dependencies of the United States. In what zone do most of them lie?. . . . 667
Locate and give the extent of Alaska. Describe the chief surface divisions of the mainland. Describe also the principal river 667
Name the chief mineral products of Alaska. State the value of its fisheries. What parts of Alaska does the government railway connect? Sketch briefly the history of Alaska . . 668–669
Describe American Samoa. Name its chief seaport. Locate and give important points about Guam 669
Briefly describe Hawaii, mentioning location, extent, surface, soil, and climate. Name the capital. What are the chief productions of Hawaii? Outline its history 670
Locate and give the extent of the Philippines. Name the two largest islands and the four most populous cities in the archipelago. Describe the vegetation and animal life of the islands 671–672
What are the chief crops of the Philippines? Name the principal exports and imports. Describe the people. Outline the history of the islands 672
Locate Porto Rico. Briefly describe its surface, climate, vegetation, and soil. Name the principal industry and products of the island. What city is the capital? Name three other important cities. Outline the history of Porto Rico 673
Briefly describe the Virgin islands. Sketch their history. In what does the chief value of the Virgin islands now consist? 674

AMERICAN CITIES AND POINTS OF TRAVEL INTEREST

What noted features of travel interest are situated near Adamana? Describe them briefly. State the chief industry of Akron, O.; give reasons for the city's growth 675
Describe briefly the city of Albany, mentioning noteworthy features. What widely known educational institution is located at Annapolis? at Ann Arbor? at Athens, Georgia? 675–676
Of what state is Augusta the capital? Austin? Baton Rouge? Compare these cities with respect to manufactures and commerce. Briefly describe Baltimore. State its rank in population and manufactures, and give reasons for its industrial and commercial prominence. 677
Locate and describe Ausable Chasm, Black Rock desert, Blue-Grass Region. For whom was Berkeley named? For what is the city noted? State the chief industries of Bayonne; of Beaumont; of Bethlehem; of Binghamton; of Birmingham 677–678
Briefly describe Boston, giving important points regarding its site, parks, monuments, buildings, and educational institutions. State its rank in population, in manufactures, and as a seaport. Mention features of historic and literary interest. Outline the history of the city. In what manufacture does Brockton rank high among American cities? What are the chief manufactures of Bridgeport? . 678–679
Give a brief description of Buffalo, covering important features. State its rank in population; in manufactures. What great commercial advantages does the city possess? Near what celebrated point of interest is it located? 679–680
Locate and give points of travel or other interest regarding Casa Grande, Castle Gate, Lake Champlain, and Chautauqua lake. Of what importance is Cebu? Locate and describe Charleston, South Carolina. Tell some of its historical associations 680–681
Describe in brief the city of Chicago, giving chief points regarding its site, area, streets, parks, and buildings. State the rank of the city in population, in manufactures, in commerce, and as a railway center. To what advantages does Chicago largely owe its commanding position? Give six important events in the history of Chicago 682–683
Where is Cincinnati located? Describe its site. Mention fine residence districts, parks, buildings. Name its leading manufactures. . . . 683
Locate and describe the city of Cleveland. State its rank in population and in manufactures. Of what does its civic center consist? With what are the city's chief industries concerned? Point out factors which have greatly aided the city's growth 683–684
Name points of interest in the vicinity of Colorado Springs. Describe the Columbia River highway. For what is Concord, Mass., noted? What and where is the Continental Divide? Describe the Corn Belt, the Cotton Belt. 684–685
Briefly describe Detroit. State its rank in population and manufactures. Of what great industry is it the world center? Of what importance is the lake traffic of Duluth? What are the chief manufactures of Elizabeth? of Elgin? 686–687
For what special industry is Flint noted? Fresno? Gary? Gloucester? Gloversville? Of what political importance is Frankfort? Harrisburg? Hartford? Where is the Grand Canyon? Describe some of its principal features. For what historic associations is Gettysburg widely known? Harpers Ferry? Hodgenville? 689–691
Describe Honolulu. Of what races and nationalities is its population composed? Where and of what importance is Iloilo? Locate and describe the Imperial valley. What is the Inland Empire? Briefly describe Indianapolis, giving important points regarding its commerce and industries. Mention factors aiding its development 691–692
Describe and give the commercial importance of Kansas City, Mo., and Kansas City, Kans. Of what great industries do these cities form a leading center? For what is Key West remarkable? 693
Trace the route of the Lincoln highway. For what is Lookout mountain noted? Of what political importance is Lincoln, Nebr.? Little Rock? 695–696
Briefly describe Los Angeles. State its rank in population, in manufactures, in commerce. Mention factors which have contributed to its growth. Name notable features and places of interest in its vicinity. State the commercial importance of Louisville. For what product is the city a leading market? 695, 697

Locate and briefly describe Manila. For what is the city mainly important? Of what production is Memphis the chief center in the United States? State the rank of Milwaukee in population and in manufactures. Briefly describe its site, harbor, parks, buildings, manufactures, commerce 698

Give a short description of Minneapolis. In the manufacture of what product does it lead American cities? Locate and describe the Mohave desert. For what historic associations is Monterey noted? 699

Why are Monticello and Mount Vernon, Virginia, places of national interest? Mention important points concerning Moundsville, Mount Clemens, Mount Rubidoux, Mount Tom, Muscle Shoals 700

In what manufacture does New Bedford lead? Of what commercial importance is New Orleans? 701

In what characteristics of its buildings does New York excel other cities? What are the chief means of transportation within the city? Describe the harbor and its connections by water and by rail. Discuss the rank of New York in commerce, in finance, in manufactures. Give reasons for the city's supremacy. 702–703

Locate and describe briefly Niagara falls. What important industries are located at the city of Niagara Falls? By what means is the power of the cataract transformed into electric power? Name cities to which this electric power is distributed 703–704

Locate Philadelphia. Describe its site and street plan. Mention important public edifices and commercial buildings. Name and locate the city's most famous historic landmark 708

On what rivers is Pittsburgh located? State its chief industries. In what manufactures does it lead? Give reasons for the city's industrial prominence 709, 712

For what is Pittsfield noted? Plymouth? Port Arthur? Portland, Maine? Portland, Oregon? 712

Locate and compare three cities named Portsmouth. Name an important educational institution at Poughkeepsie; at Princeton; at Providence 713

For what historic associations is Portsmouth, N. H., noted? Quincy, Mass.? Richmond, Va.? 713, 716

Briefly describe Saint Louis. Discuss its commercial importance. State its rank as a manufacturing center. Name leading industries. Sketch the city's history 717, 720

What is the rank of Saint Paul as a wholesale center? Mention historic associations of Salem, Mass. Describe Salt Lake City. . . 720

Describe the site and harbor of San Francisco. What is the Golden Gate? State the importance of San Francisco in commerce, in finance, in manufactures. Mention features of scenic or historic interest 721, 724

State the rank of Seattle in commerce and manufactures. Give reasons for the city's importance. In what lines does Sioux City lead? South Bend? Shreveport? 725

Locate and compare briefly four cities named Springfield. For what is Starved Rock noted? Stone mountain? 728

What is the rank of Syracuse in manufactures? Mention factors which have aided the city's growth. Locate and name features of interest regarding Lake Tahoe; Mount Tamalpais; Thousand Islands; Ticonderoga. . . . 728–729

For what special product is Trenton noted? Troy? Tulsa? Utica? Waltham? Give points of historic interest regarding Trenton, Valley Forge, Vicksburg 732–733

By whom was the city of Washington planned? How were these plans finally carried out? with what result? Name four of the most noted public buildings. Describe the Washington monument; the Lincoln memorial. . 733

Locate and briefly describe Mount Washington; Watkins Glen; Mount Whiteface; Mount Whitney; Mount Wilson 733, 736

Of what industry was Wilkes-Barre the birthplace? Locate the Wheat Belt. Of what manufacture is Winston-Salem the leading center? 733, 736

Locate Yellowstone park. Name and briefly describe its chief scenic features. Where is Yosemite park? What remarkable scenic attractions does it contain? Describe its waterfalls; its big trees 737–738

Where and what is Zuñi? Compare it with Acoma, Laguna, Walpi. . . . 738, 675, 694, 732

CANADA

Is the area of Canada greater or less than that of the United States? How far does Canada extend east and west? how far north and south? 745

Into what five natural divisions may the surface of Canada be divided? Characterize each briefly 745

How does the climate of the interior plains of Canada differ in temperature and in rainfall from the climate of British Columbia? Describe the climate of the arctic region in Canada 746

What are the four chief drainage basins of Canada? Name the chief rivers belonging to each basin 746

Name the six canal systems of Canada in connection with the Saint Lawrence and Great Lakes waterways. What was their cost to the Canadian government? 746

Indicate the approximate extent and location of the different vegetation areas in Canada . . 747

What are the three chief forest areas of Canada? What kind of timber is obtained from each? What steps have been taken by the government to preserve the forests? Where is the principal market for Canadian forest products? 747

Name 20 animals commonly found in Canada; one animal distinctive of the Canadian fauna; the animal which is a national emblem of Canada 747

Indicate the location and extent of land in Canada suitable for agriculture. What proportion of it is cultivated? 749

Name in order the four cities of Canada which rank highest as industrial centers 749

Mention distinctive features of Canada's railroad system; banking system; language conditions 749

Provinces

Mention a distinctive feature of the climate of Alberta. What recent trend is noticeable in the province's agricultural industry? What minerals are found in Alberta? 750

What are the two chief industries of British Columbia? How is the province's trade affected by the Panama canal? 750–751

Describe the conditions of soil and of climate which make Manitoba an important wheat growing region 751

What are the three principal industries of New Brunswick? Outline briefly the course of early settlement in the province 753

State the area of Nova Scotia, its population, and the length of its coast line. Name a large island and a productive fruit district of the province. Where are its richest coal mines? 753

How does Ontario rank with other Canadian provinces in each of the following respects: population, wealth, mineral production, value of field crops, output of dairy products, lumbering, and manufactures? 753–754

What is the maximum elevation of Prince Edward Island? What distinctive industry has recently become important there? 754

Give the boundaries of Quebec. Mention an important factor influencing its climate. Name a distinctive mineral obtained in the province. Discuss Quebec's rank among the Canadian provinces in forest products and manufactures. What is the predominant religion and the language of Quebec? . . . 754

Describe the climate of Saskatchewan. What is the most important product? 755

Name the highest mountain in the Yukon. State the approximate value of gold which has been obtained from the territory 755

Cities and Points of Travel Interest

Mention four places in the maritime provinces which are of interest as pleasure resorts; two, as historical scenes; and one, for its geological formations 756

Give the names of ten places frequented by tourists on the Saint Lawrence river and the Great Lakes; six summer resorts and a large park in the Muskoka and Georgian Bay region; four summer resorts in the prairie provinces 756

Locate five Canadian national parks in the Rocky Mountain region 756

What are the leading industries of Brantford? of Calgary? of Charlottetown? 756

Locate Edmonton, Fort William, and Halifax. For what is Cobalt noted? Dawson? Hull? 757

State reasons for Hamilton's growth as a manufacturing city. Discuss Kingston from the point of view of transportation, education, and historical associations 757

Name two respects in which Montreal exceeds in importance any other city of Canada. Specify two notable examples of engineering skill, three squares, and two great buildings of Montreal 757–758

For what are the following places chiefly noted: New Westminster, Niagara Falls, Port Arthur, Prince Albert, and Sainte Anne de Beaupre? 758

When was Ottawa made the capital of Canada? Mention an outstanding scenic feature near the city. Name six buildings of note. What is the chief industry? 758

Describe Quebec under the heads of location, history, industries, great buildings, and educational institutions 758

What is the oldest city in Canada? What is the distinctive industry of each of the following places: Sherbrooke, Sudbury, Sydney, Thetford Mines, and Windsor? 759

How does Toronto rank among the cities of Canada in each of the following: industry, commerce, and finance? What distinctive annual institution has Toronto? 759

What are the leading industries of Vancouver? Name the principal park of Vancouver; the chief recreation ground of Victoria. 759

Show how Winnipeg's location is favorable to its growth. Mention the city's outstanding edifice, the largest park, and a distinctive feature of the municipal supply service 759

What is the chief industry of Newfoundland? How does it compare with the remaining industries in workers employed and in products exported? 760

MEXICO, CENTRAL AMERICA, AND WEST INDIES

How much of Mexico is in the Torrid Zone? What is the length of the country? its greatest and its least width? 761

What name is applied to the portion of Mexico between 3000 and 8000 feet elevation? to that above 8000 feet? Name the chief mountain ranges and volcanoes. Give 10 products of Mexico's agriculture or forestry 761

State the reasons for saying that Mexico is potentially one of the richest mineral producing countries in the world. What is the chief manufactured product exported? . . . 761

Give the names of the two largest cities of Mexico. Describe the situation of Mexico City. For what is its museum famous? What three notable features are there in the vicinity of the city? 762

Describe Central America under the heads of mountains, climate, and inhabitants 762

Who named Costa Rica? What are the staple products of Costa Rica? of Guatemala? 762–763

Name the chief article of domestic consumption in Honduras; a distinctive fact regarding its capital; the largest lake in Central America; and the volcano of Salvador that has risen one mile in height in the past century. What benefits does Panama receive from the United States in return for granting the use of the Canal Zone? 763

What are the chief exports of Belize? of Managua? Why is the cathedral of Guatemala noteworthy? Give interesting historical facts about San Salvador and Tegucigalpa . 763–764

Explain the meaning of the terms British West Indies, Greater Antilles, Lesser Antilles. What is the origin of the name Antilles? . . 764

What is the prevailing racial strain in the population of each of the following islands or island groups: Bahama, Leeward, Cuba, and Haiti? 764–765

Mention distinctive features of the rivers and of the fauna of Cuba. What is Cuba's outstanding economic interest? What language is spoken in Cuba? in the republic of Haiti? Name five cities of Cuba 765

SOUTH AMERICA

Compare South America with North America in regard to location, area, coast line, and western mountain system 767

Name the three great plains of South America; the three greatest rivers. What is the most southerly point of the continent? 767

Where are the most arid parts of the continent? What part has the greatest rainfall? 767

Give the names of four important economic plants which flourish in South America; ten characteristic species of animals native there. 767

Name three distinctive mineral products of South America. What countries have a population predominately of the white race? of pure-blooded Indians? What is the prevailing religion? the most widespread language? 767

What are the two highest peaks of the Andes mountains? four volcanoes in this range? For what is Lake Titicaca remarkable? . . . 768

Name the chief tributaries of the Amazon river; of the Plata-Parana River system; of the Orinoco river 768

What is the maximum range of temperature recorded in Argentina? For what economic products is the country noted? Mention two respects in which Argentina leads all other South American countries 768

Specify four of the highest mountains of Bolivia. Discuss the mining and transportation difficulties of Bolivia. What are the chief minerals produced? 768–769

State the area, chief products, and population of Brazil. Describe its climate. Name a notable gold mine of Brazil; a famous cataract of British Guiana 769

Give a distinctive mineral product of Chile; of Colombia; two distinctive products of Ecuador. Name and locate the highest active volcano in the world 770

What are the chief exports of Paraguay? three distinctive products of Peru? State the principal industry of Uruguay; the origin of the name Venezuela 771–772

Name the largest city of South America. Describe the city's principal avenue. Mention interesting features of Easter island, Galapagos islands, Juan Fernandez island, Magallanes, and Santos. What city of South America was formerly a residence of the royal court of a European country? . . 772–774

EUROPE

State the boundaries of Europe. Compare the continent's area with that of the United States. What is the most noticeable characteristic of Europe's coast line? How has this feature proved advantageous for settlement? Name the principal islands of Europe . . . 775

Describe two changes of elevation that have occurred in parts of Europe within historical times. Name six mountain ranges of southern Europe; four plains of the continent. What are the chief volcanic regions? 775

Specify the four longest rivers of Europe. Into what body of water does each empty? What are the two largest lakes of Europe? 775

Account for the warm climate on Europe's northern coast; for the absence of deserts in Europe 776

Name 16 cultivated plants and 5 animals the original habitats of which were in Europe . 776

Indicate the chief areas of Europe which produce each of the following minerals: coal, iron, zinc, platinum, and quicksilver 776

Countries

Describe briefly the social and economic conditions of Albania. For what principal reason is western Austria celebrated? State the area, population, predominant religion, and capital of Austria 776

What is the density of Belgium's population? Name the chief manufactures; the most celebrated university. Indicate a peculiarity of the racial and linguistic conditions of Belgium 776–777

Give the boundaries of Bulgaria. Name a distinctive product of Bulgaria; the chief waterway; the prevailing religion; the three largest cities 777

Name the principal races of Czechoslovakia, and indicate the numerical proportion of each in the country. Discuss the natural resources and the industrial development of the country. Note a historical connection between the Czechoslovaks and America . . . 777

What is the chief economic importance of Danzig? 777

Describe the political relation of Denmark to the Faroe islands; to Greenland. Characterize the agricultural industry of Denmark. Specify a change in Denmark's territory occasioned by the World War 777–778

State the boundaries of France. How does the character of the coast and of the rivers affect the location of French ports? Name the highest mountain of France; the leading minerals produced; the principal manufactures. What is the prevailing religion of France? the most notable university? . . . 778

What territory separates the two parts into which Germany is divided? Give the names of the highest mountain in Germany; five rivers; five minerals obtained; the two leading field crops; two products for which German industry has shown special aptitude . . 779

How high is Gibraltar? Describe a memorable siege which it endured 780

Distinguish between Great Britain as a geographical entity and as a political division. Name the principal coastal indentations of Great Britain. What benefits accrue to Great Britain from the shallowness of the surrounding seas? 780

Name the chief rivers of England; the largest lake; the highest mountain. Discuss the rank of England among European countries in coal exporting, iron production, shipbuilding, and the manufacture of cutlery and of textiles. What are the four largest cities? . . 780

What is the chief economic interest of Wales? . 780

Into what three parts may Scotland be divided by the nature of its surface? Where is the densest population? What are the chief industries? the leading crop? the established religion? the four largest cities? 781

Specify the largest island of Greece; the ancient and the modern name of the chief peninsula; the largest mountain range; a notable drainage project; and a distinctive product. Describe the climate of Greece 781

Give the boundaries of Hungary. Why are the people sometimes called Magyars? . . 781–782

Describe and locate Hecla and the Great Geyser 782

How many people emigrated from Ireland between 1851 and 1921? What percentage of the inhabitants can speak the Irish language? What is the island's longest river? a district which attracts numerous tourists? Compare the number of Catholics in the island with the number of Protestants 782

Contrast the Irish Free State with Northern Ireland in regard to economic interests and religion 782–783

State the boundaries of Italy; two notable rivers of the country; the leading industry; two distinctive artistic products. Compare the northern Italians with the southern Italians in occupation and percentage of illiteracy. Mention a method by which many Italian city dwellers combine city and country life. What two disastrous earthquakes have visited Italy in modern times? 783

Describe the surface of Jugoslavia. What is the Iron Gate? How much of the country's area is forested? What are the three chief religions of the inhabitants? 783

Indicate the location of Latvia and of Lithuania. Name the principal river and the chief exports of each country 783–784

Why is the Netherlands sometimes called Holland? Characterize the surface of the country. Describe the formation and the proposed reclamation of the Zuider Zee. Indicate the country's canal mileage, three distinctive products, a breed of cattle developed there, a chief source of raw material for the industries, and the seat of government . . . 784

Mention a distinctive attraction for tourists in Norway. What are the chief occupations of the inhabitants? 784

Explain how Poland has access to the sea. Name the capital and four other cities of Poland 785

Specify three characteristic products of Portugal. Mention a noteworthy political fact concerning the country 785

State the boundaries of Rumania; the chief exports; the predominant religion 785

Name and locate the highest mountain in Russia and the three historical divisions of the country. What is the principal watershed and what rivers of southern drainage rise from it? Illustrate the economic effect of the Russian revolution by comparing the production of coal in 1913 and in 1920. From what is Russian caviar made? Specify the chief minerals produced 785–786

Characterize the surface of Spain. Name six rivers of the country. Which ones are navigable? What are the principal economic values of the plateaus in Spain? Where is Andalusia? What does it produce? Name two distinctive products of Spain. Describe the mineral wealth of the country . . . 786–787

Name four great lakes of Sweden. Characterize the three principal divisions of the country. Specify three important industries; the three principal cities 787

Describe the surface and drainage of Switzerland. Name five notable mountains. Discuss avalanches in Switzerland, stating their cause and some precautions taken against loss due to them. Mention a famous tunnel of Switzerland; the chief industries; three distinctive products. What characteristics distinguish a Swiss chalet? 787

Cities and other Points of Travel Interest

Name five glacial lakes in the Alps mountains. State an important item of interest concerning each of the following places: Amerongen, Amiens, Arcadia, Argonne forest, Arras. In what industry does Amsterdam lead the world? 788

Give the names of two important squares in the city of Athens; the four ancient edifices on the Acropolis. Specify an important fact regarding Mount Athos; Avignon; Belleau woods 789

What is the most famous boulevard of Berlin? Mention a great park, six important buildings, and 10 industries of Berlin. . . . 789–790

State the origin of the name Bern. Mention an interesting fact concerning Bingen. What is the chief industry of Birmingham? of Bradford? of Brest? 790

Name a famous ship which was built at Bristol. Specify two important industries of Budapest. When was Cadiz founded? State an important point of interest regarding each of the following: Calais, Cambrai, Canterbury, Cantigny, Capri, Cardiff, Carfin, Carrara. . 791

What American state was named after one of the Channel islands? Indicate at least one interesting fact regarding Chateau Thierry; Chemnitz; Cherbourg. Describe briefly Cologne cathedral 792

Explain the terms Stamboul, Sublime Porte, Golden Horn, Byzantium, Galata, and Pera. Name the two greatest mosques of Constantinople 792

Name the chief museum of Copenhagen; the founder of Cork; the principal art gallery of Dresden; the finest public garden of Dusseldorf; a famous thoroughfare of Edinburgh . 793

Describe Fingal's cave. Discuss Florence as an art center. Mention some of the literary and historical associations of Frankfort and important religious and political associations of Geneva 794

State at least one outstanding fact regarding Hammerfest; Havre; Heidelberg; Helgoland; Jena; Karlsbad; Kiel; Kiev. Indicate the chief commercial interest of Hamburg. . 795

Specify a distinctive product of Konigsberg; the two chief industries of Leeds; the principal manufacture of Limoges 796

Name the three divisions of Greater London; eight important streets of London; three parks or pleasure grounds; ten famous buildings of the city. For what is Lourdes noted? 797

Describe the "Lion of Lucerne" and the Maelstrom. What is the largest industry of Lyon? of Manchester? What are the chief attractions of Monte Carlo? 798–799

Give a description of the Kremlin in Moscow. Mention a famous opera house of Naples; important facts regarding Nuremberg, Oberammergau, and Olympia 799

What is the chief interest in Ostend? in Oxford? Explain the plan followed in the construction of the boulevards of Paris. What is the Latin quarter? the Louvre? the Quai d'Orsay? the Sorbonne? the Bon Marché? the Bourse? 800

Who founded Petrograd? Name the city's finest avenue. What is Pisa's most celebrated building? Mention famous persons connected with Portsmouth; Prague; Ravenna . . . 801

Justify Rome's designation as "the eternal city." Name the seven hills of Rome; three important thoroughfares; a fashionable promenade of the city. Describe the Vatican briefly 801–802

Discuss the industrial importance of the Ruhr district to Germany. Name its chief cities. 802

State interesting facts about the Cathedral of Seville and the Cathedral of Saint Mark in Venice 803

Name the most notable driveway and the largest park of Vienna. For what is Verdun noted? Versailles? Windsor? 803–804

ASIA

Compare the area of Asia with that of North and South America. Name the three great peninsulas on the south of Asia. What is meant by the term Oceania? 805

Name and locate the world's highest plateau; highest mountain; deepest lake; vastest plain 805

Describe briefly the course of the following rivers: Lena, Hwang, Brahmaputra, Indus. 806

Specify the coldest part of Asia; the hottest part; the area of the greatest rainfall; the desert portion. 806

Name 25 cultivated plants and 8 domesticated animals that are believed to have originated in Asia. Indicate the chief minerals known to exist in Asia. What are the principal religions of the continent? 806

Give the names of the independent countries of Asia. What are the staple foods of Afghanistan? a distinctive type of sheep raised there? Name the states in Arabia. . 807

Indicate the chief product of the Malay states; six products of Ceylon 807

Describe the mineral wealth of China; Chinese agriculture; transportation; religion; government 808

Name ten products of the Dutch East Indies. What is the prevailing religion of Java? What religion did it supersede? 808

What is France's largest Asiatic colony? What is that colony's chief export? In what part of India is irrigation required? Specify wild animals of India which are a source of danger to the inhabitants. How many languages are spoken there? 808–809

Indicate the two highest mountains of the Japanese empire; the highest active volcano; the extent of the empire's iron resources; the chief market for Japanese silk. 809–810

Specify five products of Persia. What race handles most of the trade in the Portuguese dependencies and in Siam? What animal is considered sacred in Siam? 810

Characterize the climate and the inhabitants of Siberia; the surface and the agricultural industry of Turkey 810–811

Distinguish a mosque from a pagoda. Describe characteristic features of the costumes worn in different parts of Asia 811

Indicate the nature of the religious interest centering in Amernath; in Bethlehem. Mention a striking historical fact regarding Agra; Bagdad; Beirut; Calcutta 811

What is the chief commercial interest of Canton? Hankow? Kobe? Madras? To what religion is each of the following places sacred: Lassa, Mecca, Jerusalem, Medina? 812

Mention two outstanding edifices of Peking; the chief park of Tokyo. What was the cost of the Trans-Siberian railroad? State the chief industry of Singapore 813

AFRICA

How has discovery in Africa been influenced by the character of the coast line and of the rivers? What is the Great Rift valley? Name three lakes in this valley. Locate Africa's highest mountain 815

Name four great rivers of Africa; the greatest cataract in the world. Mention a remarkable fact concerning Lake Chad 815–816

Indicate the two desert areas of Africa and the region of the greatest rainfall. Describe the surface of the Sahara desert. Name five native cultivated plants of Africa; five distinctive species of mammals; a deadly insect; two important mineral products 816

Contrast the Bantus and the true Negroes in Africa. What religion of outside origin has the greatest following in the continent? Give the names of two 19th century explorers in Africa; of two agencies which have more recently added to our knowledge of the continent 817

Indicate a peculiar type of money used in Abyssinia. What are the chief products and the capital of Belgian Congo? the principal exports of British Africa?. 817–818

How does Egypt rank among the cotton producing countries of the world? What part of the country is the most productive? What is the chief cause of its productivity? 818

State the area, population, and leading exports of French Africa. What does Italian Libya produce? 818

Name the only two independent Negro countries in the world. For what are Saint Thomas and Prince's islands noted? 819

Specify the leading industry and a distinctive industry of the Union of South Africa; three products of which the country provides a large part of the world's supply 819

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INTRODUCTORY

In popular speech, science is often used to mean ordered knowledge concerning the things which occur in nature. In other words, science is a short term for "natural science," and it is in that sense that it will be used in this section. It includes such branches of knowledge as astronomy, geology, physiography, physics, chemistry, zoology, and botany.

Nature of Science. Because of its method as well as of its subject matter, science differs from philosophy, which professes to examine the presuppositions of science, that is, the trustworthiness of observation and reasoning. Science differs also from history in that it deals exclusively with observable, material objects, while the subject matter of history must usually be inferred rather than observed. Again, science differs from art, which is essentially action based on knowledge and on practice. As Jevons says: "A science teaches us to *know* and an art to *do*, and all the more perfect sciences lead to the creation of corresponding useful arts." Astronomy, for example, is a science upon which the art of navigation is based.

VALUE OF SCIENCE

The debt which the modern world owes to science is incalculable. Most of the great advances made by Western civilization in the last 500 years were achieved primarily through science. It was enlarged knowledge of astronomy and improvements in the mariner's compass which resulted in the discovery of America and in the circumnavigation of the globe.

Science and Invention. Every notable modern invention has had its origin in a new application of the laws of science. The application of scientific principles to the control of steam resulted in the invention of the steam engine. By this single achievement, industry and transportation were revolutionized throughout the world. The experiments of Faraday in electricity led to the creation of the dynamo and the electromotor. Electric energy, thus utilized, became a powerful competitor of steam, and transformed numerous industries. A half century after Faraday, experiments with explosive inflammable gases made possible the internal combustion engine. The utilization of this new form of motive power added first the automobile and then the airplane to the list of great modern mechanical achievements.

Practical Benefits. Consequently, instead of the oxcart, the stagecoach, and the sailing ship, we now have the railway train, the trolley car, the ocean liner, the automobile, and the airplane, all of which are results of progress made in science. But, striking and important as these mechanical advances have been, they form only a small part of the grand total of achievements to be credited to modern science.

In countless ways, present-day civilization is deeply indebted to each of the sciences. The practical benefits which have grown out of the discoveries made in chemistry and physics, for example, extend to nearly everything connected with daily life. They affect food, water supply, clothing, housing, heating, ventilation, lighting, and the thousand-and-one conveniences with which the modern home is equipped. In some important way they affect also almost every operation in connection with the farm, factory, mine, store, or business office.

Progress in Chemistry. Advances made in chemistry have completely changed many of the world's leading industries. Processes based upon the application of chemical discoveries lie at the foundation of great enterprises, such as iron and steel making. The recovery of gold and other precious metals from their ores and the preparation of many valuable mineral products alike require advanced chemical knowledge. Present-day methods of manufacturing soaps, fertilizers, synthetic dyes, and illuminating gas have been made possible only through chemistry. The processes of refining petroleum so as to make it yield a veritable Pandora's box of useful products depend upon chemical principles. So, likewise, do the elaborate methods required for the preparation of hundreds of foodstuffs. Chemistry makes possible the photographer's art, furnishes the physician with his medicines, and provides the surgeon with anesthetics, such as ether, chloroform, and cocaine.

Progress in Physics. In the domain of physics alone, the discoveries of the last century have been epoch making. The early work on electric cells by Volta and others stimulated Morse to devise the electric telegraph. With later improvements, this became the transoceanic cable telegraph. Experiments in sound and electricity enabled Bell to perfect the telephone. These two great inventions, the telegraph and the telephone, have revolutionized methods of communication in all civilized lands.

Wireless and Radio. But, by wresting further secrets from the unknown, investigators prepared the way for a still more marvelous achievement. In an obscure laboratory in Germany, a high school teacher of physics, Heinrich Hertz, discovered the properties of the electrical waves, now known as Hertzian waves. This discovery enabled Marconi and others to work out practical methods of wireless communication, which soon proved invaluable for the use of ships at sea. These seemingly magical waves are also the basis of the recent great development in "radio" transmission. By means of improved sending and receiving devices, spoken messages and vocal and instrumental music are broadcasted at great distances to millions of listeners.

Had physics, since the 18th century, done nothing more than to revolutionize the world's methods of communication, science, as a whole, could rest proudly upon the laurels thus impressively won. But these achievements represent only a fraction of the contributions made by physics, and physics is only one of several major divisions of science. Some of the other contributions are equally worthy of consideration.

Microscope and Spectroscope. About 100 years ago, certain physicists, studying with especial care the laws governing the efficiency of lenses, made possible the achromatic objective lens and the modern high-power microscope, which was given to the world in 1835. As Pasteur later remarked, this instrument revealed the realm of the infinitely small, just as the telescope revealed the universe of the infinitely great. The use of the improved microscope led to discoveries of the first rank in the plant and in the animal world, and made possible the great modern developments in the science of biology.

Further researches in light led to the invention of the spectroscope. This instrument enables the astronomer to determine the elements composing the sun and stars with the same certainty that the chemist determines the composition of minerals in his laboratory. Later studies in light led to the detection of the X rays and to the finding of radium. These discoveries rank among the foremost scientific achievements, both of which have already proved of great value in various fields.

Progress in Biology. Humanity owes much to modern biology. Beginning with the revelations first made possible by the high-power microscope, there has been a continuous record of discovery concerning all forms of living beings, including man. Like the great advances in chemistry and in physics, the increase in biological knowledge has been of immense practical value.

First came the proof that the cell is the unit of all plant and animal structures, and, therefore, the unit of life. This fact at once placed botany and zoology on a new and firm foundation and radically changed the viewpoints of all related sciences.

Then came the doctrine of evolution, advocated by Darwin and other scientists. In the effort to test the validity of this theory, biological research was stimulated to a degree never before known. This led to many important discoveries. All classes of plants and of animals were studied with exceeding thoroughness and accuracy.

Antitoxins and Serums. In the course of these researches, investigators proved that certain minute forms of life, protozoa and bacteria, were the cause of contagious and infectious diseases. Out of this knowledge grew antiseptic and aseptic surgery, both of priceless value in saving human life. A further outcome was the successful use of antitoxins and serums in combating diphtheria, typhoid fever, and other dangerous maladies. Increased knowledge in this field has resulted in the eradication or control of malaria, yellow fever, and other insect-borne diseases. Modern sanitary science and preventive medicine owe their origin to biological discoveries.

Zoology and Animal Industry. Advances in zoological science have conferred great benefits upon animal industry. Among these have been the improvement of various breeds of domestic animals, the scientific rearing of live stock, and the prevention and control of animal diseases. Valuable improvements have been made also in the preparation, preservation, and marketing of various animal products, especially those of the dairy, poultry yard, and packing house.

In numberless other ways the knowledge contributed by zoology is of great assistance. By means of it, barren waters have been stocked with valuable food fish, noble game animals have been saved from extinction, depleted seal herds have been largely restored, and Alaskan Indian tribes have been preserved from starvation through the introduction of the reindeer.

Botany and Plant Industry. Similarly, the numerous enterprises dependent upon plant industries have been benefited by the great advances made in economic botany. To these may be attributed the remarkable progress in agriculture, horticulture, floriculture, and forestry made during recent years. Improved varieties of grains, grasses, fruits, vegetables, and other important economic plants have been developed more rapidly than ever before in the history of mankind.

Crop plants suitable for special conditions of soil and climate have been developed or obtained from other parts of the world. By means of these better adapted plants, vast areas formerly lying waste have become productive and the older lands have been made to increase their yields. New kinds of crops have been made profitable in many sections. Examples are seen in a quickly ripening wheat for northern regions, alfalfa and Kafir corn in Kansas, the orange and grapefruit in Florida, and the grape, prune, walnut, and various citrous fruits on the Pacific coast.

METHODS OF SCIENCE

The immense success of science is due to the way in which it seeks, finds, and tests knowledge. More valuable than any of its discoveries are its effective methods, which make still greater achievements possible.

The true scientific investigator never jumps at conclusions, never takes anything for granted, never considers his judgment better than his information, and never substitutes opinion or long established belief for fact. No matter how plausible a given statement may be or how logical a proposed explanation of it may seem, it must be treated merely as a supposition until it has been proved true by searching tests. Moreover, these tests must be of such kind that other scientists can repeat them, and of such nature that others repeating them will inevitably come to the same conclusion. Only in this manner can a body of dependable scientific knowledge be built up.

The Working Hypothesis. Where exact observation is impossible, a tentative explanation, adopted temporarily as a *working hypothesis*, has often proved of great service. Such working hypotheses have led to some of the most important discoveries in science. Noted examples are: in astronomy, the nebular hypothesis and the planetesimal hypothesis; in biology, the hypothesis of natural selection; and in chemistry and physics, the hypothesis of the electron, atom, and molecule. Each of these, in its field, has been a fruitful stimulus to scientific research.

Not only the scientific method, but also the scientific attitude, is of incalculable value. The true scientist seeks neither to confirm nor to confute ancient dogma or current speculation, except as his proved facts lead him. He endeavors simply to report the truth as the methods and tests of science show it to be. The true scientist never assumes the rôle of an advocate or special pleader, presenting the strong points on one side while ignoring or belittling like points on the other side.

Science, therefore, is nonpartisan and seeks only to establish the facts regardless of whether their pronouncement will be welcomed or resented. It carries on no propaganda for or against a given view, but trusts the truth to make its own way. For this reason, there is nothing regional, racial, or national about science. It is international and universal, making no exceptions for or against any nationality, race, or creed.

Use of Scientific Methods. Because of their universal effectiveness, the methods, first conspicuously developed in the natural sciences, are being more and more widely extended to other fields of knowledge. Subjects which formerly were not considered primarily as sciences are studied profitably by scientific methods. Indeed, various subjects so treated are now commonly called sciences. Moreover, there seem to be no valid reasons why they should not be so regarded. Among these are such important subjects as economics and sociology.

The most conclusive proof of the value of scientific methods is seen in their successful application to practical affairs. A noteworthy example is the use of scientific methods to increase the output of factories, to facilitate the process of merchandising, and to improve the general conduct of business. This has become known as *Scientific Management*. Salesmanship has likewise been developed by such methods, so that there has come to be a science of salesmanship which has led to great advances in the art of selling. From these and many similar practical developments, it is clear that the tendency of the times is to apply the scientific methods to every important activity of modern life.

PHYSIOGRAPHY

PHYSIOGRAPHY is another name for the science of physical geography, which is closely related to geology, on the one hand, and to geography, on the other. It is concerned with the three primary divisions of the earth: (1) the solid part of the earth, or *lithosphere*, which forms the land; (2) the water of the earth, or *hydrosphere*, which comprises the oceans, lakes, and rivers; (3) the air, or *atmosphere*, which is the outermost part of the earth.

The science or study of physiography considers the conditions and the processes which brought the surface of the earth into its present state. These processes are largely the result of the activities of air and water and of the plant and animal life which they support. Other factors are volcanic action and the slow subsidence and elevation, or warping, of the crustal portion of the earth.

Physiography, therefore, has to do chiefly with the land surface of the earth and with the relations of the air and the water to the land surface. Consequently, physiography does not attempt to treat all phases of earth science exhaustively. The comprehensive science of the atmosphere is *Meteorology*; of the ocean, *Oceanography*; of waters in general, *Hydrography*; of the lithosphere, *Geology* with its several subordinate sciences, such as *Geognosy*, *Petrology*, and *Mineralogy*. Geology is the very broad earth science which includes the history of the lands, of the oceans, and of the air.

In the following pages will be found topical treatment of more than 165 subjects connected with the science of physiography. These are arranged in alphabetical order, with numerous cross references.

Adobe (*ȧ-dō'bĕ*) **Soil.** The name given to certain clay formations or soils which cover thousands of square miles in Colorado, Utah, Nevada, Texas, New Mexico, Arizona, and California. They are composed of particles of clay, quartz, and other minerals, in an extreme condition of fineness. When moist, adobe soils are plastic and readily worked, but when dry, their compactness and coherence make easy tillage impossible. Under irrigation, adobe soils show remarkable fertility, producing for many years undiminished crops of grains and alfalfa.

While their origin has been a matter of perplexity, adobe soils, in some sections, are believed to have been formed by streams which brought down the materials from the mountains or from other highlands. In other sections, adobe soils appear to have been formed by the accumulation of wind-blown materials, in a manner similar to the formation of loess. See *Alluvium*, *Loess*, *Soil*.

Æolian (*ē-ō'lĭ-ăn*) **Deposits.** Accumulations of wind-blown material, consisting chiefly of dust, fine particles of soil, and minute sand grains. These are borne by the wind to sheltered places in much the same way as similar particles are transported and deposited by running water. In arid regions æolian deposits sometimes attain much importance. The most conspicuous and best known of these are the sand dunes. These occupy extensive areas, especially in deserts and along ocean shores. When buried under other deposits, sand dunes sometimes form sandstones.

In certain regions, especially in China and in the Mississippi valley, fine wind-blown dust, called loess, has accumulated in deposits of great thickness. When buried under other strata, loess deposits become shales. In Bermuda, dunes are formed of ground-up fragments of coral blown from the beaches. When consolidated, these dunes form æolian limestones. See *Dune*, *Loess*, *Sedimentary Rocks*, *Wind*.

Air. The transparent medium forming the outermost part of the earth, in which plants, animals, and human beings live and breathe. It is a mixture of several gases, which, though ordinarily invisible, can be weighed, compressed to a liquid, or frozen to a solid. At the sea level, the weight or pressure of the air is somewhat more than a ton to the square foot, but, at high elevations, as on great mountains, the pressure is much less. However, as the tendency of all gases is to expand, every portion of the air presses upward against the weight of the air above it, so that ordinarily the upward pressure counterbalances the downward pressure at the same point. If it were not for this property, it would be impossible for one to lift a sheet of writing paper from a table, as the air above it has a weight or pressure of many hundred pounds.

In a multitude of ways the air assists all living things to exist. Besides providing oxygen for breathing, air conveys both sound and light, absorbs heat during sunshine, enables fires to burn, propels ships, turns windmills, and makes possible the use of air brakes, vacuum cleaners, and many other valuable machines. Air in motion forms winds which modify climate, equalize heat and cold, and distribute the rainfall on the earth. Air plays such an important part in the world that the ancients ranked it with earth, water, and fire, as one of the four chief elements. For chemical constituents and physical properties, see *Atmosphere*; see also *Climate*, *Rainfall*, *Wind*.

Alluvial Fan. A deposit of sand and gravel formed usually at the base of a mountain range where the gradient of the stream bed becomes notably less steep and the stream is forced to deposit. Tiny fans form at the base of small cliffs after a single rain storm. In size, alluvial fans range from these diminutive forms to large areas including many square miles of territory. See *Erosion*.

Alluvium. The soil material produced by the processes of weathering and by the wearing-down action of water, collected by rivers, and deposited along their lower courses. Alluvial deposits consist of sand, clay, gravel, cobblestones, and bowlders. Part of this material is left in the beds of rivers, part along their banks and on their flood plains, and part at their mouths, building up deltas.

The exceedingly fertile lands of many valleys have been formed of alluvium, carried down and deposited by rivers in the course of long periods of time. Large tracts of such land are found in the valleys of the Mississippi, the Nile, the Ganges, and the Hwang. Early civilizations began in the alluvial valley plains of Egypt, Babylonia, India, and China.

Gold found in the sands of stream beds or in the soil of river banks is called *alluvial* gold. It usually consists of very fine grains brought down by streams in wearing away gold-bearing rocks. See *Delta*, *River*, *Soil*, *Valley*.

Anchor Ice. Ice which forms on and encrusts the bottom of a river, lake, or shallow sea; called also *ground ice*. On the bottoms of stony rivers, where the current is swift, ice sometimes freezes around stones in the stream bed. When large amounts of ice are thus formed, even heavy bowlders may be raised from the bottom and floated downstream. In a similar manner, ice forms on the bottom of shallow seas, as in the Baltic Sea and the Gulf of St. Lawrence. When such ice forms about an anchor and lifts it, the ship moored by the anchor may drift away.

The formation of such ice in rivers is believed to be due sometimes to the fact that the stream bed is frozen, so that the water upon coming into contact with it freezes. Again, the temperature of the entire stream may be slightly below 32° F., so that the quieter water below freezes while the swifter motion in the upper parts prevents freezing. The cause of the formation of ground ice in shallow seas is not well understood. Some scientists advance

the view that fresh water, issuing from springs in the sea bottom, is frozen by the prevailing low temperature before it becomes mixed with the salt water. See *Ice*.

Anticyclone. The opposite of cyclone. An atmospheric condition prevailing over a large area in which there is high barometric pressure with outblowing winds. At the center of an anticyclone, cool, heavy, dry air descends from the upper regions to the surface of the earth and then moves outward toward areas of warmer and lighter air. In the temperate zones, anticyclones usually appear in the west and move slowly eastward. Cool, pleasant weather generally accompanies their passage. In winter, however, an anticyclone following a storm may result in a cold wave. See *Blizzard, Cold Wave, Cyclone, Storm*.

Aridity. The state of dryness in the atmosphere, which prevails in regions of low rainfall. Aridity characterizes the climate where the annual rainfall does not exceed 10 inches. The notable deserts of the world, such as the Sahara, Arabian, Persian, and Atacama deserts, are extremely arid. Parts of the polar regions and of high mountain slopes, while usually snow-covered, receive scant precipitation, and are essentially arid.

In arid districts, not only the yearly rainfall, but the average humidity, or amount of moisture present in the air, is low. Profitable agriculture usually cannot be carried on without irrigation where the annual rainfall is less than 20 inches, or where the average humidity is less than 60 per cent. In regions of extreme aridity, such as the Atacama desert, the yearly rainfall is almost nothing, and the average humidity is often less than 40 per cent.

Wherever extreme aridity prevails, peculiar types of vegetation are developed, especially adapted to withstand heat and drought. Some of these consist of thick-stemmed, thick-leaved, often very spiny plants, whose entire surface structure is modified to prevent rapid evaporation of the water stored in their fleshy interiors. Striking examples of this kind of adaptation are found in the cactuses, yuccas, and agaves of the southwestern United States.

The types and habits of animals are likewise greatly modified wherever aridity is pronounced. For example, the smaller animals usually live in burrows, to which they retire to escape the extreme heat of the day. During the hottest and driest period of the year, many such animals *æstivate*, that is, they go into a state of summer torpor in their underground retreats. This condition is somewhat similar to the hibernation, or winter sleep, of various animals in cold regions.

Portions of the Atacama desert are so dry that neither plants nor animals can live there. When men visit or go to work in those districts, they must take with them everything they need to eat and drink. See *Climate, Desert, Humidity*.

Atmosphere. The mixture of gases and vapors, called also the air, which surrounds and is a part of the earth, extending to a height estimated at from 100 to 500 miles and upwards. According to the calculations of Humphreys, the constituents of the air at the sea level are: nitrogen 77.08 per cent, oxygen 20.75 per cent, argon 0.95 per cent, carbon dioxide, or carbonic acid gas, 0.003 per cent, hydrogen 0.001 per cent, and water vapor averaging 1.20 per cent, together with exceedingly minute quantities of the rare gases,—helium, krypton, neon, niton, and xenon.

Except water vapor, which is mostly confined near the surface and varies greatly with the temperature and altitude, the constituents of the air remain remarkably uniform to a height of seven miles, above which they exhibit marked changes. At a height of 45 miles, it is calculated that hydrogen composes 50 per cent of the atmosphere, at 60 miles, 96 per cent, and at 87 miles, over 99½ per cent, the chief other component being helium. Assuming that the atmosphere extends upward 200 miles, its volume is about one-sixth that of the rest of the earth.

The density of the air at the earth's surface is about $\frac{1}{770}$ that of water. The normal pressure or weight of the air at the sea level is 14.7 pounds per square inch, corresponding to a barometric height or pressure of 760 millimeters, or 30 inches. The total mass or weight of the air is estimated at about $\frac{1}{770}$ that of the water, or somewhat less than a millionth that of the solid portion of the earth. The density or pressure of the air varies with the elevation. In the lower altitudes it decreases about one inch on the barometer for each 900 feet of rise above the sea level. At 16,000 feet altitude the barometric pressure is about 16 inches; at 7 miles it is 6½ inches, and at 18 miles it is calculated to be only a third of an inch. By weight, one-half of the atmosphere lies below a plane about 3½ miles above sea level; three-fourths, below a plane about 7 miles above the same level; and seven-eighths, below a plane about 10 miles up.

The pressure of the air at any given point on the earth's surface varies greatly from day to day. These changes are associated with the movements of areas of high barometer attending fair weather and with movements of low areas attending storms. Hence, the variations of the barometer are of great value in forecasting the weather. In addition, local air pressure undergoes both diurnal and annual changes.

Like its density, the temperature of the air decreases with the altitude, averaging, near the earth's surface, a fall of 1° F. for each 330 feet of elevation. A mile of ascent in the air means about the same decrease in temperature as a poleward movement of 800 miles. By self-registering thermometers, sent up in balloons to a height of 10 miles, temperatures of −104° F. have been recorded. It is believed, however, that at about 18 miles elevation there is a region of constant temperature, which is computed at about −67° F.

An important property of the air is its power to absorb and radiate heat. The specific heat of the air when kept at a constant pressure is 0.2412, water being unity. The specific heat of the air when kept at constant volume is 0.1721. The ratio between the two is 1.4. This determines the rate at which air will cool when allowed to expand without the addition of heat from the outside. This ratio or property is made use of in cooling air to a liquid or solid state. It is also the principle that controls the cooling of ascending masses of air from which the water vapor therein contained condenses into cloud, rain, snow, or hail.

The amount of heat absorbed from a vertical sunbeam by the air is computed at from 40 to 50 per cent of the sunbeam's original energy. By virtue of this absorbing power, the atmosphere retains a large amount of heat which it can lose only by the slow process of radiation. The air, therefore, acts as a universal moderator, reducing extremes of temperature at all seasons. See *Air*; *Humidity*; *Temperature, Atmospheric*; *Wind*.

Atoll (*ă-tŏl'*; *ăt'ŏl*). The Malay name of a type of coral island, consisting of low, circular coral reefs which form a ring of land around a central lagoon. Atolls are numerous in the tropical portions of the Indian and Pacific oceans. Some are nearly 100 miles in circumference, and contain lagoons having a depth of 100 to 350 feet.

In 1835, Darwin advanced the explanation, since widely accepted, that atolls are produced by the growth of coral reefs around the shores of islands which have subsided, but that this subsidence does not proceed faster than the upward building of the coral. As a result, the reef eventually encircles a central body of water covering a sunken island. While this explanation has been proved correct regarding many atolls, it has been found that some are formed in other ways, without subsidence. See *Barrier Reef, Coral, Fringing Reef*.

Aurora Borealis. A luminous appearance in the heavens, called also "northern lights," occurring in high northern latitudes. The center of the zone of greatest frequency passes through the southern part of Hudson bay, through North cape, Norway, to the mouth of the Lena river in Siberia, and thence through Point Barrow, Alaska, to Hudson bay. Observers north of this belt see the aurora more often to the south than to the north. Moreover, the farther north they go, the less frequently it appears. Similarly, observers south of this belt see the aurora less often as they go nearer the equator.

The aurora is now believed to be the result of a discharge of electricity through the very thin atmosphere existing in a region from 50 to 100 miles above the earth. The luminous display takes the form of arcs, bands, rays, wavy curtains, patches, or of a broad corona, varying in color from silvery white to yellow, green, violet, or red. These ever-changing forms move about, sometimes coruscating and sometimes resembling illuminated clouds. There is an intimate connection between the aurora and magnetic disturbances and also between the aurora and sun spots. The similar display which occurs in the southern hemisphere is called *aurora australis*. See *Sun Spots*.

Avalanche. A mass of ice or snow, often mixed more or less with earth, which, having become loosened from a mountain slope or a glacier, dashes downward into the valley, occasionally causing great destruction. In the mountainous regions of the western United States, an avalanche is usually called a "slide." This term is also used to describe the portion of a mountain slope which has been denuded by the passage of an avalanche. See *Glacier, Landslide*.

Bad Lands. The name given in the western United States to certain sterile regions. They are characterized by an almost entire absence of vegetation, and by the labyrinth of fantastic forms into which the soft strata of clays, sands, and gravels have been carved through the action of wind and water. The best examples are found east of the Black Hills in South Dakota, though similar formations occur in Wyoming, Colorado, Arizona, New Mexico, and Texas. See *Erosion*.

Barrier Beach. A ridge of sand and gravel, built up by the work of the winds, the undertow, and shore line currents, that completely closes the mouth of a bay and thus forms a definite barrier. See *Beach*.

Barrier Reef. A coral reef bordering a shore line but separated from the mainland by a lagoon. The Great Barrier Reef of Australia, hundreds of miles in length, is perhaps the best example. It is composed chiefly of the exoskeletons of corals. About the margin of this reef, corals live in immense numbers, and, by their stony deposits, constantly add to its vast extent. See *Coral, Fringing Reef*.

Bayou (*bī'o͞o*). A lake occupying the abandoned part of a stream channel. Such lakes, called also oxbow lakes, are formed when a stream cuts off its own loops or meanders. The name is probably derived from the French word, *boyau*, meaning gut, and is used chiefly in Louisiana, Texas, and Arkansas. See *Meanders*.

Beach. That part of the shore of the sea or of a lake which is washed by the waves. More specifically, the beach is the sandy or pebbly part borne up by waves, tides, and shore currents and deposited between the lines of low and high water. The width of the beach depends upon the angle of slope in the shore, and upon the height attained by the tide and by storm waves. Shores of little slope have wide, nearly flat, usually sandy beaches; shores with greater slope have narrow, comparatively steep beaches, formed largely of coarse gravel and pebbles. See *Barrier Beach, Land-tied Island*.

Blizzard. A severe, blinding storm of dry snow, typically with a very sudden onset and accompanied by a freezing wind. It often attends an anticyclone. About 1880 the word became widely employed in connection with severe storms in the Western states. Following the great storm of March 1888, during which snow fell to a depth of 3 feet in the Atlantic states and in New England, and was driven for days by powerful gales into drifts 5 to 20 feet high, the term blizzard came into universal use in America. In the winter of 1919, violent storms of this type swept the eastern United States, paralyzing traffic and causing immense damage.

The most destructive blizzards occur in the plains region from North Dakota to Kansas and eastward to Ohio. The typical blizzard is very similar to the *buran* of southern Russia and the *purga* of Siberia. See *Anticyclone, Storm*.

Bluff. A name, first used in the American colonies, for a hill, cliff, bank, or headland with a broad, steep face. High banks presenting nearly perpendicular faces, especially if on the shore of a lake, river, or sea, are commonly called bluffs, as are also steep rises of ground between bottom lands and higher table-lands. See *Cliff, Escarpment*.

Bogs. Wet, spongy grounds, covered with decayed moss and other vegetable matter, and sometimes underlaid by it to a considerable depth. Bogs are frequently saturated with water and converted into a kind of quagmire, called *quaking bog*. Those which contain accumulations of peat, formed by the decay of sphagnum moss, rushes, and various other aquatic plants, are known as *peat bogs*. See *Fens, Marshes, Moor, Muskeg, Peat Bogs, Swamps*.

Bore. In running up funnel-shaped bays and the estuaries of certain rivers, the tide is so retarded and crowded by the narrowing channel and shallower bottom, that its front may become a wall-like wave.

Such a tidal wave is known as a bore and is often dangerous to shipping. In the Bay of Fundy, the range of the tide is from 40 to 70 feet, producing an enormous bore. The most remarkable river bore is that in the Tsientang, in China, the advancing wall of water being sometimes 25 feet high. The noted bore of the Severn in England is produced by a tide which rises 18 feet in an hour and a half. The bore at the mouth of the Amazon is sometimes 12 feet high. Bores occur also in the Wye of England, in the Seine of France, in the Petite Codiac of Canada, and in the Ganges and the Hugli of India. See *Tides*.

Butte (*bū't*). The name given to a steep-sided, round-topped hill or mountain. Buttes stand out as more or less solitary and conspicuous hills, or mountains, in arid plateaus that have undergone great erosion. They are the more resistant portions of the land, which have withstood the processes of erosion better than the lands that formerly surrounded them. Elevations of this type are characteristic features in the landscape of many plains in the western United States. They form landmarks which can be seen at great distances, and they often give their names to localities and towns, as Butte, Montana. A formation with similar sides, but with an extensive, flat top, is called a *mesa*. See *Mesa, Monadnock, Mountain, Plateau*.

Caldera (*kăl-dā'rà*). A broad, open, and usually flat-bottomed crater of a volcano, like that in the volcano of Kilauea in Hawaii. See *Crater*.

Campos. The term loosely used in Brazil for tropical prairies or savannas. Those which contain numerous trees are called *campos cerrados*. See *Savannas*.

Canyon. A large, deep gorge cut by a river, typical of dry climates in plateau regions where the stream deepens at the bottom faster than the rains

and atmospheric action can wear down the sides of the gorge to gentle slopes. The Grand Canyon of the Colorado river in Arizona is the greatest canyon known. It is more than 300 miles long, with nearly vertical walls rising 3000 to 5000 feet, and is often 8 to 10 miles from rim to rim. The Rio Grande and the Yellowstone have similar but much smaller canyons. In the western United States the term canyon is now quite generally applied to any deep and extensive ravine along a water course. See *Erosion, Gorge, Valley.*

Cave. Caves or caverns are hollow places in the earth, produced partly by the dislocation and fracture of rock strata and partly by the solvent and eroding action of ground water. They are most numerous in limestone regions, where rivers sometimes plunge into them through openings known as *sink holes.* Sea caves are made along shores by the wearing power of storm waves.

Among caves celebrated for their immense size or for features of scientific interest are Mammoth Cave, in Kentucky; Wyandotte Cave, in southern Indiana; Luray Cavern, in Virginia; the cave of Gailenreuth, in Germany; and the cave of Kirkdale, in Yorkshire, England. The famous picturesque cave of Fingal, in the island of Staffa, Scotland, is formed in basalt.

In many caves of Europe, remains of early human tribes, known as *Cave Dwellers,* have been found associated with those of the mammoth, rhinoceros, hippopotamus, cave hyena, cave lion, and other animals long extinct or absent from Europe. These remains furnish much valuable material for the study of anthropology and archeology. See *Fault, Ground Water.*

Chinook (*chĭ-nōōk'*). A wind which descends from the mountains, becoming warm as the air reaches lower elevation. Such a wind often sweeps far over the neighboring plains, melting snows and causing floods in winter, or burning the vegetation and ruining crops in summer. This wind takes its name from the Chinook Indians, formerly a numerous tribe which inhabited a part of the state of Washington. See *Wind.*

Cirque (*sŭrk*). The large, rounded, steep-sided heads of valleys developed by the erosion of valley glaciers are called cirques. In the Uinta, Big Horn, Sierra Nevada, and other ranges of the western United States, cirques are remarkably numerous and well developed. They served as collecting areas for the snows which, when compressed, formed the valley glaciers in these mountains. At the heads of the present alpine or mountain glaciers there are cirques filled with snow and ice. See *Glacier.*

Cliff. A high, steep, precipitous or vertical face of rock. Cliffs may be formed by the erosive action of water, as, for example, those along ocean shores, due to the beating of the waves, and those forming the sides of bluffs, canyons, gorges, and ravines, due to the erosive action of running water in various streams. Cliffs are formed also by the unequal weathering of rock strata of differing hardness, through the action of rain, frost, and the atmosphere. Cliffs are produced, too, by the faulting of rock strata, as when the resulting uplift or subsidence exposes nearly or quite vertical rock faces or scarps. See *Bluff, Canyon, Escarpment, Fault, Gorge.*

Climate. The average weather for a considerable period of time in a locality or a region constitutes its climate. In popular language, climate is described as warm or cold, dry or moist. The chief elements of climate are *temperature, humidity,* and *wind.*

Other important factors influencing climate are ocean currents, the position and height of mountain ranges, and elevation above the sea level. However, the most widespread single cause of variations in climate is the unequal distribution of the sun's heat between the equator and the poles.

With regard to temperature, it is important to notice the average annual and seasonal temperatures, the extremes of temperature, and the temperature of exceptional seasons. A distinction must be made between absolute temperature, as measured by the thermometer, and sensible temperature, as it actually feels. Air of a given temperature seems warmer when at rest than when in motion. If the temperature is high, dry air seems colder than moist air; if the temperature is low, moist air seems colder than dry air.

As regards humidity, the absolute humidity, the relative humidity, the average cloudiness, and the actual precipitation must be taken into account. Further, the average amount of yearly precipitation, the variations of precipitation, from year to year and from season to season, and the proportions which fall as rain and as snow, must be noted. Simflarly, the variations in the force, velocity, and direction of the wind must be considered.

Climates are classified as *continental* and *oceanic*; also as *tropical, temperate,* and *polar.* Oceanic or maritime climate is equable, damp, and cloudy. Continental climate is more severe, with great ranges of temperature, much sunshine, and less frequent rainfall. Desert climate is an extreme type of continental climate, with an excessive range of temperature, high winds, calm, cold nights, and very low average rainfall. While fluctuations of climate occur in relatively short periods, there is no evidence that shows any material change of climate in any region of the world within historic times.

In general, the west shores of continents in the temperate zones possess warmer and more equable climates than their eastern shores, as is the case in Europe and in North America. This condition is due to the fact that climate is very largely determined by the character of the prevailing winds. By reason of the earth's rotation on its axis, the prevailing winds throughout the temperate zones are, for the most part, westerly. In consequence, the winter winds which blow on the west coasts of Europe and North America from the surface of the adjoining oceans, are *warmer* than those which blow on the eastern parts of these continents, from their much colder interiors. Similarly, in summer, the winds blowing from the oceans are *cooler* than those blowing from the heated inner portions of the continents. See *Aridity; Climatology; Humidity; Rainfall; Temperature, Atmospheric; Weather.*

Climatology. The study or science of weather conditions. Climatology seeks to express in simple language the technical facts of meteorology, so that they may be used to advantage by farmers, planters, fruit growers, and stock breeders. The study of these facts is important, because crops, industry, and health depend upon climate.

Climatology records temperature, moisture, barometric pressure, winds, and evaporation, and takes into account the regular and irregular variations from the average of these conditions throughout the year. The highest and lowest temperatures, the rainfall, the direction, velocity, and frequency of winds, and the forecasting of any of these conditions are all of much importance to the farmer and the stock grower. Various plant and animal diseases are known to be associated with particular types of weather because certain disease-producing insects, fungi, rusts, and other parasites flourish under such conditions. See *Climate, Weather.*

Cloud. A collection of water droplets or ice particles, formed by the condensation of water vapor, and remaining suspended in the air. Ordinarily the heights of clouds vary from a few feet to about five miles, though some of the lighter forms may attain an altitude of twenty miles. Clouds assume many forms,—the most common are the cumulus, the stratus, the nimbus, and the cirrus clouds.

Cumulus clouds are white, thick, and dome-shaped, with irregular, fleecy protuberances and

nearly horizontal bases. They commonly form in the afternoon during hot weather, often developing into so-called "thunderheads." The various forms of cumulus are among the most beautiful of clouds, especially when lighted and tinted with the rays of the setting sun. On the average, the top of a cumulus cloud is about 5500 feet and the base is about 4000 feet above the ground.

Stratus clouds are horizontal sheets of lifted fog, sometimes very low, and usually less than 4000 feet high. *Nimbus* or *rain clouds* are also low clouds formed of thick, dark layers, lacking definite shape, from the ragged edges of which rain or snow falls. *Cirrus* clouds, the highest of all, usually at about six miles elevation, though sometimes at ten miles, appear most frequently in dry weather. They are composed of particles of snow and ice and take on a delicate, feathery appearance.

There are also intermediate forms of clouds: the *cirro-stratus*; the *cirro-cumulus*, which produces the "mackerel sky," heralded by sailors as a forecaster of fair weather; the *alto-stratus*; the *cumulo-stratus*; and the *cumulo-nimbus*, or "thunder" cloud. The last has the appearance of heavy, mountainous masses of cumulus clouds, with a layer of nimbus beneath, from the base of which local showers of rain and hail often fall. Taking the earth as a whole, it is estimated that clouds cover, on the average, about one-half of its surface. See *Fog, Humidity, Rain, Snow, Storm, Wind.*

Cloudburst. A name given to an extraordinarily heavy fall of rain, affecting a small area and lasting for only a short time. It is impossible to draw a clear line of distinction between a cloudburst and a heavy rainfall. Usually, however, the term cloudburst is not used unless six or more inches of rain falls at the rate of ten or more inches an hour. Probably the heaviest cloudbursts do not cover more than an acre, nor the lightest, more than a square mile in area. In the United States, cloudbursts occur most frequently in the Rocky mountains and in the Great Basin.

In arid regions, small whirlwinds sometimes take up heated air from the surface with such rapidity, and to so great a height, that the sudden expansion and cooling cause the condensation of even the small amount of moisture contained in the desert air. Sharp, short showers may then occur, and, if heavy, they are known as cloudbursts. In a storm of this nature, during the summer of 1898, sufficient rain fell in a few minutes near Bagdad, in the Mohave desert of California, to cause several washouts along the railroad. A cloudburst at Clifton, S. C., in June 1903, caused the loss of fifty lives and damaged property to the extent of millions of dollars. See *Rain, Rainfall.*

Cold Wave. In 1872 the United States Weather Bureau first applied the term "cold wave" to the areas of cold, clear, dry air (anticyclones) that flow near the ground from Canada southward over the United States, becoming the so-called "northers" in the Gulf states. The rate of progress of the front of a cold wave is so steady and uniform that the Weather Bureau is usually able to forecast its advance with satisfactory accuracy. The hoisting of a cold wave flag by the Weather Bureau indicates that the thermometer will fall at least 20° within 24 hours, and that the temperature will drop below freezing. Cold waves often cause a fall in temperature exceeding 30° in 24 hours. They usually last only two or three days. See *Anticyclone.*

Continent. The continents are the great land areas of the world, in contrast to the oceans, which are the great water areas of the world. Continents differ from islands in their size. Physiographers usually recognize six continents: (1) Eurasia, the natural grand division consisting of Europe and Asia, (2) Africa, (3) North America, (4) South America, (5) Australia, (6) Antarctica. Europe and Asia, however, are commonly called continents.

Each continent stands upon a submerged shelf, called a continental platform. These platforms surround the continents to a considerable width, sloping gently down to a depth of about 600 feet until there is a sudden drop down to about 6000 feet, where the true ocean basin begins. Some 10,000,000 square miles about the shores of continents are thus covered with shallow water. The area of the oceans is nearly three times that of the land, but the area of the ocean basins is only about twice that of the continental platforms with their respective continents.

The major surface or relief features of the land are plains, plateaus, and mountains; the minor relief features include valleys, canyons, hills, buttes, mesas, cliffs, bluffs, and many small basins.

If all the continents were graded to a common level, their height above the sea would be about 2300 feet. If all the sea bottoms were likewise graded to a common level, the water would have a uniform depth of between 12,000 and 13,000 feet. The average height of the land is, therefore, slightly less than half a mile above sea level, while the average depth of the ocean bottom is about 2½ miles below sea level.

The lowest known point, near the Philippine Islands, is 34,416 feet, or more than 6½ miles below the surface of the sea. The highest point, Mount Everest, is 29,141 feet, or 5½ miles above the same plane. About three-fifths of the land lies less than 500 meters, or 1640 feet, above sea level, and upon this area most of the earth's population lives. See *Ocean.*

Crater. The bowl-shaped depression or cavity marking the orifice through which lava and other materials are or formerly have been ejected from a volcano during eruption. Small volcanoes usually erupt through a single crater at the summit; the larger volcanoes often have numerous subsidiary funnels. The Peak of Teneriffe, for example, has many minor craters both in its sides and in its summit. Craters vary greatly in size, some being very small, while others are a mile or more in diameter. The largest known volcano, Haleakala, in Hawaii, has a crater twenty miles in circumference.

The size of the crater, however, in no way measures the intensity of an eruption. At the time of their most violent paroxysms, Krakatoa, Vesuvius, and Pelée had craters of very moderate size—that of Pelée being about 2500 feet in diameter. In volcanoes of the explosive type, the entire top of the mountain may be blown off, leaving an immense crater. The craters of extinct or of dormant volcanoes are often filled with water, forming crater lakes. In the case of Mount Mazama, in Oregon, the top of the mountain fell in, and in the great hole formed in this way is the famous and beautiful Crater lake. See *Caldera, Lava, Volcano, Vulcanism.*

Crevasse (*krĕ-vàs'*). A great fissure or crack which may form in rocks or in the great mountain glaciers.

Cyclone. Cyclones are violent storms, ranging from 100 to 1000 miles in diameter. In these storms high winds rotate somewhat spirally about a calm central area having an atmospheric pressure much lower than that of the adjoining areas. This central area of low pressure (below 30 inches) moves onward, often with a speed of 20 to 30 miles an hour, surrounded by a system of cool winds, which blow inward, and around it, from areas of high barometer, called anticyclones, with a pressure of upwards of 30 inches. Cyclonic storms are attended by rising temperature, moist air, abundant precipitation, and a cloudy sky.

Because of the rotation of the earth, a cyclone in the northern hemisphere blows about its center from right to left, or in a direction opposite to the movement of the hands of a clock. For the same

reason, cyclones in the southern hemisphere rotate from left to right. Cyclonic storms move eastward in the middle latitudes and westward in the tropics.

The general term "cyclone" includes the hurricane, typhoon, baguio, and various other severe tropical storms. The name, however, should not be applied to tornadoes, waterspouts, whirlwinds, or "twisters," in which the vertical motion of the storm is far more significant than the horizontal. In various parts of the United States, tornadoes are often incorrectly called cyclones. In middle latitudes, cyclones, or low-area storms, are the most important type of storms. While sometimes developing wind velocities of 40 to 60 miles an hour, they rarely become destructive like the more violent "hurricanes" of the tropics. See *Anticyclone*, *Hurricane*, *Storm*, *Tornado*, *Typhoon*.

Delta. A tract of land enclosed by the branches of a river's mouth; so named from a general resemblance to the shape of the Greek letter Δ. Deltas are usually somewhat triangular or fan-shaped tracts of low-lying land, formed by deposits of fine silt brought down by river currents.

The delta of the Mississippi embraces an area of about 12,300 square miles, and it is advancing into the Gulf of Mexico at the rate of 260 feet a year. The combined delta of the Ganges and Brahmaputra, one of the great rice-producing districts of the world, contains about 50,000 square miles. The famous delta of the Nile, long known as the granary of Egypt, is 200 miles wide on the sea and 100 miles long. The delta of the Niger covers some 30,000 square miles.

Other noted deltas are those of the Danube, the Po, and the Hwang. The Po delta is advancing into the sea so rapidly that the city of Adria, formerly the seaport from which the Adriatic Sea was named, is now 15 miles inland. Many deltas are cultivated, and some of them, such as that of the Hwang, support dense populations. Deltas, however, are often unhealthful and are subject to disastrous floods. See *Alluvium*, *Erosion*, *River*.

Desert. Broadly defined, a desert is any land area which supports but little plant and animal life. In this sense, all barren regions, such as southern Patagonia, the ice-covered interior of Greenland, and other arctic and antarctic lands, are deserts. As ordinarily understood, however, deserts are the continental wastes lying within the tropical and temperate zones, whose sterility is due to scanty rainfall. The most extensive deserts are situated in Africa, Asia, and Australia. Smaller arid regions are found in North and South America. In Europe there are no true deserts.

The Sahara desert of northern Africa is the largest arid region in the world. It is a part of a nearly rainless belt which extends across Africa and continues through Arabia, Persia, Turkestan, and Mongolia, almost to the Pacific shores of Asia. The wide eastern expansion of this area is known as the Desert of Gobi. In southern Africa, the so-called Kalahari desert occupies an area between the Zambesi river and the Orange and Limpopo rivers. The extent of this desert is much less than has been commonly represented on maps. Large portions of the Kalahari district have recently been found to be excellent grasslands. On the west coast of southern Africa there is a narrow strip of country of extreme aridity. The vast deserts of Australia are in the central part of the continent. In North America, the most extensive arid region, sometimes called the "great American desert," lies between the Sierra Nevada and the Rocky mountains. The Atacama desert of Chile is one of the driest places in the world. In this area an entire year may pass without a single drop of rain.

Deserts are caused by (1) the prevalence of dry winds, (2) by separation from the ocean by mountain barriers, and (3) by their great distance from oceans or other areas of evaporation. The climate of deserts is characterized by cloudless skies; by extremely high temperatures during the day, sometimes exceeding 120° F.; by a very pronounced and rapid drop in the temperature at night, even in the tropics; and by a yearly rainfall varying from a few inches to almost none. Violent windstorms occur, frequently accompanied by whirlwinds producing severe sand storms or sand spouts. Whirlwinds sometimes develop so rapidly, and rise so high in the atmosphere, as to cause brief but very heavy local rains called "cloudbursts."

While deserts, except in limited areas, are never entirely barren, their permanent vegetation is scanty and limited to the most hardy and resistant types, such as cactus, sagebrush, and saltbush. However, during brief seasons of rainfall, the vegetation in some desert areas bursts into a profusion of bloom, only to wither quickly and largely disappear when the usual arid condition is resumed. See *Aridity*, *Climate*, *Humidity*, *Rainfall*.

Dew. A formation, after sunset, of water globules upon the leaves of plants and upon other objects on or near the ground. Dew usually occurs as small drops of water which may be seen sparkling in the sunshine until evaporated by the heat of the day. A good illustration of the formation of dew is shown by the moisture which gathers on the outside of a pitcher filled with ice water. The temperature of the surface of the pitcher is lower than the dew point of the surrounding air. In consequence, the moisture in the air nearest to the pitcher condenses in droplets upon the cool surface.

Similarly, if the temperature of grass blades, or other plant surfaces, becomes lower than the dew point of the surrounding air, moisture will be condensed upon them. If the temperature at which the moisture condenses is below the freezing point, *frost* will be formed. For a copious formation of dew, the sky must be clear, the air calm, and the objects on which it is formed must be situated near the ground.

Clouds prevent the formation of dew by reflecting back to the earth much of the heat radiated by its cooling surface, and thereby keeping the temperature above the dew point. Winds also prevent the formation of dew by carrying away the cooler air before the vapor in it has been condensed. While it is common to speak of a heavy "fall" of dew, or the "falling" dew, such expressions are not scientifically accurate. Dew never falls from the sky, as does rain, but merely condenses out of the air upon the object on which it is found.

Dew sometimes forms on the under sides of objects. For example, if a pan be placed on the ground, bottom up, in the morning there will be dew on the inside of it as often as on the outside of it. Similarly, a rubber blanket spread on the ground will often be wet on the under side in the morning, even in a desert. This is explained by the fact that the air in the ground, which contains some moisture, becomes warmed during the day. At night, the air above the surface cools more rapidly than the air in the ground. The heavier cool air from above sinks into the ground, forcing up the warmer air with its contained water vapor. Upon coming into contact with the cool pan or the cool rubber blanket, a part of this moisture is condensed.

In some nearly cloudless regions, such as parts of Arizona, California, Syria, and Arabia, the amount of dew formed is sometimes so great as to become available for the roots of plants, and is an important factor in agriculture. When the air is very dry, however, objects near the surface may not cool below the dew point at night, and, consequently, no dew will be formed. See *Dew Point*, *Frost*, *Humidity*.

Dew Point. The temperature at which the water vapor in the atmosphere begins to condense. It is not a fixed temperature but varies according to the amount of vapor present in the air. In case the amount is large, the temperature of the dew point will be relatively high, and only slight cooling will



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VOLCANOES

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NOTED WATERFALLS

1 Victoria Falls, South Africa. 2 Niagara Falls. 3 Minnehaha Falls; *copyright by Detroit Photographic Co.* 4 Multnomah Falls, Oregon. 5 Yosemite Falls, California. 6 Great Falls, Potomac River; *copyright by Harris & Ewing.* 7 Argentine Falls, South America; *copyright by Underwood & Underwood.* 8 Shoshone Falls, Idaho; *copyright by Detroit Photographic Co.* 9 Howick or Great Umgeni Falls, South Africa; *copyright by Keystone View Co.*

be required to cause some condensation. In case the amount of water vapor present is small, the temperature of the dew point will be relatively low, sometimes below the freezing point. When the temperature of condensation is above the freezing point, the vapor condenses in the form of water droplets; when below the freezing point, the water crystallizes into ice particles as it condenses. See *Dew, Frost.*

Dike. A sheet of lava lying in a vertical or nearly vertical fissure in the earth. Such a sheet is formed when molten rock material, rising toward the surface along some line of least resistance, fills the fissure in which it later cools. Dike rocks are sometimes much more resistant to erosion than the surrounding formations. When the softer adjacent rocks have been worn away, the harder dike rocks stand out as great walls or ridges in the landscape. See *Igneous Rocks, Lava, Vulcanism.*

Distributaries. The branches of a stream that form when it divides in its delta or at the base of a mountain slope. They are the converse of the *tributaries* that come together and form one main river. In the delta of the Mississippi, as in all other great deltas of the world, there are numerous distributaries. See *Delta, River.*

Doldrums (*dōl'drŭms*). A belt or zone of calm within 15° north or south of the equator. This belt is characterized by the highest temperatures and humidities, coupled with the feeblest winds, that occur on the ocean. The surface of the sea is often of a glassy smoothness, frequently bearing a thin layer of oil left by passing vessels. The region of calms, which varies with the seasons in extent and location, was formerly much dreaded by navigators sailing ships across the equator.

Drumlin. A smoothly rounded, oval hill, rarely more than 250 feet high or more than a half mile long, and composed of unstratified glacial drift. Drumlins occur usually in flat lowlands, often in clusters. They are believed to have been formed by the deposition of glacial débris underneath the ice at a period when the onward movement of the great ice sheet was sluggish. The material composing them consists of clay, bowlders, sands, and gravels. Drumlins are always elliptical in form, and their larger axes are always parallel to the direction of the ice movement. They occur north of the terminal moraine of the great continental glaciers of Europe and North America.

In the United States, drumlins are found in eastern Massachusetts, around Boston Harbor; in western New York, just south of Lake Ontario; and in southeastern Wisconsin. At the battle of Bunker Hill (Breed's Hill) the Americans occupied and fortified a drumlin. Beacon Hill, Boston, is also a drumlin. See *Glacier, Pleistocene Period.*

Dune. A mound or ridge of loose sand heaped up by the wind. The name was first applied to the great sand mounds along the seacoasts of northern France, Holland, and Denmark. Dunes occur near large bodies of sand and where the prevailing winds are fairly constant in direction, being found on seashores, on the shores of some inland lakes and large rivers, and also in sandy inland districts having a low rainfall. They have a gentle windward slope and a steep leeward descent. The winds which heap the dunes roll the sand grains up the easy slope, from the crest of which they fall abruptly down the steep leeward face.

Under continuous winds, dunes often move onward at the rate of 60 or 70 feet a year, sometimes engulfing buildings and orchards and destroying fertile fields. The average coastal dunes are from 200 to 300 feet high, but the great crescent-shaped dunes of the Sahara attain a height of 600 feet. In the United States, dunes are abundant on the Atlantic coast south of New York, on the southern and eastern shores of Lake Michigan, on a limited part of the Pacific coast, and over many thousands of square miles of semiarid tracts of the Great Plains, as in western Kansas, western Nebraska, and west central Wyoming.

Large quantities of dune sand have been taken from the south end of Lake Michigan into Chicago and there used in elevated railroad embankments. Dune sands are used also as building material. See *Æolian Deposits, Wind.*

Dust. Atmospheric dust consists of minute particles of matter, both inorganic and organic. These are present in large numbers in the purest air of the country and of high mountains, as well as in vastly greater quantity in the air of cities.

The inorganic particles consist of tiny pieces of mineral matter blown up from dry roads and fields, particles of soot and smoke from chimneys, ashes from volcanoes, and meteoric dust which comes to the earth from outside space when shooting stars are burned up in the atmosphere. Organic dust is composed chiefly of bacteria and the spores and pollen of various plants.

Dust particles play a very important rôle in "scattering" the light of the sun so as to illuminate the entire atmosphere. The blue color of the sky and its varied sunrise and sunset tints are, in a large measure, determined by the presence of dust in the atmosphere. See *Atmosphere, Lava, Meteoric Dust, Volcano, Wind.*

Earthquake. A trembling or shaking of the earth, varying from a slight tremor, perceptible only with the aid of delicate instruments, to a tremendous convulsion which may cause immense destruction of life and property. Great earthquakes may or may not be heralded by preliminary tremors. The principal shock or series of shocks usually continues over a few minutes, during which buildings are demolished and huge fissures appear in the earth. After the main shock, a series of minor disturbances, gradually decreasing in intensity, may continue for a period of many weeks, or even for several years.

Earthquakes are believed to result from a number of causes. Some minor earthquakes are no doubt produced by the falling in of subterranean caverns. Some are evidently caused by the violent explosions accompanying volcanic eruptions. Others are due to landslides, avalanches, and various slumpings on the slopes of deltas and on the outer faces of the continental platforms under the sea. But many of the greatest convulsions are clearly connected with still other types of crustal movements. Faulting, or the slipping of one great body of rock upon another in the earth's crustal or outer portion, seems to be the principal cause of earthquakes. Such faulting is commonly associated with mountain-making movements, and, therefore, earthquakes in a mountain region may safely be interpreted as an indication that the mountains are growing.

The earthquake of April 18, 1906, on the coast of California, injured and practically destroyed many buildings and caused the fire which burned a large part of the city of San Francisco. This earthquake was the most disastrous in North America during historic times. It was caused by a horizontal fault of from 8 to 21 feet displacement, with a vertical movement of from 1 to 3 feet, traced northwest and southeast of San Francisco in a line near the sea for a distance of about 270 miles. On August 31, 1886, the city of Charleston, South Carolina, was very seriously damaged by an earthquake which was felt over a large portion of the United States. From 1811 to 1813, a series of earthquakes, some of which were very violent, occurred in the Mississippi valley near New Madrid, Missouri.

Great earthquakes are most numerous in volcanic regions, and particularly near the mountainous edges of continents, bordering upon the ocean. Minor earthquakes are of very common occurrence. On an average, more than 30 per year occur in California, practically all of which are so slight as to cause no damage. The countries most severely shaken by

earthquakes are Italy, Japan, Greece, the western coast of South America, the West Indies, Java, Sicily, and Asia Minor. The lands least disturbed are Africa, Australia, Russia, Siberia, Scandinavia, and Canada.

Even in severe shocks, the vibration of the earth particles usually extends through only a small fraction of an inch. As a rule, buildings with foundations resting upon solid ground do not suffer greatly from such displacements. But, when earthquake vibrations pass through land that has been "made" by filling in, the soft earth is thrown into waves, somewhat like the sea. Frequently, all structures whose foundations rest upon loose soil are completely destroyed. This was noted at Lisbon in 1755, and was very strikingly illustrated at San Francisco and Valparaiso in 1906.

At Valparaiso, the steel frames of brick buildings situated on made land were destroyed, while houses standing on rock foundations were but slightly damaged. At San Francisco, even on made land, the oscillations did not exceed three inches in width. Owing, however, to the frequency of these vibrations, few buildings withstood them. Yet on hard ground, where the vibrations were only about one-fourth of an inch, often the only result was the cracking of plaster. See *Fault*, *Landslide*, *Volcano*, *Vulcanism*; also *Dynamical Geology*, page 888.

Erosion. The process whereby the surface features of the earth—mountains, plateaus, valleys, and coasts, together with all their intermediate forms —are sculptured and worn down. Rainfall, sunshine, frost, wind, and the chemical action of the atmosphere combine to disintegrate and break down the rocks. Surface waters, supplied by rain and melting snow and ice, wash down the particles of disintegrated rock from the mountains and plateaus into the valleys. Thence these fine materials are carried downward by streams and deposited along their channels or finally borne to the sea.

Glaciers, like rivers, serve as denuding and transporting agents. While, in the warmer zones, glaciers are now confined to highly elevated regions, in former ages they covered vast continental areas. The grinding action of these glaciers and ice sheets brought about great changes in the surface features of the areas occupied by them. The sea is another important earth-shaping agent, producing erosion through the action of waves, tides, and currents. Wave action wears down cliffs, and gives a constantly changing form to the coast lines of the continents and islands. Tides bear out to sea the sediment brought down by river currents.

The tendency of erosion is to bring down the continents to a lowland or base plane a little above sea level. This process of degrading the land is counterbalanced by movements of the earth's crustal portion. These elevate the lands and restore, to a large degree, that which has been lost by denudation. See *Butte*, *Canyon*, *Fiord*, *Glacier*, *Gorge*, *Mesa*, *Mountain*, *Plateau*, *Pothole*, *River*, *Valley*, *Water Gap*.

Erosion Theory. The theory now universally held by geologists that valleys are produced by the wearing, chiseling, and sculpturing agency of water and ice, the latter chiefly in the form of glaciers. This theory has entirely replaced the earlier view, which regarded valleys as the result of fissures in the earth's crust, produced during upheaval. See *Erosion*.

Escarpment. A high, steep slope, or precipitous face of rock, of considerable length, often marking the line of strike of different strata. An escarpment frequently separates one nearly level expanse of land from another similar expanse situated at a higher elevation. For example, the Niagara escarpment divides the lower lands about Lake Ontario from the higher lands about Lake Erie. In plateaus and mountain regions, escarpments frequently mark the line of outcrop of stratified rocks, produced by unequal weathering or erosion, or by the faulting of strata. Such escarpments usually consist of a succession of steep cliffs. In the plateau regions of Utah and Arizona there are many such escarpments, some of which are 2000 feet in height. See *Cliff*, *Fault*.

Esker. A low, narrow, winding ridge of gravel and sand, examples of which are found in Scandinavia, North America, and other countries formerly covered by ice sheets. Eskers are from 1 to 20 miles long, and are often from 40 to 80 feet high. It is believed that these deposits were formed by the action of streams underneath the glaciers which existed in the Glacial period. See *Glacier*.

Fault. The name given to any displacement along a fissure, or series of fissures, in any kind of rock. Sedimentary strata that have been faulted may not always retain a horizontal position. They may show that they have been upheaved and displaced since they were first deposited. When seams of coal or other mineral veins are faulted, miners sometimes have great difficulty in locating, underground, the different parts of the coal seams or mineral veins.

Faulted blocks are sometimes tilted, and are frequently of such size and so displaced as to form mountains and basins. Faulting has taken place on an immense scale in the plateau region between the Rocky mountains and the Sierra Nevada, where numerous mountain ranges and lines of cliffs are the result of such movements. Death valley, in California, is a down-faulted oasin, as is also the Dead Sea, in Palestine. The Sierra Nevada of California is being carved by erosion out of an uplifted block. The Great Rift valley of Africa is due to faulting. Faulting is probably the principal cause of earthquakes, as the slipping of one vast body of rock upon another causes vibrations which spread far from the center of disturbance. See *Earthquake*, *Escarpment*, *Structural Geology*.

Fens. Lowland areas overflowed, or covered entirely or in part, with water. In Great Britain, the term fen is applied to marshy or boggy lands, especially to low-lying districts in Lincolnshire and adjacent counties, called the "Fens." See *Bogs*, *Marshes*, *Moor*, *Swamps*.

Fiord (*fyôrd*). A narrow inlet of the sea, having high, bold cliffs on either hand, and extending far into the land. Fiords occur along mountainous coasts and were formed largely by inland glaciers which gouged out narrow valleys on their way down to the sea. Sinking of the land relative to sea level has also affected the fiorded coasts. This movement has caused the sea water to enter the great canyons in the mountains near the coast, and it has also produced the numerous islands found along such coasts.

The fiords are exceedingly deep and their sides are often lined with waterfalls. Those of Norway are the most notable, Sogne Fiord, one of the largest, being 100 miles long. Fiords are found also in Iceland, Greenland, Alaska, British Columbia, Chile, and New Zealand. See *Canyon*, *Erosion*, *Glacier*.

Flood. Floods or inundations are most commonly due to excessive rains or melting snows. These cause rivers to rise and overflow their banks, sometimes resulting in great destruction of property and loss of life. Tidal waves produced by tropical hurricanes and by earthquakes also cause disastrous floods, as do the bursting or sudden overflow of dams and reservoirs. Some rivers have annual floods which are in no sense disastrous; as, for example, the Nile, whose risings and fallings, with their regular yearly deposit of fertile silt in the valley, form the basis of Egyptian agriculture.

In the United States, the valleys of the Mississippi, the Ohio, and the Missouri are liable to springtime floods. In 1913, a flood in the Ohio River valley destroyed large portions of Dayton, Ohio, and various other places, resulting in the loss of 400 lives and of property valued at $180,000,000. The greatest flood that has befallen the United States occurred in

1927, when the lower Mississippi river broke its levees and spread over a total area exceeding 20,000 square miles. The property loss exceeded $270,000,000. Serious loss of life was avoided by reason of the accuracy with which the flood peak was predicted and the promptness with which warnings were sent out. In 1887, the Hwang river, in China, burst through the huge levees, at some points 70 feet high. The uncontrolled waters flooded an area of 50,000 square miles and drowned 1,000,000 people.

In 1472, great sea waves burst the dikes protecting the Netherlands, destroying 72 villages and about 100,000 human lives. Tidal waves produced by a tropical hurricane caused immense destruction of property and thousands of lives at Galveston, Texas, in 1900. Typhoons in the Pacific produce waves of terrific destructive power. In 1876, 150,000 people were drowned by a typhoon wave which overwhelmed the delta of the Ganges and Brahmaputra in India.

The prodigious tidal waves following the earthquakes at Lisbon in 1755, in the Strait of Sunda in 1883, and on the coast of Japan in 1896, caused the loss of tens of thousands of lives. See *Cloudburst, Earthquake, Rainfall, River.*

Flood Plain. An area of level land, bordering the channel of a stream, and formed during periods of flood by deposits of alluvium. On account of the frequent addition of new material, the soil of flood plains, commonly called "bottom lands," is exceedingly fertile. However, crops grown on these lands are often in danger from recurring floods and, in northern countries, are subject to early frosts. Among the best-known examples of flood plains are those in the valleys of the Nile, the Ganges, the Danube, the Po, and the Mississippi. See *Alluvium, Erosion, River, Valley.*

Fog. Tiny globules or droplets of water condensed from the water vapor or moisture in the lowest layers of the air at a temperature above freezing point. Usually every particle of fog has a minute nucleus of dust in it, but electrons and ions also serve as points of condensation in the forming of fog. Fog, therefore, is a cloud resting upon the surface of the earth.

When cold air flows over warm land or water, the vapor rising from the latter is quickly condensed. Thus fogs are formed over lakes, rivers, and marshes when the warm vapor from these meets the cooler air above them. Whenever cold and warm currents of water lie adjacent to each other on the ocean, air from the warmer and moister water is carried over the colder water, and cools until fog is formed. For example, the intense fogs off the coasts of New England and Newfoundland, one of the foggiest regions of the world, occur when moist easterly or southerly winds blow over the colder waters of the Labrador Current. Fogs often form about icebergs and obscure these great masses of floating ice.

City fogs are more persistent than country fogs, and, usually, more dense, owing to the immense number of dust and soot particles in the air. Largely on account of the blanketing effect of fogs, winter temperatures do not drop so low in cities as in the country. In London as many as 74 fogs have been recorded in a single year. Some of these are so dense as to compel suspension of traffic and the closing of stores. Fogs seriously impede navigation, often occasioning disastrous collisions and shipwrecks. On land also, fogs greatly hinder travel, and are responsible for many railroad and other accidents.

Regularly recurring fogs sometimes partly take the place of rain, and, in various localities, prove of great value to growing crops. For example, in certain coast districts of California, Indian corn and other crops requiring much moisture in midsummer are successfully grown, by reason of the abundant fogs which occur during parts of the rainless season. See *Cloud, Humidity, Rain.*

Fringing Reef. A coral reef which borders a coast line. The reef material is composed chiefly of the exoskeleton of the coral polyp. This stony substance consists mainly of lime, which the coral animal secretes from the sea water, and forms the horny outer framework, which supports and protects the soft parts of the body. In time, fringing reefs may become mantled with soil and clothed with vegetation. See *Atoll, Barrier Reef, Coral.*

Frost. A covering of minute ice crystals which form on the ground, on leaves of plants, or on other objects; called also "hoarfrost," or "white frost." It is the water vapor, or moisture, always found in the air, condensed on the surface of objects whose temperature has fallen below the freezing point. At sunset the earth begins to give up the heat absorbed from the sun's rays during the day. The surface of the ground cools quickly, so that the moisture in the air immediately surrounding it is chilled and condensed. As long as the temperature remains above the freezing point, dew is formed, but, when it falls below 32° F., frost is formed. Frost, therefore, corresponds to snow, and dew, to rain.

The ground cools on clear nights much more rapidly than in cloudy weather. For this reason frosts occur most frequently when the sky is cloudless. Further, if the air is calm, frost may form on the ground when the temperature a few feet above the surface is several degrees above the freezing point. This is owing to the fact that the surface of the ground parts with heat at a much more rapid rate than does the surrounding air. Moreover, cold air is heavier than warm air and tends to settle and remain at the surface. Consequently, if a layer of air next to the ground remains undisturbed, it may be cooled below the freezing point, despite the warmer air above. A wind, however, will mix the layers of cold and warm air and thereby prevent the formation of frost. It thus becomes plain why frosts, like dew, are most plentifully formed on calm, clear nights, and why they are least likely to occur when it is cloudy and windy.

In autumn, frost occurs in valleys and on low grounds earlier and more frequently than on adjacent hills. This is because the colder air naturally drains to the lower levels, and also because narrow, hemmed-in valleys are less disturbed by winds.

Frosts occurring unseasonably late in the spring or early in autumn, often cause severe damage to field crops, vegetables, and fruits. The growing parts of plants are turgid with sap which is composed chiefly of water. Upon freezing, this expands and bursts the delicate cells, thereby killing the plant outright or greatly impairing its growth and productiveness. During high winds or when the air is abnormally dry, freezing of plant tissues may take place without the formation of ice particles on the surfaces of the leaves. This is sometimes called "black frost." See *Dew, Dew Point, Humidity.*

Geyser. An eruptive hot spring, which, from time to time, violently ejects boiling water and steam. The best-known geysers are those in Yellowstone national park, though there are geysers in Iceland and New Zealand. In some geysers, eruptions are frequent; in others, infrequent. In some, eruptions take place at regular intervals; in others, they are of very irregular occurrence. The geyser named "Old Faithful," in Yellowstone park, spouts at nearly regular intervals of about an hour.

A geyser consists of two parts, a basin and a tube. The basin is usually situated at the top of a mound of mineral matter, often of fantastic form, commonly composed of silica deposited by the water. The tube, or opening, leads from the basin down to unknown depths.

Scientists are agreed that steam is the force which explosively ejects the water of a geyser, sometimes to a height of 100 feet or more. It is believed that ground water enters the geyser tube in much the same manner as it flows into a well, but that the walls in some parts of the tube consist of hot rock.

It is believed further that water in the lower portion of the tube, where it is under great pressure, is heated to temperatures above the boiling point, and that the steam thus formed forces out violently the column of water above it. This explanation of geyser eruption is more readily understood when it is remembered that water, when changing into steam, expands to 1700 times its original volume. See *Ground Water*, *Hot Springs*, *Vulcanism*.

Glacier. A large mass of ice and snow moving slowly over a land surface. On all high mountains which are subject to moist winds, so that the snowfall is greater than the yearly melting, glaciers are formed. Consequently, they are found in most of the higher mountains of the world, and also on high plateaus in the arctic and antarctic regions.

There are six types or classes of glaciers: (1) *continental glaciers*, or ice sheets; (2) *plateau glaciers*, or local ice caps; (3) *alpine glaciers*, or valley glaciers—the most common form; (4) *piedmont glaciers*, formed when a number of alpine glaciers unite and spread out upon a plain at the foot of the mountains, as in the Malaspina glacier, in Alaska; (5) *hanging glaciers*, perched on shelves on mountain sides; (6) *reconstructed glaciers*, formed of recongealed remnants of other glaciers.

The rate of movement in a glacier varies from an almost imperceptible motion to several feet a day. Most of the well-known valley glaciers flow at the rate of a foot or two a day. The Mer de Glace, the swiftest moving glacier of the Alps, advances about 3 feet a day. The Muir glacier in Alaska has a speed of about 7 feet a day. However, the great Upernivik ice stream in Greenland has been observed to move at the rate of about 100 feet per day.

Glaciers vary greatly in size. Of about 2000 glaciers in the Alps, less than 40 are 5 miles long, and the longest is about 10 miles. A few are a mile wide, and the thickness of the ice is measured in hundreds of feet. Much larger alpine or valley glaciers occur in the Caucasus mountains and in Alaska. The great Seward glacier in Alaska exceeds 50 miles in length and is 3 miles wide at its narrowest part. The glaciers of the western United States are mostly smaller than those of the Alps. The continental glaciers or ice sheets cover vast areas in Greenland and in Antarctica, sometimes measuring thousands of feet in thickness. In Alaska, many large alpine glaciers emerge from the valleys of St. Elias range, and, by uniting on the plain, form the immense Malaspina glacier, 70 miles long and more than 20 miles wide.

Glaciers perform a twofold work; they erode or wear down the rocky surfaces over which they pass, and they carry and finally deposit the materials thus acquired. They thus degrade mountains and hills, deepen and round out valleys, and upbuild plateaus and plains. Glacial action, therefore, is a natural earth-shaping process of great importance. When glaciers flow down to the edge of the sea, their ends are broken off and float away as icebergs.

During the Ice age, which occurred in very recent geological time, great continental glaciers covered much of the northern United States and of Canada. This immense glaciation produced many important effects, one of which was to make possible the Great Lakes route. Supplemented by canals, this waterway provides interior transportation for 2000 miles, a natural advantage possessed by no other continent. Another earth-shaping work of the "great ice" was the deposition of the glacial drift which has become transformed into vast areas of fertile soil. Again, glacial deposits turned many streams from their valleys, producing rapids and cataracts, as, for example, the Falls of St. Anthony, at Minneapolis. Innumerable ponds and small lakes were likewise formed, as in Minnesota, where their number is said to exceed 10,000. The deposits left by glaciers are called moraines. See *Cirque*, *Crevasse*, *Drumlin*, *Erosion*, *Esker*, *Fiord*, *Iceberg*, *Ice Cap*, *Kettle Hole*, *Moraines*, *Striæ*, *Terminal Moraines*, *Valley Train*.

Gorge. A narrow ravine or defile, with steep, rocky walls, through which a stream flows. In the western United States, gorges are usually called canyons. Gorges are deepest and most frequent in dry regions where the downward erosion of the stream bed is much more rapid than the weathering of the walls. While the sides of small gorges are often nearly vertical, those of larger gorges or canyons are rarely so. Notable examples of gorges are Ausable Chasm in New York, the Royal Gorge in Colorado, and the Gorge of the Metlac in Mexico. See *Canyon*, *Erosion*.

Ground Moraine. A mantle of glacial débris left on the retreat or final melting of the ice over the territory which the ice of the Glacial period invaded. This moraine forms the extensive prairie country of Indiana, Illinois, Iowa, and other more northerly states. It has a rolling surface, or topography, in which there may be broad, shallow, saucer-like depressions containing lakes. The material of a ground moraine is a bowlder clay. The stones in it vary in size and kind, and the fine material grades from gravel down to the finest of silts and clays. See *Glacier*, *Moraines*, *Till*.

Ground Water. The water which passes into the earth and circulates through the ground, nourishing vegetable life, dissolving out parts of the rock and forming caves, and assisting in the concentration of mineral matter. This water usually saturates a layer of ground beneath the surface. The upper surface of this saturated layer is the *ground-water table*. Into excavations made beneath this, water will flow. Common wells are thus formed and deep excavations become flooded. See *Geyser*, *Hot Springs*, *Mineral Springs*, *Springs*, *Structural Geology*.

Gulf Stream. The best known and most important ocean current in the North Atlantic. It takes its name from the Gulf of Mexico, from which it issues between the coasts of Florida and Cuba. At its narrowest portion, in the vicinity of the Florida Keys, it is about 50 miles wide and 2000 feet deep, and moves at a speed of from 2 to 5 or 6 miles an hour. It is readily detected by its high temperature (in lat. 34° ranging from 79° F. in winter to 88° F. in summer), by the character of the marine life which it supports, and by its deep blue color.

When the Gulf Stream reaches latitude 32° N., between the Bahamas and South Carolina, it divides into several much slower streams, about 600 feet deep and aggregating 150 miles in width. North of lat. 40°, these become simply a part of the great general drift of warm waters from the southwestern or equatorial Atlantic northeastward toward Europe. The greater warmth of western Europe, as compared with eastern North America in the same latitude, has long been attributed to the influence of the Gulf Stream. However, later researches in meteorology show that this difference is due chiefly to moisture-laden westerly winds. These are but little, if at all, affected by the Gulf Stream proper, but derive their warmth from the immense expanse of equatorial waters constantly drifting northeastward toward the polar regions. See *Japan Current*, *Labrador Current*, *Ocean Currents*.

Hail. Compact, round masses of ice that fall from the clouds to the ground, commonly accompanied by rain. When these are more than a fourth of an inch in diameter, they are called *hailstones*; when very small and falling with rain, they are called *sleet*. While ordinarily ranging from about the size of a pea to that of a walnut, hailstones occur in all sizes up to about 3 inches in diameter and sometimes reach a weight of about 2 pounds. Usually only a few hailstones fall at any one place and these commonly at the onset of a thunderstorm. Sometimes, however, they are so numerous as to cover the ground to a depth of several inches, completely destroying growing vegetation.

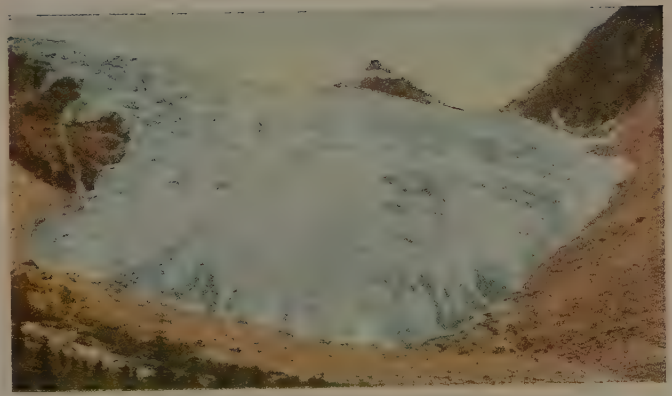
As a rule the larger hailstones are composed of concentric layers of transparent, solid ice alternating



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GEYSERS AND HOT SPRINGS, YELLOWSTONE PARK

Jupiter Terrace
Great Fountain Geyser
Emerald Hot Spring
The Paint Pot
The Punch Bowl
Old Faithful Geyser
Grotto Geyser
Minerva Terrace









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GLACIERS AND GLACIAL ACTION

Moraine Lake, Canadian Rockies

with layers of snowy white, soft ice. Frequently the large stones are formed around a central particle of small gravel, or other foreign substances such as are sometimes borne high in the air by tornadic winds. In some cases the large stones are formed around a central core of snow in which air, or some of the gases composing it, is imprisoned under a pressure estimated at 50 atmospheres.

The method or process by which hail is formed is not well understood. However, it seems to be clearly proved that when warm, moisture-laden air rises and cools, it first condenses into a cloud. Continuing to rise, it reaches a colder region where hail, or hail and rain, is formed. Rising still higher, it reaches a region so cold that only snow is formed. It is believed that ordinary small hailstones or sleet are formed in the first cold region, but that the larger stones are carried up and down many times from the rain region to the snow region until they can no longer be held up by the whirling air currents.

In certain districts, particularly in the Great Plains region, hailstorms cause the yearly destruction of crops and window glass, and even of young live stock. In the United States, hailstorms are most frequent in Ohio, Indiana, Illinois, Iowa, and Missouri. See *Rain*, *Snow*, *Tornado*.

Hardpan. A firmly compacted bed of hardened clay which sometimes underlies a thin covering of topsoil. Extensive deposits of hardpan occur in various parts of the United States and other countries. Lands whose subsoil consists of a more or less impermeable layer are often called hardpan lands. Because of their lack of internal drainage, they are inferior for crop growing. See *Soil*.

Heaths. Tracts of open, usually level, waste land, covered with a characteristic vegetation consisting chiefly of heather and other low shrubs of the heath family. Heaths occupy extensive areas in northern Europe. A few small tracts similarly covered with low evergreen shrubs are found in the United States and Canada. See *Prairie*, *Steppes*, *Tundras*.

Hot Springs. Springs are called *thermal* when their waters show a temperature exceeding 70° F. Those whose temperatures are between 70° and 98° are called *tepid*, and all those whose temperatures are above 98° are called *hot*. A hot spring which erupts intermittently is called a geyser.

The high temperature of thermal springs may be caused either by the contact of the waters with buried lava or by the circulation of the waters to great depths where the rocks are much warmer than at the surface. The rising hot water usually bears various mineral salts in solution, some of which may be deposited near the spring, forming incrustations and icicle-like masses. Many hot springs possess valuable curative properties, owing to their mineral content and, in some cases, so it is believed, to their radioactivity.

The temperatures of some well-known thermal springs are as follows: Sweet Springs, Va., 74° F.; French Broad River, Tenn., 95°; San Bernardino, Calif., 108°–172°; Washita, Ark., 140°–156°; Las Vegas, New Mexico, 110°–140°; Aix-les-Bains, France, 108°; Carlsbad, Bohemia, 162°. The volume of water discharged by hot springs varies greatly. The noted Hot Springs in Arkansas discharge about 20,000 gallons per hour, while the Warm Sulphur Springs, at Bath, Va., flow at the rate of about 350,000 gallons per hour. See *Geysers*, *Springs*, *Vulcanism*.

Humidity. The moisture or water vapor in the atmosphere. Water vapor exists in the air as an invisible gas, and, as regards quantity, it is the most important component after nitrogen and oxygen. When this vapor becomes visible it is called dew, fog, mist, haze, cloud, rain, sleet, hail, snow, frostwork or frost, according to the method and manner in which it condenses.

The actual amount of water vapor which the air contains at a given time is its *absolute humidity*. The percentage of water vapor which the air contains at any temperature, in comparison with what it *might* contain at that temperature, is called its *relative humidity*. When the air is completely saturated with moisture, its humidity is said to be 100 per cent. If it contains only half as much moisture as it might contain, it has a relative humidity of 50 per cent.

Air is called dry when its relative humidity is small, and moist when its relative humidity is high. Over the land surface of the earth the average relative humidity is probably about 60 per cent, and over the sea it is about 85 per cent. Cold and heat are much more easily resisted in regions where the humidity is low than where the air is damp. See *Aridity*, *Climate*, *Dew*, *Frost*, *Rainfall*, *Snow*.

Hurricane. A violent tropical storm, or true *cyclone*, called also *typhoon* and *baguio*, generally accompanied by rain, thunder and lightning, and very destructive winds. About two-thirds of the hurricanes occur in the West Indies and in the China Sea during August, September, and October. While reaching the highest force of all horizontal winds, hurricanes do not attain the intense violence of tornadoes, and they rarely exceed a velocity of 100 miles an hour. The general circulation of the air in a hurricane is spirally inward, and, in the northern hemisphere, in a direction opposite to that of the hands of a clock.

Tropical cyclones moving northward often do immense damage along the southern Atlantic coast of the United States, both to shipping and to lowlands near the shore. The storm which caused great devastation at Galveston, Texas, in September 1900, was a tropical hurricane which veered farther northwest than usual. Similar storms of cyclonic origin occurring in the Pacific Ocean are commonly called typhoons. Baguio is the Philippine name for such a storm. See *Cyclone*, *Storm*, *Tornado*, *Typhoon*.

Hydrosphere. The water on the surface of the earth, forming the liquid envelope of the globe, intermediate between the gaseous envelope, or *atmosphere*, and the solid land, or *lithosphere*.

The sea, including the Pacific, Atlantic, Indian, Arctic, and Antarctic oceans, together with various great gulfs and bays, covers about 72 per cent of the earth's surface. The Pacific Ocean comprises more than half of the total water surface of the globe. The average depth of the sea is about 2½ miles, or about 13,000 feet. In the Atlantic, the greatest depth yet known, a point north of Porto Rico, is 27,366 fee
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Unlike most substances, water is lighter in the solid than in the liquid state. The specific gravity of ice is 0.918, so that it floats on water with about nine-tenths of its volume submerged. However, under low temperatures and high pressures, physicists have produced special forms of ice which are heavier than liquid water. The specific heat of ice has been found to be about half that of water. In melting, ice absorbs more heat than any other solid.

Since water ordinarily expands upon freezing, it follows that its freezing point will be lowered with any increase of pressure, the rate having been determined at 0.0075° for each additional atmosphere of pressure. By this are explained various properties of ice, particularly that of *regelation*, which is illustrated as follows: If a piece of wire, with a heavy weight attached at each end, is thrown over a block of solid ice, the wire gradually cuts its way through the block, though the latter remains entire. Where the wire presses heavily on the ice the melting point is lowered so that a thin film becomes liquid, permitting the wire to descend through a minute distance. The water immediately above the wire instantly freezes again because it is relieved from pressure. The descent of the wire through the entire block is held to be due to repetitions of this process. The theory is held that the flowing motion of ice under pressure in glaciers is due in part to modifications of the foregoing process.

Freezing is retarded by substances in solution. For example, sea water freezes at 29° F., the ice separating out as pure ice and not as a mixture of ice and salt. The entire Arctic Ocean is practically covered with permanent ice, averaging between six and seven feet in thickness. The vast continent of Antarctica is fringed with a belt of sea ice, several hundred miles wide, which is formed annually. The continent itself, like Greenland, is covered with a permanent ice sheet, from which glaciers extend down to the sea. Portions of these, by breaking off, become icebergs. Permanent ice occurs also in the glaciers on high mountains. See *Anchor Ice*, *Glacier*, *Iceberg*, *Ice Cap*.

Iceberg. A large mass of floating ice broken from a glacier, or from an ice sheet, when its front has reached the sea. Among the various arctic lands, Greenland stands pre-eminent for the number and size of the icebergs which drift from its shores into North Atlantic waters. Some of the Greenland bergs tower from 100 to 250 feet or more above As, usually, only about one-seventh is the total height of such icebergs is to about 1600 feet. In the Atlantic rn limit of icebergs extends south- t lat. 60° N., near Iceland, to rand Banks of Newfoundland. iceberg in this region, April *tanic*, then the largest ship h a loss of 1500 lives. t numerous and attain polar regions. The re than 10,000 miles there is nowhere tic coast where gs into the sea. abular, that is, les often 200 30 to 40 miles 1000 square *Ice Cap*.

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averages probably thousands of feet in thickness. The south polar lands of Antarctica are likewise covered with an ice cap of immense extent and thickness. See *Glacier*.

Island. A body of land entirely surrounded by water, of small size when compared to a continent. In area, islands range from tiny tracts in rivers and lakes to great land masses in the ocean, tens of thousands of square miles in extent. As a whole, islands may be divided into two main classes, *continental* and *oceanic*.

Continental islands are formed chiefly (1) by the subsidence of a coast below sea level, leaving only the higher portions above water; (2) by the erosive action of the sea, cutting off peninsulas or other portions of the land; (3) by the constructive work of rivers, building up deltas; and (4) by ocean currents, forming sand bars. In structure, continental islands are essentially similar to the mainland, from which they are separated by narrow areas of usually shallow water overlying a portion of the continental platform or shelf.

The small islands near the coasts of Maine, Scotland, and Norway are remnants of hills and mountains whose basal portions and intervening valleys have been submerged in a general subsidence. Japan, Sicily, and the British Isles are regarded as larger masses which, likewise, were once united to the mainland, as indicated by the submarine banks in the intervening seas. The islands at the mouth of the Mississippi and the Nile are good examples of islands formed in deltas by rivers.

Oceanic islands are formed in various ways. When a peak on an elevation in the deep ocean floor rises above the surface, a true oceanic island is produced. Submarine volcanoes raise material above sea level, producing volcanic islands. Earth movements, resulting in the buckling or upfolding of the ocean bed, may elevate portions of it above the surface. Coral islands are formed by the limy secretions of coral polyps. They occur in numerous groups on oceanic plateaus where the waters are warm and shallow, or are found singly, crowning isolated peaks which rise from deep water. Oceanic islands are found in exceedingly large numbers in the Pacific where they constitute the division of the land world called Oceania.

Volcanic islands occur most frequently in the Pacific and the Indian Ocean and include both active and extinct volcanoes. Examples of volcanic islands in the Atlantic are St. Helena, Ascension, and the Azores. Many submarine eruptions, forming volcanic cones above sea level, have occurred in recent times. In 1796 the island of Johanna Bogslava appeared on the coast of Alaska. Within four years it had grown to a height of 3000 feet. In 1831 Graham island, in the Mediterranean, was thrown up. It attained a height of 200 feet and a circumference of 3 miles, but soon afterward disappeared.

Through the action of various agencies, islands undergo changes of form and contour. Wave action, together with tidal and other oceanic currents, may gradually wear them away. At the present time the east coast of England is being rapidly eroded. Helgoland, the famous German fortress in the North Sea, has been steadily eaten away by the sea for many hundreds of years. On the other hand, islands situated near the shores of continents may become joined to them. By the growth of the Hwang delta the peninsula of Shantung, China, formerly an island, has become connected with the mainland. See *Atoll*, *Land-tied Island*.

Isobars (*ī'sō-bärz*). Lines joining places at which the barometric pressure of the atmosphere is the same, either at a given time or for a certain period; called also *isobarometric lines*. A map showing such lines of equal pressure is called an isobaric map or chart. The daily weather maps issued by the Weather Bureau are isobaric charts. See *Atmosphere*, *Climate*, *Storm*.

Isostasy (*ī-sŏs'tă-sĭ*). A theory regarding the crust of the earth according to which the weight of any one portion of the earth's crust is in equilibrium with the weight of all other portions. Thus a mountain range, with its huge bulk, does not ordinarily overbalance in weight a neighboring portion of the earth's crust of a much lower altitude, since the lowness of plain and sea find compensation in a greater density of the underlying material. Earthquakes are due, by this theory, to an unsettling of this condition of equilibrium largely through the transference, by erosion, of a great weight of material from mountains to plains and ocean beds.

Isothermal Lines. A line drawn on the surface of the earth connecting points having the same average temperature is called an *isotherm*. A line connecting places having the same average temperature for the year is an *annual isotherm*. Similarly, seasonal, monthly, or daily isotherms may be drawn. A map showing the distribution of isotherms by any of these periods is called an *isothermal chart*. See *Climate; Temperature, Atmospheric*.

Japan Current. A warm current in the Pacific Ocean, smaller and cooler than the Gulf Stream in the Atlantic; called also the *Kuro Siwo*. It originates in an equatorial current which turns north near Japan, whence it crosses the Pacific in a northeasterly direction. Upon reaching the northwest coast of North America, it divides, the southern part, called the California Current, following down the coast of California, while the other part, known as the Alaska Current, turns northward. The Japan Current has a certain moderating influence on the climate of the Pacific Coast of North America, although for the most part this condition of climate is due to the prevailing westerly winds blowing over vast areas of temperate oceanic waters. See *Gulf Stream, Labrador Current, Ocean Currents*.

Kettle Hole. An undrained depression, usually only a few hundred feet in diameter but with steep sides, found in glacial moraines. Such a depression may have been formed by the lodgment of a block of ice which melted after the glacier retreated. The place occupied by the block of ice then became a great hole in the land. See *Glacier*.

Labrador Current. An ocean current of the North Atlantic. It flows southward from polar waters through Baffin bay and along the shores of Labrador, to which it imparts a severe climate. Upon passing Newfoundland, the main current continues southward, and, in the region of the Grand Banks, meets the warm waters of the Gulf Stream Drift. Here the icy waters from the north chill the vapor-laden winds from the south, condensing their moisture and producing one of the foggiest regions in the world. The Labrador Current is the chief conveyor of icebergs in the North Atlantic. It brings south, sometimes as far as lat. 40°, immense numbers of floating ice masses broken from glaciers on the west coast of Greenland. Both the fogs and the icebergs are sources of grave danger to navigation.

The Grand Banks, whose shallow waters provide invaluable fishing grounds, are believed to have been built up to some extent by the earthy materials transported in the icebergs brought down by the Labrador Current. South of the Grand Banks the colder and heavier waters from the north sink beneath the warmer and lighter but shallow drift of waters from the tropics. These heavier waters then continue as cold undercurrents as far south as Florida. See *Gulf Stream, Japan Current, Ocean Currents*.

Lake. An inland body of standing water larger than a pool or a pond. Lakes and ponds differ from most inland seas, bays, and lagoons in being completely shut off from tidal connection with the ocean, and in being usually situated with their surfaces considerably above sea level—very rarely below it. In lakes which have a regular outlet, the water is fresh, but in lakes without an outlet the water is usually salt. A few lakes, such as Great Salt lake, contain proportionately much more salt than the ocean itself. Some salt water lakes are called seas, as the Dead Sea and the Caspian Sea.

Lakes are found in nearly all parts of the world, though they are most abundant in high latitudes, where they occupy innumerable natural basins scoured out by former glaciers, or formed by the uneven deposition of debris by the ice. It is estimated that in northern Europe and in North America, there are hundreds of thousands of lakes of glacial origin. In Minnesota alone there are said to be 10,000 lakes of this kind. Lakes also occur in mountain regions, along rivers and coasts, on plateaus and coastal plains, and in the craters of volcanic mountains. Most lakes are of comparatively small size, but the Great Lakes—Lake Superior, Lake Huron, Lake Michigan, Lake Erie, and Lake Ontario—have a total area of about 95,000 square miles. Five of the large lakes of Canada possess a combined area exceeding 32,000 square miles.

Lakes vary greatly in altitude above the sea. Yellowstone lake, the highest lake of any great size in the United States, with an area of about 140 square miles, is 7740 feet above sea level. Lake Titicaca, next to Lake Maracaibo, the largest lake in South America, with an area of 3200 square miles, stands at an altitude of nearly 12,500 feet. A few lakes are below sea level,—the Caspian Sea being 86 feet, the Dead Sea 1290 feet, and the Sea of Tiberias 682 feet.

Most lakes are shallow, the great majority being probably less than 50 feet in depth, but some are exceedingly deep. Lake Superior exceeds 1000 feet in depth; Lake Huron, Lake Michigan, and Lake Ontario each exceed 700 feet; Lake Erie, however, has a maximum depth of only about 200 feet. The deepest lake, so far as known, is Lake Baikal with a reported maximum depth of about 5300 feet. Next deepest is the Caspian Sea, about 3000 feet deep. Other very deep lakes are Crater Lake, Oregon, about 2000 feet; Lake Tahoe, California, 1650 feet; and Lake Chelan, Washington, about 1500 feet. Lakes Maggiore, Como, and di Garda, in Italy, and the Dead Sea, in Palestine, exceed 1000 feet in depth.

The combined volume of water in lakes is insignificant when compared with that of the sea, and if added to the ocean, it is estimated that it would not raise the ocean's surface two feet. The waters of lakes are subject to many movements, including waves, currents, drifts, seiches, and tides, though the latter are very small, the tide in Lake Michigan being only about two inches. Lake water is derived from precipitation, through rain, melting snow and ice, springs, and rivers.

A large body of water exerts a beneficial effect upon the climate of the immediately surrounding land, making both the cold of winter and the heat of summer less extreme. In consequence, conditions of agriculture near the shores of large lakes are materially changed. For example, the great fruit belt of Michigan is a narrow strip about 200 miles in length along the eastern shore of Lake Michigan, where the prevailing winds from the broad expanse of water modify a climate otherwise too rigorous for fruit growing. The grape and peach belt of New York lies along the shores of Lake Erie and Lake Ontario. In southern Ontario, likewise, many fruits are extensively grown where, without the presence of these bodies of water, the climate would be too severe.

Most lakes abound in food and game fishes, and some support extensive commercial fisheries. The annual catch of whitefish, ciscoes, lake trout, and other food fish in the Great Lakes amounts to many millions of pounds.

Large lakes play an important rôle in inland navigation, furnishing convenient waterways for transportation and communication. The world's

most striking example of the economic value of lakes is seen in the remarkable commercial and industrial development on the shores of the great chain between the United States and Canada. This embraces manufacturing and trade centers with a total population of many millions, including Toronto, Buffalo, Cleveland, Toledo, Detroit, Duluth, Milwaukee, and Chicago, together with many important smaller cities. See *Hydrosphere*, *Salt Lakes*, *Seiche*.

Landslide. When the soil and earthy material on a steep slope become heavily charged with water, their weight is greatly increased. The water also renders the material more liquid and mobile. In consequence, a portion of the earthy mass sometimes slides or slumps downward. A movement of this kind on a large scale is called a landslide.

Landslides occur chiefly in mountainous regions. They most commonly result from the effects of freezing and thawing, or from excessive rains. Extensive cracks in deep layers of earth, resulting from shrinkage during severe drought, occasionally cause landslides. Earthquake tremors sometimes produce them.

On April 29, 1903, at Turtle mountain, Alberta, Canada, a huge mass of material, about a half mile square and some 400 or 500 feet deep, suddenly slid down the mountain slope. The length of the slide was about 2½ miles. This was traversed in less than 2 minutes. When the earth mass came to rest, it covered an area of more than a square mile, completely filling a valley a half mile wide. Many lives were lost and much property destroyed. See *Avalanche*.

Land-tied Island. An island which, by the development of a sand and gravel beach, has been tied to the mainland. In this manner the famous rock of Gibraltar has become a land-tied island. Many of the islands along the coast of New England are joined to the mainland by beaches of sand and gravel. See *Beach*.

Lava (*lä'vȧ*). Rock material in a molten state, within the earth's crust, or, that which has been poured out on the earth's surface in a molten state. Lava is erupted by volcanoes or poured out through fissures on the earth's surface. The temperature of molten lava is estimated at from about 2200° to about 3600° F. At times, the liquidity is so great that the lava appears as fountains rising and playing in the air.

After ejection, the rapidity of a lava flow depends in part upon its volume and its own fluidity, in part upon the slope of the land and the conditions of cooling. During an eruption of Mauna Loa, Hawaii, in 1855, there was a lava stream with an estimated velocity of forty miles an hour. A lava flow with an initial speed exceeding fifty miles an hour at the moment of eruption was observed at Vesuvius in 1805.

Lavas have been divided into many classes according to their chemical composition, such as rhyolites, trachytes, phonolites, andesites, tephrites, and basalts. Silicious lavas flow sluggishly and build up steep volcanic cones. Basaltic lavas are much more fluid and form cones of gentle slope, such as those of Mt. Etna and the Hawaiian volcanoes. Some lavas quickly disintegrate and form soils of remarkable fertility. Others remain practically unchanged for centuries. Obsidian or volcanic glass, much used by primitive peoples for arrowheads, spearheads, and knives, is a form of lava, as is also pumice stone, a porous mineral widely used for polishing.

Lavas from volcanoes have overflowed tracts many square miles in extent, sometimes overwhelming villages and towns, filling lakes, damming rivers, and otherwise altering the configuration of the landscape. All such changes, however, are exceedingly small when compared with those caused by the outpourings from fissure eruptions.

In Oregon, Washington, Idaho, and California, lava from ancient fissure eruptions built up a vast plateau, some 200,000 miles in extent. Through this the Snake river has eroded a titanic canyon, at some points 4000 feet deep and 15 miles wide. The walls of this giant gorge reveal the edges of successive lava flows. Some of these are separated by beds of sediment and soils in which the roots and trunks of trees are still preserved, proving that long periods of time elapsed between eruptions.

In India, a lava plateau of still greater size and age occurs. The rich soils of the Deccan, famous for cotton growing, owe their marvelous fertility to disintegrated lavas. In Iceland, fissure eruptions have occurred in recent times. During such an eruption in 1783, lava, from a fissure about twenty miles long, spread out in sheets which covered wide valleys. See *Crater*, *Dike*, *Igneous Rocks*, *Soil*, *Volcano*, *Vulcanism*.

Lightning. A brilliant flash of light in the sky, caused by the discharge of atmospheric electricity from one cloud to another or from a cloud to the ground. Electricity is produced when the air currents are in violent motion and the water vapor in the air is condensing rapidly. Flashes which take place between low clouds and the earth are comparatively narrow and vivid, and are accompanied by thunder. Flashes which take place in the higher clouds are more diffuse, and usually no thunder is heard. There are three general classes of lightning: (1) *forked*, *zigzag*, or *chain lightning*; (2) *sheet lightning*; and (3) *globular*, or *ball lightning*.

Forked lightning appears to the eye as a single, narrow, intensely brilliant line of light, which sometimes splits into one or two branches. Photographs, however, show that the line of light is never actually zigzag, but is composed of irregular, sinuous curves. Sheet lightning does not show a definite form, but appears as a rosy or reddish glow, lighting up clouds or haze on the distant horizon. Globular or ball lightning is a rare form which appears as a small globe of brilliant light, moving slowly through the lower air, or rolling along the ground. This ball, which sometimes has been observed to roll into a house through an open door or window, usually breaks up in a mild explosion, which is not very destructive or dangerous.

The average annual loss of human life from lightning stroke in the United States, about five per million of population, is greater than in most countries. Hundreds of cattle, horses, sheep, and hogs are killed and about 2000 buildings are destroyed or damaged every year by lightning. The proportion of deaths is greatest in the upper Missouri valley and parts of the Rocky Mountain region. The danger to buildings is about five times greater in the open country than in cities.

For exposed buildings, authorities are agreed that good lightning conductors are very desirable. Concerning the various forms of conductors, Sir Oliver Lodge, an eminent authority on the subject, says: "Almost any conductor is probably better than none, but few or no conductors are absolute and complete safeguards." See *Electricity*, *Storm*, *Thunder*.

Lithosphere. The solid portion of the earth, as distinguished from the aqueous portion, or *hydrosphere*, and the gaseous portion, or *atmosphere*. About 28 per cent of the surface of the lithosphere is occupied by the exposed solid portion, or land, and the remaining 72 per cent is covered by the oceans, or hydrosphere. The average height of the land above the sea level is about 2300 feet. The average depth of the ocean is about 13,000 feet. It is estimated that the average level of the solid crust of the earth is about 7500 feet below the level of the sea. The density of the lithosphere is slightly more than 5½ times that of water. See under Geology: *Igneous Rocks*, *Sedimentary Rocks*, *Metamorphic Rocks*.

Llanos (*lä'nōz*). A name commonly used in Spanish America for plains or prairies. Geographically, the term Llanos is applied to a large treeless tract in Venezuela and Colombia, lying between the Orinoco and the Andes, immediately north of the Amazon forests. This region, which is about equal to California in area, presents for the most part an unbroken expanse of level land. During the wet season, the upper, more undulating portions are grass covered, but in the dry season they become almost barren. The lower portions, mostly more or less subject to floods, produce, during the rainy period, a rank growth of grasses which usually keep green throughout the year. See *Pampas*, *Prairies*, *Steppes*.

Loess (*lō'ĕs*). A distinctive loamy deposit, the particles of which are finer than sand grains but coarser than ordinary particles of clay. Loess deposits cover considerable areas in China, in Europe, and in the Mississippi basin. By many geologists these are believed to have been formed during the Pleistocene period, largely by the action of the wind, though some loess deposits are certainly of river origin. They lack, however, the bedded arrangement characteristic of most sedimentary deposits. Moreover, they possess the remarkable property of an almost vertical cleavage. Cliffs or bluffs of soft loess will stand for a long time with almost perpendicular faces.

In parts of China, people have excavated successive tiers of houses along the faces of steep slopes of the loess, which attains a thickness of from 250 to 1000 feet. In the United States, loess deposits are usually from 30 to 50 feet thick. When loess deposits are eroded by great rivers, as, for example, the Mississippi, the Missouri, or the Hwang, nearly vertical cliffs or bluffs are often formed, like those at Kansas City, Missouri.

If properly supplied with moisture, loess forms a fine-grained soil of immense fertility. The famous black soils of southern Russia consist of loess generously mixed with organic matter. The rich but very cohesive adobe soils of the western United States are believed to have originated in a manner somewhat similar to that of loess. See *Adobe Soil*, *Æolian Deposits*, *Alluvium*, *Soil*.

Magnetic Poles. The earth is an immense magnet and, like all other magnets, has two poles called the north magnetic pole and the south magnetic pole. These poles, however, are situated far from the geographic north pole and south pole, and, further, they are not exactly opposite each other on the earth's surface. Moreover, their positions are not fixed, but shift slightly from time to time.

In 1916, the approximate position of the north magnetic pole was lat. 70° N., long. 97° W., and of the south magnetic pole, lat. 72° S., long. 153° E. A straight line connecting these two points would pass 750 miles distant from the earth's center. No satisfactory explanation as to why the earth is so unequally magnetized can be framed on the basis of the observed facts now available.

As the north end of a magnetic needle points in the direction of the north magnetic pole, it follows that the compass does not indicate true north and south except in comparatively few places. In all other localities, correction for its declination east or west of the true north is necessary. See *Magnetism*.

Marshes. Tracts of soft, wet land, usually covered wholly or in part by shallow water, and containing aquatic vegetation. In cool regions, this vegetation may, by a process of slow decay, transform into peat and, in time, fill up the marsh. In warm regions, the rate of decay is too rapid to permit the accumulation of peat. Extensive marshes occur around the margins of many lakes and along low ocean shores. In the United States, large marshes are found along the lower Atlantic and Gulf coasts, the most notable being the *Everglades* of Florida. See *Bogs*, *Fens*, *Moor*, *Muskeg*, *Slough*, *Swamps*.

Meanders. The broad, sweeping curves of a river in the old-age stage of development, as, for example, those in the lower Mississippi flood plain. See *Bayou*.

Mesa (*mā'sä*). A Spanish word meaning "table," commonly used in the southwestern United States as the name for a high, broad, and flat table-land bounded at least on one side, and sometimes on all sides, by a steep cliff or declivity. In the erosion of plateaus, isolated flat-topped areas of considerable size are sometimes left as the last remnants of the former land level. The top is usually a layer of hard rock which wears away less rapidly than the softer strata beneath it. In consequence, the top of a mesa not infrequently overhangs the walls of the cliffs that encircle it.

Many such table-like formations are found in the arid plains of the West, especially in Colorado, New Mexico, and Arizona. Among the most noted of these is the Mesa Verde, in southwestern Colorado. This is a plateau fifteen miles long and eight miles wide, with precipitous sides of yellow sandstone rising almost perpendicularly from 400 to 800 feet above the surrounding plain. The famous Enchanted Mesa near Acoma, New Mexico, is more properly called a butte.

The name mesa is applied also to a level or somewhat sloping area of high land lying against the side of a mountain. See *Butte*, *Monadnock*, *Plateau*.

Meteoric Dust. The so-called shooting stars or meteors come into our atmosphere from interplanetary space. By friction in the air these become heated, and they are often burned to a dust, which falls to the earth. See *Dust*, *Meteors*.

Mineral Waters. Spring or well waters containing in solution a sufficient amount of various substances to exert a medicinal effect upon the human body are called mineral waters. They are classified as alkaline, alkaline-saline, saline, and acid waters. The curative qualities of the waters of some of the most famous springs have been known since ancient times. The Romans discovered not only the thermal springs of Italy, but also many of the most valuable springs in other parts of Europe, such as those of Aix-la-Chapelle, Baden-Baden, Bath, and Spa.

In the United States, the Saratoga Springs, New York, were known as early as 1767; Berkeley Springs, Va., as early as 1777; and White Sulphur Springs, W. Va., as early as 1778.

It is estimated that there are not less than 10,000 mineral springs in the United States, of which nearly 1000 have produced waters in commercial quantities. The springs having the greatest commercial value are located in the Eastern states, in the Mississippi valley, and on the Pacific coast. Besides those already mentioned, the best-known mineral springs are: Hot Springs, Arkansas; Waukesha Springs, Wisconsin; Las Vegas Hot Springs, New Mexico; and Medical Lake, Washington. Among the most noted foreign mineral waters are those known as Apollinaris, from Ahrweiler, Germany; Friedrichschall, from Hildenburg, Germany; Hunyadi-János, from Budapest, Hungary; Kissingen, from Bavaria; Vichy, from France; and Carlsbad Sprudel, from Bohemia. See *Hot Springs*, *Springs*.

Mirage (*mē-räzh'*). An optical effect or illusion, occasionally seen at sea or on large lakes, but occurring very frequently on arid plains or deserts, and often in the polar regions. In mirages, various images of distant objects appear, usually in an inverted position, or top side down, while the objects themselves may or may not be in sight. Less frequently, a mirage consists of greatly magnified or heightened images of distant and often invisible objects, appearing as if projected against the sky. Mirages are caused by the extensive refraction and reflection produced when light, in reaching an observer from a distant object,

passes through layers of air which are unequally heated, and which, therefore, are of very different densities.

In case the reflecting layer of air is level and lower than the eye of the observer, the mirage usually appears as an isolated sheet of water in which various distant objects are reflected. Sometimes the illusory water appears as if ruffled by the wind. This is the deceptive form of mirage commonly seen in the deserts of Sahara, Persia, Turkestan, the western United States, and other arid regions.

When the reflecting layer in the air is higher than the eye, the illusory image appears as if located in the sky. This is the kind of mirage usually seen on the ocean, or over lakes, in which distant and otherwise invisible ships, icebergs, cliffs, shores, hills, towns, or buildings appear inverted in the clouds. In this case there is a layer of very cool and, therefore, dense air next to the water, with a layer of much warmer and rarer air above it. In the case of the common desert mirage, a layer of heated rare air lies next to the ground, with a layer of cooler and denser air above it.

The *Fata Morgana*, often observed at the Straits of Messina, consists of the apparent heightening of objects on the opposite shore. The famous "Spectre of Brocken," seen in the Harz mountains of Prussia, is a form of mirage called *looming*, in which objects appear greatly magnified horizontally as well as vertically.

Monadnock (*mŏ-năd'nŏk*). A hill or mountain standing out conspicuously above its surroundings because of its superior resistance to the agencies of weathering and erosion. The typical example from which all such formations take their name is Mt. Monadnock, in southwestern New Hampshire. This is a rocky outlier of the White mountains which rises abruptly from the surrounding plains to an altitude of 3186 feet. Such remnants, when composed of horizontal, stratified rocks, are called *mesas* or *buttes*. See *Butte*, *Mesa*.

Monsoon (*mŏn-sōōn'*). Any wind which blows regularly at fixed seasons, but particularly the periodic winds which blow over the Indian Ocean from Australia to India. Such winds are due to the unequal heating of the atmosphere over the land and over the water. From April to October, the Indian monsoon winds blow from the southwest, rushing in from the cooler ocean over highly heated land. From October to April, they blow from the northeast, moving down from the cooler land over the warmer ocean. In some parts of India, the summer monsoon begins with violent thunderstorms and torrential rains. In Bengal, the rainy season is ushered in by the winter monsoon. Besides their immense climatic influence in modifying temperature and rainfall, the Indian monsoons were formerly of great commercial importance.

The principle involved in the daily land breezes and sea breezes along coasts is identical with that of the monsoon, but the winds produced are local and usually are not felt far from shore. The influence of the monsoon principle is felt also in local winds in the vicinity of the Great Lakes. In all cases, such winds are caused by a surface movement of cool air rushing in to take the place of ascending warm air. See *Climate*, *Rainfall*, *Wind*.

Moor. An extensive tract of infertile, sandy ground, commonly overlaid with peat, and more or less marshy. In popular usage, the term is applied only to the European moors in which heather is frequently the most common plant. Similar areas, however, occur in the United States. Two types of moors are distinguished: those in which sphagnum or peat moss is present, called *high moor*, or *heath*; and those without sphagnum, called *low moor*, and known also as *swamp meadow*, or *fen*. In America, high moors are commonly called *bogs*. See *Bogs*, *Fens*, *Marshes*, *Swamps*.

Moraines. Extensive accumulations of coarse stones, sands, gravels, and clays carried on the surface of mountain glaciers or left in the country which has been invaded by a glacier. In mountain regions, the stones which rattle down and come to rest on the surface of the ice near its margin are called *lateral moraines*, because they are at the sides of the glacier. When two mountain glaciers unite and the two inside lateral moraines come together, a *medial moraine* is formed. At the end of a mountain glacier there is a *terminal moraine*.

In regions where formerly there were huge continental ice sheets, such as northern United States, Canada, and northwestern Europe, there is a mantle of glacial moraine which forms the soil. Throughout New England the moraine soils are very stony, but in New York and in the great prairie states of the Mississippi valley, the stones, though present, are not so numerous. These stones often carry striæ, indicating that they were scratched as they moved forward at the base of the glacier.

The material in a moraine is not arranged in an orderly fashion. It remains where the ice, upon melting, dropped it. Unlike the deposits laid down by water, morainic material is not stratified. It contains large and small stones of various kinds, picked up by the ice in its long route of travel. Along with these coarse constituents, moraines contain some of the finest of silts and clays. See *Glacier*, *Ground Moraine*, *Recessional Moraine*, *Terminal Moraines*.

Mountain. A lofty elevation of land, higher than a hill, with but little surface at the top, rising conspicuously above its surroundings. Where very high mountains abound, many elevations are commonly called hills which, in other regions, would usually be termed mountains. Similarly, in level districts, a hill or escarpment, rising only 100 or 200 feet above the plain, is sometimes styled a "mountain." In general, elevations which rise abruptly 1000 feet or more above the adjacent country are commonly called mountains.

Mountains occur as single peaks and as more or less elongated ridges. A mountain group is made up of several peaks or of short ridges. A mountain chain or mountain system is an elongated mountain group made up of many single mountains, of mountain ridges, or of both forms. In most continents the chief mountain systems are near the borders of the land, but in Europe and Asia there are great mountain systems in the interior.

Mountains are formed by three processes: (1) by *uplift*, effected through the intrusion, folding, or faulting of strata; (2) by *erosion*, called also circumdentation, or land sculpture, effected chiefly by running water; (3) by *volcanic action*, effected by the eruption of igneous rocks.

In height above their actual bases on the land, or on the ocean floor, mountains vary from about 1000 feet to nearly 6 miles. In North America, the highest mountain is Mt. McKinley, in Alaska, with an elevation of 20,300 feet. The highest peak in Canada is Mt. Logan, 19,850 feet. In the United States, the highest mountain is Mt. Whitney, in the Sierra Nevadas, 14,501 feet. In the Rocky mountains of Colorado alone there are 40 peaks exceeding 14,000 feet elevation. Mt. Rainier, in Washington, attains an altitude of 14,408 feet.

The highest mountains of South America exceed an elevation of 23,000 feet; those of Africa, 19,000 feet; and those of Australia, 7000 feet. In Europe, Mont Blanc, in the Alps, rises above 15,000 feet in altitude, and in Asia, Mt. Everest, in the Himalayas, the highest mountain in the world, towers to 29,141 feet. The oceanic mountain Mauna Loa, in Hawaii, rises about 14,000 feet above the sea level, but more than 30,000 feet above the ocean floor upon which it stands.

As the temperature of the air decreases, on the average, 1° F. for every 300 feet of rise, the climate of the highest mountains resembles that of the polar regions. Above a certain level called the *snow line*,

there are fields of perpetual snow and ice, from which glaciers are often formed. The vegetation of mountains becomes less and less abundant with increased elevation and practically disappears when the snow line is reached.

Mountains are of great importance in the economy of nature. They profoundly affect climate, rainfall, and the distribution of water. Although they often stand as barriers to transportation and greatly restrict the diffusion of plants and animals, on the other hand, they contain vast deposits of valuable minerals and metallic ores, bear immense forests, support a considerable agriculture, and furnish the grandest and most inspiring scenery in the world. See *Alpine Plants*, *Cirque*, *Erosion*, *Glacier*, *Snow Line*, *Timber Line*, *Volcanic Mountains*.

Muskeg. A name, derived from the Indian, widely used in Canada for the tussocky peat bogs which cover large areas north of latitude 55°. The vegetation consists of peat moss, rushes, sundews, and various aquatic plants, often interspersed with shrubs and small trees. In summer, the muskeg is, for the most part, impassable, but in winter it remains frozen for many months, during which it is readily traversed by hunters and trappers. See *Peat Bogs*.

Natural Levee. A low ridge of alluvial material built up on the flood plain of a river, immediately adjoining its channel. This land is usually sought first by settlers for farms. Later, roads and settlements become located on the levee, and even large cities may be built upon it. New Orleans is situated on a natural levee. See *Alluvium*, *River*, *Valley*.

Ocean. The entire body of salt water, called also the sea, which occupies about 143,000,000 square miles, or about 72 per cent of the earth's surface. Its five larger divisions are called the Pacific, Atlantic, Indian, Southern or Antarctic, and Arctic oceans. The average depth of the ocean is estimated at about 13,000 feet. The greatest known depth, 34,416 feet, is found near Mindanao, one of the Philippine Islands. The volume of the ocean is about fifteen times that of the land lying above sea level. The mass or weight of the sea is about five times that of the land above the sea, or 265 times the weight of the air, and $\frac{1}{4300}$ of the weight of the solid part of the earth.

Sea water contains, on the average, about 3½ per cent of dissolved mineral matter, over three-fourths of which is common salt. Besides solids, sea water contains many gases in solution, the chief of which are oxygen, nitrogen, and carbon dioxide, or carbonic-acid gas. The color of sea water, though widely variable, is usually blue or green. The deep blue color seems to be intensified by saltiness, the Gulf Stream being much more blue than the less salty Labrador Current. The temperature of the ocean at the surface varies from about 80° F. in the tropics to about 28° F. in the polar regions. Below the surface, except in polar regions, the temperature decreases with depth. At 5000 feet, even in the tropics, the temperature is below 40° F., and in deep sea bottoms it is below 35° F. The average temperature of the sea is below 39° F.

Various movements in the waters of the ocean are produced by unequal temperature, unequal salinity, inequalities of level, winds, the differing attractions of the sun and the moon, and also by earthquakes, volcanic explosions beneath the surface, and landslides on coasts. The chief movements are waves and undertow, shore or littoral currents, ocean currents, tides, drift or slow currents, and creep.

The sea teems with plant and animal life. All of the great groups of animals are represented. An immense variety of plants occurs, but the highest forms are wanting. Life is most abundant in shallow water or on bottoms within 600 feet of the surface. Plants occur more rarely down to 1200 feet, but animals are found at much greater depths. The bottom of the sea, as revealed by dredgings, is composed of gravel, sand, mud, shells, coral, and ooze. In deeper parts, below 13,000 feet, the bottom is covered with red clay.

In the economy of nature the sea plays a great part. The ocean everywhere tempers climates, making them less extreme, and is the chief source of water for rain and snow. Ocean waves modify the outlines of coasts, and water, evaporated from the sea and condensed on the land, irrigates the soil, wears down mountains and plateaus, and builds up plains and deltas. The sea produces an enormous supply of foodstuffs and other economic materials, and serves as a highway for the commerce of the world. See *Hydrosphere*, *Ocean Currents*, *Tides*, *Waves*.

Ocean Currents. Great streams flowing through the ocean, more or less distinctly divided from adjacent waters, and forming a regular system of water circulation. They are classified as *warm* currents and *cold* currents; as *surface* currents and *deep-sea* currents. A current sharply separated from surrounding waters is called a *stream*; a general movement of surface waters without definite bounding lines is called a *drift*. The speed of ocean currents varies from 3 or 4 miles an hour in swift, narrow streams to the very slow, almost imperceptible movement of some great oceanic drifts.

The great ocean currents are caused by the prevailing winds. In the belts north and south of the equator, the trade winds blowing equatorward tend, by friction, to move the waters at the surface of the sea in the direction which they are blowing. As these waters come toward the equator on the two sides, they move westward in each of the great oceans, the Atlantic and the Pacific. When they reach the western margins of these oceans they divide, turning in part northward and in part southward. In the Atlantic Ocean, Cape St. Roque, at the eastern point of Brazil, divides the south equatorial current into the Brazilian Current and a north equatorial current. This north equatorial current goes in part east of the West Indies, and in part through the Caribbean Sea and the Gulf of Mexico, issuing from the gulf around the southern point of Florida. To the northeast, the current from the gulf becomes known as the Gulf Stream.

In the Pacific Ocean, the equatorial currents are divided when they reach the islands north of Australia, the northern branch becoming the Japan Current and the southern branch, the Australian Current. When the waters flow northward or southward beyond the zone of the trade winds, they are guided in large part by the configuration of the land areas, but they are helped forward by the prevailing westerlies.

By making the waters of the equatorial regions cooler and those of the polar regions warmer, ocean currents equalize the temperature of the globe. The great poleward movement of heated surface waters from the tropics warms the prevailing winds, over vast areas of the ocean. These, in turn, profoundly modify the climate of the continents upon which they blow, as is strikingly exemplified in the mild climate of northwestern Europe and western North America. In a similar manner, polar currents impart a cold climate to the shores along which they pass.

Among important ocean currents are the north and the south equatorials of the three great oceans; the Gulf Stream and the Labrador, Canary, Brazilian, and Benguela currents in the Atlantic; the Japan, Alaska, California, Peruvian, and Australian currents in the Pacific; and the Monsoon and Mozambique currents in the Indian Ocean. See *Gulf Stream*, *Japan Current*, *Labrador Current*.

Outwash Plain. A land of even surface, composed of sands and gravels that were washed out from beneath a glacier when the margin of the ice remained stationary for a period of time. An outwash plain may often be very rich farming land, or it may be valuable as a source of sand and gravel for building purposes. The southern half of Long Island is an outwash plain, and the city of Plainfield, N. J.,

is located on such a surface. At many other points in the United States, the waters issuing from the continental glacier during the Ice age developed outwash plains. See *Glacier*.

Pampas. Vast, grassy plains in central Argentina. They occupy an area about equal to that of Texas, merging on the north into the forests of the Gran Chaco and on the south into the steppes of Patagonia. During the rainy season, the pampas are covered with a luxuriant growth of grasses, providing pasturage for immense numbers of cattle and sheep. See *Llanos, Prairie, Steppes*.

Peat Bogs. Swamps or bogs underlaid by accumulations of peat formed by the slow decay of sphagnum moss, rushes, and various other aquatic plants. Peat bogs occur over large areas in cool temperate regions, especially in Ireland, northern Europe, and Canada. They are usually found on the sites of old lakes which have gradually filled up, or of old marshes. While the layer of peat does not often exceed three or four feet in thickness, it sometimes extends to a depth of thirty feet or more. See *Bogs, Marshes, Swamps*.

Plateau. An elevated area of fairly level land, called also table-land. Most plateaus rise conspicuously above their surroundings, at least on one side. Plateaus differ from plains chiefly in being much higher, and they are almost invariably associated with or surrounded by mountains.

The Colorado plateau, which lies between the Rockies and the Sierra Nevada, is from 6000 to 9000 feet high. The lofty plateau of Tibet, flanked by the Himalayas, is from 10,000 to 13,000 feet high. The Columbia and Snake River plateau is a broad, elevated region composed of flows of lava. The Deccan of India is a similar plateau. Plateaus are often very deeply eroded by rivers which cut immense gorges, the most notable example of which is the Grand Canyon of the Colorado river in Arizona.

Plateaus are usually cool because of their elevation above the sea; they are often arid, and sometimes deserts, because surrounded by mountains which capture the moisture of rain-bearing winds. When the process of erosion has left a portion of a plateau with a flat top standing higher than the surrounding country, this remainder, if large, is known, in western America, as a *mesa*; if small, it is called a *butte*. See *Butte, Mesa*.

Pothole. A cylindrical hole in the rock beneath a waterfall or in the rapids of a river course. It is produced by the whirling motion of stones in the bed of the channel. In this way a pothole is bored out, little by little, until it is 50 or 100 feet in depth and varies in diameter from a few inches to 20 or 30 feet. See *Erosion*.

Prairie. The name given to the extensive grass-covered plain which occupies nearly the entire region between the Ohio and the Mississippi-Missouri river. It stretches from western Ohio to eastern Nebraska and includes the southern portions of Michigan, Wisconsin, and Minnesota, together with northern Missouri and the eastern parts of Kansas, Nebraska, and the Dakotas. On the east, it merges imperceptibly into the Allegheny plateau; on the west, into the Great Plains. For the most part, the prairies are characterized by an exceedingly fertile soil, especially suitable for the production of cereals. The great "corn belt" of the United States lies mostly within this area, which produces also immense crops of wheat and oats.

Various explanations have been advanced to account for the treelessness of the prairies. Among the most common of these are: the lack of sufficient rainfall; the excessive transpiration caused by the winds; the grazing of vast herds of animals, such as buffalo and deer; and the destructive action of fires systematically started by the Indians. See *Llanos, Pampas, Steppes*.

Quicksand. A mass of loose sand in which heavy bodies readily sink. It is composed of grains which have very smooth, rounded surfaces. When wet, these do not cling together in compact, solid form as do the rougher, angular particles of common sand. On the contrary, water lubricates the smooth particles, so that moist quicksand behaves like a liquid. Quicksands are frequently found on flat shores and at the mouths of rivers. When dry, quicksands may be firm and safe, but, as they cannot be distinguished from ordinary sands by their appearance, they are exceedingly dangerous when wet. Men, horses, wagons, and even railway trains have been swallowed up in quicksands. See *Sand*.

Rain. Drops of water large enough to fall rapidly by their own weight, formed by the condensation of moisture in the atmosphere. Drops which fall very slowly are called mist, fog, or cloud. The largest raindrops are between one-fourth and one-third of an inch in diameter; the smallest drops which are called rain are about one-twentieth of an inch in diameter.

For every temperature there is a definite amount of water vapor which can be held in the air. As condensation follows cooling, and as precipitation follows condensation, rain may be produced (1) when air is blown up a cold mountain side, (2) when air is blown toward the poles of the earth, (3) when warm air rises from the surface by convection, and (4) when cooler air is brought into contact with warm air.

Rain water would be chemically pure except for the substances which it washes out of the atmosphere. These consist of dust, soot, pollen grains, spores of fungi, and various other solid substances, together with dissolved gases, including oxygen, nitrogen, ammonia, carbon dioxide, and sometimes nitric acid, sulphuric acid, and other impurities in the air of cities. See *Humidity, Rainfall, Storm, Wind*.

Rainbow. An arc of prismatic colors seen at times when the sun shines while it is raining, caused by the reflection and refraction of the rays of sunlight in the drops of rain. Rainbows are always seen in the part of the sky opposite the sun, and they vary with the extent of the rain, appearing either as short arcs or as complete arcs which rest at each end on the earth. The colors are arranged in the order of the spectrum,—violet on the inside, then indigo, blue, green, yellow, orange, and red. Frequently a secondary bow, outside the first, is observed, with fainter colors arranged in an order the reverse of that in the primary bow.

The amount of the bow seen at any time depends upon the height of the sun, being low when the sun is high, and high when the sun is low. On high mountains or from balloons, when the sun is very low, completely circular rainbows are observed. Small rainbows are seen in the sprays of fountains and in the mists arising from cataracts. Lunar rainbows, formed by the light of the moon and appearing as luminous arcs with very faint colors, are occasionally seen.

Rainfall. Water precipitated from the clouds as rain or snow, usually measured by its depth in inches. The rainfall or the snowfall of a region depends principally upon what winds affect it, upon the character of the surface over which the winds have already blown, upon elevation above the sea, distance from the sea, and the relative position of mountain barriers.

The winds most affecting rainfall are the *trade* winds, the prevailing westerly winds, and the *monsoon* winds. Trade winds blow mostly from cool to warm latitudes, and are usually dry winds. The Sahara is a desert because of the dryness of the prevailing trade winds. However, the prevailing westerlies, southwesterly in the northern hemisphere and northwesterly in the southern hemisphere, blow from low to high latitudes, this is, from

warm to cool regions, and are *moist* winds. When these warm winds, laden with water vapor produced by the immense evaporation from tropical oceans, pass over cool lands or meet countercurrents of cool air, they give up much of their moisture as rain. Similarly, monsoon or seasonal winds bring rain when they blow from warm regions of high evaporation to cooler areas. Minor winds, such as land breezes or sea breezes, rarely yield much rain, though valley breezes, and even desert whirlwinds, sometimes give rise to local showers.

Other conditions being equal, countries lying near the sea and not far above sea level, have a heavier rainfall than those situated at a great distance from the sea or at high altitudes. Forested regions receive more rainfall than grassy areas, and mountainous or hilly districts receive more than level plains. The seaward slopes of mountains, facing prevailing winds, are commonly wet, while their landward slopes are dry.

In general, tropical regions receive the heaviest rainfall, estimated at an average of about 100 inches yearly. Temperate regions receive about one-third, and polar regions about one-eighth, as much as the tropics. However, there are some very arid regions within the tropics, and some very wet regions in the temperate and the polar zones.

In the temperate zones, the regions of most profitable agriculture are those receiving a yearly rainfall of from 20 to 60 inches. In the United States, the Gulf coast receives about 60 inches of rainfall annually; the Atlantic coast, from 40 to 60 inches; the central Mississippi valley and the Lake region, from 30 to 40 inches; the high plains east of the Rockies, about 20 inches; and the great American desert west of the Rockies, usually less than 10 inches. On the Pacific slope, the yearly precipitation varies from a few inches at Yuma, Arizona, to about 100 inches near Puget sound, and to 130 inches in Alaska.

The greatest annual rainfall in the world is believed to take place in the hill region of Assam, India, southeast of the Himalaya mountains, where an average of 550 inches annually for a period of ten years has been observed. See *Climate, Humidity, Ocean Currents, Snow, Wind.*

Rain Making. Various methods have been employed in attempts to produce rain by artificial means but, without exception, the results have been unsuccessful. A method frequently used is that of causing explosions of various kinds in the higher levels of the air. Even if cloud particles were in abundance, it is probable that the actual amount of rainfall which could result from even the heaviest explosions would be too small to be of consequence. The other methods which have been experimented with, or recommended, appear to be equally futile.

Recessional Moraine. A deposit left at the margin of an ice sheet or glacier at a stage of its retreat when the margin of the ice remained for a time relatively stationary. Such recessional moraines resemble in appearance and material the terminal moraines. They form many of the ridges of hilly country where bowlders are abundant. Recessional moraines occur throughout the New England and the upper Mississippi Valley states. Smaller ridges are found in the lowland plains of Germany, Poland, and northwestern Russia. See *Glacier, Moraines.*

River. A large stream of water flowing through the land in a definite channel. The bottom of a river is called its *bed*, and the sides of the channel are its *banks*. The *right* bank of a river is that on the right hand of an observer when facing downstream; the *left* bank is the opposite side.

Rivers usually empty into the ocean, either directly or by uniting with other rivers which do so, although some flow into landlocked seas or lakes, and, in arid regions, some lose themselves in desert sands. Most rivers are of small size, but a few, such as the Amazon, Nile, Congo, Yangtze, and Mississippi, are very large. Thousands of brooks, creeks, and small rivers, draining a total area of hundreds of thousands of square miles, may unite to form a single great river. Such a stream, with its numerous tributaries, is called a *river system.*

In descending to the sea from their sources in mountain snows, glaciers, lakes, ponds, and springs, rivers perform a double work. By erosion, they carve out and wear down mountains and plateaus along their upper courses. At the same time, they upbuild valleys, plains, and deltas along their lower courses.

The river systems of the earth are estimated to carry to the ocean each year about 6500 cubic miles of water. In this river water about 5 billion tons of dissolved mineral matter are in solution. The mineral matter, together with about 15 billion tons of sediment, is borne to the sea. The amount of sediment a stream can carry depends upon its volume, its velocity, and the amount and kind of sediment available.

The Thames river of England, a relatively small stream, carries to the sea each day, in solution, about 1500 tons of material. It is calculated that the Mississippi river carries into the Gulf of Mexico more than a million tons of sediment every day, and that it would require 1000 trains, each made up of 45 cars of 25 tons capacity, to transport an equal amount of silt and sand. If all the silt brought in one year by the Mississippi river to the Gulf of Mexico were placed on one square mile of land, it would rise to a height of 270 feet.

The speed at which a river flows increases with the slope of its bed and with its volume. In the Volga and in the lower Mississippi, the slope is about 3 inches per mile. The Missouri river is comparatively swift, having an average descent of 28 inches per mile. In mountainous regions the descent may be very great, though the speed of mountain torrents rarely exceeds 20 miles per hour, or about 29 feet per second. In case of large rivers flowing through nearly level valleys, a speed of a foot per second is common. The volume of rivers varies greatly with the slope of the drainage basin, the character of the soil and vegetation, and the rainfall. Some rivers are raging torrents at one season and have almost dry channels at another.

Rivers are factors of tremendous importance in the general economy of nature. They drain the land of surplus water, returning to the ocean a large part of the water removed from it by evaporation and precipitation. They provide water for irrigation and add rich silts to valley bottoms and deltas which support vast populations. They also furnish water to many cities and towns, and to millions of homes in the country places. Moreover, they generate an immense amount of water power and hydroelectric power and, wherever navigable, greatly facilitate inland commerce. See *Alluvium, Bayou, Delta, Erosion, Flood, Hydrosphere, Meanders, Valley.*

Salt Lakes. Salt lakes are inland bodies of water containing an unusual amount of salt in solution. They are without any regular outlet to the sea, and are found chiefly in arid climates. Their waters, as in Great Salt lake and in the Dead Sea, are sometimes much more saline than sea water.

As a result of changes of climate, a fresh-water lake may become salt or a salt-water lake may become fresh. If the aridity of the climate increases so that the evaporation from the surface of a fresh lake is greater than the inflow of fresh water from precipitation, a fresh lake may gradually become salt. On the other hand, if evaporation becomes less than the inflow of fresh water, the level of the lake will rise, in time an outlet will be found, and the lake will then soon become altogether fresh.

The saline contents of the water in Great Salt lake vary from 14 to 23 per cent, according to the

level of the lake, which is determined by the seasonal rainfall. At a depth of 1000 feet, the water of the Dead Sea, the saltest lake in the world, contains 27 per cent of solid substances, largely common salt. The salinity of these lakes, therefore, is several times as great as that of the ocean, which contains only about 3.44 per cent of dissolved mineral matter. The great deposits of salt that have been found in various parts of the world are the result of the complete evaporation of ancient salt lakes.

Sargasso Sea. A tract of the north Atlantic Ocean stretching north and east of the West Indies as far as the Azores. Forming an eddy in the midst of ocean currents, its surface carries much floating material, chiefly a floating alga called sargassum. This occurs in patches and shifts with the wind. Scientific observation has not confirmed the reports of earlier explorers to the effect that the floating vegetable matter was sufficiently dense to impede the progress of ships.

Savannas. Open level plains characterized by vegetation intermediate in character between grasslands and forests. Savannas abound in tropical and subtropical regions. In appearance they are parklike, with an undergrowth of drought-resisting grasses intermingled with sparsely scattered trees.

Seasons. Divisions of the year based on changes in climatic conditions. These changes are the joint effect of the earth's revolution around the sun and the inclination of the earth's axis. Except in the tropics, this results in great variation in the length of the day when compared with that of the night, and also in great differences in the angle of the heat-giving rays of the sun. In temperate zones the sun's height above the horizon at noon may vary by 47°. This variation, combined with variations in the length of day, occasions great changes in temperature.

In most latitudes the number of seasons is said to be four—spring, summer, autumn, and winter. In Europe and North America, March, April, and May are arbitrarily called the spring months; June, July, and August, the summer months; September, October, and November, the autumn months; and December, January, and February, the winter months.

However, spring is also defined as the period between the vernal equinox and the summer solstice (March 21–June 21); summer, the period between the summer solstice and the autumnal equinox (June 21–September 22); autumn, the period between the autumnal equinox and the winter solstice (September 22–December 21); and winter, the period between the winter solstice and the vernal equinox (December 21–March 21). In the southern hemisphere the order of the seasons is interchanged, summer in one coinciding with winter in the other, and spring in the one coinciding with autumn in the other.

In the tropics, where no part of the year is much warmer or colder than any other, there are usually no well-defined seasons. However, the period of the year regularly marked by abundant rainfall is commonly called the *wet* season, and that marked by scant rainfall, the *dry* season. In the arctic and antarctic regions, spring and autumn are very brief so that the natural division of the year is into summer and winter. At the poles, the warm season is the *light* season, and the cold season is the *dark* season of the year.

In the northern hemisphere, the coldest season occurs when the earth is nearest to the sun, and the warmest, when it is some millions of miles farther away. This is due to the fact that the northern hemisphere is inclined away from the sun during winter, and toward the sun in summer. See *Climate*; *Days, Lengths of*; *Equinoxes*.

Seiche (*sāsh*). Irregular pulsations or variations in the water level of a lake, set up by changes in the pressure of the air over various portions of its surface, are called seiches. They are highest under areas of low barometer. These movements were first observed in the lakes of Switzerland, where they have been much studied. In Lake Geneva, seiches with a height of six feet have been noted, during which the whole mass of water in the lake for a time swings rhythmically from shore to shore. Seiches have been observed in the lakes of Scotland, in Lake Erie, Lake Michigan, and various other lakes. See *Lake*.

Selvas. Natural forested lands, especially plains in tropical South America; as, for example, the vast, densely forested regions in the valley of the Amazon. See *Taiga*.

Slough (*slōō*). A wet, marshy place or reedy pond, but properly a side channel or inlet from a river. In the central and western United States, a small, sluggish creek which becomes wholly or partly dry in summer is called a slough, as is also a long, narrow pond formed in a ravine or other depression in a prairie. See *Marshes*.

Snow. Minute crystals of ice which form when the water vapor in the air condenses at a temperature below the freezing point. These crystals are six-sided and, when magnified under a lens, often show great beauty of form. They usually combine to make snowflakes, sometimes large and woollike, but often small and arranged with remarkable regularity. Snowflakes are not in any sense frozen raindrops; they are formed instead of raindrops when the temperature at which the moisture in the air condenses is less than 32° F. Under usual conditions, about 10 inches of snow will yield one inch of water.

At high latitudes, snow falls during the greater part of the year; in middle latitudes, it falls during the winter; and in low latitudes, except on high mountains, very little falls and this melts quickly. Within the polar circles and on lofty mountains, even in the tropics, snow lies continually on much of the land. Often in such regions the snowfall is much heavier during the cold summer than during the still colder winter. However, on about two-thirds of the earth's surface, snow never falls. In regions near the sea level, snow rarely falls between lat. 30° N. and lat. 30° S. On the Pacific coast of North America, snow falls at the sea level only north of lat. 47°, or about the latitude of Seattle, Washington. On the Atlantic coast of North America, the southern limit of such snowfall is Brownsville, Texas, lat. 26°. In the northern hemisphere, the southernmost point of record where snow falls at the sea level is Canton, China, which is just within the tropics, lat. 23°.

In Maine the annual snowfall sometimes reaches 8 feet; in New York, 7 feet; in the Sierra Nevadas of California it ranges from 10 to 30 feet. Most snow disappears by melting, running off the land in streams; but a considerable amount, especially in arid regions, disappears by evaporation, passing into the air as invisible vapor. Snow shields, like a blanket, the surfaces on which it falls, preventing deep freezing of the soil and protecting the roots of tender vegetation. Snowfalls on high mountains form glaciers and feed streams, maintaining and equalizing their flow during dry seasons, thus greatly benefiting agriculture in the plains below. See *Blizzard*, *Glacier*, *Humidity*, *Snow Line*, *Storm*.

Snow Line. The line or elevation on a mountain slope above which snow and ice exist perpetually. This elevation varies greatly in different localities and from year to year. It is influenced by the direction of the slope and by the temperature, moisture, and prevailing winds. In the tropical Andes, the average height of the snow line above sea level is about 18,400 feet; in the Himalayas, 19,000 feet; in the Rocky mountains, 11,000 feet; in the Alps, 7500 to 9000 feet; in Patagonia, 6000 feet; and in Iceland, 3000 feet. In Spitsbergen, lat. 78° N., the snow line practically corresponds with the sea level.

Soil. The loose surface material of the earth in which plants grow and animals burrow. Soil is usually composed of broken or disintegrated rock mixed with varying quantities of decaying organic matter. When a soil rests upon the parent rock strata from which it was largely formed, it is classed as *residual.* Many such soils show gradual gradations from the solid rock below to the soil at the surface. This class includes also the peaty soils formed in bogs, swamps, and marshes. When a soil is composed of materials removed from the place of their formation by glaciers, streams, or winds, it is classed as *transported.*

Among the soils brought down by glaciers are the extensive and very productive glacial drift soils of the northern United States, of Canada, and of northwestern Europe. Among the soils brought down by streams are the rich alluvial soils of flood plains and deltas, such as those of the Nile and the Mississippi. Among the soils transported by the wind, or æolian soils, are sand dunes, usually of inferior quality, formed near the shores of seas and lakes, and ash soils, often exceedingly fertile, composed of ashes ejected from volcanoes. The valuable loess soils of China and of the Mississippi valley are believed to have been formed in part by wind action. Soils formed by the disintegration of volcanic lava, frequently very productive, occur in Idaho and other northwestern states, and in Italy, Mexico, India, and Hawaii. In arid regions, soils are found which contain an excess of soluble salts; they are known as alkali soils.

The productiveness or fertility of soils depends upon their plant food elements and upon their biological and physical constituents. The food elements most essential to plant growth are nitrogen, phosphorus, calcium, sulphur, magnesium, potassium, and iron, in various chemical combinations. Living organisms, including insects, earthworms, the roots of plants, and bacteria, have much to do with soil formation and fertility. Various bacteria possess the power of transforming the nitrogen of the air into plant food. The physical constituents, chiefly silica, which serve as a medium for root growth, make up 90 to 95 per cent of the mass of the soil. See *Adobe Soil, Alluvium, Hardpan, Lava, Loess, Till.*

Springs. Water issuing from the ground through a natural opening, at sufficient speed and volume to make a distinct current, is called a spring. Water issuing from rocks or soil, too slowly to form a current, is called *seepage.* Springs occur where there are natural passageways or channels through which the ground water may emerge on dry land, or in the beds of streams, ponds, and lakes. Cold springs are usually formed by rain or melted snow soaking into the ground and reappearing at the surface on a lower level. Hot springs may be of volcanic origin or may be formed when surface waters become heated underground by contact with uncooled igneous rocks.

Spring water usually contains various mineral substances in solution. Its composition varies with that of the surrounding rocks and soil. The volume of water flowing from a spring usually varies with the season and the amount of rainfall. Some springs, however, have a nearly constant flow, of sufficient volume for domestic or even municipal water supply. Numerous springs, particularly hot springs, are of medicinal value on account of the mineral substances which they contain. The Hot Springs of Arkansas and those at Carlsbad, Bohemia, are noted examples. See *Geyser, Ground Water, Hot Springs, Mineral Waters.*

Stalactites (*stȧ-lăk'tīts*). Crystalline, icicle-like forms that sometimes hang from the roofs of caves. They are composed usually of lime, which is dissolved by waters passing through the ground and is left at the roof of the cave when these waters evaporate. Stalactites grow in length, little by little, as the water comes to their tip ends and evaporates, each drop leaving a tiny additional amount of lime. See *Stalagmites.*

Stalagmites (*stȧ-lăg'mīts*). Crystalline forms that rise as monuments from the floors of certain caves. They are commonly developed directly below stalactites of the same material. When the water, after passing through the ground, reaches the roof of a cave and drops to the floor, it may evaporate there and leave behind what it holds in solution. The precipitated material increases little by little and, in time, forms upright crystalline columns, or stalagmites. See *Stalactites.*

Steppes (*stĕps*). The name given to vast, usually level, tracts of land in European and Asiatic Russia, of which the most characteristic feature is the absence of forests. The steppe region really begins near the border of the Netherlands and extends across northern Germany where such lands are called *Haiden* or heaths; thence it stretches across Russia and Siberia almost to the Pacific Ocean, a total distance of about 4500 miles. The Russian and Siberian steppes merge southward into the deserts of central Asia, and northward into the tundras of the arctic zone. Geikie says: "Some steppes are mere desert wastes, while others are fertile tracts capable of high cultivation. Some are low plains; others are elevated plateaus. All are more or less characterized by an extreme range of temperature." See *Heaths, Llanos, Pampas, Prairie, Tundras.*

Storm. A disturbance of the atmosphere, accompanied by wind, rain, snow, hail, sleet, or lightning and thunder. A storm is usually produced whenever currents of air flow from areas of high barometric pressure to areas of low barometric pressure, the latter being called "lows" or storm centers. Storms characterized by destructive winds include windstorms, sandstorms, tornadoes, and typhoons, or hurricanes. Storms in which precipitation is the chief feature include rainstorms, hailstorms, snowstorms, monsoons, cloudbursts, and floods. A storm in which there is much thunder and lightning is called a thunderstorm. When a cold, driving wind is combined with a fall of dustlike snow, the resulting storm is called a blizzard.

Usually, the winds preceding a storm blow around and in toward the areas of low pressure, thereby producing still lower pressures near the center. The air in the center, being lighter and forced to rise, expands and cools. In consequence, it precipitates its surplus moisture, producing, according to the prevailing temperature, rain, snow, or hail. The violence of the winds and the amount of precipitation are somewhat proportional to the difference in pressure between the high and the low areas. Hence, a large and sudden fall of the barometer usually indicates a severe storm. See *Blizzard, Cyclone, Hail, Hurricane, Lightning, Rain, Snow, Thunder, Tornado, Typhoon, Waterspout, Whirlwind, Wind.*

Stream Piracy. In the history of many river systems, one stream, either because of its greater supply of water or by reason of the greater ease of down-cutting in its course, has worked headward and stolen the headwaters of a neighboring river system. This is called stream piracy. For example, the headwaters of Beaver Creek, in Virginia, were stolen by the Shenandoah river. The abandoned course of the smaller stream is now marked by a wind gap, known as Snicker's Gap, through which, in the Civil War, the armies from the Shenandoah moved toward Richmond. See *Erosion, River, Watershed.*

Striæ (*strī'ē*). Very fine scratches made on the rock surfaces over which, during the Ice age, the great continental glacier moved; also similar scratches on the stones carried by the glacier at its base. These scratches indicate the direction of ice movement. On the coast of Maine their direction is a little east of south; in New York, except in the mountain regions, chiefly south. Farther west, their direction is west of south. In high mountain regions, where there were alpine glaciers, the striæ follow the direction of the canyon. See *Glacier.*

TEMPERATURE AND RAINFALL OF REPRESENTATIVE CITIES OF THE WORLD

Name of City	Latitude	Height Above Sea Level Feet	Average or Normal Temperature Degrees F.		Extremes of Temperature Degrees F.		Average Annual Rainfall Inches
			Summer	Winter	Lowest Recorded	Highest Recorded	
Amsterdam	52° 22′ N.	6	63.2	36.8	4.1	90.0	27.29
Athens	37° 58′ N.	351	79.2	49.1	19.6	106.5	15.48
Berlin	52° 30′ N.	115	64.7	32.2	−13.0*	98.6	22.95
Bombay	18° 55′ N.	37	83.5	75.1	55.9	100.0	71.15
Brussels	50° 51′ N.	328	62.6	36.0	−4.4	95.5	28.35
Budapest	47° 30′ N.	500	68.6	30.2	−5.1	98.6	25.20
Buenos Aires	34° 36′ S.	72	73.2	51.5	25.9	103.1	36.82
Calcutta	22° 34′ N.	21	84.9	67.1	44.2	108.2	61.98
Capetown	33° 56′ S.	40	68.1	54.7	34.0	102.0	25.50
Chicago	41° 53′ N.	600	69.2	25.4	−23.0	103.0	33.54
Christiania	59° 55′ N.	82	61.0	24.4	−21.1	95.0	22.52
Constantinople	41° 0′ N.	245	74.0	43.5	13.0	103.6	28.75
Copenhagen	55° 41′ N.	46	60.7	32.1	−13.0	90.5	22.33
Dublin	53° 23′ N.	47	59.4	42.0	13.3	87.2	27.66
Glasgow	55° 51′ N.	184	52.7	41.0	6.6	84.9	38.49
Honolulu	21° 17′ N.	20	78.1	72.7	54.0	89.0	20.00
Lisbon	38° 43′ N.	312	69.6	51.3	32.5	94.1	29.18
London	51° 30′ N.	18	61.2	39.3	9.4	94.0	24.04
Madrid	40° 24′ N.	2149	73.0	41.2	10.5	107.1	16.23
Marseille	43° 17′ N.	246	70.3	45.3	11.5	100.4	21.88
Melbourne	37° 47′ S.	115	66.4	49.9	27.0	111.2	25.44
Mexico	19° 26′ N.	7415	62.5	53.0	35.0	79.0	20.00
Montreal	45° 50′ N.	108	66.4	15.5	−26.0	95.0	40.32
Moscow	55° 45′ N.	526	63.4	14.7	−44.5	99.5	18.94
New York	40° 42′ N.	54	72.1	31.7	−13.0	102.0	42.47
Paris	48° 50′ N.	165	63.5	37.1	−14.1	101.1	21.92
Peking	39° 54′ N.	143	77.7	26.6	−5.0	114.0	24.40
Petrograd	59° 56′ N.	16	61.1	17.4	−38.2	97.0	21.30
Quebec	46° 48′ N.	130	63.5	12.4	−34.3	96.0	41.10
Rio de Janeiro	25° 54′ S.	10	80.0	67.0	50.0	99.5	44.00
Rome	41° 53′ N.	166	74.3	46.0	17.2	104.2	32.57
San Francisco	37° 45′ N.	155	59.0	51.0	29.0	101.0	22.30
Shanghai	31° 15′ N.	14	77.4	39.4	10.2	102.9	44.13
Stockholm	59° 21′ N.	146	59.7	27.0	−22.0	91.8	18.31
Sydney	33° 15′ S.	146	70.7	53.8	35.9	108.5	48.16
Tokyo	35° 41′ N.	70	73.9	38.9	15.4	97.9	59.17
Vancouver	49° 16′ N.	38	61.3	36.9	2.0	92.0	60.57
Vienna	48° 11′ N.	560	65.7	30.4	−8.0	97.7	24.50
Washington	38° 53′ N.	75	74.7	34.5	−15.0	106.0	43.50
Winnipeg	49° 54′ N.	768	64.0	8.1	−46.0	103.0	20.24
Zurich	47° 24′ N.	1542	63.3	31.3	−0.8	94.1	45.15

* The minus sign (−) is equivalent to "below zero."

Subsoil. Beneath the layer of brown or black loam commonly cultivated by the farmer or gardener, there is usually found a layer of loose, dark earth and stony material. This is called the subsoil. It represents a gradation stage between the true soil and the hard rock farther down in the earth. See *Soil*.

Swamps. Tracts of wet, spongy ground, more or less overgrown with various coarse grasses, shrubs, trees, and other plants adapted to such situations. The character of the vegetation in swamps depends largely upon the extent of drainage. River swamps, being comparatively well drained, often bear a luxuriant growth of aquatics. On the other hand, totally undrained swamps develop a cold, acid soil, very unfavorable for ordinary plant growth. In consequence, they contain an entirely different (*xerophytic*) type of vegetation. Among interesting forms of swamps are the cypress and the mangrove swamps of the southern United States. See *Bogs*, *Fens*, *Moor*, *Muskeg*, *Peat Bogs*, *Tundras*.

Taiga (*tī′gä*). One of the greatest forest areas in the world. It extends across Siberia immediately south of the subarctic tundra belt but north of the western steppes and the central and eastern highlands. For the most part, the taiga is a vast, cold, sparsely inhabited region, about 4000 miles in length and from 1000 to 2000 miles wide. The immense forests, which consist chiefly of coniferous trees, such as pines, firs, and spruces, are a valuable source of timber. See *Selvas*.

Talus (*tā′lŭs*). An accumulation of rock débris at the base of a cliff. Such accumulations occur chiefly in high mountain regions. By changes of temperature and by the action of frost, angular fragments of rock are broken off from nearly vertical cliff walls. These detached fragments fall to the base of the cliff, where they often form vast heaps with steep outward slopes. Sometimes these heaps take the shape of cones and are called *talus cones*.

Temperature, Atmospheric. The air receives practically all of its heat directly or indirectly from the sun. It is supposed that the temperature of space surrounding the atmosphere is about 459° F. below zero (−273° C.). The difference between this extreme degree of cold and the comparative warmth of the air is due to the amount of solar heat which the air absorbs, directly or indirectly, and retains. The air absorbs some solar heat as the waves from the sun pass through it. However, much of the solar heat that comes to the earth is absorbed by the land and water bodies, and then returned to the air by radiation and convection. It is estimated that the amount of heat so received and held each year would be sufficient to melt a layer of ice 140 feet thick covering the entire globe. The air receives and loses heat by radiation, conduction, and convection.

Each hemisphere receives the same amount of heat each year, but different latitudes receive very different amounts. These differences are due to the inclination of the earth's axis. This inclination causes great variation in the length of the day and in the angle at which the sun's rays strike the

TEMPERATURE, RAINFALL, AND HUMIDITY IN THE UNITED STATES

From U. S. Weather Bureau Reports for Representative Stations

City, Town, or Station	Altitude Feet	Average or Normal Temperature Degrees F.			Extremes of Temperature Degrees F.		Average Annual Rainfall, Inches	Average Annual Humidity, Per Cent.
		Year	Summer†	Winter‡	Lowest Recorded	Highest Recorded		
Abilene, Tex.	1738	63	80	44	−6 *	110	24.7	63
Albany, N. Y.	97	48	70	25	−24	104	36.4	75
Atlanta, Ga.	1050	61	77	44	−8	100	49.4	72
Atlantic City, N. J.	8	53	71	34	−7	104	40.3	79
Bismarck, N. Dak.	1672	40	67	10	−45	107	17.6	70
Boise, Idaho	2695	51	70	32	−28	111	12.7	57
Boston, Mass.	14	49	69	29	−14	104	43.4	72
Buffalo, N. Y.	576	47	68	26	−14	95	37.3	75
Charlotte, N. C.	721	60	77	42	−5	102	49.2	71
Chicago, Ill.	600	48	70	26	−23	103	33.3	74
Cleveland, Ohio	582	49	70	28	−17	100	35.0	74
Denver, Colo.	5183	50	69	31	−29	105	14.0	52
Des Moines, Iowa	805	49	73	23	−30	110	32.4	72
Dodge City, Kans.	2480	53	76	30	−26	108	20.8	66
Duluth, Minn.	609	37	62	11	−41	99	29.9	76
Eastport, Me.	76	41	58	22	−23	93	43.3	79
El Paso, Tex.	3762	63	80	46	−5	113	9.8	40
Fresno, Cal.	287	63	80	47	17	115	9.7	56
Galveston, Tex.	54	69	82	55	8	99	47.1	81
Green Bay, Wis.	590	43	67	18	−36	101	31.1	74
Harrisburg, Pa.	364	52	72	31	−14	104	37.3	72
Havre, Mont.	2480	42	66	17	−57	108	13.7	70
Helena, Mont.	4108	43	65	22	−42	103	12.8	59
Huron, S. Dak.	1285	42	69	13	−43	108	21.1	72
Indianapolis, Ind.	708	53	74	31	−25	106	41.5	70
Jacksonville, Fla.	8	68	80	55	10	104	53.2	80
Jupiter, Fla.	28	74	81	65	...	...	60.2	..
Kansas City, Mo.	750	53	76	29	−22	108	37.4	70
Knoxville, Tenn.	933	57	75	40	−16	100	49.4	74
Lander, Wyo.	5372	42	65	19	−36	99	13.9	60
Little Rock, Ark.	299	62	79	43	−12	106	49.9	72
Los Angeles, Cal.	286	62	70	55	28	109	15.6	70
Louisville, Ky.	449	57	77	36	−20	107	44.3	68
Lynchburg, Va.	517	56	74	37	−7	105	43.4	73
Montgomery, Ala.	160	65	80	49	−5	107	51.2	73
New Orleans, La.	15	68	81	54	7	102	57.4	78
New York, N. Y.	54	52	71	32	−13	102	44.6	72
Northfield, Vt.	732	41	64	17	−41	98	33.8	78
North Platte, Nebr.	2805	48	71	24	−35	107	18.9	68
Oklahoma City, Okla.	1197	59	78	37	−17	108	31.7	70
Omaha, Nebr.	1041	50	74	24	−32	110	30.7	69
Oswego, N. Y.	335	47	68	26	−23	100	36.2	76
Palestine, Tex.	510	65	80	49	−6	108	43.0	74
Parkersburg, W. Va.	616	54	74	33	−27	106	40.2	76
Philadelphia, Pa.	50	56	74	38	−6	106	41.2	71
Phoenix, Ariz.	1090	69	88	52	12	119	7.9	41
Port Huron, Mich.	599	45	67	24	−25	104	30.6	77
Portland, Oreg.	74	52	64	40	−2	102	45.1	74
Rapid City, S. Dak.	3198	45	68	24	−40	106	18.7	62
Red Bluff, Cal.	307	62	80	47	18	115	25.0	56
St. Louis, Mo.	455	56	77	33	−22	107	37.2	70
St. Paul, Minn.	703	44	70	14	−41	104	28.7	72
Salt Lake City, Utah	4253	52	73	31	−20	102	16.0	52
San Antonio, Tex.	701	68	81	53	4	108	26.8	67
San Francisco, Cal.	85	55	57	51	29	101	22.3	80
Santa Fe, N. Mex.	6956	49	67	30	−13	97	14.5	49
Sault Ste. Marie, Mich.	614	38	60	15	−37	97	31.4	80
Seattle, Wash.	19	51	62	40	11	96	36.6	77
Shreveport, La.	210	65	81	48	−5	110	45.7	72
Spokane, Wash.	1891	48	67	29	−30	104	18.8	64
Springfield, Ill.	601	52	74	29	−24	107	37.0	72
Springfield, Mo.	1260	55	74	34	−29	106	44.6	72
Tampa, Fla.	15	72	81	61	19	98	53.1	80
Vicksburg, Miss.	196	65	79	49	−1	101	53.7	74
Walla Walla, Wash.	926	53	72	35	−17	113	17.7	65
Washington, D. C.	89	55	75	34	−15	106	43.5	72
Williston, N. Dak.	1860	39	67	9	−49	107	15.1	70
Wilmington, N. C.	25	62	78	47	5	103	51.0	79
Winnemucca, Nev.	4344	49	69	31	−28	104	8.4	52

* The minus sign (−) is equivalent to "below zero."
† Average for June, July, and August. ‡Average for December, January, and February.

atmosphere. So far as the length of the day is concerned, the poles in summer should receive more heat than any other part of the earth. But, for equal areas, the earth receives more heat where the sun's rays are more nearly vertical. For this reason, a unit area at latitude 40° receives about three-fourths as much heat as a unit area at the equator.

During that half of the year when the sun's rays are nearly vertical north of the equator, the greatest amount of heat is received in latitude 25° N. From about May 6 to August 6, the three months centering around June 21, or the period of the longest days in summer, the zone receiving the greatest amount of heat is in latitude 41° N. Between about June 1 and July 16 the north pole receives more heat than any other part of the earth. But the polar region does not become warm, because much of the heat is used in melting ice and snow. No

amount of heat would make the temperature of Greenland like that of the tropics until all the snow and ice was melted.

The unequal heating of the land and the water, as well as the unequal heating of the air in different latitudes, produces wind movements and water currents which tend to equalize the extremes in temperature. It is estimated that without these equalizing influences, the average temperature at the equator, instead of being about 80° F., as at present, would rise to 131° F., and that the average temperature of the poles, instead of being about zero, would fall to about 100° F. below zero.

The greatest extremes in the temperature of the air occur in regions of scant rainfall. For example, at Azizia, 25 miles south of Tripoli, Africa, a temperature of 136.4° F. was recorded on September 13, 1922. This is probably the highest natural air temperature in the world. On the other hand, temperatures of 60° F. below zero in winter occur in Montana and 75° F. below zero in arctic Canada. Near Verkhoyansk, in northeastern Siberia, 92° F. below zero has been observed—probably the lowest natural temperature on the surface of the globe. See *Climate*, *Rainfall*, *Wind*.

Terminal Moraines. Deposits left at the margin of the ice of a glacier at its position of maximum advance.

In the United States, the terminal moraine, marking the southern limit of the advance of the great continental glacier, may be traced from the Atlantic coast to the foot of the Rockies. In New England, the terminal moraine lies in the islands just off the coast—in Marthas Vineyard, Nantucket, and Long Island. It crosses New Jersey and, veering northwestward through Pennsylvania, reaches nearly to the southern boundary of New York. It then swings southwestward into Ohio and Indiana, attaining its southernmost point in Illinois. Then, changing direction to the northwest, it follows approximately the line of the Missouri river, until, in the Dakotas, it turns westward into Montana, and continues to the base of the Rocky mountains.

In Europe, the terminal moraine, marking the maximum advance of the European ice sheet, crosses southern England. In the western part of the continent it lies just north of the southern highlands of Germany. Thence it extends eastward along the north base of the Carpathian mountains, and swings northeastward through Poland into Russia.

Terminal moraines are usually hilly belts, and they may have many small, undrained depressions, called *kettle holes*, in which lakes or ponds exist. A terminal moraine is sometimes only a narrow ridge a few hundred feet in width, but more often it is a hilly belt from a quarter of a mile to two miles wide. See *Glacier*, *Moraines*.

Terraces. Benches or flat lands bordering the main channel of a river. Usually they are covered with alluvial material left on their surfaces at times when the river was much higher. Such terraces form rich agricultural lands. In the valleys of the interior plains of the United States, terraces contain some of the best farms of that region. Some river terraces furnish sands and gravels suitable for concrete construction, and, in the vicinity of large cities, these materials are used for building purposes.

In plateau regions and in some mountain regions, resistant layers of rock sometimes form benches along the sides of a valley. When worn down through such formations, river valleys may have rock terraces. See *Alluvium*, *Erosion*, *River*.

Thunder. The loud noise which follows a flash of lightning. It is produced by the sudden disturbance of the air, due to the discharge of electricity. The character of the sound depends upon the intensity and distance of the discharge, the form, number, and distance of the clouds, and the nature of the surrounding country.

In case the observer is about equally distant from the two bodies between which the discharge takes place, the thunder clap will be short and sharp. If the observer is nearly in line with the path of the discharge, but much farther from one body than from the other, the sound is prolonged into a long roll. In hilly or mountainous districts and where there are many clouds, the original sound is echoed and re-echoed many times, producing a continuous roar.

Owing to the irregular refraction of sound caused by varying temperature and wind, thunder begins to rise from the ground before it has traveled far. For this reason one often sees flashes of lightning without hearing the thunder, which passes far over-

TEMPERATURE AND RAINFALL IN CANADA

From Dominion Meteorological Service Reports for Representative Stations

City, Town, or Station	Altitude Feet	Average or Normal Temperature Degrees F.			Extremes of Temperature Degrees F.		Average Annual Precipitation Inches		
		Year	Summer*	Winter†	Lowest Recorded	Highest Recorded	Rain	Snow	Total
Anticosti, Que.	....	34.7	53.7	15.0	−40 ‡	85	23.37	72.7	30.64
Charlottetown, P. E. I.	8	42.0	62.7	20.7	−21	92	30.97	83.0	39.27
Cottam, Ont.	649	46.2	68.0	23.2	−25	100	29.95	42.0	34.15
Dawson, Yukon	1050	22.6	56.8	−15.6	−68	95	7.02	59.9	13.01
Edmonton, Alberta	2185	36.9	59.2	10.8	−57	94	13.42	42.5	17.67
Fort Chipewyan, Alta.	....	26.9	57.9	−6.3	−56	90	10.90	49.8	15.88
Fort Vermilion, Alta.	....	28.6	58.7	−6.8	−73	101	7.52	36.6	11.18
Fredericton, N. B.	29	40.4	62.9	16.0	−35	96	32.94	135.0	46.44
Haileybury, Ont.	764	37.1	63.3	9.3	−48	102	20.21	95.2	29.73
Kamloops, B. C.	1159	47.2	67.4	25.9	−31	102	7.48	35.1	10.99
Medicine Hat, Alta.	2181	41.7	65.6	15.0	−51	108	11.53	32.6	12.79
Montreal, Que.	108	41.8	66.4	15.5	−26	95	28.25	120.7	40.32
Parry Sound, Ont.	686	41.0	64.2	16.2	−39	98	27.95	121.5	40.10
Port Arthur, Ont.	615	35.7	59.6	9.3	−51	96	19.24	39.8	23.22
Port Simpson, B. C.	....	44.8	55.2	35.2	−10	88	84.15	40.2	88.17
Prince Albert, Sask.	1414	31.7	59.6	−.6	−70	96	11.13	48.4	15.97
Qu'Appelle, Sask.	2132	34.5	61.5	4.0	−55	101	13.42	55.4	18.96
Quebec, Que.	130	39.0	63.4	12.2	−34	96	28.54	125.6	41.10
Toronto, Ont.	296	44.4	65.8	23.4	−26	103	26.86	66.0	33.46
Vancouver, B. C.	38	48.7	61.0	37.2	2	92	58.06	25.1	60.57
Victoria, B. C.	30	49.4	59.1	40.3	−2	90	31.06	14.3	32.49
Winnipeg, Man.	768	34.8	63.8	1.1	−46	103	15.37	48 7	20 24
Yarmouth, N. S.	25	44.1	58.9	28.9	−12	86	39.59	79 9	47.58

* Average for June, July, and August. † Average for December, January, and February.
‡ The minus sign (−) is equivalent to "below zero."

head. Thunder is rarely heard at a distance of 15 or 20 miles, though discharges of cannon may be heard 30, 50, or 100 miles. See *Lightning*, *Storm*.

Tides. The alternate rising and falling of the water of the ocean, which occurs twice during every 24 hours and 52 minutes, caused by the differential attractions of the sun and moon. The tide rises, *flood tide*, for about 6 hours, when it is said to be *high*; it then falls, *ebb tide*, usually for a slightly longer period, when it is said to be *low*. Frequently the tide comes in as a series of waves which do not recede to the former level of the sea. In other cases the tide rises rapidly without distinct waves.

While not perceptible in the open ocean, as there is nothing to indicate the slight elevation of the water level, tides are easily seen wherever there are shores upon which the rise and fall of the water may be measured. The change in level caused by tides in the open ocean is estimated at between 2 and 3 feet. Along coasts the rise and fall usually amounts to several feet. In case of broad bays with narrow heads, the variation between high and low tides may amount to 20 or 30 feet or more, as in the Bay of Fundy, where it exceeds 50 feet.

Tides often run up broad open rivers such as the Amazon, the St. Lawrence, and many smaller streams. The tide runs up the St. Lawrence to Three Rivers, near Montreal, a distance of 283 miles. In the Hudson, there is a tide exceeding 2 feet at Troy, about 150 miles inland. In some shallow rivers the tide advances as a solid wall of water, called a *bore*. Tides involving the visible movement of large masses of water occur only in oceans and in gulfs, straits, rivers, and other waters immediately connected with the sea. In small lakes, tidal risings and fallings are imperceptible, and even in large lakes or enclosed seas they are very slight.

Tides are produced by the combined attractive forces of the moon and sun, as exerted upon the waters of the earth. The moon is the nearest of the heavenly bodies to the earth, and, by reason of this nearness, its attractive influence, or tide-raising force, is about 2½ times as great as that of the immensely larger but far distant sun. The part of the waters directly under the moon's path in the heavens is pulled out toward the moon. At the same time, the moon attracts the solid part of the earth and, as it were, draws the earth away from the waters on the surface farthest from the moon. In consequence, the waters there are heaped up, although not quite to the same extent as on the side of the earth immediately beneath the moon.

The waters are thus drawn up into ridges at the same time on opposite sides of the earth, and the waters situated between them are, for the same reason, correspondingly lowered. As the earth rotates on its axis the two slight elevations or ridges of water, properly called *tidal waves*, travel steadily across the oceans and seas, the one keeping almost directly under the moon and the other on the side of the earth opposite to it. When these tidal waves reach the edges of the land, they heap themselves upon the shore, producing high tides, and then recede, producing low tides. As a result, two high tides and two low tides occur in each lunar day, or in a period of slightly more than one revolution of the earth on its axis.

The sun's tide-raising force is only about two-fifths that of the moon, and its effect is to increase or diminish the tides produced by the moon's much greater attraction. Whether the sun's influence makes higher or lower tides depends upon the relative positions of the sun and moon with reference to the earth. At new and at full moon, both the sun and the moon attract in nearly the same line, giving rise to tides higher than the average, called *spring* tides. At first and last quarters, the sun and moon are pulling upon the earth at right angles to each other. The moon's force is then partly counteracted by that of the sun, resulting in tides lower than the average, called *neap* tides.

By their erosive action, tides greatly modify coast lines. They also carry immense amounts of débris out to sea, prevent the formation of deltas, and help rivers to build up their lower valleys or flood plains. Tides have an immense influence upon the plant and animal life of the seashore.

Till. Unstratified glacial drift. This material consists of a mixture of clay, bowlders, gravel, and sand. It is frequently called "bowlder clay." Beyond question a part of it was deposited as the great ice sheet was advancing; the greater portion of it, however, undoubtedly was deposited upon the final melting of the ice. When deposition occurs in this way, there is no assorting of material, and therefore the great body of glacial drift is unassorted or unstratified. The rolling prairie lands in the upper Mississippi valley, in portions of Canada, and in the lowland plains bordering the Baltic Sea in northwestern Europe are composed for the most part of glacial till.

In the continent of North America and in Europe the glacial deposits have been so weathered and disintegrated at the surface that the upper two or three feet now constitute excellent soils. Many of the richest farm lands in the northern United States and in Canada, as well as many of those in England and the countries to the south and east of the Baltic Sea, have glacial soils. See *Glacier*, *Moraine*.

Timber Line. The line of elevation on mountains above which there are no trees. This line is not regular but extends highest on those slopes which afford the most shelter from the winds or the longest exposure to the sun. The height of the timber line varies greatly with the latitude and general climatic conditions, rising above 12,000 feet in the tropics, and descending to the sea level in high latitudes. Wherever there is soil above the timber line and below the snow line, the surface is usually covered with low shrubs and hardy herbaceous plants. These form the alpine flora, noted for the size and beauty of its flowers. See *Alpine Plants*, *Mountain*.

Tornado. The most violent and destructive of all local storms, often incorrectly called a "cyclone." Tornadoes most commonly form in connection with thunderstorms, usually on warm, sultry afternoons when there is great humidity. The tornado cloud proper is intensely black and funnel-shaped, and points downward from a mass of storm clouds advancing rapidly and in great commotion. Like the little dust whirls seen in summer, this funnel-shaped cloud revolves about its center at tremendous speed, at the same time moving forward at the rate of 30 miles or more an hour.

Nearly all tornadoes travel from the southwest to the northeast, moving in a narrow path, usually from 100 to 300 yards wide, with an average length of from 20 to 30 miles, and they are generally accompanied by thunder, lightning, heavy rain, and hail. By reason of its small diameter and rapid movement, the duration of a tornado at any one point is exceedingly brief. The progress of the whirling funnel-cloud is often very irregular. Sometimes it appears alternately to rise and descend with a sort of bounding motion, leaving parts of its path unscathed while other portions are marked by ruined crops, uprooted trees, demolished buildings, and often by loss of human life.

A tornado may be regarded as a greatly concentrated cyclone or as a much intensified whirlwind. While a cyclone may be more than 1000 miles across, with marginal winds blowing around a center of low pressure, sometimes at the hurricane speed of 100 miles an hour, a tornado may be less than one-eighth mile across, with whirling winds rushing about a vortex or center at a speed estimated as equaling or exceeding that of a rifle bullet. In strong tornadoes the air pressure at the center may be fully one-fourth less than normal. It is to this marked difference in pressure as well as to the extreme velocity of the accompanying wind that tornadoes owe their terrific destructive power.

The normal pressure of the air at sea level is 14.7 pounds per square inch, or more than 2100 pounds per square foot. When this is reduced by one-fourth, or to 11 pounds per square inch, as estimated for the center of a tornado, the pressure is only 1584 pounds per square foot. Consequently, when a strong tornado passes a closed building, the pressure of the outside air is suddenly reduced and the inside air thrusts itself against the walls with force equal to the difference in pressure. As this difference exceeds 500 pounds per square foot, or more than two tons per square yard, the walls, unless unusually strong, will collapse outward toward the storm as if the building had exploded.

Tornadoes may occur in some part of the United States at any time of the year. During winter and early spring they occur in the Gulf states and the South Atlantic states. During June they are most frequent in the Mississippi valley. In the Middle Atlantic states and in New England they occur most often in July and August. Tornadoes are of the greatest frequency in the lower Mississippi valley. West of central North Dakota, Nebraska, and Texas, they are of rare occurrence. See *Cyclone, Storm, Whirlwind.*

Trade Winds. Constant winds which occur on the open sea, and to some extent on land, on both sides of the equator, to a distance of about 30° north and south latitude. On the north of the equator their general direction is from the northeast; on the south of the equator they are from the southeast.

The trade winds are caused by the unequal heating of the air between the tropical and the polar regions; they are influenced also by the rotation of the earth. The great heat of the tropics makes the air of that region lighter. In consequence of this, the air of the tropics ascends into the upper regions of the atmosphere. It is there condensed and flows northward to supply the deficiency caused by the undercurrents blowing toward the equator. These undercurrents coming from the north and the south are, by reason of the earth's rotation, deflected as they approach the equatorial regions, becoming northeast and southeast currents, thus forming the trade winds.

Trade winds are constant only in the open sea, and they reach their greatest strength in the south Indian Ocean. Those of the Atlantic are stronger than those of the Pacific. In some regions, trade winds are periodical, blowing for half the year in one direction and, for the other half, from the opposite quarter, as in case of the Indian monsoons. Before the era of steam, trade winds played an important part in navigation and commerce. See *Ocean Currents, Wind.*

Tundras (*tŏŏn'drȧz*). The Russian name for the level, treeless, and often marshy plains peculiar to extreme northern and arctic regions. Shrubby vegetation reaches its northernmost limit in these areas, which consist chiefly of mucky or peaty soil with a permanently frozen subsoil.

In the nearly continuous sunshine that prevails from late May until early August, the tundras are thawed to a depth of a few inches. During this period they produce a dense growth of mosses and lichens more or less intermingled with dwarf herbs and shrubs, many of which bear large showy flowers. In summer the tundras are visited by various small fur bearing animals and numerous migratory birds. Tundras occupy considerable portions of northern Russia and of the Siberian plain, and also parts of northern Canada and Alaska. See *Heaths, Marshes, Steppes.*

Typhoon. A violent hurricane occurring in the China seas and adjacent regions, principally from July to October inclusive. Typhoons are identical with the West Indian hurricanes which take place in the same latitude in the western hemisphere. They are prolonged cyclonic storms of great intensity, with wind velocities sometimes exceeding 100 miles an hour. See *Hurricane, Storm.*

Valley. A depression in the surface of the land, generally elongate, through which usually a stream of water flows. However, a small depression in which water runs only after heavy showers is not ordinarily termed a valley. When very small, such a depression is usually called a *gully*; when somewhat larger, a *ravine.* Just as rivulets and brooks unite to form creeks and these unite in larger streams called rivers, so gullies lead to ravines and ravines to valleys. Most valleys end at the sea, or at a lake, but, in arid regions, some valleys end on dry land.

In a broad sense the term valley is used to indicate the whole drainage basin of a river system, as the Mississippi valley, or the Amazon valley. Depressions between mountains, whether occupied by streams or not, are also called valleys.

The chief agency in the formation of a valley is *erosion*; first, by the *weathering* of its sides, and second, by the *deepening* of its channel. If the channel wears away faster than the sides, the valley will be narrow and deep; if the sides wear away faster than the channel, the valley will be broad and shallow. When the sides wear away much faster than the channel, a wide, flat *flood plain* is formed from the silt brought down by the current, through which the stream wanders from side to side.

River valleys are natural communications, or highways, and, when extensive, sustain large populations, such as are found in the valleys of the Nile, the Ganges, the Hwang, the Danube, and the Mississippi. See *Alluvium, Erosion, River.*

Valley Train. Deposits of sands and gravels which follow the line of a valley, but which were deposited by waters issuing from a glacier. In the United States, these deposits often form the great alluvial terraces along the rivers which flow southward from the area which, during the Ice age, was occupied by the great continental glacier. See *Glacier.*

Volcanic Mountains. Many mountains are formed by the eruption of igneous rocks through volcanic action, and occur either singly or arranged in lines. While usually built up in the form of cones, the volcanic materials may be so grouped as to form a high upland of considerable extent.

Some of the greatest single mountains of the world are of volcanic origin, including both extinct and active volcanoes. Among these are Mt. Rainier and Mt. Shasta in the United States, Mt. Wrangell in Alaska, Orizaba and Popocatepetl in Mexico, Aconcagua and Chimborazo in South America, Kilimanjaro and Kenia in Africa, Demavend and Fujiyama in Asia, and Elbruz in Europe. See *Volcano, Vulcanism.*

Volcano. A cone-shaped elevation or mountain which, during a period of activity, throws out lava, cinders, ashes, steam, and gases from the interior of the earth. Volcanoes constantly in eruption are called *active*; those which have been quiescent for a long period, though at times emitting small quantities of vapor, are termed *dormant*; while those whose craters are closed and cold, with no evidences of a connection with interior lavas, are said to be *extinct.*

In size, volcanoes vary from small hillocks to giant mountains which include some of the earth's loftiest summits. Orizaba and Popocatepetl in Mexico, Cotopaxi and Aconcagua in the Andes, Demavend and Ararat in western Asia, and Kilimanjaro in east central Africa range between 17,000 and 23,000 feet in altitude. The mass of most volcanoes is composed of the material which they have erupted. However, the size of a volcano is not an index to the force of its activity. Many exceedingly violent and destructive eruptions have occurred in volcanoes only a few thousand feet high, such as Vesuvius in Italy, Krakatoa in the Sunda Strait, La Soufrière in St. Vincent, Pelée in Martinique, Skaptar Jokull in Iceland, and Bandai-San in Japan.

A volcano usually consists of a basal part, or mountain proper, a steeper conical part, or *cone*, and a basin-shaped pit, or *crater*, at the summit.

In some cases, however, the entire mountain may be called the cone, and sometimes eruptions take place through slits or fissures, without the formation of a definite crater. The amount of material ejected depends upon the violence and length of the eruption. During the famous eruption of Vesuvius, 79 A. D., which destroyed Pompeii and Herculaneum, there was no lava, but much of Campania was covered with a layer of cinders and ashes several feet thick. It is estimated that during the violent eruption of Krakatoa, in 1883, material equivalent to more than four cubic miles was thrown out. Scientists computed that the material ejected by Tambora, on the island of Sumbawa, in 1815, was equivalent to 400 cubic miles.

It is believed that on certain days during the eruption of Pelée, in 1902, ashes equal in volume to the total quantity of sediment discharged by the Mississippi river in an entire year, were thrown into the air. Dust particles thrown from Krakatoa, in 1883, are believed to have reached finally a height of 30 miles, and to have remained suspended for more than a year, traveling completely around the earth and causing "red glows" after sunset. The sound of volcanic explosions is occasionally heard at points several hundreds of miles distant. Destructive earthquakes and tidal waves sometimes accompany volcanic eruptions.

Volcanoes are believed to be situated in areas of weakness in the earth's crust, being found in ocean basins, in the borders of ocean basins, and in mountain ranges which form or border the edges of continents. The belt of greatest volcanic activity is in the chain of mountains and islands which partly encircles the Pacific Ocean. No entirely satisfactory explanation of the cause of volcanic action has been worked out. It is believed, however, that molten lava is slowly formed in the deep interior of the earth by the force of gravity. From time to time some of this liquid is forced to the surface by the enormous pressure of heavier rocks and the terrific expansive force of the steam and gases imprisoned in the lavas. See *Crater*, *Lava*, *Volcanic Mountains*, *Vulcanism*.

Vulcanism. All phenomena associated with the rising of melted rock, from deep in the interior of the earth toward or to the surface, are grouped under the general head of vulcanism. In many cases, lavas formed at great depths in the earth fail to reach the surface. For example, in Yellowstone national park, thousands of feet beneath the earth's surface, there are great masses of hot rock. These supply heat to the waters which issue from various openings as hot springs and geysers.

When lava breaks forth at the earth's surface, a true volcano is usually formed. After a series of explosions, a mountain, with a crater at its summit, may be developed. The explosions may continue until the mountain is blown to pieces, or there may be a long period of quiet before further explosions occur. Instead of issuing through narrow-necked vents, as in typical volcanoes, lavas sometimes flow out upon the surface through long, slitlike openings. Such extrusions of melted volcanic materials are called *fissure eruptions*.

Sheets of lava that have been forced toward the surface of the earth in more or less vertical fissures, and then cooled in them, are called *dikes*. Many such formations, composed of dark lavas, appear along the coast of New England, in the White mountains, in the Green mountains, in the Adirondacks, and in various other mountain regions. See *Dike*, *Volcanic Mountains*, *Volcano*.

Water Gap. A narrow place in the valley of a river, where, owing to the unusual resistance of the rocks to erosion, the stream has failed to broaden its valley as much as it has both above and below. A good example is the Delaware Water Gap, near Stroudsburg, Pa. At this point, the Delaware river flows through a narrow gorge in the Kittatinny range of the Appalachian mountains. Other typical instances are the gap at Harpers Ferry, in the valley of the Potomac river; the notch north of Harrisburg, Pa., through which the Susquehanna river flows; and the Royal Gorge of the Arkansas river, in Colorado. See *River*.

Watershed. Properly, the meeting line of diverging slopes is a watershed, water parting, or divide. Such a line marks off the drainage area, basin, or valley of one river from that of neighboring rivers. However, the term watershed is now widely applied to the whole area contributing to the drainage supply of a river or lake, and especially to the higher or steeper portions of such a region. See *River*, *Stream Piracy*.

Waterspout. A local storm similar in origin and form to a tornado, occurring over the surface of the sea or a lake. From a large storm cloud above, a whirling, funnel-shaped mass appears suspended. This seems to grow downward, tapering toward the surface of the water, which becomes violently agitated. When the spout is completely formed, water from the surface appears to be drawn up to join the cloud above. This, however, is an optical illusion, as practically all of the water carried along by the revolving spout is condensed from the air. Even when spouts form over the surface of the sea, the water composing them is found to be fresh.

The actual volume of water contained in a spout is not large. When damage is caused by a water spout, it is due to the tornadic violence of the accompanying wind. Waterspouts, therefore, should not be confused with cloudbursts. Although by no means confined to low latitudes, waterspouts occur most frequently over warm tropical seas. See *Tornado*, *Whirlwind*.

Waves. The alternate rising and falling of successive ridges of water, produced by the friction between the wind and the surface of seas, lakes, and rivers. In the open ocean, wave motion does not result in an actual forward movement of the water. Each particle of water composing a wave describes a curve and comes back practically to the point from which it started, though the *wave form* moves on as other particles of water similarly rise and fall. The motion of ocean waves, therefore, is somewhat like that of a waving field of grain where the base of each moving stem is attached to the ground, though wave after wave passes across the field.

The top of a wave is called its *crest*. The depression between two crests is called the *trough*. The horizontal distance between two crests is the *length* of the wave, and the vertical distance from the bottom of the trough to the crest is the *height* of the wave. The time required for a crest to travel the length of the wave is called the *period* of the wave.

Under pressure of strong wind, the top of a wave may be blown forward, so that it "breaks," thus producing some motion of the water independent of the true wave motion. Large waves of this kind, striking against the shore, are called *breakers*. The destructiveness of waves depends upon their length as well as upon their height. With a given wave, the shorter its length, the greater its destructive force. Waves raised by a heavy storm often run to great distances from their starting points, forming what is known as the *swell* or *ground swell*.

When a wave comes from the open sea into water so shallow that it "drags" bottom, the velocity and length of the wave are reduced and the height is increased, so that the crest pitches forward as *surf*. The water forced against the shore in the wave runs back toward sea again, and this away-from-shore motion is called *undertow*. Whenever waves strike the shore at an angle, the water moves more or less along shore, producing a *shore current* or *littoral current*.

Storm waves in the open sea are frequently 20 to 30 feet in height, and sometimes even 50 feet. When driven against shores, the surf of broken waves is sometimes thrown to heights of from 100 to 300 feet, with sufficient force to destroy lighthouses and even cliffs of rock. The length of great waves may sometimes reach 1500 feet and the speed may be as high as 60 miles an hour, but such wave lengths and velocities are rare.

The motion of waves is confined to the water near the surface. There is little wave disturbance at a depth of 30 feet, and wave motion becomes imperceptible at a depth of a few hundred feet. Waves possess great erosive power, and by their continuous action they greatly modify the coasts of continents and islands. See *Erosion, Flood, Ocean, Tides, Wind.*

Weather. The state of the atmosphere at any time as regards heat or cold, wetness or dryness, clearness or cloudiness, calm or storm, or electrical condition. Hence the expressions, warm, cold, dry, wet, and various other terms applied to weather. Weather differs from climate in that it is simply the condition of the atmosphere at a given place at a given time, while climate is the *general* or *average* condition of the weather. The weather of a place or of a region may change from day to day, or even from hour to hour, yet its climate, or average weather, will remain practically unchanged from year to year.

If the principal conditions and features of storms are borne in mind, a forecast of the weather, more or less conjectural but frequently exceedingly useful, may be made from observations of the barometer, the winds, and the appearance of the clouds. In the last quarter century great progress has been made in systematically predicting weather conditions for the greater part of the United States and Canada. The daily forecasts of the Weather Bureau are of increasing value to agriculturists, fruit growers, and navigators, both lake and marine, particularly since the use of wireless telegraphy by ships. See *Climate, Climatology.*

Weathering. The result of all forms of atmospheric action whereby surface rock is disintegrated or decomposed. This action includes both mechanical and chemical processes.

Mechanically, the atmosphere produces changes mainly by means of wind, frost, sudden changes of temperature, and the impact of driving rain. The effect of all mechanical weathering, or *disintegration*, of the rocks is merely to grind them to finer particles of the same material.

Chemically, the atmosphere effects changes chiefly by means of oxidation, carbonation, hydration, and solution. Chemical weathering, or *decomposition*, results in the removal of the soluble substances, mostly lime, magnesia, soda, and potash, leaving behind the insoluble substances as soil-forming elements. The insoluble portion consists mainly of sand, clay, and iron oxide.

All soils were at first formed by the weathering of rocks. The residual sands sometimes consolidate to form sandstone; the clays become bedded into shales; and the gravels, into conglomerates. The soluble lime and magnesia are borne by the rivers to the ocean, where they enter into the formation of limestone. The soluble soda is likewise transported to the ocean, where it becomes part of the salt of sea water. See *Atmosphere, Erosion, Wind.*

Whirlwind. A mass of air rotating rapidly in a nearly vertical position, at the same time moving more or less rapidly forward. Whirlwinds vary immensely in size and intensity. Most whirlwinds are small, harmless eddies which occur in dusty streets, roads, or fields. The larger forms, however, include the blinding sand pillars of tropical deserts, the terrifying waterspouts of tropical seas, and the destructive tornadoes which cause great loss of life and property in temperate regions.

Whirlwinds are best observed in arid regions. In the Mohave desert of California, as many as six or eight whirlwinds, some of them conspicuous and imposing, may be seen at one time on a hot summer day. Some part of the surface of the ground becomes more strongly heated than the surrounding parts. The air in contact with it quickly rises in temperature, immediately becomes much less dense, and is forced rapidly upwards by inrushing currents of cooler air. The inequality in the force of these currents gives rise to the whirling motion. While most whirlwinds rarely extend to a height of 1000 feet, and are of short duration, a large whirlwind, even in a most arid desert, may develop into a violent local thunderstorm or cloudburst. See *Tornado.*

Wind. Air naturally in horizontal motion at the earth's surface, coming from any direction with any degree of velocity. All movement of the air is from a region of greater pressure toward a region of less pressure. The air in low latitudes is heated more effectively than the air in higher latitudes. From this arises the constant tendency of the air above the bottom of the atmosphere to move from tropical regions toward the poles. The cooler air at the surface tends to move toward the equator. As a result, there is formed a double trade wind zone, with equatorial calms or doldrums in the center, and two zones of prevailing westerly winds, with tropical calms on the equatorward side of each.

But these larger movements of the air are complicated, first, by the fact that the land and the water are very unequally heated, and, further, by the effect of the rotation of the earth. In consequence, the westerly winds are often overcome by seasonal winds, such as the monsoons of India, and by various local air movements, such as sea breezes, land breezes, valley breezes, and mountain breezes. Winds are classed as *steady*, such as the trade winds; as *periodical*, such as the winter and summer monsoons; and as *variable*, such as those occurring in connection with areas of high or low pressure, or storms.

In the North Temperate Zone, the normal wind is westerly, and all other winds soon veer to that direction. Winds blowing toward and around an area of low barometer, or storm center, are called *cyclonic*. When these are violent they are known as typhoons or hurricanes. Winds whirling around a center, in which the vertical motion greatly exceeds the horizontal, are called *tornadic*. These sometimes cause great local destruction.

The direction of a wind is always stated as that from which it blows. A wind from the east, therefore, is called an east wind. The force of a wind is commonly indicated by its velocity in miles per hour, as measured by the anemometer. A light breeze has a velocity of 13 miles; a strong breeze, 34 miles; a strong gale, 56 miles; a storm, 75 miles; and a hurricane, 90 or more miles per hour. The destructive winds revolving about the funnel-shaped cloud of a tornado attain velocities estimated at from 400 to 1500 miles per hour.

Wind is one of the most important of natural agencies. It is the factor upon which all the processes of the weather finally depend. Prevailing winds profoundly influence climate and rainfall. Even gentle breezes, by keeping the air in circulation, equalize temperatures and prevent the accumulation of impurities. Wind is an active agent in the upbuilding of sand dunes along shores and in deserts, in the weathering and wearing away of rocks in arid regions, in the dissemination of atmospheric dust, and in the formation of various soils. See *Æolian Deposits, Anticyclone, Chinook, Climate, Hurricane, Monsoon, Rainfall, Tornado, Trade Winds, Whirlwind.*

Wind Gap. A former water gap from which the stream has been diverted, usually by stream piracy. See *Stream Piracy.*

GEOLOGY

Geology is the science which considers the earth in all of its aspects,—its origin, its varied features, the composition and the structure of the material which composes it, and the life upon it. It is concerned with all the forces which have acted upon the earth and the effects of those forces. It attempts to reconstruct the history of the earth, particularly as it is recorded in the rocks of the outer crust.

In working out this history, geology makes use of the principles of many other sciences; as, astronomy, physics, chemistry, mineralogy, lithology, zoology, and botany. It is essentially an application of the various sciences to an understanding of the earth. For this reason the science is subdivided into many subjects.

Among these subdivisions are: Dynamical Geology, which treats of the forces at work upon the earth and their effects; Structural Geology, which treats of the architecture of the earth; Historical Geology, which treats of the succession of events, both organic and inorganic, upon the earth; Physiographic Geology, or Physiography, which treats of the sculpture of the surface of the earth by various destructive agents; Glacial Geology, which treats of the origin and effects of the great masses of ice which have periodically covered considerable portions of the earth's surface; Economic Geology, which treats of the origin and occurrences of the various useful natural products as metals, minerals, building stones, soils, clays, oil, gas, and coal; Stratigraphic Geology, which treats of the nature and succession of the various layers of sedimentary rocks which form the greater part of the earth's crust. Many other subdivisions of the subject might be listed.

An especially valuable aid to Stratigraphic Geology is the subject of Paleontology, which treats of the past life upon the earth as revealed by the fossils. The development of life with its succession of characteristic forms enables the stratigrapher to date the various layers and to connect layers of equal age which are exposed at widely separated places.

Geology is one of the most recently developed of the sciences. Its fundamental principles were first announced in 1785 by the British scientist, James Hutton (1726–1797). The division of the geologic record into ages was established on a working basis by the investigations of William Smith (1769–1839), published in 1799. About 1830 geology was placed upon a secure foundation by the teachings of Sir Charles Lyell (1797–1875) who, in his *Principles of Geology*, embodied the work of Hutton and Smith into an orderly system. Lyell won acceptance for the two great principles upon which modern geology rests: (1) that the age of the earth is very great, and (2) that in the processes in operation at the present may be found illustrations of most of the changes of the past.

In America, Lyell's principles were ably confirmed by the pioneer labors of James Hall (1811–1898), by the extensive researches of J. D. Dana (1813–1895), and by the notable contributions of Louis Agassiz (1807–1873), whose defense of the doctrine of a glacial period destroyed the last remnants of scientific opposition to Lyell's teachings. During the last half century the various branches of geological knowledge have been notably advanced by American and Canadian investigators, among whom are: J. D. Whitney, Sir J. W. Dawson, Joseph Leconte, A. Winchell, C. A. White, F. V. Hayden, Joseph Leidy, O. C. Marsh, C. H. Hitchcock, Clarence King, E. D. Cope, N. S. Shaler, S. W. Williston, H. F. Osborn, W. B. Scott, C. D. Wolcott, T. C. Chamberlin, H. M. Ami, and C. R. Van Hise.

MATERIAL OF THE SOLID EARTH

Rocks are the portions of the earth composed of mineral matter. Most rocks are of complex composition, usually, though not always, containing a number of different minerals. While 10 or more kinds of minerals may be present in the same rock, some rocks are composed of but a single mineral, and commonly only two or three constituent minerals are present in large quantity. With regard to their origin, rocks are divided into three great classes: *sedimentary* rocks; *igneous* rocks; and *metamorphic* rocks.

Sedimentary Rocks. These are formed of the material deposited from the air or water, rarely from ice. In most cases they are the result of the breaking down of other rocks and for this reason are sometimes called clastic (broken). Some sediments are deposited as the result of chemical action or of the action of plants and animals; these are called respectively chemical sediments and organic sediments. Among the sediments of clastic origin are sand, gravel, breccia, conglomerate, and shale. Those of chemical origin include certain tuffs, stalactite, travertine, veinstones, gypsum, and limonite. Those of organic origin include chalk, flint and chert (in part), marl, most oölites, peat, coal, shell limestone, lithographic limestone, some compact limestone, and dolomite. When deposited on the ocean bottom, rocks of this class, such as some shales and limestones, are called marine; when deposited along shores, such as conglomerates and sandstones, they are called littoral; when deposited in lakes, lacustrine; when deposited in streams, fluviatile.

Igneous Rocks. These are the result of the cooling of molten masses of material. When the molten material is injected into the crust of the earth and cools in the form of great masses (batholiths and laccoliths), or in long sheets (dikes or sills), the resultant rocks are known as plutonic (underground) igneous rocks. When the molten material is ejected upon the surface from fissures or the openings of volcanoes and cools in the form of ash beds, lava flows, and the like, the resultant rocks are known as volcanic, or eruptive, igneous rocks. Igneous rocks are characterized by their massive structure. They lack the stratified form of sedimentary rocks and the gneissic or schistose structure of many metamorphic rocks. In texture, igneous rocks are granitic, composed of distinct crystals as in granite; porphyritic, composed of larger crystals embedded in a matrix of smaller crystals or volcanic glass; and vitreous, or glassy, as in obsidian (volcanic glass). When the matrix is composed of crystals visible to the naked eye, the igneous rocks are plutonic in origin; when the matrix is composed of microscopic crystals, or is vitreous, the rocks are volcanic or eruptive in origin.

Igneous rocks are classified as acid or basic, according to the amount of silica (SiO_2) in their composition. The amount of silica present has much to do with the form the rock takes when cooling from the molten state and with the kind of soil which results from its decomposition.

Metamorphic Rocks. Altered from their original form. There are three general classes: (1) metamorphosed sedimentary rocks; (2) metamorphosed igneous rocks; (3) rocks similar to one or both of the foregoing but of indeterminable origin. The agencies producing these changes are chiefly heat, pressure, and migrating waters. Metamorphic rocks may be so far altered that their original condition cannot be made out, as in the case of certain schists which may have been originally either sedimentary or igneous. Other metamorphic rocks have been changed so little that their origin is easily determinable. All intermediate stages may be found.

Among metamorphosed sedimentary rocks are marble, crystalline limestone, quartzite, slate, anthracite coal, mica schist, hornblende schist, and various other schists. Examples of metamorphosed igneous rocks are aporhyolite and granitoid gneiss. Examples of the third group of metamorphic rocks are soapstone and serpentine rock.

BRANCHES OF GEOLOGY

The three most important branches are Dynamical Geology, Structural Geology, and Historical Geology.

Dynamical Geology. This branch of the science deals with the forces at work upon the earth and the effects of those forces. It considers the origin and effects of pressure, heat and cold, chemical action, and the various stresses and strains set up within the earth by tidal or other action.

The heat of the earth is either an initial heat, retained from a time when the whole material of the earth was in a gaseous or molten condition, or the heat of a secondary action of compression and friction, caused by the gradual concentration of an originally incoherent mass of relatively cool matter. There are two hypotheses of the origin of the earth: One, called the Laplacian hypothesis, suggests that the earth was originally a mass of incandescent gas revolving in space and that the subsequent history has been one of cooling and concentration. The other, called the planetesimal hypothesis, suggests that the earth was originally a mass of hot or cold particles, similar to the spiral nebulæ of the heavens, and that by the concentration of the particles, called planetesimals (little planets), heat has been secondarily produced. According to this theory, the history of the earth has been one of heating, at least up to a certain stage of its development.

The heat of the earth is confined to the interior of the solid portion, called the lithosphere or the rock sphere, as opposed to the hydrosphere or water sphere, and to the atmosphere or air sphere. It is the internal heat which produces the effects of an igneous character, such as volcanoes, the migrations of molten material within the crust of the earth, the heating of waters which have penetrated to the interior and which reappear at the surface as geysers, hot springs, and the abundant steam which accompanies every volcanic eruption. The heat of the interior increases rapidly with the depth, about 1° Fahrenheit for every 50–60 feet, and at no great distance down is sufficient to soften many of the rocks. It has an important effect in permitting the various stresses within the body of the earth to find relief as folds, faults, and other disturbances of the rocks, which are discussed under the head of Structural Geology.

The stresses which are set up in the earth are very largely pressure stresses, but there may be tensional stresses as well. The pressure is generally considered to be very largely due to the gradual contraction of the earth due to loss of heat. The solid crust, settling down upon the interior, is subjected to enormous lateral pressure which finds relief in the formation of great wrinkles and breaks in the crust. Such movements result in the formation of mountain chains, and the movements of the crust of the earth at such times produce earthquakes. Mountain-making movements are so slow that any growth would not be observed in the duration of many generations. The minor slips, which are a part of the great general movements, are the ones which we appreciate as earthquakes.

In general, there is a balance between the weight of the portions of the crust which lie in the great ocean basins and the portions which form the continents. As the land masses are being continually worn down and the loosened material deposited in the ocean basins, the continents become lighter and the balance is disturbed. At irregular periods, the balance is restored by the re-elevation of the continents until the weight of the two columns is again equal. This accounts for the more or less perfect periodicity of the mountain-making movements.

Chemical action is the result of the infiltering waters coming in contact with various minerals, taking more or less material into solution, and carrying it to other places where there is a reaction between the various chemical elements. This process is aided by the waters becoming warmed or heated as they penetrate into the lower part of the crust. Such chemical action results in a change of composition and in a change in size of the minerals and, at times, produces very profound stresses.

Less well understood, but probably very important, are the stresses set up in the earth by the tidal influence of the moon and other heavenly bodies and the stresses resulting from changes in the position of the polar axis.

Structural Geology. This branch of the science has to do with the form of the rock masses in the earth. It may well be called the architecture of the earth. The rocks which are formed by the cooling of an originally molten mass of material are deposited in great irregular bodies, as flows upon the surface, or as injections into the crust. The sedimentary rocks are deposited from air or water and occupy an originally horizontal position. The great movements of the crust have disturbed the original position of the rocks in various ways.

If the rock is bowed up into a great arch, it is called an anticline; i.e., the rocks slope (technically, dip) away from the center of the fold. If the rock is bowed down, it is called a syncline; i.e., the rocks slope toward the center of the fold. If but one side of the fold is seen, so that the rocks slope, or dip, in a single direction, the structure is called a monocline; i.e., a one-way slope. Such structures are of the utmost importance in determining the possible location of underground water, oil, and gas.

If the movement of the earth's crust is relatively sudden, the rocks may not be able to bend fast enough to relieve the stress but may break and slip. Such a rupture and displacement is called a fault. Sometimes the breaks and slips are of such magnitude that the upraised side of the fault may be mountainous in character; sometimes they are very small. At times the rocks are broken without any movement; the cracks thus formed are called joints.

It is along the cracks, joints, and fault lines that the underground waters most easily find their way through the crust of the earth, and it is in regions where such things have happened that a very considerable amount of the mineral wealth of the earth is found, for the underground waters carry the material to such places and deposit it. A crack which has been enlarged by water and then filled with deposited mineral is called a vein.

Many times in the earth's history mountain ranges have been raised upon the surface and then completely worn down by the action of running water and other destructive agents. Over such worn-down ranges the waters of the sea have flowed again and another series of rocks has been deposited. It is only by the study of the structure that such a history is revealed. When the mountain range was formed, the originally horizontal rocks were tilted up; when the range was worn down and covered anew by horizontal rocks, there was a difference in the position of the older tilted rocks and the younger horizontal rocks. Such a structure is called an unconformity, and its detection is of the utmost importance because of the history it reveals.

The structure of the rocks underlying any country has a great deal to do with the character of the surface. If the rocks are horizontal, the country will be a great level plain or will be sculptured into a land of large, flat-topped blocks, called mesas or buttes. If the rocks have been tilted up on edge, the land will be worn into a country of long ridges or parallel mountain ranges; such a country is always difficult to cross and may constitute an almost impassable barrier to the development of

roads or other means of communication. If the structure of the rock is irregular, the surface will be worn into an irregular form, such as occurs in many mountain ranges with high-topped peaks. Only in an extremely old country, where the forces of destruction have been at work for an enormously long time, will the surface of land be worn down to a featureless plain independent of the structure of the rock beneath.

Almost every feature of the landscape is affected by the structure of the rock. The direction of rivers, the character of the shores and cliffs of great lakes and oceans, the shape of the surface of the land—all are more or less directly determined by the structure. It is these things which have determined the migrations of peoples, the settlement of countries, the character of military campaigns, and the development of routes of communication. It can readily be seen how important to man is the structure of the rocks which lie below him.

Historical Geology. The determination of the geological age of the rocks depends upon two important principles: first, that the rock strata are normally found in the order of their deposition, the oldest below, the youngest above; second, that in the evolution of plant and animal life there has been in general an increase in complexity of structure. Consequently, a study of the fossil plants and animals of given strata (layers) makes it possible to determine the stage of life development to which they had attained, and to assign the rock formations in which they occur to a more or less definite age.

The use of the terms era, period, epoch, and age in this connection does not imply any exact number of years. They are simply terms which indicate definite periods of development in the earth's history, characterized by particular assemblages of life forms or by particular activities of an inorganic nature, either constructive or destructive. The terms Paleozoic era, Mesozoic era, and the like, refer to long periods of life development just as the terms Bronze age and Stone age refer to long periods of cultural development in the history of man.

The geological history of any region is recorded in the stratigraphy, or succession of the various sedimentary beds and their structure. The study of the stratigraphy of any region should begin with a consideration of the most ancient rocks, perhaps the Archeozoic, and continue progressively through the various later formations to the uppermost. This study should consider the fossils, their characteristics, variations, and associations, together with a careful examination of the structure, position, composition, and relations of the rocks in which they occur. If the study extends to the paleogeography of the region, it should include also the evolution of life, climatic developments, character of sedimentary deposits, relations of land and sea, geographic conditions, nature and extent of volcanic activity, and the growth and reduction of mountains. In fact, it should embrace everything that would bear upon the conditions of life of the organisms, both plant and animal.

In no place upon the earth can we expect to find a complete succession of the layers from the oldest to the youngest. Each region where there is an exposure of rocks reveals but a portion of the geological column. The partial series must be patched together to form the complete whole. Such a process of patching is called correlation. This is accomplished by identifying equivalent layers in separate regions (1) by the character of the rock, (2) by the mineral content, (3) by the fossils. The last is by far the most important. Local names, usually geographical names, as the Trenton limestone or the Detroit River series, are given to the layers for purposes of identification and description, but all are referred as accurately as possible to the standard geological column. Such a column is necessarily undergoing constant revision.

In the following table is shown the standard geological column, or time scale, in common use in America. The names for the important divisions and subdivisions are arranged chronologically in ascending order, beginning at the bottom with the most ancient. The arrangement corresponds with the position of the rocks in the earth's crust.

DIVISIONS OF GEOLOGIC TIME

Era	Period	Age	Revolutions
Cenozoic (*Modern Life*)	Recent, Pleistocene — Quaternary	Age of Man; Glacial Age	
	Pliocene, Miocene, Oligocene, Eocene — Tertiary	Age of Mammals	Great volcanic activity in the northwestern United States.
Mesozoic (*Middle Life*)			Laramide Revolution
	Cretaceous, Comanchean	Age of Reptiles	
			Sierra Nevada Revolution
	Jurassic		Palisade Revolution
	Triassic		
Paleozoic (*Ancient Life*)			Appalachian Revolution
	Permian, Pennsylvanian (Coal Measures), Mississippian	Age of Amphibians	
			Acadian Revolution
	Devonian, Silurian	Age of Fishes	
			Taconic Revolution
	Ordovician, Cambrian	Age of Trilobites	
			Epi-Proterozoic interval
Proterozoic (*Primitive Life*)	Keweenawan, Animikean, Huronian		
			Laurentide Revolution
Archeozoic (*Primal Life*)	Laurentian, Keewatin, Couchiching, Grenville		
	Basement Complex		

In the history of the earth, the long periods of mountain building and subsequent erosion, sometimes called "revolutions," are as important as the periods when the earth was covered by the sea and sedimentary beds were being deposited. The periods of quiet after a mountain-making disturbance, when the land was exposed to the action of destructive agents, were sometimes so long that whole ranges of mountains were removed and many feet of the sedimentary beds as well. The existence of such periods is recorded in the rocks by the presence of an unconformity, described in the section on structural geology.

The uplift and subsequent destruction of one portion of the earth's crust furnishes the material for the sedimentary beds which are being laid down on another portion of the crust. It is, then, obvious that the history of the earth must be made out for individual regions, as both building up and destruction are going on at the same time, but in different regions.

The age of the earth from the beginning of the Paleozoic to the Recent has been variously estimated, from 30 million years to many times that number. A very generally accepted figure, which states approximately the order of the figures in which we must think, is 100 million years.

THE GEOLOGICAL HISTORY OF NORTH AMERICA

Archeozoic Era. This era, called also the Archean, includes all the rocks from the very oldest up to and including the earliest recognizable stratified sediments. The name Archeozoic signifies most ancient, or primal, life, and implies that life in some form existed on the earth when a part, at least, of these rocks were formed. The rocks are dominantly igneous and metamorphic and, because of the high degree of complexity and the extreme metamorphism which has obscured their original nature, they are frequently referred to as the Archean or Basement Complex.

Archeozoic rocks are the product of great plutonic and volcanic activity and the metamorphism of the early sediments. In North America they are classified as a great schist series, the Keewatin and other formations of metamorphosed sediments in the Lake Superior and Adirondack region, and as a great granitoid series, called the Laurentian, which occupies much of eastern Canada and various portions of the United States. The duration of the Archeozoic era is believed to have been exceedingly long, possibly longer than all subsequent geologic time.

Proterozoic Era. This era, called also the Algonkian, includes that portion of geologic time which elapsed between the formation of the Archeozoic rocks and the earliest formations composed largely of unmetamorphosed sediments and carrying abundant fossils, the beginning of the Paleozoic era. The Proterozoic formations include the first great series of stratified rocks which clearly show in their history the geologic processes of weathering, transportation, and sedimentation. Such processes were, in all probability, active during Archeozoic time, but the extreme complexity produced by repeated disturbance and profound metamorphism has obscured the history.

In North America there are three divisions of Proterozoic rocks, the Huronian, the Animikean, and the Keweenawan. They are best known from the region around Lake Superior where the valuable deposits of iron and copper ore have led to their thorough exploration. There is evidence of the elevation of a great mountain range, or a series of mountain ranges in this region, at the end of the Archeozoic, followed by a period of exposure and erosion so long that the land was again reduced almost to the level of the sea, before the deposition of the first Proterozoic sediments. The recognition of this enormous interval of time increases our appreciation of the age of the earth. A period of similar activities and of equal duration intervened between the Proterozoic and the Paleozoic.

Paleozoic Era. This is the earliest era of dominantly unchanged sediments and abundant fossils in the rocks. Beginning with the earliest, it is usually divided into the following periods: (1) The Cambrian, (2) the Ordovician, (3) the Silurian, (4) the Devonian, (5) the Mississippian, (6) the Pennsylvanian, (7) the Permian.

Throughout the Paleozoic era there were no Appalachian mountains. The site of these mountains was occupied by a sinking trough in which accumulated over 25,000 feet of sediments derived from high land to the east. At the close of the Paleozoic a great lateral pressure raised this mass of sediments into the Appalachian mountains; this movement is called the Appalachian revolution. In a similar manner, the Rocky Mountain axis, in the western part of the continent, was an indefinite range of pre-Cambrian rocks around which was accumulating a vast mass of sediments. These were finally raised into the mountains we know, but not until the end of the Mesozoic.

Cambrian Period.—The rocks of this period consist of shales, slates, sandstones, and quartzites, sometimes of great thickness, with a subordinate amount of limestone. In North America they are grouped as Lower Cambrian or Waucoban (Georgian), Middle Cambrian or Acadian, and Upper Cambrian or Croixan (Potsdam). Cambrian rocks occur along the axis of the Appalachian mountains from Newfoundland to Alabama, along the Rocky Mountain axis from the Great Basin northwestward to the Arctic Ocean, and in scattered areas in the Mississippi valley.

These rocks are formed from the débris of great mountain ranges which outlined approximately the North American continent even in the earliest stages of its growth. The débris was deposited in a great interior sea which covered what is now the Mississippi valley, and is called the Mississippian sea. It is the history of this sea, with its alternate growth and retreat, its sediments, and the life that inhabited it, which constitutes much of the geological history of North America during the Paleozoic era.

The known fossils include no vertebrate animals, no insects, and no plants. The most characteristic fossils are trilobites, but remains of many other lower animals, as crustaceans, mollusks, brachiopods, worms, crinoids, sponges, and corals, are known.

Ordovician Period.—The formations of this period, originally called the Lower Silurian, consist chiefly of limestones, dolomites, shales, and sandstones.

During the Cambrian period the great interior sea was slowly advancing over the Mississippi valley. Early in the Ordovician the sea had established itself and the waters stretched uninterruptedly from the site of the Appalachian mountains, on the east, to the old ranges which marked the present site of the Rocky mountains, on the west. About the middle of this period two islands were probably present in the interior sea, one about where Cincinnati is located and one in southern Missouri. These islands persisted, as more or less dominant features of the continent, from that time on, and had the utmost significance in determining the location of the courses of the Ohio and Mississippi rivers and the great coal fields of the Ohio valley, Kansas, Oklahoma, and Texas.

In the rocks of this period are found the marbles and slates of Vermont and New Hampshire; the oil and gas of Ohio and eastern Indiana; the zinc and lead ores of Wisconsin, Iowa, and Illinois; and the phosphate beds of Tennessee. Trilobites reached their greatest variety in this period. Certain indefinite fossils, found in the rocks of Colorado and Wyoming, suggest the first appearance of fishlike vertebrates.

At the close of the Ordovician, a great mountain range was elevated in western New England and as far south as Virginia. It was the heat and pressure developed in this earth movement which metamorphosed the limestones and shales of western New England into marbles and slates. Before the region was again covered by water, the range had been worn down nearly to the level of the sea. This great disturbance is known as the Taconic revolution.

Silurian Period.—The rock formations of this period consist of limestones (dolomites) with interstratified beds of shale and sandstone. In North America three groups or epochs are recognized, the Oswegan, the Niagaran, and the Cayugan. The Niagaran epoch was one of great extension of the interior sea. In its pure waters there was an abundance of corals and other lime-secreting organisms, which furnished the material for the great bed of limestone that occupies much of the north central portion of the United States and extends far north into Canada. Niagaran limestones, or dolomites, are conspicuously developed in the gorge of the Niagara river, where their resistance to erosion has determined the formation of the great cataract at the falls. The saline beds in the Cayugan formations of New York and Ohio contain valuable deposits of salt and gypsum.

Remains of Silurian plant life are scarce. It is probable that there was an abundance of marine plants, but the terrestrial flora was either so scant, or so lacking in hard parts which could be preserved as fossils, that no certain remains have come down to us. It is altogether probable, however, that a terrestrial flora of some kind was in existence. The only vertebrate animals were primitive fishes, but the invertebrates were abundant. Especially was this a time when enormous reefs of coral were built up by such forms as the "wasp-nest coral," *Favosites;* the "chain coral," *Halysites*; and the "organ-pipe coral," *Syringopora.* Scorpions appeared for the first time, one of the first bits of evidence of air-breathing terrestrial life. The largest animals were giant crustaceans, called eurypterids, some of which were over six feet long.

Devonian Period.—This period is often called the "age of fishes" because of the great development of fish life and the abundance of fossil remains that have been preserved. In North America the Lower Devonian formations include the Helderberg limestones and Oriskany sandstones; the Middle Devonian includes the Onondaga limestones and the Marcellus and Hamilton shales; the Upper Devonian is made up of the Tully limestones, the Genesee shales, the Portage sandstones and shales, and the Chemung-Catskill sandstones and shales. Devonian formations occur extensively in the eastern United States and in the Mississippi valley.

In contrast with the Ordovician and Silurian periods, the Devonian was a time of shallow seas and isolated basins. The Mississippian sea was broken up into many parts with constantly shifting boundaries. For this reason the Devonian deposits are dominantly shallow water beds—muds and sands and shore pebbles—which hardened into shales, sandstones, and conglomerates. The deposits of one region are very dissimilar to those of another. It was a period of minor disturbances with such a wealth of different environments that the life was abundant and extremely varied.

The land plants included ferns, lycopods, horsetails, and conifers. In the Devonian a true terrestrial flora is in evidence for the first time, and for the first time the earth was covered with a forest growth. In New York, Pennsylvania, West Virginia, and Ontario the rocks of the Onondaga series yield immense quantities of petroleum and gas.

At the close of the Devonian, a mountain range was elevated in the region of Nova Scotia and New Brunswick, in Canada. In the period of erosion which followed, this range was very nearly destroyed. This is called the Acadian revolution.

Mississippian Period.—Originally this and the two succeeding periods were considered as one, and called the Carboniferous period, because of the large amount of coal contained in its formations. It was later found necessary to divide it into three periods. The old name Carboniferous is sometimes used for the Pennsylvanian. After the Acadian revolution the Mississippian sea again spread over the continent, reaching from the site of the Appalachians on the east to the ranges which marked the axis of the Rockies on the west. On the eastern side of the country the débris of the recently elevated Acadian mountains furnished an enormous mass of coarse material which is now the very heavy bed of fine conglomerate called the Pocono sandstone. In the region of New York there was more of mud and fine material, now called the Mauch Chunk shales.

Over the whole of the Mississippi valley and far to the west there was a clear sea with an abundant life of lime-secreting organisms which furnished the material for the heavy beds of limestone forming the bluffs of the Mississippi river in southern Wisconsin, Iowa, and Illinois, and visible on the slopes of the Rocky mountains. In the clear seas such forms of life as the crinoids, the stone lilies, flourished amazingly, and their remains are found in great numbers. Innumerable sharks inhabited the waters, but of them we have left only the teeth and spines.

The record of the land life is very poor; only a few footprints of amphibians, newt- or salamander-like creatures, occur in the shales which were the soft muds of local pools. That such life must have been present in considerable quantity, and in a fairly advanced stage of development, is proved by the fact that the imprint of an amphibian foot has been found in the shales of the preceding, Devonian, period.

Pennsylvanian Period.—This period is sometimes referred to, in nontechnical writings, as the Carboniferous, or the Coal Measures. With the oncoming of the Pennsylvanian period began the death of the great Mississippian sea which had dominated the center of the continent during the whole of the Paleozoic era. The land began to rise slowly and the great sea gave place to swamps, similar to the Great Dismal Swamp of Virginia and the Everglades of Florida, on the Atlantic coastal plain. In these swamps were laid down a succession of sandstones and shales with beds of coal, and, rarely, some limestones.

The coal beds are the result of a luxuriant growth of vegetation in the swamps; the decaying vegetation was gradually deprived of much of its volatile matter, and the residual carbon was mineralized into bituminous (soft) coal. The portion of bituminous coal formed in eastern Pennsylvania was later metamorphosed by the heat and pressure developed in the elevation of the Appalachian mountains into anthracite (hard) coal. In North America the productive coal deposits of this series occur in various areas ranging from Nova Scotia south to Alabama,—in the Ohio valley, in Iowa, Missouri, Oklahoma, and Texas, and in small amounts elsewhere, covering in all approximately 200,000 square miles. The oil of the mid-continental field (Kansas, Oklahoma, and Texas) is found in rocks of Pennsylvanian age.

The abundant plant and animal life of the period is remarkably well preserved in the shales associated with the coal beds. About 2000 species of Carboniferous plants are known, chiefly calamites (ancient horsetail rushes), lycopods, cycadofilices (seed-bearing fernlike plants), ferns, and conifers. The lycopods, now represented only by small club-mosses, then grew 50 feet high and 5 feet in diameter and in such enormous profusion that they are believed to have furnished much of the vegetable matter for the formation of coal. Animal life, likewise, occurred in great variety and profusion, the highest forms being primitive amphibians, which were the first land vertebrates.

Permian Period.—The gradual uplift of the continent finally drained away the waters from the swamps, and the surface became very largely dry land with only a few swamps and some small inland seas. Although Lower Permian formations occur in Pennsylvania and West Virginia, Permian strata, largely of terrestrial origin, are best known in Oklahoma, Texas, Kansas, and Nebraska, where they cover large areas and attain great thickness. In the Permian strata of Kansas and Oklahoma, valuable deposits of gypsum and rock salt occur. Compared with that of the Pennsylvanian, the plant and animal life of the Permian is greatly impoverished, the number of known species being only a fraction as large. The most notable advance in animal life was the appearance of true reptiles.

Mesozoic Era. At the close of the Permian period, came one of the greatest revolutions of the earth's history. Throughout the Paleozoic era, enormous quantities of material had been accumulated in a sinking trough in the place where the Appalachian mountains now stand; through the same time the gradual shrinking of the earth's crust had caused an accumulation of stresses which were only partially relieved by the Taconic and Acadian revolutions. At the end of the Paleozoic these stresses were relieved by crushing together the relatively weak sediments in the trough and elevating them into a great mountain system of folded rocks. This revolution drove the Mississippian sea from the continent, never to return, and the whole history of North America took on a new character.

The new phases in the development of life and the character of the sediments are the determining features of the Mesozoic era. The era is divided into four periods: (1) The Triassic, (2) the Jurassic, (3) the Comanchean, and (4) the Cretaceous. The Mesozoic is distinguished by the remarkable development and predominance of the *Reptilia* (whence the name "age of reptiles"), the appearance of the modern type of plants, and the first appearance of birds and mammals.

Triassic Period.—The Triassic deposits of North America occur in three areas. On the eastern side of the United States the destruction of the recently elevated Appalachian mountains furnished a large amount of débris, which was washed down the eastern slopes and deposited in the deltas and great flood plains of rivers that flowed into the Atlantic Ocean. The red and brown sandstones of Connecticut and New Jersey, and even those as far south as the Carolinas, are of this age.

The second area of deposition is in the west central portion of the United States on the slopes of the axis of the Rocky mountains; here great thicknesses of red sandstones and clays tell of terrestrial conditions with accumulations in deltas, flood plains, and local pools. The Permian and Triassic deposits form the "red beds" which are such prominent features of the landscape, always noted as one approaches the Rocky mountains from the east.

On the Pacific coast and even in the Great Basin there are great thicknesses of limestone which tell that the Pacific Ocean penetrated far over the western edge of the continent.

At the close of the Triassic occurred the last great earth disturbance on the eastern side of North America. From the Bay of Fundy south to the Carolinas, the region east of the Appalachians was broken in a most intricate manner by series of earthquakes, and through the cracks there were extruded great quantities of lava. One of the largest of these lava sheets forms the Palisades of the Hudson on the western side of the river at New York City. This disturbance is known as the Palisade revolution, though it did not attain the magnitude of some of the other revolutions.

In the Triassic rocks occur the fossils which, because of their nearer approach to modern forms, have given to the era the name Mesozoic. In the plant world the conifers and cycads had replaced, in large measure, the simpler plants of the Paleozoic. The invertebrate animals had taken on new characters and were very much more like the modern forms. Among the vertebrates were the advance legions of the great horde of reptiles which dominated the earth in the Mesozoic and justify the name, "age of reptiles," which has been applied to it. Some of these forms are briefly described in the section on Mesozoic life.

Jurassic Period.—During Jurassic time, the continent of North America was very largely out of water, and the coast line was probably farther out in the oceans than at any other time in the Mesozoic. A few uncertain deposits on the eastern coast of Maryland may be of Jurassic age, and there are marine Jurassic deposits in the Pacific Coast region and in Mexico. Most of the Jurassic of North America is terrestrial; a series of deposits along the slopes of the Rocky Mountain axis is probably Jurassic. These deposits are radically different from the red Triassic beds below them. The Jurassic beds are dark in color, with included remains of an abundant vegetation showing that the extreme aridity of Triassic times had given place to a far more humid climate, very favorable to the development of the life of the Mesozoic, both plant and animal.

For a brief interval of time, an arm of the ocean crept over the Rocky Mountain states from the North Pacific and left a thin layer of marine deposits amidst the mass of terrestrial material.

During the Triassic and Jurassic periods there was a sinking trough on the site of the present Sierra Nevada mountains. In this trough accumulated many thousands of feet of sediments, and at the close of the Jurassic a lateral pressure folded and faulted the sediments up into a mighty mountain range, the original Sierra Nevada range, which was to undergo many changes before it attained its present form. This was the Sierra Nevada revolution, one of the great disturbances in the geologic history of the continent.

Comanchean Period.—In the older textbooks this is referred to as the Lower Cretaceous. The close of the Jurassic period left the continent of North America well out of water, but a series of broad folding movements warped the surface so that the waters of the oceans spread inland for greater or less distances on all the borders of the land. The Atlantic coast, the Gulf coast, and the Pacific coast were all covered by the advancing floods. On the Atlantic and Pacific coasts the waters did not extend inland very far, as they were stopped by the barriers of the Appalachian and Sierra Nevada mountains, but the waters of the western Gulf spread over Mexico and Texas and advanced northward as far as central Oklahoma.

A counter movement raised the land again, a long period of erosion removed much of the Comanchean and older sediments, so that a great structural break (unconformity) marks the line between the Comanchean below and the Cretaceous above. There was no important mountain making at this time.

Cretaceous Period.—The surface of the land was again warped and the seas spread over the continent in much the same areas as in the Comanchean but attained greater mastery over the land. This is especially true of the invasion from the Gulf. The waters covered most of the Plains states and the portion of Canada which lies directly north of them. The great inland sea stretched from the Gulf of Mexico to the Arctic Ocean, the greatest sea that ever lay upon the surface of North America, and the last, for never again did the waters of the ocean cover more than the edges of the land. The sediments of the great Cretaceous inland sea show many phases in its development. The most important phase was the deposition of a thick bed of chalk, similar to that of southeastern England

and western France, which covers western Kansas and parts of the adjacent states.

One of the most important events of the late Cretaceous was the growth of a very luxuriant vegetation. The remains of this vegetation now form the lignite deposits of Montana, North Dakota, and the adjacent parts of Canada.

The Cretaceous period, and with it the Mesozoic era, closed with the elevation of the old ranges previously referred to as the Rocky Mountain axis. In this elevation, both the old pre-Cambrian core and the sedimentary rocks of the Paleozoic and Mesozoic ages were involved and the true Rocky mountains, as we know them, made their first appearance. This disturbance is one of the greatest in the history of the continent. It is known as the Laramide or Rocky Mountain revolution, and marks the line between the Mesozoic and Cenozoic eras, just as the Appalachian revolution marks the line between the Paleozoic and the Mesozoic.

Life of the Mesozoic Era.—With the dawn of the Mesozoic, most of the archaic forms of life which had their development in the Paleozoic, passed away forever, and their place was taken by new forms far more closely related to those now existing. In the Triassic and Jurassic, the vegetation was composed of conifers and cycads, with ferns and some old forms that held over from the previous periods. There were no flowering plants, and the trees had not as yet developed the habit of shedding their leaves in the fall of the year and gaining a new foliage with the coming spring. The forests were dark and somber, with little of grace or beauty in stem and branch. There were no flowers and nothing of the variety that now comes with the changing seasons.

By the early Cretaceous all was changed. The forests were composed of modern types of trees and we would have recognized the willow and the sassafras, the plane tree and the maple, with many other familiar kinds bearing fruits and flowers. The smaller forms of vegetation also had changed. There were fruit- and nut-bearing shrubs, and bushes and the grasses had begun to appear. There is no hint of where this new vegetation was developed. It appears with dramatic suddenness, the fossil leaves fill the sandstone which lies below the great chalk beds, and we are left to speculate upon the time and place of origin of this new flora.

Among the invertebrates the change is nearly as striking. The trilobites were gone, and with them many other archaic groups. In their place were forms much more like the modern inhabitants of the seas and fresh waters. One group is peculiarly characteristic of the era: great cephalopods, like the modern squid and cuttlefish, swarmed in the Mesozoic seas, but most of them lived within shells coiled like those of snails. The shell was divided into chambers and the partitions between the chambers were extremely complicated, so that the mark of the chamber walls on the outer shell is a very irregular line. Such coiled shells are called Ammonites. They are extremely common Mesozoic fossils and are confined entirely to the Mesozoic. If we see such a shell in a museum or in the field, we know that we are viewing a Mesozoic form. Ammonites are among the most definite and characteristic time markers or index fossils known.

Among the vertebrate animals the change was even greater than in the other groups of life. The time of the fish and the amphibian had passed; the time of the reptiles was at hand. Over 20 orders of reptiles have been identified from the fossils found in the rocks. The reptiles spread in enormous numbers and were adapted to all possible modes of life. Certain forms, as the Dinosaurs (terrible lizards), dominated the land. Of these, some were carnivorous forms which first appeared in the Triassic as animals not larger than dogs but reached giant size at the end of the Cretaceous. These animals gradually assumed a kangaroo-like form; the strong hind feet were armed with powerful claws, like the talons of an eagle; the fore feet were relatively small and useless; and the jaws were filled with sharp, conical teeth fitted for tearing the flesh of their prey. Other Dinosaurs were plant eaters; some had a kangaroo-like habit of body; still others went upon all fours and were covered with a bizarre armor. Some of the herbivorous Dinosaurs dwelt in the swamps and pools; these forms reached the largest size attained by any animal that has lived upon the land, 80 feet in length and 50 or more tons in weight.

Other reptiles were crowded from the land into the sea, as the seal and the walrus have been in recent times. Some, the Plesiosaurs, had a long neck and tail with a heavy body and powerful flippers; they have been aptly likened to a turtle strung upon a snake. Still other reptiles, the Icthyosaurs, became purely aquatic in habit and took on fishlike form. They occupied the same place in the Mesozoic seas that the whales and dolphins fill in the oceans of today. Still other forms, the Mosasaurs, were veritable sea serpents, with a long snakelike body, small paddle-shaped limbs, and powerful jaws.

Other reptiles, the Pterosaurs or Pterodactyls, took to the air; the fore limbs were converted into supports for membranous wings and the animals glided or flapped through the air in pursuit of their prey.

There were many other kinds of reptiles, too numerous to mention, but it may be noted that the beginnings of the lizards, the turtles, and the crocodiles were made in the Mesozoic. At the end of the Mesozoic, the great host of reptiles was almost entirely wiped out and only the few and lowly forms that we know today were left.

In the Jurassic appear the beginnings of the birds; the first forms were little more than feathered reptiles, with teeth in their jaws and functional claws on the fore limbs, but they speedily developed into the kinds of birds now existing. The history of the birds is not well known, for relatively few fossil forms have been discovered.

The first of the mammals appeared in the Triassic, but through all the Mesozoic they made little progress, dominated as they were by the innumerable reptiles of that time.

It is probable that the great change which came over the plant world in the Cretaceous period had much to do with the appearance of higher forms of life. The new food supply of nuts, seeds, and grasses made possible the development of new types of vertebrate life, and with the appearance of flowers came the flower visiting insects which had never before brightened the woods and fields with their presence.

Cenozoic Era. This is the era of modern life. By some it is made to include the Tertiary and the Quaternary, while the time since the appearance of man upon the earth is set off as a distinct era, the Psychozoic—the age of the dominance of mind over matter; by others, the Cenozoic is made to include all time since the Mesozoic.

The Tertiary was the age of dominance of the mammals upon the earth and is commonly called the "age of mammals"; the Quaternary was the age of the great climatic disturbance which clothed portions of the earth in sheets of ice, and it is commonly called the "ice age" or the "glacial age."

The Tertiary is divided into the Eocene, the Oligocene, the Miocene, and the Pliocene periods. It was a time of elevation of the land; the seas invaded only the edges of the continent. There are no marine deposits in the central portion but only the deposits of lakes, streams, swamps, wind, and ice. Upon the borders of the Atlantic and Pacific oceans are marine sands and clays with marine fossils. These did not extend far inland as the invading waters were stopped by the barriers of the Appalachian mountains and the mountains of the Pacific coast. The waters of the Gulf of Mexico

penetrated much farther inland; in Eocene time they extended as far north as the mouth of the Ohio river, but in later times they did not reach nearly so far. These marine deposits have furnished much of the fertile soil of the Atlantic and Gulf coastal plains.

In the interior of the continent, the Tertiary deposits are found in the Great Plains and in the intermontane basins of the West. The deposits are largely the result of the degradation of the adjacent mountain ranges.

The Rocky mountains, the Sierra Nevada mountains, the Cascade mountains, and the Coast ranges of the Pacific border were never at rest after the beginning of the Tertiary. Uplifts and readjustments occurred between the periods, and these, with the accompanying volcanic activity, furnished abundant material for the scattered sedimentary deposits in which the record is written. We read this history not only in the deposits but in the gorges, the valleys, and the canyons—the results of the erosive agents. The volcanic activity in mid-Tertiary time was extreme; in Washington, Oregon, and the adjacent states there was one of the greatest fields of volcanic activity the world has ever seen. Over 200,000 square miles of territory are covered by the lavas and ash beds. The chain of volcanoes beginning with Mount Lassen, in northern California, and ending with Mount Rainier and Mount Baker, in Washington, was formed at the same time. Intrusions of igneous material into the earth's crust in northwestern Wyoming, occurring at this time, are responsible for the geysers, the hot springs, and the other wonders of the Yellowstone National Park.

At the close of the Pliocene came the final great elevation of the mountain ranges of the West. To this very recent disturbance and the consequent vigorous action of the erosive agents, we owe the grandeur of the scenery displayed in the Yosemite valley of California, the Grand Canyon of Arizona, and the mountains of the Glacier national park and the Canadian Rockies.

Pleistocene Period.—This is commonly referred to as the Quaternary division of the Cenozoic era. It was introduced by a climatic change which lowered the temperature and increased the precipitation in the northern hemisphere until great areas were covered by moving sheets of ice (glaciers), such as now lie upon the surface of Greenland and the Antarctic continent. The ice did not accumulate at the pole and descend as a uniform cap into lower latitudes, but gathered at separate points south of the north pole. In North America there were three such centers: One in Labrador, one just east of Hudson bay, and one to the west of Hudson bay. From these the ice slowly crept out in all directions. In the United States it reached approximately as far south as the present courses of the Ohio and Missouri rivers.

It is known that the advance of the ice was not a single movement but several, with periods of retreat between the advances, when the climate was warmer and vegetation covered for a time the regions that had been covered by the glaciers. The record of the great glaciers is left in the thick mantle of mixed sand, clay, and bowlders, which was dragged beneath the ice or borne upon its surface. Such material forms the surface soil of the glaciated region. In places there are long ridges of mixed material (moraines) which was shoved before the ice or deposited at its front; they mark the farthest advance of the ice in its various stages.

The ice itself and the material which it deposited altered the courses of the streams, changed the contours of lakes, and obscured the rocks and soils of all the invaded country. The ice carried many stones frozen in its bottom, and as these stones were dragged over exposures of rock or were rubbed together, both the solid rock and ice-borne bowlders and pebbles were scratched and scored by lines (glacial striæ). These indicate the direction of the ice movement and give some idea of the amount of work done by the glaciers.

The mixed glacial material has been rehandled and sorted, in many places, by the waters from the melting ice. This is the origin of the gravel hills, the sand plains, and the fertile clay lands of the glaciated region.

It is not certain that the Ice age has passed away. We may now be living in one of the interglacial periods and the ice may again accumulate and spread over the land. The last great ice sheet disappeared from the surface of North America about 25,000 years ago.

Life of the Cenozoic Era.—The life of this era was essentially the same as that of today. Many forms that lived have passed away, but the differences which distinguished them from modern forms are differences of degree only. The plants were modern in all their characters. One of the striking innovations of the time was the development of vast areas of grass land on the growing plains of the western part of North America. This led to the development of herds of grazing animals and the rise of the carnivorous forms which inevitably follow such herds. The increase of seed- and nut-bearing plants led to the development of the rodents and the burrowing mammals. The increase in flowering plants led to the development of the insects in countless profusion, and the growth of the forests and the open lands with their diversity of climate and conditions permitted the birds to increase their numbers.

The inevitable result of all this increase in animal life was a high degree of specialization—just such as had repeatedly occurred in the older years of the earth. The animals developed all sorts of ways to gain a living and survive in the struggle for existence. Some of the mammals took to the sea, as the whale, the dolphin, the seal, and the walrus; others became swift runners, or good climbers, or burrowers in the earth. Some became eaters of flesh, some of fish, some of carrion, some of plant food; some retired to the warmer parts of the land while others found refuge in the ice-clothed North. The same thing occurred in the other groups of animals and to a lesser degree in the plants—all resulting in the wonderful diversity which prevails today.

Each period of the Tertiary has its own peculiar group of animal and plant forms by which the paleontologist can distinguish the age of the beds. These differences are too minor and too technical, particularly in the case of the invertebrates and the plants, to be understandable to the layman. In the case of the vertebrate animals, however, especially the mammals, the differences are more striking.

In the Eocene time the mammals were more simple and primitive than they are today. The earliest forms had within them the possibility of developing into any one of the modern groups. Very soon some developed the characters of the carnivorous forms, others the characters of the hoofed grazers, browsers, and runners, while still others showed the beginnings of the elephant-like forms, and so on through the entire series.

To illustrate by one or two examples: In Eocene time, there was already a group of primitive carnivores which followed the herds and fed upon the sick, the weak, and the aged; they were not yet separated into the cats, the dogs, the bears; they had not yet the agility of body nor the fine and close adjustment of tooth and claw to the peculiar life led by the modern flesh eaters. They were, however, as much superior to plant eaters in activity and cunning as are the lion and tiger of today. From these primitive carnivores developed all the modern forms which depend upon their swiftness, their cunning, and their strength to destroy other animals and feed upon them.

Another excellent example is that of the horse. We know the history of the development of the horse almost from the beginning and through all of its stages to the modern form. It is one of the most

perfect bits of paleontological history and one of the best demonstrations of continuous advance and improvement with the passage of geological time. Beginning with a small five-toed form, with nails instead of hoofs, with numerous teeth fitted for eating anything, it gradually developed through the various periods into the horse as we know it today. This was accomplished by the loss of the outer digits and the strengthening of the third, by the development of the nail into a hoof, by the elongation of the limb, and by the change of the teeth into grinding organs fitted for the mastication of hard grains and grasses.

The two-toed grazing and running forms, as the deer, the sheep, the camel—"all such as have a cloven hoof and chew the cud"—went through similar stages. They retained, however, the second and third digits of the fore and hind feet instead of the third digit only.

An enormous number of different forms of mammalian life developed and disappeared because they were unfitted to the changed conditions that came with the passage of geological time. Some of these were fully as weird in form as the reptiles of the Mesozoic. The giant Dinotheres of the Eocene and the Titanotheres of the Oligocene occupied approximately the same place in nature that the elephant does today. The enormous Zeuglodon, the whale-like mammal of the Gulf of Mexico, the giant ancestors of the elephants, of the sloths, and of the armadillos, all lived their appointed time and passed away to make room for higher forms.

The form of the continents in the Tertiary was not fixed. Constant changes, such as the opening and closing of Bering strait or the alternate establishment and breaking down of the isthmus of Panama, permitted frequent migrations of the mammals from one region to another.

It is strange to think of the camel, the rhinoceros, and the elephant as inhabitants of North America, but their remains have been found in great numbers in deposits of Tertiary and even of Quaternary time. South of the ice sheets, in Pleistocene times, the mammoth and mastodon, as well as the bison, reindeer, and muskox, were abundant and characteristic animals. The mammoth occurred in great numbers in the region which is now Mexico and the southern United States, and ranged far northwestward. The mastodon occupied a more northerly area, extending into what is now western Canada, but also to the south. At this period, however, the saber-toothed tiger, tapir, llama, and horse had become nearly extinct. Many forms now unknown in North America originated here and migrated to other lands as conditions changed; other forms which originated in other continents migrated into North America and are now well established.

The Primates, the group to which the monkeys, the apes, and man belong, originated in the Eocene, but man did not appear upon the earth till the earliest Pleistocene. The oldest remains that can be referred to man were found in the island of Java, but primitive implements, fashioned from flint and some of them marked by fire, have been found in the upper Pliocene of England. Other remains a little younger were found in Germany, near Heidelberg, and then, in increasing abundance, the remains of man have been found in the river deposits, and in the caves and shelters of many parts of the world. The history of man from the earliest apelike form to the modern man is as truly a matter of historical geology and paleontology as the history of any other form of the mammals. In Europe, man lived during the great Ice age and his remains are found mingled with those of the Hairy Mammoth, the Woolly Rhinoceros, the reindeer, and other inhabitants of the polar world. It is still uncertain whether man had reached North America before the ice had passed away, but the evidence seems to point to the probability that he was a late migrant into the Western world after a long period of development in Europe and Asia.

PALEONTOLOGY

Paleontology is the science which treats of the forms of life that inhabited the earth during past periods of geological time. There are two natural subdivisions,—Paleobotany, which deals with extinct plants, and Paleozoology, which deals with extinct animals. The science is based upon the comprehensive study of fossils. It is closely interrelated with geology and biology. In a broad sense, it is the history of the evolution and development of plant and animal life from its earliest discoverable beginnings in remote geological epochs to the present time.

While Palissy (1510–1589), the famous potter, and other early observers held that fossils were the remains of organisms that had existed in former ages, paleontology was established as a science about the beginning of the 19th century through the monumental labors of Cuvier (1769–1832) and Lamarck (1744–1829). Their investigations showed that fossils from the lower or earlier rock strata differed from the present forms of plants and animals more than do fossils from the upper or later rock formations. The extensive researches made since Cuvier's day have confirmed scientists in the view that paleontology gives a true though incomplete record of the development of the existing forms of life, and that throughout geological time successive faunas and floras show a rise in the scale of life. This is sometimes called the law of continuous improvement.

In the Cambrian, the most ancient period in which evidences of life are abundant, a group of crustaceans called trilobites were the highest animals. In the Silurian period fishes first appeared; in the Devonian period amphibians appeared; in the Carboniferous period amphibians had their greatest development and reptiles appeared; while in the Triassic period the reptiles began their great development and the first primitive mammals appeared. Wherever the fossil record can be followed, it is found that each group of animals or plants begins with simple types; that gradually more complex and specialized forms appear; and that frequently decadence sets in with great suddenness, resulting in extinction or the reduction of the group to relative unimportance.

For example, the trilobites, which were immensely varied and abundant during the Ordovician period, are not found later than the Permian period. The ammonites were a group of forms related to the modern cuttlefish, but which lived in a coiled shell. Developing from simpler forms, they appeared at the beginning of the Mesozoic, attained great importance during that era, and became extinct at the end of the Cretaceous period. The great scorpion-like eurypterids, so abundant in the Silurian, are unknown later than the Permian. Similarly, most of the orders of reptiles, which ruled the sea and land during the Mesozoic era, became extinct at the end of the Cretaceous period. In various groups the number of known fossil species is much greater than that of the living species.

Certain fossils are so characteristic of the different periods, epochs, or formations of rocks, that they serve as index fossils, enabling the geologist to fix the exact geological age of the rocks from which they come. On this account paleontology is of immense service as a working adjunct to geology, particularly to stratigraphy. As a knowledge of the latter is indispensable in economic geology, particularly in locating the beds which contain precious metals, useful minerals, coal, oil, gas, and artesian waters, it is easily seen that paleontology is of great practical value.

Among eminent pioneer and later paleontologists in America may be mentioned Joseph Leidy, Leo Lesquereux, James Hall, J. W. Dawson, C. A. White, C. D. Walcott, O. C. Marsh, E. D. Cope, W. B. Scott, David White, S. W. Williston, H. F. Osborn, E. O. Ulrich, and Charles Schuchert.

MINERALOGY

Mineralogy is a branch of the great earth science, Geology. It deals with the origin, composition, and properties of inorganic chemical substances existing already formed in the earth's crust, known as *minerals*. An allied branch, *Petrology*, treats of the origin, properties, and relations of the minerals forming the various rock masses.

While Theophrastus and Pliny the Elder among the ancients, Avicenna and Albertus Magnus during the middle ages, and Georg Agricola in the 16th century wrote treatises dealing with minerals and rocks, little real advance was made until near the close of the 18th century, after which the science made rapid progress.

The study of minerals may be divided into six branches: (1) *Crystallography*, which deals with the description, character, and classification of crystals; (2) *Physical Mineralogy*, which deals with the optical, electrical, magnetic, thermal, and other physical properties of minerals; (3) *Chemical Mineralogy*, which deals with the chemical composition and relations of minerals; (4) *Descriptive Mineralogy*, which deals with all phases of the description and classification of mineral species; (5) *Determinative Mineralogy*, which makes use of classified tables of physical and chemical properties as an aid to the identification of a mineral; (6) *Economic Mineralogy*, dealing with the use of minerals by man.

Crystallography. This branch of mineralogy is the science concerned with the form, structure, and properties of crystals. Such knowledge is essential to systematic study and classification of minerals.

Nicolaus Steno, a Danish scientist, discovered in 1669 that, while the faces of quartz crystals vary in size and shape, the angles between corresponding faces are always the same. This relationship applies to all crystals of any one species, and is known as the law of *constancy of angle*. The interfacial angles of a crystal are measured by means of an instrument called a *goniometer*. The science of crystallography became firmly established in the period 1772–83, when Romé de l'Isle and Haüy discovered the *law of symmetry* and the *law of rational indices* in crystals and derived all crystals from six primitive forms. Hessel, in 1830, proved that only 32 types of symmetry are possible in crystals. All crystals are now grouped in 32 classes corresponding to these types, which are usually arranged in six systems.

The commonly accepted systems are: 1. The *isometric* or *cubic system*, having three equal axes at right angles to each other. 2. The *hexagonal system*, including trigonal forms, with four axes, three of which are equal and cross each other in one plane at an angle of 60°, while the fourth may be either longer or shorter and is perpendicular to the others. 3. The *tetragonal system*, with three axes at right angles to each other, two being of equal length and the third either longer or shorter. 4. The *orthorhombic system*, having three axes of unequal length at right angles to each other. 5. The *monoclinic system*, with three unequal axes, two of which intersect at an oblique angle in a plane at right angles to the third. 6. The *triclinic system*, having three unequal axes intersecting at oblique angles.

Examples of crystals in each system are: *isometric* or *cubic*,—diamond, fluorite, galena, garnet, common salt; *hexagonal*,—apatite, emerald, quartz, ruby, sapphire, tourmaline; *tetragonal*,—cassiterite, chalcopyrite, zircon; *orthorhombic*,—barite, sulphur, topaz; *monoclinic*,—borax, gypsum, mica; *triclinic*,—albite, cyanite, rhodonite.

The great majority of minerals fall within seven classes, and all known minerals are probably covered by 22 of the 32 classes which make up the six systems. Of the remaining ten classes of crystals, nine have been prepared in the laboratory and one is still unknown. Aided by chemistry, physics, mathematics, and mineralogy, the science of crystallography has made great progress. Practically every known substance which assumes crystalline form can be identified by means of accurate and proper measurements of its interfacial angles.

A peculiar property of some crystals is indicated in the phenomena known as *dichroism* and *pleochroism* or *polychroism*. These are variations in color when the crystals are viewed in different directions. In passing through such crystals, the rays of light, having vibrations in different planes, undergo different degrees of absorption, whence the changes in color. Many minerals, on account of the internal arrangement of their crystals, exhibit different colors.

Physical Mineralogy. The branch of the science which is concerned with all of the physical properties and characteristics of minerals. Most of these properties, with the exception of those such as taste and odor, are greatly affected by the crystalline or, in some cases, by the noncrystalline form.

An examination of the physical characteristics of a mineral will generally include the following: color, transparency, luster, and hardness; cleavage, or the tendency to separate in certain definite directions; specific gravity; the effects produced by heat, electricity, and magnetism; and especially those properties depending on light,—such as the index of refraction, polarization, and pleochroism, or a change of color when viewed from different directions.

Hardness is determined by the resistance which a mineral offers to being scratched. It is generally expressed according to Mohs's scale, which consists of a series of ten well-known minerals arranged in order of increasing hardness, as follows:

COMPARATIVE SCALE OF HARDNESS

1. Talc	6. Orthoclase
2. Gypsum	7. Quartz
3. Calcite	8. Topaz
4. Fluorite	9. Corundum
5. Apatite	10. Diamond

The degrees of this scale are not of the same value. For example, the difference between diamond and corundum is said to be greater than that between corundum and talc. An unknown specimen which can scratch orthoclase but is itself marked by quartz is said to have a hardness of $6\frac{1}{2}$—written $H.=6\frac{1}{2}$. Minerals of $H.=6$ or greater, all scratch window glass; those of $H.=5.5$ or less can be scratched with a knife; a finger nail can mark substances up to $H.=2.5$; and a copper coin, up to $H.=3$.

Chemical Mineralogy. This branch of the science deals with the composition of minerals, with their chemical relationship, and with chemical methods for their identification.

A complete quantitative analysis is necessary to determine the exact composition of a strange mineral. However, qualitative tests of fusibility, color imparted to a flame, and reactions produced when the mineral is heated on charcoal before a blowpipe flame with borax and other fluxes, are often sufficient for chemical identification.

Descriptive Mineralogy. An important branch of the science, which is concerned first with a complete description of each mineral species. This includes not only the form and structure, as well as the chemical and physical properties of a mineral, but also its geological history, its geographical distribution, and its relation to other minerals and rocks.

When the properties of a mineral are known, it may then be classified in various ways. One of the most convenient systems of classification is that outlined by Dana, in which minerals having a similar chemical composition are placed in the same class, which is subdivided according to crystalline form and other physical properties. The principal classes are: (1) native elements; (2) sulphides, arsenides, and similar compounds; (3) sulphosalts,

such as the sulpharsenites; (4) haloids; (5) oxides; (6) oxygen salts, including carbonates, silicates, sulphates, and others; (7) salts of organic acids; (8) hydrocarbons.

It has been estimated that there are approximately 1000 different minerals; but fewer than 100 species are common, while fewer than 25 enter universally into the composition of rocks. Of these rocks, more than 90 per cent are composed of the feldspars, quartz, amphiboles, pyroxenes, and micas. A large proportion of the remainder consist of olivine, calcite, and oxides of iron.

The classification of rocks is based on the nature and arrangement of their constituent minerals. In the case of the igneous rocks, the arrangement of the mineral content is subject to great variation induced by the conditions under which the *magma* or mother rock was cooled. In consequence, only a specialist in rocks, a petrologist, can accurately determine any given igneous rock. For this reason, group or family names are used, such as *granite*, *basalt*, *obsidian*, and others, there being many different kinds within each group. Similarly, each of the common groups of sedimentary rocks—*sandstone*, *limestone*, and *shale*—includes widely different types.

Most of the common igneous rocks and all of the sedimentary rocks are useful in commercial enterprises. They are entitled, equally with gems and precious stones, to consideration with the useful minerals. See under Geology: *Igneous Rocks*, *Metamorphic Rocks*, *Sedimentary Rocks*.

Determinative Mineralogy. The branch of mineralogy which makes use of complete, classified tables of mineral properties. The more obvious characteristics of an unknown mineral place it first in some large group. Careful consideration of the special properties then assigns it to smaller and more restricted divisions of the table until the mineral is finally identified.

Economic Mineralogy. Minerals of economic importance are considered in two great groups, the metal-bearing and the nonmetallic minerals. The production of metals from the first group—especially gold, silver, iron, copper, lead, zinc, nickel, aluminum, and platinum—is the most important use to which minerals as a whole are put. Gold, copper, and platinum are frequently found as native elements. But most metals occur combined as sulphides, oxides, or carbonates; less commonly, as chlorides, silicates, tellurides, and arsenides. A knowledge of mineralogy and geology is usually necessary for the successful location, identification, and mining of these valuable metallic ores.

Although the nonmetallic minerals are of less importance commercially than the metallic ores, nevertheless, they are collectively of immense value in the various arts. With reference to these uses, the nonmetallic minerals may be classed in 9 groups:

1. *Abrasives*, including some of the hardest known minerals, such as the diamond, quartz, sand, garnet, and emery.
2. *Ceramic Materials*, such as kaolin, clays, shales, and sands used in the manufacture of pottery, porcelain, glass, terra cotta, tile, and brick.
3. *Chemical Materials*, comprising minerals employed in making soda, alum, plaster of Paris, acids, alkalies, and other chemicals.
4. *Fertilizer Materials*, such as phosphates, nitrates, land plaster, potassium salts, and marls.
5. *Fuels*, such as coal, petroleum, and natural gas.
6. *Gem Stones*, including the minerals used for jewelry, for the bearings in watches, and for other similar purposes.
7. *Graphic Materials*, including the minerals used in writing, marking, and printing,—such as graphite, chalk, and lithographic stone.
8. *Pigments*, such as ocher, which are used in making paints.
9. *Refractory Materials*, embracing the minerals employed in making asbestos fabrics, fireproofing, furnace linings, retorts, and crucibles.

ROCKS, MINERALS, GEMS, AND PRECIOUS STONES

Adamant (*ăd'ă-mănt*). An imaginary substance, either a metal or a stone, supposed by the ancients to be of impenetrable hardness. By various early writers it was confused with the magnet or lodestone. About the 17th century the word adamant came into use as a synonym for diamond, but it is now rarely so used. The term *adamantine*, as employed in mineralogy, means like a diamond in hardness and luster.

Agate. A variegated form of chalcedony, somewhat harder than steel, and capable of taking a high polish. Agates are believed to have been formed in cavities of rocks by layers of silica deposited from water. They are marked most commonly with delicate, wavy bands of white, gray, brown, yellow, blue, or black. Such forms are called *banded agate*. The colors of *clouded agate* are blended and indistinct; in *moss agate* the internal impurities have a curious mosslike appearance.

Agates are found throughout the world, but the chief supply comes from Uruguay and Brazil. When cut and polished, they are much used for making vases and other ornaments, and in jewelry. Chemists use mortars and pestles of agate with which to crush and grind hard substances. Fine playing marbles are sometimes ground from agate. Agate polishing has long been an important local industry in Scotland, Austria, and Germany.

In the Petrified Forest of Arizona, driftwood is found, sometimes occurring in logs 120 feet long and 8 feet thick, which has been converted into agate. When polished, these silicified woods are used as ornaments and paper weights, and are favorite objects for museum display. See *Chalcedony*.

Alabaster. A soft, usually white, granular, semi-transparent form of gypsum, or calcium sulphate. It is found in various countries, the finest occurring in Tuscany, where it is carved into small pieces of sculpture, vases, clock stands, and other ornamental articles. Excellent alabaster occurs also in Derbyshire, England, and in limited amounts in Nova Scotia and at Lockport, N. Y. By reason of its softness and slight solubility in water, alabaster, when exposed to the weather, soon becomes rough and opaque.

A compact, crystalline carbonate of lime, deposited from water as travertine, formed the alabaster of the ancients, and is still used for ornamental purposes. It is much harder than the true or gypseous alabaster and, unlike it, will effervesce with an acid. See *Gypsum*, *Travertine*.

Alexandrite. See *Chrysoberyl*.

Alumina. Aluminum oxide, the most widely distributed and abundant of the earths. It is found nearly pure as bauxite and as corundum. Mixed with extremely small quantities of metallic oxides, it occurs as ruby, sapphire, oriental amethyst, oriental emerald, and oriental topaz. Mixed with iron oxide, it occurs as emery. Combined with silica, it is found in many rocks and minerals of the feldspar group, which, by decomposition, become the chief constituents of clay. See *Bauxite*, *Clay*, *Corundum*.

Amber. A fossil resin of pale yellow, reddish, or brownish color. It is frequently thrown up by the waves on the shore of the Baltic Sea, and is also mined extensively in that region. Amber occurs usually in small grains, drops, or lumps, rarely in pieces weighing several pounds. It is slightly brittle, translucent, and burns with a bright flame, emitting a pleasant odor. The ancients ascribed great, but entirely imaginary, medicinal virtues to amber. It is still in demand in the Orient, where large quantities are burned in Mohammedan worship at Mecca.

Beads and other ornamental articles are made from amber, and it is also used in varnish. Numerous extinct species of insects are found fossilized and perfectly preserved in amber. These form interesting exhibits in many museums. The earliest recorded electrical experiment is said to have been performed about 600 B. C. by Thales of Miletus, who noticed that, when rubbed, amber attracts light particles. See *Electricity*.

Amethyst. A violet or purple variety of crystallized quartz, much used in jewelry. It was valued by the ancient Greeks as a charm against the intoxicating effects of alcoholic beverages. In value it ranks about the same as the garnet. The finest amethysts are found in Scotland, Siberia, India, and Ceylon. Amethysts occur in many localities in the United States, particularly in the Lake Superior region. See *Quartz*.

Amphibole (*ăm'fĭ-bōl*). The name amphibole is used by many mineralogists interchangeably with hornblende. It is given to an important group of rock-forming minerals, which occur abundantly in igneous and metamorphic rocks. Chemically, amphiboles are salts of metasilicic acid, in which hydrogen has been replaced by calcium, magnesium, or ferrous iron, or by mixtures of these. They may also

contain sodium, potassium, ferric iron, and other elements. When amphibole is combined in igneous rocks the color is usually black, varying to greenish black; when it occurs in metamorphic rocks the color ranges through various shades of green to black,—less commonly it is pink, yellow, or even whitish. Amphibole is rather hard but may be scratched by quartz. Under proper conditions, amphiboles may become changed into serpentine, chlorite, and carbonates, and, therefore, are important geological minerals.

Ordinary amphiboles are so similar to pyroxenes, both in appearance and in composition, that it is often difficult to distinguish them. However, if distinct crystals can be found, separation is usually possible. Amphibole crystals are long and bladed, and, on cleavage, form prisms whose faces meet at angles of 56° and 124°. Pyroxene differs by forming short crystals which cleave into nearly square prisms, the facial angles of which are 87° and 93°.

From the variety of amphibole called tremolite is derived the valuable long-fibered asbestos of commerce. Among other varieties of amphibole are actinolite, crocidolite, edenite, gedrite, glaucophane, and pegasite. See *Asbestos*, *Pyroxene*.

Anthracite. A dense, black, hard variety of coal, which has a bright luster and breaks with a shining fracture. It is the form of coal containing the highest percentage of fixed carbon and the smallest percentage of volatile matter. Anthracite ignites with more or less difficulty, burns slowly with very little flame or smoke, and produces intense heat. Average anthracite contains about 87 per cent of fixed carbon, as compared with somewhat less than 60 per cent for bituminous coal.

By imperceptible stages, anthracite grades into bituminous coal, from which it has been formed by the action of intense pressure or heat. While anthracite occurs in extensive deposits, it is found only in comparatively small fields in widely separated localities. In the United States, the principal anthracite field, aggregating about 470 square miles, is in Pennsylvania. The workable seams in this area have a total thickness ranging from 70 to 150 feet. Some portions of the noted "Mammoth" seam are 100 feet thick. Anthracite occurs also in Colorado and New Mexico. In Europe, it is found in Wales, France, and Belgium. The largest anthracite deposits in the world are probably in the province of Shan-si, China.

Anthracite is used almost exclusively as a domestic fuel, for which its cleanliness and freedom from smoke and dust render it especially suitable. Flying dust is often prevented by wetting the pile of coal. Contrary to popular belief, this practice decreases rather than increases the amount of heat obtained from the fire. For steaming, smelting, and various other industrial purposes, bituminous coal is superior to anthracite. See *Coal*.

Apatite (*ăp'ă-tīt*). Calcium orthophosphate containing calcium fluoride which may be partially or entirely replaced by calcium chloride. It forms hexagonal crystals, H. = 5, which are sometimes transparent, of pale green to purple color, and used as gem stones. It is also found in large opaque crystals. Apatite has been used for the production of phosphorus and in commercial fertilizers. It is of greatest importance, however, because it is almost universally distributed, though in small amounts, through igneous and metamorphic rocks. As a result of the weathering and decay of these rocks, it eventually reaches the soil, to which it furnishes the phosphates necessary for plant growth. See *Phosphate Rock*.

Aquamarine (*ă'kwă-mă-rēn'*). A transparent, sea-green variety of beryl, used as a gem. Siberia and Brazil furnish excellent aquamarines. A clear crystal weighing 243 pounds was found in Brazil, and fine gem stones have been mined in South Carolina, Colorado, and other localities in the United States. See *Beryl*.

Aragonite (*ăr'ă-gŏn-īt*). A mineral consisting of anhydrous calcium carbonate, identical with calcite in chemical composition, but different in crystal form. Aragonite forms orthorhombic crystals which are usually small, white, and prismatic or needle-shaped, with a glassy luster. It is the principal constituent of the pearly layer of sea shells and of the skeleton of corals. A fine, compact, fibrous variety is known as *satin spar*, although this name is given also to similar forms of calcite and gypsum. Aragonite is slightly heavier than calcite and lacks the latter's perfect rhombohedral cleavage. It was first discovered in the province of Aragon, Spain—whence the name—and is now found in many parts of the world. See *Calcite*.

Argentite (*ăr'jĕn-īt*). An important ore of silver, often called silver glance. It is a sulphide of silver, containing, when pure, 87 per cent of the metal. The ore usually occurs massive, but sometimes forms isometric crystals. On a freshly broken surface it has a lead gray color with a metallic luster; usually, however, it appears black and dull. Argentite is about as soft as lead and is very heavy. When argentite is fused on charcoal the sulphur burns away, leaving a bead of metallic silver. See *Silver*.

Asbestos (*ăs-bĕs'tŏs*; *ăz-*). Any silicate mineral composed of fibers which may be spun and woven into heat-resisting fabrics, or which may be used as light, insulating materials. Asbestos is generally found in rather small veins. The best quality is white, but gray, green, brown, and blue varieties are known and used.

The pieces of mineral, as removed from the open-workings, are crushed without injuring the fiber. This is cleaned and sorted by air blast, and then carded and spun similarly to cotton or wool. From the yarn, fireproof cloth, fireproof curtains for theaters, and fireproof rope are made. Sheet asbestos for protecting hot surfaces, electrical insulation, packing for valves, lining for brake bands, shingles, and wall board, are some of the many forms in which asbestos is used.

The Canadian province of Quebec is the most important source of mineral asbestos, most of which is turned into manufactured products in the United States. Mineralogists generally define asbestos as a fibrous form of amphibole, but in industrial practice the term is used for any fibrous, heat-resisting mineral. Thus, *chrysotile*, which is the most important commercial asbestos, is not amphibole but serpentine. It is known as Canadian or short-fibered asbestos. The amphibole called *tremolite*, known as long-fibered or Italian asbestos, is second in importance. See *Amphibole*.

Ash, Volcanic. The materials blown into the air by the sudden liberation of gases during a volcanic eruption. These are of four varieties, arranged roughly according to the size of the fragments. The pieces which are about the size of an apple are known as *volcanic bombs*; those the size of a nut, *lapilli*; those the size of a pea, *volcanic ashes*, while the finest material is *volcanic dust*.

The ashes and lapilli are frequently spoken of as *volcanic cinders*, and small mounds or cones made of them are known as *cinder cones*. Since many million tons of dust and ashes are discharged during an eruption, they form immense deposits usually near the volcano. Many times, however, the dust is carried hundreds of miles away and distributed over an immense area. On account of its light, cellular nature, volcanic ash is employed as an abrasive in certain types of scouring soaps. See *Pumice*.

Asphalt (*ăs'fălt*). A brown or black mineral pitch, or bitumen, occurring both as a viscous liquid and as a solid. A brittle variety, 90 to 98 per cent pure, known as glance pitch or gilsonite, is found in Utah, Cuba, and other regions. It is used chiefly in the preparation of asphalt varnish. Liquid bitumens, known as malthas, occur in California. Asphaltic and bituminous limestones are found in many parts of the world.

The chief sources of native asphalt are the marshy beds of Venezuela and the famous "pitch lake" on the island of Trinidad. From this lake, which has an area of 114 acres, the asphalt is dug out in heavy blocks. The holes thus made fill up from below in a short time. The surface of the lake is sufficiently firm to support a movable railroad track, although the ties gradually sink and require frequent replacement. By far the greatest amount of asphalt used in the United States is a by-product of the refining of petroleum.

Asphalt is employed for making varnish and protective paints and for roofing; most important of all, it is mixed with sand and ground limestone and used as the surface layer of roads. For street paving, asphalt was first used in Paris in 1838. The first asphalt pavement in America was laid in Newark, N. J., in 1870.

Azurite (*ăzh'ŭ-rīt*). A basic copper carbonate, containing about 55 per cent of the metal, occurring in dark, azure blue crystals, columnar masses, and incrustations. Azurite is a valuable ore of copper, and is found in immense quantities in the mines of Clifton and the Bisbee districts in Arizona. The small crystals, though too soft to wear well, are sometimes used in cheap jewelry. In Russia, azurite from Siberia is cut into thin slabs and used as a veneer for furniture. See *Malachite*.

Barite (*bā'rīt*; *băr'īt*). A natural barium sulphate, known also as *barytes* and *heavy spar*. It occurs as transparent tabular crystals and in massive laminated forms, usually white, opaque, or translucent. The principal uses of barite are as a filler in paints, and for the manufacture of lithopone. It is also employed as a filler to give weight to paper, in finishing leather, and in making asbestos cement, rubber goods, and artificial ivory. In the United States, barite is produced chiefly in Missouri and in the Appalachian region. See *Barium*.

Basalt (*bă-sôlt'*; *băs'ôlt*). Any heavy, dark colored, basic rock of volcanic origin, having a structure so fine that the grains cannot be seen, or at least cannot be recognized by the eye. Such rocks, which usually consist of soda-lime feldspar, pyroxene, iron oxide, and olivine, are commonly known as "trap rock" or "trap." Because of its weight and toughness, basalt is valued as a paving material.

When cooling, the lava from which basalt is derived often forms hexagonal prisms or columns, which are occasionally of great size. These basaltic columns, often 150 feet high, produce interesting scenic effects, especially in Fingal's Cave, in the island of Staffa, Scotland; in the famous Giant's Causeway, Ireland; and in the cliffs along the Columbia river in Washington.

Dense lavas, red, purple, brown, gray, or white in color, and differing from basalt in the arrangement of their constituent minerals, are called *felsite*. See *Diabase, Trap.*

Bauxite (*bō'zīt*). A claylike mineral, the most important ore of aluminum. It consists of from 20 to 40 per cent of the metal and commonly contains some silica and iron. Bauxite occurs in France, Italy, Jugoslavia, Hungary, and British and Dutch Guiana. In the United States, it is found in Georgia and Tennessee, but the chief production is in Arkansas. Besides its use as an ore, bauxite is employed in making alum and alundum, and in lining converters and steel furnaces. See *Aluminum, Cryolite.*

Beryl (*bĕr'il*). A silicate of aluminum and beryllium which crystallizes in the hexagonal system. It is commonly associated with granite veins, clay slate, mica schist, or limestone, and frequently forms enormous crystals. A beryl found in New Hampshire weighed 5000 pounds.

The crystals are usually of a dull, cloudy green or yellow, but are sometimes transparent and of various colors. H. = 7½. Of these, the rich green *emerald*, colored by a trace of chromium, if without flaws, is valued as highly as the diamond. Crystals of blue-green beryl are called *aquamarine*. The finest specimens are supplied by Siberia and Brazil. Yellow or *golden beryl*, sometimes called *heliodor*, is obtained chiefly from southwest Africa, Maine, Connecticut, and Pennsylvania. Rose beryl, or *morganite*, is found in Madagascar and California. See *Aquamarine, Emerald.*

Bloodstone. A green chalcedony sprinkled with flecks of red jasper, as if with blood. A variety called the heliotrope or St. Stephen's stone, occurs in Siberia, Scotland, and the United States. During the early period of the Christian Church, the bloodstone was used for the engraving of sacred subjects. Several famous carvings representing Jesus Christ have been made in bloodstone so selected that the red spots seem to be drops of blood. This stone has been used in making seals since early Babylonian and Egyptian times. See *Chalcedony.*

Breccia (*brĕch'ĭ-ă*). A conglomerate composed of angular fragments of rock, held together by some natural cement, such as quartz, iron oxide, or claylike material. *Volcanic breccia* results from the natural cementation of coarse particles emitted by a volcano. *Fault breccia* is frequently formed from the pieces broken between the faces of a fault passing through a limestone formation.

Volcanic breccias and fault breccias are sources of rock for road making. Calcareous rocks called *breccia marble* are used as ornamental stones. Sandstone breccias are rarely employed for building purposes. See *Conglomerate.*

Brookite. A mineral, consisting of titanium dioxide, found only in the form of orthorhombic crystals. In color it varies from yellowish to reddish brown or black. It occurs in Wales, Switzerland, and the Tyrol in Europe, and a variety with thick black crystals is found in Arkansas. Together with anastase and rutile, brookite forms the source of the metal titanium. See *Rutile, Titanium.*

Calcite. A mineral composed of anhydrous calcium carbonate, which forms crystals belonging to the rhombohedral class of the hexagonal system. It thus differs from aragonite, which has the same chemical composition but forms orthorhombic crystals. Calcite is very widely distributed, occurring in limestone, marble, and chalk, and, excepting only quartz, is the most abundant of minerals. It forms fine crystals which are usually transparent or white, although almost all colors are known, including blue, green, yellow, red, and even brown and black. Typical varieties are *dogtooth spar* and *nailhead spar*. Pure, transparent crystals, known as *Iceland spar*, exhibit double refraction, and are used for making polarizing prisms.

Calcite enters directly into the production of lime, cement, fertilizers, whiting, whitewash, crayons, and building material. See *Aragonite, Calcium, Chalk, Limestone, Marble.*

Cameo. A gem stone cut in relief, usually an onyx, sardonyx, or agate, composed of different colored layers, so that the portions in relief appear in contrast with the background. The value of a cameo depends upon the artistic merit of the engraved figure.

Cameo cutting reached high perfection among the ancient Greeks and Romans, engaging the attention of their greatest artists. Some examples of their work, such as the Sainte Chapelle agate, 12 by 10½ inches, now in the National Library, Paris, representing the triumphs of Augustus and Tiberius, surpass in size and delicacy of execution the best modern productions.

In the United States, the demand for cameos reached its height between 1870 and 1880, giving employment before its decline to many excellent artists. Among these was Lebrethon, the early instructor of Saint-Gaudens who began life as a cameo cutter. Later Saint-Gaudens became America's foremost sculptor. See *Onyx.*

Carbuncle. An old name for garnet and other red stones, used at present to designate such stones when cut in oval form. Carbuncles were formerly highly prized for their reputed power of giving out light in darkness. See *Garnet.*

Carnelian (*kär-nēl'yăn*). A variety of chalcedony ranging in color from a reddish white to a deep red. It is of medium hardness, takes a good polish, and formerly was much used for seals. Blood red carnelians were highly prized by the ancients, who executed beautiful engravings upon them. The finest carnelians now come from India, though excellent specimens are found in Florida and in Nova Scotia. The playing marbles used by children, popularly called carnelians, are usually made of agate. Since ancient times, a translucent, very deep red variety of carnelian, known as the *sard*, has been greatly esteemed as gem stone.

Cassiterite (*kă-sĭt'ĕr-īt*). The most important ore of tin, called also "tinstone." It consists of tin dioxide, and, when pure, contains about 79 per cent of the metal. The mineral generally occurs in yellow, brown, or black compact masses; it sometimes has a fibrous structure, when it is known as *wood tin*; and it frequently forms tetragonal crystals. The world's supply of tin ore comes from Tasmania, New South Wales, Queensland, and other states of Australia; from Bolivia; and from the Malay States. Cassiterite occurs also in Cornwall, England, in Saxony, in Bohemia, and in Mexico. In the United States, limited quantities have been found in Maine, Virginia, South Dakota, and California.

Cat's-eye. See *Chrysoberyl.*

Celestite (*sĕl'ĕs-tīt*; *sē-lĕs'-*). Native strontium sulphate, occurring as white, yellow, or light blue orthorhombic crystals. Fine specimens are found near Bristol, England; in the sulphur mines of Sicily; and on Strontian island, Put-in-Bay, Lake Erie. Celestite is used for the preparation of strontium salts. See *Strontium.*

Chalcedony (*kăl-sĕd'ō-nĭ*; *kăl'sē-dō-nĭ*). A beautiful quartz material, occurring in various shades of red, yellow, brown, green, and blue. It is indistinctly crystalline (amorphous), has a waxy luster, and is transparent or translucent, or, in some milk white varieties, opaque. It is believed to have been deposited from solutions of silica and is chiefly found lining or filling cracks and cavities in igneous rocks.

Ordinary chalcedony is white or gray. The bright red variety is known as *carnelian*, and the brown-red as *sard*. The red color due to iron oxide is often produced artificially by heating yellow chalcedony. *Chrysoprase* is a variety of chalcedony, colored apple green by a small amount of hydrated nickel oxide. The natural color fades on exposure to the sun or heat, but can be restored and even improved by treatment with a solution of nickel sulphate. *Plasma* is a leek green chalcedony. When marked by spots of red jasper it is known as *bloodstone* or *heliotrope*. *Agate* is a banded variety of chalcedony. These stones, although hard, fine grained, and very tough, are nevertheless easily worked, so that for centuries they have been used as seals, cameos, and other ornaments.

India and Brazil are the chief sources of chalcedony, although good specimens are found in many other parts of the world. See *Bloodstone, Carnelian, Chrysoprase, Onyx.*

Chalcocite (*kăl'kō-sīt*). An important ore of copper, known also as "copper glance" and *redruthite*. It generally occurs massive, has a conchoidal fracture, a blackish, lead gray color, and a metallic luster. This ore consists of cuprous sulphide, and, when pure, contains 79.8 per cent copper. It is found in large quantities in Montana, Alaska, Nevada, Arizona, and Mexico, usually in the upper, enriched parts of copper veins. See *Azurite, Chalcopyrite, Copper, Malachite.*

Chalcopyrite (*kăl'kō-pī'rīt*; *-pĭr'ĭt*). The most common and important ore of copper, copper-iron sulphide, commonly known as "copper pyrites," or yellow copper ore. It possesses a metallic luster, is brass-yellow or iridescent in color, and is often called "peacock ore." When pure, the mineral contains 34.5 per cent copper and 30.5 per cent iron. It is widely distributed in metallic veins, commonly with iron sulphide, and at times with nickel and cobalt sulphide. Large deposits of chalcopyrite are found in various parts of the Old World. It occurs extensively also in Colorado, Montana, Arizona, Utah, and California, and often bears gold and silver. See *Azurite, Chalcocite, Copper, Malachite.*

Chalk. A soft, fine-grained, white or yellowish rock, with an earthy texture, and somewhat rough to the touch. Under the microscope, some chalk is found to contain minute shells, spicules, and spines of protozoans, sponges, sea urchins, and other marine animals. As these remains consist of calcium carbonate, chalk is one form of limestone. Chalk was formed ages ago on former ocean bottoms, either by chemical precipitation of calcium carbonate or by the accumulation of organic remains. It is still in process of formation in modern oceans.

The Cretaceous system of rocks, while not composed exclusively of chalk, takes its name (Latin *creta*, chalk) from the extensive chalk beds, hundreds of feet thick, which are abundant in this geological period in Europe and America. England received the poetic name "Albion" from the immense white chalk cliffs on the English channel.

While not usually suitable for building stone, chalk may be used in making lime and Portland cement. When ground and washed free from grit, it forms "whiting," used in whitewash, putty, and silver polish.

The extensive deposits of chalk in the Paris basin and in western Kansas are interesting because they contain many fossil remains of fishes, reptiles, and toothed birds which lived in ancient geological times. See *Limestone*.

Chlorite (*klō'rīt*). The name given to a group of minerals consisting of hydrous silicates of aluminum with ferrous iron and magnesium. In color, chlorite is green to dark green, and, like mica, has one perfect cleavage. It is tough but not elastic, occurring in scaly masses or in flat, hexagonal tablets. Chlorite is found in many igneous and metamorphic rocks to which the mineral contributes a green color.

Chrysoberyl (*krĭs'ō-bĕr'ĭl*). A crystallized form of beryllium aluminate. It varies from green to yellow in color, is transparent or translucent, and very hard—H. = 8.5. The type most favored as a gem stone is a clear golden yellow. Cat's-eye, or *cymophane*, is a green, cloudy variety characterized by a streak of light that seems to follow the eye as the stone is turned.

Alexandrite is a pleochroic form of chrysoberyl valued almost as highly as the diamond. When properly cut, it appears emerald green, changing to raspberry red when viewed by artificial light or by light passing through the stone. It was named for Czar Alexander II because it was discovered in Siberia on his birthday, and because green and red were the military colors of Russia.

The chief sources of fine specimens of chrysoberyl are Brazil, Ceylon, and the Ural mountains.

Chrysoprase (*krĭs'ō-prāz*). An apple green variety of chalcedony. Its color is due to nickel oxide in its composition. Chrysoprase occurs in Siberia, in Silesia, and in North Carolina, Oregon, and California. It was formerly highly prized as a gem stone, being mentioned by the ancients and in the Bible. However, when kept in a warm place, its color fades; in consequence, it has lost much of its popularity. See *Chalcedony*.

Cinnabar. The most important ore of mercury. It consists of mercuric sulphide and occurs either massive or in hexagonal crystals which are bright red or brown in color. There are productive cinnabar mines at Almaden, Spain; in Idaho, and at New Almaden, California. Cinnabar occurs also in southern Russia, Peru, China, New Zealand, Australia, and South Africa. It was well known to the Romans, and its uses were described by Vitruvius and by Pliny. See *Mercury*.

Clay. Soft, very fine, earthy material which can be molded when wet and which retains its form when dry. Clay is formed chiefly by the decomposition of aluminous silicate rocks, especially the feldspars. It consists of hydrous aluminum silicate usually mixed with small quantities of quartz, mica, feldspar, iron oxide, lime, or other impurities. The plastic or moldable quality of clay, together with its property of hardening under heat, gives to the various kinds a high economic value. Clay is used for a vast number of purposes,—among them, the making of brick, tile, terra cotta, fire brick, retorts, crucibles, pottery, Portland cement, electrical insulators, mineral paint, paper fillers, soap, and ultramarine. Clay is used also for modeling.

Deposits of clay are widely distributed and are found in the formations of many geological ages. The chief varieties are kaolin or china clay, and adobe, alum, ball, brick, fire, flint, gumbo, marly, paper, pipe, pottery, saggar, slip, and terra cotta clays. In the United States, valuable clay deposits occur in a large number of localities and form the basis of important industries. See *Kaolin*, *Porcelain*, *Pottery*.

Coal. An important mineral of vegetable origin, the most valuable of all fuels. It occurs as a brown or black rocklike material, usually in layers or beds. These beds are found between strata of shale, clay, sandstone, or sometimes limestone. Coal has been produced chiefly from plant matter deposited in swamps during former geological ages. The immense vegetation of the Carboniferous period formed the world's chief deposits of coal. Extensive beds were laid down also during Triassic, Cretaceous, and Tertiary times.

The change from decaying vegetation to coal has been so gradual that the dividing lines between the various stages are not sharp. Peat, which occurs extensively in northern swamps, represents the first stage in coal making. When the submerged mosses and other vegetation composing peat are subjected to the pressure of accumulating sediments, and also to heat, further changes take place. The fibrous mass becomes more solid and uniform in structure. It loses oxygen and becomes transformed into a series of mineralized products, more and more unlike the original plant material from which it was derived. These changes are marked chiefly by an increase in the proportion of carbon and a decrease in the oxygen contained in the ever hardening mass. Successive steps in this process of carbonization are represented by peat, lignite, bituminous coal, semibituminous coal, semianthracite, and anthracite.

Peat consists of a spongy mass of vegetable matter which has partially decayed under water. Lignite is more compact and uniform in texture, but careful examination usually affords evidence of its vegetable origin. Though inferior to coal in various respects, both peat and lignite are used to a considerable extent for fuel.

Bituminous or soft coal is the most important of all varieties of coal. It is black, compact, and brittle, and frequently shows a cubical cleavage. It burns easily with a smoky flame and is the chief fuel used for making steam. When heated in a retort, it gives off gases and tarry substances, and, in the case of coking coal, the nonvolatile residue cakes together into a mass of coke. Free burning coals do not form coke. *Cannel coal* is a smooth variety with a waxy appearance, which may contain as high as 65 per cent of volatile matter. It burns with a long, smoky flame and is used chiefly for grate fires. It is believed to have been produced largely from the spores of giant fernlike plants.

Semibituminous coal and *semianthracite* represent intermediate steps in the carbonization process which, in the series of coals, ends in anthracite. *Anthracite*, or hard coal, is dense, comparatively hard, and, when broken, shows a lustrous black surface. It has a high content of fixed carbon with a low percentage of volatile material, and burns with an intensely hot, smokeless flame.

The following table represents an average made from analysis of representative types of coal taken from all parts of the United States.

APPROXIMATE COMPOSITION OF COALS

Type of Coal	Fixed Carbon	Volatile Combustibles	Moisture	Ash
Peat	26.5	53.5	10.0	10.0
Lignite	36.0	35.5	17.0	11.5
Bituminous	58.0	34.0	2.5	5.5
Semibituminous	75.0	16.2	1.3	7.5
Semianthracite	85.0	7.8	1.0	5.2
Anthracite	87.0	3.7	2.7	6.6

The best-known sizes of domestic anthracite are approximately as follows: broken, 4–2.5 inch; egg, 2.5–1.75 inch; stove, 1.75–1.25 inch; nut, 1.25–.75 inch; pea, .75–.5 inch; buckwheat, .5–.25 inch. In some districts, bituminous coal is washed and screened to the following sizes: lump, over 3 inch; egg, 3–1.5 inch; nut, 1.5–⅜ inch; slack, less than ⅜ inch.

Liquefaction of Coal. A petroleum-like substance, rich in gasoline content, may be obtained from certain low grades of coal by the so-called Bergius process, devised by Friedrich Bergius near Mannheim, Germany. The coal is treated with hydrogen under high temperature and pressure. In Germany, commercial production of gasoline by this process was begun in large quantities in 1927.

COAL PRODUCED IN THE UNITED STATES, 1925

State	Short Tons	Value
Bituminous:		
Pennsylvania	136,928,019	$287,899,000
West Virginia	122,380,959	209,655,000
Illinois	66,909,359	146,492,000
Kentucky	55,068,670	94,825,000
Ohio	28,034,112	54,057,000
Indiana	21,224,966	42,884,000
Alabama	20,004,395	42,442,000
Virginia	12,799,443	23,496,000
Colorado	10,310,551	30,322,000
Wyoming	6,553,232	18,275,000
Tennessee	5,454,011	10,077,000
Iowa	4,714,843	14,807,000

COAL PRODUCED IN THE UNITED STATES, 1925—Con.

State	Short Tons	Value
Bituminous—Con.:		
Utah	4,690,342	$11,991,000
Kansas	4,524,251	13,013,000
Montana	3,043,686	7,879,000
Maryland	2,694,572	5,312,000
Missouri	2,694,215	8,281,000
New Mexico	2,556,851	8,611,000
Washington	2,537,890	9,176,000
Oklahoma	2,325,840	7,667,000
North Dakota	1,324,620	2,445,000
Arkansas	1,220,039	4,829,000
Texas	1,008,375	1,566,000
Michigan	808,233	3,391,000
Alaska	82,868	405,000
Other States	158,399	605,000
Total Bituminous	520,052,741	1,060,402,000
Anthracite:		
Pennsylvania	61,817,149	327,664,512
Total 1925	581,869,890	$1,388,066,512
Total 1920	658,265,932	$2,564,185,000

Conglomerate. A sedimentary rock composed of rounded pebbles, or even of bowlders, set in some finer material which acts as a cement. When there is a noticeaple difference in size between the pebbles and the binding material, the rock is often called "pudding stone." The cementing material may be quartz, clay, limestone, or iron oxide, and the pebbles may consist of any kind of rock.

Conglomerates form usually in the shallow water along a shore. Beds of this material generally indicate the former presence of oceans, lakes, or, occasionally, large rivers. Colngomerate formations frequently have resulted from the deposition of material by melting glaciers.

Coral. See *Coral* under Zoology.

Corundum. A native oxide of aluminum found granular, in masses, and as hexagonal crystals. H.=9. It is the hardest of the rock-forming minerals, and is exceeded in hardness only by the diamond and the rare natural carborundum called *moissanite.*

Ordinary corundum is dark colored and nontransparent, and is used as an abrasive. The most important deposits are found in Canada. *Emery* is a black granular corundum containing magnetite as an impurity. Large amounts of artificial corundum are produced in electric furnaces.

The clear, crystalline forms of corundum include some of the most valuable of all gem stones. According to their color, these are named: *ruby,* red; *sapphire,* blue; *oriental emerald,* green; *oriental topaz,* yellow; *oriental amethyst,* purple; and *white sapphire,* colorless.

Cryolite. A natural fluoride of sodium and aluminum. It generally occurs as light colored, brown, or even black masses, but also as monoclinic crystals. Formerly, cryolite was the only important ore of aluminum, but, for the production of the metal on a large scale, it has been displaced by the cheaper bauxite. Cryolite is now used chiefly as a flux to dissolve bauxite for the electrolytic production of aluminum, and as the principal ingredient in milk glass and certain kinds of enamel. The chief source of cryolite is near Ivigtut, Greenland. See *Aluminum, Bauxite.*

Crystal. In physical science, a body formed by the solidification of a chemical element, compound, or isomorphous mixture, in accordance with a definite internal structure. A crystal is bounded by flat, usually smooth surfaces, called faces, which are symmetrically disposed about a system of imaginary lines, called axes.

The word crystal was first used by the Greeks as the name for a hard, transparent material which they believed to be a durable form of frozen water or ice. The substance which they thus named is the colorless variety of quartz still known as rock crystal. Its angular form and smooth surfaces were noted by the ancients but were considered merely as "accidents" or as forms "pleasing to the gods." Modern science, however, has shown that all of the apparently intricate forms of crystals occur in accordance with definite laws.

Many thousand kinds of crystals have been studied, described, and named. These include many of the most delicate and strikingly beautiful objects in nature. They embrace not only precious gems and valuable metallic ores but also an immense number of handsome minerals and chemical substances, as well as the wonderful forms exhibited in snowflakes and frost work. See *Crystallography.*

Dendrite. A stone in which there are branching figures, resembling shrubs or trees. These are produced by a foreign mineral, usually by an oxide of manganese, as in the moss agate or mocha stone. Dendrites are often cut and used as gems.

Diabase (*dī'ă-bās*). An important igneous rock. It is composed of pyroxene, labradorite feldspar, and iron ore, with a certain textural arrangement of the minerals. It forms the greater part of the great sheets of dark igneous rocks of the lower Connecticut valley and of northern New Jersey. Diabase is an altered form of basalt and is popularly known as "greenstone" and "trap."

Diamond. The diamond is unique among gem stones, because it is the hardest known substance and because it consists of a single element, carbon, crystallized in the cubic system. Native crystals are usually octahedrons with convex faces. When clear, colorless, and free from flaws, diamonds are said to be of the "first water." Crystals of inferior quality are usually more or less tinged with yellow due to traces of iron as an impurity. "Fancy" shades of rich yellow, pink, blue, green, and red are extremely rare and bring enormous prices.

Light passing into or out of a diamond is bent to an unusual degree, and white light passing through a wedge-shaped section of diamond is broken up into a broad rainbow-colored band. The "brilliant" form, in which over 98 per cent of all diamonds are now cut, takes the greatest possible advantage of these properties. It is so designed that most of the light passing into the stone from above does not pass out through the sides, but is reflected upward. A standard brilliant has 58 facets, 33 above and 25 below the girdle, or widest part. These facets are cut by holding the stone against a revolving metal plate covered with diamond dust. About 60 per cent of a rough stone is removed in cutting.

Diamonds were probably unknown in ancient times, and India was the only source of these precious stones until 1728, when they were discovered in Brazil. In 1876 a bright pebble was picked up by children on the banks of the Orange river, South Africa; it proved to be a perfect diamond of 22½ carats. Since then, South Africa has become the chief source of diamonds. Except for the occasional discovery of a single stone, the only source of diamonds in the United States is Pike county, Arkansas, where, since 1906, more than 2000 crystals have been found.

Diamonds are found usually in mud, sand, gravel, or conglomerate, deposited by rivers. The original source of the diamond bearing rock of India and Brazil has never been found, but most of the South African diamonds are dug from volcanic "pipes" or shafts extending down through the surrounding strata to an unknown depth. These pipes are filled with breccia resulting from alteration of the basic, igneous rock, peridotite. This altered material is called "blue ground." Usually, however, it is dark green up to within a short distance of the surface, where exposure to the atmosphere has changed the color to yellow. In this ground more than 80 varieties of minerals have been found.

Diamond mining in South Africa is carried on by natives who live in a guarded compound for periods of three to six months at a time, and who are carefully searched for concealed stones before they are allowed to depart. The blue ground is brought to the surface and exposed to the atmosphere for several months. When sufficiently softened by weathering, it is washed, sifted, and concentrated by machinery. The heavy concentrate is then passed over tables coated with grease which retains the diamonds and allows less valuable minerals to pass.

Rounded forms of imperfectly crystallized diamond are called *bort. Carbonado,* a black, opaque diamond without cleavage, is extensively used on the cutting face of diamond drills. Glaziers' diamonds are usually selected so as to present a naturally rounded marking edge. Diamond dies are used for drawing fine, hard wire; and diamond-tipped lathe tools are often the cheapest for use on soft, tough material, because they outwear several tools of hardest steel. In spite of their extreme hardness, diamonds are somewhat brittle, and may be chipped or broken by a sharp, heavy blow. A simple method of identifying genuine diamonds is based on the fact that they are transparent to X-rays, while paste imitations are not.

Diamonds have been produced artificially by dissolving carbon in molten iron, in olivine, or in an artificial magnesium silicate, and then cooling the solution under great pressure. Crystals produced in this manner are microscopic in size, but they indicate how diamonds may have been formed within the earth. Diamonds have also been found in meteorites.

The largest diamond ever found was the Cullinan. This was discovered, January 1905, in the yellow ground of the Premier mine, near Pretoria, in South Africa. The crystal weighed 3106 metric carats, or about 1⅛ pounds avoirdupois. It was presented to King Edward VII by the Union of South Africa, and in 1908, at Amsterdam, was divided and cut into 105 brilliants. Of these, the two first in size are called "Star of South Africa" and "Lesser Star of South Africa." They weigh 530½ carats and 317½ carats, respectively, and are the largest and finest brilliants in the world.

The most famous diamond is the Koh-i-nûr. This figured for centuries in the history of India. The gem was acquired by the East India Company and given to Queen Victoria. It was recut in London and now weighs 108⅜ carats. The "Orlov," given by Count Orlov to Catherine II of Russia, weighs 199.73 carats. It is supposed to have been stolen from the eye of a Hindu idol. The "Regent" or "Pitt," the most famous of the French jewels, weighs 140.6 carats, and was purchased by the French Regent, Duke of Orleans, from Thomas Pitt for about $675,000. It is now in the Louvre Museum. The Hope diamond is a blue brilliant of 45.5 carats. A red diamond of 10 carats was among the Russian crown jewels, and a green diamond of 41.1 carats is contained in a collection at Dresden. See *Carbon*.

Diatomaceous (*dī'ă-tō-mā'shŭs*) **Earth.** A porous, white or yellow, chalklike earth, composed of silica. This earth was formed chiefly by deposition of the shells of microscopic one-celled plants called diatoms, and is found in beds of various thickness. It is used in scouring-soaps and polishes, as a light, insulating material, as a clarifier and aid to filtration, and for absorbing nitroglycerin to form dynamite.

Diorite. A granular, gray, green, or almost black, igneous rock. It is composed largely of hornblende, with not more than an equal quantity of feldspar, and often contains shiny flakes of black mica. In the classification of igneous rocks, diorite comes between granite and gabbro.

Dolerite (*dŏl'ĕr-īt*). A dark gray-green or black igneous rock. It is composed of ferromagnesian minerals and feldspar, generally with smaller amounts of iron oxides. Dolerite is rather fine grained, and the small crystals so interlock that there is difficulty in distinguishing one from another. Among igneous rocks, dolerite is classified between basalt and gabbro.

Dolomite (*dŏl'ō-mīt*). A native calcium-magnesium carbonate crystallized in the rhombohedral system. Dolomite rock, transformed from limestone by the action of solutions containing magnesium, is widely distributed, and in appearance cannot be distinguished from ordinary limestone. Many types of marble used for statuary are more or less dolomitic, as are also various building stones. The Houses of Parliament, in London, and St. Patrick's cathedral, in New York City, are built of dolomite. It is also used in manufacturing certain kinds of cement, in making refractory linings for furnaces, and, in some localities, in preparing carbon dioxide and Epsom salts. See *Limestone*.

Emerald. The most highly prized variety of beryl, a precious stone of a rich green color, slightly harder than quartz. The magnificent color, which gives unusual qualities to this gem, is due to chromium. Fine emeralds closely approach the diamond in value.

The ancients, who greatly esteemed the emerald, seem to have obtained their supply chiefly from Upper Egypt, whose mines were worked at the time of Alexander the Great and later produced stones for Cleopatra. Many and varied virtues were formerly ascribed to the emerald, among which was protection to the wearer against epilepsy and evil spirits.

The finest emeralds are now obtained from Colombia, where they are found in bituminous limestone. The Colombian mines have been productive since the 16th century. Emeralds occur also in Russia and Australia. In the United States, excellent emeralds have been found sparingly in North Carolina. See *Beryl*.

Emery. A black, granular variety of corundum. Among available abrasives, it ranks next to the diamond in hardness, and is much used in cutting and polishing gems, plate glass, and various metals. Most of the emery used in the United States is obtained from Asiatic Turkey, the chief source of supply, but small quantities are found at Chester, Massachusetts, and at Peekskill, New York. See *Corundum*.

Epidote (*ĕp'ĭ-dōt*). A native orthosilicate of calcium, aluminum, and iron. It occurs in granular masses, in fibrous forms, and as monoclinic crystals. The color may be red, white, or black, but is generally pistachio green. Fine epidote crystals used in jewelry are found in France, Switzerland, Austria, Norway, and many parts of America.

Feldspar. One of the most important of rock-forming minerals. It consists of aluminum silicate, together with a silicate of one or more of the metals potassium, sodium, calcium, or, rarely, barium. Feldspars do not contain magnesium or iron. They occur in igneous, metamorphic, and some sedimentary formations, and are an essential constituent of granite, gneiss, syenite, and various other rocks. They show good cleavage; H. = 6 to 6.5; and the color is white, or pale shades of pink, yellow, green, or gray.

The feldspars crystallize in the monoclinic and triclinic systems, and are classified first according to form and secondly according to the metals combined with the aluminum. Thus *orthoclase* is monoclinic, and *microcline* is triclinic, potash feldspar; *albite* is soda feldspar; *anorthite*, lime feldspar; *plagioclase* is soda-lime feldspar; and, when soda displaces part of the potash, the products are soda-orthoclase or soda-microcline. Classification of igneous rocks depends largely on the feldspars which they contain.

Ground feldspars are chiefly used in making porcelain, other pottery, and enamels. Very pure, white feldspar enters into the composition of artificial teeth. No commercially successful process has yet been developed by which the potash in feldspar can be made soluble for use as fertilizer.

Felsite. See *Basalt*.

Flint. A massive, more or less impure form of quartz. It varies in color from gray to brown or nearly black, and breaks with a conchoidal fracture and a sharp edge. Flint is of wide occurrence and is found chiefly in the form of nodules, in beds of chalk and limestone. Under the microscope, flint shows the remains of sponges and diatoms around which, it is believed, silica was deposited from solution. By prehistoric peoples, flint was used for making axes, arrowheads, and knives. In later days, it served, when struck by a piece of steel, to produce sparks for setting fire to tinder. At present, the principal use of flint is in the manufacture of fine pottery. See *Quartz*.

Fluorite (*flōō'ŏr-īt*). A native calcium fluoride, called also *fluorspar* and *fluor*. This beautiful mineral usually crystallizes in cubes having perfect octahedral cleavage. Transparent crystals are found in many handsome colors and, although too soft for general use as gems, are frequently made into ornaments.

Fluorite is found in many European countries, in Canada, and in the United States. It is used chiefly as a flux in metallurgical processes, also as a source of hydrofluoric acid, and in making opalescent glass, enamels, and special types of lenses.

Fusulina (*fū'sū-lī'nă*) **Limestone.** A highly prized building stone found in the midwestern United States. It is formed largely of the shells of a foraminiferous protozoan called *Fusulina*. The shells, which are of the size and shape of small grains of wheat, are usually cemented together by calcium carbonate. On weathering, the softer cementing material becomes somewhat eroded, leaving a rough and very pleasing surface composed of the harder shells. The interesting type of protozoan forming such shells has existed since Cambrian times, but its chief rock-building activities took place during the great Coal period. See *Limestone*.

Gabbro (*găb'rō*). The name given to a family of granitoid rocks. They are greenish in color, and formed essentially of crystals of plagioclase and other minerals allied to pyroxene. Gabbros are coarse-grained, heavy, igneous rocks which grade from porphyries on the one hand to diabases and diorites on the other. Only a specialist in petrology can determine the various intermediate grades. All rocks of this type, if uniform in coloring and texture, are useful in fine buildings, monuments, and other structural purposes. However, many of the constituent minerals often oxidize and cause a discoloration.

Galena. An important ore of lead, consisting chiefly of lead sulphide. It occurs in fibrous, granular, or massive forms, or in cubic or octahedral crystals, and is very widely distributed throughout the world. In the United States, it is found chiefly in Illinois, Iowa, Wisconsin, and Missouri. When pure, galena contains more than 86 per cent of lead. Usually, however, it is found mixed with varying amounts of antimony, bismuth, cadmium, zinc, and silver. In the Rocky Mountain states, galena is often worked for the silver that it contains, the lead becoming a by-product. See *Lead*.

Garnet. A mineral orthosilicate which forms various types of isometric crystals. These differ in color and composition but have the same general chemical formula. The hardness is usually greater than that of quartz, and in color precious garnet is usually red.

Almandine, a favorite variety, is an iron-aluminum silicate. Other garnets may have magnesium, calcium, or manganese in place of iron, and chromium or iron in place of aluminum. The ornamental and gem stones known as *cinnamon stone*, *rose garnet*, *oriental garnet*, *Arizona ruby*, and *Cape ruby* are varieties of garnet.

A *carbuncle* is often said to be a garnet, but it is in truth any red stone cut convex—*en cabochon*—without facets.

The name garnet is thought to be from the Latin *granatus*, "grainlike," because the crystals resemble the red seeds of a pomegranate.

About 5500 tons of inferior garnet is mined annually in the United States for use as an abrasive.

Gem Stones. Minerals of any kind, which, because of their beauty, are customarily cut and polished for use in jewelry, as seals, and for similar ornamental purposes. The *precious stones* are the diamond, **ruby**, sapphire, and

emerald. The *semiprecious stones* include opal, garnet, turquoise, spinel, alexandrite, amethyst, cat's-eye, and various others.

The ancient Babylonians, Assyrians, Egyptians, Hebrews, Greeks, and Romans greatly prized many of the gem stones popular at the present day. They developed great skill in cutting, engraving, and polishing them for use in rings, seals, amulets, and other ornaments, large numbers of which are still preserved.

Many healing, protective, and other magical qualities were ascribed to various gems by ancient peoples. Some believed that each month of the year is under the influence of a precious stone. The effect of this belief is still seen in the widespread European fashion of wearing birth stones in preference to other jewels. Again, certain gems were supposed to be under the influence of the planets.

While the ancients rarely cut or engraved diamonds, rubies, or sapphires, they made extensive use of many stones of less hardness, including the carnelian, sard, chalcedony, sardonyx, onyx, agate, jasper, hyacinth or jacinth, beryl, emerald, amethyst, topaz, tourmaline, obsidian, and opal. According to the Mosaic law, the breastplate of a Jewish high priest should contain twelve precious stones, namely:

Sardonyx, Topaz, Emerald
Carbuncle, Sapphire, Jasper
Ligure, Agate, Amethyst
Chrysolite, Onyx, Beryl.

The nature of *ligure* is uncertain, the stone being variously regarded as a jacinth, opal, or tourmaline.

During the middle ages the use of gems and the art of gem cutting declined greatly. About the year 1500 it was revived in Italy, and somewhat later in other countries. At the present time a large and increasing number of stones and minerals are used as gems. Imitation and artificial gems are likewise produced in great variety and excellence.

Glauconite (*glô'kô-nīt*). A hydrous silicate of iron and potassium, which often lends a greenish color to beds of sandstone and chalk. It sometimes forms as much as 90 per cent of the greensand marls of England and New Jersey, where it is extensively mined for use as a potash fertilizer.

Gneiss (*nīs*). The name given to a group of metamorphic rocks, which, in composition, much resemble granite. Gneisses consist of granular masses of feldspar and quartz, together with mica, pyroxene, or hornblende, and sometimes rare metals. These component materials are arranged in alternate parallel bands of light and dark. Because of this banded structure, the gneisses somewhat resemble stratified rocks. Gneiss formations are the most widely distributed of metamorphic rocks. They underlie the earliest sedimentary deposits nearly throughout the world. They furnish important quarry material and are extensively used for structural stones. See *Granite*.

Granite. A group of granulated, crystalline, igneous rocks. They are composed of feldspar and quartz, alone, or more commonly with mica or hornblende—rarely with pyroxene—and with small quantities of other minerals. Granites are now regarded as plutonic rocks that have cooled at immense depths below the surface. They occur as large, irregular masses, which form the heart of many mountain ranges, as rounded exposures in other rocks, and as dykes. In color, granite is usually gray but sometimes varies to pink and red.

Granite is an important building stone because it is hard, offers unusual resistance to crushing and to weathering, and has a pleasing appearance. However, it does not stand fire well. It is much used for monuments and ornamental work, and refuse from granite quarries is often dressed for paving blocks or crushed for road building and railway ballast.

On account of being constructed largely of granite, Aberdeen, Scotland, is known as the "Granite City." Vermont has been styled the "Granite State" because of its extensive deposits and quarries of this valuable building stone. Other states noted for the production of granite are Maine, Massachusetts, and Delaware.

Graphite. A dark, steel-gray, or black mineral; called also plumbago, and, improperly, black lead. Like the diamond, it is nearly pure carbon, but it conducts electricity and is characterized by softness—H. = 1—a black streak, and a greasy feel.

Graphite may occur in layers, massive, or as hexagonal crystals, and may be of either organic or inorganic origin. It is widely distributed throughout the world, but rarely occurs in large beds or masses. The chief commercial sources of native graphite are in Ceylon and eastern Europe. Since 1898, artificial graphite has been extensively made from coke at Niagara Falls, N. Y.

Graphite is universally used in making lead pencils, the name being derived from a Greek word meaning "to write." It is also extensively employed in the manufacture of lubricants, paint, stove blacking, foundry facings, and crucibles.

Gravel. Small, loose fragments of rock, from the size of a pea to approximately that of a walnut, usually rounded by water action and aggregated into beds of loose material, are known as gravel. The individual pieces are called *pebbles*. They are generally composed of quartz. This is largely because the hardness and resistance of this mineral enable it to withstand attrition better than most other rock materials. Gravel is widely distributed and is a very important building material, entering largely into the composition of concrete. When bound together by a natural cement, beds of gravel become *conglomerate*.

Greensand. See *Glauconite*.

Gypsum. Native, hydrous calcium sulphate containing 20.9 per cent of water. It is found massive, fibrous, and as monoclinic crystals, often in connection with beds of rock salt. It can be scratched with the finger nail, varies from transparent to opaque, and is usually white, although it may be red, green, blue, gray, brown, or, when very impure, black. Clear, colorless crystals are known as *selenite*; the massive, fine-grained form is *alabaster*; the fibrous variety is called *satin spar*; and an impure, earthy type is known as *gypsite*.

When heated to about 350° F., gypsum loses three-fourths of its combined water and the resulting product is called *plaster of Paris*. When heated above 400° F., gypsum loses its property of rapidly setting, but if heated to 900° F. and finely ground, it will set slowly, and this form is used for *flooring plaster*. Various materials mixed with plaster of Paris will retard setting, and slow-setting mixtures of this type are known as *cement plasters*. Gypsum is used for a fertilizer on alkaline soils, as a retarder for Portland cement, and as a filler in some paints.

Among the world's producers of gypsum, France is first; the United States, second; and Canada, third. See *Plaster of Paris*.

Hematite (*hĕm'â-tīt*; *hē'mâ-*). The most important ore of iron, ferric oxide, containing, when pure, 70 per cent of the metal. It occurs as steel-gray rhombohedral crystals, but more commonly massive, fibrous, earthy, or as kidney-shaped nodules. Powdered or earthy forms are red, and hematite is generally the source of red color in soils and rocks. It was named from a Greek word meaning "blood."

Great beds of hematite, believed to have been deposited from solution, are found in many parts of the world. The hematite deposits of the Lake Superior region, which includes the famous Gogebic, Marquette, Menominee, Mesabi, and Vermilion ranges of Minnesota, Michigan, and Wisconsin, constitute the world's most important iron-producing field. See *Iron*, *Limonite*, *Magnetite*, *Siderite*.

Hornblende. See *Amphibole*.

Iceland Spar. See *Calcite*.

Iolite (*ī'ô-līt*). A silicate of aluminum, iron, and magnesium, used occasionally as a semiprecious stone. The orthorhombic crystals, when clear, are remarkable for dichroism, and are called also *dichroite* and *water sapphire*. The color is normally blue, but when the crystal is viewed in a direction at right angles to the principal axis, the color is yellowish or gray. Iolite occurs in gneiss or granite in various parts of Europe, Brazil, Ceylon, and also in Connecticut.

Jade. A very tough, compact stone, creamy white to dark green in color. Since prehistoric times, it has been used for carved utensils, and for jewelry and other ornaments. The term jade includes the minerals *nephrite*, which is a variety of amphibole, and *jadeite*, a silicate of sodium and aluminum. The Chinese, who are particularly fond of jade, apparently do not distinguish between these two varieties. The name nephrite is from a Greek word meaning "kidney," and the ancient Greeks believed, as do the Chinese today, that jade acts as a charm to cure all kidney diseases. In the East, milk white jades are the most highly valued. While jade has a hardness of only about 6.5, it is so tough that it can withstand blows which would pulverize diamond.

Jasper. A compact, opaque, impure variety of quartz. In color it is usually red or yellow, but varies to gray-blue and dark green. It takes a high polish, and was much used by the ancients for seals, carvings, and other ornamental purposes. It was one of the jewels in the breastplate of the Jewish high priest. The Greeks and Romans believed that jasper possessed healing qualities.

Jasper is still employed as a decorative stone. In the United States, well-known jasper quarries are located at Pipestone, Minnesota, at Sioux Falls, South Dakota, and in Colorado.

Jet. A hard, velvet black, fossil substance found in beds of lignite and coal. It is easily cut, takes a high polish, and was formerly much used for beads, toys, buttons, dress trimmings, and mourning jewelry. Since Roman times jet has been found along the seashore or

obtained from mines near it in Yorkshire, England, where for many centuries it has been extensively made into ornaments. It is found also in various other European localities and in the United States.

Kaolin (*kā'ō-lĭn*; *kā'-*). A soft clay, usually of low plasticity, which burns to a pure white color. It takes its name from a hill in China, where it occurs, and is often called china clay. Its chief use is in the manufacture of porcelain, white earthenware, and wall tile. Kaolins which are white *before* burning are used for "filling" paper. While kaolin is mined in several parts of the United States, especially in North Carolina and in Pennsylvania, the total production, including paper clay, is only about one-half of the amount imported. This comes mostly from France, Germany, and England. The kaolin producing district of Cornwall, England, is the most important in the world. See *Clay*.

Lazurite (*lăz'ū-rīt*). A beautiful blue mineral, crystallizing in the cubic system, but usually massive and compact. It is essentially sodium-aluminum sulphosilicate and is the natural source of the pigment *ultramarine blue*.

The stone known as *lapis lazuli* and called sapphire by ancient writers is a compact mixture of many minerals, generally colored blue by lazurite. The finest lapis lazuli comes from northeast Afghanistan. It is found also in metamorphic limestone in Siberia and Chile. The stone is used for cameos, vases, and for mosaic and other ornamental work.

Lignite. A mineral substance of vegetable origin; called also "brown coal." To the naked eye, lignite often shows a distinct fibrous or woody structure. It represents the second stage of coal formation, intermediate between peat and bituminous coal. Lignitized tree trunks and fragments of lignitized wood are often found in rock formations of the Cretaceous and later periods.

Lignite is usually characterized by a dull luster, brown or black color, brown streak, and open texture. It ignites readily, burns with a smoky flame, but falls far below bituminous and other higher grades of coal in heating power. By reason of the moisture which it contains, sometimes exceeding 43 per cent, lignite dries out and disintegrates rapidly following exposure to the air. Consequently, it can be neither stored nor transported to a considerable distance without crumbling more or less into powder. Hence, lignite must be consumed as fuel near the mine, converted into briquettes, or used in a gas producer.

Deposits of lignite are worked in Arkansas, Texas, North and South Dakota, and Montana, but as yet they are of comparatively little importance as sources of fuel. Lignite is found also in Canada, and extensive beds occur in Russia. See *Coal*.

Limestone. Rock composed chiefly of calcium carbonate is called limestone. If magnesium carbonate also is present, the rock becomes dolomitic limestone. Impurities, such as silica and alumina, are generally found, and iron frequently imparts a yellow or brown color. Limestones were formed chiefly by the accumulation of the shells and other hard parts of marine organisms. They were produced also by precipitation of calcium carbonate due to chemical or bacterial action.

Chalk, coquina, dolomite, lithographic stone, marl, and marble are all forms of limestone. *Travertine* is a limestone that has been deposited from hard water. *Oolitic limestone* is composed of small, round, concentric grains having the appearance of fish eggs. When the concretions are about the size of a pea, or larger, the stone is called *pisolite*. *Nummulitic limestone*, an important Old World type, is made up of coin-shaped shells. *Fusulina limestone* is composed largely of shells having the size and shape of a grain of wheat.

Typical limestone is fine-grained, or compact, gray to yellow-brown, with hardness less than 4, and of sufficient resistance to crushing to be valuable as building stone. It is found in all parts of the world, sometimes in beds more than 100 feet thick. Limestone is very important also for making lime and cement, and in smelting ores.

Pennsylvania, Ohio, Indiana, New York, and Missouri lead in the production of limestone in the United States. In Canada, much limestone is quarried in the vicinity of the cities of Montreal and Quebec. See *Calcite*, *Chalk*, *Dolomite*, *Fusulina Limestone*, *Lithographic Stone*, *Marble*, *Marl*, *Nummulitic Limestone*, *Oolite*.

Limonite (*lī'mō-nīt*). An iron ore of commercial importance; known also as *brown hematite*. Chemically, it is a hydrated ferric oxide containing, when pure, almost 60 per cent of the metal. It occurs massive, often in forms similar to a bunch of grapes, as bog ore, as yellow ocherous deposits, and as a compact brown clay-ironstone. In the United States, the production of limonite is relatively small when compared with that of other iron ores. In Europe, the most important deposits are found in Lorraine and Luxemburg. See *Hematite*, *Iron*, *Magnetite*, *Siderite*.

Lithographic Stone. A smooth, porous, even grained and compact variety of limestone. When a flat surface of such a stone is marked with a design in soapy ink or crayon, moistened, and then passed under an inking roller, the ink from the roller is retained only by the material forming the design. The process of printing from a stone treated in this manner is known as *lithography*.

Lithographic stones of the finest quality are obtained at Solnhofen, Bavaria. In limited quantities, lithographic stone occurs in France, England, and America. In the United States, the most important deposit is at Brandenburg, Kentucky. See *Limestone*.

Magnetite. An important ore of iron, which may be considered as a combination of ferrous and ferric oxides. It generally occurs massive or granular, and also forms black isometric crystals which are usually octahedrons. When pure, it contains 72.4 per cent of iron.

Magnetite is strongly attracted by a magnet but, as a rule, it does not draw small pieces of iron to itself. Certain specimens, however, act as permanent magnets and, when thus possessed of polarity, are known as *lodestones*. Good lodestone is found in Siberia, in the Harz mountains, and at Magnet Cave, Arkansas. Most of the famous iron ores of Sweden consist of magnetite. In North America, valuable deposits of the ore are found in Canada, in the Appalachian region, and in Washington, California, and other states. See *Hematite*, *Iron*, *Limonite*, *Siderite*.

Malachite (*măl'ă-kīt*). A mineral consisting of a bright green basic carbonate of copper. It sometimes forms tufts of needle-like, monoclinic crystals, but generally it is earthy or in the form of fibrous concentric nodules, which are often of great size. This compact material is translucent or opaque and has a hardness of 3.5 to 4. Malachite owes its formation to the alteration of other copper minerals, and is therefore often found in the upper parts of copper mines. When present in sufficient quantities, it may become an important ore of copper.

Malachite was mined in the Sinai peninsula by the ancient Egyptians and constituted their chief source of copper. They used the mineral also as a gem stone and for making various ornaments. In ancient times, charms cut from malachite were worn as a protection against lightning, disease, and witchcraft. As malachite takes a high polish, it has been extensively employed, especially in Russia, for ornamental purposes. It is used, for example, in making clock cases, panels, table tops, mosaics, and as a veneer or inlay for costly furniture. The mineral is obtained chiefly from the Ural mountains, Australia, and Arizona. See *Azurite*.

Marble. A granular, crystalline form of limestone that can be highly polished. Marble was metamorphosed, or changed from ordinary limestone, by the action of heat, with or without pressure, within the earth's crust.

Pure marble is white, but most specimens contain impurities which produce the many varieties of colored, streaked, and banded marbles. The fine, white Parian marble used by the ancient Greek sculptors was obtained from the island of Paros, in the Ægean sea. The best marble used by modern artists comes chiefly from the famous quarries of Carrara, Italy. Marble is much superior to granite in resistance to fire and is therefore extensively used for interior decoration of fine buildings.

Vermont is the chief producer of marble in the United States, but quarries are worked also in Alabama, Georgia and Tennessee, Arizona, Colorado, Nevada, California, and Alaska. See *Limestone*.

Marl. A natural earthy deposit of calcium carbonate and clay, containing more or less sand. In color, marl is generally gray but, owing to impurities, may be yellow, red, green, blue, or black. Marl is much used as a fertilizer for soils requiring lime. Besides lime, however, marl usually contains small amounts of potash and phosphates, which greatly increase its fertilizing value. Pure marl is sometimes found containing limestone and clay in such proportions that it can be burned in a kiln to form Portland cement. Extensive marl beds occur in the Atlantic coastal plain from New Jersey to South Carolina.

The term marl is often improperly applied to the greensands and other fertilizing earths containing very little calcium carbonate. See *Limestone*.

Meerschaum (*mēr'shŏm*; *-shŭm*). A soft, porous, white or cream colored mineral, composed of hydrated silicate of magnesium. It is called also *sepiolite*. Meerschaum occurs as wet masses buried in clayey earth. It is mined chiefly in Asia Minor, but is found also in Moravia, Morocco, Spain, and Mexico. When brought to the surface it may be easily cut with a knife; when dried it has a hardness of 2–2.5, and is light enough to float on water. The name meerschaum, in German, means "sea foam," while the term sepiolite was given because of the resemblance of the mineral to cuttlefish bone. Meerschaum is used chiefly for the manufacture of tobacco pipes. These absorb tarry materials and, after continued use, acquire a rich, dark color. Before it is made into pipes, the mineral is soaked in wax, which renders it capable of taking a high polish.

Mica. A group of minerals composed of aluminum silicate together with silicates of other metals which characterize the different varieties. Thus, *muscovite* is a potash mica; *phlogopite*, magnesium mica; and *biotite*, black iron-magnesium mica. Mica is widely distributed as small glittering particles throughout many igneous and metamorphic rocks. It crystallizes in the monoclinic system, but generally appears as six-sided tablets, all of which have very perfect cleavage parallel to the base.

Mica is often found in tablets more than two feet square. Because of the perfect cleavage, these "books" can be divided into leaves or sheets so thin that there may be 500 or more to an inch. Such plates are transparent, tough, and flexible. They are nonconductors of electricity, and are quite resistant to heat. Because of these properties, sheets of mica are valuable as insulators in electrical apparatus, for chimneys on gas burners or lanterns, and for windows on ovens and furnaces. Powdered mica is used to produce a glittering effect on wallpaper and stage costumes; when mixed with an equal weight of nitroglycerin, it forms the high explosive called mica powder.

Common potash mica was at one time so much used for windows in Russia that it became known as "muscovy glass" and later as *muscovite*. Commercial micas are generally muscovite or phlogopite. Of these, India produces about one-half, and Canada and the United States each about one-quarter of the world's supply. The chief Canadian mines are in Quebec and eastern Ontario. In the United States, the richest mica fields are in North Carolina and New Hampshire.

Mispickel (*mĭs'pĭk-ĕl*). The chief ore of arsenic, a compound of iron, arsenic, and sulphur, containing 46 per cent. arsenic, called also *arsenopyrite*. It is found massive and as rhombohedral crystals, usually associated with ores of silver, tin, copper, and lead. The color is silver white to steel gray; the luster, metallic; hardness equals 5.5. Arsenic is obtained as an oxide by roasting the ore in air. Mispickel occurs extensively in England, Germany, Canada, and the United States. See *Arsenic*.

Molybdenite (*mŏ-lĭb'dē-nīt*; *mŏl'ĭb-dē'nīt*). Molybdenum disulphide, the chief ore of the metal molybdenum, is a soft, lead gray mineral, very similar to graphite in appearance and feel. It is widely distributed, usually disseminated through granular rocks, and seldom in large quantities. Normally, Australia, Canada, and Peru are the principal sources of the ore. During the World War, the United States was the largest producer, but, because of the falling off in demand, only one mine was operating in 1920. See *Molybdenum*.

Monazite (*mŏn'ā-zīt*). A phosphate of the cerium metals, which usually contains from 3 to 10 per cent. of thorium. Because of supposed scarcity, it was named from a Greek word meaning "to be solitary." It is usually found as brown fragments or yellow, rounded grains, rarely as monoclinic crystals.

Monazite is now known to be widely distributed in pegmatite veins and in gneiss. When the gneiss decomposes, the grains of monazite, which are about five times as heavy as water, become concentrated in alluvial or placer deposits. India and Brazil are the chief producers of monazite, and a small quantity is mined in the United States. Monazite is the principal ore of the thorium and cerium used for incandescent gas mantles. See *Cerium*, *Thorium*.

Moonstone. A translucent variety of feldspar, showing pearly or opaline reflections from within, and sometimes displaying a pale tint of blue, red, or green on a gray ground. Moonstones are of wide and rather common occurrence, the best specimens coming from Ceylon. They are usually cut either *en cabochon* or round and are frequently worn as lucky charms. In olden times, many believed that a moonstone held in the mouth would improve the memory and also that the gem was a cure for epilepsy.

Native Metals. Nearly all the eighty or more chemical elements are found in combination in various minerals. However, only a small fraction of them occur free or uncombined with other elements, as native minerals. The ten solid elements which occur native are: the nonmetals,—sulphur and carbon—the latter in the form of graphite and the diamond; the so-called semimetals,—arsenic, antimony, and bismuth; and the metals,—gold, silver, platinum, mercury, and copper.

Natural Gas. A term generally restricted in meaning to inflammable gas obtained from beneath the earth's surface. The existence of such gases has been known since prehistoric times, and flames from natural vents have been kept burning for centuries in the temples of fire worshipers in India.

Natural gas, as a rule, consists largely of methane, together with small amounts of other gases such as ethane, nitrogen, oxides of carbon, hydrogen, hydrogen sulphide, and, occasionally, notable amounts of helium. This mixture is usually about .62 as heavy as air, weighs from 47 to 49 pounds per 1000 cubic feet, and has a heating value of 920 to 1250 British thermal units per cubic foot.

The origin of natural gas is unknown, the principal explanations being (1) that it was produced by decomposition of organic matter or (2) by the action of underground water on iron carbide. Deposits of soft coal and oil are usually accompanied by gas, which suggests that they might have a common source. General conditions most favorable to underground accumulation of gas require: (1) a porous layer of rock, such as sandstone, in which the gas is held; (2) an impervious covering layer, such as slate or shale, which prevents the escape of the gas; (3) a bend or arch in the strata, which permits the gas to gather at the higher points and to separate from the oil and salt water which are often present.

Natural gas has been found in many parts of the world, but probably 98 per cent of the total production is consumed in the United States. The producing sections of the United States may be divided approximately into six districts: (1) the Appalachian region, consisting of New York, Pennsylvania, southeastern Ohio, West Virginia, Kentucky, and Alabama; (2) the Trenton rock of Ohio-Indiana; (3) the Clinton sands of central Ohio; (4) the Mid-continent or Kansas-Oklahoma field; (5) the Caddo field of northwestern Louisiana; (6) the California field. Notable quantities of gas are found also in various states whose location does not fall within these divisions. Producing sections have been discovered by means of natural vents in the earth, by accident when drilling for oil or salt brine, and by expert geologists who traced out the summits of rock waves.

To obtain the gas, wells are drilled down through the covering layer of rock. The size of the bore varies usually from 2 to 8 inches and the depth from 250 to 3000 feet. At the village of Fredonia, N. Y., where, in 1821, natural gas was first used commercially in America, a supply sufficient for 30 street lamps was obtained from a well 1½ inches across and only 27 feet deep. The Geary well in Pennsylvania reached a depth of 7248 feet. Several producing wells in West Virginia are more than 4000 feet deep. The cost of a well may be figured roughly at six dollars a foot.

When gas-bearing strata are reached, the gas usually rushes out with great force which is thought to be due chiefly to water pressure. All large wells are tubed and capped with a valve so that the flow may be controlled. The shut-in pressure varies usually from 1 to 1500 pounds per square inch, the highest reported being 1700. The open flow of gas may be from 500 to 35 million cubic feet a day. A very good well will produce about one million cubic feet per day, at 300 to 400 pounds pressure.

The greatest yield on record was that of a Pennsylvania well which produced an average of 2,842,700 cubic feet a day for 7½ years, and continued for several years more at the rate of one million cubic feet a day. The supply in any field is not limitless, and new drilling is constantly required. The average yearly production of natural gas in the United States for the period 1916–20 was approximately 750 *billion* cubic feet. This exceeded in value the total production of both gold and silver for the same years.

The chief use of natural gas is as fuel for the production of heat, light, and power. Large quantities also have been burned in order to secure a deposit of the fine pigment, *gas black*, extensively used in making printing ink. It has been found that natural gas usually contains vapors of gasoline which may be removed either by condensation or by absorption.

The gas which rises between the tube and the casing of oil wells, collecting in the casing head, is especially rich in gasoline, sometimes yielding as much as 10 gallons from 1000 cubic feet. The name *casinghead gas* is now quite generally applied to gasoline obtained from any natural gas. Although the average amount of gasoline obtained from 1000 cubic feet of gas had then fallen to about .63 gallon, the total production of gasoline from this source in 1919 amounted to about 341 million gallons. See *Petroleum*.

Nummulitic (*nŭm'ū-lĭt'ĭk*) **Limestone.** An important constituent of the Eocene strata of Africa, Europe, and Asia. It occurs from 10,000 feet above sea level in the Alps to 15,000 feet in the Himalayas, in beds often thousands of feet in thickness.

The rock, which varies in character from limestone to marble, is useful as a building stone. It is composed mainly of the shells or tests of a large foraminifer called *nummulites*. These shells are usually of the size and shape of a small coin (Latin, *nummulus*), whence the name. The shell, which is without an apparent aperture, has an internal spiral cavity divided into a number of chambers by partitions, through which there are minute openings. In size, the shells vary from ⅛ of an inch to 1½ inches in diameter.

The Great Pyramid in Egypt is built chiefly of nummulitic limestone. See *Limestone*.

Obsidian (*ŏb-sĭd'ĭ-ăn*). A kind of glass produced by volcanoes, chemically identical with pumice, but different from it in structure. It is usually black and opaque though sometimes green, red, or brown, or even striped or spotted. Obsidian takes a high polish and is exceedingly brittle, breaking with a conchoidal fracture, much like flint. It was used by primitive peoples, especially in Mexico, for arrowheads, spearheads, knives, mirrors, and ornamental figures. Various kinds of obsidian are found in volcanic regions, sometimes in immense masses, such as the famous Obsidian Cliff, a mountain of volcanic glass in Yellowstone national park. See *Lava*, *Pumice*.

Olivine (*ŏl'ĭ-vĭn*; *-vēn*). An orthosilicate of magnesium and ferrous iron. This mineral forms an important constituent of the basic, igneous rocks, such as basalt and peridotite. It is found also in some metamorphic rocks. Rock composed almost entirely of olivine is called *dunite*. Olivine occurs as grains or small granular masses and rarely as well-formed orthorhombic crystals. The color is usually olive green, but it may range from yellow to brown. The terms olivine and chrysolite are generally used interchangeably. Among gem dealers, however, *chrysolite* is a yellowish green, and *peridot*, a leaf green, transparent variety of olivine. See *Serpentine*.

Onyx (*ŏn'ĭks*; *ō'nĭks*). A banded chalcedony having even, parallel layers of different colors, usually white and black, white and red, or white and brown. When the layers are white and red-brown, the stone is called *sardonyx*. Onyx and sardonyx are highly valued by makers of cameos, because the straight bands permit the artist to carve white or colored figures on a differently colored base.

Onyx was employed for ornamental purposes in ancient times, and it is still used for table tops, mantels and stairs, clocks, and similar objects. Mexican onyx and onyx marbles, such as those found in Mexico, Algeria, Missouri, Arizona, and California, are composed of calcite deposited from solution. They show onyx-like bands and are used for decorative purposes. See *Chalcedony*.

Oolite (*ō'ō-līt*). Small concretionary grains, resembling fish roe, have been observed in sandstone, in iron ore deposits, as in the Clinton ores of eastern North America, and in large strata of limestone, useful in various localities as a building stone. Rock composed of such formations is called oolite. In some cases it appears probable that the deposition of oolite was influenced by external particles, such as sand grains and bits of organic matter, which acted as nuclei for the concretions.

The well-known building material called Bedford stone, extensively quarried in southern Indiana, consists in part of oolite. In Europe, oolitic rocks are very abundant, especially in the Middle Jurassic formations, which are named Oolite.

Ooze. Fine, soft deposits in the abysmal depths of the oceans. These are of three types,—volcanic, cosmic, and organic. The last, which is by far the most important, is subdivided into calcareous and siliceous, the character depending on the nature of the shells or tests of minute organisms from which the ooze was formed. Oozes cover many million square miles of the ocean floors.

Opal. A variety of hydrated silica which occurs usually in noncrystalline masses. H. = 5.5 to 6.5. In many cases opal may be considered as a silica jelly which has dried up until it contains only from 3 to 10 per cent of water. Opal is found filling cavities in igneous rocks, and also bedded in limestone, sandstone, and clays, and as a deposit around hot springs. Fossil wood and the remains of fossil fishes and reptiles, which have been changed to opal, are occasionally found. Opal may be clear and transparent, but it is usually white, yellow, green, brown, red, or gray, generally pale, and with a characteristic milky appearance.

The play of colors reflected from a piece of *precious opal* is richer and more varied than that from any other gem. The flashes of color are caused by diffraction of light due to physical irregularities within the stone. *Fire opal* varies from hyacinth-red to yellow and shows firelike reflections. *Harlequin opal* has small patches of color. *Black opal*, which is the most highly valued of all varieties, has a dull black background lighted by intense flashes of red, green, blue, orange, and other colors. *Common opal* is generally semitranslucent but lacks fire.

The superstition that opals are unlucky is gradually disappearing. In consequence, fine opals are continually increasing in popular regard. Precious opal is found in Mexico, Honduras, and Nevada, but the finest specimens are obtained from Hungary and New South Wales.

Ore Deposits. Natural concentrations or accumulations of metal-bearing minerals are found in various formations of the earth's crust. Those portions which contain enough metal in the proper combination to be profitably worked are called *ores*. Ores may occur in the form of *veins*, *chimneys*, or *stocks*, distributed throughout all kinds of rocks—igneous, metamorphic, and sedimentary—and in all geological formations. They may occur also in surface and placer deposits.

Gold and platinum are usually found native; copper, lead, and zinc, as sulphides; iron occurs in the form of oxides; and other metals are found in various combinations. Associated with the true ore minerals, there are often minerals of nonmetallic character, called "barren minerals" or "gangue." Common gangue minerals are quartz, calcite, barite, fluorite, dolomite, hornblende, and feldspar.

In the United States and Canada, ore deposits are of wide distribution, but they are most abundant in the Cordilleran region, the Black Hills, the Appalachians, and the Lake Huron region of Ontario.

Gold and silver ores are in the main confined to fissure veins and placer deposits in the Cordilleran region, though some are known in the Black Hills, in the southern Appalachians, and in Ontario, Alaska, and Yukon. Copper ores occur in vast deposits in Michigan, Arizona, Utah, Montana, and British Columbia. Lead and zinc ores are found in Iowa, Illinois, Wisconsin, Missouri, and New Jersey.

The hematite iron ore deposits of northern Minnesota are the largest known. Iron ores are also worked in the Appalachian region. Nickel is restricted mostly to the rich mines of the Sudbury district in Ontario. The ores of the rarer metals are, for the most part, found in the same parts of the continent as the foregoing.

Orthoclase. See *Feldspar*.

Pearl. See *Pearl* under Zoology.

Peat. Brown or black carbonaceous material formed in swamps and bogs by the partial decomposition of vegetable matter under water. It consists of a loosely compacted mass of partially decayed plant fiber and represents the first stage in coal formation.

One of the chief constituents of peat is the sphagnum moss; but sedges, rushes, water lilies, and various other kinds of aquatic vegetation take part in its formation. Although occurring chiefly in temperate, and sometimes in tropical countries, peat is formed also in arctic and subarctic regions; as, for example, Siberia, Alaska, and Labrador. Peat mosses, growing in peat-forming bogs, cover many thousands of square miles in North America and northern Europe. While most peat formations are not more than 4 feet thick, deposits exceeding 30 feet in thickness are sometimes found.

Peat is extensively quarried for use as fuel. When well dried, it has a higher heating value than wood, though it is inferior to coal. However, peat often contains a jelly-like substance which retains moisture and makes thorough drying difficult. Peat has long been used for fuel in the countries of northern Europe, especially in Ireland, where about one-tenth of the land surface is covered by peat bogs. In England, the peat moors have been a source of fuel since Roman times. See *Coal*.

Peridotite (*pĕr'ĭ-dō-tīt*). A granular, basic, igneous rock. It usually ranges in color from dark green to black, and is composed chiefly of olivine. Peridotite occurs with or without pyroxene, hornblende, magnetite, chromite, or other accessory minerals, and contains little or no feldspar. Peridotitic rocks are found occasionally as independent masses forced in among other rocks, but they are usually associated with gabbro. Peridotite is regarded as the original source from which, by weathering and concentration, platinum and ores of chromium and nickel were produced. Alteration of peridotite rock generally yields serpentine. The blue ground in which diamonds are found is an altered peridotite. See *Olivine*.

Petroleum. A mineral oil which varies in color from yellow to black. It is usually a dark green liquid which may be as thin as kerosene or as thick as molasses. This material was known in the most ancient times of which there is any record. The American Indians, who found it floating on the surface of certain springs, believed that it would make them strong. White men, who came later, also believed that it had medicinal properties, and sold it as a cure for rheumatism.

Petroleum is found in all parts of the world, occurring underground in porous layers of sand or limestone. The porous layer is always covered by a hard layer, such as shale, which prevents the oil from escaping. To obtain the oil, a hole about 8 inches in diameter is drilled down and cased with steel tubing, until it passes through the covering layer. The first well was only 69½ feet deep; some later wells have been sunk to a depth of more than a mile.

If no liquid appears, it is customary to *shoot* the well by exploding, at the bottom of the shaft, a long narrow torpedo containing nitroglycerin. This explosion shatters the oil-bearing layer and leaves a reservoir into which the oil can drain. Often the fluid is under enormous pressure so that great quantities of oil are thrown high into the air and lost before the *gusher* can be controlled by covering the mouth of the well with an iron cap. A famous well in Russia spouted for several days at the enormous rate of 4½ million gallons a day. Not all wells are gushers, and it is often necessary to pump the oil to the surface. In addition to the petroleum obtained from wells, a small but

increasing quantity is extracted from oil-bearing shales. This product is called shale oil.

The *crude petroleum*, as it comes from the wells, may be used for making water gas, for oiling roads, and for fuel. For most other purposes it is *refined* by heating in a closed *still*. This is so arranged that the vapors which are given off at different temperatures may be condensed by cold water and collected separately. The various liquids are further purified by treatment first with sulphuric acid and then with alkali. Substances which boil at a low temperature are the first to come from the still. These are followed in turn by materials having higher boiling points.

Kerosene, for lighting purposes, was formerly the product most desired, while gasoline was considered a nuisance and was often thrown away. But, because of the great demand for motor fuel, every effort is now made to obtain all the gasoline possible. To increase the yield of this light product, so-called *cracking* processes have been developed. In these the oil is heated under pressure in such a way that some of the heavier vapors condense and fall back into the hot liquid. This causes them to "crack" or break up, producing a much greater proportion of gasoline.

Other valuable petroleum products are: lubricating oils; paraffin wax, which is used in the manufacture of candles and for covering jellies; and vaseline, used for ointments. The final residues consist of pitch and coke. More than 200 different products are obtained from the crude oil.

Oil refineries are usually located near large cities and are connected with the wells by lines of iron pipe. These pipes are usually about 8 inches in diameter, and through them the crude oil is pumped, often for hundreds of miles. This system of pipe lines is so extensive that, if necessary, oil can be pumped for the entire distance from the Kansas or Oklahoma fields to the Atlantic coast. The amount of pipe used for this purpose is so great that, if connected in one continuous line, it would circle the earth at the equator. Tank cars and specially designed tank ships also are used for transporting large quantities of petroleum products.

Concerning the origin of petroleum, there are several theories. The one most generally accepted holds that it was produced by the decomposition of marine organisms, both vegetable and animal, at ordinary temperatures and pressures.

The United States leads the world in the production of petroleum. The first successful well, sunk at Titusville, Pennsylvania, by Colonel C. E. Drake, produced oil August 28, 1859. Since that date extensive petroleum fields have been developed in many countries.

The following list gives the chief petroleum-producing countries in the order of their production for the year 1926: United States, Mexico, Russia, Venezuela, Persia, Rumania, India, Argentina, and Dutch East Indies. Of the total amount produced, the United States contributed nearly three-fourths. See *Natural Gas*, *Shale Oil*.

CRUDE PETROLEUM PRODUCED IN THE UNITED STATES, 1926

State	Barrels of 42 Gallons	Value at Wells
California	224,117,000	$355,000,000
Oklahoma	179,272,000	410,000,000
Texas	163,933,000	292,800,000
Arkansas	59,229,000	69,600,000
Kansas	41,427,000	93,100,000
Wyoming	24,558,000	49,300,000
Louisiana	22,803,000	38,400,000
Pennsylvania	8,942,000	34,000,000
Illinois	7,766,000	17,300,000
Montana	7,645,000	11,800,000
Ohio	7,322,000	19,500,000
Kentucky	6,280,000	15,300,000
West Virginia	5,975,000	20,200,000
Colorado	2,717,000	5,000,000
New York	1,956,000	7,300,000
New Mexico	1,627,000	3,300,000
Indiana	793,000	1,700,000
Michigan	98,000	300,000
Tennessee	44,000	100,000
Total 1926	766,504,000	$1,444,000,000
Total 1920	442,929,000	$1,360,745,000

Phosphate Rock. An amorphous rock, usually gray in color, but occasionally yellow, blue, or black. It contains a large proportion of calcium phosphate, together with limestone, sand, and various other impurities. It may be firm or spongy, and occurs either earthy or in rounded lumps.

The question of the source of phosphate rock deposits has caused much discussion. Some deposits, apparently, are formed from the bones and teeth of animals, but most beds of phosphate rock are believed to have been deposited from solutions which had been formed elsewhere. The rock occurs in beds from 3 to 50 feet thick and usually is removed from open pits rather than from sunken shafts. The types of material are hard rock, land pebble, and river pebble. For the preparation of fertilizer, the hard rock is used.

In the United States, Florida and Tennessee are the chief commercial producers of phosphate rock. The deposits which have been discovered in Idaho, Wyoming, Utah, and Montana are the largest known. See *Fertilizers, Chemical*.

Pitchblende (*pĭch'blĕnd'*). A radioactive mineral, more properly called *uraninite*. It consists chiefly of uranium oxides together with oxides of various other elements. While sometimes found as isometric crystals, it occurs usually as gray, green, brown, or black opaque masses, pieces, or grains, which have a pitchlike luster. These occur either in granite rocks or as a secondary mineral associated with sulphide ores of silver, lead, copper, nickel, and other metals. While mined chiefly at Joachimsthal, Bohemia, pitchblende occurs also in Saxony, Hungary, Turkey, and in the United States. Pitchblende and other uranium ores are the source of radium. See *Radium, Uranium*.

Porphyry (*pôr'fĭ-rĭ*). An igneous rock in which comparatively large and distinct crystals are held in a groundmass of much finer texture. The large crystals are called *phenocrysts*. According to the nature of the phenocrysts, porphyries may be classified as *Quartz-porphyry, feldspar-porphyry, mica-porphyry*, or *hornblende-porphyry*. Porphyries are intermediate between the true granites and the volcanic glasses or obsidians. Various porphyries are used for building and for ornamental stones. Their value depends upon the nature of the phenocrysts, some of which resist oxidation and weathering better than others. See *Granite, Obsidian*.

Precious Stones. Various minerals which, on account of their beauty, hardness, and rarity, are prized for use in ornamentation, especially in jewelry. Strictly speaking, the diamond, ruby, sapphire, and emerald are the only stones which are entitled to be called precious in this sense. However, the opal, on account of its beauty, is often classed with the precious stones, as is also the pearl, which is really not a true mineral but the secretion of various mollusks.

Very fine specimens of choice varieties of the softer gem stones sometimes have a higher value than average specimens of the standard precious stones. In their natural state, precious stones are often dull or coated with an external layer or crust which obscures their real beauty. Consequently, they are almost invariably cut and polished before they are mounted as gems. See *Gem Stones*.

Pudding Stone. See *Conglomerate*.

Pumice (*pŭm'ĭs*). A light, glassy rock of spongy texture, produced by the cooling of lava which has been puffed up and made porous by innumerable bubbles of expanding steam. Pumice, therefore, is a hardened lava froth, and may be regarded as a variety of obsidian. On account of its roughness and hardness, it is extensively used as an abrasive for polishing. Some of the more porous forms will float upon water. Pumice is obtained mostly from the Lipari islands, Italy, though it occurs also in Hungary, Mexico, and Iceland. See *Obsidian*.

Pyrite (*pī'rīt*; *pĭr'ĭt*). A native iron disulphide, a compound of iron and sulphur containing, when pure, 46.6 per cent of the metal. It is usually found massive but occurs also as opaque, isometric crystals. Because of their metallic luster and brass yellow color, pyrite crystals have become known as "fool's gold." Pyrite is widely distributed through almost all kinds of rock and is sometimes mined for copper or gold, with which it is associated. When heated, pyrite readily gives off sulphur dioxide and is therefore roasted as a valuable source of sulphur for making sulphuric acid. Important deposits are found in North America and Europe, notably in Spain. In the United States, Virginia, California, New York, and Georgia are important producers of pyrite. See *Iron, Sulphur*.

Pyrolusite (*pī'rō-lū'sīt*; *pīr'ō-lū'sĭt*). Black oxide of manganese, or manganese dioxide, the most important manganese ore, generally occurring as soft, black masses. It is used for making manganese steel and in the chemical industries for such purposes as the preparation of chlorine and bromine. Pyrolusite is found to a limited extent in the United States, but the main supply comes from India, Brazil, and Russia. See *Manganese*.

Pyroxene (*pī'rŏk-sēn*; *pīr'ŏk-*). Any one of a group of important rock-forming, iron-magnesian minerals, very similar to the amphiboles. The crystals are usually short, stout prisms with pointed ends and a cross section having angles of 87 and 93 degrees. Chemically, pyroxenes are metasilicates; *augite*, for example, is aluminum-calcium-iron-magnesium silicate. They often occur in grains and shapeless masses and are typical components of dark green or black igneous rocks. See *Amphibole*.

Quartz. Crystallized silicon dioxide, which, in its various forms, is the most common and widely distributed of minerals. The many varieties of quartz may be divided into (1) those which are obviously crystalline and (2) others which are so fine and compact that by ordinary inspection no crystals can be detected.

A crystal of pure quartz, called *rock crystal*, is remarkably transparent. It occurs usually as a hexagonal prism with pointed ends, has a hardness of 7 and no cleavage planes. The ancients believed that such crystals consisted of ice which had been frozen so hard that it would never melt.

Quartz is found in all colors. Its numerous forms include the amethyst, rose, and smoky quartz, cat's-eye, chalcedony, agate, onyx, and flint. It is an essential part of granite and sandstone, and is found almost everywhere as sand. In the western United States, quartz veins are the common source of gold. Fused quartz is used for making chemical apparatus which is resistant to most acids and does not crack when heated. See *Agate, Amethyst, Carnelian, Chalcedony, Flint, Gem Stones, Gravel, Onyx, Sand, Sandstone.*

Quartzite. A metamorphic rock consisting chiefly of quartz. It was produced by the alteration of sandstone to a dense vitreous rock which shows little trace of its original structure. The various forms of quartzite possess great hardness and resistance to weathering, and have a sharp-edged, splintery fracture. Some varieties, such as the Potsdam quartzite, of New York, are widely used for building stone. In some localities quartzite is used as a flux in smelting copper. Ground quartzite is employed in making sandpaper, filters, and wood fillers.

Realgar (*rē-ăl'gär*). Arsenic disulphide, a red mineral usually occurring with the yellow arsenic trisulphide or *orpiment.* These are found associated with silver and lead ores in Hungary, Bohemia, and Saxony. The two minerals are also deposited from geyser waters in Yellowstone park. Realgar is mined in Corsica and in the state of Washington. Formerly, it was mixed with saltpeter to form the white Bengal fire used in pyrotechny, but it has been largely displaced for this purpose by the artificial product. The name realgar comes from the Arabic, meaning "powder of the mine." See *Arsenic.*

Rhodonite (*rō'dō-nīt*). Manganese spar, or manganese silicate, combined with some iron, calcium, or zinc. It occurs crystallized and also in masses, and is usually rose-red in color. It is found in northern Europe and in New York, Massachusetts, and Connecticut. Massive varieties are used for table tops and for similar ornamental purposes. Fine crystals are used to a limited extent as gems.

Ruby. One of the most highly valued of precious stones. The true ruby is a red, transparent, crystallized variety of corundum. As such, it is generally said to have a hardness of 9, although it is actually slightly softer than the sapphire. It is sometimes called oriental ruby to distinguish it from other red stones improperly called rubies.

Genuine rubies are of very limited distribution. They occur chiefly in the gem gravels of Burma and Siam, where they became concentrated after the wearing away of the crystallized dolomitic limestone in which they were formed. They are found in smaller numbers in Ceylon, Russia, Australia, North Carolina, and Montana. The dark red variety from Siam, called ox-blood ruby, has about the same value as the diamond. The world famous variety from Burma, called pigeon-blood ruby, is carmine red. A flawless pigeon-blood ruby weighing more than one carat is usually worth several times as much as a diamond of the same size. Rubies exhibit various shades of color when viewed from different directions by transmitted light (dichroism). When heated they lose color but, on cooling, turn green and then regain their original hue.

The so-called "Cape rubies" of South Africa, the "Australian rubies" of South Australia, and the "Arizona rubies" of the western United States are fine forms of garnet. The "Siberian ruby" is red tourmaline or rubellite, and the "balas ruby" is spinel. Ancient writers used the term ruby for almost any red gem.

Artificial rubies that only an expert can distinguish from the finest oriental gems are now an inexpensive commercial product. They are built up by gradually fusing, in an oxyhydrogen flame, a mixture of powdered aluminum oxide with a small amount of chromium oxide which imparts the red color. These built-up or "synthetic" stones have all the physical and chemical properties of a natural ruby and are often superior in color. Under a magnifying glass either type of stone is seen to contain fine bubbles; in a natural ruby these bubbles are angular, while in the synthetic stone they are rounded. If very fine lines also are noticeable, they will have a common center in the synthetic, but not in the natural stone. See *Corundum, Sapphire.*

Rutile (*rōō'tĭl*; *-tēl*). A mineral composed of titanium dioxide, which sometimes forms beautiful, reddish brown, tetragonal crystals. Rutile is found in the more ancient rock formations of Europe and the United States. It is valuable as the chief source of the metal titanium. The mineral is used also in giving a yellow color to glass and porcelain and in imparting an ivory tint to artificial teeth. Fine specimens of rutile are sometimes cut for gems. Rutile is obtained chiefly in Norway, South Australia, and Virginia. See *Titanium.*

Sand. A loose, finely granular mass of mineral, commonly consisting of small particles of quartz with a slight admixture of feldspar and mica or other resistant materials. Sand is produced by the decomposition of rocks through chemical action, weathering, and abrasion. It is immensely abundant along the courses of rivers, on the shores of lakes and the ocean, and in arid regions. In most soils, sand is an important constituent.

Many varieties of sand are of great practical value in making mortar, cement, glass, pottery, and foundry molds. Sand is used also for polishing and scouring, as a cutting and etching agent in the sand blast, and for numerous other purposes. See *Gravel, Quartz, Soil.*

Sandstone. A stratified rock, commonly composed of small grains of quartz, but sometimes containing other minerals, such as mica, feldspar, pyroxene, and hornblende. All of these components are more or less solidly cemented together with calcium carbonate, iron oxide, or silica. In color, sandstones are white, gray, yellow, brown, or red, and in hardness and texture they likewise vary greatly. Sandstones are widely distributed throughout the world in rocks of all geologic ages. Among the important varieties are *quartzite, arkose, freestone, brownstone, flagstone, bluestone, novaculite,* and *grit.*

Many kinds of sandstones are of high value as building material. In the eastern United States, the brownstones of Connecticut, the Berea sandstone of Ohio, the Medina sandstone and the Potsdam quartzite of New York are the most extensively used. Valuable deposits of sandstone occur in Washington, Michigan, Iowa, and other states. In Canada there are important quarries in Nova Scotia and Alberta. Grindstones and oilstones are made from certain forms of sandstone. Other kinds are much prized for making pottery, glass, and silica brick. See *Quartz.*

Sapphire (*săf'ir*). A beautiful crystalline variety of corundum or aluminum oxide, highly valued as a gem stone. In composition the sapphire is essentially the same as the ruby, differing from it chiefly in color, and slightly exceeding it in hardness and density. Sapphires vary from pale blue to dark indigo, the most esteemed shade being deep bright blue.

Like rubies, sapphires exhibit different colors or shades when viewed from the proper angles by transmitted light (dichroism). When heated, sapphires lose their color and, unlike rubies, do not regain it upon cooling. The action of radium is said to change the blue color of sapphire first to green and then to yellow. By artificial light, some sapphires seem dark or inky, while others appear violet, so that they seem to be transformed into amethyst.

The finest specimens of blue sapphire are about as valuable as the diamond. These are found chiefly in Ceylon and Siam, but gem sapphires occur also in Burma, Kashmir, Madagascar, Australia, and in North Carolina and Montana in the United States. The sapphires of the ancients and of the Bible are believed to have been varieties of lapis lazuli. Synthetic sapphires are made in the same manner as synthetic rubies, titanium oxide being used, alone or with oxide of iron, as the coloring material. See *Corundum, Ruby.*

Scoria (*skō'rĭ-ă*). Volcanic rocks, usually dark to black or reddish in color, which form the porous, cindery, or slaglike products of a volcanic eruption. They belong in the basalt class and are formed in the liquid lava through the action of gas bubbles which give the molten rocks a spongy, cellular, or vesicular character. See *Lava, Obsidian, Pumice.*

Selenite (*sĕl'ĕ-nīt*). A variety of gypsum, hydrous calcium sulphate, which occurs in large, beautiful, clear crystals, sometimes five feet long, and also in foliated transparent plates, occasionally several feet across. Foliated selenite, like mica, may be split into very thin, flexible sheets. These clear sheets were sometimes used by the ancients to serve the purpose of window glass.

Fine crystals of selenite are found in various parts of Europe, also in Utah and Ohio, while the foliated form is abundant in Nova Scotia and in western New York. Selenite is used to some extent in making paints and as a filler for wall paper. It is employed also for polarizing prisms on petrographic microscopes and for microscopic objectives. See *Gypsum.*

Serpentine (*sûr'pĕn-tīn*; *-tĭn*). A metamorphic mineral, or rock, composed of hydrous magnesium silicate. It has a resinous luster, is usually massive, and may be white, brown, yellow, or red, but is generally green, often with a mottled appearance resembling the skin of a serpent. Fibrous serpentine, *chrysotile,* is the most important variety of asbestos.

Serpentine is formed by alteration of olivine, pyroxene, amphibole, and other magnesium minerals, and, consequently, from rock such as a peridotite. Because of its attractive color, durability, and easy working quality, serpentine is one of the most valuable of ornamental building stones, especially for interior decoration. Many structures in and near Philadelphia are built of a green serpentinous rock quarried at West Chester, Pa. Serpentine is found in commercial quantities in England, in the Transvaal, in Maryland, New Mexico, Washington, and California. See *Amphibole, Asbestos, Olivine, Peridotite, Pyroxene.*

Shale. A stratified rock composed largely of hardened or mineralized clay that has become solid chiefly because of the pressure of overlying strata. As a result, shales show lines of cleavage essentially parallel to the original bedding plane. In this respect they differ sharply from the slates, to which they are closely related.

Upon being ground and mixed with water, many shales become as workable as ordinary clays, and may be made into bricks. Very refractory shales are used for making fire brick. Those containing much iron oxide may enter into the manufacture of mineral paint. Calcareous shales are frequently used in making Portland cement. Shales containing iron pyrites can be used as a source of alum; shales rich in carbonaceous matter are known as bituminous shales. Many of these carbonaceous deposits contain coal, and others are sources of petroleum.

As the most common of the rocks associated with the Coal Measures, shales frequently contain interesting fossils of the plants and animals of the Carboniferous and other periods. See *Clay, Slate.*

Shale Oil. A mineral oil, similar in character to petroleum, obtained by distilling shales which are rich in bituminous matter. All sedimentary rocks of marine origin contain hydrocarbons. In some fossiliferous black shales, oil may form as high as 20 per cent of the total rock mass. In the Carboniferous rocks of Scotland there are large deposits of oil shale, a ton of which yields about 40 gallons of oily distillate. Rich oil-bearing shales occur also in Utah, New Brunswick, and New South Wales. Many oil shales can be worked profitably, even when the percentage of hydrocarbons is low. On account of the greatly increased demand for petroleum, the production of oil from bituminous shales is a growing industry. See *Petroleum, Shale.*

Siderite (*sĭd'ĕr-īt*). Iron carbonate, called also *chalybite* and spathic iron ore. When pure, it contains 48.3 per cent of iron. It forms yellow-brown rhombohedral crystals of a glassy luster, and is also found in massive deposits and irregular nodules. Siderite occurs in various rock formations, often with other metallic ores. It constitutes the chief commercial supply of iron ore in Great Britain, but it furnishes less than one per cent of the iron ores produced in the United States. See *Hematite, Iron, Limonite, Magnetite.*

Slate. Any fine-grained, metamorphic rock characterized by definite cleavage in one plane, so that it may be easily divided into slabs. In color, slate may be blue, green, or red, but it is usually gray or nearly black on account of the carbonaceous plant matter in the original material from which it was derived.

Slate was formed by the action of enormous pressure on fine, sedimentary deposits such as mud, ash, or, usually, clay. Under this pressure each grain tended to flatten out and to turn with its short axis in line with the acting force. The cleavage planes were therefore produced at right angles to the pressure, in the directions assumed by the longer axis of the grains. As the action was generally produced by a thrust from one side, slaty cleavage is frequently perpendicular to the layers in which the sediment was originally deposited. Slates thus differ from shales, whose cleavage is parallel to the original bedding plane.

Thin slabs of slate are extensively used for roofing, and larger pieces for flooring, sinks, blackboards, the beds of billiard tables, and for electrical switchboards. Writing slates are no longer of general importance. Wales and France are the chief European sources of slate. In the United States, slate is quarried in commercial quantities in some 14 states. Pennsylvania, Vermont, Maine, and Virginia usually lead in slate production. See *Metamorphic Rocks, Shale.*

Soapstone. See *Talc.*

Spinel (*spĭn'ĕl*; *spĭ-nĕl'*). A beautiful mineral, magnesium aluminate, which occurs usually as red octahedral crystals. It has a hardness of 8, and, in color, varies to green, blue, white, or almost black.

Spinel may be considered as a compound of magnesium oxide and aluminum oxide. Various members of the spinel group are known, in which these oxides are entirely or partially replaced by similar oxides, such as those of iron and chromium. The red variety is the gem stone *ruby spinel.* This is found associated with rubies and is frequently mistaken for the more valuable stone. But true ruby can scratch spinel, and spinel is not dichroic. Rose-red spinel is usually sold as *balas ruby*; yellow-red or orange-red, as *rubicelle*; the blue variety, as *sapphirine*; and violet to purple crystals, as *almandine.* In the last case it should be noted that true almandine is a garnet.

The most valuable varieties of spinel come from Ceylon and Siam, though some are obtained from New York and New Jersey. See *Ruby.*

Spodumene (*spŏd'ū-mēn*). A mineral composed of lithium and aluminum silicate. It occurs as light green, gray, yellow, or purple monoclinic crystals, with a vitreous luster. The emerald green variety, known as *hiddenite*, found in North Carolina, and the beautiful lilac variety, known as *kunzite*, found near San Diego, California, are popular as semiprecious gem stones. Large crystals of the mineral occur in the Black Hills, South Dakota. Spodumene is found in various other localities of the United States, also in the Tyrol, in Switzerland, and in Scotland. It is valuable as a source of the metal lithium and various lithium salts. See *Lithium.*

Stibnite (*stĭb'nīt*). The chief ore of antimony, consisting of antimony trisulphide. When pure, it contains 71.4 per cent of the metal. Stibnite is a steel-gray mineral with a metallic luster and a hardness of 2. It is found usually as needle-like crystals in beds or veins, in quartz, gneiss, or granite, and occurs chiefly in France, Spain, Germany, Italy, Australia, China, and Japan. Practically no stibnite is mined in the United States, the supply of antimony being obtained largely as a by-product of smelting antimonial lead ores. The ancients used stibnite as a dye for coloring the hair. See *Antimony.*

Talc (*tălk*). A very soft, silvery white, gray, or green mineral, with a pearly or semimetallic luster and a soapy feel. Chemically, talc is a magnesium silicate containing a small amount of water. Ordinarily it is mixed with various impurities. It is an exceedingly abundant mineral, sometimes occurring in large deposits.

The granular massive kinds, commonly called *soapstone*, are much used for hearthstones, mantels, sinks, laundry tubs, table tops, electric switchboards, and insulators. Purified powdered talc is used in paper making, in dressing leather, as a pigment, as a lubricator, and in various toilet preparations, such as talcum powders. Fine granular kinds, known as French chalk, are used in marking.

In the United States, Virginia is the chief producer of soapstone. The purer mineral used for making powdered talc is obtained mostly in St. Lawrence county, New York, though some is produced in Pennsylvania, North Carolina, and California. The largest European deposits are in southern France.

Topaz (*tō'păz*). A crystalline mineral, generally yellowish and pellucid, but also colorless and of various shades of blue, green, and brown. In composition, topaz is aluminum fluosilicate; it has a hardness of 8, and, when of good quality, is highly prized as a gem. The finest varieties are found in India, Ceylon, Russia, and Brazil. In the United States, fine topaz, suitable for gems, occurs sparingly in Maine, Colorado, Utah, and California.

The favorite color in topaz gems is a rich orange-yellow. Most of the jewels ordinarily sold as topaz are really *citrine* or yellow quartz. When heated, the yellow Brazilian topaz turns pink. This "burnt topaz" is often called "Brazilian ruby." Yellow corundum is sometimes known as "oriental topaz." Among the ancients the yellow gem stone known to them as topaz (probably chrysolite) was the symbol of friendship. When mounted in gold and hung about the neck, it was supposed to dispel enchantment. See *Aluminum, Ruby, Sapphire.*

Tourmaline (*tōor'mā-lĭn*). A beautiful but very complex mineral, consisting of aluminum borosilicate variously combined with chromium, iron, magnesium, and the alkali metals. It crystallizes in the hexagonal system, has a glassy luster, occurs either transparent or opaque, and may be colorless or blue, green, red, brown, or black. Some crystals are green externally and red internally; other crystals are red at one end and black, green, or blue at the other. Tourmaline usually occurs in granite, gneiss, or mica schist, though it is sometimes found in dolomite, in limestone, and in pebbles.

The white tourmalines are known as *achroite*; the black, as *aphrazite*; the blue, as *indicolite* or *Brazilian sapphire*; the red, as *rubellite* or *Siberian ruby*; and the transparent green, as *Brazilian emerald.* When of marked purity and clearness, the colored varieties are highly valued as gem stones. Such tourmalines occur in Ceylon, Russia, and Brazil. Very fine specimens are found also in Maine, California, and other parts of the United States.

Tourmaline displays remarkable physical properties. By heating or friction it becomes highly electrified. The colored varieties are the most dichroic of the gem stones, while transparent tourmaline possesses to a high degree the power of transmitting polarized light.

Trap Rock. A name somewhat loosely used to designate various close-grained igneous rocks of a black or dark green color, commonly with a columnar structure and a somewhat stairlike arrangement. The term trap has almost the same meaning as basalt or diabase but applies equally well to diorites, gabbros, and other related forms. The trap rocks which assume a dark green color are known also as *greenstone*. Both the black and the green forms include numerous rock groups or families. The Giant's Causeway in Ireland, Fingal's Cave in Scotland, North mountain in Nova Scotia, and the Palisades of the Hudson are noted formations of trap rock. See *Diabase, Gabbro.*

Travertine (*trăv'ĕr-tĭn*). A variety of limestone, commonly with an irregularly banded structure, formed by the deposition of calcium carbonate from springs and rivers. The porous varieties are called also calcareous tufa. Extensive quarries near Tivoli, Italy, furnish the travertine from which a great part of the city of Rome is built, including St. Peter's and the outer walls of the Colosseum. Interesting deposits of travertine occur around the Mammoth Hot Springs in Yellowstone national park. See *Limestone.*

Tufa (*tōō'fà*). Porous rock formed by deposits from the waters of mineral springs. Calcareous tufa, known also as travertine and calcareous sinter, is formed by water containing carbonate of lime (calcium carbonate). Siliceous tufa is deposited by water containing silica. Tufas are coarse, cellular rocks frequently containing twigs, leaves, or other remains of plants, around which the deposits are formed.

Tuff (*tŭf*). Rock composed of more or less finely divided particles of mineral matter, originally ejected from volcanoes and partially or completely compacted. The most noted example of tuff is the thick layer of hardened volcanic ash thrown out by Vesuvius in 79 A. D., under which Pompeii remained buried for many centuries. See *Ash, Volcanic*; *Lava.*

Turquoise (*tûr-koiz'*; *tûr'kwoiz*). A beautiful, semi-precious stone highly prized for its delicate blue or bluish green shades. In composition it is a hydrous aluminum phosphate colored by copper. Turquoise occurs usually as opaque, kidney-shaped masses with a nodular surface, like that of a bunch of grapes, in igneous or volcanic rocks. The finest turquoise comes from Persia but excellent specimens are found in New Mexico, Colorado, Arizona, Nevada, and California.

When used as a gem, turquoise is usually cut in circular or elliptical form with a low, convex surface. Irregular pieces are often utilized in Eastern lands, where turquoise is used not only for personal ornament, but also for decorating dagger handles, horse trappings, and various other articles. The turquoise is commonly held to be a "lucky stone," especially as a protection against falling.

Wolframite (*wōōl'frăm-ĭt*; *wōl'-*). One of the chief ores of tungsten, composed of a tungstate of iron and manganese. It occurs as black, monoclinic crystals, with a hardness of 5.5. This ore is found usually in igneous rocks, associated with tinstone, bismuth, quartz, and other minerals. Wolframite is mined in various localities in the United States and in Europe. See *Tungsten.*

Wulfenite (*wōōl'fĕn-ĭt*). One of the most beautiful minerals known, occurring in square tabular crystals, in various pyramidal forms, and in crystalline masses. It is an ore of molybdenum, consisting of lead molybdate, and in color ranges usually from yellow to red, with a resinous luster. It occurs in veins, with other lead ores, in various parts of Europe and the United States. Wulfenite is worked to a limited extent as a source of molybdenum. See *Molybdenite, Molybdenum.*

Zincite (*zĭngk'ĭt*). A valuable ore of zinc, commonly known as the red oxide of that metal. It forms hexagonal crystals of dark red color and somewhat dull luster. Zincite occurs with franklinite, willemite, and other zinc-bearing minerals at various mines in New Jersey. See *Zinc.*

Zircon (*zûr'kŏn*). A native silicate of zirconium which occurs as rounded pebbles and as tetrahedral crystals with pointed ends. Zircon has a hardness of 7.5, and is usually brown and opaque, though some is transparent and beautifully colored.

Because of their hardness, double refraction, and rich colors, the transparent varieties of zircon have long been highly prized as gems. In dispersive power, zircon is exceeded only by the diamond. The red zircons are called *hyacinth*; those that are golden yellow, *jacinth*; while those that are colorless, a condition usually produced by heating, are known as *jargon*. Colorless zircon, more than any other gem, closely resembles a diamond. It is easily distinguished, however, because the diamond is not double refracting.

The most valuable zircons are obtained in Ceylon and New South Wales. Excellent crystals are found in Norway, Russia, and Canada. In the United States, zircon is produced most extensively in North Carolina, but is found also in New York, New Jersey, and Colorado. The ordinary opaque varieties are employed for furnace and crucible linings, and in making the brilliant zircon light, which is similar to the limelight.

MINERAL PRODUCTS OF THE UNITED STATES

The following is a list of the principal minerals mined in America, with the states leading in the production of each, named in the order of their rank in 1925 as stated in the reports of the United States Bureau of Mines.

Product	States Leading in Production
Aluminum	New York, North Carolina, Tennessee
Asbestos	Georgia, Arizona, Maryland
Asphalt	Kentucky, Texas, Utah, Oklahoma
Barytes (crude)	Missouri, Georgia, Tennessee, Virginia
Bauxite	Arkansas, Georgia, Tennessee
Borates	California, Nevada
Bromine	Michigan, West Virginia, Ohio
Cement	Pennsylvania, Indiana, California, Michigan
Chromic iron ore	California, Maryland
Clay:	
Products	Ohio, Pennsylvania, New Jersey, Illinois
Raw	Pennsylvania, Missouri, New Jersey, Georgia
Coal:	
Bituminous	Pennsylvania, West Virginia, Illinois, Kentucky, Ohio
Anthracite	Pennsylvania
Coke	Pennsylvania, Ohio, Indiana, Alabama
Copper	Arizona, Montana, Utah, Michigan
Emery	New York
Feldspar	North Carolina, New Hampshire, Maine, New York
Fluorspar	Illinois, Kentucky, Colorado, New Mexico
Fuller's earth	Georgia, Florida, Texas, Illinois
Garnet (abrasive)	New York, New Hampshire
Gems and precious stones	Montana, Nevada, California, Arizona
Gold	California, Colorado, Alaska, S. Dakota
Graphite	Texas, Rhode Island, Michigan, Nevada
Grindstones and pulpstones	Ohio, West Virginia, Michigan
Gypsum	New York, Iowa, Michigan, Texas
Iron:	
Ore	Minnesota, Michigan, Alabama, Wisconsin
Pig	Pennsylvania, Ohio, Illinois, Indiana
Lead	Missouri, Utah, Idaho, Oklahoma
Lime	Ohio, Pennsylvania, Missouri
Magnesite (crude)	California, Washington
Manganese ore	Montana, Washington, Arkansas
Manganiferous ore	Minnesota, Wisconsin, Michigan
Mica	North Carolina, New Hampshire, South Dakota, New Mexico
Millstones	New York, Virginia, New Hampshire
Mineral waters	Wisconsin, New York, California, Maine
Natural gas	Oklahoma, California, West Virginia, Louisiana
Oilstones	Indiana, Arkansas, Ohio, Vermont
Peat	New Jersey, Illinois, California, Indiana
Petroleum	California, Oklahoma, Texas
Phosphate rock	Florida, Tennessee, Idaho, Kentucky
Potash	California, Maryland, Pennsylvania
Pumice	Kansas, Nebraska, California
Pyrites	California, Virginia, New York
Quicksilver	California, Texas, Nevada, Oregon
Salt	Michigan, New York, Ohio, Kansas
Sand and gravel	New York, Illinois, California
Silica (quartz)	California, Maryland, Wisconsin, North Carolina
Silver	Utah, Montana, Idaho, Nevada
Slate	Pennsylvania, Vermont, New York, Maine
Stone	Pennsylvania, Ohio, Michigan, California
Sulphur	Texas, Louisiana, Nevada, Utah
Talc and soapstone	New York, Vermont, Virginia, California
Tin	Alaska
Tungsten ore	California, Nevada, Colorado, Arizona
Uranium and vanadium minerals	Colorado, Utah
Zinc	Oklahoma, Kansas, New Jersey, Montana



Photos (except No. 8) from Yerkes Observatory

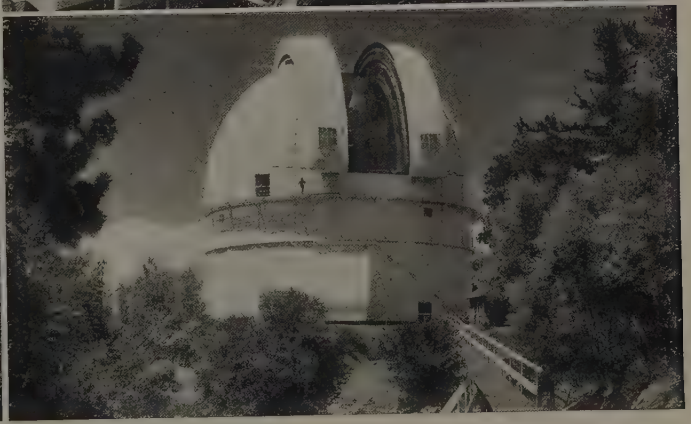
HEAVENLY BODIES

1 Morehouse's Comet. 2 Moon, Second Quarter. 3 Great Nebula in Orion. 4 Solar Prominences. 5 Sun Spot. 6 Star-cloud in the Milky Way. 7 Saturn. 8 Ring Nebula in Lyra; *photo by Mt. Wilson Observatory with 100-inch reflecting telescope.* 9 Star Cluster.









ASTRONOMICAL OBSERVATORIES

Dominion Astrophysical Observatory, Victoria, British Columbia—Dome of 72.5 inch reflector

Yerkes Observatory, Williams Bay, Wis.—Dome 40-inch refractor on right

Greenwich Royal Observatory, London, England
By Burton Holmes, From Ewing Galloway. N. Y.

Mount Wilson Observatory near Pasadena, California—Dome of 100-inch Hooker reflector

ASTRONOMY

ASTRONOMY is the science which has for its subject matter the sun, moon, planets, comets, and stars. It is concerned with the distances, dimensions, constitution, motions, origin, and evolution of these bodies.

HISTORY OF ASTRONOMY

Astronomy is the most ancient of the sciences. It seems to have had its origin, long before the earliest recorded history of mankind, in the everyday needs of primitive peoples. They hunted, sowed, reaped, and held their religious ceremonies at times determined by the phases of the moon and the locations of the heavenly bodies. Familiarity with the positions of the stars enabled the semisavage to penetrate vast forests, to cross wide deserts, and to hold sure course upon pathless seas. These conclusions are supported by the fact that the earliest writings now existing abound in references to important facts of astronomy, and reveal an extent of knowledge which could have been accumulated only by centuries of observations.

The present division of the visible stars into star-groups, or constellations, is believed to have been made by the Babylonians about 5000 years ago. The Chaldeans and the Egyptians measured the length of the year and found that it consists of about 365¼ days. Chinese annals relate that, about 2100 B. C., two royal astronomers were executed for failure to observe an eclipse with proper rites. About 1100 B. C., the Chinese determined the amount of the obliquity of the ecliptic. But it remained for the Greeks to advance astronomy to the plane of an exact science.

Thales (about 640–546 B. C.), one of the "seven wise men" of Greece, systematized and extended the learning of the Babylonians and the Egyptians. Pythagoras (about 582–500 B. C.) taught that the earth is a sphere; Eratosthenes (276–196 B. C.) attempted to measure its circumference and obtained results which were approximately correct.

Hipparchus (about 180–110 B. C.) and Ptolemy (about 100–170 A. D.) were the greatest astronomers of the ancient world. Hipparchus taught that the earth is the center of the universe. He determined the length of the sidereal and tropical years, and made a catalogue of 1080 stars, which he divided according to their apparent brightness into six classes, or magnitudes. Completing the notable work of Hipparchus, Ptolemy explained in detail the apparent motions of the sun, moon, and stars by the theory that these bodies revolve about the earth in circles. His celebrated treatise, the *Almagest*, remained the authoritative work on astronomy for 1500 years.

During the middle ages, astronomy was cultivated by the Arabs, who translated the *Almagest*, by the Moors in Spain, and by the Tatars. The Tatar prince, Ulugh Beg, a grandson of Tamerlane, erected about 1420 a splendid observatory at Samarkand.

The teachings of the *Almagest* held undisputed sway until overthrown by Copernicus (1473–1543), who explained the motions of the sun, moon, and stars by the theory that the earth rotates on its own axis and revolves around the sun. The discovery of the laws of planetary motion by Kepler (1571–1630), the construction and use of the telescope by Galileo (1564–1642), and the discovery of the law of gravitation by Newton (1642–1727) completely confirmed the doctrines of Copernicus.

Since the time of Newton, the theories of the motions of the planets and their satellites have been perfected. The chemical constitution and physical condition of the sun and stars have been determined by means of the spectroscope. On the basis of this knowledge, hypotheses of the origin and evolution of the heavenly bodies have been developed.

VALUE OF ASTRONOMY

Astronomy is the most perfect, most beautiful, and noblest of the sciences. There has never been anything low or mean associated with it. It has the merit, moreover, of having been important in many practical matters, and of still being very useful.

First, astronomy has fixed the dates of events in ancient history which happened to occur at the times of eclipses. (See *Eclipses*.) *Second*, astronomy is of supreme importance in navigation, because observations of the heavenly bodies enable mariners to conduct their ships in safety from port to port throughout the world. *Third*, astronomy is of great assistance in surveying, making it possible to construct accurate maps of continents and oceans, and to fix the boundaries between countries and states. *Fourth*, the correct time is determined daily by observations of the stars (in the United States, principally at the Naval Observatory in Washington), and is sent by telegraph or wireless from observatories to all parts of the world. *Fifth*, the laws of motion and the law of gravitation, which are the fundamental basis of mechanics, were discovered through observations of the relatively simple motions of the heavenly bodies. *Sixth*, the greatest value of astronomy is in the intellectual horizons it has opened up, and in the contributions it has made to philosophy and religion.

SCOPE OF ASTRONOMY

The best-known astronomical object is the earth. All facts concerning it that are determined wholly or chiefly by astronomical means are properly regarded as belonging to astronomy, as are similar facts concerning the various celestial bodies.

The celestial body nearest the earth is the moon. By gravitational control, the earth holds the moon in its orbit, and this satellite, in turn, produces tides upon the earth. The earth is one of eight planets which, owing to the gravitational dominance of the sun, revolve around it in nearly circular orbits. All of the planets except two are accompanied by one or more satellites. Besides the large planets, there are more than 800 small planets, or planetoids, and numerous comets which, likewise, circulate around the sun. The seemingly countless stars which fill the heavens on a clear night, are, in reality, suns, many of which greatly exceed our own sun in size and brilliancy.

The sun and its accompanying system of smaller bodies, the millions of remotely distant suns that we call stars, and the numerous cloudlike objects known as nebulæ, together make up the visible universe. The accumulated knowledge concerning it, gained by observation and tested by measurements, constitutes the science of astronomy. In the following pages various important astronomical subjects are treated in alphabetical order.

Aphelion (*ȧ-fēl'yŭn*). The point in the orbit of a planet or a comet where it is farthest from the sun is called aphelion. The earth is in aphelion about July 1 each year. It is then more than 95,000,000 miles distant from the sun. At this point, the earth is nearly 3,000,000 miles farther from the sun than when in perihelion. See *Perihelion*.

Betelgeuse (*bĕt'ĕl-gûz'*). Betelgeuse is the most brilliant star in the constellation Orion, the Warrior. It is situated on one of the shoulders of the imaginary figure of the hero and may be recognized by its red color. With Sirius in the Great Dog (*Canis Major*) and Procyon in the Little Dog (*Canis Minor*), Betelgeuse forms a conspicuous triangle of first-magnitude stars, which are visible in the southern sky during winter evenings.

Betelgeuse is the first star whose size has been determined. The problem of measuring the diameters of the stars is one of very great practical difficulty.

This is because their distances from us are from 300,000 to many million times as far as the distance from the sun to the earth. Betelgeuse is one of the nearer stars, yet its distance is 70 light years, or more than four hundred million millions (400,000,000,000,000) of miles.

Astronomers suspected Betelgeuse to be a very large star. This suspicion was confirmed in 1920 when the star was measured at the Mount Wilson solar observatory by Professor Michelson's interferometer method. It was found that the diameter of Betelgeuse is 300 million miles. An idea of the immense size of this star can be obtained from the fact that its volume is about 30 million times that of the sun, and from the fact that the volume of the sun is more than a million times that of the earth. See *Orion, Stars.*

Big Dipper. The best-known group of stars in the sky is the Big Dipper, in *Ursa Major.* Its seven second-magnitude stars form an almost perfect outline of a dipper, whose bowl is about 7° wide and 5° deep. The two stars in the bowl, opposite to the handle of the dipper, are almost exactly in a line with the Pole Star, and are known as "the pointers." By means of these stars, one can locate the Pole Star on any clear night. First find the Big Dipper. Then follow an imaginary line from the pointer at the bottom of the bowl through the other pointer and continue beyond it for about 5 times the distance between the two pointers. The bright star at the position indicated is the Pole Star.

The star Mizar at the bend in the handle of the dipper is accompanied by a faint one near it, whose name, Alcor, is said to have meant in Arabic "the test." A person who could see it was regarded as having excellent eyesight, but at the present time it is easily seen by anyone whose eyes are normal. Although Alcor and Mizar appear very close together, the distance between them is more than 15,000 times the distance from the earth to the sun.

The telescope shows that Mizar is a double star, the first telescopic double ever discovered. The two components are so close together that, with the unaided eye, they could not be seen as a double star unless their distance apart were 15 times greater than it is. The fact that the two stars appear to be very close together does not mean that they actually are close together, but simply that their distance from us is so great that they appear to be near each other. They are actually great suns, radiating more than 100 times as much light as our own sun; they are, however, so remote that 75 years are required for their light to come to us.

By means of the spectroscope each of the two components of Mizar has been found to be a double. The system, therefore, consists of four suns—two pairs whose component stars are close together, as compared to the distance between the pairs. The stars comprising the better-known of these pairs revolve about their center of gravity in a period of 20.5 days, at a distance from one another of 25 million miles.

The principal stars in the Big Dipper belong to a group of great suns which are moving through space at the same speed in parallel lines. These stars are so remote that, on an average, 60 years are required for their light to come to us, and they radiate from 7 to 400 times as much light as the sun. See *Constellations, Pole Star.*

Calendar. The week, consisting of seven days, is a unit of time dating from prehistoric antiquity. Each of the seven days corresponds to one of the seven moving heavenly bodies then known, and may, indeed, have been set apart for the worship of a corresponding god or goddess. Sunday was the sun's day; Monday, the moon's day; Tuesday, Mars's (Tues in Norse) day; Wednesday, Mercury's (Wodan's) day; Thursday, Jupiter's (Thor's) day; Friday, Venus's (Freia's) day; and Saturday, Saturn's day.

In very ancient times the calendar was based almost entirely on the moon. The month is the period from full moon to full moon, about 29.5 days, or a little more than four weeks. Consequently, the month was introduced and twelve months were taken to make a year. But there are 12.4 months, by the moon, in a year, and the result was that the year was gradually displaced with respect to the seasons.

The confusion was serious until 45 B. C., when Julius Cæsar, abandoning all attempts to base a calendar upon the moon, decreed that there should henceforth be three years of 365 days each, and then one year of 366 days, in perpetual cycle. Since there are approximately 365¼ days in a year, this arrangement was satisfactory for many years. But there are not exactly 365¼ days in a year, and, in the course of centuries, the error became appreciable. The accumulated error in the Julian calendar was corrected by Pope Gregory XIII, in 1582, by omitting eleven days from that year. At the same time he instituted a leap year rule which will serve for more than a thousand years.

The leap year rule is as follows: Those years whose date numbers are exactly divisible by 4 are leap years, unless they are also exactly divisible by 100. In such cases they are not leap years unless they are exactly divisible by 400. Thus the year 1900 was not a leap year, but the year 2000 will be a leap year.

The fact that January 1 falls on different days of the week and the fact that the months are of different lengths make our calendar far from satisfactory. The source of the difficulty in attempting to make a more systematic calendar is that a year equals about 52 weeks and 1¼ days. Several suggestions for improving the calendar have been made.

The simplest plan is that the year shall consist of 13 months of exactly four weeks each, and that at the end of the year there be set aside a day, called New Year Day, or Humanity Day, which shall not belong to any week or month. Every four years there would be two such days, the second one being placed perhaps in the middle of the year. Under this system, the corresponding days in the different months would always fall on the same day of the week. For example, the system could be started so that the first, eighth, fifteenth, and twenty-second of each month would always fall on Monday. See *Day, Time.*

Comet. Comets circulate around the sun in elongated orbits, and consist of a head and usually of a tail and a nucleus. The head is spherical in shape, from ten thousand to a million miles in diameter, very tenuous, and generally faint. The tail, which always points away from the sun, whether the comet is approaching or receding, is even fainter and more tenuous than the head, and is often millions of miles in length. The nucleus, which, when present, is situated within the head, is small and starlike.

A few great comets have been visible even in the daytime, but most comets are so faint that they cannot be seen with the unaided eye. About 400 comets were recorded before the invention of the telescope in 1608, and since that time a somewhat larger number have been observed. At the present time from three to ten comets are seen each year.

Many comets come from far beyond the orbit of the most remote planet, Neptune, pass around the sun, and then recede to the distances from which they came. Possibly some of them never appear a second time. But the orbits of others are much smaller and extend only to the orbits of the larger planets, especially Jupiter. These comets are supposed to have been captured by the planets with which they are associated.

There are two or three small groups of comets whose most remote distances are beyond the orbit of Neptune. They indicate, possibly, the existence of corresponding planets beyond the borders of the planetary system as at present known.

Comets have very small masses. This is proved by the fact that when they pass near a planet they are drawn entirely away from the orbits on which

they were traveling, yet they do not affect the planet appreciably. Their nuclei probably consist of swarms of small particles, while their heads and tails are largely gaseous. The earth has passed through the tails of various comets, and, in every case, the effects have been inappreciable. For example, on May 18, 1910, the earth passed through the tail of Halley's comet.

If the nucleus of a comet should strike the earth, probably nothing more serious would happen than a fine meteoric shower. Meteors are simply small particles of matter which are made luminous by friction when they encounter the earth's atmosphere. In fact, there are several meteoric showers which are supposed to be due to the scattered remains of former comets. The best-known is that which occurs each year on November 14–16 in the early morning hours. Every 33 years, corresponding to the period of revolution of the comet of which they are the remains, the shower is conspicuous. Great meteoric showers occurred in 1833 and 1866, and a less noteworthy one in 1899; another great one is expected in 1932. These meteors are called the Leonids because they seem to radiate from a point in the constellation Leo.

In many respects, the most celebrated comet in history is Halley's. This comet, which was visible in 1682, was not discovered by Halley; but in 1687 he computed its orbit by the methods which had just been developed by his friend Newton. Halley found that its orbit was very similar to those of comets which had appeared in 1531 and 1607. Since the three dates—1531, 1607, and 1682—are about 75 years apart, Halley concluded that the three comets were three successive appearances of the same object, and that it revolves around the sun in a period of about 75 years.

From his calculations Halley predicted that this comet would reappear in 1759. In spite of the doubts of his contemporaries, their successors found that Halley's predictions were fulfilled. The comet later passed around the sun and near the earth in 1835 and 1910. It is now invisible in the part of its orbit which extends beyond the paths of the remote planets. Astronomers follow it with their calculations, determine the characteristics of its motions, and know that in obedience to the law of gravitation it will return in 1985.

Greater comets than Halley's are observed at intervals averaging from 20 to 50 years. Very great ones appeared in 1811, 1858, 1861, 1880, and 1882. See *Meteors*.

Constellations. A glance at the sky on a clear night shows that the stars are not uniformly scattered over its surface, but, in many cases, are arranged in natural groups. These natural groups, early observed and variously named by the ancients, became known as the constellations. Often these were given very fanciful names, such as the Lion, the Scorpion, the Lyre, and Orion (the Warrior). Originally, certain parts of the sky did not belong to any of the constellations. Modern astronomers, therefore, added new constellations, especially in those far southern parts of the heavens that were not visible to the ancients, and modified the outlines of others so that the entire sky is now covered.

Ptolemy (about 140 A. D.) enumerated, located, and described 48 constellations. Their names are as follows:

(1) The twelve zodiacal constellations, or those through which the sun passes in its apparent annual motion,—the Ram (*Aries*), the Bull (*Taurus*), the Twins (*Gemini*), the Crab (*Cancer*), the Lion (*Leo*), the Virgin (*Virgo*), the Balance (*Libra*), the Scorpion (*Scorpius*), the Archer (*Sagittarius*), the Goat (*Capricornus*), the Water Bearer (*Aquarius*), and the Fishes (*Pisces*).

(2) Twenty-one constellations found in the northern hemisphere,—the Great Bear (*Ursa Major*), the Little Bear (*Ursa Minor*), the Champion (*Perseus*), the Dragon (*Draco*), the Monarch (*Cepheus*), the Woman in a Chair (*Cassiopeia*), the Woman Chained (*Andromeda*), the Winged Horse (*Pegasus*), Horse's Head (*Equuleus*), the Triangle (*Triangulum*), the Charioteer (*Auriga*), the Hunter (*Boötes*), the Northern Crown (*Corona Borealis*), the Serpent Holder (*Ophiuchus*), the Serpent (*Serpens*), the Kneeling Hero (*Hercules*), the Arrow (*Sagitta*), the Lyre (*Lyra*), the Swan (*Cygnus*), the Dolphin (*Delphinus*), and the Eagle (*Aquila*).

(3) Fifteen constellations in the southern hemisphere,—Orion, the Whale (*Cetus*), the Winding River (*Eridanus*), the Hare (*Lepus*), the Great Dog (*Canis Major*), the Little Dog (*Canis Minor*), Hydra, or the Monster (*Hydrus*), the Cup (*Crater*), the Crow (*Corvus*), the Centaur (*Centaurus*), the Wolf (*Lupus*), the Altar (*Ara*), the Southern Fish (*Pisces Australis*), the Ship (*Argo*), the Southern Crown (*Corona Australis*).

Various other groups have been added since 1600, and now 87 constellations are accepted by astronomers.

In most cases the outlines formed by the stars bear no resemblance to the animals or objects after which the groups were named. There are some exceptions, however, such as the Northern Crown, which is a semicircle of stars. The Indians called it the camp circle, and it is not difficult to imagine that the individual stars represent warriors, seated about a camp fire. The principal stars in the Great Bear are those which constitute the Big Dipper. The Indians called the bowl of the dipper a stretcher on which a sick man was being carried; the first star in the handle was the medicine man who follows behind; the next one at the bend of the handle was the medicine man's wife; and the faint one near it was the dog of the medicine man's wife. *Coma Berenices* (Berenice's hair) is a group of small stars bearing some resemblance to flowing hair, while *Cassiopeia*, in outline, is not unlike a reclining porch chair in which one may imagine a woman is sitting. See *Big Dipper*, *Orion*, *Pleiades*.

Cosmogony (*kŏz-mŏg'ô-nĭ*). The science of the origin and development of the physical universe is called cosmogony. Men in all ages have speculated on the beginning of things. Accounts of the creation are found not only in sacred and classic literatures but also in the folklore of primitive peoples. With the development of civilization and science, fanciful ideas and vague speculations gave way to theories which were based on ascertained facts, and which were elaborated by careful reasoning.

The ancient Greeks not only made the first great advances in science but were the first to attempt to found theories of cosmogony on observational data. Unfortunately, their data were wholly inadequate for the successful completion of so great an undertaking. Many centuries of observations of celestial phenomena, and the establishment of the laws of mechanics and the law of gravitation, were necessary before their followers attained any considerable measure of success. And, before success came, the peoples of western Europe sank into the intellectual stagnation of the dark ages, during which only faint sparks from the intellectual torches which the Greeks had lighted were kept alive in the monasteries of Europe. During the 14th and 15th centuries, the blackness of the night of the dark ages gradually gave way to the dawn of the Renaissance, and that has been succeeded by the full day of our own time.

In 1750, Thomas Wright, an Englishman, undertook to explain the origin and evolution of the stars on the basis of the laws of motion and the law of gravitation. His success did not equal either the sincerity of his efforts or the soundness of his point of view. His work had little influence except upon Immanuel Kant, a young German philosopher, into whose hands it chanced to fall.

Kant turned his brilliant and versatile mind to cosmogony and, in 1755, published a book on the

subject. The theories which he developed are what might be expected from so keen an intellect, though they are not wholly free from defects in the application of mechanical principles. But the work of Kant had very little immediate effect, for the world seems not to have been ripe for such magnificent and revolutionary speculations. Indeed, Kant so thoroughly recognized the fact that his theories were divergent from current ideas that he published his book anonymously. The welcome accorded recent theories furnishes a measure of the advance in the world's point of view in 160 years.

Laplace, a celebrated French astronomer and mathematician, made the next great step when he published, in 1796, what is known as the *Nebular Hypothesis*. This theory undertook to account only for the planets. Laplace advanced the idea that the atmosphere of the sun, in a highly heated state, once extended beyond the orbit of the most remote planet. He supposed that the whole mass was rotating in the direction in which the planets now revolve. His conclusions were: As the nebula lost heat by radiation, it contracted; as it contracted, it rotated more rapidly; it finally rotated so rapidly that a gaseous ring was left behind in the plane of its equator; later other rings were abandoned, one at the distance of each planet. These rings finally condensed into planets which were at first gaseous, then liquid, and later covered with solid crusts.

The nebular hypothesis of Laplace soon obtained wide acceptance among scientific men. This was partly because the world was ready for such ideas, partly because of the great name and prestige of its author, and partly because of the simplicity of the theory and its obvious harmony with many observed facts. It gave the geologists authority for the theory that the interior of the earth is fluid and that its crust may be only a few hundred miles in thickness, and these conceptions profoundly influenced the development of their science. The work of the geologists in turn reacted on the biologists and paved the way for biological evolution as it appeared, in 1859, in Darwin's *Origin of Species*. At the present time, the doctrine of evolution of both the inanimate and the animate world is central in all scientific theories.

For a century the nebular hypothesis was not seriously challenged. Then, in 1900, Chamberlin and Moulton, starting out to examine it and perhaps to justify it on dynamical grounds, found instead irrefutable arguments against its soundness. It has now been almost universally abandoned, although its value for a century in stimulating thought and directing investigations is universally recognized.

The *Planetesimal Theory* of Chamberlin and Moulton has succeeded the theory of Laplace as a working hypothesis. This new theory starts with the fact that there are hundreds of millions of suns in rapid and diverse motions. At long intervals our own sun, for example, will pass near another sun. At such a time a small part of its mass will be ejected from it and left revolving about it in the form of a small spiral nebula. Modern telescopes show that there are hundreds of thousands of spiral nebulæ. The arms of the spirals will have local condensations, or nuclei, which, in the course of time, will sweep up the scattered material and grow into planets, just as our earth is even yet sweeping up meteoric material and increasing in mass.

According to the planetesimal theory, the planets are all of the same age—at least several hundred million years. The smaller ones are solid through and through, as the earth, by the Michelson-Gale tide experiment, is now proved to be. Moreover, the planets will continue approximately in their present state for hundreds of millions of years in the future, unless the light and heat of the sun should fail or the sun should pass near another sun.

When the sun passes again near another sun, the planets will be broken up and destroyed, and their remains will be scattered along the arms of a new spiral nebula, in time possibly becoming parts of a new family of planets. In this connection it is interesting to note that many meteorites bear internal evidence of having been parts of bodies of worldlike dimensions, and it may be that they are fragments of a family of planets antedating our own. See *Comets*, *Meteorites*, *Nebulæ*, *Planetoids*.

Day. Time is measured by the rotation of the earth. The interval between two successive passages of a star across the meridian is called a *sidereal*, or star, day. Since the stars are fixed and the earth rotates uniformly, all sidereal days are of the same length.

The interval between two successive passages of the sun across the meridian is called a *solar*, or sun, day. Since the sun moves eastward among the stars about one degree a day (360 degrees in 365 days), the solar day is nearly four minutes longer than the sidereal day. The apparent eastward motion of the sun among the stars is not quite uniform, and, consequently, the solar days vary slightly in length. The day of ordinary use is the *mean solar* day, the average of all the true solar days in a year.

The astronomical day begins at noon, and its hours are numbered from 1 to 24. The *civil*, or ordinary, day begins at the preceding midnight. The Greeks counted day from sunset, the Romans, from midnight, and the Babylonians, from sunrise. See *Time*.

Days, Lengths of. The lengths of days and nights vary greatly with the season of the year and with the latitude. These variations are due chiefly to the inclination of the earth's axis of rotation to the plane of its orbit, which is about 66½°.

At the equinoxes, March 21 and September 22, the sun is exactly over the earth's equator and day and night are everywhere practically equal. At the summer solstice, June 21, when the sun is far north, the days attain their greatest length in the northern hemisphere and are shortest in the southern hemisphere. At the winter solstice, December 21, the days are shortest in the northern hemisphere and attain their greatest length in the southern hemisphere. From March 21 to September 22, in the northern hemisphere, the days are longer than the nights. From September 22 to March 21, in the northern hemisphere, the days are shorter than the nights. In the southern hemisphere, these conditions are exactly reversed.

At the poles, the sun remains above the horizon continuously for six months, and remains below the horizon continuously for six months. At the equator, it is day for practically twelve hours and night for practically twelve hours throughout the year.

In all latitudes, the actual length of the day, or the duration of sunlight, is increased somewhat by the effects of the earth's atmosphere. When the sun is near the horizon, the earth's atmosphere acts somewhat like a lens and makes the sun appear to be higher than it actually is. When it seems to be setting it is already a little below the western horizon; similarly, it appears to rise while it is still slightly below the eastern horizon. The result is that the lengths of all days are increased, while the lengths of the nights are correspondingly diminished, and the longest days in summer are everywhere somewhat longer than the corresponding longest nights in winter.

The lengths of the longest and the shortest day, which in the northern hemisphere are June 21 and December 21 respectively, are shown for various latitudes up to 65° 55′ in the following table. The day in the table means the interval between the apparent rising and setting of the sun's center. Above latitude 65° 55′ the longest days exceed 24 hours, and they rapidly increase in length toward the poles, where the sun is above the horizon continuously for a little more than half of the year. At the equator, the shortest days (12 hrs. 5 min.) are March 21 and September 22, and the longest (12 hrs. 6 min.) are June 21 and December 21.

LONGEST AND SHORTEST DAYS

Latitude	Longest, June 21		Shortest, Dec. 21	
	Hrs.	Min.	Hrs.	Min.
10°	12	37	11	30
20°	13	16	10	52
30°	14	2	10	10
40°	14	58	9	16
50°	16	18	8	0
60°	18	44	5	44
65° 55′	24	0	2	38

Earth. The globe on which we live is approximately spherical in shape, as is proved by the fact that it has been circumnavigated, that ships disappear below the horizon hulls first and masts last, and that when the ocean is viewed from an elevation the horizon appears to be a circle. But the best proof of the earth's sphericity is that its surface everywhere has nearly the same curvature, a fact that has been established by measurements of arcs and the corresponding changes in the direction of the plumb line with respect to the stars.

As a matter of fact, the rotation of the earth produces a slight bulging at the equator and a flattening at the poles, the difference in the polar and equatorial diameters being about 27 miles. The polar diameter is nearly 7900 miles and the equatorial diameter is about 7926.6 miles, the possible error in the results being less than 1000 feet. The equatorial circumference is 24,902 miles.

The average density of the earth is 5.5 times the density of water, and its total mass is 6,592,000,000,000,000,000,000 (6.592 billion trillion) tons. The interior of the earth is very hot, but the material of which it is composed is not melted because of the great pressure to which it is subjected. At the earth's center the pressure is 22,500 tons per square inch. The tidal experiments of Michelson and Gale have shown that the earth is not only solid but that it is as elastic as steel.

The earth's atmosphere is composed of about 78 per cent nitrogen, 21 per cent oxygen, and small quantities of a few other elements and compounds. The pressure of the atmosphere at the earth's surface is 15 pounds per square inch, and its total mass is about one-millionth that of the entire earth. It extends in appreciable quantities to a height of approximately 100 miles, as is proved by the fact that meteors become visible up to this altitude.

The earth rotates eastward, and the eastward velocity of the surface at the equator is more than 1000 miles an hour, or about 1500 feet per second. The rotation of the earth causes the easterly drifts of the winds in the middle latitudes.

The earth revolves about the sun in an elliptical, or slightly elongated, orbit, in a period of 365 days, 5 hours, 48 minutes, and 46 seconds, at an average speed of 18.5 miles per second. The average distance of the earth from the sun is 92,900,000 miles, the difference between the greatest and least distances being about three million miles. The earth is nearest the sun the last of December. Nevertheless, it is then winter in the northern hemisphere. This is due to the fact that the seasons are caused chiefly by the inclination of the earth's axis, the northern end of which, at that time, is turned away from the sun. See *Moon*, *Planets*, *Satellites*.

Eclipse. An eclipse of the sun occurs when the moon passes between the sun and the earth. If the entire disk of the sun is obscured, the eclipse is *total*; if only a part of it is obscured, the eclipse is *partial*. Although the moon is much smaller than the sun, it is so much nearer to the earth that usually it a little more than covers the sun's disk, just as a small coin held at arm's length will more than cover the sun's disk. The moon's apparent diameter, however, exceeds that of the sun by only a small amount. In fact, when the moon in its elongated orbit is farthest from the earth, its apparent diameter is a little less than that of the sun. If an eclipse occurs under these circumstances, a bright ring is left uncovered around the sun, and the eclipse is said to be *annular*. Since, under the most favorable circumstances, the moon but slightly more than covers the sun, an eclipse of the sun is of short duration, never exceeding 7.5 minutes.

An eclipse of the moon occurs when the moon passes into the earth's shadow. If the moon passes entirely into the earth's shadow, the eclipse is *total*; otherwise, it is *partial*. The diameter of the earth's shadow at the distance of the moon is about three times the diameter of the moon; therefore, when the moon passes through the center of the earth's shadow, it is totally eclipsed for nearly two hours.

Eclipses of the sun are somewhat more numerous than those of the moon. However, the infrequency with which solar eclipses are observed, when compared with observations of the lunar, might lead to the opposite conclusion. The reason is that when an eclipse of the moon occurs, it is visible from the whole half of the earth which is toward the moon, while an eclipse of the sun is visible only from the narrow zone on the earth across which the moon's shadow sweeps. The path of totality is usually less than 100 miles in width. From this it follows that only very rarely will any particular place be in the path of totality.

The times and places of eclipses depend upon the motions of the sun and the moon. The motions of these bodies can be predicted so accurately by astronomers that all the circumstances of eclipses for indefinitely long periods can be foretold with great accuracy. Similarly, the times and places at which eclipses have occurred in the past can be calculated with corresponding accuracy. This fact has been of use in establishing several important dates of ancient history. In a number of instances, ancient writers have referred to historical events in connection with total eclipses of the sun. Astronomers, by extending their calculations back across the intervening centuries, have been able to determine, in our system of reckoning time, the dates of these events.

Eclipses are phenomena of considerable scientific interest. They afford the best opportunities for searching for planets interior to the orbit of Mercury, and they enable astronomers to observe comets if any happen to be close to the sun. It is only during total eclipses that the sun's corona can be observed and Einstein's theory of the bending of light rays tested. This test of the theory of relativity was first made in 1919.

Ecliptic. The apparent annual path of the sun among the stars is called the *ecliptic*. It is a great circle in the heavens and is inclined to the celestial equator at an angle of 23° 27′. The two points where the ecliptic and the equator cross are the *equinoxes*.

The twelve zodiacal constellations lie along the ecliptic. The moon and planets move around the sky through these constellations and always remain near the ecliptic. In ancient times, and later wherever astrology flourished, the positions of the sun, moon, and planets among the zodiacal constellations were supposed to have important influences on human affairs. See *Constellations*, *Equinoxes*.

Equinoxes. The two points where the sun, in its annual motion among the stars, crosses the celestial equator are called the *equinoxes*. These are so named because, when the sun is at either of these points, day and night are equal in length. The celestial equator is a circle on the sky parallel to the earth's equator.

On March 21, at the *vernal equinox*, the sun crosses the equator from south to north; on September 22, at the *autumnal equinox*, it crosses from north to south. In the northern hemisphere, from March 21 to September 22 the days are longer than the nights;

from September 22 to March 21 the days are shorter than the nights. In the southern hemisphere the reverse is true.

Jupiter. The largest planet in the solar system is Jupiter, whose diameter is about 88,000 miles, or more than 11 times that of the earth. In spite of its great distance from the earth, which at the least is nearly 400 million miles, this planet is brighter than any other except Venus. If it were at only the distance of Venus, its apparent diameter would be more than one-fourth that of the moon and its brilliancy would be more than 100 times that of Venus.

Jupiter revolves around the sun at a mean distance of 483 million miles in a period of 11.86 years. Notwithstanding its great size, its average period of rotation is 9 hrs. 54 min. The equator of Jupiter, like those of the sun and Saturn, rotates a little faster than the higher latitudes. Since different parts of the surface rotate at different rates, it follows that the planet must be largely in a liquid, or even gaseous, condition. This might be inferred also from the fact that the planet's average density is only 1.25 times that of water. There are great belts parallel to Jupiter's equator which undergo continual and often radical changes. In 1878 a great red spot, 7000 by 30,000 miles in extent, suddenly appeared, remained a conspicuous object on the surface of the planet for about 20 years, and then sank back into obscurity.

Jupiter has 9 satellites, the largest 4 of which were discovered by Galileo in 1610. They were the first celestial objects discovered with a telescope. The largest of these satellites is 3558 miles in diameter, and, were it not buried in the brilliant rays of the great planet, could be seen with the unaided eye. A fifth satellite, about 100 miles in diameter, was discovered in 1892 by Barnard with the great telescope of the Lick observatory. The last 4 have been discovered by photography. The 2 most remote from the planet revolve at distances of 14 and 15 million miles, and in the direction opposite to that in which all the other satellites move. See *Planets, Satellites.*

Light Year. When astronomers found that the distances of the stars were too great to be conveniently expressed in miles, they began to employ a new unit, the *light year.* This is the distance that light travels in a year. Since the velocity of light is 186,000 miles per second, it follows that this great unit is about 63,500 times the distance of the earth from the sun, or nearly six trillion miles.

The nearest known star is more than 4 light years distant, and only a few are less than 50 light years from the earth. Most of the stars visible to the unaided eye are not more than 200 or 300 light years away. Many of the fainter ones are thousands of light years distant. See *Stars.*

Mars. The next planet beyond the orbit of the earth is ruddy Mars, a world which revolves around the sun at an average distance of 141,500,000 miles in a period of 1.88 years, or nearly 23 months. The earth and Mars are on the same side of the sun every 2 years, 1 month, and 18.7 days, and then their distance from each other, on the average, is only 48,600,000 miles. At such times Mars is favorably located for observations from the earth. The earth and Mars both revolve in somewhat elongated orbits which are so situated that every 17 years these planets pass within about 35 million miles of each other. Then the surface of our neighboring world can be observed to the best possible advantage.

Mars has two little satellites, Phobos and Deimos, each about 10 miles in diameter and barely visible through the largest telescopes. Phobos is less than 4000 miles from the surface of the planet and revolves eastward more rapidly than the planet rotates. Consequently, it rises in the west and sets in the east.

Measurements show that Mars has a diameter of 4339 miles. Its volume, therefore, is only about one-seventh that of the earth. Moreover, its average density is only two-thirds that of our planet. Objects on Mars weigh only 36 per cent as much as the same objects would weigh upon the earth's surface. Hence the size, density, and surface gravity of Mars are intermediate between those of the earth and the moon. The moon does not have enough attraction to hold the swiftly darting particles of which an atmosphere is composed. It would, therefore, be concluded that Mars could not retain so extensive an atmosphere as that which surrounds the earth. For our observations of this planet, it is fortunate that such is found to be the case, as its surface is rarely obscured by clouds.

The surface of Mars bears little resemblance to that of the earth. It has no great water-covered areas like our oceans. Most of the surface is dull brick red in color, though there are large darker regions having a greenish tinge. These dark markings are permanent, and, from observations of them, it has been found that the length of the planet's day is 24 hours and 37 minutes, or only a little longer than that of the earth. Moreover, the inclination of the equator of Mars to the plane of its orbit is 23 or 24 degrees. Consequently, the planet not only has days and nights similar to those of the earth, but also seasons which are similar, except that they are nearly twice as long.

In 1877 an Italian astronomer, Schiaparelli, saw numerous long, narrow, dark-colored streaks, which he called *canali.* Similar ones were later observed in greater numbers by Percival Lowell. On the other hand, many astronomers having larger telescopes than either Schiaparelli or Lowell have been unable to see these streaks, or "canals," as they have come to be called. They cannot be canals in the ordinary sense, for it would be necessary for them to be at least 20 miles wide in order, under the most favorable conditions, to be visible at the distance of 35 or 40 million miles which separates Mars from the earth. According to the descriptions, very remarkable things about the streaks are that they are of uniform width and often two or three thousand miles in length, that they always extend along the arcs of great circles, and that they undergo changes in appearance with the seasons of the planet.

Elaborate theories have been built up, explaining the "canals" as streaks of vegetation growing along the banks of actual canals constructed by beings of a high order of intelligence. At first, such a theory meets a ready response in the minds of most persons. Upon critical examination, however, it is found to be beset with so many serious difficulties that few, if any, astronomers now regard it with favor. This does not mean that astronomers are averse to the hypothesis that many worlds support life, but indicates simply that the evidence for the existence of high forms of life on Mars is weak. Besides, there are good reasons for believing that the conditions on the planet's surface are very unfavorable.

Among the most interesting phenomena observed on Mars are its white polar caps. These make their appearance rather suddenly, late in the planet's autumn. They persist during its long winter, and gradually disappear as its spring advances to midsummer. They have the appearance of snow fields which come and then disappear, just as snow falls and later melts away in the higher latitudes on the earth. The phenomena of the polar caps long supported the belief that the climate of Mars is warmer than that of the earth.

Since Mars is farther from the sun than the earth is, it receives less heat per unit area; in fact, it receives only 43 per cent as much heat per unit area as the earth. The amount of heat Mars receives compares with that received by the earth, almost exactly as the heat received at the earth's pole in a year compares with that received at the earth's equator. Since the temperature of the earth's surface at its poles is much lower than that at its equator, it would be expected that the temperature of Mars is much below that of the earth. Such is undoubtedly the fact.

If the earth were as distant from the sun as Mars is, its average temperature, instead of being 60°, as it is now, would be about 40° below zero. Since the atmosphere of Mars is much thinner than that of the earth, it seems very probable that the average temperature of this planet is colder than 40° below zero. The polar caps of Mars do not disappear by melting, but because the snow, or hoarfrost, of which they are composed, evaporates into the dry, cold air of the planet. They vanish just as do the snows of the western prairies, which often disappear into the dry, frigid winds that blow over them in midwinter. See *Planets, Satellites.*

Mercury. Mercury is the planet nearest to the sun, with a mean distance of about 36 million miles and a period of revolution of 88 days. On account of the eccentricity of its orbit, which is greater than that of any other planet, its greatest and least distances from the sun differ by nearly 15 million miles.

Mercury is morning star for a period of about two weeks three times each year, and evening star also for similar periods three times each year. It never rises more than two hours earlier than the sun, nor sets more than two hours later than the sun. For these reasons, Mercury must always be observed either in dawn or twilight. Consequently, it is somewhat difficult to see it with the unaided eye.

Mercury is the smallest planet, being only 3000 miles in diameter. Although so small that it holds no appreciable atmosphere, the planet is so unfavorably situated that few surface markings have been observed. Its period of rotation is uncertain, but the observations of some astronomers indicate that Mercury always keeps the same side toward the sun.

Meteorites. Meteorites, known also as aerolites, uranolites, and siderites, are solid masses, weighing from a few pounds to a few tons, which plunge down upon the earth from the regions beyond its atmosphere. Two or three per year are seen to fall, but the number striking the earth annually is probably as many as 100.

The exterior parts of meteorites are fused and glazed and their less refractory parts are burned out by the heat generated in their passage through the earth's atmosphere. Characteristic pits are left in their surfaces, while the rapid heating to which they are subjected produces frequent chipping and fragmentation. Most meteorites are stony in composition, much like our granites, although they sometimes contain particular combinations of elements not found in the earth's rocks. A small fraction of them are almost pure iron, or a mixture of iron and nickel. About 30 of the 90 known elements occur in meteorites. All elements so far found in them occur abundantly in the earth.

The question of the origin of meteorites is one to which the answer is not certainly known. The suggestion that they have been ejected by volcanoes from the earth or moon has been abandoned. It is equally difficult to see how bodies having their structure could have come from the sun. They are probably the remains of the masses circulating around the sun, out of which the planets have grown by processes similar to those which are going on at the present time. They may, indeed, be fragments of a family of planets, antedating our own, which were broken up by the near approach of a passing star. See *Cosmogony.*

Meteors. The swiftly moving points of light which flash out suddenly and dart across the sky are called meteors, or "shooting stars." They are not stars, as they appear to be, but are tiny masses of matter, often the remains of disintegrated comets. These small particles become heated and luminous by friction with our atmosphere when they plunge into it with a speed averaging more than 20 miles per second. Meteors often emit sparks, sometimes they explode, and occasionally they leave behind a luminous trail, which persists for several seconds. If the product of their combustion is gaseous, it is added to the air; if it is solid, it slowly settles to the surface of the earth. In either case the total mass of the earth is increased; but the earth's rate of growth in this way is now exceedingly slow.

The heights at which meteors become luminous can be determined by observing them from two stations a few miles apart. By this means it has been found that meteors usually become visible at an altitude of 70 to 90 miles, and that they disappear at altitudes of 30 to 50 miles. The same observations determine the lengths of their trails, usually 50 to 100 miles, and the velocities with which they move.

Two or three meteors per hour can be observed on almost any clear night. Since only a very small part of the entire atmosphere of the earth is within the range of a single observer, this means that from 10 to 20 million strike the earth daily. Usually they are quite unrelated to one another.

Occasionally meteors occur in great numbers and all seem to radiate from the same point in the sky. These "meteoric showers," as they are called, appear year after year on the same dates, and their radiant points are at the same positions among the stars. The best example of these meteoric showers is that of the Leonids. These radiate from the Sickle in Leo, and appear between midnight and dawn on November 14–16. They are the remains of a comet which was captured by the planet Uranus in 126 A. D. At their nearest approach to the sun they just touch the orbit of the earth. Since their present period of revolution is 33 years, unusually noteworthy showers occur at this interval, the last having been observed in 1899.

Another well-known shower is that of the Andromids, which are seen in the evening hours on November 24. These meteors appear in unusual numbers at intervals of 13 years, but the greatest showers of Andromids do not compare in numbers with the thousands of Leonids that were seen in 1833 and 1866. The Perseids may be observed in considerable numbers each year from about the 5th to the 15th of August. There are many other lesser showers. See *Comet, Meteorites.*

Milky Way, or **Galaxy.** The Milky Way is a hazy, somewhat irregular band of light, about 20° wide, which completely encircles the heavens. It can be seen on clear, moonless, summer evenings, stretching entirely across the northern sky. In May and early June, at 8 o'clock in the evening, it extends from the eastern horizon to the western horizon, crossing the meridian about 30° north of the zenith. On other dates and at other times of the night, its course across the sky is oblique.

The most conspicuous constellations crossed by the Milky Way are Cassiopeia, Cygnus, Perseus, the eastern part of Auriga, the western parts of Taurus and Orion, Scorpius, and Ophiuchus. Deneb and the red Antares are in its midst, while Capella, Betelgeuse, Procyon, and Sirius are near its borders.

The unaided eye gets the impression that the Milky Way is made up of faint stars. The telescope confirms this impression by showing that the light of the Milky Way is caused by millions of stars. In reality these stars are great suns, and they appear faint only because of their immense distances. Most of them are so remote that several thousand years are required for their light to come to us.

The form of the Galaxy shows that the system of stars to which our sun belongs has the shape of a flattened disk whose diameter is about 10 times its thickness. The dimensions of this system are so vast that thousands of years are required for light to cross it, even in the direction of its smallest diameter. The sun and the planets are far within the interior of the system. Its diameter is so great that they cannot approach its borders for millions of years, although the solar system is now moving with respect to the stars at the rate of 400 million miles a year. See *Stars.*

Moon. The moon is the earth's only satellite, and it revolves around the earth from west to east at an average distance of 238,862 miles in a period of about 27.3 days. Its period from full moon to full moon, or the ordinary month, is about 29.5 days. The moon rotates on its axis in the same direction as that in which it revolves round the earth, and with the same angular velocity. The result is that it always keeps the same face toward the earth.

The moon shines entirely by reflected light, and its phases depend upon its position relative to the earth and the sun. When it is between, or nearly between, the earth and the sun, its dark (unilluminated) side is toward the earth, and then its phase is *new*. It is then seen, if at all, as a very thin crescent, either low in the west in the evening or in the east in the morning. A week after the moon is new, it is in the south when the sun is setting, its western half is illuminated, and its phase is *first quarter*. In another week the *full moon* rises as the sun sets. In still another week its phase is *third quarter* and the moon is in the south as the sun rises, with the eastern side illuminated.

The moon's diameter is 2163 miles, or a little more than one-fourth that of the earth. Its average density is only about 60 per cent that of the earth. As a consequence of its small size and moderate density, its surface gravity is only one-sixth that of the earth. Such a feeble gravity cannot control the rapidly moving molecules in a gas, and, as a result, the moon has no atmosphere.

The surface of the moon is very rough, being largely covered with rugged mountains and steep-walled craters, but there are on it a few comparatively smooth areas several hundred miles in diameter. The smooth areas are relatively dark and cause those markings which appear to some people as "the man in the moon." Some of the mountains are 20,000 feet in height and their sides are often very steep. The craters are circular pits with steep walls, quite unlike the volcanic craters on the earth, and they range in diameter from the smallest that can be seen through the most powerful telescopes to immense cavities more than 100 miles across.

Since the moon has neither water nor an atmosphere, there has been no disintegration and washing away of its rocks and mountains. The moon's surface, therefore, preserves for examination through our telescopes the records of the violent forces by which it has been disturbed. The earth's surface, on the other hand, has been subject to the action of the elements during the immense periods of the geologic ages. The earliest mountains and craters were long ago totally destroyed, and their disintegrated remains were scattered in primitive oceans and valleys.

Since the moon rotates in the same period as that in which it revolves, its day from noon to noon is 29.5 of our days in length. Its surface is subjected alternately to the burning rays of the sun for 14.75 of our days, and to the frigidity of a night of equal length, and neither the heat of the day nor the cold of the night is ever tempered by a passing cloud. It is clear that a body having neither soil nor water and no atmosphere, and with a temperature ranging from 100 degrees below zero to the boiling point, cannot support life. See *Earth*, *Satellites*, *Tides*.

Nadir (*nā'dĕr*). The point in the celestial sphere exactly beneath the place where one stands is the nadir. It is directly opposite to the zenith and is called the inferior pole of the horizon. Using the zenith and the nadir as starting points, the horizon may be defined as a great circle of the celestial sphere situated at 90°, or equidistant, from each of them. See *Zenith*.

Nebulæ (*nĕb'ū-lē*). The invention of the telescope was followed by the discovery of numerous very faint clouds of matter which were called nebulæ. Two of these, the Great Orion Nebula and the Great Andromeda Nebula, under favorable conditions are barely visible to the unaided eye; most of the remainder are very faint, and some are at the limits of the most powerful photographic telescopes.

In the days of William Herschel (the latter part of the 18th century) nebulæ were supposed to be immense aggregations of stars which were so remote that their individual members could not be distinguished. The spectroscope showed, however, that in many cases nebulæ are vast masses of gas lying among, and often associated with, the stars. For example, the principal members of the Pleiades group are involved in thin wisps of nebulæ which extend from star to star.

The principal classes of nebulæ are (a) those which are irregular in form, (b) the spirals, (c) those which are ring-shaped, and (d) the planetaries. The irregular nebulæ, of which several thousand are known, are often many degrees in length. Since an object a thousand million miles across, at the distance of even the nearer stars, appears to be less than a second of arc in diameter, the dimensions of these nebulæ are enormous. The diameter of the Orion nebula, for example, is probably much more than 20 million times that of the sun.

The spiral nebulæ usually have two fairly well defined arms winding out on opposite sides from a central nucleus. Knots and local condensations are generally scattered along their branches, and they have little resemblance to gaseous bodies. Their light resembles that received from the stars rather than that received from the irregular nebulæ. Certain spiral nebulæ have recently been proved to be galaxies, several of them having been shown to be at a distance of approximately 1 million light years. The view has also been advanced that some spiral nebulæ are fragments of stars or of star groups diffused as a result of the close passage of two stars or of two star groups.

A number of nebulæ are ring-shaped, the best example of the type being in the constellation Lyra. This nebula is a symmetrical, nearly circular oval, and has a faint star at its center.

The planetary nebulæ consist of circular disks of nebulous matter having a dense, or starlike nucleus, surrounded by one or more zones of more tenuous materials. It is believed that they represent the last stages in the condensation of rare nebulæ into stars. See *Cosmogony*, *Orion*, *Pleiades*.

Neptune. The most remote planet is Neptune, which revolves about the sun at an average distance of 2792 million miles in a period of nearly 165 years. The planet is faint both because it is so far from the sun that it is feebly illuminated and because it is so far from the earth that its apparent size is small, although its diameter is nearly 35,000 miles.

The discovery of Neptune is one of the triumphs of modern science; for its position in the heavens was determined by mathematical processes before it had been observed. The planet Uranus was discovered in 1781 and its orbit was computed. Observers found by 1821, or 40 years after its discovery, that it was not exactly following its predicted path. By 1830 the discrepancy was a little larger; by 1840 it was still more serious. This does not mean that the difference between theory and observation was very great; it was actually too small to be detected with the unaided eye. Such a trifling disagreement was of little practical consequence. Its importance arose from the fact that it called in question the laws of motion, the law of gravitation, and the processes of mathematics.

The suggestion was made that the unexplained peculiarities in the motion of Uranus might be due to the attraction of an unknown planet. The problem of finding the hypothetical planet from its effects, which were so slight as to be scarcely discernible after they had accumulated for 60 years, was one of such great difficulty that it was supposed to be insoluble. It was attacked, however, and, in 1846, solved independently by Adams, a young English astronomer, and by Leverrier, a young French astronomer. The planet was first seen

through a telescope by Galle, a young German astronomer, who directed his instrument in accordance with Leverrier's instructions. See *Planets, Satellites.*

Orion (*ō-rī'ŏn*). The finest constellation in the heavens is Orion, which may be seen in the southern sky in the evening during the winter months. It contains the bluish white, first-magnitude star Rigel and the ruddy Betelgeuse. Rigel is very remote and radiates several thousand times as much light as our sun. Betelgeuse is a nearer and more enormous sun. Professor Michelson in 1920 measured its diameter with a special instrument of his own invention, and established the astounding fact that its volume is about 30 million times that of the sun.

A little east of the line joining Rigel and Betelgeuse are three second-magnitude stars which constitute the Belt of Orion. They are equally spaced on a line which crosses the celestial equator in a northwest-southeast direction. A few degrees below the belt are three fainter stars on a north-south line. The central one of the three appears slightly fuzzy to the unaided eye. Through a telescope it is found to be a nebula, the Great Orion Nebula, one of the most magnificent objects in the heavens. See *Betelgeuse, Nebulæ.*

Perihelion (*pĕr'ĭ-hē'lĭ-ŏn*). When a planet or a comet reaches the point in its orbit where it is nearest the sun, it is said to be in perihelion. The earth reaches this point about January 1 each year. On account of the eccentricity of its orbit, the earth in perihelion is about 3,000,000 miles nearer the sun than on July 1, when it is farthest away, or in aphelion. See *Aphelion.*

Planetoids (*plăn'ĕt-oids*). Between the orbits of Mars and Jupiter there revolve small, planet-like bodies called planetoids. The 800 at present known range in diameter from a few miles to nearly 500 miles. The first one was discovered by Piazzi on the first day of the 19th century, January 1, 1801. By 1807, three others had been found.

After two or three of these bodies had been discovered, astronomers thought that they might be the fragments of what was once a large planet which had been broken up by unknown forces. If this were the case, the orbits of all the planetoids would intersect at the point where the disruption occurred, because all of the fragments would move in closed curves. The later discovery of planetoids, whose orbits were far removed from the orbits of some of those earlier known, completely disproved the shattered-planet hypothesis.

Many more planetoids were discovered during the 19th century. A new epoch was started in 1891 when Wolf found planetoids by means of photography. Since these objects are moving among the stars, their images on plates which have been given long exposures are little streaks instead of points like the images of the stars.

In 1899 a planetoid was discovered, whose orbit, at its nearest approach to the sun, comes within about 13 million miles of the earth, and, when farthest away, extends somewhat beyond Mars. More recently several planetoids have been found whose distances from the sun are about the same as that of Jupiter. It is not improbable that there are others beyond the orbit of Jupiter; but, because of the distance both from the sun and from the earth, it would be difficult to see such small bodies in those regions.

It is probable that the planetoids are similar to the larger planetesimal masses out of which the planets grew. The great number existing between the orbits of Mars and Jupiter is due to the fact that no dominating planetary nucleus circulated in this region and swept up the smaller masses. It seems almost certain that there are countless unknown planetoids which are too small to be within range of the most powerful telescopes. See *Cosmogony.*

Planets. The planets are the largest eight bodies. They revolve about the sun in elliptical orbits. Their diameters range from 3000 miles, in the case of Mercury, to 88,000 miles, in the case of Jupiter; their periods of revolution range from 88 days, in the case of Mercury, to 165 years, in the case of Neptune.

The planets in the order of their distance from the sun are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. The first four are dense and solid; the other four are rare and gaseous. The former have short periods of revolution and long periods of rotation; the latter have long periods of revolution and short periods of rotation. For example, the period of Mercury's rotation is probably 88 days, while that of Jupiter is less than 10 hours. The first four planets have in all only three satellites, while the last four have twenty-three.

All the planets, except Uranus and Neptune, are easily visible to the unaided eye, and have been known since prehistoric times. Uranus, which is on the limits of visibility without a telescope, was discovered in 1781 by William Herschel with a reflecting telescope of his own construction. Neptune was discovered in 1846, its position having been determined by Adams and Leverrier from the small effects this planet had on Uranus. See *Earth, Jupiter, Mars, Mercury, Neptune, Saturn, Uranus, Venus.*

TABLE OF THE PLANETS

Planet	Mean Diameter (miles)	Density (earth's 1)	Mass (earth's 1)	Mean Distance from sun (millions of miles)	Period of revolution
Mercury	3,000	0.81 (?)	0.045	36.0	88 days
Venus	7,700	0.88	0.807	67.2	225 days
Earth	7,918	1.00	1.0	92.9	365 days
Mars	4,339	0.65	0.106	141.5	687 days
Jupiter	88,392	0.23	314.5	483.3	11.862 years
Saturn	74,163	0.11	94.1	886.0	29.458 years
Uranus	30,193	0.26	14.4	1,781.9	84.015 years
Neptune	34,823	0.20	16.7	2,791.6	164.788 years

Pleiades (*plē'ä-dēz; plī'ä-*). The Pleiades are a compact group of faint (fourth-magnitude) stars in the constellation Taurus, and they are popularly known as the Little Dipper or the Seven Sisters. These stars are visible in the evening during the winter months. Six of them can be seen easily by persons with normal eyes, while the seventh, which is at the end of the handle of the dipper, is nearer the limits of visibility. Under the most favorable conditions, those who have exceptionally keen sight can make out 10 stars in the group. With a 3-inch telescope, about 100 stars are visible in the cluster, while the powerful photographic telescopes of recent times show that the whole group is involved in immense, tenuous nebulæ extending from star to star.

According to Greek legend, the Pleiades were the seven daughters of Atlas and Pleione who were translated to the sky and transformed into stars. According to the tribal tales of the Pawnee Indians, they were the seven brothers of a famous chief who lost their earthly lives in glorious battles. They were "The Many Little Ones" of the ancient Babylonians, and "The Little Eyes" of the savages of the South Pacific islands. No other stars have been mentioned

more often in sacred and classic literature, or occur more frequently in the folklore of primitive peoples. The Aztecs determined the times of religious ceremonies by their time of crossing the meridian, and the primitive Australian tribes held dances in their honor. It is said that on November 17, the date on which the Pleiades are on the meridian at midnight, no petition was ever presented in vain to the kings of ancient Persia.

According to modern astronomical measurements, the Pleiades are magnificent suns, 200 or 300 times as great in light-giving power as our own sun. They appear faint only because of our great distance from them. When we look at them at night, we see them with light which has been on its way for 300 years; if they should suddenly cease to exist, we should continue to see them for 300 years in the future. In other terms, we are about 10 million times as far from the Pleiades as we are from the sun, and at their distance our sun would be invisible without telescopic aid. See *Constellations, Nebulæ.*

Pole Star. The second-magnitude star which is situated almost at the north pole of the sky is known as the Pole Star, North Star, or *Polaris.* It can be found by means of the pointers of the Big Dipper, which are in a line with it. *Polaris* is not exactly at the north pole, but it describes each day a circle about the pole with a radius a little more than twice the diameter of the moon.

The pole of the heavens is the point where the earth's axis extended would meet the celestial sphere; consequently it depends upon the position of the earth's axis. The attractions of the moon and sun for the equatorial bulge of the earth change the positions of the earth's equator and axis in such a way that the pole of the heavens describes among the stars a circle having a radius of about 23.5°, in a period of 26,000 years. In the days of Hipparchus, 150 B. C., the pole was 12° from *Polaris.* The pole is still approaching the North Star and in 200 years will pass about half a degree from it. In 12,000 years it will have circled in the sky until it will be less than 5° from the brilliant first-magnitude star Vega, which will then be the North Star.

The Pole Star is accompanied by a faint companion of the ninth magnitude which can be seen only with telescopic aid. By means of the spectroscope, the Pole Star itself has been found to be a system of three stars. These cannot be distinguished even with a telescope, because of the remoteness of the system, which is at least 40 light years distant. The two closer components revolve around their center of gravity in 4 days, while the third revolves around the first two in a period of 12 years. If the ninth-magnitude telescopic companion moves about the other three stars, it must have a period of several hundred years. See *Big Dipper.*

Satellites (*săt'ĕ-līts*). The secondary bodies which revolve around the planets, as the planets revolve around the sun, are called satellites. With the exception of Mercury and Venus, all of the planets are accompanied by one or more satellites. The earth has one satellite, the moon; Mars has two; Jupiter, nine; Saturn, nine; Uranus, four; and Neptune, one. Four of Jupiter's satellites, two of Saturn's, and the satellite of Neptune are each about as large as the moon. The other satellites are smaller, each of the tiny satellites of Mars being about 10 miles in diameter. See *Moon, Planets.*

Saturn. As seen through a telescope, Saturn is the most striking and the most beautiful of the planets because of the system of enormous rings which surrounds it. The diameter of the planet itself is about 75,000 miles; the extreme diameter of the rings which encircle it in the plane of its equator is 173,000 miles. Notwithstanding the great extent of the rings, they are probably not more than 50 miles thick.

The rings of Saturn are three in number. The smallest one, known as the crape ring because it is faint and filmy, begins about 6000 miles from the surface of the planet and has a width of about 11,000 miles. The next ring is very bright, the outer part of it being as brilliant as the planet. It begins where the crape ring terminates and has a width of 18,000 miles. Beyond this bright ring there is a vacant space 2000 miles wide, known as Cassini's division, after its discoverer. Outside of Cassini's division there is another ring about 11,000 miles wide.

The rings of Saturn are composed of innumerable small bodies similar to meteors, each pursuing its own path about the planet. The particles on the inner edge of the crape ring revolve about the planet in about 5 hours, while those on the outer margin of the largest ring require nearly 14 hours.

Saturn is the rarest planet, having an average density only 63 per cent of that of water. There are no permanent markings on its surface, and its physical condition is far different from that of the earth. Saturn's period of rotation is about 10 hours and 14 minutes, and, as in case of the sun and of Jupiter, the period of rotation of its equatorial zone is shorter than the periods in the higher latitudes. Although Saturn's day is less than half that of the earth, its period of revolution about the sun is 29.5 of our years. Its mean distance from the sun is 886 million miles.

Saturn has nine satellites, five of which are more than 1000 miles in diameter. The most remote one, discovered by W. H. Pickering in 1899, revolves around Saturn in the direction opposite to that of the rotation of the planet. This direction is opposite also to the motion of the remaining eight satellites and to that of the innumerable particles composing the rings.

Sirius (*sĭr'ĭ-ŭs*). The brightest star in the heavens is Sirius, the Dog Star, in *Canis Major.* It is a brilliant, bluish white sun which can be seen in the southern sky in the early evening from January to spring.

The apparent brightness of Sirius is owing not alone to the fact that it is one of the nearer stars but also to the fact that it is one of the most brilliant stars. Its distance is about 500,000 times the distance from the earth to the sun, or 8.4 light years, and its luminosity is about 50 times that of the sun.

The spectroscope shows that Sirius is approaching the solar system at the rate of about 5.6 miles per second, or 336 miles per minute. If it were coming straight toward us, it would eventually overtake the sun. Sirius has, however, a cross-component of motion which, in time, will take it into parts of space far distant from those which the solar system will traverse. But even if this star were overtaking the sun at the rate of 336 miles per minute, its brightness would not rapidly increase, because its distance from our system is enormous compared with that through which it would travel in a year. In fact, its brightness would not increase ten per cent in 10,000 years.

Sirius is accompanied by a faint companion star which was discovered in 1862. The two components revolve around their center of gravity at a distance from each other of 1800 million miles in a period of 48.8 years. The combined mass of the pair is 3.4 times that of the sun. See *Stars.*

Solstice (*sŏl'stĭs*). The solstices are the points on the ecliptic at which the sun is farthest from the equator, 23½° north or south. The word solstice is from the Latin, and means "the sun stands." The points are called solstices because, when the sun is at either of them, it stands still for a time in its northward and southward motions in the sky.

The sun is at the northern solstice, 23½° north of the equator, on June 21, which is the longest day in the northern hemisphere and the shortest in the southern. The sun is at the southern solstice, 23½° south of the equator, on December 21, when the northern hemisphere has its shortest day and the southern, its longest. See *Day, Length of.*

Standard Time. Standard time is a system of time divisions adopted in 1883 by the principal railways of the United States and Canada, and since then has been widely employed in Europe and various other countries of the world. The time divisions depend upon a series of *standard meridians* differing from the longitude of Greenwich, England, by exact multiples of 15°. A difference of 15° in longitude corresponds to a difference in time of exactly one hour. Consequently, the local times of the different standard meridians differ from the local time of Greenwich by multiples of an hour.

The standard time meridians of the United States and Canada are those whose longitudes west of Greenwich are 60°, 75°, 90°, 105°, and 120°. The times of these standard meridians are 4, 5, 6, 7, and 8 hours, respectively, slower than Greenwich time. The time of meridian 60° is called Colonial Time; that of meridian 75°, Eastern Time; that of meridian 90°, Central Time; that of meridian 105°, Mountain Time; and that of meridian 120°, Pacific Time.

A time belt is associated with each time meridian and extends, on the average, half way to the neighboring time meridians. Under this system, it is noon, Colonial Time, at the same moment at all places within about 7½° east or west of meridian 60°; 11 o'clock Eastern Time in the belt of meridian 75°; 10 o'clock Central Time in the belt of meridian 90°; 9 o'clock Mountain Time in the belt of meridian 105°; and 8 o'clock Pacific Time in the belt of meridian 120°. At the same instant it is 4 P. M. Greenwich time.

The nearer a place is to its time meridian, the less the difference, never more than 30 minutes, between its *standard* and its *local* time. In journeying from one standard time belt into another, it is necessary only to change one's watch by a whole hour, setting it ahead when traveling eastward and setting it back when traveling westward. See *Time.*

Stars. Stars are not tiny points of light, as they seem to be, nor jewels on a crystalline sphere, as the ancients often supposed; but they are actually great suns whose volumes average a million times greater than the volume of the earth. They appear as points of light simply because of their immense distances from us, which average millions of times the distance from the sun to the earth.

The stars visible to the unaided eye have often been supposed to be countless. As a matter of fact, not more than 2000 are visible at one time without optical aid, and in all there are only 5000 within range of the human eye. But the telescope reveals enormous numbers of them. Even a 3-inch glass, which would cost only a few hundred dollars, shows more than 200,000 stars, while the great photographic telescopes of recent times prove that there are in our galaxy at least 400 millions of them.

Undoubtedly, more powerful telescopes would show more stars, but it should not be inferred that they extend on indefinitely in space with approximately equal distances separating them, for such is not the case. The best telescopes of the present time reach far toward the borders of the great aggregation of stars to which our sun belongs. Indeed, they penetrate regions where the frequency of the stars is far below that in our part of space. It is believed that our sun and all the visible stars constitute a great cosmic unit, flattened in shape somewhat like a watch, and that the total number of suns within this cosmic unit is somewhere between one and two thousand million.

Stars obviously differ in apparent brightness. The differences in brightness are due in part to the differences in their actual luminosities, and in part to their different distances from us. They are divided into groups, or magnitudes, according to their apparent brightness. The group of brightest stars, 20 in number, are of the first magnitude. These stars of the first magnitude are 2.512 times as bright as those of the second magnitude, and those of the second magnitude are 2.512 times as bright as those of the third magnitude. Lesser magnitudes are determined by the same ratio of brightness. The faintest stars visible with the unaided eye are of the sixth magnitude, and the faintest within reach of our largest telescopes are of about the 17th magnitude. Typical first-magnitude stars are Arcturus, Vega, Capella, and Procyon. Sirius is the brightest star. The North Star and the stars in the Big Dipper are of the second magnitude; the Pleiades are of the fourth magnitude.

The intrinsic luminosities of the stars differ greatly. Millions of them are comparable with the sun. Some of them are 100 or 200 times more luminous than the sun, as, for example, the Pleiades and the stars in the Big Dipper. Others are thousands of times as great as the sun in light-giving power, as, for example, Rigel and Canopus. On the other hand, many stars are less luminous than the sun. For example, Sirius is composed of two stars,—one 48 times as luminous as the sun and the other 400 times less luminous than the sun.

The stars are all so remote that their distances can be determined only with great difficulty. In fact, it was not until 1840 that the distance of a star, *Alpha Centauri*, was first measured. Although this is the nearest star, its distance is 275,000 times that of the earth from the sun. Perhaps the remoteness of the stars from one another can best be understood from the fact that there is, on the average, only one star to about 4 units of stellar space. The unit of stellar space is a sphere whose radius is 206,000 times as great as the distance from the sun to the earth, or in round numbers 20,000,000,000,000 miles. Even in the great globular star clusters, in which the telescope shows from 5000 to 50,000 stars in a part of the sky apparently smaller than that covered by the moon, the average distance between adjacent stars is approximately 50,000 times the distance from the sun to the earth. Before the invention of the telescope, no one ever supposed that the interstellar distances could approach the enormous magnitudes that have been found. The imagination staggers under the results established by astronomical measurements.

The colors of the stars differ greatly, depending upon their temperatures and the constitutions of their atmospheres. The hottest stars, of which Sirius and Vega are examples, are bluish white. Stars of the class to which the sun belongs are yellowish and include such objects as Capella and Pollux. They are somewhat cooler than the blue stars and are about as numerous. The first two types include most of the stars. There are orange stars, such as Arcturus, and red stars, such as Betelgeuse and Antares.

The composition of the stars has been determined, at least in the case of the brighter ones, by means of the spectroscope. It is a remarkable fact that they contain elements which are found in the sun and the earth, and even in ourselves. Notwithstanding the vast extent of the universe in space and the great diversity of its organization, there is a fundamental unity of the materials of which it is composed.

In many cases, what are apparently single stars are found by the telescope to be composed of two stars revolving about their common center of gravity. Sometimes the two components are nearly equal; in other cases they are very unequal. Each of the stars may be accompanied by planets, but there is no direct evidence on the question. At the great distances of the stars, planets would be invisible even if telescopes were thousands of times more powerful than any so far made.

The stars are said to be "fixed" because they are so far away that neither the motions of the earth and the sun, nor those of the stars themselves, have ordinarily appreciable effects upon their apparent positions. They are, however, in rapid motion, their average speed being 20 miles per second, or about 600 million miles per year. Some stars move with much higher velocities, and the apparent positions of the nearer ones change slightly. The Big Dipper

and the other constellations, however, appear to the unaided eye almost exactly as they did when they were being marked out and named by prehistoric men in the valleys of the Tigris and the Euphrates.

In the relatively short time during which stellar motions have been studied, the stars observed have moved in approximately straight lines with uniform speed. But, in the course of time, they move about in apparently irregular paths, somewhat like individual bees in a swarm. Moreover, there is no great central sun, or other central mass, around which all the stars revolve.

The origin of stars and the length of their duration are quite unknown, although it is highly probable that they continue to exist as luminous bodies some thousands of millions of years. Our sun is but one of millions of similar objects moving about in an enormous space; worlds similar to our own probably exist to the number of hundreds of millions. Contemplation of these facts and of the notable advances that have been made in the solution of the difficult problems associated with them arouses increased respect for the power of the human mind and greater hope for the future progress of the race. See *Betelgeuse, Constellations, Pole Star, Sirius, Sun.*

Sun. The sun is the dominant member of the solar system. Its mass is 1000 times the combined masses of all the other bodies in the system. It controls their motions by its gravitation, and it warms and lights them with its abundant rays.

The sun appears small—no larger than the moon—only because of the great distance of the earth from it—92,900,000 miles. The diameter of the sun is 866,000 miles, and its volume is, therefore, more than a million times that of the earth. The sun's average density, however, is only one-fourth that of the earth, or 1.4 times that of water. The surface gravity of a body depends both upon its size and upon its density—the influence of great density counterbalancing the effect of small size, and vice versa. In the case of the sun, immense size more than makes up for low density. In consequence, an object which weighs one pound upon the surface of the earth would weigh nearly 28 pounds on the surface of the sun.

It is obvious that nearly all the light and heat received by the earth come from the sun. In the sun originate, directly or indirectly, almost all the active forces operating on the earth. The wind blows because the sun heats different parts of the earth's atmosphere unequally. The rain falls after the sun's rays have caused water in the form of vapor to rise into the regions occupied by the clouds. Wood burns because the sun's energy has been stored in its cells. Coal and petroleum are sources of power because they have preserved the solar energy contained in plants of earlier geological ages. Animals and men are warm-blooded and can move because they feed on plants or on other animals that subsist upon plants, and these plants obtain their energy from the sun. It has been found that a square yard of the earth's surface exposed perpendicularly to the sun's rays receives energy equivalent to 1.5 horse power.

The temperature of the surface of the sun is about 10,000° F., or twice that of an electric furnace, while the heat of the interior is much greater. As might be expected, the sun is the seat of violent storms. Whirling masses of intensely heated matter, in volume many times greater than the earth, often sweep along its surface at the rate of several hundred miles a minute. Occasionally there are eruptions in which streams of glowing gas are thrown up from the sun's surface to a height of several hundred thousand miles, or farther than the distance from the earth to the moon.

Geological evidence shows that the sun has been giving the earth heat and light at approximately the present rate during all the long periods of geological time, probably for much more than one hundred million years. It is difficult to account for energy sufficient to supply radiation for this long interval. It was once supposed that the sun's continual supply of heat is due to its contraction. But this theory is inadequate because it does not account for heat for more than 20 million years. It now seems probable that the sun is a vast natural laboratory in which the heavier elements are formed from the lighter ones, and that, in the process, enormous quantities of energy are released in the form of heat. Whatever be the correct theory, it is reasonable to suppose that the sun will continue to supply the earth with heat and light for tens of millions of years.

The visible surface of the sun is called the *photosphere*, or light sphere. It is in this surface that sun spots develop. Immediately above the photosphere is a layer of gas about 500 miles deep, called the *reversing layer* because it makes a dark-line spectrum. Outside of the reversing layer is the *chromosphere*, or color sphere, a deep layer of tenuous gas. And outside of the chromosphere is the *corona*, a halo of pearly light which can be seen only at times of total eclipses. The corona extends outward, especially in the plane of the sun's equator, to a distance of a million miles.

The chemical constitution of the sun has been determined by means of the spectroscope, a marvelous instrument that analyzes the light from a radiating gaseous source. About 40 of the 90 terrestrial elements have been found on the sun. Most of these are familiar metals, such as sodium, calcium, iron, nickel, copper, zinc, silver, tin, and lead. It is a remarkable fact that not only the sun but also the distant stars are made up of familiar elements, a considerable number of which are found in the human body. See *Stars.*

Sun Spots. Sun spots are dark spots or patches, generally circular or oval in shape, which appear from time to time on the surface of the sun. They range in diameter from less than 500 to more than 100,000 miles, and last from a few days to several months, the average duration being a month or two. They consist of a central dark nucleus, the *umbra*, surrounded by a lighter ring, the *penumbra*.

Sun spots occur in cycles whose periods vary somewhat, the average being slightly more than 11 years. At times of greatest frequency, from 10 to 20 sun spots may sometimes be seen; at other times no spots are visible. They always occur in two belts, one on each side of the sun's equator, and extending from latitude 6° to latitude 35°.

The cause and nature of sun spots are not yet known. It is certain that the gases in the spots are not quite so hot as the surface of the sun elsewhere, yet the total amount of heat they radiate seems to be equal to that radiated where there are no spots. They are often the seat of violent storms, sometimes cyclonic in character, and Hale has shown that they possess well defined magnetic fields.

Disturbances of the magnetic needle are most frequent and violent on the earth during periods when sun spots are most numerous. It is reasonably certain that brilliant displays of the aurora borealis are directly connected with the presence of unusual numbers of sun spots. It has been suggested also that sun spots influence the weather by modifying temperature and rainfall, but no conclusive evidence in favor of the suggestion is at hand.

Telescope. Two principal types of optical instruments have been produced for the purpose of adding to the power and effectiveness of human eyes. One is the microscope, which magnifies objects much too small to be seen without its aid; the other is the telescope, which shows distant objects as though they were nearer than they are. A good microscope will magnify the diameter of a small object a thousand times; a large telescope will make a remote object appear as though it were at one-thousandth of its distance.

When a person sees an object, light from it has passed through the pupil of his eye and has made its image on the retina, just as when a photograph of an object is secured, light from it has passed

through the lens of the camera and has made its image on the plate. The diameter of the pupil of the eye averages about one-fifth of an inch. Therefore, the amount of light that can enter the eye is limited. The diameter of a telescope may be many inches, and, consequently, a large amount of light may pass through it. For example, a telescope 20 inches in diameter transmits (neglecting small losses by reflection and absorption) 10,000 times as much as passes through the pupil of the eye. The lenses in a telescope are so arranged that the rays are condensed before they enter the eye of the observer, and the brightness of such an object as a star is correspondingly increased. Without telescopic aid only 5000 stars can be seen in the entire sky, even under the most favorable conditions. With the large telescopes of the present time several hundred million stars are visible. These facts are a measure of the importance of telescopes in astronomy.

As a telescope brings an object nearer to the observer, it makes it appear larger in diameter in the same proportion. The so-called magnification depends both upon the large lenses (the objective) at the outer end of the telescope and upon the small lenses (the eyepiece) near the eye of the observer. When the atmospheric conditions are favorable, an eyepiece can be used on the largest telescopes so that the apparent diameter of an object is increased a thousandfold. Under these conditions the apparent area of an object—the moon, for example—is magnified a million times.

Combinations of lenses similar in principle to the telescope were first made by Lippershey, in Holland, about 1600. Galileo constructed actual telescopes about 1608, and was the first man to scan the heavens with optical aid. He studied the markings on the moon, observed spots on the sun, and discovered four of the satellites of Jupiter and the rings of Saturn.

A serious difficulty in the construction of telescopes is that a lens does not bring rays of light of different colors to a focus at the same point. Since all objects radiate light which is a mixture of many colors, some confusion results. For example, when the red rays are in focus, the blue rays form a blurred image. This difficulty has been very largely overcome by making the objectives of telescopes of two kinds of glass having suitably different properties. It has been avoided also by condensing the rays by means of concave mirrors instead of by lenses. The result is that there are two kinds of telescopes: the *refractors*, in which the light passes through, and is condensed by, a lens or combination of lenses; and the *reflectors*, in which the light is reflected from, and is condensed by, a concave mirror. Both types use the same kinds of eyepieces.

A second obstacle to the construction of larger telescopes having glass lenses or mirrors is the distortion of light rays which takes place when temperature changes cause expansion or contraction in the glass. Consequently, a new era in telescope construction was inaugurated by the production of fused quartz, which shows virtually no expansion due to heat. The technique for producing this substance was sufficiently advanced by 1928 so that plans were made in that year for constructing a reflecting telescope with a mirror 200 inches in diameter, just twice the size of the largest then existing.

In a modern telescope, the lens or mirror may weigh up to 30 tons. With its tube and counterweights, also weighing many tons, the telescope must be mounted and controlled with such precision that it can follow the stars in their courses across the sky. Many auxiliary instruments are required for its effective use, since direct observation is now largely superseded by recording devices of great accuracy. Among these are many varieties of photographic plates sensitized to light rays that may be invisible to the human eye. The spectroscope, fed by the telescope, reveals the constituent elements of celestial bodies. By means of the interferometer, the size of distant stars may be measured. Thermocouples enable astronomers to measure the temperature of planets or stars.

LARGE REFRACTORS

Institution or Location	Aperture in Inches	Focal Length in Feet	Date of Erection
Yerkes Observatory, Williams Bay, Wisconsin	40.0	62.0	1897
Lick Observatory, Mt. Hamilton, Cal.	36.0	57.8	1888
Naval Observatory, Nikolaev, Russia	32.0	....	....
Meudon Observatory, near Paris	32.5	53.0	1891
Astrophysical Observatory, Potsdam	31.5	39.4	....
Bischoffsheim Observatory, Nice	30.3	52.6	1889
Allegheny Observatory, Pittsburgh, Pa.	30.0	....	....
Imperial Observatory, Pulkova	30.0	45.0	1885
National Observatory, Paris	28.9	....	....
Royal Observatory, Greenwich	28.0	28.0	1894
Berlin	27.5	....	....
Imperial Observatory, Vienna	27.0	34.0	1882
Royal Observatory, Greenwich	26.0	26.0	1897
Johannesburg, South Africa	26.0	....	....
Naval Observatory, Washington	26.0	32.5	1873
McCormick Observatory, Charlottesville, Va.	26.0	32.5	1882
Cambridge University Observatory	25.0	....	1891
Meudon Observatory, near Paris	24.4	52.2	1891
Harvard College Observatory, Bloemfontein, S. Africa	24.0	....	1927
National Observatory, Cordoba, Argentina	24.0	....	....
National Observatory, Santiago, Chile	24.0	....	....
Detroit Observatory, Ann Arbor, Mich.	24.0	....	....
Cape Observatory, Cape Town, South Africa	24.0	22.6	1897
Radcliffe Observatory, Oxford, Eng.	24.0	....	....
Swarthmore College, Pa.	24.0	36.0	....
Lowell Observatory, Flagstaff, Ariz.	24.0	31.0	1895
National Observatory, Paris	23.6	59.0	1891
Hamburg, Germany	23.6	....	....
Halstead Observatory, Princeton University, N. J.	23.0	32.0	1883
Mount Etna, Sicily	21.8	....	....
Edinburgh, Scotland	21.2	....	....
Mt. Porro Observatory, Turin, Italy	20.5	....	....
Chamberlin Observatory, Denver, Col.	20.0	28.0	1891
Manila Observatory, Philippines	20.0	....	1892
Chabot Observatory, Oakland, Cal.	20.0	....	....
Dearborn Observatory, Evanston, Ill.	18.5	....	....
Amherst College Obs'y, Amherst, Mass.	18.0	....	....
Flower Observatory, Philadelphia	18.0	....	....
Goodsell Observatory, Carleton College, Northfield, Minn.	16.0	....	1891
Zo-Se Observatory, Shanghai, China	16.0	....	....
Washburn Observatory, Madison, Wis.	15.5	....	....
Harvard Obs'y, Cambridge, Mass.	15.0	....	....
Dominion Observatory, Ottawa, Can.	15.0	....	....
National Observatory, Tacubaya, Mex.	15.0	....	....

LARGE REFLECTORS

Institution or Location	Aperture in Inches
Mt. Wilson Observatory, Pasadena, Cal.	100.0
Dominion Observatory, Victoria, B. C.	72.5
Lord Rosse, Birr Castle, Ireland	72.0
Ohio Wesleyan University	61.0
National Observatory, Cordoba, Argentina	61.0
Harvard Observatory, Cambridge, Mass.	60.0
Solar Observatory, Mount Wilson, Cal.	60.0
Melbourne, Australia	48.0
National Observatory, Paris	48.0
Lowell Observatory, Flagstaff, Ariz.	40.0
Simeis, Crimea	40.0
Carre, near Geneva, Switzerland	39.4
Meudon Observatory, near Paris	39.0
Hamburg, Germany	39.0
Detroit Observatory, Ann Arbor, Mich.	37.5
National Observatory, Santiago, Chile	36.6
Cambridge University, England	36.0
Birr Castle, Ireland	36.0
Solar Observatory, South Kensington, England	36.0
Lick Observatory, Mt. Hamilton, Cal.	36.0

Time. The fundamental means of measuring time is the rotation of the earth. The ultimate standard by which all clocks are regulated is furnished by observatories from their observations of the stars. The primary unit of time is the *mean solar day*. It is the average of the true solar days, which vary slightly in length. The difference between mean solar time and true solar time is called the *equation of time*, and is given in the *Nautical Almanac*. Mean solar time and true solar time agree four times a year; namely, on April 15, June 14, September 1, and December 24. The maximum difference between them occurs on November 2, when it amounts to 16 minutes and 21 seconds.

Every meridian has its own mean solar time. In order to avoid continual changing of time as one goes east or west, standard time belts are introduced, each being 15 degrees of longitude in width.

The *tropical year*, consisting of 365 days, 5 hours, 48 minutes, and 46 seconds of mean solar time, is the standard unit of time for longer intervals. It suffices not only for history but for the long periods of the geological ages as well. Only when the evolution of the stars is under consideration, do the time-intervals mount to such heights that still larger units seem advisable. See *Calendar*, *Day*, *Standard Time*.

Uranus (*ū'rā-nŭs*). Uranus is the next to the outermost known planet. It was discovered in 1781 by Sir William Herschel. This was the first discovery of a planet in historical times. Uranus can barely be seen with the unaided eye and appears as a star of the sixth magnitude. It has a diameter of about 30,000 miles, and its volume is about 53 times greater than that of the earth. Its density is only about one-fourth that of the earth, and its mass is therefore only about 15 times the mass of the earth. The period of its rotation on its axis is believed to be about 10 hours, and its period of revolution around the sun is 84 years. Its average distance from the sun is 1782 million miles.

When viewed through a telescope, Uranus appears as a small, greenish disk, the color being caused by the character of its atmosphere. Uranus has four satellites, ranging from 500 to 1000 miles in diameter. These revolve around the planet from east to west, or in the direction opposite to that of the motion of our moon. Since Uranus is nearly 20 times as far from the sun as the earth is, it receives only $\frac{1}{368}$ as much light and heat per unit area as does the earth. See *Planets*, *Satellites*.

Venus. Venus is the most brilliant planet in the heavens, and the one most nearly like the earth. The diameter of Venus is about 7700 miles, the planet almost equaling the earth in size. Objects on the surface of Venus weigh about 85 per cent as much as they would weigh on the earth. The atmosphere of Venus, which seems as extensive as that of the earth, appears to be filled with clouds. The length of the planet's year is equal to 225 of our days, but the length of its day is unknown.

The average distance of Venus from the sun is 67,000,000 miles; hence its orbit is interior to that of the earth. As a consequence, the planet has phases similar to those of the moon. When the planet is most brilliant, a telescope shows that it is crescent in form. Venus is at times so bright that it can be seen in full daylight, provided the observer focuses his eyes on a distant object and then looks in exactly the right direction.

Venus is seen, alternately, in the west after sunset and in the east before sunrise. In Greek mythology, Venus, as evening star, was known as Hesperus, and, as morning star, was called Phosphorus, or Lucifer. It is a notable fact that some of the tribes of American Indians knew that Venus as morning and as evening star is the same object, and that it changes from one to the other by passing from one side of the sun to the other. The period of Venus from evening star back to evening star is one year and seven months. See *Planets*.

Year. In general, a year is the time required by the earth to make a complete revolution around the sun. Astronomers have defined three different kinds of years,—(1) the *tropical*, (2) the *sidereal*, and (3) the *anomalistic*. The first is the year in ordinary use; the second and the third are employed only in astronomical calculations.

The tropical year, called also the solar, equinoctial, and astronomical year, is the time included between two successive passages of the sun through the vernal equinox. Its length is 365 days, 5 hours, 48 minutes, 46 seconds. Since the seasons depend upon the sun's place with respect to the equinox, the tropical year is used in the calendar in order that dates shall not shift with respect to the seasons.

The sidereal year is the period of the earth's revolution around the sun, from one apparent position among the stars back to the same apparent position again. On account of the westward motion, or precession, of the equinoxes, the sidereal year is about 20 minutes longer than the tropical year, the length of the sidereal year being 365 days, 6 hours, 9 minutes, 9 seconds.

The anomalistic year is the time between two successive passages of the earth through the perihelion point (point nearest the sun) of its orbit. The attractions of the other planets produce a slow eastward motion of the perihelion of the earth's orbit. Consequently, the anomalistic year is nearly 5 minutes longer than the sidereal year, its length being 365 days, 6 hours, 13 minutes, 53 seconds. See *Calendar*.

Zenith (*zē'nĭth*). The point in the heavens that is exactly overhead is called the zenith. It is the point where the plumb-line, if extended upward, would pierce the celestial sphere. The zenith is called also the upper or superior pole of the horizon, and is directly opposite the nadir, or inferior pole. By using these poles as co-ordinates, the astronomical horizon is defined as a great circle of the celestial sphere, 90° from the zenith. See *Nadir*.

Zodiac (*zō'dĭ-ăk*). A belt in the heavens extending 8° on each side of the sun's annual path is called the Zodiac, or Zone of Animals, as the constellations forming it, with one exception, are figures of animals. This zone was recognized by many ancient peoples independently, because all the anciently known heavenly bodies which had relative motions—the sun, the moon, Mercury, Venus, Mars, Jupiter, and Saturn—make their circuits of the sky in this belt. The division of the zodiac into twelve signs, or constellations, each extending over 30° and serving to mark a division of the year, is believed to have been of Babylonian origin.

Beginning with the vernal equinox, the sun travels through *Aries* (Ram), *Taurus* (Bull), and *Gemini* (Twins) in the spring; *Cancer* (Crab), *Leo* (Lion), and *Virgo* (Virgin) in the summer; *Libra* (Balance), *Scorpius* (Scorpion), and *Sagittarius* (Archer) in the autumn; and *Capricornus* (Goat), *Aquarius* (Water Bearer), and *Pisces* (Fishes) in winter. However, owing to the precession of the equinoxes, the signs of the zodiac do not now correspond to the constellations bearing their names, as they did in the times of Hipparchus (156 B. C.). See *Constellations*.

Zodiacal (*zō-dī'ā-kăl*) **Light.** This is a somewhat triangular, faintly luminous area which extends upwards from the horizon along the ecliptic, visible at the end of twilight or at the beginning of dawn. At its base on the horizon, this wedge of light is from 20° to 30° wide. It narrows upwards, and, usually, can be followed 90° from the sun. From about the brightness of the Milky Way, it shades very gradually into the dark sky. In strong moonlight, the zodiacal light is not sufficiently bright to be seen. The spring months are the most favorable for observing it in the evening, and the autumn months, for seeing it in the morning. It is believed to be caused by the reflection of light from an immense number of small particles of matter revolving around the sun in the plane of the earth's orbit.

PHYSICS

Physics is the science which deals with the physical properties of matter, such as gravitation, motion, force, and energy. It concerns itself with the study of mechanics, heat, light, sound, electricity, magnetism, and the constitution of matter. Physics thus differs from chemistry which has to do with the composition and transformations of matter, and from biology which is concerned with the manifestations of life.

In their practical application, the laws and principles of physics are connected with many of the most familiar and useful things of daily experience. For example, the present period is called the age of machinery. One of the great aims of physics, as a science, is to discover and make clearer the application of the principles that govern the construction and the operation of machines.

In the case of the automobile, the study of its gears, levers, cranks, and brakes, their movements, uses, and efficiency, and the weight, strength, and durability of their materials falls under the subject of *mechanics*; the study of the engine, its fuel, and its radiator falls under *heat*; the study of the ignition system—spark coil, spark plug, magneto, and battery—falls under *electricity*; the study of its warning devices—trumpets and horns—falls under *sound*; and the study of its lighting system—lamps, reflectors, and lenses—falls under *light*. Thus, in the construction of this single useful machine, principles derived from each of the five great branches of physics are brought into action. Similarly, all the world-transforming inventions of modern times, such as the telescope, microscope, steam engine, locomotive, steamship, telegraph, telephone, phonograph, electric dynamo, electric motor, electric light, gas engine, moving pictures, wireless telegraph, wireless telephone, submarine, and airplane, embody the principles of physics which made possible their discovery.

During the last two decades, physics has made notable advances in the study of the constitution of matter. The workers in this field are rapidly bringing to light the inner mechanism of the atom, and are making clear why one element differs from another. In fact, the dream of the alchemists regarding the transmutation of matter is all but realized. The value of these discoveries to humanity cannot be overestimated.

Fundamental Units. All practical physics begins with measurements. No law, principle, or theory can be finally accepted as valid unless sustained by the test of actual measurements. Moreover, measurements have meaning only when the results are expressed in terms of some *unit*. It is found that the measurement of any quantity, such as the pressure of steam in a boiler, the speed of an airplane, or the loudness of a bell, can finally be reduced to measurements of *length*, *mass*, and *time*. The *horse power*, for example, is defined as the power required to lift 33,000 *pounds* 1 *foot* in 1 *minute*. The units of length, mass, and time, are called the *three fundamental units* of physical science.

English and Metric Systems.—During the last century, nearly all leading nations, except Great Britain and the United States, have adopted the metric system of weights and measures in which the relation of the units is expressed according to the decimal system. In the United States and Canada, the system of money is established on the decimal plan. Yet the pound, foot, quart, gallon, rod, and mile are not part of a decimal system but of an irregular one which is comparatively very inconvenient. By reason of its simplicity, which very greatly reduces the work of making computations, the metric system is almost universally used in scientific work.

Unit of Length.—The standard units of measurement are the meter and the yard. The meter, which was intended to be equal to one ten-millionth part of the distance from the equator to either pole, is the distance between two lines on a bar of platinum-iridium alloy kept in the vaults of the International Bureau of Weights and Measures near Paris. An accurate copy of this bar, deposited with the Bureau of Standards in Washington, is the legal meter of the United States, and the yard is legally defined as $\frac{3600}{3937}$ of a meter. Should the standard meter be destroyed, it could be replaced, since its length has been determined in terms of an absolute standard—the wave length of red cadmium light. From the standard meter and yard are derived all other units for measuring length, area, and volume.

Unit of Weight.—The kilogram, which was intended to be the weight of 1000 cubic centimeters, or one liter, of pure water at its maximum density, viz., at a temperature of 4° C., is the weight of a platinum-iridium cylinder preserved along with the standard meter near Paris. An accurate duplicate of this cylinder is kept with that of the standard meter in Washington. In the United States the pound avoirdupois is legally declared to be $\frac{1}{2.204622}$ kilogram. Therefore, the kilogram very nearly equals 2⅕ pounds. From the standard kilogram and pound are derived all other units of weight, such as grain, gram, ounce, or ton.

Unit of Time.—In civilized countries the mean solar day, that is, the average time of the sun from noon to noon, is taken as the common unit of time. This is divided into 24 hours, each hour into 60 minutes, and each minute into 60 seconds. The second, therefore, is $\frac{1}{86400}$ of the mean solar day.

The C. G. S. System.—In scientific work the centimeter, by reason of its more convenient size, is taken, instead of the meter, as the fundamental unit of length; similarly, the gram, which is $\frac{1}{1000}$ of a kilogram, is taken as the fundamental unit of weight, and the second as the fundamental unit of time. This system of absolute units of physical measurement is called the *centimeter-gram-second system*, and is usually referred to as the c.g.s. system of units.

MATTER AND MOTION

Forms of Matter. Matter is constituted under three physical forms or phases,—solids, liquids, and gases. According to the definition of Sir Oliver Lodge, "A solid has volume and shape; a liquid has volume but no shape; a gas has neither volume nor shape." Liquids and gases are sometimes called *fluids*, as both possess the quality of flowing. This quality distinguishes them from solids.

Any portion of space surrounded by a rigid boundary can be filled with a fluid. A gas will always fill such a space no matter how small an amount is put into it. On the other hand, a definite amount of liquid is always required to fill a given space. Further, a liquid may be kept in an open vessel, but a gas cannot be so confined. However, under differing conditions of temperature and pressure, gases may pass to a liquid and even to a solid state, solids may pass both to the liquid and to the gaseous state, and liquids may pass either to the gaseous or to the solid state. Consequently, in speaking of any form of matter as a solid, a liquid, or a gas, it is meant that this is the form or state which the substance assumes at ordinary conditions of temperature.

Solids.—All substances which, at ordinary temperatures, do not perceptibly alter their shape or flow. However, as between typical solids which rigidly maintain their shape, as does steel or granite, and typical liquids which flow freely, as does water, there is a long series of intermediate gradations, expressed by such terms as *semisolid*, *viscous solid*, and *viscous liquid*. In consequence, there is no sharp line distinction between solids and liquids.

Further, by the application of intense heat, as in the electric furnace, even the most refractory solids can be fused or liquefied, and many can be volatilized or rendered gaseous.

Fluids.—A fluid is a substance which yields to any force which tends to change its shape without substantially altering its volume, and, hence, is capable of flowing. Fluids include liquids, which are only slightly compressible, and gases, which are readily compressible. Air, steam, water, oil, and mercury are fluids. Electricity is often spoken of as a fluid, and the luminiferous ether, in which, according to modern physicists, waves of light, radiant heat, and electricity are propagated, is also called a fluid.

Liquids.—Fluid substances which differ from gases in being only slightly compressible and in being incapable of indefinite expansion. Liquids differ from solids in the ease with which their component particles move upon one another. They are thus capable of flowing and of adapting themselves to the shape of surrounding solids or to the walls of a containing vessel. However, some liquids, such as certain bitumens, are exceedingly viscous, flowing or changing their form very slowly, so that no clear line can be drawn distinguishing them from solids. Furthermore, by the application of heat, all normal liquids can be transformed into a gaseous state. Liquid mercury, for example, readily becomes a gas when heated. On the other hand, liquids can be transformed into solids by the application of intense cold.

Gases.—A gas is an airlike fluid which, under ordinary conditions of temperature and pressure, possesses neither independent shape nor definite volume but tends to diffuse and expand indefinitely. By earlier chemists, the term *gas* was applied to any fluid which could not be liquefied by cold and pressure, and the term *vapor* to any fluid which could be so liquefied. In recent years, however, all gases have been liquefied and nearly all have been solidified. Consequently, there is now no distinction, except in degree, between the so-called gases and the so-called vapors. A gas is simply a vapor at a temperature above the so-called critical temperature. All liquids and nearly all solids have been transformed into a gaseous state by the application of intense heat.

When compared with liquids or solids, gases are extremely light. Hydrogen, the lightest known substance, is nearly 15 times lighter than air and more than 150,000 times lighter than mercury. Many gases, however, are heavier than air, as, for example, carbon dioxide and chlorine. While most gases are colorless, a few display some color. Chlorine was so named because of its greenish yellow appearance. Many gases are tasteless and odorless. Others, such as ammonia, chlorine, and sulphur dioxide, have definite taste and extremely powerful odors.

Molecular Attraction. When falling through the air, a drop of water draws itself into an almost perfect sphere. In a similar way lead shot are formed by letting molten lead fall through a sieve from the top of a tower into water beneath. As a rule, any liquid when left undisturbed tends to assume spherical form; a sphere has a smaller surface than any other form of solid of the same volume. A liquid acts as if composed of minute particles, or molecules, which exert a great attraction for each other and pull themselves together as closely as possible. Many substances, such as wood and glue, cement and stone, or paint and wood, exhibit great attraction when brought in close contact.

In case this attraction is between particles of the same kind, as in the falling shot, it is called *cohesion*; if between particles of different kinds, as wood and glue, it is called *adhesion*. Cohesion in the particles of soapsuds causes the thin film of a soap bubble to act like an elastic membrane.

Surface Tension.—In case olive oil is floated in a mixture of alcohol and water having the same density as the oil, the oil will assume the shape of a sphere or ball. If drawn out of this shape by stirring, it will at once resume its spherical form, as if possessing an elastic covering. Likewise, a drop of mercury when resting on a level surface draws itself into a smooth, roundish mass, notwithstanding its great weight which tends to flatten it.

The tendency of a liquid to reduce its exposed surface to a minimum, that is, the tendency of any liquid to act like a stretched elastic membrane, is called surface tension. The explanation of these effects are found in the strong mutual attraction existing between the molecules of the liquid. It varies with the nature of the liquid and with the temperature of the liquid. Mercury shows the greatest surface tension of any ordinary liquid, water ranking second.

Capillary Attraction.—The attraction which causes most liquids to ascend into narrow openings, called also capillarity. It is caused by adhesion and surface tension. If a hollow tube of small bore be immersed in water, the liquid rises slightly around the outside, but it rises still higher on the inside. This inside height is greatest when the opening of the tube is as small as possible. The surface of the liquid inside the tube assumes a concave form. If, however, a glass tube be immersed in mercury instead of in water, the liquid in the tube is depressed instead of being raised, and the surface, which with water was concave, is now convex.

The reason for this difference of action lies in the fact that mercury will not *wet* the glass as water does. But, if a metallic tube, such as one of copper, be substituted for the glass, the mercury will rise in it and have a concave surface, because mercury can wet copper. Whenever a liquid is able to adhere to a solid, it rises in contact with it.

It is on account of capillarity that sap rises in plants, and that oil rises in the wicks of lamps. The word is derived from the Latin *capillus*, a hair, because this action is best seen in tubes with openings as small as a hair.

Solution.—The act or process whereby a solid, another liquid, or a gas is absorbed into and becomes uniformly mixed with a liquid. When the substances dissolved can be recovered from the solution in their original form, as when brine is evaporated to give dry salt, the process is called a *simple* or *physical* solution. When new chemical substances result, as when silver is dissolved in nitric acid, the process is called a *chemical* solution.

The solution of gases in liquids is always, and that of liquids in liquids is commonly, attended by the production of heat; that of solids in liquids is usually but not always accompanied by an absorption of heat. When a solid is placed in a liquid, a certain amount only will dissolve, after which no more will be taken up at that temperature. The solution is then said to be *saturated*.

The amount of a solid that can be dissolved depends not only on the substance but also on the temperature, solubility generally increasing with heat. Liquids soluble in each other may mix in any proportion, as in case of water and alcohol, or one may dissolve only a limited amount of the other. A greater volume of gas is absorbed when the liquid is cold, and the amount is proportionate to the pressure on the liquid. For example, when the pressure on soda water is relieved, the carbon dioxide with which it was charged, escapes in bubbles, causing effervescence.

Diffusion.—The process of spreading out and interminglings that takes place when two gases or two mixable liquids are placed in contact with each other. In liquids, diffusion is comparatively slow. If a strong solution of copper sulphate is introduced by a tube into the bottom of a tall vessel containing pure water, the heavier blue solution will at first be sharply separated from the clear water above; but, in time, the sulphate will begin to move slowly upward into the water, which, finally, will become of a uniformly blue color. Gases, however, diffuse

into each other very freely. Even when of greatly different densities, two gases placed in a closed vessel will each expand through the whole space as if one alone were present.

Evaporation.—The process by which any substance is changed from a liquid or a solid state into a vapor. Evaporation differs from boiling in that it takes place at any temperature and only at the surface of the liquid, while boiling goes on inside the liquid but only at a fixed or definite temperature. Water exposed in an open dish slowly disappears or evaporates. Similarly, a thin layer of snow will disappear or evaporate, even though the temperature remains constantly below freezing. A water-soaked garment, if exposed to an atmosphere below zero, will first stiffen from freezing but will gradually become dry from evaporation.

Heat is absorbed whenever a liquid evaporates. Consequently, the temperature of the liquid itself and of substances near it falls. Owing to the heat absorbed by evaporation of moisture from the skin, the surface of the body is continually cooled in warm weather.

Mass. The mass of any substance is the amount of matter it contains. Mass is expressed in terms of weight. While the mass of a body remains constant, the attraction between it and the earth, that is, its weight, changes slightly on various parts of the earth's surface. The unit of mass is the quantity of matter contained in the piece of platinum-iridium known as the standard kilogram. It is kept by the International Bureau of Weights and Measures near Paris, France.

The mass of a body has long been considered as invariable in amount and independent of its physical state, surroundings, or motion. Experimental evidence now seems to indicate that the mass of minute bodies, when moving at enormously high speeds, varies with their velocity. Further, some of the conclusions derived from the theory of relativity, especially as developed by Einstein since 1905, if generally accepted, would require a great change in our idea of mass. This is, however, a theory which will require much experimental proof.

Volume. The amount of space occupied by a body; its bulk as measured by cubic units, such as cubic feet, inches, yards, meters, or centimeters. The volume of a body may be real or apparent; for example, the apparent volume of a heap of wheat includes the real volume of each separate grain composing it, plus the empty spaces between these grains as they lie in the pile.

Density. In ordinary usage, the word heavy has two distinct meanings. One may correctly say that lead is heavier than cork and one may also say that two pounds of cork are heavier than one pound of lead. In the latter case two pounds of cork are said to be heavier than one pound of lead in the same sense that two pounds of coal are heavier than one pound of coal. In the former case lead is said to be heavier than cork in the sense that a piece of lead weighs more than a piece of cork of the same size. The term density is used to indicate more exactly this inherent property of the lead and the cork.

The density of a substance is its weight per unit of volume; for example, the density of water is about 62.4 pounds per cubic foot and that of copper is 555 pounds per cubic foot. The simplest way to determine the density of a substance is to weigh the substance and measure its volume. The density may then be found by dividing the weight of the substance by its volume. If the body is irregular in shape, its volume may be found by immersing it in water and observing the volume of the water displaced.

Weight. The quality possessed by substances of being heavy. Weight is caused by the pull of gravity on the mass of a substance. This pull may vary with the locality although there is no change in the mass; for example, if weighed on a delicate spring balance, a given mass of gold will weigh somewhat less at the top of a high mountain than at the sea level, due to the greater distance of the mountain top from the center of the earth. The *unit of weight* is the pull of the earth's gravitational force upon the piece of platinum-iridium known as the standard kilogram, when it is near the sea level in latitude 45° N. See *Specific Gravity*.

Methods of Weighing. From the standard kilogram, secondary weights are prepared by means of a delicate, equal-arm balance. The use of such a balance may be considered the fundamental method of weighing. Various types of weighing machines, such as balances having unequal arms, platform scales, coiled-spring balances, and torsion balances, which depend upon the resistance of an elastic body to twisting, are all standardized by means of accurate weights.

Barometer. An instrument for measuring the pressure of the atmosphere, used chiefly for predicting changes in the weather and for determining altitude. The first barometer, made by Torricelli, a pupil of Galileo, in 1643, may be duplicated by filling with mercury a glass tube 32 or 33 inches long and closed at one end. The open end is covered with a finger, immersed in a bowl of mercury, and the finger removed. The column immediately falls a short distance and then comes to rest, because the weight of liquid in the tube is *balanced* by the *weight* or *pressure* of the air on the outside. If water is used instead of mercury, a tube about 34 feet long is required.

The standard atmospheric pressure is taken as 760 mm., or 29.92 inches of pure mercury. If a mercury barometer is carried up a mountain, the column falls about one inch for each increase of 900 feet in the altitude. An *aneroid* barometer consists of a metallic vacuum box connected with an indicator by means of levers, so arranged that a very slight movement of the surface of the box is magnified hundreds of times at the indicator. As storms are generally preceded by an area of low pressure, a rapidly falling barometer usually indicates the approach of a storm, while a rising barometer generally indicates the coming of clear, calm weather.

Archimedes' Principle. The loss of weight of a body submerged in a liquid is the weight of the displaced liquid. It is supposed that this principle was discovered by the Greek philosopher Archimedes (287–212 B. C.) who had been ordered by Hiero, king of Syracuse, to find out whether a goldsmith had mixed silver with the gold used in making a crown. To do this without destroying the crown was a perplexing problem. But one day while Archimedes was at the public bath, he noticed that his body was buoyed up by the water in which it was submerged. Seeing in this the solution of his problem, he is said to have rushed home shouting "Eureka!" (I have found it).

Specific Gravity. The relative density of a substance as compared with some other substance taken as a standard. For solids and liquids, this standard is usually water, while, for gases, air and hydrogen are used. The specific gravity of any substance compared with water as a standard is determined by dividing the weight of the substance by the weight of an equal volume of water taken at some definite temperature. The specific gravity of gases is similarly determined, usually with reference to hydrogen under normal pressure at a temperature of 0° C.

Specific gravity is the ratio of one density to another, and is always an abstract number, while the density of a substance is always a concrete number. For example, the *specific gravity* of mercury is 13.6, while its *density* is 850 pounds per cubic foot. See *Table of Chemical Elements*.

Gravitation. The law of gravitation, discovered by Sir Isaac Newton, is that every portion of matter attracts every other portion with a force directly proportional to the product of the two masses, and inversely proportional to the square of the distance between them. While all observations confirm that gravitation acts uniformly throughout the universe, no inquiry has shown that it is related to anything but the masses of the attracting and the attracted bodies. It appears to operate independently of physical and chemical conditions in the acting masses, and independently also of the intervening medium.

As yet there is no theory which really explains gravitation. A recent attempt, formulated by Lorentz, Thomson, and others, assumes that the attractive force between unlike electrical charges in two neighboring portions of matter is greater than the repulsive force between the like charges, and, consequently, that all bodies are drawn together by a form of electrical attraction.

Gravity, Force of. The term applied to the force with which the earth attracts every particle of matter. The force of gravity is least at the equator and gradually increases toward the poles. If weighed on delicate spring balances, a given mass of matter will weigh least at the equator and become increasingly heavier as the latitude increases.

This difference in weight is due *first* to the fact that the centrifugal force, owing to the rapid rotation of the earth, is greater at the equator, and, *secondly*, to the fact that the equator is farther from the earth's center than are the poles, which also diminishes the force of gravity. As a result of both these causes, a body which weighs 196 pounds at the equator will weigh about 197 pounds at either pole.

The force of gravity at any point can be determined by finding the length of a pendulum that beats in seconds at that point. The formula for ascertaining the force of gravity is $g = (3.1416)^2 l$ where l is the length of a simple pendulum which beats in seconds. At the sea level in middle latitudes the downward acceleration of falling bodies, due to gravity, is about 32.2 feet per second, per second.

Pendulum. A body suspended from a fixed point, so as to swing freely back and forth under the action of gravity and momentum. The laws of the pendulum were discovered in 1581 by Galileo. By experiment he showed that the successive small vibrations of a pendulum take place in equal times, and that the time does not depend upon the weight of the bob or upon the length of the swing. Galileo further proved that the time of vibration varies directly as the square root of the length of the pendulum and inversely as the square root of the acceleration of gravity.

In order, therefore, for a clock to keep correct time, its pendulum must remain of constant length. As most substances used for pendulum rods expand and contract considerably with changes of temperature, various devices, called *compensating* pendulums, have been designed to overcome this defect, such as the so-called *mercury* and *gridiron* pendulums.

At the sea level, in the latitude of Greenwich, the length of a pendulum which will vibrate in one second is 39.0968 inches. This is called the *second's pendulum*. Such a pendulum would vibrate more slowly at the top of a high mountain where the force of gravity is slightly less, and more rapidly at the north pole where the force of gravity is somewhat greater.

Mechanics. The branch of physics, called also *Dynamics*, which treats of forces and the motions they produce. The idea of force as that which produces or destroys motion is ascribed to Sir Isaac Newton, the chief founder of the science of mechanics. When two opposing forces neutralize each other, they fail to produce motion, and the bodies on which they act remain in a state of rest. Such forces are said to be in *equilibrium* and the bodies upon which they act are said to be at *rest*.

The division of mechanics which deals with conditions of bodies at rest, or, in other words, with forces in equilibrium, is called *statics*. The division which deals with the effects of forces acting to produce motion in bodies is called *kinetics*. The division which investigates the circumstances of motion, in space and time, without reference to the bodies moved or to the forces producing motion, is called *kinematics*.

Mechanics, or dynamics, has also to do with the primary conceptions of space, matter, time, and velocity, each of which admits of numerical estimation or measurement, and hence is a science of numbers and measurements. One of the earliest investigators of these subjects was Galileo, to whom is due the law of acceleration of falling bodies. Huygens added the theory of the pendulum and centrifugal force.

Force. In general, force may be defined as that which changes, or tends to change, any physical relation between two bodies, whether this relation is mechanical, thermal, chemical, magnetic, electrical, radioactive, or of any other kind. Examples are the force of gravity, centrifugal force, cohesive force, electromotive force, and expansive force. A force can be measured in three ways: (1) By the weight it can support, (2) by its power to strain an elastic body, and (3) by its power to give motion to a mass.

Motion. The passing of a body from one place to another or the continuous variation of the position of a body; the opposite of the state of rest. As we have no idea of absolute position in space, the motion of a body or point is regarded as in relation to some body or point considered as fixed. For example, the idea of the motion of the earth is derived from its relation in position to the sun and stars, while the idea of the motion of an airplane is derived from its relation to the earth below.

When bodies move in a straight line, their motion is called *rectilinear*; if in a curve, *curvilinear*; if to and fro with regard to a fixed point, *vibratory*; if they turn on an axis, *rotatory*; and if they revolve around a given point, *circular*.

Newton's Laws of Motion. All mechanics are based on three simple laws set forth by Sir Isaac Newton in his famous *Principia*, or principles of natural philosophy. The first is the law of *inertia*, the second is the law of *acceleration* (acceleration means rate of change of velocity), and the third is the law of *interaction*. These may be expressed as follows:

I. Every body persists in a state of rest, or of uniform motion in a straight line, unless compelled by external forces to change that state.

II. The acceleration of a given body is proportional to the force causing it, and is in the direction of that force.

III. With every action or force there is an equal and opposite reaction; or the mutual actions of any two bodies are always equal and oppositely directed.

Inertia. The tendency of all forms of matter to retain their condition of rest or of motion in a straight line. When a car turns a sharp curve the passengers are thrown to one side because of the inertia of their bodies. Inertia is the cause of many accidents, such as the spilling of coffee when the cup is moved too quickly, or the fall caused by jumping from a moving train. It is because of inertia that the head of an ax can be tightened by striking the end of the handle.

The amount of force required to effect a given change in the motion of a body depends both on the body and on the suddenness of the change to be effected. By experiment it is found that the inertia of a given portion of matter is always the same and cannot be increased or diminished by any known means.

Velocity. The time rate of motion of a body in a definite direction. It is expressed as the space passed over in one unit of time. When a body passes through equal spaces in equal times, its velocity is said to be *uniform*; if it traverses unequal spaces in equal times, *variable*; if it passes through a greater space in successive equal intervals of time, *accelerated*; and if it passes through less spaces in successive equal intervals of time, *retarded*.

A railway train traveling at 60 miles per hour has a velocity of 88 feet per second, and an airplane flying at 150 miles an hour has a velocity of 220 feet per second. Sound travels through the air at about 1100 feet per second. At the equator the surface of the earth rotates at a rate somewhat exceeding 1000 miles an hour, or about 1500 feet per second. A bullet fired from a modern high power rifle has a muzzle velocity of from 2000 to 3000 feet per second.

The earth travels in its orbit at about 18½ miles per second. Meteors strike the earth's atmospheres at velocities estimated at from 10 to 40 miles per second. Light and electricity travel at the enormous speed of 186,000 miles per second. Alpha particles, or atoms of helium, are emitted by radium at a velocity of 20,000 miles per second. The velocity of the beta rays emitted by radium reaches the enormous value of 9/10 the velocity of light.

Einstein Theory of Relativity. This theory, which was developed by Albert Einstein in a series of remarkable papers published from 1905 to 1917, consists of two parts. The Special or Restricted Theory of Relativity, which has to do with the question of the constancy of the velocity of light and the interrelation of time and space, and the General Theory of Relativity, which extends the special theory to the phenomena of gravitation and by implication to all natural phenomena. Both forms of the theory are highly mathematical and the conclusions drawn are largely the results of the interpretation of mathematical equations.

The Special Theory of Relativity makes two assumptions; viz., that all motion is relative and that the velocity of light in a vacuum is an absolute constant of nature. It follows, not only that the velocity of light in a vacuum is constant and independent of the velocity of its source, but also that it is a limiting velocity which may be approached but never equaled by any material body. In other words it is the maximum velocity attainable by any mass.

One of the striking successes of the Special Theory was its explanation of the failure of the Michelson and Morley experiment to detect relative motion between the earth and the ether. The ether is assumed to be the medium filling all space by means of which light, in the form of wave motion, comes to us from the sun and from the distant stars. The earth rushes through this medium at the enormous speed of 18½ miles per second, and one would expect that some evidence of relative motion could easily be detected. Michelson and Morley, however, found no evidence of this motion, and other experimenters, using apparatus of the highest precision, have had a similar experience.

It was suggested by FitzGerald and others that the negative result of the Michelson and Morley experiment could be accounted for by assuming that the apparatus was shortened in the direction of the earth's motion, the shortening being just enough to compensate for the change expected. The relativity principle of Einstein asserts that this contraction is just exactly what happens. In other words, all bodies are contracted or shortened in the direction of their motion. A yardstick is, therefore, shorter when held parallel to the direction of the earth's motion in space than when at right angles to that motion. This contraction cannot be detected on the earth but is evident to an observer located on a body at rest relative to the earth. Stated in another way, the relativity principle declares that it is impossible for an observer to detect the motion of a body by observations which are confined to the moving body itself, just as one in a railway car, which is moving quietly without change of speed or direction, cannot detect his motion by observations confined to the car.

The Special or Restricted Principle of Relativity may be stated thus: "The velocity of light is constant for all observers, and is independent of their system of reference; space and time are variable, dependent on relative translation (or motion) of systems."

The General Theory of Relativity extends the principle to all the laws of nature and does not rest upon definite test experiments, as is the case with the special relativity, but upon the successful application of the principle to the formulation of a new law of gravitation.

The law of gravitation as formulated by Newton in terms of masses and the distances between them may be stated as follows: Every portion of matter in the universe attracts every other portion with a force which is directly proportional to the product of the masses and inversely proportional to the square of the distance between them. This simple law of Newton's, together with his scheme of dynamics, was adequate to account with great accuracy for all the planetary and lunar motions with all the irregularities observed in these motions, except for one or two outstanding instances, of which the most marked was the motion of the perihelion (point nearest the sun) of Mercury's orbit. After making allowances for all known causes, there remained a discrepancy of more than 41 seconds of arc per century between the astronomical calculation for the movement and the actual observed movement of Mercury's perihelion. When, however, the calculation is made on the basis of the Einstein theory, this discordance entirely disappears and no disagreement with observation is found when the theory is applied to the other planets. This was indeed a signal triumph for the General Theory of Relativity.

In the second place, Einstein was able to predict that light rays coming to us from distant stars would be deflected if they passed near the sun. The same prediction will result from the Newtonian theory also, if we make the simple assumption that the electromagnetic energy of light is subject to gravitation. The magnitude of the deflection, however, for a ray of light just grazing the sun is, on the basis of this theory, .87 seconds, while the Einstein theory calls for a deflection of 1.74 seconds. The truth of the Einstein prediction was strikingly verified as a result of observations made during the eclipse of the sun on May 29th, 1919. Within the limits of the errors of observation, the deflections of the stars agreed with that predicted by the theory. The average of the results of two sets of observers was 1.74 seconds. Einstein's predictions were still more completely confirmed by observations made during the solar eclipse of September 21, 1922.

A third deduction from the theory, which has also been verified, is the prediction that the spectral analysis of the light coming to us from the sun and from the large stars, compared with a similar analysis of light on the earth, would show a shifting of the spectral lines toward the red end of the spectrum. It was a difficult matter to disentangle this effect from a number of similar effects that are present in the spectra of the sun and stars, but, in 1923, the predicted shifting was completely verified.

The General Theory of Relativity makes a valuable contribution to the philosophical side also, for, if we raise with ourselves the question of how we are to regard the universe as a whole, we find many difficulties with the Newtonian point of view. The Newtonian theory requires that the universe should have a kind of center in which the density of the stars is a maximum, and that, as we proceed outwards from this center, the star density diminishes until finally, at great distances, it is succeeded by an infinite region of emptiness.

This conception in itself is not very satisfactory and becomes still less so when it is noted that it

leads to the view that light emitted from the stars is perpetually pouring into infinite space never to return. Such a finite material universe would be destined to be gradually impoverished, a dilemma which men have sought in various ways to escape.

According to the General Theory of Relativity, the geometrical properties of space (that is, the shape of space) are not independent, but are determined by matter. These considerations lead us to the point of view of a "finite yet unbounded universe"; that is, a universe which is finite and yet has no limits. Such a universe, though difficult to comprehend at first sight, is certainly more rational and fits in much better with the Principle of the Conservation of Energy and the facts of observation.

In 1929, Einstein extended his ideas of space-time, otherwise known as the Theory of Relativity, to what he called the unitary field theory. In this theory he had developed a new mathematical formulation which includes gravitation and electromagnetism in a single formula. It thus appears that the forces of inertia, gravitation, and electromagnetism are different manifestations of a single force.

Acceleration of Motion. The time rate of change of velocity either in speed or direction in a moving body. Generally, acceleration means the gain in speed each second or minute; for example, a city street car standing at rest can safely gain speed so that at the end of 10 seconds it is moving at the rate of 15 miles per hour. If this increase is made at a constant rate, the acceleration is 1.5 miles-per-hour per second, or, the gain in speed each second is 2.2 feet per second.

When speed is increasing, the acceleration is called *positive*; when decreasing, it is called *negative*. If the gain in speed is uniform, acceleration is said to be *constant*. All freely falling bodies have constant acceleration. Further, they have the same acceleration; for example, if a piece of metal and a feather are placed in a long tube from which the air has been exhausted, they will fall side by side from top to bottom at exactly the same speed. The acceleration of falling bodies due to gravity is about 32.2 feet-per-second per second. The three chief laws of acceleration are stated as follows:

If the acceleration is constant:

I. The speed acquired is equal to the acceleration multiplied by the time. $s = at$.

II. The distance traversed from rest equals one-half the acceleration multiplied by the square of the time. $d = \frac{at^2}{2}$.

III. The speed equals the square root of twice the acceleration times the distance traveled. $s = \sqrt{2ad}$.

If *force* is defined as *the product of mass times acceleration*, that is, $f = ma$, we have all formulas necessary for calculating distance traveled, acceleration, and acting force, of bodies moving in straight lines. Thus: if an automobile weighing 1 ton can reach a speed of 30 miles per hour in 5 seconds, the acceleration $= \frac{30}{5} = 6$ miles per hour or 8.8 ft. per second, per second. Distance $= 8.8$ ft. $\times 5^2 \div 2 = 110$ ft. Force $= \frac{2000 \text{ lb.} \times 8.8}{32.2} = 546.6$ pounds.

Action and Reaction. Every stress may be considered in two ways. When a book lies at rest on a shelf, the force between the two bodies may be regarded as a pressure down upon the shelf or a pressure upward upon the book. Similarly, when a magnet attracts an iron bar, the force may be considered as pulling the iron toward the magnet or the magnet toward the iron. This double aspect of a stress is known as action and reaction. It is the principle of Newton's Third Law of Motion.

Momentum. The quantity of motion in a moving body. A given impulse might send a rifle bullet a mile in the same time that it could roll a cannon ball a few feet. The speed of the two bodies would depend upon their comparative weights, but their momentum, which is the product of the weight times the velocity, would be equal.

Energy. The energy of any given substance is defined as its capacity for doing work. For some time after the power has been shut off, a heavy flywheel will keep the machinery running. When in motion, therefore, a flywheel can perform work; it possesses energy. The energy of any body resulting from its motion is called *kinetic* energy.

Some bodies have a *capacity* for performing work even when they are not in motion. When a clock spring is wound up, it will drive the clock as it uncoils, by reason of the elastic strain in it. Similarly, a weight can drive a clock because of its elevated position. Inactive energy due to strain or to position is called *potential* energy.

Stress. The internal resistance, or the molecular condition of a substance when resisting an external force. When a weight is suspended from a wire, every part of the wire is subject to an external stretching force which is resisted by an internal contractile force. The wire is in a state of stress which, in this case, is called *tension*.

The foundations of a building must resist the downward pressure caused by its weight, and the upward pressure of the earth. This stress is called *compression*. Across the foundation walls are laid the beams, which must be strong enough to resist *bending*. The transmission shaft of an automobile must transmit the power without *twisting*. The stress known as *shear* is exemplified by the condition that exists in the top of a metallic can during the use of a can opener. The force causing stress tends to deform the substance on which it is acting. The amount of deformation is known as the *strain*.

Pressure. In order to distinguish between pressure and force, it should be held clearly in mind that force means a push or a pull and is commonly expressed in terms of weight, such as pounds or kilograms. Pressure means the push or the pull exerted on a unit area of surface, and may be expressed as pounds per square inch, or grams per square centimeter. In other words, pressure is force per unit area. The difference is well shown by the hydraulic press, in which the force of the large piston is many times greater than that of the smaller, although the pressure on both is exactly equal.

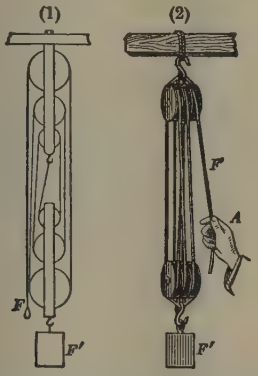
Conservation of Energy. All experiments show that energy can never be manufactured or created anew; neither can it be destroyed, but only transformed and directed in its flow. In practical operations it may often be wasted, as when the friction loss in driving a dynamo consumes energy that otherwise would be transformed into electricity. Energy is never made from anything that is not energy, nor transformed into anything that is not energy. This exceedingly important principle, first stated somewhat indistinctly by Robert Mayer in 1842, is called the law of the conservation of energy. It has become the most valuable and useful generalization in the entire science of physics.

"Perpetual Motion." For centuries, many people have been trying to produce a perpetual motion machine, one that would run by itself without requiring fuel or any other form of external energy. Such an invention would be of immense value to humanity because, as it would do work without using fuel, it would be producing energy from nothing. But, according to the law of the conservation of energy, the energy of the universe is constant. It may change from one form to another but no new energy can be created, nor can that energy which exists be destroyed. Therefore, if no new energy can be created, a perpetual motion machine is impossible.

Transformation of Energy. Throughout nature the various forms of energy, whether kinetic or potential, are continually changing into one another. To illustrate: When coal is burned under a boiler its chemical energy is transformed into heat. A part

of this heat may be changed into potential energy in the form of steam under pressure. In a steam engine some of the potential energy of the steam may be changed into kinetic energy in the flywheel and then into electrical energy in a dynamo. A part of the electrical energy may be transformed into light in an electric lamp, a part into heat in an electric stove, and another part into a cooling breeze from an electric fan.

Simple Machines. There are seven primary mechanical contrivances, usually called the *mechanical powers*. These are based upon two fundamental principles, that of the *lever* and that of the *inclined plane*. The usual grouping is the *lever, wheel and*



A system of pulleys (arranged as in 1) showing (in 2) how a small force at A can lift a large weight at F'.

axle, cord and pulley, and *toothed wheel*, which operate on the principle of the lever; and the *inclined plane, wedge*, and *screw*, which operate on the principle of the inclined plane.

A machine cannot generate force; it can only utilize or transmit the force that is applied to it. The *mechanical advantage* of any machine is the ratio of the resulting force to the applied force. *Work* is defined as the product of force times the distance through which the force acts. The *efficiency* of any machine is the ratio of the work done by the machine to the work applied to the machine. The efficiency of any machine is always less than 100 per cent, because a certain amount of work must be expended in overcoming friction.

The Lever.—There are three classes of levers: (A) those in which the point of support or fulcrum is between the power and the weight; (B) those in which the weight is between the fulcrum and the power; and (C) those in which the power is applied between the fulcrum and the weight. In the first case there is the mechanical advantage illustrated by shears and pliers and in the second that illustrated by the nutcracker. In the third case, which is exemplified by the human forearm, the fulcrum is at the elbow joint, the weight is in the hand, while the power is applied through a tendon from the biceps muscle attached near the elbow. This form of the lever results in a mechanical disadvantage but great rapidity of movement is gained.

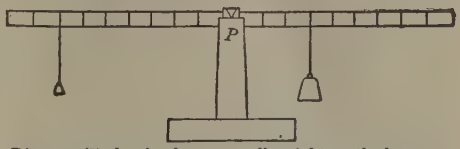


Diagram (3) showing how a small weight on the long arm of a lever can balance a large weight on a short arm.

In all cases the two so-called *arms* of the lever are the distances from the fulcrum to the power and to the weight. The principle of the lever is that the power multiplied by the length of the power arm is equal to the weight multiplied by the weight arm. For this reason, a child on the long end of a seesaw can balance an adult on the short end.

In diagram (3), which represents the simplest form of a weighing machine, the graduated lever or scale is balanced at its middle point *P*. The smaller weight is hung seven divisions from *P*; the larger weight is three divisions from *P*. Therefore, from the principle of the lever, seven times the smaller weight equals three times the larger; that is, the larger weight is ⅞ or 2⅓ times as great as the smaller.

The Pulley. The mechanical advantage of a single fixed pulley is unity, because, if the pulley wheel is considered as a lever with the fulcrum at its center, the power arm and the weight arm of the lever are each equal to the radius of the wheel.

The *block and tackle* is a combination of fixed and loose pulleys, with one continuous rope connecting them, as shown in diagrams (1) and (2). In these diagrams, each block contains three movable wheels or sheaves. The mechanical advantage of such an arrangement is the same as the number of lines leading to the loose pulleys attached to the weight. Examination of diagram (1) shows that the rope forms seven vertical lines, but that one of these leads from the upper fixed pulley to the smaller weight F. There are, then, six lines supporting the weight. Neglecting the loss due to friction and to the weight of the loose pulleys, a weight of one unit at F will balance a weight of six units at *F'*. Or, a pull of 20 pounds at *A* (diagram 2) will raise a weight of 120 pounds at *F'*. But, in raising the 120 pounds one foot, each of the six supporting lines must be shortened by the same amount, so that the 20-pound force applied at *A* must move through six feet.

$$6 \times 20 \text{ pounds} = 1 \times 120 \text{ pounds}.$$

That is to say, while one pound applied at *F* can balance six pounds at *F'*, the work done in pulling on the rope is exactly the same as that performed by the mechanical arrangement in raising the weight.

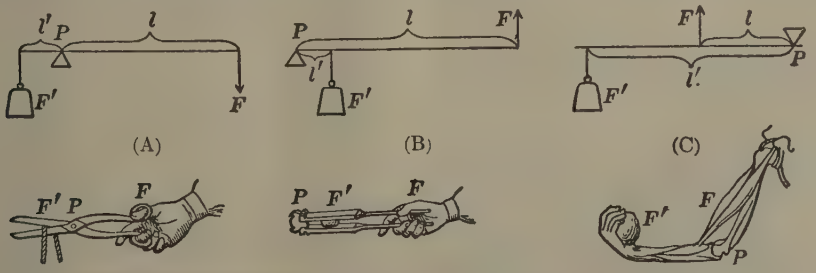


Diagram illustrating the three classes of levers where P is the fulcrum, F the power, and F' the weight; l is the power arm and l' is the weight arm.

Inclined Plane.—The principle of the inclined plane is applied in rolling barrels upon a wagon or in loading logs upon a sled. The use of an inclined plank or skid does not lessen the total work of lifting up the load, but it lengthens the distance traveled on the way up so that a smaller power used for a longer time does the work. The wedge, which is a double inclined plane, similarly gives added power at the expense of speed. The principle of the wedge is applied in a great variety of ways; for example, wedges are used in splitting logs, in quarrying stone, in fastening axes to their handles, and in locking up type for printing. The screw is essentially an inclined plane wound spirally around a cylinder. The principle of the screw is applied in the screw propeller for ships, in the lifting jack or jackscrew, and in fine measuring instruments, such as the micrometer.

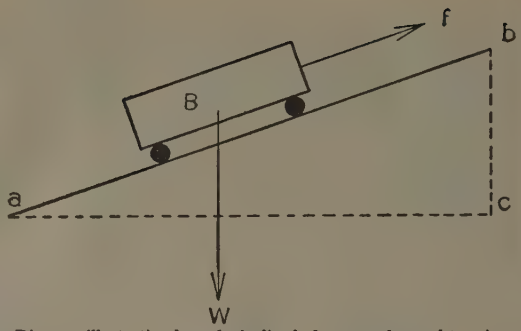


Diagram illustrating how the inclined plane may be used to raise a heavy weight by means of a small force.

Mechanical Movements.—A mechanical movement is some combination of the foregoing simple machine elements. Among the simplest forms are the familiar crank, cam, piston rod, and cylinder. Others are the rack and pinion, gear wheel and worm, the clutch of an automobile engine, and the escapement of a clock or watch. From the seven fundamental contrivances are derived some 750 more or less simple combinations which include practically all of the devices used in building modern machines and in engineering work.

Hydraulic Machines. Many machines involve more than the simple elements, the lever, and the inclined plane. Some, such as the *water wheel*, *hydraulic press*, and *hydraulic elevator*, make use of liquids.

These are called hydraulic machines and depend upon the principle announced by Pascal (1623–1662) that a liquid in a closed vessel transmits pressure equally in all directions. The most valuable application of this principle is the hydraulic press which Pascal clearly described thus: "If a vessel full of water, closed in all parts, has two openings of which the one is a hundred times the other, placing in each a piston which fits it, the man pushing the small piston will equal the force of a hundred men who push that which is a hundred times as large."

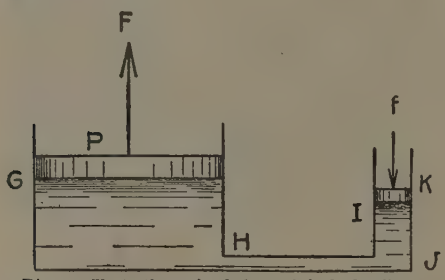


Diagram illustrating a simple form of the hydraulic press where a small force applied on piston K is capable of exerting a large force on piston P.

The *hydraulic press* offers a convenient means of exerting enormous forces, such as are required in baling cotton, punching holes in metal plates, and pressing oil from seeds. It should be remembered, however, that if the large piston has 100 times as much surface as the small one, it is lifted only $\frac{1}{100}$ of the distance that the small piston is pushed down. Neglecting friction, the product of the great force times the small distance through which it moves equals the product of the small force times the large distance which it has to travel. The input equals the output, just as when using the lever, wedge, or other simple device to obtain mechanical advantage. A machine can never give out more power than is put into it.

Hydraulic elevators for lifting immense weights are constructed on the same principle. When speed is demanded, as in elevators for high office buildings, the motion of the hydraulic piston or plunger is transmitted by a cable working over a series of pulleys which increase the speed of the elevator cage to four or more times that of the plunger.

SOUND

In ordinary language, sound is that which is recognized by the sense of hearing. It is the sensation produced in the auditory nerve centers by vibrations communicated through the ear. These vibrations have their origin in some vibrating body and are transmitted by some medium, commonly the air. When these vibrations are of uneven quality and irregular in number per second, they produce harsh sounds or *noises*. Vibrations which are even in quality and regular or uniform in number per second give rise to smooth, pleasing sounds, called *musical tones* or *musical notes*.

Acoustics (*ȧ-kōōs'tĭks*). The science of sound. This branch of physics undertakes to explain how sound is produced, how it is propagated through the air or other sound-conveying medium, and how it affects the sense organs of the ear, thereby giving rise to the sensation of hearing. It considers, too, the various properties of sound, such as quality, pitch, and loudness, including also musical sounds, resonance, reverberations, and echoes.

Nature of Sound. The propagation of sound is somewhat similar to that of light, both being caused by vibrations which produce successive waves in the transmitting medium. In ordinary cases of hearing, the vibrating medium is the air; but all substances capable of vibrating may be employed to produce and to convey sound. Sir Isaac Newton was the first to prove that the propagation of sound through any medium depends upon the elasticity and the density of that medium.

Production of Sound. If a violin or guitar string be pulled and let go, it will be seen to tremble or quiver, that is, to vibrate, and, at the same time, a sound will be heard. Similarly, if a bell be struck by its clapper, the whole bell will vibrate and again a sound will be heard. Yet, neither the string nor the bell moves permanently out of its place. Only the elastic particles of which they are composed vibrate backward and forward. Such vibrating motion, nevertheless, has power in it and can deliver a blow.

Upon touching a vibrating string or wire with the fingers, one feels a rapid succession of little thrusts

or blows. These will be felt so long as the vibrations continue. Such a vibrating body imparts these same blows to the air. Possessing elasticity, the particles of the air, upon being hit, in turn strike the particles of air next to them. This process continues until the air for a long distance may be thus put into vibratory motion. When such vibrations reach the ear, we commonly say that a sound has been heard.

Sound Waves. From the foregoing it is seen that when a body capable of producing sound is struck, it communicates its vibrations to particles of the surrounding air. It thus starts what becomes a series of vibrations or sound waves, proceeding outward from the sounding body. Some of these at length reach the ear of the listener. Outside of the ear there is no such thing as sound but only sound waves, capable, however, of producing upon the auditory nerves the sensation called sound.

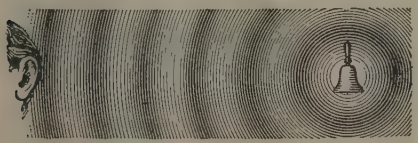


Diagram illustrating the progress of sound waves through the air.

Light can traverse a vacuum, as is proved by a radiant electric light bulb. But sound cannot do so because there can be no sound waves in the absence of an elastic medium to transmit them. If an electric bell be suspended in the receiver of a vacuum pump and set to ringing, the sounds become fainter and fainter as the air is pumped out. Upon letting the air into the receiver again, the sounds gradually become as loud as at first. A similar effect is experienced on very high mountains where the air is thin. It is said that a revolver fired at the top of Mont Blanc makes about as much noise as a firecracker at the sea level.

Other gases besides air convey sound, and liquids and solids are even better carriers of sound than are gases. A railway train can be heard when a long distance away by putting one's ear against the steel rail. Similarly, very loud sounds, such as those of cannon or of volcanic eruptions, may be heard at a distance of several hundred miles by putting one's ear to the ground.

Propagation of Sound. When a sound is produced in the open air, unimpeded by obstacles, it spreads uniformly in all directions in ever enlarging spherical waves. In general, the intensity of these waves varies inversely as the square of the distance from the sounding body. The speed with which sound travels is not influenced by loudness, pitch, or quality, but depends entirely upon the nature of the propagating medium. Sound travels more rapidly in liquids than in gases, and more rapidly in solids than in liquids. It travels slightly faster in warm or hot air than in cold air. The increase in speed is a little more than 13 inches per Fahrenheit degree.

Refraction of Sound. Just as rays of light are bent or refracted in passing from one medium to another of different density, so sound waves are also bent or refracted when passing from one medium to another in which the rate of speed is different. This sometimes gives rise to curious effects; for example, a rising column of heated air will at times so refract sound that persons speaking on opposite sides of it cannot hear each other's voices.

Reflection of Sound. When a sound wave strikes against a building, cliff, wooded hillside, or sometimes even a cloud, it is turned back or reflected, just as a rubber ball rebounds when thrown against a wall. Upon reaching the ear, the returning sound wave produces what is called an *echo*. In case the reflecting wall is situated at a short distance, the echo will be heard almost as soon as the sound. In some audience rooms the intensity of the echo may so confuse the hearer as to become an acoustic defect. This can often be overcome by placing sound-absorbing materials upon the reflecting walls. The greater the distance to which sound is reflected, the more time will elapse before the returning sound waves reach the ear, and the more distinct the echo will become.

In case of parallel walls, as in deep, narrow canyons, or in case of sound-reflecting objects situated at different distances, the echo is often multiplied or repeated, so that the same sound may be heard several times. The long continued roll of thunder is caused in part by the reflection of sound from a succession of clouds or mountains. The arched ceilings and curved walls of buildings sometimes so reflect and concentrate sound that it is possible to hear a whisper or a pin drop at very distant points in the interior, as, for example, in the Tabernacle at Salt Lake City.

Velocity of Sound. Compared with the tremendous velocity of light, sound travels very slowly. Seeing the steam from a distant whistle and later hearing the sound, seeing the flash or smoke of a distant gun and later hearing the report, seeing a distant flash of lightning and later hearing the thunder, are familiar illustrations showing how sound travels much more slowly than light. Under average conditions the speed of sound in the air is about 1087 feet a second, nearly 5 seconds to the mile, or slightly more than 12 miles a minute. In heavy gases, sound travels more slowly than in air, its speed in carbon dioxide being about 866 feet a second. In hydrogen gas, however, which is very light, its speed is about 4200 feet a second. The speed of sound in water, about 4700 feet a second, is more than 4 times its speed in air. In pine wood, sound travels 10 times; in copper, 11 times; in steel, nearly 15 times; in aluminum, more than 15 times; and in glass, nearly 17 times as fast as in air.

Kinds of Sounds. With respect to their character, sounds may be musical or nonmusical. A musical sound is produced by a regular series of exactly similar sound waves or pulses, succeeding each other in precisely equal intervals of time. In case sound waves are irregular, and do not occur in equal intervals of time, the resulting sound is a noise.

Musical Sounds. A musical sound has three characteristics—intensity or loudness, pitch, and quality. The loudness of a musical note or tone depends upon the degree to which it affects the ear. In general, the intensity of any sound decreases as the distance from the source increases, and as the density of the air decreases. But, at a given distance for a given ear, the intensity of a musical sound is determined by the amplitude of vibration of the sound waves. A tuning fork or a piano string produces a louder or more intense sound when struck hard than when struck lightly.

The pitch of a musical note depends upon frequency of vibration, and may be stated in number of vibrations per second. Thus a standard A tuning fork makes 435 vibrations per second. The quality or timbre of a note depends upon the number and character of the overtones or "harmonics" as they are sometimes called. These are characteristic of the bodies which produce the sound. By the quality of tone, we distinguish between the violin and the human voice. Similarly, we distinguish also between different violins and between different voices.

Audibility of Sound. The sounds audible to the normal human ear range in pitch from about 16 to 30 vibrations a second for the lowest and from 15,000 to 30,000 for the highest. Children are able to hear sounds of a much higher pitch than older

people. For musical purposes the extremes of pitch are from about 40 to 4000 vibrations per second. Sounds very much higher in pitch than the human ear can detect are audible to some animals.

Resonance. The property of a sounding body which enables it to take up the vibrations of another body and to vibrate sympathetically in unison with it. Various hollow vessels, boxes, or other apparatus containing columns of air which will exhibit this property are called resonators. The singing voice is much modified by the resonating property of the mouth cavity, a fact made use of by all good singers.

Reverberation. The continuance or prolongation of sound in a room for some seconds after a sounding body, such as an organ pipe, has ceased to vibrate. The acoustic success of a hall depends largely upon the length of its reverberation. In a music hall or opera house this should not exceed about 2½ seconds. The elements or factors which determine reverberation are the volume of the room, the material used in its walls and floors, the kind of furnishings and cushions, the size of the audience, and, to some degree, the intensity of the sound.

Doppler's Principle. In case a sounding body, such as a whistling locomotive, is approaching a listener, the pitch of the note is higher than when the source of the sound is at rest, or receding. In other words, the frequency of the sound waves is apparently increased when the source is approaching, and decreased when it is moving away. This principle holds true also regarding light. If a star or the edge of the rotating sun is approaching the observer rapidly, the color seen by the eye is shown by photography to have been shifted slightly toward the blue end of the spectrum. The actual change in wave number can be measured. This affords a method of estimating the velocity of the star in the line of sight or of estimating the velocity of rotation of the sun.

HEAT

Heat is a form of radiant energy which differs from light in the rapidity of its vibrations and in their effect upon the organs of sense. In ordinary language the term heat is used in several different meanings, of which the following are the most common: (1) sensation of heat; (2) degree of heat or temperature; (3) quantity of heat; (4) radiant heat.

The *sense* of heat is distinct from that of touch; for the former is experienced if one sits in front of a fire, in the sun, or near any hot body, and, therefore, is not dependent on actual contact with a heat-giving substance. From this is derived the idea that heat is something which is capable of passing from one body to another.

In case a hot iron is placed upon a cold iron plate, it may be observed by the sensation of heat that the plate is heated and the iron cooled until they both attain the same *degree* of warmth. From sensations of heat are derived the idea of a continuous scale which is expressed in such terms as summer heat, blood heat, red heat, or white heat. By the *temperature* of a body is meant its place in the scale of heat as distinct from the quantity of heat it may contain.

The *quantity* of heat in a body depends upon its size, its temperature, and also upon the material of which it is composed. The temperature of a body, however, does not depend upon its size, but upon the quantity of heat in each unit of its mass, other things being equal. When the rays of the sun or of a fire fall on a body, they warm it. It must not be supposed, however, that heat has traveled across the space between the sun or between the fire and the body warmed. What has traveled is *radiant energy* in the form of wave motion and is liberated as heat when it strikes an absorbing body.

Sources of Heat. The most important source of heat is the sun, but the interior of the earth also is hot and contains a vast supply of heat. As yet the latter of these sources has not been used directly to obtain the heat used in warming houses or in running engines. Usually such heat is produced by burning wood, coal, oil, or gas. However, even this heat comes indirectly from the sun, having been stored up as chemical energy in the plants which grew in the sunlight of past ages.

Friction also produces heat, as when a match is scratched or when two pieces of ice are caused to melt by rubbing them together. In fact, whenever mechanical energy is apparently lost, heat usually is evolved. Heat is also produced by chemical action, as when lime is slaked by uniting with water, or when various food elements are oxidized in the body, producing what is called *animal* heat.

For directly utilizing the sun's heat, the so-called solar engine has been developed to a considerable extent. This machine is being used successfully to pump water from the Nile river for irrigation purposes. By means of suitable mirrors, sunlight is concentrated on coils containing water, thus producing steam for the engine. This type of engine is destined to have a much larger use. See *Radioactivity*; *Sun*; *Temperature, Atmospheric.*

Nature of Heat. There is much evidence that heat is a rapid vibratory motion of the molecules of which substances are composed or of the ether which is assumed to fill the space between substances. According to this view, the molecules in a hot flatiron are vibrating more rapidly than when the flatiron is cold. Moreover, this vibration extends to the surrounding medium into which it is sent out in straight lines as radiant heat.

When iron is heated to a temperature of 550° C. it becomes red hot and at 1300° C. it becomes white hot. The iron, before it begins to glow, is emitting dark or *invisible* heat rays, but, when it reaches red heat or white heat, it is also sending out visible heat rays, that is, light rays. It has been proved that these heat rays and light rays differ only in the rapidity of their vibratory motion which produces different effects upon the eye and upon other sense organs.

When these vibrations are less than 400 trillion per second, they are recognized as *heat.* When, however, these vibrations are between 400 and 800 trillion per second, the eye recognizes them as *light.* Light waves possess heating properties if absorbed by a suitable substance. Experiments show that the two sets of waves differ only in degree, that is, in length, and not in kind. Thus, heat and light are both held to be forms of radiant energy, which travels, as does electricity, at the enormous speed of 186,300 miles a second. Most scientists believe that both heat and light are electromagnetic in character.

In accordance with the foregoing theory, the expansion of bodies when heated is caused by the more violent vibration or motion of their molecules, which require more space in which to move about. When a certain temperature is reached, this motion becomes so violent that the molecules in a solid body break away from their former position and the body changes its state or *melts.* Similarly, when the motion of the molecules of a liquid becomes sufficiently violent they break away from their former position and the body changes its state or *boils* and the liquid becomes a gas or vapor.

By the continued increase of heat, a solid may first become a liquid and then a gas. These are *physical changes* in the state of a body, caused by the increased motion of its molecules. Through the action of heat, various chemical compounds split up into other compounds, or decompose into their simple elements, and, vice versa, many simple elements unite into compounds. These are *chemical changes* in the composition of substances effected by the increased motion of their molecules. See *Electricity, Nature of Light.*

Expansion by Heat. In general, all substances, whether solids, liquids, or gases, expand when heated and contract when cooled. While in solids the amount of expansion is not large, nevertheless, when expanding or contracting they may exert enormous force. In the construction of steel bridges, for example, unless proper allowance for expansion is made, huge bolts may be snapped off and even great girders warped by changes between winter temperature and summer temperature.

The rate of expansion varies greatly in different metals; for example, platinum expands less and zinc more than other common metals. Invar or nickel steel changes less than $\frac{1}{14}$ as much as ordinary steel. Between extreme summer and winter temperatures a steel rail 33 feet long will vary in length about a fourth of an inch. In a mile of rail this amounts to about 40 inches. Owing to expansion by heat in summer, clock pendulums become longer and balance wheels in watches become larger, causing them to run slower. Such errors may be compensated by proper combinations of metals having different rates of expansion.

Liquids expand by the action of heat much more than do solids. A given amount of water, when heated from the freezing point to the boiling point, will expand four per cent of its volume or ten times as much as the same volume of steel under the same temperature conditions. Kerosene, other oils, and alcohol expand more than water. As in case of solids, liquids expand with tremendous force, and, if confined, exert enormous pressure on their surroundings. Water differs from other liquids in one important point regarding expansion. Instead of contracting uniformly from the boiling point to the freezing point, it becomes denser at about 4° C. above the freezing point. In consequence, water expands upon freezing, so that ice is lighter than water. This is a fact of great importance in the economy of nature.

The expansion of gases by heat is remarkable in two ways: first, it is very large, being about nine times as much as the expansion of water; and second, the rate of expansion, unlike that of solids and liquids, is nearly the same for all gases. It is found that no matter what the gas, whether air, acetylene, or hydrogen, it expands about $\frac{1}{273}$ of its volume at zero Centigrade for each degree of rise in temperature.

Further, it has been found that the pressure of any gas kept at a constant volume increases for each degree of rise in temperature very nearly $\frac{1}{273}$ of the pressure at zero. From the foregoing it is evident that by measuring the increase in volume of a gas under constant pressure or the increase of pressure under constant volume, a very precise method of determining temperature is afforded.

Expansion in Freezing. As a rule, liquids contract when changing to the solid state. There are, however, some important exceptions. A familiar example is water which expands in freezing so that 100 cubic feet of water becomes 109 cubic feet of ice. The expansive force of water in freezing is enormous. During winter this causes water pipes to burst, pavements to heave, and, in the mountains, splits great rocks asunder.

Some metals, such as cast iron, expand slightly when solidifying. By reason of this property they are well adapted for making castings. Good type metal is an alloy composed of lead, copper, and antimony, which expands in casting so as to fill very sharply every part of the mold.

Degree of Heat, or Temperature. A deep cellar may seem cold in summer and warm in winter, and yet remain at nearly the same temperature. Again, cold moist air feels *colder* than cold dry air but warm moist air feels *warmer* than warm dry air. Consequently, the physical sensation is exceedingly unreliable for determining the actual *degree* of heat. In order to indicate exactly how hot or how cold things are, it is necessary to use an instrument which will record their temperature uninfluenced by other conditions. Such an instrument is called a *thermometer*, the common forms of which are constructed on the principle that gases and liquids expand upon being heated and contract upon being cooled.

Thermometer. To obtain a standard for the measurement of heat, the volume of a gas or a liquid, such as hydrogen or mercury, when confined at the bottom of a narrow tube, is taken at the freezing point of water and again at its boiling point. The distance between these points is divided in a number of equal parts, forming the *scale* of the thermometer. For the Fahrenheit scale, in common use in North America and in England, the freezing point of water is marked 32 degrees, the boiling point 212 degrees, the difference being 180 degrees, while zero is marked 32 degrees below the freezing point.

For the Centigrade scale, employed in scientific work, and in common use in many countries, the freezing point of water is marked zero and the boiling point 100 degrees. Higher and lower temperatures are measured according to these same scales of degrees, various forms of thermometers, making use of suitable liquids and gases, being employed for the purpose. The range of temperature is from *absolute zero*, $-273°$ C. or $-459°$ F., to about 22,000° C. or nearly 40,000° F., the surface temperature of some of the hottest stars. The temperature at the center of stars of average mass is estimated to be upward of 40,000,000° C.

Absolute Zero. The lowest possible temperature; the degree of cold supposed to prevail in interstellar space. To this temperature it is believed all substances on the earth would fall, in case the heat now received from the sun and other sources should be withdrawn. The determination of this zero point is best arrived at by studying the relation between the pressure and the temperature of a gas.

If a given mass of air or hydrogen or any other more or less perfect gas is maintained at constant volume and exerts a pressure of 273 millimeters of mercury at zero degrees Centigrade, it will exert a pressure of 272 millimeters of mercury if cooled one degree. If cooled 10 degrees to $-10°$ C., the pressure will fall to 263 millimeters, and will vary similarly for all observed temperatures, the volume being constant. In other words, for each degree Centigrade of cooling, every gas at constant volume loses $\frac{1}{273}$ of the pressure it exerts at the freezing point of water. In case such a mass of gas should continue to cool indefinitely, it follows mathematically that, upon being cooled 273 degrees, it would exert zero pressure upon the walls of the containing vessel.

It is known that a gas at ordinary temperatures consists of a large number of molecules which are endowed with a continual translatory movement. Further, it is known that the pressure which a gas exerts upon the walls of the containing vessel is due to the bombardment of the walls by these moving molecules. Hence the conclusion that when no pressure is exerted the molecules have come to rest. Moreover, as has been shown, the motion of these molecules depends upon the temperature. If, then, it be assumed that the lowest possible temperature imaginable is the one at which the molecules have lost their motion of translation, it follows that the zero of temperature is 273 Centigrade degrees below the freezing point of water. This is the *absolute zero* because it represents the absence of all heat. Temperatures reckoned from this point as zero are called *absolute temperatures*.

In actual experiment, however, no gas has ever been cooled to so low a temperature as $-273°$ C. Every known gas becomes a liquid before reaching this point. With liquid air, temperatures as low as $-200°$ C. may be obtained, and with liquid hydrogen, $-258°$ C. The boiling point of liquid helium is $-268°$ C., which is within 5° of the absolute zero, and the freezing point of liquid helium is below $-271°$ C., or within 2° of the absolute zero.

Freezing Point. The temperature at which a liquid changes to the solid state or freezes. In the case of a metal, the fusing point or melting point is also its freezing point. It is the point at which the metal changes from the liquid to the solid condition when the temperature is decreasing, and from solid to liquid when the temperature is increasing. The freezing point, like the boiling point, is affected by changes in pressure. Glaciers melt at the bottom owing to the immense weight of superimposed ice. This causes their flow, though the flowing temperature may be many degrees below 32° F.

Melting Point. Melting is the change of physical state which takes place when a solid is converted to a liquid by the action of heat. Each pure substance begins to melt at a definite temperature which is constant for that substance under the same conditions. This temperature is called the melting point. Thus the melting point of ice is zero C. or 32° F. Where a high temperature is required to melt a substance, the term fusing point is often used.

Alloys show great differences in melting points; for example, 93 parts bismuth with 7 parts lead melts at 479° F., but 44 parts lead with 56 parts bismuth melts at 253°. See *Table of Chemical Elements*.

Boiling Point. The temperature at which a liquid, under the ordinary pressure of the air, bubbles as it is converted into vapor. It may also be defined as the temperature at which the vapor pressure of a liquid equals the pressure of the atmosphere. If the pressure on the surface of a liquid is increased, the temperature must be raised before it will boil.

Under the normal pressure of the air, about 15 pounds to the square inch, water boils at 100° C. or 212° F. But under a pressure of two atmospheres, or about 30 pounds to the square inch, the boiling point rises to 250° F. If the pressure is reduced, the boiling point is lowered; for example, in the city of Mexico, which is situated at an altitude of 7400 feet, water boils at about 200° F. In a vacuum, however, water boils below 98° F., so that the heat of the human hand will cause its bubbling.

Each liquid has its own boiling point, and, as in the case of water, these vary with the pressure. Under normal pressure the boiling points of various liquids are as follows:

TABLE OF BOILING POINTS

SUBSTANCE	Temperature Centigrade	Temperature Fahrenheit
Hydrogen	−253° C.	−423° F.
Nitrogen	−196° C.	−321° F.
Oxygen	−183° C.	−297° F.
Carbon dioxide	−78° C.	−108° F.
Ammonia	−38° C.	−37° F.
Sulphur dioxide	−10° C.	14° F.
Ether	35° C.	94° F.
Chloroform	61° C.	142° F.
Alcohol	78° C.	173° F.
Water	100° C.	212° F.
Mercury	357° C.	675° F.
Sulphur	445° C.	832° F.
Zinc	918° C.	1684° F.

Quantity of Heat. In purchasing a ton of coal, what does one receive for the money? It might be said that of the 2000 pounds of material about 40 pounds is water, 140 pounds is ash, and the remainder mostly carbon and hydrogen. What is important, however, is not the sort of material in the purchase but the amount of heat it contains. As heat is a form of energy and not a substance, it cannot be measured in gallons or pounds but only by the effect that it can produce. If all the heat produced by completely burning a pound of hard coal could be used to heat water, it would raise the temperature of about 7 tons of water one degree Fahrenheit. This indicates a way or method of comparing or measuring quantities of heat.

British Thermal Unit.—The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit. This is the unit used by engineers in reckoning heat values. Thus, the heat value of a pound of coal ranges from 11,000 to 16,000 such units. A pound of petroleum yields about 25,000, a pound of gasoline about 19,000, and a pound of dry wood about 5000 British thermal units.

Calorie.—The amount of heat required to raise the temperature of a gram of water one degree Centigrade. This metric heat unit is in common use in Europe and in all physical and chemical laboratories.

Specific Heat.—A kettle of water placed upon a stove becomes warm much more slowly than a flatiron of the same *weight*. The heat required to warm a quart of water one degree will warm the same weight of copper 10 degrees, of silver or tin 20 degrees, and of lead or mercury 30 degrees. The number of calories required to raise the temperature of a gram of any substance one degree Centigrade is called its specific heat. The specific heats of some common substances are as follows:

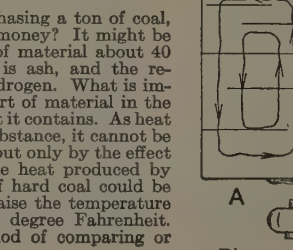
TABLE OF SPECIFIC HEATS

Water	1.00	Sand	0.19
Pine Wood	0.65	Iron	0.12
Alcohol	0.60	Copper	0.094
Ice	0.50	Zinc	0.093
Aluminum	0.22	Mercury	0.033

Transmission of Heat. Heat passes from one substance to another in three ways, (1) by conduction, (2) by convection, (3) by radiation.

Conduction of Heat.—When the bowl of a silver spoon is placed in hot coffee, the handle soon becomes hot, and, when an iron poker is put into a fire, the other end will soon burn the fingers. Yet, if a wooden rod is thrust into a fire, very little warmth can be felt at the other end. From this it is said that silver and iron *conduct* heat readily, while wood conducts heat to a much less extent. The property of transmitting heat in this way is called *conductivity*.

The metals, as silver, copper, iron, and lead, are *good conductors* of heat when compared with the nonmetals. Various substances, such as wool, fur, stone, glass, wood, and ashes, are *poor conductors* of heat, and, for this reason, they are called heat *insulators*. However, even metals vary greatly in their power to conduct heat. The best conductor is silver, followed by copper, gold, zinc, tin, steel, iron, and lead among the better known metals. Liquids are much poorer conductors of heat than solids, and gases are poorer conductors of heat than liquids; for example, iron conducts heat 100 times as well as water, while water conducts heat 25 times as well as air. Substances which are good conductors of heat are also good conductors of electricity.



Diagrams illustrating convection currents in a liquid.

Convection of Heat.—If heat be applied to the top of a column of a liquid or gas, the temperature at the bottom will change very slowly. This is due to the fact that liquids and gases are poor conductors of heat. But, if heat be applied to the bottom of the column, the lower layers upon becoming warmed will expand and rise to the top. They will then be replaced by other portions which will rise in their turn, thus producing a circulation and a general warming of the entire column. This process is called the convection of heat.

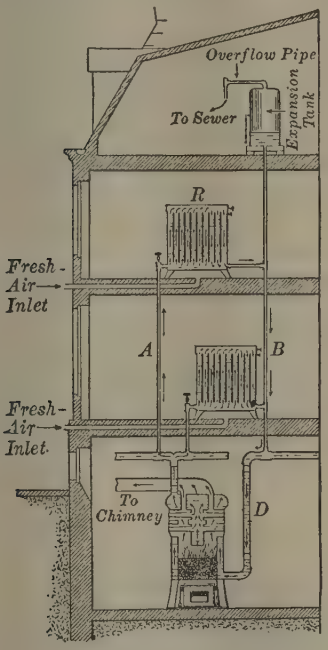


Diagram illustrating the principle of convection in a hot-water heating system.

All systems of heating and ventilating depend upon convection currents. These currents, in their turn, depend upon the expansion of liquids and gases. In a convection current the warmer, and hence the lighter, fluid is pushed upward by the heavier surrounding substance, just as wood is pushed to the top of water. The draft in a lamp, stove, furnace, fireplace, or factory chimney is the upward pull of a convection current. The hot water heaters attached to kitchen ranges and furnaces, the hot water system of heating houses, as well as the hot air system of heating by furnaces, all depend upon the principle of convection. Winds and other atmospheric movements are largely caused by convection currents.

Radiation of Heat.—If a hot flatiron be hung up in a room, the heat can be felt when the hand is held *under* it. Yet this transmission of heat cannot be due to convection, which would cause the heated currents of air to rise from the flatiron. Further, it cannot be due to conduction, because gases are very poor conductors of heat. Whenever a hot body not in actual contact with conducting bodies becomes cool, it is said to *radiate* heat, or to become cool by *radiation.*

By experiment it is easily shown that heat rays, like light rays, travel in straight lines, that they may be reflected by a mirror, or refracted to a focus by a lens, as in a burning glass. Some substances, as, for example, air or glass, allow the heat rays of the sun to pass through them and are themselves warmed only slightly by radiant heat. Other substances, such as water, do not permit heat rays to pass through and hence are warmed by radiant heat.

A highly polished surface, such as a mirror, is a good reflector of heat, and yet it remains cool. Usually, reflecting or white objects absorb radiant heat slowly, while rough or black objects absorb heat rapidly; for example, fresh clean snow melts slowly in the sun but sooty or dirty snow melts quickly. Good absorbers of heat are good radiators and poor absorbers are likewise poor radiators. A sooty black surface will radiate heat 20 times more rapidly than highly polished silver. This is illustrated by the fact that water boils sooner in a teakettle with highly polished sides than in one that is dull and rough.

Latent Heat. Heat energy is required to make a solid melt or to make a liquid turn to vapor. While a solid is turning into a liquid or a liquid into a gas, a considerable amount of heat is absorbed. This phenomenon may be observed in the following illustration.

In case a dish containing ice and water is kept in a room where everything else is at zero, the ice will not melt nor will the water freeze. Should the room become warmer, the ice will melt, but the temperature of the mixture will remain at zero until all of the ice has disappeared. The heat from the surrounding air does the work of melting the ice, and only after enough is absorbed to change all of the ice to water will the temperature of the liquid begin to rise. The amount of heat which seems to disappear when a solid changes to a liquid is known as the *latent heat of fusion.*

This heat is not lost but is given off when the liquid again becomes solid. Experiments show that the heat required to change one gram of ice to water at zero is 80 calories, or enough to raise the same gram of water from 0° to 80° C. Even more heat is required to change the water to steam. One hundred calories will bring the temperature of the melted ice from 0° to 100° C., but, to change the water at 100° C. to steam of the same temperature, about 540 calories are required. This means that it takes more than five times as much heat to turn water, already heated to the boiling point, into steam as it does to raise the temperature of the same amount of water from the freezing point to the boiling point.

The reason why so much heat is required to vaporize a gram of water is because the steam occupies 1600 times the volume of the water under the same conditions of pressure and temperature, most of the energy being used up in separating the molecules.

When steam is condensed, as in a radiator, the absorbed heat is again given off. The heat required to change a liquid to a vapor of the same temperature is known as the *latent heat of vaporization.*

LIGHT

Light is the form of radiant energy which excites the sense of vision in the eye and thus makes visible the objects from which it comes. Experiment shows that light is a transverse wave motion traveling with a finite velocity through a medium called the ether. It seems necessary to assume a medium, for, if light is undulatory, something must undulate. All wave motion has its source in some vibrating body; in the case of light, that body is the electron. Electrons of different frequencies of vibration give different colors, just as different frequencies of vibrating strings give different tones in music.

Light comes from luminous bodies, such as the sun and the stars in the heavens; from intensely hot substances on the earth, such as burning wood, coal, oil, and gas; from the electric arc; and from incandescent electric lamp filaments. Some plants and animals give out light. Examples are various bacteria, fungi, glowworms, fireflies, jellyfish, and

also the myriads of minute creatures in the sea which cause the waves to shine and sparkle with phosphorescence. Light is also produced by some chemical reactions other than burning, and by mechanical and electrical processes other than heating.

Light also comes from bodies or substances which are not luminous, as the moon, houses, and trees. However, these are seen only because of the light which they reflect from an external source. When looking at the sun, the light comes directly to the eye. When looking at a house, the light has come first from the sun to the house, and then from the house to the eye, thus making visible an object which itself does not produce any light.

Light often glances or is reflected in the foregoing manner many times before it reaches the eye. Suppose one sees a tree by moonlight. Neither the tree nor the moon of itself gives off light; neither can be seen unless light from some luminous body falls upon it. The light of the sun has been reflected by the moon to the tree, and then by the tree to the eye. If one holds a mirror so that the tree can be seen in it, the light from the tree will have been again reflected or turned out of its course by the mirror.

The light thrown off by a luminous body is emitted from it in straight lines. Each of these advancing lines is called a *ray* of light. When a sunbeam shines into a dark room through a small hole in the shutter, its path will be seen to be straight. By placing a mirror in this path and turning it in various directions the beam can be drawn or reflected to any part of the room. Its path after leaving the mirror, however, will again be seen to be straight. Similarly, it has been found that while light rays may be bent and their direction totally changed when falling upon a different substance, their path in the same substance or medium, such as air, water, or glass, is always in straight lines.

Like sound, light travels from a source equally in all directions, and its intensity or brightness varies inversely as the square of the distance from the source. A sheet of paper a foot square, for example, placed two feet away from a candle will receive only one-fourth as much light as when placed only one foot from the candle, and if placed three feet distant will receive only one-ninth as much as when placed at one foot from the candle.

Nature of Light. There have been two leading theories regarding the nature of light, the *corpuscular* and the *undulatory*. The former was advanced by Sir Isaac Newton (1642–1727), but was abandoned by scientists early in the 19th century. According to the corpuscular theory, light consists of streams of very minute particles, or corpuscles, projected with enormous velocity from all luminous bodies. The undulatory theory, first worked out by Huygens (1629–1695) of Holland, was established about 1815 by the experiments of Fresnel (1788–1827) of France, and by Young (1773–1829) of England. This theory holds that light, like sound, is propagated by means of waves in an all-pervading elastic medium.

As now amplified and developed, the undulatory theory considers that light is a vibration of the luminiferous ether which is presumed to fill all space; that both light and heat are forms of radiant energy; and, as light waves and electric waves travel with the same speed and are reflected and refracted in the same manner, that light waves are, in reality, *electric waves*. Experiments show that light waves are *transverse*, that is, the motion is perpendicular to the direction of their propagation.

It is now possible to measure directly the length of the waves of light of different colors and to show that the waves of red light are longest and that those of violet light are shortest. The average wave length in a beam of white light is about $\frac{1}{45000}$ of an inch. See *Electricity*, *Nature of Heat*.

Properties of Light. The commonest experiences of seeing are those of *visibility* or *intensity* of light, and those of *color* or *quality* of light. The study of the intensity of light is called *photometry*. The study of color involves the *composition* of light and the analysis of the *spectrum*.

When light falls upon any substance it may be returned by *reflection*, as in a mirror; it may suffer *absorption*, as when white light strikes red glass; or it may be transmitted and undergo *refraction*, as in the lenses of a telescope. White light may undergo *dispersion*, as when a sunbeam is spread out into a spectrum of colors by a prism. When brilliant colors are seen in oil films on water, the effect is the result of *interference*. In case light rays are separated into two kinds, as by crystals of Iceland spar, *double refraction* results and the emerging rays show *polarization*. When light falls on an opaque body, a *shadow* is cast, the full explanation of which requires the study of *diffraction*, or the bending of light caused by narrow openings. Some substances react on various luminous radiations, producing *calorescence*, *fluorescence*, and *phosphorescence*.

The properties and laws of light govern the construction of all optical instruments, including mirrors, lenses, spectacles, the telescope, microscope, photographic camera, stereoscope, stereopticon, and moving picture machine. Optical principles explain the rainbow, corona, halo, mirage, twilight, and the color of the sky.

Speed of Light. It was formerly believed that light travels instantaneously, that its speed is infinite and, therefore, no time is consumed by the passage of light between two points.

About 1675, Ole Roemer, a young Danish astronomer then at the Paris observatory, carefully studied the eclipses of the moons of Jupiter. By observing these eclipses first when the earth was nearest to Jupiter and again when the earth was at the opposite side of her orbit, he found that there is a delay beyond the calculated time of the eclipses. This delay amounts to about 1000 seconds. From this, Roemer correctly concluded that it requires almost 1000 seconds for light to travel the 186,000,000 miles across the earth's orbit. From this conclusion it follows that light has a speed of about 186,000 miles a second.

In recent years the velocity of light has been measured with instruments of great precision. Determinations by Fizeau, Cornu, Foucault, Newcomb, and others, employing both the "toothed wheel" and the "revolving mirror" method, give the speed of light in air as about 186,300 miles, or 300,000 kilometers, per second. A redetermination by Michelson was announced in 1926, giving a speed of 186,284 miles, or 299,796 kilometers, per second. It is computed that in a vacuum, light travels 51 miles per second faster than in air.

The speed of light is almost a million times as fast as that of sound. Unlike sound, light travels more slowly in water and in glass than in air. As in the case of sound, the speed of light does not depend upon its intensity. A beam from the sun and a beam from a candle travel at the same speed. See *Electricity*, *Hertzian Waves*.

Reflection of Light. When light strikes an opaque object, more or less of it is usually turned back or reflected. In case the surface of the object is rough, light is reflected from it in an irregular manner known as *diffused* reflection. But when light strikes a flat, highly polished, metallic surface, the light turned back from it reaches the eye as though coming direct from a distant object instead of from a reflecting surface. This is known as *regular* reflection. For all cases of regular reflection two principles or laws have been established by careful experiment: (1) The incident ray and the reflected ray lie in the same plane and (2) the angle of reflection is equal to the angle of incidence.

Refraction of Light. When a slanting ray of light passes from the air into water, glass, or other substance through which it can shine, it is bent so as to be *less* slanting as it passes through the denser substance. Similarly, when such a ray of light comes

out of water or glass, it is bent, as it enters the air, so as to be *more* slanting. This bending or change in direction of a ray of light, as it passes from one medium to another of different density, is called *refraction*. A ray so changed or bent is said to be *refracted*.

If a stick stands leaning in the water, it appears as if broken at the surface, the part which is under water appearing as if bent upward. This effect is caused by refraction. However, if the stick stands perpendicularly in the water, it does not seem to bend. This is because there is no refraction when light passes into another substance at right angles to its surface.

If one places a coin in a pitcher, close to the side, and stands so that the side of the pitcher just hides the coin from the eye, and then, without moving one's self or the pitcher, has some one fill it with water, the coin will at once come into view. This gives the effect of looking around a corner, which is what actually happens. The coin, which is invisible when looking straight through the air, is made visible by the bending or refraction of the light by the water.

Another interesting example of refraction takes place in the atmosphere surrounding the earth. The air, which extends outward for only a comparatively short distance, gradually becomes thinner and thinner, and beyond it is empty space. When a ray of sunlight, coming through space, enters the air obliquely, as at sunrise or sunset, it is bent gradually downward as it passes through denser and denser layers of air, with the effect that the sun *appears* higher than it actually is. On this account the sun and other heavenly bodies rise somewhat *earlier* and set somewhat *later* than they would if there were no refraction. In ordinary latitudes this makes the day only 7 or 8 minutes longer, but within the Arctic circle it causes the longest days to be some hours longer than the longest nights.

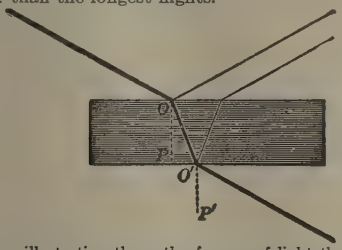


Diagram illustrating the path of a ray of light through a refracting medium, bounded by parallel sides.

When passing from a denser to a lighter medium, as from water or glass into air, a ray of light is refracted *away* from the perpendicular. Conversely, when passing from a lighter to a denser medium, as from air into water or glass, a ray of light is refracted *toward* the perpendicular. The angle formed by the *incident ray* and the perpendicular, or *normal*, is called the *angle of incidence*; the angle between the *refracted ray* and the normal is called the *angle of refraction*.

The *index of refraction* expresses the ratio of the speed of light in air to its speed in the denser medium. It is often stated as the ratio of the sine of the angle of incidence to the sine of the angle of refraction. Differences in the index of refraction of various substances are of greatest importance in the construction of optical instruments. The diamond owes its great brilliancy to its unusually high index of refraction. This is 2.44, as compared with 1.51 for crown glass and 1.65 for the heavier flint glass.

Composition of Light. When a beam of sunlight is passed through a narrow slit into a dark room and there let fall upon a triangular glass prism, the beam is refracted. If a white screen is placed in the path of the refracted light, a band of colors is formed. In this are red, orange, yellow, green, blue, indigo, and violet, though there are no sharp lines distinctly dividing any one of these colors from the others. This separation of light into different components is known as *dispersion*. The band of color, which shades by minute graduations from red on one side to violet on the other, is called a *spectrum*.

These dispersed or separated colored lights may all be brought together by means of a converging lens, the result again being a beam of white light. This dispersion by the prism and the reunion by the lens prove that the ordinary white light which comes from the sun is not simple but complex, and is composed of different kinds of light. The kind which is refracted or bent the least in passing through the prism is recognized by the eye as red. The kind that is refracted most and hence is found farthest away from the red is seen by the eye as violet.

It has been found that the property of light which determines this difference in refraction is the wave length. The longest waves which can be seen are the red; the shortest, violet. The approximate lengths of these different waves have been measured. Those of the violet are about $\frac{1}{63000}$ of an inch long, while those of the red are nearly twice the length of the violet or about $\frac{1}{33000}$ of an inch long. The wave lengths of light corresponding to the other colors are intermediate between the extremes of the red and the violet. The wave length for orange is about $\frac{1}{38000}$; for yellow, $\frac{1}{43000}$; for green, $\frac{1}{50000}$; and for blue, $\frac{1}{57000}$ of an inch in length.

Color. The various sensations which light rays of different wave lengths give to the eye. The actual color of any object is due, *first*, to the kind of light which illuminates it, and *second*, to the kind of light which it reflects or transmits to the eye.

A piece of red cloth held in red light appears red but when held in blue light appears nearly black. Likewise, a piece of blue cloth held in blue light appears blue but when held in light of any other color appears nearly black. A piece of paper appears white in daylight because it reflects all colors, that is, light of all wave lengths, equally. A piece of cloth appears red in daylight when it reflects to the eye only those long waves which produce the red light.

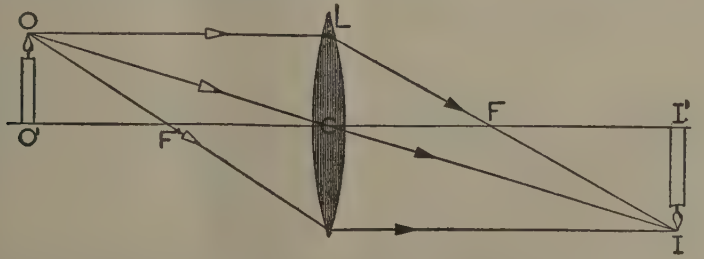


Diagram illustrating the principle of refraction as applied to the image-forming property of a convex lens.

In case white paper receives only rays of red light, it appears red. In case red cloth receives only waves which have no red in them, it appears dark. This shows that the color of an *opaque* object depends upon the wave length of the light that it *reflects*. Again, if a piece of red glass is placed in the path of the light dispersed by a prism, only the red portion of the spectrum can be seen, because the light of all wave lengths except the red has been absorbed. Similarly, a piece of green glass permits the green light to pass through but greatly changes all other parts of the spectrum. This shows that the color of a *transparent* object depends upon the wave length of the light which it *transmits*.

Ordinary white light consists of a mixture of colored lights, which, meeting the eye, together produce the sensation of white light. These colors are usually said to be seven,—*red, orange, yellow, green, blue, indigo, violet*—although in reality there is an enormous if not an infinite number of distinct hues in light. The seven chief colors are frequently called the primary colors, and various other tints and shades are producible by mixing them. In a stricter sense, however, the primary colors are three in number, namely, red, blue, and yellow. Complementary colors are those which, when combined, produce white or gray. Examples of such physiological complements are yellow and blue, red and blue-green, green and purple.

In the scientific sense, white and black are not considered colors, a white body *reflecting* and a black body *absorbing* all the rays of light without separating them. But the colors of an object seen in white light are due to *separation* of the rays of light by partial absorption and reflection or by refraction. If a body absorbs every other kind of light and reflects or transmits red light only, it will appear of a red color; if it absorbs every kind except blue rays, it will appear blue, and so on. If more than one kind of light be transmitted or reflected, the object will appear of a color compounded of these different rays of light.

The colors of metals and of some dyes are due to what is called "surface absorption." When white light strikes a piece of gold, yellow light is reflected by the surface. Yet when hammered exceedingly thin, gold transmits greenish blue light. In case of surface color, the colors by reflection and transmission are different.

Dispersion of Light. The separation of complex light into its different colored rays, as when refracted into a spectrum by a prism. *Normal dispersion* occurs when the different colored rays appear in the same order as in the solar spectrum formed when sunlight is dispersed by an ordinary glass prism. *Abnormal dispersion* takes place when light passes through sodium vapor or solutions of certain aniline dyes in which the usual arrangement of the colors is disturbed because of the absorption of some of them. The rainbow is an example of the dispersion of sunlight into its component colored rays by raindrops which act as prisms.

Aberration of Light. A deviation in the rays of light when unequally reflected by a mirror or refracted by a lens so that they do not converge to a focus but separate, resulting in an indistinct image of the object.

Aberration is called *spherical* when it is caused by the form of the lens or reflector, and *chromatic* when there is prismatic coloring of the image. In making lenses, spherical aberration is avoided by carefully calculated changes in the curvature. Chromatic aberration is largely overcome by combining lenses made of substances of different refractive power, such as crown and flint glass. Lenses so corrected are called *achromatic*.

In astronomy, aberration is an apparent displacement or small change of position in the stars and other heavenly bodies, due to the combined effect of the motion of light and the motion of the observer. It is called *annual* when the motion of the observer is that of the earth in its orbit, and *diurnal*, when of the earth on its axis.

Interference of Light. The brilliant colors produced by the reflection of light from thin transparent films, such as those seen on soap bubbles or upon oil films on water, are due to what is called interference of light. These effects furnish some of the strongest arguments for the correctness of the wave theory. To illustrate: With rubber bands fasten together two very thin pieces of plate glass a few inches long. Do this in such a manner that the plates will be separated at one end by a piece of tissue paper while remaining in contact at the other end. There will then be formed between the pieces of glass a thin film or wedge of air tapering from the thickness of tissue paper at one end to no thickness whatever at the other. Upon holding these glass strips vertically behind a sodium flame, a series of fine, dark, horizontal lines will be seen in the image of the yellow flame. This effect is owing to the fact that while part of the light is transmitted, a part is reflected from each of the slightly separated inner surfaces.

If, at any point, the distance between the two glass plates is such as to make one reflected light wave fall just half a wave length behind the other, these waves will neutralize each other, or *interfere*, and the result will be a dark line. The distance between the plates may be such that the two reflected waves will coincide, giving rise to a bright yellow line. It follows that, in case of any two consecutive dark lines, the *double path* between the plates at one line must be one wave length longer than that of the other line. As the difference in thickness of the air wedge between the consecutive lines is readily computed, this affords a method of determining the actual length of a light wave.

In the foregoing case, interference is confined to one kind of light waves, resulting in the formation of dark lines, there being no other kinds of light waves present to form complementary colors. When interference takes place in ordinary sunlight, which is composed of many kinds of light, instead of dark lines, colors complementary to those of the entire solar spectrum are produced. The iridescence of peacock feathers, of mother of pearl, of opals, of changeable silk, and various other substances is caused by interference.

The interference of light furnishes the basis of important measurements calling for extreme exactness. In 1893, with an instrument called the *interferometer*, which he invented and perfected, Michelson determined the length of the light wave adopted as the standard unit of the metric system. Twenty years later the wave length of the same line in the spectrum was remeasured by French physicists with results agreeing to a hundred-billionth of an inch. In 1920, Michelson adapted the interferometer for use with the reflecting telescope and secured thereby the first approximately accurate measurement of the diameter of a fixed star. See *Betelgeuse*.

Polarization of Light. Ordinary light is regarded as being produced by waves which vibrate in all planes at right angles to the direction of the ray; for example, when the free end of a rope that is fastened to a hook is moved up and down, a wave travels along the rope in the vertical plane. If the hand is moved from right to left, a wave is produced in the horizontal plane. If the hand is moved back and forth very rapidly, gradually changing the direction from one angle to another, the resulting waves appear much as the waves of ordinary light are supposed to be constituted. If, by various methods of reflection, refraction, or double refraction, ordinary light is so affected that the waves of the resulting beam all vibrate in one plane, this light is said to be *plane polarized*.

When a ray of light strikes a crystal of Iceland spar, it does not obey the ordinary law of refraction but gives rise to *two* refracted rays, with vibrations

at right angles to each other. Upon viewing a small object through such a crystal, *two* images will be seen. This is caused by *double refraction*. If the crystal be rotated, one image, called the *ordinary image*, remains fixed while the other, the *extraordinary image*, rotates with the crystal. The rays which produce both of these images are found to be polarized in planes at right angles to each other.

Two crystals of Iceland spar, in the form of Nicol's prisms, are the essential elements in the *polariscope*. This instrument is used for polarizing and for measuring the amount of rotation of the plane of polarization in optically active substances, such as cane sugar solutions. The Nicol prism which produces polarized light is called the *polarizer*. The prism used for detecting and for measuring the position or amount of rotation in the plane of polarization is called the *analyzer*.

ELECTRICITY

The name electricity, from the Greek *elektron* "amber," was applied originally to the unknown cause of the attractions, repulsions, and sparklings which attend the friction of amber and similar substances. The same cause is now recognized as giving rise, under various circumstances, to many other phenomena. Innumerable attempts have been made to ascertain the true nature of electricity, but it cannot be said that as yet there is any sure knowledge of what this subtle agent really is. In some ways electricity behaves as if it were an incompressible fluid substance. It differs, however, from all known fluids in so many particulars that it may be asserted that, whatever else it may be, it is not a fluid in the ordinary sense of the word.

Many scientists hold the view that electricity is the ether itself, the elastic, incompressible medium pervading all space and conveying luminous and other vibrations. They further hold that the phenomena of positive and negative electrifications are caused by strains or displacements in the ether at the surface of bodies. All the phenomena in question result from force action in fields of force called *electric* and *magnetic* fields. According to one modern view, these fields of force are places, or loci, where strains in the ether occur. Electrification of bodies is produced by the presence of free particles of matter, called electrons, only about $\frac{1}{1800}$ of the size of a hydrogen atom. The ether surrounding these electrons is believed to be in a permanent condition of strain, constituting an electric field.

By direct experiment, Hertz verified Maxwell's theory that electrical action is propagated through space by wave motion in the ether, differing only in respect to wave length and period from the vibrations which constitute light. The proofs advanced have been of the utmost value in helping physicists to arrive at a solution of this question. Investigations into the phenomena of electric discharges in high vacua, followed by the discovery by Roentgen of the X-rays, have also thrown great light on the subject. The discovery of radioactivity and the electron have led to a remarkable new insight into the constitution of matter. It is now known that the atoms of all the elements are made up of positive hydrogen nuclei, called *protons* (i. e., hydrogen atoms that have lost an electron), *helium atoms*, and *electrons*. These three components are the fundamental units of matter, and seem to indicate that in the last analysis all matter is electrical in character.

The practical applications of electricity are extremely numerous, varied, and valuable. Next to that of steam, the use of electricity has been the most important factor in modern progress. The great inventions based upon it, such as the telegraph, telephone, wireless telegraph, electric light, dynamo, motor, and the trolley car, have been epoch-making in their influence upon civilization. The 19th century has been called the age of steam, but the 20th century will doubtless be regarded as the age of electricity.

Frictional Electricity. As early as 600 B. C., it was known to the Greeks that amber, when rubbed, would attract various light bodies. This property, imparted by friction, is shown in different degrees by many other substances, such as rubber, glass, and sulphur. A body possessing this power of attraction is said to be electrified. By scuffing one's feet upon a carpet, by rubbing a cat's back, or by combing the hair vigorously with a hard rubber comb when the air is cold and dry, tiny sparks will pass from the finger when brought near a metallic object. When suitably rubbed and insulated, nearly all substances, including metals, will show some degree of electrification. Electricity produced in such ways is known as frictional or static electricity.

Positive and Negative Electricity. If a pith ball be hung from a convenient stand, and a glass rod, after being rubbed with silk, is brought near it, the ball will first be attracted by and then repelled from the glass rod. If a piece of sealing wax, after being rubbed with dry flannel, be brought near the ball which was driven away by the glass, the ball will be attracted by the sealing wax. This is because there are two kinds of electricity, or states of electrification; one is called *positive*, and the other, *negative*.

Bodies charged with the same kind of electricity always repel each other, while bodies charged with opposite kinds always attract each other. A suspended pith ball, or similar instrument, used to detect electricity, is called an *electroscope*. The electroscope shows that while the glass was charged with positive electricity, the silk with which it was rubbed had an equal negative charge. It shows also that the flannel received a positive charge equal to the negative charge it produced on the wax.

Electroscope. An instrument for detecting small charges of electricity and for testing the electrical condition of a body. It consists of a stout wire with two gold or aluminum leaves attached to one end, usually enclosed in a glass case. If a charged body is brought near the instrument, both leaves become charged with the same kind of electricity and repel each other. The electroscope can also be used to determine whether the charge is positive or negative. Much use is made of the electroscope in the study of radioactivity.

Condenser, Electric. In the practical application of electricity, it is often desirable to increase the capacity of a system for holding electricity. This is effected by a combination of conducting plates separated by insulators, which is called a condenser. The capacity of a condenser is in direct proportion to the size of the plates and increases as the distance between them decreases. It also depends upon the material used as the insulator. In commercial condensers, mica and paraffin paper are used to separate sheets of tin or aluminum foil.

Leyden Jar.—This device, much used in early experiments with electricity, is a condenser in the form of a wide glass jar. This is provided with a metallic coating inside and out for about two-thirds of its height. The inside coating is connected at the bottom with a rod bearing a knob on its top outside of the jar. The jar is charged by first connecting the outside coating with the earth and then presenting the knob to the source of electricity. Then, if the outer coat and the knob are connected by a metal wire, the electricity is released with a bright, crackling spark.

Induction, Electrostatic. If a positively electrified ball is brought near an insulated metal cylinder and is then removed, the cylinder is not electrified. But, if the cylinder is touched by the finger or by a grounded wire while the electrified body is still near, the cylinder will be found to be negatively charged, even after the charged body has been removed. If a negatively electrified ball is used in the same way, the cylinder becomes positively charged. Yet the electricity in the ball is not diminished, although, by reason of its proximity, a charge is

produced in the cylinder. This process is known as charging by *induction*, and such charges are called *induced* charges.

Electrophorus. The simplest machine for producing electricity by induction. It was invented by Volta. It consists of a circular plate of hard rubber or glass and of a somewhat smaller metal disc provided with an insulating handle. When rubbed with silk, the plate becomes negatively charged if made of rubber, and positively charged if made of glass. If the metal disc is brought close to the rubbed plate, touched with the finger so as to ground it, and the disc then brought by the handle near the finger or the knob of a *Leyden jar*, a spark will jump across the gap.

A Leyden jar may be charged with an electrophorus by repeating this process. After the rubber plate is once charged, any number of charges can be obtained from the electrophorus without producing any change in the charge of the plate. This is because the energy necessary to produce the induction charge is expended in lifting the disc. The large induction machines used by physicians operate on the same principle.

Electric Conductors and Insulators. Electricity moves through some substances very freely, and through others with great difficulty, or scarcely at all. Substances which readily convey electricity are called *conductors*; those which do not are called *nonconductors*, or *insulators*. The best conductors are the metals, while the most efficient insulators are mica, glass, hard rubber, sulphur, porcelain, paraffin, and rosin. In order to prevent leakage of electricity from conducting wires, glass or porcelain insulators are used to support electric light, telephone, and telegraph wires.

Most substances conduct electricity to a small degree, and even the good conductors vary greatly in conductivity. Dry wood, dry soil, paper, alcohol, kerosene, and *pure* water are poor conductors. Among good conductors are metals as a class, gas carbon, graphite, moist or wet earth, and water containing salts and acids in solution.

Electric Conductivity. The property belonging to many substances by which they permit the passage of an electric current; called also *conductance*. Just as cold indicates a lack of heat, so does conductivity indicate a lack of resistance to the transmission of an electric current. All substances at ordinary temperatures offer some resistance to electricity but, at extremely low temperatures, this resistance seems to disappear. At 270.5° below zero Centigrade, for example, the resistance of mercury is only one ten-thousand-millionth of that at the freezing point of water.

At ordinary temperatures, silver is the best and mercury is the poorest of metallic conductors. Reckoning the conductivity of mercury as 1, the relative conductivity of lead is 5, iron 10, aluminum 34, gold 48, copper 62, and silver 66.

Electric Battery. A device by which electric energy is derived directly from chemical action. When a strip of zinc is partially immersed in dilute sulphuric acid, chemical action takes place. The zinc goes into solution, displaces the hydrogen from the acid and forms zinc sulphate, and the hydrogen appears on the strip of zinc as bubbles of gas.

If a strip of copper (or of one of the more expensive metals, such as silver, mercury, platinum, or gold) is also placed in the solution, no apparent change takes place. But, if the tops of the strips are connected by a wire, there is noticeable chemical action at once and the hydrogen bubbles appear on the copper strip instead of on the zinc. The two metals thus placed together in the acid form an *electric cell*, and a current of electricity flows along the connecting wire, from the copper, which forms the positive or + pole, to the zinc, which forms the negative or − pole. Within the cell the flow is from the zinc to the copper.

The pressure at which the current flows is called the electromotive force, usually abbreviated as E.M.F. Although the electric current is often compared with water in a pipe, there is no flow of any known material substance but only the transmission of energy under the pressure of the electromotive force. However, modern electrical theory holds that there is a stream of negative electrons traveling in the wire, in a direction opposite to the assumed direction of the current, and that these electrons transmit the energy.

The amount of energy depends on the amount of zinc dissolved, for the zinc is the fuel which is used to run the cell. The gathering of the bubbles of hydrogen acts as a protective coating on the copper, greatly increasing the internal resistance of the cell. There is also a tendency on the part of the hydrogen to go back into solution, thus causing a current to flow in the opposite direction. This action, called *polarization*, greatly decreases the efficiency of many cells. To avoid the defect of polarization as much as possible, special types, such as the Daniell cell, the gravity cell, the sal ammoniac cell, and the dry cell, have been developed for practical use.

In the *Daniell cell*, the copper plate stands in a saturated solution of copper sulphate; the zinc stands in a solution of dilute sulphuric acid or of zinc sulphate, contained in a porous cup which allows the electricity to pass but prevents the mixing of the solutions.

In the *gravity cell*, the liquids are separated by gravity. The copper is covered with a saturated solution of copper sulphate and a heavy "crows-foot" of zinc hangs in a dilute solution of zinc sulphate which floats on the heavier copper solution. This cell has been much used in telegraphy because it works best when continually giving a small amount of current.

The *sal ammoniac cell* has electrodes of zinc and carbon immersed in a solution of ammonium chloride or sal ammoniac. It polarizes quickly and is adapted only for intermittent work, such as ringing doorbells.

The *dry cell*, which is not dry at all, is much like the sal ammoniac cell but with the electrolyte in the form of a thick paste which is sealed into the zinc container with pitch or a hard wax. Dry cells contain manganese dioxide and other materials which act as depolarizers. Because of their convenience, they are much used for ringing doorbells, running clocks, operating ignition coils on gas engines, and for similar open circuit work requiring a small current.

All of the above described cells are called *primary batteries*, because they are original producers of electricity. *Secondary batteries* are also of great importance because they are able to receive electricity from primary cells or usually from a dynamo, and hold the energy until it is required. They do not produce electricity, and can give out only what they have received from some primary source. For this reason they are usually called *storage batteries*.

Hertzian Waves. Electromagnetic waves discovered in 1887 by Heinrich Hertz, a German physicist. By experiment he found that the waves produced by the spark of an electrical machine could be received by a circular loop of wire. Hertz showed that these waves can be reflected, refracted, diffracted, and polarized in a manner similar to light. He proved also that they are transmitted with the same rapidity as light. These important discoveries confirmed the electromagnetic theory of light, establishing that in various important respects electricity and light are identical. Wireless telegraphy and telephony were made possible by the discovery of these waves. See *Radiotelegraph*, *Radiotelephone*.

X-rays, or Roentgen Rays. When a high tension electric current is sent through a glass tube from which the air has been highly exhausted, the negative pole, or *cathode*, sends out an invisible stream of negatively charged particles, called *cathode rays*. These rays can be brought to a focus like light, and, when focused on a metallic target within the tube,

the metal becomes intensely hot and gives off another kind of rays which Roentgen, who discovered them in 1895, called X-rays.

X-rays are known to be vibrations of the ether, similar to but much more rapid than those of light. The wave length of X-rays is so extremely short that every substance, regardless of its color, is more or less transparent to them. They easily pass through most materials opaque to light, such as wood, rubber, paper, aluminum, and human flesh, but denser substances, such as lead, silver, platinum, and gold, even in thin sheets, stop most of the X-rays. Moreover, these rays cannot be reflected or refracted by the substances which ordinarily reflect or refract light.

However, about twenty years after Roentgen's discovery, it was found that both reflection and refraction of X-rays can be produced by various crystals. These, by reason of their molecular structure, act not only as reflectors but also like finely ruled gratings. This discovery led to a great advance in scientific knowledge concerning both the X-rays and the internal structure of crystals. The study of crystals by X-rays has also led to interesting practical results; for example, when exposed to X-rays, a genuine diamond is entirely transparent, while imitations usually cast a shadow.

X-rays affect a photographic plate in much the same way as does light. Any object which is opaque to X-rays, if held between an X-ray tube and a photographic plate, will cast a dark shadow upon the plate. A substance less opaque to the rays will cast a lighter shadow. Consequently, by means of X-rays, photographs may be made showing the exact location of a bullet or other metallic object embedded within the tissues of the body. Similarly, the dislocation or fracture of a bone, or the presence of an internal tumor, may be revealed. Such photographs are called *radiographs*.

X-rays can be made perceptible to the eye by means of a *fluoroscope*. This is a dark box containing a screen coated with platino-barium cyanide, which becomes luminous under the action of X-rays. Any object placed between the X-ray tube and this screen will cast a shadow on the illuminated surface. The different parts of the object will be made distinguishable by gradations of the shadow. For example, upon viewing a person's chest by means of the fluoroscope, the ribs appear as medium dark bands, the lungs are very light, and below them the heart is visible as a pale shadow, rhythmically expanding and contracting.

The practical use of X-rays in photographing the skeleton, teeth, and various internal organs has been of great value in medicine, surgery, and dentistry. The treatment of cancer, tubercular glands, and various other diseases by direct application of the rays has had many marvelously beneficial effects. This marked curative action results from the fact that the rays attack abnormal or diseased tissue before they begin to affect healthy tissue.

By exposing an afflicted part of the body to the rays for the right length of time and repeating the exposure at the proper intervals, a cancer or other abnormal growth may sometimes be completely destroyed without injury to the surrounding tissues or organs. However, in giving such treatments and in making radiographs, there is grave danger to the operators unless their bodies are carefully shielded. Frequent or prolonged exposure to the rays causes painful and sometimes fatal burns and other serious disorders.

TABLE OF ATOMIC NUMBERS AND ISOTOPES

Atomic Number	Element	Symbol	Atomic Weight	Number of Isotopes	Masses (Atomic Weights) of Isotopes
1	Hydrogen	H	1.008	1	1.008
2	Helium	He	4.00	1	4
3	Lithium	Li	6.94	2	6, 7
4	Beryllium	Be	9.1	1	9
5	Boron	B	10.9	2	10, 11
6	Carbon	C	12.005	1	12
7	Nitrogen	N	14.008	1	14
8	Oxygen	O	16.00	1	16
9	Fluorine	F	19.00	1	19
10	Neon	Ne	20.20	2	20, 22
11	Sodium	Na	23.00	1	23
12	Magnesium	Mg	24.32	3	24, 25, 26
13	Aluminum	Al	27.0		
14	Silicon	Si	28.1	2	28, 29, (30)
15	Phosphorus	P	31.04	1	31
16	Sulphur	S	32.06	1	32
17	Chlorine	Cl	35.46	2	35, 37, (39)
18	Argon	A	39.9	2	36, 40
19	Potassium	K	39.10	2	39, 41
20	Calcium	Ca	40.07	(2)	40, (44)
21	Scandium	Sc	45.1		
22	Titanium	Ti	48.1		
23	Vanadium	V	51.0		
24	Chromium	Cr	52.0		
25	Manganese	Mn	54.93		
26	Iron	Fe	55.84		
27	Cobalt	Co	58.97		
28	Nickel	Ni	58.68	2	58, 60
29	Copper	Cu	63.57		
30	Zinc	Zn	65.37	(4)	(64, 66, 68, 70)
31	Gallium	Ga	70.10		
32	Germanium	Ge	72.5		
33	Arsenic	As	74.96	1	75
34	Selenium	Se	79.2		
35	Bromine	Br	79.92	2	79, 81
36	Krypton	Kr	82.92	6	78, 80, 82, 83, 84, 86
37	Rubidium	Rb	85.45	2	85, 87
38	Strontium	Sr	87.63		
39	Yttrium	Y	89.33		
40	Zirconium	Zr	90.6		
41	Columbium (niobium)	Cb	93.1		
42	Molybdenum	Mo	96.0		
43	Masurium				
44	Ruthenium	Ru	101.7		
45	Rhodium	Rh	102.9		
46	Palladium	Pd	106.7		
47	Silver	Ag	107.88		

TABLE OF ATOMIC NUMBERS AND ISOTOPES—Con.

Atomic Number	Element	Symbol	Atomic Weight	Number of Isotopes	Masses (Atomic Weights) of Isotopes
48	Cadmium	Cd	112.40		
49	Indium	In	114.8		
50	Tin	Sn	118.7		
51	Antimony	Sb	120.2		
52	Tellurium	Te	127.5		
53	Iodine	I	126.92	1	127
54	Xenon	X	130.2	(7) 5	(128), 129, (130), 131, 132, 134, 136
55	Cæsium	Cs	132.81	1	133
56	Barium	Ba	137.37		
57	Lanthanum	La	139.0		
58	Cerium	Ce	140.25		
59	Praseodymium	Pr	140.9		
60	Neodymium	Nd	144.3		
61	Illinium				
62	Samarium	Sm	150.4		
63	Europium	Eu	152.0		
64	Gadolinium	Gd	157.3		
65	Terbium	Tb	159.2		
66	Dysprosium	Ds	162.5		
67	Holmium	Ho	163.5		
68	Erbium	Er	167.7		
69	Thulium	Tu	169.9		
70	Ytterbium	Yb	173.5		
71	Lutecium	Lu	175.0		
72	Hafnium	Ha	178.6		
73	Tantalum	Ta	181.5		
74	Tungsten	W	184.0		
75	Bohemium (Rhenium)				
76	Osmium	Os	190.9		
77	Iridium	Ir	193.1		
78	Platinum	Pt	195.2		
79	Gold	Au	197.2		
80	Mercury	Hg	200.6	(6)	(197–200), 202, 204
81	Thallium	Tl	204.0	IV	
82	Lead	Pb	207.2	XI	
83	Bismuth	Bi	209.0	V	
84	Polonium	Po		VII	
85					
86	Niton (radium emanation)	Nt	222.4	III	
87					
88	Radium	Ra	226.0	IV	
89	Actinium	Ac		II	
90	Thorium	Th	232.15	VI	
91	Uranium X	Ux		II	
92	Uranium	Ur	238.2	II	

The use of X-rays also led to an important discovery in modern medicine by showing that many diseases have their origin in unknown abscesses. An abscess at the point of a root of a tooth may exist for years wholly unsuspected. Yet, during the entire period, it may steadily poison the system, thereby producing rheumatism, arthritis, neuritis, ulcer of the stomach, and other diseases.

X-ray Spectra and Atomic Numbers. The discovery that X-rays are a form of wave motion of very short wave length and can be diffracted by crystal gratings, has given physicists new views of the constitution of matter. It has been found that each element has a characteristic X-ray spectrum. Moreover, it has been shown that, if arranged in the order of increasing frequency of their characteristic X-ray spectra, all the known elements constitute a simple series, each member of which is obtained from its predecessor by adding one.

This series is in the order of increasing atomic weights, beginning with hydrogen, atomic number 1, and ending with uranium, atomic number 92. In this series, five elements are missing. The elements corresponding to atomic numbers 85 and 87 have not yet been discovered. The atomic number is the charge upon the nucleus of the atom, and upon it depends all the chemical and spectroscopic properties of the elements. See *Atom, Atomic Weight, Chemical Elements, Isotopes, Table of Atomic Numbers and Isotopes.*

Isotopes. The term isotope has been applied to atoms of elements having identical chemical properties but different integral atomic weights. For example, the element neon, atomic weight 20.2, has two isotopes, one with atomic weight 20 and the other with atomic weight 22. The element magnesium, atomic weight 24.32, has three isotopes of atomic weight 24, 25, and 26, respectively. These facts account for the nonintegral values found by chemical analysis for the atomic weights of many of the elements. The obvious explanation is that such elements are composed of a mixture of their isotopes.

A glance at the table of isotopes shows that, with the exception of hydrogen, the atomic weights of all the isotopes of the elements so far measured are whole numbers. This result carries with it the possibility of a sweeping modification of formerly accepted ideas of mass. It also indicates that the atoms themselves are built up of still smaller atoms of some primordial element. These primordial atoms are of two kinds; namely, atoms of positive and of negative electricity. The unit of negative electricity is the electron. The unit of positive electricity, which is the real unit of mass, is the positive nucleus of the hydrogen atom. To this unit of mass and of positive electricity the name proton has been given. See *Atom, Chemical Elements.*

Radioactivity. The discovery, in 1895, of the Roentgen rays or X-rays led investigators to examine certain phosphorescent substances in order to find out whether any of these give out rays with similar properties. While so engaged, Becquerel, in 1896, discovered that all the compounds of uranium emit such rays. It was found also that the mineral pitchblende, one of the ores from which the metal uranium is extracted, was more active than could be accounted for by the amount of uranium that it contained. This led to the belief that the rays emitted by the mineral were produced by some other substance. Acting upon this assumption,

Pierre Curie and his wife Marie Sklodowska Curie succeeded, in 1898, in extracting from pitchblende the remarkable element radium.

The activity of radium was found to be about four million times as great as that of uranium. The rays given off possess the power to pass through metals and various other substances which are opaque to ordinary light. These rays affect a photographic plate, discharge the electricity of an electrified body, and cause phosphorescence in various bodies exposed to their influence. Any substance which emits similar rays in this manner is said to be *radioactive*.

The atomic weight of radium is 226. Radioactivity depends on an explosion within the radium atom, which breaks down into two other elements: *helium*, with an atomic weight of 4, and *radium emanation*, or *niton*, with the atomic weight of 222. Niton, or radon, is a chemically inert gas, but it is much more strongly radioactive than radium.

The atmosphere is found everywhere to contain a small quantity of radium emanation, which diffuses from the soil or is carried up by spring water. Observations seem to indicate that the amount of radium in the earth's crust is sufficient to supply as much heat as is lost by conduction from the hot interior. As the rays emitted by radioactive substances, particularly radium, are in some respects identical with X-rays, their use has proved valuable in the treatment of certain diseases, particularly cancer. It is considered probable also that radium may prove valuable in relieving persistent high blood pressure and hardening of the arteries. For a more detailed account of radioactivity, see *Radium;* also *Niton, Polonium.*

Cosmic or **Millikan Rays.** Ever since the discovery of X-rays, radium, and other ionizing radiations, careful observers have, from time to time, found indications of a ray more penetrating than the X-ray of radium, apparently coming from extra terrestrial sources. These radiations have been carefully studied by a number of observers, notably Millikan in America and Kolhörster in Europe. Their observations indicate that very short wave length radiations are continually streaming through space.

The method used for studying cosmic rays has been to screen an electroscope from all terrestrial sources of radiation, exposing it only to radiation coming in from outer space, and then to observe the amount of absorbing material required to completely cut off the rays. Millikan accomplished this by sinking a sealed electroscope in the waters of a snow fed lake situated 11,800 feet above sea level. He found that the amount of water required to completely shut out the rays was equivalent in absorbing power to six feet of lead. The shortest X-ray yet produced cannot penetrate ½ inch of lead.

Later study with vastly improved apparatus has revealed the fact that the rays may be separated into three or four bands of definite wave lengths. With the help of Einstein's mass-energy relation and other new theories, Millikan has traced the probable origin of these rays to the formation, in interstellar space, of helium, silicon, and others of the more abundant elements from electrons and protons, that is, the nuclei of hydrogen atoms. If proved correct, this theory provides, for the first time, evidence that common elements are continually in the process of formation.

Coolidge Rays. This name has been applied to powerful cathode rays produced by Dr. W. D. Coolidge of the General Electric laboratories at Schenectady. These rays are produced in a specially made cathode tube capable of operation up to 350,000 volts. The rays pass through an aluminum window at one end of the tube and are observed in the air outside the tube. The rays are found to have very surprising effects upon animal and plant tissues, and to be highly destructive to certain bacteria exposed to them.

MAGNETISM

Since ancient times it has been known that a certain mineral called *lodestone* possesses the remarkable power of attracting and holding small pieces of iron. From its abundance near Magnesia, in Asia Minor, the Greeks named it magnetite. It is a magnetic iron ore. In case a bar of steel is rubbed against a piece of lodestone, which is a *natural magnet*, the steel, likewise, becomes magnetic, and is called an *artificial magnet*. The force or property displayed by the lodestone in attracting iron and in causing steel to show like qualities is called magnetism. The same properties can also be imparted to steel by placing it within a coil of wire through which a current of electricity is passing. This property of becoming a magnet is possessed by iron, cobalt, and nickel, and certain of the Heusler alloys.

Magnetic Poles. If a slender piece of lodestone is suspended by a thread, it will take a position with one end toward the north and the other toward the south. Similarly, if a magnetized steel bar or needle is suspended on a pivot or by means of a fine silk fiber, it will place itself approximately north and south. This is the principle of the mariner's compass.



Illustration showing how a bar magnet, dipped in iron filings, indicates that the poles are located near its ends.

Small pieces of iron are attracted by one end or the other of a magnet. In case a magnetized bar of steel is placed in a box of iron filings or wire nails, the pieces of iron will cling only to the end portions of the bar. These portions of the bar or magnet are called its poles. Hence it is said that the "magnetic force" of a magnet is concentrated at its poles. The pole of a compass needle which points north is called the *north pole*, and the other, the *south pole*.

Magnetic Attraction and Repulsion. If the north pole of a magnet is brought near the north pole of a suspended magnet or compass needle, these poles will repel each other, that is, the magnet which is free to move will turn away from the other. Likewise, if two south poles are brought together, they will repel each other. But if a north pole and a south pole are brought near together, the magnets will attract each other. From this it is seen that *like poles repel* and *unlike poles attract* each other.

By experiment it has been shown that these attractive and repulsive forces vary inversely as the square of the distance between the poles, and directly as the product of the strengths of their poles. The attraction or repulsion between two magnets which are one inch apart will be four times as great as when they are two inches apart.

Magnetism of the Earth. The earth acts as a huge magnet, with powerful north and south poles which attract the weaker poles of the compass needle. These magnetic poles, however, do not correspond to the geographic poles. One, called the North Magnetic Pole, is in North America near Hudson bay, and the other, called the South Magnetic Pole, is nearly but not quite opposite, in the antarctic region. The positions of the earth's magnetic poles are not fixed but are slowly changing.

The magnetism of the earth is somewhat irregular, so, for accurate work in surveying or navigation, it is necessary to have carefully prepared maps showing in just what direction a compass needle points at any spot on the earth's surface. The amount which the compass needle varies from the true north is called its *declination*.

Magnetic Field. Faraday was the first to study the conditions existing in the space immediately surrounding a magnet. If a pane of glass sprinkled with iron filings is laid upon a magnet and struck lightly, the filings will rearrange themselves in regular lines leading from one pole of the magnet to the other. From this, Faraday concluded that there are *lines of force* around a magnet. He also reached the further conclusion that they exist throughout the space surrounding it, and that they represent a state of strain in the ether which is presumed to surround all bodies.

These lines of force are said to "flow" out from the north pole and into the south pole. They act as though they were stretched strings of rubber trying to contract and to expand sidewise as they contract. The total number of lines in such a magnetic circuit is called the *magnetic flux*.

Magnetism by Induction. A piece of soft iron when held near a mass of iron filings does not attract them. But, if a permanent magnet is brought near, the soft iron becomes a magnet and attracts the filings. As soon as the permanent magnet is removed, most of the iron filings will drop off.

Magnetism produced by the mere presence of adjacent magnets, with or without contact, is called *induced* magnetism. If the induced magnetism of the soft iron is tested with a compass needle, it is found that the *remote* induced pole is of the same kind as the inducing pole, while the *near* pole is of unlike kind. This is a general law of magnetic induction. If a piece of plate glass, or of copper, or of any other nonmagnetic material is inserted between the soft iron and the permanent magnet, it will not change the number of iron filings clinging to the soft iron. This fact shows that nonmagnetic materials are transparent to magnetic forces.

Magnetic Permeability. The lines of force from a magnet pass with approximately equal facility through copper, glass, and wood, and even through a vacuum. That is to say, the attractive force of the magnet is exerted with approximately equal ease through most ordinary substances and also through a vacuum. However, the magnetic lines of force from a magnet pass much more readily through soft iron or steel than through ordinary materials. The facility with which the lines of force from a magnet pass through soft iron and steel depends upon what Lord Kelvin called the magnetic permeability. Ordinarily, the magnetic permeability of soft iron is about 1300 times as great as the magnetic permeability of air.

Electromagnet. When an electric current flows through a wire, the wire is surrounded by magnetic lines of force. The region around the wire is called a magnetic field. When an electric current flows through wire wound on a spool, the interior of the spool becomes a very strong magnetic field. However, the windings of wire on the spool must always be separated from each other by nonconducting material—that is to say, the wire must be insulated. A rod of soft iron placed inside of such a spool becomes strongly magnetized whenever an electric current flows through the winding, but loses its magnetism almost completely when the electric current ceases to flow. An arrangement of this kind is called an electromagnet.

The electromagnet is an important feature of the dynamo, of the telegraph instrument, of the alternating current transformer, and of many other practical devices. An interesting type of electromagnet is the so-called hoisting magnet, which is extensively used in steel works. This labor-saving contrivance avoids the delay involved in the tying of a hoisting rope to a heavy piece of iron or steel which is to be lifted, and in then untying the rope when the object is to be released. A large electromagnet is carried by the hoisting rope and lowered into contact with the piece of iron or steel to be lifted. An electric current is then sent through the winding of wire on the electromagnet and the electromagnet instantly clings to the object to be moved. As soon as the object has been transferred to the desired position, the electric current is stopped by opening a switch and the electromagnet at once releases the piece of iron or steel.

The strongest electromagnets are made by bending the soft iron core in the form of a broken ring or horseshoe. Magnetic hoists are built in this form with magnets so strong that each square inch of their surface will lift from 100 to 200 pounds of iron.

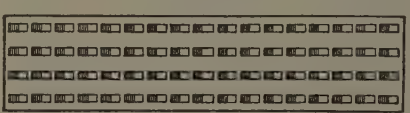
Molecular Theory of Magnetism. According to this theory every molecule of a bar of iron is regarded as being itself a permanent magnet. Under ordinary conditions, these molecular magnets are scattered at haphazard throughout the bar so that no noticeable magnetic fields of force (magnetic flux) are produced in the space surrounding the bar.



Position of molecules in an unmagnetized bar of iron.



Position of molecules in a partially magnetized bar of iron.



Position of molecules in a completely magnetized bar of iron.

Diagrams Illustrating the Molecular Theory of Magnetism

But, when the bar is magnetized, these molecules are believed to have become rearranged, lined up, so to speak, like a column of soldiers all facing the same way. In the middle portion of the bar the front ends of one row of these tiny magnets are neutralized by the rear ends of the row in front. At the ends of the bar, however, a large number of unneutralized molecules are exposed, north-seeking at one end, and south-seeking at the other.

The molecular theory enables us to understand why, when a magnetized bar of steel is broken in two parts, each piece of it remains a complete magnet, with north and south poles like the original bar. However, the severe shock which it experiences in breaking, considerably weakens its magnetism. The theory also makes clear why there is a limit to the degree of magnetization of a steel bar; namely, when all the molecular magnets are in alignment. Under these conditions the bar is said to be *saturated*.

The theory also explains why soft iron is used for electromagnets, while hard steel, although much more difficult to magnetize, is used for permanent magnets. When iron is heated gradually, its magnetic properties decrease until, at about 780° C., they suddenly disappear. The point at which this change occurs is called the *critical temperature*.

IMPORTANT ELECTRICAL TERMS

Alternating Current. An electric current which alternates or reverses its direction periodically; a to-and-fro current as distinguished from a direct current, which always flows in the same direction. On account of economy in transmission, alternating currents are much used for heating, lighting, and power.

Ammeter. The ampere meter, an instrument which measures in amperes the amount of electric current flowing through a circuit. In use, an ammeter is connected so that *all* or a *definite* proportion of the current passes through the instrument.

Ampere. The unit of electric current. It is the current which flows when an electromotive force of one volt is exerted on a resistance of one ohm. It is the quantity of electricity which, in *one second*, can deposit from a solution of silver nitrate .001118 gm. of metallic silver.

Anode. The positive electrode or pole of any source of electricity. The electrode from which a current enters an electrolyte or conductor.

Armature. A piece of soft iron or steel used to connect the poles of a magnet. In most dynamos or motors the armature is that portion which rotates or moves across the magnetic field.

Cathode. The negative electrode or pole of any source of electricity; the electrode by which a current leaves an electrolyte or conductor, or on which metals are deposited.

Circuit Breaker. An automatic device for opening or closing a circuit whenever there is a dangerous or unusual flow of current.

Commutator. A device for reversing the direction of an electric current. In a dynamo the commutator enables the alternating currents produced within the armature to be delivered to the external circuit as a direct current.

Condenser. An instrument consisting of two or more conducting surfaces, such as tin foil or copper plates, separated by a nonconductor similar to mica, glass, paraffin paper, or oil. In connection with many instruments, a condenser is used to accumulate a charge of electricity. The capacity of a condenser is usually expressed in microfarads.

Coulomb. The unit of quantity of electricity. It is equivalent to the amount necessary to deposit .001118 gm. of metallic silver from solution. An ampere represents one coulomb per second.

Cycle. The change in an alternating current during which it rises from zero to maximum intensity, returns to zero, increases to a maximum in the opposite direction, and again falls to zero.

Direct Current. An electric current which, regardless of variations in strength, always flows in the same direction.

Dynamo. A machine used for transforming mechanical energy into electromagnetic energy. To dynamos of large capacity, the term *generator* is frequently applied.

Dyne. A very small unit of force, much used in electrical and other physical measurements. It is defined as the force which, acting upon a gram for a second, imparts to it a velocity of a centimeter per second. This is approximately $\frac{1}{981}$ gram.

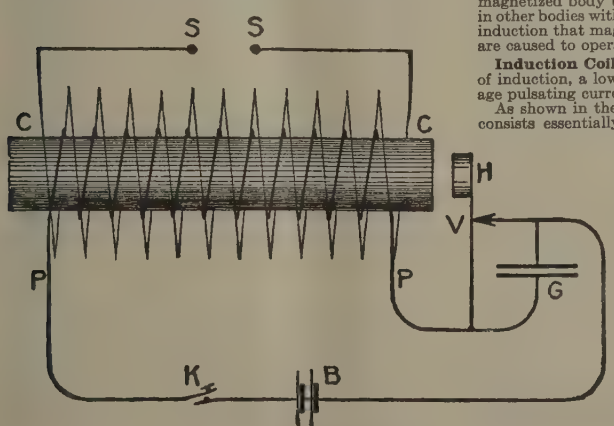


Diagram of an Induction Coil.

Electrode. Either terminal of an open electric circuit. It is usually either of the conductors by which the electric current enters or leaves an electrolyte. The positive electrode is called the *anode*; the negative, the *cathode*.

Electrolysis. The chemical decomposition or change which accompanies the flow of electricity through an electrolyte. Most conducting liquids are electrolytes.

Electrolyte. A compound decomposable by an electric current. The term electrolyte usually implies a conductive solution of such a compound in water or other liquid. Thus, in electroplating, metallic nickel is deposited by the action of a current upon an electrolyte of nickel ammonium sulphate dissolved in water.

Electromotive Force (abbreviated as E.M.F.). That force in an electric circuit which produces an electric current or the appearance of positive and negative charges. It is called also electric pressure, and is measured usually in volts.

Erg. The unit of work in the centimeter-gram-second system. It is the amount of energy necessary to move a body one centimeter against a force of one dyne. Ergs = dynes $\times$ centimeters. As a practical unit, the *joule*, equal to 10^7 ergs, is generally employed.

Farad. The practical unit of electromagnetic capacity. It represents the capacity of a condenser that acquires a potential difference of one volt when charged with one coulomb. Farads = coulombs $\div$ volts. The microfarad is one-millionth of a farad.

Foot-pound. A mechanical unit of work, equivalent to the work done in lifting one pound one foot. A horse-power represents work at the rate of 550-foot-pounds per second.

Frequency. The number of cycles or complete to-and-fro impulses affected by an alternating current in one second. On ordinary lighting and power circuits, 60 cycle and 25 cycle are the frequencies most commonly used.

Fuse. A wire, bar, or similar section of metal capable of conducting a definite amount of electricity. This wire or bar is inserted in a circuit as a protection against excessive currents. Should the flow of electricity increase beyond the limit, the fuse melts, breaks the circuit, and thus prevents further damage.

Galvanometer. An instrument for detecting the presence, ascertaining the direction, and measuring the strength of an electric current.

Generator. A machine for converting mechanical energy into electric energy. The usual type of electrical generator is called a dynamo.

Ground. The earth, regarded as an electric conductor; a return circuit provided through the ground; a leak of electricity to the earth through defective insulation.

Henry. The unit of electrical inductance; the inductance of a circuit in which an electromotive force of one volt is induced by a current changing at the rate of one ampere a second.

Induction. The power possessed by an electrified or a magnetized body to cause electrical or magnetic properties in other bodies with which it is not in direct contact. It is by induction that magnets are made and dynamos and motors are caused to operate.

Induction Coil. An apparatus for changing, by means of induction, a low voltage direct current into a high voltage pulsating current.

As shown in the accompanying figure, an induction coil consists essentially of a soft iron core, CC, on which is wound a primary coil, PP, consisting of a comparatively few turns of coarse wire, and a secondary coil, SS, made of many turns of fine wire. A battery, B, or other source of low potential direct current, is connected with the primary coil, in series with a "make and break" interrupter V.

When the circuit is closed by means of the switch K, the electricity flows through the primary coil, and the lines of magnetic force which always accompany the passage of an electric current are concentrated in and about the core, causing it to become a magnet. As a result, the iron head (H.) of the vibrator is attracted and drawn toward the end of the core, thus automatically breaking the circuit at the point of contact indicated by the arrow, and causing the magnetic lines of force to die away.

The vibrator then springs back to its original position and the action is repeated.

When the circuit is closed, the rapidly growing magnetic field tends by induction (See *Transformer.*) to cause a current of high voltage to flow through the secondary coil; when the circuit is opened, the dying magnetic field tends to cause a current to flow through the secondary coil *in the opposite direction.* An alternating electromotive force of high pressure, or potential, is thereby established at the terminals of the secondary coil, SS, so that when these are sufficiently close together, the resistance of the air is broken down and a spark crosses the gap. A condenser, G, is shunted around the vibrator in order to prevent sparking at the contact points when the circuit is broken.

Induction Motor. A type of alternating current motor which has neither a commutator nor collecting rings, but operates entirely because of induced currents.

Insulation. The nonconducting material used to prevent the escape of electricity or heat from a conducting medium.

Ion. An atom or molecule which has either a positive or a negative charge of electricity.

Joule. A small unit of electrical work representing the work done by electrical power of one watt acting for one second. It is equal to 10^7 ergs or about 0.74 foot-pound.

Kilowatt Hour. The unit of work frequently employed in the sale of electric energy. It is equal to 1000 watts, or about 1.34 horse power acting for one hour. In other words, it is 1000×3600 joules of work.

Lightning Arrester. A device connected with an electric circuit to protect it against damage from atmospheric electricity. It is usually arranged so that the lightning may discharge across small spark gaps to a direct and easy path to the earth instead of passing through the protected circuit.

Magnetic Field. Any space outside of a magnet occupied by magnetic lines of force. It is because of the magnetic field of the earth that the compass needle points toward the north.

Magnetic Flux. The magnetic influence or magnetic lines of force which permeate any magnetic field. At a given point this force possesses both energy and direction, seeming to flow from the north pole toward the south pole of the magnet.

Magneto. A small dynamo in which the magnetic field is produced by permanent magnets instead of by electromagnets. This type of dynamo is extensively used as a source of electricity for the ignition system of gas engines.

Megohm. A unit equivalent to a million ohms, used in measuring very high electrical resistances.

Ohm. The unit of electrical resistance, practically defined as the resistance offered by a uniform column of mercury 106.3 centimeters long and weighing 14.45 grams, at the temperature of melting ice.

Ohm's Law. In any simple electrical circuit the current which flows is equal to the electromotive force at the terminals divided by the resistance in the circuit. Stated practically: Amperes = volts ÷ ohms.

Parallel Connection. A method of connecting electrical instruments so that the current finds a divided instead of a single path for completing the circuit. Batteries and generators are connected in parallel when their positive poles are all connected to one side of the circuit and their negative poles are all connected to the opposite side.

Phase. The time of one complete cycle of an alternating current is, for convenience, divided into 360 degrees. Any period during the cycle is then called a certain *phase.* Commencing at the 0-degree phase, the cycle is one-fourth complete at the 90-degree phase, one-half complete at the 180-degree phase, and finished at the 360-degree phase.

Polyphase System. An alternating current distributing system making use of many alternating currents which differ definitely in phase.

Potential. An electrical term whose meaning corresponds closely to *level* as used in mechanics and hydrostatics. It is a *difference of potential,* produced by E.M.F., that causes the flow of a current.

Power. Electrical power is equal to the pressure in *volts* multiplied by the current in *amperes.* Or, power, in *watts* = volts × amperes.

Relay. A sensitive electromagnetic device which, when operated by a weak current, causes a corresponding action in a more powerful circuit. Thus, in telegraphy, the weak current from a long line may operate a delicate relay which in turn transmits the signals to a local circuit containing a battery and a sounder.

Resistance, Electrical. The opposition offered by any substance to the passage through it of an electric current. In overcoming resistance, part of the electrical energy of the current is changed into heat.

Rheostat. An adjustable electrical resistance.

Series Connection. A method of connecting an electrical system so that the current must flow *in succession* through each part of the circuit. Batteries and generators are connected in series when the positive pole of one is joined to the negative pole of the next.

Short Circuit. Any crossing or connection between the wires of an electric circuit whereby the current may take a "short cut" instead of passing over its proper path. As such a "short" often eliminates the normal resistance of a circuit, it may result in an excessive flow of electricity. With large currents this results in sparking, burning, and similar damage.

Shunt. A branch circuit, usually of comparatively high resistance, connected parallel with the main line so as to act as a bypath and thus receive a part of the current.

Starting Box. A series of resistance coils used to prevent too great a flow of electricity through a motor which is being started. As the speed increases, the resistance is removed. Should the current become too weak, the circuit is broken automatically and the resistance is again added.

Storage Battery. An instrument or cell capable of converting electrical energy, in the form of a direct current, into chemical energy. This process is called *charging the battery.* When properly charged, the cell, by a reverse chemical action, can again transpose the accumulated chemical energy and give out electricity.

Switchboard. An assemblage of switches and indicating devices mounted upon a frame, for the convenient control of an electric current, circuit, or system of circuits. A telephone switchboard contains the switches and other apparatus by which connections are made between subscribers.

Three-Wire System. A system of electrical distribution using three main conductors, on which the voltage between the middle wire and either of the others is one-half that between the outside wires. When the load on each side of the center wire is properly balanced, it acts as a neutral and carries no current. Only three-fourths as much copper is required for the wires of such a system as for a two-wire system.

Transformer. A stationary apparatus consisting essentially of two coils, one having few and the other having many turns of insulated wire wound on a core of soft iron or annealed steel. This apparatus is used to change the voltage of an *alternating current* by means of induction. When used to *raise* the voltage, it is called a *step-up* transformer; when used to *lower* the voltage, a *step-down* transformer. The change in voltage is approximately proportional to the ratio of the number of turns of wire in each coil.

Volt. The unit of electromotive force (E.M.F.). It represents the pressure necessary to force a current of one ampere through a resistance of one ohm.

Voltmeter. A measuring instrument used for determining the voltage, or difference of potential, between any two parts of an electric circuit. In use, a voltmeter is connected across the points where the voltage is to be determined, but is *not* placed in the circuit, because voltmeters are constructed with very high resistance.

Watt. The unit of electrical power; the power of a current of one ampere flowing under a pressure of one volt. The kilowatt, or 1000 watts, is the commercial unit for the sale and consumption of electric current. The mechanical unit known as one horse power is equal to 746 watts. Reckoned in c.g.s. units, the watt is equal to 10^7 ergs per second. This is equivalent to 44.4 foot-pounds per minute.

Watt Hour. A unit of electrical work, equivalent to the work done by one watt when acting for one hour; 3600 joules.

Wheatstone Bridge. An apparatus, invented by Sir Charles Wheatstone, for measuring electrical resistance. Three known resistances are connected with the unknown in a four-sided electrical circuit. Two opposite corners of the circuit are connected or bridged by a galvanometer or telephone receiver; the other two corners are connected with a battery. When the known resistance is so adjusted that no current flows across the bridge, the value of the unknown resistance is easily calculated.

Wire Loss. The power lost by a current in passing through a conducting wire. The loss in *watts* is equal to the product of the resistance of the wire in *ohms* multiplied by the *square* of the number of amperes. Watts = ohms × amperes^2.

Work. The amount of power multiplied by the time it acts. Thus, a kilowatt is a unit of power while a kilowatt hour is a unit of work.

CHEMISTRY

Chemistry is the science which deals with the composition and transformations of matter. It is concerned with and explains changes which take place in materials connected with the practical acts of everyday life as well as in rare or complex substances investigated only by specialists.

Chemical processes and principles are brought into play in building a fire, in making bread, in cooking meat, in breathing air, in digesting food, in the hardening of cement and plaster, in the drying of paint, in making lime, cement, and brick, in preparing fertilizers, in purifying water, in producing soap, vinegar, cheese, charcoal, illuminating gas, aniline dyes, and medicines, as well as in the manufacture of aluminum, copper, iron and steel, and in smelting precious metals. Chemistry, therefore, is a most useful science, and in an immense number of important ways contributes to human welfare.

Divisions of Chemistry. Chemical science may be regarded as consisting of four chief branches: (1) *General Chemistry*, embracing *Theoretical Chemistry*, which deals with the laws of composition and the chemical behavior of compounds, and *Physical Chemistry*, which deals with their physical properties, including Electrochemistry, Thermochemistry, and Photochemistry; (2) *Descriptive Chemistry*, which is concerned with the physical and chemical characteristics of substances and their classification, comprising the two great subdivisions, *Inorganic Chemistry* and *Organic Chemistry*, the latter treating only the compounds of carbon and the former treating the compounds of all the other elements; (3) *Analytical Chemistry*, which determines the composition of substances, including qualitative and quantitative analysis; and (4) *Applied Chemistry*, which embraces all the practical uses of chemistry, including *Physiological Chemistry*, which has to do with plant and animal processes, products, and functions, *Industrial Chemistry*, which deals with the uses of chemistry in the arts and manufactures, and *Agricultural Chemistry*, which is concerned with various practical problems of agriculture, horticulture, and animal industry.

Agricultural Chemistry. This branch of applied chemistry deals with the problems of soil fertility, the nutrition of plants and animals, the chemical composition of plants and animals, and the composition and value of plant and animal products for food or other useful purposes.

Analytical Chemistry. The branch of chemistry which deals with the exact composition of substances; called also chemical analysis. There are two main divisions,—*qualitative analysis*, which determines what elements or compounds are present, and *quantitative analysis*, which determines the relative amounts of each. Qualitative analysis employs the standard chemical reactions or tests, and includes the use of the blowpipe and the spectroscope. In addition to these, quantitative analysis employs *gravimetric* methods, which involve weighing, *volumetric* methods, which require measuring of volumes, and *electrolytic* methods, involving the decomposition of substances by an electric current.

The methods of chemical analysis are of great practical value in assaying ores, in the metallurgy of useful and precious metals, in testing the purity of drinking water, air, foods, and medicines, in making sugar, and in innumerable other important processes of manufacture.

Organic Chemistry. Chemists formerly divided the science of chemistry into two distinct branches: *Inorganic Chemistry*, or the chemistry of the mineral kingdom; and *Organic Chemistry*, or the chemistry of the plant and animal kingdoms.

It was formerly believed that there is an essential difference between mineral substances and substances produced by living organisms. For many years it was believed impossible to prepare artificially in the laboratory the organic compounds formed in the bodies of plants and animals. But, in 1828, Wöhler, a German chemist, prepared urea artificially by building it up from inorganic compounds. Since that time an immense number of compounds found in plants and animals have been built up from inorganic substances, or from other organic substances, so that it is well established that there is no fundamental difference between organic and inorganic chemistry.

One element, however, is contained in all plant and animal bodies, namely, *carbon*. This element has the peculiar property of combining, as it were, with itself, and, by virtue of this property, gives rise to an immense number of derivative compounds, some of which are of very complex composition and constitution. So, simply for the purposes of study, these are now classed together under the head of *Organic Chemistry*, which is broadly defined as the chemistry of the carbon compounds.

Physiological Chemistry. The branch of chemical science which deals with those processes and functions of living organisms, both plant and animal, that can be explained by chemical laws and studied by chemical methods. It examines the chemical changes involved in the two great groups of processes connected with growth; namely, the *building up* and the *breaking down* of various forms of organic matter, in such important functions as digestion, assimilation, metabolism, and excretion.

Thermochemistry. In most cases, chemical combination is accompanied by the development of heat. The quantity of heat thus developed by the formation of a given weight of a particular substance under standard conditions is always the same. Further, the decomposition of any compound requires the expenditure, in the form of heat or otherwise, of exactly the same amount of energy as was liberated by its formation. However, the formation of some compounds is attended by absorption of heat. In such case exactly the same amount of heat is liberated when the compound decomposes. The branch of chemical science that deals especially with the development or the absorption of heat which accompanies chemical reactions is termed thermochemistry.

PRINCIPLES OF CHEMISTRY

The division of chemical science which treats of the fundamental laws governing the composition of substances, and of their reactions and behavior when entering into composition, is called *Theoretical Chemistry*. From numerous experiments and observations, various theories, principles, and laws have been induced. Some of these, as, for example, the atomic theory, have proved to be as valuable in the domain of chemistry as Newton's laws have been in the realm of physics.

Kinds of Substances. By actual experiment, the chemist finds that he is able to divide all substances into two great classes; namely, *compounds*, which can be split up into two or more different substances of a simpler nature, and *elements*, which cannot be split up into anything differing from themselves. All the varied forms of matter, whether solid, liquid, or gaseous, or whether mineral, vegetable, or animal in their nature, are produced by the combinations of these elementary substances.

Chemical Attraction. Combination between different substances is due to the existence of *chemical attraction* between the atoms of which they are composed. The exact nature of this attraction is not understood. It differs from other kinds of attraction in that it entirely changes the properties of the substances between which it acts, and, moreover, it acts only between bodies which are in the most intimate possible contact. Chemical action

consequently takes place most rapidly between gases, somewhat less rapidly between liquids, and usually much less rapidly between solids.

Forms of Chemical Change. Chemical change takes place in the burning of wood, in the rusting of iron, in the hardening of mortar, in the souring of milk, in the decay of vegetables, in the spoiling of meat, and in the fermenting of fruit juices. The original substances in each case seem to lose their identity; they are no longer the same, and substances with different properties or characteristics are formed. Between the bright, tough iron and the dull, brittle rust there is no resemblance, and the solid wood and the dustlike ashes are equally unlike.

There are a few metals, as, for example, magnesium, which burn in the air. When a thin strip of magnesium is set on fire, it quickly burns to a white powder. If the metal is weighed before and after burning, the ashes will be found to be heavier than the metal, showing that something was added during the burning. However, if a piece of wood is weighed before and after burning, the ashes will be found to weigh less than the wood, indicating that something is taken away when burning. Alterations, such as the foregoing, are called chemical changes. Chemical changes which produce heat are called *exothermic*; those which absorb heat, *endothermic*.

The various forms of chemical change may conveniently be classed under three heads: (1) *Combination*, or *synthesis*, in which two or more substances combine to form a new compound of more complex composition; (2) *Decomposition*, or *analysis*, in which a compound is split up into its constituent elements, or into other compounds of simpler nature; (3) *Double decomposition*, or *metathesis*, in which a reaction takes place between two or more compounds, accompanied by a mutual interchange of elements, and ending in the formation of a new series of compounds.

Chemical change is usually made evident by an alteration in the physical properties of the bodies affected. In many cases there is development of heat, sometimes accompanied by the production of light. There may also be production, destruction, or change of color, conversion of solids or liquids into gases, or condensation of gases into solids or liquids, production of solids from liquids, or the reverse.

Conditions of Chemical Change. The occurrence of chemical change depends on the nature of the substances brought into contact, and also on certain physical conditions. In many cases the reaction takes place at ordinary temperatures; in others the substances have to be heated before any change occurs. On the other hand, substances which react on one another at ordinary temperatures are without action at very low temperatures. Further, many compounds are decomposed or split up when heated, heat being one of the main agents which bring about decomposition.

Generally speaking, a moderately high temperature is favorable to combination or double decomposition, while a higher temperature tends to produce decomposition. Oxygen and mercury, for example, combine directly only at a temperature approaching the boiling point of the latter, but if the oxide of mercury thus formed is still more strongly heated, it splits up again into oxygen and mercury.

If two or more substances are brought together in a state of solution, and by their mutual reaction can produce a new substance insoluble in the particular liquid used, then, with very few exceptions, this new compound will be produced and will be precipitated, or thrown out of solution. The production of chemical action is affected also by the relative quantities in which the different substances are present, by the relative volatility of the bodies which may be formed, and by various other conditions.

It is found, as a general rule, that those elements most readily combine which exhibit the greatest differences in their properties. Chlorine, for example, readily combines with sodium or antimony; but, for bromine, which it closely resembles in many properties, it has very little attraction.

Laws of Chemical Change. It is found, moreover, that combination always takes place in certain definite proportions, and not in haphazard quantities. For example, in round numbers, 16 parts by weight of oxygen always combine with 2 parts of hydrogen to form 18 parts of water, and 35.5 parts of chlorine always combine with 1 part of hydrogen to form 36.5 parts of hydrochloric acid.

Further, it is found that if a piece of iron is placed in a solution of copper sulphate, metallic copper is deposited on the iron, while a portion of the latter is dissolved, and for every 63.4 parts of copper deposited 56 parts of iron are always dissolved. Again, when iron is placed in dilute sulphuric acid, hydrogen gas is given off and the metal is dissolved, and it is found that for every 1 part of hydrogen given off, 28 parts of iron are dissolved. It follows that 56 parts of iron are capable of replacing, or are chemically equivalent to, 63.4 parts of copper or two parts of hydrogen.

Briefly, it is found that a certain definite quantity of each element is capable of combining with, or of replacing in compounds, certain definite quantities of other elements, and these are termed their *chemical equivalents*. For the sake of comparison, one part of hydrogen is usually taken as the standard to which all other equivalents are referred, and, from the example given above, it is evident that the equivalent of iron is 28, and so on.

In some cases, the number representing the equivalent of an element is the same as that representing its atomic weight; but in many cases the latter is some simple multiple of the former. The equivalent is a quantity determined by actual experiment; the atomic weight is to a certain extent a matter of theory.

GENERAL CHEMISTRY

Acids. An important class of chemical substances, usually sour in taste and soluble in water, possessing the power to neutralize alkalies and to react with a vast number of substances. The most common chemical test for acids makes use of their well-known property of turning certain vegetable colors red. A piece of paper, dyed blue by the juice of a lichen called archil, and known as litmus paper, is put into the liquid to be tested. If there is acid present, the blue color will be changed to red. In such a case, if an alkaline liquid be then slowly poured into the acid liquid, the red color will gradually fade and at length the blue color will be restored. In other words, acids and alkalies are opposites, for each will neutralize or destroy the effect of the other.

While many acids occur native in the juices of plants, in fruits, in animal bodies, and in many mineral substances, most acids are obtained by chemical processes. Several hundred kinds are known, of which some are gases, some are liquids, and some are solids. Chemically, acids are mostly compounds of hydrogen with some nonmetallic element, and, in addition, they usually, though not always, contain oxygen. The characteristic which distinguishes acids from all other compounds is that part or all of the hydrogen may be exchanged or replaced by being brought into contact with a metal or a base, thereby forming a new compound. The new compounds, resulting from this substitution of metals or basic radicals for the hydrogen of acids, are called *salts* of the respective metals. Similarly, the various acids themselves may be regarded as salts of hydrogen.

Only a few acids, such as hydrochloric, do not contain oxygen. These are sometimes called *hydracids*, to distinguish them from those containing

oxygen, or *oxyacids*. Acids which do not contain carbon are termed *mineral* or inorganic acids. The most common of these are hydrochloric acid, nitric acid, and sulphuric acid, which are of immense value in the industrial and chemical arts. Among other mineral acids are boric, bromic, chromic, hydrofluoric, iodic, phosphoric, silicic, stannic, and telluric acids.

Acids containing carbon, hydrogen, and oxygen, in various proportions, are called *organic acids*, for the reason that many of them were first found in animal or plant substances. For example, acetic acid occurs in vinegar; malic acid in gooseberries, currants, and unripe apples; citric acid in oranges and lemons; tartaric acid in grapes; and oxalic acid in various sorrels. Carbolic acid is obtained from coal tar. Other organic acids are benzoic, formic, gallic, lactic, oleic, palmitic, stearic, and tannic. An exceedingly large number of organic acids have been produced by laboratory methods.

The strength of acids depends upon their composition and chemical constitution. Some, such as hydrochloric, nitric, and sulphuric acids, are exceedingly powerful, while many organic acids are very mild in their action. There are three chief methods for indicating their comparative strength: (1) By determining the relative rate at which they produce hydrogen when acting on the same metal; (2) by determining the relative speed with which they decompose sugar in solution; (3) by determining their relative electrical conductivity when dissolved in water. These tests yield similar results when applied to many acids. For example, by these methods it is shown that hydrochloric acid and nitric acid are both twice as strong as sulphuric acid, and that acetic acid is relatively very weak. Most metals, or their hydroxides known as bases, dissolve more or less readily in acids. Gold cannot be dissolved in any single acid except selenic, though it readily yields to various combinations of acids.

Some acids are healthful and are used for food; as, for example, those contained in most fruits. Other acids, such as prussic, oxalic, and carbolic, are among the most violent poisons. Some are harmless to the touch; others are biting and corrosive to the skin. Strong sulphuric acid will char and destroy nearly all animal and vegetable substances. Nitric acid stains the skin yellow and leaves a painful wound. In some respects, hydrochloric acid is the most powerful of all, yet in a diluted state it forms an indispensable part of the digestive fluids of the human stomach. The practical uses of acids in medicine, in the industries, in the arts, and in scientific investigation are exceedingly numerous and valuable.

Alkalies. A class of basic compounds with a peculiar biting taste and characterized, like all other bases, by the power to react with acids to form *salts*. If a piece of blue litmus paper that has been reddened by an acid be placed in alkali, it will turn blue again. This test, which holds for all alkalies, shows that the action of the acid has been neutralized by that of the alkali. The alkalies proper are compounds of hydrogen and oxygen with the metals sodium, potassium, lithium, rubidium, cæsium, and the radical ammonium. Chemically, they are known as the hydroxides of these metals.

The principal alkalies are caustic soda, or sodium hydroxide; caustic potash, or potassium hydroxide; and ammonia, or ammonium hydroxide. The strongest alkalies are caustic soda and caustic potash, commonly known in an impure state as soda lye and potash lye. These are exceedingly caustic, act as powerful corrosive poisons, and react with fats and oils to form soaps. Alkalies are of great value in chemical research, and are extensively used in the industrial arts, especially in soap making and in dyeing. Lime, magnesia, and sodium carbonate are sometimes regarded as alkalies.

Allotropy. The capacity of certain substances to exist in two or more forms, differing from each other in physical properties. For example, carbon occurs in octagonal crystals of extremest hardness in the diamond, in hexagonal crystals of little hardness in graphite or black lead, and in a soft, uncrystallized state in lampblack and charcoal. Again, when electricity discharges in air containing ordinary oxygen, portions of the latter are transformed into ozone. This differs from ordinary oxygen as to density, odor, and disinfecting qualities, but upon analysis it is found to contain nothing but the element oxygen. Sulphur and phosphorus likewise exhibit interesting allotropic forms. Some chemical compounds exist in allotropic modifications, as, for instance, calcium carbonate, which occurs in rhombohedral crystals in calcite and in orthorhombic crystals in aragonite.

Atom. According to the atomic theory advanced by Dalton, in 1803, and widely accepted by chemists during the 19th century, an atom is the smallest particle of an element which can exist either alone or in combination with similar particles or atoms of the same element or of a different element. This conception of the structure of matter, based on the atomist theory in philosophy, was confirmed by the work of Avogadro (1776–1856), who made the important distinction between atoms and molecules. Subsequent discoveries, such as the law of atomic heat, isomorphism, substitution, and isomerism, and, more recently, ionization and radioactivity, have greatly advanced scientific theory regarding the nature of the atom.

According to recent researches, the atom is no longer to be regarded as the ultimate, indivisible particle of matter, but as a more or less complex system consisting of a nucleus accompanied by *electrons* in rapid rotation. In the case of radium and other radioactive substances, portions of the nucleus together with some of these electrons are thrown off to unite in new arrangements; that is, to form atoms of another element having a smaller atomic weight. See *Isotopes*.

Atomic Theory. A theory as to the existence and properties of atoms, accounting for the fact that in compound bodies the elements combine in certain constant proportions, by assuming that all bodies are composed of ultimate atoms, the weight of which is different in different kinds of matter. It is associated with the name of Dalton (1766–1844), who systematized and extended the imperfect results of his predecessors. On its practical side the atomic theory asserts three Laws of Combining Proportions:

1. The *Law of Constant or Definite Proportions*, teaching that in every chemical compound the nature and the proportion of the constituent elements are definite and invariable; thus water invariably consists of nearly eight parts by weight of oxygen to one part by weight of hydrogen.

2. The *Law of Combination in Multiple Proportions*. According to this law the several proportions in which one element unites with another invariably bear toward each other a simple relation. Thus one part by weight of hydrogen unites with eight parts by weight of oxygen to form water, and with sixteen parts (i.e., 8×2) of oxygen to form peroxide of hydrogen.

3. The *Law of Combination in Reciprocal Proportions*, teaching that the proportions in which two elements combine with a third also represent the proportions in which, or in some simple multiple of which, they will themselves combine; thus hydrogen combines with carbon to form ethylene, in the proportion of one to six, while oxygen combines with carbon, as carbon monoxide, in the proportion of eight to six. Consequently, when hydrogen combines with oxygen to form water, the relative weights of each element in the compound are as one to eight.

The theory that these proportional numbers are nothing but the relative weights of atoms so thoroughly accounts for the phenomena that the

existence of these laws might have been predicted by the aid of the atomic hypothesis long before they were actually discovered by analysis. In themselves, however, the laws do not prove the theory of the existence of ultimate particles of matter of a certain relative weight. Consequently, in using the word atom, it should be held in mind that the term denotes merely the proportions in which elements unite. These will remain the same whether the atomic hypothesis which suggested the employment of the term be true or false.

Further, it should be remembered that while the atomic weights of many elements are whole or integral numbers, many of the most exactly known atomic weights cannot be expressed by commensurable numbers. Even oxygen and hydrogen, mentioned in the foregoing illustration, do not combine exactly in the proportion of eight parts to one. (See *Table of Chemical Elements.*) However, with all the modifications made necessary by recent discoveries, the atomic theory still remains one of the most valuable working hypotheses in the whole realm of modern science.

Atomic Weight. The atomic weight of an element is the relative weight of an atom of that element compared with the weight of an atom of oxygen. Formerly, the atom of hydrogen, the lightest known element, was taken as 1 and the atomic weights of all other elements were determined with reference to it. At the present day, however, chemists take the atomic weight of oxygen, reckoned as 16, as the standard from which the atomic weights of the other elements are determined. On this basis, the atomic weight of hydrogen, instead of being unity, is 1.008. See *Isotopes.*

Avogadro's Hypothesis. The established facts concerning the relation of atomic weights and volumes led Avogadro, a professor of physics in Turin, Italy, to offer, in 1811, as an explanation, his hypothesis, which has proved of great value in the development of modern chemical theory. It is usually stated thus: Under the same conditions of temperature and pressure, equal volumes of gases contain equal numbers of molecules. This hypothesis is known also as "Avogadro's rule," and "Avogadro's law."

Bases, Chemical. The hydroxide of any positive element, or, any substance whose aqueous solution contains hydroxyl ions. A base reacts with an *acid* to form a *salt*, and, usually, water. The metallic hydroxides are all bases but they differ greatly in activity. Some, such as magnesium hydroxide, are so mild that they may be taken as medicine in fairly large quantities; others, such as the hydroxides of sodium and potassium, are powerful caustics. Many organic substances, such as aniline, also act as bases. The modern method for determining the relative strength of a base is to measure the electrical conductivity of its aqueous solution. Those bases which are so active that, when they are dissolved in water, the solution has a soapy feeling and changes red litmus to blue are known as *alkalies.*

Catalysis. The advancing or retarding of a chemical reaction produced by the presence of a substance called a *catalytic agent*, or *catalyzer*, which itself remains apparently unchanged.

Numerous enzymes or ferments produce catalysis, such as pepsin in the digestive fluids, or the zymase of yeast, which causes fermentable sugars to decompose into alcohol and carbon dioxide. Various metals also act as catalyzers. In the manufacture of sulphuric acid on a large scale, sulphur dioxide and oxygen are transformed into the needed sulphur trioxide simply by passing a mixture of these gases over metallic platinum and other metallic substances, the metals remaining unchanged.

Similarly, ammonia is now manufactured in commercial quantities by heating a mixture of nitrogen and hydrogen over metallic iron, in the presence of which these gases unite. Again, many organic substances can be reduced by treating them with hydrogen in the presence of finely divided nickel. By this method, liquid vegetable oils, as, for example, cottonseed oil, are now changed to solid fats and widely used for culinary purposes.

Chemical Compounds. When two or more elements unite to form a substance having properties different from those of either component element, the resulting substance is called a chemical compound.

When the gaseous element oxygen unites with the gaseous element hydrogen, the resulting liquid substance, water, is a chemical compound. Similarly, when the gas nitrogen unites with hydrogen, the resulting substance, ammonia, is a chemical compound. Again, when the metallic element sodium unites with the gaseous element chlorine, the resulting substance, common salt, is a chemical compound.

Chemical compounds may be very simple, consisting of the union of single atoms of only two elements, as in case of common salt, or they may be exceedingly complex, consisting of the union of several elements in greatly differing proportions, such as those which exist in albumen and in many other organic substances. As a rule, mineral compounds are comparatively simple and organic compounds very complex.

When two or more elements are brought together but do not form a chemical union, the result is a simple *mixture*, not a compound. For example, the oxygen, nitrogen, and other gases in air form merely a mixture. Similarly, when copper and tin are melted together to form bronze, the result is a mixture, called, like other similar mixtures of metals, an alloy.

Chemical Elements. All matter is found to be made up of some 80 or more primary substances which cannot by available physical or chemical processes be decomposed into simpler ones. These simplest substances are called the chemical elements.

The discovery of radioactivity, however, proves that some, and possibly all, of the elements are decomposable. Yet radioactive changes are entirely different from any known chemical reaction. Moreover, they are so exceedingly slow that they are practically negligible, and the metal radium itself, though being gradually transformed into the gases helium and niton, is unhesitatingly classed as an element. The essential fact about every chemical element is its relative atomic or combining weight, which is constant and unchangeable, and forms an unfailing characteristic of the element.

For convenience, the elements are spoken of as comprising two groups, the *metals* and the *nonmetals*, or *metalloids*. There is, however, no sharp line of distinction between them, various metals having some of the properties of nonmetals and various nonmetals possessing some of the characteristics of metals. Among the 60 or more metallic elements are gold, silver, iron, copper, aluminum, tin, zinc, nickel, and lead. Among the nonmetallic elements are oxygen, hydrogen, nitrogen, chlorine, carbon, silicon, sulphur, and phosphorus. All mineral, plant, and animal matter on the earth is composed of the various chemical elements, singly or in combination.

Most substances are made up of a relatively small number of the common elements. For example, about thirteen elements compose the great bulk of the mineral matter in the earth's crust. A similarly small number enter into the composition of all plant and animal matter. Most of the elements are not common, and more than half of them are comparatively rare. The inert gases, argon, helium, krypton, neon, niton, and xenon, occur singly. The other elements enter into various combinations with each other, though some are found native or uncombined. Important facts concerning the elements now known will be found in the accompanying table.

TABLE OF CHEMICAL ELEMENTS

Element	Symbol	Atomic Weight O=16	Discoverer	Year	Specific Gravity *	Fusing or Melting Point *
Aluminum	Al	27.0	Wöhler	1827	2.72	659° C., 1218° F.
Antimony (stibium)	Sb	120.2	Valentine	1450	6.70	630° C., 1166° F.
Argon	A	39.9	Rayleigh and Ramsay	1894	1.40†	−188° C., −306° F.
Arsenic	As	74.96	Schröder	1694	5.71	850° C., 1562° F.
Barium	Ba	137.37	Berzelius, Pontin, Davy	1808	3.75	850° C., 1562° F.
Beryllium (glucinum)	Gl	9.1	Wöhler	1828	1.85	1280° C., 2336° F.
Bismuth	Bi	209.0	Valentine	1450	9.80	271° C., 520° F.
Boron	B	10.9	Davy, Gay-Lussac, Thenard	1808	2.45	2200° C., 4000° F.
Bromine	Br	79.92	Balard	1826	3.19	−7.3° C., 18.9° F.
Cadmium	Cd	112.40	Hermann and Stromeyer	1817	8.65	320.9° C., 609.6° F.
Cæsium	Cs	132.81	Bunsen and Kirchhoff	1860	1.87	26° C., 79° F.
Calcium	Ca	40.07	Davy, Berzelius, Pontin	1808	1.54	810° C., 1490° F.
Carbon	C	12.005	.....	....	3.52‡	>3600° C., >6500° F.
Cerium	Ce	140.25	Berzelius, Hisinger, Klaproth	1803	6.9	640° C., 1184° F.
Chlorine	Cl	35.46	Scheele	1774	1.44†	−101.5°C., −150.7°F.
Chromium	Cr	52.0	Vauquelin	1797	6.92	1615° C., 2940° F.
Cobalt	Co	58.97	Brandt	1735	8.72	1480° C., 2696° F.
Columbium (niobium)	Cb	93.1	Hatchett	1801	7.06	1700° C., 3090° F.
Copper (cuprum)	Cu	63.57	.....	....	8.9	1083° C., 1982° F.
Dysprosium	Dy	162.5	Urbain	1906		
Erbium	Er	167.7	Mosander	1843	4.77	
Europium	Eu	152.0	Demarçay	1896		
Fluorine	F	19.0	Ampère and Davy	1810	1.14†	−223° C., −369° F.
Gadolinium	Gd	157.3	Marignac	1880	1.31	
Gallium	Ga	70.1	Boisbaudran	1875	5.95	30° C., 86° F.
Germanium	Ge	72.5	Winkler	1886	5.47	958° C., 1756° F.
Gold (aurum)	Au	197.2	.....	....	19.32	1063° C., 1946° F.
Hafnium	Ha	178.6	Coster, Hevesy	1923		
Helium	He	4.0	Ramsay	1895	.122†	<−271°C., <−456°F.
Holmium	Ho	163.5				
Hydrogen	H	1.008	Cavendish	1766	.07†	−259° C., −434° F.
Illinium			Hopkins	1926		
Indium	In	114.8	Reich and Richter	1863	7.12	155° C., 311° F.
Iodine	I	126.92	Courtois	1811	4.95	113.5° C., 236.3° F.
Iridium	Ir	193.1	Tennant	1802	22.7	2350° C., 4262° F.
Iron (ferrum)	Fe	55.84	.....	....	7.86	1530° C., 2786° F.
Krypton	Kr	82.92	Ramsay and Travers	1898	2.16†	−169° C., −272° F.
Lanthanum	La	139.0	Mosander	1839	6.15	810° C., 1490° F.
Lead (plumbum)	Pb	207.2	.....	....	11.34	327.4° C., 621.3° F.
Lithium	Li	6.94	Arfvedson	1817	.53	186° C., 367° F.
Lutecium	Lu	175.0	Urbain	1907		
Magnesium	Mg	24.32	Davy	1808	1.75	651° C., 1204° F.
Manganese	Mn	54.93	Gahn	1774	7.4	1230° C., 2246° F.
Masurium			Noddack	1925		
Mercury (hydrargyrum)	Hg	200.6	.....	....	13.595	−38.87°C., −37.97°F.
Molybdenum	Mo	96.0	Hjelm	1782	8.6	2500° C., 4500° F.
Neodymium	Nd	144.3	Welsbach	1885	6.95	840° C., 1544° F.
Neon	Ne	20.2	Ramsay and Travers	1898	.695A	−253° C., −423° F.
Nickel	Ni	58.68	Cronstedt	1751	8.9	1452° C., 2646° F.
Niton	Nt	222.4	Dorn (as radium emanation)	1900	.....	−71° C., −96° F.
Nitrogen	N	14.008	Rutherford	1772	.80†	−210° C., −346° F.
Osmium	Os	190.9	Tennant	1803	22.48	2700° C., 4900° F.
Oxygen	O	16.0	Priestley	1774	1.12†	−218° C., −360° F.
Palladium	Pd	106.7	Wollaston	1803	11.9	1370° C., 2466° F.
Phosphorus	P	31.04	Brandt	1669	1.83	44° C., 111° F.
Platinum	Pt	195.2	Watson	1750	21.16	1755° C., 3191° F.
Potassium (kalium)	K	39.10	Davy	1807	.86	62.3° C., 144° F.
Praseodymium	Pr	140.9	Muthmann and Weiss	1904	6.48	940° C., 1724° F.
Radium	Ra	226.0	M. and Mme. Curie	1898	.....	700° C., 1292° F.
Rhodium	Rh	102.9	Wollaston	1804	12.1	1950° C., 3542° F.
Rubidium	Rb	85.45	Bunsen and Kirchhoff	1860	1.53	38° C., 100° F.
Ruthenium	Ru	101.7	Claus	1845	12.26	2450° C., 4442° F.
Samarium	Sm	150.4	Boisbaudran	1879	7.8	1350° C., 2450° F.
Scandium	Sc	45.1	Nilson	1879		
Selenium	Se	79.2	Berzelius	1817	4.27	217–220°C., 422–428°F.
Silicon	Si	28.1	Berzelius	1823	2.0	1420° C., 2588° F.
Silver (argentum)	Ag	107.88	.....	....	10.53	960.5° C., 1761° F.
Sodium (natrium)	Na	23.00	Davy	1807	.97	97.5° C., 207.5° F.
Strontium	Sr	87.63	Davy	1808	2.54	>Ca <Ba
Sulphur	S	32.06	.....	....	2.06	112.8° C., 235° F.
Tantalum	Ta	181.5	Ekeberg	1802	14.49	2850° C., 5160° F.
Tellurium	Te	127.5	Klaproth	1788	6.01	452° C., 846° F.
Terbium	Tb	159.2	Mosander	1843		
Thallium	Tl	204.0	Crookes and Lamy	1862	11.85	302° C., 576° F.
Thorium	Th	232.15	Berzelius	1828	11.23	<Mo <Mo
Thulium	Tm	169.9	Urbain	1900		
Tin (stannum)	Sn	118.7	.....	....	7.30	231.9° C., 449.4° F.
Titanium	Ti	48.1	Gregor	1791	4.50	1800° C., 3272° F.
Tungsten (wolfram)	W	184.0	d'Elhujar	1782	18.7	3400° C., 6152° F.
Uranium	U	238.2	Klaproth	1789	18.68	<1850° C., <3362° F.
Vanadium	V	51.0	Sefstroem	1830	6.02	1720° C., 3128° F.
Xenon	Xe	130.2	Ramsay and Travers	1898	3.52†	−140° C., −220° F.
Ytterbium	Yb	173.5	Marignac	1878		
Yttrium	Yt	89.33	Gadolin	1794	3.80	1490° C., 2714° F.
Zinc (zincum)	Zn	65.37	Paracelsus	1520	7.14	419.4° C., 786.9° F.
Zirconium	Zr	90.6	Berzelius	1824	6.4	1700° C., 3090° F.

* The factors in these columns vary with the form which the element takes (e.g., in carbon the specific gravity varies as diamond, charcoal, or lampblack is taken), but as far as possible the factor of the most typical form is given.

† Of the liquid element. ‡ Diamond. A—Air=1. < Less than. > More than.

Combustion. The operation of fire on any inflammable substance; chemically, the union of such a substance with oxygen or some other supporter of combustion, attended with heat and in most instances with light.

The combination of the carbon in various fuels with the oxygen of the air by combustion is a universal method of obtaining heat, light, and power. However, many substances besides carbon, such as phosphorus, sulphur, magnesium, and other metals, burn in the air and in various other substances, as, for example, chlorine. While the chemical action between these uniting or burning materials is mutual, the more solid substances, such as coal, wood, charcoal, and petroleum, are called *combustibles*, while the reacting gases, such as oxygen and chlorine, are called *supporters of combustion*. A very large number of substances containing carbon, including the numerous kinds of coal, asphaltum, petroleum, and illuminating and natural gas, are combustible.

The slow oxidation of various carbon compounds in the animal body, resulting in the production of animal heat and of the carbonic-acid gas thrown off by the lungs, is also called combustion.

Deliquescence. The property displayed by certain substances of absorbing water from the air, so that they become wet or even dissolve in the absorbed liquid. Substances possessing this property are called deliquescent. Examples are caustic potash, caustic soda, magnesium chloride, and calcium chloride, the last being extensively used as a drying agent.

Efflorescence. The property possessed by some crystallized substances of giving up their water of crystallization upon exposure to dry air. For example, a clear, bright crystal of washing soda (sodium carbonate), upon being left in the air, soon becomes covered with a fine powder. This is caused by the evaporation of water from its surface, which leaves behind particles of dry soda. Glauber's salt (sodium sulphate) effloresces in similar manner.

Electron. A particle or corpuscle, carrying a charge of negative electricity and possessing about $\frac{1}{1800}$ the mass of a hydrogen atom; now regarded as a common constituent of the atoms of all chemical elements. According to the theory of electrons, the charge borne by an electron is the natural unit or atom of negative electricity, and, whenever a body is charged with negative electricity, the charge is due to the congregation of electrons upon it.

Electrons have been detected only when they are in rapid motion, and, so far as known, they are all of one kind and always bear the same charge of electricity. They are emitted from the surface of glowing metals, from the electric arc, from flames, and from metal plates exposed to ultra-violet light. In such cases an external force or stimulus is necessary to liberate the electrons. But all radioactive substances, such as radium, thorium, and uranium, continuously and spontaneously emit these same small, negatively charged particles.

Further, it has been found that the charge carried by the electron or gaseous ion is identical with that carried by a monovalent anion in electrolysis. Moreover, the charge carried on a monovalent cathion is equal in quantity but opposite in sign. This constancy in the mass and in the charge of the electron, regardless of its origin, has led scientists to the conclusion that all matter contains this primordial element. See *Electricity*, *Isotopes*.

Enzymes. A group of remarkable substances, comprising the active principles of many and perhaps of all ferments. Enzymes possess the peculiar property of transforming various substances while remaining unchanged or being only very slowly changed themselves. They are found in plants and animals, especially in active plant cells, and are secreted by various yeasts and bacteria, though as yet little is known as to their exact chemical nature.

Various enzymes play a very essential part in many important plant and animal processes, particularly those concerned with digestion and nutrition. For example, *pepsin*, found in the gastric juice of the stomach, and *trypsin*, which occurs in the pancreatic juice, convert undigested protein food substances into assimilable amino acids. Pure pepsin has been found capable of digesting 25,000 times its own weight of egg-albumin. *Rennin*, the active principle of rennet which is prepared from the digestive stomach of a calf, causes the casein of milk to coagulate, producing the curd formed in the process of making cheese.

Lipase, which occurs in oily seeds, changes fats into glycerin and fatty acids. *Diastase*, found both in plants and in animals, has the power to transform starch into maltose and glucose. *Invertase*, found in many plants, causes cane sugar to split into grape sugar (glucose) and fruit sugar (fructose). *Zymase*, secreted by the yeast plant, causes certain sugars to split into alcohol and carbon dioxide, thereby producing alcoholic fermentation.

Fermentation. A chemical change brought about by the action of certain living organisms, such as yeasts and bacteria, or by remarkable catalytic agents, called *enzymes*, which these minute plants possess the power to secrete.

Many substances, both organic and inorganic, are acted upon by fermentation, and numerous organisms may produce it. The various kinds of fermentation are classed in three groups: *splitting*, in which the substance acted upon is split into two or more substances; *oxidative*, in which the substance acted upon is oxidized to another substance; and *compound*, in which both the foregoing are combined.

During fermentation, gases are often formed, so that the fermenting solution becomes covered with froth caused by their rapid escape. The most familiar example is that produced by the yeast plant, the enzyme of which, called *zymase*, splits sugar into alcohol and carbon dioxide, or carbonic-acid gas. This process, known as *alcoholic fermentation*, takes place whenever yeast is placed in a dilute solution of sugar and kept at a temperature between 50° and 86° F. For example, it occurs when malt is brewed into beer, when grape juice is changed into wine, when apple juice becomes "hard" cider, and when canned fruit "works." It occurs also when yeast is used to generate the carbon dioxide which "raises" the dough of yeast bread.

Lactic-acid fermentation, which causes the "souring" of milk and various fruit juices, is produced by certain bacteria which convert milk and fruit sugars into lactic acid. The aroma of butter is due largely to butyric-acid fermentation. Nitrifying bacteria in the soil oxidize ammonia into nitrites and nitrates. Sulphur bacteria oxidize the hydrogen sulphide of putrid streams into sulphuric acid. An important example of oxidative fermentation is the change of ordinary alcohol into vinegar, easily effected in cider and wine, through the action of acetic-acid bacteria found in the slimy substance commonly known as "mother of vinegar." Compound fermentations occur chiefly in various putrefactions, the chemical nature of which is as yet imperfectly known.

Formulas, Chemical. The formula of a chemical compound is indicated by grouping together the symbols of the atoms composing a molecule of it. The molecule of common salt is composed of one atom of sodium (Na) and one atom of chlorine (Cl). Hence the chemical formula for common salt is written NaCl. In case a molecule contains more than one atom of the same kind, the number of these atoms is usually written as a subscript to the symbol. For example, the formula for water, a molecule of which contains two atoms of hydrogen and one atom of oxygen, is written H_2O. Similarly, the formula for sulphuric acid is H_2SO_4; of nitric acid, HNO_3; of ammonia, NH_3.

The arrangement of the atoms in a compound is often more easily understood when shown by means of a graphic or structural formula. For example: The formula for aniline might be given as C_6H_7N; and for toluene, as C_7H_8, instead of $C_6H_5NH_2$ and $C_6H_5CH_3$ as shown in the table. But the first formulas do not show any relation between these two substances, while the second method shows that both contain the important phenyl group C_6H_5, and are probably made from benzene. If necessary, a graphic formula can illustrate the relationship of each atom to every other one in the molecule.

Chemical Formulas

Inorganic Compounds:

Aluminum acetate	$Al(C_2H_3O_2)_3$
Aluminum oxide	Al_2O_3
Barium sulphate	$BaSO_4$
Bismuth subnitrate	$BiONO_3$
Boric acid	H_3BO_3
Calcium carbonate	$CaCO_3$
Calcium phosphate	$Ca_3(PO_4)_2$
Carbon dioxide	CO_2
Carbon disulphide	CS_2
Carbon monoxide	CO
Carbon tetrachloride	CCl_4
Cobalt chloride	$CoCl_26H_2O$
Cyanogen	C_2N_2
Fulminate of mercury	$Hg(ONC)_2$
Gold chloride	$AuCl_3$
Hydrofluoric acid	HF
Hydrogen peroxide	H_2O_2
Hydrogen sulphide	H_2S
Iron hydroxide	$Fe(OH)_3$
Iron oxide, red	Fe_2O_3
Lead nitrate	$Pb(NO_3)_2$
Magnesium carbonate	$MgCO_3$
Mercuric nitrate	$Hg(NO_3)_2.\ 2H_2O$
Nickel ammonium sulphate	$NiSO_4(NH_4)_2SO_4.6H_2O$
Nitrogen pentoxide	N_2O_5
Potassium arsenite	$KAs\ O_2$
Potassium bromide	KBr
Potassium cyanide	KNC
Potassium dichromate	$K_2Cr_2O_7$
Potassium iodide	KI
Potassium permanganate	$KMnO_4$
Radium bromide	$RaBr_2$
Selenium oxychloride	$SeOCl_2$
Silver bromide	$AgBr$
Silver iodide	AgI
Silver nitrate	$AgNO_3$
Sodium acetate	$NaC_2H_3O_2$
Sodium benzoate	$NaC_7H_5O_2$
Sodium oxalate	$Na_2C_2O_4$
Sodium salicylate	$NaC_7H_6O_3$
Stannous chloride	$SnCl_2$
Sulphur dioxide	SO_2
Sulphur trioxide	SO_3
Zinc sulphide	ZnS

Organic Compounds:

Acetanilid	$CH_3CONH.C_6H_5$
Acetone	CH_3COCH_3
Acetylene	C_2H_2
Alizarin	$C_6H_4(CO)_2C_6H_2(OH)_2$
Amyl acetate	$C_5H_{11}CH_3CO_2$
Amyl alcohol	$C_5H_{11}OH$
Aniline	$C_6H_5NH_2$
Anthracene	$C_6H_4(CH)_2C_6H_4$
Antipyrene	$C_{11}H_{12}N_2O$
Benzene	C_6H_6
Caffeine	$C_8H_{10}N_4O_2.H_2O$
Camphor	$C_{19}H_{16}O$
Chloral	CCl_3CHO
Chloroform	$CHCl_3$
Citric acid	$C_3H_4OH(COOH)_3$
Glycerin	$C_3H_5(OH)_3$
Iodoform	CHI_3
Lactic acid	C_2H_5OCOOH
Menthol	$C_{10}H_{19}OH$
Morphine	$C_{17}H_{19}NO_4.H_2O$
Naphthalene	$C_{10}H_8$
Nicotine	$C_{10}H_{14}N_2$
Oleic acid	$C_{17}H_{33}COOH$
Oxalic acid	$H_2C_2O_4$
Picric acid	$C_6H_2OH(NO_2)_3$
Saccharin	$C_6H_4CO.SO_2.NH$
Salicylic acid	$C_6H_4OH.COOH$
Stearic acid	$C_{17}H_{35}COOH$
Sugar	$C_{12}H_{22}O_{11}$
Tannin	$C_{14}H_{10}O_9$
Tartaric acid	$(COOH)_2.(CHOH)_2$
Toluene	$C_6H_5CH_3$

Molecular Weight. The molecular weight of a compound is the sum of the weights of its component atoms. As a molecule of oxygen gas contains two atoms, its molecular weight equals 2×16, or 32. Thus it follows that the molecular weight is equal to the sum of the atomic weights multiplied by *one or more*.

Since the gram is the unit of weight, 32 grams is called the gram-molecular-weight of oxygen. Now, one liter of oxygen weighs 1.429 gm., so that 32 gms. would occupy 22.4 l., which is known as the *gram-molecular-volume*. It is a very important value, because from Avogadro's hypothesis it follows that the molecular weight of any *gaseous* substance may be found by determining the weight of an amount of it which would occupy 22.4 l. at 0°C. and 760 mm. pressure.

For convenience, the molecular weight of a solid or a liquid is usually considered to be the simple sum of the atomic weights of its component atoms. Thus the molecular weight of water, H_2O, is usually given as $2 + 16 = 18$; similarly, for common salt, NaCl, it is $23 + 35.5$ or 58.5, and for cane sugar, $C_{12}H_{22}O_{11}$, it is $144 + 22 + 176$, or 342.

Molecule. The smallest quantity of a substance which can exist and retain its identity in character with the mass of which it forms a part. As the atom or atoms composing it do not separate during physical change, the molecule is the unit of the mass. A molecule usually consists of a union of two or more atoms of the same or different elements, and some organic molecules contain a very large number of atoms. A molecule of water, H_2O, consists of two atoms of hydrogen and one atom of oxygen, and a molecule of hydrochloric acid, HCl, consists of one atom of hydrogen and one atom of chlorine.

In the case of many elementary gases, as, for example, oxygen, hydrogen, and chlorine, their molecules consist of two atoms each. In the case of ozone, which is an allotropic form of oxygen, the molecule consists of three atoms. On the other hand, the molecule may be identical with the atom, as in the case of mercury and argon.

Periodic Law. A principle of classification for the chemical elements, discovered and worked out chiefly by Mendeléef (1834–1907), a Russian chemist, who proved that "a periodic repetition of properties is obtained if all the elements be arranged in the order of their atomic weight." From this he derived the law which he summarized as follows: The properties of the elements are a periodic function of the atomic weight. In accordance with this principle, the elements have been grouped in nine classes possessing similar or recurring properties.

While not perfect, Mendeléef's system, based on the periodic law, has been of great value in predicting the discovery and the properties of new elements. It has led also to the revision and the adjustment of atomic weights, and has been of immense service in developing a systematic study of the elements.

Salts. Substances formed when metals or bases combine with acids; so named because in appearance many of them resemble common salt. Chemically, a salt is a compound formed by substituting the metal of a base for the hydrogen of an acid. In a sense, all acids may be regarded as salts of hydrogen. When the hydrogen is exchanged for a metal, the resulting compound is a salt of the metal. Or, what amounts to the same thing, a salt is formed by eliminating the elements of water (hydrogen H and hydroxyl OH) between an acid and a base.

The number of salts is exceedingly large and embraces a great variety of very useful substances. Besides common salt, which is sodium chloride, other well-known examples are: *Glauber's salt*, which is sodium sulphate; *Epsom salt*, which is magnesium sulphate; *saltpeter*, which is potassium nitrate; *borax*, or sodium borate; *sal ammoniac*, or ammonium chloride; *washing soda*, or sodium carbonate;

baking soda, or sodium bicarbonate; *common alum*, or aluminum-potassium sulphate; *copperas*, or *green vitriol*, which is an iron sulphate; and *blue vitriol*, which is copper sulphate.

Many substances, very unlike common salt in appearance, are, chemically, true salts. Among such are chalk, which is calcium carbonate; kaolin, or china clay, which is aluminum silicate; and glass, which is a mixed silicate of sodium, calcium, and other metals.

Spontaneous Combustion. The ignition of a body by the internal development of heat without the application of fire. Chemically, it is an active burning started by the accumulation of the heat produced in a slow oxidation. Spontaneous combustion not infrequently takes place (1) in heaps of rags, wool, and cotton, more or less saturated with oil; (2) in piles of damp hay or straw; and (3) in bituminous coal in the closed bunkers of vessels.

In the first case, the oil rapidly combines with the oxygen of the air, accompanied by formation of heat which is not carried away by the surrounding air as fast as it forms. In the second case, the heat is produced by a kind of fermentation, similar to that which takes place in heaps of rotting compost. In the case of coal, heat is formed by the pyrites throughout its mass, which rapidly combine with the oxygen of the air.

Symbols, Chemical. The symbol of an element is usually the capitalized initial of its name, as H for hydrogen, O for oxygen, and C for carbon. Where many elements have the same initial, a second, small letter is added, as Ca for calcium, Cd for cadmium, Cl for chlorine, and Co for cobalt. When the name of an element is not the same in all languages, the symbol is frequently taken from the Latin or from the name as known to the alchemists. Thus, Cu is from *cuprum*, copper; Fe from *ferrum*, iron; Hg from *hydrargyrum*, mercury; Na from *natrium*, sodium; and K from *kalium*, potassium.

Such symbols are necessary in order to represent in a simple manner chemical compounds and their changes. Thus, sodium chloride or common salt is represented by NaCl, which means 23 parts of sodium combined with 35.5 parts of chlorine. As generally employed, a symbol means a definite proportion of the element it represents, but not a definite quantity.

Valence. The valence of an atom of any element is the number of hydrogen atoms with which it may combine, or which it may replace.

Any element which combines with hydrogen, or replaces it in combination, atom for atom, is said to have a valence of one, and is called *univalent*. For example, hydrogen, chlorine, sodium, and silver are univalent. An element which unites with, or replaces, two hydrogen atoms, has a valence of two, and is said to be *divalent*. Oxygen, copper, zinc, and most common metals are divalent. An element which combines with three atoms of hydrogen has a valence of three and is called *trivalent*. Similarly, an element may have a valence of four, *quadrivalent*; of five, *quinquivalent*; and of six, *sexivalent*.

Aluminum is trivalent, silicon is quadrivalent, vanadium is often quinquivalent, and tungsten is sexivalent. Many elements show two or more valences; for example, iron has a valence of two and three; phosphorus, of three and five; sulphur, of two, four, and six; chromium, of two, three, and six; and carbon, of two, three, and four. The inert gases, such as argon and helium, do not unite with hydrogen or any other known element and hence have no valence.

Water of Crystallization. Many soluble chemical compounds, when dissolved in water and allowed to crystallize, are found to have combined with a definite proportion of the liquid. When such crystals are heated they usually crumble and give off this combined water, which therefore became known as the water of crystallization. The beautiful crystals of *blue vitriol* contain 63.9 per cent of copper sulphate and 36.1 per cent of combined water, or 5 molecules of water for each molecule of copper sulphate. The powdered copper sulphate which remains when such crystals are heated is white and has entirely different physical properties from the blue compound it forms with water. It can be used to detect the presence of water, which causes a return of the blue color.

EVERYDAY CHEMICALS

Acetates (*ăs'ē-tāts*). The salts and esters of acetic acid. The salts are generally formed by the action of the acid upon metallic carbonates and hydroxides. Iron acetate is usually produced by the direct action of acetic acid on iron filings.

Solutions of *aluminum acetate*, known as *red liquor*, and *iron acetate*, or *black liquor*, are valuable mordants in the dye industries. Lead acetate, called also *sugar of lead*, as well as ammonium and potassium acetates are employed in medicine. Verdigris, a basic acetate of copper, is used to prepare Paris green.

Many of the esters, or combinations of acetic acid with alcohols, have pleasant odors and are extensively employed in perfumery. *Benzyl acetate* imparts the principal odor to jasmine; linalyl acetate is found in the perfume of orange flowers, gardenia, ylang ylang, and lavender. *Amyl acetate*, or *banana oil*, a valuable solvent, is frequently used to dissolve guncotton and *cellulose acetate*. Such solutions form the airplane *dopes* applied to the wings of airplanes as a protective varnish. Cellulose acetate is formed into many substances similar to celluloid but noninflammable.

Acetic Acid. The sour principle of vinegar, an organic acid composed of carbon, hydrogen, and oxygen. Acetic acid occurs sparingly in nature; as, for example, in sweat and in the juices of various plants. It is formed by the acetic fermentation (oxidation) of ordinary alcohol in making vinegar from cider or wine. Crude commercial acetic acid, known as *pyroligneous acid*, is obtained as one of the products from the destructive distillation of hard wood. Any material which may be fermented to alcohol may serve as a source of acetic acid.

The pure anhydrous acid is called *glacial acetic acid* because below 62° F. it is a white crystalline solid. At a higher temperature it is a colorless liquid with a very pungent odor. In concentrated form, acetic acid burns the skin although it is a comparatively weak acid. It is extensively used in making white lead, acetone, and various acetates, among which are sugar of lead and verdigris; in making certain dyes; and in dyeing silk and wool. Acetic acid is especially important for the manufacture of amyl acetate and cellulose acetate, used for making noninflammable picture films and airplane dopes. Diluted acetic acid is often sold as wood vinegar. See *Vinegar*.

Acetone (*ăs'ē-tōn*). A colorless, volatile liquid having a peculiar odor and taste. It is used for preparing chloroform and iodoform, and as a solvent for many resins, gums, waxes, and other organic materials; as, for example, in the process of making smokeless powder. Acetone dissolves large volumes of acetylene gas. Portable tanks containing acetylene so dissolved are used in various lighting devices and for the acetylene torch.

Acetylene. A colorless gas, composed of carbon and hydrogen, widely used as an illuminant, particularly for house lighting and in portable lamps. When ignited in but little air, acetylene burns with a smoky flame, but, when thin sheets of the gas are ignited in an abundance of air in specially designed burners, it forms an intensely brilliant flame, producing a light very similar to sunlight.

For commercial purposes, the gas is made by treating calcium carbide with water,—the resulting products being acetylene and slaked lime. When mixed with air or oxygen, or if kept under a pressure of more than two atmospheres, acetylene becomes dangerously explosive. It is, however, one of the best illuminants, and, provided reasonable precautions are observed, the risk involved in storing and handling it is slight.

In making nonexplosive, portable tanks of acetylene, advantage is taken of the great solubility of the gas in acetone. Such tanks contain acetone absorbed in some porous material. About 100 volumes of the gas will dissolve in the acetone, and, in this form, may be transported without danger. When acetylene is burned with pure oxygen, the resulting blast has one of the highest temperatures of any known flame, the theoretical maximum being 7878° F. It is used industrially to cut through steel beams and plates. Properly applied, the flame divides steel or other hard metals almost as smoothly and quickly as a saw cuts through soft wood. The oxyacetylene torch is also extensively used for *welding* or fusing pieces of metal.

Acetylene may be used as the starting point for the chemical production of alcohol. It combines with iodine to form di-iodoform, an antiseptic similar to iodoform but without its unpleasant odor.

Albumin (*ăl-bū'mĭn*). A group of organic substances of which white of egg is the best-known example. These substances are composed of carbon, hydrogen, oxygen, sulphur, and nitrogen, and, although very complex in structure, are classed as *simple proteins*. In water, the albumins form colloidal solutions which are coagulated by heat above 160° F. They are also coagulated by acids and other substances, such as alcohol and corrosive sublimate.

Albumins are found in plants and in animal tissue, in blood, in milk, and in the humors of the eye. Albumin obtained from blood or from white of egg is frequently used for clarifying liquids, because, when the albumin coagulates, it retains various coloring matters and impurities, which settle or may be removed by filtration. It is for this reason that white of egg is used to clear coffee. See *Protein*.

Alcohol. Common or grain alcohol, known chemically as ethyl alcohol, is a light, colorless liquid, which burns with an intensely hot, nonluminous flame. When pure and free from water, it has a specific gravity of 0.7936 at 60° F., boils at 173° F., and does not freeze until about 200° below zero F. As mercury freezes at about −38°, alcohol is often used for low temperature thermometers.

Alcohol may be produced by chemical means from acetylene, and is produced naturally by the action of yeast in solutions containing fermentable sugars. The stimulating and intoxicating effects of fermented drinks have been known for thousands of years. Alcohol is the active principle of beer, wine, hard cider, brandy, whisky, rum, cordials, and the many other fermented and distilled beverages.

As strong liquors are usually subject to a tax corresponding to the amount of alcohol which they contain, a standard has been fixed which is known as *proof spirit*. English proof spirit contains 49.24 per cent alcohol by weight or 57.06 per cent by volume. The United States standard proof spirit contains 50 per cent alcohol by volume or 42.52 per cent by weight at 60° F.

When alcohol is mixed with water, a contraction of volume takes place, so that when 49.8 parts of water are added to 53.9 parts of pure alcohol, the volume of the mixture is 100 instead of 103.7. According to the United States Pharmacopœia standard, alcohol contains not less than 92.3 per cent by weight of pure ethyl alcohol. Rectified spirit contains about 95 per cent alcohol, while pure alcohol free from water is known as *absolute alcohol*. It can be prepared by repeatedly distilling rectified spirit over unslaked lime, which absorbs the water.

Alcohol may be produced from sugar solutions, such as molasses, but it is usually prepared from starchy materials, such as potatoes, corn, rice, and barley,—whence the name *grain alcohol*. These are first subjected to the action of diastase or of an acid which changes much of the starch to glucose. The action of yeast then changes the glucose to alcohol, which is obtained by distillation. Sawdust, corn cobs, and the liquors obtained in making sulphite paper, when properly treated, are also sources of alcohol which will probably become of great importance.

In medicine, alcohol is extensively used for making tinctures, and solutions of alkaloids, resins, essential oils, and many other materials. As alcohol coagulates albumins, arrests the development of micro-organisms, and prevents putrefaction, it is employed to preserve specimens of organic material. Highly refined alcohol known as *cologne spirits* is used for making perfumes, while industrial alcohol of various grades is used for heat, power, and, by the aid of the Welsbach mantle, to some extent for light. It is employed also as a solvent for varnishes and dyes and for making many organic chemicals, such as ether, chloral, chloroform, and acetic acid.

Because of the many needs for alcohol in the industries, a tax-free *denatured alcohol* is prepared by adding to the spirits some substance such as ether, iodine, carbolic acid, pyridine, creosote, benzine, or wood alcohol. The added material is selected so that it does not interfere with the intended use of the alcohol but does spoil it for beverage purposes. After water, acids, and petroleum, alcohol is one of the most important industrial liquids. See *Chloroform*, *Ether*, *Wood Alcohol*.

Alizarin (*ă-lĭz'ă-rĭn*). A valuable dye, originally obtained from the madder root, used for ages in dyeing cotton Turkey red. It was the first vegetable color to be prepared artificially, and, since 1869, it has been manufactured on a large scale from *anthracene*, a product of coal tar. Chemically, alizarin is a complex compound of carbon, hydrogen, and oxygen, known as dioxy-anthraquinone. From it a number of beautiful dyes are made, among them *alizarin orange*, *alizarin blue*, and *alizarin carmine*. The extensive production of alizarin by chemical industry has greatly changed agriculture in the regions where madder was formerly the chief product.

Alkaloids. The name given to a series of substances derived from the vegetable kingdom which, in their chemical action, closely resemble the alkali ammonia. They all contain nitrogen, and, in solution, exert a powerful influence on the ray of polarized light. Like ammonia, they combine directly with acids to form salts. Most alkaloids react powerfully when taken into the animal body. As a rule, they constitute the chief medicinal properties of the plants from which they are extracted.

When administered in proper doses under the direction of a competent physician, the alkaloids are remedial agents of the greatest value. Among the most important of these are atropine, cocaine, codeine, morphine, quinine, and strychnine. Some alkaloids are exceedingly violent poisons. Examples are *conine*, the active principle of the fatal hemlock, which, it is believed, Socrates was sentenced to drink; *curarine*, the destructive agent in curare, the famous South American arrow poison; and *physostigmine*, extracted from the deadly Calabar bean.

Alum. Common alum is a double salt of aluminum sulphate and potassium sulphate which forms beautiful, colorless, octahedral crystals containing 38.5 per cent of water. Small amounts occur native, but alum is usually prepared by roasting alum shales or by treating clay or bauxite with sulphuric acid and extracting with water the aluminum sulphate thus formed. The proper amount of potassium sulphate is added to these solutions, which are then allowed to crystallize. Alum is used in medicine, as a mordant in dyeing, for tanning leather, for purifying water, in sizing paper, and for fireproofing fabrics. When heated, alum falls to a white powder, known as *burnt alum*, which is sometimes used in medicine as a caustic.

Various other double sulphates and selenates form crystals similar to potash alum and are classed as alums. In place of potassium these may contain sodium, ammonium, or other alkali metal, while iron, chromium, or manganese is sometimes substituted for aluminum.

Ammonal. An explosive composed of ammonium nitrate and powdered aluminum, mixed in various proportions, thereby giving a range in power from that of common black powder nearly to that of nitroglycerin. As ammonal explosives cannot be fired without a detonator, they can be handled with perfect safety, and are especially valuable in mining, because the gases produced—nitrogen, oxygen, and steam—are entirely harmless.

Ammonia. A colorless, suffocating gas having a characteristic odor. It is composed of nitrogen and hydrogen and is about three-fifths as heavy as air. Ammonia is formed when animal matter decomposes, and was formerly obtained by destructive distillation of hides, feathers, and horns; hence the old name, *spirits of hartshorn*, for its water solution.

This solution is usually known today as *aqua ammonia*, or *ammonia water*, and is widely used as a cleansing agent. At 60° F. one volume of ammonia water can contain 760 volumes of the gas, which is given off when heated. The solution acts chemically as an alkali to neutralize acids, forming *ammonium* salts. Smelling salts, or *sal volatile*, consist chiefly of ammonium carbonate. *Sal ammoniac*, or ammonium chloride, is used in medicine, in soldering, and especially in dry cell electric batteries, such as are used in flashlights. Ammonium nitrate is heated in order to prepare nitrous oxide, or laughing gas.

When ammonia gas is subject to pressure, it becomes *liquid* or *anhydrous ammonia*. This liquid, which is widely used for refrigeration, and ammonium sulphate, the valuable fertilizer, are probably the most extensively used forms of ammonia. Large quantities are also used for the artificial production of nitric acid.

The principal source of ammonia is the gas given off during the destructive distillation of coal for the production of coke and illuminating gas. Increasing amounts of ammonia are being produced by treating cyanamid with steam, and the gas is prepared in large quantities by the Haber process, directly from nitrogen and hydrogen. The destruction of Oppau, Germany, in 1921, was caused by the explosion of immense stores of ammonium nitrosulphate, made from ammonia prepared by the Haber method.

Anesthetic. Any agent that produces insensibility to pain. These may be classified as *general anesthetics*, which cause complete unconsciousness, and *local anesthetics*, which numb the sensory nerves of the parts to which they are applied.

General anesthesia is usually brought about by inhalation of *nitrous oxide*, or *laughing gas*, *ether*, *chloroform*, or a mixture of the last two. Acetylene, ethylene, and scopolamin are sometimes employed. Nitrous oxide is generally used for dental operations which are quickly performed.

The alkaloid *cocaine*, obtained from coca leaves, and similar compounds, such as *stovaine* and *novocaine*, are the most useful of local anesthetics because, when applied directly to mucous membrane or injected under the skin, they quickly prevent all sensation of pain. Cold produced

by evaporation of a spray of *ethyl chloride* or from *carbon dioxide snow* is also very efficient for minor operations. See *Chloroform*, *Ether*, *Nitrous Oxide*.

Aniline. A colorless, poisonous liquid, with a slight, somewhat unpleasant odor, which boils at 184° C., or about 297° F.; extensively used in the preparation of aniline dyes. It is a coal tar product prepared commercially from nitrobenzene. Aniline was discovered in 1826 by Unverdorben while distilling indigo, and was first found in coal tar by Runge in 1834. Since the discovery of mauve by Perkin in 1856, the manufacture of aniline has been increasingly important. From this colorless, slightly oily substance, many beautiful dyes, embracing a wide range of colors, are made by chemical processes. By reason of their brilliancy, permanence, and cheapness, synthetic dyes, made artificially from aniline and other coal-tar products, have practically replaced the vegetable dyestuffs, formerly obtained from indigo, madder, and other plants.

Argon. A colorless and odorless gas, heavier than air and forming 0.933 per cent of the volume of the atmosphere. It was discovered in 1894 by Sir William Ramsay and Lord Rayleigh, through their efforts to learn why nitrogen produced from air was slightly heavier than the same gas prepared from other sources. Argon is obtained commercially from liquid air. It is used to fill certain types of incandescent electric lamps, because the pressure of the gas prevents evaporation of the filament at high temperature, thus giving a more efficient and satisfactory light. All attempts to combine argon with other elements have failed. The gas forms a liquid which boils at 303° below zero and becomes solid at 306° below zero F.

Aspirin. A trade name for acetyl-salicylic acid. It is a white powder used in the treatment of rheumatism, gout, tonsilitis, pleurisy, and sometimes for colds and headaches. Aspirin passes unchanged through the stomach and liberates salicylic acid in the intestine.

Benzene. A colorless, volatile, and highly inflammable liquid having a characteristic odor; obtained chiefly from the distillation of coal tar. Benzene is a valuable solvent for gums, resins, and many organic compounds. It is used in paints and varnishes, is added to gas to increase the illuminating power, and is the raw material from which *aniline*, hundreds of *aniline dyes*, and many other chemicals are made.

Benzine. A colorless, volatile, and highly inflammable liquid consisting chiefly of a mixture of paraffin hydrocarbons obtained in the earlier stages of the distillation of petroleum or asphalt oil. It thus differs greatly from *benzene*, which is a definite chemical compound obtained from coal tar. There is very little, if any, difference between *benzine*, *gasoline*, and ordinary *naphtha*.

Benzine is a valuable solvent for fats, oils, and resins, and is used as such in paints and varnishes, and in the preparation of linoleum and oil cloth. It is also much used for dry cleaning. As its vapor, when mixed with air, is explosive, benzine has been the cause of many serious accidents.

Benzol. A term often applied to *benzene*. As an article of commerce, benzol consists chiefly of benzene together with various proportions of similar compounds of higher boiling points. It is used as a solvent and as a substitute for benzene whenever purity is not essential.

Bleaching Powder. A valuable powder made by the action of chlorine gas on slaked lime, extensively used for disinfecting purposes and for bleaching cotton and linen. It is commonly though incorrectly known as *chloride of lime*.

A bleaching solution, called *Javelle water*, is valuable for bleaching the yellow color of old linen and is very effective in the removal of stains. It may be prepared as follows: Dissolve one pound of washing soda in one quart of boiling water and let cool. Dissolve one-half pound of "chloride of lime" in two quarts of cold water; let settle and then pour the clear solution into the soda; let settle. Bottle the clear liquid and keep in a dark place. Apply it directly to stains or mix with an equal volume of water and immerse the garment for not more than half an hour. After this treatment, the fabric must be thoroughly rinsed.

Borax. An inorganic salt, sodium tetraborate, which occurs native in monoclinic crystals on the shores of various lakes in the Old and the New World. It is also mined in a state of high purity as kernite ore in the Mohave desert, Kern county, California. At Searles lake, California, borax is obtained through evaporation of the brine. Next to the United States, Chile is the largest producer of borax.

Borax is extensively used for household purposes, in soaps, and as an antiseptic. It is employed as a flux in glazing pottery, in making enamels, in assaying ores, as a reagent in chemical analysis, and for softening "hard" water. Borax is also very widely used in soldering and welding, because it dissolves the oxides which form on hot metals and leaves their surfaces clean and free to unite. See *Boric Acid*, *Boron*.

Bordeaux Mixture. A valuable and probably the best known general fungicide that is sprayed upon growing plants and trees in order to prevent blight, rot, and other growths of destructive fungi.

It is prepared as follows: Five pounds of copper sulphate are dissolved in about five gallons of water; five pounds of good lime are slaked and likewise mixed with five gallons of water. The copper solution is poured into a barrel about three-quarters full of water, and the lime is added slowly with vigorous stirring. This makes about fifty gallons. Smaller amounts may be prepared in the same proportions. The combined solution does not keep well and should be mixed fresh for each application.

Boric (or **Boracic**) **Acid.** A weak mineral acid occurring as thin white plates or flakes which feel soapy. It is somewhat volatile in steam, and large quantities are obtained in Tuscany from the vapors of hot springs. It is also prepared by treating borax, or calcium borate, with sulphuric acid.

A solution of boric acid is often used as an eyewash or for similar purposes when a very mild antiseptic is desired. Together with various essential oils, it forms the basis of many well-known mouth washes and throat sprays. It is also used in the production of fusible glazes, of optical glass, and of many types of hard glass.

Boron. A nonmetallic element which occurs chiefly in borax, large deposits of which are found in various parts of the world, notably in California. Pure boron is an odorless, tasteless, greenish brown powder. It combines with nitrogen and hydrogen, and dissolves in nitric and sulphuric acids. It is also soluble in melted aluminum, from which it crystallizes out upon cooling. The resulting crystals, called "boron diamonds," which always contain a small amount of aluminum, are among the hardest substances known, scratching the ruby and also corundum. The most valuable compounds of boron are boric acid, boric oxide, and borax.

Bromine. A dark red, volatile, liquid element, one of the halogen group, discovered in 1826 by Balard, a French chemist, in the salts obtained on evaporation of sea water. Commercially, bromine is produced from the mother liquors of salt works at Stassfurt, in Germany, and in New York, Ohio, West Virginia, and Michigan. Bromine boils at 145° and freezes at 19° F. It is an irritating poison which, during the World War, was extensively used in the preparation of tear gas. Bromine is used in making various dyes, and, in the form of its salts, is used in medicine. The principal compounds of bromine are the *bromides*. One of these, silver bromide, because of its sensitiveness to light, is extensively used in photography.

Calomel. A heavy, white, tasteless powder, insoluble in water. It is a compound of mercury with chlorine, and is called mercurous chloride—the *subchloride* or mild chloride of mercury—to distinguish it from the poisonous corrosive sublimate—mercuric chloride or the *bichloride of mercury*. Calomel acts medicinally as a purgative. When used with quinine, it is valuable in the treatment of malarial fever, and is most effective when followed by a saline cathartic. Vinegar, lemonade, and similar acid substances are to be avoided when calomel is used. See *Corrosive Sublimate*, *Mercury*.

Carbides. Various substances composed of carbon combined only with a metal or metalloid, the most important of which are iron carbide and calcium carbide. Under the proper conditions, molten iron combines directly with carbon to form iron carbide, or *cementite*, the presence of which in metallic iron greatly influences its properties. *Steel* may be considered as an alloy of pure iron with cementite, which, when cooled, also contains *pearlite*, a mixture of small particles of iron with its carbide. Iron carbide is consequently immensely important in the manufacture of iron and steel.

Calcium carbide, upon being treated with water, yields acetylene gas and is the chief commercial source of this valuable illuminant. Like calcium carbide, most other carbides, when treated with water or dilute acids, yield various hydrocarbons. For example, aluminum carbide yields marsh gas, or methane. The carbide of silicon, known commercially as *carborundum* and by other trade names, possesses great hardness and is widely used as an abrasive. The carbide of boron is even harder. Carbides are usually produced in the electric furnace.

Carbohydrates. The important group of chemical compounds which includes sugar, starch, cellulose, and related organic substances. These are composed of carbon, hydrogen, and oxygen, of which the last two elements are present in the proportions necessary to form water. Crystalline and soluble carbohydrates are classed as *sugar*;

amorphous, insoluble forms, as *starch* or *cellulose*. If treated with dilute acid, the more complex forms are changed to simple sugars or *monosaccharides*.

Cane sugar and milk sugar are known as disaccharides because, when treated with acid, they yield two molecules of simple sugars. Similarly, starch and cellulose, which yield many molecules of sugar, are called polysaccharides. Carbohydrates form the greater part of human food. See *Glucose, Starch, Sugar*.

Carbolic Acid or **Phenol.** A powerful antiseptic, germicide, and disinfectant, which is used also in making picric acid, many dyestuffs, and pharmaceuticals. With formaldehyde it condenses to a valuable material which may have the properties of hard rubber and the beauty of amber. It is obtained chiefly from coal tar and is also made from benzene. When pure it consists of colorless crystals. Carbolic acid is the standard by which the germ destroying power of all other disinfectants is measured. It is used in medicine, and, when dissolved in from 20 to 100 parts of water, for disinfecting surgical instruments, walls and floors of sickrooms, and other materials. As carbolic acid is a powerful, caustic poison, great care should be exercised in its use.

Carbon. One of the most important and widely distributed of all elements, occurring free as diamond and graphite, and, in noncrystalline forms, as charcoal, coke, and lampblack. In combination with other elements, carbon is an essential part of all living things and also composes a large group of important minerals. The hardness and brilliancy of diamonds, the soft, lubricating properties of graphite, the power of charcoal to absorb gases and of hot coke to reduce many ores to metal, are all characteristics of carbon. Carbon does not melt, and, at ordinary temperatures, does not dissolve in any solvent. It is, however, soluble in melted iron and platinum.

Carbon is usually quadrivalent. It forms a greater number of complex compounds than any other element because the atoms of carbon seem able to combine with themselves to an almost unlimited extent. The chemistry of carbon compounds is called *organic chemistry* because it was originally held that such compounds were formed only by living organisms.

Combined with hydrogen, carbon forms the great group of *hydrocarbons*, although there are only three compounds with oxygen, or oxides of carbon. With sulphur, carbon gives the evil smelling liquid, carbon disulphide; with nitrogen, the poisonous cyanogen gas; with metals, the *carbides*, which are very important industrially. Vast quantities of limestone and numerous ores are *carbonates* or compounds of a metal with carbon and oxygen. All organic compounds contain carbon. These include glucose and the sugars, fats and oils, starch and cellulose, petroleum, alcohol, ether, dynamite, dyestuffs, the vegetable alkaloids, and perfumes.

Stated in another way, practically everything we eat and everything we wear contains carbon. Wooden houses are built of carbon compounds, and bricks are held together by the formation of carbonates in the mortar. The house is usually heated by burning coal, oil, or wood, all of which contain carbon. General diffusion of knowledge depends greatly on the art of printing, which would not exist to any extent without paper. The paper of which this book is made is a highly purified carbon compound, and the printing is done with carbon ink. See *Carbides, Carbohydrates, Charcoal, Coke, Diamond, Graphite, Hydrocarbons*.

Carbon Tetrachloride. A heavy, colorless, volatile liquid, very similar to chloroform. It is an excellent solvent for fat and wax, and its vapor is not inflammable. For these reasons it is valuable for removing grease spots from clothing, and its use in place of benzine for "dry cleaning" is free from the danger of fire. A bottle of carbon tetrachloride, placed where it is quickly available, may be of great use in extinguishing small fires. The fumes are heavy, and act as a blanket which prevents air from reaching the flame.

Carborundum. A trade name of an abrasive material of great hardness. Chemically, it is an artificial carbide of silicon produced by heating together coke, sand, and salt in powerful electric furnaces to a temperature of 4000° F. Like emery and garnet, carborundum is used in making various forms of abrading cloth, and is one of the most valuable abrasives, especially in the form of grinding wheels. It is used also for polishing steel balls and stone surfaces, as a constituent of refractory cements, and for various similar purposes.

Catalyzer. Any substance which, merely by its presence, causes the speed of a chemical action to be greater or less than normal. The catalytic agent or catalyzer remains unchanged at the end of the reaction. Sugar, for example, dissolves easily in water and can be obtained again as sugar by evaporating the liquid. But, if acid is added to the solution, the sugar gradually combines with the water to form two new sugars, glucose and fructose. *Artificial honey* is prepared in this manner. The acid remains unchanged and acts only as a catalyzer. See *Catalysis, Enzymes*.

Caustic Alkalies. The hydroxides of the alkali group of metals, of which the best-known are *caustic soda* and *caustic potash*. They do not occur free in nature, but are prepared by passing an electric current through melted or dissolved alkali chlorides or by adding milk of lime to a solution of the carbonates. They are white when pure, and have a strong caustic action upon flesh. Caustic potash is used chiefly in the preparation of soft soap. Caustic soda is used for making hard soap, for refining oils, for mercerizing cotton, and for manufacturing paper pulp, dyestuffs, and many other materials.

Charcoal. The residue of impure carbon remaining after destructive distillation of vegetable or animal substances. The largest proportion of all charcoal is prepared from wood. It is black, porous, and brittle, and retains the form but has only about three-fourths the volume and one-fourth the weight of the original wood.

Charcoal is often prepared by covering a heap of wood with earth and lighting the pile at openings near the bottom. The earthy covering keeps out air so that the wood does not burn to ashes, while the heat of combustion drives off most of the volatile matter, which escapes from small holes at the top. This wasteful process is being supplanted gradually by the retort method whereby the wood is heated in closed vessels from which the escaping gases may be collected and purified. Large amounts of wood alcohol, acetone, acetic acid, creosote, and turpentine are obtained in this manner.

Immense quantities of charcoal are used for fuel, especially in Europe. It burns with a small, hot, colorless flame. Willow charcoal is an important ingredient of gunpowder. *Charbon rouge*, or red coal, is a gunpowder charcoal produced from wood by the action of hot air or superheated steam. Pencils of soft charcoal are extensively used for artistic purposes. Powdered charcoal is used as a pigment and as a polishing material. *Animal charcoal*, prepared from bones, is especially valuable as a decolorizing agent for bleaching oils and solutions such as sugar sirup.

Charcoal has the property of absorbing large amounts of gases. For this reason, it sometimes gives relief during gastric indigestion. It is also extensively used in connection with a mask to protect troops against poisonous gases. One of the most efficient materials used for this purpose, called *activated charcoal*, is prepared by heating coconut shells in retorts and treating the charcoal thus formed with steam at high temperature. See *Carbon, Coke*.

Chlorine. A greenish yellow, gaseous element, discovered by Scheele in 1774. It may be compressed to a liquid which boils at −28.5° F. and at lower temperature forms a solid which melts at −152° F. Chlorine is so active chemically that copper foil catches fire when placed in a jar full of the gas. Under the same conditions, a lighted candle will continue to burn, depositing much soot because the chlorine combines with the hydrogen of the candle and sets the carbon free.

Chlorine is never found free in nature, but, combined with metals, especially as sodium chloride or common salt, it exists in enormous quantities. Gaseous chlorine is prepared from salt by means of an electric current or by the action of manganese dioxide on hydrochloric acid. It is used chiefly for bleaching and for preparing bleaching powder; also in making certain dyes, for recovering tin from scrap tin plate, and as a powerful germicide, disinfectant, and deodorant. As a germicide, it is largely used to sterilize drinking water and sewage.

As dry liquid chlorine does not attack iron, it can be stored under pressure in steel cylinders. The gas itself is 2½ times as heavy as air, and is an intensely irritating poison which will cause death if inhaled in quantity. For these reasons, chlorine was the first of various poisonous gases to be used in chemical warfare. See *Bleaching Powder, Hydrochloric Acid*.

Chloroform. A heavy, colorless liquid, having a pleasant odor and a sweet, burning taste; usually prepared from alcohol or acetone by the action of "chloride of lime." It is a valuable solvent for many organic substances, is noninflammable, and acts as an antiseptic. Chloroform has several uses in medicine but is best known as one of the most important general anesthetics. Its use for this purpose was first demonstrated in 1848 by Sir James Simpson of Edinburgh. See *Anesthetic*.

Chrome Yellow. A brilliant yellow pigment, chemically known as lead chromate. It is usually made by adding sodium or potassium bichromate to a solution of lead nitrate. Chrome yellow is permanent to light, and, in addition to its use in paint, it is applied to textile fibers as a dyestuff.

Citric Acid. An organic acid found in many tart fruits, such as gooseberries and currants, but especially abundant in lemons and limes. It can be made by the action of certain micro-organisms on sugar and glycerin, but is produced commercially from the juice of low grade lemons. The white crystals, which have a pleasant sour taste, are used in dyeing and textile printing, for making cooling drinks, and for the preparation of mild laxatives, such as magnesium citrate.

Coal Tar. A thick, black, oily liquid, slightly heavier than water, which is deposited in the condensers of gas works during the process of making coke and illuminating gas from soft coal. This liquid, called also gas tar, is an exceedingly complex mixture of substances. The separation of these into their various constituent parts is a most important division of chemical industry, for they form the only known source of an immense number of very valuable compounds. Among these are solvent naphtha, benzene, toluene, xylene, phenol, naphthalene, cresol, and anthracene.

From these crude coal-tar products are derived such substances as the beautiful coal-tar dyes; pure carbolic acid, with strong antiseptic properties; trinitrotoluene, or TNT, and picric acid, powerful explosives; naphthalene, used in making dyes and moth balls; and creosote oil, used as a preservative—together with other, almost innumerable, compounds of greater or less value, including many drugs, such as antipyrin and acetanilid.

The pitch, remaining after the foregoing have been distilled off, is used in the manufacture of asphalt, varnishes, and tarred paper, and as a binder in making coal briquettes. Many of the most valuable discoveries in the field of organic chemistry have resulted from the study of the coal-tar compounds.

Codeine (*kō-dē'ĭn*). One of the alkaloids found in opium. It is a white, crystalline substance, very similar to morphine. Codeine is used in medicine, chiefly to diminish sensibility to pain when a sedative milder than morphine is desired. See *Morphine*.

Collodion. A thick, colorless, and highly inflammable liquid, consisting of soluble guncotton or pyroxylin dissolved in a mixture of alcohol and ether. When exposed to the air, it dries quickly to a tough, transparent film. It was formerly much used in photography. Collodion is frequently applied as a protection to scratches and cuts, and, when medicated, is used for the removal of corns and callosities, and for blistering the skin.

Colloid. Any substance exhibiting, when treated with water, properties similar to those of glue, gelatin, and starch. Colloids remain *suspended* in the surrounding liquid in contrast to *crystalloids*, such as salt and sugar, which go into solution. Colloids do not pass through vegetable or animal membranes, neither do they lower the freezing point nor raise the boiling point of the liquids in which they are suspended. Nongelatinous substances, such as gold or silver, can be prepared in colloidal form as extremely fine particles which do not settle out from the water or other liquid. The structure and growth of the protoplasm and cells in the human body are largely dependent on colloids. Many colloids are coagulated by the action of heat or acid, as is shown by cooking the white of an egg or adding vinegar to milk.

Corrosive Sublimate. A salt of mercury, called also bichloride of mercury and mercuric chloride. It is produced commercially by heating mercury in chlorine gas, and forms heavy, colorless crystals soluble in water. Corrosive sublimate is a powerful irritant and an intense poison, for which *white of egg* is given as an antidote. It is used in dilute solution for the treatment of certain skin diseases, and as a powerful antiseptic and preservative. See *Calomel, Mercury*.

Cream of Tartar. A white, sour, crystalline compound of potassium and tartaric acid. It is used chiefly as the acid ingredient of some baking powders, and also in medicine. To the chemist it is known as potassium bitartrate, and is prepared by purifying the *argols* deposited in vats where wine is fermented. See *Tartaric Acid*.

Creosote. An oily liquid having a burning, smoky taste. It is obtained by the distillation and purification of wood tar, especially that obtained from the destructive distillation of beechwood. When fresh it is colorless, but, after standing, it becomes yellow or brown. Creosote means *meat preserver* and it is frequently used for that purpose, as well as in the treatment of tuberculosis and bronchitis, and as a stimulant to digestion. *Creosote oil*, a crude creosote obtained from both wood and coal tar, is widely applied as a sheep dip and wood preservative.

Cyanamid (*sī'ăn-ăm'ĭd*). The trade name of a fertilizer, known also as calcium cyanamid. It is prepared in special electric furnaces by heating powdered calcium carbide to about 1800° F. in the presence of pure nitrogen. The gas combines with the carbide, giving a product that contains about 20 per cent nitrogen. As a fertilizer, calcium cyanamid is rather slow in action. It is usually applied before the seeds are planted, and not to the growing plants.

Equally important with its use as fertilizer is the employment of cyanamid for the preparation of ammonia. When calcium cyanamid is treated with steam, calcium carbonate is formed and ammonia gas is given off. In this way the inert nitrogen of the air is combined into a valuable product. See *Ammonia, Fertilizer*.

Dextrin. A soluble, gummy substance, called also *British gum*, prepared from starch by the action of heat, dilute acids, or ferments. It is employed for gumming postage stamps and envelopes, for making paste, for sizing paper and cloth, and as a substitute for natural gums in many other processes. See *Starch*.

Diastase. An enzyme, called also amylase, capable of converting starch into a sugar. It is found in almost all plants, in which it serves to change accumulated starch to a soluble form. The saliva contains an active form of diastase, known as ptyalin; consequently, starchy foods which are thoroughly masticated may be more quickly digested. A form of diastase is also found in the pancreatic juice. The diastase produced in sprouting barley is frequently used in the fermentation industries in order to change starch into fermentable sugars. See *Catalysis, Enzymes*.

Disinfectant. A substance having the power to destroy infectious germs, used to purify and render harmless, articles and rooms that have been exposed to contagion or infection. A disinfectant differs from an *antiseptic* in not being intended for use on the human body, but, when properly diluted, many disinfectants are so used. Moist heat, formaldehyde gas, carbolic acid, chlorinated lime, and corrosive sublimate are all powerful disinfectants. See *Carbolic Acid, Corrosive Sublimate, Formaldehyde*.

Distillation. The process of heating a liquid or solid in a closed vessel, and condensing some or all of the resulting vapors.

When water boils in a teakettle, steam escapes from the spout and disappears. If the spout were connected with a cold pipe, the steam would condense and run from the pipe as *distilled water*. If the boiling water contains salts in solution, as most water does, the distilled water will nevertheless be pure and free from dissolved substances, because salt is not volatile. This process was used as early as the 3d century to purify sea water for drinking purposes. The apparatus necessary for distillation includes a *still*, or *retort*, in which the material is heated, a *condenser* to cool the vapors, and a *receiver* in which to collect the condensed liquids.

Crude petroleum contains many substances which are separated by distillation. When the still is heated, gasoline of low boiling point is first to come from the condenser. The temperature gradually rises and kerosene is given off, followed by heavier oils until only solid coke remains in the still. Each material may be collected separately, so that the crude oil is divided into a number of fractions, and the process is called *fractional distillation*. Each fraction is still a mixture which may be further purified by the same method.

Distillation of fermented liquids in order to concentrate the alcohol was practiced at least as early as the 10th century. This separation takes place because of the difference in boiling point of pure alcohol and water, and may be carried out until a liquid containing about 96 per cent alcohol is obtained. Greater concentration cannot be obtained, because alcohol of this strength has a boiling point lower than that of water or of pure alcohol.

Water boils at about 100° C., and turpentine boils at 165° C., but a mixture of turpentine and water can be boiled at about 95°. Aniline oil and many other liquids of high boiling point are often distilled at lower temperatures by passing steam through the still. This process is called *steam distillation*.

When coal is heated in a retort, it gradually decomposes so that ammonia, illuminating gas, coal tar, benzene, and many other substances are given off, and coke remains in the still. This type of distillation, which involves chemical as well as physical changes, is usually called *destructive distillation*.

Epsom Salt. White or colorless crystals of hydrated magnesium sulphate, best known because of their use as a purgative. The salt was originally obtained from spring waters in Epsom, England, but is now prepared chiefly from the mineral *kieserite*. Epsom salt is employed in finishing cotton fabrics, and for weighting paper, leather, and silk.

Essential Oils. The group of volatile, oily, odoriferous substances to which is due a large part of the odor of plants. The essential oils are composed of many very different chemical compounds, and as a group they are

classified chiefly by their physical characteristics. They are volatile, and are often called volatile oils to differentiate them from the fixed or fatty oils also found in plants; they make a temporary grease spot on paper; they are combustible; and they usually have a characteristic odor.

Essential oils are obtained from plants or plant products in which they occur, by expression, distillation, and extraction. For example: oil of lemon is obtained by subjecting lemon rinds to pressure; turpentine, and many others, such as the oils of cloves, wintergreen, lavender, peppermint, and rose, are obtained by steam distillation; while the delicate odorous substances of such flowers as violet, tuberose, and jasmine are often extracted from the petals by means of lard or vaseline.

The essential oils are used chiefly for making perfumes and flavoring extracts; many are powerful antiseptics and germicides, and turpentine is largely employed in the paint and varnish industries.

Ether. A light, colorless, volatile, and extremely inflammable liquid known chemically as *diethyl ether*. Because it is prepared from alcohol by the action of sulphuric acid, it is often called *sulphuric ether*. Ether is used extensively in the manufacture of artificial silk and collodion, but is most highly valued as an anesthetic. It is occasionally used as an intoxicant, with effects similar to those of opium. See *Anesthetics*.

Explosive. Any chemical compound or mixture capable of producing suddenly a large volume of gas at a high temperature. When confined in a small space, the hot gas exerts enormous pressure which may be used for throwing projectiles, shattering rock, making trenches or pits in the ground, and similar purposes.

Explosives may be classified as: (1) mixtures of inflammable substances with some oxidizing material; (2) organic nitrates and nitro-substitution products; and (3) detonators similar to mercury fulminate. Black powder is an example of the first type; nitroglycerin and TNT, or trinitrotoluene, of the second. Detonators, because of their extremely violent action, are employed in small quantities for exploding compounds of the second class. Mixtures act more slowly than chemical compounds, and the somewhat longer pressure of blasting powder is, in mining, often more useful than the shattering effect of dynamite. See *Gunpowder*, *Nitroglycerin*.

Fats. Greasy or oily compounds which yield soap and glycerin when treated with caustic alkalies. Fats are found in all animals and most plants, where they serve as a store of energy- and heat-producing material. They are often classified as fats if solid, and fatty oils if liquid at ordinary temperatures. This arrangement depends largely on climate, for the fat from coconuts, which is usually a solid in North America, is an oil in the countries where it grows.

As all fats are compounds of glycerin with the higher fatty acids, the characteristics of any fat depend largely on the acids of which it is composed. Hard fats, such as beef and mutton tallow, contain much palmitin and stearin. Olive oil consists largely of liquid olein. Linseed oil is very valuable for paint and varnish because it contains certain fatty acids which harden on combining with the oxygen of the air. A *rancid fat* is one which has more or less decomposed, with the formation of evil smelling compounds other than glycerin and fatty acids.

Well-known animal fats are beef and mutton tallow, lard, and butter. Large amounts of fish oil are obtained chiefly from the menhaden, sardines, and salmon. Seal oil and whale oil are widely used, and high-grade cod liver oil is valuable in medicine. Oils extensively employed for finishing leather and for lubrication are obtained from the feet of cattle, horses, and sheep.

Vegetable oils are usually pressed or extracted from crushed seed or fruit. They include cottonseed, peanut, corn, olive, soy bean, linseed, castor, coconut, palm, and palm kernel oils, cocoa butter, and very many others. Sperm oil and wool fat are waxes rather than fats, because they are not glycerin compounds, while Japan wax, so called because of its appearance, is really a fat.

The finest and purest oils are generally used for food. Other grades are made into soap, candles, and glycerin. Large amounts are also used for tanning and dressing leather, for lubrication, and in paints.

Fehling's Solution. A blue liquid formed by mixing an alkaline solution of Rochelle salt with a solution of copper sulphate. It is used as a test for certain sugars which when boiled with it cause the formation of a red precipitate.

Fertilizers, Chemical. Chemical compounds and mixtures added to the soil in order to stimulate plant growth. Such materials may be divided into two classes: those which are a direct source of plant food, and those, such as gypsum and lime, which tend to make available the plant food already in the soil. True fertilizers contain compounds of nitrogen, phosphoric acid, and potash, alone or mixed in various proportions.

Commercial fertilizer is usually marked with a formula similar to 4–8–2 or 3–6–4. This gives the percentage content of nitrogen, phosphoric acid, and potash, in the order stated. A ton of 4–8–2 fertilizer thus contains 80 pounds of nitrogen, 160 pounds of phosphoric acid, and 40 pounds of potash, combined with mineral and organic substances, such as lime, oxygen, carbon, and sulphates, which make up the bulk of the material.

Nitrogen is obtained from various organic materials, including cottonseed meal, tankage, and guano; also from Chile saltpeter, cyanamid, ammonium salts from gas works, and the products of artificial nitrate plants. Phosphoric acid is prepared chiefly from natural deposits of phosphate rock. The principal source of potash has been the Stassfurt deposits of Germany, but during the World War other sources were developed, some of which will probably be of permanent value. Wood ashes are valuable as fertilizer because they contain potash, phosphoric acid, and lime. See *Cyanamid*, *Phosphates*.

Flashlight Powder. A mixture of powdered magnesium with one or more compounds rich in oxygen. When ignited, the powder burns with a sudden, intense flash of light that is used in photography as a valuable source of illumination.

Fluorine (*floo'or-in*). An irritating, pale yellow, gaseous member of the halogen group of elements, which occurs chiefly in the minerals fluorite and cryolite. Small quantities of fluorine compounds are found in the blood, in the bones, and in the enamel of the teeth. The element was recognized by Ampère and Davy in 1810, but was not isolated until 1886 when it was first prepared by Moissan.

Fluorine is chemically the most active of the elements, and combines rapidly with all others, excepting only oxygen and the *noble gases*. Dry gold and platinum are affected least. It decomposes water, attacks glass, and combines so vigorously with such substances as cork, alcohol, and turpentine as to set them afire.

The gas has no commercial use, but sodium fluoride is valuable as an antiseptic and preservative, while hydrofluoric acid is used for etching glass. See *Hydrofluoric Acid*.

Formaldehyde. A colorless, irritating gas produced by passing the vapor of methyl alcohol mixed with air over heated copper gauze. It dissolves readily in water and is sold in about a forty per cent solution under the name of *formalin*. It is one of the best-known disinfectants, a valuable preservative, and when diluted is used as a fungicide on vegetables and plants. Combined with carbolic acid, it gives products used in varnish and as a substitute for hard rubber and amber. Formaldehyde is a poison which forms leather-like compounds with skin and similar protein matter. It should never be used as a food preservative. See *Disinfectant*.

Fowler's Solution. A solution of potassium arsenite made to contain one per cent of arsenic trioxide or white arsenic. It was named for Fowler, an English physician, who first used it in medicine as a convenient form for dispensing definite amounts of soluble arsenic.

Freezing Mixture. A combination of substances which becomes much colder when the ingredients are mixed together. The best-known freezing mixture, consisting of three parts of ice or snow with one of salt, will produce a temperature of about −5° F. Other mixtures produce much lower temperatures. Of the materials used, one is almost always a solid, and the mixture tends to become a solution.

Lowering of the temperature depends on the following facts. First, the change from a solid to a liquid requires a certain amount of heat, which becomes *latent*; second, when a solid dissolves, heat is frequently absorbed; third, the freezing point of a solution is *lower* than that of the pure solvent.

When ice and salt are mixed, salt begins to dissolve in the small amount of moisture present on the surface of the ice. This forms brine, which has a lower freezing point than pure water. Ice cannot exist at 32° F. in the presence of brine, so it melts, forming more liquid in which more of the salt dissolves. For this reason salt is often sprinkled on an icy sidewalk. Both processes, melting of ice and solution of salt, require heat, which is absorbed from the mixture itself, and the temperature falls. The process might go on indefinitely, but at −5.8° F. brine freezes and the action comes to an end.

One part of ice mixed with three parts of crystallized calcium chloride will produce a temperature of about −55° F. Ammonium sulphocyanate added to an equal weight of almost boiling water lowers the temperature of the mixture nearly to 32° F. If the water is at room temperature it will cool to about −5° F. One hundred parts of water, 43 parts of sodium nitrate, and 18 parts of ammonium chloride will give about 8° below zero F. See *Latent Heat*.

Glauber's Salt. Sodium sulphate in the form of white, bitter crystals containing 55.9 per cent of water. This salt was originally prepared by J. R. Glauber, a German chemist. Although found in many natural deposits, it is usually obtained from *salt cake*, a by-product in the manufacture of hydrochloric acid. Glauber's salt is used in glass making, in medicine, especially for veterinary purposes, and as a mordant in dyeing.

Halogens. A name meaning "salt-forming," given to the group of similar chemical elements consisting of fluorine, chlorine, bromine, and iodine.

Helium. A light, colorless, chemically inert gas, which was first detected in 1868 by means of a strange yellow line in the solar spectrum. As this line was not produced by any known terrestrial substance, it was interpreted by Lockyer and Frankland as the sign of an unknown element. This element was first recognized on the earth by Ramsay in 1895, and he showed later that it existed in air to the amount of four parts per million. Efforts to combine the gas with other elements have been without success.

Helium is given off when various minerals are heated, and is also found in the waters of certain springs. It has been produced on a commercial scale from natural gas wells of Texas by liquefying all other gases except the helium, which is collected separately. As helium is not inflammable and is less than one-seventh as heavy as air, it is considered the most valuable of all known gases for filling balloons and airships. When condensed, it forms a liquid about one-eighth as heavy as water, which boils within 4.5° C. of absolute zero, or about −451.5° F.

The most interesting fact concerning helium is that it is *actually created* as a *new* substance during the disintegration process of radioactivity. The *alpha rays*, given off by radium and other radioactive elements, consist of electrically charged atoms of helium moving at enormous velocities. As helium has an atomic weight of four, niton, the substance remaining when helium has been given off, has an atomic weight of four less than radium, the parent element. Helium and niton are the immediate products of the disintegration of radium. See *Radioactivity, Radium.*

Hydrocarbons. A large group of chemical compounds composed only of hydrogen and carbon. As a class, they are insoluble in water, combustible, and neither acid nor alkaline. Some are gases, some liquids, and others solids. Methane, acetylene, benzene, the constituents of gasoline, and also the principal constituents of turpentine and india rubber are all hydrocarbons.

Hydrocarbons should not be confused with *carbohydrates*, which are compounds of carbon, hydrogen, and oxygen. See *Acetylene, Benzene, Methane, Naphthalene, Paraffin.*

Hydrochloric Acid. A colorless solution of hydrogen chloride gas in water, forming one of the strongest acids. In view of this fact, it is interesting to note that the *perfectly dry gas* is not acid and does not attack metals. The gas is produced by the action of sulphuric acid on common salt, and is then absorbed in water. This yields the commercial product called *muriatic acid*, which is often yellow from impurities. It is used to clean sheet iron before coating with tin, in making chlorides and chlorine, in the production of glue, and for many other purposes. The gastric juices in the human stomach generally contain about one-third of one per cent of free hydrochloric acid.

Hydrofluoric Acid. A colorless, corrosive liquid having a suffocating odor, prepared by heating calcium fluoride with sulphuric acid and dissolving the resulting gas in water. The acid attacks silicon and all of its compounds; consequently, it decomposes glass and porcelain, and must be kept in bottles of lead or wax. It is used chiefly for etching and marking glass, and in the chemical analysis of materials containing silica or sand, which it changes into a vapor. See *Fluorine.*

Hydrogen. A colorless, odorless, and tasteless gas. It was first found to be an element by Cavendish in 1766 although it had been produced but not recognized by Paracelsus in the 16th century. It is the lightest of all substances, being 14½ times lighter than air, and therefore useful for filling balloons. For practical purposes the lifting force of one cubic yard of hydrogen is considered to be about 1⅔ pounds.

Hydrogen is found free in natural gas, in volcanic vapors, in gases from the Stassfurt salt beds, and, in traces, as part of the atmosphere. Combined hydrogen makes up about 11 per cent of the weight of water. It is found in almost every organic substance and is the essential element in all acids.

When a mixture of hydrogen and oxygen is ignited, the two gases combine with explosive violence to form water. The name hydrogen, derived from the Greek, means "water-forming." Although the mixed gases explode, a stream of pure hydrogen burns quietly in air with a flame so intensely hot that it easily melts platinum. The oxyhydrogen flame is often superior even to that of oxyacetylene for cutting thick metal. Hydrogen combines with many other elements, the compounds with carbon being especially important as the great group of *hydrocarbons*.

In the laboratory, hydrogen is usually prepared by the action of dilute hydrochloric acid on zinc. Commercially, it is produced by the action of sulphuric acid on scrap iron and also by passing steam over red-hot iron turnings and filings. In the first case, the iron combines with the radical of the acid, forming a salt, and the hydrogen of the acid is set free. In the second case, the iron combines with the oxygen of the steam, releasing the hydrogen. During the World War, a process used by the army to prepare hydrogen for filling balloons utilized the action of caustic potash on ferrosilicon. A very important process consists of decomposing slightly acidulated or alkaline water by means of the electric current. Two volumes of hydrogen are given off at the negative pole for every volume of oxygen produced at the positive electrode.

In addition to its use for filling balloons and for obtaining high temperatures, hydrogen is used for deodorizing oils, and for changing liquid fats to solid fats in the presence of finely divided metallic nickel or other substances, used as a catalyzer. It is also required for the synthetic production of ammonia by the Haber process. Artificial sapphires and rubies, almost indistinguishable from the genuine, are made by melting powdered aluminum oxide with a trace of coloring matter in the oxyhydrogen flame.

Under proper conditions, hydrogen may be condensed to a liquid and then to a solid which melts at −434° F. All other gases except helium become solid when passed through a tube surrounded by liquid hydrogen. It is the lightest known liquid, only 0.07 the density of water, and boils at 423° below zero F. See *Acids, Alkalies, Carbohydrates, Hydrocarbons, Water.*

Hydrogen Peroxide. A heavy, colorless liquid, composed, like water, of hydrogen and oxygen, but having twice as much oxygen. It is unstable, and readily breaks down into water and a form of oxygen which is chemically very active. Because of its oxidizing action, hydrogen peroxide is used chiefly as a mild antiseptic and for bleaching hair, feathers, silk, wool, and ivory. It is prepared commercially by treating barium peroxide with dilute sulphuric acid. As the pure substance decomposes easily, it is usually sold as a three per cent solution, preserved by a small amount of acetanilid.

Hypo. A white, soluble, crystalline compound, made by boiling a solution of caustic soda or of sodium sulphite with sulphur. Its chemical name is *sodium thiosulphate*. Hypo is extensively used in photography for removing from negatives and prints any silver salts that have not become insoluble through the action of light and the developer. It is used also for removing excess chlorine from bleached fabrics.

Iodine. A soft, gray-black, crystalline solid having a metallic luster. It is one of the *halogen* group of elements, and was discovered in 1811 by Courtois in the ashes of seaweeds. The crystals, which are almost five times as heavy as water, melt at 236° F. and boil at about 380° F. The violet color of the vapor suggested the name iodine, which is taken from the Greek and means "violet-like." Iodine is soluble in about 6000 parts of water. It dissolves readily in chloroform, giving a violet solution, and in alcohol, forming a brown liquid. This difference is thought to be due to feeble combination with alcohol.

Iodine is produced from the ashes of seaweeds and from the "mother liquors" remaining after the purification of Chile saltpeter. It forms with nitrogen and hydrogen the so-called *nitrogen iodide*, a violent explosive which is so sensitive when dry that it explodes if touched with a feather. The element is extensively used in medicine as tincture of iodine for treatment of swellings, and as a powerful germicide. Various compounds such as potassium iodide and ammonium iodide are used also in medicine. Large quantities of silver iodide are used in photography, and iodine is necessary for the preparation of certain artificial dyes. With starch, iodine gives a blue color, which is used as a delicate test for either substance.

The *thyroid gland* is the only tissue of the human body which normally contains more than a trace of iodine.

Iodoform (*ī-ō'dō-fôrm*). A yellow, crystalline compound containing iodine. It has been used extensively as an antiseptic in the treatment of sores and wounds. Iodoform has a powerful, unpleasant odor, and has been largely displaced in medicine by more effective and less poisonous substances.

Litharge (*lith'ärj*). A heavy, yellowish red powder, obtained by grinding the scaly material produced when lead is roasted in the presence of air. It is used as a drier in paint oils, in the preparation of rubber goods, and for making lead glass, enamels, and many lead compounds. Chemically, it is lead monoxide and has the same composition as *massicot*, which is a lighter powder produced in the same way but at a temperature below its melting point. Massicot is used for making red lead.

Litmus. A vegetable dyestuff obtained from certain fermented lichens. The pure substance is a red organic acid that turns blue in the presence of alkalies. Litmus is used chiefly by chemists, in solution or dried upon porous paper, as an indicator of the acidity or alkalinity of any substance. When a drop of the solution, or a piece of blue *litmus paper* is placed in an acid liquid it immediately becomes red and will again change to blue in an alkaline liquid. A solution is often said to be neutral when it does not change the color of either red or blue litmus.

London Purple. A purple compound of arsenic which has been extensively used as an insecticide.

Lye. A water solution of any alkali, such as caustic potash or washing soda. Lyes are extensively employed in manufacturing soaps, refining oils, making paper, and for many other industrial purposes.

Mercurochrome. A synthetic germicide containing about 23 per cent of mercury in combination with bromine and other elements. It appears as irridescent green scales, which are readily soluble in water, forming a bright red solution. Since its announcement in 1919, it has made rapid progress, due to the fact that, although a powerful disinfectant, it is almost nonirritant.

Methane. A light, odorless, inflammable gas produced by the natural decomposition of organic matter, and in other ways. It is often called *marsh gas* because it rises from the bottom of marshy pools. Miners know it as *fire damp*, which issues from seams in the coal beds and often causes explosions. Methane is the simplest of the hydrocarbons, and is the principal constituent of natural gas.

Minium or **Red Lead.** The red oxide of lead, produced as a heavy powder by carefully heating massicot until it is completely oxidized. The color varies somewhat according to the care taken and the method of preparation. Minium is used chiefly in paint, in making glass, in storage batteries, and as a lute for sealing pipe joints.

Morphine. The principal alkaloid of opium, from which it is separated as bitter, white crystals. It is generally used in medicine as the chloride, sulphate or acetate, for relieving pain, producing sleep, or to allay certain nervous disorders. The action of the drug is quickest when injected hypodermically. See *Codeine*, *Poppy*.

Naphtha. A term often used to describe any volatile, inflammable liquid obtained by distillation of organic material. Thus *wood naphtha* is crude methyl alcohol, obtained by destructive distillation of wood. In some countries naphtha refers to the product called gasoline in America. When refining petroleum, the first products coming from the still are classed as light and heavy naphthas.

Naphthalene. A hydrocarbon obtained in large quantity from coal tar. In a pure state it forms beautiful white crystals, which are insoluble in water and have a characteristic odor. Naphthalene is the starting point for many dyes, including most of the azo colors. It is used also in making celluloid and certain smokeless powders, and as the basis of noninflammable artificial wax. Moth balls are cast from melted naphthalene.

Niter. A term used to include both India saltpeter, or potassium nitrate, and Chile saltpeter, or sodium nitrate. The latter occurs in great beds in the rainless northern provinces of Chile. See *Saltpeter*.

Niton. A gaseous element, detected in 1900 by Dorn, who called it radium emanation because it is generated by the element radium. In 1910 its elemental nature was proved by Ramsay and Gray. Under pressure, niton becomes a liquid at ordinary temperatures, its boiling point being −62° C. or −79° F. When pressed into a glass tube with an exceedingly fine bore, and sufficiently cooled, niton becomes solidified into a microscopical rod of ice-like material. Although this minute rod is too small to be seen with the unaided eye, it produces a brilliant light in the tube, whence its name niton, from the Latin *nitere*, "to shine." It is known also as radon.

When an atom of radium gives off an atom of helium, the atom of radium is no longer radium but thereby has become an entirely new element, the intensely radioactive gas niton. Like helium and argon, niton is chemically inert, forming no salts or other compounds. Its existence, too, is only temporary. Like radium, niton has a definite "half period" of decay, which, however, is comparatively very brief. In four days only half of the niton remains, and half has changed into something else. In eight days a fourth of it remains, in twelve days an eighth, and so on until at the end of a month practically all of the niton has disappeared.

To niton is largely due the remarkable heating effect of radium. In comparison with its weight, niton gives off a million times more energy than is released by the most violent chemical reaction. If a cubic centimeter, about 1/16 of a cubic inch, of the gas were confined in an ordinary glass tube, the heat given off would probably melt down its walls. It is computed that a pound of niton, immediately after being separated from radium, would emit energy equivalent to 10,000 horse power. However, this heat-producing property is not permanent, but diminishes rapidly, as does the radioactivity.

Niton is constantly produced by any compound of radium and is readily obtained from any solution of a radium salt. On account of its greater convenience, niton, under its earliest name, radium emanation, is widely used in medicine instead of radium itself. See *Radioactivity*, *Radium*.

Nitric Acid. One of the earliest known and most valuable mineral acids; usually prepared by adding sulphuric acid to sodium nitrate and distilling off the nitric acid that forms. It is also produced commercially from ammonia gas; and, where electric power is extremely cheap, by passing air through a powerful flaming electric arc.

Nitric acid is a colorless liquid when pure, but the commercial product is yellow. It is a powerful oxidizing agent as well as an active acid which attacks all metals except gold and platinum. Its salts are called nitrates. It corrodes the skin, leaving a yellow stain. *Fuming nitric acid* contains an oxide of nitrogen (NO_2) in solution. Nitric acid is necessary for the production of almost all explosives, a large proportion of the coal-tar dyes, and celluloid and similar pyroxylin compounds. Thousands of tons of nitrates are used yearly for fertilizers. See *Explosive*, *Fertilizers*.

Nitrogen. A colorless, tasteless elementary gas composing about 78 per cent of dry air, which was discovered by Rutherford in 1772. As the gas did not support life or combustion it was called *azote*, meaning without life. This name is still used by the French; the English term, nitrogen, was given because the element is found in niter. Nitrogen is ordinarily an inert gas which can be made to combine directly with only a few elements. In 1911, an active modification of nitrogen which unites directly with phosphorus, mercury, and other elements was obtained by J. R. Strutt, Lord Rayleigh, who passed electric sparks through the ordinary gas. The change in condition is accompanied by phosphorescence. Nitrogen may be condensed to a liquid which boils at −321° F. and becomes solid at −346° F.

Compounds of nitrogen are great both in number and in importance. The niter beds of Chile and India furnish valuable fertilizer, as do ammonia and its salts; nitric acid is necessary for explosives; cyanogen gas is a deadly poison; acetanilid and the alkaloids are of great use in medicine. The beautiful azo colors contain nitrogen, which is also an essential part of the proteins and therefore is found in every living thing. There are five different oxides of nitrogen.

Because of the great industrial need for compounds of nitrogen and the plentiful supply of the free element in air, various processes of *nitrogen fixation* have been developed. One of the earliest employed huge electric arcs, sometimes 20 feet long, to produce oxides of nitrogen, which combined with water to give nitric acid. In the *cyanamid process*, nitrogen is passed over heated calcium carbide, with which it combines. When cyanamid is treated with steam, ammonia is given off, which can be absorbed in sulphuric acid and used for fertilizer. In a somewhat similar manner, free nitrogen is combined with alkali to form cyanides. By the *Haber process*, a moderate temperature and a high pressure together with a catalyzer are employed to combine nitrogen and hydrogen directly into ammonia. Hydrogen for this process is obtained by electrolysis of water or by the reaction of coke on steam. The latter method has the merit of requiring much less power than other processes of nitrogen fixation.

Various soil bacteria, especially those which grow in nodules on the roots of leguminous plants, such as clover, vetch, peas, and beans, are able to fix free nitrogen so that it ultimately becomes available as plant food. See *Air*, *Ammonia*, *Atmosphere*, *Cyanamid*, *Explosive*, *Fertilizers*.

Nitrous Oxide, or **Laughing Gas.** A general anesthetic discovered by Sir Humphry Davy in 1800, and usually believed to have been first used in surgery in 1844 by Dr. H. Wells, an American dentist. The gas is produced by heating ammonium nitrate. When the gas is inhaled the first effects are usually pleasantly exhilarating and may cause singing, laughing, and quick violent motions. This state is soon followed by unconsciousness and insensibility to pain. See *Anesthetic*.

Noble Gases. A group of gaseous elements, including argon, helium, krypton, neon, niton, and xenon, so named because they do not enter into combination with any of the other elements.

Ocher (*ō'ker*). A naturally occurring pigment which varies in color but is usually yellow. It consists of clay, colored by an oxide of iron that contains combined water. If ocher is heated until this water is driven off, it becomes

orange or red, and is known as *burnt ocher*. The ochers give permanent color, mix well with oil, have good covering power, and are cheap. *Sienna* is similar to ocher but is usually somewhat finer grained. *Burnt sienna* is a reddish orange pigment.

Oxalic Acid. A poisonous organic acid, occurring as its potassium or calcium salt, in sorrel, rhubarb, many lichens, and other plants. It was formerly prepared by heating sawdust with caustic soda, but is now chiefly produced from sodium formate or carbonate. Oxalic acid forms transparent crystals which are used in the dyeing and printing of fabrics, for purifying glycerin, bleaching straw and leather, and for removing ink stains. Milk of lime is the best antidote for oxalic acid poisoning.

Oxygen. The most abundant of all the elements, which, in its free state, occupies about 21 per cent of the volume of the air. Oxygen is a colorless, tasteless gas, discovered in 1774 by Priestley, who prepared it by heating red oxide of mercury. It may be condensed to a pale blue magnetic liquid which boils at −297° and freezes at 360° below zero F. Oxygen has been given the atomic weight of 16, and, chiefly because of its chemical activity, it is the standard by which the atomic weights of all other elements are compared.

Almost one-half of the earth's crust is oxygen. Water alone contains about eight-ninths of its weight of the element, and the human body more than 60 per cent.

Oxygen is absorbed by all animals in breathing. When passing through the lungs, the blood takes up about six per cent of its volume of oxygen, and gives off about eight per cent of carbon dioxide. It is the heat produced by the chemical action of changing oxygen to carbon dioxide that maintains the normal temperature of the body. When a ton of fuel is burned in a furnace, almost three tons of oxygen are required, and if this oxygen were not available in the air, no heat could be obtained from the coal or wood. Similarly, if a living animal can no longer obtain oxygen, it dies. There are, however, certain forms of bacteria known as *anaërobes* which develop normally only in the absence of free oxygen. In the presence of sunlight, green plants absorb carbon dioxide and give off free oxygen.

Rusting is due to the slow combination of iron with oxygen, in the presence of moisture and carbon dioxide. If both iron and air are perfectly dry, no rusting will occur. When a thin piece of iron, such as a watch spring, is heated red hot and plunged into a jar full of oxygen, the iron burns with a brilliant shower of sparks. The ash formed is magnetic oxide of iron.

In the laboratory, oxygen is easily prepared by heating a mixture of manganese dioxide with potassium chlorate. Commercially, it is produced simultaneously with hydrogen by electrolysis of water, or by liquefying of air and boiling off the more volatile nitrogen. The oxygen obtained is compressed and transported in heavy steel cylinders.

The principal use of oxygen is for welding and other high temperature operations with the oxyacetylene and oxyhydrogen flames. It is frequently used in medicine for treating certain diseases and cases of asphyxiation, in submarines, in airplanes at high altitudes, and as an aid to complete combustion. See *Acids, Air, Alkalies, Atmosphere, Ozone, Water*.

Ozone. A colorless gas with a strong penetrating odor which is often noticeable near sparking electrical machines. It is a modified or allotropic form of oxygen, formed by condensation of three volumes of ordinary oxygen into two volumes of ozone. At very low temperature it forms a deep blue, magnetic liquid. It is a different substance from oxygen and is notable for its extreme chemical activity. Oxygen does not tarnish mercury or silver, but ozone quickly changes them to their oxides.

The frequently made claim that a small quantity of ozone is a normal constituent of the atmosphere is denied by some scientists because oxidization of silver has never been obtained by air. This point is apparently unsettled, but a certain amount of ozone is undoubtedly formed by a flash of lightning.

Ozone may be produced in small amounts by chemical action, by vaporization of water, by incandescent solids, by radioactive elements, by ultra violet rays, and especially by means of a high tension electrostatic field. It is prepared commercially in various forms of apparatus, called *ozonizers*, in which air or oxygen is passed through an electric field charged by a rapidly alternating current at a pressure of from 5000 to 60,000 volts.

Small ozonizers are frequently used as an aid to ventilation because ozone has the power to destroy many organic odors. However, when used in this manner, the ozone is not sufficiently concentrated to exterminate disease germs. Ozone rapidly decomposes articles made of rubber.

The chief technical application of ozone has been for the sterilization of drinking water. It has also been used to prevent bacterial growth in the cold storage industries, to bleach delicate fabrics, oils, and waxes, and as an oxidizing agent in the preparation of organic chemicals such as vanillin, the flavoring principle of the vanilla bean.

Paraffin. A white, tasteless and odorless, waxlike mixture of hydrocarbons which occurs naturally in the mineral ozocerite. It is also obtained by distillation of coal, shale, and peat. The chief source of paraffin is the tar distillate formed in the process of refining crude petroleum. After the lighter and more volatile oils have been removed, the crude wax is separated by chilling and pressing the residue. It is refined by being heated gradually in a warm room, and the final product bleached white with fuller's earth or bone black. Refined paraffin varies in melting point between 110° and 200° F. It is used for making candles, for preparing waxed paper, and for protecting the surface of jellies and jams from mold and other infections. In medicine, paraffin is used to cover burns so that the wound will heal without a disfiguring scar.

Paris Green. A poisonous green powder consisting of a double salt of copper acetate and copper arsenite. Paris green was formerly used as a pigment, but, because of its poisonous nature, this employment of it has been largely abandoned. It is now very commonly applied to growing plants in order to destroy potato bugs, cotton worms, slugs, and similar harmful insects. Usually it is mixed with water and used as a spray, or mixed with air-slaked lime and dusted upon the plants.

Pepsin. An enzyme or ferment produced by certain glands in the stomachs of the higher animals. When in a weakly acid solution, it acts upon the proteins of the food, changing them to simpler compounds called amino acids, which can pass through the walls of the intestine and be absorbed. Pepsin is produced commercially from the stomachs of pigs and sheep, and is used in medicine as an aid to digestion. It is usually sold in the form of light yellow flakes or scales which should digest at least 3000 times their weight of boiled white of egg. See *Enzymes*.

Permanganates. Salts of permanganic acid, of which the deep purple crystals of *potassium permanganate* are best known. As they have powerful oxidizing properties, solutions of permanganates are used as disinfectants. In order to destroy the poison, crystals of potassium permanganate are often applied directly to a wound caused by the bite of a venomous snake.

Phosphates. Compounds of phosphoric acid, many of which are of great importance because they are necessary for the life and growth of plants and animals. The term phosphate, when used commercially, generally refers to phosphate fertilizer or to beds of calcium phosphate which occur in Tunis, Algeria, Florida, Tennessee, and other parts of the world. Natural phosphate rock is insoluble; it is changed to soluble phosphate, or *superphosphate*, by treatment with sulphuric acid, which renders most of the phosphorus available for plant food. When phosphates are purchased for fertilizer, it is the *available* rather than the *total* phosphoric acid which is most important. Other phosphate fertilizers are steamed bone meal, spent bone black, and Thomas slag, a by-product from the manufacture of steel.

The fluids and soft tissues of the human body contain phosphates, usually as the sodium and potassium salts. The bones contain more than half their weight of normal calcium phosphate, while the enamel of the teeth is composed of 80 to 90 per cent of the same substance. The ash obtained from blood, milk, or the yolk of eggs has a large content of phosphates, thus indicating the importance of these salts in the life processes. The brain and the nerves contain an unusually large proportion of phosphates. See *Fertilizers*.

Phosphorus. A nonmetallic element discovered by the merchant alchemist, Brandt, in 1669. It does not occur free in nature but, usually combined with calcium, is widely distributed in various phosphate minerals and beds of fossil bones. It is generally prepared in an electric furnace from a mixture of sand, coke, and calcium phosphate. Phosphorus distills from the furnace, is collected under water, and purified by filtering through canvas or chamois leather.

The element prepared in this manner is a yellowish white, intensely poisonous, waxlike solid, which is very soluble in carbon disulphide, melts at 111° F., and has a specific gravity of 1.83. It combines readily with oxygen, glows in the dark, and takes fire spontaneously at low temperatures. Under the influence of light or when heated in closed pots to about 500° F., white phosphorus gradually changes to a red allotropic modification having entirely different properties. Red phosphorus is a dull red powder 2.3 times as heavy as water. It does not phosphoresce, is not poisonous, does not dissolve in carbon disulphide, and does not catch fire in air below 460° F., although the common variety burns at about 105° F.

When common or white phosphorus burns, it forms a dense cloud of phosphorus pentoxide. For this reason,

large amounts of the element were used in smoke bombs during the World War. A small amount, mixed with lard and flour or corn meal is made into rat poison. Large quantities were formerly employed for tipping matches, but because the poisonous element causes necrosis, or rotting of the jawbones, among the workers, it can no longer be lawfully used for this purpose. The rubbing surface on a box of safety matches usually contains red phosphorus.

Phosphorus forms three different oxides and a great variety of other compounds of which the most important are the phosphates.

Plaster of Paris. A white powder made by heating gypsum until three-quarters of the water it contains is given off. When the powder is mixed with water, these constituents again combine and set to a hard mass. Plaster of Paris is used chiefly for plaster and stucco work and for making molds and casts. It expands slightly on setting, and consequently yields a sharp reproduction of the details of a mold.

Protein (*prō'tē-ĭn*). An important class of exceedingly complex organic compounds which are found in all active plant and animal cells. Proteins always contain carbon, hydrogen, oxygen, and nitrogen. They usually contain sulphur, and occasionally phosphorus, iodine, and other elements. The nitrogenous food of animals, which is absolutely necessary for their life and growth, is essentially protein food. Eighteen per cent of the human body is protein.

Proteins are chemical combinations of simpler substances known as *amino acids*, of which certain ones are necessary for animal growth. Plants have the power to build up these acids and combine them into proteins, while animals usually seem able only to modify and reconstruct those proteins which are received in the food. Consequently, the *amount* and *kind* of protein eaten is of great importance. It acts chiefly to build and to renew muscular tissue but may serve also as a source of energy.

Lean meat consists largely of protein, as do the white of egg and the curd of skim milk. The first known vegetable protein was the gluten of wheat. Peas and beans contain large amounts of protein, and the protein of peanuts is one of the most satisfactory vegetable substitutes for meat. Corn and other cereals, as well as many seeds and nuts, contain protein that is characteristic of its source.

Prussian Blue. An artificial blue pigment known chemically as a ferrocyanide of iron. It mixes well with oil, but lacks covering power and fades somewhat in light. The color is not affected by acids but is destroyed by alkalies. Prussian blue dissolved in oxalic acid is the basis of much of the liquid *bluing* used in the laundry.

Prussic Acid. The common name of hydrocyanic acid, a colorless liquid with an odor similar to bitter almonds, which boils at about 79° F. It is one of the swiftest and most deadly of known poisons; a single drop, if swallowed, is sufficient to cause almost instant death. Its most important salts are *potassium cyanide* and *sodium cyanide*, which are used in electroplating and, in the *cyanide process*, for recovering gold from pulverized ore.

Purple of Cassius. A fine purple pigment first prepared by Andreas Cassius about 1685, called also *gold purple*. It is obtained by treating a solution of gold chloride with a mixture of tin chlorides. The resulting product is believed to consist of tin oxides mixed with finely divided metallic gold. It is used to impart a pink, rose, or ruby red color in staining glass, in painting pottery and enamel, and in coloring artificial gems.

Quinine. An intensely bitter, crystalline alkaloid extracted from the bark of the cinchona tree. It is produced in Peru and adjoining South American countries and in Java. As the free alkaloid is almost insoluble, it is generally used in medicine as the sulphate, hydrochloride, or salt of some other acid. Quinine finds its greatest use in the treatment of malarial fevers, for which it is regarded as a specific. It is also valuable, when properly used, as a tonic and preventive. The average dose varies from one-half grain to five grains. Excessive amounts depress the heart and cause temporary deafness.

Rochelle Salt. A white, crystalline salt known to the chemist as sodium-potassium tartrate. It has a mild, salty, somewhat bitter taste and is used as a laxative, especially in Seidlitz powders.

Saccharin (*săk'ă-rĭn*). A white, crystalline, intensely sweet, coal-tar product discovered in 1879 by Fahlberg and Remsen. Saccharin has definite antiseptic properties, does not ferment in the stomach, is not a food, and when pure, is about 500 times sweeter than sugar. Consequently, it is often employed during treatment of diabetes, obesity, intestinal infections, and other diseases where sugar is to be avoided. The use of saccharin in ordinary food and drink is prohibited under the national pure food regulations, and by the laws of many states. This does not prevent its employment in medicinal products which are properly labeled.

Salt. Sodium chloride or common salt is one of the most important and widely distributed chemical substances. When pure, it is in the form of white, cubical crystals that often have concave sides. It melts at 1474° F., and is almost as soluble in cold water as in hot. Saturated brine contains 26.4 per cent of salt and is 1.2 times as heavy as pure water.

The chief sources of salt are the water of the sea and of salt lakes, rock salt, and natural brines. Sea water contains only about 2.75 per cent of salt and is utilized when no richer source is available. Large quantities have been produced from Great Salt lake, which contains about 12 per cent of salt. In 1927, a concession was granted for obtaining salt and other chemicals from the waters of the Dead Sea. It is estimated that its waters contain 11,900 million tons of salt.

When thick beds of rock salt are near the surface, it is usually mined like coal, and, if sufficiently pure, the mineral is merely ground and sifted to proper size. Impure salt is often dissolved in water and recrystallized. Salt mines are usually less than 1000 feet deep. If the beds are far below the surface, it is customary to drill narrow holes down to the salt. Fresh water is then run in, and, after it becomes saturated, the brine is pumped to the surface. Often wells are sunk until natural brines are reached. At least two wells of this type are more than a mile deep; that drilled to a depth of 6600 feet at Paruschowitz, Upper Silesia, Germany, is the deepest salt well in the world. Salt springs result when natural brines force their way to the earth's surface.

The largest and most famous salt mine is that of Wieliczka, Poland, which is tunneled to a depth of 982 feet and forms a subterranean town. There are 77 miles of passage on seven levels. Roads, churches, monuments, and a beautiful crystal ballroom are all carved from the solid salt.

In the United States, Michigan leads in total output as well as in the production of brine salt. New York is second. The total production of the entire country is normally about 7.5 million tons.

Brine may be evaporated by exposure to the sun, when large crystals of *solar salt* are produced, and by artificial heat in open tanks or vacuum kettles. It is often evaporated in long, shallow vats called graniers, heated by steam pipes hung about six inches from the bottom so that the crystals that settle may easily be removed.

Many different grades of salt are prepared, such as table, dairy, common, fine, packers, solar, milling, and rock salt. Table salt must be free from magnesium and calcium chlorides, which are impurities that absorb moisture and cause the crystals to cake. Special grades of shaker salt often contain small amounts of magnesium carbonate, which is added to prevent caking and thus to allow the salt to run freely. Rock salt does not dissolve so quickly as finer crystals and is used for feeding cattle, curing meat, and preserving hides. Salt is usually packed in barrels containing 280 pounds net. The principal uses of salt are for food, and for the production of sodium carbonate, caustic soda, chlorine, and all other sodium compounds. It is used also for preserving meat and fish, glazing cheap pottery, and salting out soap. Crystals of salt have been used for studying heat, as they are more transparent than glass to the infra-red rays. In France, Germany, and India, salt fit for seasoning food is subject to a tax.

Salt is a natural constituent of all animal fluids and is therefore necessary for life. What is known as a *normal* or *physiological salt solution* contains 8.5 grams of salt per liter. A man or race living on raw meat requires no extra salt, but a diet of boiled meat and vegetables requires the addition of this important substance. In many parts of Africa and other regions where salt is scarce, pieces of it are often employed as money.

If all of the waters of the seas were to be evaporated, about 4,500,000 cubic miles of salt would remain. This is about 14½ times the volume of all Europe above sea level, or enough to cover the entire earth with a layer of salt 112 feet thick. See *Chlorine*, *Sodium*.

Saltpeter. White, crystalline potassium nitrate. It occurs naturally to a limited extent, and is sometimes called India saltpeter, to distinguish it from sodium nitrate, or Chile saltpeter, from which it is usually prepared. It is valuable for making gunpowder and as a fertilizer, and is sometimes used in medicine.

Selenium (*sĕ-lē'nĭ-ŭm*). A nonmetallic element somewhat similar to sulphur, discovered in the dust found in the flues of sulphuric acid factories. It occurs free in small amounts, usually together with sulphur, and in combination with many metals. It is obtained chiefly as a by-product in the electrolytic refining of copper. The principal forms of selenium are a red amorphous powder and a gray variety obtained by slowly cooling the melted element.

The electrical conductivity of the gray form increases under exposure to light. This property is the basis of *selenium cells*, which are used for various purposes, including the measurement of changes in the light from the stars. Selenic acid is notable because it dissolves gold. Selenium oxychloride has been shown to be a valuable solvent for many substances.

Silica and **Silicates.** The oxide of silicon and compounds of silicic acid are the most abundant of all substances which compose the earth's crust. Clean white sand and quartz or rock crystal are almost pure silica, which is known chemically as silicon dioxide. The porous infusorial earth used in making dynamite is silica, while agate, jasper, onyx, and amethyst are colored forms of the same substance. Opal is silica containing a variable amount of water. Clear crystals of quartz are used for optical purposes; and valuable chemical "glassware" that will not break, even though dipped in water when red hot, is made from fused silica.

The silicates, which are often very complex compounds, are exceedingly numerous. Kaolin or clay is an acid silicate of aluminum; mica, which is so different in form from clay, is very similar chemically but contains also a silicate of potassium; granite is a mixture of silicates. Glass, pottery, porcelain, and water glass are artificial silicates which illustrate the great value of these compounds to mankind. See *Clay, Glass, Kaolin, Porcelain, Pottery, Water Glass.*

Silicon. A nonmetallic element which, in its many compounds, makes up about one-fourth of the earth's crust. After oxygen, it is the most plentiful of the elements, but, unlike oxygen, it is found only in combination.

Silicon is usually prepared in the electric furnace by heating pure sand with an amount of coke insufficient to form carborundum. It exists chiefly as a brown amorphous powder and as gray-black crystals which are sometimes used for the detection of signals in wireless telegraphy. The chief use for silicon is in the production of ferrosilicon alloys. Cast-iron apparatus employed in the chemical industries usually contains a large amount of silicon and is almost unaffected by acids which would quickly ruin ordinary iron or steel. Silicon forms compounds with all of the halogens except iodine, and with sulphur, nitrogen, carbon, oxygen, and several other elements.

Soda. A term applied to sodium carbonate, or washing soda, but also used in a more general way to include baking soda and caustic soda. Sal soda consists of crystals of sodium carbonate which also contain 63 per cent of combined water. The *Leblanc process* for making soda from salt by means of sulphuric acid, limestone, and coal was introduced in 1791 and existed without competition until 1863, when the Solvay process appeared. Some soda is obtained from natural deposits occurring in Egypt, California, and other places. Sodium carbonate is used in enormous quantities for making glass, soaps, washing powders, dyes, and in preparing explosives. See *Caustic Alkalies, Solvay Process.*

Solvay Process. A method for making baking and washing sodas from common salt by passing carbon dioxide gas, under pressure, into brine that contains ammonia. Baking soda is thrown out of solution and may be changed to washing soda merely by heating. This process, first developed by Ernest Solvay, a Belgian, in 1863, has been expanded until it is now used to produce practically all of the world's soda.

Solvent. Any substance which may be used to dissolve something. Water is the most generally useful of all solvents, as it dissolves sugar and most salts, as well as many liquids and gases. But water will not dissolve shellac, or camphor, or iodine, for which alcohol is the best solvent. Flavoring extracts cannot be made with water, because it is not a solvent for the essential oils and resins. Neither water nor alcohol will remove a grease spot that quickly disappears when treated with gasoline or ether, both of which are good solvents for fats, oils, and waxes. Acetone, methyl alcohol, amyl acetate or banana oil, and carbon tetrachloride are frequently used organic solvents.

In ordinary solution there seems to be little if any combination between the dissolved substance and the solvent. Sugar can be obtained again by boiling off water from a sirup; but another type of solvent acts by causing a chemical change in the dissolved substance. Thus, when hydrochloric acid dissolves zinc or iron, the free metal cannot be obtained again by evaporating the acid, because it has been changed to a chemical compound. In certain methods of mining, sodium cyanide is employed as a solvent for gold, to separate the yellow metal from quartz and similar impurities. Practically every substance can be dissolved by use of the proper solvent.

Sulphur. A solid, nonmetallic element known since ancient times. It is found free in many places, especially in volcanic regions either active or ancient, where it occurs mixed with pumice, gypsum, and other substances. It is usually separated from such impurities by heating until the sulphur melts, when it can be drawn off and cooled in round molds, forming ordinary *roll sulphur*. A purer form is obtained by boiling the crude material and cooling the vapors, which condense into a crystalline powder known as flowers of sulphur. The flowers are often remelted and cast as pure roll sulphur.

Ordinary sulphur is a yellow, tasteless, and odorless solid, insoluble in water and alcohol but soluble in carbon disulphide. It forms rhombic crystals, has a specific gravity of 2.06, melts at 235° F., and burns easily, with a blue flame, to form the suffocating gas, sulphur dioxide. It is the odor of the gas which is often referred to as the smell of sulphur. Sulphur is a poor conductor of heat and electricity. As a mineral or stone that burns, it received the common name of *brimstone*. Above 205° F. and below 246°, rhombic sulphur gradually changes to another variety which forms long, almost colorless, monoclinic crystals that melt at 247° F. and are 1.96 times as heavy as water. When either type is heated, it melts to a pale yellow, mobile liquid which, at about 320° F., suddenly becomes dark, and so thick that it will not spill if the container is inverted. With further heating, the gummy mass again becomes liquid and boils at 832° F.

When sulphur is boiled with milk of lime, and acid is added to the resulting solution, a fine, almost white powder called *precipitated sulphur* is deposited. Another form known as *colloidal sulphur* gives a solution, or rather a colloidal suspension, in water. When boiling sulphur is poured into cold water, it assumes a semifluid form known as *plastic sulphur*, which becomes hard after a few days. The hardened product then consists of a mixture of the ordinary form with *amorphous sulphur*, which is not soluble in carbon disulphide.

The *sulphides*, or direct compounds of sulphur with a metal, form numerous minerals. Examples are: Cinnabar or mercury sulphide; galena, a sulphide of lead; pyrites or iron sulphide; stibnite or antimony sulphide; realgar and orpiment, sulphides of arsenic; sphalerite or zinc sulphide. Gypsum is representative of the large group of sulphates. Many organic compounds, such as the oils of mustard and garlic, hair, wool, and white of egg, contain sulphur. Combined with hydrogen, it forms hydrogen sulphide, a poisonous, evil smelling gas. This gas, which is the chief cause of the odor of rotten eggs, is extensively used in chemical analysis. Four oxides of sulphur are known, the most important being sulphur dioxide, and sulphur trioxide which combines with water to produce sulphuric acid. Sulphur may be found in compounds with almost all of the other elements.

Sicily was for many years the chief source of sulphur, but Texas now produces over 80 per cent of the world's supply, although mines exist also in Louisiana, Nevada, and Utah.

The American deposits, which occur in thick beds hundreds of feet below the surface, are mined by a process patented by Herman Frasch in 1890. A series of five pipes, one within the other, the largest about 17 inches, and the smallest one inch, in diameter, are driven to the proper depth. Superheated water is forced down into the sulphur, which melts, collects in pools, and is forced to the surface by compressed air sent down through the smallest pipe. The melted sulphur is run into bins, where it cools, forming huge blocks 50 or more feet high from which the material is removed by blasting. This sulphur is often more than 99.9 per cent pure.

Sulphur is burned in enormous quantities for the preparation of sulphur dioxide, which is used as a disinfectant, as an active bleaching agent, as a preservative of dried fruits, and for manufacturing sulphuric acid. Gunpowder, fireworks, paper manufacturing, and the fertilizer industry also require large amounts of sulphur. It is necessary for vulcanizing rubber and is employed extensively in medicine for skin diseases. Powdered sulphur is a valuable fungicide.

Sulphuric Acid. A heavy, colorless, oily liquid, composed of hydrogen, sulphur, and oxygen; one of the most important of all chemicals. It was known as early as the 8th century, and is commercially called *oil of vitriol* because in the early days the alchemists prepared it by distilling the vitriols, especially green vitriol or iron sulphate.

Sulphuric acid is produced by chemical combination of the fumes of burning sulphur, oxygen of the air, and water. The sulphur fumes are generally obtained by burning sulphur, or a native sulphide of iron called *pyrites*. An increasingly important source of sulphur fumes is the waste gases from smelters where copper and zinc are produced from their sulphide ores.

There are two principal methods for manufacturing the acid, the *chamber process* and the *contact process*, which differ chiefly in the means used to cause the gases to combine. In the chamber process, the gases, mixed with oxides of nitrogen which speed up the reaction, are passed into large lead chambers and then through towers where the combination is completed. The more modern contact

process is so called because the gases are caused to combine by contact with a catalyzer, such as finely divided platinum. The chamber process produces a large proportion of the weaker commercial acid; the contact process produces a purer and more concentrated product as well as *oleum*, or fuming sulphuric acid, which is 100 per cent acid containing dissolved sulphur trioxide. The standard commercial grade known as oil of vitriol has a gravity of 66° Bé. and contains 93.2 per cent of sulphuric acid. Dilute acids are usually handled in lead or special iron containers, while the stronger acids can be shipped in steel tanks.

Sulphates, or the salts of sulphuric acid, are of two kinds: acid sulphates in which only half of the hydrogen in the acid is replaced by a metal, and neutral sulphates in which all of the hydrogen has been replaced. Barium sulphate is probably the most generally insoluble of all known salts. When sulphuric acid is mixed with water, a large amount of heat is generated. Consequently, in order to avoid danger, the acid should always be added to the water and water should never be poured into strong acid.

Manufacture of sulphuric acid is one of the greatest chemical industries because the use of this acid is necessary in preparing almost all other chemical products. The largest amount of the acid is used in the preparation of fertilizers. Purification of petroleum, cleaning of iron and steel, production of nitric, hydrochloric, and mixed acids, and the textile industries, all require large amounts of sulphuric acid.

The concentrated acid is a powerful corrosive poison, with such a great attraction for water that it often causes charring of organic tissue. Sulphuric acid burns should immediately be rinsed with large quantities of water and then treated with solution of baking soda or other weak alkali.

Sympathetic Ink. A writing fluid which leaves characters that are colorless or so faint that they may pass unnoticed until developed by application of heat or the proper chemical agent. Writing made with a dilute suspension of starch in water becomes blue when treated with a weak solution of iodine. Lead acetate solution affords a secret ink which becomes black when moistened with dissolved sodium or ammonium sulphide. Similarly, writing made with diluted cobalt chloride is almost colorless until heated, when it becomes blue. The color is not permanent but gradually disappears.

Tannin. A substance extracted from nutgalls, oak and hemlock bark, quebracho and chestnut woods, sumac, and many other plants. It has the power to combine with raw skin and change it to leather. The active tanning materials from these different sources are not all the same substance, but all are very similar to *tannic acid*. This tannin is obtained from powdered galls and purified by chemical methods. It is used not only in tanning but also in medicine and as a mordant in dyeing. When a solution of tannic acid is added to a solution of an iron salt, a black substance is formed which is the basis of most writing ink. See *Ink*, *Leather*.

Tartaric Acid. A white, crystalline, organic acid obtained chiefly from *argol*, the sediment that forms during the fermentation of grape juice. Tartaric acid is used in medicine, dyeing, bleaching, calico printing, and the manufacture of cooling drinks. It is sometimes used as an ingredient of baking and of Seidlitz powders.

Thermit (*thûr'mĭt*). A mixture of aluminum filings or powder, with iron oxide. When such a mixture is ignited, violent chemical action takes place; aluminum combines with the oxygen of the oxide, and metallic iron is set free. The reaction temperature is so high, about 5400° F., that the iron forms a white hot liquid covered by a slag of aluminum oxide.

In the *Goldschmidt process* of welding, the thermit reaction takes place within a crucible from which molten iron is run into a mold built around the rail ends, broken shafting, or pieces of cast iron which are to be joined. The exposed surfaces are melted by the intense heat and the space between the pieces is filled with liquid iron, which cools to a strong, solid joint. This method is of greatest value for repairing broken parts of heavy machinery, such as the shaft or propeller blades of a ship, without removing the pieces from their place.

By using oxides other than iron, pure metals such as chromium and manganese may be produced, which are valuable for the preparation of special steels. During the World War large amounts of thermit were used for filling incendiary bombs, usually together with some inflammable material such as a solid mixture of petroleum and soap.

Venetian Red. An artificial red pigment that has been known and used for more than a century. It is usually prepared by heating copperas with lime. The color is caused by oxide of iron.

Verdigris (*vûr'dĭ-grēs*). A poisonous, green salt consisting of basic acetates of copper. It is used chiefly in the preparation of Paris green. Verdigris is prepared by treating copper scrap or thin sheets of the metal with acetic acid. Because of the immediate formation of the poisonous salt, copper vessels should never be used for pickling or cooking foods which contain vinegar.

Vermilion. Mercuric sulphide, a heavy, expensive, bright red pigment. Formerly it was prepared from the mineral *cinnabar*, but it is now all made artificially. It tends to darken in the light, eventually becoming brown. *Permanent vermilion* is usually prepared from orange mineral, which is similar to red lead, tinted with certain coal-tar dyes.

Vitriol. A term used by the earlier chemists to include certain glasslike salts, of which the best known are: *white vitriol* or zinc sulphate, *blue vitriol* or copper sulphate, and *green vitriol* or iron sulphate. Sulphuric acid is often called *oil of vitriol* because it was originally prepared from green vitriol.

Wood Alcohol. A colorless, volatile liquid, with a peculiar pungent odor, known chemically as *methyl alcohol*, or *methanol*, and called also *wood spirit*, or *pyroxylic spirit*. It is one of the important constituents of the distillates produced when wood is heated in closed retorts, without free access to the air. Like ordinary alcohol, it is highly inflammable and is an excellent solvent for many substances. It is composed of carbon, hydrogen, and oxygen, and is the simplest in molecular structure of all the alcohols. It boils at 65° C., or 149° F., and mixes readily with water, ether, acetone, and other alcohols.

Wood alcohol is employed chiefly for making shellac varnishes, and for denaturing grain or ethyl alcohol so that it may be used tax-free in various industries. It is used also in making formaldehyde and dyestuffs and for many other purposes. When taken into the human stomach, wood alcohol is a violent poison, with the peculiar property that a small dose, insufficient to produce death, may cause total blindness. If inhaled in quantity, the fumes are also dangerous.

CHEMICAL SUBSTANCES, COMMON NAMES OF

Common Name	Chemical Name
Alcohol, grain	Ethyl alcohol. C_2H_5OH.
Alcohol, wood	Methyl alcohol, Methanol. CH_3OH.
Alum, chrome	Potassium-Chromium sulphate. $Cr_2(SO_4)_3K_2SO_4 \cdot 24H_2O$.
Alum, common	Potassium-Aluminum sulphate. $Al_2(SO_4)_3K_2SO_4 \cdot 24H_2O$.
Aqua fortis	Nitric acid. HNO_3.
Aqua regia	Mixed nitric and hydrochloric acids.
Arsenic, white	Arsenous oxide. As_2O_3.
Bauxite	Hydrated alumina. $Al_2O_3 \cdot 2H_2O$.
Bleaching powder	Calcium hypochlorite.
Borax	Sodium tetraborate. $Na_2B_4O_7 \cdot 10H_2O$.
Calomel	Mercurous chloride. $HgCl$.
Carbolic acid	Phenol. C_6H_5OH.
Caustic potash	Potassium hydroxide. KOH.
Caustic soda	Sodium hydroxide. $NaOH$.
Cementite	Iron carbide. Fe_3C.
Chalk	Calcium carbonate. $CaCO_3$.
Chrome yellow	Lead chromate. $PbCrO_4$.
Copperas	Sulphate of iron. $FeSO_4 \cdot 7H_2O$.
Corrosive sublimate	Mercuric chloride. $HgCl_2$.
Cream of tartar	Potassium bitartrate. $KHC_4H_4O_6$.
Epsom salts	Magnesium sulphate. $MgSO_4 \cdot 7H_2O$.
Fire damp	Methane. CH_4.
Fruit sugar	Fructose. $C_6H_{12}O_6$.
Galena	Lead sulphide. PbS.
Glauber's salt	Sodium sulphate. $Na_2SO_4 \cdot 10H_2O$.
Goulard water	Basic acetate of lead. $Pb(OH)(C_2H_3O_2)$.
Grape sugar	Glucose. $C_6H_{12}O_6$.
Gypsum	Calcium sulphate. $CaSO_4 \cdot 2H_2O$.
Hematite	Ferric oxide. Fe_2O_3.
Hypo	Sodium thiosulphate. $Na_2S_2O_3 \cdot 5H_2O$.
Iceland spar	Crystallized calcium carbonate. $CaCO_3$.
Iron pyrites	Iron disulphide. FeS_2.
Jewelers' putty	Tin oxide. SnO_2.
Laughing gas	Nitrous oxide. N_2O.
Lime, quick	Calcium oxide. CaO.
Lime, slaked	Calcium hydroxide. $Ca(OH)_2$.
Limestone	Calcium carbonate. $CaCO_3$.
Litharge	Lead monoxide. PbO.
Lunar caustic	Silver nitrate. $AgNO_3$.
Magnetite	Magnetic oxide of iron. Fe_3O_4.
Marsh gas	Methane. CH_4.

Common Name	Chemical Name
Minium	Red oxide of lead. Pb_3O_4.
Mosaic gold	Tin sulphide, stannic sulphide. SnS_2.
Muriatic acid	Hydrochloric acid. HCl.
Orpiment	Arsenous sulphide. As_2S_3.
Phosgene	Carbonyl chloride. $COCl_2$.
Phosphate rock	Calcium phosphate. $Ca_3(PO_4)_2$.
Prussian blue	Ferric ferrocyanide. $Fe_4[Fe(CN)_6]_3$.
Prussic acid	Hydrocyanic acid. HNC.
Quicksilver	Mercury. Hg.
Realgar	Arsenic sulphide. As_2S_2.
Red lead	Red oxide of lead. Pb_3O_4.
Red oil	Crude oleic acid. $C_{17}H_{33}COOH$.
Rochelle salts	Sodium potassium tartrate. $NaKC_4H_4O_6 \cdot 4H_2O$.
Sal ammoniac	Ammonium chloride. NH_4Cl.
Saleratus	Sodium bicarbonate. $NaHCO_3$.
Sal soda	Sodium carbonate crystals. $Na_2CO_3 \cdot 10H_2O$.
Salt, common	Sodium chloride. NaCl.
Saltpeter	Potassium nitrate. KNO_3.
Saltpeter, Chile	Sodium nitrate. $NaNO_3$.

Common Name	Chemical Name
Salts of sorrel	Acid potassium oxalate. KHC_2O_4.
Soda, baking	Sodium bicarbonate. $NaHCO_3$.
Soda, washing	Sodium carbonate. Na_2CO_3.
Spirits of hartshorn	Ammonia, solution of, NH_3.
Spirits of salts	Hydrochloric acid. HCl.
Sugar of lead	Lead acetate. $Pb(C_2H_3O_2)_2$.
Superphosphate	Monocalcium phosphate. $CaH_4(PO_4)_2 \cdot H_2O$.
Tartar emetic	Potassium antimonyl tartrate. $KSbOC_4H_4O_6 \cdot \frac{1}{2}H_2O$.
TNT	Trinitrotoluene. $C_6H_2 \cdot CH_3(NO_2)_3$.
Verdigris	Basic acetate of copper. $Cu_3(OH)_2(C_2H_3O_2)_4$.
Vermilion	Sulphide of mercury. HgS.
Vitriol, blue	Copper sulphate. $CuSO_4 \cdot 5H_2O$.
Vitriol, green	Ferrous sulphate. $FeSO_4 \cdot 7H_2O$.
Vitriol, oil of	Sulphuric acid. H_2SO_4.
Vitriol, white	Zinc sulphate. $ZnSO_4 \cdot 7H_2O$.
Volatile alkali	Ammonia. NH_3.
Water glass	Sodium silicate. $Na_2Si_4O_9$.
White lead	Basic lead carbonate. $Pb_3(OH)_2(CO_3)_2$.

USEFUL AND PRECIOUS METALS

The metals constitute an important division of the chemical elements. In general, metals have a characteristic shiny surface or luster, and are usually hard, heavy, opaque, malleable, ductile, tenacious, and good conductors of heat and electricity. They differ greatly, however, in regard to the foregoing qualities, and no sharp line can be drawn between the metals and the nonmetals.

Sodium and potassium, for example, are as soft as wax, while titanium surpasses quartz in hardness. Gold may be hammered into exceedingly thin sheets, but antimony is very brittle. Most metals are heavier than water—osmium being 22½ times and platinum 21½ times heavier—though sodium, potassium, and lithium float like wood. Under ordinary conditions all metals exclude the light, yet gold in very thin sheets is translucent. In chemical behavior some metals act in part like nonmetals, the oxides of several, such as arsenic, tin, and chromium, uniting with oxygen and hydrogen to form *acids*.

In ductility, malleability, and tenacity, metals also differ greatly. The most malleable metal is gold, followed in order by silver, copper, platinum, palladium, iron, aluminum, tin, zinc, lead, cadmium, nickel, and cobalt. Gold is also the most ductile metal, and next to it are silver, platinum, iron, nickel, copper, palladium, aluminum, zinc, tin, and lead. In tenacity, nickel stands first, followed by iron, copper, platinum, silver, gold, palladium, and zinc.

Except gold, which is yellow, copper, which is red, and silver and tin, which are nearly pure white, metals are grayish in color, sometimes with a bluish or pinkish tinge. Except mercury, which is a liquid, all metals at ordinary temperatures are solids, and all can be melted or volatilized.

Iron, nickel, and cobalt possess magnetic properties. Silver is the best conductor of electricity, followed by pure copper, pure gold, and aluminum. Silver is also the best conductor of heat, with copper, gold, and aluminum next in order. Those metals which resist oxidation, as do gold, silver, and platinum, have been styled the *noble metals*. Those which do not possess this quality, such as iron, zinc, and lead, have been called the *base metals*.

The metals comprise about three-fourths of the elements, and, together with their compounds, embrace an immense number of valuable mineral substances. Of more than 60 metals now known, only seven—gold, silver, mercury, copper, iron, tin, and lead—were known to the ancients. Bismuth, antimony, zinc, and arsenic were added to the list of known metals between 1400 and 1700. Nine metals, including platinum, manganese, nickel, and cobalt, were discovered between 1700 and 1800, while all the other metals, some 40 or more, have been found since 1800. About half the metals are very scarce and some are exceedingly rare. A limited number, such as gold, silver, and copper, occur in the native state, but most metals are found combined with oxygen or sulphur in numerous mineral compounds or *ores*, from which they are extracted by various processes of *metallurgy*.

By chemical methods, metals are combined with various nonmetals, forming an immense number of compounds, such as oxides, hydroxides, sulphides, and the salts of various acids. When fused, many metals mix with various other metals, forming, upon being cooled, solid solutions called *alloys*. Most metals ordinarily seen are not pure, but consist of various mixtures or alloys; as, for example, gold and silver coins, cast iron, steel, or bronze. Mercury possesses the power to dissolve many other metals, forming *amalgams*.

Iron is the most common and useful metal, with copper, zinc, lead, and tin among the next most widely used. Aluminum, though difficult of extraction, is the most abundant metal, existing in all clays and feldspathic rocks. Sodium occurs in enormous quantities in the salt of the ocean. Calcium forms the metallic base of all limestones. Gold, silver, and platinum, widely used in coinage, jewelry, and the arts, are called *precious metals*, though many others are far more rare and costly. The rarest, most remarkable, and most costly of all metals is radium.

Aluminum. A bluish white metal, with a satiny luster, distinct in color from silver, tin, and nickel. Aluminum is the most abundant of the metals, and, excepting oxygen and silicon, there is more aluminum than any other substance in the earth's crust. However, it is not found in a free state, but always in combination with one or more elements, occurring in clay, marl, slate, granite, and scores of other minerals, including such precious stones as the ruby and the sapphire.

Although it is computed that a cubic yard of ordinary clay contains about 900 pounds of aluminum, no cheap method of extracting it was known until 1886, when C. M. Hall invented the electrolytic process which has made aluminum a widely used metal. In 1855 aluminum sold at $55 a pound; in 1888, at $2 a pound; but in 1910 the price had fallen to 20 cents a pound. Nearly all of the commercial aluminum produced in the United States is obtained from bauxite, a very pure ore mined chiefly in Arkansas. In 1885 only 285 pounds of the metal were produced; in 1916 the output was more than 120 million pounds. The value of the aluminum produced annually in the United States is normally about $40,000,000.

Aluminum is only about a third as heavy as iron or steel, is not changed by fresh water or sea water, and does not rust in either moist or dry air. It is not affected by organic acids, such as those contained in fruit juices or in vinegar. Cold nitric and sulphuric acids act upon it very slowly, but hydrochloric acid and the caustic alkalies readily dissolve it. Aluminum is nearly as hard as silver, yet it may be drawn into a wire $\frac{1}{250}$ of an inch in diameter,—about half as strong as a copper wire of the same size. In malleability, aluminum ranks high among the metals; it may be rolled into sheets less than $\frac{1}{100}$ of an

inch thick, and these may be hammered into foil only $\frac{1}{1000}$ of an inch thick.

As a conductor of heat and electricity, aluminum exceeds all metals except silver, copper, and gold. Its tensile strength is such that, weight for weight, an aluminum girder will carry a greater load than a steel girder. Weight for weight, aluminum wire will carry a heavier electric current than copper wire. Further, it is nonmagnetic and, hence, very useful in electrical work.

When warm, aluminum may be pressed into molds of any shape, including bars and tubing of any length, fancy architectural moldings and cornices. For a given thickness of plate, one ton of aluminum is equal in area to 2.7 tons of tin, 2.8 tons of iron, 3.3 tons of copper, and 4.2 tons of lead. Compared with copper, aluminum sheets are 66 per cent lighter, usually 25 to 50 per cent cheaper, and, for many purposes, much more serviceable.

With all the common metals, except lead, aluminum readily forms alloys, some of which have proved very useful, such as combinations of aluminum with antimony, bismuth, cadmium, copper, chromium, magnesium, manganese, molybdenum, nickel, and tin—all of which are harder than pure aluminum. The former difficulty of soldering aluminum has been solved by the invention of autogenous welding. Aluminum may be plated with other metals by an electrolytic process.

By reason of its many remarkable qualities, aluminum is now devoted to an immense and increasing number of uses. Some 500 or more articles are made direct from the metal and its alloys. Among the most important of these are airplane and automobile parts, cooking utensils, dental plates, foil for wrapping foods and confectionery, horseshoes, gas and oil stoves, telephone fixtures, and scientific instruments. Powdered aluminum is used to keep up the heat of molten iron and steel, and is the basis of the valuable "thermit" process of welding. It is also used in making explosives, as, for example, ammonal, and as a basis for bronze powders in the painter's trade. Salts of aluminum are much used as mordants in the dye industry. Cables made of aluminum wires twisted about a strengthening core of steel, are extensively used for electrical transmission lines. See *Bauxite*, *Duralumin*, *Magnalium*, *Thermit*.

Aluminum Bronze. An alloy of copper containing 5 to 12 per cent aluminum. It is easily fusible, has a beautiful golden color, and possesses very high chemical and mechanical resistance. As it is unaffected by salt water, this alloy is much used for marine fittings.

Aluminum Gold. A beautiful alloy consisting of gold 78 parts and aluminum 22 parts, remarkable for its rich purple shade. It is used in the manufacture of jewelry.

Aluminum Steel. While aluminum combines with iron in all proportions, only alloys containing minute quantities of aluminum are of practical value. Aluminum steel usually contains only from 2 to 12 ounces of aluminum per ton. This addition gives the metal greater tensile strength and a smoother and closer grain.

Amalgam. An alloy of mercury with one or more metals, sometimes found native, as in case of certain mineral amalgams of silver and gold, but usually produced artificially, either by bringing mercury into contact with a metal or its salts, or by treating a metal with the salts of mercury. The resulting amalgams may be either solid or liquid,—the liquid amalgams being considered as solutions containing an excess of mercury.

Among the more important amalgams are: (1) *gold amalgam* and (2) *silver amalgam*, formed as a part of the process of extracting these metals from various ores; (3) *copper-silver-tin amalgam*, used in filling teeth; (4) *sodium amalgam*, formerly used in chemical industry; (5) *tin amalgam*, at one time widely used for silvering mirrors; (6) *zinc amalgam*, used in coating the rubbers of electric machines. Besides the foregoing, amalgams of aluminum, antimony, arsenic, bismuth, cadmium, calcium, iron, magnesium, potassium, and other metals are known.

Antifriction Metals. Certain alloys employed in the construction of machine bearings to minimize friction. Four metals chiefly are used in these mixtures; namely, tin, lead, antimony, and copper, to which zinc, nickel, or bismuth are sometimes added. The original antifriction metal, called Babbitt metal, after its inventor, has long since been largely supplanted by alloys containing combinations better adapted for use in the various classes or kinds of bearings. For example, entirely different proportions of the component metals are required for light-work bearings and for heavily loaded bearings. The alloy known as "universal bearing metal" consists of tin 6 parts, lead 77.75 parts, antimony 16 parts, and bismuth 0.25 part.

Antimony. A bluish white metal so brittle that it may easily be pounded to a powder. While it is found in the pure state, commercial antimony is obtained mostly from the mineral stibnite, a sulphide of the metal. It is a poor conductor of heat and electricity, and at ordinary temperatures is not acted upon by air or water. Its most important use is in alloys, to which it imparts its peculiar property of expanding when cooling. It is therefore a very valuable component of type metal and it enters into the composition of pewter, britannia metal, Babbitt metal, and shrapnel shot metal. See *Britannia Metal*, *Type Metal*.

Arsenic. A hard, steel-gray, very brittle metal, usually occurring in ores of iron, antimony, lead, silver, cobalt, and nickel, found in large quantities in Siberia and Silesia, and widely distributed in many other countries. The white powder, commonly called arsenic, is the oxide or rust of the metal, and, like all other compounds of arsenic, it is a deadly poison. Arsenic is used in making shot, speculum metal, opal glass, aniline dyes, Paris green, London purple, in taxidermy, in medicine, and for various other purposes. See *Fowler's Solution*, *Paris Green*.

Babbitt Metal. An alloy of copper, tin, and antimony, invented in 1839 by Isaac Babbitt, widely used as an antifriction metal. The original alloy consisted of tin 24 parts, antimony 8 parts, and copper 2 parts. A tough and serviceable variety contains tin 96 parts, antimony 8 parts, copper 4 parts. On account of cheapness, lead is often added, and commercial Babbitt metal often contains a much larger percentage of inexpensive lead than the selling price would indicate.

Barium. A silver-white metal, slightly softer than lead, most commonly found in various carbonate (*witherite*) and sulphate (*barite*) ores. Various salts of barium, particularly the chloride, hydrate, and sulphate, are of value in manufacturing glazed or coated paper, in chemical analysis, and as pigments in paints. Barium sulphate is one of the most insoluble salts known. The soluble salts of barium are poisonous. Previously to the World War almost the entire American supply of barium products was imported from Germany, but after 1914 many mines were opened in the United States. In 1920 these mines yielded barium products valued at about $2,000,000. See *Frary Metal*.

Bell Metal. A kind of bronze, usually consisting of an alloy of copper and tin in varying proportions. Soft-toned bells contain about 16 per cent tin; cymbals, gongs, and house bells, 18 to 20 per cent tin; school bells, 22 per cent tin; church bells and fire bells, about 24 per cent tin. In some cases larger proportions of tin are used. A very fine bell metal is made of copper 90 parts, tin 5 parts, zinc 5 parts, and manganese 1 part.

Beryllium. A steel-colored, malleable metal, only about two-thirds as heavy as aluminum, called also glucinum, found in various minerals such as phenacite, chrysoprase, and beryl. The salts of beryllium, which usually have a sweetish taste, are of little practical use, but the metal itself imparts valuable properties to various alloys. A small percentage makes copper sonorous, while copper containing 5 per cent beryllium is malleable, is capable of a high polish, and is not acted upon by the air.

Bismuth. A shining, brittle metal, with a peculiar reddish tinge, usually found mixed with the ores of cobalt, nickel, copper, silver, tin, and lead. While of little value in the pure state, bismuth is widely used in making alloys with various metals. An alloy composed of 3 parts of lead and 2 parts of bismuth has 10 times the hardness and 20 times the toughness of pure lead. Alloys of bismuth with tin, lead, and cadmium have very low melting points, and hence are used in soft solders and in the so-called "fusible metals," several of which, such as Rose's metal and Wood's metal, melt below the boiling point of water.

Bismuth is highly diamagnetic, a piece of the metal being noticeably repelled by a magnet. Various forms of bismuth are used in staining glass, in gilding porcelain, in making cosmetics, and in medicine. In the United States the commercial supply of bismuth is obtained as a by-product in smelting lead, copper, gold, and silver ores. See *Fusible Metals*.

Brass. An alloy composed of varying proportions of copper and zinc, usually about 2 parts copper to 1 part zinc. It was known and used in very ancient times, and is employed for a great variety of purposes, including the manufacture of an immense number of useful articles, which have given rise to extensive industries. Varieties of brass well known in trade and industry are red brass, yellow brass, brass foil or Dutch leaf, gilding metal, Mannheim gold, pinchbeck, bath metal, Bristol brass, Munz metal, and spelter solder.

Britannia Metal. A kind of pewter, an alloy composed of tin and antimony, with small additions of zinc and copper. It is much harder than ordinary pewter and is nearly as white in color and handsome in luster as silver. Britannia metal was formerly largely used for making coffeepots, teapots, soup tureens, and other large table dishes.

Bronze. An alloy of copper and tin, in proportions varying from 5 to 1 to 24 to 1, to which other metals are often added. Bronze was used by prehistoric peoples in Europe and South America, and by the ancient Assyrians and Egyptians. At the present day an immense variety of bronzes are made; as, for example, those used for mathematical instruments, gear wheels, statues, medals, coins, bells, machine bearings, and speculum metal.

The commercial "bronzes" are usually three-metal alloys made by adding other metals,—chiefly lead, zinc, phosphorus, manganese, or aluminum—to the true copper-tin bronze. Many so-called bronzes are only varieties of brass. Titanium-aluminum bronze is the hardest form of all but is very difficult to work. Statuary bronzes are always cast hollow, the standard thickness of the shell filling the mold being from about a quarter to a third of an inch. See *Coin Bronze, Phosphor Bronze.*

Cadmium. A bluish white, lustrous metal found in association with zinc ores, chiefly in Silesia. As a metal, cadmium is used in making fusible alloys of low melting point, and an amalgam of cadmium and tin is used in dentistry. *Cadmium yellow*, a valuable pigment of great permanency of color, is cadmium sulphide. Other compounds are used in making fireworks and in calico printing.

Cæsium (*sē'zi-ŭm*). A soft, ductile, silvery white metal, much lighter than aluminum, found chiefly in the scarce mineral pollucite, usually associated with the rare element rubidium. In its properties, cæsium strongly resembles potassium, oxidizing rapidly in the air, decomposing water, and forming very stable salts. Cæsium was the first new element discovered by the aid of the spectroscope, being detected by Bunsen and Kirchhoff in 1860. While displaying interesting properties, the metal and its known compounds are of slight practical importance.

Calcium. A light yellow metal, slightly softer than gold, very malleable and ductile, and only about half as heavy as aluminum. While very abundant and widely distributed, calcium is never found free but always in combination with other elements, from which it is separated by electrolysis. Calcium forms a part of many common rocks and minerals, such as limestone, marble, chalk, and gypsum. It occurs also in the bones of animals, and in shells and corals. In dry air calcium does not tarnish, but in moist air it rapidly becomes coated with a layer of calcium hydroxide (*slaked lime*). The metal burns with an orange flame, forming calcium oxide (*quicklime*).

The compounds of calcium are very numerous, and several are of great industrial value. Limestone, used in building and for making quicklime and mortar, is a form of calcium carbonate, as are marble, chalk, and calcite. Gypsum, from which plaster of Paris is made, is calcium sulphate. Calcium chloride is used as a drying agent and calcium hypochlorite is used as bleaching powder. Calcium carbide is the source of commercial acetylene gas. Calcium bisulphite dissolves the resins and separates the fibers in manufacturing wood pulp for paper making.

Carboloy. A trade name of an extremely hard alloy of tungsten, carbon, and cobalt originated by the Krupp works in Germany about 1927. It is used for the cutting edge of machine tools, being hard enough to shave glass. In Germany it is called widia, from *wie Diamant*, "like diamond."

Cast Iron. A casting of iron, known also as pig iron. It is run directly from the smelting furnace into open sand or metal molds, forming small oblong bars of a weight convenient for handling, called *pigs*. Cast iron is usually very impure, containing various other elements and metals which make it much harder, more brittle, and much more easily fusible than wrought iron. The substances which give to cast iron its peculiar qualities are mainly carbon, manganese, sulphur, phosphorus, and silicon. Sometimes copper, nickel, chromium, or titanium are present. Cast iron commonly contains from 1½ to 4 per cent of carbon. In case the carbon is in the form of carbide, the iron is hard and brittle; if in the form of graphite, the iron is soft and tough. Foundry irons used for ordinary castings may contain not to exceed 3½ per cent of silicon. Such castings will be fairly soft and easily machined.

Pig iron low in phosphorus is used for making steel by the Bessemer process. Such iron is called *Bessemer pig*. When high in phosphorus, cast iron is suitable for making steel by the basic Bessemer and the open-hearth processes, and is called *basic pig* or *Thomas pig*. Owing to its brittleness, cast iron cannot be hammered like wrought iron or soft steel. It is suitable, however, for articles which can be cast in molds. See *Iron, Wrought Iron.*

Cerium. A soft, steel-gray, ductile and malleable metal, not quite as heavy as iron, belonging to the "rare earth" group. It is obtained chiefly from the mineral monazite, found in North Carolina and Brazil. Cerium dissolves violently in dilute acids, forming various salts, some of which are used in dyeing and in medicine. The oxide of cerium is employed for imparting glow to incandescent gas mantles.

Chrome Steel. A special steel containing in some high-speed tool steels as high as 7 per cent of chromium. The addition of less than one per cent of chromium materially increases the strength, hardness, and elasticity of steel.

Chromium. A very hard, steel-gray metal, with a melting point between that of iron and platinum. Chromium is so named because of the bright colors of its compounds,—the green of the emerald and the red of the ruby being due to its oxide. It never occurs pure but is usually found in minerals containing lead or iron, such as chromite. The world's supply of chromium comes from Rhodesia, New Caledonia, Turkey, and Greece, though some is produced in California, Wyoming, and Maryland.

Chromium forms both acids and salts, yielding various useful compounds. *Chrome yellow*, a valuable pigment, is lead chromate. Potassium bichromate, an important oxidizing agent, is used in electric batteries, for bleaching, and in photography. The addition of a small percentage of chromium notably improves the strength, hardness, and elasticity of steel. Chromium plating gives an extremely hard and durable surface to metals so plated and is much superior to nickel plating in resisting tarnish and corrosion. See *Chrome Steel, Ferrochrome, Stellite.*

Cobalt. A hard, white metal, showing a trace of pink. It is slightly heavier than iron, strongly magnetic, and usually found associated with nickel, arsenic, and sulphur. Formerly cobalt came chiefly from Europe, but since 1904 the mines of northern Ontario have been the chief source of production. Owing to brittleness, cobalt has no practical use as a metal, but when alloyed with chromium, molybdenum, and tungsten, it is admirably adapted for cutting tools. Various compounds of cobalt are highly valued for making fine colors, such as cobalt blue, Thenard's blue, cob bronze, and Rinman's green or cobalt green, widely used in coloring glass, pottery, tiles, and enamel. See *Stellite, Sympathetic Ink.*

Coinage Alloys. As established by acts of Congress, the standard gold coins of the United States contain 9 parts of gold and 1 part of copper. Coinage gold, therefore, is 900 fine. Similarly, all silver coins contain 9 parts of silver and 1 part of copper and are, likewise, 900 fine. The present day five-cent coins, or "nickels," are an alloy of copper 75 per cent and nickel 25 per cent. The copper cent is an alloy of copper 95 parts and zinc and tin 5 parts.

Coin Bronze. An alloy of copper and tin containing from 96 to 98 per cent copper, used by the Greeks and Romans for coinage and medals. Modern researches show that the bronzes most suitable for coins are those containing a somewhat larger proportion of tin. The United States one cent pieces, sometimes called bronze coins, contain copper 95 parts, tin 3 parts, and zinc 2 parts.

Columbium. A rare metal, called also niobium, which occurs in the minerals columbite, found in Connecticut, and tantalite, found in Sweden. It is a steel-gray powder, slightly lighter than iron, which forms salts called columbates or niobates. As yet, the metal and its compounds are of little practical value.

Cooperite. An alloy of nickel and zirconium used in making high-speed tools for metal working. It is lighter and stronger than stellite and various other alloys used for the purpose and is comparatively inexpensive.

Copper. A brilliant metal of a peculiar red color, somewhat heavier than iron, known and used since remotely ancient times. Copper is the only metal which occurs widely distributed in nature in the free state. Blocks of nearly pure metallic copper, sometimes weighing hundreds of tons, have been found. For this reason it was the first metal extensively used by man. The copper or bronze age followed the stone age. Copper utensils found in Egypt are believed to be more than 5000 years old. The Indians of North America made use of copper, obtained in the Lake Superior region, long before the discovery of the continent by the white man. In the time of the Romans the island of Cyprus was famous for the production of copper or Cyprian brass, whence the name *cuprum* from which the word copper is derived.

Copper is the most ductile and malleable of the common metals and is exceeded only by gold, silver, and platinum in respect to these properties. In tenacity, copper is surpassed only by iron. Copper is more highly elastic than any metal except steel, and as a conductor of heat and electricity is surpassed only by silver. Copper has a distinct odor and an unpleasant metallic taste. It takes a high polish and is not acted upon by water, but in the air it becomes coated with a thin layer of green carbonate which protects it against further corrosion.

Nearly all acids act upon copper, forming a large number of salts, the most important of which are copper sulphate, commonly known as *blue vitriol*, and basic copper carbonate, sometimes called *blue verditer*. The important ores,

malachite and azurite, are basic carbonates of the metal. Copper oxides are used in staining glass.

Copper is universally used as an alloy for silver and gold, imparting hardness and wearing qualities to these metals when used for coins and in jewelry. Various alloys of copper, especially bronze, which consists of tin and copper, and brass, which is made of zinc and copper, have been widely used since ancient times. *German silver* is an alloy of copper, nickel, and tin; *aluminum bronze* is an alloy of aluminum and copper.

Immense quantities of copper are used for industrial purposes, the most important being for wire and cables for electrical machinery and for the transmission of electric currents in telegraph, telephone, and power lines. For this purpose, metal of practically absolute purity is required. Copper is used also for sheathing ships, covering roofs and domes, for electrotyping, for engraving, and for making numerous utensils and fittings for domestic and scientific purposes, including water heaters, vacuum pans, and kettles. The use of copper in cooking vessels is attended with some danger, as the action of vegetable acids on the metal produces poisonous compounds similar to *verdigris*.

While copper occurs widely distributed in the metallic state, commercial copper is obtained chiefly from various ores, in which it is usually combined with sulphur and iron and often associated with silver and gold. Among the most abundant ores are chalcopyrite, cuprite, and malachite. From these the metal is separated and finally refined to a state of great purity by electrolysis.

The United States leads all other countries in copper production, contributing more than half of the world's yearly output, the chief producing states being Arizona, Montana, Utah, and Michigan. Among foreign countries, Japan, Mexico, Spain and Portugal, Russia, Chile, and Canada are important producers. Immense deposits of copper ore, as yet but little worked, are found in the highlands of central Africa. The largest single copper mine is said to be the Anaconda at Butte, Montana. See *Brass*, *Bronze*, *German Silver*.

Copper Aluminum. An alloy of aluminum containing 7 to 10 per cent copper. This tough metal is especially useful in making automobile and other constructional parts which are subjected to sudden and severe shocks.

Crucible Steel. A fine grade of cast steel made in crucibles and characterized by great hardness due to a high content of carbon. The crucible process was originally used for obtaining homogeneous metal by melting bars of blister steel, which contain more carbon near the surface than at the center.

In the modern process, pure wrought iron is melted with selected materials high in carbon, such as pig iron, scrap steel, or pure charcoal. Small amounts of manganese are generally added, together with chromium, vanadium, or other metals required for special products. After melting is complete, the metal is held liquid for about half an hour at the "killing" temperature. During this time gases are given off, silicon is taken up from the slag or crucible, and the liquid becomes quiet. Slag is then removed from the surface and the steel poured into molds.

In England the crucibles used are made entirely of clay, but in America they generally contain about 50 per cent of Ceylon graphite. A standard graphite crucible holds about 90 pounds of metal and lasts for from 5 to 10 heats.

Crucible steel is used especially where hardness is required —for cutting tools, razors, springs, dies, and similar products. It usually contains from .9 to 1.4 per cent carbon, although extremely hard steels contain larger amounts.

D'Arcet's Metal. An alloy composed of 8 parts of bismuth, 8 parts of lead, and 3 parts of tin. This metal melts at 79° C. or 174° F.,—or below the boiling point of water. It has the property of expanding when cooling, while still soft, and is used for taking proof impressions of dies, as each line of the die is exactly reproduced in the cast.

Duralumin. An alloy whose average composition is 95% aluminum, 3½% copper, and the remainder magnesium and manganese. It was discovered in 1910 by the German chemist Alfred Wilm. It is comparable with steel in strength and has the additional merit of lightness of weight. Its tensile strength per ton is nearly 3 times as great as that of 40 tons of steel. One of its most important applications is in the construction of aircraft.

Dutch Metal. A variety of brass containing a large percentage of copper; called also Dutch foil or Dutch leaf. It is made by rolling the metal into very thin sheets and then beating it to a foil, often not more than $\frac{1}{10000}$ of an inch in thickness. It is widely used for gilding.

Electrum. A name given to natural alloys of gold and silver, known and used for inlaying and for coins since very ancient times. Pliny states that the term electrum was given to gold containing at least 20 per cent of silver. The electrum found in various mines of California and Nevada bears about 40 per cent of silver.

Erbium. A rare metallic element found in gadolinite and other minerals. The oxide of erbium, a rose-colored powder, has not yet been melted, but, when heated to a high temperature, glows with a brilliant green light. The oxide dissolves in hot acids, forming various rose-colored salts. The metal itself has not been separated from its compounds.

Europium. A metallic element found in minute quantities in monazite sand, associated with various other elements of the "rare earth" group. Its oxide is a pinkish powder, and its sulphate forms pale pink crystals, but as yet europium is unknown in the metallic state.

Ferrochrome. A ferro-alloy containing from about 60 to 70 per cent of chromium; used for making special chromium steels.

Ferromanganese. An alloy of iron and manganese containing 80 per cent of the latter; the name is given also to any ferro-alloy containing over 30 per cent of manganese. It is used chiefly in steel making.

Ferrosilicon. An alloy of iron produced in the blast furnace and containing about 12 per cent of silicon. A high grade containing over 40 per cent of silicon is made in the electric furnace. Ferrosilicon is used in producing steel of a special quality and for generating hydrogen.

Frary Metal. An alloy of lead containing not more than 2 per cent barium, 1 per cent calcium, and ¼ per cent mercury, to which smaller amounts of other elements may be added. When used to reduce friction, as in machine bearings, this alloy is considered even more satisfactory than Babbitt metal. It has also the property, unusual for a lead compound, of giving a clear, bell-like note when struck.

Fulminating Gold. A greenish or brownish powder prepared by treating gold chloride with ammonia. This preparation has the property of readily exploding when dry.

Fusible Metals. A name given to a group of alloys characterized by very low melting points, such as D'Arcet's metal, Lipowitz' metal, Rose's metal, and Wood's metal. All of these contain bismuth mixed with lead, tin, or cadmium in various proportions and have melting points ranging from 140° F. to 201° F.,—all below the boiling point of water.

Gadolinium (*găd'ō-lĭn'ĭ-ŭm*). A rare metallic element, known as yet only in the form of its oxide and in various colorless salts formed from the oxide, such as the chloride, sulphate, and nitrate.

Gallium. A hard, slightly malleable metal, somewhat lighter than iron, found in minute quantities in various zinc ores. It melts to a silvery white fluid at 29.75° C. or 85.5° F.,—or some 13° F. lower than the temperature of the human body. Fluid gallium adheres to glass and does not tarnish in the air. In chemical properties gallium resembles aluminum, but the various compounds of gallium are of little practical importance. The spectrum of gallium shows two brilliant violet lines which afford the chief means of detecting the presence of the metal.

Galvanized Iron. Sheet iron or steel coated with zinc. This coating is most commonly put on simply by dipping well cleaned sheets or articles in a bath of molten zinc. It is also effected by heating the sheets of iron in a drum filled with zinc dust, and by electroplating them with zinc. As the last method, which is but little used, is the only one employing the galvanic current, zinc-coated iron is a more accurate term than galvanized iron. As this coating prevents rust, galvanized iron (or steel) is very extensively used for roofing, gutters, cisterns, tanks, wire ropes, wire netting, ship fittings, and innumerable minor purposes. In making the so-called galvanized tinware, the sheet iron is first thinly coated with tin and then coated with zinc.

Germanium. A grayish white, lustrous metal, found in the silver ore called argyrodite. While the metal has but little practical value, its discovery in 1886 was a great triumph of chemical science. Fifteen years earlier, in 1871, Mendeléev, on the basis of the "periodic law," not only prophesied the existence of such an element but also indicated with remarkable accuracy its chemical and physical properties.

German Silver. An alloy composed of copper, zinc, and nickel, in proportions varying according to the purpose of its use. When intended to replace silver, it contains copper 50 parts, zinc 25 parts, and nickel 25 parts. This alloy is harder than silver and is capable of taking a high polish. It is used as a substitute for silver in making bells, candlesticks, and various utensils, and, more especially, as a foundation metal in the manufacture of silver-plated ware.

Gold. A heavy yellow metal, with a resplendent luster, found in many parts of the world, well known and highly prized from time immemorial. On account of its beautiful

color, the ease with which it may be worked, the fact that it does not become tarnished or corroded in ordinary use, and its universal scarcity, gold is regarded as the most uniformly precious of the metals. For this reason, it has been adopted as the principal standard of value throughout the civilized world.

With the exception of platinum, iridium, and osmium, gold is the heaviest known substance. It is more than nineteen times as heavy as water and nearly twice as heavy as silver or lead. Gold is the most malleable of the metals and may be hammered into sheets less than $\frac{1}{300000}$ of an inch in thickness. In such condition it is somewhat transparent and appears green by transmitted light. Gold surpasses all other metals in ductility and may be drawn into a wire less than $\frac{1}{20000}$ of an inch in diameter, 900 miles of which would weigh scarcely a pound. Gold is also one of the best conductors of heat and electricity, being surpassed only by silver and copper.

Neither water nor the oxygen of the air acts upon gold in any way. No single acid except selenic has the power to dissolve it, though it dissolves readily in aqua regia, or in any solution in which chlorine, bromine, or iodine are set free. Gold also dissolves in either potassium or sodium cyanide, a property made use of in extracting the metal from its ores. Under certain conditions, gold is attacked by alkalies and nitrates, and yields to the powerful solvent action of selenium oxychloride.

While harder than lead, gold is softer than platinum, silver, copper, nickel, iron, or zinc. In fact, it is much too soft for most practical purposes, although only the purest form of the metal can be used for making gold leaf. To increase its hardness and wearing qualities, it is usually alloyed with copper or silver, or with both. Copper makes gold redder, and silver makes it lighter than its natural color. When alloyed with silver, gold forms the various "white alloys" used by jewelers. With mercury, gold readily forms a white, pasty amalgam. This property of amalgamation is the basis of one of the most effective processes in use for the recovery of fine particles of gold from placer sands or crushed ores.

The proportion of gold entering into the composition of an alloy is expressed either in "carats" or in "degrees of fineness." Pure gold is rated as 24 carats fine, and the carat value of any alloy is expressed in parts of 24. For example, 14-carat gold consists of 14 parts pure gold and 10 parts of some alloy. Fineness is stated in parts per thousand—for example, 925—or in the form of a decimal, 0.925. American, German, and Italian standard gold for coinage contains 9 parts of gold and 1 part of copper, and is therefore 21.6 carat or 900 fine. British standard gold contains 11 parts of gold and 1 part of copper, and hence is 22 carat or 916.6 fine.

Gold is employed for an immense number of useful and ornamental purposes, the most important of which are coinage, jewelry making, gilding, electroplating, and dentistry. The use of gold for rings, ornaments, and coins dates to remote antiquity. Goldbeating and also gilding by the use of extremely thin sheets of gold, as is now done in lettering signs and in stamping titles on books, are likewise very ancient arts. On Egyptian mummy cases, believed to be at least 5000 years old, the gold leaf gilding still retains its brilliance and luster.

While gold occurs in minute amounts dissolved in sea water and in small deposits in nearly every country, it is obtained in paying quantities only in comparatively limited districts. South Africa leads the world in gold production, the great mines of the Witwatersrand, in the Transvaal, sometimes yielding nearly half of the total annual output; the United States ranks second, usually producing about one-eighth of the world's yearly total; Canada ranks third, contributing about one-ninth. Other important gold producing countries are Russia, Mexico, Australia, British India, and Japan.

From the voyage of Columbus in 1492 until 1850, it is estimated that the total amount of gold produced did not average ten million dollars yearly. From 1850 to 1900, owing to the discovery of many rich fields, and more especially to improved methods of treating low grade ores, gold production increased enormously. During the half century, gold to the value of nearly seven billions of dollars was added to the world's supply, or more than twice the amount contributed during the preceding 400 years. From 1901 to 1925, the world's annual production of gold averaged nearly $400,000,000. Important discoveries of gold were made in California, 1848; Australia, 1851; British Columbia, 1858; New Zealand, 1861; South Africa, 1868; Juneau, Alaska, 1880; Klondike, Yukon, 1896; Nome, Alaska, 1899; and Porcupine, Ontario, 1910.

Gold is usually found in the metallic state, in the form of nuggets or smaller particles, diffused in sand and gravel or distributed through rocks and veins. Nuggets weighing from a few ounces to some hundreds of pounds have been found but most of the metal is obtained in the form of fine flakes called gold dust. Native gold commonly contains some silver. The metal is found also in combination with tellurium as "telluride ore," and often accompanies copper ores and iron pyrites. See *Coinage Alloys*, *Electrum*, *Gold Nuggets*, *Green Gold*, *Noble Metals*.

Gold Nuggets. Gold usually occurs in the form of small flakes or scales, often exceedingly fine, known as gold dust. It is, however, sparingly found in larger rounded masses, weighing from half an ounce to many pounds, commonly called nuggets. From placers in the Klondike, nuggets have been taken weighing 80 ounces. In California, nuggets weighing as high as 280 ounces have been found. A nugget from the Ural mountains, exhibited at the School of Mines in Petrograd, tipped the scales at 100 pounds. The largest nuggets on record have been discovered in Australia. Among these may be mentioned the "Blanche Barkley" nugget, which weighed 143 pounds, and the "Welcome Stranger" nugget, found at Ballarat, Victoria, valued at more than $40,000, which scaled 183 pounds. At Hill End, New South Wales, an immense nugget was unearthed, measuring 4 feet 9 inches by 3 feet 3 inches, and nearly 4 inches in thickness. It weighed about 600 pounds and was sold for $148,000.

Green Gold. An alloy of gold containing one per cent aluminum. The addition of the latter metal has a marked effect upon the color. Five per cent of aluminum combined with gold will entirely obscure the yellow, yielding a white metal.

High-speed Steels. A large number of alloys of steel, containing tungsten, or molybdenum and manganese, or chromium; known also as self-hardening or air-hardening steels. These special steels are capable of doing from two to four times as much work in machinery or metal lathe work as can be done with tempered carbon steel, now called ordinary tool steel.

High-speed steel tools are most useful in making rapid rough cuts with the lathe or planer. For fine finishing, tempered carbon steel tools are superior. However, a tungsten steel tool will hold a cutting edge at a temperature more than twice as high as any plain carbon steel. The speed of lathes for rough cuts can be raised from two to five times their normal rate when high-speed steel is used instead of ordinary tempered steel for tools. Consequently, a workman can triple his former output in axle turning and similar rough cutting work. This increased efficiency has revolutionized shop practice in both metal and wood lathe and planer work throughout the world.

Indium. A ductile, silver-white, lustrous, easily fusible metal, about as heavy as iron, which occurs in minute quantities in various zinc, lead, and manganese ores. Its most distinguishing property and the characteristic which led to its discovery by Reich and Richter in 1863, is the indigo-blue line displayed by the spectrum of all its known compounds. While very interesting to the chemist, neither the metal nor any of its salts has any economic value.

Invar. An alloy composed of nickel, 36 per cent, and steel. Under the influence of heat and cold, invar shows the least variation of all available metals; it is therefore very valuable for instruments of exact measurement. It is soft, bends easily, and resembles nickel rather than steel. Its tensile strength, while less than that of steel, is sufficient for surveyors' measuring tapes. Invar is used in making bars for standards of length, for comparators, for clock pendulums, and in constructing other instruments of precision.

Iridium (*ĭ-rĭd'ĭ-ŭm*). A very hard, brittle, whitish metal, one of the heaviest substances known, found pure, or mixed with platinum and osmium. It is obtained chiefly in Russia, Borneo, and Brazil, and in small quantities in California. Compact iridium resists the action of acids, air, and moisture. It is used chiefly for tips of gold and stylographic pens and in constructing standards of measurement. The standard meter at Paris is a bar of platinum alloyed with 10 per cent of iridium.

Iridosmine. A natural alloy of iridium and osmium, first observed by Wollaston in 1805; called also osmiridium. It is an exceedingly hard, slightly malleable mineral which occurs in the form of flattened grains associated with various platinum metals in Russia, Colombia, and California. Iridosmine is employed to some extent in points for gold pens.

Iron. The most common, useful, and important of metals. While it occurs sparingly in nature in the metallic state, it is usually found in combination with oxygen (iron oxide) or carbon and oxygen (iron carbonate), the most important ores being red hematite, brown hematite, and magnetite, all widely distributed throughout the world, and especially abundant in the United States, England, and Germany. Small masses of nearly pure iron sometimes fall from the sky as meteorites. Iron in some form is a constituent of nearly all rocks, clays, and other earths, to which it usually imparts their red color. Small quantities of iron are found in most waters, in various parts of plants, and in the blood of animals.

When absolutely pure, iron is nearly as white as silver, is softer and more malleable than ordinary wrought iron, and takes a high, lustrous polish. It is the most tenacious of the ductile metals, and may be rolled into sheets so thin that their weight is less than that of sheets of paper of the same size. The finest grades of commercial iron are never entirely pure but contain small quantities of carbon, silicon, manganese, phosphorus, and sulphur. These substances, as well as other impurities, are present in much larger amounts in cast iron as it comes from the smelting furnaces. The numerous varieties of steel are forms of iron which usually contain considerably more carbon than wrought iron but always less carbon than cast iron.

Iron does not change in dry air, but in moist air it soon unites with the oxygen of the air, forming iron oxide, or rust. To prevent the formation of rust, articles made of iron are given a thin coating of tin, lead, nickel, copper, or zinc, or are otherwise protected by some form of waterproof paint or varnish.

Like most metals, iron combines freely with acids, forming a large variety of salts, some of which are very valuable. Among the most important of these are *green vitriol* or *copperas* (ferrous sulphate), used in dyeing and in making *prussian blue* and other pigments; ferric nitrate, used as a mordant in dyeing; ferrous oxalate, used in photography; and ferric chloride, widely used in medicine. Iron combines directly with chlorine, bromine, iodine, fluorine, sulphur, carbon, boron, silicon, phosphorus, and arsenic, producing a great diversity of compounds. Melted iron dissolves carbon, some of the carbon uniting to form iron carbide and some remaining uncombined as graphite. Iron also forms a vast number of alloys with other metals, many of which, such as the different varieties of steel, are invaluable in modern industry.

The most remarkable single property of iron is its magnetism, iron being the most powerfully magnetic substance known. Magnetite (lodestone), an ore rich in iron, is a natural magnet. Wrought iron becomes temporarily magnetic and steel is made permanently magnetic when brought into a magnetic field.

Next to bronze, iron ranks as the most anciently used of the common metals. Articles made of iron, found in the pyramids of Egypt, are believed to be more than 5000 years old. Throughout all history iron has played an important part in social and industrial development. At the present time iron and steel form the foundation of the greatest manufacturing industries of the world. See *Cast Iron*, *Galvanized Iron*, *Steel*, *Wrought Iron*.

Lanthanum (*lăn'thă-năm*). A rare metal of the cerium group, which occurs in the minerals cerite and gadolinite, and also in the lanthanite found in New York and Pennsylvania. It is white, moderately ductile and malleable, and somewhat lighter than iron. Lanthanum forms many compounds but neither the metal nor any of its salts is as yet of any practical importance.

Lead. A very heavy bluish gray metal, easily cut by a knife or scratched by the finger nail. It is highly malleable and ductile, being readily rolled into sheets or drawn into a wire, though its tenacity is small. Lead is a poor conductor of heat and electricity. By pressing freshly cut surfaces together, lead may be welded at ordinary temperatures. Under pressure and gentle heat it may be forced through openings and pipes. When exposed to the air, lead soon becomes covered with a thin film of rust or oxide which protects it from further corrosion.

While found sparingly in the metallic state, lead is obtained chiefly from ores, the most important being galena, or lead sulphide, in which it is usually associated with small quantities of silver, arsenic, copper, and various other metals. The United States contributes about a third of the world's output of lead, which comes chiefly from Missouri, Utah, and Idaho. Spain, Germany, Australia, Mexico, and Belgium are also important producers.

As it is but slightly acted upon by air or water and is highly resistant to most acids, except dilute nitric acid, lead is employed for a great variety of purposes, particularly in plumbing, for water pipes, gutters, cisterns, and tanks. Sheet lead is used for roofing, lining tea chests, and wrapping snuff. Lead enters into many valuable alloys. For example, with arsenic it forms *shot metal*; with tin, *pewter* and *solder*; and with antimony, *type metal*.

Many compounds of lead are exceedingly useful. Among these are *white lead* (basic lead carbonate), used in making white paint; *red lead* or *minium* (red lead oxide), used in making red paint and flint glass; *litharge* or *massicot* (lead monoxide), used in making oil varnishes; *sugar of lead* (lead acetate), used in calico printing; and *chrome yellow* (lead bichromate), used in making yellow paints. The carbonate, iodide, and oleate of lead are much used in soothing plasters and ointments.

When taken into the human system, even in small quantities, various lead salts in time cause severe and sometimes fatal cases of poisoning, the most common form of which is painter's colic. Consequently, the glazing of cooking vessels with lead, the coloring of candy with lead chromate, or the drinking of water left standing in new lead pipes may result in dangerous illness. In 1926, after much controversy, the use of lead tetraethyl for producing an "antiknock" gasoline was permitted by the United States Public Health Service.

Lipowitz' Metal. An alloy consisting of 15 parts of bismuth, 8 parts of lead, 4 parts of tin, and 3 parts of cadmium. This metal melts at 65° C. or 149° F.,—or 63° F. below the boiling point of water. It is used in various devices, such as automatic sprinklers for fire protection, which take advantage of its low melting point.

Lithium. The lightest of the metals, about as heavy as ash or maple wood, widely distributed in nature but always in minute quantities. It occurs most abundantly in spodumene and a few other rare minerals but is present in sea water, various mineral springs, numerous plants, and in blood and milk. Lithium is soft, silvery white, and can be pressed into wire or welded at ordinary temperatures. It is classed with the alkali metals, and, like sodium and potassium, tarnishes quickly in air, decomposes water with great readiness, and dissolves in liquid ammonia. With acids it forms various salts widely used in fireworks on account of the splendid red color which they impart to flame.

Magnalium. An alloy of aluminum with 2 to 10 per cent of magnesium; lighter than aluminum, but equal in strength and workability to high quality brass.

Magnesium. A soft, lustrous, silver-white metal, which can be hammered into sheets or drawn into a wire. It is one of the lightest of metals, being only two-thirds as heavy as aluminum. While never occurring free, magnesium is exceedingly abundant in nature as a constituent of various limestones and other common rocks. In the form of filings, wire, or ribbon, magnesium takes fire readily when heated and burns with a dazzling bluish white flame. Finely divided particles of the metal, either pure or mixed with some oxidizing material, form the flashlight powders widely used by photographers. The metal is also used in making signals and in fireworks. With aluminum, magnesium forms the valuable alloy, *magnalium*.

When burning in the air, magnesium unites with oxygen, producing the *oxide*, a tasteless white powder, called *magnesia*. This does not melt except at extremely high temperatures, and is extensively employed in making crucibles and fire bricks. Besides the oxide, there are many other valuable compounds of magnesium. Among the most important of these are the *sulphate*, known as *Epsom salts*, used for fertilizer, in dyeing, and in medicine; the *carbonate* called *magnesia alba*, also used in medicine; the *chloride*, employed in cotton spinning; and the *citrate* widely prescribed as a laxative. See *Flashlight Powder*, *Magnalium*.

Magnetic Alloys. A group of interesting alloys discovered by F. Heusler in 1898; called also Heusler alloys. Besides manganese, or manganese copper, these more or less complex mixtures contain one or more of the elements aluminum, antimony, arsenic, bismuth, boron, and tin. Of these, the aluminum-manganese-copper alloys exhibit the greatest magnetism,—about one-third of that of soft iron—though none of the component metals, when taken separately, is magnetic. Manganese tin is magnetic, and continues so when copper is added to the mixture. Manganese copper is nonmagnetic but acquires magnetism when tin is added.

Manganese. A very hard gray metal, with a gray luster, about as heavy as iron, which it resembles in many of its properties. Unlike iron, however, manganese is neither malleable nor magnetic. While not found free, manganese occurs very widely distributed in pyrolusite and other ores, especially those bearing iron, and, to a lesser extent, those containing silver, zinc, or lead. In the pure metallic state manganese has no uses, but it forms exceedingly valuable alloys with many metals, particularly copper, iron, zinc, tin, aluminum, lead, and magnesium. Iron containing 8 to 20 per cent manganese is the *spiegeleisen* used in making Bessemer steel. Iron with 20 to 80 per cent manganese is called *ferromanganese*. In the modern manufacture of iron and steel, the strength, toughness, and elasticity of which it greatly increases, manganese is practically indispensable. It is present in varying small percentages in nearly all commercial grades of iron and steel. By far the greater part of the world's production of manganese ores is turned over to the iron and steel industries. Some, however, is used in making flint glass, in coloring pottery, tiles, and bricks, and in smelting precious metals. High-grade pyrolusite is employed in making dry batteries.

Manganese combines with various other elements, forming both salts and acids. *Potassium permanganate* is extensively used as an oxidizer, in bleaching, for purifying water, as a disinfectant, and to counteract the venom in the bites of poisonous snakes.

Manganese Bronze. An alloy of copper and manganese, with tin or zinc. The red variety, composed of 80 parts copper, 10 parts tin, and 10 parts of a 20 per cent manganese-copper alloy, is used for gear wheels. The yellow variety is composed of 50 parts copper, 44 parts zinc, and 6 parts of a 20 per cent manganese-copper alloy. It is used for automobile castings, gun mechanisms, and especially for motor boat shafts and propeller blades, as it is unaffected by the action of sea water.

Manganese Steel. A form of steel containing from 7 to 15 per cent manganese, which imparts great hardness, toughness, and resistance to abrasion. It is used for pulverizers, rock crushers, and other similar purposes.

Mercury. A silver-white liquid metal, nearly twice as heavy as iron, called also quicksilver. It becomes solid or freezes at −39.5° C., or about 39° F. below zero, and boils at 357° C., or 610° F. It occurs in small quantities in the metallic state but chiefly in the sulphide ore, called *cinnabar*, containing over 86 per cent of the metal. Mercury was widely known in ancient times, and during the middle ages became the subject of much study by the alchemists.

Mercury dissolves and perhaps enters into combination with nearly all the metals, forming a group of alloys known as *amalgams*. It combines with oxygen to form two oxides, mercurous and mercuric, and with various acids to form a double series of mercurous and mercuric salts. Among the most important of these are the sulphide, known as cinnabar when native, and as the pigment *vermilion* when artificially prepared; *mercurous chloride*, or *calomel*; and *mercuric chloride*, or *corrosive sublimate*. Metallic mercury and most of its salts are highly poisonous.

The chief uses of mercury are in making drugs, thermometers, barometers, and other scientific instruments, fulminate for explosive caps, and in separating gold and silver from their ores. In 1920 California furnished about three-fourths and Texas nearly all of the remainder of the mercury produced in the United States.

Molybdenum (*mō-lĭb'dē-nŭm*). A white metal, slightly heavier than iron, with a melting point higher than platinum, but lower than tungsten. It is softer than steel, somewhat malleable, and may be drawn into thin sheets or fine wire. Molybdenum occurs chiefly in the mineral molybdenite, from which the world's commercial supply of the metal is obtained. It is produced chiefly in the United States, Norway, Sweden, Canada, and Australia.

The most important use of molybdenum is in making special alloy steels, commonly in conjunction with manganese, chromium, nickel, cobalt, vanadium, or tungsten. These steels are used for the so-called self-hardening or high-speed machine tools; for propeller shafts, crank shafts, connecting rods, and similar purposes in the motor industry; for boiler plates, armor-piercing projectiles, gun linings, and armor plates.

Molybdenum is also employed in making various electric devices, such as targets in X-ray tubes and supports for incandescent lamp filaments, various reagents, dyes, glazes, and disinfectants. See *High-speed Steels*.

Molybdenum Steel. A special steel containing molybdenum and manganese; one of the first to be used in high-speed tool work, but found, for this purpose, inferior to tungsten steel. The addition of molybdenum, however, exerts a beneficial effect upon the magnetic qualities of the metal, and molybdenum steel ranks as one of the best materials known for making permanent magnets. Alloys of steel with molybdenum, nickel, and chromium are employed in making guns, armor plates, steel helmets, and airplane and automobile parts.

Monel Metal. An alloy consisting of about 70 parts of nickel and 30 parts of copper, with some metallic impurities. This metal, which is manufactured direct from native Canadian nickel ore, possesses great tensile strength and resists, to a remarkable degree, tarnishing by the air. It is particularly suitable for window screens, ship fittings, and various similar purposes.

Mosaic Gold. A fine, flaky, yellow form of tin bisulphide, used as an imitation bronze. It is prepared by heating to low redness a mixture of 6 parts of ammonium chloride, 7 parts of sulphur, and 18 parts of powdered tin amalgam made in the proportion of 2 parts of tin to 1 of mercury.

Neodymium (*nē'ō-dĭm'ĭ-ŭm*). A pale yellow metal about as heavy as iron, with properties similar to those of cerium. Neodymium occurs only in certain rare minerals, such as cerite and monazite, from which it is finally separated by electrolysis. It rapidly decomposes boiling water, and combines with various acids, forming rose-colored salts, none of which is of practical importance.

Newton's Metal. A fusible metal, composed of bismuth 50 parts, lead 31.25 parts, and tin 18.75 parts, which melts at 202° F.,—or 10 degrees below the boiling point of water. It is one of a group of fusible alloys whose low melting points are taken advantage of in making safety plugs for boilers, automatic fire sprinklers, and various other devices.

Nickel. A very hard, silvery white, lustrous metal, somewhat heavier than iron, which it resembles in many properties. Nickel is ductile and malleable, possesses great tenacity, and, next to iron and cobalt, is the most magnetic substance known. Unlike iron, however, nickel does not rust or tarnish in ordinary air, a property which makes it one of the most useful of the more common metals.

Metallic nickel occurs in the form of grains in the bed of the Fraser river in British Columbia and is a common constituent of meteorites. Commercial nickel is obtained chiefly from niccolite and garnierite ores found in many countries. The main sources are the mines of the Sudbury district, Ontario, which produce more than three-fourths of the world's output, and the mines of Noumea, New Caledonia, which furnish most of the remainder. Only very small quantities of nickel are produced in the United States.

By far the most important uses of nickel are in electroplating and in making alloys. By reason of the high, lustrous polish which it readily takes and the protection which it affords against rust, nickel is employed in electroplating an immense variety of useful articles. In alloys with other metals, nickel is used for coins and for innumerable other purposes. German silver, monel metal, invar, and platinite are examples of valuable nickel alloys. With iron it forms the so-called "nickel steel" alloys.

Nickel enters into many compounds, the most important of which commercially is nickel-ammonium sulphate, a bright green crystalline salt used in the process of nickel-plating. An interesting compound is nickel carbonyl, which is formed by placing the finely divided metal in a stream of carbon monoxide gas at a temperature of 85° F. The nickel absorbs the gas, forming a volatile liquid which freezes at 13° below zero and boils at 109°. When the vapor from the boiling liquid is heated to 145°, it explodes violently, depositing pure metallic nickel upon the walls of a tube containing it. This reaction is the basis of the Mond gas process for refining nickel. Pure nickel, finely divided, is used as a catalyzer in the hydrogenation of fats. See *German Silver, Invar, Monel Metal, Platinite*.

Nickel Steel. Various alloys of steel and nickel which melt at a lower heat than the corresponding carbon steels. While tough and possessing high tensile strength and elasticity, nickel steel forgings are not difficult to machine. The alloy called invar or invar steel, containing 36 per cent of nickel, is remarkable for its small rate of expansion when heated. As its expansion is only one-twelfth that of pure iron, invar is very valuable for clock pendulums, chronometers, and measuring rods. It also possesses great power to resist corrosion.

Noble Metals. A name given to those metals which do not tarnish or corrode in the air, such as gold, silver, platinum, rhodium, mercury, and palladium. Sometimes, however, the term is applied only to the first three; again, it is made to include copper and other metals which are fairly resistant to oxidation.

Osmium (*ŏs'mĭ-ŭm*). A very hard, bluish white metal, with a violet luster, one of the heaviest substances known, infusible except in the electric arc. It occurs native, commonly alloyed with iridium or with platinum, which it resembles. It forms oxides and the so-called osmic acid, used for technical purposes, such as staining nervous tissue for microscopical examination. Points for gold pens are made of an alloy of osmium and iridium.

Palladium. A white, lustrous, ductile, and malleable metal, about as heavy as lead. While occurring native, associated with platinum and other precious metals, the chief sources of palladium are the nickel ores of Sudbury, Ontario. It does not tarnish in the air, is resistant to most acids, and has the property of absorbing many times its own volume of hydrogen. Palladium is used in making scientific instruments, in jewelry, and in dentistry.

Permalloy. An alloy of 39 parts of nickel and 11 parts of iron. It is extremely sensitive to magnetizing and demagnetizing influences. For this reason it is valuable for encasing submarine cables and adds greatly to their capacity. A New York-London cable, laid in 1926 and encased in permalloy, showed a transmitting capacity of 2500 letters a minute. This rate is about four times the previous maximum.

Pewter. An alloy usually composed of about four parts of tin and one part of lead, sometimes with small additions of copper, zinc, and antimony. Formerly all kinds of dishes, plates, mugs, and tankards were made of pewter, and polished pewter plate held the same place on the sideboard that silver plate does at the present time. The cheap production of pottery, china, and silverware caused a great decline in the use of pewter, though it is still employed for making various small articles.

Phosphor Bronze. An alloy generally composed of copper and tin, together with from 0.3 to 0.8 per cent of phosphorus. It possesses unusual toughness and hardness and hence is especially valuable for piston rings, valve covers, cog wheels, and screw propellers.

Platinite. A trade name of an alloy of iron, containing 36 per cent nickel. This base metal alloy is used as leads for electric light bulbs, replacing platinum, which was formerly employed for the purpose.

Platinum. A very heavy, steel-gray metal, somewhat harder than copper, very malleable, ductile, and tenacious, which does not rust or change in the air, cannot be melted by ordinary furnace heat, and resists the action of all common acids. By reason of these properties, platinum is exceedingly useful for many important purposes. Retorts, crucibles, stills, and blowpipe tips for chemists' use are made of the metal, and it is very widely employed in the construction of electrical appliances. Large amounts are used in dentistry and, in recent years, for jewelry, especially in making watch cases, small ornamental pieces, and settings for diamonds and other precious stones.

Platinum is of great value in the manufacture of sulphuric and nitric acids for explosives, and in the construction of airplanes, electrical devices, and other war machinery. During the World War, the price of the metal rose to more than five times that of gold.

Platinum is the heaviest of the commonly known metals, being nearly three times as heavy as iron and about twice as heavy as lead. Like gold, platinum dissolves in a mixture of hydrochloric and nitric acids (aqua regia), and chlorine, bromine, and iodine attack it.

Various salts of platinum are useful in photography. At high temperatures platinum is attacked by sulphur, phosphorus, and arsenic. Finely divided platinum, called platinum black, has the remarkable property of absorbing 800 times its own bulk of oxygen. With gold and several other metals it forms alloys which melt much more easily than the metal itself. However, when alloyed with iridium, platinum gains greatly in hardness.

Platinum is found in the form of little scales, flakes, or grains, in sand or gravel deposits, often in company with gold, and commonly with one or two of the so-called platinum metals. While minute quantities of platinum occur in many regions, 99 per cent of the world's supply is produced in Colombia, where it was originally discovered about 1735, and in Russia, where it was first mined in 1819. It is estimated that up to the beginning of the World War, in 1914, Russia had contributed 95 per cent of the world's total stock of platinum, reckoned at about 5,000,000 ounces. During the period 1900-26 the United States imported platinum valued at upwards of $130,000,000.

As compared with gold, the price of platinum has varied enormously. In 1788 Colombian platinum was sold for 14 cents an ounce. While Russia was coining platinum, 1828–45, it was valued at about $7 per ounce. In 1906 the price had advanced to $20 an ounce, and in 1913 to $45 an ounce. In 1918 the United States government established the price of platinum at $105 per ounce.

Platinum Metals. A group of precious metals found associated with platinum and more or less resembling it in various properties. Besides platinum, it includes palladium, osmium, iridium, ruthenium, rhodium, and the natural combination or alloy called osmiridium or iridosmine. Each of these has its special characteristics and usefulness. Of these, iridium and osmium are heavier than platinum, being the heaviest substances known.

Polonium (*pō-lō'nĭ-ŭm*). A rare metallic element discovered in pitchblende by Madame Marie Sklodowska Curie in 1898, and named in honor of Poland, her native country. It is similar to nickel in color but in properties more closely resembles bismuth, with which it is associated and from which it is separated only with extreme difficulty.

The special characteristic of polonium is its radioactivity, which is some 300 times greater than that of uranium, although immensely inferior to that of radium. This radioactivity is accompanied by the emission of helium. If pieces of barium platinocyanide, or hexagonal zinc sulphide (*Sidot's blende*), are placed near polonium in the dark, they will glow with a greenish light. While some investigators have claimed that polonium is only a radioactive form of bismuth, advanced researches seem to prove that it is a true element. According to Rutherford, polonium is identical with radium F, and is, therefore, one of the series of elements resulting from the disintegration of uranium. See *Radioactivity, Radium, Uranium.*

Potassium. A silvery white, lustrous metal, lighter than water, brittle at 32° F. but waxlike and easily cut with a knife at 60°. It melts at 144°, boils at 1250°, and, with the exception of lithium, is the lightest of the metals.

While never occurring in the free metallic state, potassium in combination with other elements is an essential constituent of many important rocks and minerals, as, for example, feldspar, mica, carnallite, and niter. Potassium salts occur in sea water, in various springs, in the bodies of animals, and in plants. The most familiar source of potassium carbonate is wood ashes (*pot ashes*) which are still leached in some districts to obtain "lye" for soap making, whence the names potash and potassium. However, the bulk of the world's supply of potash is obtained from the famous mines in central Germany, notably those at Stassfurt. The metal is separated from its salts by electrolysis.

A freshly cut piece of potassium quickly rusts in the air, becoming immediately covered with a white film of the hydroxide. When thrown upon water, potassium floats upon the surface, where an intense chemical reaction takes place, with a brilliant display of heat and light. The metal decomposes the water, setting hydrogen free. By the great heat evolved, the liberated hydrogen gas is set on fire, burning with the beautiful violet-purple color which potassium salts impart to flame. By reason of its great avidity for oxygen, potassium can be kept only in fluids which contain no oxygen, such as benzol or petroleum.

Potassium belongs to the group of alkali metals. It unites with oxygen and hydrogen, forming a powerful hydroxide or base. Because it destroys the skin or other organic tissue with which it comes in contact, potassium hydroxide, called also potassium hydrate, is commonly known as "caustic potash."

Potassium enters into almost innumerable compounds, many of which are of great economic value. Among these are saltpeter, or niter (potassium nitrate); potash (potassium carbonate); cream of tartar (potassium bitartrate); sal polychrest (potassium sulphate); muriate of potash (potassium chloride), used as a fertilizer; potash alum (potassium-aluminum sulphate); potassium bichromate, used in photography and dye making; and potassium cyanide, a powerful poison, used in metallurgy.

Various potassium salts are useful drugs, such as potassium bromide, potassium iodide, potassium chlorate, potassium permanganate, and potassium hypophosphite. Seidlitz powder contains potassium tartrate, and Rochelle salt is potassium-sodium tartrate. Large crystals of Rochelle salt, which are piezo electric, are said to have been used during the World War in the production of so-called "supersound," by means of which submarines were located even when resting quietly on the ocean bottom.

Pyrophoric Alloys. A group of alloys so named on account of their peculiar property of emitting hot sparks when rubbed with a rough file. They consist of metals of the cerium group in alloy with cobalt, nickel, iron, or manganese. The pyrophoric alloy used in making automatic gas lighters is composed of 65 per cent of cerium metals and 35 per cent of iron. In gunnery, pyrophoric alloys are set in the shells of projectiles so that the friction caused by their rapid passage through the air ignites the alloy, producing a shower of sparks which mark their path of flight.

Radium. A remarkable chemical element discovered jointly by Professor Pierre Curie and his wife Marie Sklodowska Curie at Paris in 1898. Pure radium is a brilliant silver-white metal which tarnishes very rapidly in the air and decomposes water with great energy. Its most striking characteristic is its radioactivity, which consists in the continuous emission of minute particles at enormous speed. These radiations are so powerful that they can be detected in ores containing extremely minute quantities of radium. It was this property of the element which led to its discovery.

Radium emits three distinct kinds of rays, known as *alpha, beta,* and *gamma rays.* The alpha and beta rays are corpuscular and are more accurately called particles. The alpha rays or particles are atoms of helium, each bearing a charge of positive electricity. The beta rays, which are identical with cathode rays, consist of single electrons charged negatively. The gamma rays, which are nonelectrified, are like light waves but with very short wave length. Some gamma rays have ten times the penetrating power of the strongest X-rays. Radium has also the property of maintaining itself at a temperature higher than that of the surrounding air. It emits constantly a quantity of heat sufficient to raise its own weight of water from the freezing point to the boiling point in an hour.

It is now believed that the expulsion of alpha and beta particles from the atoms of a radioactive substance results from a form of explosion in some of its atoms. In each second of time about thirty-six thousand million of alpha particles are expelled from a single gram of radium. However, the number of atoms in a gram is so enormous that this rate of expulsion can proceed for several years without sensibly changing the quantity of the radium.

During the period of its radiant activity, radium breaks down through seven stages, each representing a distinct product. The first of these is radium emanation or radon. When this series of transmutations is complete the final product is radio lead. Half of a given amount of radium

will disappear in about 1700 years, called its "half period of decay." Half of the remainder will disappear in the next 1700 years, and so on, until, in about 20,000 years, practically all of it will have changed into other elements, no matter how securely it is kept imprisoned.

In eruption, radium projects atoms of helium (alpha particles) with a speed 25,000 times as great as that of a rifle ball. A single gram of radium, about $\frac{1}{30}$ of an ounce, discharges some 30 billions of such atoms every second. Yet these helium atoms, though moving at a velocity of from 10,000 to 13,000 miles a second, are the heaviest, slowest, and least penetrating of the three kinds of radiations. Their progress may be stopped by a single sheet of paper. Some of the beta particles or electrons move with almost the speed of light; they have 100 times the penetrating power of the helium atoms, and will pass through aluminum or glass one-fourth of an inch in thickness. They have been shown to be similar to the cathode ray in an X-ray tube, except that they travel twice as fast. It is the smallest known body, its mass being about $\frac{1}{1800}$ of that of a hydrogen atom. The gamma rays, which are light rays of the X-ray type, possess 100 times the penetrating power of the beta particles. They will pass through more than three inches of lead.

This bombardment of infinitesimally small particles moving at tremendous speed will corrode the flesh against which it strikes, producing dangerous sores. Further, these rays act upon diseased tissue more quickly than upon healthy tissue. For this reason radium is used, often with great effectiveness, to destroy cancers and various other abnormal growths. When compared with its weight, the radium emanation emits a quantity of energy more than a million times greater than that produced by the most violent chemical reaction. It is calculated that one pound by weight of the emanation would emit an amount of energy equivalent to 60,000 horse power days. If a cubic centimeter of the emanation were collected in a glass tube, sufficient heat would probably be given off to melt its walls. To prevent injury to persons handling it, radium is divided into small portions which are kept in heavy metal containers thickly lined with lead.

All solutions, fusions, salts, and ores of radium give off radium emanation. It is found in the waters of many curative springs and is present in very minute amounts in the air. The emanation is of value in measuring small quantities of radium and is widely used in medicine where formerly only the element itself was employed. For this purpose it is readily collected from a parent solution of any radium salt. As the radium will lose by this process only about one-thirtieth of its volume in 100 years, a practically uniform supply of the emanation may be maintained.

Radium possesses the power to render certain substances luminous. For example, it will cause many thousand times its weight of hexagonal zinc sulphide, or Sidot's blende, to emit light. Various luminous paints, containing zinc sulphide and mixed with minute quantities of radium, are used for watch dials, keyhole plates, gunsights, and other special purposes.

Radium occurs in minute quantities in all uranium ores, such as pitchblende, found at Joachimsthal, Bohemia, and in the Belgian Congo; also in carnotite, obtained in Colorado and Utah. The United States was formerly the chief producer of radium. Of the total world's output to 1921, estimated at 160 grams, 120 grams came from America. Since then, however, Katanga, Belgian Congo, has been the chief producer of the metal. A mineral containing as much as one part of the metal in 10,000,000 parts of ore is considered very rich. Consequently, the cost of extraction is very great, and the separated product ranks as the most costly substance known. See *Luminous Paint*, *Niton*, *Polonium*, *Radioactivity*.

Radon. See *Niton*.

"Rare Earth" Metals. The name given to a group of metals whose oxides are known as "rare earths." For a long period these resisted all efforts of chemists and metallurgists to reduce them to the metallic state. Among these metals are cerium, gadolinium, lanthanum, terbium, thorium, samarium, scandium, ytterbium, yttrium, and zirconium.

Rhodium. A very hard, difficultly fusible metal, slightly heavier than lead, found in small quantities in platinum and gold ores. An alloy of platinum containing about 18 per cent rhodium is used in making thermo-electric pyrometers.

Rose's Metal. An alloy composed of 1 part lead, 1 part tin, and 2 parts bismuth, which melts at 94° C., or 201° F.,—or below the boiling point of water. It is used in various safety devices in which advantage is taken of its low melting point.

Rubidium. An alkali metal, resembling sodium and potassium, found in minute quantities in certain minerals and mineral springs, in seaweed, tobacco, tea, and sugar beets. It is soft and waxy, silver-white, slightly more than half as heavy as aluminum, and melts at 38.5° C., or 101.3° F. Like potassium, rubidium decomposes water with evolution of hydrogen gas which takes fire on account of the heat evolved. The metal and its compounds show two characteristic dark red lines in the blue portion of the spectrum.

Ruthenium (*rōō-thē'nĭ-ŭm*). A rare, whitish gray metal of the platinum group, about as heavy as lead, found in small quantities in platinum ores. Neither the metal nor any of its compounds is of commercial importance.

Scandium. A rare metallic element, found in gadolinite and other minerals, chiefly interesting because its existence and properties were foretold by Mendeléev, on the basis of the periodic law, ten years in advance of its actual discovery in 1879.

Silver. A brilliant white metal, known and used since the dawn of history. Like gold and platinum, it is ranked among the "precious metals." Silver is extremely malleable and ductile, has great tenacity, and is the best conductor of heat and electricity known. At ordinary temperatures it does not rust or oxidize, nor is it affected by any atmospheric agent, except sulphur compounds, which quickly tarnish its surface. Silver is slightly lighter than lead, or a little more than half as heavy as gold. It takes a high polish and is a powerful reflector of light, whence its use among ancient peoples for mirrors.

Silver occurs native, sometimes in masses of several hundred pounds of nearly pure metal, but chiefly in ores, such as argentite, stephanite, and cerargyrite, in combination with sulphur, arsenic, chlorine, antimony, or tellurium, and also in association with copper and lead. While silver occurs in every continent, it is most abundant along the Rocky Mountain-Andes systems of the Americas. The mines of the United States, Canada, Mexico, and Peru are the richest known, yielding about five-sixths of the world's output of silver, those of the United States and Mexico far surpassing the combined production of all other countries.

In the United States, Utah, Montana, Idaho, Nevada, Arizona, and Colorado usually contribute nine-tenths of the total production of the country. Outside of the Americas, Germany, Spain, Japan, and Australia are leading producers of silver. However, the output of any of these countries is small when compared with that of single rich districts in the New World. For example, the mines near Cobalt, Ontario, yield about as much silver as those of Europe, Asia, Africa, and Australia combined.

The uses of silver are exceedingly important and world wide. In most countries a large part of the coinage consists of silver. Industrially, silver is employed in making various kinds of tableware and an immense number of decorative articles. It is used also for silver plating, for silvering mirrors, and in many valuable alloys. The standard United States coin consists of 9 parts of silver to which 1 part of copper is added to give greater hardness. Articles made entirely of silver of about the same fineness as standard coins are called "solid silver."

Many of the compounds of silver are exceedingly valuable. The whole art of photography is based upon the fact that certain salts of silver (the chloride, bromide, and iodide) are sensitive to the action of light. Silver nitrate, commonly called *lunar caustic*, is used in dyeing hair and in making indelible ink. It is used also in medicine, as is argyrol and various other compounds of silver and albumen. See *Coinage Alloys*, *Electrum*, *Sterling Silver*.

Sodium. A silvery white metal, lighter than water, which is hard at zero Fahrenheit, becomes waxlike at ordinary temperatures, and melts at 207°. While exceedingly abundant in nature, sodium is never found in the metallic state but always in combination with other elements. Upon exposure to the air, sodium unites with oxygen and moisture, forming a white powder, sodium hydroxide.

If a piece of sodium is thrown into water, it will float on the surface, decomposing the water and setting hydrogen gas free. In case the water is hot, the hydrogen will take fire, burning with a yellow flame. Sodium cannot be preserved if permitted to come in contact with air or water, but must be kept in sealed containers. Metallic sodium is prepared by various processes which take away the oxygen from soda, leaving the metal free.

Sodium unites with most acids, forming many salts which are of great importance. Among the most valuable are common salt (*sodium chloride*), Glauber's salt (*sodium sulphate*), washing soda (*sodium carbonate*), baking soda (*sodium bicarbonate*), Chile saltpeter (*sodium nitrate*), "water glass" (*sodium silicate*), borax (*sodium tetraborate*), and "hypo" (*sodium thiosulphate*), used in photography.

Sodium belongs to the group of so-called alkali metals, which unite with oxygen and hydrogen to form hydroxides or bases. Sodium hydroxide, called also sodium hydrate, "caustic soda," or "soda lye," is a powerful alkali, used in large quantities in making soap, in mercerizing cotton, and for many other useful purposes. As a rule, the properties of sodium salts closely resemble those of potassium salts. For many purposes, a salt of either metal may be

substituted for the corresponding salt of the other. All the volatile salts of sodium impart a characteristic yellow color to flame, affording an unfailing test for the presence of the metal, even in the minutest quantities. See *Glauber's Salt, Hypo, Salt.*

Solder. An alloy or metal used, when melted, to join other metals. Soldering alloys may be classified as *hard solder* if they melt above a red heat, and as *soft solder* when they melt at lower temperatures. These are also called brazing solder and tinning solder. The melting point of a solder should be lower than that of the metal on which it is used.

A well-liked soft solder is that known as half and half, made from equal weights of tin and lead. For electrical work, antimony is usually added so as to impart a low melting point. Forty parts of copper and 60 parts of zinc make a good hard solder for copper and hard brass; a mixture of 60 parts of copper with 40 parts of zinc is often used for soldering iron. Gold is usually soldered with a mixture of gold, silver, and copper. No completely satisfactory solder for aluminum has yet been found.

Soft solders are usually applied by means of a pointed bar of copper, called a soldering iron, while hard soldering is almost always done with a blowpipe. In certain branches of the canning industry the soldering is often performed entirely by machinery. A flux of rosin, sal ammoniac, zinc chloride, borax, or similar substance, is generally applied to the parts to be joined, so as to dissolve any oxides and clean the metallic surfaces.

Spelter. The trade name for ordinary commercial zinc which usually contains various impurities, chiefly lead and iron. As only the purer grades can be used for making ductile brass, the price of spelter depends very largely upon the amount of lead and iron present. Some forms of hard solder are also called spelter.

Stainless Steel. An alloy of iron, chromium, and carbon, combining hardness with a remarkable freedom from corrosion. It was discovered in Sheffield, England, about 1912. Chromium is present in amounts of 12 to 14%, while .25 to .4% of carbon is employed. The alloy is heated to a bright red heat and then quenched rapidly, the latter operation being necessary to the noncorrosive property of the alloy. It is used for cutlery and in automobile manufacture.

By employing a lower percentage of carbon, about .1%, a *rustless iron* of high tensile strength may be produced. Heat treatment of the finished forms is unnecessary. Being cheaper and more easily worked, this alloy is suitable for wide industrial application. Among the first uses to which it was put was the manufacture of a rustless wire rope having a tensile strength of about 100 tons per square inch.

Steel. A form of iron possessing many qualities greatly superior to those of ordinary iron for an immense number of purposes. Steel is a compound of iron and carbon intermediate between wrought iron and cast iron, usually containing more carbon than wrought iron, but always less carbon than cast iron, and is sometimes alloyed with small quantities of various other metals. So many varieties of steel are made that no single quality, except excellence or adaptability, can be said to be characteristic of it. In general, steel is stronger, harder, finer, smoother, and more elastic than iron. It takes a higher polish and does not rust so readily. The different forms of steel are grouped in two general classes:

High-carbon steels, containing from 0.8 to 2 per cent carbon, are granular in structure, and may be cast and tempered, but are not easily welded. They are very hard when tempered, form permanent magnets, and are used for cutting-tools, springs, and dies.

Low-carbon and *medium steels*, with from 0.05 to 0.8 per cent carbon, are either granular or fibrous in texture, moderately soft, and may be either cast or welded and, when containing above 0.3 per cent carbon, tempered. To this class belong the varieties of metal used in making sheet steel, structural steel, steel rails, steel wire, and steel nails. The various steels of this group, manufactured in forms adapted to a multitude of uses, constitute the most valuable metallic product of modern times and are indispensable to present-day civilization.

Formerly, practically all steel was made by heating bars of wrought iron covered with charcoal in an air-tight furnace for a week or ten days. In this process some of the carbon of the charcoal enters into the iron, forming what is called *blister steel*. The bars are then hammered into *shear steel* or, after being melted and cast into ingots, are forged and rolled into bars, called *cast steel*. This process, which yields only small quantities, is very slow and expensive, so that before the introduction, about 1870, of cheap methods of steel making, very little steel, as compared with wrought or cast iron, was used.

Cast steel is now made almost entirely by the Bessemer and open-hearth processes, whereby a great variety of steels are produced directly from cast iron. By making possible the manufacture of excellent steel in immense quantities at low cost, these processes have not only completely revolutionized the iron and steel industries of the world, but also all mechanical and engineering construction.

Besides the many common or carbon steels, there is a large number of special steels, called *alloy steels*. These are alloys of steel with varying, but usually small, proportions of one or more metals, including aluminum, chromium, molybdenum, nickel, tungsten, vanadium, and zirconium. Of these, chrome steel, molybdenum steel, nickel steel, tungsten steel, and vanadium steel are of great value in the construction of modern machinery, especially in making automobiles and airplanes. See *Aluminum Steel, Chrome Steel, Crucible Steel, High-speed Steels, Invar, Molybdenum Steel, Tungsten Steel.*

Stellite. The name given to a group of alloys consisting chiefly of cobalt and chromium, patented in 1913 by Elwood Haynes. Stellite containing not to exceed 30 per cent of chromium may be rolled into sheets or forged into rods. When polished, stellite displays a beautiful luster which does not become tarnished by exposure to the air, water, or household acids. While stellite may be readily forged into knives, forks, spoons, and similar articles, these are so hard that a file will scarcely scratch their surface and are stiffer than if made of steel.

With the addition of tungsten or molybdenum, the hardness of stellite is very greatly increased, making it suitable for use as a tool metal. When cast into bars, such alloys require only grinding to a cutting edge to make them available for use in metal-working machines.

Stereotype Metal. An alloy composed of lead 67 parts, tin 17 parts, antimony 16 parts; used in the printing trades for casting stereotype plates from which daily newspapers and sometimes books are printed.

Sterling Silver. An alloy consisting of 925 parts of silver and 75 parts of copper, established by law as the standard of fineness of British silver coins, whence the use of the term sterling silver for all articles made from silver of equal purity and wearing qualities.

Strontium. A malleable, ductile, yellow metal, slightly lighter than aluminum. Strontium oxidizes or rusts quickly in the air, and, when heated, burns with a brilliant red flame. It is found in various minerals, particularly strontianite, celestite, and brewsterite; in mineral springs; and in certain plants. Strontium forms various salts, some of which are of practical value. The oxide is much used in beet-sugar making; the nitrate finds employment in fireworks because of the red color with which it burns.

Tantalum (*tăn'tă-lŭm*). A rare metal found in tantalite and other minerals, almost invariably in association with columbium. It is obtained chiefly in Australia and Scandinavia, though some occurs in the Black Hills of South Dakota. It is a black substance with a metallic luster, soluble in hydrofluoric acid but not acted upon by hydrochloric, sulphuric, or nitric acid, or even by aqua regia. By reason of this remarkable resistance to powerful acids, tantalum is valuable for many chemical purposes. Another important property is its power of absorbing gases. It is capable of taking up 740 times its own volume of hydrogen.

Tellurium. A silver-white, brittle, semimetallic element. It is nearly as heavy as iron and does not tarnish upon exposure to air. While sometimes occurring free, tellurium is usually found associated with gold, silver, lead, and bismuth, chiefly in Austria and the United States. In many properties tellurium resembles sulphur, and, like it, imparts very undesirable qualities to metals, even when present in very small quantities. If taken into the human body, tellurium and its compounds give the breath a strong garlic-like odor.

Thallium. A brilliant, silver-white metal which tarnishes very rapidly in the air and is softer than lead. Thallium occurs in the mineral crooksite and in various natural sulphide ores of iron, copper, zinc, bismuth, and other metals. The spectrum of thallium shows a characteristic green line, and thallium salts impart a green color to a nonluminous flame. The metal and its compounds are employed in making thallium glass, valuable for optical instruments and artificial gems.

Thorium (*thō'rĭ-ŭm*). A valuable metal of the "rare earth" group; obtained chiefly from the mineral monazite which is found in North Carolina, Norway, and Brazil. Upon being heated in the air, the pure grayish metal takes fire and burns with a bright flame, forming the white dioxide called thoria, used with ceria in making the mantles for the Welsbach incandescent gas burner. Thorium displays remarkable radioactive properties.

Tin. A bluish white, ductile metal, with a brilliant luster, about as heavy as iron, somewhat harder than lead but softer than gold. Tin is very malleable and may be

beaten into sheets only $\frac{1}{2500}$ of an inch in thickness. It is very flexible, emitting while bending a peculiar creaking sound called the "cry" of tin. While it may be drawn into wire, its tenacity is much inferior to most common metals. Tin melts at about 460° F., and, if cooled slowly, the metal may be obtained in crystallized form. At a temperature of 54° F. below zero, tin becomes brittle and loses many of its characteristic properties.

On account of its brightness and the fact that it does not tarnish or rust in ordinary air, tin is very extensively employed as a covering or plate for other metals. Its most important industrial use is in coating thin iron plates for tinware. Copper and brass are similarly coated with tin; as, for example, pins, cooking vessels, and bathtubs. Tin is used in making tin foil and in forming many valuable alloys, the chief of which are those made with copper, including various bronzes, and those made with lead, such as britannia metal, type metal, pewter, and solder.

The Phœnicians made utensils of bronze at least as early as 1000 B. C., obtaining much of the tin for its production from the famous mines of Cornwall, England, which were later worked in turn by the Greeks and by the Romans. Commercial tin is obtained from a single kind of ore, called tinstone or cassiterite, found chiefly in the East Indies, Bolivia, Siam, China, Australia, Nigeria, and England. Although mining only insignificant amounts of tin, the United States consumes in various industries more than half of the world's output of the metal. See *Bronze, Mosaic Gold, Pewter.*

Tin Plate. Sheet iron or sheet steel covered on both sides with tin. The process of making tin plate is simple. The iron or steel sheets are first thoroughly cleaned with acid, and are then dipped into vats of molten tin and palm oil. When the sheets have become coated to the required thickness, they are taken out of the vats and cleaned. The greater part of the tin now produced is devoted to the manufacture of tin plate.

Titanium (*tī-tā'nĭ-ŭm*). A steel-like metal, somewhat more than half as heavy as iron, found in various mineral ores, particularly in Scandinavia. When heated in the air, titanium burns to the oxide with great brilliancy. At high temperature in the electric furnace, titanium unites directly with nitrogen, forming a bronze-yellow nitride, which is very nearly if not quite as hard as the diamond. When used as an alloy, titanium imparts hardness and toughness to steel and gives a fine, brilliant luster to silver. Various compounds of titanium are employed in dyeing and making paints for the protection of iron from the air. Electrodes for arc lights, composed of titanium carbide, give twice as much light as those made of carbon.

Tungsten. A bright, steel-gray metal, which occurs in wolframite, scheelite, and other minerals, usually associated with tin, found in veins and placer deposits chiefly in Burma, Portugal, and the western United States, particularly in Colorado, California, and the Black Hills. Pure tungsten is nearly as heavy as gold, very resistant to acids, and, although hard enough to scratch glass, is somewhat malleable. It has an exceedingly high melting point, about 3400° C., or 6150° F.

When alloyed with other metals, such as iron and aluminum, tungsten greatly increases their hardness and tenacity. Some of the best high-speed tool steels are tungsten alloys. Except the limited use of various carbonized fibers, tungsten wire is now practically the only material employed in making incandescent electric lamp filaments. *Partinium*, a light and tough alloy of tungsten and aluminum, enters extensively into automobile construction.

Tungsten Steel. A special steel containing varying amounts of tungsten, sometimes as high as 12 or even 25 per cent, especially valuable for high-speed metal cutting. Tools made of tungsten do not lose their temper until very high temperatures are reached, and may be worked up to white heat without impairment of cutting power.

Type Metal. An alloy commonly composed of about 10 parts of lead, 4 parts of antimony, and 2 parts of tin. The tin gives toughness; the antimony, hardness and also the property of expansion when solidifying. This combination produces the required sharp casting.

Uranium (*ū-rā'nĭ-ŭm*). A hard, nickel-like, malleable metal, almost as heavy as gold, found only in combination with other elements in a few rare minerals. It occurs chiefly in ores from which radium is extracted, the principal source of which is Katanga in the Belgian Congo. Uranium melts at bright red heat, and acts both as an acid-forming and as a base-forming element, yielding numerous compounds. Of these, sodium uranate, known as *uranium yellow*, is used in the manufacture of beautiful fluorescent glass and in decorating porcelain.

A most striking fact concerning uranium is that the metal itself and all of its compounds are radioactive. The study of this remarkable property of uranium ores by Pierre and Marie Curie led to the discovery of radium. Uranium has the highest atomic weight of all known elements. It constantly undergoes slow disintegration and is believed to be the parent of a series of elements, each of which has a lower atomic weight than the preceding, due to the emission of radiations. The wonderful substance radium is regarded as one of these transmutation products, as are also niton, polonium, and radio-lead. See *Radioactivity, Radium.*

Vanadium (*vă-nā'dĭ-ŭm*). A white metal, about two-thirds as heavy as iron, found very widely distributed, but in small quantities, particularly in iron, copper, and lead ores. In the United States it occurs in mineral deposits in Colorado, Utah, and elsewhere. Vanadium forms various compounds, the most important of which is vanadic acid. Some vanadium salts are very useful in the manufacture of aniline black, vanadium inks, mordants for dyeing, and photographic developers. The most important use of vanadium is as an alloy with steel. The addition of one-tenth or two-tenths per cent of vanadium to chrome steel and various other steels greatly increases their elasticity and tensile strength, making them especially valuable for automobile construction.

Wood's Metal. An alloy composed of bismuth 15 parts, tin 4 parts, and cadmium 3 parts; remarkable for its low melting point, only 60° C., or 140° F.,—the lowest of all the fusible alloys. This and similar bismuth alloys are used for safety plugs in automatic fire-sprinkler systems, now widely installed in large buildings.

Wrought Iron. One of the purest forms of iron industrially used. It contains a much smaller amount of carbon and other impurities than either cast iron or steel. Wrought iron is made from cast iron in specially prepared furnaces by the puddling process, during which most of the carbon, sulphur, phosphorus, silicon, and manganese is removed. This purified or "wrought" iron is a soft, grayish white metal with a melting point much higher than that of cast iron and approaching that of platinum.

Wrought iron is very malleable and ductile, and, when heated, may readily be hammered into bars, rolled into plates, or drawn into wire. Further, it can easily be welded at red heat, a property which makes wrought iron the most useful of metals for an immense variety of purposes. It is used for making boiler plates, ship's plates, anchors, sheet iron, chain cables, wire, wheel tires, horseshoes, nails, spikes, bolts, and the iron parts of innumerable tools and implements. However, the softer kinds of steel have largely replaced wrought iron for many of its most extensive uses. See *Cast Iron, Iron.*

Zinc. A bluish white metal, with a bright luster, about as heavy as iron, widely found in various ores, such as zincite, franklinite, calamine, and zinc blende. Commercial zinc, commonly known as spelter, is a coarse, flaky metal, rather hard to file, and usually containing impurities, chiefly lead and iron. After being freshly melted, zinc when bent gives forth a peculiar creaking sound similar to the "cry" of tin. At ordinary temperatures zinc is brittle, but, when heated to between 200° and 300° F., it can be rolled into sheets or drawn into wire. In dry air zinc does not tarnish, but in moist air it soon becomes covered with a thin film of grayish rust (zinc carbonate) which effectively protects the metal itself from further corrosion. This peculiar property gives zinc its great value as a protective coating for iron and steel.

As one of the most useful of the common metals, zinc is employed for an immense number of industrial purposes, such as making brass, German silver, and numerous other alloys; for galvanizing sheet iron and wire; and for electric batteries. Of the numerous compounds of zinc, some of the most important are *zinc oxide*, known as *zinc white*, widely used in making paint; *zinc chloride*, used as a preservative and disinfectant; and *zinc sulphate*, or *white vitriol*, used in dyeing, calico printing, and as a dryer in varnishes. Various zinc salts are highly prized in medicine.

Although the Romans made brass by fusing certain zinc ores with copper, zinc, as a pure metal, was unknown until modern times. The chief ore of zinc is a compound of zinc and sulphur, variously known as sphalerite, zinc blende, or "black jack." During recent years the United States has been the leading producer of zinc, followed by Germany, Belgium, France, and Great Britain. In the United States the chief zinc producing mines are in Oklahoma, Montana, New Jersey, Missouri, Wisconsin, Kansas, and Idaho. See *Brass, Spelter.*

Zirconium (*zĕr-kō'nĭ-ŭm*). A metallic element found in combination with silica in zircon and in various rarer minerals, chiefly in Brazil. Zirconium is obtained either in the form of a black powder or as a gray, lustrous, crystalline solid. The latter is nearly as heavy as cast iron, which it somewhat resembles. Both varieties readily combine with oxygen to form the dioxide called zirconia, a white, tasteless powder sometimes used with thoria in the manufacture of mantles for Welsbach incandescent gas lamps. See *Cooperite.*

PHYSIOLOGY AND ANATOMY

PHYSIOLOGY, strictly defined, is the science which treats of the *uses* or *functions* of organs in living beings. Anatomy deals with the structure and organization of plants and animals. These subjects as treated here are limited to the physiology and anatomy of man.

Closely allied to these sciences are several others whose subject matter is drawn on slightly in making the following articles as helpful as possible. The chief ones are *histology*, that is, minute or microscopic anatomy; *hygiene*, the study of the ways of living that promote health; *sanitation*, which deals with external conditions conducing to health; *dietetics*, the study of foods and food values, including their use in health and disease; and *pathology*, the study of disease.

Structure of the Body. The human body is composed primarily of solids and liquids. In childhood and youth, fluids are more abundant, giving softness, roundness, and pliancy to the flesh. In advanced age, the fluids are much less abundant, so that the flesh is firmer, and the skin is more wrinkled. In a sense the fluids contain the entire body in a state of solution, that is, they contain the various materials out of which the tissues and organs are built up.

Chemical Constituents.—Seventeen different chemical elements have been found in the human body, as follows: oxygen, carbon, hydrogen, nitrogen, sulphur, phosphorus, chlorine, fluorine, silicon, sodium, potassium, lithium, calcium, magnesium, iron, manganese, and iodine. Of these, oxygen, carbon, hydrogen, and nitrogen comprise nearly the whole bulk of the fluids and softer portions. The others, mostly in a state of combination and in comparatively small quantities, enter into the composition of various tissues. The chemical compounds occurring in the body may be classed as organic and inorganic. The organic compounds contain carbon, oxygen, hydrogen, and some nitrogen, the most important being albumins, fats, and carbohydrates. The chief inorganic compounds are water, common salt, carbonate of lime, and phosphate of lime.

Physical Constituents.—The body consists of various organs and systems of organs, each serving some special use or function in carrying on the various vital activities and processes.

System.—A system is a group of several separate organs spread throughout the body for a definite use, as, for example, the circulatory system or the nervous system.

Organ.—An organ is a group of different tissues of the body capable of performing some special action, as, for example, the liver, the heart, or the lungs.

Tissues.—The substances which make up the organs of the body are called tissues. Of these, the most important are the *epithelial* or *areolar*, *mucous*, *serous*, *fibrous*, *adipose*, *lymphoid*, *cartilaginous*, *bony* or *osseous*, *muscular*, and *nervous* tissues. These various tissues are the primary building materials which enter into the structure of the different parts of the body.

Cells.—Every bodily tissue is made up of cells. The cell is the unit of life, of structure, and of function. A fully developed cell consists of the cell body or *protoplasm*; the *nucleus*, a minute spherical body of denser protoplasm embodied in the contents of the cell; and the *nucleolus*, a small object lying within the nucleus. While differing greatly in shape, cells are usually rounded or flattened, and, in size, rarely exceed a thousandth of an inch in diameter. Some cells, however, are greatly elongated into fibers, attaining a maximum of about a yard. Cells are reproduced by dividing themselves into two parts, each half soon developing into a new cell, exactly similar to the original or parent cell from which it sprang.

Protoplasm.—The main bulk of the bodies of most cells consists of protoplasm, the so-called physical basis of life. It is living matter. In active cells it is a jelly-like, semitransparent, grayish, viscid substance somewhat resembling the raw white of an egg. It possesses all the vital properties by means of which the processes of nutrition, secretion, and growth go forward. The important principles of *contractility* and *irritability* and the fundamental processes of *metabolism* and *reproduction* are exemplified in the protoplasm of a single actively growing cell.

Function.—A function is the normal work performed by a healthy organ, as the function of the stomach in the secretion of gastric juice, or the function of the liver in secreting bile.

Metabolism.—The process by which living cells are nourished by the nutritive material in the blood, or that by which they change their cell protoplasm into other substances, is called metabolism. As this process may both build up and tear down cells and tissues composed of cells, it may be either constructive (*anabolism*) or destructive (*katabolism*).

Abdomen. The portion of the body lying between the thorax and the pelvis, containing the abdominal cavity. This cavity, the largest in the adult body, is separated from the thorax or chest, which lies immediately above it, by a thin muscular wall called the diaphragm or midriff. The abdominal cavity extends from about the lower end of the sternum or breastbone to the pelvis and contains the most important digestive organs, including the stomach, intestines, liver, pancreas, and spleen, and also a part of the urinary system.

The walls of the abdomen consist of various layers of flat muscles, covered on the outside with skin and lined throughout the inside with a thin, smooth, moist serous membrane, called the *peritoneum*. All abdominal organs are covered on the outside with this membrane. On account of this characteristic lining, the abdominal cavity is often called the *peritoneal cavity*. The disease known as peritonitis is an inflammation of the peritoneum. See *Pelvis*, *Thorax*.

Alimentary Canal. The digestive tract; in man a highly developed and differentiated tube or canal in which food is received, digested, and absorbed. It includes the whole passage traversed by substances taken in as food, from their entrance into the mouth to the excretion of the indigestible residue.

In an adult the alimentary canal has a total length of from 25 to 30 feet, and is lined throughout with mucous membrane. Outside this membrane are layers of muscle and other tissue to give strength to the walls of the various organs forming the canal, to help mix the food with the digestive fluids, and to push it along its course.

The principal organs of the canal in the order that the food passes through them are the *mouth*, *pharynx*, *esophagus*, *stomach*, and the *small* and the *large intestine*. The mouth opens into the pharynx or throat. The pharynx opens into the esophagus or gullet, a cylindrical tube about 10 inches in length. Passing back of the windpipe and lungs, the esophagus leads into the stomach through the *cardiac orifice*.

The stomach is a somewhat pear-shaped organ, varying in size with different individuals. Its widely expanded upper portion is called the *cardiac pouch*. The tapering lower or *pyloric* portion communicates with the small intestine through a ring-shaped constriction formed of sphincter muscle, called the *pylorus*.

The small intestine usually occupies a length of about 20 to 25 feet, and, necessarily, is decidedly coiled. The first 10 or more inches is called the

duodenum; the next 8 or more feet, the *jejunum*, and the remainder, about 11 or 12 feet, the *ileum*. The small intestine finally communicates with the large intestine through a slitlike opening, called the *ileocæcal valve*.

The large intestine is divided into the *cæcum*, the *colon*, and the *rectum*. The first portion is the cæcum, into which the small intestine opens. The cæcum, however, projects below this opening and its lower part forms a blind sac, while the part above the opening continues upward into the colon. A small wormlike appendage of the cæcum, the function of which has not been exactly determined, is called the *vermiform appendix*. The colon is divided into an *ascending*, a *transverse*, and a *descending* portion, which, by their position, form an outer wall almost completely surrounding the small intestine. The colon is held in place by a fold of the peritoneum. The rectum, or final portion of the large intestine, is a short, wide, smooth tube. See *Intestines*, *Mouth*, *Stomach*, *Throat*.

Aorta. The great artery or trunk of the arterial system, proceeding from the left ventricle of the heart, and giving origin to all the arteries except the pulmonary. It first rises toward the top of the breastbone, when it is called the *ascending aorta*. It then makes a great curve, called the *transverse arch* or *great arch* of the aorta, which gives off branches to the head and upper extremities. Thence proceeding downward toward the lower extremities, under the name of the *descending aorta*, it gives off branches to the trunk. Finally, the aorta divides into the two *iliac* arteries, which supply the pelvis and lower extremities.

Arteries. The blood vessels by which the blood is carried out from the heart and distributed to the general system and to the lungs. The arteries which proceed to the general system, or body as a whole, commence in one large vessel, the *aorta*. This divides and subdivides into many branches, which, like those of a tree, become more and more minute as they are farther removed from the trunk, until they finally terminate in exceedingly small vessels called *capillaries*. These *systemic arteries* contain pure, oxidized, scarlet blood, known as arterial blood.

On the other hand, the arteries which proceed to the lungs, called the *pulmonary arteries*, are two vessels which have their origin in the right ventricle of the heart, and carry the blood to the right and to the left lung respectively. The pulmonary arteries contain unpurified, dark-colored blood, the same as that which is contained in the veins and known as venous blood, while the pulmonary veins carry arterial blood.

The principal arteries are the two *carotid arteries*, which supply the head; the two *subclavian arteries*, which proceed to the arms; the two *iliac arteries*, to the legs; the *cœliac axis*, which supplies the liver, spleen, and stomach; the *mesentery arteries*, which supply the walls of the intestines; and the *renal arteries*, which supply the kidneys. The arteries and the veins may readily be distinguished from each other in the dead body, the arteries being round or cylindrical, and having their walls comparatively stiff and thick, while the walls of the veins are collapsed and flaccid. The walls of the arteries are composed of elastic fibers, connective tissue, and muscle cells.

Owing to its rigid walls, an artery, when cut, continues to bleed until death ensues, and the only way to arrest the bleeding permanently is to tie the severed end that is nearest to the heart. From a cut artery the flow of blood is of a jetlike nature, owing to the force with which the blood is propelled from the heart, while from a cut vein the blood merely trickles out. After a cut artery has been tied to prevent bleeding, the circulation of blood through it is re-established by what is called *anastomosis*, in which a network of small branches of the artery carries the blood around the point of injury and again unites with the main trunk.

The inner lining of the arteries is perfectly smooth, and there are no valves as in the veins. The arteries were so named because the ancients supposed that they contained air, being generally found empty after death. See *Aorta*, *Circulatory System*, *Heart*.

Assimilation. The changing of nutritive material into the fluid or solid portions of the body. Living tissues possess the power of working up into their own substance various food elements derived from the outside, as from the substances digested in the alimentary canal, absorbed by the lymphatics, and distributed throughout the body by the blood. Assimilation is the final stage in the process of nutrition. It takes place in the tissues side by side with the tearing down process, called dissimilation, which results in the removal of waste matter. See *Digestion*, *Nutrition*.

Bile. A yellowish brown or greenish, viscid fluid, secreted by the liver. It has a peculiar, musklike odor, a bitter taste, and an alkaline reaction. Of normal bile, various solids in solution form from 9 to 14 per cent. The chief constituents are the bile salts, sodium taurocholate and sodium glycocholate, and the bile pigments, or coloring matters, bilirubin and biliverdin. In addition, bile contains small quantities of mucinoid substances, fats, soaps, cholesterin, lecithin, urea, and mineral salts. The amount of bile secreted in a day by a healthy adult is estimated at from somewhat more than a pint to slightly more than a quart.

In digestion, the principal action of the bile is as an aid to the pancreatic juice, especially in emulsifying fat. Owing to its alkaline character, bile assists in neutralizing the acid chyme received in the intestine from the stomach. The bile seems to act also as an antiseptic, reducing excessive fermentation in the intestines. Moreover, the bile stimulates the muscular movements of the intestinal walls, *peristalsis*, thereby preventing constipation. Waste products, eliminated from the blood by the liver, are carried off by the bile.

Bladder. A membranous sac which serves as the receptacle of the urinary fluid secreted by the kidneys. It is situated in the pelvic cavity, behind the pubic bone, and is held in position by ligaments. When moderately distended, the bladder is about five inches long and three inches across, and ordinarily contains about a pint of urine. The bladder is connected with each kidney by a tube called a *ureter* and discharges its contents through a tube called the *urethra*. The walls of the bladder consist of a thick coat of unstriped (smooth) muscular tissue lined by a mucous membrane.

Blood. The thickish, opaque, red fluid which circulates through the tissues of the body, conveying digested food and oxygen and carrying away waste. Blood has a faint odor, is salty to the taste, and is alkaline in reaction. It consists of a transparent, colorless fluid, the *plasma*, or *liquor sanguinis*, in which float extremely minute solid bodies, called *corpuscles*. The plasma is composed of water in which are dissolved fibrin, albumin, and several salts, including common salt and calcium phosphate, together with various digested food nutrients and waste materials connected with the upbuilding and the tearing down of tissues. The corpuscles which are of two kinds, *red* and *white*, occur in enormous numbers,—a single small drop of blood containing 25 million red ones.

The *red corpuscles* are very small flattened disks, about $\frac{1}{3200}$ of an inch in diameter, and thicker at the edge than at the center. They contain an important substance, called *hemoglobin*, which has the power of absorbing oxygen from the air in the lungs and of conveying it to the various tissues. The red color of hemoglobin is caused by the iron which it contains.

The *white corpuscles* are larger but far less numerous than the red, existing in healthy blood in the

proportion of two or three to 1000. While ordinarily spherical in form, they are seen under the microscope to vary their shape in the same way as does the amœba, and these characteristic movements are called *amœboid*. An important function of the white corpuscles is to protect the body against disease by destroying the various harmful bacteria which find their way into the tissues of the body.

In the systemic circulation, the color of the blood in the arteries is bright scarlet, while in the veins it is dark red or purple. The bright-colored arterial blood contains oxygen and nutrient materials which are given up to the tissues in passing through the capillaries. The much darker-colored venous blood contains carbon dioxide and other waste products accumulated during the passage through the tissues. The oxygen conveyed by the blood is obtained during its circulation through the lungs. The nutrient fat materials absorbed from the intestines by the lacteals reach the blood through the thoracic duct which discharges into the subclavian vein. The materials contributed by the liver pass directly from that organ into the circulatory system by the hepatic vein.

Clotting, which prevents the prolonged flow of blood from an ordinary wound, is produced by *fibrinogen*, which, when acted upon by an enzyme present in the blood, causes the fibrin, on exposure to the air, to change from liquid to solid form.

The amount of blood in the human body is approximately one-thirteenth of its weight, or from 12 to 15 pounds,—about six quarts, in a man of average weight.

Blood Pressure. In flowing through the vessels the blood exerts a lateral pressure upon their walls. The amount of this pressure depends upon the energy of the heart stroke, the volume of blood in the vessels, the elasticity of their walls, and the resistance offered by the capillaries. When the body is in good health, the blood pressure, within certain average limits, is maintained with remarkable constancy. In the case of many diseases, however, the blood pressure varies greatly from that which prevails in health. Consequently, the observation of blood pressure has become of great value in medicine. The blood pressure may be readily taken by means of an instrument called a *sphygmomanometer*. In this the rise in a column of mercury, as in an ordinary barometer, is made to indicate the pressure.

According to Janeway, the average arterial blood pressure of adults in health ranges between 100 mm. and 130 mm. The normal barometric pressure of the air at the sea level is 760 mm. or 30 inches. During childhood a pressure of from 90 to 110 mm. may be regarded as normal. After middle life the blood pressure increases so that from 145 to 160 mm. may be taken as the range for good health. Pressures higher than 160 mm. are considered as indications of disease. In certain kidney and brain diseases, for example, pressures as high as 250 or even 300 mm. are by no means rare.

Blood pressure, however, varies in different individuals and at different times in the same individuals. It is lowest during sleep, is increased by muscular exertion or mental emotion, and is influenced by changes in external temperature and by altitude. As excessive blood pressure is regarded as one of the causes of *arteriosclerosis* or hardening of the arteries, a disease producing a sort of premature old age, it is important to ascertain what causes abnormal pressure. Among known causes are excessive mental or physical work, chronic worry, the habitual use of tobacco, overeating, and steady use of alcohol. By regulating the daily life, chronic high pressure may, to a very considerable extent, be controlled. Abstention from worry, moderation in eating, drinking, and smoking, combined with some of the milder forms of outdoor exercise, are necessary requirements.

Abnormally low blood pressure is also observed, especially in case of wasting diseases, hemorrhage, collapse, and shock.

Bones, Structure of. In shape, bones are *long*, as in the clavicle or humerus; *short*, as in the wrist and ankle bones; *flat*, as in those of the skull; *irregular*, as in the backbone; and *sesamoid*, as in the kneecap. During life, bones are bluish white in color, and are more or less flexible and elastic. They usually consist of an outer compact layer and an inner spongy portion containing red marrow. The compact portion is porous, but its cavities are much smaller than those in spongy bone. Bones are made up of both mineral and animal matter. The mineral matter, chiefly carbonate and phosphate of lime, gives them hardness and strength. From the animal matter they derive their elasticity.

In the *periosteum*, or tissue which covers the bones, and in the marrow which fills their central cavities, the blood vessels and nerves spread out before entering the bone proper. The periosteum is a necessary part of bones. If it is removed, the bone will die; but, if the bone be removed without destroying the periosteum, the bone will grow again. In the solid portion of bones there are numerous microscopic tubes, called *Haversian canals* which usually run lengthwise of the bone. These are connected by many cross branches, some of which open on the surface beneath the periosteum where blood vessels enter to bring nourishment. From small vessels in the Haversian canals, blood penetrates throughout the bone in extremely fine tubes called *canaliculi*. See *Skeletal System, Skeleton*.

Brain. The great central organ of the nervous system, situated within the cranial cavity of the skull. It is the chief mass of nervous tissue in the body, and consists of three divisions,—a large part called the *cerebrum*, a much smaller part known as the *cerebellum*, or "little brain," beneath which a still smaller part, the *medulla oblongata*, tapers downward into the spinal cord.

The brain is a very complex organ. In it are connected all the nerve fibers from the different parts of the body. By means of these fibers and their connections, all bodily movements and other functions are co-ordinated. Dominating and controlling the whole, the brain has the exceedingly important function of adapting man to his environment, through the thinking or intellectual processes.

In its action and workings, the brain may be likened to a great central telephone switchboard, by means of which all parts of the body are connected and bound together, and the whole body placed in touch with its surroundings. From the entire surface of the body and from the internal organs, nerve fibers pass either directly into the brain or into the spinal cord and then up the spinal cord into the brain. These fibers are the bearers of impressions of all kinds, such as touch, taste, smell, sight, hearing, temperature, and pain. From the brain itself, somewhat similar fibers run outward through openings in the skull or downward through the medulla oblongata into the spinal cord. Thence they pass outward into nerves, and end in some muscle or other organ having a special character or use. These outgoing fibers are the bearers of nervous impulses originating in various centers in the brain. The total number of these fibers is very great. There are millions of incoming and outgoing fibers, with minute interconnecting branches, and an equally vast number of minute nerve cells, in direct association with these fibers. The brain, therefore, may be regarded as a vast collection of *nerve-ganglion cells* together with their associated *nerve fibers*, commonly called nerves.

Cerebrum.—This constitutes by far the greater part of the brain, and is composed of two symmetrical halves, called the *cerebral hemispheres*. Above, these are separated by the great *longitudinal fissure*,

but, at the bottom of the fissure, they are held together by a firm band of fibers called the *corpus callosum*. At their bases, the hemispheres are bound together by the *cerebral peduncles*, which unite below to form the *pons varolii* and the *medulla oblongata*. The pons varolii is the bridge by which fibers from one side of the body or brain pass to the cerebral hemisphere of the opposite side.

Each hemisphere is divided by various fissures into four major lobes named after the bones of the skull nearest them. These larger lobes are more or less divided by shallower indentations into still smaller lobes called *lobules*. The further extensive division into *convolutions* increases the outside surface of the hemispheres. This affords room for the vast number of nerve cells forming the *gray matter*, which is located in the outermost layer, or *cortex*, of the convolutions. These nerve cells are connected with each other and with other parts of the brain and body by the nerve fibers which compose the *white matter*. Most of the gray matter occurs in the outer layers of the cerebrum, though some is found in the interior parts of the brain and spinal cord. The white matter makes up the remainder of the brain and spinal cord, and also the nerves.

By means of experiments and the study of injuries and disease, localization of function in the *cortex* of the brain has been well established. Thus the *sensory area* lies just back of the central fissure in the post-central lobule; the *motor area* is in the pre-central lobule, in which the subdivisions represent a man standing on his head, that is, the foot and leg areas are above the arm and trunk areas; the *visual area* lies around the *calcarine fissure* in the occipital lobe; the *auditory area* is in the superior temporal lobule; *taste* and *smell* are deficient in man and their centers lie within the brain, around the *hippocampus*; the *speech area* is in the left frontal lobe in right-handed individuals and in the right frontal lobe in left-handed. *Intellect and reason* are thought to have their centers in the *association areas*, which occur in the frontal, parietal, and occipital lobes. All of these areas and lobules, with their *fiber tracts*, intercommunicate by means of short and long *association fibers* and by *projection fibers* throughout the body.

All of these different localized areas, or centers of specialized activities, are brought into connection, one with another, by immense numbers of fibers. Moreover, the two largely separated hemispheres are connected by millions of fibers in the corpus callosum. So, in the normal adult brain, the various nerve centers of the cortex, or outside layer of gray matter, are placed in close connection with each other and with similar centers in the other half of the cerebrum. Further, all of these centers have very definite connections with the cerebellum and the spinal cord.

Cerebellum.—The cerebellum is situated behind and nearly beneath the cerebrum, to the stem of which it is attached by the cerebral peduncles. The connections of the cerebellum with the cerebral nerve centers and also with those of the spinal cord are very numerous and complex. While possessing characteristic features, the nerve cells of the cerebellum are fundamentally similar to those of the cerebrum. The main function of the cerebellum seems to be to co-ordinate and harmonize the muscular movements of the body, as, for example, those which are necessary to keep it in an upright position when standing, walking, or running. In proportion to the size of the cerebrum, the cerebellum of lower animals is much larger than in man.

Medulla Oblongata.—This relatively small part of the brain is composed chiefly of nerve fibers, and connects the cerebrum and cerebellum with the spinal cord. Nerve cells in the medulla oblongata control the beat of the heart, involuntary respiration, and the work of the alimentary canal.

Size of the Brain.—Compared with the size and weight of the body, the human brain is larger than the brain of any other animal, except possibly some of the smallest mammals and birds. With the exception of the elephant and the larger whales, the human brain is actually larger and heavier than that of any other animal. The brain of man is usually larger than the brain of woman, though at birth and at the age of 14 the female brain is heavier than the male brain. The average weight of the adult male brain is estimated at from 48 to 50 ounces; that of the average female brain, at from 43 to 45 ounces. Tall, heavy persons usually have heavy brains. There is, however, no direct relationship between weight of brain and intelligence. Cuvier's brain weighed 64½ ounces, while Gambetta's weighed only 39 ounces. Similar comparisons may be made in the case of many other persons of great intellectual capacity. See *Nervous System.*

Capillaries. The minute vessels connecting the arteries with the veins. They are the smallest vessels of the body. In width a capillary is from $\frac{1}{3000}$ to $\frac{1}{2000}$ of an inch, while in length it varies from $\frac{1}{1000}$ to $\frac{1}{50}$ of an inch. The capillaries form such a dense network of tubes that a needle cannot be thrust into any part of the body without puncturing several. Each capillary consists of a single layer of epithelial cells, such as those which line the arteries. Through the walls of these tubes an exchange of food and oxygen and waste products occurs in every cell by *osmosis*. Osmosis is the intermingling of two liquids or gases of different densities through a membrane, the greater flow being toward the denser substance. Only the thin membrane of the capillaries separates the blood containing digested food and oxygen from the contents of the cells and their waste products,—carbon dioxide, water, and urea, produced by oxidation.

Chyle. A creamy fluid absorbed by the lacteals of the small intestine during the final stage of digestion. This fluid is slightly alkaline, and, when outside the body, coagulates into fibrin and serum. Chyle differs from ordinary lymph chiefly in containing globules of emulsified fat. To these it owes its milky color. The fat is derived from the food materials in the chyme after they have been acted upon by the bile, the pancreatic juice, and the intestinal juice. Lymphatic vessels take chyle from the lacteals to the thoracic duct, which conveys it to the left subclavian vein. Here the chyle becomes mixed with the blood and is distributed to various cells and tissues of the body. In the process of absorption, chyle serves as the principal medium for the transfer of ingested fats to the blood. See *Assimilation, Bile, Digestion, Intestines, Nutrition, Pancreas.*

Chyme. The semifluid mass of partly digested food passed from the stomach into the small intestine. At this stage of digestion, the food materials have been reduced to finely divided particles. This condition is brought about first, by chewing in the mouth; secondly, by admixture with the saliva and the gastric juice; and, finally, by the churning movements (*peristalsis*) of the stomach. The starchy portions have been largely changed into a form of sugar by the action of the saliva, and the protein components have been mostly turned into peptones (or amino acids) by the action of the gastric juice. Besides these principal changes, various other transformations have taken place. As a result, the nutrient materials contained in the chyme are ready for the completion of the digestive process which takes place in the intestines. See *Digestion, Gastric Juice, Stomach.*

Circulation. The natural motion of the blood in a living animal, by which it proceeds *from* the heart to all parts of the body by the arteries, and returns *to* the heart by the veins. There are in reality two circulations: the *pulmonary*, from the right side of the heart through the lungs to the left side of the heart; the *systemic*, from the left side

of the heart through the body back to the right side of the heart.

The blood is returned to the right auricle of the heart by the descending and the ascending vena cava. The right auricle, when distended, contracts and sends it into the right ventricle. It is prevented from returning to the auricle by the tricuspid valve. From the right ventricle it is propelled through the pulmonary artery, to circulate through and undergo a purifying change in the lungs, being prevented from returning into the right ventricle by the closing of the semilunar valves at the mouth of the pulmonary artery.

Having been purified in the lungs, the blood is brought to the left auricle of the heart by the four pulmonary veins, and thence is emptied into the left ventricle. The left ventricle, after having been distended, contracts, and forces the blood through the aorta into the arteries which carry it to every part of the body. The blood is then returned by the veins into the venæ cavæ. The blood is prevented from passing back from the left ventricle into the auricle by a valvular apparatus called the mitral or bicuspid valve. The pulmonary artery and the aorta are also furnished with similar valves, called the semilunar valves. These prevent the blood from returning into the ventricles.

Circulatory System. The organs of the circulatory system comprise the *heart*, the *arteries*, the *capillaries*, the *veins*, and the *lymphatics*. The heart pumps the blood to all parts of the body through the blood vessels. The arteries carry blood from the heart; the capillaries distribute it throughout the cells of the tissues; the veins and the lymphatics return to the heart impure blood filled with waste matter from the tissues. The heart then sends this impure blood to the lungs for purification, after which it comes back to the heart to be again distributed throughout the body.

The circulatory system, therefore, plays a very important part in the activities of the body. Without it there could be no distribution of nourishment nor removal of waste matter. Next to the control exercised by the brain and the nerves, the function performed by the heart and its helping organs is the most important in the human body. See *Arteries*, *Capillaries*, *Heart*, *Veins*.

Diaphragm. The muscular partition separating the cavity of the chest from the cavity of the abdomen, called also the midriff. The diaphragm has a flat, tendinous center, from which striped muscular fibers radiate in all directions, and are attached by their outer ends to the lower ribs, the breastbone, and the vertebral column or backbone. In its middle part the diaphragm rises high in the chest, somewhat in the shape of a vaulted roof, with the heart and lungs above and the stomach and liver beneath. In respiration the strong muscles of the diaphragm play an important part. The spasmodic breathing movement known as *hiccup* is caused by sudden contraction of the diaphragm.

Digestion. The process in the animal body by which foods are so acted upon that the nutritive parts are prepared to pass through the walls of the blood vessels and lacteals of the small intestine and become a part of the blood. The organs effecting this process are called the *digestive organs* and consist of the mouth, the stomach, the small and large intestines, the liver, and the pancreas.

When foods, after being properly prepared and mixed with saliva by chewing in the mouth, reach the stomach, they are then thoroughly mixed with the gastric juice by the motion of the stomach. By this motion the various forms of food are separated into their smallest parts, penetrated by the gastric juice, and transformed into a uniform pulpy or fluid mass. The gastric juice acts upon the protein or albuminous parts of the food, converting them into peptones and finally into amino acids, in which form they can pass through organic membranes and thus enter the blood. This action is also aided by the warmth of the stomach.

The resulting pulpy mass, called *chyme*, proceeds from the stomach, through the pylorus, into the small intestine, where it is mixed with the pancreatic juice, bile, and intestinal juice. The pancreatic juice converts the starch into sugar, changes the remaining albumins into peptones and amino acids, and emulsifies the fats, so that all these kinds of food are rendered capable of absorption. The process is aided by the intestinal juice; the bile also acts upon fats; and thus the food is finally transformed into *chyle*. This nutritious chyle is absorbed into the system by the capillaries and lacteals of the villi situated on the inner walls of the small intestine. The nonnutritious matters pass farther down the intestinal canal and are carried off. See *Assimilation*, *Bile*, *Chyle*, *Chyme*, *Gastric Juice*, *Nutrition*.

Ductless Glands. A group of organs of which most are related, in function or development, to the circulatory system. The most important of these are the spleen, the thymus, the thyroid, the parathyroids, the suprarenal glands, or adrenals, the hæmolymph glands, the pituitary body, the pineal gland, the coccygeal gland, and the carotid glands.

The function of a gland that has a duct is comparatively easy to determine. But the use of ductless glands was long a perplexing problem. Recent investigations, however, have shown that most of the ductless glands form a secretion though it is not discharged through a duct. This *internal secretion*, as it is called, is taken away from the gland by the venous blood or by the lymph. In this manner, the internal secretion is distributed and ministers to the needs of the various parts of the body.

In many cases, the internal secretion is absolutely essential to life. The removal, or destruction by disease, of the gland that forms it, results in derangements culminating in death. In other cases, however, the internal secretion is not essential, or its place is taken by that formed by similar glands in other parts of the body. See *Parathyroids*, *Pineal Body*, *Pituitary Body*, *Spleen*, *Suprarenal Glands*, *Thymus*, *Thyroid*.

Ear. The organ of hearing, composed of three parts, namely, the *external ear*, the *tympannic cavity*, or *middle ear*, and the *labyrinth*, or *internal ear*.

The external ear consists of a cartilaginous portion, called the pinna, auricle, or pavilion, and the auditory canal (*meatus auditorius*) about an inch in length, extending inward from the pinna to the drum of the ear. The eardrum, or *membrana tympani*, is a thin, semitransparent membrane about three-eighths of an inch in diameter, placed obliquely across the inner end of the auditory canal.

The middle ear is an irregular bony cavity situated within the temporal bone. It is traversed by a chain of three small bones called the hammer (*malleus*), anvil (*incus*), and stirrup (*stapes*). There are ten openings in the middle ear, five large and five small. These connect it with the mastoid cells in the temporal bone, with the internal ear, and with the throat. Two openings connect the middle ear with the internal ear. They are called the *fenestra ovalis* and the *fenestra rotunda*. Leading from the middle ear to the pharynx or throat is a small canal called the *Eustachian tube*.

The internal ear, or labyrinth, is the essential part of the organ of hearing. It is composed of three chief parts,—*vestibule*, *semicircular canals*, and *cochlea*. In the central part lies the vestibule, the outer side of which is fitted to the base of the stirrup bone. Behind the vestibule are bony semicircular canals which open into the back of the vestibule at each end. In front of the vestibule is the cochlea, a tube coiled on itself somewhat like a snail's shell. Within these complex organs are various membranous bodies in which are spread out numerous branches of the auditory nerve.

Vibrations striking the eardrum are conveyed through the series of small bones in the middle ear to the nerve endings in the internal ear where the sensation of sound is produced. Thence they are transmitted to the brain.

Excretion. The process whereby waste, useless, or harmful matter of all kinds is separated and carried away from the body. The principal organs of excretion are the large intestine, the lungs, kidneys, bladder, and skin. Among the most important excretions are carbon-dioxide gas from the lungs, perspiration from the skin, and urine from the kidneys. See *Secretion.*

Eye. The organ of sight or vision, of which the essential part is a globular structure, the *eyeball*, contained in a bony cavity in the skull, called the orbit, communicating with the brain by the optic nerve, and moved in the cavity by a set of small muscles. It has three refractive media through which the rays of light pass,—the *aqueous humor* in front, the *crystalline lens* in the middle, and the *vitreous humor* behind. The eyeball is almost a perfect sphere, about an inch in diameter, the front portion bulging slightly forward.

There are three coats, the outer or *sclerotic*, the middle or *choroid*, and the inner, called the *retina*. The sclerotic coat, a hard, fibrous, protective outer covering, is white and opaque, except in the more prominent front part, where it is transparent, forming the *cornea*. The sclerotic coat continues around the back of the eyeball to the optic nerve, which pierces it. The middle coat consists of the *choroid membrane*, the *ciliary processes*, and the *iris*. Of these the choroid membrane, a black vascular layer, extends forward almost to the edges of the cornea; the ciliary processes extend radially around the eyeball at the junction of the sclerotic coat and the cornea, while the iris is a thin, colored curtain behind the aqueous humor in front of the crystalline lens. In the center of the iris is a small circular aperture, the *pupil*, for the transmission of light.

The retina, or inner coat, is a soft, delicate structure lining the back portion of the eyeball. It has two small, round marks upon it,—one in the middle, called the *yellow spot*, which is the point of keenest vision, and the other, somewhat below it, called the *blind spot*, which is the point where the optic nerve enters. In structure the retina is exceedingly complex, consisting of various layers in which are spread out radiating fibers of the optic nerve.

Between the cornea and the crystalline lens is the *aqueous humor*, composed chiefly of water with a very slight solution of salt and albumin. Behind the pupil, and in contact with the iris, is the *crystalline lens*, composed of many thin layers of transparent, ribbon-like fibers. This lens, which is convex on both sides, is held in place by ligaments from the ciliary processes. The *vitreous humor*, which fills the eyeball behind the lens, is a transparent, jelly-like substance.

The accessory organs of the eye are: the four small *rectus* muscles, which rotate the eyeball in its orbit; the *eyelid*, which protects the eye in front; the *conjunctiva*, a thin, transparent membrane which covers the entire outer coat of the eye and lines the eyelid; the *lachrymal gland*, which secretes the tears that moisten both the cornea and the conjunctiva; and the *tear ducts* or small canals by which the surplus fluid is carried into the nose.

As an optical instrument the eye is remarkably perfect and is capable of adjusting itself quickly to an immense range of visual conditions. In the act of seeing, the rays of light from a luminous object strike the cornea and converge from it to pass through the aqueous humor. The outer rays are shut off by the iris, but the central rays pass through the pupil to the crystalline lens, which, owing to its high refractive power, greatly converges them. Passing on through the vitreous humor, the rays are brought to a focus on the sensitive retina, forming an inverted but otherwise exact image of the object. By the stimulation of nerve elements in the retina, an impression of the object is transmitted by the optic nerve to the brain. Thus the sensation of sight is produced.

When the eyeball is too short or too long, the image is formed either in front or behind the retina. If in front, the defect is known as nearsightedness or *myopia*; if behind, farsightedness or *hypermetropia*. The use of concave lenses overcomes myopia, while convex lenses correct farsightedness. Sometimes the cornea or crystalline lens may be more strongly curved in one direction than in another. In such case a part of an object will appear distinct and another part blurred, because of the imperfect focusing of the light rays. This defect of vision, called *astigmatism*, may be remedied by the use of proper glasses.

Fauces. The opening at the back of the mouth, leading to the throat cavity, or pharynx. Above, it is bounded by the soft palate and uvula; below, by the root of the tongue; and, on the sides, by muscular ridges called the *pillars of the fauces*. Each of these pillars divides below, and in the depression between the two divisions lies a tonsil.

Gall Bladder. A pear-shaped membranous sac, about four inches in length, situated on the underside of the liver, beneath its right lobe. The gall bladder serves as a reservoir for the bile secreted by the liver. It constantly discharges its contents into the small intestine (duodenum) through the bile duct when digestion is going on, but accumulates and stores bile during the periods when no food is being digested.

Gastric Juice. The powerful digestive fluid secreted by the glands of the stomach. It is a thin, colorless liquid, with an acid reaction. This is due to hydrochloric acid, of which, during digestion, about 0.3 per cent is present. The gastric juice contains also small amounts of mineral salts, principally the chlorides of sodium, potassium, and calcium. Besides, there are several enzymes, the chief of which is pepsin. It is estimated that the stomach of a healthy adult secretes daily about eight pints of gastric juice.

The great importance of the gastric juice is due to its action upon the protein elements in food. In combination with hydrochloric acid, pepsin converts the proteins in meat, milk, eggs, beans, and other nitrogenous protein-bearing foods into proteoses, forming also smaller quantities of peptones and acid albumins. In these changed forms, the protein food elements are ready for the final stage of digestion. They are finally broken up into their constituent amino acids and, as such, are absorbed by the lacteals of the small intestine.

Gastric juice is an effective antiseptic. The hydrochloric acid present destroys nearly all of the disease germs and other micro-organisms swallowed with the food. Upon starch, gastric juice has no effect, but it changes sucrose into glucose and fructose. Owing to the action of the fat-splitting enzyme, called lipase, the gastric juice transforms a small amount of fat into glycerol and fatty acids. The rennet enzyme, rennin, in gastric juice, curdles milk. In this process, the caseinogen of the milk coagulates, forming casein. The casein thus produced is then digested in the same manner as other proteins. See *Chyme, Digestion, Stomach.*

Hair. An appendage of the skin, distinctive of all animals higher than birds, including man. Hair is produced on almost all parts of the human body, attaining its greatest growth on the scalp. Each hair is a long filament of epidermis which grows continuously from a small, bulbous *root* seated at the bottom of a *hair follicle* in the skin. At the base of each is a *papilla* which forms the hair. If the papilla is destroyed, a new hair will not be formed.

The portion of a hair buried in the skin is called the *root*; this is succeeded by the *shaft* or *stem*, which, in uncut hair, tapers to a *point*. The shaft of a hair is covered by a very thin layer of overlapping scales forming the *hair-cuticle*. Beneath the hair-cuticle is the *cortex*, consisting of greatly elongated cells united into fibers. In the center of the shaft in many hairs there is a *medulla*, made up of rounded cells.

The color of the hair depends mainly upon pigment cells in the cortex, or fibrous layer. All hairs contain some air cavities, particularly in the medulla. In white hairs air cavities are very abundant, causing the whiteness by reflecting all the light. Slender muscle fibers run down from the true skin to the side of the hair follicles, which are usually implanted obliquely, so that most hairs lie down on the body. These muscles are so fixed that, when they contract, they will erect the hair, causing it to bristle, for example, as in an angry cat, or sometimes in case of a greatly terrified man. Connected with each hair follicle are commonly two *sebaceous glands* that secrete an oily substance, or *sebum*, which lubricates both the skin and the hair.

If the hair follicle or root of the hair be destroyed, there is no way of reproducing the hair; but if the hair falls, leaving the root intact, as is the case after certain fevers, the hair grows again. In health each hair lasts only a certain length of time, and is replaced by another, so long as the papilla is not weakened. See *Nails*, *Skin*.

Heart. The living force pump which propels the blood through the blood vessels and maintains circulation throughout the body. It is a muscular organ, about the size of one's fist, lying somewhat obliquely between the lungs in the center of the chest cavity. In shape it is somewhat pearlike or conelike, with its broad end or base in the direction of the right shoulder and its narrow end or apex pointing downward and to the left. From base to apex the heart of an adult measures approximately 5½ inches, and across its broad basal surface, 3½ inches. In men its weight is usually about 11 ounces; in women, 9 ounces.

The heart is surrounded by a sac called the *pericardium*. This secretes a lubricating fluid which prevents friction. The walls of the heart are formed of thick, muscular tissue composed of interlacing fibers, and are nourished through blood vessels which are termed *coronary*. The heart is divided in the middle by a strong lengthwise partition. Each half is divided by a transverse partition into an upper and a lower cavity. The two cavities in the broad basal portion are the *right* and *left auricles*, and the two in the narrower apex are the *right* and *left ventricles*.

In the right auricle there are four openings, two of the *venæ cavæ*, or great veins, one of the coronary vein, and one an opening into the right ventricle. In the left auricle there are five openings, one into the left ventricle, and four into the pulmonary veins. Each ventricle has two openings, one from the auricle, and another into the outgoing artery. The ventricles are supplied with valves. Those at the arterial openings are called *semilunar*; those between the right auricle and the right ventricle, *tricuspid*; and those between the left auricle and the left ventricle, *mitral* or *bicuspid*.

In reality, the heart is a double organ, pumping two different blood streams and maintaining two separate circulations at the same time,—a lesser one in the lungs, *pulmonary circulation*, and a much greater one in the body, *systemic circulation*. The blood is pumped to the lungs by the right ventricle through the pulmonary artery, and to the body by the left ventricle through the aorta. While all four cavities of the heart have muscular walls, those of the ventricles, which do the hardest work, are much stronger than those of the auricles. Furthermore, the walls of the left ventricle, which pumps blood to the entire body, are about three times as thick as those of the right ventricle, which pumps blood only to the lungs.

Throughout life, the heart works ceaselessly day and night, resting only between its strokes or "beats." In infancy it beats about 120 times per minute; at the age of seven, about 90 times, and in adult life, usually between 70 and 80 times, with an average of about 72. The alternate contraction (*systole*) and dilatation (*diastole*) of the heart are entirely involuntary, depending for control upon nerve centers in the medulla oblongata and the sympathetic nervous system. See *Circulation*, *Circulatory System*.

Intestines. The bowels, or tubular portion of the alimentary canal, which occupy the greater part of the abdominal cavity, extending from the lower end of the stomach to the anus. In man the intestines are from five to six times the length of the body, and consist of the *small intestine*, about twenty feet long, comprising the *duodenum*, *jejunum*, and *ileum*, and the *large intestine*, about five feet long, comprising the *cæcum*, *colon*, and *rectum*. Like the stomach, the walls of the intestine are composed of four coats: a *serous*, a *muscular*, a *submucous*, and a *mucous* coat.

Through most of its length the mucous coat of the small intestine is raised into folds, called *valvæ conniventes*, which greatly increase its absorbing and secreting surface. The mucous coat of the small intestine is everywhere covered by innumerable, minute, finger-like projections from 1/60 to 1/8 of an inch in length, called *villi*. These contain blood vessels and lacteals, by which the nutritious digested portion of the food is absorbed. Between the bases of the villi, small glands, called the *crypts of Lieberkühn*, open upon the inner surface. These glands secrete a digestive fluid called the intestinal juice. The muscular coat of the small intestine consists of two layers of muscular tissue, of which the inner is circular, and the outer longitudinal. By their contractions, these muscles mix the food with the digestive fluids and force it to move along the tube. Food remains in the small intestine from five to fifteen hours.

The *large intestine* forms the last portion of the alimentary canal. It is from one and one-half to two and one-half inches in diameter, has two muscular layers, like the small intestine, but the inner mucous coat, while containing numerous glands, has no villi or valvæ conniventes. The small intestine opens into the large intestine by means of the *ileocæcal valve*, which permits matter to pass into the colon but not back into the ileum. The opening of the small intestine into the large intestine is on the side of the colon at some distance from the end. The portion of the colon below the opening is called the *cæcum*, from the end of which projects the *vermiform appendix*.

The small intestine receives food through the *pylorus*, the orifice at the lower end of the stomach. About four inches below the pylorus, it receives secretions from the liver and pancreas through the common bile duct. The intestines also receive secretions from glands within their walls. The function of the intestines is to complete the digestion of food begun by the stomach, through the action of the various secretions, so that it can be taken up by the blood vessels and lacteals in the villi of the small intestine and passed on to the blood. The large intestine is also an organ of excretion. See *Alimentary Canal*, *Digestion*.

Joints. The chief kinds of joints are: *ball and socket*, as in the hips and shoulders, a powerful joint adapted for great ease of motion; *hinge*, as in the knee; *pivot*, as in the upper two vertebræ, permitting the skull to turn to the right or the left; and *gliding*, as in the closely packed bones of the wrists and ankles. Most bones are enlarged at the ends forming the joints, which are held firmly together by strong ligaments. These enlarged ends of bones which move upon each other are covered

with rubber-like pads of very smooth cartilage, and the whole is moistened or lubricated with the *synovial fluid*, secreted by the *synovial membrane*, which lines the joints. The mechanism of the various joints is remarkably perfect, and upon it depend all the wonderful powers of movement displayed by the human body. There are also immovable joints, such as the skull *sutures* and the *symphyses* of the pelvic bones and the sacrum.

Kidneys. Two large, glandular bodies situated within the abdomen on either side of the spine, in what is commonly known as "the small of the back." In an adult they are usually from four to five inches long, about two and one-half inches broad, and about one inch thick; and each kidney weighs from four to six ounces. In shape they resemble kidney beans. Each is supplied with blood from the aorta by a *renal* artery. From each kidney issues a membranous tube, or ureter, about the size of a goose quill and eighteen inches long. The ureters run down the back wall of the abdomen behind the peritoneum, and empty the urinary secretion into the bladder, one ureter on either side.

The body of the kidney is composed of two structures, an outer *cortical* portion, and an inner *medullary* portion. The latter is made up of fibrous pyramids or cones with their bases resting upon the cortical layer and their points emptying into the central cavity, which is an expansion of the upper portion of the ureter. The kidneys are the organs of urinary secretion. Their function is to remove urea, uric acid, and other harmful or useless substances from the blood. The serious and often fatal malady, called Bright's disease, is an affection of the kidneys.

Ligaments. Bands of strong tissue connecting and covering the bones forming a joint, or holding any other organ of the body in place. Ligaments are usually composed of parallel or interlacing fibers of flexible, dense, white, fibrous tissue.

Liver. The largest gland in the body, usually weighing somewhat more than three pounds, situated just beneath the diaphragm under the short ribs, rather more on the right than on the left side.

The liver is dark reddish brown in color and of soft glandular texture. In form it is irregular, being convex and smooth above, where it is in contact with the diaphragm, and irregularly concave below. It is thick behind but ends in a thin edge in front, and is somewhat divided into two upper lobes,—a much larger right lobe and a much smaller left lobe. From each half of the organ a duct passes out and unites to form the *hepatic duct*. On the underside of the right lobe is the *gall bladder*, which serves as a reservoir for the bile, and empties through the common bile duct into the small intestine. The glandular structure of the liver is composed of an immense number of minute lobules, each consisting of *hepatic cells*.

The chief function of the liver is the secretion of bile, which performs important work in digestion. The liver also removes the excess of sugar from the blood and stores it up in the form of *glycogen*, a kind of animal starch. The hepatic cells give out glycogen again as sugar whenever the blood needs it. The hepatic cells also destroy old red corpuscles, probably changing them into urea which is excreted by the kidneys.

The liver is well furnished with blood vessels, including the *hepatic artery*, *hepatic veins*, and the *portal vein*. Two kinds of blood are received by the liver,—arterial, for the nourishment of the gland, and venous, from which bile is chiefly formed. See *Digestion*, *Gall Bladder*.

Lungs. The breathing organs of man and the higher animals. The essential idea of a lung is that of a sac communicating with the atmosphere by means of a tube, the trachea or windpipe, through which air is admitted to the internal parts of its structure, the air serving to supply oxygen to the blood and to remove carbon dioxide.

The lungs are situated one on each side of the heart; the upper part of each fits into the upper corner of the chest, about an inch above the collar bone, while the base of each rests upon the diaphragm. The right lung is shorter and broader than the left, which extends downward farther by the breadth of a rib.

Each lung exhibits a broad division into *two* lobes, an upper and a lower portion, the division being marked by a deep cleft which runs downward obliquely to the front of the organ. In the case of the right lung, however, there is a further partial division at right angles to the main cleft. Hence, while the left lung is always said to have two lobes, the right lung is sometimes said to have *three* lobes. These lobes again are divided into lobules which measure from one-fourth to one-half inch in diameter, and consist of air cells, blood vessels, nerves, lymphatic vessels, and the tissue by which the lobules themselves are bound together.

The trachea, or windpipe, connects the throat cavity with the lungs. At its lower end it divides inside the chest cavity into a right and a left *bronchus*, or *bronchial tube*. Each bronchus enters a lung and there branches into finer and finer tubes, called *bronchioles*, which at last open into minute globular or cup-shaped air sacs. The walls of these sacs consist of thin, elastic connective tissue, through which run small capillary blood vessels connected with the pulmonary arteries and veins. Impure or venous blood is brought into contact with the air through the exceedingly thin walls of the air cells, and is transformed into pure or arterial blood. The total extent of air-absorbing surface presented by the air cells is estimated at upward of 2500 square feet.

In man and the higher animals the lungs are freely suspended in the cavity of the chest, or *thorax*, which is completely separated from the abdominal cavity by the muscular diaphragm, or midriff. Both lungs are covered with a delicate membrane, called the *visceral pleura*. The chest cavity is lined with the *parietal pleura*. The painful disease known as *pleurisy* arises from inflammation of these membranes.

The elasticity of the lungs, by which they expand and take in air and contract and expel air, is due to the highly contractile tissues found in the bronchial tubes and air cells. This elasticity is further aided by the delicate surface tissue or pleura. The lungs are popularly termed "lights," because they are the lightest organs in the body, and, except when diseased, float when placed in water. See *Respiration*.

Lymphatics. The system of vessels, glands, and ducts which absorbs digested fat from the intestines and transfers it to the blood, and also removes various waste or harmful substances from the tissues and the blood.

The *lymphatic vessels* are minute, delicate, transparent structures, found in almost every tissue of the body, being absent only from the brain, spinal cord, eyeball, cartilages, and a few other tissues. The larger lymphatic vessels, which are provided with numerous valves, somewhat resemble the veins in structure.

The *lymphatic glands*, which are about the size of small almonds, are commonly arranged in groups along the trunks of the larger lymphatic vessels. Each gland is composed of a spongy network of fiber filled with cells which are known as *lymphocytes*. These glands are most numerous in certain regions of the body, as, for example, the armpit, the neck, and the groin.

In case poisons, disease germs, or other irritating substances are forced into the system, the lymphatic glands situated between the point of entrance and the vital organs of the body absorb the foreign substance into their cells. These often become

greatly inflamed and sometimes even suppurate, thereby expelling the injurious material. The lymphatic glands thus act as guardians of the body. On this account they are peculiarly liable to attack in infectious diseases. The lymphatic glands also help to produce white blood corpuscles.

The lymphatics of the small intestine are usually called *lacteals*. Their function is to convey the digested fat, or chyle absorbed from the intestine, to a central vessel, the *receptaculum chyli*, an elongated pouch which lies along the spinal column. From this receptacle, the lymph elaborated by the lymphatic glands goes upward through the *thoracic duct*. This vessel, which has about the diameter of a goose quill, proceeds along the aorta, finally emptying near the base of the neck into the large subclavian vein.

The *lymph*, produced in the lymphatic glands and vessels, is a colorless or slightly yellowish red fluid, with a salty taste, closely resembling the plasma of the blood. The lymph has two important uses. First, it conveys from the tissues to the venous blood various waste matters to be excreted later by the lungs, skin, and kidneys. Second, the lymph brings to the blood new materials for its upbuilding. Sometimes lymph collects in the lymph spaces faster than it can be removed. This causes the uniform swelling called dropsy. See *Blood*, *Digestion*, *Nutrition*.

Mouth. The mouth cavity, the beginning of the alimentary canal, is bounded in front by the lips and cheeks, above by the hard and soft palates and the uvula, and below by the tongue. At the back it opens into the throat through the fauces. The mouth and its accessory organs,—the tongue, lips, teeth, and salivary glands,—perform very important functions in the mastication of food and the articulation of speech. In the tongue are situated the organs of taste. See *Salivary Glands*, *Teeth*, *Tongue*.

Muscles. In the human body there are more than 500 muscles, varying in length from a small fraction of an inch to two feet. These cover the skeleton almost entirely and make up nearly all the fleshy parts of the body.

Forms of Muscles.—Muscles are usually rounded in form, but some are flat, particularly those which form the walls of body cavities. Most muscles consist of a soft, red, middle part or belly, tapering toward each end into whitish, fibrous tendons which serve to attach them to the various bones upon which they act. Among the numerous forms of muscles are: *simple*, tapering toward each end; *biceps*, or two-headed, divided at one end; *triceps*, three-headed, as at the back of the upper arm; *digastric*, where a tendon occurs in the middle as well as at each end; and *polygastric*, where there are several portions separated by short tendons, as in some abdominal muscles.

Kinds of Muscles.—There are three distinct kinds of muscles,—striated, nonstriated, and heart muscles. Voluntary muscles act chiefly under the control of the will and are usually called *striated*, from the fine lines or striations on their fibers. Involuntary muscles, or organic muscles, which act independently of the will, such as the muscles of the stomach, are called also *nonstriated* or *smooth*, because their fibers do not show the markings which characterize the striated muscles.

The voluntary muscles are usually attached to the skeleton, and are capable of very rapid action. Involuntary muscles are not directly attached to the skeleton, and are not involved in the ordinary movements of the body. They act with comparative slowness and mostly without our knowledge or consciousness. They occur chiefly in the walls of hollow organs, as the stomach, intestines, and arteries. The muscles of the heart are intermediate between the striated and nonstriated types, so that relatively rapid action is possible.

Structure of Muscles.—Muscles are composed of contractile tissue made up of true muscle cells, connective tissue, and blood and lymph vessels which bring in nourishment and carry off waste material, together with the nerves which control their activities. The striated voluntary muscle cells occur in bundles. These are made up of the fiber-like cells which are about an inch long and $\frac{1}{500}$ of an inch in diameter. The nonstriated involuntary or smooth muscle cells are very much smaller, being usually less than $\frac{1}{100}$ of an inch long and $\frac{1}{4000}$ of an inch in diameter. They are not arranged in bundles but consist of masses of single spindle-shaped cells held together by a cement-like substance and connective tissue. They have no tendons and are controlled by nerve centers not under direct control of the will. Muscles consist of 75 per cent or more of water and salts. The remainder is true organic matter, chiefly of a protein or an albuminous character.

Uses of Muscles.—The primary function of muscles is to produce motion. By their power of contractility, muscles cause the bones to move upon each other at the joints, thus producing bodily movements. The muscles protect various bones and assist in holding them together at the joints. Muscles also enclose various body cavities, as the mouth and abdomen.

The muscles perform work and enable the various organs of the body to carry on their activities. The central portion, or belly, is the working part of a muscle. When stimulated by nerves under the control of the brain or spinal cord, the muscular tissue in the central portion contracts, growing larger in the middle and shorter at the ends. As a result, the muscle transmits a *pull* through its tendons upon the parts to which they are attached.

This contraction, or use of muscular force, is accompanied by a waste or change in the substance of the muscle itself. The minute muscular fibers or the cells composing them make up the loss by taking the proper material or food from the blood. But, when the contractions are too frequent, severe, or prolonged, the waste becomes much greater than the supply. The muscle then grows tired and is said to be *fatigued*.

Extreme fatigue is dangerous because in time it may destroy the power of the muscle cells to repair waste. On the other hand, the disuse of a muscle causes it to become weak and flabby and, in time, to lose the power of repairing itself. When muscles at work under normal strain are allowed short periods of rest, they very quickly recover from fatigue. See *Joints*, *Tendons*.

Nails. Outgrowths of the cuticle, or outer layer of the skin, specially modified to protect the sensitive ends of the toes and fingers. Each nail is a flattened, horny plate, the base of which, called the *root*, fits behind into a furrow of the dermis, or true skin. The visible part of a nail consists of a *body* fixed to the dermis beneath, and of a *free edge*. Near the root of the nail is a small whiter area called the *lunula*. The portion of the true skin on which the nail is developed is called the *matrix*. By new cells added on at the root, a nail grows in length, and by new cells added to its lower surface, it grows in thickness, so that a nail is thickest at its outer end. If all parts of a nail except the matrix be destroyed, a new nail will grow again. In chemical composition, nails are identical with the cuticle, or outer layer of the skin. See *Hair*, *Skin*.

Nervous System. The nervous system is concerned with the functions of sensation, motion, and volition, and through it all actions, whether voluntary or involuntary, are controlled. It consists of three parts: *central nervous system*, including the brain and spinal cord; *nerves*, extending from the central system to all parts of the body; and *sympathetic nervous system*, consisting of bunches of cells, chiefly in the body cavity, and their nerves supplying the glands and involuntary muscles.

Brain.—The part of the nervous system located within the skull. It is composed of three principal

parts: the *cerebrum* or brain proper; the *cerebellum*, or little brain; and the *medulla oblongata*, the stem or bulb joining the higher parts of the brain to the spinal cord. The cerebrum is composed of two hemispheres connected with each other by nerve fibers. Broadly speaking, the cerebrum is made up of gray matter containing cells in groups forming centers for thought, action, or sensation, and white matter containing nerve strands acting as lines of communication. It is the seat of the mind. The cerebellum regulates and co-ordinates muscular movement. The medulla oblongata is the center which controls the respiratory and circulatory organs. If it is destroyed, death rapidly follows.

Spinal Cord.—That part of the nervous system which is fastened in the canal of the spinal column, composed of white matter outside and gray matter inside. The cells of gray matter send off long processes to help form the nerves of the arms and legs. It is the path of communication between the brain and the nerves of the arms, legs, and trunk. The spinal cord is also the seat of many muscular movements necessary in routine work.

Nerves.—As usually classified, there are twelve pairs of *cranial nerves* springing from the brain, and thirty-one pairs of *spinal nerves* arising from the spinal cord. The branches from these primary nerves reach all parts of the body. In addition to the cranial and spinal nerves, there is the *sympathetic nervous system.*

Each nerve is made up of a bundle of nerve fibers surrounded by sheaths of connective tissue. Each nerve fiber connects a central nerve cell with a peripheral end-organ. The distinguishing characteristic of a nerve cell is its irritability; that of a nerve fiber is its faculty of transmitting nervous energy at the rate of about 100 feet per second. While in many respects this nerve energy resembles electricity, it is far from being identical with that force. Each spinal nerve is from two roots, one containing *motor* and the other *sensory* fibers. The motor nerves dispatch impulses which produce contractions of the muscles. The sensory nerves transmit sensory impressions.

Sympathetic Nervous System.—This consists of a double chain of ganglia, lying on each side of the vertebræ, and nerves connecting these to the internal organs and the central nervous system. It controls the involuntary muscles in all parts of the body; for instance, it governs the heartbeat and the movements of the intestines. See *Brain.*

Nose. An organ connected with the respiratory system, and the seat of the sense of smell. Externally, the prominent part of the nose, which gives character to the features, is composed of several cartilages connected to the nasal bones and to each other by strong fibrous tissue. This is sufficiently firm to preserve the shape of the nose, and yet so elastic and flexible as to permit the expansion and contraction of the nostril during breathing. Internally, the nose consists of two large cavities, or *nostrils*, formed by the nasal cartilages and the bones of the face, and separated from each other by a perpendicular flat partition, known as the *septum.* At the rear the nostrils open into the nasal passages which lead back to the throat.

Various cavities in the bones of the face are connected with the nostrils and nasal passages by small openings, among which are the *frontal sinuses*, the *antrum*, and various *ethmoid* and *sphenoid* cells. The nose not only contains in its upper mucous membranes the sense organs of smell, but serves also to clean, warm, and moisten the air during its passage to the lungs, and has an important influence on the quality and character of the voice.

Nutrition. The process whereby the body takes, changes, and uses the substances necessary to maintain life and growth. In nutrition the final appropriation of food material takes place in the individual cells of the various tissues. The cell has the power, not only of attracting materials from the blood, but also of causing them to assume its own structure and properties. Besides this power of *assimilation*, the cell has the power of discarding the waste matter produced by its own vital activity.

In order that nutrition may proceed properly, the blood must be normal in composition and amount; it must circulate with suitable rapidity; there must be the right nervous stimulation and control; and the tissue or organ to be nourished must be able to use the materials brought to it by the blood. Further, it is necessary that the food supply should consist of the proper elements. In order to maintain normal nutrition, food must contain proteins, fats, carbohydrates, mineral matter, and water in the proper proportions. Further, it must contain the right amount and kind of *vitamines.* In other words, what is known as a *mixed diet* is required. See *Assimilation, Digestion, Vitamines.*

Pancreas. A glandular organ of a pinkish yellow color, in lower animals commonly called *sweetbread*, lying along the great curvature of the stomach. In man the pancreas is of an irregular, elongated form, from six to eight inches long, an inch and a half broad, and from half an inch to an inch thick. In structure it somewhat resembles the salivary glands. It secretes a watery looking fluid called the *pancreatic juice*, of great importance in digestion. In an adult the amount of pancreatic juice secreted daily is from five to seven ounces. It is discharged by a duct emptying into the small intestine through the common bile duct. The pancreatic secretion changes starch into glucose, a form of sugar; dissolves proteins, converting them into peptones, and breaks up and emulsifies fats so that the lacteal vessels in the intestines can absorb them. Diabetes, a disease characterized by sugar in the blood, is caused by a destruction of certain groups of cells in the pancreas.

Parathyroids. Small, ductless, glandular bodies, usually four in number, situated near or embedded in the substance of the thyroid. Although connected with the thyroid anatomically, they have different functions, and may be thought of as acting as a neuromuscular balance wheel, or control. They have also antitoxic functions, and serve to neutralize poisonous substances in the body. If the parathyroids are removed or are destroyed by disease, tetany (muscular spasms) results. See *Ductless Glands, Secretion, Thyroid.*

Parotid Glands. Two soft bodies situated, one on each side, in front of the lower portion of the ear, just above the angle of the jaw. The function of these glands is to secrete *saliva*, which affords the necessary moisture to the mouth, assists in the mastication of food, and digests starch, changing it into maltose, a form of sugar. The saliva is conveyed to the mouth through the *salivary ducts*, which open, one opposite each second molar tooth in the upper jaw. The disease known as mumps (*parotitis*) is an inflammation of the parotid glands. See *Salivary Glands.*

Pelvis. A somewhat basin-shaped bony structure situated at the base of the spinal column so as to transmit the weight of the body to the bones of the legs. It consists of an irregular girdle composed of three bones; namely, the two hip bones, or innominate bones (*ossa innominata*), which form its sides and front, and the sacrum. The coccyx consists of vestigial bones attached to the sacrum.

Each innominate bone is made up of three portions, separate in early life but firmly united in adults, called the *ilium*, the *ischium*, and the *pubis* or pubic bone (*os pubis*). These meet and form the cup-shaped cavity called the *acetabulum*, or socket of the hip joint, in which the head of the thigh bone (*femur*) rests. The ilium is the broad upper expanded portion, in shape somewhat resembling the blade of a screw propeller. This forms the prominence of the hips, and is joined behind to the

sacrum. The ischium is the lowest and strongest portion. When the body is in a sitting position, its weight rests principally upon the ischium. From the inner side of each acetabulum a pubic bone runs horizontally inward and then downward and forward to meet the corresponding pubic bone from the opposite side. The union of these bones forms the *pubic arch*, or frontal portion of the bony girdle of the pelvis.

The cavity formed by the pelvic bones is shallow in front, only about 2 inches in depth, and deepest behind, about 5 inches. The *pelvic cavity* is divided into a *true* and a *false* pelvis. The false pelvis comprises the expanded portion bounded on the sides by the flattened hip bones. It lies above a line drawn through the crests of the pubic bones in front to the top of the sacrum behind. This broad, shallow false pelvis serves largely to support the weight of the intestines above it. The true pelvis lies below a line drawn through the crest of the pubic arch and the top of the sacrum. It contains the rectum, the bladder, and other organs. See *Abdomen, Thorax.*

Perspiration. The perspirable fluid, or *sweat*, is excreted from the blood by means of the *sudoriferous* or *sweat glands* of the skin, of which about two and one-half millions are distributed over the body. It is a colorless fluid, consisting of water, over 99 per cent, and small amounts of urea, common salt, and other salts. This excretion exerts a very important influence on the health. A sudden check or prolonged retention of perspiration produces serious derangements. Its principal uses are to moisten the skin, to regulate the temperature of the body, and to remove waste, poisons, or irritating material from the system.

A portion of the fluid evaporates as rapidly as it is secreted. This is called *insensible* perspiration. When a part of the secretion accumulates in drops, it is called *sensible* perspiration. The amount of perspiration normally discharged by a healthy person varies from about 1½ to 5 pints per day, increasing with exercise and high temperature. The evaporation of large quantities of perspiration from the skin during warm weather greatly aids in keeping the body cool. See *Excretion.*

Pineal (*pĭn'ē-ăl*) **Body.** An upward and forward outgrowth of the mid-brain, called also epiphysis, conarium, and pineal gland. It is a small, ovoid, reddish gray organ about one-fourth of an inch long. Its exact function in the human body is not known. Some researches seem to indicate that the pineal body is a gland, or, at least, has an internal secretion which is believed to influence physical and mental growth during early life. In all vertebrate animals possessing a skull the pineal body is present. Comparative anatomists have shown that the pineal body in man corresponds to the third eye possessed by some reptiles, and hence may be regarded as a vestigial organ. The ancients had a grotesque theory that the pineal body was the abiding place of the human soul. This view was shared also by some of the modern Cartesian philosophers. See *Ductless Glands, Secretion.*

Pituitary (*pĭ-tū'ĭ-tā-rĭ*) **Body.** A small, oval, reddish gray body attached to the infundibulum of the brain, called also the hypophysis of the brain or pituitary gland. It occupies the sella turcica, a depression in the middle line of the anterior surface of the sphenoid bone. In size the pituitary body averages about one-half inch in length and in width, and one-third of an inch in thickness. It weighs somewhat less than one-half ounce.

While its function is not fully understood, the pituitary body is now regarded as a ductless gland producing an internal secretion which influences the growth of certain organs and tissues, especially connective tissue and bone. It is believed that the pituitary and the thyroid gland have a somewhat reciprocal or complementary relation. When the thyroid is impaired, enlargement of the pituitary is observed. Destruction or disease of the pituitary usually accompanies acromegaly, a peculiar nervous disease characterized by a gradual enlargement of the head, chest, hands, and feet. Complete removal of the pituitary body speedily results in cachexia and death.

Respiration. The act of breathing. In its broadest sense, respiration is the taking of oxygen to all cells of the body and the giving off of carbon dioxide. The essential organs are the lungs, but the accessory or helping organs include the nose, throat, trachea, ribs, diaphragm, and various tissues and muscles.

Respiration is both a mechanical and a chemical process. The mechanical process consists of *inspiration* and *expiration*, or the taking in and the forcing out of air. The action of the organs of respiration in forcing air in and out of the lungs is similar to that of a bellows. The muscles of the chest and of the abdomen, by simultaneously elevating the ribs and depressing the diaphragm, enlarge the cavity occupied by the lungs. In consequence, the air, by reason of its own natural pressure, rushes in to fill the extra space, thereby equalizing the air pressure inside and outside of the lungs. This completes the act of inspiration.

In expiration the muscles of the chest and the abdomen reverse their action. By depressing the ribs and elevating the diaphragm, the cavity of the chest is made smaller, and the surplus air is expelled through the passages by which it entered. At all times the lungs, which are composed of highly elastic tissue, completely fill the chest cavity, swelling like a rubber balloon when it enlarges, and diminishing in size when it contracts.

In normal breathing, the air, after being moistened and warmed nearly to the bodily temperature in passing through the nose and throat, enters the lungs through the windpipe or trachea. Thence the air passes into the bronchial tubes, which divide and subdivide until they finally reach the individual air cells, whose walls are enmeshed in a fine network of blood vessels. Here the chemical process of respiration takes place. A part of the oxygen of the incoming air diffuses through the very thin walls of the capillaries and is absorbed by the red corpuscles of the blood. At the same time, carbon dioxide, water vapor, and various impurities in the blood diffuse through the walls of the capillaries into the air cells and are expelled from the body with the exhaled air.

Respiration thus includes both breathing and oxidation. Oxidation is the chemical union of oxygen and any other substance. It occurs in all the cells of the body. When the oxygen in the blood reaches the cells, it combines chemically with the protoplasm, and heat and energy are produced. As a result of this union, carbon dioxide, water, and urea are formed. These eventually enter the blood and are carried by it to the different excretory organs to be given off from the body.

From 20 to 30 cubic inches of air are normally changed with each act of breathing. This amount, however, is always increased by physical exertion. But, at no time, is all of the air in the lungs changed at a single breath. While about 100 cubic inches above the normal 20 or 30 inches may be drawn in or expelled by forced breathing, there remains in any case about 100 cubic inches of *residual* air. Nearly 400 cubic feet of air pass through the lungs of an adult each day, but this quantity can be doubled by prolonged muscular exertion.

In health, respiration is easy, gentle, regular, and without noise. The act of breathing proceeds unconsciously, except when one voluntarily tries to inhale or to expel more or less than the normal or usual quantities of air. The rate of respiration during the first year of infancy is about 35 per minute, during the second year about 25, during adolescence about 20, and in adult life about 18.

The function of respiration is absolutely essential to life. All higher animals, including man, quickly perish if the supply of air to the lungs is cut off. The vigor of the system is soon impaired if the air is contaminated by smoke, noxious gases, or by overcrowding in heated rooms. Abundance of fresh air, good ventilation, and correct habits of breathing are necessary conditions of health for persons of all ages. See *Lungs*.

Salivary Glands. The glands which secrete the saliva, or watery fluid which moistens the food in the mouth and performs an important part in digestion. There are three pairs of salivary glands: the *parotid*, lying in front of each ear behind the lower jaw; the *submaxillary*, lying between the halves of the lower jawbone; and the *sublingual*, lying under the tongue. Each gland is provided with one or more ducts discharging into the mouth cavity. Saliva contains a digestive ferment, called *ptyalin*, which turns starch into sugar. See *Parotid Glands, Secretion*.

Secretion. The process of forming, through the action of certain cells, membranes, and glands, various substances to perform special functions in the body, as, for example, the *gastric juice* secreted by the glands of the stomach to aid in digestion. Among important secretions are: *saliva*, secreted by the salivary glands; *bile*, secreted by the liver; *pancreatic juice*, by the pancreas; *serous fluid*, by the serous membranes; *mucus*, by the mucous membranes; *synovial fluid*, by the synovial membranes; and *sebum*, by the sebaceous or oil glands of the skin. See *Bile, Ductless Glands, Liver, Pancreas, Parotid Glands, Salivary Glands, Thyroid*.

Skeletal System. The human skeleton consists of *bone*, *cartilage*, and *connective tissue*. There are slightly more than 200 separate bones. The actual number, however, varies at different periods of life. Many bones which are separate in youth grow together in advanced age. The bones make up the framework of the body, provide levers and points of attachment for the muscles, and, by surrounding cavities, furnish protection for delicate organs, such as the brain, spinal cord, heart, and lungs.

Cartilage is found at the ends of bones, forming elastic pads or shock-absorbing cushions for the joints. It sometimes serves in the place of bone, as at the outer ends of the ribs. *Connective tissue* occurs in the form of *ligaments* which serve as stout cords binding bones together, as *tendons* which attach muscles to bones, and as *periosteum* which protects and assists in nourishing bones. *Articulations* are the points where bones meet, or are joined together, in the body. *Joints* are forms of articulations which permit considerable freedom of movement.

Skeleton. The bony skeleton is made up of two chief divisions, the *axial skeleton* and the *appendicular skeleton*. The axial skeleton, which supports the head, neck, and trunk, consists of the skull, the hyoid bone, which attaches the tongue to the skull, the vertebral column, ribs, and sternum, or breastbone. The appendicular skeleton, which supports the legs and arms and attaches them to the trunk, consists of the pectoral girdle, the pelvic girdle, and the bones of the arms and legs.

Axial Skeleton.—The skull is composed of 28 bones as follows: *cranium* or brain box, 8; bones of the face, 14; bones of the inner ear, 6. The *hyoid bone*, to which the tongue is attached, is suspended from the skull by ligaments. The *vertebral column*, or backbone, consists of 24 vertebræ, of which 7 are cervical (neck), 12 dorsal (chest), and 5 lumbar ("small of the back"). Below the separate vertebræ are the *sacrum* and the *coccyx* consisting, in adults, of one bone each, but, in children, of 5 and 4 bones respectively. There are 24 ribs, 12 on each side, of which 7 are joined to the sternum in front, 3 are attached by cartilage, and 2 have free outer ends. The axial skeleton thus consists of 54 bones.

Appendicular Skeleton.—The pectoral arch, or shoulder girdle, consists of two bones, a *clavicle*, or collar bone, and a *scapula*, or shoulder blade, on each side. The two clavicles, or collar bones, lie one on each side of the sternum, their upper and outer ends being attached to the scapulas and their lower and inner ends to the sternum. The two scapulas, or shoulder blades, lie outside of the ribs on the back of the chest. The pelvic arch, or girdle, consists of three bones, namely the two hip bones and the sacrum.

Bones of the Arms.—There are 30 bones in each arm: *humerus*, extending from shoulder to elbow; *radius*, forearm bone, thumb side; *ulna*, the second forearm bone; 8 *carpal* bones, in the wrist; 5 *metacarpal*, in the palm of the hand; and 14 *phalanges*, two for the thumb and three for each finger.

Bones of the Legs.—There are 30 bones in each leg: *femur*, or thigh bone; *tibia*, lower leg, inside; *fibula*, lower leg, outside; *patella*, or kneecap; 7 *tarsal* bones, below the ankle joint; 5 *metatarsal*, in the front part of the sole; and 14 *phalanges*, 2 in the great toe, and 3 in each of the others. See *Pelvis, Skull, Spinal Column, Thorax*.

Skin. The strong, elastic integument which invests and surrounds the body, consisting of two fundamental layers, the *cuticle* or *epidermis*, the outer skin, and the *cutis* or *dermis*, the true skin.

The cuticle, or epidermis, is a thin layer of epithelial cells, varying somewhat in thickness in different parts of the body. It is without blood vessels and nerves and, therefore, is devoid of sensibility. It may be divided into two layers, a *superficial* and a *deep* layer. The superficial one is what is usually termed the epidermis. This is the so-called "dead skin" often rubbed off with the towel after bathing. The inner or deep layer lies on the true skin, and consists of softer, moister, and more rounded cells than the outer layer. This inner portion, sometimes called the *Malpighian* layer, or *rete mucosum*, is the seat of the coloring material or pigment of colored races, such as the Negro. Freckles result from the formation of coloring matter in spots or patches in this layer.

The cutis, or dermis, from about one-sixteenth to one-eighth of an inch in thickness, forms the much more complex lower layer of the skin. It consists of densely-interwoven fibrous tissues, and is abundantly supplied with blood vessels, lymphatics, glands, hair follicles, touch-papillæ, and nerves. This layer contains the *sudoriferous* or *sweat glands*, which pour out the perspiration, and also the *sebaceous glands*, which secrete oily matter, the use of which is to keep the skin and hair soft and flexible. The *papillæ* of the skin consist of small conical processes on the surface of the cutis. The central portion of each papilla contains a group of blood vessels and a nerve, and on the more sensitive parts of the skin minute touch organs are also present. Hair and nails are developed from special structures in the dermis.

The skin is one of the most varied and useful of the bodily structures. It protects the outer parts of the body, serves as an organ of excretion, regulates the bodily temperature by the evaporation of water, and is the seat of the sense of touch. See *Hair; Nails; Perspiration; Touch, Organs of*.

Skull. The skeleton or bony framework of the head in early adult life consists of 28 separate bones, in case the 6 small ossicles of the ear are included. In infancy and youth, however, the number is greater, and in old age it is less. Of these, 8 bones form the cranium, and 14, the face.

The bones of the *cranium* are arranged so as to enclose the brain and to protect the inner parts of the ear. They include the *frontal* bone, extending across the forehead; the *parietal* bones, one on each side, forming the lateral walls of the cranium or brain case; the *temporal* bones, one on each side, forming part of the wall of the cranium and containing the internal ear; and the *occipital*, behind

and at the base of which, through a circular opening, called the *foramen magnum*, the spinal cord and the vertebral arteries pass. The base or floor of the cranium, in front of the part formed by the occipital bone, is composed of two very irregularly shaped bones. These are the *sphenoid*, with wings extending upward to the parietal bones on each side, and the *ethmoid*, which occupies a central position between the orbits of the eyes at the root of the nose.

The bones of the *face* include two *nasal*, at the base of the nose: two *superior maxillary*, which form the upper jaw, bound the nasal cavity and the inner margin of the eye socket; two *lachrymal*, small bones taking part in the formation of the orbit; two *malar*, or cheek bones; two *pterygoids*, lying just back of the nasal cavity; the *vomer*, which divides the rear portion of the nasal cavity; two palatal processes of the maxillary, forming the *hard palate*; and the *inferior maxillary*, forming the lower jaw.

Except the inferior maxillary, all the bones of the skull are joined to one another by *sutures*, many of which become completely changed to bone and disappear in adult life. The upper cranial bones of a baby's skull do not normally unite until several months after birth, as is easily observed in the fontanels or "soft spots" on the top of the head. This condition permits the brain to grow rapidly. Imbecile children are often born with the fontanels closed, although the idiocy is not due to the union of the bones.

Smell, Organs of. The sense of smell resides in the mucous membrane that lines the upper parts of the cavity of the nose. From the underside of the *olfactory lobes*, or *bulbs*, lying on the skull floor, *olfactory nerves* arise and pass out through the roof of the nose. These ramify into finely divided branches throughout the olfactory portions of the mucous membrane. The function of the olfactory nerves is to carry to the brain the impulses which cause the sensation of smell.

Only a very minute quantity of a substance is required to affect the sense of smell. For example, a grain of musk will perfume a room for a long period without appreciably losing weight. To appreciate odors, that is to exercise the sense of smell, one must draw the air containing them through the nose, or sniff. If the air remains motionless in the nasal passages, usually but little smell will be noticed. The sense of smell is of great importance in detecting improper food and injurious impurities in the air.

Solar Plexus. An important plexus or center of the sympathetic nervous system, situated in the abdomen, behind the stomach and in front of the aorta. It contains several ganglia which distribute nerve fibers to the stomach, liver, kidneys, and intestines. If this nerve center is severely shocked, as by a heavy blow, temporary suspension of the vital functions, or even death, may ensue. Hence the origin of the expressions "to strike a solar plexus blow," and "to strike in the solar plexus."

Speech, Organs of. The larynx, a somewhat triangular box of cartilage, situated at the top of the windpipe, is the chief organ of the voice. It is composed of nine plates of cartilage, connected together by ligaments and moved by numerous muscles. The *vocal cords*, two narrow bands of dense, fibrous, and highly elastic tissue, are stretched between the thyroid and arytenoid cartilages. They lie in the pharynx so that only a narrow slit, the *glottis*, is left between them.

When air is forced through the glottis, the vocal cords vibrate, giving rise to sounds. The shorter the vocal cords, the higher the pitch of the voice. Children's voices are high-pitched and shrill, because the larynx is small. A woman's voice is usually higher than a man's for the same reason. At the age of sixteen or seventeen years, a boy's larynx grows rapidly and his voice becomes an octave deeper in tone.

Besides the larynx there are several accessory or helping organs for the production of speech, including the tongue, teeth, lips, and resonant cavities of the nose, together with the lungs and the chest muscles which force the air between the vocal cords. See *Nose*, *Teeth*, *Throat*, *Tongue*.

Spinal Column. The series of twenty-four bony structures, or vertebræ, comprising the spinal column, commonly called the *backbone*, is admirably adapted for its many uses. First, the column widens and increases in stability from the neck to the sacrum. Again, the column is bound together with a system of flexible ligaments which give it almost the strength of steel. Moreover, the column has four curves, imparting to it somewhat the shape of an elongated letter S. These add greatly to its springiness and prevent the transmission of shocks. Besides, there are elastic cushions of cartilage between the vertebræ, called *intervertebral disks*. These permit some movement between the vertebræ and aid in protecting the spinal cord.

Each vertebra or separate bone of the column consists of four parts: a *body*, a *neural arch*, a *neural ring*, and *bony processes* projecting from both the body and the arch. The succession of the neural rings forms the *neural tube* or *canal* which contains the spinal cord. Through openings leading into this canal, called *vertebral foramina*, nerves pass out of or into the spinal cord.

The spinal column serves several extremely important uses: it supports the body and the head; gives attachment to the ribs and various muscles of the trunk; encloses and protects the spinal cord; and absorbs shocks which otherwise might injure the brain. At the same time it is so constructed as to combine great strength with remarkable freedom of movement. See *Pelvis*, *Skull*, *Thorax*.

Spleen. A long, flat, red organ, which lies on the left side just under the diaphragm, near to the stomach and pancreas. While normally about five inches long and weighing six ounces, the spleen varies greatly in size, enlarging during digestion and shrinking until the next meal. Although there has been much doubt as to its real function, the spleen is now regarded as a kind of blood gland or lymphatic gland, because of its similarity in structure to the lymphatic glands. The blood circulates through it freely. It has no duct, and, whatever its product is, it enters the blood directly. It is believed that in the spleen the red blood corpuscles, after performing their function in the blood, are disintegrated and changed, and there is definite evidence to support this. *Lymphocytes*, small, white blood corpuscles, are formed in the spleen.

The red marrow of spongy bones closely resembles the pulpy structure of the spleen, and may be able to fulfill the same function, as may also the thymus and the thyroid glands or even the lymphatics. It is certain that the spleen is not an absolutely essential organ, as it may be removed from man and from lower animals without apparent bad consequences. Among the ancients the spleen was believed to be the seat of melancholy.

Stomach. The human stomach is an elongated, curved pouch, from ten to twelve inches long, and four or five inches in diameter at its widest part, having somewhat the form of a bagpipe. It lies nearly transversely across the upper left portion of the abdomen, immediately beneath the diaphragm at its left end, but overlapped by the liver at its right end. The stomach is very dilatable and contractile, with an average capacity of about two pints. It has two openings, one connected with the esophagus, called the *cardiac orifice*, and one connected with the small intestine, called the *pyloric orifice*.

The wall of the stomach is composed of four coats or membranes: (1) the exterior or *serous* coat,

very tough and strong, and covering every part of this important organ; (2) the muscular coat, composed of three layers of muscle fibers, one arranged longitudinally, the second, circularly, and the third, obliquely; (3) the *submucous* coat made up of lax areolar tissue; and (4) the interior or *mucous* coat, arranged in wrinkles or folds, containing the glands which secrete the *gastric juice*.

Food enters the stomach through the esophagus by the cardiac orifice. Its presence in the stomach excites the gastric glands, which pour forth their secretion. By powerful motions of the stomach muscles, the gastric juice becomes thoroughly mixed with the food, the digestion of which proceeds rapidly. The gastric juice is a clear, yellowish fluid consisting chiefly of water but containing salts, two ferments, pepsin and rennin, and free hydrochloric acid. The principal action of the gastric juice is to change albuminous or protein principles of food into peptones. This is brought about by the hydrochloric acid and pepsin. After having been properly acted upon by the gastric juice, the food thus digested is passed on in a semifluid or pulpy mass, called chyme, through the pyloric orifice into the small intestine. The time required for the stomach to empty itself ranges from two to five hours. See *Alimentary Canal, Digestion, Gastric Juice.*

Suprarenal (*sū′prà-rē′năl*) **Glands.** Two small, ductless, glandular bodies, each of which surmounts the upper end of a kidney. They are called also suprarenal bodies, or adrenals. In color they are yellowish, and in shape each somewhat resembles a liberty cap. Their size is variable, but the length rarely exceeds two inches, the width one and one-fourth inches, and the thickness one-fourth inch. Each suprarenal body weighs about a dram.

The internal secretion of the suprarenals is absolutely necessary to life. Removal of the glands from the body, or their complete degeneration in disease, is rapidly followed by death. The function of the suprarenals is to control the pigmentation of the skin, to counteract the effect of various poisons found in the body, and to regulate blood pressure. The most active substance produced in these glands is adrenaline. This is a definite chemical substance (a methyl-amino derivative of catechol), which is extracted in the form of white crystals.

Adrenaline, in small quantities, is continually passing into the blood stream. This stimulates the sympathetic nervous system, increases arterial blood pressure, causes the liver to discharge more sugar into the blood, and increases the efficiency of the heart and other muscles. Adrenaline is so powerful that a solution containing one part in a million will produce physiological effects. In medicine, various preparations of adrenaline are used as a stimulant and as a hæmostatic to control hemorrhages. See *Blood Pressure, Ductless Glands, Secretion.*

Taste, Organs of. The organs of taste are situated in the mucous membrane on the upper surface of the tongue, and, in some persons, on the soft palate and pharynx. On the tongue are a great number of little projections, or *papillæ*, which are of three kinds, *filiform, fungiform,* and *circumvallate,* in which the branches of the gustatory (glossopharyngeal) nerve ramify, ending in *taste buds.* The taste buds are minute circular bodies; from one end of each, fine hairs project, while at the other end a nerve filament enters. Besides taste buds, there are believed to be other sense organs of taste, for the sensation of taste can be perceived at other places on the tongue.

In reality, however, many so-called tastes are smells, as the olfactory sense is much more keen than the sense of taste. For example, in case of various people, if the nose be closed, an apple cannot be distinguished from a potato by taste alone. Most persons taste bitter things with the back part of the tongue and sweet things with the tip. Some substances are known which, for some persons, cause a pure sweet taste if placed on the tip of the tongue, and a pure bitter taste if placed on the back of the tongue. See *Tongue.*

Teeth. In adults the teeth are 32 in number, 16 in each jaw, of which 4 are incisors, or cutting teeth, 2 are canines, 4 are bicuspids, and 6 are molars, or grinding teeth. Each tooth is composed of a *crown,* covered with *enamel,* a *neck,* and a *root,* or *fang,* covered with *cement.* The root is surrounded by a thin layer of bone, *crusta petrosa,* embedded in the alveolar process formed by the jawbone. The interior of a tooth is composed of *dentine,* in the center of which is the *pulp cavity* containing blood vessels and nerves.

The temporary teeth of children are 20 in number, of which 10 grow in the upper jaw and 10 in the lower. These temporary, or so-called "milk teeth," usually appear during the first three years of life. The teeth of the lower jaw commonly erupt somewhat in advance of the corresponding teeth of the upper jaw. The following are the most usual times of eruption: lower central incisors, 6 to 9 months; upper incisors, 8 to 10 months; lower lateral incisors and first molars, 15 to 21 months; canines, 16 to 20 months; second molars, 20 to 24 months.

There is, however, much variation in the periods at which the temporary teeth appear. For example, some authorities state that, at the age of one year, a child should have 6 teeth; at one and one-half years, 12 teeth; at two years, 16 teeth, and at two and one-half years, 20 teeth.

The permanent teeth, likewise, vary considerably in the time of their appearance, and, as in case of the temporary teeth, those of the lower jaw slightly precede those of the upper. The permanent teeth erupt in the following order and usually at about the periods stated: first molars, the 6th year; two central incisors, the 7th year; two lateral incisors, the 8th year; first bicuspids, the 9th year; second bicuspids, the 10th year; canines, the 11th to the 12th year; second molars, the 12th to the 13th year; third molars, the 17th to the 25th year.

The layer of enamel covering the crown of a tooth is the hardest substance forming a part of the human body, being composed almost entirely of earthy matter. The enamel enables the teeth to withstand their important work of cutting and grinding food so that it can be acted upon by the saliva and easily swallowed and digested. Great care should be taken not to break the enamel by biting hard substances or by using metal toothpicks, since it is the only substance in the body which nature does not replace.

Tartar, a limy deposit from the saliva, forms on the teeth. To prevent decay, it should be removed by a dentist once or twice a year.

Tendons. White, glistening cords of fibrous tissue, varying in length and thickness, which connect the ends of muscles with bones, cartilages, and ligaments. Tendons are usually round, sometimes flattened, of considerable strength, and only slightly elastic. Examples of tendons are the so-called "leaders," connecting the muscles of the arm with the hand, and the "heel cord" or *tendo Achillis,* connecting the muscles of the lower leg with the foot. See *Joints, Muscles.*

Thorax. The part of the body situated between the neck and the abdomen, commonly called the chest. Externally, it is bounded by the ribs and is somewhat conical in form with the broad lower end closed internally by the diaphragm. The important vital organs contained within the chest are protected by a combination of bones, cartilages, muscles, and tendons. These are arranged so as to permit the expansile movements necessary in breathing and, at the same time, shield from injury the delicate organs within.

The structures which form the walls of the thorax are: (1) the thoracic portion of the backbone or spinal column, comprising twelve dorsal

vertebræ; (2) twelve ribs on either side, attached behind to the dorsal vertebræ and ending in front in costal cartilages; (3) the sternum or breastbone, situated in the middle line in front and forming the attachment for the costal cartilages which extend from the ends of the ribs; (4) the diaphragm, a strong muscular partition, convex toward the thorax and concave toward the abdomen; (5) various muscles and tendons connected with the backbone and ribs and concerned with respiration and other movements. These form much of the fleshy part of the chest wall.

The organs contained within the thorax are the heart, lungs, trachea or windpipe, bronchi or branches of the trachea leading to the lungs, the esophagus or gullet, certain important nerve trunks, and the thoracic duct through which chyle and lymph from the lymphatic system are discharged into the blood. As these comprise some of the most essential of the vital organs, a healthy condition of the chest is a matter of the highest importance. Several of the most fatal maladies develop in connection with the organs of the thorax. Among these are bronchitis, pneumonia, and pulmonary tuberculosis, affecting the lungs, and pericarditis, angina pectoris, and other diseases, affecting the heart. See *Heart*, *Lungs*, *Respiration*.

Throat. The throat cavity, or *pharynx*, is a portion of the alimentary canal lying between the back of the mouth and the esophagus or gullet. In shape it is a somewhat conical bag, with the broad end upward. The throat cavity has seven openings: the fauces opening into the mouth, the two rear nostrils, the two Eustachian tubes leading to the middle ear, the opening of the larynx, and the opening of the gullet. Except when one is swallowing or speaking, the soft palate hangs as a curtain between the mouth and the pharynx. During the act of swallowing, the soft palate rises to a horizontal position, shutting off the openings of the nostrils. Through the upper part of the pharynx only air passes; through the lower part, both food and air pass—the food when going to the gullet and air when going to the larynx and the windpipe.

Covering the opening to the larynx is a small plate of cartilage called the *epiglottis*. In the act of swallowing, the epiglottis closes over the top of the larynx like a lid. When food sometimes accidentally "goes the wrong way" it enters the windpipe instead of the gullet.

Thymus, The. A ductless gland situated within the chest, between the lungs in front of the heart, and extending upward nearly to the thyroid. The thymus is a temporary organ, attaining its largest size at the age of two or three years, when its weight is about one-half ounce. Thereafter it slowly and steadily shrinks in size. At the age of fifteen it has nearly disappeared, although traces of it may be discovered in old age.

The thymus consists of two nearly symmetrical lobes,—the *right lateral* and the *left lateral*—each completely independent of the other. The lobes are divided into lobules. These, in turn, are divided into nodules or follicles and are surrounded by numerous lymphatics and blood vessels. The functions of the thymus are undetermined, but it is generally believed that the gland exerts a strong influence upon growth and development. See *Ductless Glands*, *Secretion*.

Thyroid, The. A large ductless gland, situated in the lower part of the front of the neck. It consists of two lobes, one on each side of the trachea and usually connected at their lower parts by a narrow bridge or isthmus. The lobes are broadest below and taper to a point above. Each lobe is about two inches long, one and one-fourth inches wide at its broadest part, and three-fourths of an inch thick. The thyroid is larger in women than in men and, on the average, weighs about one and one-half ounces. The gland, however, is subject to great variations in size, and may become enormously enlarged, as in *goiter*.

In maintaining growth and health, the thyroid, which, doubtless, forms an internal secretion, is an organ of great importance. Its removal, or impairment by disease, is followed by grave disturbances. When the gland is diseased in children, so that its function is destroyed, a species of idiocy, called *cretinism*, is produced. In adults the corresponding condition is called *myxœdema*. Its most marked symptoms are slowness both of body and mind, accompanied by muscular twitchings and other derangements. *Graves's disease*, known also as *exophthalmic goiter*, is due to enlargement and overactivity of the thyroid. See *Ductless Glands*, *Parathyroids*, *Secretion*.

Tongue. The chief seat of the sense of taste and an important auxiliary or helper to other organs in articulation or speech, mastication or chewing of food, and deglutition or swallowing. The tongue is a double organ situated in the floor of the mouth. It is composed chiefly of muscular fibers which run in almost every direction, so that it possesses great freedom of motion and can be changed into a variety of shapes. The two sides of the tongue are absolutely distinct, so that sometimes, as in paralysis, one side is useless while the function of the other side continues unimpaired.

The tongue is well supplied with blood vessels, receiving an artery on each side. It is also well furnished with nerves, filaments from the fifth, ninth, and twelfth pairs of cranial nerves entering it. A branch of the fifth, called the *gustatory nerve*, is commonly regarded as the nerve of taste. The surface of the tongue is thickly covered with *papillæ*, or *villi*, which give it a somewhat velvety appearance.

The papillæ are of three kinds,—*circumvallate*, *fungiform*, and *filiform*. The circumvallate, from 7 to 12 in number, lying near the root of the tongue, are elevations of the mucous membrane, much larger than the other papillæ; these secrete mucus that helps to lubricate the food in swallowing. The fungiform papillæ consist of small, rounded heads supported on short stalks, somewhat resembling a mushroom in shape, and are found over the middle and fore parts of the upper surface. The filiform papillæ, the smallest and most numerous, are scattered over the whole surface except near the base. The *taste buds* occur around the fungiform and circumvallate papillæ and receive fibers from the gustatory nerves. See *Taste, Organs of*.

Tonsil. A soft, rounded body, normally about the size of an almond, lying in a depression of the fauces on either side of the opening into the throat. Small, white blood corpuscles are formed in the tonsils. Goblet cells on the surface secrete mucus. During a cold or other infection, the tonsils sometimes become greatly enlarged, and, by pressure, close the Eustachian tube leading to the middle ear, causing partial deafness. Tonsillitis is an inflammation of the tonsil, and quinsy is due to an abscess around the tonsil. Because of their tendency to become seats of infection, the tonsils are often surgically removed.

Touch, Organs of. The sense of touch, called also the *tactile sense*, enables the mind to become acquainted with some of the properties of bodies,—whether smooth or rough, warm or cold, and, in some degree, too, with their form and weight. The principal seat of the sense of touch is the skin. The hand, with its fineness of skin, great sensibility, and length and flexibility of the fingers, is admirably adapted for exercise of the tactile sense. Nearly all parts of the skin are more or less sensitive to the touch. There are, in the skin, special nerve endings to receive the stimulus of cold, heat, pressure, or pain, respectively. See *Skin*.

Veins. The blood vessels which convey the blood from the capillaries to the heart, gradually joining together to form larger and larger vessels

as they near that organ, finally uniting in the ascending and descending *venæ cavæ* which pour the impure venous blood into the right auricle of the heart.

The *pulmonary veins* lead from the lung capillaries to the left auricle of the heart, conveying to it purified or arterial blood, forming the only part of the circulatory system in which veins carry pure blood. The *portal veins* take venous blood from the capillaries of the intestines to the liver, where these vessels in turn break into capillaries. The *hepatic vein* carries the blood from the liver toward the heart.

As in case of the arteries, the walls of veins are composed of three coats, but much thinner and weaker in structure. Many veins, especially those of the legs and arms, contain valves, which permit blood to flow only toward the heart. In some of the large veins, including the venæ cavæ, the pulmonary, and the portal veins, there are no valves. There is no pulsation in veins as there is in the arteries, and the blood is of much darker color.

The circulation of the blood in the veins is indirectly caused by the pulsation of the heart and arteries and the great pressure thereby produced in every part of the system. This, together with the force of capillary attraction and restriction of the flow of blood to only one direction by the valves, is believed to account for the regularity of the venous circulation. To stop bleeding from a severed vein, pressure should be applied on the side of the wound farthest from the heart. See *Circulation, Circulatory System.*

Vermiform Appendix. A small, worm-shaped, blind tube, from three to six inches long and somewhat larger than a goose quill, which arises from the upper end of the large intestine or colon. The appendix is situated in the right iliac region of the abdomen. While it is hollow to the tip and its cavity communicates with that of the large intestine, its function or use in the body is considered unimportant. The vermiform appendix, however, is often the seat of the serious inflammatory disease called *appendicitis.*

Vitamines (*vī'tă-mēnz'*; *vī-tăm'ĭnz*). This name has been given to certain food substances of unknown composition which experiment has shown are necessary for the normal growth and health of men and animals. Vitamines can be recognized only by the effects produced when they are added to or withheld from food.

For many years it was believed that the human body might be compared to a steam engine. If the human machine received sufficient air and water and plenty of fuel in the form of proteins, fats, carbohydrates, and mineral salts, it was expected to operate steadily and efficiently. But it has recently been proved that, unless vitamines are present along with the other required elements of food, the human engine cannot operate normally. Not only will it fail to perform expected work, but its entire mechanism will soon become deranged or wrecked. For this reason, vitamines are sometimes called accessory food factors. But what they are and how they produce such important results are still unsolved problems.

Young rats on a diet of purified protein, starch, lard, and mineral salts, which, according to former theories of nutrition, should be quite sufficient for normal growth, nevertheless, do not grow and soon become sick. If, however, in addition to the other food, the sick rats receive each day as little as a quarter to a half teaspoonful of fresh milk, they get well and grow rapidly. Obviously the milk contains some substance necessary for health. Further experiment demonstrates that this vital substance is chiefly concentrated in the milk fat and that it is present also in cod-liver oil, and various other fat-containing foods. This substance is called the growth-producing vitamine, or fat-soluble A.

When chickens are confined to a diet of water and polished rice, they soon develop a nervous disease similar to that known as beriberi in man. The addition to their food of butter, with its fat-soluble A, does not help in their case. But, if the fowls receive a small amount of the husk which was removed when the rice was polished, their health is soon restored. The vitamine in the husk which prevents beriberi is known as the antineuritis vitamine, or water-soluble vitamine B.

A third substance has been found which prevents scurvy, a disease formerly greatly dreaded by seamen. This is known as the antiscorbutic vitamine, or water-soluble vitamine C. Lemon juice and orange juice are particularly rich in this substance, but, contrary to general opinion, preserved lime juice has very little of it.

Of these three vitamines, A and B are necessary to growth, fertility, and resistance to infective diseases. Vitamine C promotes proper digestion, appetite, and utilization of food. A fourth vitamine, designated as D, is of value in preventing rickets, a disease due to defective nutrition of the bones. Vitamine E, most richly contained in the germ of wheat and in red meat, is necessary for fertility. A, D, and E are soluble in fat; B and C in water.

Vitamine A is found in all green leaves, including those of such plants as cabbage, spinach, and lettuce; in carrots, sweet potatoes, and tomatoes; in whole milk, cream, cottage cheese, peanut oil, beef fat, egg yolk, mackerel and other fat fish, liver, and kidney. Butter and cod-liver oil are unusually rich in this growth factor.

Vitamine B generally occurs in the seeds of plants and the eggs of animals. In peas and beans it exists throughout the seed, but in cereals it is concentrated in the germ and outside layer, which indicates that it is to be found in graham or whole wheat but not in patent flour. This vitamine is found also in eggs, milk, cabbage, carrots, potatoes, spinach, lettuce, bananas, and nuts. Yeast and yeast extract are by far the richest available source of this substance. As the body does not seem to store it in quantity, constant supply of water-soluble B appears necessary.

Vitamine C is found chiefly in fruit juices and fresh vegetables and also in fresh meat. Whole raw milk contains a small amount. Orange and lemon juices contain the largest amounts. This is one reason why orange juice is so frequently added to the diet of babies and young children. When foods are cooked, vitamine C is the most easily affected by the heat, while fat-soluble A is the least impaired.

Beriberi and scurvy are diseases due to food deficiency and therefore occur when, for some special reason, the diet is one-sided. For instance, beriberi was a common disease among the Filipinos who lived chiefly on polished rice. When, in 1910, in place of their former ration of polished rice, unpolished rice and beans were issued to the Philippine scouts, cases of beriberi stopped as if by magic.

Vitamine D is found in cod-liver oil and can be supplied to the system by exposure of the skin to ultra-violet rays. This treatment is thought to endow certain atoms of the body cells with energy and these in turn aid in the absorption, from the alimentary canal, of the salts of calcium and phosphorus required for bone formation.

Ultra-violet rays are radiations similar to those of light, but having a wave length so great as to place them beyond the range of light sensation in the human eye. They cannot be seen as light or color. Sunlight, unimpeded by smoke or ordinary window glass, is rich in ultra-violet rays, and they may be produced artificially by a carbon arc, mercury vapor, or specially made electric lamp. Sunburn is caused by the ultra-violet rays in the sunlight. Properly controlled exposure to these rays has been found to accelerate the healing of wounds and to strengthen the system when in a debilitated condition.

PSYCHOLOGY

THE word psychology is derived from the Greek words *psychē*, "mind or soul," and *logos*, "study or discourse." It was formerly defined as the study of the mind, but in recent times its scope has widened so that it may be not improperly characterized as the study of human nature. It is closely allied, on the one hand, to physiology, which deals more particularly with the structure and uses of the parts of the body. On the other side, it approaches the field of the philosopher, who has made it a part of his task to consider the relation between the conscious mind and the universe of which the mind is conscious.

Early Psychologists. The history of psychology may be said to begin with Plato, who was the first influential scientist to draw a clear distinction between the mind and the body. Aristotle went further than Plato in distinguishing various faculties of the mind and attempted to solve the problem of the relation of the mind and the body. His acute analysis of the human organism, *De Anima*, remained the standard work on psychology for nearly two thousand years, receiving added importance through the interest in the soul which Christianity awoke. The Aristotelian psychology was popularized and assimilated to the Christian point of view by Thomas Aquinas, whose interpretations of the subject are still widely accepted.

Largely through the influence of Descartes in France and of Locke, Berkeley, Hume, Mill, and Spencer in England, the method of introspection or internal observation was increasingly employed in psychology, metaphysical presuppositions being discarded as much as possible. At this stage in the development of the study, the subject matter of psychology was greatly enriched by dramatists and novelists through their observations and descriptions of mental and emotional experiences, although professional psychologists continued to be scholars whose major interests lay in philosophy.

The rise of so-called scientific psychology took place in Germany about the middle of the 19th century, when Fechner and Wundt extended the scope of the study and introduced laboratory methods for testing and measuring the response of individuals to various stimuli. The earlier distinction between mind and body began to be discarded, and interest shifted from the mind by itself to the whole of consciousness. Ingenious instruments were devised for the measurement of perception, attention, memory, fatigue, and similar phenomena. At the same time, observations began to be made in the psychological reactions of groups of people, of abnormal individuals, of infants, of adolescents, and other special subjects.

Scientific investigation of human nature has been modified in recent years by two highly important influences; namely, the so-called behaviorist school and psychoanalysis.

Behaviorism. The behaviorists approach the study of human nature in the same way as they would study the behavior of lower animals. Their ideal is to observe and classify the responses of the human organism to stimuli with such precision that general principles may be deduced and predictions made, just as is now possible in the sciences of chemistry and physics. Consciousness is ignored or relegated to a position of minor importance. They support this procedure by the contention that the introspective psychology cannot be scientific, since what the observer sees in watching his own mental reactions is dependent on his own presuppositions and other organic influences of which he is unable to divest himself. Their opponents maintain, on the other hand, that the behaviorists ignore a large section of psychological facts which can be investigated only by introspection.

Psychoanalysis. This name was first applied by Sigmund Freud to a method of treating nervous disorders. By recalling to consciousness certain suppressed memories, Freud found he was frequently able to restore his patients to health. From this beginning, he was led to the conclusion that repressed desires or memories explained not only many nervous maladies but innumerable acts of those apparently in health. He used it to account for dreams, slips of memory, even art and religion, and many actions for which quite different reasons are assigned by those performing them. In support of his view, it is pointed out that when a person in a hypnotic trance is told to take a book, for example, at a certain time after awakening, he will do so but will "rationalize" the act, that is, will invent some reason of his own for having performed it. It is by such means that primitive impulses, repressed through shame or other socializing factors, issue in acts symbolic of those desired but taking a more or less harmless form, the agent being ignorant of his real reason for so acting. On this view, the mind becomes a much more complex subject of study, the zone of consciousness being always subject to invasion by influences from the larger zone of the so-called unconscious, made up of forgotten experiences and suppressed desires.

Parallel with this attempt to depose the intellect as the prime factor in human conduct has grown up a technique for measuring the efficiency of the intellect. By means of carefully devised tests, it has become possible to measure certain aspects of the intelligence of an individual and to express them mathematically, the average of a large group of tests being taken as the standard.

Applied Psychology. While all personal influence is based on a working knowledge of human nature and so may in a sense be described as applied psychology, *scientific* psychology has found application only within very recent years. Laboratory studies have yielded results of value for child training, education, advertising, and business management. Intelligence tests have proved of value in selecting men to train for officers in the army and are frequently used as supplementary entrance tests for colleges. They afford help also in vocational guidance and personnel management. As applied to medicine, psychology has opened up a new field of healing, psychotherapy, applicable to what are often called nervous disorders.

The following pages are devoted chiefly to psychology as an aid in child training and education. For a detailed account of intelligence tests, the reader is referred to pages 1650–55 in the department of Education. Other aspects of psychology may be studied through a reference to the bibliography on page 1132.

MIND AND BODY

An understanding of brain physiology is one introduction to psychology. A review of the central nervous system, as described in the topics entitled *Brain* and *Nervous System* in the section on Physiology in this volume, would be a good preparation for a better understanding of psychology.

The Nervous System. The cerebrum, or big brain, is the directing center of the whole nervous system. The cerebellum, or little brain, co-ordinates the muscular movements of the body. Every part of the brain has its own particular work to perform, and from specialized areas, as from the hand center, the foot center, the sight center, or the speech center, connecting fibers radiate to other associated parts.

Sensitivity and Conductivity. A nerve in the finger tip may be stimulated by a pin prick. This excitation is transmitted by a sensory or afferent nerve to a spinal cell which in turn transmits the excitation to a motor nerve and companion muscle,

causing quick withdrawal of the hand. At the same time, the same excitation of the pin prick may be carried to a higher brain center and consciousness may be aroused. Through a further transmission of the excitation to the organ of speech, an utterance of pain may result. In addition to this, a tear gland may be excited and add its contribution. Thought and emotion may complicate the process and one may remove the pin and resolve never to be so careless again. Thus the behavior resulting from so simple a thing as a pin prick may be very complicated, involving many types of physical and mental response.

Plasticity. In addition to sensitivity and conductivity, nerve tissues possess a third important quality—plasticity. Nerve tissues change in response to stimulation; each excitation leaves its trace, which helps to determine the response to the next similar excitation. It is plasticity which makes habit formation possible and which is the basis of all physical and mental development.

All tissues of the body have their degree of plasticity and are subject to modification through habit, but the nervous system is the most sensitive of all. "So sensitive is the nervous system," says Professor D. E. Phillips, "that the slightest, even unconscious, movements, the odors of flowers and foods, the conscious and unconscious position of the vocal organs, the chirp of the cricket, the song of birds, the sound of a violin, the delicate forms of touch, and slight variations in form and color all so modify the structure of the nervous system as to establish a predisposition to respond more readily in a similar way again." The Law of Repetition obviously follows: All things else being equal, the oftener a nerve action is repeated the more ready is the response, and the more unlikely is any other response in the presence of similar stimuli.

This extreme sensitivity of the nervous system, which results in ever more prompt and exact responses to oft repeated stimuli, makes it possible, by adding new elements to the accustomed stimulus, to establish a connection between the given response and a set of new stimuli. A man saw a child injured on a street corner; he was so affected by the sight that he became nauseated. Ever after, when he passed that corner, he experienced a sensation of nausea. The corner had become a part of the original stimulating situation and, when that part of the stimulus returned, the original response followed.

Educators now realize that accustomed reactions may be shifted by adding a new stimulus to the original one, later dropping the original stimulus and presenting the added one alone. This is true even of the simplest of all reactions—the simple reflex, or the motor response which mechanically follows a sensory stimulus because of the ready-made connection in the nervous system. A baby, for example, opens his mouth for a piece of candy; if at several successive times, as candy is fed, the child's hand is patted, it will follow that the patting of the hand, unaccompanied by the candy, will at length result in the opening of the baby's mouth. If a mother rightly understands this process, she can begin to train her very young baby by presenting an associated excitation together with an accustomed one which produces the desired response.

Man's Original Nature. Man's original nature is the capital with which he begins life. "What a man is and does throughout life," says Professor Edward L. Thorndike, "is a result of whatever constitution he has at the start and all the forces that act upon it before and after birth."

To understand man, then, we must know:

1. The nature of his original endowment.
2. The laws which govern changes in this original endowment in relation to intellect, character, and skill.
3. How to utilize the original endowment as a basis for further growth and development.

Function of Training. "A man's nature," continues Thorndike; "and the changes that take place in it may be described in terms of the responses—of thought, feeling, action, and attitude—which he makes, and of the bonds by which these are connected with the situations which life offers." Man has developed responses which he originally lacked. It is in his potentialities that man is infinitely above the lower animals. All training must begin with ready-made or instinctive tendencies. It must strengthen some and redirect or eliminate others.

We must utilize potential energies. A repressed child, whose instincts of curiosity, of love of approval, of mastery, of ownership, and of freedom for physical activity are constantly thwarted, becomes by negative resistance a creature of discontent and of pugnacious violence. Reverse the program, give opportunity for development, and the child may become a constructive force in the community, working with, rather than against, his neighbor. The fundamental need is expression, not repression. The suppressed desires, the hidden repressions, like subsoil fires, secretly burn their way to destructive conflagrations.

INSTINCT

Instinct is an inborn, unlearned tendency to act in a certain definite manner in response to a certain definite condition. The organism is so constituted that it responds in definite ways to appropriate conditions without training or former experience; for instance, when a child cries and hides its face during a thunderstorm, the storm is the stimulus to which the child responds by the instinctive acts of crying and of trying to withdraw from the storm. Instincts are race inheritances—inherited alike by all members of the same group. They are independent of training but, nevertheless, they are purposive—fitted to achieve some definite purpose.

Instincts and Emotions. Instinctive acts are usually accompanied by an emotional experience. The child who involuntarily draws away from the flash of lightning experiences at the same time a fear. Some psychologists hold that an instinct includes both the act and the emotional impulse, or inner drive, while others regard the two reactions as distinct, though related. All emotional experiences—fear, anger, disgust, tenderness, love, ambition—are distinguished by their purely subjective, personal quality. Two children may look at a false face. They both see the same thing, they both get practically the same impression of eyes, nose, mouth, and other features; but one child laughs with glee at the funny sight and the other hides his face in terror. The amusement of the one child and the fear of the other are purely personal, unshared reactions, resulting from the same visual experience.

Such emotional experiences and the more simple personal reactions of a similar kind, called feelings, are called forth by many stimulations of sense organs, as well as by organic movements and ideational experiences.

Instinct and Responsibility. Instincts as unlearned behavior are compelling. Deterrent penalties cannot helpfully be imposed upon a child for responding to any of them if he has not a sufficient background of experience for the formation of social judgments. This is true also of the child-minded adult. Many a so-called criminally minded man or woman is by no means a criminal by choice, but is of such low mental capacity that the most primitive wants and their satisfaction are the controlling impulses. From the psychologist's viewpoint, there is a vast difference between the responsibility of such immaturity and the responsibility of the intelligent person who knowingly follows an antisocial course of action.

A misunderstanding of this principle leads to many grave errors in discipline. Parents and teachers should have for their guide all the knowl-

edge they can get of child nature and its impulses, so that they may substitute a better for a mistaken act, thus modifying and educating the impulses in a desirable direction. Instincts may thus be utilized for the development of advantageous habits and for fitting the individual to live a more satisfactory life in society. On the proper adjustment of the instinctive impulses depend not only the value of the individual as a member of society but also his own mental health and happiness.

Instinct and Education. Instincts are the foundation on which we build education. We must foster some, sublimate or redirect others. Uneducated instincts lead to blind behavior; wise education modifies and refines native impulses and leads to a well balanced personality.

Instinctive acts are originally reactions to some definite stimuli, yet it constantly happens that instinctive acts shift their connections from one stimulus to another. A stimulus which originally excited to one reaction finally results in quite another reaction. The conditions of these changes and shiftings have been closely observed and at present they are brought about designedly by educators and by re-educators. A certain kindergarten teacher put the method into practice with a class which was frightened into disorder by a thunderstorm. Being quick of thought and a skilled story-teller, she exclaimed, "Children, listen! Hear the giants rolling their heavy balls. Listen! up there in the clouds." Dramatically presented, this story caught the children's attention. Fear vanished. They were eager to hear the giants' game. And, after that, enjoyment, not fear, was their response to a thunderstorm.

A young father similarly changed a fear to a joy reaction in his little baby who was not yet old enough to walk. They were on an ocean liner which was passing through a fog bank. When the foghorn blew, the child, who was on his father's knee, was startled and hid his face in his father's coat. The father tossed him up in the air, crying, "Oh, listen to the whistle," and laughed as though it were a good game. The foghorn blew every thirty seconds, and with the third repetition the baby joined in his father's laughter. How many fathers would have said, "Never mind, it will not hurt you, father is here," and thus have established the fear reaction to the foghorn?

Social Instincts. Many and various attempts have been made to classify instincts. Many writers describe as instincts certain complex reactions to set stimuli and certain complex reactions to other individuals or to the social group. Some include play as an instinct, though play does not satisfy our definition of instinct, as it is not a set organic response to a given stimulus.

The instincts of self-preservation are familiar in everyday experience. The social instincts are equally commanding. Man cannot dwell alone. He finds his highest satisfaction in being with others. He belongs to the group. The group may represent a few individuals or a crowd. The psychology of social groups furnishes us our most interesting reading. History, romance, reflective essays on human life, poetry and drama, all furnish valuable studies of man's social reactions.

Awakening of Social Consciousness. Tolstoy gives an interesting and vivid account of the awakening of his own social consciousness during the storm and stress period of adolescence:

"Has it ever happened to you," Tolstoy asks, "to perceive all at once, at a certain period of your life, that your view of things had entirely changed, as though all the objects you had seen hitherto had suddenly turned another side to you? This species of moral change took place in me . . .

"During that period of time which I regard as the limit of boyhood and the beginning of adolescence, four sentiments formed the foundation of my dreams: The first sentiment was love for *her*, the ideal woman of whom I thought always in the same strain, and whom I expected to meet somewhere at any moment . . . . The second sentiment was love of love. I wanted to have every one know and love me . . . . The third feeling was the hope of some remarkable, glorious good fortune,—so great and firm was the hope sometimes that it would border on madness . . . . The fourth feeling was disgust at myself at times and remorse, but a remorse so mingled with hope of bliss that there was nothing really sorrowful about it."

G. Stanley Hall, in his great work on adolescence, emphasizes the fact that the awakening to sex attractions and the intense emotions and sentiments of adolescence are not to be played with or laughed at. How the energy is employed and what interests are established will determine the future life.

The principle of conservation, so strongly urged for the adolescent, is equally important for every period from infancy to maturity. For every period there are vital ideas and characteristics which are essentially its own. "It is the duty of the educator," says Dr. Hall, "to note the changes which occur at any period and to find their relation to physical and mental development." As Froebel states it, "The full and complete development of one period is the best possible preparation for the next period."

Play Responses. "Play," said a Puritan authority, "is the devil's own instrument for leading astray the children of men." "Play," said Colonel Parker, "is God's method of teaching children how to work." A better understanding of the psychology of play has made a radical change in the attitude of adults toward sports in general and toward vacations and relaxations of any pleasurable kind. From the Puritan restrictions to the freedom of the present day, pleasure seeking runs a long and devious path of public sentiment.

Man's original inherited nature has not changed, but society's conception of the ideal way to modify or educate it has varied widely from generation to generation. Modern psychology aims at finding the right method through a systematic study of human nature. Asceticism and overindulgence are both wrong. Right thinking, which means intelligent thinking, must help us to find a balance of behavior without too much license and without too much restraint.

Play, Work, Drudgery. The distinction between play, work, and drudgery has been experienced in every man's life. Play is free energy, spent for immediate pleasure in the exercise. Work is effort for the purpose of accomplishment; it may be pleasurable or not pleasurable, but the accomplishment is regarded as sufficient to justify the effort. Drudgery is blind toil, done under sullen resistance for no self-chosen end. Pleasure, profit, and rebellion are the respective fruits of play, work, and drudgery. The difference between play and work lies, therefore, not in the amount of effort involved, but in the spirit which impels the individual to make the effort.

Kinds of Play. All human beings and many animals play, some oftener and more merrily than others, but every one plays or has played sometime in his life. The character of the play indicates the character of the individual. Play may be of the childish type with games and toys, or it may be of the mature type involving the highest intellectual activities. To be really play, however, it must be recreative rather than exhaustive.

Play of the mind is as natural and as important for growth of the mind as is active bodily play for growth of the body. Through imitative play, the child learns to adapt himself to the social world and develops inventiveness and initiative. How grown-ups often fail to appreciate the value of child initiative is well illustrated by the following anecdote: A little boy playing with his grandfather's cane had pranced with it to the piano stool, which was his fountain. At that moment his mother left the room

and returning with a pail of water said, "Mother will help you. This is a real pail of water for your horse." In disgust the child burst out, "Take it away. A pertend horse wants pertend water." The child was right. His play was of the imagination. His mother had interrupted his mind's creativeness, a normal and worthy activity.

Play and Work. Professor G. T. Patrick, who has made a careful study of play and work theories, characterizes play as spontaneous, self-developing, self-rewarding, inclusive of practically all of the child's activities and many of those of adults. He defines the essence of work as sustained attention, controlled association, concentration, and analysis, together with inhibition of impulses. "These are the capacities," he adds, "that have made for progress in civilization, but in children they are undeveloped, in adults only partially so, and in any case the use of them is excessively and rapidly fatiguing."

Both play and work contribute toward the full development of character. "All work and no play makes Jack a dull boy." This is true indeed if work represents only drudgery—just dull mechanical grind, no initiative, no interest, no compensating joy. A life thus filled with work would grow dark and sullen, nonsocial, old before its time. As Shakspere says of the lean and hungry Cassius:

> "He loves no plays,
> As thou dost, Antony; he hears no music;
> Seldom he smiles, and smiles in such a sort
> As if he mock'd himself and scorn'd his spirit
> That could be mov'd to smile at any thing."

On the other hand, all play and no work would be equally destructive. Jack, the overworked, would become a sullen grumbler; Jack, the idler, a discontented vagabond. Both would be antisocial elements in their community.

If work and play can be fused—if we can succeed in attacking our serious tasks with the enthusiasm which we bring to play—we shall find the most satisfying activity life has to offer. The task then becomes our own and we can say, "I loved the task and no other asked." Life demands strenuous effort, but, to be satisfying, it must be happy, hopeful effort.

ATTENTION, INTEREST, ACTION

"A fundamental element in decision is desire, either in its positive form as desire for what is agreeable, pleasurable, or in its negative form, which we best describe as aversion. The inclination or tendency of mind toward what is pleasant and away from that which is painful is the essential fact in willing. Experience teaches the child what is pleasurable or painful and what kind of actions are fitted to realize the one and to avoid the other. But the impulse to seek pleasure and avoid pain is primordial and instinctive." This primordial law of pleasure seeking, Thorndike calls the "Law of Satisfaction." We are interested in, we attend to, we do.

In the psychology of learning, the part played by interest has in recent years received much attention. When interest is lacking, attention wanders or is brought to bear only with effort, and progress is correspondingly retarded. If the interest is keen, however, attention is concentrated on a task without effort, and the activity becomes pleasurable even when pursued to the point of fatigue.

Development of Self-Control. For training in self-control, definite steps have been formulated:

1. Get control of the body. Muscles obedient to control give readiness and confidence in action. We are ready to do what we can do. A trained body is a moral asset.

2. Build up worthwhile interests and the habit of giving attention. Interests should be carefully selected; they should not be so many that all must be slighted nor so few that warped judgments result. If one is interested in anything, that thing holds the attention.

3. Furnish the mind with ideas and ideals and give it practice in using them. Give it problems that demand invention and imagination. Some ideas and ideals must be given ready-made; they are needed as tools for thought. But, if the individual is not led to a resorting, a reassembling, of ideas, he will never arrive at new levels of thought. His mind will become merely a storehouse, an encyclopedia; it will be a dead thing.

4. Make strong the bond of association between ideas and action. Determine upon the desired act, then do it. People who have missed such training lose the power of realizing an idea in action. They think of the act, desire to do it, and stop there. A young man lost a good position because he had not the power to arise in the morning in response to his idea of arising. A young woman went without many a breakfast because it took her until lunch time to accomplish the acts of arising and putting on each garment in turn. Another woman failed to answer letters because her impulse to write was completely exhausted in her resolve to do so.

The Evolution of a Moral Act. From reflex, instinctive, and impulsive actions to voluntary, self-determined, self-directed acts is an important evolution in human conduct, leading from the nonmoral to the moral. Morality implies intelligent choice of right habits of action.

Take for illustration an infant held to the window to greet his father who is coming from work. How hands and feet and body spring into rhythmic gladness as the child sees his father's face! Observe the overflow of emotion and reflex bodily expression. Observe also how mother takes the little hand and waves it in gesture of welcome. Again and again the mother repeats the hand gesture until the child makes it without the mother's aid. Through repetition, the gesture has now become a part of the set response to the sight of the father's return and is a part of the joyous greeting. The greeting is now a social act of reciprocal pleasure giving, shared by father, mother, and child. Is not this the essence of a moral act—joy getting and joy giving? It may not be full, conscious morality, but surely it satisfies that part of the definition of morality which demands "intelligent choice by the individual of habits of action for the good of the group."

Kinds of Attention. The active mind attends. Attention is an inborn capacity. We must attend, but what we attend to and how we attend indicate the mind's quality. Cultured minds show marked superiority in the breadth of their attention and in their ability to attend to uninteresting things. The trained mind does not attend by fits and starts, but it gives selective, sustained attention. "If there is anything that can be called genius," says one authority, "it consists chiefly in the ability to give attention to a subject and to keep it steadily in mind until it has been surveyed from all sides." All consciousness involves attention, but sustained attention is the result of experience and of discipline.

The infant newly born must give himself up to the play of objective stimuli; the mind is caught by the strength of the stimulus and has no resistance. In active or voluntary attention of the mature mind, ideas are master, and the responses of the individual are controlled by thought; whereas, in passive or involuntary attention, circumstances are master and determine the ideas.

"You cannot prevent birds from flying over your head, but you can prevent them from making nests in your hair" is an old Spanish proverb. Attention is subjective as well as objective—"Watch your thoughts. Cultivate an awareness concerning your own thinking."

To the two types, or more properly two attitudes, of attention already described, the passive and the active, some authorities have added a third attitude of attention, the secondary-passive or acquired-passive, sometimes called nonvoluntary. The individual has rendered himself passively attentive to

a stimulus through habit or selective interest. He attends not because he thinks he must attend, but because he enjoys the stimulus of music, of art, or of some favorite sport or adventure. On the other hand, the secondary-passive may be merely the reflex of habit, not so much a matter of pleasure as it is the path of least resistance; that is, the individual attends because it has become mechanically his habit to attend. In this way one may acquire habits of ease in an oft-repeated task, or may learn to prefer that which was once distasteful.

HABIT

"When you feel too old to do a thing, then get up and do it," said an elderly clergyman. This is equivalent to the advice of Professor James that, "by a little gratuitous effort every day," we keep alive in ourselves the habit of forming habits. Our instincts we get by inheritance, as we get our relatives, but our habits we acquire for ourselves, consciously or unconsciously.

Function of Habit. All life is action and action tends to repeat itself. We are obliged to form habits, but within limits we have choice of the habits we form. The root of this modifiability of behavior is in the plasticity of the nervous tissues. Herein lies the superiority of man over all the lower animals; for, owing to his greater plasticity, man is able to change, if need be, his mode of living. He can adapt and readapt himself to conditions. When climate is unsuitable to him, he can accommodate himself to climate. When shelter and food are not according to his needs, man by his power of adjustment can provide shelter and food. Habit adjustments may be either physical or mental.

Moral training is essentially habit training. Habits are the bonds which give stability to character and make society stable, but progress demands that there shall be not too many habits and not too few. There must be flexibility in stability. "The abuse of habit strengthens conventionalism." The emphasis in training should be to form habits that are serviceable for life—habits that are intellectual, moral, industrial, cultural.

Habit Formation. Habits should be formed in periods of greatest plasticity and when environment and emotional attitudes are favorable. Form good habits. Reward good impulses. Attend to what you would attain to. These are good maxims.

We are liked or disliked, we are told, according to our habits, but a habit once formed remains unmodified unless in some way attention is called to it. To call attention to unprofitable habits is the office of kindly friendship. It is essential that we keep our habitual acts under some kind of surveillance so that when necessary we may modify them.

Habit forming must be definite, concrete, systematic exercise. As a suggestion for instruction in habit formation, the following outline was given to a group of students to work out in their own practice teaching:

HELPING A CHILD TO FORM A HABIT

The habit I desire the child to form . . . .
To produce a strong, decided initiative, I would .
To re-enforce the motive, I would . . . .
To strengthen the desire, I would . . . .
I would keep a record of improvement.

The following lesson plan was handed in by a student who taught in a social settlement a group of girls from twelve to fifteen years of age:

HABIT FORMATION

SUBJECT—DOMESTIC SCIENCE

"The habit I desire each child to form is that of making bread at home instead of buying baker's bread.

"To produce a strong decided initiative, I would teach the process and let each girl make one loaf of bread to take home. In the same lesson, in order to stimulate interest, I would compare the cost and the nutritive value of the homemade bread and the baker's bread, thus showing homemade bread to be less expensive and better than baker's bread.

"To re-enforce the motive, I would tell the girls that, if they make bread every week at home, at the end of three weeks an exhibit will be given, at which the best loaf of bread will be chosen.

"To strengthen desire, I would have the girls report progress each week and also allow them to take orders at school, thus making money for their school organization.

"I would keep a chart showing the number of loaves each girl made and the money earned."

In this lesson are emphasized not only the habit of making bread but also habits of orderliness and neatness, habits of thought about health and economy, habits of systematic study. Emphasis is placed also upon motive and initiative, and upon the wholesome character of satisfactions appealed to. The lesson was justly accredited as one of the best in its treatment of the psychological principles involved. One does not need to question the response of the class, or the influence of the lesson in the homes of the pupils.

It might be profitable for one who has followed this study of habit making thus far to try himself out by the formula given or to use it in helping some little child to a habit worth forming. The effort itself would quicken interest, for "We learn to do by doing," and "We are always interested in our own doing." Remember also the injunction to keep the faculty of forming a habit alive "by a little gratuitous effort every day."

A lesson on habit breaking was given out to the same class with the injunction that habit breaking requires equally as definite, concrete, and systematic exercise as does habit making. The following paper, somewhat startling but sincere, was handed in by one of the young women:

BREAKING MYSELF OF A BAD HABIT

"It has been said that we are liked or disliked on account of our habits. Since habits tend to inattention, we are often unaware of our disagreeable habits until some one tells us of them.

"I have one habit in particular which has met with disapproval. It is that of using coarse and senseless expletives if anything goes wrong. I have had that habit more or less throughout life and have never really tried to overcome it. Whenever I am irritated, such words as 'gosh' or 'darn it' or 'plague take it' come out most glibly.

"I would have gone on quite unconcerned, but for my friends. Those I love best expressed great displeasure. 'Why do you use those expressions?' 'They do not sound like you.' At first I only laughed and blamed the provoking cause, but more and more the habit grew upon me. Then for the sake of my friends and for my own pride's sake I determined I would break myself of this bad habit.

"Every time 'gosh' and 'darn it' slip out of my mouth, to myself I say, 'I must not say that'; and aloud I repeat, 'I must break myself of that habit. I will.'

"I am determined not to shock and distress my friends in this manner any more. I will also exercise sufficient self-control not to let slip from my mouth words I do not want to say. This habit is not easily broken, but I am going to succeed."

Observe again the strong initiative, the steadfastness of purpose, the "will to succeed," and the wholesome character of motives appealed to.

MEMORY

How can I improve my memory? Why do I always forget? Why can I not remember now as well as I used to remember? These questions are often asked without any hope of answer. They are the mind's complaints against itself. Memory is both an inborn and an acquired capacity. It has its

limitations both in its native quality and in its capacity for training. There is a native plasticity or impressionability which training apparently does not increase. But this native capacity may be utilized effectively or it may be squandered.

Memory capacities vary with the individual both in degree and in kind. One man differs widely from another in the intensity and in the scope of his memory power. However, the differences between his own abilities for recalling different types of experience are equally great. He may, for instance, remember dates with great accuracy and yet be unable to recall a tune. Strictly speaking, a man has not memory but memories, and the ability or the lack of ability to remember certain types of experience is peculiar to the individual. This fact must be taken into account in fitting education to the individual and in choosing for each man his work. The gifts of memory are a large inheritance for which to be grateful, in whatever degree and for whatever types of experience they are possessed.

Child and Adult Memory. To those who regret that nature has not more richly endowed them with a good memory, it may be a satisfaction to know that very seldom is this power cultivated to the limit of capacity. You can remember better than you do. Memory needs intensive training.

To those who mourn that they have passed the memory age of childhood, it may be an added satisfaction to learn that memory powers do not steadily decline with years. Youth is the time for building up our catalogue of memories; objects, events, language, dress, the look of faces,—these are the memories of youth. The adult mind works rather in patterns of thought. It remembers through related experiences, and the mind early forms its habits of association. The well-ordered mind remembers what it has trained itself to remember—what is related to its dominant interests. It pays little attention to trivialities and promptly forgets them. Not everything should be kept in mind. The rubbish heap of memory should be swept aside.

Memory Training. Memory is precious. Save it for what is worth remembering. Saint Paul spoke the choice word for the storing of memory:

> "Whatsoever things are true,
> Whatsoever things are honest,
> Whatsoever things are just,
> Whatsoever things are pure,
> Whatsoever things are lovely,
> Whatsoever things are of good report;

If there be any virtue, and if there be any praise, think on these things."

Thorough learning, well linked up associations, systematic exercise, and the will to remember are the essentials for the cultivation of a good memory.

The following rules will be found useful in training memory:

1. Keep your body in good condition. The condition of the body is always fundamental to mental activity. We remember best when we are physically fit.

2. Hold to strong incentives. Believe in yourself. We remember best when we are determined to remember.

3. Stimulate the memory to act. In committing to memory by reading, the memory should be urged into activity; it should be given every chance to reproduce all it can recall of what has been read. Rereading should be applied only to such parts as the memory has not yet grasped.

4. Repeat and repeat, but avoid dead monotony. Where memorizing is mechanical, learn with rhythm if possible, as in learning multiplication tables and dates.

5. Review important memory material within the first day or two. The rate of forgetting is found to be very much less rapid after the lapse of the first twenty-four hours.

6. Learn with energy, but avoid overfatigue. Memory is helped by intervals of rest. Study to discover the intervals best fitted to your exercise. Experiment, record results, and select the intervals that give to you the best returns. In this way you will follow a scientific method for securing economy in learning.

7. Take time. Do not waste time. First, accuracy; then, speed.

8. Learn by wholes rather than in small detached parts. In large wholes, such as a speech or a poem, select smaller units, but do not break up the material into disconnected parts.

9. Systematize, visualize, memorize. There are many ways of learning, many interests, many kinds of association. Find for yourself the way that is best for you; then put that method into practice.

MEMORY, IMAGINATION, THOUGHT

Memory, imagination, and thought are derived from the same source, personal experience, and are alike dependent upon the mind's retentiveness. They have, as Professor D. W. LaRue says, "but one set of counters to play three games." He further distinguishes them in this strikingly original way: "Memory gives us the was-so; imagination, the might-be-so; and thought, the must-be-so." To illustrate,—we remember the house in which we live, we imagine the house in which we should like to live, and we think out how we can bring it to pass that we can build such a house. All progressive thinking involves memory, imagination, thought. So closely do they blend and interblend that we can truly say, thought is memory and imagination, and both memory and imagination are factors in thought.

Imaginative Thinking. Civilization owes an immeasurable debt to imaginative thinking. In bodily resistance, man is weaker than the brutes; but defensive thinking has given him infinitely the advantage in the struggle for existence. Stage by stage from savagery to civilization, man has risen by his one distinctive instrument, constructive thought.

"Science does not know its debt to the imagination," said Emerson. Imagination can construct in images of the absent and of the future. It can make the unreal realizable. It can control time and space and the elements of air and water. All this imagination can do, and it can do more. It can control the mind of the thinker and hold him within the bounds of reason. It can make him a friend to his fellow man.

Ruskin writes truly,—"An unimaginative person can be neither reverent nor kind." Those alone who can realize in thought another's experiences can really sympathize. Sympathy is born of imagination. Realizing in thought the experiences of another, the emotions appropriate to these experiences are also realized, and sympathy, which is the sharing of another person's emotions, is established.

Emotion and Thought. Strong emotions, on the other hand, influence thought. "They may," as Professor Edward B. Titchener says, "cause us to see only what we wish to see, and to remember only what interests us." This is the disastrous side of uncontrolled intellect combined with selfish passion. It was the contemplation of such ruin which made Robert Burns exclaim:

> "Man's inhumanity to man
> Makes countless thousands mourn."

Psychology emphasizes control through education.

Right Thinking. It is not easy always to hold one's thinking within the bounds of reason. Superficially associated ideas crowd in, and we forget essentials because we have too much to remember. Ideas may be too vague, too emotional. Reliable thinking is a test of training and of sincerity as well.

The function of reason is not repression; it is the turning of the full forces of being into channels through which they may have free play but not disaster. Advancement is achieved through the stimulation of commanding desires. "Wants are the

ultimate sources of value." The nature of the wants determines the line of advancement. If the wants are material only, material advancement or worldly success is the goal; if the wants are spiritual and intellectual, a cultural development is the goal. Culture is a higher goal than the outer thing men call success. It is true as has been written:

"He who has power to appreciate beauty, power to think the true and will the good, power to live the life of thought, faith, hope, and love, has by right thinking fitted himself for complete living."

PSYCHOLOGY AND EDUCATION

Education and psychology overlap in many of their discussions. It is not intrusion of one science upon the other, for the field of observation is the same in both, although the angles of inspection are different. Professor Charles H. Judd explains this in his *Science of Education*. He writes, "A friendly alliance will always exist between the science of psychology and the science of education. Psychology has given to education certain methods and such special results as it has worked out . . . .; education has taken the psychological material and developed a special branch of science under the name of 'educational psychology.'"

The Individual Mind. All processes of learning must be fitted to the individual mind. If all persons were equally well endowed, it would be comparatively easy to apply a uniform system. But people are not equally equipped. We have the child mind of all ages, and superior adult qualities are often found in little children. The psychology of education demands, therefore, that we recognize as a separate problem each individual mind, giving to each its freedom for growth: to the adult mind its full privileges; to the child mind of whatever age the protection needed; to the perverted mind its necessary restraint, with every opportunity for reconstruction. This is psychology combined with humane sociology.

The Individual and His Work. Schools and communities are gradually assuming larger responsibility for the individual, realizing that each person should be developed to the fullness of his powers and be placed where he can work according to his best abilities. This is an ideal, but it is something to have formulated the ideal. Conservation of human energy will in time rank above the conservation of material forces.

Says J. McKeen Cattell, "If everybody were trained and selected for work according to his ability, there might result a revolution in industry as great as that brought about through the introduction of machinery. The scientific control of conduct may become of greater economic importance than the uses of electricity or steel." What an increase there would be in national happiness as well as in national wealth if everybody were selected for the work he is best fitted to do and were trained to do it in the best way!

Placing men to serve in varying capacities calls for a grading of ability to serve. It was so in the army; it is even more so in civilian life where failures often are inevitable. "We have largely subdued the material world to our uses," adds Mr. Cattell, "but men are trained and selected, influenced and controlled, employed and dismissed, put in prison and in Congress by methods that have survived from the prescientific era."

Testing Mental Ability. Applying this criticism to the placing of children in our schools, Professor Terman says: "We must find for every child the level where he can function successfully if we would have him escape the shock of disappointment, the habit of failure, and the resulting inactivity, day-dreaming, vain wishing, and the chasm between thinking and doing. If we will only take the pains to fit the task to the capacity, every child can be taught to do certain things well and to take pleasure in doing them." This principle applies equally well to the placing of men in industry or in any field of activity.

"What can he do?" is the fundamental question. What he can do depends primarily upon his native ability and secondarily upon his spirit of endeavor, together with the opportunities of his environment. It is not an easy task to distinguish between raw native ability and acquired ability, between the capacity to achieve and achievement. A man through ignorance may seem exceedingly dull, yet he may have an unsuspected capacity for learning. There should be some standard for judging capacity of intellect. The search is for reliable standards. No measuring scale of mentality can ever be comparable in accuracy with standard measures of time or space or quantity, but within the last decade many psychological scales have been devised which are dependable to a high degree.

Criteria of Intelligence. No absolutely satisfactory definition of intelligence has been formulated though many attempts have been made. William Stern, a German psychologist and philosopher, has singled out three basic criteria of raw intelligence or native ability:

1. Attention—a selective, self-directing force—the power to direct and control one's mental activities.

2. Adaptation, or fitting in constructively; it is not merely passive to environment, but it is a creative force, a problem working mind.

3. Auto-criticism, or judging one's self or one's accomplishments by the same critical standards that one would apply in judging others.

Judged by any criterion, there are many grades of mental capacity. This is no recent discovery, but measuring scales of native intelligence are the contribution of this century. The value of such scales is incomparable. They have been called "a mariner's compass for educational and vocational guidance."

"There are few if any more significant events in modern history," says Professor Terman, "than the development which has recently taken place in mental measurement." He also adds: "Standardized tests of the school's raw material can no more be dispensed with than standardized tests in agriculture, manufacturing, or medicine."

Supervisor Virgil Dickson, who has had notable success in applying scientific methods to the schools under his administration, emphasizes the importance of intelligence tests for the guidance and placement of children in our schools. "Intelligence tests," he says, "are of fundamental importance in pointing the way to more intelligent classroom procedure. They will assist in the study of methods, in the segregation of children according to capacity, in making and adapting the course of study, and, finally, in determining the success of instruction."

Applying Psychometric Tests. Psychological tests have been called by Henry C. Link, a conservative critic, "one of the greatest single contributions to the field of education in our time." He also adds: "It is impossible to make an entire separation between inborn ability and the facility of using it." There are qualitative as well as quantitative factors that must enter into the estimate of human conduct. Emotional and character traits are essential in the summing up of an individual's capacity. "All that a man is, is the measure of a man." The cautious psychologist, like the cautious physician, will enlarge his data and minutely scrutinize the evidence before giving his conclusion. The danger from hasty or imperfect judgment cannot be too strongly emphasized in submitting school children to mental tests. Because of the many possible retarding influences, no one psychological test in a doubtful case should be the determining factor. The disaster of a false stigma for life is too great. No child should ever be rated as incapable until he has been studied

from every possible standpoint. With this caution in mind, mental measurements are indeed "a mariner's compass for educational guidance."

Vocational Guidance. For vocational guidance, three main types of innate ability or native intelligence have been selected for different types of occupation:

1. Keenness for abstract ideas—the scholarship type of mind;

2. Motor intelligence or skill with use of the hands—the mechanical type;

3. Social ability or the ability to get on well with men, ability to influence them—the social leader, the superintendent, the salesman.

It must be emphasized again and again that intelligence alone will not account for a man's success or failure in life. Success depends also upon certain personal traits which modify the use he makes of his native intelligence. Physical conditions, previous training, industry, personality, power of self-expression, disposition, and attitude toward life, all enter in. Other factors must be recognized as sometimes unnecessarily dooming a man to failure; as, unfamiliarity with language, undue slowness, a sense of awkwardness, hypersensitiveness, emotional strain, lack of incentive, indifference to the task or even antagonism to it. Intelligence is essential, but it is not the only factor. If honest and industrious and anxious to succeed, a man of mediocre intellect may surpass in achievement one of much higher mental grade who is a slacker at his task or is antagonistic to it. Moral qualities count.

Use and Abuse of Mental Tests. The following anecdote will illustrate the radical difference between the abuse of mental measurements through ignorance and their use through scientific procedure: Two little brothers were brought to the psychological laboratory for mental tests because of serious school complications. The older boy, nine and a half, had been in school three and a half years and had been twice demoted. He had been pronounced incapable of learning to read and his number work in fundamental operations was equally a failure.

The younger boy, eight years of age, had succeeded well in all of his school work and had recently been promoted. He was now placed one grade above his older brother, who was in the same school. The tragedy of sorrow in the life of this older boy no one can ever know. It was written in the joylessness of his whole attitude, the utter absence of all animation. The younger boy was filled with laughter and showed great eagerness for the task which was before him.

The two little lads were given the same standardized mental test, and everything that might be significant in the manner of their responses was noted. Sight difficulty was at once detected in the older boy. There was great eyestrain and lack of focusing power. Consequently, he could not take the reading tests. He also failed in close picture discrimination, but in picture interpretation he was excellent. His mind was creative and he was sympathetic. Questions requiring judgment he answered well. Language discriminations were especially good. His final rating by the Stanford Revision of Binet was mental ability considerably above his own age level. The younger boy was not the intellectual superior of his brother, as had been thought, though he surpassed him in the mechanism of the three school R's. Both were children of superior minds, but one child had been retarded because of physical disability.

What was the remedy for the situation here outlined, which also has its parallel in many homes? The older boy went that very day to an oculist, who was amazed that the boy with such eyes had never been fitted with glasses before. Neither at home nor at the country school to which he went was there anyone trained to recognize his defects or to provide for their correction.

A second recommendation was that, by a little individual coaching, the older boy should be helped to make his grade. His advancement was rapid and the crowning joy came when his mother wrote, "J— is such a happy boy now. He goes about the house night and morning whistling." He had never whistled before.

Psychology Applied. Said a young man who came to the psychological laboratory: "I have come to you for help. I'm no good in business. What is the matter with me?" A single common sense glance helped to the answer,—dress shabby, uncared for, drooped shoulders when sitting or standing, a look of discouragement and the sound of it in the voice. Added to this was his revelation of himself, a salesman by accident, no enthusiasm for his work, no faith in himself, but instead a hanging on to old regrets, a phobia of fear lest some greater disaster should come upon him. In other words, he was an egoist, not in the sense of elation and self-glorification, but rather in the negative sense of self-depreciation. He had sold his manly vigor to fear and discouragement. He did not sleep well at night. He had also lost all healthy appetite. Fear was his destroyer.

A careful psychological test revealed normal ability, not superior but fair, memory span a little below normal. A medical examination revealed no disease but the need of more vigorous exercise and better living. The remedy self-applied was more faith in himself,—to forget yesterday, to believe in tomorrow, and to be determined, above all, to be determined to be a success. This one thing I do and I do it with all the power that is in me.

The young man has reported to the laboratory again. He has not attained but he is attaining. He believes in himself. He believes in his selling proposition. He will finally succeed. A barely normal mentality means hard work, but work will win. This is psychology applied to life. It does not promise desired success. It makes no vain promises; but it does give the assurance of more intelligent procedure. Cases of scientific reconstruction such as this could be multiplied.

Personal Efficiency. A study of efficiency brings one to close personal questions: Am I efficient? What can my mind do? What can my body do to help my mind? Is my mind doing all it can do? Why not? For personal efficiency to the extent of one's ability, and that is for each individual his 100 per cent, Oswald's Imperative of Energetics is the one rule: "Waste no free energy; treasure it and make the best use of it."

There are many inquiries into the subtlety and complexity of mind that cannot be answered. Some of them are under scientific investigation and will be carried to solution. Many others are vain suppositions, wandering through a maze and leading into blind pockets of confusion.

The psychologist must remember that he is a scientist. He must weigh values carefully and adjust accordingly.

Psychology as a science is an endeavor to understand life. Practically applied, it is a constructive process. Man by nature is endowed with certain potentialities. We must not emphasize intelligence to the extent of ignoring instinctive, emotional, and character traits, neither must we allow the importance of the latter to obscure intelligence as a fundamental factor in all behavior. Economy of training demands that we utilize original forces in the building up of the individual and give to every man freedom for growth and development into the fullness of self-expression and self-realization.

Nature and nurture are companion forces in the making of the individual. For "the nobler race that is to be," psychology must combine with the twin sciences, eugenics and euthenics. It is the right of every individual to be well-born. He has also the inalienable right to a rich and full development of all his powers and possibilities.

BIOLOGY

Biology treats of living organisms. Broadly stated, it is the science of life. In its most inclusive sense it embraces every form, activity, and function of living beings. From this standpoint, all human knowledge, human history, and human progress, including anthropology, ethnology, psychology, and sociology, as well as all the facts of zoology, botany, and paleontology, may be regarded as part of biological science. As commonly understood, however, biology is the study of the *general principles* concerning the *origin, development, structure, function, reproduction,* and *distribution* of plant and animal life. Among the most important and widely accepted tenets of biology are the cell theory, the doctrine of evolution, and the principle of metabolism or chemical change accompanying all vital processes.

HISTORY OF BIOLOGY

Even the savage is gifted with some powers of observation. He can divide living matter into its two great divisions of plants and animals. He can further divide these into tree, shrub, herb, beast, bird, and fish. In so far as he is able to do this, to that extent he is a biologist. From this it is readily seen that developing powers of observation will produce two kinds of naturalists—those who observe plants, or botanists, and those who observe animals, or zoologists.

Ancient Period. Early in authentic Greek history Hippocrates (460–357 B. C.) began to study the human body and discarded the theory that disease was due to the wrath of the gods. About a century later Aristotle (384–322) began to classify animals. Soon afterward Theophrastus (372–287) described and classified more than 500 kinds of plants as trees, shrubs, and herbs. In the early years of the Christian era Pliny (23–79 A. D.), the Roman naturalist, wrote his voluminous natural history. About the same time Dioscorides, a Greek physician, collected a vast store of information on plants, embodying it in a famous *Materia Medica* which remained an authoritative work for 1500 years. Galen (130–201) described two sets of nerves and proved that the arteries contain blood.

Modern Period. During the middle ages science seems to have become lost in the vagaries of alchemy. But beginning with the 16th century the study of biological science began to subdivide into specialized branches. Vesalius (1514–1564) advanced the study of anatomy. Gesner (1516–1565) formed a botanical garden and a zoological cabinet. Cæsalpinus (1519–1603) originated the first system of classifying plants.

In the 17th century Fabricius (1537–1619) discovered the valves in the veins, and Harvey (1578–1657) discovered the mechanism of the circulation of the blood, opening a new branch of anatomy. Harvey also advanced the study of embryology by his famous assertion *Omne vivum ex ovo*, that is, all animals are produced from an ovum or egg. Rudbeck (1630–1702) discovered the lymphatics. Malpighi (1628–1694) applied the microscope to physiology and anatomy, discovering air cells in the lungs, and, with Grew, revealing the cellular nature of plants. Ray (1628–1705) and Willughby (1635–1672) classified the entire animal and vegetable kingdoms, and laid the foundation for the later work of Linnæus and Cuvier.

In the 18th century Boerhaave (1668–1738) began the science of organic chemistry. Haller (1708–1777), of Gottingen, investigated muscular irritability. John Hunter (1728–1793) advanced the study of comparative anatomy. Bonnet (1720–1793) contributed to plant physiology and originated the term "evolution." Buffon (1707–1788) wrote the first modern natural history and added the geographical distribution of animals to science. Linnæus (1707–1778) revolutionized the study of botany and zoology by inventing the binomial system of classification and by originating the exceedingly valuable divisions of genus, species, order, and class, which led to the present world-wide use of scientific names. Hutton (1726–1797) founded modern geology by teaching that present processes are sufficient to explain the formation of stratified rocks and the formation and preservation of fossils.

The 19th century began with the recognition of the work of Jussieu (1748–1836), who founded the natural system in botany. Cuvier (1769–1832) likewise established an exceedingly valuable natural system for the classification of animals. Bichat (1771–1802) studied the tissues or parts of organs, laying the foundation for the science of histology. Sprengel (1766–1833) studied the fertilization of plants by insects. Robert Brown (1773–1858) developed embryological botany. Lamarck (1744–1829), the true father of the modern doctrine of evolution, advanced the theory of the development of organs by environment, or by the results of use and disuse. Von Baer (1792–1876) placed the study of embryology on a scientific basis. Schleiden (1804–1881), working from the botanical side, and Schwann (1810–1882), working from the zoological side, resolved all living organisms into cells, and, in 1839, established the cell theory which is the foundation of modern biology.

Early in the second half of the 19th century, Charles Darwin (1809–1882) and A. R. Wallace (1823–1913) simultaneously developed the theory of organic evolution beyond all previous attempts by their hypothesis of natural selection, or the survival of the fittest. The controversy which this new doctrine aroused greatly stimulated biological investigation and research, leading to discoveries of immense practical and theoretical value, and finally placed biology in the front rank among modern sciences. The theory of evolution became firmly established in the scientific world largely through the teachings of Huxley, Hooker, Herbert Spencer, Fritz Müller and Asa Gray, supported by numerous other investigators. Following the lead of Darwin, Galton (1822–1911) developed a theory of eugenics. Weismann (1834–1914) showed that heredity has a physical basis and maintained the "all-sufficiency of natural selection."

About the beginning of the 20th century, De Vries advanced the theory of mutations and, in 1900, simultaneously with Correns and Tschermak, discovered and brought to light the long obscured but valuable researches of Gregor Mendel (1822–1884) on heredity. During the first two decades of the 20th century, extensive investigations were carried on in the field of genetics, centered chiefly around the Mendelian principles, and testing the validity of Mendel's laws of heredity, which, on the whole, have been confirmed. Among the leading investigators in this field were Bateson, Morgan, Whitman, Riddle, Castle, Tower, Jennings, and Davenport.

The practical results of biological research since the middle of the 19th century have been of incalculable value,—the advances in curative and preventive medicine alone being greater than during any preceding period. In agriculture, horticulture, stock breeding, animal industry, hygiene, and sanitation, the progress due to the discoveries of modern science has been revolutionary. In addition, the methods and principles of modern biological study have been extended into psychology, sociology, economics, and other important fields.

Organic Evolution. The doctrine of evolution undertakes to explain the origin and development of the various forms of plant and animal life upon the earth, both past and present. Comprehensively considered, it is a theory of descent, or progressive development, from earlier simple, generalized types

of life to later complex, highly specialized forms. The theory attempts to account for the origin of the different species of plants and animals, including man, by the operation of natural laws.

This doctrine, which has great philosophical as well as scientific significance, has its foundation in certain unities in nature which are universally existent and demonstrable. Chief among these are:

1. The unity of action of the processes of nature.

2. The unity of structure in plants and in animals,—all being composed of cells.

3. The unity in the mode of reproduction in plants and animals,—all arising from germs, seeds, or eggs.

4. The universal presence of protoplasm as the material basis of life.

5. The contractility of protoplasm as the source of all movements of plants and animals.

In its finished and definite form, the doctrine of evolution is a modern product, and its history shows that the idea itself is the result of a long process of evolution. Empedocles (493–435 B. C.) has been styled "the father of the evolution idea." This Greek philosopher believed in spontaneous generation as the explanation of the origin of life, and held that the different plant and animal forms were not produced simultaneously. Aristotle, the greatest natural philosopher of the ancients, is regarded as the originator of the theory of descent. He believed in a complete gradation in nature and held that man is the culminating point in a long and continuous ascent from the simplest or lowest animals.

During the middle ages and until the 19th century, the doctrine of special creation almost universally prevailed. A few, however, questioned it. In the 4th century, Saint Augustine (354–430 A. D.) spoke of the creation of things by a series of causal factors, and, 900 years later, Thomas Aquinas (1227–1274) supported this teaching. The German philosopher Leibnitz (1646–1716) declared his belief in a universal connection between species, which, he maintained, could be changed by a change in environment. The French naturalist Buffon asserted his belief in the mutability of species. Erasmus Darwin (1731–1802), grandfather of Charles Darwin, more or less clearly defined some of the causes of variation in plants and animals.

The French zoologist Lamarck was the true founder of modern evolution. He taught that all organisms develop from germs; that development is always from the simple to the complex; and that the effects of use and disuse may be inherited. His views were almost totally disregarded until Darwin and Wallace formulated upon a different basis the theory of descent which has since revolutionized scientific teaching. The chief tenet of this new theory was natural selection, later defined by Herbert Spencer as "the survival of the fittest."

Darwin did not claim that natural selection was the only factor in evolution, but emphasized, by a monumental array of scientific facts, that it is an important one. Stimulated by the masterly example of Darwin, later investigators have contributed a vast mass of confirmatory evidence. This has established practically universal acceptance by the scientific world of the general theory of evolution as a cosmic process.

Scientists, however, are not agreed as to the relative importance of the various recognized factors in evolution. For example, the principle of natural selection itself is being subjected to rigorous review. In fact, there is an increasing tendency among zoologists to recognize in the Darwinian theory of selection many difficulties not formerly perceived. This has led to a search for supplementary or possibly replacing theories.

According to Davenport, the most advanced theory used in explaining evolution is essentially anti-Lamarckian and anti-Darwinian, and may be described as orthogenetic and vitalistic. It reverts to the idea of evolution from *within*, by virtue of a perfecting or progressive tendency. This conception, which goes back to Aristotle, includes among its modern advocates such eminent scientists as Nägeli and Huxley and also the philosopher Bergson.

Mendel's Law. A principle governing the inheritance of many characters in animals and plants, discovered through experiments on garden peas by Gregor J. Mendel (1822–1884), an Augustinian abbot, of Brunn, Austria. These researches were made between 1851 and 1868, but the results remained unknown to the scientific world until they were brought to light about 1900 by De Vries and others.

Mendel showed that height, color, and other characters depend upon the presence of determining factors which act as units in heredity. For example, there are tall and dwarf peas which breed true from generation to generation. Such plants, therefore, have a pair of marked and easily recognizable opposite "unit" characters, *tallness* and *shortness*. In Mendel's experiments the tall and the short forms were crossed with one another, and their ripened seeds collected and sown. The new plants resulting from this crossing were found to belong *entirely* to the *tall* variety, which had apparently extinguished the short.

However, when the flowers of this generation were self-fertilized and their seeds sown, the resultant plants were a mixture of tall and short plants. Furthermore, these mixed tall and short plants were found to occur in *definite numerical proportions*. On the average, *three* of the tall forms occurred to every *one* of the short forms. From this it was clear that the quality of shortness or dwarfishness was not extinguished in the second generation, but was merely temporarily obscured, though present potentially.

To the character which alone appears in the first cross was given the name *dominant*. In this particular case tallness is dominant. To the obscured character which remained hidden in the first cross, the name *recessive* was given. In this instance shortness or dwarfishness is recessive. Mendel further found that in case the talls and the shorts of the *third* generation are allowed to be self-fertilized, all of the recessives, or shorts, breed true, and will continue so to breed unless again artificially crossed. On the contrary, the dominants, or talls, after self-fertilization, produce both talls and shorts. A *part* of the talls, like *all* of the shorts, will breed true, and continue to breed true. But the others will produce a mixed progeny of talls and shorts.

From this Mendel found that, out of each 100 descendants of the first cross, 75 on the average will be dominants (talls) and 25 recessives (shorts). Of the 75 talls, 25 will be pure and will continue to produce talls, and 50 will be mixed and their descendants will consist of pure dominants, mixed dominants, and recessives. The mixed will continue to breed indefinitely in the proportion of 25 pure talls, 50 mixed, and 25 pure shorts.

While Mendel's original experiments were confined chiefly to seven pairs of contrasting or unit characters, as exemplified in peas, it has been proved that this same qualitative and numerical relation exists in regard to many different qualities and characters of plants and animals, such as the colors of flowers, of hair or eyes, peculiarities of structure, or power of resisting certain diseases. The task of modern biology is to ascertain what characters or qualities are subject to Mendel's law of inheritance, and to test the results practically in the field of agriculture, horticulture, stock breeding, and eugenics.

Experience has already shown that great improvements can be made by applying Mendelian principles to the breeding of such anciently established crop plants as wheat, oats, and tobacco. From this it follows that many important economic plants which have only recently been placed in cultivation, such as rubber, coconut, jute, and cacao, offer limitless possibilities for scientific improvement.

ZOOLOGY

Zoology is the science that treats of animal life. The study of animals from various points of view gives rise to special divisions of the science. Thus *Anatomy* is concerned with the gross structure of animals; *Histology*, with their minute structure and tissues; *Cytology*, with the structure and development of the cells which compose the tissues; *Physiology*, with the function or use of organs; *Taxonomy*, with classification; *Paleontology*, with extinct or fossil animals; *Ecology*, or *Bionomics*, with the relation of animals to their environment; and *Economic Zoology*, with the relation of animals to man.

The study of certain groups of animals is known by special names, as, for example, the study of mammals is *Mammalogy*; of birds, *Ornithology*; of reptiles, *Herpetology*; of fishes, *Ichthyology*; of insects, *Entomology*; of mollusks, *Malacology* or *Conchology*; of worms, *Helminthology*.

CLASSIFICATION OF ANIMALS

Systematic zoology, called also *Taxonomy*, treats of the orderly arrangement of animals according to their natural relationships. The animal kingdom is divided into primary groups, or subkingdoms, called *Branches* or *Phyla*. These, in turn, are divided into *Classes*. Classes are divided into *Orders*, orders into *Families*, families into *Genera*, genera into *Species*, and species into *Varieties* or *Races* composed of individuals.

The naming of animals and of the groups to which they naturally belong, so as to make clear the character of the animal and its place in nature, comprises what is called *nomenclature*. Scientific nomenclature consists of the technical terms employed uniformly by scientists throughout the world, regardless of their nationality or language.

The *scientific name*, by which an animal or plant is universally known, consists of two Latinized words. The first of these is the name of the *genus* to which the animal or plant belongs. It is called the *generic name* and always begins with a capital letter. The second word of a scientific name denotes the *species* to which the animal or plant belongs. It is called the *specific name*. Usually this word is in the form of a Latin adjective. In zoology, and for the most part in botany, it begins with a small letter.

The difference between a scientific name and a common name is well illustrated in the case of the puma, a large, catlike animal which is found over much of North and of South America. Even in the United States, the puma is known by several other common or local names, such as cougar, catamount, panther, painter, and mountain lion. In Argentina and other South American countries it has various names of Spanish and Indian origin. In consequence much confusion of names arises. But the scientific name by which the puma is instantly recognized by zoologists in the United States, in Argentina, or in any other country in the world, is *Felis concolor*. *Felis* is the Latin name of the cat, which, in zoology, is used as the name of the "cat" genus, while *concolor*, the name of the species, is a Latin adjective meaning "of a uniform color." The adoption of this form of scientific name, consisting of two words indicating at once the genus and the species, was one of the great contributions made to modern science by Linnæus, the famous Swedish naturalist. Its use has revolutionized systematic zoology and botany.

The complete classification of the puma, showing its place in the animal kingdom is as follows:

Subdivision:	*Metazoa*, or Multicellular animals.
Phylum:	*Chordata*, or Chordate animals.
Subphylum:	*Vertebrata*, or Backboned animals.
Class:	*Mammalia*, or Mammals.
Order:	*Carnivora*, or Flesh-eaters
Family:	*Felidæ*, or Cat Family.
Genus:	*Felis*, or True cats.
Species:	*Concolor*, or uniformly colored.

Most scientific names are derived from Latin and Greek words, but some are Latinized forms of words from other languages. Although some scientific names are long, complex, strange sounding words, many are shorter and simpler than the corresponding common names. In numerous cases the scientific name of an animal or a plant has been adopted as the common name. Examples of this use among animals are alligator, boa constrictor, gorilla, hippopotamus, hyena, ibis, octopus, python, rhinoceros, trogon, and vireo. Similar examples among plants are alyssum, anemone, asparagus, aster, azalea, begonia, cactus, chrysanthemum, clematis, fuchsia, geranium, magnolia, petunia, and sassafras.

According to the widely used classification of Parker and Haswell, the animal kingdom comprises twelve phyla or branches, arranged in two subdivisions, as follows:

ANIMAL KINGDOM

Subdivision Protozoa

(*Unicellular Animals*).

Phylum I. Protozoa, or Protozoans. Animals composed of a single cell; or, if of several cells, these are of the same kind.

- Class 1. *Rhizopoda*. Amœbas.
- Class 2. *Mycetozoa*. Slime molds.
- Class 3. *Mastigophora*. Protozoa without cilia but with flagella.
- Class 4. *Sporozoa*. Internal parasites.
- Class 5. *Infusoria*. Protozoa with cilia or with sucking tentacles.

Subdivision Metazoa

(*Multicellular Animals*).

Phylum II. Porifera, or Sponges. Fixed aquatic animals whose body wall is perforated with incurrent pores.

Phylum III. Cœlenterata, or Polyps. Animals with radial structure and possessing nettling or stinging organs, whose body cavity is a food sac.

- Class 1. *Hydrozoa*. Hydroids.
- Class 2. *Scyphozoa*. Jellyfishes.
- Class 3. *Actinozoa*. Sea anemones and corals.
- Class 4. *Ctenophora*. Ctenophores.

Phylum IV. Platyhelminthes, or Flatworms. Bilaterally symmetrical, soft-bodied animals, without true segmentation of the body.

- Class 1. *Turbellaria*. Planarians.
- Class 2. *Trematoda*. Flukes, parasitic.
- Class 3. *Cestoda*. Tapeworms.
- Class 4. *Nemertinea*. Nemertines, aquatic, carnivorous.

Phylum V. Nemathelminthes, or Roundworms. Bilateral, unsegmented, round-bodied; usually with alimentary tract.

- Class 1. *Nematoda*. Threadworms.
- Class 2. *Acanthocephala*. Parasitic; mouth wanting.
- Class 3. *Chætognatha*. Marine "arrow worms."

Phylum VI. Trochelminthes, or Wheel Animalcules.

- Class 1. *Rotifera*. Microscopic wheel animalcules.
- Class 2. *Dinophilea*. Minute, wormlike, marine forms.
- Class 3. *Gastrotricha*. Minute, spindle-shaped, freshwater forms.

Phylum VII. Molluscoida, or Sea Mats and Brachiopods.

- Class 1. *Polyzoa*. Bryozoans.
- Class 2. *Phoronida*. Wormlike polyzoans.
- Class 3. *Brachiopoda*. Lamp Shells.

Phylum VIII. Echinodermata, or Echinoderms. Animals with radial structure, with calcareous plates in the skin, and with intestinal wall distinct from body wall.

- Class 1. *Asteroidea*. Starfish.
- Class 2. *Ophiuroidea*. Brittle Stars.
- Class 3. *Echinoidea*. Sea Urchins.
- Class 4. *Holothuroidea*. Trepangs or Sea Cucumbers.
- Class 5. *Crinoidea*. Crinoids or Sea Lilies.
- Class 6. *Cystoidea*. Fossil forms.
- Class 7. *Blastoidea*. Fossil forms.

Phylum IX. Annulata, or Worms. Bilateral, segmented worms without jointed legs.

- Class 1. *Chætopoda*. Annelids.
- Class 2. *Myzostomida*. Parasites of crinoids.
- Class 3. *Gephyrea*. Marine sessile annelids.
- Class 4. *Archi-Annelida*. Minute marine annelids.
- Class 5. *Hirudinea*. Leeches.

Phylum X. Arthropoda, or Arthropods. Symmetrical, segmented animals, with jointed appendages.
- Class 1. *Crustacea.* Crustaceans.
  - Subclass 1. *Entomostraca.* Water Fleas.
  - Subclass 2. *Malacostraca.* Crabs, Crawfish.
- Class 2. *Trilobita.* Extinct (fossil) trilobites.
- Class 3. *Onychophora.* Peripatus.
- Class 4. *Myriapoda.* Centipedes and millipedes.
- Class 5. *Insecta.* Insects.
- Class 6. *Arachnida.* Spiders, scorpions.

Phylum XI. Mollusca, or Mollusks, Animals with unsegmented body, and without jointed appendages, with a muscular organ of locomotion, called the "foot," and usually with a shell.
- Class 1. *Pelecypoda.* Bivalves,—clams, oysters.
- Class 2. *Amphineura.* Chitons.
- Class 3. *Gastropoda.* Gastropods,—snails, whelks, limpets.
- Class 4. *Scaphopoda.* Tusk Shells.
- Class 5. *Cephalopoda.* Cephalopods,—cuttlefish, squids, octopods, nautilus.

Phylum XII. Chordata, or Chordates. Animals having a notochord which may persist from birth and in the adult become replaced by a bony or cartilaginous axis, the spinal or vertebral column.
- Subphylum A. *Adelochorda.* Balanoglossus,—marine, wormlike animals.
- Subphylum B. *Urochorda.* Ascidians,—marine animals having a notochord when larvæ.
- Subphylum C. *Vertebrata.* Vertebrates. Animals having a backbone.
  - Section I. *Acrania.* Animals without a head, includes the lancelets (*Amphioxus*).
  - Section II. *Craniata.* Animals with a head, includes fishes, amphibians, reptiles, birds, mammals.
    - Class 1. *Cyclostomata.* Cyclostomes,—lampreys.
    - Class 2. *Pisces.* Fishes.
    - Class 3. *Amphibia.* Amphibians.
    - Class 4. *Reptilia.* Reptiles.
    - Class 5. *Aves.* Birds.
    - Class 6. *Mammalia.* Mammals.

ANIMALS

Adjutant (*Leptoptilus*). A very large land bird of the stork family, so named for its measured walk, which at times absurdly resembles that of a self-important army officer.

The Indian adjutant (*L. dubius*), of southeast Asia, a huge, untidy looking bird, stands about 5 feet high, with a wing spread of about 10 feet. It has long legs, an enormous bill, a curious pouch hanging from the chest, and the head and neck are bare. In color it is ashy gray above and white below. The tail coverts are composed of beautiful, soft, downy plumes. The adjutant is a true scavenger, feeding largely on carrion, but also capturing living prey, such as fish, tortoises, snakes, and other small animals, and is protected by law in various Indian cities. It nests on rocky cliffs or in high trees, and lays from 2 to 4 chalky white eggs.

The somewhat smaller African adjutant, or Marabou Stork (*L. crumeniferus*), a conspicuous bird throughout tropical Africa, assists the vultures in cleaning up the refuse of towns and cities. The similar Javan adjutant (*L. javanicus*) is widely distributed in the East Indies. From the tail and wing coverts of all three species are obtained the beautiful marabou feathers or plumes of commerce.

Albatross (*Diomedea*). A group of large oceanic birds, with long, narrow wings, webbed feet, and tubular external nostrils. There are about 18 species, found chiefly in warm southern seas.

Albatrosses display truly remarkable powers of flight, sailing in the air for perhaps an hour without the slightest apparent motion of the expanded wings, which are of the type that best fulfills the conditions required by an airplane. Those of a full-grown albatross may have a spread of 11 feet, yet they are not more than 9 inches wide. The weight of the body rarely exceeds 18 pounds. Albatrosses feed upon fish, cuttlefish, jellyfish, and offal thrown overboard from ships. At nesting time they resort in great numbers to isolated islands, where they build moundlike nests of mud and grass, in which a single very large egg is laid.

The wandering albatross (*D. exulans*), widely distributed over southern oceans, with a wing spread of 10 to 11 feet, is the largest and handsomest species. Its white plumage is marked with narrow, black, transverse lines on the back. The similar royal albatross (*D. regia*) occurs in New Zealand waters. The white-winged albatross (*D. chionoptera*) inhabits the Indian Ocean. The black-footed albatross (*D. nigripes*), with dark plumage and a wing spread of only 4 feet, and the short-tailed albatross (*D. albatrus*), with white plumage and a wing spread of about 4½ feet, are found in the Pacific from California to Alaska.

Alewife (*Pomolobus pseudoharengus*). A small, herring-like fish, 8 to 10 inches long. It is very abundant on the Atlantic coast, leaving the ocean to ascend rivers at spawning time. While inferior in quality to salmon and shad, the alewife is taken in such enormous numbers that, in commercial value, it ranks next to them among sea fishes taken in American rivers. See *Herring*.

Alligator. A genus of saurian reptiles, natives of America and China, closely related to the crocodile. They differ from the true crocodiles in having a broader head, blunter nose, and cavities or pits in the upper jaw into which the long canine teeth of the under jaw fit. Alligators also have thicker, heavier bodies than crocodiles, and, when full grown, are dull black, while crocodiles are dull gray. The largest alligators attain a length of 16 feet, but living specimens exceeding 12 feet in length are very rare.

The female alligator lays from 30 to 40 hard white eggs, about the size of those of a goose. These are deposited in a heap of sand, muck, or vegetable matter, where they are hatched by the heat of the sun or by the fermentation of the vegetable mass. The mother watches the nest until the young appear, immediately conducting them to the water. Alligators live chiefly on fish, but they also catch various land animals that venture into the water. According to W. T. Hornaday, there is no authentic record of the loss of a human life by an alligator.

Unlike crocodiles, alligators rarely leave fresh water. They prefer sluggish creeks and stagnant ponds, along large rivers. In these they lie in wait for their prey, with only the tip of the snout and the eyes protruding from the water. During the hottest part of the day they often bask in the sun on shore, returning to the water at night.

The American alligator (*A. mississippiensis*) was once exceedingly abundant throughout the Gulf states from southeastern North Carolina southward throughout Florida and westward to the Rio Grande river in southern Texas. Alligator hide makes excellent leather for various purposes. Consequently, the alligator, like the buffalo, has been slaughtered by millions, so that it has become comparatively rare. The much smaller but very similar Chinese alligator (*A. sinensis*) is only 6 feet long. It was discovered in the Yangtze river in 1870 by Swinhoe. See *Cayman, Crocodile, Gavial.*

Alpaca (*Lama pacos*). A domesticated form of the guanaco, a ruminant animal smaller than the llama, belonging to the camel family. It is raised in large herds in the high valleys of the Andes for its valuable silky wool. In appearance the alpaca is very sheeplike, except for its slender neck and erectly carried head. It bears a heavy coat of dark brown wool, which sometimes attains a length of two feet. Remains of blankets woven from alpaca wool have been found in the most ancient Incan tombs.

Like the llama, the alpaca feeds on the coarse, scanty grass and mosses of the higher Andes. It seems incapable of existing upon any other food or in any other climate. All attempts to rear the alpaca

in other regions of the world have failed. Alpaca wool, long an important article of commerce in Peru and Bolivia, has, since 1836, been extensively exported to the outside world. See *Guanaco, Llama.*

Amœba (*ȧ-mē'bȧ*). A minute protozoan, about $\frac{1}{100}$ of an inch in diameter, one of the simplest forms of animal life. It inhabits fresh water and moist earth. When observed under a microscope, its body is found to consist of a single cell of naked protoplasm. The amœba moves about by thrusting out portions of protoplasm in one direction and drawing them in from the opposite direction. It takes in food by a similar process, is sensitive to light, heat, and the contact of foreign bodies, and reproduces its kind by simple division,—the parent amœba splitting into two smaller similar organisms which, upon attaining maturity, split into new individuals as before. This animalcule is often selected to illustrate the fundamental animal processes of motion, sensation, nutrition, and reproduction, all of which it clearly exemplifies in a single cell. See *Protozoans.*

Amphibians (*Amphibia* or *Batrachia*). This class contains the cold-blooded vertebrates known as frogs, toads, salamanders, newts, proteans, sirens, and their allies. These form an interesting connecting link between the reptiles and the fishes. A typical example of this class hatches from an egg deposited in the water and begins life as a *gill-breathing* water animal, like a fish. Later, it becomes a *lung-breathing* land animal, like a reptile. From this arises the name amphibian, which means literally a "creature of two lives."

The number of existing species of amphibians is estimated at from about 1100 to 2200. In size they range from cricket frogs a half inch long to salamanders three feet in length. None has a poisonous bite though some protect themselves from attack by acrid secretions of the skin. Amphibians feed chiefly on worms, slugs, and insects, and hence are useful to agriculture. While not of much importance economically, practically all are of some value to man.

The class *Amphibia* comprises three living orders: *Anura*, tailless amphibians, including frogs and toads; *Urodela*, tailed amphibians, including salamanders, newts, proteans, and sirens; and *Apoda*, wormlike amphibians, including the cæcilians. See *Frogs, Salamander, Toad, Tree Frogs.*

Anaconda (*Eunectes murinus*). The largest of New World snakes, sometimes exceeding 30 feet in length, and second in size only to the reticulated python. Combining aquatic with arboreal life, the anaconda inhabits swamps and rivers in the dense forests of tropical South America. Its vertical nostrils are provided with valves which can be closed when submerged. Its eyes are elevated so that it can look downward as well as forward. It spends much time in the water, watching for its prey, with only a small part of its head above the surface. While powerful enough to crush a small deer, it feeds chiefly upon small mammals and water birds. Unlike other boas, it is ill-tempered. On land it is sluggish and not feared by the natives who kill it for its skin and use its flesh for food. See *Boa, Python.*

Anchovy (*ăn-chō'vi*) (*Engraulis*). A dwarf herring with the snout projecting beyond the wide mouth, frail bones, and oily, tender flesh. The European anchovy (*E. encrasicholus*), about 3 inches long, is caught in immense numbers along the shores of the Mediterranean when it comes in from the Atlantic to spawn. Anchovies are preserved in oil, often with spices, or made into a fish paste and used as a relish. Anchovy sauce is made now just as it was by the ancient Romans, by boiling the fish over a slow fire with melted butter. See *Herring, Sardine.*

Anteater (*Myrmecophaga jubata*). A large edentate mammal, of Central and South America, so named because it feeds entirely upon ants; called also tamanoir. It is an animal of truly remarkable appearance, with an immense bushy tail, narrow head, and small ears. The nose and jaws are prolonged into a sort of tube, with a small, circular, toothless mouth at the end. Through this tubular snout it thrusts out its slender elongated tongue, about 18 inches long, covered with glutinous saliva, with which it gathers its insect food. Its body is about 4 feet in length, its tail 2½ feet, and it measures about 2 feet in height at the shoulder.

While large and strong, the anteater is timid and inoffensive, and is easily overcome by the jaguar and other enemies. It lives upon the ground, hunts its insect food by night, and sleeps in a lair in the tall grass during the day. See *Armadillo, Pangolin, Sloth.*

Antelope (*Antilopinæ*). A large group of hollow-horned ruminants of the ox family (*Bovidæ*). They are intermediate between the ox and the goat, and include some of the swiftest and most graceful of the four-footed animals. There are about 150 species, all except some 15 of which are found in Africa, the others occurring in Europe and Asia, no true antelope being found in America or Australia. The American pronghorn, popularly called an antelope, belongs to a different family.

Most antelopes are slender, deerlike creatures with horns more or less twisted, and generally, though not uniformly, borne by both sexes. In size they vary from pygmy duikerbok gazelles, only a foot tall, to huge oxlike species, such as the eland, which sometimes attain a weight of 1500 pounds. In color they range from black to brown, roan, sandy, purple, orange, dun, bluish, and gray to white, and are often strikingly marked with brilliant spots and stripes. Antelopes are useful and valuable animals, seldom damaging cultivated fields, and are highly prized for their flesh, horns, and hides.

Some of the most noteworthy African antelopes are the addax, bushbuck, eland, gazelle, gemsbok, gnu, hartebeest, koodoo, oryx, rietbok, sable antelope, steenbok, and waterbuck. Among the Asian antelopes are the chousingha, the nilgai, the saiga, and the sasin or blackbuck of India. Many species were once immensely abundant in various portions of Africa, but, like the buffalo in America, they have been so extensively hunted for food that their numbers have become greatly depleted. See *Chousingha, Eland, Gazelle, Gnu, Nilgai, Pronghorn.*

Ants. Insects with four membranous wings; in some cases, wingless. They are related to sawflies, wasps, bees, and other members of the order *Hymenoptera.* These insects are the highest developed representatives of their class, the six-footed creatures of the world. No insects are more familiar than ants, which, in some ways, are the most intelligent and interesting examples of the order, yet even these are often confused with insects that are not ants at all. The so-called white ants resemble the typical ants only in their colonial habits, and the velvet ants are hymenopterous insects allied to the wasp group. True ants may always be told by the *one* or *two scalelike segments* between the thorax and abdomen of the body, a characteristic found in no other group of insects.

All ants live in communities or colonies, and these assemblages are composed of several kinds of individuals. There are winged males and females as well as wingless workers in all typical colonies. In addition, there may also be exceptionally developed workers with tremendously specialized heads and jaws, the so-called soldiers, together with fertile wingless males and females. Eight different kinds or castes of ants are known to science, but not all of these can be found in any one colony, as certain castes peculiar to one species are not developed in another.

It is thought that most colonies are established by a single young fertile queen which, immediately after mating, builds a small nest, lays a few eggs, and at first cares for the issuing brood unaided. The first larvæ are always workers; these develop

rapidly and, upon reaching the adult condition, take over the responsibility of the colony. A curious fact is noted in the feeding of the first brood by the queen. This is done by regurgitation of gland-manufactured food, for the queen does not eat during this period. The above described method of founding new colonies prevails in the case of many common species. However, as many of the more than 2500 known kinds of ants have not been thoroughly studied, it is probable that other colonizing habits exist among them.

Ants, like all hymenopterous insects, undergo complete metamorphosis. They pass through an egg, larva, pupa, and adult stage in the course of their life cycle. The larvæ and pupæ are commonly mistaken for eggs by the untrained observer; indeed, when dried they are sold as bird food under that name. The eggs of these insects are very small and rarely seen except by students of entomology. Many ants secrete formic acid and when fighting inject it into wounds made by their jaws. Some species are provided with a well developed sting which resembles that possessed by the queen and the worker of the honeybee.

Colonies of ants often consist of many thousand individuals, the greater number of which are workers. These extend the nests, defend the colony, raid other colonies, care for eggs, larvæ, and pupæ, and feed the fertile males and females. Ants swarm in summer, but only to mate and disseminate their kind. After mating, the winged males die, and the fertilized females, upon taking up domestic duties, bite off their wings and never again leave the colony. A queen may live many years, and large ant mounds often represent colonies that have been established a dozen years or more.

Ants make homes or nests of many kinds. Each species, however, makes the same type of nest. The earth-dwelling kinds construct homes which vary in form from a simple tunnel to large complex mounds containing a labyrinth of passages, galleries, food larders, and snug breeding chambers. Some species have several mounds belonging to a single colony. These may be connected by tunnels, roofed passageways, or by hard beaten paths. Of the wood-tunneling species, the large, black carpenter ants make the most elaborate homes. Their nests frequently occupy the greater part of large tree trunks. Tunnels and chambers are cut by the jaws of the workers out of the solid wood, forming a structure that, for utility and complexity, is hardly equaled by the work of any other insect.

Aphids, or plant lice, are sometimes called "ant cows." These insects feed by sucking the juices of plants, which, after elaboration in the body, is excreted as a sweet substance called honeydew. Ants are extremely fond of honeydew and usually may be looked for where plant lice abound. Some species actually protect the aphids, driving away their insect enemies. Others shelter them by building mud sheds over the places where they are feeding. In the case of corn plant lice, the ants go to the length of caring for them during the winter and of transporting them to suitable feeding grounds as necessity demands. This care and protection is repaid by the aphid with its abundant excretion. Ants are known to obtain the honeydew by stroking the aphids with their antennæ. This is a kind of milking process, for the plant lice readily respond to the stimulus by giving up a drop of the coveted liquid.

Economically considered, ants are, for the most part, detrimental to human interests. The large black carpenter ants are extremely destructive to growing trees, tunneling in valuable timber species, especially white pine. They injure frame houses also by making their nests in veranda pillars and sills, often completely destroying them. Certain aphids, known as corn plant lice, are very destructive to corn, feeding at the roots and greatly reducing the possibilities of a crop where they occur in numbers. It has been demonstrated that this aphid is absolutely dependent upon a species of ant which cares for it, and, without the aid of these attendants, the lice would be unable to reach the roots of the plants which they injure.

Of doubtful value to man are the honey ants which are used as food by certain classes of people in Mexico. These ants also occur in the United States and are interesting chiefly because of their peculiar habit of storing honey in living vessels. Certain ants in the colony become these living honey-jars and perform no other duty. Honey brought in by workers is regurgitated into the mouth of a honey ant. This act is repeated until the abdomen of the "receptacle" becomes greatly distended. The honey ants thus actually store this food for the colony. It is these swollen ants that are eaten in Mexico. See *Aphids*, *Honeybee*, *Wasp*.

Aoudad (*ä'ŏŏ-dăd*) (*Ovis tragelaphus*). A goat-like wild sheep of northern Africa, often called Barbary sheep. It is somewhat larger than the domestic sheep and is at once distinguished by a long shaggy mane on the breast which covers the forelegs and reaches nearly to the ground. The Arabs use its flesh for food, weave rugs of its wool, and make morocco leather from its skin.

Ape. A name often employed, in common language, as a synonym for monkey. In its more accurate sense, it is applicable only to the anthropoid apes, so called because they most resemble mankind.

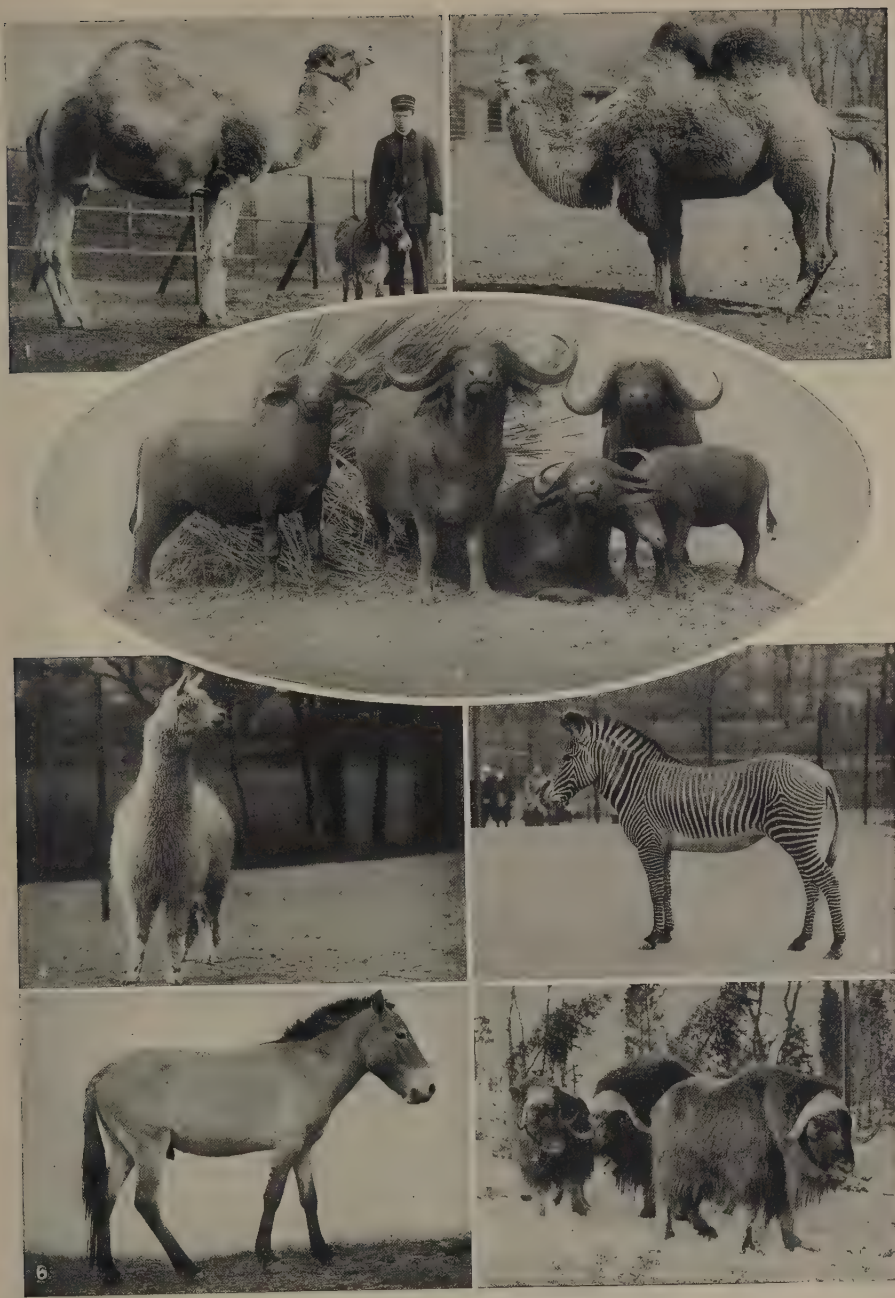
The group of manlike apes (*Simiidæ*), found only in the Old World, includes the chimpanzee, the orang-utan, the gorilla, and the gibbons. Most of these approach and some exceed man in size. They differ from baboons and monkeys in having teeth of the same number and form as in man. All are devoid of tails and cheek pouches; the arms are remarkable for their extreme length and the hind limbs for their shortness. Their hands and feet are equally suited for grasping and climbing. The great length of their arms gives them a peculiar advantage in their native forests, enabling them to climb to the topmost branches or to pass from tree to tree with surprising facility.

The skeleton is substantially similar to the human skeleton, but the spinal column lacks the curvatures which enable man to stand erect with ease. The skull is thicker, the brain case is smaller, and the bulk of the brain much less than that of man. See *Chimpanzee*, *Gorilla*, *Monkey*, *Orang-utan*.

Aphids. Minute, greenish, sap-sucking insects of the order *Hemiptera*. They are commonly found infesting house plants and they abound on field and garden crops. They are gregarious and defenseless, and are preyed upon by many carnivorous animals; but they are able to survive by reason of their extraordinary fecundity.

Aphids are remarkable for their manner of life. Many of them regularly shift from one kind of plant to another during the course of the season. This change of hosts is accompanied by a change in reproductive methods: winged forms are reproduced at the time for the migration, though many generations of wingless forms may have been produced on a single plant prior to the time for the change. Females only are present during the greater part of the season; but both males and females are produced at its close, and eggs are then laid, instead of living young, and only these eggs, produced in autumn, survive the winter. See *Ants*.

Aquarium. An artificial container of water for keeping living aquatic plants and animals under control, and made wholly or partly of glass to facilitate observation. Tumblers, fruit jars, and battery jars serve very well for the smallest aquaria; the larger ones are usually specially built for the purpose. Clean sand and gravel are placed in the bottom to give a foothold for plants. When the amount of animal life present is properly proportioned to that of the green plants, so that the animals yield sufficient carbon dioxide for the plants and the



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HOOFED MAMMALS

1 Arabian Camel or Dromedary. 2 Bactrian Camel. 3 African Buffalo (*Group Mounted by C. E. Akeley, Field Museum*). 4 Alpaca. 5 Grevy's Zebra. 6 Siberian Wild Horse or Steppe Horse (*Equus przewalskii*). 7 Musk Ox.



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NORTH AMERICAN SONG BIRDS

1 Bluebird. 2 Baltimore Oriole. 3 American Goldfinch. 4 Rose-breasted Grosbeak. 5 Mockingbird.
6 Brown Thrasher. 7 Cardinal. 8 Wood Thrush.



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NORTH AMERICAN GAME BIRDS

1 Bobwhite. 2 Mountain Plumed Quail. 3 Ruffed Grouse. 4 Mallard. 5 Green-winged Teal. 6 Canvasback. 7 Wilson's Snipe. 8 American Woodcock.



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RARE OR CURIOUS MAMMALS

1 Great Anteater. 2 Five-toed Echidna. 3 Two-toed Sloth. 4 Brazilian Porcupine. 5 Rat-tailed Opossum. 6 Armadillo. 7 Okapi (*photo by American Museum of Natural History*). 8 Kangaroo.

plants yield sufficient oxygen for the animals, the result is a balanced aquarium. This will run itself, just as nature runs the ponds out of doors, with infrequent changes of water. The plants require sunlight and the animals require food; and the bodies of any of either that die require prompt removal. A cage for terrestrial animals, containing both land and water, is sometimes called a *vivarium*.

Armadillo (*Dasypodidæ*). A group of edentate mammals, chiefly South American, intermediate between the sloths and the anteaters. They are so named because of the hard bony armor which incases and protects the body everywhere except the breast and the abdomen. The legs are short and stout and the feet are provided with strong claws for burrowing. The head has an elongated snout, and the tongue is long. Armadillos are usually small in size, nocturnal and inoffensive in habit, subsisting chiefly upon roots, fruits, worms, ants, and carrion.

The nine-banded armadillo (*Tatusia novemcincta*) is found from southern Texas and Arizona to Paraguay. Inclusive of tail, it is about 2 feet long, being nearly equal in size to an opossum. This species feeds upon worms, snaïls, small lizards, beetles, grasshoppers, and other insects. Its flesh is well flavored and is generally considered palatable food.

The Peba (*Tatusia peba*), with a body 16 inches long and a tail of 14 inches, burrows in open plains from Texas to Argentina, storing in its underground chambers supplies of carrion upon which it largely subsists. Notwithstanding the character of its food, the peba is much hunted for its flesh, which is said to be wholesome and of excellent flavor. See *Anteater*, *Pangolin*, *Sloth*.

Arthropods (*Arthropoda*). A branch of the animal kingdom which includes all invertebrates having segmented bodies and jointed legs or appendages. It embraces the crustaceans, spiders, myriapods, and insects.

In the arthropods the body is composed of segments or rings covered by an outer wall, called the exoskeleton, which serves both as a means of protection for the soft, internal parts and as a place of attachment for muscles. In insects this outside skeleton is composed of a horny substance called chitin. In crabs and crawfishes it is strongly charged with a limy deposit, forming a very hard shell. While closely allied to the higher worms, arthropods differ from them in having jointed appendages consisting of antennæ or sense organs, jaws or mandibles, maxillæ or accessory jaws, palpi or feelers, and legs, *all arranged in pairs*.

The arthropods constitute the largest branch of animals, numbering more than 400,000 known species. By some authorities the unknown and undescribed species are estimated to total several millions.

Ass (*Equus*). An equine mammal distinguished from the horse by its usually smaller size, longer ears, and rougher and more shaggy coat. It differs further from the horse by the absence of warts or callosities on the hind legs, by having the hair of the tail short on the sides and long only at the end, and by having a harsh bray. It differs from the zebra chiefly in the absence of stripes encircling the body. There are two types, the Asiatic and the African.

The Asiatic asses occur throughout the arid interior of Asia, where they have been much hunted since ancient times for their flesh which is ranked in excellence with venison. The Kiang, Koulan, or Dziggetai (*E. hemionus*) inhabits high desert steppes and mountains of Tibet and Mongolia, ranging upward to the snow line. It is one of the largest, most horselike, and swiftest of the wild asses, standing about 4 feet high at the shoulder, dark reddish in color, with black mane and tail and a narrow black stripe along the spine. The Onager, or Ghorkhar (*E. onager*), which occurs on the plains of central Asia, is smaller and silvery white in color, varying to pale sorrel, with a broad back stripe bordered with white. The Syrian wild ass (*E. hemippus*), very similar to the onager, found in Persia and Assyria, is doubtless the wild ass referred to by writers of the Old Testament. It is one of the most agile of four-footed animals.

The African wild ass (*E. africanus*), believed to be the parent species of the donkey, has larger ears, shorter mane, and scanter tail than the Asiatic kinds. In color it is creamy or bluish gray, with a distinct dark stripe along the spine and across the shoulders. It ranges from Somaliland to the Red Sea, and westward in the Sudan. In its native deserts it is a remarkably spirited and active animal, galloping over the rocks and sand with the speed of a horse. The rare Somaliland ass (*E. somalicus*) is grayer in color and the shoulder stripe is wanting. See *Donkey*.

Auk. A maritime diving bird, somewhat intermediate between the loons and the gulls. The great auk (*Plautus impennis*), of the North Atlantic, called also garefowl, became extinct about 1850. In size it was about equal to a goose. It was the only sea bird in the northern hemisphere which could not fly, the rudimentary wings having been used only in swimming. While formerly immensely abundant, the pursuit of this bird for its feathers resulted in its total extinction.

The razor-billed auk (*Alca torda*) is about 18 inches long, sooty black above and white below, with a white line from the beak to the eye. It is abundant on the coasts and islands of the North Atlantic, and in winter migrates southward to Long Island. At nesting time it congregates by thousands on rocky cliffs where the female deposits a single, large, handsome egg on the bare rock. In Greenland this auk provides both food and clothing for the Eskimos.

Axolotl (*ăk'sŏ-lŏt'l*). A remarkable salamander, native of Mexico and the Rocky mountains. As an axolotl, it is a dark gray, smooth-skinned animal, which lives wholly in the water. It is about 9 inches long, with large, ragged, external gills, four strong legs, and a fin-bordered tail. Although this is the larval stage, yet it breeds successfully without attaining the adult form, producing eggs which develop into similar axolotls. But, if the pond in which it lives dries up, the gills and fins shrink and disappear, and the animal begins to breathe air at the surface of the water. Later it emerges with serviceable lungs, but with no gills or fins, and lives on land as a spotted salamander (*Amblystoma tigrinum*). The axolotl is abundant in central Mexico where it is much used for food. See *Salamander*.

Babiroussa (*băb'i-rōō'sà*) (*Babirusa alfurus*). A peculiar wild hog, called also "pig deer," with long slender legs and nearly naked body, native to Celebes and other Malasian islands. The male possesses two pairs of remarkable tusks, both of which grow upward and curve backward. The upper pair, instead of protruding from the mouth, as in the wild boar, grow upward like horns out of long sockets through the skin on the front of the snout, sometimes reaching a length of 10 inches and curving backward nearly to the eyes. The babiroussa feeds chiefly upon aquatic vegetation and fallen fruits instead of rooting in the ground for food like most swine. See *Swine*.

Baboon (*Cynocephalus*). A group of Old World monkeys, ranking below the anthropoid apes, found only in Africa and southern Arabia. They have limbs of nearly equal length, the canine teeth are long, and the large head, with the nostrils situated at its extremity, somewhat resembles that of a wolf. They are large, strong animals, extremely unattractive in appearance, and of great ferocity. More than any other monkeys, they use the fore limbs when on the ground, running upon all fours, like the quadrupeds, with the greatest ease. They travel in troops of ten or more and steal grain and fruit with great skill and boldness. See *Monkey*.

Badger (*Taxidea americana*). A carnivorous, burrowing animal, allied to the bears and to the weasels. It is of clumsy appearance, with short, thick legs, and with long claws on the forefeet. In size it is intermediate between the skunk and the wolverene. The badger is found on dry plains from Manitoba to the Pacific coast, southward to Mexico and northward to Alaska. It feeds largely upon ground squirrels and prairie dogs. Badger fur is used for robes, muffs, tippets, and trimmings.

Banteng (*Bos sondaicus*). An East Indian ox, native to Burma, the Malay peninsula, Java, Borneo, and Bali, sometimes called the Javan ox. The wild banteng lives in the jungle and is exceedingly wary and pugnacious. It is smaller and more slender than the gaur, and the female is of a light dun color. The banteng has long been tamed by the Malays of Java and Bali, who have interbred it with the zebu and other domestic cattle, producing a useful hybrid stock which is reared in large herds. See *Gaur, Gayal, Ox.*

Barnacle. The name of an order (*Cirripedia*) of marine crustacean animals always found as parasites on other marine animals or attached to some foreign object, such as a ship's bottom, rocks, piles, or floating timbers. They have a partially segmented body, surrounded by a mantle which is generally calcified and forms more or less of a shell. They have no heart, gills, or other organs of respiration. They live either as parasites or by feeding on small marine animals, brought within their reach by the water and secured by their tentacula. Some of the larger species are used for food in China, Chile, and elsewhere. According to an old fable, the so-called goose barnacle (*Lepas anatifera*) produced barnacle geese.

Barnacle Goose (*Branta leucopsis*). A small sea goose, closely related to the brant, common in northern Europe and Greenland, but rare in continental North America. It is so named on account of the curious belief which gained much credence from the 11th to the 17th century, when its remote arctic nesting places were as yet unknown, that it was developed from the barnacle, a small crustacean which grows on timbers exposed to salt water. This myth, long since discredited by scientific zoology, was one of the most bizarre in the chronologies of superstition. It gave rise to grave discussion among theologians as to whether geese so born were fish or flesh, and placed on the Church the necessity of deciding whether they could be eaten on Fridays or fast days.

Basilisk (*Basiliscus americanus*). A lizard of tropical America. It is so named on account of a fancied resemblance to the basilisk of ancient fable, whose breath envenomed the air and whose mere glance was fatal. While of grotesque and forbidding appearance, this modern namesake is wholly harmless. It is about 2½ feet long and greenish brown in color. The head, back, and tail have serrated crests. It lives chiefly in trees, feeding on fruits and insects.

Basking Shark (*Cetorhinus maximus*). According to Jordan, this huge, clumsy shark of the northern seas, called also elephant shark and bone shark, is the most massive of all fishes, attaining a length of 36 feet and an enormous weight. It is a dull and sluggish animal, but it is said that a blow from its tail will destroy an ordinary whaleboat. Whalers occasionally take it for its liver. It has been captured most frequently in the North Sea and about Monterey bay, California.

Bass (*Micropterus*). A highly prized game fish, found in cool streams and lakes from New Hampshire to Manitoba and southward. The small-mouthed black bass (*M. dolomieu*), olive green above and lighter below, 12 to 18 inches long, and attaining 5 pounds in weight, is one of the most active and gamest of fishes.

The large-mouthed black bass (*M. salmoides*), found in ponds and sluggish waters from Canada to Florida and Mexico, 1 to 2½ feet long, and weighing 2 to 8 pounds or more, is dark green above and silvery below, the young being spotted and banded. It is called also Oswego bass, green bass, bayou bass, and chub. The rock bass, or Red Eye (*Ambloplites rupestris*), abundant in cool waters from Canada to Texas, sometimes a foot long and weighing ½ to 1½ pounds, is olive green above, brassy on the sides, with rows of dark spots. The large eyes have red irises.

The calico bass (*Pomoxis sparoides*), a handsome fish found from the Great Lakes to Texas, a foot long and weighing 1 to 2 pounds, is silvery olive in color, beautifully mottled with green. The very similar Crappie (*P. annularis*) is more common in the South. See *Sea Bass.*

Bats (*Chiroptera*). A group of wing-handed, flying mammals, having the fore limbs peculiarly modified so as to serve for flying. Bats are animals of the twilight and darkness, common in warm and temperate regions, but most numerous and of largest size in the tropics. About 450 species of bats have been recognized. While not frequently seen, owing to their nocturnal habits, they, nevertheless, occur in enormous numbers.

There are two main divisions of the order: the large sized, fruit-eating species, mainly of the Oriental tropics, including the so-called flying fox or fox bats (*Megachiroptera*), and the much smaller insectivorous or carnivorous bats of temperate and warm regions (*Microchiroptera*). About 5 species of South American bats are known to suck the blood of other mammals, and hence are called "vampire bats," though this name has also been given to various species not guilty of this habit.

In cold climates, bats either migrate southward as winter approaches, somewhat after the manner of birds, or seek shelter in caverns, vaults, ruinous buildings, and similar retreats. In these they cling together in large clusters, hanging, head downward, by the feet, and remain in a torpid condition until the warmth of returning spring recalls them to activity. Bats bring forth one or two young, which, while suckling, remain closely attached to the mother's breast. The parent shows a strong attachment for her offspring, and, when they are captured, will follow them and often submit to captivity herself rather than forsake her charge.

Our common bats measure 3 to 5 inches in length, with a wing spread of 9 to 14 inches. The great fruit-eating bats of the West Indies sometimes attain a length of 15 inches, with a wing spread of nearly 5 feet. See *Flying Fox, Vampire.*

Bear (*Ursus*). A group of large carnivorous mammals of the bear family (*Ursidæ*), nearly all natives of the northern hemisphere. They are distinguished by their heavy, clumsy bodies, very short tails, thick legs, and flat, plantigrade feet, each with 5 toes armed with strong claws. The teeth are 42 in number, the same as in the dog. Their fur is usually long, thick, and shaggy, and brown, black, or yellowish white in color. Bears are omnivorous, eating, besides the flesh of animals, fish, reptiles, birds' eggs, fruits, leaves, roots, and honey. In temperate regions, bears are unable to procure food in winter, and therefore hibernate during that season. Most bears thrive in captivity and are the best known of the large carnivorous animals.

In North America, according to Dr. C. H. Merriam, 22 species of bears occur, including 5 kinds of grizzly bears, 8 kinds of brown bears, 8 kinds of black bears, and the polar bear. The American black bear (*U. americanus*), rarely more than 5 feet long, with black, shining hair, is a very active climber. It is much less dangerous than the grizzly bear or the brown bear, and is much hunted for its fur and flesh. The grizzly bear (*U. horribilis*), of the Rocky mountains, sometimes 9 feet long and weighing 1000 pounds, is an exceedingly ferocious

animal. While bulky and unwieldly in form, it is capable of great rapidity of motion and fights with desperate fury when cornered.

The Kodiak bear (*U. middendorffi*), a huge brown species discovered on Kodiak island, Alaska, about 1895, is not only the largest of all living bears, but is also the largest living carnivorous land animal. It stands more than 4 feet high at the shoulder and attains a length of 9½ feet and a weight of 1200 pounds. The glacier bear (*U. emmonsi*), a rare species, first found in 1895 near Mount St. Elias, Alaska, is the smallest American bear. It stands only about 2 feet high at the shoulder.

The European brown bear (*U. arctos*), native of Europe and Asia, sometimes reaches the length of 7 feet. It has been known in captivity since the days of the Roman arena, is the docile companion of wandering bear tamers, and a common inmate of zoological gardens and menageries. Other important species are the Himalayan black bear (*U. torquatus*), Japanese bear (*U. japonicus*), sun bear (*U. malayanus*), sloth bear (*U. labiatus*), and the spectacled bear (*U. ornatus*). See *Polar Bear.*

Beaver (*Castor*). An aquatic rodent mammal. Only two species are known, the European beaver (*C. fiber*), now largely extinct, and the American beaver (*C. canadensis*), once common throughout North America from Mexico to the Arctic circle Formerly, immense numbers of these animals were killed for their valuable fur.

The American beaver is now restricted to a few northern and mountainous districts, dwelling in communities on the banks of rivers and ponds in forested regions. The beaver is about 3½ feet long, with a thick, heavy body, sometimes weighing over 40 pounds. The skin is covered by two sorts of hair, of which one is long, stiff, glossy, and reddish brown in color; the other is short, thick, soft, and silky. The hind feet are completely webbed, and the tail, 10 or 12 inches long, is flattened horizontally and covered with scales.

In engineering ability and industriousness, the beaver easily ranks first among the mammals. With remarkable skill and indefatigable labor, it constructs wide dams of logs, sticks, and mud, in order to retain streams at an even level. It then builds its houses or lodges of similar materials in the water above them, felling trees sometimes 12 inches in diameter and transporting their boughs for use in these structures.

Bees (*Apoidea*). The bees form a numerous group or superfamily of insects belonging to the order *Hymenoptera.* There are about 1500 species, widely diffused throughout the world but most numerous in the tropics. The true bees (*Apidæ*) and the bumblebees (*Bombidæ*) are social in their habits, living in communities in which each member performs some service for the common welfare of all. The other families of bees are solitary in their habits, each individual living and working alone. Among these are the digger, cuckoo, carpenter, mason, leaf cutter, potter, and burrowing bees. See *Honeybee.*

Beetle. Any insect of the order *Coleoptera.* Beetles are characterized by having a pair of horny wing covers, called elytra, which meet in a straight line down the middle of the back. Beneath the covers is a single pair of membranous wings, the tips of which are folded transversely. The mouth parts are formed for biting. The beetles form a very numerous group, more than 11,000 species being known in the United States and Canada. Among the most important families are the blister, buprestid, carrion, click, featherwinged, ground, leaf, long-horned, rove, scarabeid, tiger, and water beetles, also the fireflies and ladybugs. On the whole, the order is one of the most destructive in the insect class. It includes such pests as potato beetles, apple-tree borers, carpet beetles, wireworms, white grubs, and fruit, grain, and cotton-boll weevils. Among the beneficial forms are the ladybirds, carrion beetles, and tiger beetles. See *Firefly, Ladybird, Weevils.*

Bighorn (*Ovis*). The popular American name for the wild Rocky Mountain sheep, so called because of their immense semispiral horns. There are about 6 species distributed through the mountains northwestward from Mexico to Alaska and Yukon. The best-known bighorn (*O. canadensis*), found on high mountains from Mexico to northern British Columbia, is gray-brown in color, with a large white patch on the hind quarters. It stands nearly 3½ feet high, is about 5 feet long, and weighs about 300 pounds. Horns measuring 18 inches in circumference and 52 inches in the curve have been taken from large rams. The female has small, flat, erect horns about 6 inches long.

The bighorn lives in bands, sometimes 50 in number, and is very alert, wary, and difficult of approach. It has been incessantly hunted, not only for sport, but also for its excellent flesh and for its horns which make handsome trophies. In consequence, the bighorn has become nearly extinct throughout much of its former range, except where strictly protected by law.

Bird of Paradise. The name for members of a family of birds (*Paradiseidæ*) of splendid plumage, allied to the crows and bower birds, inhabiting New Guinea and the adjacent islands. The family includes about 65 species, some of which are remarkably beautiful, ranging in size from that of a sparrow to that of a crow.

The Great Bird of Paradise (*Paradisea apoda*), about 18 inches long, has thickset feathers like velvet pile, straw-colored above and emerald green below. From under the shoulders spring tufts of orange plumes about two feet in length which the bird can elevate over the back at will. In the tail of most species are two narrow, wirelike feathers sometimes elongated to the length of 30 inches. These splendid ornaments are confined to the male bird; the female has very plain plumage.

Birds (*Aves*). A class of warm-blooded, egg-laying vertebrates whose bodies are clothed with feathers, with the fore limbs forming wings normally capable of flight. They are classified as intermediate between the reptiles, which are ranked below them, and the mammals, which stand above them at the head of the animal kingdom.

Birds vary exceedingly in size, form, and appearance. They are adapted to every kind of climate and food, inhabit all regions of the world, and are of immense economic value to man. They display high mental qualities, are usually beautiful in outline, movement, and color, and many of them possess melodious voices. Since the Mesozoic era, birds have been present on the earth and they now comprise the most numerous class of higher animals.

All existing birds have horny, toothless beaks or jaws, but some extinct fossil forms had teeth in both jaws. Birds have a four-chambered heart, complete double circulation, and very warm blood. Their bodily temperature varies from 100° in the wingless kiwi to 102° in emus and penguins; from 105° to 107° among the ducks, fowls, and game birds; and from 107° to 111° among the sparrows and warblers. In size, birds range from pygmy humming birds about 2 inches long to ostriches which stand about 8 feet high and weigh 300 pounds.

The number of species of living birds is computed at from 10,000 to nearly 20,000, inclusive of varieties. These are usually grouped in about 20 orders. The most numerous order, *Passeres*, which includes the perching and the song birds, embraces more than half of all known species.

According to Parker and Haswell, living birds are classified as follows:

Division *Ratitæ*,—breastbone without a keel; flightless birds, containing 3 orders: *Megistanes*, kiwis, emus, and cassowaries; *Rheæ*, rheas; *Struthiones*, ostriches.

Division *Carinatæ*,—breastbone with a keel; flying birds, containing 18 orders: *Pygopodes*, diving birds, loons, grebes; *Impennes*, wingless

birds, penguins; *Tubinares*, tube-nosed swimmers, petrels, albatrosses; *Steganopodes*, totipalmate birds, cormorants, pelicans; *Herodiones*, storklike birds, herons; *Anseres*, gooselike birds; *Accipitres*, falcon-like birds, hawks, eagles; *Crypturi*, tinamous; *Gallinæ*, fowllike birds; *Grallæ*, cranelike birds; *Gaviæ*, gulls, terns, auks; *Limicolæ*, shore birds; *Pterocletes*, sand grouse; *Columbæ*, pigeons; *Psittaci*, parrots; *Striges*, owls; *Picariæ*, cuckoos, humming birds, woodpeckers; *Passeres*, sparrow-like birds.

Bison (*bī'sŭn*). The name applied to two species of ruminants very closely related to the true ox. One of these, the European bison (*B. europæus*), is now found only in a few forests of southern Russia. The other, or American bison (*B. americanus*), commonly but incorrectly termed "buffalo," is likewise nearly extinct. The two forms closely resemble each other, though the American bison is somewhat smaller. They are at once distinguished from all other cattle by their immense fore quarters and small hind quarters.

The American bison is especially remarkable for the great hump or projection over its fore shoulders, at which point the adult male is sometimes almost 6 feet in height. It is also conspicuous for the masses of long, shaggy, rust-colored hair on the head, neck, and fore part of the body. In summer, from the shoulders backward, the skin is covered with a very short, fine hair as smooth and soft as velvet. The short tail is tufted at the end, and the short but massive horns are curved inward. As in case of many other animals, the male bison is much larger and more powerful than the female. While the skeleton of the bison is similar in many points to that of the ox, it differs in having 14 instead of 13 pairs of ribs.

Although easily subjugated when taken young, the bison has not proved docile and is of little practical use as a farm or pasture animal. The crosses frequently produced between the bison and domestic cattle have not displayed qualities that make them desirable for the stock grower.

The bison formerly ranged in vast herds over immense areas in North America, from the Sierra Nevadas eastward to North Carolina and from Great Slave lake southward to central Mexico. The flesh makes excellent beef, scarcely distinguishable from that of cattle, either in appearance or flavor. It was formerly dried and transported in immense quantities. The hide furnished material for clothing, lodges, trappings, robes, and leather. In consequence, the bison was hunted and slaughtered on a wholesale scale. By 1850, it had disappeared east of the Mississippi, and, by 1875, it had vanished from the central plains.

In 1889, when the American bison reached its lowest ebb, there were only 835 wild and 256 captive animals in existence. In 1926, the American Bison Society, organized to reclaim the animal from extinction, took a census of all living bisons as of that year. This census showed a total of 16,417 throughout the world, comprising 4376 in the United States, 11,957 in Canada, and 84 in other countries, of which England had 45 animals. The largest single herd consisted of 8300 at Buffalo park, Wainwright, Alberta. See *Buffalo*.

Bittern (*Botaurus*). A group of wading birds closely related to the herons, but with shorter necks and with more mottled plumage. There are several species widely distributed in both hemispheres. The American bittern (*B. lentiginosus*), about 26 inches long, with varied plumage of buff, brown, and slate-blue, occurs throughout temperate North America. It lives in marsh meadows, nests on the ground, laying 4 or 5 greenish brown eggs, and feeds on snails, lizards, frogs, and insects. It is remarkable for its curious, booming cry, which has given rise to the local names "stake driver" and "thunder pumper." The least bittern (*Ardetta exilis*), only about a foot in length, much darker in color, with the top of the head, back, and tail shining black, ranges from Oregon, Manitoba, and Maine, south to Brazil.

Blackbird. A name given in America to several birds of the family *Icteridæ*, closely related to the bobolink, meadowlark, and grackles. About a dozen species are found in the United States and Canada, distinguished from each other by size and color. When in full plumage, the males are more strikingly colored than the females. All are somewhat smaller than the robin, with uniformly dark plumage sometimes brilliantly marked with red, orange, yellow, or white. They live chiefly on injurious insects, grains, and weed seeds.

The red-winged blackbird (*Agelaius phœniceus*), with bright scarlet shoulders varying to light buffy on the wings, nests in swampy places from New Brunswick to Manitoba and southward to the Gulf of Mexico. The tricolor blackbird (*A. tricolor*), with silky blue-black plumage and red shoulder marks bordered with white, inhabits the interior valleys of California and Oregon.

The yellow-headed blackbird (*Xanthocephalus*), with yellow head, throat, and chest, and a white wing spot, ranges from British Columbia and Hudson bay south to Mexico. It builds its nest a foot or two above water in reedy marshes. The rusty blackbird (*Scolecophagus carolinus*), glossy black in summer but rusty brown in winter, is a forest-loving species common east of the Rocky mountains. The Brewer blackbird (*S. cyanocephalus*), with glossy, greenish black plumage, the common dooryard blackbird of the Pacific coast, ranges eastward to Nebraska and Minnesota. The grackles are sometimes called crow blackbirds. The European blackbird, noted for its song, is a species of thrush. See *Bobolink*, *Meadow Lark*.

Blind Fish (*Amblyopsis spelæus*). A peculiar fish, related to the mud minnow and killifish, found in underground streams in Mammoth Cave and in other caves of Kentucky and Indiana. It is from 2 to 5 inches long, entirely white, with no trace of external eyes.

Bluebird (*Sialia sialis*). A small bird of the thrush family, very common in the eastern United States, nesting from the Gulf states to Manitoba and Nova Scotia, and wintering from southern Illinois and southern New York southward. It is about 7 inches long; the upper part of the body is blue, and the throat, breast, and sides are dull red. It makes its nest in the hole of a tree or in the box that is so commonly provided for its use by the friendly farmer, and feeds chiefly upon insects and wild berries. The bluebird is the harbinger of spring, its cheerful song being most frequently heard in March and April.

The exquisite mountain bluebird (*S. arctica*), purplish blue above and greenish blue below, ranges from the Great Plains to the Pacific Ocean, and the western bluebird (*S. mexicana occidentalis*), with chestnut and blue back and purplish blue throat, occurs on the Pacific coast. Their habits are very similar to those of the eastern bluebird.

Bluefish (*Pomatomus saltatrix*). A highly valued, widely distributed food fish, common along the Atlantic coast. It is bluish above, silvery white beneath, with an average weight of 3 to 5 pounds, though often larger. It is exceedingly active and voracious, traveling in large schools and feeding chiefly on menhaden. As a table fish, it is ranked next to the shad, and in commercial value is surpassed by but few fishes taken in American waters, such as the salmon, cod, shad, alewife, and mullet.

Boa (*Boidæ*). The boas constitute a family of very large nonvenomous snakes which kill their prey by constriction. It includes boas, pythons, and anacondas. They possess teeth in both jaws and rudimentary hind limbs which are developed into horny spines or hooks. There are more than 50 species, nearly all tropical.

The boa constrictor (*Boa constrictor*), of South America, is typical of the whole family. A full-grown specimen is about 12 feet long. It has a prehensile tail by which it suspends itself, head downward, from a tree while waiting for its prey. It feeds mostly upon birds and small mammals. When one of these comes within reach, the boa seizes it with its jaws by a quick darting movement of the head, and instantly throws about its victim a fold of the upper part of the body, enveloping and crushing it. After the prey is dead, the boa coats it with saliva and swallows it whole, a process which sometimes takes several hours. While digestion is going on, the snake is sluggish and torpid.

The rubber boa (*Charina bottæ*), of the Pacific coast from Washington to Mexico, ranges farther from the equator than any other member of the family. Although only 15 inches long, this chubby little snake kills small mice and birds by constriction in the same fashion as the huge pythons. See *Anaconda*, *Python*.

Bobolink (*Dolichonyx oryzivorus*). An American song and game bird, closely related to the blackbirds and orioles. It is about 7½ inches long, with handsome buff, black, and white plumage. In summer it nests on the ground in grassy meadows from New Jersey northward to Nova Scotia and westward to Utah and Montana. It migrates southward in early autumn and passes the winter south of the Amazon. When in their sober fall plumage, the young and the adults alike are called reedbirds or ricebirds. During migration, they pause to fatten in the rice swamps and grainfields of the Southern states, where they are shot in immense numbers for the city markets.

Bobwhite (*Colinus virginianus*). A small game bird of the grouse family, commonly called quail in the northern United States and partridge in the South. It is an alert, handsome bird, 10 inches in length, with beautifully barred and mottled brown and white plumage. From Maine to Minnesota southward to Florida and Texas, it is a familiar native bird, and, by naturalization, it has spread westward to California, Oregon, and Washington, thriving wherever food conditions are favorable. The bobwhite receives its name from the spring call of the male,—a clear, ringing, musical "bobwhite!" Wherever found, it is a year-round resident, frequenting clearings and cultivated fields, and feeding upon insects, seeds, and berries. It nests on the ground in grassy places, laying 10 to 18 white eggs. Although largely exterminated in many localities by excessive hunting, it rapidly regains its numbers wherever reasonably protected. See *Partridge*, *Quail*.

Boll Weevil (*bōl wē'v'l*). The name applied to various insects which attack the cotton plant. The most destructive of these, the Mexican boll weevil (*Anthonomus grandis*), was formerly confined chiefly to Central America and the West Indies. About 1888 it reached Matamoros, Mexico, and soon after appeared across the Rio Grande, near Brownsville, whence it spread throughout the cotton belt of Texas, causing enormous damage.

The adult insect, a long-snouted, grayish weevil, somewhat less than a fourth of an inch in length, punctures the bolls in which it lays its eggs. Upon hatching, the larvæ feed upon the soft tissues of the buds and bolls. The mature larvæ pupate within the bolls. After hibernating, chiefly in old bolls, the adult weevils appear about blossoming time. The most effective protection is afforded by early planting in wide rows to admit the sunshine, by frequent cultivation, and by burning or plowing under affected plants early in autumn. See *Weevils*.

Booby (*Sula leucogastra*). A species of gannet found in most tropical seas. Its name, said to have been given by Portuguese sailors on account of its stupid habit of alighting on ships and allowing itself to be captured, has become an English byword.

Bower Bird. A name given to a family (*Ptilonorhynchidæ*) of Australian birds on account of their remarkable habit of building bowers as places of resort. The bowers are constructed on the ground, usually under overhanging branches in the most retired parts of the forests. They are decorated with variegated feathers, shells, small pebbles, and bones. At each end there is an entrance left open. These bowers do not serve as nests, but seem to be places of amusement, especially during the breeding season. The various kinds of bower birds build rude nests in trees and subsist chiefly on fruits. The best-known species is the satin bower bird.

Bowfin (*Amia calva*). A remarkable fish, called also grindle, dogfish, mudfish, and lawyer, the only living representative of the group *Halecomorphi*. It inhabits lakes and swamps of the Mississippi valley, and the Great Lakes region southward to Virginia, attaining a length of 2½ feet, and sometimes weighing 12 pounds. In structure it stands between the true lungfishes and the garpikes. The air bladder is a well-developed lung, enabling it to breathe out of water, so that it will live in air longer than any other American fish. It is a very voracious, hard-fighting game fish, but its flesh is watery and ill-flavored.

Buffalo (*Bos*). True buffaloes are large, ruminant animals of the Old World, closely related to the domestic ox. They should not be confounded with the American or the European bison, popularly, though wrongly, called buffalo. Although heavily built with strong limbs and a short neck, the buffalo lacks the hump and the mane which at once distinguishes the bison. Buffaloes have long, flattened, angulated horns, and in mature age their dark-colored skin is nearly bare.

The water or Indian buffalo (*B. bubalus*), found wild in India, Ceylon, and the Philippines, sometimes exceeds 5 feet in height at the shoulder. It has very long, flat horns, measuring, along the curve, 8 to 12 feet from tip to tip. It lives in grassy swamps near streams or lagoons and spends much time in the water. Domesticated breeds, highly valued for their flesh, milk, and as beasts of burden, have been reared in India and the Malasian region for at least 2000 years. During the middle ages, the water buffalo spread westward, appearing in Italy about the year 600 and somewhat later in southern France and in Hungary. It is now extensively used in many parts of southern Europe, Asia Minor, and Egypt.

As a labor animal, the water buffalo is particularly well suited for warm, moist climates and marshy regions, such as Java and other parts of the East Indies. The buffalo cow gives more milk than the common cow, but the flesh of the buffalo is inferior to that of the ox. The Cape buffalo (*B. caffer*) is a similar but wild species found in southern and eastern Africa. See *Bison*, *Ox*.

Bullhead (*Ameiurus nebulosus*). The best-known American catfish, called also bullpout and horned pout. It is common everywhere in slow streams and muddy ponds from Maine to South Dakota and south to Florida and Texas. It has been introduced into California and Oregon, where it has become abundant.

The bullhead differs from the channel catfish in having a plumper body and a rounded instead of a forked tail fin. It is dark brown above and yellowish below, with a smooth, rubber-like skin. It attains a length of from 12 to 18 inches or more, and, at full age, sometimes weighs 5 pounds. Sluggish in habit, the bullhead lives near the bottom, moving slowly about, with its catlike feelers widely spread, in search of food. It is a gluttonous feeder and will take any kind of bait, swallowing it, hook and all, into a capacious stomach. When caught from cool waters, especially in early spring, the bullhead is an excellent food fish. See *Catfish*.

Bull Snake (*Pituophis*). A genus of large, constricting snakes with pointed snouts. They are unique among American serpents in possessing a filament of cartilage in the mouth, so placed that when the breath is expelled violently against it, a very loud, hissing sound is produced. They are among the most useful of reptiles, feeding upon animals injurious to man.

The pine snake, or white gopher snake (*P. melanoleucus*), found in pine woods from New Jersey to Ohio and southward, is one of the largest serpents of the Eastern states. It attains 8 feet in length, has a turtle-shaped head, and the tail ends in a spine. In color it is whitish above, with large black blotches, and marble-white below. It is a bad-tempered reptile, vibrating its tail rapidly when angry, and emitting a hiss audible at a distance of 50 feet. A powerful constrictor, it preys upon rabbits, squirrels, and other rodents.

The bull snake, or yellow gopher (*P. sayii*), ranges from Canada to Mexico between the Mississippi river and the Rocky mountains. It is the largest North American serpent, attaining a length of 9 feet and a circumference of 6 inches, and is often exhibited by showmen. In color it is rich orange-yellow with large, square, dark blotches above and yellow below.

The Pacific bull snake (*P. catenifer*), often called gopher snake, is found west of the Sierra Nevada. It is smaller than the bull snake, usually about 5 feet long, with smaller marking on the back.

Butterfly. The butterflies belong to the order *Lepidoptera* or scaly-winged insects. Unlike the moths, to which they are closely related and which they sometimes resemble, butterflies fly only by day and, when at rest, hold their wings erect above the back. They also differ from moths in the shape of their antennæ, which terminate in club-shaped knobs, while those of moths are pointed and often fringed on the sides.

One of the most remarkable and interesting circumstances connected with these beautiful insects is their series of transformations before reaching a perfect state. The female butterfly lays a large number of eggs, which produce larvæ, commonly called caterpillars. After a shorter or longer period of feeding and growth, these assume a new form, becoming chrysalids or pupæ, which are attached to twigs and other objects in a variety of ways. These chrysalids occur in various forms and are often strikingly marked with brilliant golden or silvered spots. Within the hard outer covering of the chrysalid, the insect still further develops, to emerge at last as an active and brilliant butterfly.

More than 7000 kinds of butterflies have been described, about 1000 of which are found in North America. While various species, particularly many tropical forms, are of surpassing beauty, their larvæ, as in case of the cabbage butterfly, are often exceedingly destructive pests.

Buzzard. Properly, any bird of prey of the genus *Buteo*, including both American and European species, commonly known in the United States as hawks. The Red-tailed Hawk (*B. borealis*), the largest American species, 25 inches long with a wing spread of 4 feet, ranges throughout eastern North America. The Red-shouldered Hawk (*B. lineatus*), slightly smaller, is of similar range. Both are sometimes wrongly called chicken hawks or hen hawks, though they rarely destroy poultry.

The Western Red-tailed Hawk (*B. borealis calurus*) and Swainson's Hawk (*B. swainsoni*) are the most common large hawks from the Mississippi west to the Pacific. Like the eastern species, they prey chiefly upon mice, ground squirrels, and other injurious animals and are of great benefit to agriculture. All of the foregoing may be called buzzards. The so-called turkey buzzard is a vulture. See *Hawk, Vulture.*

Cacomistle (*kăk'ō-mĭs''l*) (*Bassariscus astutus*). A small carnivorous mammal closely related to the raccoon, called also bassarisk, raccoon fox, civet cat, and ring-tailed cat. It is found in Mexico and from Texas to California, northward to Oregon. In size and habits the cacomistle is similar to the raccoon. In color it is brown above, white below, and the long bushy tail has 6 or 8 broad white rings. It is often tamed and is regarded as a pleasing pet. See *Raccoons.*

Caddisfly (*Trichoptera*). A group of aquatic insects found in all sorts of fresh waters in vast numbers, and of great importance as fish food. The adult insects are mothlike in appearance and mostly nocturnal. The larvæ, known as caddisworms, are familiar to every boy who collects from brook or pond, because of the cumbrous cases which they carry about. These cases are cylindric dwelling tubes made of sticks and bits of leaves and pebbles, stuck together with a silklike secretion which also lines the tube, and they are built in a great variety of designs. On approach of danger, the caddisworm retreats into his case, and most fishes that eat caddisworms swallow the case and all. Some caddisworms of streams live in fixed cases and gather their food from the passing current by means of nets spun beside the upstream opening. A few kinds do not build cases but live among sheltering stones.

California Quail (*Lophortyx californicus*). A handsome crested game bird, called also California partridge, found in the mountains from the vicinity of Monterey northward to British Columbia. It is about 9 inches long, with dark brown plumage and a black recurved crest. It feeds upon seeds and insects and nests in sheltered places, laying 12 to 16 white, irregularly spotted eggs.

The valley quail (*L. californicus vallicola*), known also as the valley partridge, very similar but lighter colored, abounds in arid valleys and foothills from Oregon and Nevada to Mexico. It is the most common game bird of southern California. The larger mountain plumed quail (*Oreortyx pictus*), called also plumed partridge, 11 inches long, with olive brown plumage and a blackish crest composed of two slender, drooping plumes, occurs in the mountains from Mexico to Washington.

Camel (*Camelus*). Large, hornless, ungulate mammals of the camel family (*Camelidæ*). They are distinguished from other ruminants by the presence of two incisor teeth in the upper jaw, and by broad padded feet, with two toes, the hoofs of which cover only the upper surfaces, the sole not being divided. The legs and neck are long; the head is small with short ears. The hair is soft, unevenly distributed over the body, and in color usually sandy, though sometimes white, gray, brown, or black.

Although very ungainly and awkward in appearance, and both stupid and vicious in disposition, camels are exceedingly valuable and useful animals. By the peculiar structure of the stomach, they are enabled to survive several days without water and to subsist upon coarse shrubby vegetation. These characteristics, together with their padded feet, great strength, and remarkable powers of endurance, fit them especially for living in arid regions.

There are only two species, and these are known only in the domesticated state. The Arabian camel (*C. dromedarius*), found both in Asia and in Africa, has one hump on the back; the Bactrian camel (*C. bactrianus*), of west central Asia, has two humps. Both kinds have been domesticated in southwestern Asia and in northern Africa since exceedingly remote antiquity—so long, indeed, that the parent wild species, from which they have sprung, are no longer known or remembered. For ages they have been invaluable as beasts of burden, as means of travel, and as sources of food and clothing, their flesh, milk, and wool being indispensable to many desert peoples. Camels were known to the ancient Egyptians and are often mentioned in the Bible

and in the writings of the ancient Greeks and Romans.

Saddle camels of either species, bred especially for speed and usually called dromedaries, can travel from 8 to 10 miles an hour for 8 to 10 hours a day. Baggage camels carry loads of 450 to 600 pounds, sometimes 1000 pounds, at a pace of about 2½ miles an hour. Caravans or trains of baggage camels often contain 1000 and sometimes as many as 4000 or 5000 camels.

Overland commerce between China and eastern Europe, from the beginning of the Christian era until the present day, has been carried across the Tibetan plateau and over the high passes of the Hindu Kush by caravans of Bactrian camels. The Arabian camel thrives in Spain and has been successfully established in Australia. In 1856 the United States government introduced camels into Texas, New Mexico, and Arizona. They were used for a time in carrying mails, but the experiment finally proved unsuccessful.

Canary (*Serinus canarius*). A highly prized song bird of the finch family, native of the Canary islands. It has been domesticated for over three hundred years and many varieties have been developed. In Great Britain, Belgium, and Germany, the breeding of canaries has attained some commercial importance. Practically all the caged varieties are of a yellow plumage, though in the native state they are of a dull greenish color. The domestic birds are also much larger than those of the parent wild species. The canary is the most popular house bird in the United States and a fine songster frequently commands a price of $100 and upwards.

Cardinal (*Cardinalis cardinalis*). A handsome bird of the southeastern United States, belonging to the finch family. It has fine red plumage, a crest on the head, and a large, conspicuous, reddish beak. In size it is about equal to the oriole. The cardinal has a rich sweet song which makes it very popular in the southern United States, where it is common. It breeds as far north as Iowa and southern New York and resides permanently throughout its range. The cardinal builds a frail nest in a bush or low tree, laying 2 to 4 white, irregularly spotted eggs. Its food consists of insects, berries, seeds, and grain.

Caribou (*Rangifer*). A flat-horned deer closely related to the European reindeer, and much resembling it in appearance and habits. The full-grown animal stands about 4 feet high and weighs about 475 pounds. Its winter coat consists of a thick feltlike covering of fine hair, through which grows the coarser hair of the outer or rain-shedding portion. The legs are stout and muscular, terminating in broad flat hoofs which permit it to walk safely over snow fields or quaking bogs. Nine species have been described, which fall into two groups, of which the woodland caribou (*R. caribou*) and the barren ground caribou (*R. arcticus*) are typical. The woodland caribou inhabits the forests and open country of British America from Manitoba eastward to Newfoundland and Nova Scotia, and the northern part of Maine. It feeds chiefly upon the tender branches of shrubs. The antlers of this group are much palmated and have a somewhat treelike appearance. The barren ground caribou inhabits the treeless and inhospitable region of northern Canada, with a range extending from western Alaska to eastern Greenland. It lives mainly on lichens, moss, and swamp grass. Caribou afford the principal source of food of the Indians and Eskimos inhabiting subarctic regions, and the skins furnish material for wigwams, harness for dogs, and serve other useful purposes. See *Reindeer*.

Carnivores (*Carnivora* or *Feræ*). An order of mammals embracing the flesh-eating animals or beasts of prey. Most carnivores are predatory, living chiefly upon other animals, but some live partly or almost wholly upon vegetable food. The canine teeth are large and powerful, and the other teeth are adapted for cutting and tearing flesh. Most carnivores have toes armed with strong, sharp claws. The brain is well developed, and the senses of sight and of smell are remarkably keen.

Active habits, high intelligence, and a fierce disposition characterize the animals of this important group. They range in size from the ermine, which one may conceal in his pocket, to bears which may weigh a ton, and are fitted for the chase of nearly every other kind of living creature. There are four well-marked divisions of the order, the catlike, the doglike, the bearlike, and the marine carnivores.

The catlike group contains the true cats (*Felidæ*), the civets (*Viverridæ*), the hyenas (*Hyænidæ*), and the aard-wolf (*Protelidæ*). The doglike group (*Canidæ*) includes the dogs, wolves, jackals, and foxes. The bearlike group comprises the bears (*Ursidæ*), the raccoons (*Procyonidæ*), and the marten or weasel family (*Mustelidæ*), of small fur bearers. The marine carnivores consists of the sea lions (*Otariidæ*), the seals (*Phocidæ*), and the walruses (*Trichechidæ*). The first three divisions have toes armed with claws and constitute the suborder *Fissipedia*, or fissiped carnivores. The marine species have webbed feet for swimming and form the suborder *Pinnipedia*, or pinniped carnivores.

True carnivora are widely distributed over the world except in the Australian region, where their place is taken by the flesh-eating marsupials. There are more than 300 living species, upwards of 50 of which belong to the cat family, 70 to the civet family, 40 to the dog family, and 80 to the marten family. Some 90 species occur in the United States and Canada, about half of which are small fur bearing animals.

In North America the cats are represented by the puma, the jaguar (in southern Texas), the ocelot, and the lynxes; the dog family by various wolves and foxes; the bear family by the brown, grizzly, black, and polar bears; the raccoon family by the raccoon and cacomistle; and the marten family by the otter, mink, ferret, weasel, skunk, wolverene, and badger. Various species of sea lions, seals, and walruses occur along the shores of the continent.

While some carnivores are destructive to human life and to domestic animals, on the whole they are of economic value as fur bearers. They serve also as a necessary check upon the hordes of rodents and various other animals injurious to agriculture, which otherwise would multiply excessively.

Carp (*Cyprinus carpio*). An important food fish, native of China, where it has been domesticated for about 2000 years. It was introduced in eastern Europe before 600 A. D., has been reared in France and Germany since the 13th century, and is first mentioned in England in 1496 as "German" carp. In 1872 it was introduced into ponds, lakes, and streams in the United States and has since become as thoroughly naturalized as the English sparrow. The flesh of the carp is coarse-grained and inferior in flavor, but, owing to its abundance, ease of propagation, and rapidity of growth, it is extensively used for food, especially in central Europe. It ranges in length from 12 to 20 inches or more and often attains a weight of from 15 to 30 pounds. Many millions of pounds of carp, under a great variety of names other than the true one, are sold annually as food fish in American markets. See *Goldfish*, *Minnows*.

Carrier Pigeon. A variety of the domestic pigeon, having a slender form and great powers of flight, called also homing pigeon. It is trained to return to its home from great distances and is employed to carry messages in places where no other means of communication is available. In the Orient, carrier pigeons have been used since very ancient times. They were brought to the attention of Europeans during the First Crusade when the Saracens were found to employ them regularly for

conveying information to their armies. During the siege of Paris, in 1870, communication with the outside world was regularly maintained by carrier pigeons. Thereafter various European governments established pigeon corps for the use of their armies and navies.

The carrier is of large size, with long wings, and represents the highest type of pigeon development. The young birds are first trained to return home from short distances; these are gradually lengthened until they may be made to return swiftly from points 500 or 600 miles away. Their flight is steady, direct, and strong, and their speed, which is often greatly exaggerated, averages about 30 miles an hour.

Cassowary (*Casuarius*). A large, flightless, ostrich-like bird, with a heavy, massive body, standing more than 5 feet high. The legs are stouter and shorter than those of the ostrich; there are 3 toes on each foot; and the blackish plumage is coarse and hairlike. The top of the head is surmounted by a horny and helmet-like excrescence, the head and neck are bare, and the skin is usually blue-black in color. The wings are mere rudiments, and there is no visible tail.

According to Rothschild, there are about 9 species, natives of Australia and the Papuan islands, all very fleet-footed, forest-loving birds, feeding upon vegetable matter, insects, and various other animals. Unlike ostriches, only one female lays in a nest. The greenish blue eggs, about 7 in number, are 5 to 6 inches long. The hatching and the care of the young are assumed by the male. Cassowaries are easily domesticated and become very tame and docile. See *Emu*, *Ostrich*, *Rhea*.

Cat (*Felis domestica*). The domestic cat had a secure place around the family hearthstone when recorded history began. Unquestionably, it was highly cherished by many prehistoric peoples. Numerous mummies of sacred cats, as carefully preserved as the human mummies, are found in the most ancient Egyptian tombs. The cat is mentioned in Sanskrit writings of India dating back to 2000 B. C. While its origin is not certainly known, the domestic cat is believed to be a permanently established mixed strain, originally derived from the Egyptian wild cat (*F. caffra*) crossed with the European wild cat (*F. catus*).

The common house cat belongs to a genus—that which contains the lion and the tiger—better armed than any other for the destruction of animal life. The short, powerful jaws, long, sharp teeth, strong claws, combined with a cunning disposition, nocturnal habits, and much patience in pursuit, give these animals great advantages over their prey. In a degree, the cat partakes of all the attributes of its race. In the state of domestication its food is necessarily various, but always includes flesh or fish if these can be obtained. Though the cat is usually extremely averse to wetting itself, instances of its catching fish are known.

The cat is a very cleanly animal, avoiding any sort of filth, and preserving its fur in a very neat condition. Its fur is easily injured by water because of the want of oil in it. By friction the fur may be rendered highly electric, as is shown by the sparks produced by rubbing a cat's back. The cat usually brings forth from 3 to 6 young at a litter. These remain blind for nine days. The cat is usually regarded as less intelligent than the dog, but this is by no means certain. It is less loyal and less demonstrative than the dog, and shows a remarkable attachment for places. When taken to a distance and covered up while on the way, it has a singular power of finding its way home.

Among the various breeds or races may be mentioned the tailless or Manx cat; the larger Angora and Persian cats, with long, silky fur; the curious Siamese cats; the Abyssinian cats; the orange, brown, gray, and silver tabbies; and various forms of the common short-haired cat.

Catbird (*Galeoscoptes carolinensis*). A well-known American song bird, related to the wrens and mocking birds. Its home is in copses and thickets, often near dwellings. It is about 9 inches in length, deep slate-color above and lighter below, with a black cap and tail. In habit it is lively, familiar, and unsuspicious. Its call note is a taunting, long-drawn "kee," or mew, a most unpleasant cry, but its song is rich, melodious, and often imitative of other birds. It ranges over most of North America, but chiefly east of the Sierra Nevada. During the winter it inhabits the extreme south of the United States, and is found also in Mexico and Central America. It nests in thickets and orchards, laying 3 to 5 bluish green eggs, and feeds on insects and small fruits and berries.

Caterpillar. The active immature stage of moths and butterflies (called also a larva), more or less wormlike in form, and usually covered with bristles or hair. It is during this stage of their existence that moths and butterflies do most of their feeding and attain all of their growth. Therefore it is in this stage that they are of economic importance. Most caterpillars feed upon plants, and very few plants are exempt from the ravages of certain of them. Cut worms, army worms, palmer worms, silk worms, and many other so-called worms, are caterpillars and not true worms. The apple worm is the larva of the codling moth.

All caterpillars, when they have attained their full growth, go into retirement and enter upon a quiescent pupal stage (or chrysalis), usually first spinning about themselves a silken cocoon. This stage is a period of making over of the materials of the body of the larva into the form of the adult insect. The butterfly or moth emerges from the cocoon at the final transformation.

Cat Family (*Felidæ*). An important and well marked group of flesh-eating animals. There are about 50 species, widely distributed throughout the world, embracing the most powerful living beasts of prey, including the lion, tiger, leopard, ounce, jaguar, puma, and cheetah, as well as lynxes, wild cats, and other small carnivores.

As a group, the cats are distinguished by their uniformity of structure, flexibility of spine, looseness of skin, and also by their exceeding suppleness, quickness, and muscular power. They are predatory in habit, procuring their prey by lying quietly in wait, or by a stealthy approach, terminating in a sudden spring, a clutch of their lacerating claws, and a crushing bite. Their entire physical structure embodies agility and strength to a remarkable degree. They are mostly nocturnal in habit, with eyes adapted for seeing in dim light. The pupils of the eyes are vertical, except in case of the lion, which has round pupils. All are clothed in rather long, soft fur, and the male lion is provided with a conspicuous mane.

The cats, great and small, live and hunt alone or in small family parties, never in numerous groups, and all except the lion are monogamous. None are migratory, and few, except the tiger, wander far from their lairs. Most of them live at constant enmity with man, being dangerous and destructive either to him or to his domestic animals. In consequence they have been largely exterminated in all civilized lands. For example, the lion and the tiger inhabited Europe in historic times, but none are now found there. The puma has practically disappeared from the eastern United States and the jaguar has likewise largely vanished north of central Mexico. See *Cheetah*, *Jaguar*, *Leopard*, *Lion*, *Lynx*, *Puma*, *Tiger*.

Catfish (*Nematognathi*). An important group of fishes, characterized by the presence of barbels or feelers on the head, somewhat like the "smellers" of a cat. They have scaleless bodies and are usually armed with a stout spine in the front of the dorsal fin and with one in front of each pectoral

fin. These spines, which are capable of inflicting painful wounds, are provided with revolving socket joints, so that they may be elevated and made rigid or depressed and made movable. The most important family is that of the true catfishes (*Siluridæ*), containing about 700 species, most abundant in South America and Africa. About 30 species occur east of the Rocky mountains, but none is native on the Pacific coast.

The Channel Cat (*Ictalurus punctatus*) is found in large streams of the Mississippi valley. It is 2 to 3 feet long, weighs 25 to 30 pounds, and is a fine food fish. The Great Blue Cat (*I. furcatus*), of the Mississippi and southern rivers, is the giant among American catfishes, sometimes exceeding 150 pounds in weight. While ugly in appearance, it is a highly prized steak fish. The Great Lakes Cat (*I. lacustris*), also of very large size, has a more northern range. Many millions of pounds of the foregoing species are annually sold in the markets. The common bullhead or horned pout, of muddy ponds and sluggish streams, belongs to the catfish family. See *Bullhead*.

Cattle. In a broad sense this term refers to any kind of live stock, that is, all four-footed domestic animals which may do labor or serve to provide food or clothing for man. With this meaning the term may include horses, asses, camels, llamas, alpacas, goats, sheep, and even swine, as well as all domesticated bovine animals. This is the general meaning of the word as used in the Scriptures and in various other earlier writings. In the common usage of the day, however, the word cattle is restricted to mean domestic beasts of the cow kind, such as the ox, zebu, yak, water buffalo, gaur, gayal, and banteng.

Cayman (*Caiman*). A large crocodilian which much resembles the alligator, but differs in having bony armor on the lower as well as on the upper part of the body. There are five species peculiar to Central and South America. The great cayman (*C. niger*) of Brazilian rivers, usually 9 to 14 feet long, is reported by Bates to attain a length of 20 feet. The spectacled cayman (*C. sclerops*) of tropical America, sometimes 18 feet long, is so named for the rims of bone which surround the eyes. The rough-backed cayman (*C. trigonatus*) of the Upper Amazon is only 6 feet long.

Cetacea or **Cete.** An order of aquatic mammals, chiefly marine, which includes the whales, the dolphins, and the porpoises. They have no distinct neck, external hind limbs are lacking, the fore limbs are modified into finlike paddles, and the tail ends in a broad horizontal fin or fluke. Although fishlike in form, they are warm-blooded, breathe air, bring forth their young alive and nourish them with milk from their own bodies. Usually, cetaceans swim together in groups called schools. For the most part they feed upon small fish, marine crustaceans, and especially squids and cuttlefish. Most cetaceans are harmless to larger animals, but the orca, or whale-killer, is the most savage and dangerous animal that swims.

The order consists of about 100 species, of which about 25 are whalebone and sperm whales, and over 60 are porpoises and dolphins, widely diffused in all oceans and in a few tropical rivers. Cetaceans range in size from the common porpoise, 5 feet long, to immense sulphur-bottom whales, 95 feet long and weighing about 300,000 pounds, the largest animals, so far as known, that have ever lived upon the earth. See *Dolphin*, *Killer Whale*, *Porpoise*, *Whale*.

Chameleon (*Chamæleontidæ*). The chameleons constitute a family of Old World tree-dwelling lizards. They are distinguished by a wormlike, extensile tongue, and by the structure of the feet, in which the toes are divided into two opposing parts, forming grasping organs. The eyes are prominent, with thick lids, and may be moved independently of each other. Chameleons live on insects captured by means of their viscid tongues, which can be protruded with great rapidity to a distance of 4 to 6 inches.

All chameleons possess the power of rapidly changing the color of their bodies. The prevailing green color may quickly turn to yellowish, blackish, or gray. Their colors are brightest on warm, sunny days, and dullest on dark days or when the animal is frightened or angry. There are more than 60 species, most abundant in Africa and Madagascar.

The American chameleon (*Anolis carolinensis*), a remarkable little creature belonging to the *Iguanidæ*, is not closely related to the true Old World chameleons. It is about 7 inches in length and much resembles a small alligator. It is usually green in color, but it can vary its bodily hue with great rapidity, sometimes changing from brown to leaf green in three minutes. This dainty little lizard, which is found from North Carolina to Texas, makes a pretty and amusing pet.

Chamois (*shăm'ĭ*) (*Rupicapra tragus*). A hoofed mammal intermediate between the goats and the antelopes. Its home is in the high mountains of southern Europe. Its horns, which are about 6 or 7 inches long, are round, almost smooth, perpendicular, and straight until near the tip, where they suddenly terminate in a hook directed backward and downward. Its hair is brown in winter, brown fawn color in summer, and grayish in spring. The head is of a pale yellow color with a black band from the nose to the ears and surrounding the eyes, and the tail is black. Its flesh equals venison in quality, the horns are valuable, and the hide makes fine leather. The agility of the chamois, the nature of its haunts, and its remarkable powers of sight and smell render its pursuit exceedingly difficult and hazardous.

Cheetah (*Cynœlurus jubatus*). A large carnivorous mammal of the cat family (*Felidæ*), native of Africa and southwestern Asia, trained since ancient times for hunting game, hence often called hunting leopard. It differs from the true cats in having more slender limbs and short, blunt claws, which are only slightly retractile. In color it is tawny, thickly marked with small black spots. For a short distance its speed is said to be greater than that of any other large animal.

While similar in size to the leopard and the jaguar, the cheetah does not possess their tiger-like ferocity, but is docile and doglike in disposition, being easily tamed and sometimes kept about houses as a pet. Its use in hunting is now confined to Persia and India, where it is trained by wealthy natives for the chase of the antelope and other swift game. Cheetah hunting is depicted on early Assyrian and Egyptian monuments. It flourished extensively in the Mogul Empire, in Asia, and was introduced into Europe by returning crusaders. During the 14th and the 15th century, hunting with cheetahs was regarded a noble sport in Italy and France.

Chewink (*Pipilo erythrophthalmus*). A well-known American bird of the finch family, called also towhee and ground robin. It is about 8 inches long, black above and white below with chestnut sides, breeding from Manitoba to Maine and southward, and wintering in the Southern states. It constructs its nest on or near the ground, laying 3 to 5 finely speckled eggs. Its food consists of insects and seeds. The chewink is a bustling, vigorous bird, inhabiting thickets and bushy undergrowths, greeting all passers with an inquiring "chewink, towhee!" Ernest Thompson Seton well expresses its mating song as "chuck-burr-pil-a-will-a-will-a."

Chicken Hawk (*Accipiter*). A name popularly given to various birds of prey supposed to be destructive to poultry. In North America, three species may rightly be called chicken hawks or hen hawks. Cooper's hawk (*A. cooperi*), 14 to 20 inches long, is found throughout the United States and

southern Canada. It is bluish gray above, with the top of the head black, and white below, barred and spotted with reddish brown. The rounded tail has 3 or 4 black bars and a narrow white tip. Throughout the United States it is the most common and destructive chicken hawk.

The much smaller sharp-shinned hawk (*A. velox*), 10 to 14 inches long, uniform bluish gray above, and white below, barred with reddish brown, ranges from the Arctic circle to Guatemala. It feeds chiefly upon small birds and young poultry. The much larger goshawk (*A. atricapillus*), about 24 inches long, occurs throughout the northern United States and Canada. It is dark bluish gray above, becoming black on the head, and whitish below marked with fine gray zigzags and darker streaks. In Canada and Alaska it is exceedingly destructive to poultry and game birds.

The red-tailed hawk and the red-shouldered hawk, which live chiefly on mice, gophers, and other injurious small animals, are often wrongly called chicken hawks. See *Buzzard, Hawk.*

Chigoe (*chĭg'ō*). A species of flea (*Sarcopsylla penetrans*), called also chigger or jigger. It is found in the West Indies and South America, where it is an exceedingly troublesome pest, burrowing in exposed places on the human skin and causing painful and often dangerous sores. In the Southern states the name is applied also to various kinds of minute red mites (*Trombidiidæ*) which fasten upon or penetrate the skin. Their bite, while very annoying, is not fatal to the larger animals but, when numerous, chigoes sometimes cause the death of newly hatched poultry.

Chimæras (*kĭ-mē'răs*) (*Holocephali*). A group of fishes of curious form, allied to the sharks and the rays, known also as spookfishes, ratfishes, and elephant fishes. The Sea Cat (*Chimæra monstrosa*), of the North Atlantic, inhabits deep waters and is rather infrequently seen. It attains a length of 3 or 4 feet and has a sharklike body with a long, slender, finned tail. The eyes have a greenish pupil, surrounded by a white iris, and shine, especially at night, like cats' eyes. The spotted chimæra, or Elephant Fish (*C. collei*), first discovered at Monterey, California, is the best-known species. It occurs in shallow waters, is brown above, with whitish spots, and reaches a length of 2½ feet. It is harmless, and also useless, except for the oil obtained from the liver.

Chimpanzee (*Pan troglodytes*). The native Guinea name of a large ape of equatorial Africa, belonging to the anthropoid or manlike monkeys and to the same family as the gorilla (*Simiidæ*). There are about ten known species, all forest-dwelling animals.

When full grown, the chimpanzee is sometimes about 5 feet high, with shining black hair, but is not so large and powerful as the gorilla. It has large ears, distinct eyebrows and eyelashes, and whiskers. Like the orang-utan, it has the hair on its forearm turned backward, but differs from it in having an additional dorsal vertebra and a thirteenth pair of ribs. It walks erect, better than most of the apes. It feeds on fruits, often robs the gardens of the natives, and constructs a sort of nest among the branches. No other large ape is so human in its characteristics, appearance, and intelligence. See *Ape, Gorilla, Orang-utan.*

Chinch Bug (*Blissus leucopterus*). A small gregarious insect pest, of the order *Hemiptera*, which attacks grasses and cereal grains. It is about one-eighth of an inch long and of contrasting black and white color. It came originally from Central America, where it lives upon native grasses, but it thrives even better upon our cultivated grain crops, and has spread with them all over the continent, doing most damage to corn and wheat in the Middle West. In the state of Illinois it was estimated to have caused a loss of $73,000,000 in the year 1864 alone. The chinch bug has been the subject of much investigation by agricultural experiment stations, any of which, on application, will furnish information as to means for its control.

Chinchilla. The Spanish name of a small rodent mammal, native to South and Central America, allied to the guinea pig, but outwardly very similar to a ground squirrel. There are several species, all gregarious, living in holes or burrows, and feeding upon roots, bulbs, and bark. All are valued for their fur, particularly the common chinchilla (*C. lanigera*), of the Andes, whose soft, silky, mouse-gray fleece now constitutes an important article of commerce.

Chousingha (*chou'sĭng-hä*) (*Tetraceros quadricornis*). A small East Indian antelope, about 2 feet high, distinguished from all other living ruminants by having two pairs of horns. It lives singly or in pairs in thinly forested or bushy hills, always in the near vicinity of water. The horns, which are small, short, and smooth, are borne only by the males.

Chuckwalla (*Sauromalus ater*). Next to the Gila monster, the largest lizard of the southwestern desert region of the United States. It is 14 inches long, with a broad body, stubby limbs, and a flattened tail. It is herbivorous, quite harmless, and lives among rocks.

Clam. The common name for various bivalve mollusks, especially those which are edible. The soft-shell or long clam (*Mya arenaria*), a common article of food, about 4 inches long and 2½ inches wide, is found in the sand between tide lines from the Arctic Ocean south to Cape Hatteras and San Francisco. The highly prized hard-shell or round clam (*Venus mercenaria*), called quahog in New England, is abundant on the Atlantic coast. The painted clam (*Callista gigantea*), 16 inches long, is a large edible species of the Southern states. The very numerous species of fresh-water mussels are often called clams.

The largest known bivalve is the giant clam (*Tridacna gigas*) of the East Indies. The fleshy portion of this animal, which is highly valued for food, weighs about 20 pounds. The huge, deeply ridged shell, often 2 feet long, sometimes weighs more than 500 pounds. The halves or valves are used in some French churches as fonts for holy water. The painter, Botticelli, in his "Birth of Venus," represents the goddess as standing in one of the valves of this shell.

Climbing Fish (*Anabas scandens*). A small, perchlike, fresh-water fish of the East Indies, which is able to live out of water for a long time in moist situations. It is remarkably active, hitching itself over the ground and even climbing the wet trunks of trees to a height of several feet by means of its spiny fins and gill covers.

Cobra (*Naja*). A genus of about 10 exceedingly venomous snakes of Asia and Africa, which cause a greater destruction of human life than all other poisonous serpents combined. It is estimated that in India 20,000 persons perish annually from their bites. The cobra de capello (*N. tripudians*), 4 to 6 feet long, occurs from the Caspian Sea to South China, but is most numerous in India. When about to strike, it lifts its head and spreads its neck into a broad shell-like hood. The similar Egyptian cobra (*N. haie*), called also the asp, found throughout Africa, is one of the most deadly serpents. The king cobra, or Hamadryad (*N. bungarus*), the longest and most deadly of all venomous snakes, occurs sparingly from Ceylon to the Philippines. It sometimes attains 15 feet in length, lives on other reptiles, and is extremely active and vicious. It will attack man without provocation, and, if abundant, would be the most terribly destructive of all serpents. The Krait (*Bungarus cæruleus*),

smaller and less deadly than the cobra de capello, is very abundant in India. The eradication of the cobra in India is made more difficult by the fact that the natives regard it with religious veneration.

Cochineal (*Coccus cacti*). A scale insect feeding upon the nopal cactus (*Opuntia cochinillifera*), anciently grown in Mexico as a dyestuff. Following the Spanish Conquest, it was successfully transplanted into the Canary islands, Algeria, Java, and other warm regions. The dried bodies of the females, some 70,000 of which are required to weigh a pound, are used in making a crimson and a scarlet dye and also in the preparation of carmine and lakes. Cochineal has been largely replaced by aniline dyes; consequently, the formerly extensive cochineal industry has greatly declined.

Cockatoo. The common name of any bird of the family *Cacatuidæ*. They are very closely related to the true parrots, but differ in having a conspicuously crested head and less highly colored plumage. There are about 30 species, natives chiefly of the Australian region where they are hunted for food by the natives. They are large, noisy, active birds, frequenting the tops of high forest trees and feeding upon nuts, seeds, grains, bulbs, and roots, usually nesting in hollow trees or in crevices in rocks. Among the more striking species are the great black, the sulphur-crested, the white-crested, and the rose-crested cockatoos. While readily imitating various animals and birds, none learn to speak many words.

Cockroach. A nocturnal household insect of the order *Orthoptera*, allied to the grasshoppers. It is half an inch or more in length and brown or blackish in color. Several species of the large group of cockroaches have taken up their abode in human habitations, and have followed man to every part of the earth. They like the shelter that his house affords and they like his food. They like warmth and moisture and so are frequently found about kitchens near the water pipes, most commonly in dark recesses. Their flat bodies enable them to enter narrow crevices, and into these they scurry on the approach of light. Cockroaches are best controlled by blowing borax powder into the cracks which they inhabit.

Codfish (*Anacanthini*). The codfishes comprise an important group containing some of the world's most valued food fishes, and forming, like the herring and the salmon, the basis of great industries. Codfishes may be known by the complete absence of spines in all fins, by the jugular position of the ventral fins, and by the usually isocercal tail.

The common codfish (*Gadus callarias*), found everywhere on the shores of the North Atlantic, averages about 10 pounds in weight, but sometimes exceeds 150 pounds. It is exceedingly voracious and prolific, feeding close to the bottom to a depth of 100 fathoms, chiefly on small mollusks, crustaceans, and other fish. Each year a mature codfish produces several million eggs which are spawned in the open ocean. Codfish are caught in immense numbers, especially on the banks of Newfoundland. The codfish industry supports hundreds of vessels in the fishing fleets of Atlantic waters. The very similar Alaska codfish (*G. macrocephalus*), equally abundant as the Atlantic species, abounds from Oregon to the Aleutian islands and Japan.

The Haddock (*Melanogrammus aeglifinus*) closely resembles the cod, from which it may be distinguished by the black lateral line. It occurs on both shores of the Atlantic, usually weighs 3 to 5 pounds, and ranks second to the cod in economic value among codfishes. When smoked it is the finnan haddie of commerce.

The Pollack (*Pollachius carbonarius*), of similar range to the haddock, is darker and more lustrous in color than the cod, and swims at the surface instead of at the bottom. It sometimes attains a length of 3 feet and a weight of 25 pounds. Though it is a favorite food fish in Great Britain, it is generally considered inferior to the cod.

Cœlenterates (*sē-lĕn'tĕr-āts*) (*Cœlenterata*). A branch of the animal kingdom comprising invertebrate animals in which the stomach cavity occupies the whole interior of the body. This digestive cavity is connected with the outside only by means of the mouth through which all food enters and all indigestible portions are thrown out. The cœlenterates include the hydroids, polyps, jellyfishes, sea anemones, and corals, and are ranked as next to the lowest branch of the *Metazoa* or many-celled animals. Over 6000 species are known.

Condor (*Sarcorhamphus gryphus*). A huge South American vulture. It is one of the largest of all flying birds, although the California vulture and the albatross sometimes exceed it in expanse of wing. The condor is found in the Andes from Peru to Patagonia, usually at altitudes of from 9000 to 16,000 feet. It is from 44 to 55 inches in length, with a wing spread of 8½ to 10½ feet. As in other vultures, the head and neck are naked. The plumage is uniformly black with a white ruff on the neck and broad white bars across the wings. It nests on inaccessible ledges of rock, depositing 2 white eggs. The young are unable to fly until about two years old.

Condors feed chiefly on carrion but under stress of hunger successfully attack sheep, goats, calves, and deer. When gorged with food, they cannot rise readily from the ground and are easily captured. In flight, condors are remarkably graceful, wheeling in majestic circles, often at immense heights, and seeming to sail in the air without apparent movements of their wings. See *Vulture*.

Coot (*Fulica*). A wading bird of the rail family, differing from the true rails in having broader-lobed toes and by its more aquatic habits. There are about 12 widely distributed species, all uniformly slaty in color, with a darker head and neck, and usually with white bills and white edges on the wings. They frequent reedy swamps, borders of ponds, and sluggish streams, feeding on water plants, insects, worms, fish, snails, and other small aquatic animals. Coots swim well, with a bobbing motion of the head and neck, and obtain much of their food by diving.

The American coot (*F. americana*), called also mudhen and crowduck, about 15 inches long, is found in ponds and marshes everywhere from Greenland and Alaska south to the West Indies and Central America. It nests among reeds in the water, laying 8 to 15 creamy-white, finely speckled eggs. Usually its flesh is of a rank flavor, but when it fattens by feeding on water celery the coot is said to rival the canvasback duck as a table bird.

Coral. The horny or limy secretions or skeletons of various kinds of polyps, chiefly *Actinozoa*, some of which occur in strikingly beautiful forms. The coral-producing polyps, sometimes wrongly called "coral insects," form colonies which increase mainly by gemmation, or budding. From some portion of the parent polyp, young polyp buds spring. From these, when grown, new generations, similarly produced, appear. In many cases, the colony thus developed assumes a branching or treelike form, as in the sea fan and the staghorn coral. In others, as in the mushroom coral and the brain coral, the colony becomes oval or dome-shaped.

The large stony corals (*Madrepora* and *Mœandra*) build up extensive coral reefs in tropical seas. Since early Paleozoic times, various corals have been important rock-forming agents, and today are actively producing rock material. In warm, shallow parts of the ocean, limestone is often formed by the combined activity of coral polyps and calcium-precipitating bacteria. The rate of growth in corals

is not well known, but the reef-building mæandrinas at Key West, Florida, are estimated to make an average growth of half an inch a year. Madrepores, developing upon submerged wrecks, have been observed to maintain, for a half century, a growth averaging 3 inches annually.

The red coral, or precious coral (*Corallium nobile*), of the Mediterranean, grows about a foot in height, with a slender, branching stem. It occurs in many handsome tints and shades and takes a high polish. This valuable coral is much used, especially in India, for jewelry and ornaments. The finest rose-pink varieties command a price of $400 to $600 and upwards an ounce. Ordinary red-colored small pieces are worth about $10 an ounce, while the coral grains or fragments used in children's necklaces cost about $15 a pound.

Cormorant (*Phalacrocorax*). A large group of fishing birds, with completely webbed feet, closely related to the pelicans. Cormorants are chiefly maritime and usually inhabit rocky coasts. They are swimmers rather than fliers and feed exclusively on fish, which they are extremely skillful in catching. They are between 2 and 3 feet in length, with a strong, elongated body, short stout legs, rather lengthy neck, and a hooked bill with sharp cutting edges. The throat is greatly dilatable so that fish of large size may be swallowed. There are more than 30 species, ranging from Greenland and Siberia south to New Zealand, but most numerous in the tropics. Cormorants are sociable birds, often congregating in immense flocks. They breed in communities, building crude nests on cliffs or in trees, in which the female lays from 3 to 5 large greenish eggs.

The common cormorant or shag (*P. carbo*), glossy black above and sprinkled with white on the head and neck, is found in eastern North America, Greenland, Europe, Asia, Africa, and Australia. It possesses a marked degree of intelligence and, if taken when young, may be readily tamed. Since ancient times this species has been trained to catch fish. The young birds have a ring placed around the neck to prevent swallowing, and they soon learn to bring all captures to their masters. A well-trained male cormorant will continue to catch fish for about five years. While usually regarded merely as a sport in Europe, fishing with cormorants is an important industry in China and Japan. Besides the common cormorant, about 9 others are found in North America.

Corn Borer, European (*Pyrausta nubilalis*). A destructive insect pest, one of the most injurious introduced into America. Following its discovery in Massachusetts in 1917, it spread rapidly to New York and other states, causing the department of agriculture to undertake vigorous measures for its control. Like various other pernicious insects, the corn borer inflicts its chief damage when in the larval or caterpillar stage.

The female moth is pale yellow, with a stout body and a wing spread of slightly more than an inch. The outer third of the fore wing is marked by two darker, sawtooth-like lines; the hind wings are unmarked. The male moth is reddish brown, with a long, slender body, and is slightly smaller and much darker than the female. On the fore wings of the male moth there is a pale yellow streak between the two sawtooth-like lines, and, near the middle, there are two small yellowish spots. The hind wings of the male are grayish with a broad band of pale yellow.

The European corn borer produces one or two generations each year. Usually the moths fly from early June until late July. They appear about 9 o'clock in the evening and ordinarily make flights of 20 to 30 feet in length, reaching a height of some 6 feet from the ground. The female moth lays from 300 to 700 eggs in clusters on the underside of corn leaves. Upon hatching, the young caterpillars eat small portions of the leaves. As they grow larger, they attack the unfolded tassel, often causing it to break at the base and fall over, one of the surest signs of the presence of the pest. When full grown, the caterpillars enter the stalk and tunnel through all parts of the plant, except the fibrous roots, greatly weakening its vitality. They also bore into the cob and destroy the growing ear, the damage to a badly infested field ranging from 25 to 50 per cent and upwards.

In growing corn the presence of these insects is easily detected by hanging masses of borings on the stem, and by the sap which exudes from the entrance holes. In winter the presence of borers in dry cornstalks is indicated by the entrance holes, which are about one-eighth inch in diameter, usually with discolored edges and more or less plugged with borings. These holes lead to interior burrows, each of which is inhabited by a yellowish gray caterpillar, about three-fourths of an inch long, with a brown head and with minute brown spots on the body.

Besides devouring field and sweet corn, the European corn borer feeds incidentally upon various vegetables, garden flowers, and weeds, all of which harbor the insect and assist in spreading it from one locality to another. The chief protective measures employed are total destruction of infested cornstalks, vegetable refuse, and weeds, together with rigid quarantine regulations against infested districts. Fermentation of infested corn in silos kills the insect. The possibilities of damage and the problems of control are so great that, wherever the pest is discovered, immediate and complete cooperation with the department of agriculture is necessary.

Cowbird (*Molothrus*). A small group of parasitic birds, closely allied to the blackbirds and orioles, found only in the New World. Like many cuckoos of the Old World, cowbirds are notorious for the practice of laying their eggs in the nests of other birds and leaving them to be hatched and the young to be nourished exclusively by the foster parents.

The American cowbird (*M. ater*), about 7 inches long, glossy black, with head, neck, and chest uniform brown, ranges nearly throughout temperate North America. It is also called cow blackbird, cow bunting, and buffalo bird, from its habit of closely following cattle in pastures or of alighting upon their backs in search of insects. Major Bendire gives a list of more than 90 different birds in whose nests the cowbird has been known to deposit its eggs. Among these are thrushes, woodpeckers, towhees, flycatchers, pewees, orioles, vireos, sparrows, wrens, and warblers.

Crab. The crabs form a large group (*Brachyura*) of invertebrate animals belonging to the class *Crustacea*. There are more than 1000 species, chiefly marine, which vary exceedingly in size, color, and modes of living.

In the main, crabs do not differ essentially in structure from the lobster and the crawfish. The body, however, is usually broader than long, with the very short abdomen and tail hidden under the cephalothorax. The sense of sight is peculiarly acute. The mouth is furnished with strong jaws, in addition to which the stomach has internal projections, or teeth, for grinding. Crabs furnish food for many valuable fishes, serve as useful scavengers, and some are much prized as human food. Like the crawfishes and lobsters, crabs molt or throw off periodically their entire calcareous covering. They are then soft and helpless. In this condition, they are the "soft-shelled" crabs of the markets.

In the United States the blue crab (*Callinectes hastatus*) is the principal food species, though the shore crab (*Cancer irroratus*) of the Atlantic coast and the rock crab (*C. magister*) of the Pacific coast are edible. Crabs range in size from less than an inch in width to the giant crab (*Macrochira kæmpferi*), which sometimes measures 18 feet across the outspread legs. See *Lobster*, *Shrimp*.

Crane (*Grus*). The largest of the wading birds, resembling the heron in appearance but the rails in structure. Cranes have long legs, a long neck, a straight, sharp-pointed bill, and the short hind toe is elevated above the others. A striking peculiarity is the enormous development of the windpipe within the keel of the breastbone, where it is coiled and twisted, sometimes for a length of more than two feet, before emerging into the neck.

Cranes frequent marshes and open plains throughout most temperate regions, migrating southward in winter and returning north in the spring. They fly in large flocks, usually at night, often uttering a trumpet-like cry which can be heard for two miles. All are strictly terrestrial, never perching upon trees, and build their nests on the ground, usually in swamps, laying 2 brownish, dark-spotted eggs. Cranes are omnivorous, feeding upon small animals, insects, roots, and seeds. When sleeping, they stand upon one leg with the other drawn up under the body, and the head and neck are tucked among the feathers of the back. There are about 19 species, nearly all natives of the Old World.

The whooping crane (*G. americana*) is a magnificent bird, standing over 4 feet high, with a wing spread of over 8 feet. Excepting the dark outer wing feathers, the plumage is white throughout. While formerly ranging from Saskatchewan to central Mexico, it has become exceedingly rare. The sandhill crane (*G. mexicana*) is found from the Mississippi valley and Manitoba westward to the Pacific coast, and eastward along the Gulf coast to Florida. It is about 4 feet long and slate-gray or brownish gray in color. It prefers dry prairies, plowed fields, and sandy hills rather than wet situations.

Crawfish (*Astacus* and *Cambarus*). A freshwater crustacean, called also crayfish, much used for food in Europe and to some extent in the larger American cities. In appearance and structure it much resembles a small lobster.

The body of the crawfish is composed of a front part, the cephalothorax, in which the head and chest are united, and a posterior part consisting of the abdomen and the tail. The cephalothorax, which is incased in a hard shell, called the carapace, has three groups of appendages: first, a group of three pairs of mouth parts, belonging to the head; second, a group of three pairs of foot jaws, belonging to the thorax; and third, a group of five pairs of walking legs. The gills are attached to the bases of the walking legs. The stomach is provided with internal toothlike projections or teeth which serve in grinding the food. Like lobsters and crabs, crawfishes molt or cast off their outer shells periodically, keeping out of sight until the new shell has become hard enough to protect the body.

Crawfishes frequent fresh-water lakes, ponds, rivers, and small streams in most parts of the United States. Some kinds live in banks and moist meadows, burrowing down to the water. They feed on water insects, worms, small frogs and fish, and various plants and roots. See *Lobster*.

Crocodile (*Crocodilus*). The true crocodiles have a somewhat triangular, more or less pointed head, intermediate between the slender-snouted gavials and the broad-snouted alligators. They differ from alligators in that the fourth tooth of the lower jaw fits into a notch in the upper jaw so that it can be seen when the mouth is closed.

Crocodiles lay from 20 to 50 or more eggs, covered with a hard, white shell and about equal in size to those of a goose. They are deposited in some depression, covered with sand, and left to hatch by the warmth of the sun.

The American crocodile (*C. americanus*), first discovered in the United States by W. T. Hornaday in 1876, has a more slender muzzle than most crocodiles. It attains a length of 14 feet and is found in southern Florida, the West Indies, Mexico, and southward to Ecuador. While much more agile and vicious than the alligator, it exhibits no hostility to man.

The Egyptian crocodile (*C. niloticus*), mentioned by Herodotus and described by Aristotle, is plentiful in African rivers. It was held sacred by the ancient Egyptians, who built temples in its honor and placed the bodies of thousands of embalmed crocodiles in their tombs. It attains a length of 20 feet, and is sometimes so bold as to attack people in canoes or boats. See *Alligator, Cayman, Gavial.*

Crow (*Corvus*). A large perching bird, noted for its intelligence and considered by many scientists as standing at the head of the entire avian class.

The crow family (*Corvidæ*), which includes the common crow, the raven, the rook, the magpie, the jackdaw, and the jays, embraces about 200 species, which are widely found throughout the world, except in New Zealand. Of these, about 25 occur in North America. All inhabit wooded regions, usually residing permanently wherever nesting, and are omnivorous feeders, eating seeds, fruits, insects, small mammals, also birds and their eggs and nestlings.

The common crow (*C. americanus*) of North America, about 19 inches long, is remarkable for its gregarious and predatory habits. Crows pair in March. The nest is built of sticks and is usually placed in a low tree, preferably an evergreen, about 20 feet from the ground. The eggs, usually from 4 to 6 in number, are pale green, clouded and spotted with purplish and brownish markings. Although they feed chiefly on worms and the larvæ of insects, crows also eat grain and seeds, whence they have sometimes been regarded as injurious to the farmer; but they amply repay him for what they take, by destroying immense numbers of grasshoppers, weevils, cutworms, and other noxious insects.

The smaller fish crow (*C. ossifragus*), 16 inches long, with somewhat brighter plumage, frequents the coasts and rivers of the southern United States, ranging northward to Massachusetts. While fond of shellfish and crabs, it feeds also on berries and grain, and is especially destructive to small birds and to their eggs and young. See *Jackdaw, Magpie, Raven, Rook.*

Crustaceans (*Crustacea*). A large class of gill-bearing, aquatic arthropods, containing the lobsters, crabs, crawfish, prawns, shrimps, water fleas, and barnacles. They derive their name from the hard armor, or outer skeleton, in which the body of most of them is incased, which serves not only for protection but also for the attachment of the muscles. Crustaceans differ from insects and from most other arthropods in having gills and two pairs of antennæ or feelers.

Some 16,000 species of crustaceans are known, the vast majority of which live in the sea, though some inhabit fresh waters and a few dwell on land. They are of great importance in the economy of the ocean, as they constitute the chief food of many valuable food fishes and are the natural scavengers of the sea. See *Barnacle, Crab, Lobster, Shrimp, Water Flea.*

Cuckoo. The cuckoos constitute a large family of birds (*Cuculidæ*), numbering about 175 species, mostly natives of warm regions, 35 of which are found in the New World. They are of medium size, with a compressed, somewhat arched beak, and feet with two toes in front and two behind. Many cuckoos are birds of shams and pretenses, imitating the habits, plumage, or voices of other birds and seeking to be mistaken for them. In addition, most cuckoos are parasitic, never building nests of their own, but placing their eggs in the nests of other birds and leaving them to be hatched and the young to be fed by the proper owners of the nests.

In North America there are two common species, the yellow-billed cuckoo (*Coccyzus americanus*), found across the continent, and the black-billed cuckoo (*C. erythrophthalmus*), found east of the

Rocky mountains. Both are slender, dovelike, brownish gray birds, about a foot long. Unlike most cuckoos, they usually build their own nests and rear their own young. In the Middle West and the South they are called "rain crows," from the belief that their peculiar notes predict rain.

Cuttlefish (*Sepia officinalis*). A small cephalopod mollusk, about 8 inches long, closely related to the squid and the octopus, found in Old World waters. The limy plate or shell protecting its back is the cuttlefish bone used to feed canary birds. Like the squid, it has an ink sac from which, when pursued, it discharges a blackish fluid, beclouding the water and often enabling it to escape. Since ancient times this fluid has been used in making ink, yielding the sepia used by artists and some kinds of india ink. Dried cuttlefish form an article of food in southern Europe and Asia. See *Octopus, Squid.*

Deer. A large group of hoofed mammals of the family *Cervidæ*. Deer are animals of graceful form, combining much compactness and strength with slenderness of limb and fleetness. They have a long neck, a small head, which they carry high, large ears, and large full eyes. Below each eye, in most species, there is a sac or fold of the skin called the tearpit, the use of which is not well known. Deer have no cutting teeth in the upper jaw; the males usually have two short canines in the upper jaw but neither sex has any in the lower jaw. They are distinguished from all other ruminants by their solid branching horns or antlers, which, with few exceptions, are possessed by the male only. The horns fall off annually, and are renewed with increase of size and number of branches, according to the kind, until the animal has reached mature age. In most English-speaking countries, the male deer is commonly called a buck, the female deer, a doe, and the young of either sex, a fawn.

There are more than 50 known species of deer, found in almost all parts of the globe except Australia and South Africa. They range in size from the diminutive pudu of Chile, about the size of a hare, to the so-called American elk or wapiti, as tall as a horse, and to the moose which is still larger. Some of them live amidst the snows of very northerly regions and some in tropical forests. The greater number inhabit the warmer temperate countries and are found chiefly in wide plains and hills of moderate height. The flesh (venison) of most kinds of deer is highly esteemed for the table. Deer have long been regarded as among the noblest objects of the chase. Only one species, the reindeer, can be said to have been fully domesticated and reduced to the service of man.

The most common American species, the white-tailed deer (*Odocoileus virginianus*), called also Virginia deer, with the tail snow-white underneath, was formerly abundant nearly throughout the eastern United States and Canada. In summer its coat is rusty brown above, in autumn, gray-brown, and in winter, dark brown. The under parts are white. While shy and timid, it is strongly attached to its haunts, and will remain around them even when intruded upon by populous settlements. On this account it has been largely exterminated by hunting, except where protected by law. During the day this deer retreats to swamps or thickets, coming out at night for food and drink. It is fond of the water and is an excellent swimmer. In summer it often feeds on water lilies and other aquatic plants, as well as swamp grasses and various tender shrubs. In winter it eats buds, young branches of trees, various berries, leaves, mosses, lichens, and sometimes nuts and acorns, which it paws out of the snow. A smaller form, known as the Florida deer, occurs in the southeastern United States.

The somewhat larger mule deer (*O. hemionus*), so-called from its large ears, is known also as black-tail. It is brownish gray above and whitish gray beneath, with a pale reddish tail tipped with black. It occurs in the Rocky Mountain region from Canada to Mexico. The mule deer prefers a rough, broken country, with small groves of trees. It grazes when grass is in season, browses on tender buds and branches, and also eats various fruits.

The black-tailed deer (*O. columbianus*), the most beautiful American species, is found on the Pacific coast from the Columbia river to Alaska. It is smaller and more graceful than the mule deer, and is brighter colored than the Virginia deer. Its summer coat is reddish brown above and white beneath. In winter its coat becomes grayish. The outer surface of the tail is black above and white below. Its habits are similar to the other deer, roving chiefly at night, and feeding largely upon twigs of wintergreen, huckleberry, and various other shrubs.

The best-known European species are the graceful fallow deer (*Cervus dama*), often kept in herds in parks for ornament, and the large red deer or stag (*C. elaphus*), once abundant in forested mountains and formerly the object of the favorite sport of stag hunting. The full-grown male stag is called a hart and the female a hind. A very handsome Old World species is the spotted axis deer (*C. axis*) of the East Indies. The large, handsome American deer, called wapiti, and popularly, though incorrectly, styled "elk," is closely related to the stag of Europe. See *Musk Deer, Wapiti.*

Dodo (*Didus ineptus*). A clumsy, defenseless bird, about the size of a swan, found living on Mauritius when the island was discovered, near the beginning of the 16th century, by the Portuguese. It had a very stout, hooked beak, short, stocky legs, and was covered with downy feathers. Its wings were small and quite incapable of flight. Such a creature could survive only in isolation. Consequently, it speedily succumbed under the changed conditions introduced by the coming of man. Unable to cope either with his weapons or with his domesticated animals, this helpless bird was soon exterminated (1651) and no entire specimens are anywhere preserved. The dodo is known to science mainly from the study of its bones and from some quaint pictures left by Dutch artists.

Dog. The dog family (*Canidæ*) is an important group of carnivores, intermediate between the hyenas and the bears. It includes the various kinds of dogs, wolves, jackals, and foxes. There are about 50 species, with living representatives in every part of the world except Madagascar.

The domestic dog (*Canis familiaris*) was a member of the family circle long before the dawn of recorded history, having been used by Neolithic man. The oldest human monuments in the valleys of the Euphrates, the Indus, and the Nile show that many important breeds of dogs were then already common among the ancient peoples. The parent wild species, from which the many varieties of domestic dogs have sprung, are unknown and apparently indeterminable. Modern scientists, however, believe that they have been derived from numerous species of wolves and jackals, intermingled, diffused, and modified through centuries of breeding.

Ages of domestication have produced adaptations to climate, varying from the hairless dogs of the tropics to woolly Eskimo breeds possessing the heaviest fur of any known animal. In size, dogs vary from tiny lap dogs no larger than kittens to Great Danes which stand 3 feet high at the shoulder. There are some 200 recognized varieties or breeds of dogs. These present far greater differences in size, structure, and appearance than all the wild members of the dog family combined. Most domestic breeds are believed to have arisen from the intercrossing of a few leading types, such as mastiffs, wolflike dogs, greyhounds, spaniels, hounds, and terriers.

The dog is at once the most intelligent, affectionate, and loyal of the domestic animals. It is the devoted companion of man throughout a wider

range of climatic conditions than any other animal, greatly surpassing in this regard the cat, the donkey, and the horse. Dogs are employed as draft animals in various countries, and share, with the reindeer, the burden of transportation in arctic regions. Trained sledge dogs made it possible for Peary to cross the frozen ocean to the north pole and for Amundsen to ascend the high antarctic plateaus to the south pole. See *Fox*, *Jackal*, *Wolf*.

Dogfish (*Squalus acanthias*). A small, slate-colored shark, 3 feet long, with a strong spine in the dorsal fin. It inhabits both shores of the North Atlantic, southward to Cuba. The flesh is used for food, the liver yields oil, and the very rough skin is dried and used, like sandpaper, for polishing wood. Sometimes as many as 20,000 dogfish have been taken in a single haul of the net.

Dolphin (*Delphinidæ*). The dolphins are marine, fishlike mammals, closely related to the whales, which they somewhat resemble in form, but much smaller and differing from them in usually having teeth in both jaws. The dolphin family contains about 60 species, widely distributed in all seas, and includes the dolphins, the porpoises, the grampuses, the beluga, or white whale, the so-called black fish, and the terrible orca, or killer whale. The names "dolphin" and "porpoise" are frequently used interchangeably, but the true dolphins have the snout prolonged into a slender beak, while the snout of the porpoise is blunt.

The common dolphin (*Delphinus delphis*), 6 to 10 feet in length, with a beak half a foot long, blackish above and satiny white below, is frequent in European but rare in American waters. This is the dolphin of the ancients, sacred to Apollo whose most famous oracle at Delphi bore its name. Dolphins are very active and voracious, feeding chiefly on squids and other small marine animals. They live in herds, which often gather about ships and delight the voyagers with their graceful gambols. Their flesh is palatable and was formerly very highly esteemed.

Domestic Animals. The taming of useful animals ranks, with the cultivation of plants, the making of tools, and the use of fire, among the great achievements of early man. In case of the most important animals, domestication is remotely ancient. Practically all animals of the first rank appear to have been in age-long use when recorded history began, including the dog, ox, humped cattle, sheep, goat, ass, horse, camel, elephant, cat, pigeon, goose, and honeybee. The chicken, peacock, rabbit, and guinea fowl had reached Europe before the beginning of the Christian era. No animal of prime economic importance has been brought into domestication during the last 2000 years.

Of the many thousands of wild species, only about 40 animals are now considered as domesticated, and in case of some of these domestication is only partial. The parent wild species of the camel, sheep, and humped cattle appear to have become extinct during prehistoric times, and the ancestry of the horse and the dog cannot with certainty be assigned to animals now living.

The Old World has contributed about seven-eighths of all domesticated animals, including every species of high economic rank. Of these, Asia is the native home of by far the greater number,—including the humped ox, water buffalo, banteng, gaur, gayal, yak, elephant, Bactrian camel, horse, goat, cheetah, chicken, peacock, cormorant, carp, goldfish, honeybee, and silkworm. The parent wild species of the pig, reindeer, pigeon, duck, and goose are of European as well as of Asian distribution, but their domestication is believed to have first taken place in Asia. Africa has contributed the ass, cat, ostrich, parrot, canary, and possibly the one-humped camel. In the New World, South America has furnished the llama, alpaca, and guinea pig, while North America has contributed only the turkey. Australia and the adjacent islands as yet have added none to the list.

Donkey (*Equus asinus*). The common ass, donkey, or burro, widely used throughout the world as a beast of burden, is a domesticated form of the African wild ass (*E. africanus*), native of Abyssinia, Nubia, and Somaliland.

The donkey was probably first domesticated in the valley of the Nile, where it was known and used for centuries in advance of the horse. It found its way into ancient Greece through Asia Minor, but is mentioned much less frequently than the mule by Homer and other early writers. In Bible times it was the custom of great personages to ride upon white asses, and a preference for breeds of this color still persists in some parts of the Orient.

With the westward spread of vine and olive culture, the ass was introduced into Italy, Spain, and France. In England it was known as early as the time of Ethelred and was re-established during the reign of Elizabeth. It was brought to South America and Mexico by the Spanish during the period of exploration and conquest. The numerous breeds vary greatly in size from pygmy West Indian donkeys, less than two feet high, to large Spanish asses, over five feet high.

While not adapted to cool moist climates, such as that of the eastern United States, asses are invaluable as baggage animals in warm, arid, and mountainous regions. They are extensively employed for transportation in southern France, Spain, Italy, Mexico, and Andean South America. The burro is a small breed much used by miners and prospectors in the western United States. See *Ass*.

Dragonflies (*Odonata*). A group of long-winged, carnivorous insects, also known as "darning needles" and "snake feeders," of which some 250 species are known to occur in North America. All are aquatic in their immature stages, and are eaten extensively by fishes. The adult insects fly by day over ponds and along streams, and feed upon mosquitoes, midges, and other insects which they capture in flight. Many dragonflies are large insects, and some are of brilliant coloration. The slender, low-flying, mostly blue-banded forms that flit about among the sedges by the waterside are often called damselflies.

Duck. The duck family (*Anatidæ*) belongs to a large group of web-footed, swimming birds which includes, besides the true ducks, the mergansers, the geese, and the swans, the whole constituting the important natural order *Anseres*. The true ducks differ from the mergansers in having a broad and flat bill; they differ from the geese and swans in having shorter necks, and, further, the male and female of the true ducks are unlike in color. Ducks are strong, swift fliers, and are noted for their powers of diving and swimming under water. They live largely on animal food, such as insects, snails, frogs, and small fish, though some prefer aquatic plants, such as water celery. Many species are highly prized for food and are much hunted as game birds.

There are two divisions of the true ducks, the river ducks (*Anatinæ*) and the sea ducks (*Fuliguli-næ*). The sea ducks have a lobe or web on the hind toe; this is lacking in the river ducks. The river ducks frequent sluggish streams, ponds, lakes, and even ocean shores. They usually feed at night and obtain their food by probing on the bottom in shallow water. The sea ducks inhabit seas, bays, lakes, and inland rivers. They feed by day, securing their food by diving, sometimes descending 150 feet, and spend the night on shore.

There are about 70 species of river ducks, including the mallard, teal, pintail, widgeon, shoveler, gadwall, baldpate, and wood duck. The sea ducks comprise more than 50 species, among which are the canvasback, redhead, scaup, scoter, and eider. Most ducks breed far northward, often within the

Arctic circle, and winter in warm or tropical regions. In the greater part of the United States they are seen only during their migrations.

The various breeds of the domestic duck are believed to have been originated from the mallard (*Anas boschas*), found wild throughout Asia, Europe, and North America. In China the rearing of ducks is a very important industry. Since the introduction of the Peking duck, about 1870, duck raising has been extensively developed in various parts of the United States.

Dugong (*Halicore dugong*). A fish-shaped, aquatic mammal, of the order *Sirenia*, found along the shores of the Indian Ocean. It is from 8 to 12 feet long, with a rounded body, thickest in the middle and tapering toward the tail, which ends in a flattened fin or flukes. The front limbs, which are paddle-like, have no trace of nails or of division into fingers. There are no hind limbs. The upper lip is very fleshy and thick, and both lips are provided with a horny edge, which enables the animal to tear off seaweeds and other marine vegetation growing upon the bottoms of shallow seas in which it feeds. The dugong sometimes enters wide estuaries, but it never ascends rivers or appears on land.

It is supposed by some that the habit of the dugong in suckling its single young, clasped by one flipper, while it paddles with the other, keeping the heads of both out of the water, gave rise to the fable of the mermaid. See *Manatee*.

Eagle. A large bird of prey belonging to the same family as the hawks, kites, and falcons, often called the king of birds. From ancient times the eagle has been universally regarded as the symbol of might and courage.

There are more than 40 species, found in all parts of the globe. Eagles have a strong bill, much arched at the hooked tip, and the toes are armed with sharp, curved claws. The females are larger than the males. Most eagles kill their own prey but nearly all will eat animals found dead. They build huge nests of sticks, usually on inaccessible cliffs or in tall trees, and lay 2 or 3 eggs. They have great powers of flight, soar at immense heights, and possess remarkable keenness of vision.

The bald eagle or white-headed eagle (*Haliætus leucocephalus*), the national emblem of the United States, is a large, handsome sea eagle, found nearly throughout North America. It is about 3½ feet long with a wing spread exceeding 7 feet. The head, neck, and tail of adult birds are pure white. The bald eagle lives chiefly on fish which it captures alive, finds thrown up on shores, or secures by robbing fish hawks.

The golden eagle (*Aquila chrysaetus*), a magnificent bird inhabiting mountain regions, occurs throughout Europe, northern Asia, and most of North America, though rare east of the Mississippi. It is similar in size to the bald eagle, but with dark brown plumage, and the feet are feathered to the toes. It preys chiefly upon small mammals and birds, including rabbits, lambs, and grouse.

Earthworms. Burrowing annelid worms of the order *Oligochæta*, commonly called angleworms. Numerous species are found in all parts of the world except frozen regions, dry sandy soils, and certain parts of the prairies of North America. They have cylindrical bodies, tapering slightly at each end, and are commonly flesh-red in color, though varying to dull pink and muddy brown. In length they usually range from a few inches to a foot, though several Australian and South African forms are 5 feet long.

In their habits the different kinds of earthworms are very similar. All burrow in damp earth, the more common kinds usually to a depth of about two feet. They come to the surface only to avoid drowning when their burrows are flooded, or at night to throw their castings or sometimes to obtain food. In the morning after a night of heavy rain, great numbers of earthworms are frequently seen on sidewalks and other hard surfaces. This circumstance often gives rise to the erroneous report that they "rained down." The fact is that earthworms, upon emerging from their flooded burrows, crawl about very actively in their endeavor to escape from the water, often climbing up comparatively smooth surfaces. The firm texture of a sidewalk or roadway prevents them from burrowing out of sight when daylight returns, hence they remain exposed to view.

Earthworms feed exclusively upon vegetable matter. For the most part, they swallow soil containing it, digest out the nutritive elements, and reject the remainder as castings from the mouths of their burrows. During the night they sometimes partially leave their burrows to feed upon the stalks of leaves and other plant parts with which, in cold weather, they close their tunnel openings.

As they exist in countless millions, earthworms play an important part in the formation and improvement of soil. They fertilize it with their castings, and keep it stirred up and exposed to the air by incessant tunneling. It is estimated that in some districts earthworms deposit each year a layer of castings one-fifth of an inch in thickness over the entire surface of the land.

Earthworms form the prey of many animals; they comprise the chief food of moles and shrews, and are extensively eaten by numerous birds. As earthworms sometimes go into the water and as immense numbers are borne by floods into streams and ponds, they provide food for many fishes, and are the most popular bait for stillfishing.

Echidna (*ē-kĭd'nȧ*). An egg-laying mammal native to Australian regions, called also porcupine anteater. The five-toed echidna (*Echidna aculeata*), found in Australia, New Guinea, and Tasmania, is 14 to 20 inches long, with a powerful body beset with stiff spines, short legs with strongly clawed feet, and a birdlike head and beak. The forefeet are adapted for digging, and the creature burrows with remarkable rapidity. It lives in dry woodlands, coming forth from its burrow at night, in search of its food, chiefly ants and termites, which it catches with its glutinous tongue. The much larger three-toed echidna (*Zaglossus bruijnī*), found only in New Guinea, is about 2 feet in length, with a long, somewhat curved snout. See *Monotremata*, *Platypus*.

Echinoderms (*ē-kī'nō-dûrmz*) (*Echinodermata*). A branch of the animal kingdom, consisting of marine invertebrate animals in which the body, while varying greatly in form, is built on the radiate plan, usually with five diverging parts as in the starfish. All have a tough outer skin or a sort of shell composed of many small plates. They have a well-developed digestive system and organs of locomotion. The latter consist of tubular ambulacral feet, provided with sucking disks enabling the animal to cling to rocks or to move about on the sea bottom. Echinoderms are carnivorous, feeding upon crustaceans, mollusks, and other marine animals.

There are about 4000 species of echinoderms, divided into 5 classes: the Starfishes, *Asteroidea*; the Brittle Stars, *Ophiuroidea*; the Sea Urchins, *Echinoidea*; the Sea Cucumbers, *Holothuroidea*; and the Sea Lilies or Feather Stars, *Crinoidea*. See *Starfish*.

Edentata (*ē'dĕn-tā'tȧ*) or **Bruta.** An order of mammals, characterized by the absence of incisors or front teeth, and, in a few instances, by the absence of all teeth. It includes the sloths, the anteaters, the armadillos, the pangolins, and the aard-varks. There are about 40 species, mostly natives of South America and Africa. See *Anteater*, *Armadillo*, *Pangolin*, *Sloth*.

Eel (*Anguilla chrysops*). A long-bodied, serpent-shaped fish, without ventral fins. It lives in the mud and ooze of brackish and fresh waters of most



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BEARS, WOLVES, AND FOXES

1 Alaskan Brown Bear. 2 Bald-faced Grizzly Bear. 3 Polar Bear. 4 Black Bear. 5 Timber Wolf. 6 Prairie Wolf or Coyote. 7 Arctic Fox. 8 Red Fox.



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GNAWING MAMMALS

1 Beaver. 2 Beaver at Work. 3 Beaver Dam and Home, Rocky Mt. National Park; *photo from Brown Bros.* 4 Muskrat. 5 Prairie Dog.

regions, but is not found on the Pacific coast of America. It is abundant along coasts from Newfoundland to Central America, and in all streams and lakes connected with them. It attains a length of 5 or 6 feet, but averages 20 to 30 inches. In color it is olive brown above and paler below. Its smooth, exceedingly slimy and slippery skin may or may not contain small scales.

The eel is a fresh-water fish which goes to salt water to spawn. It is exceedingly prolific, a female 32 inches long producing about 10,000,000 eggs. During the second year after hatching, young eels ascend rivers in great numbers. When migrating to the sea, eels do not take any food, and, after spawning, both males and females die, none returning to fresh water a second time.

Eels are immensely abundant, exceedingly active and voracious, and serve as valuable scavengers, preferring for food dead fish and other dead animal matter. However, they do not hesitate to attack any living creature, including man, when so disposed. The eel is an excellent food fish and great quantities are annually taken for the markets.

Eider (*Somateria*). A large sea duck, native chiefly of arctic regions. It is famous for its fine, elastic, gray down, the valuable eider down of commerce, used in making bedcovers and in trimming ladies' dresses. There are several species, all handsome birds, with strongly marked colors.

The European eider (*S. molissima*) breeds on rocky shores from Spitsbergen to the Faroe islands. As soon as the eggs are laid the female plucks the soft down from her breast with which to hide them and protect them during her absences from the nest. About a sixth of a pound of down is said to be obtained yearly from each nest. In Norway and Iceland many eider folds are kept in which the birds nest and become partially domesticated.

The Greenland eider (*S. molissima borealis*), very similar to the European eider, breeds from Labrador northward, and winters southward to Maine. Its down is gathered in Greenland and in Iceland. Except at nesting time, eiders live in the open sea. They obtain their food, which consists chiefly of mollusks and crustaceans, by diving.

Eland (*Oreas canna*). An oxlike antelope, with twisted horns, native of South Africa, sometimes called the "Cape elk." It is the largest of the antelopes and forms a connecting link between them and the oxen. Its body resembles that of an ox and its head that of a deer. The eland stands 5 to 6 feet high at the withers, and weighs from 800 to 1500 pounds. While formerly exceedingly abundant, living in large herds throughout grassy plains of southern Africa, it is now rare from excessive hunting, except in the interior. The natives cure its excellent flesh by salting, make candles from the fat, and leather from the hide. See *Antelope.*

Electric Eel (*Electrophorus electricus*). A large, eel-like fish, 6 feet long, closely allied to the carp and the sucker, inhabiting the rivers of Brazil and Guiana. It is the most powerful of all electric fishes. The electric organs situated on its tail are capable of producing a shock sufficient to kill other fishes and small mammals. See *Torpedo.*

Elephant (*Elephas*). The largest existing land animal. Elephants are the only living representatives of the *Proboscidea*, or mammals with a proboscis or trunk. They are exclusively confined to the tropical regions of the Old World, in the forests of which they live in herds.

Only two living species are known, the Asiatic elephant and the African elephant. In both species the two upper incisors, or front teeth, are enormously developed, forming long tusks. The nose is prolonged into a cylindrical trunk, movable in every direction, highly sensitive, and terminating in a finger-like, prehensile lobe. This trunk is the elephant's weapon of offense and defense, and by means of it all food is gathered and conveyed to the mouth. The limbs, which are of colossal thickness and strength, are remarkably straight and column-like. The feet are furnished with five toes; the sole of the foot is formed of a thick pad of integument.

The Indian elephant (*E. indicus*), the species which is now caught and domesticated, averages from about 8 to 10 feet in height, and weighs from 2 to 3 tons. As it does not readily breed in captivity, the demand for it is supplied almost entirely by the capture of adult wild individuals. The taming and the use of elephants date back to prehistoric times in India. The Indian elephant is distinguished by its concave forehead and its comparatively small ears.

The somewhat larger African elephant (*E. africanus*), often exceeding 10 feet in height, has a strongly convex forehead and great flapping ears. It is hunted chiefly for its ivory, a pursuit which threatens the complete extinction of these fine animals. While it is presumed that the African elephant was the species domesticated by the Carthaginians and used by Hannibal in his wars against the Romans, none of the Negro peoples seem to have tamed it.

The elephants are vegetable feeders, living almost entirely on the foliage of shrubs and trees, which they strip off by means of the prehensile trunk. As the tusks prevent the animal from drinking in the ordinary manner, the water is sucked up by the trunk, which is then inserted in the mouth, into which it empties its contents. Many species of fossil elephants are known, the most familiar of which are the mastodon and the mammoth. See *Mammoth, Mastodon.*

Emu (*Dromæus*). Next to the ostrich, the largest of living birds. There are only two surviving species, both found in Australia, where, like the kangaroos, they once formed a characteristic part of the landscape. While closely allied to the ostrich, they differ in having three toes on each foot, the neck and body are completely covered with hairlike feathers, and there are no ornamental wing or tail plumes. The common emu (*D. novæ-hollandiæ*), of eastern Australia, which stands more than 5 feet high, has light brown plumage mottled with gray. The more slender spotted emu (*D. irroratus*), of western Australia, has feathers barred with white and gray.

Emus go about in small parties, preferring open or sparsely wooded country. They subsist chiefly upon fruits, seeds, roots, and herbage. The nest is a mere hollow in the earth or a low platform of grass and bark. The eggs, about 9 in number and about 5 inches in length, are of a beautiful green color. The male emu takes full charge of hatching the eggs and rearing the young. Emus are readily domesticated and make interesting pets. Their flesh and eggs are palatable. See *Cassowary, Ostrich, Rhea.*

English Sparrow (*Passer domesticus*). A name popularly given in America to the common house sparrow, native of Europe but now introduced and naturalized in many other regions where it usually becomes a pest, notorious for its fecundity, voracity, and destructiveness. Since ancient times it has fearlessly associated with man, living in towns and cities more than in the country and rarely visiting or nesting in wild regions.

The English sparrow was first introduced into the United States from England, at Brooklyn, N. Y., by Nicholas Pike in 1850. During the ensuing 20 years it was brought to various other American cities, mainly with the view of freeing shade trees of destructive caterpillars. The house sparrow, however, is a grain-eating rather than an insect-eating bird. In some localities it destroys much grain and fruit; in other places it drives away bluebirds, wrens, swallows, and other native insect-eating birds.

Ermine (*Putorius*). Various species of weasel, found in the northern parts of Europe, Asia, and North America, whose fur, except the tip of the tail, turns white in winter. The European ermine (*P. erminea*) is also known as the greater weasel or stoat. In the northern United States and Canada, the common or New York weasel (*P. noveboracensis*), the short-tailed weasel (*P. cicognani*), and the Arctic coast weasel (*P. rixosus*) yield ermine fur during the winter season. White ermine fur is very valuable. It has long been regarded as emblematic of royalty and authority and is extensively used in ornamenting the official robes of kings, nobles, and judges. See *Weasel*.

Finch. The popular name of various small seed-eating birds belonging to the family *Fringillidæ*, some of which possess remarkable powers of song. By many authorities the name finch is applied to this entire group, which constitutes the most numerous family of birds, comprising more than 1000 species. They are found throughout the world except in Australia, over 200 occurring in the United States and Canada. The birds known as finches, buntings, sparrows, grosbeaks, linnets, redpolls, snowbirds, and also the canary, belong to this family. They are closely related to the tanagers, weaver birds, and blackbirds, and, by some ornithologists, are ranked as standing at the head of the entire avian class. See *Canary*, *Chewink*, *Goldfinch*, *Grosbeak*, *Snowbird*, *Sparrow*.

Firefly. A nocturnal beetle, called also lightning bug, belonging to the family *Lampyridæ*, found chiefly in the warmer parts of the United States and southern Europe. Fireflies have long, soft bodies, with leathery wing covers, and possess a light-giving organ which produces flashes of greenish white light. Not only are the adult beetles luminous, but in some kinds the pupæ, the larvæ, and even the eggs, emit light. The wingless, somewhat wormlike females of certain species are known as "glowworms."

In Paraguay there is a remarkable form, called the railway beetle, which flashes a red light at the ends of the body and a green light along the sides. In tropical America several species of elater beetles or click beetles (*Pyrophorus*) are styled fireflies. Of these, the best-known is the Cucuyo (*P. noctilucus*), about 2 inches long, with two eyelike spots on the thorax which emit a steady light. The ladies of Cuba and Mexico place these beetles in little lace nets which they fasten as ornaments upon their dresses and hair.

Fishes (*Pisces*). The lowest of the five large classes of vertebrates. A typical fish is cold-blooded, breathes by means of gills throughout life, lays eggs for the production of its young, and lives entirely in the water. It has a bony skeleton which supports an elongated, wedge-shaped body, narrowest at the tail, thin at the sides, and covered with overlapping scales. It has highly developed fins for steering, balancing, and propulsion, immovable eyes, and a swim bladder filled with air. The tail is the chief organ of progression. The use of the swim bladder is not always clear. It is believed that it serves as a balancing organ, enabling the fish to adjust itself constantly to the water pressure and to rise or descend with ease.

There are, however, among fishes, numerous variations from the type. For example, the lungfish has limblike fins and practical, air-breathing lungs; certain sharks and a few other fishes bring forth their young alive; the sturgeon has a cartilaginous skeleton: the catfish has no scales; the climbing perch can climb trees, and the flying fish can rise out of the water for gliding flight.

Fishes were the first true vertebrates to appear in geologic history, and the living forms abound in enormous variety and numbers in oceans, lakes, rivers, and smaller waters throughout the world. The number of existing species at present known is estimated at about 13,000. A large number of these are of great economic value as food fishes. The skin of certain species yields shagreen, and the swim bladder of others yields isinglass.

Fishes are grouped in four subclasses: *Dipnoi*, the lungfishes; *Teleostomi*, the bony fishes; *Holocephali*, the chimæras; and *Elasmobranchii*, the sharks and rays.

Flamingo (*Phœnicopterus*). A genus of large, web-footed, wading birds. They are intermediate between the storks and the ducks, with very long legs and necks, gooselike bodies, webbed feet, and large, peculiarly shaped bills curved downward near the middle. There are about 8 species, all more or less rose-red in color when in full plumage. These inhabit the warmer regions of the world. Flamingos feed upon small mollusks, crustaceans, fishes, worms, insects, and seeds, which they fish up from the water and mud. They breed in companies, sometimes of immense numbers, in mud flats or salt marshes, such as the Marasmus of Spain and the Great Atacama of South America. They raise the mud into a small hillock, made slightly concave at the top, so as to form a rude nest. In this hollow, the female lays 2 eggs and hatches them by sitting on the nest with her legs doubled up beside her.

The North American flamingo (*P. ruber*), deep red in color, stands about 4½ feet high. While formerly common in the southern United States, it is now very rare north of the West Indies and Central America. Small colonies still persist in the Bahama islands. The European flamingo (*P. antiquorum*), of southern Europe, northern Africa, and the warmer parts of Asia, is rose-white in color, with scarlet wing coverts. It was well known to the ancients, being highly esteemed as food by the Romans, who considered its fatty tongue a rare delicacy.

Flea (*Pulex*). A small insect of the order *Siphonaptera*, characterized by its compressed body and by the absence of true wings. The mouth parts are adapted for biting and sucking, the eyes or ocelli are single, and the antennæ are threadlike. The flea is remarkable for its agility, leaping to a surprising distance. About 100 species of fleas are known, some 30 of which occur in North America. The common flea of the Old World (*P. irritans*), which attacks man, poultry, pigeons, and swallows, is rarely seen in America. The so-called house flea of the United States is the cat and dog flea (*P. serraticeps*). The rat flea is regarded as the chief carrier of bubonic plague.

Flies (*Diptera*). A numerous order of insects characterized by usually having only two wings. In place of the hind pair possessed by most insects are two knobbed threads, called *balancers*, which are supposed to assist in maintaining equilibrium while in flight. Flies are exceedingly rapid and prolific breeders, laying great numbers of eggs, and the young upon hatching pass quickly through larval and pupal forms to the mature state. In one group, however, the *Pupipara*, the young are brought forth as full-grown larvæ ready to pupate.

The various flies which disseminate disease are the most dangerous insect enemies of man. Certain mosquitoes transmit malaria, yellow fever, and filariasis; the house fly spreads typhoid fever, Asiatic cholera, and prurient ophthalmia: the tsetse fly transfers sleeping sickness. African fever, and various animal plagues. The Hessian fly, onion maggot, and apple maggot rank high among injurious insects. On the other hand, the dried larvæ of certain species of *Ephydra*, which swarm in myriads around alkaline lakes in California and Mexico, form a nutritious food used by the Indians and the Mexicans.

There are about 50,000 known species, of which 7000 or more are North American. Among these are the house flies, flesh flies (or bluebottles), horse-

flies (greenheads), flower flies, bee flies, pomace flies, botflies, robber flies, black flies and punkies, midges, gnats, and mosquitoes. See *Fruit Flies*, *House Fly*.

Flycatcher. A name originally applied to various birds of the thrushlike, insectivorous family, *Muscicapidæ*, which comprises some 700 species found exclusively in the Old World. In America the name is universally given to birds of the so-called "tyrant" flycatcher family (*Tyrannidæ*). This includes over 500 species peculiar to America. They are most abundant in the tropics where their services as insect destroyers are in greatest demand.

Flycatchers are solitary birds, mostly of dull plumage, and have the habit of remaining perched for a long time on a single spot, darting away only to catch passing insects with a swift snap of the bill, and then returning. They vary in size from pygmy South American forms less than 3 inches long to the derby flycatchers of Mexico nearly a foot in length. Of some 35 species which migrate to the United States and Canada, among the best-known are the great-crested, scissor-tailed, Acadian, Traill, and least flycatchers, the familiar phœbe or pewee, and kingbird. See *Kingbird*, *Phœbe*.

Flying Dragon (*Draco volans*). A small arboreal lizard provided with a parachute-like expansion of the skin, with which it is enabled to fly or glide from tree to tree. It is about 8 inches long, with irregular scales and a very long whiplike tail. This brilliantly colored, entirely harmless creature lives in the forests of the East Indies.

Flying Fish (*Syentognathi*). A group of exceedingly interesting fishes, allied to the pikes on the one hand and to the mullets on the other. There are two chief divisions or families, the flying fishes (*Exocœtidæ*) and the garfishes (*Belonidæ*).

The common flying fish (*Exocœtus volitans*) is widely distributed throughout the world in warm seas. It rises 4 to 6 feet above the water and sustains a flight of 50 to 100 feet by means of its strongly developed pectoral fins which act as wings. While a mid-ocean fish, it occurs in schools near the Barbados, where it is taken in large numbers for food.

The Catalina flying fish (*Cypselurus californicus*), of southern California, sometimes 18 inches long, is perhaps the largest known species. It is one of the strongest fliers of the group, having its ventral as well as its pectoral fins greatly enlarged.

Flying Fox. The name given to various large, fruit-eating bats of the Oriental tropics and Australia, because of their doglike or foxlike heads. There are about 70 species, mostly tailless, with small, pointed ears and large eyes. The Kalong (*Pteropus edulis*), of Java, Sumatra, and adjoining regions, is the largest of the fruit-eating bats,—its body attaining a length of 15 inches, with a wing spread of about 5 feet. It subsists on various kinds of fruits, especially figs and mangoes, and frequently does great damage in orchards. The kalong is much hunted by the Malays for its flesh which is highly esteemed for food. See *Bats*.

Flying Squirrel. A small rodent mammal of the squirrel family (*Sciuridæ*). The expanded skin of the flank, extending between the fore and hind legs, enables this animal to support itself as with a parachute, and to make very long gliding leaps. The American flying squirrel, or Assapan (*Sciuropterus volans*), of eastern North America, is one of the most exquisite of small mammals. The limbs are delicately formed and its fur is as soft as silk. Its body is about 5 inches long and the tail about 4 inches. Owing, however, to its nocturnal habits, it is not often seen. The flying squirrel nests in hollow trees, sleeping in the daytime, and appearing for play about sunset.

Fowl (*Gallus domesticus*). The numerous breeds of domestic fowl—cock and hen, or chicken—are believed to have originated from the red jungle fowl (*G. gallus* or *bankivus*), native of eastern India and Indo-China. In plumage this wild species, which is closely related to the pheasants, strongly resembles the modern black-breasted game fowl. Various circumstances warrant the belief that jungle fowls were first domesticated in Burma or in adjacent countries during prehistoric times.

Apparently the domestic fowl reached eastern Europe about 500 B. C. and, at the time of Julius Cæsar's visit, had already become established in Britain. It is now the most thoroughly domesticated, widely distributed, generally useful, and economically important of birds,—the total value of its eggs and flesh greatly exceeding that of all other domesticated birds combined. Long periods of selective breeding in many lands have developed numerous races, varying in size, form, and color from pygmy bantams to huge brahmas approaching the turkey in weight, and from pure white to pure black strains, with almost innumerable intermediate forms. In Japan a remarkable breed has been produced in which the tail of the cock attains a length of 10 or 15 feet.

Fox (*Vulpes*). A carnivorous animal, closely related to the dog and the wolf. It is characterized by its sharp muzzle and its long bushy tail, and also by its cunning, which has passed into a proverb. The pupil of the eye is elongated, and not circular as in the dog; the ears are triangular in shape, and pointed. A very powerful scent is emitted by the fox from glands placed near the root of the tail.

The fox usually remains concealed in a burrow during the day and ventures stealthily abroad at night in search of food. Birds, mice, rabbits, or hares constitute its usual prey, but, when pressed by necessity, it will have recourse to certain kinds of fruit, such as grapes. To poultry it is terribly destructive. It is to its power of endurance, its great speed, and its cunning that the chase of this animal owes its exciting character. Among its various expedients for escape is that of feigning death.

Numerous species of fox are found in the Old and the New World, of which the most important are the European fox (*V. vulgaris*), celebrated in fox-hunting, the arctic or blue fox (*V. lagopus*), and the American or red fox (*V. fulvus*). The arctic fox abounds in far northern regions, and is remarkable for changing its color with the season, being brown or bluish in summer, and white in winter. The soles of its feet are hairy. The red fox is found throughout North America; it is quite variable in color and marking, and varieties of it are known by different names.

The skins of all species of fox are valuable, and make warm and soft furs, used for muffs and linings. Choice pelts of the so-called silver fox or black fox, which is a northern variety of the American red fox, command the highest prices paid for any kind of fur,—a single silver-black skin fetching $2000 and upwards. Fox-farming, for the commercial rearing of these foxes, became established about 1900 in Prince Edward Island, Canada, where, in 1913, there were 277 ranches, possessing more than 2500 foxes, with an estimated value of $15,000,000.

Frogs (*Ranidæ*). A large family of tailless amphibians. The true frogs have four limbs, the skeleton is without ribs, and there are teeth only in the upper jaw. Their bodies are short and broad, with the hinder legs greatly developed for leaping. The skin is soft, smooth, and often brightly colored. It sometimes secretes a milky fluid, which, in some tropical species, is highly poisonous. This forms the only means of defense possessed by frogs.

In the adult, breathing is carried on by means of lungs, but, as there are no movable ribs, the method is somewhat peculiar. It is, in fact, a process of swallowing air, and it is possible to suffocate a frog simply by holding its mouth open. The moist,

delicate skin, however, also performs an important part in respiration. In the frog, as in the toad, the tongue is fixed to the front of the mouth, while it is free behind. Consequently, it can be rapidly protruded at some distance from the mouth, greatly aiding in the capture of insects.

Practically all frogs live in or near the water, to which they go to breed, usually in the spring, when the males make themselves conspicuous by incessant rattling or croaking calls.

In pools and other quiet waters the female frog deposits large masses of tiny eggs. These are velvety black above, creamy white below, and surrounded by a jelly-like secretion. When hatched, the young, commonly called tadpoles or polliwogs, are fishlike in form, with a broad, rounded head, no mouth, and a long, compressed tail. At first there are external gills, but internal gills soon develop and the outer ones disappear. At the time of transformation, the internal gills are replaced by lungs. At the same time, the lower jaw develops and the limbs make their appearance. The tail gradually disappears, and the transformed animal rises to the surface to breathe. Thus, the fishlike tadpole becomes a four-limbed, active frog, quick of sight and hearing, a strong swimmer, and a powerful jumper.

In cold regions frogs hibernate in mud or damp places during the winter. During dry seasons some species burrow deeply underground in search of moisture. Frogs feed chiefly upon worms, slugs, insects, tadpoles, small fish, and other frogs. Nearly all of the true frogs may be used for food. Usually only the large hind legs are eaten, though all of the muscular parts are edible.

There are more than 250 species of true or water frogs. These are widely distributed in moist regions, except in Australia. Some 15 species occur in the United States and Canada, chiefly in the South and the East. Among these are the bullfrog, green frog, leopard frog, and wood frog. The American bullfrog (*Rana catesbiana*), sometimes 8 inches in length, is exceeded in size by only two known species, the larger of which, the goliath frog (*Rana goliath*) of West Africa, reaches 10 inches in length.

Fruit Flies (*Rhagoletis*). A group of dipterous insects which are a serious menace to fruit culture, since the immature stages or larvæ feed upon the pulp of many kinds of valuable fruits, such as apples, oranges, and currants. The adult insects are harmless little flies, about the size of house flies, with the wings beautifully banded in brown. The extensive damage caused by fruit flies is done by the larvæ which burrow through the flesh of the fruit, feeding upon it and causing it to decay. The apple maggot or "railroad worm" is well known by reason of the brownish spongy tissue bordering its tunnels through the flesh of apples which from the outside appear to be sound.

Fur Seal (*Callorhinus*). A marine mammal, belonging to the eared seal family (*Otariidæ*), more properly called sea lion or sea bear. The fur seal differs from the true seals in that it has external ears and its flapper-like limbs are adapted to some degree of locomotion on land. There are about 9 species, of which 6 occur in the southern hemisphere and 3 in the northern. Except in a few specially protected localities, the southern fur seals, once abundant, have become practically extinct through ruthless fur hunting. The northern fur seals are confined to islands in Bering Sea and adjacent waters. All are very highly prized for their valuable fur, formerly an article of much commercial importance.

The mature male fur seal attains a length of 6 feet and a weight of 500 pounds. The body fur is dark brown in color with long, yellowish white outer hairs which form a mane on the neck. The female is much smaller, averaging only about 80 pounds in weight. The young are brought forth on rocky beaches in summer, and take to the water at about the age of 6 weeks. At the approach of winter the Alaskan herds migrate to shallow feeding grounds in the ocean as far south as Lower California, while the Siberian herds journey as far as the Sea of Japan, all returning to their northern breeding grounds in May and June.

At the time of its greatest size, the Pribilof herd contained about 2,500,000 animals, but owing to excessive land and open sea sealing, it became reduced to less than 300,000. In 1911, by international agreement, open sea sealing was suspended for a period of 15 years, and, in 1912, land sealing was similarly restricted. Under continued protection the herds will probably regain their former numbers, and the once valuable sealing industry may again become important. See *Sea Lion*.

Gallflies. A general term loosely covering insects of several orders that attack growing plant tissues, disturbing the growth process and causing the plants to produce the abnormal growths and swellings known as galls. Within the galls live the insects that cause them to be developed, profiting by the increased accumulation of food materials brought to these growths by the plant. The galls furnish both food and shelter. Many galls are so well known as to receive common names, as "oak apples," "bullet galls," "cone gall" of the willow, and the "mossy rose gall" of the sweetbrier.

Gall wasps of the order *Hymenoptera* cause the finest galls, often with three-layered walls,—a spinous or defensive outer layer, and a close-fitting central chamber. These abound on oaks and rosebushes. Sawflies, of the order *Hymenoptera*, and gall midges, of the order *Diptera*, cause fleshy and leafy galls of many sorts on a great variety of plants, especially willows, hickories, and touch-me-nots. Aphids and psyllids of the order *Hemiptera* cause galls of various forms, but always open to the outside, on many kinds of plants; as, for example, witch-hazel, elm, and goldenrod. A few true flies (order *Diptera*) and a few moths (order *Lepidoptera*) cause large stem galls on goldenrods. Many mites (order *Acarina* of the class *Arachnida*) cause very imperfect galls on leaves and twigs of various plants, the galls being often but little more than hollows filled with overgrown and felted plant hairs.

Garter Snake (*Eutænia*). The most common North American snake, called also "striped snake" and "ribbon snake," found almost everywhere in grassy places and along streams. It is usually from 2 to 3 feet in length, with three yellowish stripes on a darker ground. There are 11 species, all inoffensive and harmless, feeding on worms, fishes, frogs, and toads. Upon the approach of winter, these snakes creep as far as possible into some opening in the ground, and become dormant, emerging, however, somewhat earlier in spring than most other serpents.

The common garter snake (*E. sirtalis*), of which there are several varieties, occurs throughout the United States and southern Canada. It brings forth its young alive, sometimes as many as 45 in a single brood.

Gaur (*Bos gaurus*). A handsome wild ox, native of northeastern India, where it is kept in partially domesticated herds for its flesh. It is probably the largest living species of wild cattle. Full-grown males sometimes stand 6 feet high at the shoulder and have horns 3 feet long with a basal diameter of 6 inches. In its native haunts the wild gaur is a very alert, wary, and cunning animal, and exceedingly pugnacious when brought to bay; an old male is said to be a match even for a tiger. The gaur is much hunted by sportsmen, by whom it is often erroneously called "bison." See *Banteng*, *Gayal*, *Ox*.

Gavial (*gā'vi-ăl*) (*Gavial gangeticus*). In general form, the gavial, found in the rivers of India, resembles the crocodiles. It has, however, a very long, slender snout, and the upper jaw ends in a

knob. The snout is one-fifth of the length of the body and gives the animal a peculiar appearance. This huge reptile sometimes attains a length of 25 feet. Gavials feed exclusively upon fish and small animals. They are entirely harmless to man and by some Hindu sects are considered sacred. Fossil remains of the gavial have been found in the Pliocene deposits of India, so it is perhaps the oldest of all living species of air-breathing vertebrates. See *Crocodile.*

Gayal (*gā'ăl*) (*Bos frontalis*). A wild ox found in the forest regions of northeastern India, Assam, and adjacent portions of China. It is domesticated to some extent by the native peoples for its flesh and skins, though it is not employed as a beast of burden and no use is made of its milk. The gayal is smaller than the gaur, and its head, which is very broad and flat above, with a wide space between the horns, contracts abruptly toward the nose. See *Gaur, Ox.*

Gazelle (*Gazella*). A group of beautiful antelopes. There are about 20 species, natives of northern Africa and southwestern Asia, of very graceful shape, and usually rather smaller in size than the chamois. The dorcas gazelle (*G. dorcas*), or true gazelle, is fawn or dun on the back, with a reddish brown band on the sides, and with the lips, nose, buttocks, and under parts white. The horns, which are stronger in the male than in the female, are twice bent, in the shape of a lyre, and without sharp edges. The eyes of this animal are beautiful and soft in expression, and its movements are elegant and light. It inhabits the large plains and the Saharan region of northern Africa as well as Arabia and Syria, living in numerous herds. When taken young, the gazelle, though naturally wild and timid, is readily domesticated, and becomes quite tame. See *Antelope.*

Gila Monster (*Heloderma suspectum*). A poisonous lizard, inhabiting deserts of Arizona, New Mexico, and Mexico. It is about 20 inches long, with short, stubby limbs and a stout body, covered with beadlike tubercles, jet-black and yellow in color, arranged as if in a Navajo pattern. When wild, it is active and vicious, but it becomes very docile in captivity. It is the only lizard provided with venomous salivary glands. Its bite is very poisonous to small animals and is sometimes fatal to man.

Giraffe (*Giraffa camelopardalis*). The tallest living animal, attaining a height of 18 feet, measured from its head to the ground. It is native to Africa, and, with the okapi, constitutes a well-marked family of ruminants (*Giraffidæ*).

The giraffe has two straight horns, without branches, about 8 inches long, covered with hair, blunt at the end and tufted. The shoulders are of such great length as to render the fore part of the body much higher than the hind part. The legs are long and slender. The neck is exceedingly long, although, as in case of most mammals, it contains only 7 neck bones. The head is slender and elegantly formed, and the color of the body is dusky white with large rusty spots. The eye is exceptionally large, prominent, and lustrous, and commands a wide field of vision. The sense of smell is highly developed and the nostrils are provided with muscle by which they can be closed against drifting sand.

The giraffe feeds almost entirely upon the leaves of trees, which it plucks with its long tongue. When it grazes, which is but rarely, the giraffe is forced to spread its legs far apart to enable it to bring its head to the ground. In disposition the giraffe is mild and inoffensive and usually seeks safety by immediate flight. It fights by kicking powerfully with the hind legs. While formerly occurring throughout most of Africa, from Nubia to the Cape of Good Hope, the giraffe is now restricted to desert regions of the interior, where it is much hunted for its excellent flesh and valuable skin. See *Okapi.*

Glass Snake (*Ophisaurus ventralis*). A species of lizard, popularly regarded as a snake. It has an elongated, serpent-like body, about 2 feet in length, with no trace of limbs. However, it may be instantly distinguished from a snake by its well-developed eyelids and ear openings. Its long tail, about two-thirds of the length of the body, is very brittle. Like many other lizards, the glass snake may divest itself of its tail in case of emergency, and possesses the power of partially reproducing the lost part. It lives in burrows in dry ground and feeds chiefly on insects. It occurs from North Carolina to Wisconsin and Nebraska and southward.

Globefish (*Tetraodontidæ*). A peculiar family of oceanic fishes. In this group the abdominal walls are capable of great distention, so that, when inflated, the fish appears like a globe with a beak and a tail attached. These fishes have the power to distend their bodies with air to such a size that it is very difficult for any ordinary enemy to swallow them. Some kinds are as large as a football. The common swellfish (*Spheroides maculatus*), of the Atlantic coast, is called also "puffer" or "swelltoad" by coastwise boys who tease it to cause it to inflate itself like a huge bladder. The Mukimuki (*Tetraodon hispidus*), a strikingly colored, highly inflatable swellfish of tropical seas, is regarded in Hawaii as the most poisonous of all fishes. It is said that its gall was formerly used for poisoning arrows.

Gnu (*nōō*) (*Connochætes gnu*). A peculiar South African antelope now nearly extinct, intermediate in appearance between the antelope, the ox, and the horse. Its height is about 4 feet and it attains a length of 9 feet. Both sexes are horned, the horns nearly meeting on the forehead, then bending downward and outward with a final sharp upward turn. The muzzle is broad like that of an ox; the neck short and surmounted by a mane of bristly hair; the withers are high; and the tail is long and hairy like that of a horse. Between the forelegs is a pendulous hairy extension of the dewlap, like that of the buffalo. The feet and the head resemble those of the buffalo, while the mane, tail, and general form are horselike, probably suggesting the name "horned horse" by which it is also known. See *Antelope.*

Goat (*Capra hircus*). A ruminant animal closely related to the sheep. The common goat was derived from the wild bezoar goat of southwestern Asia and, doubtless, was one of the first animals to be subjugated by man. It was domesticated by the ancient Egyptians, by the Lake Dwellers of Switzerland, and is very frequently mentioned in the Bible.

The uses of the goat are numerous. Its flesh is good, particularly that of the young goat, or kid, which, in many countries, is esteemed a delicacy. The milk is very rich and nutritious and is more easily digested than that of the cow. It is often useful for consumptive patients. Some goats yield four quarts of milk per day, but the average quantity is more nearly two. The skin of the goat was early used for clothing, and is now extensively dressed as leather for many purposes, particularly for making gloves, the finer kinds of shoes, and for binding books. The hair, which may be profitably clipped each year, is used for making ropes which are indestructible in water. The horns are made into knife handles and similar articles, and the fat is used for candles.

Most of the world's goats are grown in the dry, warm regions of southern Europe, northern Africa, and southwestern Asia. Centuries of selective breeding have developed many valuable varieties, such as the Angora, Kashmir, Egyptian, Syrian, and Sudan goats. The fleece of the Angora goat is called mohair. Kashmir shawls are woven from the fine underwool of the Kashmir goat. Since 1900, flocks of Angora goats have become established in various parts of the western United States.

Goldfinch (*Carduelis elegans*). A highly prized song bird of the finch family, native of the Old World, with golden-yellow plumage marked with black. It has long been a favorite cage bird in Europe, being very docile and greatly attached to its keepers. In one of Raphael's masterpieces, called the "Madonna of the Goldfinch," the Madonna is represented as offering a tame goldfinch to the Infant Jesus. Since about 1880 the goldfinch has become naturalized in the vicinity of New York and Boston. It builds a neat, carefully concealed nest in the fork of a shrub or low tree, in which it lays 4 or 5 white eggs, somewhat marked with purple.

The American goldfinch (*Astragalinus tristis*), 5 inches long, called also yellowbird and thistle bird, is bright yellow, with black crown, wings, and tail. It ranges throughout eastern North America, where it is well known on account of its characteristic song and undulating flight. It breeds from South Carolina to Labrador, building an elegant nest in a bush or low tree and laying 3 to 6 bluish white eggs. Its food, like that of the European goldfinch, consists chiefly of weed seeds.

Goldfish (*Carassius auratus*). A small, carplike fish, sometimes called golden carp, highly valued for aquariums on account of its handsome golden color and striking variety of form. It is a native of fresh waters in China, where it was domesticated about 450 A. D. By careful selection, many grotesque forms and striking colorations have been developed, a Japanese variety with three large tail fins being a great favorite. With the establishment of maritime trade with the Far East, the goldfish was brought westward, reaching England in 1691, and has since been widely diffused throughout the world. When it escapes from domestication and becomes naturalized, as in the Potomac and other eastern streams, the goldfish reverts to its original dark olive color and attains a length of 6 to 12 inches. Many thousands have been distributed by the bureau of fisheries, so that it is taken in nets and sometimes brought to market. See *Minnows*.

Goose. A large, web-footed, swimming bird, closely related to the duck and the swan.

True geese differ from swans in that the neck is always shorter than the body, and from ducks in that the male and female are alike in color. Geese walk better than ducks, live more on land, and are essentially vegetable feeders. When disturbed they hiss with outstretched necks, like the swans. They usually fly in V-shaped companies and utter a characteristic cry, or honk, when on the wing. In color, geese are usually grayish or white, with darker markings. Nearly all are highly prized for food.

There are about 30 species, most abundant in the northern hemisphere. Many rear their young well within the Arctic circle in summer and range southward over wide areas in winter. In North America some 12 species or varieties are found, several of which migrate throughout the United States. Among the best-known are the Canada goose (*Branta canadensis*), the white-fronted goose (*Anser albifrons gambeli*), and the snow goose (*Chen hyperborea*). Among other wild geese are the brant, barnacle goose, graylag, emperor goose, bean goose, and spur-winged goose.

The domestic goose (*Anser domesticus*), valued for its eggs, quills, feathers, and flesh, is a domesticated form of the wild graylag goose (*A. anser*) of Europe, Asia, and northern Africa. Its domestication dates back to prehistoric times in northern Africa and southern Asia. It is pictured on the oldest Egyptian monuments and was well known to the ancient Greeks and Romans. Goose raising, while never extensive in the United States, is an important industry in various parts of Europe.

Gopher, Pocket. A small burrowing rodent, native only to North and Central America. It has a ratlike body and is peculiar in possessing large cheek pouches, lined with hair, which open on the outside of the mouth.

The common pocket gopher (*Geomys bursarius*), widely distributed in the Mississippi valley, is about 11 inches long, including the tail, reddish brown above and ashy below, with white feet. It is an agricultural pest, enormously destructive in its habits and its appetites, despoiling meadows by throwing up countless hillocks of loose earth, devouring immense quantities of vegetables, small grain, and corn, and destroying young fruit trees by eating their roots.

The northern pocket gopher (*Thomomys talpoides*) is a native of Canada, and is found everywhere west of the Rocky mountains. It is about a foot long, lead color above and white below. In California this species is very injurious to gardens, field crops, and orchards, and it is destroyed wherever possible by traps and by poison.

Gorilla. The largest and fiercest of the anthropoid apes, and the one most resembling man in certain structures and in size. The hands and feet are strong and well adapted for living either in trees or on the ground. It is able to walk erect, somewhat like a man. However, its skull, which is of a low type, and its strong canine teeth indicate a savage nature. In height the gorilla equals an average man, and its thick, muscular body sometimes attains a weight of 400 or 500 pounds. Its black skin is covered with grayish black or grizzly hair, about 2 inches long. The home of the gorilla is in the forests of western Africa near the equator. It is of a sullen disposition and does not thrive in captivity, invariably dying after a few months of confinement. See *Ape*, *Chimpanzee*, *Orang-utan*.

Grebes (*Podicipidæ*). A family of diving birds, called also "dabchicks." They are closely related to the loons, but much smaller, ranging from 8 to 20 inches in length. There are 25 to 30 widely distributed species, 6 of which are found in North America. Grebes are distinctly aquatic birds, living chiefly on fish, frogs, and crustaceans, and rarely venturing on land. The wings are short and there is no visible tail. When on land, the grebes assume a somewhat erect position, like the penguins, and walk with much difficulty. The nest, in which about 5 chalky white eggs are laid, is made of coarse-stemmed vegetation, and sometimes practically floats on the water. The handsome chicks take to the water as soon as hatched. Like the loons, grebes are expert divers and swimmers.

The pied-billed grebe (*Podilymbus podiceps*), called also "dabchick," "dildapper," "hell-diver," and "water witch," occurs from Hudson bay southward to Argentina. It is about 15 inches long, dull in color, and the whitish bill is crossed by a black band. Like other grebes, it can swim with only the tip of its bill out of the water. This largely explains its seemingly mysterious disappearance when pursued by hunters. Other North American species are the horned grebe, eared grebe, least grebe, and Holboell grebe. A flightless grebe occurs on Lake Titicaca in Peru.

Green Snake (*Liopeltes vernalis*). An innocent, dainty reptile, about 15 inches long and a fourth of an inch in diameter. It is uniformly pale green above and yellowish below, and is found from southeastern Canada to the Gulf of Mexico. Insects form its chief food. The closely related Magnolia Snake (*Cyclophis æstivus*), similar but with keeled scales and whitish below, is 30 inches long and less than a half inch in diameter. It is a tree-climbing species, found in the southern United States from New Jersey to California.

Grosbeak. A name given to several medium-sized birds of the finch family, noted for their large, thick beaks, brightly colored plumage, and charming song. The best-known is the pine grosbeak, found in northern coniferous woods of North

America and Europe. It is about 8½ inches long, rosy-red above and ashy below, and is often kept as a cage bird. Other American species are the evening grosbeak, yellowish olive marked with black, and the rose-breasted grosbeak, of the northeastern United States and Canada, the blue grosbeak of the Southern states, and the black-headed grosbeak of the Pacific coast.

Grouse. The grouse family (*Tetraonidæ*) contains about 200 species of gallinaceous birds, and includes the quails, bobwhites, and partridges as well as the true grouse. The true grouse (*Tetraoninæ*), numbering some 25 species, inhabit northern temperate regions. They are nonmigratory, though after the nesting season they usually gather in small coveys or bevies, sometimes uniting in large flocks. Grouse are game birds of the first rank, trusting largely to the concealment afforded by their inconspicuous colors, but flying rapidly when flushed, with a startling whir of their small, stiff-feathered wings.

The ruffed grouse (*Bonasa umbellus*), which ranges across the continent, is the best-known American species. This grouse is called partridge in the North and pheasant in the South. It is 17 inches long, with reddish brown, barred and mottled plumage, and black neck tufts, and is noted for the peculiar habit, exhibited by the male, of drumming with its wings. The ruffed grouse lives in woodlands, feeding upon insects, berries, seeds, buds, and leaves, and nests on the ground, laying from 8 to 14 pale buff eggs. Its flesh is superior to that of any other American grouse.

The pinnated grouse, commonly called Prairie Chicken (*Tympanuchus americanus*), formerly abundant on prairies in the Mississippi valley, is now comparatively rare. It is 18 inches long, with brownish, barred plumage. In addition to erectile neck tufts, the male has an inflatable air sac, as large as an orange and of the same color, on each side of the neck.

The Heath Hen (*Tympanuchus cupido*), similar to the prairie chicken, which formerly lived in woodlands in the Northeastern states, is now extinct, except for perhaps a few survivors on the island of Marthas Vineyard. The sharp-tailed grouse (*Pediœcetes phasianellus*), with no neck tufts and a pointed tail, occurs from New Mexico to Manitoba and eastward to Illinois. The Sage Hen (*Centrocercus urophasianus*), which inhabits the sagebrush plains of western North America, is the largest American grouse, attaining a length of 30 inches and a weight of 6 pounds. The buds of the sagebrush upon which it feeds impart a bitter taint to its otherwise excellent flesh.

The Canada grouse, or Spruce Partridge (*Dendraphus canadensis*), 15 inches long with dark barred plumage, lives in coniferous forests from northern New England and Minnesota northwestward to Alaska. It feeds largely upon the leaves and young shoots of the spruce and the tamarack.

Among Old World species are the famous black grouse, or Blackcock (*Lyurus tetrix*), 23 inches long, and the Capercaillie (*Tetrao urogallus*), sometimes 35 inches long and weighing 12 pounds, which is the largest of all grouse. See *Bobwhite*, *Partridge*, *Ptarmigan*, *Quail*.

Guanaco (*gwä-nä'kō*) (*Lama guanacus*) A South American mammal which, excepting the vicuña, is the only living wild representative of the camel family in the New World. The guanaco is much smaller than the camel and is more alert and intelligent in appearance. It stands 3 to 4 feet high at the shoulder, while the head is carried about 5 feet high. There is no hump on the back, the feet are narrow, divided above into 2 toes, each with a horny hoof above and a thick cushion or pad beneath, for traveling on stones or sandy ground. Near the equator, as in Ecuador, the guanaco is found only in the higher mountains, but in temperate Patagonia it lives on plains at the sea level. The Indians hunt the guanaco for its flesh, which they cure by salting and drying.

Two domesticated forms of the guanaco are of great economic importance in the Andean region—the llama, used as a beast of burden, and the alpaca, valued for its excellent wool. See *Alpaca*, *Llama*.

Guinea Fowl (*Numidinæ*). A group of game birds closely related to the pheasants. There are about 23 species, all natives of Africa. The common guinea fowl (*Numida meleagris*), native of West Africa, about the size of the domestic fowl, has slate-colored plumage, covered with rounded white spots, and the head is surmounted by a naked, bony helmet. It lives in forests, often in large flocks, feeding upon seeds, fruits, and insects; it nests in thickets, laying 16 to 24 yellow-white, finely speckled eggs.

The guinea fowl was domesticated by the Greeks and Romans but disappeared from Europe during the middle ages. It was re-introduced in the 16th century by the Portuguese and has since become widely diffused throughout the world. While its flesh and eggs are excellent, the guinea fowl is not widely popular, because of its noisy cries and the difficulty of rearing its young in moist regions.

Guinea Pig (*Cavia cutleri*). A small, tailless, rodent mammal, about 6 inches long, native of South America, where it has been domesticated since prehistoric times. Mummies of the guinea pig have been found in the tombs of the Incas. While related to the porcupines, it is also somewhat intermediate between the rabbits and the mice. In color it is usually yellow, white, or black, variously spotted. It is an extremely prolific animal, sometimes beginning to breed at the age of two months and producing five or six broods a year, each litter consisting of from 4 to 12 young.

Guinea pigs are now introduced into many parts of the world as household animals. As they are cleanly, gentle, and never bite, they make pleasing pets for children. They are also in wide use as subjects of experiment in medical and bacteriological research, especially in the study of germ diseases.

The name guinea pig is a double misnomer, for the animal did not come from Guinea and it is not a pig. Its present English name is thought to be a corruption of "Guiana pig," at once referring to its native country, to its somewhat piglike form, and to its habit of grunting.

Gull (*Larus*). A long-winged, web-footed swimming bird, closely related to the terns. There are about 50 species, widely distributed throughout the world. They are especially abundant along ocean shores and occur also about many inland bodies of water. In size they range from the little gull (*L. minutus*), of northern Europe and Asia, only 11 inches long, to the great black-backed gull (*L. marinus*), of the North Atlantic, sometimes 32 inches long. Their usual color is white with a gray mantle varying from pearl gray to blackish.

Gulls feed largely upon fish and serve as useful scavengers in cleaning up the refuse of shores and harbors. They are gregarious at all seasons, but at nesting time they congregate in vast numbers, sometimes almost in millions. Their nests are placed on the ground, on bare ledges of rock, or among tall grasses on swampy shores. The eggs are 2 to 4 in number and irregularly spotted or blotched. The soft feathers of various species are used for stuffing pillows. The flesh of old birds is tough and unfit for food, but that of young gulls is palatable, and the eggs are good eating.

Halibut (*Hippoglossus*). A large flatfish, living on shallow sea bottoms. It is found off both shores of the Atlantic and the Pacific, north of about the latitude of Paris, Boston, Cape Mendocino, and Mutshushima bay in Japan. The halibut exists in great numbers, sometimes attaining a length of 9 feet and a weight of 700 pounds, though usually

from 100 to 200 pounds. The flesh is of excellent quality, that of the small forms, called "chicken halibut," being very highly esteemed. The catch in 1912 off the coasts of New England, the Puget Sound region, and Alaska totaled 35 million pounds; the Canadian catch for the same year amounted to 23 million pounds.

The Monterey halibut (*Paralichthys californicus*), a highly valued food fish of the Pacific coast, much resembling the true halibut, sometimes reaches a weight of 60 pounds.

Hammerhead Shark (*Sphyrna zygæna*). A large shark, sometimes 15 feet long, with an oddly formed head, shaped somewhat like a mallet, more than twice as broad as long, and with the eyes on the outer ends. This peculiar species, which is much dreaded for its ferocity, is found in all warm seas, and ranges northward to Cape Cod and to California.

Hare (*Lepus*). A small rodent mammal, with long hind legs, short bushy tail, large eyes, very long ears, and close, almost woolly fur. There are many species, found over all the world except in the Australian region. Hares differ from rabbits in their larger size, longer ears, and longer hind legs. Unlike the rabbits, they do not live in burrows, but in the open or among rocks in thickets, and their color usually or often changes with the season. They feed chiefly on herbage and the bark of shrubs and trees.

The varying hare (*L. americanus*), about twice the size of a cottontail rabbit, found from New England to Ontario and north to Hudson bay, changes from pale cinnamon brown in summer to pure white in winter. The polar hare (*L. arcticus*), of the arctic regions, remains white during the entire year.

The jack hare, commonly called the jack rabbit (*L. texianus*), easily recognized by its slender body, long legs, very large ears, and by a black mark on the tail, occurs from Nebraska to Oregon and southward to Mexico. It is exceedingly abundant in California and Colorado, where great rabbit drives are made to reduce its numbers, resulting in the slaughter of thousands. This hare does not change color with the seasons. The very similar prairie hare (*L. campestris*), with a pure white tail, inhabits the great sagebrush plains from Kansas to Saskatchewan and west to northern California and Oregon. It varies from gray in summer to white in winter. See *Rabbit*.

Hawk. A name indiscriminately applied in the United States to various buzzards, falcons, harriers, and kites, or to any bird of prey that is not an eagle, an owl, or a vulture. More than twenty different raptorial birds are thus popularly known as hawks, including the sharp-shinned hawk, Cooper's hawk, goshawk, red-tailed hawk, red-shouldered hawk, Swainson's hawk, duck hawk, fish hawk, marsh hawk, pigeon hawk, and sparrow hawk.

The first three of the foregoing, wherever found, are terribly destructive to poultry and game birds, and may properly be called chicken hawks or hen hawks. Various other species, particularly the red-tailed hawk and the red-shouldered hawk, often wrongly called chicken hawks, are among the farmer's best friends, destroying immense numbers of mice, rats, gophers, and other injurious small animals, and rarely attacking poultry.

All hawks have strong, hooked beaks, and long, powerful, curved claws, fitted for seizing and holding their prey. They also possess remarkable keenness of vision, and, upon sighting their prey, swoop down upon it with great rapidity. See *Buzzard*, *Chicken Hawk*.

Headfishes (*Molidæ*). The fishes of this group, called also sunfishes, have the body so shortened behind that the dorsal, anal, and caudal fins seem to be attached to the rear border of the head. The common headfish, or sunfish (*Mola mola*), occurs sparingly in all temperate and tropical seas. It is almost circular in form, and its body is covered with a rough, leathery skin. It is found on both coasts of the United States. Specimens 8 feet long and weighing 1200 pounds have been taken in southern California waters.

Hedgehog (*Erinaceus europæus*). A small Old World mammal, belonging to the order *Insectivora*, so named for its piglike snout and because it is generally found under hedges. It is about 10 inches in length. The upper surface of the plump body is completely armed with sharp prickles or spines intermixed with the hair. These spines are about an inch long, brownish black in color, tipped with white. The legs are short and the five toes are armed with claws adapted for digging.

Hedgehogs are nocturnal in habit, and live chiefly upon insects, snails, worms, eggs, small mammals, and birds, but sometimes upon fruits, roots, and seeds. They hibernate in burrows or hollow trees during the winter season. When frightened, they have the habit of rolling themselves into a ball with only their spines exposed, thus presenting a most effective defense against dogs and foxes, which are their principal enemies. Hedgehogs are easily tamed and are sometimes used to catch mice, cockroaches, and water bugs. In the United States and Canada the porcupine is sometimes wrongly called hedgehog. See *Porcupines*.

Heron (*Ardea*). A genus of storklike wading birds, somewhat resembling the cranes and rails. They have thick, compressed bodies, long legs, long necks, and long and pointed bills. There are about 12 species of true herons, ranging in length from 28 to 56 inches. They frequent swamps and marshes and occasionally the seacoast. Many species are gregarious, feeding and breeding in communities, where they build large bulky nests, often in trees, laying from 3 to 6 bluish white eggs. Herons are noted for their tireless watchfulness and great voracity. They subsist chiefly upon fish, frogs, small mammals, birds, and insects.

The great blue heron (*A. herodias*), called also blue crane, ranges from northern South America northward to the arctic regions, breeding throughout its range and wintering from the Middle states southward. It is from 42 to 50 inches in length, with a wing spread of 6 feet. In color it is uniformly bluish gray above, with black lower parts broadly striped with white. It nests in trees, usually at a height of 50 feet or more.

The great white heron (*A. occidentalis*), of Florida, Cuba, and Jamaica, 45 to 54 inches long, is pure white, with long ornamental neck plumes. The little blue heron (*A. cærulea*), 22 inches long, occurs from Nova Scotia to Nebraska and southward. The little green heron (*A. virescens*), 17 inches long, is found from Nova Scotia to Oregon and southward.

Herring (*Clupeidæ*). A family of important food fishes, with narrowly oblong bodies and cycloid scales, but lacking the fatty back fin characteristic of salmon and trout. Practically all are marine, though some ascend rivers to spawn. The family contains the herring, sardine, alewife, menhaden, and shad, and other fishes of economic value.

The common herring (*Clupea harengus*), of the North Atlantic, is one of the most important food fishes of the world. It attains a length of 12 inches and a weight of about a pound. It moves in immense schools or shoals, sometimes several square miles in extent, and is taken in enormous numbers by fishing fleets. The largest fisheries are in Norway and Sweden and on the British coasts, employing thousands of boats, with an annual catch of more than four billion fish. The similar Pacific herring (*C. pallasi*) is equally abundant and, with a similar market, would be equally valuable. See *Alewife*, *Anchovy*, *Sardine*, *Shad*.

Hippopotamus. A huge, semiaquatic, thick-skinned mammal, closely allied to the pigs and peccaries, native of African rivers and often called river horse. Only two living species are known. On account of their more or less swinelike structure and habits it would be far more accurate to call these animals river hogs instead of river horses. However, they differ from true swine in having a broad, rounded snout, with the nostrils on the upper surface and with no trace of a terminal rooting disk.

The common hippopotamus (*H. amphibius*) occurs in rivers and lakes in central and southern Africa. It is an enormously bulky and unwieldy animal, attaining a height of 5 feet, a length of 12 feet, and a weight of 4 tons. Next to the elephant, it is the most bulky of land animals. The massive feet terminate in 4 hoofed toes, each toe resting upon the ground. The nearly naked, exceedingly thick and tough skin contains an oily substance, which exudes from the pores. When the animal is excited this flows out very freely, and is somewhat tinctured with blood, producing the so-called bloody sweat for which the hippopotamus is famous. It is most at home in the water, swims well, and is able to dive quickly. By use of sphincter muscles it can close its nostrils and its ears. It is thereby enabled to keep out the water while submerged. Having infolded lips, it is able to browse while under water.

Although subsisting chiefly upon aquatic vegetation, commonly feeding at the bottom of rivers, the hippopotamus often leaves the water by night and makes extensive inroads upon cultivated fields, consuming and injuring growing crops. The natives eat its flesh and fat and make some use of its skin, but by white men it is hunted chiefly for sport.

The pygmy hippopotamus (*H. libericus*), about 6 feet long, 2½ feet high, and weighing 400 to 600 pounds, is an exceedingly rare animal of the Guinea coast. It is more swinelike than the common hippopotamus, seeks its food chiefly in woodlands and swamps, and never gathers in herds.

Hog (*Sus scrofa domestica*). The European breeds of domestic swine are believed to have been originated from the wild boar of Europe (*S. scrofa*) and the Asiatic breeds from the wild boar of India (*S. cristatus*), called also wild pig. In China the domestication of the pig dates back at least 5000 years. The Lake Dwellers of Switzerland and the ancient Greeks and Romans used the flesh of the pig for food. By the Mosaic law the Hebrews were expressly forbidden to eat it. The hog is now reared almost throughout the world, though it does not thrive in high mountain regions.

The hog is remarkable as the only important domestic animal grown primarily for food,—the use of its hide for leather and its bristles for brushes being rarely considered by the breeder. Ages of domestication have greatly changed some of the prominent characteristics of the wild pig. The domestic pig is omnivorous, while the wild pig is practically herbivorous. The wild boar is armed with large tusks with which it fights fiercely; the domestic pig has largely lost its tusks and the disposition to use them.

During the last hundred years many valuable breeds have been developed by careful selection and crossing. The various Yorkshires and Berkshires, the Tamworth, Victoria, Large Black, and Essex swine are among the English breeds thus originated. Among standard breeds developed in America are the Chester White, Poland China, Duroc-Jersey, and Hampshire. The rapidity with which these improved breeds can be grown and the ease with which their flesh can be cured and marketed, place the modern hog among the world's chief food-producing animals.

Hognose Snake (*Heterodon platyrhinus*). A flat-headed, thick-bodied snake found in the United States east of the Rocky mountains. It is about 2½ to 3 feet long, with an upturned, shovel-like snout. In color it is an indefinite mixture of brown, yellow, and black. While absolutely harmless, it pretends to be very fierce and dangerous, advancing menacingly toward an intruder, dilating its neck like a cobra, and hissing loudly. It strikes viciously but always with its mouth closed. If assumed hostility fails, it will turn on its back and feign death. This species is called also "blowing viper," "spreading adder," and "blow snake."

Honeybee (*Apis mellifica*). A remarkable social insect belonging to the *Hymenoptera*, a highly developed order which includes also the ants and the wasps. Of more than a million known species of insects, many of which are useful to man, only one small group, comprising the various kinds of honeybees, contributes directly to his food supply.

The honeybee has been fostered and studied by man for many centuries. In the course of time a number of races have been bred in several widely separated countries. These numerous races, some of which are known as Egyptians, Caucasians, Cyprians, Holy-land, Italian, Carniolan, and German, indicate the universal interest that has been taken in this valuable insect. The honeybee was introduced into America more than 300 years ago.

The typical colony of bees, as found in modern, scientifically operated apiaries, consists of one queen, or mother, several hundred drones, and about 70,000 workers. The *queen* is a sexually fully developed female, produced from a fertile egg in a specialized cell by a process of feeding that results in the complete development of the ovaries. She normally lays all the eggs, and, consequently, is the mother of the entire colony.

The *workers* are sexually undeveloped females hatched from eggs that under the conditions just described result in queens; indeed the very young larva of any worker is a potential queen if the colony desires to create one. In the economy of the hive the workers play varied and important rôles. They build comb, ventilate the hive, defend the colony, nurse the young, and gather all stores. The field force is made up entirely of workers. These garner nectar, pollen, and propolis, or bee glue, and, while so engaged, perform for man the important office of cross-fertilizing his fruit trees.

The *drones* are males developed from unfertilized eggs. The drone functions only in mating, meeting the virgin on the wing, a fact that accounts for his extraordinary size and remarkable powers of flight.

In their metamorphosis, bees pass through four stages, namely, egg, larva, pupa, and adult. The queen develops in 16 days; the worker, in 21; and the drone, in 25 days. The life history of the worker is worth recounting. The egg hatches in 3 days, and the resulting white, footless larva, fed by the nurse bees, grows rapidly until, between the 9th and the 10th day, it is sealed up in its cell. The insect then rests in the pupal condition until, on the 21st day, it emerges a perfect winged bee.

The life of the adult worker during the active summer season is about six weeks. The fall brood lives throughout the winter. Drones live during the summer at the pleasure of the workers, who dispose of them early in the autumn. Queens may live 6 or 7 years, but usually they are replaced when their ability to lay large numbers of eggs begins to fail. In commercial apiaries queens are commonly replaced at the end of the second year. During the height of the season, a good Italian queen is capable of laying from 2000 to 3000 eggs per day. Queens and workers are provided with stings. These defensive organs are simply modified egg-placers, or ovipositors. Swarming is the natural means of dividing the colony and disseminating the race. If left free to follow their instincts, bees will swarm at least once a year.

The saccharine exudations of flowering plants, known as *nectar*, form the main source of honey. These wholesome juices would be lost were it not

for two highly specialized organs that have been developed in the honeybee. These are the *tongue* and the *honey stomach*. By the aid of the delicate tubelike tongue, nectar is sought out and sucked into the mouth. It is retained in the mouth for some time before it is transferred to the honey stomach, which is a storage vessel of astonishing capacity. In it a worker bee can transport nectar equal to its own weight. Returning to the hive with its load, the bee disposes of it by regurgitating the nectar into a cell of the honeycomb. *Nectar is not honey*. Beginning in the honey stomach of the bee, changes take place in the sugary plant juices. These changes continue in the hive until the substance reaches the altered condition known as ripened honey. The process results in an inversion of sugars and in the expulsion of excess water.

Pollen is a necessary food substance for the young, or larvæ, of the honeybee. The way in which the bees gather and carry this food to the hive is a unique performance in the insect world. On the head and thorax of the honeybee are hairs modified to catch and hold the pollen of the plants visited by the insect. Pollen brushes have also been developed on the hind legs of the workers; these are found on the inside of the flattened tarsi. With these special brushes, the pollen is removed from the hairs after which it is conveyed to the mouth, moistened, and finally packed away in the wonderful pollen baskets on the tibiæ of the hind legs. In the form of a pellet, the pollen mass is carried to the hive. Like honey, it is stored in the cells of the comb and is then known as beebread.

Beeswax is secreted by worker bees in the following remarkable manner. Large numbers of young bees, after gorging themselves with honey, hang up in the hive, clinging to one another, thus forming living chains or festoons. While they are in this inactive condition, the honey is transformed by special glands into beeswax. The wax then flows out on the plates under the abdomen, in a liquid condition. In contact with air it hardens in the form of tiny scales. These are removed from the body, manipulated by the jaws and mixed with saliva before being built into comb. It requires from 10 to 15 pounds of honey to produce one pound of beeswax.

The honeybee does not hibernate, but winters in the following interesting manner. When the temperature outside the hive falls below 57° F., the colony forms what is known as the winter nest or cluster. This cluster is really a hollow ball composed of many closely packed bees, which thus construct an insulating shell of their bodies, within which many bees remain active. These consume their stores, and by muscular activity generate the heat necessary to keep the colony alive. The insulating bees and those engaged in heat production often exchange places, though many individuals perish in the course of the winter. It has been found, by measuring the oxygen consumed and the carbon dioxide and water formed, that the energy spent by the working bee while generating heat, is proportionally greater than that exerted by a man engaged in hard manual labor.

The true economic importance of the honeybee is difficult to calculate accurately. In the United States the annual honey crop is estimated by the Bureau of Agricultural Economics to amount to more than 200 millions pounds. Beeswax is also an important article of commerce. However, the value of the honeybee, in cross-fertilizing fruit trees and other fruit-bearing plants, greatly exceeds that of its natural products. See *Bees*.

Honeydew. A sweet, honey-like fluid that is produced by aphids, or plant lice, and by a few other sap-feeding insects. In the alimentary canal of these insects the sugar of the sap is not digested but is passed through the body in such quantity as to give this character to the residue of the food. It is discharged from the anal opening, often by many aphids simultaneously when a tree that is full of them receives a jar, and falls as a shower on whatever lies below. Undershrubs become coated with honeydew, and bees gather it from their leaves; or ants may follow and tend and guard an aphid colony in order to profit by their product.

The ants behave like herdsmen, stroking and patting the aphids with their antennæ to induce them to yield up a drop of honeydew, which the ants then suck up.

Honeydew is sticky, and deposits of it on the leaves of trees in smoky cities gather a coating of black soot and render the trees very unsightly. See *Ants*, *Aphids*.

Hookworm (*Necator americana*). A small nematode worm, closely related to the trichina and whipworm, slightly less than a half inch long. It infests the small intestine of man and the gorilla, where it moves about, sucking blood, often causing severe anemia, terminating in exhaustion and death. This species is common among the poorer classes in the southern United States. The young worms live in moist earth, and the infection may be caught by drinking infected water, by eating infected food, and sometimes by contact of the feet and hands with infected soil.

The similar Old World hookworm (*Anchylostoma duodenale*) is very abundant throughout a large zone over 4000 miles wide, from 36° N. latitude to 30° S. latitude, some 46 countries, with a population exceeding 900,000,000, being more or less afflicted. In India and southern China about 75 per cent of the population suffer from it. The disease, however, readily yields to medical treatment, and its prevention and control depend almost entirely upon sewage disposal. See *Trichina*.

Hoopoe (*hōō'pōō*) (*Upupa epops*). A peculiar Old World bird, about the size of a blue jay, related to the hornbills, found in Europe, southern Asia, and northern Africa. It has a large crest on the head, a long slender bill, and beautiful white, buff, and black plumage. Hoopoes are tame, familiar birds, usually frequenting open grounds, and feeding upon grubs and insects obtained by probing in the earth with their long bills. In autumn they become very fat and, in some European countries, are highly esteemed for food. They nest in holes in trees or walls, laying four or five greenish blue eggs. Various other hoopoes occur in Asia and Africa, including some 16 species of wood hoopoes.

Horned Lizard (*Phrynosoma*). The so-called "horned toads" are native only to North American deserts. Seventeen species occur in the western United States and in Mexico. They are usually 4 to 6 inches long, with grotesque, flattened, toadlike bodies, covered with spiny scales, and with sharp, conical horns upon the head. They inhabit hot, arid, sandy situations, lying quiet by day and coming out in the evening to search for insects, which they catch with the tongue, somewhat after the manner of true toads. All species are entirely harmless.

Horse (*Equus caballus*). A one-toed ungulate mammal, the best-known representative of the horse family (*Equidæ*). The true horse is characterized by the tail being furnished with long hairs from its base outward; by the long and flowing mane; by the presence of a bare callosity on the inner surface of the hind as well as of the forelegs; and by the head and ears being smaller and the legs longer than those of the ass and other closely related species.

The horse seems to have been first domesticated in central Asia. It was pictured on ancient Assyrian monuments, was early known in Egypt, and is mentioned throughout the Bible and the classic Greek and Roman writings. Horses were probably first used for war in central Asia. Bodies of cavalry and horses drawing war chariots are shown in the oldest sculptures at Nineveh.

According to Ewart, at least four wild species have contributed to the origin of the modern breeds of horses; namely, the woodland horse (*E. robustus*), adapted for forest life, the steppe horse (*E. przewalskii*), adapted for plains life, the desert horse (*E. agilis*), adapted for life in arid regions, and the Sivalik (*E. sivalensis*), which formerly lived in northern India. Of these, only the steppe horse still exists in the wild state.

The horse is the most spirited, trustworthy, and affectionate of the larger working animals, and is held in such intimate regard by man that sentiment practically prohibits the use of its excellent flesh for food. Ages of domestication have produced numerous breeds, ranging in size from a Shetland pony to a Percheron draft horse. In weight, horses vary from a few hundred pounds in the small breeds to 2200 pounds in English shire horses. The average horse normally lives to 18 or 20 years, though a few attain the age of 40 or 50 years. They are, however, rarely serviceable for work or speed after reaching 15 years.

House Fly (*Musca domestica*). A small two-winged insect found around human habitations almost throughout the world. The strongly veined, transparent wings are never folded when at rest, as are those of the grasshopper or beetle, but are always extended flat. In place of hind wings are two small rodlike organs which are believed to aid the insect in balancing and steering when in flight. The greater part of the head is made up of two remarkable eyes, each composed of thousands of facets, enabling the insect to see in nearly all directions. At the top of the head, between the two large compound eyes, are three small, single or simple eyes.

The mouth of the fly is provided with a curious, fleshy, tonguelike organ or sucking proboscis which is bent beneath the head when at rest. Upon alighting on a food substance, the fly unrolls and extends its tongue. The knoblike end opens into two flat muscular, corrugated surfaces. With these the fly laps up plant and animal juices or sugar that it has moistened and dissolved with its own saliva. The inside of the muscular surfaces of the tongue is rough, like a rasp or file, and is used to scrape delicate surfaces, or even to puncture the skin of animals, causing a minute flow of blood.

The feet of the fly are beset with small hairs, each terminating in a disk, which is believed to act as a sucker, enabling the insect to walk on smooth surfaces, as, for example, on a ceiling, with its back downward.

The fly multiplies with extreme rapidity. The few scattering flies which are usually all that survive the winter, are capable of producing countless millions during the summer season. In stable manure, decaying garbage, or other refuse matter, the female lays from 120 to 160 eggs. In 6 or 8 hours these hatch, producing the larvæ or maggots, which become full grown in 4 or 5 days. These then pass into the pupa or transition stage, emerging about 5 days later as fully developed, perfect flies,—or from egg to adult in about 10 days! It is estimated that in six months the progeny of a single pair might exceed 100 quintillion flies.

Flies act as scavengers and consume filth that otherwise would become offensive from decay. But, far outweighing all this benefit is the fact that they carry germs from sores, decomposing animal matter, and cesspools, and deposit them on human food, thereby spreading many dangerous diseases. Among these are typhoid, diphtheria, and tuberculosis. The house fly, therefore, should everywhere be ruthlessly exterminated, and its breeding places removed or thoroughly treated with insecticides. See *Flies*.

Humming Bird. The numerous family (*Trochilidæ*) of humming birds contains the smallest, most active, and most brilliantly colored of all feathered beings. While they differ in a marked degree from all other birds, they are most nearly related to the swifts. They have powerful wings which move so rapidly in flight as to become almost invisible, giving forth the buzzing sound from which the birds take their name. The bill, usually long and slender, and sometimes strongly curved, is occasionally very short, and the feet are small and weak.

The plumage fairly glows with flashing, jewel-like combinations of the most resplendent colors, and is fittingly described by Audubon as "glittering fragments of the rainbow." Contrary to widespread belief, humming birds feed chiefly on minute insects found in and among flowers, and rarely upon honey or nectar. Their elegant cup-shaped nests, usually placed on trees, shrubs, or reeds, rank among the marvels of bird architecture. They are made chiefly of plant down and spiders' webs, ornamented on the outside with lichens and mosses. The pure white eggs are almost invariably two in number. As in the case of the swifts, the young are fed by regurgitation. Except for a weak twitter, humming birds possess no voice nor song.

There are more than 500 species of humming birds, all natives of the New World and most abundant in the tropical Andes. About 50 are found in Mexico, and 17 occur in the United States, mostly near the Mexican border, only one ranging east of the Mississippi. The largest known species is the giant hummer of the high Andes, 8½ inches long; the most diminutive is the fairy humming bird of Cuba, only 2¼ inches long, which, so far as known, is the smallest bird in the world. Among many species noted for their handsome plumage are the topaz-throated, fire-tailed, saber-wing, sylph, sun-gem, and coquette humming birds.

The ruby-throated humming bird (*Trochilus colubris*), 3¾ inches long, shining green above, with dusky under parts and a ruby-red throat, nests from Labrador to Nebraska and south to Florida and Texas, and winters in Cuba and Mexico. The rufous humming bird (*Selasphorus rufus*), 3½ inches long, bright reddish brown, with a gorget of fire red, orange, and green, breeds from Arizona and California northward to Alaska, migrating to southern Mexico in winter. The calliope humming bird (*Stellula calliope*), of the Southwest, barely 3 inches long, is the smallest species native to the United States.

Hyena (*Hyæna*). Carnivorous mammals, combining in their structure features characteristic of the cats, the civets, and the dogs. There are three species, found only in Africa and in southern Asia. Hyenas have a repulsive appearance, and are covered with coarse, bristly hair, short over the greater portion of the body, but produced into a mane along the ridge of the neck. The hind legs are shorter than the fore, giving the body a slope from the withers to the haunches. In size they are somewhat larger than a shepherd's dog. The cheek muscles are greatly developed, and the large teeth have great crushing power.

While they sometimes attack cattle, hyenas rarely molest man though they occasionally seize children. Contrary to popular belief, hyenas are capable of being tamed, and have even been used as watchdogs. As carrion feeders they are useful scavengers. All are nocturnal in their habits. The striped hyena (*H. hyæna*) occurs from Abyssinia and Asia Minor eastward to India. The spotted hyena (*H. crocuta*) ranges through nearly all of Africa south of the Sahara. The brown hyena (*H. brunniens*) is confined to southern Africa.

Ichneumon (*ĭk-nū'mŏn*) (*Herpestes ichneumon*). A small carnivorous mammal, native of northern Africa, called also "Egyptian mongoose" and "Pharaoh's rat." In size, the ichneumon is a little larger than a cat. It was held sacred by the ancient Egyptians, who depicted it upon the walls of their temples, because they believed it was sent by their gods to destroy the eggs of the crocodile, of which

it is very fond. The ichneumon is readily tamed and becomes greatly attached to persons and places. It has been domesticated since ancient times in Egypt and used, like the cat, to rid houses of rats and other animal pests.

Iguana (*ĭ-gwä'nȧ*). A large lizard of tropical America and the West Indies, sometimes 6 feet long. It is surpassed in size among living lizards only by the monitors of the Old World. The body is much compressed, with powerful limbs, long-toed feet, and an elongated tail, sometimes two-thirds of the total length. There is a continuous crest of flat spines from the nape of the neck to the end of the tail. Under the throat there is a large pendent fold of skin.

The common iguana (*Iguana tuberculata*), 4 to 6 feet long, is green, black, and yellow in color. It has long, slender toes for climbing, and lives chiefly in the tops of trees overhanging streams in Central and South America and the West Indies. When frightened, it has the habit of leaping downward into the water, where it remains for some time before returning. The iguana is said to be fond of music and to enjoy having its body stroked. It lives mainly on the leaves, blossoms, and fruits of various trees. The flesh and eggs of the iguana are palatable, and it is much hunted for food.

Injurious Insects. Of the vast group of insects, more numerous in kinds than all other groups of animals combined, only a few species have been brought into human service, notably the honeybee and the silkworm. Many kinds, however, are capable of doing much injury in a very great variety of ways.

For example, insects may injure health by carrying germs of disease, as do the typhoid or house fly and the mosquito; they may destroy comfort, as do the black flies, lice, bedbugs, and fleas. They may injure domesticated animals, as do horseflies, botflies, screw worm flies, and ticks. They may injure clothing and textiles, as do the clothes moth and the carpet beetle. Some may destroy buildings and wooden implements, as do white ants (termites) and powder-post beetles. Others may destroy foods, as do the flour moth, larder beetle, and the cockroaches. Some may destroy stored grains, as do the weevils and the grain moth. Some kinds, like the timber beetles, the bark beetles, and the carpenter worm, may destroy timber. Other kinds, like the radish fly, tuber moth, and onion maggot, may destroy root crops. Fruits are subject to injury by such pests as the codling moth, the fruit flies, and the curculios; while various borers and miners do much hidden damage to growing crops.

But most numerous of all, and capable of inflicting the most extensive damage, are the insects that feed upon the surface of plants. While the other injurious groups are controlled in a great diversity of ways, these plant-destroying kinds are in the main controlled by spraying, as follows:—

1. Those that chew up the plants are killed by spraying an arsenical poison upon their food.

2. Those that suck up the sap only are killed by spraying their bodies with some insecticide that kills by contact, such as nicotine sulphate. See *Ants*, *Aphids*, *Boll Weevil*, *Caterpillar*, *Chinch Bug*, *Corn Borer*, *Fruit Flies*, *House Fly*, *Mosquitoes*, *San Jose Scale*, *Scale Insects*, *Weevils*.

Insectivora (*ĭn'sĕk-tĭv'ō-rȧ*). An order of mammals, so called because they feed chiefly upon insects and other small invertebrates. All are of small size and nearly all are nocturnal, burrowing animals. In external appearance they resemble the rodents, but in structure they are more like the bats. Usually they have five toes, armed with claws for digging, and soft fur, though some, such as the European hedgehog, are covered with spines or bristles. There are about 250 species, widely distributed throughout the world, comprising the various moles, shrews, hedgehogs, desmans, and tenrecs, also the solenodon, potamogale, and colugo. See *Hedgehog*, *Moles*, *Shrews*.

Insects (*Insecta* or *Hexapoda*). A class of six-legged arthropods which comprises the most numerous group of animals, embracing a greater number of species than all other groups combined. A true insect may be known by the division of its body into three distinct regions: head, thorax, and abdomen,—the thorax bearing three pairs of legs and usually two pairs of wings, though sometimes only one pair, and sometimes wingless. All insects are air-breathing and chiefly terrestrial, feeding upon vegetable matter, though some are carnivorous and others are parasitic. A few insects bring forth living young, but the vast majority lay eggs, which, after hatching, undergo complete or partial metamorphosis.

Some species, such as the honeybee, silkworm moth, lac insect, and cochineal insect, are of great economic importance. On the other hand, the damage to forestry and agriculture, caused by injurious insects, is enormous. Various insects are carriers of disease, among them the mosquito which transmits malaria, the house fly which conveys typhoid fever and Asiatic cholera, the rat flea which spreads the bubonic plague, and the tsetse fly which infects man with sleeping sickness. Many insects have poisonous stings and bites; as bees, wasps, ants, and various flies.

Insects are found everywhere throughout the world, flourishing prodigiously in the tropics and abundant even within the Arctic circle. The number of living species is conservatively estimated at 5,000,000. More than 300,000 species have been collected and described. These are usually classified in the following 19 orders: *Thysanura*, springtails; *Ephemerida*, May flies; *Odonata*, dragon flies; *Plecoptera*, stone flies; *Isoptera*, termites; *Corrodentia*, book lice; *Mallophaga*, biting bird lice; *Euplexoptera*, earwigs; *Orthoptera*, cockroaches, grasshoppers; *Hemiptera*, true bugs; *Neuroptera*, ant lions; *Mecoptera*, scorpion flies; *Trichoptera*, caddis flies; *Lepidoptera*, butterflies and moths; *Diptera*, true flies, mosquitoes; *Siphonaptera*, fleas; *Coleoptera*, beetles; *Hymenoptera*, bees, ants, and wasps.

Jackal (*Canis*). A doglike carnivore, smaller and more foxlike than the wolf. There are several species, all natives of the Old World. They are seldom more than 15 inches high, generally buff or tawny in color, with the tip of the tail always dark. Jackals are nocturnal in habit, living in burrows in caves, rocks, or ruins, venturing forth to hunt in packs at night. Like dogs, they are omnivorous feeders, devouring small animals, poultry, carrion, vegetables, sugar cane, and even fruit. Their howlings at night are regarded as peculiarly unpleasant. The formerly prevalent notion that the jackal is the "lion's provider" is an exploded fable of natural history.

Jackals are readily domesticated, and they everywhere interbreed with native dogs. Crossings of jackals with wolf dogs or wolves are supposed to account for the origin of many of the existing varieties of the dog. The Indian jackal (*C. aureus*), found in northern Africa, southeastern Europe, and southern Asia, acts as a scavenger in the Orient, prowling about the streets of large towns. See *Dog*.

Jackdaw (*Corvus monedula*). A European bird of the crow family, somewhat smaller than the common crow, with the entire plumage glossy black, excepting a slaty-gray collar about the neck. The jackdaw frequents ruined buildings, old towers, steeples, and cliffs, and sometimes is found in the midst of populous cities. It builds a large nest of sticks in all sorts of abandoned situations, and lays 4 to 6 greenish eggs, spotted with gray and brown. In its habits the jackdaw is very similar to the crow. It is readily tamed, taught various tricks, and sometimes learns to speak a few words. See *Crow*.

Jaguar (*jăg'wär*) (*Felis onca*). The largest, fiercest, and most formidable of the wild cats of the New World. Its massive body is about 4 feet long, the head large and strong, the tail relatively short. The ground color is usually golden yellow. On the back and sides are hollow patches of black enclosing spots of the ground color. On the head, legs, and belly the spots are of solid black.

The jaguar inhabits North and South America, ranging from southern Texas through Mexico, Central America, and Brazil, as far south as Paraguay. Wooded banks of rivers are its favorite haunts, and it is said to frequent the reedy margins of lakes, seeming to have a great predilection for water. It preys chiefly upon weaker mammals, and is said to catch fish; occasionally it kills horses and cattle, and even men. The jaguar is a noisy animal, roaring much at night, especially on the approach of bad weather.

Jays. A numerous group (*Garrulinæ*) of perching birds, closely allied to the crows and the magpies. In general their plumage is brightly colored, usually with a tint of blue predominating, and the tail is always at least three-fourths as long as the wings. They are active, noisy, forest-loving birds, with harsh, discordant voices. About 20 species occur in North America, most numerous in the West and Southwest, usually remaining the year round wherever they breed.

The blue jay (*Cyanocitta cristata*), about a foot long, with black and white markings and a conspicuous crest, is a common resident from Labrador to Nebraska and south to Florida and Texas. It constructs a well built nest of twigs and roots lined with rootlets, usually in a tree either in the woods or in an orchard. In this it lays 4 or 5 brownish olive or ashy green eggs.

The Canada jay (*Perisoreus canadensis*), called also "whisky jack" and "moose bird," inhabits coniferous forests from Nova Scotia, northern New York, and Minnesota northward to the arctic regions. It is about a foot long, gray in color with darker and lighter markings. Less shy than the blue jay, it becomes almost tame if unmolested. It nests early in March, incubating its eggs when the temperature is far below zero.

Among the numerous kinds found in the western United States are the Steller, blue-fronted, long-crested, black-headed, blue-eared, green, woodhouse, Rocky Mountain, Oregon, California, Arizona, and Texan jays. While omnivorous feeders, subsisting largely on insects in summer, and on seeds, particularly acorns and pine seeds, in winter, some species, as the blue jay and the California jay, eat the eggs and also the young of other birds.

Kangaroo (*Macropodidæ*). A family of pouch-bearing mammals. They are the most highly developed of the marsupial animals, and are peculiarly suited for the conditions of life in Australia, Tasmania, New Guinea, and adjacent islands.

The family comprises no fewer than 60 species, and, of these, the gray kangaroo (*Macropus giganteus*) may be taken as a type. This species was formerly plentiful and roamed over all the plains, but it is now fast retiring before the colonist. The fore limbs are small; the hind limbs very large and thick; the head small, with rather long ears, and a long, dusky brown muzzle; the body long, with the fur short but thick, and of a gray-brown tint. Full-grown specimens are about 4 feet high and attain a weight of 200 pounds.

When moving quickly the hind limbs alone are brought into action, and by means of these the animal bounds along in great leaps of from 15 to 20 feet, the body being carried in a nearly horizontal position, and the tail extended to balance it. The fore limbs are chiefly used in handling, and with these the female lifts her young which she carries in a pouch on the underside of the abdomen.

The number of young produced at birth is from 1 to 3. When born they are very small, usually about an inch in length, blind, naked, and helpless. After birth the mother places them in her pouch where they usually remain several months. Into this pouch the milk glands of the udder open, and the young are fed at the will of the mother.

The kangaroos are vegetable feeders, delighting in grasses, leaves, and herbs. The skins of kangaroos are prized for leather used in making shoes.

Killdeer (*Ægialitis vocifera*). A large, ring-necked plover, common throughout temperate North America, so named because of its familiar and persistent cry. The killdeer is about 11 inches long, grayish brown in color, with a white and a black band circling the neck, and with various other black and white markings. It frequents meadows and fields, in the vicinity of water, and lives upon worms, grasshoppers, beetles, snails, and other small forms of animal life. At nesting time it lays 4 buffy white eggs spotted with chocolate brown, in a slight hollow in the ground. When an intruder approaches the nest or young, the parent birds endeavor to lead him in another direction by uttering frantic cries, limping, fluttering, and falling over as if injured. See *Plover*.

Killer Whale (*Orca*). A group of large, powerful, carnivorous dolphins, armed with very strong, sharp teeth. They are the only cetaceans which habitually attack and devour mammals. On account of their habit of destroying more animals than they can eat, they are generally known as killers. A full-grown male attains a length of 20 feet, with a back fin 6 feet high. The surface of the body is smooth and glossy, black in color, and marked with white spots or patches. Killers are found in all oceans and sometimes even ascend rivers to attack their prey, which consists of large fish, dolphins, seals, and even the great whales. The speed, strength, and ferocity of the killers make them veritable tigers of the sea.

About 8 species have been described. The Atlantic killer (*Orca gladiator*) has been longest known, but the habits of the Pacific killer (*Orcinus orca*), which kills and eats the California gray whale, have been more generally observed.

Kingbird (*Tyrannus tyrannus*). An American bird of the flycatcher family, noted for its pugnacity; called also "bee bird" and "bee martin." It is about 8½ inches long, blackish slate-gray above and white below, with a concealed orange-red crest on the head, and a black tail tipped with white. It nests in trees from New Brunswick and Manitoba southward, rarely crossing the Rocky mountains, laying 3 to 5 white, somewhat spotted eggs.

During the nesting period, the male kingbird will fearlessly attack cuckoos, blackbirds, jays, crows, and even hawks and eagles which may come near its home, driving them off with swift darts and peckings. While sometimes eating a few bees, the kingbird on the whole performs very valuable service by destroying injurious insects which form its chief food. The somewhat larger Arkansas kingbird (*T. verticalis*) and Cassin kingbird (*T. vociferans*), with yellow under parts, which range from the Great Plains westward to the Pacific, are similar in habit to the eastern kingbird.

Kingfisher. The kingfishers form a numerous and interesting family of birds (*Alcedinidæ*). They are related to the cuckoos and hornbills, but are distinguished by having a long, straight bill and unequal toes united for about half their length. There are about 200 species, mostly native to the Malay archipelago. Of about 12 American species, all but one are practically confined to the tropics. They are mostly solitary birds of beautiful plumage, living near the water and feeding chiefly upon fish. They nest in holes in banks or in hollow trees, laying several glossy white eggs.

The handsome belted kingfisher (*Cercyle alcyon*), found throughout North America, is about 13 inches

long, ashy blue above, white below, with conspicuous white markings and a crested head. It is an alert, active, but rather shy bird, frequenting clear streams and lakes. It has the habit of sitting quietly and then suddenly darting into the water for its prey. The beautiful ringed kingfisher (*C. torquatus*), 17 inches long, and the little Texas kingfisher (*C. americana septentrionalis*), of South and Central America, range northward into southern Texas.

King Snake (*Ophibolus*). A genus which includes some of the most interesting North American serpents. They range from 14 inches to 6 feet in length and are strikingly colored. All are powerful constrictors, feeding largely upon small rodents, but some kill and eat other snakes, including the most venomous. Toward man, however, the king snakes are remarkably mild-tempered and inoffensive. Seven species, with several varieties, occur in the United States.

The king snake, or Chain Snake (*O. getulus*), from 5 to 6 feet long, is black with narrow, chain-like, yellow or white crossbands. In its several varieties it extends throughout the United States. It is highly useful, destroying immense numbers of rats and mice. A bold fighter and entirely immune to snake poison, it frequently kills and eats copperheads and rattlesnakes. It is, however, very easily tamed and is gentle and hardy in captivity.

The common Milk Snake, or House Snake (*O. doliatus*), about 3 feet long, is gray above with large chestnut-brown saddles bordered with black. It occurs from New England to Wisconsin and southward. Owing to its habit of invading barns and dairies, and even houses, in search of mice and rats, it has acquired the reputation of stealing milk, a myth which has no foundation in fact.

Kiwi (*kē'wĭ*) (*Apteryx*). The Maori name of a peculiar New Zealand bird. It is somewhat related to the ostrich, but possesses no visible wings or tail, and the nostrils are placed at the end of a long, slender beak. There are about five very similar species, the largest of which, the South Island kiwi (*A. australis*), attains a length of 27 inches. Kiwis are nocturnal in habit and feed largely upon berries and worms. They nest in holes in which the female lays one or two very large eggs which are incubated by the male. See *Moa*.

Lac Insect (*Carteria*). The name given to several scale insects which secrete the valuable substance known as lac, much used in making varnishes. The Asian lac insect (*C. lacca*) lives chiefly on fig trees. The body becomes coated with a resinous secretion, after which the insect dies. Immense numbers thus live and perish upon the same twig, which becomes enveloped in a coating sometimes a half inch thick. When melted and refined, this resinous material becomes the gum lac or shellac of commerce.

In the southwestern United States a native lac insect (*C. larriæ*) feeds upon the creosote bush (*Larrea mexicana*), an immensely abundant desert shrub. The species secretes lac identical in composition with the Asiatic product, but as yet it has not been commercially utilized. See *Scale Insects*.

Ladybird. A small beetle of the numerous family *Coccinellidæ*, 150 species of which are found in the United States. Ladybirds, called also ladybugs, are uniformly of small size, hemispherical shape, and are usually readily distinguished by their polka dot markings. They are often of a brilliant red or yellow color variously spotted with black, white, red, or yellow. Ladybirds feed almost entirely upon scale insects and plant lice, and, hence, are immensely beneficial to agriculturalists and fruit growers.

The two-spotted ladybird (*Coccinella bipunctata*), found throughout the United States, is one of the most valuable native species. In 1886 the Australian ladybird (*Novius cardinalis*), a red and black species, was brought to California to check the cottony-cushion scale then rapidly destroying the orange and lemon orchards. Within a few years this ladybird had practically exterminated that destructive pest.

Lamprey (*Hyperoartia*). The lampreys form an order of round-mouthed eels (*Cyclostomata*). They resemble the hagfishes in form, but the single nostril ends in a blind sac instead of penetrating the palate. The scaleless skin is not usually slimy, as in case of the common eel. The eyes are well developed, and the mouth is a round disk formed for sucking and armed with rasplike teeth. Their small eggs are usually laid in brooks away from the sea, and, in nearly all cases, the adult lamprey dies after spawning. The lampreys feed upon the blood and flesh of fishes, attacking shad, sturgeon, cod, halibut, and other valuable food species. In Cayuga lake, New York, lampreys destroy great numbers of horned pout.

The sea lamprey (*Petromyzon marinus*), wrongly called lamper eel, common in North Atlantic waters, 2 to 3 feet long, follows the shad up the rivers to spawn. Its flesh is edible and was formerly much used for food.

Lance-head Viper (*Lachesis*). A genus of exceedingly virulent crotaline snakes, differing from rattlesnakes in having keeled scales and in possessing a horny spine at the end of the tail. There are 40 species, found in tropical America and southeastern Asia. The Fer-de-Lance (*L. lanceolatus*), of Central and South America, 4 to 7 feet in length, has a broad head and very long fangs. It will attack without warning and its bite is often fatal.

The Bushmaster (*L. mutus*), of the Amazonian region, is the largest known viperine snake, attaining a length of 12 feet, with a much thicker and stronger body than that of the king cobra. By vibrating its horned tail, it makes a warning noise somewhat like that of the rattlesnake. It has enormous fangs and its bite is most deadly, that of an eight-foot snake having caused death in 10 minutes.

Lark. The larks make up a numerous family of passerine birds (*Alaudidæ*). They are land birds of sober plumage which build their nests upon the ground and feed chiefly upon seeds and insects. There are about 100 species, mostly natives of Europe, Asia, and Africa, only one of which is found in America. Many are noted for their melodious songs.

The most celebrated is the Old World Skylark (*Alauda arvensis*), which rivals the nightingale in sweetness. This famous song bird is now introduced and naturalized in Oregon and on Long Island, New York. It is a favorite cage bird and sings well in captivity. During migrations the skylark is shot in immense numbers for the European markets.

The Horned Lark (*Otocornis alpestris*), called also shore lark, about 8 inches long, has earlike tufts and yellow markings on the head. It breeds in northern Europe, Greenland, and Canada, wintering in eastern America as far south as North Carolina. About a dozen varieties of the horned lark are found in the western United States.

Leopard (*Felis pardus*). One of the largest of the cats (*Felidæ*), being exceeded in size only by the lion and the tiger, with which it ranks in grace, quickness, ferocity, and destructiveness. The leopard is found throughout Africa and in Asia from Palestine to China and Japan, south of the Himalayas, and also in Borneo. The color is usually some shade of buff, sometimes tawny or rufous, irregularly but strongly marked with spots of black. The body of this fierce and rapacious animal is about 4 feet long. From the great flexibility of the limbs and spine, it can take surprising leaps, swim, crawl, and ascend trees. Leopards feed chiefly upon antelopes, deer, monkeys, goats, and dogs. They also capture peafowl and other ground birds.

Occasionally, leopards attack women and children, but they rarely, if ever, molest men. See *Cat Family.*

Lion (*Felis leo*). The most famous of the great cats, distinguished from all other species by its mane and tufted tail. A lion of the largest size stands about 3 feet high, with the body about 6½ feet long and the tail about 3 feet long, and sometimes weighs 500 pounds.

When mature, the lion is of a nearly uniform tawny or yellowish color, though sometimes reddish and occasionally almost black, and always paler on the under parts. The whole frame is extremely muscular, and the fore parts, in particular, are remarkably powerful. The large head, bright, flashing eye, and copious mane give a noble appearance to the animal. This, together with his immense strength, has led to his being called the "king of beasts." The lioness is smaller, has no mane, and is of a lighter color on the under parts.

The lion is found chiefly in Africa, although it occurs in some parts of Arabia, Persia, and India. It is not an inhabitant of deep forests, but rather of open plains in which the shelter of occasional bushes and thickets may be found. When taken young the lion is easily tamed, breeds readily in captivity, but is never trustworthy. See *Cat Family.*

Lizards (Suborder *Lacertilia*). A numerous group of reptiles. Together with the snakes (Suborder *Ophidia*), they constitute the large order *Squamata*, which includes more than nine-tenths of all living reptiles. Most lizards have four well-developed limbs with five-toed feet, and long, slender tails. Some degenerate lizards lack one or both pairs of limbs. In lizards the lower jaws are firmly united by sutures, while in snakes they are connected by an elastic ligament. An ear opening is always present in lizards, and the eyelids are usually movable. The skin is covered with scales or armed with spines. Nearly all are egg-laying, although a few bring forth their young alive.

Except the Gila monster (*Heloderma*), no lizard has a venomous bite. Nearly all lizards are land animals, though a few tropical species are aquatic. Many live in deserts, some among rocks, and others are arboreal. The vast majority are insectivorous or carnivorous. Some herbivorous lizards, as, for example, the iguana, are used for human food. There are about 1800 species widely diffused in warm and temperate regions. These are grouped in some 20 families. Among the more important groups are the geckos, chameleons, iguanas, amphisbænas, true lizards, monitors, and skinks. See *Basilisk, Chameleon, Chuckwalla, Flying Dragon, Gila Monster, Glass Snake, Horned Lizard, Iguana, Moloch, Monitor.*

Llama (*Lama glama*). A South American mammal of the camel family, used as a beast of burden in the Andes mountains. It is a domesticated form of the guanaco (*L. guanacus*), still found wild from Peru to Patagonia. The llama has a height of about 3 feet at the shoulder and resembles a small camel, except that it lacks a hump and carries its head erect. It will carry a load of 100 pounds at the rate of 12 to 15 miles a day, and, being sure-footed, is the principal carrier of burdens on the narrow, mountainous trails of the Peruvian Andes. The long hair or wool is used for making coarse fabrics. At the time of the Spanish conquest, the llama had long been in use by the native Peruvians. See *Alpaca, Guanaco.*

Lobster (*Homarus*). A well-known marine crustacean highly prized for food. It is very similar in form and structure to the common fresh-water crawfish, but of much greater size, and with very large, unequal front claws or pincers. It has blunt teeth situated in the stomach for crushing shells, and swimming legs on the abdomen, though the tail is the chief swimming organ.

The American lobster (*H. americanus*) is found from southern Labrador to North Carolina, usually near rocky shores, at a depth of 10 to 20 fathoms, migrating to deeper waters in winter. It is a bottom feeder, subsisting chiefly upon fish and other animals, both living and dead. Mature lobsters average about 10 inches in length and weigh about 2 pounds. They sometimes attain a length of 24 inches and a weight exceeding 30 pounds. See *Crawfish, Crustaceans.*

Longevity or Age of Animals. According to accredited data collected by Carl W. Neumann, the following may be regarded as normal life spans of some of the more important animals.

Between 200 and 300 years: eider duck, giant tortoise, goose, parrot, raven.

Between 100 and 200 years: elephant, 150–200; falcon, 162; pike, 150; carp, 150; vulture, 118; golden eagle, 104; swan, 102.

Less than 100 years: ant, 10–15; ass, 40–50; bear, 40–50; beaver, 20–25; bee, queen, 4–5; bee, worker, 6 weeks; blackbird, 18; canary, 24; cat, 9-10; chicken, 15–20; crab, fresh-water, 20; crane, 40–50; crocodile, 40; cuckoo, 40; dog, 10–15; dove, 60–70; dromedary, 40–50; earthworm, 10; eel, fresh-water, 10–12; elk, 20; fox, 10; goat, 12–15; guinea pig, 5–7; gull, 44; hare, 7-8; heron, 60; hippopotamus, 40; horse, 40–50; lion, 20–25; magpie, 25; mouse, 3-4; ostrich, 60–70; owl, 68; pearl mussel, 60–70; pig, wild, 20–30; rat, 3; reindeer, 16; rhinoceros, 40–50; roebuck, 15; salamander, 10–12; sheep, 10–15; squirrel, 10–12; stag, 30; tiger, 20; toad, 40; tree frog, 10; wolf, 10–15; woodpecker, 60–70.

Loon (*Gaviidæ*). A family of large diving birds, two or three feet in length, with powerful wings and somewhat webbed or lobed feet. Their legs are placed so far back on the body that they can scarcely walk on land, but in the water they are among the most expert divers and swimmers known. A loon can disappear below the surface so quickly that it is very difficult to shoot it even with a rifle. There are about 5 species, found in northern regions.

The common loon, or Great Northern Diver (*Gavia imber*), occurs throughout northern America, Europe, and Asia. In America it nests, usually in old muskrat houses in ponds or lakes, from the northern United States to within the Arctic circle, migrating in winter as far south as Mexico. Its general color is black above and white below, with the back spotted and the sides streaked with white. It has a loud, weird, startling cry, somewhat like that of a wolf or the scream of a human being.

Lungfish (*Dipneusti*). The lungfishes, or dipnoans, form a subclass of fishes which have, in addition to the regular gills, the air bladder modified so as to serve as a lung. The heart is more highly developed and the paired fins are more leglike than in ordinary fishes. By many zoologists the lungfishes are considered as a connecting link between the fishes and the amphibians. While very abundant in earlier geologic times, only a few living species are known.

Lynx. The lynxes are short-tailed, tree-climbing wildcats found in various parts of the world. In North America two species, very nearly equal in size, are known, the bay lynx, or bob cat (*L. rufus*), and the Canada lynx (*L. canadensis*). The former is of a reddish gray color, sometimes spotted, and varying greatly in the rufous shades. It is found in nearly all wild regions of the United States.

The Canada lynx is found principally in southern and western Canada as far north as the sixtieth parallel. The body is about 32 inches long, the tail 4 or 5 inches, and the height at the shoulder about 18 inches. It may be distinguished from the bay lynx by its lighter gray color, huge hairy paws, and by a slender tuft of stiff hairs on the tip of each ear. The Canada lynx is much hunted and trapped for its fur, highly valued for robes, coats, and collars. Lynxes feed upon small mammals and birds, which they catch after the manner of the cat family. Although reputedly dangerous animals, lynxes lack

courage and seldom, if ever, voluntarily attack a man even when he is unarmed and alone. See *Cat Family*.

Lyre Bird (*Menura superba*). A handsome Australian bird, somewhat intermediate in structure between the woodpeckers and the perching birds. It is so named because the remarkable tail feathers of the male, when erected and spread, are arranged somewhat in the form of a lyre. The lyre bird measures about 42 inches in length, of which the tail comprises 25 inches. In color, it is brown above, grayish below, with reddish markings.

Lyre birds live in pairs on the ground, frequenting rocks and bushes and feeding upon beetles, slugs, and snails. They build an oven-like, covered nest of sticks, in which a single purplish brown egg is laid. The tail feathers of the cock are shed at the end of each season and renewed the following year.

Macaw (*Ara*). A genus of large, beautiful birds of the parrot family. They are sometimes 3 feet long, and are distinguished by having their cheeks destitute of feathers, and their tails long and wedge-shaped. There are about 15 species, all natives of tropical South America. The largest and most splendid in regard to color is the great scarlet or red-and-blue macaw. The great green macaw and the blue-and-yellow macaw are somewhat smaller. Unlike the true parrots, the macaws do not readily learn to articulate words. See *Cockatoo*, *Parrot*.

Mackerel (*Scombridæ*). A family of marine, spiny-rayed fishes, highly valued for food. The common mackerel (*Scomber scombrus*), abundant on both shores of the North Atlantic, supports important fisheries. It is a beautiful fish, brilliant green and blue above, and silvery below, with numerous transverse black streaks. Usually, it is from 12 to 18 inches long and weighs from 1 to 3 pounds. Mackerel appear in immense schools, rarely approach land, and live chiefly on small fish. The similar chub mackerel (*Scomber japonicus*), found in both the North Atlantic and the North Pacific, is common off southern California.

The Spanish mackerel (*Scomberomorus maculatus*), a most excellent food fish, averaging 3 to 4 pounds in weight, is, likewise, found on both coasts of the United States. The Kingfish (*Scomberomorus cavallus*) is a fine southern food fish common on Florida coasts. It usually ranges from 10 to 20 pounds but sometimes attains a weight of 100 pounds. The Sierra (*Scomberomorus regalis*), common off Florida and Cuba, 2½ feet long, silvery with brown spots, is a fine game and food fish.

The Tunny, horse mackerel, or Great Albacore (*Thunnus thynnus*), highly esteemed for food since ancient Phœnician and Roman times, is called Tuna in Mediterranean countries and also in California. While sometimes reaching 10 to 15 feet in length and 1500 pounds in weight, it usually weighs much less than 500 pounds. In southern California the Santa Catalina sportsmen pursue it as a game fish, taking specimens weighing from 50 to 250 pounds with rod and reel.

The Pompano (*Trachinotas carolinus*), of the Florida and Gulf coasts, 18 inches long, bluish and golden in color, is the most prized table fish taken in southern waters.

Maggot. The immature stage (larva) of a dipterous insect or true fly. It is more or less worm-like, soft, whitish, and thin skinned, lacking eyes, legs, and head, and incapable of living except in soft organic substances, such as the flesh of animals, the pulp of fruits, or the softer tissues of plants. The larvæ of blowflies are the maggots that quickly consume carrion. The larvæ of house flies feed by preference in manure piles. Apple, grape, and currant maggots live in fruits. (See *Fruit Flies*.) The larvæ of many other flies are important consumers of soft plant substances.

Magpie (*Pica*). A bird belonging to the crow family. There are several species, two of which belong to America. The European magpie (*P. pica*) is about 19 inches in length; the plumage is black and white, the black glossed with green and purple; the bill is stout, and the tail is very long. The magpies continue in pairs throughout the year, and subsist on a variety of food, chiefly animal. They are determined robbers of other birds' nests, devouring the eggs and young birds. In captivity they are noted for their crafty instincts, their power of imitating words, and their propensity to purloin and secrete glittering articles.

The American magpie (*P. pica hudsonica*) is a beautiful bird, about 20 inches long, purple-black with large patches of white on the breast, rump, and top of the wings. The tail is very long and pointed. Although sometimes preying upon small mammals, birds and their eggs, this magpie feeds chiefly upon insects, including many destructive kinds. It is a resident of the Rocky Mountain region from Arizona to Alaska, east to Nebraska and Hudson bay, and west to the Sierra Nevada. The smaller yellow-billed magpie (*C. nuttallii*) inhabits portions of central California. See *Crow*, *Jackdaw*, *Raven*, *Rook*.

Mallard (*Anas boschas*). The most common and widely distributed wild duck, found nearly throughout the northern hemisphere, wintering as far south as India, Egypt, and Panama. The mallard is usually about 2 feet long and the plumage of the male is handsomely colored. The head and neck are glossy green, with a white border below, and the breast is rich chestnut. The wing has a broad band, or speculum, of brilliant purple, bordered on each side with black and white bands.

In North America the mallard breeds from Indiana and Iowa northward and is most numerous in the interior. It builds a nest of grass and leaves, usually on the ground, in which it lays from 6 to 18 greenish eggs. It feeds chiefly on seeds, roots, worms, snails, and insects. The mallard is the parent wild species from which most varieties of the domestic duck have sprung. See *Duck*.

Mammals (*Mammalia*). The highest group of vertebrates, comprising all animals whose young after birth are fed by the mother with milk from the mammary glands. The class includes man, the apes and monkeys, the quadrupeds, bats, seals, and whales. Mammals are warm-blooded, have a four-chambered heart, breathe by lungs, and, except the duckbills and echidnas, bring forth their young alive. Most mammals are provided with hair, a distinctive skin-covering possessed by no other group of animals. While authorities differ, there are said to be at least 7500 living species of mammals. These are usually classified in from about 10 to 20 orders.

The widely used classification of Parker and Haswell groups the mammals in 11 orders as follows: *Monotremata*, egg-laying mammals—echidna, duckbill; *Marsupialia*, pouched mammals—kangaroos; *Edentata*, edentates—sloths, armadillos; *Cetacea*, cetaceans—whales, porpoises; *Sirenia*, sirenians—manatees, dugongs; *Ungulata*, hoofed mammals—ox, deer, horse; *Carnivora*, flesh-eating mammals, or beasts of prey—lion, tiger, jaguar; *Rodentia*, rodents, or gnawers—rats, squirrels, beavers; *Insectivora*, insectivores—moles, shrews; *Chiroptera*, winged mammals—bats; *Primates*,—lemurs, apes, man.

Mammoth (*Elephas primigenius*). An extinct elephant whose fossil remains are abundant in the northern parts of Europe, Asia, and North America. In size and general appearance the mammoth was very similar to the Indian elephant, but was covered with a heavy coat of long black hair, beneath which was an inner coat of reddish brown woolly hair. The tusks were strongly curved both upward and outward. These great animals lived in the Pleistocene period, and in Europe were contemporaneous with early man. They appear to have become

extinct about the same time as the woolly rhinoceros, the cave bear, the cave tiger, and other great animals which, unlike man, did not survive the Ice age.

Many specimens of the mammoth have been found in Siberia frozen in ice, where they have lain, as in cold storage, for unknown thousands of years. In some cases their flesh is so perfectly preserved as to be eaten by bears and dogs. Remains of this animal are so numerous along some Siberian islands and river shores as to support, for many centuries, a considerable trade in its tusks, which yield valuable ivory. For the last 200 years, at least 100 pairs of tusks have been sent out from northern Siberia annually. In North America, remains of the mammoth occur from the vicinity of Washington, D. C., northward and westward to Alaska. A somewhat larger species, called the southern mammoth (*E. columbi*), has been found in the southern United States. See *Elephant, Mastodon.*

Manatee (*Trichecus*). An aquatic mammal of the order *Sirenia*, called also sea cow. Three species are known, one of which is found in West Africa and the others in America. The American manatees frequent rivers from Florida and Cuba to the Amazon, usually choosing the quiet reaches of the streams above tidewater. Their food consists of water grasses and other aquatic plants. They have a long, fishlike body, somewhat resembling that of a whale. Their anterior limbs are flat and not adapted for walking, hence they never come upon land. The hind limbs are wanting, and the broad, horizontally flattened tail is adapted for swimming. They are large, awkward animals, attaining, as a rule, a length of 8 to 10 feet but sometimes growing to 13 feet. The skin is of a grayish color, sparsely covered with hairs. Their flesh is excellent, and they furnish a soft, clear oil which does not become rancid. See *Dugong, Sirenia.*

Marsupialia (*mär-sū'pĭ-ā'lĭ-ā*). An order of mammals, standing at the foot of the *Eutheria*, or true mammals. They are so named because they carry their young for some time after birth in a marsupium, or external pouch, in which they are suckled by the mother. Excepting the opossums, which are found only in North and South America, all living marsupials are native to Australia, New Guinea, and adjacent islands. There are about 175 species, divided into two groups,—the vegetable-eating marsupials, including the kangaroos and phalangers, and the flesh-eating marsupials, including the bandicoots, the thylacines, and the opossums. See *Kangaroo, Opossum, Wombat.*

Marten. The marten family (*Mustelidæ*) is a numerous group of small carnivores. It includes many valuable fur bearing animals, as the weasels, ermines, sables, martens, minks, otters, ferrets, skunks, fishers, badgers, and wolverenes. There are upwards of 80 species, found chiefly in the northern hemisphere. The true martens (*Mustela*) also include the sable and the fisher.

The American marten (*M. americana*), often called American pine marten and American sable, is a highly prized fur bearing animal, found from Alaska to Labrador, southward to California, Colorado, and the Adirondacks. It has a slender body 18 inches long, and a bushy tail 8 inches long, and its general color is a rusty brown. This marten is a very active and cunning animal, living in pine woods, and feeding chiefly upon small mammals and birds. It is incessantly trapped for its excellent fur.

Mastodon. An extinct mammal of the elephant family. It much resembled the living kinds of elephants but had a longer head, very different teeth, and possessed, when young, rudimentary tusks in the lower jaw. About 30 species, widely scattered throughout the world, have been discovered. Mastodons originated in the Miocene period, flourished in all continents during the Pliocene period, and became extinct in Pleistocene time.

The American mastodon (*M. americanus*) formerly ranged over the greater portion of the United States. It was slightly less than 10 feet tall and was somewhat more heavily built than elephants of the same height. The strongly curved tusks were 7 to 9 feet long, and a short pair was sometimes present in the lower jaw. Great numbers of mastodon bones have been unearthed in the Mississippi valley.

Upon being dug up in various countries during ancient and medieval times, the huge limb bones of mastodons were often described as those of a former race of human giants. See *Elephant, Mammoth.*

Mayflies (*Ephemerida*). A group of very delicate aquatic insects, remarkable for the extreme brevity of their adult life. The immature stages are not shorter in duration than those of other insects, and are spent in the water feeding upon various plant substances. The adults, however, eat absolutely nothing, feeding and growth having been completed before the final transformation. Their sole business is to reproduce their kind. They have no jaws or other mouth parts, but they possess great powers of flight, and some of the larger species fly in vast swarms about the waterside for a brief period in summer. Some species live only a few hours after leaving the water, and those of longest life live but two days. They lay their eggs in the water and then die. In both the adult and the immature stage, mayflies are excellent food for fishes.

Meadow Lark (*Sturnella magna*). An American bird of the family *Icteridæ*, related to the blackbirds and orioles, found from New Brunswick to Minnesota and southward. It is about the size of a robin, the upper parts being black, brown, or buff, the under parts yellow, the neck with a scarf of jet-black, the sides with black spots arranged in rows, and the outer tail feathers white. They frequent meadows, preferring short thick grass, living much upon the ground. The nest is built in a tuft of grass, and usually contains from four to six whitish eggs spotted with brown.

The western meadow lark (*S. magna neglecta*), similar in plumage but superior in song, ranges from Manitoba to British Columbia and southward to Mexico. Meadow larks live mostly upon injurious insects.

Migration of Animals. Seasonal migrations constitute one of the most remarkable features of animal life. In general, birds fly south for the winter and north for the summer. Among the more remarkable flights are those of the golden plover, which travels some 8000 miles south from the Hudson Bay region, crossing about 2000 miles over the sea from Nova Scotia to the Caribbean countries, and winters in Argentina. It returns to Arctic America by way of Central America and the Mississippi valley. The arctic tern migrates almost from the north pole to the south pole and back again each year. Few North American birds, however, pass the equator, Mexico being the southern limit for many.

Whales, seals, salmon, lemurs, and various other animals migrate. Salmon, for instance, leave the deep sea and ascend rivers to spawn, usually in the same locality which they left in their earlier life.

The causes of migrations and the sense of direction shown by migrating animals remain among the most baffling problems of science.

Mink (*Putorius*). A small carnivore, closely allied to the weasel, native to cool parts of the northern hemisphere. The American mink (*P. vison*) is an animal of semiaquatic habits, living on the borders of ponds and streams. Its body varies in length from 13 to 18 inches, and the tail from 8 to 10 inches. In color it is usually yellowish brown with a dark tail and a white chin. Although it kills and eats fish, it feeds principally upon small mammals and birds, and is very destructive to poultry. It is much trapped for its fine fur, which is becoming increasingly valuable.

Minnows (*Cyprinidæ*). The largest family of fishes, comprising more than 2000 species, of which more than 225 are North American. With few exceptions they are small, feeble fish, of very little economic value, confined almost exclusively to fresh waters of northern temperate and tropical regions. Here is grouped the great assemblage of fishes known as carp, dace, chub, minnows, bleak, bream, and shiner. The majority are from 2 to 7 inches long, though the squawfish, of Pacific Coast rivers, attains a length of 4 or 5 feet. Various minnows are much used for bait. See *Carp*, *Goldfish*.

Moa. A gigantic bird of New Zealand which became extinct in comparatively recent times. When the first colonists arrived on the islands, the plains were still strewn with the immense bones of moas, and their eggs and feathers have been found preserved in various surface deposits. From these abundant remains, scientists have recognized about 20 different species, ranging in size from that of a turkey to a stature exceeding that of the ostrich. The largest moa (*Dinornis maximus*), of South island, probably stood about 10 feet high. The moas possessed only very rudimentary wings and were, therefore, flightless. Among living birds their nearest relatives appear to be the kiwis. See *Kiwi*.

Moccasin (*Ancistrodon*). The name of a group of highly venomous serpents. They are characterized by large, shieldlike scales on the head, a pit between the eye and the nostril, and a spiny-tipped tail. There are 10 species,—7 Asiatic, 3 North American.

The water moccasin, or Cottonmouth (*A. piscivorous*) is one of the largest and ugliest poisonous snakes found in the United States. While sometimes 4 to 5 feet long and 3 inches in diameter, it is usually smaller. It has a flat head, very distinct from the neck, with large scales projecting somewhat over the eyes. Its skin is muddy brown and very rough. It occurs from North Carolina to Texas, frequenting shore lines of swamps, where it lies partly out of water. It feeds chiefly on fish and frogs.

The Copperhead (*A. contortrix*), a serpent of the woods and rocks, is found from Massachusetts to Illinois and southward. It is smaller, usually about 30 inches long, hazel-brown above with darker crossband, and the head often coppery tinged. If caught at close quarters, it will strike viciously and its venom is nearly as deadly as that of the rattlesnake. Unlike the rattlesnake, the copperhead strikes without warning, and hence has become a symbol of treachery. It feeds upon mice, frogs, and small birds.

Mocking Bird (*Mimus polyglottus*). A famous American song bird, closely related to the wrens and thrushes. It is noted, not only for its unusual powers of song, but also for its remarkable ability to imitate the songs of other birds. In size it is about equal to a robin; in color it is ashy gray above, with darker wings and tail marked with white, and whitish below. It ranges from the Bahamas and Mexico northward to New Jersey and southern Illinois, nesting in trees and thickets, laying 4 to 6 greenish blue eggs, spotted with brown, and feeding chiefly on earthworms, insects, and berries.

The very similar but slightly larger western mocking bird (*M. polyglottus leucopterus*) is found from Oklahoma and Texas to California and southward into Mexico. Throughout its range, the mocking bird is even more active, alert, and familiar than the robin, living in gardens, parks, public squares, and city streets, singing almost continuously, even during the noonday heat and often throughout moonlit nights. While varying greatly in their powers of mimicry, some mocking birds have been known to imitate the songs of more than 30 different birds within a period of 10 minutes. See *Bluebird*, *Robin*, *Thrasher*, *Thrush*, *Wren*.

Moles (*Talpidæ*). A family of small insectivorous mammals, natives of temperate regions. Moles usually have a thick, clumsy body, clothed in soft fur, a small, pointed head, no external ears, very small eyes, a short tail, and extremely large, spadelike front feet admirably adapted for digging. They live in elaborate burrows, which they dig with marvelous dexterity, rarely coming to the surface. As they feed mainly on an animal diet, chiefly insects and worms caught underground, they are very beneficial to the farmer, though they disfigure lawns and meadows with their galleries, and sometimes eat potatoes and other root crops.

The common mole (*Scalops aquatica*), of the eastern and southern United States, about 6 inches long and 2 inches high, is covered with shining, velvety, gray fur. Though this animal is entirely blind, its senses of smell, hearing, and touch are remarkably acute. The rudimentary eyes are hidden under the hairy skin. See *Insectivora*, *Shrews*.

Mollusks (*Mollusca*). An important phylum or branch of the animal kingdom, usually distinguished by the presence of a shell which incases the body. The mollusks include the oysters, clams, snails, limpets, chitons, cuttlefish, and octopuses. They are soft-bodied, cold-blooded animals, lacking an internal skeleton, but mostly provided with an external bivalve or univalve shell, which serves in place of bones and affords protection. The body typically consists of four parts: the head, with the mouth, feelers, and eyes; the visceral mass or trunk, containing the internal organs; the so-called "foot," a muscular portion by means of which the animal moves; and the mantle, or outer fold of integument, which secretes the shell.

Mollusks are chiefly aquatic, the great majority living in the sea, though many inhabit moist situations on land. While most mollusks, as, for example, the snails, are vegetable feeders, some, such as the octopus, are powerful predacious animals, and a few are parasites. Next to the arthropods, mollusks comprise the most numerous branch of animals, the number of species being computed at upwards of 60,000. They range in size from minute, almost microscopic forms, to the giant squid, 50 feet long, which is the largest of the invertebrate animals.

The Mollusca are divided into five classes: *Pelecypoda*, bivalves—oysters, clams, scallops, about 11,000 species; *Gastropoda*, univalves—snails, whelks, sea slugs, limpets, about 49,000 species; *Scaphopoda*, tooth shells, 200 species; *Amphineura*, chitons, about 600 species; and *Cephalopoda*, squid, cuttlefish, octopus, about 400 species. Many mollusks, such as oysters, clams, mussels, snails, and scallops, are highly prized for food. A few, such as the shipworm and the octopus, are injurious. See *Clam*, *Cuttlefish*, *Mussel*, *Octopus*, *Oyster*, *Scallop*, *Snail*, *Squid*.

Moloch (*mō'lŏk*) (*Moloch horridus*). A small Australian lizard, 8 inches long, whose entire body is covered with conical spines and tubercles. While very uncouth and ugly-looking, its armor is only for defense. It feeds chiefly on ants and is entirely harmless.

Mongoose (*Herpestes griseus*). A species of ichneumon, native to India, but introduced into Jamaica and other countries, for the purpose of destroying rats and other animal pests, upon which it largely feeds. The mongoose is reddish gray in color, and in size it is somewhat larger than a rat. Being easily domesticated, it is kept in many houses in Hindustan, to rid them of reptiles, mice, or other vermin. The mongoose kills and devours the most venomous snakes, such as the cobra, whose bite it avoids by its quickness of sight and remarkable agility. Unfortunately, the mongoose also destroys small terrestrial mammals and the eggs of all birds that nest upon the ground. In Porto Rico it has driven the common rats from the

ground and compelled them to take refuge and habitation in trees. See *Ichneumon.*

Monitor (*Varanus*). The largest of living lizards, found in Africa, India, and Australia. It is so named because of its habit of giving warning, by a whistling sound, of the approach of a crocodile. Monitors have a long body, five-toed feet, a long-forked tongue, and a long tail. Some are aquatic, some arboreal, and some live in sandy deserts. All are carnivorous, living on frogs, snakes, small mammals, and birds. All lay white, soft-shelled eggs, which are more highly esteemed than hens' eggs by some Eastern peoples. The Nile monitor (*V. niloticus*), of tropical African rivers, attains a length of 6 feet. It is the chief enemy of the crocodile, destroying immense numbers of its eggs.

Monkey. The name popularly used for any animal of the families *Simiidæ*, anthropoid apes and gibbons; *Cercopithecidæ*, Old World monkeys; *Cebidæ*, American monkeys; and *Callitrichidæ*, marmosets. In its more proper, restricted sense, however, the term monkey is applicable only to the group first named. The Old World monkeys and baboons are widely distributed over Africa and Asia. The American monkeys differ from those of the Old World in having an additional molar tooth, or grinder, in each jaw. Some have a prehensile tail, which is as useful to them as an additional hand. The members of this family are strictly confined to the forest regions of tropical America, from southern Mexico to northern Chile. The marmosets are distributed from southern Mexico to southern Brazil.

Monkeys live chiefly in forests, for which their structure is especially adapted, enabling them to climb trees with ease, and to leap from branch to branch with extraordinary agility. Their food consists chiefly of fruits and other vegetable substances. Of all animals, monkeys are the most intelligent and playful; when captured young they can be taught many interesting ways. They are full of curiosity and of unbounded activity; and in all tropical countries they are prime favorites as pets. See *Ape, Baboon.*

Monotremata (*mŏn'ō-trē'mà-tà*). An order of egg-laying mammals, intermediate between the higher mammals and the birds. The group includes the platypus, or duckbill, of Australia and Tasmania, and the echidnas of Australia, Tasmania, and New Guinea. While resembling the birds, reptiles, and amphibians in that their young are incubated from eggs laid by the female, the monotremes correspond to mammals in that the young after being hatched are suckled by milk secreted by the mother. See *Echidna, Platypus.*

Moose (*Alces americana*). The largest North American quadruped, and the largest known representative of the deer family. It is closely related to the European elk and may properly be called the American elk, a name which is often, though incorrectly, applied to the wapiti. The moose stands from 6 to 7 feet high at the shoulder, and sometimes weighs more than 1000 pounds. It has long fore limbs, humped shoulders, and short hind limbs. The head is very large, with a broad, square-ended, overhanging nose. The male bears enormous flattened and palmated antlers, with a spread of 5 to 6 feet.

The moose is a browsing animal, feeding chiefly upon leaves, small branches, and bark. Its range extends from Nova Scotia to the Rocky mountains and northward through Canada and Alaska to the limit of trees. In the United States the moose is now found only in Maine, Minnesota, Montana, Wyoming, and Idaho. Except where specially protected by law, this splendid game animal is being rapidly exterminated. The Alaska moose (*A. gigas*), said to stand as high as 8 feet at the shoulders, with an antler spread of 6 feet, occurs from British Columbia northwestward to the Arctic Ocean.

Mosquitoes. Small two-winged insects, of the family *Culicidæ*, closely related to the midges, black flies, and crane flies. There are more than 350 species, abundant in arctic as well as in temperate and tropical regions. Mosquitoes have a narrow body, a long, slender but firm proboscis, or beak, and narrow wings, more or less fringed with minute scales. In the males the mouth parts are not adapted for piercing. The females, however, have a set of extremely sharp, needle-like organs in the beak. With these they readily puncture the skin of fruits or of animals and then suck their juices or their blood.

Mosquitoes lay their eggs in stagnant water, often in raftlike masses. In from 1 to 4 days the eggs hatch into legless larvæ, called "wigglers." These live in the water but come to the surface to breathe. After a week or more the larvæ molt and transform into pupæ which are also active wigglers. In a short time the pupæ transform into imagoes. These promptly cast off their pupal coverings and emerge from the water as flying mosquitoes. The total period of life in the water varies greatly in different species, but, in case of the common mosquito, it ordinarily ranges from 10 to 15 days.

Among the enemies of the mosquito in the aquatic stages are various fishes, newts, leeches, dragon fly larvæ, and water beetles. In the flying stage, mosquitoes are preyed upon by bats, nighthawks, swallows, swifts, dragon flies, hornets, and various other birds and insects. The natural food of both males and females of some species of mosquitoes, and the only food of the males of nearly all species, consists of plant juices. However, the females of various species attack mammals, birds, turtles, frogs, fishes, and sometimes other insects.

Until recently, mosquitoes were looked upon merely as annoying pests. But, following the discovery that various mosquitoes transmit dangerous diseases, their great importance has become recognized. Three very serious human maladies, *malaria, yellow fever,* and *elephantiasis,* as well as various diseases of lower animals, are known to be spread by mosquitoes. The common mosquito (*Culex pungens*), of the United States and Canada, is not known to be a bearer of disease. A spotted-winged swamp mosquito (*Anopheles*) is responsible for the spread of malaria. In the South the most dangerous mosquito is the *Stegomyia fasciata*, which transmits yellow fever.

Mosquitoes are best combated (1) by draining as thoroughly as possible all swamps, pools, and other stagnant waters, and (2) by pouring small quantities of kerosene upon the water surface of their breeding places.

Moth. The common name for a numerous group of scale-winged insects, which, with the butterflies, form the important order *Lepidoptera*. Moths are distinguished from butterflies by their antennæ, which are filiform or feathered instead of knobbed; by their holding the wings in a horizontal position when at rest; and by their nocturnal habits.

There are some 40 families of moths, embracing more than 40,000 species, about 6000 of which occur in North America. Many of these, such as the cankerworm, cutworm, army worm, codling, brown-tailed, gypsy, grain, and clothes moths, are among the most destructive of injurious insects. The silkworm moth, which has been grown in China for more than 5000 years, and is now extensively reared throughout the world, ranks next to the cotton plant and the sheep among the world's most valuable producers of textile fiber. Many species of moths are strikingly beautiful, such as the cecropia, polyphemus, emperor, luna, and other handsome forms. See *Silkworm.*

Motmot. A group of small birds, forming the subfamily *Momotinæ*, closely related to the kingfishers. They are handsome birds with brilliant green, blue, cinnamon, and black plumage. Usually the central tail feathers are elongated and end in

racket-shaped tips. In length motmots range from 6½ to 20 inches. They are solitary birds, living usually in pairs in gloomy forests, feeding upon insects, small reptiles, and fruits, and nesting, so far as known, in holes excavated in banks, usually along watercourses, laying 3 or 4 glossy white eggs. There are about 24 species, native to tropical America, one of which, the blue-headed motmot (*Momotus cæruliceps*), ranges northward nearly to Texas.

Mouflon. See *Sheep*.

Mouse (*Mus*). The common name of the smaller rodent mammals of the family to which the rat belongs, and which includes also the lemmings, voles, and muskrats. Mice much resemble rats but are smaller, more graceful in movement, and more cleanly in habits.

The house mouse (*Mus musculus*), supposed to be a native of Asia, has been unintentionally distributed by man throughout nearly the entire world. The date of its arrival in Europe is unknown, but it is mentioned by Aristotle, Pliny, and other ancient writers. Mice are pretty, gentle, timid little animals, with cunning ways, and dainty in their choice of food. Yet, by reason of their destructive habit of gnawing woodwork, furniture, books, fabrics, and other valuable articles, they are universally regarded as pests to be exterminated.

There are many interesting wild mice, such as the meadow mouse, harvest mouse, white-footed mouse, mole mouse, cotton mouse, and rice-field mouse. Nearly related also are the pocket mouse and jumping mouse.

Mule. A hybrid animal, the progeny of a male ass and a mare, highly valued and widely used as a draft and pack animal. The mule has a large, clumsy head, long, erect ears, a short mane, and a thin tail. In these points, the mule resembles the ass rather than the horse. However, as regards size, height, and strength, the mule approaches more nearly to the horse. In intelligence the mule seems to surpass both the horse and the ass. Its powers of muscular endurance are remarkable, making it highly serviceable in mountainous countries. No other beast of burden is so sure-footed or so capable of enduring fatigue. Further, the mule is more easily kept, can subsist upon a greater variety of food, and endures heat, hunger, and thirst better than the horse. The mule also lives to a greater age and is less susceptible to diseases. In size, strength, and appearance the mule is very greatly superior to the "hinny," which is the offspring of the male horse and the female ass.

Mules were reared more than 3000 years ago in Asia Minor, whence they were taken to Greece at a very early period, being frequently mentioned in Homer. While reference to mules is made in the Bible, the Israelites were forbidden by law to rear them. In ancient Italy they were used for hauling loads on the highways much as in modern times, and the ancient Latin names *mulus* and *hinnus*, mule and hinny, have been adopted in many languages.

The finest mules are bred in Spain and in the United States, but good breeds are extensively reared in France, Italy, Mexico, and northwestern India. The best imported breed is the Catalonian; other leading foreign breeds are the Andalusian, Maltese, Italian, and Majorcan. A mixture of various strains is used as the standard in the United States. Missouri and Texas lead in the rearing of mules, which are extensively used throughout the South, especially in the cotton growing states. In the United States, as a whole, there are about one-fifth as many mules as horses.

Mullet (*Mugil*). A spiny-finned fish of the family *Mugilidæ*. There are about 70 species, widely distributed in warm seas, some of which are of high economic value. The striped mullet (*M. cephalus*), very abundant on Florida coasts, is found also from California to Chile and in Hawaii. It sometimes attains a weight of 6 pounds. The white mullet, or silver mullet (*M. brasiliensis*), of Florida waters, is a big-scaled, round-bodied, trim little fish about 9 inches long, with spotless, silvery sides. Both the foregoing are excellent food fish, many millions of pounds being marketed annually by Florida fishermen. Mullets are eaten fresh, salted, and smoke-dried.

The closely related European mullet (*Mullus barbatus*) is celebrated for its brilliant colors. It was a great favorite with the ancient Romans, who are said to have paid enormous prices, sometimes exceeding $300, for a single fish.

Murre (*mûr*) (*Uria*). A marine diving bird, closely related to the auks and puffins, found only on the shores of northern oceans. The common murre (*U. troile*), 16 inches long, native of northern Europe and America, migrates in winter as far south as New Jersey. At breeding time it congregates in vast colonies on rocky cliffs, where the female lays a single, large, pear-shaped egg on a bare ledge of stone. The eggs, which are used extensively as food, are often gathered in immense quantities.

The similar California murre (*U. troile californica*) is found on Pacific shores from southern California northward. Millions of eggs, obtained from murre rookeries on the Farallon islands, were sold in the San Francisco markets until, in order to save the species from threatened extinction, the traffic was prohibited.

Musk Deer (*Moschus moschiferus*). A kind of deer found chiefly in the elevated table-lands of central Asia, and particularly of Tibet. It stands about 20 inches high at the shoulder, with large ears and a rudimentary tail. Both sexes are hornless, but the upper jaws of the male bear long, saber-like canine teeth which project downward and backward below the chin. The males alone yield musk, which is secreted by an abdominal gland of about the size of a hen's egg. Musk is extensively used by perfumers. Its scent is more penetrating and powerful than that of any other known substance.

Musk Ox (*Ovibos moschatus*). A ruminant animal intermediate between the ox and the sheep, resembling in general appearance a large, goatlike sheep. It stands about 5 feet high at the shoulder. Its body is covered with a coat of tufted hair, brownish in color and of great length. The hair about the neck and shoulders is so thick as to give the animal a "humped" appearance; on the rest of the body it is very long, smooth, and flowing. The horns, broad at the base and covering the forehead and crown, curve downward between the eye and the ear, and then upward and slightly backward. The ears are short, the head large and broad, and the muzzle blunted. The average weight of the musk ox is from 400 to 600 pounds. Its food consists chiefly of grasses and lichens.

The musk ox inhabits the arctic regions of America north of latitude 64°. While its musk-like odor is sometimes perceptible at a distance, the flesh is free from the odor or taste of musk. The beef is excellent and has been an important source of food to arctic explorers.

Muskrat (*Fiber zibethicus*). An aquatic rodent, found throughout North America. It has a ratlike body 15 inches long and a flat tail 10 inches long. In color it is brown above, darker on the back, and gray below. The fine, close, silky fur is intermingled above with long, coarse hairs. The muskrat lives in burrows with the entrances under water. In marshes it sometimes builds mounds of twigs and leaves, 2 to 4 feet high, containing grassy nests large enough for several animals. It is an expert swimmer and an omnivorous feeder, subsisting on roots, fruits, vegetables, grasses, mussels, and sometimes flesh. Immense numbers are trapped for their fur, which is becoming increasingly valuable.

Mussel. A common name applied to two groups of bivalve mollusks. The marine mussels number several hundred species, of which the edible mussel (*Mytilus edulis*) is a familiar example. It is about 3 inches long, half as wide, dark brown with violet margins, and is found on all northern coasts where it attaches itself in enormous masses to tide covered rocks and shallow shores.

The fresh-water mussels comprise the family *Unionidæ*, embracing more than 1000 species, some 500 of which occur in the United States, flourishing in lakes, ponds, rivers, and smaller streams. Some large forms are 8 inches long and 4 inches wide, but they are usually much smaller. While occasionally used for food, their flesh is inferior. The shells of many fresh-water mussels are extensively used in the manufacture of pearl buttons, now an established industry along the Mississippi river. Some of these species also yield valuable pearls, and form the basis of the American fresh-water pearl industry. As high as $25,000 has been paid for a single fresh-water mussel pearl. The most important mussel fisheries are located near Muscatine, Iowa, and the total value of their products amounts to millions of dollars annually. See *Pearl.*

Mythical Animals. Before the days of careful observation in natural history, the world was filled with travelers' tales of strange beasts found in remote lands and seas. These creatures were in some cases wholly imaginary; many, however, were illustrated by figures created in the imagination of the artists of the day. Such are the various sea serpents of world-wide fame, and most sincerely believed in by some even down to the present time. Two of extraordinary interest, familiar throughout the world through their appearance upon the insignia of great nations, are the unicorn, which still has a place upon the seal of Great Britain, and the great dragon, which was until recently conspicuously displayed upon the flag of China.

Nighthawk (*Chordeiles virginianus*). A small insectivorous bird, sometimes called bull bat, closely related to the whippoorwill and goatsucker. The nighthawk is found from Labrador to British Columbia and southward to Argentina. It is about 9 inches long, blackish brown mottled with gray and buff, with a prominent white wing spot, a white bar across the tail, and a white V-shaped mark on the throat.

Nighthawks fly high at evening or in cloudy weather, often in flocks, with their broad mouths wide open to catch insects, and uttering a sharp, rasping cry. Their flight is rapid and irregular, and they sometimes dive almost vertically for a considerable distance. They build no nests, but lay two white eggs blotched with brown, on the ground or in a hollow tree. While occasionally shot because of their somewhat hawklike appearance when on the wing, they are harmless except to small insects, which they devour in immense numbers.

Nightingale (*Luscinia megarhynca*). A famous song bird of western and central Europe, belonging to the warbler family (*Sylviidæ*) and closely related to the English robin redbreast (*Erythacus*). It is a small migratory bird, about 7 inches long, wintering in Africa, and visiting Europe and western Asia in the summer. The plumage of this delightful songster is of a somber hue, being reddish brown above, redder on the head and rump, the tail a lighter tint, and the throat, lower part of the breast, and the abdomen, grayish.

The nightingale is a shy bird, frequenting woods, copses, and hedgerows. Its food consists of insects, soft fruits, and berries. The nest, which is either on the ground or in a low bush, is composed of dry leaves, lined with grass, roots, and hair. The eggs are 4 or 5 in number, and of a uniform olive brown color. Only the male nightingale sings, beginning at mating time in the spring and continuing until the young are hatched. Its song is most pleasing on quiet evenings, and, when the moon is shining, the bird may often be heard until midnight.

Nilgai (*nĭl'gī*) (*Boselaphus tragocamelus*). The largest of the Indian antelopes, somewhat intermediate between the deer and the ox. It is about the size of a mule, bluish gray in color, standing 4½ feet high at the shoulder, with an oxlike head and body, long, slender legs, and small, short horns. The nilgai lives in herds on the plains and hills of India, where it is much hunted for its flesh.

Octopus. A marine cephalopod mollusk, closely related to the cuttlefish and squids, called also "devilfish" or "poulp." It has a short, bag-shaped body from which project eight long arms or tentacles, covered with sucking disks, with which it seizes its prey. There are two large, glaring eyes, one on each side of the head. The mouth, which is provided with powerful, horny, parrot-like jaws, is situated between the encircling arms. The octopus swims rapidly, crawls on the sea bottom, and feeds chiefly on shellfish and other invertebrates.

There are about 50 species, found among rocks along the shores of all oceans. Some, such as the small octopus (*O. bairdii*), found from Cape Cod northward, have arms only a few inches long, but the largest species, which measure from 12 to 15 feet across the outstretched tentacles, are powerful and dangerous animals. The common octopus, or devilfish (*O. vulgaris*), of Mediterranean and West Indian waters, attains an arm expansion of 9 feet and a weight of 60 pounds. The Pacific octopus (*O. punctatus*), which ranges from Alaska to Lower California, sometimes has an arm spread of 14 feet. It lives just below low-water mark, and, in the vicinity of San Francisco, is often caught for food by the Chinese and the Italians.

The huge devilfish described by Victor Hugo in *The Toilers of the Sea* as inhabiting the Channel islands and attacking fishermen, is a creature of the imagination. However, the large species found in Pacific waters may severely injure or even cause the death of pearl divers and shell collectors. See *Cuttlefish, Squid.*

Okapi (*ô-kä'pē*). The native African name for a recently discovered animal of the giraffe family (*Ocapia johnstoni*). The first complete skin sent to Europe was received in England from Sir H. H. Johnston in 1901. The okapi is a native of the Semliki forest between Lake Albert Edward and Lake Albert at the northeastern border of the Congo basin.

In height the okapi stands nearly 5 feet at the withers, and is, therefore, about as large as a good-sized American elk or wapiti. While closely related to the giraffe, which is the only other living representative of the family now known, the okapi differs in having a much shorter neck and forelegs. The male okapi possesses two small, dagger-shaped horns, the tips of which usually protrude through the hairy skin with which they are covered. Unlike the giraffe, the female okapi is hornless.

In coloration the okapi is truly remarkable. The forehead is red, the cheeks are yellowish white, while the neck, shoulders, and body range from jet-black to purplish and wine red. The hind quarters and the hind and fore legs are either snowy white or light cream color, touched with orange and transversely barred with purplish black stripes and blotches.

Little is known concerning the habits of the okapi except that it dwells in dense primeval forests, where it feeds upon an undergrowth of swamp-loving plants. Observers affirm that it would be impossible to distinguish an okapi in its native haunts at a distance greater than 25 paces. This suggests that the peculiar coloration of this animal is of a purely protective type. Indeed, this effective natural "camouflage" may serve, in part, to explain why so large an animal remained so long unknown to the scientific world. See *Giraffe.*

Opossum (*Didelphidæ*). The opossums constitute a family of pouch-bearing mammals, belonging to the order *Marsupialia*. They range throughout the wooded districts of America, from the southern boundary of Texas to the valley of the La Plata, where they are most numerous. One species, however, the Virginia opossum (*Didelphis virginiana*), is found in North America, from Florida to the Hudson river, and west to the Missouri.

The opossums are ratlike in form; the largest species are about equal in size to a cat. The long tail, which is almost destitute of hair, is very useful. From its prehensile nature, it enables the animal not only to hang by it but also to climb and to descend trees. The opossums are sly and intelligent, and live chiefly in trees, hiding in the daytime and roaming abroad at night in search of their food, which consists of fruit, insects, small reptiles, and birds' eggs. Some species have no marsupium, or pouch, or one which is only very slightly developed. In the case of the murine opossum (*Marmosa murina*), a South American species about the size of a chipmunk, the young, on leaving the nipples, are carried on their mother's back, retaining their position by entwining their tails around hers.

When caught, the Virginia opossum feigns death, whence the common expression "playing 'possum."

Orang-utan (*ō-răng'ōō-tăn'*) (*Simia satyrus* or *Pongo pygmæus*). A large, manlike ape, with brick red hair, brown skin, and small ears, native to the swampy forests of Sumatra and Borneo. According to W. T. Hornaday, the largest specimen on record stood 4 feet 6 inches in height from heel to head, measured 42 inches around the chest, and between the finger tips stretched 8 feet. The weight of a full-grown male orang may reach 250 pounds. The legs are very short, the arms disproportionately long, reaching to the ankle when the animal is placed in an erect position. The males have a longish beard, and they sometimes develop warty protuberances, called cheek callosities, on each side of the face. The resemblance to man in appearance is greatest in the females and in young animals.

In its native home, the orang-utan lives in the tree tops and seldom descends to the ground except for water. Instead of leaping from tree to tree like the monkey, it swings from one branch to another with great accuracy. In its wild state the orang makes a nest of leafy branches laid crosswise in a forked tree. It sleeps lying flat on its back on this nest, grasping an overhead branch with both feet and hands for security. In captivity the orang-utan has been taught to wear clothes and to imitate various actions of men. See *Ape*, *Chimpanzee*, *Gorilla*.

Orioles (*Icterus*). The American orioles, or "hangnests," comprise a group of perching birds closely allied to the bobolink and the blackbird. There are about 50 species, mostly confined to the tropics, noted for their richly colored plumage, pleasing song, and skill in weaving nests. All are solitary, tree-loving birds, living in pairs, and feeding chiefly on noxious insects, and thus are highly beneficial to the farmer and fruit grower.

Some 8 species of orioles occur in the United States. Of these, the best-known is the handsome Baltimore oriole (*I. galbulus*), called also "firebird," "golden robin," and "hangnest." It is about 7½ inches long, with the head, neck, throat, and upper back black, and with the breast, wing coverts, and lower parts bright reddish orange. It breeds from Saskatchewan to New Brunswick and southward, building a long, skillfully constructed, bag-shaped nest, usually suspended from slender branches 8 to 50 feet from the ground. It lays from 4 to 6 pale brown eggs, variously spotted and lined with dark brown.

Ostrich (*Struthio*). The largest of living birds, standing nearly 8 feet high and weighing about 300 pounds. It belongs to the natural order *Ratitæ*, which includes other large flightless birds, such as the rhea, the emu, and the cassowary. In these birds the breastbone is raft-shaped, and lacks the narrow keel which is present in birds of flight.

The wings of the ostrich are rudimentary, with long, bending, soft plumes. The legs are long and powerful, with the thigh partly bare; the neck is slender and naked; the head is small with a short, broad beak. Ostriches are unique among birds in that they have only two toes on each foot. While formerly covering a much wider area, they now range over the desert countries from Arabia and Syria to South Africa. Some authorities recognize four species; others regard all of these as forms of the northern ostrich (*S. camelus*), mentioned by Aristotle and also in the Bible.

In habit, ostriches are gregarious, going about in small companies. At breeding time they are polygamous, each male accompanying three to five females, all of which deposit their eggs in a single large nest scooped out in the sand. Almost the entire duty of guarding and sitting upon the eggs is performed by the male. Ostriches are omnivorous, feeding upon herbage, seeds, fruits, small mammals, birds, lizards, and snakes. The voice of the ostrich resembles the roar of a lion, though its most common sound is an angry hiss.

The ostrich is perhaps the swiftest of all land animals, covering 25 feet or more at a stride and attaining a speed of 60 miles an hour. Its proverbial foolishness in hiding its head in the sand, and thinking it is thereby concealed, is one of the many myths that have been discredited by modern science. In fact, the ostrich is a very alert and wary bird, and, except for its habit of running in a circle, could rarely be captured.

While the ostrich has been partially domesticated for centuries by native tribes of Central Africa, ostrich farming for the commercial production of plumes was unknown prior to 1860. South Africa is the chief center of this industry. See *Cassowary*, *Emu*, *Rhea*.

Otter (*Lutra canadensis*). An aquatic fur bearing animal with webbed feet, closely related to the marten, inhabiting lakes and streams and feeding on fish. It is about 4 feet long with a rather stout body and a strong, flattened tail adapted for swimming. In color it is dark brown above and lighter below. The otter makes burrows in the banks of streams, with the entrance under water. Although an expert swimmer and diver, it is awkward upon land. While formerly widely distributed north of Mexico, it is now most numerous in Canada. Otter fur is highly prized, and, wherever the animal is numerous, forms an important article of commerce.

Ovenbird (*Seiurus aurocapillus*). A small song bird of the warbler family, abundant in woodlands in eastern North America, called also "golden-crowned thrush." The ovenbird is about 6 inches long, olive green above and white below, with buff and black on the head. It is noted for building a bulky, oven-like nest of coarse grasses, which it places on the ground, with the entrance at one side. Several small South American birds of the genus *Furnarius*, which construct huge globular nests of mud, are also called ovenbirds.

Owl. A nocturnal bird of prey, resembling the hawks and eagles in the shape of its bill and feet, but more closely allied to the goatsuckers in structure. The head is extremely large; the eyes huge and directed forward; the bill short and stout; the ears very large; the legs feathered; the toes four in number, the outer one capable of being directed backward. The plumage is full and remarkably soft, the feathers of the face being so arranged as to form two disks around the eyes.

More than 400 species and subspecies of owls are known, forming the distinct group or suborder *Striges*. They range over the whole of the globe from the highest northern latitudes and are found

in the remotest oceanic islands. Owls vary in size from the gray owl of polar regions, 28 inches long, to the curious elf owl of Arizona, less than 6 inches long. They feed on small mammals, birds, fishes, and insects, swallowing the hair, bones, feathers, and scales, which they afterward disgorge in the shape of "pellets." Their flight is buoyant and noiseless. They place their nests on the ground, among rocks, in hollow trees, and in buildings, while some resort to the old nests of other birds. They lay from 2 to 5 roundish white eggs.

Of the 18 species which occur in North America, among the best-known are the long-eared owl, short-eared owl, barred owl, great horned owl, snowy owl, screech owl, burrowing owl, elf owl, and barn owl. With the exception of the great horned owl, which is very destructive to poultry, owls are beneficial to agriculture, as they prey upon mice, rats, gophers, English sparrows, and other noxious animals.

Ox (*Bos taurus*). The common ox is believed to be a domesticated form of the wild ox or aurochs (*Bos primigenius*), abundant in historic times in Europe and western Asia.

As a beast of burden and as a draft animal, the ox long preceded the horse, which, among primitive peoples, was chiefly employed for war or the chase. The ox is mentioned early in the Bible, is pictured on ancient Egyptian monuments, and is often referred to by classic Greek and Roman writers. Its introduction into the New World was first made by Columbus, who brought it to the West Indies in 1493. It was taken from Spain to Mexico about 1525; from England to Virginia in 1610, and to Massachusetts in 1624; from Holland to New York in 1627; and from Denmark to New Hampshire in 1631.

The ox is the chief source of wealth in many regions. While the horse now ranks first as a labor animal, the ox ranks first as a food producing animal. The total value of cattle products, including beef, butter, cheese, milk, and hides, immensely exceeds that of the products of any other animal. In intelligence and mental power, the ox is far inferior to many animals of relatively small value to man. Age-long domestication, while it has produced many valuable breeds, has not brought about extreme variations in size and form, as has been the case with the dog, the donkey, the horse, or the zebu. Intensive breeding during the last two centuries has produced such valuable specialized breeds as the Hereford, Alderney, Jersey, and Shorthorn. See *Banteng*, *Bison*, *Buffalo*, *Gaur*, *Gayal*, *Ox Family*, *Yak*, *Zebu*.

Ox Family (*Bovidæ*). The largest family of hoofed mammals, embracing some 200 known species of hollow-horned ruminants, including the antelope, bison, buffalo, goat, sheep, and the various kinds of cattle. It is distinctly an Old World group, being represented in the New World by only 8 species, all North American. There are no native representatives of the Ox family in Australia or in South America. In the continent of Africa, however, about 140 species occur, or about two-thirds of the entire group. It contains more animals of great economic value to man than any other single family, including the ox, sheep, goat, zebu, water buffalo, gaur, gayal, banteng, and yak.

Oyster (*Ostrea*). A bivalve mollusk, found in nearly all seas, usually near shore, in from about 15 to 35 feet of water. There are upwards of 50 species, of which the common European oyster (*O. edulis*) and the American oyster (*O. virginiana*) are the best-known and most highly prized for food. The Pacific oyster (*O. lurida*) is a small, thin-shelled species, marketed principally on the Pacific coast. The young oyster is at first a free-swimming organism which, after a short time, develops a shell and attaches itself to stones or other hard objects upon the sea bottom. Very commonly it adheres to adult shells, and thus are formed the large masses termed oyster banks. The oyster feeds upon minute plants and animals brought to it by the tide and other water currents.

Oyster culture consists of hatching young, or "seed," oysters, and transplanting them at the proper time to artificially prepared beds where they grow to marketable size. They are then gathered from the beds by means of rakes, tongs, and dredges. Oyster culture is now carried on along various coasts of Europe and very extensively on the Atlantic coast of the United States, particularly in and near Chesapeake bay. See *Pearl*.

Pangolin (*păng-gō'lĭn*) (*Manis*). A small group of burrowing edentate mammals, native to Asia and Africa, often called the scaly anteaters. Like the true anteater, the pangolin has a long, narrow, pointed snout, a toothless mouth, and an extensile tongue. The upper parts of the body and tail are completely protected by large, overlapping, horny scales. The limbs are stout and provided with curved claws suitable for digging. The pangolins are nocturnal, and subsist chiefly upon ants and termites which they capture with their long, glutinous, retractile tongue. When attacked, the pangolin, like the armadillo, rolls itself into a ball completely encircled with horny scales, which defies the attack of most animals. See *Armadillo*.

Panther. In the Old World, a name applied to certain colored varieties of the leopard (*Felis pardus*). In eastern North America, particularly in colonial days, the word panther was commonly used to designate the puma, or cougar, also locally called "painter," "catamount," and "mountain lion." See *Puma*.

Parrot. The name broadly applied to all birds of the order *Psittaci*, which comprises about 600 species, including the parrots proper, the cockatoos, parrakeets, macaws, lories, and nestors.

The true parrots have the upper mandible toothed and longer than it is high, a short and rounded tail, and short, strong feet with two toes before and two behind. These birds combine with the beauty of their plumage a nature of great docility, and have the faculty of imitating the human voice to a degree not possessed by other birds. They are found chiefly in the tropics, and are especially numerous in Africa, the native home of the gray parrot, which is the favorite and best-known species. South America, which is also rich in species, furnishes the well-known green parrot. North America is the home of only two species, the Carolina parrakeet, now rare, and the thick-billed parrot of southern Arizona. The parrots are forest birds, and are adepts at climbing, using for that purpose not only the feet but also the bill. Their food consists of seeds and fruits. They usually nest in hollow trees, and lay from 2 to 5 white eggs.

Parrots were introduced into ancient Europe from Asia through the conquests of Alexander the Great, and are mentioned by Aristotle, Ovid, and other classic writers. In equatorial Africa the gray parrot (*Psittacus erythacus*) has been domesticated for centuries by the native peoples, who rear it as a pet, make use of its flesh for food and of its feathers as insignia of rank. This sober-plumaged bird is the most easily taught of all the parrots, and its powers of speech are sometimes remarkable. See *Cockatoo*, *Macaw*.

Partridge. A popular name for various gallinaceous birds or other birds resembling them in appearance. The name partridge was first given and rightly belongs to certain small, grouselike birds of the genus *Perdix*, found only in the Old World. In New England the ruffed grouse (*Bonasa umbellus*) is called partridge. In the Southern states the bobwhite, or American quail (*Colinus americanus*), is known as partridge and the ruffed grouse is called pheasant.

The American birds most closely resembling the

Old World partridges are Gambel's partridge and the mountain and valley partridges of California, which are also widely known as quails. In India and South Africa the name partridge is given to various francolins, and, in South America, tinamous are called partridges. The common partridge of Europe and central Asia (*Perdix cinerea*) is about a foot long, reddish brown mixed with gray in color, and frequents open grounds, cultivated fields, and heaths. It is a standard game bird throughout its range. See *Bobwhite* and *Grouse*.

Passenger Pigeon (*Ectopistes migratorius*). An American wild pigeon, at one time very abundant in the Mississippi valley and in the states eastward and northward to Hudson bay, but now probably extinct. The passenger pigeon is 16 inches long, with a ruddy breast, blue-gray back, and a pointed tail. In the early days of the United States these pigeons were so numerous that at times the flocks covered the entire view for hours at a time. As late as 1860 they were still so plentiful that, when migrating in the spring or autumn, flocks were visible almost constantly at all hours of the day. When roosting at night their weight broke down large branches and even small trees. Advantage was taken of this gregarious habit to kill them, when sleeping, in great numbers.

The nesting places of the passenger pigeon were often of vast extent. One near Shelbyville, Kentucky, was several miles wide and 40 miles long. The last nesting place in western New York, which was located near Olean, in 1868, extended for 14 miles. In 1876 there was a nesting place in Michigan 28 miles long and 3 or 4 miles wide. In 1911, the passenger pigeon was so nearly extinct that the American Ornithologists' Union made an organized effort to discover and save the remnant then living, and rewards aggregating over $2000 were offered for the discovery of undisturbed nestings. In 1914 what was supposed to be the last survivor died in the zoological gardens at Cincinnati.

Peacock (*Pavo cristatus*). A large bird of the pheasant family, somewhat smaller than a turkey, native of India and Ceylon. It is distinguished by its gorgeous plumage and exceedingly long tail. The upper tail feathers are elongated into a magnificent train, which can be spread out like a fan, beautifully marked at the tip with eyelike or moonlike spots and glowing with iridescent tints of green, gold, bronze, and blue. The wild peacock lives in warm, wooded districts, roosting on high branches, nesting on the ground, and laying a single clutch of from 12 to 18 eggs yearly.

The peacock has been domesticated since very ancient times in India, where it is still reared in immense numbers for its flesh and eggs. From India the peacock spread widely throughout the world. According to the Bible, it was brought in ships from Tarshish to Palestine at the time of Solomon. In classic mythology it became the bird of Juno. Aristophanes mentions the peacock in his plays, and it became well known in Greece after Alexander's expedition to India. By the Romans, peacocks' brains and tongues were served as delicacies at the most sumptuous feasts. During the middle ages, peacocks were often placed on the tables of royalty.

Pearl. A beautiful concretion, usually rounded in form, with a brilliant luster, produced within the shells of pearl oysters, river mussels, and other mollusks. A true pearl takes form in a pearl sac, but, it is believed, a tiny grain of sand or other foreign body must be present as a nucleus about which layers of hard, smooth nacre are secreted. In Japan the growth of pearls in oysters is promoted by skillfully removing the pearl sac, inserting a fragment of fresh water mussel as a nucleus, and transplanting the sac into another oyster, which is planted in a known spot and left for five years. It is then recovered, and the pearl is taken from the oyster.

Pearls occur in many forms, from spherical to irregularly oblong, and their color varies from black to gray, blue, yellow, pink, and white, the finest having a silvery or a satiny luster. When of proper size, shape, color, and luster, pearls are of great value as jewels. The most highly prized are perfectly round or pear-shaped, pure white or nearly translucent, with a delicate iridescent sheen. The choicest pearls are obtained from the Persian gulf and on the coasts of the Philippines, various Polynesian islands, Australia, and Lower California.

Excellent pearls are obtained from various kinds of fresh-water mussels in the Mississippi and the Ohio valley in the United States. Pearl fishing, which often requires the work of expert divers, is an important local industry in many regions.

The most perfect pearl is said to be "La Pellegrina" in the Museum of Zosima in Moscow, a globular Indian pearl of unusual beauty, weighing 28 carats. A somewhat irregularly shaped pearl in the Victoria and Albert Museum, London, is said to be the largest known. It measures 2 inches in length, 4½ inches in circumference, and weighs 3 ounces.

Peccary (*Dicotyles*). An American mammal of the swine family, related to the wild boar of Europe. Peccaries are found from southwestern United States, southward through Mexico and Central and South America. In appearance, the peccary much resembles a small, slender-legged pig, but differs in having only three toes on its hind feet, and no visible tail. Both jaws are fitted with long tusks, and, when enraged, the animal fights with great courage and ferocity. Its food consists chiefly of nuts, seeds, and fruits, but it also eats small animals and carrion. The peccary is provided with a musk gland on its back, which gives the flesh a strong flavor, but, if this gland is removed as soon as the animal is dead, the meat is palatable.

The collared peccary (*D. torquatus*), about 3 feet long and 16 inches high, blackish gray in color with a white band encircling the neck, is found from Arkansas and Texas southward to Patagonia. It lives chiefly in forests, usually in pairs or in small parties. See *Swine*.

Pelican (*Pelecanus*). A group of large fish-eating birds possessing an enormous bill, with an elastic pouch under it, used as a scoop net to catch fish.

Pelicans range from 4 to 6 feet in length, have short legs, completely webbed feet, and very large, strong wings, which often have a spread of nearly 10 feet. There are about 10 species, widely distributed throughout temperate and tropical regions, 3 of which are found in North America. All are birds of very odd form and striking color. They thrive in captivity and are amiable, sociable, and harmless. At breeding time, pelicans nest in communities, usually on islands. The pure white eggs, 3 or 4 in number, are deposited in crude low nests. The young are fed by the regurgitated food of the parents.

The beautiful white pelican (*P. onocrotalus*), 5 to 6 feet long, with a wing spread of about 9 feet, abundant in the Mediterranean region, was well known to the ancients. The American white pelican (*P. erythrorhynchos*), similar in size, is one of the most handsome and dignified of American birds. While formerly ranging throughout North America from Hudson bay southward, it is now rare except in the interior, where it breeds from Minnesota to northern Saskatchewan.

The brown pelican (*P. fuscus*), 4 feet long, nests abundantly in Florida and along the Gulf coast, sometimes straying northward to Illinois and New England. The similar California brown pelican (*P. occidentalis*) ranges from British Columbia to the Galapagos islands.

Penguins (*Impennes*). A remarkable group of flightless birds, found only in antarctic regions. They differ from all other birds in that their wings

are modified into swimming paddles, for which they are exclusively used. There are about 20 species, living on the shores of southern oceans, being very abundant in the Falkland islands. In size they range from the blue penguin (*Eudyptula minus*) of Australia, which is 16 inches long, to the great emperor penguin (*Aptemodytes forsteri*) of the antarctic continent, which attains a length of 48 inches and a weight of 60 to 75 pounds.

Penguins are essentially sea birds, feeding chiefly upon fishes and crustaceans. They are excellent swimmers and really fly under water, using their wings as fins. Their bodies are covered with short, stiff, scalelike feathers. Penguins are rarely seen on land except at breeding season, when they congregate in vast rookeries. On land they stand very erect, with drooping wings. They walk clumsily with a peculiar gait. The eggs, usually two in number, are laid on the ground or in holes. Both parents take part in hatching them and attend to the needs of the young with great care.

Perch (*Percidæ*). A large family of fresh-water fishes, found chiefly in northern regions. The yellow perch (*Perca flavescens*) occurs in lakes and ponds from Maine to Minnesota. It is golden yellow or umber brown in color, measures 7 to 12 inches in length, and weighs from ½ to 3 pounds. Along the greater lakes it takes rank as a market fish.

The Yellow Pike-Perch (*Stizostedeon vitreum*), often called "yellow pike" and "wall-eyed pike," is not a pike. The pike-perches have two prominent dorsal fins, while the true pikes, related to the pickerel and muskellunge, have only one. The yellow pike-perch is abundant in many lakes and streams from Lake Champlain to Saskatchewan and southward nearly to the Gulf states. It is usually dark olive above and mottled below, 1 to 3 feet in length, and often weighs from 10 to 20 pounds. It is highly esteemed as a food fish.

Petrel (*Procellariidæ*). A well marked group of strictly oceanic birds, with long narrow wings, webbed front toes, and tubular external nostrils. The petrels take their name from the habit of appearing to walk on the water, as the Apostle Peter is said to have done, the Latin name *petrellus* meaning "little Peter."

There are about 100 species, most numerous in southern oceans, of which more than 30 have been found to occur in North America. All are sooty black or grayish, and more or less marked with white. They literally live on the open sea, never venturing on land except at breeding time. Most petrels nest in holes among rocks or in clumps of grass, though some burrow in the ground, and they lay only one egg. They often follow a ship for days, seemingly without rest. The stormy petrel (*Procellaria pelagica*), called "Mother Carey's chicken," the smallest of web-footed birds, only 5½ inches long, occurs on both sides of the Atlantic from the latitude of Newfoundland northward.

Phainopepla (*fā-ĭ'nō-pĕp'lȧ*) (*P. nitens*). A handsome crested bird, closely related to the waxwings. It is about 7 inches long, with silky blue-black plumage marked with white wing patches, and is found from western Texas to Utah and California and southward. It builds a compact, saucer-shaped nest in elders, pepper trees, oaks, and blue gums, laying 2 or 3 whitish, thickly spotted eggs, and feeds upon berries and insects. It is a dashing, vivacious bird of fine presence and pleasing song.

Pheasant (*fĕz'ănt*) (*Phasianus*). The true pheasants, of which there are about 30 kinds, all natives of Asia, are among the most gorgeous of the entire feathered tribe. They are of large size, usually from 30 to 70 inches in length, inclusive of the very long tail. In the male, the naked skin on the sides of the head is bright red, and each leg is provided with a pair of spurs.

The common pheasant (*P. colchicus*), widely naturalized in Europe and elsewhere, is now a standard game bird in many countries. In Europe it is reared in enormous numbers in great game preserves for the annual shooting season. About 12 different species have been introduced into North America, including the ring-necked pheasant, the golden and the silver pheasant from China, and the copper and the green pheasant from Japan.

Various hybrids between the common pheasant and the ring-necked pheasant (*P. torquatus*) have been reared in more than half of the States. Some of these have become thoroughly naturalized in Oregon, Washington, western New York, and elsewhere. They live and breed in open woods and thickets, and sometimes mingle with barnyard fowls. They roost in trees like turkeys. Their flesh and eggs are excellent eating.

Pheasants nest on the ground and usually lay 10 or more olive brown eggs in a slight depression among the leaves. Like the domestic fowl, they feed chiefly on seeds, berries, young shoots of plants, worms, and insects.

Phœbe (*Sayornis phœbe*). A familiar North American flycatcher often called "pewee." It nests on beams or rafters and under bridges or banks from North Carolina to Manitoba and Newfoundland, wintering southward to Cuba and Mexico. The phœbe is about 7 inches long, grayish olive brown above, with a dark crown, wings, and tail, and with white outer tail feathers. It builds a nest of mud and moss, lined with grasses and hair, and lays 4 to 6 usually pure white eggs. This confiding bird feeds chiefly on injurious insects. The smaller black phœbe (*S. nigricans*), black above and white below, is a handsome Pacific Coast species.

Phosphorescence. The emission of light by certain animal tissues was so called because it was formerly thought to be due to the presence of phosphorus. Its chemical cause is unknown, although it is thought that oxygen plays a necessary part in the production of this light. It is especially remarkable for the fact that it is not attended by the evolution of heat, and so is the most economical light known. The colors of animal light include white, green, blue, red, and lilac.

Among the more noteworthy examples of luminous animals are the firefly, the lantern fishes, and the transparent pelagic animals that float on the surface of the tropical seas. Lantern fishes are usually found at great depths, and frequently bear a light-giving area on their heads, by which their surroundings are illuminated. The production of light is said in some cases to serve the purpose of terrifying enemies and, in others, of attracting attention during the mating season.

Pigeon. The family of the true pigeons or doves (*Columbidæ*) embraces fully 500 species, widely distributed throughout the world but most numerous in Australia and in tropical islands. They have four toes all on the same level, the rather slender bill is deeply grooved, and the nostrils end in a soft, fleshy membrane. In temperate regions pigeons are plainly colored, but in the tropics their plumage is often gorgeous, with striking colorations of green, red, yellow, violet, and blue.

Pigeons are strictly monogamous, and the sexes share alike in the work of nest making, incubating, and caring for the young. The nests are usually placed in trees, and the eggs, almost invariably two in number, are uniformly pure white. The young are hatched naked and are fed with food regurgitated from the stomachs of the parent birds. Pigeons are vegetarian feeders, living chiefly upon grains, seeds, and fruit. Unlike other birds, they keep the bill immersed when drinking. Their soft low notes are well described as cooing. They are usually classed as game birds and are much hunted for their excellent flesh.

About 12 species occur in North America. Of these, 8 are confined to the southern borders of the United States. Those of wider range are the familiar

mourning dove, common from Canada to Cuba, the little ground dove of the Southern states, the band-tailed pigeon of western North America, and the rare or perhaps extinct passenger pigeon, formerly enormously abundant from Hudson bay southward.

The domestic pigeon or dove has long been regarded as a direct descendant of the wild blue pigeon, or rock dove (*Columba livia*), of Europe and Asia, but recent investigations seem to indicate a mixed parentage. Its domestication is prehistoric. According to Lepsius the earliest record of the domestic pigeon in Egypt dates to 3000 B. C. Frequent reference is made to it in the Bible, and the early Christians adopted the dove as a symbol of the Holy Spirit. Domestic pigeons are said to have reached Greece by way of Syria about 400 B. C., whence they spread to Rome and other parts of Europe.

Ages of selective breeding have developed more than 250 varieties of the domestic pigeon, including pouters, tumblers, fantails, rough-footed pigeons, and homing or carrier pigeons. While valuable for food, pigeons are now kept chiefly as pets and ornamental birds. See *Carrier Pigeon, Passenger Pigeon.*

Pike (*Esox*). A genus of slender, long-snouted, voracious fishes, widely distributed in the northern hemisphere. The common pike (*E. lucius*), found from the northeastern United States to Alaska, 2½ to 4 feet long, sometimes exceeds 40 pounds in weight.

The Muskellunge (*E. masquinongy*), of the Great Lakes region, is a splendid game fish, attaining a length of 6 feet and a weight of 75 pounds or more. It is a good fighter when hooked and tries the skill of the best anglers. The Chautauqua Muskellunge (*E. ohiensis*), called also salmon pike, of Chautauqua lake and the Ohio valley, sometimes 5 feet long, is a good food fish. It has been successfully propagated by fish hatcheries.

The Chain Pickerel (*E. reticulatus*), common in lakes and ponds east of the Alleghenies, attains a length of 30 inches and is a fair food fish. The Little Pickerel (*E. vermiculatus*), of the Mississippi valley, rarely exceeds a foot in length.

Platypus (*Ornithorhynchus anatinus*). An Australian animal, called also "duckbill," intermediate between mammals and birds. It has webbed feet and a flat bill like a duck; the body is about a foot long and covered with soft brown fur, intermingled with longer hairs; the tail is broad, flat, hairy above and naked below.

The platypus is a nocturnal animal, frequenting quiet pools and streams and therefore not easily found. It digs deep burrows in banks in which it builds a nest and lays two ovoid white eggs, each less than an inch long, with strong, flexible shells. The young, which at first are blind and hairless like young mice, are suckled for some weeks by the mother. The food of the platypus is mostly animal and consists largely of water insects. See *Monotremata.*

Plover. A group of shore birds, closely related to the snipes and sandpipers. They are mostly from 7 to 11 inches long, with a small pigeon-like bill, large, rounded head, short neck, long and pointed wings, moderately long legs, and usually only 3 toes. Plovers frequent marshes, tide flats, sandy, open grounds, and plains, feeding on insects, worms, and other small forms of animal life.

The golden plover (*Charadrius dominicus*) is 10 inches long, with black upper parts spotted and margined with golden yellow. It breeds in the arctic regions, building a crude nest in the sand at the edge of seabeaches, in which it lays about 4 brownish buff eggs splotched with brown. It migrates southward over nearly all North and South America, wintering from Florida to Patagonia. Six species of ringed plover occur in the United States, the largest of which is the familiar killdeer. The so-called crocodile bird is the Egyptian spur-winged plover. Several of the plovers are highly prized table birds.

Polar Bear (*Thalassarctus maritimus*). A tall, powerful arctic species of bear, with thin sides, long legs, and flat, wide, hairy paws. It stands more than 4 feet high and has a length of over 7 feet. Its color is creamy white at all times of the year. The home of the polar bear is the ice packs and the barren islands of the arctic zone, where it wanders at will, living upon fish, seals, walruses, and the scanty vegetable matter of frigid regions. It is a powerful swimmer, and is sometimes seen in the open sea many miles from land. While formerly reputed very ferocious, the polar bear rarely attacks man, unless brought to bay or made fierce by extreme hunger. See *Bear.*

Polecat. A name given to several small animals of the weasel family, but properly applied only to the European marten (*Putorius fœtidus*). The true polecat is dark brown in color and about 17 inches in length. It is a nocturnal animal, sleeping during the day and searching for its prey at night, being especially destructive to poultry, rabbits, and pheasants. It has glands secreting a fetid fluid, somewhat like that of the American skunk, which it ejects when irritated or alarmed. The fur of the polecat, which is exported in large quantities from northern Europe, is known as that of the fitch. Its hairs form a superior kind of artists' brushes. In America the skunk is sometimes called a polecat. See *Skunk.*

Porcupines. Rodent mammals whose bodies are covered, especially on the back, with so-called quills, or dense, solid, spinelike structures, intermixed with bristles and stiff hair. In their usual position the spines lie nearly flat, with their points directed backward. When the animal is excited, the spines are capable of being raised, and form an effective defense against the attack of nearly all animals. The quills, which are barbed at the point, are loosely inserted in the skin. On being violently shaken, they may become detached. Under no circumstances, however, can porcupines actually shoot their quills. The true porcupines of the Old World live in burrows or in caves in the rocks. The American porcupines differ in being largely arboreal in their habits.

The Canada porcupine (*Erethizon dorsatus*), about 2½ feet long, with yellowish white spines, is found in wooded districts from New England to Ohio, north to Hudson bay. It is a slow-moving, dull-witted animal, living either on the ground or in tree tops, and feeding chiefly upon bark, buds, and fruit, often remaining in a tree until it has stripped off all the bark. Porcupines delight to prowl about camps, eating every piece of leather or of greasy or painted wood which they can discover. See *Hedgehog.*

Porgy (*Stenesthes chrysops*). A spiny-finned sea fish, often called "scuppaug" or "scup," found along the eastern shores of the United States. It is a much esteemed food fish, attaining a length of 18 inches and a weight of 4 pounds. The larger but closely related Sheepshead (*Archosargus probatocephalus*), marked with vertical bands of black, weighs from 6 to 20 pounds. It is an excellent table fish, occurring along the Atlantic and Gulf coasts. In California, the surf fish, or white perch (*Damalicthys argyrosomus*), is sometimes called porgy.

Porpoise. A marine, fishlike mammal, belonging to the same family as the dolphin, and to the order *Cetacea.* The common porpoise (*Phocæna communis*), usually 4 to 5 feet in length, is an inhabitant of northern seas. In color it is mostly jet-black above, merging into pink, mottled gray, or white beneath. The porpoise is compelled continually to seek the surface of the water in order to breathe. It is then observed rolling over, as it were, and is heard discharging air from the blowhole on the crown of the

head, at the same time taking in a fresh supply at the mouth. From this habit arises the popular expression "to blow like a porpoise."

Prairie Dog (*Cynomys*). A small rodent mammal of the squirrel family, so called because its cry somewhat resembles the bark of a small dog. The common prairie dog, or American marmot (*C. ludovicianus*), was formerly enormously abundant on the plains east of the Rocky mountains from the Canadian border to the Rio Grande. It is about a foot long, with a tail of 4 inches, and in color is reddish brown, variegated with gray. Prairie dogs are very alert and active animals. They live together in societies on the prairies, excavating burrows contiguous to each other, and often forming immense colonies, called prairie dog "towns," sometimes miles or scores of miles in extent. The widely current story that the prairie dog lives in peace and harmony in the same burrow with the rattlesnake and the burrowing owl is a myth.

Primates. The highest order of mammals, including man, the anthropoid apes, monkeys, and lemurs. They are characterized by the presence of well-developed clavicles, two pectoral mammæ, and by eye orbits encircled by bone and directed forward. In at least one pair of limbs the innermost digits of the hands or feet are opposable to each other, and usually they are opposable in both pairs of limbs. The fingers and toes bear flat nails, very rarely claws. Except in the lemurs, the brain is of a high type, with a large, much convoluted cerebrum covering the cerebellum.

Exclusive of man, the primates are chiefly tree-dwellers, and are admirably adapted for such a mode of life. The tail is often long and sometimes prehensile, serving as an additional hand in climbing and in swinging from tree to tree. While mostly small, or of medium size, some of the apes are heavier and stronger than man. As to food, they are omnivorous, but subsist chiefly upon fruits, berries, and other vegetable products.

The primates consist of two distinct suborders, the *Lemuroidea*, with foxlike muzzles and rodent-like teeth, containing the lemurs and their near allies, and the *Anthropoidea*, which includes the marmosets, monkeys, baboons, apes, and man. There are about 260 species, chiefly natives of tropical forest regions. See *Ape*, *Baboon*, *Chimpanzee*, *Gorilla*, *Monkey*, *Orang-utan*.

Pronghorn (*Antilocapra americana*). A small, hollow-horned ruminant, intermediate between the antelopes and giraffes, found only in North America, and popularly called antelope. It differs from the true antelopes and from all other bovine animals in having a branch or prong on its horns. Like the deer, it sheds its horns periodically.

The pronghorn stands about 3 feet high at the shoulder, has a slender neck, and carries its head erect. Both sexes possess horns, sometimes a foot long, which rise directly upward above the eyes. In general color the pronghorn is chestnut above and white below. It associates in herds, and, although a shy, timid animal, it never skulks or takes to cover, but trusts for safety to its remarkable speed, which exceeds that of any other North American animal.

While formerly very numerous on the plains and plateaus from Mexico to Saskatchewan and westward to the Pacific, the pronghorn has been practically exterminated except in limited areas. See *Antelope*.

Protective Coloring. Color is one of the most valuable agencies in the survival of many animals. In most instances, it serves to conceal the animal in its natural environment, enabling it to elude the notice of its enemies. This effect is seen, for example, in the white fur of arctic animals, which resembles snow; in fish, whose coloring above resembles the beds of streams and that on the lower part of the body resembles the water surface as it appears from beneath; and in the tiger, okapi, and other tropical animals, whose markings frequently resemble the effect of sunlight shining through rank vegetation. The chameleon and certain fish are able to alter their color rapidly with a change of environment. Many subarctic animals have a darker color in summer than in winter.

Another type of protective coloring is found in the apparent mimicry of one animal by another. Thus certain palatable beetles of the family *Cerambycidæ* resemble very closely in color pattern various wasps and unpalatable beetles, and so are avoided by birds that might otherwise eat them.

Protozoans. The protozoans are minute, microscopic, aquatic animals, each of which consists of a single cell. They constitute the lowest or most primitive forms of animal life. The body, like any other animal cell, is a mass of protoplasm which contains one or more nuclei. While lacking distinct organs, protozoans nevertheless perform all the essential functions of the animal body. They possess the power of motion; engulf and assimilate food; respond to external stimulation, such as that of light and heat; and reproduce their kind.

Protozoans feed upon many forms of organic matter, both plant and animal, living or dead, and a large number are parasitic. Many of the parasitic forms are the cause of disease in man and in animals. For example, the *plasmodium*, when introduced into the human blood by the bites of mosquitoes, produces malaria. Various *trypanosomes*, which are transmitted by certain kinds of flies, produce the deadly sleeping sickness in man and the fatal surra and nagana diseases in horses and cattle. See *Amœba*.

Ptarmigan (*tär'mĭ-găn*) (*Lagopus*). A group of circumpolar grouse. They are remarkable for the seasonal changes of their plumage, which varies from black, brown, buff, and gray in summer, to pure white in winter. There are about 15 species and varieties, most common in arctic America. The white-tailed ptarmigan (*L. leucurus*), 14 inches long, inhabiting alpine summits of the Rocky mountains from Alaska to New Mexico, is the smallest and handsomest species. Other species include the willow ptarmigan (*L. lagopus*) and the rock ptarmigan (*L. rupestris*). The Red Grouse (*L. scoticus*), confined to Great Britain, is the only ptarmigan which does not turn completely white in winter.

Puma (*Felis concolor*). A large animal of the cat family (*Felidæ*), sometimes called cougar, peculiar to America, where it ranks next to the jaguar in importance as a destructive or dangerous creature. It is known also as the American or mountain lion, probably from its resemblance in build and color to the lioness; but it is much smaller in size and lacks the lion's mane. Its length is 7 to 8 feet from nose to tip of tail; its height is about 2 feet.

The geographical range of the puma is very extensive. It is found in the Adirondacks and in Florida, and along the Rocky mountains and the Andes from British Columbia to Patagonia. In North America the principal food of the puma is deer, though it seizes upon other smaller animals. While practically exterminated east of the Missouri river, the puma is still found in the Rocky mountains and on the Pacific coast. In western ranching districts it destroys sheep, calves, and colts. It is of cowardly nature, and is not regarded with fear by hunters. Unlike most of the larger members of the cat family, it is remarkably silent; but sometimes when prowling it screams like a terrified child. While the subject of many thrilling tales of adventure, the puma is nowhere known to attack man, even when he is alone and unarmed.

Python. A genus of very large snakes. Like all other members of the boa family (*Boidæ*), they are powerful constrictors, killing their prey by crushing it within the encircling folds of their muscular bodies. They feed almost entirely upon small mammals and birds, which they swallow whole.

While the boas bring forth their young alive, pythons lay eggs, as do most serpents, but with one remarkable difference. After laying from 50 to 100 roundish, white eggs, about the size of those of a goose, the female gathers them into a somewhat cone-shaped pile. She then coils herself around it so that her head rests in the center at the top of the heap. Here she remains on guard without taking food for about two months, when the shells split open and the little snakes appear.

The largest pythons weigh many hundred pounds and possess tremendous strength. Doubtless they could readily overpower and kill almost any large land animal. But their mouths, though extremely distensible, are probably not large enough to enable them to swallow any creature larger than a sheep or a goat, and this only after the bones have been thoroughly crushed.

Except a single Mexican species, the pythons inhabit tropical parts of Asia, Africa, and Australia. They are chiefly tree-dwellers, preferring the vicinity of water, though some live in broken, rocky places.

The reticulated python (*P. reticulatus*), of Indo-China, Sumatra, and Borneo, sometimes attains a length of nearly 33 feet. It is the largest known snake, although it is very nearly equaled by the anaconda. This species is frequently seen in menageries. The Indian python (*P. molurus*), scarcely smaller, is the rock snake of India and Ceylon. The rock python (*P. sebæ*), of tropical and southern Africa, with a small head, is sometimes 15 feet long. The Diamond Snake, or Carpet Snake (*P. spilotes*), a small python of Australia and New Guinea, 6 or 7 feet long, lives in trees near the water and feeds on small mammals and birds. See *Anaconda, Boa.*

Quail. A name applied to several small game birds of the grouse family. In eastern North America the familiar bobwhite (*Colinus virginianus*) is commonly called quail, though in the Southern states it is known as partridge. In the western and southwestern United States there are several species of handsome, crested quails, which are known also as partridges. Among these are the beautiful California quail (*Lophortyx californicus*), Gambel's quail (*Lophortyx gambeli*), the mountain plumed quail (*Oreortyx pictus*), the blue quail (*Callipepla squamata*), called also scaled partridge, and the Massena quail (*Cyrtonyx montezumæ*).

The American birds known as quails are permanent residents and breed wherever found. After the nesting season they often gather in bevies, sometimes in large flocks, and are much hunted by sportsmen. The true Old World quail (*Coturnix communis*), abundant in the Mediterranean region, is migratory. See *California Quail, Grouse, Partridge.*

Quezal (*kĕ-säl'*) (*Pharomacrus mocinno*). The most beautiful species of trogon and one of the handsomest of all birds. It is a native of Central America, especially of Guatemala, of which country it is the national emblem. In size the quezal is about as large as a dove. The male has a crested head, yellow bill, plumage which is metallic green above and brilliant scarlet below, and white tail plumes 3 feet in length.

Before the Spanish Conquest, the quezal was so highly prized by the natives that no one was allowed to kill it, but only to remove its long plumes, which none but chiefs were permitted to wear. Through the demand for its skin and plumes by European milliners, the quezal has become rare. The quezal, like other trogons, nests in hollow trees, and the greenish blue eggs are believed not to exceed two in number.

Rabbit (*Lepus*). A rodent mammal, very similar to the hare, but smaller, with much shorter legs and ears. Unlike the hare, the rabbit usually lives in burrows, and the color of its fur does not change with the seasons. Rabbits are shy animals and very swift of foot, though less fleet than the hares. They are extremely prolific, sometimes producing in a single year 5 or 6 litters of from 3 to 10 young at a time, which in turn reach maturity in about six months. They feed upon grasses, grains, fruits, vegetables, and the bark of trees, and wherever numerous are destructive to growing crops, pastures, gardens, and orchards.

The gray rabbit, or Cottontail (*L. sylvaticus*), found throughout eastern North America, is easily recognized by its fluffy white tail. This rabbit is about 18 inches long, gray above, varied with black tinged with yellowish brown, and white below. The cottontail is the most abundant small game animal in the Eastern states and is much hunted for food. The sage rabbit (*L. artemisia*), a similar species, inhabits high western sagebrush plains.

The domestic rabbit is believed to have originated from the wild European rabbit (*L. cuniculus*). It was probably first domesticated by the ancient peoples of Spain, whence it was brought to Rome about the time of the Cæsars. Centuries of breeding have developed many varieties, among which are the Belgian, lop-eared, Dutch, Angora, Siberian, and Himalayan rabbits. Of these the Belgian rabbit, often wrongly called Belgian hare, is the best-known. Its flesh is excellent and forms a staple article of food in France, Belgium, and England.

About 1850, three pairs of the domestic rabbit were turned loose in New South Wales, Australia, where they multiplied so rapidly as soon to become a public pest. About 1875, this rabbit gained a foothold in New Zealand, and there also immediately became a menace to agriculture. Millions of these rabbits are now killed each year for food and for fur in these countries, but as yet there is no apparent reduction in their numbers. See *Hare.*

Raccoons. A small family (*Procyonidæ*) of flat-footed, flesh-eating mammals, peculiar to America. They are bearlike in appearance but of small size, and include the raccoon, the cacomistle, and the coati.

The common raccoon (*Procyon lotor*) is a pretty animal, about the size of a cat, but much stouter. It has a long brown or grizzled coat, with black facial markings, a ringed, bushy tail, and a pointed nose. Its legs are short and armed with strong claws, useful for digging or climbing. In its attitudes it is somewhat monkey-like and usually sits upon its haunches when feeding, holding its food in its forepaws. It has a curious habit of washing articles given to it, and of soaking food in water before eating it. It is found in wooded districts from Newfoundland to British Columbia and south to Mexico. Its skin is highly valued as a fur, and its flesh is considered a delicacy. Raccoon hunting, usually with dogs, is a favorite sport, especially in the Southern states. See *Cacomistle.*

Racers (*Zamenis*). A numerous genus of slim, graceful, exceedingly active but harmless snakes, found in both the Old and the New World. The Black Snake (*Z. constrictor*), 5 to 6 feet long, uniform slaty black in color, is found from Canada to Florida and westward to the Mississippi. Despite many romantic folk tales, this agile serpent does not crush its prey by constriction, destroy rattlesnakes, or hypnotize birds. It is rather timid, fights only when cornered, and, whenever possible, seeks escape by its lightning-like speed. A western variety, known as the blue racer (*Z. constrictor*, var. *flaviventris*), is smaller and more slender than the eastern black snake. It is bluish green or olive above and pale yellow below, and occurs from the Mississippi to the Pacific.

The Coachwhip Snake (*Z. flagelliformis*) is found from South Carolina westward to Arizona. It is more slender, longer, and more speedy than the black snake. While only about an inch in diameter, it is sometimes 8 feet long. The arrangement of its large scales gives this snake the appearance of a braided whip.

Rail (*Rallidæ*). A large family of wading birds which includes the rails, gallinules, and coots. They have very narrow, compressed, slender bodies, rather long necks, short wings, and strong legs and feet. All are weak flyers and depend chiefly upon running and hiding in order to escape danger. A few have entirely lost the power of flight. There are about 180 species, found in all temperate regions, inhabiting marshes, ponds, and borders of streams, and feeding upon water plants, worms, snails, tadpoles, insects, and other small forms of animal life. They usually nest in secluded marshes, laying 10 to 12 eggs.

The true rails (*Rallus*) comprise about 21 species, 16 of which occur in the New World. Among these are the clapper rail of the Atlantic coast and the California clapper rail, both of which inhabit salt-water marshes, and also the yellow rail, the king rail, the Virginia rail, and the sora or Carolina rail, which frequent fresh-water marshes of the central and eastern United States and Canada. Most rails are popularly called marsh hens. When fat, many kinds are highly esteemed for the table.

Rat (*Mus*). A well-known rodent of the same subfamily as the mouse, but much larger, uglier, and clumsier.

The brown rat (*M. decumanus*), native of India and Persia, has become distributed throughout the world by the ships of modern commerce. It reached Europe through Russia about 1727, and America about 1775, and is now a common pest. Wherever it gains a foothold, it drives out all other rats and many other small animals. It is enormously prolific, producing in a single year 3 to 5 litters of 10 to 12 young at a time. While scavengers, living mostly in filthy places, rats are usually cleanly in appearance and always have sleek coats. They feed on all kinds of refuse matter and are useful to some extent in the disposal of what otherwise would become injurious to health. On the other hand, rats not only destroy millions of dollars worth of food but they are also bearers of dangerous diseases, especially the bubonic plague. Consequently, a war of extermination is waged against them.

In North America, there are several native wild rats, such as the Florida wood rat (*Neotoma floridana*), common in the South; the gray wood rat (*Neotoma cinerea*), of the Rocky Mountain region, which, like the crow, steals knives and spoons; and the California wood rat (*Neotoma fuscipes*) which builds of sticks a huge nest 4 feet high.

Rattlesnake (*Crotalus*). The most widely known of North American poisonous snakes. It is distinguished by the possession of a series of loosely jointed, horny rings at the end of the tail, the rattle, with which it gives its characteristic warning. About three new rings are added every year, replacing those worn away or broken off.

There are 16 species of true rattlesnakes, of which 12 occur in the United States, 2 in Mexico, 1 in Central America, and 1 in South America. Except in the Southwest, where 10 species are found, most regions in the United States have only one or two species. The rattlesnakes are the most highly developed of venomous snakes. Some are large, powerful, and superbly colored. All are dangerous, and the larger kinds are deadly. But, owing to their habit of giving warning and their disposition not to attack, the fatalities from their bites are very few compared with those caused by other venomous serpents.

The timber rattlesnake (*C. horridus*), 3½ to 4 feet long, extremely variable in color, occurs from Vermont to Iowa and southward to Texas. The diamond-back rattlesnake (*C. adamanteus*), the largest, handsomest, and most deadly of North American snakes, is found in coastal regions from North Carolina to Mississippi. It sometimes exceeds 8 feet in length and 4 inches in diameter. It is strikingly colored with diamond-shaped markings. The western diamond-back rattlesnake (*C. atrox*), ranging from Texas to southern California, sometimes 7 feet long, but averaging much smaller, has a white tail with jet-black rings.

The prairie rattlesnake (*C. confluentus*), abundant on the plains from Saskatchewan to Texas, is usually about 3 feet long. The oft-repeated tale of its fraternal relations with prairie dogs and burrowing owls is a myth. The Pacific rattlesnake (*C. oreganus*), found from British Columbia to southern California, is smaller than the prairie rattlesnake. The horned rattlesnake, or Sidewinder (*C. cerastes*), of Arizona and adjoining desert regions, 18 to 30 inches long, has a hornlike projection above the eyes. When running, it moves at an oblique angle to the direction in which its head is pointing.

Raven (*Corvus*). The largest bird of the crow family, native of both hemispheres. In plumage and appearance the raven much resembles the crow, but is larger, with the feathers of the throat narrow and pointed.

The European raven (*C. corax*), about 26 inches long, lives alone or in pairs, though sometimes gathering in flocks about carrion, which is always its chief food. However, it attacks wounded or dying animals, young rabbits and birds, and sometimes devastates grainfields. The raven nests in high trees or in holes in cliffs. It is intelligent, easily tamed, and in captivity may be taught to speak a few words. In ancient Greece and Italy the raven was sacred to Apollo, and the Roman augurs pretended to be able to forecast the future from its manner of flight.

The similar northern raven (*C. corax principalis*) ranges from Greenland to Alaska and south to British Columbia on the Pacific coast and to North Carolina on the Atlantic coast. In the eastern United States it is a very rare and local bird. The smaller American raven (*C. corax sinuatus*) frequents middle altitudes from the Rocky mountains to the Pacific coast. The white-necked raven (*C. cryptoleucus*), 20 inches long, inhabits deserts from western Texas to southern California. See *Crow, Jackdaw, Magpie, Rook.*

Ray (*Batoidea*). A group of fishes allied to the sharks but differing from them in having the gill-openings always on the underside of the body. It includes the rays, skates, sawfishes, sea devils, and other related forms. The true rays have greatly flattened bodies adapted for life on shallow sea bottoms. For example, the spotted ray of Ceylon, measuring 5 feet across, is only 5 inches thick at the center of the body and tapers to almost vanishing edges. The skates lay large eggs, incased in a leathery covering, but most other rays bring forth their young alive. See *Sawfish, Sea Devil, Skate, Sting Ray, Torpedo.*

Red Snapper (*Lutianus aya*). A beautiful, crimson colored, spiny-finned food fish of the Gulf of Mexico, usually weighing 8 or 9 pounds but sometimes exceeding 25 pounds. Several million pounds of red snappers are marketed annually by Florida fishermen.

Reindeer (*Rangifer tarandus*). An arctic species of deer, native of northern Europe and Siberia. It has been long domesticated in Scandinavia, Lapland, and Russia as a beast of burden, as a means of travel, and as a source of food and clothing. In size and appearance it much resembles the American caribou, which, by some authorities, are regarded as varieties of the reindeer. It differs from ordinary deer in having flat horns which are possessed by both sexes. The domestic reindeer, although smaller than the wild reindeer, possesses remarkable strength and endurance. Its ability to subsist upon stunted shrubs, lichens, and other scanty vegetation makes it invaluable to the far northern peoples.

In 1889, reindeer were introduced into Alaska by the United States government in an attempt to

save the Eskimos from starvation, due to the destruction of their walrus fisheries. In 1927, the original importations of about 1500 animals from Siberia had increased to about 500,000, of which two-thirds were owned by the natives. See *Caribou*.

Remora (*Echeneididæ*). A family of peculiar small fishes of the open seas, called also sucking fish. They are provided with a flat sucking-disk on top of the head, by which they attach themselves to sharks, swordfish, turtles, and even ships. However, remoras do not attack or injure in any way the various animals to which they attach themselves. Like a rider upon a horse, the remora is transported by its host to better feeding grounds, sometimes at great distances. The Shark Sucker, or Mediterranean Remora (*Echeneis naucrates*), well known to the ancients, is about 30 inches long. It is found on our Middle Atlantic coasts. The Swordfish Remora (*Remora brachyptera*), only 12 inches long, usually attaching itself to the swordfish, occurs in our more southern waters.

Reptiles (*rĕp'tĭls*) (*Reptilia*). A class of vertebrate animals which comprises the crocodiles, turtles, lizards, and snakes. They differ from birds and mammals in that they are cold-blooded instead of warm-blooded, and from amphibians and fishes in that they breathe air by means of lungs throughout life instead of temporarily or permanently by gills.

Reptiles are often provided with an exoskeleton, or hardened skin, consisting of horny plates or scales. Ribs are always present. Teeth, which are generally present, are not sunk in distinct sockets, except in crocodiles. The tortoises and turtles, however, are toothless, but their jaws have sharp cutting edges. The young of reptiles are produced from eggs, mostly being hatched after being laid, or oviparously, but in some cases the eggs are hatched within the body, so that the young are brought forth alive, or ovoviviparously.

Upwards of 4000 species of living reptiles are known, comprising over 2000 species of snakes, some 1800 species of lizards, about 300 species of turtles, and less than 25 species of crocodilians.

The formerly numerous order of rhynchocephalians now contains only a single living representative. The living reptiles are grouped in the following orders: *Crocodilia*, crocodiles and alligators; *Chelonia*, turtles; *Rhynchocephalia*, tuatara; *Squamata*, lizards and snakes.

Rhea. A large flightless bird, called also the South American ostrich. It differs from the true ostrich in having three toes instead of two on each foot, and these are provided with claws instead of nails. The head and neck are fully feathered, the wings are longer, and there is no tail.

The common rhea (*R. americana*), about half the size of an ostrich, is found in Bolivia, Uruguay, Paraguay, and Argentina. Rheas live in small bands. Several females lay in the same nest, which usually contains 30 to 60 eggs. The sitting and hatching are conducted entirely by the male, who also watches over the young with great care. The speed and endurance of the rhea is so great that it is almost impossible for a hunter to overtake it. When not persecuted, rheas become as tame and familiar as domestic animals. The long-billed rhea (*R. macrorynchа*) occurs only in northeastern Brazil. Darwin's rhea (*R. darwini*), only three feet long, is found in Patagonia. The long wing plumes of rheas are much used in feather dusters. See *Ostrich*.

Rhinoceros. The name of a family of ungulate mammals, natives of tropical Asia and Africa. Next to the elephant, rhinoceroses are the most powerful of land animals. They have large, unwieldy bodies; short, thick legs, terminating in large pads, each with 3 hoof-bearing toes; large elongated heads, with a long horn or horns springing from the snout; small eyes and ears; and short tails. Their hide, while extremely thick, is soft and sensitive, and not bullet-proof, as is popularly supposed. They are wholly herbivorous, some living on grasses, and others on the tender shoots and young twigs of trees.

Two species belong to Africa, both possessing two horns. Of these, the white rhinoceros (*R. simus*) is the larger, attaining a length of over 12 feet and a height of nearly 6 feet; but the smaller black rhinoceros (*R. bicornis*) is the better-known species. The Asiatic species, three in number, are smaller in size; two of the species possess single horns and one a double horn. The Indian rhinoceros (*R. unicornis*), a one-horned species, is the one usually seen in menageries. It leads a tranquil, indolent life, wallowing on the marshy borders of lakes and rivers. Owing to the keenness of its smell and hearing, the rhinoceros cannot be easily attacked; but, when brought to bay, it charges with great fury and impetuosity.

Fossil rhinoceroses are very numerous, especially in the northwestern United States. The woolly rhinoceros (*Atelodus antiquitatis*) is found fossil in England, and complete carcasses of it have been taken from the frozen mud of Siberian tundras.

Robin (*Merula migratoria*). A familiar song bird of the thrush family, found throughout North America east of the Rocky mountains. It nests from Virginia and Kansas northward to Alaska and the arctic coasts and winters chiefly in the Southern states, though a few stragglers remain as far north as southern Canada.

The robin is about 10 inches long, olive gray above with blackish head and tail, and chestnut red below. It nests usually in fruit or shade trees, laying 3 to 5 greenish blue eggs. Its food consists chiefly of worms, insects, small fruits, and berries. By reason of its numbers, friendly disposition, and cheerfulness, the robin has become one of the best-known and most affectionately regarded of American birds. Nehrling says: "The Pilgrim fathers of Massachusetts called this thrush the robin, or robin redbreast, because it reminded them of the beloved robin of their English home, and the love of the latter bird together with its name passed over to the somewhat similarly colored thrush of their new country."

The western robin (*M. migratoria propinqua*), very similar but slightly larger and with a darker head, is found from the Rocky Mountain region westward to the Pacific coast and south to Mexico. It nests in the mountains and in the far north, descending into the valleys or going southward in winter.

The Old World robin, or true robin redbreast (*Erythacus rubecola*), famous in poetry, song, and story, is a much smaller bird, barely 6 inches in length. It belongs to the warbler family (*Sylviidæ*) and is closely related to the nightingale.

Rocky Mountain Goat (*Oreamnus montanus*). An American wild goat, or, more properly, a goat antelope related to the chamois; called also white goat. It occurs at high elevations in the central Rocky mountains and in the Coast ranges from middle California northward to Alaska. In form, though not in color, it somewhat resembles a pygmy American bison. It has high shoulders, low hind quarters, strong legs, a stout body, a shaggy coat, and its head is carried low. A full-grown male stands about 3 feet high at the shoulder, is about 6½ feet long, and its weight is about equal to that of the Virginia deer.

While the white goat is the most expert and daring climber of all American hoofed animals, it is said to be rather stupid and erratic in habit and easily killed by hunters, in case they succeed in reaching the high rocky fastnesses above timber line where it dwells. It feeds upon the lichens, mosses, stunted grasses, and dwarf shrubs composing the vegetation of high altitudes. In 1900 a new species, with somewhat lyrate horns, called Kennedy's mountain goat (*O. kennedyi*), was discovered in the mountains near the Copper river in Alaska. See *Chamois*.

Rodentia (*rō-dĕn'shĭ-ȧ*). Rodents or "gnawers" compose the largest order of mammals, embracing some 20 families and several thousand species, widely distributed throughout the world. They range in size from the mouse, one of the smallest of mammals, to the capybara, somewhat smaller than a hog, although fossil rodents as large as an ox are known.

Rodents differ from all other mammals in the character of the front teeth, the incisors on each jaw being specially developed for gnawing. There are no canine teeth and there is a toothless space between the cutting teeth, *incisors*, and the grinding teeth, *molars*, on each side. The two (rarely four) large incisor teeth in each jaw grow continuously, and, by gnawing on hard substances, are kept at uniform length and given chisel-like edges.

Rodents are chiefly herbivorous, living upon seeds, nuts, roots, and other vegetable products. They are mostly arboreal, though many are burrowers, and some are aquatic. Some, as, for example, the chinchilla, yield valuable fur; others, like the rat, are immensely destructive pests. The brain is small and not highly developed. Most rodents are not distinguished for sagacity, though some, such as the beaver, exhibit truly remarkable instincts. The order includes squirrels, rats, mice, gophers, rabbits, hares, sewellels, beavers, dormice, mole rats, jumping mice, porcupines, chinchillas, agoutis, guinea pigs, and pikas.

Rook (*Corvus frugileus*). A European bird of the crow family, closely resembling the common crow in size, form, and color. It resides permanently in large rookeries which sometimes contain many thousands of nests and birds. The nests are built in the tops of high trees, and are repaired and used over again for many years. While frequenting towns and cities, rooks prefer protected groves, such as those surrounding old mansions, whence they can fly over a large extent of country in search of food. They feed chiefly on insects, worms, grain, seeds, and fruit. Young rooks are often shot for the table. While they possess much cunning, rooks are inferior in intelligence to the crow, raven, and jackdaw. See *Crow*.

Ruminant. Any hoofed mammal that chews the cud. The ruminants comprise a large group or suborder of ungulates, called *Ruminantia* or *Pecora*. They have a complex stomach made up of several compartments. In the largest of these, food is received without being chewed, to be later regurgitated into the mouth, and there chewed at leisure. In the true ruminants, which include all members of the deer, ox, pronghorn, and giraffe families, the stomach has four separate divisions, known as the rumen or paunch, the reticulum, the omasum, and the abomasum. In the camels and llamas the stomach is imperfectly divided and in the chevrotains the omasum is lacking.

Sable (*Mustela zibellina*). A fur bearing mammal, closely related to the weasel, found chiefly in mountainous forests of northern Asia. It has a slender body 18 inches long, and a bushy tail 12 inches long. Its color is a dark lustrous brown, with paler head and neck and black feet. Like the martens, the sables spend most of the day in trees or in holes in their trunks or roots, going forth at night for food. They live chiefly on small animals, such as squirrels and hares, but to some extent upon fruits and fish. The sable is extensively trapped and hunted in Siberia for its excellent fur, which has been very highly valued since ancient times.

Salamander (*Salamandridæ*). Salamanders are small, smooth-skinned, lizard-like amphibians, slow in movement, and incapable of active defense or flight. Some are aquatic, some terrestrial, and others variously intermediate, exhibiting all degrees of adaptation between gill-breathing and lung-breathing. Sixteen species occur in the United States and 18 in Mexico.

The spotted salamander (*Amblystoma punctatum*) is found from Nova Scotia to Nebraska and southward. It is about 6 inches long, dark brown or black above, and marked with about 30 irregular yellow spots. The larva resembles a tadpole but has external gills. This harmless creature, which is fond of dark places and lives largely on worms and insects, is sometimes found in spring houses and cellars. See *Axolotl*.

Salmon, Atlantic (*Salmo salar*). An excellent food and game fish, of northern Europe and America, which ascends northeastern rivers from Maine to Hudson bay. It attains a length of from 3 to 4 feet, and an average weight of from 12 to 30 pounds, but these limits of size and weight are frequently exceeded. It usually continues in the shallows of its native stream for two years after hatching, and during this period it attains a length of 8 inches. In this stage it is called a "parr." When the season of its migration arrives, generally between March and June, the fins have become darker and the fish has assumed a silvery hue. It is now known as a "smolt." The smolts congregate into shoals and proceed leisurely seaward. On reaching the estuary they remain in its brackish water for a short time and then make for the open sea.

Leaving its native river as a fish, weighing perhaps not more than 2 ounces, the smolt, after an absence varying from a few months to two years, returns to fresh water as a "grilse," weighing 4 or 5 pounds. In the grilse stage the fish is capable of depositing eggs. After spawning in the fresh water the grilse again seeks the sea in the autumn, and when its second stay in the ocean is over it returns, after a few months' absence, as the adult salmon, weighing from 8 to 10 pounds. The salmon returns, as a rule, to the river in which it passed its earlier existence.

This salmon is caught by the rod and also by means of nets. It is one of the largest game fishes known to rise to a fly. It is also noted for its remarkable ability to leap up waterfalls, sometimes to a height of 10 to 15 feet.

The Ouananiche (*S. ouananiche*), a landlocked species of Quebec and Labrador, usually weighing 2 to 4 pounds, is likewise a very gamy fish. When hooked it will leap high from the water, often several times in succession. The Sebago salmon (*S. sebago*), another landlocked form, weighing 10 to 15 pounds, but much less active, is found in quiet lakes in Maine. See *Trout*.

Salmon, Pacific (*Oncorhynchus*). A group of exceedingly valuable food fishes, allied to the Atlantic salmon and the trout. There are five kinds,—the quinnat, the blueback, the silver, the chum, and the pink salmon, of which the quinnat, the blueback, and the pink are the most important. They differ somewhat from eastern salmon in form and much more in breeding habits. The young are hatched in cool fresh waters, living in small streams and rivers until they reach a weight of a few ounces. They then descend to the sea where they find suitable feeding grounds, living on small crustaceans, mollusks, and other marine animals.

Upon becoming full grown, in the course of 2 or 4 more years, they leave the sea and ascend to the snow-fed headwaters of rivers to spawn. A remarkable fact concerning these salmon is that none of them take food after leaving salt water. As they proceed up the rivers their stomachs shrivel, and their long fast is broken only by their death, which takes place in the upper waters after spawning time, often more than 1000 miles from the sea. In the gravelly bed of a rapid stream, the male, with tail and snout, digs out a broad shallow nest. In this the female deposits her eggs and the pair cover them with stones and gravel. Both then float down the stream, tail foremost, making no effort to swim, and die usually within a few days. The eggs hatch in from 4 to 6 months.

The Quinnat, Chinook, or king salmon (*O. tschawytscha*), the largest, finest flavored, and most highly prized salmon, has an average weight of 22 pounds, though it sometimes reaches 70 or even 100 pounds. The flesh is usually rich salmon-red in color, becoming paler toward spawning time. It is found near the shore from central California northward, but runs chiefly in streams of large size fed with melting snows. It ascends the Yukon to a distance of 2250 miles. The bulk of the world's pack of this species is obtained in the Columbia river.

The Blueback, Sockeye, or red salmon (*O. nerka*) usually weighs from 5 to 8 pounds. It ranges from the Columbia river to Siberia, being most abundant in Alaska. It is second in quality only to the quinnat salmon and, like it, is taken in enormous quantities for canning. These two species, together with the pink salmon mentioned below, constitute by far the greater portion of the salmon catch.

The silver salmon, or Coho (*O. kisutch*), weighs from 5 to 8 pounds, but the flesh is somewhat paler than that of the king or red, and it is, therefore, frequently marketed as "medium-red salmon." The chum salmon (*O. keta*), called saké in Japan, weighs about 9 pounds. Its light-colored flesh is well flavored but low in oil content. In protein, however, it is equal to the other species. The pink salmon (*O. gorbuscha*) is the smallest of the group, weighing only 3 to 6 pounds. It has pale flesh and a delicate flavor but averages lower in oil content than the king, red, or silver salmon. It forms approximately 45 per cent of the American salmon pack.

Salmon for canning are taken near the mouths of rivers during the spring running, when their flesh is plump and firm. They are caught in enormous quantities in various forms of nets, weirs, and traps. See *Trout*.

Sandpiper. A group of small shore birds of the snipe family, so named from their low notes and a habit of running upon the sand. They are rarely over a foot in length, with sober but pleasing plumage, a very short tail, and a long, slender, curved bill. Sandpipers usually inhabit the seashore, stream banks, and marshes, often in large flocks, probing in the soft earth with their bills in search of worms, aquatic insects, small crustaceans, and mollusks. They breed mostly in arctic regions but migrate extensively in temperate latitudes. There are more than 20 very widely diffused species. The one best known in America is the spotted sandpiper (*Actitis macularia*), 8 inches long, olive gray and white in color, marked with dusky spots and a conspicuous white bar on the wing. It ranges throughout North America, migrating in winter to Brazil and Uruguay. Most sandpipers are considered game birds.

San Jose Scale (*Aspidiotus perniciosus*). A pernicious scale insect, the most destructive found in the United States. It is a native of Japan or China and was introduced at San Jose, California, about 1870, whence it has spread to all fruit-growing districts. It attacks the principal deciduous fruit and ornamental trees and shrubs, causing immense damage, but does not injure the citrous fruits. The individual insects appear as irregularly circular, flattened, waxy scales, the largest about $\frac{1}{25}$ of an inch in diameter. When a plant is badly infested, the scales lie close together, often overlapping, and form a grayish scurf over the bark.

While a chalcidid fly and the Chinese ladybird attack the San Jose scale, none of its natural enemies have proved effective. The principal remedies consist of treating the bark with a wash of lime, sulphur, and salt; of spraying the foliage with various soap and oil emulsions and extracts of nicotine, and of fumigating entire trees with hydrocyanic acid gas. See *Scale Insects*.

Sardine (*Sardinella*). Small, herring-like fish, with rich flesh and feeble skeleton, which, when broiled or when preserved in oil, may be eaten, bones and all. All are migratory, inhabiting the deep sea, coming to the shores only in the spawning season. The European sardine or pilchard (*S. pilchardus*), 3 to 4 inches long, greenish blue above and silvery white below, has been highly esteemed since ancient times. The California sardine (*S. cærulea*) closely resembles the European sardine, but is larger, about 12 inches long, and has round black spots on the sides. See *Herring*.

Sawfish (*Pristididæ*). A group of large, shark-like rays which attain a length of from 10 to 20 feet. Like the sawsharks, they have the snout prolonged into a very long, flat blade, with strong, sharp, enameled teeth implanted in sockets along either edge. Sawfish inhabit the mouths of tropical rivers, where they wreak havoc among the schools of sardines and mullets upon which they feed. The sawfish (*Pristis pectinatus*) of the Florida and Gulf coasts, sometimes 15 feet long, has a saw about one-third the length of its body.

Scale Insects. A general name applying to members of the family *Coccidæ*, of hemipterous insects. These, in the female sex, assume a scale-like form and become spot bound upon the bark and leaves of trees and plants. They live by sucking the sap and include some of the worst plant pests, such as the San Jose scale, the oyster-shell scale, and the cottony cushion scale. Among them, however, are two well-known forms that excrete products of value; one, in India, produces the lac of commerce, and another, in Mexico, produces cochineal.

The group is remarkable for the differences between the sexes in size, in form, and in manner of life. The male is much smaller and develops wings for getting about, which the female entirely lacks. Unlike the female, the male passes through a pupal stage before assuming the adult form. See *Cochineal, Lac Insect, San Jose Scale*.

Scallop (*Pecten*). A bivalve mollusk of the family *Pectenidæ*, which has a fan-shaped shell, usually with ribs radiating from the umbo to the margin, and with extended or eared hinges. The common scallop (*P. irradians*), of the Atlantic coast, about 2 inches across, is highly prized for food, the large adductor muscle being regarded as a table delicacy.

Scorpion. The scorpions constitute a distinct order of arthropods, *Scorpionida*, allied to the king crabs and spiders. There are more than 300 species, chiefly tropical, some 25 of which occur in the southwestern and western United States. They are small, jointed animals, somewhat resembling a miniature lobster, with four pairs of legs, a single pair of jaws, a pair of large, crablike pincers, and a long taillike abdomen terminating in a venomous sting. The young are brought forth alive, and, for a time, are carried by the mother. The scorpions are nocturnal in habit and prey chiefly upon spiders and insects, which they seize with their pincers and often kill with their sting. While exceedingly painful, the sting rarely, if ever, proves fatal to man.

Sea Bass (*Serranidæ*). A group of sea fishes, some of which ascend rivers, closely resembling the fresh-water bass. They are represented in North American waters by more than 100 species, some of which attain enormous size. The great Jewfish, or black sea bass (*Stereolepis gigas*), of the southern California coast, is one of the largest of the spiny-finned fishes. The Santa Catalina anglers, with rod and reel, catch black sea bass weighing 300 to 400 pounds. The Black Grouper (*Garrupa nigrita*), found in Atlantic waters from Charleston to Brazil, has a normal weight of 500 pounds.

The striped bass, Rockfish, or Rock (*Roccus lineatus*), a highly valued food and game fish of Atlantic waters, is the finest representative of the family. It is a handsome, silver-white fish with



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DEER

1 American Elk or Wapiti. 2 Red Deer or Stag. 3 Caribou. 4 Fallow Deer. 5 Mule Deer. 6 Virginia Deer. 7 Axis Deer. 8 Florida Deer.



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GOATS, SHEEP, AND ANTELOPES

1 Rocky Mountain Goat. 2 Asiatic Wild Goat or Markhor. 3 Sable Antelope. 4 White-tailed Gnu.
5 Mouflon. 6 Bighorn. 7 Punjab Wild Sheep. 8 Aoudad.

seven equidistant black stripes. In the markets it ranks in quality with the shad and the bluefish. It attains a length of 3 to 5 feet and a weight of 100 pounds, averaging 5 to 20 pounds. In 1879 the striped bass was introduced with great success into Pacific Coast waters by the United States bureau of fisheries.

Sea Devil (*Mobulidæ*). A family of fishes which embraces the largest and most powerful of the rays. According to Risso, some reach a width of 20 feet and a weight of 1200 pounds. The sea devils differ from all other rays in having, on the upper part of the head a pair of fins which stand up like ears or horns. It is said that a sea devil, when harpooned, will drag a boat with great swiftness. Although of terrifying appearance, all sea devils have small teeth, their tails have no spines and hence they are comparatively harmless.

The Manta (*Manta birostris*), of tropical America, is a species of sea devil greatly feared by pearl fishermen, but Jordan states that it rarely devours anything larger than the pearl oyster which it seeks in common with the fishermen. Another species of sea devil (*M. hamiltonia*) occurs in the Gulf of California.

Sea Horse (*Hippocampus hudsonius*). An interesting little pipefish, about 4 inches long, found on the Atlantic coast from Cape Cod to Florida. It has a head and neck somewhat resembling those of a horse, and a finless, prehensile tail with which it clings to seaweed and is sometimes carried far out to sea. The body is incased in a more or less spiny shell which is composed of bony rings. The brood pouch, in which the male carries the eggs until they are hatched and the young partly grown, is situated on the breast.

Seal. The true seals are marine carnivorous mammals constituting the family *Phocidæ*. They have no external ears; and this, in addition to the fact that the construction of their limbs does not permit of their using those organs on land, at once distinguishes them from the allied family of eared seals, or sea lions. The head is very round, and the eyes are large and expressive. In swimming, the true seals seldom use their forefeet, while the eared seals use them as powerful sweeps.

There are some 15 species about equally divided between the northern and the southern hemisphere. Among these are the harbor seal, the harp seal, or Greenland seal, the ringed seal, the hooded seal, the monk seal, and the ribbon seal. They inhabit the coastal waters of temperate and cold regions, feeding on fish and other marine animals.

Seals are much hunted on account of their skins, their fur, and the oil which they yield. To the inhabitants of the polar regions they afford food, clothing, and fuel. The Eskimos show great skill in harpooning seals from their kayaks, or skin-covered boats. See *Fur Seal* and *Sea Lion*.

Sea Lion. A group of marine mammals constituting the family *Otariidæ*. They differ from the true seals in having external ears and limbs adapted for locomotion on land. There are about 10 species. While mostly antarctic, three types occur in the North Pacific, including the well-known sea lions of the California coast and the valuable fur seals of Alaskan waters.

The Steller sea lion (*Eumetopias stelleri*) is the more conspicuous of the two animals which have made the seal rocks of San Francisco famous. It is found in a few widely scattered localities from Santa Cruz, California, to Bering strait. This large animal attains a length of 11 feet, stands 6 feet high, and is estimated to weigh upwards of 1400 pounds. While the fur is inferior, its skin, flesh, and oil are much used by the natives of the Aleutian islands.

The California sea lion (*Zalophus californianus*) inhabits nearly the entire coast of California, Lower California, the Farallons, Santa Catalina, and other coastal islands. It attains a length of 7 feet and a weight of 450 pounds. In the water it is very active, and it climbs rocks and cliffs with surprising agility. It never roars like the Steller sea lion, but keeps up an incessant honking bark or growl. In captivity, it thrives in fresh water, is remarkably docile and intelligent, and is capable of being trained to go through surprising performances. The hair of this species is short, coarse, and valueless as fur.

The so-called fur seal (*Callorhinus*), which yields the costly seal fur of commerce, belongs to this family. See *Fur Seal, Seal.*

Sea Snakes (*Hydrophinæ*). A numerous group of strictly marine serpents, with deep, flattened bodies and strongly compressed tails, inhabiting the tropical Indo-Pacific ocean. They bring forth their young alive, subsist almost entirely on small fish, and sometimes attain a length of 12 feet, or only a fraction of the length of the fabled sea serpents. While all are exceedingly poisonous, they are very shy, fleeing from danger at the least alarm, so that fatalities from their bites are rare.

Sea Turtles (*Chelonidæ* and *Sphargidæ*). The largest living turtles, distinguished from all others by their seal-like flippers. None of the sea turtles can withdraw the head inside the shell. They are wholly adapted for marine life, feeding chiefly on fish, crustaceans, and mollusks, and coming ashore only at breeding season. Their eggs are laid in the sand, sometimes in hundreds in a single excavation, and left to hatch by the heat of the sun. Only five species are known, very widely distributed in warm seas.

The Leatherback, or Trunk Turtle (*Sphargis coriacea*), differs from all other turtles in having seven lengthwise ridges on the carapace, which is covered with a soft, leathery integument saturated with oil. It is the largest known turtle, sometimes reaching 8 feet in length and weighing 800 to 1200 pounds. Its flesh, which has an unpleasant taste and is reputed to cause sickness, is but rarely eaten for food. The leatherback occurs in Atlantic waters, and breeds on the Dry Tortugas, the Bahamas, and other warm coasts.

The Loggerhead (*Thalassochelys caretta*), which sometimes weighs 450 pounds, breeds upon the Florida coast and wanders northward to Massachusetts. The female sometimes lays 1000 eggs. While taken chiefly for oil, its flesh is sometimes sold in the markets.

The Green Turtle (*Chelone mydas*) is the most highly prized food turtle, especially for making soups. It occurs in warm seas throughout the world. It is sometimes 4 feet long and weighs 500 pounds, but most market specimens range from 50 to 70 pounds. Unlike other sea turtles, the green turtle is herbivorous, living almost entirely on the roots of the eelgrass or turtle grass, which grows in shallow waters.

The Hawksbill (*Chelone imbricata*), the smallest of the sea turtles, rarely 2½ feet long, is distinguished by its sharply curved beak. It occurs from North Carolina to Brazil and furnishes the valuable tortoise shell of commerce, used in making combs and various ornaments. See *Turtle.*

Secretary Bird (*Serpentarius secretarius*). A large, somewhat cranelike bird of prey, closely allied to the vultures, native of South Africa. It stands about 4 feet high and has bluish gray plumage, with various black markings above and below. From a fancied resemblance of its erectile crest to the pen behind the ear of a clerk, it received the name secretary bird. It feeds on reptiles of all kinds, boldly attacking and dispatching the most venomous, either by stunning them by vigorous blows of its knobbed wings or by seizing them in its powerful feet and flying so high that they are killed when let fall. While protected by law as a destroyer of noxious vermin and often tamed as a

protector of poultry, the secretary bird, if not well fed, will help itself to chickens and other young fowls.

Shad (*Alosa sapidissima*). The finest food fish of the herring family, ranking next to the cod and the salmon in economic importance. It is an ocean fish found from Florida to Newfoundland, going up rivers in early spring to spawn. It attains a length of 25 to 30 inches, and a weight of 4 pounds. Many streams are annually restocked by the bureau of fisheries. The shad has been successfully introduced on the Pacific coast, where it is now found in the markets. See *Herring*.

Shark (*Squali*). A group of large, powerful fishes, chiefly marine, with a more or less cylindrical body and a cartilaginous skeleton. The gill slits open on the sides of the neck, and the mouth is on the underside of the head at some distance behind the end of the snout. Consequently, sharks often turn upon their backs to seize their prey. Most sharks have very numerous and exceedingly sharp teeth, often with sawlike edges. The teeth of others are mill-like, tubercular plates for crushing shells. Many sharks bring forth their young alive, the eggs hatching within the body. Others lay leathery eggs of various unusual shapes, some being spirally twisted or coiled.

There are about 150 species, found in all seas, but most abundant in the tropics, varying in size from small dogfish, barely a foot long, to the great basking sharks, sometimes 50 feet long, of enormous girth and weight. Many are very destructive to other fishes, and several of the larger forms are dangerous to man. Among the most important types are the cow sharks, bullhead sharks, dog sharks, tiger sharks, mackerel sharks, threshers, basking sharks, cat sharks, hammerhead sharks, and dogfishes.

Few sharks are of economic value, though some yield an inferior oil, and the rough skin of others, called shagreen, is used in polishing wood. Dried shark fins are commercially important in India and China. The flesh of various species is wholesome and edible, and is increasingly used for food. See *Basking Shark*, *Hammerhead Shark*, *Whale Shark*.

Sheatfish (*Siluris glanis*). A huge, Old World catfish, sometimes weighing 300 to 400 pounds, abundant in the Danube. Next to the sturgeon it is the largest river fish in Europe. See *Catfish*.

Sheep (*Ovis*). Hollow-horned ruminants of the ox family, closely related to the goats. All wild sheep inhabit mountains or high table-lands of the northern hemisphere. There are about 12 species, among which are the European mouflon, the African aoudad, the Asian argali, the Punjab wild sheep, and the North American bighorn.

The original wild species, from which the domesticated sheep has been derived, is unknown. However, the domestic sheep is most closely related to the mouflon (*O. musimon*) of Sardinia, to the Armenian wild sheep (*O. gmelini*), and to the oorial (*O. vignei*), of central Asia.

Since prehistoric times the domestic sheep has been reared in Asia and Europe for its flesh, milk, wool, and skin. The ancient Lake Dwellers of Switzerland used the sheep; it is mentioned throughout the Bible, and in the earliest Greek and Roman writings. The Latin word *pecus*, meaning cattle, whence the word *pecunia*, meaning wealth, was applied especially to sheep. Now widely diffused throughout both hemispheres, the sheep has become the world's chief fiber-producing animal. Of the various domesticated animals of the ox family, the sheep is the least intelligent, although it is remarkably mild, gentle, and inoffensive in disposition. The sheep is a thrifty feeder, subsisting where cattle and horses cannot obtain sufficient pasturage. The male sheep is called a ram, the female, a ewe, and the young, a lamb. A group or herd of sheep is most commonly called a flock.

Centuries of breeding have produced numerous breeds of sheep which are grouped as short-wooled, medium-wooled, and long-wooled. The Spanish Merinos are typical of the first class, the Southdown and Shropshire of the second, and the Leicester, Lincoln, and Cotswold of the last. While some breeds are successfully grown in moist climates, such as that of England, sheep are best adapted to dry, cool regions. They thrive upon the scanty vegetation of semideserts, where they often pasture for days without water. The chief wool-growing countries are Australia, Russia, the United States, and Argentina. In the United States, California, Texas, Wyoming, Utah, and Montana usually lead in production.

Besides wool, meat, and leather, which are the principal sheep products, the entrails, when dried and twisted, form the so-called catgut used for violin strings, the fat yields tallow, and the milk, in some countries, is made into cheese. In the mountain regions of India, sheep are employed to a limited extent as beasts of burden.

Shrews (*Soricidæ*). Very small, mouselike, insectivorous mammals, with long, pointed muzzles, soft fur, and ratlike feet. They constitute the most numerous family belonging to the order *Insectivora*. There are more than 125 species, widely distributed throughout the world, some of which are the smallest known mammals. Nearly all are nocturnal and burrowing in habit, living chiefly upon insects, worms, and small mollusks. The common shrew (*Sorex personatus*), found from Massachusetts to Alaska and south to North Carolina, is one of the smallest of American shrews. It is only 2¾ inches long, chestnut brown in color, with a short tail and large ears. Some 35 other species occur in various parts of North America. See *Insectivora*, *Moles*.

Shrike. The shrikes belong to a numerous family of perching birds (*Laniidæ*). Although displaying some powers of song, they have strong hooked beaks and predacious habits like those of the true birds of prey. There are about 200 species, mostly confined to the Old World, only 2 of which occur in the United States and Canada.

The northern shrike, or butcher bird (*Lanius borealis*), 10 inches long, with gray, black, and white plumage, breeds in the far North and winters in the northern United States. Like other shrikes, it is noted for its habit of impaling insects, mice, and small birds upon thorns, leaving them to be eaten later. It feeds chiefly upon mice, noxious insects, and, in winter, upon English sparrows. The slightly smaller loggerhead shrike (*L. ludovicianus*), of the southeastern United States, and its western varieties, the white-rumped, California, and island shrikes, are very similar in color and habits.

Shrimp (*Crangon*). A small, slender, long-tailed crustacean, closely allied to the crawfish and prawns. The common shrimp (*C. vulgaris*), about 2 inches long, greenish gray, spotted with brown, is found in shallow bays from Labrador to South Carolina and on the Pacific coast. It is highly esteemed for food in Europe and is increasingly used in America. On the southern Atlantic coast the catch amounts to about $500,000 annually. In San Francisco bay the catch of the California shrimp (*C. franciscorum*) amounts to about $250,000 yearly.

Silkworm. A name applied to the larvæ, or caterpillars, of several species of moths. The common silkworm moth (*Bombyx mori*) is the most important silk-producing species. It is a native of China, where it has been cultivated from a remote period. The mature moth is of a cream color with faint brownish markings. The caterpillar (silkworm) when first hatched is black or dark gray, becoming cream-colored after the last molt. It feeds upon the white mulberry, and will also eat the black mulberry and the Osage orange.

The silk is produced in a pair of specially constructed vessels which contain a gelatinous substance and become much enlarged at the time when the animal is about to spin. These silk organs unite at the mouth to form a common duct termed the spinneret. Through this tube the semifluid substance is ejected. On coming in contact with the air, it hardens into the soft fiber so highly prized for textile fabrics.

The caterpillar employs the silk in constructing a cocoon in which it assumes the pupa state. The pupa is usually killed by heating gently in an oven, because the natural exit of the moth is injurious to the silk. After soaking in warm water, the fibers composing the cocoon are unwound and reeled into hanks or skeins, known as the raw silk of commerce.

Sirenia (*sī-rē'nĭ-ȧ*). An order of aquatic mammals, with thick, naked or slightly hairy skin, finlike fore limbs, and the hind limbs lacking. While somewhat resembling the whales in appearance, they are quite different in structure. The order comprises only the dugongs of the Indian Ocean and the manatees of tropical America and Africa. See *Dugong, Manatee.*

Skate (*Raja*). A numerous group of fishes closely related to the sharks, represented by about 40 living species, inhabiting the colder seas. The angular, much flattened body, sometimes broader than long, is usually armed with spines. Their eggs, which are "wheelbarrow-shaped" with a tube projecting from each of the four corners, are from 3 to 8 inches long. Most species are edible and some are largely used for food.

The common skate (*R. erinacea*), of the North Atlantic, called also tobacco-box from its shape, is about 18 inches in length. The light-brown body is variegated with dark spots and covered with spines. The barn-door skate (*R. lævis*), of Atlantic shores, so named on account of its size, is about 4 feet long, and nearly spineless. A similar skate (*R. binoculata*) occurs in California waters.

Skunk. A fur bearing animal of the marten family, closely allied to the badger, found only in the New World, sometimes incorrectly called polecat. There are many species, distributed from northern Canada to Patagonia. They are somewhat smaller than a cat in size, with long hair, bushy tails, and black and white markings. All are noted for the possession of large anal glands from which a powerfully acrid fluid with an exceedingly offensive odor may be projected to a distance of several feet.

The North American skunk (*Mephitis*), of which 9 forms or species are recognized, occurs from Hudson bay to Guatemala. They live in dens or burrows, are chiefly nocturnal, and prey upon small rodents, birds, reptiles, and insects, destroying many noxious kinds. Except for their depredations on poultry, skunks are in the main beneficial to the farmer. Since early colonial times, skunks have been trapped and sometimes reared for their valuable fur. See *Polecat.*

Sloth (*Bradypodidæ*). An edentate mammal, found only in Central and South America, so named because of the extreme sluggishness of its movements. All sloths are arboreal, living in an inverted position, suspended by their long curved claws from branches in tree tops. They feed on leaves and twigs. Sloths are clothed with thick shaggy hair, which often so closely resembles the lichen-covered bark of the trees upon which they are suspended that it is difficult to see them. Their heads are round, the short ears are nearly concealed in the heavy fur, the forelegs are much longer than the hind legs, and the toes are provided with very long claws. See *Edentata.*

Smelt (*Argentinidæ*). A family of excellent food fishes, all marine and closely allied to the salmon. The American smelt (*Osmerus mordax*), seldom exceeding 10 inches in length, occurs on the Atlantic coast from Virginia to the Gulf of St. Lawrence. In the winter it enters the mouths of rivers and bays to spawn, and is taken in great numbers for the markets. Its flesh is delicate, tender, and oily, with a distinct odor and taste. The surf smelt (*Mesopus pretiosus*), of the California coast, is prized as a pan fish.

Snail. The common name for the air-breathing gastropod mollusks constituting the numerous order *Pulmonata*, which embraces about 19,000 known species of land and fresh-water snails. With the exception of the slugs, in which the shell is rudimentary or absent, snails have a well-developed, external spiral shell, which encloses the whole body as a protective covering. The part of the snail protruding from the shell is the foot, upon the forward end of which is the head, bearing one or two pairs of tentacles or feelers. The eyes are either at the base of the tentacles or, as in the land snail, on the ends of the upper pair. The mouth has a hard, horny upper jaw and lip for biting, and contains a long, rasplike tongue, the radula, for tearing or rasping food.

While a few are carnivorous, most snails feed upon vegetable matter and some are destructive to vegetation. They lay round, semitransparent eggs, which are either deposited on the surface of the ground or buried beneath it. Some species are edible and highly prized for food. The garden snail (*Helix pomatia*) was considered a great luxury by the ancient Romans, and in southern Europe and in France is still grown in large numbers as an article of food. It has been introduced at New Orleans and other places in the United States.

Snake Bird (*Anhinga*). A small group of web-footed birds, closely related to the cormorants; called also anhingas or darters. They have elongated bodies, long, snakelike necks, small, narrow heads, and slender, sharp pointed bills. There are four species, natives of warm regions, ranging in length from 28 to 36 inches. They usually live in pairs around bodies of fresh water, are expert swimmers and divers, and feed upon fish. The American snake bird, or water turkey (*A. anhinga*), of tropical America, is also common in the Gulf states and breeds as far north as southern Illinois. Its plumage is glossy black with greenish reflections.

Snakes (Suborder *Ophidia*). A numerous group of reptiles, which, together with the lizards (Suborder *Lacertilia*), makes up the order *Squamata.* Snakes have greatly elongated, scaly bodies, without limbs or with only tiny vestiges of hind limbs, and without eyelids or external ear openings. They have a bifid tongue; the teeth are consolidated with their supporting bones, and usually the right and left halves of the lower jaw are connected by an elastic band. The vertebræ are very numerous, sometimes nearly 300, and, excepting the atlas and those of the tail, all bear ribs. There is usually only one lung, which is much elongated.

Most snakes are timid and harmless, but numerous species have highly developed poison glands and powerful fangs, so that their bite is dangerous and often fatal to man and to many animals. Snakes are oviparous, usually depositing from 10 to 80 leathery-shelled eggs, which are hatched by the heat of the sun. The most venomous, however, as well as many common, harmless species, retain their eggs in the oviducts until the embryos are developed, and then bring forth living young.

Snakes are usually carnivorous, feeding upon small rodents, frogs, reptiles, and insects, and, on the whole, are of great service to agriculture. Their flesh, which is white, chicken-like, and wholesome, is often eaten by savage peoples.

There are about 2000 existing species of snakes, comprising about half of all living reptiles. They occur throughout the world, except in latitudes where the subsoil is permanently frozen, or in

isolated islands, such as New Zealand, Hawaii, and the Azores. In Scandinavia, snakes pass north of the Arctic circle. They vary greatly in habits, the chief distinctive groups being burrowing snakes, ground snakes, tree snakes, fresh-water snakes, and sea snakes.

Many entirely different snakes are remarkably similar in general appearance. Hence it is difficult to make distinctions between them in nontechnical language. In consequence, many entirely harmless species are popularly regarded as venomous and there is great confusion of names.

Some 600 species, or more than a fourth of all the existing snakes in the world, are more or less venomous. About half of these are only mildly poisonous and a much smaller fraction are regarded as fatally poisonous to man. North America is remarkably free from poisonous snakes, only 24 out of about 110 native species being considered dangerous. Of these, the poisons of only the larger rattlesnakes and their allies are fatal to man.

Snipe (*Gallinago*). A small game bird, closely related to the woodcock and the sandpiper, with short legs and tail, medium wings, and a long, straight, slender bill. Snipes inhabit marshy places, feeding upon worms, insects, and larvæ, which they obtain by probing in the mud. They nest in shallow hollows in the ground, usually laying 4 eggs. There are about 23 widely distributed species, only one of which is native to North America. Wilson's snipe (*G. delicata*), called also English snipe and jacksnipe, is about 11 inches long, mottled brown and buff above and white below. It breeds from Connecticut to Utah, northward to beyond the Arctic circle, and winters far southward. Its flesh is considered a great delicacy.

Snowbird (*Junco hyemalis*). A small bird of the finch family, about 6 inches long, slaty gray above, with a darker head, and white below. It breeds from northern Minnesota and New York northward, migrating southward, upon the approach of snow, as far as the Gulf states. It nests on the ground, laying 4 or 5 whitish, finely speckled eggs, and feeds upon insects and weed seeds. In winter, snowbirds often fly about barns or approach the doors of houses in search of food. Several varieties occur in the Western and the Southern states.

Sole (*Soleidæ*). The soles constitute a family of flatfishes related to the flounders. They differ from the flounders, however, in having small eyes, placed close together, and a small, much twisted mouth, with few teeth. There are about 150 species. The common sole (*Solea vulgaris*), found from Norway to Italy, is the most valued representative of the true soles. It is from 1 to 2 feet long, usually weighing about a pound, though sometimes reaching a weight of 9 pounds. When properly cooked, it is esteemed as one of the most delicate of European table fish.

Sparrow. A small bird of the finch family, usually with dull plumage, conical bill, and feeble song, living on or near the ground, and nesting in bushes or on the ground. The name was first given to the common house or English sparrow (*Passer domesticus*), but it is now extended over a large number of closely related species. Some 75 or more North American birds are known as sparrows. Among these are the black-throated, chipping, field, fox, lark, sage, savanna, seashore, song, swamp, tree, vesper, white-crowned, white-throated, and wood sparrows.

In strong contrast to the pestiferous English sparrow, the native American species are highly useful birds. They consume tons of noxious weed seeds in winter and myriads of injurious insects in summer, but destroy very little grain or cultivated fruit.

Spider. The spiders are insect-like arthropods forming the order *Araneida* or *Araneæ*, of the class *Arachnida*. They differ from insects in having the head and thorax united in one piece, called the cephalothorax; by having four pairs of legs; and by the absence of wings and antennæ. The abdomen, which is joined to the cephalothorax by a short, narrow stalk, is provided at the end with organs for spinning silk. This is used in weaving webs to entangle prey, for making abodes, and for various other purposes.

Spiders are carnivorous, feeding chiefly on insects. Some powerful tropical species, with bodies 3 inches long, are able to kill small birds, fish, and even rats. All spiders have poison glands, connected with their hooked, biting jaws, and use the venom from them in capturing their prey. In nearly all species the jaws are far too weak to pierce the human skin and the amount of poison they can eject is too small to produce any serious injurious effect. Some of the larger forms, called tarantulas, produce painful wounds, but, so far as accurate records go, these never prove fatal.

Spiders lay spherical eggs which the female winds with silk into a roundish mass called the cocoon. This she fastens in her web, to a grass stalk, or hides in her nest. The young are born in the form of their parents but differ from them at first in appearance. When grown, the males are much smaller than the females.

There are more than 10,000 known species of spiders, some 1300 of which are found in the United States. Among the chief families are the orb-web, trapdoor, funnel-web, crab, wolf, and jumping spiders. See *Tarantula*.

Sponge. A group of low water animals, forming the branch *Porifera*. The body is penetrated by numerous channels of pores, some of which are inlet tubes, others outlet tubes, and others form a third set connecting the two. The outside of the sponge is covered with a thin, leathery membrane, the *ectoderm*; the pores are lined with a softer membrane, the *endoderm*, and between these is a third membrane, the *mesoderm*, which is strengthened by fibrous, limy, or glassy material.

In the connecting tubes are chambers lined with ciliated cells. The water enters through the inlet tubes, passes through the connecting tubes, and is expelled through the outlet tubes. In passing through the chambers lined with ciliated cells, the cells capture and digest minute vegetable and animal organisms in the water, and by movement of the cilia create currents which keep the water moving through the sponge.

Sponges are almost exclusively marine. They are generally found attached to the underside of projecting rocks, or clinging to the roofs of submarine caverns. Common bath sponge is the siliceous skeleton of a certain kind of sponge with the living animal tissue entirely removed. Commercial sponges are mostly obtained from the Grecian archipelago, Florida, and the Bahamas.

Squid. A cephalopod mollusk, closely related to the cuttlefish and the octopus. It differs from the cuttlefish in having a narrow, horny pen or shell beneath the skin of its back, and from the octopus in having ten arms, two of which are much longer than the others. When pursued, it ejects an inky fluid to conceal its movements. There are many species, frequenting all seas and feeding largely upon fish. Some are used for human food.

The common squid (*Loligo pealei*), about 8 inches long, is abundant from Maine to South Carolina. The flying squid (*Ommastrephes illecebrosus*), about a foot long, common from Long Island northward, is much used for bait in the cod fishery. The California squid (*O. tryoni*), 8 inches long, is caught in great numbers on the Pacific coast, and dried for export to China.

The giant squid (*Architeuthis princeps*), of the North Atlantic, is the largest known invertebrate animal. Its body is sometimes 19 feet long, with tentacular arms 35 feet long, so that its total length

when outstretched exceeds 50 feet. Its huge eyes are 14 inches in diameter. See *Cuttlefish, Octopus.*

Squirrel. A small rodent mammal with a bushy, hairy tail. There are more than 250 species, occurring nearly everywhere except in Australia. In America the squirrel family (*Sciuridæ*) is divided into three groups—the marmots, the flying squirrels, and the true squirrels. The true squirrels are divided into the tree squirrels, the rock squirrels, and the ground squirrels, according to their mode of living.

The tree squirrels are mostly arboreal, living either in hollow trees or building spherical nests on the branches. The gray squirrel (*Sciurus carolinensis*) is typical of this group. As the name indicates, it is grayish or iron grayish on the back, and the tail is fringed with white. From tip of nose to tip of tail its length is 18 inches.

The rock squirrels live in rocks, stone piles, and fence corners. The chipmunk (*Tamias*) is the type of this group. It has cheek pouches, and uses them to gather and store up grain and nuts for the winter.

The ground squirrels burrow in the earth and store their food in their burrows. They live mostly on grain, and from this fact are known as spermophiles, or "seed lovers." They are most numerous west of the Mississippi river.

The largest squirrel in the world is the Malabar squirrel (*Sciurus malabaricus*) of India, over 30 inches long and weighing 4 pounds. The most beautiful squirrel is Prevost's squirrel (*Sciurus prevosti*) of the Malay peninsula, with a handsome color pattern of brown, black, white, and buff. Nearly all squirrels are eaten as food, and the skins of various species have some commercial importance as fur. See *Flying Squirrel.*

Starfish. The starfishes proper (*Asterias*) are echinoderms covered with a tough, leathery skin beset with prickles. They have the form of a star, with five or more rays radiating from a central disk. In the middle of the undersurface of the disk is situated the mouth, opening into a digestive system which sends prolongations into each ray. If the prickly skin be removed, it will be seen to be supported by a series of plates beautifully jointed together. On the undersurface of each ray the plates exhibit a series of perforations, through which, in the living state, the ambulacra, or tubular feet, can be protruded so as to effect locomotion.

Starfishes are found in almost all tropical, European, and American seas, and some species occur as far north as Greenland. They are very destructive to oysters, clams, mussels, barnacles, snails, worms, and small crustaceans.

Starling. The starlings compose a large family of birds (*Sturnidæ*) intermediate between the crows and the blackbirds. There are about 200 species, mostly natives of tropical Asia and Africa. The common starling (*Sturnus vulgaris*) is a European bird noted for its song and powers of mimicry. It is about 8 inches long, with glossy black-brown plumage and a buff tip to each feather. Its food consists of insects, worms, snails, seeds, and fruits. When numerous, starlings sometimes inflict great damage on orchards. They nest in holes in trees or in old buildings, laying from 4 to 6 pale blue eggs. The starling was well known to the ancients and is now often kept as a cage bird. In 1890 it was introduced into Central park, New York, and has since become naturalized in several northeastern states.

Sting Ray (*Dasyatidæ*). A family of rays which have a slender, whiplike tail armed with a long spine having backwardly projecting teeth; called also "stingaree." In many species this tail spine serves as a very effective weapon, making a lacerated wound which, in man, is attended with much danger of blood poisoning. Sting rays inhabit nearly all seas, lying flat on sandy bottoms, and feeding upon crabs, oysters, and other shellfish. All hatch their eggs within the body. The common sting ray (*Dasyatis centrurus*), found on Atlantic shores from Cape Cod southward, attains a length of 12 feet. A similar species of the Pacific coast (*D. dipterura*) abounds in the vicinity of San Diego bay. See *Ray.*

Stork (*Ciconia alba*). A large, voiceless, Old World wading bird, closely related to the herons. It is common in summer over most of Europe and Central Asia, migrating southward in winter to Africa and India. It is about 3½ feet long, stands fully 3 feet high, and, excepting the black wing coverts, its plumage is pure white throughout. The long bill and the legs are red, the neck long and usually arched, and the breast feathers long and pendulous. The stork frequents marshes, feeding upon eels, frogs, lizards, snakes, small mammals, young birds, and insects. It also eats offal and scraps of food refuse around villages and towns. Long associated with man, it seeks rather than avoids human habitations. It usually selects a chimney or a roof for a nesting site, to which it returns year after year, although it sometimes builds its nest in trees or on high rocks. The eggs, 3 to 5 in number, are pure white.

In various European countries, particularly in Holland and in Germany, storks are welcomed and protected on account of their value as scavengers and also for their fidelity to their young, which is proverbial. It is a common belief among many peoples that good luck will attend the house to which a stork attaches itself, and when a new baby comes to a family it is customary to say "the stork has arrived."

The smaller black stork (*C. nigra*), of range similar to the white stork, lives in secluded swamps, nesting in tall trees. The wood ibis and jabiru are closely related American species.

Sturgeon (*Acipenseridæ*). The sturgeons compose an important family of ganoid fishes. They have cartilaginous skeletons; the body is armed with five rows of large, bony, and usually spiny bucklers, and the upper lobe of the tail is much larger than the lower. All are sluggish, bottom feeding fish; the mouth, which is situated beneath the snout, is sucker-like and devoid of teeth. There are about 30 species, abounding in rivers and seas. Some live exclusively in fresh waters; others are marine, ascending streams only to spawn. They range in length from 2½ to 30 feet, and include some of the largest living fishes, some attaining a weight of 2000 pounds.

All kinds of sturgeon are used for food, and, from their abundance, are of great economic value. Their flesh is marketed in vast quantities, both fresh and smoked, the roe forms the caviar of commerce, and their air bladders are made into isinglass. The common sturgeon (*Acipenser sturio*), of both shores of the Atlantic, is the largest and most valuable species in American waters. It sometimes attains a length of 10 feet and a weight of 500 pounds.

Sucker (*Catostomidæ*). A group of fishes closely related to the carp and minnows, but differing chiefly in the structure of the mouth, which is placed underneath the head and provided with fleshy, tubular lips for sucking food from the bottom of streams. There are about 60 species, all except two of which are found in the rivers of North America.

The white sucker (*Catostomus commersoni*), abundant in streams and lakes from Quebec to Montana and southward to Missouri and Georgia, attains a length of 18 inches, and is locally important as a food fish. The Buffalo Fish (*Ictiobus cyprinella*) of the Mississippi valley, so named because of its humped neck, is a huge sucker which attains a length of 3 feet and weighs from 20 to 40 pounds. Many millions of pounds of buffalo fish are marketed annually in Illinois, Missouri, Mississippi, and Arkansas. See *Carp, Minnow.*

Sunfish. A group of small, perchlike, freshwater fishes found in ponds and streams in most parts of North America. The common sunfish, or Pumpkin Seed (*Eupomotis gibbosus*), abundant from Minnesota eastward and southward, is usually about 8 inches long and weighs about half a pound. In color, it is olive green, often brilliantly marked with blue, orange, and scarlet. As it is easily caught, it is a prime favorite with young anglers. The blue-gill sunfish (*Lepomis pallidus*), a somewhat larger but less handsome species, is suitable for pond-culture.

Surf Fishes (*Embiotocidæ*). A family of small, perchlike fishes, 5 to 18 inches in length. All, save two Japanese species, are natives of California waters. They differ strikingly from all related higher fishes in being viviparous. The young, some 10 to 20 in number, are brought forth alive at an advanced stage of development, those of some species being about a third as long as their parents. The blue surf fish (*Embiotoca jacksoni*), first discovered in Sausalito bay in 1863, is the most common species.

Swallow. The swallows constitute a very distinct family (*Hirundinidæ*) of small passerine birds. They have compact, usually lustrous plumage; long pointed wings; more or less forked tails; very short, flat, triangular, deeply cleft bills, and weak feet, adapted only for perching. Swallows feed almost exclusively upon insects, which they capture on the wing. They nest in pairs and colonies, and during migrations associate in immense numbers. There are about 80 species, very widely distributed throughout the world, except in arctic regions. They cannot endure cold and hence migrate northward only upon the sure approach of summer, usually returning southward well in advance of frost.

Among the best-known American species are the familiar barn swallow, the cliff or eave swallow, the white-bellied or tree swallow, the rough-winged swallow, the bank swallow, and the purple martin. By reason of destroying many noxious insects, swallows are of considerable economic value.

Swan (*Cygninæ*). A group of large, graceful, web-footed, swimming birds, closely related to the ducks and the geese. Swans differ from geese in that the neck is longer than the body and from ducks in that the sexes are alike in color. There are about 8 species, all except 2 of which have pure white plumage. They walk awkwardly, fly strongly, and swim with remarkable grace. The handsome trumpeter swan (*Cygnus buccinator*), so named for its loud, sonorous cry, is found chiefly in the interior of North America and west to the Pacific coast, breeding from Iowa to the Arctic Ocean. It is about 5 feet long, with a wing spread of 8 to 10 feet.

The noisy whistling swan (*Olor columbianus*), 4½ feet long, with a wing spread of about 7 feet, nests and rears its young on the shores of the Arctic Ocean, ranging southward in winter to Mexico. At night its clamors may be heard at a distance of several miles. The famous black swan (*Chenopsis atrata*) of Australia, 40 inches long, is black throughout except the white outer wing feathers and the scarlet bill. It is comparatively tame and is frequently kept as an ornamental bird. The beautiful black-necked swan (*Chenopsis melanocoryphus*), of Argentina and Patagonia, is pure white throughout, except the upper part of the neck which is velvety black. The mute swan (*Cygnus olor*), native of Europe and Asia, so named because it is voiceless in the domesticated state, is the parent wild species from which the tamed swans of parks and gardens have been developed. It is about 5 feet long, with pure white plumage.

Swans were partly domesticated by the ancient Romans, who used their flesh for food. During the middle ages, swans became a part of the regalia of European courts, and only kings were permitted to keep them. Swans are now reared as ornamental birds throughout the world.

Swift. The swifts form a group of exceedingly active small lizards, which includes the small-scaled swifts (*Uta*) and the spiny swifts (*Sceloporus*). In the United States there are about 15 species of the former and 35 species of the latter, nearly all confined to the West and Southwest. The harmless common swift (*Sceloporus undulatus*), which feeds on insects, occurs from New Jersey to Oregon and southward. It is about 5½ inches long, gray with wavy black crossbands, and with sharply keeled and bristling scales. It frequents fallen tree trunks and rail fences, and moves about with lightning-like rapidity.

Swine (*Suidæ*). A name properly given to the domesticated pig or hog, but embracing also its wild relatives which include the Old World swine and the American peccaries. The true swine (*Sus*) have a long mobile snout, with the nostrils placed in its flat terminal surface, and narrow feet, each with four toes, two of which do not ordinarily reach the ground in walking. They include the wild boar of Europe (*S. scrofa*), the wild boar of India (*S. cristatus*), the banded pig of Sumatra (*S. vittatus*), the warty pig of Java (*S. verrucosus*), the bearded pig of Borneo (*S. barbatus*), and the pygmy hog of Nepal (*S. silvanus*). Closely related to the true swine are the river hogs and wart hogs, or bush pigs, of Africa, and the babiroussa of Celebes. See *Babiroussa*, *Hog*, *Peccary*.

Swordfish (*Xiphius gladius*). A huge, pugnacious fish of the open seas, with the bones of the upper jaw prolonged into a long, stiff, horizontally flattened sword. It attains a length of 15 feet and sometimes weighs from 400 to 800 pounds. The swordfish is a powerful fighter, and many instances are on record wherein it has driven its armed beak through the sides of boats or even of small ships. It preys upon fish which swim in schools, killing large numbers by swift strokes of its sword. While somewhat oily, its flesh is much esteemed for food, over two million pounds being marketed annually by New England fishermen.

Tanager (*tăn'ă-jĕr*). The tanagers form a large, exclusively American family of birds (*Tanagridæ*), closely related to the finches, remarkable for their beautiful plumage. There are about 350 species, nearly all natives of the tropics, only 5 of which reach the United States during summer. They are forest-loving birds, nesting in trees, and feeding on flowers, fruit, and insects. Like many other birds of brilliant plumage, they are not musical. The scarlet tanager (*Piranga erythromelas*), about 7 inches long, bright scarlet with black wings and tail, breeds from Illinois and Virginia to southern Canada. The summer tanager (*P. rubra*), 7 inches long, dark red above and bright red below, is a summer resident of the southeastern United States which sometimes wanders northward as far as Nova Scotia. The western tanager (*P. ludoviciana*), 6½ inches long, with red, yellow, and black plumage, breeds from western Nebraska to British Columbia and southward to Mexico.

Tapir (*Tapirus*). Large, thick-skinned mammals of the tapir family, with the nose prolonged into a short movable trunk or proboscis. In appearance they somewhat resemble the pig and the elephant. Tapirs differ from all other ungulates in having 4 toes on the forefeet and 3 toes on the hind feet, all separate and with naillike hoofs. There are 5 known species, 4 of which occur in tropical America and 1 in the East Indies. Tapirs are forest loving and nocturnal, generally sleeping by day and going forth at night to feed upon fruits, grasses, water plants, and other vegetables. They are usually shy, solitary, and harmless, living near the water into which they invariably flee when attacked.

The American tapir (*T. americanus*), native to the great South American forests from Venezuela and Guiana southward through Brazil and Paraguay to Argentina, is about 6 feet long, 3½ feet high, and mahogany brown in color. It subsists chiefly upon palm leaves and fruits but often raids plantations in search of melons and sugar cane. It is much hunted by the natives for its juicy, well-flavored flesh, which is said to resemble beef. It is readily tamed when young, and domesticated tapirs are often seen wandering about the streets of South American towns. This species is the one commonly seen in menageries.

Tarantula (*tà-răn'tù-là*). The name given to various species of venomous spiders. The true tarantula is a large wolf spider (*Lycosa tarantula*) of southern Europe. Its bite was fabled to produce the dancing mania called tarantism. Several large hairy spiders of the American tropics, including the huge bird spider or the crab spider, are called tarantulas, as is a spider-like scorpion, *Tarantula whitei*, found from Texas to California. While painful, their bites, so far as authentic records go, are not dangerous and never prove fatal. See *Spider*.

Tarpon (*Tarpon atlanticus*). A magnificent game fish of the Gulf coast and West Indian waters, sometimes 7 feet long and weighing over 300 pounds. It is remarkable for its enormous silvery scales, 1 to 4 inches in diameter, which are sometimes sold as curiosities. Next to the tuna, it is the greatest of game fishes, and various points on the Gulf coast have become famous as resorts for tarpon fishermen.

Teal. A group of small, beautiful fresh-water ducks. There are about 15 species, all favorite game birds, widely distributed throughout the world. Teal are migratory, make their nests usually at some distance from the water, and lay greenish or cream-colored eggs. The most common North American species is the handsome green-winged teal (*Nettion carolinense*). Other North American species are the blue-winged teal (*Querquedula discors*) and the cinnamon teal (*Q. cyanoptera*).

Tern (*Sterna*). A long-winged, web-footed, swimming bird of very graceful flight, closely related to the gulls; called also sea swallow. There are about 50 species, distributed throughout the world, most abundant on ocean shores, but also found around many inland ponds, lakes, and rivers. In size, terns are smaller and more slender than the gulls, ranging from 6 to 22 inches in length. Some 18 kinds of terns occur in North America.

Terrapin. Various small chelonians, often called pond turtles or river turtles. They inhabit marshes, ponds, and shores of slow streams. In size they vary from 6 to 14 inches, and often have beautifully colored markings. Several edible species are sold in markets as "slider" terrapin. The Diamond-back (*Malacolemmys palustris*), of the salt marshes of the Atlantic coast, is highly valued by epicures, selling from $60 to $80 a dozen and upwards. The shield plates of the shell or carapace have diamond-shaped markings, whence the name "diamond-back."

The painted terrapin (*Chrysemys picta*), also called "painted tortoise" or "mud turtle," is beautifully marked with crimson, yellow, and olive. It is about 5 inches long, and occurs from New Brunswick to Louisiana. The Western Pond Turtle, or Ellachick (*Chelopus marmoratus*), is the only fresh-water turtle of the Pacific region north of Lower California. See *Turtle*.

Thrasher (*Toxostoma*). A name given in the United States to several large thrushlike wrens, with a decurved bill, short wings, and a long tail. They are usually brown or ashy in color, with spotted breasts.

The brown thrasher (*T. rufum*), often incorrectly called "brown thrush," is one of the most familiar song birds of eastern North America. Like the mocking bird, to which it is closely related, the brown thrasher is a fine mimic. It is about a foot long, reddish brown above and buffy white streaked with blackish below. The brown thrasher nests from the Gulf states to Manitoba, Quebec, and Maine, and winters from Virginia southward. It builds its nest in bushes, thickets, and hedgerows, laying 3 to 6 bluish white, thickly speckled eggs. Its food consists chiefly of insects, spiders, small fruits, and seeds. Although injuring some grain and fruit, it amply pays for it by destroying cutworms, cankerworms, and other noxious insects.

Several similar species, including the curved-bill, Sennett, Palmer, Bendire, Leconte, Crissal, and California thrashers, are found in the western and southwestern United States.

Thrush. The thrush family (*Turdidæ*) includes many of our most familiar birds and sweetest songsters. In America, the robin (*Merula migratoria*) and the bluebird (*Sialia sialis*), both of this family, are among the earliest birds of spring, and build their nests in orchards or near the habitations of men. Of the true thrushes (*Turdus*), the veery, or Wilson's thrush, the hermit thrush, and the wood thrush are famous for the sweetness and brilliancy of their song. All are cinnamon-brown upon the upper parts with brown spots upon the breasts or sides, and all are inhabitants of groves and woodlands.

Among the thrushes of the Old World are the song thrush or mavis of the Scotch, the fieldfare, the blackbird, the song ouzel, and many others. The name thrush is also inaccurately given to birds of other families that are fine singers. See *Bluebird*, *Robin*.

Tiger (*Felis tigris*). The largest, most powerful, and most dangerous of the great cats (*Felidæ*), slightly exceeding the lion in size, and far surpassing it in destructiveness. The tiger is purely Asiatic and reaches its highest development, both in size and coloration, in the hot plains of India. A full-grown male Bengal tiger is from 9 to 11 feet and the tigress from 8 to 10 feet from the nose to the tip of the tail, and from 3 to 3½ feet high at the shoulder. The ground color of the body is rufous or tawny yellow, shaded with white on the ventral surface. This is varied with vertical black stripes or elongated ovals and brindlings. On the face and posterior surface of the ears the white markings are peculiarly well developed.

While possessing immense strength and ferocity, the tiger, unless strongly provoked, rarely attacks groups of armed men, though it often carries off defenseless women and children. In India the principal food of the tiger is cattle, deer, wild hogs, monkeys, and peafowl. When pressed by hunger or enfeebled by age and incapable of dealing with larger prey, such as buffaloes, the tiger prowls around villages, and, having once tasted human flesh, becomes a "man-eater." In 1902, man-eating tigers caused the destruction of about 1300 lives in British India. See *Cat Family*.

Toad (*Bufonidæ*). The common name for a numerous family of tailless amphibians. Most toads have a short-limbed, thickset body, a warty skin, and are terrestrial or burrowing in habit. They differ from the true frogs in the absence of teeth. Although living chiefly on land, toads almost uniformly deposit their eggs in water, though one African species brings forth its young alive. There are upwards of 100 species, of which 13 are found in the United States, the greatest variety occurring in Texas.

The common toad (*Bufo lentiginosus*) occurs from Mexico north to Great Slave lake eastward of the Rocky mountains, throughout North America. It is 3½ inches long, or longer, with a rough, warty skin, generally brownish above and yellowish below. It remains quiet in shady places or burrows beneath the earth during the day, going forth at night in

search of food. A single female sometimes lays as many as 12,000 eggs, which are deposited in water in gelatinous ropes or cylinders. When frightened, toads puff out their skins, which secrete an acrid fluid very irritating to tender surfaces, such as the lips of a dog, but otherwise they are harmless. Toads are not poisonous, nor can they produce warts. On the other hand, they destroy immense numbers of injurious insects and should, therefore, be preserved and protected. See *Amphibians.*

Torpedo (*Narcobatidæ*). A family of remarkable rays. They are provided with an electric organ, situated under the skin about the back of the head, which is capable of benumbing an enemy by a severe electric shock. Torpedoes are known also as crampfishes and numbfishes, and, though not abundant, are found in all warm seas. The torpedo, or crampfish (*Tetronarce occidentalis*), of the Atlantic coast, 3 to 5 feet long and sometimes weighing 200 pounds, is one of the largest species known. The rare California torpedo (*T. californica*), which reaches 3 feet in length, is sometimes taken in warm sandy bays on the Pacific coast. See *Ray.*

Tortoise (*Testudinidæ*). The common name of the land turtles whose limbs are developed for walking. Many frequent barren situations and some live in true deserts. Of some 40 species, 3 occur in North America. The gopher tortoise (*Testudo polyphemus*) dwells in burrows in sand hills from South Carolina to Texas. Its high dome-shaped shell is much longer than wide. Agassiz's tortoise (*T. agassizi*), about 9 inches long, is found in the deserts of Arizona and southern California. The giant tortoise (*T. vicina*) of the arid Galapagos islands, attains great size, weighs several hundred pounds, and is believed to live for centuries. Specimens have been kept in captivity for more than 100 years. See *Turtle.*

Totem Animals. Among savage peoples no belief is more common than that some peculiar kind of animal is the guardian of each clan or local group, protecting it in all its affairs. This animal is the totem of the group. Each member of the group must show this totem animal proper respect, may regard it without fear, must not injure, kill, or eat it, but must worship and propitiate it.

The savage believes that he is descended from his totem. His clan is named from it, and identified by crude symbols or images of it. Be it bear, deer, eagle, or whatever else, he may embroider it as a symbol on his tent, as did the Indians of the United States, or carve it on a tall post set in front of his house, as did those of Alaska; or he may tattoo it upon his body, as did the natives of the South Pacific. When an animal of the kind dies, he buries it with the same rites that are accorded to a member of his clan.

Toucan. The toucans form a numerous family of birds (*Rhamphastidæ*), allied to the puff birds and woodpeckers, remarkable for the immense size of their bills, sometimes more than half the length of the body, and for their brilliantly colored plumage. There are about 60 species, all natives of tropical America. While subsisting chiefly on fruit, they also devour small birds, lizards, and other small animals. Toucans are readily tamed and make interesting pets. The largest is the Toco toucan (*Rhamphastos toco*) of Argentina, 24 inches long, with a bill nearly 7 inches long. One of the best-known is the ariel toucan (*R. ariel*) of Brazil, with brilliant yellow and scarlet markings.

Tree Frogs (*Hylidæ*). This interesting family of small amphibians, though possessing teeth in the upper jaw, is otherwise closely related to the toads. Tree frogs vary from less than 1 inch to 5 inches in length, are usually green or variegated in color, and their toes are expanded into adhesive disks for climbing. Owing to a large resonating sack in the throat, their voices are surprisingly loud. They possess the power of changing color to correspond with that of their surroundings. Owing to their abundance, they destroy immense quantities of insects. There are about 200 species, occurring throughout the world except in Africa. Fifteen species are found in North America. See *Amphibians.*

Trichina (*trĭ-kī'nȧ*) (*Trichina spiralis*). A small, nematode worm, closely related to the hookworm. In its immature state it inhabits the muscles of man, the pig, and other mammals, the original host being presumably the rat. The young worms, about $\frac{1}{25}$ of an inch long, are the cause of a very painful and often fatal disease, called *trichinosis*, in man.

When pork containing the encysted worms is eaten without being sufficiently cooked, living worms are released. Upon passing into the intestine they become mature in a few days' time. The female, a slender round worm, about $\frac{1}{8}$ of an inch in length, immediately brings forth young worms, continuing for a period of 2 or 3 weeks. These young worms pierce the intestinal wall and migrate through the blood and lymph to the muscles, where they encyst themselves. In thus migrating, they often so seriously impair the action of the muscles of the chest, throat, and jaws, as to cause death. See *Hookworm.*

Trogon. The trogons constitute a family (*Trogonidæ*) of beautiful tropical birds, related to the cuckoos and kingfishers. There are about 60 species, found in both hemispheres, but most numerous in tropical America. Trogons are of moderate size—the largest being somewhat smaller than a crow—with strong bills, weak feet, and long tails. They live in forests, feeding on insects, fruits, and berries, most of which they seize when on the wing. Their eggs, 2 to 4 in number, are laid in holes in trees. Among the most handsome species are the resplendent trogon, the red-bellied trogon, and the quezal. The coppery-tailed trogon (*T. ambiguus*), 12 inches long, bronze green above, rose-pink below, with black throat, white breast, and copper-colored tail, is found from southern Texas to Arizona and south to Mexico.

Trout (*Salmo* and *Salvelinus*). The most beautiful and highly prized of American fresh-water game fishes, closely related to the salmon. They are usually small or of medium size, and are often handsomely colored with various spots and markings. There are several species, all exceedingly active, swimming with arrow-like swiftness, stemming the strongest currents, ascending rapids, and leaping up small waterfalls.

For food, trout seek living prey, chiefly smaller fishes, crawfishes, worms, and insects. Trout thrive in cool, clear, rapidly flowing waters in which there are rapids and deep pools. They are most numerous in northern and western mountain brooks. Most trout spawn at the approach of winter, depositing their eggs in nests hollowed in the bottom of the stream, where they hatch early in the following spring. Nearly all trout are very gamy and afford fine sport for the angler. Their delicately flavored flesh is highly prized for food.

The brook trout (*Salvelinus fontinalis*) is the best-known American game fish. It is found in cold streams and lakes, from Maine to North Dakota, northward to the Arctic circle. It occurs also in the mountains of Alabama and Georgia and has been introduced in the Rocky Mountain and Pacific states. In small streams it ranges from 6 to 10 inches in length, but in larger ponds and lakes it attains 18 or 20 inches. Usually it does not exceed 1 or 2 pounds in weight, though it sometimes reaches 4 or 5 pounds.

The Great Lake trout or Mackinaw trout (*Christovomer namaycush*) is a food fish of great value, usually weighing from 15 to 20 pounds, but sometimes reaching 50 or 80 pounds. It occurs in

the larger lakes from Maine to Vancouver island, northward to Labrador and Alaska.

The mountain trout (*Salmo clarkii*) is characteristic of mountain streams and lakes from Colorado to California and northwestward. It weighs from 4 to 6 pounds in Lake Tahoe and from 20 to 30 pounds in Alaska.

The rainbow trout (*Salmo irideus*), "by many anglers regarded as the gamest of all fishes." (Jordan), is found in the mountains of California and Oregon. It is from 15 to 18 inches long and usually weighs from 2 to 3 pounds. This trout closely resembles the European salmon (*S. fario*). The steelhead trout (*S. rivularis*) is a highly prized game fish found in river mouths and bays from Santa Barbara to Alaska. It weighs from 12 to 20 pounds, and, on the Columbia river, it is canned in large quantities for food. It has been successfully planted in Lake Superior by the bureau of fisheries. See *Salmon*.

Trunkfish (*Ostraciidæ*). A family of curious fishes, mostly of tropical seas. Their bodies are enclosed in a bony box made up of six-sided scutes, connected by sutures, leaving only the jaws, fins, and tail free. They are from 4 to 12 inches long, are slow of motion, live in shallow water, and are protected against most enemies by their bony carapace. Unlike most solid-jaw fishes, they are not poisonous, and are often baked in the shell for food. The common trunkfish (*Lactophrys trigonus*), with the body enclosed in a three-angled shell, occurs on the Atlantic coast from New York southward.

Tuatara (*tōō'ä-tä'rä*) (*Sphenodon punctatus*). A lizard-like reptile of New Zealand. It is the only living representative of the primitive order *Rhynchocephalia* which otherwise became extinct in the Triassic age. As first pointed out by E. D. Cope, the anatomy of the tuatara sharply distinguishes it from the lizards. For example, the carpus or wrist contains ten bones, the primitive number, and all are separate. It is a sluggish animal, about 2½ feet long, fond of the water, and feeds upon worms, insects, crustaceans, and fish.

Turkey (*Meleagris*). The largest of the gallinaceous birds, and the only native American representative of the pheasant family. The wild turkey (*M. gallopavo*), of which there are several varieties, formerly ranged from the table-lands of Mexico northward over much of temperate North America, but is now rare in the United States except locally in the South and Southwest. It is about 3½ feet long and usually weighs from 15 to 20 pounds. In general its plumage is of a copper-bronze color with green reflections and variously barred with white, brown, and black. It inhabits woodlands, securing much of its vegetable and insect food by scratching among the leaves. While it runs swiftly, it is also a strong flier and roosts in trees. It nests on the ground, laying about 12 creamy-white eggs. The male is fond of strutting with the feathers puffed out and the tail spread.

The domestic turkey, a descendant of the Mexican wild turkey, was introduced into Europe by the Spaniards early in the 16th century. It is now reared in many countries for its excellent flesh and is the only domestic animal contributed by the New World that is in wide and valued use outside of its native region.

Turtle (Order *Chelonia*). The turtles differ from all other reptiles in having the body incased by a protective shell of bony plates. The upper part of this shell is called the *carapace*, and the lower, the *plastron*. Usually the head, legs, and tail can be drawn into the shell. While generally provided with claws, the feet of marine turtles are modified into flippers. Most turtles are carnivorous, though some are herbivorous. All lay eggs, covered with a leathery shell, which are usually buried in the sand and hatched by the heat of the sun, the young digging their way out. Turtles have no teeth, but their jaws have horny, chisel-like biting edges. While the name turtle properly applies to *marine* forms, terrapin to *fresh-water* forms, and tortoise to *land* forms, there is much confusion in their use.

The flesh and eggs of many turtles are much prized for food. Among the most highly esteemed are the green turtle and various terrapin. The eggs of Amazonian turtles yield oil of commercial value. There are about 300 living species of turtles, of which 44 occur in North America. Many fossil turtles are known, some of which are of enormous size. See *Sea Turtle*, *Terrapin*, *Tortoise*.

Umbrella Bird (*Cephalopterus ornatus*). A singular South American bird, related to the bell birds and cotingas, so named because of its large umbrella-like crest, which droops forward so as nearly to conceal the bill. It also has a feathered tuft or lappet, several inches long, which hangs down from the breast. The umbrella bird is about the size of a crow, with glossy black plumage. It lives in the tops of high forest trees, building a platform-like nest of small branches and laying four pure white eggs. Its food consists chiefly of fruits.

Ungulates (*ŭng'gū-lâts*) (*Ungulata*). An order of mammals embracing all the hoofed animals, or those characterized by having from one to four blunt nails or hoofs on each foot. To this important group belong most of the domestic animals, such as the horse, ox, sheep, goat, pig, and also the deer, antelope, buffalo, zebra, camel, llama, giraffe, tapir, elephant, rhinoceros, hippopotamus, and many others. With few exceptions, all the ungulates are herbivorous land animals. Their molar teeth are adapted for grinding, and the canine teeth are either very small or wanting. In all existing species the toes never exceed four in number, and in no case are plantigrade.

The living ungulates are grouped into four suborders: odd-toed forms (*Perissodactyla*), including animals like the horse, zebra, tapir, and rhinoceros; even-toed forms (*Artiodactyla*), embracing the cloven-footed animals, such as the ox, deer, pig, camel, and hippopotamus; animals with a proboscis or trunk, *Proboscidea*, as the elephant; and the peculiar conies or hyraxes, *Hyracoidea*. The elephants and the hyraxes differ so greatly from other ungulates that they are often regarded as composing distinct orders. There are more than 300 living species of ungulates, grouped in about 13 families and found in all parts of the earth except the Australian region.

Vampire. True vampires are small blood-sucking mammals belonging to the family of leaf-nosed bats, native of tropical Mexico and Central and South America. The bloodsucking vampire (*Desmodus rufus*) is a reddish brown bat, about 3 inches long, which remains in caves or hollow trees during the day. It issues forth at night in search of prey, attacking horses, cattle, and other warm-blooded animals, even including man, while they sleep, shaving the skin with their incisor teeth, and sucking the blood as it flows. It is believed that blood constitutes the sole food of this and a few other smaller species.

The great vampire, or false vampire (*Vampyrus spectrum*), a large leaf-nosed bat, 7 inches long, with a wing spread of 28 inches, occurs in the Amazon region. Its hideous face, black, shining eyes, erect, leathery ears, exposed teeth, and spear-pointed nose, give it a most diabolical expression, but it eats only fruit and insects and is entirely harmless. See *Bats*.

Vicuña (*vĭ-kōōn'yà*) (*Lama vicunia*). A South American animal of the camel family, intermediate in size between the llama and the alpaca. The vicuña is about 2 feet high at the shoulder, with a

slender neck, erectly carried head, and rich brown curly wool spotted with white. It is an exceedingly fleet-footed, alert, and active animal, with habits similar to those of the wild goat or antelope. It lives in herds in desolate places at very high altitudes in the Andes. While much hunted for its flesh and wool, it has never been domesticated like the guanaco. See *Guanaco.*

Viper (*Viperinæ*). The vipers compose a group of Old World serpents containing about 40 species, all venomous. They are usually short, with a thick body and a flat, often triangular, head, with no pit between the eye and the nostril.

The common viper, or Adder (*Vipera berus*), about 10 inches long, the only snake in England except the water snake, extends eastward throughout Europe and Asia. The Asp (*V. aspis*), common in the Alps, is the only poisonous snake found as far north as Sweden. The Puff Adder (*V. arietans*), found nearly throughout Africa, some 6 feet long, is a much dreaded reptile. When angry it hisses loudly with a puffing sound. The chain viper (*V. russellii*), sometimes 5 feet long, next to the cobra, is the most dangerous snake in India.

The horned viper (*Cerastes cornutus*), of North African deserts, about 2½ feet long, with a horn-like spike above each eye, is a vicious, aggressive snake whose bite is usually fatal. The asp associated with the death of Cleopatra is now supposed to have been this species.

Vulture. The New World vultures (*Cathartidæ*) are large, turkey-like, carrion-eating birds of prey, with powerful wings and of graceful flight. The head and the upper neck are bare; the long, weak bill is but slightly hooked, the nostrils are perforate, and the toes have blunt claws. All are voiceless. They build no nests but deposit their eggs, 1 to 3 in number, in a crevice in the rocks, in a hollow tree, or on the bare ground. There are about 9 species, most abundant in warm regions where they perform invaluable service as scavengers.

The turkey vulture, or Turkey Buzzard (*Cathartes aura*), ranges from Saskatchewan to Patagonia. It is about 2½ feet long, with a wing spread of 5 feet. The plumage is lustrous black, the bare head and neck crimson, and the bill white. It is very graceful on the wing, and soars in great circles to enormous heights. While subsisting chiefly on carrion, it will devour fresh meat, and even small living mammals, birds, and reptiles.

The black vulture, or Carrion Crow (*Catharista urubu*), is found from the Gulf states to Argentina. It is about 2 feet long, with a wing spread of 4½ feet. It associates with the turkey buzzard and acts as a scavenger, going about in flocks in the streets of populous cities. The rare California vulture (*Gymnogyps californianus*), called also California condor, is one of the world's largest birds of flight. It is from 44 to 55 inches long with a wing spread of 8¼ to 11 feet, and weighs 20 to 25 pounds. In wing spread it sometimes surpasses the famous condor of the Andes but is usually a lighter bird.

The Old World vultures (*Vulturinæ*) are similar to the American vultures in appearance though different in structure. There are 17 species, including the widely known lammergeier, the griffon, and the Egyptian vulture, or Pharaoh's hen. See *Buzzard, Condor.*

Walrus (*Odobenus*). A large marine mammal, closely related to the seals and sea lions, found in arctic regions. It is known at once by its enormous tusks or canine teeth which project straight downward from the upper jaw. These are longest in the female and sometimes attain a length of 2½ feet. They are composed of solid yellowish ivory, which is much inferior, however, to elephant ivory. Walruses have a thick, clumsy body, deepest at the shoulder. They reach a length of 12 feet and a weight of 2200 pounds. The skin, which rests upon a thick layer of fat, is clothed with brown fur but becomes more or less bare with age. The head is small and the upper lip has a sort of mustache of long, yellowish bristles. The feet, which are adapted for swimming, are also furrowed for holding on to smooth ice.

Walruses feed largely on clams and other mollusks, dug from the sea bottom with their tusks, though they also eat fish and various crustaceans. During the breeding season they visit islands and ice floes, often congregating in large numbers. Ordinarily only one young is produced at a birth and is suckled by the parent for about two years. In disposition the walrus is gentle and inoffensive, though a fierce, persistent fighter when attacked, and quick in rushing to aid a wounded companion.

There are two living kinds of walrus, one found in the Atlantic and the other somewhat larger form, in the Pacific. The Atlantic walrus (*O. rosmarus*), formerly abundant as far south as Newfoundland, is now found in few localities on the shores of the Arctic Ocean. The Pacific walrus (*O. obesus*) is the largest marine carnivore. It once existed in great herds on the northern shores of Alaska. Like the Atlantic walrus, it has been largely exterminated by commercial hunting for its valuable oil, hides, and tusks. South of the Aleutian islands it is now rarely seen.

To the Eskimo, the walrus is exceedingly valuable, furnishing flesh for food, oil for fuel and light, skins for making boats, sinews for bird nets, and ivory for various tools and implements. The almost total destruction of the walrus through commercial hunting caused great privation among the native peoples of Alaska and Siberia.

Wapiti (*wŏp'ĭ-tĭ*) (*Cervus canadensis*). A large, handsome species of true deer, the North American representative of the stag of Europe. It is usually but incorrectly called "elk." It was formerly widely distributed over the United States and Canada, but is now restricted to limited districts in the Rocky mountains and on the Pacific coast, being most numerous in the vicinity of Yellowstone national park.

The wapiti attains a height of about 5 feet at the shoulder and a weight sometimes exceeding 800 pounds. It is reddish brown in color, with blackish shades on the legs and ears. The antlers have a spread of 4 feet or more and weigh 20 to 30 pounds. Thriving equally well in mountains, forests, or plains, the wapiti is easily kept in parks and game preserves and increases in number in captivity. The Roosevelt wapiti (*C. roosevelti*), yellowish brown, with darker head and neck, and white spots on the body, is found in the Coast ranges of Oregon, Washington, and British Columbia. See *Deer* and *Moose.*

Warbler. Properly, a small song bird of either of two numerous passerine families, the American *Mniotiltidæ* or the Old World *Sylviidæ.*

The New World family, called by some the wood warblers, contains, according to Ridgway, about 200 species, most of which do not exceed 6 inches in length. They have pretty though never gorgeous plumage, and, while some sing well, most warblers have weak voices. With few exceptions, all are woodland birds and feed wholly upon insects. Of 60 or more kinds found in the United States and Canada, nearly all pass the coldest months within the tropics. Among these are the prothonotary, yellow, parula, swamp, Kentucky, Blackburnian, and hermit warblers. The birds known as redstart, ovenbird, yellow-breasted chat, water thrush, and Maryland yellowthroat are various species of wood warblers.

The Old World warblers number about 100 species, of which some of the best-known are the grasshopper, sedge, and willow warblers. The famous nightingale and robin redbreast belong to this family.

Wasp. The wasps belong to the *Hymenoptera*, the highest order of insects. They include the solitary wasps (*Sphecoidea*) and the social wasps (*Vespoidea*).

The social wasps, such as the hornet, or yellow jacket, are the best known. They build nests of paper attached to bushes, trees, roofs, and eaves of buildings. The paper is manufactured from wood fiber obtained from posts and unpainted boards. This is chewed in the mandibles or jaws and united into sheets, often of considerable extent. The nests are often top-shaped or balloon-shaped, with horizontal layers of cells inside resembling honeycomb, all enclosed in a spherical paper covering with a hole at the bottom for entrance and exit. The nests of some tropical species are occasionally 6 feet long. These wasps savagely attack intruders, and their sting is extremely painful. Wasp colonies include three forms,—males, females, and workers.

The solitary wasps include miners or diggers, mud daubers, and carpenters. The mason wasps, or mud daubers, are the most familiar, as their mud nests are commonly seen on beams and walls. The carpenters cut tubular nests in wood and divide them by mud partitions. The miners dig tunnels in the earth. Wasps are endowed with a marked degree of intelligence. See *Ant*, *Bee*, *Honeybee*.

Water Flea. A general name applied to small or microscopic crustaceans of the group of *Entomostraca*, found in all waters. They are mainly herbivorous, feeding upon the microscopic plants that float free in the water. In their turn, these minute crustaceans constitute a most important food supply for fishes and other aquatic animals. All water fleas have jointed swimming feet and antennæ. *Cyclops* has a pear-shaped body and a forked tail. *Daphne* has a flat body enclosed in a delicately sculptured, two-valved, spine-tipped shell. There are many other common forms of great beauty and interest. As their bodies are highly transparent and their internal organs varicolored, many water fleas, when observed through a microscope, are most beautiful objects. See *Crustaceans*.

Water Snake (*Tropidonotus*). A large genus of fresh-water snakes, living in ponds, rivers, and swamps. There are about 100 species, widely distributed in North America, Europe, and Asia. Ten species are found in the Southern and the Eastern states. While active and pugnacious, none are venomous. The common water snake (*T. fasciatus*, var. *sipedon*), often wrongly called "water moccasin," is very abundant from Canada to Wisconsin and southward. It is from 3 to 4 feet long, dingy brown above and spotted with red below. When cornered it flattens its head and strikes viciously, but it is perfectly harmless. It is ovoviviparous, sometimes producing 40 young in a brood.

Weakfish (*Sciænidæ*). A family of spiny-finned sea fishes, many of which are highly prized for food. The common weakfish, or Squeteague (*Cynoscion regalis*) is one of the most valuable food fishes of the Atlantic coast. It is graceful in form, has an undivided tail fin and a projecting lower jaw. It usually weighs from 1 to 6 pounds, though it is often larger. The White Sea Bass, or Santa Catalina Salmon (*C. nobilis*), attaining a length of 4 to 6 feet and a weight of 20 to 80 pounds, is an important food fish of the Pacific coast. The California Bluefish, or Corvina (*C. parvipinnis*), steel-blue in color, sometimes 2 feet long and weighing 8 pounds, is also an excellent food fish.

Weasel (*Putorius noveboracensis*). A small fur bearing mammal of the family *Mustelidæ*. It has a remarkably slender body, a long head, and short legs, and is usually from 12 to 16 inches long, inclusive of the rather short tail. In color it is brown above and white or pale yellow below, with the end of the tail black. In the North, during winter, the fur, except the black tip of the tail, becomes more or less white. When in the winter phase, the animal, like various other species of weasels, is known as ermine.

In one or more of its varieties, the common weasel occurs throughout the eastern United States and Canada, ranging westward to Minnesota and southward to North Carolina. With tireless energy and great courage it preys upon rats, mice, hares, rabbits, birds, and other small animals. Fastening upon the neck of its victim, the weasel first sucks its blood, next devours its brains, and then sometimes eats part of its flesh, often killing many more animals than it needs for food. It is especially fond of eggs and is a notorious despoiler of birds' nests and henroosts. Although numerous, even near large cities, the weasel is but little known to most people, owing to its habit of coming forth only at night. It lives in holes under walls, rocks, and trees, and in burrows captured from woodchucks and ground squirrels. See *Ermine*.

Weaver Bird. The popular name for a numerous family (*Ploceidæ*) of Old World birds, closely related to the finches. There are about 275 species, 200 of which occur in Africa and the remainder in Asia and the East Indies. They are small birds, with conical, often coral-red bills, noted for their remarkable skill in weaving elaborate nests. These exhibit great diversity of form and structure. Some are pouches elongated into tubes, entered from below; others are kidney-shaped, with the entrance at the side. The social weaver bird (*Philetærus socius*) lives in communities, building an umbrella-shaped roof in a tree, under which there may be as many as 200 or 300 individual bird homes.

Weevils. A general name applied to seed-eating snout beetles (*Ryncophora* in the order *Coleoptera*), especially to those that feed upon grain. The most important are the members of the genus *Calandra*, which feed upon cereals, as, for example, the granary weevil and the rice weevil. They are exceedingly hard-shelled, very small beetles, one-eighth of an inch long, of grayish color, with the front of the head produced in a long, stout beak. In tight bins, weevils are controlled by fumigation with poisonous gases. See *Beetle*, *Boll Weevil*.

Whale. A cetacean mammal, the largest of living animals. Though fishlike in form and living only in the sea, whales are true mammals. They are warm-blooded and air breathing, bringing forth their young alive and suckling them in the same manner as land mammals. There are two types of families, the baleen whales (*Balænidæ*) and the sperm whales (*Physeteridæ*), comprising in all about 25 species, distributed in all oceans.

The whale has an immense head, with distorted jaws and upward directed nostrils, great bulk, and rudimentary limbs. The nostrils, commonly called blowholes, are placed on the top of the head, and the animal can breathe only when these are above water. Instead of being vertical, as in fishes, the tail is horizontal, and furnishes immense driving power. The tail is used also as an offensive and defensive weapon. The blubber, which is a thick layer of fat, preserves the animal heat, and serves to bring the mighty bulk of the whale nearer to the specific gravity of the water in which it spends its life.

The food of whales consists chiefly of minute mollusks and crustaceans with which their immense pasture grounds in the seas abound. In the baleen whales the enormous head is entirely destitute of teeth. Instead of teeth, the palate is furnished with an apparatus of baleen, or whalebone. This serves the purpose of straining out of the water the small marine animals upon which these whales feed.

The sulphur-bottom whale (*Balænoptera sulfureus*) of the Pacific Ocean, the largest of the baleen group, and the largest known whale, sometimes reaches a length of 95 feet, and a weight of about

150 tons. The baleen of such whales weighs about 800 pounds. The blubber is from 1 foot to 2 feet in thickness, the whole mass in a large whale sometimes weighing more than 30 tons.

The right whale (*Balæna mysticetus*), called also the Greenland whale or "bowhead," is the most important species commercially. It abounds chiefly in the arctic regions, attaining a length of 60 or 70 feet. It furnishes large quantities of baleen and oil,—a single specimen sometimes yielding 3500 pounds of whalebone. The California gray whale (*Rachianectes glaucus*), 45 feet long, which frequents shallow water from the arctic seas to Lower California, is a savage and dangerous species.

Sperm whales have teeth in the lower jaw, but no baleen plates or whalebone. They live almost entirely upon cuttlefish and squid. The huge, very blunt head occupies one-third of the length of the body. The entire head consists largely of a cartilaginous case filled with an oily liquid. On exposure to the air, this oillike matter hardens, and the resulting waxlike substance is the valuable spermaceti of commerce, much used in making candles. The oil of this whale, called sperm oil, is much superior to ordinary whale oil. Another product is ambergris, used in perfumery. This is formed in the intestines but is usually found floating on the sea. The great sperm whale (*Physeter macrocephalus*), the largest and best-known member of the group, found in all warm seas, attains a length of 55 or 60 feet.

Whale fisheries were formerly a very important industry. Large fleets of whaling vessels sailed to nearly all quarters of the globe. Whale oil, whalebone, sperm oil, and spermaceti were staple articles of commerce. However, since the introduction of petroleum, gas, and electric lighting, the industry has greatly declined.

Whale Shark (*Rhinodon typicus*). An immense shark, called also basking shark, of the tropical Indo-Pacific ocean. It attains the greatest length of all known living fishes, sometimes exceeding 50 feet and reputed to reach 70 feet. It is a sluggish monster, with the mouth and nostrils near the end of the muzzle, and with feeble teeth. It does not pursue its prey, but feeds upon small marine creatures taken without effort. Like most species of sharks, it is harmless to man. See *Shark*.

Whippoorwill (*Antrostomus vociferus*). A species of goatsucker or nightjar, so named because of its peculiar cry, which is repeated continually in the night. The whippoorwill is found throughout eastern North America from the Canadian border southward. It is about 10 inches long, grayish in color, variegated with blackish and buff. The whippoorwill remains hidden during the day and flies by night, usually with its large mouth wide open to catch the insects which constitute its food. It makes no nest, but lays two brown-blotched whitish eggs on the ground or on a log or stump.

The similar Chuck-will's-widow (*A. carolinensis*), 12 inches long, reddish brown in color, occurs in the southern United States. It flies during twilight, feeding upon various insects. The Poorwill (*Phalænoptilus nuttallii*), about 10 inches long, breeds from Nebraska to British Columbia, southward into California, and winters in Mexico and Guatemala. It feeds upon night-flying moths and other nocturnal insects. See *Nighthawk*.

Whitefish (*Coregonus*). A group of food fishes of the salmon family. They have a long, flattened body, a cone-shaped head, and a very small mouth, almost destitute of teeth. In color they are bluish olive above and silvery below and on the sides. There are some 15 species, found in lakes and streams in northern America, Europe, and Asia.

The common whitefish (*C. clupeiformis*), 1 to 3 feet long, with an average weight of about 4 pounds, is regarded as the finest flavored food fish of interior American waters. It occurs in lakes from New England westward to Lake Superior and northward to the Arctic circle. The annual catch in the United States and Canada exceeds 30 million pounds.

The Sault whitefish (*C. labradoricus*), called also lake whiting, about 20 inches long, is found in clear lakes and streams from Maine to Labrador and Lake Superior. The Rocky Mountain whitefish (*C. williamsoni*) occurs in clear streams from the Rocky mountains to the Pacific coast. Like the trout, it will take a fly and is a favorite of sportsmen.

The closely related Lake Herring, or Cisco (*Argyrosomus artedi*), of the Great Lakes region, ranks next to the common whitefish in commercial importance. It is somewhat smaller, usually about 15 inches long, bluish above and silvery below, with a larger mouth and a projecting snout.

Wolf (*Canis*). A savage animal of the dog family, closely related to the fox and the jackal. There are several species, with numerous varieties, found chiefly in northern regions. None occur in Africa, South America, or Australia.

The gray wolf, or timber wolf (*C. occidentalis*), strongly resembles a tall, gaunt dog, with a wide head, erect ears, long nose, and pointed muzzle. The obliquely set eyes give it a vicious appearance. Including the bushy, drooping tail, it is about 5 feet long, and stands slightly over 2 feet high at the shoulder. In color it is gray above, more or less mixed with blackish, and yellowish gray varying to white below. As a rule, it is sly, stealthy, and cowardly, but, when provoked by hunger, becomes bold and dangerous.

The timber wolf lives chiefly upon poultry and other small animals, preying habitually upon the weak, sick, and injured. When hungry, it will eat also birds, mice, frogs, and sometimes carrion. It hunts singly and in packs. A single wolf can bring down a full-grown deer. A numerous pack will attack cattle, horses, and the largest game animals. Except when desperate from starvation, wolves rarely, if ever, molest man.

During the spring and summer, wolves live singly or in pairs, making dens in caverns in the rocks, in hollows under the roots of trees, or in holes in thickets dug by themselves. In these the young, called cubs, usually from 6 to 10 in number, are reared. During autumn and winter they often congregate in packs. When in groups, wolves utter short, rapid, snarling or snapping cries, but when alone their call is usually a long, weird, blood-curdling howl.

While formerly numerous, the timber wolf has been practically exterminated east of the Mississippi river and Lake Huron. It is locally abundant in the Rocky Mountain region, in the Pacific states, and in northern Canada, where it is often very destructive to sheep and other domestic animals.

The prairie wolf, or Coyote (*C. latrans*), is similar in form and color to the timber wolf but is about one-third smaller. While an exceedingly cowardly and slinking animal, it is a notorious killer of poultry, pigs, lambs, rabbits, young colts, calves, and other farm animals. The coyote is found in the Rocky Mountain region, from Mexico to northern Canada.

The white wolf (*C. albus*) of arctic America, pure white except the black-tipped tail, and the black wolf (*C. ater*) of the Florida everglades, are very closely related to the gray wolf. The European gray wolf (*C. lupus*), especially numerous in parts of Russia and Siberia, is also very similar in appearance, habits, and disposition to the American gray wolf.

While varying much as to length and thickness of hair, wolf skins are much prized for fur, and are extensively made into coats, robes, and rugs. See *Dog*, *Fox*, *Jackal*.

Wolverene (*Gulo luscus*). A carnivorous fur bearing animal, found in the northern United States and Canada. It is closely related to the marten, and is called also "carcajou," "glutton," and

"skunk-bear." It is about 2½ feet long exclusive of the tail, with a thickset body, square head, low ears, strong, short legs, bearlike feet, and a bushy tail. In color it is blackish with a light brown or whitish stripe on each side. The wolverene is noted for its voracity, ferocity, and sagacity. It feeds upon small mammals, birds, and carrion.

Where numerous, wolverenes are a great obstacle to fur-hunting, robbing traps of their bait or captured animals, and displaying great cunning in avoiding capture. The wolverene is notorious also for plundering stores of meat, fish, and provisions, often carrying away and hiding articles that it cannot use. Its valuable fur is much used for making mats, robes, and muffs.

Wombat (*wŏm'băt*) (*Phascolomys wombat*). A burrowing marsupial mammal, native to Australia and Tasmania. It is from 2 to 3 feet in length, of clumsy form, with stout legs, very short tail, blunt snout, and rough hair of varying color. In actions and general appearance, wombats resemble small bears. They have a similar shuffling gait, and even shorter legs and broader backs. Wombats live usually in burrows, and feed chiefly on roots, grasses, and other vegetable substances. In habit, they are nocturnal, sleeping by day and going forth for food at night. While possessing only limited intelligence, wombats are gentle in disposition and are capable of a minor degree of domestication. Their flesh, which is said to resemble pork, is highly esteemed for food. Besides the foregoing, there are several less common species, of similar size and habits. See *Marsupialia*.

Woodchuck (*Arctomys monax*). A hairy-tailed rodent, allied to the squirrels and known also as the American marmot and ground hog. It inhabits North America from the Atlantic seaboard to Nebraska and from Hudson bay to South Carolina. A full-grown specimen is about 19 inches long, inclusive of the tail, and weighs from 10 to 15 pounds. The head is broad and flat, the legs short, and the body thick and "chunky." The prevailing color is a grizzly, reddish gray, although individuals are frequently nearly black, while others are whitish. The fur has no commercial value.

Woodchucks dig holes, preferably in gravelly hillsides, in which they live and in which the young are born. The bottom of the burrow is usually below the frost line and may extend from 15 to 20 feet underground, sometimes having several connecting passages. In summer they frequent meadows and cultivated fields, doing much damage to the crops upon which they feed, and becoming very fat. At the approach of winter they retire to their burrows, preferring those in the woods, where they remain in a comatose state until spring.

The woodchuck is one of the earliest animals to go into winter quarters and one of the first to emerge in spring. According to popular legend he emerges on February 2, "Ground-hog Day." If he sees his shadow, he immediately returns to his burrow and sleeps six weeks longer, betokening a late, cold spring.

Woodcock (*Philohela minor*). A small game bird of the snipe family, found in eastern North America from Labrador to Manitoba and southward. It is about 11 inches long, with a stout body, short neck, and a long bill which is very sensitive at the tip. The large eye is placed far back in the head. In color it is mottled tawny, black, and gray above, and pale grayish buff below. The woodcock inhabits fresh-water swamps and margins of streams, feeding at night upon earthworms and various insects, which it secures by probing in the mud or by turning over leaves. It builds a nest of leaves and grass, usually on the ground in woods, and lays 4 buffy white eggs spotted with brown. The European woodcock (*Scolopax rusticola*) is similar but much larger. Both species are highly prized for the table, and, in consequence, their numbers have been very greatly depleted by hunting.

Woodpecker. The woodpeckers form a large and distinctly marked family of birds (*Picidæ*). They are forest birds, ranging from about 5 to 20 inches in length, with long, powerful, chisel-shaped bills, well adapted for cutting wood. The feet have two toes directed forward and two (rarely only one) backward, with strong claws for climbing. In many species the short, stiff, spiny-tipped tail feathers serve as a prop when climbing or resting. The long, distensible tongue has a horny, spearlike tip for impaling insects. Woodpeckers nest in holes which they excavate in trees, and their eggs are uniformly white. They feed chiefly upon insects, such as borers, grubs, and ants, which they dig from the bark and wood of trees. Some eat berries, seeds, and acorns, which they sometimes store like squirrels, and others subsist in part upon the sap of trees. The vocal powers of woodpeckers are of limited range, though some have strong, clear notes. Most species beat with their bills a long, rolling tattoo, which is a mating call or love song.

There are about 400 species of woodpeckers, found throughout the world except in Australia, Polynesia, and Madagascar. About half of these are native to the New World, some 25 occurring in North America. Among these are the flicker, the sapsucker, and the red-headed, white-headed, hairy, downy, ivory-billed, pileated, and three-toed woodpeckers. The California woodpecker (*Melanerpes formicivorus*), closely related to the eastern redhead, is noted for its habit of drilling holes in trees, sometimes thousands in a single trunk, into each of which it hammers an acorn to be used later as food.

Although occasionally eating fruit or grain, woodpeckers are very useful birds, destroying millions of tree borers and other injurious insects.

Wren. The wrens form a numerous family (*Troglodytidæ*) of small song birds. They are closely related to the mocking birds and creepers, and comprise about 150 species, chiefly natives of tropical America. About 12 occur in the United States, but only one true wren is found in Europe. Wrens have a somewhat curved bill, very short wings, a short tail, usually carried erect, slender legs, and dull plumage. As a rule, they are active, nervous, aggressive, highly musical birds, 4 to 8 inches long, dwelling mostly on or near the ground, in thickets, patches of cactus, or in piles of rock. Their food consists almost entirely of insects.

The familiar house wren (*Troglodytes aëdon*), 5 inches long, nests in or near dwellings from the Gulf states to Manitoba, Quebec, and Maine, and winters from South Carolina southward. It builds its nest in hollow trees, crevices in rocks, holes in walls, or in bird boxes, laying from 6 to 8 minutely speckled eggs, and often rearing two broods in a season.

Among other interesting species are the Bewick, Carolina, winter, and marsh wrens of the Eastern and Southern states, and the Baird, Vigors, Parkman, cactus, rock, and canyon wrens of the Western and Southwestern states. Of these, the cactus wren, about 8 inches long, is noted for its large size, and the Carolina and canyon wrens for their powers of song.

Yak (*Bos grunniens*). A ruminant mammal related to cattle and sometimes known as the "grunting ox of Tartary." It inhabits the highest and coldest regions of central Asia, pasturing near the snow line on the mountains. The yak is about the size of the domestic ox, which it somewhat resembles in form. The head is short, the horns tapering, spreading, and curved backward. The body is covered with long, silky, usually blackish brown hair which hangs down like the wool of a sheep. Between the horns is a mass of thick curly hair, and over the shoulders is a large bunch of long, fine hair, resembling a hump, and giving the animal the appearance of a buffalo or zebu. The tail is covered with long hair, like the tail of a horse,

and descends nearly to the ground. The voice is a short grunt very similar to that of a pig.

The domesticated yak is of great importance to the Tibetans, forming a large part of their wealth. It is used as a draft animal, as a saddle animal, and as a beast of burden. The milk is rich and yields a high per cent of butter, which is an important article of domestic commerce. The meat resembles beef and is palatable and nutritious. The hair is spun into ropes or woven into cloth for tent coverings; the finer fur of the hump is used for clothing. The skins, tanned with the fur on, are used for caps, outer winter garments, rugs, and blankets.

Yellowbird. The name given to several familiar birds with predominantly yellow plumage. In the United States, the name is applied to the American goldfinch and especially to the yellow warbler (*Dendroica æstiva*), which is commonly known as the "summer yellowbird." The latter is common in summer throughout the eastern United States and Canada. In color it is a bright yellow dimly marked with salmon-colored streaks. It builds a deep nest of strong, compactly woven fibers, which is placed in an upright fork of a shrub or small tree. The pinkish white eggs, 4 or 5 in number, are marked with reddish and purplish dots. Summer yellowbirds often outwit the cowbird which drops an egg in their nest, by building a false floor over the intruding egg and then hatching their own brood above it. Like various other warblers, the summer yellowbird has a sweet, trilling song, which is often heard in gardens, parks, and orchards. See *Goldfinch, Warbler.*

Yellowlegs (*Totanus*). The popular name for two well-known American birds of the snipe family. They have long, slender bills, cross-barred tail feathers, and long, greenish yellow legs. Because of their great alertness and continual noisy calls, sportsmen often call them "telltale snipe."

The greater yellowlegs (*T. melanoleucus*) is about 14 inches in length with a wing spread of 2 feet. The upper parts are dark ashy, and the under parts are white, streaked and barred with black. During some part of the year this game bird inhabits nearly all parts of the Americas. In summer, it breeds from the northern United States northward far beyond the Arctic circle; in winter, it migrates as far south as Argentina. In the United States, it is seen most commonly along ocean shores, though it migrates through the Mississippi valley, and is found also around the interior lakes. Its food consists largely of small fishes, mollusks, shrimps, crabs, worms, and insects. Its nest is a grass-lined depression in the ground, in which it lays usually 4 greenish yellow eggs, blotched with gray and brown.

The lesser yellowlegs (*T. flavipes*), 10 to 11 inches long with a wing spread of 20 inches, is very similar in color, range, and habits. In the eastern United States, it is more common than the greater yellowlegs, flies in larger flocks, and is better known to hunters of shore birds.

Yellowtail. The name given in various parts of the world to several different fishes because of the yellow or orange color of their tail fins. The yellowtail, or blanquillo (*Caulolatilus princeps*), of southern California and Mexican coasts, is interesting as a game fish, and is also highly prized for food. It is closely related to the Atlantic tilefish, and is abundant along rocky shores. While usually of smaller size, it attains a length of 3 feet and a weight exceeding 50 pounds.

Zebra (*Equus*). A large asslike mammal, native of Africa. It is strikingly distinguished from all other members of the horse family by having the body marked with dark brown or blackish stripes. It differs from the horse in its larger head, longer ears, narrower hoofs, and upright mane. Four species are usually recognized, one of which, the *quagga*, has recently become extinct.

The mountain zebra (*E. zebra*), often called the "true" zebra, is a native of the mountainous districts of South Africa. It is about 4 feet high at the shoulder, of graceful form, with slender limbs, light head, and long open ears. Its ground color is white or yellowish white, and the head, neck, body, and legs are transversely striped with black. This handsome species has now become rare.

The other living species are Burchell's zebra (*E. burchelli*), of South Africa, and Grevy's zebra (*E. grevyi*), which inhabits the hilly country north of the Victoria Nyanza. The former, called "dauw" by the Boers, is the species most often seen in menageries. The latter is more slender than the true zebra, and the black markings are narrower and closer together. The habits of the zebra, on the whole, are very similar to those of wild horses and asses. See *Horse.*

Zebra Wolf (*Thylacinus cynocephalus*). The largest of the flesh-eating marsupial animals; called also pouched dog, Tasmanian wolf, or thylacine. It is slightly smaller than the common wolf, which it resembles in general appearance, but differs by having black stripes across the back, somewhat like those of a zebra. This peculiar marsupial is found only in Tasmania, where it was formerly abundant. In its nocturnal raids for food, it commits great depredations on sheep and poultry. See *Marsupialia.*

Zebu (*Bos indicus*). The European name given to the humped ox found in southern Asia, eastern Africa, and adjacent islands. It has been domesticated since remote antiquity and the parent wild species is unknown. The ancient Egyptians pictured it on their monuments, and the Hindus have held it in age-long veneration. Thousands of years of domestication have produced breeds varying extremely in size, some being larger than our largest oxen while others are no larger than a Newfoundland dog.

The prevailing color is a rusty gray or mouse color but this is not constant, buff, red, and black also being found. The ears are pendulous and the horns usually short or wanting. There is a conspicuous dewlap, and a prominent fatty hump over the shoulders. The flesh makes excellent beef, the fatty hump being regarded as a great delicacy. These cattle are gentle and docile, and are used as beasts of burden and as draft and saddle animals. It is said that a zebu may be driven 30 miles in a day when harnessed to a carriage, or ridden when saddled at the rate of 6 miles an hour for 15 hours.

In India, the white bulls are considered sacred by the Brahmans and allowed to graze, without interference, in gardens and cultivated fields as they will. Humped cattle have been introduced into Central America and Jamaica for use on plantations. The Galla Ox, called also sanga or sunga, is a peculiar Abyssinian breed with massive horns nearly 4 feet long. See *Ox.*

Zeuglodon (*zū'glō-dŏn*). A member of a group of extinct whalelike cetaceans whose fossil remains are found in the strata of the Eocene period. The living animal was probably about 70 feet long and in shape somewhat resembled the whale of the present day, but was more slender and snakelike. It differed from all existing whales, however, in having two kinds of teeth. The incisors and canines were conical, but the back teeth, or molars, had serrated triangular crowns and were inserted in the jaw by two roots. In appearance each molar tooth resembled two teeth united by their crowns. This peculiarity gave rise to the name zeuglodon, which, in Greek, means "yoke tooth."

The bony remains of these whales occur in great profusion in the Eocene marls of the southern United States. According to Dana, the larger joints of the backbone (vertebræ) were a foot and a half long and a foot in diameter. In some localities in Alabama these bones were formerly so abundant that they were built into walls or burned in order to clear the fields for cultivation.



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MOTHS AND BUTTERFLIES

1 Ailanthus Silkworm Moth. 2 Polyphemus Moth. 3 Cocoon, Ailanthus Silkworm Moth. 4 Luna Moth. 5 Cocoon, Polyphemus Moth. 6 Larva, White-lined Sphinx Moth. 7 Promethea Moth. 8 Larva, Cecropia Moth. 9 Spicebush Swallow-tail Butterfly. 10 Cocoon, Cecropia Moth. 11 Mourning-Cloak Butterfly.













CITROUS FRUITS

Orange Tree in Fruit
(*Citrus aurantium*)

Lemon, Flowers and Unripe Fruit

Grapefruit Tree
(*Citrus decumana*)

Oranges, Ripe Fruit

Lemon Tree
(*Citrus medica*)

Cluster of Ripe Grapefruit

BOTANY is the science which treats of plant life. As plants may be considered from various points of view, there are several important divisions of the science.

Regarded as a living organism, an individual plant may be considered in two ways. First, it may be studied with reference to its form and parts; that is, its *structure*. Second, it may be studied with reference to the uses of these parts or organs; that is, its *functions*. In these are represented the two great fundamental divisions of botanical science,—anatomy, or structural botany, and physiology, or physiological botany. All other divisions of the science are special developments of one or both of these, either exclusively or in relation also to other branches of knowledge.

Structural Botany. This division, called also *Plant Morphology*, deals with the form and structure of plants, especially with the shape and relation of their different parts or organs. It includes *Plant Anatomy*, and passes into the microscopic consideration of vegetable tissues, or *Plant Histology*. The latter includes *Cytology*, which is the study of the various forms of *cells* as the organic units of plant life. The essential element in the cells is *protoplasm*, or life substance. All plant structures, from the simplest to the largest and most complex, arise from various combinations of cells.

Physiological Botany. The study of the living plant in action, called also *Plant Physiology*. It considers all the important life processes and functions, including nutrition, absorption, transpiration, photosynthesis, respiration, movement, and reproduction.

Systematic Botany. The study of the classification of plants and their grouping into floras, or the orderly arrangement of the plants of different regions. This division is called also *Taxonomy*.

Plant Sociology. This division, commonly termed *Ecology*, and also regarded as a part of *Bionomics*, takes up plants in their relation to other plants and considers their adjustment to their physical surroundings. Certain plants live in the water, other plants live in marshes, still others in deserts, and some upon high mountains. Ecology studies the plants of each group in relation to their environment.

Economic Botany. The study of plants with reference to their usefulness to man, including the origin and distribution of cultivated plants. This division of botany considers also wild plants of economic value, such as timber trees, rubber and other gum trees, medicinal plants, dye plants, and forage plants.

Plant Breeding. The study of plant improvement, by means of crossing and selection, thereby developing more productive or desirable varieties of economic plants. On its scientific side, called *Genetics*, it deals with the problem of heredity. The practical application or art of plant breeding is revolutionizing agriculture, horticulture, and floriculture.

Plant Pathology. The study of plant diseases, called also *Phytopathology*. In agriculture, horticulture, and floriculture, this subject is of immense practical value. By reason of their great economic importance, the nature, effects, and especially the prevention of plant diseases, are subjects of extensive investigation and research.

Plant Geography. The distribution of plants throughout the world, called also *Phytogeography*. This division of botany concerns itself with the causes which have brought about and now maintain the distinctive plant populations or floras existing in various regions. On the side of plant relations, plant geography merges with ecology, and, on the side of plant history, with paleobotany.

Geological Botany. This division, called also *Paleobotany*, comprises the study of fossil plants or extinct vegetable life. It is of great interest and value for what it reveals concerning the ancestry, development, and relationships of the plants now existing upon the earth.

CLASSIFICATION OF PLANTS

Beginning with plants having the simplest structure and progressing upwards to the most highly organized forms, the vegetable world comprises four great natural divisions:

PLANT KINGDOM

Subkingdom 1. Thallus Plants (*Thallophyta* or Thallophytes),—algæ, bacteria, fungi.

Subkingdom 2. Moss Plants (*Bryophyta* or Bryophytes),—mosses and liverworts.

Subkingdom 3. Fern Plants (*Pteridophyta* or Pteridophytes),—ferns, club mosses, horsetails.

Subkingdom 4. Seed Plants (*Spermatophyta* or Spermatophytes),—flowering plants, trees, shrubs, herbs.

The thallus plants have plant bodies which are not separated into root, stem, and leaves, and they do not possess the reproductive structures known as *archegonia* found in the next higher group.

The moss plants have reproductive structures known as *archegonia*, but they do not possess the fibrovascular bundles or true plant ducts and woody tissues found in all higher groups.

The fern plants possess fibrovascular bundles but do not produce seeds.

The seed plants possess fibrovascular bundles or true woody tissue, and normally produce seeds.

The foregoing is a brief statement of the fundamental distinctions between the grand divisions of the plant kingdom. From these distinctions it will be seen that each higher group is characterized by the possession of important plant structures not found in any group which ranks below it.

While all plants so far known may be readily referred to the foregoing groups, these grand divisions are not regarded as equivalent natural groups. Some eminent authorities hold that there should be more subkingdoms; that is, more divisions of primary rank. For example, some of the biologists who regard the slime molds as plants group them with the fungi; others, however, make of the slime molds a fifth subkingdom, *Myxophyta*, which they rank below the thallophytes as the most primitive of all plants. But still other biologists regard the slime molds as animals, *Mycetozoa*, and classify them with the protozoans. In the present state of knowledge, the classification of plants into four primary groups, as described in the foregoing paragraphs, is more widely accepted and used than any other.

The plants which, without the aid of cultivation, grow naturally and spontaneously in any region constitute its flora. The name "flora" is given also to a book in which the plants of a designated area are described in systematic order.

The classification of a plant in a flora is determined by the structure of the plant itself and by its relationships to other plants. For example, the place of the white oak in the plant kingdom is as follows:

Subkingdom:	*Spermatophyta*, or seed-bearing plants.
Class:	*Angiospermæ*, or plants with seeds enclosed in seed vessels.
Order:	*Fagales*, plants of the beech-birch alliance.
Family:	*Fagaceæ*, plants of the beech group.
Genus:	*Quercus*, the oaks.
Species:	*Alba*, the white oak.

PLANTS

Acacia (*ȧ-kā'shȧ*). A numerous genus of shrubs and trees of the mimosa group of the pea family, containing about 450 species. Of these, about 300 are native to Australia and Polynesia, the remainder being found in other warm regions. About 17 species grow in the southern United States. The leaves are usually divided into minute leaflets, but in many Australian species the leaflets are practically wanting, the enlarged green leafstalks, called *phyllodia*, serving in place of true leaves. The very numerous small flowers are mostly borne in globular clusters.

Many acacias are of importance as the source of valuable gums, timber, tan barks, and food products. Several Asiatic and African species yield gum arabic. Gum senegal and the drug catechu come from acacias. The Blackwood, or Blackheart, an Australian species (*A. melanoxylon*), now grown in California, furnishes a very valuable cabinet wood. Various species of acacia are planted for ornament, especially those of rapid growth.

Among the best-known American species are the Catsclaw (*A. greggii*), an exceedingly thorny shrub of the southwestern deserts, and the Huisache (*A. farnesiana*), a small tree, native to Texas, with bright yellow, very fragrant blossoms appearing in February. The huisache is often grown for ornamental purposes.

Alder (*Alnus*). Trees and shrubs of the birch family, natives of cold and temperate regions. There are about 14 species, some 9 of which occur in North America.

The European black alder (*A. glutinosa*), a native of Europe and Asia and introduced into eastern America, is a tree 30 to 60 feet high, with smooth bark and sticky leaves. The wood is extensively used in making the best kinds of charcoal for gunpowder. It resists decay in water and is much employed for piles, pumps, sluices, and pipes. The bark yields a yellow and a black dye.

The speckled alder (*A. incana*) is a swamp shrub which grows from Newfoundland to Saskatchewan and south to Pennsylvania and Nebraska. The wood is of little value but the bark is used in dyeing.

The white alder (*A. rhombifolia*), 30 to 100 feet high, grows in the Sierra Nevada and Coast ranges from southern California to Washington. The Oregon alder (*A. rubra*), 40 to 90 feet high, ranges from Idaho to Washington and Oregon and southward through California. The wood is used for cheap furniture, piles, bridge foundations, and boats. The mountain alder (*A. tenuifolia*), 8 to 30 feet high, found from Saskatchewan to British Columbia and southward to New Mexico and Lower California, is the common alder of the Rocky Mountain region. The Sitka alder (*A. sinuata*), 20 to 30 feet high, grows from Alaska to Oregon and Montana. The wood is of no commercial value.

Alders are usually the first trees to grow at the borders of retreating glaciers or in the track of avalanches.

Alfalfa (*Medicago sativa*). A valuable fodder plant, called also lucerne, of great importance throughout the world.

Alfalfa belongs to the clover group and is closely related to peas, beans, and other legumes. It is a strong, deep rooted perennial, with a large root system often penetrating from 10 to 20 feet or more below the surface. The much branched stem grows from 18 to 24 inches in height and bears small leaves composed of three-toothed leaflets, and small, purplish flowers, somewhat like those of the pea. The pods are coiled into two or three spirals and the kidney-shaped seeds are about one-twelfth of an inch long.

Alfalfa is native to western Asia, where it has been cultivated for at least 2500 years, and is especially well adapted to dry regions. The Persians introduced it into Greece about 470 B. C.,—the present scientific name *Medicago* meaning "what the Medes planted." Virgil, Varro, and other Roman writers mention it. The Spanish took it to Mexico and South America, whence it was introduced from Chile into California in 1854.

In the western United States and Canada, alfalfa is the chief forage crop under irrigation. It is becoming an increasingly valuable crop eastward to New York without irrigation, particularly in Kansas and Oklahoma. In commercial beekeeping alfalfa is of great importance as a honey plant. See *Leguminous Plants*.

Algæ (*ăl'jē*). The simplest and most primitive forms of plant life. They constitute a large group which embraces the seaweeds and also various filamentous and microscopic organisms found everywhere in stagnant pools and in moist places, such as damp soils, dripping stones, and the bark of trees. Algæ vary in size from minute bits of nucleated protoplasm, distinguishable only by the microscope, to giant seaweeds 800 feet long.

None of the algæ possess true leaves, stems, or roots, however much some of their structures may resemble them. All possess chlorophyll, though its green color is sometimes masked by other pigments. They differ from the fungi by possessing the power to extract and to build up their own food from inorganic substances, while the fungi subsist only on plant or animal food.

The algæ are divided into four great groups: The blue-green algæ (*Cyanophyceæ*), the green algæ (*Chlorophyceæ*), the brown algæ (*Phæophyceæ*), and the red algæ (*Rhodophyceæ*). The green algæ embrace those of simplest structure, including the green slimes (*Protococus*) found on the bark of trees, the pondscums (*Spirogyra*), diatoms, desmids, and stoneworts. The brown algæ include the kelps, rockweeds, and other marine forms. The red algæ contain the red seaweeds, the most beautiful of all the marine algæ.

Almond (*Amygdalus communis*). A small tree of the rose family, closely resembling the peach, native to the Mediterranean basin and western Asia. It yields the sweet almond, valued as an edible nut, and the bitter almond, used in making flavoring extracts and as a source of prussic acid. The cultivation of the almond is prehistoric in western Asia, where it has been grown for more than 4000 years. The great naturalists of the ancients, Theophrastus, Pliny, and Dioscorides, mention the almond, and references are made to it in the Bible.

The production of sweet almonds is commercially important in southern Europe and in California, but cultivation of the bitter almond is limited chiefly to the Mediterranean region. Sweet almonds, either raw or cooked, are widely used for food and also in making cakes and candies. Salted almonds and sugared almonds are highly esteemed delicacies. The bland oil of sweet almonds is used in medicine.

The flowering almond (*A. nana*), a low shrub native to southern Russia, which bears a profusion of purplish red flowers in early spring, is often planted for ornament. See *Peach*.

Aloe (*ăl'ō*). A genus of plants of the lily family, containing about 100 species, mostly natives of western Asia and South Africa, some of which are cultivated in the Mediterranean region and the West Indies. They vary in height from a few inches to 30 feet. From the fibers obtained from their succulent leaves, the Negroes of West Africa make cordage and nets. Aloes are valuable chiefly for their medicinal properties, the dried juice of the leaves of various species yielding the intensely bitter cathartic drug called aloes.

Alpine Plants. The vegetation of high mountains near the line of perpetual snow. The adverse conditions for growth result in various gnarled, dwarfed, and creeping plants. These grow usually in close tufts, often forming mats, or carpet-like patches. The flowers of many species are abnor-

mally large and brilliantly colored so as to attract the scarce insect life of such regions. Saxifrages, arenarias, primroses, gentians, and certain forms of heaths, especially rhododendrons and azaleas, are characteristic flowering plants of high altitudes. Along with these, and extending above them sometimes to the snow line, are various small ferns, mosses, lichens, and algæ. See *Desert Plants*.

Anemone (*ă-nĕm'ô-nē*). A genus of small perennials of the crowfoot family, comprising about 90 species native to cold and temperate regions. About 18 species occur in North America, usually bearing beautiful flowers which blossom in early spring.

The wood anemone (*A. quinquefolia*) is a delicate forest species of the eastern United States, having white flowers tinged on the outside with purple. The Pasque Flower (*A. patens nuttalliana* or *Pulsatilla hirsutissima*) is conspicuous in early spring on the prairies from northern Illinois to Saskatchewan and southward across the high plains to Texas. It is the state flower of South Dakota. The Canada anemone (*A. canadensis*), with large, showy white flowers, is abundant in low grounds from Labrador to Saskatchewan and southward to Maryland and Colorado.

The garden anemone, much prized by florists, was probably developed from *Anemone coronaria*, a handsome West Asian species, thought by some to be the "lily of the field" mentioned in the Bible.

Anise (*ăn'ĭs*) (*Pimpinella anisum*). An annual of the parsley family, 1½ to 2 feet high, native to Mediterranean countries. It is much cultivated in southern Europe, Germany, South America, and India for its pleasantly aromatic seed. This is used as a condiment, in making liqueurs, and in medicine.

Annuals. The term annual is applied to a plant which reaches maturity and completes its life cycle during the first season of growth. After producing flowers and ripening seeds, the plant dies. The annuals include a vast number of ornamental plants together with the most important economic plants, such as the cereals,—wheat, maize, rice, rye, barley, and oats; the sorghums and millets; the fiber plants,—cotton, flax, hemp, and jute; the legumes,—pea, bean, peanut, lentil, lupine, and various clovers; the gourd plants,—watermelon, muskmelon, pumpkin, and squash; the vegetables,—tomato, lettuce, radish, mustard, okra, eggplant, and spinach; the narcotic, tobacco; and the subtropical food plants,—quinoa and sesame. See *Biennials, Perennials*.

Apple (*Pyrus malus*). A small tree of the rose family, native of Europe and Asia Minor, producing a valuable fruit, which ranks with the grape, olive, orange, lemon, and banana among the leading fruits of the world. It has been cultivated since prehistoric times, having been grown in Europe for at least 4000 years. Apples were abundantly used by the Lake Dwellers of the Stone age in Italy and Switzerland.

North America, however, is now the leading apple growing region. Cultivation dates back to the earliest settlements. The records show the introduction of the apple in Massachusetts in 1629 and the production of cider in New York in 1639. New York, Pennsylvania, Ohio, Michigan, Virginia, and West Virginia in the East, and Washington, Oregon, and California in the West, are important apple producing states. In Canada, the apple is the leading fruit, Ontario producing more than half of the total yield. See *Crab Apple, Pear, Quince*.

Apricot (*Prunus armeniaca*). A small tree of the rose family, widely esteemed for its plumlike fruit. In some regions it blossoms as early as January, the white flowers appearing in advance of the heart-shaped leaves. The sweet, yellowish fruit, somewhat smaller than a peach, has a delicate flavor. It is marketed fresh and is also dried and canned in large quantities.

The apricot is supposed to be a native of China where it was in cultivation earlier than 2000 B. C. It was introduced into southeastern Europe at the time of Alexander the Great, and is now extensively grown in India, Persia, southern Europe, and Egypt. In the United States, marketable quantities have been produced in New York, but the crop is commercially important only in California and Oregon, where it is a leading orchard fruit. See *Peach, Plum*.

Aquatic Plants. Plants which live either entirely or partly submerged in water. Among the lower forms of plants the seaweeds and the freshwater algæ are typical aquatics. Among the higher plants, noteworthy aquatics are the cat-tail, pondweed, arrowhead, water hyacinth, water buttercup, pickerel weed, nelumbo, and water lily. With few exceptions, as in the sea wrack (*Zostera*) which blossoms under water, aquatic seed plants produce their flowers above the surface. There they are fertilized by the wind and by insects, like the flowers of other higher plants. Aquatic plants usually have special modifications of structure to insure the retention of air in their tissues.

Araucaria (*ăr'ô-kā'rĭ-ă*). A genus of magnificent trees of the pine family, highly prized for timber and for ornamental planting. There are some 15 species, native to South America and Australia. While in form they somewhat resemble the true pines, the leaves are very different, being scalelike, stiff, and broad, and the branches usually appear in whorls.

The Chile Pine (*A. imbricaria*), often called "monkey puzzle" on account of the peculiar growth of its branches, attains a height of 150 feet. It is highly valued for its strong, white wood, and for its seeds which are used by the Indians for food.

The Norfolk Island Pine (*A. excelsa*), a native of New Caledonia, reaches 220 feet in height and 11 feet in diameter. The wood is close-grained, tough, and very heavy. This species is a favorite greenhouse plant. Both of the foregoing are much planted in warm regions, particularly in California, and occasionally in the Southern states.

Arbutus, Trailing (*Epigæa repens*). A creeping plant of the heath family, with branching stems and oblong, hairy, evergreen leaves, known in New England as "mayflower" and in the South as "ground laurel." It occurs in gravelly soils from Canada to Texas and is highly esteemed for its delicate, fragrant, pinkish white flowers which blossom in early spring. See *Mayflower*.

Arnotto (*ăr-nŏt'ō*) (*Bixa orellana*). A small tropical-American evergreen tree of the bixa or Indian-plum family. The seed coverings yield the well-known yellowish red dye, arnotto, used for coloring butter, cheese, various lacquers, varnishes, ointments, and plasters. The tree, long cultivated in tropical America and now naturalized in India, is called also arnatto, annatto, and anatto.

Arrowroot (*Maranta arundinacea*). A perennial plant, about 2 feet high, of the arrowroot family. It is a native of tropical America now extensively cultivated in the West and the East Indies. It is grown also in Africa and in Florida. The tuberous rootstocks yield the excellent starch food called arrowroot, widely used for children and invalids. The name "arrowroot" is said to have originated from the use of the freshly cut roots by the South American Indians as a remedy for arrow poison.

Artichoke (*Cynara scolymus*). A somewhat thistle-like plant of the composite family, native to South Europe and North Africa. It is much esteemed in Europe as a garden vegetable, but as yet is only sparingly used in the United States. Parts of the flower head are eaten raw as a salad, or boiled and served with butter. The artichoke was cultivated 2000 years ago by the Romans. It was not brought into England, however, until 1548. In the wild state the plant is called cardoon.

During the 19th century the cardoon was introduced into Argentina, where, as a weed, it has spread over vast areas of the pampas.

Artichoke, Jerusalem (*Helianthus tuberosus*). A tall species of sunflower, native to the Ohio and the Mississippi valley, sparingly cultivated in the United States for its large, coarse, tuberous roots, used chiefly as food for swine. The plant is now grown most extensively in France, some 300,000 acres being planted annually for the production of alcohol from the roots. Fruit sugar also may be derived from the roots. It yields enormous crops of 200 to 500 bushels or more to the acre.

Ash (*Fraxinus*). A genus of valuable forest trees of the olive family, with light, tough wood, and usually with rather thick furrowed bark and ash colored branches. Some 50 species grow in northern temperate regions. About 20 are native to the United States, several of which are important timber trees.

The white ash (*F. americana*), of the eastern and southern United States, with a trunk sometimes 120 feet high and 6 feet in diameter, is the most valuable for timber. It is extensively used in making agricultural implements, wagons, carriages, and tool handles, and sparingly for furniture. The black or brown ash (*F. nigra*) grows from Canada to Delaware and Arkansas, reaching 90 feet in height. It is much used for making barrel hoops, splint baskets, and for interior finish.

The red ash (*F. pennsylvanica*), occasionally 60 feet high, grows from Canada to Florida. The heavy hard wood is sometimes substituted for that of the more valuable white ash. The green ash (*F. lanceolata*), very similar to the red ash, occurs from New York to Saskatchewan and southward to Arizona. The wood is likewise used in place of white ash. The blue ash (*F. quadrangulata*), confined mainly to the central United States, usually 60 to 70 feet high, has stout, four-angled branchlets. In general appearance it resembles the black ash. The wood is the strongest of all the ashes, and is the finest for fork handles. A blue dye is obtained from the bark. The Oregon ash (*F. oregana*) has a trunk sometimes 80 feet high and from 2 to 3 feet in diameter. It is one of the most important deciduous timber trees of the Pacific states.

Asparagus (*ăs-păr'ă-gŭs*) (*Asparagus officinalis*). A perennial plant of the lily family, native to Europe and western Asia. It has been much changed by 2000 years of cultivation, the succulent young stems, highly prized for food, attaining many times their usual size in the wild state. Asparagus is an increasingly popular table vegetable, and its cultivation is an important market-garden industry near large cities. The plant is often grown in flower gardens and cemeteries for its delicate ornamental foliage.

Aster. A large genus of the composite family, containing some 250 species, mostly natives of the United States. They are usually perennial, blooming from July to November, with a profusion of blue, lavender, pink, or white flowers, and, with the goldenrods, are the most common autumn wild flowers in eastern North America. The New England aster (*A. novæ-angliæ*) is one of the most showy native species. Many kinds are in cultivation. The most valuable of these is the China aster (*A. chinensis* or *Callistephus chinensis*), of which more than 200 varieties are grown. In the United States, wild asters are of considerable economic importance as late autumn honey plants.

Avocado (*ăv'ō-kä'dō*) (*Persea gratissima*). A small tree of the laurel family, native to Central America and the West Indies. It is much cultivated for its highly esteemed fruit, called also midshipman's butter and alligator pear. There are many varieties in cultivation, the fruits varying in form from nearly spherical to pear-shaped and bottle-shaped, and varying in color from light green to purple, brown, and red.

The properly ripened fruit has a firm, butter-like marrow, possessing a rich, nutlike flavor. It is remarkable in that it contains about 10 per cent of fat and 7 per cent of carbohydrates, so that its food value is rated at about half that of ordinary beefsteak. While essentially a salad fruit, to be served with salad dressing, the avocado is also eaten as a dessert, with sugar and cream. In the United States, avocados are grown chiefly in southern Florida and southern California.

Azalea (*ă-zā'lē-ă*) (*Azalea* or *Rhododendron*). Shrubs of the heath family, usually with showy flowers, differing from the true rhododendrons chiefly in having deciduous instead of evergreen leaves. There are about 40 species, natives of North America and Asia. The Pinksterflower, or Wild Honeysuckle (*A. nudiflora*), which grows in rocky woods from Canada to Texas, has long been cultivated in Europe for its delicate pink-white flowers. The Swamp Pink, or Honeysuckle (*A. viscosa*), with showy, fragrant blossoms, is found in swamps from Maine to Texas. At flowering time, the flame azalea (*A. calendulacea*) covers whole mountain slopes in the Southern states with a robe of brilliant scarlet. Many species of azalea are cultivated as ornamental shrubs. See *Rhododendron*.

Baby Blue-eyes (*Nemophila insignis*). A small plant of the waterleaf family, native to California. It bears delicate blue blossoms veined with white, which bloom in early spring. This dainty plant is one of the most beautiful of Pacific Coast wild flowers, and is now widely cultivated. In England it is regarded as one of the choicest garden annuals.

Bacteria. Minute, one-celled plants, the smallest living things known, called also microbes or germs. They are so minute that microscopes magnifying 1000 or more diameters are required for their study. A single drop of water may contain thousands of these tiny organisms.

Bacteria are found almost everywhere,—in the air, in water, and in nearly all foods. They are always present in the mouth, in the digestive organs, and in the outer layers of the skin. Well water, spring water, artesian well water, and even sulphur spring water alike contain bacteria, as does the air, not only of cities, but also of plains and mountains. They are present in enormous numbers in all decaying vegetable and animal matter; in fact, they are the chief cause of decomposition.

Bacteria are of various shapes. For example, *Bacillus* forms little rods, *Micrococcus* consists of single rounded cells, *Streptococcus* forms chains of rounded cells, *Sarcinæ* occur in irregular cubes, and *Spirillum* is spiral in form. Bacteria multiply either by transverse division or by spore formation. When a bacillus reproduces by division, it elongates and an indentation appears near the middle. This is followed by complete division into two smaller daughter cells exactly similar to the parent cell. These new cells in turn split in the same manner. Under favorable conditions this process is very rapid. A bacterium sometimes reproduces itself in 15 or 20 minutes. At such rate a single germ would produce many millions of its kind within the short period of one day.

In reproduction by means of spores, the process is much slower. The bacillus, for example, forms within itself a small round body which finally entirely replaces the bacillus. This minute body is called a spore. A bacillus can form only a single spore, and a spore, upon developing, can form only a single bacillus. But the spore may be blown about by the winds or be subjected unharmed to severe heat, cold, or other extremes that would instantly destroy the bacillus.

Many bacteria are beneficial to man. Various kinds convert dead organic matter into soluble food material for plants. Some possess the power to transform the nitrogen of the air into usable plant food, thereby greatly enriching soils. Other bacteria promote useful fermentations, as in the making of vinegar and in the curing of cheese. On the other hand, various *pathogenic* bacteria cause nearly all of the most dangerous contagious and infectious diseases, such as diphtheria, typhoid fever, pneumonia, tuberculosis, leprosy, lockjaw, cholera, erysipelas, influenza, and bubonic plague. See *Fungi*.

Bamboo (*Bambusa*). The common name of a group of treelike grasses. There are many species, native to the warmer parts of Asia, Africa, and America, ranging from a few feet to fully 100 feet in height and reaching a foot in diameter.

The best known is the common bamboo (*B. vulgaris*), abundant in tropical and subtropical regions. From the underground rootstock spring several round jointed stalks, which grow to their full height unbranched, but afterward throw out horizontal branches. The oval leaves, eight or nine inches long, are placed on short footstalks. The flowers grow in large panicles from the joints of the stalk.

The woody stems grow to eight or ten inches in diameter, and are so hard and durable as to be used for innumerable purposes in the East Indies, China, and other eastern countries. Cottages are made almost wholly of bamboo. It is also used for making bridges, boxes, water pipes, ladders, fences, bows and arrows, spears, baskets, mats, paper, and masts for boats. The young shoots are pickled and eaten, or otherwise used as food; the seeds also of some varieties are eaten.

Several species of bamboo have been introduced into Florida, Louisiana, and California. Some of the more hardy kinds are widely used in landscape gardening.

Banana (*Musa sapientum*). A perennial plant, with a tall, herbaceous stem, 10 to 40 feet in height, bearing a whorl of very large leaves, each usually 6 to 10 feet long and 1 or 2 feet wide. It belongs to the banana family (*Musaceæ*) and is a native of India, where its cultivation, antedating all historical records, has been extensive for more than 4000 years. Pliny writes that the Greeks with Alexander the Great saw the banana growing in India.

Only the wild plants produce seeds, the various cultivated varieties being reproduced by offshoots or suckers from parent rootstocks. When the plant is full grown, a huge cluster appears, composed of small purple blossoms, from each of which, when fertilized, grows a banana. From 50 to 150 bananas grow in a single cluster or bunch, which may weigh from 40 to 100 pounds. The fruit, which is eaten both raw and cooked, contains about 20 per cent of starch and sugar. Pound for pound it has a greater food value than other common fresh fruit.

The banana is the most important tropical fruit used in temperate regions, ranking with the apple, grape, olive, orange, and lemon among the leading fruits of the world. It is grown in all tropical countries, enormous quantities being produced in the West Indies and Central America and shipped to the United States and to Europe. Beginning with a few hundred bunches in 1870, the shipments of bananas to the United States have increased to a total value of many millions of dollars annually.

Banyan (*băn'yăn*) (*Ficus bengalensis*). A noted East Indian fig tree remarkable for its habit of growth. From its larger branches it sends down shoots that take root in the ground and grow into prop trunks. These, in turn, extend from their branches similar shoots which likewise take root. Thus the tree becomes in time a cluster or small grove of connected trunks which sometimes covers a considerable area of ground. In the Calcutta Botanical Gardens there is a famous banyan, known to be about 100 years old, which has upwards of 200 trunks ranging from 6 to 10 feet in circumference. A great banyan, with 350 large prop trunks and more than 3000 smaller ones, has been described. It is estimated that 7000 persons can stand under this immense tree. The Hindus rank the banyan among their sacred trees and believe that its bark and leaves have medicinal virtues. The wood is too soft and porous to be of commercial value.

Baobab (*bā'ō-băb; bā'ō-băb*) (*Adansonia digitata*). One of the largest trees known, though not one of the tallest, called also sour-gourd and cream-of-tartar tree. It belongs to the silk-cotton-tree family (Bombacaceæ) and is a native of tropical West Africa but is now cultivated in other warm regions. Although in height the baobab is usually less than 70 feet, the massive trunk sometimes attains a girth of 90 feet. Old baobabs have branches as large as the trunks of our ordinary forest trees. In shape the leaves resemble those of the horse-chestnut. As the huge branches droop, the foliage forms an immense dome which makes the tree appear at a distance like a small grove.

Baobabs bear large, white, somewhat poppy-like flowers, and woody, gourdlike fruits. Each fruit contains 8 or 10 cells filled with pulp, enclosing seeds about the size of peas. The pulp is somewhat tart but has an agreeable flavor and is eaten by the natives. It is also a favorite monkey food; hence the Negroes call the baobab the monkey-bread tree. A beverage is prepared from the pulp, and an infusion of the bark is used as a medicine in fevers. Ropes and cloth are made from the bast or inner bark. Decayed baobabs are often hollowed out by the natives and utilized as houses or as receptacles for corpses.

Barberry (*Berberis*). A genus of low shrubs of the barberry family. They have small leaves, which grow in the axils of spines, and produce showy, yellow flowers followed by an oblong, acid, usually red fruit. There are about 80 species, widely distributed throughout the world. While used chiefly as ornametals, some kinds yield an edible, currant-like fruit and others are used in tanning and dyeing.

The common barberry (*B. vulgaris*), a native of Europe, was formerly widely planted in the United States. Its fruit is made into preserves, and various parts of the plant have been used medicinally. Since the discovery that this species acts as an intermediate host plant for the destructive wheat rust, its culture has been very greatly restricted. The similar American barberry (*B. canadensis*), native to mountain woods from Virginia to Missouri, may be distinguished by its reddish brown instead of gray twigs. It does not harbor the wheat rust.

Barley (*Hordeum vulgare*). A valuable cereal, belonging to the grass family, native to Asia, and widely cultivated throughout the world. Barley is found in the oldest Egyptian tombs and among the remains of the Lake Dwellers of the Stone age in Switzerland, so that for upwards of 4000 years it has been grown for food. This grain yields profitable crops in greater extremes of climate than any other cereal. It is grown in Iceland, Alaska, and Norway; also in Egypt and India, as well as in all temperate regions. Barley ranks sixth in importance among the great world cereals, being preceded by wheat, rice, maize, oats, and rye. See *Cereals, Grasses*.

Bean, Lima (*Phaseolus lunatus*). A leguminous annual plant, native to Brazil. It is widely grown for food in tropical regions, especially in Africa, where it was introduced through the slave trade. In temperate regions this bean is rather sparingly grown. In the United States, production is most

extensive in California. The presence of the Lima bean in ancient Peruvian tombs indicates its prehistoric cultivation in South America.

Bean, Navy (*Phaseolus vulgaris*). An annual, more or less climbing plant of the pea family, called also kidney bean. It is a native of South America, and was introduced into Europe after the discovery of the New World. It is now the common garden and field bean of the United States. More than 150 varieties are grown as garden vegetables and as forage crops. The closely related *frijoles*, now grown in the southwestern United States, are universally cultivated in Mexico and other Spanish American countries, where these beans rank second only to maize as a staple food crop.

Bean, Soy (*Glycine hispida*). A leguminous annual, closely related to the common kidney bean, native to China, Java, and Japan. Its cultivation is most ancient, being mentioned in Chinese records dating to 2700 B. C. It is now grown in enormous quantities in eastern Asia. In various preparations this bean enters largely into the daily food of millions of people, taking the place of meat in supplying necessary protein elements. The soy bean is extensively planted in Europe and in the southern and southwestern United States as a forage, hay, and soiling crop.

Beech (*Fagus*). An important forest tree, closely related to and of the same family as the oak and chestnut. It is much valued for its hard, fine-grained wood and small, sweet flavored, triangular nuts. There are about five species of beech, only one of which is native to the United States. The American beech (*F. grandifolia*) is a handsome tree, usually 70 to 80 feet high, with a trunk 3 to 4 feet in diameter, smooth, gray bark and deep green foliage. It grows from eastern Canada to Wisconsin and southward to Florida and Texas, often forming nearly pure forests. The wood is extensively used in making chairs, shoe lasts, plane stocks, tool handles, and for fuel.

Beet (*Beta vulgaris*). A fleshy-rooted plant of the goosefoot family, native of the Mediterranean region. Since about the 3d or 4th century B. C. it has been cultivated in southeastern Europe for its root and leaves, being mentioned by Theophrastus and by Dioscorides. Its cultivation for the production of sugar from the root was established in France and Germany about 1810, as the result of an attempt to reduce the sugar shortage caused by the interruptions of commerce during the Napoleonic wars.

The development of this relatively unimportant garden vegetable into an economic plant of the first rank is perhaps the most striking achievement of modern scientific agriculture. In less than a century the sugar beet rose to the leading position among the world's sources of sugar, furnishing in 1900 over three-fifths of the total production. During the World War, however, the production of beet sugar fell to less than one-third of the world's total yield of sugar. Germany, France, and Russia have been the principal producers. Since 1900 the beet sugar industry has developed notably in the United States, particularly in Michigan, Nebraska, Colorado, Utah, and California.

Garden beet roots vary in color from white to dark red, the red varieties being preferred. Sugar beet roots are usually yellowish white and the better varieties contain, on the average, about 14 per cent of sugar. Some varieties of the beet are grown exclusively for the leafy top, as, for example, the excellent Swiss chard. Coarse varieties, commonly called mangels, are widely grown as food for cattle. See *Sugar*.

Begonia (*bē-gō'nĭ-ȧ*). A numerous genus of herbaceous plants of the begonia family. They have fleshy, oblique, variously colored leaves, and showy, mostly pink or red flowers. There are 450 species, natives of the tropics. Cultivation of begonias began in 1777, and since that date hundreds of fine varieties have been developed. From the shape of their leaves these plants are sometimes called elephant's-ear.

Betel (*bē't'l*) (*Piper betle*). A shrub of the pepper family, native to the Malaysian islands. The leaves have been chewed with the betel nut, or areca nut, since ancient times by Malay peoples. Cultivation of betel is extensive in the East Indies, where the consumption of the leaves as a narcotic stimulant is enormous.

Betel Nut (*Areca catechu*). A small palm tree, native to the Malay archipelago. It produces a nut, about the size of a hen's egg. This nut, called also areca nut, is extensively used wherever betel chewing is practiced. The cultivation of this palm by Malay peoples considerably antedates the Christian era. The betel nut, mixed with lime and chewed with betel leaves, serves as a stimulant and narcotic. Its use in this manner stains the lips and blackens the teeth. Immense quantities of the betel nut are produced in India, Cochin China, Ceylon, and the Malaysian islands, where it forms a considerable article of trade. See *Betel*.

Biennials. Plants whose life period requires two seasons of growth in order to produce flowers and ripen seeds. In many cases the first season is employed to store up surplus food in enlarged portions of the root, stem, or leaves. This is used during the second season to mature seeds. Then the plant perishes. While few in number compared with annuals or perennials, the biennials include several valuable economic plants, such as the beet, cabbage, carrot, celery, parsley, parsnip, turnip, and onion. See *Annuals, Perennials*.

Big Trees. The most massive tree known, height and trunk diameter both being considered, is the giant redwood, or California big tree (*Sequoia washingtoniana*), of the Sierra Nevada, which attains a height of 325 feet and a basal diameter of 30 to 35 feet. The closely related California redwood (*Sequoia sempervirens*) attains a height of 340 feet, but rarely exceeds 16 feet in diameter.

The tallest known tree is the great gum tree, or peppermint tree (*Eucalyptus amygdalina*), of southeastern Australia. Trees 400 feet high are reported as frequent and one measured specimen was 471 feet high. The baobab, or monkey-bread tree (*Adansonia digitata*), of tropical Africa and the East Indies, attains a basal diameter of 20 to 30 feet or more but does not rise to a great height.

The giant cypress (*Taxodium mexicanum*) of Mexico sometimes grows to an immense girth. Like the baobab, it does not reach a correspondingly great height. For example, the famous "big tree" of Tule, described by Humboldt early in the 19th century and still flourishing, measures 154 feet in circumference at 6 feet above the ground. Yet the height of the huge spreading crown is only about 150 feet.

The banyan tree (*Ficus bengalensis*) of India, with its immense system of prop roots, shades a greater area than any other tree. See *Banyan, Baobab, Blue Gum, Eucalyptus, Sequoia*.

Birch (*Betula*). A genus of trees and shrubs of the birch family, *Betulaceæ*, all natives of the North Temperate Zone. There are about 30 species, of which 20 species and varieties grow in North America, ranging in size from small shrubs to large forest trees.

The European birch (*B. alba*), of northern Europe and Asia, is a beautiful, hardy tree which sometimes attains a height of 70 feet. It is noted for its silvery white bark, slender, drooping branches, and bright green, quivering leaves. The close-grained wood has many uses, and an extract from the bark is used in medicine and also in tanning

Russia leather. A graceful variety, with long, pendulous branches, called weeping birch, is often planted for ornament.

The paper birch, or canoe birch (*B. papyrifera*), very similar to the European birch, 80 feet high, grows from Newfoundland to Alaska and southward to Pennsylvania, Nebraska, and Washington. The brilliant white bark, which is easily separated into thin layers, is used by the Indians for making canoes and baskets. Very thin strips of the bark have been used as a substitute for paper. The light wood is used for making wood pulp and in turnery.

The cherry birch, or sweet birch (*B. lenta*), which grows from 70 to 80 feet high and sometimes 5 feet in diameter, has aromatic twigs and bark. These yield an oil very similar to the oil of wintergreen, for which it is used as a substitute. This birch grows from Newfoundland to Iowa and southward. The strong, hard, reddish brown wood is much prized for making furniture.

The yellow birch (*B. lutea*), one of the largest deciduous trees of northeastern America, sometimes reaches a height of 100 feet and a trunk diameter of 4 feet. It is distinguished by its glossy, yellowish brown bark, and is native to rich woods from Newfoundland to Minnesota and southward to North Carolina. The valuable, close-grained wood of this birch, and also that of the sweet birch, is much employed in making imitation mahogany furniture, wheel hubs, tool handles, and interior finishings.

The red birch, or river birch (*B. nigra*), grows in swampy land and along streams and lakes from Massachusetts to Minnesota and southward to Florida and Texas. It is a slender tree, sometimes attaining a height of 90 feet and a trunk diameter of 2½ feet. The bark is reddish or greenish brown, peeling in very thin layers. The light brown, hard, strong wood is used for ox-yokes, woodenware, and furniture. This tree, sometimes called black birch and water birch, grows rapidly and is suitable for planting in lawns and parks.

Bitterroot (*Lewisia rediviva*). A low, stemless plant of the purslane family, related to the portulacas of the gardens. It bears thick roots, short, fleshy leaves, and large, handsome, rose-red, cactus-like flowers which bloom in great profusion on mountain ridges and in alpine valleys in early spring. The bitterroot grows from Montana to British Columbia and south to New Mexico and southern California. It was first described from specimens collected by Captain Meriwether Lewis of the Lewis and Clark Expedition, the scientific name *Lewisia* being bestowed in his honor. On account of its large, starchy roots, bitterroot was highly prized as a food plant by the Indians, who called it spatlum.

Bitterroot is a corruption of butterroot, a common name first given to the plant. The Bitterroot mountains and the Bitterroot valley, in Montana, derive their names from this plant, which has been adopted as the state flower.

Bittersweet (*Solanum dulcamara*). A poisonous plant of the potato family, called also dulcamara or woody nightshade. It is a native of the Old World, now widely introduced in the United States and Canada. It has climbing, somewhat woody stems, heart-shaped or spear-shaped leaves, and purple or blue flowers much resembling those of the potato. The bittersweet bears poisonous red berries of tempting appearance. These are sometimes the cause of serious accident to children who carelessly eat them. The twigs contain solanin and dulcamarin, used in medicine. See *Climbing Bittersweet.*

Blackberry (*Rubus*). The name given to various prickly fruit-bearing shrubs, closely related to the raspberries. There are two main types, the trailing or creeping forms, commonly called Dewberry (*R. villosus* or *canadensis*), and the upright, bushy forms, generally known as blackberry or as high-bush blackberry (chiefly *R. allegheniensis* or *nigrobaccus*).

Although several wild species of the eastern United States yield berries of excellent quality, they received but little attention as garden fruits previously to 1850. Since that date, numerous improved varieties of blackberries and dewberries have been developed from the native plants. Many of these are widely grown, producing an important bush-fruit crop. Blackberries are marketed chiefly fresh for dessert purposes and are also used extensively for canning. Outside of the United States and Canada, the blackberry has not as yet become commercially important.

The bark of the blackberry root possesses tonic properties and an extract made from it is sometimes prescribed in cases of diarrhea. In Great Britain, the bramble (*R. fruticosus*), which bears an inferior fruit, is sometimes called blackberry. See *Loganberry, Raspberry.*

Black-eyed Susan (*Rudbeckia hirta*). A rough, hairy, biennial species of coneflower, common in the eastern United States. It grows about 2 feet high, with nearly entire leaves and naked flowering stems. Each of these stems bears a single large head of brilliant yellow ray flowers surrounding a conical dark brown center. This is one of the most handsome of native American plants and is the state flower of Maryland.

Bladder Nut (*Staphylea trifolia*). A shrub of the bladder nut family, usually 6 to 15 feet high, with leaves of three leaflets, and greenish striped branches. It bears small flowers from which develop large, bladdery, three-horned pods. This shrub, which becomes treelike in the South, grows in moist thickets from Quebec to Minnesota and southward to South Carolina and Kansas. A somewhat similar species (*S. bolandieri*) occurs in California.

Bloodroot (*Sanguinaria canadensis*). A beautiful plant of the poppy family. It has palmately lobed leaves and a fleshy rootstock, the latter containing a red, acrid juice. It produces large, handsome, pure white blossoms, which are among the earliest and most conspicuous of eastern American wild flowers. The bloodroot, called also "red puccoon," "redroot," and "snakebite," is found in rich woodlands from Nova Scotia to Manitoba and southward. The stem and root are poisonous.

Blueberry (*Vaccinium*). Widely branching shrubs of the heath or huckleberry family. In the eastern United States and Canada the sweet, edible, many seeded, bluish black berries of several species are gathered wild in large quantities. Efforts are being successfully made to bring some of the most highly prized native blueberries into cultivation.

The tall blueberry (*V. corymbosum*), 6 to 15 feet high, is found in swampy woods from Quebec to Minnesota and southward to Florida and Louisiana. It yields the greater part of the late blueberries of the markets, and is the species best adapted for cultivation.

Several smaller species, ranging from 6 inches to 4 feet in height, are locally abundant and produce excellent fruit. Among these are the early blueberry (*V. pennsylvanicum*), the low blueberry (*V. vacillans*), and the Canada blueberry (*V. canadense*).

Bluebonnet (*Lupinus texensis*). A small plant of the pea family. It has silky-hairy, palmate leaves of five leaflets and handsome blue flowers borne in a terminal cluster. The bluebonnet is a native of Texas, where it is exceedingly abundant and popular, having been adopted as the state flower. See *Lupine.*

Blue Gum (*Eucalyptus globulus*). A large tree of the myrtle family, native to Australia. It is one of the world's tallest trees, sometimes reaching a height of 375 feet. The blue gum was introduced into various dry and warm regions of the world about 1850. It was planted in California first in 1856 and is now grown there extensively for fuel and timber. It is said to be the most rapidly growing hardwood tree in the world. The heavy wood is difficult to work but exceedingly strong. It is used for wheel spokes, hubs, and in turnery, and also for mining timber, as it is resistant to borers. The leaves yield eucalyptus oil, important medicinally.

Plantations of eucalyptus thrive only in climates permanently above the frost line. It was once believed that where this tree grew there could be no malaria. Hence it was extensively planted in and about the Pontine marshes of Italy. Its effectiveness in this respect is now known to be due to its enormous consumption of soil moisture. These quickly growing trees remove the water in which the malaria-carrying mosquito breeds. See *Big Trees, Eucalyptus.*

Boneset (*Eupatorium perfoliatum*). A useful perennial herb, of the composite family, called also "thoroughwort." It is a native of North America, growing from Nova Scotia to Manitoba and south to Florida and Texas. The plant is easily recognized by its tall stem, four or five feet in height, passing through the middle of large, double, hairy leaves, and surmounted by a broad, flat cluster of white flowers. In pharmacy, boneset is a recognized official plant, used for its stimulant, laxative, and emetic properties. Boneset tea, made from the leaves, is much used in household medicine as a tonic and for causing perspiration.

Bottle Tree (*Sterculia*). Peculiar trees of the sterculia family, somewhat allied to the cacao or cocoa tree. The Australian bottle tree (*S. rupestris*) is noted for the globular expansion of its trunk, which gives it the aspect of a huge bottle with the limbs appearing to grow from its mouth. The enlarged stems are hollow and contain a quantity of water which travelers and the Australian natives sometimes secure for use by cutting through the soft wood.

The maple-leaved bottle tree, or Flame Tree (*S. diversifolia*), the stem of which tapers rapidly from a broad base, is also a native of Australia. It is often planted for ornament in California and in other mild climates. The seeds of various species are edible, some contain an illuminant oil, and the bark contains a tough, waterproof fiber, suitable for mats and cordage.

Box Tree (*Buxus sempervirens*). A shrubby evergreen tree, of the box family, native to Europe and parts of Asia. It grows about 12 feet in height and bears small, oval, opposite, evergreen leaves, and greenish, inconspicuous flowers. The wood is yellowish, close-grained, very hard and heavy, and takes a beautiful polish. It is much used by turners, wood carvers, engravers on wood (no wood surpassing it for their requirements), and by mathematical-instrument makers. Flutes and other wind instruments are made of it. The boxwood of commerce comes mostly from the regions adjoining the Black Sea and the Caspian Sea, and from Spain and Portugal. In gardens and shrubberies, box trees may often be seen clipped into various formal shapes. A dwarf variety is grown as an edging for garden walks.

Brake (*Pteris aquilina*). One of the most abundant and widely distributed ferns, called also bracken. It occurs in nearly all parts of the world, frequently covering large tracts. The plant has a long, creeping, black rootstock from which arise naked stems. Each of these stems divides at the top into three branches which bear the leafy portion of the fern. In Japan the young shoots are highly prized as food; in Siberia great quantities of the rootstock are used as an ingredient in making a beerlike beverage. Brake is sometimes used in dressing leather, for thatching, and as fodder for cattle.

Brazil Nut (*Bertholletia excelsa*). A beautiful tree of the lecythia family, native to Amazon and Orinoco forests. It grows from 100 to 150 feet high, with leathery leaves 2 feet long. It bears a large, spherical, hard-shelled fruit, about 6 inches in diameter, which contains 18 to 24 three-sided seeds or nuts—the brazil nuts or "niggertoes" of commerce. The fruit is extensively gathered by the natives, who chop open the thick shell to obtain the nuts. These are exported in large quantities, chiefly from Pará.

Breadfruit (*Artocarpus incisa*). A slender tree of the mulberry family, related to the fig. It is a native of the Sunda islands, from which its cultivation has been widely extended in the Indian archipelago and the Pacific islands. The tree attains a height of from 30 to 40 feet and bears large, glossy, deeply cut leaves. The large, edible fruit is somewhat like a watermelon in size and shape. Upon being properly baked, it resembles wheat bread. The bark furnishes a fairly good fiber for making clothes, the juice yields a serviceable glue for caulking canoes, and the wood has many economic uses. The breadfruit tree, like certain species of palms, is necessary to the existence of the native peoples inhabiting many oceanic islands. The closely related African breadfruit, the Australian breadfruit, and the jack fruit are also valuable as food producers.

Broom Corn (*Sorghum saccharatum*). One of the many useful varieties of *Sorghum* which have been developed in the course of forty or more centuries of cultivation. Broom corn is grown solely for the valuable brush fibers of the flowering panicle, which remain after the more or less ripened seeds have been removed. It is cultivated chiefly in Italy, France, Germany, and the United States, and the product is used entirely in making various kinds of brooms. The first broom corn in the United States was grown somewhat earlier than 1800. Illinois, Kansas, Missouri, and Oklahoma now produce nearly the entire crop, Oklahoma contributing approximately one-half. See *Sorghum Cane.*

Brussels Sprouts. A cultivated variety of cabbage with an elongated stem, from 2 to 5 feet high, on which are borne numerous small, clustering green heads, like miniature cabbages. This vegetable is extensively cultivated near Brussels and in many other parts of the world. See *Cabbage.*

Buckeye (*Æsculus*). A genus of trees or shrubs of the buckeye family. They have digitate leaves and bear large, nutlike seeds, somewhat resembling chestnuts and often called horse-chestnuts. There are about 15 species, natives of the northern hemisphere. Of these, 6 species occur in the United States.

The Ohio buckeye (*Æ. glabra*) grows sometimes 70 feet high. It bears yellow flowers and spiny seed capsules. This tree is native to rich soil from Pennsylvania to Iowa and southward. The leaves and nuts are reputed poisonous.

The sweet buckeye (*Æ. octandra*) often attains a height of 90 feet and a trunk diameter of 3 feet. It has yellow flowers and smooth seed capsules. This species occurs in the central and southern United States.

The red buckeye (*Æ. pavia*), a shrub 4 to 12 feet high, with red flowers and smooth fruiting capsules, grows from Virginia to Texas. The southern buckeye (*Æ. austrina*), about 25 feet high, with downy leaves and yellow seeds, is found from Tennessee to Texas. The California buckeye (*Æ. californica*), sometimes 30 feet high, with pale rose-colored, showy flowers and with large,

smooth seed capsules, is sometimes planted for ornament. Its seeds are said to be used for food by the Indians.

The Horse-chestnut (*Æ. hippocastanum*) is a native of Asia, now grown extensively in many temperate countries. It bears white flowers followed by large prickly seed capsules. This common Old World species is widely planted as a shade tree in the eastern United States and Canada. In France, starch, used for food, is made in large quantities from the seeds. During the World War the British government caused enormous stores of the seeds to be collected from the horse-chestnut trees in England. The bitter principle, esculin, always present in the starchy flesh, was removed by a chemical process, so that the seeds could be utilized for human food. In several countries the seeds are extensively used for feeding live stock.

The soft wood of the horse-chestnut and of the various species called buckeye is of little commercial value.

Buckthorn (*Rhamnus*). Small trees or shrubs of the buckthorn family (*Rhamnaceæ*). There are some 90 species, native to tropical and temperate regions, about 15 of which grow in the United States and Canada.

The common buckthorn (*R. cathartica*), a somewhat spiny shrub, 6 to 20 feet high, is a native of Europe. It is cultivated and sparingly naturalized in the eastern United States. The berries yield a yellow dye and have powerful purgative properties. The Indian Cherry (*R. carolinana*), sometimes 40 feet high, with a black, seedy fruit resembling small cherries, grows wild from Virginia to Nebraska and southward.

The Cascara Sagrada (*R. purshiana*) yields the cascara bark of commerce, widely used in medicine. It is a slender tree, 35 to 40 feet high, which grows from Idaho and northern California to Puget sound. The California Coffee (*R. californica*), with large, black, grapelike fruit, is a common shrub, 6 to 8 feet high, on the Sierra Nevada foothills. The medicinal properties of the bark are similar to those of cascara sagrada, and the two barks are said to be mixed by collectors.

Buckwheat (*Fagopyrum esculentum*). An annual plant of the buckwheat family, native of Manchuria and Siberia. It has smooth, branching stems, somewhat heart-shaped leaves, and pale red or white flowers, which yield a good quality of honey. The triangular, dark-coated seed, called buckwheat, is sometimes incorrectly classed with the true cereals.

The cultivation of buckwheat as a food plant probably dates back 2000 years in Asiatic Russia, whence it was introduced into Europe during the middle ages. While a common article of diet throughout much of Russia, buckwheat is relatively unimportant as a food in the remainder of Europe and elsewhere.

In the United States, where the chief use of buckwheat is for pancakes or griddlecakes, production has declined about one-third since 1860. New York and Pennsylvania are the leading producers. Canada grows over half as much buckwheat as the entire United States, the production centering chiefly in Ontario and Quebec.

Buffalo Berry (*Shepherdia argentea* or *Lepargyrea argentea*). A handsome shrub of the oleaster family, native to the northern Rocky Mountain region. It has small, silvery leaves and bears red or yellow currant-like berries. Long valued as an ornamental, the buffalo berry has recently taken rank as a fruit plant. It is successfully cultivated in the Northwest, where it is much used for jellies.

Buttercup. The popular name for many yellow-flowered species of *Ranunculus*, usually growing in moist places and flowering in early spring. The marsh or swamp buttercup (*R. septentrionalis*), with large, brightly colored blossoms, abounds in wet grounds from New Brunswick to Kansas. The creeping buttercup (*R. repens*), spreading by runners, occurs from Newfoundland to British Columbia and southward. The early buttercup (*R. fasciculatus*), with tufted thickened roots, is found in woodlands from Ontario to Texas. The California buttercup (*R. californicus*) is a showy species, immensely abundant on the Pacific coast. In early spring, unforested hills, sometimes many square miles in extent, are colored bright yellow by the blossoms of this wild buttercup. The tall or meadow buttercup (*R. acris*), naturalized from Europe, is very abundant in fields and roadsides in southern Canada and the northeastern United States. The bulbous buttercup (*R. bulbosus*), also introduced from Europe, is common from New England to Louisiana.

Cabbage (*Brassica oleracea*). A fleshy-leaved plant of the mustard family, native to rocky shores of Europe. It has been cultivated in various forms since prehistoric times, and is perhaps the most ancient of all vegetables now in extensive use. There are evidences indicating that the cabbage has been in cultivation for more than 4000 years. It is now very widely grown in the Old World. In the United States, cabbage is produced upon a greater number of gardens and farms than is any other vegetable. The leaves only are eaten, and, in ordinary kinds, these are crowded in a dense head around the top of the short, stout stem. The name "cabbage" is derived from the Latin *caput*, meaning a head.

The ancient Greeks grew three varieties of cabbage; Pliny mentions six; and at the present time there are more than 150. Centuries of cultivation have developed several greatly modified forms, remarkably different from ordinary cabbage. Among these are kale, kohl-rabi, cauliflower, and Brussels sprouts. The tree cabbage, or cow cabbage, grown for cattle, is a tall perennial form which, in France, sometimes attains a height of 15 feet. See *Brussels Sprouts*, *Cauliflower*, *Kale*, *Kohl-rabi*.

Cacao (*kȧ-kā'ō*; *kȧ-kä'ō*) or **Cocoa** (*Theobroma cacao*). A medium-sized tree, 12 to 30 feet high, with large, entire leaves and clustered flowers, belonging to the sterculia family. It is a native of the Amazon and Orinoco valleys, where at the time of the discovery of America it had evidently been in cultivation for many centuries. The tree is extensively grown for the seeds, which lie embedded in a large, pulpy, edible fruit. The seeds, known as cocoa beans in commerce, are the source of chocolate, cocoa, and the semisolid oil, chemically a hard fat, called cocoa butter, the last mentioned constituting over 50 per cent by weight of the shelled beans. The cacao tree bears fruit within 4 or 5 years from planting, attains full productiveness in 12 years, and thereafter yields 2 principal crops annually for many years. Cocoa, as usually prepared, contains an alkaloid principle called theobromine. In its properties this stimulant is very similar to the caffeine of coffee and the theine of tea. See *Coffee*, *Maté*, *Tea*.

Cactus. Any plant of the cactus or Indian fig family. There are about 1000 species, commonly fleshy-jointed, succulent shrubs a few feet high. All, except a few African species, are natives of America, and are found mostly in very dry, warm regions, being most numerous in Mexico. In structure these plants show remarkable adaptation to climatic conditions. Their problem is to absorb and retain as much moisture as possible. The stems are fleshy, permitting the storage of a large amount of water. To avoid losing it by evaporation, they expose but little surface to the air. The leaves are reduced to minute bracts, scales, or hairs, or are entirely wanting, and the smooth, hard, green bark functions in place of leaves.

The various types assume many weird and peculiar forms of growth. Some have great treelike, deeply-ribbed stems, 40 to 70 feet high, with huge

columnar branches. Others are cylindrical, barrel-shaped, or globular, ranging in height from a few inches to several feet. Many of the most widely known are made up of thick, oval, flattened joints. Practically all are heavily armed with exceedingly sharp, needle-like spines.

In the arid deserts of the southwestern United States about 100 kinds of prickly pear (*Opuntia*) occur, together with some 30 kinds of hedgehog cactus (*Echinocereus*), and many other species. Among the most striking are the giant cereus or saguaro, the thorny chollas, the deerhorn cactus, the melon cactus, and the barrel cactus. About 10 kinds of cactus grow from the Great Plains eastward, one species of which, the eastern prickly pear (*Opuntia vulgaris*), occurs in Massachusetts, Kentucky, and Florida. Several kinds of cactus have become naturalized in the Old World; as, for example, in Italy, northern Africa, Palestine, and various islands in the Mediterranean.

The fruits of the prickly pear, Indian fig, or tuna, and various other species are edible. The stored sap of the barrel or melon cactus is sometimes used for drinking when water is not available. A thornless variety of opuntia, developed by Burbank, with large oval-jointed stems 8 to 15 feet high and cucumber-like fruit, promises to become valuable as a food and forage plant in arid regions.

The flowers of the various kinds of cactus are usually very large and brilliantly colored. Some, such as those of the night-blooming cereus, are remarkably beautiful. Many varieties of cactus are cultivated in greenhouses and gardens. See *Cereus, Saguaro.*

California Poppy (*Eschscholtzia californica*). One of the most common, striking, and widely diffused of native California plants. It blossoms profusely in the spring, but is sometimes found in flower at all seasons. This wild poppy has suberect, diffuse stems a foot or two in length, dissected leaves, and large, golden yellow flowers. The petals are sometimes 2 inches or more long, with a rich sheen, very brilliant in the sunshine. There are many fanciful or poetic names for this handsome plant, mostly from Spanish sources, such as "copa de oro," "toroso," "amapolo," and "dormidera." It is the state flower of California, and is widely planted in gardens in other regions.

Calla Lily (*Zantedeschia æthiopica*). A fleshy-leaved plant of the arum family, native to Africa. It is now widely grown as a house plant and in gardens for its large beautiful white spathes. These surround a central portion (spadix) which bears the true but inconspicuous flowers.

Camellia. Handsome shrubs or trees of the tea family with dark green, shining, laurel-like leaves, and showy, roselike, waxy flowers. *Camellia japonica*, native to Japan and China, is a tall tree of graceful proportions. It is the parent of many beautiful cultivated shrubs with double-flowered variations, universally grown in gardens. Besides the foregoing, the so-called *Camellia sasanqua*, with small, white, scentless flowers, and *Camellia reticulata*, with large, peony-like blossoms, are also cultivated in the southern United States. While these ornamentals were long regarded as belonging to the genus *Camellia*, and are popularly known as camellias, most botanists now place them in the genus *Thea*, to which the tea plant also belongs. See *Tea, Tea Oil Tree.*

Camphor Tree (*Cinnamomum camphora*). A large evergreen tree of the laurel family, usually regarded as a native of China, now extensively cultivated in many warm countries. It is highly valued for timber and as the source of gum camphor, much used in making celluloid and explosives and also in medicine. Camphor trees are extensively planted in California and in the Gulf States, chiefly for ornament.

Candleberry (*Myrica cerifera*). A shrub or small tree of the sweetgale family, native of the eastern United States, called also bayberry, wax myrtle, and tallow tree. It is usually from 4 to 18 feet high, with evergreen lanceolate leaves, small flowers, and a somewhat fleshy, stone fruit. When bruised, both the bark and the leaves emit an agreeable odor. The fully ripe, dry fruits are covered with a whitish wax. This is collected by boiling the fruits and skimming the wax off the surface of the liquid. The refined wax is used in making candles which burn slowly with a pleasant, balsamic odor, though with a feeble light.

The California Myrtle (*M. californica*), a small tree or shrub, grows on the Pacific coast from Washington to California. Its wax-covered berries yield a wax similar to that of the eastern candleberry. See *Tallow Tree.*

Caraway (*Carum carui*). A perennial plant of the carrot or parsley family, with a tapering, fleshy root, a furrowed stem, and white flowers. It is native to Europe where it extends northward to within the arctic circle. Caraway is widely cultivated for its aromatic seeds, used by confectioners and perfumers and also in making cakes and sweetmeats. In medicine, caraway seeds have recognized stimulant and diuretic properties.

Carnation. The name given to double-flowering forms of the clove pink (*Dianthus caryophyllus*). The carnation ranks among the most popular flowers in cultivation. It is a native of southern Europe, where, for more than 2000 years, it has been grown for its spicily fragrant flowers. Carnations are now produced in immense quantities for city flower markets. A large number of varieties, as to both form and color, have been developed. Red, white, pink, and yellow varieties predominate. Striped variegations occur, ranging from one to three colors. In other forms, petals are found edged with a color which is different from the general hue of the flower.

Carrot (*Daucus carota*). A hardy biennial of the parsley family, native to Europe, where it has been grown since ancient times. It is in general, though not extensive, cultivation as stock food and as a table vegetable. The slender, tapering roots of the cultivated kinds are yellow, white, or reddish in color, with a bland or sweetish taste when cooked, owing to the sugar which they contain. The carrot is wholesome and nutritious as an article of diet and is especially prized as a food for dairy cattle.

In the wild state and wherever naturalized, as in the eastern United States, where it is known also as Queen Anne's lace, the carrot often becomes a pestiferous weed. In this condition it has a woody root with a very strong flavor. The wild plant is frequently infected by the leaf-spot fungus (*Cercospora apii*) which is very injurious to celery.

Carthamin (*kär'thȧ-mĭn*) (*Carthamus tinctorius*). An annual plant of the composite family, called also safflower. It is unknown in the wild state but is thought to be originally a native of western Asia. Carthamin has been cultivated since remote antiquity as the source of a beautiful red dye for cotton and silk. The grave clothes of mummies were dyed with carthamin, and fragments of the plant itself have been discovered in ancient Egyptian tombs. The Chinese received the plant from the West about 150 B. C. It has been largely supplanted as a dyestuff by modern coal-tar products, except in China and India, where it is still locally important. Carthamin is grown to some extent in France, Italy, and Spain. The extract, when mixed with talcum powder, forms the standard cosmetic known as rouge.

Cashew (*kȧ-shōō'*) (*Anacardium occidentale*). A spreading tree, of the cashew or sumac family, which attains a height of from 20 to 40 feet. It is a native of tropical America, where it is much

cultivated for its fleshy fruit stalks and oily nuts which are used as food. The trunk of the tree yields a gum similar in character to gum arabic. Since the discovery of America the cashew has become very widely distributed in tropical regions, notably in West Africa, British India, and the East India islands.

Cassaba (*kă-să'bà*). A variety of winter muskmelon, called also pineapple melon. Under proper handling, it is capable of keeping several weeks after being picked. The cassaba melon is large, firm, smooth skinned, and yellow in color, with a very thick, yellow flesh. When fully ripened it has a delicious flavor. The name is derived from the town Kassabah, not far from Smyrna in Asia Minor, whence it was introduced. Seeds were sent to California in 1878, and the first crop was produced for the market in 1879. This attempt was a failure because the melons were picked too green. With later improved methods of handling, the cassaba has become very popular. It is now very extensively grown in the San Fernando valley and elsewhere. See *Muskmelon.*

Cassava (*kă-să'và*) (*Manihot utilissima*). A bushy, somewhat herbaceous shrub, 6 to 8 feet high, with large palmately divided leaves. It belongs to the spurge family, and is native to tropical America, where it was cultivated for food for several centuries previous to the Spanish exploration. During the period of the slave trade, cassava became widely distributed in Africa. It is now grown to some extent in Florida.

Cassava is propagated from cuttings of its stems and branches planted in furrows, and is cultivated much like corn. About 7 months are required to mature the large, farinaceous roots, which are 1 to 3 inches thick and 1 to 3 feet long. There are 2 varieties, the poisonous, or bitter, and the nonpoisonous, or sweet. The poison in the bitter variety is due to the presence of hydrocyanic or prussic acid in its sap. Both varieties yield wholesome food, as the poisonous principle is readily dispelled by cooking.

The starchy, somewhat potato-like roots constitute an important article of food in many tropical countries. The starch of cassava is the arrowroot of commerce. This starch, when it is dried quickly under the action of intense heat, forms into irregular masses and is sold under the name of tapioca. Sago, or pearl tapioca, is a fine-grained form of this product.

Castor Oil Plant (*Ricinus communis*). A widely known plant of the spurge family, thought to be a native of tropical Africa. In warm countries it is a perennial, occurring as a small, much-branched tree; but, as it cannot endure frost, it becomes an annual in temperate regions.

The castor oil plant has been cultivated since extremely remote antiquity, dating back more than 4000 years in Egypt, where its seeds are found in the ancient tombs. The Romans knew it as *Ricinus* and it is mentioned by Theophrastus and by Dioscorides. The oil obtained from the seeds, called castor beans, is used in medicine, in the arts, and, in the Far East, as lamp oil. The plant is cultivated in Italy, France, Spain, India, Algeria, and the West Indies. Although often planted in the United States for ornamental purposes, its cultivation for commercial use is as yet of slight importance.

Catalpa (*kà-tăl'pà*). A tree of the trumpet creeper family, with large leaves and showy flowers in terminal clusters. The common catalpa (*C. catalpa* or *bignonioides*) is native to the Gulf States but is widely cultivated in the eastern United States for ornament. It reaches 60 feet in height, has light gray bark, strong scented, entire or sometimes lobed leaves, and bears numerous white flowers strongly dotted inside with yellow and purple spots.

The hardy catalpa (*C. speciosa*) occurs from southern Indiana, Illinois, and Tennessee to Missouri and Arkansas. It attains a height of 120 feet and a diameter of 4½ feet. The bark is rough and thick, the leaves are not unpleasantly scented, and the large white flowers are but faintly spotted within. It grows rapidly and in the Middle West is often planted for timber as well as for ornament. The durable wood is used for ties and fence posts and for telephone and telegraph poles.

Catnip (*Nepeta cataria*). A small erect herb of the mint family, so named because of the remarkable fondness which cats display for its foliage. It grows from 2 to 3 feet in height, with velvety, heart-shaped leaves, whitish-downy beneath, and a terminal spike of small blue flowers. It is a native of Europe and has become widely naturalized in North America from New Brunswick to Oregon and southward. Catnip is used in rural districts as a home remedy, its properties being regarded as tonic.

Cat-tail (*Typha*). A genus of reedlike aquatic plants of the cat-tail family. They have swordlike leaves, and an erect stem bearing a club-shaped spike of minute flowers. There are about 10 species, two occurring in North America.

The broad-leaved cat-tail (*T. latifolia*) has stout stems 4 to 8 feet high, flat leaves about an inch wide, and dark brown spikes an inch or more in diameter. It is abundant in swamps nearly throughout the northern hemisphere. The astringent rootstocks are rich in starch. In Russia the young shoots are eaten like asparagus.

The narrow-leaved cat-tail (*T. angustifolia*) has slender stems 5 to 10 feet high, somewhat convex leaves about a half inch wide, and light brown spikes, usually less than a half inch in diameter. This plant occurs abundantly in coastwise marshes but rather rarely inland.

The leaves of both species are used in making mats, baskets, chair bottoms, and in cooperage. Cat-tail rootstocks are much eaten by muskrats. These valuable fur-bearing animals are usually numerous in large cat-tail marshes.

Cauliflower (*kô'lĭ-flou'ẽr*). A variety of cabbage in which the budlike head of compacted leaves is replaced by a tight head of clustered rudimentary flowers. On account of its delicate flavor, cauliflower is highly esteemed as a table vegetable. However, its cultivation is much more difficult than that of cabbage. Cauliflower seed is very expensive, being largely imported from northern Europe, though increasing quantities are supplied from Washington and British Columbia. Successful production of marketable cauliflower depends upon a peculiar combination of moisture and temperature conditions. In consequence, it is profitably grown only in favored localities.

Cauliflower requires a well drained but permanently moist and highly fertile soil. It must also be sheltered from the direct rays of the sun. The latter condition is met either by growing it on north slopes or by planting it very early or very late in the season, so as to avoid maturing the heads during midsummer. When the head begins to form, the surrounding leaves are drawn up and tied above it. This process, by screening the sunlight, blanches the heads to a milk white color, making them more tender and delicate and improving their appearance for the market. See *Cabbage.*

Cedar. A name given to various kinds of evergreen coniferous trees. However, it is properly applied only to the two or three species of *Cedrus*, namely, the cedar of Lebanon (*C. libani*), famous since biblical times for its fragrant, enduring, reddish wood; the Himalayan or deodar cedar (*C. deodara*), of India; and the African cedar (*C. atlantica*), of the Atlas mountains.

The so-called white cedar of the eastern United States (*Chamæcyparis thyoides*) grows in swampy regions near the Atlantic coast. The yellow cedar of the Pacific coast (*Chamæcyparis nookatensis*), with fragrant yellow wood, occurs from California to Alaska. The Port Orford cedar (*Chamæcyparis lawsoniana*), a valuable timber tree often 175 feet high, is found in Oregon and California. The arbor vitæ (*Thuya occidentalis*) is called northern white cedar, while the giant arbor vitæ of the Northwest (*Thuya plicata*) is called western red cedar.

The name cedar is also popularly given to redwooded species of juniper (*Juniperus*) and to various trees which are not conifers. Among the latter is the Spanish cedar (*Cedrela odorata*), extensively used for cigar boxes. See *Deodar*, *Juniper*.

Celandine (*sĕl'ăn-dĭn*) (*Chelidonium majus*). A smooth, brittle, branching herb of the poppy family. It has deeply cut leaves and bears small clusters of showy yellow flowers. A native of Europe, celandine is now widely naturalized in the eastern United States as a weed. The yellow juice is very acrid and burning to the skin, and, in large doses, is an active poison.

Celery (*sĕl'ĕr-ĭ*) (*Apium graveolens*). A biennial plant of the parsley or carrot family. It is a native of Europe, West Asia, and North Africa. The plant was anciently grown as a vegetable in the Mediterranean region. It is mentioned in Homer's *Odyssey*; and eating celery, as well as eating the onion, was recommended by Dioscorides as a means of inducing sleep. Celery is now widely cultivated in Europe and America for the leaf stalks, which are blanched and eaten as a salad and also cooked as a vegetable. In Europe a form called celeriac is extensively grown for its thickened root. The ripe seeds of celery contain a volatile oil used in medicine as a sedative.

Century Plant (*Agave americana*). A stout perennial of the amaryllis family, native to Mexico, called also agave and American aloe. In its growing stage the plant consists of a large rosette of long, fleshy, sharp-pointed, spiny-margined leaves. It is sometimes many years in attaining maturity, whence the misleading name century plant. At blossoming time it quickly develops a very tall and stout flowering stem, sometimes 30 feet high, surmounted with a huge panicle of flowers. After flowering, the seeds ripen and the whole visible plant withers and dies.

The cultivation of the agave in Mexico far antedates the Spanish discovery of that country. *Pulque*, the national beverage of the Mexicans, is made from the fermented sap, and, by distillation, *mescal* is produced. The maguey or Pita flax and the sisal hemp, both very valuable fibers used for cordage and binding twine, are obtained from very similar species. The agave was introduced into Europe in 1561, and is widely grown in many countries as an ornamental plant. See *Sisal*.

Cereals. The plants belonging to the grass family which are cultivated for their seeds used as human food,—the name being derived from Ceres, the goddess of agriculture. They are called also corn plants or bread plants. The standard cereals are wheat, barley, rye, oats, rice, and maize or Indian corn. The millets and sorghums, also raggee and Job's tears, are often grouped with the cereals. Buckwheat, which is not a grass, is sometimes incorrectly classed with them.

Cereus (*sē'rē-ŭs*). A genus of the cactus family, including about 100 species, natives of the southwestern United States, Mexico, and dry regions southward to Argentina. Some of these attain gigantic size and others produce some of the most splendid flowers known. The immense flowers of the night-blooming cereus (*C. grandiflorus*), sometimes eight inches in diameter, are famous for their beauty and fragrance. See *Cactus*.

Chamisal (*chä'mē-säl'*) (*Adenostoma fasciculatum*). A small evergreen shrub of the rose family. It grows usually from 2 to 5 feet high, with resinous, narrow leaves in bundles or fascicles, and small clusters of white flowers. The chamisal covers large areas on the slopes of California mountains. It is one of the most valuable covering shrubs of the chaparral belt, preventing erosion and the rapid run-off of water.

Chaulmoogra (*chôl-mōō'grȧ*) (*Taraktogenos kurzii*). A large tree native to tropical forests of southeastern Asia. It bears a fruit which, in size, is about equal to a small orange. Within the hard rind is a sweetish pulp, closely packed with large seeds. From these seeds is obtained the highly valuable chaulmoogra oil. This oil, which, in the Orient, has been long used in the treatment of skin diseases, is the only known means of arresting the course of leprosy.

Cherimoya (*chĕr'ĭ-moi'ȧ*) (*Anona cherimola*). A small tree of the custard apple family, called also cherimoyer. It is a native of tropical America and is widely cultivated in warm regions for its delicious fruit. It grows from 15 to 30 feet high, with drooping branches, oblong leaves which are velvety beneath, and highly fragrant flowers. The fruit, which ranks among the finest produced in the tropics, ranges from the weight of an orange to 15 pounds or more. It is roundish or heart-shaped, with a thick, yellowish or reddish skin and a white, juicy flesh. Cherimoyas are grown to some extent in southern California and Florida.

Cherry (*Prunus*). A genus of small trees of the almond family, comprising, with the almond, peach, apricot, and plum, the important group of stone fruits. Garden cherries have originated chiefly from two species, the sour cherry (*P. cerasus*) and the sweet cherry (*P. avium*), both natives of eastern Europe and western Asia where they have been cultivated since ancient times. They bear a profusion of white flowers in early spring, followed by mostly red, yellow, or black fruit, without bloom, containing a smooth, nearly round stone.

The common red or sour cherry is a low, spreading tree, usually not exceeding 15 feet in height, with somewhat drooping branches. Sour cherries, especially the dark red morello varieties, are extensively grown in the eastern United States. Large quantities are marketed, either as fresh fruit or canned, Pennsylvania usually leading in production.

The sweet cherry, called also bird cherry or mazzard, is a larger and stronger tree, sometimes reaching a height of 45 feet. It includes the various black and white cherries which have a sweet pulp when ripe. While cultivated to some extent in the eastern United States, sweet cherries are produced chiefly in California, whence they are shipped to eastern markets.

The wood of both species is reddish brown, close-grained, and takes a high polish. It is prized for making furniture, interior finishings, and musical instruments. See *Plum*.

Cherry, Wild (*Prunus*). Trees or shrubs of the rose family, closely related to the plums. Those found in North America form three groups, the bird cherries, with small, bright red fruit, the dark fruited cherries, and the evergreen cherry laurels.

The most important is the wild black cherry (*P. serotina*), a large, handsome tree, sometimes 100 feet high, with a trunk 4 to 5 feet in diameter, and bearing a small, thin-fleshed, bitterish, black fruit. It grows from Nova Scotia to North Dakota and southward to Florida and eastern Texas. The light red wood is much used in cabinetmaking.

The wild red cherry (*P. pennsylvanica*), called also bird cherry, 30 to 40 feet high, with slender trunk, reddish branches, and small, light red, sour fruit, occurs throughout eastern North America. The bitter cherry (*P. emarginata*), often a mere

shrub, but sometimes 30 to 40 feet high, with bright red, bitter fruit, grows from Montana and Arizona westward to the Pacific Ocean. The choke cherry (*P. virginiana*), a shrub or small tree, with reddish black, very astringent fruit, is common east of the Rocky mountains. The western choke cherry (*P. demissa*), similar to the last, occurs from the Rockies to the Pacific slope.

The holly-leaved cherry or Islay (*P. ilicifolia*), an evergreen species of California and the coast islands, is usually shrubby but sometimes grows 30 feet high. It bears thick, spiny-toothed leaves and dark purple fruit with a very large stone.

The laurel cherry (*P. caroliniana*), of the South Atlantic and Gulf states, sometimes called "mock orange," is another evergreen-leaved species. It is usually a small tree and in the South is sometimes planted for ornament. Its small, black fruit has a thin, dry flesh. See *Plum*.

Chestnut (*Castanea*). A genus of trees of the beech family. There are 4 or 5 species, natives of temperate climates.

The American chestnut (*C. dentata*) is a stately, spreading tree which reaches a maximum height of about 90 feet with a trunk diameter of 4 feet. It is found from Maine to southern Michigan and southward to Delaware, Tennessee, and Mississippi. The fruits are finely flavored nuts, which are enclosed in burs, usually 2 or 3 nuts in a bur. The wood is yellowish brown, soft, and weak, but durable in the soil and much used for fence posts and also in furniture manufacturing. In recent years a fungus disease, believed to have been introduced from China, has killed thousands of chestnut trees.

The Japanese chestnut (*C. crenata*), a smaller tree, is now much cultivated for its productiveness, its large nuts, and its freedom from blights. It is often grafted on the American species.

The Chinquapin or Chinkapin (*C. pumila*) is a shrub or small tree native to dry soil from New Jersey to Missouri and southward to Florida and Texas. It is generally about 10 feet in height, but occasionally reaches 40 feet, especially in Arkansas, where it attains its highest development. The nuts are ovoid, sweet, and about half the size of ordinary chestnuts. The brown, coarse-grained, hard, durable wood is extensively used for fence posts and railroad ties.

Chicory (*Cichorium intybus*). A herbaceous perennial of the composite family, with handsome blue flowers, native to the Mediterranean region. It was known to the Greeks and Romans and is still widely cultivated in Europe as a salad plant, for fodder, and for its roots. The latter, when roasted and ground, are used as a substitute for, or as an adulterant of, coffee. Chicory has become naturalized as wayside weed in many parts of the United States, where it is now grown to some extent for its roots.

Christmas Berry (*Heteromeles arbutifolia*). A shrub or small tree of the rose family, native to the chaparral belt of California foothills and low mountains. This elegant shrub is known also as toyon, tollon, and California holly. It has a short, thick trunk with many upright branches, ashy gray, wrinkled bark, oblong, shiny, evergreen leaves, and whitish flowers borne in large clusters. The handsome, bright red berries, which ripen from October to February, are sold in the markets, like holly, for holiday decorations. Though very suitable for turnery, the hard, heavy, reddish brown wood is as yet but little used. See *Holly*.

Chrysanthemum. A numerous genus of plants of the composite family, embracing about 200 species, mostly native to Asia, Europe, and North Africa. Nearly all are free blooming and produce showy white, yellow, or rose-purple flowers. In popular language the name chrysanthemum is confined to the many greenhouse and garden varieties, now widely cultivated in Europe and America, which have been derived from two Chinese and Japanese species, *C. indicum* and *C. sinense*. By cross-fertilization and selection, a remarkable array of forms and colors has been produced, ranging in size from mere button-like tufts to huge heads nearly 8 inches in diameter, with ray florets 4 inches long. Like the rose in the western world, the chrysanthemum is a favorite in the Far East, and is the national flower of Japan.

The Oxeye Daisy, which has become a troublesome weed in the eastern United States, is a chrysanthemum (*C. leucanthemum*) native to Europe, as are also the Feverfew (*C. parthenium*) and the Costmary (*C. balsamita*), which have escaped from gardens. In France, the Marguerite (*C. frutescens*) is much grown in gardens for ornamental purposes.

Cinchona (*sĭn-kō'nâ*). A genus comprising several small trees of the madder family, natives of Bolivia and Peru. They yield cinchona bark, the source of the quinine of commerce, and are now extensively cultivated in Jamaica, Japan, India, and Ceylon. The bark of these trees was first introduced into Europe by the Countess of Cinchon, the wife of a viceroy of Peru. She was cured of malaria by its use.

Cinnamon (*Cinnamomum zeylanicum*). A small tree belonging to the laurel family, native of Ceylon, the bark of which yields cinnamon oil and cinnamon, the well-known spice for flavoring. From biblical times the bark had been taken from wild trees until systematic cultivation was begun by the Dutch in Ceylon about 1765 and later was extended to Brazil, the West Indies, Egypt, and Java.

Citrous (or **Citrus**) **Fruits.** A group of valuable fruits, produced by trees and shrubs of the rue family. They belong chiefly to the genus *Citrus*, and, by many, are called "citrus" fruits. The most important are the orange, the lemon, and the grapefruit. Other fruits of the group include the citron (*C. medica genuina*), the thick rind of which is used in confectionery and in preserving; bergamot (*C. aurantium bergamia*), which yields an essential oil used in perfumery; also the citrange, the mandarin, the tangelo, and the tangerine. The closely related trifoliate orange (*Poncirus trifoliata*) and the kumquats (*Fortunella*) are classed with the citrous fruits. See *Citrous Belt*, *Grapefruit*, *Kumquat*, *Lemon*, *Lime*, *Orange*, *Tangerine*.

Clematis (*klĕm'ă-tĭs*). A genus of trailing vines of the crowfoot family. They bear conspicuous flowers and seeds, the latter having usually long feathery awns. There are about 150 species, some 20 of which are native to the United States and Canada.

The Virgin's Bower (*C. virginiana*), with leaves divided into three leaflets and showy clusters of white flowers, grows from Nova Scotia to Manitoba and southward to Georgia. The Western Virgin's Bower (*C. ligusticifolia*), with leaves divided into five leaflets and flowers similar to the preceding, ranges from Missouri to the Pacific coast. The large-flowered clematis (*C. lasiantha*), with leaves of three leaflets and solitary flowers, is found in California.

Many handsome species are in cultivation. Among the most popular are *Clematis paniculata*, with fragrant flowers, *Clematis viticella*, with solitary bell-shaped flowers, and *Clematis patens*, with large, blue flowers—all natives of Japan, and the evergreen *Clematis indivisa*, from New Zealand.

Climbing Bittersweet (*Celastrus scandens*). A woody vine of the staff-tree family, which grows in rich soil from Quebec to Manitoba and southward to North Carolina and New Mexico.

It has alternate leaves, greenish flowers with finely toothed margins, and an orange-yellow fruiting capsule or pod. This opens after the leaves have fallen, exposing the scarlet aril covering the seeds. The handsome clusters of brightly colored fruit are used for winter ornament. See *Bittersweet.*

Clover (*Trifolium*). An important genus of plants of the pea family, embracing 275 species widely distributed in temperate regions. Of these, more than 60 are native to the United States. The true clovers have leaves composed of three leaflets, nontwining, herbaceous stems, and roundish or oblong heads of small flowers, which persist in a withered state until the seeds ripen. Several species are of great value to agriculture as pasture, fodder, and honey plants.

Among the most important cultivated kinds are red clover (*T. pratense*), alsike or Swedish clover (*T. hybridum*), Italian or crimson clover (*T. incarnatum*), and Egyptian clover (*T. alexandrinum*). In many sections the white clover (*T. repens*), a native both of Europe and of North America, quickly establishes itself in pastures and meadows without cultivation. In common with many other leguminous plants, the clovers possess the power, through the agency of bacteria living on their roots, of taking nitrogen from the air and transforming it into a soil fertilizer.

Many related plants which do not belong to the true clover group (*Trifolium*) are popularly called clovers. Among these are the sweet clover (*Melilotus*), bur clover (*Medicago*), prairie clover (*Petalostemon*), and bird's-foot clover (*Lotus*). See *Leguminous Plants.*

Clove Tree (*Eugenia caryophyllata*). A beautiful evergreen tree, 20 to 40 feet high, belonging to the myrtle family. It bears large oval leaves and numerous clusters of crimson flowers. The unexpanded flower buds, when properly dried, form the cloves of commerce. The tree was found native in the Molucca or Spice islands by early Portuguese traders. It has since become naturalized in various other warm regions, and is now cultivated in Sumatra, Mauritius, Zanzibar, the West Indies, and elsewhere in the tropics.

Coca (*Erythroxylon coca*). A small shrub, 3 to 6 feet high, belonging to the coca family, native to Peru and Bolivia. The tealike leaves are much used by the natives of several South American countries as a narcotic stimulant. The plant was grown for this use by the Indians of the Andes long before the discovery of America. Quantities of the leaves are found buried with the mummies in ancient Peruvian tombs. Coca is the source of the medicinal alkaloid *cocaine,* extensively used in medicine. The shrub is now cultivated in various parts of South America, India, Java, and Ceylon. The yearly production of leaves in the South American trade is estimated at about 35 million pounds.

Coconut (*Cocos nucifera*). A very valuable tree of the palm family, probably native to the Malay archipelago and possibly to tropical America. In southern Asia and the East India islands this palm has been cultivated for upwards of 3000 years. It is now diffused along the coasts of all tropical regions and is the principal food plant of many Pacific islands. The stem, which is about a foot in diameter and from 60 to 80 feet high, bears at the summit a crown of downward-curving leaves, 12 to 20 feet long.

The chief product of this palm is the coconut, whose dried kernel or meat is the *copra* of commerce and the source of coconut oil. Palm wine, arrack, and sugar are obtained from the sap; cordage is made from the fiber of the leaves, and coir from husks of the nut. The wood of the lower part of the stem, very hard when seasoned, takes a beautiful polish and is employed for a great variety of uses. It is known commercially as porcupine wood. See *Palms.*

Coffee (*Coffea arabica*). A small tree of the madder family, native to Abyssinia, and ranking with tea among the world's most important beverage plants. In ordinary cultivation, coffee is a pyramidal tree, 6 to 10 feet high, with evergreen, leathery leaves and small, white, fragrant flowers. It bears a dark red, cherry-like fruit which encloses two somewhat hemispherical seeds with flattened faces, called coffee beans. These seeds, when properly prepared and cleaned, constitute the coffee of commerce.

The use of coffee is comparatively recent, probably dating back about 500 years in Arabia, whence it was introduced into Europe in the 16th century. The Dutch began growing coffee in South America in 1718, and its cultivation has since become extensive in many tropical countries. Coffee culture is now the chief industry of Brazil, which produces about two-thirds of the world's supply.

The stimulating principle in coffee is the alkaloid, caffeine, which is very similar in its action to the theine of tea and the theobromine of cocoa. See *Cacao, Maté, Tea.*

Columbine (*kŏl'ŭm-bĭn*) (*Aquilegia*). A herbaceous plant of the crowfoot family, noted for its handsome flowers. These have 5 petal-like, colored sepals and 5 tubular petals with hornlike spurs, usually ending in honey sacs. There are about 50 species, mostly native to north temperate countries, over 20 of which occur in North America. The common columbine (*A. canadensis*), with scarlet, yellow, or rarely white flowers, 1 or 2 inches long, grows in rocky woods throughout eastern United States and Canada. The blue columbine (*A. cærulea*), one of the most beautiful species, native to the Rocky mountains, is the state flower of Colorado.

Compass Plant (*Silphium laciniatum*). A tall, coarse plant of the composite family, native to the prairie regions of the United States, called also resinweed. It has a tall, resinous stem and nearly vertical root leaves. When growing in open situations, exposed alike on all sides to the sunlight, the edges of most of the leaves point approximately north and south. This peculiarity is mentioned in Longfellow's "Hiawatha." The stem leaves of the prickly lettuce (*Lactuca scariola*) exhibit the same compass-like property.

Compositæ (*kŏm-pŏz'ĭ-tē*). The composite family, called also aster, thistle, or sunflower family, is the most numerous natural group of flowering plants. It contains upwards of 800 genera and about 12,500 known species, or about one-tenth of all seed-bearing plants, very widely distributed throughout the world. In some regions this family constitutes a large part of the total flora, comprising over one-sixth of the flowering plants in California, over one-fifth in Chile, and in certain regions of the Andes more than one-third.

The *Compositæ* are now regarded by botanists as the most highly developed of plants, and in recent classifications the group is placed at the head of the vegetable kingdom. Some botanists divide this great group into three distinct families, as, for example, into the *Cichoriaceæ* or chicory family, the *Ambrosiaceæ* or ragweed family, and the *Asteraceæ* or aster family. Other authorities, while regarding the ragweed and chicory families as distinct and separate, retain the name Compositæ for the remainder, which comprises about five-sixths of the entire group.

The family includes many useful plants, such as the artichoke, carthamin, endive, chicory, lettuce, salsify, scorzonera, wormwood, camomile, tansy, arnica, coltsfoot, pyrethrum, and elecampane. Among the very large number of cultivated ornamental plants belonging to this family are the dahlia, chrysanthemum, aster, cineraria, coreopsis, cosmos, cornflower, immortelle, and marigold.

Conifers (*kō'nĭ-fērz*) (*Coniferæ* or *Coniferales*). The chief group of living gymnosperms. All are trees or shrubs of temperate regions or of high altitudes in the tropics, mostly with evergreen, resinous, needle-shaped or scalelike leaves. They usually produce a cone-shaped strobile, or cone, containing the seeds, whence the name *conifer*, or "cone-bearer." There are two great groups: (1) the pine family (*Pinaceæ*), with about 240 species, commonly with scaly cones, including the pines, spruces, firs, hemlocks, cedars, larches, junipers, cypresses, redwoods, and araucarias; (2) the yew family (*Taxaceæ*), comprising about 75 species, with a somewhat fleshy fruit, including the yews, *Torreyas*, *Cephalotaxus*, *Dacridium*, and the South American podocarps.

Cork Tree. The cork oak (*Quercus suber* and *Q. occidentalis*) is native to southern Europe and northern Africa. It grows from 20 to 40 feet high and sometimes has a trunk 4 feet in diameter. The thick, spongy outer bark, known as cork, has been widely used since ancient times. Theophrastus refers to it; Plutarch mentions cork life preservers; and Pliny tells of the use of cork for stoppers, floats for nets, and for inner soles of shoes. Cork is taken from both wild and cultivated trees, at intervals of about 9 years. The removal of the thick outer layer does not injure the vitality of trees, which yield the best bark at 40 years and continue to produce for about 150 years. Spain and Portugal now furnish over two-thirds of the world's supply of cork.

The cork oak trees planted in the South Atlantic and Gulf states and in southern California between 1880 and 1890 are still living. They have not, however, been worked for commercial cork, which, under proper management, they would probably yield. See *Oak*.

Corn (*Zea mays*). An annual of the grass family, producing a valuable cereal grain. Corn, called also Indian corn and maize, is the most important contribution made by the New World to the economic plants used by man, ranking with wheat and rice among the world's chief food plants.

Like wheat and some other very anciently cultivated plants, corn is unknown in the wild state. By most authorities it is supposed to have originated from a parent wild species growing on the high plateaus of tropical America between Mexico and Peru. Some investigators have regarded the Mexican teosinte (*Euchlæna mexicana*) as a possible ancestor of maize. These two plants hybridize freely and produce fertile offspring. From such hybrids Burbank and other plant breeders derived by selection degenerate forms of corn, but the origination of corn from pure teosinte has not been proved.

While botanists generally recognize only a single species of corn, centuries of cultivation have developed many varieties, ranging in size from dwarf kinds only two feet high to giant West Indian forms exceeding 30 feet in height. The most important varieties are the dent corns, flint corns, sweet corns, pop corns, soft corns, and pod corns. See *Cereals*, *Grasses*.

Cotton (*Gossypium*). A genus of small trees, shrubs, and herbaceous plants of the mallow family, comprising many species which are widely distributed in the tropics. From the long hairs covering the seeds of various forms now cultivated in warm regions, the world's supply of cotton fiber is obtained. The seeds yield cottonseed oil, cottonseed meal, and fertilizer.

According to the researches of Sir G. Watt, the commercially important cottons are derived chiefly from the following five species: (1) sea island or Egyptian cotton (*G. barbadense*), native to tropical America, and highly valued for its long fiber; (2) upland cotton (*G. hirsutum*), native to Mexico, the most important cotton yielding plant and source of the standard American cotton; (3) kidney cotton (*G. brasiliense*), native to South America, and yielding a harsh, wiry fiber suitable for mixing with woolens; (4) levant cotton (*G. herbaceum*), native to India, and source of most of the short-fibered cottons grown in Asia, and (5) tree cotton (*G. arboreum*), native to northern Africa, and sparingly cultivated in the Orient for its silky fiber.

Cotton has been grown in southern Asia for upwards of 2000 years, and was known also to the ancient Greeks. In the New World its cultivation and use were well established from the West Indies to Peru and from Mexico to Brazil at the time of the discovery of America. See *Cotton Cloth*, *Flax*, *Ramie*.

Cowpea (*Vigna sinensis*). A leguminous annual, native to southeastern Asia. It has been cultivated since prehistoric times as a food and forage plant, having been known to the ancient Romans. The cowpea is now widely distributed in tropical and subtropical regions. Its introduction into the United States dates from about 1725. In the South the cowpea has become a valuable fodder and soiling crop, corresponding in importance to red clover in the North or to alfalfa in the Western States.

Crab Apple (*Pyrus*). A name commonly given to various species of apple, bearing hard, sour fruit. The Siberian crab apple (*P. baccata*), a native of northern Asia and Europe, has been notably improved by cultivation. It is of great importance to fruit growers because it transmits its hardiness to crosses with the common apple, many valuable resistant varieties having been developed.

The American or sweet crab apple (*P. coronaria*) is one of the most beautiful trees of the eastern United States when its fragrant pink flowers are in bloom. Its fruit is of little value. The similar narrowleaf crab apple (*P. angustifolia*), a small tree growing from Pennsylvania to Florida and Louisiana, is very popular on account of its sweet-scented, rose-colored flowers. The prairie or Iowa crab apple (*P. ioensis*), similar to the eastern crab apple, produces larger and less acid fruit. Valuable crosses with the common apple have already been made, including the so-called Soulard apple (*P. soulardii*). Horticulturally, the Iowa crab apple is the most promising native species. See *Apple*.

Cranberry (*Vaccinium macrocarpum*). A small, creeping shrub of the heath family, native to peaty bogs and marshlands in the northeastern United States and in Canada. It is highly esteemed for its firm, red, acid fruit, which is of good keeping quality. The cultivation of the cranberry was begun in New England about 1800. Cranberry culture is now of commercial importance in Wisconsin, New Jersey, and Massachusetts, the last-mentioned state usually producing somewhat more than half of the total crop. This now exceeds a million bushels.

Creosote (*krē'ō-sōt*) **Bush** (*Covillea glandulosa*). A common evergreen desert shrub, of the caltrop or bean caper family, occurring from Texas to California, and usually attaining a height of 3 or 4 feet. It has somewhat brittle stems and small, olive green leaves which emit a strong, tarry odor. Early in the season it bears a profusion of yellow flowers, followed by woolly seed vessels. Throughout vast areas in the Gila, Colorado, and Mohave deserts the creosote bush is a characteristic plant. As it harbors a small insect which secretes a resinous substance identical in composition with the lac used in making varnishes, the creosote bush possibly may become commercially important.

Cucumber (*Cucumis sativus*). A vinelike annual of the gourd family, native to India, and cultivated as a garden vegetable since prehistoric times. It was known to the ancient Greeks and Romans, was introduced into China about 150 B. C., and is now widely grown throughout the world. The oblong, fleshy fruit, 4 to 30 inches long, is eaten in the green state as a salad and is also extensively used in pickling.

Cultivated Plants. Along with the domestication of animals, the invention of tools, and the use of fire, the cultivation of plants ranks as one of the fundamental advances made by primitive man. The earliest historical records show that many of the plants still of supreme importance to mankind were well established in cultivation at an extremely remote period.

According to De Candolle, some 50 plants are known to have been in cultivation for upwards of 4000 years. Among these are wheat, barley, millet, rice, bean, lentil, apple, peach, apricot, olive, fig, date palm, cabbage, onion, turnip, flax, hemp, saffron, carthamin, and tea.

Among plants in cultivation since the beginning of the Christian era but not known to have been grown for more than 4000 years are oats, rye, beet, carrot, lettuce, celery, pea, asparagus, watermelon, orange, lemon, grapefruit, madder, indigo, poppy, cotton, and probably the potato, sweet potato, maize, and tobacco.

During the last 2000 years few plants of primary importance have been placed in cultivation, though some older plants have been very greatly improved and many valuable minor plants have been added to husbandry. Among these are buckwheat, horseradish, parsnip, parsley, chicory, endive, artichoke, pumpkin, squash, tomato, Lima bean, okra, New Zealand spinach, currant, gooseberry, raspberry, blackberry, strawberry, muskmelon, persimmon, pineapple, various clovers, jute, sisal, cinnamon, clove, hop, and cinchona, coca, peanut, coffee, maté, and cocoa.

There were three distinct regions in which most cultivated plants were developed, namely, China, southwestern Asia from the Ganges to the Nile, and tropical America from Mexico to Peru. The number of useful cultivated plants when compared to the vast array of unused wild species is exceedingly small. About 140,000 species of higher plants have been described, but of this number only about 300 have become permanently useful and economically important in cultivation. Of these, the Old World has contributed about four-fifths and the New World about one-fifth. In the New World, South America heads the list, being credited with the potato, tobacco, tomato, Lima bean, peanut, manioc, coca, cocoa, cassava, cinchona, and usually with Indian corn or maize. Among those originating in the United States are the American grape, strawberry, plum, blackberry, and raspberry; also the pumpkin and the Jerusalem artichoke.

Currant, Black (*Ribes nigrum*). A small shrub of the saxifrage family, native to northern Europe, and Asia. It has been cultivated in Europe since the early middle ages for its black, strongly scented, berry-like fruit. It is now widely grown in Canada but only sparingly in the United States. The unpleasant odor and taste of the raw fruit are removed by scalding. In France large quantities of *liqueur de cassis* are made from it. The native North American black currant (*R. floridum* or *americanum*), possessing similar qualities, is sparingly cultivated.

Owing to the fact that this and other species of *Ribes* are intermediate hosts of the white pine blister rust, a deadly fungous disease of all 5-leaved pines, the sale and distribution of currant and gooseberry bushes have been greatly curtailed. See *Gooseberry*.

Currant, Red (*Ribes rubrum*). A small shrub of the saxifrage family, native to northern temperate regions. It is highly esteemed for its agreeable, acid fruit, which is extensively used for jellies. In Europe, the cultivation of the red currant began early in the middle ages, though it was but little known in England until after 1600. It is now very widely grown in fruit gardens in the northern United States and Canada. In the commercial production of red currants for the markets, New York, Michigan, and Ohio rank among the leading states. See *Gooseberry*.

Cypress (*Cupressus*). A genus of coniferous trees. The European cypress (*C. sempervirens*) is a dark-colored evergreen, with extremely small, scalelike leaves entirely covering the twigs. Cypress trees, though of a somewhat somber appearance, may be used with great effect in shrubberies and gardens. They are much valued also on account of their wood, which is hard, compact, and very durable, of a reddish brown color and a pleasant smell.

The Monterey cypress (*C. macrocarpa*) is native to a few miles of shore (Cypress and Pinos points) near Monterey, California, whence all the trees of this species, now widely planted for ornament in America and Europe, were originally obtained. The bald cypress (*Taxodium distichum*), of the southern United States and Mexico, is a deciduous-leaved species, highly prized for its valuable timber, which, under water, is almost imperishable. In the swamps of the southern United States this cypress constitutes forests hundreds of square miles in extent. See *Big Trees*.

Dahlia. A genus of perennial plants of the composite family, native to Mexico and Central America, and named in honor of Dahl, a Swedish botinist. Dahlias were first brought to Madrid in 1789, and from two species, *Dahlia variabilis* and *Dahlia juarezii*, have been derived the immense number of handsome kinds now in cultivation. In the wild state the dahlia is a stiff, formal flower with 8 red rays about a yellow center. But, under cultivation, dahlias are produced in a great variety of colors and shapes. Some are compact and spherical, others have large, flat petals, while the beautiful cactus dahlias have double blossoms with twisted rays. After frost in the autumn the tuberous roots are dug and stored in cellars, like potatoes, to be planted in the spring for the next season's flowering.

Dandelion (*Taraxacum officinale*). A common, stemless plant of the sunflower family. The smooth, erect, hollow flower stalk rises from the center of a rosette of leaves. It bears a bright yellow flower head, followed by a "blow-ball" of feathered seeds, which are blown everywhere by the wind. The whole plant contains a bitter, milky juice.

Originally a native of Europe and Asia, the dandelion is now very widely naturalized in temperate countries, and often immensely abundant as a weed, particularly in the eastern United States. It is used to some extent as a potherb and for salads. Medicinal qualities are ascribed to the root, which is sometimes used to adulterate coffee. The name dandelion means "tooth of a lion," referring to the irregular, jagged teeth on the leaves.

In the spring the dandelion is an exceedingly valuable plant to commercial beekeepers. It furnishes large quantities of nectar and pollen when most needed by the bees for rearing their brood.

Date Palm (*Phœnix dactylifera*). A large tree of the palm family, native of the oases in the deserts of southwestern Asia and northern Africa. In height it ranges from 40 to 80 feet and bears at its summit a crown of large, pinnated leaves. The fruit is produced in huge clusters, a single tree frequently yielding 300 to 500 pounds. In Egypt and Arabia the date palm has been cultivated for its valuable fruit for more than 4000 years. It is mentioned in Herodotus and is the palm of the Bible. This palm is an important source of wealth in Mediterranean countries, producing, in addition to the date of commerce, oil, fiber, and wood. Its cultivation has extended to Italy, France, China, and southwestern United States. American production exceeds one million pounds annually and is of exceptionally high quality. See *Palm*.

Deodar (*dē'ō-där'*) (*Cedrusdeodara*). A magnificent cedar of the Himalaya mountains, called also the "god tree." It sometimes grows to a

height of 70 feet without branching, the trunks attaining great size. The close-grained, perfumed, highly resinous wood is much used for building. In England and in California the deodar is often grown as an ornamental tree; it is also much planted in California for shelter belts about orange groves. See *Cedar*.

Desert Plants. Without special modifications of their structure, plants living in a very dry atmosphere would soon wither and die. The perennials and biennials growing in arid regions are peculiarly adapted to prevent undue loss of water from the plant tissues. Some desert plants are protected by a covering of densely matted hairs. Others are covered with scurfy scales or with waxy or resinous exudations. Still others have highly specialized structures guarding the breathing pores of the leaves. Many desert plants are bulbous, especially the biennials, and quickly wither down to the ground after a brief period of growth. Some, such as the cactus, century plant, and aloe, have fleshy leaves or stems in which a supply of water is stored. However, the great majority of desert perennials are shrubby or woody. Many are provided with thorns or with acrid or poisonous juices as a protection against being eaten by animals.

Besides perennials and biennials, desert vegetation usually includes a large number of short-lived annuals. These spring up with great rapidity after the scant rains. They often grow to maturity and ripen their seeds within a period of a few weeks. Then they quickly perish, leaving their seeds to be scattered broadcast by the winds. See *Alpine Plants*, *Aquatic Plants*.

Douglas Fir (*Pseudotsuga taxifolia* or *P. mucronata*). A valuable timber tree of the pine family, called also red fir and Douglas spruce. It has some of the characteristics of the hemlocks and the firs but most closely resembles the spruces.

Except the great sequoias of California, the Douglas fir is the most gigantic tree of Pacific Coast forests. Under the most favorable conditions of growth, it often attains a height of 180 or 190 feet and a trunk diameter of from 3½ to 6 feet. Occasionally, the tree reaches a height of 250 feet, with a trunk diameter of 10 or 12 feet. It grows from British Columbia to South Dakota and southward to Texas and Mexico, attaining its greatest development in Oregon and Washington. In the two last-named states it forms immense forests, furnishing the strong structural timber known to lumbermen as "yellow fir" and also as "Oregon pine."

The Big-cone Spruce (*P. macrocarpa*), 30 to 90 feet high, grows on southern California mountains. It is remarkable for its large cones, sometimes 3 inches thick and 7 inches long, which hang downward from the widely spreading branches. This species is a valuable covering tree on dry mountain slopes. See *Fir*, *Hemlock*, *Spruce*.

Dutchman's-pipe (*Aristolochia macrophylla*). A slender, twining vine of the birthwort family. It grows sometimes 30 feet long, has broad heart-shaped leaves, and bears curved, somewhat pipe-shaped, purple-brown flowers. This quaint plant, which is native to rich woods from Pennsylvania to Minnesota and southward to Georgia and Kansas, is often planted for ornament.

Ebony (*Diospyros ebeneum*). A large tree of the ebony family, native to India, Ceylon, and other tropical regions. It produces a hard, heavy, durable, intensely black heartwood, susceptible of a fine polish, highly prized by cabinetmakers. Ebony is used in making various instruments and as a veneer. Various other species of *Diospyros* furnish ebony of a less excellent quality, including the native American persimmons (*D. virginiana* and *D. texana*), of the Southeastern states and Texas. See *Persimmon*.

Edelweiss (*ā'dĕl-vīs*) (*Leontopodium alpinum*). A beautiful perennial of the composite family. It grows about 6 inches in height, with sage-green leaves and dense heads of silver-white flowers surrounded by woolly bracts. Edelweiss is native to high mountains in Switzerland, where it is protected by law. It has become famous because of its rarity in the Alps and on account of the dangers involved in obtaining it. The plant, however, thrives in cultivation, and is now grown in gardens in Europe and America.

Eggplant (*Solanum melongena*). An annual plant of the potato family, called also aubergine and guinea squash. It has somewhat woody stems, usually less than 2 feet high, and prickly leaves. The eggplant is a native of India, where it has been grown since remote antiquity for its large, white or dark purple, fleshy fruit. This is sometimes 6 or 8 inches in diameter and is used as a vegetable. Through long cultivation the eggplant has become an important garden product in the East Indies. It is easily grown in many parts of the United States, particularly in the South, and its cultivation is increasing.

Eglantine (*ĕg'lăn-tīn*). A poetic name of the sweetbrier rose (*Rosa rubiginosa*). It has fragrant foliage and is often grown in gardens. A climbing West Asian rose (*R. eglanteria*), which has ill-scented yellow flowers, is likewise known as eglantine. The fruits of the sweetbrier and other roses are known as "hips." In Norway and other European countries these hips are collected and used as an article of food. See *Rose*.

Elder (*Sambucus*). A genus of shrubs and small trees of the honeysuckle family. There are about 25 species, widely distributed throughout the world. Of these, several are North American.

The common elder (*S. canadensis*) is a shrub with pithy stems, 4 to 10 feet high. It bears creamy white flowers appearing in June, and dark purple, edible berries. This elder grows from Nova Scotia to Manitoba and southward in the United States. The Simpson elderberry (*S. simpsonii*), of southern Florida, formerly thought to be a southern form of the preceding shrub, is a veritable tree, often a foot in diameter. The red-berried elder (*S. racemosa*) is a shrub 2 to 12 feet high, with white flowers appearing in April or May, and red, inedible berries. It occurs from Newfoundland to California and northward to Alaska.

The Mexican elder (*S. mexicana*), a tree 25 to 30 feet high, with creamy white flowers, appearing in March, and black fruit, is found from western Texas to California. The blue-berried elder (*S. glauca*), a widely branching tree, 30 to 50 feet high, with blue-black, pleasantly acid fruit, grows from British Columbia and California eastward to Utah.

Many species of elder possess medicinal qualities, the fresh fruits are used in making elderberry wine, and a perfume is made by distilling the flowers.

Elecampane (*ĕl'ē-kăm-pān'*) (*Inula helenium*). A tall, stout, herbaceous plant of the composite family, native to Europe and naturalized in America. It sometimes grows 6 feet high, has coarse, wrinkled leaves clasping the stem, and bears large yellow flowers which appear in late summer. The root contains an aromatic, acrid resin used in medicine.

Elm (*ĕlm*) (*Ulmus*). A genus of trees of the elm family common to all north temperate regions except western North America. The English elm (*U. campestris*), 60 to 80 feet high, found throughout Europe, West Asia, and North Africa, has been extensively planted in the eastern United States. The compact, durable wood is superior to that of any other elm. The smooth-leaved or Huntington elm (*U. glabra*), native of Europe, is also used as a shade tree in America, as are the Scotch elm (*U. montana*), a rough-leaved species of northern Europe, and the Camperdown elm, which has a low, broad, umbrella-shaped crown.

The American or white elm (*U. americana*), a magnificent, widely branching tree, sometimes 120 feet high, with a huge buttressed trunk 6 to 11 feet in diameter, grows in river bottoms from Newfoundland to the Rocky mountains and southward to Texas. It is one of the finest street and park trees. The Washington elm at Cambridge and a large elm formerly on Boston Common rank as famous examples. The tough, coarse-grained wood, very difficult to split, is used for piles, flooring, and wheel hubs, and also in cooperage.

The red or slippery elm (*U. fulva*), 60 to 70 feet high, with a trunk sometimes 2 feet in diameter, grows on stream banks and forest hills from Quebec to North Dakota and southward to Florida and Texas. The dark red, straight-grained wood is more valuable for various uses than that of the white elm. The mucilaginous bark is used for various purposes in medicine.

The wahoo elm, or winged elm (*U. alata*), a rather slender tree 40 to 50 feet high, with branchlets often bearing 2 thin, corky wings, grows chiefly in moist uplands in the Southern states. It is often planted as a shade tree as far north as Maryland. The cork elm (*U. thomasi*), sometimes 80 to 100 feet high, with branchlets usually clothed with 3 or 4 thick, corky wings, occurs from Quebec to Wisconsin and southward to New Jersey and Missouri. The cedar elm (*U. crassifolia*), with small, leathery leaves, often grows 80 feet high. It occurs from Texas and Arkansas to Mississippi and Mexico and is the common elm tree of Texas.

Endive (*ĕn'dīv*; *-dĭv*) (*Cichorium endivia*). An annual or biennial, somewhat bitter plant of the composite family, closely related to chicory. It is a native of the Mediterranean region where it has long been cultivated, perhaps since Greek and Roman times, as a salad plant. It is grown like lettuce and is blanched for use by tying the root leaves together at the top. While popular in Europe, endive as yet is only sparingly used in the United States. In central Florida it is grown to some extent as a winter garden crop.

Epiphytes (*ĕp'ĭ-fītz*). Plants which grow upon the surface of other plants for mechanical support but which do not obtain nutriment from their sap or growing tissues as do parasitic plants. Epiphytes are most abundant in warm, moist regions. Various mosses and lichens are epiphytic as are an immense number of tropical orchids and arums. The so-called Spanish moss (*Tillandsia usneoides*), a true flowering plant, which hangs in festoons from live oaks in the Southern states, is a good example of an epiphyte. See *Parasitic Plants*.

Eucalyptus (*ū'kă-lĭp'tŭs*). A numerous genus of trees of the myrtle family, comprising about 300 species, mostly natives of Australia and Tasmania. Many of these are popularly called gums or gum trees. They are usually trees of striking appearance and give a characteristic aspect to the forests of which they form a most valuable part. The leaves, which contain much volatile oil, are entire, leathery in texture, hang obliquely on their stalks, and are usually placed with their edges to the sun. The various species furnish excellent timber adapted to nearly every requirement. Some produce a kind of sugar and others yield kino, tannin, and the eucalyptus oil widely used in medicine. Certain species are exceedingly rapid growers, and several attain immense size. The Great Gum, or Peppermint Tree (*E. amygdalinus*), the tallest tree known, sometimes grows to a height of 470 feet.

About 70 species of eucalyptus are grown for timber or ornament in California, Arizona, and Florida. Among these are the blue gum (*E. globulus*), the sugar gum (*E. corynocalyx*), the gray gum (*E. tereticornis*), the red gum (*E. rostrata*), the branched gum (*E. viminalis*), and the desert gum (*E. rudis*). See *Big Trees*, *Blue Gum*.

Everlasting. The name given to various plants of the composite family whose flowers retain their form and color for long periods after being gathered and dried. Various species of *Helichrysum*, called also immortelles, are often cultivated. The pearly everlasting (*Anaphalis margaritacea*), a beautiful wild species, grows in dry woodlands from Newfoundland to Alaska and south to Oregon and Kansas.

Feijoa (*fā-zhō'ä*) (*Feijoa sellowiana*). A small tree of the myrtle family sometimes 15 feet high. It is native to Brazil, Paraguay, Uruguay, and Argentina, and is closely related to the guava. The feijoa has olive-like leaves, glossy green above and silver-gray beneath, and large flowers, white outside and purplish crimson within. The oval, dull green fruit is marked with crimson. It is about two inches long, with a translucent melting pulp and a delicate pineapple flavor for which it is very highly esteemed. The feijoa was introduced into cultivation in southern Europe in 1890. It was brought to the United States about 1900, and is now widely planted in California.

Ferns (*Filices* or *Filicales*). The highest group of the flowerless or non-seed-bearing plants, comprising about 5000 species, very widely distributed throughout the world but most numerous in humid tropical regions. In size they range from minute, mosslike plants to treelike forms rivaling the palms. Ferns are leafy plants, often strikingly beautiful in outline and texture, varying from delicate, filmy structures to vigorous, luxuriant growths.

In ordinary ferns, only the leaves, properly called *fronds*, are seen above the ground. The fronds are borne on more or less lengthened stalks, known as *stipes*, which usually rise from a nearly horizontal underground stem or *rhizome*. In tree ferns, the fronds form a rosette at the summit of a hollow arborescent trunk.

The method of reproduction in ferns is very interesting. The leafy plant never produces structures corresponding to flowers with stamens and pistils. It is, therefore, *asexual*. But, on the under side of the fronds of typical ferns are borne groups (*sori*) of little brownish structures, called *sporangia* or spore cases. In these are developed countless, exceedingly minute bodies, known as *spores*. Each spore consists of a single plant cell and is totally unlike a seed. When the spores have ripened, the spore cases split open, scattering abroad the spores. Upon falling on moist earth, these germinate and grow, not into leafy fronds, but into minute flattened bodies, called *prothallia*. These tiny prothallia bear organs corresponding to flowers, and are therefore *sexual*. They produce egg cells and antherozoids which, by a process of fertilization similar to that effected by the stamens and pistils of higher plants, develop an entirely new plant organism. In time this grows into the asexual leafy fern, which, in its turn, bears spores. This regular recurrence of asexual and sexual forms in the life history of a plant is known as the *alternation of generations*.

Ferns occur in greatest variety in moist tropical or subtropical islands, as, for example, in Hawaii, Samoa, the Philippines, and New Zealand. In the United States and Canada there are about 300 kinds of native ferns. In the island of Java there are nearly 600 species. The state of New York, about equal to Java in area, has only about 50 wild species. Among the best-known ferns growing in the United States and Canada are the bracken, maidenhair, spleenwort, polypody, adder's tongue, lady fern, shield fern, sword fern, Christmas fern, New York fern, royal fern, ostrich fern, sensitive fern, climbing fern, hay fern, chain fern, walking fern, deer fern, and gold fern.

On account of their graceful foliage, many ferns are widely cultivated for ornamental purposes. The bracken is sometimes used for thatch and the oil extracted from the male fern is used in medicine. As a group, however, ferns are of small economic importance. See *Bracken*, *Maidenhair*.













Photos from J. Horace McFarland Co.

DECIDUOUS TREES

1 American Elm (*Ulmus americana*). 2 Black Walnut (*Juglans nigra*). 3 Ginkgo or Maidenhair Tree (*Ginkgo biloba*). 4 Eucalyptus (*Eucalyptus viminalis*). 5 American Locust (*Robinia pseudacacia*). 6 White Birch (*Betula papyrifera*).









Photos from National Park Service

WESTERN CONIFERS

Western Yellow Pine
(*Pinus ponderosa*)

California Redwood
(*Sequoia sempervirens*)

Douglas Fir
(*Pseudotsuga taxifolia*)

California Big Tree
(*Sequoia gigantea*)

Fig (*Ficus carica*). A tree of the mulberry family, 15 to 30 feet high, with large, rough, deeply lobed leaves. It is a native of western Asia and the Mediterranean region, where, since prehistoric times, it has been extensively grown for its valuable fruit. The fig is pictured in Egyptian pyramids and its cultivation by the Greeks is mentioned by Homer, Herodotus, Aristophanes, Plato, and Theophrastus.

The fig is an oblong or pear-shaped fruit, about the size of a small peach. It is green, yellow, red, or blue-black in color, and, when ripe, very pulpy, juicy, and pleasant flavored. It is eaten fresh, canned, preserved, or, most commonly, when dried. The dried figs of commerce, which are nearly as nutritious as dates, are obtained chiefly from Asia Minor, especially from the vicinity of Smyrna. Since 1899 figs of Smyrna quality have been grown in California, where, in 1920, the production of dried figs exceeded 20 million pounds. Figs are grown also in Texas and other Gulf states.

The golden fig (*F. aurea*) and the poplarleaf fig (*F. populnea*) are small trees found in Florida and adjacent islands. Their fruit is unimportant.

Fir (*Abies*). A genus of large, handsome, evergreen trees of the pine family, some of which attain immense size. There are about 25 species, mostly native to northern mountain regions. The firs have more or less conical-shaped crowns, linear, flat, scattered leaves, and bear large cylindrical cones erect on the uppermost branches. The firs are peculiar in having blister-like cavities in the trunk bark which contain a honey-like oleoresin used in medicine and in the arts. The resin is obtained by puncturing the "blister" and forcing the fluid to flow into a wide-mouthed bottle. The cones of firs differ from those of spruces in having deciduous scales which fall away from a central woody stem when the fruit is ripe.

The balsam fir (*A. balsamea*) is a rather widely branching tree, 50 to 60 feet high, with fragrant, resinous leaves, growing from Labrador to Alberta, southward to Minnesota, and in the mountains to Virginia. It is the source of the valuable oleoresin known as Canada balsam.

The silver fir (*A. amabilis*), a handsome tree, native to the Olympic and Cascade ranges from Oregon to British Columbia, often attains a height of 250 feet, with a trunk 4 to 6 feet in diameter. The lowland white fir (*A. grandis*), sometimes 300 feet high, grows in valleys from Montana, Idaho, and British Columbia through Washington and Oregon to California. The red fir (*A. magnifica*), of the Sierra Nevada, is a beautiful tree often 200 feet high, with a trunk 4 to 6 feet in diameter. A variety of the red fir, the Shasta fir, occurring on Mt. Shasta, bears cones with exserted bracts.

The white fir (*A. concolor*) occurs from the Rocky mountains to the Sierra Nevada where it sometimes grows 250 feet high, with a trunk 6 feet or more in diameter. The noble fir (*A. nobilis*) forms extensive forests in the mountains of Oregon and Washington, whence it extends to northern California. It is a handsome tree, commonly 150 to 200 feet high, but sometimes reaching 250 feet, with a trunk diameter of 6 to 8 feet.

Unique among all of our native firs is the bristlecone fir (*A. venusta*), found only in a few narrow canyons in southern California. It is a handsome but little known species, with unusually long, sharp-pointed, glossy leaves, and long, bristle-like bracts extending from the cone scales.

While, with the exception of the noble fir, the wood of most of the firs is much inferior to that of pine or spruce, it is used for lumber, pulpwood, and various other purposes. See *Douglas Fir*.

Flax (*Linum*). A fiber and seed plant of great importance, cultivated since very ancient times in the Old World, and now widely grown in the New. The common flax (*L. usitatissimum*) grows wild in western Asia. It is an erect, narrow-leaved annual with a slender stem, 2 or 3 feet high, which branches near the top where it bears many handsome, bright blue, nodding flowers. These are followed by small, globular, many-celled pods, containing very smooth, flattened, brownish seeds, the linseed of commerce, from which linseed oil is obtained. Since the dawn of history various kinds of linen cloth, thread, cordage, and rope have been made from the fiber of flax stems. The mummies found in the most ancient Egyptian tombs are wrapped in cloth woven from the narrow-leaved flax (*L. angustifolium*).

Flax is grown in vast quantities for fiber in Russia, Hungary, Belgium, Holland, France, and Ireland. Russia usually produces about half the world's crop, though western Europe contributes the finer grades. Comparatively little effort has been made to produce flax fiber in the United States. The world's commercial crop of flaxseed or linseed is grown in about equal proportions by the United States, Canada, Argentina, India, and Russia. In the United States, North Dakota, Montana, Minnesota, and South Dakota lead in production. In Canada, Saskatchewan is the chief producer. See *Cotton, Hemp, Jute, Manila Hemp, Sisal*.

Forget-me-not (*Myosotis*). Low, more or less hairy, branching herbs of the borage family. They bear alternate, entire leaves and small blue, pink, or white flowers in stemless, one-sided racemes. There are about 35 widely distributed species, several of which occur in the United States and Canada. Various species are cultivated for their delicately beautiful flowers, which long have been regarded as emblematic of friendship. Among the best known of these is the true forget-me-not (*M. scorpioides*). This plant is a native of Europe and Asia, now widely grown in gardens in temperate countries. It has escaped from cultivation and become naturalized from Newfoundland southwestward to Tennessee.

Foxtail Grass. A common name for various grasses. The true meadow foxtail (*Alopecurus pratensis*), an excellent European pasture grass, has become naturalized in eastern North America. Jointed foxtail (*Alopecurus geniculatus*), native of Europe and Asia, now widely introduced in moist soils, is highly prized by cattle. The yellow foxtail (*Setaria glauca*) and the green foxtail (*Setaria viridis*), both naturalized from the Old World and often called pigeon grass, are extremely abundant everywhere as field and wayside weeds.

Fuchsia (*fū'shĭ-ă; fū'shà*). A genus of climbing plants, shrubs, and trees of the evening-primrose family, named in honor of the botanist, Leonhard Fuchs. There are about 70 species, mostly native to tropical America. Several varieties are cultivated for their handsome flowers, which occur in many forms and colors.

Fungi (*fŭn'jī*). A large class of flowerless plants, comprising, with the *Algæ*, the lowest primary division of the plant kingdom, known as thallophytes. Fungi range in size from the minutest organisms known to threadlike masses several feet long. They are either *parasitic*, deriving their nutriment from living plants and animals, or *saprophytic*, deriving their sustenance from dead or decaying organisms.

It is estimated that there are more than 250,000 species of fungi, of which only about one-third have been described. Fungi are usually classed in five divisions: *Myxomycetes*, or slime molds; *Schizomycetes*, or bacteria; *Phycomycetes*, or alga-like fungi; *Ascomycetes*, or sac fungi, including molds and mildews; and *Basidiomycetes*, or basidium fungi, including rusts, smuts, puffballs, and mushrooms. Some authorities, however, place the slime molds in a separate class, distinct from the fungi; others regard them as animals (*Mycetozoa*) and group them with the protozoa.

Some fungi, such as truffles, morels, puffballs, and various mushrooms, are edible. Others, such

as the deadly amanita and the fly amanita, are most violent poisons. Many kinds are extremely destructive to grain, garden, and fruit crops, as, for example, the smuts, rusts, mildews, and molds. Numerous species, particularly the pathogenic bacteria, produce diseases in man and animals. Those fungi which decompose dead animal and vegetable matter, transforming it into food for living plants, are highly beneficial. See *Bacteria*, *Mushrooms*, *Yeast*.

Garlic (*Allium sativum*). A bulbous-rooted perennial of the lily family, closely allied to the onion, and native to western Asia. Garlic has been cultivated since ancient times, being mentioned by Herodotus and in the Bible. It is grown for the root, which consists of several small bulblets popularly called "cloves." These have a powerful, onion-like odor and a pungent taste. In southern Europe, garlic is very generally used as a flavoring agent in cooking. The oil of garlic is used in medicine. See *Leek*, *Onion*.

Gentian (*jĕn'shăn*) (*Gentiana*). Herbs of the gentian family, native to cool temperate and arctic regions, and noted for their beautiful blue or sometimes yellow flowers. There are about 300 species, some 40 of which occur in North America. The yellow gentian (*G. lutea*), of alpine Europe, is valued for its medicinal root. The root of the soapwort gentian (*G. saponaria*), a blue-flowered species of the eastern United States, is similarly used. The fringed gentian (*G. crinita*), with a conspicuously fringed, bright blue corolla, is one of the most beautiful American wild flowers. It is found in moist meadows from Quebec to Minnesota and southward to Georgia. The closed gentian (*G. andrewsii*), of similar range, with a closed, somewhat bottle-shaped blue flower, is now cultivated in gardens.

Geranium. A genus of herbs belonging to the family of the same name. There are about 190 species, found in temperate regions, about 60 of which occur in North America. They bear regular flowers, usually pink, red, purple, or white, and palmately lobed or divided leaves, often with a pungent odor.

The Wild Cranesbill (*G. maculatum*), growing from Newfoundland to Manitoba and southward, with rose-purple flowers over an inch broad, is an attractive wild flower of woodlands in spring. The rootstock is used in medicine for its tonic and astringent properties. The Carolina Cranesbill (*G. carolinianum*), found throughout the continent, is a small, stout annual with deeply cleft leaves and bearing clusters of small pinkish flowers.

The hardy, handsome house and garden plants popularly known as geraniums have been developed from various species of *Pelargonium*, introduced from South Africa.

Ginger (*Zingiber officinale*). A herbaceous plant of the ginger family. It has been cultivated in the East Indies since time immemorial, and is now grown in the West Indies and other tropical countries for its fleshy pungent rootstock. This, when dried, is the ginger of commerce. The unscraped rootstock is known as black ginger and the scraped and peeled rootstock as white ginger. Candied ginger, a delicious sweetmeat, is made of the young rootstock preserved in sugar. Essences and sirups of ginger are used in flavoring. Various preparations are employed in medicine as a stimulant. The ancient Romans were familiar with ginger, which, according to Pliny, was brought from Arabia.

Ginkgo (*gĭngk'gō*; *jĭngk'gō*) (*Ginkgo biloba*). A beautiful tree, often called maidenhair tree, long grown around temples in China and Japan, now widely planted as an ornamental tree in all civilized countries. In the eastern United States it is cultivated as far north as the Great Lakes. It is slender and slow-growing, with a central shaft and widely spreading, ascending branches, and sometimes attains a height of about 100 feet. In form and appearance the fan-shaped, deciduous leaves strongly resemble those of the maidenhair fern. The filbert-like seed of its vile-smelling, plumlike fruit is parched and eaten by the Chinese.

In cultivation the ginkgo has been a familiar tree for many centuries. Its native country, however, was unknown to scientists until the tree was recently discovered growing wild in remote districts of western China. The ginkgo has a very long and interesting geological ancestry. It is the sole surviving representative of the numerous ancient group of gymnosperms called *Ginkgoales*, which were most abundant during the Jurassic period.

Ginseng (*jĭn'sĕng*) (*Panax*). A genus of small perennial plants of the ginseng family, whose roots are very highly esteemed as a medicine by the Chinese. The native East Asian species (*P. ginseng*), one to two feet high, bears five smooth leaves, inconspicuous flowers, and scarlet fruit. Roots which, when dried, assume the shape of the human form are said to have been sold for their weight in gold. The discovery, in 1716, of the very similar American ginseng (*P. quinquefolium*), native of the Northeastern states and Canada, soon led to a large export to China of the wild roots, which became increasingly scarce and valuable. All attempts to cultivate the American ginseng failed until 1885 when George Stanton grew it successfully at Apulia, N. Y. It is now grown to a limited extent in artificial shade.

Gladiolus. A genus of bulbous plants of the iris family. They are mostly natives of the Cape of Good Hope, whence many handsome-flowered species have been introduced into general cultivation. Southern Europe formerly furnished the world with gladiolus bulbs, but the United States now contributes by far the greater part of the supply.

Goldenrod (*Solidago*). A genus of perennial herbs of the composite family. They bear a profusion of small, bright yellow flowers which blossom in late summer or early autumn. There are about 125 species, mostly native to North America, only one kind being found in Europe. They range in height from a few inches to 6 or 8 feet and grow in a great variety of situations, occurring in forests, swamps, prairies, along streams and roadsides, and on high plains and mountains. By reason of its beauty, abundance, and very wide distribution in the United States, the goldenrod is sometimes styled the national flower. Several states have chosen it as a floral emblem.

Goldenseal (*Hydrastis canadensis*). A small, erect herb of the crowfoot family, called also orange-root, yellowroot, turmeric root, and puccoon. The plant grows about a foot high with a thick, yellow rootstock and palmately lobed leaves. It bears a solitary, greenish white flower, blossoming in April in its native woodlands in the eastern United States and Canada. Goldenseal is widely used in medicine as a tonic. The plant also yields a yellow dye.

Goldthread (*Coptis trifolia*). A beautiful little plant of the crowfoot family. It has tufted stems, evergreen leaves, white flowers, and a bright yellow, threadlike, bitter rootstock, from which a tonic medicine is extracted. It grows in damp woods and bogs from Newfoundland to Tennessee and northwestward to Alaska.

Gooseberry (*Ribes*). A genus of the saxifrage family embracing many species of prickly shrubs, native to the North Temperate Zone. These bear a nearly round, pulpy berry, usually about one-third of an inch in diameter, light green in color and very acid when immature, but usually purplish brown and sweet when fully ripe. The fruit of several species has been greatly improved by cultivation.

The European gooseberry (*R. grossularia*), which became generally cultivated in Germany and Holland about the year 1500, reaches perfection in England. Since 1890 it has been grown to a limited extent in the United States. The cultivated American gooseberry originated in Massachusetts about 1850 from a seedling of a common native species (*R. oxyacanthoides*). Gooseberries are used chiefly in making jam, preserves, tarts, and pies. See *Currant* (*Black* and *Red*).

Grape (*Vitis*). A genus of the vine family, containing many climbing, woody vines. They have large, usually toothed or lobed and somewhat heart-shaped leaves, small, greenish flowers, and globular, berry-like fruit borne in dense clusters. There are about 50 wild species, widely distributed in temperate countries. Several species, improved by cultivation, yield excellent fruit.

The European grape (*V. vinifera*), commonly called the "vine," native of the Mediterranean region, was one of the first fruits cultivated by man. It was grown by the ancient Egyptians, by the Lake Dwellers of the Bronze age in Italy, and by the Phœnicians, Hebrews, Greeks, and Romans, reaching China as early as 120 B. C. This grape shares leadership with the apple among the chief fruits of the temperate zone. The cultivation of the grape has become extensive in every continent,—table grapes, raisins, currants, and wine being important articles of commerce in many countries. France, Italy, and Spain combined produce about three-fifths of the world's supply of wine. Spain leads in production of raisins in the Old World; California stands first in the New World. In value, the products of the European grape grown in California amount to approximately half the total grape products of the United States.

The American grape is the most important native fruit developed in the New World. About 20 species of wild grapes are found in the United States and Canada. From several of these, various cultivated forms have been produced. By far the most important ones, such as the Concord and Worden, have been derived from the northern fox grape (*V. labrusca*). In fact, this wild grape has furnished more cultivated varieties than all other native species combined. Therefore, when taken together with its many valuable varieties, this species may properly be styled the American grape. Since 1860 the culture of the American grape, for table use and for making grape juice, has become extensive in the eastern United States and Canada, especially in New York, Ohio, Pennsylvania, Michigan, and Ontario.

Besides adding an excellent new fruit, the introduction of the American grape has proved of inestimable value to the entire grape growing industry. Its root is resistant to the phylloxera, a terribly destructive insect pest, which formerly ravaged the choicest vineyards of the Old World. Millions of young American vines have been sent to various parts of the world to be top-grafted with the European grape. By replanting with European grapevines growing upon resistant American graperoots, the vineyards of the most important grape producing countries have been saved from impending destruction.

The American grape differs from the European, both in its manner of growth and in the character of the fruit. While the American grape is capable of enduring much colder climates than the European, the vines are more slender and slow-growing. In order to support the fruit, the American grapevine is usually trellised. The Old World vine, however, when properly pruned, develops a short, stout trunk which easily sustains a heavy load of ripened fruit. The American grape is very juicy, with a readily detachable skin, and the seeds are firmly embedded in the somewhat tough central pulp. The European grape has a firmly adhesive skin, less juicy but more uniformly tender pulp, and easily removable seeds.

By reason of containing much more sugar than the American grape, many Old World varieties can be made into raisins simply by drying them in the sun. Small, seedless varieties thus preserved are known as currants, a corruption of the name Corinth (Greece), where they have long been grown.

Grapefruit (*Citrus decumana*). A small tree of the orange family, native to the East Indies, cultivated upwards of 2000 years in India and Malaysia for its excellent fruit. The tree closely resembles the orange in appearance, but the fruit is much larger and is usually borne in clusters somewhat like bunches of grapes, whence the name, grapefruit. It is extensively grown in most tropical countries, under various names, such as pomelo, pummelo, pompelmous, and shaddock. After its cultivation became established in Florida and California, about 1900, grapefruit soon rose to popularity in the United States. The growing of grapefruit has recently been extended into subtropical sections of southern Arizona, where fruit of excellent quality is produced. See *Citrous Fruits, Orange.*

Grasses (*Gramineæ* or *Poaceæ*). A very important family of flowering plants, embracing about 4500 species, widely diffused and abundant throughout the world. Several hundred of these grow in the United States and Canada. All are herbaceous except a few, such as the bamboo, which have woody stems. Most grasses have round or somewhat flattened, usually hollow stems, solid at the joints, and alternate leaves with tubular sheaths, usually split on the side opposite the blade. The fruit is a seedlike grain, called a *caryopsis*, with a groove on one side.

In temperate and cold regions, the true stems of the perennial grasses form a thick, interlacing network below the surface of the ground, which is called turf or sod. From this are sent up annual growths or culms, popularly but inaccurately called stems. In warm regions, the stems of the perennial grasses grow erect, like annual grasses, and, consequently, no true turf is formed. Grasses are of inestimable value, furnishing the chief food plants used by man and by domestic animals. The group includes blue grass, red top, timothy, millet, sorghum cane, Kafir corn, sugar cane, barley, rye, oats, rice, wheat, and corn.

Greasewood (*Sarcobatus vermiculatus*). A much branched, somewhat spiny shrub of the goosefoot family. It grows from 2 to 10 feet high, with fleshy, entire, sessile leaves. Greasewood is a characteristic plant of strongly alkaline and saline soils from Montana to Mexico. The name is given also to certain species of saltbush (*Atriplex*) and to various other plants.

Ground Ivy (*Nepeta hederacea*). A small, creeping perennial herb of the mint family, called also Gill-over-the-ground. It has nearly round or kidney-shaped leaves and bears rather large blue or violet flowers in axillary clusters. This plant, native to Europe, is now widely naturalized in damp, shady places in the eastern United States and Canada.

Ground Pine (*Lycopodium*). The name popularly given to various species of club mosses. They have long trailing stems and numerous narrow, evergreen leaves, usually arranged in several ranks. The erect fruiting spikes produce sulphur-yellow, highly inflammable spores. Several species occur in moist woods in the eastern United States and Canada. Ground pines are extensively used for Christmas decoration. Lycopodium powder, composed of the spores of various species, is used in making fireworks and in medicine.

Guava (*gwä'vȧ*) (*Psidium guayava*). A small tree of the myrtle family, with blunt leaves and white, fragrant flowers, native to tropical America. The guava was in cultivation for its delicious fruit from Mexico to Peru at the time of the Spanish

discovery of those countries, and is now widely grown in tropical regions. Cultivation of certain varieties is also well established in Florida and California. The smooth, yellow fruit, about the size of a hen's egg, is extensively used for making jellies. These are now exported in considerable quantities from the West Indies.

Guayule (*gwä-yōō'lā*) (*Parthenium argentatum*). A small, densely branched, spreading shrub of the composite family, native to western Texas, New Mexico, and northern Mexico. When dried this plant yields about 10 per cent rubber, produced chiefly from the bark. As the natural supply is now limited, the plant is being grown successfully under cultivation. The artificially grown plants yield a much larger percentage of rubber than do the wild plants. Many millions of pounds of crude guayule rubber are annually exported from Mexico.

Hackberry (*Celtis*). Trees and shrubs of the elm family, widely distributed in temperate and tropical regions. There are about 60 species, some 13 of which occur in the United States.

The common hackberry (*C. occidentalis*) is a handsome tree, sometimes 130 feet high, with a trunk 3 feet in diameter. This tree has ovate, sharply serrate, roughish leaves, and bears small, dark purple, thin-fleshed, berry-like, sweet fruit, ripening in autumn. It grows in river valleys from Quebec to Oregon and southward to Florida and Texas. It is much planted as a shade tree. The wood is sparingly used in making furniture.

The Sugarberry (*C. mississippiensis*) is a medium-sized tree, common from Kentucky, Indiana, and Illinois southward. This species is often used as a street tree in the South.

Hawthorn (*Cratægus*). A large genus of shrubs or small trees of the rose family, closely allied to the apple. They are usually spiny, with white or pink clustered flowers, and bear a small red or yellow pome fruit. There are several hundred species and hybrids, chiefly native to the United States, Mexico, and the Andes region. Over 250 species are native to the United States. Those producing conspicuous fruit are often called red haws. Various species are popularly known as thorns; as, for example, the Round-leaved Thorn (*C. chrysocarpa*).

The English hawthorn (*C. oxyacantha*), with its numerous varieties, bearing small, deeply lobed leaves and handsome white flowers, is a valuable hedge and ornamental plant. It is widely cultivated in the eastern United States and Canada, and is becoming sparingly naturalized.

Hazelnut (*Corylus*). A genus of shrubs and small trees, of the birch family, which bear a sweet, edible nut enclosed in two enlarged leaflike bracts. There are about 7 species, all native to the northern hemisphere.

The common hazelnut (*C. americana*) is a shrub 3 to 8 feet tall, with light brown nuts enclosed in bracts commonly broader than high. It grows in thickets from Maine to Saskatchewan and south to Florida and Kansas. The similar beaked hazelnut (*C. rostrata*), with nuts enclosed in bracts prolonged into a somewhat tubular beak, is found from Nova Scotia to British Columbia and south to Kansas. The California hazelnut (*C. californica*) grows commonly 6 to 10 feet high, with nuts enclosed in densely hairy bracts extended into a fringed beak. It occurs along streams, west of the Sierra Nevadas.

The filbert (*C. avellana*), a native of the Old World, is extensively cultivated in Europe for its excellent nuts.

Heliotrope (*Heliotropium*). A genus of herbs or shrubs of the borage family. They have entire leaves and small blue or white flowers, usually in more or less curled spikes. There are about 125 species, natives of warm regions, many of which have fragrant flowers and are highly prized in cultivation. The Peruvian heliotrope (*H. peruvianum*) is a small shrub, about 2 feet high, with lilac-blue flowers. It is widely cultivated for its vanilla-like fragrance. The European heliotrope (*H. europæum*), with small white flowers, is now naturalized in the eastern United States.

Hemlock (*Tsuga*). A genus of tall pyramidal trees of the pine family, native to North America and eastern Asia. Four of the seven known species occur in the United States and Canada. The common hemlock (*T. canadensis*), usually 60 to 70 feet high, with a trunk 2 to 4 feet in diameter, and bearing scattered, linear, petioled leaves and small, pendulous cones, occurs in upland forests from Nova Scotia to Minnesota and south to Georgia and Alabama. The bark is extensively employed in tanning leather, and the wood, while inferior to pine and spruce, is much used for building. The much smaller Carolina hemlock (*T. caroliniana*) occurs in the Blue Ridge mountains from Virginia to Georgia.

The western hemlock (*T. heterophylla*), a graceful and valuable timber tree, often 200 feet high, with a trunk 6 to 10 feet in diameter, occurs near the coast from Alaska to central California. The wood of the western hemlock is far superior in commercial quality to that of all other hemlocks. It is heavy, easy to work, and in other respects compares favorably with pine and spruce. Western hemlock lumber is now used for interior finish and in the manufacture of doors. It lacks entirely the splintery quality of the common eastern hemlock.

The mountain hemlock (*T. mertensiana*), 20 to 90 feet high, with fleshy, densely crowded leaves spreading around the branchlets, grows on high mountains from Alaska to California. The soft, very light wood is not commercially used.

Hemp (*Cannabis sativa*). An erect annual of the mulberry family, native to Siberia. It grows from 4 to 20 feet in height, has palmate, usually four-fingered, finely toothed leaves, and greenish yellow flowers, the male and female borne on separate plants.

Hemp has been cultivated since prehistoric times for the strong, durable fiber contained in its stems, valuable for making rope, other cordage, and coarse cloth. It is now grown in immense quantities in Europe, Russia leading in production. While of local importance in Kentucky, Indiana, and California, hemp production in the United States has greatly declined, owing to the increasing use of jute, manila, and sisal. Hempseed is widely sold as food for cage birds, and hempseed oil is used in cooking.

Various fibers are commonly called hemp, although obtained from totally different plants, such as sunn hemp, sisal hemp, manila hemp, and bowstring hemp. From the flowering tops of the Indian hemp (*Cannabis indica*) is obtained the narcotic intoxicant known as hashish.

Henna (*Lawsonia alba*). A shrub of the loosestrife family, native of tropical Asia. It has been cultivated as a dye plant in India, Arabia, and Egypt, since prehistoric times. The leaves yield an orange dye, extensively used in coloring hair and leather. Women in the Orient employ this dye to stain their nails. This custom dates back some 4000 years in Egypt, as is evidenced by pictures in ancient monuments and by mummies. The sweet scented flowers of the henna are used in perfumery and embalming.

Hickory (*Hicoria*). A genus of valuable timber and nut trees of the walnut family. There are 43 species, varieties, and hybrids, all native to eastern North America. The wood of most species is heavy, strong, close-grained, and highly prized for many uses where strength and hardness are required. The fruit is a hard-shelled nut, usually of the size of a small walnut, and enclosed in a separate valved shell. In most species the nuts are sweet and edible.

The shagbark hickory (*H. ovata*) grows usually from 70 to 90 feet high. It has a straight trunk, 3 to 4 feet in diameter, and sheds its bark in long strips. This tree grows in rich soil from Quebec to Minnesota and southward to Florida and Texas. The wood is very highly valued and the sweet nut is the common hickory nut of the stores. Closely resembling the shagbark hickory, and with similarly valuable wood, is the Big Shellbark, or Kingnut (*H. laciniosa*), found in the Mississippi and Ohio valleys. This tree produces larger nuts than any other hickory.

The Pecan (*H. pecan*), sometimes 170 feet high with a trunk 6 feet in diameter, is native to the Mississippi valley. While the wood is less valuable than that of most hickories, the excellent nuts are a staple article of commerce, and many choice thin-shelled varieties are cultivated.

The Mockernut (*H. alba*), rarely 100 feet high, with close bark, heavy, hard wood, and sweet nuts, occurs on uplands from Ontario to Florida. The Pignut (*H. glabra*) sometimes attains a height of 90 feet. It has light gray bark, strong, tough wood, and a small nut, either bitter or sweet. This species grows on dry hillsides from Maine to Nebraska and southward to Florida and Texas. See *Walnut*.

Holly (*Ilex*). A genus of numerous shrubs and trees of the holly family, several of which have handsome evergreen foliage. There are about 280 species, mostly natives of the New World. Some 15 or more of these are found in the eastern and southeastern United States. A South American species furnishes the maté or Paraguay tea. Several hollies are widely planted for ornament.

The American holly (*I. opaca*) is a slow-growing tree, sometimes 40 to 50 feet high, with handsome, spiny, evergreen leaves and bright red berries, much used for Christmas decorations. It grows in rich woods from Maine to Texas, and is widely planted for ornament in the eastern United States. It is valued for its hard, white, fine-grained wood, used in cabinet work and wood engraving.

The Inkberry (*I. glabra*), a low shrub, from 2 to 4 feet high, with shining evergreen leaves and small black berries, grows in sandy soil, mainly near the coast, from Nova Scotia to Louisiana.

The evergreen leaves of the Dahoon (*I. cassine*), a native of the Southern states, are sometimes used for tea. The leaves of the Yaupon (*I. vomitoria*), another evergreen holly of the South, have long been used as an emetic. The brilliant red berries of both these plants are popular for Christmas decorations. See *Christmas Berry*.

Hollyhock (*Althœa rosea*). A perennial of the mallow family, native to India. It has a tall, unbranched stem, heart-shaped, wrinkled leaves, and large, showy flowers, which vary greatly in color. Numerous varieties are now cultivated for ornament in gardens. In Egypt the hollyhock is cultivated for its leaves, which, when young, are esculent and much used in Egyptian cookery.

Honey Dew Melon. A horticultural variety of the winter muskmelon (*Cucumis inodorus*), closely related to the Cassaba. It was introduced by John Gauger about 1911 into North America from southern France, where it is known as the White Antibes Winter. Mr. Gauger, who believed he had originated the species by cross breeding, gave it the name Honey Dew. The mature melon averages 5 or 6 pounds in weight, is 7 or 8 inches long, and about 6 inches in diameter. The rind is a creamy yellow when ripe, the flesh being a light green blending to white with a sweet taste. American production comes chiefly from the Imperial valley, California, and from Colorado.

Honey Locust (*Gleditsia triacanthos*). A handsome, thorny tree of the pea family, native to alluvial valleys from Ontario to Texas. It grows from 75 to 140 feet high with the trunk and limbs sometimes nearly covered with dense bunches of three-branched, sharp, strong thorns.

The tree bears conspicuous, broad, flat, beanlike pods 12 to 18 inches long, maturing in autumn. The bony seeds within these pods are surrounded by a sweet, jelly-like, edible pulp, whence the name honey locust and honey shucks. From the sugary pulp it is said that the Indians formerly fermented a much prized beverage. The honey locust has been widely planted in the eastern United States for hedges and as an ornamental tree. The red-brown, mahogany-like heartwood is suitable for cabinetwork. A thornless variety of this locust is occasionally found.

A similar southern species, the Water Locust (*G. aquatica*), is peculiar for its short, one-seeded pods. See *Locust Tree*.

Honey Plants. From the viewpoint of the beekeeper, plants that yield nectar accessible to the honeybee are honey plants. Many hundred species of North American plants are nectar secreting, but the truly important honey plants are few in number. In the United States and Canada the honey of commerce is derived mainly from alfalfa and various species of blackberry and basswood.

Among other valuable honey plants are buckwheat, important source of dark honey; white clover and alsike clover, ranking for quality among the best of all honey plants; various goldenrods, for autumn honey; mesquite, main source of honey in Texas; orange and palmetto, very important in Florida; red raspberry, important in the Northern states and in southern Canada; sage (*Salvia mellifera*), of great importance in California; also sourwood (*Oxydendron arboreum*), Spanish needles (*Bidens aristosa*), sweet clover, tupelo, and willow-herb (*Epilobium angustifolium*).

The importance of these plants, chiefly wild species, can be understood only when the extent of the honey crop is known. In the United States, this crop amounts annually to more than 200,000,000 pounds.

Honeysuckle (*Lonicera*). A genus of erect or twining shrubs of the honeysuckle family. There are about 160 species, nearly all native to north temperate regions, more than 20 of which are found in North America. Fully half the species are in cultivation as ornamental plants. The trumpet honeysuckle (*L. sempervirens*), a climbing evergreen shrub, native to low grounds from Maine to Texas, is much cultivated for its scarlet or yellow, highly fragrant flowers.

The woodbine honeysuckle (*L. periclymenum*), an Old World species, with pleasantly scented flowers, is often planted in gardens. The Italian honeysuckle (*L. caprifolium*), native of Europe and much resembling the woodbine honeysuckle, has run wild in the eastern United States. The Tartarian honeysuckle (*L. tatarica*), a large, smooth shrub, with pinkish white flowers, native of Asia, has escaped from cultivation from Maine to Ontario and southward, as has the climbing or trailing Japanese honeysuckle (*L. japonica*). In the Atlantic Coast region from New York to North Carolina the latter species has become a nuisance. See *Woodbine*.

Hop (*Humulus lupulus*). A perennial climbing vine of the mulberry family, with hairy stems and rough, deeply lobed leaves, native to northern America, Europe, and Asia. Since the early middle ages the hop has been extensively cultivated for the resinous, leafy bracts which surround the female flower cluster. When properly gathered and cured, these form the hops used in brewing. The first mention of hop gardens was made by Pepin, father of Charlemagne, in 768. Hop growing was introduced into the United States in 1629. While cultivation is confined to certain favorable localities, the United States contributes a substantial part of the world's commercial supply of hops. California, Oregon, and Washington

usually produce about five-sixths of the American crop, the remainder being grown mostly in New York and Wisconsin.

Horehound (*Marrubium*). A genus of perennial, white-woolly herbs of the mint family. They have wrinkled leaves, small, white or purplish flowers in dense axillary clusters, and bitter juice. About 40 species are native to the Old World. The common horehound (*M. vulgare*) has become so thoroughly naturalized in many parts of the United States and Canada as to have the appearance of a native plant. The plant possesses medicinal properties and is widely used as a remedy for coughs, either in an infusion, in a sirup, or in candy. Horehound was known to Pliny and Columella as a medicinal plant. Its present wide distribution throughout the world is thought to be due to emigrants, who, believing in its curative properties, carried it far and wide.

Horse-radish. A perennial herb of the mustard family, native to eastern Europe. It has been cultivated since the middle ages for its pungent root, which is extensively used as a condiment. While the cultivated form is seedless, the plant spreads rapidly by its long roots. It has become widely naturalized in the United States.

Horsetail (*Equisetum*). A genus of flowerless plants, closely related to the ferns and club mosses, called also horsetail rush and scouring rush. Some 25 species are known, widely scattered throughout the world, about half of which are found in the United States and Canada. They have slender, fluted, many-jointed stems, from a few inches to 10 or 15 feet in height, with whorled, similarly jointed branches and leaves.

The common horsetail (*E. arvense*) is dangerously poisonous to horses. In Vermont, where horse raising is extensive, the annual loss of many animals is attributed to this plant.

The living horsetails are nowhere numerous and are of but little economic value, though the rough, silicious stems of some species are used for scouring and polishing. They are, however, of interest as composing a very small remnant of a once exceedingly numerous and varied group of plants which flourished in the Paleozoic and Mesozoic ages. Some of these were treelike in size and made up part of the vegetation from which coal was formed. Fossil horsetails are abundant in the rocks as early as the Devonian period.

Huckleberry. A name popularly given to various small shrubs of the heath family. It is properly applied, however, only to certain species of *Gaylussacia*, particularly to the black huckleberry (*G. baccata*). This shrub grows usually from 1 to 3 feet high, with resinous leaves, green on both sides. It bears small pink or red flowers, and small, sweet but seedy, shining, black fruit. It grows in sandy woods from Newfoundland to Manitoba and southward to Georgia. The various species of *Vaccinium* which have bluish fruit with a grapelike bloom, often called huckleberry, are properly called blueberries. See *Blueberry*.

Hydrangea (*hī-drăn'jē-ȧ*). A genus of ornamental shrubs of the saxifrage family, native to America and eastern Asia. There are about 35 species, 4 of which grow wild in the eastern and southern United States. Many handsome varieties are in cultivation. A dwarf form (*H. hortensiana*) is extensively grown in greenhouses.

Iceland Moss (*Cetraria islandica*). A lichen which grows abundantly in Iceland, Norway, and other northern countries and is much used for food. The plant, which is usually less than four inches in height, has the appearance of a moss. Iceland moss is gathered in large quantities and forms an article of commerce. It is dried and crushed into a powder from which, after its bitter quality has been reduced by soaking, a kind of bread is made. The dried plant is also boiled with water or milk until it becomes a jelly, forming a food for the sick. Preparations of Iceland moss are sometimes used in making paper and in weaving cloth.

Ice Plant (*Mesembryanthemum crystallinum*). A very fleshy, watery herb of the carpetweed family, with trailing stems and showy flowers. It is remarkable for its greenish or reddish foliage, appearing as if frosted with particles of ice which glitter in the sun. The ice plant grows on southern California sea beaches, in the Mohave desert, and in the Canary Islands. Where abundant, the seeds are eaten as food and the ashes obtained by burning the plant in quantity are a source of carbonate of soda, used in soap and glass making. The ice plant is often planted in greenhouses as a curiosity.

Incense Cedar (*Libocedrus decurrens*). A handsome tree of the pine family. It grows at high elevations on the mountains from Oregon to Lower California, frequently attaining a height of 150 feet, with a trunk sometimes 7 feet in diameter. The slender branches and cypress-like leaves form a beautiful feathery crown. Where abundant, incense cedar is a valuable timber tree, the soft, durable, straight-grained, fragrant wood being much used for fence posts and telephone poles. The wood of the largest trees is usually riddled with what appear to be the galleries of a woodboring insect, but these galleries are caused by a little-known fungus. The tree is sometimes planted for ornament in the Middle Atlantic states.

Indian Paintbrush (*Castilleja*). A large genus of herbs of the figwort family, parasitic on the roots of other plants. They have alternate leaves and showy red, yellow, or white flowers, in dense, leafy, bracted spikes,—the conspicuous bracts often more brilliantly colored and larger than the flowers. There are about 50 species, mostly of the New World, about 35 of which occur in the United States and Canada. Several varieties have been successfully cultivated, and a beautiful Rocky Mountain species is the state flower of Wyoming.

Indigo (*Indigofera tinctoria*). A shrub of the pea family, probably native to India, long cultivated in the Orient as a dye plant. The blue dyestuff prepared from it was known to the Romans, who called it *indicum*. This is extracted by steeping with water and fermenting the entire plant, which is cut for the purpose just before flowering. Although still locally important in India and Java, indigo culture has seriously declined, owing to the increasing use of aniline dyes.

Iris. A genus of beautiful herbaceous plants of the iris family (*Iridaceæ*). They have creeping rootstocks, erect stems, equitant leaves, and conspicuously beautiful flowers, many of which are much prized in cultivation. There are about 100 species, mostly of the North Temperate Zone. Of these some 20 occur in North America.

The Blue Flag (*I. versicolor*), 3 feet high, with violet-blue flowers, variegated with yellow and white, is common in marshes from Newfoundland to Manitoba and southward to Florida. An acrid resin from the rootstock is used in medicine. The Western Blue Flag (*I. missouriensis*) grows from 6 to 24 inches high, with very narrow leaves and pale blue, variegated flowers. It abounds in wet soil from South Dakota to Idaho and southward to Arizona.

The Fleur-de-lis (*I. germanica*) is a native of Europe, with large, very showy flowers, deep violet-blue, veined with yellow, brown, and sometimes white. This handsome iris is everywhere planted in gardens. From the rootstocks of this and other European species, the orris root used in perfumery is obtained. The fleur-de-lis is the national flower of France and the emblem of the city of Florence.

Ivy. A name used to designate various climbing, twining, or creeping plants. The English ivy (*Hedera helix*), which belongs to the ginseng family, is a native of Europe. It has been highly prized as an ornamental plant since the days of the Greeks and Romans. This beautiful ivy is now extensively grown for rock and wall cover in the United States. The Boston or Japanese ivy and the Virginia creeper, often called ivy and similarly used, belong to the grape family. The poison ivy belongs to the sumac family, and the ground ivy to the mint family.

Jack-in-the-pulpit (*Arisæma triphyllum*). A fleshy perennial of the arum family, called also Indian turnip, common in moist woods throughout eastern North America. The annual flowering stem, a foot or more high, springs from an intensely acrid, bulb-shaped corm and bears 1 or 2 leaves of 3 leaflets. The small flowers, which appear in early spring, are clustered at the base of an erect, clublike spadix, the "jack." This is surrounded by a hooded, often purple-striped spathe, open at the throat and curving over at the top in a broad flap. The whole floral arrangement is fancifully held to resemble a preacher in an old-fashioned pulpit with a sounding board above it.

By reason of its unusual form and color, the jack-in-the-pulpit is one of the best-known wild flowers in eastern North America. The fruit, which usually lasts until autumn, consists of a mass of bright scarlet berries. When properly cooked, the peppery corm loses its burning taste and becomes a nutritious vegetable. It was formerly used for food by the Indians.

Jasmine (*jăs'mĭn*) (*Jasminum*). Shrubs and climbers of the olive family, natives of southern Asia. There are about 100 species, several of which are much grown in gardens for their fragrant flowers, which yield the oil of jasmine used in perfumery.

Jessamine (*jĕs'ă-mĭn*) (*Gelsemium sempervirens*). A slender climbing vine of the logania family, occurring in woodlands near the Atlantic and Gulf coasts from Virginia to Texas. It has handsome, yellow, trumpet-shaped flowers, which exhale a fragrance similar to the true jasmine. All parts of the plant are extremely poisonous, the roots yielding the powerful drug, gelsemium.

Job's Tears (*Coix lachryma*). A tall, stout cereal of the Old World. It is closely related to corn and sometimes attains a height of 8 feet. It takes its name from the hard, shining, tearlike seeds. These have the appearance of bluish white porcelain and are used similarly to beads in making bracelets, necklaces, and rosaries. The plant is a native of India where it is cultivated to some extent for food. It is grown also in China on account of supposed medicinal properties. In Spain and Portugal, where it has become naturalized, flour is sometimes made from it. In the United States and in various other countries it is grown as a curiosity.

Judas Tree (*Cercis*). A genus of trees and shrubs of the pea family. They bear pink or rose-colored flowers which appear earlier than the broad, simple leaves. There are about 7 species, all native to north temperate regions.

The best-known species of *Cercis* from the Old World is the Judas tree (*C. siliquastrum*), a small tree common in Asia Minor and throughout the Far East. There is a tradition that Judas Iscariot hung himself upon a tree of this species which was standing near Jerusalem, this incident giving rise to the common name of the tree. The Judas tree is frequently planted for ornament in the Middle Atlantic states.

The Redbud (*C. canadensis*) is a widely branching tree, sometimes 50 feet high, with beautiful rose-colored flowers. It grows wild from Ontario to Nebraska and south to Florida and Texas, and is often planted for ornament. The Texas Redbud (*C. reniformis*), a similar tree, but with smaller kidney-shaped leaves, occurs in eastern Texas. The California Redbud (*C. occidentalis*) is a conspicuous shrub or small tree in California foothills from Mt. Shasta southward.

Jujube (*jōō'jōōb*) (*Zizyphus jujuba*). A spiny shrub or small tree of the buckthorn family, believed to be native to Syria. Since ancient times, the jujube has been cultivated in southern Europe for its wholesome, pleasantly flavored fruit. This ranges in size from that of an olive to that of a hen's egg. The tree blossoms in June and ripens its fruit in October or November. If to be eaten fresh, the fruit is gathered when it assumes a reddish brown color; if to be dried, the fruit is left on the tree until it darkens and becomes slightly wrinkled. The jujube was introduced into North Carolina in 1838 and is now sparingly grown in various warmer parts of the United States. It thrives best in the Southwest and in California.

Juniper (*Juniperus*). Pungently aromatic evergreen trees and shrubs of the pine family. They bear closely overlapping, awl-shaped or scalelike leaves, and a fleshy, berry-like fruit,—a modified cone—which is matured in from one to two seasons. There are some 40 species, widely scattered over the northern hemisphere from the arctic circle as far south as Abyssinia. When the trees are of sufficient size, the wood of the various junipers is suitable for many uses. The wood of most species is remarkable for its durability in the ground, that of red cedar being known to have resisted decay for more than 40 years.

About 15 species of juniper occur in North America. The common juniper (*J. communis*), usually a small shrub, is sometimes a tree 30 feet high. The leaves are rigid, awl-shaped, and prickly-pointed. As a shrub, this juniper grows from Greenland to Alaska and south to Pennsylvania and California, and also in the Old World. It attains the size of a tree only in southern Illinois and in certain parts of Europe. The berries of this species are used to flavor gin. Oil of juniper, extracted from the unripe fruit, is used in medicine.

The Red Cedar (*J. virginiana*) grows sometimes 100 feet high, with a trunk diameter of 5 feet. It bears scalelike, four-ranked leaves, and dark blue, sweetish fruit. This valuable tree is native to dry soil from Nova Scotia to South Dakota and southward to Georgia and Texas. The light but very durable, fragrant, red wood is much used for making lead pencils, clothes chests, and interior finish, also for fence posts and telegraph poles. The Rocky Mountain Red Cedar (*J. scopulorum*), a similar red-wooded species, 20 to 30 feet high, grows throughout the Rockies and northwestward to British Columbia. The durable wood makes the tree useful locally for posts and poles. The foliage is usually overcast with a whitish bloom, giving the leaves a bluish cast. On this account, the tree is becoming a popular ornamental with nurserymen of the Middle West.

The most remarkable species of all is the alligator juniper (*J. pachyphlœa*), so called from its distinctly checkered, thick bark. This juniper grows in the mountains from southwestern Texas through the southern Rockies into Mexico. It is a low, thick-trunked tree, sometimes 30 feet high, valuable locally for post timber and for fuel. The rarest of our native junipers is the drooping juniper (*J. flaccida*), a beautiful tree, 15 to 20 feet high, with long, weeping branches. Within the borders of the United States it is found only in the Chisos mountains of southwestern Texas, whence it extends southward into Mexico. Two other southern Rocky Mountain species, forming valuable fuel-wood growths, are the one-seed juniper (*J. monosperma*) and the Utah juniper (*J. utahensis*), the latter bearing the largest berries (half an inch in diameter) of all the junipers.

The Rock Cedar (*J. mexicana*), of Texas and Mexico, usually 20 to 30 feet high, is very similar in general appearance to the red cedar, but its wood is brown. The California juniper (*J. californica*), sometimes 40 feet high, with leaves in threes, bears a reddish fruit, eaten by the Indians.

Two exotic junipers are frequently planted in the United States for ornament. One is the Irish juniper (*J. communis hibernica*), native to the mountains of Ireland. It is a dense, pyramidal shrub, 6 to 10 feet high, with spreading, prickly, three-ranked leaves. The other is the Chinese juniper (*J. chinensis*), a small tree from Japan and China. In appearance it is somewhat similar to the red cedar, but the crown is more dense and of a yellow-green color, and the ends of the branches are drooping. See *Cedar*.

Jute (*Corchorus capsularis*). An annual plant of the linden family. It is native to southern Asia and has been cultivated since ancient times for its coarse fiber, which is the cheapest known. While introduced into many tropical countries and experimentally grown in Florida, the commercial culture of jute is of importance only in India. During the last century, production has increased enormously, both of jute fiber, used for coarse twine and cordage, and of jute cloth, called gunny, used for sacking and burlap. The fiber is made into wrapping paper and sometimes mixed with silk and wool in making cloth. In 1914 the yield of jute fiber in India exceeded four billion pounds. See *Flax, Hemp, Manila Hemp, Olona, Sisal*.

Kafir (*kăf'ĕr*) **Corn.** A variety of nonsaccharine sorghum, native to Africa. This plant has been cultivated for food since ancient times in the Old World. About 1885 it was introduced into the United States by the department of agriculture. Kafir corn is extensively grown in parts of Texas, Oklahoma, Kansas, California, and other dry regions, as a substitute crop for Indian corn. See *Sorghum Cane*.

Kale. A variety of cabbage developed by cultivation, differing from it in having open instead of solid heads of leaves. It is grown as a winter vegetable and as food for cattle. Kale patches are common in yards and gardens in Florida and other parts of the South. See *Cabbage*.

Kalmia. A genus of erect shrubs or small trees of the heath family, with thick, evergreen leaves and showy flowers in naked clusters. There are 6 species, all North American.

The Mountain Laurel (*K. latifolia*), called also calico bush, is a handsome shrub, 3 to 20 feet high, or sometimes a tree 40 feet high, with large, beautiful, pink or white flowers. It grows in rocky woods from New Brunswick to Ontario and south to Florida. The poisonous leaves are dangerous to many animals.

The Sheep Laurel (*K. angustifolia*), called also lambkill or wicky, is a small shrub 3 feet high, with purple or crimson flowers. The leaves have poisonous properties similar to those of the mountain laurel. The sheep laurel occurs from Newfoundland to Hudson bay and southward to Georgia and Michigan. See *Laurel*.

Kangaroo Apple (*Solanum aviculare*). A plant closely related to the potato, native to Peru, New Zealand, and Australia. The mealy, slightly acid fruit, which is eaten either raw or cooked, is used for food by the native peoples.

Kapok (*kā'pŏk*) (*Ceiba pentandra*). A Javanese tree of the silk-cotton-tree family, closely related to the mallows. It yields a silky fiber called kapok, used principally for stuffing pillows, cushions, and mattresses. The elasticity of the fiber, though rendering it unsuitable for spinning, prevents matting when it is used as a filler. Many thousand bales of kapok are exported from Java annually.

Kelp. The name applied to many dark brown seaweeds, especially to the various species of *Fucus* and *Laminaria* which, in northern Europe, are dried and burned for their ashes, also called kelp, formerly the principal source of iodine.

Kohl-rabi (*kōl'rä'bĭ*; *kōl'rä'bē*). A variety of cabbage, in which, instead of a head of densely packed leaves, there is a globular swelling of the stem, some 3 or 4 inches in diameter, just above the ground. Several leafstalks spring from this swollen part, adding to the peculiar appearance of the plant. The enlarged portion of the stem is cooked as a table vegetable, with uses very similar to those of the turnip. Kohl-rabi is cultivated like cabbage, and, though fairly popular in Europe, is not extensively grown in America. See *Cabbage*.

Kumquat (*kŭm'kwŏt*) (*Fortunella*). A genus of shrubs of the rue family, very closely related to the orange. There are several species, natives of Japan and China, some of which are now cultivated in the Gulf states and in California. The kumquat usually grows from 8 to 12 feet high, and bears white, fragrant flowers followed by oblong, orange-colored fruit, from 1 to 2 inches in diameter. While the delicious, refreshing fruit may be eaten raw as a dessert, it is used chiefly for making jellies, marmalades, and various preserves. See *Citrous Fruits*.

Lady's-slipper (*Cypripedium*). Leafy-stemmed herbs of the orchid family. They bear large, drooping, showy flowers, with a pouchlike lip, fancifully thought to resemble a slipper or a moccasin, whence the names, lady's-slipper and moccasin flower. There are about 20 species, native to north temperate regions. Of these, 9 are found in North America.

The showy lady's-slipper (*C. reginæ*) has large, white flowers, variegated with crimson. This species is one of the most beautiful of American wild flowers. It grows in swamps and woods from Newfoundland to Minnesota and south to Georgia. The yellow lady's-slipper (*C. parviflorum*), with pale yellow flowers marked by purple lines, occurs from Nova Scotia to Minnesota and southward. The small white lady's-slipper (*C. candidum*) is found in bogs in the eastern United States. The Moccasin Flower (*C. acaule*) is a small, almost stemless species with handsome pink flowers. It grows in sandy woods from Newfoundland to Manitoba and south to Tennessee. See *Orchids*.

Larch (*Larix*). A genus of tall trees of the pine family, with slender, deciduous leaves borne in clusters, and small, erect cones. There are 9 species, native to temperate and subarctic regions. Three of these occur in North America.

The American larch, or Tamarack (*L. laricina*), is usually 50 to 60 feet high, with a trunk diameter of 18 or 20 inches. It grows from Newfoundland and Labrador to Alaska and the arctic circle and south to Pennsylvania and Minnesota. This tree frequents swamps in the southern part of its range, and uplands in the northern. The heavy, strong, durable wood is used for fence posts, telegraph poles, and railway ties.

The western larch (*L. occidentalis*) is a valuable timber tree. It sometimes grows 250 feet high, with a naked, tapering trunk, 6 to 8 feet in diameter, surmounted by a short pyramidal head of small branches. It occurs from British Columbia to the Columbia River basin.

The alpine larch (*L. lyallii*), a little-known species, native to high mountain ranges in the northwestern United States and in British Columbia and Alberta, grows from 30 to 40 feet high. The woolly young shoots distinguish it from the western larch, one of the local names for the alpine larch being "woolly larch."

The European larch (*L. larix*) is much planted for ornament and for timber in the eastern United States.

Larkspur (*Delphinium*). A genus of beautiful plants of the crowfoot family. They have palmately lobed or divided leaves and large, irregular, handsome flowers. There are about 125 species, native to north temperate regions, many of which occur in the United States and Canada. Several beautiful species, some of them being extremely poisonous to cattle, grow in the Rocky Mountain region. The field larkspur (*D. consolida*), native to Europe, and everywhere grown in gardens for its showy flowers, is naturalized in the eastern United States.

Laurel (*Laurus*). A genus of graceful shrubs and trees of the laurel family. There are but few species, all natives of the Old World. The best-known is the noble laurel (*L. nobilis*), a beautiful tree with lanceolate, leathery, shining leaves. It was called daphne by the ancient Greeks, and was sacred to Apollo. Heroes in war, illustrious poets, and victors in games, were crowned with wreaths made of the leaves and ripened berries, whence the terms "laureate" and "laureation."

The California laurel (*Umbellularia californica*), found in Oregon and California, is a handsome tree, sometimes 90 feet high, with a trunk 5 feet in diameter. It has lanceolate, aromatic leaves and bears an olive-like fruit. This tree, which belongs to the same family as the Old World laurels, yields the most valuable cabinet wood produced in the Pacific states. When the logs are soaked in water, the whitish wood becomes beautifully mottled. See *Kalmia*.

Lavender (*Lavendula vera*). A small plant of the mint family, native to Europe, with narrow leaves and pale lilac-purple flowers. It is widely grown for its aromatic oil, called the oil of lavender, used in medicine and perfumery.

Leek (*Allium porrum*). A biennial plant of the lily family with a stem about 2 feet high, native to southern Europe. It is closely related to the onion, but is much milder to the taste and has a thickened stem base instead of a bulb. While widely cultivated in Europe as a flavoring plant, and used in cookery since Greek and Roman times, the leek has not become popular in America. The leek has long been the national emblem of the Welsh. See *Garlic, Onion*.

Leguminous Plants (*Leguminosæ*). An immense natural group of flowering plants, commonly called the pea, bean, or pulse family. It comprises about 10,000 species, and, excepting the *Compositæ*, is the largest family of flowering plants. By some authorities the group *Leguminosæ* is divided into three families, as, for example, into the *Fabaceæ* or pea family proper, the *Cæsalpiniaceæ* or senna family, and the *Mimosaceæ* or mimosa family.

The various species are widely diffused throughout the world but are most numerous in the tropics. Among them are many exceedingly useful plants, such as alfalfa, peas, beans, clovers, peanut, indigo, logwood, brazilwood, gum arabic, gum senegal, laburnum, calabar bean, copal, and cassia, together with many valuable timber trees and an immense number of ornamental plants.

Soil everywhere is usually greatly benefited by the growth of leguminous plants, especially the clovers, peas, beans, and alfalfa. This is due to the fact that nitrogen-fixing bacteria, which enrich soil, almost invariably are found upon their roots. For this reason, leguminous plants are the most valuable of all in the so-called rotation of crops.

Lemon (*Citrus medica*). A small evergreen tree, 10 to 20 feet high, of the orange family. It is native to India, where cultivation for its valuable acid fruit dates back at least 2500 years. The lemon was grown very early in Mesopotamia and was made known to the ancient Greeks by the Medes, whence the species name *medica*. The Arabs extended lemon culture into Africa and Europe about the time of the Crusades. Lemons are now extensively grown in Italy, Spain, and in various tropical and subtropical countries. In the United States, lemon culture is becoming increasingly important in Florida and southern California. Besides the world-wide use of the fruit as food and drink, citric acid, obtained from the juice, is employed in dyeing and calico printing; and lemon oil, extracted from the rind, is widely used for flavoring. See *Citrous Fruits, Lime*.

Lentil (*Ervum lens*). A small annual of the pea family, native to western Asia and southern Europe, which produces flattened, lens-shaped, nutritious seeds. The lentil is one of the most anciently cultivated of the food plants used by man. It has been grown for more than 5000 years; the ancient Lake Dwellers produced it, and it is thought that the red pottage of Esau, mentioned in Genesis, was made of lentils. Although less popular than peas and beans, lentils are extensively grown in Europe and Asia, and constitute a commercial crop in Egypt. Some varieties are sparingly cultivated in New Mexico and Arizona. The lenses used in telescopes and other optical instruments were so named from the resemblance in form of a double convex lens to the seed of this plant, *lens* being the ancient Latin name of the lentil.

Lettuce (*lĕt'ĭs*) (*Lactuca sativa*). An annual or biennial of the composite family, with tender leaves and a milky juice. It is native to Mediterranean countries and was cultivated as a salad plant by the ancient Greeks and Romans. Lettuce is now grown in gardens throughout the world wherever the climate permits. Theophrastus mentions three varieties grown in ancient Greece, and centuries of cultivation have developed scores of others. Among these are heading varieties in which the leaves form a cabbage-like head, the cutting varieties in which the leaves are loosely arranged, and the romaine varieties in which the outer leaves are tied above the head in order to blanch the inner ones.

Lichens (*lī'kĕnz*). A group of flowerless plants, represented in all lands where vegetation exists. They grow on bare rocks, tree trunks, and on the surface of the ground, deriving their food entirely from the air and water. They have no true roots, stems, or leaves, but are composed of variously-shaped expansions of vegetable tissue, known as thalli.

When somewhat leaflike in form, as is the case with many which grow on bark or wood, lichens are called *foliose*. If hardened and somewhat shell-like in texture, as, for example, those which cover rocks with various gray-green patterns, they are called *crustaceous*. If somewhat shrublike, as in case of those which occur in long bearded forms on trees or which densely carpet barren ground, they are called *fruticose*.

A lichen consists of two plants, a fungus and an alga, living together in a peculiar relation, called *symbiosis*. In this unique partnership the function of the blue or green alga is to produce the food for both plants, while the function of the fungus is to absorb water and afford protection for its companion. Some 4000 species of lichens have been described. They are most abundant in polar regions and on high mountains, where they cover vast areas of otherwise practically barren land. Lichens are common also in moist, temperate countries, and some occur in the tropics. As they require no fertility of soil for their sustenance, lichens thrive where most other vegetation cannot exist.

Some lichens, as Iceland moss, are used for human food, and others afford pasturage for the reindeer, caribou, and muskox. Litmus and other dyes are obtained from lichens. See *Algæ, Fungi, Iceland Moss, Reindeer Moss*.

Licorice (*lĭk'ō-rĭs*) (*Glycerrhiza glabra*). A perennial herb of the pea family, native to southern Europe and western Asia. It is cultivated for its

long, sweet, gummy root, which yields the licorice of commerce. The plant grows about 4 feet high and bears pinnate leaves, usually pale violet flowers in clusters, and burlike pods or fruits.

Licorice root is grown in several countries of the Old World, but the finest grades come from Italy and Spain. Pieces of the dried root, of about the length and thickness of a lead pencil, are sold for chewing. The extracted sweetish principle, when boiled down with starch and made into sticks or lozenges, is a popular remedy for coughs and colds. Licorice extract is also very widely used in flavoring tobacco, wines, liquors, cooling drinks, candy, and chewing gum, and to disguise the unpleasant taste of medicines. Usually over a half million dollars' worth of licorice root and extract is imported into the United States each year. Licorice grows readily in Louisiana and California but the crop has not been commercially profitable.

The American wild licorice (*G. lepidota*), the only native species, occurs in prairies from Hudson bay to Chihuahua, and westward to Washington. While an abundant and a hardy grower, the root lacks the characteristic sweetness of that of the Old World plant.

Lignum-vitæ (*lĭg'nŭm-vī'tē*) (*Guaiacum officinale*). A small tree of the caltrop or bean caper family, about 25 feet high and a foot in diameter, native to tropical America. It is noted for its extremely hard, heavy, dark colored, oily wood, which instantly sinks in water. As it weighs over 70 pounds to the cubic foot, it is 50 per cent heavier than ordinary oak and about three times as heavy as white pine. By reason of its great toughness and other wearing qualities, lignum-vitæ is extensively used for stern bushings in shipbuilding and also for tool handles, pulleys, bed and chair castors, and bowling balls. Gum guaiacum, a resin extracted from the wood, is valued in medicine. A species of lignum-vitæ (*G. sanctum*) occurs in southern Florida, where it is a small tree with white bark. The wood of this species has the essential characteristics of the preceding.

Lilac (*lī'lăk*) (*Syringa*). Smooth shrubs of the olive family. They have entire leaves and four-lobed flowers borne in dense terminal clusters. There are about 7 species, native to Asia and eastern Europe.

The common lilac (*S. vulgaris*), which bears pink-purple, fragrant flowers, is a native of Persia. It is one of the most popular of ornamental shrubs, both in Europe and in North America. The white lilac (*S. vulgaris alba*), with white, very fragrant flowers, the oldest variety of the common lilac, is much planted in the United States and Canada. Another delicately fragrant species, with pale lilac flowers, is the Persian lilac (*S. persica*), which grows wild from the Caucasus to Afghanistan. It is frequently planted in the Eastern States.

The Japanese lilac (*S. japonica*), which attains the size of a tree and bears yellowish flowers, is sometimes planted in New England. See *Syringa*.

Lily (*Lilium*). Tall, bulbous plants of the lily family (*Liliaceæ*). They usually have leafy stems and large, erect or drooping, showy flowers. There are about 45 species, natives of north temperate regions. Of these, about 15 occur in the United States and Canada.

The red lily (*L. philadelphicum*) has lanceolate leaves and erect, reddish orange flowers, 2½ to 4 inches high. It is found in the eastern United States and Canada. The western red lily (*L. umbellatum*) is very similar but has linear leaves and smaller flowers. It ranges from Ontario to British Columbia and Colorado. The southern red lily (*L. catesbæi*) has alternate, linear leaves and erect, solitary, scarlet flowers, 3 to 5 inches high. It occurs from Kentucky and Missouri to Florida.

The Canada lily (*L. canadense*), sometimes 5 feet high, has whorled leaves and from 1 to 16 nodding, yellow or red flowers. It grows in meadows from Nova Scotia to Minnesota and southward. The Turk's-cap lily (*L. superbum*) grows sometimes 8 feet high, with a large panicle of orange-yellow, nodding flowers, 2½ to 4 inches long. It is found from New Brunswick to Minnesota and southward to Tennessee. The Humbolt lily (*L. humboltii*) grows from 6 to 12 feet high. This handsome species, with leaves in whorls of 10 to 20 each, and large, reddish orange flowers, is native to southern California.

The tiger lily (*L. tigrinum*) is a native of China, with orange colored flowers spotted with purple. It is widely cultivated in gardens and has become naturalized in many parts of the United States. The European orange lily (*L. bulbiferum*), with large, erect, showy flowers, and the white or Madonna lily (*L. candidum*), with large, erect, pure white flowers, both natives of the Old World, are much prized in gardens. The white trumpet lily (*L. longiflorum*), native to Japan, vigorous forms of which are known as Easter lily or Bermuda lily, is much grown in greenhouses.

The name "lily" is popularly applied to many plants which are not true lilies, such as mariposa lily (*Calochortus*), spider lily (*Tradescantia*), atamasco lily (*Atamosco*), water lily (*Nymphæa*), and snake lily (*Iris*). The "lily of the field" mentioned in the Bible is believed by some to be the beautiful dark red windflower (*Anemone coronaria*), native to Palestine and adjacent regions.

Lily of the Valley (*Convallaria majalis*). A beautiful ornamental plant of the lily family. It is a native of Asia, Europe, and the Allegheny region of the United States, and is now widely cultivated in various countries. From an underground rootstock the plant sends up two ovate or lance-shaped leaves and a slender raceme of small, white, drooping, bell-shaped flowers. All parts of the plant contain an acrid, bitter juice from which is extracted the poisonous alkaloid, convallarin.

Lime (*Citrus medica acida*). A small evergreen tree, rarely over 8 feet high, usually regarded as a variety of the lemon, widely grown in tropical countries. The tree bears a smooth, nearly round, intensely acid fruit, much smaller than a lemon, extensively used as a source of citric acid and for lime juice in beverages. The limes of the American markets are grown chiefly in Florida and the West Indies. See *Citrous Fruits*, *Lemon*.

Linden (*Tilia*). Forest trees of the linden or basswood family. They have sharply toothed leaves, small yellow or whitish flowers, and fibrous inner bark. There are about 20 species common in temperate regions, except western America and the Himalayas. Some 29 species and varieties occur in the eastern United States. The soft, straight-grained wood is used in cabinetmaking and for sounding boards of pianos. The tough inner bark is made into mats, cords, fish nets, and shoes. The flowers yield honey of unsurpassed flavor and delicacy, also lime-flower oil used in perfumery. Many species are extensively planted for shade and ornament.

The American linden, or Basswood (*T. glabra*), 60 to 125 feet high, with a trunk 2 to 5 feet in diameter, grows in rich woods from New Brunswick to Manitoba and south to Texas. It is much planted for ornament in the eastern United States, as is the White Basswood (*T. heterophylla*) of the southeastern United States. The so-called European linden, or Lime Tree (*T. europœa*), often grown in lawns and parks in the United States, may include two distinct species,—*Tilia vulgaris*, the tree bordering the famous avenue "Unter den Linden" in Berlin, and the Dutch linden (*T. platyphyllos*).

Litchi (*lē'chē'*) (*Litchi chinensis*). A large evergreen tree of the soapberry family, native to China, India, and the Philippines. It is extensively grown in many tropical countries for its excellent fruit, reputed to be one of the most delicious

known. The fruit consists of a nut about an inch in diameter, with a thin, rough, brittle shell surrounding a sweet pulp which encloses a hard, smooth seed. The pulp is eaten fresh, dried, or preserved. The dried fruit, called litchi nuts, is an article of commerce. The litchi has been sparingly introduced into Florida and California.

Live-forever (*Sempervivum*). Fleshy perennials of the orpine or stonecrop family, with thick, succulent leaves, usually in basal rosettes, erect flowering stems, and showy flowers. There are 40 species, mostly of the Old World. The common live-forever, called also houseleek (*S. tectorum*), is native to the Alps. It is widely grown in gardens, especially on rockwork, and has become naturalized in Massachusetts, New Jersey, and elsewhere. Broken portions of the stem, or leaves, preserve their vitality remarkably, taking root after long exposure, whence the name "live-forever."

Liverworts (*Hepaticæ*). One of the two primary divisions of the Bryophytes, or moss plants, the other division including the true mosses (*Musci*). The liverworts are moisture loving plants, some floating on the water, others growing on trees, damp earth, or rocks. The plant usually consists of a prostrate, flattened, green thallus, which develops rootlike structures (rhizoids) from its lower surface, and reproductive organs from its upper surface. There are three groups or orders: *Marchantiales*, with flat, green thallus disks, often reproducing by means of gemmæ or budding; *Jungermanniales*, frequently mistaken for mosses, in which the thallus bears two rows of small foliage leaves; and *Anthoceratales*, simple in structure, but with greatly elongated spore cases, which split into two valves.

Locust Tree (*Robinia*). A genus of trees or shrubs of the pea family. They have compound leaves and bear large clusters of showy flowers. There are about 8 species, all natives of North America and Mexico.

The common locust tree (*R. pseudacacia*) sometimes grows 80 feet high, with a trunk diameter of 3½ feet. It is sparingly found wild from Pennsylvania south to northern Georgia. Formerly much planted for ornament, this tree has become widely naturalized in the eastern United States. The exceedingly strong, heavy, durable wood is used in shipbuilding, for fence posts, and for treenails. Two forms of this species are popularly recognized, the yellow and the black locust. Botanically, they are not distinguishable, but the heartwood of one form is yellowish, "yellow locust," and that of the other is olive-brown, "black locust."

Two other species of *Robinia* are known, the New Mexican locust (*R. neo-mexicana*), of the southern Rockies, and the clammy locust (*R. villosa*), of North Carolina, now widely naturalized in the eastern United States by cultivation. Both are small trees, useful only for ornament. See *Honey Locust*.

Loganberry. A valuable bramble fruit originated by Judge J. H. Logan, of Santa Cruz, California, in 1881. It is the result of a cross between a variety of the wild blackberry of California (*Rubus vitifolus*) and a cultivated red raspberry. When thoroughly ripe, the loganberry is of a purplish red color and very large, being one of the largest berries grown. In flavor and habits it shows the characteristics of both the blackberry and the raspberry. The loganberry is a fruit of constantly increasing commercial importance. It is grown from British Columbia to southern California, and especially in western Oregon, where its culture has become an extensive industry.

Loquat (*lō'kwŏt; -kwät*) (*Eriobotrya japonica*). A small tree of the rose family, native to Japan and China, now introduced into many subtropical countries. It grows about 12 feet high, with thick, clustered, evergreen leaves and fragrant, woolly, white flowers which blossom in the autumn. The oval or pear-shaped, yellow, subacid fruit, about an inch in diameter, ripens in early spring. In the Gulf States and in California, the loquat has become a popular home fruit, used chiefly for desserts and for making jellies. The large, pleasant tasting seeds are sometimes employed in cookery, especially for flavoring tarts and cakes.

Lotus. The name given by the Greeks to several different plants, the fruit of which was used for food, particularly a species of jujube (*Zizyphus lotus*) and the date plum (*Diospyros lotus*). The name was applied also to several beautiful species of water lily, especially the blue water lily (*Nymphæa cærulea*) and the Nile water lily (*Nymphæa lotus*), still highly prized by the Egyptians. The sacred bean of Hindu and Chinese mythology is *Nelumbo lotus*. In the United States the yellow water lily, or water chinquapin (*Nelumbo lutea*), much esteemed by the Indians, is called lotus.

Lupine (*lū'pĭn*) (*Lupinus*). Herbs, or rarely shrubs, of the pea family. They have alternate, digitate leaves, and showy, variously colored, pealike flowers in terminal clusters. There are over 100 species, native to temperate and warm regions, 70 of which occur in western North America, largely in California. The ancient Greeks and Egyptians grew lupines (*L. albus* and *L. termis*) for fodder and used the seeds for food. Many handsome species are cultivated for ornament. The Blue Lupine (*L. perennis*), the only native eastern species, grows in sandy soil from Maine to Minnesota and southward. The bitter seeds were used for food by the Indians.

Madder (*Rubia tinctorum*). A small perennial of the madder family, with weak stems and glossy leaves, beset with sharp prickles. It grows wild east and north of the Mediterranean. For twenty centuries it has been cultivated in Europe, the East Indies, and China, as a dye plant, yielding the valuable red dye, sometimes called Turkey-red. Since the introduction of aniline dyes, madder culture has been practically abandoned.

Madroña (*mà-drō'nyà*) (*Arbutus menziesii*). A large, handsome tree of the heath family, native to the Pacific coast from British Columbia to Mexico and to the Sierras of California. The madroña grows from 80 to 100 feet high, with a trunk diameter of from 4 to 7 feet. It bears large, lustrous, dark green leaves, often nearly white below, small, heathlike flowers, and bright orange-red fruit. The heavy, close-grained wood is sometimes utilized for furniture but mainly for making a special quality of charcoal used in the manufacture of gunpowder.

Two southwestern species are the Mexican madroña (*A. xalapensis*), 20 feet high, growing from western Texas into Mexico, and the Arizona madroña (*A. arizonica*), 40 to 50 feet high, which occurs in the mountains of southern Arizona and adjacent parts of Mexico. Both are beautiful trees with thick, glossy leaves, the former with brilliant orange-red fruit, and the latter with deep red fruit.

Magnolia. A genus of trees or shrubs of the magnolia family (*Magnoliaceæ*). They have aromatic bark, large, thick, entire leaves, handsome, fragrant flowers, conelike fruit, and fleshy, pendulous seeds. There are about 25 species, all ornamental, and natives of warm temperate regions. Seven species grow naturally in the United States, one of which, the cucumber tree, is an important timber tree.

The Large-leaf Umbrella Tree (*M. macrophylla*) grows from 30 to 50 feet high. It bears leaves 20 to 30 inches long and 10 inches wide and white flowers a foot in diameter. This tree is found native from North Carolina to Arkansas and southward. The Umbrella Tree (*M. tripetala*), 30 to 40 feet high, has leaves 20 inches long and creamy white flowers 5 inches deep. It grows wild from Pennsylvania to Arkansas.

The mountain or cucumber magnolia (*M. acuminata*), called also cucumber tree, grows from 60 to 90 feet in height. It has oval leaves about 8 inches long, and greenish yellow flowers 2 inches high. The reddish fruit somewhat resembles a small cucumber. This magnolia occurs from New York and Ontario southward to Alabama and Arkansas. The excellent close-grained wood is used for flooring and in cabinetmaking.

The laurel magnolia, or Sweet Bay (*M. virginiana*), 50 to 70 feet high, bears lustrous leaves 6 inches long, and creamy white, fragrant flowers 3 inches across. It is native to coast swamps from Massachusetts to Texas, and is widely planted for ornament.

Mahogany (*Swietenia mohagoni*). A valuable timber tree, of the mahogany family, native to tropical America, growing from southern Florida to Peru. In height it ranges from 60 to 100 feet and sometimes attains a diameter of 6 feet. It has pinnate leaves and bears panicles of small white, yellow, or reddish flowers. The rich, reddish brown wood is fine grained and capable of taking a high polish. For this reason, mahogany is one of the most highly prized materials used in cabinet work and for veneers, being very extensively employed in making furniture.

The wood of several much less valuable kinds of trees also is called mahogany. In the western United States two or three species of *Cercocarpus*, small trees of the rose family, with an exceedingly hard, red-brown wood, are known as mountain mahogany. The Kentucky coffee tree (*Gymnocladus dioicus*), of the eastern United States, is sometimes called mahogany.

Maidenhair (*Adiantum*). A genus of graceful ferns with divided leaves and dark, slender, polished, shiny stems or stipes. There are about 175 species, chiefly tropical American, 3 of which grow in the United States. The common maidenhair (*A. pedatum*), one of the most beautiful of ferns, occurs in moist woods almost throughout North America. The Venus's-hair fern (*A. capillus-veneris*), more slender, and with black stipes, is found from Virginia to Florida and westward to California. The similar western maidenhair (*A. emarginatum*) is confined to the Pacific states. The so-called maidenhair tree, planted for ornament, is *Ginkgo biloba*, a native of China. See *Ginkgo*.

Mango (*Mangifera indica*). A tree of the sumac family, sometimes 40 feet high, with large, shining leaves and yellow or reddish flowers. It is a native of India, where it has been cultivated since very ancient times for its valuable fruit. In different varieties this ranges from the size of a plum to that of an apple, sometimes weighing a pound or more. The sweet or slightly acid ripe fruit is much prized as a dessert, and the unripe fruit is used for pickles and sauces. The nourishing seeds are sometimes roasted for food by native peoples. Mangoes are now grown in many tropical and subtropical countries, particularly in the West Indies, and, to a limited extent, in southern Florida and in California.

Mangrove (*Rhizophora mangle*). A small, bushy tree of the mangrove family. With its spreading branches and numerous aerial roots, it forms almost impenetrable thickets on the shores of Florida and many other subtropical and tropical countries. It is an important factor in protecting low tidal shores and in extending them into the ocean.

Manila Hemp (*Musa textilis*). A small, tree-like banana, native to the Philippine Islands. Though valueless for fruit, it is extensively cultivated as a fiber plant, particularly in Luzon. The stems yield an excellent fiber, called manila hemp, or abaca, of great value for cordage, fabrics, and paper making. This fiber has become an important article of export from the Philippines.

Manzanita (*măn'zà-nē'tà*) (*Arctostaphylos* or *Uva-Ursi*). A genus of shrubs or small trees of the heath family, with thick, evergreen leaves and small, white or pink flowers. They bear a small drupelike fruit, somewhat resembling a tiny apple, whence the Spanish name "manzanita." Many handsome species occur in the chaparral belt of the California mountains.

Maple (*Acer*). Trees or rarely shrubs, of the maple family, usually with watery and sometimes with sugary sap. They bear palmately lobed or pinnate leaves, small, usually inconspicuous flowers, and a winged fruit consisting of two samaras, joined at the base, each one-seeded. There are more than 100 species, widely distributed over the northern hemisphere. Of these, about 25 species and varieties are North American.

The sugar or rock maple (*A. saccharum*) is a large, handsome tree, sometimes 100 to 120 feet high, with a trunk often 3 to 4 feet in diameter. This tree, distinguished by its smooth, heart-shaped, lobed leaves and gray-brown bark, grows in rich woods from Newfoundland to Manitoba and southward to Florida and Texas. It is also widely planted for ornament, particularly on roads and streets. This species is the most valuable North American maple. The hard, fine-grained wood is much used in making furniture, in shipbuilding, in turnery, and for flooring and fuel. A beautiful bird's-eye form of the wood occurs and is highly prized for furniture. The sap, with that of the next species, is the chief source of maple sugar and sirup.

The black maple (*A. nigrum*), sometimes 80 feet high, very similar to the sugar maple and used for the same purposes, occurs from Montreal to South Dakota and southward. The leaves are thick, dull green above and somewhat hairy below, and the bark on old trees becomes almost black. The large-tooth maple (*A. saccharum grandidentatum*), conspicuous in mountain canyons of western Texas, New Mexico, and Arizona, is brilliantly colored in autumn.

The silver or soft maple (*A. saccharinum*) is a rapidly growing tree, 90 to 120 feet high. It has pale green, deeply lobed leaves which are silvery white below. This maple is found native from New Brunswick to South Dakota and south to Florida and Oklahoma. While the wood is soft and brittle, the tree is very widely planted for quick shade. A good quality of sugar, similar to that of the sugar maple, is sometimes made from its sap.

The red maple (*A. rubrum*), 80 to 120 feet high, has a tall and rather slender trunk, upright branches, and reddish branchlets. It grows in low or moist grounds from Quebec to Iowa and southward to Texas. The close-grained, light brown or reddish wood is much used for making chairs, woodenware, flooring, and for gunstocks. Excellent sugar and sirup are sometimes made from the sap.

The Box Elder, or ash-leaved maple (*A. negundo*), is a widely branching tree, sometimes 50 to 70 feet high. It is distinguished by its leaves, which are composed of from 3 to 5 leaflets. The wood is soft and brittle. This maple grows along streams from Vermont to Utah and southward to Florida and eastern Arizona. Sugar is sometimes made from its sap, and the tree is much planted for quick shade. The variety *californicum* is the California box elder, a broad-topped tree, 30 to 45 feet high, with leaves of three leaflets. Three or four garden varieties of this tree are cultivated.

The mountain maple (*A. spicatum*) is a bushy tree, sometimes 30 feet high. It bears three-lobed leaves and conspicuous clusters of flowers which appear after the leaves. This tree occurs from Quebec to Saskatchewan and southward in the mountains to Georgia. The striped maple, or Moosewood (*A. pennsylvanicum*), is usually shrubby but grows sometimes 30 to 40 feet high. The leaves have three long-pointed lobes at the summit, and

the bark is marked lengthwise by broad, pale stripes. It occurs native from Quebec to Minnesota and southward in the Blue Ridge mountains to South Carolina.

The broad-leaved maple (*A. macrophyllum*) is a handsome and valuable timber tree, 80 to 100 feet high. It bears bright yellow, fragrant flowers in long clusters, and dark green leaves sometimes 12 inches wide. This tree grows along streams near the coast from Alaska to southern California. The hard, straight-grained wood is used for the same purposes as that of the sugar maple. The vine maple (*A. circinatum*), usually a small tree, is often vinelike or even prostrate. It bears deeply lobed leaves and reddish flowers in pendent clusters. The range of this maple is from British Columbia to northern California. The dwarf maple (*A. glabrum*) is a low tree, but often shrubby, with small, upright branches, reddish twigs, and greenish flowers appearing just after the leaves. It grows in the mountains at 5000 to 6000 feet altitude, from New Mexico to Alaska.

Several foreign species are planted for ornament in the United States and Canada. The Norway maple (*A. platanoides*), of Norway and Switzerland, sometimes 100 feet high, with a dense crown and dark green leaves, is extensively grown in the East and in the Middle West. It is similar in foliage to the sugar maple, from which it is distinguished by a milky juice. A handsome red-leaved variety (*schwedleri*) is very widely planted.

The sycamore maple, or Plane Tree (*A. pseudoplatanus*), is an important timber tree in central and southern Europe and in Asia. It grows from 70 to 90 feet high and has sycamore-like leaves. This exotic maple is sparingly planted in America, as are several small cut-leaved varieties of the Japanese maple (*A. japonica*).

Marsh Mallow (*Althæa officinalis*). An erect, velvety hairy, herbaceous plant of the mallow family, 2 to 4 feet high, with ovate, three-lobed leaves. It is native to Europe and has become widely naturalized in the United States. The very mucilaginous roots are used in confectionery and in medicine. In France, its leaves, when boiled as a potherb, are much eaten.

Marsh Marigold (*Caltha*). A genus of beautiful marsh plants of the crowfoot family. They have fleshy stems, heart-shaped leaves, and handsome, yellow, white, or pink flowers. There are about 15 species, some 8 of which occur in North America. The common marsh marigold (*C. palustris*), often wrongly called cowslip, is abundant in northern Europe and Asia. It occurs frequently also in swamps and meadows from Newfoundland to Saskatchewan and southward to South Carolina and Nebraska. The marsh marigold is a conspicuous wild flower of early spring, at which season the leafy portion of the plant is often used as a potherb.

Maté (*mä'tā*; *mät'â*) (*Ilex paraguensis*). A small tree, a species of holly, native to Paraguay and southern Brazil. The dried leaves and shoots are used in South America for making a tealike beverage, also called maté. Gathering, drying, and preparing the leaves for the market is an important industry in parts of Paraguay and Brazil. From these countries several million pounds of cured maté leaves, called also Paraguay tea, are exported annually to other parts of South America. The stimulating effects of maté are due to the caffeine which it contains. As ordinarily used, maté is a milder beverage than tea or coffee. See *Cocoa, Coffee, Tea.*

May Apple (*Podophyllum*). A genus of erect herbs of the barberry family, with horizontal, poisonous rootstocks, large, shield-shaped, palmately lobed leaves, and solitary white flowers. There are four species, one of which is North American. The wild may apple, or mandrake (*P. peltatum*), has peltate leaves about a foot in diameter. The single, large, nodding flower, 2 inches broad, generally appears immediately between two leaves. This plant abounds in low woods from Quebec to Minnesota, southward to Florida and Texas, and also grows wild in Japan. The yellowish, fleshy fruit, about 2 inches long, is edible, though insipid. A purgative resin (podophyllin), much used in medicine, is extracted from the root.

Mayflower. A name given to various plants which blossom in May. In England the hawthorn (*Cratægus oxyacantha*) is commonly called may or mayflower; the cuckoo-flower (*Cardamine pratensis*) and the marsh marigold (*Caltha palustris*) are likewise so named. In New England the trailing arbutus (*Epigæa repens*) is usually known as mayflower, but, in other sections of the United States, the spring beauty (*Claytonia virginica*), the wood anemone (*Anemone quinquifolia*), the pasque flower (*Pulsatilla patens*), the pink azalea (*Azalea nudiflora*), and other plants are sometimes given the name. In New York State the hepatica, or liverleaf (*Hepatica triloba*), is called mayflower.

Mesquite (*mĕz-kēt'*) (*Prosopis*). A genus of thorny trees and shrubs of the pea family. They bear divided leaves, greenish white flowers in small dense clusters, and long, straight or sometimes twisted pods containing somewhat beanlike seeds. There are about 17 species widely distributed in warm arid regions. Of these, 3 are found in the southwestern United States.

The common mesquite (*P. juliflora*), usually 10 to 15 feet high, has a thick taproot which frequently penetrates to a depth of 50 or more feet. It grows from southern Kansas to southern California and southward to Chile and Argentina. The extremely heavy, close-grained, reddish wood is highly prized for fence posts, railway ties, fuel, and for many other uses. The long, beanlike pods, rich in sugar, supply Mexicans and Indians with nutritious food and are greedily eaten by domestic animals, especially by horses and by burros.

The screw-pod mesquite (*P. pubescens*) is a shrub or small tree, 10 to 25 feet high, somewhat similar to the common mesquite but with spirally coiled, screwlike pods. The screw-pod mesquite occurs from western Texas to Nevada, California, and southward. Both the foregoing are characteristic desert shrubs. Even when the bushy stem is only 2 or 3 feet high, the long, straight taproot may penetrate to the water level 60 feet or more below the surface. These woody roots are used for fuel in regions where no wood of fuel size grows above the ground.

Millet. The name given to various annual grasses cultivated for forage and for food, the most important being certain species of *Setaria*, called foxtail millets.

Common millet (*S. miliacea*), a native of Egypt and Arabia, has been planted since prehistoric times, and was known to the ancient Greeks and Romans. It is an important forage plant in Europe, Asia, and North America, being grown for hay or for soiling and silo purposes in every state in the United States and in the lower provinces of Canada.

Italian millet (*S. italica*), native to eastern Asia, has likewise been cultivated since remote antiquity. It is said to have been planted in China, by royal edict, as early as 2700 B. C. It is now widely grown in Europe, Asia, and America for forage. In the Old World, particularly in China and Japan, the seeds are much used for human food. In Europe and America the nutritious seeds are fed chiefly to poultry and other birds. See *Cereals, Grasses.*

Mints (*Labiatæ* or *Menthaceæ*). Aromatic herbs or shrubs of the mint family, mostly with four-sided stems, opposite leaves, and often strongly scented flowers. The family consists of about 3200 species of wide distribution throughout temperate and tropical regions. The foliage of various

mints contains fragrant essential oils, valued as stimulants, for flavoring purposes, and in perfumery. Peppermint, spearmint, and pennyroyal are very widely used, while lavender, spike, thyme, marjoram, basil, and sage furnish well-known oils and flavors. Patchouli, rosemary, and lavender are used in making perfumes. Horehound, ground ivy, dittany, balm, and various other mints enter into household remedies.

Mistletoe (*Phoradendron*). Small shrubs of the mistletoe family (*Loranthaceæ*), parasitic on trees. They have fleshy, evergreen leaves, brittle twigs, small flowers, and pearl-white, viscid, berry-like fruit. There are 157 known species, mostly American, 8 of which occur in the United States. Some of these species, in time, kill the trees which serve as their hosts.

The American mistletoe (*P. flavescens*) has dark green leaves and small, white berries. It grows on deciduous trees, particularly the tupelo, elm, and red maple, from New Jersey to Missouri and southward to Florida and New Mexico. The California mistletoe (*P. villosum*), with similar leaves, forms bushlike clusters on oaks in Pacific Coast valleys.

The European mistletoe (*Viscum album*), long used in Christmas festivities, is closely related to the American species. It is an evergreen bush, about 4 feet in height or length, with crowded branches and small, white, very sticky berries. While parasitic on many kinds of trees, in England and France it grows most abundantly on the apple. When it grew upon the oak, which was but rarely, the mistletoe was an object of veneration by the ancient Druids.

Moonflower (*Ipomœa bona-nox*). A climbing plant of the convolvulus family. It is highly prized for its large, pure white, fragrant flowers which open in the evening and close before noon of the next day. Several handsome varieties are in cultivation.

Morning-glory (*Ipomœa purpurea*). A hardy climbing plant of the convolvulus family, native to Mexico. Many varieties are widely grown throughout the United States. The large, funnel-shaped, variously colored flowers open in the early morning and close during the heat of the day. In many localities it has become naturalized as a weed.

Mosses (*Musci*). A well-marked group of plants, standing next below the fern plants in development. They comprise, with the somewhat less highly organized liverworts, the primary division or subkingdom of plants known as bryophytes. The mosses are small, green plants with structures closely resembling and corresponding to the roots, stems, and leaves of the ferns and seed plants. They are adapted to an immense range of conditions, from almost aquatic to nearly arid, but are most common in cool and arctic regions. There are two chief divisions of mosses, the *Sphagnum* forms, which include the peat-forming mosses, and the *Bryum* forms, which embrace the true mosses.

While peat is of local importance, and various species of *Sphagnum* are used in packing and for surgeons' dressings, the mosses on the whole possess but slight economic value. See *Liverworts*.

Mountain Ash (*Sorbus*). Erect, handsome, ornamental trees of the rose family, closely related to the apple. They bear pinnately divided leaves, white flowers in large flat clusters, and bright red, berry-like fruit. There are about 10 species native to north temperate regions. Of these, 4 occur in North America.

The American mountain ash (*S. americana*), sometimes 30 feet high, grows from Newfoundland to Manitoba, southward to Michigan and along the Appalachian mountains to North Carolina. Various forms are cultivated for the brilliantly colored fruit which ripens in autumn. The western mountain ash (*S. americana sitchensis*) is a small tree or shrub with bright green leaves and large, handsome fruit. It occurs in moist ground from Labrador to Alaska and south to Maine, Michigan, and Utah. When planted for ornament it becomes a tree from 30 to 40 feet high.

The European mountain ash (*S. aucuparia*), called also rowan tree, is very similar to the American species. It is often cultivated in Canada and in the northern United States, where it has become sparingly naturalized.

Mulberry (*Morus*). A genus of trees of the mulberry family, growing in temperate regions. There are about 10 well-marked species with numerous varieties or races, widely distributed throughout America, Europe, and Asia.

The white mulberry (*M. alba*) is a native of Asia but has been naturalized in Europe and in the United States. Generally it is a short, low-branched tree. Its leaves form the favorite food of the silkworm. The tree was extensively planted in the United States in the first half of the 19th century, when an attempt was made to introduce silk culture. The fruits are too dry to be palatable. In Europe the foliage is fed to goats and sheep, and the wood is used for barrel staves. The inner bark furnishes a coarse fiber, a dye is obtained from the roots, and the root bark has medicinal value.

The black mulberry (*M. nigra*) came originally from Persia, but it has long been cultivated in Europe and America for its agreeable, black berries. The juice of the ripe berries has medicinal properties. Sometimes the leaves are fed to silkworms.

The red mulberry (*M. rubra*) is a native American tree found wild from Massachusetts to Nebraska and southward to Florida and Texas. This is the largest of the mulberry trees. Several varieties produce pleasant, reddish black berries, juicy and slightly acid. The dark yellow wood is coarse-grained, tough, and very durable. It is employed for fence posts, for making barrels, churns, and shoe lasts.

Mushrooms. Numerous fungi belonging to two large orders which include the agarics with related forms (*Hymenomycetes*) and the puffballs and their allies (*Gasteromycetes*). Together, these embrace some 40,000 species, widely distributed throughout the world.

Formerly the term mushroom was more generally given to the comparatively small number of forms then known to be edible, while the poisonous kinds, supposed to be exceedingly numerous, were called toadstools. However, since it has been discovered that the dangerous kinds are very few in number while the wholesome or harmless kinds may be counted by thousands, the name mushroom is becoming more and more frequently used for the entire group. Instead of referring to the deadly amanita and the fly agaric, the two most venomous American species, as toadstools, it is more common to call them "poisonous mushrooms," and to call the wholesome field agarics, the morels, and the puffballs "edible mushrooms."

Unfortunately, the poisonous kinds are very widely distributed and closely resemble some of the best edible species. Because of these facts, no one who is not an expert in distinguishing them should gather or use mushrooms for food.

Among the edible mushrooms are many which are greatly esteemed as table delicacies. Their food value, which is often vastly overestimated, is about equal to that of ordinary vegetables. The common mushroom (*Agaricus campestris*), found in fields and pastures, cultivated in Europe since the middle ages, is now widely grown for the market in the United States and other countries. The morels (*Morchella*), common in many parts of the United States and Europe, are highly prized for food, as are many other species, such as the ink cap (*Coprinus*), the parasol mushroom (*Lepiota*), the chanterelle (*Cantharellus*), the fairy ring mushroom (*Marasmius*), and various puffballs (*Lycoperdon*). A highly valued European species is the truffle (*Tuber*), which grows beneath the surface of the ground. See *Fungi*.

Muskmelon (*Cucumis melo*). An annual vine of the gourd family, native to India and Guinea, much prized for its fleshy fruit. In the Old World it has been cultivated for upwards of 2000 years, being depicted in an ancient Roman painting excavated at Herculaneum. In the United States the hard-shelled varieties, with furrowed rind and yellow flesh, are called "cantaloupes," and the soft-shelled varieties, with smooth, netted-veined rind and greenish flesh, are known as "nutmeg" melons. Both kinds, and also the recently introduced winter muskmelon, called the "cassaba" or "pineapple melon," are extensively grown. Muskmelons as a whole rank about fifth in acreage devoted to vegetables. See *Cassaba*.

Mustard (*Brassica*). A genus of plants belonging to the mustard family, with yellow flowers and narrow, beaked pods, containing small, pungent, oil-bearing seeds. Black mustard (*B. nigra*), native to Mediterranean countries, has been cultivated in Europe since ancient times for mustard oil. White mustard (*B. alba*), native to the same region, is grown in Europe, and sparingly in America, as a salad plant, as a condiment, and as a source of mustard oil. The ground seeds are used in medicine as a counterirritant, as a stimulant, and as an emetic.

The foregoing and various related species have become widely distributed as troublesome weeds, including the charlock (*B. arvensis*), hedge mustard (*Sisymbrium officinale*), tumble mustard (*S. altissimum*), hare's-ear mustard (*Conringia orientalis*), and garlic mustard (*Alliaria officinalis*). Hedge mustard is especially detested by truck gardeners because it harbors the clubroot fungus, injurious to cabbage and turnips.

Narcissus. A genus of bulbous plants of the amaryllis family. They bear one or more showy flowers on leafless scapes, the leaves being linear and basal. There are about 20 species, natives of the Old World, mostly blooming in early spring, several of which are very highly prized in cultivation.

The Daffodil (*N. pseudo-narcissus*), native to Europe, has a two-edged scape about a foot high, and bears a solitary, bright yellow flower. This plant has escaped from cultivation in the eastern United States. The poet's narcissus (*N. poeticus*), also native to Europe, with white flowers, has likewise become locally naturalized. The Jonquil (*N. jonquilla*) is much grown for its fragrant yellow flowers, used in making perfumes.

Nettle (*Urtica*). A genus of herbs of the nettle family. They have stinging hairs, opposite leaves, and very small axillary flowers. There are about 30 species, very widely distributed, several of which occur in the United States and Canada.

The tall nettle (*U. gracilis*) grows from 2 to 7 feet in height, with erect branches. It occurs in dry soil from Newfoundland to British Columbia and southward to Louisiana and Colorado. The stinging nettle (*U. dioica*), native to Europe, has a stout stem, 2 to 4 feet tall, densely beset with stinging hairs. This plant has become naturalized from Newfoundland to Colorado. The dwarf nettle (*U. urens*), 6 to 18 inches high, also naturalized from Europe, with stinging-bristly branches, is found almost throughout North America. Various related plants with more or less stinging hairs are also called nettles.

From the fiber obtained from the stems of various Old World nettles many kinds of cordage and cloth are made. The roots and leaves of certain species yield beautiful yellow and green dyes. In India the tubers produced by a native nettle are used for food.

Nutmeg (*Myristica fragrans*). A small evergreen tree of the nutmeg family, about 25 feet high, with shining leaves. It is a native of the Molucca islands, and has long been cultivated in the East Indies as a spice plant. It bears a golden yellow, pearlike fruit, the flesh of which is preserved and eaten as a sweetmeat. The seed is the nutmeg of commerce; from the seed-covering, mace is made. Upon being pressed, nutmegs yield a yellow fat, called nutmeg butter, or oil of mace. From this is obtained the oil of nutmeg, used in flavoring. Nutmeg culture has been successfully established in the West Indies and in Brazil.

Oak (*Quercus*). An important genus of trees or shrubs of the beech family. They bear lobed, toothed, or entire leaves, both deciduous and evergreen, small flowers, and a characteristic nutlike fruit, called an acorn. There are about 220 species, natives of the northern hemisphere. Of these, 138 species, varieties, and hybrids are found in North America. There are two distinct groups, white oaks and black oaks. Those of the first group mature their fruit in one season; those of the second group require two seasons.

Economically, the oaks are among the most valuable of hardwood trees. For many uses the strong, heavy, durable wood of various species is unsurpassed, especially in shipbuilding, mechanical construction, interior finish, floors, and for furniture. The bark of some species is widely used in tanning, while that of others yields dyestuffs and cork. The acorns of several oaks are articles of human food, particularly among the Indians, and since time immemorial have been used for fattening swine. In some regions, as on the Pacific coast of North America, the timber from native oaks is mostly of inferior quality. But in eastern North America and in Europe, the oak, on account of the staunch quality of its wood, is everywhere regarded as a symbol of strength and dependableness.

The white oak (*Q. alba*), a magnificent forest tree, sometimes 150 feet high, with a trunk diameter of 8 feet, is the most valuable American timber oak. It grows from Maine to Minnesota and southward to Florida and Texas.

Other eastern and southern oaks valuable for their timber include the post oak (*Q. stellata*), bur oak (*Q. macrocarpa*), chestnut oak (*Q. montana*), yellow oak (*Q. muhlenbergii*), swamp white oak (*Q. bicolor*), basket oak (*Q. prinus*), red oak (*Q. rubra*), overcup oak (*Q. lyrata*), and water oak (*Q. nigra*). In the same area, but of less importance for timber, are the scarlet oak (*Q. coccinea*), the Texas oak (*Q. texana*), the pin oak (*Q. palustris*), and the shingle oak (*Q. imbricaria*).

The bark of the black oak, or Quercitron (*Q. velutina*), a very common oak from Maine to Minnesota and southward, is used in tanning, as the source of the yellow dye called quercitron, and in medicine. The shingle or laurel oak (*Q. imbricaria*), usually 50 to 60 feet high, has lance-shaped, entire leaves. It grows from Pennsylvania to Wisconsin and southward to Georgia.

The southern live oak (*Q. virginiana*) is a widely branching tree, 40 to 60 feet high, with evergreen, usually entire, leaves. It grows from Virginia to Florida, Texas, Central America, and Cuba. The very heavy, tough wood was formerly much used in shipbuilding.

The maul oak (*Q. chrysolepis*), sometimes 60 feet high, with a trunk diameter of 5 feet, native to the Sierra Nevadas and the Coast Ranges, is the most useful timber oak of California. The Oregon oak (*Q. garryana*), sometimes 55 feet high, with a trunk diameter of 5 feet, occurs from British Columbia to California. Next to the maul oak, it is the most valuable western American timber oak.

The valley oak, or weeping oak (*Q. lobata*), grows from 40 to 75 feet tall, with a round-topped crown which is often broader than high. It is the most characteristic tree of the great California valleys. Not less conspicuous is the California blue oak (*Q. douglasii*) which covers the western foothills of the Sierras; its heavy cross-grained wood is used only for fuel. Its large acorns, and those also of the valley oak, are much used for feeding hogs.

The coast live oak (*Q. agrifolia*) grows usually from 20 to 40 feet high, with widespreading limbs and entire or spiny-toothed evergreen leaves. This tree is very abundant in the southern Coast Ranges of California. The scrub live oak (*Q. dumosa*), 2 to 8 feet high, with small spiny-toothed leaves, is a common chaparral shrub on the Pacific Coast. The most important tree of the oak group in California is the tan oak (*Lithocarpus densiflora*), which yields large quantities of excellent tanbark.

Various native species are often planted for ornament in the United States, as is also the European oak.

The British or European oak (*Q. robur*) is the most important European timber oak. It is native to nearly all parts of Europe, except the far north, and is the only oak growing wild in Great Britain. This is the oak tree celebrated in history and myth. It does not reach the height attained by several American oaks but it surpasses most of them in girth and is very long-lived. Occasionally, it attains immense size and great age. An oak tree known to be 800 years old, in Gloucestershire, England, measured 47 feet in circumference at 5 feet above the ground.

Other important European and West Asian oaks are the holm or evergreen oak (*Q. ilex*), the Turkey oak (*Q. cerris*), the Valonia oak (*Q. œgilops*), the gall oak (*Q. lusitanica*), and the cork oak (*Q. suber*). See *Cork Tree.*

Oat (*Avena sativa*). An annual plant of the grass family, unknown in the wild state but probably native to eastern temperate Europe. It has been cultivated for about 4000 years, having been grown by the Lake Dwellers of the Bronze age, and used for food by the Germans at the time of Pliny. While not adapted to hot countries, the oat is a cereal of the first rank in northern regions. The world crop usually totals between four and five billion bushels, with the United States and Russia as the leading producers. The wild oat (*A. fatua*), usually regarded as a weed, has become an abundant and valuable pasture grass in California. See *Cereals, Grasses.*

Ocotillo (*ō'kō-tēl'yō*) (*Fouquieria splendens*). A thorny shrub of the tamarisk family, sometimes called candlewood. It branches at the base into several slender, intensely spiny stems, 10 to 25 feet high. These are leafy only near the top, and bear at their upper ends narrow clusters of bright scarlet flowers. The ocotillo is a characteristic shrub of rocky mesas and deserts from western Texas to California, and from its thorny appearance is often mistakenly called a cactus. Mexicans weave ocotillo stems into fences for confining chickens and pigs.

Oil Palm (*Elæis guineënsis*). A small tree, 20 to 30 feet high, native to west tropical Africa. The fruit is an immense cluster of orange colored, plumlike drupes, with a hard stone and an oily pulp. Palm oil, obtained from the fruit, is exported in large quantities from western Africa. The tree is now naturalized and cultivated in Brazil and the West Indies. See *Palm.*

Okra (*Hibiscus esculentus*). A soft-stemmed annual of the mallow family, called also gumbo. It is closely related to the shrubby althea of the gardens. Okra grows from 3 to 5 feet high, has crenate leaves, and bears sulphur colored flowers. These are followed by somewhat pyramid-shaped fruiting capsules or seed pods. In tropical countries, and also in the southern United States, the unripe, somewhat gummy seed pods are used in thickening soups. Okra is a native of tropical Africa, where it has been cultivated for many centuries. It reached Egypt about the year 1200, and is now widely grown in warm regions.

Olive (*Olea europea*). A small tree, with a low trunk, willow-like leaves, and yellow flowers, belonging to the olive family. It is a native of Asia Minor and bears a pulpy fruit with an oil-yielding seed of great economic value. Olive oil, widely used for salad dressings and in cooking, takes the place of butter in many countries and is used in medicine as "sweet oil." The pickled fruit, both ripe and green, is also an important article of commerce.

The olive was grown by the ancient Egyptians. It is mentioned in Homer's *Iliad* and in the Bible. Pliny states that the Romans began planting it about 600 B. C. It is much cultivated in dry countries, notably in southern Europe, Asia Minor, South Africa, and Australia. In the United States, olive culture has become established only in California, where it was introduced by the Spanish missionaries about 1770. Since time immemorial the olive branch has been regarded by many of the leading peoples as an emblem of peace.

Olona (*Touchardia latifolia*). A valuable fiber plant of the hemp group, indigenous only to the Hawaiian islands where it has long been cultivated by the native peoples. It is an erect shrub of the nettle family, with slender branches, large, thick leaves, and small flowers in globose clusters. The bark of the young branches contains a bast fiber which, weight for weight, is the strongest known, its tensile strength being about three times that of the best manila or about eight times that of hemp. Olona fiber is remarkably pliable and is easily woven by hand into cloth or cordage. It also possesses extraordinary durability in water. Fish nets and lines made from it are handed down from generation to generation as precious objects and are serviceable after a century of use. See *Hemp, Manila Hemp, Sisal.*

Onion (*Allium cepa*). A biennial plant of the lily family, with slender, hollow leaves, native to southwestern Asia. Since prehistoric times the onion has been cultivated for its pungent, bulbous root, used as a vegetable. It was grown by the ancient Egyptians, by the Greeks and Romans, and is now widely cultivated throughout the world. In the United States it is grown in every state, New York and Ohio usually leading in production. Bermuda onions, Spanish onions, and other foreign varieties are now extensively produced in the southern United States, particularly in Texas and California.

The wild onion (*A. cernuum*), which occurs from New York to British Columbia and southward to Kentucky and New Mexico, sometimes becomes a pestiferous weed. It invades pastures, and cattle feeding upon it produce milk with a marked onion-like flavor. See *Garlic, Leek.*

Orange (*Citrus aurantium*). A small evergreen tree of the orange family, with dark green, oval leaves, white, fragrant flowers, and large, golden yellow, pleasantly flavored fruit. Flowers and fruits in all stages are often found almost continuously on the same tree, but the great mass of fruit ripens at one time or season each year. The orange is a native of southern China, where its cultivation seems to have begun during the middle ages and thereafter spread to India. After about 1500, orange culture rapidly spread throughout warm regions.

The orange is now the most important citrus fruit, and is very extensively grown in Mediterranean countries, India, Japan, the East Indies, Jamaica, and Brazil. In the United States, California and Florida are the leading producers, though some oranges are grown in Louisiana, Texas, and Arizona. Important varieties in the United States are the seedless *navels*, grown in California, and the bronze colored *russets*, grown in Florida. The small, rich flavored *mandarin* orange has recently been introduced from China.

The chief use of the orange is as a dessert fruit. A refreshing drink is made of orange juice, and orange peel is used in making marmalades, in flavoring, and, when candied, as a confection. Bridal

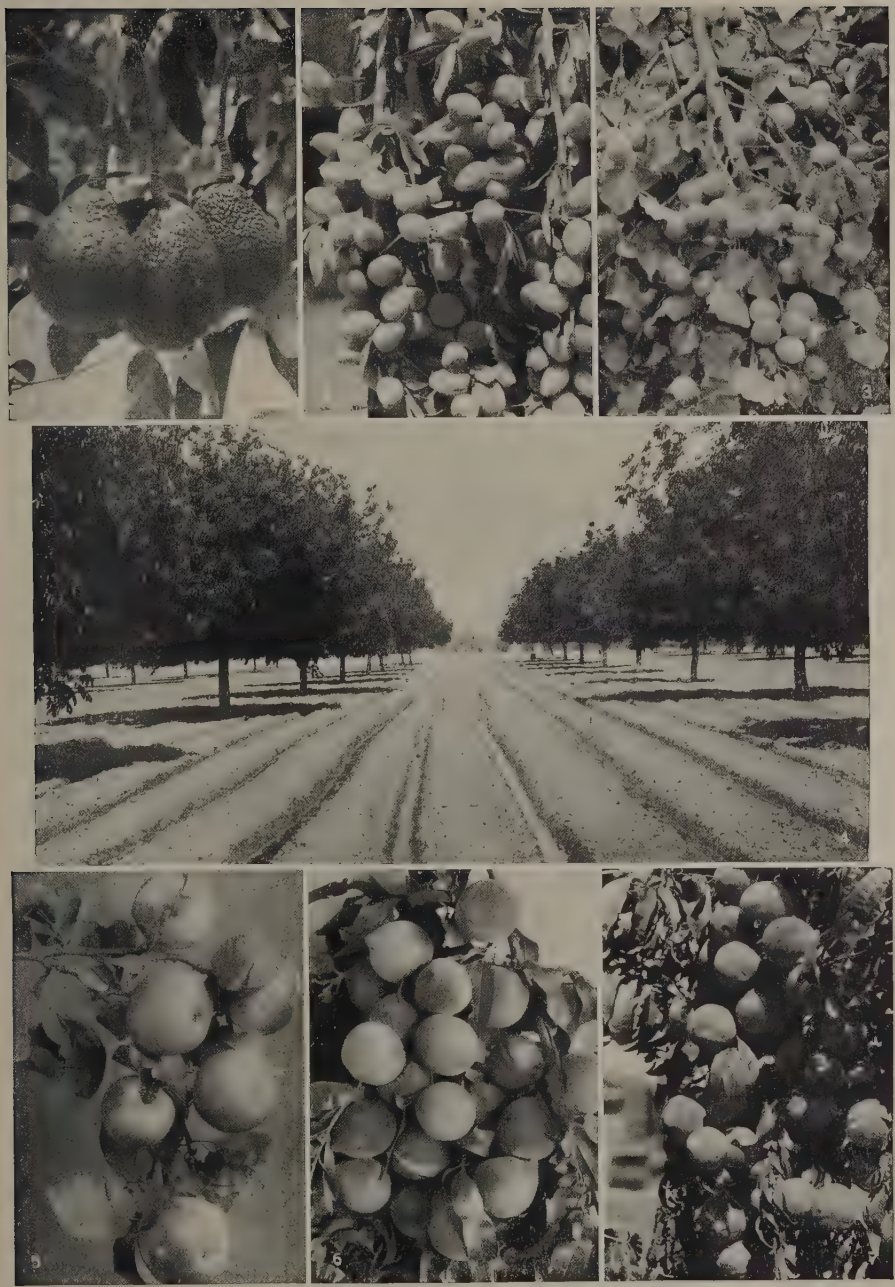


Photo for No. 3 from Publishers' Photo Service; photos for Nos. 5 and 6 from J. H. McFarland Co.

FRUITS AND NUTS. I

1 Avocado or Alligator Pear. 2 Almond. 3 Apricot. 4 Irrigated Walnut Orchard, California. 5 Winesap Apple. 6 Peach. 7 Hungarian Prune.



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AMERICAN SHRUBS AND VINES

High-bush Blackberry
Virginia Creeper
Beach Plum
Pointed Forestiera
Black Haw
Witch-hazel
Purple-flowering Raspberry
Inkberry
Round-leaved Thorn



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AMERICAN WILD FLOWERS. I

Unicorn Plant
Bird's-eyes
Malvaviscus

Jack-in-the-pulpit
Wake-robin
Buffalo Berry

Lyon's Turtlehead
Yellow Adder's-tongue
New England Aster












Photos for Nos. 1, 2, 3, 6, and 7 from U. S. Department of Agriculture; photo for No. 8 from Publishers' Photo Service.

FRUITS AND NUTS. II

1 Jujube. 2 Mango. 3 Japanese Persimmon. 4 Fig. 5 Banana. 6 Date Palm. 7 Papaya. 8 Coconut Palm.

wreaths are made from orange flowers. Orange-flower water and orange-leaf oil are ingredients in perfumes. The fine-grained, yellow wood is valued for turnery and inlaid work.

A deadly fungus disease, known as citrus canker, introduced on orange plants received from Japan, recently spread through the orange groves from Florida to eastern Texas. For several years it threatened to wipe out the orange industry of Florida. The states involved, as well as the Federal government, spent millions of dollars in stamping out this dread disease. See *Citrous Fruits, Tangerine.*

Orchids (*ôr'kĭdz*) (*Orchidaceæ*). A large group of perennial herbs comprising the orchid family. They have corms, bulbs or tuberous roots, sheathing, entire leaves, and irregularly shaped flowers. The flowers are composed of six segments and possess many curiously developed structures to aid in pollination by insects. There are more than 5000 species occurring throughout the world, except in arctic or very arid regions, but most numerous in the tropics. In cool temperate regions orchids grow in the soil, but in the tropics an immense number are epiphytes, perching on trees. Many produce strikingly beautiful flowers, which are highly prized for greenhouse cultivation. Among native North American orchids are the lady's-slippers, pogonias, lady's-tresses, twayblades, rattlesnake plantains, and the coralroot.

Oregon Grape (*Mahonia aquifolium*). A handsome small shrub of the barberry family, with prickly, shining, pinnate, evergreen leaves, yellow flowers, and clustered, acid, blue fruit, somewhat resembling small grapes. It grows wild from western Nebraska to British Columbia and Arizona, and is sparingly cultivated as an ornamental plant. It is called also ash-leaf barberry, holly-leaf barberry, or trailing mahonia, and is the state flower of Oregon.

Osage Orange (*Toxylon pomiferum*). A thorny tree of the mulberry family, sometimes 50 to 60 feet high, native to rich soil from Missouri and Kansas to eastern Texas. It has a milky sap, dark green, glossy leaves, and bears a hard, yellow, uneven-surfaced, inedible fruit, 4 to 5 inches in diameter, ripening in autumn. The exceedingly strong, heavy, elastic, lemon-yellow wood, prized for railway ties, fence posts, and wheel stock, was used by the Osages and other Indians for bows, whence the name *bois d'arc.* This tree has been widely planted for hedges, and the foliage is used to some extent as food for silkworms. The bark contains a flaxlike fiber, and the root yields a yellow dye, similar to that from fustic.

Palm (*Palmæ* or *Palmaceæ*). The palms form a great natural group or family containing about 150 genera and 1200 species. Nearly all are confined to the tropics where they form a striking and characteristic part of the vegetation.

A typical palm tree has a columnar, buttressed trunk, sometimes more than 100 feet high, crowned with a rosette of huge leaves. However, some palms have branching stems and others are only a few feet in height. Various rattan palms have rope-like stems and climb to heights of several hundred feet by means of hooked prickles.

The leaves are either *palmate,* as in the fan palms, or *pinnate* or feather-like, as in the date palm and the coconut palm. Some fan palms have leaves 30 feet long and 5 feet broad, while certain feather-leaved palms have leaves 50 feet long and 8 feet broad. The flowers grow in enormous clusters,—a single coco palm sometimes producing upwards of a half million blossoms. As to fruits, palms vary immensely. More or less fleshy berries and drupes are the most common forms. Many palm fruits are enclosed in a fibrous husk and often contain a hard nut.

With the exception of the grasses, the palms excel all other families of plants in economic importance. Sugar, wine, starch, oil, wax, and resins are obtained from various species. Others yield valuable fruits, fibers, and timber. Among the most valuable are the coconut palm, the date palm, and the oil palm. A few palms are native in temperate regions, one species (*Chamærops humilis*) growing in southern Europe.

In the southern United States, 10 species of native palms attain the size of trees; of these, 7 are confined to Florida. The Cabbage Palmetto (*Sabal palmetto*) often grows 30 to 40 feet high. The deeply divided leaves are 7 to 8 feet broad. This species grows along the coast from North Carolina to western Florida. The Texas Palmetto (*Inodes texana*), a beautiful, large palm, grows exclusively in the extreme southeast corner of Texas and southward into Mexico. It is much planted for ornament in Texas as far north as San Antonio. The royal palm (*Roystonia regia*) grows from 80 to 100 feet high. The handsome, closely pinnate leaves are 10 feet in length. This palm occurs sparingly in southern Florida and is a common tree in the West Indies. It is widely planted for ornament in tropical countries.

The desert palm, California fan palm, or Washington palm (*Washingtonia filamentosa*) grows from 20 to 75 feet high, with a trunk diameter of from 1 to 3 feet. The palmate leaves, 3 to 6 feet long, bear copious fibers or filaments at the ends of the leaf divisions. This interesting palm grows wild on the western margins of the Colorado desert in southern California, sometimes forming small groves near the mouths of canyons. It is now extensively cultivated for ornament in California, southern Europe, and other warm temperate regions. See *Coconut, Date Palm, Oil Palm.*

Palo Verde (*pă'lô vĕr'dā*) (*Cercidum torreyanum*). A small, intricately branched tree of the pea family. It grows from 15 to 20 feet high, with a short trunk, smooth, green bark, and minute leaves, which fall soon after appearing, leaving the tree leafless for most of the year. The bright yellow flowers are borne in axillary clusters and are followed by flattened, short, beanlike pods, 3 inches long. The palo verde is a characteristic tree along sandy washes in the Colorado desert of southern California, eastward into southern Arizona, and southward to Mexico.

Papaw (*pà-pâ'*; *pâ'pâ'*) (*Asimina triloba*). A shrub or low tree of the custard apple family. It grows from 10 to 40 feet high in deep, rich soil from Ontario and southern Michigan southward to Florida and Texas. The conspicuous leaves are from 10 to 12 inches long and from 4 to 6 inches wide. The plant bears dark red flowers, nearly 2 inches across, and banana-shaped, sweet, edible fruit, ripening in autumn. See *Papaya.*

Papaya (*pà-pä'yà*) (*Carica papaya*). A palm-like tree of the passion flower family, called also papaw, native to tropical America. It attains a height of 12 to 15 feet, bearing at the summit a crown of large, seven-lobed leaves, with the flowers and fruit below. The papaya is widely cultivated in tropical countries for its orange-yellow, melon-shaped fruit, 8 to 10 inches long, which the tree begins to bear in about a year after planting. The pleasantly flavored, fleshy fruit is eaten raw, cooked, or pickled. See *Papaw.*

Papyrus (*pà-pī'rŭs*) (*Cyperus papyrus*). A stout, reedlike sedge of the Nile valley. It grows from 3 to 10 feet high, and bears a large umbel of drooping flower clusters at the summit of the stem. From the pith of this plant, the ancient Egyptians prepared a kind of paper which they used extensively for manuscripts. Some of these manuscripts, called papyri, now existing are believed to be about 5000 years old. Shortly after the time of Alexander the Great, papyrus paper became the writing material of the Greeks. Later it was extensively used by the Romans for several centuries.

Parasitic (*păr'ă-sĭt'ĭk*) **Plants.** True plant parasites live in part or entirely within the tissues of other plants or animals, and derive their nutriment chiefly from them. Many species of fungi, including the rusts, smuts, mildews, leaf curl, blights, and tree-destroying, bracket-like forms, are parasitic upon other plants. Other fungi, such as the *Trichophyton*, grow in the human skin, producing the diseases known as ringworm, barber's itch, and similar affections. Many kinds of bacteria are always present in the skin and in the digestive organs of various animals. Among the higher, or seed plants, the dodder and rafflesia are true parasites. The mistletoes, which possess more or less green foliage, are only partly parasitic. Epiphytic plants, which merely perch on other plants, as do various orchids, are often wrongly called parasitic plants. See *Epiphytes*.

Parsley (*Petroselinum sativum*). A biennial plant of the carrot or parsley family. It is a native of southern Europe, and has been planted in gardens since the time of Charlemagne. While now widely grown in Europe and the United States as a flavoring plant and for garnishings, it is a relatively unimportant minor vegetable. Apiol, or oil of parsley, obtained from the seed, is used in medicine.

Parsnip (*Pastinaca sativa*). A biennial of the parsley or carrot family, native to northern Asia and Europe. It has been cultivated since the early middle ages for its thick, white, mucilaginous roots, used as a winter vegetable and for feeding cattle. The wild form, with a hard, acrid, somewhat poisonous root, occurs as a weed in the eastern United States and Canada.

Passion Flower (*Passiflora*). A genus of climbing, tendril-bearing vines with mostly alternate leaves and large, showy flowers. There are about 300 species, natives chiefly of tropical America, of which some 10 occur in the southern United States.

These plants were named passion flowers by early Spanish missionaries in America from a fancied resemblance of the parts of the flower to the instruments of Christ's Crucifixion. The fringe or corona was supposed to represent the crown of thorns, the three styles were the nails of the cross, and the five anthers were the marks of the wounds. Omitting Peter who denied and Judas who betrayed, the five sepals and the five petals were regarded as symbolizing the apostles.

The Passion Vine (*P. incarnata*) climbs to a height of from 10 to 30 feet. It has 3-lobed leaves and white flowers with a purple crown. The large, yellow, edible berry is sometimes called maypops. This vine grows from Virginia to Missouri and southward to Florida and Texas. Several tropical species of passion flower produce highly perfumed, delicate, dessert fruits, such as the granadilla, various curubas, the water lemon, and the sweet calabash.

Pea (*Pisum*). An important group of leguminous plants, of great value for food and forage. They are usually tendril-bearing, more or less climbing annuals, with pinnate leaves, white or reddish flowers, followed by straight pods bearing several rounded seeds.

The garden pea (*P. sativum*), a native of western Asia, has been cultivated since remote antiquity for its delicious unripe seeds, used as a table vegetable. It was grown by the Lake Dwellers of the Bronze age and by the ancient Greeks. While the garden pea is chiefly used as a green vegetable, the canning of peas has become an important industry. The numerous varieties belong mostly to two chief types,—those bearing *smooth* seeds, usually low growing, early fruiting plants, and those bearing *wrinkled* seeds, mostly tall, twining, late fruiting plants. A variety with tender, edible pods is called the sugar pea.

The field pea (*P. arvense*), a native of Italy, appears to have been first cultivated by the Greeks and Romans. It is now grown on a large scale in Europe for its dry seeds widely used as food, and for its green parts used to some extent for fodder. While widely grown for food in Canada, the field pea is not extensively cultivated in the United States, although it is locally planted as a forage and soiling crop. See *Leguminous Plants*.

Peach (*Amygdalus persica*). A small, freely branching tree of the rose family, closely related to the plum. It bears long, lance-shaped, somewhat drooping leaves, and handsome pink flowers which usually appear in advance of the leaves in early spring. Double-flowered forms with variously colored flowers are planted for ornament. The stone fruit, commonly somewhat smaller than an apple, varies greatly in size, color, and downiness of skin. It has a delicious fleshy pulp, containing, when fully ripe, about 9 per cent of sugar. The peach is used in large quantities as a table fruit, and is also extensively canned, dried, or otherwise preserved.

The peach is believed to be a native of China, where it has been cultivated since prehistoric times. About the year 100 it was introduced by way of Persia to the Greeks and Romans, who called it the Persian apple. It is now widely grown in warm temperate regions, particularly in Asia, Europe, and North America. Peaches, unexcelled in quality and productiveness, are produced in various sections from Connecticut to California and southward to Texas and Florida. In the United States the peach ranks second only to the apple as an orchard fruit. California, Georgia, New York, and Ohio are the states which usually lead in production.

Some 300 varieties of the peach are grown in North America. Popularly, these are grouped in two classes, *freestones* and *clingstones*, although these freely merge into each other. According to Price, all the numerous varieties may be separated into five races, the Peen-To, the North China, the South China, the Spanish, and the Persian. The greater part of those commonly grown for the market belong to the Persian strains. Various smooth-skinned varieties are known as *nectarines*. See *Almond*, *Apricot*, *Plum*.

Peanut (*Arachis hypogœa*). An annual plant of the pea family, native to Brazil, called also ground nut, earth nut, pindar, and goober. It has a stout, hairy stem, 1 to 2 feet high, spreading branches, and leaves of 3 somewhat beanlike leaflets. The bright yellow flowers are followed by wrinkled pods containing 1 to 4 nutlike, edible seeds. In its manner of fruiting, the peanut is remarkable. When the petals have fallen, the flower stalk bends downward, pushing the growing pods into the ground, where they develop and ripen below the surface.

In South America, the peanut has been cultivated since prehistoric times for its nutritious seeds. About 1500 it was introduced into Africa where it is extensively grown by the native peoples. Its cultivation has now spread to all warm regions. In the United States, the peanut is a crop of increasing commercial importance as far north as Virginia.

While rich in food elements—fats, carbohydrates, and protein—peanuts are eaten chiefly as a confection, or semiluxury, rather than as a regular article of diet. Large and increasing quantities are made into peanut oil and peanut butter and regularly used for food.

Pear (*Pyrus communis*). A small tree of the rose family, closely related to the apple. It bears glossy, pointed leaves, white flowers in umbel-like clusters, and an oblong pome fruit, usually much larger at its outer or blossom end. The fruit is sweeter, juicier, and more melting than the apple, from which it differs also in having grit cells. Among dessert fruits the pear ranks high, and it is extensively used for canning and preserving.

The pear is a native of Europe. It was cultivated by the Lake Dwellers of the Bronze age, and is mentioned by ancient writers, including Homer, Theophrastus, and Pliny. While the pear is widely

grown in temperate countries, its cultivation is most important in France and in the United States. It usually stands fourth among American orchard fruits, being outranked by the apple, the peach, and the plum. Pears are most extensively grown in California, New York, Washington, Michigan, and Georgia. See *Apple, Quince.*

Peony (*pē'ō-nĭ*) (*Pæonia*). Large, herbaceous or somewhat shrubby plants of the crowfoot family, mostly native to the Old World. Several species are widely cultivated for their large, beautiful flowers. The common peony (*P. officinalis*), native to southern Europe, is the most widely grown species. It produces large, red, pink, or white flowers in early summer. The white peony (*P. albiflora*), native to Siberia, is much cultivated for its white or pink, fragrant flowers. The tree peony (*P. moutan*), 3 or 4 feet high, is a native of Japan. It produces very large flowers of many colors. The wild peony (*P. brownii*), a fleshy plant about a foot high, with brownish red, leathery flowers, grows in the foothills of the Sierra Nevada and the Coast Ranges.

Pepper (*Piper nigrum*). A climbing shrub of the pepper family, native to India. It bears small red berries, which, when dried, form the black pepper of commerce. White pepper is the seed from which the skin and fleshy parts of the fruit have been removed. The plant has been cultivated since remotely ancient times. Hippocrates, the great Greek physician, used pepper as a medicine about 400 B. C. During the middle ages pepper was one of the most highly esteemed and costly of spices. It is still the most widely used of all spices and is grown in large quantities in the East and West Indies and other tropical countries.

Red pepper (*Capsicum annuum*) is a small annual of the nightshade or potato family, native to Brazil, much planted in gardens in temperate as well as in warm regions. Large-fruited kinds furnish peppers for pickling, while the seeds yield the red pepper, or cayenne pepper, also called "capsicum." Mild forms of red pepper, called "paprika," yield the various condiments known by that name.

Peppermint (*Mentha piperita*). An aromatic plant of the mint family, native to Europe. It is a small perennial which grows 1 or 2 feet high, with oval, pointed, dark green leaves, and small, bluish white flowers, clustered in spikes. The pungent, volatile oil, obtained from the dried leaves by pressure and distillation, has long been used for flavoring candies and in medicine. Hippocrates, the famous Greek physician, who lived about 450 B. C., praised the virtues of this mint, as did Aristotle, Theophrastus, and other great writers of antiquity.

Commercial cultivation for producing peppermint oil is chiefly carried on in Japan and the United States. Michigan, which for a long period grew most of the American crop, was, in 1925, surpassed by Indiana, while Oregon ranked third.

Pepper Tree (*Schinus molle*). An evergreen tree, about 20 feet high, known also as the Peruvian mastic tree and the pea tree. It belongs to the sumac family and is a native of tropical South America. It bears long, resinous, drooping branches, small, narrow, pinnate leaves, and yellowish white flowers. The fruits, which are bright red and aromatic, are borne in graceful pendent clusters. They are about the size of peppercorns and, in Chile, are used as a substitute for pepper. Its rounded top and drooping branches make the pepper tree desirable as an ornamental for lawns and parks.

Introduced into California, the pepper tree quickly became popular there. But orange growers found that it was used as a host plant by certain scale insects very injurious to orange orchards. Further planting of pepper trees was then discouraged, and, in orange growing districts, thousands of the planted trees were cut down.

Perennials. Those plants whose duration of life continues for more than two growing periods are called perennials. They are thus distinguished from annuals, which have one growing period, and from biennials, which have two growing periods.

Persimmon (*pĕr-sĭm'ŭn*) (*Diospyros*). A genus of trees or shrubs of the ebony family. They have very hard, sometimes exceedingly valuable wood, broad leaves, and a juicy, berry-like fruit. There are about 160 species, mostly natives of the tropics, 2 of which occur in the southern United States.

The common persimmon (*D. virginiana*), usually from 30 to 50 feet high with a trunk one foot in diameter, sometimes attains a height of 100 feet. The large, thick, ovate leaves are dark green above and pale beneath. This handsome tree grows wild from Connecticut to Iowa and southward to Florida and Texas. The plumlike, reddish yellow fruit is about an inch long. When ripe, it is usually sweet and edible, especially after frost has acted upon it, but is very astringent when green. The heavy, dark-colored wood is used in turnery. The Texas persimmon (*D. texana*) is a small, densely branched tree common in western Texas and adjacent Mexico.

The Japanese persimmon (*D. kaki*), 10 to 40 feet high, is highly prized and extensively cultivated in China, Korea, and Japan. The excellent fruit, which is several times larger than that of the native American species, somewhat resembles the tomato in appearance and the apricot in flavor. Japanese persimmons are now successfully grown in the southern United States from Virginia to California. See *Ebony.*

Petunia (*pē-tū'nĭ-ȧ*). A genus of hairy, somewhat sticky, branching herbs of the potato family. They have entire leaves, and bear solitary white, violet, or purple flowers. There are about 12 species, all natives of South America. The white petunia (*P. axillaris*) and the violet petunia (*P. violacea*), native to Brazil, are widely cultivated in innumerable varieties for their beautiful flowers. Both of these species have become somewhat naturalized in the eastern United States.

Phlox (*flŏks*). A genus of perennial herbs of the phlox family. They have opposite, entire leaves and bear large purple, red, or white flowers in terminal clusters. There are about 40 species, native to North America and northern Asia, many of which are widely cultivated in gardens. Some 35 species occur wild in various parts of North America.

The garden phlox (*P. paniculata*) grows from 2 to 6 feet high, with floral clusters, often a foot long, composed of pink, purple, or white flowers. It is native to woods from Pennsylvania to Illinois and southward. This phlox is much planted in gardens in the northern and eastern states, where it freely escapes and runs wild.

The Wild Sweet William (*P. maculata*), 1 to 3 feet high, usually bears pink flowers. It occurs in moist woods from Connecticut to Minnesota and southward to Florida, and is often cultivated.

Pine (*Pinus*). A genus of handsome, cone bearing trees of the pine family. The evergreen, narrow, linear or needle-shaped leaves are usually borne singly or in bundles of 2, 3, or 5, surrounded by a basal sheath. The fruit is a woody cone, maturing at the end of the second or, rarely, of the third season. There are about 100 species, natives of the northern hemisphere, of which some 35 are found in North America.

Pines grow in various situations from sea level to altitudes of 10,000 feet throughout the North Temperate Zone. A few occur on mountains in the tropics. In size they range from small shrubs to lofty trees. The wood is white or yellow, straight-grained, and that of some species is very durable. It varies greatly in hardness and is always more or less resinous. The pines form by far the most numerous group of coniferous trees and are immensely valuable for lumber, pitch, tar, turpentine,

and various resins. Economically, they are the most important group of timber trees, their nearest rivals being the oaks. The pines fall naturally into two groups,—white pines, with little resin in the wood and with 5 leaves in a cluster, and pitch pines, with more or less heavy resinous wood and with 2 or 3, exceptionally 4, leaves in a cluster.

The white pine (*P. strobus*), in England called Weymouth pine, is one of the most valuable timber trees of North America. It often grows 100 feet high, with a straight stem 3 to 5 feet in diameter. The slender leaves are borne in clusters of fives. The range of this pine is from Newfoundland to Manitoba and southward to northern Georgia. The wood is white, practically free from resin, and remarkably straight-grained. The western white pine (*P. monticola*), occurring from northwestern Montana to California, is a similar tree in size and in the value of its wood which is used as a substitute for white pine.

The sugar pine (*P. lambertiana*), a magnificent Pacific Coast species, is the largest of American pines. This handsome tree occasionally attains a height of 150 to 300 feet and a trunk diameter of 12 feet. It bears rigid leaves, 4 inches long, in 5-leaved clusters, and cones 11 to 24 inches in length. The sugar pine grows on mountains from Oregon to Lower California, being most abundant on the west slopes of the California Sierras. It is highly valued for lumber.

The long-leaved pine (*P. palustris*), called also yellow or Georgia pine, ranks high in value among American timber pines, where strength is a requisite quality. It grows near the coast from Virginia to Texas, attaining a height of 120 feet and a trunk diameter of 3 feet, with leaves sometimes 14 inches long in 3-leaved clusters. The hard, very strong, yellowish, resinous wood is much used for construction. The long-leaved pine is one of the two southern pines that yield the turpentine and rosin of commerce in the United States. The slash pine (*P. caribæa*) is second only to the long-leaved pine in the production of naval stores. The timber, however, is less valuable because of its coarser grain.

The red pine (*P. resinosa*), wrongly called Norway pine, is found from Nova Scotia to Manitoba and south to Minnesota and Pennsylvania. It usually grows 70 to 80 feet high, with a trunk 2 or 3 feet in diameter, dark green leaves, in 2-leaved clusters, and red-brown bark. The close-grained, pale red wood is highly valued for construction timber.

The western yellow pine (*P. ponderosa*), called also bull pine, is the most abundant and valuable western timber species. It is found throughout a wide range from western Nebraska to British Columbia and Lower California. In appearance it is an imposing tree, sometimes 150 to 230 feet high, with a massive trunk 5 to 8 feet in diameter. The cinnamon-red bark is usually broken into large squarish plates.

The lodgepole pine (*P. contorta*) is a slender tree, usually 70 to 80 feet high. It bears yellow-green leaves, 2 inches long, in 2-leaved clusters, and small prickly cones. This is a common species of pine from the valley of the Yukon in Alaska, southeastward through the high Rockies to New Mexico and Arizona and in the Cascades and Sierras to southern California. The lodgepole pine takes its name from its former use by the Indians in building their tepees or lodges. It is much used for ties and for telegraph and telephone poles.

Of the Old World pines the so-called Scotch pine (*P. sylvestris*) is the most important. This is a 2-leaved species which occurs in immense forests in Europe. It is the chief timber pine of that continent and the only species of pine native to Great Britain. In the eastern United States it is often grown for ornament. Planted in the Nebraska national forest, naturally a treeless, sandy waste, the Scotch pine is proving useful in reforesting that section of western Nebraska.

The Austrian pine (*P. austriaca*), a 2-leaved species common in southern Austria, is a handsome timber pine sometimes 120 feet high. It is frequently planted for ornament and increasingly for forest purposes in the eastern United States. See *Piñon.*

Pineapple (*Ananas sativus*). A perennial plant of the bromelia family, native to tropical America. It grows from 2 to 4 feet in height, producing at the base a rosette of stiff, sword-shaped leaves. From the center of the rosette rises the single, large, fleshy, scaly-coated fruit 4 to 10 inches long. The fruit is surmounted by a cluster of leaves similar to those forming the basal rosette. In appearance, the fruit, which weighs from 4 to 20 pounds, resembles a huge pine cone, whence the name pineapple.

At the time of the Spanish discovery of that region, cultivation of the pineapple was well established in tropical America. Since that time it has extended to many warm countries, especially Hawaii and Porto Rico. The delicious fruit is shipped long distances to market, and large quantities are canned.

Piñon (*pē-nyōn'*; *pĭn'yŏn*) (*Pinus*). The Spanish name for two species of nut pines native to the southwestern United States and northern Mexico. They bear large, sweet, edible, oily seeds, ½ to ¾ of an inch long, much used for food by the Indians and the Mexicans, and now often sold in the markets. Both species are small, usually bushy trees, with one or two short, incurved leaves in each leaf sheath. The more important of these is the Rocky Mountain piñon (*P. edulis*), a 2-leaved species which forms large open forests from Colorado and Utah south to Mexico. The single-leaf piñon (*P. mònophylla*), with only one leaf in each leaf sheath, grows on desert slopes from Utah to California and southward. The wood of the piñons is locally used for mine-props and for light traffic railway ties. See *Pine.*

Pistachio (*pĭs-tā'shĭ-ō*; *pĭs-tä'-*) (*Pistacia vera*). A tree of the sumac family, native to Persia and Syria, and anciently cultivated in western Asia. It is now widely grown in Mediterranean countries, and also to some extent in southern California, for its small, thin-shelled nuts. These are often called green almonds and are highly prized for flavoring, for oil, and for coloring confectionery and ice cream. A native wild species, recently discovered in southwestern Texas, is the Texas Pistach Tree (*P. texana*).

Pitcher Plant (*Sarracenia*). A genus of peculiar insectivorous marsh herbs of the pitcher plant family. They have urn-shaped leaves and large, nodding flowers. There are about 8 species, natives of eastern and southern North America. The hollow leaves secrete a fluid in which various insects are trapped, decomposed, and finally transformed into plant food.

The common pitcher plant, or Sidesaddle Flower (*S. purpurea*), has purple-veined leaves, sometimes a foot long, and bears a single, large, purple or yellow flower. This interesting plant grows in peaty bogs from Labrador to Alberta and southward to Florida and Iowa. Mosquitoes sometimes breed in the water contained in the pitchers. The Trumpetleaf, or Watercup (*S. flava*), called also trumpets, has trumpet-shaped leaves 1 to 3 feet long, and bears a solitary yellow flower 2 to 3 inches wide. This striking species occurs in bogs from Virginia to Louisiana.

Many species of *Nepenthes*, natives of eastern Asia and the East Indies, bear a pitcher-like organ at the end of the leaves. These plants are now widely cultivated in greenhouses, and are commonly called pitcher plants. In these Old World species the pitcher-like organs usually have lids to keep out the rain, and are provided with downwardly pointing hairs which permit insects to crawl inside

but prevent their escape. Some species secrete a sort of digestive fluid which acts upon the bodies of the entrapped insects.

In Australia there is a pitcher plant (*Cephalotes follicularis*) less well known but quite as interesting as the lid-bearing Nepenthes. See *Sundew, Venus's Flytrap.*

Plane Tree (*Platanus*). A genus of large trees with exfoliating bark, native to temperate regions, so named because of their broad leaves and spreading form. There are about 8 species, 3 of which are North American.

The American plane (*P. occidentalis*), commonly called Sycamore, grows sometimes 170 feet high with a basal diameter of 14 feet. It is probably the largest deciduous tree in the United States. It occurs along streams from New Hampshire to Ontario and Nebraska and southward to Florida and eastern Texas. The wood, long a favorite material for tobacco boxes, ox-yokes, and butchers' blocks, is now largely used for cheap furniture and occasionally for interior finishing. The similar but smaller California sycamore (*P. racemosa*) grows from the Sacramento valley southward to Lower California. The still smaller Mexican sycamore (*P. wrightii*) occurs in southern New Mexico and Arizona.

The handsome Oriental plane (*P. acerifolia*) was planted for shade by the ancient Greeks and Romans. It is still a popular tree in European cities and is frequently grown for ornament in the eastern United States and in California, Oregon, and Washington.

Plum or **Prune** (*Prunus domestica*). A small tree of the rose family, closely related to the cherry, peach, and apricot. It grows usually from 10 to 20 feet in height, and bears a profusion of white blossoms, which appear in early spring, before or with the oval, pointed leaves. The fruit is thick-fleshed, with a somewhat flattened, pointed stone and with a smooth skin covered with a whitish bloom. The plum or prune differs from the cherry in its larger size and oblong stone, and from the peach in its smaller size, smooth skin, and unwrinkled stone.

The plum is a native of southwestern Asia where it has been cultivated since ancient times. The Romans prized the fruit highly. It is now widely grown in temperate regions, and, in the United States, ranks next to the apple and peach as an orchard fruit. Among the best-known varieties are the damson, greengage, Lombard, and Burbank, and various kinds of prunes.

Commercially, the prune is by far the most important variety of the European or *domestica* plum. It contains so large an amount of sugar that the fruit may be dried in the open air without first removing the skins or stones. France, Spain, Turkey, Portugal, Germany, and Jugoslavia produce prunes as do also various parts of South America and Australia. Prune growing was introduced into California in 1856 and the first large orchard was planted at San Jose in 1870. The Pacific states now produce more prunes than the whole of Europe.

The Japanese plum (*P. triflora*), supposed to be a native of China, ranks next in importance to the European plum. It was introduced into the United States in 1870 and has become popular, especially in the South. Many of the orchard plums grown in the eastern United States are selected varieties of native American species, chiefly of the common wild plum (*P. americana*), the Canada wild plum (*P. nigra*), the wild goose plum (*P. hortulana*), and the Chickasaw plum (*P. angustifolia*). There are several other native species, including the beach plum (*P. maritima*), a small shrub found on or near sea beaches from New Brunswick to Virginia, and also the sand plum (*P. pumila*), of the Great Lakes region, a straggling shrub which sometimes grows prostrate, like a vine, on sandy or rocky shores. See *Cherry, Peach.*

Poison Ivy (*Rhus* or *Toxicodendron*). The name popularly given to several small shrubs of the sumac family, the entire herbage of which is more or less poisonous to the touch. They usually bear dark green, trifoliate leaves, small, greenish flowers, and a whitish, berry-like fruit.

The common poison ivy (*R. toxicodendron*) is found from Nova Scotia to British Columbia and south to Florida and Texas. When young, it is a low, woody plant but later becomes a high climbing vine. It bears dark green leaves composed of 3 ovate, entire or slightly toothed leaflets.

The Poison Oak (*R. quercifolia*), of the Southern States, is a small branching shrub, 3 feet high, with 3 somewhat hairy, lobed or deeply toothed leaflets. The Western Poison Oak (*R. obtusiloba*), common throughout California, usually an erect shrub, 4 to 5 feet high, has 3 roundish, variously lobed leaflets, similar to oak leaves but smaller.

The Poison Sumac, Poison Elder, or Poison Dogwood (*R. vernix*), a shrub or small tree, sometimes 25 feet high, grows in swamps throughout eastern North America. It has somewhat ashlike or elderlike, pinnate leaves, composed of from 7 to 13 smooth, pointed leaflets.

The foliage and other parts of each of the foregoing will cause the painful inflammation of the skin known as ivy poisoning. An efficient remedy is to bathe the affected parts with a 5 per cent solution of potassium permanganate. In order to prevent poisoning when one expects to be exposed to it, the skin should be washed with a strong solution of ferrous sulphate in water. The solution should be allowed to dry on the skin. See *Ground Ivy, Sumac, Virginia Creeper.*

Pomegranate (*pŏm'grăn'ăt; pŭm'-*) (*Punica granatum*). A thorny shrub or small tree of the myrtle family, native to western Asia. It bears glossy leaves, red, waxlike flowers, and a large, globular, yellow or rose-colored fruit. This is sometimes 5 inches in diameter, with a leathery rind enclosing numerous seeds, each separately encased in a juicy pulp. For its sweet or subacid fruit the pomegranate has been widely cultivated in warm regions throughout historic times. It is depicted in ancient Assyrian and Egyptian sculptures, and is believed to have been introduced into southern Europe by the Carthaginians. The pomegranate is sparingly grown in southern Florida, Texas, California, and tropical America.

Poplar (*Populus*). Large, fast-growing trees of the willow family. There are about 37 species, natives of the northern hemisphere. Of these, some 31 species and varieties grow in North America. While of little value for lumber, several species are used for pulp wood, for making woodenware, and are extensively planted for ornament.

The Aspen, or Quaking Asp (*P. tremuloides*), sometimes 100 feet high, with tremulous leaves, grows from the Arctic circle to Mexico, and from Labrador to California. It has a greater range than any other North American tree. The Large-toothed Aspen (*P. grandidentata*), 60 feet high, occurs in the eastern United States and Canada.

The Common Cottonwood, or necklace poplar (*P. deltoides*), sometimes 100 feet high, with a trunk diameter of 8 feet, grows from Quebec to Alberta and south to Florida and New Mexico. The Swamp Cottonwood (*P. heterophylla*), 80 or 90 feet high, with large downy leaves, abundant in the Gulf states, furnishes the lumber known as black poplar.

The balsam poplar, or Tacamahac (*P. tacamahacca*), 80 feet high, with very resinous buds, grows from Newfoundland to Oregon and northward to the Arctic circle. The Balm of Gilead (*P. candicans*), grown as a shade tree, is a cultivated variety of the balsam poplar. The Black Cottonwood (*P. trichocarpa*), often 200 feet high, with a trunk 8 feet in diameter, grows from Alaska to southern California. It is the largest broad-leaved tree native

to the Pacific coast of North America. The wood is much used for barrel staves and woodenware and for pulp.

The white poplar (*P. alba*), of the Old World, the black poplar (*P. nigra*), native of Asia, and the Lombardy poplar (*P. nigra*, var. *italica*), of southern Europe, are much planted for ornamental purposes. Most poplars have thick, handsome foliage, little subject to insect attack, and are very useful as quick-growing shade trees. However, as the penetrating, broomlike roots frequently destroy sewers, the planting of poplars in cities is often discouraged or forbidden

Poppy (*Papaver somniferum*). An annual, bristly herb of the poppy family, with large, showy, red, yellow, or white flowers. It is a native of the Mediterranean region, where it has been cultivated since remote antiquity, having been grown by the ancient Swiss Lake Dwellers and by the Greeks and Romans. Its seeds are used for food and for making poppy oil, used like olive oil. The dried sap is the source of opium from which morphine is obtained. Cultivation for the production of opium is very extensive in India, China, Turkey, and Egypt. In the United States the poppy is known chiefly as a garden flower.

Potato (*Solanum tuberosum*). A perennial plant of the potato family, native to the mountains of tropical America from Chile to Mexico. It grows from 1 to 3 feet high, with smooth, herbaceous stems and somewhat fleshy, divided leaves. At the top of the stems it bears white or purple flowers, about an inch wide, and a small, globular, purplish fruit or seed ball, about equal to a gooseberry in size. The plant produces, entirely distinct from the roots, numerous tubers or underground stems. These contain accumulations of starch which serve as food for the new plants which grow from the buds or eyes. Under cultivation the tubers become much enlarged, forming a staple article of food in temperate regions.

The potato was in wide cultivation from Chile to Colombia at the period of the Spanish conquest. It was introduced into Europe by the Spaniards early in the 16th century, into England by Sir Walter Raleigh in 1585, and into Virginia about the same date. Next to Indian corn, the potato is the most important contribution of the Americas to the food plants of the world.

The total annual production exceeds five billion bushels, Germany, Russia, Austria, France, Great Britain, and the United States being the chief producing countries.

Privet (*Ligustrum*). A genus of shrubs or small trees of the olive family. They have opposite, entire leaves and white flowers borne in terminal clusters. There are about 35 species, all found in the Old World. The common privet (*L. vulgare*), native to Europe and Asia and long cultivated for ornament, has become naturalized in the eastern United States. The so-called California privet (*L. ovalifolium*), native to Japan, is one of the best varieties for hedges.

Pumpkin (*Cucurbita pepo*). An annual vine of the gourd family with rough, slightly lobed leaves and large yellow flowers. It is a native of temperate North America and was in wide cultivation by the Indians at the period of earliest discovery by Europeans. The vine sometimes exceeds 20 feet in length and its fleshy, deep yellow fruit normally weighs from 15 to 40 pounds. It is planted extensively as a food for cattle and as a vegetable used in making pumpkin pies. A fixed oil, obtained from pumpkin seeds, is used in medicine for expelling tapeworms.

Quassia (*kwŏsh'i-ă*; *kwăsh'-*). A group of trees and shrubs of the ailanthus family, natives of warm regions. The extremely bitter root and wood of certain kinds, especially *Quassia amara* of tropical America, are used in medicine.

Quince (*Cydonia vulgaris*). A shrub or small tree of the rose family, closely allied to the apple. It has crooked branches and bears large, solitary white or pink flowers. The hard, acid fruit, which in appearance resembles a large yellow apple, cannot be eaten raw. It is, however, widely used in Europe and America for flavoring and for making preserves, marmalades, and jellies.

The quince is a native of Persia and has been in cultivation since a very ancient period, being mentioned in the writings of Plutarch and Pliny. It is a minor orchard fruit and is not grown in large quantities. The largest American orchards are located in western New York. See *Apple*, *Pear*.

Quinoa (*kē'nō-ă*) (*Chenopodium quinoa*). A small annual plant of the goosefoot family, closely related to the common lamb's quarters, or pigweed, of waysides and gardens. It is indigenous to Colombia and Peru, where it has been cultivated since ancient times for its seeds. When ground, these form a staple food used by the native peoples dwelling on the high Andean plateau.

Radish (*răd'ish*) (*Raphanus sativus*). A small annual or perennial plant of the mustard family, with lobed leaves and pink flowers. It is a native of temperate Asia and since very ancient times has been cultivated in gardens from China to Europe for its pungent, fleshy root, eaten raw as a relish. Mention is made of the radish in Chinese records dating back to about 1100 B. C. It is now in universal use as a table vegetable throughout the United States and is widely grown in many other countries. In California, the radish, like the mustard in the Eastern States, has become a common field and roadside weed.

Rafflesia (*ră-flē'zhĭ-ă*; *-zĭ-ă*). Remarkable parasitic plants of the East Indies, which attack various vines of the grape family. The only visible part of a rafflesia consists of a huge flower. A species native to Sumatra (*R. arnoldii*) bears a flower three feet in diameter, expanding from a mammoth bud that develops directly from the woody stem of the plant upon which the parasite lives. The flower has the appearance of decomposing flesh and exhales a carrion-like odor which attracts carrion insects. These bear pollen from one plant to another and thereby probably produce cross-fertilization.

Ramie (*răm'ē*) (*Bœhmeria nivea*). An East Indian shrub, 5 to 8 feet high, often called China grass, though it is not a grass but a nettle. Its erect stems furnish a valuable fiber which is stronger than hemp and nearly equal to silk in fineness, pliability, and luster. While experimentally grown in the United States, it is extensively produced only in India and in China. The fiber is highly esteemed for cordage, nets, various fabrics, and in making bank note paper. See *Hemp*, *Manila Hemp*, *Nettle*, *Olona*.

Raspberry, Black (*Rubus occidentalis*). A small, thorny shrub of the rose family, native to the eastern United States and Canada. It bears deep green, trifoliate leaves which are woolly whitened beneath, large white flowers, and a black, juicy, well flavored, somewhat cap-shaped berry. When ripe, this readily separates from the fruiting receptacle, whence the popular name "black cap." Since its introduction into cultivation in 1832, the black raspberry has become an important bush fruit of the United States, ranking third to the strawberry among the so-called small fruits. It is marketed fresh as a table fruit and is extensively canned and preserved. The yellow-fruited raspberry (*R. occidentalis*, forma *pallidus*) occurs wild.

Raspberry, Red (*Rubus idæus*). A small, prickly shrub of the rose family, native to northern Europe and Asia. It has been long and extensively cultivated in Europe for its excellent fruit, but as

yet is rather sparingly grown in the United States. A variety of the native American red raspberry (*R. strigosus*), almost equal in quality and somewhat hardier, is the form most cultivated in America. It is highly prized for making jams and preserves.

Red Snow (*Sphærella nivalis*). A microscopic, one-celled plant, belonging to the algæ, which forms crimson patches on the snow in arctic and alpine regions. The plant thus produces the so-called "red snow" noted by travelers in Greenland and various other frigid districts. See *Algæ*.

Reindeer Moss (*Cladonia rangiferina*). An erect branching lichen, a few inches in height, which covers vast areas of ground in arctic regions. It is the principal food of the reindeer, and forms pasturage for other arctic animals, such as the barren ground caribou and the muskox. In parts of Norway fresh, crisp reindeer moss is sometimes eaten as human food. See *Lichens*.

Resurrection Plant (*Anastatica hierochuntica*). A small herb of the mustard family, native to Arabia, called also Jericho rose. When the seeds have ripened and the foliage has become dry, the branches roll up so that the plant assumes a globular form. Upon being moistened, the branches and leaves unfold, become greenish, and assume for a time the appearance of the growing plant. Various mosslike selaginellas which display similar qualities are sometimes called resurrection plants.

Rhododendron. A large genus of trees and shrubs of the heath family, found in northern temperate regions. There are about 200 species, many of which are noted for their beautiful flowers and evergreen foliage. Several species, together with very numerous hybrids, are highly prized in cultivation.

The great rhododendron (*R. maximum*), called also great laurel and rose bay, and the similarly handsome Mountain Rose Bay (*R. catawbiense*) are abundant in the Allegheny and the Appalachian region. They have large, dark green, shining leaves, and umbellate clusters of pale red or white blossoms, spotted with red or yellow. The great rhododendron, which has been adopted as the floral emblem of West Virginia, is often cultivated, as is also the mountain rose bay.

The western rhododendron (*R. californicum*) is an elegant shrub, 6 to 10 feet high, with shining, leathery leaves, sometimes 6 inches long, and beautiful rose-colored flowers. It grows in open woods from British Columbia to California and is the state flower of Washington. See *Azalea*.

Rhubarb (*Rheum rhaponticum*). A fleshy perennial of the buckwheat family, native to China, commonly called pieplant or wine plant. It has very thick rootstocks from which rise large heart-shaped leaves on flattened, fleshy leafstalks, from 1 to 3 feet long. Rhubarb has been long and extensively cultivated in the Old World as a vegetable, as an ornamental foliage plant, and for the medicinal properties of the root. In the United States it is grown chiefly for its acid leafstalks which are stewed for sauces and pies, made into preserves, and sometimes used in making rhubarb wine.

Rice (*Oryza sativa*). An annual plant of the grass family, 2 to 5 feet high. It is a native of India and has been cultivated since remote antiquity as a cereal grain. Rice is mentioned in Chinese records dating back to about 2800 B. C. It is grown in immense quantities in southeastern Asia, where it affords sustenance to about a third of the human race. Rice is also produced in many other warm and moist regions. Usually, rice is produced only where the land can be flooded during the growing season, but in some districts flooding is not required.

In the United States the cultivation of rice began in the Carolinas about 1700. It is now a crop of importance in Louisiana, Texas, Arkansas, California, Hawaii, and the Philippines. Canada rice (*Zizania aquatica*), the wild rice of North American swamps, while producing a grain of good quality, is not adapted for cultivation. It is, however, important as food for wild ducks. See *Cereals, Grasses*.

Rose (*Rosa*). Erect or climbing shrubs with prickly stems, pinnate leaves, and large, handsome, usually fragrant flowers, which vary in color from red to pink, yellow, and white. There are numerous wild species, all natives of the northern hemisphere, many of which have been long cultivated.

Centuries of floriculture have developed an immense number of varieties which are widely grown in temperate regions. Many of these are greatly prized for their remarkable beauty of form and color and for their delicate fragrance, especially in Europe and America. Just as the chrysanthemum is the favorite flower of the Orient, the rose holds the place of highest esteem in the Western world. It is the most important of cultivated flowers, and is probably grown in more gardens than any other plant. Except for ornamental purposes, roses are of slight commercial importance. The fruit of some varieties is made into preserves, and attar of roses, used in perfumery, and rose water are made from the flowers.

There are two chief groups of cultivated roses,—those which flower but once a year, usually early in summer, sometimes called early roses, and those which bloom more than once, including the perpetual, summer, and autumn roses. Among the summer-flowering roses are the brier, evergreen, damask, French, multiflora, alba, and Provence roses. Among the perpetual varieties are the tea, moss, musk, Bourbon, China, Ayrshire, hybrid tea, hybrid perpetual, and perpetual brier roses. Popular florists' varieties, used for cut flowers, are the red American beauty, the crimson liberty, the cherry-red Ulrich Brunner, the yellow pearl of the garden, the white bride, and the pink bridesmaid roses.

Some 20 species of wild roses grow in North America. The prairie rose (*R. setigera*) has climbing stems, leaves of 3 leaflets, and rose-pink flowers which soon turn white. It is found native from Ontario to Wisconsin and south to Florida and Texas, and is naturalized as far east as Connecticut. The prickly rose (*R. acicularis*), with very spiny stems, leaves of from 5 to 9 leaflets, and large solitary flowers, grows from Quebec to Alaska and south to Colorado. The smooth rose (*R. blanda*), usually lacking prickles, with flowers 3 inches broad, grows from Newfoundland to Saskatchewan and south to New Jersey and Missouri. In its range it is usually the most common wild rose.

The pasture rose (*R. virginiana*), sometimes 6 feet high, with slender spines, few or solitary flowers, which are sometimes double, is found from Newfoundland to Wisconsin and south to Louisiana. It is the commonest wild rose of the eastern United States and Canada. The swamp rose (*R. carolina*), sometimes 8 feet high, with stout recurved spines and clustered flowers, occurs from Nova Scotia to Minnesota and south to Florida and Mississippi. The California rose (*R. californica*), 3 to 5 feet high, sparsely prickled, with flowers in terminal clusters, often forms thickets along creeks on the Pacific coast.

The Cherokee rose (*R. sinica* or *R. lævigata*) is a native of China and Japan now widely cultivated in mild climates. In the southern United States this rose has become thoroughly naturalized, often running wild along roadsides. It is a handsome, high-climbing species, with slender, prickly branches, smooth, shining leaves, usually of 3 leaflets, and large, solitary, white or rarely rose-colored flowers.

Rose Family (*Rosaceæ*). A large natural group of herbs, shrubs, and trees, comprising about 1800 species, very widely distributed throughout the world. It contains many of the most valuable fruits and a large number of the most highly prized

flowering plants, ornamental shrubs, and trees in cultivation. The list of fruits belonging to this family includes the almond, apple, apricot, nectarine, peach, pear, plum, quince, blackberry, loganberry, raspberry, and strawberry. The list of ornamental plants contains the flowering almond, cherry laurel, mountain ash, hawthorn, medlar, and innumerable kinds of roses.

Some authorities regard this large group as comprising three plant families, namely, the apple family (*Malaceæ* or *Pomaceæ*), the peach family (*Amygdalaceæ*, *Drupaceæ*, or *Prunaceæ*), and the rose family proper (*Rosaceæ*). In this division the apple family consists of trees or shrubs which produce a pome fruit, such as the apple, crab apple, pear, mountain ash, and hawthorn. The peach family consists of trees or shrubs which produce a stone fruit, such as the peach, cherry, and plum. The rose family, as thus restricted, comprises herbs, shrubs, or trees which usually produce dry fruits, though some of these fruits are modified into berries, as the blackberry, raspberry, and strawberry, and into fleshy hips, as in case of the rose.

Rubber Tree (*Hevea braziliensis*). A tree of the spurge family, with leaves of three leaflets, small greenish flowers, and capsular, three-sided fruits. It is native to the Amazon valley and is now extensively cultivated in various tropical regions. From the dried milky juice, or latex, of this tree, the finest grades of Pará rubber are produced. This juice is not the true sap, but a secretion which does not seem to be necessary to the life of the plant. The rubber tree widely grown as an ornamental house plant is an East Indian species of fig (*Ficus elastica*). This tree is an important source of rubber in southeastern Asia. See *Rubber*.

Rye (*Secale cereale*). An annual plant of the grass family, native to northeastern Europe. It is the least ancient of the important cereals. This grain was unknown to the ancient Greeks and Romans, but probably was cultivated north of the Danube before the beginning of the Christian era.

Rye is the hardiest of the cereals, withstanding a wide range of climatic conditions. Besides its cultivation as a food crop, it is sometimes grown as a cover crop and for green manuring. The long, smooth, flexible straw is used in making hats, mats, and paper, for stuffing mattresses and horse collars, and for various packing purposes. In Europe, rye straw is used for thatching houses.

As a food, rye is less nutritious than wheat but superior to barley. It is the chief ingredient in the black bread which is a staple food of northern Europe. In the United States, rye flour is mixed with wheat flour in making rye bread. Among the cereals rye stands fifth, being outranked by wheat, corn, rice, and oats. Russia produces about half of the world's crop of rye, and Germany and Austria grow most of the remainder. See *Cereals*, *Grasses*.

Sagebrush. The name given to various shrubby species of *Artemisia*, of the composite family, native to the plateau regions of the Rocky mountains and westward. They have somewhat hoary leaves, contain a bitter juice, and emit a sagelike odor. The common sagebrush (*A. tridentata*) usually grows from 2 to 5 feet high but sometimes reaches 12 feet. The small, silvery, wedge-shaped leaves are mostly three-toothed at the upper end. This shrub is immensely abundant on high, dry plains, being especially so in Nevada, which is called the sagebrush state. Unlike the greasewood and other shrubs characteristic of alkaline plains, sagebrush usually grows on fertile soils, needing only sufficient water to insure crop production.

Saguaro (*sä-gwä'rō*) (*Carnegia gigantea*), called also suwarro, giant cactus, or monument cactus. A columnar tree of the cactus family, 15 to 60 or more feet high, with a stout woody trunk attaining a diameter of 2 feet, sometimes unbranched, when it has the appearance of a fluted column. Usually there are 2 or 3 candelabra-like branches above the middle; more rarely there are many branches which rise like organ pipes from near the base. There are no foliage leaves, the ribbed green bark functioning in their stead. Large white flowers are borne along the ribs of the stem. These are followed by crimson, edible fruit.

The saguaro is one of the most remarkable trees in America, its singular appearance making it an extraordinary feature in the desert landscapes of southern Arizona and Sonora, Mexico. It is found also in limited areas in southeastern California. See *Cactus*.

Salad Plants. Vegetables whose green parts are used raw as articles of human food. There are three groups, the piquant or warm, the bitter, and the neutral salads. The piquant salads include cress, nasturtium, water cress, and mustard. With the bitter salads are grouped endive, chicory, dandelion, celery, and lettuce. The neutral salads include corn salad and bland forms of lettuce.

Sandalwood (*Santalum album*). A small tree of the sandalwood family, native of India. It is much prized for its close-grained, persistently fragrant wood, extensively used for making chests, boxes, and small ornamental articles. Various somewhat similar woods are also called sandalwood.

Sand Lily (*Leucocrinum montanum*). A small stemless plant of the lily family, with long narrow leaves and delicate white flowers, somewhat resembling those of the narcissus. It is abundant on high plains and foothills of the Rocky Mountain region.

Sapodilla (*săp'ô-dĭl'ȧ*) (*Achras sapota*). A large evergreen tree of the sapodilla family, with hard, reddish, durable wood and evergreen foliage. It is a native of Central America and tropical South America, where it was in wide cultivation for its luscious, apple-shaped fruit at the time of the Spanish discovery. It is now much grown in other tropical regions. The tree also yields chicle, extensively used for making chewing gum.

Sassafras. Handsome trees of the laurel family, with aromatic foliage and bark. There are only two known species, one North American, the other Asiatic. The sassafras or Ague Tree (*S. variifolium*), usually a shrub or a small tree from 20 to 50 feet high, sometimes attains a height of 125 feet and a trunk diameter of 7 feet. It has a rough bark, entire, mitten-shaped, or three-lobed leaves, all forms of which are often borne upon the same twig, and yellow flowers followed by small dark blue fruit. Sassafras grows in sandy soil from Maine to Michigan and Kansas and southward to Florida and Texas. The fleshy, pungent bark of the root, used in household medicine for making sassafras tea, yields the oil of sassafras employed in flavoring and in perfumery. See *Spicebush*.

Seed Dispersal. The dispersal of seeds is accomplished by four chief agencies: wind, mechanical propulsion, animals, and water. Seeds scattered by the wind include those with fluffy tufts, such as the dandelion or thistle; winged seeds, as the maple and elm; and the tumbleweeds, the stem and branches of which may be rolled along by the wind. The touch-me-not and many other pod-bearing plants scatter their seeds mechanically when the dry pod bursts. Others, such as the burdock, attach themselves to animals by hooks and other clinging devices. Many adhere with mud to the feet of wading birds and may thus be conveyed thousands of miles. Water is instrumental in dispersing many seeds having structures adapted for floating. Walnuts, for example, are frequently carried by streams, and coconuts drift over great expanses of water.

Seed Plants (*Spermatophyta*). The highest of the four great primary divisions of the plant kingdom. They differ from the other groups by the production of seeds. The seed plants, called also spermatophytes, are grouped in two distinct divisions of very unequal size,—the Angiosperms,

which produce seeds inclosed in vessels or seed cases, and the Gymnosperms, which produce naked seeds.

The angiosperms embrace the true flowering plants, characterized by the ordinary conspicuous flower. There are about 140,000 known species of angiosperms. These comprise most of the conspicuous vegetation of the world. They are divided into two very distinct groups, Dicotyledons and Monocotyledons.

Dicotyledons have two or more seed leaves or cotyledons in the seed, net-veined leaves, five- or four-parted flowers, and wood fibers arranged in a ring around the pith. Examples are the common trees, such as the oak, elm, and maple, and familiar herbaceous plants, such as buttercups, roses, peas, violets, mints, and sunflowers.

Monocotyledons have one seed leaf or cotyledon in the seed, parallel-veined leaves, three-parted flowers, and wood fibers scattered throughout the pith. Typical monocotyledons are the pondweeds, aroids, grasses, palms, orchids, and lilies.

The gymnosperms, which number about 500 living species, include the conifers, the cycads, the gnetums, and the ginkgo.

Sego Lily (*Calochortus nuttallii*). A small plant of the lily family, closely allied to the tulip. It has a slender stem springing from a coated bulb, narrow leaves, and strikingly beautiful white flowers streaked with lilac and variously dotted with yellow and purple. It grows in dry soil from South Dakota to New Mexico and west to California and Washington. The early followers of Brigham Young are said to have regarded the edible roots of this plant much as the Jews looked upon the manna which saved them from starvation in the wilderness. The sego lily has figured largely in the history of the Mormon Church in Utah, where it has been formally adopted as the state flower.

Sensitive Plants. Certain species of mimosa, with finely divided leaves, whose leaflets, when lightly touched, fold together in pairs. Upon ruder treatment many nearby leaflets similarly fall together, and, in a short time, the leafstalk itself droops, so that the entire leaf has a withered appearance. If left at rest, the leafstalk soon rises and the leaflets again unfold. The sensitive pea (*Cassia nictitans*), which grows from Maine to Kansas and Texas, and the sensitive brier (*Schrankia uncinata*), of the Southern states, also exhibit similar behavior.

Sequoia (*sē-kwoi'ä*). A genus of mammoth evergreen trees of the pine family. They have immense columnar trunks which bear short branches near the top, small oval cones, exceedingly thick bark, and extraordinarily durable, light, reddish wood. There are only two living species, both of imposing stature and narrow geographic range.

The California Big Tree (*Sequoia gigantea* or *S. washingtoniana*) grows in limited areas, or groves, some 26 in number. These are found along the western slope of the Sierra Nevada, at 5000 to 8000 feet altitude, from Placer county to Tulare county, a distance of about 250 miles. Mature trees are about 275 feet high and from 30 to 35 feet in diameter at the flaring, buttressed base, above which the diameter is about 25 feet. The largest standing specimen measures 325 feet in height. A shattered fallen tree, known as the "Father of the Forest," is estimated to have been more than 400 feet high. The red-brown, fibrous bark is from 1 to 2 feet thick. While fanciful estimates of much greater longevity have been made, lumbered specimens show annual rings indicating an age of from 1100 to 2400 years. Although soft and coarse-grained, the reddish wood is extensively made into lumber on account of its remarkable lasting qualities.

The California Redwood (*Sequoia sempervirens*) is a similar but more slender tree. It attains a height of from 200 to 340 feet, with a trunk diameter of 10 to 15 feet, rarely 28 feet, at the thickened base. This tree grows only within the summer fog belt near the ocean from the vicinity of Monterey, California, to the southern borders of Oregon, in an area about 450 miles long and from 1 to 40 miles wide. The age of mature trees is from 500 to 1300 years. This redwood is of great value as a timber tree. The light, soft, straight-grained wood, free from resin and remarkably durable, is suitable for an immense variety of uses, from shingles to interior finishing lumber.

The scientific name *Sequoia* was given in honor of Sequoyah, the noted Indian chief who invented the Cherokee alphabet. See *Big Trees*.

Serviceberry (*Amelanchier*). A genus of shrubs or trees, natives of north temperate regions, closely related to the apple. There are about 25 species, chiefly North American. The best-known is the American serviceberry (*A. canadensis*), called also shadbush and juneberry, found in dry woodlands from Nova Scotia to Minnesota and southward to Florida and Louisiana. It is a medium-sized tree, often cultivated for its early flowers. These appear usually about the time of the shad runs. The sweet, reddish purple fruits vary in size—some being as small as currants while others are as large as cherries. Tool handles and parts of machines are often made of the hard, brown wood.

Sesame (*sĕs'ä-mē*) (*Sesamum indicum*). An annual hairy herb of the pedalium family. It is a native of the Sunda islands, where it has been cultivated since ancient times for its oil-bearing seeds. Sesame was introduced into India about 1000 B.C., into Egypt about 500 B.C., and is now widely grown in many tropical countries. The bland, long-keeping oil obtained from its seeds is used for food, like olive oil, and as a cosmetic. The Hindus make a highly nutritious meal from the parched and ground seeds.

Shamrock. A species of hop clover (*Trifolium minus*) is generally regarded as the true shamrock, or national floral emblem of Ireland. Various other plants with small leaves divided into three leaflets, such as the white clover (*Trifolium repens*), the bird's-foot clover (*Lotus corniculatus*), and the wood sorrel (*Oxalis*), are associated with the national badge. It is said that St. Patrick made use of the shamrock to illustrate the doctrine of the Trinity.

Sisal (*Agave sisalina*). A fleshy-leaved perennial of the amaryllis family, closely related to the century plant, native to tropical America. It has long been cultivated in Mexico for its fiber, which is second only to manila hemp in quality. Large quantities are now grown in Yucatan for export to the United States. It is extensively made into binding twine used in harvesting grain, and into various kinds of cordage, coarse cloth, and bags. See *Century Plant*, *Flax*, *Hemp*, *Manila Hemp*, *Olona*, *Ramie*.

Soap Plants. Various plants, belonging to many different families, which contain the poisonous principle, *saponin*. The bruised stems, bark, roots, leaves, or fruits of such plants form a lather in water and may be used like soap for cleansing purposes. Among these are the common soapwort or bouncing Bet (*Saponaria officinalis*), found along roadsides in Europe and America, and the somewhat similar cowherb (*Vaccaria*). The leaves and roots are the parts used for washing, but the reddish bark of the root sometimes stains white articles.

In the southwestern United States and adjoining parts of Mexico, several plants, called by the general name *amole*, are used for soap. Well-known examples are the small agave (*A. heteracantha*) and the soaproot (*Ornithogalum pomeridianum*). The latter plant, which belongs to the lily family, has a bulb from 1 to 4 inches in diameter, which is the part used for cleansing. In California the Indians throw the finely pounded bulb into small ponds,

stupefying the fish so that they may be easily captured. Among other western soap plants are the zygadene (*Zygadenus fremontii*) and the mountain lily (*Leucocrinum montanum*) which are used by the Indians, especially for washing the hair.

Sorghum Cane (*Sorghum saccharatum*). A tall annual of the grass family. It is a native of tropical Africa, cultivated since remote antiquity in Egypt, India, and China. Ages of husbandry have developed many valuable varieties, now widely grown throughout the world. These fall in two groups: (1) the *saccharine*, embracing the sorghum canes grown for making molasses and sirup and for fodder; (2) the *nonsaccharine*, including Kafir corn, durra, rice corn, Jerusalem corn, and broom corn, grown for grain, fodder, and broom fiber.

Spanish Moss (*Tillandsia usneoides*). A peculiar perching plant of the pineapple family, called also New Orleans moss. It has threadlike, grayish stems, covered with small scales, and small, solitary flowers. The plant hangs in festoons from various trees in the Southern States, especially from the live oak. From the fibery stems of the Spanish moss is obtained much of the so-called "hair" extensively employed in making mattresses and furniture. The stems of the plant are also widely used for packing.

Spicebush (*Benzoin æstivale*). A small, graceful shrub of the laurel family, closely related to the sassafras. The spicebush, called also feverbush, is common in moist woods in the eastern United States and Canada. It grows from 4 to 20 feet high, with fragrant twigs and foliage, and bears small, bright yellow flowers and scarlet berries. See *Sassafras*.

Spinach (*Spinacia oleracea*). A small, fleshy-leaved annual of the goosefoot family. It is a native of western Asia, and was anciently cultivated by the Medes and Persians. The plant was introduced into China about 150 B. C., and into Europe about the 15th century. It is now in wide and increasing use as a potherb.

The so-called New Zealand spinach (*Tetragonia expansa*) is a small annual of the carpetweed family, native to seacoasts of Australasia. This plant was first brought to England from New Zealand in 1771 by Captain Cook. It has proved valuable as a salad plant in dry, hot climates, and is sparingly grown in the United States.

Spiræa (*spī-rē'ä*). Handsome shrubs of the rose family, usually with small, finely toothed leaves and white or pink flowers borne in clusters. There are about 70 species, natives of north temperate regions, of which about 20 are North American. The Meadowsweet (*S. latifolia*), with white flowers, grows from Newfoundland to Saskatchewan and south to Virginia. The Hardhack (*S. tomentosa*), with woolly leaves and pink flowers, is frequent in swamps from Nova Scotia to Manitoba and south to Georgia. Several hardy foreign species with showy flowers, as, for example, the Bridal Wreath (*S. hypericifolia*), are very widely cultivated.

Spruce (*Picea*). A genus of evergreen coniferous trees with linear, four-sided, spreading leaves, and pendulous cones. There are about 18 species, natives of north temperate and subarctic regions. Eight of these are North American.

The white spruce (*P. canadensis* or *P. glauca*) sometimes attains a height of 150 feet and a trunk diameter of 4 feet. It grows from the northern limit of forests in Alaska southeastward to New York and Montana. This tree is highly valued for lumber and for pulp wood.

The Engelmann white spruce (*P. engelmanni*) often reaches a height of 150 feet and a trunk diameter of 5 feet. This species forms great forests from Alberta and British Columbia southward to New Mexico and Oregon. The wood is extensively used for ties and lumber.

The tideland or Sitka spruce (*P. sitchensis*), usually about 100 feet high, with a trunk 3 feet in diameter, occasionally grows 200 feet high, with a trunk 16 feet in diameter. This giant spruce occurs along the coast from Alaska to northern California. The wood is highly valued for lumber and during the World War was used extensively in making wings for airplanes.

The black spruce (*P. mariana*), commonly 20 to 30 feet high, grows sometimes 100 feet high. It is native to swamps from the Arctic circle southward to Alberta, Michigan, and North Carolina, attaining its largest size in Saskatchewan. This tree is the source of spruce gum, and the wood is used in making paper pulp.

The red spruce (*P. rubens*), usually about 80 feet high, grows from Nova Scotia south to North Carolina. It is used for lumber, sounding boards, and paper pulp. The blue spruce (*P. parryana*), 80 to 150 feet high, grows near streams on high mountains in Colorado, Utah, and Wyoming. Varieties with very blue foliage are widely planted for ornament in America and Europe, the Koster blue spruce being the most popular form.

The Norway spruce (*P. excelsa*) is a handsome, rapidly growing tree, sometimes 150 feet high, with large cones. It is the most important timber spruce of Europe and is widely planted for ornament in the eastern United States and Canada.

The demand for pulp wood has caused the denudation, in the northeastern United States and in the adjacent portions of Canada, of great areas that were formerly covered by dense spruce forests. See *Douglas Fir*.

Squash (*Cucurbita*). A tendril-bearing, vinelike plant, the large fleshy fruit of which is a much used garden vegetable. There are several species, natives of warm climates but widely grown as annuals in all temperate regions. They have large, rough leaves, on long, hollow, juicy stalks, and large yellow flowers. The hard fruits, which in structure are immense berries, occur in a great variety of forms and sizes.

The summer squashes (*C. pepo*) are usually varieties with small fruits, maturing early in the season. These include the scallop, called also "simlin" and "symbling" in southern markets, the pattypan, and the crookneck squashes. The winter squashes mature late in autumn, just before frost. If gathered when fully ripe and handled without bruising, they may be safely stored in dry, cool cellars for several months. The Canada crookneck (*C. moschata*), the China squash, and the cushaw squash belong to another important group.

Strawberry (*Fragaria*). A group of perennial trailing herbs of the rose family, natives of temperate regions, and extensively grown for their fruit. Strawberries are low-growing plants with slender runners which root at the joints, forming new plants. They have divided leaves of three-toothed leaflets, and white flowers. The numerous seeds (akenes) are borne on the surface of a red, greatly enlarged, fleshy receptacle. This fleshy portion forms the edible part of the fruit, the so-called berry.

Garden strawberries are mostly crosses or hybrid forms derived from three wild species,—the European strawberry (*F. vesca*), the American strawberry (*F. virginiana*), and the Chile strawberry (*F. chilensis*). Cultivation of the strawberry has been established in Europe for about 500 years. In America, the culture of this fruit dates from the introduction of Hovey's strawberry in 1834. Strawberries are now grown from Florida to Alaska, and constitute the leading small fruit crop of the United States.

Sugar Cane (*Saccharum officinarum*). A perennial of the grass family. It grows from 8 to 12 feet high, with many-jointed stems containing a sweet, juicy pith. The plant is now unknown in the wild state but is believed to have been a native

of the East Indies. Until the recent great development of the sugar beet, sugar cane was the only extensive source of sugar. Anciently cultivated in India, it was brought to Europe during the Crusades, and is now grown in all warm regions, especially in the East and West Indies, Brazil, Mexico, Hawaii, and Louisiana. The plant, which rarely bears seeds, is reproduced by cuttings. A plantation lasts from six to ten years. See *Grasses, Sorghum Cane, Sugar.*

Sumac (*sū'măk; shōō'măk*) (*Rhus*). A group of trees or shrubs of the sumac family, many of which are of commercial value. More than 100 species are found in temperate and warm regions, some 15 occurring in North America.

The staghorn sumac (*R. hirta*), of the eastern United States and Canada, with crooked branches, sometimes grows 40 feet high. The dried and powdered leaves were once used in tanning leather, as were both the leaves and bark of the mountain sumac (*R. copallina*) which grows from Maine to Minnesota and south to Florida and Texas. The smooth sumac (*R. glabra*), a small shrub, common from Minnesota eastward and southward, was also sometimes used in tanning.

Among the most important Old World sumacs are the Venetian sumac (*R. cotinus*), called also smoke tree, cultivated for its wood and leaves used in dyeing and tanning; the elm-leaved sumac (*R. coriaria*), valued for its very acid fruit, used as a condiment; the Japanese Varnish Tree (*R. vernicifera*), from which lacquer and candle oil are obtained, and the Australian sumac (*R. rhodanthema*), which yields a very highly prized cabinet wood. See *Poison Ivy.*

Sundew (*Drosera*). A genus of small insectivorous plants of the sundew family. About 85 species are known. Of these, 7 are North American. They are low, bog herbs with small leaves spread out around the base of the slender flower stem. This bears a one-sided cluster of small, usually whitish or pinkish flowers. The leaves are everywhere clothed with viscid, glandular hairs. When irritated, these sticky hairs fold up, entrapping insects and digesting them through the action of enzymes secreted by the plant. The glands of the leaves exude drops of a clear glutinous fluid. These glitter in the sunshine like dewdrops, whence the name sundew. See *Pitcher Plant, Venus's Flytrap.*

Sunflower (*Helianthus*). A genus of tall, mostly perennial herbs of the composite family, comprising some 60 species, nearly all native to the United States. These plants are so named because of their gorgeous flower heads which are encircled by long, bright yellow, petal-like rays. When blossoming, the flowers of some species turn toward the sun.

The common sunflower (*H. annuus*) is a robust annual, long cultivated as a food plant by the American Indians. It is now extensively grown in India, Egypt, and Russia for its oil-bearing seeds. In the United States, the sunflower, though often planted for ornament, is only sparingly grown for seed production and for green fodder.

The Jerusalem Artichoke (*H. tuberosus*), native to the Ohio valley, was formerly widely cultivated by the Indians. It is now grown for its immense tubers, which, in the United States, are used chiefly for feeding swine and, in France, for making alcohol.

Sweet Flag (*Acorus calamus*). An erect plant of the arum family, with long, aromatic rootstocks and sword-shaped leaves. It grows in swamps in Asia, Europe, and eastern North America. The pleasant-scented root is used in confectionery, in perfumery, and in medicine.

Sweet Gum (*Liquidambar styraciflua*). A tall forest tree allied to the witch-hazel family, called also red gum, star-leaved gum, liquidambar, bilsted, and alligator tree. It occurs from Connecticut to Missouri and south to Guatemala, and is remarkable for the fragrant balsam, or gum, it exudes. The wood is hard and takes a high polish but is liable to check and warp. As an ornamental tree the sweet gum has few superiors.

Sweet Pea (*Lathyrus odoratus*). A highly prized garden annual of the pea family, native to Europe. It has been cultivated since ancient times for its beautiful fragrant flowers. Centuries of garden culture have developed an immense variety of sweet peas, differing greatly in form, size, color, and fragrance.

Sweet Potato (*Ipomœa batatas*). A creeping perennial vine of the convolvulus family. It is closely related to the morning-glory and is highly prized for its sweet, edible root. The plant is unknown in the wild state and authorities are not agreed as to whether it was originally native to tropical America or to the East Indies. The sweet potato was anciently grown in China, was in cultivation in the West Indies before the Spanish discovery of America, and is now the most widely used vegetable in tropical and subtropical countries. In the United States it ranks next to the potato among root vegetables. It is an important crop in the South and is grown for home use as far north as New Jersey and southern New York.

Syringa (*sĭ-rĭng'gà*) (*Philadelphus*). Shrubs of the saxifrage family, called also mock orange. There are about 50 species, 25 of which occur in North America. They are mostly of medium size, 6 to 10 feet high, with simple, petioled, opposite leaves, and large, white, orange-like flowers.

The garden syringa (*P. coronarius*), a native of Europe, with sweet-scented, clustered flowers 1 to 1½ inches broad, is extensively planted for ornament in the eastern United States and Canada. The scentless syringa (*P. inodorus*), native of hilly thickets from Virginia to Mississippi, with odorless, usually solitary flowers about 1 inch broad, is widely planted as a garden shrub, as is also the large-leaved syringa (*P. grandifolia*), which grows wild from Virginia to Florida and Missouri. The western syringa (*P. lewisii*), a mountain species, 3 to 6 feet high, with reddish branches and flowers 1½ inches broad, grows on stream banks and hills from Montana and British Columbia to Oregon. This beautiful syringa has been chosen the state flower of Idaho. See *Lilac.*

Tallow Tree. The name given to various trees which yield an oily or resinous substance suitable for making candles and soap. Among the best-known is the Chinese tallow tree (*Sapium sebiferum*). By crushing and boiling the seeds a hard, white, vegetable tallow is obtained. Since time immemorial in China this substance has been a standard candle making material. The leaves yield a black dye and the stems produce a resin-like copal used in making varnishes. This handsome tree is now cultivated and somewhat naturalized in the Carolinas and the Gulf states. In China the wood is used for furniture and for printing blocks. See *Candleberry.*

Tamarind (*Tamarindus indica*). A handsome tree of the pea family, 70 to 80 feet high, native to India, now extensively cultivated in tropical countries for its fruit. It bears large seed pods which are filled with an acidulous juicy pulp, especially prized for making cooling drinks. The pods and also various preparations of the pulp with sugar or sirup are articles of commerce in many warm regions. In India the tree is grown not only for the fruit pulp but also for the astringent seeds, for the leaves which yield dyestuffs, and for the wood used as timber. The tamarind is grown to some extent in southern Florida where it has become sparingly naturalized.

Tangerine (*Citrus nobilis*). A small, hardy, early variety of the orange, derived from the mandarin orange. The fruit differs from the common orange in its flatter shape and very tender rind

which separates upon the slightest pressure. When fully ripe the tangerine has a peculiarly luscious flavor and a fine fragrance. Small quantities of tangerines are grown in Florida and California. See *Citrous Fruits, Orange.*

Taro (*tä'rō*) (*Colocasia antiquorum*). A perennial of the arum family, native to India and Polynesia. It has been cultivated since ancient times for its large tuberous roots, 12 to 16 inches long, which are a staple food in the Pacific islands. Taro reached China about 100 B. C. and has long been grown in India and Egypt. In Hawaii the cooked root is fermented, the resulting product being called poi. The young leaves are used as a potherb, like spinach or chard.

Tea (*Thea sinensis*). A small evergreen tree of the tea family, native to southeastern Asia. The young leaves of this plant, when properly gathered and cured, become the tea of commerce. In its natural state the tea tree grows sometimes 30 feet in height. It bears long, narrow, somewhat willow-like, leathery leaves and beautiful cream-white or rose-tinted flowers, followed by woody capsules or pods, each containing three round seeds.

To increase the leaf production, the tree is pruned to the form of a much branching shrub from 2 to 4 feet high. The first crop is ready to pick in the third year after planting, and the full crop, sometimes 400 pounds per acre, is established about 5 years after planting. The difference in color and taste between *green* and *black* teas is due to the mode of preparation. In making black tea the leaves are wilted and allowed to ferment before they are subjected to a firing or quick drying process. In making green tea the leaves, as soon as gathered, are withered by steaming in perforated pans, thus retaining the green color, and then are roasted in pans for five minutes. They are next dropped on bamboo mats and rolled by hand, after which they are dried quickly over charcoal fires. Old leaves are often deficient in color and are treated with prussian blue or indigo.

In China, the culture of the tea plant is prehistoric, being mentioned in records dating back to 2700 B. C. In Japan, tea culture dates from the early middle ages. In India and Ceylon, however, tea growing, which has become very extensive, was not begun until about 1870. Japan, including Formosa, produces the most tea; China ranks second in production; and India and Ceylon, third. Tea has been experimentally grown in South Carolina. It cannot, however, be profitably grown there, as American labor is much more highly paid than labor in tea growing countries.

The stimulant and tonic properties of tea are due to the presence of theine, an alkaloid identical in chemical composition with caffeine, the active principle in coffee, cocoa, and maté. Tea is used by a greater number of people than is any other beverage. China, Japan, England, Russia, the United States, Canada, and Australia are the leading tea consuming countries. In England several times as much tea as coffee is consumed; in the United States these proportions are reversed. See *Cacao, Camellia, Coffee, Maté.*

Teak (*Tectona grandis*). A valuable timber tree, belonging to the verbena family, native to southeastern Asia. It is a magnificent tree, sometimes 150 feet high and 8 feet in diameter, with large leaves 10 inches long, small, white flowers, and oily seeds encased in hard, bony nuts. The handsome, durable, golden brown wood is so heavy that it sinks in water unless well seasoned. It somewhat resembles mahogany to which it ranks next in market value among commercial hard woods. Teak is extensively used for furniture, wood carving, house building, and shipbuilding. While the immense natural forests have been largely exhausted, teak plantations under British governmental protection have been established in India and Burma.

Tea Oil Tree (*Thea sasanqua*). A small tree of the tea family, native to China, where it is extensively cultivated. The oil pressed from its seeds is widely used in Chinese cookery. The seed cake remaining after the removal of the wholesome, edible oil, contains the poisonous principle, saponin. As this lathers water, the seed cake is used as a mild soap for washing delicate fabrics. When the bruised seeds or seed cakes are thrown into fish ponds or rivers, the poisonous saponin stupefies fish, so that they rise to the surface and are readily caught. Gardeners' varieties of this beautiful tree are planted for ornament in the United States. By horticulturists, the tea oil tree and several other species of *Thea*, now in extensive cultivation, are commonly known as camellias. See *Camellia.*

Thistle. The common name for various prickly or spiny plants of the composite family, many of which are widely distributed as weeds. Of these, the Canada thistle (*Cirsium arvensis*), native of Europe, is one of the most troublesome. The milk thistle (*Silybum marianum*) is a coarse biennial now found from the Atlantic to the Pacific. The white-blotched leaves are sometimes used as a salad or boiled as a potherb. The Scotch thistle (*Onopordon acanthium*), with cottony or woolly leaves, common in the Atlantic states, is said to be the emblem of Scotland. The blessed thistle (*Cnicus benedictus*), with yellow flowers, native of Asia, formerly of high repute for medicinal purposes, has become established in the United States.

Besides the foregoing introduced kinds, there are many native species, such as the common pasture or bull thistle and the tall swamp thistle, which rarely, if ever, become abundant as weeds.

The so-called Russian thistle (*Salsola pestiver*), known also as tumbleweed, is very injurious to crops in the plains region of the United States and Canada. It is a spiny-leaved annual of the goosefoot family, closely related to the pigweeds.

Timothy Grass (*Phleum pratense*). A valuable cultivated grass, native to Europe, sometimes called cat's-tail. It has an erect, slender stem, from 1 to 3 feet high. This bears at the top a dense, cylindrical spike of closely packed flowers, resembling in form that of the common cat-tail of the marshes, but much smaller. This grass was named for Timothy Hanson, who is said to have brought the seed into the Carolinas about 1720. It is often planted with clover and now forms an important part of the hay crop of the eastern United States and Canada.

Tobacco (*Nicotiana tabacum*). A large-leaved annual of the potato family. It is a native of the Peruvian region, now extensively cultivated in many parts of the world. The plant grows from 2 to 5 feet in height, has ovate or lanceolate, pointed leaves, 1 to 3½ feet long, and bears clusters of showy, white or pink, tubular flowers. The leaves, after being prepared by drying and various curing and manufacturing processes, are used for smoking, chewing, and as snuff. Usually the leaves are dried separately or on the stalk, tied in bundles, and placed together in heaps to induce the fermentation by which the various aromas and flavors are developed.

Tobacco for smoking has been in almost universal use among the Indians since ancient times. Tobacco pipes, which are abundant in Aztec tombs, are found also in the remains of the Mound Builders. Tobacco was introduced into France in 1559 by Jean Nicot, whence the scientific name of the plant, *Nicotiana*, and the name of its active principle, *nicotine*. In 1585 Sir Francis Drake took tobacco to England, where Sir Walter Raleigh soon after made pipe smoking fashionable. In America, tobacco culture began with the earliest settlement of Virginia.

The United States is the chief tobacco raising country, producing over a third of the world's crop. Cuba produces the best cigar tobacco, though most

Havana cigars are made in Florida by Cubans from raw material imported from the island.

Tomato (*tō-mā'tō*; *tō-mä'tō*) (*Lycopersicon esculentum*). An annual plant of the potato family, native to the Andean region. The fleshy, acidulous fruit is highly prized as a vegetable. Varieties were in cultivation in Peru at the time of the Spanish discovery of that country. The tomato was formerly called the love apple and was long regarded as poisonous. It is now widely cultivated in temperate regions and is grown more extensively than any other vegetable for canning.

Trumpet Vine (*Bignonia radicans*). A climbing shrubby vine of the bignonia family, native to the southern United States. It sometimes grows 40 feet in length, has pinnate leaves, and bears scarlet or orange-yellow, trumpet-shaped flowers 2½ inches long. These are followed by fruiting pods 6 inches long, containing winged seeds. The trumpet vine is highly prized in cultivation, and has been adopted as the state flower of Kentucky.

Tulip (*Tulipa*). Hardy, bulbous, early blooming plants of the lily family. They have broad leaves and large, solitary, brilliantly colored flowers. There are about 45 species, natives of Asia and southern Europe. Most cultivated varieties have been derived from a West Asian species (*T. gesneriana*) which was brought to Germany by Gesner in 1559. Nearly 2000 varieties, presenting an immense range of forms and colors, are now catalogued.

Tulip Tree (*Liriodendron tulipifera*). A handsome and valuable tree of the magnolia family, known also as yellow poplar and whitewood. Its columnar trunk attains a height of 60 to 190 feet and a maximum diameter of 10 feet. It bears large, smooth, more or less deeply lobed leaves, and showy, tulip-like, greenish yellow flowers, about 2 inches deep and orange colored within. The fruit, a dry light brown cone, some 3 inches long, sheds its winged seeds in the autumn. This tree, now widely planted for ornament, grows native in rich soil from New England to Lake Michigan and southward to Florida and Louisiana. The soft yellowish wood is much used for cabinet making and interior finish. In Indiana the tulip tree is the state flower.

Tumbleweeds. Various annuals, abundant in prairie regions, which scatter their seeds when the dry matured plants, after being uprooted, are rolled or tumbled from field to field by the wind. Among these are the Russian thistle, the tumbling pigweed, the winged pigweed, and the bugseed.

Tupelo (*tū'pē-lō*) (*Nyssa*). A genus of large trees or, rarely, shrubs of the dogwood family, natives of America and Asia. Seven species are known, four occurring in the United States.

The Water Gum (*N. biflora*), known also as water tupelo and black gum, is a swamp tree growing near the coast from New Jersey to Louisiana. Its maximum height, 120 feet, is attained in southern Louisiana. The yellowish white wood, though soft, is very tough and difficult to split on account of its twisted grain.

The Black Gum (*N. sylvatica*), called also tupelo gum, sour gum, yellow gum, pepperidge, and stinkwood, is found in rich swampy soil from Maine to Ontario and southward to Texas and Florida. In the mountain regions of Georgia and Tennessee it reaches a height of 110 feet with a trunk diameter of 4 feet. This tree is esteemed for ornamental planting, but it requires moist land.

Tupelo Gum (*N. aquatica*), a swamp-loving tree, called also cotton tupelo, ranges from Virginia to Florida and westward to Texas. It attains a maximum height of about 100 feet and a trunk diameter of 4 feet. The wood is used for crates and boxes.

The Ogeechee Lime (*N. ogeche*), called also Ogeechee plum, gopher plum, and sour tupelo, is a slender tree inhabiting swamps in South Carolina and Florida. It occasionally attains a height of 60 feet, with a trunk diameter of 2 feet. The fruits, which resemble olives in size and shape, are bright red, thick fleshed, juicy, and sour. They are sometimes preserved in sugar. The wood is coarse-grained and weak, but difficult to split.

Turnip (*Brassica rapa*). A biennial plant of the mustard family, very closely related to the cabbage. It has a flattened, white-fleshed root, crowned with a close tuft of hairy leaves. During the second season, a flowering stem, a foot or more high, rises from the center of the leaves. This bears yellow, mustard-like flowers and tiny seeds. The wholesome, edible root is widely used in cool countries as a spring and autumn vegetable and also for feeding dairy cattle and other live stock.

The Swedish turnip, or rutabaga (*B. campestris*), has a somewhat globular, yellow-fleshed root with a more or less elongated neck, bearing smooth, cabbage-like leaves. It is extensively grown in northern regions as a winter vegetable and as a stock food.

Both the common turnip and the rutabaga are believed to be natives of eastern Europe or western Asia, where they have been cultivated since prehistoric times.

Upas (*ū'pas*) **Tree** (*Antiaris toxicaria*). A tree of the mulberry family, native to Java, the Philippine Islands, and adjoining regions. The intensely poisonous, milky juice is used by the Malays for tipping arrows. According to a widely repeated myth, there is a poison-vale in Java in which the exhalations from the upas trees are so virulent as to destroy all animal life. It is now believed that the presence of noxious gases in volcanic valleys on the island caused the destruction long wrongly ascribed to the upas tree. The name is given also to a Javan tree or shrub (*Strychnos tiente*) of the logania family, the sap of which is used by the natives of the East Indies as arrow poison.

Vanilla. A robust, high-climbing orchid, native to the tropics. It has bright green, fleshy leaves, large, fragrant, greenish white flowers, and a pod-like fruit, opening along the side. The slender, bean-like pods, about 8 inches long, contain a sweet, aromatic, oily pulp and small black seeds. From these fruits, after careful drying, is extracted the vanilla widely used in flavoring and in perfumery. The vanilla of commerce is obtained chiefly from *Vanilla planifolia*, found wild from Mexico to Peru and cultivated in many tropical countries. See *Orchids*.

Venus's Flytrap (*Dionæa muscipula*). A remarkable insectivorous plant of the sundew family. It grows wild only in the sandy savannas of North Carolina. The plant bears a slender scape of white flowers. This flowering stem is encircled at the base with hairy, traplike leaves which close suddenly upon insects alighting on them. By means of secretions from the glandular surface of the leaf, portions of the insects thus caught are assimilated as food. This process requires about 14 days, after which the hinged, jawlike portion of the leaf reopens and is ready to capture another insect. After functioning in this manner a few times, the leaf withers and dies. See *Pitcher Plant*, *Sundew*.

Verbena. A genus of herbs or sometimes shrubs of the vervain family. They have mostly opposite leaves and variously colored flowers. There are about 100 species. With the exception of one species found in Europe, all the verbenas are natives of the New World. Of these, more than 20 occur wild in the United States and Canada. Many coarser-leaved kinds, with narrow spikes of small flowers, usually called vervain, are common weeds. The large-flowered kinds have many handsome representatives in cultivation. The sweet-scented verbena (*V. teucrioides*), native to Brazil, is widely grown for its pinkish white flowers, which are fragrant at night.

Viburnum (*vī-bûr'nŭm*). A large genus of shrubs or trees of the honeysuckle family. They have entire, toothed or lobed leaves, and white, or rarely pink, flowers in dense compound clusters. There are about 100 species, widely distributed throughout the world, comprising many beautiful shrubs cultivated for ornament.

Some 20 species are found in the United States and Canada. Among the best known are the high Bush Cranberry (*V. opulus*), which grows across the continent, and also in Europe and Asia. The red, edible, acid fruit somewhat resembles the cranberry. The Snowball or Guelder Rose of the gardens is a cultivated form with large globular clusters of sterile flowers. The sweet viburnum, called also nannyberry, or wild raisin (*V. lentago*), is a handsome shrub or small tree. It bears beautiful, fragrant flowers, and bluish black, sweet, edible fruit. This species is found from Quebec to Saskatchewan and southward to Georgia, Kansas, and Colorado. The very similar Black Haw (*V. prunifolium*) has a more southern range.

The Wayfaring Tree (*V. lantana*), of Europe, is often cultivated in America. The very similar Hobblebush, or Witch Hobble (*V. alnifolium*), with large round leaves, grows from New Brunswick to Michigan and southward. The Dockmackie (*V. acerifolium*), the Arrowwood (*V. dentatum*), and the Witherod (*V. cassinoides*), of similar range to hobblebush, are handsome shrubs. The Laurustinus (*V. tinus*), prized by the ancient Romans, is a highly valued ornamental plant, suitable for hedges. It is widely grown in California and other mild climates.

Violet (*Viola*). Small herbs of the violet family, which bear delicately beautiful flowers that appear in early spring. In many species, these showy blossoms are succeeded later by inconspicuous flowers which never open, but which produce abundant seeds. In color the flowers range from pure white to various shades of yellow, blue, violet, pink, or purple, and are often variously streaked or tinted. There are two chief groups,—the leafy-stemmed violets and the stemless violets.

Violets usually grow in moist situations and are among the best known and most highly prized plants of our native flora. Many kinds are planted in gardens, and two species, the Pansy (*V. tricolor*) and the sweet violet (*V. odorata*), both natives of the Old World, are very extensively cultivated. The bird's-foot violet (*V. pedata*), which grows wild from Massachusetts to Minnesota and south to Florida and Louisiana, is the parent of several handsome garden varieties.

The early blue violet (*V. palmata*) is the wild okra of the Southern states. Its mucilaginous leaves are largely used by the colored population in making soups.

There are about 200 species of violets, widely distributed throughout the world. Of these, about 75 species are native to North America, nearly 50 being found wild in the northeastern United States and Canada.

Virginia Creeper (*Psedera quinquefolia* long known as *Ampelopsis quinquefolia*). A handsome, woody vine of the grape family. It has climbing or trailing stems, large, palmately divided leaves, and dark blue, berry-like fruit. It grows wild from Quebec to Saskatchewan and southward to Cuba and Mexico, and is often planted for ornament. The Virginia creeper is sometimes wrongly called woodbine and is often mistaken for poison ivy. From the latter it is easily distinguished by observing the leaves. The leaves of the poison ivy consist of *three* leaflets, while the leaves of the Virginia creeper have *five* leaflets. See *Poison Ivy*.

Wahoo (*wä-hōō'*; *wä'hōō*) (*Euonymus atropurpureus*). A shrub or small tree of the staff-tree family, 6 to 25 feet high, called also burning bush or spindle tree. This tree grows in woodlands from Ontario to Florida and westward to Oklahoma and Nebraska. It bears clusters of small purple flowers, followed by deeply lobed fruiting arils which enclose the seeds. The bright red fruit, which persists after the leaves have fallen, is used for winter decoration. See *Climbing Bittersweet*.

Walnut (*Juglans*). Handsome trees of the walnut family, with dark-colored wood. They have compound leaves, which emit a balsamic odor when bruised, and bear hard-shelled nuts enclosed in fleshy husks. Ten species are found in North and South America, Europe, and Asia, all of which produce sweet, edible nuts. Four species are native to the United States.

The black walnut (*J. nigra*) is a magnificent tree, sometimes 150 feet high, with a trunk diameter of 4 to 6 feet. It occurs in rich soils from Massachusetts to Minnesota and southward to Florida and Texas. It has been lumbered almost to extinction for its exceedingly valuable wood. This is used for furniture, interior finishings, gunstocks, and shipbuilding.

The Butternut, or white walnut (*J. cinerea*), is usually a short-trunked, widely branching tree, from 50 to 75 feet high. It grows from New Brunswick to South Dakota and southward to Georgia and Arkansas. The soft, light brown wood is used for interior finishings of houses and for furniture. The bark and husks of the fruit furnished the yellow dye for woolens used in making the "butternut jeans" of pioneer days.

The rock or Mexican walnut (*J. rupestris*) is a small tree or shrub of stony stream banks from Texas and Arizona, south to Mexico. It bears a deeply grooved, hard-shelled, very sweet nut, the size of a hickory nut. The West Texas form of this species (var. *minor*) has nuts about the size of a large pea. The California walnut (*J. californica*), a graceful tree with a smooth, round nut, grows from the Sacramento valley to the Santa Ana mountains. Horticulturally, it plays a very important part in the walnut growing industry. On the Pacific coast this native species is universally used as a stock on which to graft the finer varieties of the English walnut, thereby greatly increasing the hardiness and productivity of the latter.

The English walnut (*J. regia*), a native of Asia, was cultivated in ancient times in Persia. Thence it was early brought to southern Europe, later to England, and, in the 19th century, to America. The nut was greatly esteemed by the ancient Greeks and Romans, the classic name *Juglans* meaning "Jupiter's acorn" or "nut of the gods." Centuries of cultivation have produced many excellent varieties of the nut, which is now commercially grown in immense quantities in various countries. In California, where cultivation of the English walnut is becoming very extensive, the crop normally exceeds 50 million pounds per annum. The wood of the English walnut is of great value for gunstocks and in veneering.

Water Hyacinth (*Eichhornia speciosa*). A floating aquatic of the pickerel weed family. It is a native of tropical South America, widely cultivated in Europe and elsewhere as an ornamental plant. Its large leaves form rosettes which sometimes rise 2 feet above the surface. From the center of the leaves springs a cluster of showy flowers. The plant multiplies with great rapidity. Within a few years after its introduction, it sometimes chokes large streams so as to impede navigation. The obstruction of the St. John's and other rivers in Florida and of various inland waters in California and in South America, illustrates the danger of planting the water hyacinth to beautify streams.

Water Lily (*Castalia*). A genus of aquatic perennial herbs of the water lily family. They have roundish, shield-shaped, or heart-shaped leaves which float on the surface of the water. Both leaves and flowers grow from thick rootstocks imbedded in the mud of ponds or sluggish streams. The leaf-stalks and flower stalks sometimes attain a length of several feet, varying with the depth of the water.

The sweet-scented water lily (*C. odorata*) has fragrant flowers from 3 to 6 inches in diameter, mostly white but sometimes pinkish or even deep pink. It occurs throughout the eastern United States and Canada. The white water lily (*C. tuberosa*), with tuberous rootstocks, has large, pure white flowers, 4 to 9 inches in diameter, which are nearly scentless. This species is most abundant in the region of the Great Lakes. The yellow pond lily (*Nymphæa advena*), closely related to the water lily, has yellow flowers tinged with green or brown. It is found from Labrador to Utah and southward.

The starchy seeds and rootstocks of various kinds of water lilies are used for food by native peoples in many districts of Asia, Africa, Australia, and tropical America. In North America, the Indians formerly included the water lily among their food plants.

Watermelon (*Citrullus vulgaris*). An annual vine of the gourd family, native to tropical Africa. It has been cultivated since very ancient times for its large, refreshing fruit, which weighs from 20 to 50 pounds and upwards. In structure, the fruit is really a huge berry with a hard, green, usually variegated rind. This encloses a pink or red pulp with a copious, sweet, watery fluid and numerous seeds. The watermelon is extensively grown in warm regions, particularly in South Russia and in the southern United States. Of the pulp of the ripe fruit, water comprises about 93 per cent and sugar about 2 per cent.

Wheat (*Triticum*). The most valuable and widely useful of the cereal grasses. It is an erect annual, with a hollow, jointed stem, usually from about 2 to 4 feet high, and long flat leaves. It bears at the summit a series of flowering spikelets, each consisting of from 2 to 8 flowers, closely crowded together in a dense, cylindrical, usually bearded head. In this are produced the starchy, gluten-bearing, nutritious seeds, everywhere highly prized for human food.

Wheat is unknown in the wild state but is believed to have been originally a native of the Euphrates region in southwestern Asia. Its cultivation antedates all recorded human history. It was grown by the Lake Dwellers of Switzerland, by the ancient Egyptians, and, as early as 2700 B. C., by the Chinese. Through ages of careful husbandry, wheat has been developed into the most highly esteemed bread plant in western civilization and the most extensively used cereal grain in the world.

While wheat is grown in large quantities in some warm climates, as in Egypt, India, and California, the world's chief supply is produced from 39° to 60° north latitude and from 24° to 40° south latitude. Though a hardy plant, wheat is not grown successfully so far north as barley, oats, or rye. Where the climate is sufficiently mild, wheat is usually sown during the autumn and matures early in the following summer. This is known as *winter wheat*. Where the winters are more severe, wheat is sown in the spring and is harvested after midsummer. Such a crop is called *spring wheat*. Wheat grown in somewhat dry climates is superior in quality to that produced in humid regions.

Of the many varieties of wheat, the true bread wheats are by far the most valuable. This group includes the hard and the soft winter wheats, the hard spring wheats, the white wheats, and the early wheats. The soft winter wheats are produced in the eastern United States, northern Europe, parts of Asia, Australia, and Argentina. The hard winter wheats are grown in the Mississippi valley and the Rocky Mountain region, in western Asia, and in southeastern Europe. The hard spring wheats are cultivated in Minnesota, North and South Dakota, and other northern plains of the United States, in the prairie provinces of Canada, in eastern Russia, and in southwestern Siberia. The white wheats are grown in western Asia, Australia, and along the Pacific coast of North and South America. The early wheats are produced in Australia, India, Japan, and the southern United States.

Besides the standard bread wheats, universally used for making flour, other important varieties are: the club or square head wheat; the poulard wheat; the durum wheat, the hardest known, used in making macaroni; Polish wheat; one-seeded wheat; emmer; and spelt.

In value, the world crop of wheat surpasses that of all other cereals. The total yield usually exceeds four billion bushels, of which Europe, with Russia and France leading, produces about one-half, and the United States about one-fourth. Other important wheat growing countries are Canada, India, and Argentina. See *Cereals*, *Grasses*.

Wild Flowers, American. The number of species of flowering plants growing wild in the United States and Canada is estimated to exceed 10,000. In the northeastern United States and the adjoining Canadian provinces there are about 4000 species. Small's *Flora of the Southeastern United States* describes more than 6300 species. Rydberg's *Flora of the Rocky Mountains and Adjacent Plains* enumerates about 5900. The flora of the Pacific slope embraces some thousands of species.

Many of the plants of one region are found in the adjacent regions and some are common to all parts of the continent. Consequently, the enumerations mentioned contain a large number of duplications. Each major region, however, has many characteristic plants which usually do not occur in the adjoining regions. Examples of wild flowers representative of the chief floral regions north of Mexico are given in the accompanying table.

REPRESENTATIVE AMERICAN WILD FLOWERS

NORTHEASTERN UNITED STATES AND SOUTHEASTERN CANADA

(Manitoba to northern Kansas and eastward)

Adder's-tongue	(*Erythronium americanum*).
Anemone, or Windflower	(*Anemone*, various species).
Asters	(*Aster*, numerous species).
Black-eyed Susan	(*Rudbeckia hirta*).
Bloodroot	(*Sanguinaria canadensis*).
Bluebells	(*Mertensia virginica*).
Blue Flag	(*Iris versicolor*).
Bunchberry	(*Cornus canadensis*).
Cardinal Flower	(*Lobelia cardinalis*).
Columbine, Red	(*Aquilegia canadensis*).
Coneflower	(*Rudbeckia*, various species).
Crane's-bill	(*Geranium maculatum*).
Dogwood, Flowering	(*Cornus florida*).
Dutchman's-breeches	(*Dicentra cucullaria*).
Gentian, Fringed	(*Gentiana crinita*).
Goldenrod	(*Solidago*, various species).
Harebell	(*Campanula rotundifolia*).
Hepatica	(*Hepatica acutiloba, triloba*).
Jack-in-the-pulpit	(*Arisæma triphyllum*).
Jewelweed	(*Impatiens biflora, pallida*).
Lady's-slipper	(*Cypripedium*, various species).
Lily, Wild	(*Lilium*, various species).
Marsh Marigold	(*Caltha palustris*).
Moccasin Flower	(*Cypripedium acaule*).
Oswego Tea	(*Monarda didyma*).
Pitcher Plant	(*Sarracenia purpurea*).
Rose, Wild	(*Rosa*, various species).
Spring Beauty	(*Claytonia virginica*).
Squirrel Corn	(*Dicentra canadensis*).
Trailing Arbutus	(*Epigæa repens*).
Turtlehead	(*Chelone glabra, lyoni*).
Twinflower	(*Linnæa americana*).
Violets	(*Viola*, many species).
Virgin's-bower	(*Clematis virginiana*).
Wake-robin	(*Trillium*, various species).
Water Lily	(*Nymphæa, Castalia*, various species).
Wood Betony	(*Pedicularis canadensis*).

SOUTHERN UNITED STATES

(Virginia to Oklahoma and southward, largely excluding the plants of the Northern states which extend southward)

Azaleas	(*Rhododendron*, various species).
Black Snakeroot	(*Cimicifuga racemosa*).
Bluebonnet	(*Lupinus texensis*).
Colicroot	(*Aletris farinosa*).
Cup Plant	(*Silphium perfoliatum*).

REPRESENTATIVE AMERICAN WILD FLOWERS—Con.

SOUTHERN UNITED STATES—Con.

Cypress Vine . . . . . (*Ipomœa quamoclit*).
Fetterbush . . . . . (*Andromeda floribunda*).
Forestiera . . . . . (*Forestiera acuminata*).
Great Laurel . . . . . (*Rhododendron maximum*).
Hydrangea . . . . . (*Hydrangea arborescens*).
Indian Pink . . . . . (*Spigelia marilandica*).
Jessamine, Yellow . . . . . (*Gelsemium sempervirens*).
Leather Flower . . . . . (*Clematis viorna*).
Loblolly Bay . . . . . (*Gordonia lasianthe*).
Magnolia . . . . . (*Magnolia*, various species).
Malvaviscus . . . . . (*Malvaviscus drummondii*).
Maypop . . . . . (*Passiflora incarnata*).
Meadow Beauty . . . . . (*Rhexia virginica*).
Mountain Laurel . . . . . (*Kalmia latifolia*).
Redroot . . . . . (*Ceanothus americanus*).
Rose, Cherokee . . . . . (*Rosa laevigata*).
Salvia, Wild . . . . . (*Salvia coccinea*).
Sneezeweed . . . . . (*Helenium tenuifolium*).
Spanish Bayonet . . . . . (*Yucca filamentosa, baccata*).
Spiderwort . . . . . (*Tradescantia virginica*).
Sweet Bay . . . . . (*Magnolia virginiana*).
Tree Orchis . . . . . (*Epidendrum*, various species).
Trumpet Vine . . . . . (*Bignonia radicans*).
Unicorn Plant . . . . . (*Martynia louisiana*).
Wistaria . . . . . (*Wistaria frutescens*).
Yellowwood . . . . . (*Cladrastis lutea*).

GREAT PLAINS

(Saskatchewan to western Texas)

Blanket Flower . . . . . (*Gaillardia aristata*).
Blazing Star . . . (*Liatris* or *Lacinaria*, various species).
Compass Plant . . . . . (*Silphium aristatum*).
Coneflower, Purple . . . . . (*Brauneria angustifolia*).
Golden Aster . . . . . (*Chrysopsis villosa*).
Golden Pea . . . . . (*Thermopsis rhombifolia*).
Indian Parsnip . . . . . (*Cymopterus glomeratus*).
Loco Weed . . . . . (*Aragallis lamberti*).
Mallow, Red . . . . . (*Malvastrum coccineum*).
Pasque Flower . . . . . (*Anemone patens nuttalliana*).
Pomme de Prairie . . . . . (*Psoralea esculenta*).
Prairie Clover . . . . . (*Petalostemon purpureus*).
Rose, Prairie . . . . . (*Rosa*, various species).
Sand Lily . . . . . (*Leucocrinum montanum*).
Shooting Star . . . . . (*Dodocatheon multiflorum*).
Spring Aster . . . . . (*Townsendia sericea*).
Sunflower, Wild . . . . . (*Helianthus*, various species).
Vetchling . . . . . (*Lathyrus ornatus*).
Western Dandelion . . . . . (*Agoseris glauca*).
Wild Licorice . . . . . (*Glycerrhiza lepidota*).

ROCKY MOUNTAIN REGION

(Alberta to New Mexico and Arizona)

Arnica . . . . . (*Arnica*, various species).
Beardtongue . . . . . (*Pentstemon*, numerous species).
Bitterroot . . . . . (*Lewisia rediviva*).
Columbine, Blue . . . . . (*Aquilegia coerulea*).
Deer's-tongue . . . . . (*Frasera speciosa*).
Evening Primrose . . . . . (*Oenothera*, various species).
Globe Flower . . . . . (*Trollius albiflorus*).
Golden Currant . . . . . (*Ribes aureum*).
Indian Paintbrush . . . . . (*Castilleja*, various species).
Moss Campion . . . . . (*Silene acaulis*).
Mountain Pink . . . . . (*Douglasia nivalis*).
Mountain Primrose . . . . . (*Primula parryi*).
Prickly Poppy . . . . . (*Argemone mexicana*).
Red Heather . . . . . (*Phyllodoce empetriformis*).
Sand Verbena . . . . . (*Abronia fragrans*).
Sego Lily . . . . . (*Calochortus nuttallii*).
Syringa . . . . . (*Philadelphus lewisii*).
Turkey Beard . . . . . (*Xerophyllum tenax*).
Umbrella Plant . . . . . (*Eriogonum*, various species).
White Heather . . . . . (*Cassiope mertensiana*).

PACIFIC NORTHWEST

(Including Oregon, Washington, British Columbia, and southeastern Alaska)

Aconite . . . . . (*Aconitum columbianum*).
Blue-eyed Mary . . . . . (*Collinsia tenella*).
Currant, Red Flowering . . . . . (*Ribes sanguineum*).
Fireweed . . . . . (*Epilobium angustifolium*).
Flowering Dogwood, Western . . . . . (*Cornus nuttallii*).
Gum Plant . . . . . (*Grindelia oregana*).
Hellebore, White . . . . . (*Veratrum californicum*).
Leopard Lily . . . . . (*Fritillaria lanceolata*).
Miterwort . . . . . (*Tellima grandiflora*).
Oregon Grape . . . . . (*Mahonia aquifolium*).
Pearly Everlasting . . . . . (*Anaphalis occidentalis*).
Rattlesnake Plantain . . . . . (*Peramium decipiens*).
Rhododendron, Western . . (*Rhododendron californicum*).
Salal . . . . . (*Gaultheria shallon*).
Salmonberry . . . . . (*Rubus spectabilis*).
Star Flower . . . . . (*Trientalis latifolia*).
Sweet Coltsfoot . . . . . (*Petasites speciosa*).
Valerian . . . . . (*Valeriana sitchensis*).
Wood Orchis . . . . . (*Piperia elegans*).
Yerba Buena . . . . . (*Micromeria chamissonis*).

CALIFORNIA

(Largely excluding the plants of the Pacific Northwest which extend southward)

Baby Blue-eyes . . . . . (*Nemophila insignis*).
Bird's-eyes . . . . . (*Gilia tricolor*).
California Poppy . . . . . (*Eschscholtzia californica*).
Chamisal . . . . . (*Adenostoma fasciculatum*).
Christmas Berry . . . . . (*Heteromeles arbutifolia*).
Cream Cups . . . . . (*Platystemon californicus*).
Farewell-to-spring . . . . . (*Godetia amoena*).
Golden Stars . . . . . (*Bloomera aurea*).
Ice Plant . . . . . (*Mesembryanthemum crystallinum*).
Larkspur, Scarlet . . . . . (*Delphinium nudicaule*).
Lupine . . . . . (*Lupinus*, many species).
Manzanita . (*Arctostaphylos* or *Uva-ursi*, various species).
Mariposa Tulip . . . . . (*Calochortus luteus*).
Miner's Lettuce . . . . . (*Montia perfoliata*).
Mission Bells . . . . . (*Hesperoyucca whipplei*).
Monkey Flower . . . . . (*Mimulus*, various species).
Owl's Clover . . . . . (*Orthocarpus versicolor*).
Pink Paintbrush . . . . . (*Orthocarpus purpurascens*).
Sierra Primrose . . . . . (*Primula suffrutescens*).
Snow Plant . . . . . (*Sarcodes sanguinea*).
Tidytips . . . . . (*Layia platyglossa*).
Whispering Bells . . . . . (*Emmenanthe penduliflora*).
White Sage . . . . . (*Audiberta polystachya*).
Wild Buckwheat . . . . . (*Eriogonum fasciculatum*).
Yerba Santa . . . . . (*Eriodictyon californicum*).
Zygadenus . . . . . (*Zygadenus fremonti*).

Willow (*Salix*). A genus of woody-stemmed plants of the willow family, closely related to the poplar, aspen, and cottonwood. There are nearly 200 species, found in most countries of the world except Australia. About half of all the known species of willows occur in North America, some 20 of which attain the size of trees.

In size, willows vary from tiny, herblike forms only 1 or 2 inches high, found in the arctic regions, to handsome trees 50 to 120 feet high, of temperate countries. As a rule, willows have narrow, lance-shaped, sharply pointed leaves, tough, bitter bark, and soft, white, brittle wood. The small blossoms, usually greenish, are borne in dense clusters called aments, or catkins, the male and female flowers being found on different trees. The small seeds, which are furnished with a long silky down, are often carried great distances by the wind.

Willows usually inhabit the banks of streams, and other low, moist grounds. However, they occur also in similar ground on the alpine summits of mountains, and quite generally in arctic and sub-arctic regions. Their range is from near the extreme northern limit of flowering plants southward to Chile and South Africa. They grow rapidly and have many large roots. These penetrate long distances through moist soil and bind it together with a network of fibers, thus preventing the banks of streams from being worn away.

While the willow is not of great commercial importance, few trees have more varied uses. Because of their rapid growth, various species are planted for hedges, shade and ornamental trees, windbreaks, and quick timber. The wood is used in cabinetwork, for making baseball bats and tool handles, and for wood pulp and charcoal. The bark is used in tanning and yields the bitter crystalline compound *salicin*, used in medicine. Baskets and wickerwork are woven from the young shoots, called osiers, produced by certain species of willows. Osier culture is important in low wet lands in England, France, Belgium, and the Netherlands. Osiers are grown to some extent in the United States, particularly in western New York, southeastern Michigan, and Maryland.

The most important of all the species is the white willow (*S. alba*), found throughout Asia and Europe and widely planted in America. It sometimes



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AMERICAN WILD FLOWERS. II

Canada Lily
Bitterroot
Trailing Arbutus
Cardinal Flower
Laurel Magnolia
Showy Lady's-slipper
Jewelweed
Pasque Flower
American Mistletoe



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AMERICAN WILD FLOWERS. III

Coneflower
Georgia Syringa
Goldenrod
Trumpet Vine
Early Blue Violet
Indian Paintbrush
Wild Rose
Sunflower
Great Laurel

reaches the height of 90 feet. The black willow (*S. nigra*), commonly 30 to 40 but sometimes 120 feet high, with a trunk 3 feet in diameter, is the largest and commonest native willow of North America. It occurs from New Brunswick to Manitoba and Florida, west to California. Except the aspen, the black willow has a more extensive range in North America than any other tree. The pussy or glaucous willow (*S. discolor*), usually a shrub but sometimes 25 feet high, is common on stream banks in the Eastern States and Canada. It bears white, silky, flowering catkins, called "pussy willows," which appear before the leaves very early in spring. The weeping willow (*S. babylonica*), a native of Asia, and the crack willow (*S. fragilis*), a European species, have been widely planted in America.

Winterberry (*Ilex verticillata*). A small shrubby species of holly; called also black alder or Christmas berry. It grows in swamps and on wet banks of streams in the northeastern United States and in adjacent parts of Canada. The oval, pointed leaves turn black in autumn and, after the first severe frosts, soon wither and fall. The greenish white flowers, borne in axillary clusters, blossom in early summer. These are followed by brilliant scarlet berries, about the size of peas. When mature in late autumn, the short-stalked berries are so crowded on the branches that they appear as if arranged in rings (verticillate). The handsome fruit remains on the shrub during winter, furnishing food to various species of birds. Fruit-bearing branches of the winterberry are often sold by city florists for winter decorations.

The smooth winterberry (*I. lævigata*), which occurs near the coast from Maine to Florida, is a beautiful shrub, similar to the black alder. The orange-colored berries, however, ripen earlier, are borne on longer stalks, and are much less crowded on the branches. See *Holly, Inkberry*.

Wintergreen (*Gaultheria procumbens*). A small, creeping, evergreen plant of the heath family, known also as checkerberry and partridge berry. It has shining leaves, white, recurved flowers, and bright red, spicy, berry-like fruit. The plant abounds in woods, especially under evergreen trees, in the northern United States and Canada. It yields the oil of wintergreen, much used for flavoring, for perfumery, and in medicine. Various species of *Pyrola* and *Chimaphila* are also called wintergreen.

Winter's Bark (*Drimys winteri*). An evergreen tree of the magnolia family, native to mountains and highlands from Mexico to Patagonia. The bark, which has a very pungent and astringent taste and a peculiar odor, is used as a tonic and as an antiscorbutic. In Brazil and in other South American countries, winter's bark is highly prized as a remedy for scurvy. There are many commercial substitutes for the drug, much so-called winter's bark being obtained from entirely different West Indian trees.

Wistaria (*wis-tā'ri-à*). A genus of climbing shrubs of the pea family, named in honor of Caspar Wistar, but often spelled *Wisteria*. They have divided leaves and beautiful bluish flowers in drooping clusters. Some species are among the most handsome ornamental climbers. The American wistaria (*W. frutescens*) grows wild in marshy grounds from Virginia to Florida. It attains a length of 30 to 40 feet, and bears fragrant bluish purple flowers. This native climber is sometimes cultivated. The Chinese wistaria (*W. chinensis*), the finest and most popular cultivated species, has showy blue flowers. It is much used as a climber over arbors and the walls of houses.

Witch-hazel (*Hamamelis virginiana*). A large shrub or small tree, related to the sweet gum, with wavy-toothed leaves somewhat like those of the hazel. It grows from 15 to 25 feet high in low woods from Nova Scotia to Minnesota and southward to Florida and Texas. The witch-hazel blossoms late in autumn, the profuse yellow flowers appearing in showy clusters while the leaves are falling. The fruit, a two-seeded, woody capsule which ripens during the ensuing summer, has the peculiar property of shooting its seeds to a considerable distance.

A fluid extract, prepared from the leaves, called "witch-hazel" or "hamamelis," is used as a tonic and as a lotion. It does not, however, possess any known therapeutic value. Great virtues have long been popularly ascribed to a forked branch of this shrub when used as a divining rod for locating water and minerals, whence the name witch-hazel.

Woodbine. A popular name for the European honeysuckle (*Lonicera periclymenum*). The evergreen honeysuckle (*L. caprifolium*) is sometimes styled the American woodbine. Various other honeysuckles and several entirely different twining plants are likewise known as woodbine. For example, in New England, the Virginia creeper, and, in the Southeastern States, the yellow jessamine, are called woodbine, as is, in various districts, the hedge bindweed. See *Honeysuckle, Jessamine, Virginia Creeper*.

Woodruff (*Asperula odorata*). A small herb of the madder family, commonly called sweet woodruff, native to many parts of Europe. It has a weak but usually erect stem, 5 to 10 inches high, which bears 4 or 5 whorls of lance-shaped leaves, from 6 to 8 in a whorl, and small white flowers. The plant grows in shady woods, and, when dried, has a pleasing fragrance. It makes an agreeable herb tea and is usually one of the ingredients of the so-called "May drink," widely popular in Germany. The Germans in the United States substitute for woodruff the sweet-scented bedstraw (*Galium triflorum*), a closely related and somewhat similar plant, common in rich woodlands.

Dyer's woodruff (*A. tinctoria*), a native of Europe and of Siberia, is a perennial herb with reclining stems bearing whorls of 4 or 6 linear leaves and whitish flowers. In Dalmatia and in various other districts the root is used to some extent as a substitute for madder.

Wormwood (*Artemisia absinthium*). A perennial herb of the composite family, native to Europe and to northern Asia and introduced into the United States and Canada. It has an erect, somewhat woody stem, from 2 to 4 feet high, bearing silvery gray, much divided leaves and small heads of yellowish flowers arranged in racemes. The plant is somewhat aromatic, and all parts, especially the leaves, are intensely bitter.

Formerly wormwood was widely used as a tonic, as a vermifuge, and to protect garments from moths. It is now cultivated to some extent as the source of a bitter aromatic oil used in the preparation of absinthe, a strong alcoholic liquor made chiefly in France. Wormwood is mentioned in the Bible as a symbol of bitterness. The name wormwood is applied also to various other species of *Artemisia*. See *Sagebrush*.

Yam (*Dioscorea*). Twining, herbaceous plants of the yam family, natives of the tropics. They have heart-shaped leaves, small whitish flowers, winged seeds, and very large, tuberous roots. Various species are cultivated for food in warm regions, especially in China, India, and the East and West Indies. The starchy roots are used like the sweet potato, though somewhat coarser fleshed and less palatable. They usually contain an acrid principle which disappears upon cooking. The winged yam (*D. alata*) has immense roots which sometimes attain a weight of 100 pounds. The West Indian yam (*D. sativa*), with smaller roots than the preceding, is grown in southern United States.

Yarrow (*Achillea millefolium*). A small perennial of the composite family, native throughout the northern hemisphere. It was anciently named for

Achilles, to whom legend ascribed the discovery of its virtues. It has a somewhat woolly stem, finely dissected leaves with bitter aromatic taste and odor, and white, pink, or purple flowers borne in a flat-topped cluster. Both the leaves and the flowers are used in medicine, as a stimulant and tonic. The leaves, formerly in high repute for the treatment of wounds, are said to be still so employed in Scotland.

Yeast (*Saccharomycetes*). Yeast plants are single-celled fungi, of microscopic size. They are characterized by a peculiar method of reproduction known as budding, by which, under favorable conditions, they multiply with enormous rapidity. Numerous species live in plant juices or other liquids containing sugar in solution. They secrete a peculiar substance, called an enzyme, which causes the sugar to split into alcohol and carbon dioxide. This process is known as alcoholic fermentation. For many centuries yeasts have been cultivated for the production of beer and for making bread. In the form of compressed yeast, the plant is used as a means of supplying to the human diet certain necessary vitamines. See *Fungi*, *Vitamines*.

Yellowroot (*Xanthorrhiza apiifolia*). A low shrub of the crowfoot family; known also as shrub yellowroot, native to the southern United States. The long roots, the rootstock, and the bark are bright yellow. The root, which is intensely bitter and astringent, is used as a tonic. At the top of the short stem are borne numerous pinnate leaves. These are crowded together near the summit, giving the plant somewhat the appearance of a fern. In autumn, the foliage becomes brilliantly colored. The small wine-colored flowers are arranged in slender, elongated clusters. The name yellowroot is applied also to the goldenseal and to various other plants having yellow roots. See *Goldenseal*.

Yellowwood, American (*Cladrastis lutea*). A beautiful tree of the pea family, known also as Kentucky yellowwood, yellow ash, yellow locust, and gopher wood. This tree, native to rich soils, especially along mountain streams, from western North Carolina to Missouri, is widely cultivated for ornament in the eastern United States. It attains a maximum height of about 50 feet, with a trunk diameter of 3½ feet. The tree bears divided leaves of 5 to 11 leaflets, and showy white flowers in large clusters. The bark is used in medicine and yields a yellow dye. The yellow, strong, hard but brittle wood is sometimes used for making gunstocks. The name yellowwood is applied to various other species of trees.

Yew (*Taxus*). A genus of evergreen trees or shrubs of the yew family (*Taxaceæ*), somewhat related to the pine and hemlock. They have flat, linear leaves, appearing as if in two ranks, a fleshy, cup-shaped, red fruit, nearly enclosing the bony seed, and purplish, thin bark. There are about 7 species, natives of the North Temperate Zone. Of these, 3 occur in North America.

The European yew (*T. baccata*) is a medium-sized, long-lived forest tree, highly prized for its hard, strong, elastic wood, formerly used in making bows. The American yew, or Ground Hemlock (*T. canadensis*), is a low, straggling shrub, usually 1 or 2 feet high and seldom over 5 feet high. It grows in woods from Newfoundland to Manitoba and south to New Jersey and Iowa. The western yew (*T. brevifolia*), a tree sometimes 80 feet high, with a trunk occasionally 4 feet in diameter, occurs from British Columbia to California. The hard, flexible, bright red wood is used for tool handles and machine bearings. The Indians of the northwest coast made from it their best bows and also canoe paddles. The Florida yew (*T. floridana*), of western Florida, is a rare and local species.

The stinking yew, or California Nutmeg (*Tumion californicum*), which closely resembles the true yews, is a handsome tree, usually 35 to 50 feet high. It has a straight trunk about 3 feet in diameter, with rigid, bristle-pointed leaves, and a fleshy, plumlike or olive-like fruit. The hard, fine-grained, lemon-yellow wood is very durable.

Yucca (*yŭk'ȧ*). A genus of large plants of the lily family. They have rigid, sharp-pointed leaves, and large nodding flowers sometimes borne in huge terminal clusters. There are about 16 species, natives of North and Central America.

Adam's Needle (*Y. filamentosa*) is a showy species, much cultivated for ornament. It grows wild in sandy soil from Maryland to Louisiana. This plant bears an edible fruit called datile. The Spanish Bayonet (*Y. baccata*) has stout-pointed leaves and dark purple, edible fruit. It occurs native from Texas to California and southward.

The Joshua Tree (*Y. brevifolia*), so named by the Mormons, sometimes grows from 30 to 40 feet high, with a woody trunk 3 feet in diameter. It is a weirdly branching species, characteristic of the Mohave desert, and extending eastward to Utah.

The so-called Mission Bells (*Y. whipplei*) is a handsome plant of the southern California chaparral. It is almost stemless, with numerous rigid, spiny, basal leaves. At flowering time it bears aloft an immense cluster, sometimes 15 feet high, of fragrant, creamy white, somewhat bell-shaped, drooping blossoms.

Zamia (*zā'mĭ-ȧ*). A genus of cycads found only in the tropics and subtropics of the western hemisphere. There are about 30 species, ranging from Florida to Chile. They usually have short, thickened stems, densely covered with persistent leaf bases, and surmounted by a crown of large pinnate leaves. In old plants the central portion of the stem often contains much starch, from which a kind of sago or arrowroot is made.

From the tuberous rootstocks of the Coontie (*Z. pumila*), which grows in low grounds in Florida, the Seminole Indians prepared a favorite starch food. This was later used by the whites and called Florida arrowroot. The misleading name "sago palm" has been given to this plant.

Zanthoxylum (*zăn-thŏk'sĭ-lŭm*). A genus of prickly trees or shrubs of the rue family, with divided leaves and small greenish flowers. There are about 150 species, natives chiefly of tropical regions. Of these, 4 occur in the United States.

The Prickly Ash (*Z. americanum*), usually 6 to 10 feet high but sometimes 25 feet high, bears its leaves and flowers in axillary clusters. It is found wild from Quebec to South Dakota and southward to Virginia and Kansas. The Southern Prickly Ash, Toothache Tree, or Pepperwood (*Z. Clava-Herculis*), usually 25 or 30 feet high but sometimes 50 feet high, bears its flowers in terminal clusters. This very prickly tree grows along streams from Virginia to Texas. The bark and fruit of both the foregoing species have powerful stimulant and tonic properties.

The Satinwood (*Z. flava*), called also yellowwood, is a small evergreen tree of southern Florida and the West Indies. The hard, yellow wood takes a satiny polish and is in demand for making furniture and tool handles. A smaller, shrubby, nearly spineless species (*Z. coriacea*) occurs in southern Florida and in Cuba.

Zinnia (*zĭn'ĭ-ȧ*). A genus of herbs and half-shrubs of the composite family. There are about 20 species, natives of mountainous regions from southern Colorado to Chile, but most numerous in Mexico and in Central America. Generally, zinnias have opposite, undivided leaves and bear showy heads of flowers. Several species have become popular in cultivation. Of these, the best-known is the garden zinnia (*Z. elegans*). This is an erect annual, usually about 18 inches high, bearing large, handsome flowers which exhibit a great range of colors. There are both single and double forms, the heads of which often exceed 3 inches in diameter. Zinnias are hardy, thrive on great variety of soils, and bloom profusely from midsummer until frost.

TEST QUESTIONS

Distinguish between the fields of science, philosophy, and art, in respect to subject matter and purpose 857
Enumerate some important results of progress in chemistry; in physics 857
Give several illustrations of the practical results arising from the use of the microscope in the study of plants and animals 858
To what is the success of science due? What is a working hypothesis? Name some conspicuous examples of such hypotheses . . . 858
Point out the characteristics of the scientific attitude 858
Discuss the general application of scientific methods in practical affairs 858

PHYSIOGRAPHY

State the three divisions of the earth with which physiography is concerned. Name several sciences closely related to physiography 859
Describe the character and origin of adobe soils. 859
Name and locate two important examples of æolian deposits 859
Enumerate several ways in which the air plays a part in human life 859
What is alluvium? Where are important alluvial areas to be found? 859
State some explanations of the formation of anchor ice 859–860
Describe the air movement in the anticyclone. What weather changes may accompany the anticyclone? 860
State the conditions of climate implied in the term aridity. Point out some striking types of vegetation and animal habits developed under arid conditions 860
Name the principal constituents of the earth's atmosphere 860
To what cause is the aurora borealis now ascribed? What name is given to the similar phenomenon in the southern hemisphere? . 861
Describe the following: barrier beach; barrier reef; beach 861
What conditions are said to account for the form of the distribution of buttes? 861
By what process are caves produced? Name some famous caves 862
Explain the application of the name chinook; of cirque 862
Define climate. State its chief elements. Point out the important factors that determine variations of climate 862
Why are the western shores of continents in the temperate zones warmer than the eastern shores? 862
Of what are clouds composed? Describe the principal kinds of clouds 862–863
To what conditions of rainfall is the term cloudburst applied? 863
Name the six continents. What is a continental platform? Give the average height of land on the continents 863
Describe the wind movement and other attendant conditions of a cyclone 863–864
Discuss the character and the causes of deserts. 864
Explain the formation of dew. What is the meaning of the expression dew point? . 864–865
Describe the following: dike; drumlin; dune. Discuss the origin and some effects of atmospheric dust 865
To what causes are earthquakes ascribed? In what countries are earthquakes most frequent? Where are they least frequent?. 865–866
Define erosion. Point out the effects of several agents of erosion 866
Define escarpment. What is an esker? Give examples of the effect of faulting 866
Explain the formation of fiords 866
What atmospheric conditions give rise to fogs? Why are city fogs more persistent and dense than country fogs? 867
Indicate the conditions under which frost is formed. Compare these conditions with those attending the production of dew. What is "black frost"? 867
State an accepted explanation of the action of geysers 867–868
Enumerate the types or classes of glaciers. Give examples of the important earth-shaping work of the Ice Age glaciers in the United States and Canada 868
Describe the Gulf Stream 868
Outline the probable process by which hailstones are formed. Define hardpan; heaths. 869
Distinguish between thermal, tepid, and hot springs. To what characteristics are the curative properties of some hot springs ascribed? Discuss the term humidity 869
In what parts of the world do the greatest number of hurricanes occur? 869
Define hydrosphere. State the greatest depth of the Atlantic Ocean; of the Pacific. Compare the mass or weight of the sea with that of the air; with that of the solid part of the earth 869
Why can ice float on water? Illustrate the process of regelation 870
What is an iceberg? What proportion of an iceberg usually appears above water? Indicate the usual form of antarctic icebergs 870
Point out the processes by which continental islands are formed. To what agencies are oceanic islands due? 870
Define isobars 870
Indicate the origin and the course of the Japan Current 871
To what earth formations are the names kame and kettle hole applied? 871
Discuss some of the important effects of the Labrador Current 871
To what origin are the many lakes in high latitudes attributed? What lake, so far as known, is the deepest in the world? From what sources is lake water derived? Point out some important climatic effects of the Great Lakes. Indicate some of their other economic values 871
Describe the nature and origin of lava. To what practical uses are some lavas applied? Locate two great plateaus formed by lava flows 872
Outline the causes and the general classes of lightning. Are lightning conductors desirable on buildings? 872
Locate and describe the Llanos 873
Point out the distinctive characteristics of loess 873
Explain the form and origin of mesas 873
Define mineral waters. Name the most famous European mineral waters 873
Explain the appearance of a mirage . . . 873–874
Explain the origin and application of the term monadnock 874
Describe the wind known as a monsoon . . . 874
In what regions of the world are soils formed of moraines to be found? 874
Indicate the senses in which the term mountain is used. Define mountain group; mountain system 874
By what three processes are mountains formed? Name the highest peak in North America; in Canada; in the United States 874
Name the chief substances found dissolved in the water of the ocean. What is the average temperature of the sea? 875
To what causes are the great ocean currents due? Indicate some of the important effects of these currents 875

Define pampas; peat bogs; potholes 876
State some explanations offered to account for the treelessness of the prairies 876
Account for the treacherous character of quicksands 876
Under what conditions may rain be produced? Name some substances washed out of the air by falling rain 876
Explain the formation of the rainbow. Name the colors of the rainbow in their order, beginning at the inside 876
Discuss the conditions which may affect the rainfall of a region. 876–877
Point out with examples the magnitude of the work of rivers in transporting eroded materials. Indicate the economic importance of rivers 877
To what causes are the changes of the seasons due? 877
Define the following terms: seiche; selvas; slough 878
What is snow? Under what conditions are snowflakes formed? 878
Of what materials is soil usually composed? Give examples of valuable transported soils. Name the food elements most essential to plant growth 879
Distinguish between stalactites and stalagmites. 879
Explain the following terms: stream piracy; striæ; subsoil; taiga; talus 879–880
What is supposed to be the temperature of space outside the earth's atmosphere? Explain the presence of warmth in the air. Why do different latitudes receive different amounts of heat from the sun? 880–881
Indicate the extent of the terminal moraine left from the Glacial period in the United States 882
Describe the production of thunder . . . 882–883
Explain the action of the attractive forces of the sun and moon in causing tides. Point out some effects of tides on the seashores . . 883
Explain the destructive action of a tornado. 883–884
Account for the movement and direction of the trade winds. Why was the name trade winds applied to these currents? 884
What are tundras? 884
Point out the two chief results of erosion in the formation of a valley 884
Distinguish between active, dormant, and extinct volcanoes 884
What forces are believed to cause volcanic eruptions? Discuss vulcanism 885
Define water gap and watershed. Describe the appearance and action of a waterspout . . . 885
Define waves. Explain the character of wave motion in the open ocean. Define the following terms used in respect to waves: crest; trough; height; period. What are breakers? What is a ground swell? surf? undertow? . 885
Distinguish between weather and climate. . . 886
Explain the effects of the mechanical and the chemical processes of weathering 886
Outline the conditions which determine the air movements called winds. Point out some of the most important effects of winds upon climate and upon the land surface 886

GEOLOGY

With what subjects is the science of geology concerned? Name seven subdivisions of this science. State the subject matter of each. . 887
Name the three classes of rocks of which the earth is composed 887
Point out the distinctions between the different classes of sedimentary rocks,—clastic, chemical, organic 887
Explain the origin of igneous rocks 887
Name several examples of metamorphic rocks. 888
Define dynamical geology. What subjects does it consider? 888
State the Laplacian and planetesimal hypotheses as to the origin of the earth . . . 888
Describe three important rock phenomena treated under structural geology. Point out some relations between rock structures and the activities of man 888–889
Discuss the senses in which the terms era, period, epoch, and age are used in historical geology 889
Where is the record of the geological history of any region to be found? Outline the phenomena that should be examined in the study of stratigraphy 889
Name the geological eras in the standard American geological column 889
State two estimates of the age of the earth, reckoning from the beginning of the Paleozoic era. Explain the meaning of the name Archeozoic era 890
How are Proterozoic rocks distinguished from those of Archeozoic time? Where in North America are they best known? State the distinguishing features of the Paleozoic era . . 890
Describe the region between the site of the Appalachian mountains and that of the Rocky mountains as it appeared in the Ordovician period 890
Point out some conspicuous results of the Silurian period of rock formation 891
Why is the Devonian period called the "age of fishes"? Account for the character of the rock deposits of this time. Indicate the economic importance of the rocks of this period 891
Describe the origin of the coal beds in the Pennsylvanian period 891
What types of animal and plant life distinguish the Mesozoic era? 892
To what period do the red sandstones of Connecticut and New Jersey belong? When were the "red beds" of the Rocky Mountain slopes deposited? Explain the formation of the Palisades of the Hudson 892
State the evidence of a marked change of climate between Triassic and Jurassic time . . 892
What deposits of the Cretaceous period are conspicuous in the western United States?. . 892
Characterize the changes in vegetation that took place within the Mesozoic era. Describe the Dinosaurs; the Plesiosaurs. At what stage did birds appear? mammals? . . 893
Point out some conspicuous effects of geologic activity in Tertiary time which appear in the western United States 894
Describe in general terms the geologic effects of the glaciers of the Pleistocene period . . . 894
Compare the mammals of the Eocene time with those of today. Review the history of the development of the horse 894–895
Name some of the characteristic animals of North America in the Tertiary period . . . 895
In what period did man appear on the earth? . 895
Define paleontology and name its two subdivisions 895
Name five types of animal life that appeared successively, beginning with the Cambrian period 895
Give three examples of animal forms that have appeared and become extinct, beginning with the Ordovician period 895

Mineralogy

With what subjects does mineralogy deal? Of what does petrology treat? 896
With what topics is the science of crystallography concerned? 896
To what system of crystals does the diamond belong? the emerald? the topaz? gypsum? 896
Outline the method by which minerals are classified according to hardness 896
State the principles of a common method of classifying minerals. Upon what is the classification of rocks based? 896–897

Explain the use of the words adamant and adamantine 897
Enumerate some uses of agate. Whence does the world's chief supply of agate come? . . 897
For what purposes has amber been used? . . 897
Describe the composition of anthracite. Where are the principal deposits of anthracite found? 898
Explain the application of the word asbestos. How is the mineral prepared for commercial use? 898
From what principal sources is asphalt obtained? 898
What is basalt? For what practical use is it valuable? Where has its presence produced notable scenic effects? 898–899
For what industrial purposes are bauxite and calcite used? 899
Describe the composition and formation of chalk. Enumerate its industrial uses. . . . 900
Explain the formation of clay. State its chief uses. Enumerate the principal varieties of clay 900
Discuss the processes that contribute to the forming of coal. Distinguish between the chief varieties of coal 900
What is conglomerate? How is it formed? . . 901
To what use is ordinary corundum put? Name some of its most valuable forms 901
Describe the distinguishing features of the diamond. What is the form of the standard brilliant cut stone? Name some of the most famous diamonds 901–902
To what substance in the gem is the color of the emerald due? 902
Describe the composition and enumerate the chief uses of granite, graphite, gypsum . . 903
Whence is the name kaolin derived? Where is this mineral obtained? 904
To what popular gem stone does lazurite impart a blue color? 904
Describe the composition and uses of marl; of meerschaum 904
Enumerate the principal uses of mica. Where is it obtained? 905
Outline the conditions favorable to the accumulation of natural gas in the earth. Name the chief gas producing sections of the United States 905
From what source is obsidian derived? Name some of the uses to which it is applied . . . 906
Discuss the composition, sources, kinds, and popularity of the opal 906
What is petroleum? Describe the methods of securing the oil by wells. Explain the production of refined products from crude petroleum. 906–907
Explain the application of the term "precious stones" 907
For what purposes are the following valuable: pumice? pyrite? pyrolusite? 907
Explain the production of artificial rubies . . 908
Describe the color changes observable in sapphires 908
Explain the formation of the following: shale; slate. Enumerate the uses of talc 909
Enumerate the countries from which topaz and tourmaline are obtained 909
Where is the finest turquoise found? To what purposes is it applied? 910
What is zincite? Describe the most highly prized kinds of zircon 910

ASTRONOMY

Outline the subject matter of the science of astronomy 911
Summarize the principal services rendered in astronomy by the following men: Hipparchus; Ptolemy; Copernicus; Newton . . . 911
In what ways has the science of astronomy proved itself practically valuable? 911
In what constellation is the star Betelgeuse located? Indicate its distance from the earth; its volume in comparison with the sun and the earth 911–912
Explain the method of locating the Pole Star by means of "the pointers" in the Great Dipper. 912
Give the reasons for the corrections of the calendar by Julius Cæsar and Pope Gregory. State the leap year rule 912
Describe the structure of a comet. Tell the story of the predictions in respect to Halley's comet 912–913
Explain the application of the term constellation. How many constellations are now accepted by astronomers? 913
Define cosmogony. Characterize the work of the Greeks in this science. State the theory of Laplace, called the Nebular Hypothesis. Outline the Planetesimal Theory. By whom was this theory developed? 913–914
Account for the effect of the atmosphere in lengthening the day in all latitudes 914
State four accepted proofs of the spherical form of the earth. At what tares of speed does the earth rotate on its axis and revolve around the sun? 915
State the conditions under which eclipses of the sun and the moon occur. Why is a total eclipse of the sun so infrequently seen at any particular place on the earth? 915
Define ecliptic. Account for the application of the term equinox 915
State the distinguishing characteristics of the planet Jupiter 916
What is a light year? 916
Discuss the probability of the existence of inhabitants on the planet Mars 916–917
Describe the composition of meteorites. State a probable theory as to their origin 917
What are "meteoric showers"? 917
Of what is the Milky Way composed? What does the form of this Galaxy show as to the system to which our sun belongs? 917
Describe the surface of the moon 918
Name the principal classes of nebulæ. What is known about the nature of the spiral nebulæ? 918
Recount the story of the discovery of the planet Neptune 918–919
Name the principal stars in the constellation of Orion 919
Discuss the discovery of planetoids and the theories as to their nature 919
Name the planets in the order of their distance from the sun 919
Recount some of the ancient fancies about the Pleiades. Describe this group of stars as they are known to modern science 919–920
What has the spectroscope revealed about the Pole Star? Describe the planet Saturn, its rings and satellites 920
Discuss the facts revealed by the spectroscope about the motion of Sirius 920
Explain the astronomical use of the word solstice. 920
Describe the actual nature of stars. Account for their apparent form. How many stars are there in our galaxy? 921
Indicate the distances between adjacent stars. Explain the meaning of the expression "fixed stars" 921
Discuss the probable method of development of the sun's energy. 922
Define the three different kinds of years . . . 924
Describe the Zodiac; zodiacal light 924

PHYSICS

Define physics. Distinguish this science from chemistry and biology. Cite some practical applications of the principles of physics . . 925
Explain the use of the expression "fundamental units." What is the c. g. s. system? 925

Matter and Motion

Define the following terms: solid; fluid; liquid; gas. Name the lightest known substance. 925–926
Explain the meaning of surface tension. Point out some examples of this tendency of liquids. 926
Distinguish between a physical and a chemical solution 926
Explain the meaning of the term density . . 927
By whom and when was the barometer invented? How is the weight of the mercury column in the barometer supported? Define specific gravity 927
Point out the reasons for the difference between the weight of a body at the equator and its weight near either pole 928
State Newton's laws of motion. Define inertia. Name some practical examples of the effect of inertia 928
How is the velocity of bodies expressed? Compare the velocity of sound with that of a high power rifle bullet 929
Distinguish between the application of the Special Theory of Relativity and the General Theory. By what astronomical observations were Einstein's predictions about light rays confirmed? 929
Define the following: energy; kinetic energy; potential energy 930
State the meaning of the principle of conservation of energy. Why is the construction of a "perpetual motion" machine impossible? . . 930
Point out some examples of the transformation of energy 930–931
Enumerate the primary mechanical contrivances. Upon what two fundamental principles are they based? 931
Characterize each of the three classes of levers. Name an example of each class 931
Explain the operation of the block and tackle . 931
Indicate some common applications of the principle of the inclined plane. By what principle is the action of the hydraulic press governed? 932

Sound

Define sound. To what conditions are the differences between noises and musical tones attributed? 932
How is sound propagated through the air or any other medium? 932
Discuss refraction and reflection of sound. Compare the velocities of sound in air, in hydrogen gas, and in water 933
By what conditions are intensity, pitch, and quality of musical sounds determined? . . . 933

Heat

Explain the four most common meanings attached to the term heat. Outline the sources from which heat is commonly derived . . . 934
State the difference between heat rays and light rays. Account for the expansion of bodies when heated; for the change of solids to liquids and to gases under heat 934
Describe the construction of a thermometer . 935
Discuss the meaning of the expression "absolute zero" 935
Explain the following: freezing point; melting point; boiling point 936
Define British thermal unit; calorie; specific heat 936
By what ways is heat transmitted? Discuss conduction 936
Explain the application of the principle of convection in the heating of buildings 937
Why will water boil sooner in a polished teakettle than in one with a dull surface? . . . 937
Illustrate by an example the meaning of the expression "latent heat" 937

Light

Define light. From what sources does it come? 937–938
Trace the path of light which reaches an observer who is looking at a tree by moonlight. 938
State the present meaning of the undulatory theory of light. Give examples of the following phenomena: reflection; dispersion; interference 938
Tell how the speed of light was first calculated by Roemer 938
Describe three interesting examples of light refraction 938–939
What is the spectrum? What property of light determines the separation of the light ray into colors by a prism? 939
Explain the cause of the apparent color of any object 939–940
Describe an interesting experiment in interference of light. For what measurements does this experiment furnish a means? 940
Explain polarization of light 940–941

Electricity

Account for the origin of the word electricity. Discuss the modern theory as to the nature of electricity. Indicate the bearing of the discovery of radioactivity upon ideas about the constitution of matter 941
Illustrate what is meant by the terms positive and negative as applied to electricity. Describe the electroscope and its use. Describe the Leyden jar 941
Name some good and some poor conductors of electricity 942
Describe the construction of a simple electric cell. Explain the production of the current in this cell 942
Explain the dry cell. Distinguish between primary and storage batteries 942
Indicate the importance of the electrical discoveries of Heinrich Hertz 942
Point out the important properties of X-rays. For what uses have they proved highly valuable? 942–944
Narrate the events which led up to the discovery of radium 944–945
What two principal products result from radioactivity? What is the probable source of the Millikan ray? Describe its penetrative power 945
Define the following: lodestone; magnetism . 945
Explain magnetic poles; magnetic attraction and repulsion 945
Discuss the location of the earth's magnetic poles. What is a magnetic field? . . . 945–946
State the general law of magnetic induction. What is meant by the phrase "magnetic permeability"? 946
Discuss the construction and the practical uses of the electromagnet 946
State the molecular theory of magnetism. Point out two phenomena which this theory explains 946
Define the following: alternating current; ammeter; ampere 947
For what purpose are the following used: armature? circuit breaker? commutator? . . . 947
Define the following units of measurement: coulomb; dyne; erg; farad 947
Point out the use of a fuse in an electric circuit. 947
Explain the operation of an induction coil. 947–948
Point out the use of the lightning arrester. Indicate the meaning of the term potential . . 948
Point out the use of the relay in telegraphy. . 948
State the process by which a storage battery accumulates and discharges electrical energy. 948
What is a transformer? For what purpose is it used? 948
Define the watt 948
Describe the use of the Wheatstone bridge . . 948

CHEMISTRY

Define the term chemistry. Name the chief branches of the science. Mention four practical applications of analytical chemistry . . 949
Explain the difference between organic and inorganic chemistry; between compounds and elements 949
Name five examples of chemical change. Explain the term "chemical equivalents" . . . 950
State the effect of acid on litmus paper. What fruit contains tartaric acid? What single acid will dissolve gold? 950–951
Name the principal alkalies. Mention three allotropic forms of carbon 951
Summarize the laws of combining proportions. 951
Give the names and atomic weights of three metals; of three nonmetallic elements. State the melting point of gold; of lead . . . 952–953
Discuss the process of combustion 954
What is an electron? 954
Show how pepsin aids digestion. Discuss the souring of milk 954
Give the chemical formula of common salt; of water; of sulphuric acid; of gold chloride; of sugar. What is the molecular weight of sugar? 954–955
What is a salt? Name three salts 955
Explain how a fire can originate in a pile of oily rags 956
What is the valence of copper? of iron? Indicate the difference between copper sulphate and blue vitriol 956
Name two commercial uses of acetates; of acetone; of acetylene 956
Define "proof spirit." Name three poisonous alkaloids. What alkaloid is used as a local anesthetic? 957
What is aniline? aspirin? calomel? Give a method for preparing a bleaching solution; for preparing Bordeaux mixture 958
State three uses for carbolic acid. Name ten compounds of carbon. What properties of carbon tetrachloride make it useful as a fire extinguisher? 959
Summarize the properties of chlorine 959
Name an explosive, a disinfectant, and a drug, each prepared from coal tar. Name three commercial applications of distillation . . . 960
What is a 4–8–2 fertilizer? 961
Explain the effect of salt upon an icy sidewalk. 961
Compare the properties and uses of helium and hydrogen 962
What strong acid occurs in the normal human stomach? In what human gland is iodine normally found? 962
Describe the remarkable properties of niton. Name four compounds which contain nitrogen. How may ammonia be made from air? 963
Who first used laughing gas in surgery? . . . 963
Which of the elements is most abundant? Compare the properties of oxygen and ozone . . 964
What is the commercial source of pepsin? of phosphorus? Why are phosphates important? 964
Describe plaster of Paris 965
State the amount of an average dose of quinine. What coal-tar product is 500 times sweeter than sugar? 965
How is salt obtained and prepared for use? . . 965
State the relationship between opal, sand, clay, and glass. What is the important feature of fused silica "glass ware"? 966
What is sal soda? Summarize the differences between the Leblanc and the Solvay process of making soda 966
Name five compounds of sulphur. Describe the Frasch process of mining sulphur. Compare the chamber process and the contact process of making sulphuric acid 966–967
Name two kinds of sympathetic ink 967
Describe the Goldschmidt process of welding . 967
State the effects of methanol (wood alcohol) upon the human system 967
Give the chemical name of each of the following: grain alcohol; alum; borax; carbolic acid; quicklime; muriatic acid; baking soda; TNT; water glass 967–968
Summarize the properties of metals 968
Which of the metals is the best conductor of electricity? What metals were known to the ancients? Name the most abundant of the metals 968
Why is aluminum wire frequently substituted for copper in electrical work? 969
Give the principal components of the following alloys: amalgam; antifriction metals; bell metal; brass 969
Point out the difference between brass and bronze. Describe the effects of carbon on the properties of cast iron 970
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Point out the relation of blood pressure to conditions of health and disease 981

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Discuss the structure and the functions of the cerebrum 981–982
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PSYCHOLOGY

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State three types of native intelligence recognized in vocational guidance 1002

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NOTED MATHEMATICIANS

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Johann Kepler	Isaac Newton	Gottfried Wilhelm Leibnitz
Blaise Pascal	James Clerk Maxwell	Leonhard Euler

MATHEMATICS

INTRODUCTORY

From the very earliest times, man has needed some means of counting things in groups. In learning to count beyond 2 or 3, primitive peoples often devised systems based on a grouping of fives, tens, or twenties, as suggested by finger counting and by gestures connected with the hands and the feet. Thus, in Greenland, on the Orinoco, and among the aborigines of Australia, six is "one on the other hand," ten is "two hands," and twenty is "a man." Traces of counting in this fashion still remain in the languages of peoples who use a purely decimal notation; for example, the English word *score* in such expressions as "three score years and ten," the French numeral *quatre-vingts* (four 20's), and the Roman notation. The ancient Babylonians developed a system of grouping by sixties, which still prevails in our system of measuring time and angles.

Had the number of fingers or toes in man been more or less than ten, our numbering system would probably have been different. It is likely that people having six fingers on each hand and six toes on each foot would have adopted a system of notation based on twelve instead of on ten. Such a system would have many advantages over our method of computation, since twelve has four exact divisors, 2, 3, 4, and 6, while ten has only two exact divisors, 2 and 5.

Whatever system is used, the counting of real things in groups still remains the root principle of mathematics. It is true that our "numberings" have become more complicated by reason of our community life and our progress in civilization; but all calculations, no matter how far removed from a mere enumeration of things, ultimately rest on this fundamental principle of arithmetic.

The average individual needs a comparatively limited knowledge of mathematics for his actual use, but that little must be so thoroughly mastered that every part of it is a living reality. It would be difficult to name a calling or a business for which a person with some skill in mathematics is not far better equipped than he would be without it.

BABYLONIA AND EGYPT

The earliest documents relating to mathematics have come from Babylon and Egypt. Early Babylonian clay tablets (3000–2000 B. C.) indicate a well developed system of numbers and a knowledge of land measures. The Babylonians divided the circumference of the circle into 360 degrees. They probably knew that the radius could be applied to the circumference six times as a chord and that each part thus cut off would contain 60 degrees. This was the probable origin of their sexagesimal notation. For the mensuration of the circle, they used, as did the early Hebrews and the Chinese, the value $\pi = 3$.

The earliest definite knowledge of Egyptian mathematics comes from a work in the Rhind collection in the British Museum. This treatise was written on papyrus by a scribe named Ahmes, at least as early as 1700 B. C. It is, as the writer states, a copy, the original of which dates possibly as far back as 3000 B. C.

The structures built by the Egyptians imply a considerable knowledge of applied mathematics. Geometry, in fact, as a practical art, is said to have originated in Egypt. Egyptian surveyors, called by the Greeks *harpendonaptai*, or "rope stretchers," constructed the right angle by stretching, in the form of a triangle, a rope divided by knots into three portions. These portions, whose lengths were in the ratio 3 : 4 : 5, were made the sides of the triangle. The right angle was that opposite the longest side. Present day surveyors occasionally use the same method, employing a steel tape instead of a rope. Herodotus tells us that surveying was developed by the Egyptians to relocate tracts of land after the annual inundations of the Nile.

GREECE

The Greeks were a people much devoted to scientific and philosophical study, but in no branch of learning were their achievements more brilliant than in the field of mathematics. The Greeks received mathematics as a body of practical rules and left it a well developed science.

Thales (640–546 B. C.), a merchant of Miletus, was interested in the geometrical theories and practices of the Egyptians. In the latter part of his life, he established a school at Miletus. He deduced the heights of the pyramids from the lengths of their shadows and measured the distance of ships from shore by the method of similar triangles.

Pythagoras (582–500 B. C.) is credited with the discovery of "irrational numbers," such as $\sqrt{2}$, which cannot be calculated exactly. He is credited also with the formulation of the so-called Pythagorean theorem, according to which the square on the longest side of a right-angled triangle is equal to the sum of the squares on the other two sides.

Plato (429–347 B. C.), though not primarily a mathematician, urged the study of mathematics on his pupils, some of whom were largely instrumental in the development of solid geometry.

Euclid (about 300 B. C.) is responsible for the division of geometry into "books," as they appear in the present day textbook in geometry. His formal statement of theorems, his constructions, proofs, and conclusions, with some alterations and additions, have been followed by the standard textbooks for over 2000 years. With the exception of sacred writings, no book has been translated into so many languages or has been so widely used as the *Elements* of Euclid.

Archimedes (287–212 B. C.), a geometrician and mechanician of Syracuse, was one of the greatest mathematicians of antiquity. His methods of solving problems in mechanics bear a strong resemblance to the methods of the calculus of modern times. By the use of inscribed and of circumscribed regular polygons, he determined the value of π correct to the third decimal place. His contributions to mechanics include the formulation of the laws of the lever, of pulleys, and of screws. The *Principle of Archimedes* is one of the most important propositions in the science of hydrostatics.

SOME FAMOUS PROBLEMS

The development of geometry in ancient times was aided materially by the appearance of problems whose solution seemed to defy the powers of the best mathematicians. These problems were the duplication of the cube, the squaring of the circle, and the trisecting of any angle. It was mainly through attempts to solve these problems that many new propositions and processes were discovered.

Each of these problems is capable of a practical solution by modern methods. However, the condition laid down in the original formulation was that the solution must be effected by no instruments other than the compass and the unmarked straight edge. Modern mathematicians have proved that the problems cannot be solved by means of these instruments only.

Squaring the Circle. This problem is the determination of a square exactly equal in area to a given circle. The problem becomes that of arriving at the exact value of π, the ratio of the circumference to the diameter of a circle. It has been shown in modern times that the exact determination of this ratio is impossible.

Duplication of the Cube. According to tradition, this problem originated from an oracle of Apollo, whose shrine was at Delos. The problem, therefore, was known as the Delian problem. The oracle declared to the Athenians that a pestilence prevailing among them would cease if they would double the cube-shaped pedestal of the altar of Apollo, that is, replace it by another of twice the original volume. This requirement reduces to the solution of the equation $x^3 = 2a^3$. The solution of this equation gives an incommensurable quantity which cannot be represented with the limitations originally laid down. However, through the use of the higher plane curves and of methods somewhat similar to those of modern analytical geometry, the problem was solved even by the ancient Greeks.

Trisection of any Angle. There are many methods of trisecting an angle, and the modern dividing engine makes possible the construction of circular scales by which we may trisect any angle within very small limits of accuracy. None of these methods, however, is limited to the use of the compass and the unmarked straight edge.

Modern mathematics has definitely shown that the problem presents equations that are irreducible and that they can be solved by the aid of a finite number of square roots only for special values of the angle. Polygons of various numbers of sides can be constructed with the compass and the unmarked straight edge, and certain multiples of the angles subtended by these sides can be trisected. A method, however, that claims to trisect *any* angle is only approximate or else employs means disallowed by the limitations of the problem.

Evaluation of the Ratio π. The earliest attempts to determine the value of π were either guesses, or computations made by determining the perimeter of a regular polygon having so large a number of sides that the polygon approached a circle in character. By this method, the value of π was known to fifteen decimal places by the close of the 16th century. This result required the calculation of the perimeter of a polygon of over one billion sides. Modern methods, by the use of infinite converging series, have carried the value to 707 decimal places, as determined by William Shanks in 1873.

The results of modern study have shown that π cannot be expressed as a decimal, as a surd, or as an algebraic number.

HINDUS AND ARABS

The Hindus early developed a pronounced talent for numerical computation. They incorporated into their own system the knowledge of Babylon and of Greece and then worked out many independent results. They seem to have developed the use of the symbol "0" to indicate the *place value* of notation. Thus, in 51 = 50 + 1, the 5 means five tens, while in VI = V + 1, the V means simply five ones. This improvement in symbols was one of the greatest advances in the progress of mathematics.

Brahmagupta (about 598 A. D.) and Bhaskara (born 1114 A. D.) were two notable mathematicians of the Hindu school.

The Arabs carried to Europe a knowledge of Eastern mathematics. From the 9th to the 13th century, the courts of the Mohammedan princes were the seats of remarkable scientific activity, and to this circumstance we owe the preservation of much of the mathematical knowledge of the ancients.

THE RENAISSANCE IN EUROPE

In the 16th century, Tartaglia, Ferro, and Ferrari, in Italy, and Viète, in France, developed algebra to such a point that Descartes, applying the algebraic methods to geometry, invented a new and simple method for the study of many curves which had previously been studied with great difficulty.

Pure geometry was developed by Kepler, Descartes, and Pascal, and the theory of numbers by Fermat. Logarithms were invented by Napier, and the simplification of his method by Briggs led to an ease of computation without which it is probable that the civilization of today would not have attained to its present stage. The most far-reaching advances of the period, however, were the invention of the differential and integral calculus by Newton and Leibnitz and the invention of analytical geometry by Descartes. These inventions had much to do with the foundation of modern mathematics by Euler, Lagrange, and Laplace.

MODERN MATHEMATICS

Since the time of Newton, the older branches of mathematics have steadily grown in power, and many new branches have arisen. Of these, some of the most important are differential geometry, non-Euclidean geometry, vector analysis, quaternions, determinants, and functions of a complex variable.

Argand (1755–1803) published an interpretation of the complex number. His work began the development of this hitherto mysterious quantity in the field of applied mathematics.

In the hands of Abel, Gauss, Cauchy, Weierstrass, and Reimann, the general theory of the complex variable and the various "infinite" processes of mathematical analysis were developed. Invaluable aid was thereby given to most of the great mathematical theories.

Modern science is constantly relying on the aid of the mathematician. To the joint efforts of the pure mathematician and the practical scientist is due, in great degree, our prosperity and the advance of knowledge. Thus the history of modern mathematics is the account of an ever widening development of two interdependent aspects of the science: the inner realm of order among mathematical ideas themselves, and the outer realm, which seeks dominion over material objects in time and space.

MATHEMATICAL EDUCATION

Educational systems must constantly undergo changes to meet conditions imposed by the times in which they exist. The earliest American elementary schools taught arithmetic only and did not go much beyond the study of fractions and of proportion. A few decades later, when high schools first began to appear, arithmetic had become more difficult and included such subjects as duodecimals, alligation, and cube root. Gradually these topics have been replaced by some of the simpler parts of higher mathematics, so that we are studying algebra, geometry, and trigonometry in our secondary schools, whereas large parts of these subjects were formerly considered to be of college grade. The junior high school movement has furthered this reorganization, bringing into the seventh, eighth, and ninth school years the simpler parts of algebra, geometry, and trigonometry and leaving to a later period the formal study of these subjects.

The teaching of mathematics will always form an important part of our educational program. Many mature minds look back with pleasure to the formation of logical habits in their school days by the use of the old-fashioned formal mathematics.

ARITHMETIC

THE word arithmetic is derived from the Greek *arithmos*, meaning number. It is usually defined as the *science* of numbers and the *art* of computation.

Many pupils who stand well in other subjects find great difficulty in mastering arithmetic. Such difficulty often arises because the pupil has not grasped adequately the few basic principles which underlie the use of numbers.

This section explains, in clear and simple language, the arithmetical operations and their application to the various types of problems. It is not intended, however, to take the place of the school textbook or of a teacher. It goes further than the average textbook, which is meant to be used under the guidance of an instructor.

The various problems are accompanied by the most careful explanations, which enable the student to comprehend the *reasons* for the steps in the processes of solution. This is especially true in the case of fractions, which will be found treated in two ways. The problems are first analyzed, with concrete examples, in order to inculcate the *principles* upon which shorter methods are based. Then, after the student has thus learned how and when to employ them, he will find the shorter and more practical solutions given. The material throughout is presented with a thoroughness and a clarity that are not even attempted by the average school text.

For these reasons, the section constitutes an invaluable guide for the person who desires to study or to review arithmetic by himself. For the one who may have forgotten much of the subject, it will serve as a work of ready reference. It will be found extremely helpful also to the student who has experienced trouble with arithmetic and to every teacher who values simple and effective ways of presenting a subject usually considered difficult to teach.

In the study of arithmetic, there are certain tasks which cannot be performed by the most competent teacher or by the most perfect book. There is no substitute for a thorough mastery of the multiplication tables and similar elementary but absolutely necessary groups of facts. Such knowledge should be so familiar that its use becomes a habit of the mind.

DEFINITIONS

Many definitions are given where they are first required, that is, in connection with the topics which they concern. Other definitions, which belong to the whole subject of arithmetic, are as follows:

A **unit** is one, or a single thing: 1, one day, one dollar.

A **number** is a unit, or a collection of units: 1, 4, 18, 23, 35.

A **figure** is a character or symbol used to express a number: 2, 3, 9.

Notation is a method of writing or expressing numbers by characters. The notation in common use today is the Arabic, or decimal, system. According to this system, numbers are expressed as so many individual units, tens, hundreds, and higher powers of ten. The figure designating how many of each power of ten are included, has a fixed relative position. The powers of ten, such as hundreds, thousands, and ten-thousands, are called units of different **orders.**

The different orders of units increase from right to left, and decrease from left to right, in a tenfold ratio. The number 64,832 contains units of five different orders—ones (units), tens, hundreds, thousands, and ten-thousands. The figure 2 placed at the extreme right indicates that the number includes 2 ones. The figure 3, standing in the second position from the right, designates 3 tens. The figure 8, in the third place from the right, means 8 hundreds. Similarly, in this number, 4 means 4 thousands, and 6 means 6 ten-thousands.

A **digit** is any of the ten figures or symbols, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, by which all numbers may be expressed. Many authorities do not include 0 with the digits. By itself, 0 expresses no value, but it is used with other digits in order to preserve their relative position, thereby showing the order of units which they represent.

Significant figures are figures that remain to a number or decimal after the ciphers at the right or left are canceled. Thus, the significant figures of 35,000, or of .0035, are 35.

An **aliquot part** of a number is that part which will divide the number without a remainder: 6 is an aliquot part of 18.

An **abstract number** is a number used without reference to any particular thing or quantity: 5, 20, 37.

A **concrete number** is a number used with reference to some particular thing or quantity: 4 bushels, 17 dollars.

A **factor** is any of the numbers which, when multiplied together, form a product: 3 and 5 are factors of 15; 6 and 4 are factors of 24.

A **prime number** is a number having no factor other than itself and 1. Such, for example, are 5, 7, 13, 17, 29.

A **prime factor** is a factor that is a prime number: 7 is a prime factor of 21.

A **composite number** is a number that has factors other than itself and 1. Examples of composite numbers are 8, 9, 42.

An **even number** is a number that is divisible by 2 without a remainder: 4, 6, 30.

An **odd number** is a number that is not divisible by 2 without a remainder: 3, 9, 27.

An **integer** is a whole number: 7, 16, 23.

A **problem** is a question to be solved.

A **solution** is a statement or a series of statements showing how a problem is solved.

ADDITION

Addition is the process of uniting several numbers into one equivalent number.

The **addends** are the numbers to be added.

The **sum** is the result obtained by addition.

Like numbers are numbers that represent the same kind of units: 17 and 25; 18 bushels and 3 bushels; 12 boys and 5 boys.

Unlike numbers are numbers that represent different kinds of units: 8 days and 4 dollars; 35 miles and 4 hours.

Only *like numbers* can be added.

The sign + indicates addition and is read *and* or *plus.*

The sign = indicates equality and is read *equals* or *is equal to.*

ADDITION BY CARRYING

Problem. Find the sum of 8378, 4872, and 8847.

Solution.—

ten-thousands	thousands	hundreds	tens	units	
	8,	3	7	8	Write the numbers so that units of like order stand in the same column.
	4,	8	7	2	
	8,	8	4	7	
2	2,	0	9	7	

Add the figures in the column of units. The result is 17 units, or 1 ten and 7 units. Write the 7 units under the column of units. Add the 1 ten to the column of tens. This column then totals 19 tens or 1 hundred, and 9 tens. Place the 9 tens under the

column of tens. Adding the 1 hundred to the figures in the hundreds' column, we have 20 hundreds, or 2 thousands and no hundreds. Place a cipher under the hundreds' column. The 2 thousands added to the figures in the thousands' column make 22 thousands, or 2 ten-thousands and 2 thousands. Write the 2 thousands under the column of thousands and place the 2 ten-thousands in the next column to the left. The sum of the addends, therefore, is 22,097.

It will be observed that the sum of each of these columns consists of two figures, one of which represents the next higher order of units. The figure representing the next higher order of units, when added to its proper column, is said to be *carried*; hence the name of the process.

TO PROVE ADDITION

(1) *Reverse the direction of adding.* Add *up*, then add *down*, each column.

(2) *Add columns separately.* Add by columns without carrying.

8378	8378
4872	4872
8847	8847
17	20
18	19
19	18
20	17
22,097	22,097

The method shown is very desirable in cases where there is much liability to interruption.

Add each column separately and set the unit figure of each column sum under its corresponding column. Add the column sums as shown. Reverse the direction of adding the columns.

(3) *Cast out nines.* Find the sum of the digits, or figures, in each addend. Divide each sum by 9. The remainder, if any, is called the excess of 9's for that addend. Add these excesses, and find the excess of 9's in this sum. Find the excess of 9's in the answer to the problem. If the work is correct, the two results will agree.

8,378	Excess of 9's in 26 =	8.
4,872	Excess of 9's in 21 =	3.
8,847	Excess of 9's in 27 =	0.
22,097	Excess of 9's in 20 = **2**.	11 Excess of 9's in 11 = **2**.

The sum of the digits in the first addend is 26 and the excess of 9's in 26 is 8; the sum of the digits in the second addend is 21 and the excess of 9's in 21 is 3; the sum of the digits in the third addend is 27, in which number there is no excess of 9's. The sum of the excesses is 11 and the excess of 9's in 11 is 2. The sum of the digits in the answer to the problem is 20 and the excess of 9's in 20 is 2. The two results agree and the work is probably correct.

This method of checking will not detect transposition of numbers or errors in the casting out of nines.

SUBTRACTION

Subtraction is the process of finding how much greater one number is than another.

The **minuend** is the number from which another number is subtracted.

The **subtrahend** is the number to be subtracted.

The **difference** or **remainder** is the result obtained by subtraction.

The sign − indicates subtraction and is read *less* or *minus*.

Two methods of subtraction are in common use: (1) the "taking away" method; (2) the Continental, or Austrian, method.

THE "TAKING AWAY" METHOD

Problem. Subtract 929 from 1486.

Solution.—

1486 minuend	Write the subtrahend under the minuend, placing units of the same order in the same column.
929 subtrahend	
557 remainder	

Begin the subtraction at the column of units. Since we cannot take 9 units from 6 units, we take 1 ten from the tens' column and reduce it to units. 1 ten = 10 units. Adding 10 units to the 6 units, we have 16 units. 9 units from 16 units = 7 units. Place the 7 units under the column of units. Since we have taken 1 ten from 8 tens, we have only 7 tens left. 2 tens from 7 tens = 5 tens. Write the 5 tens under the column of tens. 9 hundreds from 14 hundreds = 5 hundreds. Write the 5 hundreds under the hundreds' column. The remainder, or difference, is 557.

THE CONTINENTAL (AUSTRIAN) METHOD

Problem. Subtract 929 from 1486.

Solution.—

1486 minuend
929 subtrahend
557 remainder

(9 plus how many are 16?) 9 plus **7** are 16; 1 to carry.

The 1 is carried to the tens' column of the subtrahend and is added to the 2, which thus becomes 3.

(3 plus how many are 8?) 3 plus **5** are 8; 0 to carry.

(9 plus how many are 14?) 9 plus **5** are 14.

The figures in bold-faced type are those which appear in the result.

This method is also called the "making change" method and the method of "complementary addition."

TO PROVE SUBTRACTION

(1) *By addition.* Add the remainder to the subtrahend. The result, if correct, will equal the minuend.

$$929 + 557 = 1486.$$

(2) *By subtraction.* From the minuend, subtract the remainder. The result, if correct, will equal the subtrahend.

$$1486 - 557 = 929.$$

(3) *By casting out nines.*

(a) Add the excesses of 9's in the remainder and the subtrahend. The excess of 9's in the result should equal the excess of 9's in the minuend.

remainder	557	Excess of 9's =	8.
subtrahend	929	Excess of 9's =	2.
minuend	1486	Excess of 9's = **1**.	10 Excess of 9's = **1**.

It will be observed that this process is similar to the proof of an addition by casting out nines.

(b) Subtract the excess of 9's in the subtrahend from the excess of 9's in the minuend. If the result is equal to the excess of 9's in the remainder, or difference, the work is probably correct.

If the excess of 9's in the subtrahend is greater than that in the minuend, add one 9 to the minuend figure and then subtract.

minuend	1486	Excess of 9's	= 1.
subtrahend	929	Excess of 9's	= 2.
remainder	557	Excess of 9's = **8**.	8

MULTIPLICATION

Multiplication is the process of taking one number as many times as there are units in another; it is a short process of finding the sum of equal numbers.

The **multiplicand** is the number to be multiplied.

The **multiplier** is the number by which to multiply; it shows how many times the multiplicand is taken.

The **factors** are the multiplicand and the multiplier, or the numbers multiplied.

The **product** is the result obtained by multiplication.

Partial products are the several results obtained by multiplying the multiplicand by each digit of a multiplier which contains two or more figures.

The sign × indicates multiplication. It is read *times* when it precedes the multiplicand, and *multiplied by* when it follows the multiplicand.

Problem. Multiply 986 by 75.

Solution.—

```
  986 multiplicand
   75 multiplier
 4930 partial product
6902  partial product
-----
73,950 product
```

Write the multiplier under the multiplicand, placing units of like order in the same column.

The multiplicand, 986, represents 9 hundreds, 8 tens, and 6 units. 6 units × 5 = 30 units. 30 units = 3 tens and 0 units. Write the 0 under the units' column and carry the 3 tens to be added to the tens' column. 8 tens × 5 = 40 tens. 40 tens + 3 tens = 43 tens. 43 tens = 4 hundreds and 3 tens. Write the 3 under the tens' column and carry the 4 to be added to the hundreds' column. 9 hundreds × 5 = 45 hundreds. 45 hundreds + 4 hundreds = 49 hundreds. 49 hundreds = 4 thousands and 9 hundreds Write 49 so that the 9 stands in the hundreds' column and the 4 stands in the thousands' column, which represents the next higher order of units. The first partial product is thus 4930. The second partial product, 6902, obtained in a similar manner, is written so that the 2 stands in the tens' column because the 7 of the multiplier represents 7 tens. The sum of the two partial products so written is 73,950, the product of 986 and 75.

The result will not be affected by interchanging the multiplicand and the multiplier, that is, by using 75 as the multiplicand and 986 as the multiplier.

TO PROVE MULTIPLICATION

(1) *By reversing the order of multiplication and multiplying again.*

```
  986        75
   75       986
```

(2) *By dividing the product by either the multiplicand or the multiplier.* In either case, the quotient should be the other factor.

```
      75          986
986|73,950    75|73,950
```

(3) *By casting out nines.*

Find the excess of 9's in the multiplicand and in the multiplier. Multiply the numbers so obtained. If the excess of 9's in the product agrees with the excess of 9's in the answer to the problem, the work is probably correct.

```
multiplicand  986 Excess of 9's  =  5.
multiplier     75 Excess of 9's  =  3.
product    73,950 Excess of 9's = 6.   15 Excess of 9's = 6.
```

SHORT METHODS

(1) To Multiply an Integer by 10, 100, 1000, etc.

Annex to the multiplicand as many ciphers as there are ciphers in the multiplier.

Problem. Multiply 28 by 1000.

Solution.—Three ciphers annexed to 28 gives 28,000, which is the product required.

(2) To Multiply Integers Ending in Ciphers.

Multiply the significant figures and annex to the product as many ciphers as there are ciphers in the multiplicand and the multiplier together.

Problem. Multiply 540 by 300.

Solution.—54 × 3 = 162. Three ciphers annexed to 162 gives 162,000.

(3) To Multiply Integers by 9, 99, or Any Other Number Consisting of 9's.

Annex to the multiplicand as many ciphers as there are 9's in the multiplier and from this result subtract the multiplicand.

Problem. Multiply 476 by 99.

Solution.—Two ciphers annexed to 476 gives 47,600. 47,600 − 476 = 47,124.

(4) To Multiply Integers by 25, 50, 75, etc.

To multiply by 25, multiply the multiplicand by 100 and divide the product by 4.

Problem. Multiply 384 by 25.

Solution.—384 × 100 = 38,400.
38,400 ÷ 4 = 9,600.

To multiply by 50, multiply the multiplicand by 100 and divide the product by 2.

Problem. Multiply 384 by 50.

Solution.—384 × 100 = 38,400.
38,400 ÷ 2 = 19,200.

To multiply by 75, multiply the multiplicand by 100; divide the product by 4 and multiply the result by 3.

Problem. Multiply 384 by 75.

Solution.—384 × 100 = 38,400.
38,400 ÷ 4 = 9,600.
9,600 × 3 = 28,800.

DIVISION

Division is the process of finding how many times one number is contained in another.

The **dividend** is the number to be divided.

The **divisor** is the number by which the dividend is divided.

The **quotient** is the result obtained by division and indicates how many times the divisor is contained in the dividend.

The **remainder** is the part of the dividend that is left when the divisor is not exactly contained in the dividend; it is always less than the divisor. When there is no remainder, the division is said to be **exact.**

The sign of division is ÷. It is read *divided by.* Division is indicated as follows:

36 ÷ 9 ; $\frac{36}{9}$; 9)36 ; 9|36 ; 36/9 ; 36 : 9.

Problem. Divide 54,862 by 85.

Solution.—

```
                645 37/85   quotient
divisor 85|54,862           dividend
          51 0
           3 86   Write the divisor at the
           3 40   left of the dividend and
             462  separated from it by a ver-
             425  tical line.
              37   remainder
```

Since 54 will not contain the divisor, 85, it is necessary to take 548 as a partial dividend to be divided by 85. The number of times 85 is contained in 548 is determined by estimating the number of times 8, the left-hand figure of the divisor, is contained in the left-hand figure of the dividend. Since 5 is too small to contain 8, we estimate the number of times 8 is contained in 54. Eight is contained in 54 six times. We thus estimate that 85 is contained in 548 six times. The first quotient figure, therefore, is 6. Write the 6 over 8 in the dividend, the last of the three figures chosen for the partial dividend. Multiply the divisor, 85, by 6, writing the product, 510, beneath the first three figures of the dividend as shown. Subtract 510 from 548 in the dividend. To the difference, 38, append the 6, "brought down" from the dividend, where it stood immediately to the right of the figures 548. The difference then appears as 386.

This process is repeated, 386 now being regarded as the dividend. 85 is contained in 386 four times. Write the 4 in the quotient to the right of the quotient figure previously obtained. Multiply 85 by 4 and write the product, 340, beneath 386. Subtract 340 from 386. To the difference, 46, append the 2 "brought down" from the dividend, and we have 462, which is now regarded as the dividend. 85 is contained in 462 five times. Write the 5 in the quotient to the right of the other quotient figures. Multiply 85 by 5, writing the product, 425, beneath 462. Subtracting 425 from 462, we have 37.

When there are no more digits to be "brought down," the process of division is complete. The difference, if any, obtained in the final step is the remainder, which should be written in the quotient with the divisor under it and separated from it by a horizontal or an oblique line. The quotient of 54,862 divided by 85 is $645\frac{37}{85}$.

When the process of division is carried out in full as shown in the above problem, the operation is called **long division.**

When the multiplication and the subtraction in the process of division are performed mentally, only the quotient figures and the differences being written at each step, the operation is called **short division.** The work for the same problem then appears as follows:

	$645\frac{37}{85}$	quotient
divisor 85	54,862	dividend
	3 86	
	462	
	37	remainder

Short division is especially useful when the divisor consists of one figure only. In that case, the quotient only is usually written:

divisor 9	8763	dividend
	$973\frac{2}{3}$	quotient

TO PROVE DIVISION

(1) *By multiplication.*

If the division is exact, multiply the quotient by the divisor. Where there is a remainder, multiply the integral part of the quotient by the divisor and to the product add the remainder. The result in either case should equal the dividend.

$$645 \times 85 = 54{,}825.$$
$$54{,}825 + 37 = 54{,}862.$$

(2) *By casting out nines.*

Multiply the excess of 9's in the quotient by the excess of 9's in the divisor; from this product, cast out the 9's. The result should be equal to the excess of 9's in the dividend after the remainder, if any, has been subtracted.

quotient 645 Excess of 9's = 6.
divisor 85 Excess of 9's = 4.

24 Excess of 9's = **6.**

54,862 − 37 = 54,825 Excess of 9's = **6.**

SHORT METHODS

(1) When the Divisor is 10, 100, 1000, etc.

Cut off from the right hand of the dividend as many figures as there are ciphers in the divisor. Place the divisor under the figures cut off and the whole will be the quotient.

Problem. Divide 3875 by 100.

Solution.— $3875 \div 100 = 38\frac{75}{100}$.

(2) When the Divisor is 20, 25, 50, etc., an Aliquot Part of a Unit of Higher Order.

Divide the dividend by a unit of the order next higher than the divisor. Take the result as many times as the divisor is contained in this next higher unit.

Problem. Divide 42,800 by 25.

Solution.—

$$42{,}800 \div 100 = 428.$$
$$428 \times 4 = 1712.$$

The divisor, 25, is ¼ of 100, the next higher unit. When a number is divided by 100, which is 4 times 25, the quotient will be ¼ of what it would be if the number were divided by 25. Since the divisor is 4 times as great, the quotient will be ¼ as large. Therefore, to divide by 25, divide the dividend by 100 and multiply the result by 4.

TESTS OF DIVISIBILITY

2 is an exact divisor of an *even* number, that is, a number the right-hand digit of which is 0, 2, 4, 6, or 8.

3 is an exact divisor of a number, the sum of whose digits is divisible by 3.

4 is an exact divisor of a number if its two right-hand figures are ciphers, or if the number expressed by its two right-hand figures is divisible by 4.

5 is an exact divisor of any number whose right-hand digit is 0 or 5.

6 is an exact divisor of an even number, the sum of whose digits is divisible by 3.

8 is an exact divisor of a number whose three right-hand figures are ciphers, or if the number expressed by its three right-hand figures is divisible by 8.

9 is an exact divisor of any number having digits whose sum is divisible by 9.

10 is an exact divisor of any whole number whose units' digit is 0.

12 is an exact divisor of a number divisible by both 3 and 4.

GREATEST COMMON DIVISOR

A **common divisor** of two or more numbers is a number that is an exact divisor of each of them.

The **greatest common divisor** (G. C. D.) of two or more numbers is the greatest number that is an exact divisor of each of them.

Numbers prime to each other are such as have no common divisor: 7 and 12; 8, 9, and 11.

(1) To Find the Greatest Common Divisor of Numbers That Can be Readily Factored.

(a) Separate each number into its prime factors; multiply the factors that are common to all, taking each factor the greatest number of times it occurs in every number. The product will be the G. C. D.

Problem. Find the G. C. D. of 27, 36, and 45.

Solution.—

$$27 = 3 \times 3 \times 3.$$
$$36 = 2 \times 2 \times 3 \times 3.$$
$$45 = 3 \times 3 \times 5.$$
$$3 \times 3 = 9. \quad \text{G. C. D.}$$

(b) Divide the numbers by any factor common to all; divide the quotients in the same manner and continue the division until there is a set of quotients prime to each other. Multiply the divisors and the product will be the G. C. D.

3	27	36	45
3	9	12	15
	3	4	5

$3 \times 3 = 9$. G. C. D.

(2) To Find the Greatest Common Divisor of Numbers That Cannot be Readily Factored.

Divide the larger number by the smaller. If there is a remainder, divide the preceding divisor by this remainder. Continue in this manner until there is no remainder. The last divisor is the G. C. D.

Problem. Find the G. C. D. of 161 and 207.

Solution.—

161 | 207 | 1
161
46 | 161 | 3
138
23 | 46 | 2
46

23 = G. C. D.

Problem. Find the G. C. D. of 425 and 3825.

Solution.—

$$425 \mid 3825 \mid 9$$
$$3825$$

425 = G. C. D.

If more than two numbers are given, find the greatest common divisor of two of them, then of this divisor and of one of the remaining original numbers, and so on. The last common divisor will be the G. C. D.

Problem. Find the G. C. D. of 292, 1022, and 1095.

Solution.—

$$292 \mid 1022 \mid 3 \qquad 146 \mid 1095 \mid 7$$
$$876 \qquad 1022$$
$$146 \mid 292 \mid 2 \qquad 73 \mid 146 \mid 2$$
$$292 \qquad 146$$

73 = G. C. D.

Numbers that contain no common factor cannot have a greatest common divisor: 30 and 77; 8, 12, and 15. Such numbers are prime to each other.

LEAST COMMON MULTIPLE

A **multiple** of a given number is a number that is exactly divisible by the given number.

A **common multiple** of two or more numbers is a number that is exactly divisible by each of those numbers.

The **least common multiple** (L. C. M.) of two or more numbers is the least number that is exactly divisible by each of those numbers.

To Find the Least Common Multiple of Two or More Numbers.

(1) Separate each number into its prime factors. Take each prime factor the greatest number of times it occurs in any one of the numbers. The product of the factors thus selected is the L. C. M.

Problem. Find the L. C. M. of 27, 36, and 45.

Solution.—

$27 = 3 \times 3 \times 3.$
$36 = 3 \times 3 \times 2 \times 2.$
$45 = 3 \times 3 \times 5.$

$3 \times 3 \times 3 \times 2 \times 2 \times 5 = 540$. L. C. M.

(2) Divide the numbers by any factor common to any two or more of the numbers. Bring down the quotients and any indivisible numbers. Repeat the process until the quotients are prime to each other. The product of the divisors and the last quotients is the L. C. M.

Problem. Find the L. C. M. of 7, 18, and 24.

Solution.—

$$3 \mid 7 \quad 18 \quad 24$$
$$2 \mid 7 \quad 6 \quad 8$$
$$7 \quad 3 \quad 4$$

$3 \times 2 \times 7 \times 3 \times 4 = 504$. L. C. M.

CANCELLATION

Cancellation is the process of shortening computations in division by rejecting factors common to both dividend and divisor.

Problem. Divide $12 \times 5 \times 18 \times 70$ by $3 \times 14 \times 9 \times 20$.

Solution.—

$$\frac{\overset{2}{\cancel{12}} \times 5 \times \overset{9}{\cancel{18}} \times \overset{7}{\cancel{70}}}{\underset{2}{\cancel{3}} \times \cancel{14} \times \underset{2}{\cancel{9}} \times \cancel{20}} = 10$$

By inspection, it will be seen that 10 is a factor common to 70 in the dividend and to 20 in the divisor. Draw a line through 70 and above it write 7, the quotient of 70 when divided by the common factor 10. 20 in the divisor will, similarly, be replaced by 2, as shown. 7 in the dividend and 14 in the divisor have 7 as a common factor, which, being rejected, leaves 2 in place of 14 and 1 in place of the 7. The 1 is seldom written. When all factors common to both dividend and divisor have been rejected in this manner, divide the product of the remaining factors of the dividend by the product of the remaining factors of the divisor. Two factors, 2 and 5, remain in the dividend and none in the divisor. $2 \times 5 = 10$.

COMMON FRACTIONS

A **fraction** is one or more of the equal parts of a unit.

If a unit, which is a single thing, is divided into 2 equal parts, one of the parts is called *one half* of the unit and is represented by the fraction $\frac{1}{2}$; if a unit is divided into 3 equal parts, one of the parts is called *one third*, or $\frac{1}{3}$ of the unit; if a unit is divided into 4 equal parts, each part is called $\frac{1}{4}$ of the unit, and so on.

A unit that is divided into *halves* contains only 2 equal parts. Since one part is $\frac{1}{2}$, 2 parts, or the whole, $= \frac{2}{2}$. A unit divided into *fourths* must contain 4 equal parts: 1 part is $\frac{1}{4}$; 2 parts are $\frac{2}{4}$; 3 parts are $\frac{3}{4}$; 4 parts, or the whole, are $\frac{4}{4}$. It is clear, then, that fractions like $\frac{4}{4}$, $\frac{5}{5}$, $\frac{8}{8}$, $\frac{7}{7}$, express the *whole*; each fraction represents the *whole unit* or all of the parts into which each unit is divided. An expression such as $\frac{2}{3}$, $\frac{3}{4}$, $\frac{4}{5}$, or anything less than $\frac{3}{3}$, $\frac{4}{4}$, $\frac{5}{5}$, etc., represents but a *fractional part* of the unit.

A **common fraction** is a fraction expressed by two numbers, one under the other with a line between them: $\frac{1}{3}$; $\frac{5}{8}$; $\frac{7}{9}$.

The **denominator** of a fraction is the number below the line. This number is called the denominator because it always *denominates*, or *names*, the parts, whether *thirds*, *fourths*, *fifths*, etc., into which the unit is divided.

If an orange is cut into 2 equal parts, one of these parts is larger than each piece of the same orange would be if the orange were cut into 3 equal parts. It is evident, therefore, that $\frac{1}{3}$ is less in value than $\frac{1}{2}$, that $\frac{1}{4}$ is less than $\frac{1}{3}$, and so on. In other words, the larger the denominator, the *greater* the number of parts into which the unit is divided and the *smaller* their size. As the denominator of the fraction grows larger, the parts of the unit grow smaller.

A **common denominator** is a denominator that is common to two or more fractions: 12 is a common denominator of $\frac{1}{12}$, $\frac{5}{12}$, $\frac{7}{12}$.

The **least common denominator** (L. C. D.) is the least denominator that can be made common to two or more fractions without changing their value. The L. C. D. of several fractions is the L. C. M. of the given denominators: The L. C. D. of $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{7}{8}$ is 8, which is also the L. C. M. of 2, 4, and 8.

The **numerator** of a fraction is the number above the line.

The fraction $\frac{5}{8}$, for example, shows that the unit is divided into 8 equal parts and that 5 of these parts are under consideration; $\frac{7}{8}$ means that 7 of these parts are being considered, and so on. It follows, therefore, that the number above the line *numbers* or *numerates* the parts; it always shows *how many* are taken.

The **terms** of a fraction are the numerator and the denominator.

A fraction is an expressed division. The numerator is the *dividend* and the denominator is the *divisor*.

The **value** of a fraction is the result obtained by dividing its numerator by its denominator.

A **proper fraction** is a fraction whose value is less than 1. Its numerator is less than its denominator: $\frac{2}{3}$; $\frac{7}{9}$; $\frac{5}{12}$.

An **improper fraction** is a fraction whose value is 1 or more than 1. Its numerator equals or exceeds its denominator: $\frac{5}{5}$; $\frac{4}{3}$; $\frac{10}{7}$.

A **mixed number** is a number expressed by an integer, or whole number, and a fraction: $7\frac{3}{4}$; $16\frac{2}{3}$.

The **reciprocal** of a fraction is the fraction inverted: the reciprocal of $\frac{3}{7}$ is $\frac{7}{3}$.

Similar fractions are fractions that have a common denominator: $\frac{5}{8}$ and $\frac{7}{8}$.

Dissimilar fractions are fractions that have different denominators: $\frac{1}{4}$; $\frac{3}{8}$; $\frac{5}{12}$.

A fraction is in its **lowest terms** when its numerator and its denominator are prime to each other, that is, when the terms of the fraction have no common divisor: $\frac{4}{5}$; $\frac{7}{9}$; $\frac{15}{17}$.

Of two fractions having the same denominator, the one having the larger numerator has the greater value: $\frac{7}{12}$ is more than $\frac{5}{12}$.

Of two fractions having the same numerator, the one having the larger denominator has the smaller value: $\frac{5}{9}$ is less than $\frac{5}{8}$.

Multiplying the numerator or dividing the denominator by a number multiplies the fraction by that number. Thus, in the fraction $\frac{3}{7}$, if the numerator, 3, is multiplied by 2, the fraction itself is multiplied by 2, becoming $\frac{6}{7}$. Similarly, in $\frac{3}{8}$, if the denominator, 8, is divided by 2, the fraction is multiplied by 2, becoming $\frac{3}{4}$.

Dividing the numerator or multiplying the denominator by a number divides the fraction by that number. Thus, in the fraction $\frac{4}{9}$, if the numerator, 4, is divided by 2, the fraction $\frac{4}{9}$ is divided by 2, becoming $\frac{2}{9}$. Likewise, in $\frac{5}{9}$, if the denominator, 5, is multiplied by 2, the fraction is divided by 2, becoming $\frac{5}{10}$.

REDUCTION OF FRACTIONS

Reduction of fractions is the process of changing the form of fractions without changing their value.

(1) To Reduce Fractions to Higher Terms.

Fractions may be reduced to higher terms by multiplication. Multiply each term of the fraction by the number necessary to give the fraction the new denominator.

Problem. Reduce $\frac{3}{4}$ to twelfths.

Solution.—To obtain twelfths, it is necessary to divide the unit into 12 equal parts. An orange that has been divided into *fourths* contains 4 equal parts. The same orange may be divided into *twelfths* by cutting each one of the *fourths* into 3 equal parts. Since in $\frac{1}{4}$ of the orange there are $\frac{3}{12}$, in $\frac{3}{4}$ of the orange there are 3 times as many, or $\frac{9}{12}$. Therefore, $\frac{3}{4} = \frac{9}{12}$.

The new denominator, 12, is 3 times the given denominator, 4. By multiplying each term of the fraction $\frac{3}{4}$ by 3, the fraction becomes $\frac{9}{12}$. Therefore, $\frac{3}{4} = \frac{9}{12}$.

Multiplying both numerator and denominator by the same number changes the *form* of a fraction but does not change its *value*.

(2) To Reduce Fractions to Lower Terms.

Fractions may be reduced to lower terms by division if the numerator and the denominator contain one or more common factors. Divide each term of the fraction by the common factor or factors.

Problem. Reduce $\frac{6}{8}$ to fourths.

Solution.—To obtain fourths, an orange must be divided into 4 equal parts. $\frac{1}{8}$ of an orange is obtained by dividing an orange into 8 equal parts, which is the same as dividing each quarter into 2 equal parts. $\frac{2}{8} = \frac{1}{4}$. Then $\frac{6}{8}$ is equivalent to $\frac{3}{4}$.

The new denominator, 4, is $\frac{1}{2}$ of the given denominator, 8. By dividing each term of the fraction $\frac{6}{8}$ by 2, the fraction becomes $\frac{3}{4}$. Therefore, $\frac{6}{8} = \frac{3}{4}$.

Dividing both numerator and denominator by the same number changes the *form* of a fraction but does not change its *value*.

(3) To Reduce an Improper Fraction to a Whole or Mixed Number.

Divide the numerator by the denominator. If the division is *exact*, the quotient will be an integer. In all other cases, however, the result will be a mixed number.

Problem. Change $\frac{64}{8}$ to a whole or mixed number.

Solution.—Since in 1 unit there are 8 eighths ($\frac{8}{8}$), there are as many units in $\frac{64}{8}$ as the number of times 8 is contained in 64, which is 8. Therefore, $\frac{64}{8} = 8$. The division is exact.

It will be seen that the above solution is equivalent to dividing the numerator by the denominator: $\frac{64}{8} = 8$.

Problem. Change $12\frac{1}{7}$ to a whole or mixed number.

Solution.—1 unit = 7 sevenths ($\frac{7}{7}$). The number of units in $12\frac{1}{7}$ is equal to the number of times 7 is contained in 12, which is $1\frac{5}{7}$. Therefore, $12\frac{1}{7} = 1\frac{5}{7}$. The division is not exact.

As in the preceding problem, the result may be obtained by dividing the numerator by the denominator: $12\frac{1}{7} = 1\frac{5}{7}$.

(4) To Reduce a Mixed Number to an Improper Fraction.

Multiply the whole number by the denominator of the fraction. To the product add the numerator and under the result write the denominator.

Problem. Change $16\frac{2}{3}$ to an improper fraction. In other words, how many thirds are there in $16\frac{2}{3}$?

Solution.—Since in 1 unit there are $\frac{3}{3}$, in 16 units there are 16 times $\frac{3}{3}$, or $\frac{48}{3}$. Adding $\frac{48}{3}$ and $\frac{2}{3}$, we have $\frac{50}{3}$. Therefore, $16\frac{2}{3} = \frac{50}{3}$.

The above solution is equivalent to the following: $16 \times 3 = 48$; $48 + 2 = 50$; $16\frac{2}{3} = \frac{50}{3}$.

(5) To Reduce an Integer to a Fraction.

An integer may be reduced to fractional form by writing 1 under it for a denominator: $27 = \frac{27}{1}$. Since a fraction is an expressed division, $\frac{27}{1}$ shows that 27 is divided by 1. There are 27 ones in 27. Therefore, $\frac{27}{1} = 27$.

(6) To Reduce Two or More Fractions to a Common Denominator.

A common multiple of the denominators will be a common denominator of the fractions.

Divide the common multiple of the denominators by the denominator of each fraction and multiply both terms of each fraction by the quotient.

Problem. Reduce $\frac{1}{2}$ and $\frac{2}{3}$ to a common denominator.

Solution.—A common denominator of $\frac{1}{2}$ and $\frac{2}{3}$ is 6. To change $\frac{1}{2}$ to sixths, multiply each term of the fraction $\frac{1}{2}$ by 3. Thus, $\frac{1}{2} = \frac{3}{6}$. To change $\frac{2}{3}$ to sixths, multiply each term of the fraction $\frac{2}{3}$ by 2. Thus, $\frac{2}{3} = \frac{4}{6}$. Therefore, the fractions $\frac{1}{2}$ and $\frac{2}{3}$, when changed to a common denominator, become $\frac{3}{6}$ and $\frac{4}{6}$.

(7) To Reduce Fractions to Their Least Common Denominator.

The L. C. D. of two or more fractions must be the L. C. M. of their denominators.

Divide the L. C. M. of the denominators by the denominator of each fraction, and multiply both terms of each fraction by the quotient.

Problem. Reduce $\frac{5}{6}$, $\frac{3}{4}$, and $\frac{5}{9}$ to their least common denominator.

Solution.—The L. C. M. of 3, 4, and 6 is 12, which is also the L. C. D. of the fractions. The fraction $\frac{5}{6}$ changed to twelfths—which is *reducing the fraction to higher terms*—becomes $\frac{10}{12}$; $\frac{3}{4}$ changed to twelfths is $\frac{9}{12}$; $\frac{5}{9}$ changed to twelfths is $\frac{11}{12}$. Therefore, $\frac{5}{6}$, $\frac{3}{4}$, and $\frac{5}{9}$ changed to their L. C. D. = $\frac{10}{12}$, $\frac{9}{12}$, and $\frac{11}{12}$.

ADDITION OF FRACTIONS

(1) To Add Fractions Having a Common Denominator.

Add the numerators and place the sum over the denominator.

Problem. Add 1/14, 8/14, and 7/14.

Solution.—

$$1/14 + 8/14 + 7/14 = \frac{1+8+7}{14} = 1\frac{1}{14}.$$

(2) To Add Fractions Having Different Denominators.

Only *similar* fractions can be added. Therefore, two or more fractions that have different denominators must be reduced to a common denominator before they can be added. This is done as follows: Find the L. C. M. of the denominators and multiply both terms of each fraction by the factor necessary to give each fraction the common denominator. Add the numerators only and place the sum over the common denominator.

Problem. Add 2/3 and 3/4.

Solution.—Divide a unit into 3 equal parts; divide another unit of the same size into 4 equal parts. By dividing each unit also into 12 equal parts, it will be seen that in 1/3 there are 4/12 and in 1/4 there are 3/12. Since 1/3 = 4/12, then 2/3 will be twice as much, or 8/12. Since 1/4 = 3/12, then 3/4 will be 3 times as much, or 9/12. Therefore, 2/3 = 8/12; 3/4 = 9/12. 8/12 + 9/12 = 17/12 = 1 5/12.

The above solution is equivalent to the following: The L. C. D. of 2/3 and 3/4 is 12. 2/3 = 8/12; 3/4 = 9/12. 8/12 + 9/12 = 17/12 = 1 5/12.

(3) To Add Mixed Numbers.

Add the integers and the fractions separately; then add their sums.

Problem. Add 18 5/6 and 14 2/3.

Solution.—As in the preceding problem, the fractions must be changed to similar fractions before they can be added. Divide a unit into 6 equal parts; divide another unit of the same size into 9 equal parts. By dividing each unit also into 18 equal parts, it will be seen that 1/6 = 3/18 and 1/9 = 2/18. Then 5/6 = 15/18 and 2/9 = 4/18. 15/18 + 4/18 = 19/18 = 1 1/18. 18 + 14 = 32. 32 + 1 1/18 = 33 1/18.

The above solution is equivalent to the following: The L. C. D. of 6 and 9 is 18. 5/6 = 15/18; 18 5/6 = 18 15/18. 2/9 = 4/18; 14 2/9 = 14 4/18. 18 + 14 = 32. 15/18 + 4/18 = 19/18 = 1 1/18. 32 + 1 1/18 = 33 1/18.

SUBTRACTION OF FRACTIONS

The principles used in addition of fractions apply also to subtraction of fractions. One fraction can be subtracted from another only when the two fractions have a common denominator; as, 7/9 − 5/9 = 2/9.

(1) To Subtract Dissimilar Fractions.

Reduce the fractions to their least common denominator. Subtract the numerator of the subtrahend from the numerator of the minuend. Place the difference over the new denominator.

Problem. From 5/8 take 3/5.

Solution.—The L. C. D. of 5/8 and 3/5 is 24. The new denominator is 24. Divide 2 units of the same size, one into *sixths* and the other into *eighths*. By dividing each unit also into 24 equal parts, it will be seen that 1/6 = 4/24 and 1/8 = 3/24. Then 5/8 = 20/24 and 3/5 = 9/24. 20/24 − 9/24 = 11/24.

The above solution is equivalent to the following: The L. C. D. of 8 and 5 is 24. 5/8 = 20/24; 3/5 = 9/24. 20/24 − 9/24 = 11/24.

(2) To Subtract Mixed Numbers.

Reduce the fractions, if necessary, to a common denominator; subtract the whole numbers and the fractional parts separately.

Problem. From 27 3/8 subtract 13 3/4.

Solution.—

$$\begin{array}{r} 27\,3/8 = 27\,3/8. \\ 13\,3/4 = 13\,6/8. \\ \hline 13\,5/8 \end{array}$$

Changed to a common denominator, 3/8 and 3/4 become 3/8 and 6/8. Since we cannot take 6/8 from 3/8, it is necessary to take 1 unit from 27 and add it to 3/8. In 1 unit there are 8/8; 8/8 + 3/8 = 1 1/8. Subtracting 6/8 from 1 1/8, we have 5/8. Having taken 1 unit from 27, we have only 26 left. 26 − 13 = 13. Therefore, 27 3/8 − 13 3/4 = 13 5/8.

MULTIPLICATION OF FRACTIONS

The multiplication of fractions depends upon certain principles; namely, that multiplying the numerator multiplies the fraction by *increasing the number* of fractional units, while their *size* remains unchanged, and that dividing the denominator multiplies the fraction by *increasing the size* of the fractional units, while their *number* is unchanged. Either process increases the value of the fraction.

The multiplication of fractions is indicated by "of" or by the sign ×.

Note.—Before multiplying fractions, cancel all factors that are common to numerators and denominators.

(1) To Multiply a Fraction by an Integer.

Multiply the numerator of the fraction by the integer and place the product over the denominator. If the result is an improper fraction, it should be reduced to a whole or mixed number.

Problem. Multiply 7/12 by 5.

Solution.—7/12 × 5 means that 7/12 is taken 5 times. 7/12 taken once = 7/12; 7/12 taken 5 times = 5 times as much, or 35/12. Therefore, 7/12 × 5 = 35/12 = 2 11/12.

The above solution is equivalent to multiplying the numerator of the fraction by the integer and placing the result over the denominator: 7/12 × 5 = 35/12 = 2 11/12.

(2) To Multiply an Integer by a Fraction.

Multiply the integer by the numerator of the fraction and divide the product by the denominator.

Problem. Multiply 108 by 5/9.

Solution.—108 × 5/9 is the same as 5/9 of 108. 1/9 of 108 = 12; 5/9 of 108 = 5 times 12, or 60. Therefore, 108 × 5/9 = 60. Or, $108 \times 5/\cancel{9}_{1} = \frac{540}{1} = 60$.

By cancellation, $\cancel{108}^{12} \times 5/\cancel{9}_{1} = 60$.

(3) To Multiply a Fraction by a Fraction.

Write the product of the numerators over the product of the denominators.

Problem. Multiply 4/5 by 2/3.

Solution.—4/5 × 2/3 = 2/3 of 4/5. Divide a unit into 5 equal parts. Divide each of the 5 equal parts into 3 equal parts. The unit will then be divided into 15 equal parts. It will be seen that 1/3 of 1/5 equals 1/15 of the whole. If 1/3 of 1/5 = 1/15, then 1/3 of 4/5 will equal 4 times as much, or 4/15; 2/3 of 4/5 will equal 2 times as much, or 8/15. Therefore, 2/3 of 4/5 = 8/15, or 4/5 × 2/3 = 8/15.

The above solution is equivalent to multiplying the numerators and placing the result over the product of the denominators: 4/5 × 2/3 = 8/15.

(4) To Obtain the Product of a Mixed Number and an Integer.

Reduce the mixed number and the integer to improper fractions and proceed as in the multiplication of a fraction by a fraction. Or, multiply the whole part and the fractional part of the mixed number separately by the integer and add these partial products.

Problem. Find the product of $31\frac{1}{2}$ and 27.

Solution.—$31\frac{1}{2}$ reduced to an improper fraction $= \frac{63}{2}$; $\frac{63}{2}$ taken 27 times $= \frac{63}{2} \times 27 = \frac{1701}{2} = 850\frac{1}{2}$. Or, $\frac{63}{2} \times \frac{27}{1} = \frac{1701}{2} = 850\frac{1}{2}$. Or,

(a)
$$\begin{array}{r} 31\frac{1}{2} \\ 27 \\ \hline 13\frac{1}{2} \quad (\frac{1}{2} \times 27 = 13\frac{1}{2}.) \\ 217 \\ 62 \\ \hline 850\frac{1}{2} \end{array}$$

(b)
$$\begin{array}{r} 27 \\ 31\frac{1}{2} \\ \hline 13\frac{1}{2} \quad (27 \times \frac{1}{2} = 13\frac{1}{2}.) \\ 27 \quad (\frac{1}{2} \text{ of } 27 = 13\frac{1}{2}.) \\ 81 \\ \hline 850\frac{1}{2} \end{array}$$

In (a), multiply the fraction $\frac{1}{2}$ by the integer 27; multiply 31 by 27. In (b), multiply the integer 27 by the fraction $\frac{1}{2}$; multiply 27 by 31. In each problem, add the partial products in order to obtain the complete product.

(5) To Multiply Mixed Numbers.

Reduce the mixed numbers to improper fractions and proceed as in the multiplication of a fraction by a fraction.

Problem. Find the product of $17\frac{5}{8}$ and $16\frac{2}{3}$.

Solution.—$17\frac{5}{8}$ reduced to an improper fraction $= \frac{141}{8}$; $16\frac{2}{3}$ reduced to an improper fraction $= \frac{50}{3}$. Canceling the factor 5, which is common to numerator and denominator, and multiplying we have

$$\frac{141}{8} \times \frac{\overset{10}{\cancel{50}}}{3} = \frac{235}{3} = 293\frac{1}{3}.$$

Or,
$$\begin{array}{r} 17\frac{5}{8} \\ 16\frac{2}{3} \\ \hline \frac{5}{8} \ (\frac{5}{8} \times \frac{2}{3} = \frac{5}{12} = \frac{5}{12}.) \\ 11\frac{1}{3} \ (17 \times \frac{2}{3} = \frac{34}{3} = 11\frac{1}{3}.) \\ 9\frac{3}{8} \ (\frac{3}{8} \times 16 = \frac{48}{8} = 9\frac{3}{8}.) \\ 272 \quad (17 \times 16 = 272.) \\ \hline 293\frac{1}{3} \end{array}$$

This method is sometimes called the four-step process of multiplying mixed numbers.

DIVISION OF FRACTIONS

In general, the process of division of fractions is the reverse of the process of multiplication of fractions. Dividing the numerator divides the fraction by *decreasing the number* of fractional units, while their *size* remains unchanged. Multiplying the denominator divides the fraction by *decreasing the size* of the fractional units, while their *number* is unchanged. Either process decreases the value of the fraction.

(1) To Divide a Fraction by an Integer.

Divide the numerator or multiply the denominator by the integer. This is the same as multiplying the dividend by the reciprocal of the divisor.

Problem. Divide $\frac{9}{10}$ by 3.

Solution.—Divide a unit into 10 equal parts. $\frac{9}{10}$ shows that 9 of these parts are being considered. To divide 9 of these parts, or $\frac{9}{10}$, by 3 is to take $\frac{1}{3}$ of these parts, or $\frac{1}{3}$ of $\frac{9}{10}$. $\frac{1}{3}$ of $\frac{9}{10} = \frac{9}{30}$. Therefore, $\frac{9}{10} \div 3 = \frac{9}{30}$.

$\frac{9}{10}$ is the dividend; 3 is the divisor. $\frac{9}{10}$ divided by $3 = \frac{9}{10} \div 3$. $\frac{9}{10} \div 3$ is the same as $\frac{1}{3}$ of $\frac{9}{10}$. $\frac{1}{3}$ of $\frac{9}{10} = \frac{9}{30}$, or $\frac{9}{10} \div 3 = \frac{9}{30}$.

The above solution is equivalent to multiplying the dividend, $\frac{9}{10}$, by the reciprocal of the divisor, 3:

$$\frac{9}{10} \div \frac{3}{1} = \frac{9}{\overset{3}{\cancel{30}}} \times \frac{1}{3} = \frac{3}{10}.$$

(2) To Divide an Integer by a Fraction.

Multiply the integer by the reciprocal of the fraction. In other words, multiply the dividend by the reciprocal of the divisor.

Problem. Divide 35 by $\frac{5}{8}$.

Solution.—In 1 unit there are $\frac{8}{8}$. In 35 units there are 35 times $\frac{8}{8}$, or $\frac{280}{8}$. Then $35 = \frac{280}{8}$. $\frac{280}{8} \div \frac{5}{8}$ means that we are asked to find how many $\frac{5}{8}$ there are in $\frac{280}{8}$. There are as many $\frac{5}{8}$ in $\frac{280}{8}$ as the number of times 5 is contained in 315, which is 63. Therefore, $35 \div \frac{5}{8} = 63$.

The above solution is equivalent to inverting the divisor and multiplying:

$$35 \div \frac{5}{8} = \frac{\overset{7}{\cancel{35}}}{1} \times \frac{8}{\cancel{5}} = 63.$$

(3) To Divide a Fraction by a Fraction.

Multiply the dividend by the reciprocal of the divisor and proceed as in the multiplication of a fraction by a fraction.

Problem. Divide $\frac{4}{5}$ by $\frac{2}{3}$.

Solution.—Changed to a common denominator, $\frac{4}{5} = \frac{12}{15}$ and $\frac{2}{3} = \frac{10}{15}$. $\frac{12}{15} \div \frac{10}{15}$ means that we are asked to find how many times $\frac{10}{15}$ is contained in $\frac{12}{15}$. $\frac{10}{15}$ is contained in $\frac{12}{15}$ as many times as 10 is contained in 12, that is, $1\frac{2}{10}$ times. Therefore, $\frac{4}{5} \div \frac{2}{3} = \frac{12}{15} \div \frac{10}{15} = 1\frac{2}{10}$.

The above solution is equivalent to inverting the divisor and multiplying:

$$\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2} = \frac{6}{5} = 1\frac{1}{5}.$$

(4) To Divide a Mixed Number by a Mixed Number.

Reduce the mixed numbers to improper fractions and proceed as in the division of a fraction by a fraction.

Problem. Divide $9\frac{3}{8}$ by $4\frac{1}{2}$.

Solution.—$9\frac{3}{8} = \frac{75}{8}$; $4\frac{1}{2} = \frac{9}{2}$. Change $\frac{9}{2}$ to eighths to give the fractions a common denominator. $\frac{9}{2} = \frac{36}{8}$. $\frac{75}{8} \div \frac{36}{8}$ means that we are to find how many times $\frac{36}{8}$ is contained in $\frac{75}{8}$. $\frac{36}{8}$ is contained in $\frac{75}{8}$ as many times as 36 is contained in 75, which is $2\frac{3}{12}$ times. Therefore, $9\frac{3}{8} \div 4\frac{1}{2} = 2\frac{3}{12}$.

The above solution is equivalent to the following: $9\frac{3}{8} = \frac{75}{8}$; $4\frac{1}{2} = \frac{9}{2}$.

$$\frac{75}{8} \div \frac{9}{2} = \frac{\overset{25}{\cancel{75}}}{\underset{4}{\cancel{8}}} \times \frac{\overset{1}{\cancel{2}}}{\underset{3}{\cancel{9}}} = \frac{25}{12} = 2\frac{1}{12}.$$

DECIMAL FRACTIONS

A decimal fraction is commonly called a **decimal.** The word decimal comes from the Latin word *decem*, which means ten.

A **decimal fraction** is a fraction whose denominator, usually not written, is 10 or a power of 10.

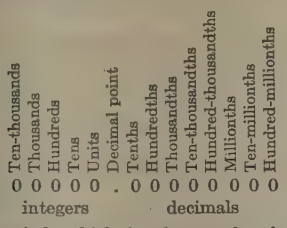
The **denominator** of a decimal is indicated by the number of the places to the right of a period, called the **decimal point.** In other words, the denominator of a decimal is always 1 with as many ciphers annexed as there are places in the decimal. Thus, $0.4 = \frac{4}{10}$; $0.16 = \frac{16}{100}$; $8.125 = 8\frac{125}{1000}$. Conversely, there will be as many places to the right of the decimal point as there are ciphers in the denominator. Thus, $\frac{76}{1000}$ is written .076.

A **mixed decimal** is a number expressed by an integer and a decimal: 589.082. This number is read five hundred eighty-nine and eighty-two thousandths.

The decimal .0825 is read eight hundred twenty-five ten-thousandths; .825 is read eight hundred twenty-five thousandths; .00825 is read eight hundred twenty-five hundred-thousandths.

It will be observed that moving the decimal point one place to the *right* multiplies the decimal fraction by 10 and that moving the decimal point one place to the *left* divides the fraction by 10.

The value of the denominator of a decimal fraction is determined by the position of the last figure in the decimal. The following notation indicates the values of the denominators for each of the first eight decimal places:



The period, which is always placed *before* the decimal, *separates* the decimal fraction from the integer.

REDUCTION OF DECIMALS

The decimal .6 is read 6 tenths. Changed to hundredths .6 becomes .60, or 60 hundredths; changed to thousandths .6 is .600, or 600 thousandths. Since $\frac{6}{10} = \frac{60}{100} = \frac{600}{1000}$ or $\frac{600}{1000} = \frac{60}{100} = \frac{6}{10}$, it is clear that .6 = .60 = .600. Therefore, ciphers annexed to a decimal fraction or ciphers dropped from the end of a decimal fraction do not change its value.

(1) To Reduce a Decimal to a Common Fraction.

Omit the decimal point; supply the denominator and change the fraction to its lowest terms.

Problem. Reduce .052 to a common fraction.

Solution.—$.052 = \frac{52}{1000} = \frac{13}{250}$.

(2) To Reduce a Common Fraction to a Decimal.

Annex decimal ciphers to the numerator and divide by the denominator; from the right of the quotient point off as many decimal places as there are ciphers annexed and used.

Problem. Reduce $\frac{3}{16}$ to a decimal.

Solution.—$\frac{3}{16} = 3.0000 \div 16 = .1875$.

Note.—A table of the decimal equivalents of some common fractions will be found in the list of mathematical tables.

ADDITION OF DECIMALS

In arranging decimals or mixed decimals for addition, care must be taken to place under one another the digits which have the same denomination; that is, units must be placed under units, tenths under tenths, and so on. This brings the decimal points directly under one another.

Add as with whole numbers, placing the decimal point in the sum directly under the decimal points in the addends.

Decimals	Mixed Decimals
0.238	17.34
0.05	0.84
0.0022	3456.
0.2902	3474.18

SUBTRACTION OF DECIMALS

Write the subtrahend under the minuend so that units of the same order stand in the same column. This brings one decimal point directly under the other. Proceed as in the subtraction of whole numbers, placing the decimal point in the remainder directly under those above it.

Decimals		Mixed Decimals
.5310	minuend	128.3090
.0429	subtrahend	46.5692
.4881	remainder	81.7398

MULTIPLICATION OF DECIMALS

Multiply decimals as whole numbers are multiplied; from the right of the product, point off as many figures for decimals as there are decimal places in both multiplicand and multiplier, prefixing ciphers if necessary.

(1) $7.32 \times 0.032 = 0.23424$,
or
$7.32 \times .032 = .23424$.

(2) $0.0026 \times 0.0003 = 0.00000078$,
or
$.0026 \times .0003 = .00000078$.

In the first example, the multiplicand has 2 decimal places and the multiplier has 3. $2 + 3 = 5$. Therefore, the product must have 5 decimal places.

In the second example, the multiplicand has 4 decimal places and the multiplier has 4. $4 + 4 = 8$. Since the product must have 8 decimal places, it is necessary to prefix 6 ciphers to the digits in the product.

To multiply a decimal by 10, 100, 1000, etc., move the decimal point as many places to the right as there are ciphers in the multiplier.

$.63 \times 10 = 6.3$.
$.63 \times 100 = 63$.
$.63 \times 1000 = 630$.

DIVISION OF DECIMALS

(1) To Divide a Decimal by an Integer.

The division is performed as with integers. The decimal point in the quotient is placed directly above the decimal point in the dividend.

Problem. Divide 399.552 by 192.

Solution.—

2.081 quotient
divisor 192 | 399.552 dividend

Where the division is exact, the position of the decimal point may also be determined by pointing off from the right of the quotient as many decimal places as there are decimal places in the dividend.

One may also test the correctness of the result mentally in this manner: It is obvious that 192 is contained 2 + times in 399. The integral part of the quotient will therefore be 2.

(2) To Divide a Decimal by a Decimal.

The division is performed as with integers, except that the first figure of the quotient is written as many places to the left of its normal position as there are decimal places in the divisor. The decimal point in the quotient is placed directly above the decimal point in the dividend.

Problem. Divide 7.8125 by 31.25.

Solution.—

.25 quotient
divisor 31.25 | 7.8125 dividend

In dividing with integers, 2, the first figure of the quotient, would be written over the 2 in the dividend. Since there are two places of decimals in the divisor, the 2 of the quotient must be written two places farther to the left, that is, over 8 in the dividend.

Where the division is exact, the position of the decimal point may also be determined by pointing off, from the right of the quotient, decimal places equal in number to the excess of the decimal places in the dividend over those in the divisor. Thus, in the above problem, there are 4 decimal places in the dividend and 2 in the divisor. $4 - 2 = 2$. Therefore, the quotient must have 2 decimal places.

(a) If the number of decimal places in the divisor exceeds the number of decimal places in the dividend, the deficiency must be supplied by annexing ciphers to the dividend. This should be done before beginning the division.

Problem. Divide 278.2 by .325.

Solution.—

856. quotient
divisor .325 | 278.200 dividend

(b) If the number of figures in the quotient is less than the excess of the decimal places in the dividend over those of the divisor, the deficiency must be supplied by prefixing ciphers to the figures in the quotient.

Problem. Divide .730 by 365.

Solution.—

.002 quotient
divisor 365 | .730 dividend

(c) If there is a remainder after dividing a decimal either by an integer or by a decimal, annex ciphers to the dividend and continue the division as many more places as is desired. The ciphers annexed are decimals of the dividend. They do not change its value.

Problem. Divide 1682.3 by 24.

Solution.—

70.0958 + quotient
divisor 24 | 1682.3000 dividend

Problem. Divide 5638.7 by .204.

Solution.—

27640.686 + quotient
divisor .204 | 5638.700000 dividend

A SIMPLE METHOD

When both divisor and dividend contain decimal figures, the work may be simplified as follows:

Move the decimal point, in both divisor and dividend, as many places to the right as there are decimal places in the divisor, annexing ciphers to the dividend if necessary. The divisor thus becomes an integer. The process is equivalent to multiplying both divisor and dividend by the same number and does not change the quotient.

Divide as with integers. In case there is a remainder, continue the division if desired by annexing decimal ciphers to the dividend. Place the decimal point in the quotient as in dividing a decimal by an integer, prefixing ciphers to the figures in the quotient if necessary.

Problem. Divide 7.8125 by 31.25.

Solution.—

.25 quotient
divisor 3125. | 781.25 dividend

PERCENTAGE

Per cent and **percentage** are terms derived from the Latin *per centum* and mean *by the hundred*: 7 per cent is 7 out of every hundred, or 7 hundredths; 11 per cent is 11 out of every hundred, or 11 hundredths. The sign % is used for the words per cent: 7 per cent may be written 7%.

Since any percentage is a certain number of hundredths, it may be expressed by a common fraction or by a decimal fraction: 7 per cent is equivalent to $\frac{7}{100}$, .07, or 7%. No new principle is involved, for units per cent are really numerators of fractions whose denominators are 100.

The equivalent of any fraction in units per cent is found by reducing the fraction to a decimal and using the figures in the first two decimal places as the number of integral units per cent. The following are the equivalents of some common fractions in units per cent:

$\frac{1}{2} = .50 = 50\%$. $\frac{1}{6} = .20 = 20\%$.
$\frac{1}{3} = .33\frac{1}{3} = 33\frac{1}{3}\%$. $\frac{1}{6} = .16\frac{2}{3} = 16\frac{2}{3}\%$.
$\frac{1}{4} = .25 = 25\%$. $\frac{1}{8} = .12\frac{1}{2} = 12\frac{1}{2}\%$.

There are five elements which enter into the operations of percentage; namely, *rate, percentage, base, amount, difference.*

The **rate** or **rate per cent** is the number which denotes how many hundredths or units per cent are taken. This number is sometimes written in the form of a decimal.

The **percentage** is the result obtained by taking a certain per cent of a number.

The **base** is the number on which the percentage is reckoned.

The **amount** is the sum of the base and the percentage.

The **difference** is the base minus the percentage.

All problems in percentage are similar to three type problems; namely, to find any one of the three numbers,—base, rate, and percentage,—when the other two are given.

(1) To Find the Percentage When the Base and the Rate Are Given.

Problem. A man had $480 in a bank and drew out 15% of it. How much money did he draw out?

Solution.—

15% = .15.
15% of $480 =
$480 × .15 = $72, sum drawn out.

$480 is the base; .15 is the rate; $72 is the percentage.

Percentage = base × rate.

Since the percentage is the product of two factors, the base and the rate, it is clear that, if the product and one factor are given, the other factor is obtained by dividing:

15 = 3 × 5.
15 ÷ 3 = 5.
15 ÷ 5 = 3.

(2) To Find the Base When the Percentage and the Rate Are Given.

Problem. A man rented a house for $60 a month. The yearly rent of the house was 12½% of its value. What was the value of the house?

Solution.—

$60 × 12 = $720, rent for 1 year.
12½% = .125.
$720 ÷ .125 = $5760, value of house.

$720 is the percentage; .125 is the rate; $5760 is the base.

Base = percentage ÷ rate.

This problem may also be analyzed as follows: At $60 a month, the yearly rent of the house is $720. Since the yearly rent, $720, is 12½% of the value of the house, then $720 is 12½% of a certain number. If 12½% of this number = $720, 1% of it = $720 ÷ 12½ = $57.60. 100%, or the whole amount, = 100 times as much, or $5760.

(3) To Find the Rate When the Base and the Percentage Are Given.

Problem. A farmer had 550 sheep and sold 121 of them. What per cent and also what fractional part of his flock did he sell?

Solution.—

121 ÷ 550 = .22 = 22%, rate.
22% = $\frac{22}{100}$ = $\frac{11}{50}$, the fractional part.

121 is the percentage; 550 is the base; 22% is the rate.

Rate = percentage ÷ base.

This problem may also be analyzed as follows: The number 550 is the whole, or 100%, of the flock. 1% of this number is 550 ÷ 100, or 5.5. Since 5.5 is 1% of the whole number of sheep, 121 will include as many units per cent of the whole flock as the number of times 5.5 is contained in 121. 121 ÷ 5.5 = 22, which is the required percentage.

(4) To Find the Base When the Amount and the Rate Are Given.

Problem. This year's salary is $900, which is 12½% more than last year's. What was last year's salary?

Solution.—

Last year's salary = 100% of itself.
Increase in salary = 12½% of last year's salary.
Therefore this year's salary, which is $900, = 100% + 12½% = 112½% of last year's salary.
112½% = 1.125.
Last year's salary × 1.125 = $900.
Therefore last year's salary = $900 ÷ 1.125 = $800.

Base = amount ÷ (100% + rate).

The *amount* is always a *product*, of which the base is one factor and 1 (that is, 100%) + the rate, expressed as a decimal or as a common fraction, is the other factor.

(5) To Find the Base When the Difference and the Rate Are Given.

Problem. A man sold his automobile for $1275 and thereby lost 15% of what he paid for it. What was the cost of the automobile?

Solution.—

Cost = 100% of itself.
Loss on automobile = 15% of cost.
Therefore the selling price, which is $1275, = 100% − 15% = 85% of the cost.
85% = .85.
The cost × .85 = $1275.
Therefore the cost = $1275 ÷ .85 = $1500.

Base = difference ÷ (100% − rate).

The *difference* is always a *product*, of which the base is one factor and 1 (that is, 100%) − the rate, expressed as a decimal or as a common fraction, is the other factor.

INTEREST

Interest is the sum paid for the use of money.

Principal is the sum for the use of which interest is paid.

Amount is the sum of the principal and the interest.

Rate of interest is the number indicating the sum of money paid for the use, throughout one year, of each unit of the principal. It is usually expressed as a percentage of the principal: six per cent rate of interest is six cents of interest for every hundred cents of principal. The maximum rate is generally established by law and varies in different states and in different countries.

Usury is a higher rate of interest than that allowed by law.

Simple interest is interest calculated on the principal only.

Compound interest is interest calculated at regular intervals on the sum of the principal and the accumulated interest.

Exact interest is interest computed on the basis of 365 days to a year.

Ordinary interest, or **bankers' interest,** is interest computed on the basis of 360 days to a year.

Problems in interest are similar to problems in ordinary percentage:
The *principal* is the base.
The *rate of interest* is the rate per cent.
The *interest* is the percentage.
The *amount* is the same in both interest and percentage.

For the purpose of computing interest for short periods, the so-called commercial year, 360 days, is commonly used. When large sums of money are involved, *exact interest* may be used.

SIMPLE INTEREST

The following methods of computing simple interest are based on a year of 360 days, or 12 months of 30 days each.

SIX PER CENT METHOD

At 6% the interest on $1.00
for 1 year is $.06,
for 1 month is $.005,
for 1 day is $.000⅙.

Problem. Find the interest on $600 for 3 years 4 months 10 days at 6%. Find the interest and the amount at 4%.

Solution.—

At 6% the interest on $1.00
for 3 years is $.18,
for 4 months is $.02,
for 10 days is $.001⅔,
for total time $.201⅔.
$.201⅔ × 600 = $121, interest.
$600 + $121 = $721, amount.

Interest = principal × rate × time.

Amount = principal + interest.

At 6% the interest on $1 for 3 yr. 4 mo. 10 da. = $.201⅔;
at 1% = ⅙ of $.201⅔ = $.033$^{11}/_{18}$;
at 4% = $.033$^{11}/_{18}$ × 4 = $.134⅘.
$.134⅘ × 600 = $80.66⅔, or $80.67, interest.
$600 + $80.67 = $680.67, amount.

Note.—Interest at any rate per cent may be determined by dividing the interest at 6% by 6 (to get 1%) and multiplying the result by the required rate per cent.

BANKERS' SIXTY-DAY METHOD

The interest on any principal for 60 days, or 2 months, at 6% is 1% of the principal.

Problem. What is the interest on $350 for 5 mo. 13 da. at 6%?

Solution.—

$3.50 = interest for 60 da., or 2 mo.
$.35 = interest for 6 da.
5 mo. = 2½ times 2 mo.
12 da. = ⅕ of 60 da.
1 da. = ⅙ of 6 da.
$3.50 × 2½ = $8.75, interest for 5 mo.
⅕ of $3.50 = $ .70, interest for 12 da.
⅙ of $ .35 = $ .058⅓, interest for 1 da.
$9.508⅓, or $9.51.

To find the interest on any number of dollars for 6 days at 6%, move the decimal point in the number representing the principal *three* places to the left; for 60 days, *two* places to the left; for 600 days, *one* place to the left.

A SHORT METHOD

Multiply the number of dollars by the number of days, divide by 6, and move the decimal point *three* places to the left.

Problem. What is the interest on $350 for 5 mo. 13 da. at 6%?

Solution.—

5 mo. 13 da. = 163 da.
$350 × 163 ÷ 6 = $9508.33⅓.

Moving the decimal point three places to the left, we obtain $9.50833⅓, or $9.51.

GENERAL EQUATION OF INTEREST

All problems in interest may be reduced to the one general equation:

Interest = principal × rate × time.

Any one of these may be found when the other three are known. The time is expressed in terms of years; the rate, as a decimal fraction. Ordinary and exact interest differ only in the method of computing the time. The following problems show the

principal variations of the formula that has been given above:

Problem. What principal will produce $44.80 in 2 yr. 8 mo. at 6%?

Solution.—

2 yr. 8 mo. = 2⅔ yr.
6% × 2⅔ = 16% = .16.
$44.80 ÷ .16 = $280, principal.

Principal = interest ÷ (rate × time).

Problem. What sum of money in 2 yr. 6 mo. at 7% will amount to $197.40, and what will be the interest?

Solution.—

2 yr. 6 mo. = 2½ yr.
$.07 × 2½ = $.175.
$1 + $.175 = $1.175, amount of $1 for 2 yr. 6 mo. at 7%.
$197.40 ÷ 1.175 = $168.00, principal.
$197.40 − $168.00 = $29.40, interest.

Principal = amount ÷ amount of $1 for given time and rate.

Problem. At what rate of interest will $1800 produce $297 in 2 yr. 9 mo.?

Solution.—

2 yr. 9 mo. = 2¾ yr. = 2.75 yr.
$297 ÷ 2.75 = $108, interest for 1 yr.
$108 ÷ $1800 = .06, or 6%, rate of interest.

Rate = (interest ÷ time) ÷ principal.

Problem. In what time will $1600 produce $240 at 6%?

Solution.—

$1600 × .06 = $96, interest for 1 yr.
$240 ÷ $96 = 2.5 = 2½.
The required time is 2½ yr., or 2 yr. 6 mo.

Time = interest ÷ (principal × rate).

COMPOUND INTEREST

Many financial problems, such as those concerned with the computation of the accumulated values of savings bank deposits, of life insurance policies, or of the sinking funds of corporations, require for their solution a knowledge of the methods of determining compound interest.

The solution of such problems may become very complicated if the transactions involve many payments over a long period of time. This is due, for example, in the case of savings bank deposits, to the necessity of adding interest to the principal at regular intervals. After each addition, interest for the succeeding period must then be calculated on the sum of the amount deposited plus the accrued interest.

Since the accrued interest also receives interest after it has been added to the principal, the total amount of compound interest always exceeds the amount of simple interest calculated for the same time and the same rate. The following illustrations will show the differences between simple and compound interest:

SIMPLE INTEREST

$600 = principal.
6% = rate.
5 yr. = time.
$600 × .06 × 5 = $180, interest.
$600 + $180 = $780, amount.

COMPOUND INTEREST

$600 = first principal.
$36 = interest for first year.
$636 = second principal.
$38.16 = interest for second year.
$674.16 = third principal.

Continuing this method, we find that the amount at the end of 5 years is $802.94.

Problems in compound interest are easily solved by the following table, which shows the amount of $1 compounded annually at different rates:

COMPOUND INTEREST TABLE

Years	4%	5%	6%	7%	8%
1	1.040000	1.050000	1.060000	1.070000	1.080000
2	1.081600	1.102500	1.123600	1.144900	1.166400
3	1.124864	1.157625	1.191016	1.225043	1.259712
4	1.169859	1.215506	1.262477	1.310796	1.360489
5	1.216653	1.276282	1.338226	1.402552	1.469328
6	1.265319	1.340096	1.418519	1.500730	1.586874
7	1.315932	1.407100	1.503630	1.605782	1.713824
8	1.368569	1.477455	1.593848	1.718186	1.850930
9	1.423312	1.551328	1.689479	1.838459	1.999005
10	1.480244	1.628895	1.790848	1.967151	2.158925
11	1.539454	1.710339	1.898299	2.104852	2.331639
12	1.601032	1.795856	2.012197	2.252192	2.518170
13	1.665074	1.885649	2.132928	2.409845	2.719624
14	1.731676	1.979932	2.260904	2.578534	2.937194
15	1.800944	2.078928	2.396558	2.759032	3.172169
16	1.872981	2.182875	2.540352	2.952164	3.425943
17	1.947901	2.292018	2.692773	3.158815	3.700018
18	2.025817	2.406619	2.854339	3.379932	3.996020
19	2.106849	2.526950	3.025600	3.616528	4.315701
20	2.191123	2.653298	3.207136	3.869685	4.660957

Problem. Find the compound interest on $600 for 5 years at 6%.

Solution.—The table shows that $1 at compound interest in 5 years at 6% will amount to $1.338226.
$1.338226 × 600 = $802.94, amount.
$802.94 − $600 = $202.94, compound interest.

SINKING FUNDS

If money is placed at compound interest at regular intervals, each payment draws interest and the total value at the end of any period is the sum of the value of all of the payments, each being calculated as a separate problem in compound interest. Such problems are easily solved by the following table, which gives, for the end of each yearly period, the value of $1 deposited annually.

SINKING FUND TABLE

Years	4%	5%	6%	7%	8%
1	1.04	1.05	1.06	1.07	1.08
2	2.1216	2.1525	2.1836	2.2149	2.2464
3	3.2465	3.3101	3.3746	3.4399	3.5061
4	4.4163	4.5256	4.6371	4.7507	4.8666
5	5.6330	5.8019	5.9753	6.1533	6.3359
6	6.8993	7.1420	7.3938	7.6540	7.9228
7	8.2142	8.5491	8.8975	9.2598	9.6366
8	9.5828	10.0266	10.4913	10.9780	11.4876
9	11.0061	11.5779	12.1808	12.8164	13.4866
10	12.4864	13.2068	13.9716	14.7836	15.6455
11	14.0258	14.9171	15.8699	16.8885	17.9771
12	15.6268	16.7130	17.8821	19.1406	20.4953
13	17.2919	18.5986	20.0151	21.5005	23.2149
14	19.0236	20.5786	22.2760	24.1290	26.1521
15	20.8245	22.6575	24.6725	26.8881	29.3243
16	22.6975	24.8404	27.2129	29.8402	32.7502
17	24.6454	27.1324	29.9057	32.9990	36.4502
18	26.6712	29.5390	32.7600	36.3790	40.4463
19	28.7781	32.0660	35.7856	39.9955	44.7620
20	30.9692	34.7193	38.9927	43.8652	49.4229

Problem. If $100 is deposited annually at 4% compound interest, what will be the value of the account at the end of 15 years?

Solution.—The table shows that $1 deposited annually for 15 years at 4% will amount to $20.8245.
$20.8245 × 100 = $2082.45, value of account.

EXACT INTEREST

Problem. Find the exact interest on $360 for 90 days at 5%.

Solution.—

$360 × .05 = $18, interest for 1 year.
$18 ÷ 365 = $.0493, interest for 1 day.
$.0493 × 90 = $4.437, or $4.44, exact interest.

DISCOUNT

Discount is a deduction made from a gross sum on any account whatever.

Rate of discount is the amount of discount for each unit of the gross sum. It is usually expressed as units per cent.

Discount series is a series of successive discounts made on a bill.

Net price or **net cost** is the price or cost as originally set forth less the discount.

Promissory note is a written promise to pay a stated sum of money on demand or at a specified time.

Face of a note is the sum for which the note is drawn.

The **amount** is the value of the note at maturity, being the sum of its face value and of the interest accrued.

Term of discount is the time from the date of discount of a note to the date of its maturity.

Commercial discount is a deduction from the price or value of anything.

Cash discount is a reduction made for the immediate payment of a bill.

Time discount is a reduction made for the payment of a bill within a definite time.

Trade discount is a deduction from a trade list or list price. It may be based on the condition of the market, the size of the order, or various other factors.

Bank discount is the sum charged by a bank for cashing a note or a time draft.

Proceeds is the difference between the face of the note and the bank discount.

True discount is the interest which added to a principal, called present worth, will equal the face of the note.

Present worth of a debt payable at some future time without interest is that sum which, being put at interest, will amount to the debt at the time the debt becomes due.

COMMERCIAL DISCOUNT

Problem. Find the net price of a piano listed at $500, sold at 20% and 5% off.

Solution.—

$500 × .20 = $100, first discount.
$500 − $100 = $400, first net price.
$400 × .05 = $20, second discount.
$400 − $20 = $380, net price.

Problem. What single discount is equivalent to a discount of 25%, 15%, and 5%?

Solution.—

$100 × .25 = $25, first discount.
$100 − $25 = $75, first net amount.
$75 × .15 = $11.25, second discount.
$75 − $11.25 = $63.75, second net amount.
$63.75 × .05 = $3.1875, third discount.
$63.75 − $3.1875 = $60.5625, third net amount.
$100 − $60.5625 = $39.4375 = $39.44.
$39.44 ÷ $100 = .3944 = 39.44%, which is the rate of an equivalent single discount.

BANK DISCOUNT

(1) To Find Bank Discount and Proceeds When Face of Note, Time, and Rate Are Given.

Problem. A note for $500 payable in 60 days is discounted by a bank. Find the bank discount and the proceeds, money being worth 5%.

Solution.—

$500 × .05 = $25, interest for 1 year.
60 days = ⅙ of a year.
⅙ of $25 = $4.16⅔, or $4.17, bank discount.
$500 − $4.17 = $495.83, proceeds.

Bank discount = face of note × rate × time.

Problem. A note for $600, bearing 6% interest, dated Sept. 20, 1909, and payable in 6 mo. was discounted at 7%, Feb. 12, 1910. Find the bank discount and the proceeds.

Solution.—

Date of maturity is March 20, 1910.
Term of discount = 36 da. (number of days from Feb. 12 to Mar. 20, 1910).
Interest on $1 for 6 mo. (½ yr.) at 6% = $.03.
Interest on $1 for 1 da. at 6% = .000⅙.
$.03 × 600 = $18, interest for 6 mo.
$600 + $18 = $618, amount.
$.000⅙ × 36 = $.006, interest on $1 for 36 da. at 6%.
Interest on same at 1% = ⅙ of $.006 = $.001.
Interest at 7% = $.001 × 7 = $.007.
$.007 × 618 = $4.326, or $4.33, bank discount.
$618 − $4.33 = $613.67, proceeds.

Note.—When an interest-bearing note is discounted, the discount must be computed on the amount due at maturity.

(2) To Find Face of Note When Proceeds, Time, and Rate Are Given.

Problem. For what sum must a 90 day note be drawn to yield $3160 in cash if the rate of discount is 5%?

Solution.—

90 da. = ¼ of 1 yr.
5% of $1 = $.05.
¼ of $.05 = $.0125, interest on $1 for 90 da. at 5%.
$1.00 − $.0125 = $.9875, proceeds of $1.
$3160 ÷ .9875 = $3200, face of note.

Face of note = proceeds ÷ proceeds of $1.

TRUE DISCOUNT

To Find the Present Worth and the True Discount.

Problem. A man owes $260 payable in 8 months, money being worth 6%. What is the present worth of the debt? What is the true discount?

Solution.—

$1 at 6% for 8 months will amount to $1.04.
$260 ÷ 1.04 = $250, present worth.
$260 − $250 = $10, true discount.

Present worth = amount due ÷ value of $1 for given time and rate.

PROFIT AND LOSS

Profit and Loss are terms used to express the sum gained or lost in buying and selling.

Cost is the sum paid for an article purchased.

Selling price is the sum received for an article sold.

Profit or **Loss** is the difference between cost and selling price.

Gross profit usually refers to the gain on the article over the purchase price, delivery charges, and other overhead expenses.

Net profit usually refers to the gain after all overhead charges have been considered.

Unless otherwise stated, the profit is figured as a percentage of the cost.

Problems in profit and loss are problems in percentage in which the factors are as follows:

The *cost* or sum invested is the base.
The *per cent* of profit or loss is the rate.
The *profit* or *loss* is the percentage.
The *selling price* is the amount or the difference according as it is greater or less than the cost.

(1) To Find Gain or Loss in Dollars When Cost and Gain or Loss Per Cent Are Given.

Problem. A man bought a lot for $2560 and sold it at a gain of 20%. How much did he gain? What was the selling price?

Solution.—

$2560 × .20 = $512, gain.
$2560 + $512 = $3072, selling price.

Gain or loss = cost × rate.
Selling price = cost + gain or cost − loss.

(2) To Find the Rate Per Cent of Profit or Loss When Cost and Selling Price Are Given.

Problem. A farm was bought for $5600 and was sold for $6300. What was the gain per cent?

Solution.—

$6300 − $5600 = $700, gain.
$700 ÷ $5600 = .12½ = 12½%, rate of gain.

Rate = gain or loss ÷ cost.

(3) To Find Cost of an Article When Gain in Dollars and Gain Per Cent Are Given.

Problem. A man sold a watch at a profit of $24, which represented a gain of 16⅔%. What was the cost of the watch?

Solution.—$24 ÷ .16⅔ = $144, cost.

Cost = gain or loss ÷ rate.

(4) To Find Cost of an Article When Selling Price and Per Cent of Gain or Loss Are Given.

Problem. A bicycle dealer sold a wheel for $60, thereby gaining 20% on the cost. Find the cost of the wheel.

Solution.—

100% + 20% = 120% = 1.20.
(For each $1 in the cost, there is $1.20 in the selling price.)
$60 ÷ 1.20 = $50, cost.

Cost = selling price ÷ (100% + rate of gain).

Problem. A bicycle dealer sold a wheel for $60, thereby losing 20% on the cost. Find the cost of the wheel.

Solution.—

100% − 20% = 80% = .80.
(For each $1 in the cost, there is $.80 in the selling price.)
$60 ÷ .80 = $75, cost.

Cost = selling price ÷ (100% − rate of loss).

COMMISSION OR BROKERAGE

Commission or **brokerage** is the compensation or percentage allowed an agent for transacting business.

Consignment is the merchandise forwarded to the agent.

Consignor is the person who sends the merchandise.

Consignee is the person to whom the merchandise is sent.

Gross proceeds is the amount for which the merchandise is sold.

Net proceeds is the sum remaining after the commission and all other charges have been deducted.

Problems in commission and brokerage are merely applications of percentage in which the factors are as follows:

The *purchase price* or the *sales price* is the base.
The *rate of commission* or *brokerage* is the rate.
The *commission* or *brokerage* is the percentage.

Problem. A real estate agent sold a house for $6500. After deducting his commission of 2%, how much did he remit to his principal?

Solution.—

$6500 × .02 = $130, commission.
$6500 − $130 = $6370, sent to principal.

Commission = sales price × rate of commission.

Problem. A grain dealer bought 24,000 bushels of wheat at 60c a bushel. His commission was 5%. How much money must be sent to cover cost of grain and commission?

Solution.—

$.60 × 24,000 = $14,400, cost of wheat.
$14,400 × .05 = $720, commission.
$14,400 + $720 = $15,120, sum sent.

Commission = purchase price × rate of commission.

Problem. The average rate of commission charged by a real estate agent is 3¼%. What is the value of the real estate he must sell each year to produce an income of $6500?

Solution.—

3¼% = .0325.
$6500 ÷ .0325 = $200,000, value of real estate.

Sales price = commission ÷ rate of commission.

Problem. An agent charged 12½% for buying a consignment of bicycles. His commission was $250. What was the total cost to be transmitted by the consignee?

Solution.—

$250 ÷ .125 = $2000, purchase price.
$2000 + $250 = $2250, cost.

Purchase price = commission ÷ rate of commission.

Problem. A man bought 400 acres of land at $25 an acre. The agent's commission was $250. What rate of commission did he charge?

Solution.—

$25 × 400 = $10,000, cost of land.
$250 ÷ $10,000 = .025 = 2½%, rate of commission.

Rate of commission = commission ÷ purchase price.

Problem. If $2500 is sent to an agent to invest in grain at a commission of 1¾%, what will be the amount actually invested in the grain? What is the agent's commission?

Solution.—

100% + 1¾% = 101¾% = 1.0175.
(For every dollar invested, $1.0175 is sent to the agent.)
$2500 ÷ 1.0175 = $2457, investment.
$2500 − $2457 = $43, commission.

Purchase price = amount ÷ ($1 + rate of commission).

INSURANCE

Insurance is a guaranteed security against a specified type of loss or damage. There are two general kinds of insurance; namely, property and personal.

Property insurance includes, chiefly, fire, marine, live stock, furniture, plate glass, automobile, tornado, crop, cyclone, flood, boiler, and burglar insurance.

Personal insurance includes, chiefly, life insurance, health insurance, accident insurance, and liability insurance.

Policy is a written contract between the party insured and the company which assumes the risk.

Face of the policy is the amount of insurance.

Premium is the sum paid for insurance.

Rate is the cost of $1 of insurance for the term of the policy.

Problems in insurance are identical with the problems of percentage:

The *sum insured*, or the *face of the policy*, is the base.

The *premium* is the percentage.

The *amount paid per $1 of insurance* for the term of the policy is the rate.

The rate varies greatly with the kind of property insured and with the length of time for which it is insured. The rate may also be fixed on a unit basis; as, $.50 per $100 valuation for a term of three years.

(1) To Find Premium When Face of Policy and Rate Are Given.

Problem. Household goods valued at $2500 are insured at the rate of $.50 per $100 for a term of 3 years. What is the premium?

Solution.—

$.50 ÷ $100 = .005 = ½%, rate.
$2500 × .005 = $12.50, premium.

Premium = face of policy × rate.

(2) To Find Rate When Face of Policy and Premium Are Given.

Problem. A store is insured for $18,000 and the annual premium is $600. Find the rate.

Solution.—

$600 ÷ $18,000 = .03⅓ = 3⅓%, rate.

Rate = premium ÷ face of policy.

(3) To Find Face of Policy When Premium and Rate Are Given.

Problem. A man paid $18 for insuring his automobile at ¾%. Find face of policy, or amount of insurance.

Solution.—

¾% = .0075.
$18 ÷ .0075 = $2400, face of policy.

Face of policy = premium ÷ rate.

(4) To Find Face of Policy When Value of Property and Rate Are Given.

Problem. For what sum must a store and contents valued at $29,400 be insured in order to cover entire loss by fire in addition to the premium paid at the rate of 2%?

Solution.—

$1.00 − .02 = $.98.
(For each $.98 in the value of the property, there must be $1 of insurance.)
$29,400 ÷ .98 = $30,000, face of policy.

Face of policy = value of property ÷ (100% − rate).

TAXES

Tax is a sum of money levied on persons or on property by a government for public purposes.

Taxes are of two general kinds, direct and indirect.

Direct tax is a tax levied on persons who are expected to bear the ultimate weight of it. Such are a poll tax, an income tax, a real estate tax.

Indirect tax is a tax, the ultimate weight of which is not expected to be borne by the persons who pay it. Import and sales taxes are indirect taxes.

Poll tax is a tax of uniform amount levied on each individual, usually on each male citizen. Poll is an obsolete word for head. The tax was so named because it amounted to a definite sum per head.

Property tax is a tax on property.

Income tax is a tax on a person's income.

Property is of two kinds—real estate and personal property.

Real estate is immovable property, such as houses and lands.

Personal property is movable property, such as household goods, cattle, machinery, cash, notes, bonds, and mortgages.

Assessors are officers appointed to determine the taxable value of property, to prepare assessment rolls, and to apportion the taxes.

Assessed valuation is the value put upon property by the assessors.

After the assessor has completed his list of assessed valuations, the determination of the amount of tax that each shall pay is called *spreading the tax*. The use of a *tax table* greatly facilitates spreading the tax.

Rate of taxation is the amount of taxes payable on each unit of the assessed valuation of the property. The rate is usually expressed in mills per dollar. One mill is one tenth of one cent. Expressed as a percentage, a rate of one mill is 1/10 of 1%. A rate of 14 mills is 1.4%. The rate per cent is found from the rate expressed in mills by moving the decimal point one place to the left.

The principles of percentage apply to the problems in taxes:

The *assessed valuation* is the base.

The *rate of taxation*, expressed as units per cent, is the rate per cent.

The *tax* is the percentage.

(1) To Find Tax When Assessed Valuation and Rate Are Given.

Problem. The assessed valuation of a certain county is $4,246,600 and the rate of taxation for public schools is 4½ mills on the dollar. What is the school tax?

Solution.—

4½ mills = .45% = .0045, rate.
$4,246,600 × .0045 = $19,109.70, school tax.

Tax = assessed valuation × rate.

(2) To Find Assessed Valuation When Tax and Rate Are Given.

Problem. A man pays a tax of $250 on his property at the rate of 12½ mills on the dollar. What is the assessed valuation of his property?

Solution.—

12½ mills = 1.25% = .0125, rate.
$250 ÷ .0125 = $20,000, assessed valuation.

Assessed valuation = tax ÷ rate.

(3) To Find Rate When Assessed Valuation and Tax to be Raised Are Given.

Problem. The assessed valuation of property in a certain village is $3,270,000 and the tax to be raised is $16,350. What is the rate of taxation? What is A's tax whose property is valued at $8750?

Solution.—

$16,350 ÷ $3,270,000 = .005 = 5 mills, rate.
$8750 × .005 = $43.75, tax on A's property.

Rate = tax ÷ assessed valuation.

STOCKS AND BONDS

Stock, or **Capital Stock,** represents the amount contributed by stockholders to carry on the business of a corporation, company, or firm.

Share is one of the equal parts into which capital stock is divided.

Par value of stock is its face value. The par value of one share is usually $100. Some stocks, however, have no par value.

Market value of stock is the sum for which it will sell. This price may be above or below the par value, where a par value is specified on the face.

Stock is **at par** when it sells for its face value; stock is **above par,** or at a **premium,** when it sells for more than its face value; stock is **below par,** or at a **discount,** when it sells for less than its face value.

Dividend is the sum paid to stockholders from the profits of the business. It is usually computed on the par value of a share.

Preferred stock is stock upon which a certain specified dividend is payable from the company's profits before any of the profits are available for dividends on the remainder of the shares. The remaining shares constitute the **common stock.**

Bond is a term currently used to denote a document representing one of a number of parts of a debt payable to the holders of the bonds. Bonds are usually issued in denominations of $1000, $500, or $100. A bond differs from a share of stock in the following ways: (1) a bond is a contract, generally secured by a mortgage, to pay a definite sum, known as the par value, at a definite time, while stock is not an unconditional promise to pay any sum; (2) a bond bears interest, while stock normally pays dividends; and (3) a bond always has a par value, while many stocks have no par value.

Brokerage is the fee or compensation paid to a broker for his services in buying or selling stocks or bonds.

When a broker buys stock for a customer, the brokerage must be *added* to the quoted price in order to determine the actual cost of the shares; when a broker sells for a customer, the brokerage must be *subtracted* from the quoted price in order to determine the proceeds of the sale.

Brokerage charges were formerly calculated at a certain rate per cent on the par value of stocks or bonds. This is still the practice for Liberty and municipal bonds in large denominations. Since many stocks are now issued, however, with no par value, it has become necessary to adopt a different method. The scale charged for ordinary transactions by the New York stock exchange and by practically all other brokers in America is as follows:

Bonds: par value $1000, charge $1.50
par value $500, charge $1.00
par value $100, charge $ .50

Stock: market value of share $125 and up, charge $.20
market value of share $10 to $124.99, charge $.15
market value of share $1.00 to $9.99, charge $.07½

The above scale should be consulted in connection with the problems which follow.

(1) To Find the Amount of Dividend.

Problem. A stock company whose shares have a par value of $100 declares a dividend of 5%. How much does A receive who owns 57 shares?

Solution.—
$100 × 57 = $5700, stock.
$5700 × .05 = $285, dividend.

(2) To Find the Rate of Dividend or Installment to be Paid.

Problem. The capital of a company is $500,000. The receipts for one year are $67,000 and the expenses are $103,000. If stockholders are assessed, what will be the rate of assessment?

Solution.—
$103,000 − $67,000 = $36,000, loss.
$36,000 ÷ $500,000 = .072 = 7⅕%, rate.

(3) To Find the Cost of Bonds at a Given Quotation.

Problem. Find the cost of 30 bonds quoted at 106, the denomination of the bonds being $1000.

Solution.—
$1000 × 1.06 = $1060, market value of 1 bond.
Brokerage on one $1000 bond = $1.50.
$1060 + $1.50 = $1061.50, cost of one bond.
$1061.50 × 30 = $31,845, cost of 30 bonds.

(4) To Find How Much Stock Can be Purchased for a Given Sum.

Problem. How many shares of mining stock at 61¼ can be bought for $6876.80?

Solution.—
Market value of 1 share at 61¼ = $61.25.
Brokerage on 1 share bought at $61.25 = $.15.
$61.25 + $.15 = $61.40, cost of 1 share.
$6876.80 ÷ $61.40 = 112, number of shares.

(5) To Find What Income any Investment Will Produce.

Problem. What will be the annual income from an investment of $3429 in 5% preferred stock purchased at 57, par value $100?

Solution.—
Market value of 1 share at 57 = $57.00.
Brokerage on 1 share bought at $57 = $.15.
$57.00 + $.15 = $57.15, cost of 1 share.
$3429 ÷ $57.15 = 60, number of shares purchased.
Par value of each share = $100.
$100 × .05 = $5.00, dividend on 1 share.
$5 × 60 = $300, income from 60 shares.

(6) To Find What Sum Must be Invested in Order to Obtain a Given Income.

Problem. How much must I invest in preferred stock at 142 in order to secure an income of $1600 if the stock pays a dividend of 8%?

Solution.—
$1600 ÷ .08 = $20,000, par value of stock required (200 shares).
Market value of 1 share at 142 = $142.
Brokerage on 1 share bought at $142 = $.20.
$142 + $.20 = $142.20, cost of 1 share.
$142.20 × 200 = $28,440, cost of 200 shares.

(7) To Find the Price at Which Stock Must be Purchased to Obtain a Given Rate of Income.

Problem. What should I pay for one share of 4% stock, par value $100, in order that my investment shall yield 5% income?

Solution.—
$100 × .04 = $4, income from one share.
$4 ÷ .05 = $80, price of stock.

(8) To Find the Rate of Income or Profits on an Investment in Stock.

Problem. What per cent return on my investment will I receive if I buy 6% stock, par value $100, at $120 a share? What per cent if I buy 5% stock, par value $100, at $90 a share?

Solution.—
(*a*) $100 × .06 = $6, income from one share.
$6 ÷ $120 = .05 = 5%, rate of income.
(*b*) $100 × .05 = $5, income from one share.
$5 ÷ $90 = .05⅝ = 5⅝%, rate of income.

Problem. A man purchased 300 shares of 8% stock at 49, par value $50. After receiving his dividends for one year, he sold the stock at 53¼. What per cent of his investment did he receive in dividends and profits?

Solution.—
$49 + $.15 (brokerage) = $49.15, cost of 1 share.
$49.15 × 300 = $14,745, amount invested.
$50 × 300 = $15,000, par value of shares.
$15,000 × .08 = $1,200, dividends.
$53.25 − $.15 = $53.10, selling price of 1 share.
$53.10 × 300 = $15,930, total selling price.
$15,930 − $14,745 = $1,185, profit on sale.
$1,200 + $1,185 = $2,385, total return.
$2,385 ÷ $14,745 = 16.17+%, rate.

MENSURATION

MENSURATION is a branch of applied mathematics dealing with the calculation of lines, surfaces, and volumes from measured data. In the following section are given the areas of plane figures, together with formulas relating to their dimensions and properties; the surfaces and volumes of solids are also treated in the same manner. Practically all of the problems of measurement met with in everyday experience may be solved by an adaptation of the formulas here given. The formulas, as far as possible, follow the notation given in the figures. Where this is not possible, an explanation is given at the beginning of each set of formulas.

The reader is reminded that, in using these formulas, the product of the measures of two dimensions of a plane figure gives the measure of the area in square units, and that the product of the measures of the three dimensions of a solid gives the measure of the volume of the solid in cubic units.

The satisfactory use of this section demands a knowledge of the operations of arithmetic, such as may be obtained from the preceding section. In many cases, also, the various rules will be understood more easily if the reader has become familiar with the principles given in the sections entitled *Algebra* and *Geometry*, which appear farther on in this department.

The following general method of using the data here given is recommended:

1. Represent by a sketch the problem to be solved, showing the dimensions in the sketch in the same proportions that they bear in the problem.

2. Select from the figures in this section the one similar to the sketch thus obtained.

3. Replace the letters used in the figure with the measurements stated in the problem.

4. Select the formula in which the dimension to be found is shown at the left of the equality sign.

5. Substitute for each letter given in the formula the corresponding dimension of the problem, and perform the indicated operations. Remember that multiplication signs are seldom given in formulas. The formula $A = ab$ is translated $A = a \times b$. Unless otherwise specifically stated, all dimensions must be measured by the same unit; for example, feet and inches must be changed to either feet or inches.

MENSURATION OF PLANE SURFACES

TRIANGLES

Triangles are usually classified in two ways:

1. Classification based on the sides;

An **equilateral triangle** is a triangle in which the three sides are equal.

An **isosceles triangle** is a triangle having two equal sides.

A **scalene triangle** is a triangle having no two sides equal.

2. Classification based on the angles;

A **right-angled triangle** is a triangle having a right angle.

An **acute-angled triangle** is a triangle in which all of the angles are acute.

An **obtuse-angled triangle** is a triangle which has one obtuse angle.

The **base** is the side upon which the triangle appears to rest.

The **vertex** of a triangle is the vertex of the angle opposite the base.

The **altitude** of a triangle is the perpendicular distance from the vertex to the base. It may be necessary to extend the base to meet the perpendicular.

The **median** is the line drawn from the vertex of a triangle to the middle of the opposite side.

The **area** of any triangle is equal to half of the product of the base and the altitude. In the following formulas, a, b, and c have been used to designate the sides of the triangle, h its altitude, and A its area.

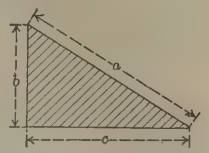
RIGHT-ANGLED TRIANGLE

$$A = \frac{bc}{2}.$$

$$a = \sqrt{b^2 + c^2}.$$

$$b = \sqrt{a^2 - c^2}.$$

$$c = \sqrt{a^2 - b^2}.$$



Problem. The sides b and c in a right-angled triangle are 12 and 20 inches respectively. What is the area, and what is the length of the side a?

Solution. $A = \frac{bc}{2} = \frac{12 \times 20}{2} = 120$ square inches.

$$a = \sqrt{b^2 + c^2} = \sqrt{12^2 + 20^2}$$
$$= \sqrt{144 + 400} = \sqrt{544} = 23.32+.$$

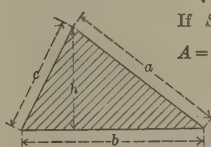
In the same manner, b may be found from a and c, and likewise c may be found from a and b.

ACUTE-ANGLED TRIANGLE

$$A = \frac{bh}{2} = \frac{b}{2}\sqrt{a^2 - \left(\frac{a^2 + b^2 - c^2}{2b}\right)^2}.$$

If $S = \frac{1}{2}(a + b + c)$, then

$$A = \sqrt{S(S-a)(S-b)(S-c)}.$$



Problem. If $a = 22$ inches, $b = 24$ inches, and $c = 18$ inches, what is the area of the triangle?

Solution. $A = \frac{24}{2}\sqrt{484 - \left(\frac{484 + 576 - 324}{2 \times 24}\right)^2}$

$$= 12\sqrt{484 - \frac{2116}{9}} = 189.3 \text{ sq. in.}$$

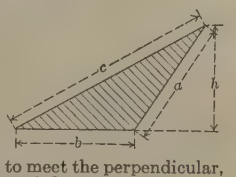
Or,

$$S = \tfrac{1}{2}(22 + 24 + 18) = 32.$$

$$A = \sqrt{32 \times 10 \times 8 \times 14}$$
$$= \sqrt{35840} = 189.3 \text{ sq. in.}$$

OBTUSE-ANGLED TRIANGLE

Problems involving this figure are solved by the same formulas and in the same manner as those which involve the acute-angled triangle.



In order to indicate the length of the altitude in a sketch, it is customary to extend the base, b, to meet the perpendicular, h, dropped from the vertex of the triangle.

QUADRILATERALS

A **quadrilateral** is a portion of a plane bounded by four straight lines.

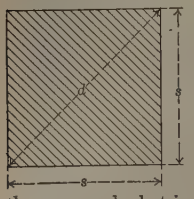
A **diagonal** of a quadrilateral is a straight line that joins two opposite vertices.

SQUARE

A **square** is a quadrilateral all of whose sides are equal and all of whose angles are right angles.

A = area, s = side, d = diagonal. The diagonal divides the square into two right-angled triangles.

Therefore, according to the Pythagorean theorem,



$d^2 = s^2 + s^2 = 2s^2$. $\therefore d = s\sqrt{2}$.
$A = s^2$.
$A = \frac{1}{2}d^2$.
$s = 0.7071\,d = \sqrt{A}$.
$d = 1.414s$
$= 1.414\sqrt{A}$.

Problem. The side, s, of a square is 14 inches. What is the area, and what is the length of the diagonal, d?

Solution. Area $= A = s^2 = 14^2 = 196$ sq. in. Diagonal $= d = 1.414s = 1.414 \times 14 = 19.80$ inches.

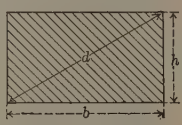
Problem. The area of a square is 196 square inches. What is the length of the side?

Solution. $s = \sqrt{A} = \sqrt{196} = 14$ inches.

RECTANGLE

A **rectangle** is a quadrilateral all of whose angles are right angles.

A = area; b = base, or length; h = altitude, or width; d = diagonal. The diagonal divides the rectangle into two right-angled triangles. Therefore, according to the Pythagorean theorem, $d^2 = b^2 + h^2$.



$A = bh$.
$A = b\sqrt{d^2 - b^2}$
$= h\sqrt{d^2 - h^2}$.
$d = \sqrt{b^2 + h^2}$.
$b = \sqrt{d^2 - h^2} = A \div h$.
$h = \sqrt{d^2 - b^2} = A \div b$.

Problem. A rectangle measures 11.5 inches by 15 inches. What is its area?

Solution. Area $= bh = 15 \times 11.5 = 172.5$ sq. in.

Problem. The height, h, of a rectangle is 11.5 inches and its area is 172.5 square inches. What is the length of the base, b, and of the diagonal, d?

Solution. $b = A \div h = 172.5 \div 11.5 = 15$ in.
$d = \sqrt{b^2 + h^2} = \sqrt{132.25 + 225}$
$= \sqrt{357.25} = 18.90$ inches.

PARALLELOGRAM

A **parallelogram** is a four-sided figure whose opposite sides are parallel. Rectangles, squares, rhombi, and rhomboids are all parallelograms.

A **rhombus** is an equal-sided parallelogram whose angles are not right angles.

A **rhomboid** is a parallelogram whose adjacent sides are not equal and whose angles are not right angles.

A = area, b = base, h = altitude. The dimension h must always be measured at a right angle to the dimension b.



$A = bh$.
$b = A \div h$.
$h = A \div b$.

Problem. The base, b, of a parallelogram is 24 inches. The height, h, is 9 inches. What is the area?

Solution. Area $= bh = 24 \times 9 = 216$ sq. in.

Problem. The area of a parallelogram is 216 square inches. The base is 24 inches. What is the height?

Solution. $h = A \div b = 216 \div 24 = 9$ inches.

TRAPEZOID

A **trapezoid** is a quadrilateral which has two of its sides parallel.

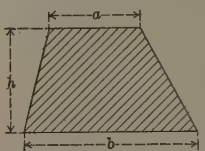
The **legs** are the nonparallel sides.

The **bases** are the parallel sides.

The **mid line** of a trapezoid is a straight line joining the mid-points of the legs.

An **isosceles trapezoid** is a trapezoid whose legs are equal.

The **altitude** of a trapezoid is the perpendicular distance between the parallel sides.



A = area, a = one base, b = other base, h = altitude.

$$A = \frac{(a + b)\,h}{2}.$$

Problem. The lengths of the parallel sides of a trapezoid are 20 and 30 feet, and the height is 12 feet. What is the area?

Solution.

$$A = \frac{(a+b)\,h}{2} = \frac{(20+30)\,12}{2} = \frac{600}{2} = 300 \text{ sq. ft.}$$

The areas of many irregular figures may be obtained by drawing a series of parallel lines across the given figure, thus dividing the figure into a series of trapezoids. The area of each trapezoid is then computed separately and the total area is obtained by addition. This process is simplified by the *Trapezoidal Rule*, which may be stated as follows:

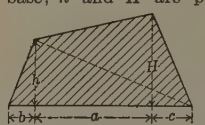
To half the sum of the lengths of the first and last parallels add the sum of the lengths of all intermediate parallels, and multiply this result by the common distance between the parallels.

The reader is referred to the article on *Chain Surveying* for a specific illustration of the foregoing rule.

TRAPEZIUM

A **trapezium** is a quadrilateral having no two sides parallel.

A = area; a, b, and c are line-segments of the base; h and H are perpendiculars to the base.



$$A = \frac{(H+h)\,a + bh + cH}{2}.$$

A trapezium may be divided, as shown, by the diagonal line into two triangles. It may be divided also into two triangles and a trapezoid by the perpendiculars h and H. The formula shown above is based on the latter arrangement. The reader is referred to the article on *Chain Surveying* for an illustration of the triangle method of computing the area of a trapezium. Care must be taken to measure the height of each triangle at a right angle to its base.

Problem. The dimensions of a trapezium are: $a = 11$ feet, $b = 2$ feet, $c = 3$ feet, $h = 6$ feet, $H = 9$ feet. What is the area of the trapezium?

Solution.

$$A = \frac{(9+6)\,11 + (2\times6) + (3\times9)}{2} = 102 \text{ sq. ft.}$$

OTHER PLANE FIGURES

CIRCLE

A **circle** is a portion of a plane surface, bounded by a closed curved line all points of which are equally distant from a point within called the **center.** This bounding line is called the **circumference.**

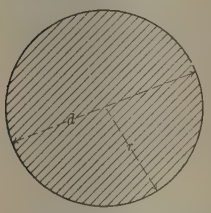
The **area** of a circle is the area of the plane surface inclosed by the circumference.

The **radius** of a circle is a straight line drawn from the center to the circumference.

The **diameter** of a circle is a straight line passing through the center of the circle and terminated at both ends by the circumference.

The ratio of the circumference to the diameter is expressed by the Greek letter π, "p," pronounced *pi*, the approximate value of which is $3\frac{1}{7}$. A more accurate value, which is very generally used, is 3.1416. The value of π may be computed to any desired number of decimal places. Calculated to 15 places, it reads 3.141592653589793.

A = area, C = circumference, d = diameter, r = radius.



$$A = \pi r^2 = 3.1416\, r^2$$
$$= \frac{\pi d^2}{4} = 0.7854\, d^2.$$
$$C = 3.1416 d = 6.2832 r.$$
$$r = C \div 6.2832$$
$$= \sqrt{A \div 3.1416}$$
$$= 0.5642 \sqrt{A}$$
$$= 0.1592\, C.$$
$$d = C \div 3.1416$$
$$= \sqrt{A \div 0.7854}$$
$$= 1.1284 \sqrt{A}$$
$$= 0.3184\, C.$$

The diameter of the circle is the dimension usually given. The formula $A = 0.7854\, d^2$ is another way of stating that the area of a circle equals .7854 times the area of the circumscribing square.

Problem. A 15-inch circle is cut from a 15-inch square of metal which weighs 1 pound, 8 ounces. What is the area of the circle and what is its weight?

Solution.

$A = 0.7854 d^2 = 0.7854 \times 15 \times 15 = 176.7$ sq. in.

The weight is 78.54% of 1.5 pounds, or 1.18 + pounds.

Problem. The area of a circle is 44.2 square inches. What is its diameter?

Solution. $d = 1.128 \sqrt{A} = 1.128 \sqrt{44.2}$
$= 1.128 \times 6.65 = 7.5$ in.

Note.—Since the area is here given to only one decimal point, no advantage of accuracy is to be gained by using the value of d to more than two decimal places, that is, 1.13. But, when very exact measurements are available, it is customary to perform the calculation using for these measurements numbers correct to one decimal place more than accuracy would seem to require. For this reason the value 1.128 is used rather than 1.13 or 1.1284.

ELLIPSE

An **ellipse** is a closed plane curve so constructed that the sum of the distances from any point on the curve to two fixed points within, called the *foci*, is a fixed length.

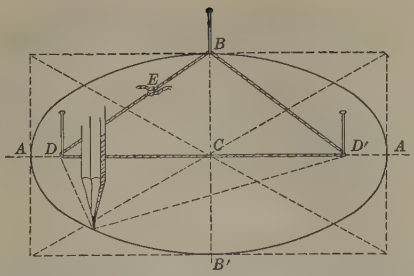
A **diameter** of an ellipse is any line passing through the point midway between the *foci* and terminated at each end by the curve.

The **major axis** of an ellipse is its greatest diameter, or its length.

The **minor axis** of an ellipse is its shortest diameter, or its width.

To Construct an Ellipse.

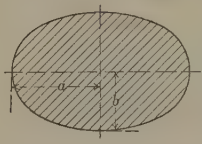
Draw a rectangle whose length and breadth are equal respectively to the major and the minor axis of the ellipse to be drawn. Drive a pin at the middle of the upper line at B. Then locate the points D and D' by striking an arc of radius AC with the center at B. Drive pins at D and D' and adjust a loop of thread passing around the points B, D, and D'. Remove the pin B and replace it by a pencil point; then, by moving the pencil so as to keep the string taut, the complete ellipse may be drawn within the bounding rectangle.



The points D and D' are the foci, and the sum of the distances from the foci to any point of the curve is constant and is equal to the length of $DB + BD'$.

The curve is frequently used. It is of especial interest because the orbits of the planets are approximately elliptical. When a cylinder or a right circular cone is cut through by a plane at an angle with the axis other than a right angle, the flat exposed surface shows the form of an ellipse.

A = area, a = half of major axis, b = half of minor axis, P = perimeter.



$$A = \pi ab = 3.1416\, ab.$$

$$P = 3.1416 \sqrt{2\,(a^2+b^2)},$$

approximately.

Like the circle, the area of the ellipse is always 78.54% of the circumscribing rectangle. Finding the exact length of the perimeter of an ellipse is not an easy problem and requires a knowledge of the calculus for its solution.

Problem. What are the area and the perimeter of the largest ellipse that can be drawn on a card measuring 7 inches by 10 inches?

Solution.

$A = 0.7854 \times 7 \times 10 = 54.98$ sq. in.

$P = 3.1416 \sqrt{2 \times (12.25 + 25)}$
$= 3.1416 \sqrt{74.5} = 3.1416 \times 8.63 = 27.1$ in.

REGULAR POLYGONS

A **regular polygon** is a polygon having all its sides and all its angles equal. If any one of its dimensions is known, the area and other dimensions may easily be determined by the following table:

A = area of polygon.
R = radius of circumscribed circle.
r = radius of inscribed circle.
s = length of one side.

Table of Regular Polygons

No. of Sides	Area	Area	Area	Radius of Circumscribed Circle	
3	$0.433\, s^2$	$1.299\, R^2$	$5.196\, r^2$	$0.577\, s$	$2.000\, r$
4	$1.000\, s^2$	$2.000\, R^2$	$4.000\, r^2$	$0.707\, s$	$1.414\, r$
5	$1.720\, s^2$	$2.378\, R^2$	$3.633\, r^2$	$0.851\, s$	$1.236\, r$
6	$2.598\, s^2$	$2.598\, R^2$	$3.464\, r^2$	$1.000\, s$	$1.155\, r$
7	$3.634\, s^2$	$2.736\, R^2$	$3.371\, r^2$	$1.152\, s$	$1.110\, r$
8	$4.828\, s^2$	$2.828\, R^2$	$3.314\, r^2$	$1.307\, s$	$1.082\, r$
9	$6.182\, s^2$	$2.893\, R^2$	$3.276\, r^2$	$1.462\, s$	$1.064\, r$
10	$7.694\, s^2$	$2.939\, R^2$	$3.249\, r^2$	$1.618\, s$	$1.052\, r$

Problem. What is the area of a regular octagon each of whose sides is 5 inches long?

Solution. $A = 4.828 \times 5 \times 5 = 120.7$ sq. in.

Problem. If the figure in the preceding problem is drawn inside a circle, what will be the radius of the circumscribing circle?

Solution. $R = 1.307 \times 5 = 6.535 = 6\frac{17}{32}$ inches, approximately.

MENSURATION OF SOLIDS

A **solid** has three dimensions: length, breadth, and thickness.

The **faces** are the surfaces that bound the solid.

The **edges** are the lines produced by the intersections of the faces.

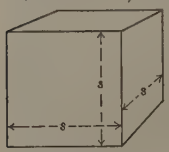
The **volume** of a solid is expressed by the number of cubic units that it contains.

CUBE

A **cube** is a solid bounded by six squares.

A **diagonal** of a cube is a straight line joining two opposite vertices which do not lie in the same face.

V = volume; s = length of edge; d = diagonal.



$V = s^3$.

$s = \sqrt[3]{V}$.

$d = 1.732s$.

Problem. The side of a cube measures 5½ in. What is its volume?

Solution. $V = 5\frac{1}{2} \times 5\frac{1}{2} \times 5\frac{1}{2} = 166\frac{3}{8}$ cu. in.

Problem. The volume of a cube is 120 cubic inches. What is the length of its side?

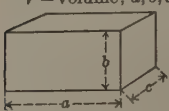
Solution. $s = \sqrt[3]{120} = 4.93 +$ inches.

Note.—The reader is referred to the article on *Logarithms* for the most convenient method of computing a cube root.

RECTANGULAR PRISM

A **rectangular prism** is a solid bounded by six rectangles.

V = volume; $a, b,$ and c are the lengths of the edges.



$V = abc$.

$a = \frac{V}{bc}$; $b = \frac{V}{ac}$; $c = \frac{V}{ab}$.

Problem. What is the volume of a rectangular box measuring 2 inches by 4 inches by 8 inches?

Solution. $V = 2 \times 4 \times 8 = 64$ cubic inches.

Problem. A box 10 inches by 12 inches is designed to hold a cubic foot. What is the height?

Solution. $b = \frac{1728}{10 \times 12} = 14.4$ inches.

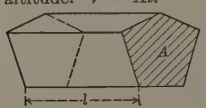
PRISM

A **prism** is a solid whose two ends, or bases, are equal, similar polygons parallel to each other and whose sides are parallelograms.

A **parallelepiped** is a prism whose bases are parallelograms.

The **length** or **altitude** of a prism is the perpendicular distance between the bases.

V = volume, A = area of the base, l = length or altitude. $V = Al$.



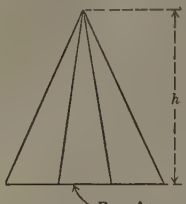
The area of the base, A, is found by the use of the formulas given under plane figures. The length, l, must be measured perpendicularly to the base.

Problem. A prism having for its base a triangle whose area is 10.5 square inches has a length of 9 inches. What is its volume?

Solution. $V = 10.5 \times 9 = 94.5$ cubic inches.

PYRAMID

A **pyramid** is a solid whose base is a polygon and whose faces are triangles meeting at a point, called the *vertex*.



V = volume.
h = height.
A = area of base.
$V = A \times \frac{1}{3} h$.

Determine the area of the base by consulting the proper figure as given above, or, if the base is a regular polygon, consult *Table of Regular Polygons* under *Other Plane Figures*.

Problem. A pyramid having a height of 6 inches has a base formed by a regular hexagon, each of whose sides measures 1 inch. What is the volume of the pyramid?

Solution.

Area of hexagon $= 1 \times 1 \times 2.598 = 2.598$ sq. in.

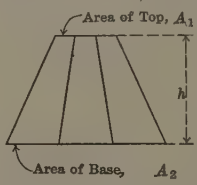
Volume of pyramid $= \frac{2.598 \times 6}{3} = 5.20$ cu. in.

FRUSTUM OF A PYRAMID

The **frustum** of a pyramid is the portion of the pyramid next the base, formed by cutting off the top by any plane parallel to the base. The surface resulting from this cutting is one of the two bases of the frustum.

The **altitude** of a frustum is the perpendicular distance between the planes of its bases.

V = volume, A_1 = area of upper base, A_2 = area of lower base, h = altitude.



$V = \frac{h}{3}\left(A_1 + A_2 + \sqrt{A_1 \times A_2}\right)$.

Problems of this character may easily be solved by the prismoidal formula described later in this section.

Problem. The pyramid in the previous problem having an altitude of 6 inches and a base measuring 1 inch on a side is cut off 2 inches from the top. What volume remains?

Solution (1). The small pyramid formed by the cut is similar in every way to the large pyramid. Consequently, as the small pyramid has a height of 2 inches, or ⅔ the height of the larger pyramid, the length of a side of the smaller base will be ⅔ that of a side of the larger base, or ⅓ inch. Therefore the volume of the smaller removed pyramid $= \frac{1}{3} \times 2\,(\frac{1}{3} \times \frac{1}{3} \times 2.598) = 0.19$ cu. in.

Then the volume of the frustum remaining $= 5.20 - 0.19 = 5.01$ cu. in.

Solution (2). Using the formula, we have

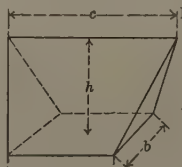
$A_1 = \frac{1}{3} \times \frac{1}{3} \times 2.598 = 0.29$ sq. in.

$A_2 = 2.60$ sq. in.

$V = \frac{2}{3}(2.60 + 0.29 + \sqrt{0.29 \times 2.60}) = 5.01$ cu. in.

WEDGE

A **wedge** is a solid bounded by five plane faces, two of which are triangles, and whose base is a parallelogram.



V = volume.
h = height.
c = sharp edge.
a and b = sides of base, a being parallel to c.

$V = \frac{(2a + c)bh}{6}$.

This formula is true for rectangular bases only. Other shapes of wedges should

be solved by the prismoidal formula described later in this section.

Problem. A wedge whose height is 8 inches has a sharp edge measuring 9 inches and a rectangular base whose dimensions are 4×6 inches. The sharp edge is parallel to the 6-inch sides. What is the volume of the wedge?

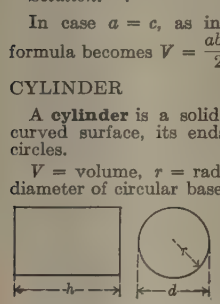
Solution. $V = \dfrac{(12 + 9) \times 4 \times 8}{6} = 112$ cu. in.

In case $a = c$, as in an ordinary wedge, the formula becomes $V = \dfrac{abh}{2}$.

CYLINDER

A **cylinder** is a solid bounded by a uniformly curved surface, its ends being equal and parallel circles.

V = volume, r = radius of circular base, d = diameter of circular base, h = length, or altitude.



$V = 3.1416\, r^2 h$
$= 0.7854\, d^2 h.$
Area of side (lateral surface) $= 3.1416 dh.$
Area of end (base) $= 0.7854 d^2.$

Problem. What is the volume of a cylindrical tank whose length is 6 feet and whose diameter is 4.5 feet? What is the area of the metal in the side and in one end?

Solution.

$V = 0.7854 \times 4.5 \times 4.5 \times 6 = 95.426$ cu. ft.

Surface $= (0.7854 \times 4.5 \times 4.5) + (3.1416 \times 4.5 \times 6) = 100.73$ sq. ft.

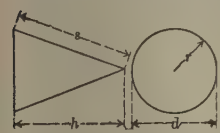
CONE

A **cone** is a solid whose base is a circle and whose curved lateral surface tapers uniformly to a point, called the vertex.

The **altitude** of a cone is the perpendicular distance from its vertex to its base.

The **slant height** of a cone is the distance from the vertex to any point in the circumference of the base.

V = volume, A = area of lateral surface, h = altitude, s = slant height, d = diameter of circular base, r = radius of circular base.



$V = \dfrac{h}{3}(3.1416\, r^2)$
$= 1.0472\, r^2 h$
$= 0.2618\, d^2 h.$
$A = 3.1416\, rs.$
$s = \sqrt{r^2 + h^2}.$
$h = \sqrt{s^2 - r^2}.$

Problem. A conical flower holder has a slant length of 6 inches and a diameter of 3 inches. Determine the area of the metal surface and the volume.

Solution.

$r = \dfrac{d}{2} = \dfrac{3}{2} = 1.5$ in.

$h = \sqrt{36 - 2.25} = 5.81$ in.

$V = 0.2618 \times 3 \times 3 \times 5.81 = 13.69$ cu. in.

$A = 3.1416 \times 1.5 \times 6 = 28.27$ sq. in.

FRUSTUM OF A CONE

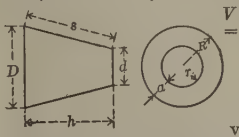
The **frustum** of a cone is the portion of a cone included between the base and the plane of a section, or cut, made through the cone, parallel to the base. The surface resulting from this section is one of the two bases of the frustum.

The **altitude** of a frustum is the perpendicular distance between the bases.

The **lateral surface** of a frustum is the portion of the surface of the frustum included between the bases.

The **slant height** is the shortest distance along the lateral surface from one base of the frustum to the other.

V = volume, A = area of lateral surface, D = diameter of lower base, d = diameter of upper base, R = radius of lower base, r = radius of upper base, $a = R - r$, s = slant height, h = altitude.



$V = 1.0472\, h\,(R^2 + Rr + r^2)$
$= 0.2618\, h\,(D^2 + Dd + d^2).$
$s = \sqrt{h^2 + a^2}.$
$A = 3.1416\, s\,(R + r)$
$= 1.5708\, s\,(D + d).$

Problem. Find the volume and the metal area of a pail 10 inches deep, the top diameter being 9 inches and the bottom diameter being 7.5 inches.

Solution. $V = 0.2618 \times 10 \times (81 + 67.5 + 56.25) = 536.0$ cu. in. $= 2.32$ gallons capacity.

$a = \dfrac{9}{2} - \dfrac{7.5}{2} = .75$ in.

$s = \sqrt{100 + .5625} = 10.03$ in.

$A = 1.5708 \times 10.03(9 + 7.5) = 259.95$ sq. in.

Area of base $= .7854 \times 7.5^2 = 44.18$ sq. in.

Total area $= 259.95 + 44.18 = 304.1$ sq. in.

SPHERE

A **sphere** is a solid bounded by a uniformly curved surface, every point of which is equally distant from a point within, called the **center.**

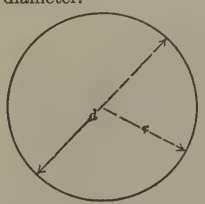
The **radius** of a sphere is a straight line joining the center with any point on the surface.

The **diameter** of a sphere is a straight line passing through the center and terminated at both ends by the bounding surface.

A **hemisphere** is one of the two equal parts into which a sphere may be divided by a plane passing through the center.

A **great circle** is a circle that divides the area of a sphere into two equal parts.

V = volume, A = surface area, r = radius, d = diameter.



$V = \dfrac{4\pi r^3}{3} = \dfrac{\pi d^3}{6}$
$= 4.1888\, r^3$
$= 0.5236\, d^3.$
$A = 4\pi r^2 = \pi d^2$
$= 12.5664\, r^2$
$= 3.1416\, d^2.$
$d = 1.2408 \sqrt[3]{V}$
$= 0.5642 \sqrt{A}.$

The volume formula, $V = \dfrac{\pi d^3}{6}$, states in algebraic language that the sphere occupies 52.36% of the circumscribing cube. Similarly, the formula $A = 4\pi r^2$ states that the area of the convex surface of the sphere is equivalent to the sum of the areas of four great circles.

Problem. Find the volume and the weight of a cast iron ball 4 inches in diameter if 1 cu. in. of cast iron weighs 0.26 lb.

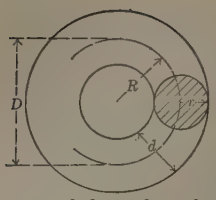
Solution.

Volume $= 0.5236 \times 4 \times 4 \times 4 = 33.51$ cu. in.

Weight $= 33.51 \times 0.26 = 8.7$ lb.

TORUS OR RING

V = volume. A = area. D = average diameter of ring, that is, one-half the sum of the diameter of the outside circumference and the diameter of the hole encircled by the ring. d = diameter, and r = radius, of the circular cross section of the body of the ring. R = average radius of the ring.



$$V = 2\pi^2 Rr^2 = 19.739\,Rr^2 = \frac{\pi^2}{4}\,Dd^2 = 2.4674\,Dd^2.$$

$$A = 4\pi^2 Rr = 39.478\,Rr = \pi^2 Dd = 9.8696\,Dd.$$

Problem. Find the volume and the surface of a ring, the inner diameter being 3 inches and the outer diameter being 4 inches.

Solution. If the inner and outer diameters are 3 in. and 4 in. respectively, the corresponding radii are ³⁄₂ and ⁴⁄₂, or 1.5 in. and 2 in. The diameter or thickness of the solid part of the ring, d, will therefore equal $2 - 1.5 = 0.5$ in.

$d = 0.5$ in.

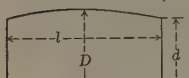
$D = \frac{3+4}{2} = 3.5$ in., the average of the internal and external diameters.

$\therefore V = 2.4674 \times 3.5 \times 0.5 \times 0.5 = 2.16$ cu. in.

$A = 9.8696 \times 3.5 \times 0.5 = 17.27$ sq. in.

BARREL

V = volume.
D = greatest diameter.
d = diameter of head.
l = length.
$V = 0.26\,l\,(2D^2 + d^2)$, approximately.



Problem. The length of a barrel is 26 inches, its greatest diameter is 19½ inches, and its head diameter is 16½ inches. Find the volume.

Solution. $V = 0.26 \times 26 \times (2 \times 19.5 \times 19.5 + 16.5 \times 16.5) = 6.76 \times (760.5 + 272.25) = 6981$ + cu. in.

This is probably a standard barrel, as an error of ¼ inch in measurement would account for the difference between the volume found and the standard volume, or 7056 cu. in.

PRISMOIDAL FORMULA

The prismoidal formula affords a method of calculating accurately the volume of many regular solids and of calculating the approximate volume of many irregular solids. It may be used, for example, to determine the volume of a frustum of a cone or a pyramid, of a segment of a sphere, of a wedge, or of a conoid, which last figure has a form similar to a rifle bullet. It serves also as a method of determining the cubic contents of a tank with flaring sides, of a pail or a barrel, and of piles or heaps of material. The end surfaces must be parallel (one may be a point or a line), and the area of a section midway between these must be determined.

V = volume.
h = length of solid.
A_1 = area at one end of the solid.
A_2 = area at the other end of the solid.
A_m = area of the mid section.

$$V = \frac{h}{6}\,(A_1 + 4\,A_m + A_2).$$

Problem. What is the approximate volume of a pile of coal 6 feet high whose base measures 10 feet by 12 feet? The mid section measures 6 feet by 7½ feet. The top area is assumed to be 0, since theoretically it is a point or line. However, in most cases a larger number could be used.

Solution. $V = \frac{6}{6}\,(0 + 4 \times 45 + 120) = 300$ cubic feet. Supposing the coal were stove size, red ash anthracite, its weight would be 300×52.5, or 15,750 pounds. See table of *Weights of Various Substances.*

FORMULAS

An equation which expresses algebraically some arithmetical or scientific rule is called a **formula,** and the expression of this formula in words is called a rule. Since these formulas hold true for whatever numbers the letters represent, the process of evaluating the formula consists in substituting, for the letters of the formula, the quantities mentioned in the problem, using the same unit of measurement employed in the formula. Metric measures cannot always be used in formulas based on English units; for example, distances must be expressed in feet, inches, or meters, as the formula indicates. Oftentimes it is possible to combine all the constant figures into one coefficient, thereby greatly reducing the amount of computation. It should be noted that all formulas are in the algebraic form and that when two letters are placed together the sign of multiplication is implied.

Following is a list of some of the formulas used in the sciences, engineering, and business. The reader is referred to the preceding paragraphs for the relations of the various common figures and also to the article *Arithmetic.* If the formula does not express the factor desired, it should be algebraically transformed so that the desired factor stands on the left of the equality sign.

CONVERSION OF FAHRENHEIT AND CENTIGRADE TEMPERATURES

$$C = \tfrac{5}{9}\,(F - 32);\ F = \tfrac{9}{5}C + 32.$$

Problem. What is the equivalent of 68° Fahrenheit in degrees Centigrade?

Solution. $C = \frac{5}{9}(68 - 32) = \frac{5}{9} \times 36 = 20$. Therefore 20° Centigrade represents the same temperature as 68° Fahrenheit.

FALLING BODIES AND PROJECTILES

The following formulas are true for movement in a vacuum and approximately true for movement in air.

S = distance fallen in feet.
g = acceleration due to gravity, 32.16 feet per second per second.
t = time in seconds.
v = velocity in feet per second.
h = height to which a projectile will rise when given an initial velocity v.

$$S = \frac{gt^2}{2} = 16.08t^2. \quad (1)$$

$$v = gt = 32.16t. \quad (2)$$

$$h = \frac{v^2}{2g} = .01555v^2. \quad (3)$$

Problem. How long will it take a stone to fall a distance of 100 feet?

Solution. Since the time is the unknown factor, equation (1) must be transformed to read as follows:

$$t = \sqrt{\frac{S}{16.08}} = .249\,\sqrt{S}$$

$= .249\,\sqrt{100} = 2.49$ seconds.

Problem. A baseball thrown vertically upward returns in 5 seconds. With what velocity did it start? How high did it rise?

Solution. The time required for the ball to rise to its highest position is exactly equal to the time it takes in falling back to the starting point. Consequently, the time of rising or falling equals one-half the total time, or 2.5 seconds.

From (2), $v = 32.16 \times 2.5 = 80.4$ ft. per second; from (3), $h = .01555 \times 80.4 \times 80.4 = 100.5$ feet.

HORSE POWER OF A GAS ENGINE

According to the formula adopted by the Society of Automotive Engineers (S. A. E.), the horse power

$$\text{(H. P.)} = \frac{nd^{\text{II}}}{2.5} = 0.4nd^2$$

where n = number of cylinders
and d = diameter of cylinder in inches.

Problem. What is the rated horse power of a four-cylinder automobile engine whose cylinders are 3.5 inches in diameter?

Solution. H. P. $= 0.4 \times 4 \times 3.5 \times 3.5 = 19.6$.

CAPACITY OF A PIPE IN GALLONS

$C = 0.0408\ L\ D^2$, in which C = capacity in gallons, L = length in feet, D = diameter in inches.

Problem. How many gallons of water will be contained in a 2″ pipe line 300′ long?

Solution. $C = 0.0408 \times 2 \times 2 \times 300 = 48.96$ gal. (Reduction of feet to inches and other steps in the mensuration are included in the coefficient 0.0408.)

RELATION OF WATER PRESSURE TO HEAD

$P = 0.433\ h$; $h = 2.31\ P$ where h = head, or vertical height in feet, of a column of water and P = pressure in pounds per square inch.

Problem. The level of the water in a house tank is 40 feet above a laundry tub faucet. What is the pressure in pounds per square inch at the faucet?

Solution. $P = 40 \times 0.433 = 17.32$ lb. per sq. in.

Problem. How high must a tank be placed above a laundry motor if the motor requires a pressure of 20 lb. per sq. in. to operate it?

Solution. $h = 2.31 \times 20 = 46.2$ ft.

CURVATURE OF THE EARTH AND VISIBILITY

The greatest distance from which any object, such as a ship, can ordinarily be seen by a person on the same level as the object depends on the height of the object and is expressed by the formula

$$d = \sqrt{\frac{3h}{2}}, \text{ in which}$$

d = the distance of the object from the observer in miles and
h = the height of the object in feet.

Problem. A lightship carries a light 30 feet above the water. What is the greatest distance at which this light can be seen from a position on the shore line?

Solution.

$$d = \sqrt{\frac{3 \times 30}{2}} = \sqrt{45} = 6.7 + \text{ miles.}$$

Used in another way, this formula will show the distance from an observer on the seashore to his *horizon*, or the point where the sky and the water seem to meet.

Problem. What is the distance to the horizon for a man whose eyes are 5½ feet above the sea level?

Solution.

$$d = \sqrt{\frac{3 \times 5\frac{1}{2}}{2}} = \sqrt{8.25} = 2.87 \text{ miles.}$$

WIND PRESSURE

The pressure of the wind against a vertical surface may be determined approximately by the formula

$$P = 0.005V^2, \text{ where}$$

P = the pressure in pounds per square foot and
V = the velocity of the wind in miles per hour.

Problem. What is the wind pressure against a building 30 feet long by 20 feet high when the wind is blowing squarely against it at the rate of 40 miles per hour?

Solution. $P = 0.005 \times 40 \times 40 = 8$ pounds per square foot. The exposed area is 600 square feet. Therefore $P = 8 \times 600$, or 4800, pounds.

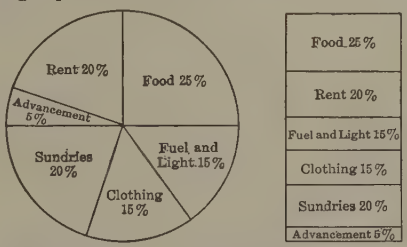
GRAPHS

Frequently a fact may be more clearly expressed by a symbol or a drawing than by words. It is not possible for the ordinary mind to read through a column of statistics and see all of the relations indicated therein, if the list be at all extended. These relations are easily grasped if the facts are properly set forth in a graphic picture, or *graph*.

A **graph** is a diagram or picture, so planned and proportioned that the relation of one set of values to one or more other sets of values may easily be perceived. Commerce and industry make extensive use of the graphic record. The engineer uses the graph as an aid to computation and design. The construction of a graph is essentially a mathematical process, and the use of graphs has simplified many of the complicated situations arising in higher mathematics. Magazines and the daily papers frequently use graphs in order that their readers may at a glance comprehend certain comparisons, such as, for example, the relative sizes of national standing armies, the proportion which the cost of an army bears to other items of governmental expense, the changes in the cost of living, in the national birth rate, etc. The types of graph most commonly employed are the *area graph*, the *bar graph*, and the *statistical graph*.

AREA GRAPHS

A single circle or rectangle may be divided so as to illustrate the relative importance of each one of a set of items as compared with each other and with the group as a whole.



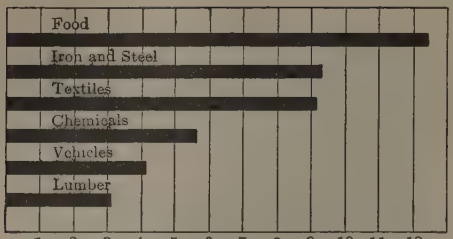
The scale used in making the circle graph is based on the degree. For example, since 20% of the family budget represented by the accompanying graph is spent for rent, an angle of $.20 \times 360°$, or 72°, is laid off at the center of the circle, and the sides are extended to the circumference. An instrument called a protractor is used for measuring the angles. Sectors representing the other items are constructed in a like manner, and the whole figure easily conveys to the mind the proportional relations.

The rectangular graph is constructed by dividing a rectangle into smaller rectangles. In the sketch shown, the small rectangles are so laid out that each one occupies a proportion of the total area of the large rectangle corresponding to the percentage of the family budget it represents. This division of area is obtained by dividing the height of the large rectangle according to the percentages to be displayed.

BAR GRAPHS

Bar graphs are used to indicate direct comparison, each bar being used to represent one value. The length of a bar is directly proportional to the value which it represents. A single scale is generally used, on which the value of any bar may be determined.

The accompanying bar graph will inform the reader at a glance concerning the relative value of the products of the six most important groups of manufacturing industries in America. The exact values may be found by comparison with the scale, on which, reading from left to right, each division represents an increase of one billion dollars.



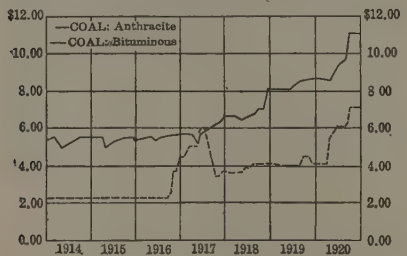
Value of products in billions of dollars.

Leading Manufacturing Industries of the U. S.

STATISTICAL GRAPHS

Graphs of this type are used to indicate, by means of the change in direction of a line, a corresponding change of one factor in respect to another. The following graph represents the changes in the price of coal over a period of seven years. Since this graph is designed to show the change of price with the passage of time, two reference scales are needed to show the constant changes of these two factors of the story: a time scale and a price scale. There are seven horizontal and eight vertical lines, and the large spaces thus formed represent both time and price. Changes in the course of the line upward or downward show corresponding changes in the price of coal. The course of the line from left to right shows the passage of time. The distance of any point in the graph line, measured in a vertical direction, from the horizontal base line indicates the price at a time determined by the distance of the same point, measured in a horizontal direction, from the vertical guide lines.

It appears that the price of "soft" coal for several years remained the same and about $3.00 a ton cheaper than "hard" coal. Then, for some economic reason, it suddenly rose for the brief period of about one month to a price level higher than "hard" coal. It then fell and did not change much until the close of the World War. The price of "hard" coal for the first six months of 1919 was a little greater than $8.00 a ton. It rose to about $8.50 a ton at the end of 1919, and at the end of 1920 it commanded a price of $11.00 a ton. Such are the facts presented by this graph. The information which the reader desires is more easily and quickly secured than by the tabular method.



PRACTICAL PROBLEMS

In this section are given formulas and directions for dealing with situations in everyday industry which call for special methods of measurement or computation.

HOW TO ESTIMATE WALL PAPER

All wall paper is made in double rolls or bolts, 16 yards long and 18 inches wide. Under average conditions of matching and waste, a double roll will cover 60 square feet, and the number of double rolls needed may be found by dividing the total number of square feet to be papered by 60; the quotient will be the number of double rolls required. The price quoted for wall paper is usually the price per single roll, and in buying paper the purchaser should note whether the advertised price is for a single or a double roll.

The following table will facilitate the estimating of the quantity of paper needed. Measure around all four walls with a rule or yardstick. Find the height of the room by measuring from the ceiling or molding to the baseboard or floor. The number of yards of border will be found by dividing the distance around the room in feet by 3. Do not use the table for the ceiling of a long hallway, but apply the rule stated above.

Distance around Room in Feet	Double Rolls of Side-wall Paper Necessary, according to Height of Room				Double Rolls of Ceiling Paper
	8 Ft.	9 Ft.	10 Ft.	12 Ft.	
30	3	3	4	4	1
33	3	4	4	5	2
36	4	4	4	5	2
39	4	4	5	6	2
42	4	5	5	6	2
45	5	5	6	7	3
48	5	6	6	7	3
51	5	6	7	8	3
54	5	6	7	8	3
57	6	7	7	9	4
60	6	7	8	9	4
63	7	7	8	10	4
66	7	8	9	10	5
69	7	8	9	11	5
72	7	8	9	11	6

In practice it is hardly worth while to compute the exact amount of paper that will be wasted in papering a room. A single illustration will show how the table given above was computed, average conditions of waste being considered.

Problem. How many rolls of paper will be required to paper the walls of a room 12 feet long by 9 feet wide by 9 feet high?

Solution. Perimeter of room = 9 + 9 + 12 + 12 = 42 feet; number of vertical strips required = 42 ÷ 1½ = 28; 28 strips each 9 feet long will require 28 × 9 = 252 feet, or 84 yards. The number of rolls required will be 84 ÷ 16 = 5¼ rolls. The allowance for openings will probably make the quantity given in the table a safe estimate of the number of rolls required for the walls. Since a double roll will cover 60 to 72 sq. ft., the ceiling, with an area of 9 × 12, or 108, sq. ft. will require more than 1 and less than 2 rolls. Hence 2 double rolls must be purchased, making a total of 7 rolls.

HOW TO ESTIMATE WOOD-LOT PRODUCTS

The products of the wood-lot may be cordwood, poles, piling, crossties, mine timbers, or lumber. They are sold in a number of different units. The amount may be measured in cords or in board feet; or it may be sold by the linear foot or piece in the form of posts, piling, ties, or other products. In the latter case, the specifications of the purchaser will determine just which pieces fulfill the requirements. Some suggestions relating to the measurement of cordwood and lumber are given as follows:

CORDWOOD

Bolts are short sections of logs. Billets are obtained by splitting or sawing bolts lengthwise. A split piece of cordwood is a good example of a billet. Billets may be sold by count or stacked and sold by the cord, either standard or short cords of specified width. A standard cord is 128 cubic feet, and, unless a state law specifically determines the volume, a less amount is not a cord. A short, or running, cord is the equivalent of a pile of wood 4 feet high and 8 feet long of the length specified. The specifications for

cordwood should refer to the kind of wood, length, average size of piece, whether split or round, general soundness, body or limb wood, degree of dryness, measurement to be made before or after splitting. The space occupied by a cord of wood includes both wood and air. The actual contents of a cord of wood vary from 75 cubic feet for small wood to 100 cubic feet for sticks of 10 inches in diameter. A cord of wood usually contains from 500 to 600 board feet.

Problem. How many standard cords in a pile of wood 4 feet, 6 inches high by 9 feet long by 4 feet wide?

Solution. Amount of wood $= 4.5 \times 9 \times 4 = 162$ cubic feet $= 162 \div 128$, or 1.27, cords $= 1\frac{1}{4}$ cords.

Problem. How many short, or running, cords in a pile of 22-inch wood whose average height is 5 feet, 4 inches and whose length is 30 feet, 6 inches?

Solution. Amount of wood $= 5.33 \times 30.5 = 162.7$ sq. ft. $= 162.7 \div 128$, or 5.1, short cords, approximately.

Problem. A 16-foot log has a middle diameter, outside of the bark, of 11 inches. How many cords of 22-inch stove wood may be cut from it?

Solution. Volume of the log = middle section × length, approximately. Middle section $= 11 \times 11 \times .7854 = 95.0$ sq. in. $= \frac{95}{144}$, or .66, sq. ft. Volume $= 16 \times .66 = 10.6$ cu. ft. of solid wood. As stated above, a cord does not contain 128 cu. ft. of solid wood; in fact, a short cord of 22-inch wood, split into pieces which vary from 1 inch to 5.5 inches in diameter, has an actual solid content of approximately 35 cu. ft. Therefore, the log will yield $\frac{10.6}{35}$, or .3, cord.

LUMBER

Specifications for lumber deal with quality and size, in addition to the kind of wood. Four grades of rough lumber are generally recognized, as follows: firsts and seconds, a general term for the highest grade; No. 1 common; No. 2 common; No. 3 common, or culls.

To determine the number of board feet in a tree or log it is best to use a volume table or a log rule. Since different kinds of trees vary in form, the table will be accurate only for the trees for which the table was computed. Slight corrections must be made for forms different from those for which the table was designed. A log rule is a statement, either in the form of a printed table or burned on a measuring stick, of the estimated number of board feet that may be obtained from logs of various lengths and diameters. There are over forty different rules in use and the values given by them vary considerably. The following rule will serve to determine approximately the number of board feet in a log:

Measure in inches the diameter inside the bark at the small end. Deduct 4 inches for slabs and divide the remainder by 4. Square the quotient thus obtained and multiply this number by the length in feet. A quick rule for 16-foot logs is: Take three-fourths of the square of the diameter.

Problem. How many board feet may be obtained from a 16-foot log which measures 24 inches under the bark at the small end?

Solution. $24 - 4 = 20$; $20 \div 4 = 5$; $5 \times 5 = 25$; $25 \times 16 = 400$, the number of board feet.

The following values are given by various rules for the same log: Scribner, 404; Doyle, 400; Tiemann, 419; Three-fourths of the square of the diameter, 432.

By-Products. For every thousand feet of hardwood lumber, between two-thirds and three-fourths of a cord of wood may be cut from the tops. For every 10 ties, about 1 cord of wood may be cut from the tops. For every 10 poles, about 1 cord of wood may be cut from the tops.

LUMBER MEASURE

Rough lumber is usually sawed in thicknesses of 1 in., $1\frac{1}{4}$ in., $1\frac{1}{2}$ in., 2 in., etc. Dressed stock is usually sold on a basis of the value of the rough material before it was dressed plus the cost of dressing.

Lumber is usually sold by the hundred (C) or thousand (M) feet, board measure.

A **board foot** is a square foot of lumber one inch or less in thickness. Thus, $\frac{7}{8}$ in. and $\frac{3}{4}$ in. lumber is measured and priced the same as 1-inch lumber, but for thinner material, such as $\frac{1}{2}$ in. and $\frac{3}{8}$ in. stock, a reduced price is made. The number of feet, board measure, for $1\frac{1}{4}$ in. stock is $1\frac{1}{4}$ times that of an inch board.

Matched lumber, such as is used for flooring, sheathing, etc., is usually sold on the basis of the size in the rough. Thus, "flooring 4 in. wide" means that the rough lumber was 4 in. wide. The process of planing and matching this board has narrowed its face to about $3\frac{1}{4}$ in., which is the width of floor such a board will cover. In estimating the quantity of lumber required for a floor, add $\frac{1}{4}$ to $\frac{1}{3}$ of the area to be covered for narrow flooring (3 in. or less) and $\frac{1}{6}$ for wider flooring.

To Find the Number of Board Feet in a Piece of Lumber 1 Inch or Less in Thickness.

Multiply the length in feet by the width in feet.

To Find the Number of Board Feet in a Piece of Lumber More Than 1 Inch in Thickness.

Multiply the length in feet by the width in feet by the thickness in inches.

Problem. How many board feet are there in 2 joists 15 ft. long, 8 in. wide, and 3 in. thick?

Solution.
Amount of lumber $= 15 \times \frac{8}{12} \times 3 \times 2 = 60$ board feet.

Problem. What will be the quantity of lumber required to cover a floor 25′ × 32′ with 3″ matched boards? Allow $33\frac{1}{3}\%$ for matching and 5% for waste in cutting.

Solution. Total waste is $38\frac{1}{3}\%$. Area to be covered $= 25 \times 32 = 800$ sq. ft. Waste $= 800 \times .38\frac{1}{3} = 306\frac{2}{3}$ sq. ft. Equivalent area in rough lumber $(800 + 306\frac{2}{3}) \times 1 = 1106\frac{2}{3}$ board feet, or approximately 1100 board feet.

Problem. How many feet, board measure, are there in a stick of timber 32 ft. long, 8 in. thick, 12 in. wide at one end, and 9 in. wide at the other end?

Solution. Average width $= \frac{12 + 9}{2} = 10\frac{1}{2}$ in.

$32 \times \frac{8}{12} \times 10\frac{1}{2} = 224$ board feet.

HOW TO ESTIMATE ROOFING

Roofing is almost invariably estimated by the *square*, a unit containing 100 square feet. Deductions for skylights or other openings are usually omitted unless the openings contain over 100 square feet.

Ordinary wood shingles come in random widths, and are usually packed in bunches which are the equivalent of 250 shingles, each 4 inches wide. A fractional part of a bunch cannot usually be bought.

The number of shingles required to cover a certain area depends on the distance the shingles are "laid to the weather." To obtain the number of shingles required to cover a single square foot, divide 144 sq. in. by the area "exposed to the weather" by a 4-inch shingle. On plain work, a carpenter should handle and lay 250–300 shingles per hour.

Prepared roofing fabrics usually come in rolls containing 108 sq. ft., which it is estimated will cover one square per roll used.

Estimating Roof Areas. On inspection it will be found that the surface to be covered may be divided into plane figures, such as triangles, rectangles, and trapezoids. *Be sure to remember that*

most roofs have two sides. For methods of computing these areas the reader is referred to the articles on the mensuration of various plane figures. The total area in square feet divided by 100 will give the number of squares required.

Estimating Shingles and Nails. The table given below states the number of wood shingles and the proper allowance for nails required to cover 100 square feet when the shingles are laid at the indicated distance to the weather.

Distance shingles are laid to the weather	Area covered by one shingle in square inches	Number required per square, without waste	Number of shingles per square, allowing for a reasonable waste	Quantity of nails per square	
				3d.	4d.
4 in.	16	900	1000	3¾ lb.	6½ lb.
4½ in.	18	800	875	3¼ lb.	5¾ lb.
5 in.	20	720	800	3 lb.	5¼ lb.
5½ in.	22	655	725	2¾ lb.	4¾ lb.
6 in.	24	600	650	2½ lb.	4¼ lb.

Problem. Estimate the number of bunches of shingles, laid 4½ inches "to the weather," and the quantity of 4-penny nails required for a hip roof having the following dimensions:

(*a*) One side (trapezoid). Length at eaves, 30 ft.; length of ridge, 10 ft.; length of rafter, 18 ft.

(*b*) One end (triangle). Length at eaves, 26 ft.; length of central rafter, 18 ft.

Solution.

Area of trapezoid $= \frac{(30+10)}{2} 18 = 360$ sq. ft.

Area of both sides $= 360 \times 2 = 720$ sq. ft.

Area of triangle $= \frac{26 \times 18}{2} = 234$ sq. ft.

Area of both ends $= 234 \times 2 = 468$ sq. ft.

Total area $= 720 + 468 = 1188$ sq. ft. $= 11.88$ squares.

Number of shingles required $= 11.88 \times 875 = 10{,}395$.

Number of bunches required $= 10{,}395 \div 250 = 41.58$, or 42.

Nails required $= 11.88 \times 5.75 = 68.3$ lb.

LATHING AND PLASTERING

Plastering is usually computed by the square yard, and estimates for plastering, which may include the lathing, are figured to the nearest square yard. The allowance for openings depends on the size of the opening and the character of the work. Some contractors make no deductions for openings, and some make no deductions for openings less than two feet wide; for openings more than two feet wide a deduction varying from 50% to 100% of the area of the openings is made.

The regular size of lath is ¼ in. × 1½ in. × 4 ft. Laths are sold by the thousand (M) and are put up in bundles containing 100 laths. It requires 1400 to 1500 such laths and 10 lb. of 3-penny nails for 100 sq. yd.

The quantity of cement or hard wall plaster, mixed 2 parts of sand to 1 part of plaster, required to cover 100 sq. yd. of wood lath varies from 10 to 12 100-pound sacks. The white finish (putty coat) will require 1½ barrels of lime and 200 lb. plaster for each 100 square yards of surface.

Problem. Find the amount of material required to lath and plaster a room 10 ft. wide, 14 ft. long, and 9 ft. high, making no allowances for openings.

Solution.

Distance around room $= 10 + 14 + 10 + 14 = 48$ ft.

Area of walls $= 48 \times 9 = 432$ sq. ft.

Area of ceiling $= 10 \times 14 = 140$ sq. ft.

Total area $= 572$ sq. ft. $= 63\frac{5}{9}$%, or 64, sq. yd.

The material ordered will be 64% of that required for 100 sq. yd., as given above, or 10 bundles of lath, 7 lb. of 3-penny nails, 8 sacks of hard plaster, 1 bbl. of lime, 125 lbs. of finishing plaster, and 1 cu. yd. of sand.

ESTIMATING CONCRETE

The methods of using concrete and the proper proportion of cement, sand, and stone to be employed in preparing concrete for definite purposes are explained in the article on *Concrete.*

When calculating the amount of materials required for a certain piece of concrete work, the first step is to compute the total cubic space to be filled. Secondly, decide on the proper mixture to be used. (See *Concrete.*) Thirdly, by means of the tables, ascertain the exact quantities of materials that will be needed.

If a large volume of concrete is needed, the following table will be most convenient. This table shows the amount of cement, sand, and stone required to make 1 cu. yd., or 27 cu. ft., of concrete.

MATERIALS REQUIRED TO MAKE ONE CUBIC YARD OF CONCRETE

Mixture	Quantity of Materials		
	Cement (in sacks)	Sand (cu. ft.)	Stone or Gravel (cu. ft.)
1–1½	15.5	23.2	
1–2	12.8	25.6	
1–3	9.6	28.8	
1–1½–3	7.6	11.4	22.8
1–2 –3	7.0	14.0	21.0
1–2 –4	6.0	12.0	24.0
1–2½–4	5.6	14.0	22.4
1–2½–5	5.0	12.5	25.0
1–3 –5	4.6	13.8	23.0

If less than 1 cu. yd. of concrete is needed, it will be found useful to consult the following table which gives the volume that one may expect to result, in the case of each mixture, from one bag of cement.

CONCRETE OBTAINABLE FROM ONE BAG OF CEMENT

Mixture	Quantity of Materials			Volume Obtained in cu. ft.
	Cement (in sacks)	Sand (cu. ft.)	Stone or Gravel (cu. ft.)	
1–1½	1	1½		1.7
1–2	1	2		2.1
1–3	1	3		2.8
1–1½–3	1	1½	3	3.5
1–2 –3	1	2	3	3.9
1–2 –4	1	2	4	4.5
1–2½–4	1	2½	4	4.8
1–2½–5	1	2½	5	5.4
1–3 –5	1	3	5	5.8

Problem. What quantities of materials will be required to build a one-layer concrete floor, 30 ft. long, 24 ft. wide, and 5 in. thick?

Solution.

Volume to be filled $= 30 \times 24 \times \frac{5}{12} = 300$ cu. ft. $= \frac{300}{27}$, or $11\frac{1}{9}$, cu. yd.

Reference to the article on *Concrete* shows that such a floor should be composed of a 1 – 2 – 3 mixture. As shown by the first table, 1 cu. yd. of this mixture would require 7 bags of cement.

Cement required $= 7 \times 11\frac{1}{9} = 78$ bags.

Sand required $= 14 \times 11\frac{1}{9} = 156$ cu. ft.

Gravel required $= 21 \times 11\frac{1}{9} = 233$ cu. ft., or 26 cu. yd.

It will be noticed that the results are expressed in integers, although if multiplied exactly the values would be 77%, 155%, and 233%. The values given

are sufficiently accurate for practical purposes because, for example, an even greater error in the volume might be occasioned by a slight difference in the amount of water used to wet the mixture.

Problem. A man who has 8 bags of cement wishes to make concrete fence posts 8 ft. long and tapering evenly from 5 × 5 inches at the bottom to 3 × 3 inches at the top. How many posts can he make? How much sand and gravel will he need?

Solution.

Average thickness of posts $= \frac{5+3}{2} = 4$ in., or $\frac{1}{3}$ ft.

Volume of each post = $\frac{1}{3} \times \frac{1}{3} \times 8 = \frac{8}{9}$ cu. ft.

From the article on *Concrete*, it is seen that fence posts are best made from a 1 − 2 − 3 mixture. The table shows that 1 bag of cement will make 3.9 cu. ft. of this mixture.

Volume of mixture obtainable from 8 bags of cement = 3.9 × 8 = 31.2 cu. ft.

Number of posts = 31.2 ÷ $\frac{8}{9}$ = 35.

Sand required = 2 × 8 = 16 cu. ft.

Gravel required = 3 × 8 = 24 cu. ft.

HOW TO DETERMINE THE WEIGHT OF AN IRON OR STEEL BAR

To problems of this character, either of the following methods may be applied:

(1) An iron or steel bar 1 inch square and 12 inches long weighs 3.4 lb. Hence the weight of any iron or steel bar will be found by multiplying the area of its cross section by 3.4 and multiplying this result by the length of the bar in feet.

(2) An iron or steel bar has a weight of 0.283 lb. per cu. in. Hence, to determine the weight of such a bar, multiply its volume in cubic inches by 0.283.

Problem. What is the weight of a round steel bar ¾″ in diameter and 7 feet, 6 inches long?

Solution (1).

Area of cross section =
0.75 × 0.75 × 0.7854 = 0.442 sq. in.
Weight of given bar 1 foot long =
0.442 × 3.4 = 1.50 lb.
Weight of given bar 7.5 feet long =
1.50 × 7.5 = 11.25 lb., or 11 lb., 4 oz.

Solution (2).

7 ft., 6 in. = 90 in.
Area of cross section =
0.75 × 0.75 × .7854 = .442 sq. in.
Volume = 90 × .442 = 39.78 cu. in.
Weight = 39.78 × 0.283 = 11.25 lb.

Problem. What is the weight of a steel bar whose dimensions are ¼″ × 1¼″ × 8′9″?

Solution. Weight = 0.25 × 1.25 × 3.4 × 8.75 = 9.3 lb. = 9 lb., 5 oz., nearly.

HOW TO DETERMINE THE CAPACITY OF A COAL BIN

The question often arises: "How much coal can be placed in a given bin?" or "How large a bin must be built to hold a stated quantity of coal?" Questions of this character cannot be answered with a high degree of accuracy, as there are many possibilities of errors in measurement and of variation in the size and in the weight of coal in different localities.

Problem. A coal bin 8 feet, 6 inches long and 5 feet, 10 inches wide is filled to an average depth of 5 feet, 9 inches with white ash anthracite coal of nut size. The dealer claims to have delivered 8 tons of coal. Check the accuracy of this statement.

Solution. Change all dimensions to feet and decimals of a foot. Consult conversion table *Inches Reduced to Decimals of a Foot*, if necessary. Consult table *Weights of Various Substances* for the weight of nut size white ash anthracite coal. Proceed as follows:

Area of the bottom =
8.5 × 5.83 = 49.6 sq. ft.
Volume of coal =
49.6 × 5.75 = 285.2 cu. ft.
Weight of coal =
285.2 × 55.5 = 15,829 lb.

This seems to be about 171 pounds short of the supposed weight. To determine how high the bin should have been filled, compute the weight of coal per foot of vertical height.

Weight of coal per vertical foot =
49.6 × 55.5 = 2753 pounds.
Error in height =
171 ÷ 2753 = 0.06 + feet, or about ¾ inch.

This amount clearly might have been an error in measurement, and the weight has been checked as closely as a volume measurement will do it.

Problem. It is desired to store 10 tons of red ash anthracite coal of stove size in a cellar having an available height of 6 feet. How large a bin must be built?

Solution. Weight of a column of red ash anthracite coal 1 foot square and 6 feet high = 1 × 1 × 6 × 52.5 = 315 pounds. The bottom of the bin must have an area of 20,000 ÷ 315 = 63.5 square feet. A bin 8 feet square will hold the required amount of coal. If one dimension is fixed by the location, the other dimension may be found by dividing 63.5 by the fixed dimension.

HOW TO DETERMINE THE CAPACITY OF A BARREL

To determine the capacity of a full barrel, compute the volume by the formula given under *Barrel*.

To determine the volume of the contents of a barrel partly filled, compute the volume by the prismoidal formula. The results will be approximate.

Illustration. A barrel is filled to a depth of 18 inches. What is the volume of its contents? Three diameters must be found as follows: one measured at the height to which the barrel is filled, one measured at the bottom of the barrel, and one measured midway between these diameters. The areas of these three circles must then be computed and used as shown. The following problem shows the actual diameters as measured in a real problem, and opposite each is the computed area of the circle.

Note that all measurements must be made on the inside of the barrel, or, if this cannot be done, allowance must be made for the thickness of the sides.

	Diameter	Area
Top	19 inches	283.5 square inches
Middle	19⅝ inches	302.5 square inches
Bottom	17 inches	227.0 square inches

Volume = $(283.5 + 4 \times 302.5 + 227.0) \times \frac{18}{6}$ = 5161 cu. in. = 22.3 gal. = 2.4 bu.

For the capacity of standard barrels, see *Barrel* in *Dictionary of Weights and Measures*.

HOW TO DETERMINE THE CAPACITY OF TANKS, CISTERNS, OR BOILERS

The determination of the capacity of a tank is essentially a problem in mensuration. The usual shapes of these containers are prisms, cylinders, or frustums of cones or pyramids. Measure each dimension carefully and change all dimensions preferably to feet. Frequently, outside dimensions are the only ones that can be measured. When this is the case, corrections must be made for the thickness of the sides of the container, as shown below. The reader is referred to the table *Inches Reduced to Decimals of a Foot* for the changing of inches to feet; to *Conversion Factors* for the changing of cubic feet to gallons or bushels; and to the articles on the various figures for the proper formula to be used.

CIRCULAR TANKS

Problem. Find the capacity per foot of height of a cylindrical tank made of 1½ inch material with an outside circumference of 17 ft., 3½ in.

Solution.

Circumference = 17.292 ft.

External diameter = 17.292 ÷ 3.1416 = 17.292 × 0.318 = 5.50 ft.

Internal diameter = 5.50 − .125 × 2 = 5.25 ft.

Area of base = 0.7854 × 5.25 × 5.25 = 21.648 sq. ft.

Volume for 1 ft. of depth = 21.648 cu. ft.

Capacity for 1 ft. of depth = 21.648 × 7.48 = 161.9 gal.

Problem. Find the capacity of a water tank 5 ft., 6 in. deep and made of 1¾ in. material. The tank is shaped like a frustum of a cone with outside circumferences of 18 ft., ¾ in., measured at the top, and of 19 ft., 11¾ in., at the bottom.

Solution.

Top outside diameter = .318 × 18.06 = 5.74 ft.

Bottom outside diameter = .318 × 19.98 = 6.35 ft.

Correction for thickness of sides = .145 × 2 = .29 ft.

Upper inside diameter, $d_1 = 5.74 - .29 = 5.45$ ft.

Inside diameter at base, $D_1 = 6.35 - .29 = 6.06$ ft.

Volume = $.2618\ h\ (D^2 + Dd + d^2) = .2618 \times 5.5\ (6.06^2 + 6.06 \times 5.45 + 5.45^2) = 143.21$ cu. ft.

Capacity = 143.21 × 7.48 = 1071.2 gal.

This answer is correct mathematically, but it is unnecessarily accurate for practical purposes because it seems to indicate that the volume is actually known to within 0.1 gal. In fact, an error of ¼ in. in measuring either circumference would introduce an error of about ½ gal. into the result.

RECTANGULAR TANKS

The volume of a tank with a rectangular base and parallel sides is found by multiplying the area of the base by the altitude, all dimensions being expressed in the same unit.

Problem. What is the capacity in gallons of a rectangular tank 3 ft., 6 in. by 4 ft. by 6 ft.?

Solution. Volume = 3.5 × 4 × 6 = 84 cu. ft.

Capacity = 84 × 7.48 = 628.32 gal.

TANKS WITH SLOPING SIDES

Laundry tubs, some vats, corncribs, etc., are types that come under this heading. If the ends are parallel and equal in area, the volume is the product of the end area and the length. If the ends are unequal, the volume is computed by the prismoidal formula.

Problem. A laundry tub with parallel ends measures 15 in. by 25 in. at the bottom. When the tub is filled to a depth of 12 in., the area at the surface of the water measures 21 in. by 25 in. How much water does the tub then hold?

Solution. The end area is a trapezoid of which the area $= \frac{(15 + 21)\ 12}{2} = 216$ sq. in.

Volume = 216 × 25 = 5400 cu. in.

1 cu. in. = .00433 gal. Therefore, capacity of tub = .00433 × 5400 = 23.4 gal.

HOW TO LAY OUT A BASEBALL DIAMOND

The four bases of a ball field mark the four corners of a 90-foot square. The official rule books give explicit directions as to the amount of fair territory and other situations needed, but for impromptu games and outings the following method is sufficient. According to the article on the *Square*, the diagonal of a square is 1.414 *s*, where *s* = one side of the square. Therefore, the distance from "first" to "third" is 1.414 × 90, or 127.26 (127 ft., 3 in.). Secure a cord or rope over 180 feet in length. Knot or otherwise mark the cord at the following distances from one end: 60 feet, 6 inches; 90 feet; 127 feet, 3 inches; 180 feet.

Select for the home plate a location as favorable as possible to the fielders' eyes, and there drive a peg. Attach one end of the cord to the peg and then proceed to lay out in line the pitcher's slab at 60 feet, 6 inches and second base at 127 feet, 3 inches. Attach the 180-foot point at second base, leaving the other end still fastened at "home." Now grasp the line at the 90-foot point, and then, proceeding to the right of "home" until the cord is taut, mark the location of first base. In a similar manner, proceeding across the "diamond" to the left of "home," locate third base. For boys under 16 years of age, the following modifications are recommended: distance between bases, 82 feet; home plate to second base, 116 feet (115.94 exactly); home plate to pitcher's slab, 50 feet.

CHAIN SURVEYING

The old-fashioned surveyor's chain has been practically supplanted by the steel tape. The term chain is still in use, and the men who do the measuring are called chainmen. The term chain surveying as here used applies only to surveys done without the use of instruments to measure angles or to determine magnetic bearings. The accurate survey of a large tract of land, however, cannot be made without the use of surveying instruments and without the aid of a skilled surveyor.

Materials and Methods. A preliminary rough sketch of the field should be made, showing the approximate relative dimensions. Keeping in mind the lay of the land, divide the tract into a number of triangles as shown in the sketch below and mark all corners with stakes.

Surveyors use poles of wood or steel several feet long, known as range poles, for ranging lines and for sights. The wooden poles are shod with iron, and both kinds are usually painted with alternate foot spaces of red and white. Several straight poles of some description will be needed. These will be used to assist in keeping the surveyors on the straight lines to be measured. Two plumb bobs and a tape will complete the outfit.

Many of the common errors of measurement occur for the following reasons:

1. The tape is not held in a horizontal position. All distances must be measured on a horizontal line. If the tape is not held level, the measurement will exceed the actual distance.
2. The tape is not held with a proper and constant tension.
3. The plumb bobs are too light.
4. The number of tape lengths are not carefully counted.

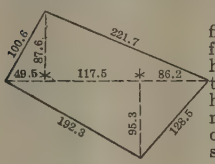
The plumb bobs are used to transfer the measurement from the horizontal tape to the ground. With the foot a small spot on the ground is smoothed in order to receive a clear impression of the bob, which must not be allowed to swing. This spot is then marked with a chalk mark, nail, or pin.

Measure all sides of the tract and all of the diagonals or tie lines. If the figure is thought to be a rectangle, measure both diagonals; if they are equal, the figure is a rectangle. The methods of computing the areas of plane figures are given in the section on *Mensuration of Plane Surfaces*.

It is usually best to divide the figure, as previously suggested, into triangles by tie lines. The computation of the area of a triangle when the three sides are known is a tedious process. It is therefore advisable to drive a stake on each line to establish the perpendicular height of the triangle and to compute the area according to the simpler formula. If the distances are

measured in feet and inches, reduce all measurements to feet and decimals of a foot. See table *Inches Reduced to Decimals of a Foot.*

COMPUTATION OF THE AREA OF A FIELD



A possible four-sided figure is shown here. The four sides and the diagonal have been measured, and the perpendiculars also have been staked and measured. Two methods of computing the areas are shown—one with and one without the perpendiculars.

Using the formula $A = \frac{bh}{2}$, where $b = 49.5 + 117.5 + 86.2 = 253.2$ and $h = 87.6$ or 95.3, we have, as the area of the upper triangle, $253.2 \times 87.6 \div 2 = 11{,}090$ sq. ft. and, as the area of the lower triangle, $253.2 \times 95.3 \div 2 = 12{,}065$ sq. ft. The total area then is $11{,}090 + 12{,}065 = 23{,}155$ sq. ft. To reduce this area to acres divide the total area by 43,560. We thus obtain for the area 0.531 acres, or, as usually stated on maps, $\frac{53}{100}$ A.

Using the formula $A = \sqrt{S\,(S-a)\,(S-b)\,(S-c)}$, where S is half the sum of the three sides, and solving by the use of logarithms, we proceed as follows:

UPPER TRIANGLE

		Factor	Logarithm
a = 100.6.	$S - a$ =	187.15.	2.2722
b = 221.7.	$S - b$ =	66.05.	1.8199
c = 253.2.	$S - c$ =	34.55.	1.5385
2)575.5	S =	287.75.	2.4590
S = 287.75.			2)8.0896
			4.0448

4.0448 is log A. Therefore A = 11,087 sq. ft.

LOWER TRIANGLE

		Factor	Logarithm
a = 128.5.	$S - a$ =	158.5.	2.2001
b = 192.3.	$S - b$ =	94.7.	1.9763
c = 253.2.	$S - c$ =	33.8.	1.5289
2)574.0	S =	287.0.	2.4579
S = 287.0.			2)8.1632
			4.0816

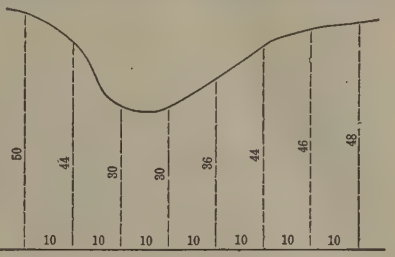
4.0816 is log A. Therefore A = 12,067 sq. ft. and the total area = 11,087 + 12,067 = 23,154 sq. ft. which checks the former computation.

It is not necessary to have the perpendicular heights of the triangles set exactly at right angles, as slight variations of the lines will not change the perpendicular distances to any appreciable extent. Two slots sawed at right angles in a block of wood make a good device to set approximately a right angle. A method of testing a right angle, which is as old as the pyramids, is the so-called 3-4-5 method based on the Pythagorean theorem. Stake No. 1 is driven at the proposed intersection. From stake No. 1, with a length of 30 feet as a radius, an arc is scratched on the ground, crossing the proposed perpendicular. Stake No. 2 is set on the established line at a distance of 40 feet, and from No. 2 as a center, with a radius of 50 feet, a second arc is scratched on the ground. Drive stake No. 3 where these two arcs intersect. This triangle with sides measuring 30, 40, and 50 must be a right-angled triangle, since its sides answer the Pythagorean condition as follows: $30^2 + 40^2 = 50^2$, or $900 + 1600 = 2500$.

SURVEY OF IRREGULAR TRACT

The area of an irregular piece of ground, such as a tract of land bounded on one side by a curved and irregular line marked by a stream of water, may be computed by the mid-ordinate rule as follows:

Divide the plot preferably into a series of strips of equal width, as shown. Measure the width of each strip and the length of each figure. The area of each trapezoidal figure will be the width of each strip multiplied by the average of the parallel dimensions.



The middle lengths are $\frac{50+44}{2} = 47$, $\frac{44+30}{2} = 37$, $\frac{30+30}{2} = 30$, $\frac{30+36}{2} = 33$, $\frac{36+44}{2} = 40$, $\frac{44+46}{2} = 45$, $\frac{46+48}{2} = 47$; and the area = $10\,(47 + 37 + 30 + 33 + 40 + 45 + 47) = 2790$ sq. ft.

Or, using the trapezoidal rule as given in the article on *Trapezoid,* the area is computed as follows: $(25 + 44 + 30 + 30 + 36 + 44 + 46 + 24) \times 10 = 279 \times 10 = 2790$ sq. ft.

LEVELING

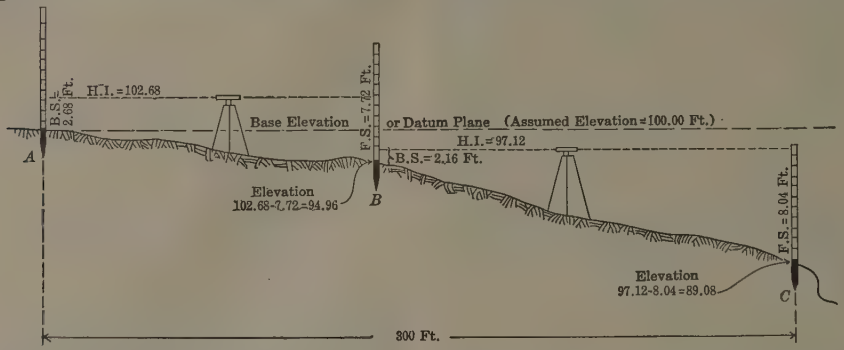
Many small local improvements depend for their execution upon a determination of the difference of elevation between two or more points. To do this within certain rough limits demands an improvised leveling instrument and the ability to add and subtract.

A vertical line is a line that points to the center of the earth. A level line is a line parallel to the surface of still water, which is a curved surface. A level line as determined by a leveling instrument is at right angles to a vertical line. It is a straight line tangent to the earth's surface and follows the level line so closely that the small error is ordinarily neglected.

Leveling Instruments. There are many kinds of leveling instruments, varying from the engineer's instrument to a simple water level. A carpenter's spirit level may be fitted with sights and mounted on a driven stake, on a tripod, or supported by some other improvised means; a long rubber tube, free from kinks, fitted with glass tubes and filled with water, makes a good device for short distances; a float, fitted with sights and placed in a pail of water, may serve the purpose. There are also moderately priced leveling instruments on the market. A measuring pole with some kind of movable sighting target must be provided.

Whatever kind of instrument is used, it must answer one test, which may be performed as follows: A nail is driven into a pole. By means of the leveling instrument, a line is sighted across the nail to another pole some distance away. The intersection of the line on the distant pole is marked with a second nail. The instrument is now moved beyond the second pole, and the line is sighted in the reverse direction. If both nails are still on the line, the instrument is correct. If not, a third nail is driven above or below the first, to mark the second line. A line connecting the second nail with a point midway between the first and the third is level, and the instrument must be adjusted to "line up" with the corrected points. A level that will not reverse correctly should not be used.

Process of Leveling. In most cases the elevation of the starting point is unknown, and it is usually assumed at some figure sufficiently large to obviate the necessity of using minus numbers. The process of leveling is illustrated by the accompanying diagram.



H. I. means height of the instrument; F. S. means foresight; B. S. means back sight. We add 2.68 to the starting elevation to find the first H. I. We subtract 7.72 from this H. I. to find the elevation of the second point. We add 2.16 to this second elevation to find the second H. I. We subtract 8.04 from the second H. I. to find the elevation of the third point. This operation may be repeated for any number of points. From the differences of elevation the proper system of grades is planned.

In order that the fall may be uniform, it is necessary to measure the distance between the stakes. By dividing the total fall by the total distance, the fall per foot or per hundred feet may be determined.

This procedure may be illustrated as follows: A ditch drops 4′ 10″ in 460′. 4′ 10″ = 4.83′. 4.83′ ÷ 460′ = 0.0105+. The fall is 0.0105′ per foot or 1.05′ per 100′. 1.05′ = 1′ 0-5⁄8″. See table *Decimal Equivalents*.

WEIGHTS AND MEASURES

Accurate and definite standards of weight, measure, and value are an absolute necessity of modern science, commerce, and industry. Rough standards of weights and measures have been in use since man first began to have commercial relations with his fellows, the only essential requirement being that all persons of a given locality should comprehend the amounts represented.

Originally, an acre meant the amount of land that a man with a yoke of oxen could plow in one day; the total length of the left feet of sixteen men selected at random constituted a legal rod; and a fathom was the distance between the middle finger tips of a man's outstretched hands. The extension of commerce created a need for much more accurate methods of measurement. As a result, each nation gradually established legal standards for use within its own boundaries.

With the great development of science, of modern mechanical methods of production, and of rapid universal transportation and communication, the degree of accuracy required even for ordinary measurements had a corresponding increase. An error of an inch made in measuring a piece of land in New York City might result in *a difference in value* greater than that of an entire prairie farm. Many of the interchangeable parts of modern machines must not vary in size by so much as the thousandth part of an inch. This necessary uniformity is assured by having definite standards and methods of weighing and measuring.

The two principal modern systems of weights and measures are the English system, based on the standard yard and the standard avoirdupois pound, and the metric system, based on the meter and the kilogram. Values expressed in either system may be converted into the other by means of the table of equivalents given below. It should be remembered that no measurement is absolutely accurate; but scientific methods are so exact that, should the standard meter and the yard be destroyed, they could be replaced within one ten-millionth of their present values.

DICTIONARY OF WEIGHTS AND MEASURES

Acre. (*A.*) A measure of surface area of land. The U. S. and the English acre are the same; each contains 160 sq. rds., or 4840 sq. yds. A Scotch acre is .27 larger and an Irish acre is .62 larger.

Acre Foot. The volume required to cover an acre 1 foot deep: 43,560 cu. ft., or 325,851 U. S. gallons of water.

Are. (*a*) Meaning "area." A land measure 10 meters (about 33 ft.) square.

Astronomical Unit. The average distance of the earth from the sun: 92.9 million miles.

Avoirdupois Weight. From the French *avoir-de-pois*, "goods of weight." The name of the system of weights generally applied in Great Britain and in the United States to all goods except precious metals, precious stones, and medicines.

Bale. A large compressed bundle or package fastened with cords, wire, or straps. The approximate weight of a bale of cotton is 500 pounds gross.

Barleycorn. The length of a grain of barley; 1⁄3 inch. Survives only in *shoe sizes*, which increase from 4 inches, by barleycorns, in series of 13's. For example: "Youth's size 12" equals 4 + 1⅔ = 8 inches long. "Adult size 8" equals 4 + 1⅔ + ⅔ = 11 inches.

Barrel. (*bbl.*) The size of this unit varies greatly. A barrel for fruits and dry commodities in the United States must contain 7056 cu. in. A liquid barrel is usually considered as 31½ gal. A barrel of flour weighs 196 pounds net; petroleum is measured by the barrel of 42 gallons.

Board Foot. (*bd. ft.*) The contents of a board 144 square inches on the surface and 1 inch thick. Lumber is usually sold by the thousand board feet.

Bushel. (*bu.*) The U. S. bushel is based on the Winchester bushel of 2150.42 cu. in., while the Imperial bushel of Canada and Great Britain equals 8 Imperial gallons, or 2218.192 cu. in. The amount delivered from a *heaped bushel* is usually considered as 1¼ *struck bushels*. A struck bushel consists of a bushel measure filled to the rim. A heaped bushel consists of a struck bushel on which the commodity is piled in the form of a cone, as high as the nature of the article will naturally permit. Because of the great chance for error, the legal weight of a bushel of most commodities is now generally fixed by statute. See table of *Legal Weights per Bushel*.

Calendar, Perpetual. To find the day of the week for any given date: (1) Take the last two digits of the number indicating the year. Increase by ¼ the number formed by these digits, omitting fractions. (2) If the first two digits of the year number compose 18, add 2; if 19, add 0; if 20, add 6. (3) Add, if Jan. or Oct., 1; May, 2; Aug., 3; Feb., March, or Nov., 4; June, 5; Sept. or Dec., 6; April

or July, 0; but, if in a leap year, add, for Jan., 6; Feb., 3. (4) Add day of month. (5) Divide the sum by 7; the *remainder* gives the number of the day in the week. If there is *no* remainder, the day is Saturday.

For example: On what day of the week was the World War armistice signed? The date was Nov. 11, 1918. 18 + 4 = 22. For Nov. add 4, then add the date, 11. Divide the total, 37, by 7. The remainder is 2, indicating the 2d day of the week, or Monday.

Carat. (*c.*) (1) A small unit of weight used for weighing precious stones. Originally a seed of the Abyssinian coral tree or of the carob tree of the Mediterranean region. On July 1, 1913, the international metric carat of *200 milligrams*, equivalent to 3.086 grains, was made official in the United States. (2) A term used to indicate the fineness of gold. Pure gold is said to be 24 carat fine. Therefore, 18 carat gold contains 18 parts of pure gold together with 6 parts of some other metal or metals.

Catty. A Chinese weight of 1⅓ pounds. A *tea caddy* was originally a box or canister containing a catty of tea.

Cental. 100 pounds avoirdupois, or a short hundredweight.

Centare. (*ca*) 1 square meter. About 1⅙ square yards, or 10.7643 sq. ft.

Centimeter. (*cm*) About ⅖ inch. 1 inch = 2.54 cm.

Chain. (*ch.*) The 66-foot surveyor's chain, legal in the United States, has 100 links, each of 7.92 inches. The engineer's chain has 100 one-foot links.

Cord. (*cd.*) A measure of wood equal to a pile 4 ft. high, 4 ft. wide, and 8 ft. long. A *cord foot* is a pile 4 × 4 × 1 feet. A cord of masonry usually contains 100 cu. ft.

Dekaliter. (*dkl*) A metric unit of capacity equal to 10 liters, or about .9 U. S. pecks.

Drop. A convenient unit for practical use, although it varies greatly with the liquid and with the method of dropping. It corresponds roughly to a minim.

Ell. A measure, chiefly for cloth, now rarely used. It varies from 27 to 48 inches in different countries. The English ell = 1¼ yards, or ⅛₂ bolt.

Firkin. A wooden, hooped container for butter, lard, etc. A standard Danish firkin of butter weighs 50 kilograms. In British liquid measure, a firkin is 9 gal.

Gallon. (*gal.*) The British Imperial gallon equals the volume of 10 lbs. of water at 62° F., or 277.274 cu. in., and is 20% larger than the standard U. S. gallon of 231 cu. in. In some states a dry gallon and a milk gallon of 282 cu. in. are in use. A proof gallon contains a gallon of proof spirit.

Grain. (*gr.*) A small unit which has the same value in the troy, apothecaries', and avoirdupois systems: .0648 gram.

Gram. (*g*) The metric unit generally used to express ordinary weights of less than 1 kilogram. It is equal to 15.4324 grains. 28.35 g = 1 oz. avoir.

Hand. A measure of 4 inches; used chiefly in measuring the height of horses.

Hank. Used in measuring yarn. A hank of cotton yarn contains 840 yards, of worsted yarn 560 yards, and of linen yarn 3000 yards. A hank of linen yarn consists of 10 *leas* of 300 yards each. The Scottish hank contains 12 leas. Other lengths also are used.

Hectare. (*ha*) A unit of area used similarly to the English acre: 100 meters square or 10,000 square meters (m^2), about 2½ acres (2.471).

Hectoliter. (*hl*) A metric measure of capacity equal to 100 liters, or 26.418 U. S. gal.; about ⅘ bbl. dry, or ⅝ bbl. liquid.

Hundredweight. (*cwt.*) Commonly 1/20 long ton, or 112 lb. avoir. A short cwt. = 100 lb.

Kilogram. (*kg*) The fundamental standard of weight in the United States; equal to 2.20462 lb. avoir.

Kilometer. (*km*) The metric unit of distance corresponding to the English mile; 1000 meters; ⅝ (.62137) mile.

Knot. The only unit of speed in the English language. Only a landsman says "so many knots per hour." *10 knots* means a speed of 10 nautical miles per hour.

Libra. The "pound" weight of Spain, Portugal, and the Latin American countries. Equal to about 1.016 lb. avoir. Also a gold coin of Peru, equal to one British pound sterling.

Line. (*l.*) A small unit of length equal to: (1) 1/12 inch. (2) Button measure, 1/40 inch.

Liter. (*l*) The metric unit of capacity, both of liquid and of dry measure. It is equal to 1.0567 liquid qt., which is the volume of 1 kilogram of water at 4° C. This is 1.000027 times the volume of 1000 cubic centimeters.

Meter. (*m*) The fundamental standard of length in the United States and in almost all civilized countries outside of the British Empire. It is equivalent to 39.37 inches, or about 1 1/11 yards.

Metrology. The branch of science which is concerned with weights and measures; also a system of weights and measures.

Mil. (1) A measure equal to .001 inch. The *circular mil*, used to express the area of the cross section of electrical conductors, is equal to the area of a circle 1 mil in diameter. A wire *1 inch* in diameter has a cross section of 1,000,000 circular mils.

(2) An angular measure used by artillerists. It is the angle subtended by a single unit at a distance of a thousand units.

Mile. (*mi.*) From the Latin *mille passuum*, or "1000 paces." As the Roman pace was a double step, the mile became a unit of about 5000 feet. The length of a mile used in different European countries has varied from about ⅔ U. S. mile, in Holland, to 7 U. S. miles, in Norway. The geographical, or nautical, mile is defined as 1 minute of the arc of a great circle of a sphere having a surface equal to that of the earth. One statute mile = 5280 ft.

Milliliter. (*ml*) .001 liter. This unit is slightly (.000027) larger than the cubic centimeter. Consequently, in accurate work the abbreviation *cc*, or cm^3, for cubic centimeter is incorrectly used when substituted for *ml*. This measure is usually referred to as a *mil*.

Miner's Inch. The amount of water which will flow from an opening 1 inch square at a pressure usually fixed by state laws. The unit varies, but it is about 1.5 cubic feet per minute.

Minim. (*min.*) Approximately 1 drop; 1/60-fluid dram.

Ounce. (*oz.*) One oz. avoir. = 437.5 grains, or 28.35 grams. One oz. troy or apoth. = 480 grains, or 31.1 grams.

Perch. A unit having various meanings: (1) One rod. (2) One sq. rod. (3) In stonework, about 25 cu. ft., often 16½ × 1½ × 1 ft.

Pig. A British weight: 301 lb. of lead; 2½ lb. of hemp; 60 lb. of salt.

Point. (1) One of the 32 principal divisions of the compass: equal to 11¼°. (2) In type founding, an arbitrary unit, .0138, or practically 1/72 inch, used to designate the size of type. Printing done with 6-point type will have 12 lines per inch; with 12-point, 6 lines per inch.

Pood. A Russian weight: 36.1128 lb.

Pound. (*lb.*) One pound avoir. = 453.5924277 grams. The pound troy, 373.24177 grams, was legalized in 1828 as the standard unit to be used by the U. S. mint. In practice, however, weights of precious metals are always expressed in troy ounces. The troy pound was declared illegal in England in 1878.

Puncheon. A large cask holding from 72 to 120 gallons.

Second Foot. A flow of water equal to 7.48 U. S. gallons per second, or 1.98347 acre feet per day.

Shoemaker's Sizes. See *Barleycorn*.

Skein. A variable quantity of reeled yarn or thread. A skein of woolen yarn equals 256 yds. A skein of cotton yarn is equal to 80 turns on a reel 1½ yds. in circumference. It is 120 yards, or 1/7 hank.

Square. A surface 10 feet square, or 100 sq. ft. of flooring, ceiling, or roofing.

Ton. (*t.*) A variable unit, of which the *short* or *net ton* of 2000 lbs., the *long ton* of 2240 lbs., and the *metric ton* of 2204.6 lbs. are most common. Others are: *shipping ton*, calculated as 40 cubic feet; *displacement ton*, equal to 35 cubic feet of water displaced by a vessel; *register ton*, 100 cubic feet of a ship's volume; *gross ore ton* of 2688 lbs., to allow for sand in the ore; *timber ton* of 42 cubic feet. An *assay ton* contains 29.166 grams because the number of milligrams of gold or silver obtained from a sample of this size represents the number of troy ounces of the metal contained in a short ton of the ore. The customary abbreviation of ton is *t.*; but in scientific usage the abbreviation *t* represents a metric ton and *tn.* represents a short ton.

Tun. A liquid ton; a large cask for holding wine or other liquids, nominally 8 bbl., or 252 gal., but often much larger.

Verst. A Russian measure of distance: ⅔ mile, or 1.06 kilometers.

Yard. (*yd.*) A legal measure of length in the United States and one of the two fundamental units of length in the British Empire. In the United States, the yard = 3600/3937, or .9144018, meters and is consequently very slightly longer than the British Imperial yard, which = .9143835 meters. According to legend, the original English yard was established by King Henry I as the extreme distance from the point of his nose to the end of his thumb.

TABLES OF WEIGHTS AND MEASURES

LINEAR MEASURE

Used for measuring distances.

12 inches (″) = 1 foot (*ft.*, ′).
3 feet = 1 yard (*yd.*).
5½ yards } = 1 rod (*rd.*), perch, or pole.
16½ feet }
40 rods } = 1 furlong (*fur.*).
660 feet }
8 furlongs }
1760 yards } = 1 statute mile (*mi.*).
5280 feet }
3 miles = 1 league (*lea.*).
3 barleycorns }
12 lines }
72 points } = 1 inch (*in.*).
1000 mils }
2¼ inches = 1 nail.
3 inches = 1 palm.
4 inches = 1 hand.
9 inches = 1 span.
18 inches = 1 cubit.
40 yards = 1 bolt (cloth).
2½ feet = 1 military pace.
5 feet = 1 geometrical pace.

SQUARE MEASURE

Used for computing areas.

144 square inches = 1 square foot (*sq. ft.*).
9 square feet = 1 square yard (*sq. yd.*).
30¼ square yards = 1 square rod (*sq. rd.*) or perch.
160 square rods = 1 acre (*A.*).
640 acres = 1 square mile (*sq. mi.*).

CUBIC MEASURE

Employed for computing volumes.

1728 cubic inches = 1 cubic foot (*cu. ft.*).
27 cubic feet = 1 cubic yard (*cu. yd.*).
144 cubic inches = 1 board foot (*bd. ft.*).
128 cubic feet = 1 cord (*cd.*).
40 cubic feet, merchandise = 1 shipping ton.

SURVEYORS' LINEAR MEASURE

Commonly employed by surveyors in measuring land.

7.92 inches = 1 link (*l.*).
25 links = 1 rod (*rd.*).
4 rods }
66 feet } = 1 chain (*ch.*).
100 links }
80 chains = 1 mile (*mi.*).

SURVEYORS' SQUARE MEASURE

Used by surveyors in computing the area of land.

625 square links = 1 square rod (*sq. rd.*).
16 square rods = 1 square chain (*sq. ch.*).
10 square chains = 1 acre (*A.*).
640 acres = 1 square mile (*sq. mi.*).
36 square miles (6 miles square) = 1 township (*tp.*).

NAUTICAL MEASURE

Used for expressing distances on the sea.

6 feet = 1 fathom.
120 fathoms = 1 cable's length.
6080.27 feet }
1.1516 statute miles } = 1 nautical, or geographic, mile.
3 nautical miles = 1 league (marine).
1 nautical mile *per hour* = 1 knot (speed).

CIRCULAR MEASURE

Used in astronomy, navigation, engineering, and wherever angles or arcs of circles must be measured.

60 seconds (60″) = 1 minute (1′).
60 minutes = 1 degree (1°).
90 degrees = 1 quadrant.
4 quadrants }
360 degrees } = 1 circle or circumference.
1 radian = 57.29577 degrees.
3.14159 (π) radians = ½ circumference.

AVOIRDUPOIS WEIGHT

The system of weights most commonly used in Great Britain and the United States.

27⅓ grains (27.34375) = 1 dram (*dr. avoir.*).
16 drams }
437.5 grains } = 1 ounce (*oz. avoir.*).
16 ounces }
7000 grains } = 1 pound (*lb. avoir.*).
14 pounds = 1 stone (*st.*) (Eng.).
25 pounds = 1 short quarter (*sh. qr.*).
28 pounds = 1 long quarter (*l. qr.*).
100 pounds }
4 short quarters } = 1 short hundredweight (*sh. cwt.*).
112 pounds }
4 long quarters } = 1 long hundredweight (*l. cwt.*).
2000 pounds }
20 short hundredweight } = 1 short ton (*sh. tn.*).
2240 pounds }
20 long hundredweight } = 1 long ton (*l. tn.*).

TROY WEIGHT

Used for expressing the weight of precious metals.

24 grains = 1 pennyweight (*pwt.* or *dwt.*) = 24 grains.
20 pennyweights = 1 ounce (*oz. t.*) = 480 grains.
12 ounces = 1 pound (*lb. t.*) = 5760 grains.

APOTHECARIES' WEIGHT

Used for weighing medicines when filling physicians' prescriptions.

20 grains = 1 scruple ℈ (*sc. apoth.*) = 20 grains.
3 scruples = 1 dram ʒ (*dr. apoth.*) = 60 grains.
8 drams = 1 ounce ℥ (*oz. apoth.*) = 480 grains.
12 ounces = 1 pound ℔ (*lb. apoth.*) = 5760 grains.

APOTHECARIES' FLUID MEASURE

Employed for measuring liquid medicines.

			Symbol
60 minims ♏	=	1 fluid dram (*fl. dr.*).	f ʒ
8 fluid drams	=	1 fluid ounce (*fl. oz.*).	f ℥
16 fluid ounces	=	1 liquid pint (*pt.*).	O
8 liquid pints	=	1 gallon (*gal.*).	C

In writing prescriptions in the apothecaries' system, Roman, not Arabic, numbers are used. These are placed *after* the symbol. Thus: f ʒii means 2 fluid ounces; ℈ss means one-half scruple; ʒiss means one ounce and one-half.

LIQUID MEASURE—UNITED STATES

4 fluid ounces = 1 gill (*gi.*).
4 gills = 1 pint (*pt.*) = 28.875 cu. in.
2 pints = 1 quart (*qt.*) = 57.75 cu. in.
4 quarts = 1 gallon (*gal.*) = 231.00 cu. in.
31½ gallons = 1 barrel (*bbl.*).
2 barrels = 1 hogshead (*hhd.*).
2 hogsheads = 1 pipe.
2 pipes = 1 tun.

DRY MEASURE

The system of units commonly employed for measuring the bulk of "dry commodities," such as grain, vegetables, nuts, and fruit. The dry peck and the dry quart are 16.36 per cent larger than the corresponding liquid measures.

2 pints = 1 quart (*qt.*) = 67.2 cu. in.
8 quarts = 1 peck (*pk.*) = 537.6 cu. in.
4 pecks = 1 bushel (*bu.*) = 2150.42 cu. in.
105 quarts = 1 barrel (*bbl.*) = 7056.0 cu. in.

LIQUID AND DRY MEASURE—BRITISH AND CANADIAN

The system of units adopted by Great Britain is the same as that of the United States, but it is based on the Imperial gallon of 277.274 cu. in. and on the Imperial bushel of 2218.192 cu. in.

KITCHEN MEASURE

3 teaspoonfuls }
½ fluid ounce } = 1 tablespoonful.
16 tablespoonfuls }
2 gills }
½ liquid pint } = 1 cupful.
8 fluid ounces }
2 cupfuls }
16 fluid ounces } = 1 pint.
4 cupfuls = 1 quart.

PAPER MEASURE

For small paper the old measure is still in use:

24 sheets = 1 quire (*qr.*).
20 quires } = 1 ream (*rm.*).
480 sheets }
2 reams = 1 bundle.
5 bundles = 1 bale.

For papers packed in cases, bundles, or frames, the following measure is now used:

25 sheets = 1 quire.
20 quires } = 1 standard ream.
500 sheets }

ASTRONOMICAL DISTANCE

92.9 million miles = 1 astronomical unit.
63,500 astronomical units = 1 light year = 5.9 trillion miles.
3.26 light years = 1 parsec = 19.2 trillion miles.

MISCELLANEOUS

12 units = 1 dozen.
20 units = 1 score.
12 dozen = 1 gross (144).
12 gross = 1 great gross (1728).

CONVERSION FACTORS

To change cubic feet to gallons.
Multiply the number of cubic feet by 7.48. For approximate results multiply by 7½.

To change gallons to cubic feet.
Multiply the number of gallons by 0.1337.

To change cubic inches to gallons.
Divide the number of cubic inches by 231, or multiply by 0.004329.

To change cubic feet to bushels.
Divide the number of cubic feet by 1.244. For approximate results multiply the number of cubic feet by ⅘.

To change cubic inches to bushels.
Divide the number of cubic inches by 2150.42, or multiply the number of cubic inches by 0.000465.

To change bushels to cubic feet.
Multiply the number of bushels by 1.244. For approximate results multiply the number of bushels by 5/4.

METRIC SYSTEM

A system of weights and measures invented by the French during the latter part of the 18th century. The fundamental unit or base of the system is the *meter*, which was intended to be exactly one ten-millionth part of a quadrant of the earth's meridian. Seven years were spent by famous scientists in obtaining the length as exactly as possible; but the resulting value was subsequently found to be slightly incorrect, so that the meter is now defined as the distance between two engraved lines on a bar of platinum-iridium alloy which is preserved in the archives of the International Metric Commission at Paris.

The unit of weight—the *gram*—was intended to be the mass, at 4° C., of a cubical volume of pure water measuring exactly .01 meter, or 1 centimeter, on each side. As this unit is comparatively small, it was decided that the standard actually constructed should have the mass of 1000 grams, or 1 *kilogram*. Here again a *very slight* error was made, so the kilogram is now defined as the mass of a certain piece of platinum, which also is deposited with the International Metric Commission.

The unit of capacity, the *liter*, is defined as the volume of 1 kilogram of water at its greatest density and is practically equal to 1000 cubic centimeters.

All of the units are theoretically based on the unit of length, and the tables are built on the decimal plan. Since our system of notation is a decimal system, metric computations are very easily made although the results are no more accurate than those obtained by any other system.

The following prefixes are used: Latin, *milli* (.001); *centi* (.01); *deci* (.1); Greek, *deka* (10); *hecto* (100); *kilo* (1000); and *myria* (10,000). These ratios are not difficult to remember; for, just as a cent is .01 dollar and a mill .001 dollar, so is a centimeter .01 meter, a centigram .01 gram, and a milliliter .001 liter. It is not generally known that the U. S. five-cent piece, or nickel, weighs, when new, just 5 grams; the dime, 2.5 grams; the quarter, 6.25 grams; and the half dollar, 12.5 grams.

METRIC MEASURE

UNITS COMMONLY USED

Length	10 millimeters (*mm*)	= 1 centimeter (*cm*).
	100 centimeters	= 1 meter (*m*).
	1000 meters	= 1 kilometer (*km*).
Capacity	1000 milliliters (*ml*)	= 1 liter (*l*).
	100 liters	= 1 hectoliter (*hl*).
Weight	1000 milligrams (*mg*)	= 1 gram (*g*).
	1000 grams	= 1 kilogram (*kg*).
	1000 kilograms	= 1 metric ton (*t*).

METRIC TABLES

Length	10 millimeters (*mm*)	= 1 centimeter (*cm*).
	10 centimeters	= 1 decimeter.
	10 decimeters	= 1 meter.
	10 meters	= 1 dekameter.
	10 dekameters	= 1 hectometer.
	10 hectometers	= 1 kilometer.
	10 kilometers	= 1 myriameter.

In microscopic work, and for expressing the length of light waves, the micron (Greek. Very small) is used.

	1 micron (μ)	= .001 millimeter
	1 millimicron (μμ)	= .001 micron
Capacity	1 milliliter (*ml*)	= .001 liter.
	10 milliliters	= 1 centiliter (*cl*).
	10 centiliters	= 1 deciliter (*dl*).
	10 deciliters	= 1 liter (*l*).
	10 liters	= 1 dekaliter (*dkl*).
	10 dekaliters	= 1 hectoliter (*hl*).
	10 hectoliters	= 1 myrialiter.
Weight	1 milligram (*mg*)	= .001 gram.
	10 milligrams	= 1 centigram (*cg*).
	10 centigrams	= 1 decigram (*dg*).
	10 decigrams	= 1 gram (*g*).
	10 grams	= 1 dekagram (*dkg*).
	10 dekagrams	= 1 hectogram (*hg*).
	10 hectograms	= 1 kilogram (*kg*).
	1000 kilograms	= 1 metric ton (*t*).

Area	100 square millimeters (mm^2)	= 1 square centimeter.
	100 square centimeters (cm^2)	= 1 square decimeter.
	100 square decimeters (dm^2)	= 1 square meter.
	100 square meters (m^2) / 1 are (*a*)	= 1 square dekameter.
	100 ares / 1 hectare	= 1 square hectometer.
	100 hectares	= 1 square kilometer.
	1 square kilometer (km^2)	= 1,000,000 m^2.

Volumes	1000 cubic millimeters (mm^3)	= 1 cubic centimeter (cm^3).
	1000 cubic centimeters	= 1 cubic decimeter (dm^3).
	1000 cubic decimeters	= 1 cubic meter (m^3).
	1000 cubic meters	= 1 cubic dekameter (dkm^3).
	1000 cubic dekameters	= 1 cubic hectometer (hm^3).
	1 cubic meter	= 1 stere.

COMPARISON OF METRIC AND CUSTOMARY (U. S.) WEIGHTS AND MEASURES

These tables are based on the U. S. legal standard, which is slightly different from the British standard. Equivalents such as those here given should be used only to the required degree of accuracy. For example, 4 inches is equal to about 10 centimeters. If greater accuracy is desired, 10.2 centimeters or 102 millimeters may be used.

LENGTH

1 centimeter	= 0.394 inch.
1 inch (″)	= 2.540 centimeters.
1 meter	= 3.281 feet.
1 foot (′)	= 0.305 meter.
1 meter	= 1.094 yards.
1 yard	= 0.914 meter.
1 kilometer	= 0.621 statute mile.
1 statute mile	= 1.609 kilometers.
1 kilometer	= 0.540 nautical mile.
1 nautical mile	= 1.853 kilometers.

CAPACITY

1 milliliter	=	0.271 U. S. fluid dram.
1 U. S. fluid dram	=	3.697 milliliters.
1 milliliter	=	0.034 U. S. fluid ounce.
1 U. S. fluid ounce	=	29.573 milliliters.
1 liter	=	1.057 U. S. liquid quarts.
1 U. S. liquid quart	=	0.946 liter.
1 liter	=	0.908 U. S. dry quart.
1 U. S. dry quart	=	1.101 liters.
1 liter	=	0.264 U. S. gallon.
1 U. S. gallon	=	3.785 liters.
1 hectoliter	=	2.838 U. S. bushels.
1 U. S. bushel	=	0.3524 hectoliter.

WEIGHT

1 gram	=	15.432 grains.
1 grain	=	0.065 gram.
1 gram	=	0.643 pennyweight.
1 pennyweight	=	1.555 grams.
1 gram	=	0.772 apothecaries' scruple.
1 apothecaries' scruple	=	1.296 grams.
1 gram	=	0.257 apothecaries' dram.
1 apothecaries' dram	=	3.888 grams.
1 gram	=	0.035 avoirdupois ounce.
1 avoirdupois ounce	=	28.350 grams.
1 gram	=	0.032 troy ounce.
1 troy ounce	=	31.103 grams.
1 kilogram	=	2.205 avoirdupois pounds.
1 avoirdupois pound	=	0.454 kilogram.
1 kilogram	=	2.679 troy pounds.
1 troy pound	=	0.373 kilogram.
1 metric ton	=	0.984 gross or long ton.
1 gross or long ton	=	1.016 metric tons.
1 metric ton	=	1.102 short or net tons.
1 short or net ton	=	0.907 metric ton.

AREA

1 square centimeter	=	0.155 square inch.
1 square inch	=	6.452 square centimeters.
1 square meter	=	10.764 square feet.
1 square foot	=	0.0929 square meter.
1 square meter	=	1.196 square yards.
1 square yard	=	0.8361 square meter.
1 square kilometer	=	0.3861 square mile.
1 square mile	=	2.590 square kilometers.
1 hectare	=	2.471 acres.
1 acre	=	0.4047 hectare.

VOLUME

1 cubic centimeter	=	0.0610 cubic inch.
1 cubic inch	=	16.3872 cubic centimeters.
1 cubic meter	=	35.3145 cubic feet.
1 cubic foot	=	0.02832 cubic meter.
1 cubic meter	=	1.3079 cubic yards.
1 cubic yard	=	0.7646 cubic meter.
1 liter	=	0.03532 cubic foot.
1 cubic foot	=	28.3162 liters.
1 stere	=	0.2759 cord.
1 cord	=	3.6245 steres.

WEIGHTS OF VARIOUS SUBSTANCES

The *density* of a substance is determined by the weight of a unit volume of the substance; as, the density of water is 62.4 lb. per cubic foot at 4° C. The *specific gravity* of a substance is the ratio of the weight of a given volume of the substance to the weight of an equal volume of the standard substance, which for solids and liquids is water at the temperature of its greatest density, 4° C. or 39.2° F. The specific gravity of water is 1.

The following table contains the density and the specific gravity of many substances in common use. In the figures for the specific gravity, it is assumed that the substance is solidly packed. Where this condition is impossible, however, as in the case of sand, coal, and grains, the figures for the specific gravity are omitted, and those only appear which indicate the density for each substance as usually constituted. The density for such substances remains about constant if the parts have a uniform size.

WEIGHTS AND SPECIFIC GRAVITIES

Substance	Average Specific Gravity	Average Weight per Cubic Foot in Pounds	Average Weight per Cubic Inch in Pounds
Metals, Alloys			
Aluminum	2.7	168	.097
Brass	8.5	530	.31
Copper	8.9	556	.32
Gold	19.3	1205	.70
Gold, coin (U. S.)	17.2	1073	.62
Iron, gray cast	7.1	443	.26
Iron, wrought	7.8	487	.28
Lead	11.3	707	.41
Mercury	13.6	849	.49
Platinum	21.2	1320	.78
Silver	10.5	655	.38
Steel	7.8	487	.28
Zinc	7.1	443	.25
Various Solids			
Butter	.....	59	.....
Cereals in bulk	.....	.....	.....
Oats	.....	26	.....
Barley	.....	39	.....
Corn, Rye	.....	45	.....
Wheat	.....	48	.....
Cork	.25	16	.009
Fats	.90–.97	58	.034
Flour, loose	.....	28	.....
Flour, pressed	.....	47	.....
Glass	2.6	162	.094
Hay and Straw	.....	20	.....
Ice	.91	57	.033
Potatoes (piled)	.....	42	.....
Timber (Seasoned, moisture 15 to 20%)			Weight per Board Foot in Pounds
Ash	.63	40	3.3
Birch	.51	32	2.7
Cedar	.35	22	1.8
Chestnut	.66	41	3.4
Cypress	.48	30	2.5
Hemlock	.47	29	2.4
Hickory	.75	48	4.0
Maple	.68	43	3.6
Oak, red, black	.65	41	3.4
Oak, white	.74	46	3.8
Pine, white	.41	26	2.2
Pine, long-leaf	.70	44	3.7
Pine, shortleaf	.61	38	3.2
Spruce, white, black	.43	27	2.3
Walnut, black	.67	42	3.5
Willow	.50	31	3.6
			Weight per Gallon in Pounds
Various Liquids			
Cider Vinegar	1.01	63	8.42
Cream (18% fat)	1.01	63	8.42
Cream (40% fat)	.99	62	8.25
Gasoline	.7	44	5.83
Kerosene	.8	50	6.66
Linseed Oil	.93	58	7.7
Milk	1.03	64.5	8.6
Sirup (65.6% sugar)	1.32	82.5	11.0
Turpentine	.86	54	7.2
Water (4°C., 39.2°F.)	1.00	62.357	8.34
Water (100° C., 212° F.)	.958	59.765	7.99
Water, sea	1.03	64	8.59
Masonry			
Brick, pressed		140	.....
Brick, common		120	.....
Concrete, cement, stone, sand		144	.....
Concrete, cement, cinder, etc.		100	.....
Limestone, mortar rubble		125	.....
Sandstone, mortar rubble		110	.....
Various Building Materials			
Ashes, cinders		43	.....
Cement, Portland, loose		94	.....
Clay, damp, plastic		110	.....
Earth, moist, packed		96	.....
Sand, gravel, dry, packed		100–120	.....
Coal, piled			
Anthracite, white ash, egg		57	.....
Anthracite, white ash, stove		56.5	.....
Anthracite, white ash, nut		55.5	.....
Anthracite, white ash, pea		53.5	.....
Anthracite, red ash, egg		53	.....
Anthracite, red ash, stove		52.5	.....
Anthracite, red ash, nut		52	.....
Anthracite, red ash, pea		51	.....
Bituminous		47–55	.....

INCHES REDUCED TO DECIMALS OF A FOOT

In.	Feet	In.	Feet	In.	Feet
0	0.0000	4	0.3333	8	0.6667
1/16	0.0104	1/16	0.3438	1/16	0.6771
1/8	0.0208	1/8	0.3542	1/8	0.6875
3/16	0.0313	3/16	0.3646	3/16	0.6979
1/4	0.0417	1/4	0.3750	1/4	0.7083
5/16	0.0521	5/16	0.3854	5/16	0.7188
3/8	0.0625	3/8	0.3958	3/8	0.7292
7/16	0.0729	7/16	0.4063	7/16	0.7396
1	0.0833	5	0.4167	9	0.7500
1/16	0.0938	1/16	0.4271	1/16	0.7604
1/8	0.1042	1/8	0.4375	1/8	0.7708
3/16	0.1146	3/16	0.4479	3/16	0.7813
1/4	0.1250	1/4	0.4583	1/4	0.7917
5/16	0.1354	5/16	0.4688	5/16	0.8021
3/8	0.1458	3/8	0.4792	3/8	0.8125
7/16	0.1563	7/16	0.4896	7/16	0.8229
2	0.1667	6	0.5000	10	0.8333
1/16	0.1771	1/16	0.5104	1/16	0.8438
1/8	0.1875	1/8	0.5208	1/8	0.8542
3/16	0.1979	3/16	0.5313	3/16	0.8646
1/4	0.2083	1/4	0.5417	1/4	0.8750
5/16	0.2188	5/16	0.5521	5/16	0.8854
3/8	0.2292	3/8	0.5625	3/8	0.8958
7/16	0.2396	7/16	0.5729	7/16	0.9063
3	0.2500	7	0.5833	11	0.9167
1/16	0.2604	1/16	0.5938	1/16	0.9271
1/8	0.2708	1/8	0.6042	1/8	0.9375
3/16	0.2813	3/16	0.6146	3/16	0.9479
1/4	0.2917	1/4	0.6250	1/4	0.9583
5/16	0.3021	5/16	0.6354	5/16	0.9688
3/8	0.3125	3/8	0.6458	3/8	0.9792
7/16	0.3229	7/16	0.6563	7/16	0.9896

Opposite each inch or fraction of an inch will be found its decimal equivalent in feet. Thus, 7 3/8 in. = 0.6146 ft.

TABLE OF DECIMAL EQUIVALENTS

DECIMAL AND MILLIMETER EQUIVALENTS OF FRACTIONAL PARTS OF AN INCH.

Fractions of an Inch	Decimal Equivalents in Inches	Equivalents in Millimeters
1/32	0.03125	0.794
1/16	0.0625	1.588
3/32	0.09375	2.381
1/8	0.125	3.175
5/32	0.15625	3.969
3/16	0.1875	4.763
7/32	0.21875	5.556
1/4	0.25	6.350
9/32	0.28125	7.144
5/16	0.3125	7.938
11/32	0.34375	8.731
3/8	0.375	9.525
13/32	0.40625	10.319
7/16	0.4375	11.113
15/32	0.46875	11.906
1/2	0.5	12.700
17/32	0.53125	13.494
9/16	0.5625	14.288
19/32	0.59375	15.081
5/8	0.625	15.875
21/32	0.65625	16.669
11/16	0.6875	17.463
23/32	0.71875	18.256
3/4	0.75	19.050
25/32	0.78125	19.844
13/16	0.8125	20.638
27/32	0.84375	21.431
7/8	0.875	22.225
29/32	0.90625	23.019
15/16	0.9375	23.813
31/32	0.96875	24.606
32/32	1	25.400

TABLE OF POWERS, ROOTS, AND RECIPROCALS

No.	Square	Cube	Square Root	Cube Root	Reciprocal	No.	Square	Cube	Square Root	Cube Root	Reciprocal
1	1	1	1.0000	1.0000	1.0000	51	2601	132651	7.1414	3.7084	0.0196
2	4	8	1.4142	1.2599	0.5000	52	2704	140608	7.2111	3.7325	0.0192
3	9	27	1.7321	1.4422	0.3333	53	2809	148877	7.2801	3.7563	0.0189
4	16	64	2.0000	1.5874	0.2500	54	2916	157464	7.3485	3.7798	0.0185
5	25	125	2.2361	1.7100	0.2000	55	3025	166375	7.4162	3.8030	0.0182
6	36	216	2.4495	1.8171	0.1667	56	3136	175616	7.4833	3.8259	0.0179
7	49	343	2.6458	1.9129	0.1429	57	3249	185193	7.5498	3.8485	0.0175
8	64	512	2.8284	2.0000	0.1250	58	3364	195112	7.6158	3.8709	0.0172
9	81	729	3.0000	2.0801	0.1111	59	3481	205379	7.6811	3.8930	0.0169
10	100	1000	3.1623	2.1544	0.1000	60	3600	216000	7.7460	3.9149	0.0167
11	121	1331	3.3166	2.2240	0.0909	61	3721	226981	7.8102	3.9365	0.0164
12	144	1728	3.4641	2.2894	0.0833	62	3844	238328	7.8740	3.9579	0.0161
13	169	2197	3.6056	2.3513	0.0769	63	3969	250047	7.9373	3.9791	0.0159
14	196	2744	3.7417	2.4101	0.0714	64	4096	262144	8.0000	4.0000	0.0156
15	225	3375	3.8730	2.4662	0.0667	65	4225	274625	8.0623	4.0207	0.0154
16	256	4096	4.0000	2.5198	0.0625	66	4356	287496	8.1240	4.0412	0.0152
17	289	4913	4.1231	2.5713	0.0588	67	4489	300763	8.1854	4.0615	0.0149
18	324	5832	4.2426	2.6207	0.0556	68	4624	314432	8.2462	4.0817	0.0147
19	361	6859	4.3589	2.6684	0.0526	69	4761	328509	8.3066	4.1016	0.0145
20	400	8000	4.4721	2.7144	0.0500	70	4900	343000	8.3666	4.1213	0.0143
21	441	9621	4.5826	2.7589	0.0476	71	5041	357911	8.4261	4.1408	0.0141
22	484	10648	4.6904	2.8020	0.0454	72	5184	373248	8.4853	4.1602	0.0139
23	529	12167	4.7958	2.8439	0.0435	73	5329	389017	8.5440	4.1793	0.0137
24	576	13824	4.8989	2.8845	0.0417	74	5476	405224	8.6023	4.1983	0.0135
25	625	15625	5.0000	2.9240	0.0400	75	5625	421875	8.6603	4.2172	0.0133
26	676	17576	5.0990	2.9625	0.0385	76	5776	438976	8.7178	4.2358	0.0132
27	729	19683	5.1962	3.0000	0.0370	77	5929	456533	8.7750	4.2543	0.0130
28	784	21952	5.2915	3.0366	0.0357	78	6084	474552	8.8318	4.2727	0.0128
29	841	24389	5.3852	3.0723	0.0345	79	6241	493039	8.8882	4.2908	0.0127
30	900	27000	5.4772	3.1072	0.0333	80	6400	512000	8.9443	4.3089	0.0125
31	961	29791	5.5678	3.1414	0.0323	81	6561	531441	9.0000	4.3267	0.0123
32	1024	32768	5.6569	3.1748	0.0313	82	6724	551368	9.0554	4.3445	0.0122
33	1089	35937	5.7446	3.2075	0.0303	83	6889	571787	9.1104	4.3621	0.0120
34	1156	39304	5.8310	3.2396	0.0294	84	7056	592704	9.1652	4.3795	0.0119
35	1225	42875	5.9161	3.2711	0.0286	85	7225	614125	9.2195	4.3968	0.0118
36	1296	46656	6.0000	3.3019	0.0278	86	7396	636056	9.2736	4.4140	0.0116
37	1369	50653	6.0828	3.3322	0.0270	87	7569	658503	9.3276	4.4310	0.0115
38	1444	54872	6.1644	3.3620	0.0263	88	7744	681472	9.3808	4.4480	0.0114
39	1521	59319	6.2450	3.3912	0.0256	89	7921	704969	9.4340	4.4647	0.0112
40	1600	64000	6.3246	3.4200	0.0250	90	8100	729000	9.4868	4.4814	0.0111
41	1681	68921	6.4031	3.4482	0.0244	91	8281	753571	9.5394	4.4979	0.0110
42	1764	74088	6.4807	3.4760	0.0238	92	8464	778688	9.5917	4.5144	0.0109
43	1849	79507	6.5574	3.5034	0.0233	93	8649	804357	9.6437	4.5307	0.0108
44	1936	85184	6.6333	3.5303	0.0227	94	8836	830584	9.6954	4.5468	0.0106
45	2025	91125	6.7082	3.5569	0.0222	95	9025	857375	9.7468	4.5629	0.0105
46	2116	97336	6.7823	3.5831	0.0217	96	9216	884736	9.7980	4.5789	0.0104
47	2209	103823	6.8557	3.6088	0.0213	97	9409	912673	9.8489	4.5947	0.0103
48	2304	110592	6.9282	3.6342	0.0208	98	9604	941192	9.8995	4.6104	0.0102
49	2401	117649	7.0000	3.6593	0.0204	99	9801	970299	9.9499	4.6261	0.0101
50	2500	125000	7.0711	3.6840	0.0200	100	10000	1000000	10.0000	4.6416	0.0100

LEGAL WEIGHTS (IN POUNDS) PER BUSHEL

(From Bureau of Standards, Department of Commerce)

States	Apples	Apples	Barley	Beans	Beets	Bran	Buckwheat	Carrots	Clover Seed	Coal	Corn	Corn	Corn Meal	Cotton Seed	Flaxseed (Linseed)	Hemp Seed	Hungarian Grass Seed	Millet	Oats	Onions	Orchard Grass Seed	Parsnips	Peaches	Peaches	Pears	Peas	Potatoes	Sweet Potatoes	Rye	Timothy Seed	Tomatoes	Turnips	Wheat
											Corn In Ear	Shelled Corn												Dried									
Federal Statutes*	50	..	48	..	..	..	..	..	..	..	..	56	..	..	56	..	..	..	32	..	..	..	..	..	..	60	..	..	56	..	..	..	60
Alabama	50	24	47	60	50	20	50	50	60	80	70	56	..	32	56	44	..	50	32	57	14	45	50	..	50	60	60	55	56	45	56	55	60
Arkansas	50	24	48	60	..	20	52	..	60	..	70	56	48	33⅓	56	..	..	50	32	57	14	..	..	33	..	60	60	50	56	60	..	57	60
California	..	..	50	..	..	..	40	..	..	..	..	52	..	..	..	..	..	..	32	..	..	..	..	..	..	..	..	..	54	..	..	..	..	60
Colorado	..	..	48	60	..	..	52	..	60	80	70	56	50	..	..	44	..	..	32	57	..	..	..	..	..	..	60	..	56	45	..	..	60
Connecticut	48	25	48	60	60	20	48	50	60	..	..	56	50	30	55	..	..	..	32	52	..	45	52	33	52	60	60	54	56	..	56	50	60
Delaware	..	..	..	..	..	..	..	..	..	..	..	56	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	60
District of Columbia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Florida	48	24	48	60	..	20	..	..	..	..	..	56	48	32	..	..	..	50	32	56	..	..	..	54	24	55	..	60	56	56	..	..	..	54	60
Georgia	..	24	47	60	..	20	52	..	60	80	70	56	..	30	56	44	..	..	32	57	..	..	..	..	..	60	60	55	56	45	..	55	60
Idaho	48	24	48	60	56	20	50	50	60	..	70	56	48	..	56	44	50	50	32	57	..	..	50	48	33	..	60	60	50	56	45	56	55	60
Illinois	47	24	48	60	60	20	52	50	60	80	70	56	48	32	56	44	50	50	32	57	14	50	48	33	58	60	60	50	56	45	56	55	60
Iowa	48	24	48	60	56	20	48	50	60	80	70	56	48	..	56	44	50	50	32	52	14	45	48	33	45	60	60	50	56	45	56	55	60
Kansas	48	24	48	60	56	..	48	50	60	..	70	56	..	..	56	44	..	50	32	55	..	48	48	33	50	60	60	50	56	45	56	55	60
Kentucky	..	24	47	60	..	20	56	..	60	76	*a*70	56	50	..	56	44	50	50	32	57	14	..	..	39	..	60	60	55	56	45	..	60	60
Louisiana	..	..	32	..	..	..	..	..	..	..	..	56	..	..	..	..	..	..	32	..	..	..	..	..	..	..	..	..	32	..	..	..	..	60
Maine	44	25	48	60	60	20	48	50	60	..	..	56	50	30	56	44	48	50	32	52	14	45	48	33	58	60	60	54	56	45	56	50	60
Maryland	50	28	48	60	..	20	48	50	60	80	70	56	48	..	56	44	50	50	32	54	14	..	40	..	..	60	60	60	56	45	60	60	60
Michigan	48	22	48	60	56	..	48	50	60	80	70	56	50	..	56	44	50	50	32	54	14	50	..	28	..	60	60	56	56	45	..	58	60
Minnesota	50	28	48	60	50	..	50	45	60	..	70	56	..	..	56	50	48	48	32	52	14	42	48	28	45	60	60	55	56	45	50	55	60
Mississippi	..	26	48	60	..	20	48	..	60	80	72	56	48	32	56	44	50	50	32	57	..	..	..	33	..	60	60	54	56	45	..	55	60
Missouri	48	24	48	60	..	20	52	50	60	80	70	56	50	33	56	44	48	50	32	57	14	44	48	33	48	60	60	56	56	45	45	42	60
Montana	45	..	48	60	50	20	52	50	60	76	70	56	50	..	56	44	50	..	32	57	..	50	..	45	60	60	..	56	45	..	50	60	60
Nebraska	48	24	48	60	56	20	50	50	60	80	70	56	48	..	56	44	..	50	32	57	14	50	48	33	45	60	60	50	56	45	56	55	60
Nevada	48	24	48	60	56	20	50	50	60	..	70	56	48	..	56	48	50	50	32	57	..	50	48	33	..	60	60	50	56	45	56	56	60
New Hampshire	48	25	48	60	60	20	48	50	60	..	..	56	50	..	56	..	..	..	32	52	..	45	48	33	58	60	60	54	56	45	56	55	60
New Mexico	45	24	48	60	56	20	52	50	60	80	70	56	50	32	56	44	50	50	32	57	14	42	48	33	48	60	60	50	56	45	50	56	60
New York	..	25	48	60	..	20	48	50	60	..	..	56	50	30	55	..	..	..	32	57	..	..	..	33	..	60	60	54	56	45	..	..	60
North Carolina	..	24	48	60	50	20	50	50	60	80	70	56	..	30	56	44	48	50	32	57	14	50	50	25	56	60	56	56	56	45	56	50	60
North Dakota	50	28	48	60	60	20	42	45	60	80	70	56	..	..	56	50	48	50	32	52	14	42	..	28	45	60	60	46	56	45	50	60	60
Ohio	48	24	48	60	56	..	50	50	60	70	68	56	48	..	56	44	50	50	32	56	..	50	48	33	..	60	60	50	56	45	56	60	60
Oklahoma	48	24	48	60	60	20	52	50	60	80	70	56	50	32	56	44	48	50	32	57	14	44	48	33	48	60	60	55	56	45	45	42	60
Pennsylvania	45	25	48	60	56	20	48	50	60	76	70	56	50	..	56	44	50	50	32	50	14	50	48	..	50	60	60	54	56	45	56	56	60
Rhode Island	48	25	48	60	50	20	48	50	60	80	70	56	50	..	56	44	50	50	32	50	..	50	48	33	..	60	60	54	56	45	56	50	60
South Carolina	50	24	48	60	50	20	50	50	60	80	70	56	..	30	56	44	48	50	32	56	14	50	50	25	36	60	60	50	56	45	56	50	60
South Dakota	48	24	48	60	56	..	48	50	60	..	70	56	50	..	56	44	50	50	32	52	14	48	48	33	45	60	60	54	56	45	50	55	60
Tennessee	50	24	48	60	50	20	50	50	60	80	70	56	..	28	56	44	48	50	32	56	14	50	50	26	56	60	60	50	56	45	56	50	60
Texas	50	28	48	60	60	20	52	50	60	80	*b*70	56	50	32	56	44	48	50	32	57	14	50	50	28	58	60	60	50	56	45	56	55	60
Vermont	48	25	48	60	60	..	48	50	60	..	70	56	50	..	55	..	50	50	32	52	..	45	48	..	58	60	60	54	56	45	56	60	60
Virginia	45	28	48	60	..	20	48	50	60	80	70	56	48	30	56	44	48	50	32	57	14	50	..	..	..	..	60	56	56	45	60	55	60
Washington	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
West Virginia	48	24	48	60	56	20	48	50	60	80	*c*68	56	48	32	56	44	50	50	32	55	14	42	48	33	50	60	56	50	56	45	56	50	60
Wisconsin	44	25	48	60	50	20	50	50	60	..	..	56	50	..	56	44	48	50	32	50	..	44	48	33	48	60	60	54	56	45	56	42	60
Wyoming	48	..	48	60	56	..	..	50	..	..	70	56	..	..	56	..	..	..	32	57	..	50	48	..	..	..	60	50	56	..	56	55	60

* Weights fixed for customs purposes.

a From Nov. 1 to May 1 following; 68 pounds from May 1 to Nov. 1 following.

b Seventy pounds after Dec. 1, and 72 pounds for new crop before Dec. 1.

c In ear, dry; 72 pounds in ear, green.

ALGEBRA

THE word algebra is derived from the Arabic *al-jebr*, the first part of a phrase meaning transposition and removal. The phrase was used as the title of a book on the science by one of the 9th-century Arabian mathematicians, to whom the early development of algebra is chiefly due.

Algebra may be defined as an extension and generalization of arithmetic. It is the science of solving mathematical problems by means of symbols and equations. These are used in the place of arithmetical numbers and enable the rules and formulas of arithmetic and certain other sciences to be expressed more concisely than is otherwise possible. A knowledge of algebra is essential for the student of geometry, trigonometry, physics, and other branches of mathematics and science.

DEFINITIONS AND NOTATION

An **algebraic expression** is the representation of any number or quantity by a symbol or a combination of symbols. The symbols commonly employed are the letters of the alphabet. Examples of algebraic expressions are $3b$; $2a-bc$.

A **coefficient** is a number, a letter or letters, or a number and one or more letters prefixed to a quantity to show how many times the given quantity is taken: $5x$; ax; $5ax$; $5abx$. In these quantities, 5, a, $5a$, $5ab$, are respectively the coefficients of x.

A **numerical coefficient** is a coefficient composed only of numbers: $5x$; $12y$.

A **literal coefficient** is a coefficient composed only of letters: ay; aby.

A **mixed coefficient** is a coefficient composed of both numbers and letters: $5ax$; $3acx$.

A **term** is an algebraic expression whose parts are not separated by a + or − sign: $5a$; $3b$.

A **monomial** is an algebraic expression of one term: $2x$; ab.

A **polynomial** is an algebraic expression of two or more terms: $2a + 3b$; $a^2 + 2ab + b^2$.

A **binomial** is a polynomial of two terms: $2m+3a$.

A **trinomial** is a polynomial of three terms: $2x + 3y - 4z$.

A **formula** is an expression of a general principle or rule by the aid of symbols. Thus, as the area (A) of a rectangle is equal to the product of the length (l) and the width (w) of the figure, this relationship is expressed by the formula $A = lw$.

The **factors** of a number are the parts which, when multiplied together, produce the number: 3, 2, x, and y are the factors of $6xy$.

A **power** is the product obtained by multiplying a number by itself a certain number of times: $3 \times 3 \times 3 \times 3 = 81$, the fourth power of 3. It may be read "3 to the power of 4."

A **square,** or **second power,** is the product obtained by taking a number or an algebraic expression twice as a factor: $5 \times 5 = 25$, the square of 5; $2a \times 2a = 4a^2$, the square of $2a$, which is read "$4a$ squared."

A **cube,** or **third power,** is the product obtained by taking a number three times as a factor: $4 \times 4 \times 4 = 64$, the cube of 4; $2b \times 2b \times 2b = 8b^3$, the cube of $2b$, which is read "$8b$ cubed."

An **exponent** is the small character or characters (letters, figures, or both) written above and to the right of a quantity to show the power to which the quantity is raised. It is omitted when it equals unity. An exponent may be a positive number, a negative number, or a fraction: x^2; x^{-2}; $x^{\frac{1}{2}}$; $x^{-\frac{1}{2}}$. x^2 means the product of x taken as a factor twice; x^{-2} means $\frac{1}{x^2}$; $x^{\frac{1}{2}}$ indicates the number which, when multiplied by itself, is equal to x; and $x^{-\frac{1}{2}}$ means $\frac{1}{x^{\frac{1}{2}}}$.

Observe the distinction between *coefficient* and *exponent*. A coefficient is placed before the quantity and *multiplies* the quantity: $2b$ means 2 times b. An exponent, when an integer, indicates that the quantity is to be multiplied by itself: b^2 means b times b.

A **root** of a number is one of the equal factors whose product is the number: 2 is a root of 4, 8, 16, 32, 64, and all other numbers composed of 2 multiplied by itself any number of times.

The symbol $\sqrt{4}$, sometimes written $4^{\frac{1}{2}}$, is read "the square root of 4." It represents the number or numbers which, when squared, or raised to the second power, will equal 4. The symbol $\sqrt[3]{4}$, sometimes written $4^{\frac{1}{3}}$, is read "the cube root of 4" and represents the number which, when cubed, or raised to the third power, will equal 4.

A **positive term** is a term either preceded by a plus sign or having no sign. A term is assumed to be positive if no sign precedes it: $+ 2x$; $3a + 2y$; $4b$.

A **negative term** is a term preceded by a minus sign: $-6a$; $-abc$.

Similar terms are terms that differ only in their numerical coefficients: $8ax$; $-9ax$.

A **known quantity** is a quantity whose value is given. It is usually represented by one of the first letters of the alphabet; as, a, b, c, d.

An **unknown quantity** is a quantity whose value is to be determined. It is usually represented by one of the final letters of the alphabet; as, x, y, z.

Positive and Negative Quantities. *Positive* and *negative* are terms used in algebra to distinguish between quantities that have the property of being opposite in direction, character, or quality; as, gain and loss, money earned and money owed, right and left, water running into a tank and water running out. Such quantities are called (1) *signed numbers*, (2) *directed numbers*, or (3) *+ and − numbers*. These signs in this relation are not to be interpreted as indicating *addition* or *subtraction* but as indications of *direction*, *character*, or *quality*.

The difference between positive and negative numbers in algebra may be illustrated by a line, the center of which is marked zero. If units of length marked off to the right of zero are called positive, then units marked off to the left are negative. -3 will indicate 3 units to the left of zero and $+5$ will indicate 5 units measured to the right of zero.

In arithmetic, the integration of $5 - 3$, for example, is called subtraction. In algebra, such an integration may be regarded as addition, due regard being had to the quality or direction of each number. Thus $5 - 3$ may be considered $(+5) + (-3)$. It may be interpreted to mean measuring 5 units to the right of zero and then 3 units in the negative direction from the point previously reached. The final result is 2 units to the right of zero, or $+2$.

Problem. A man gains \$200 and loses \$325. What is his net loss?

Solution.—In arithmetic, we obtain the net loss by subtracting \$200 from \$325. In algebra, the problem may be solved by finding the so-called *algebraic sum* of the numbers. If the gain is considered positive, the loss must be represented by a negative number. By his gain, the man's financial condition advances \$200 in a positive direction from its original state, represented by zero. It then moves from this point \$325 in the opposite, or negative, direction. Its final position is \$125 on the negative side of zero, or \$ − 125. Since a gain was considered positive, \$ − 125 means a net loss of \$125.

In *arithmetic*, numbers may be arranged in a series beginning at zero and extending indefinitely *toward the right*. Thus: 0, 1, 2, 3, 4, 5, 6, 7, 8, ...

In *algebra*, numbers may be arranged in a series beginning at zero and extending indefinitely *both to the right and to the left.* Thus: $-4, -3, -2, -1, 0, +1, +2, +3, +4, \ldots\ldots$

Such scales could also be made of both fractions and whole numbers.

Signs of Operation. The signs $+$, $-$, $\times$, and $\div$ have in algebra the same meanings that they have in arithmetic. The $+$ and $-$ signs are the main points of separation in a simple algebraic expression.

Multiplication is usually indicated by the absence of any sign between terms. When a sign is needed, the dot, $\cdot$, is often used in preference to the symbol $\times$, which may easily be mistaken for the letter x.

Since every fraction represents an indicated division, the symbol $\div$ is seldom used in algebra. The process of division is generally indicated by writing the dividend as the numerator of a fraction, with the divisor as the denominator. Thus $a \div b$ is written $\frac{a}{b}$ or a/b. The division process is implied also by the notation $a{:}b$, which is read "a is to b."

The order of the letters *m d a s* expresses the order in which the operations indicated in any algebraic expression should be performed, that is, (1) multiplication, (2) division, (3) addition, (4) subtraction. Thus, the expression $3 + 4 \times 5 - 8 \div 2 + 7 = 3 + 20 - 4 + 7 = 26$.

Signs of Aggregation. The *parenthesis*, ( ), is the most commonly used sign of aggregation. In addition to the parenthesis, the following also are used: the *bracket*, [ ]; the *brace*, { }; and the *vinculum*, $\overline{\quad}$.

Any expression within a parenthesis or within similar signs or under a vinculum is to be treated as a single quantity. If this quantity is raised to a certain power, the exponents of each factor within the parenthesis are multiplied by the index of that power. A minus sign in front of a parenthesis reverses the sign of every term within when the parenthesis is removed. Thus:

$$(a^2b)^3 = a^6b^3.$$
$$(a^9b^6)^{\frac{1}{3}} = a^3b^2.$$
$$-(+b-c) = -b+c.$$

Other Signs. The sign of *equality*, $=$, is read "equals" or "is equal to."

The symbol $\neq$ means "not equal to";
$\pm$ means "plus or minus";
$\propto$ means "varies as";
$\therefore$ means "therefore."

$|\,a\,|$ means "absolute value of a" and refers to its numerical value regardless of sign. Thus:

$$|\,5\,| = 5, \quad |\,-5\,| = 5.$$

The symbol $n!$ or $\underline{n}$ (where n is a whole number) is read "n factorial" and means the product of the natural numbers from 1 to n inclusive. Thus:

$$1! = 1; \quad 3! = 1 \times 2 \times 3; \text{ etc.}$$

Commutative Law. The product or the sum of any set of numbers will not vary with any change in the order of the operations. Thus:

$$ab = ba; \quad a + b = b + a.$$

Associative Law. The product or the sum of several numbers or expressions is the same in whatever manner they are grouped. Thus:

$$(a + b) + c = a + (b + c); \quad (ab)\,c = a\,(bc).$$

Distributive Law. The product of a polynomial and a monomial is the algebraic sum of the products obtained by multiplying each term of the polynomial by the monomial. Thus:

$$a\,(b + c) = ab + ac.$$

These laws hold when a, b, and c are any of the quantities that occur in ordinary algebra. The laws may be checked by substituting concrete numerical values.

ADDITION

MONOMIALS

(1) The *algebraic sum* of two terms with like signs is the sum of their absolute values, with the common sign prefixed:

$+5a$	$-4c$
$+2a$	$-8c$
$+7a$	$-12c$

(2) The *algebraic sum* of two terms with unlike signs is the difference between their absolute values, with the sign of the greater in absolute value prefixed:

$+5x$	$+5w$
$-3x$	$-7w$
$+2x$	$-2w$

POLYNOMIALS

Arrange similar terms in the same column. Find the algebraic sum of each column and write the results in succession, with their proper signs.

Problem. Add $5x^2 + 4x + 3$, $4x^2 - 6x + 4$, $-3x^2 - 2x - 6$.

Solution and Check. $(x = 2)$.

$5x^2 + 4x + 3 =$	20	$+8+3 =$	$31.$
$4x^2 - 6x + 4 =$	16	$-12+4 =$	$8.$
$-3x^2 - 2x - 6 =$	-12	$-4-6 =$	$-22.$
$6x^2 - 4x + 1 =$	24	$-8+1 =$	$+17.$

To check the accuracy of the work, substitute some convenient value for x in each algebraic expression added and in the algebraic sum. In the above problem, 2 has been so used. The sum of the numerical values of the added expressions should equal the numerical value of the algebraic sum.

SUBTRACTION

MONOMIALS

On account of the extension of the scale of numbers below zero, subtraction is always possible in algebra. Using the number series of positive and negative numbers previously referred to, we observe that the subtraction of a positive number is equivalent to counting backward along the number series. Conversely, the subtraction of a negative number is equivalent to counting forward along the number series.

This rule may be stated thus: When subtracting, change the sign of each term of the subtrahend and add the result to the minuend. The change of sign should be made mentally:

$+5a$	$-4c$	$+5x$	$+5w$	minuend
$+2a$	$-8c$	$-3x$	$-7w$	subtrahend
$+3a$	$+4c$	$+8x$	$+12w$	difference

POLYNOMIALS

Arrange similar terms in the same column. Change the signs of the subtrahend and add.

Problem. From $6x^3 - 3x^2 + 2x + 4$, subtract $3x^3 - 4x^2 - 2x + 3$.

Solution and Check. $(x = 2)$.

$6x^3-3x^2+2x+4 = 48-12+4+4 = 44$		minuend
$3x^3-4x^2-2x+3 = 24-16-4+3 = 7$		subtrahend
$3x^3+x^2+4x+1 = 24+4+8+1 = 37$		difference

MULTIPLICATION

MONOMIALS

Multiplication has been referred to in *Arithmetic* as a process of addition. The extension of this idea in algebra is consistent with the sense attached to multiplication when the multiplier is a positive, or $+$, quantity. When the multiplier is a negative, or $-$, quantity, the extension of the same idea indicates that the repetitions of the multiplicand are to be subtracted. Thus:

$+3 \times +8 = +24$; $+3 \times -8 = -24$;
$-3 \times +8 = -24$; $-3 \times -8 = +24$;

or, using letters,

$(+a) \times (+b) = +ab$; $(+a) \times (-b) = -ab$;
$(-a) \times (+b) = -ab$; $(-a) \times (-b) = +ab$.

Law of exponents. The exponent of a product is equal to the *sum* of the exponents in the multiplicand and the multiplier:

$$a \times a \times a = a^3; \quad a^2 \times a^3 = a^5.$$

Law of coefficients. The coefficient of a product is equal to the product of the coefficients of the multiplier and the multiplicand:

$$2x^2 \times 3x = 6x^3.$$

Law of signs. The sign of the product of two quantities is + when the quantities have *like signs*; the sign is − when the quantities have *unlike signs*:

$3a \times 2b = 6ab$; $(-3a) \times (-2b) = 6ab$;
$-3a \times 2b = -6ab$.

POLYNOMIALS

Two cases are to be considered: (1) when the multiplier is a monomial; (2) when the multiplier is a polynomial.

MULTIPLICATION BY MONOMIALS.

Multiply each term of the polynomial by the monomial and to each product prefix its proper sign.

Problem. Multiply $5a - 3b$ by $2a^2$.

Solution and Check. $(a = 2)$, $(b = 3)$.

$5a - 3b$	$10 - 9 = 1$
$2a^2$	$8 = 8$
$10a^3 - 6a^2b$	$80 - 72 = 8$

MULTIPLICATION BY POLYNOMIALS.

Multiply every term of the multiplicand by each term of the multiplier and add the products.

Problem. Multiply $5a - 6b$ by $3a - 4b$.

Solution and Check. $(a = 3)$, $(b = 2)$.

$5a - 6b$	$15 - 12 = 3$
$3a - 4b$	$9 - 8 = 1$
$15a^2 - 18ab$	$135 - 108$
$- 20ab + 24b^2$	$- 120 + 96$
$15a^2 - 38ab + 24b^2$	$135 - 228 + 96 = 3$

The terms $-18ab$ and $-20ab$ are called *cross products* because they are obtained by multiplying diagonally opposite terms.

DIVISION

Division is the reverse of multiplication; that is, the product of the divisor and the quotient is equal to the dividend.

Law of exponents. If two powers of the same quantity are divided, one by the other, the exponent of the quotient is obtained by *subtracting* the exponent of the divisor from the exponent of the dividend:

$$\frac{36x^5y^4z^3}{-3x^2yz^3} = -12xy^3.$$

Law of coefficients. The coefficient of the quotient is obtained by dividing the coefficient of the dividend by the coefficient of the divisor:

$$\frac{36x^2}{3x} = 12x.$$

Law of signs. The sign of the quotient is + when the divisor and the dividend have like signs; when they have unlike signs, the sign of the quotient is −.

POLYNOMIALS

In general, the algebraic process of division is similar to the process of division in arithmetic.

DIVISION BY MONOMIALS.

Divide each term of the dividend by the divisor and to each partial quotient prefix its proper sign.

Problem. Divide $4x^3 - 6x^2$ by $2x$.

Solution. $\dfrac{4x^3 - 6x^2}{2x} = 2x^2 - 3x.$

DIVISION BY POLYNOMIALS.

Arrange the terms of the dividend and the divisor in ascending or descending order, according to the powers of some letter common to both.

Divide the first term of the dividend by the first term of the divisor. Write the result for the first term of the quotient.

Multiply all the terms of the divisor by the first term of the quotient.

Subtract the product from the dividend. If there is a remainder, affix to it the term next in order "brought down" from the dividend. Having thus obtained a new dividend, proceed as before until there is no remainder or until the first term of the divisor is not contained in the first term of the new dividend.

If there is a remainder after the last step in the process, write it over the divisor in the form of a fraction, which should be added to the quotient previously obtained.

Problem. Divide $9a^3 - 18a^2 + 26a - 24$ by $3a^2 - 2a + 6$.

Solution and Check. $(a = 2)$.

dividend $9a^3 - 18a^2 + 26a - 24$ | $3a^2 - 2a + 6$ divisor

$9a^3 - 6a^2 + 18a$ | $3a - 4$ quotient

$-12a^2 + 8a - 24$

$-12a^2 + 8a - 24$

dividend	$72 - 72 + 52 - 24$	$= 28.$
divisor	$12 - 4 + 6$	$= 14.$
quotient	$6 - 4$	$= 2.$
	$28 \div 14$	$= 2.$

SPECIAL CASES IN MULTIPLICATION

(1) THE SQUARE OF THE SUM OF TWO TERMS.

The multiplication

$$\begin{array}{r} a + b \\ a + b \\ \hline a^2 + ab \\ + ab + b^2 \\ \hline a^2 + 2ab + b^2 \end{array}$$

gives the formula $\mathbf{(a + b)^2 = a^2 + 2ab + b^2}$.

This may be expressed by the following rule: *The square of the sum of two terms is the sum of the squares of the terms plus twice their product.*

$$(20 + 5)^2 = 400 + 25 + 2 \times 5 \times 20 = 625.$$

(2) THE SQUARE OF THE DIFFERENCE OF TWO TERMS.

By a process of multiplication similar to that in (1), we derive the formula $\mathbf{(a - b)^2 = a^2 - 2ab + b^2}$.

This may be expressed as follows: *The square of the difference of two terms is the sum of their squares minus twice their product.*

$$(20 - 5)^2 = 400 + 25 - 2 \times 5 \times 20 = 225.$$

(3) THE PRODUCT OF THE SUM AND THE DIFFERENCE OF TWO TERMS.

The multiplication

$$\begin{array}{r} a + b \\ a - b \\ \hline a^2 + ab \\ - ab - b^2 \\ \hline a^2 \qquad - b^2 \end{array}$$

gives the formula $\mathbf{(a + b)(a - b) = a^2 - b^2}$.

This may be expressed by the following rule: *The product of the sum and the difference of two terms is equal to the difference of their squares taken in the same order.*

$$(20 + 5)(20 - 5) = 400 - 25 = 375.$$

(4) The Product of two Binomials having a Common Term.

By the accompanying multiplication,

$x + 2$	$3a - 5$	$x + a$
$x + 5$	$3a + 1$	$x + b$
$x^2 + 2x$	$9a^2 - 15a$	$x^2 + ax$
$+ 5x + 10$	$+ 3a - 5$	$+ bx + ab$
$x^2 + 7x + 10$	$9a^2 - 12a - 5$	$x^2 + (a + b)x + ab$

we obtain the formula

$$(x + a)(x + b) = x^2 + (a + b)x + ab.$$

This may be expressed by the following rule: *The product of two binomials having a common term equals the square of the common term, plus the algebraic sum of the unlike terms multiplied by the common term, plus the product of the unlike terms.*

(5) The Product of two Binomials Whose Corresponding Terms are Similar.

By actual multiplication,

$2x - 5$	$ax - d$
$3x + 4$	$bx + c$
$6x^2 - 15x$	$abx^2 - bdx$
$+ 8x - 20$	$+ acx - cd$
$6x^2 - 7x - 20$	$abx^2 + x(ac - bd) - cd$

we obtain the formula

$$(ax - d)(bx + c) = abx^2 + x(ac - bd) - cd.$$

This result may be expressed as follows: *In the product of two binomials whose corresponding terms are similar, the first term is the product of the first terms of the binomials; the last term is the product of the second terms of the binomials; the middle term is the sum of the cross products of the terms of the binomials.*

SPECIAL CASES IN DIVISION

From the preceding special products we may derive corresponding special quotients by observing that if either factor is used as a divisor of the product the other factor will be the quotient. Several cases not previously included are here given.

$a^n - b^n$ is always exactly divisible by $a - b$ when n is any positive integer:

$$(a^2 - b^2) \div (a - b) = a + b;$$
$$(a^3 - b^3) \div (a - b) = a^2 + ab + b^2.$$

$a^n - b^n$ is exactly divisible by $a + b$ only when n is even:

$$(a^2 - b^2) \div (a + b) = a - b.$$

$a^n + b^n$ is never exactly divisible by $a - b$.

$a^n + b^n$ is exactly divisible by $a + b$ only when n is odd:

$$(a^3 + b^3) \div (a + b) = a^2 - ab + b^2.$$

FACTORING

Factoring is the process of finding two or more expressions whose product is equal to a given expression.

A **prime factor** is an expression that has no factor except itself and 1.

Square roots. Every expression has two square roots, which differ only in sign. Thus:

$\sqrt{4} = +2$ or -2 because $(+2)(+2) = 4$ and $(-2)(-2) = 4$. Usually the $\pm$ (plus or minus) sign is used to denote this relation; as, $\sqrt{4} = \pm 2$.

(1) To Factor a Polynomial Whose Terms Have a Common Monomial Factor.

The type form is $ab + ac - ad = a(b + c - d)$.

Divide the expression by the common factor.

Problem. Factor $3xy - 6x^2y^2 + 9y^3$.

Solution.—

$$3y \mid 3xy - 6x^2y^2 + 9y^3$$
$$\quad\; x - 2x^2y + 3y^2$$

The factors are $3y$ and $x - 2x^2y + 3y^2$.

(2) To Factor the Difference Between two Squares.

The type form is $a^2 - b^2 = (a + b)(a - b)$.

Find the square root of each term. The sum of these roots is one factor; the difference of the roots taken in the same order as in the original expression is the other factor.

Problem. Factor $x^2 - 9y^2$.

Solution.—

$$x^2 - 9y^2 = (x + 3y)(x - 3y).$$

The factors are $x + 3y$ and $x - 3y$.

(3) To Factor a Trinomial that is a Perfect Square.

Test.—Arrange the trinomial according to the descending powers of one letter. The trinomial is a perfect square if the absolute value of the middle term is twice the product of the absolute values of the square roots of the other terms. Thus:

$a^2 + 14a + 49 = a^2 + 2 \times 7a + 7^2 = (a + 7)^2$.

Here $14a$ is twice the product of $\sqrt{a^2}$ and $\sqrt{49}$.

The type form is $a^2 + 2ab + b^2 = (a + b)^2$.

Find the square roots of the first and last terms and connect these by the sign of the middle term; take the result twice as a factor.

Problem. Factor $25m^2 - 30m + 9$.

Solution.—

$25m^2 - 30m + 9 = (5m)^2 - 2 \times 5 \times 3m + (3)^2 = (5m - 3)(5m - 3)$.

The factors are $5m - 3$ and $5m - 3$.

(4) To Factor a Quadratic Trinomial.

The type form is $x^2 + bx + c$.

Find two numbers whose algebraic product is c, the absolute term, and whose algebraic sum is b, the coefficient of x. The first factor is $x +$ one of these numbers; the second factor is $x +$ the other number.

Problem. Factor $x^2 - 7x + 12$.

Solution.—It is necessary to find two numbers whose product is $+12$, and whose sum is -7.

The numbers whose product is 12 are 2 and 6, 1 and 12, 3 and 4. Of these, the two whose sum is 7 are 3 and 4. The sign of each number is minus. Thus:

$$x^2 - 7x + 12 = (x - 4)(x - 3).$$

The factors are $x - 4$ and $x - 3$.

HIGHEST COMMON FACTOR

The **highest common factor** (H. C. F.) of two or more algebraic expressions is the factor of *highest degree and greatest numerical coefficient* that is common to these expressions. It is equal to the product of all the common factors of the expressions. Its value is determined by the following method:

Write each expression as the product of its prime factors. Find the product of the common factors, using each factor the least number of times it occurs in any one expression. This product is the H. C. F. of the expressions.

Problem. Find the H. C. F. of $2x^4 - 12x^3 + 18x^2$ and $4x^5 - 36x^3$.

Solution.—Factoring, we have

$2x^4 - 12x^3 + 18x^2 = 2 \cdot x \cdot x\,(x-3)\,(x-3)$
and $4x^5 - 36x^3 = 2 \cdot 2 \cdot x \cdot x \cdot x\,(x-3)\,(x+3)$.

H. C. F. is $2 \cdot x \cdot x\,(x - 3)$, or $2x^3 - 6x^2$.

LOWEST COMMON MULTIPLE

The **lowest common multiple** (L. C. M.) of two or more algebraic expressions is the expression of *lowest degree and smallest numerical coefficient* that is exactly divisible by each of the given expressions. To find the L. C. M., observe the following method:

Write each expression as the product of its prime factors. Find the product of all the different prime factors, using each factor the greatest number of times it occurs in any one expression.

Problem. Find the L. C. M. of $x^2 + 5x + 6$, $x^2 + 4x + 3$, $x^2 + x$.

Solution.—Factoring, we have

$$x^2 + 5x + 6 = (x + 3)\ (x + 2).$$
$$x^2 + 4x + 3 = (x + 3)\qquad (x + 1).$$
$$x^2 + x\ \ = \qquad\qquad (x + 1)\ (x).$$
$$\text{L. C. M.} = (x + 3)\ (x + 2)\ (x + 1)\ (x).$$

FRACTIONS

An **algebraic fraction** is an indicated division of two algebraic expressions in which the dividend is the *numerator* and the divisor is the *denominator*. The type form is written $\frac{a}{b}$, in which a and b may each represent any algebraic expression. This form is read "a divided by b" or "a over b."

The **terms** of a fraction are the numerator and the denominator.

A fraction with a zero numerator becomes zero. If the denominator only is zero, the fraction does not represent any finite quantity. If both numerator and denominator are zero, the fraction may be regarded as equal to any number.

An **integral expression** is an expression which does not contain a fraction: $2x^2 + 3y$.

A **mixed expression** is an expression, part of which is fractional and part integral:

$$2x + y + \frac{3}{x + 1}.$$

An **improper fraction** in algebra is a fraction in which the numerator contains a power equal to or higher than the highest power of the same letter in the denominator; as,

$$\frac{6x^2 + 6}{2x^2};\quad \frac{6x^3 + 4x^2 - 8}{x - 2}.$$

The **sign of a fraction** is the sign placed before the dividing line. This sign is distinct from the sign of either the denominator or the numerator. By the laws of signs of multiplication and division, we have

$$+\frac{+a}{+b} = +\frac{-a}{-b} = -\frac{-a}{+b} = -\frac{+a}{-b};\quad \frac{x}{-ay} = -\frac{x}{ay};$$
$$\frac{m + n}{m - n} = \frac{-(m + n)}{-(m - n)} = \frac{-m - n}{-m + n}.$$

REDUCTION OF FRACTIONS

Reduction of fractions is the process of changing their *form* without changing their *value*.

Multiplying or dividing both terms of a fraction by the same number does not change the value of the fraction.

A fraction is in its **lowest terms** when its terms have no common factor.

(1) To Reduce a Fraction to its Lowest Terms.

Separate the numerator and the denominator into their prime factors, and cancel all factors common to both.

Problem. Reduce $\frac{9x^2 + 6x + 1}{9x^2 - 1}$ to its lowest terms.

Solution.—

$$\frac{9x^2 + 6x + 1}{9x^2 - 1} = \frac{(3x + 1)\ (3x + 1)}{(3x + 1)\ (3x - 1)} = \frac{3x + 1}{3x - 1}.$$

(2) To Reduce an Improper Fraction to an Integral or a Mixed Number.

Divide the numerator by the denominator; if there is a remainder, write it over the denominator in the form of a fraction, which, with its proper sign, should be annexed to the integral part of the quotient.

Problem.

Reduce $\frac{16x^2 + 8x - 3}{4x}$ to a mixed expression.

Solution.—

$$\frac{16x^2 + 8x - 3}{4x} = 4x + 2 - \frac{3}{4x}.$$

(3) To Reduce a Mixed Expression to a Fraction.

Multiply the integral expression by the denominator of the fraction; to the product add the numerator; and under the result write the denominator.

Problem. Reduce $a + y - \frac{a^2 + y^2}{a - y}$ to a fraction.

Solution.—

$$\frac{(a + y)\ (a - y) - (a^2 + y^2)}{a - y}$$
$$= \frac{a^2 - y^2 - a^2 - y^2}{a - y} = \frac{-2y^2}{a - y} = \frac{2y^2}{y - a}.$$

(4) To Reduce Fractions to their Lowest Common Denominator.

Find the lowest common multiple of the denominators; this is the lowest common denominator (L. C. D.) of the fractions.

Divide this lowest common denominator by the denominator of the first fraction and multiply both terms of the fraction by the resulting quotient. Treat the other fractions similarly.

Problem. Reduce $\frac{1}{3x - 6}, \frac{5}{2x + 4}, \frac{3}{x^2 - 4}$, to their lowest common denominator.

Solution.—Find the L. C. D. as follows:

$$3x\ - 6 = 3\quad (x - 2).$$
$$2x\ + 4 = 2\qquad (x + 2).$$
$$x^2 - 4 = \qquad (x - 2)\ (x + 2).$$
$$\text{L. C. D.} = 2.3\ (x - 2)\ (x + 2), \text{ or } 6(x^2 - 4).$$
$$\frac{1}{3x - 6} = \frac{2x + 4}{6(x^2 - 4)};\quad \frac{5}{2x + 4} = \frac{15x - 30}{6(x^2 - 4)};$$
$$\frac{3}{x^2 - 4} = \frac{18}{6(x^2 - 4)}.$$

ADDITION AND SUBTRACTION OF FRACTIONS

Reduce the given fractions, if necessary, to fractions having a lowest common denominator. Find the algebraic sum of the numerators in the reduced fractions. Place this sum over the common denominator. Reduce the result to its lowest terms.

Problem. Simplify $\frac{1}{a + b} - \frac{1}{a - b} + \frac{2a}{a^2 - b^2}$.

Solution.—Find the L. C. D. as follows:

$$(a\ + b) = (a + b).$$
$$(a\ - b) = \qquad (a - b).$$
$$(a^2 - b^2) = (a + b)\ (a - b).$$
$$\text{L. C. D. is } (a + b)\ (a - b), \text{ or } (a^2 - b^2).$$
$$\frac{1}{a + b} - \frac{1}{a - b} + \frac{2a}{a^2 - b^2} = \frac{(a - b) - (a + b) + 2a}{(a + b)\ (a - b)} =$$
$$\frac{a - b - a - b + 2a}{(a + b)\ (a - b)} = \frac{2a - 2b}{(a + b)\ (a - b)} =$$
$$\frac{2(a - b)}{(a + b)\ (a - b)} = \frac{2}{a + b}.$$

MULTIPLICATION OF FRACTIONS

Separate both the numerators and the denominators into their prime factors. Cancel all factors that are common to both the numerators and the denominators. Multiply the remaining factors of the numerators to obtain the new numerator, and the remaining factors of the denominators to obtain the new denominator.

Problem. Find the product of $\frac{y^2-9}{y^2+y} \cdot \frac{y^2-1}{y-3}$.

Solution.—Where possible, factor and cancel.

$$\frac{y^2-9}{y^2+y} \cdot \frac{y^2-1}{y-3} = \frac{(y+3)\ (y-3)}{y\ (y+1)} \cdot \frac{(y+1)\ (y-1)}{(y-3)} =$$

$$\frac{(y+3)\ (y-1)}{y} = \frac{y^2+2y-3}{y}.$$

DIVISION OF FRACTIONS

Reduce all integral or mixed expressions to fractional form. Invert the divisor and proceed as in the multiplication of fractions.

Problem. Divide $\frac{x^2-1}{4}$ by $\frac{x-1}{x+2}$.

Solution.—Invert the divisor. Where possible, factor and cancel.

$$\frac{x^2-1}{4} \div \frac{x-1}{x+2} = \frac{(x+1)\ (x-1)}{4} \times \frac{(x+2)}{(x-1)} =$$

$$\frac{(x+1)\ (x+2)}{4} = \frac{x^2+3x+2}{4}.$$

EQUATIONS

An **equation** is a statement of equality between numbers or algebraic expressions; as,

$$2x + 3 = 3x - 2.$$

SIMPLE EQUATIONS

A **simple equation** or **linear equation** is an equation which, when cleared of fractions and simplified, involves only the first power of one unknown quantity in any one term. Thus:

$x + y = 7$ is a simple equation;
$xy = 5$ and $x^2 - y^2 = 40$ are not simple equations.

The **first member,** or **left side,** of an equation is the part that precedes the equality sign.

The **second member,** or **right side,** of an equation is the part that follows the equality sign.

An **identical equation,** or an **identity,** is an equation which is true for all values of the letters involved. Thus:

$$3(x+2) = 3x + 6;$$
$$(a+b)^2 = a^2 + 2ab + b^2.$$

A **conditional equation** is an equation that is true for certain particular values of the letters involved. Thus: $3x - 6 = 4x - 12$ is satisfied by the value $x = 6$, and by no other value of x.

An equation is satisfied by any number which, when substituted for the literal part, reduces the equation to an identity. Thus: $3x - 6 = 4x - 12$ is satisfied by 6. $3 \times 6 - 6 = 4 \times 6 - 12$, or $12 = 12$.

A **root** of an equation is any number that satisfies the equation. Thus:

6 is a root of the equation $3x - 6 = 4x - 12$.

Substitution is the process of replacing one number or expression either by another of the same value or, if the first number is indefinite, by another of definite value.

Axioms. In solving equations, use is made of the following self-evident truths, called axioms.

Addition axiom. If equal quantities are added to equal quantities, the sums are equal.

Subtraction axiom. If equal quantities are subtracted from equal quantities, the remainders are equal.

Multiplication axiom. If equal quantities are multiplied by equal quantities, the products are equal.

Division axiom. If equal quantities are divided by equal quantities, the quotients are equal.

Comparison axiom. Quantities that are equal to the same quantity are equal to each other.

Transposition is the process of changing a term from one member of an equation to the other without destroying the equality.

Any term may be transposed from one side of an equation to the other, provided its sign is changed. This is really equivalent to the addition of the same number to, or the subtraction of the same number from, each side of the equation. Thus:

$3x - 6 = 12;$
$3x - 6 + 6 = 12 + 6.$
$\therefore\ 3x = 18,$ or $x = 6.$

$2x + 8 = 10;$
$2x + 8 - 8 = 10 - 8.$
$\therefore\ 2x = 2,$ or $x = 1.$

A **numerical equation** is an equation in which the known quantities are expressed in numbers:

$$3x - 6 = 0.$$

A **literal equation** is an equation in which some or all of the known quantities are expressed by letters:

$$ax - b = 0.$$

SOLUTION OF SIMPLE EQUATIONS

The equation should be cleared of parentheses by performing the operations indicated.

Transpose the unknown terms to the first member of the equation and the known terms to the second member of the equation.

Collect the terms.

Divide both members by the coefficient, if any, of the unknown quantity.

Check to show that the results satisfy the conditions stated in the equation.

Problem. Solve the equation

$$3(x+2) = 2(x-3) + 17.$$

Solution.—Clear the equation of parentheses.

$$3x + 6 = 2x - 6 + 17.$$

Transpose. $3x - 2x = -6 - 6 + 17.$

Collect terms. $x = 5.$

Check. $3(5+2) = 2(5-3) + 17.$
$3 \times 7 = 2 \times 2 + 17.$
$21 = 21.$

FRACTIONAL EQUATIONS

The process of changing an equation containing fractions to an equation without fractions is called *clearing of fractions.*

To Clear an Equation of Fractions.

Multiply both members of the equation by the L. C. M. of the denominators. Reduce the resulting fractions to their lowest terms, thereby eliminating their denominators. If a fraction is preceded by a minus sign, all the signs in the numerator must be changed when the denominator is removed.

Problem. Solve the fractional equation

$$\frac{3x+5}{4} = 1 - \frac{x+4}{6}.$$

Solution.—The L. C. D. is 12. Multiplying both members of the equation by 12 and reducing the resulting fractional equation, we have $9x + 15 = 12 - (2x + 8)$.

Remove parenthesis. $9x + 15 = 12 - 2x - 8.$
Transpose. $9x + 2x = 12 - 8 - 15.$
Collect terms. $11x = -11.$
$x = -1.$

Check. $\frac{(3)\ (-1)+5}{4} = 1 - \frac{-1+4}{6}.$

$\frac{1}{2} = \frac{1}{2}.$

QUADRATIC EQUATIONS

A **quadratic equation** is an equation that, when simplified, contains the unknown quantity in the second but no higher power: $ax^2 + bx + c = 0$.

A **constant term** in a quadratic equation is a term that does not contain the unknown quantity. In the equation $3x^2 - 27 = 0$, 27 is the constant term.

A **pure quadratic equation** is a quadratic equation that does not contain the first power of the unknown quantity. Such are, for example, $2x^2 = 8$ and $x^2 - ab = 0$.

Every pure quadratic has two roots, numerically equal but opposite in sign. In the first of the above examples, $x^2 = 4$ and, therefore, $x = \pm 2$; in the second example, $x^2 = ab$, so that $x = \pm\sqrt{ab}$.

Problem. Find the value of x in the equation $7x^2 - 36 = 3x^2$.

Solution.—
Transpose and combine. $4x^2 = 36$.
Divide by 4. $x^2 = 9$.
Extract the square root. $x = \pm 3$.

An **affected quadratic equation** is a quadratic equation that contains both the first and the second power of the unknown quantity: $y^2 + 3y = 10$.

Every quadratic equation may be reduced to the general form $ax^2 + bx + c = 0$, where a may have any known value other than 0, and b and c may have any known values whatsoever. Methods of solving quadratic equations are as follows:

(1) the factoring method;
(2) the method of completing the square;
(3) the Hindu method;
(4) the use of the quadratic formula.

(1) FACTORING METHOD

To solve equations by factoring, transpose all terms to the left member, uniting all similar terms. The right member will then be zero.

Factor the left member.

Set each factor in turn equal to zero, and solve.

Problem. Solve $x^2 + 5 = 6x$.

Solution.—
Transpose. $x^2 - 6x + 5 = 0$.
Factor. $(x - 5)(x - 1) = 0$.

Since the product of two or more factors is zero, one or both of the factors must be zero.

Then $x - 5 = 0$, and $x = 5$
or $x - 1 = 0$, and $x = 1$.
Check. $5^2 + 5 = 6 \times 5$, and $1^2 + 5 = 6 \times 1$.

(2) COMPLETING THE SQUARE

Problem. Solve the equation $x^2 - 12x - 20.25 = 0$.

Solution.—
Transpose. $x^2 - 12x = 20.25$.

Take half the coefficient of x (that is, 6), square it, and add the result (36) to both members of the original equation.

$$x^2 - 12x + 36 = 56.25.$$

Take the square root of each side.

$$x - 6 = \pm\sqrt{56.25} = \pm 7.5.$$
$$x = 7.5 + 6 = 13.5$$
or $$x = -7.5 + 6 = -1.5.$$

(3) THE HINDU METHOD

This is a convenient modification of the preceding method, in that it avoids fractions in completing the square.

Multiply both sides of the given quadratic by four times the coefficient of x^2, and add to each member the square of the coefficient of x.

Problem. Solve the equation $x^2 - 12x - 20.25 = 0$.

Solution.—
Transpose. $x^2 - 12x = 20.25$.
Multiply by 4. $4x^2 - 48x = 81$.
Add 12^2. $4x^2 - 48x + 144 = 225$.

Extract the square root of each member.

$$2x - 12 = \pm 15.$$
$$2x = 27 \text{ or } -3.$$
$$x = 13.5 \text{ or } -1.5.$$

(4) FORMULA METHOD

Since any quadratic equation may be reduced to the form $ax^2 + bx + c = 0$, the solution of this equation furnishes a general means of solving any quadratic equation. By using the method of completing the square, we obtain

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

Problem. Solve the equation $x^2 - 12x - 20.25 = 0$.

Solution.—Put equation into the standard form,

$$ax^2 + bx + c = 0.$$
$$x^2 - 12x - 20.25 = 0$$

where $a = 1$, $b = -12$, and $c = -20.25$.

Substitute these values in the formula.

$$x = \frac{-(-12) \pm \sqrt{144 - (-81)}}{2} = \frac{12 \pm \sqrt{225}}{2} =$$
$$\frac{12 \pm 15}{2} = \frac{27}{2} \text{ or } \frac{-3}{2} = 13.5 \text{ or } -1.5.$$

SIMULTANEOUS EQUATIONS

Simultaneous equations are two or more equations that are satisfied by the same values of the unknown quantities.

Elimination is the process of combining two or more equations so as to make one unknown quantity disappear. Several methods of elimination are here shown.

(1) Elimination by Addition or Subtraction.

Multiply each given equation by a number such that the coefficients of the same unknown quantity in both of the new equations will be numerically equal.

If the equal coefficients thus obtained have the same sign, subtract one equation from the other; if they have unlike signs, add.

Problem. Solve the system of equations:

$$\left.\begin{matrix} 3a + 2b = 13. \\ 2a - 7b = -8. \end{matrix}\right\} \begin{matrix} (1) \\ (2) \end{matrix}$$

Solution.—

Multiply (1) by 2.	$6a + 4b = 26.$	(3)
Multiply (2) by 3.	$6a - 21b = -24.$	(4)
Subtract (4) from (3).	$25b = 50.$	(5)
	$b = 2.$	(6)

Substitute in (1) the value of b as shown in (6), transpose, and solve. $3a = 13 - 2 \times 2 = 9$.
$a = 3$.

Check by substituting 2 for b and 3 for a in the given equations. $3 \times 3 + 2 \times 2 = 13$.
$2 \times 3 - 7 \times 2 = -8$.

(2) Elimination by Substitution.

Solve either equation for one unknown in terms of the other.

Substitute this value in an equation from which it was not obtained, and solve the resulting equation.

Substitute the value thus found in the other equation, and solve for the other unknown.

Problem. Solve the system of equations:

$$\left.\begin{matrix} 5b + 2x = 36. \\ 2b + 3x = 43. \end{matrix}\right\} \begin{matrix} (1) \\ (2) \end{matrix}$$

Solution.—From (1), we obtain $5b = 36 - 2x$.

$$b = \frac{36 - 2x}{5}. \quad (3)$$

Substitute in equation (2) the value of b as found in equation (3).

Thus $2\left(\frac{36 - 2x}{5}\right) + 3x = 43.$

$$72 - 4x + 15x = 215.$$
$$11x = 143.$$
$$x = 13.$$

Substitute for x in (3). $b = \frac{36 - 2\times 13}{5} = 2.$

Check by substituting the values 2 for b and 13 for x in both equations. $5 \times 2 + 2 \times 13 = 36.$
$2 \times 2 + 3 \times 13 = 43.$

(3) Elimination by Comparison.

In each equation find the value of one unknown in terms of the other. Form an equation with these values, and solve it.

Problem. Solve the system of equations:

$$\left.\begin{matrix}3x + 2y = 5.\\ 2x + 5y = 7.\end{matrix}\right\} \begin{matrix}(1)\\(2)\end{matrix}$$

Solution.—

From (1), $3x = 5 - 2y$; $x = \frac{5 - 2y}{3}$. (3)

From (2), $2x = 7 - 5y$; $x = \frac{7 - 5y}{2}$. (4)

From (3) and (4), $\frac{5 - 2y}{3} = \frac{7 - 5y}{2}$.

Clear of fractions. $10 - 4y = 21 - 15y.$

Transpose. $-4y + 15y = 21 - 10.$

Collect terms. $11y = 11.$

$$y = 1.$$

Substitute 1 for y in (4). $x = \frac{7 - 5}{2} = 1.$

Check by substituting the values 1 for x and 1 for y in both equations. $3 \times 1 + 2 \times 1 = 5.$
$2 \times 1 + 5 \times 1 = 7.$

GRAPHS OF EQUATIONS

These may be most conveniently constructed on paper which is ruled in small squares. A horizontal line, called the X-axis, is drawn and is intersected at right angles by a vertical line, called the Y-axis. The sides of the small ruled squares provide units of measurement. If we designate by x any distance measured parallel to the X-axis from the Y-axis, and by y any distance parallel to the Y-axis from the X-axis, we may fix the position of any point by assigning specific values to x and y. A positive value of x locates the point to the right of the Y-axis, and a negative value locates it to the left of the Y-axis; similarly, positive values of y locate points above the X-axis and negative values locate them below. Thus the point located by $x = 4$, $y = -3$ is 4 units to the right of the Y-axis and 3 units below the X-axis.

An equation having two unknowns, x and y, may be represented by a graph by assigning arbitrary values to one unknown and, for each of these values, solving the equation for the corresponding value of the other unknown. Thus, pairs of values for x and y are found, and each pair will locate one point. All such equations of the *first degree* will give points lying in a straight line, and this line is called the **graph of the equation.** Equations of a *higher degree* represent curves, and each graph must be plotted by locating many points and joining them by an appropriate curve.

In $3x + 2y = 5$, we may obtain the following pairs of values: $x = -3$, $y = 7$; $x = 3$, $y = -2$. Locate the two points corresponding to these two pairs of values. Since this equation is of the first degree, its graph will be a straight line, and it will pass through the two points located.

If the graph of $2x + 5y = 7$ is similarly plotted with reference to the same axes, a second straight line is found which intersects the first at the point corresponding to $x = 1$, $y = 1$. This fact is a verification of the solution of these two simultaneous equations as obtained in the problem above under *Elimination by Comparison.*

BINOMIAL THEOREM

Where the exponent of a binomial of the form $(a + b)^n$ is a positive integral quantity, we can obtain by successive multiplications the following identities:

$(a + b)^2 = a^2 + 2ab + b^2$;
$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$;
$(a + b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$.

Any one of these expansions may be written tc show the law of its formation. Thus:

$$(a + b)^4 = a^4 + 4a^3b + \frac{4\cdot 3}{1\cdot 2} a^2b^2 + \frac{4\cdot 3\cdot 2}{1\cdot 2\cdot 3} ab^3 + \frac{4\cdot 3\cdot 2\cdot 1}{1\cdot 2\cdot 3\cdot 4} b^4.$$

If n represents the exponent of $(a + b)$, then it may be observed that

(1) The number of terms in the expansion is $n + 1$.

(2) The first term is a^n, and the exponent of a decreases by 1 in each succeeding term.

The first power of b is found in the second term, and the exponent of b increases by 1 in each succeeding term.

(3) The sum of the exponents of a and b in any term is n.

(4) The coefficients of the terms, taken in order, are 1, n, $\frac{n(n-1)}{1\cdot 2}$, $\frac{n(n-1)(n-2)}{1\cdot 2\cdot 3}$, etc.

The formula, therefore, for the expansion of any positive integral power of the binomial expression $a + b$ is as follows:

$$(a + b)^n = a^n + na^{n-1}b + \frac{n(n-1)}{1\cdot 2} a^{n-2}b^2 + \frac{n(n-1)(n-2)}{1\cdot 2\cdot 3} a^{n-3}b^3 + \ldots\ldots + b^n.$$

If b is negative, the signs of the even-numbered terms are negative.

If n is a negative number or a fraction, we may also form such a series, but it will contain an infinite number of terms.

Problem. Expand $(a + b)^5$.

Solution.—

$$(a + b)^5 = a^5 + 5a^4b + \frac{5.4}{1.2} a^3b^2 + \frac{5\cdot 4\cdot 3}{1\cdot 2\cdot 3} a^2b^3 + \frac{5\cdot 4\cdot 3\cdot 2}{1\cdot 2\cdot 3\cdot 4} ab^4 + \frac{5\cdot 4\cdot 3\cdot 2\cdot 1}{1\cdot 2\cdot 3\cdot 4\cdot 5} b^5.$$

By cancellation, $(a + b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$.

PROGRESSIONS

A **series** is a succession of numbers formed according to some fixed law.

The **terms** of a series are its successive numbers.

Two kinds of progressions are treated in this section: arithmetical and geometrical.

ARITHMETICAL PROGRESSIONS

An **arithmetical progression** (A. P.) is a series, each term of which, except the first, is derived from the preceding term by the addition of a constant number: 2, 5, 8, 11, 14;
19, 14, 9, 4, − 1, − 6;
$x, x + y, x + 2y, x + 3y.$

The **common difference** is the number which, added to each term, produces the next term. In the first of the three arithmetical progressions given above, the common difference is 3; the common difference in the second is -5; that in the third is y.

The first of these progressions is ascending; the second, descending.

THE FORMULA FOR THE nTH TERM l OF AN A. P., WHEN THE FIRST TERM a AND THE COMMON DIFFERENCE d ARE GIVEN, IS

$$\text{(I)}\quad l = a + (n-1)\,d.$$

Problem. Find the 10th term of the series 3, 7, 11, 15, etc.

Solution.—

$$l = a + (n-1)\,d;$$
$$l = 3 + (10-1)4;$$
$$l = 39.$$

Explanation: $a = 3$, $d = 4$, $n = 10$. Substituting these values in the formula, the value of l, or the last term, is 39.

THE FORMULA FOR THE SUM OF THE TERMS IN AN A. P. IS

$$\text{(II)}\quad s = \frac{n}{2}(a+l), \text{ or } n\left(\frac{a+l}{2}\right).$$

Problem. What is the sum of the series 2, 4, 6, 8, etc. containing 12 terms?

Solution.—

$$l = a + (n-1)\,d;$$
$$l = 2 + (12-1)2 = 24.$$
$$s = \left(\frac{a+l}{2}\right) n.$$
$$s = \left(\frac{2+24}{2}\right) 12 = 156.$$

Explanation: Since the last term is not given, it is found by formula (I) to be 24. Then, by formula (II), the sum of the series is found to be 156.

In most problems relating to arithmetical progressions, five quantities are involved; hence, if any three of them are given, the other two may be found by substituting the known values in formulas (I) and (II), and solving the resulting simultaneous equations.

Problem. The first term of an A. P. is 12, the last term is 144, and the sum of the terms is 1014. Find the series.

Solution. $s = 1014$, $a = 12$, $l = 144$.

Substituting in formulas (I) and (II),

$$144 = 12 + (n-1)d, \quad (1)$$
$$1014 = \frac{n}{2}(12 + 144). \quad (2)$$

From (2), $78n = 1014$, or $n = 13$.

Substituting in (1), $144 = 12 + 12d$.

Hence, $d = 11$.

The series is 12, 23, 34, 45, 56, 67, 78, 89, 100, 111, 122, 133, 144.

Problem. Find n if $s = 204$, $d = 6$, $l = 49$.

Solution.—

Substituting in formulas (I) and (II),

$$49 = a + (n-1)\,6, \quad (1)$$
$$204 = \frac{n}{2}(a + 49). \quad (2)$$

From (1), $a = 49 - (n-1)\,6 = 49 - 6n + 6 = 55 - 6n$.

Substituting in (2) this value of a,

$$204 = \frac{n}{2}(55 - 6n + 49),$$
$$408 = 55n - 6n^2 + 49n.$$

Collecting and transposing, $6n^2 - 104n = -408$,
$3n^2 - 52n = -204$.

Solving by any of the methods found under quadratic equations, we have $n = 6$ or $11\frac{1}{3}$.

But n cannot be fractional, hence $n = 6$.

GEOMETRICAL PROGRESSIONS

A **geometrical progression** (G. P.) is a series, each term of which, except the first, is derived from the preceding term by multiplying it by a constant number, called the *common ratio*.

The **common ratio** is the constant multiplier.

The common ratio may be integral or fractional, positive or negative.

Geometrical means are all the terms of a geometrical progression intermediate between the first term and the last term.

THE FORMULA FOR THE nTH TERM l OF A G. P., WHEN THE FIRST TERM a AND THE COMMON RATIO r ARE GIVEN, IS

$$\text{(I)}\quad l = ar^{n-1}.$$

Problem. Find the 6th term of the series 2, 6, 18, etc.

Solution.—

$$l = ar^{n-1}.$$
$$l = 2 \times 3^5.$$
$$l = 486.$$

Explanation: In this problem $a = 2$, $r = 3$, and $n = 6$. Substituting these values in formula (I), we obtain $l = 2 \times 3^5 = 2 \times 243 = 486$.

$\therefore$ the 6th term = 486.

THE SUM OF THE TERMS IN A G. P. IS EXPRESSED BY THE FORMULA,

$$\text{(II)}\quad s = \frac{ar^n - a}{r - 1}.$$

Problem. Find the sum of 8 terms of the series 2, 4, 8, etc.

Solution.—In this problem, which requires the use of formula (II), $a = 2$, $r = 2$, and $n = 8$. Substituting these values in formula (II), we have

$$s = \frac{2\times 2^8 - 2}{2 - 1} = \frac{2\times 256 - 2}{1} = 510.$$

If r is less than unity, it is convenient to write formula (II) in the following form:

$$\text{(III)}\quad s = \frac{a - ar^n}{1 - r}.$$

In most problems relating to geometrical progressions, five quantities are involved; hence, if any three of them are given, the other two may be found by substituting the known values in equations (I) and (II), and solving the resulting simultaneous equations.

Problem. Insert 5 geometric means between 9 and 576.

Solution.—The total number of terms is $5 + 2$.

Hence, $n = 7$, $a = 9$, $l = 576$.

Substituting in (I), $576 = 9r^6$.

$$r^6 = 64.$$
$$r = \pm 2.$$

Hence, the series is 9, 18, 36, 72, 144, 288, 576
or 9, -18, 36, -72, 144, -288, 576,
and the required means are ± 18, 36, ± 72, 144, ± 288.

PERMUTATIONS AND COMBINATIONS

The **permutations** of a number of things are the different orders in which these things may be arranged in respect to each other.

The **combinations** of a number of things are the different collections, or groups, that can be formed from them without regard to the order in which the things are arranged in each group.

The difference between permutations and combinations may be illustrated by arranging the first three letters of the alphabet in different orders. Thus, *abc*, *acb*, *bca*, *bac*, *cab*, and *cba* all form different permutations, but each represents the same combination.

Formulas. The number of permutations of n different things taken r at a time,

$${}_nP_r = n(n-1)(n-2)\ldots\ldots(n-r+1).$$

The number of permutations of n different things taken all at a time is $n!$. The number of permutations of n different things taken r at a time when repetition is allowed is n^r.

The number of combinations of n different things taken r at a time,

$${}_nC_r = \frac{n(n-1)(n-2)\ldots\ldots(n-r+1)}{r!}.$$

Problem. Four people enter a room in which there are seven vacant chairs. In how many different ways can they be seated?

Solution.—In this problem, $n = 7$, $r = 4$, and $n - r + 1 = 7 - 4 + 1 = 4$.

Substituting these values in the formula for permutations given above, we get ${}_7P_4 = 7 \cdot 6 \cdot 5 \cdot 4 = 840$.

Problem. How many committees of nine men each can be selected from twelve men?

Solution.—This is a problem in combinations, where $n = 12$, $r = 9$, and $n - r + 1 = 12 - 9 + 1 = 4$.

Substituting these values in the given formula,

$${}_{12}C_9 = \frac{12 \cdot 11 \cdot 10 \cdot \cancel{9} \cdot \cancel{8} \cdot \cancel{7} \cdot \cancel{6} \cdot \cancel{5} \cdot \cancel{4}}{\cancel{1} \cdot \cancel{2} \cdot \cancel{3} \cdot \cancel{4} \cdot \cancel{5} \cdot \cancel{6} \cdot \cancel{7} \cdot \cancel{8} \cdot \cancel{9}} = \frac{\overset{4}{\cancel{12}} \cdot 11 \cdot \overset{5}{\cancel{10}}}{\cancel{1} \cdot \cancel{2} \cdot \cancel{3}} =$$

220, possible committees.

SQUARE ROOT

APPROXIMATE METHOD

In the use of the approximate method of finding a root, a value which is near the correct value is first obtained by trial or inspection. Then by division and averaging of quotient and divisor and by a continuation of the process, the number is broken into two nearly equal factors. This method is sometimes called the *inspection method.*

Problem. Approximate the square root of 85.

Solution. $9^2 = 81$, and $10^2 = 100$. Hence the square root of 85 lies between 9 and 10 and much nearer 9 than 10. Assume 9.3 as an approximate root and proceed as follows: $85 \div 9.3 = 9.14$; the average of 9.14 and 9.30 is half their sum, or 9.22; $85 \div 9.22 = 9.219$, which is a root correct to the third decimal place.

ALGEBRAIC METHOD

The square of a number of one digit contains one or two digits; similarly, the square of a number of two digits contains three or four digits, etc. Therefore if any integral number is divided from right to left into groups or periods of two digits, the number of digits in the root will be the same as the number of groups. The last group to the left may contain one or two digits. For a similar reason the digits of a decimal number are divided into groups of two digits each, beginning at the decimal point.

A study of the following method of building up a square will guide the reader to an understanding of the method of finding a square root.

The square of 28 may be found as follows:

$$(28)^2 = (20+8)^2.$$

$$\begin{array}{r} 20+8 \\ 20+8 \\ \hline 20^2 + (20\times 8) \\ \quad (20\times 8) + 8^2 \\ \hline 20^2 + 2(20\times 8) + 8^2 = 784; \end{array}$$

or, using letters where t = tens and u = units, we have

$$\begin{array}{r} t+u \\ t+u \\ \hline t^2 + tu \\ \quad tu + u^2 \\ \hline t^2 + 2tu + u^2. \end{array}$$

By squaring several numbers composed of tens and units, we find that in every case the square of the number is equal to the square of the tens plus twice the product of the tens and units plus the square of the units. Or, using the letters, the statement becomes, the square of any number equals $t^2 + 2tu + u^2$. By a reversal of the process, the square root of any number may be found by means of dividing it into parts which correspond to $t^2 + 2tu + u^2$. The number whose digits are t and u will then be the root.

TO EXTRACT SQUARE ROOT

The steps in finding the square root of any number are:

1. Separate the number into groups of two digits each, beginning with units or at the decimal point.
2. Find the greatest perfect square in the left-hand period and write its square root as the first figure of the required root. Subtract the square of this number from the left-hand period. Annex to the remainder the next group so as to form a dividend.
3. Double the root already found and write it as a partial divisor at the left of the new dividend. Annex one cipher and divide the new dividend by the partial divisor.
4. Write the quotient in the root as a trial term and also annex it to the partial divisor, making the latter complete.
5. Multiply the complete divisor by the figure just obtained and, if possible, subtract the product from the last remainder. If this product is too large, the trial term of the quotient must be replaced by the next smaller number and the operations performed as before.
6. Proceed in this manner until all the periods are used. If there is still a remainder, decimal ciphers may be employed to carry the extraction to any desired length.

Problem. Find the square root of 655.36.

Solution.—

		6, 55.36 | 25.6
greatest perfect square		4
first partial divisor	40	2 55
first complete divisor	45	2 25
second partial divisor	500	30 36
second complete divisor	506	30 36

Check. $25.6 \times 25.6 = 655.36$.

Problem. Find the square root of $4a^4 + 12a^3 - 3a^2 - 18a + 9$.

Solution.—

	$4a^4+12a^3-3a^2-18a+9$ | $2a^2+3a-3$
square of $2a^2$	$4a^4$
first remainder	$12a^3-3a^2$
first trial divisor $4a^2$	
first complete divisor $4a^2+3a$	$12a^3+9a^2$
second remainder	$-12a^2-18a+9$
second trial divisor $4a^2+6a$	
second complete divisor $4a^2+6a-3$	$-12a^2-18a+9$

The required square root is $\pm(2a^2 + 3a - 3)$.

LOGARITHMIC METHOD

This method enables one easily to extract all roots. Its use is always preferable after one has mastered the subject of logarithms. The process is as follows:

Obtain from logarithmic tables the logarithm of the given number. Divide this logarithm by the index of the root to be extracted. Thus, the logarithm is divided by 3 for the extraction of the cube root; by 4, for the extraction of the fourth root; and so on. The quotient will be the logarithm of the required root, which can be obtained by reference to a table of logarithms. The roots obtained by this method are approximate.

Problem. What is the square root of 85?

Solution.—

log 85 = 1.9294.

log square root of 85 = ½ log 85 = 0.9647.

0.9647 is the log of 9.22.

Check. $9.22 \times 9.22 = 85.00 +$.

CUBE ROOT

The cube root of any number may be extracted by a method suggested by the form of the cube of the binomial $t + u$, where t represents *tens* in the Arabic notation and u represents units. The form is given in the following identity:

$$(t + u)^3 = t^3 + 3t^2u + 3tu^2 + u^3.$$

If a number can be divided into parts corresponding to the terms of the right-hand member of the above identity, the root will be a number whose digits are the numbers corresponding to t and u. The method described below is a practical means of arriving at this result.

TO EXTRACT CUBE ROOT

The steps in finding the cube root of any number are:

1. Separate the number into groups of three digits each, beginning with units or at the decimal point.

2. Find the greatest perfect cube in the left-hand period and write its cube root as the first figure of the required root. Subtract the cube of this number from the left-hand period. Annex to the remainder the next group so as to form a dividend.

3. To three times the square of the figure in the root annex two ciphers and write the result as a partial divisor at the left of the dividend.

4. Estimate the number of times the partial divisor is contained in the dividend and place the estimated quotient in the root as a trial term.

5. To three times the product of the first and second terms of the root annex one cipher and place the result beneath the partial divisor. In the next line below, write the square of the second term of the root. The sum of these two numbers and the partial divisor will be the complete trial divisor.

6. Multiply the complete trial divisor by the second term of the root and, if possible, subtract the product from the dividend. If this product is too large, the trial term of the root must be replaced by the next smaller number and the operations performed as before.

7. Proceed in this manner until all the periods are used. If there is still a remainder, decimal ciphers may be employed to carry the extraction to any desired length.

Problem. Find the cube root of 12,167.

Solution.—

		12,167 | 23
		8
partial divisor	1200	4 167
	180	4 167
	9	
complete divisor	1389	

The cube root of 12,167 is 23.

Check. $23 \times 23 \times 23 = 12{,}167$.

Problem. Find the cube root of $b^6 - 3b^5 + 5b^3 - 3b - 1$.

Solution.—

		$b^6 - 3b^5 + 5b^3 - 3b - 1 \mid b^2 - b - 1$
		b^6
trial divisor	$3b^4$	$-3b^5 + 5b^3$
complete divisor	$3b^4 - 3b^3 + b^2$	$-3b^5 + 3b^4 - b^3$
trial divisor	$3b^4 - 6b^3 + 3b^2$	$-3b^4 + 6b^3 - 3b - 1$
complete divisor	$3b^4 - 6b^3 + 3b + 1$	$-3b^4 + 6b^3 - 3b - 1$

The required cube root is $b^2 - b - 1$.

Other Roots. By the successive extraction of square root or cube root or both, roots of many other orders may be found. Thus the fourth root is obtained by extracting the square root of the square root; the sixth root, by extracting the square root of the cube root; the eighth root, by extracting the square root of the square root of the square root; the ninth root, by extracting the cube root of the cube root; and so on.

RADICALS

A **radical,** or **radical expression,** is an indicated root of a quantity, in which the radical sign is used to signify that a certain root is to be found.

The **radicand** is the quantity whose root is required.

$\sqrt{3a}$, $(x^5)^{\frac{1}{4}}$, $\sqrt[6]{a^2+2}$, and $(a + b)^{\frac{1}{4}}$ are radicals whose radicands are $3a$, x^5, $a^2 + 2$, and $a + b$.

The **order** of a radical is shown by the index of the root or by the denominator of the fractional exponent.

$\sqrt{x+y}$ and $(m - n)^{\frac{1}{2}}$ are radicals of the second order.

A radical is **rational** if the root can be extracted exactly: $4^{\frac{1}{2}}$; $\sqrt[3]{64}$; $\sqrt{(x + y)^2}$.

A radical is **irrational** if the root cannot be extracted exactly: $\sqrt{2}$; $\sqrt[3]{5}$.

A **surd** is a word sometimes used to denote an irrational radical.

A **mixed surd** is the product of a rational factor and a surd factor:

$$2\sqrt{3};\ (a - b)\sqrt{x}.$$

An **entire surd** is a surd whose coefficient is unity:

$$\sqrt{3};\ \sqrt[3]{x - y}.$$

Similar surds are surds which contain the same irrational factors:

$$\sqrt{3};\ 2 - a\sqrt{3};\ 5\sqrt{3}.$$

To Reduce a Radical to its Simplest Form.

Separate the quantity under the radical sign into factors if possible, one of which is the greatest perfect power of the same degree as the radical.

Extract the required root of the factor, and multiply the coefficient of the radical by the result.

Problem. Simplify $5\sqrt{18a^3b^2}$.

Solution.—

$$5\sqrt{18a^3b^2} = 5\sqrt{9a^2b^2 \cdot 2a} = 15ab\sqrt{2a}.$$

To Reduce any Quantity to the Form of a Radical.

Raise the quantity to the power corresponding to the index of the given root, and place the result under the appropriate radical sign.

Problem. Reduce $3ay^2$ to the form of a cube root.

Solution.—

$$3ay^2 = \sqrt[3]{(3ay^2)^3} = \sqrt[3]{27\,a^3y^6}.$$

To Reduce Radicals to Equivalent Radicals of the Same Degree.

Express the given radicals with fractional exponents. Reduce the fractional exponents to equivalent exponents having a common denominator.

Raise each quantity to the power indicated by the numerator of its exponent, and indicate the root which is expressed by the common denominator.

Problem. Reduce $\sqrt{x^2y^3}$ and $\sqrt[3]{xy^2}$ to radicals of the same degree.

Solution.—

$$\sqrt{x^2y^3} = (x^2y^3)^{\frac{1}{2}} = (x^2y^3)^{\frac{3}{6}} = \sqrt[6]{x^6y^9}.$$
$$\sqrt[3]{xy^2} = (xy^2)^{\frac{1}{3}} = (xy^2)^{\frac{2}{6}} = \sqrt[6]{x^2y^4}.$$

ADDITION AND SUBTRACTION OF RADICALS

Only similar radicals can be united into one term by addition or subtraction.

Problem. Simplify $\sqrt{45a^3} + 5\sqrt{20a^3} - \sqrt{80a^3}$.

Solution.—

$$\sqrt{45a^3} = \sqrt{9a^2 \cdot 5a} = 3a\sqrt{5a}.$$
$$5\sqrt{20a^3} = 5\sqrt{4a^2 \cdot 5a} = 10a\sqrt{5a}.$$
$$-\sqrt{80a^3} = -\sqrt{16a^2 \cdot 5a} = -4a\sqrt{5a}.$$
$$3a\sqrt{5a} + 10a\sqrt{5a} - 4a\sqrt{5a} = 9a\sqrt{5a}.$$

MULTIPLICATION OF RADICALS

Surds of the same order are multiplied by multiplying the product of the coefficients by the product of the irrational factors.

$$a\sqrt[n]{y} \cdot b\sqrt[n]{x} = ab\sqrt[n]{xy}.$$

Dissimilar surds are reduced to surds of the same order and then multiplied.

Problem. Multiply $5\sqrt[3]{25y^2}$ by $3\sqrt[3]{50y^2}$.

Solution.—

$$5\sqrt[3]{25y^2} \cdot 3\sqrt[3]{50y^2} = 15\sqrt[3]{5^2 \cdot 5^2 \cdot 2 \cdot y^4} = 75y\sqrt[3]{10y}.$$

Problem. Multiply $3\sqrt{2}$ by $\sqrt[3]{3}$.

Solution.—

$$3\sqrt{2} \cdot \sqrt[3]{3} = 3\sqrt[6]{2^3} \cdot \sqrt[6]{3^2} = 3\sqrt[6]{72}.$$

Problem.

Multiply $5\sqrt{7} - 2\sqrt{5}$ by $4\sqrt{7} + 8\sqrt{5}$.

Solution.—

$$\begin{array}{r} 5\sqrt{7} - 2\sqrt{5} \\ 4\sqrt{7} + 8\sqrt{5} \\ \hline 140 - 8\sqrt{35} \\ + 40\sqrt{35} - 80 \\ \hline 140 + 32\sqrt{35} - 80 = 60 + 32\sqrt{35}. \end{array}$$

DIVISION OF RADICALS

Monomial surds of the same order may be divided by multiplying the quotient of the coefficients by the quotient of the surd factors. Thus:

$$a\sqrt{b} \div m\sqrt{x} = \frac{a}{m}\sqrt{\frac{b}{x}}.$$

This method is applicable also to monomial surds of different orders, since the latter may always be reduced to the same order and then treated as here shown.

Problem. $12\sqrt{60} \div 15\sqrt{3}$.

Solution.—

$$12\sqrt{60} \div 15\sqrt{3} = \frac{4}{5}\sqrt{20} = \frac{4}{5}\sqrt{4 \cdot 5} = \frac{8}{5}\sqrt{5}.$$

Problem. $(\sqrt{50} + 3\sqrt{12}) \div \sqrt{2}$.

Solution.—

$$(\sqrt{50} + 3\sqrt{12}) \div \sqrt{2} = \sqrt{25} + 3\sqrt{6} = 5 + 3\sqrt{6}.$$

Problem. Divide $\sqrt{6}$ by $\sqrt[3]{2}$.

Solution.—

$$\sqrt{6} \div \sqrt[3]{2} = \sqrt[6]{6^3} \div \sqrt[6]{2^2} = \sqrt[6]{216 \div 4} = \sqrt[6]{54}.$$

RATIONALIZATION OF THE DIVISOR

Rationalization of the divisor is the process of multiplying both dividend and divisor by such a quantity that the divisor will be free of surds.

Problem. Rationalize the divisor of $\frac{3}{\sqrt{2}}$.

Solution.—

$$\frac{3}{\sqrt{2}} = \frac{3 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{3\sqrt{2}}{2} = \frac{3}{2}\sqrt{2}.$$

Explanation: Since the divisor is to be freed of surds, $\sqrt{2}$ must be multiplied by a factor which will render the radical a perfect square. Any quantity multiplied by itself gives a perfect square; hence, in this case, the multiplier is $\sqrt{2}$. To avoid changing the value of the fraction, the numerator also must be multiplied by $\sqrt{2}$.

When the divisor is a binomial involving a surd or surds of no higher order than the second, the multiplier required is made up of the terms of the divisor connected by the opposite sign.

Problem. Divide $x + \sqrt{z}$ by $x - \sqrt{z}$.

Solution.—

$$\frac{x+\sqrt{z}}{x-\sqrt{z}} = \frac{x+\sqrt{z}}{x-\sqrt{z}} \times \frac{x+\sqrt{z}}{x+\sqrt{z}} = \frac{x^2 + 2x\sqrt{z} + z}{x^2 - z}.$$

LOGARITHMS

Many of the computations of commerce, industry, and science are greatly facilitated by the use of tables of logarithms. Problems in compound interest, annuities, bond tables, sinking funds, statistics, insurance, and engineering are easily solved by the use of these tables. Modern civilization is much indebted to John Napier, baron of Murchiston, who invented logarithms in 1614. The idea was later improved by Henry Briggs, who suggested the number 10 as the base of the tables. Tables of logarithms are not difficult to understand if one will study thoroughly the explanation of their use.

EXPLANATION AND DEFINITIONS

Logarithms are based on the four laws of exponents. These laws, which have already been stated under different subjects in this section, are illustrated by the following examples:

$a^m \times a^n = a^{m+n}$ (To multiply the numbers, *add* exponents.)

$a^m \div a^n = a^{m-n}$ (To divide the numbers, *subtract* exponents.)

$(a^m)^n = a^{mn}$ (To find a power of a number, *multiply* exponents.)

$\sqrt[n]{a^m} = a^{\frac{m}{n}}$ (To extract a root of a number, *divide* exponents.)

It will be observed that, in the first example, the process of multiplying two numbers is performed by the simpler process of adding the exponents. In the second example, division is replaced by subtraction; in the third, we multiply the exponents instead of performing the more difficult process of raising a number to a power of itself; and, in the fourth, instead of extracting a root, we divide.

All numbers may be expressed as certain powers of 10, the exponents being usually in the form of decimal numbers. Through the use of such exponents, we may replace the more difficult processes performed with the numbers by the simpler processes performed with the exponents. Thus 100 is 10^2 and 1000 is 10^3. The exponents, when the numbers are expressed as powers of 10, are 2 and 3. If we wish, for example, to multiply the numbers, we may do so by means of adding their exponents. The sum, 5, is the exponent of their product, which may readily be calculated or found from a table.

The **logarithm** of a number is the exponent of the power to which another number, known as the **base**, is raised to produce the first number. Thus, an alternative way of stating that $2^3 = 8$ is to say that 3 is the logarithm of 8 to the base 2.

As a brief way of writing "the logarithm of," we frequently use the word "log," followed by the appropriate number.

The base used for so-called common logarithms is 10. The logarithms of the different numbers to this base have been calculated and made available by tables for convenient reference. The table accompanying this article gives the logarithms of all numbers from 1 to 10,000, calculated to four decimal places.

The **mantissa** is that portion of a logarithm which is a decimal. The mantissa is the only part of the logarithm found in tables. It is always positive and is independent of the position of the decimal point in the number whose logarithm is required; for example, the mantissa of 327.6 is the same as the mantissa of 32.76.

The **characteristic** is the integral part of a logarithm, and it may be positive or negative. It is not found in the table, but must be determined by rule. The method of its determination will be clear from a consideration of the following table:

Since	$10{,}000 = 10^4$,	the log of	10,000 is 4.
Since	$1000 = 10^3$,	the log of	1000 is 3.
Since	$100 = 10^2$,	the log of	100 is 2.
Since	$10 = 10^1$,	the log of	10 is 1.
Since	$1 = 10^0$,	the log of	1 is 0.
Since	$0.1 = 10^{-1}$,	the log of	0.1 is -1.
Since	$0.01 = 10^{-2}$,	the log of	0.01 is -2.
Since	$0.001 = 10^{-3}$,	the log of	0.001 is -3.

Negative characteristics are generally written with a minus sign placed above them; as, $\bar{3}.6281$.

Any number between 100 (10^2) and 1000 (10^3) must have for its logarithm the number 2 + a decimal; any number between 10 (10^1) and 100 (10^2) must have for its logarithm the number 1 + a decimal; any number between 1 (10^0) and 10 (10^1) must have for its logarithm the number 0 + a decimal. Any number less than 1 will have a negative characteristic.

As a practical aid in determining the characteristic, the following rule is valuable:

If the number is *greater* than 1, the characteristic is *1 less* than the number of digits in the integral part of the number; if the number is *less* than 1, the characteristic is *negative* and is *1 more* than the number of zeros between the decimal point and the first significant figure of the given number. Thus the characteristic of log 1736.1 will be 1 less than the number of figures at the left of the decimal point; that is, 4 − 1, or 3. The characteristic of .0027 will be negative and 1 more than the number of figures between the decimal point and the first significant figure; that is, 2 + 1, or 3.

TO FIND THE LOGARITHM OF A NUMBER

Suppose that we desire to find the logarithm of 327.6. Turn to the accompanying table of logarithms. The column *N* at the extreme left contains all numbers in order from 10 to 99. Follow this column down to the number 32, which is composed of the first two digits of the given number. Follow the horizontal row of numbers from 32 to the right until the eye reaches the vertical column headed by 7, the third digit of the given number. The number which stands in this column and is directly opposite 32 is 5145. It is the mantissa of a number whose significant figures are 327. The next number to the right is 5159, which is the mantissa of 328. Since 327.6 lies between 327 and 328, dividing their difference in the ratio of 6 to 4, therefore, the mantissa of 327.6 will lie between 5145 and 5159, dividing this difference, 14, in the same ratio, 6 to 4. $\frac{6}{10}$ of 14 = 8 +. Add 8 to 5145 in order to obtain the mantissa of 327.6. The result, 5153, is the decimal part of the required logarithm.

The characteristic is obtained by observing that 327.6 is greater than 100, or 10^2, but less than 1000, or 10^3. The characteristic will be the exponent of the smaller of these limits; that is, 2. Consequently, the logarithm of 327.6 is 2.5153.

An **antilogarithm** is the number that corresponds to a given logarithm.

TO FIND AN ANTILOGARITHM

Suppose we wish to find the antilogarithm of 2.7448. This may be done from the table of logarithms, but the process is the reverse of that used for obtaining a logarithm. Since the characteristic has reference only to the position of the decimal point in the required number, the mantissa alone requires consideration in obtaining the significant figures of the antilogarithm.

It will be observed that the numbers in the body of the logarithm table increase continuously from zero to 9996. Look for the numbers nearest to the given mantissa, 7448. In the horizontal row of numbers to the right of 55 and in the vertical column headed by 5, the number 7443 will be found, while the next higher number, 7451, stands in the same row in the column headed by 6. 7443 is the mantissa of the number whose significant figures are 555, and 7451 is the mantissa of 556. The given mantissa, 7448, lies between 7443 and 7451, dividing the difference, 8, in the ratio of 5 to 3. Therefore, the required number lies between 555 and 556 and divides the difference, 1, in the same ratio, 5 to 3. $1 \times \frac{5}{8} = .6 +$. The required number will have the significant figures 5556.

Since the characteristic of the given logarithm is 2, the required number lies between 10^2, or 100, and 10^3, or 1000. It is, therefore, 555.6.

The following rule is valuable in determining the place of the decimal point in an antilogarithm:

If the characteristic of the logarithm is *positive* or *zero*, the integral part of the antilogarithm must have *1 more* digit than the number of units in the characteristic; if the characteristic is *negative*, write, between the decimal point and the first significant figure, zeros *1 less* in number than the units in the characteristic. Thus the antilogarithm of 2.9031, for example, will have 2 + 1, or 3, digits in its integral part; that of .9031 will have 0 + 1, or 1, digit in its integral part; and the antilogarithm of 2.9031 will have 2 − 1, or 1, zero to the right of the decimal point and preceding the first significant figure.

APPLICATION OF LOGARITHMS

To Multiply Numbers.

Add the logarithms of all of the numbers whose products are desired. The antilogarithm of this sum is the desired product.

Problem. Multiply 254 by 781.

Solution.—

log 254	=	2.4048.
log 781	=	2.8927.
log product	=	5.2975.
Product	=	198,400.

Problem. Multiply 561.75 by 0.0328.

Solution.—

log 561.75 = 2.7495.
log 0.0328 = $\bar{2}$.5159.
log product = 1.2654.
Product = 18.42 +.

To Divide One Number by Another.

Subtract the logarithm of the divisor from the logarithm of the dividend. The antilogarithm of this difference will be the quotient.

Problem. Divide 781 by 254.

Solution.—

log 781 = 2.8927.
log 254 = 2.4048.
log quotient = 0.4879.
Quotient = 3.075 +.

Problem. Divide 46.72 by 0.0998.

Solution.—

log 46.72 = 1.6695.
log 0.0998 = $\bar{2}$.9991.
log quotient = 2.6704.
Quotient = 468.2.

To Raise a Number to any Power.

Multiply the logarithm of the number by the exponent indicating the desired power and find the antilogarithm of the product.

Problem. Find the value of 0.214^6.

Solution.—

log 0.214 = $\bar{1}$.3304.
Multiply by 6. 6
log product = $\bar{5}$.9824.
$\therefore 0.214^6 = 0.00009603 +$.

To Extract any Root of a Number.

As previously stated under *Square Root*, logarithms provide a convenient method of extracting any root. This method consists of dividing the logarithm of the given number by the index of the desired root and finding the antilogarithm of the quotient. The following problem exemplifies the process:

Problem. Find the cube root of 7640.

Solution.—

log 7640 = 3.8831.
⅓ log 7640 = 1.2944.
1.2944 = log 19.70.
$\therefore \sqrt[3]{7640} = 19.70$.

TABLES OF COMMON LOGARITHMS

N	0	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996
N	0	1	2	3	4	5	6	7	8	9

GEOMETRY

GEOMETRY had its beginning in practical problems. The ancient Egyptians developed land surveying to locate given tracts of land after the annual flood of the Nile. Their temples and pyramids give evidence of skill in the employment of lines and angles. The Babylonians also knew something of land measures, and their monuments show many geometrical designs. The methods of measurement and calculation which these peoples contrived for their practical purposes became the basis for the science of geometry, as it was evolved by the Greeks. To them we are indebted for the name *geometry*, or "earth measure." Euclid, about 300 B. C., organized all of the geometrical knowledge of his time into a systematic body, and set it forth in his *Elements*, a book on which the teaching of geometry since that time has been based. The logical plan of Euclid is founded on a relatively small number of fundamental postulates, axioms, and definitions, derived through sense perception and intuition.

We study geometry for its development of logical principles, for the exact truths it contains, and for its many practical relations to life. Both the facts and the methods of geometry are important elements in our daily activities, and this survey will discuss the most commonly used facts of space and position.

TERMS AND DEFINITIONS

A **theorem** is a statement to be proved.

A **corollary** is a truth that follows from another with little or no proof.

A **demonstration** is the proof of a theorem.

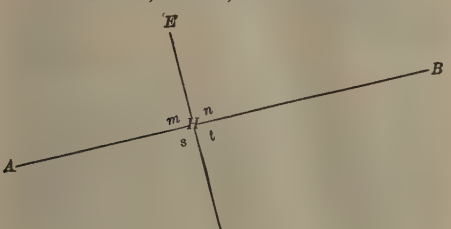
Q. E. D. is the abbreviation for the Latin words *quod erat demonstrandum*, meaning "which was to be proved." It is usually placed at the close of a demonstration.

A **problem** is a construction so to be made that it shall satisfy given conditions.

Q. E. F. is the abbreviation for the Latin words *quod erat faciendum* and means "which was to be done." It is usually placed at the close of the solution of a problem.

A **construction** is the representation of a required figure by means of points and lines.

POINTS, LINES, AND ANGLES



In examples under the following definitions, the letters refer to corresponding letters in the above figure.

A **point** has neither length, breadth, nor thickness. It has position only and is designated by a capital letter. Thus, the point K.

A **line** has one dimension only—length. The finest wire or lead pencil mark, therefore, is not a geometric line, as both have width and thickness. A line is usually named by two capital letters. Thus, the line AB.

A **segment** of a line is a part, or section, of a line. KH is a segment of the line FE.

A **straight line** is a line that does not change its direction throughout its entire length. The test of a straight line is that if any part be applied to any other part it will coincide even though its direction be reversed. A straight line is frequently called a **right line.**

A **broken line** is a line made up wholly of straight lines lying in different directions.

A **curved line,** or **curve,** is a line no part of which is straight.

An **angle** is the figure formed by two straight lines which meet at a point. The abbreviation or symbol for the word angle is $\angle$.

An angle may also be defined as the amount of revolution of a line about a point.

The **sides** of an angle are the lines which form the angle.

The **vertex** of an angle is the point at which the sides of the angle meet.

An angle is measured in *degrees* or *radians*. A **degree** is equal to $\frac{1}{360}$ of one complete revolution of a line about a point. A **radian** $= \frac{360}{2\pi}$ degrees, or 57.29 + degrees. An angle is named by three capital letters, reading from one side to the other with the vertex letter in the middle. Where there is no doubt as to which angle is meant, the vertex letter alone is used. Thus $\angle FKD = \angle z$. The symbol $\angle K$ cannot be used here to name any single angle, as there are four angles around the point K.

A **straight angle** is an angle whose sides lie in the same straight line in opposite directions from the vertex. The $\angle AHB$ is a straight angle, or 180°.

A **right angle** is half of a straight angle, or 90°. The $\angle AHE$ is a right angle.

A **perigon** is equal to the sum of two straight angles, four right angles, or 360°. Thus, $\angle x + \angle z + \angle y + \angle w = 360°$ and is a perigon.

An **acute angle** is less than a right angle. The $\angle CKE$ is an acute angle.

An **obtuse angle** is greater than a right angle and less than a straight angle. The $\angle CKF$ is an obtuse angle.

Complementary angles are angles whose sum is a right angle.

Supplementary angles are angles whose sum is a straight angle. Thus, $\angle FKD$ and $\angle DKE$ are supplementary.

Adjacent angles have a common side and a common vertex. Thus, $\angle CKE$ and $\angle EKD$ are adjacent.

Opposite angles, or **vertical angles,** are the nonadjacent angles formed by two intersecting lines. Thus, $\angle AHE$ and $\angle BHF$ are vertical angles.

A **transversal** is a line that intersects two or more lines. The line EF is a transversal.

The following terms are used to designate angle pairs, as illustrated in the figure shown above:

Corresponding angles, $\angle n$ and $\angle x$;

Alternate-interior angles, $\angle w$ and $\angle t$;

Alternate-exterior angles, $\angle m$ and $\angle z$.

A **perpendicular** is a straight line that forms a right angle with another line. The point of intersection is the *foot* of the perpendicular. A perpendicular is the shortest distance from a given

external point to a given line. Thus, EH is the shortest distance from the point E to the line AB.

A **bisector** of an angle is a straight line that divides the angle into two equal angles.

Parallel lines are lines that are equally distant from each other throughout their entire lengths.

A **triangle** is a figure bounded by three straight lines. The bounding lines are the *sides*, and the points where these lines meet are the *vertices*. The sum of the interior angles of a triangle is equal to two right angles, or 180°. The symbol △ is sometimes used for the word triangle.

A **polygon** is a portion of a plane bounded by a broken line. A *triangle* is a polygon of *three* sides. Likewise, a *quadrilateral* has *four* sides, a *pentagon* has *five* sides, a *hexagon* has *six* sides, etc.

A **regular polygon** is a polygon which has all its sides equal and all its angles equal.

A **circle** is a portion of a plane bounded by a curved line, known as the **circumference,** all points of which are equally distant from a point within, called the **center.** A circle may be considered as a regular polygon of an infinite number of sides.

The **radius** of a circle is a straight line drawn from the center of the circle to the circumference. All radii of the same circle are equal.

An **arc** of a circle is a portion of the circumference.

A **sector** of a circle is a portion of a circle bounded by an arc and two radii.

A **chord** of a circle is a straight line joining the extremities of an arc.

A **segment** of a circle is the portion of a circle bounded by an arc and the chord joining its extremities.

A **secant** is a straight line of indefinite length which cuts the circumference of a circle in two points.

A **tangent** is a straight line that meets a circle but, though extended to any length, will not cut the circle. A tangent to a circle is perpendicular to the radius drawn to the point of contact.

Congruent. Two figures are said to be congruent if they can be made to coincide throughout, when placed one upon the other.

A polygon is said to be **circumscribed** about a circle when each of its sides is tangent to the circle. Under the same circumstances, the circle is said to be **inscribed** in the polygon.

A polygon is said to be **inscribed** in a circle when each of its sides is a chord of the circle. Under the same circumstances, the circle is said to be **circumscribed** about the polygon.

An **axiom** is a general statement admitted without proof to be true.

A **postulate** is a geometric statement admitted to be true, without proof.

A **proposition** is an axiom, a theorem, a postulate, or a problem.

The following are some of the most important axioms and postulates:

Axioms. 1. Quantities equal to the same quantity or to equal quantities are equal to each other. Thus a quantity may be substituted for its equal at any time in any expression.

2. If equals are added to equals, the sums are equal.

3. If equals are subtracted from equals, the remainders are equal.

4. If equals are multiplied by equals, the products are equal.

5. If equals are divided by equals, the quotients are equal. The divisor must not be zero.

6. Like powers or like positive roots of equals are equal.

7. The whole is greater than any of its parts and is equal to the sum of all its parts.

8. If unequals are operated on by positive equals in the same way, the results are unequal in the same order. This axiom states for unequals ideas similar to those given for equals in axioms 2, 3, 4, 5.

9. If unequals are subtracted from equals, the remainders are unequal in the reverse order.

10. If the first of three quantities is greater than the second, and the second is greater than the third, then the first is greater than the third.

Postulates. 1. One straight line and only one can be drawn through both of two given points.

2. Any figure may be moved from one place to another without changing its size or shape.

3. A straight line is the shortest distance between two points.

4. A straight line may be produced to any required length.

5. Through a given point one straight line and only one can be drawn parallel to another given straight line.

6. All straight angles are equal.

7. A circle may be described with any given point as a center and with any given line as a radius.

METHODS OF PROOF

There are two general methods of proving theorems, the direct, or synthetic, and the indirect method. Either method may use algebraic or geometric facts in the proof. A theorem may be proved indirectly by analysis or by means of exclusion and reduction to an absurdity.

Direct Proof. A direct proof uses the method of superposition, or starts with some known fact and combines known truths with it, step by step, until the desired conclusion is reached. Illustration:

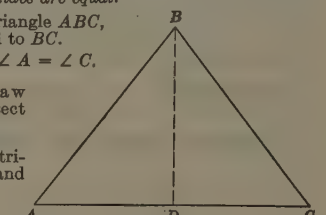
If two sides of a triangle are equal, then the angles opposite these sides are equal.

Given the triangle ABC, with AB equal to BC.

To prove $\angle A = \angle C$.

Proof.—Draw BD so as to bisect the $\angle ABC$.

Then in the triangles ABD and DBC,



$AB = CB$, given
$BD = BD$, identical
and $\angle ABD = \angle DBC$. construction
(BD is the bisector of the $\angle ABC$.)

$\therefore$ $\triangle ABD$ is congruent to $\triangle DBC$.

(If two sides and the included angle of one triangle are equal respectively to two sides and the included angle of the other, the triangles are congruent.)

$\therefore$ $\angle A = \angle C$.

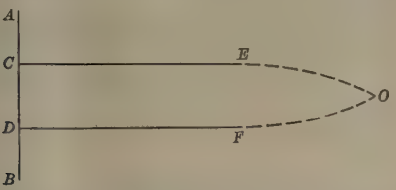
(Corresponding parts of congruent figures are equal.) Q. E. D.

Indirect Methods of Proof. Three possibilities of relation may occur with two magnitudes. The first may be less than, equal to, or greater than, the second. If two of these relations are false, then of necessity the third is true. This is the method of exclusion, or elimination.

The method of analysis consists in investigating the immediate condition under which the conclusion would be true. This step suggests new conditions, and each new condition is examined until one known to be true is found. The proof is then derived analytically and rearranged by retracing the steps taken.

The method known as *reductio ad absurdum*, or "reduction to an absurdity," consists in assuming the falsity of the proposition and showing that this assumption leads logically to an absurdity. The following is an illustration of the last method.

Two lines in the same plane perpendicular to the same line are parallel.



Given the two straight lines CE and DF, both perpendicular to the line AB.

To prove that the lines CE and DF are parallel.

Proof.—If these lines are not parallel, then, being produced, they will meet on one side or the other of AB. Let them be produced and meet in O. Then there will be two perpendiculars, OC and OD, let fall from the same point on the same straight line, which is impossible.

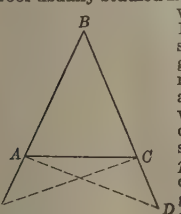
$\therefore$ CE and DF are parallel. Q. E. D.

SOME FAMOUS THEOREMS

A number of geometrical theorems became famous, even in ancient times, because of some special difficulty, some neatness in demonstration, or some historical interest attaching to them. Two of these theorems are here given:

Pons Asinorum. *In an isosceles triangle, the angles opposite the equal sides are equal.*

This theorem is attributed to Thales, but the proof usually studied is due to Euclid. Roger Bacon, writing near the close of the 13th century, says that few students at Oxford cared to go beyond the first few theorems of Euclid and on this account the fifth proposition was called *elefuga*, or "flight of the wretched." This proposition is known also as the *pons asinorum*, or "bridge of fools." The average beginners doubtless found it difficult on account of the many lines and angles, to which they were not as yet accustomed.

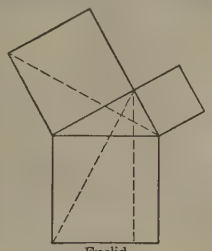


The theorem is proved as follows: The sides of the original triangle ABC are produced to D and E so that $BD = BE$. The triangle BCE is congruent to the triangle BAD, since two sides and the included angle of the first triangle equal the two sides and the included angle of the second triangle. The triangle ACE is congruent to the triangle ACD, since three sides of the first triangle are equal respectively to three sides of the second triangle. Since $\angle ACE = \angle CAD$ and $\angle BAD = \angle BCE$, by subtraction we find $\angle BAC = \angle BCA$. Q. E. D.

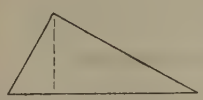
The Pythagorean Theorem. In many respects this theorem is the most famous, and perhaps the most useful, single truth of plane geometry. It is practically certain that the truth here stated was known to the Egyptians and Hindus long before the time of Pythagoras, who is credited with having formulated the first geometrical proof of the theorem.

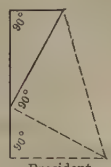
In any right-angled triangle the square on the hypotenuse is equivalent to the sum of the squares on the other two sides.

Many ways of proving this theorem have been devised. Of the following figures, that attributed to Euclid is the one in common use.









President Garfield

The proof according to Euclid is based on the fact that triangles having the same base and the same altitude are equal and that, since these triangles are halves of rectangles having the same base and the same altitude, the rectangles also are equal. With these considerations, we are able to prove that, in the figure given, the left-hand rectangle of the large square is equal to the square above it. Similarly, we can prove that the area of the right-hand rectangle in the large square is equal to the area of the small square. Hence, the area of the large square is equal to the sum of the areas of the smaller squares.

The unmarked figure makes use of the theorem: *If in a right triangle a perpendicular is drawn from the vertex of the right angle to the hypotenuse, each leg of the triangle is the mean proportional between the hypotenuse and its adjacent segment.*

Thus, if, in the given figure, a = the shorter leg, b = the longer leg, and c = the hypotenuse of the triangle and if x = the shorter, and y = the longer, segment of the hypotenuse,

then	$c : a :: a : x$	(1)
and	$c : b :: b : y$	(2)
and	$c = x + y.$	(3)
Hence from (1),	$cx = a^2.$	(4)
From (2),	$cy = b^2.$	(5)
Adding (4) and (5),	$c(x + y) = a^2 + b^2.$	(6)
Substituting (3) in (6),	$c^2 = a^2 + b^2.$	(7)

The proof according to Bhaskara is based on the fact that a large square may be divided into four equal right triangles and a square whose side is equal to the difference between the legs of one of the right triangles.

If c = the side of the large square, a = the shorter leg of the triangles, and b = the longer leg, then c^2 = the area of the large square; $\frac{ab}{2}$ = the area of one of the right triangles; $(b-a)^2$ = the area of the small square.

Therefore, $c^2 = 4\left(\frac{ab}{2}\right) + (b - a)^2$,

from which $c^2 = a^2 + b^2$.

The proof attributed to President Garfield is based on the fact that the area of a trapezoid may be computed in two ways. For example, let a and b represent the parallel bases of the trapezoid above, $a + b$ its altitude, and c the hypotenuse of the triangle. If A = the area of the trapezoid, then

$$A = \frac{(a + b)}{2}(a + b) = \frac{a^2 + 2ab + b^2}{2}$$

The area of the trapezoid considered as the sum of the three triangles is $\frac{ab}{2} + \frac{ab}{2} + \frac{c^2}{2} = \frac{2ab + c^2}{2}$.

Equating these two values of the area, we derive the equation $a^2 + b^2 = c^2$. Q. E. D.

The study of the right-angled triangle in an intuitional manner is included in the subject matter of many arithmetics. Many of the formulas found in the article on *Mensuration* are based on this theorem.

Problem. From the top of a building wall 60 feet high, a rope is stretched to the bottom of a fence 50 feet distant from the base of the wall. What is the length of the rope between the points of attachment?

Solution. The rope forms the hypotenuse of a right triangle; the height of the wall and the distance from the base of the wall are the legs.

Let L = the length of the rope.

Then $L^2 = 60^2 + 50^2 = 3600 + 2500 = 6100$.

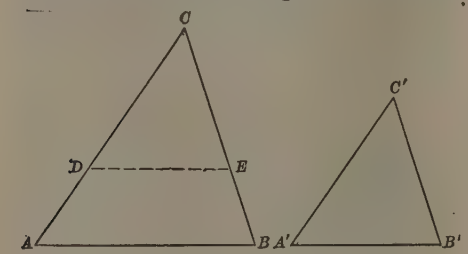
Therefore $L = \sqrt{6100}$, or 78.1, feet.

SIMILAR FIGURES

Similar figures are figures which are alike in shape or form, differing only in size. A map is similar in outline to the area which it represents. Photography is based on the idea of similarity. The plans of the carpenter, the architect, or the engineer are reproductions on a small scale of the outlines of the structure each intends to build. The relative size of any part of such a drawing may be determined by a comparison of measurements, since all parts are drawn to the same scale. This condition of similarity exists only when every possible pair of dimensions in one figure has a ratio equal to the ratio of corresponding dimensions in the other figure. Thus, all circles are similar; likewise all squares, all spheres, and all cubes. Rectangles are similar when they have the same ratio of width and length.

SIMILAR TRIANGLES

Since all plane figures may be divided into triangles, the laws of similarity may best be mastered by a study of the following summary of the geometrical theorems on similar triangles.



$\triangle ABC \sim \triangle A'B'C'$.

The fact that two figures are similar, and therefore that this equality of ratios of corresponding sides exists between them, is denoted in geometry by the symbol $\sim$. Thus, the notation $\triangle ABC \sim \triangle A'B'C'$ is read, "The triangle ABC is similar to the triangle A prime, B prime, C prime."

1. *Two triangles are similar if two angles of one are equal respectively to two angles of the other;* that is, in the above figures, if $\angle A = \angle A'$ and $\angle B = \angle B'$, the triangles are similar.

2. *Two triangles are similar if the ratio of two sides of one is equal to the ratio of two sides of the other and the angles included between these sides are equal;* that is, if $\frac{AC}{CB} = \frac{A'C'}{C'B'}$ and $\angle C = \angle C'$, the triangles are similar.

3. *Two triangles are similar if the ratios of their corresponding sides are equal;* that is, if $\frac{AC}{A'C'} = \frac{CB}{C'B'} = \frac{AB}{A'B'}$, the triangles are similar.

Other theorems relating to similar plane figures or to similar solids are:

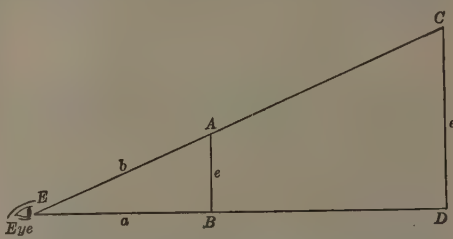
4. *The perimeters of two similar polygons have the same ratio as any corresponding parts of the polygons in the same dimension.*

5. *The areas of two similar polygons are to each other as the squares of any corresponding lines of the polygons.*

6. *The volumes of two similar solids are to each other as the cubes of any corresponding lines of the solids.*

DISTANCE MEASURING DEVICES

How far is it from a given point to a certain tree or other object? For calculating the answers to such questions as this, many interesting devices have been perfected, varying from the elaborate range finders of the coast defense artillery to the string and calibrated wooden stick of the boy scout. The method of operation of these instruments is based on the theory of similar triangles as follows:



The $\triangle EAB$ is similar to the $\triangle ECD$ because $\angle E$ is identical in both triangles and the $\angle ABE$ and $\angle CDE$, by construction, are both right angles, thus answering the condition: *Two triangles are similar if two angles of one are equal respectively to two angles of the other.* Therefore the following equality results: $\frac{AB}{CD} = \frac{EB}{ED}$. This fractional equation may be solved in four ways so as to find any one of the four lines in terms of the other three. Thus:

(1) $AB = \frac{CD \times EB}{ED}$, (2) $CD = \frac{AB \times ED}{EB}$,

(3) $EB = \frac{AB \times ED}{CD}$, (4) $ED = \frac{CD \times EB}{AB}$.

A device for practical use in applying these ratios to the calculation of distances may be improvised as follows: Bore a small hole through the side of a cheap rule. Pass through this hole an unelastic cord and tie two knots, one on each side of the rule, exactly 1 ft. 9 in. (21 in.) apart, thus permitting the rule to be held at that distance from the eye. Two problems will now be solved with the aid of this device.

Problem. A boy, holding a rule perpendicularly at a distance of 21 in. from his eye, finds that a Ford sedan which he knows to have a height of 6 ft., 9 in., or 81 in., intercepts on the rule a distance of ¼ in. How far away is the auto?

Solution. Using formula (4) above, $ED = \frac{CD \times EB}{AB}$, $EB = 21$ in., $CD = 81$ in., $AB = \frac{1}{4}$ in.

Substituting these values in the formula, $ED = \frac{81 \times 21}{\frac{1}{4}} = 81 \times 21 \times \frac{4}{1} = 81 \times 84 = 6804$ in., or 567 ft.

It will be observed that the ratio

$$\frac{\text{distance of ruler}}{\text{intercept}} = \frac{21}{\frac{1}{4}} = 21 \times \frac{4}{1} = 84.$$

This same ratio holds between the distance of the object observed and its height. Hence, on the ruler, the ¼-inch point might be marked 84 to indicate that, when this intercept is obtained, the distance to the object is 84 times the height of the object. Other multipliers could be obtained and the instrument made useful within the limitations stated.

Problem. A boy using the instrument described in the previous problem finds that a tree distant 189 ft. intercepts a distance of 3 in. on the ruler. Find the height of the tree.

Solution.

$ED = 189$ ft., $EB = 1.75$ ft., $AB = 3$ in. $= 0.25$ ft.

$$CD = \frac{AB \times ED}{EB} = \frac{0.25 \times 189}{1.75} = 27 \text{ ft., height of tree.}$$

HEIGHT BY SHADOWS

The sun's rays are considered to be parallel. Therefore the line connecting the top of any object with the corresponding point of its shadow is parallel to every other line similarly formed. Since parallel lines make equal angles with a horizontal plane, the shadows cast by vertical objects may be considered as corresponding parts of similar triangles and the ratios of their corresponding sides as equal.

Problem. A yardstick standing vertically casts a shadow 30 in. long. What is the height of a tree which at the same time casts a shadow 35 ft. long?

Solution (1). By the formula (2) above for similar triangles, $CD = \frac{AB \times ED}{EB}$, letting ED and EB represent the lengths of shadows. Substituting,

$$CD = \frac{3 \times 35}{2.5} = \frac{105}{2.5} = 42 \text{ ft.}$$

Solution (2).

$$\frac{\text{height of yardstick}}{\text{shadow of yardstick}} = \frac{\text{height of tree}}{\text{shadow of tree}}.$$

$$\frac{3 \text{ ft.}}{2.5 \text{ ft.}} = \frac{\text{height of tree}}{35 \text{ ft.}}.$$

Height of tree $\times$ 2.5 = 105 ft.

Height of tree = 42 ft.

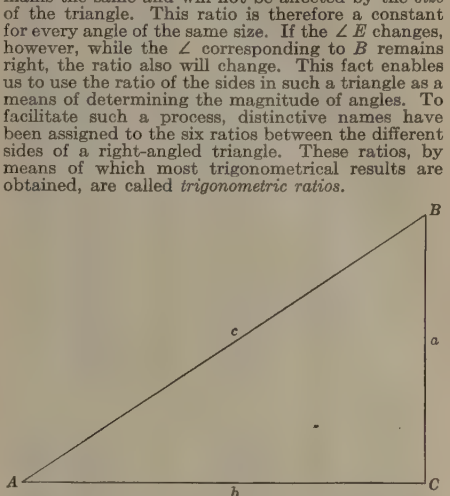
Problems such as the preceding, in which several of the lines may be measured, are easily solved by making use of the geometrical relationships between the sides of similar right triangles. However, it frequently happens that the length of only one side of a right triangle is known or can be measured. In such cases, if the size of one of the acute angles can also be measured, the dimensions of all of the sides and angles may then be calculated by means of trigonometry.

TRIGONOMETRY

Trigonometry is the branch of mathematics that deals specifically with relations between the sides and angles of triangles and with quantities closely related to them. It is based chiefly on theorems concerning similar triangles and on the Pythagorean theorem. The science has wide application in astronomy, physics, engineering, and other fields where magnitudes may be calculated more readily by means of the construction of triangles some elements of which can be easily measured.

The need for this type of calculation arises especially in the determination of distances that do not readily admit of the actual physical processes of measuring, such as the distance between the tops of two buildings or the distance of a ship from a point on the shore. The following paragraphs explain the elementary ratios used in trigonometry and exemplify their application in the solution of a few simple problems.

Trigonometrical Ratios. The preceding figure (page 1188) shows the similar right-angled triangles EAB and ECD. Since these triangles are similar, their corresponding sides are in proportion and the ratio of AB to EA, for example, is equal to the ratio of CD to EC. In any triangle similar to these, the ratio of the sides corresponding to AB and AE remains the same and will not be affected by the *size* of the triangle. This ratio is therefore a constant for every angle of the same size. If the $\angle E$ changes, however, while the $\angle$ corresponding to B remains right, the ratio also will change. This fact enables us to use the ratio of the sides in such a triangle as a means of determining the magnitude of angles. To facilitate such a process, distinctive names have been assigned to the six ratios between the different sides of a right-angled triangle. These ratios, by means of which most trigonometrical results are obtained, are called *trigonometric ratios.*



With reference to the right-angled triangle ABC, in which C is the right angle and c is consequently the hypotenuse, the names and definitions of the fundamental trigonometric ratios may be defined as follows:

Sine of $\angle A = \frac{a}{c} = \frac{\text{opposite side}}{\text{hypotenuse}}$.

Cosine of $\angle A = \frac{b}{c} = \frac{\text{adjacent side}}{\text{hypotenuse}}$.

Tangent of $\angle A = \frac{a}{b} = \frac{\text{opposite side}}{\text{adjacent side}}$.

These three ratios are those most commonly employed. They are usually abbreviated **sin** A, **cos** A, and **tan** A, respectively. The **cosecant** (csc) $= \frac{1}{\sin}$; the **secant** (sec) $= \frac{1}{\cos}$; and the **cotangent** (cot) $= \frac{1}{\tan}$.

By definition,

$\sin A = \frac{a}{c}$, therefore $a = c \sin A$, and $c = \frac{a}{\sin A}$;

$\cos A = \frac{b}{c}$, therefore $b = c \cos A$, and $c = \frac{b}{\cos A}$;

$\tan A = \frac{a}{b}$, therefore $a = b \tan A$, and $b = \frac{a}{\tan A}$.

Just as $\sin A = \frac{\text{side opposite } A}{\text{hypotenuse}} = \frac{a}{c}$, so the sine of $\angle B$, or $\sin B$, $= \frac{\text{side opposite } B}{\text{hypotenuse}} = \frac{b}{c}$. As stated above, the ratio $\frac{b}{c}$ also equals $\cos A$. Therefore $\sin A = \cos B$.

Since $\angle C$ is a right angle and the sum of all of the angles in a triangle equals two right angles, $\angle A + \angle B$ must equal 90°. It follows, therefore, that the sine of any angle is equal to the cosine of its complementary angle. Similarly, the tangent of any angle is equal to the cotangent of its complement.

These relationships explain why, in using the following table of the numerical values of trigonometrical functions, the values for any angle from 45° to 90° may be obtained by reading from the foot of the table to the top, using the column of degrees at the right.

TRIGONOMETRIC TABLES

Angle	sin	cos	tan	cot	
0°	0.0000	1.0000	0.0000	∞	**90°**
1°	.0175	.9998	.0175	57.2900	89°
2°	.0349	.9994	.0349	28.6363	88°
3°	.0523	.9986	.0524	19.0811	87°
4°	.0698	.9976	.0699	14.3007	86°
5°	.0872	.9962	.0875	11.4301	**85°**
6°	.1045	.9945	.1051	9.5144	84°
7°	.1219	.9925	.1228	8.1443	83°
8°	.1392	.9903	.1405	7.1154	82°
9°	.1564	.9877	.1584	6.3138	81°
10°	.1736	.9848	.1763	5.6713	**80°**
11°	.1908	.9816	.1944	5.1446	79°
12°	.2079	.9781	.2126	4.7046	78°
13°	.2250	.9744	.2309	4.3315	77°
14°	.2419	.9703	.2493	4.0108	76°
15°	.2588	.9659	.2679	3.7321	**75°**
16°	.2756	.9613	.2867	3.4874	74°
17°	.2924	.9563	.3057	3.2709	73°
18°	.3090	.9511	.3249	3.0777	72°
19°	.3256	.9455	.3443	2.9042	71°
20°	.3420	.9397	.3640	2.7475	**70°**
21°	.3584	.9336	.3839	2.6051	69°
22°	.3746	.9272	.4040	2.4751	68°
23°	.3907	.9205	.4245	2.3559	67°
24°	.4067	.9135	.4452	2.2460	66°
25°	.4226	.9063	.4663	2.1445	**65°**
26°	.4384	.8988	.4877	2.0503	64°
27°	.4540	.8910	.5095	1.9626	63°
28°	.4695	.8829	.5317	1.8807	62°
29°	.4848	.8746	.5543	1.8040	61°
30°	.5000	.8660	.5774	1.7321	**60°**
31°	.5150	.8572	.6009	1.6643	59°
32°	.5299	.8480	.6249	1.6003	58°
33°	.5446	.8387	.6494	1.5399	57°
34°	.5592	.8290	.6745	1.4826	56°
35°	.5736	.8192	.7002	1.4281	**55°**
36°	.5878	.8090	.7265	1.3764	54°
37°	.6018	.7986	.7536	1.3270	53°
38°	.6147	.7880	.7813	1.2799	52°
39°	.6293	.7771	.8098	1.2349	51°
40°	.6428	.7660	.8391	1.1918	**50°**
41°	.6561	.7547	.8693	1.1504	49°
42°	.6691	.7431	.9004	1.1106	48°
43°	.6820	.7314	.9325	1.0724	47°
44°	.6947	.7193	.9657	1.0355	46°
45°	.7071	.7071	1.0000	1.0000	**45°**
	cos	sin	cot	tan	Angle

The letters designating sides and angles in the following problems correspond to those used in the figure given above, in which BC, or a, is the altitude, or height; AB, or c, is the hypotenuse; and AC, or b, is the base. The student is advised to make his own sketch for every problem.

Problem. If the right-angled triangle shown in the sketch has a base, b, 12 inches long and the $\angle A$ is 30°, what are the lengths of the other sides?

Solution. By definition, $a = b \tan A$. The table of trigonometric values shows that tan 30° = .5774. Therefore $a = 12 \times .5774 = 6.93$ in. As we now have the lengths of two sides of a right-angled triangle, the length of the hypotenuse could be found by using the Pythagorean theorem. Using trigonometric relations, $c = \frac{b}{\cos A}$. From the table, cos 30° = .8660; therefore $c = \frac{12}{.8660} = 13.86$ in.

Problem. An isosceles triangle has a base 12 inches long, and the angle at the vertex is 40°. What is the length of each of the equal sides, and what is the area of the triangle?

Solution. As there is no right angle given, how are the formulas to be used? This first difficulty is solved by bisecting the vertex angle and extending the dividing line, which will also bisect the base, thus giving two right-angled triangles, each with a base of 6 inches and a vertex, $\angle B$, of 20°. Note that the bisecting line will form a right angle with the base only in the case of an isosceles or equilateral triangle. The sine of $\angle B = \frac{\text{opposite side}}{\text{hypotenuse}}$, or, substituting, $\sin 20° = \frac{6}{c}$, and $c \sin 20° = 6$. Therefore $.3420\ c = 6$, and $c = 17.54$ inches, which is the length of each of the sides.

Similarly, $\tan 20° = \frac{\text{opposite side}}{\text{adjacent side}} = \frac{6}{a}$.

Substituting, $.3640 = \frac{6}{a}$, and $a = \frac{6}{.3640} = 16.48$ in.

Area of triangle $= \frac{\overset{6}{\cancel{12}} \times 16.48}{\cancel{2}} = 98.88$ sq. in.

Check by means of the following formula:

Area of a triangle = one-half the product of two sides and the sine of the included angle.

As the vertex angle = 40°, each of the two equal angles of the base must be 70°.

$\therefore$ area $= \frac{\overset{6}{\cancel{12}} \times 17.54 \times \sin 70°}{\cancel{2}} = 98.89$ sq. in.

Problem. The line of sight from the eyes of an observer standing on level ground 250 feet from the base of a flagpole to the top of the pole forms an angle of 20° with the horizontal. What is the height of the pole if the observer's eyes are 5 feet above the ground?

Solution. Height above observer's eyes =
$a = b \tan A = 250 \tan 20°$
$= 250 \times .3640 = 91$ ft.
True height = 91 + 5 = 96 ft.

Problem. From an airplane directly above a town, the angle of depression of another town 9 miles distant from the first is 6°. How high was the plane at the moment of observation?

Solution. The angle of depression of the town as seen from the airplane is the same as the angle of elevation of the airplane as seen from the town. Therefore, lines joining the two towns and the plane form a right-angled triangle in which $b = 9$ miles and $\angle A = 6°$. The height, $a = b \tan A = 9 \tan 6°$ $= 9 \times .1051 = .9459$ miles, or 4994 feet.

Problem. In order to determine his position at sea, the captain of a ship sent out a call by wireless telegraph asking for his bearings from two land stations, X and Y, which were equipped with radio compasses. Both stations were located near the shore, and station X lay just 100 miles due south of station Y.

Y replied that the ship's signals were received from 160°. As the direction card is graduated into 360°, beginning with the north as zero and moving clockwise (See *Compass.*), this reply meant that the ship's direction from Y was 70° south of due east. Station X reported that the signals reached it from 70°, which meant a point 20° north of east. How far was the vessel from each station at the time when the wireless call was sent out?

Solution. Construct a triangle showing the relative position of the stations and the ship, using as the base of the triangle the north and south line connecting the stations. The angle at Y must be 20°, the difference between 180°, or south, and 160°, the direction of the ship. The angle at X equals 70°, as reported. Therefore the angle at the ship, S, must equal 180° − (70° + 20°), or 90°, which is a right angle. Thus, the three positions determine a right-angled triangle having a hypotenuse 100 miles long and acute angles of 70° and 20°.

From the tables, sin 70° = .9397; sin 20° = .3420. SY, the distance of the ship from Y, = 100 sin 70° = 93.97 miles, and the distance SX = 100 sin 20° = 34.2 miles.

TEST QUESTIONS

Name five outstanding Greek mathematicians and indicate at least one contribution which each made to the science of mathematics . 1133

Mention and explain three famous problems the solution of which long engaged the efforts of ancient mathematicians. . .1133–1134

What notable improvement in mathematical notation was introduced by the Hindus?. . 1134

For what in the history of mathematics is each of the following best known: Descartes, Fermat, Napier, Briggs, and Leibnitz?. . . 1134

ARITHMETIC AND MENSURATION

What is a unit? a digit? Name the digits. Explain the difference between a number and a figure 1135

What is notation? What place-name has the first figure at the left of tens? at the left of thousands? 1135

Define and illustrate the following: abstract number; concrete number; factor; odd number; even number; prime number; composite number 1135

Show that 56 is a composite number. Mention three factors of 30. What factors produce 48? 1135

What is a prime factor? How does a prime factor differ from a prime number? What are the prime factors of 21, 35, 49? 1135

Fundamental Operations

Distinguish between like and unlike numbers. What is meant by the term addends? . . . 1135

Define subtraction. Explain the terms used in subtraction. From 87,063 subtract 9875 and show that the result is correct 1136

Define multiplication, multiplicand, multiplier. Distinguish between product and partial product. The factors of a number are 1987 and 43. What is the product of the factors? What are the partial products?
(*Ans.* 85,441; 5961, 7948—*pages* 1136, 1137)

Multiply the sum of 875 and 250 by twice their difference.
(*Ans.* 1,406,250—*pages* 1135, 1136, 1137)

Explain a short method of multiplying numbers by 100; by 99; by 25 1137

What is division? When is division said to be exact? Distinguish between long and short division. When is short division especially useful? 1137, 1138

Divide 763,200 by 29 and prove the work.
(*Ans.* 26,317$\frac{7}{20}$—*pages* 1137–1138)

The product of three factors is 8736; two of the factors are 42 and 16. What is the third factor? . . . (*Ans.* 13—*pages* 1135, 1137, 1138)

Multiply 1628 by 32; add 558 to the product; from this sum subtract 778; divide the remainder by 36. Prove the work.
(*Ans.* 1441—*pages* 1137, 1135, 1136, 1137–1138)

G. C. D. and L. C. M.

What is the G.C.D. of two or more numbers? What numbers have no G.C.D.? Find the G.C.D. of 72, 216, and 420; of 925 and 1475.
(*Ans.* 12, 25—*pages* 1138–1139)

What is a multiple of a number? a common multiple of two or more numbers? the L.C.M. of two or more numbers? Find the L.C.M. of 24, 45, 60, and 120.
(*Ans.* 360—*page* 1139)

What number is the difference between the G.C.D. and the L.C.M. of 28, 35, and 70?
(*Ans.* 133—*pages* 1138, 1139)

Common Fractions

Define common fraction. How does a fraction differ from a unit? How is a common fraction written? Name and define the terms of a fraction. What does the denominator of a fraction show? the numerator? 1139

Illustrate proper fraction, improper fraction, similar fractions, dissimilar fractions, and mixed number. Explain what is meant by the reciprocal of a fraction 1139, 1140

How may one tell by inspection which fraction has the greater value, $\frac{5}{18}$ or $\frac{5}{17}$? 1140

How are fractions reduced to higher terms? to lower terms? When is a fraction in its lowest terms? Reduce $\frac{14}{35}$ to its lowest terms . . 1140

Express $5\frac{7}{9}$ as an improper fraction; $\frac{517}{12}$ as a mixed number; 48 in the form of a fraction. 1140

Change $\frac{3}{7}$ and $\frac{2}{3}$ to similar fractions; reduce $\frac{6}{8}$, $\frac{5}{6}$, $\frac{2}{3}$, and $\frac{7}{12}$ to equivalent fractions having the least common denominator . . 1140

Under what conditions can fractions be added or subtracted? Find the value of $15\% + 14\frac{2}{3}\%$; of $30\% - 12\frac{5}{7}\%$.
(*Ans.* $30\frac{1}{6}$, $17\frac{81}{385}$—*page* 1141)

Upon what principles does the multiplication of fractions depend? Multiply $\frac{7}{16}$ by 5; $16\frac{2}{3}$ by 12; $12\frac{5}{6}$ by $\frac{2}{3}$; $\frac{3}{40}$ by $\frac{5}{36}$.
(*Ans.* $2\frac{9}{16}$, 200, $8\frac{5}{12}$, $\frac{1}{96}$—*pages* 1141, 1142)

Explain the method of dividing a fraction by a fraction. Divide $7\frac{3}{5}$ by 46; 9 by $\frac{18}{25}$; $\frac{3}{40}$ by $\frac{3}{64}$ . . . . (*Ans.* $\frac{1}{6}$, $12\frac{1}{2}$, $\frac{24}{55}$—*page* 1142)

Decimal Fractions

Define decimal fraction. By what other name is a decimal fraction commonly known? What is a mixed decimal? Illustrate . . . 1142

How may a decimal be reduced to a common fraction? a common fraction to a decimal? Express .069 and .0375 as common fractions in their lowest terms. Write $\frac{7}{8}$ as a decimal . . . (*Ans.* $\frac{69}{1000}$, $\frac{3}{80}$; .875—*page* 1143)

Reduce $\frac{7}{8}$, $\frac{4}{5}$, and $\frac{3}{16}$ to decimals and add.
(*Ans.* 1.8625—*page* 1143)

What is the difference between 150 and 16.25?
(*Ans.* 133.75—*page* 1143)

In the multiplication of decimals, how may the position of the decimal point in the product be determined? Multiply .3675 by .0027 . . . . . (*Ans.* .00099225—*page* 1143)

Find the quotient in each of the following examples: 82.944 ÷ 36; .00115 ÷ .05; 2.4 ÷ .0025.
(*Ans.* 2.304, .023, 960—*pages* 1143, 1144)

Percentage and Related Subjects

Define per cent, rate, base, amount, and difference as used in percentage 1144

Show three ways of expressing 9 per cent. Change the following fractions to units per cent: $\frac{3}{5}$, $\frac{1}{4}$, $\frac{4}{25}$ 1144

Six dollars is 30 per cent of how many dollars? What per cent of $3400 is $85?
(*Ans.* $20, $2\frac{1}{2}$ per cent—*page* 1144)

Define interest, principal, amount, rate, simple interest, compound interest, exact interest 1145

Explain the bankers' sixty-day method of computing interest. Find the difference between the bankers' interest and the exact interest on $800 for 60 days at 6 per cent.
(*Ans.* $.11—*pages* 1145, 1146)

What is discount? commercial discount? bank discount? true discount? cash discount? time discount? 1147

Explain what is meant by the present worth of a debt. Find the present worth of $500 due in 90 days, the rate being 4 per cent. (*Ans.* $495.05—*page* 1147)

Define cost, gross profit, net profit 1147

The profit or loss is usually figured as a percentage of what sum? If the cost and the selling price of an article are given, how may the gain or loss be determined? 1147

By selling a house for $7500, I lost 5½ per cent. What was the cost of the house? (*Ans.* $7936.51—*page* 1148)

Define commission, consignment, consignor, consignee, net proceeds 1148

An agent sells 500 barrels of flour at $10 a barrel and remits $4900. What rate of commission does he charge? (*Ans.* 2 per cent—*page* 1148)

Name two general kinds of insurance and distinguish between them. Define policy, face of policy, premium 1148

What will be the cost of insuring a house for $6000 if the rate of insurance is ¾ per cent? (*Ans.* $45—*page* 1149)

Distinguish between a direct and an indirect tax. Define poll tax, property tax, income tax, real estate, personal property, assessed valuation, mill 1149

What tax is payable on property assessed at $7500 if the rate is 26 mills on the dollar? (*Ans.* $195—*page* 1149)

Distinguish between the market value and the par value of stock. When is stock at a premium? at par? below par? 1149

Define dividend, preferred stock, brokerage. Mention three differences between a share of stock and a bond 1150

What is the annual income from investing $6858 in 5 per cent stock, par value $100, purchased at 57, brokerage being charged at the rate of $.15 a share? (*Ans.* $600—*page* 1150)

REGENTS' EXAMINATIONS

In order that the student, after a careful study of the text in this section, may obtain an idea of the progress which he has made, two Regents' examinations in arithmetic have been selected from those held in recent years and are here printed complete. The Regents' arithmetic examinations are given in the eighth grade in New York State and are accepted as a standard in practically all other parts of the United States.

The first question of a Regents' examination in arithmetic usually consists of a mental test, which is printed on a separate sheet and is read aloud by the teacher or deputy. The mental test given below is an actual example of such tests as are referred to in the first question of each Regents' examination given in this section. The answer in each case has been supplied.

Arithmetic Mental Test

a Find the cost of a 17 word telegram, if the first 10 words cost 40 cents and each additional word costs 3 cents . . . . . (*Ans.* 61 cents)

b When sugar is 7½ cents a pound, how much is saved by buying 14 pounds for 98 cents? (*Ans.* 7 cents)

c If a car uses a gallon of gasoline every 16 miles, what will be the cost, at 25 cents a gallon, of the gasoline necessary to run the car 80 miles? (*Ans.* $1.25)

d If a player makes 6 hits in 24 times at bat, what is his per cent of hits? . . . . (*Ans.* 25 per cent)

e A gas meter shows a consumption of 2500 feet of gas in one month; find the cost at $1.50 per thousand feet . . . . . (*Ans.* $3.75)

f If a train runs 9 miles in 15 minutes, what is its rate per hour? . . . . . (*Ans.* 36 miles)

g A certain truck is built to carry 3000 pounds; if the driver puts on an overload of 40%, what is the weight of the entire load? (*Ans.* 4200 pounds)

h A restaurant check shows charges as follows: soup 15 cents, beef 30 cents, pie 10 cents, coffee 5 cents; if the waiter is given a tip of 10 cents, what is the cost of the meal? . . . . . (*Ans.* 70 cents)

i A landlord raises the rent of a house from $48 a month to $60 a month; what is the per cent of increase? . . . . . (*Ans.* 25 per cent)

j Separate the number 240 into parts having the ratio of 3 to 5 . . . . . (*Ans.* 90 and 150)

The following are two complete Regents' examinations in arithmetic of recent date. In order that the student may test the correctness of his work, the answer to each question has been inserted; it is followed by a reference to the page or pages in this volume containing the material upon which the solution is based. In many cases a problem similar to the one given will there be found.

Arithmetic Examination I

1. Mental test. (See *Arithmetic Mental Test.*)

2. Copy and add the following: 234.15; 17.125; 19.5; 195.303; 59.007; 3.1; 41.009; 2005.9; 1.17; 222.01; 709.02; 1.1. (*Ans.* 3508.394—*page* 1143)

3. Divide 38.54 by .164. (*Ans.* 235—*page* 1144)

4. Prove that the result obtained in answer to question 3 is correct 1138, 1143

5. From the sum of 1½, 3⅓ and 5¾ take 4½ . . . . . (*Ans.* 6½₂—*page* 1141)

6. If a ton of coal costing $10.50 occupies 36 cubic feet, how much will it cost to fill a bin 12 feet long, 8 feet wide and 6 feet deep? (*Ans.* $168—*page* 1154)

7. A farmer raised 250 bushels of oats and sold all but 65 bushels; what per cent of his crop did he sell? . . (*Ans.* 74 per cent—*page* 1144)

8. An aviator went in an aeroplane to a height of 18,000 feet. How many feet over 3 miles did he go? . . . (*Ans.* 2160 feet—*page* 1166)

9. If a man should draw $3000 from a savings bank which pays 4% interest and should invest it in 4¼% Liberty Bonds at par, how much would he increase his income in six months by the change of investment? (*Ans.* $3.75—*pages* 1145, 1150)

10. How much will be due a wholesale dry goods merchant on a bill for $872 after discounts of 12½% and 10% have been deducted? . . . . . (*Ans.* $686.70—*page* 1147)

11. If a family spent ⅛ of their yearly income for rent, ¼ of it for food, ⅓ of it for other expenses and saved $624, how much was their entire yearly income? (*Ans.* $2880—*pages* 1141, 1144)

12. A dealer sold an automobile and took a note for $1500, without interest; he had the note discounted at the bank at 6% sixty days before maturity. How much did he receive from the bank? . . . . (*Ans.* $1485—*page* 1147)

13. The shorter side of a rectangular lot measures 5 rods and the diagonal 13 rods; how many rods does the longer side measure? (*Ans.* 12 rods—*page* 1151)

14. At 78 cents a square yard, how much will it cost to cover with cloth the top and the four sides of a box 3 feet long, 18 inches wide and 12 inches deep? (*Ans.* $1.17—*pages* 1152, 1154)

15. Find the area of a table top, circular in form, with a diameter of 7 feet. (*Ans.* 38½ feet or, using 3.1416 as the value of π, 38.4846 feet—*page* 1153)

Arithmetic Examination II

1. Mental test. (See *Arithmetic Mental Test.*)

2. Copy and add the following: 426.37; 725.06; 8942.6; 72.847; 62.25; .0725; 6377.48; 936.936; 7389; 35.896.
(*Ans.* 24,968.5115—*page* 1143)

Express the answer in words. 1135, 1142

3. From $3\frac{3}{8}$ subtract the product of $2\frac{2}{5}$ and $\frac{3}{4}$ . . . . . (*Ans.* $1\frac{23}{40}$—*page* 1141)

4. Divide .09 by 1.385, carrying the quotient to *four* decimal places.
(*Ans.* .0649—*page* 1144)

5. Tell how to do *each* of the following:
a Divide a fraction by a fraction 1142
b Raise a number to the third power . . . 1171
c Find the number of bushels in a bin if its length, height and depth in feet are given 1154, 1166

6. On January 5, 1923, Robert Price bought from Platner and Sneck, Albany, N. Y., the following goods: $5\frac{1}{2}$ yards elastic at 16 cents a yard; $3\frac{3}{4}$ yards gingham at 76 cents a yard; 7 yards braid at 17 cents a yard; 4 sheets at $2.50 each. Make out the bill. What amount must be paid if the bill is discounted at 10%?
(*Ans.* $13.43—*page* 1147)

(Bills of this sort are usually made out on specially printed forms in which are entered the name of the customer and the items and date of purchases, showing the amount of the bill.)

7. Find the cost of 3 loads of coal weighing respectively 2610 lb., 1965 lb. and 2425 lb., if the coal costs $14.25 per ton and 50 cents extra per ton is charged for carrying it to the second floor . . . . . (*Ans.* $51.63—*page* 1166)

8. What will be the cost of laying a cement walk 12 rods long and 4 feet wide at $17\frac{1}{2}$ cents a square foot? . (*Ans.* $138.60—*pages* 1152, 1166)

9. At 5 per cent simple interest, find the amount due on a note for $1785 for 1 year, 9 months, and 6 days .(*Ans.* $1942.68—*page* 1145)

10. If a man owns 29 bonds of $500 each, bearing interest at $3\frac{1}{2}$ per cent, how much does he receive at each semiannual interest period? . . . . . (*Ans.* $253.75—*page* 1150)

11. The diameter of a circular park is 350 feet: find the cost of grading at 12 cents a square foot. (*Ans* $11,550 or, using 3.1416 as the value of π, $11,545.38—*page* 1153)

12. A rectangular lot is 24 rods long and 15 rods wide; find the length of the diagonal, carrying your answer to *two* decimal places.
(*Ans.* 28.30 rods—*pages* 1151, 1180)

13. The assessed valuation of a school district is $25,000,000; the total tax is $168,750. If Mr. A's property is valued at $8000, what is his tax? . . . . . (*Ans.* $54—*page* 1149)

14. A merchant sold a piano for $480, thereby making a profit of 60 per cent. Do not solve in figures but tell in good clear English sentences what you would do to find the cost of the piano and the merchant's gain, explaining the reason for each step of the process . . . 1148

Miscellaneous Questions

Since the material in this section, particularly in its more practical aspects, carries the subject far in advance of the standard required to pass the Regents' examination, miscellaneous questions, many of a somewhat more difficult type, have been added for the purpose of enabling the reader to assure himself that he has effectively mastered the text.

Define and illustrate by drawings the following figures: rhombus, rhomboid, trapezoid, trapezium, prism, parallelepiped, pyramid, cone, frustum of a cone, and cylinder. Draw an ellipse 3 inches long and 2 inches wide 1152–1155

Find the cost, at 20 cents a square foot, of paving a space in the form of a trapezoid the parallel sides of which are 18 and 21 feet long and the distance between these sides is 10 feet . . . . . (*Ans.* $39.00—*page* 1152)

Calculate the weight of a solid cylinder of steel 21 inches long which has a circular base 10 inches in diameter.
(*Ans.* 466.76 cubic inches—*pages* 1155, 1161)

An iceman delivered a cake of ice measuring 18 inches by 12 inches by 10 inches. What is its weight? . (*Ans.* 71.3 pounds—*pages* 1154, 1168)

A man buys 6 per cent stock at 140; what rate per cent on the investment will this stock yield? (*Ans.* 4.28 per cent—*pages* 1144, 1150)

At 90 cents a square yard, what would be the cost of constructing $2\frac{1}{2}$ miles of state road 24 feet wide? . (*Ans.* $31,680—*pages* 1152, 1166)

A ton of coal requires 36 cubic feet of space. A coal bin is 9 feet long and 8 feet wide; how deep must the bin be to hold 10 tons of coal?
(*Ans.* 5 feet—*page* 1161)

The diagonal of a square is 30 feet: find to two decimal places the length of one side.
(*Ans.* 21.21 feet—*page* 1152)

A room has a hardwood floor 12 feet by 15 feet partly covered by a rug 9 feet by 12 feet; at $2\frac{1}{2}$ cents a square foot, find the cost of varnishing the part of the floor not covered by the rug. . . . . (*Ans.* $1.80—*page* 1152)

At 55 cents a cubic yard, how much will it cost to excavate a cellar 42 feet by 26 feet and $7\frac{1}{2}$ feet deep? . (*Ans.* $166.83—*pages* 1154, 1166)

How much more does a table marked $16.50 with a discount of 20 per cent cost than one marked $11.75 without discount?
(*Ans.* $1.45—*page* 1147)

What is the sum, in feet, of the sides of a square 10-acre field?
(*Ans.* 2640 feet—*pages* 1166, 1152, 1180)

What is the side of a cube which contains 25,934.336 cubic feet?
(*Ans.* 29.6 feet—*pages* 1181, 1184)

If 5184 is the square of a number, what is its cube? . . . (*Ans.* 372,248—*pages* 1180, 1184)

What percentage of 30,000 bushels is 50 bushels?. . . (*Ans.* .16$\frac{2}{3}$ per cent—*page* 1144)

Illustrate by a diagram the difference between 5 square feet and 5 feet square . 1166, 1151, 1152

The smaller end of a log is 21 inches in diameter. What is the side of the squared beam that may be sawed from it?
(*Ans.* 14.85 inches—*page* 1153)

What percentage of a mile is 124 rods, 2 yards, $2\frac{1}{2}$ feet? . (*Ans.* 38.9 per cent—*pages* 1166, 1144)

What is the difference between 37 per cent of $5000 and .37 per cent of the same sum?
(*Ans.* $1831.50—*page* 1144)

If by selling land at $80 an acre I lose 25 per cent, how must I sell it to gain 40 per cent?
(*Ans.* $149\frac{1}{3}$—*page* 1148)

A farm that cost $4500 was sold for $5400. What was the gain per cent?
(*Ans.* 20 per cent—*page* 1148)

Find the amount of $125 for 3 years, 3 months, and 3 days at 7 per cent.
(*Ans.* $153.51—*page* 1146)

What is the difference between the simple and the compound interest on $700 for 5 years at 6 per cent? . . (*Ans.* $26.76—*pages* 1145, 1146)

What are the dimensions of a cube that has the same volume as a box 12 feet 6 inches long, 10 feet wide, and 5 feet high?
(*Ans.* 8 feet, 6.6 inches—*pages* 1154, 1181, 1184)

The altitude of a pyramid having a square base is 80 feet; the length of each side of the base is 120 feet. Find its slant height, surface, and contents. (*Ans.* 100 feet; 24,000 square feet; 384,000 cubic feet—*page* 1154)

Find the solid contents of a cone 12 inches high that has a base 12 inches in diameter.
(*Ans.* 452.39 cubic inches—*page* 1155)

What quantities of cement, sand, and gravel will be required for building the foundation and the floor of a garage having an inside measurement of 18 feet by 12 feet if the foundation is to be 8 inches thick and 3 feet deep and the floor is to be a single layer 4 inches thick?
(*Ans.* cement, 45 bags; sand, 4 cubic yards; gravel, 6 cubic yards—*page* 1160)

How high above sea level must a powerful searchlight be placed in order that the light may be visible from the surface of the water at a distance of 25 miles?
(*Ans.* 116⅔ feet—*page* 1157)

A rifle is aimed in a horizontal direction directly over a level field. How soon after leaving the barrel will the bullet strike the earth if the rifle is held 6 feet above the ground? The time will be the same as that consumed during the fall of the bullet if dropped to the ground from the muzzle of the rifle.
(*Ans.* .61 seconds—*page* 1156)

An official baseball is 9 inches in circumference. How many cubic inches does the ball contain, and what is the area of its leather covering? (*Ans.* 12.31 cubic inches; 25.78 square inches—*page* 1155)

An ice cream dipper in the form of a hollow cone has a diameter of 3 inches across the top and is 3 inches deep. How much ice cream will be required to serve 98 people with one portion each, the portions being measured by this dipper? . . . (*Ans.* 3 gallons—*page* 1155)

What is the capacity in gallons of a cylindrical cistern 5 feet in diameter and 8 feet from top to bottom?
(*Ans.* 1175 gallons, approximately—*pages* 1155, 1167)

A gardener wishes to fill a semicircular plot of ground with fine black soil to a depth of 18 inches. The straight side of the plot is 15 feet in length. What would be the cost of the soil required if soil may be procured at $3.00 a cubic yard or fraction thereof?
(*Ans.* $15.00—*page* 1153)

Find the cost of papering a room 18½ feet long, 14½ feet wide, and 12 feet high if the paper for the ceiling costs 40 cents a double roll, that for the wall costs 95 cents a double roll, and the work requires the labor of 2 men for 7 hours, the wages of each being 75 cents per hour . . . . . (*Ans.* $22.00—*page* 1158)

A supply tank on a roof is filled with water by a pump located 60 feet below the opening of the discharge pipe. What is the back pressure of the column of water at the pump if the supply pipe is 3 inches in diameter?
(*Ans.* 183⅜ pounds—*page* 1157)

A farmer purchased 10 maple logs, each of which was 132 inches long, 2½ feet in diameter at the larger end, and 2 feet across the smaller end. If these logs were sawed into 22-inch bolts and then split for firewood, how many short cords of wood could be obtained? . . . . . (*Ans.* 12½ cords—*page* 1159)

What is the diameter of the largest sphere of steel that may be sent by parcel post from New York to San Francisco?
(*Ans.* 6.96 inches—*pages* 1161, 1210, 1155, 1181, 1184)

A surveyor measured a triangular plot of land and found that the sides were 98.3 feet, 84.2 feet, and 20.7 feet long, respectively. Find the area. (*Ans.* 686.9 square feet—*page* 1163)

ALGEBRA

Give the origin of the word algebra and explain briefly the relation of the science of algebra to arithmetic 1171

Define algebraic expression, coefficient, term, binomial, formula, power, exponent, root, negative term, similar terms 1171

Illustrate by examples the difference between positive and negative quantities 1171

If a polynomial in a parenthesis is preceded by a minus sign, how will each term be affected when the parenthesis is removed? If a polynomial in parenthesis is multiplied by a quantity, how will each term be affected by the removal of the parenthesis? 1172

State the rule for subtraction in algebra; the law of signs for multiplication; the law of exponents and of coefficients for division. What are cross products? 1172, 1173

Write the formulas for the square of the sum of two terms; the square of the difference of two terms; the product of the sum and the difference of two terms; the product of two binomials having a common term; the product of two binomials whose corresponding terms are similar 1173, 1174

Is $a + b$ a factor of $a^5 + b^5$? of $a^5 - b^5$? of $a^8 - b^8$? Is $a - b$ a factor of $a^7 - b^7$? of $a^4 + b^4$? 1174

How many square roots has an algebraic expression? What is meant by factoring? Factor each of the following expressions:

$4a^2 - 20ab + 12ac$;
$49m^2 - 9n^2$;
$16x^2 + 8xy + y^2$;
$a^2 - a - 6$ 1174

Find the H.C.F. and the L.C.M. of $x^3 + 3x^2 - x - 3$ and $abx - ab$.
Ans. $x - 1$; $ab(x - 1)(x + 1)(x + 3)$—*pages* 1174, 1175.

Explain the process of adding fractions in algebra; illustrate by finding the sum of $\frac{a}{b}$ and $\frac{c}{d}$. How will the sign of a fraction be affected by changing the sign of its denominator? 1175

Is $x^2 - 2x + 1 = 0$ an identity or a conditional equation? Define the root of an equation, numerical equation, literal equation. What is meant by transposition? How is a term affected by being transposed from one side of an equation to another? 1176

Explain the process of clearing an equation of fractions. Clear the following equation of fractions: $\frac{1}{a} + \frac{1}{b} = \frac{1}{ab}$.
Ans. $a + b = 1$—*page* 1176.

Define quadratic equation, pure quadratic equation, affected quadratic equation. Indicate four methods of solving quadratic equations 1177

What are simultaneous equations? Mention three methods by which simultaneous equations may be solved 1177, 1178

Explain clearly what is meant by the graph of an equation. How may the solution of simultaneous equations be verified by means of graphs? Illustrate by reference to the following equations: $x^2 + y^2 - 25 = 0$ and $x - 2y + 5 = 0$.
Ans. Graphs cut at points $x = 3$, $y = 4$ and $x = -5$, $y = 0$—*page* 1178.

Define series, terms of a series, arithmetical progression, common difference. Write the formula for the nth term of an arithmetical progression when the first term and the

common difference are given. Find the sum of the numbers taken in order from 1 to 20.
Ans. 210—*page* 1179.

What is a geometrical progression? common ratio? geometrical mean? 1179

If money invested at a certain rate of interest doubles in each period of nine years, what will $950 invested now amount to in 54 years?
Ans. $60,800—*page* 1179 (*Geometrical progressions*).

A library shelf contains an encyclopedia of 8 volumes. In how many ways may these volumes be wrongly arranged?
Ans. 40,319—*page* 1180.

Define radical, radicand, surd, mixed surd, similar surds. When is a radical said to be rational? when irrational?. 1181

Reduce each of the following radicals to its simplest form: $\sqrt{18x^2y^3}$; $\sqrt[3]{27a^5b^2c^3}$.
Ans. $3xy\sqrt{2y}$; $3a^2c\sqrt[3]{b^2}$—*page* 1181.

Rationalize the denominator of $\dfrac{1}{\sqrt{a}+\sqrt{b}}$.
Ans. $\dfrac{\sqrt{a}-\sqrt{b}}{a-b}$—*page* 1182.

Define logarithm, mantissa, characteristic, antilogarithm. By reference to the table on page 1184, find the logarithm of 7183 and the antilogarithm of 2.7639.
Ans. 3.8563; .05806—*page* 1183.

By means of logarithms, find the value of $\sqrt[3]{781^2}$.
Ans. 84.82—*page* 1184.

COLLEGE ENTRANCE EXAMINATIONS

The following problems include two complete recent papers in elementary algebra set by the College Entrance Examination Board. The standard maintained by this board is accepted by all the principal colleges and universities of the United States. After each question, the answer is given along with a reference to the portion of the text in this volume in which are explained the principles on which the solution is based.

Algebra Examination I

1. Factor: (*a*) $20 - x - x^2$; (*b*) $3x^3 - 81$; (*c*) $a^4 - 13a^2 + 36$.
Ans. (*a*) $(5+x)(4-x)$—*page* 1174; (*b*) $3(x-3)(x^2+3x+9)$—*page* 1174 (*Factoring* and *Special cases in division*); (*c*) $(a+3)(a-3)(a+2)(a-2)$—*page* 1174.

2. Solve the simultaneous equations: $2x - 5y - 10 = 0$, $9x + 8y - 14.5 = 0$.
Ans. $x = 2.5$, $y = -1$—*pages* 1177-1178.

3. Simplify:
$$\left(m+\frac{p^2}{m-p}\right) \div \left(m-\frac{(m-p)p^2}{m^2+p^2}\right).$$
Ans. $\dfrac{m^2+p^2}{m^2-p^2}$—*pages* 1176, 1174 (*Division of fractions* and *Special cases in division*).

4. Compute the positive root of the following equation to the nearest hundredth: $4x^2 - 9x - 11 = 0$.
Ans. 3.13—*pages* 1177, 1180.

5. Given the formulas: $v = v_0 - at$, $s = v_0t - \frac{1}{2}at^2$. Eliminate t and express v in terms of the other letters.
Ans. $v = \pm\sqrt{v_0^2 - 2as}$—*pages* 1177-1178, 1176 (*Elimination by substitution* and *Fractional equations*).

6. The federal income tax on incomes between $12,000 and $14,000 was in 1919 as follows: first, a uniform tax of $190 on all such incomes; secondly, an additional tax of 5 per cent on the excess of such an income over $12,000. Write down a formula expressing the total tax, t, which a man must pay, whose income, x, lay between the foregoing limits.
Ans. $t = 190 + .05(x - 12{,}000)$—*page* 1156 (*Formulas*).

7. (*a*) Find, and simplify, the fourth term in the binomial expansion of $\left(a - \dfrac{b}{\sqrt[3]{2}}\right)^{24}$. (*b*) Free the following expression from negative and fractional exponents, and from radicals: $(\sqrt[6]{5}x^{\frac{1}{4}}y^{-\frac{1}{3}})^{12}$.
Ans. (*a*) $-1012a^{21}b^3$—*page* 1178. (*b*) $\dfrac{25x^{21}}{y^8}$—*pages* 1171, 1172 (*Exponent* and *Signs of aggregation*).

8. Solve the simultaneous equations: $xy = 8$, $2x + y = 10$.
Ans. $x = 1$ or 4, $y = 8$ or 2—*page* 1177 (*Simultaneous equations, Quadratic equations*, and *Factoring method*).

9. Plot the graphs of Question 8, and thus check your answers.
Page 1178.

10. A workman, wishing to explode a blast of powder, set the fuse to cause the explosion to take place in 30 seconds. He ran back at the rate of 8 yards per second. How far had he run when he heard the explosion, if sound travels at the rate of 1080 feet per second?
Ans. Pages 1156, 1176 (*Formulas* and *Simple equations*). By letting x represent the distance covered by the workman, the following equation may be deduced:
$x = \dfrac{1080}{3}\left(\dfrac{x}{8} - 30\right)$, from which the required distance is found to be 245 $\frac{5}{11}$ yards.

Algebra Examination II

1. Factor: (*a*) $2x^2 - 12x + 18$; (*b*) $a^2 - 12a - 49b^2 + 36$; (*c*) $x^3 - x^2 - x + 1$.
Ans. (*a*) $2(x-3)^2$—*page* 1174; (*b*) $(a-6+7b)(a-6-7b)$—*page* 1174; (*c*) $(x-1)^2(x+1)$—*page* 1174.

2. Simplify $\dfrac{\dfrac{a}{m}+\dfrac{m}{a}}{\dfrac{a}{m}-\dfrac{m}{a}} \times \dfrac{\dfrac{m}{a}-\dfrac{a}{m}}{a^2+m^2}$.
Ans. $-\dfrac{a+m}{a^2m^2}$—*pages* 1175-1176.

3. Solve the following equation for x: $x^2 - 2.1x + 0.8371 = 0$. Compute the smaller root to two places of decimals.
Ans. $x = \dfrac{2.1 \pm \sqrt{1.0616}}{2}$; .53—*pages* 1177, 1180.

4. Solve: $\dfrac{\sqrt{12+x}}{5} = \dfrac{3}{2+\sqrt{12+x}}$. Check your answer.
Ans. $x = -3$—*pages* 1176, 1182 (*Fractional equations* and *Multiplication of radicals*).

5. Given the formulas: $l = ar^{n-1}$, $s = \dfrac{rl-a}{r-1}$; eliminate a and derive a formula for l.
Ans. $l = \dfrac{sr^{n-1}(r-1)}{r^n-1}$—*page* 1177 (*Elimination by substitution*).

6. If I lend a certain sum of money for a certain time at 6 per cent (simple interest), the interest exceeds the loan by $160; but if I lend it at 4 per cent for one-half that time, the loan exceeds the interest by $480. What is the sum?
Pages 1145, 1177 (*Simple interest* and *Elimination by addition*). By letting x represent the sum and t the time, we obtain the equations $.06tx - x = 160$ and $x - \dfrac{.04tx}{2} = 480$, from which t may be eliminated by addition and the required sum found to be $800.

7. Solve the simultaneous equations: $x^2 - y^2 = 9$, $x + 2y - 3 = 0$.
Ans. $x = 3$ or -5, $y = 0$ or 4—*page* 1177.

8. Plot the graphs of the equations of Question 7, and thus check your answer.
Page 1178.

9. Find, and simplify, the first three terms of the binomial expansion: $(x^{-1} - \frac{1}{2}y^{\frac{1}{2}})^{12}$.
Ans. $x^{-12}, -6x^{-11}y^{\frac{1}{2}}, \dfrac{33}{2}x^{-10}y$—*pages* 1178, 1172 (*Binomial theorem, Exponent*, and *Signs of aggregation*).

10. Two automobiles leave the same place and travel over the same route without stopping. The first travels 15 miles the first hour, 15½ miles the second hour, 16 miles the third hour, and so on. The second leaves 5 hours and 12 minutes after the first and travels at the uniform rate of 30 miles an hour. In how many hours after the first starts are the two automobiles together, and how far has each traveled?

Pages 1179, 1176 (*Formula for the sum of the terms in an A. P.* and *Fractional equations*). By letting x represent the number of hours during which the first automobile travels before being overtaken, we obtain expressions for the distance each has traveled. These, when equated, give the following relation: $\frac{x}{2}\left(30 + \frac{1}{2}\overline{x-1}\right) = 30\left(x - \frac{26}{5}\right)$.

From this equation, x is found to be 13 or 48. Of these results, 13 is the one pertinent to this problem, and 48 is the answer to a related problem asking when the two automobiles will again be together, provided that both continue to travel at the rates described. The required distance is $\left(13 - 5\frac{1}{5}\right)$ 30, or 234, miles.

GEOMETRY AND TRIGONOMETRY

Define the following terms: angle, radian, complementary angles, parallel lines, circle, arc, sector, secant, and tangent. When are figures said to be congruent? 1185, 1186

What is meant by the *pons asinorum*? Prove the theorem 1187

Explain and give an example of a proof known as *reductio ad absurdum* 1187

What is the Pythagorean theorem and why is it so called? Mention three different proofs that have been given for this theorem. . . 1187

A tree 90 feet high is broken off 40 feet from the ground. How far from the foot of the tree will the top strike if the two sections are not severed at the point of fracture? (*Ans.* 30 feet—*page* 1189)

A 4-foot pole standing vertically casts a shadow 60 inches long. What is the height of a tree which at the same time casts a shadow 45 feet long? (*Ans.* 36 feet—*page* 1189)

Define trigonometry. What are trigonometrical ratios? State a purpose for which they are used. Define the sine, the cosine, and the tangent of an angle 1189

An observer knew that the horizontal distance from himself to a flagpole was 300 feet. From his position the angle of elevation to the top of the pole was 15°, and the angle of depression to the bottom of the pole was 5°. How high was the pole? What was the elevation of the observer above the base of the pole? (*Ans.* 106.62 feet; 26.25 feet—*page* 1190)

A surveyor wished to measure the distance to a tree on the opposite side of a stream which he was unable to cross. He therefore laid out a straight 300-foot base line along the bank of the stream. When sighted from one end of the line, the tree had an angular deviation from the base of 90°. When sighted from the opposite end, the tree had an angular deviation of 63°. What was the distance from the tree to the nearer end of the base line? (*Ans.* 588.8 feet—*page* 1190)

A man wished to calculate the area of the gable roof of his house. Since his ladder was too short, he was unable to take measurements above the eaves. Those, however, which he did obtain were as follows: length along the eaves, 30 feet; length of line across end of house connecting the eaves, 20 feet; angle formed by this line and the roof, 50°. What was the area of the roof? (*Ans.* 933.4 square feet—*page* 1190)

BIBLIOGRAPHY

In the standard textbooks upon several branches of elementary and advanced mathematics, of which a number are included in this bibliography, the student will find the means of extending and supplementing the subject matter of the preceding sections. The rapidly widening field of applied mathematics also is represented in this list by a carefully chosen group of general and special works. To teachers the suggested books upon the teaching and the history of mathematics will prove helpful toward increased efficiency and interest in their work.

ARITHMETIC

Modern Arithmetic, B. M. Watson and C. E. White
Standard Arithmetic . . . . . W. J. Milne
Advanced Arithmetic . . . . G. A. Wentworth

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Business Mathematics . . . . . E. I. Edgerton
Practical Business Arithmetic, J. H. Moore and G. W. Miner
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Workshop Mathematics . . . . . F. Castle
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AGRICULTURE
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ECONOMICS AND USEFUL ARTS

INTRODUCTORY

No subject so directly engrosses the attention of men today as that embraced under the term economics. Everybody is concerned with economic questions; everybody has opinions on their solution. This is because economics deals with the means whereby men live and with the system within which they provide and share the goods and services that supply their wants.

This system is like a living thing—never still, always changing. Of late, the changes in it have been so marked, so rapid, and so disturbing that even the most unobservant could hardly fail to notice them. Indeed, everyone must, at some time, have had his attention turned to the causes of the changes which so profoundly affect his life. When prices rise 100 per cent in the course of a few years, who can help asking why the dollar fluctuates so much, while units of other kinds, such as the yard and the gallon, remain fixed. If, in some other countries, prices have risen not hundreds but thousands per cent, causing grave disturbances to our trade with them as well as creating great internal confusions, the need for inquiry becomes still more urgent.

Besides, every intelligent citizen is interested in the manifest fluctuations of prosperity and depression which seem to sweep like waves over countries and even over the entire world. The United States has happily escaped some of the more extreme movements which have occurred in Europe, but here too we have had quite startling changes. High wages, high profits, and plentiful employment have been abruptly succeeded by a slump involving heavy losses and much unemployment and this again has been followed by a marked recovery. Why, we are driven to ask, do these changes occur?

Why is it that, during and after the World War, most of the great countries of the world, outside of the United States, were forced to abandon the gold basis on which their currencies had previously been established? Why did the franc and the crown, to say nothing of the mark and the ruble, so greatly depreciate in terms of the dollar?

And again, to turn to another aspect of the economic situation, why is it that the growth of industry, for all the new wealth it creates, has ushered in a new form of conflict, as revealed in the serious strikes which tie up the activities of a whole country? What explains the strife of "capital" and "labor," and what can be done to remove it?

What Economics Is About. Such are some of the pressing questions which have led people to take a new interest in economics; for economics is just the science of wealth,—how it is produced and exchanged and distributed and consumed. It deals with our everyday affairs, not with something abstract or in the clouds. The first business of life is after all to make a living. We live within a social order, in and through which we seek to satisfy our needs. Every one of us, unless he is altogether dependent on others, contributes something to the common store; he puts into it some particular work or service or at least provides the use of some goods which aid the work of others. In return, he receives, through the agency of money, the right to a certain share of that common store.

We are so accustomed to this arrangement that it seems to us very natural and simple. But the system which makes it possible has been built and rebuilt by many generations of men, the results differing according to each generation's degree of intelligence and skill, its command over nature, and its social relationships. The system rests on such institutions as property and contract, the division of labor, competition and combination. These institutions change their forms through the centuries, and the record of their changes is an important part of human history. But behind them are the far less mutable laws of human nature. These laws, working through the instincts to acquire, to possess, and to provide for family and dear ones, operate to turn the boundless resources and powers of the earth into human service.

The Division of Labor. We have just mentioned the division of labor. It is the key to the understanding of the whole economic order. If every man or every family produced only for himself or itself, there would be no exchange, no markets, no money, no means of transportation; in fact, no economic system. Some such situation actually existed in the more primitive ages of the world. Each household was almost self-sufficient. Each raised its own crops, spun and wove its own garments, made its own furniture, baked its own bread, and so forth. Life under these conditions was extremely poor and rude. With the advance of civilization, however, the division of labor became more and more pronounced.

Men have discovered that it is far more profitable to co-operate with one another, each finding and keeping to his own special task. Adam Smith, the "father of political economy," remarked that if a man set out to make pins by his unaided labor he could scarcely produce a single pin a day, whereas, when even a few combine in the business of pin-making, each is enabled, through the division of labor, to produce many thousands per day.

Ours is an age of specialization, because we have discovered how much more efficient such an arrangement is. To provide the breakfast of even the humblest family in a modern country, all parts of the earth are drawn upon. To serve our needs we have thus built up the vast network of modern trade and commerce. The enormous extent of this is indicated in the divisions that follow entitled *Commerce* and *Commercial Raw Materials*.

Linking the World. The greatest benefits of the division of labor are reaped when cities and districts and countries exchange with one another those products which they can produce most advantageously. Such advantages in the production of certain commodities may arise in a particular place by reason of its climate, soil, natural resources, and the capacities of its inhabitants. The United States, with its wide range of soil and climate, is more self-sufficient than most countries. But it needs the rubber of the Amazon, the nitrates of Chile, the nickel of Canada, the tea of China, the coffee of Brazil, and a thousand other products which commerce brings to our shores.

In a similar way, different parts of the same country specialize and create domestic trade. Indiana specializes in corn; South Dakota, in wheat; California, in oranges. Each produces the crops which it can raise to the greater advantage. Likewise, the city depends on the country, but so also does the

country depend on the city. This all-round dependence of part on part is made possible by great systems of transportation and communication.

By aid of the means of communication, we have today markets that are nation-wide and even world-wide for the main articles of commerce—wheat, cotton, wool, rubber, and so forth. By aid of the system of transportation, the resources of the world are exploited and brought wherever there is a demand for them. Nowhere have these agencies been more highly developed than in the United States, and nowhere have they been such important factors in the building up of a national life. In the pages that follow, special attention is paid to the history of *Communication* and *Transportation*.

Capital and Labor. We have spoken of capital as a form of wealth. It has another aspect, which appears when we contrast capital with labor. Here lies one of the greatest problems of modern society. Since the Industrial Revolution, the mechanism of production has grown so elaborate and so costly that the worker can no longer own the instruments with which he works. He must work for an employer and often the employer is a large corporation. So a conflict of interests arises.

As producers, capital and labor are of necessity partners, for capital is useless without labor and labor is powerless without capital. But, as claimants to the product of this partnership, the owners of capital and the givers of labor have unreconciled interests. This conflict of interests is not strictly a warfare, as it is sometimes called, since capital and labor *must* combine to produce. Some degree of struggle and conflict is at the same time inevitable at every stage of social evolution. But this struggle has grave social and economic consequences, and no question is more important than that of avoiding the more serious and destructive forms of this conflict. This vital issue is treated in the section on *Capital and Labor*.

From Producer to Consumer. When production takes place on a large scale, the consumer is no longer in direct and personal relation to the producer. Hence arises the need for agencies to bring the two together. Modern business makes necessary a system of commission houses, middlemen, and retailers. They all have their parts to perform in the division of labor, and, as such, they serve useful economic functions. The practical aspect of this subject is taken up in the sections on *Advertising* and *Salesmanship*.

Money as the Medium of Exchange. All this interchange requires a scale of value and a money system. Barter, or the direct exchange of goods for goods, is a cumbersome and difficult process. A standard of value, universally recognized and accepted, is therefore essential, and most modern countries have found it in gold, though some use silver instead. The American dollar means an amount of gold of certified weight and fineness. So did the pound sterling, the mark, the franc, and other national units, before the war upset the currencies of various countries.

On the basis of gold, a wonderful system of credit is built. Banks and other financial institutions issue notes and certificates that are generally "as good as gold" because of the guarantee behind them. These notes do away with the inconvenience involved in carrying around the precious metal. All economic wealth has come to be reckoned and measured in these units of value. In fact, wealth has come to mean, not the owning of so much land and so many cattle and so many houses, as in the old days, but the owning of so much "capital," so many of the standard units of value.

For example, no individual owns today a particular stretch of railroad or a particular locomotive that runs along it, but he may own so many shares, representing so many units of value, in the railroad company. It is this development of the ownership of capital which has made possible the growth of the institutions described in this department under *Insurance*, *Investments*, and *Money and Banking*. In the section on *Business Crises*, another very significant aspect of the subject is treated.

The Useful Arts. We now turn to the second great branch of our subject. Today the consumer never sees the source of the great multitude of objects of which he makes direct or indirect use. He does not know whence they come. He does not know how or by whom they are made. The work of the world is usually a closed book to us, because each of us is engaged on such a tiny and subdivided fraction of the whole. We live in a world whose activity mostly passes us by, whose marvel is largely unappreciated by us. In order to convey some idea of the complexity of our economic system, this department is supplemented by an account of the arts and technique of production.

The Stages of Production. We begin with the land, for on it or out of it (including, as economists do, the oceans and inland waters as part of the "land") are produced all the raw materials which the labor and organization of men turn into the means of satisfying their numerous wants. Thus we have first in order the extractive industries, which are described under the titles *Agriculture*, *Animal Industry*, *Fisheries*, and *Mining and Mineral Production*.

Most raw materials—wheat, cotton, wool, silk, iron, copper, lumber, and a host of others—go through many and elaborate processes before they are ready for their final use. They must be conveyed by land and water, they must pass through many hands, they must be treated by complicated machinery. Production calls for the work of the inventor and of the engineer no less than that of the farmer and of the miner. Hence the division on *Inventions* and on *Engineering and Building*.

Then comes the last stage, that of manufacturing. In the plant of the manufacturer, the work of the farmer, the miner, the inventor, and the engineer is brought together. Out of the factory the results of their labor pass at last as finished goods, and the whole roundabout process of production is complete. The more important aspects of this last step are treated under *Manufacturing* and *How Things are Made*.

The Age of Industry. One man today can do the work which hundreds or even thousands were needed to perform in the pre-industrial age. Power has been harnessed and applied in countless ways. Steam and electricity and oil and gasoline serve the desires of man. The blast furnace, the power loom, the self-binding reaper, the linotype machine—to mention at random a few of our innumerable inventions—make possible an efficiency of production which surpasses the wildest dreams of the past. The standard of living of ever-greater populations has risen vastly. The ordinary man has at his command commodities that in earlier times were the rare luxuries of kings. Thus has industry, aided by invention, revolutionized the world. The Industrial Revolution is well named because, of all the great changes society has known, none has been at once so rapid and so extensive as this development. A period of much less than a hundred years saw the transformation of the everyday life of our Western civilization, saw a remarkable change in the habits and thoughts and modes of work of many millions, saw a new power over nature created, and saw the very face of the country completely altered.

To understand these things is to understand our own age and civilization. Through a study of economics and the arts of production, we may attain this understanding and learn in a new way the meaning of the world and the society in which we live. To serve this purpose, through a compact and accurate presentation of the whole system, the material in this department has been prepared.

COMMERCE

COMMERCE consists of all those processes of trade involved in the general distribution of commodities from the producer to the consumer. However, the term generally implies an exchange of large volumes of merchandise between different places or communities rather than the trade carried on between individuals. Traffic passing from one nation to another is *foreign*, or *international*, commerce; that moving between localities included within national boundaries is *internal*, or *domestic*, commerce. In the United States, commercial shipments of merchandise from one state to another are said to enter into *interstate* commerce.

Origins. The desire of man to satisfy his wants as easily as possible supplies the primary reason for commercial transactions. However, there can be comparatively little exchange between countries or districts inhabited by people who produce the same type of commodities; for then, neither locality has anything required by the other. Commerce, therefore, depends upon existing differences in temperature and climate, in natural resources, in industrial development, or in racial and cultural characteristics.

Transportation and Commerce. Wherever such differences exist, the inhabitants of one district will generally have a surplus of certain commodities which they are anxious to exchange for the surplus from other places. But, before the exchange can be accomplished, the goods must be transported to the locality where they are needed. For this reason commerce and transportation are mutually dependent to such an extent that the condition of one is almost invariably indicated by a corresponding degree of development in the other.

Because of this intimate relationship, the history of commerce may be divided into three fairly distinct periods: First, that in which transportation was accomplished by man or by beasts of burden on land, and by coasting vessels on the water. Second, that in which mariners, by the aid of the compass, were able to guide their sailing vessels upon the open seas. Third, that in which transportation by land and by sea depended chiefly upon the power of steam. The first period, of possibly 5000 years' duration, extended from the beginning of commerce well into the 15th century, in spite of the fact that the compass was known in parts of Europe as early as 1200; the second period, of about 400 years' duration, may be said to have terminated in 1838, when the first line of commercial steamships began operation. The third period is that of the past century.

ANCIENT COMMERCE

The city of Babylon, possibly as early as 3000 B. C., was a market place to which precious metals, grain, wool, and other materials were brought from all directions. Later, records show that, by 1600 B. C., well developed trade routes existed, over which the Arabs conducted caravans transporting silks, spices, wine, gold, and other commodities from the Red Sea district, from Phœnicia, and even from Asia, to Egypt, where they were exchanged chiefly for grain and linen. Excavations in Egypt have revealed certain vases which seem to have been brought from the island of Crete as early as the year 2000 B. C.

The Phœnicians. The first people devoted chiefly to commerce were the Phœnicians, who inhabited a strip of land about 100 miles long and 10 miles wide on the eastern coast of the Mediterranean. Forced upon the sea as fishermen, these people gradually developed commercial fleets which in time extended their voyages to the Strait of Gibraltar and even north to England. The ships brought back ivory, tin, copper, and precious metals, while caravans sent inland brought spices and frankincense from India. Manufacturing industries were developed, especially in glassware, cloth, and metal products; great cities such as Sidon and Tyre came into existence; colonies—of which Carthage, on the north coast of Africa, was later to become the great rival of Rome—were founded at many advantageous points; and, for perhaps 1000 years, the Phœnicians controlled the commerce of the world.

The Greeks. Eventually, the commercial supremacy of the Phœnicians passed to the Greeks, who excelled both as sailors and as business men. Their homeland, which in area was smaller than the state of Maine, nevertheless offered great incentives to commerce. It was sufficiently fertile to afford a surplus of some products, such as wine, figs, and olive oil, but it did not produce enough grain to feed the population. Mountains on the north protected it fairly well from attack by land; it was centrally located in relation to other countries of the Mediterranean; and its extensive coast line afforded many good harbors.

The conditions of living in a small, well populated country having an insufficient supply of grain were conducive to emigration; ships furnished an easy means of travel. Consequently, for a period of about 500 years, the Greeks followed a consistent policy of founding and of developing settlements in fertile sections of foreign lands, notably on the Black Sea, in Asia Minor, and in southern Italy and Sicily. Malaga, in Spain, and what is now Marseille, in France, were sites of thriving Greek colonies. From these colonies, grain and raw materials were supplied to the mother country, which developed many manufacturing industries, especially the production of bronze, clay, marble, and woolen products.

The Greeks were quick to adopt new devices for facilitating commerce. From contact with the Phœnician traders, they acquired an alphabet, which they greatly improved. From the Lydians of Asia Minor, they learned to mark pieces of silver with an official seal and to use these coins as money.

In spite of the success of the Persians, who broke the Greek power in the East, the Western colonies developed more rapidly than before, while Greece itself, under the leadership of Athens, reached the pinnacle of its power.

Empire of Alexander. The enormous eastern empire held by the Macedonian, Alexander the Great, took away from Athens the control of commerce and led to the development of great commercial cities farther east. Of these, the largest was Alexandria, located near the western corner of the Nile delta. This city surpassed in volume of trade all centers of commerce which had previously existed. The huge lighthouse erected on the island of Pharos to guide mariners safely into the harbor of Alexandria was considered to be one of the seven wonders of the ancient world.

The Romans. The expansion of Roman power outside of Italy is said to have begun in 241 B. C., when Sicily was taken from the Carthaginians. Ninety-five years later, the great commercial cities of Carthage and Corinth were destroyed by Roman soldiers, and Greece and Macedonia were reduced to the position of Roman provinces.

Although Rome ruled the Western world, she never became a commercial city. Captives of war were extensively sold as slaves, and great quantities of foodstuffs, manufactured products, and luxuries were sent to the capital by sea, and over the fine roads that were constructed by Roman engineers, even in the farthest provinces. These products, however, to a large extent, did not represent commercial transactions but were the tributes and taxes imposed upon conquered peoples. What Rome gave in return was almost five centuries of comparative peace and security, during which time commerce developed wherever conditions permitted.

MEDIEVAL COMMERCE

During the "dark ages" that followed the fall of Rome, commerce was almost entirely in the hands of the Mohammedans, with centers at Bagdad, Damascus, Cairo, Alexandria, and the Moorish cities in Spain.

Western and northern Europe became divided under the feudal system into thousands of tiny units, each attempting to be complete within itself, and entirely independent of all external sources of supply. Roads were totally neglected; strangers were regarded with suspicion; robbery was a common practice; and commerce, under such conditions, was quite naturally almost nonexistent.

Growth of Towns. Soon after 1000 A. D. the need for places where an interchange of commodities might be carried on was filled by the widespread development of towns. In these growing communities, manufacturing and trading not only became possible, but were necessary in order to provide something to exchange for the food and raw materials brought in at first from the surrounding country, and, later, from other parts of the world.

Under these conditions some men were enabled to devote all of their time to trading and dealing in commodities. The fear of the townspeople that these traders would take undue advantage of their opportunities, coupled with the prevalent suspicions of all strangers, next led to the establishment of *public markets*, where commercial transactions might be carried on under official supervision. As the markets increased in size and prosperity, traders customarily united for mutual benefit, forming *merchants' guilds*. Somewhat later, the craftsmen also combined, according to their special trades, to form *craftsmen's guilds*. These guilds were at first private organizations, but eventually they were recognized by the town authorities and attained to great power in the local government.

Fairs. An extension of the idea of the town markets led, in all parts of Europe, to the establishment of *fairs* under the protection of various powerful lords. At the fairs, which were usually held annually, special efforts were made to insure honest dealing and the safety of those in attendance. For this reason the large fairs, such as those held in various parts of Champagne, France, were visited by dealers from other French towns and also from Flanders, Italy, Germany, and England. Bankers also were frequently present in order to lend their money. Fairs represented the most important form of commercial activity of the times.

Risks of Medieval Commerce. The extensive commerce of the latter part of the medieval period was carried on at very great risk, because of constant rivalry and open warfare between great commercial cities. There was no central government sufficiently powerful to enforce its laws and to guarantee security. Shipments on land and by inland waterways were subject both to innumerable and excessive tolls and to constant danger from highway robbers. Similarly, coasting vessels always had to be ready for battle with pirates or with ships from rival cities.

Venice and the Hanse. In the north of Europe, during the 13th and the 14th century, the great commercial cities of Lubeck, Hamburg, Cologne, Danzig, and many others united, for mutual protection, into an organization known as the Hanse, or Hanseatic league. This league became extremely powerful and had complete control of commerce with the countries on the Baltic and, to a large extent, with those on the North Sea.

On the Mediterranean the struggle for supremacy was largely between Venice and her chief rivals, Genoa and Pisa. Leadership was secured to Venice by the crafty manner in which the doge, Enrico Dondolo, directed the energies of the Fourth Crusade, first to the capture of Zara, a rival Christian city, and next, in 1203, to the subjugation of Constantinople. Venice then completely dominated the trade with the East, and developed commerce to a degree never before attained. Venetian methods of banking and bookkeeping represented standards that were copied throughout the commercial world.

Between Venice and northern Europe, commerce was carried on in two ways: Traders from central and southern Germany were permitted to bring their metals, furs, coarse textiles, twine, and leather over the Alps by way of the Brenner or the Saint Gothard pass, to Venice. By sea, the Venetian galleys, with their precious cargoes of spices, dyes, alum, fine textiles, weapons, and paper, traveled to Flanders. Bruges, which was succeeded in the 15th century by Antwerp, was the common center at which the wares of Venice were traded for the fish, furs, coarse textiles, wax, grain, and salt meat brought by the ships of the Hanseatic league, and for the wool, tallow, leather, tin, and lead of England. English exports at this time were almost entirely under the control of the "Merchants of the Staple," a society composed chiefly of foreigners.

MODERN COMMERCE

During the 14th and the 15th century, England, France, and Spain were becoming nations in which many loosely connected feudal divisions were gradually merged under comparatively strong central governments. Then, for the first time, the individual cities of Italy and the weak organization of the Hanse came into conflict with commercial rivals who had less experience but were more powerful and determined than themselves.

Portugal, under the direction of wise rulers, had already attained the leadership in navigation; not because the Portuguese were better sailors than the Venetians, the Genoese, or the mariners of the Hanseatic league, but because they received encouragement and assistance from their government.

New Trade Routes. In the East, the ancient land routes by which the commerce of India and of China had reached Venice were gradually cut off by the spread of Turkish power. As a result, each of the important European nations was actively searching for the "Eastern passage" by which their ships could reach the fabulously rich countries of the Orient.

In 1492, Columbus, a Genoese in command of Spanish vessels, sailed west until he reached the New World, which blocked the direct route to Asia. Cabot, an Italian master of an English ship, reached North America in 1497. Finally, by sailing around Africa, Vasco da Gama, a Portuguese, established trade by sea with India in 1498, and returned home the next year with goods that sold for sixty times the cost of the voyage. In 1522 the expedition which had set out from Spain three years before under command of Magellan completed the first voyage around the world.

The Portuguese obtained the rewards due the winner of the race to the East, for to them Pope Alexander VI assigned all of Africa and of Asia, with the exception of the Philippines. The Americas, except Brazil, were allotted to Spain.

The Struggle for Supremacy. The open seas now became the highway on which the ships of Portugal, Spain, France, and England speeded in order to obtain as much as possible from the newly found sources of wealth. Portuguese ships brought back great quantities of Eastern products which, because of the increased supply, eventually sold at prices low enough to change such important commodities as tea, coffee, and sugar from luxuries to necessities. Lisbon for a time succeeded Antwerp as the most important city of commerce.

Spain. During the century which followed the discovery of America, Spain became the richest and most important country on the earth. From her colonies she received enormous quantities of gold

WORLD'S PROGRESS IN COMMERCE AND PRODUCTION

1820–1925

Year	Population	Total Commerce	Commerce per Capita	Ships, Sail	Ships, Steam	Railways
		Dollars	Dollars	Tons	Tons	Miles
1820	780,000,000	1,659,000,000	2.13	5,814,000	20,000	.....
1830	847,000,000	1,981,000,000	2.34	7,100,000	111,000	200
1840	950,000,000	2,789,000,000	2.93	9,012,000	368,000	5,400
1850	1,075,000,000	4,049,000,000	3.76	11,470,000	864,000	24,000
1860	1,205,000,000	7,246,000,000	6.01	14,890,000	1,710,000	67,400
1870	1,310,000,000	10,663,000,000	8.14	12,900,000	3,040,000	139,900
1880	1,439,000,000	14,761,000,000	10.26	14,400,000	5,880,000	224,900
1890	1,488,000,000	17,519,000,000	11.80	9,166,000	8,295,000	390,000
1900	1,543,000,000	20,105,000,000	13.02	6,674,000	13,857,000	500,000
1910	1,616,000,000	33,634,000,000	20.81	4,624,000	22,046,000	637,000
1920	1,730,000,000	61,277,000,000	35.42	4,066,000	32,092,000*	710,600
1925	1,838,000,000	53,922,000,000**	29.83**	2,261,000	62,380,000*	757,800

Year	Telegraphs	Cables†	Cotton	Coal	Pig Iron	Gold Production‡
	Miles	Miles	Pounds	Short tons	Long tons	Dollars
1820	.....	.....	630,000,000	17,200,000	1,000,000	76,100,000
1830	.....	.....	820,000,000	25,100,000	1,800,000	94,500,000
1840	.....	.....	1,310,000,000	44,800,000	2,700,000	134,800,000
1850	5,000	25	1,435,000,000	81,400,000	4,700,000	363,900,000
1860	100,000	1,500	2,551,000,000	142,300,000	7,200,000	1,334,000,000
1870	281,000	15,000	2,775,000,000	213,400,000	11,900,000	1,263,000,000
1880	440,000	49,000	3,601,000,000	340,000,000	18,000,000	1,150,800,000
1890	768,000	132,000	5,600,000,000	466,000,000	27,200,000	1,060,100,000
1900	1,180,000	200,000	6,247,000,000	800,000,000	40,400,000	2,100,000,000
1910	1,307,000	291,000	9,013,000,000	1,141,600,000	65,800,000	3,780,700,000
1920	1,592,000	.....	9,405,000,000	1,305,000,000	68,300,000	4,253,800,000
1925	6,675,000	331,000	13,240,600,000	1,191,800,000	75,509,000	3,757,300,000

* Includes motor ships. ** Statistics of 1924. † Nautical miles. ‡ For decade ending year named.

and silver, and also many valuable cargoes of hides, drugs, dyes, cocoa, vanilla, and sugar. Manufacturing industries at home were developed on a large scale for the production of silk and woolen textiles, wines, soap, salt, and many other commodities. In addition to manufactured articles, Spain exported figs, raisins, olives, olive oil, iron ore, and large amounts of mercury for use in obtaining gold and silver at the mines of Mexico and Peru.

All of these great advantages were nullified and finally destroyed by a prolonged period of bad government, marked especially by exorbitant taxes of every kind, and by a policy of exploitation rather than assistance in connection with the colonies. So serious were the results that the population declined rapidly, and some great commercial cities retained only one-fourth of their former inhabitants.

Portugal. The commercial greatness of Portugal was open to attack by her rivals, because it lacked the firm foundation of domestic production. The Portuguese were excellent traders, but their country was small and was not developed industrially. Manufactured articles for export were not made at home but had to be purchased from other European countries. Consequently, England and the Netherlands were eventually able to cut off Portugal's supply of export goods, and to fill the Eastern demand themselves. In addition to this fundamental lack of commercial stability, Portugal fell under the harmful rule of Spain during the 60 years between 1581 and 1640. By the time the Spanish yoke was cast off, England had broken Portuguese control in India, and the Netherlands had taken the islands of Ceylon, Sumatra, Java, and the valuable Moluccas, or Spice islands.

The Netherlands. Dutch traders were quick to take advantage of the opportunities offered by the decline of Spain and Portugal. Their ships traveled to India and to the Eastern islands, and were equally active in European trade. Most of the wool exported by Spain was carried to northern countries by Dutch vessels, which also entered the Baltic and returned with cargoes from Russia.

At home, large business companies grew up, the manufacture of silk and of leather was developed, the fishing industry increased until more than 2000 fishing boats were regularly employed, and business of all forms was greatly stimulated. The Netherlands became the financial center, and Amsterdam the most important commercial city, of Europe.

Unfortunately for the country, a strong central government was lacking, corruption became common among high officials, and taxes were greatly increased. The volume of commerce ceased to grow after 1730. In 1798 the Dutch East India Company, which had ruled all of the Eastern possessions and for 180 years had paid average annual dividends of over 18 per cent, came to an end. Its debts of more than 50 million dollars were assumed by the government.

France. Among the five European nations that achieved commercial power during the modern period of 1500 to 1800, France was one of the two which a historian in the 16th century would probably have selected as most likely to reach and to keep first place. Portugal and the Netherlands were obviously handicapped by their lack of area and domestic resources. But France and Spain were the largest and richest countries of western Europe, and both had extensive coast lines. In exploration, France surpassed both the English and the Dutch, while in area of foreign colonies, she was second only to Spain.

France did develop a prosperous trade with the Levant and with Italy and Spain, but this could not become of first importance because faulty political organization raised almost insuperable obstacles to the free flow of commerce.

The greatest checks to commerce within the country were due to the existence of feudal divisions which prevented national unity, to the continuance of the guilds long after these organizations had been displaced in more progressive nations, and to the establishment of an absolute monarchy wherein the correction of existing evils was impossible unless the ruler was unusually strong and wise. High customs duties were collected whenever goods entered the country and also when they crossed from one internal division to another. The quarrels and the strict regulations of the numerous guilds

CANADIAN SHIPPING

Seagoing Vessels Entered and Cleared at Principal Ports, 1925

Ports	British		Foreign		Total	
	No.	Tonnage	No.	Tonnage	No.	Tonnage
Halifax, N. S.	2,144	4,268,118	806	2,285,579	2,950	6,553,697
Montreal, Que.	1,281	5,203,858	625	1,756,993	1,906	6,960,851
Nanaimo, B. C.	280	146,114	1,446	313,199	1,726	459,313
New Westminster, B. C.	129	320,968	164	491,410	293	812,378
North Sydney, N. S.	1,303	299,516	428	125,585	1,731	425,101
Prince Rupert, B. C.	2,202	209,414	1,449	224,648	3,651	434,062
Quebec, Que.	405	2,673,381	44	109,198	449	2,782,579
St. John, N. B.	822	1,543,518	689	676,884	1,511	2,220,402
Sidney, B. C.	491	309,234	1,081	299,219	1,572	608,453
Sydney, N. S.	295	450,958	323	562,622	618	1,013,580
Vancouver, B. C.	2,340	4,016,451	1,668	3,867,919	4,008	7,884,370
Victoria, B. C.	2,250	2,605,915	2,062	3,874,366	4,312	6,480,281
Windsor, N. S.	70	51,985	279	371,482	349	423,467
Yarmouth, N. S.	419	259,006	212	136,193	631	395,199

largely prevented any improvements in methods of manufacture, and, finally, selfish monarchs entered upon a series of wars which gained nothing at home and lost most of the colonies abroad.

England. In spite of serious wars and intense commercial competition with larger countries, England, by 1750, had become the dominating factor in world commerce. Of the various reasons for her success, two may be considered as fundamental: First, she was a part of Europe and yet was separated from the continent by a wide channel which effectively prevented invasion by land; this condition made the possession of a powerful navy a primary necessity for national safety. Second, England acquired a coherent central government much sooner than did her rivals, and this government was far more flexible and democratic than theirs.

As a basis for exchange with other countries, England had from very early times the products of her sheep industry and of her mines. Manufacturing industries were gradually developed, which changed these raw materials into cloth and metal products. Ships were required to carry the excess production to other countries, and ships were needed also for protection and to supply trained sailors to the navy in time of war. The government, therefore, adopted the policy of encouraging shipping and commerce. Whenever possible, special privileges were secured by the state for English merchants, and success in battle usually meant the addition of foreign colonies in which an extension of trade could be expected.

English Trading Companies. During the 17th century, English commerce was to a large extent controlled by trading companies such as the East India Company, the Guinea Company, the Virginia Company, and the Hudson's Bay Company. A trader who was not a member of one of the companies could deal only with France, Spain, or Portugal. The strict control and regulations of the companies provoked so much antagonism that they finally lost their power and disbanded. The Hudson's Bay Company, however, still exists as an ordinary business corporation.

Having extensive colonies which supplied raw materials and required manufactured articles in return, together with a powerful merchant marine for the distribution of her products, England experienced at home a high degree of industrial development. Textiles and products of iron and steel were the chief commodities manufactured and exported. Homeward bound ships brought wool, cotton, naval stores, grain, sugar, tea, coffee, spices, tobacco, and rum; also silk, linen, and other foreign

GROWTH OF CANADIAN COMMERCE

Imports and Exports of Merchandise, 1870–1926

Fiscal Year	Imports				Exports			
	From United Kingdom	From United States	From Other Countries	Total	To United Kingdom	To United States	To Other Countries	Total
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1870	37,537,095	21,697,237	7,667,742	66,902,074	22,512,991	30,361,328	6,169,271	59,043,590
1875	60,009,084	48,930,358	8,469,126	117,408,568	34,199,134	27,902,748	7,607,941	69,709,823
1880	33,764,439	28,193,783	7,942,320	69,900,542	35,208,031	29,566,211	8,125,455	72,899,697
1885	40,031,448	45,576,510	14,147,817	99,755,775	36,479,051	35,566,810	7,085,874	79,131,735
1890	43,277,009	51,365,661	17,039,903	111,682,573	41,499,149	36,213,279	7,545,158	85,257,586
1895	31,059,332	50,179,004	19,437,555	100,675,891	57,903,564	35,603,863	9,321,014	102,828,441
1900	44,280,041	102,224,917	26,146,718	172,651,676	96,562,875	57,996,488	14,412,938	168,972,301
1905	60,342,704	152,778,576	38,842,934	251,964,214	97,114,867	70,426,765	23,313,314	190,854,946
1908	94,417,320	205,309,803	52,813,756	352,540,879	126,194,124	90,814,871	29,951,973	246,960,968
1909	70,682,600	170,432,360	47,479,236	288,594,196	126,384,724	85,334,806	30,884,054	242,603,584
1910	95,337,058	218,004,556	56,976,585	370,318,199	139,482,945	104,199,675	35,564,931	279,247,551
1911	109,934,753	275,824,265	66,965,585	452,724,603	132,156,924	104,115,823	38,043,806	274,316,553
1912	116,906,360	331,384,657	74,113,658	522,404,675	147,240,413	102,041,222	40,942,222	290,223,857
1913	138,742,464	436,887,315	95,577,275	671,207,234	170,161,903	139,725,953	45,866,744	355,754,600
1914	132,070,406	396,302,138	90,821,454	619,193,998	215,253,969	163,372,825	52,961,645	431,588,439
1915	90,157,204	297,142,059	68,656,645	455,955,908	186,668,554	173,320,216	49,430,066	409,418,836
1916	77,404,361	370,880,549	59,916,224	508,201,134	451,852,399	201,106,488	88,651,751	741,610,638
1917	107,096,735	665,312,759	74,041,384	846,450,878	742,147,537	280,616,330	128,611,901	1,151,375,768
1918	81,324,283	792,894,957	89,313,338	963,532,578	845,480,069	417,233,287	277,314,432	1,540,027,788
1919	73,035,118	750,203,024	96,473,563	919,711,705	540,750,977	454,873,170	220,819,659	1,216,443,806
1920	126,362,631	801,097,318	137,068,174	1,064,528,123	489,152,637	464,028,183	286,311,278	1,239,492,098
1921	213,973,562	856,176,820	170,008,500	1,240,158,882	312,844,871	542,322,967	333,995,863	1,189,163,701
1922	117,135,343	515,958,196	114,710,793	747,804,332	299,361,675	292,588,643	148,290,362	740,240,680
1923	141,330,143	540,989,738	120,259,363	802,579,244	379,067,445	369,080,218	183,303,780	931,451,443
1924	153,586,690	601,256,447	138,523,730	893,366,867	360,057,782	430,707,544	254,585,730	1,045,351,056
1925	151,083,946	509,780,009	136,068,582	796,932,537	395,843,433	417,417,144	255,806,766	1,069,067,343
1926	163,710,431	609,825,350	153,866,951	927,402,732	508,249,576	474,890,028	332,053,187	1,315,192,791

textiles. It must not be thought that all of this commerce depended on the colonies, for, at the end of the 18th century, more than half of England's trade was carried on with Europe. The trade with America ranked second in value. That with Africa was very much smaller, but was considered important because it furnished a supply of slaves for sale in America and the West Indies.

Canadian Commerce. The early commerce of Canada was largely under the control of monopolistic companies chartered by the French government. When England conquered the country, this control passed to British traders who confined their commerce almost entirely to the homeland. Trade with the United States was at first carried on by smugglers, until the restrictions on normal traffic were at last removed by Great Britain.

In 1870, Canadian foreign commerce amounted to about 132 million dollars, of which 43 per cent went to England and 36 per cent to the United States. In 1926, the total commerce had increased to 2243 million dollars, but only 30 per cent went to Great Britain, while 48 per cent went to the United States. During the period 1870 to 1926 the total value of Canadian foreign trade increased from $36.46 to $239.49 *per capita*.

To England, Canada sends chiefly grain and meat. Lumber, wood pulp, and print paper constitute about one-half of the exports to the United States. Imports are composed largely of manufactured articles. As shown by the accompanying tables, the Canadian importations from the United States greatly exceed in value those from Great Britain in almost every group. In textiles alone is there an approximate parity.

IMPORTS OF CANADA

Classes of Merchandise	From United Kingdom	From United States	From All Countries
	Dollars	Dollars	Dollars
Vegetable products (except chemicals, fibers, and wood)	34,603,501	98,530,605	203,417,431
Animal products (except chemicals and fibers)	5,960,932	32,996,830	49,259,558
Fibers, textiles and textile products	70,153,478	79,115,464	184,761,831
Wood, wood products, and paper	3,473,664	34,715,231	40,403,096
Iron and its products	17,905,166	158,029,982	181,196,800
Nonferrous metals and their products	5,303,872	38,911,300	47,692,985
Nonmetallic minerals and their products (except chemicals)	14,226,799	110,686,261	139,033,940
Chemicals and allied products	4,282,489	18,754,942	28,404,276
All other commodities	7,800,530	38,084,735	53,232,815
Total	163,710,431	609,825,350	927,402,732

EXPORTS OF CANADA

Classes of Merchandise	To United Kingdom	To United States	To All Countries
	Dollars	Dollars	Dollars
Vegetable products (except chemicals, fibers, and wood)	356,888,044	65,964,214	605,895,672
Animal products (except chemicals and fibers)	98,784,204	63,559,623	190,975,417
Fibers, textiles and textile products	1,244,060	4,621,774	8,940,046
Wood, wood products, and paper	19,131,234	237,898,369	278,674,960
Iron and its products	8,307,441	7,582,833	74,735,077
Nonferrous metals and their products	15,885,946	58,555,643	97,476,270
Nonmetallic minerals and their products (except chemicals)	1,220,494	17,244,986	24,568,845
Chemicals and allied products	3,318,614	9,204,155	17,498,128
All other commodities	3,469,539	10,258,431	16,428,376
Total	508,249,576	474,890,028	1,315,192,791

UNITED STATES

The preceding sections relate the story of commercial progress on the earth, from the days of ancient Babylon to the beginning of the 19th century. At the conclusion of this 4800-year period of development, world commerce had reached a yearly value of about one and one-half billion dollars. Of the total, the United States of America was credited with about one-tenth.

From 1800 to the present time, the increase in world commerce has been so amazingly rapid that, by comparison, all previous advances seem insignificant. From 1800 to the beginning of the World War, the rise of American foreign commerce was almost exactly proportional to that of the rest of the world.

In the following paragraphs, the development of foreign commerce in the United States is given especial attention. The corresponding growth in other nations is indicated by the commercial relations of these countries with America, and by the comparative importance of each in world trade.

The commerce of the English colonies in North America was such as would be expected between fertile, newly discovered lands, and the older, more advanced countries. Food and raw materials, consisting chiefly of flour, grain, tobacco, lumber, fish, potash, and indigo, were exported in exchange for textiles and other manufactured articles, and for colonial products such as sugar, molasses, coffee, and tea.

It is surprising to note that after the Revolution the United States continued to trade chiefly with England, although that country closed the ports of the West Indies to American ships. The European wars between England on one side, and France, Spain, and the Netherlands on the other, afforded the new nation its first great commercial opportunity. Having ships and sailors equal to any in the world, the American merchant marine developed rapidly, and carried a large share of the world's commerce while Europe was busily engaged in warfare.

This commercial growth received serious checks when France and England both placed arbitrary restrictions on neutral shipping. A general embargo, ordered by the American government in 1807 as a means of retaliation, proved even more disastrous. Commerce declined until the conclusion of the War of 1812, and then, after a few years of sharp fluctuations, experienced a long period of slow growth.

Expansion and Development. This period was, for the United States, one of active territorial expansion and economic development. The West grew rapidly, and in various parts of the country improved highways, new canals, or steamboats on the large rivers supplied better means of transportation. At the same time, more and better manufactured commodities were produced by industries which had originated or developed during the seven years between the passing of the Embargo act and the end of the War of 1812. Domestic manufacturers fought hard to retain the home market which had been created by the temporary shortage of foreign goods. They succeeded to a notable extent because their increased *production* was accompanied by an even greater increase in *demand*, together with great improvements in the natural means of *distribution*. Although the *per capita* consumption of

foreign goods decreased, the total amount of foreign trade continued to increase, and was carried chiefly by American ships. During this period the American merchant marine approached very closely in size that of Great Britain, and was second to none in skill and efficiency.

The change in the economic condition of the country is well shown by the changes in the list of exports. In 1800, grain amounted to one-third, and cotton to less than one-fourteenth, of all exported merchandise; in 1860, cotton accounted for four-sevenths of the total, and grain for only one-thirteenth. Manufactured goods, which stood very low on the earlier list, were second only to cotton in 1860.

Triangular Exchange. The South gave all of its energies to the production of cotton. The North developed extensive manufacturing industries, but it also produced sufficiently large amounts of grain and meat to supply the entire nation and still to have a surplus for export. From New Orleans, enormous quantities of cotton were shipped to Europe. Europe returned to New York textiles, articles manufactured from iron and steel, and luxuries. Finally, the cycle was completed and the South received compensation for its cotton in the form of food and manufactured products sent from the North.

Effects of Civil War. Intersectional warfare checked for a time the development of American commerce; it decided that the country should be one political unit; and it abolished slavery. It also had the effect of definitely marking the economic paths to be followed by the opposing sections. The world demand for cotton, and the consequent high prices paid for this staple, forced the South to resume the production of white fiber as rapidly as possible. In the North, a shortage of labor accentuated the advantages that were to be obtained by the extensive use of machinery in the factories and on the farms.

In an earlier paragraph, the year 1838 has been given as the beginning of the period in which ocean commerce was carried by steamships. Obviously, the change was not made abruptly in any single year. Sailing vessels, in 1850, were still carrying the larger part of seagoing traffic, although the more efficient steamer was gradually supplanting its rival. The use of railroads and of power machinery had a similar period of development.

1850 to 1900. During the second quarter of the 19th century the annual production of coal increased from one-half million to six million tons, and the economic value of railroads was clearly demonstrated. Between 1850 and 1860, thousands of miles of track were laid, especially in the middle west. Our domestic exports, which amounted to 316 million dollars in 1860, averaged less than 225 million dollars a year until 1870; but by 1880 they became 824 million, and in 1892 they exceeded one billion dollars for the first time.

The last half of the 19th century was marked throughout the civilized world by the expansion of industrial and commercial activities. That the United States was able to hold a position of decided commercial importance is shown by the tables, *Economic Growth of the United States* and *World's Progress in Commerce and Production.*

Merchant Marine. This position was retained in spite of a great decline in American shipping. Many conditions contributed to this marked decrease in tonnage. The country was expanding and developing so rapidly that there were unusual opportunities for profits in domestic rather than in foreign trade. Higher tariff rates gave protection to home industries but did not help the merchant marine. Lower priced, foreign built ships were not purchased because, according to the law, they could not obtain American registry. And, finally, we were not prepared to build iron ships at a cost that could compete with those built in England.

In 1860, 70 per cent of our exports and 63 per cent of the imports were carried by American vessels, but, by 1910, only 7.5 per cent of the exports and 10 per cent of the imports were transported under the flag of the United States. The foreign commerce of the United States amounted to $21.26 *per capita* in 1860. Fifty years later, although population was three times as great, the figures had increased to $34.78. In 1920, following the World War, the amount became $120.81, but fell to $78.72 by 1927.

COMMERCIAL STATISTICS OF LEADING COUNTRIES.

Showing their trade with the United States

Country	Year	Total Imports	Imports from United States		Total Exports	Exports to the United States	
		Dollars	Dollars	Per Cent	Dollars	Dollars	Per Cent
Argentina	1924	647,478,000	142,723,000	22.0	790,210,000	56,129,000	7.1
Australasia:							
Australia	1924	618,933,000	152,168,000	24.6	494,729,000	29,147,000	5.9
New Zealand	1924	214,344,000	34,415,000	16.1	226,581,000	14,043,000	6.2
Austria	1924	485,067,000	27,018,000	5.6	276,489,000	5,719,000	2.1
Belgium	1924	815,802,000	90,795,000	11.1	644,600,000	50,604,000	9.0
Belgian Congo	1924	25,648,000	498,000	1.9	24,976,000	1,186,000	4.7
Bolivia	1924	18,568,000	5,292,000	28.5	34,184,000	7,574,000	22.2
Brazil	1924	305,181,000	73,810,000	24.2	422,684,000	181,222,000	41.4
Bulgaria	1924	40,463,000	501,000	1.2	35,693,000	648,000	1.8
Canada	1926	927,403,000	609,825,000	65.7	1,315,193,000	474,890,000	36.1
Central America:							
British Honduras	1924	3,894,000	1,935,000	49.7	3,338,000	2,642,000	79.1
Costa Rica	1924	12,003,000	6,807,000	56.7	16,565,000	7,938,000	47.9
Guatemala	1924	18,271,000	9,199,000	50.3	24,457,000	12,329,000	50.4
Honduras	1924	11,138,000	9,784,000	87.8	7,897,000	7,186,000	91.0
Nicaragua	1924	8,807,000	6,425,000	71.8	12,990,000	7,442,000	57.3
Panama	1924	13,769,000	8,976,000	65.2	3,008,000	2,412,000	80.2
Salvador	1924	14,006,000	8,498,000	60.7	24,368,000	6,333,000	25.2
Chile	1924	120,340,000	28,279,000	23.5	199,252,000	85,581,000	43.0
China	1924	925,736,000	170,124,000	18.4	687,582,000	89,762,000	13.1
Colombia	1924	51,513,000	25,777,000	50.0	69,490,000	56,190,000	80.9
Cuba	1924	289,831,000	194,197,000	67.0	434,865,000	362,407,000	83.3
Czechoslovakia	1924	468,380,000	26,276,000	5.6	503,259,000	21,242,000	4.2
Denmark	1924	395,712,000	49,088,000	12.4	330,453,000	4,623,000	1.4
Dominican Republic	1924	21,581,000	15,865,000	73.5	30,263,000	10,071,000	33.3
Ecuador	1924	10,521,000	4,240,000	40.3	12,396,000	3,843,000	31.0
Egypt	1924	229,853,000	8,148,000	3.5	297,794,000	32,101,000	10.8
Esthonia	1924	21,077,000	2,644,000	12.5	20,207,000	75,000	.4
Finland	1924	118,245,000	15,775,000	13.3	122,370,000	7,541,000	6.2
France	1924	2,103,245,000	292,523,000	13.9	2,218,775,000	165,017,000	8.0
Algeria	1924	166,964,000	5,636,000	3.4	115,518,000	1,481,000	1.3
French Indo-China	1924	72,725,000	2,159,000	3.0	92,772,000	2,007,000	2.2
Tunis	1924	48,595,000	1,832,000	3.8	30,493,000	376,000	1.2

COMMERCIAL STATISTICS OF LEADING COUNTRIES—Con.

Showing their trade with the United States

Country	Year	Total Imports	Imports from United States		Total Exports	Exports to the United States	
		Dollars	Dollars	Per Cent	Dollars	Dollars	Per Cent
Germany	1924	2,169,716,000	406,635,000	18.7	1,559,844,000	117,033,000	7.5
Greece	1924	144,163,000	19,887,000	13.8	58,658,000	10,634,000	18.1
Haiti	1924	14,696,000	11,821,000	80.4	14,176,000	1,338,000	9.4
Hungary	1924	142,388,000	3,593,000	2.5	116,497,000	615,000	.5
India, British	1924	774,755,000	44,979,000	5.8	1,172,959,000	102,635,000	8.8
Irish Free State	1924	304,293,000	16,381,000	5.4	222,093,000	1,065,000	.5
Italy	1924	844,566,000	202,555,000	24.0	626,283,000	53,682,000	8.6
Japan	1924	1,010,451,000	276,418,000	27.4	744,240,000	309,073,000	41.5
Chosen	1924	127,508,000	4,715,000	3.7	135,517,000	52,000	.04
Jugoslavia	1924	105,386,000	4,113,000	3.9	122,268,000	649,000	.5
Latvia	1924	49,390,000	2,004,000	4.1	34,659,000	738,000	2.3
Liberia	1925	2,115,000	77,000	3.6	1,715,000	329,000	13.9
Lithuania	1924	20,653,000	988,000	4.8	26,658,000	812,000	3.0
Malaya, British*	1925	753,938,000	11,388,000	1.5	693,892,000	314,023,000	45.3
Mexico	1924	155,084,000	112,332,000	72.4	238,938,000	183,460,000	76.8
Morocco	1924	42,389,000	1,570,000	3.5	30,419,000	465,000	1.2
Netherlands	1924	903,127,000	103,409,000	11.5	634,552,000	22,222,000	3.5
Dutch East Indies	1924	259,173,000	17,118,000	6.6	584,858,000	55,582,000	9.5
Dutch West Indies	1925	32,153,000	9,298,000	26.4	27,971,000	4,207,000	15.0
Norway	1924	214,219,000	29,369,000	13.7	145,192,000	18,441,000	12.7
Paraguay	1924	9,661,000	1,327,000	13.7	9,720,000	1,133,000	11.7
Peru	1924	73,829,000	28,857,000	39.1	102,842,000	34,390,000	33.4
Poland	1924	285,376,000	35,502,000	12.4	244,312,000	1,378,000	.6
Portugal	1924	95,872,000	8,085,000	8.4	31,310,000	3,041,000	9.7
Rumania	1924	130,491,000	1,192,000	.9	138,617,000	99,000	.07
Russia	1924	199,716,000	49,729,000	24.9	247,368,000	4,389,000	1.8
Siam	1924	63,239,000	1,700,000	2.7	65,696,000	682,000	1.0
Spain	1924	338,266,000	56,822,000	16.8	233,119,000	23,541,000	10.1
Sweden	1924	377,808,000	60,281,000	16.0	334,434,000	40,530,000	12.1
Switzerland	1924	452,654,000	37,661,000	8.3	363,934,000	32,929,000	9.0
Turkey	1925	128,080,000	14,648,000	11.4	102,073,000	3,380,000	3.3
Union of So. Africa	1924	263,350,000	38,806,000	14.7	156,541,000	5,368,000	3.4
United Kingdom	1926	6,040,317,000	970,800,000	16.0	3,778,447,000	412,000,000	10.9
United States	1927	4,253,000,000	.....	....	4,968,000,000	.....	....
Alaska	1926	32,131,000	31,587,000	98.6	73,822,000	73,301,000	99.3
Hawaii	1926	86,517,000	76,263,000	88.1	100,145,000	98,261,000	98.1
Philippine Islands	1926	119,299,000	71,576,000	60.0	136,884,000	100,003,000	73.0
Porto Rico	1926	97,417,000	84,753,000	87.0	97,747,000	90,167,000	92.2
Uruguay	1924	66,554,000	15,954,000	24.0	87,894,000	5,844,000	6.6
Venezuela	1924	41,496,000	22,984,000	55.4	41,027,000	6,303,000	15.4

*Totals for Straits Settlements; these include imports from and exports to other British Malay states.

Exports and Imports of the U. S. American exports are composed of large quantities of comparatively few types of products. In 1860, 80 per cent of these were agricultural. In 1927, the most important exports, in the order of their value, were cotton, petroleum, machinery, automobiles, wheat and flour, iron and steel mill products, coal and coke, packing house products, tobacco, fruits and nuts, cotton goods, and lumber, the foregoing twelve groups comprising three-fourths of the total amount.

The imports consist mainly of manufactured articles, raw materials, and food. Manufactured goods, which, in 1860, amounted to two-thirds of the total, in 1927, comprised barely two-fifths, while raw materials totaled fully one-third, and foods about one-fourth, of the whole. The item of food is composed chiefly of luxuries and of tropical products, among which coffee, sugar, fruits and nuts, cocoa, and tea usually rank in the order named.

Customers of the U. S. In 1913 the total foreign trade of the United States was 4240 million dollars. The leading nations sharing this trade were: England 18 per cent, Canada 13, Germany 12.5, France 7, Cuba 4.5, Japan 3.8, The Netherlands 3.8, Brazil 3.3, Italy 3.2, and Mexico 3.1.

In 1927 the total foreign trade of the United States exceeded 9300 million dollars, with marked changes in the percentages shared by some of the chief participating countries indicated as follows: England 14.3 per cent, Canada 13.6, Japan 7.8, Germany 6.8, Cuba 4.6, France 4.2, Brazil 3.4, British Malaya 3.4, China 3.3, Mexico 2.9, Italy 2.7, British India 2. 6, The Netherlands 2. 6, Argentina 2.5, and Australia 2.3. The most noteworthy recent development is the greatly increased import trade with Asiatic countries, notably with Japan and with British Malaya.

The following table shows how the commerce of the United States is divided among the grand divisions of the world. It indicates also that some important changes are taking place in the direction of American foreign trade.

WHERE THE U. S. BUYS AND SELLS

Grand Division	U. S. Exports			U. S. Imports		
	1913	1921	1927	1913	1921	1927
	%	%	%	%	%	%
Europe	60.4	52.7	48.3	48.2	30.5	29.7
N. America	24.2	25.2	24.4	21.8	30.1	23.6
Asia	5.0	10.8	11.8	15.7	22.5	30.6
S. America	5.9	6.1	9.1	11.1	11.8	12.4
Oceania	3.3	3.6	4.3	1.9	3.5	1.4
Africa	1.2	1.6	2.1	1.3	1.6	2.3

Internal Commerce of the U. S. Although the United States ranks high in world commerce, the internal or domestic trade of the country is of far greater importance. The larger proportion of American commerce never crosses the national boundaries. Within these boundaries, sections of the most widely diversified economic and geographical character are able to specialize in the production of those commodities to which the locality is best adapted. Excess production may be transported to any part of the Union, or may be shipped out of the country without any hindrance of toll or tariff except the cost of transportation.

Each year the internal commerce of the United States exceeds the total foreign trade of the entire world. In general, it is only the commodities which are produced in excess of domestic requirements that can be used in exchange for foreign wares.

Seaports. The relative importance of the gateways through which international commerce must pass, if carried by ships, is shown in detail by the table, *Commerce of Principal World Ports.*

World Commerce. Previous to the World War, England led all other nations in total volume of foreign commerce; Germany ranked second, the United States third, France fourth, and the Netherlands fifth. Inspection of the table, *Commercial Statistics of Leading Countries*, shows that, in 1926, the United Kingdom still held the first position, the United States was second, France third, Germany fourth, Canada fifth, and Italy sixth. Germany lost the second position, which she had reached by definitely directing all of the economic and political forces of the empire towards the attainment of commercial supremacy. The World War immensely strengthened the position of the United States in the world's markets. To meet this situation, various European nations proceeded to organize international trusts, or cartels. Among the most important are those for marketing steel, potash, and chemicals.

Characteristics of Modern Commerce. Commerce is a natural process. It permits of a division of labor, helps to adjust the productive inequalities of different lands and peoples, and makes possible the development of manufacturing and the consequent growth of large cities.

In the medieval period, when transportation was difficult and consequently expensive, commerce served chiefly to provide *luxuries* for the rich and powerful. In later times, it developed to such a degree that various *comforts* and *conveniences* enjoyed by the ordinary individual depended upon commercial intercourse. Today, commerce supplies the *necessities* of existence to a large proportion of the population in all civilized countries. Consequently, the wares most characteristic of modern commerce are food, raw materials, manufactured articles, and fuel. The qualities characterizing modern commerce are safety, regularity, economy, and sensitiveness. These are due largely to the great improvements that have been made in transportation, communication, and finance.

Great reductions in the cost of transportation now make commercially possible the shipment of low priced materials over long distances. The rapid means of communication furnished by cables and radio permit floating cargoes to be diverted from one destination to another according to market conditions. By these means prices are rendered more stable, the stream of commerce is more regular, and its cost is diminished.

ECONOMIC DEPENDENCE OF THE UNITED STATES

The United States is more favorably situated in regard to raw materials than any other country. Nevertheless, her high scale of living and enormous consuming power create many needs that cannot be satisfied by materials obtainable within her own territories. The following table presents a summary of the most essential commodities for which she is dependent chiefly on foreign sources of supply. Those in *italics* are of especial importance for national defense in the event of war. An asterisk (*) appears after those of which there is practically no supply native to the United States.

Material	Chief Uses	Approximate Amount Imported 000 Omitted	Chief Sources
*Antimony**	printing, glass, enamels, cables	9 tons	China
Bananas*	food	47,384 bnchs.	Honduras, Guatemala
Bristles	brushes	6,563 lbs.	China
Camphor	celluloid, photographic films	7,488 lbs.	Formosa
Castor Beans*	lubrication, perfumery	88,539 lbs.	India, Brasil, Spain
Chalk	crayons, paints, polishes, linoleum	128 tons	England, France
Chicle*	chewing gum	9,208 lbs.	Mexico
Chinawood Oil*	paint, varnishes	87,292 lbs.	China
Chromite	hard steels, paints	129 tons	Rhodesia, India
Cobalt*	steel alloys, colored enamels	284 lbs.	Canada
Cocoa*	candy, beverages	414,237 lbs.	W. Africa
Coffee*	beverage	1,420,870 lbs.	Brasil, Colombia
*Cork**	bottle stoppers, life preservers, insulation	123 tons	Spain, Algeria
Flaxseed	paint oil	24,332 bu.	Argentina
Graphite	lubrication, polish, paints, lead pencils	19,818 tons	Mexico, Madagascar
Gutta Percha*	insulation	3,155 lbs.	East Indies
Hat Braids	hats	1,625,289 yds.	Japan, China, Italy
Hides and Skins (exc. furs)	shoe leather, travel goods, bookbinding, bags	531,576 lbs.	India and other countries
*Iodine**	disinfectant	273 lbs.	Chile
*Jute**	twine, burlap, bags, linoleum, carpet	415 tons	India
Kauri Gum*	varnishes	8,917 lbs.	N. Zealand
Manganese	structural steel	425 tons	Brazil, Russia
Mercury	explosives, medicinal agent	1,569 lbs.	Italy, Spain
Mica	electrical equipment, lubrication	7,189 lbs.	India, Canada
*Nickel**	steel, electroplating	20 tons	Canada
Nitrate of Soda	fertilizers, explosives	974 tons	Chile
Nutgalls*	dyeing, inks, color printing	3,945 lbs.	China, Turkey
*Nux Vomica**	medicinal agent	2,196 lbs.	India
*Opium**	medicinal agent	112 lbs.	India, China
Palm Oil	soap, tin plate	128,495 lbs.	W. Africa
Perilla Oil	paints	6,400 lbs.	E. Asia
Pigments (mineral earth)	paints	50 tons	Italy, Turkey
Platinum	electrical equipment, jewelry, chemical industries	96 oz.	Russia, Colombia
Potash	fertilizer	665 tons	Germany
Pulp	paper	1,362 tons	Canada
Quebracho Extract*	leather tanning	54 tons	Argentina, Paraguay
*Quinine**	medicinal agent	5,050 oz.	Java, Peru
*Cinchona Bark**	quinine	2,396 lbs.	Java, Peru
Rabbit Fur	felt hats	96,695 skins	Australia, Belgium
Rattan*	furniture	18,258 lbs.	East Indies
*Rubber**	tires, electrical equipment, footwear, raincoats	734,845 lbs.	East Indies
*Shellac**	varnishes, insulation, phonograph records, paint	38,447 lbs.	British India
*Silk, Raw**	textiles	51,281 lbs.	Japan
*Sisal Hemp**	binder twine	114 tons	Mexico, Yucatan
Sugar	food, confections	8,271,607 lbs.	Cuba
Tagua Nut*	buttons	24 tons	Colombia, Panama
Tea*	beverage	105,138 lbs.	Japan, China
Tin	canning, dyeing, textile mfr.	80 tons	E. Indies Bolivia
Tungsten	high-speed steels, electric lights	615 lbs.	India, China, Spain
Vanadium	hard steels	4,177 lbs.	Peru
Wool, Carpet	rugs	122,399 lbs.	China
Wool, Other	clothing	271,851 lbs.	Argentina Australia, N. Zealand

COMMERCIAL RAW MATERIALS

By far the most important commercial raw materials are those commodities which are utilized for food, for clothing, for the production of machinery and of power, and for structural purposes. These are obtained from all parts of the earth as contributions from the three kingdoms of nature—the vegetable, the animal, and the mineral.

The following classification is based primarily on this natural division, and secondarily on the purpose for which each commodity is generally employed. In the various groupings are included the most important commercial raw materials, together with representative examples of a vast number which are of minor importance.

VEGETABLE PRODUCTS

Cereals: Wheat,—including emmer and spelt,—rice, corn, oats, rye, barley, the sorghums, millet, and buckwheat (not a true cereal but used as such).

Other Starchy Foods: Potatoes, yams, sweet potatoes, arrowroot, cassava (tapioca). See *Starch*.

Pulses: Peas, beans, lentils, soy beans.

Sugars: Cane sugar, beet sugar, maple sugar, palm sugar (jaggery), and glucose.

Vegetables: Artichoke, asparagus, beans (string), beet, cabbage, carrot, cauliflower, celery, cucumber, eggplant, endive, garlic, kohl-rabi, leek, lettuce, mushrooms, okra, onion, parsnip, peas (green), pumpkin, radish, rhubarb, spinach, rutabaga, squash, tomato, turnip, and various others.

Fruits: Orchard fruits,—apple, apricot, cherry, peach, pear, plum, prune, and quince; various grapes,—table, raisin, wine, and currant; berry fruits,—blackberry, blueberry, cranberry, currant, gooseberry, huckleberry, loganberry, mulberry, raspberry, and strawberry; melon fruits,—cassaba melon, muskmelon, watermelon; citrous fruits,—citron, grapefruit, kumquat, lemon, lime, and orange; subtropical fruits,—carob (Saint-John's-bread), date, fig, olive, persimmon, and pomegranate; tropical fruits,—avocado, banana, guava, mango, papaw, soursop, and tuna, or prickly pear.

Nuts: Almond (sweet and bitter),—Jordan almonds are a choice hard-shelled variety of sweet almond from Malaga, Spain; chestnut, native to the eastern United States, also imported from southern Europe; cashew nut, from India and Brazil,—poisonous until roasted; coconut, commonly grown in tropical countries; filbert, grown in southern Europe,—see *Hazelnut*; hickory nut, native to the eastern United States; litchi nut, a dried fruit from China; peanut, not a true nut but the fruit of a legume; pecan, both wild and cultivated in the southern United States; pine nuts, oily seeds of pines native to southern Europe and southwestern Asia; piñons, nuts from pines native to the southwestern United States and Mexico; pistachio, grown in Mediterranean countries; and the English walnut, extensively cultivated.

Beverages. The plant materials chiefly used for making beverages are coffee, the cleaned seeds of the coffee tree; cocoa, prepared from the seeds of cacao; maté, the dried leaves of a South American holly; and tea, the variously cured leaves of the Asiatic tea shrub. With these are sometimes grouped fermented beverages, such as beer, wine, sake (Japan), and pulque (Mexico), and also distilled liquors, such as whisky, brandy, rum, gin, mescal (Mexico), arrack (Orient), and vodka (Russia), which, strictly speaking, are manufactured products.

Timber. The most important kinds of commercial timber cut in the United States are shown in the table entitled *Production of Lumber in the United States*. Of imported woods, the most valuable include mahogany, teak, lignum-vitæ, Spanish cedar, Circassian walnut, rosewood, or Jacaranda (from Brazil), satinwood (from the East Indies and West Indies), ebony, greenhart (from South America), lancewood (from Jamaica), and rule boxwood (from West Indies and South America).

Fibers. Textile and cordage fibers include cotton, flax, hemp, jute, ramie, manila hemp, sisal hemp, bowstring hemp, sunn hemp, coir, pineapple fiber, and raffia. Among brush fibers are broom corn, piassaba (from the West Indies and from Brazil), saw palmetto (from Florida), and palmyra (from Ceylon). Other fibers or fiber-like products are kapok, or silk cotton; luffa, a vegetable sponge; Spanish moss, from the southern United States, used for upholstery; rattan, from the East Indies, used in making furniture, baskets, and whips. Fibers used for paper making are exceedingly numerous (See *Paper.*). Panama hat straw, or toquilla, is prepared from the young leaves of a South American screw pine.

Alkaloidal Stimulants and Narcotics. These include tobacco, the most extensively used narcotic; cola leaves, chewed by the Indians of South America; pituri leaves, used by the natives of Australia; the kola nut, containing caffeine, chewed by the natives of Africa; betel leaf and betel nut, widely used by Malayan peoples; hashish, from Indian hemp, used by the peoples of southern Asia; and opium, the dried juice of the poppy, used widely in the Orient.

Medicinal Plants. Many plants contain medicinal principles which experience has proved to be of such value that they are employed more or less widely by all civilized nations. Among plants used for their leaves are belladonna, one source of atropin; coca, the source of cocaine; digitalis, or purple foxglove, grown in Europe and in America; and senna, from Egypt and India. Some of the best-known medicinal roots are aconite, hydrastis (golden seal), gentian, ginseng, licorice, may apple, rhubarb, and sarsaparilla.

Among the most highly prized medicinal barks are cascara sagrada, native to California and Oregon, and cinchona, or Peruvian bark, the source of quinine, now obtained chiefly from cultivated trees in Java. Nux vomica (the source of strychnine), chaulmoogra, and the castor oil plant are valued for the medicinal properties of their seeds. Plants yielding medicinal juices include aloes and also the poppy, the source of opium. Among medicinal resins are asafetida, balsam of Peru, and guaiac.

Gums and Resins: Rubber, gutta-percha, balata, chicle (See *Sapodilla.*), gum arabic, gum Senegal, gum tragacanth, turpentine, rosin, and copal (See *Varnish.*).

Tanning Materials. These include various barks, woods, roots, fruits, and nuts which contain tannin. Among these are oak bark, hemlock bark, chestnut bark and wood, sumac leaves, canaigre root, myrobalans (unripe fruit), divi-divi (seed pods), quebracho wood, gambier (twigs and leaves), mangrove bark, and oak galls.

Dyestuffs: Logwood, fustic, Brazilwood, Lima wood, Osage orange, indigo, archil, and cudbear.

Vegetable Oils. *Drying oils*, used extensively in paints and varnish, include linseed oil, perilla oil, Chinese wood oil (tung oil), candlenut oil, hempseed oil, walnut oil, soy bean oil, poppy-seed oil, and sunflower oil. *Semidrying oils*, used for various purposes, include corn oil, cottonseed oil, sesame oil (benne oil), rape oil (colza oil), olive oil, apricot kernel oil, peach kernel oil, almond oil, castor oil, and peanut oil.

Vegetable Fats. These substances, which are solid at ordinary temperatures, include cocoa butter (See *Chocolate.*), coconut oil, palm oil, palm kernel oil, and Japan wax.

Essential Oils. Many of these form the basis of natural perfumes; as, for example, attar of roses, geranium oil, lemon-grass oil, lavender oil, neroli, ylang-ylang oil, and patchouli oil. Peppermint oil and spearmint oil are widely used for many purposes.

Spices and Condiments: Allspice (or pimento), cinnamon, cloves, mace, mustard, pepper, tonka bean, and vanilla.

ANIMAL PRODUCTS

Food. Beef, pork, mutton, poultry, and game form the chief items in the meat supply of most civilized countries. In some parts of the world, meat from the whale, horse, camel, and reindeer is also used. Eggs, almost universally an important article of food, are a commercial source of albumin and are used also in tanning. Milk is the source of butter, cheese, casein, milk sugar, and various fermented beverages, such as koumiss and leben. Butter, cheese, condensed milk, preserved meats, canned meats, and meat extracts, though often classified as manufactured products, may also be listed here.

Fish, oysters, clams, lobsters, crabs, and shrimps, marketed fresh, dried, canned, or otherwise preserved, are used in great quantities for food. See *Fisheries*.

Animal Oils. Oils used for food include butter, lard, tallow, and oleo oil (See *Oleomargarine*.). Medicinal cod-liver oil is expressed from the livers of freshly caught cod. Large amounts of other fish oils are obtained, especially menhaden oil. (See *Fisheries*.) Sperm oil, valued as a lubricant, is obtained from the sperm whale. Wool wax, widely used in making salves and ointments, is the natural grease from sheep's wool.

Animal Fibers. Wool, produced chiefly by the sheep, is obtained also from the alpaca in Peru and from the Kashmir goat of central Asia. Silk, produced by the silkworm, ranks next in value to wool among animal fibers. Long hair from the tails of cows and from the manes and tails of horses is used in making bows for musical instruments, for weaving into haircloth, and for stuffing mattresses. Short hair from various animals is used as stuffing material and in making plaster. Swine bristles from Russia and China are largely used in making brushes. The hair of the Australian rabbit is one of the most important materials entering into the manufacture of felt hats.

Hides and Skins. See *Leather*.

Furs. The most expensive furs are probably those of the sea otter, the Russian sable, and the silver fox. Among other valuable furs are those of the seal, ermine, marten, weasel, mink, skunk, mole, chinchilla, beaver, muskrat, karakul sheep (yielding the Persian lambskin), various species of fox, wolf, and bear, and the larger cats, such as the lion, the tiger, and the leopard.

Horns, Hoofs, Bones, and Tusks. Ivory is obtained chiefly from the tusks of the elephant, but also from the tusks of the hippopotamus, the horn of the narwhal, the tusks of the walrus, and the tusks of the extinct mammoth whose remains are still found in Siberia. Horns and hoofs are utilized for the production of buttons, combs, ornaments, and of cyanide compounds. Bones are used for making buttons and ornaments, for the production of fertilizer, and for the preparation of bone black and bone charcoal.

Bird Products. Besides eggs, the most important bird products include feathers, plumes (See *Ostrich*.), edible birds' nests, eider down (See *Eider*.), and guano (See *Fertilizer*.).

Insect Products. In addition to silk, the most valuable of all, insect products include honey, beeswax, lac, and cochineal.

MINERAL PRODUCTS

The immense number of commercial products obtained from the mineral kingdom may be classified as (1) ores, metals, and other minerals; (2) fuels; (3) building materials; and (4) gems and precious stones. These are described in detail in the sections entitled *Mining and Mineral Production*; *Useful and Precious Metals*; *Rocks, Minerals, Gems, and Precious Stones*; and *Everyday Chemicals*.

COMMUNICATION

By communication is meant the transference of thoughts and of information from person to person. Underlying, as it does, all human cooperation, it has an importance which can scarcely be exaggerated. The initial step, and unquestionably the most important in making possible an unimpeded exchange of ideas, was the invention of spoken and, later, of written language.

A great length of time elapsed during which communication between distant points could be effected only by means of messages, oral or written, which were carried by messengers. The great development of electrical signaling devices and the vast improvements which have taken place during the past century in the means of transportation have reduced to comparative insignificance the time element in communication. With the help of the printing press, they bring to the whole population of every civilized country a knowledge of all events of importance in the whole world within a few hours of the time of their occurrence.

Early Postal Systems. The complicated postal organization of today had its origin in the system of private messengers employed by ancient rulers. Each messenger was given a fixed station where he should always hold himself in readiness to receive a message and to carry it to the next post. The emperor Diocletian was apparently the first to establish such a post open to the use of private persons. In the 12th century a commercial post was organized by the Hanse Towns of northern Germany, and in the 13th century a postal system was developed by the University of Paris for the benefit of its students. The national postal system in France was established by Louis XI in 1464.

Postal System in England. In England, private postal systems were used in the 14th century, but it was not until 1533 that Sir Brian Tuke was appointed the first "Master of the Post" by Henry VIII. Improvements in the service were gradually made, but, in 1812, the cost of sending a single sheet varied from 8 cents to 35 cents according to the distance. A money order system was begun in 1792 for the convenience of soldiers and sailors.

Due to reforms initiated by Sir Rowland Hill, a rate of one penny was established throughout the United Kingdom in 1840. The first adhesive postage stamp was issued in May of that year. This one-penny stamp was black and carried the profile of Queen Victoria. It had to be cut from the printed sheet. Perforated stamps were not officially issued until 1854. If the postage was not prepaid by means of a stamp, a double rate was charged upon delivery of the letter. The use of postage stamps made possible the mail box, which was first introduced in 1855.

Universal Postal Union. In 1874 an International Postal Union was organized at Berne, Switzerland. This was followed in 1878 by a larger organization known as the Universal Postal Union, which includes practically all nations on the globe. All these countries are declared to be "a single postal territory for the reciprocal exchange of correspondence." Postal accounts between countries are adjusted every three years by checking the amount of correspondence for a month. In all countries the one-cent stamp, or its equivalent, is green, the two-cent stamp, pink, and the five-cent stamp, blue.

Postal System in America. The general court of Massachusetts in 1639 ordered that the house of Richard Fairbank was to be the official distributing point for overseas mail. In 1691, Thomas Neale was by royal patent granted authority for the establishment and control of an American post, and, in 1693, Andrew Hamilton was appointed the first colonial postmaster-general. In 1707, control of the post was purchased from Neale by the English

government, which held it until the Revolution.

Under the new order, Benjamin Franklin was appointed the first postmaster by the Continental Congress in 1775. The first Federal postage stamps were issued in 1847, although in 1845 the postmasters of various large cities were permitted to issue five- and ten-cent stamps at their own expense. Stamped envelopes were first used in 1853.

It was not, however, until 1856 that prepayment was required and stamps came into general use. In 1851 the rate was reduced to three cents up to a distance of 3000 miles, and in 1863, under Lincoln, this rate was established for all distances and free delivery was begun in some of the larger cities.

COMMUNICATION PRINCIPAL COUNTRIES

Country	Post Offices Number	Telephones Number	Telegraphs Miles of Line
Argentina	3,968	189,036	200,442
Australia	8,767	362,949	114,048
Austria	2,702	153,043	48,135
Belgium	1,680	159,072	25,733
Bolivia	359	1,824	6,986
Brazil	4,181	102,984	97,034
Bulgaria	4,904	9,000	20,000
Canada	12,376	1,144,095	284,121
Central America:			
British Honduras	34	320	350
Costa Rica	299	1,801	2,125
Guatemala	358	2,111	4,817
Honduras	253	1,937	4,635
Nicaragua	124	2,000	3,063
Panama	96	6,814	4,112
Salvador	206	3,035	2,865
Ceylon	625	3,000	7,426
Chile	979	35,164	45,116
China	11,790	117,774	84,847
Colombia	934	17,342	15,538
Cuba	762	62,114	10,939
Czechoslovakia	4,558	120,548	44,298
Denmark	1,382	316,397	9,064
Dominican Republic	88	1,546	311
Ecuador	217	4,518	4,555
Egypt	3,030	35,744	26,973
Esthonia	125	9,805	5,894
Federated Malay States	145	2,436	3,290
Finland	2,713	85,000	9,758
France	15,698	737,198	474,228
Algeria	6,725	13,414	25,911
Tunis	497	14,878	6,638
Germany	32,623	2,588,016	558,987
Greece	1,112	5,500	30,000
Haiti	92	643	950
Hungary	1,791	78,451	51,468
India, British	19,491	43,239	392,660
Irish Free State	.....	21,853	22,983
Italy	11,000	200,000	264,000
Japan	8,546	636,736	176,339
Chosen (Korea)	652	.....	20,467
Jugoslavia	3,537	29,942	55,484
Latvia	330	18,843	5,996
Lithuania	389	4,420	19,578
Mexico	2,684	54,465	81,376
Netherlands	1,560	214,041	28,818
Dutch East Indies	542	40,963	20,032
Newfoundland	864	.....	5,200
New Zealand	2,035	130,186	25,814
Norway	3,969	173,752	25,067
Paraguay	385	461	2,223
Peru	910	11,000	10,691
Poland	3,739	120,230	60,005
Portugal	7,922	20,956	19,500
Rumania	6,626	41,755	50,757
Russia	5,929	192,782	382,709
Siam	365	1,569	6,465
Spain	11,412	113,000	83,000
Sweden	3,724	436,340	54,503
Switzerland	4,010	195,525	24,674
Union of South Africa	2,887	80,689	45,830
United Kingdom	21,380	1,379,656	327,890
United States	50,910	16,935,918	2,035,000
Alaska	164	.....	762
Hawaii	93	18,804	0
Philippine Is.	914	16,966	9,521
Porto Rico	92	12,760	1,067
Uruguay	1,216	26,051	6,404
Venezuela	379	12,055	6,883

A money order system was established in 1864; postal cards came into use in 1873; the two-cent rate went into effect October 1883; a special delivery service, for which an extra charge was made, began in October 1885; and rural free delivery was inaugurated in 1896. A two-cent rate between the United States and England was established in 1908.

Parcel Post Rates. By the provisions of the general parcel post act which took effect January 1, 1913, and by its subsequent revision, the United States and certain other territories are divided into units of area which are the basis of eight postal zones. The zones represent an area having a mean radial distance of 50, 150, 300, 600, 1000, 1400, 1800, all beyond 1800, miles from the center of any given unit of area which is the mailing point.

Weight Pounds	Local Rate	1st Zone Rate	2nd Zone Rate	3rd Zone Rate	4th Zone Rate	5th Zone Rate	6th Zone Rate	7th Zone Rate	8th Zone Rate
1	$0.07	$0.07	$0.07	$0.08	$0.08	$0.09	$0.10	$0.12	$0.13
2	.08	.08	.08	.10	.12	.15	.18	.22	.25
3	.08	.09	.09	.12	.16	.21	.26	.32	.37
4	.09	.10	.10	.14	.20	.27	.34	.42	.49
5	.09	.11	.11	.16	.24	.33	.42	.52	.61
6	.10	.12	.12	.18	.28	.39	.50	.62	.73
7	.10	.13	.13	.20	.32	.45	.58	.72	.85
8	.11	.14	.14	.22	.36	.51	.66	.82	.97
9	.11	.15	.15	.24	.40	.57	.74	.92	1.09
10	.12	.16	.16	.26	.44	.63	.82	1.02	1.21
11	.12	.17	.17	.28	.48	.69	.90	1.12	1.33
12	.13	.18	.18	.30	.52	.75	.98	1.22	1.45
13	.13	.19	.19	.32	.56	.81	1.06	1.32	1.57
14	.14	.20	.20	.34	.60	.87	1.14	1.42	1.69
15	.14	.21	.21	.36	.64	.93	1.22	1.52	1.81
16	.15	.22	.22	.38	.68	.99	1.30	1.62	1.93
17	.15	.23	.23	.40	.72	1.05	1.38	1.72	2.05
18	.16	.24	.24	.42	.76	1.11	1.46	1.82	2.17
19	.16	.25	.25	.44	.80	1.17	1.54	1.92	2.29
20	.17	.26	.26	.46	.84	1.23	1.62	2.02	2.41
21	.17	.27	.27	.48	.88	1.29	1.70	2.12	2.53
22	.18	.28	.28	.50	.92	1.35	1.78	2.22	2.65
23	.18	.29	.29	.52	.96	1.41	1.86	2.32	2.77
24	.19	.30	.30	.54	1.00	1.47	1.94	2.42	2.89
25	.19	.31	.31	.56	1.04	1.53	2.02	2.52	3.01
26	.20	.32	.32	.58	1.08	1.59	2.10	2.62	3.13
27	.20	.33	.33	.60	1.12	1.65	2.18	2.72	3.25
28	.21	.34	.34	.62	1.16	1.71	2.26	2.82	3.37
29	.21	.35	.35	.64	1.20	1.77	2.34	2.92	3.49
30	.22	.36	.36	.66	1.24	1.83	2.42	3.02	3.61
31	.22	.37	.37	.68	1.28	1.89	2.50	3.12	3.73
32	.23	.38	.38	.70	1.32	1.95	2.58	3.22	3.85
33	.23	.39	.39	.72	1.36	2.01	2.66	3.32	3.97
34	.24	.40	.40	.74	1.40	2.07	2.74	3.42	4.09
35	.24	.41	.41	.76	1.44	2.13	2.82	3.52	4.21
36	.25	.42	.42	.78	1.48	2.19	2.90	3.62	4.33
37	.25	.43	.43	.80	1.52	2.25	2.98	3.72	4.45
38	.26	.44	.44	.82	1.56	2.31	3.06	3.82	4.57
39	.26	.45	.45	.84	1.60	2.37	3.14	3.92	4.69
40	.27	.46	.46	.86	1.64	2.43	3.22	4.02	4.81
41	.27	.47	.47	.88	1.68	2.49	3.30	4.12	4.93
42	.28	.48	.48	.90	1.72	2.55	3.38	4.22	5.05
43	.28	.49	.49	.92	1.76	2.61	3.46	4.32	5.17
44	.29	.50	.50	.94	1.80	2.67	3.54	4.42	5.29
45	.29	.51	.51	.96	1.84	2.73	3.62	4.52	5.41
46	.30	.52	.52	.98	1.88	2.79	3.70	4.62	5.53
47	.30	.53	.53	1.00	1.92	2.85	3.78	4.72	5.65
48	.31	.54	.54	1.02	1.96	2.91	3.86	4.82	5.77
49	.31	.55	.55	1.04	2.00	2.97	3.94	4.92	5.89
50	.32	.56	.56	1.06	2.04	3.03	4.02	5.02	6.01
51	.32	.57	.57	1.08					
52	.33	.58	.58	1.10					
53	.33	.59	.59	1.12					
54	.34	.60	.60	1.14					
55	.34	.61	.61	1.16					
56	.35	.62	.62	1.18					
57	.35	.63	.63	1.20					
58	.36	.64	.64	1.22					
59	.36	.65	.65	1.24					
60	.37	.66	.66	1.26					
61	.37	.67	.67	1.28					
62	.38	.68	.68	1.30					
63	.38	.69	.69	1.32					
64	.39	.70	.70	1.34					
65	.39	.71	.71	1.36					
66	.40	.72	.72	1.38					
67	.40	.73	.73	1.40					
68	.41	.74	.74	1.42					
69	.41	.75	.75	1.44					
70	.42	.76	.76	1.46					

The accompanying table shows the rates charged for the different zones. For parcels mailed on rural delivery routes and marked "mailed on a rural route," two cents less per parcel is charged, except for those to be delivered in the 4th to 8th zone, in which case the reduction is one cent per parcel.

Parcel post includes 4th class mail weighing more than 8 ounces. Par-

GROWTH OF UNITED STATES POSTAL SERVICE

Item	1820	1850	1880	1900	1920	1925
Post offices, number	4,500	18,417	42,989	76,688	52,638	50,957
City carriers, number	.....	.....	2,628	15,322	36,142	46,251
Annual cost carrier service	.....	.....	$2,363,693	$14,512,190	$74,932,500	$110,356,000
Rural delivery routes, mileage	.....	.....	.....	28,685	1,151,832	1,227,654
Rural delivery routes, cost, $	.....	.....	.....	$420,433	$75,562,424	$102,944,000
Money orders, $	.....	.....	$103,816,680	$255,670,027	$1,365,659,884	$1,585,217,000
Air mail service, cost, $	.....	.....	.....	.....	$1,264,495	$2,743,750
Postage stamps issued, number	.....	1,540,545	875,681,970	3,998,544,564	13,212,790,033	17,387,000,000
Postal cards issued, number	.....	.....	272,550,500	587,815,250	986,156,087	1,497,000,000
Compensation paid postmasters	$352,295	$1,549,376	$7,708,407	$19,112,097	$40,108,080	$47,562,000
Gross revenue, $	$1,111,761	$5,499,985	$33,315,479	$102,354,579	$437,150,212	$599,591,000
Gross expenditure, $	$1,160,926	$5,212,963	$36,542,804	$107,740,267	$454,322,609	$639,282,000

cels are not to exceed 84 in. in combined length and girth. The weight limit for the first three zones is 70 lbs.; that for all other zones, 50 lbs. The 8th zone rate applies to parcels sent to Alaska, Cuba, Porto Rico, Canal Zone, Panama, Mexico, Hawaii, and the Philippines. Parcels up to 15 pounds may be sent to Canada at 14 cents per pound.

A mailable parcel on which the postage is fully prepaid may be insured against loss in an amount equivalent to its actual value, but not to exceed $5, on payment of a fee, in affixed stamps, of 5 cents; up to $25, a fee of 8 cents; up to $50, a fee of 10 cents; up to $100, a fee of 25 cents.

Parcels may be sent C. O. D., additional postage being required according to the sum to be collected: 12 cents for $10 or less; 15 cents for $10.01 to $50; 25 cents for $50.01 to $100. A money order fee for remittances is charged as follows: 5 cents for $2.50 or less; 7 cents for $2.51 to $5; 10 cents for $5.01 to $10; 12 cents for $10.01 to $20; 15 cents for $20.01 to $40; 18 cents for $40.01 to $60; 20 cents for $60.01 to $80; 22 cents for $80.01 to $100.

All parcels must bear the name and address of the sender preceded by the word "From."

Parcel post packages may be sent special delivery by marking them accordingly and affixing 15 cents additional postage for packages weighing up to 2 pounds; 25 cents for those up to 10 pounds; and 35 cents for those in excess of 10 pounds. The sender may have packages handled as first class mail by affixing a "special handling" stamp or its equivalent in ordinary postage, showing the words "Special Handling" under the stamp. The rates for this service are 10 cents for parcels up to 2 pounds, 15 cents for those from 2 to 10 pounds, and 20 cents for those over 10 pounds.

Air Mail Service. The next innovation after the parcel post came in 1918 with the regular use of airplanes for carrying mail. The scope of the air service increased enormously, so that by 1929 it served the 48 states of the Union and made connections with several foreign countries. First class postage was reduced in 1928 to 5 cents for a letter weighing up to an ounce and 10 cents for each additional ounce.

Dead Letter Office. Every year about 20,000,000 pieces of mail matter are received by the post office so carelessly addressed that they cannot be delivered. These are sent to the dead letter office, where, by means of maps and directories, skilled clerks are able to guess correctly the destinations of about one-half the items. Currency, checks, and money orders amounting to more than $1,000,000 are received annually. Merchandise which cannot be delivered or returned to the sender is sold at auction, letters are burned, and thousands of magazines, picture cards, and valentines are sent to hospitals. The dead letter office originated in 1825.

Parcel Post in Canada. The Canadian post office accepts at parcel post rates all parcels, not classifiable as first class mail, up to 15 pounds in weight and 6 feet in combined length and girth, provided that no dimension exceeds 3½ feet. For parcels up to 1 pound, the rate is 5 cents if the destination is within 20 miles of the mailing point and 10 cents for points beyond the 20-mile limit but within the same province. A maximum of 12 cents on 1 pound is charged for parcels going to any destination within the Dominion. The maximum charge for a 15-pound parcel is $1.80. Parcels may be insured on payment of an additional fee in stamps. Provision is made also for a C. O. D. service.

Telegraphic Communication. Postal communication depends for its speed on the available means of transportation. These are in any case comparatively slow, although the present system of transporting special mail by airplanes has effected great improvement. A means of communication even more rapid than the modern airplane was opened to the public in 1844 when Morse's telegraph began commercial operations.

As the advantage of the land telegraph became apparent, there naturally arose a demand for telegraphic communication between localities separated by bodies of water. The first submarine cable in North America was laid in 1852 between Prince Edward Island and New Brunswick. A transatlantic cable was successfully completed in 1868, thereby reducing the time required to send a message between the Old World and the New, from weeks to minutes.

Telephony. Vocal communication over long distances became possible when Bell invented the telephone in 1876. Improvements on the original device were made by many of the greatest inventors of the world. The advantages of the telephone have been so obvious that in the United States there is an average of one telephone for every 6.6 persons. These instruments are connected by more than 52 million miles of wire, and their use gives employment to approximately 375,000 people.

Radio Communication. With the beginning of the 20th century, radiotelegraphy became a practical means of transmitting messages, so that ships at sea were enabled to keep in continuous communication with each other and with many stations ashore. Navigation became at once more safe and more accurate, because a captain can always obtain the exact time and, during a fog, can usually obtain his bearings from a land station equipped with direction-finding apparatus known as the radio compass. All seagoing passenger ships must now be equipped with "radio" apparatus.

Long distance conversation by means of the radiotelephone became possible in 1915. Due to developments made in the research laboratory of the American Telephone and Telegraph Company, the wire systems may be used in connection with the radiotelephone. By this method it is now possible to establish communication with a properly equipped ocean liner at sea from any commercial telephone in North America. On January 7, 1927, a regular transatlantic radiotelephone service was inaugurated between New York and London. This was followed by extensions which make possible direct vocal communication between any telephone in North America with any telephone in Europe. See *Cable, Submarine; Radiotelegraph; Radiotelephone; Telegraph; Telephone.*

TRANSPORTATION

TRANSPORTATION is conducted chiefly by the use of vehicles operated upon the water, upon the land, and, more recently, through the air. Water transportation was early conducted by means of sailing vessels. Land transportation, except upon pack animals, required the construction of roads and railways, as well as the invention and improvement of appropriate vehicles.

Sailing Vessels. Long before the Christian era, the Egyptians, the Phœnicians, and the Greeks made use of sails to propel the small vessels of their time. To a large extent the Greeks, and especially the Romans, propelled by oars the ocean craft with which they navigated the Mediterranean. In the larger boats, called galleys, the oars were arranged in two or three rows or banks. The largest type of vessel widely used in ancient times for commercial or war purposes was the trireme, equipped with three banks of oars. The life of the oarsmen in these galleys was a hard one, and slaves were commonly employed. This practice gave rise to the term "galley slave."

The sailing vessels employed by the Venetians, Italians, Spanish, Portuguese, Danes, Norsemen, and the early English navigators were small craft which seldom ventured far from sight of land. But, beginning with the 14th century, the increasing use of the mariner's compass made it possible for sailing vessels to make voyages of great length.

According to present standards, the ships then employed seem small. Few people now living would care to cross the ocean in the tiny caravels in which Columbus and his party first crossed the Atlantic at the close of the 15th century. Nor would many persons willingly undertake a transatlantic voyage in a ship of the size of the *Mayflower*, in which the Pilgrims, early in the 17th century, came to their new home in America. But, in small sailing vessels of these or similar types, men in those days were making voyages halfway round the world, and, in a few instances, daring sailors circumnavigated the globe.

Steamships. The great revolution in transportation came when mechanical power was substituted for wind power on the ocean and for muscle power on the land. In performing the service of transportation, mechanical power was first applied to vessels. As early as 1787, John Fitch, a Pennsylvania farmer, propelled a boat on the Delaware by steam power. Twenty years later, Robert Fulton ran the *Clermont* from New York to Albany by steam power and demonstrated the practical success of steam navigation.

Upwards of twenty years more elapsed before the steam locomotive was perfected by the English engineer, George Stephenson, whose famous "Rocket," produced in 1829, was the first notably successful locomotive. A few years more were to pass before a vessel crossed the ocean entirely by steam power. The first transatlantic voyage of a steamer was the one made by the *Royal William*, which sailed from Quebec to the Isle of Wight in 1833. This was a wooden vessel, but in 1845 an iron steamer, the *Great Britain*, built by I. K. Brunel, a celebrated British engineer, was put in operation upon the transatlantic service.

The latter vessel is notable also because it was the first large merchant ship driven with a screw propeller. While its basic principle had long been known, the modern practical screw propeller was invented almost simultaneously in 1836 by Francis B. Smith, an English farmer, and by John Ericsson, a Swedish engineer.

Highways. The extensive use of vehicles upon the land could not precede the building of roads. The earliest road building on a large scale was carried on by the Romans. By maintaining order and by building permanent highways in the lands about the Mediterranean and in far-away Britain, the Romans made possible the development of Western civilization.

The first of the modern nations to undertake road building on an extensive scale was France. Beginning in 1597 under Sully, this progressive country proceeded to construct 15,000 miles of surfaced road. Colbert, who became prime minister in 1661, introduced the corvée system of forced labor upon the roads. The method was bad, but it gave France good roads in advance of other nations.

Two Scottish engineers, Thomas Telford and John L. McAdam, who did their work between 1800 and 1830, have fixed their names permanently to types of roads now largely built. Both men emphasized the necessity of providing adequate drainage for roads. Telford roads have a foundation of large broken stones surfaced by more finely broken or crushed rock; macadam roads are built without the foundation of larger stones. Hard surfaced roads are now constructed of the following materials: Sand clay, gravel, water bound macadam, surface treated macadam, bituminous macadam, cement concrete, brick and other block paving materials. The development of the motor car has given great impetus to road construction.

Canals. Canals are nearly as old as human history. The Assyrians built them. The Egyptians connected the Nile with the Red Sea by a canal. The Chinese are said to have constructed canals more than 2000 years ago. They built their Grand Canal, a system about 1000 miles long, in the 13th century. In the 15th century the famous artist, Leonardo da Vinci, invented the canal lock which was introduced into the canals of Milan. France began her existing system of canals early in the 17th century. England built her canals in the 18th century. In the first half of the 19th century numerous canals were built in North America.

Along with the construction of canals went the canalization of rivers until various countries, such as France and England, were equipped with a co-ordinated system of canalized rivers connected by canals. During the early development of the United States and Canada, however, it was impossible, because of physical obstacles, to create a fully co-ordinated system of inland waterways.

Railways, Steam and Electric. Before the system of inland navigation was completely worked out in the United States and Canada, the superiority of the railroad had been demonstrated. By 1830, the Baltimore and Ohio, the Mohawk and Hudson, predecessor of the present New York Central, and a few other railroad systems began to operate in a small way. The completion of the Union Pacific in 1869 opened the first transcontinental span of railroad in America. About twenty years later, the electric railway became recognized as a demonstrated success and attained a place as the worthy partner of the steam railroad.

OCEAN TRANSPORTATION

Ocean Vessels in Colonial Times. The *Mayflower*, in which the Pilgrims came to America, was a typical sailing vessel of its time. It was a three-masted, square-rigged ship, only 100 feet long, and between 20 and 25 feet wide. It was registered as of 180 tons burden or, as it would be measured today, of about 160 tons gross register. Aboard this ship were 102 Pilgrims and the crew. The *Speedwell*, which started across the ocean with the *Mayflower* but which had to turn back, was only one-third the capacity of the *Mayflower*.

At the beginning of the 19th century, many ships were owned and operated by the merchant princes of America; as, for example, Elias Haskett Derby of Salem, Mass., and Stephen Girard of Philadelphia.

FOREIGN CARRYING TRADE OF THE UNITED STATES

TOTAL IMPORTS AND EXPORTS, 1821–1925

YEAR	BY SEA AND THE GREAT LAKES				BY LAND VEHICLES	TOTAL BY LAND AND SEA
	In American Vessels	In Foreign Vessels	Total	Per cent in American Vessels		
1821	$ 113,201,462	$ 14,358,235	$ 127,559,697	88.7	.....	.....
1830	129,918,458	14,447,970	144,366,428	89.9	.....	.....
1840	198,424,609	40,802,856	239,227,465	82.9	.....	.....
1850	239,272,084	90,764,954	330,037,038	72.5	.....	.....
1860	507,247,757	255,040,793	762,288,550	66.5	.....	.....
1870	352,969,401	638,927,488	991,896,889	35.6	.....	991,896,889
1880	258,346,577	1,224,265,434	1,482,612,011	17.4	20,981,393	1,503,593,404
1890	202,451,086	1,371,116,744	1,573,567,830	12.9	73,571,263	1,647,139,093
1900	195,084,192	1,894,444,424	2,089,528,616	9.3	154,895,650	2,244,424,266
1910	260,837,147	2,721,962,475	2,982,799,622	8.7	319,132,528	3,301,932,150
1920	5,071,623,227	6,803,374,582	11,874,997,809	42.7	1,474,230,838	13,349,228,647
1925	2,608,747,000	5,287,267,000	7,896,014,000	33.0	1,150,252,000	9,046,266,000

The ships were square-rigged sailing vessels—ships and barks with three masts and brigs with two masts—of 100 or 200 tons register, a few being as large as 300 tons. The American merchants, lumbermen, planters, and fishermen of that period usually operated their own vessels instead of employing the services of common carriers. Derby, with his fleet of small sailing vessels, built up an extensive trade with the East Indies. Stephen Girard used forty sailing ships to carry on his trade with the West Indies and other parts of the world. The small vessels which these men used were well adapted to the service requirements of their time and brought fame and wealth to their owners.

Common Carriers on the Ocean. In American commerce, the common carrier on the ocean dates from 1816, when the Black-Ball Line was established from New York to England. Even in Great Britain the common carrier was hardly known until the beginning of the 19th century. For hundreds of years men had owned ships for hire or for charter to those who desired to use them, but transportation services on the ocean were not organized and conducted by common carriers until a little more than a century ago. The early common-carrier lines employed sailing vessels, but, from about 1840 in England and from about 1870 in America, steamship lines began to take the place of lines of sailing vessels.

American Clipper Ships. In the 1840's the Cunard and other British companies began to use steamships and iron vessels. Thereupon the shipbuilders and seamen of America sought to increase the size and speed of the wooden sailing vessel so as to enable it to compete successfully with its new rival. Out of this competition grew the famous American clipper ships of the late 1840's and early 1850's. These were square-rigged sailing vessels, some of them between 2000 and 3000 tons gross register—fifteen times the size of the *Mayflower*. They derived their name from their long, overhanging prow and their sharp lines forward.

For a time the swift-sailing clippers held their own in competition with the steamship. But, as the marine engine became more efficient and iron and steel vessels of increasing dimensions were constructed, sailing tonnage rapidly declined. The last serious effort to enable the sailing vessel to maintain its place on the high seas was made at the close of the 19th century. About that time huge six- and seven-masted, steel-hulled sailing vessels of over 5000 tons register were built. Some of these vessels were capable of carrying 7000 tons of cargo, but even the most efficient have played their rôle and are passing from the stage.

Ocean Steamships. The steamship has had an interesting history. The marine engine, first successfully employed in the 1830's to propel vessels entirely across the Atlantic, was installed in wooden vessels with paddle wheels. English builders began to use the screw propeller for transoceanic service in the 1840's. It was more than a decade later before American builders substituted the screw for the less efficient paddle wheels. Indeed, even some of the British lines, such as the Cunard, kept to the use of paddle wheels until after 1860. The celebrated *Great Eastern*, completed in 1859, was equipped both with screw and with paddle wheels. This ship marked the transition from the older to the newer type of steam vessel. Incidentally, it should be mentioned that the *Great Eastern* was too large to be successfully driven by the engines of its day.

The Marine Engine. Most steamships are today equipped with the inverted direct-acting marine engine. This type was used first in 1854, and most of the early engines were single expansion, although from the beginning some double expansion engines were constructed. The triple expansion marine engine made its appearance in 1881. However, it was not until 1894, when the *St. Louis* and the *St. Paul* of the American Line were built by the Cramps of Philadelphia, that the quadruple expansion marine engine was constructed.

During this same year, 1894, an entirely new type of engine, the turbine, was also applied to the propulsion of vessels. The first large ocean vessel to be equipped with turbines was the *Carmania* of the Cunard Line, built in 1905. The leviathans of recent construction usually have either turbines or both turbines and reciprocating engines.

The Diesel Engine. Both of these types of marine engines are, however, being displaced by an entirely different kind of engine, which is far more efficient and requires much less fuel. This is the internal combustion engine, named after its inventor, Rudolf Diesel. This engine has no boilers or furnaces but burns oil as fuel in the cylinders. The principal limitation upon the immediate use of the Diesel engine is its relatively large cost, but, in 1927, the tonnage of new ships being equipped with this type of engine exceeded for the first time that of steamship construction. See *Internal Combustion Engine*.

Ocean Leviathans. The large vessels of today have little resemblance to the ocean vessels of a century ago. The remarkable increase in the size of vessels is indicated by the developments of the first fifteen years of the 20th century. The *Mauretania* which began operation in 1908 was considered a marvel because she registered nearly 30,700 tons gross. In 1910 the *Olympic* was launched. This ship's length, slightly more than 850 feet, was 90 feet in excess of that of the *Mauretania*; its tonnage, gross register, was 46,439.

Then, in 1912 and shortly thereafter, came the *Imperator* (renamed the *Berengaria*), the *Vaterland* (renamed the *Leviathan*), and the *Bismarck* (renamed the *Majestic*), all approximately 900 feet long, and with a gross tonnage exceeding 52,000 tons. These huge vessels require crews of 1100 to 1300 men and have accommodations for more than 4000 passengers. As measured by population and by wealth, they are small cities afloat upon the ocean.

SOME NOTABLE STEAMSHIPS

Name	Registry	Length (Feet)	Tons (Gross)
Leviathan	United States	907	59,957
Majestic	Great Britain	915	56,551
Berengaria	Great Britain	883	52,226
Olympic	Great Britain	852	46,439
Europa	Germany	938	46,000
Bremen	Germany	938	46,000
Aquitania	Great Britain	869	45,647
Ile de France	France	758	43,500
Paris	France	735	34,569
Homeric	Great Britain	751	34,351
Augustus	Italy	711	33,650
Roma	Italy	665	33,000
Columbus	Germany	749	32,354
Mauretania	Great Britain	762	30,696
Statendam	Holland	670	28,150
Cap Arcona	Germany	643	27,561
Belgenland	Great Britain	670	27,132
Empress of Scotland	Great Britain	677	25,128
Saturnia	Italy	599	25,000
Vulcania	Italy	599	25,000
Adriatic	Great Britain	709	24,541
Conte Biancamano	Italy	651	24,416
Duilio	Italy	602	24,281
Rotterdam	Holland	709	24,149
Baltic	Great Britain	709	23,884
George Washington	United States	699	23,778

The American Marine. The British colonists in America were a maritime people. They had to build ships in order to market their products in the West Indies and in Europe. With low-priced material for shipbuilding from the abundant forests, American shipping prospered until the Civil War.

During the Civil War there was a shrinkage of nearly a million tons in American shipping on the high seas. Four-fifths of this shrinkage was due to war losses and to the transfer of American vessels to foreign flags to escape the hazards of war. Moreover, this blow to the American marine came at the time when the steamship was taking the place of the sailing vessel, and when iron was supplanting wood in the shipyards of the world.

The American marine of 1860 was composed almost entirely of wooden sailing vessels. By 1870 the marine engine had been so improved as to make certain the superiority of the steamship over the sailing vessel. In consequence, an entirely new American marine had to be built up, and, further, this had to be done in competition with the well established British merchant marine. Moreover, the cost of building an iron or a steel ship was less in England than in the United States. On account of these great handicaps the American marine declined for nearly a half century.

During the World War, American shipping and shipbuilding had an opportunity for great expansion. Private yards were busy until the United States entered the war. Then, with feverish activity, the government began to establish shipyards and proceeded, with all possible speed, to construct tonnage. Twelve hundred million dollars' worth of vessels were built by the government. Of this tonnage, the major part was completed after the hostilities had ended. The expansive effect of the World War upon the tonnage of American merchant shipping is shown by the table entitled *Growth of United States Merchant Marine.*

In 1925, as shown by the table entitled *The World's Merchant Marine,* the merchant marines of the world had a combined tonnage of 64,641,418. Over 15 million tons, or nearly one-fourth of the total, were under the American flag. Despite this large tonnage of American shipping, less than one-third of the foreign commerce of the United States in 1925 was carried in American vessels. The value of this commerce is shown in the table entitled *Foreign Carrying Trade of the United States.*

THE WORLD'S MERCHANT MARINE

Number and Tonnage of Vessels of 100 Tons and Upward
(Lloyd's Register, 1925–1926)

Flag	Steamer and Motor Vessels		Sailing Vessels		Total	
	Number	Gross Tons	Number	Gross Tons	Number	Gross Tons
American (U. S.), total	3,921	14,272,329	961	1,105,151	4,882	15,377,480
Sea	3,329	11,931,562	936	1,017,070	4,265	12,948,632
Northern Lakes	500	2,276,839	25	88,081	525	2,364,920
Philippines	92	63,928	.....	.....	92	63,928
Argentine	192	202,692	34	20,067	226	222,759
Belgian	237	538,193	3	4,390	240	542,583
Brazilian	330	447,554	44	18,089	374	465,643
British, total	10,068	21,907,924	921	314,274	10,989	22,222,198
Great Britain and Ireland	8,161	19,304,670	398	136,041	8,559	19,440,711
Australia and New Zealand	634	826,987	22	9,971	656	836,958
Canada—Coast	548	838,301	250	105,343	798	943,644
" —Lakes	112	258,452	2	965	114	259,417
India and Ceylon	153	183,789	51	13,364	204	197,153
Other dominions	460	495,725	198	48,590	658	544,315
Chilean	123	165,900	21	19,858	144	185,758
Chinese	173	267,300	5	2,637	178	269,937
Cuban	53	53,734	17	7,768	70	61,502
Danish	652	1,021,617	120	38,229	772	1,059,846
Dutch	1,046	2,587,789	53	13,042	1,099	2,600,831
Finnish	185	128,894	139	81,935	324	210,829
French	1,527	3,319,645	301	192,339	1,828	3,511,984
German	1,947	3,006,270	81	67,443	2,028	3,073,713
Greek	448	894,542	11	3,336	459	897,878
Italian	1,035	2,930,836	318	97,825	1,353	3,028,661
Japanese	2,087	3,919,807	.....	.....	2,087	3,919,807
Jugoslavian	129	167,543	.....	.....	129	167,543
Norwegian	1,745	2,618,445	60	62,197	1,805	2,680,642
Peruvian	22	58,529	17	17,194	39	75,723
Portuguese	180	267,310	104	32,611	284	299,921
Rumanian	37	67,851	.....	.....	37	67,851
Russian	361	313,854	16	8,403	377	322,257
Spanish	789	1,142,924	141	41,797	930	1,184,721
Swedish	1,203	1,253,900	186	47,226	1,389	1,301,126
Turkish	173	131,754	1	490	174	132,244
Uruguayan	50	67,722	15	9,048	65	76,770
Other Countries	444	561,874	116	33,966	560	595,840
Flag not stated	48	63,644	26	21,727	74	85,371
Total	29,205	62,380,376	3,711	2,261,042	32,916	64,641,418

GROWTH OF UNITED STATES MERCHANT MARINE

Showing number and tonnage of vessels in the foreign trade, in the coasting trade, and in the fisheries, for the period 1790–1925

Year	Foreign Trade		Coasting Trade		Whale Fisheries		Cod and Mackerel Fisheries		Total Merchant Marine	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
1790	.....	346,254	.....	103,775	.....	.....	.....	28,348	.....	478,377
1800	.....	667,107	.....	272,492	.....	3,466	.....	29,427	.....	972,492
1810	.....	981,019	.....	405,347	.....	3,589	.....	34,828	.....	1,424,783
1820	.....	583,657	.....	588,025	.....	36,445	.....	72,040	.....	1,280,167
1830	.....	537,563	.....	516,979	.....	39,705	.....	97,529	.....	1,191,776
1840	.....	762,838	.....	1,176,694	.....	136,927	.....	104,305	.....	2,180,764
1850	.....	1,439,694	.....	1,797,825	.....	146,017	.....	151,918	.....	3,535,454
1860	.....	2,379,396	.....	2,644,867	.....	166,841	.....	162,764	.....	5,353,868
1870	2,643	1,448,846	23,764	2,638,247	299	67,954	2,292	91,460	28,998	4,246,507
1880	2,204	1,314,402	20,011	2,637,686	174	38,408	2,323	77,538	24,712	4,068,034
1890	1,451	928,062	20,481	3,409,435	76	18,633	1,459	68,367	23,467	4,424,497
1900	1,288	816,795	20,568	4,286,516	42	9,899	1,435	51,629	23,333	5,164,839
1910	1,490	782,517	22,982	6,668,966	36	9,308	1,232	47,291	25,740	7,508,082
1920	5,932	9,924,694	21,644	6,357,706	26	3,901	581	37,723	28,183	16,324,024
1925	4,695	8,151,426	21,185	9,215,893	19	3,546	468	35,037	26,367	17,405,902

During the year 1925 the water-borne foreign commerce of the United States was valued at $7,896,014,000, of which 33 per cent was carried in American vessels and 67 per cent in foreign. For imports, the proportion carried in American bottoms is approximately 31.5 and for exports about 36.1. If the commerce is measured by tonnage, however, the proportion of the total commerce carried in ships of American registry rises to 42 per cent, indicating that a larger amount of goods bulky in relation to their value, such as grain and petroleum, are carried in American ships. These figures show clearly that, in the overseas commerce of the United States, American vessels in 1925 were playing a minor rôle. This rôle, which had diminished steadily since 1830, expanded remarkably during and immediately after the World War, but, following 1921, began again to diminish.

TRANSPORTATION ON LAKES, RIVERS, AND CANALS

River Navigation. Long before men had the capital or the knowledge required for the construction of highways, and centuries before railroads were thought of, rivers and lakes were used wherever possible for inland transportation. Not only in ancient Egypt, Babylonia, and China, but in modern European countries, such as Austria, Germany, France, Holland, England, and others having navigable streams, the rivers were the only avenues over which traffic could move from interior points to seaboard markets.

For a long time rivers were used without improvement. Later their channels were improved by the removal of obstacles and, to some extent, by the construction of dams, locks, and canals past the rapids in the streams. The importance of rivers as avenues of inland transportation in Europe during the middle ages is indicated by the practices established by the feudal barons. These medieval rulers often maintained their power by constructing castles and barriers along the rivers. Possessing these strategic strongholds, they secured their revenues by exacting tolls from all those who used the streams for commercial purposes.

Canal History. As a result of improving their rivers and of constructing canals during the 17th and the 18th century, Holland, France, and England in turn acquired the economic leadership of other European countries. By building canals to connect their natural waterways, each of these countries was able to develop industrially, to accumulate capital, and successively to play an important rôle in international affairs.

Canal construction in the Netherlands required no special engineering skill, and it was to be expected that the people of that country would extend their numerous natural waterways by artificial channels. In countries like France and England, however, superior engineering skill was required. To France first credit must be given, for in that country as early as 1605, during the reign of Henry IV, construction was begun on the Briare canal to connect the Seine and the Loire rivers. It took until 1642 to finish the work. In 1675 the Orleans canal connected the same rivers by another route, and in 1681 the celebrated Languedoc canal was completed, connecting the Bay of Biscay with the Mediterranean. The summit level of this canal was 600 feet above the sea.

The greatest names in English canal history are Francis, duke of Bridgewater, and his engineer, James Brindley. The Bridgewater canal, connecting Manchester and Liverpool, was begun in 1759. During the succeeding 75 years one inland canal after another was constructed in England and Scotland until the principal streams of the island were connected by a network of waterways. Until after the middle of the 19th century, the waterways of Great Britain, France, and of several other European countries were far more important as freight carriers than were the railways.

Canals in the United States. River and canal transportation in the United States dates from colonial days. The first great leader in the development of inland waterways was George Washington. Washington was a surveyor, and the knowledge he gained in the French and Indian war, which took him as far west as the Ohio river, gave him a lifelong interest in waterways. In 1774, before the Revolution, he brought about the establishment of a company, chartered by Virginia and Maryland, for the improvement of the Potomac river. The ultimate purpose of this company was to connect the Chesapeake bay and the Ohio river by a canal, if possible, or at least by a portage road westward from Cumberland on the Potomac river.

The Revolutionary War interrupted the plans of the colonies for joining the Potomac and Ohio. However, upon the termination of the Revolution, Washington again returned to the prosecution of the project, only to be interrupted once more by being called to the presidency of the new republic. Much later, and in a different manner than Washington had planned, the Chesapeake bay and the Ohio river were connected by the construction of the Baltimore and Ohio railroad which reached Wheeling on the Ohio river in 1851. Forty years earlier, a highway, called the National Pike, had joined the two waterways.

The first man to plan a comprehensive system of inland navigation and of inland waterways and highways in the United States was Albert Gallatin, who for twelve years served as secretary of the treasury under Jefferson and Madison. In the year 1808 Gallatin made a report to Congress outlining

SOME IMPORTANT CANALS

Name	Location	Length (miles)	Width (feet)*	Minimum Depth (feet)†	Number of Locks	Opened	Approximate Cost
Amsterdam Ship	Zuider Zee—North Sea, Netherlands	16.7	164	32.1	none	1876	$ 12,700,000
Cape Cod	Buzzards Bay—Barnstable Bay	7.68	100	25	none	1914	13,500,000
Chesapeake-Delaware	Delaware and Maryland	13.63	24	12	none	1829	9,000,000‡
Chicago Drainage and Ship	Chicago—Lockport, Ill.	38.6	174	22	1	1900	55,250,000
Corinth	Gulf of Corinth—Ægina Gulf	4	69	26	none	1893	13,750,000
Cronstadt	Leningrad—Bay of Cronstadt	18.75	275	22	none	1884	10,000,000
Hohenzollern	Berlin—Stettin, Germany	136	32	9.8	19	1914	12,500,000
Houston Ship	Galveston Bay—Houston, Texas	50	150	30	none	1925	20,000,000
Illinois-Mississippi	LaSalle, Ill.—Mississippi River	75	35	7	33	1906	7,600,000
Kaiser Wilhelm (Kiel)	Baltic—North Sea, Germany	61	147.6	36	2	1895	95,000,000
Lake Washington	Seattle—Puget Sound	8	80	34	1	1916	3,500,000
Languedoc	Garonne R.—Mediterranean, France	148	19.7	6.5	119	1681	3,500,000
Manchester	Manchester—Mersey River, England	35.5	80	28	4	1894	90,000,000
New Orleans Industrial	Mississippi River—Lake Pontchartrain	5.5	300	30	1	1923	20,000,000
New York Barge	Lake Erie—Hudson River	540.8	44.44	12	57	1918	168,000,000
Panama	Through Isthmus of Panama	50.5	110	41	6	1914	400,000,000
Port Arthur	Taylor's Bayou—Sabine Pass, Texas	7	150	26	none	1899	1,500,000
Rhone	Rhone River—Marseille, France	51	82	10.5	3	1916	20,000,000
Sabine Neches	Sabine River—Port Arthur Canal	23	150	30	1	1926	18,100,000
Sault Ste. Marie, U. S.	Lake Superior—Lake Huron	1.6	100	25	1	1896	17,500,000
Sault Ste. Marie, Can.	Lake Superior—Lake Huron	1.41	60	19.5	1	1895	5,000,000
Suez	Mediterranean to Red Sea	104.5	147.6	39.4	none	1869	136,000,000
The Dalles-Celilo	Columbia River	8.5	65	8	5	1915	4,800,000
Canadian Canals	**Lakes to the Sea**						
Welland	Lake Ontario—Lake Erie††	26.75	44	14	26	1833	30,000,000
Welland Ship	Lake Ontario—Lake Erie††	25	80	25	7	1930‡‡	63,000,000
	St. Lawrence River						
Galops, Rapide Plat, Farran's Pt.	Cardinal—Iroquois	7.33	45	14	3	1847	6,000,000
	Rapide Plat, Morrisburg	3.67	45	14	2	1847	2,200,000
	Farran's Point Rapids	1.25	50	14	1	1847	900,000
Cornwall	Dickinson's Landing—Cornwall	12	45	14	6	1842	7,300,000
Soulanges	Coteau Landing—Cascades Pt.	14	45	15	5	1899	8,000,000
Lachine	Lachine—Montreal	8.5	45	14	5	1826	14,000,000
Trent**	Georgian Bay—Lake Ontario	233.6	33	6	42	..	19,000,000

*Width of locks or bottom of channel. †A depth greater than 20 feet indicates a ship canal. ‡Converted, 1926, from a lock to a sea-level canal. **Incomplete. ††These canals follow the same channel for 15 miles from Port Colborne. ‡‡Estimated.

in detail a plan for a system of inland waterways and of highways extending throughout the then settled portion of the United States. But again an armed conflict, the War of 1812, interrupted transportation development.

History of "Internal Improvements." During the War of 1812–15 the United States had great difficulties in conducting land campaigns. The practical failures of most of the land campaigns of that war made it clear to every one that both military and economic considerations demanded the development of transportation facilities. The railroad had not been invented, and the public naturally turned to improving the rivers, constructing canals, and building highways. The movement for "internal improvements" was led by the ardent young statesman, Henry Clay, and was supported by John Quincy Adams. For a time, leaders of the South, such as John C. Calhoun, advocated Federal support for canals and roads.

But, from 1820 on, the conflict over slavery and state rights caused the leaders of the South to oppose internal improvements by direct action of the Federal government. During the administration of John Quincy Adams, 1825–29, the Federal government gave active support to canal and road building. But after Andrew Jackson became president he supported the strict constructionists, and took the position that the Federal government could not constitutionally carry on works of internal improvement within the states. His popularity and powerful personality put an end to the policy of Federal aid for canals and roads.

During the year that Andrew Jackson was inaugurated president, the construction of railroads was begun in the United States. Within a decade it became evident that the railroads were to be efficient carriers of freight as well as of passengers, and that the inland waterways must at least share their traffic with the railroads. Indeed, as time went on, the waterways lost most of their traffic to the rival railroads.

Nevertheless, the states which had begun works of internal improvement during the two decades following the War of 1812 continued to carry on such works until the Civil War. The activities of some of the states continued beyond the period of the Civil War. Many millions of dollars were spent upon internal improvements by the states, either directly or in support of canal and highway companies. See table *Some Important Canals.*

River and Harbor Works. The Civil War settled the controversy as to the power of the Federal government. After 1865 no question was raised as to the power of the United States to expend funds upon the improvement of harbors, upon the channels of the Hudson, the Mississippi, the Ohio, and other rivers, and upon the connecting channels and the ports of the Great Lakes. From 1870 on, the Federal government regularly appropriated funds for rivers and harbors.

River Traffic. Railroads are now so generally used for freight traffic and passenger travel that it is hard to realize the great rôle played by the Mississippi, Missouri, Ohio, Kentucky, Tennessee, and other rivers, in the development of the country from 1840 to 1870. The steamboat, which began to run on the Hudson in 1807, made its appearance on the Ohio in 1811, and its use increased with the settlement of the Mississippi Valley states. St. Louis, on the Mississippi, near the mouth of the Missouri, became the principal trading city of the Mississippi valley, and New Orleans became the chief export city of the United States. The traffic of the great Middle West and of much of the South moved with the river currents to the Gulf, borne by the busy steamboats.

The Erie Canal. The canal which had most influence upon the economic development of the United States was the Erie canal—De Witt Clinton's

"big ditch"—constructed by the State of New York from 1817 to 1825. It connected the Hudson river and New York City with the Great Lakes, and thus made New York City the ocean gateway of the rapidly growing traffic of the Great Lakes. The Erie canal enabled New York to take advantage of its excellent harbor and to become the unquestioned commercial metropolis of the United States. After 1870, railroad competition and rate wars caused the Erie Canal traffic to pass steadily to the railroads so that before the end of the 19th century the historic waterway had lost the larger share of its business. See *New York State Barge Canal System.*

Canals in Canada. Canada had an exceptional opportunity for the development of river and lake transportation by canalizing the St. Lawrence river and by connecting Lake Erie with Lake Ontario. The possibility of connecting Georgian bay with the Ottawa river, and thus with the St. Lawrence river at Montreal, was also early apparent.

The St. Lawrence river has four rapids, which render upstream navigation impossible except by the construction of canals and locks along the river past the rapids. The Lachine rapids are just above Montreal, and a canal past those rapids was begun in 1824. At later dates, canals past the other rapids of the river were constructed. These were equipped with locks 270 feet by 45 feet, and having 14 feet depth, thus enabling vessels to pass through with a draft of nearly 14 feet.

The first Welland canal, enabling boats to pass from Lake Erie to Lake Ontario, was opened in 1829. This waterway has been enlarged from time to time, and in 1912 work was authorized which, when completed, will give the waterway the dimensions of an ocean ship canal. There will be seven locks, each of which will be 800 feet in length by 80 feet in width, with a depth of 30 feet of water above the sills, each lock having a lift of 46½ feet. The canal prism is being excavated to a depth of 25 feet, with provision made for the possible future deepening of the canal to 30 feet.

Proposed Saint Lawrence Power-Navigation Project. The industrial development of the region about the Great Lakes in Canada, and particularly in the United States, has been remarkable. In consequence an enormous traffic has developed on the Great Lakes. At the same time there has been a rapid growth of the commerce of Montreal, which now has a 30-foot channel to the sea. This situation suggested to the people of the United States and Canada the importance of connecting Montreal and Lake Erie with a 25- or 30-foot channel. Further there is the possibility of developing hydroelectrically as much as four million horse power by constructing dams at the rapids of the St. Lawrence. Moreover, this could be done in connection with the improvement of the river for navigation purposes.

These possibilities caused the governments of the United States and Canada to have the St. Lawrence project investigated and reported upon by an international commission. This commission, in December 1921, recommended the construction of a 30-foot waterway from Montreal to the Great Lakes, and the carrying out of plans for developing and utilizing the great store of hydroelectric power. This recommendation was taken under consideration by the governments of the United States and Canada.

The Suez Canal. The first great interoceanic canal to be constructed was the Suez, which connects the Mediterranean and the Red Sea. It was begun in 1859 and opened in 1869, and was constructed by a French company under the leadership of the celebrated Ferdinand de Lesseps.

The canal is about 100 land miles in length and is a sea-level waterway. Its original dimensions were: depth 26 feet, 3 inches; bottom width 72 feet, 2 inches. By successive enlargements, the canal has been given a depth of 39 feet, 4 inches, and a bottom width of 147 feet, 7 inches. It may now be navigated by vessels of 35 feet draft. The original cost was $80,000,000 and the total capital investment in the waterway is approximately $136,000,000.

During the first decade of operation the traffic of the canal developed slowly. This was because the Suez route cannot be used by sailing vessels, which were the only vessels then employed in the traffic between Europe and the East Indies and the Orient. After the introduction of steamships, traffic development was so rapid as to yield dividends to the stockholders of from 25 to 30 per cent. In 1876 the British government, under the leadership of Disraeli, acquired 176,000 of the 400,000 shares of stock, and thus became the largest stockholder, although the British government has never controlled a majority of the company's outstanding stock.

Tolls of 10 francs per passenger and per vessel ton, net measurement, were authorized by the original concession. Later, for a limited period, a surtax as high as 3 francs per net ton was allowed; but, as the traffic developed, the tolls after 1884 were reduced from time to time until they reached 6.25 francs ($1.206) per net ton. During the World War the tolls were raised to a level of 8.15 francs ($1.57), but after its close the tolls were again reduced, and presumably will be brought eventually to the pre-war level. Before the World War, the Suez canal was serving about 20 million tons of shipping annually. This tonnage diminished greatly during the World War but later rose to more than 27 million.

The Panama Canal. Encouraged by their success at Suez, the French sought to construct a canal across the isthmus of Panama. A concession was secured from the Colombian government by the French company in 1879, and construction work was begun in 1882. But, at Panama, the failure of the French was as signal as was their success at Suez. It was found that the physical obstacles to be overcome at Panama were greater than had been anticipated. The real causes, however, of the collapse of the French enterprise at Panama were the yellow fever and malaria. When the French attempted to construct the Panama canal, nothing was known of the mosquito theory of the transmission of yellow fever and malaria. Twenty years later, when the United States undertook the work, the part played by the mosquito in the transmission of these diseases had been clearly established. Hence it was possible to eliminate these fevers from the isthmus and to make the Canal Zone one of the healthiest spots on the globe.

At the time of the French failure at Panama in the late 1880's an American company was undertaking to construct a canal across Nicaragua by way of the San Juan river and Lake Nicaragua. This company failed and it became manifest that, if an Isthmian canal was to be constructed, the project would have to be carried out by the United States government.

Because of the scandal connected with the failure of the French company at Panama, the people and the government of the United States naturally turned to the Nicaragua route, and consideration was given first to the project of a canal in that location. After the whole subject of available routes had been carefully investigated, the United States in 1902 decided in favor of the Panama route, the French company having agreed to sell their concession and property to the United States government for $40,000,000.

In June 1902, Congress passed the Spooner act authorizing President Roosevelt to construct a canal by the Panama route, or by the Nicaragua route in case he could not obtain a concession from the Colombian government giving the United States the necessary rights at the isthmus of Panama. During the same year President Roosevelt

attempted to secure a concession from the Colombian government. However, the amount, ultimately $50,000,000, demanded by Colombia for the concession was far in excess of the $10,000,000 which the United States thought it was worth.

When it seemed that the Colombian government was blocking indefinitely the construction of a canal at Panama, the state of Panama by revolution achieved its independence, November 4, 1903, and established the Republic of Panama. The United States promptly recognized the new Republic of Panama, made a treaty with it, and secured a concession for the construction of a canal. In 1904 work was begun upon it. Ten years later, in August 1914, the canal was opened for traffic.

The Panama canal was constructed by the United States government under the secretary of war, and by a commission consisting mostly of United States army engineers. In 1904 Col. Wm. C. Gorgas, who banished yellow fever from Havana, was sent to the isthmus of Panama. He introduced and carried out effective sanitary measures which made possible the construction of the canal under most favorable health conditions. The engineer to whom greatest credit is due for the remarkable success of the United States in the construction of the Panama canal is Col. George W. Goethals. His success at Panama was as great as that of De Lesseps at Suez, although the engineering problems at Panama were far more difficult than those encountered at Suez. After the canal was completed, Colonels Gorgas and Goethals were justly raised to the rank of major-general in recognition of their services.

The length of the Panama canal is about 44 nautical miles or 50 statute miles. The minimum depth is 41 feet, and the minimum bottom width through the divide is 300 feet. Navigation for most of the distance from one ocean to another is in lake channels. Four and one-half miles from the Caribbean shore are the Gatun hills, through which the torrential Chagres river had cut an opening 1½ miles wide. This opening has been closed by the huge Gatun dam, which created Gatun lake, 164 square miles in area, the largest artificial lake in the world. The level of the lake is 87 feet above the sea. A vessel passing from the Caribbean Sea to the bay of Panama proceeds through a sea level channel across the swamp district to Gatun, where, by means of three locks, the vessel rises to the level of the lake. Thence, the channel is through the lake to the Continental Divide, where, through a cut nine miles in length, the vessel passes to within a few miles of the ocean. At Pedro Miguel the vessel is lowered 30 feet to Miraflores lake, a small body of water 1½ miles in length, created by the construction of a dam at Miraflores. Two locks at Miraflores lower the vessel 55 to 57 feet to mean sea level. From this point the vessel proceeds by a short canal and a submerged channel into the bay of Panama.

The total cost of the Panama canal has been about $400,000,000. The tolls which have been fixed by the president, in accordance with the authority given him in 1912 by Congress, are at the rate of $1.20 per net vessel ton for loaded vessels. The tolls thus established were practically the same as those charged at Suez in 1912-13. Notwithstanding the interruption of traffic resulting from the war, and despite the general reduction in shipping due to the business depression that began early in 1921, the traffic through the Panama canal during that year rose to an average of about one million vessel tons per month. In 1925 the receipts from tolls exceeded $21,400,000, more than four times the amount collected in 1915. The traffic in 1925 averaged nearly 2 million cargo tons per month. The total number of ships passing through the canal exceeded 4600.

Cape Cod Canal. The growth in the coastwise commerce of the United States has given rise to renewed interest in projects intended to facilitate coastwise shipments. In 1914, a canal across the isthmus of Cape Cod was opened for the purpose of shortening the distance between New England ports and New York and other Atlantic ports to the south. By using this canal the dangerous and often foggy outside route is avoided. In 1921, the owners of this canal agreed to sell it to the United States government for $11,500,000, although it cost approximately $13,500,000 to construct. Its purchase was authorized by Congress in 1926.

Coastwise Canals. In 1824, the Chesapeake and Delaware Canal Company constructed a canal connecting the Chesapeake and Delaware bays. This canal was acquired by the United States government during the World War. The Engineer Corps of the Army took in hand the work of improving the canal by the elimination of curves and the removal of locks, converting it into a sea-level canal. These improvements, completed in 1926, were calculated to reduce a ship's transit time from ten hours to four hours or less.

Attention is being given to the project of enlarging the Delaware and Raritan canal across New Jersey into a waterway that may be used for ocean vessels and for warships. But, because of the other large demands upon the United States treasury, this project will probably not be carried out for some years. Eventually, however, vessels of commerce and of war will be able to proceed from Boston by the Cape Cod canal, Long Island sound, the Delaware and Raritan canal, and the enlarged Chesapeake and Delaware canal to Hampton Roads and Norfolk. Barge canals connect Norfolk with Albemarle sound and the North Carolina seaboard.

RAILROAD TRANSPORTATION

When in 1829 Stephenson succeeded in running "The Rocket" at the rate of 44 miles an hour in the contest at Rain Hill near Liverpool, England, he inaugurated a new epoch in the world's history. The effect of Stephenson's achievement was greater even than that of Watt, for the influence of the locomotive upon the industrial and social life of the world has been more fundamental than that of the stationary engine. The locomotive has made possible the rapid settlement and development of the continents of North and South America and of Australia, and is rapidly opening up the continent of Africa. Within a few decades the great continent of Asia will be served generally by railways, and a revolution in the economic and social life of that vast continent will surely follow.

History of American Railroads. The railroad has had its most rapid and its largest development in the United States. The chartering of railroad companies in the United States began in 1826, and construction, on a small scale at first, soon followed. The first locomotives were run in 1830. Several roads, the antecedents of the present Baltimore and Ohio, New York Central, and Pennsylvania systems, started at about the same time. The Baltimore and Ohio was chartered in 1827, and the first rail of this historic road was laid July 4, 1828 by Charles Carroll who was then the only surviving signer of the Declaration of Independence.

The Mohawk and Hudson, from which the great New York Central system has developed, was chartered in 1826. Construction was begun in 1830, and the first 17 miles of the line were opened in 1831. These early roads developed slowly, but Buffalo was reached in 1842. The Baltimore and Ohio reached Wheeling in 1851. The most active center of railroad construction in the 1830's was Philadelphia, which was connected with the Susquehanna river by rail in 1834 and thus with Pittsburgh by rail and canal lines. The Camden and Amboy connected the Delaware river with New York bay in 1837, and Baltimore was reached by rail in the same year. The railroad to Reading was opened in 1838.

Between 1830 and 1835 three lines were built out from Boston, one north to Lowell, one south to

Providence, and the other west to Worcester. By 1841 this third line had been extended to Albany, and before the close of the following year one could travel from Boston to Buffalo by an all-rail route.

Periods of Railroad Construction. It is interesting to note the growth and recent decrease of railroad mileage as indicated in the following table:

Year	Mileage	Year	Mileage
1830	23	1890	167,191
1840	2,818	1900	198,964
1850	9,021	1910	249,992
1860	30,626	1920	264,021
1870	52,922	1925	250,003
1880	93,262		

It will be seen from the foregoing that construction was especially rapid during the third decade of railway history, that is, from 1850 to 1860, when the mileage was increased from 9000 to over 30,000 miles. This was the decade preceding the Civil War, and it was the construction of railroads in the South during that decade that gave the Southern states the economic strength that enabled them to prosecute the war vigorously against the North for the four years, 1861–65. During this same decade, railroads were built extensively between the Allegheny mountains and the Mississippi river and to some extent beyond that river. It was these railroads that enabled the North to defeat the South in the Civil War.

After the Civil War, two or three years elapsed before railroad building became especially active, but beginning with 1868 there was a period of very rapid construction. During the five years ending with 1873, 28,000 miles of road were added. Then followed the severe panic of 1873, the effects of which lasted for fully five years. This was caused mainly by the construction of railroads in the Middle West and Far West in advance of traffic needs. It was distinctly a railroad panic, but, by 1880, its effects had been practically overcome.

From 1880 to 1890, more than 73,000 miles were added to the American railroad net. Building operations were carried on in all parts of the country, though naturally the new states of the central and western portions were those in which construction was most rapid.

By 1890 the principal railway systems required to meet the commercial needs of the country had been constructed. From that time on most new railroads were built to supplement or to extend existing systems. Some 30,000 miles of new line were placed in operation from 1890 to 1900; about 50,000 miles, from 1900 to 1910; but somewhat less than 15,000 miles, from 1910 to 1920. Most of the mileage constructed during this last decade was built during the first five years of the period. Following 1920 so much railroad mileage was abandoned that, despite some new construction, there was by 1925 an actual shrinkage in the transportation system.

RAILWAY MILEAGE OF UNITED STATES POSSESSIONS

Possession	Miles of Line	Miles per 100 Sq. Mi. of Area	Population per Mile of Line
Alaska	798	1.3	75
Hawaii*	250	3.8	1,628
Philippine Islands	792	.68	14,523
Porto Rico	346	9.9	3,892

* Does not include plantation railways estimated to be about 700 miles of track.

Railroad Mileage in the United States. The accompanying table states the number of miles of railroad in operation in the United States each year from 1830 to 1925, inclusive. The figures in the table are for line mileage operated and do not include second, third, and fourth tracks nor yard trackage. The total track mileage of American railroads in 1920 was about 415,000.

ANNUAL GROWTH OF RAILROADS IN THE UNITED STATES

1830–1925 *

Year	Miles of Line in Operation	Annual Increase in Mileage	Year	Miles of Line in Operation	Annual Increase in Mileage	Year	Miles of Line in Operation	Annual Increase in Mileage
1830	23	....	1862	32,120	834	1894	182,733	2,899
1831	95	72	1863	33,170	1,050	1895	184,628	1,895
1832	229	134	1864	32,908	738	1896	186,681	2,053
1833	380	151	1865	35,085	1,177	1897	188,844	2,163
1834	633	253	1866	36,801	1,716	1898	190,870	2,026
1835	1,098	465	1867	39,250	2,249	1899	194,336	3,466
1836	1,273	175	1868	42,229	2,979	1900	198,964	4,628
1837	1,497	224	1869	46,844	4,615	1901	202,288	3,324
1838	1,913	416	1870	52,922	6,078	1902	207,253	4,965
1839	2,302	389	1871	60,301	7,379	1903	213,422	6,169
1840	2,818	516	1872	66,171	5,870	1904	220,112	6,690
1841	3,535	717	1873	70,268	4,097	1905	225,196	5,084
1842	4,026	491	1874	72,385	2,117	1906	230,761	5,565
1843	4,185	159	1875	74,096	1,711	1907	236,949	6,188
1844	4,377	192	1876	76,808	2,712	1908	240,846	3,897
1845	4,633	256	1877	79,082	2,274	1909	244,084	3,238
1846	4,930	297	1878	81,747	2,665	1910	249,992	5,908
1847	5,598	668	1879	86,556	4,809	1911	254,732	4,740
1848	5,996	398	1880	93,262	6,711	1912	258,033	3,301
1849	7,365	1,369	1881	103,108	9,846	1913	261,036	3,003
1850	9,021	1,656	1882	114,677	11,569	1914	263,547	2,511
1851	10,982	1,961	1883	121,422	6,745	1915	264,378	831
1852	12,908	1,926	1884	125,345	3,923	1916	266,381	2,003
1853	15,360	2,452	1885	128,320	2,975	1917	266,059	−322†
1854	16,720	1,360	1886	136,338	8,018	1918	264,233	−1,826
1855	18,374	1,654	1887	149,214	12,876	1919	263,707	−526
1856	22,016	3,642	1888	156,114	6,900	1920	264,021	314
1857	24,503	2,487	1889	161,276	5,162	1921	251,175‡	−2,846
1858	26,968	2,465	1890	167,191	5,915	1922	250,412	−663
1859	28,789	1,821	1891	172,035	4,844	1923	250,222	−190
1860	30,626	1,837	1892	175,691	3,656	1924	250,155	−67
1861	31,286	660	1893	179,834	4,143	1925	250,003	−152
....	.....	....	....	.....	.....	....	.....	.....

* For 1840–89 and 1916–25, calendar years; for the period 1890–1915, years ending June 30. Figures refer to single-track mileage. † The minus sign indicates decrease. ‡ System of reporting mileage changed.

RAILWAY MILEAGE OF THE UNITED STATES BY STATES

(JANUARY 1, 1925)

STATE	Miles of Line	Miles per 100 Square Miles of Area	Population per Mile of Line
Alabama	5,302	10.34	438
Arizona	2,409	2.15	135
Arkansas	4,917	9.11	346
California	8,333	5.34	412
Colorado	5,097	4.91	177
Connecticut	980	20.89	1,380
Delaware	332	17.68	665
District of Columbia	36	51.43	12,155
Florida	5,372	9.27	182
Georgia	7,019	11.96	399
Idaho	2,884	3.42	150
Illinois	12,037	21.39	538
Indiana	7,188	19.99	406
Iowa	9,842	17.72	244
Kansas	9,489	11.55	188
Kentucky	3,979	9.86	613
Louisiana	5,088	11.18	351
Maine	2,229	7.49	339
Maryland	1,448	14.65	1,000
Massachusetts	2,092	26.00	1,830
Michigan	8,500	13.14	426
Minnesota	8,820	10.92	264
Mississippi	4,206	9.10	421
Missouri	8,054	11.72	421
Montana	5,064	3.44	108
Nebraska	6,190	8.06	210
Nevada	2,145	1.95	35
New Hampshire	1,237	13.76	357
New Jersey	2,307	30.81	1,365
New Mexico	2,994	2.43	121
New York	8,382	17.61	1,238
North Carolina	5,352	10.47	474
North Dakota	5,276	7.52	122
Ohio	8,880	21.77	640
Oklahoma	6,540	9.42	309
Oregon	3,372	3.50	234
Pennsylvania	11,384	25.46	761
Rhode Island	203	21.10	2,878
South Carolina	3,762	12.40	445
South Dakota	4,260	5.56	148
Tennessee	4,054	9.58	582
Texas	16,134	6.13	280
Utah	2,197	2.68	208
Vermont	1,058	11.62	322
Virginia	4,660	11.52	494
Washington	5,519	8.21	246
West Virginia	4,040	16.82	361
Wisconsin	7,480	13.59	352
Wyoming	1,990	2.05	106

Distribution of Railroad Mileage. About forty per cent of the entire railway mileage of the world is in the United States. Somewhat over three-tenths is in Europe, while all the other countries of the world have only three-tenths of the total railway mileage. The distribution of the railroads in the United States among the several states in 1920 is shown by the accompanying table; as is also the railway mileage of United States possessions.

The state of Texas, because of its great territorial area, surpassing that of France or Germany, naturally has the greatest mileage. Illinois comes second and Pennsylvania third, while Iowa, Kansas, Minnesota, Ohio, New York, Missouri, and Michigan also rank high. New Jersey ranks first among the states in the number of miles of railroad per hundred square miles of area. Nevada, because of its large size and small population, has the lowest mileage per hundred square miles of area. At the same time this state has the highest ratio of mileage to population of any of the states.

History of Canadian Railroads. In many respects the development of Canadian railways corresponds with that of the United States. As was the case in the States, the Canadian colonies devoted their attention first to canal building and the establishment of inland waterways. During the first half of the 19th century, these were the chief activities concerned with improvements in transportation.

The first railway in Canada was placed in operation in 1836. This was a line 16 miles in length, connecting Montreal and St. John's on the Champlain route to New York. Up to 1850 only 50 miles of railway in addition to this original line had been constructed. But the great activity in American railroad building during the 1840's convinced the Canadians that they too must have railroads to supplement their canals.

In 1849 the Canadian government adopted a vigorous policy regarding railway construction by undertaking to guarantee 6 per cent interest on a sum not to exceed one-half the cost of railways 70 miles in length or longer. As a result, the St. Lawrence and Atlantic railway, connecting Montreal and Portland, Maine, was completed in 1853, and, during the same year, the Northern railway from Toronto to Collingwood was placed in operation. In 1854 the Great Western railway, connecting Niagara and Detroit, was opened. The Grand Trunk railroad, chartered in 1852, operated the St. Lawrence and Atlantic under a lease, and, in 1856, completed the main line from Toronto to Montreal, thereby connecting the chief commercial districts of Canada with the Atlantic seaboard.

By 1860 more than 2000 miles of Canadian railways were in operation. These were constructed largely by heavy outlays of British capital. But the financial crisis of 1857, together with the pecuniary embarrassments of most of the lines, prevented extensive railway construction for the ensuing 10 years. Except for the completion of local lines, there was but little additional railway building until after the confederation of the various provinces of the Dominion was effected in 1867.

Fulfilling a condition of Confederation in the East, the Dominion government undertook the completion of the Intercolonial railway between the province of Quebec and the ice-free Atlantic ports of Nova Scotia and New Brunswick. In 1876, at a cost exceeding $20,000,000, this line was completed. A corresponding condition of western federation, demanded by British Columbia, was fulfilled by the construction of the Canadian Pacific railway. At a cost to the country of $62,000,000 in cash and 25,000,000 acres of land, this notable enterprise in railway transportation was begun in 1881 and completed in 1885. It is worthy of note that in the United States at this time only three transcontinental railway connections with the Pacific coast had been established. These were the Central Pacific, from Ogden to San Francisco, finished in 1869; the Southern Pacific, from the Texas seaboard to San Francisco, completed in 1877, and the Atchison, Topeka, and Santa Fé, from the Missouri river to Los Angeles, opened in 1885.

The railways of Canada have been built largely under various forms of government aid. The principal forms of aid extended have consisted of land grants, cash subsidies, loans, and the guarantee of bonds or interest. The total area of land so granted, up to 1921, exceeded 58,000,000 acres. Aid has been granted by the Dominion government, by various provincial governments, and by municipalities. From 1851 to 1921 the total value of such public aid to steam railways amounted to more than $281,000,000.

Government Railways in Canada. A feature wherein railway development in Canada sharply differs from that in the United States is found in the large mileage owned or controlled by the Dominion government. The Prince Edward Island railway, completed in 1875, and the Intercolonial railway, completed in 1876, were the earliest government owned lines. In 1903 the Dominion government began the construction of the eastern division of the National Continental railway from Moncton, N. B., to Winnipeg. This line was to be leased to the Grand Trunk railway. Upon the failure of the latter to operate the new road after it had been completed at a cost of $165,000,000 up to 1919, the Dominion government undertook its operation.

At the beginning of 1918 the Canadian government railways had a total mileage of 5150, comprising the Intercolonial, 2305 miles; St. John and Quebec railway, 128 miles; Prince Edward Island railway, 314 miles, and National Continental railway, 2403 miles. During 1918 branch lines in New Brunswick aggregating 143 miles were taken over for operation. In the same year the Dominion government acquired the capital stock and control of the Canadian Northern Railway Company. The Canadian Northern system at this time had a total mileage of 9566 miles. With the later acquisition of various subsidiaries, including the Hudson Bay railway, the Canadian Northern system, as controlled by the government, comprised fully 10,000 miles of line. In 1920, the Grand Trunk Pacific railway, having a mileage of about 2700 miles, was taken over and operated by the government. The Grand Trunk railway, also, with a total length of about 3600 miles, was placed under government management in 1921.

From the foregoing it will be seen that about 22,000 miles of railways, or more than one-half of the total mileage of the Dominion is under government ownership or control. In these railways the Dominion had invested up to 1921 a capital expenditure of $485,000,000.

The accompanying table shows the growth of mileage in operation from 1840 to 1925. The periods of the greatest relative expansion were between 1850 and 1860, and between 1900 and 1915.

GROWTH OF CANADIAN RAILWAYS

Year	Mileage	Year	Mileage
1840	16	1900	17,657
1850	66	1910	24,731
1860	2,065	1915	35,582
1870	2,617	1920	39,384
1880	7,194	1925	40,061
1890	13,151		

Technical Triumphs of American Railroads. The triumph of American railroads has been quite as great in the development of equipment as in the rapidity of track construction. The success of railroading in the United States depended upon the ability to move heavy trainloads long distances and over such grades as were required to surmount the Appalachian and the Rocky mountains.

The great grain fields of the country are in the Mississippi valley, and the products of the Middle West have to be transported 1000 or 1500 miles on the average to reach the markets of the East or the seaboard for export. The chief sources of iron ore are in northern Michigan and northern Minnesota. The important coal fields are on the western slopes of the Appalachians and in Illinois, Iowa, Kansas, and Oklahoma. The leading oil fields are in the Appalachians, Kansas, Texas, Louisiana, Oklahoma, and southern California. The great lumber producing forests are in the upper Mississippi valley, in the South, and in the Far West.

Moreover, the locations of many other important natural resources are equally scattered and remote. The immense distances and diversities involved indicate the complex nature of the transportation problem which the railroads of the United States have been called upon to solve.

The Locomotive. To provide transportation for the products of forest, mine, and field, the steam locomotive has been enormously increased in size and tractive power. From the tiny locomotive of the 1830's and 40's, weighing from 5 to 20 tons, has been developed the huge triplex articulated locomotive of the present day with 24 driving wheels and a total weight of 853,000 pounds. This is an extraordinarily large locomotive and is intended for work on heavy mountain grades. But the standard freight locomotive, with eight driving wheels, now has a total weight of about 500,000 pounds.

The heavier passenger locomotives with six drivers are quite as large and heavy as those used for freight haulage. Freight trains of 50 to 100 loaded cars are handled by these powerful locomotives which, with favorable grades, can haul, without difficulty, 100 cars carrying 5000 to 6000 tons of freight.

The Car. Such heavy trainloads would not be possible except for the size and the strength of the freight cars now in use. At the close of the Civil War, the standard freight car had a capacity of about 20 tons. By the end of the 19th century the standard had been raised to 40 tons for box cars and to 50 tons for coal and ore cars. During the past two decades additions had been made to the capacity of coal cars. About 1910, coal cars of 90 tons' capacity were put into service. More recently cars with a capacity of 150 tons have been constructed and put in operation upon a few roads. The only limit to the size of the car is the strength of the tracks and the bridges of the railroad.

Application of Electric Power. In the future, the technical development of the railroads will probably result mainly from the wider application of electric power. Important beginnings have been made in the use of electric locomotives.

For three forms of service the electric locomotive is far preferable to the steam locomotive. (1) By electrifying railway terminals in large cities, it is possible to eliminate the smoke nuisance. (2) By using electric locomotives in tunnels, the smoke and gases may be kept out of them. In consequence, tunnels may be made longer and thus obviate many steep grades. (3) For heavy mountain grade work the electric locomotive is far superior to the steam locomotive.

The units of power, that is, the number of locomotives electrically driven, may be multiplied as required. By the use of electricity instead of steam, the weight of the trains upon mountain grades can be increased and their speed kept higher. Ordinarily, the electricity required for this work can be economically developed by water power. The Chicago, Milwaukee, and St. Paul railroad has electrified its line across the Rocky mountains. Other railroads have made beginnings in the electrification of mountain sections.

TRANSPORTATION UPON ELECTRIC RAILWAYS

Tramways. The first electric railways were built to take the place of horse car lines or tramways in the cities. The tramways had been preceded by bus lines, which began to run in New York City in 1830 and in Philadelphia the following year. It was not until 1852 that the first horse car was built in the United States. Naturally, it was in New York City. The first street railway in Boston dates from 1853, and, in Philadelphia, from 1858. Chicago's first line was started in 1859. These horse car lines provided a service of four or five miles an hour, and were fairly adequate for the transportation needs of the cities at the middle of the 19th century.

Cable and Elevated Roads. By 1870, more rapid transit than could be provided by horse car lines had become necessary, and in one important city, San Francisco, steep hills made horse cars impracticable. The cable lines were the first to provide rapid transit. San Francisco opened a cable line in 1873, Chicago in 1878, and Philadelphia in 1884.

In New York City, rapid transit was provided by the construction of elevated railways. The franchise for the first of these elevated railways was granted in 1867. Construction followed in due course, and by 1879 New York City had a fairly complete system of elevated roads. It was intended at first to use cable traction upon these elevated lines, but, before operation began, it was

ELECTRIC RAILWAYS OF THE UNITED STATES

State	Number of Companies	Miles of Track	Motor Passenger Cars	Revenue Passenger Cars	Electric Locomotives	Freight and Express Motor Cars	Service Cars
Alabama	12	367.85	482	567	3	6	111
Arizona	3	44.12	52	50	....	....	3
Arkansas	9	120.32	242	248	....	1	22
California	29	3,053.07	3,873	3,854	76	1,726	436
Colorado	13	430.81	455	541	8	195	139
Connecticut	7	1,010.86	1,924	1,624	2	68	302
Delaware	1	95.50	130	186	....	3	16
District of Columbia	3	198.57	929	1,209	2	....	99
Florida	7	197.04	372	369	....	25	21
Georgia	11	449.34	737	738	1	20	66
Idaho	3	149.46	35	35	....	7	1
Illinois	70	3,416.13	6,231	6,927	38	1,776	793
Indiana	27	2,304.67	1,719	1,949	14	498	461
Iowa	22	999.33	842	862	40	2,771	161
Kansas	15	581.20	424	413	3	140	60
Kentucky	9	517.02	860	831	....	20	141
Louisiana	9	304.80	733	763	....	....	85
Maine	15	566.08	523	411	8	114	147
Maryland	11	758.38	1,868	2,011	3	99	132
Massachusetts	31	2,688.37	5,594	5,111	5	89	1,073
Michigan	20	1,817.39	2,727	2,877	5	502	243
Minnesota	10	680.89	1,313	1,238	3	5	119
Mississippi	7	97.91	102	119	2	8	3
Missouri	19	1,098.23	2,603	2,760	6	32	362
Montana	5	111.27	121	143	....	7	23
Nebraska	5	206.05	529	474	4	5	67
Nevada	1	4.52	5	4	....	....	1
New Hampshire	14	263.46	311	279	1	2	65
New Jersey	19	1,342.16	2,680	2,971	2	9	379
New Mexico	2	11.00	17	16	....	....	1
New York	98	4,737.02	15,903	16,769	30	....	1,611
North Carolina	9	215.55	277	268	2	357	25
North Dakota	4	20.66	55	71	....	2	8
Ohio	71	3,973.82	4,700	4,740	18	....	861
Oklahoma	11	323.95	284	301	6	564	32
Oregon	9	612.01	719	740	19	20	177
Pennsylvania	117	4,440.06	7,660	7,171	7	505	1,162
Rhode Island	3	402.55	754	1,080	3	293	170
South Carolina	6	301.40	195	211	16	64	25
South Dakota	1	17.20	21	18	....	159	3
Tennessee	13	494.53	739	768	3	....	68
Texas	24	974.63	1,394	1,428	1	8	145
Utah	6	516.67	293	320	21	33	64
Vermont	8	117.40	80	71	5	386	12
Virginia	14	553.64	921	996	4	4	78
Washington	19	953.57	1,184	1,147	31	67	137
West Virginia	16	422.06	510	440	4	704	82
Wisconsin	18	919.44	1,199	1,168	8	51	355
Wyoming	2	22.84	14	14	....	61	1
Totals	858	43,904.80	75,335	77,301	404	11,406	10,548

decided to use dummy locomotives. Twenty-five years later these steam locomotives were displaced by electric locomotives.

Chicago began the construction of elevated roads in 1888; Boston, in 1903; and Philadelphia, in 1907.

Subways. The earliest underground railway for passengers was opened in London in 1863. It was operated with steam locomotives at first, but electric traction began to be used in 1890. The term "tube" is ordinarily applied in England to these railways. Budapest and Glasgow followed with the inauguration of electric train subways in 1896. A subway was opened in Boston in 1898 for the special purpose of giving the surface lines access to the business district without the use of the street surface. A subway service in Paris was initiated in 1900. The first line of the New York subway system was opened in 1904. Construction in this city presented peculiar difficulties. The subways had usually to be blasted through rock and, in certain sections, buildings of enormous weight had to be safeguarded while tunnels were driven beneath them. More recently, Philadelphia and Rochester have constructed transit facilities of this type. Chicago has a freight subway with a network of tunnels some 70 feet beneath the street level.

Technical Development. The electric railway was made possible by the dynamo, which was developed for practical use shortly after the middle of the nineteenth century. However, it was not until 1888 that an electric trolley line was actually demonstrated to be commercially practicable. After its introduction during that year, the electric railway made rapid progress in all cities. By the end of the century it had almost completely displaced horse car lines.

The first motors were large and relatively inefficient, commutation was imperfect, and the devices for regulating speed were unsatisfactory. Until the magnetic circuit breaker was invented, the motors were often disabled by lightning or by excessive currents. The electric railway car has developed from the old modified horse car to the long, comfortable, eight-wheel car now in service. This is nearly as large and heavy as the standard day coach in use upon the steam railroads.

The street railway track has developed from the old tracks with wooden stringers surfaced with iron to the light T (tee) rails used until 1890, and later to increasingly heavy girder rails weighing from 140 to 160 pounds per yard. In order to avoid possible interference with vehicular traffic, the grooved girder rail is now universally used in city streets.

In most cities the transmission of the current is by the overhead trolley, but in New York City, Washington, D. C., and some other cities, the conductor is placed in a conduit between the rails. This arrangement frees city streets of unsightly and dangerous overhead wires.

Electric Locomotives. The electric locomotive was first used for hauling cars in mines. This was in 1882. Its next use was in subways and tunnels. The first tunnel to adopt electric locomotives was that of the City and South London railway, under the Thames, London. This tunnel was opened for

MOTOR VEHICLES OF THE WORLD

REGISTRATION IN PRINCIPAL COUNTRIES—1929

COUNTRY	Passenger Cars	Busses	Trucks	Persons per Motor Vehicle
Argentina	259,120	2,200	49,485	34
Australia	418,173	2,152	96,370	12
Belgium	72,863	1,200	39,322	70
Brazil	109,000	1,200	55,000	223
Canada	930,405	1,618	129,807	9
China	17,814		7,767*	17,000
France	740,000	13,000	345,000	37
Germany	390,000	9,000	132,000	118
Great Britain†	952,042	46,790	319,337	34
Irish Free State	33,076	726	6,496	88
Italy	135,900	6,300	35,130	230
Japan	47,197	4,255	22,392	853
Mexico	52,500		10,000	229
New Zealand	125,690	1,200	24,564	9
Norway	22,691	1,397	12,664	75
Russia	8,750	2,248	10,051	6,980
Spain	112,452		33,636*	151
Sweden	98,600	2,250	27,000	47
United States	21,379,125	92,325	3,113,999	4.9

*Includes busses. †Includes Northern Ireland.

REGISTRATION IN THE UNITED STATES—BY STATES—1929

STATE	Total of Motor Vehicles	Passenger Cars	Motor Trucks	Persons per Pass. Car
Alabama	269,519	235,026	34,493	10.94
Arizona	94,372	86,036	8,336	5.50
Arkansas	214,931	181,280	33,651	10.72
California	1,799,890	1,582,477	217,413	2.87
Colorado	284,867	260,906	23,961	4.17
Connecticut	309,792	261,091	48,701	6.38
Delaware	51,210	41,195	10,015	5.92
Dist. Columbia	126,556	112,505	14,051	4.90
Florida	352,961	296,691	56,270	4.75
Georgia	318,856	277,881	40,975	11.52
Idaho	108,154	96,960	11,194	5.63
Illinois	1,504,359	1,314,003	190,356	5.62
Indiana	823,806	706,713	117,093	4.49
Iowa	733,466	672,447	61,019	3.61
Kansas	533,799	471,897	61,902	3.88
Kentucky	304,231	272,636	31,595	9.36
Louisiana	264,293	223,445	40,848	8.72
Maine	172,638	139,460	33,178	5.70
Maryland	285,311	275,221	10,090	5.87
Massachusetts	726,295	637,153	89,142	6.73
Michigan	1,249,221	1,084,615	164,606	4.28
Minnesota	673,573	583,789	89,784	4.66
Mississippi	246,242	214,754	31,488	8.34
Missouri	712,965	636,717	76,248	5.53
Montana	126,035	104,231	21,804	5.26
Nebraska	391,355	358,173	33,182	3.93
Nevada	27,376	21,733	5,643	3.55
New Hampshire	102,644	88,594	14,050	5.14
New Jersey	758,430	629,748	128,682	6.06
New Mexico	65,737	63,743	1,994	6.21
New York	2,083,942	1,760,549	323,393	6.56
North Carolina	464,376	418,864	45,512	7.01
North Dakota	173,525	151,778	21,747	4.22
Ohio	1,649,699	1,450,994	198,705	4.69
Oklahoma	529,843	465,550	64,293	5.21
Oregon	248,118	227,404	20,714	3.96
Pennsylvania	1,642,207	1,420,957	221,250	6.93
Rhode Island	125,698	106,155	19,548	6.74
South Carolina	216,805	194,267	22,533	9.59
South Dakota	191,374	171,067	20,307	4.11
Tennessee	322,137	294,305	27,832	8.50
Texas	1,214,297	1,060,028	154,269	5.17
Utah	98,541	84,220	14,321	6.30
Vermont	86,231	78,685	7,546	4.47
Virginia	360,545	306,911	53,634	8.39
Washington	402,875	344,977	57,898	4.60
West Virginia	251,556	215,787	35,769	7.99
Wisconsin	742,135	646,747	95,388	4.56
Wyoming	56,336	48,760	7,576	5.06
Totals	24,493,124	21,379,125	3,113,999	5.6

INCREASE IN UNITED STATES, 1895–1928

YEAR	PRODUCTION		REGISTRATION	
	Passenger Cars	Motor Trucks	Passenger Cars	Motor Trucks
1895	4	...	4	...
1900	5,000	...	8,000	...
1905	24,500	450	77,400	600
1910	181,000	6,000	458,500	10,000
1915	818,618	74,000	2,309,666	136,000
1920	1,883,158	322,039	8,225,859	1,006,082
1925	3,839,302	497,452	17,512,638	2,441,709
1928	4,024,590	576,540	21,379,125	3,113,999

Figures for 1920–1928 include Canadian production but not registration.

traffic in 1890. Since that date, the electric locomotive has been placed in operation in a large number of tunnels. It is used also to provide the tractive power for the electrified terminals and suburban divisions of the steam railroads in New York, Philadelphia, and other cities.

The most recent, and probably the most important, application of the electric locomotive has been in heavy mountain railway work. In this field the electric motor has greatly reduced the cost of moving heavy traffic over mountain grades. It has also largely increased the tonnage that may be handled over mountain sections of railroads. Further, the electric motor has made it possible to reduce the summit levels of the mountain sections of railroads by the construction of longer tunnels at lower altitudes.

Electric Trains. At first, electric cars for passenger transportation were operated singly. This method required the services of a motorman for every car. But at present, on electric urban lines and upon interurban electric roads, the multiple unit train is run. By the multiple unit system, invented by Frank J. Sprague, cars may be run either singly or in trains. When several cars are united in a train, they are managed as a unit by a single motorman.

Electric Railway Mileage. In 1926, as shown by the table entitled *Electric Railways of the United States*, there were about 44,000 miles of electric railway track in the United States. This is nearly one-fifth the mileage of steam railroads. In some states, notably Massachusetts, there are more miles of electric railway than of steam railroads. In New York State there are nearly 5000 miles of electric railway; in Pennsylvania, nearly 4500 miles. During the decade preceding the World War, the development of interurban and long distance electric railways proceeded rapidly, particularly in New England and also about Detroit, Indianapolis, and Los Angeles. Since the advent of the motor bus, however, electric railway mileage has suffered great losses, having declined over 3000 during 1920–25.

The electrification of main line railroads has been limited chiefly to the terminal divisions of trunk line railroads serving large cities. The New Haven railroad is electrified between New Haven, Conn., and New York City. The most important instance of main line electrification is that of the St. Paul railroad, which has an electric service from the eastern side of the Rocky mountains through to the Pacific coast.

Freight Services of Electric Railways. For the most part, electric railway services are still limited to passenger traffic. However, beginnings have been made with the transportation of three kinds of freight. Packages, parcels, and various lighter grades of freight are handled by numerous electric lines into and out of large cities. Another freight service performed by the electric roads is that of bringing traffic to and taking it from main line steam railroads. Numerous railroads have encouraged the construction of electric branch lines to serve as feeders for freight business as well as for passenger traffic.

A third class of freight service performed by trolley lines in the past has been that of gathering up farm products and taking them to the town markets and of bringing commodities from the towns to the country. These rural trolley lines, however, have been supplanted by motor trucks as the latter can perform rural transportation services with much less investment of capital and have much greater flexibility in operation.

MOTOR VEHICLES IN CANADA

Registration by Provinces, 1925

Province	Passenger Cars	Commercial Vehicles and Trucks	Busses	Motor Cycles	Total†
Alberta	50,496	3,138	*	362	54,357
Brit. Columbia	46,336	9,269	*	770	56,618
Manitoba	46,736	3,606	32	542	51,241
New Brunswick	17,420	1,342	16	85	19,022
Nova Scotia	20,012	2,563	35	135	22,853
Ontario	303,736	34,690	216	3,748	344,112
Prince Edward Island	2,824	114	1	8	2,955
Quebec	80,854	14,174	307	2,083	97,657
Saskatchewan	71,205	5,560	1,171	184	79,078
Yukon	76	33	none	3	112
Totals	639,695	74,489	1,778	7,920	728,005

*Included under Passenger Cars. †Includes dealers' cars and miscellaneous motor vehicles.

TRANSPORTATION ON THE PUBLIC ROADS

Highway History. In colonial days and until within a few decades, road building in the United States was carried on mainly by local governments. The work of construction was done by townships and towns in the middle and eastern states, and by counties and subdivisions of counties in the southern states. These local highways were mostly dirt roads and were not suitable for the handling of freight and passenger traffic between distant points. The first long distance or through-transportation highways were the turnpike roads, built by corporations chartered by the several states. The first important turnpike was the one from Philadelphia to Lancaster, Pa., begun in 1792 and completed two years later. Early in the 19th century, turnpike roads in large numbers were built in Pennsylvania, New York, and other states.

For a time the government of the United States gave aid to highway construction. Works of internal improvement then included highways as well as canals. But the policy of national aid to public highways came to an end in the 1830's, when it was held that Federal works of internal improvement were unconstitutional. By 1850 most of the states had come upon financial difficulties in attempting to build or aid canals, railroads, and highways. As a result, the old colonial policy of local highway construction again prevailed.

Until near the end of the 19th century, the railroads performed long distance transportation in the United States with great efficiency and with a fair degree of adequacy. But by that time a large part of the United States had become closely settled and industry had reached an advanced stage of development. In this changed situation improved highways were recognized to be as necessary as efficient railroads.

Good Roads Movement. About 1890 a "good roads" movement started in Massachusetts, New Jersey, New York, and other states. Following 1910, this movement was powerfully re-enforced through the need for roads more suitable for motor vehicles, which by that time were coming into general use. Rural roads began to be hard-surfaced on an extensive scale. The amount expended in a single year in the United States for the construction and maintenance of public roads has frequently exceeded a billion dollars. By the beginning of 1926, over half the state highways were surfaced, a total of 144,854 miles. Of all rural roads, 521,260 miles were surfaced. This mileage was about 17 per cent of the whole, which comprised a mileage of 3,006,083. The table entitled *Rural Roads in the United States*, page 1224, shows the total length, and the mileage surfaced, of the state highway system and of all rural roads in each state.

National Aid to Highways. When the motor truck came to be used extensively, it was plain that highways were to be considered not only as state roads, but also as avenues of interstate traffic. Interstate highways are necessary for motor truck transportation. For this and other reasons, the Federal government began anew to aid the states

RURAL ROADS IN THE UNITED STATES, 1925

State	Total Mileage all Types	Total Mileage Surfaced	State Highway Systems	
			Total Mileage	Mileage Surfaced
Alabama	61,541	13,560	3,954	1,833
Arizona	22,552	3,190	2,014	1,452
Arkansas	74,865	6,499	8,295	3,795
California	79,197	18,002	6,591	3,383
Colorado	67,839	8,600	8,933	3,457
Connecticut	13,346	2,610	1,872	1,725
Delaware	3,796	782	506	506
Florida	31,389	10,194	5,616	2,545
Georgia	97,892	18,711	6,232	2,473
Idaho	35,402	12,116	4,627	2,196
Illinois	96,300	15,228	4,794	4,137
Indiana	73,131	48,125	3,936	3,860
Iowa	102,921	5,986	6,674	3,029
Kansas	127,964	3,195	7,386	963
Kentucky	68,704	17,231	8,000	2,272
Louisiana	39,803	5,184	7,000	3,822
Maine	20,765	4,279	1,459	1,219
Maryland	14,715	4,536	2,276	2,276
Massachusetts	19,083	7,888	1,542	1,529
Michigan	77,283	21,514	6,706	6,026
Minnesota	108,080	24,385	6,954	5,979
Mississippi	56,108	9,910	5,501	2,690
Missouri	110,500	10,610	7,640	2,553
Montana	67,177	1,189	7,957	859
Nebraska	87,805	2,550	6,256	1,930
Nevada	23,171	1,252	2,997	874
New Hampshire	13,918	1,947	2,197	1,821
New Jersey	17,722	7,608	1,290	1,182
New Mexico	48,296	2,441	9,160	1,616
New York	82,041	26,304	14,068	9,567
North Carolina	67,850	20,097	6,134	5,392
North Dakota	106,498	1,785	6,174	804
Ohio	84,883	37,972	10,784	7,225
Oklahoma	134,262	1,686	5,589	1,348
Oregon	49,753	10,754	4,447	3,008
Pennsylvania	92,774	18,845	10,843	7,543
Rhode Island	2,374	777	768	406
South Carolina	64,634	10,061	4,951	3,221
South Dakota	116,906	3,007	5,918	2,023
Tennessee	65,723	14,056	5,046	3,330
Texas	169,745	20,942	18,728	8,781
Utah	23,477	3,133	3,228	1,059
Vermont	14,861	4,613	4,453	3,000
Virginia	59,237	9,782	5,077	3,560
Washington	49,016	17,271	3,266	2,542
West Virginia	35,243	1,628	3,664	1,263
Wisconsin	78,965	28,318	10,265	7,978
Wyoming	46,576	907	3,143	802
Total	3,006,083	521,260	274,911	144,854

in highway construction. If the rate of construction established immediately after the World War is continued, all parts of the United States will be provided, within comparatively few years, with hard surface roads. These will be serviceable for motor transportation during all seasons of the year.

Motor Truck Transportation. During the decade 1910–20, the motor truck was developed so as to command a very important place among transportation facilities. By 1920, it had become certain that an important revolution in transportation methods was taking place. When completed, this revolution will doubtless result in a substantially equal division of freight transportation between the steam railroads and the highways.

The substitution of the motor truck for the steam railroad in the transportation of a large share of the local freight will bring about many significant changes in industrial organization and processes. The concrete road, the motor truck, and organized transportation upon the highways promise to introduce a new order of things, both socially and industrially.

N. Y. STATE BARGE CANAL SYSTEM

The canal system of New York State consists of the Erie, Champlain, Oswego, Cayuga and Seneca canals, the Cayuga Lake inlet at Ithaca, and the Glens Falls feeder. The lakes, rivers, reservoirs, feeders, harbor basins, and terminal docks connected with these canals and natural bodies of water also form part of the Barge Canal system. Officially, the Shinnecock and Peconic canal belongs to it, although this canal is in Long Island. The Black River canal is included in the canal system of the state but does not belong to the Erie Barge Canal system.

Erie Barge Canal. The trunk of the new system, the Erie canal, begins officially at Congress street, Troy, and, after passing through the Federal government lock, follows the Hudson river north to Waterford. At Waterford the canal turns west and extends across the state to Tonawanda, and thence, by way of the Niagara river, to Buffalo.

Champlain Canal. From the eastern end of the Erie canal at Waterford, the Champlain canal extends north to Lake Champlain at Whitehall. Barges may thus have continuous passage from the mouth of the Hudson to the International boundary line, and thence, in connection with Canadian waterways, to the Saint Lawrence river.

Oswego Canal. About midway between Waterford and Buffalo, the Oswego canal extends north from its junction with the Erie canal at Three River Point, and connects the system with Lake Ontario at Oswego.

Cayuga and Seneca Canal. The south central counties of the state are served by the Cayuga and Seneca canal, which leaves the Erie at a point about a half mile west of the village of Montezuma and connects first with Cayuga lake and then with Seneca lake. Canal channels are provided to the southern extremities of both of these lakes.

The following table gives the exact lengths of the various canals:

	Miles
Erie Canal	
From the Ohio Basin, Buffalo, to Tonawanda.	14.42
From Tonawanda to Waterford	337.9
From Waterford to Federal lock at Troy	2.5
Champlain Canal	
From Whitehall on Lake Champlain to junction with the Erie canal at Waterford	60.1
Oswego Canal	
From Lake Ontario at Oswego to Erie canal at Three River Point	23.8
Cayuga and Seneca Canal	
From Erie canal to Ithaca and to Montour Falls, including Cayuga and Seneca lakes	92.1
Canal harbors at Utica, Syracuse, and Rochester	10.

The total length of the canals, including the connecting rivers and lakes which serve as part of the system, is 801.3 miles.

The canals are all at least 12 feet deep, with a minimum bottom width of 75 feet when dredged through earth, and of 94 feet where cut through rock. There are 306 bridges across the canal system. These are required to clear the water by at least 15.5 feet. Each of the 56 concrete locks built by the state is 300 feet long by 45 feet wide. The Federal lock at Troy, however, has a width of 44.44 feet. The locks will accommodate a barge 300 feet long and 43 feet wide, with a draft of about 10 feet and a height of 15 feet above the water line. Such a vessel could transport about 2800 tons. The barges most commonly used have a capacity of 300 tons.

To facilitate canal transportation, the state maintains terminal warehouses or piers in East river, New York City. The distance from these piers to Buffalo is 506.72 miles.

The lock at Little Falls has a lift of 40½ feet, exceeding in this respect any other single lock in the world. The series of 5 locks at Waterford raise a vessel 169 feet—a lift twice as great as that to the summit of the Panama canal.

CAPITAL AND LABOR

DISAGREEMENTS and conflicts between industrial managers and labor leaders as to wages and working conditions constitute what is generally known as "the labor problem." The so-called labor problem is readily seen to be a problem of capital and labor because the usual dramatic form which the issue takes is that of a threatened or actual strike or lockout, wherein the industrial management, which is compelled to protect invested capital, is seen in conflict with labor. This problem is thus one essentially of management and labor. The designation "capital and labor" originated in that early period when owners of industrial plants were their own managers. At the present time, however, wide stock ownership necessarily separates managers and owners into different groups.

All disturbances in the large scale production of goods to meet human wants affect the consumer both as to continuous delivery and as to price. Widespread violence, sometimes the incident of strikes and lockouts, touches the interest of the public, which is vitally concerned with the maintenance of law and order and with the continued approximation of justice,—civil and social considerations which are often set aside in the course of industrial strife.

Five Human Interests. All adequate solutions of the current maladjustments between labor and management must finally take into account the distinct as well as the overlapping interests of five human groups: the employees, the managers, the investors, the consumers, and the citizens.

The overlapping or mutual interests of these five groups cover a very wide zone, while the zone of conflicting interests is quite narrow. This is the inevitable view of those who study the situation as a whole, after they have once noted the indirect and final effects of each interest when narrowly pursued.

It is a narrow and immediate view of self-interest which is responsible for most of our group conflicts with their resulting inefficiencies in industry.

Overlapping Groups. The five groups mentioned are by no means distinct. They never have been distinct. In the United States they are growing less so every day. The members of all groups are citizens and consumers. Stock ownership in industry and business is now so widely distributed among the general public that the capitalist group overlaps other groups more than ever. The deliberate policy of encouraging consumers and employees to become stockholders in corporations is another striking change of recent years. Labor organizations have also set up banks and undertaken business enterprises. Class-conflict consciousness is weakened as economic groups discover identity of interest, and as individuals find that their economic interest is multiple because they are really members of several groups. The old economic class attitude remains only when membership in one group greatly dominates that of others. Moreover there is an increasing recognition by each individual that the inefficiencies and wastages of economic conflict are finally charged up against him, not once but many times.

Distribution of Losses. When an avoidable strike occurs, labor loses income through lost employment, management loses through failure to achieve higher salaries which greater effectiveness would bring, investors lose through reduced dividends, consumers lose through higher costs, and the public loses through increased taxation for the protection of property and life.

The losses in terms of personal content and individual happiness need not be specifically mentioned, but they cannot be ignored. Higher economic returns to any group are intended to buy enriched satisfactions to human life, and these are worth only the balance of happiness which obtains after the anxiety, the strain, the discontent, and the bitterness accompanying the struggle to victory of an industrial group are accurately subtracted.

Non-income Factors. While higher economic returns in wages or profits occupy the center of attention in most disputes in industry, other factors in human welfare and happiness are steadily being given increased consideration. For some time, working conditions, such as length of working day, unemployment, labor turnover, physical safety, sanitation, and fatigue, have been part of the program of the labor organizations. Likewise, management is beginning to take into account the subtle psychological factors which make work and co-operation more congenial. Employment managers seek to banish the fear of unemployment and injustice, to redress grievances quickly so that they do not become contagious, and to provide participation in management which gives understanding, stimulates co-operation, and increases production.

Thus, persons who are part of the industrial organization are less and less treated as mere economic men, and are being considered in all of the human aspects which industry affects for good or ill. This humanization of industrial life constitutes the basis of most of the recent experiments in the rearrangement of industrial relations.

Correction Precedes Prevention. For the most part, these experiments aim to engender greater consideration on the part of one group for every other group concerned with industry and thus tend to prevent friction and strife. Historically, however, society begins with a policy of correction before it embarks upon a policy of prevention. The first efforts for industrial peace aimed at the prompt settlement of actual strikes and lockouts. Later, the threat of strike was dealt with before the strike actually occurred. Now the attention of industrialists is directed to the underlying causes of misunderstanding and dissatisfaction. Its object is no longer negative,—mere strike prevention. It is positive and aims to improve co-operation in the day-to-day aspects of production.

The methods of settling labor disputes which have been evolved are numerous, and exceedingly varied in their effectiveness. They range from conciliatory conferences of the representatives of management and those of labor, through the various forms of mediation and arbitration.

Stages in the Conflict. These formal modes of settlement do not become prominent until both wage earners and employers are organized into powerful associations, capable of resisting each others' demands. In the earliest stage of industrial development, where individual bargaining between employer and employee was prevalent, the workers had little power to make effective resistance. In the next stage, where employees were well organized and employers were not, the strike and the boycott were very effective in attaining labor's ends.

Collective Bargaining Enters. In the third stage, where strong organizations are found upon both sides and where a clean-cut victory seems impossible to either, bitter strife continues until the sense of loss leads to conference and to compromise, which finally terminates in an agreement extending over a specific period of time, usually from one to three years. Then collective bargaining, as a terminus to strike or lockout, may be said to have begun. At the expiration of the contract a new bargain is made, or, failing this, a new strike or lockout is initiated. The degree of success attained by either side determines the conditions imposed by it, or the nature of the compromise accepted for another period of time.

Inequitable Agreements. Collective bargaining is successful in preventing actual strife just to the extent that the agreements made are felt to be fair by both sides. If they are not fair to the funda-

mental interests of one side or the other, it accepts and tolerates them for the time being because of lack of strength to resist. When resistance finally seems possible with the coming of better organization or more favorable economic conditions, a forced rectification occurs. However, if a deeply aggravated sense of mistreatment has persisted through the period of forced agreement, the more powerful and successful group may set out to punish or crush its opponent, creating a vindictive resentment on the other side, which in turn will assert itself in its own later opportunity. Collective bargaining conducted in this spirit is only armed truce, which may at any moment end in even more disastrous industrial warfare. Under such circumstances, collective bargaining does not solve the problem.

Successful Bargaining. When collective bargaining ends in mutually considerate agreements, the method is a success; for conference and agreement then recur at stated periods, continuing without break the production of industry and the content of both sides. Such success is most likely in the skilled trades with a stabilized tradition of fair dealing and with a leadership well trained in the handling of the human and economic factors involved in the labor problem.

Such collective bargaining is the ideal of most of our labor leaders. For this reason they do not favor any form of intervention by the public working through the government. They believe that the problem will finally be adjusted best by those engaged in the industry itself.

Collective bargaining has still further strengthened itself by numerous variations and additions. It cannot be said to be just one device. In some cases there is a continuing board of conference and adjustment which may operate during the life of an agreement for the purpose of making needed interpretations and adjustments to prevent misunderstanding.

Arbitration by Agreement. Trade agreements often provide for arbitration by a disinterested outsider whenever the representatives on such boards cannot finally agree. Such is coming to be the practice wherever organized collective bargaining has been in effect for a considerable period of time. Under such conditions stability of pleasant relations is greatly increased.

Revolutionists against Agreements. Industrial organizations such as the Syndicalists or the Industrial Workers of the World, which are to be sharply distinguished from trade unions though both consist of wage earners, place no reliance on collective bargaining. These groups will be bound by no agreements. At the conclusion of one strike and compromise, they merely await a favorable opportunity to gain further advantages. Their methods promise no solution to the industrial system, save through its annihilation in its present form and through some radical substitution. Fundamentally, they are industrial revolutionists, not evolutionists.

Syndicalism and other radical forms of socialism based on the class-conflict theory of economic relations have not made much headway in the United States. The American social organization, with its open-class system, is unfavorable to extreme class consciousness. Economic groups overlap now to an extent hitherto unknown. The wide diffusion of stock among employees, consumers, and the public generally has widened the economic consciousness of old groups, a result which owes much also to labor organizations through their capitalistic and managerial undertakings in the business world.

Passing Cost to Consumer. There have been numerous instances where the method of collective bargaining has seemed to be satisfactory to both employers and employees, but not to the consumers. Specific applications of the system have sometimes been sharply criticized by both consumers and the public. A readiness to make too many concessions to keep industry going regardless of the advanced price to the public is the cause of the consumers' discontent. Increased costs are passed on to the buyer of the goods, whether they be wages or profits, and such industrial peace casts the burden on those who are not engaged in the industry at all. Obviously, the capacity for such abuses is limited to particular periods and situations. It can operate in this way only when there is more or less monopolistic control of labor and goods, or where prices are rising.

Coercion versus Consideration. Wherever collective bargaining with its constant threat of strike or lockout is used coercively and not considerately, the battle ground is quickly shifted to new and more bitter issues than fair agreements as to the rights of all parties.

Coercion of employer by organized employees leads to a fight against labor organizations as such. Employers then attempt to go back to the previous status of individual bargaining. They refuse to "recognize the union." Others less conservative would recognize an organization of men within their own plant but not "outsiders." Working with this last attitude, transient plant committees and permanent "works' councils" and joint advisory committees have been stimulated by employers. This movement meeting another tendency of labor unions and their leaders has led to the use of the same devices in connection with collective bargaining and its working agreements. The motives in the two groups are often quite different or even opposed.

Right to Organize. Any refusal to recognize the union which denies the right of men to organize is futile. Neither public opinion nor expressed law will sanction such an attitude. The right of men to organize and co-operate for legitimate ends cannot be denied. That much has been settled at least, without at all limiting the employer's right to refuse to make agreements with irresponsible bodies which do not keep their agreements, or to obtain injunction or redress against a conspiracy aiming toward unlawful ends.

Right to Choose Representative. Intimately associated with the problem of "recognizing the union" is another problem,—the right of the wage earner to his own agent, representative, or counsel. The right to expert service when there is special need has long attached to men. It is the right of attorney long recognized in common and statutory law wherever a man's fundamental legal guarantees are involved. Common fairness would give the wage earner the benefits of counsel on those matters of supreme economic concern to him and his associates. Without counsel, negotiation would be disadvantageous to him.

Fight to Control Plant. Along with the issues that arise out of the employer's attitude toward the union, is the bitter one of the open and the closed shop. In heated controversy, where neither side feels confidence in the other's fairness or where a too zealous partisanship destroys industrial vision and mutual consideration, the war becomes one for control of the employees operating the plant.

Union Closed Shop. When the union insists upon a "closed shop," it provides that none but union members shall be employed. In the establishment of such a system, it may and usually does take into membership those workers in the factory who were not with them on strike. Employees may not be discharged save for cause. As a recompense, the employer is often assured of an adequate labor supply and of the correction of labor abuses which occur in the ordinary conduct of industry. This may or may not imply actual hiring by union officials.

The Open Shop. When the employers are able to resist the imposition of a "closed shop," they may set up an "open shop," in which jobs are open to all capable workers alike regardless of whether or not they are members of labor organizations. Practically, the "open shop" has not been easy to

maintain, save where labor controversy and bitterness have been absent or where a large supply of labor obtains and working conditions and wages are superior. Without the presence of these conditions, human nature makes the open shop unstable. A limited and well organized labor supply, particularly where skill is called for, prompts labor leaders to attempt to unionize the open shop. The opposite condition prompts employers to employ the unorganized in preference to the organized wage earners.

Two Closed Shops. In many instances, therefore, what is at first an open shop becomes a closed shop. It may be one closed to nonunion men by labor organizations or one closed to union men by the employers. Thus it is clear that there are two kinds of closed shop.

It is a misuse of terms to speak of a nonunion shop as an open shop, though this is often done. In a situation where labor is unorganized in a particular craft, it may be possible to employ only nonunion men and still have an open shop, for the essence of the open shop is nondiscrimination. In such a case there is no one against whom to discriminate.

Employers' Labor Organizations. Open shops are sometimes changed into closed shops of a different nature from those already defined. Employers, or their associations, sometimes organize the unorganized workers into a plant organization or independent labor union, which becomes a local rival to the traditional labor organization with national affiliations. They are difficult to organize and maintain, save where the union has antagonized public sentiment and the workingmen themselves.

Blacklist and Boycott. Special forms of discrimination which are the outcome of irritable and warlike relations in industry are to be found in the employer's blacklist and in the employee's boycott. The first applies to the hiring of men who are undesirable from the standpoint of the management and the other to the purchase of goods or services which are the output of men in establishments hostile or indifferent to organized labor.

Union Label. The use of a special label for goods made in factories where labor is unionized is another form of aiding a consumer's boycott. In another sense it is a form of advertising so as to permit preferential buying, no more objectionable than the injunction to "buy home goods." The compulsory addition of the label to goods is sometimes a source of friction.

Picketing. Labor organizations use a system of picketing to interfere with the employer's labor supply at time of strike, and again to diminish the supply of consumers or customers where a business is under boycott. The interference with personal rights and the tendency to create disorder involved in the practices of blacklisting, boycotting, and picketing create a public interest which brings the labor problem into the domain of law.

Sympathetic Strikes. When the means at the disposal of a single craft-union on strike are not effective, the sympathetic strike is sometimes employed. Other craft unions refuse to work with nonunion men or to handle goods made in non-union concerns. The sympathetic strike represents the fullest use of the coercive phases of the strike threat. Of all forms of the strike it is the one which gains the least support from the general public. Too many people not implicated in the original dispute are thus involved in loss and inconvenience.

Government Intervention. The disposition of government to intervene in the prevention and in the settlement of industrial disputes increases and decreases in succeeding periods, depending on conditions. Widespread strikes accompanied by considerable violence which involve basic rights and the presence of some larger social issue, such as war, tend to stimulate the movement toward government intervention. Periods of industrial peace and prosperity strengthen the doctrine of non-intervention.

Most governments are interested officially to the extent of exerting "good offices." They provide the administrative machinery for initiating conciliation, mediation, and voluntary arbitration. This has been done by many of the European governments, the Federal Government and the various states of the United States, Canada, and other English speaking commonwealths. Effort beyond this elementary and generally acceptable practice is exceptional. Where it is made, it has been cautious, save in a few dramatic instances.

Delay and Investigation. Canada is responsible for an advance beyond the common practice which has enlisted much support. Under its Industrial Disputes Investigation Act it introduces the principles of delay and investigation. Delay diminishes the heat of partisan passion and official and unbiased inquiry into the facts informs both the groups involved and the public as to the actual and well founded issues at stake. No strikes or lockouts may be called prior to the investigation of the dispute by an official board appointed for the particular case.

This board may make recommendations if it sees fit, and may bring about an agreement if it can. It cannot, however, enforce its conclusions as legal decisions. It may impose legal penalties if strikes and lockouts are not delayed until its investigation is completed. Without doubt it has prevented much precipitate action. At least one American state, Colorado, followed the general lines of the Canadian compulsory investigation law in its act of 1915.

Defining Legal Strikes. The Trade Disputes and Trade-Union Act of England (July 29, 1927) is a far more drastic act. Passed shortly after the costly general strike of 1926, it aims to define a legal strike, outlawing all strikes aiming to intimidate the government, and giving the attorney-general power to enjoin trade-union funds if employed in contravention of the act.

Illegal strikes are those which have any other object than the furtherance of a trade dispute within the trade where the strikers are engaged, especially if calculated to coerce the government "by inflicting hardships upon the community." Civil servants are denied the right to join trade unions with those outside the public service. Membership in unions may not be made a condition of employment in the local governments, nor may the trade unions discipline their members for refusal to participate in illegal strikes. Political levies on members of trade unions may not be made save on specific permission in writing. Picketing is forbidden.

The whole act is designed, not to prevent and end strikes used for their ordinary economic purposes, but to forbid the use of strikes for political purposes, and further to protect those principles and rights which have long had protection under the common law of England.

More Radical Legal Action. In almost every country there has been a group of thinkers who have felt that any fracture in group relations which tended to become violent to the extent of jeopardizing fundamental human rights must sooner or later be brought under legal control. These visage an ultimate industrial court operating under a legal industrial code. Such a code requires a well defined public opinion guided by thoroughly established principles having wide popular acceptance among both parties to the dispute as well as among the citizens outside the immediate controversy. Such legal codes are evolved out of long experience rather than framed outright.

Attempts to set up courts of compulsory arbitration have nevertheless been made. They were once set up in Prussia, quickly abandoned, and only sporadically revived. New Zealand and the states of Australia, less hampered by tradition, have established a form of compulsory arbitration. The state

of Kansas in 1920 attempted to set up a Court of Industrial Relations which would deal with strikes in industries greatly affecting the public interest. It was divested of its crucial powers, however, through a decision of the United States supreme court in 1923. As a result of war conditions, the United States made special provision for the handling of disputes touching railroads engaged in interstate commerce. In 1926 a new act was passed providing a machinery for settlement of railroad labor disputes through a Board of Mediation. Mediation failing, special boards of arbitration, consisting of representatives of both sides and the public, were provided. Their decision was to be binding.

Appraisal. It is difficult to appraise the effect of the more far reaching interventions of law in labor disputes in the different countries. Our experiences with them, save possibly in the case of New Zealand and Australia, are too brief. The legal definition of strikes in England dates only from 1927. The Federal Board of Mediation for labor disputes in interstate railroads has thus far settled most of the cases before it with favorable increases to the employees, but not without threat of nonacceptance, because the awards were not wholly satisfactory to the labor leaders.

In New Zealand and Australia, compulsory arbitration presents us with our longest and largest experience with the judicial determinations of working conditions and wages. The meaning of that experience is quite diversely interpreted by proponents and opponents. One thing is certain, that the whole system has not fulfilled its promise. It has been far more difficult to make labor unions as responsible as employing corporations are. The reasons for this are plain to be seen. It is contended that industrial courts or boards of arbitration fall under the influence of the mass of voters, who incline to be sympathetic with the more numerous individuals of the labor group, causing wages to rise to a point which makes industry unprofitable and therefore stagnant. Again it is urged that, while decisions are enforcible on the employer, they are not enforcible on the worker, who cannot be compelled to labor under an unfavorable decision if he does not wish to do so. Thus it is said that compulsory arbitration works as long as conditions permit rising wages and fails when conditions require a reduction of pay.

Present Governmental Limits. It is doubtful whether most governments can go very far beyond the protection of fundamental rights long guaranteed and widely accepted in times of keen industrial strife. A community that becomes bitterly partisan in its industrial sympathies may lose even this old power. It may exercise greater authority in a crisis than in ordinary times. It may advance its jurisdiction first where general social welfare is most seriously menaced, particularly since an independent public opinion is becoming more coherent and active as to its own final interest in the behavior of industrial disputants. Since public opinion is no insignificant force in influencing the attitude of managers and workers, it may well try to invoke that delay which permits partisanship and bitterness to relax and allows official discovery and promulgation of facts to reach the public.

Possible Industrial Codes. Such are the present limits of government intervention. They are not its ultimate limits. The far distant future may see an effective industrial code approximated. But it will be evolved out of much trial and error and will wait on a common consent to principles and practices.

Viewing the situation in the United States as a whole, our greatest promise of progress is to be found within industry itself. The constructive capacities of managerial and labor leaders for industrial co-operation offer us our best resource. The whole present trend of public opinion in the United States is against too great interference of government in the conduct of business affairs.

Contacts at Crises. In the presence of a threatened strike or lockout, there is no better method for avoiding mounting acrimony and violent conflict than full, frank contact from the beginning between leaders of both sides involved in a dispute. The discussion should be on the facts of the case, obtained if possible by competent neutral persons, and coercive and emotional attitudes should be repressed or ignored during the course of conference. Any human grievance, real or fancied, is entitled to a hearing, regardless of the body or representative which presents it. All the artificialities or conventions which interfere with rational treatment of the felt-problems of any group in industry should be set aside. Fact finding and true rational discussion within the institution of industry offers the best promise of industrial co-operation and peace, once a crucial sense of present misadjustment has arisen.

Continuous Contacts within Plant Unit. Whoever may handle negotiations when a dispute rises to the point of threatened rupture, the fact remains that the reality and intensity of grievances is determined by the attitudes of those actually engaged in the operation of a particular plant. For this reason much progress in sound relations may be made by continuous day-to-day contacts within the plant organization. Understanding of problems not immediate to each person is always more readily given and received in periods of industrial peace than in hours of labor war. Single grievances handled one at a time are more readily adjusted than a multitude of accumulated discontents which create a large and sullen irritation. Where these essential truths of human nature have been recognized by wise leadership, new mechanisms of continuous contact and co-operation have been provided for industrial managers and their employees.

Co-operation in Shop Management. Such machinery of contact, conference, and interchange has been set up in many forms. Grievance and shop committees, which express the feelings of the wage earner with reference to his own welfare as it is influenced by the shop conditions, represent one approach. Personnel departments set up by the management to take account of the human and psychological factors in the hiring, transferring, promoting, demoting, penalizing, and discharging of employees are an approach from the opposite direction. Works' councils, joint advisory committees, and similar boards occupy a more central position of co-operation and deal with a wide range of activities which extend from wages, hours of work, and welfare activities to problems of shop management wherein the handling of the men and the machinery, materials, and processes leads to more effective co-operation in production.

Broadened Interest. All such efforts make a definite appeal to the wage earner. He gains an interest far beyond his own special task. He begins to understand the problems of co-ordination involved in management. In greater degree he feels that the shop is his shop. His interest, his knowledge, and his loyalties are broadened through the representation he has.

It is a mistake to assume that the wage earner has only a wage interest. As he is truly human, many other motives can be and are associated with his work, if they are encouraged rather than repressed. The monotony of a highly specialized and mechanical task at a machine needs relief, if not through changed labor, at least through a changed and enlarged consciousness, which participation in a larger problem provides.

Their Variety. The problems with which he may deal through these shop councils and other workers' committees touch safety work and sanitation, seniority of rights, shop discipline, instruction, standard of output, better supply and routing of materials, improvement of processes, the better co-ordination of different working departments each of

which affects the production of others. Outside the shop, the workers' participation in the management of such enterprises as rest rooms and lunch rooms, clubrooms, summer camps, and other recreative provisions unifies the community life of all the people in the plant.

Limits of Participation. In such participation, nothing is implied in the way of giving labor representation a responsibility it is not competent to carry. To be sure, such representation has sometimes gone so far as to include a place on the board of directors, chiefly with the idea of affording the workers some conception of the dependence of production and wages on financial conditions, distribution and marketing, raw materials, production plans, and other economic factors.

As all such basic facts can be readily transmitted by other methods, through the shop councils, for example, and as workers for the most part do not desire to assume responsibilities far outside their experience and capacity, these exceptional expedients have not been much used and are not likely to be, save where stock participation involves representation of the workers on the board of directors on totally different grounds.

Effect on Production. Such joint advisory committees as have been brought into shop management offer one of the largest opportunities for mutual understanding and co-operation in efficient production. The movement for the use of scientific technicians in industry, which was given so large an impetus among employers by Frederick Winslow Taylor and by his associates and which was subjected to such doubt and suspicion by the wage earners and by their leaders, here finds a chance to re-establish itself with new understanding and force.

Efficiency Management Systems. Systems of efficiency management need not be applied to men as mechanically as they are to machines, materials, and processes. In fact, the essence of such scientific analysis of production processes as applied to the workers involves, if successful, just that regard for human psychology and human welfare which the men themselves would wish.

Studies in Technique. Scientific experimentation on technique of operation, as in motion studies where effective movements are made automatic and where useless indefinite motions which merely increase weariness are eliminated, adds greatly to personal efficiency and reduces fatigue. Such acceleration as is involved is not like the speeding up of processes which the workers have feared because they enhance an unhealthy fatigue, leading to ill health and to accidents.

Instruction and Training. The instruction and the training of workers in more effective technical and personal methods should be welcomed by them. If a process is to be automatic, as most specialized and habitual activities are bound to become, there is little chance to preserve individuality by persisting in those wasteful and fatiguing acts which are acquired in the course of personal trial and error unguided by careful analysis. The preservation of personality through a more enriched consciousness and initiative in work must be provided by supplementary arrangements such as change of work and appreciation of all the steps in production. Such instruction may itself be made an illuminating matter, as enlightening as the explanation of proper technique may be to an athlete.

Selection and Assignment. Neither is the careful selection and assignment of workers on the basis of natural aptitude and capacity an evil. It need not even create antagonism if approached so as not to do violence to one's pride about personal conclusions and desires. A tactful and kindly assignment of men may be made to appeal to them as an opportunity instead of as a humiliation. Surely there is nothing to be gained and much to be lost in doing the thing one can do less well in preference to the thing one can do better, provided social status among one's fellows is not disturbed.

Proper Co-ordination. In the proper preparation of shop work through adequate supply and routing of materials, the worker gains. Poor planning of production is an evil which the wage earner quickly senses. It is the cause of many of his irritations, not only when his piecework earnings are reduced by delays but also when his sense of good workmanship and management is offended. Normally, every man has an appreciative sense of things well planned and well done.

Greater Production Primary. So far as the scientific mind in industry can increase production by better methods, worker and manager alike should appreciate this new asset as one of their largest common grounds. The struggle over the distribution of existing earnings has bred a suspicion which has blinded many to the fact that greater productive power establishes a new potential wage, salary, profit, or price for each economic group interested in the thing produced.

Joint Responsibility. The struggle for more profit or more wages should not be permitted to lower production to the point where investment, production, and employment cease, or so stagnate that net returns become restricted to such an extent as to make futile the struggle for a greater individual return. In the effort to increase economic welfare, there will be two struggles—one to produce a larger surplus and another to gain a fair share.

Even the consumers, retailers, and jobbers carry considerable responsibility for the influence which irregular, sudden, and changing demands have had upon production, unemployment, and annual income of workers. The coal, textile, garment, and shoe industries are cases in point. Some problems in the management of industry are too large for its unit to handle by itself. Jobbers, retailers, and consumers must be brought into co-operation.

Defenses against Unemployment. In seasonal employments, the laborer has tried to prolong his job by curtailing daily production until the piecework system has been substituted for the day wage. Similarly, low employment periods have been met by union men through restriction of days of work so as to make available work go around among the existing number of trained workers in the craft. Monopoly of labor supply through restricted apprenticeship and membership is another means used to prevent unemployment. The traditional opposition of labor organizations to labor-saving machinery was based on fear of displacement. All such expediencies heighten the cost to the consumer, decrease the consuming market, increase unemployment, and, finally, reduce the laborer's real wages. However such curtailments of production may inevitably affect the worker's ultimate economic return, the immediate situation is too imperious for him to follow a larger policy.

In the United States, as contrasted with Europe, the flexibility of economic attitudes is to a considerable extend explanatory of our better labor-management co-operation and of the prosperity which results therefrom.

Labor-Saving Machinery. The ability of labor to maintain wages against large cuts proposed in the post-War period of business depression, and the curtailment of labor supply and competition brought about by restrictive immigration laws, greatly modified labor's traditional opposition to the introduction of labor-saving machinery. Freed from the two pressing fears of diminished wages and unemployment, workers have become increasingly tolerant of the introduction of mechanisms which increased the productive capacity of the individual worker, this despite the temporary displacements of his fellows. A few violent strikes have occurred, but the chief expression has been a plea for a policy which would

transfer the cost of temporary displacement from the worker and his family to the industry as a whole.

Labor Supply. Similarly the more tolerant attitude of labor toward mass, machine production has greatly decreased the opposition of industrial management to immigration laws decreasing the labor supply. The industrial manager has found a substitute for a large labor supply in improved mechanisms which increase the productive power of the human beings at hand. Furthermore, the increased consuming power of highly productive, well paid employees constitutes a domestic market which is the mass producer's chief reliance.

Seasonal Unemployment. The hand-to-mouth buying of retailers in a post-War period of uncertainty, which for the time being unsettled the manufacturing and jobbing trade, has proved to be a blessing in disguise to all concerned inasmuch as it has modified the peaks and depressions of seasonal variations, thereby stabilizing employment, and factory and office operations. What was regarded at first as a liability has come to be regarded as an asset. It has contributed to labor content. What was largely an accident or incident of economic conditions now becomes a theory or policy to be applied as largely as possible to seasonal industries and even to periods of depression resulting from business cycles. It is now proposed that government works be projected with due reference to periods of decreasing employment in industry, for the benefit of all economic groups and of the public in general.

Hatred Impairments. Of a different kind are the worker's interferences with production which are based upon antagonism or hatred of his managers and their economic class. Slowing up through necessary self-interest or sympathy for the members of his own group may have a defense. Curtailed production from malice has none. Every form of sabotage, where destruction to the plant or goods is done to reduce production and profits, is definitely criminal. These practices are the product of bitter conflict in which the distant but inevitable result is overlooked or deliberately ignored. The price has to be paid by all. It is a wasteful cost to industry which must be carried, thus reducing the margins of earnings which can be distributed. Fortunately such attitudes do not thrive under recent American economic conditions. Economic radicalism has of late distinctly subsided.

High Turnover. There is another type of loss in the productivity of labor which is not the result of conscious policy, at least it is not a deliberate group or organization policy. It is found wherever the labor conditions of an industry are far from being satisfactory either in wage or working conditions, both physical and mental. This is the loss through high turnover in working staff,—a low grade, continuous partial strike on the job, where men and women are going and coming all the time.

A turnover of 50 or 60 per cent has not been unusual in factories, and some plants show as high as 200 or 300 per cent. The use of new, untrained, inexperienced labor in continuous quantity means a loss in production. The cost of constant training of new workers is itself a charge on industry, one not always clearly recognized by employers.

Recurrent absenteeism of individual workers, ascribable to many causes not always coincident with those of high turnover, is another charge against production which good management is trying to avoid by better selection and assignment of personnel, by improved sanitation and health care, and by better shop morale.

Production and Earnings. While production is an exceedingly important factor in the determination of returns to all parties concerned with industry, and sets the maximum amount which may be distributed to the various contributors to industry, it must be remembered that increased production cannot have an indefinitely progressive effect in the direction of profits and wages. Human wants make markets, and markets, prices, and sales are determined by the relation of supply to demand. Price levels affect demand as they also affect supply.

Complex Wage Problem. In spite of many complicating factors which influence the return that comes to a business concern or the distribution of such return to contributing industrial groups, higher personal production does help to raise the limits above which wages cannot go. This is not to imply that higher production always brings increased or adequately increased returns. One may deserve and not get. The wage problem is as complicated as any other problem in economic life. Many factors natural and artificial enter into its solution.

Real Wages. Money wages need to be translated into real wages, that is to say, into that which the money will buy. Constant confusion and misunderstanding arise because comparisons are made between money rates of wages instead of between buying rates of wages. A high rate of wages in a depreciated currency may be low real wages. High wages in a period of high prices may bring less return than when wages and prices were both lower.

Wages and Earnings. Wage rates are not to be confused with actual earnings. Overtime may increase earnings above the indication of the wage rate. The day's wage may be the same as in a previous period but the hourly rate may be higher, owing to a shortened workday. The annual income also is greatly affected by disturbances in service due to sickness and to accidents. Breakdowns in machinery and shortage of materials likewise create factory shutdowns. Strikes and lockouts greatly reduce the income of workers. Shutdowns due to over production and resultant poor markets decrease earning power. Finally, seasonal employments give fluctuating incomes which leave wage rates unindicative of earnings. Yearly incomes of the workers are difficult to determine but they are the best index as to whether subsistence or comfort levels are reached.

Factors in Wage Determination. There are many factors entering into the determination of wages, not all of which are purely economic, though the chief limiting influences still remain economic. These factors cover a wide range: they extend from the more or less tyrannizing economic factors of supply and demand to such social factors as the relative strength of labor organizations and managerial associations in bargaining, and the personal factors of congeniality of employment.

The effects of supply and demand are always obvious. With a short labor supply, managers may and do bid up the price offered for services. Laborers, where a large supply and a small demand are present, are pressed, by the necessity of making a living, to compete in bidding down wages. Organized labor tries to preserve the existing wage rate, making the needed economic adjustment through curtailment of the weekly working period. Thus while the total weekly income is less per worker, the conventionalized wage rate is maintained through the period of depression until a more favorable period arrives.

No Single Reservoir. It must not be assumed that all labor constitutes one reservoir of supply. All labor might theoretically become one large labor supply if it were not for the fact that labor is more or less immobile, making geographical location an important limitation. In addition, skilled labor does not readily descend into the common unskilled labor group, save under generally demoralized employment conditions or for a temporary period due to special industrial circumstances or to individual situation.

The supply of labor is more correctly assumed to be located in many reservoirs located at different places and again partitioned into many subdivisions according to quality of skills. Thus, there is one

supply of carpenters in New York, of textile workers in Massachusettes, of electrical workers in Seattle, etc. Each of these has uncertain limits due to the possible flow of workers from one market to another.

Single Wage Standard. Such segregated bodies of labor interfere considerably with the establishment of a national wage standard or even of one covering a considerable territory. Differences of specialization and skill in the conduct of industry in different localities still further complicate the matter. Living costs also vary from place to place and enter as an influence in fixing local wages.

Labor Not A Commodity. Those who consider that only supply and demand operate in the fixing of the worker's wages fail to analyze the problem completely. They regard labor as a commodity. Labor is not a commodity and should never be so treated. It is more than a mere economic entity.

Labor is the service of a person and not an objective economic thing which passes hands. The manner of its delivery is quite different from that of ordinary economic goods. The value of today's potential labor cannot be conserved for tomorrow. It must be delivered each day. Its total annual value depends upon the number of days it is employed. Undelivered labor is a lost asset. In a civilized community, it may be used but it may not be "used up." As a service offered for a price it is subject to economic laws but is not completely dominated by them, in fact less so with every passing year.

The influence of the economic factors of supply and demand is by no means denied by labor organizations. Their acceptance of its very great influence is expressed in their attitude toward the foreign immigration policies of the government, in the control they exercise over domestic supply of skilled craftsmen through their limitation of apprentices and their restriction of union membership.

Many other elements besides the surplus and shortage of the particular skill or service required enter into the determination of wages. Accident and health hazards, personal discomfort, and probable unemployment, all enter into bargaining as into the limiting of the number of men available.

The minimum precision and attention required by the job, the superior skill and aptitude required by one type of work as compared with another, call for their own special consideration in wage adjustment. Finally, superior personal productive power of one man over another in the same line of work requires its special reward.

Personal Opportunity. Compensations which attract are not always immediate wage compensations. Some men look to the economic future, and count the opportunities for instruction, advancement, and transfer to congenial work as of more immediate importance than present wage return.

Others seek and accept compensatory satisfactions in an organization which permits individual consideration, enlists enthusiasm, and frees the workman from arbitrary discharge and from other humiliations, fears, and anxieties which too often accompany industrial organization elsewhere.

Still others, while recognizing that such benefits might be deducted from the cost of industrial operation and might be added to wages, prefer an organization which provides special care for safety and sanitation, and maintains sickness and accident insurance, old age pensions, medical attention, and group insurance.

Motives of Such Provisions. All of these forms of making jobs more attractive have been used by employers to stabilize labor supply and production by increasing human content. They constitute a kind of insurance against a high labor turnover and against strikes. In some instances they are the direct outcome of careful psychological analysis of the problem of human co-operation as such. In others they are the result of the effort to frustrate control of the men by labor organizations, an indirect attempt to gain loyalty for the concern and to identify the self-interest of the worker with the management rather than with labor leadership.

Cost of Living. This also has been urged as an important consideration in the determination of wages, particularly since the ascending prices of the War and post-War periods began to disturb living conditions. With this theory a distinctly social argument enters into the adjustment of wages.

The actual use of cost-of-living studies has been the source of much discussion and of serious criticism on scientific grounds. Wholesale prices have sometimes been used where retail prices are what concern the workman. It is assumed that every wage earner has a family of five, a wife and three children of school age being dependent upon him. This theoretical assumption is often far from the actual facts in a particular group of employees. Families are frequently smaller; sometimes they are larger. The employment of women and other members of the household affects the accuracy of assumptions made as to dependence on the male worker.

Additional Complexities. There is, likewise, a large opportunity for differences of opinion as to what constitutes a standard of living. One's standard of living is an intensely personal matter.

Among the millions of people in the United States, there is a considerable range of variation. In building a comfort standard as distinguished from a mere subsistence standard, additional complexities arise. What seems a necessity or luxury for one is not for another. A multitudinous number of controlling tastes of exceedingly varied groups must be taken into account. The details of actual budgets vary greatly with individual capacity for thrifty management and expenditure.

Changing Resistance. Upward adjustments, suggested by cost of living investigations, will tend to be resisted by organizations of employers and downward revisions will be fought by labor individually and collectively. In many industries, within the limits fixed by economic factors which can never be set aside, the strength of the union as compared with the strength of the employer's associations fixes the wages and the working conditions.

Labor's Attitude. As a main basis for fixing wages, cost of living is not acceptable to some of the prominent labor leaders. In the long run, it might tend to depress higher scales of wages. Again its theoretic acceptance at a favorable period would lead to a lowering of recompense at an unfavorable period of falling prices, thus losing to labor hard won gains. When used by labor as an argument, it is offered as collateral evidence of the need of readjustment of minimum wages and of the need of the maintenance of general wage levels in terms of purchasing power.

Attitude of Others. The general public and social workers are keenly responsive to the cost of living factor. Employers themselves as a class are sensitive to fluctuations in living costs as affecting real wages. In controversies over wage adjustment where this factor is argued, the vital disputes are over the facts of living budgets and over the method of arriving at standards of living and applying them to specific groups in particular places.

Important Applications. Studies of the cost of living have a limited field of application in wage adjustments. The most important points of application are two: (1) In the consideration of general wage levels, where the real worth of wages is disturbed by changes in retail prices, they show the difference between money values and real wages. (2) In fixing minimum wages, where common labor or the labor of apprentices or beginners is involved, they aid in guaranteeing minimum necessities.

Wages and Production. In a period when the productive power of the worker is greatly enhanced by machinery, the disposition of labor leadership is to claim an enlarged wage on the basis of increased power of production per worker. Thus labor claims

a share in the benefits of science and invention, which hitherto have seemed to go to management, capital, and the consumer. The indices of increased production prepared by economists have been the basis of these claims for the participation of labor. The shifting arguments made on the fixing of wages reveal the opportunist phases of the economic struggle. However, the American industrialist senses the importance of the vast consuming power of the multitude of employees. As their wages go up, market demand increases. High wages and a high American standard of living provide greater domestic markets for American mass production goods. Some have said that this tolerant attitude is the beginning of a new American economic philosophy.

Relative Wages. Studies of the cost of living do not aid much in two of the most difficult and inclusive problems of industry: (1) the fixing of relative wages, that is, the differentials among the various classes of operatives, and (2) the determination of individual earnings where personal skill brings about large variations in individual production.

The adjustment of general wage levels and minimum wages are very acute problems when present, but these disturb economic life drastically only now and then. The problem of relative wages and of individual earnings is a continuous problem in industry. Hence cost of living studies do not have the same importance to management at all times.

Administration of Payments. The actual administration of payments to employees is one of the most complex practical tasks of management. Plans are innumerable, being the product of wide variation in custom and in experimentation.

These systems may be based on comparatively simple rates for hourly, daily, or weekly service, or they may be founded upon a piecework system, with or without standards of production above which extra bonuses are given. They may be further complicated by profit sharing plans, where cash or stock is distributed. Every variation and every combination of plans employed in a shop, a concern, a craft, or an industry is a separate study in efficiency, economy, and human motivation.

Their Productive Purpose. Part of the purpose of every system of payments is to heighten production by encouraging individual ability and by discouraging malingering through promise of greater reward. Until recently, such systems have depended too exclusively upon the powerful motive of increased earnings. In many cases they have led to the evil of speeding up work unduly, so that much of the really worthy work in efficiency planning has suffered through reactions against the evils of fatigue.

Straight Time. The straight time wage system is the simplest form of payment. Payment may be by the hour with extra overtime payments beyond a certain stretch of time, now usually eight hours. Payment may also be made by the day or by the week. Here productivity is dependent upon effective selection and distribution of personnel and upon the development of morale among the workers.

Time Plus Efficiency. The time system of payment has been variously modified for the recognition of efficiency. In such plans, a basic wage rate is established for both beginners and journeymen, and a reasonable standard of accomplishment is set up for the given time period after careful measurements of production have been made. Achievement beyond the standard fixed is then rewarded.

Thus on the day-pay basis, payment is made upon a standard of quantity and again on a standard of quality, the number of defective products being taken into account. Additional premiums may be paid for attendance and even for length of service in the concern. Similar efficiency rewards are made on hourly and on weekly basic wage rates. Where defects in machinery or management interfere with production, the worker is usually compensated.

Piecework System. In contrast with the time basis of payment is the piecework basis. Here practically all payment is made on personal accomplishment. Widely used, it has led to many abuses, resistance to which has forced control.

The tendency of such a system is to sacrifice quality of workmanship since it induces a degree of speeding which is good neither for the worker nor for refined production. Inefficient management in the routing of materials and in the distribution of opportunities for earning is always a fertile soil for discontent under this system. When rate cutting is engaged in, after production has been greatly stimulated, the greatest evils of the system appear.

Modified Systems Best. Generally speaking, neither the straight time system nor the straight piecework system of industrial production is as effective in the long run as the time system of payment modified by bonuses and premiums for superior skill. There are always exceptions, particularly where a talented management, with a superior regard for the human element in production, is in charge of the works.

Profit Sharing. Profit sharing also has been introduced into numerous industries. A basic wage is paid as in ordinary circumstances. Annually, there is distributed a certain portion of the net profits of the firm or corporation.

If it is a true profit sharing system, the percentage of net profits to be given is fixed in advance. The system for its division and for its distribution is also announced. The amount received by any given worker rises and falls with each year's business as the degree of success warrants.

The Annual Bonus. Many annual bonus systems are not true profit sharing systems. They are more or less arbitrary and depend upon the will and the plans of the business management. The bonuses they give are not on a predetermined basis. One year the bonus may represent a larger fraction and another year a smaller fraction of the net profits. In some cases such an annual bonus approximates a gift of good will rather than a real share in the profits of efficiency. Such bonuses are usually paid to the higher officers and other employees associated with the management of the industry rather than to the industrial workers. Banks and other commercial establishments often give the unfixed bonus.

Sharing Savings. Another method of sharing gains with employees is that which provides for the distribution of savings. Money calculated to be the savings made by various workers in improving processes of production or in effecting economies in operation is prorated among those contributing the ideas or co-operating in their execution. Besides enlarging individual returns, such sharing engenders personal interest which leads to improved morale and to superior co-operation.

Labor's Attitude. Labor leaders are often frankly hostile to profit sharing systems in any form. Like pensions, they tend to divide loyalty between the employer and the employee in times of controversy. Stock participation plans for employees fall under similar disfavor. The improvement of wage return and working conditions through group solidarity is the labor leader's chief hope for amelioration, and the maintenance of strong organization loyalty is regarded as a necessity in his program. Hence labor leaders often resist policies which are an immediate benefit to the workers rather than to permit distraction of loyalty from the organized labor movement, which has been responsible, directly or indirectly, for his previous and present gains, and which must be depended upon for new advances in the future. This attitude of organized labor is frequently overlooked by the public, which sees the issues only as of the immediate situation.

In Industry. The problem of the relations between employer and employee has been discussed chiefly in terms of industrial conditions. This is because the problem developed first in that field. Industry provides for solution our largest experience and our widest experimentation. The field of trans-

portation, for example, offers no more variation from typical industrial situations than is to be found among the diversities of industry itself.

In Commerce. The labor problem is found in commerce as well as in industry. Typical of complicated organizations for selling purposes are our modern department stores. In connection with them, there have been evolved some of the most interesting systems of bringing employer and employee into right relation. Commercial concerns have developed their own acute phases of the labor problem and they have apparently been more progressive and more successful in solving them than has industry.

In Agriculture. The labor problem has appeared even within the domain of agriculture, creating some of the most aggravating situations. It has involved chiefly the itinerant working population, engaged in search of seasonal employment. Inevitably, living and working conditions have been more of a major irritant than have wages. This is bound to be the case where large masses of workers are gathered together on farms and ranches which have no adequate human accommodations.

Labor Problem Similarity. Wherever the labor problem appears, the fundamentals are the same. There is the same human nature ever present, the same selfishness, ignorance, and lack of vision. The same economic factors limit the field of solution, the consumer and the competitor holding down costs to that zone of salability which usually makes the difference between prosperity and bankruptcy.

What Is Needed. Wholesome understanding of the problem is fundamental. Without intelligent comprehension of all that is involved, no single interested group can conduct itself wisely in pursuing its own ends, much less co-operate where common interests are concerned. It is essentially a situation which requires "less heat and more light." Agitation and passion, the partial view and the class conscious attitude, and a certain forgetfulness that all kinds of people are human in their interests, enthusiasms, and aversions, have been at the bottom of most of our mistakes in the conduct of the large enterprises of our modern economic life.

Rational Attitudes. The specific facts which concern every variation of the struggle, and the particular techniques which will aid adjustment, will be acquired only with patient study and with considerable experience. The important thing in making a rational entrance into so big a human problem is to get an accurate general view of the larger considerations and tendencies which are involved, and to maintain that multiple sense of responsibility which so few of the men actively involved in the industrial struggle possess.

If we are too single-minded as employer or as employee, we shall solve very little. If we remember that the whole task is to be accomplished by us in many overlapping relations, we shall make progress. Each negotiating employer or employee will constantly need to remember that he is also a citizen, a consumer, and an investor. He should think and feel and act at all times with this sense of multiple responsibility.

Substitutes and Compromises. It is not hard for a man to sympathize with himself in any circumstance. It can be made the beginning of a sympathetic understanding of the other fellow. Tolerant regard is a fair substitute for kindly feeling where such feeling is lacking. Where vital differences of self-interest seem inevitable, and appeal to fact and principle seems to yield little common ground, it may be necessary to divide the disputed field and to proceed to the best possible co-operation in sight. Such a spirit in procedure will do much to help solve the disturbed human relations which exist in our economic life.

TRADE UNIONS

A trade union is an association of working people who follow the same trade or calling, organized for the purpose of improving their economic, legal, political, and social conditions. Economic betterment stands out as the most important of these objects, although trade unions frequently provide their members also with insurance and with opportunities for social enjoyment and educational improvement.

In order to attain their ends, trade unions have resorted to the use of various economic weapons, the most effective of which are the strike and the boycott. A *strike* is a cessation of labor mutually agreed upon by a group of workers in order to enforce their own demands or to resist the demands of their employers. A *sympathetic strike* is a strike made by the members of a union, not directly in their own interests, but with the purpose of assisting some other group of workers. A *boycott* is a combination formed to withhold all business patronage from an individual or organization under ban; to refuse to handle any products of the object of the boycott; and to influence others to exercise the same form of economic pressure.

The employer, on the other hand, may endeavor to enforce his terms by means of a *lockout*; that is to say, by depriving the workers of their employment with him.

Early Unions and Strikes. The first recorded strike in America took place in 1741, when New York bakers quit work as a protest against a municipal ordinance regulating the price of bread. The earliest known strike for higher wages took place in 1786, when the Philadelphia printers ceased work as a means of enforcing their demand for a minimum weekly wage of six dollars. A sympathetic strike took place in 1799, when the shoemakers, belonging to the organization known as the Federal Society of Journeymen Cordwainers, were compelled to lay down their tools in order to aid the bootmakers, who were seeking an increase in wages. This action may be regarded also as the first *organized* strike in America. Sympathetic strikes, however, did not play an important part in industrial disputes until the last two decades of the 19th century.

A successful attempt to establish a 10-hour working day was made by the unions of Philadelphia in 1835. Fifty-one years later, in 1886, occurred the first nation-wide strike for an eight-hour day.

Many trade unions were formed in the period between 1792 and 1810, especially in the cities of New York, Baltimore, Philadelphia, and Pittsburgh. The first central organization of trades in one city was formed at Philadelphia in 1827. It was called the Mechanics Union of Trade Associations.

In 1833, there were 29 organized trades in New York City. Many of these affiliated to form the New York Trades Union. Similar organizations followed quickly in other cities, so that when a convention was called in New York in August 1834, delegates were present representing the trades unions of Boston, Brooklyn, Philadelphia, Poughkeepsie, New York, and Newark. At this convention was inaugurated the National Trades Union. A trades union, comprising as members *unions* in various trades, must be distinguished from a trade union, which comprises as members *individual workers* in *one* trade only.

National Trade Unions. The printers were apparently the first craft to unite their local units into a national association, so that the Typographical Union, organized in 1850, is the oldest *national* trade union in America. The Stonecutters effected a national organization in 1853; the Hat Finishers, in 1854; the Molders, and the Machinists and Blacksmiths, in 1857.

In addition to unions of the workers in a particular trade, two organizations on a national scale arose prior to 1870 each of which admitted workers of any

trade. The first was known as the National Labor Union, founded in 1866. The second, established in 1869, was called the Noble Order of the Knights of Labor. It began as a secret society, but the policy of secrecy was abandoned in 1878. Dissensions within these organizations led, in 1881, to the formation at Pittsburgh of the Federation of Organized Trades and Labor Unions of the United States and Canada. This federation merged with a separate trade union conference on December 8, 1886, forming the present American Federation of Labor. In 1889, the new federation recognized the continuity of its existence by dating its records from 1881.

AMERICAN FEDERATION OF LABOR

The American Federation of Labor (A. F. of L.) is an association, chiefly of trade unions, in the United States, Canada, Porto Rico, and Panama. Each of the constituent bodies retains the right of self-regulation. The basic unit in the organization is the local union, of which there are approximately 30,000. Most of these locals belong to one or another of the national and international unions, numbering about 107, by which they are represented in the Federation. There are also about 380 local trade unions and federal labor unions which have direct affiliation with the Federation instead of being represented in the Federation by a national union. In addition, there are 48 state federations, about 830 city central unions, and 4 departments.

Income and Defense Funds. The funds of the Federation are obtained by a levy of not more than seven-eighths of a cent per month on each member of an affiliated trade union, fifteen cents per month on each member of directly affiliated local or federal trade unions, and ten dollars per year on central unions and state federations. The annual income of the Federation is about $500,000.

For the defense of national and international unions engaged in prolonged strikes or lockouts, a levy may be made on all affiliated unions, the amount not to exceed ten cents per year for each member. For the defense of local trade and federal unions, each member of such unions may be assessed a maximum of fifty cents per year. In case of a duly authorized strike by a local trade or federal union, strike benefits are allowed for a period of six weeks. The A. F. of L. has no power to initiate strikes except for the unions that are directly affiliated with it.

Membership. Individual membership in the A. F. of L. is confined to wage earners — skilled and unskilled, men or women. The membership of the organization approximates three million.

The Federation does not include all the unions of the United States and Canada. The great railway brotherhoods, for example, maintain independent existence. These railroad unions, known collectively as the "big four," are the Brotherhood of Locomotive Engineers, organized in 1863; the Order of Railroad Conductors, 1868; the Brotherhood of Firemen and Enginemen, 1873; and the Brotherhood of Railroad Trainmen, 1883. The membership of all trade and labor unions in America is said to include about one-tenth of the total number of workingmen.

Most of the constituent units of the A. F. of L. are trade unions, which accept as members only those who follow a designated trade. The Federation includes also a few *industrial* unions, each of which aims to unite workers in all trades connected with the industry in question. The United Mine Workers of America, for example, admits not only the actual miners, but all workers in and around the mines provided only that their labor contributes to the production of coal or coke.

The largest organization in the Federation is the United Mine Workers of America, which was formed January 25, 1890. It has a membership of more than 400,000 and is divided into 29 districts with over 3000 locals.

Representation. The policy of the Federation is decided in open, annual convention. Each national or international union is represented at the convention by one delegate for a membership of 4000 or less; two delegates for a membership up to 8000; three delegates, up to 16,000; four, up to 32,000; and so on. A delegate has one vote for each 100 members that he represents. During the intervals between conventions, the authority of the A. F. of L. rests with the executive council. This council meets quarterly and consists of the president, secretary, treasurer, and eight vice presidents of the Federation.

Objects and Policy. The avowed objects of the American Federation are as follows: to establish local, national, and international trade unions for the purpose of mutual assistance; to promote the use of the union label; to secure legislation in the interests of working people; to influence public opinion by peaceful and legal methods in favor of organized labor; and to aid and encourage the labor press. The official organ of the A. F. of L. is the *American Federationist*.

The general policy of the A. F. of L. has been frankly opportunistic, with the watchword of "more now." The Federation has consistently abstained from partisan politics, except in so far as its interests might be furthered by voting for its friends and against its enemies, irrespective of their party affiliations. By such means, however, it has been very successful in obtaining legislation favorable to it and in defeating unfavorable legislation. Among its more important victories are the wide acceptance of the eight-hour day, the exclusion of Chinese and of laborers imported under contract, the establishment of Labor day and of the Federal bureau of labor, and the inclusion of the secretary of labor as a member of the president's cabinet.

Certain other aims of the Federation have up to the present failed of complete realization. These objectives include the abolition of the sweatshop system, discontinuance of the contract system on public works, prevention of child labor, governmental regulation of safe and sanitary conditions of employment, the adoption of an easier way of amending the Constitution of the United States, and a diminution of the power of courts to issue injunctions affecting the action of union workmen during strikes and lockouts.

INDUSTRIAL WORKERS OF THE WORLD

The Industrial Workers of the World, more commonly known as the I. W. W., is a labor organization of revolutionary character having objects somewhat similar to the French Syndicalists and to the Russian Bolsheviki. The organization was formed at Chicago in 1905 by the amalgamation of several radical labor groups antagonistic to the A. F. of L. The Western Federation of Miners, which at first formed part of the organization, withdrew in 1907, and, in 1908, those who remained, divided into two factions: the Detroit group, which favored the use of political means to attain their objects; and the Chicago, or direct action, group. The latter retained the name of I. W. W.

Aims and Methods. The object of the I. W. W. is to form one big union (O. B. U.) composed of all workers, who, organized as a class, desire to "take possession of the earth and the machinery of production, and abolish the wage system." As the I. W. W. holds that "the working class and the employing class have nothing in common," it refuses all forms of arbitration and does not consider that any contract is binding on employees. It endorses sabotage, or the secret destruction of an employer's property by the workers, and it favors the general strike. The unpatriotic action of the I. W. W. after the United States entered the World War resulted in the indictment and conviction of 94 of its members.

ADVERTISING

It is estimated that more than one billion dollars is spent annually in the United States for advertising. In this estimate the term "Advertising" is understood to cover all forms of printed and painted public announcements that help in the sale of goods and services. Signs on stores and wagons, labels on bottles and cartons, catalogues, circulars enclosed in packages or sent by mail, calendars, novelties, and even house organs are included in this definition, although there is some doubt about the propriety of classifying all these as advertising.

Misconceptions. The magnitude of this expenditure has led to some popular misconceptions. The fact that, for a single page advertisement in some of our leading magazines, advertisers are willing to pay seven or eight thousand dollars—even more for cover pages—gives some people the mistaken idea that it ought to be easy to get $100 for a page in a local Bazaar program. However, it must be remembered that, when the advertiser buys space in the magazine, what he pays for is the privilege of addressing his message to an audience of two million or more families. If he were to send them a single post card, his postage bill would be $20,000. The magazine advertisement, therefore, may be his most economical method of speaking to that audience effectively. On the other hand, a page in a local Bazaar program, reaching possibly 1000 people, would be tremendously expensive and wasteful at $100. Similarly, $10 an inch for space in a newspaper with a circulation of 300,000 is cheaper than $1 an inch in a newspaper with a circulation of 20,000. The cost of an advertisement is relative to the size and to the quality of the audience it reaches effectively.

Another popular misconception is that the huge expenditure for advertising is a burden upon the consumer and a public waste. People are amazed at the idea of a manufacturer's spending $1,000,000 a year for advertising, whereas they would applaud his expenditure of an equal amount for electric cranes or other labor-saving devices to cut down his production costs. Nevertheless, his investment in advertising is analogous. Advertising is a labor-saving device to cut down marketing costs. It may not always achieve this purpose, but it is also true that the manufacturer who invests in an electric crane cannot always use it economically. Advertising is not always efficiently used, but its economic function is to do work that must be done and to do it more cheaply than it can be done by other methods.

THE ECONOMIC VALUES OF ADVERTISING

To understand what work must be done by advertising, we need to know something of the process of marketing and its economic justification. A century or so ago there was a feeling that farmers and manufacturers were the only true producers; that those employed in the exchange of goods were largely parasites. To a certain extent this traditional view still persists, but thoughtful people generally recognize that, to possess utility for consumers, goods must be made available; that is, they must be brought to the place where they are needed, at the time when they are needed, and be made exchangeable. Thus all the facilities for physical distribution, including transportation, storage, and storekeeping, are economically justified.

Knowledge of Goods Essential. It is not so easily perceived, but it is equally true, that, to have value, goods must be *known* to the consumer. He must know what they are and what they will do and how they will perform certain services for him better than something else he might use. He must know where he can get them and on what conditions, including price. In other words, information about goods is a necessary part of their utility to the consumer. The work of marketing includes not only the physical distribution of the goods, but also the mental distribution of ideas about the goods.

There are several reasons why this important truth is so generally overlooked. Many articles used in the household we know from earliest childhood, and the process of acquiring knowledge of others is so gradual as to pass unnoticed. Nevertheless a community in which the people use only articles that their fathers used before them and with which they have always been familiar is not a progressive civilization. In this country every one of us enjoys comforts and luxuries that previous generations scarcely dreamed of, and our knowledge of them has been gained comparatively recently. The manufacturer, for his part, sometimes fails to perceive the need of spreading knowledge of his products. This is because all those with whom he comes in contact know these products, and he mistakenly assumes that this knowledge is universal. In most cases, the public needs to be informed.

Uncontrolled Channels. The public gets information about goods through many channels, some of which are not within the control of the manufacturer or dealer. In the first place there is gossip—what people say. An ancient adage declares that if a man build a mousetrap better than does his neighbor, the world will beat a path to his door. Unfortunately, this is a slow process and frequently does not work out satisfactorily. The world is too busy to be beating new paths, and its gossip about a manufacturer and his products frequently is derogatory. The many Ford jokes have helped keep the car in the public eye, but they have not been altogether beneficial to its reputation.

Journalism is another channel for information about goods and services. New inventions are constantly being described in the news and editorial columns of various publications. Books and plays are reviewed. The exploits of actors and moving picture people are often featured. To have news value, however, a thing must be reasonably new, and manufacturers cannot rely upon reporters and editors to keep telling the public about their offerings. "Free" publicity, even though stimulated by the most astute publicity men, is usually expensive and uncertain.

Controlled Channels. The average business man must transmit information about his goods by channels which he can control. The chief of these are personal salesmen and advertising. Personal salesmen are powerful, but they are costly and of limited range. They are the hand labor method as compared to the machine method of advertising. The salesman can usually speak to only one person at a time, whereas advertising can be used to reach millions of people at once. This is not meant to imply that advertising can always be used to take the place of salesmen. The personal touch of the salesman is often necessary to adapt the message to the prospective buyer, and his physical presence as an order-taker is often needed. Advertising should attempt to do simply that part of the work of salesmen which it can do more cheaply and efficiently, and, except in the case of mail-order selling, it must work in conjunction with personal salesmanship.

As a practical matter, advertising is largely used by the manufacturer in one of the following ways:

(a) *To pave the way for salesmen.* Advertising may draw inquiries from people who are interested and thus give the salesman a chance to know who his best prospects are, so as to avoid fruitless calls on those who cannot be interested. Or the advertising may give such introductory knowledge of the company and its products that the salesmen will be able to complete the task of selling more quickly, and at smaller expense. Again, the advertising may

point out that the salesmen of a company are really business or technical advisers, or in other ways it may help to assure the salesmen of a friendly and receptive audience.

(b) *To supplement the work of salesmen.* The printed word has a power of conviction that the spoken word does not always have. People more readily believe the statements of a salesman if they also see them in print. Moreover, knowledge is always a step in the direction of friendship, and goods that are well known are readily salable.

(c) *To control salesmen.* No crew of salesmen is 100 per cent honest and truthful. In some instances, a salesman might misrepresent the house if left entirely to his own devices. This danger is lessened when the printed advertising of the company puts on record its policy.

By using advertising in these ways, some manufacturers have been able to cut the cost of personal salesmanship sufficiently to more than offset the advertising expense. In other words, the cost of advertising plus that of salesmanship is sometimes less than the cost of salesmanship alone. Statistics compiled some years ago showed that, among the clothing manufacturers, the most extensive advertiser was the one who had the lowest percentage of selling cost for each dollar's worth of goods sold.

How the Dealer Benefits. Advertising may also cut marketing cost by inducing the dealer to handle the article at a smaller margin of profit. This might not appear to be a benefit to the dealer. The smaller profit is justified, however, because less personal salesmanship on his part is required to sell the well-known advertised article. His stock-keeping problems are simplified and often his own prestige is increased by his handling of goods that are well and favorably known. Because of the increased turnover of the advertised articles, his gross profit will be larger. Here, too, it may be said that advertising does work that otherwise would have to be done by personal salesmen—the dealer and his clerks—at greater cost. The dealer in turn uses advertising to inform people about his store, his stock, and his service, and thus lessens the amount of personal salesmanship required to do the same volume of business.

From this brief summary, it is evident that the cost of advertising is not altogether a burden upon the consumer. Frequently a large part of the cost is saved by the economies which advertising effects in personal salesmanship. In addition it frequently effects indirect savings by making larger quantity production possible, with consequent savings in manufacturing costs. Because of this factor many articles—canned soup, for instance—are made available at a lower price than the cost of making the same thing at home.

The Consumer. Advertising may sometimes result in added expense to the consumer, but there are advantages which make it worth its cost to him. Among these advantages are the following:

(a) It gives the public information about new articles and improvements which make life healthier and happier;

(b) It shows people how they can benefit through the wider use of articles and services which they have previously used only to a limited extent;

(c) It simplifies the task of buying;

(d) It enables people to secure articles of standard quality (standardization of a product is a necessary preliminary to advertising it);

(e) It gives people, in advance of the actual use of an article, a certainty of its satisfactory performance;

(f) It gives, in certain cases, the psychological satisfaction of having and using an article which is well and favorably known by others.

Increased Volume. It must be admitted that advertising as actually practiced does not always conform to these ideals, either in performance or in intention. Advertisers, like other people, are actuated by self-interest, and are often too short-sighted to perceive how closely their interests are bound up with those of the public. Increased profits are usually an incentive, and these may be secured through increased volume of business, even though the sales cost per unit remains the same or is slightly higher. Moreover, the advertiser who does cut down his selling costs may not pass any share of the savings along to the consumer. For this condition the consumer is partly to blame, in that his vanity sometimes leads him to pay a higher price than is necessary for certain luxuries and style articles, rather than to have his neighbors think he could not afford the best. Manufacturers sometimes refrain from lowering prices for fear of losing prestige. Indeed, it may be said that the high price of such an article as a hat, a box of candy, or a vial of perfume may be one of the elements that give it its high utility in the eyes of the public.

Truth in Advertising. During the rapid growth of advertising that has occurred in the past half century, there were naturally many instances of its fraudulent and illegitimate use. Frequently its function was to *misinform* people regarding an article which would have been purchased by few if the truth about it had been known. There are some survivals of this practice; but the Better Business Bureaus, fostered by the Associated Advertising Clubs of the World, have done much to stamp out the evil, and are constantly on the watch for those who attempt to publish misleading statements. It is worthy of comment, in this connection, that fraudulent advertising would not succeed if the majority of advertising were not truthful. It is probable that at least 99 per cent of advertising today tells the truth.

The chief evil that remains in advertising is its uneconomic use, mainly by those who have considered it only as a means of increasing their sales volume, and have ignored its public service functions. The law of "survival of the fittest" tends to eliminate many of these short-sighted advertisers, and in the future we shall probably see more general conformity to the standards of economic value that have been outlined in this discussion.

THE FUNCTIONS AND METHODS OF ADVERTISING

From the advertiser's viewpoint, advertising is a method of selling; from the consumer's viewpoint, it is a method of gaining information that helps him in buying. This latter view should govern. Unless advertising does have educational value, it is likely also to fail of its selling purpose. It is true that some advertising is educational only in the degree that a picture of a cat accompanied by the letters C A T on a page in a child's primer is educational. Advertising of this class is not highly efficient, but, in teaching consumers to recognize a brand and to become familiar with it, it accomplishes something. It is also true that some advertising is largely emotional, with the message presented in pictures and in color; nevertheless, even a picture of a charming girl made more charming by lustrous silk hosiery has in it a lesson that many women gladly accept. If we interpret *educational* as including training of the memory and emotions as well as informing the mind, we shall find few cases of successful advertisers whose message is not educational.

Inviting and Readable. Information that is of service to the consumer is the basis of good advertising—but only the basis. The information must be delivered. Every teacher can testify that "the human mind has an almost infinite capacity to resist the introduction of knowledge." And the teacher has the great advantage that his audience cannot easily get away from him. The advertiser, on the other hand, has to deal with a public that does not particularly care to listen and has many

competing attractions to draw its attention away. A high degree of artistic and literary skill is required to build an advertisement so attractive and interesting that it will attract and hold the attention of the public until its message is delivered. Usually the message must be repeated many times and in a variety of ways before it can accomplish all the purposes of the advertiser.

Kinds of Responses. Nor is the task of the advertiser ended when his message is impressed upon the mind of the reader. His object is to secure a profitable response from the reader. There are two main kinds of response, and on the basis of these we may classify advertisements as "action advertisements" and "good-will advertisements." An action advertisement has the object of securing a direct response from the reader in the form of an order or inquiry, either by mail or at the store. In the good-will advertisement, the object is to induce a friendly feeling which will make the reader receptive to other selling efforts. Often the advertisement tries both to get action and to induce good will; but one object should be dominant, since the very things that tend strongly to stimulate action are most likely to lose good will, and vice versa.

A new advertiser whose capital is small and who cannot afford to wait long for returns from his investment is likely to prefer action advertisements. In their extreme form they are packed with facts, and often offer a book or a sample as an incentive for replies. A coupon may be at the bottom to make action easy. Later in his history, when his goods are more widely distributed and his sales force is large enough to cover the territory adequately, the same advertiser may turn to good-will advertisements, in the belief that the friendly feeling of hundreds of thousands of people is more valuable than the active response of a few thousand. It is harder to stimulate a "consumer demand" than to stimulate a state of "consumer acceptance," and the latter is all that is necessary for many advertisers. Mail-order houses, however, and manufacturers, as well as many retailers, of short-lived novelties and specialties, depend chiefly on action advertisements from one year's end to another.

Both action advertisements and good-will advertisements can be further classified in four groups, depending on the kind of information they contain. These four groups are:

(a) Pioneering
(b) Competitive
(c) Institutional
(d) Reminder

Pioneering Advertisements. Pioneering advertisements try to introduce the article or service to people who have not been in the habit of using this type of article at all, and who frequently have not realized their need for it. The advertisements show them how they will benefit by adopting it. They rarely *create* demand—it is doubtful if any advertising can do more than arouse a latent demand—but they are the most nearly creative of all forms of advertisements.

Competitive Advertisements. Competitive advertisements try to direct existing demand toward the advertised product, in preference to any other product of the same class. They point out distinctive merits and advantages, and usually back up their claims with proof.

Institutional Advertisements. Institutional advertisements try to build the prestige of a name or brand, usually one that embraces an extensive line or "family" of articles. These advertisements are always of the good-will type, and often make no attempt either to show the consumer his need or to demonstrate the merits of any particular product. Nevertheless, they may give information of real service to the buyer in the form of bits of history, advice about investments, or the like. This type of advertisement is hardly suited to any house that is not already recognized as a leader in its field.

Reminder Advertisements. Reminder advertisements, as their name implies, try to refresh in the public mind its previous knowledge or belief regarding the advertised product or company. To some extent, they attempt also to stimulate action, choosing such media as will reach prospective buyers at a favorable time. Display cards in stores, and to a considerable extent street car cards and billboards, are suitable for reminder advertising. Few manufacturers can depend upon it exclusively; its chief value is to supplement and to re-enforce other forms of advertising and selling. Used alone, it is likely to be inefficient and wasteful.

Types in Series. The history of an advertiser may include all of these types of advertising. When the talking machine was a new invention, pioneering advertisements were needed to convert the public to the idea of possessing such an instrument. Later, as it became a stock item of the household furnishings, competitive advertisements taught the public to discriminate among the various brands offered. Institutional advertisements associated one brand with the names and faces of great opera singers and other musicians. Reminder advertisements warned the prospective buyer to look for the trade-mark so as to be sure of securing the genuine. While the majority of these advertisements were of the good-will class, action advertisements were used at the psychological moment, just before Christmas.

Pioneering versus Competitive. Although the great majority of manufacturers are in fields where competition is keen, it does not necessarily follow that competitive advertising is most suitable for their use. In the case of some articles, like automobile tires, where the increase in the market depends almost entirely upon conditions outside the control of the tire manufacturer and where car owners must necessarily buy some brand of tires, competitive advertising is the logical method. Frequently it happens, however, that a manufacturer, instead of trying to convert a larger percentage of the present users to his brand, may seek to develop new markets. The talking-machine manufacturer may develop a new field in business houses or among those learning languages, or even among people who want to reduce weight by pleasant and painless methods. Raisins are a staple food, but advertising of the pioneering sort has greatly developed the consumption of raisins by converting people to raisin bread, to raisin pie, and to the eating of raisins between meals. Practically every article likewise has some opportunity of developing new markets through the use of pioneering advertising. This is often a wiser policy than that of fighting for a larger share of existing business.

THE BASIS OF ADVERTISING PLANS

Because of the relation of advertising to salesmanship and other marketing forces, an advertising campaign is a complex matter and cannot be safely undertaken without a thorough analysis of many different factors. The most important are the market, the product, the trade channels, and the media. The analysis of these may be made by the advertiser, but more frequently it is intrusted to a group of outside experts called an "advertising agency." Their services are valuable, not only because they can approach the question in a comparatively unbiased frame of mind, but also because they bring to it a valuable background of experience gained through contact with problems of other advertisers. Moreover, they are experts in the execution of advertising plans.

Analysis of the Product. The analysis of the product is of two kinds: analysis of the class to which it belongs and analysis of the particular article in comparison with other members. Under the first head, one needs to consider the following questions: "Is it (1) a luxury for the few or (2) a necessity for the many?" "Is it (3) a staple, in

constant demand and bought habitually; or, is it (4) a specialty for which demand is yet to be created?" "Is it (5) a convenience article, bought without much deliberation, and at the handiest place; or, is it (6) a shopping article, for which people will go out of their way and which they will buy only after careful comparison?" "Is it purchased (7) frequently or (8) only rarely?" "Does its possession lead to the purchase of (9) other 'contingent' articles made by the same manufacturer?" "Is it (10) affected by style changes?" "Is it subject to (11) territorial or (12) seasonal limitations?"

Examples of such products are: (1) steam yacht; (2) salt; (3) stockings; (4) self hair-cutter; (5) chewing gum; (6) automobile; (7) soap; (8) silver polish; (9) safety razor blades; (10) millinery; (11) ice skates; (12) straw hats.

Further questions are necessary in the analysis of the particular product, and to answer them it is usually necessary to examine competitors. How does this article differ in design, in materials, in workmanship, in cost? Has it any exclusive features protected by patent or copyright? Who are the people responsible for it? What is the life history of the company? The analyst needs the reporter's "nose for news" in his search through the factory, the office, and the laboratory, for the distinguishing superiorities in which the public may be interested. It should be remembered, however, that the most valuable facts about a product are those which relate to its performance in the hands of users. This brings us to the analysis of the market.

Analyzing the Market. The analysis of the market should discover who the present buyers are, how many they are, where they are, and what are their reasons for buying. It should discover what characteristics they have in common, such as age, sex, wealth, education, vocation, and the like. It should discover their buying habits and the basis for their discrimination between different brands of the same type of product, if they discriminate at all between brands. It should discover their attitude toward the particular product in question—why they prefer it, why they object to it.

Adaptability. Through this analysis of the market, it sometimes becomes apparent that the product is not ideally suited to the needs of the majority of consumers. Sometimes improvements either in the article itself or in the size and the design of the package have to be made before advertising can be undertaken with much prospect of success. Sometimes the price, the name, or some other element is a hindrance and must be changed. In any event, the analysis will reveal the kind of information that must be given and the points that must be emphasized in order to secure larger sales. Often it is far more important to know what an article is in the public mind than to know what it is in reality.

Trade Channels. It is then necessary to analyze the trade channels through which the goods flow to the consumer and also to study the other possible channels which might be employed. Sometimes before advertising can be made effective it is necessary to change from the method of selling through jobber and dealer to the method of selling direct to dealer or even direct to consumer. Or, a change in the opposite direction may be advisable; for, when advertising is undertaken to reach the general public over a wide territory, it would obviously be wasteful to have goods on sale at such a small number of points that many of the interested prospects would be unable to find a dealer handling them. The question of territory is important in this connection. The manufacturer whose goods can be profitably sold only in limited territory would obviously waste his money if he advertised in publications covering the whole country.

Analysis of Media. After the manufacturer has discovered where his market lies, what selling points his product has, and what kind of distribution is most expedient, his next task is to analyze the media which are valuable for reaching the prospective consumers. He finds a bewildering variety, including magazines, newspapers, and various periodicals, such as farm papers, women's publications, trade and technical publications, going to selected groups of people. There are also street car cards, billboards, direct mail, and many other avenues of reaching the public. In choosing his media, his ideal is to find those which cover his market with a minimum of waste and at a minimum cost. The difficulty of comparing different classes of media makes selection a task for the expert. Here again the advice of the advertising agency is valuable.

Factors which Influence Media. Each class of medium has its peculiar advantages. The newspaper appeals to people of all kinds within a limited territory. The magazine has a more carefully selected audience in a wider territory, and has a longer life. Street car cards are of local influence, and, as they are all of the same size, they permit the small advertiser to make as good a showing as his biggest competitor. Billboards offer the advantage of size. "Class" publications appeal to a group, selected on the basis of their wealth, vocation, or other known interests, and this group may happen to contain the advertiser's best prospects. Within any class of media, there are differences in value, depending upon the quality of the circulation, the methods by which it was secured, and the confidence the readers have in the publication. The advertiser who buys the privilege of talking to an audience is interested not only in the size and in the buying power of the audience but also in its receptivity to his message.

A very practical consideration that affects the choice of media and the size of space to be used in them, as well as other elements in the advertising campaign, is the amount of money available. Theoretically, the appropriation should depend upon the selling work to be done and upon the means required to do it. Actually, it is often an arbitrary matter, and, unless the previous advertising history of the company has given a sound basis of estimating, the sum they spend on advertising may be far less or far more than is economically justifiable. Some advertisers determine their appropriations by observing the policy of competitors. This method is generally wasteful, and in some instances it has led to battles for advertising supremacy in which the prize was not worth the cost.

Problems of Space. Two advertisers using the same amount of space in a given publication may have radically different methods of apportioning it. One may use small space frequently, while the other uses large space—perhaps full pages—at longer intervals. Both may be right. Generally speaking, the advertiser who depends on direct returns and hence uses action advertisements will find small or moderate-sized space most profitable, whereas the good-will advertiser benefits from the prestige value of dominant space. The tendency in recent years has been away from the pretentious double-page spreads and multi-page advertisements. There are probably few cases where anything larger than a full page is needed to uphold an advertiser's prestige in his field.

PSYCHOLOGICAL ASPECTS OF ADVERTISING

As the whole selling process is mental, the advertiser is deeply concerned with psychology, the science of the mind's behavior. Every decision to buy is preceded by certain mental stages or steps, usually classified as attention, interest, desire, and conviction, or confidence. Although the individual advertisement rarely attempts to lead the prospect through all these stages, it does usually try to attract attention, to interest, and to inspire confidence. The first of these functions is of paramount importance. Many psychological investigations

have been made to discover the relative attention-value of different sizes and shapes, of different positions in the publication, and of different devices, such as color, borders, amount of white space, typography, and the like, for winning and holding attention.

Value of Research. Other functions of the advertisement have also been studied and analyzed. Laboratory tests are sometimes made to discover the relative strength of different appeals and of different selling points for the same product, before choosing one for the campaign. It is unlikely that the process of influencing human beings by advertising can ever be made an exact science; but many of the most serious errors of early advertisers are now avoided by practically every one, and the percentage of mistakes is likely to be reduced further by scientific research and experiment.

Favorable Attention. One prevalent error of the past was the assumption that anything that attracted the *eye* was necessarily good at the beginning of an advertisement. This idea was responsible for the use of irrelevant "attention-getters," such as pictures of pretty girls, comic cartoons, eccentric borders, misleading headlines like "Don't read this" or "For Women Only," and other bizarre and sometimes disgusting stunts. It is now recognized that the advertisement should attract the *mind* as well as the eye, and attract it not merely to the advertisement, but also to the subject of the advertisement. In other words, the attention must be *relevant* and *favorable*.

Avoiding Negatives. Another generally accepted principle is that, in order to hold attention and interest, an advertisement should be pleasing, both in form and in substance. A rectangle of the proportions of the "Golden section" (about 3 x 5) is the most pleasing shape, and is preferable to the square, which is monotonous and ugly. A promise of benefits to be derived from an article is more pleasing than is a warning of the dangers of not having it. Attacks on competitors are psychologically bad, not only because they are unpleasant, but also because such attention as they do receive is focused upon the competitor, whereas it should be directed toward the advertiser's own article.

Intellectual versus Emotional Appeals. Some purchases are made upon impulse or are inspired by the senses or by the emotions; others are the result of deliberately reasoned choice. Advertising appeals are therefore emotional (human-interest) or intellectual (reason-why). There is no sharp dividing line between the two, and many advertisements combine both elements. Competitive advertisements usually contain a reason-why argument, but of late years there has been an increasing tendency to make this more readable by introducing the human-interest touch. Pioneering advertisements usually appeal to some fundamental instinct or emotion, such as ambition, fear, pride, and the like, and hence are more likely to be human-interest.

Rationalized Appeals. It may happen that the appeal which is really most powerful in producing sales is not the one which the advertiser should use. This most commonly happens in the case of articles that are bought on the basis of emotions which the average buyer would not care to acknowledge even to himself. If questioned regarding his reasons for buying a silver pencil, he would not say, "because it satisfied my craving for ornament" or "because I want people to consider me a big business executive." More likely he would mention the convenience of having a pencil that never needs sharpening, or he would mention the economy of a pencil that writes 50,000 words for ten cents. The advertiser, therefore, is likely to use advertising with one of these reason-why appeals; in other words, he uses a "rationalized appeal."

The advertising campaign is usually planned by the principals or account executives of an advertising agency in co-operation with the sales executives of the manufacturer. They are likely to consult with various expert specialists, including research men and psychologists. The plans cover the choice of media, the general policy and objects of the advertising, and the chief appeals to be used. The actual preparation of the advertisements, however, is generally intrusted to writers and to artists. Upon their skill in delivering the message depends the success of the carefully laid plans.

PREPARATION OF ADVERTISING COPY

The message in words, called the "copy," is in most cases the backbone of the advertisement. It must not be forgotten, however, that the display elements—color, illustrations, type, and ornament—are also forms of language and sometimes tell the advertiser's story more plainly than it can be told in words. They always have the power to help or to hinder the effectiveness of the impression made by the copy. To secure good teamwork between copy and display, it is advisable to have one person supervise the entire construction of the advertisement and be responsible for every element that enters it. For convenience, however, we shall discuss copy separately.

Sales Letters versus Advertisements. Writing a piece of advertising copy is much like writing a sales letter. If the copy is for some mailing piece or for some periodical of selected circulation, the similarity is very close. Copy for a general magazine or a newspaper differs from the sales letter in some vital respects. The most important of these are the following:

(a) The advertisement must automatically select its audience, whereas the sales letter goes to a carefully picked list of prospects who are presumed to be interested. Few articles advertised in general magazines are of universal appeal. Some are for men, some for women, some for people who live in city apartments, some for automobile owners, and so on. To be effective, the advertisement must attract and interest the prospective buyers, out of the great public who turn the pages of the publication. A crude way is to use a salutation, such as "Ford owners, attention!" The better way is to have in the headline some key word that flashes to the prospective buyer the message, *This Is For You*; for example, "Does Your *Ford* Start Easily on Cold Mornings?"

(b) The advertisement is public, not private. It may be intended for a certain selected group, but many other people will see it and read it. It should not contain anything that will offend these uninvited readers or forfeit their good will. Many things that can be said in sales talks and in sales letters cannot safely be said in advertising copy. Slang, coarse humor, sex allusions, and references to nationality, religion, or politics are all dangerous and rarely permissible.

(c) The advertisement is necessarily more impersonal than the sales letter. Usually it is anonymous. The writer is simply the interpreter of his subject and must not come between it and the reader. Moreover, each reader is conscious of the fact that the advertiser's message is not directed at him alone, but it is also intended for many others. Advertising copy can sometimes be made more personal by having a statement or testimonial from some well-known person, or a monologue from some pictured typical user, but at best its personal touch is less than that of the sales letter. Printed matter has some advantages over the typewritten letter, but it can never secure the same degree of personal intimacy.

(d) Advertising copy must compete with the editorial contents of the publication. It competes at a disadvantage, because the publication is bought for the amusement or instruction contained in its

news, stories, and articles. The subscriber reads these willingly; advertising copy, on the other hand, he reads unwillingly, if at all. Hence it must be so interesting and serviceable to him that he cannot pass over it indifferently. In recent years, there has been a tendency away from the straight sales argument and other forms of preachments and exhortations. Instead, copy has been put in stories, dramas, and in almost every other literary form. It is often possible to harmonize the copy with the reader's temporary mood and interests by casting it in the form that prevails in the editorial columns. Thus, timely or newsy copy is appropriate in newspapers, story copy in a fiction magazine, and household recipes and advice about home decoration in a woman's publication. Advertising copy should be literature as well as salesmanship.

(e) Advertising copy usually requires a more terse, condensed style than does a sales letter. This does not always mean greater brevity, but it does mean speedier movement. Advertising copy may be long if it is sufficiently interesting. Some of the most successful campaigns have employed lengthy copy, and advertisements that try to secure direct action are nearly always long.

Avoid "Manufacturer's Copy." Advertising copy should be written from the reader's viewpoint. Since its justification as a public utility depends on its furnishing information of value, it should bring out the truths regarding the product in a way that renders real service. Too often the manufacturer regards his advertising as an opportunity for self-glorification, or he assumes that the facts about it that interest him will also interest others. So-called "manufacturer's copy" is characterized by rather boastful claims of superiority, and the lavish use of the pronouns "I" and "we." Such copy almost never appeals to the consumer.

The Service Viewpoint. It is true that often the claims of superiority are justified, and the distinctive merits set forth in the copy are real ones. But these selling points should be presented from the service viewpoint; for example, a rubber water bottle of seamless construction may be meritorious, but the word "seamless" does not show its service. The service viewpoint is in the words, "It can't leak." This assertion of service may then be backed up by the reason, "because it's made in one piece." Every good selling point is really a "buying point" and should be so presented.

Finding a Point of Contact. At the beginning of the copy especially, the consumer's viewpoint is vitally important. Rarely is he considering the purchase of anything, still less the particular article we have to offer. His mind is moving along its accustomed path, absorbed in the various interests, large and small, that make up his life. Our task is not so much to draw him away from these things as it is to relate our message to them. In other words, we try to find a "point of contact" in the reader's present interests. Thus, in theater programs, the reader's central interest is the play, and one notably successful advertiser invariably begins his copy with some reference to the title or story of the play. When some news event, like the discovery of Tutankhamen's tomb, occupies the attention of the public, advertisers may begin with some reference to it. At various seasons, such as Christmas and Easter, there are obvious points of contact for many advertisers.

Not only temporary interests, but also permanent interests and the fundamental instincts and emotions, provide points of contact. Every housewife is compelled to plan meals for the family, every young man and every young woman has some hope of being a social success, every car owner is interested in getting greater mileage, every mother is interested in her children's growth and health. The copy writer should try to find an interest that is common to most of the audience he wishes to reach, and, having found it, he should tie his message to it. Of course the point of contact should not be far-fetched or only distantly related to his product.

Good-will Copy. In good-will advertising, the copy often says very little about the merits of the product. The watch manufacturer may use a historical series showing "Time throughout the ages." Musical instruments may be advertised by telling the stories of famous musicians. A printing house may give valuable information regarding the various processes of typesetting. In such cases, the advertiser apparently subordinates his own interests entirely, in order to present something that the public will read with pleasure and with profit. His benefit comes partly from the fact that he is recognized as an authority in his field, and partly from his association with something the consumer admires. In some cases, the consumer may realize that those who give free service can be depended upon to give service when they are paid for it.

Copy Easy to Read. In style as well as in substance, advertising copy should be adapted to the reader, always keeping in mind the axiom, "He doesn't want to read it." The general construction and the little details of diction and of sentence structure should all help to make the copy *easy to read.* No matter how interesting the message may be or how valuable the information it contains, if the message taxes the brain and tires the patience of the reader, it will be ineffective. It must be clear, correct, and concise. Examination of the copy of successful advertisers who appeal to a wide audience will show a general tendency toward short sentences and paragraphs, and simple Anglo-Saxon language.

Adaptation of Style. Where the advertiser is addressing a selected audience, composed, let us say, of society women, engineers, or sportsmen, his style may have closer adaptation to his readers. With the intellectual or sophisticated audience, his sentences may be longer and his vocabulary of wider range, but his language should never be pretentious or florid. Society women may be favorably impressed by the dignified formal style of a wedding invitation, in which the pronouns "you" and "we" never appear. Technical men respond to information expressed in their own peculiar lingo, and sportsmen welcome the slang of their favorite diversion.

Copy Should Concentrate. A piece of copy should always be concentrated upon one main idea. This is usually the big idea or keynote of the entire campaign. A series may continue for months to inform the public that a certain varnish won't turn white in water, that a tooth paste counteracts acid-mouth, that a coffee is good to the last drop. A common fault of copy writers is that of trying to tell too much. This is sometimes caused by over-enthusiasm for the product, and the desire to show the world its superiorities in all respects. More often it is because of timidity or inability to discover what is really the most effective talking point. While it is easier to hit a target with bird shot than with a rifle bullet, the latter makes the deeper and more lasting impression. An equally serious fault is the long-winded introduction that beats about the bush for several paragraphs before coming to the real point of the advertisement. The advertisement should be well aimed, and it should then strike home swiftly and surely.

Slogans. The keynote idea is often crystallized into a catchy statement called a "slogan," and this slogan is included in every piece of copy. Such slogans as "The Flavor Lasts," "Chases Dirt," "Hammer the Hammer," "Keep that School Girl Complexion," by constant repetition, have become impressed on the minds of millions of people. There is some question as to the value of slogans for articles that are bought only rarely and after deliberation; certainly they have more advertising effect in copy for low-priced convenience articles like chewing gum

and soap. In any case the slogan should not be a general abstract claim that could have been made equally well by any competitor if he had happened to think of it. It should bring out a distinctive point and should be brief, concrete, and easily remembered. Reminder advertisements often contain no copy except the slogan and the name of the product.

Helping the Reader's Progress. In copy of any considerable length, the writer must grapple with the problem of holding the reader's attention until he reaches the end. This is relatively easy in human-interest advertising, where the story or some other intrinsically interesting form may be used, but it is somewhat harder in reason-why copy, where an explanation or an argument must be presented. The basis of such copy must be facts, and facts are sometimes dry and dull. Testimonials may be interesting because of the prominence of the signer, but they are a weak form of evidence. Records of the performance of a product are stronger proof, and tests that the reader is invited to perform for himself are the most convincing of all. If the evidence in itself is interesting, it may be given first, and it may be followed by the advertiser's general claim which it establishes. Otherwise it is better to begin the copy with a statement of the service the product will render, and to back this up with the concrete facts that prove its truth.

The reader's progress through the copy may also be helped by the rhetorical device of parallelism, which means casting similar ideas in similar form. The construction of sentences should not be so uniform as to be monotonous, but unnecessary changes in subject, in tense, and in viewpoint should be avoided.

Emphasizing the Copy. To emphasize his points, the copy writer sometimes depends upon the use of italics, capitals, and other display methods, but these lose their effect if used too lavishly. Structural methods of emphasis, moreover, are of greater value. Important words, so far as possible, should be placed at the beginnings and ends of sentences. The present tense is the most emphatic. "This hat is becoming to any face" is stronger than "This hat will be becoming to any face." Verbs in the active voice are always stronger than those in the passive voice. The imperative "Do this" is more dynamic than the subjective "You should do this." Toward the end of the copy, where action is most desired, the imperative may be used freely. At the beginning, it is sometimes too strong and may antagonize. It is well to remember that verbs are the lifeblood of expression. Wisely selected, they will do a great deal of work, provided they are not overloaded with qualifying adverbs and phrases.

DISPLAY OF THE ADVERTISEMENT

The copy in all advertisements is presumably intended to be read. In many kinds of advertisements, especially those that attempt to secure action, the copy *must* be read; otherwise the advertisement fails. In such cases, the function of the display is merely to assist by making the reading matter more inviting and more emphatic. Sometimes the only display element is the type. This should be chosen for its readability; fancy letters and the extensive use of capitals or italics should be avoided. Two or three ideas, rarely more, may be emphasized by setting them in larger size or in bolder type. Pictures, if used, should illustrate some idea in the copy and they should lead the eye into the copy. Color and ornament should be used with discretion, or they may suggest that the advertisement is merely to be looked at, not to be read.

Importance of Display. There are some conditions, however, which may demand that the display rather than the copy undertake the task of carrying the advertiser's message. Among these conditions are the following: (a) Human-interest appeals to the senses and to the emotions, especially to the sense of sight and to the emotion of vanity. (b) Good-will and general publicity advertisements, especially those which depend upon atmosphere to build prestige. (c) Street car cards, billboards, and other forms of advertising that must flash their message almost instantaneously. (d) Advertisements that are intended to appeal to all classes of people including the illiterate and the unintelligent. (e) Advertisements of products that have artistic qualities, such as furniture, silverware, and jewelry.

Suggestion of Type. In all these conditions, when display is of dominant importance and copy is secondary, the type may be selected for its decorative value rather than for its readability, although readability should not be entirely sacrificed. The type founders have produced types that suggest such qualities as dignity, antiquity, delicacy, strength, and the feeling of the type selected should be in harmony with the idea of the advertisement. If a suitable type is not available, hand lettering may be used. Borders and other ornaments should likewise be selected for their appropriateness. Frivolous French borders may be suitable for the advertising of cosmetics and lingerie, but they are not appropriate for tractors or Portland cement.

Headlines. A headline in bold-faced type is a common feature of advertisements, whether the copy or the display is the chief element. But the function of the headline differs in the two cases. Where the copy *must* be read, the headline should be like the title of a fiction story; it should reveal the character of the advertisement but it should not attempt to summarize its main idea. It should select the right audience and pique their curiosity sufficiently to make them want to read more. "Eleanor Finds a Way" is intended to attract women, but the phrase tells them nothing about the merits of the advertised article. Where the display is dominant and the copy is a subordinate element, the headline is like the headline of a news article. Read either alone or in combination with the other display type, it tells the main idea of the advertisement. Those who are interested enough can obtain more detailed information from the text matter. "Right over the Old Shingles—Blank Asbestos Shingles" tells the main fact and those who read no further have at least some information about the product.

The Language of Color. Color speaks a language of its own and this language should be mastered before attempting to use it. The wise advertiser chooses color not merely for its attention-getting power but also for its atmosphere. Red and orange catch the eye more quickly than do other colors, but they are too hot and violent for the advertising of electric fans and cooling drinks. Purple is distinctive, but its suggestion of mourning makes it inappropriate for most advertising. Color is useful also for the more realistic representation of various articles of merchandise and for the identification of packages.

Illustrations. Pictures may, in some instances, tell almost the whole of the advertiser's story. They are particularly useful where the appeal is of a kind that might be offensive in words. A woman would probably not respond favorably to the advertisement of a cosmetic if the advertiser said baldly, "It will help you attract the men," but a picture which illustrates this result may subtly implant the idea in her mind.

To have a popular appeal, pictures should contain some suggestion of action, preferably with human characters. "Still life" illustrations are less dynamic, and are usually warranted only in advertisements that demand extreme dignity. High class period furniture may stand alone, but a convertible davenport bed is helped by the representation of people or by the suggestion of their presence. Action in the pictures should direct attention down and into the advertisement, rather than up and out.

Photographs versus Drawings. The choice between photographs and drawings depends upon several considerations. The photograph has the advantage of genuineness and reality. It is therefore preferable for illustrations of evidence and reason-why copy. The tire that has run 15,846 miles, or the battery that has been in service 4 years and 8 months, is most effectively shown by a photograph. On the other hand, a photograph may not be able to emphasize the important points. Moreover, in advertising articles like hosiery, it is often difficult to find a professional model whose type will appeal to people of the class the advertiser wishes to reach. The drawings of an artist who has created a popular type of man or woman may, in such cases, be a good investment.

Layout and Visualization. The advertisement-builder need not be an artist, but he should have artistic appreciation sufficient to know how his advertisement ought to look, and sketching ability sufficient to put on paper a rough approximation of it. Those who are experts in this work of "visualization," as it is called, are able to give the artist and the printer a guide that often prevents costly mistakes. Those who lack this sketching ability may produce an adequate substitute by pasting up pictures, borders, specimen blocks of type, and other display material in a "layout." Such a layout is invaluable to the copy man in showing the amount of material that can be put in the space without crowding and without using unreadably small type.

The style of the display, like the copy, should be suitable to the subject and should be adapted to the audience. It is usually advisable to maintain the same style of art work throughout the campaign, including even the store cards and the package, in order to link all the advertising impressions together and to secure the cumulative effect of repetition. If this plan is not entirely feasible, there should be at least some identifying element, such as a representation of the trade-mark, in all the advertisements.

SOME FINAL CONSIDERATIONS

Because of the brevity of this discussion, it has dealt mainly with the manufacturer's advertising in its relation to prospective consumers. This is most important, not only because there is often no other way by which he can speak directly to this audience, but also because all other effects are dependent upon consumer effect. These other effects, however, should not be disregarded entirely. With articles like automobiles, that have a useful life covering several years, advertising may tend to increase the pride of ownership in the minds of present users, and thus keep them "sold." In fact, it may be truly said that an article is not sold at all, until it has been used with satisfaction. Again, advertising may have a valuable reaction on the workmen who produced the article by stimulating their pride of craftsmanship and by increasing their *esprit de corps*.

Relations with the Dealer. The dealer-effects of general advertising have lately received much attention. Advertisements addressed to the consumer may influence new dealers to stock the article in anticipation of the demand, and may stimulate present dealers to devote their efforts more enthusiastically and whole-heartedly to its sale. Quite frequently a part of the appropriation is used to "merchandise" the advertising; that is, to inform the dealer of the extent and the quality of the consumer advertising that is planned, and thus convince him that the article has salability sufficient to warrant him in putting it on his shelves. It must be remembered that the element of chief importance to the merchant is the salability of the goods. Some of the advertising appropriation may likewise be put into "dealer-helps," such as window and store display, demonstration, distribution of samples, and local advertising in newspapers and street cars. All these are welcomed by the dealer because their effect is concentrated in his neighborhood and he is in a position to benefit, especially if he has an exclusive agency, or is one of the few dealers permitted to carry the advertised goods.

Retail Advertising. The dealer's own advertising problem differs from the manufacturer's, but the fundamental principles are much the same. Less harm is done if the retailer uses only a reminder card to "keep his name before the public"; for his personal contact with his clientele may do much of the sales work, especially in a small town. If he can put that personal element in his advertising, so much the better. Too much reliance upon bargain sales, and upon other appeals that try to lure people into the store, is an unwise policy for the retailer who wishes to build a substantial and permanent business. The retailer, like the manufacturer, should aim to give serviceable information, and to give it in such form that it will be seen, read, and believed.

The bulk of retail advertising consists of offers of timely merchandise, usually competitive in character. Since the buyer's choice is likely to be based upon quality and price, both elements should be included. *Bargain* advertisements usually make the price seem low in comparison with quality; *style* advertisements describe the article so alluringly that quality seems high in comparison with price. Some retailers try to gain and hold their customers upon the basis of service or prestige, and hence use some institutional advertising. The average retailer, however, wants advertisements that will lead to direct and immediate sales.

Advertising of Ideas. Besides the commercial uses of advertising in the marketing of goods and services, there is an increasing tendency to use advertising in selling ideas. Political beliefs, religious creeds, and economic doctrines have been taught through advertising. It has aided in settling industrial disputes by putting before the public the cases of the two disputing parties and thus enlisting the force of public opinion. The government used it during the late war to encourage saving rather than spending, producing rather than consuming, self-denial rather than self-indulgence. Of all forms of influencing group action, advertising is the most democratic, since its effectiveness depends upon a willing response, with no element of coercion.

Benefits of Advertising. Although the *cost* of advertising in the United States has been estimated, there is no way of estimating its *benefits*. These benefits are not even appreciated, except possibly by those who have lived in other countries, where merchandise is unstandardized, where buying is a long process of higgling, where the common people have only the most primitive utensils for production and the barest necessities of food for consumption. Advertising in this country has certainly simplified the process of buying. It has not only raised the standard of living but it has also made it nearly uniform. The visitor from a Western town who arrives at the Grand Central Station today is not readily distinguishable from the born New Yorker. He may wear the same brands of clothes, from hat and collar to socks and shoes; he may have the same kind of watch and fountain pen in his pocket, the same kind of tooth paste, razor, and soap in his traveling bag. The fact that people all over the country can know and buy the same articles tends to build a national harmony and a unity of thought in place of a group of sectional prejudices. In this way, too, advertising is a force that makes for democracy.

Advertising is by no means free from faults and wastes. Under our present system of specialized industry and complex marketing channels, however, it is essential to the public welfare—so essential, in fact, that if it were not done by the seller it would have to be done by the buyer.

SALESMANSHIP

In a limited sense, salesmanship concerns itself chiefly with the *technique* of selling. This type of training is usually acquired through personal instruction, demonstrating the most effective way of discovering, approaching, interesting, convincing, and closing a sale with a prospective buyer. By similar processes the salesman is also taught how to anticipate, how to surmount, and how to turn to profitable account the difficulties that he may encounter in the practice of his profession. However, training of this kind is usually followed by a certain amount of actual field experience under the direction of an expert salesman, if the most satisfactory results are to be attained.

In a larger sense, salesmanship is one of the most far-reaching and fundamental of all human activities. Directly or indirectly, it enters into practically every field of human endeavor.

Yet it is only during the past 25 years that salesmanship has been regarded in a manner befitting its social, educational, and economic importance. The attention more recently accorded to salesmanship is due chiefly to the extraordinary development of trade and industry to which it has so effectively contributed. Scarcely an article of extensive use can be mentioned that is not produced by a centralized industry. In order to continue operating, such an industry must conserve or create a market for its products. This end can be accomplished only through effective salesmanship.

The great opportunities in salesmanship are reflected in the marked changes that have taken place in the field of higher education. In 1825, the percentage of college students preparing for business pursuits was negligible. By the end of the century, it had increased to 20 per cent of the total, being exceeded only by the teaching profession. It is a well-known fact that of those entering the teaching profession but a small percentage remain for more than a few years. On the other hand, very few who enter commerce and industry ever leave that calling. Since 1900, many universities and colleges have added special departments for training in commerce, in finance, and in business administration. It is practically certain, therefore, that today the greatest proportion of all college graduates are entering a field in which salesmanship is of paramount importance.

The following article, dealing particularly with the broader aspects of salesmanship, has been prepared especially for this volume by Dr. Frank Crane.

A WOMAN SEEKS EMPLOYMENT

Some time ago a woman came into my office and asked if I could suggest for her some kind of employment. Her home duties did not require all of her attention. Her husband was earning a fair salary; but, as this woman was perfectly well and as she had received a good education, she wished to do something to add to the family finances.

"What kind of position do you want?" I asked.

"Oh, anything," she answered. "I thought you might have some office work that I could do, such as filing, or addressing, or copying."

"No," I replied. "There is no position of that kind open here. And I will tell you something else that will save you unnecessary effort. There is no position of that kind open anywhere in the world. All such positions are not only filled, but there is a line of applicants waiting to seize any place in which a vacancy occurs."

She looked rather crestfallen.

"And I will tell you another thing," I continued. "Even if you secured a job here as typist, or at copying, or some such work, at, say, fifteen dollars a week, you would, if you attended strictly to business and made good, be receiving at the end of ten to twelve years just about fifteen dollars a week. In other words, you are asking to become a cog in the wheel of a big machine. A cog never gets anywhere. It just goes round and round until finally it wears out."

"Oh," she said, "That's not very encouraging, is it?"

"It is not encouraging at all," I answered. "In fact, I intended to be discouraging. But," I added, "there is a job waiting for you, and a job that you do not have to hunt long to find. In fact, you may go into almost any business house in the city, perhaps the first one you come to, and the manager will be glad to give you employment."

She looked puzzled, but hopeful.

"Of course there is a string to it," I said. "You can get a job in almost any business house in the world, provided you are willing to do one thing. It is a thing that you can do, or that you can easily fit yourself to do, a thing that is perfectly consistent with your self-esteem, indeed a thing that will greatly develop your character."

"What is it?" she inquired.

"SELLING," I replied. "If you are willing to sell, you need not seek very long for employment. All this talk about people who are out of jobs and are unable to get something to do, all this complaint of unemployment arises simply from the fact that people will not do the thing that everybody wants done, which is to SELL. Why," I added, "you don't even have to go out of this building to get a job of this kind. You cannot get it in my office, because there are only clerks here; but, if you will see the business manager, and tell him that you want to sell, he will gladly give you employment."

"But," she returned, "I have had no experience in selling. I don't know anything about it. I never sold anything in my life. I am no talker."

"But," I answered, "you are a woman of good appearance; you have a pleasant face and a cultured manner. In other words, you have personality, and, in the business of selling, personality is an important factor. The article to be sold matters little provided it is useful—something the public needs. What counts particularly is *you* and *your mental attitude.* If you will go to the business manager, listen to his instructions, and do as you are told, you will not have to work any harder than you would as a clerk, and you will not be tied to a desk. Moreover, there will be no limit to the money you can earn, except the limit that you yourself put to it."

She followed my advice, went to see the business manager, was soon earning money at the rate of $35.00 a week, and, so far as I know, she is making the usual progress.

SALESMANSHIP AND OPPORTUNITY

There is more opportunity in salesmanship than in any other calling.

To those who have never tried it, salesmanship may look hard. That is one proof that it is a lucrative business, for it is a pretty safe general rule that easy work brings little pay. Too many people want the easy places. The law of supply and demand operates to make such jobs poor jobs and the hard jobs good ones.

Irving T. Bush, the founder and president of the Bush Terminal Company, one of the world's great business organizations, said, in a recent article in the *American Magazine*, "Get into the selling end of your business. The opportunities for making money are greater and the competition is less."

Expanding this idea a little, he said:

"There is a selling end to every business. In some it is called 'business getting'; but, no matter what the name, it is the job of securing new orders and it is the work for which the world pays the best salary. The world is willing to pay for salesmanship, because every one who owns a business hopes to increase it. If an American merchant sells one hundred thousand dollars' worth of goods in a year, he hopes to sell two hundred thousand dollars' worth in the next year, and the man he is looking for and

is willing to pay a good salary to is the man who can help him to do this. Go through any industry and you will find that the same grade of intelligence is better paid in the selling force than it is in other departments."

Further along in the same article he adds the following statements, which every experienced business man will ratify:

"Opportunities for selling jobs are ten to one in other fields. The world needs salesmen. This is supposed to be a day of labor surplus, but look over the advertisements of any daily paper and see how many salesmen are needed. There seems to be no surplus there. Compared with the openings of any other line, the call is ten to one.

"If the average man would put one-half the time and energy that he is willing to give to a technical education into the study of selling, I'd guarantee that he'd become a salesman. The minute he is a salesman his chances for making money are unlimited.

"Not only is a salesman's job better paid in actual salary return for the effort expended, but it is more stimulating mentally. It brings him into contact every day with new people, new ideas, and new problems.

"To those young men who must make money to take care of responsibilities and support a family, I again say, 'Go Sell!'"

THE SALESMAN'S PLACE IN THE WORLD

The salesman occupies an essential position in the world's work. The activities of man can be divided into two parts, production and distribution. Goods have to be made or grown in the first place, and in the second place they have to be carried to the consumer. These two operations constitute that sum of man's activities which we call business or commerce.

The salesman is an important factor in the business of distribution. To be sure, he does not carry the goods as a truck driver or as a railroad man, and does not store them and display them as does the grocery man or the hardware merchant. But he does something more important than these. He *creates the desire* for the goods.

All civilization can be measured by desires. The cultured and successful citizen of America in the 20th century differs from the American Indian of the 15th century mainly in the fact that his wants are so much more varied and of a higher character.

The business of a salesman is fundamentally that of convincing. His task is not simply to transfer a lawn mower or a washing machine from the shopkeeper to the farmer and receive the money for it. The salesman's task is the more difficult one of making the farmer see that a lawn mower is more useful than a scythe, and that the farmer's wife really needs a washing machine.

In other words, the real business of a salesman is usually that of changing people's minds. And, of all the occupations on the globe, nothing is more essential to human welfare or a greater factor in prosperity or a more important element in progress.

What we call education is merely changing children's minds so that they will think the earth is round instead of flat; that two and two always make four, instead of making sometimes one thing and sometimes another; and that the first president of the United States was George Washington, but not the gentleman who lives down the street and happens to have the same name.

Culture is no more nor less than the changing of one's mind. Culture is merely a progress in tastes. A cultured person is one who has grown to like Beethoven instead of jazz music; Millet's pictures instead of comic supplement pictures; good, clean English words instead of profanity; courteous manners instead of boorishness, and so on.

This element of salesmanship is illustrated in the somewhat recent use of the word "sold." We have a way of saying "I am sold on that proposition" when we mean that whereas we did not believe it, or did not know much about it, we have come to grasp it. We say that people are "sold" on an idea when we mean they have been convinced that it is true or practical.

In this sense, Theodore Roosevelt pleading for honesty in public service was a salesman, selling his ideal of American life to the American people. In this sense of the word, Woodrow Wilson was a salesman, selling to the peoples of the world a new ideal of international relations. In this sense of the word, Secretary of State Hughes at the Disarmament Conference in Washington sold a new naval program to England, to France, and to Japan. In this sense of the word, a father may sell to his son the value of a university course; he may induce the boy to buy that university course, the price to consist of the hours, weeks, and years of study the boy must give to his work. In this sense of the word, if I invite you to a picnic at a time when you are very busy and do not think you ought to go, I can sell you the idea, if I can make you picture to yourself sufficient pleasure and profit in the excursion, and I shall fail if I cannot make you think it is worth the effort. I have no choice as to whether I shall be a salesman or not, nor have you. The only choice open to us is whether we shall be good salesmen or poor salesmen. We are selling something all our lives. We sell ourselves, our ideas, our abilities, our convictions, and the particular project in which at the moment we may be interested.

THE BEST BEGINNING OF AN EDUCATION

It is for the foregoing reason that the foundation of any practical education should be made up of some sort of selling.

I remember when I was about seventeen years of age I undertook to sell a map of the United States. My territory was around Jacksonville in Morgan county, Illinois. It was a somewhat prosperous rural district, and I went from one farmhouse to another. It was my first contact with the world in an endeavor to persuade people to do something. I look back to that experience that seemed somewhat trying at the time as a most valuable part of my education. It certainly did me as much good as any equivalent amount of time that I ever put in at school.

One kind of selling in which hundreds and thousands of young people have engaged and which is an excellent training for any kind of career is the selling of books.

Elbert Hubbard, in his little pamphlet *Success and Salesmanship*, gives a number of instances of successful men who at one time or another sold books.

He says that Mark Twain sold books before he wrote them. Ulysses S. Grant at one time was a book salesman and sold Washington Irving's *Life of Columbus*.

James G. Blaine, twice candidate for president of the United States, began his career by selling the *Biography of Henry Clay*.

Bismarck paid his way through college by the sale of *Blumenbach's Handbooks*.

Daniel Webster obtained the money to pay his tuition at Dartmouth college by selling De Tocqueville's *Democracy in America*.

George Washington, when a young man, took orders for a book called *Blydell's American Savage*. His diary shows that he sold more than 500 copies, delivering the books himself, carrying them in saddlebags.

Napoleon Bonaparte, John J. Ingalls, Thomas Brackett Reed, Annie Besant, Susan B. Anthony, and Jay Gould all sold books at some time.

THE BUSINESS ERA

Many people do not understand that the 20th century is the Business era, just as in the past there have been Military eras and Ecclesiastical eras.

The gist of this is that life in this age of the world is conceived in terms of achievement, not in terms of privilege, and not in the sense of being merely a place to prepare for the next world.

The English-speaking people, the dominant race of the world today, is a race of shopkeepers, as Napoleon called them; that is, their purpose in life is to do business, not to fight, nor to play, nor to strut.

We are put in this world to accomplish something, to do our little part of the world's work in that small corner in which we are placed.

This is pre-eminently the American idea. Americans are not any more money-mad than is any other race. It is not alone money they are after; it is achievement. They have a hearty contempt for people who never accomplish anything.

All Achievement is some form of salesmanship. It consists in putting one's own personality, ideas, and opinions against the world. And success can be measured by the degree to which we have "sold" ourselves and all we are to the universe.

SALESMANSHIP AND LIFE

Salesmanship, therefore, means very much the same thing as life. Any practical rules for salesmanship are about the same sort of rules that are needed in life anywhere.

Let us note some of the qualifications for salesmanship, and we shall see, as we go along, that, after all, they are similar to the qualifications one needs for the rounding out of a satisfactory life.

THE PART PERSONALITY PLAYS

All salesmanship consists first in selling one's personality, one's total quality.

When we go out to sell anything, whether it is washing machines, real estate, or ideas, it is ourselves that we sell first in selling the goods we handle.

There is comfort in this, for we realize that our success depends not upon acting a part, being somebody else or putting something on, but rather upon our genuineness and sincerity.

Few of us realize that the most attractive thing about a person is his real self. As a rule, that person is the most winning who is the most frank and unassuming.

"Nothing," says Howard Coonley, one of America's great business men, the president of the Emergency Fleet Corporation during the war, "is so disarming, nothing so compelling, as the whole truth plainly and sincerely told. Forgetting morals and looking at frankness merely as a matter of business, it is the most powerful ally any man can have. The man who tries to be tricky or cute is his own victim in the long run. If you are trying to make a deal with a man, and he senses that you are holding something back, he becomes suspicious immediately. A normal human being will try to outtrick anyone whom he suspects of trying to trick him, but nine men out of ten will meet perfect candor with fair dealing."

The things we dislike most in other people are egotism, pretense, and falsity; these in turn they dislike in us. What we have to do, therefore, in the great business of selling is the very thing that conduces most to the great business of life. It is to be ourselves, and to make those selves as attractive as possible.

SALESMANSHIP IS NOT A NATURAL GIFT

Many people possess the naïve idea that to be a good salesman one must be a great talker, and excel in forwardness.

Once we understand that all salesmanship consists in making one's personality as forceful as possible, we abandon this erroneous idea. For it is perfectly plain that, if we do not like offensive self-assertion in others, they do not like it in us. As a matter of fact, the best salesman, other things being equal, is the best gentleman, and the best saleswoman is the one who comes nearest to being a lady. In no other business do good breeding, gentleness, courtesy, and all-around fineness count for more.

Natural ability is not the same in all people. Some are more resourceful than others, some think more quickly, some are brighter, some are handsomer, and some are more courageous. But all that is just as true anywhere else as it is in the business of selling. In art, in letters, in society, in clerkship, in the ministry, and in the medical or legal profession, there are varying degrees of ability. There will always be some who are better salesmen than others, just as there will always be some who are healthier than others, taller than others, and younger than others.

THE IMPORTANCE OF LITTLE THINGS

Viewing salesmanship from the angle we have taken, we can see the importance of those things which at first sight seem to have no bearing upon the subject. It has been said that "Trifles make perfection, but perfection itself is no trifle."

Whatever makes for culture, using the word in its best sense, makes for efficiency in selling. Culture is simply the harmonious development of all our faculties, tastes, and ideas.

For this reason, education is a great asset. Education means background. It means that we have equipped our personality with a knowledge of what the world before us has thought and done. It stands to reason that we are more effective if we are equipped with this experience than we would be without it.

Manners count. The effect of manners is to make oneself agreeable. They are the open door to welcome. The good salesman will give attention to his personal appearance. The acme of being well dressed is to be dressed so that no one will notice *how* we are dressed. We should not divert attention from our business by the fact that we are too exquisitely dressed nor by the fact that we are slouchy and dowdy.

The voice has much to do with acceptability. People are apt to accept the voice as something they cannot change. But all defects of speech or tone can be rectified if we are teachable and intelligent. If our voice is pitched too high, if we talk too fast, if we mumble our words, if our tone is rasping, if we have a provincial or foreign accent, any of these things can be rectified, if we will go about it, seek the proper teacher, and diligently practice.

Thoughtfulness, kindliness, and geniality are of immense assistance.

And, above all things, cheer, just plain good nature, brightness, and optimism are our best advance agents. The world is hungry for cheer. Nobody wants to buy gloom.

IMAGINATION IN SALESMANSHIP

Perhaps the most important faculty of the human being and his greatest aid in the struggle for pre-eminence is imagination.

The imagination is not merely to be used in daydreaming, in fancy, or in impractical theorizing. It is most essential in any kind of achievement.

Imagination is simply the ability to *Other* yourself, which means to put yourself in the other man's place, to get out of your mind into his, to realize his point of view.

The successful parent is not the one who merely instructs or disciplines the child properly, but rather the one who can himself or herself become a child and enter into the child's feelings.

The teacher fails when she cannot send her soul out of her own possession and into the soul of the pupil, see his difficulties, and help him with them.

The successful saleswoman in a dry goods store is the one who best realizes the wants and the condition of mind of the customer.

And the best salesman is always the one who is able to forget himself, his own egotisms and predilections, and enter most unreservedly into the mind of his customer.

SALESMANSHIP MEANS HARD WORK

When some one discovers an easy way to achieve character and contentment in life, then it will be time to talk about some easy way to be a successful salesman.

But the truth is, there is no success anywhere without hard work. This does not mean that it is irksome or disagreeable. We must get over the notion that work is an affliction and something to be endured only for subsequent gains. Work to a healthy person is the very best form of enjoyment.

There are two kinds of pleasure. One we get from yielding, or from having something done to us; the other we get from overcoming, or from doing something. One is the pleasure of receiving, the other is the pleasure of forthputting.

When the alarm clock rings at seven o'clock in the morning, you can wince at it, and turn over and take another hour's snooze. That is one kind of pleasure. Or, you can jump up, throw off your drowsiness, take a cold bath, and go out to your day's activities, tingling with health. That is another and a better kind of pleasure. It is the pleasure of overcoming.

The great law of life is "To him that overcometh shall be given the Crown of Life and the Morning Star."

Salesmanship represents the most normal and healthy part of existence, the constant exercise of one's faculties, the daily "bucking the line," continuously wresting victory from defeat.

To be sure, it is easier to have a routine job, to be a mere cog in the wheel of some great organization, to get down to the office at nine o'clock in the morning and go away at five in the afternoon, and just do certain routine things. It is easier, and the timid and the unambitious prefer that sort of thing; but there is no outcome to it, there is no growth in it. It is deadening and it does not appeal to the ambitious nor to those who seek the largeness of life.

SALESMANSHIP PAYS

Every level-headed man wants to get the most he can honestly for his services. This is not because he is working only for pay, but because, as a rule, in the long run the amount of money that people pay for what we do is a fair test of our value to them. Money is not everything, but money is something. It is the greatest common divisor of communal values. And, with many glaring exceptions, the rule holds that a man is paid about in accordance with what he is worth to other people.

Judged by this test, a salesman is of greater value to the community than is almost any other kind of worker. Statistics show that 75 out of every 100 men are earning not more than $18.00 a week, while the salary of women is much smaller still.

Those who are engaged in salesmanship are probably averaging double that amount. Salesmanship is, therefore, the ideal occupation for those who want to "get ahead." There are many other occupations in which one can engage, if one simply wants to "get along."

SALESMANSHIP AND CHARACTER

This calls up one of the most important values in salesmanship, that of influence upon character.

We said a little while ago that the rules of salesmanship are very much the same as the rules of life. To be a good salesman one must constantly exercise self-discipline, and that is the basis of any sort of moral excellency. No man can count himself a real success until he has learned to control himself. For triumph in life does not entirely depend upon the amount of force which is in us, but quite as much upon our ability to handle and direct that force; just as the value of a horse to us consists not only in his spirit, his wind, and his strength, but also on our ability to drive him properly.

No man can be a good salesman without patience and perseverance. These are the very acme of character; the ability to stick to a thing in spite of all discouragements is what marks the thoroughbred.

In a recent play, one of the characters spoke lines somewhat as follows: "You go on to the very limit of your ability, you endure all you possibly can; and then you stand it another minute. And it is that minute that counts." Every salesman knows that it is this ultimate minute of persistence that has often brought results.

Salesmanship develops the other finer qualities, such as courage, gentleness, optimism, and the like. In fact, it calls up all of our resources and makes any man use the best that is in him.

THE HARDER THE BETTER

Three general lines of business stand at the top in selling requirements: bonds, insurance, and books. These probably represent the hardest things one can try to sell. They are things that the average man does not on his own initiative feel inclined to buy. There are few people in the world who will go hunting for an opportunity to buy any of them. Moreover, to a certain extent the profit which a customer gets out of the transaction, whether he buys stocks or bonds, or insurance, or books, is an intangible profit, and more or less indefinite. If he buys stocks and bonds, it is in the hope of making a profit, but without absolute certainty. If he buys insurance, it is usually for the profit of some one else. When he buys books, he has to dig the profit out of them for himself, and, unless he does dig, he gets little profit; for the mere possession of books, while it is worth something, is certainly not enough to induce most people to buy.

It seems to be harder to sell books than to sell insurance, and harder to sell insurance than stocks and bonds. But the average man in the insurance business will make more money than he would in stocks and bonds, and the average man in the book business, more money than he would make either in bonds or in insurance.

This is in accordance with the law that has been alluded to above; namely, that profits are usually in proportion to effort.

SALESMANSHIP AND SERVICE

The ideal salesman is not the one who approaches the customer with the single purpose of getting his money, but who rather is interested in showing the customer how he can make money for himself.

"The reason that men fail as salesmen," says Frederick W. Nash, a well-known and successful salesman, "is that they think of themselves more than they do of those they want to have as customers. The first principle of salesmanship is not persuasion, it is not a kind of oratory or hot air. Neither is it a kind of glorified begging. A real salesman thinks how what he has to sell can make money for some one else, and, when he has that all planned, he goes out and tells that some one of the plan."

According to Mr. Nash, a star salesman, good salesmen are made and not born, and star salesmen don't jump out of cradles any more than do star piano players.

THE LAW OF COMPENSATION

This idea of service can better be grasped if we realize the simple but often forgotten truth that we pay for what we get. In the long run all the success and all the satisfaction we get out of life that we have not paid for in one way or another is of little consequence:

Edward A. Filene is a Boston merchant of nation wide reputation. He is not a money-making machine but has given a great deal of time and attention toward helping his fellow men and justifying his right to live and to be fortunate. I quote from what he said recently:

"Only the rendering of some service to one's fellow men can rightly be called success. But one may reasonably expect, as a by-product and reward

of service, to obtain some degree of material success. In this world a material foundation is necessary for every stable structure. A business, to continue, has to make money. No one's career can be satisfactory that does not result in enough earnings to give security to him and to those dependent upon him.

"From my long experience in 'hiring and firing,' the comforting truth has come to me that the average young man really has as good a chance to succeed as the so-called genius or specially favored one, provided that average young man realizes that success must be fully paid for, just as anything else one wants must be paid for. The gymnasium for developing the capacity for straight thinking, hard work, and good health is found not in a few specially favored jobs, but in the average job. That is why one can, with few exceptions, begin to train himself for a big job—i. e., for a big service—through the position he is holding today, whatever it may be.

"I wish I had the power to make you understand once and for all that the road up to service depends not on the job, but on the way it is done. No 'pull' or 'luck' will help you unless you really understand this. You may seem to succeed for a time by smartness or trickery or chance, but, even if you do 'get by' in spite of shoddy work and flabby mind and body, you will not be able to hold on to your so-called success when years turn the tide of life and declining strength makes it dependent on the right use of the experience you have gained, coupled with the reasoning of a rational, energetic, and mellowed mind. If one has an ox-mind when his strength begins to fail, he will do oxlike things. But if, at that time, he has a well-trained, energetic, rightly balanced man's mind, he may, like most successful men I know, make his greatest contribution to mankind after forty or even fifty years of age, and, by means of it, win a satisfactory material reward."

THE PROSPECTIVE CUSTOMER

I cannot resist the temptation to turn aside for a moment from addressing the salesman and to say a word to the prospective customer.

That word is "Take time to give attention to the salesman!"

Of course most people will listen to the salesman if he is courteous and concise. Still there are some who will not. When they do not and their reason is that they are actually busy and cannot spare the time, their excuse is fairly good. It is not contended that people should always lay aside their work to listen to salesmen upon any and every subject. That would be extreme and absurd. The man I have in mind is the kind who draws back into his shell and regards it as cleverness not to allow a salesman to talk to him about anything. He is over-cautious and to his own detriment.

It is said that on one occasion Alexander Graham Bell went to see Commodore Vanderbilt for the purpose of securing financial aid in placing the Bell telephone on the market. The story goes that the Commodore refused to see Bell and sent back some tart reply to the effect that he had no time to consider such foolish playthings as telephones.

TEN SUGGESTIONS

No one can lay down a set of rules for successful salesmanship any more than one can lay down a set of rules for a successful life. Neither of these two is to be achieved by rules. Real success anywhere is the result of infinite experiment, of trial and failure, and of trial again.

Just as nature in her great program of evolution by which she is pushing the universe up toward perfection appears to make infinite mistakes and to exhibit infinite baffled effort, yet somehow to make continual advance, so also progress in the life of any one of us is all more or less a "progress by fumbling."

Life is not fixed. It is fluid. It is complex and baffling. And no one is more absurd than the pedant who thinks that he can box it all into a little set of rules.

The ten points I am going to make, therefore, I would not call rules, but rather suggestions. They are mere hints of truths that I have discovered in my own living, truths that I have found out, sometimes in bitterness and sometimes in pleased surprise, but truths which, every one of them, have actually emerged out of reality, truths not one of which has been artificially constructed to fit a theory:

I. Be a Successful Animal

You should never lose sight of the fact that, after all, each one of us is an animal. Unquestionably we are wholly animal from the chin down, and some of us are pretty much animal from the chin up.

Our animality is a thing we cannot forget nor ignore. The sensible thing to do is to take account of it and put it squarely in its place. Since we cannot escape it, let us use it.

What I mean is, that the basis of normal contentment in life is a sound, healthy body. We should give attention to this body just as we should give attention to our automobile when we go for a ride. The basis of a successful auto ride is the machine that carries us, and not any particular highbrow conversation we enjoy while we are riding.

And the more perfect our bodily machine, the less it bothers us. There is a good deal of talk about sensuality, but the person least likely to be sensual is the one whose body is the most normal and sound. We should give thought to our diet, to the rules of health and physical culture, not because we ought always to be thinking of our bodies, but because we want to get our bodies out of the way.

The people who are always thinking and talking about their physical condition are the sick people, not those who are well. The folks who are sitting on the front porch of the sanatorium are the ones whose conversation is continually about their physical condition, while the children who are playing in the school yard never think about their bodies at all.

None of us wants to be brutish, or sensual, and the very best way to escape from the body is intelligently to look after it, so that it runs smoothly and without the friction of disease and pain.

Therefore, each one of us should find out for himself what is best for him to eat and to drink, and take only such things and in such amounts as will keep his physical machine in good order. It will not do to eat what we like. That may be all right for horses and dogs and wild animals, who live in a state of nature; but we are living in a complex civilization, and all of our instincts must be ordered and controlled by our intelligence. We therefore should pay attention to our diet for the simple reason that by so doing we shall make what we eat and drink give us the most pleasure for the longest period. Many a man has dug the pit of his failure with his teeth

Health is a very distinct asset. We like to see a healthy person, and, as a rule, any personality that looks deficient or diseased to any extent impresses us unpleasantly.

First of all, therefore, it behooves us to keep well.

II. Be a Successful Mind

While the basis of our personality is animal, that part of us which counts most is the mind. It is the little handful of gray matter at the top end of the spine which is the significant part of a human being. Within the brain box lies the secret of our career.

From the chin down no man is worth much more than $2.50 a day. From the chin up there is no limit to what he is worth.

The way to have a successful mind is to feed it, to train it, and to use it properly.

First of all, we should feed it. That is, we should regularly, every day, accumulate a store of facts and experience from which valuable opinion and judgment are to be formed.

This we do mostly by reading. Every one of us ought to be a habitual reader. We should read largely, omnivorously. Old Dr. Johnson used to say that while you are debating as to which of two books your boy ought to read another boy has read them both.

There are two kinds of reading. One is the sort we indulge in for mere entertainment, that which gives us the receptive sort of pleasure; the other is the kind we do for a purpose, the kind we call study, and this gives us the overcoming kind of pleasure.

A certain part of our reading every day should be of the sort that is hard work, and requires an effort. Otherwise, our minds become flabby. A strong and vigorous mind can only be developed in the same way that a strong and vigorous arm is developed; that is, by regular and continual hard work.

Every one of us, therefore, ought to carry with him in his pocket or have by his bedside some book which challenges his effort and attention, some book that is hard to read, and yet a book he thinks he ought to read.

Most of us are lazy-minded. Every four years we waste enough time to secure a college education. If we would carefully plan our reading, or at least the solid part of it, according to some program, we would find our minds constantly being sharpened and strengthened as the years go on, and our efficiency constantly increasing.

III. Study Your Business

The successful salesman is the one who looks upon his job as a course of study, and not merely as a means of making money.

If you are selling automobiles, find out everything there is to know about the automobile, who invented it, the various points of its development, all the inventions connected with it, all about the internal combustion engine, all about gasoline and the petroleum industry, all about the rubber industry and the construction of tires, the statistics concerning the output of automobiles in the various states, in this country, and in the world. In other words, an automobile salesman should be a walking encyclopedia of automobile information. He should be able to answer any question concerning automobiles. And it stands to reason that a man who tackles his job backed by this mass of information is going to hit harder and score higher than the ignoramus that knows nothing but the price list.

In like manner, if you are selling a book, first of all read the book from cover to cover, and thoroughly familiarize yourself with it; get acquainted with other books of similar nature; find out the real place of your book in the field of literature; acquaint yourself with the business of the house which publishes the book; and learn generally not only what is in the book, but the whole mass of facts that are around the book.

It is said that knowledge is power. It is more than that, for knowledge is pleasure. And a salesman who is fully informed in regard to what he has to sell always produces a better impression than the one who is stumped at the first question the customer asks him.

Study your line, therefore. If it is coffee, learn all there is to know about coffee and its use throughout the world. If it is sugar, inform yourself of every fact concerning the subject. Go to the library and read up. If you are selling a life of Napoleon, put in hours gathering data concerning him. If you are selling a dictionary, find out all you can about all the dictionaries that were ever printed.

Information counts. In the great campaign for success it is knowledge, it is the possession of facts concerning your business and the goods you have to sell which constitutes your reserve forces, your re-enforcements, which often turn defeat to victory.

IV. Be a Monetary Success

There are two kinds of fools about money. One is the kind that thinks too much of it, and the other is the kind that thinks too little of it. Money is like a cipher. It means nothing when it stands by itself, but it multiplies any figure by ten when it stands at the right hand.

Money is concentrated life. It is the great common divisor of human achievement. As such it is not to be worshiped and not to be despised. It is to be understood and appreciated.

What James J. Hill, the great railroad magnate, said is perfectly true, that no young man will ever be a success who is not able to save money.

The meaning of that is not that money is all there is to success, but that the qualities necessary to save money, the qualities of self-denial, of intelligent planning, and of fixed purpose, are the very qualities that are essential to getting on.

Whoever would succeed, therefore, in this present day world ought first of all to make up his mind to save a certain portion of every bit of money he receives from any source whatever,—suppose we say one-tenth. I set it down as a statement to which I have never found a successful contradiction, that any human being can live on nine-tenths of what he does actually live on. I said this once to an audience of young men to whom I was lecturing; in the discussion that followed the lecture, one young man said that, if he observed this rule, he would have to sleep in the park. My answer was "What of it? Better men than you have slept in the park." Of course, this was extreme, but it contained a truth, and that truth is that no man's objection to saving money is really that he cannot do it, but it is that it hurts to do it, and, if one is not willing to be hurt a little in order to accomplish an important purpose, success is not for him.

Every man, woman, and child ought to have a savings bank account. If bees and ants know enough to lay up stores for the coming winter, human beings ought to have sense enough to lay up resources against coming adverse days.

When one has money enough in the bank to warrant it, one ought to begin to buy bonds or other securities, and to study finance sufficiently to familiarize oneself with the subject. It is perfectly amazing the amount of ignorance the average man has upon the question of investments.

Thoughtful attention to money would save us infinite worry, for a good part of our earthly troubles are money troubles.

Every one of us ought to keep money enough behind him so that he is never reduced to the desperation that comes from poverty. Some poverty is inevitable, and not our own fault, but most poverty is directly due to ignorance and to shiftlessness.

V. Use Tact

There is little question that tact is one of the best attributes of successful salesmanship.

Not long ago a very fat man went into a big clothing establishment and rather plaintively asked if he could be shown a suit that would fit him. The floor manager replied pleasantly that they could fit anyone from their large stocks and turned the customer over to a salesman. The latter, it happened, being tall and thin, offered a marked physical contrast to the customer, who, in addition to being stout, was short. The day was warm, the customer had been disappointed at several other stores, and the corners of his mouth were sagging perceptibly.

"Guess you won't be able to fit me any more'n them other places could," he said.

"Sure, we can," came back the cheerful reply. "We don't have any trouble fitting you husky fellows. It's the skinny ones like me that give us trouble. Why, a good strong breeze would blow me away like a leaf." Then, with a gentle pressure on the customer's plump upper arm, the salesman added, "Wish I could grow a muscle like that."

Maybe it was the salesman's inference that the fat man was strong and husky, instead of soft and pudgy, that pleased the customer; maybe it was a conjured up mental picture of the salesman being tossed about willy-nilly by the wind. In any event, the drooping mouth corners turned upward into a broad smile, and the customer stood manfully while suit after suit was tried on him. Finally, by taking the coat and vest of one suit and the trousers of another, the task was completed and the customer left the store satisfied.

VI. Success Is a Matter of Courage

The most indispensable element to the ascendant life is courage. It is the strong heart that is back of every permanent triumph.

The only man who never fails is the one who refuses to fail. The one thing in this world that can never be defeated except by its own consent is the human spirit. Maeterlinck says, "To the hero there is no tragedy." The meaning of this is that out of every defeat we can make a triumph if we refuse to surrender.

Despair, self-pity, and complaint are the marks of the moral coward.

The world is full of striking instances of this truth of brave hearts that have succeeded in spite of every obstacle. There have been blind men who have won their way to fame, there have been cripples and bedridden invalids who have made their mark in the great game of life. There has been many a soldier in the battle for existence who, mangled and broken, has yet won the Order of Distinguished Service.

It is fear that cripples us all. No man can hope to succeed until he has struck from his hands, his feet, and his brain the shackles of fear.

In the business of selling, which is the very flower of the business of life, there is going to be many a disappointment, many a dark day, and many a foreboding cloud. Those who will triumph in spite of these things are those who steadily fight on, and never lose courage.

And courage is a cumulative thing. If we have it today we shall have more tomorrow, and it will come more easily. We don't have to begin at the zero point every day. Courage is a good deal a matter of habit, and if we get into the way of it we shall find that it grows from its own root.

There is a good verse from Henley's *Invictus* that we might all well repeat in times when things go against us:

> "In the fell clutch of circumstance
> I have not wineed nor cried aloud;
> Beneath the bludgeonings of chance
> My head is bloody but unbowed."

VII. Good Salesmanship Implies Team Work

We have been emphasizing a good deal the personal element in salesmanship. And it is well enough to stress the fact that one's success depends upon himself.

However, this statement needs qualification. For there is no success in selling, any more than there is in any other department of life's activity, that does not depend upon co-operation with one's fellows. Weaklings tell us that their failure is due to other people. And certain it is that no man achieves success in the arena of business struggle unless he knows how to co-ordinate his efforts with the efforts of others.

In everything we do we must make use of other people. To get an education we must study the books that others have written. To get training in our chosen calling we must take advantage of the experience of others. Just as no army can succeed unless the soldiers are properly drilled and generaled, and no political organization can win unless its members work together, and no community can prosper except in the harmony of law, so there is no business success without joining hands with our fellow men in some way or other.

The huge fortunes of this day have all been built up by combination. Carnegie, Rockefeller, and Armour were not giants of production. They were giants of combination. They knew how to get various interests to combine with one another instead of fighting one another.

The same principle should be kept in mind by the individual salesman. He is not alone. He is not a solitary sharpshooter; he is a soldier in the line. He will have no permanent success unless others succeed with him. If others have success he will share it and if general failure overtakes his organization he cannot escape.

In the first place there is the house that he works for. It is only by loyalty to the house, by understanding its general aims and plans and working with them and by keeping in mind that his own success is interwoven with that of the company, that he can be permanently efficient.

Then there are his fellow salesmen, those who work with him, those who have preceded him, and those who shall follow him. He is part of them all. Their reputation touches him and his reputation touches them.

There are his customers. These are not to be exploited, but to be served. And he and his customer together are to join forces in serving the public.

Besides this there are his competitors. It is a shrewd worker that knows how to use his competitors. Competition rightly understood means an increase of business for all. It is not true that there is just so much business and that the more one man gets the less there will be left for other men. On the contrary, the best field in which to succeed, is one wherein your competitors are succeeding. Monopoly overreaches itself.

In particular, the salesman should appreciate the head of his house. He ought not to work for a boss in whose interests he cannot be enthusiastic. In a recent editorial in *The Ambassador and Publicity Digest* there is an interesting story by a man who overheard a conversation between two salesmen in a parlor car. One sold hosiery; the other, shoes. They began by discussing conditions and finally drifted into the details of each man's product.

It soon became evident that one was much better informed than the other. One talked the ordinary rote that any salesman might use after his first trip on the road. He had the same anecdotes to relate and the same stock observations to make.

But the other had something more. After a lull in the conversation he said, "One of the most inspiring things about my business is the big chief that guides it." Then he told the story of his boss's career so interestingly and with such intimate knowledge of facts that one might have thought that he and the chief had been brought up as boys together.

"That's an interesting story," said the hosiery salesman. "Sounds as if you'd told it before."

"I have told it many times," replied the shoe salesman, "and it's landed many an order for me. I remember trying for an hour once to sell a hard customer. He was indifferent to every argument I offered. Finally I began talking about the boss. I had just finished when the customer jumped up and said, 'By jiminy, that's the kind of man I want to do business with,' and he gave me a whopping order."

The head of a business organization ought to be an inspiration to all young men just as a general puts confidence into all of his soldiers. There is a good deal in choosing your boss. Get one that you can be enthusiastic over.

VIII. Salesmanship Rests on Integrity

Integrity means wholeness. It implies honesty, sincerity, and absolute loyalty to the truth. A great advantage in the truth is that it is the law of the universe. And when a man sticks to the truth all the molecules of the earth and all the stars of heaven are working with him. When he starts out to cheat or deceive, he is pitting himself against the cosmos and he is just as sure to lose in the long run as any schoolboy is sure to fail in doing his examples when he insists that two and two make five.

Charles M. Schwab, chairman of the board of directors of the Bethlehem Steel Corporation, who rose from a steelworker to a leader in industry, said the other day in a signed article in one of the newspapers:

"If I were asked to say the most important things that lead to a successful life, I should say that first of all was integrity—unimpeachable integrity. No man can ever do anything of any great value in life and have the confidence and approval of his fellow men or be successful in his undertakings with other business men if he doesn't have the reputation of being a man of honor and integrity."

IX. Salesmanship Is an Art

It is sometimes said that salesmanship is a science. It would be better to say that it is an art. The difference is that a science is something you can learn out of a book and from teachers, while an art is something that is learned only by practice.

Success in an art implies all there is in learning a science, plus application.

A man who hopes to go far in salesmanship will take pains to learn all he can from the recorded experience of others. Just as no one would expect to be a good architect without studying works of architecture and the buildings other architects have erected; just as no man could hope to be a good lawyer without reading law and finding out what experience others have had; just as no man can excel in any profession without sufficient study to enable him to stand on the shoulders of others who have gone before: so no man can be a first-rate salesman unless he studies the principles of salesmanship that have been demonstrated by experience.

There are many excellent works on salesmanship which can be found in any public library. There are various periodical publications devoted to the business. The alert salesman will avail himself of all these and he will save himself many an error and many a foolish experiment by carefully noting what others have done and the conclusions they have reached.

Study, planning, reflection, and observation are all elements that lie behind personal efficiency.

The good salesman will not despise psychology, but by means of it will try to understand human nature in general. He will study the market and post himself upon business conditions. He will appreciate general education and endeavor by reading to make himself a more interesting character. He will study his customers and endeavor to adapt himself to them. He will study his goods and never be satisfied until he understands them thoroughly. And he will study himself and learn how to hedge against his own weakness and how to use his own talents to best advantage.

Speaking of studying his goods, I am reminded of what the editorial from which I previously quoted said further concerning the conversation of the shoe salesman. "As he talked on," says the writer, "he carried the hosiery salesman—and me—down to South America, where mountain goats are wearing unborn shoes to protect them from the snow of the Andes. He killed the goats and cured the hides, put them on vessels and carried them to the tanneries of Pennsylvania, brought out the finished skins, took them to the great factories in New England and made them into shoes. He told about the various kinds of leather that were used and where they came from. He told about the improvements in machinery that had taken place in the past thirty years.

"He knew the history of McKay and Goodyear almost as well as he knew the history of the big chief. He talked, and others as well as I listened to what he had to say. All were interested—and the hosiery salesman was aghast. It seemed hard for him to believe that any salesman could know as much about a business as this shoe salesman knew about his.

"Along about ten o'clock the hosiery salesman had cut into a bridge game. Others had gone into their berths and the shoe salesman and I were alone.

" 'Tell me,' I asked, 'where do you get this fund of information you have about your business? You talk more like a student than like a salesman.'

" 'It's very simple,' he said. 'With my house, knowledge of conditions is part of a salesman's curriculum. The big chief believes that human nature is inquisitive and hungry for information and he insists upon every salesman's knowing the life story of the organization. You've heard the story in my own words, but it reflects the story as it was handed to me—as it was written by an expert writer. It has helped me to sell hundreds of thousands of dollars' worth of goods. Even when I do not use it, it influences my selling talk and strengthens my argument.

" 'But it does more than that. It makes me a bigger man. I saw you next to us when I was talking to that hosiery salesman. I knew that I was interesting you. I knew those men who sat opposite were interested. It was a source of deep gratification to me to feel that I could hold the attention for an hour or more of the class of men who travel on this train, and at the same time I knew I was building up in the mind of every man who heard me an appreciation for my house.' "

X. Success Is Always Now

Success is not something to be achieved at the end of life, at the end of one's job, nor at the end of the year. Success is something to be gained every day. Many of us become discouraged when we think of toiling on and on at some irksome task, our spirits held up only by the hope of some distant reward. This is no way to live.

The Creator has kindly arranged our lives in daily compartments. Once every twenty-four hours we are dipped in death. It is each twenty-four hours that we have to make satisfactory.

If we have done our work well during the day, if we have reasonably carried out our program, if we have put forth our best efforts, we ought to cultivate the habit of "calling it a day" and going to bed with a free and happy mind. We don't have to live all our lives at once.

Any clock would get discouraged if it thought of all the millions of ticks it had to make during its existence, but, for every tick it is required to give, it has a second to give it in and so goes merrily on.

"Sufficient unto the day is the evil thereof," says the Bible, and the habit of living a day at a time, doing the best we can in that day and not trying to do a whole year's work in twenty-four hours, will promote health, give a sound mind, and increase efficiency.

"Today
This little strip of light
Twixt night and night
Let me keep bright
Today.
And let no shadow of tomorrow
Nor gloom of yesterday
Obscure today.
And if tomorrow should be sad
Or never come at all, I've had
At least
Today."

INSURANCE

Few appreciate the enormous proportions attained by the insurance business. During 1921 the people of the United States paid in excess of $3,500,000,000 in premiums for insurance protection. At the close of that year various companies and other institutions writing insurance in the United States held assets of approximately $10,500,000,000, or about one out of twenty dollars of our total national wealth.

The real function of all insurance is the elimination of risk from our economic activities. Where such risk contemplates loss arising out of premature death, or out of injury or ill health to the person, the insurance may be regarded as belonging to the so-called "personal forms of insurance," that is, insurance pertaining to the person. This group contemplates life, accident and health, employers' liability, and workmen's compensation insurance, and in the aggregate represents about one-half of the premiums and eight-tenths of the assets referred to above.

Where the risk relates to loss of or damage to property, as distinguished from the person, the insurance may be classified conveniently under the heading of "Property Insurance." This group, representing approximately one-half of the total premium income from all forms of insurance, comprises fire, marine, fidelity and surety, title, and credit insurance, as well as a large variety of miscellaneous forms of insurance protection.

LIFE INSURANCE

Life insurance may be defined as being a "contractual arrangement, whereby, for a stipulated compensation called the premium, one party (the insurer) agrees to pay the other (the insured), or his beneficiary, a fixed sum upon the happening of death or some other specified event." With few exceptions, its real purpose is to indemnify the beneficiary for the financial loss suffered through the premature death of the insured.

Purpose and Extent. In the vast majority of instances, life insurance is taken for the purpose of protecting the family against the loss of the earning capacity of the breadwinner through an untimely death. But, in recent years, the business uses of life insurance have also shown a marvelous growth. Recourse is had mainly to the use of life insurance as a means of indemnifying business enterprises against loss arising out of the death of managers, business partners, or expert employees. In the average business enterprise such individuals are strategically important, and the removal of their managerial or technical skill through death may cause either loss of the invested capital or a serious impairment of credit.

To an increasing extent, also, business concerns are using the group form of life insurance, whereby large groups of employees are protected under a single policy for a stated amount for each employee, usually the equivalent of one or two years' wages.

An examination of the figures in the table entitled "Life Insurance in the United States" will make clear the extraordinary growth of life insurance in this country. Even as late as 1880, ordinary life policies numbered only 685,531 with a face value of $1,581,481,706, and industrial policies only 236,674 with a face value of $20,533,469. By the close of 1920 the number of ordinary life policies totaled 16,733,000, representing $35,299,292,000, while industrial policies numbered 47,608,000 with a face value of $7,031,676,000.

Within the last four decades, therefore, ordinary life insurance increased nearly seventeen-fold in the number of policies and over twenty-two times in the amount of insurance outstanding. Industrial insurance, as indicated by the foregoing figures, has enjoyed practically all of its growth in this limited period, the number of policies having increased from less than a quarter of a million to nearly fifty millions, and the amount of insurance involved from less than twenty-one millions to over seven billions.

From the standpoint of invested assets, life insurance has developed also to the very forefront of financial institutions. In 1880 the total assets of American companies amounted to less then $453,000,000. At the close of 1920, however, the admitted assets of these companies totaled about $7,000,000,000, an increase of almost sixteen-fold.

To these enormous totals it is necessary to add the business of the numerous fraternal orders which write life insurance. At the close of 1920, according to best estimates, the amount of this type of insurance was somewhat in excess of $9,000,000,000. It would seem, therefore, that the total life insurance then outstanding in the United States, combining the ordinary, industrial, and fraternal plans, was approximately $51,000,000,000. To this should be added some $4,000,000,000 more carried by the War Risk Bureau. The vastness of this total can scarcely be comprehended. It was equal to fully one-sixth of our aggregate national wealth, real and personal combined. These figures, showing immense growth, testify convincingly that the value of life insurance is keenly appreciated by the rank and file of our population.

Basic Principles. Life insurance differs from other forms of insurance in one very vital respect. In other forms of insurance the contingency insured against may never happen, and, as regards the great majority of policies written, does not happen. Life insurance, however, protects against the event of death, which, under a whole-life policy, is a "hazard converging into certainty." It is, therefore, necessary to provide not only against the risk of death each year, but also "to accumulate a fund sufficient not only to meet a claim whenever occurring, but also to provide at the ultimate limit of human life an absolutely certain claim if one has up to that time been escaped."

To accomplish this purpose it is necessary to have life insurance companies base their premium charges upon a so-called mortality table, which indicates the yearly probability of death at various ages. Various tables are in use, but the American Experience Table has received widest recognition in the United States. This particular table assumes 100,000 persons at age 10, and gives the number of deaths and the yearly probability of death for each year up to age 96, when all are presumed to have died.

AMERICAN EXPERIENCE TABLE OF MORTALITY

Age	Number Living at Beginning of Designated Year	Number Dying During Designated Year	Yearly Probability of Dying	Yearly Probability of Surviving
10	100,000	749	.007490	.992510
11	99,251	746	.007516	.992484
12	98,505	743	.007543	.992457
13	97,762	740	.007569	.992421
14	97,022	737	.007596	.992404
15	96,285	735	.007634	.992366
16	95,550	732	.007661	.992339
17	94,818	729	.007688	.992312
18	94,089	727	.007727	.992273
19	93,362	725	.007765	.992235
20	92,637	723	.007805	.992195
21	91,914	722	.007855	.992145
22	91,192	721	.007906	.992094
23	90,471	720	.007958	.992042
24	89,751	719	.008011	.991989
25	89,032	718	.008065	.991935
26	88,314	718	.008130	.991870
27	87,596	718	.008197	.991803
28	86,878	718	.008264	.991736
29	86,160	719	.008345	.991655

AMERICAN EXPERIENCE TABLE OF MORTALITY—Con.

Age	Number Living at Beginning of Designated Year	Number Dying During Designated Year	Yearly Probability of Dying	Yearly Probability of Surviving
30	85,441	720	.008427	.991573
31	84,721	721	.008510	.991490
32	84,000	723	.008607	.991393
33	83,277	726	.008718	.991282
34	82,551	729	.008831	.991169
35	81,822	732	.008946	.991054
36	81,090	737	.009089	.990911
37	80,353	742	.009234	.990766
38	79,611	749	.009408	.990592
39	78,862	756	.009586	.990414
40	78,106	765	.009794	.990206
41	77,341	774	.010008	.989992
42	76,567	785	.010252	.989748
43	75,782	797	.010517	.989483
44	74,985	812	.010829	.989171
45	74,173	828	.011163	.988837
46	73,345	848	.011562	.988438
47	72,497	870	.012000	.988000
48	71,627	896	.012509	.987491
49	70,731	927	.013106	.986894
50	69,804	962	.013781	.986219
51	68,842	1,001	.014541	.985459
52	67,841	1,044	.015389	.984611
53	66,797	1,091	.016333	.983667
54	65,706	1,143	.017396	.982604
55	64,563	1,199	.018571	.981429
56	63,364	1,260	.019885	.980115
57	62,104	1,325	.021335	.978665
58	60,779	1,394	.022936	.977064
59	59,385	1,468	.024720	.975280
60	57,917	1,546	.026693	.973307
61	56,371	1,628	.028880	.971120
62	54,743	1,713	.031292	.968708
63	53,030	1,800	.033943	.966057
64	51,230	1,889	.036873	.963127
65	49,341	1,980	.040129	.959871
66	47,361	2,070	.043707	.956293
67	45,291	2,158	.047647	.952353
68	43,133	2,243	.052002	.947998
69	40,890	2,321	.056762	.943238
70	38,569	2,391	.061993	.938007
71	36,178	2,448	.067665	.932335
72	33,730	2,487	.073733	.926267
73	31,243	2,505	.080178	.919822
74	28,738	2,501	.087028	.912972
75	26,237	2,476	.094371	.905629
76	23,761	2,431	.102311	.897689
77	21,330	2,369	.111064	.888936
78	18,961	2,291	.120827	.879173
79	16,670	2,196	.131734	.868266
80	14,474	2,091	.144466	.855534
81	12,383	1,964	.158605	.841395
82	10,419	1,816	.174297	.825703
83	8,603	1,648	.191561	.808439
84	6,955	1,470	.211359	.788641
85	5,485	1,292	.235552	.764448
86	4,193	1,114	.265681	.734319
87	3,079	933	.303020	.696980
88	2,146	744	.346692	.653308
89	1,402	555	.395863	.604137
90	847	385	.454545	.545455
91	462	246	.532466	.467534
92	216	137	.634259	.365741
93	79	58	.734177	.265823
94	21	18	.857143	.142857
95	3	3	1.000000	.000000

The assumption is that the death rate of the future will be approximately that demonstrated by the past. Being given the age of the insured, the kind and amount of the policy desired, and the maximum rate of interest which the company will guarantee on its funds, it is possible to compute a premium based on the particular mortality table in use. That premium is known as the "net premium," and is intended to cover only the actual mortality cost of the company. To this "net premium" the company must add a percentage to cover expenses of operation and contingencies, thus giving the so-called "gross premium." This is the premium that is actually charged the policyholder.

Should the premium be found to be too large, owing to a more favorable death rate than was indicated by the mortality table, or because expenses are smaller and interest earnings larger than anticipated, the company may have agreed to return to the policyholder all or a portion of such gains in the form of a "dividend." When this is done, the insurance is known as "participating." When the insurance is "nonparticipating," the premium charged the policyholder is usually considerably smaller. This is due to the fact that the company, as distinguished from the policyholder, remains entitled to all the gains which may accrue.

While the premium may be increased from year to year as the age of the insured increases, this is seldom done. Experience has shown that life insurance, in order to be practicable, must be based on a uniform annual premium during the premium-paying period. But such a plan requires the company, during the early years of the policy, to charge a premium more than sufficient to pay the current cost of insurance. The excess portions of the annual premiums are thus accumulated in a fund, known as the "reserve." This will be drawn upon in later years when, owing to the increasing hazard connected with increasing age, the uniform annual premium becomes insufficient to meet the current cost.

When considering a large number of policies, the reserve (the overcharge or unearned premium) may be defined as representing that "sum which, together with future premiums paid by policyholders, will just enable the company to meet its claims according to the mortality table in use." Accumulation of such a reserve fund is fundamental to any sound plan of life insurance. Its absence in the past has been the cause of failure of many insurance institutions. Even today, it is the one great distinguishing feature between the sound and the unsound. It is for this reason that all regular life insurance companies are required by law to operate on the so-called "legal reserve basis."

Who Can Be Insured. Unlike the various kinds of property insurance, life insurance has not been construed by the courts as furnishing contracts of indemnity for loss suffered. It is well settled in the law that an individual possesses an insurable interest in his own life to an unlimited extent. Likewise, the insured may make his life insurance payable to his own estate, or to any beneficiary he may choose to name.

In view of the above ruling, it is necessary for insurance companies to protect themselves against the acceptance of risks which are either substandard in quality or which involve amounts of insurance greatly out of line with the earning capacity of the applicants. The protection needed is secured in several ways. A medical examination of the prospect is invariably required in the case of individual applicants. This precaution may be dispensed with when employers insure a sufficiently large number of employees under a single "group policy." The prospect is required also to give true answers to numerous questions, relating to his health, family history, habits, and other points, contained in the application for his insurance. Where the insurance applied for is apparently too large, inquiry will also be made into the financial status of the applicant.

The problem of providing insurance for substandard applicants is receiving careful study in insurance circles. It is recognized that applicants for insurance are by no means equal in the quality of the risk involved. Numerous features, involving occupation, state of health, nationality, stature, weight, family history, and various other points, need to be considered if due allowance is to be made for the actual merits of the case. It is now felt that substandard lives should be given the benefits of life

insurance, although at premiums sufficiently increased to meet the additional hazard associated with the substandard character of the applicant.

Who May Be a Beneficiary. As already noted the insured has an insurable interest in his own life to any extent. Further, in the absence of policy conditions to the contrary, he may name his own estate, or any individual he chooses, as beneficiary under the policy. But what is the situation when the insurance is taken out by a person other than the one insured?

Here we unfortunately meet with a great variety of judicial decisions. With respect to ties of affection, blood, or marriage, the courts have generally held that certain of such ties create an insurable interest even though the element of financial dependence is not present. The weight of authority holds that a parent has an insurable interest in the life of a child. Husband and wife are conclusively presumed to have an insurable interest in each other's life.

As regards all other relations, however, the courts have generally taken the position that the interest of the beneficiary, when taking out the insurance, must be based upon a reasonable expectation of deriving pecuniary benefit from the continuance of the insured's life. The weight of legal opinion is to the effect that the insurable interest of a beneficiary taking out insurance "must exist at the time the contract is made and that a policy valid at its inception will not, therefore, be voided if it should happen that the interest ceases before the maturity of the contract, unless the provisions of the policy are such as to bring about that result."

A creditor has an insurable interest in the life of a debtor. This interest has been held even to survive a discharge of a debtor in bankruptcy. The only question about which there is variance relates to the amount of insurance, as compared with the amount of the debt, which the creditor may obtain on the life of the debtor.

Three important lines of judicial decisions relate to this matter. One (exemplified by Pennsylvania) limits the creditor's right to insure the life of the debtor to "an amount equal to the debt plus all premiums payable during the life expectancy of the insured according to the Carlyle Table, together with interest on the debt and premiums." Another (adopted by the United States Supreme Court and by New York) indefinitely limits the insurable interest of the creditor by providing that "the relationship between the amount of insurance and the amount of the debt must not be so disproportionate as to make the policy take on the appearance of a wagering contract as distinguished from its legitimate purpose."

Still another line of decision (exemplified by Texas) allows the creditor to secure all the insurance he may wish to take on the debtor's life, but limits his recovery, in case of the debtor's death, "to the amount of the debt and the premiums plus interest thereon, the balance, if any, passing to the debtor."

What Type of Policy to Select. When considering the leading types of policies—term, ordinary life, limited-payment life, and endowment—the average applicant unfortunately gives too little thought to the importance of making the proper selection. No one type of contract serves all persons equally well. In every case the applicant's special circumstances should be considered by the salesman, and the insurance recommended should be such as will meet the needs of the prospect.

The size of the premium varies greatly with the kind of policy, depending mainly on the extent to which a savings fund is provided for in addition to the current cost of protection. When a term policy grants protection only, and contains no savings fund accumulation, the premium outlay is small. The company's promise is limited to $1000 in the event of death during the term, nothing being paid in case of survival. The whole life policy, on the contrary, promises, not only $1000 upon death at any time, but also the same amount upon survival at age 96. As compared with short term policies, it represents a gradually increasing savings fund, thus requiring a higher premium to be paid throughout life.

The limited-payment whole life policy resembles the ordinary whole-life contract in every respect, except that premium payments are limited to a term of years, like 20 years, instead of being continued throughout life. Since the liability is the same under the two contracts, the insurance company must collect the same amount, considering an assumed rate of interest. If all payments are, therefore, completed within 20 years, as under a 20-payment life policy, the premium rate must necessarily be higher than when the payments continue indefinitely for life. As distinguished from the above, endowment insurance—using a 20-year endowment for illustrative purposes—promises $1000 upon death during the 20-year term as well as an equal amount upon survival at the end of the term. Since this policy involves, in addition to the term insurance, a rapidly increasing savings fund (amounting to $1000 in 20 years), the premium must be correspondingly large. The difference in cost between the aforementioned types of policies may be illustrated at age 25 with the following rates charged by a certain company per $1000 of insurance: 10-year term, $11.34; whole-life, $19.00; 20-payment life, $24.16; and 20-year endowment, $44.82.

Owing to the low premium, term insurance gives the largest protection for the smallest possible outlay. It, therefore, meets the insurance needs of the young man with a small income and with a family on his hands. Here no surplus earnings exist to pay for the accumulating savings fund under other types of policies. Even where there is some small surplus, it may probably be used to better advantage in the profession or business, as yet in the formative stage. Moreover, in the average man's family there is a peculiarly hazardous period, the child-raising period, when the death of the income producer proves a calamity. Accordingly, many who carry a substantial line of higher premium insurance supplement the same with additional 10- or 20-year term insurance to cover the period mentioned. The total insurance is thus substantially increased without unduly straining the pocketbook.

The essential purpose of term insurance is to protect a *known temporary hazard*, under conditions when no other form of policy can be purchased in adequate amount. Its great disadvantage lies in the fact that the temporary nature of the hazard may be misjudged. At the expiration of the term policy, insurance protection may still be needed, and yet be unobtainable because of inability to meet the medical standard. For this reason term policies usually contain a convertible privilege, allowing the policy to be converted into a higher premium form within a designated number of years. Holders of term policies should make every effort to thus

LIFE INSURANCE IN CANADA

1870–1925

Year	Amount in Force			
	Canadian Companies	British Companies	Foreign Companies	Total
	Dollars	Dollars	Dollars	Dollars
1870	6,404,437	17,391,922	18,898,353	42,694,712
1880	37,838,518	19,789,863	33,643,745	91,272,126
1885	74,591,139	25,930,272	49,440,735	149,962,146
1890	135,218,990	31,613,730	81,591,847	248,424,567
1895	188,326,057	34,341,172	96,590,352	319,257,581
1900	267,151,088	39,485,344	124,433,416	431,069,846
1905	397,946,902	43,809,211	188,578,127	630,334,240
1910	565,667,110	47,816,775	242,629,174	856,113,059
1915	829,972,809	58,087,018	423,556,850	1,311,616,677
1920	1,664,348,605	76,883,090	915,793,798	2,657,025,493
1925	2,672,700,192	108,572,851	1,377,464,924	4,158,737,967

LIFE INSURANCE IN THE UNITED STATES

INSURANCE IN FORCE, 1850–1925

YEAR	ORDINARY		INDUSTRIAL		TOTAL	
	Number of Policies	Amount	Number of Policies	Amount	Number of Policies	Amount
		Dollars		Dollars		Dollars
1850	29,407	68,614,189	.....	.....	29,407	68,614,189
1860	60,000	180,000,000	.....	.....	60,000	180,000,000
1870	839,226	2,262,847,000	.....	.....	839,226	2,262,847,000
1880	685,531	1,581,481,706	236,674	20,533,469	922,205	1,602,015,175
1890	1,319,561	3,620,057,439	3,882,914	428,789,342	5,202,475	4,048,846,781
1900	3,176,051	7,093,152,380	11,219,296	1,468,928,342	14,395,347	8,562,080,722
1910	6,954,119	13,227,213,168	23,044,162	3,179,489,541	29,998,281	16,406,702,709
1915	9,890,264	18,349,285,339	32,623,419	4,394,051,492	42,513,683	22,743,336,831
1917	11,581,701	21,965,594,232	37,468,776	5,151,096,538	49,050,477	27,116,690,770
1918	12,768,019	24,167,111,902	40,453,438	5,629,956,453	53,221,457	29,797,068,355
1919	12,768,019	24,167,111,902	41,852,179	5,703,198,032	54,620,198	29,870,309,934
1920	16,694,561	35,091,538,279	49,804,808	7,189,852,248	66,499,369	42,281,390,527
1921	17,663,249	36,378,537,873	54,096,515	8,006,119,747	71,759,764	44,384,657,620
1922	18,788,173	39,557,051,825	58,283,139	8,886,519,078	77,071,312	48,443,570,903
1923	20,513,882	44,227,342,307	63,460,660	10,107,256,433	83,974,542	54,334,598,740
1924	22,082,377	49,241,424,055	68,247,642	11,343,740,085	90,330,019	60,585,164,140
1925	23,881,758	54,519,175,903	73,735,801	12,823,680,595	97,629,440	71,642,127,685

INCOME, PAYMENTS, ASSETS, LIABILITIES, AND SURPLUS, 1880–1925

YEAR	Total Income	Total Payments to Policy Holders	Assets	Liabilities	Surplus
	Dollars	Dollars	Dollars	Dollars	Dollars
1880	80,537,990	55,881,794	452,680,651	.....	.....
1890	196,938,069	90,007,819	770,972,061	678,681,309	92,290,752
1900	400,603,257	168,687,601	1,742,414,173	1,493,378,709	249,035,464
1910	781,011,249	387,302,073	3,875,877,059	3,385,821,478	490,055,571
1915	1,043,083,337	544,705,320	5,190,310,353	4,648,524,264	541,786,089
1917	1,249,491,387	590,183,247	5,940,622,780	5,335,513,267	605,109,513
1918	1,324,586,741	710,201,684	6,529,620,899	6,201,990,207	327,630,692
1919	1,559,982,880	738,944,337	6,790,582,415	6,176,968,414	581,890,690
1920	1,764,212,582	744,649,245	7,319,997,018	6,752,303,987	567,693,031
1921	1,951,417,924	839,967,405	7,936,496,844	7,332,551,820	603,945,024
1922	2,149,186,346	1,005,714,048	8,652,318,490	7,042,943,382	709,375,108
1923	2,427,327,961	1,088,333,350	9,454,630,713	8,656,309,703	798,311,090
1924	2,702,770,023	1,205,271,945	10,394,034,380	9,550,821,142	843,213,238
1925	3,017,800,322	1,246,169,158	11,537,614,609	10,623,226,346	914,388,263

convert their contracts within the indicated time. Moreover, term policies, since they contain no savings feature, do not inculcate the habit of systematic thrift. In the overwhelming number of cases, holders of such policies manifest great displeasure at not receiving something when the contract matures.

The shortcomings just noted with respect to term insurance are obviated by the whole-life policy. This represents *permanent* protection at a very moderate cost. It also combines protection with reasonable saving. Whenever possible, this type of insurance should be preferred to the term plan. Many who take term insurance could, through a little additional effort, pay the extra premium on an equal amount of whole-life insurance. Very many argue that they prefer to place the difference in premium in building and loan association accounts, or some other type of investment. Yet this seems inadvisable, even assuming the resolution is carried out, owing to the absolute security of the life insurance investment and the approximate return of 5 to 5½ per cent.

When the prospect's income permits, and when there is a temptation not to save or to lose the savings through foolish investment, limited-payment and endowment policies may be recommended. They represent compulsory saving with a vengeance, absolutely safe and at a fair return. Moreover, the limited-payment principle often enables the policyholder to meet his premium payments during the years of greatest income producing capacity. Even should a 20-year endowment policy not appeal, emphasis should be given to long term endowments, maturing at about age 65, or the age of retirement. This type of policy will mature for its full face value at that time, thus yielding a substantial sum for old age support. It may be questioned if the same amount would have been realized otherwise, owing to the general habit of human beings not to save systematically and to lose that which they may have succeeded in saving.

Methods of Paying the Proceeds at Maturity of the Policy. The proceeds of life policies may be paid either in a lump sum or in installments. In the latter case, commonly known as life income insurance, monthly installments are usually paid for ten or twenty years, irrespective of the life of the beneficiary and, therefore, as much longer as the beneficiary may survive the 10- or 20-year period.

The lump sum payment plan has little to commend it where the purpose of the insurance is to give an income to dependents. The fairness of giving 20 or 50 thousand dollars in one lump sum to a widow may well be questioned in these days of stock-selling ventures and the vast army of goldbrick specialists. The underlying purpose of life insurance is to *assure an income* to dependents *as long as needed*. This the lump sum payment method does not guarantee. The life income plan, on the contrary, "insures the insurance," and is just as necessary a form of protection to the beneficiary as the original insurance itself. It is in reality insurance against foolish investment and reckless expenditure.

Under the life income plan the policy proceeds constitute an "insurance estate" administered by the insurance company. It relieves the beneficiary of all expenses of reinvestment, and of all exercise of judgment in the placing of investments and of their supervision thereafter. Administration of the insurance estate by the insurance company also compares very favorably with the administration of an estate through other channels. There are no legal contests between heirs, no legal expenses of administration, no income taxation, and no fluctua-

tion in either the value of or the income obtained from the estate. Moreover, there is no danger of loss of the principal. Other trustees can only be held for failure to exercise due diligence and care. The insurance estate, however, is not a segregated trust, and in the event of unfortunate investment the insurance company assumes full responsibility.

Disposal of Policy before Maturity. In very many instances, however, life insurance policies terminate by lapse or surrender instead of by death. Various circumstances may be responsible for this, such as inability to pay premiums, death of the named beneficiary without leaving other dependents to be protected, or impairment of the insured's health to such an extent as to make further payments of premiums inadvisable in view of the "extended insurance option" granted by the policy.

Cash or Loan Value.—When a policy terminates by surrender, the insured has the option of selecting any one of a number of "guaranteed values," set forth in the contract. One of these values is called the "cash" or "loan value." This value represents the amount of the reserve value of the policy which may be borrowed, if it is intended to keep the policy alive, or which may be taken in cash, if the policy is to be terminated. Usually, such a value is granted after the third annual premium has been paid. The amount, however, will not represent the full reserve value, in most cases, until a considerable number of years have elapsed. Usually, the full reserve value is given or loaned after the payment of ten annual premiums.

Paid-up and Extended Insurance.—Instead of the cash value of the policy, the insured may, upon terminating his policy, take either "paid-up insurance" or "extended insurance." The "paid-up insurance" represents that amount of insurance which may be purchased with a net single premium equal to the amount of the cash value of the policy. "Extended insurance," on the contrary, means insurance of the same kind on a term basis and for the original amount for as long a period as may be purchased with a net single premium equal to the cash value at the attained age.

In a typical case, the cash value of a $10,000 20-payment life policy at age 35 amounts to $682 at the end of the third year. Instead of taking the $682 in cash, the policyholder may obtain $1540 of paid-up whole-life insurance, or $10,000 of extended term insurance for a period of 7 years and 334 days. In other words, all three of these options are mathematically equivalent, assuming a given mortality table and a stipulated interest rate. Aside from these options, many companies give the insured, upon termination of his policy, the privilege of utilizing the cash value to purchase an annuity, or some other type of life insurance contract.

Industrial Insurance. As its name implies, industrial insurance is a form of life insurance especially adapted for wage-earners. Its purpose is to enable the large industrial portion of our population to have the funds necessary to meet the expenses connected with medical attendance during their last illness and to assure a decent burial. But, while these are its special purposes, industrial insurance has proved a great educator to the masses in that it has conveyed a proper appreciation of the value of ordinary life insurance.

The remarkable development of this special form of life insurance has already been indicated. Owing to the comparative poverty and to the lack of thrift among this type of policyholders, small premiums of 5 cents or multiples thereof up to 70 cents are collected weekly through personal calls at the homes of the insured. The amount of insurance is "adjusted to the unit of premium." We thus refer in industrial insurance to 5-, 10-, or 15-cent policies. The amount of insurance obtainable for such units of premium, however, will vary according to the age of the insured. Unlike ordinary life insurance, industrial policies attach to every member of the family, including children.

With the exceptions just noted, industrial insurance is based on the same general principles that serve as the foundation for ordinary life insurance. The legal reserve basis is used and the contracts contain practically all of the leading provisions found in regular policies. Premiums are calculated upon an actuarial basis, although a different mortality table is necessary to indicate the higher death rate that prevails among this type of policyholders.

Fraternal Insurance. A very considerable proportion of the total life insurance of the country is carried by fraternal orders. These societies usually observe some ritual, and their government is purely democratic. With respect to insurance, their chief purpose has been to enable the members to secure protection at the smallest possible cost.

Owing to this desire, many of the societies have ignored the "reserve basis" of life insurance and have charged premiums wholly inadequate to meet the necessities of the situation as demonstrated by a mortality table. Numerous failures have, therefore, occurred. Many of the orders, however, either have adopted, or are considering the adoption of, the legal reserve basis. In case of such adoption new policyholders should no longer be confronted with the fear of insecure insurance. In fact, most of our leading states have already shown a distinct legislative tendency to require fraternal orders to establish the protective features of the old regular line companies.

Whereas an ordinary life policy is a definite promise to pay a stated sum in return for a fixed annual premium, the benefit certificate of a fraternal society has, in the past, merely recognized the holder's rights as a member in the society to share in its benefits if the same can be paid out of the assessments levied on the membership. With the adoption of actuarial methods, however, a fraternal benefit certificate can be made as definite a promise as an ordinary life policy.

Usually, the holder of a certificate can name as beneficiary only some member of his family, or other dependent recognized by the society, and in most cases for an amount not to exceed a limited sum like two or three thousand dollars. Many societies also extend to their members sickness and accident benefits.

LIFE INSURANCE IN THE UNITED STATES BY FRATERNAL ORDERS

Year	Organizations Reporting	Assets	Liabilities	Income Including Interest	Assessments and Dues	Paid for Claims	Paid to Agents and for Management	Insurance in Force
		Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
1916	478	250,477,038	37,579,513	146,369,847	133,160,930	107,635,627	19,004,711	9,162,111,616
1917	492	280,737,745	32,736,079	155,089,965	140,416,788	97,398,076	20,711,781	9,129,974,447
1918	444	270,058,940	71,966,019	155,878,098	140,371,909	118,620,904	17,781,777	8,838,578,765
1919	448	295,580,625	57,902,538	180,123,643	160,020,836	141,380,388	24,600,329	9,531,216,614
1920	336	326,076,725	55,561,809	181,229,109	165,152,253	109,594,855	26,212,605	8,879,451,774
1921	283	326,520,000	63,662,000	194,798,000	171,174,000	107,925,000	28,679,000	9,159,042,000
1922	245	340,086,000	77,956,000	197,663,000	173,239,000	110,568,000	34,063,000	8,687,939,000
1923	227	490,855,000	100,837,000	206,570,000	128,149,000	109,545,000	32,854,000	8,758,555,000
1924	228	565,929,000	110,570,000	216,226,000	186,325,000	116,432,000	31,789,000	9,805,648,000
1925	224	628,262,000	125,989,000	222,147,000	188,370,000	121,241,000	36,245,000	9,769,609,000

HEALTH AND ACCIDENT INSURANCE

Just as life insurance serves to protect dependents against financial need through the death of the insured, so health and accident insurance are intended to protect dependents against a similar need arising out of the incapacitation of the insured through sickness or accident. For the average family this form of protection is indispensable. Industrial accidents are covered today in most states by Employers' Compensation Insurance. But the largest number of accidents do not occur in industry and must be covered by private insurance. Moreover, loss due to sickness is equal to many times the loss resulting from accidents of all kinds. It is estimated that about 250,000,000 working days are lost annually in the United States through sickness.

Various methods of granting protection against sickness and accident have been adopted by private insurance companies. Most life insurance companies grant protection, in the form of a monthly income for life, in the event of the total and permanent disability of the insured. But fully 97 per cent of all sickness and accident claims are for temporary disability. Many accident and health companies also issue "limited policies" at comparatively small premiums since the coverage is confined to a limited number of diseases or accidents and the compensation to a comparatively short period.

ACCIDENT AND HEALTH INSURANCE IN THE UNITED STATES

(Stock Companies Only)

State	Premiums Received (1920)	Losses Paid (1920)
	Dollars	Dollars
Alabama	2,349,087	1,064,097
Arizona	96,327	33,794
Arkansas	512,887	256,819
California	4,572,361	1,687,714
Colorado	1,111,735	534,581
Connecticut	1,094,756	488,920
Delaware	85,132	28,255
District of Columbia	470,578	258,203
Florida	507,602	205,571
Georgia	1,441,082	611,435
Idaho	268,911	129,023
Illinois	6,732,948	2,784,574
Indiana	1,175,380	480,283
Iowa	2,935,560	1,163,428
Kansas	2,324,944	522,017
Kentucky	2,470,877	891,598
Louisiana	714,934	236,691
Maine	596,079	281,145
Maryland	1,140,873	399,933
Massachusetts	2,944,330	1,823,485
Michigan	2,676,726	1,162,567
Minnesota	1,998,887	748,020
Mississippi	398,922	158,890
Missouri	1,572,426	733,709
Montana	375,793	143,928
Nebraska	2,537,171	1,138,984
Nevada	72,380	22,893
New Hampshire	289,755	108,497
New Jersey	1,822,747	685,363
New Mexico	111,366	33,468
New York	8,766,087	3,723,462
North Carolina	665,589	286,915
North Dakota	639,666	166,215
Ohio	4,945,955	2,847,398
Oklahoma	640,792	254,083
Oregon	580,401	282,141
Pennsylvania	5,830,582	2,163,782
Rhode Island	388,855	180,718
South Carolina	570,186	230,256
South Dakota	614,513	186,161
Tennessee	866,906	304,960
Texas	3,140,491	1,231,857
Utah	379,990	173,734
Vermont	210,425	82,265
Virginia	1,069,754	473,070
Washington	1,290,011	539,510
West Virginia	1,208,624	445,609
Wisconsin	1,760,728	1,057,579
Wyoming	208,481	93,372
Total	79,180,592	33,540,972

Much more adequate are the health and accident policies which are "general" in their coverage. These cover against disability from every variety of sickness or accident. They may be issued either separately or in combination, that is, be either health or accident policies or both.

Under accident policies a certain principal sum, like $5000, is paid in the event of death, the loss of sight, both hands, both feet, or one hand and one foot. Smaller sums are paid for the loss of one eye, or one hand, or one foot. Weekly or monthly compensation is also provided either for a definite period or for life, in the event of permanent disability, and a smaller compensation when the disability is only partial. Almost invariably all indemnities are doubled if the accident occurs on a public conveyance.

In health insurance no principal sum is paid in case of death, and the payments are limited to a weekly compensation for a stipulated period. Often, both health and accident policies provide for extra payments covering hospital and surgical expenses. Until recently all health and accident policies were subject to cancellation by the company. But recently various companies have undertaken to issue so-called "non-cancellable policies," which may be renewed from year to year at the option of the insured until a stipulated age is reached.

EMPLOYERS' LIABILITY AND WORKMEN'S COMPENSATION INSURANCE

Although both relate to industrial accidents, the distinction between these two kinds of insurance must be kept clearly in mind. Employers' liability insurance has been defined as "indemnity to the insured and not insurance for the injured." This means that, with the exception of expenses incurred with respect to the handling of notices of accident, claims, and lawsuits, the insurance company is under no further obligation until the insured (the employer) has actually been obliged to pay money to the injured party by virtue of a legal judgment obtained in a court of competent jurisdiction.

Employers' Liability Insurance. The employers' liability policy covers "against loss from liability imposed by law upon the insured," and expressly excludes any workmen's compensation allowance, as hereinafter defined. Ordinarily, the face of the policy consists of two limits—so-called "first" and "second" limits—the first amounting to a maximum of $5000 in case of injury to one person as the result of a single accident, and the second to a maximum of $10,000 in case of injury to two or more persons as the result of one accident. The policy usually continues to run for a year and therefore covers succeeding accidents, each to the extent indicated above. The limits, moreover, may be arranged to suit the convenience of the employer, upon a proper adjustment of the premium charged for the regular limits just mentioned.

In most instances, the rate of premium represents a percentage of the employer's entire pay roll, and the aggregate premium payment is based upon an average of previous annual pay rolls for a designated period. At the end of the year, however, when the year's pay roll is definitely known, an adjustment is made. If, owing to poor business and resulting small employment, the annual pay roll happens to be less than the estimated one, the company returns a proportionate share of the premium to the insured. Similarly, if larger, the insured is obligated to the company for the payment of an additional premium, measuring the extent to which the actual pay roll exceeded the estimate.

Laws Formerly Adverse to Employee. Since employers' liability insurance indemnifies "against loss from liability imposed by law upon the insured," it is important to note the nature of the law of the particular jurisdiction under consideration as it governs the liability of employers. Prior to 1837, the common-law relation between employer and

employee was similar to the legal relation between strangers. Following that year, however, a vast mass of special law between employer and employee—so-called judge-made law—developed both in England and in America.

The adverse character of this law from the employee's standpoint is indicated by the following doctrines or practices: (1) the *contributory negligence doctrine*, which held that an employee must show his freedom from negligence, and cannot collect if he has failed to use reasonable care and if that neglect contributed to his injury; (2) the *fellow-servant rule*, which provided that an injured employee could not recover from the employer if the injury was caused by the negligence of a fellow servant; and (3) the *assumption of risk rule*, which was to the effect that "an employee entering employment is held to assume and consent to the ordinary and obvious risks incident to the employment."

With the increasingly harsh application of these rules, various statutes were enacted with a view to increasing the employee's protection. But this tendency was soon counteracted by the development of the "*contracting-out privilege*," according to which the employer could request his employees to contract away their rights under the law, thus relieving the employer of all liability in case of injury.

Under such a system of law it naturally followed that little financial redress was obtainable for injured employees. Criticism of the system was well merited, but should have been directed against the law itself, and not against the form of insurance which merely sought to protect against the law as it existed. The fault was with the system of law. This forced upon the employee the burden of proof and yielded substantial compensation to only a small proportion of injured employees, This system led also to excessive delay owing to the slow operation of court trials. These proved exceedingly wasteful, in time and attorneys' fees, to both employer and employee.

Workmen's Compensation Laws. In view of such shortcomings it was only natural that the public should demand a more definite and rational system of law with respect to employers' liability for industrial accidents. This was accomplished through the passage of so-called workmen's compensation laws. Within the decade 1910–20 practically every industrial state of the Union enacted such legislation.

While lacking uniformity in details, the various laws have a common purpose. All of the objectionable doctrines mentioned in the preceding paragraphs are abrogated. Employers who refuse to come under the act are compelled to take their chances in a court of law without the support of any of the aforementioned legal rules.

All features of administration are clearly defined and are designed to overcome the delay occasioned under the previous system. Specific payments are provided for each of the following: death, total disability, partial disability, or specific injuries. The compensation is based upon the wage of the injured person; and, in addition, in the event of death, upon the number and the degree of consanguinity of the dependents.

All compensation is paid in installments, in the same manner as the wages were payable, unless allowed otherwise by the authorities administering the act. All employers, if choosing to come under the act, are compelled to protect their legal obligation under the law through insurance. In most states, the insurance may be taken either with a state fund or with a stock or mutual company. In most instances self-insurance is permitted only when authorized by the administrative authorities, and may subsequently be revoked at any time. A few states make it compulsory to take the insurance in the state fund. Whatever insurance institution is selected, the policy must be based on the compensation law under consideration, and any provisions to the contrary are declared null and void.

FIRE INSURANCE

Fire insurance easily ranks as the most important form of indemnity in the field of property insurance. Property values in the United States, protected by fire insurance, are estimated as in excess of $100,000,000,000. Total annual fire insurance premiums collected in the United States have been computed as amounting to approximately $750,000,000. But, to measure the total cost of the fire hazard in this country, it is necessary to add the heavy cost involved in the equipment and maintenance of fire departments, and of fire-extinguishing and fire-retarding devices.

Purpose of Fire Insurance. Like other forms of insurance, fire insurance has for its fundamental purpose the "substitution of certain for uncertain loss." In this way, as regards a great and ever-present hazard, it serves to stabilize business, to reduce all costs to consumers, and to enhance production by eliminating fear of loss and by increasing initiative.

Fire insurance also serves as the support of commerce and of industry, in so far that it and its companion, marine insurance, are the basis of our whole credit system. The significance of this function becomes apparent when we reflect that fully 90 per cent of the world's business is conducted on credit, and that nearly all transactions involving goods, buildings, and ships, are confronted with the danger of ruinous loss through fire or marine disaster.

As has been elsewhere stated: "It can be shown in a hundred ways that fire and marine insurance have become absolute necessities of trade, without the assuring protection of which the large undertakings of today would be a gigantic gamble and would never be attempted if liable to miscarry through a single fire or marine disaster. As it is, enormous sums are borrowed on stocks and bonds and warehouse receipts; merchants sell their wares on credit; investors furnish millions for the upbuilding of vast industries supporting whole towns; capitalists make loans on buildings worth many times the value of the ground upon which they are built—all being willing to do this because they know that the insurance policy stands as collateral between them and loss."

Personal Character of the Contract. Fire insurance policies are personal contracts, that is, strictly speaking, they do not insure the property but the persons who own the same or have an interest therein. Two buildings may be just alike in all respects, except that one is owned by an honest person whereas, with respect to the other, the owner may be grossly careless or even inclined to profit from a dishonest fire. The importance of this factor cannot be overemphasized. Probably no other type of contract places one party (the insurer) so much at the mercy of the other (the insured). With reference to over-insurance, therefore, as well as the determination of rates, it is highly important that the insurance company should know the character of the owner of the property to be insured.

Nature of the Indemnity. The fire insurance contract is also one of indemnity for actual loss. Irrespective of any value stated in the policy, insurance companies are not liable for more than the "actual value of the property at the time of the fire." Any other rule might work the greatest injustice to companies, and might even result in fraud, owing to the constant and frequently great fluctuations in values as regards both buildings and goods. Should companies be obliged to pay the full face of the policy in the event of total loss, irrespective of an actually lower value, the policyholder would be enabled to profit from a fire. Such a result is contrary to the very idea of "indemnity," which "implies that the insured should be compensated for loss actually incurred, but should never find the insurance contract a source of profit."

Two other concepts, relating to the nature of the indemnity, should be mentioned. Only the loss of material values is indemnified, i. e., the fair cash market value of the property at the time of the fire. Sentimental values, such as those associated with gifts, documents, and objects of art, are not covered unless there is an express agreement to the contrary. In case of inability to reach a fair settlement with the insured as to the fair value of the property damaged or destroyed, the insurer is given the option, under the terms of the policy, of replacing or reconditioning the property. Moreover, in the event of agreement as to the value of all the property, damaged and undamaged, the insurer is given the option of settling at that figure and taking title to the undamaged portion.

Restriction of Liability. The company's liability is also limited to "loss or damage directly traceable to fire." Small fires, working through a chain of circumstances, such as charged wires and explosives, may result in enormous loss for which the insurer becomes liable. In all such cases the question is: "Is fire the real cause, and if so, is the sequence of events between the origin of the fire and the destruction of the property an unbroken one or has some outside force, such as an act of God, intervened to bring about or increase the loss."

Who May Insure. Since fire insurance policies are contracts for indemnity and not for profit, it follows that only those who have a pecuniary interest—an insurable interest—in the property under consideration have a right to insure. Insurable interest, however, has been given a very broad meaning by our courts. Eliott defines it as "every interest in property or in relation thereto, or liability in respect thereof, of such a nature that a contemplated peril may directly damnify the insured."

Such an interest does not necessarily imply ownership or even possession of the property. Thus insurable interest has been held to extend to the following: (1) custodians of property intrusted to their care, to the extent of their interest or liability, such as administrators of estates, agents in property held for the principal, assignees in insolvency, trustees, common-carriers, warehouse men, and commission merchants; (2) creditors or debtors, such as mortgagees, debtors with respect to property seized for debt, pledgees to the value of the property pledged, and those who have by agreement expended money on the property of others; and (3) those possessing contract rights depending upon the preservation of the property, such as consignees and consignors, contractors whose payment is deferred until completion of the contract, patentees possessing a right to royalties, and even insurers in the property they have insured.

The last illustration serves as the basis for the very important practice of reinsurance, whereby an insurance company may reduce its risk by reinsuring all or a part with other insurers, who, in turn, may again pass on a part of their risk to still other insurers.

Use of a Standard Policy. In probably no form of insurance is it so essential to have a uniform or standard policy as in fire insurance. Prior to 1870 there was an utter lack of uniformity, one form of policy prevailing in Boston and others in New York, Philadelphia, and other centers. To make the situation worse, certain companies undertook to enlarge their business by issuing apparently attractive policies. Other companies sought to defraud the insured through skillfully drawn policy clauses.

The first state to attempt a remedy was Massachusetts, which adopted a standard form in 1873, and later, in 1880, made the same mandatory for all companies writing insurance in the state. New York followed in 1887, and the so-called New York Standard Fire Policy, although improved from time to time, has been adopted as the standard in numerous other states. Even where not enacted into law, this policy is generally used by all the companies.

Standard policies, it should be noted, are necessarily drawn to meet a general situation, and cannot be designed to cover the numerous special needs surrounding the many different types of property or the various insurable interests therein. All such exceptional circumstances must be arranged for through so-called "endorsements" attached to the policy.

Coinsurance. With comparatively few exceptions, fire insurance is written subject to coinsurance. This means that the insured will have any claim paid in the proportion that the insurance taken bears to the insurance required. Stated in another way, the insured will have his claim paid in the proportion that he was willing to pay premiums.

For example, with a building valued at $10,000, let us assume that the insurance required is $8000 (80 per cent), that only $4000 of insurance was taken, and that a loss of $2000 occurred. Under the circumstances the $2000 loss is paid only in the proportion that $4000 (the insurance taken) bears to $8000 (the insurance required), or to the extent of only one-half, or $1000.

Usually the amount of insurance required is 80 per cent of the value, this percentage representing the proportion of the property value subject to destruction by fire. Where, however, the property is subject to total destruction, a 100 per cent coinsurance clause may be used. In other cases much lower percentages, as, for instance, 70 or even 50 per cent, are applied.

Where property appreciates materially during the term of the policy, it is highly important that the owner should correspondingly increase his insurance in order to comply with the coinsurance requirement. The purpose of coinsurance is to secure justice between property owners and to enable the companies to derive an adequate premium income. The overwhelming majority of fires result merely in partial losses. In most large cities, probably 80 per cent of the total fire loss results from fires that damage the insured property to only 20 per cent or less.

If the rate of premium is to remain the same, irrespective of the amount of insurance, and all losses are to be paid in full up to the face of the policy, it would follow that many owners, in their desire to evade their just share of the community's fire tax, would venture taking out just enough insurance to cover their probable partial losses. Yet the very factors which induce them to pursue this policy, such as good construction and nearness to a fire department, have already been considered and allowed for in a reduced rate of premium.

Moreover, many business men, owing to the demands of creditors or their own unwillingness to take reduced insurance, would be obliged to pay premiums on a large volume of insurance at an increased rate, because those taking little insurance are deriving in claims, on the average, more than they are paying for. Where it is not desired to scale down claims as the insurance decreases, the companies may agree to pay all claims in full, irrespective of the amount of insurance taken. This can be done by increasing the rate as the insurance decreases. The two plans may be adjusted to a mathematical equivalent. The latter method is usually employed in communities where the application of coinsurance is forbidden by a so-called anti-coinsurance law.

MARINE INSURANCE

This form of insurance represents in the United States approximately $110,000,000 of annual premium income on a total volume of insurance of $65,000,000,000, and has for its purpose the indemnification of interested parties "against loss, damage, or expense occasioned accidentally in connection with vessels, cargoes, and freight charges, through any of the numerous perils incident to transportation by water."

Extent of Field Covered. In recent years the coverage has become so broad as to make the term "marine insurance" virtually synonymous with "transportation insurance." In fact, the so-called "warehouse to warehouse clause," used in insuring cargo, covers goods from the time they leave the shipper's warehouse in the interior—through all the various stages of the journey, rail, truck, dock, steamship, and port of destination,—until they reach the warehouse of the consignee in the foreign country.

Perils Covered. Unlike fire insurance, marine insurance covers a multitude of causes of loss. To quote the policy, they include, among others, perils of the sea, men-of-war, fires, enemies, pirates, rovers, thieves, jettison, and barratry of the master and mariners. By endorsement the policy may also be made to cover loss, in the case of vessels, through explosion, damage to machinery and latent defects, and in the case of cargo, through theft, pilferage, nondelivery, and breakage. Under so-called "builders' risk policies" all hazards connected with the construction, launching, and trial trips of vessels are also covered.

Types of Losses Covered. Policies of marine insurance may vary according to the type of losses they cover. Marine losses are either "total" or "partial." Total losses, in turn, may be either "actual" or "constructive," the latter comprising those cases where the property has not actually been destroyed but where the cost of releasing or reconditioning is so great, as compared with the restored value, as to make the attempt financially inadvisable.

Partial losses may be classified as "general average," "particular average," and "salvage." General average has been defined as comprising "losses and expenditures which result from the sacrifice of any interest voluntarily made by the master of the vessel, in time of real distress, for the common safety of vessel, cargo, and freight, and which must be repaid proportionately by all the parties benefited." Any partial loss which does not meet this definition is regarded as a "particular average loss." "Salvage" represents the remuneration recoverable under maritime law by a salvor for saving property at sea.

"Full-form policies" cover all of the aforementioned types of losses. Often, however, contracts are limited to only "total" or "partial" loss, and sometimes to only certain kinds of partial loss.

CORPORATE BONDING, TITLE AND CREDIT INSURANCE

Among the many other types of property insurance, mention should be made of corporate bonding, title insurance, and credit insurance. A surety bond has been defined as a "written obligation to pay a sum of money under one or more expressed conditions, among which may be found negligence, breach of trust, disobedience of a law, failure to pay a judgment, failure to pay a debt voluntarily assumed, and other conditions under which losses may be sustained by personal acts." Hundreds of kinds of policies are issued by bonding companies today to meet every possible variety of obligation. Broadly speaking, however, these bonds may be classified as falling under fidelity, public official, court, license, franchise, permit, and depository bonds.

Title insurance, as defined elsewhere, "promises to protect the owner of real estate, or the lender of money thereon, against loss or damage, not exceeding the amount stated in the policy, sustained by reason of any defect of title assumed under the policy, or because of the unmarketability of the title or by reason of unknown liens or encumbrances against the property at the time the policy is issued."

Credit insurance has for its purpose "the indemnification of losses, coming within the coverage of the policy and exceeding the normal loss of the business under consideration, suffered by manufacturers and jobbers through the insolvency of their customers."

BUSINESS CRISES

It is a matter of common observation that business activity pursues a distinct course of expansion and contraction, prosperity and depression. This ebb and flow of the business tide has a certain rhythm or regularity. If conditions are prosperous, there is a buoyant demand, which causes prices to rise. This creates at first a larger margin of profit which in turn stimulates further production. New enterprises are undertaken. Old plants are extended and new ones are erected. Employment is good. A spirit of optimism prevails. Money is borrowed extensively to carry the growing business program. The movement seems to accelerate as it grows.

Negative Factors Working. Yet within this time of prosperity there are forces at work which are preparing a change. The price of raw materials rises as the demand grows, until at length it more than compensates for the higher price of the finished products. The rate of interest increases with the demand for capital until it reduces profits and curbs enterprise. The efficiency of labor diminishes as less qualified workers are added to the pay roll, while at the same time the wage rate continues to rise under the competition for new hands. Bank reserves are depleted until considerations of security require a curtailment of loans. Rents and other costs of doing business are augmented. Thus the momentum of business is checked.

The Business Crisis. A moment comes when the wave of prosperity seems to break. This is the *business crisis*. Orders fall off, loans are called, the interest rate rises as banks and other financial institutions protect themselves against prospective losses, employment suffers, wages drop, and the prices of commodities and of securities decline together.

The Panic. If the crisis is violent, it is called a *panic*. In such a case there is a sudden dislocation of business, a complete loss of confidence, and a slump on the exchanges. This abrupt reversal of the business outlook is accompanied by bankruptcies, runs on banks, cancellation of contracts, and other drastic readjustments. These may be accentuated by some striking disturbance such as the failure of a bank, a credit establishment, or some other large concern.

Fortunately, the panic is not a regular or a necessary concomitant of the crisis. But, whether it degenerates into a panic or not, the crisis is always succeeded by a period of depression. This too follows a regular course. During the depression, wholesale prices fall more rapidly than retail prices, prices of raw materials fall more rapidly than those of manufactured goods, while the fall in the value of securities generally precedes the actual decline of trade. New forces now enter in, which first retard and finally check the downward movement. Bank reserves grow larger, the interest rate falls, labor becomes more efficient, the costs of doing business decrease, surplus stocks are exhausted, and a fresh demand springs up. Confidence is thus restored, and trade revival passes once more into prosperity.

The Business Cycle. Here then we have the business cycle, from prosperity to crisis, and from the ensuing depression back again into prosperity. While there are minor fluctuations constantly occurring in business, and while each cycle differs in some respects from every other, they all reveal alike the rhythm and succession which has just been described.

Causes. The crisis is the most striking phenomenon of the business cycle. It is consequently the point on which attention has been focused. Many explanations have been brought forward to account for it, but it has to be noted that the crisis is really bred during the preceding period of prosperity. A great failure, such as the Knickerbocker Trust

affair, or a bad harvest, or a declaration of war, or any other untoward event, may precipitate a crisis, but that event usually determines merely the time and the manner of the crisis. The root cause of the crisis goes deeper. It works imperceptibly during the time of prosperity. If we should sum it up in one word, it is the word "over-speculation."

Modern business is necessarily speculative. In other words, it works always on an estimate or forecast of future conditions. Goods are produced ahead of the market, and the reward of successful anticipation of market conditions is profits. Costs are reimbursed often long after they are undergone. During the period of prosperity the stimulus of present profits leads to the hopeful anticipation of future profits. This anticipation acts on the delicate mechanism of prices, leading to higher values of commodities, higher wages, higher interest rates, higher costs, higher capitalization. This process cannot continue indefinitely. As will appear presently, wise precautions can be applied to modify the crisis—to prevent its more violent and disastrous consequences.

But the crisis itself is inevitable. Wherever speculation enters—and modern business cannot be conducted without it—there must be upward and downward movements. This may be in part attributed to business psychology, the contagious optimism stimulated by success and the contagious pessimism fostered by the failure of enterprise. These attitudes obviously affect the credit mechanism, the demand and supply of the resources which are the raw materials of enterprise. But the crisis has other than psychological causes. It is generated by the stresses and strains which develop within the expanding system. While the panic is a pathological affair, there must be a period of readjustment and repose before business can advance further, and the sign of the commencement of that readjustment is the crisis.

It is possible that there is a rhythm also in the process of nature, in the succession of good and bad harvests; and this has been claimed to be the foundation of the business cycle. One famous theory associated the business cycle with sun spots, the magnitude of these being found to vary according to a somewhat regular course, and this variation in turn being linked with weather changes. But the process of prosperity, crisis, depression, revival, and renewed prosperity, though certainly affected by all such outward changes, is inherent in the very nature of modern business.

Explanatory Table. In the examination of the table which follows, showing the important crises of the modern world, the above statements should be borne in mind. Under the heading "Special Causes," attention is drawn only to particular events which precipitated the crisis, it being unnecessary to mention in each case the general causes of over-speculation and its concomitants. Similarly, in the column headed "Special Consequences," no mention is made of the normal features accompanying and succeeding the crisis,—the fall in prices, slack trade, unemployment, and so forth—unless these features showed some special character worthy of notice.

Possibility of Control. There are two important practical questions which can now be answered. In view of the serious consequences of the business crisis, it is worth considering how far and by what means it is possible to prevent or control these recurrent disturbances of the economic system. We have seen that, under the present and, indeed, under any now conceivable form of production within our civilization, the succession of prosperity, crisis, and readjustment is inevitable. It might further be maintained that the crisis and its necessary sequels are part of the price which we pay for industrial expansion, and that, consequently, in the countries where expansion has been most notable, such as the United States and Great Britain, the crisis has been most prominent.

But, while the crisis cannot be prevented, it can certainly be controlled and modified so as to do away with its more unfortunate results. This can be attained partly through the action of national or central banks which should direct their policy in such a way as to curtail credit facilities whenever the signs point to unhealthy speculation. On the other hand, these banks can relieve the pressure of a crisis by a system permitting not only of a certain expansion and contraction of notes and loans according to trade conditions, but also of the transfer of reserves from one center to another.

The Federal Reserve system was established partly to achieve these ends, and the greater elasticity of circulation and credit which that system ensures is in itself a great bulwark against the occurrence of future panics. The system was put to a severe test in 1914 and stood it to a satisfactory degree. In addition, the dissemination among business men of the knowledge of underlying business principles is an influence making for more orderly development. If it were generally recognized that there are important signs which reveal not only the present but also the approaching stage of the business cycle, that in itself would be an insurance against its more disturbing forms and effects.

A recent and very valuable investigation, *Business Cycles and Unemployment* prepared by the national bureau of economic research, points out that, not only governments as large scale buyers, but also individual firms, especially big corporations, can do something to moderate the effect of crises by stabilizing their production in various ways. Certain devices already employed by a few firms in times of failing markets might with advantage be far more generally tried. Among these devices are manufacturing to stock, standardizing stock, planning ahead, selling on a smaller margin of profit, increasing the variety of products, and eliminating waste.

The Business Barometer. Finally, what are the signs by which the approach of a crisis can be recognized? There are a number of valuable indices which, taken together, enable us to estimate with reasonable accuracy the trend of business. We may group these as indices of prices and indices of trade. Among the former is the index of wholesale prices, a change in the direction of which marks the beginning or the end of a movement. Such indices are now provided by the United States bureau of labor statistics, Dun's, Bradstreet's, Gibson's, and other agencies. The index of security prices provides another important series, since these discount in advance the prospects of business. The rates on commercial paper, both long-term and short-term, throw light on the credit situation. The fall in these rates, especially if accompanied by a rise in the security index, is a phenomenon of trade revival.

Among the indices of trade we must include the figures showing the volume of exports and imports, of unfilled orders in iron and steel and other fundamental industries, of the production of coal, pig iron, and other raw materials, of new capital issues, and of bank clearings. In the last mentioned case it is generally assumed that the clearings of the New York City banks form an index of speculation, while the clearings of other banks form an index of general business. Nor must we overlook the crop reports, the earnings of the railroads, the statistics of employment, and the returns of business failures.

It is obvious, therefore, that the business barometer can be fully read only by experts who are able to relate all these various indices. This fact has led to the establishment of regular institutions for the forecasting of trade conditions, such as Babson's, Brookmire's, the Harvard committee on economic research, and the New York national bureau of economic research. The success of such institutions is a welcome sign that the importance of the business cycle is being more and more appreciated, not only by economists, but also by intelligent men of affairs.

IMPORTANT BUSINESS CRISES

DATE	Countries Chiefly Affected	Special Causes	Special Consequences	Period of Depression
1560	Belgium, England . . .	Difficulty of obtaining funds to carry on war.	Panic among creditors of British government at Antwerp.	About 2 years
1563	England . .	Plague and bad harvest.	Scarcity of money and credit.	3 years
1569	England . .	Privateering: trouble with Scotland; internal troubles of Flanders prevented renewal of loans to Elizabeth; effect of troubles with Spain on commerce; bad harvest and rebellion.	Failures and embarrassments of English public finances. Parliament summoned: complains of monopolies, usury, and treasury abuses.	5 years
1587	England . .	Spanish reprisals against English privateering; bad harvests; long war with Spain; plague.	Long continued trade depression.	16 years
1620	England . .	Dutch competition. East India Co. & Russia Co. could not pay debts. Gov't interference with cloth trade; bad harvests; bad state of public credit.	Depression in agriculture and cloth trade; much unemployment; high interest; many bankruptcies.	5 years
1630	England . .	War with Spain; dispute about tonnage and poundage.	Depression and unemployment lessened when peace made with Spain.	A few months
1640	England . .	Bankruptcy of government of Charles I; seizure of bullion from the mint.	Political unrest culminating in civil war prevented recovery.	10 years
1659	England . .	War with Spain; losses from privateering; government unable to pay army and navy.	Refusal to pay taxes; demand for setting up of a new government.	About 2 years
1667	England . .	Dutch war; the great plague; great fire of London, Dutch fleet appears in the Thames.	Destruction of commerce, run on banks, deaths from starvation.	About 1 year
1672	England . .	Financial difficulties of Charles II.	Stop of the Exchequer; failure of half the banks in England.	About 2 years
1682	England . .	Run on a bank, engineered by political enemies of lord mayor of London.	Some banks had temporary difficulties.	A few months
1696	England . .	Taxation for French war; scarcity of standard coin.	Run on banks; suspension of Bank of England; this led to recoinage.	1 year
1701	England . .	Fears of war; struggle between rival East India companies.	Several bankers failed; stocks fell 34% to 53%.	Less than 1 year
1704–1708	England, Scotland . . .	Failure of Darien Co.; expectation of long war; tension between England and Scotland; French landing in 1708.	Bank of Scotland suspends payment.	4 years
1710	England . .	Defeat of Whigs; new ministry lacked investors' confidence; collapse of insurance boom; cumulative effect of war.	Some life insurance companies dissolved by Act of Parliament; trade recovery hastened by arrangements to fund debt.	1 year
1720–1721	France, England . . .	Mississippi Bubble, South Sea Bubble, —both outbreaks of speculative mania.	Widespread bankruptcy and collapse of stock markets. In England strict enforcement of Bubble Act, which made it difficult to obtain legal authorization to start new enterprises.	
1745	England . .	Landing of the Pretender.	Panic in London; fall of funds; shops closed; run on Bank of England.	A few weeks
1763	Germany, Holland, England	Speculation connected with Seven Years' war.	Collapse of that speculation.	
1772	England, Holland . . .	Speculative mania following great prosperity.	Panic in England; 525 failures; similar occurrences on continent.	1 year
1783	England . .	Rapid trade expansion and extravagance following War of Independence. Overissue of bank notes.	Note issue checked.	6 months
1793	England . .	Bad harvest; declaration of war against France.	Parliament made loan to merchants to restore confidence.	1 year
1797	England . .	Pitt's excessive war borrowings from Bank of England; efforts of country banks to withdraw coin from London; fear of French invasion; contraction of bank issues.	Bank Restriction act passed. Suspension of cash payments by Bank of England. Bank notes created legal tender.	
1809	England, United States	Speculation connected with Napoleonic war which led to credit and note inflation.	Bullion committee's recommendation for resumption of cash payments not accepted; depreciation of notes continued.	2 years
1815	England . .	Close of Napoleonic wars; vast production of English manufactured goods which European countries were too much impoverished to buy.	Much unemployment, machine-breaking, fall of prices.	About 2 years
1819	United States	Rapid growth of manufactures and trade after War of 1812–15; excessive bank issues; land speculation.		About 2 years
1825	England . .	Overspeculation, particularly in Mexico and South America, led to a "bubble" situation. This collapsed leaving a glut of commodities which could not be disposed of at cost.	Failure of many banks and speculators; much unemployment, misery, and riots.	2 years

IMPORTANT BUSINESS CRISES—Con.

Date	Countries Chiefly Affected	Special Causes	Special Consequences	Period of Depression
1836–1839	England, U. S. A., France, Belgium . .	Railway speculation in England and U. S. A. Land speculation and paper money inflation in U. S. A. Collapse occurred simultaneously in England, Ireland, and U. S. A., in 1836. Bad harvest of 1838 caused another crisis in which Bank of England was threatened with ruin.	Failure of many banks and speculators; much unemployment. Drain of bullion from England was finally checked by raising discount rate and by aid of Bank of France. Bank Act of 1844.	7 years
1847	England, Holland, Germany, France, U. S. A.	Bad harvests; failure of potato crops in Ireland; railway speculation.	Numerous business failures. Starvation in Ireland and extensive emigration. European revolutionary disturbances, 1848.	1 year
1854	United States	Crimean war; tight money; sluggish trade.	Panic on Wall Street in September; failures in different sections.	
1857	United States, nearly all other countries . . .	American crisis due to great discoveries of gold, railroad extension, development of banking and speculation. In England, overdevelopment of credit system.	Suspension of Bank Act in England. Very great unemployment in all countries.	3 years
1866	England . .	Wild speculation in limited liability companies, excessive borrowings by means of "finance bills," unsound banking practices.	Universal distrust of English investments. The failure of the weaker banks left the well-established banks stronger. The practice of giving accommodation bills was checked.	About 1 year
1869	United States	Operations of Jay Gould, made possible by unsound paper money system.	Many failures. (Black Friday, Sept. 23, 1869).	
1873	Nearly all countries .	Payment of French indemnity to Germany loosed a speculative mania in Germany and Austria; railway boom in U. S. A.; excessive construction of permanent works and "overproduction" at high prices. Collapse spread from Vienna to New York, which was swamped with unmarketable railway securities.	Failures of banks and commercial houses; unemployment (3,000,000 "tramps" in U. S. A. during winters of 1873 and 1874). Shrinkage of prices, stagnation, glut.	6 years
1882	France, England . . .	Wild speculation inspired by Union Generale, a company promoted among French and Austrian Catholics to destroy financial supremacy of Jews.	Collapse of this company and of the boom in general. Long period of depression.	5 years
1884	United States	Railroad speculation; large foreign wheat crops caused low prices for American grain and lessened American railroad earnings.	Very low prices.	2 years
1890–1894	England ("Baring crisis"), Germany, France . .	Speculation in South America. Revolution in Argentina.	Support of the Bank of England, aided by the Bank of France, averted panic, and no widespread failures followed.	4 years
1893	United States	Good harvest of 1891 stimulated all sorts of business; but smaller harvest of 1892, low agricultural prices, heavy gold exports, fear that gold standard might be abandoned, and doubtful bank loans occasioned a crisis.	Widespread failures, unemployment, and industrial unrest; march of Coxey's Army. Political and tariff uncertainties prevented thorough recovery until latter part of 1897.	4 years
1900	England, Germany, France	Great prosperity in England in 1898; business further stimulated by war in 1899 till it reached highest point in 1900 and then receded; high taxation and dear coal (both due to South African war) held responsible.	In England, unemployment but no spectacular failures. In Germany alarming failures occurred.	4 years
1903–4	United States	Decline of security prices after speculation of 1900 and 1901, precipitated by withdrawal of European funds—("Rich man's panic").	A few corporations failed, idle money accumulated in banks, but abundant harvests of 1904 hastened recovery.	About 1 year
1907	United States, Europe . .	Failure of Knickerbocker Trust Co. inaugurated panic in New York which spread over the whole country. American panic caused rise of bank rates in London, Paris, Berlin, and intensified depression there.	Failures, but not on a very extensive scale. U. S. government aided banks; Clearing House certificates issued; gold shipped to U. S. A. from Europe. This crisis strengthened movement which led to Federal Reserve System.	1½ years
1914	United States, Europe . .	Crisis due to general overspeculation suddenly transformed into a special financial crisis by the outbreak of the World War.	Many normal features of depression disappeared in the increased business activity due to the war.	About 2 years
1920–1922	United States, England, Europe . .	Increase of productive capacity in victorious countries accompanied with loss of purchasing power in defeated countries partly due to collapse of national currencies. Cessation of wartime demand for goods.	Widespread unemployment and business losses; famines and pestilence in some countries.	Less than 2 years in the United States. Continued depression in England and Europe
1922–1925	England, Austria, Germany, Japan, China . . .	Post-War trade conditions; stabilizing of currencies; in Orient, reaction after post-War boom; Japanese earthquake; China's civil war and anti-foreign movement.	Considerable fluctuations of fortune through currency changes.	Great variations in different countries

INVESTMENTS

INVESTMENT has been defined as the exchange of money for property rights from which a profit is expected. This definition must be qualified somewhat for the purpose of the present discussion. All such exchanges are not investments in the true sense of the word. The true investor receives his profit in the form of an annual income upon his commitment rather than from an appreciation in the value of his investment. One who buys Pennsylvania Railroad stock to procure an annual income of five per cent is an investor; another who buys the same security in anticipation of a rise in price is a speculator.

An absolutely safe investment does not exist. Since safety is a relative term, all securities have a certain element of risk. The yield which the safest security affords may be considered as the true rate of investment income. The higher yield obtainable from all other securities may be considered as a premium received for the additional risk assumed in the purchase of securities less desirable than the best.

The yield on long-term United States government bonds may be accepted as the "true" rate at any given time. As an investment "rule of thumb," it may be stated that the premium for risk should never exceed the true income. This may be interpreted to signify that all securities which afford a yield exceeding twice the current United States government bond yield have too large an element of risk to make them desirable investments.

A true investment may therefore be summarized as a commitment of capital (1) for use in production; (2) intrusted to the management of another; (3) for which the primary purpose of the capitalist is to receive income by reason of the use in production; and (4) in which the estimated risk for use is not so great that the premium for risk is greater than the true interest.

Determination of Yield. The annual return, or yield of an investment is the percentage relationship between the amount of annual income obtained therefrom and the cost price. In the case of stocks, the method of determining the yield is fairly simple. The rule is to divide the number of dollars received in annual dividends per share by the number of dollars paid as original cost per share. To illustrate: A certain stock pays dividends at the rate of $9 per share and is quoted at 180; 9 divided by 180 gives 5 per cent, which is the yield.

The determination of bond yields is somewhat more involved as the bond will be paid at par at maturity date regardless of the purchase price. If the bond is purchased below par, it is assumed that the holder will receive, in addition to the annual interest, an increase in the value of the bond as the bond approaches the due date. Conversely, if the bond is purchased above par, the holder is obliged to charge against his current income a certain amount to cover the decrease in the value of the bond as it nears maturity.

To illustrate: a 6 per cent bond due in ten years is quoted at 105; from the annual interest income of $60 on a thousand dollar bond, a deduction of $5 must be made, leaving $55 net return upon an investment of $1050, or a yield of 5¼ per cent. The amount of deduction, $5 per year, has been arrived at by dividing the number of dollars paid as premium (50) by the number of years (10) in the period during which the bond will run.

Classes of Securities. Investment securities may be divided into two classes, stocks and bonds. Notes are simply short-term bonds. A fundamental difference exists between the position of the stockholder and the bondholder. The stockholder is a part proprietor in the enterprise, and must be prepared to share both in the profits and in the losses according as the business prospers. The bondholder is a creditor who has loaned money to the business and who expects the payment of interest regularly and of principal at maturity, regardless of the incidental prosperity of the company.

The income of a bondholder is said to be fixed, regular, and certain. This is because the bond bears a fixed rate of interest, such as 5 per cent; because the interest must be paid regularly irrespective of earnings; and because default in payment to the bondholder usually brings foreclosure of the mortgage upon the corporate property.

The income of a stockholder is not so satisfactorily assured. The amount will depend upon the prosperity of the company and the discretion of the directors. During poor years, his income may cease entirely. His right to receive income is subordinate to that of all others who have a claim against the company.

The preferred stockholder occupies a middle position between the bondholder and the common stockholder. His income is a fixed amount but the payment is contingent upon the corporate earnings.

A great many types of bonds are in use. The usual form is the mortgage bond under the terms of which the bond is protected by a mortgage upon the corporate property. However, some bonds, known as debentures, have no mortgage security. Other classes will be mentioned in succeeding paragraphs.

Stock is divided into two classes, common and preferred. Many companies issue no preferred stock. Preferred stock always has preference as to dividends, which means the preferred must be paid in full before any distribution to the common, and sometimes has preference as to assets, which means that in the event of dissolution the preferred stocks are paid first.

Tests of Investments. What comprises a good investment? There are many attributes. The first is, that the principal be safe. The second is, that the income be satisfactory. The third, that it possess a fair degree of marketability. The fourth, that its tax position be favorable. The fifth, that both maturity date and denomination of the security be satisfactory. And the sixth is, that its collateral value be reasonably good.

Safety of principal depends chiefly upon the value of the assets of the company. Satisfaction of income comprehends both stability of earnings, which depends upon the nature of the business and the efficiency of management, and amount of income, which should be adequate to compensate the investor for the conservative risk he undertakes. Marketability of a security means that it can be disposed of at a fair price in a reasonable time. Marketability depends in part upon the volume of security outstanding in the hands of the public, but much more largely upon the reputation of the company. These are the three major tests, and unless the prospective security meets each satisfactorily, the subordinate tests may be eliminated.

Public Bonds. Public bonds may be divided into two classes, federal and municipal. Federal bonds include the bonds of the United States government. Of these, the Liberty Loan bonds are best known to investors. The Liberty bonds are regarded as the premier investment security of the country because they are secured by the credit of the United States. No question exists as to the ability of the government to arrange payment at maturity. The market price of the bonds will change from month to month with changes in the market rate of interest, but this is in no way attributable to apprehension over their payment.

Municipal bonds comprise the state, county, and city bonds. These bonds are most desirable investment securities. They are secured by the taxing power of the communities. While it is true that the respective states are sovereign powers, and, as such, cannot be sued in the event of default of payment of their bonds, it is also true that constitutional restrictions upon the creation of debt have

kept the bond issues within conservative limits. There has been no default in the payment of state bonds since the early nineties. The value of a state bond depends upon (a) the good faith of the people, (b) the financial standing of the state, and (c) the constitutional restrictions on the amount and purpose of issue.

County and city bonds are also highly regarded as investment securities. Unlike a state, a municipality may be sued. The first test therefore is ability to pay. Experience has shown that a net debt of ten per cent of the value of the taxable property marks the ordinary limit of safety in municipal borrowing. For small communities, seven per cent is a safer limit. The second test is validity of issue. Unless the bonds have been issued in accordance with existing laws, there is constant danger that the issue may be declared invalid. The average investor is not in a position to pass upon questions of validity. His chief protection is to buy municipal bonds only through reliable bond houses which have had the advice of counsel in this respect. The third test is the good faith of the citizens of the city with regard to the payment of their debts. State, county, and city bonds are regarded as tax-free securities, as the income is exempt from the Federal normal and surtax.

Corporate Securities in General. Corporate securities include the stocks and bonds of railroads, public utility, and industrial companies. From the standpoint of investment desirability, they range from very good to very bad. In general the nature of the business has material effect upon the prosperity of the companies. The income of railroad and public utility companies has a greater inherent stability than that of the industrial companies. Consequently, the rails and utilities are more highly regarded in the investment field.

The stability of income depends upon (a) the product it makes or the service it sells, and (b) the character of the management. The bonds of the Pennsylvania Railroad Company are better than those of the Bethlehem Steel Company because there is a more constant demand for transportation service than for steel products. And the bonds of the latter company, which is efficiently managed by men of great ability, are better than those of another company which is less fortunate in this respect.

The strength of corporate securities may be best judged from the financial statements of the company. The balance sheet shows the resources and liabilities; the income statement shows the profit or loss for the preceding year. From the balance sheet may be determined the valuation of the assets which represent the security behind the bonds and stock. From the income statement may be judged the earning power of the enterprise. Of the two, the earning power is by far the more significant.

For a railroad company, the value of the property should not exceed four times the annual revenues. The operating expenses should not exceed 75 per cent of the revenues, and the interest charges on the bonds should not exceed 10 per cent of the revenues. Moreover, the income available to pay the interest charges should be at least 150 per cent of the charges, and the net income available to pay dividends should allow a fair margin over the dividend requirement.

For a public utility company, the value of the property should not exceed four times the annual revenues. The operating expenses should not exceed 65 per cent of the revenues, and the interest charges should not exceed 15 per cent of the revenues. The income available to pay the interest charges should be at least 175 per cent of the charges, and dividend payments should be met with a fair margin of safety.

For an industrial company, the value of the property should not exceed ten times the net income after operating expenses. The operating expenses should not exceed 90 per cent of the revenues, and the interest charges should not exceed 4 per cent of the revenues. The income available to pay the interest charges should be at least twice the charges, and dividends should be met with a fair margin of safety.

Railroad Securities. The securities issued by the American railroad companies enjoy a high rating in investment circles. This is due to many reasons. The roads have proved their earning power over the course of many years. The Pennsylvania Railroad Company has paid regular dividends upon its stock without interruption since 1856. The nature of the business is such that earnings are not greatly affected by periods of business depression. Railroads operate under the supervision of a Federal board—the Inter-State Commerce Commission—which is instructed to regulate rates so that the roads will receive a fair return upon their investment.

Not all railroad securities are equally desirable, however. Some roads have established excellent reputations due to the efficiency of management—such as Pennsylvania, Lackawanna, Burlington, Atchison, and Southern Pacific. Other roads have not fared so well, as is illustrated in Seaboard Air Line, Chicago Great Western, and the Rutland.

Railroad companies issue more different classes of securities than any other enterprise. The senior bonds are those which are protected by an early mortgage on the property; they include the first mortgage and the second mortgage which is usually called a refunding mortgage. The junior bonds are those which follow the senior issues in their claim; they are never given a numeral sequence such as sixth or ninth mortgage but rather are called consolidated, unified, general, or debenture. The rolling stock is usually bought on the installment plan and is financed through the sale of equipment trust and car trust notes. Equipment securities rank among the very best investments. The railroads issue both preferred and common stocks, which have a claim on the earnings subordinate to the bonds.

The first test of a railroad security is the dividend record of the road. If dividends have been paid regularly during the preceding five to ten years, the bonds of the road are entitled to a good rating. If dividends are not being paid on the stock, the investor should assure himself that the annual income is sufficient to cover all interest charges in full after the payment of operating charges, with a fair margin of safety.

The second test is the yield, or rate of return, obtainable from the security. For the ordinary investor, this rate should be not less than 5 per cent and not more than 7 per cent. A lower yield would indicate an abnormally high margin of safety, and a higher rate, too great an element of risk.

The third test is the nature of the commodities carried. A railroad company derives its revenue primarily through freight shipments. Passenger traffic is barely self-supporting. The more diversified the products are, the more stable will be the earnings. The size of the cotton crop has large effect upon the roads in the Southern states; the yield of the grain crops has similar effect upon the roads in the Central states; and, likewise, the prosperity of the mining industry greatly increases the earnings of various roads in the Far West.

Public Utility Securities. Public utility securities comprise those issued by electric light and power companies, by artificial gas companies, by water companies, by electric railways, and by telephone and telegraph companies. The types of securities issued are much simpler than in the case of the railroads. They comprise first mortgage and refunding mortgage bonds, collateral trust notes, debenture bonds, preferred and common stocks.

The utility companies enjoy many of the advantages of the railroads and others in addition. They operate under public service commissions in the different states which aim to set rates sufficiently high to ensure a fair return. They have a virtual

monopoly in supplying their product under the franchises granted by the communities in which they operate.

A great many holding companies operate in this field. These companies do not conduct any direct operations but simply buy and hold the securities of operating companies. The effect practically is a consolidation of the separate companies. As a result, many economies are gained in management and financing. Holding companies do not issue any mortgage bonds as they have no physical property to pledge as securities. They issue either collateral trust notes, secured by bonds and stocks previously owned, or unsecured debenture bonds, often convertible into stock. Moreover, many holding companies have obtained new capital from the sale of their junior equities, such as preferred and common stocks.

As in the case of railroad securities, the first test is the dividend record of the company and the second is the rate of return. The third test is the location of the community served. Naturally the companies operating in populous districts have a great advantage over those serving fewer people.

Industrial Securities. Industrial securities comprise the stocks and bonds issued by all companies outside the railroad and utility field. The usual plan under which railroads issue securities is in the ratio of two of bonds to one of stocks; in the utility field, the ratio is about one to one; but in the industrial field it is one to four. In other words, 80 per cent of all industrial securities represent stock and 20 per cent, bonds.

Unlike railroad and utility company earnings, the profits of industrial companies vary with changing business conditions. When business is booming, industrial companies realize large returns; when business is dull, the industries are fortunate to avoid loss on their operations.

Industrial securities, notably the common stocks of companies which are the leaders in essential and growing industries, have gained greatly in public esteem during recent years. The combination of enormous resources, good products, and efficient management has stabilized the earning power of these enterprises and enhanced the investment position of their securities. Considerable caution is necessary, however, in choosing industrial securities.

In testing an industrial security, consideration should be given to the nature of the product manufactured, the control of the raw materials used, the type of competition, the effect of the tariff, and the processes employed.

Real Estate Mortgages. Real estate mortgages have long been the most popular form of investment in this country. This is due both to their simplicity of form and to their proved investment merit. The chief concern of the investor should be to secure ample margin of safety. In no case should the mortgage exceed two-thirds of the conservative value of the property pledged. The average investor should avoid all but first mortgages on property which is more likely to appreciate in value than to decline. Moreover, he should invest with particular care during times when rents are abnormally high as this condition makes for inflated real estate values. The mortgage should contain a condition that the entire principal becomes immediately due and payable in the event of default of any promise made by the mortgagor. The average investor in mortgages should confine his holdings to residential property. "Special utilizations," such as office buildings, hotels, and stores, are likely to have wide fluctuations in value. Mortgages on vacant land are likewise inadvisable.

Foreign Securities. Two primary reasons exist for foreign investing: At times, the income return in the domestic market declines to such an extent that investors are compelled to invest abroad to get a satisfactory yield, even at the increased risk of loss. The second reason is the desire to facilitate the financing of foreign trade. Long-term credits make a strong appeal in international trade and are made possible through the willingness of the nationals of the exporting countries to advance the necessary funds by purchasing foreign securities offered directly or indirectly in payment.

The developments of recent years have considerably bettered the position of foreign securities as investments. The prospect of war, the great deterring influence on international investments, constantly grows less likely as more cordial relations are established by the great nations. In buying foreign securities, the investor should confine his commitments to the bonds of countries whose financial position is strong and whose internal affairs are stabilized.

Effect of Taxation. Present tax laws materially affect investment income. The Federal normal and surtax applies on all bond interest with the exception of municipal and certain government bonds. Dividends upon stock are exempt from the payment of the normal tax. In addition to the Federal taxes, many of the states impose additional taxes upon income.

Current income taxes are established on a graduated scale under which those having the largest income are required to pay the highest rate of tax. The maximum is 25 per cent for the Federal tax. This means that one-fourth of the investment income is taken from the wealthy investor by the government. As a result, rich investors have been driven to purchase tax-exempt securities. Consequently, tax-exempt securities are selling too high for the average investor. Investors whose average income is below $50,000 can receive a better return from taxable securities than from the tax-free issues.

Economic Conditions. Business conditions are constantly changing. Periods of prosperity and depression have followed alternately during the entire commercial experience of this country. Interest rates are high when business is active, and low when business is dull. Stock prices are high when business is booming, and low when business is poor. Bond prices, peculiarly, are low during periods of activity and high during periods of inactivity. See *Business Crises*.

Stock prices are determined by the earning power, present and prospective, of the issuing companies. If the present condition is good and the future promising, stock prices will tend upward. But, if the future is unpromising, the trend will be downward regardless of current earnings. Moreover, if the prospect is favorable, prices will move upward even if current earnings are poor. The stock market always endeavors to discount the future, that is, to act before rather than after the influencing event takes place.

Bond prices are determined, not by the earning power of the company, since the bondholder is forever limited to his fixed interest rate, but by the solvency of the company and relative interest rates. If the bond bears a 5 per cent rate, and the current market rate on such bonds is 6 per cent, the bond will sell below its face value regardless of the issuing company; if the current market rate is 4 per cent. the price will be above the face value.

The most favorable time to buy stocks is when prospective earning power is good, and the most favorable time to sell is when the outlook is poor, The most advantageous time to buy bonds is when market interest rates are high, and the best time to sell bonds is when interest rates are low.

Fraudulent Offerings. It is usually possible to detect investment frauds through a close scrutiny of the sales circular. Certain earmarks should be looked for. A favorite device is to call attention to the large profits made in the same field by other companies. A second distinguishing mark is that of stating opinions rather than facts. A third method

is called the "hurry-hurry" game since it is stated to be open only for a limited time. The fourth method is the promise of large profits, the "get-rich-quick" game. There are many others, such as the ridiculing of income from savings banks, the sale of stock at a large discount, the denouncing of Wall Street, the sale of a limited number of shares, the promise of absolute safety, and the exchange of Liberty bonds.

The average investor should place his funds only with established companies with a proved earning power. He should never "invest" in a company in the promotion or development stage.

Work of the Bond House. An investor can protect himself in no way more efficiently than by buying only through bond houses with an established reputation. While there are undoubtedly many reputable houses which are not members of the Investment Bankers Association, it is nevertheless true that membership in this association is a decidedly favorable sign. Before opening an account with an investment house, the investor should inquire of his bank as to the integrity and reputation of the house he has selected.

The bond houses ordinarily act as dealers rather than as brokers. They own outright the securities they sell. Naturally they assured themselves of the worth of the securities before they themselves purchased. While they do not guarantee the investor against loss, they are usually prepared to buy back at a fair price any of the securities they have sold. Moreover, in the event that the issuing company gets into financial difficulty, the bond houses act promptly to protect the interests of the investors.

The investor should consult freely with his bond house on all matters pertaining to his investments, as the house is always in a position to offer valuable suggestions.

UNITED STATES LIBERTY LOANS

Final Allotments by States

State	First Liberty Loan June 1917 3½ per cent	Second Liberty Loan Oct. 1917 4 per cent	Third Liberty Loan April 1918 4¼ per cent	Fourth * Liberty Loan Oct. 1918 4¼ per cent	Victory Liberty Loan Apr.-May 1919 4¾ per cent	Total Liberty Loans
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Alabama	6,628,950	13,847,150	23,181,450	36,209,150	19,971,700	99,838,400
Alaska	91,500	979,250	1,737,250	3,180,950	1,413,050	7,402,000
Arizona	3,739,100	9,968,850	11,176,450	14,533,700	6,017,500	45,435,600
Arkansas	4,202,750	12,486,650	22,714,450	26,657,650	18,689,550	84,751,050
California	100,190,900	159,362,100	174,506,200	291,126,700	186,702,950	911,888,850
Colorado	12,602,050	20,946,100	31,295,750	42,007,550	28,581,150	135,432,600
Connecticut	41,008,000	66,942,300	70,316,950	124,558,750	82,050,950	384,876,950
Delaware	6,130,600	7,705,700	25,391,400	22,621,300	12,784,450	74,633,450
Dis't. Columbia	†	†	25,992,250	51,042,150	26,710,400	103,744,800§
Florida	5,271,700	8,611,650	18,053,900	27,538,100	17,918,100	77,393,450
Georgia	11,852,400	21,185,650	39,031,600	62,783,550	36,394,450	171,247,650
Hawaii	1,590,700	4,543,550	4,819,850	7,080,650	4,628,450	22,663,200
Idaho	3,617,600	10,063,150	10,972,600	16,895,150	10,963,950	52,512,450
Illinois	166,044,850	233,713,500	279,716,650	468,875,150	329,785,300	1,478,135,450
Indiana	27,597,150	78,653,000	84,650,300	136,336,300	96,186,800	423,423,550
Iowa	23,522,850	79,851,800	117,160,050	157,860,100	110,552,250	488,947,050
Kansas	11,108,750	27,895,200	47,381,200	73,914,550	51,208,250	211,507,950
Kentucky	17,794,400	31,615,700	43,561,650	64,151,650	42,723,100	199,846,500
Louisiana	14,198,900	23,316,250	34,555,300	50,329,000	31,671,700	154,071,150
Maine	14,332,300	22,996,100	18,348,100	27,694,150	18,084,550	101,455,200
Massachusetts	177,236,400	274,057,900	228,329,750	405,330,900	222,114,650	1,307,069,600
Maryland	†	†	48,729,800	88,819,350	56,058,700	193,607,850§
Michigan	44,914,950	104,380,500	107,436,900	176,102,700	125,372,300	558,207,350
Minnesota	26,309,000	74,157,500	98,785,200	135,441,350	96,730,200	431,423,250
Mississippi	3,162,950	11,529,600	17,817,050	27,827,750	19,648,100	79,985,450
Missouri	49,707,000	91,563,150	112,332,900	177,234,300	117,898,750	548,736,100
Montana	8,906,800	17,952,550	18,017,200	21,928,800	12,159,050	78,964,400
Nebraska	11,996,200	31,184,900	50,524,400	75,583,200	43,086,100	212,374,800
Nevada	2,295,100	2,809,900	4,793,400	5,996,150	3,309,150	19,203,700
New Hampshire	9,897,500	15,484,400	14,252,000	21,979,050	15,653,800	77,266,750
New Jersey	64,572,250	122,493,550	139,858,050	236,816,600	157,309,200	721,049,650
New Mexico	1,392,850	3,860,100	5,903,300	5,898,150	2,915,500	19,969,900
New York	530,704,500	1,042,230,650	985,618,450	1,826,418,250	1,176,004,250	5,560,976,100
North Carolina	†	†	24,582,250	48,804,250	26,164,300	99,550,800§
North Dakota	2,867,700	9,660,650	12,158,750	21,657,450	19,131,450	65,476,000
Ohio	126,980,950	233,892,250	225,090,050	385,288,000	257,804,950	1,229,056,200
Oklahoma	11,801,100	27,702,950	39,018,300	48,719,750	31,773,050	159,015,150
Oregon	10,157,550	23,822,450	28,300,800	38,362,550	25,891,850	126,535,200
Pennsylvania	217,468,600	411,930,300	467,918,850	812,076,850	493,512,300	2,402,906,900
Rhode Island	23,073,900	33,466,050	28,717,700	61,253,300	38,077,500	184,588,450
South Carolina	†	†	19,426,250	39,317,150	21,134,000	79,877,400§
South Dakota	3,898,200	12,630,350	31,454,200	36,256,750	24,784,700	109,024,200
Tennessee	10,924,800	26,043,650	33,783,250	55,867,250	37,555,450	164,174,400
Texas	31,210,600	63,250,000	97,312,700	124,542,700	73,176,050	389,492,050
Utah	6,689,150	14,158,550	12,966,950	19,878,600	12,846,250	66,539,500
Vermont	6,992,150	10,061,550	9,330,750	15,315,450	11,135,600	52,835,500
Virginia	†	†	44,048,750	83,576,800	57,485,850	185,111,400§
Washington	17,070,650	38,481,100	42,907,950	70,189,650	45,024,150	213,673,500
West Virginia	3,253,450	8,815,200	31,913,250	55,156,000	31,371,350	130,509,250
Wisconsin	27,311,350	81,261,400	85,936,350	121,765,700	96,143,250	412,418,050
Wyoming	1,568,900	5,132,650	6,737,000	10,183,150	6,862,250	30,483,950
Allotments unallocated by States: Fifth Fed. Res. Dist.	85,560,100	182,711,250	17,750	.....	372,200	268,661,300
Special Treasury	.....	.....	17,076,450	5,597,100	6,273,900	28,947,450
Total	1,989,450,100	3,807,865,000‡	4,175,600,050	6,964,581,250	4,497,818,750	21,436,918,850

* Nonconvertible; with the exception of this issue, purchasers of Liberty Loan bonds were granted various privileges of conversion into Liberty Loan bonds of other issues. † Included with allotment to Fifth Federal Reserve District. ‡ After deducting $1,543,700 unallocated over-allotment to Sixth Federal Reserve District. § Includes the Third, Fourth, and Victory loans only.

MONEY AND BANKING

WHY do men engage in business? Primarily for the purpose of profit. Business is fundamentally a matter of the production and of the distribution of commodities. Therefore, business men might normally expect to profit in proportion as they assist in production and in distribution. But profit under modern business conditions does not arise precisely in this manner.

Production and distribution should be the two most important factors in everyday commerce. But the business man is constantly obliged to subordinate them to two other factors vastly different. He engages in business for profit. Profit is measured by the difference in prices, buying and selling. So commercial men constantly watch price and profit as essential factors in determining conditions of production and of distribution.

Both price and profit are money concepts. Price is the amount of money for which commodities are exchanged. Profit is the relationship between cost and selling prices. If selling price exceeds cost, a positive profit results; if selling price is less than cost, a negative profit, or a loss, results.

If money were a mere go-between, serving simply to facilitate the transaction of commerce, with a stable value of its own, a study of its principles would be of limited service. But money itself is ever changing in value, thus contributing, in a manner not popularly understood, to price changes and to fluctuations in business conditions.

What Is Money? Money has been defined as anything which is universally acceptable in final payment for goods and services. Under this definition, gold coins are the only true money in circulation in this country. One dollar, which is the monetary unit in the United States, is 23.22 grains of pure gold. Other forms of currency, such as silver and paper notes, are money only in the popular sense. They may more truly be termed "credit money," since they derive their value from the fact that they are payable in gold on demand.

Money does not necessarily have to be gold. Indeed, in many countries, silver is the monetary standard. The Orient has always preferred silver to gold. The American Indians used wampum, or shells, for money. Porcelain and aluminum coins are said to be in circulation in Europe even now. And in bygone days commodities, such as wheat, corn, and tobacco, have served as media of exchange. Thomas Edison and Henry Ford have recently suggested that the United States might well return from a gold to a commodity monetary standard.

Why Gold Is Used as Money. Recent proposals that a change from the gold standard would be desirable in this country suggest a discussion of the reasons why gold has always been the most popular form of money. Gold coins over two thousand years old were recently discovered in Asia Minor. Gold has many attributes which make it especially valuable as a money standard:

It has beauty. Gold is used universally in the arts to add beauty to articles of all description.

It is almost indestructible. Gold resists corrosion by powerful acids.

It is large value in small bulk. One million dollars is represented by less than three cubic feet of gold. This fact makes gold convenient to transport, and economical to store. The Spartans made their coins of iron to prevent exportation of money.

It is homogeneous. Pure gold is all of the same grade. There are many grades of cotton and of wheat but only one of pure gold.

It is both malleable and tenacious. This makes it particularly adaptable for coining.

It is scarce. All the gold stocks in the world assembled, would make a block less than 30 feet square. Moreover, the supply cannot be rapidly increased. The annual production, even under the most favorable conditions, has never exceeded 5 per cent of the existing stocks. This tends to give a stability in value greater than that of any other commodity.

Other commodities have certain of these attributes, but in the case of no other metal does the combination exist so favorably. Even if gold were not used as money, it would still retain its value as one of the most desirable and most useful commodities of commerce.

The Functions of Money. Money serves four important functions in commerce: It is used as a medium of exchange, as a standard of value, as a store of value, and as a standard of deferred payment. As each function differs materially from the others, it should be fully appreciated that money bears a fourfold burden rather than serves a single function.

Money is most popularly known as a medium of exchange. Without money, men with commodities and services to dispose of, would be compelled to exchange them directly for other commodities or for other services. The farmer who produces wheat and desires shoes would be obliged to find some one who had shoes to exchange and who wanted wheat. Under a monetary system, producers simply exchange their production for money, and exchange the money for the commodities and services desired. The barter system of exchange is both slow and inconvenient; the money system has made possible a method of exchange infinitely more efficient.

Complementary with its use as a medium of exchange, money serves as a standard of value. Value is expressed in terms of price. Value and price, however, are not the same. Value is a relationship; it means the worth of one commodity in terms of other commodities. A decline in the value of one commodity must mean a corresponding increase in the value of another commodity or in the value of other goods. Hence, the total value of all commodities cannot change. But the general price level can change, since the value of all commodities is expressed in terms of a single commodity, gold. When gold falls in value, all prices tend to rise; when gold rises in value, prices tend to fall. By reason of this function, one has but to know the price of any commodity to appreciate its value in terms of all other commodities. If wheat is quoted at one dollar a bushel, corn at 50 cents, and oats at 25 cents, it is apparent that wheat is twice as valuable as corn and four times as valuable as oats, and that corn has double the value of oats. This function of money in acting as a common denominator of values is decidedly useful. One likes to remain acquainted with the relative values of different goods without necessarily desiring immediately either to buy or to sell.

Money serves as a store of value. People often have goods or services to dispose of without a concurrent desire for other commodities or services. By exchanging the goods immediately for money, one may hold the money indefinitely, awaiting the desired time for exchanging for other commodities. In the meantime, the money represents so much stored value. In much the same way, money serves as a basis for the security underlying credit transactions. The reserves which banks must maintain are usually in the form of impounded money which is really stored value.

Money serves also as a standard of deferred payment. All credit transactions represent the postponed payment of money. If the transaction is not immediately completed, there must be some agreement between the buyer and the seller, or between the borrower and the lender, as to the method of settlement at the due date. The purchasing power of the money may substantially change in the meantime; nevertheless, the number of dollars agreed upon remains the basis of the settlement.

BANKING POWER OF THE UNITED STATES

Report of the Comptroller of the Currency, 1925

Classification	Number of Banks	Capital Paid In	Surplus and Profits	Deposits*	National Bank Circulation and Federal Reserve Notes	Total
		Dollars	Dollars	Dollars	Dollars	Dollars
National Banks	8,072	1,369,400,000	1,600,600,000	17,023,300,000	648,500,000	20,641,800,000
Federal Reserve Banks . .	12	115,600,000	217,800,000	2,767,500,000	1,634,200,000	4,735,100,000
State Banks, Savings Banks Trust Companies, etc. .	20,769	1,800,300,000	2,580,100,000	30,588,800,000	.....	34,969,200,000
Private Banks (estimated)	437	9,000,000	8,700,000	105,600,000	.....	123,300,000
Grand Total	29,290	3,294,300,000	4,407,200,000	50,485,200,000	2,282,700,000	60,469,400,000

* Includes also dividends unpaid, postal savings, and United States deposits, certified checks and cashiers' checks outstanding to banks except in case of reserve deposits of member banks with Federal Reserve banks, but not amounts due to other banks.

The Purchasing Power of Money. The purchasing power of money is its worth in exchange for other commodities. It is highly desirable that this power be stable but experience has shown that such is far from the case. When prices advance, the purchasing power of money falls; when prices decline, the purchasing power rises. Prices were much lower in 1913 than in 1920. In 1913, one dollar would have purchased one bushel of wheat; in 1920, one dollar would have bought less than one-half of a bushel. On an average basis, one dollar in 1920 would have exchanged for but 40 per cent of the commodities it would have commanded in 1913. The 1920 dollars were therefore called "forty-cent dollars." Expressed the other way, it would require $2.50 in 1920 to buy the same commodities one might have purchased for one dollar in 1913.

Changes in price levels, therefore, represent concurrent changes in the value of money. It is important to appreciate that these changes exert large influence upon business conditions. It profoundly affects credit transactions, since it creates an undesirable element of risk for both parties. It affects production as changes in the value of materials during process interfere with expected profits.

But most important is the fact that prices do not change uniformly. There is a wide variance both in degree and in time. The position of the farmer in 1921 was very unfavorable because the prices of farm products had fallen much farther than other prices. The usual sequence of price changes is as follows: first, in the basic raw materials, such as pig iron, copper, wool, rubber, wheat, cotton, corn, etc.; next, in semifinished goods, such as cotton cloths; and later, in finished products. Then wholesale prices are affected, followed at a definite interval by retail prices. Wages are usually the last to be affected.

The Measurement of Prices. The general level of prices is measured through the use of index numbers. Current prices on a great many commodities are taken and a general average is secured after giving weight in accordance with the importance of each commodity. The present custom is to make this compilation monthly. This permits one to judge the general trend of prices, not only from month to month, but also over a period of years. A great many agencies perform this function. The United States government, through the department of labor, issues a monthly index number of wholesale prices. For some years after the World War, it used 1913 prices to represent 100 per cent. The index number early in 1920 was about 250, which represented an increase of 150 per cent over 1913 price levels. Early in 1923 the index number was 156, which showed that prices had fallen substantially from the 1920 level, but were still well above the 1913 level. The index numbers are used inversely to measure the purchasing power of money. The dollar of 1913, which was 40 cents in 1920, had increased to 64 cents in 1923.

What Establishes the Value of Money? Money is a commodity itself, and, like all other commodities, its value is determined by the relationship between demand and supply. The demand for money constantly varies. Of course, in the popular sense, there is no limit to the demand for money. The ordinary person really does not demand money, but rather the goods or the services which money commands. The true demand for money comes only from those who have goods or commodities to sell. It, therefore, depends upon the volume of transactions, upon the population, and upon the extent of the use of credit. The volume of transactions depends largely upon the quantities of goods produced in the community.

The supply of money is the amount in circulation. Very little money is hoarded. The chief value of money is in exchangeability. Money must be kept in action, since idle money earns nothing. The person who has money "idle" in a bank expresses a condition which is pertinent to him only. The bank has the money constantly at work.

The extent of the use of credit naturally affects the demand for money. At least 75 per cent of the ordinary business transactions are on a credit basis.

A most peculiar relationship exists between the demand for and the supply of money. The supply always equals the demand. A bushel of wheat has the power of satisfying only so much hunger, but a given quantity of dollars may satisfy any demand, however large, for money. The adjustment is taken up in price levels. If, at current prices, there is a demand for six billion dollars for exchanges, and only five billion is available, the supply will automatically equal the demand through a decrease of one-sixth in price levels.

Why Prices Rise and Fall. The price of any commodity, therefore, depends upon two different sets of conditions: the value of the commodity, which is determined by the demand and by the supply of that commodity, and the value of money, which is determined by the demand and by the supply of money. Wheat will *rise* in price under any one of the following conditions, other factors remaining unchanged: (1) an increase in the demand for wheat; (2) a decrease in the supply of wheat; (3) a decrease in the demand for money; and (4) an increase in the supply of money. Wheat will *fall* in price under any one of the following conditions, other factors remaining unchanged: (1) a decrease in the demand for wheat; (2) an increase in the supply of wheat; (3) an increase in the demand for money; and (4) a decrease in the supply of money.

It is self-evident that the total value of the money in any nation is irrespective of the number of monetary units in circulation. To double the number of units in circulation simply serves to double prices, rather than to double the value of money. One important reason why prices rose so high in the United States during and following the World War was because of a large increase in the currency in circulation. The reason why the German mark, for

example, fell so low was primarily because Germany issued so many marks. The value of each monetary unit decreases in proportion as the total number of units is increased.

Of course, if there is an increased demand for money proportionate to the increased supply, the value of each unit will remain unchanged. But the European experience has been a large arbitrary increase in the supply, regardless of the demand.

The Use of Credit. The extent of the use of credit has been given as one of the factors affecting the demand for money. Credit is the power to obtain goods or services by giving a promise to pay money at some time in the future. Credit is usually divided into two classes, general acceptability and limited acceptability. Credit is essentially a promise to pay money, and, if the credit is in the form of an instrument which is universally acceptable in payment of goods or services, it becomes of general acceptability. A Federal Reserve Bank note is credit of general acceptability as it is freely accepted in payment of debts. In this same class are national bank notes, gold and silver certificates, treasury certificates, United States notes, and coins other than gold.

A bank check is an instrument of limited acceptability, since it will be accepted only by those who are acquainted favorably with the drawer of the check. And likewise are promissory notes, drafts, and acceptances. Bank loans and buying on open account are also examples of credit of limited acceptability.

DEBTS OF THE LEADING NATIONS

Country	Pre-War Debt		Post-War Debt*		National Debt, 1926†	Obligations to U. S. Government 1926
	Year	Amount	Year	Amount		
Argentina	1913	$ 732,398,000	1918	$ 866,380,000	$ 928,008,000	
Australia	1913	80,753,000	1919	1,583,000,000	2,089,097,000	
Austria	1913	2,152,490,000	1919	17,688,000,000	344,775,000	32,715,764
Belgium	1914	825,269,000	1920	4,000,000,000	1,610,509,000	415,680,000
Bolivia	1913	19,369,000	1919	26,500,000	47,036,000	
Brazil	1912	663,667,000	1918	1,118,546,000	835,856,000	
Bulgaria	1912	135,300,000	1919	2,158,000,000	261,741,000	
Canada	1913	544,391,000	1920	2,349,180,110	2,515,668,000	
Ceylon	1913	30,011,000	1919	27,100,000	63,202,864	
Chile	1913	207,704,000	1918	228,377,000	327,255,000	
China	1913	969,189,000	1920	1,534,575,000	1,726,400,000	
Chosen	1913	21,837,000	1918	46,652,000	6,194,959	
Colombia	1913	24,234,000	1918	22,856,000	23,407,000	
Costa Rica	1913	16,488,000	1919	30,000,000	13,155,468‡	
Cuba	1914	67,620,000	1918	63,289,000	92,070,000	
Czechoslovakia	....	.....	1919	1,500,000,000	1,034,372,000	112,000,000
Denmark	1913	95,579,000	1921	215,000,000	324,816,000	
Dominican Republic	1914	13,218,000	1920	13,100,786	11,175,000	
Dutch East Indies	....	.....	1916	91,871,000	466,653,000	
Ecuador	1913	19,780,000	1918	25,756,000	19,294,704‡	
Egypt	1913	459,153,000	1918	460,338,000	447,005,498‡	
Esthonia	....	.....	....	.....	21,094,011‡	15,299,155
Finland	1913	33,706,000	1921	382,000,000	103,000,000	8,863,000
France	1913	6,346,129,000	1921	50,960,000,000	17,358,444,000	4,025,000,000
Germany	1913	1,194,052,000	1921	71,000,000,000	574,872,000	
Greece	1913	206,640,000	1919	469,367,000	545,169,000	18,750,000
Guatemala	1913	15,577,000	1918	23,970,000	9,275,616‡	
Haiti	1912	42,863,000	1917	24,983,000	21,661,000	
Honduras	1913	121,261,000	1919	31,771,000	11,936,160	
Hungary	1913	1,731,350,000	1921	14,200,000	387,994,000	1,962,865
India, British	1912	1,475,272,000	1919	2,310,000,000	4,710,817,970	
Irish Free State	....	.....	....	.....	64,931,316	
Italy	1913	2,921,153,000	1921	18,650,000,000	7,053,636,000	2,037,000,000
Japan	1913	1,241,997,000	1920	1,300,000,000	2,563,229,000	
Jugoslavia	....	.....	1920	705,000,000	559,817,000	62,650,000
Latvia	....	.....	....	.....	17,316,799‡	6,321,049
Lithuania	....	.....	....	.....	.....	6,105,000
Mexico	1912	226,404,000	1921	282,000,000	416,931,000	
Netherlands	1914	461,649,000	1920	1,072,000,000	1,366,000,000	
Newfoundland	1913	27,450,000	1919	35,000,000	67,018,405	
New Zealand	1913	438,271,000	1919	856,875,000	1,160,837,623	
Nicaragua	1913	9,189,000	1917	18,596,000	3,753,184‡	26,883
Norway	1913	97,215,000	1920	250,000,000	464,076,000	
Paraguay	1913	12,751,000	1918	13,515,000	7,482,022	
Persia	....	.....	1919	45,000,000	8,198,995‡	
Peru	1913	34,268,000	1916	34,015,000	86,061,000	
Poland	....	.....	1921	69,000,000,000	370,943,000	196,423,908
Portugal	1913	947,603,000	1918	1,289,646,000	160,503,901‡	
Rumania	1913	316,693,000	1921	5,270,000,000	388,638,000	44,390,000
Russia	1914	4,537,861,000	1917	25,000,000,000	212,633,000**	270,599,640
Salvador	1913	9,970,000	1920	15,000,000	19,516,000	
Siam	1913	27,799,000	1919	32,616,000	59,914,537	
Spain	1914	1,814,270,000	1920	2,374,000,000	175,770,581‡	
Straits Settlements	1913	33,627,000	1919	57,424,000	136,578,359	
Sweden	1913	161,390,000	1920	340,000,000	473,386,000	
Switzerland	1912	23,614,000	1920	350,000,000	435,238,000	
Turkey	1913	675,654,000	1920	2,300,000,000	362,440,000	
Union of South Africa	1913	573,415,000	1921	847,000,000	1,011,640,628	
United Kingdom	1913	3,485,818,000	1921	37,910,000,000	37,473,000,000	4,530,000,000
United States	1913	1,028,564,000	1921	23,922,000,000	19,643,183,000	
Uruguay	1913	137,827,000	1918	164,308,000	229,494,000	
Venezuela	1913	35,051,000	1918	28,983,000	10,448,838‡	
Other and Total	....	$43,200,931,000	....	$354,181,523,786	$111,934,571,438	$11,783,787,264

*Figures based on the par values of currencies, some of which were greatly depreciated at the dates specified. This largely accounts, in certain instances, for the disparity between these figures and those given for national debts in 1926, which approximate real values. †Or latest available earlier figures. ‡External debt only. **Does not include Imperial Russian debts, these having been officially repudiated.

ESTIMATED WEALTH OF LEADING NATIONS

Country	National Wealth 1914	Wealth per Capita, 1914	National Wealth 1926	Wealth, per Capita, 1926
	Dollars	Dollars	Dollars	Dollars
Argentina	11,679,600,000	1,655	15,000,000,000	1,500
Australia	7,445,745,000	1,548	14,114,000,000	2,585
Belgium	5,839,800,000	764	7,141,000,000	922
Canada	11,119,953,000	1,460	22,500,000,000	2,675
Denmark	2,433,250,000	857	5,943,000,000	1,737
France	58,398,000,000	1,475	52,363,000,000	1,285
Germany	80,540,575,000	1,187	58,025,000,000	916
Holland	5,109,628,000	813	8,260,000,000	1,115
Italy	21,801,920,000	623	22,000,000,000	522
Japan	11,679,600,000	214	53,207,000,000	891
Norway	1,070,630,000	438	1,818,000,000	685
Russia	58,398,000,000	414	52,000,000,000	388
Spain	14,307,510,000	701	.....	.....
Sweden	4,574,510,000	818	4,650,000,000	774
Switzerland	3,893,200,000	998	11,000,000,000	2,800
United Kingdom	70,564,250,000	1,548	120,000,000,000	2,663
United States	204,393,000,000	2,063	320,804,000,000 *	2,919

* Based on 1922 figures.

Credit thus serves as a medium of exchange in over 75 per cent of the daily business in the United States. The demand for money as a medium of exchange is therefore materially affected by the use of credit. Credit does not displace money; it makes money more efficient. Yet, in times of financial panic, prices drop because of an increase in the demand for money for which credit cannot be substituted.

Credit does not increase the supply of money. It does increase the efficiency of money and so lessens the need of it. Since goods can be bought with credit as well as with money, an increase in the volume of credit advances prices as effectively as does an increase in the volume of money.

Credit of General Acceptability. In order that credit may gain general acceptability, all persons in the community must be willing to accept it. For this to result, credit must have four attributes: (1) the promisor must be one in which the people have confidence; (2) credit must be in convenient denominations; (3) it must be easily recognizable; and (4) it must be difficult to counterfeit. Practically all the currency in circulation in this country is credit of general acceptability. Of more than five billion dollars in circulation, more than four and one-half billions are in such credit.

Credit of Limited Acceptability. The most important form of credit of limited acceptability is the bank check. As is discussed later, business obligations are settled customarily with check payments. Technically, a check is an order to the bank to pay money to the payee. In practice, this seldom happens as the payee deposits the check in his own bank for collection. The banks offset balances against each other rather than actually pay the checks in full in cash. This greatly reduces the demand for money.

Foreign Exchange. Monetary systems differ in various nations. Just as the standards of nations differ, for example, the United States on a gold standard and China on a silver basis, so, too, do the monetary units vary. Both the United States and England are on a gold basis, yet the United States uses the dollar as a unit and England uses the pound. France, also on a gold basis, uses the franc. The relative value of the units, therefore, depends upon their respective gold content. The American dollar contains 23.22 grains of pure gold; the English pound contains 113 grains. Dividing 113 by 23.22 gives 4.8665; therefore, the "par value" of the pound in American money is $4.8665. And, proceeding in like fashion, we find that the par of the Spanish peseta is 19.3 cents and of the Japanese yen 49.8 cents.

Previously to the World War, the market values of all foreign currencies remained constantly fairly close to par in the American markets. This was so because the currencies might be converted into gold in the foreign countries and the gold might be shipped to this country. The premium or discount was thereby limited to the actual cost of shipping the gold. But, during the war, the European countries suspended gold redemption of the paper currencies and concurrently greatly expanded the volume of notes outstanding. The result was a large discount on the exchange markets. The pound sterling fell as low as $3.19; the franc to 2.8 cents; the Italian lira from a par of 19 cents to 3.2 cents; and the German mark from a par of 23 cents to a fraction of one cent. The European currencies which are quoted at so large a discount, it must be remembered, are not the gold coins of the countries, but rather the paper currencies which are not now redeemable in gold.

The United States, practically alone of all the nations in the world, has been able to keep the dollar at par because it did not at any time suspend gold redemption.

Distribution of the World's Gold. The European nations were obliged to suspend gold redemption of their outstanding currencies because of the inadequacy of their gold holdings. Moreover, the strong position of the United States in this respect is due to the extremely large reserves held in this country. The total gold monetary stock of the world is estimated at about 10 billion dollars, of which nearly 40 per cent is now held in this country. The United States has gained nearly 2.5 billion dollars since 1914 largely as a result of the payment of merchandise shipments made to foreign nations in excess of imports received.

Effect of Increase in Gold Holdings. The large increase in the gold holdings of the United States during recent years has created no little apprehension that it will cause higher prices in this country. The theory is that gold has no established value; that the value of gold depends upon conditions of demand and of supply for the metal; that the supply in the United States has been greatly increasing without a corresponding increase in the demand; and that the result must be a lowering in the value of gold and consequently an increase in price levels. Such at least has been the previous experience. European prices increased materially following the discovery of America's riches; prices in the United States advanced substantially after the discovery of gold in California in 1848; and world prices in general advanced from 1896 to 1913 almost in proportion to the increase in gold production.

Present-day conditions, however, are different from those prior to the World War. The great bulk of the gold in the United States is not in circulation, nor even in the vaults of the thousands of banks

throughout the country. Practically the entire stock is held by the Federal Reserve banks. It serves chiefly as a reserve against the liabilities of the system. Indirectly it does affect prices, however. The large gold reserves permit increased loans by the banks of the nation. Easily obtained credit makes for speculative borrowing. The result is an increased demand for goods and consequent higher prices. Whether or not such will prove the case depends largely upon the policy adopted by the lending banks and upon the rate of interest which is charged.

The Rate of Interest. Interest is the cost of borrowing money. The rate changes with conditions of business, and is determined, not by the demand for and the supply of money, but by the demand for and the supply of loanable funds. The business man seldom withdraws actual money at his bank when arranging a loan. He secures a credit to his deposit account which he draws against in payment of his obligations.

The average business man is a constant borrower at his bank. He needs additional capital for the expansion of his business and secures it through his bank. The extent to which he borrows depends upon the relationship between the cost of borrowing—the rate of interest—and the return he can obtain in his business from the added investment. There must be a profit margin, else he will not borrow. Low rates of interest therefore encourage borrowing by business men and make for increased business activity. High rates of interest discourage borrowing and make for decreased activity in the markets of the nation.

Money in the United States. The present monetary system of the United States is on a gold monometallic basis, which means that a single metal, gold, is the basis of our monetary system. Our monetary unit is the dollar, which contains 23.22 grains of pure gold. As coins made of pure gold would rapidly lose weight in circulation through abrasion, our coins are made nine-tenths fine, one-tenth alloy being added to gain durability. A gold dollar would therefore weigh 25.8 grains of gold nine-tenths fine. As this quantity of gold would make a coin too small for convenience, the actual coins are in larger denominations only.

The United States has not always been on a monometallic basis. From 1792 until 1873, bimetallic systems were in use under which both gold and silver served as a double standard. The bimetallic experience was unfavorable, however. With the defeat of Bryan and "free silver," in 1896, bimetallism ceased to agitate American politics.

Under the present system, anyone is privileged to bring gold metal in unlimited quantities to the government and have it coined into dollars of equivalent value without any charge save for the alloy which is used in the coining. Holders of silver, or of any other metal, do not have a similar privilege.

The American system is known as free coinage with a brassage charge. In some countries a seigniorage charge is made for coinage. This means the government retains a certain part of the metal as a charge for the service. "Free silver" in the United States meant the right to bring silver to the mint in unlimited quantities for coining on the same basis as gold.

Credit Money in the United States. Credit money is also called representative money. It takes its value from the fact that it is redeemable in actual money on demand. All forms of currency in the United States, with the exception of gold coins, are credit money. As previously mentioned, this includes silver coins, and paper money of all kinds, such as national bank notes, Federal Reserve notes, treasury notes, United States notes, gold and silver certificates. Of the total amount of five billion dollars in circulation, about one-half is in Federal Reserve notes, one-fifth is in national bank notes, and the remainder is divided among the other classes.

As long as credit money may freely be converted into gold, it will command the same value as gold, and will be as freely accepted in payment of debts. In this country, one accepts a five-dollar Federal Reserve note as readily as he accepts a five-dollar gold piece. But let the gold redemption feature be suspended, as is the case in many countries, and credit money will fall to a discount in terms of gold. Such was the experience of the United States with the "greenbacks" issued during the Civil War. At such times, gold is said to command a premium, although really gold remains constant and paper money depreciates. As business is done in terms of the depreciated money, it displaces gold both as a medium of exchange and as a standard of value.

It should be remembered that the silver dollar takes its monetary value in the United States from the fact, not that it is made of a precious metal, but because it is redeemable into 23.22 grains of pure gold. Indeed, if one were to melt down a silver dollar into silver metal, the metal itself would be worth less than fifty cents. It is only when silver has a market price of $1.29 or more an ounce, that the silver in the silver dollar is worth one dollar in gold. This principle was illustrated clearly when England reduced the silver content of her silver currency from 92½ per cent to 50 per cent without in any way affecting the monetary value of the coins.

Advantages of Credit Money. The wide use of credit money as a substitute for real money both in this country and abroad is due to two important advantages:

It is more economical. The use of credit money, which is easily manufactured, relieves the demand for gold, which is much more difficult to produce.

It makes possible an elastic currency supply. In view of the fact that the demand for money is constantly changing, it is highly desirable that the supply be regulated accordingly; otherwise, price levels will constantly fluctuate. Elasticity of currency means the power to expand and to contract according to the needs of business. The supply of gold currency in circulation may be increased or decreased only with extreme difficulty; the supply of paper currency—credit money—may be easily regulated, as is illustrated in the use of Federal Reserve notes in the United States.

MONEY IN THE UNITED STATES, 1860–1925

Year	Coin, Including Bullion in the Treasury	United States Notes and Bank Notes	Total Money	Money Held in Treasury as Assets	Money in Circulation	Circulation per Capita
1860	$ 235,000,000	$ 207,102,000	$ 442,102,000	$ 6,695,000	$ 435,407,000	$13.85
1870	199,500,000	700,376,000	899,876,000	124,910,000	774,966,000	20.10
1880	494,363,000	691,186,000	1,185,550,000	212,168,000	973,382,000	19.41
1890	1,152,471,000	532,652,000	1,685,123,000	255,872,000	1,429,251,000	22.82
1900	1,683,379,000	656,321,000	2,339,701,000	284,550,000	2,055,151,000	26.93
1910	2,359,480,000	1,060,112,000	3,419,591,000	317,236,000	3,102,356,000	34.33
1920	3,237,176,000	4,672,822,000	7,909,998,000	489,673,000*	5,332,141,000	50.11
1925	5,191,729,000	3,029,463,000	8,221,192,000	362,056,000*	4,736,464,000	41.51

* In addition there was withheld from circulation $2,088,184,000 in 1920 and $3,122,671,000 in 1925, partly within and partly outside the Treasury for Federal Reserve Banks.

UNITED STATES POSTAL SAVINGS SYSTEM, 1925

State or Dependency	Amount Due Depositors	Interest Paid Depositors
Alabama	$ 388,091	$ 6,060
Alaska	599,554	9,160
Arizona	538,704	7,751
Arkansas	162,126	3,300
California	2,645,051	46,371
Colorado	1,514,017	23,761
Connecticut	2,014,963	38,748
Delaware	186,933	3,205
District of Columbia	342,175	5,417
Florida	875,722	14,744
Georgia	271,906	4,215
Hawaii	36,601	560
Idaho	1,030,749	13,381
Illinois	7,985,524	141,804
Indiana	773,266	16,005
Iowa	836,356	11,390
Kansas	717,353	12,285
Kentucky	287,365	4,929
Louisiana	318,557	5,493
Maine	192,100	4,476
Maryland	183,631	3,284
Massachusetts	9,080,356	153,448
Michigan	2,649,662	50,515
Minnesota	2,032,915	26,521
Mississippi	69,478	1,248
Missouri	2,962,394	48,934
Montana	2,827,103	34,427
Nebraska	301,297	4,888
Nevada	274,943	6,104
New Hampshire	423,933	7,914
New Jersey	3,985,827	69,617
New Mexico	282,041	2,900
New York	55,804,296	997,041
North Carolina	54,430	842
North Dakota	161,790	1,527
Ohio	3,141,941	63,099
Oklahoma	1,092,748	11,513
Oregon	1,870,997	31,543
Pennsylvania	11,564,165	209,547
Porto Rico	155,302	2,079
Rhode Island	935,311	17,398
South Carolina	120,031	1,733
South Dakota	327,980	3,196
Tennessee	199,119	3,996
Texas	851,787	12,508
Utah	561,289	9,537
Vermont	97,480	1,427
Virginia	268,028	5,778
Virgin Islands	3,114	24
Washington	6,898,917	116,845
West Virginia	317,711	5,584
Wisconsin	1,129,892	20,730
Wyoming	467,114	6,132
United States	$132,814,135	$2,304,934

Federal Reserve Notes. The Federal Reserve note is believed to be closer than any other to an ideal form of currency. For this reason, and because it has become the outstanding form of American currency, a brief summary of its features should be of interest.

Federal Reserve notes are issued by Federal Reserve banks to member banks of the system when commercial paper, discounted by the member bank for its depositors, is rediscounted by that bank at the Federal Reserve bank. Jones, a rancher in Montana, borrows $500 from the First National bank of Butte for sixty days to enable him to market his wool crop. The First National bank of Butte rediscounts the promissory note of Jones at the Federal Reserve bank of Minneapolis, which issues as proceeds Federal Reserve notes to the Montana bank, which puts them into circulation. Sixty days later, Jones pays his loan at the Montana bank with Federal Reserve notes, and the bank returns the notes to Minneapolis to liquidate the rediscount.

It should be noticed that the notes were issued as the result of a legitimate business demand and that the notes were withdrawn from circulation when the demand no longer existed. It should also be appreciated that the Montana bank was charged interest on the notes as long as they remained outstanding. This interest charge gives the essential "homing quality" which is lacking in other forms of currency. National bank notes, once issued, rarely if ever find their way back to the bank of original issue because there is no inducement to cause their return.

The security behind the Federal Reserve note is the promissory note of the commercial borrower plus a reserve of at least 40 per cent in gold in the vaults of the Federal Reserve banks.

Federal Reserve notes have been in existence only since 1914, but it is believed that eventually they will replace all other forms of currency in circulation.

Legal Tender. Any form of currency which the law states must be accepted in payment of obligations is known as legal tender. Specifically, it comprises only gold coins; silver dollars; halves, quarters, and dimes up to $10; pennies and nickels up to 25 cents; and United States notes. Federal Reserve notes, national bank notes, and gold and silver certificates are not legal tender. As all forms of currency in the United States bear the promise of the government to redeem in face value in gold on demand, whether or not any form is legal tender is of academic rather than of practical interest. To the average person in this country, Federal Reserve notes are even more acceptable than silver dollars in payment of obligations.

Money and the Banks. In the popular sense, banks are institutions where money is stored for safe-keeping. This is far from being the case, however. A bank may be holding many thousands of dollars on deposit for its patrons. But, under ordinary circumstances, only a very small fraction of this amount is carried as money in the vaults of the bank. One may wonder why banks are willing to safeguard the funds of their depositors without making a charge for the service. Of course the answer is that the bank loans out the deposits to borrowers and receives interest payments upon the loans. In some cases, the bank shares this revenue with its patrons by paying interest on the deposits.

Kinds of Banks. Just as there are different kinds of stores, so there are different classes of banks. We have dry goods stores, grocery stores, and hardware stores. In like manner we have commercial banks, savings banks, and farm loan banks. In the United States there are about 30,000 banks, the vast majority of which are commercial banks. Each type of bank serves a definite purpose, however. One desiring to purchase a hammer would scarcely go to a grocery store; and, for the same reason, one desiring to open an account with a ten-dollar deposit would hardly go to a commercial bank.

Commercial Banks. Commercial banks are banks for business men. They accept deposits subject to check, which means that the depositor may at any time, without notice, draw against his deposit by writing out a check. This means that the bank must exercise extreme caution in loaning out the funds on deposit, since it can never tell in advance just when the depositor is going to withdraw his funds. The bank knows from experience, however, that it is extremely unlikely that all the depositors will ask repayment on the same day. It knows also that the new deposits each day tend to equal the amount of the withdrawals. Consequently, it feels safe in loaning out the largest share of the funds on deposit. But the banks naturally do not desire to make loans for extended periods because of the ever-present possibility that heavy withdrawals may be made simultaneously. Commercial banks, therefore, seldom make loans for a period exceeding six months and rarely, if ever, loan for more than one year. The great bulk of the loans at a commercial bank are for ninety days, or for less.

Sometimes a rumor of unsatisfactory conditions at a bank will cause depositors to become apprehensive of the safety of their deposits and will result in large withdrawals in short intervals. This is known as a "run" on the bank. Unless the bank has kept its loans in liquid condition, it may not be

able to meet the sudden demand and therefore be obliged to suspend operations.

Bank Deposits. Banks accept funds on deposit from their patrons and make a corresponding credit in the deposit book of the patron and on their own books of account. It should be appreciated that the funds deposited immediately become the property of the bank and that the depositor becomes a creditor of the bank to that amount. Items which are payable at other banks are credited conditionally, subject to collection. If payment is refused at the other bank, the credit at the first bank is canceled.

Deposits are of two kinds, demand and time. A demand deposit is subject to withdrawal at any time at the option of the depositor. A time deposit may not be withdrawn before the expiration of the definite period for which the deposit was made. Time deposits are more satisfactory to the bank, because the institution knows in advance when withdrawal may be expected. The banks invariably pay a higher interest rate on time deposits. But the larger share of the deposits in a commercial bank are naturally demand deposits.

Bank Checks. A check is an order drawn upon a bank by one who has funds in that bank to pay a certain sum to another party upon demand. The party to whom the check is payable may possibly present the check to that bank and secure cash from the bank. More probably, he will deposit the check in his own bank for credit to his account. Each day the banks exchange these checks, usually through a clearing house. In this way, the payee receives his funds without being obliged personally to present the check for payment, and the banks are relieved of the obligation of carrying large cash reserves to meet checks presented by individuals for payment. The depositors in a certain bank may during one day draw checks aggregating $10,000; yet that same day the bank may receive in deposits $15,000 in checks on other banks. The net result is an increase of $5000 in the funds of the bank, despite the fact that checks for $10,000 were drawn against it.

Payment by check is the most popular method in this country. At least three-quarters of the daily business transactions are settled on this basis. It expedites the conduct of business both to the business men and to the banks.

But the very fact that the check is so popular makes it somewhat of a dangerous instrument. It is a rule of business that checks should never be accepted from strangers, and those who violate this rule do so at their peril. Raised amounts and forged signatures on checks are everyday occurrences in modern business.

Bank Loans. From the banker's viewpoint, he is in business to make loans. Deposits and withdrawals are simply a service which he offers as an inducement for customers, but which, of themselves, bring no profit to the bank. The bank profits, as has been stated before, from the interest it receives upon its loans.

Loans differ in thousands of ways. One man desires to borrow $1000 for ten days to meet his payroll at a time when his cash balance is low; a second man desires to borrow $10,000 to finance the purchase of one hundred shares of United States Steel Common Stock as a speculation for an indefinite period; a third man wishes to borrow $5000 for five years to buy a home; and so on. The first two men may receive accommodation at a commercial bank, but the third man will have to go to a savings bank.

Commercial loans should never exceed one year at the outside. A depositor is usually permitted to borrow in proportion to his bank balance. If he is well and favorably known, he will secure the credit upon his simple promissory note; otherwise, he may be obliged to pledge collateral as security. The more marketable the collateral, the more satisfactory it is to the banker. The interest charge is usually collected in advance when the loan is made. The bank is usually less interested in what the borrower is going to do with the funds than it is in the chance for repayment; yet the two are closely interrelated. Often the depositor is expected to allow a part of his loan—about one-fifth—to remain on deposit to permit the bank to carry an adequate reserve.

Banks loan in proportion to their deposits. It is a popular misconception that banks make large profits because they loan in excess of deposits. A bank can loan in excess of its cash reserve but not conservatively in excess of its deposits. For the ordinary bank, the loans average about three-quarters of the deposits.

The total loans outstanding in the banks of the United States run into enormous figures. At the present time, the total is over 30 billion dollars.

Basis of Credit Granting. If the nature of the loan is satisfactory, the question whether or not it will be granted by the bank becomes almost purely a matter of the personal equation. The banker considers capital, capacity, and character. The *capital* of the prospective borrower is his financial worth, and this is shown by the statement of his assets and liabilities which ordinarily he is asked to submit. His *capacity* is his ability successfully to engage in business, and this is shown by the earning power he has demonstrated in the past. His *character* is his personal integrity, and this is reflected by his standing in the trade and by his reputation for honesty. The banker considers all three carefully in reaching his decision.

Rediscounting Loans. Banks which are members of the Federal Reserve system are permitted to rediscount customers' promissory notes. All loans are not eligible for this purpose, especially those which are made for stock speculation. The Cleveland Trust Company may loan $5000 to a manufacturer in Cleveland, and then have the Federal Reserve bank of Cleveland rediscount it, in the same manner as was previously mentioned in connection with the Montana bank. The rediscount privilege greatly increases the loaning power of the member banks. But, more important, it allows the bank quickly to convert loans into cash in times of emergency. It is this rediscount privilege which is one of the strongest features of the Federal Reserve act and which, it is believed, will prevent any repetition of financial panics such as occurred in this country in 1907.

Other Types of Loans. Other types of loans handled by commercial banks include drafts and acceptances. Brown in Albany buys merchandise from White in Buffalo on terms of thirty days. White may immediately draw an order upon Brown, payable in thirty days, and have this order, or draft as it is called, discounted at his Buffalo bank in the same manner in which he would discount his personal promissory note. An acceptance is a draft which bears the written acceptance of the party upon whom it is drawn that payment will be made when due. Many firms now have their customers sign acceptances upon receipt of goods. In this manner the firm is able to receive immediate payment through discounting the acceptance at its local bank. Otherwise the firm would have to wait until the invoice was due before receiving the money.

Types of Commercial Banks. Commercial banks are divided into two classes, depending upon the method of incorporation. National banks receive a Federal charter. State banks receive charters from the states in which they are located.

National banks are required to operate under the provisions of the National Banking act. The minimum capital is $25,000 for a country bank and $200,000 for a large city bank. Stockholders are subject to double liability on their investment which means that, in the event of the failure of the bank, the stockholders are held liable to the extent of their investment. Loans cannot be made to any individual in excess of ten per cent of the capital of the bank.

GROWTH OF SAVINGS BANKS IN THE UNITED STATES

Year	Banks	Depositors	Deposits	Average Due Each Depositor	Average per capita
1820	10	8,635	$1,138,576	$131.86	$0.12
1830	36	38,035	6,973,304	183.09	.54
1840	61	78,701	14,051,520	178.54	.82
1850	108	251,354	43,431,130	172.78	1.87
1860	278	693,870	149,277,504	215.13	4.75
1870	517	1,630,846	549,874,358	337.17	14.26
1880	629	2,335,582	819,106,973	350.71	16.33
1890	921	4,258,893	1,524,844,506	358.03	24.35
1900	1,002	6,107,083	2,449,547,885	401.10	31.78
1910	1,759	9,142,908	4,070,486,246	445.20	45.05
1920	1,707	11,427,556	6,536,470,000	571.99	61.83

The bank is permitted to issue circulating notes—the national bank notes previously mentioned—provided they deposit at Washington, United States bonds of equal value as security. National banks are not permitted to have branches, but, of late, technical ways have been found for evading this restriction. National banks must be members of the Federal Reserve system. About one-third of all the banks in this country are national banks.

State banks operate under the banking laws of the respective states. These laws vary widely but, in the main, follow closely the Federal law. State banks, however, are not permitted to issue notes. They are permitted, though not required, to join the Federal Reserve system.

The Federal Reserve System. Banking methods in the United States have radically changed since the creation of the Federal Reserve system in 1913. Prior to that time, business was severely handicapped through the inadequate banking facilities furnished under the provisions of the antiquated National Banking act of 1863. The 30,000 banks in the country were being operated in comparative independence of each other with the result that, in times of financial difficulty, the co-ordination which is essential was impossible to achieve. The purpose of the act was to eliminate the disadvantages which prevailed under the old law. The aim was to make the banks of the country interdependent instead of independent, to concentrate and thus make more efficient the cash reserves, to provide the rediscount facilities previously mentioned, and to make possible an elastic currency system. The extent to which the Federal Reserve system has achieved these invaluable objectives is now of common knowledge.

The Federal Reserve system comprises 12 Federal Reserve banks, located in different sections of the country, and about 10,000 member banks. The membership includes all the national banks, but very few of the state banks. Although the members number but one-third of the total, their assets comprise about three-quarters of the total banking

SAVINGS BANKS OF LEADING COUNTRIES

Country	Form of Organization	Number of Depositors	Deposits	Average Deposit Account	Average Deposit per Inhabitant
			Dollars	Dollars	Dollars
Argentina	Postal savings banks	473,782	10,368,398	21.88	1.22
Chile	Public savings banks	985,692	40,101,996	40.68	9.93
Denmark	Communal and corporate savings banks	1,611,554	389,210,173	241.51	133.25
Egypt	Postal savings banks	224,760	3,961,419	17.63	.31
Finland	Private savings banks	488,764	75,286,010	154.03	22.59
	Postal savings banks	104,062	1,051,521	10.10	.32
France	Private savings banks	1,922,365	591,352,006	74.64	14.93
	Postal savings banks	6,908,854	194,119,692	28.10	4.90
Algeria	Municipal savings banks	20,511	885,945	43.19	.16
Tunis	Postal savings banks	1,883	1,416,199	752.10	.73
Germany	Public and corporate savings banks	32,769,470	3,858,832,710	117.76	57.84
Italy	Communal and corporate savings banks	2,639,201	410,338,436	149.80	11.17
	Postal savings banks	6,273,500	547,211,842	87.23	14.89
Japan	Private savings banks	9,705,600	99,759,850	10.29	1.73
	Postal savings banks	20,088,713	301,832,170	15.02	5.23
Formosa	Private savings banks	8,065	172,732	21.42	.05
	Postal savings banks	358,204	2,750,812	7.68	.74
Chosen	Postal savings banks	1,406,259	7,440,556	5.29	.43
Netherlands	Private savings banks	561,179	70,915,614	126.37	10.38
	Postal savings banks	1,887,362	107,811,734	57.12	15.78
Dutch East Indies	Private savings banks	8,473	2,050,642	242.02	.05
	Postal savings banks	182,348	5,602,219	30.72	.12
Dutch Guiana	Postal savings banks	12,211	409,047	33.50	4.35
Dutch West Indies	Postal savings banks	4,793	101,229	21.12	1.78
Norway	Communal and private savings banks	1,626,202	374,624,481	230.37	143.31
Spain	Private savings banks	926,718	123,014,227	132.74	5.78
	Postal savings banks	325,144	14,745,821	45.35	.69
Sweden	Communal and Trustee savings banks	2,200,067	501,366,871	227.89	85.75
	Postal savings banks	661,686	22,607,418	34.17	3.87
Switzerland	Communal and private savings banks	2,597,947	496,732,891	191.20	125.12
United Kingdom	Trustee savings banks	2,046,996	254,758,195	124.45	6.03
	Postal savings banks	15,215,824	989,174,810	65.01	23.40
British India	Postal savings banks	1,677,407	61,072,871	36.41	.25
Australia	Government and private savings banks	3,281,437	573,492,964	174.77	104.61
New Zealand	Postal savings banks	664,819	171,240,522	257.58	139.56
	Private savings banks	100,343	15,172,274	151.21	12.37
Canada	Postal savings banks	116,541	41,654,920	357.50	4.98
	Dominion Government savings banks	30,277	13,633,610	450.30	1.63
Union of South Africa	Postal savings banks	306,103	33,933,496	110.86	4.75
British West Indies	Government and post-office savings banks	89,567	6,242,420	69.70	3.40
British colonies, other	Government and post-office savings banks	279,635	17,205,547	61.53	.61
Total, foreign countries		120,794,318	10,433,656,290	86.38	15.17
United States	Postal savings system	466,109	152,389,903	326.94	1.41
	Mutual and stock savings banks	10,737,843	6,018,258,000	560.47	55.63
Philippines	Postal savings banks	110,574	3,052,844	27.61	.29
Grand Total		132,108,844	16,607,357,037	125.71	20.59

power of the nation. Statistical tables which accompany this article show the vast financial power which is concentrated in the Federal Reserve system. With total gold reserves exceeding three billion dollars, it is by far the strongest financial institution the world has yet witnessed.

Bank Reserves. Banks are required by law to maintain cash reserves in proportion to their liabilities. Banks which are members of the Federal Reserve system must carry reserves equivalent to at least 10 per cent (7 per cent in small localities and 13 per cent in New York and Chicago) of their demand deposits and 3 per cent against time deposits. These reserves must be carried at the Federal Reserve banks. The Federal Reserve banks, in turn, must carry as reserves at least 35 per cent in gold or legal tender against deposits, and at least 40 per cent against Federal Reserve notes in circulation. To illustrate: The First National bank of Albany may be assumed to hold one million dollars in demand deposits; it must therefore carry on deposit with the Federal Reserve bank of New York as a reserve at least $100,000. In turn, against this deposit balance, the Federal Reserve bank of New York must carry in gold or lawful money in its vaults at least $35,000, or only 3½ per cent of the deposits in the member bank. The reserve seems extremely low, but experience has shown that it is ample. Reserve requirements of state banks vary widely.

Savings Banks. As the name indicates, savings banks aim to provide a place to safeguard the savings of the people. The funds are invested in securities of the highest class, and the income is distributed to the depositors in the form of interest. In New York State, all savings banks are mutual, which means they are owned by and operated for the depositors. The entire investment income becomes the property of the depositors after the payment of expenses. The entire amount is seldom distributed, however, as a certain part is placed in a surplus account for the protection of the accounts. Under state law, savings banks may invest only in United States government, state, and municipal bonds, underlying mortgages of certain railroad and utility companies, and real estate mortgages. An account may usually be opened with a very small deposit and it is the custom to limit the maximum balance to a few thousand dollars.

Farm Loan Banks. Farm loan banks and joint stock land banks operate under the Federal Farm Loan act of 1916. They loan funds to farmers for comparatively long periods with the understanding that repayment will be made in regular installments. The loans are secured by a mortgage on the farm property. The property usually has an appraised value at least double the amount of the loan. If the loan is made for 20 years, the farmer repays at the rate of one-twentieth each year. The banks secure their funds through the sale of bonds to investors. The bonds are thus secured by the mortgages and, being tax-exempt, appeal to wealthy investors.

Savings and Loan Associations. These associations exist chiefly to facilitate the purchase of homes by people of limited means. The depositor subscribes for a certain number of shares and pays in regular installments in the form of dues. At maturity, the depositor either has paid in full a loan made at the time of subscription, or is entitled to receive the face value of the subscription. The funds of the association are usually loaned on real estate mortgages. The interest received pays running expenses and provides income upon the depositors' money.

BUILDING AND LOAN ASSOCIATIONS IN THE UNITED STATES

State	Number		Membership		Assets	
	1920	1925	1920	1925	1920	1925
					Dollars	Dollars
Arizona	4	6	3,100	5,530	1,173,812	2,371,970
Arkansas	49	63	28,000	46,286	17,886,788	27,551,264
California	87	152	42,420	156,388	47,851,294	140,657,891
Colorado	42	56	22,000	72,183	10,986,445	30,458,600
Connecticut	30	37	18,615	35,574	7,097,282	16,197,954
District of Columbia	21	23	45,525	57,239	30,125,125	46,020,000
Illinois	686	852	292,600	783,888	148,779,130	317,403,747
Indiana	358	397	212,300	349,879	109,721,337	218,479,623
Iowa	68	74	49,000	71,800	17,654,390	37,380,525
Kansas	90	148	86,716	172,272	39,059,897	93,267,836
Kentucky	119	145	77,818	125,200	34,800,940	64,192,658
Louisiana	68	94	80,000	162,148	46,183,575	129,924,059
Maine	39	39	17,548	25,787	9,248,960	16,631,015
Massachusetts	202	220	296,411	439,553	174,042,652	369,273,095
Michigan	75	90	99,765	177,883	50,976,795	96,302,277
Minnesota	63	83	23,904	66,429	11,354,493	25,212,662
Missouri	181	242	71,494	182,550	40,863,168	117,007,732
Montana	21	30	16,156	36,900	3,667,486	13,109,462
Nebraska	74	84	119,131	202,100	77,939,337	141,435,904
New Hampshire	25	28	11,067	14,773	4,700,529	8,145,484
New Jersey	939	1,410	426,264	1,008,092	238,908,007	645,539,550
New Mexico*	13	12	4,100	6,300	1,707,200	2,950,000
New York	267	305	249,174	447,721	115,779,799	258,089,817
North Carolina	145	246	57,526	92,007	29,368,115	81,188,546
North Dakota	12	17	7,325	13,960	3,656,795	6,965,555
Ohio	775	865	973,168	2,098,733	462,790,288	847,570,701
Oklahoma	62	88	46,343	146,210	28,590,423	93,061,767
Oregon	10	37	17,611	34,200	5,200,457	14,871,323
Pennsylvania*	2,788	4,440	1,036,052	1,700,000	475,615,427	990,000,000
Rhode Island	8	7	14,680	29,248	8,126,956	17,075,323
South Carolina*	129	150	15,920	25,000	5,777,452	20,000,000
South Dakota	16	27	6,515	7,950	4,006,312	4,951,443
Tennessee	11	21	5,000	8,775	3,053,130	5,212,066
Texas	31	119	9,360	83,562	3,251,891	51,971,859
Vermont	7	9	1,499	3,533	548,618	1,798,039
Washington	43	71	55,354	217,440	20,175,163	76,145,600
West Virginia	53	59	26,150	54,500	9,928,091	25,000,000
Wisconsin	97	167	87,000	200,939	43,641,142	149,648,269
Other States*	916	1,490	374,170	524,465	189,981,000	306,112,538
Total	8,624	12,403	5,026,781	9,886,997	2,534,219,701	5,509,176,154

* Estimated.

MONETARY STOCKS OF PRINCIPAL COUNTRIES, 1925

Stated in United States Dollars

Country	Monetary Unit*	Value in U. S. Money	Gold††	Silver††	Paper Circulation†	Per Capita		
						Gold	Silver	Paper
			Thousand Dollars	Thousand Dollars	Thousand Units			
North America:								
United States	Dollar	$1.00	$4,408,696	$ 827,568	5,423,421	$39.33	$ 7.38	48.38
Canada	Dollar	1.00	156,769	26,266	401,060	17.83	2.98	45.63
Mexico	Peso	.4985	16,683	7,783	3,220	1.17	.54	.22
British Honduras	Dollar	1.00	90	195	653	2.00	4.33	14.51
Cuba	Peso	1.00	23,655	8,413	317,376	7.57	2.69	101.62
Dominican Republic	Dollar	1.00	300	400	2,300	.33	.44	2.56
Guatemala	Quetzal	1.00	208	500	25,339	.08	.20	10.32
Haiti	Gourde	.20	250	.....	16,763	.12	.....	8.19
Honduras	Peso	‡	30	420	1,250	.04	.62	1.86
Jamaica	Pound	4.8665	.....	888	223	.....	1.03	.26
Nicaragua	Cordoba	1.00	.....	435	6,898	.....	.62	9.85
Newfoundland	Dollar	1.00	1,000	2,300	185	3.77	8.68	.69
West Indies, British								
Trinidad	Dollar	1.0133	.....	1,625	4,260	.....	4.15	10.89
Barbados	Dollar	1.0133	.....	41	940	.....	.26	6.02
West Indies, French								
Martinique	Franc	.193	.....	.....	20,000	.....	.....	83.33
Guadeloupe	Franc	.193	299	54	40,297	1.30	.23	175.24
South America:								
Argentina	Peso	.9643	435,880	.....	1,319,798	50.11	.....	151.72
Brazil	Milreis	.5462	54,298	.....	2,829,134	1.77	.....	92.35
Chile	Peso	.1217	25,217	2,957	388,346	6.71	.79	103.42
Colombia	Peso	.9733	7,617	9,519	29,121	1.30	1.62	4.97
Paraguay	Peso	.9643	3,000	.....	262,707	3.00	.....	262.71
Peru	Pound	4.8665	19,164	.....	6,400	2.63	.....	.88
Uruguay	Peso	1.0342	56,814	3,304	50,282	37.15	2.16	32.89
Venezuela	Bolivar	.193	15,000	9,000	40,000	6.22	3.73	16.58
Europe:								
Austria	Schilling	.1407	2,087	463	890,001	.32	.07	138.56
Belgium	Franc	.193	52,855	17,469	7,813,692	7.08	2.34	1,046.57
Bulgaria	Leu	.193	7,981	3,351	3,655,301	1.62	.68	744.46
Czechoslovakia	Krone	.2026	19,014	5,070	8,408,351	1.39	.37	617.76
Denmark	Krone	.268	56,085	3,627	437,737	17.13	1.11	133.94
Esthonia	Mark	.00268	133	11	3,457,418	.12	.01	3,123.23
Finland	Mark	.0252	8,357	22	1,309,306	2.48	.....	388.86
France	Franc	.193	710,968	61,993	51,085,133	18.13	1.58	1,302.86
Germany	Reichsmark	.2382	264,753	106,932	6,497,452	4.42	1.78	108.55
Great Britain	Pound	4.8665	712,086	305,245	438,156	15.04	6.44	9.25
Greece	Drachma	.193	8,941	.....	5,682,309	1.73	.....	1,099.51
Hungary	Pengo	.1749	10,407	167	415,515	1.31	.02	52.29
Italy	Lira	.193	137,956	32,096	21,449,700	3.54	.82	551.39
Jugoslavia	Dinar	.193	14,657	3,375	6,062,684	1.22	.28	504.51
Latvia	Lat	.193	4,548	3,860	61,443	3.02	2.50	40.88
Lithuania	Litas	.10	174	750	81,918	.07	.32	35.72
Netherlands	Guilder	.402	178,080	48,130	899,818	25.94	7.01	131.07
Norway	Krone	.268	45,513	6,673	362,800	17.29	2.53	137.84
Poland	Zloty	.193	15,195	17,362	663,265	.55	.63	24.06
Portugal	Escudo	1.0805	9,267	1,964	1,766,693	1.59	.32	292.83
Rumania	Leu	.193	26,735	893	26,460 185	1.53	.05	1,521.31
Russia	Chervonetz	5.1455	93,858	73,100	78,136	.66	.51	.55
Spain	Peseta	.193	489,629	125,737	4,445,134	22.93	5.89	208.23
Sweden	Krona	.268	61,876	22,752	529,789	10.48	3.85	89.73
Switzerland	Franc	.193	135,208	49,344	877,315	34.84	12.71	226.11
Turkey	Piaster	.044	345,526	73,548	**158,749	23.75	5.05	10.91
Asia:								
Ceylon	Rupee	.3244	15	12,438	57,971	.....	2.76	12.86
China	Dollar	‡	1,250	164,143	192,728	.....	.38	.45
Cyprus	Pound	4.8665	292	711	525	.92	2.24	1.66
Federated Malay States	Dollar	.5678	.....	60	9,746	.....	.04	7.35
India, British	Rupee	.4867	81,464	1,608,206	1,917,620	.33	6.51	7.75
Indo-China, French	Piaster	‡	.....	76,629	1,476,300	.....	3.88	74.75
Japan	Yen	.4985	575,768	192,196	1,721,206	7.86	2.62	23.55
Netherland Indies	Guilder	.402	76,327	168,357	388,310	1.54	3.41	7.86
Philippine Islands	Peso	.50	3,237	18,934	134,506	.31	1.83	13.04
Siam	Tical	.3709	.....	44,452	125,134	.....	4.72	13.29
Straits Settlements	Dollar	.5678	1,754	12,155	198,033	1.87	13.00	212.44
Africa:								
Algeria	Franc	.193	.....	.....	917,411	.....	.....	158.12
Belgian Congo	Franc	.193	.....	.....	66,492	.....	.....	4.43
Egypt	Pound	4.9431	16,710	36,938	35,572	1.23	2.72	2.62
Kenya Colony	Shilling	.2433	.....	9,422	1,194	.....	3.72	.47
Nigeria	Pound	4.8665	.....	4,995	347	.....	.26	.01
Nyasaland	Pound	4.8665	349	1,246	.....	.29	1.06	.....
Rhodesia, Southern	Pound	4.8665	2,020	.....	.....	2.50	.....	.....
Sierra Leone	Pound	4.8665	.....	164	150	.....	.11	.09
Union of South Africa	Pound	4.8665	56,910	17,204	10,694	8.21	2.48	1.54
Zanzibar	Rupee	.3244	.....	675	3,791	.....	3.43	19.24
Australasia:								
Australia	Pound	4.8665	127,840	.....	54,092	23.51	.....	9.95
New Zealand	Pound	4.8665	.....	.....	6,948	.....	.....	5.37
Others			17,571	53,963	.....	.....	.....	.....
Total			9,509,793	4,288,672	.....	5.63	2.52	.....

* Gold is the monetary standard except in China, French Indo-China, and Honduras, where silver is the monetary standard; and Czechoslovakia, for which no monetary standard had been established. † Stated in monetary units of issuing countries. ‡ Fluctuates with the price of silver. ** Turkish pounds; value of Turkish pound about $4.45. †† Exclusive of unclassified metallic stocks in various countries amounting to $427,698,000.

BUSINESS, BANKING, AND LEGAL TERMS

THE everyday life of the average man or woman brings frequent occasions which demand the ability to understand and use many terms peculiar to business, banking, or the law. To know the nature and the meaning of commercial forms and legal instruments is to be acquainted with the necessary working tools of the business world. Every person needs to know what these tools are and how they are used.

The treatment of the topics in the following dictionary of business, banking, and legal terms is adapted to meet such everyday needs. This alphabetic list will supply definite information upon specific subjects, and it will supplement with greater detail the chapters that precede it in the department of Economics.

Acceptance. A term used broadly to designate any bill of exchange which has been accepted by the drawee—the person upon whom it is drawn.

The term is more narrowly and appropriately used with reference to the act of the drawee in accepting the bill of exchange, by writing upon the face of the bill the word "accepted" and signing his name as acceptor. The date of acceptance and the place of payment are generally added. These, however, are not essential to the validity of the acceptance. After the bill has been accepted, it becomes the direct obligation of the acceptor, and the drawer of the bill then becomes liable to pay the amount of the bill only in the event that the acceptor does not pay it.

A bank or banker's acceptance is a bill of exchange of which the acceptor is a bank or trust company or some person, firm, or corporation which makes a business of lending its credit by accepting bills of exchange.

A trade acceptance is a bill of exchange drawn by a seller upon a purchaser to cover a current sale of goods. Ordinarily, the trade acceptance is drawn by the seller payable to himself, and the acceptance of the bill by the purchaser converts the bill into what is substantially the same as a promissory note. The trade acceptance, however, bears upon its face the statement: "The obligation of the acceptor hereof arises out of the purchase of goods from the drawer"; and it is made a crime under the Federal laws to use a trade acceptance in interstate commerce for any other purpose than in payment for an original purchase of goods. See *Bill of Exchange, Payee.*

Acceptor. One upon whom a draft or bill of exchange is drawn, and who, by writing his acceptance upon the face of the bill, has undertaken to pay the amount of the bill.

Acceptor for Honor. One who accepts a bill drawn upon another, in order to prevent the bill from being protested for nonacceptance or nonpayment. Thus the acceptance is deemed to be for the "honor" of the person upon whom the bill is drawn.

Accommodation Paper. An instrument by which one person lends his credit to another. Usually, but not necessarily, the transaction involves no financial profit to the person lending his credit. The accommodation may take the form of signing a note as maker or endorser, or of drawing, accepting, or endorsing a draft or bill of exchange, or otherwise affixing one's name to a commercial instrument in such manner as to become liable in the event that the instrument is not paid when due by the person receiving the accommodation.

Accounts Payable. Sums owing by a person, partnership, or corporation to others upon open account, the obligations not being represented by notes, bills, or other instruments of indebtedness. See *Bills Payable.*

Accounts Receivable. Sums due to a person, partnership, or corporation from others upon open account, the obligations not being represented by notes, bills, or other instruments of indebtedness. See *Bills Receivable.*

Accrued Dividends. A term improperly applied to dividends which have not been paid or declared, but which are loosely regarded as having "accrued" because the stock upon which the dividends are payable entitles the holder to cumulative dividends at a specified rate. In fact, a stockholder can have no right to dividends until they have been declared by the board of directors of the company. See *Preferred Stock.*

Accrued Interest. While interest upon an obligation usually becomes due and payable at the termination of some definite period or periods of time, the interest upon the obligation, in fact, accrues from day to day. In the purchase and sale of securities between interest payment dates, the amount of interest accrued must be added to the face value of the obligation in order to determine the actual present value. Similarly, an exact statement of the financial condition of a business at any particular moment must include among the liabilities of the company the item of accrued interest upon interest-bearing obligations of the company held by others. A similar item will also be included among its assets, representing interest accrued upon interest-bearing obligations of others held by the company. Interest already due and unpaid is not properly included in the item of accrued interest.

Active Stocks. Stocks that are frequently bought and sold upon the general market in considerable quantities.

Actuary. One whose business is the formulation of mortality tables based upon statistics of the death rates per unit of population within different periods of life and among different groups of people. Upon these mortality tables, rates of insurance, values of annuities, and values of remainder interests in property are based.

Ad Valorem Duties. Taxes imposed upon articles according to their value.

Agent. One hired to carry on certain activities for an employer. The person employing the agent is known as the principal, and is bound by any acts performed by the agent within the scope of the agent's employment. The principal is liable also for any damages sustained by third persons from wrongful acts committed by the agent in the course of his employment.

Frequently it is difficult to distinguish an agent from an independent contractor. Where there is a mere agency, the employer may direct and supervise the work of his agent, both in large matters and in details. In the case of the independent contractor, this power of supervision does not exist. For this reason, if the person who is hired to do a particular piece of work is in fact an independent contractor and not an agent, the "employer" usually is not liable for any wrongful acts committed in the performance of the undertaking.

Agio. The rate at which the money of one country exchanges with the money of another country; also applied to the rate at which a particular kind of money, such as gold, exchanges with another kind of money within the same country.

Amortization. The setting aside periodically, out of revenue or earnings, of a definite proportion of the initial cost of machinery, plant, or other capital investment, for the purpose of providing a fund with which to replace the machinery or equipment when it has become worn out.

The term is applied also to the building up of a fund for the retirement of a loan when it becomes due.

Ancillary Receiver. A receiver appointed in a state or a district other than the one in which the principal or original proceedings have been begun. The duties of an ancillary receiver are to gather in and administer property in the state or the district of his appointment. See *Receiver.*

Arbitrage. Purchasing exchange, securities, or commodities in one market, and selling immediately at a higher price in another market. This practice tends to keep the price of a particular security or commodity at substantially the same level at any particular time in all markets of the world. Arbitrage is frequently resorted to where artificial exchange rates exist in any country with respect to the currency of another.

Assay Office. A bureau connected with the United States mint, in which the weight and fineness of metals used in the coining of money are tested and certified to.

Assessed Valuation. The value placed upon property by government or municipal officials as a basis for the imposition of taxes. Frequently the assessed valuation of property is considerably below its real or market value. In most communities, the assessed valuation averages from about 60 to 80 per cent of the true value of the property.

Assessment. (1) A tax or charge imposed upon property to defray a part of the cost of a local improvement by which the property has directly benefited. Assessments for paving and cleaning streets, for installing sewers, and for widening streets are of this character.

(2) A levy made by a company upon its shareholders for the purpose of securing additional capital. The stock of most business corporations is today nonassessable if the par value of the stock has once been fully paid in cash or its equivalent. However, stockholders in banking and similar corporations are generally subject to assessment to make good any impairment of capital, and to pay the obligations of the company in the event of its insolvency, even though their stock has been paid in full.

Assets. Anything of material value belonging to a person, firm, or corporation. The term includes, not merely real property and tangible personal property, but also good will, copyrights, patent rights, and all other rights, privileges, franchises, and property interests having any value.

Assignee. One to whom any contract, right, security, or interest has been assigned.

Assignment. The transfer to another of one's interest in a contract, security, or any other thing of value. Except in the case of negotiable instruments, an assignee receives no better title to the thing assigned than his assignor had.

A "general assignment for the benefit of creditors" is sometimes made by a debtor who is insolvent or financially embarrassed. The assignment takes the form of a transfer, by the debtor, of all his assets to a trustee. The purpose of such an assignment is to show the good faith of the debtor and his willingness to distribute his assets among his creditors. If satisfied that the debtor has not withheld assets from the trustee, the creditors will join in a composition agreement whereby each creditor agrees to accept, in satisfaction of the debt, a certain percentage of the amount due him. If all the creditors join in the composition agreement, the property of the debtor can be equitably distributed among the creditors, without the stigma and the wastage of assets which bankruptcy proceedings would entail. Any group of creditors, however—sometimes one creditor is sufficient—may refuse to enter into this plan for an informal distribution of the debtor's assets, and may insist upon formal bankruptcy proceedings; and the general assignment is itself a sufficient ground for the institution of bankruptcy proceedings against the debtor.

Assumed Bonds. Bonds issued by one corporation and assumed by another, as a result of a merger or consolidation of the two companies, or as a result of the acquisition of the control of the former company by the latter. The bonds so assumed become the liabilities of the second corporation as though such bonds had originally been issued by it.

Attachment. A writ issued by a court of competent jurisdiction, authorizing the seizure of a person or of designated property.

Audit. An examination by an accountant of the books of a person, firm, or corporation, to determine whether there are any arithmetical errors or fraudulent entries in the accounts, or whether any improper methods of accounting have been employed.

Available Assets. Property, personal or real, not already pledged or otherwise encumbered, that can be sold, pledged, or mortgaged as security for a proposed indebtedness.

Balance of Trade. A term applied to the relation between the volume of exports and the volume of imports of a country. Where the exports from a country exceed its imports during any period, the balance of trade is said to be "favorable." Where imports exceed exports, the balance of trade is regarded as "unfavorable." It is so regarded largely because an excess of exports is likely to be accompanied by an influx of gold—in payment of the excess of products sent abroad. And, vice versa, an excess of imports may result in a flow of gold out of the country.

As a matter of fact, however, an excess of imports frequently indicates merely that the citizens of a country have loaned or invested heavily abroad and are receiving the income upon their investments, or repayment of the principal, in merchandise. When this is the case, there can be no harm in an "unfavorable" balance of trade.

Balance Sheet. A statement of the assets, liabilities, and net worth of an individual, firm, or corporation as of a certain date.

Bank Acceptance. See *Acceptance.*

Bank Balance. The amount credited to a customer or a depositor by a bank at any particular time. This sum does not represent actual currency in the custody of the bank to the amount of the balance; rather, it represents the amount of an obligation due from the bank to the customer or depositor. In the ordinary deposit in a commercial bank, the amount of this balance is subject to withdrawals upon written orders called checks, drawn by the depositor upon the bank.

Bank Book. A book, issued by a bank to a depositor, in which the deposits made with the bank are recorded. The bank book issued by the ordinary commercial bank is nothing more than a receipt; and a transfer of the book by the depositor to another, whether as a gift or for value, will not ordinarily transfer the ownership of the deposit. A bank book, issued by a savings bank, however, is for many purposes regarded as a symbol of the deposit itself; and, in some states, a gift, or a transfer for value, of a savings bank book gives to the transferee a valid claim against the bank, to the extent of the deposit represented by the book.

Bank Discount. Simple interest deducted in advance from the face value of a loan, the principal of which is payable at a definite future date. By thus taking the interest before it is earned, a slightly higher rate of interest than the rate nominally charged is actually received by the bank, since the full amount of the principal is never turned over to the borrower. Banks, however, are very generally permitted to indulge in this practice, even though the interest which they thus obtain is in excess of the legal rate of interest.

Bank Draft. An order in writing, drawn by one bank upon another, directing the latter to pay a designated sum of money to a third person. The draft may be payable at sight, that is, on demand, or at a definite or determinable future time.

Banker's Acceptance. See *Acceptance.*

Bank Examiner. Both state and national banks, as depositories of the funds of the general public, are subjected to stringent control and supervision by the respective state and Federal authorities. This control is exercised by examinations of the books of the banks, made periodically by bank examiners acting under the authority of the comptroller of the currency, or under the direction of the banking department of a particular state. Such examinations supplement and check the statements which banks are required to furnish, setting forth in detail the financial condition of the institutions. Any fraudulent or false entries or unsafe practices discovered by the bank examiners are reported to the proper officials, and the bank guilty of the improper practice or false entry is promptly required to rectify the situation. These examinations of the records and accounts of banks by trained examiners have proved to be a most effective safeguard against dishonest and improper practices by banks and bank employees.

Bank Note. An instrument containing a promise of a bank to pay to the bearer on demand a definite sum in legal tender. These notes commonly bear no interest. When safeguarded by an adequate redemption fund, so as to be redeemable upon presentation by a holder, and when carefully limited and supervised by governmental authorities, bank notes may circulate at par as a part of the paper currency of the country. Prior to 1837, bank notes were issued, in unlimited quantities and without adequate security, by numerous state banks. When a number of these issuing banks failed in the panic of 1837, many persons who held what appeared to be currency found that they had nothing more than promises to pay, issued by banks whose promises were worthless.

By the National Bank act of 1862, a tax of 10 per cent was imposed upon bank notes issued by state banks, and national banks were permitted to issue bank notes only by depositing with the United States treasury, bonds of the United States government to an amount equal to the face of the notes to be issued. The tax of 10 per cent upon notes issued by state banks was intended to be prohibitive and was in fact so. State banks, therefore, have not issued bank notes since that law was enacted. Federal Reserve banks, under the Federal Reserve act of 1913, are permitted to issue bank notes in substantially the same manner as national banks. These are called Federal Reserve Bank notes and are to be distinguished from Federal Reserve notes, which are not bank notes, but rather obligations of the United States. See *Federal Reserve Notes.*

Bank of Deposit. Any bank which receives deposits subject to withdrawal by check. National banks, state banks, and, in many states, trust companies are included within the general class of banks of deposit.

Bank of Issue. A bank legally authorized to issue bank notes which may circulate as currency. Only national banks and Federal Reserve banks are banks of issue in the United States. The Bank of England, the Bank of Paris, and the Imperial Bank of Germany are the leading banks of issue in Europe.

Bankrupt. One who has been adjudicated a bankrupt, in proceedings under the National Bankruptcy law.

Bankruptcy. Proceedings under which the property of an insolvent debtor may be distributed ratably among his creditors under the supervision of a court, and the bankrupt be thereupon discharged of his debts. Bankruptcy proceedings thus serve two purposes: (1) the equitable distribution of the property of the debtor among his creditors; (2) the release of the debtor from his obligations, giving him a fresh start in the business world.

Bankruptcy proceedings in the United States are governed by the Federal Bankruptcy act of 1898 and the amendments thereto. Under this act, proceedings may be either "voluntary" or "involuntary." In the former, the debtor himself institutes the proceedings by filing a voluntary petition showing that he owes debts to the amount of at least $1000, which he is unable to pay. In involuntary proceedings the creditors file the petition. Three or more creditors with unsecured claims amounting to at least $500, or, if there are fewer than twelve creditors, one creditor with a claim amounting to $500 may institute the proceedings.

A debtor may be adjudicated an involuntary bankrupt only if, within four months prior to the filing of the petition, he has done one or more of the following acts: (1) concealed, removed, or otherwise fraudulently disposed of property with intent to hinder, delay, or defraud his creditors; (2) transferred property, while insolvent, to any creditor, with intent to prefer that creditor over others; (3) permitted a creditor to obtain a preference by legal proceedings, as by attachment or levy upon goods of the debtor, and failed to vacate the preference at least five days before a sale under the levy or attachment; (4) made a general assignment for the benefit of creditors; (5) being insolvent, applied for a receiver, or if a receiver has been appointed at the request of creditors.

Wage earners receiving less than $1500 a year and farmers cannot be adjudicated bankrupts. Claims for torts, that is, injuries to person or property, usually may not be proved in bankruptcy proceedings, and are not affected by the discharge of the bankrupt.

Bank Statement. A statement issued by a bank or trust company, setting forth in detail its assets and liabilities, together with its capital stock and surplus profits.

The term "bank statement" is sometimes applied also to a statement of financial condition supplied to a bank by one seeking a loan, to enable the bank to determine whether the loan should be made.

Bar Gold. Gold in the form of bars, of a specific weight and fineness. When gold is shipped from one country to another in payment of obligations, it is shipped in the form of bar gold.

Baring Panic. A panic in England in 1890, which came at the end of a period of violent overspeculation. The failure of the brokerage house of Baring Brothers precipitated the panic which at once spread to a number of other banks and brokerage houses. The intensity of the panic was alleviated by loans of gold obtained by the Bank of England from the Bank of Saint Petersburg and the Bank of France.

Bar Silver. Silver in the form of bars, of a specific weight and fineness.

Bear. A stock or commodity speculator who gambles on the prospect of prices going down. The "bear" sells, for future delivery, stock or wheat which he does not then have, expecting to cover, that is, buy in, at a lower price than that for which he has agreed to sell, at some time before delivery must be made.

Bear Market. A condition of declining prices in securities or commodities, generally accompanied by little activity in the market and by a general depression in trading.

Bear Panic. When those who have sold "short" in any security or commodity find that the market is rising, they attempt to cover in order to keep their losses as low as possible. When the rise in prices is very sudden or very pronounced, the haste of the "bears," to cover their sales by buying in on the market, reaches the point of a veritable panic. See *Cover*, *Selling Short*.

Bear Raid. A concerted movement by those traders who make a business of selling "short" on stock or commodity exchanges, the purpose of which is to cause the market price of a certain stock or commodity to fall. This result is effected by sales of the stock, against which the raid is directed, at prices below the true market value of the stock. In the case of a successful "bear raid," these sales, which usually provide for delivery at some future time, result in a very pronounced temporary fall in the price of the stock, the public being afraid to hold a stock, the price of which is apparently on the down grade. When the market price has thus been hammered down to an artificially low price, the bears "buy in" and so cover at a profit their earlier sales for future delivery.

Bids and Offers. The rules of the New York stock exchange provide definite terms upon which bids and offers must be made and construed in dealings upon the exchange. These are: "cash," that is, for delivery upon the day of contract; "regular way,"—for delivery upon the business day following the contract; "at three days,"—for delivery upon the third day following the contract; "buyers' or sellers' options,"—for not less than four days nor more than sixty days. Unless otherwise specified, bids and offers are deemed to be "regular way."

Bill of Exchange. An unconditional order in writing, addressed by one person (called the drawer) to another (called the drawee), requesting the person to whom it is addressed to pay on demand, or at a fixed or determinable future time, a definite sum of money to the order of a third person (called the payee). The term "draft" is used in the United States with respect to domestic bills of exchange.

A check is in effect a bill of exchange drawn upon a bank, payable upon presentation or at sight. See *Acceptance*, *Check*, *Draft*.

Bill of Lading. A receipt given by a railroad or other carrier, stating that the goods described in the receipt have been received by the carrier for transportation to a designated point, and setting forth the terms of the contract between the carrier and the shipper under which the goods are transported. There are two kinds of bills of lading in use in the United States. One is the so-called "order bill of lading," and the other the so-called "straight bill of lading."

In the "order bill of lading," the carrier undertakes to deliver to the *order of* a designated person, and only upon the surrender of the document. In the "straight bill of lading," the carrier merely undertakes to transport and to deliver to the person named as consignee in the bill of lading; the surrender of the bill of lading is not made a condition precedent to the surrender of the goods by the carrier.

The distinction between the order bill and the straight bill has become very important by reason of the effect which the law has given to order bills of lading. Since the order bill may be negotiated from one holder to another by mere endorsement and delivery, and since the carrier undertakes to deliver the goods represented by it only upon a surrender of the document, the order bill has come to be dealt with commercially as the symbol of the goods. Thus loans are frequently made upon the security of properly endorsed bills of lading, the lender being protected by the assurance that the carrier will not deliver the goods represented by the bill of lading except upon the surrender of that instrument properly endorsed.

In order to further the use of the order bill of lading as an instrument in commerce and as the basis for the advance of credit to owners of goods in transit, 39 states have passed the Uniform Bill of Lading act, which makes the order bill of lading in effect a negotiable instrument and protects from loss all bona fide purchasers of such bills, as well as persons who lend upon the instruments, even though the bill of lading itself may have been lost by, or even stolen from, the true owner. The Uniform Bill of Lading act also forbids any attachment of, or interference with, goods in transit represented by an order bill of lading, unless the negotiation of the bill has first been enjoined and thus its transfer to a bona fide purchaser or lender has been rendered impossible. The Uniform Bill of Lading act has been passed by Congress, and has thus been made applicable to all shipments in interstate and foreign commerce.

The straight bill of lading possesses none of these peculiar attributes that the law has given to the order bill. The straight bill of lading, therefore, does not in any sense represent the property in the possession of the carrier, and cannot form the basis for a loan upon the goods. The duty of the carrier, where a straight bill of lading has been issued, is merely to deliver to the person named as consignee, and this duty remains unchanged and unaffected by any attempted dealing with the bill of lading.

Bill of Sale. A written instrument transferring or assigning, from one person to another, personal property or any interest therein.

Bills Payable. Obligations owing to others, represented by bonds, notes, or other instruments of indebtedness.

Bills Receivable. Obligations due from others, represented by notes, bills, or other instruments of indebtedness.

Bimetallism. The free and unlimited coinage of both gold and silver as the basis of the monetary system. The bimetallic system has been abandoned in all Western countries. The single gold standard was not definitely adopted by the United States, however, until 1900.

Black Friday. September 24, 1869. A day when the "bears" of the New York stock exchange were practically ruined by a "bull" movement engineered by Jay Gould and Jim Fisk, which caused an unprecedented rise in the prices of speculative stocks upon the exchange. The movement was precipitated by the redemption by the United States of $4,000,000 of its bonds in gold.

Blanket Mortgage. A mortgage which covers several different properties, or one mortgage which is issued in place of several existing mortgages. Such a mortgage is not necessarily a first mortgage.

Block of Stock. A number of shares of stock held by an individual or by a group in a particular corporation.

Bond. An instrument by which a person, corporation, or government agrees to pay a certain sum of money on a determinable date. Bonds are usually given under seal and, in many states, are enforceable for a period of twenty years after their maturity; while the ordinary promissory note, or contractual obligation, is not enforceable after the lapse of six years from the date when the obligation matured.

Bonded Debt. The amount of the indebtedness of a government, a corporation, or an individual, represented by bonds issued and outstanding. The bonded debt is taken to represent the fixed or permanent indebtedness, as opposed to current or short time indebtedness, which must be paid or renewed currently.

Bonus. Stocks and bonds are frequently sold under a plan which purports to give to the purchaser a "bonus"—a nominal interest in the corporation in excess of the amount paid by the purchaser for the securities. Thus, stock selling schemes have frequently provided for the sale of two classes of securities or two classes of stock, the purchaser paying the par value of one class of security and receiving in addition thereto a further interest in the company as a bonus.

A not unusual plan is to offer one share of preferred stock having a par value of $100, together with one share of common stock also having a par value of $100, for a total purchase price of $100, the common stock being thrown in as a "bonus." In fact, stock which is thus issued as a bonus is valueless until some surplus has been created in the corporation beyond the amounts actually received by the company in exchange for the stock issued. Moreover, persons who receive stock as a bonus, pursuant to such a selling plan, may, under some circumstances, be compelled later to pay the par value of the stock so received to the corporation or to its creditors. This is true even though the stock which they have received as a bonus purports on its face to be fully paid and nonassessable. The newer plans for the flotation of stock avoid some of the legal dangers heretofore involved in the acceptance of bonus stock, by issuing the bonus stock without any nominal or par value.

The term "bonus" is frequently used also with reference to the sum paid by a borrower to a lender or his agent, as a consideration for granting or obtaining a loan. Frequently the bonus is merely an attempt to circumvent the usury laws, and, where that is the case, the law will see through the device and deem the loan usurious and unlawful.

Books Closed. The books of a corporation are usually closed as of a certain date, for the purpose of determining what persons are entitled as stockholders to share in a dividend to be declared, or in other distributions to be made by the company, or to determine who are entitled to vote as stockholders in any stockholders' meeting of the company. During the period when the books are closed, no transfers of stock are made on the books of the company. For all corporate purposes, the holders of record, as of the date upon which the books are closed, are deemed the stockholders of the company until the books are again opened to transfers of stock.

The term "books closed" is sometimes used also with reference to subscriptions to a new issue of securities, when the issue has been fully subscribed. In the event of oversubscription, the issue is frequently prorated among all who have sent in subscriptions. But, unless the right to prorate the issue among the subscribers has been specifically reserved in the offer of sale of the securities to the public, a subscriber is not obliged to accept less than the full amount called for by his subscription.

Book Value. The value of the assets of a company as set forth upon the books of the company.

The book value of a share of stock issued by a company, as distinguished both from its par value and from its market value, or selling price on the market, may be obtained by dividing the net assets of the company by the number of outstanding shares. If the books of the company are accurately kept, the book value of any share of stock is thus a closer approximation to the amount of capital investment represented by each share than either the par or the market value of the stock.

Boom. Unusual activity and enthusiasm in any line of business, or in business generally, resulting in a marked rise in prices.

Bottomry. Lending money upon the security of vessels or their cargo.

Bourse. The stock exchange of Paris; by extension, any exchange in continental Europe.

Break in the Market. A sharp and rapid decline in the prices of stocks or bonds, generally coming at the end of a period of violent speculation and rising prices.

Broker. One who, for a commission or other fee, buys or sells personal or real property for others.

Brokerage. Fee charged by a broker for services in buying or selling.

Bucket Shop. An establishment operated by irresponsible brokers, generally not members of any recognized exchange, who, when they receive orders from their clients to buy or sell, do not in fact make the purchase or sale, but merely make entries upon their own books. Instead of being actually executed, orders received are simply "bucketed," figuratively, thrown into a bucket. Thus the bucket-shop broker stakes his judgment against the judgment of his own client. For example, in the event that a client has sent in an order to purchase, and the particular stock thereafter falls in price, the broker can purchase the stock at the lower price, when a sale is actually demanded by the client. In such a case, he may pocket, not merely a commission upon the purchase and sale, but also a profit equivalent to the difference between the amount for which the client bought and the amount at which the client directed the broker to sell.

Where the orders to buy and the orders to sell any particular stock are substantially even over a period of time, the bucket shop may with a fair degree of safety make two sets of commissions without in fact executing any of the orders. But, where buying and selling orders do not remain even, the bucket shop in an adverse market may lose heavily and be unable to meet its commitments to its clients. The rules of stock exchanges uniformly forbid "bucketing" orders, and, under the laws of most states, this practice is made unlawful.

It has been said that the term "bucket shop" originated from the practice, at one time common in the Chicago grain exchange, of calling in outside brokers, who had no regular connection with the exchange, when business became dull. These outside brokers were carried to the floor of the exchange, huddled together in an elevator, and each group so invited came to be called a "bucket full of brokers." The "bucket shop" was, therefore, synonymous with a brokerage house maintained by a broker of no recognized standing.

Bull. A speculator in the stock market who gambles upon the expectation of a rise in prices; one who manipulates the market in such a manner as to bring about a rise in prices.

Bullion. Uncoined gold or silver, generally in the form of bars or ingots, ready to be turned into coins. Bullion is frequently used in payment of obligations due from persons of one country to those in another. See *Dollar Exchange*.

Bull Market. A bull market is one of activity and rising prices. The term is particularly applied to such a condition in the stock market.

Buyer's Option. A special term applied to a contract permitted by the rules of the New York stock exchange, whereby the buyer of stock is not compelled to accept and pay for the securities purchased until the expiration of a specified time. The buyer has the privilege, however, of demanding delivery of the stock upon one day's notice. The rules of the New York stock exchange provide that such a contract must be for a term of not less than four days and not more than sixty days. A buyer's option, the term of which is four days, is called "buyer's four"; if the term is ten days, it is called "buyer's ten"; and so forth.

Buying Outright. A purchase of stock or other security by a payment of the full purchase price at once or within a definite period after the purchase. This is distinguished from buying "on margin," where only a portion or percentage of the purchase price is paid by the purchaser, the remainder of the price being loaned to the purchaser by the broker. See *Margin*.

Callable Bonds. Bonds issued with a right reserved by the issuing corporation to redeem or "call" the issue, in whole or in part, after a specified date, at a designated price. The "call" price is generally five to ten points above par. A redemption provision is now commonly inserted also in issues of preferred stock.

Call Loan. The lending of money repayable on demand. Loans of this character are very common in New York City, where brokers and speculators upon the various exchanges borrow large sums of money from the banks upon securities as collateral. In this type of loan, both the borrower and the lender have the right to terminate the loan at any time. The advantage to the bank of such a loan is that it enables the bank to make some profitable use of its available funds during any period of temporary abundance; while leaving the bank free to terminate the loan at any time, should any extraordinary demand for cash arise. Its advantage to the borrower is that, as soon as the temporary need of cash or credit has passed, the loan may be repaid and the incurring of interest may at once be terminated.

Calls. Transactions upon stock and commodity exchanges in which one person is given an option to require another to deliver a specified amount of stock or of a commodity at a particular price at any time within a specified period. A "call" is frequently referred to as a "buyer's option."

The term "call" is used also with reference to a notice issued to stockholders or subscribers to the stock of a corporation, requiring payment to the corporation of sums upon stock purchased or held by them. In this sense a "call" may be issued either before or after the stock has been paid in full. If issued prior to full payment, it is nothing more than a notice that an installment is due upon the purchase price of the stock. Where a call is issued after the stock has once been fully paid for, it amounts to an assessment of stockholders to enable the corporation to carry on its business.

Most stock is now issued as nonassessable after it has once been fully paid for. In that event, a "call" of the latter character cannot be made. If it is in need of further capital, a corporation must then issue additional securities to be taken up either by the existing stockholders or by the general public. See *Buyer's Option*, *Callable Bonds*, *Put*.

Carrier. Any person or company that purports to engage in the business of transporting passengers or freight for hire. The more appropriate term is "common carrier," the term "carrier" being used as a colloquial abbreviation of the longer term. Included within the general class of common carriers are railroads, steamships, ferries, street railways, hacks, or other vehicles, which solicit publicly upon the highways, and other vehicles which make a business of carrying persons or property from one place to another. An elevator has been held not to be a common carrier.

From the early days of feudal England down to the present time, common carriers have been subjected to special rules of law, at least with respect to the transportation of property. Thus, a common carrier is held absolutely liable for any damage or loss to goods in transit, regardless of the negligence or fault of the carrier. The origin of this rule is said to have been in the danger in the middle ages—sometimes perhaps founded in the fact—that carriers of goods were in league with the robbers who frequently held up carriers and relieved them of their goods. This rule of absolute liability has not been applied to the transportation of passengers, the theory of the law being that a passenger is, to some extent, able to look out for himself.

From early times, too, the law limited the charge which a common carrier may make, for transporting persons or property, to such sum as was deemed a reasonable compensation for the service rendered. In modern times, common carriers have come to be strictly regulated by statutes administered by governmental commissions; and the more important carriers, such as the huge railroad systems and steamship lines, as well as street railway systems, are looked upon as quasi public corporations. The Interstate Commerce act, originally enacted by Congress in 1887, and amended from time to time since then, created a commission with power to regulate the service rendered and the rates charged by any carrier engaged in interstate traffic. In most states, there are similar regulatory statutes and commissions designed, first, to secure to the public adequate service and fair rates, and, secondly, to insure to the carrier a "living wage" and freedom from destructive competition.

Carrying Charges. Interest on moneys advanced by banks or brokers, insurance, storage charges, and similar costs incurred by one who has purchased goods or securities on credit or on margin.

The term is sometimes used also as the equivalent of "fixed charges," that is, costs incurred regardless of the volume of operations or the amount of business done.

Cashier's Check. A check issued by a bank, usually signed by the cashier (whence the name is derived), and drawn against the bank itself or against a metropolitan bank with which the drawing bank keeps an account. New York funds are generally provided in the form of cashier's checks. The cashier's check differs radically from an uncertified check drawn by a depositor of the bank. The cashier's check gives the holder an obligation against the bank itself, while the ordinary check gives the holder no claim against the bank, but only a claim against the depositor in the event that the check is not honored.

Certificate of Deposit. A certificate or receipt, in which a bank acknowledges that it has received a certain sum of money from the person to whom the certificate is issued, and agrees to pay the sum to the person named in the certificate, or to his endorsee, upon demand or at a definite future date. Such a certificate is usually negotiable and bears interest. The amount represented by a certificate of deposit is generally not subject to withdrawal by check. In the case of a time certificate of deposit, that is, one payable at a definite future date, the holder of the certificate is not regarded as a depositor of the bank, but as a mere general creditor of the bank. A bank book issued by a savings bank is, for some purposes, equivalent to a certificate of deposit.

Certified Check. A check having the word "certified" stamped or written upon it, and bearing the signature of an official of the bank upon which the check is drawn. The effect of the certification is merely to furnish a guarantee from the bank that the amount to the credit of the drawer of the check is adequate to meet the check, and that the amount of the check will be set aside for the purpose of paying the check when presented for payment. It is not true, as is sometimes thought, that a certified check constitutes a direct obligation of the bank to pay the amount of the check. Thus, if the check is a forgery, the bank may subsequently refuse to pay the check, even though it be certified, without liability to any holder or endorsee. Or, if the check has been fraudulently raised before certification by the bank, a subsequent holder of the check can recover from the bank only the amount for which the check was originally drawn.

Chattel Mortgage. A lien given upon personal property, generally as security for a loan or other obligation. Nominally, a chattel mortgage takes the form of a transfer of title of the personal property to the person to whom the mortgage is given (called the mortgagee). In almost all states, however, a chattel mortgage is now regarded, not as a transfer of the title to the property, but as merely giving a lien upon the property.

Generally, a chattel mortgage, in order to be valid against creditors of the mortgagor or against subsequent transferees of the property, must be recorded in the city or town where the mortgagor resides. Chattel mortgages usually provide for a sale of the property in the event of nonpayment of the debts or obligations which they are given to secure. The method of sale, however, is usually expressly prescribed by statute.

Check. A check is a written order directed to a bank, requesting the bank to pay a specified sum of money to the order of the person named in the check or to the bearer of the check. A check does not operate as an assignment of any part of the deposit maintained by the drawer in the bank on which the check is drawn. The check, therefore, gives no direct right to the payee or holder of the check against the bank.

A check payable to "cash" is equivalent to a check payable to bearer, and may be negotiated from one person to another without endorsement. It is the practice of banks, however, to require one who presents a check payable to bearer or payable to cash to endorse the check. Such an endorsement, however, merely operates as a receipt to the bank.

Checks should be presented promptly for collection or payment. Where a check is not presented promptly for payment and the bank upon which it is drawn becomes insolvent during the interval, the holder may in some cases be compelled to shoulder the loss. Moreover, death or bankruptcy of the drawer of the check renders the instrument void, and relegates the holder to the status of a mere general claimant against the drawer's estate.

C. I. F. An expression used in quoting prices, particularly in the export trade, to indicate that the price includes the cost of the goods plus insurance and freight.

Clearing House. The place at which the banks of a particular city or vicinity meet daily for the purpose of presenting checks drawn upon each other. A definite debit or credit balance against or in favor of each of the member banks is arrived at, and settlement is made on the basis of these balances.

The method by which the clearing house operates is as follows: Each bank sends a messenger to the clearing house with the checks which it has received that are drawn against the other members of the clearing house. Each bank assorts the checks it receives, placing all of the checks drawn against one bank in an individual folder, to which is attached an itemized statement of all of the checks contained and their total amount. Each bank has a designated desk at the clearing house, and, at an appointed time, a gong is sounded and the messenger of each bank distributes to the desks of the other banks the checks drawn upon the latter, retaining a duplicate memorandum of each amount. When the distribution is complete, each bank is in possession of all the checks which have been drawn upon it and deposited in other banks. The amount of such checks is then totaled, and, in the event that this total exceeds the amount of the checks presented by it against the other banks, a debit balance is entered against the bank. In the event that the amount of checks presented by any bank against the other banks exceeds the amount of checks presented by the other banks against it, a credit balance is entered for the particular bank.

If there is a debit balance, the amount thereof is paid by the particular bank to the clearing house; if there is a credit balance, the amount of the credit is received by the bank having the credit balance from the clearing house. Under the Federal Reserve system, debit and credit balances are paid by means of checks upon Federal Reserve banks, rather than upon the clearing house.

In the larger cities, clearing house organizations have been established whose functions are wider than those of the ordinary clearing house.

Clearing House Balance. Applied both to an amount due from a clearing house to a creditor bank and to an amount due from a debtor bank to the clearing house. In the former case the balance is called a favorable balance, and in the latter it is called an adverse balance, at the clearing house.

Collateral Loan. A loan secured by a pledge of securities or other personal property.

Collateral Note. A form of note in common use, in connection with secured loans, by banks and other institutions which make a business of lending funds. This type of note not merely recites the promise of the borrower to pay but also sets forth the terms upon which the security is deposited with the lender. The terms of the collateral note are designed to relieve the bank or other lender from the obligations imposed by law upon pledgees who undertake to sell the pledged property.

Commercial Agencies. Organizations which make a business of compiling and furnishing to their subscribers information with respect to the assets and liabilities, promptness of payment of obligations, and general solvency and credit of individuals, firms, and corporations engaged in business. This information is given out in the form of general ratings, furnished to all subscribers, and in special reports with respect to any particular concern, furnished upon the special request of a subscriber.

Dun's and Bradstreet's are the leading commercial agencies in the United States. The credit ratings and reports given by these agencies constitute an important basis for extending or withholding of credit to prospective borrowers or to purchasers on credit.

Commercial Paper. Notes of business concerns of national reputation, which are purchased by so-called note brokers and then distributed by them among various banks and investors throughout the country. The broker usually makes a profit or commission of one-quarter of one per cent upon the principal of these notes. By using this type of commercial paper, these large borrowers are able to borrow at a lower rate than they would be compelled to pay for current loans obtained from local banks.

This type of security, by reason of its general marketability, has come to be highly regarded throughout the banking community as an excellent mode of investment for superfluous funds and as a secondary reserve. The notes, commonly in amounts of $2500 and $5000, usually run for a period of six months, and can be made to bear such a maturity as will fit in with the needs of the banks purchasing the securities. While these notes are not guaranteed by the houses which buy and sell them, the larger note brokerage houses have made a practice of virtually protecting their purchasers against loss, both by thorough examination of the businesses of those whose notes are purchased and by taking control of such businesses, if necessary, in order to save purchasers from loss.

Commission House. A firm which buys and sells commodities or securities, as a broker or agent for others, receiving a commission on the purchases or sales, or upon both, in compensation for the service rendered.

Common Stock. That class of stock which is entitled to receive dividends or otherwise share in the earnings of a company only after all preferential rights to payments out of the earnings of the company have been satisfied. The term common stock is also used with reference to all of the stock issued by a corporation where only one class of stock has been created. Usually the control of the company is vested in the holders of the common stock. This, however, is not necessarily so, and sometimes the holders of preferred stock are given an equal or greater share in the control of the corporate affairs.

While the common stock usually receives no dividends until the preferential dividends to which any class or classes of preferred stock may be entitled have been paid, the common stock is normally entitled to receive all of the surplus after the preferential payments to the preferred stockholders have been made. The relative rights of holders of any particular issue of preferred or common stock depend, however, upon the special provisions of the certificate of incorporation of the company which issues the stock, and, to determine what these rights are, resort must always be had to the certificate.

Usually, the holder of preferred stock is assured the more continuous and steady return upon his investment. On the other hand, the common stock carries with it the possibility of great profits, in the event that the enterprise proves especially profitable. See *Preferred Stock.*

Consignee. A person named in a bill of lading as the one to whom goods are to be delivered by a railway or other carrier.

Consignment. Goods are said to be shipped upon "consignment" when they are forwarded by a seller, called the principal in the transaction, to a broker or sales representative, pursuant to an arrangement whereby the broker is to sell the goods and remit to his principal the proceeds less his commission, the broker undertaking no responsibility for the purchase price of the goods until they are actually sold. However, when a sale has in fact been made, if the goods were shipped upon consignment, the broker becomes personally responsible for the sale price, less the commission to which he is entitled. In this respect, such a broker is similar to a "*del credere factor*" who insures the financial responsibility of his purchasers.

Consignor. One who delivers goods to a railway or other carrier for transportation to a designated point.

Consols. The name applied to the 3 per cent "consolidated annuities," sometimes referred to as "consolidated threes," issued by the government of Great Britain, entitling the holder to a certain sum from the government annually. These annuities are obligations of the British government, but differ from bonds in that they have no definite date of maturity. The government, however, reserves the right to pay the principal represented by the securities at any time. They are, therefore, in a real sense, mere annuities—a promise by the government to pay to the owner of the consol a certain amount annually.

The full name, "3 per cent consolidated annuities," had its origin in the fact that this form of obligation was issued to replace the entire or consolidated debt of Great Britain, and a purchaser of such an annuity received 3 per cent annually upon the amount paid to the government for the consol.

Controlling Interest. A phrase used to indicate a person, or a body of persons united in mutual interest, who have secured the right, by purchase or by proxy, to vote a majority of the shares of capital stock in a corporation at any stockholders' meeting. The name is sometimes used to designate the holder, or the aggregate of holders having mutual interests, who own a majority or more of the shares of such stock.

Convertible Bonds. Bonds which are issued subject to a provision for their surrender and cancellation at some future time and the issuance of stock in their place. The provision for conversion may make the conversion optional in the bondholder or in the company, or may be made absolute upon the fulfillment of some condition, depending in each case upon the particular provision contained in the bond.

Where the conversion into stock is optional in the bondholder, there would be no inducement to convert the bonds into stock, so long as the stock remains at par or below par. However, if the stock should begin to pay a high rate of dividends and, as a result, its market value should rise considerably above par, the holder of a bond, convertible into stock at the option of the holder, would find it to his profit to take advantage of the provision permitting conversion.

Corner. The acquisition by an individual, or by a group of speculators, of the larger part or of all of the available supply of a particular stock, or of a commodity such as cotton, wheat, copper, or sugar. When a corner has been successfully effected, one who has sold the stock or commodity short, or who must have the commodity to carry on his business, is compelled to pay practically any price demanded.

The most notable corners in American financial history were the successful corner of Harlem Railroad stock by Commodore Vanderbilt in 1863 and the attempted corner of gold by Jay Gould in 1869.

Cost, Insurance, Freight. See *C. I. F.*

Country Banks. Prior to the inauguration of the present Federal Reserve system, the national banks were divided into three classes: (1) those located in the central reserve cities—New York, Chicago, and Saint Louis; (2) those located in reserve cities, which included all of the larger cities of the country; and (3) the so-called country banks, which were not situated in either a central reserve city or a reserve city.

The country banks were required to keep reserves of 18 per cent of their deposits, and the larger portion of this reserve could be kept in the form of deposits in banks in reserve cities or central reserve cities.

The distinction between country banks and banks in the larger cities has been retained to some extent in the Federal Reserve system, the banks in the smaller communities being required to keep a reserve of only 7 per cent of demand deposits and 3 per cent of time deposits.

Coupon. A certificate attached to a bond, representing the interest for a given period, to be detached and forwarded to the corporation or government which has issued the bond when such interest becomes due. The coupon generally bears the name of the debtor or obligor upon the bond, the number of the bond, the rate of interest, and the amount due or payable upon the coupon. Usually, a sufficient number of coupons is attached to each bond to meet the interest charges during the period that the bond is to remain outstanding.

Coupon Bonds. Bonds issued with coupons attached, representing the interest falling due from time to time. The interest upon coupon bonds is obtained by detaching or clipping the coupons as they fall due and forwarding them to the debtor corporation for payment. Coupon bonds may be registered or unregistered.

Cover. Where a person has sold for future delivery stocks or commodities which he does not actually own at the time he makes the sale, he is said to "cover" when he buys in such stocks or commodities at a favorable price, at some time before delivery from him is due.

Curb. The name given originally to the group of brokers who formerly made a practice of meeting daily in Broad street, New York, one block from the New York stock exchange. There they bought and sold securities of both the better and the cheaper grades. This practice of congregating at a point near the financial center of New York City, for the purpose of engaging in stock transactions, began as early as 1869, and continued until 1920, when an ordinance was passed by the city of New York prohibiting the carrying on of brokerage transactions upon the public streets. As a result of the enforcement of this ordinance, the so-called curb brokers organized and erected their own exchange, which has continued to be called "the curb exchange." Here is now carried on the business which formerly was transacted upon the street and sidewalks of Broad street.

Current Assets. Assets which are readily convertible into cash and which change in amount from day to day. Cash on hand, bank deposits, merchandise, and accounts and bills receivable are all regarded as current assets.

Current Liabilities. Obligations which fall due from day to day or which will mature in the near future. Included within this designation are accounts payable, notes payable, wages unpaid, interest due or accrued, and similar obligations which are immediately payable or of short term duration.

Cutting a Melon. An extraordinary distribution by a corporation of accumulated profits or surplus in the form of either cash dividends or stock dividends. In the case of a holding corporation, the "cutting" may take the form of a distribution of securities of the subsidiary companies controlled by the holding corporation.

Dating. An agreement between a buyer and a seller of goods, providing that the date of purchase shall be deemed to be of a later date than the actual date of purchase. The purpose of "dating" is to extend the period or term of credit beyond that normally allowed.

Days of Grace. The laws of many states formerly allowed the obligor or debtor, upon a note or other commercial instrument, three extra days after the date of maturity within which he could pay the amount of the instrument without subjecting the instrument to protest or dishonor. Days of grace have now been abolished in nearly all states. In some parts of Europe, however, days of grace are still granted.

Debenture Bonds. In the United States, an evidence of indebtedness issued by a corporation and not secured by a mortgage or other lien upon property of the corporation. Such a bond is similar to an ordinary promissory note, except that it normally runs for a longer period.

Deed. An instrument signed and sealed, purporting to convey an interest in real property from one person to another.

A *quitclaim deed* is one in which the grantor purports merely to convey such right, title, or interest as he may have in the property described in the deed. Such a conveyance does not carry with it any representation of ownership vested in the grantor, and, in the event that it is later discovered that the title to the property is encumbered or was vested in some other person than the grantor, no recourse can be had against the grantor.

A *warranty deed* is one in which the grantor covenants that he is the owner of the property and that there are no encumbrances upon the property (except such as are expressly excluded from the covenants), and that the grantee will enjoy quiet and peaceful possession of the property. A grantor who executes a warranty deed may be called upon to defend the title to the property, should the grantee's title or possession be attacked. He may also be compelled to respond in damages, should the title prove to be defective.

Deferred Dividend. When dividends are not regularly paid upon preferred stock, carrying cumulative dividends, such unpaid dividends are regarded as "deferred," and ordinarily must be paid before any dividends can be paid upon the common stock.

Demurrage. A charge imposed upon a shipper for detaining a railroad car, or other vehicle of transportation, for a longer time than that allowed by the agreement with the carrier for loading or unloading the cargo.

Deposit. Funds deposited with a bank, entailing an obligation upon the bank to repay an amount equal to the sum deposited. The ordinary deposit with a commercial bank involves an undertaking by the bank to honor withdrawals, in the form of checks drawn upon the account, until the amount of the deposit is exhausted. A deposit of this character is a "demand deposit," being payable at any time upon presentation of a check or order drawn upon the bank.

Deposits in savings banks are usually withdrawable in whole or in part only upon presentation of the bank book. Such deposits are also usually "time deposits," and nominally are payable only after the lapse of a definite period—frequently 30 days—after notice of the intended withdrawal has been given to the bank. Many commercial banks and trust companies now accept deposits in so-called "special accounts," which are in fact similar to the type of deposit formerly typical of the savings bank. These accounts draw interest quarterly or semiannually, and sometimes are made subject to withdrawal only at definite future dates or upon the lapse of a prescribed period after notice of intended withdrawal, as is the case of savings bank deposits.

Depreciation. Diminution in the value of any property, real or personal, whether due to ordinary wear and tear or to any other cause resulting in the lessened value of the property, during any period of time.

Discount. This term has several meanings. It is applied to a loan made by a bank to a customer upon his note, where the interest which is to accrue upon the loan during the term of the note is deducted in advance. Thus, if a customer wishes to borrow $1000 for six months at 6 per cent, the bank "discounts" his note and credits him with the sum of $970. The $30, which is deducted from the principal of the loan, is termed discount or unearned interest, and the entire transaction is called a "discount."

The term discount is applied also to the purchase by a bank, from the payee or holder, of a note having a definite maturity. In such a purchase, as in a direct loan upon the paper of the borrower himself, the interest to become due upon the note during the term it has to run is deducted in advance, and the net proceeds only are credited to the seller of the note.

Discounts are sometimes distinguished from "loans," the latter term being applied to demand obligations, having no definite date of maturity, the interest upon which cannot be computed and deducted in advance of the termination of the loan.

Another use of the term discount is with reference to the amount or percentage by which the market price of a particular kind of domestic or foreign currency, or of a bond or other obligation, falls below its nominal or par value. Thus, when Liberty bonds of the United States government, having a face value of $100, sell for $98, they are said to sell at a discount of $2 or of 2 per cent.

Dishonor. The refusal of one upon whom a draft or bill of exchange is drawn to pay or to accept the bill in accordance with the terms of the instrument.

Dividend. A proportionate distribution of profits by a corporation among its stockholders. Where the stock of the company has a nominal or par value, the dividend will be payable in terms of a certain per cent of this nominal or par value. Where, however, the stock has no nominal or par value, the dividend merely represents a distribution of cash among the stockholders, out of the earnings or surplus profits of the company, in proportion to their respective holdings in the company. The laws of practically all the states prohibit the payment of dividends to stockholders except out of earnings or surplus profits, in order that the capital of the corporation may be kept intact for the benefit of creditors. Any violation of this prohibition usually renders the directors participating in the declaration or payment of the dividend guilty of a crime.

A stock dividend is entirely different from a cash dividend, and represents merely a distribution of additional evidences of ownership in the corporation, no property of the company being turned over to the stockholders.

Dollar Exchange. Bills of exchange, drawn in foreign countries upon banks or business concerns of the United States, and payable in United States currency.

Domestic Exchange. Drafts or bills of exchange, drawn upon banks or commercial houses located in New York or other important commercial centers, used in making remittances from one part of the country to another. Bank drafts upon New York City formerly constituted the greater part of domestic exchange. In recent years, however, bank drafts upon Federal Reserve banks have in large measure replaced drafts upon New York.

Double Taxation. Frequently the same person or the same property is taxed by more than one governmental authority. The most common instance of double taxation of this sort is taxation by both the Federal and the state government. But sometimes the same person or interest in property may also be taxed by more than one state. Thus, where a person residing in the state of New York owns property which is physically present in the state of Ohio, a tax may be imposed by both states, one by reason of jurisdiction over the person owning the property, and the other by reason of jurisdiction over the property or "*res*" itself.

Likewise, where two different states or countries impose income taxes, a tax may be imposed by one state or country, by reason of the income being derived within the limits of its territorial sovereignty; and an income tax may be

imposed upon the same income by another state or country, by reason of its jurisdiction over the person earning the income. Frequently, too, succession or inheritance taxes seem to operate to impose double or multiple taxation, where the decedent was a resident of one state and had property subject to the jurisdiction of other states. Double or multiple taxation of this sort may sometimes appear to operate unjustly, but the courts have uniformly held that such taxation is entirely lawful and constitutional.

Draft. A written order drawn by one person, directing a second person to pay a definite sum of money to a third person and to charge the same to the account of the one drawing the instrument. A draft may be drawn payable at sight or on demand, that is, upon presentation; or it may direct payment at a definite or determinable future time. A draft is similar in all respects to a bill of exchange. In the United States, however, the term draft has come to be applied to ordinary domestic or inland bills of exchange, as distinguished from bills of exchange used in foreign commerce.

Duebill. A written nonnegotiable acknowledgment of a credit to the account of the person to whom the bill is addressed. This type of instrument is usually given by merchants to persons who have purchased goods and have subsequently returned them.

Earnest Money. A sum paid at the time of making an offer or of entering into an agreement of purchase, as evidence of the good faith of the person making the offer or entering into the agreement. In contracts for the sale of personal property, the law has laid stress upon, and has given important legal effect to, the giving of earnest money at the time a transaction is entered into. Thus, under the Statute of Frauds—originally enacted in England in 1666—an oral agreement for the sale of personal property was not valid if the consideration involved was in excess of the sum of ten pounds, unless, at the time the agreement was entered into, a part payment of the purchase price was made. This part payment was regarded as the earnest money which made the transaction enforceable. This provision of the Statute of Frauds has been adopted in one form or another in most of the states in this country. In the case of real property, however, the giving or withholding of earnest money has no effect upon the legality or legal enforcement of a contract of sale, although earnest money frequently accompanies an agreement to purchase real property.

E. & O. E. Abbreviation for "errors and omissions excepted." This term appearing upon any financial statement negatives any representation of the one furnishing the statement that it is absolutely accurate. Its use absolves the one furnishing the account from personal liability for errors in the statement, other than those due to fraud or willful misrepresentation.

Endorse. To write one's name upon the back of a note, check, or other instrument, for the purpose of transferring the instrument to another, or for the purpose of lending one's credit as a guarantor of the payment of the obligation. An endorsement by one whose name already appears upon the instrument as a payee or endorsee should be made without variation from the form in which it first appears upon the instrument. An endorsement, however, is legally sufficient if, in fact, the person who endorses the instrument is the same person as the one to whom the instrument was payable as payee or endorsee.

Endorsee. One to whom a note or other negotiable instrument has been transferred by endorsement by the holder of the instrument.

Endorsement, Anomalous. Where one who is not a party upon the face of a note or other instrument writes his name upon the back of the instrument, as a guarantor of its payment at maturity, such endorsement is termed anomalous.

Endorsement, Restrictive. An endorsement which indicates that the holder or endorsee of the instrument is not the owner of the instrument, but has merely been intrusted with it for certain definite purposes specified in the restrictive endorsement. Thus, a note or check may be restrictively endorsed, "Pay to the First National Bank for collection only," or "Pay to John Jones as agent," signed by the holder of the instrument.

Endorsement, Special. Where a payee or endorsee of a note or other instrument, upon transferring it, designates upon the back of the instrument the particular person to whom or to whose order the instrument shall be paid, such endorsement is termed a special endorsement. When an instrument has been thus endorsed, it may be further negotiated or transferred only by an endorsement of the person named in the special endorsement.

Endorsement without Recourse. See *Endorser, Without Recourse.*

Endorser. One who has signed his name upon the back of a note, check, or other commercial instrument, to lend his credit to the maker or to the holder of the instrument, in which case he may be an anomalous endorser; or one who, being the holder of the instrument, endorses the instrument in order to negotiate it or sell it to another. Unless an endorser has signed his name "without recourse," he may be held liable for the payment of the instrument, in the event that the maker fails to pay it at maturity. The endorser may, however, be released from liability if the instrument is not duly presented to the maker and protested, and notice of the protest given to the endorser within 24 hours.

Escrow. An instrument deposited with a third party, to be delivered to the grantee named in the instrument upon the performance of some condition or upon the happening of a certain event.

Excess Profits Tax. In 1918, the United States imposed a tax upon corporations whose profits exceeded 8 per cent of the actual capital invested or used in the business. This tax was removed in 1920.

Exchange. Claims upon foreign merchants or banking institutions, in the form of bills of exchange or drafts accepted or drawn upon them, arising out of the export of goods to foreign countries or out of other international transactions. These instruments are bought by persons who are obliged to make remittances to such countries. The result of this buying and selling of "exchange" is that claims by individuals in one country against individuals or banks in another country are offset by claims which individuals in the latter country have against individuals and banks in the former country. In this way, the actual shipment of gold from one country to another, in payment of purchases made in foreign countries, is, to a very considerable extent, avoided.

Excise. Any tax imposed by a government upon commodities manufactured, sold, or used, or upon activities carried on, within its territorial jurisdiction. The tax upon cigars and cigarettes, and the tax upon liquors, formerly constituted the most important excise taxes in the United States. In recent years the scope of excise taxes in the United States has been very much widened. At the present time, excise taxes are imposed upon deeds, bonds, and other commercial instruments, and upon transfers and contracts for the sale of stock. The tax upon theater tickets and that upon automobiles when originally sold by the manufacturer are also properly to be regarded as excise taxes.

Ex Dividend. Literally, without dividend. When stock is sold during a period when the stock books of the particular company are closed in anticipation of the payment of a dividend, no transfers of ownership being recorded by the company during this period, the stock is said to sell on the market "ex dividend." This is because the purchaser of the stock during such a period will not be entitled to receive the dividend about to be paid by the company, the dividend being paid to the stockholder of record at the time of the closing of the books.

External Loan. A loan which a country obtains by selling its bonds or other obligations to investors in other countries; it is to be distinguished from an internal loan, which is obtained by the sale of securities to the country's own citizens. Frequently, in the case of an external loan, securities are made payable in the currency of the country in which they are intended to be sold.

Face Value. The value noted upon the face of a check, note, bond, certificate of stock, bank note, or unit of currency. The term "face value" is used in contradistinction to the actual value of the instrument, which may be either greater or less than its face value. See *Par.*

Factor. One who sells goods for another upon commission. See *Agent, Consignment.*

Farm Loan Bank. Banks organized pursuant to the Federal Farm Loan act of July 17, 1916. This act provided for the creation of a Federal land bank in each of twelve designated farm loan districts. A part of the stock in these land banks is subscribed by the United States government through the secretary of the treasury. The act provides for the lending of funds to farmers, but only upon the security of first mortgages on farm land; and the loans are to be made, not directly to the farmer, but through advances to local farm loan associations. In order to obtain a loan under the provisions of this act, an intended borrower has to become a member of one of these associations and subscribe to stock in the association to an amount equal to at least 5 per cent of the amount to be borrowed. The land banks are restricted to an interest rate of 6 per cent per annum on their loans. The act provides also that the mortgages shall run for not less than five and not more than forty years.

F. A. S. Free alongside ship. This term is used to indicate the extent of the obligation of the seller with respect to delivery of goods sold. Where the goods are sold "F. A. S.," the seller's obligation is fulfilled when the goods are delivered to a wharf from which the goods can be loaded into a vessel for transportation to the port of destination. Where it is necessary to carry the goods from the wharf to the vessel by means of small tugs or lighters, the seller would be obligated to bear the expense of this part of the transportation in addition to carrying the goods to the wharf.

Federal Reserve Bank Notes. Currency issued by Federal Reserve banks in denominations of one dollar, two dollars, five dollars, and ten dollars, secured by the deposit, with the secretary of the treasury, of United States bonds of an amount equal to the bank notes issued. A redemption fund of 5 per cent in gold must also be maintained by banks issuing this form of currency. In most respects, the Federal Reserve Bank notes are similar to the national bank notes which national banks have issued since 1863. They may, however, be issued in denominations of one and two dollars, and are not limited, as are national bank notes, to higher denominations. Federal Reserve Bank notes are not legal tender, although they are lawful currency.

Federal Reserve Notes. Currency issued by Federal Reserve banks, secured by a gold reserve of at least 40 per cent of the amount of the notes issued, and by commercial paper to the extent of the remaining 60 per cent. Whether additional Federal Reserve notes shall be issued at any time by a particular bank is determined by the Federal Reserve board, which also has the power in emergencies to permit the issuance of Federal Reserve notes with a lesser gold reserve than 40 per cent. The Federal Reserve note, secured as it is by commercial paper, has introduced an elastic element into the currency of the United States. Its volume can be increased or decreased in accordance with seasonal and extraordinary demands. The Federal Reserve act, under which these notes are issued, also provides for the prompt redemption of such notes by the issuing bank, and forbids their reissue. Through this limitation, a permanent inflation of the currency is prevented.

Fee Simple. The absolute, unconditional ownership of real property. The fee simple is the highest estate known to the law. The ownership of the fee simple in any particular parcel of property is not inconsistent with the existence of restrictions or encumbrances upon the property.

Fiduciary. One who occupies a position of trust, or who receives and dispenses funds for another. Executors, administrators, trustees under wills and deeds of trust, directors of corporations, agents, committees of the estates of lunatics, and guardians of infants are all within the general class designated as fiduciaries.

Firm. Descriptive term applied to prices of securities or commodities when there appears to be no tendency toward a fall in prices, and when the supply at the price quoted does not appear to be in excess of the demand. When prices are "firm," a rise in prices may normally be expected.

First Mortgage Bond. A bond secured by a first or prior lien upon a part or all of the assets of the company issuing the bond. The extent of this lien depends upon the particular terms of the mortgage in each case. Some so-called "first mortgage bonds" cover only a very limited part of the tangible assets of the issuing company. Others purport to cover not merely specific physical property described in the mortgage, but also property both tangible and intangible which may subsequently be acquired. In the event of a default in the payment of interest or principal upon first mortgage bonds, a foreclosure of the mortgage securing the bonds would bar all secondary or subsequent liens or mortgages upon the property.

Fiscal Year. Any twelve consecutive months used as a period of financial accounting by an individual or a corporation. The fiscal year of any business concern may or may not coincide with the calendar year.

Fixed Charges. The fixed expenses of a business, which can be determined in advance, and which do not vary in proportion to the amount of business carried on. Fixed charges include interest upon bonds or other fixed or long-time indebtedness, taxes upon property, rent, insurance, and depreciation.

F. O. B. Free on board. This term is used in price quotations to indicate the extent of the undertaking of the seller with respect to defraying the cost of transportation, at the price quoted. Thus, if flour is quoted at ten dollars a barrel, f. o. b. cars Buffalo, the seller undertakes merely to deliver the flour to the railroad company at Buffalo, and the cost of transportation from that point on must be borne by the purchaser.

Foreclosure. A remedy provided by the law for realizing upon the security given for a loan or other obligation, in the event of a failure of the obligor or debtor to comply with the terms of his agreement. The usual mortgage upon real property, for example, provides that in the event of a failure to pay any installment of principal when due, or to make any payment of interest within thirty days after the payment is due, the mortgagee may sell the property at a foreclosure sale and receive payment out of the proceeds of the sale. If, upon a mortgage foreclosure, the amount received from a purchaser is more than sufficient to satisfy the claim of the mortgagee and the expenses of sale, the surplus is turned over to subsequent lienors or, if there are none, to the mortgagor.

The term foreclosure applies, not merely to the sale of real property to realize upon sums advanced upon real property as security, but also to sales of personal property under like circumstances. A foreclosure sale may take place also to satisfy a judgment obtained against the owner of the property or to obtain payment of taxes which have been imposed upon the property.

Fractional Currency. Coins of less than one dollar.

Fully Paid. Stock is "full paid" or "fully paid" when it has been completely paid for by the stockholder and no further payment or assessment can legally be demanded from or imposed upon the stockholder by reason of his ownership of the stock. In order that stock be fully paid, it must have been issued in exchange for cash, property, or services having some reasonable relation in value to the par value or amount of the stock issued.

The practice of issuing so-called fully paid stock, bearing a par value of a particular amount, for worthless patents, fictitious good will, and highly overvalued services of promoters, together with the associated practice of issuing shares of stock as bonuses to subscribers or purchasers of stock, has rendered this term in practice almost meaningless. The misleading character of issues of this sort has led to the introduction of non-par-value stock. This becomes fully paid when any sum, however small, is paid to the corporation for the stock, if the agreement between the stockholder and the corporation does not require any further or other payment.

Funding. The floating of a new issue of securities to pay off obligations which have matured or are about to mature. The term is used also with reference to the replacing of a number of outstanding issues of securities by a single new issue, generally for a longer term than the outstanding issues. Such a funding plan frequently provides economies in administration, in addition to extending the period during which the obligations will remain outstanding.

Futures. Contracts for the delivery of stocks or commodities at a future date. Dealing in futures is a very legitimate and even a necessary element in the conduct of some businesses. Thus, a flour manufacturer, in order to make his plans of production for the ensuing quarter or half year, must make his purchases in advance of his actual needs. Only by so doing can he, with any safety, make quotations to his customers for future delivery to them. But speculators upon the commodity and stock exchanges deal in futures in a manner which amounts to plain gambling. These speculators, however, by selling for delivery in the future, relieve the business man of the risks incident to possible fluctuations in prices, and enable him to do business upon a safe, carefully calculated basis.

Garnishee Proceedings. Legal proceedings by which a creditor reaches an obligation owed to his debtor by a third person. Thus, if A owes B $50 and C owes A $50, B may garnishee the sum which C owes to A and thus obtain payment of B's claim against A. In these proceedings, C, the debtor's debtor, is known as the garnishee.

Gold Basis. The currency of a country is said to rest upon a "gold basis," when a certain quantity of gold by weight constitutes the basic monetary unit and standard of value of the country. Only gold can then be freely coined. The currencies of all the larger countries of the Western world are now upon a gold basis. The monetary system of the United States has been upon a gold basis in fact since 1873, although the single gold standard was not adopted by positive statute until 1900.

Gold Bond. Bonds payable, according to their terms, in gold coin of the present weight and fineness. The term gold, used in this connection, receives an emphasis wholly out of proportion to its actual import. The use of the word gold, however, has been found effective in inducing the purchase of such securities by the general public. The provision that the principal of the bond shall be paid "in gold coin of the present weight and fineness" merely protects the holder against the possibility of payment by the debtor in depreciated paper or metal currency.

Gold Certificates. Currency issued by the United States government, representing gold in an amount equal to the face value of the certificate, deposited with the secretary of the treasury. Gold certificates may not be issued in denominations of less than ten dollars. These certificates are legal tender for all purposes, and, upon presentation,

will be redeemed in gold by the secretary of the treasury. Anyone may obtain gold certificates by depositing, with the secretary of the treasury, gold coin or gold bullion in amounts of not less than twenty dollars or its equivalent.

Gold Reserve. The term applied to the reserve of $150,000,000 in gold which the treasury department is required to keep, under the act of Congress of March 14, 1900, as a redemption fund for outstanding United States notes or "greenbacks," of which there are still some $346,000,000 outstanding. This act provided that if this reserve at any time fell below $100,000,000, it should be replenished by the sale of government bonds.

The term "gold reserve" is applied also to the reserve of 40 per cent in gold which normally must be held by a Federal Reserve bank against its issues of Federal Reserve notes. This gold reserve may be reduced below 40 per cent in emergencies by special dispensation from the Federal Reserve board. Five per cent of this gold reserve must be deposited and maintained with the secretary of the treasury as a redemption fund for outstanding Federal Reserve notes.

Good Will. Reputation enjoyed by a company or its product, which gives to the product a ready and wide marketability. Frequently, good will constitutes the most valuable single asset a business possesses. Where the good will has been acquired through the expenditure of large sums in advertising, it is deemed proper accounting to set forth as an asset the good will achieved by the advertising at a valuation approximately equal to the sum spent in advertising.

Greenbacks. See *United States Notes.*

Gresham's Law. The principle of public finance, according to which, if there is an excess of money of different kinds in a country, the better money, that which intrinsically is more valuable, will go out of circulation or will leave the country, and that kind of money which is of less intrinsic value will tend to become the sole currency of the country. Thus, depreciated paper currency, so long as it continues to circulate as money, will tend to drive gold out of circulation entirely, the gold finding its way into industry or to foreign countries in payment for imports.

Guarantee. The undertaking by one who is not a direct party to a transaction to perform the promise or obligation made or assumed by another, in the event that the latter does not himself perform the promise or obligation. Bonds of subsidiary corporations are frequently guaranteed by the principal or holding corporation. It is not legally possible, however, for a company to guarantee the payment of the principal or interest upon its own bonds or the payment of dividends upon its own stock. For, in order to have a true guarantee, there must be three parties in the transaction,—the creditor, the debtor, and the guarantor.

Hedging. Either buying or selling in such a manner as to curtail threatened losses through speculative sales or purchases in stocks or commodities. Thus, for example, a speculator agrees to deliver a certain number of units of stock or of a commodity at a certain price at a future time. He intends to cover the sale by purchasing at some time before delivery is due, at a price lower than that named in his contract of sale. Prices then begin to advance in such a manner as to indicate that there probably will be a continuous advance rather than any decline in prices. The speculator will then at once "cover" by buying in the amount of stock or commodity that he has sold, and thus limit his loss to the difference between the price at which he has sold and the price at which he has covered.

High Finance. A popular term applied to the large scale promotion of financial ventures which yield unconscionably great profits to the promoters and yet successfully evade any civil or criminal liabilities.

Holder in Due Course. One who has acquired a promissory note or other negotiable instrument for value, without notice of any defect in the instrument or in the title of the transferor. A holder in due course may ordinarily recover upon the instrument, regardless of defenses claimed by the maker or by other parties to the instrument. The defense of forgery, however, is available even against a holder in due course.

Holding Company. A corporation whose chief function is the holding of stock in other corporations, the latter being sometimes referred to as its "subsidiaries."

Honor. The act of paying or accepting a check, draft, or bill of exchange upon presentation by the holder, in accordance with its terms.

Hypothecation. Depositing stocks or bonds with a creditor as security for the payment of a debt.

Inactive Account. An account of a depositor in a commercial bank or trust company, against which few checks are drawn. Many commercial banks now pay interest upon inactive accounts at rates as high, or nearly as high, as those paid by savings banks; while accounts which are regarded as active receive no interest upon balances, or interest at considerably lower rates.

Inactive Stocks and Bonds. Stocks and bonds for which there is no active market, and which are seldom bought or sold or quoted upon the exchanges.

Income. Gains received in any form capable of valuation, including compensation for services rendered, interest, dividends, gains from sales and exchanges of personal or real property, profits derived from the conduct of a business, and any other thing of value received during any period. Under the Federal income tax law and under state income tax laws generally, the value of gifts received is not taxable as income. But current or periodical returns from property received as a gift are taxable.

Income Tax. Tax imposed upon a person and measured by the income he receives. A state may impose an income tax by reason of the fact that gain has been derived from sources within that state's jurisdiction, even though the person upon whom the tax is imposed has never been, by citizenship or residence, or otherwise, personally subject to the jurisdiction of the state imposing the tax. In such cases, the income tax is more properly to be deemed a tax upon property rather than upon the person. Income taxes may thus be imposed by one state, by reason of the citizenship of the person in that state or because of his residence within its borders; and an income tax may be imposed upon the same person by another state, by reason of his obtaining income from sources within the latter state. There may then lawfully be a double tax by reason of the same income.

Indenture. An agreement or deed under seal, executed by two or more persons. The origin of the term was in the practice, now obsolete, of executing an agreement in duplicate, or in as many counterparts as there were parties, the copies being separated unevenly in such manner as to create indentures, those in one copy fitting into those in another. In this way, the authenticity of the copies was assured.

Inheritance Tax. A tax levied upon the succession to property of a deceased person. Thus, the term "transfer" tax or "succession" tax is sometimes applied to this tax.

Usually, an inheritance tax is imposed upon the entire estate of the decedent by the state in which he resided at the time of his death, regardless of the situs or physical location of the property left by him. Most states, however, also impose a so-called inheritance tax upon the transfer of property from a deceased person to his heirs at law, or other beneficiaries, if any of the property of the deceased has a situs within the territorial limits of those states, regardless of the domicile or residence of the decedent or of the beneficiary. In this case, the tax is usually regarded as a transfer tax,—an imposition of a governmental charge upon the transfer of title to property from one person to another.

A so-called inheritance tax is sometimes imposed upon a beneficiary also, by reason of his succession to property, whether under a will or by operation of law, even though the property had no situs or physical presence within the taxing state and the decedent had no residence or domicile there. The tax is then properly regarded as a mere tax upon the right of succession to property. It is thus possible for three different states to impose three so-called inheritance taxes upon the same transfer from a decedent to a beneficiary. Each of these forms of inheritance tax has been upheld as lawful, upon the ultimate ground that there is no natural or vested right in anyone to acquire property by inheritance or by will, nor any natural or vested right to leave or bequeath property to particular beneficiaries or to one's heirs at law or next of kin.

Insolvent. Formerly one was deemed insolvent if he was unable to meet his obligations as they matured. The repeated failure of anyone engaged in business to pay definitely maturing obligations upon their due dates was regarded as conclusive evidence of his insolvency.

In recent years, the term has acquired a new meaning. This meaning has been legislated into legal and commercial usage by the Federal Bankruptcy act of 1898. This act defines an insolvent as one whose liabilities exceed his assets at a fair market valuation. Obviously, under this latter definition, one who fails to meet his obligations as they mature may nevertheless be solvent.

Interest. A periodical return paid for the use of money or other capital. Fundamentally, interest is regarded as a compensation paid to those who deprive themselves of the present use of their funds or capital, in order that these funds may be put to productive and profitable employment. The rate of interest, from the economist's viewpoint, is therefore determined by two factors—the amount necessary to induce individuals to sacrifice the present for the future, and the amount of additional value that can be created by using the capital thus set aside in producing goods to be consumed in the future.

Interim Certificates. Frequently, in the reorganization of corporations, considerable time is consumed in carrying into effect the plans of reorganization. It is then customary for stockholders who join in the plan of reorganization to deposit their certificates of stock with designated trustees or with a stockholders' committee, who act for the participating stockholders. These trustees—commonly a single trust company is designated to perform this function—issue to the stockholders interim certificates in exchange for the stock certificates deposited with the trustees. The interim certificate is issued only as a temporary evidence of the interest of the holder. When the reorganization has been completed, the interim certificate is surrendered to the trustees, and the new securities to which the stockholder is entitled, under the reorganization, are then issued to him in exchange for the interim certificate.

Sometimes so-called interim certificates are issued by corporations even though no reorganization is involved, where, for some reason or other, a period of time must elapse before permanent stock certificates or definitive bonds can be issued by the corporation.

Internal Loan. A government loan, the securities for which are intended by the government for flotation and sale primarily among its own citizens; as distinguished from an external loan, which is intended primarily for foreign investors. See *External Loan*.

Inventory. An itemized statement or schedule of the assets of an individual, a firm, or a corporation, usually accompanied by a statement of the value of each of the separate items set forth in the schedule.

Investment Banker. One who buys securities wholesale and sells them retail. It is the practice of the well established investment bankers to underwrite or purchase blocks of new securities of corporations and then to market them to their customers. The investment banker is thus the connecting link between persons who have funds in large amounts to invest and persons actively engaged in existing industries or in the promotion of new enterprises.

Invoice. Statement furnished by a seller to a buyer, setting forth in detail the character, quantity, and price of goods sold, and any other terms of the sale.

Jetsam. Sunken wreckage of a ship or its cargo.

Judgment. A determination of a judicial tribunal, reached at the conclusion of legal proceedings. The judgment may impose upon the defendant an obligation to pay a certain sum of money; it may order him to do or to refrain from doing certain acts; or it may merely state a conclusion of law as to what are the rights of the parties before the court.

Judgment Debtor. A debtor against whom a creditor has obtained from a court a judgment which has been placed on record.

Judgment Note. A promissory note containing a power of attorney, authorizing the holder of the note to confess judgment on behalf of the maker or obligor in the event the note is not paid at maturity. The purpose of such a provision is to avoid the necessity of bringing formal legal action against the maker for the recovery of the amount due upon the note. In many states such a power of attorney, if incorporated in the note itself, is given no legal effect. This form of note, however, is still valid and is commonly used in Pennsylvania, Illinois, Wisconsin, and some other states.

Killing. The making of exceptionally large profits in a speculative transaction. The word "coup" is sometimes used in a similar sense.

Kiting. A method of obtaining from banks the use of funds for a short period, without paying interest therefor, by the exchange of checks between two or more individuals having accounts in different banks. Thus, if A desires the use of $1000 and is unable or unwilling to borrow the sum from a bank, he may, by prearrangement with a friend, B, who has an account in another bank, request the friend to forward to A a check for $1000. A deposits B's check in the bank with which A keeps his account, and receives credit therefor immediately. A then draws upon the amount thus placed to his credit in his bank, either by obtaining cash from the bank or by issuing checks, to pay his current obligations.

Before B's check reaches the bank with which B keeps his account—and several days may elapse between the deposit of the check in A's bank and its presentation to B's bank—A forwards to B a check drawn upon A's bank for a similar sum, and B deposits the check of A in B's bank, thus obtaining a credit upon the books of the bank sufficient to meet the check drawn by B in A's favor. B then draws a second check in favor of A in the sum of $1000, or in some other sum, which A again deposits in the bank with which A deals. Again A forwards a check to B in a similar amount, which B deposits in time to meet the second check drawn by B in favor of A. By continuing this exchange of checks, it is possible for A to carry indefinitely a fictitious credit in his favor, upon which he can draw in the form of cash or otherwise, depending upon the practice and rules of the particular bank.

Kiting is, therefore, merely a method of taking advantage of the delay incident to the collection of checks. Ordinarily, depositors are not expected to draw checks unless they have on deposit, at the time the check is drawn, sufficient funds to meet the checks. Where depositors adhere to this proper banking practice, banks receive the use of the funds deposited during the several days, or sometimes more, that elapse before a check is presented for payment. Banks feel that they are justly entitled to this use of funds while checks are in transit, and frown upon depositors who deprive them of this advantage. Where depositors go further and maintain a fictitious credit through "kiting" checks, banks look upon this practice as a borrowing of funds of the bank without payment of the interest to which the bank is properly entitled for the loan of its credit. Depositors who persist in this practice are sooner or later advised that their accounts are no longer desired.

Lamb. An amateur speculator upon the stock market who is shorn of his money as the lamb is shorn of its fleece. Thus, buyers of worthless securities, or others deprived of their savings in near-fraudulent transactions, are said to have been "fleeced."

Latin Union. Agreement of France, Belgium, Italy, Greece, and Switzerland to adopt a common gold monetary unit as the basis of their systems of currency. In Italy this monetary unit is called the lira; in Greece, the drachma; and in France, Belgium, and Switzerland, the franc. The unit is equivalent to 19.3 cents in the currency of the United States.

Lawful Money. A term covering broadly any form of currency in common use, whether or not it be legal tender in a technical sense. Thus, national bank notes, silver certificates, and Federal Reserve Bank notes are lawful money, although they are not legal tender.

Legal Investment. Savings banks and insurance companies are, under the laws of most states, required to invest their funds in a limited class of securities. These securities consist of Federal, state, county, and municipal bonds; first mortgages on real estate in an amount not exceeding, under the laws of most states, 60 per cent of the value of the real property; and bonds of certain designated railroads. A further limitation with respect to investment in railroad and municipal bonds is frequently imposed, to the effect that the bond of a particular municipality or of a particular railroad may not be the subject of investment if there has been, at any time during the preceding five years, or sometimes a longer period, a failure to pay interest upon its bonds; and, in the case of some railroad bonds, if there has been, for a certain period preceding the investment, a failure to pay dividends.

In most states, either by statute or by repeated rulings of the courts, fiduciaries (in which class are included trustees under wills and under deeds of trust, executors and administrators, and guardians of the estates of minors and incompetents) are required to invest the funds of the trust estate in securities which are legal investments for savings banks. This rule, where not prescribed by statute, is not an absolutely hard and fast limitation upon the investments of fiduciaries. But, if investments are made in any other securities or property than the so-called "legal investments," the fiduciary runs a very serious risk of being held liable personally for any diminution or depreciation in the value of the principal of the estate.

Legal Rate of Interest. The maximum rate of interest fixed by the laws of a state or country as a lawful charge for the use of money. Each state in the Union may fix its own lawful rate of interest. Where individuals of different states, having different legal rates of interest, are involved in a transaction, that rate governs, which is fixed by the laws of the state in which the transaction takes place, or in which it is to be performed.

Where interest in excess of the rate allowed by law is charged, the rate is usurious, and the lender is guilty of usury. Under the laws of most states, if the facts are proved, the lender can then recover neither the interest nor the principal. In some states usury is also made a misdemeanor, punishable under the penal law.

Legal Tender. Currency which a creditor is compelled to accept in payment of a debt, in the absence of an express agreement prescribing the specific kind of money to be paid by the debtor.

Gold certificates, gold coin, United States notes, originally issued during the Civil War and known as greenbacks or legal tenders, United States Treasury notes of 1890, and silver dollars are full legal tender in unlimited amounts. Silver coins of less than one dollar, commonly called fractional or subsidiary silver, are legal tender only to the amount of ten dollars in any one transaction. Nickels and pennies are legal tender only to the amount of 25 cents.

Silver certificates, national bank notes, Federal Reserve notes, and Federal Reserve Bank notes are not legal tender.

Letter of Advice. A formal notification sent by the drawer of a bill of exchange to the one upon whom the bill is drawn, generally a banking house with which the drawer has made arrangements for the acceptance of bills drawn by him, advising the latter of the drawing of the bill and of the amount and terms of the instrument.

Letter of Credit. A formal letter, issued by a bank or banking firm at the request of a customer, requesting correspondents of the bank to honor drafts drawn by the person named in the letter of credit, and to charge the amounts thereof to the issuing bank.

Letters of credit are of two general classes—travelers' letters of credit and commercial letters of credit. The traveler's letter of credit is merely a letter addressed generally to the correspondents of the issuing bank, introducing the person for whose benefit the letter has been issued, and requesting that his drafts be honored up to a named amount by any correspondent bank. The signature of the one in whose favor the letter is issued is written at the bottom of the letter at the time it is issued. With this letter in his possession, a traveler may, at the office of any correspondent bank, obtain currency in any sum up to the amount named in the letter of credit, by writing a draft for the amount desired. The signature upon the draft is compared with the signature upon the letter of credit, and, if it appears to be in proper form, the desired funds will be paid to the holder of the letter of credit in any form of currency he may desire. Whenever any payment is made pursuant to the letter of credit, an entry is made on the reverse side of the letter, showing the date of payment, the bank making the payment, and the amount paid. Travelers' checks issued by express companies and also by the Bankers' Trust Company of New York City, on behalf of the American Bankers' Association, are a simplified form of the letter of credit.

Commercial letters of credit are drawn by a bank at the request of a customer, usually in order to facilitate purchases abroad. Thus, if an importer desires to purchase goods in a foreign country on credit, he obtains a letter of credit from his bank or from another bank with which his bank has made arrangements for the issuance of letters of credit. This document may be addressed to a foreign correspondent of the issuing bank, or it may be addressed by the issuing bank directly to the foreign exporter.

The letter in effect is an undertaking or a guarantee that the issuing bank will pay all drafts drawn in accordance with the terms specified in the letter of credit. Where the letter specifies that drafts will be honored only when accompanied by bills of lading, consular invoices, and, sometimes, also by policies of insurance, the instrument is called a "documentary" letter of credit. Where there is no requirement that drafts shall be accompanied by bills of lading or other instruments of title, the letter is called a "clean" letter of credit.

The letter may be a "revocable" letter of credit or an "irrevocable" letter, depending upon the particular terms of the instrument. In the former, the bank reserves the privilege of withdrawing the credit at any time before drafts have been drawn against it. Where the letter is "irrevocable," it remains in effect until it is exhausted or expires by its terms.

Where the letter of credit is forwarded first to a correspondent of the issuing bank, and the correspondent notifies the exporter and undertakes on behalf of the issuing bank to accept drafts drawn by the exporter, pursuant to the letter of credit, the letter is said to be "confirmed." Where, however, the correspondent or notifying bank merely advises the exporter of the receipt of the letter of credit, without itself undertaking to accept or guarantee drafts drawn against it, the letter is "unconfirmed."

Lien (*lē'ĕn*; *lēn*). A legal right of a person to detain or control property belonging to another until certain charges upon it have been paid, or until some pecuniary claim against the owner has been satisfied.

Lighterage. Transferring goods from a dock or wharf to a lighter or barge, and then from the lighter or barge to a ship, or vice versa. The term is applied also to the expense involved in thus loading or unloading a vessel. This expense will be incurred whenever the shallowness of the water or the lack of proper dock facilities makes it impossible to load or unload directly from wharf to ship.

Limited. See *Ltd.*

Limited Partnership. A partnership in which the liability of one or more of the members is limited to the amount invested in the business. Such a partner, in the event of the insolvency of the partnership, cannot be held liable for any of its obligations beyond the amount which, under the partnership agreement, he has undertaken to place at the disposal of the business.

Usually, limited partnerships are strictly regulated by statute, the purpose of such regulation being to provide adequate notice to the public of the limited liability of one or more of the partners. These laws generally provide that the active management of the partnership shall be vested solely in the general partners—those members of the firm who are liable, without limitation, for any and all debts contracted by the partnership.

Liquidation. The conversion of the assets of a corporation, firm, or partnership into cash, and the distribution of its assets among the creditors and stockholders or other persons having an interest in the company or business.

A liquidation is known as a "voluntary" liquidation where it results from the mere desire of the owners of the business, or the stockholders of a corporation, to terminate the business and distribute its assets. The liquidation is a "forced" liquidation where the pressure of creditors has thrown the business, or has threatened to throw it, into receivership, and liquidation is the only method by which creditors can receive payment of the sums due them.

Listed. Before a stock or bond may be bought and sold on any of the larger stock exchanges, the security must be submitted to the governors of the exchange or to a special committee appointed to pass upon the character of the security and the qualifications of the corporation issuing the stock or bond. Certain definite requirements usually must be met to qualify the security for listing. When the stock or bond has been approved as fulfilling these requirements, it becomes "listed" on the particular exchange.

Sometimes the term listed is used with reference solely to listing on the New York stock exchange.

Lombard Street. The name applied to the financial section of London, of which Lombard street forms a part. The use of this term corresponds to the use of the term "Wall Street" in this country, as expressive of the entire metropolitan financial district.

Ltd. Abbreviation for the word limited, required to be included in the names of companies organized under limited liability statutes in Louisiana, Great Britain, Canada, and in some other countries. The term "Ltd." is used with the same purpose and effect as the abbreviation "Inc."—which is more commonly used in the United States—to indicate that the company is one in which the liability of the stockholders is limited to the amount invested in the corporation.

Manifest. A complete list of the passengers or freight carried upon each voyage made by a vessel. This list must be signed by the captain or other person in charge of the ship. If a passenger ship, it must contain, in addition to the name of every passenger, a complete record of the voyage, including particularly the name of the port of embarkation and that of the port of landing. Where the manifest covers a shipment of freight, it must contain the name of each shipper or consignor, the character of the freight, the number of packages, and the ports of loading and destination.

Margin. A sum deposited with a broker for the purchase of stocks or commodities on speculation. The "margin" so deposited constitutes a protection against loss to the broker, in the event of a fall in the value of the securities purchased. The amount of the margin required by the broker varies with the speculative quality of the security or commodity to be purchased for the customer. In the case of some standard stocks, a margin of 10 per cent may be sufficient. Where the stock, however, is subject to violent fluctuations, the broker may require a deposit as high as 30 per cent of the amount of the purchase.

Whenever the price or quotation of a security purchased for a customer on margin falls to such a point that the margin is reduced below the stipulated percentage, the broker calls upon the customer for additional margin. If this is not forthcoming, the broker "sells out" the customer before the fall in price has completely wiped out the margin deposited.

Matched Order. An order to buy, given simultaneously with an order to sell a similar number of shares of the same stock or an equal quantity of a commodity. Such an order really amounts to a fictitious sale and gives an appearance of activity in the particular stock or commodity which has no basis in actual demand. The purpose of "matched orders" is usually to cause an artificial or temporary rise in prices.

Mechanic's Lien. Under the laws of many states, one who performs labor or provides materials used in the construction of a building may obtain a lien upon the building for the value of the labor or materials rendered, by filing a notice in the office of the county clerk or registrar of deeds. Such a lien is called a mechanic's lien. The purpose of these statutes is to provide security and some assurance of ultimate payment to those who render services or provide materials by which the owner of the building benefits.

In order to obtain a mechanic's lien, it is not necessary that the work or materials be rendered directly to the owner at his request. A notice of lien may be filed by one who performs work for a contractor or subcontractor. But, in that event, under the laws of most states, the lien is valid

only to the extent to which money is or may become due from the owner to the contractor or subcontractor, by reason of work performed upon the structure. The filing of a notice of a mechanic's lien, therefore, operates as a notice to the owner that, if any sums are or may become due to his contractor, he must set aside out of these sums, an amount sufficient to pay the mechanic's lien asserted against the building. To avoid double payment, it is customary for the owner to require a contractor to file a bond, protecting the owner against the possibility of having his property subjected to liens of persons hired by the contractor to perform services upon the building.

Middleman. One who stands between the producer or manufacturer and the consumer. Distributors of all kinds, such as jobbers, wholesalers, retailers, brokers, factors, and commission merchants, are included within this class.

Money. Any recognized medium of exchange. In a more limited sense, and as the term money is now commonly used, it applies to the currency either issued or recognized by governmental authority, whether or not it is legal tender. See *Legal Tender*.

Money Order. An order payable at sight to a person designated in the instrument, the amount to be charged to the account of the drawer. Money orders are issued by express companies and by the post-office department of the United States government, and, more recently, also by bankers' associations. They are quite similar to cashiers' checks in their essential character and in the purpose which they serve. By reason of their almost universal acceptability and further by reason of the fact that they are made payable to a designated party—so that one not entitled to the money order cannot avail himself of it—they provide a safe and convenient means for transmission of payment through the mails.

Moratorium. An act of the government providing that, during a certain period, creditors shall have no right to bring proceedings against debtors for the collection of debts.

Mortgage. Technically, a transfer of title to real or personal property as security for a loan or other obligation.

Formerly a mortgage was deemed to convey to the mortgagee the ownership in the property subject to defeasance; that is, subject to termination upon payment of the debt for which the mortgage was given as security. Today, however, mortgages, upon either real or personal property, are commonly regarded as giving to the mortgagee merely a lien upon the property mortgaged, and not as conveying any actual rights of ownership.

In most states, statutes provide specifically how mortgages may be foreclosed in the event of nonpayment of the debt for which the mortgage was given, the purpose of these statutes being to protect the mortgagor—the one who gives the mortgage—from a forfeiture of his interest in the property.

In order that the mortgagee shall have a valid lien upon the property mortgaged, as against a person to whom the property may be sold by the mortgagor, or, in most states, even as against judgment creditors of the mortgagor, the mortgage must be recorded. If the mortgage is upon real property, it will be recorded in the office of the clerk or the registrar of deeds of the county where the property is located. Chattel mortgages must generally be recorded in the office of the clerk of the town or municipality in which the mortgagor resides.

Mortgage Bond. A bond secured by a mortgage upon real or personal property.

Municipal Bonds. Obligations of a city, school district, incorporated village, or other municipality, issued to provide funds for municipal purposes.

National Bank. A bank organized under the National Banking law of the United States, and subject to regulation by Federal authority. The present national banks have been organized pursuant to acts passed on February 25, 1863 and June 3, 1864, as a part of the general financing plan of the Northern states during the Civil War. These banks were specifically given the power to issue bank notes upon depositing, with the United States treasury, bonds of the United States in an amount equal to the amount of notes issued. All national banks are now members of the Federal Reserve system.

National Bank Notes. Notes payable to bearer upon demand, issued by national banks. These notes are secured dollar for dollar by bonds deposited with the United States treasury and also by a 5 per cent redemption fund kept on deposit with the treasurer of the United States. The Federal Reserve act, approved December 3, 1913, provided for the gradual retirement, over a period of about twenty years, of national bank notes, and the substitution for them of Federal Reserve Bank notes and Federal Reserve notes.

National bank notes are not legal tender. They are, however, receivable in payment of all public dues to the United States, except duties on imports. They also constitute a valid payment for all obligations of the United States government except interest on the public debt. They are redeemable in legal tender on presentation at the bank which has issued them.

Negotiable Paper. A check, draft, bill of exchange, or other commercial instrument payable to bearer or to order, the title to which may be transferred by delivery or by endorsement. An instrument is not negotiable unless it is payable to "bearer" (or a recognized equivalent of the term bearer, such as "cash") or to "the order of" a designated person. In order to be negotiable, the instrument must have also a definite or ascertainable date of maturity, and must contain an unconditional obligation to pay a definite sum of money. One who acquires a negotiable instrument for value, prior to maturity and without notice of any defect in the title of previous holders of the instrument, usually may recover against those who appear to be liable upon the instrument, irrespective of any defenses which they may claim or possess against previous holders of the instrument.

Negotiable Securities. Bonds payable to bearer and therefore transferable by delivery, as distinguished from registered bonds, which can be effectively transferred only by changing the registration of the bond at the office of the issuing corporation.

Net. A term applied to a price or to an amount after all discounts and other deductions have been made.

The net weight of a commodity sold in a container is the weight of the contents alone, free from the container.

No Account. When a check, drawn upon a bank in which the drawer is not a depositor, is presented at that bank, it is stamped with the words "no account."

No Funds. When a check is drawn upon a bank in which the drawer has or has had an account, but which has no funds to his credit when the check is presented for payment, the check is returned with the words "no funds" stamped upon its face. Where the drawer of the check has some funds on deposit, but not enough to meet the check, the words "insufficient funds" are stamped upon it.

Nonassessable. A term applied to stock in a "limited liability" corporation, which has been paid for in full, and the owner of which, under the terms of the issuance of the stock, cannot be required to make further contributions to the capital or business of the corporation. When such stock has once been fully paid for, the ownership of it entails no further liability on the part of the owner, either to the corporation or to its creditors. Holders of stock in banking or insurance corporations are usually liable to assessment for a sum equal to the par value of the stock which they hold, in addition to the par amount already paid in upon the stock.

No Protest. An instrument that is not subject to protest is marked with these words. See *Protest*.

Note. An unconditional written promise to pay a specific sum of money at a definite or determinable future date, signed by the person making the promise.

Option. A right or privilege to buy (or sometimes to sell) property upon designated terms. An option differs from a contract in that the person to whom the option is given is under no obligation to buy or to sell, whichever the case may be. He may or may not exercise his privilege, as he chooses. In order that an option may be valid and binding, usually something of value must be given to the person granting the option. Otherwise, it is a mere offer to buy or to sell upon the terms specified, which may be withdrawn at any time.

Outlawed. A colloquial term applied to the barring of rights by the failure to enforce them within a certain period.

The practical administration of justice requires that a definite limitation be placed upon the time within which those who claim rights against others shall enforce these rights in courts of justice. The principle upon which statutes of limitation rest is that the facts about a matter are likely to be obscured by the lapse of time, and also that it is socially desirable that a long existing situation should not be disturbed by reason of long past events.

The period within which an action must be commenced upon a note or other contractual obligation is, under the laws of most states, six years. An instrument under seal, however, does not become outlawed in some states until twenty years have elapsed from the date when the obligation matured. Tort actions—actions for injuries to person or property—are usually "outlawed" in two, three, or four years, the term varying in different states.

Overdrawn. When a depositor draws checks to an amount in excess of the credit to his account, his account is said to be overdrawn. Where such an overdraft is permitted by a bank, it constitutes, in effect, a loan by the bank to the depositor. Such a loan, however, is not represented by any written instrument from the depositor to the bank, and is therefore deemed a highly objectionable bank practice.

Paper Money. Any paper currency, whether or not it is legal tender.

Par. The face value of a note, security, or other instrument. A stock or bond is said to sell at par, above par, or below par, accordingly as its sale price is equal to, greater than, or less than, the nominal value stated upon the instrument itself.

Pass Book. A term sometimes applied to a bank book. See *Bank Book.*

Payable to Bearer. An instrument payable to "bearer" is payable to the holder of the instrument, and may be transferred from one holder to another by mere delivery, without endorsement. Where an instrument is made payable to "cash," it is regarded as payable to bearer.

Payee. The one to whom a note, draft, or other instrument is made payable.

Payor (Payer). The maker or drawer of a promissory note, or of a similar instrument.

Personal Property. Any property, whether tangible or intangible, that is not affixed to land. Stocks, bonds, jewelry, furniture, live stock, automobiles, trade-marks, good will, patents, and leases for definite periods of years are all included within the general class of personal property.

Pit. The trading room of the Chicago board of trade, in which grain, rye, oats, barley, and other commodities are bought and sold.

Point. The unit used in designating the extent of a rise or fall in the market price of a security or a commodity. A point may indicate different amounts for different securities or commodities. Thus, a rise or fall of a point in the quotation of a stock ordinarily indicates a rise or fall of one dollar. In quotations of cotton, a point is $\frac{1}{100}$ of a cent, and a rise of 25 points in the price of cotton would indicate merely an increase of one-quarter of a cent per pound. In foreign exchange, a rise of one point would mean normally an increase of one cent in the exchange value of the foreign monetary unit.

Pool. A combination of individuals or interests for the purpose of creating an artificial rise or fall in the price of securities or commodities dealt in upon the stock or commodity markets. The members of the pool combine their resources and, under the management of a designated individual or group of men, buy and sell in a particular stock or commodity with the purpose, either of hammering down the price of the stock or commodity, or of artificially raising the price to a point that will enable them to unload the security or commodity upon the public at a profit. The method of operation most frequently used is the following:

A particular stock is chosen as a desirable one with which to execute the series of maneuvers which it is expected will yield a profit to the members of the pool. A large quantity of this stock is bought up quietly at the normal price. The members of the pool then engage in sales to and from one another, sales which by reason of the ultimate identity of interest of the parties to the pool are in fact fictitious or "wash" sales. When a block of the stock is offered upon the stock market by one member of the pool, it is promptly purchased by another member of the pool. As additional blocks of stock are offered, the stock is bought up at continually rising prices by members of the pool. By this series of operations, the price of the stock is artificially raised to a point much higher than its actual or true market value, and, when a favorable moment arrives, the pool unloads the stock upon the public at this artificially created high price. As soon as the unloading has been effected, the bottom falls out of the stock, and the innocent purchasers upon whom the stock has been unloaded by the pool find that their stock cannot be sold at anywhere near the price which they paid. A pool which operates in this fashion is sometimes called a "bull" pool.

In a "bear" pool, the members of the pool combine their resources and proceed to sell a particular stock or commodity at the current price for future delivery. They then, by actual sales of the stock or commodity in the market at continually falling prices, as well as by fictitious transactions, "hammer down" the price of the stock or commodity to a point where they can cover at a profit the sales which they have made. Just as in the "bull" pool, the repeated purchases of the stock at a continually rising price cause the price of the stock to rise abnormally, so, in the "bear" pool, the psychological effect upon the general public of a continuous series of sales of considerable proportions, at a steadily falling price, results in a demoralization of the market for the particular stock or commodity. The pool operators can then buy in and cover, at a very handsome profit, the sales which they originally made for future delivery.

In the "blind" pool, the plan of attack, or even the particular security with which the pool is to deal, is left to the discretion of a manager or a group of managers who are placed in charge of the undertaking.

Postdated Check. A check bearing a later date than the date upon which it was actually drawn. A postdated check will not be honored by a bank until the date indicated upon the check arrives.

Power of Attorney. A writing or instrument signed by one person and giving to another person authority to perform certain acts on behalf of the signer of the instrument. A power of attorney, in most states, must either be witnessed, or be acknowledged before a notary public or other official authorized to take acknowledgments. The power of attorney may be very general in its scope, or it may be limited to a single specific act.

A power of attorney may be terminated at any time by the grantor of the power, unless the holder of the power of attorney has some pecuniary interest of his own which would be violated or infringed by the termination.

For some purposes, a power of attorney may be conferred by one person upon another by mere oral or parol authorization, without any instrument in writing. An authority conferred in this manner is more properly termed a mere agency rather than a power of attorney.

Preferred Creditor. A creditor entitled to payment of his claims before the claims of mere general creditors are paid. Whether a creditor has a preferred claim becomes important where a debtor has become insolvent or has been adjudicated a bankrupt. Claims arising out of personal services rendered within two years of the filing of a petition in bankruptcy are entitled to a preference, and such claims must be paid in full before other debts may be paid.

Preferred Stock. Stock in a corporation, which confers upon the holder a prior right to dividends or to payment out of the assets of the corporation, in the event that the corporation is dissolved.

The usual preference given to holders of preferred stock is one entitling the holders to dividends of a certain per cent upon the par value of their stock in each year, before any dividends shall be paid to holders of the common stock. This preference as to dividends may be either cumulative or noncumulative. If the dividend preference is cumulative, then, if no dividends, or dividends less than the amount of the dividend preference, are paid in any year upon the preferred stock, the amount unpaid must be paid to the holders of the preferred stock before any dividends can be paid upon the common stock in any subsequent year. If the preference as to dividends is noncumulative, then, if no dividends are paid upon the preferred stock in any year, such omission of dividends does not affect the relative rights of the holders of preferred and common stock in any subsequent year, the prior omission of payment of dividends to the preferred stockholders being entirely disregarded.

Generally, the dividends which holders of preferred stock may receive from the corporation are limited to a definite rate or amount. Thus, if the preferred stock entitles the holder to dividends of 7 per cent upon the par value of the stock, all of the profit in any year, in excess of the dividends to which the preferred stock is entitled, goes to the holders of the common stock. This, however, is not necessarily the case. For, in the absence of a provision limiting the holders of preferred stock to dividends of a certain per cent, preferred stockholders are entitled to share equally with the common stockholders in any excess profits distributed by the corporation, after the common stockholders have received dividends at a rate equal to that paid to the holders of the preferred stock. See *Common Stock.*

Premium. When any security having a par value sells at a price above par, it is said to be quoted at a premium.

The term is used also in transactions in international or foreign exchange, with reference to the amount above the normal exchange rate at which any particular currency is quoted. And where different kinds of money, such as gold and silver, or gold and paper, are used simultaneously within a country, gold will be quoted at a premium whenever the paper currency, or the currency having a lower intrinsic value, is issued in such a quantity as to cause the public to lose confidence in it. In such a case, gold is driven out of monetary uses, and gold coin is bought and sold as a commodity rather than dealt in as mere money or currency. See *Gresham's Law.*

Principal. The capital sum due upon a bond or other obligation as distinguished from the interest which accrues or becomes due upon the principal from time to time.

Profiteering. Selling goods or services at a price yielding an unusually large profit. In 1918, Congress passed a law designed to prevent and punish profiteering in certain businesses. This law, however, was held unconstitutional.

Promissory Note. An instrument containing an unconditional promise to pay a definite sum of money to a particular person or to his order, or to bearer, either on demand or at a definite future time. A promissory note may be either negotiable or nonnegotiable. It is nonnegotiable when it is payable to a definite person only, and not to his order or to bearer.

Promoter. One who makes a business of floating or financing new enterprises or of obtaining additional capital for already existing enterprises.

Pro Rata. In proportion to their respective rights or liabilities. Thus, it is the policy of the law that creditors of an insolvent debtor shall share pro rata in his assets; that is, in proportion to their respective claims. Conversely, where several persons are engaged in a joint enterprise, it is the policy of the law that they shall, as among themselves, be liable pro rata for any obligations incurred; that is, they share the burden in proportion to their interests in, or contributions to, the enterprise.

Protest. The formal step necessary to fix the liability of the endorsers of a check, note, or other instrument which has been presented to the maker or acceptor for payment and has been refused. In the case of a note or of a draft or bill of exchange payable at a definite future date, the instrument must be presented formally to the maker or acceptor during business hours upon the date of maturity. If the instrument is not paid before the close of business on that day, the one who made the formal presentation of the instrument for payment certifies over his seal and signature that the instrument was presented and payment was refused. This certification is the "protest" of the instrument.

It is not necessary, in order that the maker of a note shall remain liable upon the instrument, that the note be presented and protested for nonpayment.

Proxy. An authorization from one person to another to act in his place and on his behalf. It is customary for stockholders of a corporation to vote their stock by proxy; that is, by executing a written authority authorizing another to act on their behalf at a meeting of the stockholders. Persons who occupy positions of trust, such as directors of a corporation, cannot act as such by proxy.

Put. An agreement to accept and pay for a certain amount of a stock, or of a commodity, at a fixed price at any time before the expiration of a designated period.

Pyramiding. Buying additional blocks of a particular stock or commodity upon margin, with the book profits yielded by a rise in prices. Thus, a customer requests a broker to buy 100 shares of a particular stock at 25 dollars a share, on a five-point margin, that is, a margin of 20 per cent, and gives directions to the broker to buy additional stock upon the same margin upon each advance in the market price of the stock. If the stock advances five points, the broker, under his instructions, will buy another hundred shares upon a similar margin upon the basis of the five-point paper profits yielded by the first purchase. As the stock continues to rise in price, the paper profits furnish additional margin for further purchases, until a large quantity of the stock has been purchased; and, if the stock so purchased is unloaded before a fall in the price of the stock, a very handsome profit upon the original investment will result.

Quotation. A price bid or asked for a stock, bond, or commodity. Sometimes a quotation may represent an actual market price based upon actual sales.

Rate of Exchange. The rate at which a unit of currency of one country exchanges for a unit of currency of another country. Under normal conditions, the monetary unit of one country has a definite value in terms of the currency of any other country, generally based upon the amount of pure gold represented by the respective monetary units. When exchange is at par, then the currency of one country has a value, in transactions with persons of the other country, equal to the relative amount of gold represented by the monetary units.

Where depreciated paper currency, which is not redeemable in gold, circulates within a country, a new element is introduced, which affects exchange rates very materially. The currency of such a country will be exchangeable for the currency of other countries, not at a rate based upon the relative amount of gold nominally represented by the respective monetary units of the countries, but rather at a rate which takes into consideration the extent of the depreciation of the paper currency. Thus at the close of the World War the rates of exchange of the currencies of Germany, Russia, Italy, France, and other European countries, in terms of American dollars, differed greatly from the normal rates of exchange. The extent of this variation from the normal rate measured the depreciation of the paper currencies of those European countries.

Rating. The credit worth of an individual, firm, or company, as estimated by Dun's, Bradstreet's, or any other recognized mercantile agency.

Real Property. Land and all things permanently attached to the land. Thus, real property includes structures erected upon the land and intended to remain affixed for an indefinite time, minerals, water flowing through the land, trees and other issues of the soil (excepting crops which are planted and reaped yearly or more frequently), rights of way and other easements, and rights of every nature in land and in waters, not including, however, leases for years or mere licenses.

Rebate. A return of part of a sum received for goods or for services rendered. At one time it was customary for railroads to make rebates to large or favored shippers. The result of this practice was that certain large corporations were able to save sufficiently upon their transportation costs to undersell their smaller or less favored competitors. The result of this was to crush the smaller concerns out of existence. The Interstate Commerce act of 1887 and the amendments which have since been made to that act have had, as one of their chief objects, the prevention of this practice. Under this act, the giving of a rebate by any railroad or other common carrier in interstate commerce was made a crime.

Receiver. Person appointed by a court to manage the property of a person or a company, pending the termination of legal proceedings affecting the property or its owner. Thus, a receiver may be appointed to receive the rents and profits of a property with respect to which mortgage foreclosure proceedings have been instituted. Similarly, a receiver may be appointed to receive the rents and profits of property the ownership of which is disputed.

The type of receiver that is most common, however, is the receiver who is appointed ostensibly to take over the assets and continue the business of a corporation, pending its dissolution. Frequently this means of preserving the property of a corporation until its affairs can be liquidated is abused by those in charge of the affairs of the corporation. Thus, the receiver may be appointed at the behest of friendly creditors, with the sole purpose of preventing unfriendly creditors from pressing their claims and levying execution upon the property of the company. No bona fide purpose to dissolve the corporation or to liquidate its affairs then exists; but the protection which receivership proceedings provide against the collection of claims by creditors is obtained. In these cases, therefore, a receivership merely grants the corporation a moratorium—a suspension of payment of its debts—and serves no other purpose than to carry the corporation through temporary financial straits.

Refunding. Floating a new issue of securities to replace outstanding issues which are about to mature.

Registered Bonds. Bonds payable to a definite person designated in the face of the bond, and transferable only by endorsement properly witnessed and by an entry of the transfer upon the books of the issuing corporation. Where the bond is registered not merely as to principal but also as to interest, the interest is paid by check to the record holder of the bond, without the necessity of the transmission of any coupons to the corporation. When the bond is registered as to principal only, and not as to interest, it usually bears coupons representing the interest due or to accrue upon the bond, the coupons being payable to bearer and cashed upon presentation as they mature.

Registrar. One who records original issues and transfers of stock or bonds of a corporation. The functions of the registrar generally include the duty of safeguarding against a fraudulent or erroneous overissue of stock or bonds by the officers of the corporation. The registrar must then make certain that no certificates of stock or bonds are issued unless they are part of a duly authorized original issue or are issued in place of surrendered and canceled certificates of like amount.

Reserve. Funds set aside to meet a contingent or definite future expenditure.

Most corporations have a reserve for obsolescence and depreciation, the purpose of which is to provide a fund with which to replace capital assets when they have become worn out or useless. Where a company carries its own insurance—that is, does not take out insurance with regular insurance companies, but carries its own risks as to fire loss or other damage—a reserve will be accumulated from year to year so that, in the event of a loss by fire or otherwise, there will be sufficient funds set aside to cover the loss. It is also customary for companies that have issued bonds or other long-term notes to set aside annually a certain amount as a so-called reserve, with which to fund or pay the bonds or notes when they become due. Banks are required by law to maintain a reserve consisting of cash or its equivalent, amounting to a certain proportion or percentage of their deposits. See *Bank Reserves*.

Rights. The term applied to the privilege given to existing stockholders of a corporation to purchase a proportionate number of shares of any new issue of the company's stock.

Under the law which has grown up with respect to the rights of stockholders in corporations, a stockholder is entitled to subscribe to any new issue of stock that the corporation may make, in proportion to his holdings in the corporation, before the stock may be offered to the general

public. Where the outstanding stock of the corporation has a market value higher than par, this privilege of purchasing stock of the new issue, at par or at any price lower than the market quotation for the outstanding stock, is a valuable one. Thus, assuming that there are 10,000 shares of the stock of a corporation outstanding, the shares having a par value of $100, but selling on the market at $150, if a new issue of 5000 shares is to be offered at $100 per share, each stockholder would be entitled to purchase one share of the new issue for each two shares which he already owns in the corporation. The holder of 100 shares would then be the owner of 50 so-called "rights," a right being the privilege of purchasing one share of stock of the new issue. If the new stock is issued at $100 and the stock outstanding is quoted at $150, then the value of a right would be something less than $50. These rights may be bought and sold and, in the case of stocks having a wide market, are sometimes the subject of considerable speculation.

Savings Banks. Banks organized for the purpose of receiving deposits from small savers, and utilizing these savings in the form of investments in high-grade bonds and in loans upon real estate. Savings banks are very strictly regulated by statute in nearly all states, with the purpose of insuring the utmost safety to depositors. Thus, savings banks are generally prohibited by law from investing their funds in other than Federal, state, or municipal bonds and bonds of certain designated railroads, and in loans secured by first mortgages upon real estate, where the loan is not in excess of 60 per cent of the value of the property. Generally, deposits in savings banks are not subject to check or to withdrawal upon demand, although banks frequently waive the requirement that they receive a certain period of notice of an intended withdrawal.

Scalper. One who obtains inside information of events likely to affect the price of securities, and utilizes this information to his own profit by buying or selling upon the basis of his advance information. This practice is called "scalping the market."

Scrip. A form of promissory note or certificate of indebtedness, issued by a corporation to its stockholders in lieu of cash dividend payments. A corporation will resort to the use of scrip dividends when, although the profits of the company are such as to warrant some return being made to the stockholders upon their holdings in the company, the amount of actual cash on hand is not enough to permit immediate payment of cash to the stockholders.

Second Mortgage. A mortgage upon property which is already subject to a prior or first mortgage. Mortgages are called first, second, third, or fourth mortgages, according to the order in which they have been placed upon the property, and they are entitled to payment out of the property in order of their priority. Thus, if a second mortgage is foreclosed on default in the payment of interest or principal, the property can be sold only subject to the first mortgage. In other words, only the equity of the owner above the first mortgage can be relied upon to pay the amount of the second mortgage. In the event that the interest or principal due upon the first mortgage is not paid when due, the first mortgage may be foreclosed, and, in that event, the amount of the first mortgage must be paid out of the proceeds before any sum will be paid to the holders of the second or subsequent mortgages. If, after payment of the amount of the first mortgage and the expenses of the foreclosure sale, there is any residue, this will be paid to the second and subsequent mortgagees or lienors, in order of their priority.

Secured Creditor. A creditor who has security or collateral, in the form of personal or real property, for a sum due him from a debtor.

Securities. Stocks, bonds, and other evidences of indebtedness or of ownership in a corporation.

Seigniorage. Charge made by a government for coining bullion into money.

Sellers' Option. A contract entered into in a stock or commodity exchange, whereby the seller is given the option of delivering at any time during a specified period upon one day's notice to the buyer. Under New York Stock Exchange rules, the period of a sellers' option cannot be less than four days nor longer than sixty days. "Sellers' option four" or "sellers' option ten" designates the period during which delivery may be made. See *Bids and Offers, Buyer's Option.*

Selling Short. Selling for "future delivery." One who sells short makes an agreement whereby he agrees to deliver at a future time, a stock or commodity which he does not possess at the time he enters into the contract to deliver, with the expectation that he will be able to purchase the stock or commodity, before delivery is due, at a lower price than he sold for. One who habitually sells short is called a "bear." See *Bear.*

Shave. The fee or commission taken by a broker or by a lender of money for obtaining or granting a loan. Generally, where the shave goes to the lender, it is merely a device to cover a usurious rate of interest. Thus, if one goes to a money lender and desires to borrow $900 in cash, the money lender will sometimes require, not a note for $900, bearing the legal rate of interest of 6 per cent, but a note for $1000. The difference between the amount given to the borrower and the amount named in the note is the amount of the "shave" taken by the lender. The amount actually paid by the borrower for the use of the $900 obviously is much more than the legal rate of interest; and, if the actual facts could be established, the laws which prohibit usury would prevent the lender from recovering either the principal or the interest of the loan. To avoid this possible penalty of making a usurious loan, notes given by borrowers are frequently "purchased" by the lender from a third party, who is in fact a straw man in the transaction. By this device, what is in fact a direct loan is made to appear to be a "purchase," it being perfectly lawful to purchase a note, at any discount, however large.

Shoe String. When a person trades in stocks or commodities on margin, with a very limited capital, he is said to be "trading on a shoe string."

Sight Draft. A draft due and payable upon presentation to the person upon whom it is drawn. The ordinary check drawn upon a bank is, in effect, a sight draft. See *Draft.*

Silent Partner. One who has money invested in the business of a partnership and shares in its profits and losses, but whose interest in the business is not known to the general public. A silent partner is usually liable without limit for all of the debts of the partnership, incurred while he maintained his interest in the business. He may, however, retire from the partnership at any time without giving notice of his withdrawal to the public, and he cannot be held liable for debts thereafter incurred by the partnership. See *Limited Partnership.*

Silver Certificate. Paper currency issued by the government of the United States as a substitute for, and representative of, silver dollars deposited with the United States treasury. The Bland-Allison act of 1878 authorized the purchase of silver bullion by the secretary of the treasury and the coining of the bullion into silver dollars. The act further provided that the silver dollars so coined could be deposited with the United States treasury, and that silver certificates, redeemable on demand in silver dollars, should be issued in their place.

So, for each dollar of silver certificates outstanding, there is on deposit with the United States treasury a silver dollar containing 412½ grains of silver $\frac{900}{1000}$ fine.

Silver certificates are not legal tender, but they are receivable for customs taxes and all public dues.

Simple Interest. Interest computed on the principal only. Simple interest is to be distinguished from compound interest. In the latter, at regular intervals, interest due or accrued is added to the principal, and interest is computed thereafter upon the principal plus the interest so credited.

Single Standard. A phrase used to describe a monetary system in which one metal is used as the sole standard of value. The single gold standard now prevails throughout the Western world. Formerly, nearly all countries had a bimetallic system, or double standard, in which both silver and gold were freely coined at a certain ratio. Values were then determined in terms of either silver or gold. England was the first country formally to adopt the single gold standard, the act accomplishing this reform having been passed in 1816. The single gold standard was formally adopted by the United States in 1900.

Sinking Fund. A fund created by setting aside periodically, out of earnings or revenue, sums with which to pay bonds or other long-term obligations when they mature. A sinking fund may be created also for the purpose of replacing worn-out machinery or other capital assets which may become used up or exhausted over a period of years. See *Amortization.*

Specie. Coin, or metallic money.

Spot. A term used in quotations on commodity exchanges to indicate that the price is for immediate delivery and cash payment.

Standard Weight and Fineness. A phrase referring to the weight and purity of the metal in a coin established by law. Thus, the gold dollar has a standard weight of 25.8 grains, $\frac{9}{10}$ fine, that is, $\frac{9}{10}$ pure gold and $\frac{1}{10}$ copper alloy, or 23.22 grains of pure gold.

State Banks. Banks organized under the laws of a particular state and subject to state regulation. Savings banks, trust companies, and all types of commercial banks, except national banks, Federal Reserve banks, and farm loan banks, are "state banks."

Sterling. Abbreviation for the pound sterling, the unit of the English monetary system. Under normal conditions, the pound sterling is equivalent to $4.86 of American money.

Sterling Exchange. Bills of exchange payable in pounds sterling, and drawn upon London banking houses.

Stock. The capital stock of a corporation represents the amount invested by stockholders in the business of a corporation. From the point of view of the law, the capital so invested represents a fund to which creditors may look for payment of debts incurred by the corporation.

The capital stock of a corporation is usually divided into a number of shares which are held by the various stockholders of the company. These shares, evidenced by certificates of stock, represent the proportionate interest which each stockholder has in the corporation.

Stock Certificate. A printed or engraved certificate issued as an evidence of ownership of stock in a corporation. This certificate must be signed by certain authorized officials of the company, and sometimes also by a "registrar of transfers."

Stock certificates may be transferred by endorsement upon the reverse side of the certificate, or by a separate instrument of transfer. The transfer, however, vests no rights in the one to whom the transfer is made, as against the corporation, until a record of the transfer has been made on the books of the corporation.

Under recent statutes, certificates of stock have been rendered highly negotiable. Under these statutes, if a certificate is endorsed in blank by the holder of record, it becomes similar to a negotiable instrument, the ownership of which can be transferred by mere delivery from one person to another. Under the Uniform Stock Transfer act, which has been adopted in a majority of states, one who, in good faith, purchases or advances money upon a certificate which bears a valid endorsement may obtain a good title to the stock, even though the certificates have been stolen from, or lost by, the true owner.

Stock Dividend. Nominally, a distribution of surplus or earnings to stockholders, in the form of additional stock, rather than in the form of cash. The use of the term distribution, in connection with stock dividends, is, however, misleading. For, in a stock dividend no property is turned over by the corporation to its stockholders. The stockholders merely receive additional evidences of their ownership or interest in the company. Thus, if a stock dividend of 100 per cent has been declared and made by a corporation, each stockholder merely holds two shares of stock where he formerly held one. The net assets of the company remain unchanged, and the proportionate interest of each stockholder in the net assets of the company remains the same. His interest in the company, however, is evidenced by a greater number of shares of stock.

Where the stock has a par value, a stock dividend operates to convert surplus on the books of the company into capital.

Stockjobber. A dealer in stocks of doubtful character.

Stop-loss Order. An order left by a customer with his broker directing the broker to sell stock owned by the customer in the event of a fall in the price of the stock below a certain point. The object of such an order is to check further loss where there appears a definite tendency to a decline in the price of the stock.

Where a stock or commodity has been sold short by the customer, an order would be placed with the broker to buy as soon as the price had risen to a definite point, in order to avoid greater losses, which would be incurred if the customer were compelled to cover at a still higher price.

Stop Payment. An order by a customer to a bank, directing it to refuse payment of a check or other instrument drawn by the customer upon the bank, or made payable at the bank.

A bank owes no obligation to the holder of a check drawn upon the bank by a customer, in the absence of a certification of the check by the bank. The bank may, therefore, with entire impunity, refuse payment of a check upon which the drawer has stopped payment. If the check, however, has been transferred by the payee or any other holder to a bona fide purchaser, either by endorsement or, if payable to bearer, by delivery, then the drawer of the check may be held liable to such a transferee for the amount of the check. No claim, however, can be made against the bank by any holder or transferee of the instrument.

Subpœna. A writ issued by a court of law commanding a person to appear on a certain day and at a place designated under a penalty for nonappearance or default.

Subpœna Duces Tecum (*sŭb-pē'nȧ dū'sēz tē'kŭm*). A court order in an action, directing a witness to bring with him any books, documents, or other papers in his possession or control which may or can be used as evidence. Such an order must describe with reasonable clearness what is wanted.

Supplementary Proceedings. A statutory remedy brought against a judgment debtor in aid of execution, for the purpose of locating and setting apart property of his to be applied in satisfaction of the judgment.

Surplus. The net worth of a firm or corporation, above its capital or capital stock. The term nominally includes both earnings from business operations and increases in the value of capital assets.

Tare. The difference between the gross and the net weight of an article in a container or vehicle. The gross weight of a barrel of flour is the total weight, including the container. The net weight is the weight of the flour itself. The difference between the gross and the net weight is the "tare."

Teller. A paying teller is an officer of a bank who pays out cash over the counter upon checks and other instruments made payable at the bank.

A receiving teller is a bank officer who receives and counts sums deposited with the bank, giving receipts for the funds deposited.

Ticker. An instrument, operated by telegraph, which automatically types messages transmitted from a central station. The instrument is used in brokers' offices, primarily for receiving prompt information with regard to stock transactions.

Time Deposit. A deposit of funds with a bank, under an agreement that the bank shall be entitled to the use of the funds for a definite period, or until a certain number of days have elapsed after notice has been given of an intention to withdraw the deposit. Deposits in savings banks are normally "time deposits."

Trade Acceptance. See *Acceptance.*

Trade Discount. A deduction, usually on a percentage basis, from the retail or "list" price of goods, allowed to a merchant by the manufacturer or jobber.

Trade-Mark. A special mark or symbol used for the purpose of identifying a certain product, or the products of a certain merchant or manufacturer. A trade-mark is protected under the law against use or appropriation by others than the one first to use the particular mark. The purpose of this protection given by the law is chiefly to prevent fraud upon the public.

Trade-marks may be registered at the United States patent office. Such registration does not add to the rights already possessed, without registry, by the owner of a trade-mark. Registration, however, provides conclusive evidence of a time since which the trade-mark has been used, and may prove of considerable value in the event of any litigation respecting the particular trade-mark.

Transfer Agent. Custodian of the stock book of a corporation, whose duty is to record transfers of stock and to issue new stock certificates in place of the surrendered certificates.

Transfer in Blank. Normally, stock is transferred by delivery, accompanied by an endorsement upon the reverse side of the stock certificate, made by the one in whose name the certificate has been issued. Where the name of the person to whom the stock is transferred is left blank, the stock certificate is said to be endorsed "in blank," and may then be transferred from one person to another by mere delivery, without further endorsement.

The stock is not effectually transferred, as against the corporation, however, until an entry of the change of ownership has been made upon the books of the corporation. And all rights of participation in benefits accruing to stockholders, including the right to dividends and the right to vote at stockholders' meetings, are determined by the record of stock ownership kept by the corporation.

Treasury Certificates. Short-term obligations bearing interest, issued by the United States government.

Treasury Notes. Currency issued by the United States government, pursuant to the Sherman act of July 14, 1890. This act directed the purchase, by the secretary of the treasury, of 4,500,000 ounces of silver monthly, the silver to be paid for with treasury notes redeemable on demand in gold or silver. These notes were legal tender for all public and private debts. The total amount of notes so issued was $155,931,002. In 1900, Congress passed a law providing for the cancellation and retirement of these notes as rapidly as the bullion which had been purchased with the notes was coined into silver dollars and subsidiary silver. As rapidly as treasury notes have been retired, pursuant to the provisions of this act, silver certificates have been issued in their place.

Trust Companies. Corporations organized under state laws, usually with powers to carry on a general commercial banking business and to act in various fiduciary capacities. These fiduciary capacities include acting as an executor under a will; administrator of the estate of a deceased person; trustee under a will, a deed of trust, or a mortgage

indenture; guardian of the estate of an infant; committee of the estate of an incompetent; registrar and transfer agent of a corporation; and fiscal agent for a person, a corporation, or a municipality.

Trustee. One to whom property or rights are transferred, to be administered for the benefit of a certain person or group of persons known as the beneficiaries of the trust, or the *cestuis que trustent*.

A trustee under a will or a deed of trust is usually given the custody of property or securities, for the purpose of collecting and distributing the income for a designated period—during the minority of an infant or during the life of the beneficiary—the principal to be preserved intact by the trustee and distributed to certain persons at the termination of the trust.

A trustee under a corporate mortgage is appointed to safeguard the interests of numerous bondholders scattered throughout the country. It is the duty of such a trustee to see that the corporation which has given the mortgage does nothing to lessen the value of the property which forms the security for the bonds issued.

Underwriting. An agreement to share in the risk of a proposed venture or undertaking. Before the rise of the large insurance corporation, it was customary for a group of capitalists to underwrite a policy of fire, marine, or other insurance, each underwriter, or person who subscribed his name to the agreement, undertaking to pay a definite proportion of the loss.

The term is now frequently applied to an agreement by private banking houses, or by other dealers in securities, to provide a market for a proposed issue of bonds or other securities. Such an underwriting agreement normally contains a promise by the underwriters that they will dispose of a certain proportion of the securities to the general public on or before a certain date, and, if all of the securities are not taken up by the general public, that the underwriter will himself purchase the remainder. Where the proposed issue is large, a number of private banking houses form a "syndicate" and together underwrite the issue. They then proceed to use their joint efforts to dispose of the stock to the public. A generous commission is usually paid to the underwriters for the service rendered.

Unearned Increment. The increase in the value of land, resulting from an increase in population or from any other cause not traceable to the expenditures or efforts of the individual owner.

United States Notes. Paper money of the United States, originally issued under the act of February 25, 1862. This currency was merely a promise by the government to pay the bearer, on demand, the face amount of the note in gold. In fact, however, the notes were not redeemable until 1879, when specie payments were resumed by the government. These notes, when issued, were expressly made legal tender for all debts, and were received in payment for all public dues except customs and excise taxes. By reason of their legal-tender quality, they were popularly called "legal tenders." They were also called "greenbacks," from the color of the reverse side of the notes.

Unlisted Securities. Stocks and bonds not listed upon the recognized stock exchanges. Frequently the term is applied to any security not listed upon the New York stock exchange. See *Listed*.

Upset Price. The price below which a security or a commodity will not be offered; as, for example, by an auctioneer at a public sale.

Voucher. A receipt, evidencing a payment of money, together with a statement of the items for which the payment was made.

Wall Street. Name popularly given to the financial district of New York City, of which Wall street itself forms the center. At the corner of Broad and Wall streets are the New York Stock Exchange, the banking house of J. P. Morgan and Company, the Bankers' Trust Company, and the United States Branch Treasury.

War Baby. A corporation engaged in the sale of war materials, which sprang into existence, or came out of obscurity, and made large profits as a result of the war. The stock of such a corporation was also sometimes referred to as a "war baby."

Warehouse Receipt. A receipt issued by a warehouseman, evidencing a deposit of certain goods with him. The warehouse receipt may be negotiable; that is, it may run to the bearer or to the order of the depositor of the goods, in which case it may be transferred by delivery or by endorsement from one holder to another. When a negotiable receipt has been issued, the goods will be surrendered by the warehouseman only upon a surrender of the receipt. For many purposes, such a receipt may then be dealt with in commerce as though it were the goods themselves, since the possession of the receipt gives control over the goods. Thus, banks frequently make loans upon these negotiable receipts as collateral, and the goods themselves are bought and sold in the market by mere negotiation or delivery of the receipt.

The Uniform Warehouse Receipt act, which has been passed in most states, is designed to further the commercial dealing in negotiable warehouse receipts as the representatives of the goods. This act, however, differs from that governing negotiation of "order bills of lading," in that a pledgee or purchaser of a warehouse receipt from or through a thief or a finder gets no title to the receipt or to the goods represented by it.

Warrant. In law, a warrant is a precept, or writ, issued by a court, authorizing a public official to do some special act; as, for example, to make an arrest. In business, a warrant is a written authorization proceeding from a competent source to a proper individual, conveying power to receive either money, its equivalent, or other personal property, or to pay money to one who is entitled to receive it. In England, the term is in general use to designate a receipt for goods which have been deposited in a warehouse, showing the date of entry, the person or persons to whom the goods are deliverable, the date upon which rent commences, and all other details necessary to identify the particular parcels for which the warrant is issued. The warrant is transferable by endorsement, the same as a bill or delivery order.

Warrant, Bench. A warrant issued by a court "in bench," authorizing an officer to arrest and bring before the court persons who are in contempt, or who have disobeyed a court order, or who have been indicted. The name distinguishes this writ from warrants issued by inferior judicial officials.

Warrant, Search. A written authority of state, issued by a court, directing some judicial officer to examine a named place for articles alleged to be unlawfully concealed there. The articles most commonly searched for are stolen and embezzled goods, counterfeit money, gambling implements, and other unlawful possessions.

Wash Sales. Fictitious sales made for the purpose of creating an artificial market price for a stock or commodity. See *Bear*.

Watered Stock. Where stock has been issued, having a total nominal or par value in excess of the capital actually invested in a corporation, the stock is said to be "water." And the amount of stock issued in excess of the actual assets held by the corporation is called "water." The result of watering stock is to mislead creditors of the corporation and the general public who form a market for the sale of the stock of the corporation.

When, As, and If Issued. Frequently, when a corporation plans to issue stock or bonds to the public, a campaign for the sale of the securities will be undertaken before the necessary legal steps involved in creating the new issue of securities have been completed. The corporation, or the banking house through which it has arranged to dispose of the securities, in order to safeguard itself against the possibility of some legal obstacle preventing the proposed issue, will then offer the securities to the public "when, as, and if issued." In the event that, for any reason, the securities are not issued, the corporation or the banking house through which it operates will then not be liable to those who have given orders for the proposed stock or bonds.

Will. A formal, written instrument executed pursuant to provisions prescribed by law, providing for the distribution of the property of the testator—the person making the will—at his death. Normally, a will may be revoked or amended by the testator at any time before his death.

Under the laws of most states, a will is invalid unless it is subscribed by the testator and declared by him to be his last will and testament, in the presence of two witnesses who, at his request, also subscribe their names to the will in the presence of the testator and in the presence of each other. In some states, three witnesses are necessary. Under exceptional circumstances, as in the case of a soldier dying on the field of battle, the ordinary formalities necessary to render a will valid may be dispensed with.

Without Recourse. One who endorses a note, check, or other commercial instrument is usually liable to subsequent holders of the instrument, in the event of the nonpayment of the instrument at maturity, if proper presentation and protest of the instrument is made. If one desires to relieve himself from this liability, he must prefix or append to his endorsement the words "without recourse." His endorsement then merely operates to transfer such title as he has to the instrument, and carries with it no implied promise to pay the instrument in the event that the maker does not pay it at maturity.

Woman's Signature. The proper signature of a married woman is that of her legal name, which is made up of her given name followed by the surname of her husband. It is not unusual, and is generally regarded as lawful, for a woman to use her maiden name followed by the surname of her husband. The prefix "Mrs." forms no part of the legal name of a married woman.

AGRICULTURE

THE story of agriculture, like the story of the human race, begins in prehistoric times. Nevertheless, to a certain limited extent, it can be told. Through the discovery of various tools used by the ancient races, scientists have been able to trace the development of man, from the stone ages, through the periods when bronze implements were substituted for stone and when iron displaced bronze. By a somewhat similar method, the story of prehistoric agriculture has been pieced together.

Emerson has written that "the first farmer was the first man," but, according to archeological records, the earlier man knew nothing of agriculture. He was a hunter who was probably forced by hunger to eat wild fruits, grasses, and roots, when he could capture no game. Such was the condition of the men of the Paleolithic or Old Stone age. They were hunters and fishers who had fire and probably the bow and arrow, but no domestic animals, with the possible exception of the dog.

Prehistoric Agriculture. Sometime during the Paleolithic period, possibly some 25,000 to 50,000 years ago, man acquired his first ideas of planting the edible seeds from wild plants, thus producing crops of grain. The men of the next period, the Neolithic or New Stone age, not only polished their stone tools and kept dogs, sheep, goats, and oxen, but also learned to raise wheat, barley, and millet. Where wheat was first found is an unsolved question that has provoked much discussion. Many scientists now believe that it originated as a wild grass, somewhere in the region of the eastern Mediterranean. The grain was gradually improved and ultimately carried to all parts of the earth. It did not reach the American continent until after Columbus' voyage, nor was it known in Australia until 1788.

Although Neolithic man had learned some of the benefits of keeping domestic animals and of planting grain, he nevertheless depended on hunting and fishing for a large part of his food and clothing. But the hunters slowly changed their modes of living to those of shepherds or farmers. Some tribes increased their herds of cattle and sheep, and adopted the nomadic life necessary to guarding their animals and leading them to new pastures. Others found that in certain rich valleys food was most easily obtained by erecting permanent dwellings and devoting their energies to tilling the soil. From farming settlements of this kind, made in Mesopotamia and Egypt, came the first civilized communities of which any record can be found.

Ancient Agriculture. Five thousand years before Christ, both in the valley of the Nile and in the rich country between the Tigris and Euphrates rivers, crops of bearded wheat, six-rowed barley, millet, flax, and durra, which is a variety of sorghum, were raised by tillage and irrigation. The earliest Egyptians seem to have known onions, garlic, radishes, beans, chick-peas, lentils, and the castor bean. Cattle grazed on the grass covered range; poultry and swine were well known; sheep were raised for their wool, goats for their milk, and camels and donkeys for burden bearers. Horses were not introduced until 1900 B. C., when the nomadic shepherd kings from Asia conquered the country. For fruit the Egyptians had watermelons, grapes, olives, figs, pomegranates, and dates.

On coming further down the scale of time, we find that the Greeks raised wheat and barley as their chief cereals, and that they had hemp as well as flax. They had mules and commonly kept swarms of bees. To the vegetables known to the Egyptians, the Greeks added beets, cabbage, lettuce, turnips, kidney beans, and garden peas. Naturally they did not have the date palm, but they had the almond tree, and also apples, quinces, cherries, pears, and plums. The Greeks are said to have been the first to apply manure to the fields, and to plow under a growth of green lupine in order to enrich the land.

The Romans gave much attention to agriculture, and fortunately left many accurate records telling of their crops and the methods used to produce them. They carefully plowed and harrowed their fields and were acquainted with methods of drainage. Oxen were used as work animals on the Roman farms, and mules as beasts of burden. Much attention was given to breeding fine horses, sheep, swine, cattle, many kinds of poultry, and even hares, fish, snails, and dormice. Oats and rye, celery, peaches, apricots, and melons were added to the list of products known to the older nations, and alfalfa was raised for fodder. Milk was obtained chiefly from sheep and goats, and was made into cheese by curdling with lamb's or kid's rennet. As the Romans came into possession of great tracts of land taken from vanquished nations, they developed an extensive system of working large foreign estates by means of slaves. The popular demand for the division among the common people of these great holdings of state-owned land was resisted by the aristocratic possessors, and this dispute led to one of the greatest internal struggles in the history of Rome.

Medieval Period. During the dark ages which followed the conquest of Rome, agriculture made very little progress, for the conquerors were a warlike people who had reached a stage of development not far above the pastoral. There were, however, two agencies that carried on agricultural work with great activity. In Spain, the Moors, or Arabs, who were also great engineers, brought in rice, cotton, and sugar, and when necessary used irrigation to bring the land to a high degree of cultivation. At the same time, in western Europe, the members of many religious brotherhoods studied the manuscripts left by the Romans, and worked with great energy to improve on the crops and the methods of producing them. Much later, toward the end of the middle ages, the people of the Low Countries—the Netherlands and Belgium—gained a great reputation as farmers and dairymen, and northern Italy was so intensively cultivated during the 13th and 14th centuries that it not only supported a large population, but it also exported much grain.

Contemporary with the development in Europe, the Chinese, and the Incas of Peru had reached a very high state of agricultural production. Both nations understood the use of fertilizers and of methods of irrigation. The important crops of the Chinese have for centuries been wheat, rice, tea, cotton, and silk for which large amounts of mulberry leaves are required. The ancient Peruvians terraced the hillsides in order to make use of all available ground. Their principal crops were corn, potatoes, and cotton; much coca also was grown for the alkaloid contained in its leaves. The chief beast of burden was the llama, and the alpaca was raised for its hair. Neither of these nations has made any permanent impression on modern methods of agriculture. The civilization of the Incas is extinct, and the typical Chinese farmer of today still prefers the methods of cultivation used by his ancestors of one or two thousand years ago.

Modern Improvements. The two greatest improvements in modern agriculture may be said to be due to the proper rotation of crops and a chemical knowledge of fertilizers. The value of the first was demonstrated when Lord Townsend established in England the Norfolk system, consisting in the annual rotation of wheat, turnips, barley, and clover. This permitted half of the land to be used for grain, while the other half produced fodder with which to fatten cattle. Under this system, the land was neither exhausted by the continuous growth of one crop nor unproductive from lying fallow, cattle raising was promoted, and much of the product of the land was returned to it as manure.

A knowledge of the chemical composition of plants and of soils came at first from the work of Liebig in the beginning of the 19th century. This led to the scientific use of artificial fertilizers containing potash, phosphorus, and nitrogen. Breeding experiments have led to better types of all farm animals, and, by means of modern methods of transportation, the most satisfactory breeds of plants or animals can be quickly sent to any part of the world.

Investigations in agricultural science are promoted by the governments of practically every civilized nation, with the result that modern agricultural practice is based on knowledge rather than on the Chinese system of adherence to the ways of their ancestors.

AGRICULTURE IN THE UNITED STATES

The first farmers of North America were the Indians, who, long before the coming of the white race, were accustomed to raise beans, pumpkins, squashes, peppers, onions, sunflowers, tobacco, and, most important of all, maize or Indian corn. This was most fortunate for those pioneers who arrived in 1607 and 1620, for, without the corn which they obtained from the Indians, the settlers both of Jamestown and of Plymouth would have starved during their first winters in America.

First Experiments. The early history of agriculture after the arrival of the settlers is one of adaptation and adjustment. The summers at Jamestown were so warm that it seemed that semitropical vegetation should be successful. Consequently, pineapples, French grapes, olives, figs, ginger, and sugar cane were planted, and attempts were made to raise silkworms. Naturally these undertakings, begun in ignorance of the colder winters, were failures. Furthermore, because of the high summer temperature and very rich earth, the wheat plant grew luxuriantly but failed to produce much grain. Tobacco was an early success and proved so profitable that all other crops were neglected until laws were made requiring each planter to raise a certain amount of corn and other food products.

In New England, a friendly Indian named Squanto taught the newcomers to plant corn. The earth was exposed to the sun by girdling the trees and burning the branches and underbrush. Four grains of corn and two beans were then dropped at four-foot intervals into openings made with an ax or hoe. If possible, a fish was placed in each hill for fertilizer. Later, when the plants were high enough, the ground was piled up around the base of the stalks. White potatoes, which are native to South America, were brought from England by the settlers and were not previously cultivated by the Indians, although the natives in the South were well acquainted with the sweet potato. Cattle and hogs, both in the North and in the South, were allowed to run wild in the woods, where they developed rapidly and often formed large herds.

Experiments gradually taught what crops were most satisfactory and profitable in each section. Buckwheat was introduced into New York by the Dutch in 1625. Apples were planted on Governors island in Boston harbor, and the first fruit was picked October 10, 1639. Cherries were brought first to Virginia, in 1641. Rice, which in 1647 had been a failure in Virginia, was tried at Charleston in 1693, and, together with indigo, soon became the principal crop of South Carolina and Georgia. Long fiber or sea-island cotton was introduced into these states in 1786, and, by this time, the best crops were so well established that, except for sorghum and alfalfa, nothing new was introduced during the next century.

Sectional Differences. The reasons why agricultural conditions in the South became so different from those in the North were at first chiefly due to climate and the conditions of the soil. Here was a large country,—how large no one at that time really knew,—but the settlers were few and there was plenty of land for all.

In New England, however, title to a farm was not quite so easily obtained as in Virginia. The growing season was shorter, and a greater amount of effort was necessary to clear the land of forest and rocks before it became highly productive. Each farmer raised on his own land the grain, vegetables, fruit, cattle, swine, and other live stock necessary for himself and his family. Help was hard to obtain, and the farms were therefore comparatively small. Men were farmers in order to make a living, but, as there was no one crop which would yield an unusual profit, other industries such as lumbering, fishing, and shipbuilding also received attention.

In the South, with its rich land and long, warm growing season, tobacco proved almost at once to be a money-making crop. Rice and indigo and, later, sugar cane and cotton were also found to be exceedingly profitable, especially when cultivated on a large scale. Commercial production of this sort required extensive cultivation, cheap labor, and sufficient capital to carry on operations, with the result that the land was held in large estates and used, not merely to make a living for the workers, but chiefly to produce a profit for the owner.

The average New England farm contained about 100 acres, while the average Virginia plantation was 50 times as large. The cheap labor, so necessary for the operation of the Southern plantation, was supplied by indentured servants who sold their services for a period of years in return for transportation to the colonies, by transported convicts, and, later, almost entirely by Negro slaves.

Agriculture, as practiced in the colonies, was simple and careless. Crops were planted until the land was exhausted, and then new land was used. Plows were crude affairs, and, as late as 1830, all work on the farm except plowing, harrowing, and carting was done by hand. Sufficient agricultural products were raised to supply the home demand, but almost the only exports up to 1783 were wheat from the North and tobacco, rice, and indigo from the South.

The Rise of Cotton. The invention and improvement of the spinning jenny, between 1767 and 1780, and the invention of the power loom in 1785 produced a large demand in England for American cotton. Nevertheless, comparatively little cotton was exported because of the great difficulty of separating the fiber from the seeds. This problem was solved in 1793 when Whitney invented the cotton gin.

Probably no other invention has had so great an effect on American agriculture as has that of Whitney. After the Revolution the use of slaves had gradually become less profitable, and many Southerners would have been glad to see slavery abolished. But slave labor was most easily employed in raising cotton, and cotton now meant money for the planter. The result was that slavery became for years the outstanding feature of the Southern economic system.

When the gin was invented, cotton was produced only in Georgia and South Carolina. It soon spread north as far as Virginia, and by 1815 was being grown in Alabama and Mississippi. Cotton culture with slave labor was a most wasteful process because there was no rotation of crops and no use of fertilizers. Cotton was raised until the soil was exhausted; then the planter moved west to take up fresh land. This continuous westward movement added Louisiana, Texas, and Oklahoma to the "cotton states," and was checked only when it was found that cotton would not flourish west of Texas.

While the South was devoting all of its energy to the production of cotton, the settlers who moved west across the Northern and Central states were producing corn, wheat, and other grains, as well as potatoes, fruit, and live stock. Agricultural practice was very far from scientific because there was no

THE THREE LEADING CROPS IN EACH STATE

On the Basis of Value, U. S. Census of Agriculture, 1925

State and Crop	Acreage	% of Total Crop Acreage	Production	Unit	Value Dollars	% of Total Value of All Crops in State
Alabama						
Cotton*	2,948,072	44.4	983,673	Bales	113,478,208	62.7
Corn	2,754,448	41.5	32,999,894	Bushels	43,457,535	24.0
Hay	508,949	7.7	372,631	Tons	7,711,211	4.3
Arizona						
Cotton*	177,013	38.7	109,519	Bales	15,000,848	63.2
Hay	149,432	32.6	386,984	Tons	6,354,404	26.8
Wheat	32,162	7.0	489,900	Bushels	734,853	3.1
Arkansas						
Cotton*	2,776,934	44.6	1,090,259	Bales	127,841,030	64.6
Corn	1,918,525	30.8	29,449,148	Bushels	34,563,842	17.5
Hay	684,719	11.0	749,640	Tons	12,766,50.	6.4
California†						
Hay	1,821,623	31.8	3,632,789	Tons	74,169,978	47.9
Barley	751,931	13.1	16,458,556	Bushels	19,145,751	12.4
Peaches	13,151,350‡	.....	11,204,288	Bushels	9,826,201	6.3
Colorado						
Hay	1,621,702	27.3	2,510,279	Tons	26,460,116	29.1
Sugar Beets	205,647	3.5	2,387,287	Tons	19,097,014	21.0
Wheat	1,306,208	22.0	15,342,775	Bushels	18,353,902	20.2
Connecticut						
Tobacco	25,992	5.2	34,690,858	Pounds	10,060,349	40.1
Hay	362,584	73.0	376,862	Tons	8,328,651	33.2
Corn for Silage	28,327	5.6	305,409	Tons	1,893,536	7.6
Delaware						
Corn	133,182	32.9	3,176,414	Bushels	3,970,518	34.8
Wheat	96,703	24.0	1,698,481	Bushels	2,547,102	22.3
Hay	75,292	18.6	90,355	Tons	1,536,035	13.5
District of Columbia						
Hay	465	21.2	827	Tons	13,340	31.8
Sweet Potatoes	74	3.4	8,318	Bushels	11,645	27.7
Corn for Silage	143	6.5	1,249	Tons	6,870	16.4
Florida†						
Corn	581,166	42.4	6,902,661	Bushels	8,233,428	37.7
Potatoes	27,721	2.0	2,429,014	Bushels	4,531,518	20.8
Cotton*	88,181	6.4	21,794	Bales	2,345,398	10.7
Georgia						
Cotton*	2,708,151	33.3	1,036,741	Bales	115,822,174	55.9
Corn	3,793,139	46.7	39,776,457	Bushels	47,724,103	23.0
Peanuts	387,931	4.8	8,545,695	Bushels	10,423,896	5.0
Idaho						
Hay	1,162,332	45.1	1,879,747	Tons	18,611,645	34.7
Wheat	809,204	31.4	13,241,306	Bushels	17,964,144	33.5
Potatoes	60,694	2.4	10,147,181	Bushels	6,580,018	12.3
Illinois						
Corn	7,778,700	39.4	259,545,250	Bushels	248,697,995	55.6
Oats	4,074,839	20.6	159,562,831	Bushels	72,778,627	16.0
Hay	3,602,115	18.2	3,890,899	Tons	46,909,383	10.5
Indiana						
Corn	3,595,810	33.9	99,853,733	Bushels	98,431,388	47.6
Wheat	1,605,117	15.1	26,407,631	Bushels	36,708,901	17.8
Hay	2,352,692	22.2	2,678,637	Tons	27,796,713	13.4
Iowa						
Corn	8,761,141	40.8	248,544,341	Bushels	236,187,665	56.2
Oats	5,702,250	26.6	224,578,096	Bushels	99,088,809	23.6
Hay	3,885,622	18.1	4,938,291	Tons	47,805,891	11.4
Kansas						
Wheat	9,716,922	43.4	151,553,396	Bushels	182,319,203	48.7
Corn	5,464,915	24.4	118,823,671	Bushels	112,224,310	30.0
Hay	2,569,886	11.5	3,778,014	Tons	33,332,290	8.9
Kentucky						
Corn	2,751,045	53.1	62,844,742	Bushels	68,885,159	41.8
Tobacco	449,140	8.7	349,747,909	Pounds	59,373,225	36.0
Hay	1,110,835	21.4	1,068,106	Tons	18,895,059	11.5
Louisiana						
Cotton*	1,434,630	41.2	502,197	Bales	56,027,153	52.5
Rice	351,594	10.1	12,289,275	Bushels	17,323,205	16.2
Corn	1,119,540	32.1	12,403,070	Bushels	14,902,198	14.0
Maine						
Potatoes	135,402	8.4	40,121,881	Bushels	14,857,601	45.3
Hay	1,260,757	78.5	1,013,486	Tons	11,635,988	35.4
Oats	103,898	6.5	3,938,124	Bushels	2,677,925	8.2

THE THREE LEADING CROPS IN EACH STATE—Con.

On the Basis of Value, U. S. Census of Agriculture, 1925

State and Crop	Acreage	% of Total Crop Acreage	Production	Unit	Value Dollars	% of Total Value of All Crops in State
MARYLAND						
Corn	480,801	27.1	13,345,718	Bushels	15,750,563	31.8
Wheat	484,659	27.3	7,664,394	Bushels	10,761,689	21.7
Hay	416,455	23.4	529,320	Tons	8,120,474	16.4
MASSACHUSETTS						
Hay	477,794	76.5	501,423	Tons	10,780,599	47.9
Tobacco	10,035	1.6	14,074,156	Pounds	3,940,764	17.5
Apples	1,402,223‡	....	3,006,120	Bushels	3,847,833	17.1
MICHIGAN						
Hay	2,947,491	34.1	3,498,824	Tons	35,588,486	23.2
Wheat	792,965	9.3	18,842,976	Bushels	27,442,699	17.9
Oats	1,443,063	17.0	57,470,383	Bushels	27,106,678	17.6
MINNESOTA						
Oats	4,546,661	25.4	189,071,696	Bushels	77,468,687	25.1
Corn	2,657,689	14.8	70,415,687	Bushels	59,399,891	19.3
Wheat	1,643,682	9.2	36,513,521	Bushels	49,987,043	16.2
MISSISSIPPI						
Cotton*	3,011,441	53.2	1,120,146	Bales	133,447,318	75.4
Corn	2,036,226	36.0	24,611,961	Bushels	32,793,036	18.5
Hay	311,530	5.5	290,877	Tons	5,746,662	3.2
MISSOURI						
Corn	5,482,203	39.9	128,954,889	Bushels	133,325,684	53.5
Hay	3,625,134	26.4	3,512,434	Tons	41,209,768	16.5
Wheat	1,439,448	10.5	19,131,037	Bushels	25,657,898	10.3
MONTANA						
Wheat	3,102,879	48.4	44,058,012	Bushels	57,668,832	60.1
Hay	1,872,994	29.2	2,087,773	Tons	20,664,080	21.5
Oats	455,385	7.1	11,815,924	Bushels	5,845,055	6.1
NEBRASKA						
Corn	7,979,871	40.3	169,377,327	Bushels	158,521,360	50.4
Wheat	3,007,217	15.2	55,687,684	Bushels	69,321,632	22.0
Hay	4,965,127	26.1	5,196,962	Tons	39,763,317	12.7
NEVADA						
Hay	332,682	91.7	465,886	Tons	6,946,676	82.2
Potatoes	3,415	.9	448,551	Bushels	562,016	6.6
Wheat	13,862	3.8	315,938	Bushels	521,298	6.2
NEW HAMPSHIRE						
Hay	477,823	91.4	403,967	Tons	6,705,852	65.8
Apples	620,412‡	....	1,327,820	Bushels	1,420,767	13.9
Potatoes	9,838	1.9	1,365,812	Bushels	1,201,917	11.8
NEW JERSEY						
Hay	281,532	31.1	411,379	Tons	6,828,891	21.0
Corn	158,059	17.4	5,254,918	Bushels	6,621,197	20.3
Potatoes	62,201	6.9	8,514,815	Bushels	4,926,748	15.1
NEW MEXICO						
Hay	204,780	15.2	475,081	Tons	8,293,501	33.3
Cotton*	108,488	8.1	58,584	Bales	6,854,858	27.5
Wheat	207,632	15.4	2,331,586	Bushels	3,059,481	12.3
NEW YORK						
Hay	5,015,603	60.5	5,720,765	Tons	71,987,974	41.8
Potatoes	285,586	3.4	38,805,641	Bushels	20,921,788	12.2
Apples	9,468,661‡	....	19,055,965	Bushels	19,771,600	11.5
NORTH CAROLINA						
Cotton*	1,733,244	31.1	855,028	Bales	94,816,392	40.1
Tobacco	407,228	7.3	237,436,496	Pounds	53,149,278	22.5
Corn	1,930,678	34.6	30,547,920	Bushels	42,730,707	18.1
NORTH DAKOTA						
Wheat	8,322,558	41.9	123,010,149	Bushels	159,099,234	55.9
Flaxseed	1,873,744	9.4	13,944,829	Bushels	32,835,888	11.5
Oats	2,524,380	12.7	76,021,334	Bushels	26,534,346	9.3
OHIO						
Corn	2,692,555	25.1	74,149,004	Bushels	80,488,848	33.4
Wheat	1,818,522	17.0	33,233,421	Bushels	48,033,194	19.9
Hay	3,327,936	31.1	4,152,594	Tons	45,693,139	19.0
OKLAHOMA						
Cotton*	3,812,942	26.2	1,511,480	Bales	167,945,057	50.9
Wheat	3,509,372	24.1	54,502,175	Bushels	62,694,225	19.0
Corn	2,666,101	18.3	47,575,170	Bushels	46,376,917	14.0
OREGON						
Hay	1,059,249	40.8	1,483,865	Tons	20,478,211	35.4
Wheat	859,541	33.2	14,270,348	Bushels	18,558,735	32.1
Apples	2,773,293‡	....	5,989,885	Bushels	7,851,994	13.6

THE THREE LEADING CROPS IN EACH STATE—Con.

On the Basis of Value, U. S. Census of Agriculture, 1925

State and Crop	Acreage	% of Total Crop Acreage	Production	Unit	Value Dollars	% of Total Value of All Crops in State
Pennsylvania						
Hay	3,093,172	42.5	3,712,851	Tons	54,684,615	27.8
Corn	1,010,687	13.9	36,761,347	Bushels	44,064,542	22.4
Wheat	1,113,818	15.3	18,166,999	Bushels	26,652,032	13.6
Rhode Island						
Hay	48,013	69.2	48,281	Tons	1,076,667	48.9
Apples	165,856‡	....	271,307	Bushels	396,109	18.0
Potatoes	2,110	3.0	254,373	Bushels	251,829	11.4
South Carolina						
Cotton*	2,023,926	46.9	844,224	Bales	94,093,915	67.1
Corn	1,547,120	35.9	18,651,052	Bushels	24,864,865	17.7
Tobacco	78,459	1.8	38,497,602	Pounds	6,655,897	4.7
South Dakota						
Corn	3,460,120	21.9	71,197,907	Bushels	56,368,708	30.0
Wheat	2,364,447	15.0	33,669,913	Bushels	43,223,033	22.9
Oats	2,799,488	17.7	98,508,576	Bushels	37,810,313	20.1
Tennessee						
Corn	2,872,599	46.3	60,248,771	Bushels	69,383,351	40.4
Cotton*	940,312	15.1	358,943	Bales	40,977,257	23.8
Hay	1,363,026	22.0	1,164,858	Tons	23,425,544	13.6
Texas						
Cotton*	16,658,356	61.5	4,856,142	Bales	562,662,374	74.4
Corn	3,615,583	13.4	54,143,427	Bushels	62,179,670	8.2
Hay	659,894	2.4	2,528,415	Tons	44,169,638	5.8
Utah						
Hay	607,499	59.3	1,158,793	Tons	13,336,017	50.1
Wheat	194,540	19.0	3,236,264	Bushels	4,673,374	17.6
Sugar Beets	75,567	7.4	548,536	Tons	4,114,025	15.5
Vermont						
Hay	930,180	82.5	1,025,799	Tons	14,976,664	65.3
Corn for Silage	59,639	5.3	581,560	Tons	2,907,800	12.6
Potatoes	18,507	1.6	2,523,462	Bushels	1,943,063	8.5
Virginia						
Corn	1,336,172	33.7	27,726,988	Bushels	37,587,524	27.0
Tobacco	194,974	4.9	116,525,407	Pounds	23,348,225	16.7
Hay	905,564	22.8	940,794	Tons	17,651,787	12.7
Washington						
Wheat	1,746,653	53.5	24,764,991	Bushels	31,624,796	34.4
Apples	6,781,852‡	....	17,890,109	Bushels	25,261,685	27.5
Hay	965,824	29.6	1,462,532	Tons	22,459,032	24.4
West Virginia						
Hay	770,492	45.9	754,671	Tons	13,776,199	32.4
Corn	403,201	24.0	9,375,248	Bushels	12,251,061	28.8
Apples	5,480,350‡	....	6,895,824	Bushels	6,505,036	15.3
Wisconsin						
Hay	3,516,320	36.9	5,263,955	Tons	62,935,782	33.9
Oats	2,460,425	25.8	87,378,346	Bushels	43,575,501	23.5
Corn for Silage	1,071,704	11.2	6,644,215	Tons	28,901,976	15.6
Wyoming						
Hay	1,017,205	64.0	1,177,675	Tons	10,953,908	58.0
Wheat	136,253	8.6	1,651,150	Bushels	2,111,284	11.2
Sugar Beets	23,316	1.5	230,673	Tons	1,791,799	9.5

*The U. S. Census of Agriculture, 1925, does not include statistics regarding the production of cottonseed. In the last preceding census (1920) this was reported along with that of cotton. According to the 1920 census, the yield of cottonseed, stated in tons and its value in dollars, for the chief cotton growing states was as follows:

State	Tons	Value
Alabama	331,794	$23,889,168
Arizona	27,420	1,933,112
Arkansas	412,072	24,724,320
Georgia	771,993	57,127,482
Louisiana	139,898	8,953,472
Mississippi	449,082	28,516,727
North Carolina	386,285	28,585,090
Oklahoma	473,943	26,540,808
South Carolina	668,917	50,503,248
Tennessee	146,734	9,537,710
Texas	1,444,264	82,323,048

†The 1925 Census of Agriculture does not give, except for apples and peaches, statistics of the production of fruits. In consequence, these statistics with regard to California and Florida do not take into account crops which normally are much larger than any of those above given. According to the 1920 Census, in which fruits were included, the three leading crops of the two states mentioned, with the value of each crop and its percentage of the total value of all crops in its respective state, were as follows:

California:	Value	Per Cent
Fruits and Nuts	$273,067,484	46.3
Hay	96,121,846	16.3
Wheat	36,938,477	6.2
Florida:		
Fruits and Nuts	$ 23,981,571	29.8
Corn	14,129,774	17.6
Vegetables	13,695,255	17.0

‡Number of trees of bearing age.

need to care for the land when plenty more could be found a little farther west. Very naturally, help was hard to obtain because few men cared to work for others when they could take up government land at very small cost and work for themselves. The Northern farmer as a rule was fairly prosperous, his land easily supplied his wants, and there was a good market in the South for his excess crop. Much of his grain was often fed to live stock, which found a ready and profitable market.

On the fertile western prairies, the crops were restricted only by the amount that could be harvested before it spoiled in the field. This condition led to the development of agricultural machinery, and between 1830 and 1860 the reaper, mower, thresher, corn planter, and cultivator were invented and were developed to a high degree. In this same period the railroads were extended into the West and supplied a means of sending meat and grain to the Atlantic coast for export.

Spring Wheat. In 1870 the introduction of the roller system of grinding flour increased the demand for spring wheat, which, by the older process of milling, produced a dark-colored flour. This invention caused a great rush of settlers into Minnesota and the Dakotas, where spring wheat was the principal crop. In these states wheat was raised on an enormous scale by using machinery to plow, plant, harvest, and thresh. The famous Dalrymple farm contained 55,000 acres.

Scientific Agriculture. By 1890 almost all of the productive land in the humid regions of the United States had been settled, and the pioneer could no longer sell his farm and move to cheap frontier land as good or better than that which he left. The logical conclusion was that, if new land was no longer available, then care must be given to the old. Now, for the first time, the great body of American farmers were ready to consider the application of science to agriculture which had been preached by a few for more than a century. In 1887 Congress passed the Hatch act, which appropriated funds for the establishment of experiment stations in connection with the state agricultural colleges. In 1889 the head of the department of agriculture became a member of the president's cabinet. Agriculture as a profession and as a science began to receive the attention which it deserved as the greatest and most important industry of the country.

The improvements resulting from a more careful study of agricultural problems have been especially noticeable in the application of proper fertilizers to the land, and in the quality of the plants and animals raised by the average farmer; in the selection of crops best suited to the character of the soil and to local economic conditions; in the use of labor-saving machinery driven by gasoline or kerosene engines, both in the field and in the farm buildings; in methods of fighting destructive insects and plant diseases; and, most important of all, in the acquirement of modern conveniences such as the telephone and the automobile, which tend to make farm life more cheerful and to break down the isolation which formerly existed.

Live Stock. One of the greatest improvements has been in the quality of the live stock. Cattle and hogs were brought to Florida from the West Indies in 1538; to Newfoundland by the Portuguese in 1553; and to Canada and Virginia in 1608. Horses were first taken into Florida in 1527, but all of these were killed. Those arriving in 1538 were ancestors of the later herds of wild horses. In the early days the sheep were small and had only a light coat of coarse wool, the hogs were long-legged and thin, the cattle were light and wiry, and the cows produced only enough milk for their calves. Gradually, however, fine animals were imported from Europe, and, from these, careful breeding has produced the splendid modern herds of dairy and beef cattle, the enormous short-legged pork and lard-producing hogs, sheep that yield from 15 to 30 pounds of wool at a clip, and ordinary flocks of hens that average at least 120 eggs a year instead of one or two dozen. The famous range of the Western states has been fenced so that the great herds of cattle are much more restricted in their feeding grounds. Nevertheless, more beef is produced than ever before, and the quality of the present day animals is a wonderful improvement on the small nervous cattle of former days. Cattle raising is no longer so spectacular, but it now produces better beef with a greater certainty of profit.

Hog raising and the fattening of cattle for market are especially important in the corn growing regions, because, by feeding the grain to animals, a higher priced product is obtained; at the same time, the productivity of the fields is preserved by means of natural fertilizers. Near the large cities the combination of grain raising and milk production is usually profitable for the same reason. Until 1850 all butter and cheese was produced on the farm, but 1851 saw the opening of the first cheese factory and the beginning of associated dairying. Today, cheese factories and commercial creameries produce practically all the cheese and more than half the butter.

Farm Machinery. The great use of power machinery on American farms has been for the purpose of economizing man power and time. The farmer of today, with his machinery, can produce more than twenty times as much as the pioneer who worked with his hands. American agriculture has always been, and still largely is, extensive rather than intensive. The average amount of wheat or potatoes produced on each acre is often only half of that produced on European farms, but the amount produced by each worker is always much higher than in the older countries.

Crop Regions. The figures of the accompanying tables illustrate how nature has divided the United States by means of climatic and physiographical conditions into fairly definite crop regions. Thus grain and fruit predominate on the Pacific coast; cattle grazing and wool production, in the Rocky Mountain states; cotton, in the South; corn and winter wheat, in the Central states; spring wheat, in the Dakotas, Minnesota, and Wisconsin.

Farming as a Business. In this country of big business, whether judged by the capital invested, the number of laborers, or the value of the produce, farming is the biggest business of all.

According to the census of 1920, approximately one worker in every four was a farmer. Corn was the most important crop, and the value of this one cereal was almost equal to all of the products of the country's mines and quarries. The value of the tobacco crop was greater than the cost of the Panama canal. The crop of sweet potatoes was worth more than all of the gold and silver produced during the year. The annual production of eggs was three times as valuable as that of iron ore. The hay and forage raised on the farms was worth a billion dollars more than all of the hard and soft coal, and the cotton and cotton seed of the South were worth a half billion dollars more than the automobile and motor truck output of the entire United States.

United States Department of Agriculture. An executive branch of the Federal government which has been the greatest organized force acting for the improvement of agricultural methods and rural conditions of living in this country. The department had its origin in 1836 when the commissioner of patents began the distribution of selected seed. In 1854 an entomologist was employed; the next year a chemist and a botanist were added to the staff, and a propagating garden begun. This work was taken from the patent office by President

Lincoln, in 1862, and placed under the direction of Isaac Newton, of Pennsylvania, as the first commissioner of agriculture. During Cleveland's administration in 1889, Norman J. Colman, the last commissioner, became the first secretary of agriculture and a member of the president's cabinet.

The department was established "to acquire and diffuse among the people of the United States useful information on subjects connected with agriculture in the most general and comprehensive sense of that word, and to procure, propagate, and distribute among the people, new and valuable seeds and plants." In following these objects, it has become one of the greatest scientific establishments in the world, with more than 20,000 employees and an annual budget of over 35 million dollars. For a period of 16 years, during which the greater part of this wonderful development occurred, the department was under the control and guidance of James Wilson. He was appointed secretary by President McKinley in 1897, and administered his department with such notable success that he was retained in office by the two succeeding presidents, Roosevelt and Taft.

Departmental Activities. The department is conducting fundamental research in every phase of farm life. It is supervising the execution of the greatest road building program ever undertaken in the history of the world. It is administering the national forests, which have an area of about 160 million acres, and it is enforcing numerous regulatory laws, such as those concerning the sale of pure foods, drugs, and insecticides, the inspection of packing house products, the enforcement of the interstate game laws, and the fixing of domestic and foreign quarantine regulations to prevent the spread of plant and animal diseases.

Co-operative Marketing. This consists essentially in the pooling of marketable produce for the purpose of selling it to better advantage. The number of farmers in the United States belonging to such co-operative associations increased approximately fourfold between 1915 and 1925, and the business transacted by them increased in about the same proportion. The Capper-Volstead act of 1922 protected these associations, when properly conducted, from the threat of prosecution under the Antitrust law. In 1926, a bureau of co-operative marketing was added to the department of agriculture. The work of this bureau is chiefly research and the dissemination of information concerning such topics as supply, demand, and prices; also practices found advantageous or the reverse by co-operative organizations.

The principal objects aimed at by a successful "co-operative" include standardizing the grades and handling methods of the products, thereby effecting economies and meeting the preferences and needs of various markets; developing an effective merchandising program, sometimes by means of advertising; and giving the farmer information facilitating adjustments in his production program. Among the commodities marketed extensively in this way in the United States are grain, dairy products, live stock, fruits and vegetables, cotton, and tobacco.

In Canada, the co-operative marketing of wheat has become the outstanding method of selling this commodity. A voluntary wheat pool was organized with a Dominion charter in 1922, known as the Canadian Co-operative Wheat Producers, Ltd. Both directly and through its subsidiaries in the prairie provinces, it owns a large number of country and terminal elevators. It engages in a commission business and export trade. Being highly centralized, it is able to exert a definite influence in the world market.

STATES LEADING IN CROP PRODUCTION

On Basis of Yield, 1925*

Crop and State	Production	Unit	% U. S. Total Production	Crop and State	Production	Unit	% U. S. Total Production
Alfalfa	28,439,000	Tons	100.0	Idaho	1,584,000	Bu.	8.0
California	4,078,000	Tons	14.3	New York	1,458,000	Bu.	7.3
Nebraska	3,016,000	Tons	10.6				
Idaho	2,694,000	Tons	9.4	Beets, Sugar	7,366,000	Tons	100.0
Kansas	2,057,000	Tons	7.2	Colorado	1,640,000	Tons	22.3
Colorado	2,001,000	Tons	7.0	Utah	1,064,000	Tons	14.4
				Michigan	969,000	Tons	13.2
Almonds†	15,852,965	Lbs.	100.0	Nebraska	933,000	Tons	12.6
California	15,690,748	Lbs.	99.0	Montana‡	673,000	Tons	9.1
				California	488,000	Tons	6.6
Apples, Commercial Crop	33,246,000	Bbl.	100.0				
Washington	8,670,000	Bbl.	26.1	Broom Corn	29,500	Tons	100.0
New York	6,250,000	Bbl.	18.8	Oklahoma	11,000	Tons	37.2
Montana	1,750,000	Bbl.	5.3	Illinois	8,400	Tons	28.5
Michigan	1,700,000	Bbl.	5.1	Kansas	3,100	Tons	10.5
Virginia	1,440,000	Bbl.	4.3				
				Buckwheat	13,994,000	Bu.	100.0
Apples, Total Crop	172,389,000	Bu.	100.0	New York	4,541,000	Bu.	32.4
New York	32,500,000	Bu.	18.9	Pennsylvania	4,462,000	Bu.	31.9
Washington	29,550,000	Bu.	17.1	Minnesota	854,000	Bu.	6.1
Michigan	9,000,000	Bu.	5.2	Michigan	712,000	Bu.	5.1
Virginia	7,844,000	Bu.	4.6	West Virginia	612,000	Bu.	4.4
Pennsylvania	7,300,000	Bu.	4.2				
				Clover Seed	1,113,000	Bu.	100.0
Apricots†	6,130,086	Bu.	100.0	Wisconsin	232,000	Bu.	20.8
California	5,907,645	Bu.	96.4	Ohio	185,000	Bu.	16.6
Washington	79,908	Bu.	1.3	Michigan	101,000	Bu.	9.1
Arizona	60,463	Bu.	1.0	Illinois	99,000	Bu.	8.9
				Iowa	95,000	Bu.	8.5
Barley	216,554,000	Bu.	100.0				
North Dakota	38,970,000	Bu.	18.0	Corn	2,916,961,000	Bu.	100.0
Minnesota	32,940,000	Bu.	15.2	Iowa	492,648,000	Bu.	16.9
California	32,550,000	Bu.	15.0	Illinois	394,506,000	Bu.	13.5
South Dakota	23,790,000	Bu.	11.0	Nebraska	236,600,000	Bu.	8.1
Wisconsin	16,965,000	Bu.	7.8	Indiana	203,232,000	Bu.	7.0
				Missouri	198,860,000	Bu.	6.8
Beans, Dry	19,928,000	Bu.	100.0				
Michigan	8,626,000	Bu.	43.2	Cotton	16,104,000	Bales	100.0
California	4,560,000	Bu.	22.9	Texas	4,163,000	Bales	25.9
Colorado	2,240,000	Bu.	11.2				

*Statistics from Bureau of Agricultural Economics for crop of 1925, except where otherwise indicated. † U. S. Census, 1920. ‡Includes Wyoming.

STATES LEADING IN CROP PRODUCTION—Con.

On Basis of Yield, 1925

Crop and State	Production	Unit	% U. S. Total Production
Cotton—Con.			
Mississippi	1,991,000	Bales	12.4
Oklahoma	1,691,000	Bales	10.5
Arkansas	1,600,000	Bales	9.9
Alabama	1,357,000	Bales	8.4
Cottonseed	7,150,000	Tons	100.0
Texas	1,849,000	Tons	25.8
Mississippi	884,000	Tons	12.3
Oklahoma	751,000	Tons	10.5
Arkansas	711,000	Tons	9.9
Alabama	602,000	Tons	8.4
Cranberries	569,000	Bbl.	100.0
Massachusetts	429,000	Bbl.	75.4
New Jersey	115,000	Bbl.	20.2
Wisconsin	25,000	Bbl.	4.4
Figs*	26,876,827	Lbs.	100.0
California	21,801,899	Lbs.	81.1
Louisiana	1,351,060	Lbs.	5.0
Texas	949,055	Lbs.	3.5
Flaxseed	22,424,000	Bu.	100.0
North Dakota	9,496,000	Bu.	42.3
Minnesota	7,400,000	Bu.	33.0
South Dakota	3,801,000	Bu.	17.0
Montana	1,098,000	Bu.	4.9
Grain Sorghums	75,230,000	Bu.	100.0
Texas	30,875,000	Bu.	41.0
Kansas	22,770,000	Bu.	30.2
Oklahoma	14,216,000	Bu.	18.9
Grapefruit	8,190,500	Boxes	100.0
Florida	7,300,000	Boxes	89.0
California	600,000	Boxes	7.3
Grapes†	2,349,000	Tons	100.0
California	2,040,000	Tons	86.8
New York	106,700	Tons	4.5
Michigan	60,900	Tons	2.6
Ohio	29,100	Tons	1.2
Pennsylvania	25,110	Tons	1.0
Hay, Tame	85,717,000	Tons	100.0
New York	6,794,000	Tons	7.9
Wisconsin	5,486,000	Tons	6.4
California	5,417,000	Tons	6.3
Pennsylvania	4,225,000	Tons	4.9
Minnesota	3,989,000	Tons	4.7
Hops	28,573,000	Lbs.	100.0
Oregon	15,600,000	Lbs.	54.6
California	8,000,000	Lbs.	28.0
Washington	4,973,000	Lbs.	17.4
Lemons			
California‡	7,136,000	Boxes	
Maple Syrup**	3,089,000	Gal.	100.0
Vermont	956,000	Gal.	30.9
New York	896,000	Gal.	29.0
Ohio	341,000	Gal.	11.0
Maple Sugar**	3,236,000	Lbs.	100.0
Vermont	1,794,000	Lbs.	55.4
New York	624,000	Lbs.	19.2
New Hampshire	227,000	Lbs.	7.0
Oats	1,487,550,000	Bu.	100.0
Iowa	243,863,000	Bu.	16.4
Minnesota	200,340,000	Bu.	13.5
Illinois	157,788,000	Bu.	10.6
Wisconsin	126,246,000	Bu.	8.5
South Dakota	96,356,000	Bu.	6.5
Olives			
California‡	28,000,000	Lbs.	
Oranges	33,723,300	Boxes	100.0
California	24,200,000	Boxes	72.3
Florida	9,100,000	Boxes	26.9
Alabama	200,000	Boxes	.5
Peaches	46,562,000	Bu.	100.0
California	16,418,000	Bu.	35.3
Georgia	7,304,000	Bu.	15.7
Arkansas	2,200,000	Bu.	4.7
Peaches—Con.			
New York	1,920,000	Bu.	4.1
Texas	1,750,000	Bu.	3.8
Peanuts	698,475,000	Lbs.	100.0
North Carolina	212,750,000	Lbs.	30.5
Virginia	143,520,000	Lbs.	20.5
Georgia	139,000,000	Lbs.	19.9
Alabama	100,800,000	Lbs.	14.4
Pears	20,720,000	Bu.	100.0
California	7,542,000	Bu.	36.4
New York	3,045,000	Bu.	14.7
Washington	2,300,000	Bu.	11.1
Oregon	1,500,000	Bu.	7.2
Peas, Cow†	7,484,000	Bu.	100.0
Georgia	1,660,000	Bu.	22.1
North Carolina	910,000	Bu.	12.1
Alabama	862,000	Bu.	11.5
South Carolina	850,000	Bu.	11.3
Mississippi	542,000	Bu.	7.2
Plums and Prunes*	19,083,942	Bu.	100.0
California	13,200,805	Bu.	69.2
Oregon	2,151,864	Bu.	11.3
Washington	785,920	Bu.	4.1
Potatoes††	379,379,000	Bu.	100.0
Maine	36,904,000	Bu.	9.7
Minnesota	35,537,000	Bu.	9.3
New York	33,491,000	Bu.	8.8
Michigan	30,972,000	Bu.	8.1
Wisconsin	27,086,000	Bu.	7.1
Rice	33,309,000	Bu.	100.0
Louisiana	14,319,000	Bu.	43.0
Arkansas	7,525,000	Bu.	22.6
Texas	6,216,000	Bu.	18.7
California	4,800,000	Bu.	14.4
Missouri	300,000	Bu.	.9
Sorghum, Sirup†	35,977,000	Gal.	100.0
Kentucky	4,845,000	Gal.	13.4
North Carolina	4,004,000	Gal.	11.1
Alabama	3,600,000	Gal.	10.0
Texas	3,230,000	Gal.	8.9
Tennessee	2,976,000	Gal.	8.3
Strawberries†	256,411,000	Qts.	100.0
Maryland	34,080,000	Qts.	13.3
Louisiana	24,975,000	Qts.	9.7
Missouri	23,232,000	Qts.	9.0
Arkansas	19,781,000	Qts.	7.7
Virginia	19,360,000	Qts.	7.5
Sugar Cane, Sirup	20,400,000	Gal.	100.0
Louisiana	6,541,000	Gal.	32.0
Georgia	3,520,000	Gal.	17.3
Alabama	3,080,000	Gal.	15.1
Mississippi	2,408,000	Gal.	11.8
Florida	2,100,000	Gal.	10.3
Sugar Cane, Sugar			
Louisiana‡	139,000	Tons	
Sweet Potatoes	62,319,000	Bu.	100.0
North Carolina	7,040,000	Bu.	11.3
Texas	6,132,000	Bu.	9.8
Mississippi	5,952,000	Bu.	9.6
Louisiana	5,760,000	Bu.	9.2
Georgia	5,170,000	Bu.	8.3
Tobacco	1,376,628,000	Lbs.	100.0
Kentucky	387,990,000	Lbs.	28.2
North Carolina	380,165,000	Lbs.	27.6
Virginia	129,400,000	Lbs.	9.4
Tennessee	94,380,000	Lbs.	6.9
South Carolina	71,040,000	Lbs.	5.2
Walnuts	73,287,000	Lbs.	100.0
California	72,000,000	Lbs.	98.2
Oregon	1,000,000	Lbs.	1.4
Wheat††	792,639,000	Bu.	100.0
Kansas	117,810,000	Bu.	14.9
North Dakota	98,618,000	Bu.	12.4
Oklahoma	49,458,000	Bu.	6.2
Montana	44,798,000	Bu.	5.6
Illinois	44,602,000	Bu.	5.6

* U. S. Census, 1920. † Crop of 1926. ‡ Produces more than 95% of total U. S. Crop. ** Ten leading states only.
†† Four-year average, 1923-26, inclusive.

HORTICULTURE

Originally the term horticulture meant the cultivation of a garden. It now includes the art and science of vegetable growing or *olericulture*, fruit growing or *pomology*, flower growing or *floriculture*, and landscape gardening. Horticulture, therefore, might justly be called applied botany, and it bears much the same relationship to botany as do any of the branches of engineering to mathematics and physics.

In a new and undeveloped country, horticulture, as a branch of agriculture, usually receives comparatively little attention. But it increases rapidly in importance as the primary problems of producing a sufficient supply of grain, potatoes, and live stock are gradually solved. The phenomenal development of horticulture in America is shown by the great and increasing number of horticultural publications, by the extent to which the subject is taught in the schools, by the obvious importance of the canning and preserving industries, greenhouses, nurseries, and seed raising, and by the accompanying tables. Factories devoted to the manufacture of boxes, baskets, barrels, glass jars, and tin cans depend for their existence largely on the success of horticultural enterprises.

Robert Squibbs's *Garden Kalendar*, published at Charleston, South Carolina, 1787, was probably the first separate book on horticulture printed in America. Since that time, more than 1400 books have been published and more than 500 horticultural journals started, of which about 65 are still in circulation. In the United States and Canada, there are approximately 30 national or sectional horticultural societies, together with numerous local organizations.

Elementary instruction in horticulture is usually given in the primary schools of the cities, as well as in the rural districts. Wherever possible, theory is coupled with practice in the school garden. This training is given not only to teach horticulture, but because it has been found one of the best methods of developing a growing mind. Advanced courses in horticulture are given by 67 colleges and universities located in every state and territory except Alaska. Similar courses are given by 6 universities and various colleges of Canada.

Vegetables. The chief sources of vegetables are: truck farms and greenhouses located near large cities, where, by intensive cultivation, $1000 to $2000 worth of crops may be taken from a single acre; farms devoted to raising green vegetables for commercial canning; and home gardens. The importance of the home garden was recognized during the World War, when many people learned by experience that a piece of ground no larger than 25 by 50 feet can be made to produce all of the vegetables required by a family of five.

Fruits and Nuts. In the production of fruit, North America leads the world, and, of all fruits, the apple comes first both in quantity and in value. The raising of oranges, lemons, and grapefruit has become the most highly organized branch of the orchard industries. The annual crop of nuts is increasing rapidly, English walnuts, pecans, and almonds, in the order named, being the most important.

Flowers. In the commercial production of flowers the rose takes first place, the carnation second, and the violet third. An important branch of this industry is the forcing of bulbs and plants in order to produce potted flowers for sale at Christmas and Easter. Although it has been demonstrated that bulbs of first quality can be produced in America, they are practically all imported, chiefly from Holland, Japan, Formosa, and Bermuda.

Landscape gardening consists in the arrangement of growing trees, shrubs, and other ornamental plants in connection with walks, drives, and other features of the landscape, so that together they form an artistic and pleasing view.

STATES LEADING IN PRODUCTION OF MARKET VEGETABLES, 1926*

Crop and State	Acreage	Value Dollars	% U. S. Total Production
Asparagus, Table	37,190	9,633,000	100.0
California	7,980	4,733,000	49.1
New Jersey	10,000	2,257,000	23.4
South Carolina	5,300	946,000	9.8
Asparagus, Canning	48,450	3,542,000	100.0
California	48,300	3,520,000	99.4
New York	150	22,000	.6
Beans, Snap, Table	65,260	10,756,000	100.0
Florida	16,000	3,990,000	37.1
New Jersey	11,000	1,320,000	12.3
Louisiana	8,740	957,000	8.9
Beans, Snap, Canning	26,210	2,421,000	100.0
New York	5,220	523,000	21.6
Wisconsin	3,210	288,000	11.9
California	700	259,000	10.7
Cabbage	122,610	17,385,000	100.0
New York	31,480	3,403,000	19.6
Texas	14,000	2,373,000	13.6
Wisconsin	13,140	1,436,000	8.3
California	6,480	1,201,000	6.9
Cantaloupes and Muskmelons	103,160	18,044,000	100.0
California	43,680	8,531,000	47.3
Colorado	11,670	2,321,000	12.8
Arizona	7,000	1,848,000	10.2
Carrots	16,030	2,695,000	100.0
Louisiana	6,160	742,000	27.5
New York	2,250	635,000	23.6
Mississippi	1,500	369,000	13.7
Cauliflower†	16,900	4,938,000	100.0
New York	5,180	2,346,000	47.5
California	7,887	1,998,000	40.5
Oregon	2,667	437,000	88.5
Celery	24,270	12,463,000	100.0
Florida	3,520	3,960,000	31.8
California	8,550	3,782,000	30.3
New York	4,890	2,259,000	18.1
Cucumbers, Table	39,210	6,756,000	100.0
Florida	7,590	2,781,000	41.1
North Carolina	4,570	599,000	8.9
Texas	2,800	516,000	7.6
Cucumbers, Pickling†	84,580	4,484,000	100.0
Michigan	32,430	1,413,000	31.5
Wisconsin	16,970	769,000	17.1
California	2,970	419,000	9.3
Egg Plant	3,220	932,000	100.0
Florida	1,020	547,000	58.7
New Jersey	1,000	220,000	23.6
Louisiana	1,020	140,000	15.0
Lettuce	106,100	27,541,000	100.0
California	65,000	16,473,000	59.8
Arizona	8,300	3,661,000	13.3
Colorado	13,240	2,178,000	7.9
Onions	74,560	15,574,000	100.0
Texas	14,010	3,691,000	23.7
California	9,000	2,383,000	15.3
New York	7,580	1,828,000	11.7
Peas, Green, Table	36,820	5,353,000	100.0
California	10,200	2,346,000	43.8
New York	7,800	830,000	15.5
New Jersey	3,800	678,000	12.6
Peas, Green, Canning	218,400	12,420,000	100.0
Wisconsin	106,120	6,689,000	53.8
New York	34,990	1,911,000	15.4
Utah	9,510	723,000	5.8
Peppers, Green	15,430	5,031,000	100.0
Florida	3,480	3,062,000	60.8
New Jersey	7,500	1,228,000	24.4
Louisiana	2,850	397,000	7.9
Potatoes, Early	316,850	52,696,000	100.0
Virginia	99,400	12,334,000	23.4
Florida	23,070	8,275,000	15.7
North Carolina	29,000	5,846,000	11.1
New Jersey	25,650	4,920,000	9.3
Spinach	48,530	7,061,000	100.0
Texas	16,770	2,455,000	34.8
Virginia	8,050	1,264,000	17.9
California	11,880	1,238,000	17.5

*Statistics from Bureau of Agricultural Economics.
†Three-year average, 1924-26, inclusive.

STATES LEADING IN PRODUCTION OF MARKET VEGETABLES—Con.

Crop and State	Acreage	Value Dollars	% U. S. Total Production
Sweet Corn, Canning	311,640	10,579,000	100.0
Illinois	58,280	2,073,000	19.6
Iowa	50,480	1,567,000	14.8
Maine	13,940	1,241,000	11.7
Tomatoes, Table*	133,210	34,214,000	100.0
Florida	34,750	9,157,000	26.8
Mississippi	13,530	4,073,000	11.9
California	13,700	3,867,000	11.3
Tomatoes, Canning*	299,950	19,302,000	100.0
New Jersey	30,670	3,028,000	15.7
California	29,420	2,883,000	14.9
Indiana	58,780	2,856,000	14.8
Watermelons	199,560	10,141,000	100.0
Florida	24,150	2,765,000	27.3
Georgia	53,600	2,536,000	25.0
Texas	34,900	1,550,000	15.3

*Three-year average, 1924-26, inclusive.

THREE LEADING FIELD CROPS, CANADA

On basis of value, showing yield, by provinces, 1925.

Province and Crop	Yield	Value
Canada:		
Wheat bu.	411,375,700	$459,149,200
Oats bu.	513,384,000	201,050,600
Hay and Clover tons	16,141,200	164,585,400
Alberta:		
Wheat bu.	102,955,000	112,208,000
Grain Hay tons	4,297,000	38,673,000
Oats bu.	75,517,000	23,410,000
British Columbia:		
Hay and Clover tons	321,000	6,067,000
Potatoes bu.	3,105,000	3,260,000
Grain Hay tons	141,000	2,364,000
Manitoba:		
Wheat bu.	39,453,000	46,555,000
Barley bu.	52,156,000	25,556,000
Oats bu.	71,770,000	24,402,000
New Brunswick:		
Hay and Clover tons	954,000	10,899,000
Potatoes bu.	7,053,000	7,525,000
Oats bu.	6,813,500	4,088,000
Nova Scotia:		
Hay and Clover tons	906,000	8,365,000
Potatoes bu.	4,283,000	4,575,000
Oats bu.	3,878,000	2,911,500
Ontario:		
Hay and Clover tons	5,233,200	62,013,400
Oats bu.	118,100,500	51,288,100
Wheat bu.	25,205,300	30,648,700
Prince Edward Is.:		
Potatoes bu.	6,432,000	6,753,000
Hay and Clover tons	366,000	3,755,000
Oats bu.	5,519,000	2,468,000
Quebec:		
Hay and Clover tons	6,703,000	58,517,000
Potatoes bu.	18,303,000	35,692,000
Oats bu.	54,010,000	32,946,000
Saskatchewan:		
Wheat bu.	240,551,000	264,606,000
Oats bu.	174,967,000	57,739,000
Flaxseed bu.	7,439,000	14,580,000

PRINCIPAL FIELD CROPS OF CANADA

Yield and Value, 1925

Crop	Yield	Value
	Bushels	Dollars
Barley	112,668,300	57,820,100
Beans	1,500,700	3,876,600
Buckwheat	10,448,800	8,880,600
Corn for husking	10,564,300	9,938,700
Flaxseed	9,297,100	18,462,500
Mixed Grains	34,301,000	21,900,900
Oats	513,384,000	201,050,600
Peas	3,410,700	5,616,400
Potatoes	70,663,200	83,614,900
Rye	13,688,500	9,721,800
Turnips, mangolds	67,032,700	20,964,400
Wheat	411,375,700	459,149,200
	Tons	
Alfalfa	1,640,200	20,730,800
Fodder corn	5,428,700	23,260,100
Grain hay	4,438,000	41,037,000
Hay and Clover	16,141,200	164,585,400
Sugar beets	458,200	2,784,900

DRAINAGE AND RECLAMATION

In agricultural practice the term drainage generally refers to the removal of excess water from the soil by means of ditches or by tunnels formed of porous tile, in which the water collects and is carried away under the action of gravity. When the ground is so low that the water collected by the system must be removed with pumps, the process is usually termed reclamation.

Drainage was used to a certain extent by the Romans, and during the 17th century attention was occasionally called to its advantages; but the methods practiced by James Smith, of Perthshire, England, about 1823, are generally considered to have introduced the modern systems of farm drainage. In America, John Johnson imported tiles from Scotland in 1835 and placed them in the wet ground of his farm near Geneva, New York. The improvement in his crops was so noticeable that the advantages of draining were quickly appreciated.

The most simple way of draining wet soil is to dig ditches from 3 to 5 feet deep, and connect these with a main ditch that is somewhat deeper. Because this method cuts up the surface of the ground, 3-inch porous tile pipes are generally placed at the bottom of the ditches, which are then refilled. The ground waters filter through the tile and then flow through the pipe to six-, eight-, or ten-inch mains and thence to the outlet.

The advantages of such drainage are many. The texture of the soil is improved, and the ground becomes more fertile. Drained ground is usually ten to fourteen degrees warmer than that which is full of water; consequently, it freezes later and thaws earlier, thus giving a longer growing season. A drained region is much more healthful than one where the earth contains stagnant water. Moreover, when drainage is completed, the vegetation is stronger, the plants root more deeply, and the additional crops more than pay for the expense of installation. Drainage is frequently an efficient method of removing the soluble salts from alkaline land.

LEADING AGRICULTURAL PRODUCTS OF CANADA

By Provinces on Basis of Value, 1925

Province	Wheat	Oats	Barley	Rye	Flaxseed	Hay and Clover	Potatoes	Turnips
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Alberta	112,208,000	23,410,000	6,417,000	1,166,000	68,000	3,410,000	3,385,000	1,606,000
British Columbia	1,533,000	1,798,000	173,000	128,000	22,000	6,067,000	3,260,000	1,441,000
Manitoba	46,555,000	24,402,000	25,556,000	3,761,000	3,494,000	6,479,000	2,824,000	449,000
New Brunswick	415,000	4,088,000	114,000	5,100	.....	10,899,000	7,525,000	1,348,000
Nova Scotia	291,500	2,911,500	197,400	2,600	.....	8,365,000	4,575,000	2,061,000
Ontario	30,648,700	51,288,100	10,069,700	1,445,100	231,500	62,013,400	15,651,900	8,644,400
Prince Edward Is.	798,000	2,468,000	110,000	.....	.....	3,755,000	6,753,000	1,012,000
Quebec	2,094,000	32,946,000	3,006,000	326,000	67,000	58,517,000	35,692,000	3,682,000
Saskatchewan	264,606,000	57,739,000	12,177,000	2,888,000	14,580,000	5,080,000	3,949,000	721,000
Total	459,149,200	201,050,600	57,820,100	9,721,800	18,462,500	164,585,400	83,614,900	20,964,400

United States Projects. In the United States 14.3 per cent of all farms have drainage, while 14.8 per cent are still in need of this improvement. Where entire districts are in need of drainage, so that the work presents a large-scale engineering problem, the individual landowners usually form a *drainage enterprise* which is organized according to the state laws. The drains constructed by the individual farmer may either be supplemental to, or entirely independent of, the larger works installed by a drainage enterprise. In some states the drainage enterprises include large areas of timber and unimproved lands that are not yet included in farms. Michigan, Minnesota, and Indiana, each have more than 9 million acres included in drainage enterprises; Ohio has 8 million; Iowa, more than 5 million; Illinois, almost 4 million acres. Important plans are under way for the reclamation of the Everglades of Florida, where 1⅔ million acres are already included in various enterprises. Drainage is frequently necessary in connection with irrigation, to prevent the ground from becoming filled with stagnant water.

Old World Projects. The Fens on the east coast of England, the valley of the Po, in Italy, the south of France, and Egypt have all benefited by extensive reclamation projects. These are only less famous than those of the Netherlands, where, by an elaborate system of dikes and canals, many marshes have been changed to fertile regions known as "polders." In the Haarlem Meer, 44,724 acres which had been covered with 13 feet of water were surrounded by a dike, and, after 39 months of pumping, the water was removed. Work is now being carried out toward the greater project of reclaiming the Zuider Zee, a branch of the North Sea which was formed in 1170 when a terrific storm broke down the sand dunes on the coast. It is estimated that this work will require about 30 years to complete and will reclaim 480,000 acres of fertile land.

DRAINAGE OF FARMS IN THE UNITED STATES

State	No. of Farms Having Drainage	No. of Acres Provided with Drainage	Capital Invested in Drainage Enterprises
New England:			Dollars
Maine	2,068	26,302	.....
New Hampshire	1,013	11,777	.....
Vermont	1,728	35,649	.....
Massachusetts	2,955	39,022	.....
Rhode Island	116	2,403	.....
Connecticut	1,203	14,646	.....
Middle Atlantic:			
New York	33,896	1,180,423	.....
New Jersey	4,903	174,260	.....
Pennsylvania	22,750	318,955	.....
East North Central:			
Ohio	130,117	7,365,532	30,707,863
Indiana	111,435	8,308,844	31,201,517
Illinois	99,246	11,247,637	43,595,069
Michigan	66,948	3,156,632	24,686,729
Wisconsin	21,838	658,411	4,168,055
West North Central:			
Minnesota	53,011	2,993,034	42,089,304
Iowa	88,865	7,334,404	49,649,775
Missouri	11,917	859,663	20,889,328
North Dakota	682	89,054	2,208,049
South Dakota	4,077	161,371	1,461,063
Nebraska	2,356	214,428	4,588,578
Kansas	2,806	106,985	938,103
South Atlantic:			
Delaware	4,246	185,831	.....
Maryland	6,911	249,799	.....
Dist. Columbia	21	197	.....
Virginia	9,899	225,068	.....
West Virginia	1,949	38,464	.....
North Carolina	45,246	1,066,933	3,623,518
South Carolina	26,993	676,152	583,083
Georgia	15,121	274,688	828,681
Florida	4,597	147,940	14,060,857

DRAINAGE OF FARMS IN THE UNITED STATES—Con.

State	No. of Farms Having Drainage	No. of Acres Provided with Drainage	Capital Invested in Drainage Enterprises
East South Central:			Dollars
Kentucky	5,817	225,228	1,620,027
Tennessee	8,887	254,118	2,995,515
Alabama	19,967	415,293	.....
Mississippi	34,926	825,878	7,192,907
West South Central:			
Arkansas	13,426	497,489	14,217,155
Louisiana	21,271	1,004,935	9,117,991
Oklahoma	2,032	107,014	76,415
Texas	8,106	756,263	5,700,805
Mountain:			
Montana	756	51,146	664,990
Idaho	1,167	64,648	1,678,294
Wyoming	433	35,654	1,182,362
Colorado	2,749	127,037	1,081,875
New Mexico	1,294	47,311	1,710,796
Arizona	241	9,651	414,925
Utah	2,729	74,316	1,014,973
Nevada	380	46,252	117,851
Pacific:			
Washington	10,020	274,696	1,442,419
Oregon	6,618	229,582	200,000
California	5,078	813,960	47,688,153
Total	924,810	53,024,975	373,397,025

IRRIGATION

The practice of supplying water to the fields by artificial means has been known for thousands of years. The ancient Egyptians, the Babylonians, the Chinese, and the natives of India—all made use of irrigation. In the western hemisphere, the Incas of Peru, the Aztecs of Mexico, and the Pueblo Indians of New Mexico employed artificial methods of watering very similar to those of the Old World.

In many parts of the earth, the soil is extremely fertile, but vegetation is scanty because the annual rainfall either is less than 20 inches or is concentrated in a relatively short season and followed by a long period of drought. In such regions, the ability to obtain water and distribute it to the fields when needed means the difference between a comparative desert and a rich region capable of supporting a large population.

Water is usually obtained from a river having its source in a more humid country, and today, along the banks of the Nile or the rivers of southern China, natives may be seen drawing up water from the river and pouring it into distributing channels just as their ancestors did 3000 years ago. Lakes, wells, and springs also may serve as a source of water, and in India during the rainy season many small reservoirs, called tanks, become filled by the floods.

Irrigation is practiced more extensively in India than in any other country, but in Egypt and in China, as also in Italy, Spain, and France, where irrigation was first introduced by the Romans, millions of acres are artificially supplied with water, and the present extensive systems are being enlarged under governmental direction.

Methods of Irrigation. More than 90 per cent of all irrigated lands receive their moisture from rivers and streams. During the season of flood, these streams usually carry far more water than can be used, while later in the year their volume is much less than is needed by the surrounding country. By means of a dam equipped with control gates, a reservoir can be created which may be filled when the river is high and gradually emptied when the river would otherwise be too low.

Most of the great dams of the world, of which that at Assuan, Egypt, is a notable example, have been constructed as the most important feature of some irrigation project. The force of the falling waters is frequently sufficient to generate electric

IRRIGATION IN THE UNITED STATES

State	Number of Farms Irrigated	Area Irrigated (Acres)	Capital Invested in Irrigation Enterprises	Average Cost per Acre for Irrigation Works	Value of Irrigated Crops
			Dollars	Dollars	Dollars
Arizona	6,605	467,565	33,498,094	53.40	34,190,780
Arkansas	1,166	143,946	7,183,322	40.13	18,352,240
California	67,391	4,219,040	194,886,388	33.06	319,208,503
Colorado	28,756	3,348,385	88,302,442	22.90	110,215,136
Idaho	25,283	2,488,806	91,501,009	29.59	76,830,557
Kansas	504	47,312	2,067,381	30.47	842,161
Louisiana	6,471	454,882	14,063,181	19.30	42,735,849
Montana	10,807	1,681,729	52,143,363	18.94	30,382,674
Nebraska	3,021	442,690	13,909,185	24.73	11,547,679
Nevada	2,718	561,447	14,754,280	20.94	12,380,593
New Mexico	11,390	538,377	18,210,412	26.16	11,400,144
North Dakota	340	12,072	1,857,118	54.25	267,148
Oklahoma *	73	2,969	151,325	15.65	.....
Oregon	9,154	986,162	28,929,151	21.52	12,294,191
South Dakota	1,198	100,682	5,465,248	36.21	2,403,548
Texas	5,974	586,120	35,072,739	30.48	22,543,976
Utah	22,218	1,371,651	32,037,351	18.84	34,115,652
Washington	13,271	529,899	29,299,011	45.98	39,801,619
Wyoming	6,449	1,207,982	34,326,328	18.75	15,683,997
Total	222,789	19,191,716	697,657,328	26.81	795,196,447

* Value of crops grown on irrigated land not stated in the returns of the 1920 Census.

UNITED STATES GOVERNMENT IRRIGATED LAND PROJECTS

Statistics from Bureau of Reclamation

State Project	Construction Cost to June 30, 1927	Irrigable Acreage	Acreage Cropped	Value of Crops Harvested, 1926			
				Cereals	Alfalfa	Fruits and Vegetables	Total for all Crops
	Dollars			Dollars	Dollars	Dollars	Dollars
Arizona: Salt River	12,744,223	239,850	221,500	755,400	2,271,740	6,254,144	16,549,160
Ariz.—Cal.: Yuma*	9,264,126	71,180	55,570	21,973	470,472	209,048	2,961,820
California: Orland	1,526,821	20,750	12,700	10,115	212,225	272,905	624,650
Colorado: Grand Valley	4,748,115	30,380	13,500	50,072	104,176	147,667	422,880
Uncompahgre	6,438,177	94,820	58,490	374,270	303,711	1,050,522	2,056,930
Idaho: Boise	14,392,235	143,270	139,820	1,347,224	983,700	481,414	3,572,980
King Hill	1,904,899	10,000	6,110	20,995	109,485	26,766	183,200
Minidoka	6,810,690	121,570	96,800	706,672	984,460	1,481,929	3,672,300
Montana: Huntley	1,499,251	32,540	19,790	139,467	149,579	61,586	839,320
Milk River	6,751,731	73,250	18,650	61,434	109,390	43,573	352,870
Sun River	4,627,951	55,880	28,900	357,470	116,672	40,623	552,430
Mont.—N.Dak.: Lower Yellowstone	3,175,593	58,250	23,060	175,976	152,040	55,745	743,060
Neb.—Wyo.: North Platte	18,822,348	238,160	168,690	762,241	443,190	806,863	4,797,110
Nevada: Newlands	7,688,013	65,280	41,640	162,975	1,236,335	143,881	1,594,280
New Mexico: Carlsbad	1,463,266	25,280	22,860	4,701	221,028	1,795	1,100,620
New Mex.—Tex.: Rio Grande	14,309,777	150,000	128,860	274,290	1,288,850	802,234	7,760,900
Oregon: Umatilla	5,157,624	24,590	11,850	8,208	210,595	39,528	297,230
Ore.—Cal.: Klamath	5,264,412	45,000	37,190	75,042	351,500	288,063	906,750
South Dakota: Belle Fourche	3,566,124	74,570	47,730	359,561	235,637	33,396	880,320
Utah: Strawberry Valley	3,507,424	53,890	30,300	181,480	297,362	78,338	741,480
Washington: Okanagon	1,460,361	7,300	3,850	.....	1,704	502,497	512,890
Yakima	14,964,232	134,460	102,850	468,195	1,154,698	6,265,097	8,331,300
Wyoming: Riverton	2,839,116	9,000	260	1,566	.....	410	2,420
Shoshone	9,405,904	65,280	37,750	96,600	198,728	241,337	912,720
Total	171,721,588†	1,844,550	1,328,720	6,415,927	11,607,277	19,329,361	60,369,620

* Inclusive of Yuma Auxiliary (Mesa). † Includes $9,389,175 expended on incompleted projects.

power, which is especially valuable in irrigated regions where fuel is generally very scarce. The water is usually distributed from the river by main canals, from which branch ditches carry it to the fields. Irrigation is accomplished by running the water in shallow channels until it is absorbed by the earth, or by flooding the entire field.

Irrigation in America. In the United States, irrigation was at first carried on by private enterprise, but the capital required was so great and the payments were necessarily spread over such a long period that the work on many projects was finally undertaken by the government. By the terms of the National Reclamation act, which was passed in 1902, a large part of the money received from the sale of public lands in sixteen Western states was to be used for the construction of reclamation projects under the direction of the department of the interior. But, when the equipment has been paid for, the control passes to the owners of the irrigated land.

Alfalfa is the most important field crop raised in the Western irrigated districts. Fruits and vegetables rank highest in total value, being especially important in the Yakima irrigated area in Washington, in the Salt River region in Arizona, and in Grand Valley, Colorado. Cereals amount to only about 10 per cent of the total crops and are produced chiefly because of the expense of transporting grain from the corn and wheat producing states farther east. The Salt River project, Arizona, on which the waters are stored by means of the famous Roosevelt dam, produces important crops of cotton. The true economic value of these investments in irrigation can be best appreciated when it is noticed that, in some instances, the value of the crops for but one year exceeds the total cost of construction.

The Arrowrock dam on the Boise project in Idaho will probably remain for several years as the highest in the world, while the reservoir formed by the Elephant Butte dam in New Mexico, is also the largest of its kind. These dams have extremely large storage capacity, the latter with a capacity of 3.2 billion tons of water being the greatest in the world in this respect. The total area of irrigated land in the United States is approximately 20 million acres. For details, see table on *United States Government Irrigated Land Projects* and on *Irrigation in the United States*.

In Canada, the largest irrigation project in operation includes about 400,000 acres. It is located on the Bow river south of Calgary, Alberta, and is under the control of the Canadian Pacific railway. The total area irrigated in Canada is between 1 and 2 million acres.

Old World Irrigation. As already stated, India is the most extensively irrigated country in the world, the total area of government projects being approximately 30 million acres, which is about 12 per cent of the total area cropped. The Sukkur barrage in the Sind province is designed to irrigate 5,500,000 acres. It is part of a larger plan for impounding the waters of the Indus river by works estimated to cost 250 million dollars. The annual value of crops on irrigated land in India approximates an average of 1½ times the total cost of the irrigation works.

The area in Egypt which can be cultivated is about 7,300,000 acres, all of which is dependent for its fertility on the Nile floods or irrigation. The Assuan dam, constructed in 1902 and more than doubled in storing capacity in 1912, is credited with having saved Egypt from famine and economic disaster in the low-flood year of 1913. The Sennar irrigation dam on the upper Nile, in the Sudan, was completed in 1925 at a cost of about 30 million dollars. A canal system for the distribution of the water called for the expenditure of an additional 15 million dollars. China has a large area of irrigated land, but no authentic statistics are available by which its extent may be determined.

FORESTRY

Forestry is the art and the science of the economical management of existing communities of trees, and the development of new forests upon land unsuited to agriculture.

Value of Forests. Forests supply fuel and timber; they break the force of strong winds; they are warmer in winter and cooler in summer than open country; they afford parks for amusement; and they protect game for the hunter. Finally, forests exert a very noticeable influence upon the flow and character of neighboring streams. This effect has three principal causes: First, the trees break the direct force of the rainfall so that the earth on wooded hillsides is not cut up and washed into the valley. Second, water accumulates in the porous bed of a forest, and escapes to the stream gradually, thus tending to produce a continuous flow rather than a series of sudden, disastrous floods. Third, trees draw from swampy ground a large amount of water, which is evaporated through their leaves, thereby substantially decreasing the volume to be drained off by streams.

The purpose of forestry is to secure the greatest possible utilization of forests and forest products for the present, and, at the same time, to provide new growth for the future. To attain these results, existing forests must be protected from their chief enemies, fire and insects; lumbering operations must be performed with a minimum of waste; and cut-over areas must be replanted. Replanting may be done by allowing seed trees to remain standing, by artificial distribution of seed, or by setting out young trees which have been raised in nurseries.

Forestry has been practiced in Europe for several centuries, especially by the Germans and the French. England depended largely upon her commercial organizations to provide a supply of timber from foreign lands, but for a time during the World War she could obtain only that wood which France was able to spare. Because of this experience, England, shortly after the war, planned to plant one million acres of forest within forty years, and appropriated 17 million dollars to be used for this purpose within a period of ten years.

Forestry in the United States. During the early days of American history, the entire country, with the exception of the treeless plains of the mid-continent, was heavily wooded. Forestry, therefore, received little attention. Today, it is estimated that 80 per cent of the standing timber which remains is controlled by private owners, and that, if no precautions are taken, all this will have been destroyed within a century.

In recognition of the pressing need for conservation of a dwindling national asset, Congress, in 1891, empowered the president to create forest reserves. Yellowstone Park Timberland reserve, the first to be established under the new law, was created by President Harrison. There are now about 160 national forests, with a total area of approximately 159 million acres, distributed over 35 states and territories. These are under the control of the forest service of the department of agriculture. They are chiefly located in the Western states.

Within the national forests, cutting of mature trees and replanting of new crops is continually going on. Fuel and fencing may be obtained free by local settlers, but most of the timber is sold. Grazing of live stock within the areas of the national forests is a practice of great importance. About one-seventh of the cattle and one-half of the sheep slaughtered annually are fed in the forests during some part of the year.

Possibly the most important function of the national forests is to safeguard the streams which supply water for the famous Western irrigation projects. Without water there can be no irrigation, and without the forests the supply of water would be irregular and uncertain. Forty-two per cent of the power resources of the West are within the national forests.

UNITED STATES NATIONAL FORESTS, 1927

State or Dependency and Forest	Net Area Acres
Alabama:	
Alabama	107,389
McClellan	15,350
Total for State	122,739
Alaska:	
Chugach	4,792,634
Tongass	16,547,758
Total for Terr.	21,340,392
Arizona:	
Apache*	677,392
Coconino	1,717,744
Coronado*	1,356,983
Crook	1,425,166
Kaibab	723,411
Prescott	1,207,706
Sitgreaves	673,921
Tonto	2,261,147
Tusayan	1,292,992
Total for State	11,336,462
Arkansas:	
Ouachita	665,784
Ozark	316,970
Total for State	982,754
California:	
Angeles	646,312
California	822,996
Cleveland	380,569
Crater*	48,218
Eldorado*	551,478
Inyo*	1,525,248
Klamath*	1,524,873
Lassen	944,932
Modoc	1,475,759
Mono*	796,219
Plumas	1,109,600
San Bernardino	597,359
Santa Barbara	1,775,076
Sequoia	1,342,430
Shasta	870,034
Sierra	1,493,513
Siskiyou*	329,384
Stanislaus	811,292
Tahoe*	515,657
Trinity	1,410,460
Total for State	18,971,409
Colorado:	
Arapaho	636,506
Cochetopa	908,787
Colorado	828,744
Grand Mesa	659,384
Gunnison	905,265
Hayden*	65,769
Holy Cross	1,125,174
La Sal*	26,631
Leadville	927,413
Montezuma	697,582
Pike	1,087,115
Rio Grande	1,135,764
Routt	750,254
San Isabel	599,416
San Juan	1,241,720
Uncompahgre	754,291
White River	884,565
Total for State	13,234,380
Florida:	
Florida	343,180
Georgia:	
Benning	78,560
Cherokee*	105,162
Nantahala*	89,783
Total for State	273,505
Idaho:	
Boise	1,063,313
Cache*	494,449
Caribou*	703,459
Challis	1,272,023
Clearwater	793,178
Coeur d'Alene	657,873
Idaho	1,688,056
Kaniksu*	192,264
Lemhi	1,358,772
Minidoka*	520,549
Nezperce	1,661,503
Payette	1,307,555
Pend Oreille	676,572
Idaho—Con.:	
Saint Joe	555,114
Salmon	1,708,374
Sawtooth	1,158,262
Selway	1,689,157
Targhee*	1,031,371
Weiser	565,945
Total for State	19,097,789
Illinois:	
Bellevue-Savanna	10,710
Kentucky:	
Knox	22,660
Maine:	
White Mountain*	32,256
Maryland:	
Meade	4,725
Michigan:	
Michigan	126,762
Minnesota:	
Minnesota	191,025
Superior	810,017
Total for State	1,001,042
Montana:	
Absaroka	851,046
Beartooth	660,112
Beaverhead	1,339,172
Bitterroot	1,047,071
Blackfeet	832,566
Cabinet	829,653
Custer*	517,703
Deerlodge	828,834
Flathead	1,719,112
Gallatin	581,002
Helena	682,482
Jefferson	1,040,310
Kootenai	1,351,165
Lewis and Clark	810,731
Lolo	851,249
Madison	953,456
Missoula	1,024,026
Total for State	15,919,690
Nebraska:	
Nebraska	205,946
Nevada:	
Dixie*	56,324
Eldorado*	400
Humboldt	1,322,313
Inyo*	60,416
Mono*	464,502
Nevada	1,175,128
Tahoe*	16,373
Toiyabe	1,883,690
Total for State	4,979,146
New Hampshire:	
White Mountain*	427,325
New Jersey:	
Dix	6,785
New Mexico:	
Apache*	886,861
Carson	1,088,603
Coronado*	124,828
Datil	1,748,654
Gila	1,596,229
Lincoln	1,113,559
Manzano	679,610
Sante Fe	1,270,195
Total for State	8,508,539
New York:	
Pine Plains	9,800
North Carolina:	
Cherokee*	0
Nantahala*	117,094
Pisgah*	259,089
Unaka*	0
Total for State	376,183
Oklahoma:	
Wichita	61,480
Oregon:	
Cascade	1,023,800
Crater*	805,088
Deschutes	1,296,142
Fremont	849,286
Oregon—Con.:	
Klamath*	8,723
Malheur	1,048,666
Mount Hood	1,059,852
Ochoco	718,137
Santiam	610,918
Siskiyou*	1,032,750
Siuslaw	549,774
Umatilla*	920,897
Umpqua	1,014,174
Wallowa	961,701
Whitman	1,338,184
Total for State	13,238,092
Pennsylvania:	
Allegheny	214,506
Tobyhanna	20,870
Total for State	235,376
Porto Rico:	
Luquillo	12,443
South Carolina:	
Jackson	20,225
Nantahala*	41,042
Total for State	61,267
South Dakota:	
Black Hills*	475,481
Custer*	73,606
Harney	513,494
Total for State	1,062,581
Tennessee:	
Cherokee*	190,238
Pisgah*	19,679
Unaka*	112,873
Total for State	322,790
Utah:	
Ashley*	980,332
Cache*	283,801
Dixie*	795,630
Fishlake	1,386,459
La Sal*	504,291
Manti	725,476
Minidoka*	70,635
Powell	1,051,505
Uinta	1,076,626
Wasatch	609,767
Total for State	7,484,522
Virginia:	
Eustis	4,220
Humphreys	3,184
Lee	7,177
Monongahela*	10,414
Natural Bridge	157,246
Shenandoah*	361,416
Unaka*	45,209
Total for State	588,866
Washington:	
Chelan	1,807,962
Columbia	759,430
Colville	747,142
Kaniksu*	273,163
Mount Baker	1,460,651
Olympic	1,529,501
Rainier	1,261,558
Snoqualmie	612,095
Umatilla*	313,359
Wenatchee	860,405
Total for State	9,625,266
West Virginia:	
Monongahela*	165,639
Shenandoah*	59,689
Total for State	225,328
Wyoming:	
Ashley*	6,460
Bighorn	1,125,632
Black Hills*	147,003
Caribou*	6,315
Hayden*	327,784
Medicine Bow	552,275
Shoshone	1,619,796
Targhee*	345,570
Teton	1,881,212
Washakie	867,899
Wyoming	1,668,288
Total for State	8,548,234
Aggregate for the 159 National Forests	158,800,424

*Forest extending into more than one state.

TOTAL AREA OF NATIONAL FORESTS EXTENDING INTO TWO OR MORE STATES

Forest	States	Net Area Acres
Apache	Arizona and New Mexico	1,564,253
Ashley	Utah and Wyoming	986,792
Black Hills	South Dakota and Wyoming	622,484
Cache	Idaho and Utah	778,250
Caribou	Idaho and Wyoming	709,774
Cherokee	Georgia, N. C., and Tenn.	293,400
Coronado	Arizona and New Mexico	1,481,811
Crater	California and Oregon	853,306
Custer	Montana and South Dakota	591,309
Dixie	Nevada and Utah	851,954
Eldorado	California and Nevada	551,878
Hayden	Colorado and Wyoming	393,553
Inyo	California and Nevada	1,585,664
Kaniksu	Idaho and Washington	465,427
Klamath	California and Oregon	1,533,596
La Sal	Colorado and Utah	530,922
Minidoka	Idaho and Utah	591,184
Mono	California and Nevada	1,260,721
Monongahela	Virginia and West Virginia	176,053
Nantahala	Georgia, N. Car., and S. Car.	247,919
Pisgah	North Carolina and Tenn.	278,768
Shenandoah	Virginia and West Virginia	421,105
Siskiyou	California and Oregon	1,362,134
Tahoe	California and Nevada	532,030
Targhee	Idaho and Wyoming	1,376,941
Umatilla	Oregon and Washington	1,234,256
Unaka	N. Car., Tenn., and Va.	158,082
White Mountain	Maine and New Hampshire	459,581

STATE FORESTS, 1925*

State	No.	Acres
Connecticut	8	9,687
Idaho	1	177,545
Indiana	1	3,500
Kentucky	1	3,624
Louisiana	1	2,200
Maryland	6	6,026
Massachusetts	38	74,514
Michigan		351,700
Minnesota		400,000
Montana	7	203,000
Nebraska	1	8,000
New Hampshire	47	20,538
New Jersey	6	18,954
New York	2	2,078,994†
Ohio	11	15,993
Pennsylvania	14	1,131,277
Texas	2	3,332
Vermont	14	30,259
Virginia	1	588
Wisconsin		330,997
Total Acres	.....	4,870,728

*From Report of National Conference on State Parks.
†From Report of State Conservation Department, 1928.

Progress of Forestry. By the enactment, in 1924, of the Clarke-McNary forestry law, the United States government became committed to a definite national forestry policy, embracing alike the publicly and the privately owned forest lands of the nation. The provisions of this act insure increased protection to immature forests and a larger measure of Federal assistance in fire prevention. Provision is made for the systematic study of the problems of forest taxation with the specific purpose of developing equable laws to encourage timber growing. Appropriations also are authorized for supplying nursery stocks of young forest trees to the farmer and for aiding him in caring for his tree plantations, the latter work to be carried out in co-operation with the agricultural extension service and forestry department of his own state. The immense economic importance of effectively stimulating farm forestry is shown by the fact that in 1925 there were in the United States upwards of 143 million acres, or about 225,000 square miles, of forest land in farm holdings.

In 1926, the first World Forestry Conference was held, at Rome, Italy. Delegates from 58 countries assembled and took steps toward the collection and distribution of forestry statistics and the shaping of a policy regarding grazing, forest injury, education, research, legislation, and taxation.

Forestry in Canada. The Dominion government administers forest areas, not privately owned, in the provinces of Manitoba, Saskatchewan, Alberta, and portions of British Columbia. In all other cases, forest areas are administered by the provinces in which they occur. In most forest areas, only the right to cut timber is disposed of, the land itself remaining under government ownership.

Forest reserves are intended primarily to supply the surrounding settlements with timber for local use and to protect the watersheds. The policy of most of the governments is to extend these reserves so that eventually they will include all non-agricultural lands capable of supporting tree growth. Government plans also provide for their maintenance in a forested condition by natural regeneration, except where entirely denuded areas require artificial reforestation. The export of unmanufactured timber or pulpwood cut from public lands is prohibited in every province except Nova Scotia. This is one of the factors which have made Canada the world's largest producer of newsprint paper.

All the provinces provide means of protection against forest fires, including the patrolling of the forest areas, building of roads and telephone lines, and the maintenance of airplane and motor service for reporting or combatting fires. Many millions of trees are distributed annually free of charge from governmental nurseries.

DOMINION FOREST RESERVES, 1927

Province and Reserve	Area Sq. Mi.	Total Sq. Mi.
ALBERTA:		
Cooking Lake	60	
Cypress Hills No. 1	81	
Lesser Slave	5,023	
Rocky Mountain	13,786	
Total for Province		18,950
BRITISH COLUMBIA:		
Arrowstone	252	
Fly Hill	219	
Glacier	106	
Hat Creek	338	
Larch Hills	43	
Long Lake	262	
Martin Mountain	34	
Monte Hills	182	
Mount Ida	44	
Nicola	502	
Niskonlith	312	
Shuswap	326	
Tranquille	278	
Yoho	127	
Total for Province		3,025
MANITOBA:		
Duck Mountain No. 1	1,426	
Porcupine No. 1	775	
Riding Mountain	1,148	
Sandilands	189	
Spruce Woods	224	
Turtle Mountain	109	
Total for Province		3,871
SASKATCHEWAN:		
Beaver Hills	68	
Big River	1,342	
Cypress Hills No. 2	98	
Duck Mountain No. 2	81	
Dunburn	63	
Elbow	119	
Fort à la Corne	511	
Keppell	66	
Manito	181	
Moose Mountain	154	
Nisbet	155	
Pasquia	2,536	
Pines	161	
Porcupine No. 2	2,791	
Seward	31	
Sturgeon	729	
Total for Province		9,086
Grand Total for Dominion		34,932

AGRICULTURAL INDUSTRY IN

U. S. Census of Agriculture, 1925

STATE	Total Land Area (Acres)	Total Area in Farms (Acres)	Total Area Crop Land (Acres)	Total Area Woodland* (Acres)	Total Number Farms	Average Acreage Per Farm	Average Value Land Per Acre†
Alabama	32,818,560	16,739,139	7,691,713	5,784,045	237,631	70.4	$ 24.78
Arizona	72,838,400	11,065,291	578,246	436,786	10,802	1024.4	13.01
Arkansas	33,616,000	15,632,439	7,323,199	5,392,900	221,991	70.4	34.59
California	99,617,280	27,516,955	8,401,342	4,665,423	136,409	201.7	114.57
Colorado	66,341,120	24,167,270	7,199,300	1,352,967	58,020	416.5	24.51
Connecticut	3,084,800	1,832,110	534,354	729,923	23,240	78.8	110.22
Delaware	1,257,600	899,641	518,859	198,566	10,257	87.7	66.33
Dist. of Columbia	39,680	3,813	2,371	276	139	27.4	1,257.65
Florida	35,111,040	5,864,519	2,022,284	2,292,083	59,217	99.0	81.67
Georgia	37,584,000	21,945,496	10,695,817	7,045,813	249,095	88.1	26.77
Idaho	53,346,560	8,116,147	3,714,336	743,561	40,592	199.9	46.00
Illinois	35,867,520	30,731,947	21,314,837	2,635,608	225,601	136.2	136.65
Indiana	23,068,800	19,915,120	11,981,079	2,716,962	195,786	101.7	85.15
Iowa	35,575,040	33,280,813	21,997,675	2,212,940	213,490	155.9	148.87
Kansas	52,335,360	43,729,129	23,896,507	994,396	165,879	263.6	50.26
Kentucky	25,715,840	19,913,104	6,827,373	4,835,418	258,524	77.0	42.56
Louisiana	29,061,760	8,837,502	4,279,528	2,406,219	132,450	66.7	36.74
Maine	19,132,800	5,161,428	1,643,515	2,489,037	50,033	103.2	38.22
Maryland	6,362,240	4,433,398	2,227,515	1,132,943	49,001	90.5	77.00
Massachusetts	5,144,960	2,367,629	677,357	1,119,922	33,454	70.8	107.53
Michigan	36,787,200	18,035,290	9,671,381	3,301,781	192,327	93.8	71.20
Minnesota	51,749,120	30,059,137	18,651,190	4,749,811	188,231	159.7	79.63
Mississippi	29,671,680	16,053,243	6,708,892	5,447,097	257,228	62.4	28.60
Missouri	43,985,280	32,641,893	15,278,436	7,405,843	260,473	125.3	61.37
Montana	93,523,840	32,735,723	8,474,224	1,545,773	46,904	697.9	13.91
Nebraska	49,157,120	42,024,775	20,698,098	883,268	127,734	329.0	60.06
Nevada	70,285,440	4,090,586	533,614	69,622	3,883	1053.5	16.62
New Hampshire	5,779,840	2,262,064	542,846	1,316,244	21,065	107.4	38.30
New Jersey	4,808,960	1,924,545	1,126,051	297,152	29,671	64.9	136.42
New Mexico	78,401,920	27,850,325	1,784,851	2,314,995	31,687	878.9	6.28
New York	30,498,560	19,269,926	9,087,663	3,805,629	188,754	102.1	70.95
North Carolina	31,193,600	18,593,670	6,856,933	8,456,483	283,482	65.6	49.80
North Dakota	44,917,120	34,327,410	21,864,401	510,762	75,970	451.9	29.72
Ohio	26,073,600	22,219,248	11,694,956	2,827,493	244,703	90.8	87.57
Oklahoma	44,424,960	30,868,965	15,837,735	3,429,973	197,218	156.5	33.97
Oregon	61,188,480	14,130,847	4,227,337	2,664,637	55,911	252.7	43.60
Pennsylvania	28,692,480	16,296,468	8,431,049	3,530,189	200,443	81.3	71.81
Rhode Island	682,880	309,013	76,003	144,924	3,911	79.0	90.35
South Carolina	19,516,800	10,638,900	5,035,956	3,570,365	172,767	61.6	43.01
South Dakota	49,195,520	32,017,986	16,440,746	400,054	79,537	402.6	44.89
Tennessee	26,679,680	17,901,139	7,588,506	5,562,497	252,669	70.8	42.42
Texas	167,934,720	109,674,410	29,368,716	12,690,824	465,646	235.5	27.77
Utah	52,597,760	5,000,724	1,424,686	161,228	25,992	192.4	38.43
Vermont	5,839,360	3,925,683	1,149,656	1,549,034	27,786	141.3	34.97
Virginia	25,767,680	17,210,174	5,368,188	6,855,232	193,723	88.8	51.53
Washington	42,775,040	12,610,310	6,083,649	1,855,583	73,267	172.1	57.64
West Virginia	15,374,080	8,979,847	1,921,139	3,168,623	90,380	99.4	39.66
Wisconsin	35,363,840	21,850,853	10,127,914	5,648,127	193,155	113.1	86.90
Wyoming	62,430,720	18,663,308	1,877,879	445,161	15,512	1203.2	9.25
Alaska**	378,165,760	90,652	5,736	44,699	364	249.0	.....
Hawaii**	4,127,360	2,702,245	435,242	599,531	5,284	511.4	.....
Porto Rico**	2,198,400	2,022,404	1,303,547	296,213	41,078	49.2	.....

* Includes woodlands used for pasture. † Inclusive of value of farm buildings. ** According to U. S. Census, 1920.

THE UNITED STATES

roduction for the year 1924.

No. Farms Operated by Owners	No. Farms Operated by Tenants	Total Value Farm Property	Total Value Crop Products	Total Value Live Stock	Total Value Dairy Products	Number Tractors on Farms	STATE
93,396	144,235	$ 500,740,332	$ 181,026,321	$ 62,031,018	$ 11,890,324	2,465	Alabama
8,475	2,327	194,048,696	23,740,092	43,106,556	3,383,215	1,239	Arizona
96,092	125,899	628,846,351	198,020,989	56,864,560	10,737,461	3,476	Arkansas
116,363	20,046	3,424,785,986	154,883,599‡	158,809,964	58,422,073	29,948	California
40,102	17,918	712,284,622	90,778,958	86,356,774	11,548,629	6,693	Colorado
21,752	1,488	230,828,891	25,071,560	17,281,744	16,910,488	1,441	Connecticut
6,589	3,668	72,798,416	11,418,279	7,216,527	2,356,628	694	Delaware
100	39	5,002,875	42,034	99,938	117,401	8	Dist. of Columbia
46,596	12,621	513,884,122	21,832,679‡	20,438,591	4,827,809	2,777	Florida
90,087	159,008	686,673,248	207,191,093	72,133,244	12,332,730	4,145	Georgia
30,706	9,886	451,884,713	53,566,308	52,032,679	9,110,184	1,927	Idaho
130,951	94,650	4,627,964,933	447,249,928	281,401,981	62,828,092	43,325	Illinois
138,697	57,089	1,931,742,483	206,698,038	156,261,980	34,667,574	23,567	Indiana
118,094	95,396	5,602,077,895	420,063,715	420,349,285	59,585,699	37,230	Iowa
95,878	70,001	2,504,339,779	374,397,245	195,100,130	26,103,314	31,171	Kansas
175,723	82,801	963,568,916	164,839,538	85,513,239	18,225,120	4,994	Kentucky
52,889	79,561	385,910,844	106,611,297	39,899,825	5,823,639	3,482	Louisiana
48,334	1,699	245,869,106	32,795,897	24,108,040	12,662,882	1,774	Maine
36,074	12,927	397,092,670	49,544,369	32,845,747	13,408,598	4,026	Maryland
31,849	1,605	293,405,059	22,503,786	21,758,276	21,645,011	2,212	Massachusetts
163,208	29,119	1,523,976,902	153,584,853	143,662,160	68,098,869	19,217	Michigan
137,148	51,083	2,761,684,227	308,232,457	229,976,511	81,351,771	26,739	Minnesota
81,486	175,742	550,570,838	177,006,377	63,129,269	10,882,520	1,871	Mississippi
175,446	85,027	2,286,639,415	249,120,835	207,397,958	28,638,424	12,745	Missouri
36,648	10,256	574,897,007	95,932,717	88,869,249	8,043,005	6,602	Montana
68,435	59,299	2,874,477,959	314,493,139	238,605,247	19,567,890	18,765	Nebraska
3,577	306	98,086,358	8,455,833	26,373,528	1,748,710	221	Nevada
20,051	1,014	107,084,055	10,195,895	11,463,037	7,791,159	531	New Hampshire
24,948	4,723	311,084,284	32,539,549	25,095,213	15,087,874	4,419	New Jersey
26,261	5,426	236,300,563	24,925,591	52,671,161	2,805,190	1,080	New Mexico
162,210	26,544	1,706,929,770	172,140,512	170,419,127	118,303,772	25,681	New York
155,228	128,254	1,050,015,835	236,582,967	77,553,544	14,095,407	7,909	North Carolina
49,874	26,096	1,191,036,966	284,549,783	94,302,899	18,595,769	17,483	North Dakota
182,407	62,296	2,236,901,636	240,972,102	193,378,086	62,125,816	30,905	Ohio
81,720	115,498	1,210,134,914	330,160,246	102,998,393	18,742,360	10,950	Oklahoma
46,505	9,406	714,410,119	57,874,738	62,698,734	14,576,451	5,768	Oregon
165,486	34,957	1,460,702,270	196,586,374	149,878,423	73,999,263	19,764	Pennsylvania
3,439	472	33,446,425	2,204,218	3,462,344	3,525,889	318	Rhode Island
60,337	112,430	523,084,383	140,296,823	42,356,701	5,852,427	2,906	South Carolina
46,491	33,046	1,658,921,488	188,496,840	146,222,212	18,653,164	17,426	South Dakota
148,951	103,718	883,646,221	171,878,708	83,473,478	15,817,925	4,767	Tennessee
184,421	281,225	3,471,867,466	756,105,985	284,697,546	33,442,933	16,780	Texas
23,103	2,889	250,317,551	26,603,195	48,018,867	5,253,108	850	Utah
25,196	2,590	180,911,645	22,929,604	25,510,828	23,788,584	1,568	Vermont
144,825	48,898	999,465,839	139,445,360	72,630,566	16,244,974	6,750	Virginia
61,324	11,943	823,437,940	91,950,590	55,313,145	22,640,322	4,490	Washington
75,605	14,775	411,159,152	42,465,700	39,318,735	9,074,181	1,860	West Virginia
163,219	29,936	2,272,402,472	185,638,751	226,753,652	142,508,931	29,651	Wisconsin
12,736	2,776	240,396,413	18,889,391	58,548,413	2,934,239	1,323	Wyoming
353	11	1,808,641	393,902	436,703	47,945	.....	Alaska
1,545	3,739	151,129,085	44,899,889	7,252,845	482,871	.....	Hawaii
37,620	3,458	179,392,511	64,086,178	18,110,686	1,429,252	.....	Porto Rico

‡The U. S Census of Agriculture, 1925, does not include production and value of citrus fruits, grapes, and various market vegetables. By the 1920 Census, the total value of all crops for California was $589,757,377; for Florida, $80,256,806.

PRINCIPAL AGRICULTURAL PRODUCTS

Statistics from Bureau of Agricultural

State	Corn	Wheat	Oats	Barley	Rye	Rice	Flaxseed	Peanuts
	Total Farm Value	Total Farm Value	Total Farm Value	Total Farm Value	Total Farm Value	Total Farm Value	Total Farm Value	Total Farm Value
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Alabama	34,781,000	150,000	2,064,000	.....	.....	.....	.....	3,591,000
Arizona	1,344,000	1,235,000	394,000	744,000	.....	.....	.....	.....
Arkansas	33,226,000	518,000	2,780,000	.....	14,000	10,017,000	.....	405,000
California	2,661,000	15,620,000	2,434,000	18,792,000	.....	10,462,000	.....	.....
Colorado	7,435,000	19,770,000	2,059,000	3,670,000	727,000	.....	.....	.....
Connecticut	3,105,000	.....	317,000	.....	.....	.....	.....	.....
Delaware	2,738,000	2,678,000	66,000	.....	66,000	.....	.....	.....
Florida	7,097,000	.....	152,000	.....	.....	.....	.....	742,000
Georgia	42,063,000	2,565,000	7,872,000	.....	422,000	66,000	.....	5,871,000
Idaho	2,435,000	26,173,000	2,142,000	2,486,000	34,000	.....	.....	.....
Illinois	175,263,000	50,061,000	43,231,000	7,372,000	1,071,000	.....	.....	.....
Indiana	85,264,000	42,216,000	23,457,000	619,000	1,787,000	.....	.....	.....
Iowa	231,608,000	9,431,000	68,587,000	3,741,000	444,000	.....	271,000	.....
Kansas	40,109,000	178,599,000	15,454,000	1,850,000	451,000	.....	524,000	.....
Kentucky	65,830,000	6,348,000	3,363,000	199,000	301,000	.....	.....	.....
Louisiana	17,750,000	.....	511,000	.....	.....	16,892,000	.....	342,000
Maine	546,000	210,000	3,256,000	110,000	.....	.....	.....	.....
Maryland	14,111,000	15,548,000	853,000	274,000	284,000	.....	.....	.....
Massachusetts	2,484,000	.....	214,000	.....	.....	.....	.....	.....
Michigan	39,538,000	21,958,000	20,724,000	2,464,000	2,095,000	.....	.....	.....
Minnesota	82,691,000	34,169,000	43,915,000	16,664,000	3,765,000	.....	16,851,000	.....
Mississippi	30,197,000	133,000	915,000	.....	.....	22,000	.....	519,000
Missouri	118,449,000	26,630,000	17,447,000	173,000	350,000	671,000	31,000	.....
Montana	3,633,000	50,095,000	8,750,000	2,749,000	963,000	.....	1,487,000	.....
Nebraska	94,797,000	46,753,000	21,006,000	2,725,000	1,981,000	.....	113,000	.....
Nevada	58,000	472,000	40,000	238,000	.....	.....	.....	.....
New Hampshire	705,000	.....	286,000	.....	.....	.....	.....	.....
New Jersey	6,918,000	1,742,000	825,000	28,000	740,000	.....	.....	.....
New Mexico	3,845,000	6,242,000	847,000	135,000	15,000	.....	.....	.....
New York	20,167,000	6,444,000	17,289,000	3,800,000	434,000	.....	.....	.....
North Carolina	45,999,000	9,013,000	4,706,000	390,000	1,690,000	.....	.....	7,985,000
North Dakota	12,350,000	90,352,000	11,355,000	9,683,000	6,780,000	.....	13,000,000	.....
Ohio	87,262,000	51,286,000	29,344,000	2,301,000	770,000	.....	.....	.....
Oklahoma	34,260,000	87,019,000	14,172,000	2,756,000	502,000	.....	.....	391,000
Oregon	2,475,000	23,503,000	4,408,000	1,546,000	125,000	.....	.....	.....
Pennsylvania	44,580,000	30,186,000	17,420,000	320,000	1,443,000	.....	.....	.....
Rhode Island	497,000	.....	67,000	.....	.....	.....	.....	.....
South Carolina	19,893,000	1,240,000	7,024,000	.....	196,000	102,000	.....	338,000
South Dakota	46,281,000	12,776,000	8,357,000	4,086,000	399,000	.....	5,234,000	.....
Tennessee	56,247,000	9,645,000	3,946,000	720,000	403,000	.....	.....	565,000
Texas	64,118,000	39,355,000	31,793,000	4,081,000	369,000	6,756,000	.....	2,221,000
Utah	497,000	5,772,000	1,368,000	490,000	29,000	.....	.....	.....
Vermont	3,751,000	53,000	1,870,000	153,000	.....	.....	.....	.....
Virginia	39,597,000	14,850,000	3,047,000	391,000	650,000	.....	.....	5,244,000
Washington	1,629,000	46,727,000	5,219,000	1,414,000	240,000	.....	.....	.....
West Virginia	15,479,000	3,175,000	3,420,000	.....	172,000	.....	.....	.....
Wisconsin	54,830,000	3,262,000	38,655,000	11,683,000	3,226,000	.....	264,000	.....
Wyoming	2,837,000	3,615,000	2,110,000	839,000	478,000	.....	.....	.....
United States	1,703,430,000	997,589,000	499,531,000	109,677,000	33,416,000	44,988,000	37,775,000	28,214,000

* Crop of 1925. † Crop of 1924. ‡ Inclusive of Wyoming. ** Includes $970,000 from minor producing states.

OF THE UNITED STATES BY STATES

Economics for Crop of 1926.

Potatoes	Sweet Potatoes	Hay	Tobacco	Cotton	Cottonseed	Sugar Beets	Total Value Products Sold by Cooperative Marketing†	State
Total Farm Value	TotalFarm Value	Total Farm Value	Total Farm Value	Total Farm Value	Total Farm Value	Total Farm Value*		
Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	
4,060,000	5,525,000	10,224,000	.....	79,715,000	12,578,000	.....	7,028,647	Alabama
440,000	465,000	8,399,000	.....	7,648,000	918,000	.....	1,514,115	Arizona
3,552,000	4,001,000	12,564,000	.....	89,100,000	12,582,000	.....	7,119,097	Arkansas
9,138,000	1,280,000	62,541,000	.....	8,960,000	1,140,000	4,005,000	87,245,308	California
15,288,000	.....	27,863,000	.....	.....	.....	9,815,000	21,090,456	Colorado
3,906,000	.....	11,062,000	10,858,000	.....	.....	.....	7,954,808	Connecticut
722,000	813,000	2,156,000	.....	.....	.....	.....	121,602	Delaware
7,080,000	3,500,000	1,190,000	1,762,000	1,683,000	285,000	.....	13,104,289	Florida
2,274,000	7,568,000	7,389,000	9,591,000	81,862,000	13,755,000	.....	9,081,592	Georgia
17,008,000	.....	25,759,000	.....	.....	.....	2,846,000	2,712,165	Idaho
9,520,000	1,930,000	59,091,000	.....	.....	.....	.....	52,827,619	Illinois
6,336,000	478,000	35,732,000	1,491,000	.....	.....	.....	17,212,911	Indiana
10,341,000	618,000	62,910,000	.....	.....	.....	.....	81,290,503	Iowa
6,652,000	697,000	41,591,000	.....	.....	.....	.....	36,804,833	Kansas
7,129,000	2,203,000	25,823,000	42,736,000	.....	.....	.....	27,515,129	Kentucky
3,733,000	6,399,000	4,632,000	180,000	45,100,000	6,552,000	.....	8,604,125	Louisiana
48,984,000	.....	18,958,000	.....	.....	.....	.....	3,823,291	Maine
5,904,000	1,361,000	10,390,000	6,221,000	.....	.....	.....	7,297,676	Maryland
3,627,000	.....	14,377,000	3,294,000	.....	.....	.....	4,144,690	Massachusetts
35,856,000	.....	56,957,000	.....	.....	.....	6,833,000	19,552,039	Michigan
34,270,000	.....	54,886,000	.....	.....	.....	.....	73,260,576	Minnesota
1,534,000	5,928,000	8,396,000	.....	111,940,000	17,997,000	.....	8,101,501	Mississippi
11,016,000	1,456,000	49,352,000	950,000	12,750,000	1,898,000	.....	32,574,506	Missouri
3,570,000	.....	25,566,000	.....	.....	.....	4,213,000‡	3,080,564	Montana
8,526,000	.....	66,807,000	.....	.....	.....	5,574,000	32,740,682	Nebraska
910,000	.....	6,900,000	.....	.....	.....	.....	15,588	Nevada
3,086,000	.....	10,311,000	.....	.....	.....	.....	375,303	New Hampshire
11,238,000	2,958,000	8,212,000	.....	.....	.....	.....	2,309,491	New Jersey
290,000	135,000	5,566,000	.....	4,428,000	576,000	.....	3,253,861	New Mexico
46,426,000	.....	96,708,000	418,000	.....	.....	.....	37,944,517	New York
11,840,000	7,560,000	14,552,000	103,802,000	71,875,000	12,210,000	.....	13,017,567	North Carolina
9,024,000	.....	22,786,000	.....	.....	.....	.....	17,031,768	North Dakota
17,099,000	472,000	56,170,000	4,544,000	.....	.....	2,945,000	27,991,322	Ohio
4,825,000	2,520,000	13,672,000	.....	94,575,000	13,336,000	.....	20,854,280	Oklahoma
4,500,000	.....	21,294,000	.....	.....	.....	.....	8,061,738	Oregon
37,699,000	143,000	70,699,000	4,574,000	.....	.....	.....	10,019,901	Pennsylvania
810,000	.....	1,478,000	.....	.....	.....	.....	570,659	Rhode Island
5,472,000	4,160,000	4,070,000	13,400,000	60,255,000	9,597,000	.....	8,922,354	South Carolina
5,247,000	.....	27,455,000	.....	.....	.....	.....	18,651,404	South Dakota
4,286,000	3,874,000	27,868,000	10,058,000	23,750,000	4,009,000	.....	7,181,922	Tennessee
3,885,000	8,128,000	17,650,000	.....	318,600,000	45,850,000	.....	39,146,689	Texas
2,588,000	.....	14,368,000	.....	.....	.....	6,416,000	2,367,733	Utah
4,340,000	.....	21,324,000	.....	.....	.....	.....	3,876,575	Vermont
18,070,000	5,375,000	19,734,000	25,412,000	3,135,000	624,000	.....	20,912,352	Virginia
10,184,000	.....	28,616,000	.....	.....	.....	.....	20,564,340	Washington
8,320,000	528,000	19,887,000	1,615,000	.....	.....	.....	919,188	West Virginia
32,568,000	.....	88,839,000	4,269,000	.....	.....	1,218,000	27,484,199	Wisconsin
1,820,000	.....	14,433,000	.....	.....	.....	.....	1,008,912	Wyoming
504,993,000	80,075,000	1,317,207,000	245,175,000	1,016,346,000**	154,089,000††	47,059,000‡‡	858,284,387	United States

††Includes $182,000 from minor producing states. ‡‡Includes $3,194,000 from minor producing states.

AGRICULTURAL PRODUCTION OF PRINCIPAL COUNTRIES*

Country	Wheat Bushels	Corn Bushels	Oats Bushels	Barley Bushels	Rye Bushels	Rice Pounds	Cotton Bales	Sugar† Short Tons	Tobacco Pounds	Potatoes Bushels
United States	832,809,000	2,646,853,000	1,250,019,000	188,340,000	41,010,000	1,139,056,000	17,977,000	1,011,000	1,301,211,000	356,123,000
Hawaii	.....	.....	.....	.....	.....	.....	.....	800,000	.....	.....
Philippines	.....	18,034,000‡	.....	.....	.....	2,566,134,000‡	.....	550,000**	92,378,000**	.....
Porto Rico	.....	.....	.....	.....	.....	.....	.....	616,000	35,000,000	.....
Algeria	23,551,000	222,000	8,693,000	23,000,000	16,000	.....	9,000	.....	27,183,000	2,730,000
Argentina	220,827,000	320,848,000	66,276,000	18,372,000	3,268,000	.....	60,000	524,000	.....	35,386,000
Australia	160,858,000	.....	.....	.....	.....	.....	4,000	505,000	.....	.....
Austria	9,438,000	3,825,000	29,955,000	9,074,000	18,712,000	.....	.....	88,000	.....	47,685,000
Belgium	12,801,000	.....	50,729,000	4,202,000	20,108,000	.....	.....	253,000	13,153,000	110,276,000
Brazil	4,589,000	164,336,000	365,000	377,000	646,000	.....	449,000	938,000	.....	10,014,000
Bulgaria	41,064,000	29,019,000	7,413,000	11,970,000	8,008,000	17,155,000	3,000	36,000	59,942,000	1,811,000
Canada	409,811,000	7,815,000	383,419,000	99,684,000	12,114,000	.....	.....	38,000	28,824,000	81,137,000
Chile	23,286,000	1,405,000	4,139,000	5,202,000	57,000	.....	.....	.....	.....	10,024,000
China††	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cuba	.....	.....	.....	.....	.....	.....	.....	5,040,000	74,160,000	.....
Czechoslovakia	34,130,000	10,452,000	95,066,000	52,500,000	45,908,000	.....	.....	1,146,000	14,532,000	185,798,000
Denmark	8,767,000	.....	60,333,000	33,415,000	12,480,000	.....	.....	163,000	.....	29,827,000
Egypt	37,207,000	76,846,000	.....	10,097,000	.....	415,000,000	1,497,000	79,000	.....	.....
Finland	924,000	.....	40,835,000	7,170,000	11,909,000	.....	.....	4,013	.....	31,269,000
France	231,767,000	12,880,000	364,120,000	45,855,000	30,076,000	.....	.....	758,000	25,228,000	409,193,000
French Indo-China	.....	.....	.....	.....	.....	8,275,639,000	1,584,000	.....	.....	.....
Germany	95,429,000	.....	435,725,000	113,102,000	252,191,000	.....	.....	1,835,000	31,746,000	1,103,420,000
Greece	11,171,000	.....	5,556,000	8,135,000	1,412,000	.....	35,000	.....	120,169,000	1,870,000
Guatemala	.....	3,513,000	.....	1,002,000	.....	.....	260	37,000	.....	43,000
Hungary	74,909,000	76,545,000	24,802,000	25,509,000	31,416,000	.....	.....	193,000	57,267,000	68,879,000
India, British	324,651,000	74,960,000	.....	120,587,000	.....	66,032,960,000	4,162,000	3,593,000	.....	.....
Irish Free State	1,381,000	.....	65,202,000	6,764,000	.....	.....	.....	15,000	.....	112,023,000
Italy	220,642,000	118,090,000	40,647,000	11,023,000	6,496,000	925,388,000	.....	341,000	97,789,000	84,914,000
Japan	28,430,000	.....	10,764,000	88,075,000	.....	17,464,227,000	.....	99,000	132,278,000	.....
Chosen (Korea)	10,517,000	.....	4,296,000	38,307,000	.....	4,849,869,000	145,000	.....	22,050,000	16,416,000
Java and Madura	.....	77,745,000	.....	.....	.....	8,251,428,000	.....	2,175,000	.....	.....
Jugoslavia	71,428,000	134,251,000	24,645,000	17,274,000	7,454,000	.....	.....	79,000	32,682,000	34,539,000
Mexico	10,244,000	81,768,000	.....	4,004,000	.....	99,763,000	396,000	203,000	20,256,000	1,579,000
Netherlands	5,487,000	.....	22,530,000	3,558,000	13,644,000	.....	.....	306,000	.....	109,255,000
New Zealand	7,496,000	.....	5,994,000	.....	.....	.....	.....	.....	.....	5,380,000
Norway	586,000	.....	13,332,000	5,125,000	647,000	.....	.....	.....	.....	32,870,000
Peru	.....	.....	.....	.....	.....	.....	236,000	308,000	.....	.....
Poland	47,080,000	4,166,000	210,110,000	71,401,000	197,289,000	.....	.....	645,000	5,128,000	914,123,000
Portugal	8,538,000	.....	4,728,000	1,487,000	3,638,000	.....	.....	.....	.....	9,535,000
Rumania	110,882,000	239,496,000	79,850,000	77,391,000	11,243,000	.....	.....	163,000	40,307,000	65,398,000
Russia (European)	809,649,000‡‡	145,870,000	762,552,000	230,504,000	897,339,000‡‡	.....	.....	947,000	.....	.....
Spain	146,600,000	17,186,000	37,688,000	96,284,000	23,504,000	435,250,000	3,000	248,000	.....	110,993,000
Sumatra, East Coast	.....	.....	.....	.....	.....	.....	.....	.....	43,484,000	.....
Sweden	12,363,000	.....	86,057,000	14,869,000	23,325,000	.....	.....	23,000	1,667,000	69,065,000
Switzerland	4,027,000	130,000	3,107,000	565,000	1,583,000	.....	.....	9,000	397,000	22,413,000
Union of South Africa	8,502,000	68,193,000	7,262,000	1,263,000	.....	.....	9,000	243,000	.....	.....
United Kingdom	50,774,000	.....	156,800,000	47,834,000	.....	.....	.....	191,000	.....	136,715,000
Uruguay	10,108,000	.....	1,435,000	70,000	.....	.....	.....	.....	.....	.....

*Statistics from Bureau of Agricultural Economics for crop harvested in 1926. †Cane and beet sugar. ‡Crop of 1924. **Crop of 1925. ††China takes no census of agricultural products and forbids the export of cereals. ‡‡Total for United Socialist Soviet Republics.

ANIMAL INDUSTRY

During the early period of man's development, wild animals were a valuable source of food and of clothing. Later, certain of the larger animals were tamed and used as beasts of burden. Fine furs are still taken chiefly from wild animals; but, as the population of the earth increased in numbers and advanced in the arts of civilization, man learned that better meat, more comfortable clothing, and superior types of motive power could be obtained from domestic animals. By careful selection and breeding, he gradually developed these animals to suit his needs.

Nevertheless, the number of species used by man is very small. Swine, cattle, sheep and goats, horses, mules, and asses comprise more than 99 per cent of all live stock exclusive of poultry. These animals are extensively distributed throughout the temperate zones, the type or species most suitable to any locality depending almost entirely on the climate and on the condition of the soil.

Swine. The total number of swine is less than that of either cattle or sheep. Nevertheless, because of its rapid growth and great rate of reproduction, the hog is the chief meat producing animal of the world. Hogs cannot live upon grass, but require a more concentrated food. They are found, therefore, wherever grain is raised, because the feeding of grain to hogs usually results in a more valuable food product. More than one-quarter of the American corn crop goes to market as pork. In fact, the corn belt is the center of the hog raising industry. According to the purpose for which they are raised, modern breeds of swine are divided chiefly into lard hogs and bacon hogs. The Poland–China, Duroc–Jersey, and Chester White hogs are of the first class, and, when fattened on corn, may yield as much as 50 per cent of their live weight in lard. The Tamworth and the Yorkshire are typical bacon producing breeds. In number of swine produced, China is first, followed by the United States, Germany, Russia, and Spain.

Sheep. Just as pork is the principal meat of grain producing countries, so mutton and wool are the chief animal products of all dry, rough, and thinly settled, grass-growing regions. Tunis, Algeria, and Morocco are known as the "sheep countries," and for centuries the shepherd has been representative of one of the most important industries of Syria, Palestine, and the great dry steppes of southern Russia and the Crimea. The semiarid regions of western United States and the high plateaus of Mexico are largely devoted to sheep raising. Australia leads all countries in number of sheep, Russia is second, United States third, and Argentina fourth. The number of sheep in the United States reached its maximum in 1903.

Draft Animals. The horse is the most important and the most valuable of all draft animals; nevertheless, for this purpose, it is exceeded in numbers, even at the present time, by the ox. In the production of horses, Russia is first, followed by the United States, Argentina, Brazil, China, Germany, and Canada. In Canada, horse raising is of unusual importance, as is shown by the fact that the number of horses normally exceeds that of sheep and is almost equal to that of swine.

The United States produces more than half of the world's supply of mules. The greatest horse and mule market in the world is at East Saint Louis, Illinois.

The Percheron, which is considered by many to be the finest type of draft horse, was developed by French breeders in the south of Normandy. The English Shires are the largest of all horses. The breeding of thoroughbreds—horses whose pedigree shows unbroken descent from pure Arabian and Barbary ancestors—is most extensive in Great Britain. A thoroughbred racer has sold for more than $200,000.

As a beast of burden, the camel is especially well adapted to traveling in the desert, the reindeer to the plains of the arctic regions, and the yak to cold places of high altitude, such as Tibet. The llama performs in the Andes the same services as does the yak in the Himalayas. The elephant is extensively used in India as a draft animal, and his great power is utilized by almost every traveling circus. The dog is the least important of general draft animals. However, it is very useful for drawing sleds in the snow regions of North America, and is commonly used for hauling wagons in the densely populated sections of northwestern Europe.

Cattle. India, the United States, Russia, Argentina, Brazil, Germany, and China are the chief cattle producing countries of the world; but the chief beef exporting nations are Argentina and Australia. The cattle of India consist largely of the humped Brahman variety, and of the water buffalo. They are not used to any great extent for food. Cattle raising is quite generally divided into the production of beef cattle of the Shorthorn and Hereford types, and of milk producing breeds, such as the Jersey and the Holstein. In a new, level, thinly settled country, well covered with rich grass, beef cattle are raised on a large scale for the export of meat, hides, and tallow. Fresh beef can be shipped to any part of the world, because of modern methods of artificial refrigeration. But, as the population increases, cattle ranges give place to farms, and the type of cattle gradually changes from beef producers to dairy animals. In order to produce more beef from fewer animals, the tendency of modern breeding is towards early maturing cattle. In Europe, where extensive pastures are no longer available, practically all cattle are stall-fed. Denmark is first as an exporter of butter, with Russia normally second, and Australia and New Zealand third.

Poultry. Poultry raising is the most universal form of animal industry. All countries raise poultry, chiefly chickens. China leads in the production of eggs, with Russia second. In the United States there is an average of only about 65 chickens to each farm, yet the annual production of eggs amounts to some 2000 million dozens with a value five times as great as that of all of the nation's fisheries. Turkeys, ducks, geese, and guinea fowls amount to about 3½ per cent of all poultry in the United States. This total normally exceeds 400 million, and in Canada is about 48 million.

Of about 100 standard varieties of domestic chickens, the best-known fall into three classes: the Asiatic, meat producing type, such as the Brahmas, Cochins, and Langshans; the Mediterranean, egg laying type, which includes Leghorns, Minorcas, and Anconas; and the American, general utility type, represented by the Plymouth Rocks, Wyandottes, and Rhode Island Reds.

Silk Culture. The annual production of silk amounts to about 88 million pounds, of which Japan, China, and Italy together produce over 90 per cent. Silk raising requires, not only a plentiful supply of mulberry leaves, but also a large amount of inexpensive labor. The industry is, therefore, carried on chiefly by the women living on small farms. The annual importation of silk into the United States exceeds 400 million dollars in value.

Bees. The production of honey is an industry which depends upon the food-storing instinct of the honeybee, and upon a supply of growing flowers to provide the nectar. The total production of honey in the United States has been estimated by the department of agriculture at 200 to 250 million pounds annually.

Animals in the U. S. In 1925, each of the 6.4 million farms of the United States had on the average eight swine, nine cattle, six sheep, three horses, one mule, and 64 chickens, valued in all at $759. These animals produced, besides what was con-

ANIMAL INDUSTRY IN

Animals on Farms and

State	Cattle			Sheep			Swine	
	Number	Value	Dairy Products	Number	Value	Wool, lbs.	Number	Value
Alabama	822,093	$14,468,330	$11,890,324	55,554	$199,777	168,114	826,833	$7,914,603
Arizona	1,068,727	25,439,854	3,383,215	1,163,905	10,899,605	5,906,773	19,234	169,453
Arkansas	810,156	13,364,830	10,737,461	51,156	,214,747	199,993	847,427	6,235,798
California	1,918,489	81,860,654	58,422,073	3,045,095	28,074,211	21,079,375	431,258	4,676,306
Colorado	1,436,150	37,773,216	11,548,629	2,243,869	22,740,036	6,473,969	492,962	5,248,245
Connecticut	152,864	9,913,142	16,910,488	6,941	68,558	35,454	17,017	297,196
Delaware	46,160	2,573,889	2,356,628	1,749	15,633	9,624	24,106	285,984
District of Columbia	907	47,693	117,401	. . . .	. . . .	. . . .	999	13,048
Florida	656,217	7,593,993	4,827,809	59,729	184,245	135,764	497,780	2,755,173
Georgia	905,679	15,657,721	12,332,730	50,503	161,414	141,158	1,299,711	9,921,224
Idaho	605,604	17,638,765	9,110,184	1,745,769	19,833,718	14,025,808	276,323	2,603,880
Illinois	2,305,073	103,282,886	62,828,092	566,079	6,148,347	3,354,149	4,249,101	61,075,315
Indiana	1,281,810	57,028,536	34,667,574	595,461	6,625,197	3,415,846	2,939,074	31,967,645
Iowa	4,264,493	163,139,915	59,585,699	818,403	9,384,824	5,123,594	8,567,131	124,402,313
Kansas	3,068,289	89,995,215	26,103,314	314,894	2,984,525	1,394,518	2,196,569	25,312,458
Kentucky	904,983	26,337,849	18,225,120	695,962	6,596,785	2,890,802	919,304	8,085,609
Louisiana	696,571	11,207,333	5,823,639	108,581	345,120	298,864	517,551	3,601,171
Maine	236,446	10,199,162	12,662,882	84,680	697,226	459,152	54,435	810,497
Maryland	272,509	13,474,770	13,408,598	91,878	908,842	429,914	187,656	1,966,277
Massachusetts	188,157	11,699,999	21,645,011	10,114	100,484	55,033	57,821	980,309
Michigan	1,406,467	66,533,315	68,098,869	1,066,217	12,498,921	6,867,389	855,368	10,232,318
Minnesota	2,853,465	109,381,396	81,351,771	378,972	3,831,974	2,346,777	2,715,074	39,153,051
Mississippi	922,981	15,543,673	10,882,520	113,824	318,797	322,507	697,742	5,402,632
Missouri	2,372,335	77,412,802	28,638,424	893,611	8,688,181	5,633,244	3,501,941	36,350,751
Montana	1,321,604	37,960,609	8,043,005	2,187,928	24,239,845	16,714,389	277,603	3,098,859
Nebraska	3,282,690	102,370,717	19,567,890	646,783	6,771,652	1,832,320	4,235,638	62,330,706
Nevada	419,275	11,241,000	1,748,710	1,183,572	12,422,111	8,098,237	25,455	268,010
New Hampshire	121,064	6,105,058	7,791,159	16,055	140,620	88,302	15,928	219,406
New Jersey	153,492	11,299,002	15,087,874	5,684	52,083	24,666	55,854	879,024
New Mexico	1,266,688	27,817,851	2,805,190	1,743,079	14,633,453	9,775,521	55,431	519,153
New York	1,836,900	96,270,742	118,303,772	472,616	5,457,397	2,699,164	259,189	3,820,356
North Carolina	538,780	16,500,837	14,095,407	66,557	462,776	282,889	871,787	9,626,762
North Dakota	1,341,018	36,934,318	18,595,769	310,527	3,110,710	1,845,536	784,396	9,568,362
Ohio	1,652,594	74,567,634	62,125,816	1,941,023	18,482,101	14,100,742	2,367,570	24,556,269
Oklahoma	1,656,763	36,139,898	18,742,360	62,108	512,350	371,747	920,059	8,467,872
Oregon	784,459	26,465,271	14,576,451	1,775,093	17,447,463	14,749,743	216,065	2,095,376
Pennsylvania	1,318,856	70,380,631	73,999,263	415,085	3,752,784	2,772,867	734,465	10,504,646
Rhode Island	27,203	2,081,441	3,525,889	1,897	16,487	8,684	4,175	79,126
South Carolina	340,625	8,246,755	5,852,427	14,418	56,947	47,357	534,642	4,546,400
South Dakota	2,022,189	61,290,180	18,653,164	643,555	6,476,157	4,174,615	2,599,568	37,570,256
Tennessee	986,083	21,944,305	15,817,925	289,577	1,940,240	1,055,650	1,009,062	9,138,528
Texas	5,845,918	122,630,336	33,442,933	3,137,129	27,433,934	20,112,976	1,166,253	9,704,945
Utah	504,368	14,520,711	5,253,108	2,355,038	26,063,260	18,795,805	63,921	583,725
Vermont	393,274	16,799,811	23,788,584	34,670	298,273	212,164	43,864	583,482
Virginia	806,524	26,253,190	16,244,974	350,850	3,300,565	1,441,323	582,193	5,662,224
Washington	581,714	25,692,644	22,640,322	515,798	5,499,386	4,243,059	197,975	2,419,247
West Virginia	567,769	17,706,639	9,074,181	441,401	3,855,648	2,118,096	177,012	1,739,041
Wisconsin	3,010,493	143,551,824	142,508,931	309,758	3,073,456	2,043,670	1,363,135	16,485,926
Wyoming	783,398	23,148,645	2,934,239	2,507,012	27,464,490	18,727,834	99,869	1,022,047
United States	60,760,366	2,019,488,987	1,260,777,798	35,590,159	354,485,355	227,105,177	50,853,526	614,951,004

THE UNITED STATES

Animal Products, 1925*

Horses		Mules		Goats		Poultry†			State
Number	Value	Number	Value	Number	Value	Number Raised	Value	Eggs Produced Value	
87,464	$5,607,054	302,708	$28,695,223	72,469	$90,751	9,527,321	$5,370,724	$5,363,107	Alabama
111,601	3,921,492	12,134	762,911	281,564	985,478	755,853	581,794	1,324,935	Arizona
181,978	8,172,238	340,865	23,265,449	95,731	146,291	9,869,664	5,554,988	6,457,999	Arkansas
314,288	23,713,128	55,853	5,560,800	98,859	395,436	14,382,861	12,808,329	31,615,277	California
365,425	15,090,758	38,073	2,092,090	21,525	107,625	5,005,977	3,343,769	5,094,348	Colorado
34,063	4,236,051	874	97,970	353	2,824	2,670,099	3,417,727	5,887,365	Connecticut
22,496	1,659,711	9,451	846,030	138	622	1,582,186	1,582,186	2,360,929	Delaware
249	17,025	30	2,310	. . .	. . .	10,192	9,988	23,388	Dist. Columbia
28,848	2,504,193	42,656	5,027,996	36,944	34,420	2,766,369	2,397,065	3,544,787	Florida
54,483	4,274,602	343,569	36,193,500	90,606	99,645	12,283,568	7,359,621	5,709,027	Georgia
232,546	9,826,437	7,845	425,145	1,602	9,800	2,539,708	1,537,203	3,185,424	Idaho
1,029,909	70,956,317	167,760	12,985,257	8,503	45,259	32,203,811	27,560,014	32,285,697	Illinois
556,078	35,957,190	100,976	7,199,040	3,995	16,084	25,256,884	20,842,292	24,923,976	Indiana
1,180,139	84,840,032	96,691	8,031,837	5,435	32,610	38,184,909	30,448,956	34,841,094	Iowa
931,283	41,803,127	260,163	16,670,457	5,581	27,924	29,091,095	19,668,080	23,619,069	Kansas
307,163	14,978,430	294,069	18,825,097	33,255	89,343	16,445,420	12,502,192	10,071,935	Kentucky
131,369	6,984,958	173,458	14,570,447	59,767	72,780	5,433,938	3,420,097	2,998,619	Louisiana
82,096	9,783,485	568	57,861	221	1,547	2,837,654	2,922,784	5,717,381	Maine
116,711	8,642,188	30,733	2,762,064	668	2,859	6,025,180	5,597,445	6,945,803	Maryland
43,537	5,279,366	525	53,675	891	8,910	3,631,388	5,120,256	7,592,071	Massachusetts
482,441	40,063,169	6,979	574,963	1,015	6,796	15,275,548	12,934,751	20,604,319	Michigan
834,680	62,292,271	12,601	951,217	2,082	12,597	20,352,255	13,867,950	20,955,638	Minnesota
131,285	7,926,230	327,646	28,907,068	64,947	75,466	8,981,868	5,349,902	4,525,286	Mississippi
708,122	31,549,590	371,568	25,120,529	118,316	315,725	34,596,179	25,151,724	35,242,474	Missouri
594,173	21,053,309	10,452	470,974	1,475	7,375	3,067,280	1,881,254	3,493,476	Montana
862,333	47,214,389	119,997	8,626,971	2,952	17,976	20,310,433	13,994,525	13,346,068	Nebraska
50,222	1,817,360	4,090	208,177	3,228	16,140	280,451	245,443	518,937	Nevada
31,457	3,247,282	283	24,152	368	2,208	2,441,812	2,856,921	3,599,769	New Hampshire
57,137	5,567,586	4,966	563,966	764	5,735	5,491,704	7,248,127	11,515,217	New Jersey
186,573	6,373,075	30,837	1,575,722	240,067	840,245	1,122,742	755,134	1,208,536	New Mexico
440,203	45,817,001	7,062	701,319	2,542	22,798	14,940,905	15,432,527	33,020,981	New York
130,963	10,728,073	279,767	32,206,208	15,959	42,241	15,057,400	10,337,442	7,783,439	North Carolina
731,089	40,394,052	9,495	549,574	1,064	7,448	5,721,854	3,173,473	4,869,964	North Dakota
630,012	50,201,115	32,831	2,716,333	2,001	11,863	26,937,309	24,397,833	35,474,028	Ohio
608,210	23,940,124	368,037	22,318,882	32,436	89,209	19,670,036	12,876,328	12,707,030	Oklahoma
223,848	11,705,237	19,062	1,188,875	121,193	365,045	4,065,559	3,136,601	6,290,972	Oregon
409,565	38,285,126	53,133	5,423,076	1,536	11,031	19,346,285	20,095,240	37,705,820	Pennsylvania
5,368	641,080	93	9,135	53	371	519,211	726,894	1,205,591	Rhode Island
49,116	4,024,561	199,078	21,814,920	16,395	25,033	7,829,998	5,140,671	3,277,540	South Carolina
720,060	33,165,015	21,349	1,224,892	1,369	8,913	10,607,376	7,003,365	8,786,213	South Dakota
242,349	13,762,978	352,335	26,000,084	63,154	121,826	16,148,484	10,531,788	11,067,127	Tennessee
837,969	32,893,180	1,010,339	70,686,146	1,791,325	5,655,741	26,024,551	14,968,166	18,937,104	Texas
110,172	5,155,772	3,693	181,402	48,292	289,752	1,644,266	933,074	2,518,304	Utah
62,819	6,517,803	685	56,487	179	716	1,339,275	1,433,023	2,548,699	Vermont
260,182	18,068,739	102,482	9,463,120	5,774	26,443	15,892,037	11,829,989	11,631,573	Virginia
242,099	14,355,404	26,417	1,849,616	5,586	54,721	7,059,059	5,222,093	13,920,080	Washington
142,620	10,141,234	15,117	1,206,947	3,994	21,658	5,305,124	4,245,643	6,975,982	West Virginia
604,270	50,456,561	6,396	508,187	2,893	17,594	14,193,839	10,820,261	17,444,098	Wisconsin
199,560	5,915,581	5,106	265,973	1,152	6,912	1,121,118	744,876	1,201,996	Wyoming
16,400,623	1,001,520,679	5,680,897	449,520,074	3,370,218	10,249,786	545,848,035	419,380,528	571,938,492	United States

*U. S. Census of Agriculture: Statistics of production are for the year 1924. † Chickens only.

sumed on the farms, 300 dozen eggs, 36 pounds of wool, 418 gallons of milk, 7 gallons of cream, and 100 pounds of butter, valued in all at about $300. The inhabitants of the United States are the greatest meat eaters in the world, with an average total consumption in 1926 of 142.8 pounds for each person. In 1900 the average was 215.9 pounds.

The most important breeding grounds of beef cattle in the United States are the western portion of the Corn Belt, the Great Plains, the valleys and high plateaus of the Far West, and the Gulf coast from Georgia to Texas. Many animals are shipped from the ranges to the corn belt to be fattened.

Milk. The insuring of an adequate daily supply of fresh milk of standard quality in the large centers of population necessitates elaborate organization, specialized transportation, and rigid inspection. Most milk offered for sale is pasteurized, that is, heated to 60–63° C. for 20 to 30 minutes. Many municipalities have insisted on a unified system of grading milk as A, B, and C. Grade A, either raw or pasteurized, must have not more than 10,000 bacteria per cubic centimeter; grades B and C, not more than 50,000. Grade B must be pasteurized under official supervision; grade C is pasteurized, but not under official supervision. By the Babcock test, devised in 1890 by S. M. Babcock, the proportion of fat in milk is readily determined. This normally varies from 3 to 6%. Large amounts of milk are concentrated and shipped in air-tight tins for use in the home or food factories. Wisconsin and New York are the leading states in milk production.

Serums and Vaccines (*văk'sĭn*; *-sēn*). Employment of animals for the preparation of serums and of vaccine used in the treatment and prevention of diseases is a small but exceedingly important branch of animal industry. For example, diphtheria antitoxic serum is developed within the blood of healthy horses, while the vaccine used for preventing smallpox is generally obtained from calves. Production of these invaluable substances in the United States is carried on under rigid governmental inspection.

There is a marked difference between antitoxin and vaccine. Diphtheria antitoxin, as its name implies, contains substances which, when injected into the blood of a person suffering from diphtheria, neutralize the poisons already produced in the blood by the active germs of that disease. A vaccine is the exact opposite of an antitoxin. Smallpox vaccine, for example, contains, in a greatly diluted or weakened form, the virus which tends to produce smallpox, or, rather, cowpox. When, by the process of vaccination, a minute quantity of vaccine is allowed to enter the system, the blood soon proceeds to develop within itself quantities of antitoxin which neutralize the virus. As the result of this reaction, the system builds up a more or less permanent resistance to further attacks of the specific disease.

In the preparation of diphtheria antitoxin, a very small amount of the poison produced by growing diphtheria germs is injected into a healthy horse. The horse develops a very mild fever, which soon disappears. Successively larger doses are administered at intervals until the horse receives without injury an amount of the toxin many hundreds of times that which would kill an ordinary animal.

Smallpox vaccine is obtained by vaccinating healthy young calves with smallpox or cowpox virus. The virus is applied in long narrow scratches, which, in about a week, develop the characteristic swelling that contains vaccine lymph. The virus produced in these lesions is collected, purified, diluted with glycerin, and quickly distributed. The vaccine is prepared under most rigidly sanitary conditions. Wherever it is consistently used, smallpox becomes practically unknown.

Insulin. This extract, secured chiefly from the pancreas of cattle and hogs, is used extensively in the treatment of diabetic patients. It occurs in certain interior portions of the pancreas, known as the "islands (Latin—*insulæ*) of Langerhans"; hence its name. Diabetes is due to a failure of the liver to act normally in transforming sugar into glycogen, and as a result the blood becomes surcharged with unassimilated sugar. Insulin, when injected into the blood, temporarily enables the liver to take this sugar from the blood and, if persistently administered, serves to prolong the life of the patient. F. G. Banting and J. J. R. MacLeod of the University of Toronto received jointly a Nobel prize in 1923 for their discovery of insulin and its use.

ANIMAL INDUSTRY IN CANADA

Farm Live Stock, Dairy Products, and Poultry, by Provinces, 1925

Province	Horses		Cattle			Sheep	
	Number	Value	Number	Value	Dairy Products	Number	Value
Alberta	849,939	$36,393,000	1,526,729	$45,953,000	$ 8,188,000	236,804	$2,357,000
British Columbia	48,208	3,616,000	287,828	12,792,000	4,789,000	61,224	796,000
Manitoba	359,839	24,815,000	720,745	23,754,000	8,093,000	101,997	976,000
New Brunswick	50,782	5,140,000	216,488	8,237,000	1,443,000	151,349	1,103,000
Nova Scotia	53,352	5,005,000	291,972	10,830,000	2,878,000	273,499	1,976,000
Ontario	644,138	57,137,000	2,809,373	135,999,000	73,751,000	868,526	10,045,000
Prince Edward Is.	32,752	2,766,000	113,194	4,377,000	1,108,000	87,219	790,000
Quebec	345,079	33,675,000	1,841,558	73,651,000	30,659,000	843,579	7,570,000
Saskatchewan	1,169,952	77,217,000	1,499,411	46,433,000	7,373,000	131,359	1,182,000
Total Canada	3,554,041	245,764,000	9,307,298	362,026,000	138,282,000	2,755,556	26,795,000

Swine		Poultry		Fur-Bearing Animals*	Total Value	Rank of Province by Value	Province
Number	Value	Number	Value	Value			
854,902	$12,459,000	6,352,717	$ 4,963,000	$ 716,000	111,029,000	4	Alberta
41,868	712,000	2,385,650	2,473,000	442,000	25,620,000	6	British Columbia
298,507	4,856,000	3,890,843	3,350,000	646,000	66,490,000	5	Manitoba
60,376	1,160,000	951,063	1,176,000	969,000	19,228,000	8	New Brunswick
44,670	638,000	860,225	808,000	559,000	22,694,000	7	Nova Scotia
1,678,595	25,121,000	17,778,581	19,783,000	1,750,000	323,586,000	1	Ontario
52,114	1,024,000	941,490	1,015,000	3,276,000	14,356,000	9	Prince Edward Is.
784,143	13,956,000	7,029,000	7,676,000	1,212,000	168,399,000	2	Quebec
610,973	9,776,000	7,944,400	5,927,000	140,000	148,048,000	3	Saskatchewan
.....	.....	.....	.....	83,000	83,000	10	Yukon Terr.
4,426,148	69,702,000	48,133,969	47,171,000	9,793,000	899,533,000		Total Canada

* On fur farms.

DAIRYING

This term embraces the production of milk and the manufacture of milk products. While goats, sheep, camels, reindeer, mares, and the Asiatic buffalo are sometimes used as a source of milk, the cow alone is bred for the purpose and supports a huge dairy industry. The dairy industry was revolutionized in the late 19th century by the introduction of the centrifugal cream separator and of the Babcock test for determining the fat content of milk. The latter, invented in 1890, made possible the purchase of milk, for manufacture and distribution, on the basis of quality and powerfully stimulated the improvement of herds.

The same period saw the rise of education in dairy management. A school of agriculture was opened in 1873 at Copenhagen, Denmark, which country has shown the most marked improvement in the quality of its milch cows. The first of an annual series of British educational dairy exhibits was held at London in 1876. In 1890, at Madison, Wis., the first American school for dairying was opened, under the direction of W. A. Henry. Since that time numerous schools for dairying, experimental stations, and co-operative cow-testing associations have come into existence in the United States, Canada, and other countries. Australia, New Zealand, Argentina, Russia, and Switzerland are also large producers of milk and milk products.

Dairying in North America. In 1925 the number of dairy cows in the United States was over 25 million, and the average amount of milk produced per cow was 4368 pounds, containing 175 pounds of butter fat. A United States gallon of milk weighs about 8.6 pounds; the Canadian gallon, about 10.3 pounds. Each person in the United States annually consumes on the average about 17.25 pounds of butter, 4.2 pounds of cheese, and 2.5 gallons of ice cream.

The chief dairying states are Wisconsin, New York, Iowa, Minnesota, Texas, and Illinois. Wisconsin produces the greatest amount of butter, cheese, and condensed milk; New York, the most milk for market. The dairy production of the United States is valued at about 1500 million dollars—$13.40 *per capita*; that of Canada, about 250 million dollars—$28.70 *per capita*. Among the Canadian provinces, Ontario leads in the production of cheese but falls slightly behind Quebec in butter production.

Cheese and Other Milk Products. Cheese was a common article of diet at least as early as 1400 B. C. It is made from milk by separating the curd, or casein, portions of the fat, and other constituents from the whey, shaping the mass into different forms, and usually curing it. The separation is ordinarily effected by rennet, prepared from the stomachs of young calves, puppies, or pigs. Upward of 150 kinds of cheese are made in Europe and America, the differences being dependent on the kind and condition of milk used, the manufacture, the seasoning, and especially the curing.

Milk is preserved either in the form of powder; as a sweet, slow-flowing liquid; or as an unsweetened, creamlike liquid. In these forms, which were first made about 1855, milk is now susceptible of much wider use than was formerly the case. It has become an important article of international commerce, and its use by bakers has resulted in a marked improvement in the quality of factory-made bread.

When used for ice cream, milk is generally *homogenized*, the fat globules being thereby rendered so small that they do not rise in the form of cream.

Casein obtained from milk is used in the manufacture of glue and also, in a plastic form, as a strong, elastic, noninflammable product resembling celluloid. Its uses include electric insulation and ornamental objects.

See *Butter*, page 1360; *Milk*, page 1318; *Cattle*, page 1315; also, for dairy production in the United States and Canada, tables on animal industry, pages 1316 and 1318.

FISHERIES

The three greatest commercial fishing grounds of the world are located near the coasts of northwestern Europe, northeastern North America, and northeastern Asia. In these places, where the ocean is comparatively shallow, enormous "schools" of valuable food fishes congregate in order to obtain the food that they find near the bottom. A second important type of fisheries takes advantage of the spawning habits of certain fish, which, at the spawning season, travel up rivers or to the shores, where they are easily caught. The cod and haddock are chief examples of bottom feeders, while salmon and shad are the most valuable of the second group.

The rank of various nations in order of the value of their fisheries is approximately: United States, Great Britain, Japan, France, Spain, Canada, Russia, Portugal, Norway, and Germany. Although the United States heads the list, the fishing industry is of less relative importance there than in any other of the countries named. The total annual products of the fisheries in the United States are about 2½ billion pounds, valued at $80,000,000, which represents only about one-fifth the value of the annual production of butter. In Newfoundland and Norway, fishing is the chief industry, while in Japan the fisheries supply almost the only animal food of the entire population. The world's fish production averages about 2 million dollars a day in value. London is the greatest fish market of the world and the herring is the most important fish.

Fisheries of the United States. Because of its great extent, the United States affords almost all kinds of fishing, from seals in Alaska to sponges in Florida. The oyster is the most valuable product of the country's fisheries, with salmon second, menhaden third, cod fourth, and halibut fifth. The menhaden is used chiefly for its oil. Of the fish taken from the Great Lakes, the most valuable are the ciscoes, lake trout, whitefish, and pike-perch.

Salmon is canned chiefly in the northwestern coastal states and in Alaska. The salmon pack of Alaska exceeds in value any other product of the territory. Tuna packing is a comparatively recent industry of southern California, where the pack in 1920 amounted to approximately 820,000 cases of 48 pounds each. Sardines are canned in Maine, where young herring are used, and in California, where the pilchard or true sardine is extensively taken. Canned crab meat is largely imported from Japan. Lobsters, which are taken on the Atlantic coast from Delaware to Labrador, are most abundant on the shores of Maine and Nova Scotia.

A bureau of fisheries is maintained in the department of commerce to encourage the nation's fisheries.

Canadian Fisheries. The salmon of British Columbia is the most valuable product of Canadian fisheries, with lobster second, cod third, halibut fourth, and herring fifth. In order of production, British Columbia leads the provinces, and is followed by Nova Scotia, New Brunswick, Ontario, and Quebec. Government bounties are paid to encourage the industries and interior bodies of water are stocked with fish fry.

Secondary Products. In addition to food, there are many other uses for fishery products. From the whale are obtained the ordinary whale oil and whalebone, and also sperm oil, spermaceti wax, and ambergris, which is highly valued for use in fine perfumes. True caviar is prepared from the roe of the sturgeon, and the swimming bladder of the same fish is the source of the finest isinglass. Liquid glue is prepared from fishskins and offal, while crushed oyster, clam, and other shells are used for poultry grit, for surfacing roads, and for making lime. Sealskin, pearls, and corals are among the luxury products of the fisheries. Fish scales enter into *essence d'orient*, used in making artificial pearls.

MINING AND MINERAL PRODUCTION

Mining includes all the methods and processes involved in obtaining useful materials from the earth. The further processes by which metals are obtained from their ores are included in the science of metallurgy.

Mining is purely an extractive process. For this reason it is the most destructive of the primary industries by which man satisfies his wants. A ruined forest may be replaced, if necessary, within a few generations; even the number of fish in the sea may be greatly increased by artificial propagation. But, when a ton of coal or of iron ore has once been mined, the store available to future generations has been decreased by just so much. There can be no replacement.

Importance. In the United States, the combined crops of corn and wheat greatly exceed in value all mineral products, so that on this basis of comparison mining might at first seem of secondary importance. Nevertheless, the distinctive character of modern commerce, industry, and civilization is due largely to the extensive employment of the products of the mine. Consider, for example, modern methods of transportation as represented by the railroads. Engines and cars are built largely of metal, and travel on metal rails; the fuel used to generate the power necessary to run the trains comes from the mines; and the terminal buildings are composed chiefly of products of the quarry. Finally, 65 per cent of the freight hauled by American railroads consists of mining products. Similarly, nearly all essential parts of the automobile have the same source; the fuel and the lubricating oil, the glass of the wind shield, and even the acid in the battery are prepared from mineral products. The rubber tires, while they may seem to be an exception, could not be used were it not for the sulphur with which they are vulcanized.

Historical. In the development of the human race, the acquirement of a knowledge of mining and of the metallurgical arts marks the change from savagery to barbarism. This change has not been made by all races at the same time. Copper was obtained from the mines of Sinai by the Egyptians 5000 or more years ago, although this stage was not reached in Europe until about 2000 B. C. Gold and meteoric iron, which are found as free metals, were utilized at even earlier periods. Similarly, the savages of North America employed native copper which they found in the region of Lake Superior.

Copper was the first metal to be reduced from its ore. The Phœnicians, about 1000 B. C., were accustomed to obtain the red metal from Cyprus and from Spain. They obtained also great quantities of silver from Spain, and, for the tin necessary to alloy with copper in making bronze, they sailed north to the "tin islands," which we now call Great Britain. The Romans had extensive iron mines on the island of Elba. During the 16th century it was the quest for gold that sent the Spanish adventurers to South America and to Mexico. They found gold in enormous quantities, although the Aztecs, whom they despoiled of their treasure, still employed weapons and tools of bronze. The value attached to iron and other metal products by ancient peoples is suggested by the fact that the Greek god Hephæstus, the Roman god Vulcan, and Thor, the Norse deity, were all workers at the forge.

Mining Products. These important substances may be roughly classified as metals, fuels, and the products of the quarry. The first group supplies the materials from which practically all tools and machines are constructed; the second group yields energy, without which most of our machinery would be useless; while from the third group are produced cement, limestone, granite, marble, and other products, so necessary for permanent building.

Types of Mines. Heavy minerals, of which gold is the most important, are frequently found disseminated throughout an alluvial or a glacial deposit. A mineral-bearing bed of this type is known as a placer, from the Spanish word *placel*, meaning sand bank. The simplest form of placer mining consists in shaking the gold-bearing earth in a pan of water with such a motion that the heavier particles sink to the bottom while much of the lighter material can be thrown over the side.

In *sluicing*, an operation which depends on the same principle, a stream of water flows through a wooden trough or other form of channel provided with corrugations, or riffles, on the bottom. Mercury is placed in the riffles. When placer dirt is shoveled into the sluice, the current carries away the lighter substance while the gold settles into the riffles, where it amalgamates with the mercury and is retained. The amalgam is collected and heated in a retort, from which the mercury distills, leaving the gold.

Hydraulicking is placer mining on a large scale. In this process the gravel bank is washed down into sluices by means of a stream of water under a pressure of 250 to 400 pounds per square inch. Huge dredges are also used on placer deposits, the buckets dropping the sand on screens, from which the fine particles pass to sluices, where the gold is recovered.

Where bodies of ore are to be found comparatively near the surface, *open-pit* mining is frequently most satisfactory. By this process the overburden of useless earth is removed so that the ore may be taken up by steam shovels and dropped directly into railroad cars. This is the principal method used in Minnesota for obtaining iron ore. It is also employed elsewhere on copper ores and, to some extent, on coal. In 1914, Hibbing, Minnesota, a town of 10,000 people, was moved to a new location in order that a valuable body of ore might be available for open-pit operation.

Drilled wells are used chiefly to obtain petroleum, natural gas, salt, and sulphur.

Underground mines are reached by tunnels entering the side of a hill or mountain, by shafts sloping gradually, or by vertical shafts. When the veins of mineral are reached, various systems of cutting away the ore are used so as to obtain as much of the valuable material as possible, consistent with economy, safety, and ease of working. Some of these methods are known as *stoping*, *room-and-pillar* mining, the *longwall* method, *milling*, and *caving*. Removal of the coal or ore may be accomplished by pick-and-shovel methods or by machines.

Explosives are nearly always used in mining; in fact, three-quarters of all explosives ordinarily manufactured in the United States are discharged in the mines. High explosives are employed where a hard ore is being mined, but for coal "permissible explosives" are preferred. These cause less shattering than does dynamite, and have a short, low-temperature flame, in order to eliminate, as far as possible, the danger of igniting any explosive gases that may have collected in the mine. The use of permissible explosives has reduced the accident mortality in coal mines from 3.39 per 10,000 in 1903 to much less than 1 per 10,000 at present.

Prospecting. The search for valuable bodies of minerals in the earth is known as prospecting. An oily spot on the surface of the ground, an outcropping vein, rusty places, or a strip of unusually rich or poor vegetation may call attention to a useful deposit. Modern methods of prospecting are generally carried out by large companies in the light of geological knowledge supplied by scientific experts. Any region that gives indication of mineral wealth may be tested by means of core drills which bring up a section of the material through which they pass. Careful geological and chemical examination of the core forms a basis for a fairly accurate estimate of the amount and the quality of ore that may be expected.

Development. Having established a promising location, shafts must be sunk, the ore blocked out by further drilling, and provision made for drainage and ventilation of the tunnels. If early indications are confirmed, the necessary machinery is installed, a mill or a cleaning house is constructed, and the mine is placed in operation. The proper operation of a mine is a great problem of economics, because commercial success often depends on the utilization of products which in earlier times were considered of no value.

Ore Dressing. Ore as taken from the mine is usually contaminated with various impurities of no value. Mechanical methods of concentrating the valuable minerals and of separating one ore from another, as zinc sulphide from lead sulphide, are known as *ore dressing*. Ore from the mine is usually discharged upon bar screens called *grizzlies*, where large lumps of impurities can be rejected by hand. The remainder passes through crushing, grinding, and pulverizing machinery, washers, screens, settling tanks, and other devices—all acting to produce a concentrated ore for the smelter.

Technical Processes. Magnetic ores are frequently separated from nonmagnetic substances by passing the powdered material through a magnetic field. A similar separation of conducting and nonconducting minerals may be produced by means of an electrostatic field. The use of the amalgamation process in placer mining has already been explained. Gold-bearing ore taken from the lodes of underground mines usually consists chiefly of quartz. This hard material is reduced to powder by stamp mills or by other types of machinery and is then passed over copper plates coated with mercury. Much of the gold is retained by these plates. The remainder of the metal may be obtained by treating the powder with chlorine gas, which forms a soluble chloride of gold, or with weak cyanide solution, which dissolves gold and silver. The precious metal is precipitated from the cyanide solution by means of zinc dust or shavings; heat is sufficient to decompose the salt formed by chlorination.

In separating diamonds from other minerals, the final concentrates are passed in a stream of water over greased plates, which retain only the diamonds. A similar physical, selective action is utilized in the important concentrating process known as *flotation*. This consists in causing one of the constituents of a finely ground ore to float at or above the surface of a mixture of the ore with water and, usually, oil. As generally practiced, the ore is mixed with pine oil,—wood and tar oils and petroleum are also used,—and passed through a flotation machine in a rising current of water. Minerals having an adamantine, a resinous, or a metallic luster are carried to the surface with the oil so that a separation is readily effected. Other flotation processes make use of bubbles of gas rather than of particles of oil to accomplish the same result.

Mining in Canada. Minerals were first discovered in Canada in 1604 by Master Simon, a French mining engineer. Coal is the most valuable product of the Canadian mines, but to the world at large the nickel mines are most important. The mines at Sudbury, Ontario, produce 85 per cent or more of the world's supply of this valuable metal, for which no satisfactory substitute is known. Canada produces notable quantities of gold, silver, and copper. The Hollinger mine, in the Porcupine district, is the largest gold mine in the world. The geological formation which, in Ontario, yields the gold of Porcupine, the silver of Cobalt, and the nickel of Sudbury passes into northern Quebec, where, because of the undeveloped condition of the country, the mineral wealth is still unknown.

Production in the United States. The United States, because of the great variety and abundance of its natural resources, is the center of the mineral industry of the world. It produces each year more than one-third of the total value of all mineral products, and ranks first in output of approximately half of the 30 most important mineral commodities. It is also first, not only in absolute value of mineral products, but in the ratio of production to population. Most of the copper used in Europe comes from America.

The value of the annual production of minerals in the United States is in excess of 6 billion dollars. Of the total for 1925, petroleum and natural gas contributed 29.9 per cent, bituminous coal 20.3 per cent, and anthracite 7.6 per cent — a total of 57.8 per cent for fuel. Pig iron was valued at 12 per cent of the total, copper 3.9 per cent, lead and zinc 3.2 per cent, gold and silver 1.4 per cent, and limestone 1.5 per cent. Thus limestone alone was worth more than all the gold and silver. The value of cement production constituted 4.5 per cent of the total.

More than one million persons, or one-thirtieth of all male workers, were engaged in the mineral industry. Of these, more than 70 per cent were engaged in the production of coal. A train of a length sufficient to carry the annual products of the coal mines of the United States would stretch six times around the earth.

Bureau of Mines. This branch of the department of the interior was established by an act of Congress which became effective July 1, 1910.

It is the duty of the bureau to conduct scientific investigations having for their object the improvement of technical processes and conditions of labor involved in the production and the use of mineral wealth. One of the most valuable results of this work has been a great reduction in the number of explosions and other accidents in mines.

The headquarters of the bureau are at Washington, D. C., where an analytical laboratory is maintained for testing the quality of the fuel used by the navy, the army, the Panama Canal zone, and the Federal buildings. The central laboratory is established at Pittsburgh, with other stations devoted to special investigations located in various parts of the United States and in Alaska.

Economic Problems. Oil and coal are the basis of many of the most difficult of modern social, political, and economic problems. Oil is placed first because petroleum has become the preferred fuel of the 20th century, while coal is now of secondary international importance. National leadership on the sea and in the air seems to be absolutely dependent upon the possession of adequate supplies of mineral oil. The paralyzing effect of coal strikes in America, the demand of British workmen for nationalization of the coal mines of Great Britain, the struggle among European nations to obtain commercial supremacy in Mesopotamia, and the action of the French in the Ruhr district are all striking illustrations of the fundamental importance of fuel. The necessity of providing further sources of fuel leads the great oil companies to drill wells in comparatively inaccessible parts of the world. Alaska, northern Canada, almost within the Arctic circle, the Philippine Islands, and Colombia are all being searched for new fields of oil.

MINERAL PRODUCTION OF CANADA

By Provinces on Basis of Value, 1925

Province	Rank	Value	Per Cent of Total
Alberta	3	$25,318,866	11.2
British Columbia	2	64,485,242	28.5
Manitoba	6	2,276,759	1.0
New Brunswick	8	1,743,858	0.8
Nova Scotia	5	17,625,612	7.7
Ontario	1	87,980,436	38.8
Quebec	4	24,284,527	10.7
Saskatchewan	9	1,076,392	0.5
Yukon Territory	7	1,791,641	0.8
Total		226,583,333	100.0

MINERAL PRODUCTS OF THE UNITED STATES, 1926

Product	Quantity	Value
Metallic		
Aluminum lbs.		$37,583,000
Antimonial lead[a] tons	22,524	3,916,714
Bauxite long tons	392,250	2,415,200
Cadmium lbs.	810,428	429,527
Chromite long tons	141	2,079
Copper lbs.	1,739,622,094	243,547,000
Ferro-alloys long tons	689,258	61,368,407
Gold troy oz.	2,335,042	48,269,600
Iron: Ore long tons	69,292,832	174,015,645[b]
Pig long tons	38,181,053	749,633,468
Lead, refined tons	680,685	108,910,000
Manganese ore[c] tons	46,258	1,228,633
Manganiferous ore[d] long tons	1,235,431	3,138,489
Mercury flasks[e]	7,642	702,323
Nickel tons	306	223,598
Platinum[f] troy oz.	84,981	9,210,669
Silver troy oz.	62,718,746	39,136,497
Tin tons	8	10,400
Titanium ore[g] tons	5,612	100,000
Tungsten ore tons	1,382	920,400
Uranium and Vanadium ores tons	21,624	329,000
Zinc tons	611,991	91,799,000
Nonmetallic		
Arsenious oxide tons	11,805	674,350
Asbestos tons	1,358	134,731
Asphalt, native tons	715,180	4,484,960
Barite, crude tons	232,875	1,743,293
Borates tons	115,970	3,128,110
Bromine lbs.	1,245,760	426,837
Calcium chloride tons	82,340	1,710,405
Cement bbls.[h]	164,218,941	280,783,542
Clay: Products[a]		423,446,917
Raw tons	3,851,995	13,540,416
Coal: Bituminous tons	578,290,000	1,272,000,000
Penna. anthracite long tons	75,390,582	474,164,252
Diatomaceous earth and tripoli tons	106,242	1,482,383
Emery tons	386	3,641
Feldspar, crude long tons	209,989	1,607,401
Fluorspar tons	128,657	2,341,277
Fuller's earth tons	234,152	3,356,482
Garnet, abrasive tons	6,397	523,875
Graphite: Amorphous tons	2,975	40,500
Crystalline lbs.	4,989,200	178,842
Grindstones tons	38,339	1,873,234
Gypsum tons	5,635,441	46,721,219
Lime tons	4,580,000	40,800,000
Magnesite, crude tons	133,500	1,200,830
Mica: Scrap tons	7,667	131,128
Sheet lbs.	2,135,351	393,873
Millstones		45,937
Natural gas M cubic feet	1,320,000,000	294,000,000
Natural gas gasoline gal.	1,356,800,000	136,000,000
Oilstones tons	1,640	218,359
Peat tons	61,936	364,413
Petroleum 42 gal. bbls.	766,504,000	1,444,000,000
Phosphate rock long tons	3,209,976	10,893,800
Pigments: Zinc and lead tons	184,289	25,896,269
Potash (K_2O) tons	25,060	1,083,064
Pumice tons	53,887	208,504
Pyrites long tons	166,559	616,668
Salt tons	7,371,600	25,055,012
Sand: Glass tons	2,000,000	3,200,000
Molding, building tons	166,000,000	103,300,000
Sand-lime brick M	330,586	3,981,492
Silica (quartz) tons	27,743	274,333
Slate tons	718,000	12,352,767
Stone tons	124,000,000	184,800,000
Sulphur long tons	2,072,657	37,300,000
Sulphuric acid (smelters) tons	1,068,449	8,274,435
Talc and soapstone tons	181,568	2,110,994
Summary		
Total value of all metallic products		$1,402,920,000
Total value of nonmetallic products exclusive of mineral fuels		1,231,800,000
Total value of mineral fuels		3,620,200,000
Total value of unspecified products (partly estimated)		7,080,000
Total approximate value of all mineral products		$6,262,000,000

Tons are of 2000 pounds; long tons are of 2240 pounds.
[a] From both domestic and foreign ores. [b] Not included in the total value. [c] 35% or more of manganese. [d] 5% to 35% of manganese. [e] Of 75 pounds net. [f] Inclusive of other platinum metals. [g] Production and value, 1925. [h] Of 376 pounds net.

VALUE OF MINERAL PRODUCTION IN THE U. S., BY STATES*

State	1921	1925
Alabama	$ 52,269,451	$ 77,139,340
Alaska	17,041,057	18,286,320
Arizona	30,818,363	114,202,670
Arkansas	22,515,412	87,185,532
California	297,025,679	496,923,376
Colorado	54,045,056	63,148,959
Connecticut	4,219,457	6,755,454
Delaware	379,785	539,261
District of Columbia	411,745	954,795
Florida	12,597,948	16,650,659
Georgia	8,650,003	16,503,741
Idaho	16,502,273	31,611,166
Illinois	254,019,136	231,658,604
Indiana	97,700,676	111,833,732
Iowa	35,639,505	38,420,203
Kansas	113,098,346	142,944,214
Kentucky	114,404,662	131,370,840
Louisiana	61,061,974	60,503,891
Maine	4,392,039	5,838,718
Maryland	16,083,965	21,557,810
Massachusetts	9,835,107	16,831,529
Michigan	69,551,198	122,212,254
Minnesota	72,609,973	110,252,956
Mississippi	1,954,353	2,171,945
Missouri	56,375,543	92,548,473
Montana	30,161,734	79,261,284
Nebraska	2,366,287	3,358,585
Nevada	14,038,071	26,469,901
New Hampshire	2,234,007	3,464,837
New Jersey	47,429,290	76,761,313
New Mexico	13,227,268	25,548,804
New York	62,567,967	102,035,557
North Carolina	5,456,479	9,504,063
North Dakota	2,500,349	2,662,029
Ohio	223,533,658	247,506,588
Oklahoma	269,882,786	501,767,118
Oregon	5,199,803	7,826,711
Pennsylvania	944,688,650	867,196,142
Rhode Island	922,765	1,151,857
South Carolina	1,754,491	3,507,804
South Dakota	7,498,656	7,971,650
Tennessee	33,754,823	38,869,198
Texas	212,141,250	351,211,629
Utah	40,595,872	100,275,442
Vermont	10,650,213	14,408,933
Virginia	32,810,842	41,038,393
Washington	17,605,878	22,382,132
West Virginia	316,180,647	333,527,697
Wisconsin	9,990,961	19,205,380
Wyoming	51,365,150	78,754,915

* In this table iron ore, not pig iron, is taken as the basis of valuation of iron; in the case of other metals, production, or recoverable content of the metals, is the basis.

TOTAL VALUE OF MINERAL PRODUCTS OF THE U. S., 1880–1926

Year	Metallic Value Dollars	Nonmetallic Value Dollars	Total Value Dollars*
1880–1905	8,324,477,000	10,885,063,000	19,263,306,000
1906	886,180,000	1,014,500,000	1,900,880,000
1907	904,108,000	1,165,376,000	2,069,570,000
1908	550,768,000	1,040,761,000	1,591,773,000
1909	754,944,000	1,131,866,000	1,887,107,000
1910	749,879,000	1,237,668,000	1,987,844,000
1911	680,907,000	1,242,942,000	1,924,081,000
1912	862,008,000	1,375,420,000	2,237,794,000
1913	878,869,000	1,554,298,000	2,433,545,000
1914	686,639,000	1,424,063,000	2,111,172,000
1915	991,730,000	1,400,484,000	2,394,644,000
1916	1,620,745,000	1,884,413,000	3,508,439,000
1917	2,086,234,000	2,900,462,000	4,992,496,000
1918	2,153,318,000	3,380,690,000	5,540,708,000
1919	1,359,744,000	3,232,626,000	4,595,770,000
1920	1,762,350,000	5,214,170,000	6,981,340,000
1921	654,130,000	3,481,720,000	4,138,500,000
1922	987,180,000	3,656,410,000	4,647,290,000
1923	1,510,930,000	4,471,620,000	5,986,500,000
1924	1,232,330,000	4,067,730,000	5,305,800,000
1925	1,380,280,000	4,291,100,000	5,677,630,000
1926	1,402,920,000	4,852,000,000	6,262,000,000
Grand total	32,420,670,000	64,905,382,000	97,438,189,000

* Includes various unclassified products in each year, amounting in all to $112,137,000.

INVENTIONS

PRIMITIVE man became safely established in his supremacy over the lower animals when he invented the bow and arrow. Since that prehistoric time, millions of inventions have been made, each adding a part to the total sum of knowledge by which mankind is gradually achieving mastery of space and control of the forces of nature. Some inventions are of trifling importance; others are so fundamental that their development affects the lives of all civilized people. The history of human progress has been marked by a series of epoch-making inventions.

At Ghent, in Flanders, on December 14, 1814, a treaty was signed which formally declared at an end the War of 1812 between England and the United States. Nevertheless, fighting was still going on in Louisiana 59 *days* later, because news of the treaty had not yet arrived. Few examples could more strikingly illustrate the progress of invention during the last century. Today, an event of similar importance could be known throughout the country in less than 59 *minutes*.

An invention is considered to be any new and useful machine, art, manufacture, or composition of matter, or any new and useful improvement thereon. All civilized nations recognize the right of an inventor to his product, and, when all requirements have been fulfilled, will issue a written contract or *patent*, guaranteeing to him the exclusive right to the use of his invention for a definite period of time. The life of a United States patent is 17 years. Approximately one and one-half million patents have been issued by the United States patent office.

SOME NOTED INVENTIONS OF MODERN TIMES

Certain inventions have proved to be of special importance because of their marked influence upon the welfare and the progress of mankind. Talking machines, telephones, and motion pictures, for example, are so much a part of our daily life that the wonderful principles governing their operation usually receive but little attention. Some of the more noteworthy of these inventions are given special treatment in the articles that follow.

Air Brake. A device, invented by George Westinghouse, Jr. in 1869, for applying the brakes to the cars of a railroad train by means of compressed air. Although the original system has been greatly improved in many ways by Westinghouse and others, the following description applies to the mechanism common both to passenger and to freight trains.

Each car is equipped with a *brake cylinder*, in which there is a piston connected to the brake shoes by a rod; an *auxiliary reservoir* to hold compressed air; a *triple valve*; and a train pipe with flexible couplings at each end. On the locomotive, in addition to its own brakes, are a steam driven *air compressor* which supplies air to the whole system, a *main air reservoir*, and the *control valve* operated by the engineer.

Under normal conditions, equal pressures of about 70 pounds are maintained in the train pipe and in the auxiliary reservoirs, and this condition of equal pressure holds the triple valve in a position closing the brake cylinder. To *set* the brakes, the engineer allows air to *escape* from the train pipe, thus reducing the pressure below that of the auxiliary reservoir. The triple valve then changes so that air enters the brake cylinder and forces the brake shoes against the wheels.

To *release* the brakes, the engineer allows air from the main reservoir, which has about 110 pounds pressure, to enter the train pipe until it again has a pressure equal to that in the auxiliary reservoir. The triple valve then resumes its normal position and the pressure is removed from the brakes. It is obvious that, if the coupling of a car becomes detached or broken, the train pipe pressure is lowered and the brakes are immediately applied.

This system has been of great importance in the development of the railroads because it allows the engineer to have complete control of his train, and permits of quick stops at high speed, either in an emergency or under ordinary running conditions.

Airplane, or **Aeroplane.** A heavier-than-air flying machine that flies because of the lifting effect of *moving* air upon a surface inclined to the wind at a small angle. The necessary movement of the air is relative to that of the airplane. For example; a speed of about 35 miles per hour *with respect to the air* is generally required before a flying machine can leave the ground. If the air is still, the machine will have to travel along the ground at 35 miles per hour, but, if a 20-mile wind is blowing, the machine can rise when moving into the wind at only 15 miles per hour.

Airplanes are usually classified according to the number of their supporting surfaces, as *monoplanes*, *biplanes*, *triplanes*, and, for the rare exception having more than three surfaces, *multiplanes*. The planes are not flat but are curved upward, with the greatest curve near the front edge. Airplanes having the propeller in front are known as *tractors*, those with the propeller behind, as *pushers*.

Among notable attempts to solve the problem of artificial flight was the work of Lilienthal and Chanute, with gliders; and of Ader, Maxim, and Langley, who, with the aid of their respective governments, built power driven machines which were usually destroyed by accidents at the first trial.

Orville and Wilbur Wright, bicycle manufacturers of Dayton, Ohio, were interested in aviation, and they found after many tests that the current theories were partly correct and partly guesswork. The Wrights devoted their attention chiefly toward a means of securing stability of a machine when in the air. They succeeded in developing a system of maintaining balance and control by bending or warping the ends of the planes, and using an elevating rudder in front. On December 17, 1903, they achieved flights of from 12 to 59 seconds, Wilbur being the first to fly successfully in a heavier-than-air machine. Reports of this work traveled to Europe and encouraged the French school of enthusiasts to continue their efforts. Alberto Santos-Dumont was the first of these to succeed, when in 1906 he made flights of several hundred feet. The French airplanes differed from the Wright type in having a tail, which was not adopted by the Wrights until about seven years later. Glenn H. Curtiss, in America, developed a type of biplane, and in 1911 and 1912 he developed the hydro-airplane and flying boat, capable of rising from and landing on the water.

From 1908 the development of the airplane was very rapid, especially in France and Germany. Improved engines also supplied greater power although they weighed much less. Of these, the rotary engines are most peculiar because the cylinders are placed like the spokes of a wheel, and revolve around a fixed crank shaft. This arrangement tends to eliminate vibration. The Liberty motor weighed only 1.8 pounds per horse power.

At the beginning of the World War very few airplanes carried any fixed armament, but heavy fighting machines were developed which carried a ton or more of bombs as well as several machine guns. These guns were often geared so as to fire between the revolving blades of the propeller. Airplanes equipped with photographic and wireless telegraph or telephone apparatus were of greatest value for finding ranges, locating enemy concentrations, and destroying morale by bombing operations. Large machines have carried more than 75 people in the air at one time.

Noteworthy aerial achievements include the first non-stop flight across the Atlantic Ocean, 1930 miles from Newfoundland to Ireland, in 16 hours, 12 minutes, made in 1919 by English aviators, Alcock and Brown; a discontinuous flight of 26,103 miles around the world in 365 hours, 11 minutes, of flying time, made in 1924 by U. S. Army Air Service planes; and an altitude record of 41,795 feet by Willi Neunhofen, a German, in 1929.

Of the transatlantic flights, that made by Charles A. Lindbergh had the distinction of being the first by an unaccompanied pilot and the first from the United States to Europe. The flight extended from New York to Paris, 3600 miles, and occupied 33 hours, 29½ minutes. The extraordinary enthusiasm aroused by this flight and by the personal popularity of Lindbergh greatly stimulated interest in aeronautics and in the development of airports by American cities. The Ford Motor Company did much also to promote means of safe commercial flying.

The first American passenger air line service was begun on November 1, 1920, between Key West and Havana. Within the following ten years, air transit became a recognized part of the transportation systems of the United States, as well as of the other countries of the world. It is of special significance in territories where mountains render the construction of railroads and highways difficult. Elsewhere the airplane is used to supplement and quicken other means of travel.

Various types of airplanes have been built for vertical ascent. These include so-called helicopters, having propellers mounted on a vertical shaft. A machine of this type made a flight across the English channel for the first time in 1928. See *Aeronautics*.

Airship. A dirigible balloon as distinguished from an airplane. Ordinary balloons were invented by the Montgolfier brothers in 1783, and in the same year Pilâtre de Rozier made the first ascension. Attempts were made, almost from the beginning, to control the direction of flight. However, the first successful dirigible was not built until 1852 when Henri Giffard propelled a balloon at six miles per hour by means of a three horse power steam engine. A great advance was made in 1884 when Captains Renard and Krebs built *La France* for the French army. Alberto Santos-Dumont constructed 14 dirigibles and made many important contributions to the science of aeronautics. As all of the earlier airships were handicapped by lack of light, powerful motors, it remained for the Lebaudy brothers, Major Parseval, and Count Ferdinand von Zeppelin to develop dirigibles capable of fulfilling the requirements for military use.

Dirigible balloons may be classified as rigid, semirigid, and nonrigid. The rigid type has a strong skeleton or framework inside the envelope; the semirigid is held by a network of wires and rods; the nonrigid is merely a large bag of gas. Successful development of the rigid type is due largely to Zeppelin, whose airships were all rigid, with the interior divided into about 16 compartments, each containing an ordinary spherical balloon.

The zeppelin was developed commercially so that between 1910 and 1914 over 17,000 passengers and large amounts of mail were transported on regular schedule. During the World War, zeppelins were frequently used for bombing expeditions. The British "Blimp" is a small, nonrigid airship developed for antisubmarine, coast patrol work.

Among the more notable flights of airships is that of the 643-foot British rigid, *R-34*, which, in 1919, flew from Scotland to Mineola, N. Y., and returned safely, completing a trip of about 6500 miles in 183¼ hours. The *Norge*, built in Italy, was used by Amundsen in 1926 in a successful flight beginning at Spitzbergen and passing over the north pole to Alaska.

Amplifier. This is a general term applied to devices for magnifying variations in electric currents. The commonest form is the three-electrode vacuum tube. It has made possible such recent achievements as transatlantic radiotelephony, telephotography, television, speaking motion pictures, a radically improved type of phonograph, and the "loud speaker."

The idea is already familiar that the sound variations constituting speech or music can be rendered as equivalent grooves on the record of a phonograph and then reconverted into sound. It is equally true that a modulated electric current can be produced which will represent such sound variations. The current may also represent light variations, through the agency of the photoelectric cell, the action of which is explained under *Telephotography*. The amplifier is used to magnify the modulated electrical current to such a degree that, when this is converted to equivalent sound or light variations, the results will be easily heard or seen.

In speaking motion pictures, sound is converted to an equivalent band of light and shade, which is placed so accurately beside the pictures on the film that, on reconversion to sound, it produces an effect remarkably close to real life. The amplifier is essential to the process. Phonographs also owe much to the amplifier, both in improving the quality, and in enlarging the volume, of the sound reproduced.

Automobile. A self-propelled, four-wheeled vehicle designed to travel on highways. As steam and electric automobiles comprise less than 2 per cent of the total number, the term refers, when used without qualification, to a motor vehicle propelled by a gasoline engine. In Great Britain, gasoline is commonly called *petrol*; in Germany, *benzin*; and, in France, *essence de pétrole*, or simply *essence*.

Most standard automobiles of today consist essentially of a steel frame, attached through springs and axles to four pneumatic tired wheels. A four-cycle gasoline engine is mounted at the front, just behind a radiator through which water for cooling the engine is pumped. By means of a *clutch* operated by a left-foot pedal, the flywheel may be connected with the *transmission gears*, which transmit the power through a driving shaft to bevel and differential gears attached to the middle of the rear axle.

Speed of the car is varied by shifting from one to another of the transmission gears, and by changing the amount of fuel supplied to the engine. The *differential gear* permits the rear wheels to revolve at different rates when the car rounds a curve and the outside wheel must move faster than that on the inside. The engine is started by means of an electric motor which receives power from a storage battery and is geared to the flywheel. When the engine is running, the "starter" usually acts as a dynamo to recharge the battery.

The front axle does not turn, but the wheels are attached to it by movable joints which are connected by a bar called the drag link. The bottom of the post on which the steering wheel is mounted is fitted with a screw thread which causes a vertical *steering arm* to move forward or backward. This movement is transmitted to the *steering knuckle* by a connecting rod.

The engine usually has from 4 to 12 cylinders, runs at from 800 to 4000 revolutions per minute, and weighs from 5 to 15 pounds per horse power. Some of the speed records which have been made are: 1 mile in 17.7 sec.; 10 miles in 4 min. 9.31 sec.; 50 miles in 26 min. 23.4 sec.; 100 miles in 54 min. 17.8 sec.; and 500 miles in 5 hr. 7 min. 26 sec.

It is probable that Siegfried Markus, a German, should be called the inventor of the gasoline automobile, for in 1875 he built a crude machine which carried him about the streets. Gottlieb Daimler is often called the "father of the automobile" because of the great improvement which he made in the gasoline engine, about 1884. In 1885 both Daimler and Karl Benz used gasoline engines to propel bicycles and tricycles. The first commercially manufactured car, made by Panhard and Levassor in 1891, used the Daimler engine. But the first automobile imported into the United States was a Benz, taken to the Chicago World's Fair in 1893.

The first American automobile that ran was built by Charles E. Duryea in 1892. Henry Ford built a car in 1893, and Elwood Haynes in 1894. In 1896 these three cars and the imported Benz were the only ones in the United States; in 1926 there were 17⅓ million passenger cars alone. The first public auto race was run in 1894 from Paris to Rouen; the first in the United States took place in 1895 from Chicago to Waukegan. The commercial history of gasoline automobiles in the United States may be said to date from 1898, when a Winton was the first car to be sold. The first commercially successful Ford car was sold in 1903.

In 1879, George B. Selden, of Rochester, N. Y., applied for a fundamental patent on a road vehicle driven by a gasoline motor. The application was kept active, by perfectly legitimate methods, for 16 years, when a patent was taken out in 1895. Because of this patent, many of the leading manufacturers were forced to pay royalties of from .8 to 1.25 per cent of the retail price. Others refused to pay and, led by Henry Ford, carried the question to the United States circuit court of appeals which in 1911 decided in their favor and freed the industry of this burden. See *Internal Combustion Engine.*

Compass, Mariner's. The most important instrument employed in the navigation of ships. It is a device designed to seek and to hold a certain *definite direction* from which a vessel may establish and maintain a true course. There are two kinds of compasses, the *magnetic* and the *gyroscopic.* The former has been in use for hundreds of years; the latter has been developed since the beginning of the 20th century.

Magnetic Compass.—For its action, this form of the compass depends upon the magnetic force of the earth. The earth is a huge magnet, with one pole situated in about 70° N. lat. and 97° W. long., and with the other pole located in about 72° S. lat. and 153° E. long. These poles are small areas which shift slightly in location from time to time.

When over either of these areas, a bar magnet, if freely balanced about its center, hangs with one end pointing directly downward. The downward *inclination* or *dip* of the magnet becomes less and less as the magnet is brought nearer to the magnetic equator, where there is no dip whatever. While changing its inclination in this manner, the magnet continues to point in the general direction of the magnetic pole.

It is this latter property of the magnet which is utilized in the construction of the magnetic compass. As ordinarily constructed for use on board ship, the magnetic compass consists of several magnets or needles mounted to move in a horizontal plane within a circular framework, the flat upper side of which is called the *compass card.*

The compass, supported on a pivot beneath its center, is placed in the compass *bowl.* In the so-called "liquid" compasses, the framework carrying the needles is hollow, and floats on a nonfreezing mixture composed usually of alcohol and water. In the so-called "dry" compass the entire weight of the needles and framework rests upon the pivot. Compasses of the liquid type are now generally used for nautical purposes, and are indispensable for the operation of airplanes and airships.

On board a vessel, the magnetic compass is acted upon by the magnetism both of the earth and of the ship. The earth's force produces the dip, or inclination, already described, and also *variation,* or *declination.* The latter is the angle between the compass meridian and the true geographical meridian. In naval science, this angle is known as the *compass error.* The variation changes constantly from year to year in all parts of the earth, though in some regions the change is exceedingly slight. As a matter of fact, however, the magnetic needle points at true north in only a few places on the earth. To enable navigators to make necessary corrections for variation and dip, *magnetic charts* are from time to time prepared.

The magnetic force of the ship causes *deviation.* Various methods of correction, called *compensation,* have been devised for overcoming this error. The difficulties of compensation involved in the case of armored warships led to the development of the nonmagnetic compass.

Gyrocompass.—In the construction of this nonmagnetic compass, use is made of the fact that the axis of a freely suspended gyroscope wheel will tend to turn parallel to the earth's axis of rotation.

The most successful type of gyrocompass is that known as the *Sperry compass.* This was perfected about 1910 by Elmer A. Sperry, an American inventor. It was soon after installed on all battleships and submarines of the United States navy and its use has been extended to many other vessels of steel and iron construction.

The instrument consists essentially of a gyro wheel mounted so as to be free to spin, free to tilt about a horizontal axis, and free to turn about a vertical axis. The gyro wheel is about 9 inches in diameter and weighs 50 pounds. It revolves in a vacuum inside a metallic casing at a speed of about 8500 revolutions per minute.

Upon starting the gyro wheel in motion, it gradually assumes a position parallel to the earth's axis. In the course of a few hours it establishes a north and south direction, which is maintained with marked accuracy so long as the wheel is kept rotating at the right speed. As usually mounted, the instrument carries a compass card similar to that of the magnetic compass. See *Gyroscope*; also *Magnetism,* page 945.

Boxing the Compass.—Around the outer edge of the circular compass card the degrees are marked, usually from 0 to 90 on each side of the north and south points. In case of the more recent compasses, the degrees are marked from 0 to 360, beginning at north and numbering in the same direction as the hands of a clock move. Besides being marked in degrees, the compass card is marked also in points (11¼°), half points, and quarter points. The four primary directions—north, south, east, and west—are called the *cardinal* points. The points intermediate between these—northeast, southeast, southwest, and northwest—are called *intercardinal.* The point halfway between north and northeast is north-northeast, that between northeast and east is east-northeast, and so on for like subdivisions. Other points are named north by east, northeast by north, northeast by south, and similarly, according to the following table.

COMPASS CARD

N.	E.	S.	W.
N. by E.	E. by S.	S. by W.	W. by N.
N. N. E.	E. S. E.	S. S. W.	W. N. W.
N. E. by N.	S. E. by E.	S. W. by S.	N. W. by W.
N. E.	S. E.	S. W.	N. W.
N. E. by E.	S. E. by S.	S. W. by W.	N. W. by N.
E. N. E.	S. S. E.	W. S. W.	N. N. W.
E. by N.	S. by E.	W. by S.	N. by W.

Composing Machine. A machine which sets either type or type molds and arranges them in lines of the proper order and length for printing. The true typesetting machine has been almost entirely supplanted by those which set type molds from which castings are automatically produced. Of this second class, the linotype and monotype are best known, and, because of their extensive use in printing, are of greatest economic importance.

The linotype was invented in 1885 by Ottmar Mergenthaler, a German living in Baltimore. It is operated similarly to a typewriter, from a keyboard having 90 or more keys. When a key is pressed, the corresponding brass matrix is released from its compartment in a magazine and falls on a moving belt which carries it to a collector. At the end of each word a wedge-shaped spacer is inserted. When

the molds for one line of type are assembled they are carried to a casting wheel and placed in front of a slot.

At this time the wedge-shaped spacers are pushed up between the matrices so that the words are spread until they exactly fill one line. A pump then forces molten type metal into the slot and against the matrices. The metal cools rapidly, so that the molds may be almost instantly removed and redistributed into the proper section of the magazine. The slug of metal is trimmed to exact size between knives and placed with others to form a column of type. Should any error be discovered, a whole line must be reset. Linotype machines may be operated electrically by the so-called teletypesetter, first used in 1928. This device makes use of ticker tape perforations transmitted by telegraph. These, corresponding to words, are fed into the teletypesetter, which depresses the proper keys of the linotype keyboard so as to reproduce the words of the message.

The monotype, as indicated by its name, casts each letter separately. It also differs from the linotype in that the composing and the type casting are done on different machines. The composing mechanism has a keyboard of 225 keys which cause holes corresponding to the proper letter to be punched in a moving strip of paper. When words have been set almost to fill a line, an automatic indicator shows the operator what size space is required to *justify*, or exactly fill the line. When this ribbon is passed through the casting machine, each type is cast separately and delivered in proper order of lines.

Dynamo and Electric Motor. The dynamo, sometimes called a generator, is a machine for producing electric current. It is driven by mechanical power, usually steam or water power. The same machine, when reversed in action, is an electric motor. Driven by an electric current, it is capable of performing work, such as driving machinery or providing traction for cars. The dynamo and motor are sometimes referred to under the single term dynamo-electric machine.

Michael Faraday in England discovered, in 1831, the principle on which the dynamo is based, namely, that, if the lines of force between the poles of a magnet are cut by an electric conductor moving across them, an electric current is induced in the conductor. The dynamo consists essentially of one or more coils of insulated copper wire about a ring of soft iron, which revolves rapidly on its diameter between the poles of a magnet. The revolving part is called the *armature*. The ends of the wire lead to metal *collecting rings*, from which two metal brushes, connected through an external circuit, pick up the current. In this simple form, at each complete revolution of the armature, the current flows first in one direction and then in the opposite direction. The change from one point of maximum intensity in one direction to the next in the same direction is called a cycle. By adding two or more rings to the armature, a so-called two or many-phase current is produced, in which, for every revolution of the armature, there are two or more points of maximum current intensity in each direction.

If the collecting rings are replaced by a *commutator*, that is, by insulated ring segments placed opposite each other, a one-direction, or direct, current may be produced. It will fall to zero once during each revolution of the armature, but this pulsation may be virtually eliminated by increasing the number of armature rings and coils.

The magnets used for the early dynamos were permanent magnets, but later the electromagnet was substituted. For alternating currents, this is actuated by a separate circuit, but, with direct current machines, the current produced by the dynamo may be used in whole or part to actuate, and regulate the strength of, the magnet.

Designs of modern dynamos differ widely. One or many magnets may be used and either the magnets or the armature may revolve, the other remaining stationary. Motors have been adapted to innumerable uses, including electric railways, elevators, machine shops, and household appliances.

For long distance transmission, the alternating current is almost exclusively used in America, since this current may be readily transformed to a high potential and so transmitted over a much smaller copper or aluminum conductor than would otherwise be necessary. At the point of use, the current is "stepped down" by transformers and distributed to the users. It is common practice to transmit in this way currents of 220,000 volts over hundreds of miles.

When the peak requirements for electricity at different using centers occur at different times, economies can be effected by connecting many generating stations and consuming centers, thereby making available the surplus from any station for the center needing it. To such systems the term *superpower* has been applied.

Electric power is generated most economically where coal, natural gas, oil, or water power are readily available. The chief generating centers or regions in the United States include Niagara Falls; New York City; Chicago; Los Angeles; San Francisco; Pittsburgh; Muscle Shoals, Tenn.; Butte, Mont.; and the North Pacific states. The electric power produced and used in the United States is over 60 billion kilowatt hours and the number of customers exceeds 15 million. Each customer uses, on the average, over 42 incandescent lamps.

Electron Tube. A vacuum tube very similar in appearance to an incandescent electric lamp, but generally containing, in addition to the filament, a flat metallic plate and an irregularly shaped grid. When the filament is heated to glowing by means of an electric current, it emits *electrons* or negative charges of electricity, which ordinarily would return to the wire. If, however, a battery is connected to the filament and to the plate so that the plate is *positively* charged, the electrons will be attracted to the plate and a current of electricity will flow through the vacuum and around the circuit. If the plate is negatively charged, no current will flow; consequently, when connected with an alternating current, the tube acts as a valve which allows the electricity to pass through in one direction only, thus producing a direct current.

The grid is placed between the filament and the plate, so that, if a charge of varying strength is applied to the grid, corresponding changes will also be imposed on the current flowing through the tube. A weak current is thus enabled to control one that is much stronger. Because of these properties, electron tubes are used as relays, which make long-distance telephony possible; as converters, by which direct current may be obtained from an alternating source; as detectors, which amplify weak radio telegraph or telephone signals and make them audible; and as transmitters, which can be used to send out a continuous train of ether waves of almost any desired frequency.

The first patent for a simple electron tube was issued to J. A. Fleming in 1904. Notable improvements were made later by DeForest and Langmuir. See *Radiotelegraphy*.

Gyroscope. A mechanical device invented early in the 19th century, and at first used chiefly to illustrate certain laws of rotating bodies. It consists essentially of a wheel with a heavy rim, mounted on an axis which is pivoted at both ends within a light circular framework. Instruments of this type are frequently sold as toys under the name *gyro-top*. The more scientific form of gyroscope is so mounted that it is free to revolve about three mutually perpendicular axes, whose common center is the center of gravity of the spinning wheel.

When the wheel of a gyro-top is made to rotate rapidly,—usually by pulling away a string coiled about the axis,—two characteristics are noticeable. First, any attempt to change the direction of the axis meets with a surprising amount of resistance.

Second, this resistance is so great that, if the gyroscope is turned on its side and supported at only one end, it will not fall, but will move in a horizontal circle about its point of support, apparently in contradiction of the laws of gravity. This circling movement, known as *precession*, takes place in the direction opposite to that in which the wheel is rotating.

A gyroscope resists any force which tends to change the direction of its axis for the same reason that the passengers on a moving train are jerked forward when the brakes are suddenly applied; that is, because of inertia. The amount of inertia depends upon the speed of the wheel, its mass, and the average distance of the mass from the axis.

The act of precession is explained by the fact that a body moving under the influence of two forces must respond to both. The wheel which is rotating on one axis is also pulled downward because of gravitational attraction. The gyroscope then tends to place its axis parallel to a third, intermediate axis, and, as a result, moves backward. As the third axis also changes its position at the same time, precession continues as long as the inertia of the wheel is sufficient to prevent falling.

The earth acts as a huge gyroscope, spinning on an axis which points toward the polestar, and also rotating around the sun. As these two axes of rotation do not coincide, the earth, like the top, is forced to precess, thus causing the pole to move west in a small circle which is completed once in 25,900 years. For this reason, the star which indicated true north when the Egyptians built the pyramids is not the polestar of today.

The tendency of a gyroscope to rotate in one plane has been utilized for many purposes. By means of a gyroscope, Léon Foucault, about 1852, was able to demonstrate the rotation of the earth.

Gyroscopes are no longer scientific toys. The *Brennan monorail car* is capable of retaining perfect equilibrium upon a single rail, because of two heavy, motor-driven gyroscopes, which spin in opposite directions. Somewhat similar devices are used upon ships to prevent rolling, while, for ice-breaking vessels, the gyroscope is fastened so as to cause the vessel to roll. Torpedoes are held to their course by means of a controlling gyroscope which begins to spin when the torpedo is released. Gyroscopic apparatus for stabilizing airplanes is also in use. This stabilizing influence becomes more comprehensible in the light of Newton's third law of motion—to every action there is an equal and opposite reaction. Probably the most important application of the gyroscope is the gyrocompass which indicates true north regardless of any change in the magnetic field. See *Gyrocompass*.

Internal Combustion Engine. A heat engine which performs work because of the expansive energy of hot gases formed within a closed chamber. The fuel used may be a natural or an artificial gas, a volatile liquid such as gasoline or alcohol, a poorly volatile liquid such as kerosene, or heavy oils and tars. An engine is usually named for the fuel to which it is best adapted.

In order that such engines may operate continuously it is necessary that the fuel, together with the proper amount of air, be placed in the cylinder, compressed, burned, and allowed to expand, after which the spent gases must be removed and the series of operations repeated. When these processes are performed during four strokes of the piston the machine is called a *four-cycle* engine.

The action of a four-cycle gas or gasoline engine is as follows: At the first, or *intake stroke*, with the exhaust valve closed and the intake valve open, the piston moves away from the closed end of the cylinder, and fuel is sucked into the chamber. With both valves closed, the piston then returns on the *compression stroke* which forces the confined gas into a small space. The compressed gas is then ignited by means of an electric spark, and the chemical action of burning raises the temperature so that the gases expand and force the piston outward. After this *power stroke*, the exhaust valve opens and the piston returns on the *exhaust stroke*, forcing out the burned gas.

In a *four-cycle* engine there is one power stroke during two revolutions of the flywheel. In a *two-cycle* engine the same operations are performed during two strokes of the piston, so that there is an explosion at each revolution of the crank shaft. This is usually effected by making the crank case gas-tight and filling this space with the proper mixture of gas and air. At the end of the power stroke, two valves or ports are uncovered. One opens to the exhaust and the other to the crank case, which is under slight pressure, so that the burned gas flows out and fresh fuel is forced into the cylinder. As the piston returns, it covers the valve openings and compresses the gas, which is then ignited and the series repeated.

It is obvious that power thus imparted by a blow on the piston at every second or fourth stroke will be jerky. In order to prevent excessive vibration, a single-cylinder engine usually has a heavy flywheel, while larger engines have several cylinders connected to one crank shaft and firing in rotation so that the pressure is more continuous. For automobile and aircraft engines, four and six vertical cylinders in a straight line, or eight and twelve cylinders in two equal rows inclined so as to form a V, have been most generally satisfactory. In some aircraft engines vibration is almost eliminated by having the cylinders rotate like a flywheel about a fixed crank shaft.

In gas engines the proper amounts of gas and air are easily adjusted in a mixing chamber; in the gasoline engine a jet of the volatile liquid is sprayed into a current of air as it is drawn through a *carburetor* into the cylinder. With kerosene or other less volatile fuels, a hot bulb or other form of heating device is often necessary. Ignition is almost universally caused by means of an electric spark produced by an induction coil or a high tension magneto.

The *Diesel* type of engine, which operates with heavy hydrocarbons such as tar oil, usually requires no ignition system when once in operation. Instead, air is drawn into the cylinder and highly compressed. The great pressure raises the temperature of the air to such a degree that, when the fuel is forced into the cylinder by means of a pump, spontaneous combustion occurs. The great advantage of the Diesel engine due to the low cost of fuel is partly offset by the heavier construction necessary to provide for the great pressure.

A theoretical plan for the four-cycle engine was originated by Beau de Rochas in 1862. The same plan was independently invented by Nicholas A. Otto, of Cologne, and was developed into a practical machine in 1877.

The power which a four-cycle engine will deliver is generally calculated by means of the formula,

$$\text{DHP} = \frac{\text{D}^2 \times \text{S} \times \text{RPM}}{18{,}000}$$

For example: the *delivered horse power* (DHP) of an engine having a 3-inch bore (D), a 4-inch stroke (S), and running at 1000 *revolutions per minute* (RPM) equals $3 \times 3 \times 4 \times 1000 = 36{,}000 \div 18{,}000$ or 2 horse power. The power of a two-cycle engine is obtained by dividing by 13,500 instead of 18,000. For multicylinder engines the result is multiplied by the number of cylinders.

Microscope. An optical instrument consisting of a lens or combination of lenses, used to obtain a magnified image of minute objects. A *simple microscope* consists of a single convex lens composed of one or more parts, and is often called a magnifying glass. Instruments of this class have been known and used for centuries.

A *compound microscope* is composed of two lenses,—the objective and the eyepiece, or ocular,—mounted in opposite ends of a metal tube. The objective, being of short focus, is placed close to the

object, of which it produces a magnified image within the tube. The eyepiece, which is generally of low power, magnifies this image a second time.

The first instrument of this type seems to have been made, about 1590, by Zacharias Janssen, a native of Holland. The magnifying power of a compound microscope depends on the power of the objective, the power of the eyepiece, and the distance between the two. It would thus seem possible to produce images of any magnification, but greatly enlarged images lack detail and sharpness, so that a power of 2000 diameters is seldom exceeded for visual work. It should be remembered that, as area increases with the square of the diameter, 2000 diameters means 4,000,000 times the area of the object.

The usual form of compound microscope consists of the lenses in an adjustable tube fastened above a platform having an opening in the center, across which the object is to be placed. Beneath the platform is a mirror which reflects rays of light from some source of illumination upward through a condenser. This, as its name indicates, concentrates the light from the mirror into a small bundle of rays which pass up through the stage, object, and lenses. For opaque objects the lighting must be from above.

Eyepieces which magnify from 4 to 20 diameters are generally used with objectives having a focal length of ⅔, ⅙, or $\frac{1}{12}$ inch and a corresponding power of about 10, 44, and 90 diameters. A $\frac{1}{12}$ inch objective with a 10-power ocular would therefore produce a magnification of 900 diameters. To prevent loss of light when using objectives of very short focus, a drop of cedar oil or similar fluid is placed so that it touches both the object and the lens. Objectives constructed to operate under such conditions are called *oil-immersion* lenses.

No microscope can show the true form of any object smaller than one-half the wave length of the light by which it is seen. The *ultramicroscope* consists of an arrangement by which such minute objects may be made visible as spots of light against a dark field. Light is sent across the field instead of up through it, so that any ultramicroscopic particles reflect light and are seen like dust in the air of a dark room through which a ray of sunshine is passing. By this means colloidal particles of gold have been seen, so small that 6.3 million would measure only one inch.

Moving Pictures. A series of separate pictures projected upon a screen, and changed so rapidly that the eye receives the effect of continuous motion. This effect is due to a physiological property of the eye called *persistence of vision*, which causes an image to remain apparent for about $\frac{1}{8}$ second after it has really disappeared. Standard pictures are projected at the rate of 16 per second. Each picture is shown perfectly still for $\frac{1}{16}$ second, and the screen is dark for $\frac{1}{16}$ second three times in the period during which one picture passes before the source of illumination.

After the invention and the development of photography, many investigators worked over the problem of picturing motion. Edward Muybridge, using methods devised by John D. Isaacs about 1872-73, studied the movements of a trotting horse by means of a row of 24 cameras, exposed in order as the horse passed before them. The photographs were projected in such a way as to simulate movement, but his apparatus was necessarily clumsy as he had only glass plates. A light, flexible, continuous film was needed as a substitute for the glass, and this was invented by Goodwin and produced by Eastman.

In 1894, Edison placed on the market his kinetoscope, which successfully depicts motion by means of photographs printed on an endless strip of celluloid film. But the pictures in this machine can be viewed by only one person at a time. In 1895, Thomas Armat of Washington was the first to produce moving pictures by modern methods. The essential point in the improvement made by Armat, with whom C. F. Jenkins was for a while associated as experimenter, was a device by which the film moved intermittently, having periods of rest and illumination largely in excess of the period of movement from image to image. Other projectors were made and exhibited in 1896. From 1897 to 1907 a violent war of litigation over patents disturbed the industry.

Motion picture film is so standardized that pictures made by one company may be exhibited on any machine in the world. It is usually prepared in strips 200 feet long by $1\frac{3}{8}$ inches wide. On each side there is a margin of $\frac{3}{16}$ inch in which perforations are cut. There are 16 photographs and 64 perforations to the foot. Each picture is thus 1 x ¾ inches. One thousand feet is the standard length to fill one reel.

The moving picture camera is equipped with a very fast, high grade lens of 2 to 3 inch focus. The shutter is a revolving, perforated disk driven by a crank which the operator usually turns at the rate of two revolutions per second. Eight exposures are made at each turn of the handle. Within the box the film passes from the original coil over several rolls. It is carried behind the lens, over other rolls which preserve an even tension and prevent tearing, and finally is rewound on a second reel. A delicate mechanism, catching in the perforated edges, holds the film firmly while the shutter is open and jerks it forward just ¾ inch when the shutter closes.

The exposed film is wound spirally on racks and is developed in huge tanks in a dark room. From the negative, any number of positives may be printed at the rate of from 5 to 8 pictures per second. These are made on similar strips of film coated with an emulsion which is not so sensitive but which gives greater contrast.

In the projecting machine, an electric arc is the usual source of illumination. The light passes first through heat filters and condensing lenses, and then through the film and the projecting lenses to the screen, where the picture is enlarged about 10,000 times. Most films are made of celluloid and are consequently highly inflammable. Non-inflammable films may be produced from cellulose acetate, but even these are melted by the heat from the arc if they are held too long between the lenses. The used and the unused reels of film are therefore held in asbestos lined boxes, and a safety shutter is provided, which automatically protects the picture from the light if the machine accidentally stops. The mechanism for moving the film is similar to that used in the camera, but the shutter disk which revolves once for each picture has two large openings instead of a single small one. It is due to the relation between the speed of this shutter and that of rotating objects which are being photographed, that the wheels of an automobile in the picture often seem to revolve backward.

The motion picture industry as organized today has three principal divisions: production, distribution, and exhibition. Thirty years after its birth, in about 1895, the industry in the United States had grown to such proportions that it employed about 300,000 people, paid 75 million dollars in wages and salaries annually, and collected 500 million dollars in admissions to some 20,000 motion picture theaters. Screen theaters in other countries totalled about 30,000. In the post-War period, the United States dominated about 90 per cent of the world's market. Outside of American productions, those of Germany have been the most successful.

The first studio for making motion pictures was a little, black, paper covered shanty built by Edison near his factory in New Jersey. Today a whole town in California is given over to the staging and filming of picture stories. Here a sandy desert, high mountains, and the ocean are all available as scenery, which by the help of carpenters and painters may be used to represent the Sahara desert, the canals of Venice, or a view of the Alps.

The camera records only that which is directly within the angle of view. It therefore frequently happens that a visitor to a moving picture studio

is surprised to find a group of actors taking part in a ballroom scene, while, close by, under another battery of lights, events are depicted as occurring in the hut of a Russian peasant. Trick photography and double exposure allow an actor to appear simultaneously in several rôles in the same scene, transparent ghosts to be visible, or a man to run upside down on the ceiling.

Animated cartoons are made by photographing a great number of single drawings each showing a different stage of the action. Colored "movies" are made by exposing through a series of color screens and projecting in the same manner. These pictures must usually be shown at about twice the normal speed, and in spite of their beauty are not generally so satisfactory as the black and white. "Talking movies" depend for their success on the exact timing of picture and voice. This problem was solved by the use of the photoelectric cell and the amplifier. See *Amplifier*.

Motion pictures are an important source of amusement for millions of people in all parts of the world. They also have great scientific and educational value. Geography assumes a new interest if the lessons are illustrated by "movies" showing the scenery, inhabitants, and customs of foreign countries. History may seem even more vivid than the present, when taught in connection with historical dramas. Pictures showing the life histories of plants and animals, the details of industrial processes, the death battle between disease germs and the white corpuscles of the blood, and thousands of similar subjects, are available to all schools equipped with a projecting machine.

Photographs made at high speed and exhibited much more slowly permit detailed study of actions, such as the motion of a bird's wing, which are too rapid for the human eye. The most efficient methods of performing routine operations can best be learned by studying the pictured action of expert workers. Films showing important events both serve to satisfy current interest and furnish valuable historical records.

Photography. The process of forming and fixing images of objects upon a sensitized surface by means of the physical and chemical properties of light. The question "Who invented photography?" is often asked, but cannot be definitely answered because modern photographic methods have been developed by contributions from many minds.

J. H. Schultz, in 1727, made the first photographic copy of writing. In 1802, Thomas Wedgwood copied pictures by the action of light. Joseph Nicéphore Niepce produced the first permanent pictures in 1814. Louis Jacques Daguerre, in 1839 made public the details of his *daguerreotype* process of sensitizing a silver plate with iodine, and developing, with vapors of mercury, the image produced on exposure. The next year Professor John W. Draper of New York university made by this method the first photograph of a human face. William H. F. Talbot, in 1841, presented his calotype process, which permitted many copies to be made from one paper negative.

In 1851, Scott Archer introduced the process in which sensitive silver salts are produced in a film of *collodion* supported on a glass plate. The gelatin-silver bromide emulsion, which is the basis of modern dry plates, was discovered in 1871 by Dr. R. L. Maddox. In 1884, George Eastman patented a successful roll film of paper, and, in 1887, Rev. Hannibal Goodwin applied for a patent on a transparent, sensitive, celluloid-like pellicle which was the basis of the modern roll and cut film. Both films and glass plates are coated with a creamy yellow emulsion of gelatin containing the bromide and iodide of silver.

Modern photographic apparatus usually consists of a light-tight box or camera, equipped with a lens which focuses an image upon the sensitive surface of a plate or film when the shutter is opened. No change can be seen on the exposed plate until it is *developed* by immersion in an alkaline, oxygen-absorbing solution of pyrogallol, metol, or similar reducing agent. In this solution the plate gradually darkens and the image appears. But, as the parts of any object which reflect the most light cause the greatest change in the silver salts, a reversed image, called a *negative*, is produced, in which the high lights of the object appear dark, and the shadows, light. Developing is done in the dark or in a red light, which does not affect ordinary plates. The negative is next *fixed* with a solution of sodium thiosulphate, commonly called *hypo*, which dissolves all *unchanged* silver salts. After further washing in fresh water, the negative is dried. Satisfactory negatives are produced almost mechanically by the system of *tank development*, in which the exposed plates are treated with a developer of known strength, for a definite time at a fixed temperature.

The final step consists in making a positive *print* by placing sensitized paper behind the negative and exposing these to the light. The dark parts of the negative hold back more light than the lighter shadows, so that the resulting image has the same light values as the original object. The principal kinds of photographic paper are: those which are printed by artificial light, developed, and fixed in the same way as the negative; and ordinary *printing out paper*, which is exposed to the sun until the image appears, and is then fixed, washed, and often given further treatment to improve the color. Other types of photographic paper are the gum bichromate, platinum, and blue print.

Photographs in natural colors are generally produced by means of screens or filters which separate light into its red, green, and violet components. The finished photograph must usually be viewed through a similar screen. The processes of Ives, Joly, Wood, and the Lumière brothers are best known. On the Lumière autochrome plate a permanent screen is formed by a layer of starch grains, colored red, green, and violet and mixed in the proper proportions.

In astronomical work, by long exposure, stars are frequently photographed which cannot be seen by the eye. During the World War, photographs made from airplanes often revealed important details concerning changes in the enemy's forces which to the human observer were unnoticeable because of camouflage. The silver used annually for the production of photographic supplies exceeds in amount that used by any other industry.

Radiotelegraphy. A method of transmitting electromagnetic signals to a distance without the use of connecting wires. Induction and other methods have been tried, but the basis of modern systems of wireless or radiotelegraphy was laid down in 1864 when Clerk-Maxwell, by mathematical reasoning, predicted the existence of electromagnetic waves in the ether. In 1887 Professor H. Hertz proved by experiments that such waves existed, and later Edouard Branly and Sir Oliver Lodge each developed an instrument called a coherer, by which these waves could be detected.

When a stone is thrown into still water, a series of waves may be seen traveling outward in circles. Hertz found that somewhat similar waves could be produced in the ether by the discharge of an electric spark. The shortest of these waves is many times longer than the longest light wave, but they travel at the same speed, 186,330 miles per second.

Guglielmo Marconi, in 1895, was the first to combine the discoveries of earlier scientists into a practical method of signaling, and deserves complete credit as the inventor of wireless, or radiotelegraphy.

Marconi produced his signals by means of sparks formed by an induction coil and condenser. One side of the electric discharge was connected with the earth; the other, with a series of aerial wires or antennæ supported from tall poles. The current producing the spark was controlled by a telegraph key, so that long and short trains of waves,

corresponding to the dashes and dots of the telegraph code, were radiated from the antennæ. At the receiving station, similar aerial wires conducted the incoming waves to a coherer which under their influence operated a local telegraphic circuit.

The coherer was soon replaced by electrolytic detectors and by crystals of carborundum, silicon, galena, and other minerals which, when used with telephone receivers, were much more sensitive. These in turn have been largely superseded by electron tubes which are used both for receiving and for transmitting.

A message sent out is radiated in every direction. To insure that the receiving station obtain only that message intended for it, the so-called wave antenna is employed, having a length approximately that of the wave used and pointed in the direction of expected messages. The antenna is not sensitive to waves coming crosswise. The large transatlantic stations are able to transmit two and receive six messages simultaneously. This result is possible partly through the use of different wave lengths and partly through the so-called barrage receiver, by which interfering waves from near-by stations are neutralized and the desired waves are amplified. In the short-wave "beam" system, reflectors are used at the sending and receiving ends, thereby greatly increasing the energy of the waves received.

The development of wireless telegraphy has been rapid. Three large systems are those of the Marconi and Telefunken companies, and of the Radio Corporation of America. In 1902 the first transatlantic message was sent, and later the value of the wireless telegraph on shipboard was proved by incidents such as the rescue of the survivors of the *Titanic* in 1912. Commercial service is regularly carried on between the United States, Europe, Japan, and many other nations. See *Electron Tube, Radiotelephony.*

Radiotelephony. The process of telephoning without wires by means of electromagnetic radiations or waves. It differs from radiotelegraphy chiefly in the form of the waves that are used. When signaling with dots and dashes a series of interrupted waves may be satisfactory, but to transmit the tones of the human voice a continuous wave (CW) is required. To produce such radiations, an alternating current of very high frequency is necessary. This is supplied by electron, or vacuum, tubes.

In modern high-power transmitting stations several electron tubes may be used to produce these waves. Just as a phonograph disk is marked by the recording needle, so are the electromagnetic waves marked, or rather, modulated to the vibrations of the human voice, by means of a telephone transmitter properly connected into the sending system. These waves are radiated from the aerial wires *in all directions* with the speed of light.

Transmitting apparatus is comparatively expensive and is operated under strict Federal regulations. As a means of avoiding *interference*, sending stations employ waves of such lengths as are assigned by the government. In order to reach more listeners, the more powerful broadcasting stations often send out their programs on their assigned wave lengths and also on a short wave length, about 100 meters, which will not interfere with any other long-wave station. The programs on the short wave length are picked up by repeating stations at considerable distance, converted to standard wave lengths, and sent out to the immediate vicinity, where they may be heard through less elaborate receiving sets. Similar results may be obtained by using long distance telephone systems, as intermediary links, instead of the short-wave radio transmission.

The first requirement for an ordinary receiving set is an aerial wire or system of wires extended as high as possible into the air, together with a good electrical connection to the earth. This may be replaced by a loop antenna, a flat coil of 20 to 30 turns in the form of a square of about 30 inches to the side. Between the aerial and the ground the receiving apparatus is connected. This consists essentially of a detector, a pair of telephone receivers, a local battery, a tuning coil, and one or more condensers. The tuning coil and condensers are for the purpose of adjusting the complete circuit so that it will respond to waves of the length sent out by the transmitting station.

The detector may consist of a crystal of carborundum, galena, or other suitable mineral, which is usually satisfactory for distances up to 25 miles. For more sensitive work over longer distances the electron tube is best because it allows the weak incoming waves to control or modulate a stronger current from the local battery. This current then produces in the telephone receiver vibrations which are in turn imparted to the air. The latter vibrations are recognized as sound. If desired, the signals received by the first electron tube may be *amplified* by others. Early receiving sets were fitted with telephone headpieces, but amplifiers, or loud speakers, later became general, in order that an incoming message might be heard by anyone in the room.

On September 29, 1915, the same year in which the first transcontinental telephone line was completed, a conversation over the wireless telephone occurred between New York and San Francisco and was heard in Panama and Honolulu. A regular transatlantic radiotelephone service was inaugurated in 1927. See *Electron Tube, Radiotelegraphy.*

Rotor Ship. This new type of wind-driven vessel was invented by Anton Flettner, a German, about 1924. Its operation is based on the so-called Magnus effect, by which a revolving body is deflected at right angles to a wind blowing on it and toward the side moving with the wind.

The first ship of this type built, the *Buckau*, was fitted with two hollow steel cylinders 9.2 feet in diameter and 61 feet high rotated by reversible electric motors. As these cylinders rotate rapidly in the wind, the ship is propelled forward at right angles to the wind's direction. As much as 1000 horse power from the wind may thus be obtained through an expenditure of 20 horse power by the motor. To obtain the same driving power from sails, a spread of six to eight times the area of these cylinders would be necessary. The ship requires no rudder, but is guided by regulating the rotation of the cylinders. It can sail neither with nor against the wind, but must tack at least 23° from the direction of the wind.

Sewing Machines. Modern sewing machines may be divided into two classes, chain stitch and lock stitch. The great majority of domestic machines make the lock stitch because the chain stitch is liable to ravel. Both types use a needle having the eye near the point, and usually a groove along the side so that the thread will not bind.

In making the chain stitch the needle plunges through the cloth and returns to its first position, leaving a loop of thread on the underside of the cloth. The material is advanced automatically, and the needle descends through the first loop, which is tightened while another loop is left. Through this the needle passes on the next stitch. The upper side of chain stitching appears as a straight line; the lower side forms a series of chainlike links. A second type of chain stitch machine employs a rotating hook to make a twisted loop.

Two threads are necessary to form the lock stitch. One passes from the spool, over various guides, and through the eye of the needle. The other is wound upon a bobbin that is attached beneath the sewing table to a vibrating shuttle or at the center of a rotating hook. When the needle descends, it throws out a loop, through which the shuttle or the hook passes with the second thread, thus locking the stitch. With a properly adjusted tension on the thread, the end of the loop is drawn

to the middle of the cloth, so that both sides of the stitching present the same appearance.

An important device used on all domestic machines is the four-motion feed plate which lies under the material and moves it forward between stitches. The surface of this plate is covered with forward-pointing teeth which engage the cloth and with the first motion pull it toward the needle. The plate next drops down from the cloth, moves backward, then upward, and again travels forward for the length of the stitch.

Several hundred different types of sewing machines are used for commercial purposes. There are machines which sew on buttons, others which make the buttonholes, and delicate machines, having from four to a dozen needles, for sewing gloves. Carpet-sewing machines travel along the seam, because the material is too large and heavy to be moved to the needle. Sewing machines have had a predominating influence upon the garment making industry. The McKay stitching machine, invented by Lyman Blake, and the Goodyear welt-sewing machine have revolutionized shoemaking. By the Goodyear method, the insole of a shoe is fastened to the upper, and a narrow strip, called the welt, is sewed around the edge of the insole. The sole is then sewed to the welt.

The first sewing machine was invented in 1790 by Thomas Saint, an Englishman. Saint probably never built a machine, but a model constructed from his plans has been shown to be entirely practicable. In 1830, Barthelemy Thimonnier, a French tailor, produced a machine which was used for sewing uniforms for the French army. It was Thimonnier's factory that was destroyed by a mob. Later improvements of the sewing machine were made almost entirely by Americans.

About 1832–34, Walter Hunt, a machinist, first combined an eye-pointed needle with a lock stitch machine. He sold his interest in his invention to a blacksmith, who refused to apply for a patent. In 1853, Hunt himself applied, but the courts held that in waiting so long he had abandoned his rights to protection.

Elias Howe, in September 1846, received a patent for a sewing machine on which he had been working for three years. Howe's machines were the first to become a real competitor of hand labor. As the courts sustained the fundamental principles of Howe's patent, he is generally considered to be the inventor of the modern sewing machine. Howe was also the first to patent a lock stitch machine. He used in it an eye-pointed, grooved needle that moved horizontally.

In 1849, John Bachelder produced the first machine having a horizontal sewing table and a continuous feed. This feed consisted of an endless leather belt studded with pins.

Isaac Merritt Singer, in 1851, received patents for the first machine with a rigid, overhanging arm and a vertical needle. His machine made the lock stitch and was operated by a foot treadle.

The four-motion feed was invented in 1850 by Allen B. Wilson, a cabinetmaker. In 1857, A. E. Gibbs, a Virginia farmer, invented a rotary hook for making a chain stitch. As the fundamental patents have gradually expired, the most satisfactory features of the older machines have been adopted by all modern sewing machine manufacturers.

Steam Engine. A machine by which the expansive power of steam is transferred into mechanical energy and useful work.

The use of steam as a driving force is not new, for, about 120 B. C., Hero of Alexandria described a toy which revolved because of escaping steam. During the 17th century, steam appliances were used for pumping water, and, in 1705, Newcomen built for the same purpose the first practicable engine in which pressure was applied to a piston. In 1765, James Watt invented the separate condenser, and later made many other improvements of the greatest importance.

Modern steam engines may be divided into two types: the *reciprocating engine* and the *steam turbine.* In the first and more common type, steam acts alternately on either side of a *piston* which is forced back and forth within a hollow cylinder.

The piston is attached by a *piston rod* to a *cross-head,* which is in turn conected with the *flywheel* by a *connecting rod.* Through the action of valves, the steam is admitted behind the piston, while that part of the cylinder in front is connected with the exhaust. The piston moves toward the opposite end, and at the proper moment the steam is cut off, the piston finishes its stroke, and the valves automatically change so that the action is reversed. In a noncondensing engine the exhaust steam is forced out into the air against the atmospheric pressure of 14.7 pounds per square inch. In a *condensing engine* the exhaust steam is drawn off into a vacuum and condensed. By thus avoiding back pressure, more power is developed. In *expansion* engines the exhaust steam is forced into a second, larger cylinder, where it expands further and does more work. Marine engines are frequently of the *triple expansion* and even *quadruple expansion* type in which the steam, before it is exhausted, is allowed to expand into a third and a fourth cylinder, each larger than that preceding.

In spite of the great commercial importance of the reciprocating engine, it is very far from being efficient. In the best engines only about 12½% of the energy in the fuel is delivered as mechanical energy. The largest single units of this type are of about 10,000 horse power.

In the steam turbine, steam flows from an opening against vanes attached to a *rotor,* which revolves under the pressure of the moving steam. As the steam leaves the moving vanes, it strikes stationary blades, which again deflect it against another row of the vanes.

The turbine is the most nearly perfect of all steam engines. It operates at very high speed and is especially effective in driving dynamos and in propelling ships. Turbine generators may attain a capacity of 160,000 kilowatts, or 251,000 horse power. The first vessel driven by turbines developed a speed of 34½ knots, so that large vessels were soon equipped with the new engines which give greater power and require much less space. The turbine was used by De Laval in 1879 for driving a cream separator, and in 1884 Parsons built the first practical power turbine.

The steam necessary for such engines is produced by heating water in a boiler. *Saturated steam* is in such a condition that any lowering of its temperature or increase of pressure will cause part of it to condense to water. One pound of such steam normally occupies 26.36 cubic feet. Saturated steam holding in suspension less than 3 per cent of water is called *dry steam.* It should be remembered that steam is a colorless, transparent, invisible vapor. The white clouds formed when steam escapes into air are due to condensation and the formation of fine particles of water.

Steam at a temperature higher than its normal condensing point is known as *superheated steam.* By its use and through improvements in design and fueling, boilers have been constructed to operate at a pressure of 3375 pounds to the square inch. Variant types of boilers include those which employ electricity for heating or which use mercury vapor instead of steam.

Talking Machine. An instrument which records and reproduces sound by means of a moving diaphragm that is caused to vibrate by sound waves in the air. A stylus or chisel-like needle connected with the diaphragm is allowed to trace or engrave a spiral line upon a revolving cylinder or disk. The slightest movement of the diaphragm is thus recorded on the path of the needle. To reproduce the sound, the record is again revolved at the same speed and a smooth needle attached to a second diaphragm is allowed to travel over the engraved

line. The irregular motion of the needle then forces the diaphragm to vibrate and produce sound waves similar to those first recorded.

The first talking machine, called a *phonograph*, was invented by Thomas A. Edison in 1877. It consisted of a cylinder having a spiral groove cut on its surface, and mounted on a screw passing through its center. A smooth layer of tin foil was placed on the cylinder, which was then revolved so that the groove was always under the point attached to the diaphragm. The movements of the diaphragm thus produced irregular indentations in the tin foil, which would impart similar vibrations when the stylus was again allowed to travel over the cylinder.

The *graphophone*, invented in 1885 by Chichester Bell and Charles Tainter, improved on the phonograph by substituting a wax tube for the tin foil. The *gramophone*, invented by Emile Berliner in 1887, differed fundamentally from the first two, in producing a tracing of the sound waves as a zigzag line of even depth, rather than an up-and-down engraving. This system was found more satisfactory on disks than on cylinders. Modern practice tends toward the use of wax cylinders for temporary records, such as those used for commercial dictation, and of hard disks for all permanent records. Some machines employ reproducing needles which are used but once, while others have a permanent diamond or sapphire point. The diaphragm is generally made of mica.

In preparing commercial records the original is recorded directly upon a wax tablet. This is carefully covered with graphite in order that it may conduct electricity, and is then electroplated with copper. The copper shell is stripped from the wax and then nickel-plated in order to harden it. From this *master record*, a second, mother record is prepared in the same way, and from the mother record several matrices are made which are used for molding the familiar commercial disks. These are generally composed of shellac, together with charcoal, barium sulphate, and other substances.

In the *auxetophone*, an ordinary record is used to control the action of a delicate valve which impresses the proper vibrations on a stream of air generated by an air compressor. The recorded sound is thus *reproduced* without the aid of a vibrating diaphragm.

In producing records for the newer types of phonograph, a vacuum tube amplifier is used to magnify the mechanical energy produced by sounds. The stylus is thereby enabled to trace a much more faithful record of the sounds and the reproduction is correspondingly improved, even when accomplished by the usual mechanical system. By the additional use of a vacuum tube in the reproducing machine, the intensity of the sound may be softened or indefinitely magnified.

In addition to providing entertainment, talking machines have been adapted for use in dictating letters.

Telegraph. Any device for transmitting signals to a distance. Telegraphy is therefore not a modern invention, because lights and beacon fires were used as signals even in prehistoric times. The American Indians used a well developed system of signaling by covering a fire with a blanket, and releasing clouds of smoke according to a definite code. The *heliograph* for reflecting flashes of sunlight has been extensively used in military operations, and signals made by changing the position of the arms of a semaphore are still used in the navy.

In ordinary use, the term telegraph refers to the electromagnetic telegraph system, which, in its simplest form, is composed of a *line* of wire, usually galvanized iron; a key for sending; a sounder to make the signals audible; and some source of current such as a battery or dynamo. All are connected so that the current must pass through each one. Only one wire is generally used because the earth serves as a return wire to complete the circuit.

The *key* is merely a lever held in place by a spring. It has an insulated knob on one end, and carries a contact point underneath. The *sounder* consists of two electromagnets with a piece of iron mounted close to their ends. The iron armature is attached to a pivoted arm which strikes a brass anvil when it moves either up or down. When the key is *open*, no current can flow, but, when the knob is depressed, a contact is made which closes the circuit. The current then flows through the magnets, which pull the iron toward them, causing a click when the arm strikes the anvil. When the key is raised, the arm springs away from the magnets with another click.

The signals depend upon the time between the sounds of an up and a down click. A short period corresponds to a dot, a longer period to a dash, with a definite arrangement of dots and dashes for each letter. The Morse code, which is used in the United States and Canada, also makes use of a space in order to simplify the combinations. To avoid errors, the Continental Morse code using only dots and dashes is generally employed in Europe, and also in radiotelegraphy.

A commercial Morse telegraph key is equipped with a switch which is closed when the instrument is not in use. A current thus flows continually through all the instruments on a line until some operator wishes to send a message. He then opens his switch and sends the signals which are repeated in every office connected with the line. As the current flowing over a long line is usually too weak to operate a sounder, the main line is connected with a *relay*, which operates in the same way but is much more sensitive. The moving arm of the relay acts as a key to close a local circuit and operate a sounder. Very long lines, such as those from New York to Chicago, are generally divided into sections by *repeaters* which act as a reversible relay to repeat the signals with a stronger current.

By using currents differing in strength or direction, or both, it is possible by the *duplex* system to send a message in both directions at the same time. In 1873, Edison invented the *quadruplex* system whereby two messages may be sent in both directions at the same time. The *synchronous multiplex* system permits six operators to send over the same wire. Machines, such as the Wheatstone automatic telegraph, which use a perforated tape, are capable of transmitting 300 to 400 words per minute as compared with 25 to 40 by a good operator. With the multiplex *printing telegraph* system, messages are sent by pressing keys on a machine resembling a typewriter, and are automatically printed on telegraph blanks at the receiving end.

The supreme court of the United States has decided that Samuel F. B. Morse was the inventor of the electromagnetic telegraph. Other famous scientists who worked on the same problem were the Englishmen, Wheatstone and Cook, whose five-wire system was the first to be tried commercially, and Professor Joseph Henry, an American, who in 1831 operated the first sounding electric telegraph. Steinheil of Munich also developed a similar system about 1837. At present the Morse system is used in the greater part of the world. Morse began his work in 1832. His first commercial line was constructed with government aid. It extended between Washington and Baltimore and was opened to the public April 1, 1844.

Morse Code. A·— B—··· C—·—· D—·· E· F··—· G——· H···· I·· J·——— K—·— L—·· M—— N—· O——— P·——· Q——·— R·—· S··· T— U··— V···— W·—— X—··— Y—·—— Z——··

Continental Code. A·— B—··· C—·—· D—·· E· F··—· G——· H···· I·· J·——— K—·— L—·· M—— N—· O——— P·——· Q——·— R·—· S··· T— U··— V···— W·—— X—··— Y—·—— Z——··

Telephone. An instrument used for the purpose indicated by its name, which means a "voice from afar." Early attempts at the transmission of sound resulted in the discovery of the speaking tube and the tightly stretched string used in the "tin can" type of toy telephone. Many inventors worked on the problem of an electric telephone, notably Elisha Gray, who filed a caveat to protect an idea for its solution, February 14, 1876. On the same day, Alexander Graham Bell applied for a patent, granted on the following March 7, which is fundamental for this method of transmitting speech by means of electricity. After protracted litigation, this patent was upheld by the supreme court, and Bell's title was thereby assured as the inventor of the telephone.

Bell's original system used a device similar to the modern receiver, both for sending and receiving. The transmitter of today, which has been developed by many scientists, is much more delicate and satisfactory. At present the telephone consists essentially of a transmitter, an induction coil, and a receiver, connected by copper wires and supplied with a source of direct current.

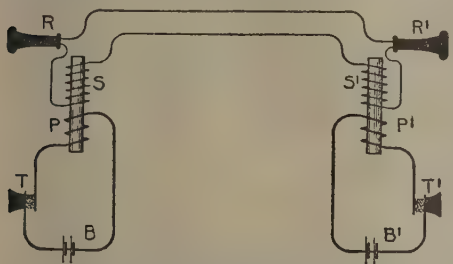


Diagram of a Simple Telephone Circuit

T, T′, transmitters; B, B′, batteries or other source of direct current; P, P′, primary windings of induction coils; S, S′, secondary windings of induction coils; R, R′, receivers.

The *transmitter* is composed of a thin metallic diaphragm to the back of which is attached a small carbon block. A second piece of carbon is mounted a short distance behind the first, and the space between the two is filled with hard grains of carbon. Such an arrangement of conductors in loose contact, called a *microphone contact*, has the property of changing its electrical resistance even under very slight pressure.

The modern *receiver* usually consists of one or two strong permanent steel magnets, on the ends of which are welded short pieces of soft iron surrounded by coils of fine wire. A thin iron diaphragm is mounted so that its center is a short distance from the ends of the magnets.

Electrical connections are made from the source of current to the movable carbon of the microphone contact; from the fixed microphone carbon to one end of the primary winding of the induction coil; and from the other end of the primary to the source of the current, thus completing a circuit. The secondary winding of the induction coil connects with the line and with the coils in the receiver.

In operation, the sound waves formed in air by the voice are directed against the diaphragm of the transmitter. This vibrates back and forth, continually changing the pressure on the grains of carbon. The current of electricity which flows through the microphone and primary of the induction coil is thus varied in strength according to the sounds of the voice. An alternating current of higher voltage is formed in the secondary winding of the induction coil and flows over the wires and around the end of the magnets in the receiver. Here the attraction of the magnets for the diaphragm changes with the strength of the current, so that the diaphragm vibrates in the air and thus produces sound waves exactly similar to those spoken into the transmitter. Obviously, the sound of the voice does not travel along the wire, but, instead, an alternating current is transmitted which produces sound waves at the receiver.

Connections between subscribers are made by grouping the terminals from each telephone on a *switchboard* at a central exchange. Each line is represented by a hole in the board, and underneath each hole is a tiny electric light. When a subscriber removes his receiver from the hook, the lamp lights and the operator inserts the tip of a flexible wire in the hole and asks for the number required. She then places the other end of the wire in the hole corresponding to the number wanted, and operates a switch which rings the call bell. When either party hangs up his receiver a light flashes and the operator removes the connecting cord. The first exchange was erected in New Haven, Conn., in 1878, for eight subscribers.

Telephone lines require a complete metallic circuit. The development of the *phantom circuit*, in which two circuits are made to do the work of three, and of the *Pupin loading coil* and *vacuum tube repeaters*, which make conversation possible over long distances, has permitted the present extensive use of the telephone. The first conversation between New York and San Francisco was held January 25, 1915. This line was 3390 miles long, or 6780 miles in the complete circuit which contained 2960 tons of copper. The voice traveled across the continent in ⅓ second. About 17 million telephones, or 60 per cent of all on the earth, are in use in the United States. The automatic telephone eliminates the central operator by means of an automatic switching system.

Telephotography (Phototelegraphy). A process for sending photographs by telegraph or telephone, perfected in the Bell Telephone laboratories, New York City, about 1925. The apparatus consists of a transmitter and a receiver, which may be used at the ends of any telephone line. A positive film of the photograph to be transmitted is rolled into cylindrical form and inserted in the transmitter. This film is revolved, at the same time moving forward very gradually with a screwlike motion. A small intense ray of light is focused on the film and shines through it with intensities varying according to the lightness or shade of that portion of the film traversing the course of the ray at any instant. The portion of the light ray passing through falls on a photoelectric cell within the cylindrical roll and sets up currents of electricity directly proportional to the intensity of the light. These pulsating currents, when amplified by a vacuum tube, are transmitted to the receiver, where they control the intensity of a beam of light falling on an unexposed photographic film rolled in cylindrical form and geared to rotate synchronously with the film on the transmitter. The result is a reproduction of the original photograph. The transmission of the picture requires a little over five minutes.

In *television*, an actual scene, instead of a photograph, is somewhat similarly reproduced at least fifteen times per second. The succession of pictures, projected on a screen, appears to the receiver as a motion picture, which re-enacts the scene, possibly hundreds of miles away.

Typewriter. An instrument for writing in characters similar to those used for printing. Christopher Latham Sholes is generally considered to be the inventor of the modern typewriter. On his first machine, completed in September 1867, many letters were written and sent to friends. One of these letters induced James Densmore, of Meadville, Pa., to take a large financial interest in the new invention, which was patented in 1868. Six months later, when Densmore first saw the typewriter, he decided that it was absolutely impracticable. Soule and Glidden then withdrew

from the enterprise. Under the constructive criticism of Densmore, Sholes proceeded to build model after model, until, after five years of work, a satisfactory machine was produced.

A famous firm of gunmakers, E. Remington and Sons, was then persuaded to manufacture the machine, which, in 1874, appeared on the market as the Remington typewriter.

Most of the standard modern typewriters are operated by 42 keys arranged in what has been found to be the most convenient order. This arrangement is known as the *universal keyboard*. Scores of other arrangements are used for writing in foreign languages, or for the use of special characters. Each key controls a steel type bar which carries two characters near the free end. Selection of the desired character is obtained by means of a shift key.

The type bars are hinged in a basket-like group, so that each one may strike on a common center when the proper key is depressed. The paper is placed upon a rubber cylinder, which is mounted on a carriage moving from right to left. Under the control of a pawl and ratchet, the carriage moves one space to the left after each letter is printed or when the space bar is used. At the end of a line the carriage is pushed to the right by the operator. This pressure also serves to advance the paper for a new line.

Just before the type bar reaches the cylinder, an inked ribbon is raised into place so that the key strikes the ribbon and leaves a sharp impression upon the paper. Key and ribbon then drop back so that the writing is always visible. The ribbon, which is usually about 25 feet long, is stretched between two spools and moves at the same speed as the carriage. When most of the ribbon has been wound upon one spool, the direction of winding is automatically reversed.

Some machines are equipped with a double keyboard so that each key has but one character. In a second type of machine, the characters are arranged upon a circle or segment of a circle. When a key is depressed, this circle revolves so as to bring the proper character to the common printing point. One of the chief advantages of this form of writing machine is that the moving segment may be quickly replaced by another bearing a different style of type.

The average operator writes about sixty words per minute, which is about three times as fast as the ordinary penman. Most operators use the touch system, in which they have trained their fingers until they can strike the desired key without looking at the keyboard. Special typewriters having a flat printing surface instead of a cylinder are in use for bookkeeping and similar operations. Practically all business correspondence is now typewritten. By the use of carbon paper several copies may be prepared at the same time.

Not only has the use of the typewriter revolutionized commercial practice, but it has also profoundly affected social relations, in that it has afforded to women a broad opportunity of entering commercial occupations.

MODERN INVENTIONS

Invention	Date	Inventor	Country
Adding machine	1642	Blaise Pascal	France
Air brake	1869	George Westinghouse, Jr.	United States
Airplane	1903	Orville and Wilbur Wright	United States
Airplane compass	1917	Mendenhall and Williamson	United States
Air pump, to produce a vacuum	1654	Otto von Guericke	Germany
Airship	1852	Henri Giffard	France
Aluminum, Hall process of making	1886	Charles M. Hall	United States
Automobile, gas engine	1875	Siegfried Markus	Germany
First commercial	1891	Levassor	France
Babbitt metal	1839	Isaac Babbitt	United States
Bakelite	1907	L. H. Baekeland	Belgium-United States
Balloon	1783	J. E. and J. M. Montgolfier	France
Barbed wire machine	1874	Glidden and Vaughan	United States
Barometer	1643	Torricelli	Italy
Bicycle	1840	Macmillan	Scotland
Modern type	1884	James Starley	England
Bifocal lens	1780	Benjamin Franklin	United States
Calcium carbide, commercial production of	1892	Thomas L. Willson	United States
Carborundum	1891	E. G. Acheson	United States
Car coupler, automatic	1873	E. H. Janney	United States
Cartridge, metallic	1847	Houiller	France
Cash register	1879	J. Ritty	United States
Caterpillar tractor	1900	Benjamin Holt	United States
Caustic soda, Castner process	1890	Hamilton Y. Castner	United States
Celluloid	1869	J. W. and Isaac Hyatt	United States
Centrifugal cream separator	1879	C. G. P. de Laval	Sweden
Chrome tanning	1884	Schultz	United States
Clock, pendulum	1657	Huygens	Netherlands
Coach, steam	1801	Richard Trevithick	England
Coherer, for detecting "wireless" waves	1892	E. Branly	France
Color photography	1892	F. E. Ives	United States
Ruled screen process	1894	John Joly	Ireland
Autochrome process	1906	A. and L. Lumière	France
Cotton gin	1793	Eli Whitney	United States
Cultivator, rotary disk	1878	Mallon	United States
Cyanide process for gold and silver ore	1890	Forrest and MacArthur	Scotland
Dental plate, rubber	1855	Charles Goodyear, Jr.	United States
Diesel engine	1893	Rudolph Diesel	Germany
Diver's suit	1819	A. Siebe	Germany
Dynamite	1866	A. Nobel	Sweden
Dynamo-electric machine, first	1831	Michael Faraday	England
Drum wound armature	1854	Werner Siemens	Germany
Separately excited field	1863	H. Wilde	England
Electric arc lighting, practicable system	1878	C. F. Brush	United States
Electric battery, primary	1799	Alessandro Volta	Italy
Electric battery, storage	1859	Gaston Planté	France
Pasted type	1881	Camille A. Faure	France
Nickel-iron type	1903	Thomas A. Edison	United States
Electric furnace, arc type	1853	Pichou and Johnson	France & England
Resistance type	1880	W. Borchers	Germany
Electric welding, resistance process	1886	Elihu Thompson	United States
Electromagnet	1824	Wm. Sturgeon	England

MODERN INVENTIONS—Con.

Invention	Date	Inventor	Country
Electron tube, practical	1904	J. A. Fleming	England
Three-electrode	1906	Lee De Forest	United States
Electroplating	1805	Luigi Brugnatelli	Italy
Electrotyping	1838	Moritz H. von Jacobi	Germany
		Thomas Spencer	England
Elevator, power	1852	Elisha G. Otis	United States
Food preservation, canning process	1810	Appert	France
Fourdrinier paper-making machine	1798	Louis Robert	France
Galvanometer	1820	Sweigger	Germany
Gas engine, electric ignition	1857	Barsonti and Matteucci	Italy
Four-cycle	1877	Nicholas August Otto	Germany
Successful	1884	Gottlieb Daimler	Germany
Gaslighting system	1792	Wm. Murdock	England
Gas mantle, incandescent	1885	Carl Auer von Welsbach	Austria
Gas meter, wet	1815	S. Clegg	England
Dry, modern	1843	Wm. Richards	United States
Gatling gun	1861	R. J. Gatling	United States
Gauge, steam pressure	1849	Bourdon	France
Gramophone	1887	Emile Berliner	United States
Graphite, deflocculated	1906	E. G. Acheson	United States
Graphophone	1885	Bell and Tainter	United States
Guncotton	1846	Schönbein	Germany
Gyrocompass	1906	H. Anschütz-Kämpfe	Germany
Improved	1910	Elmer A. Sperry	United States
Harvester and thresher, combined	1888	S. C. Matteson	United States
Hydraulic press	1795	Joseph Bramah	England
Hydrogenation, catalytic	1902	Sabatier and Senderens	France
Hydroplane	1911	Glenn H. Curtiss	United States
Ice machine, compressor system	1834	Jacob Perkins	United States
Absorption system	1860	F. P. E. Carré	France
Incandescent lamp, carbon filament	1860	Joseph W. Swan	England
	1879	Thomas A. Edison	United States
Ductile tungsten filament	1910	W. D. Coolidge	United States
Induction coil, modern	1851	Ruhmkorff	Germany
Injector, steam, for boilers	1858	Henri Giffard	France
Interferometer	1887	A. A. Michelson	United States
Iron, galvanizing process	1837	Henry Craufurd	England
Kaleidoscope	1816	David Brewster	England
Knitting machine	1589	William Lee	England
Circular	1816	M. I. Brunel	England
Latch needle	1858	Townsend and Moulding	England
Kodak, roll-film hand camera	1888	Eastman and Walker	United States
Leakproof gasoline tank for airplanes	1917	G. S. Fulcher	United States
Lewis gun	1912	I. N. Lewis	United States
Lewisite, dew of death	1918	W. L. Lewis	United States
Leyden jar, modern	1746	John Bevis	England
Lightning conductor	1752	Benjamin Franklin	United States
Linotype	1885	Ottmar Mergenthaler	United States
Lithography	1798	Alois Senefelder	Bohemia
Locomotive, steam, on rails	1804	Richard Trevithick	England
First successful	1829	George Stephenson	England
Loom, pattern	1801	M. J. Jacquard	France
Power	1785	Edmund Cartwright	England
Machine rifle, Browning	1916	John M. Browning	United States
Matches, friction	1827	John Walker	England
Safety	1855	Lundstrom	Sweden
Mercerized cotton	1844	John Mercer	England
Mercury vapor lamp	1900	Peter Cooper Hewitt	United States
Microphone	1877	Emile Berliner	United States
Microscope, compound	1590	Zacharias Janssen	Netherlands
Monotype	1887	Talbert Lanston	United States
Motion picture machine	1895	Thomas Armat	United States
Multiplying machine	1671	G. W. Leibnitz	Germany
Nails, machine cut	1786	Ezekiel Reed	United States
Naval telescopic gun sight	1891	Bradley A. Fiske	United States
Nernst lamp	1897	Walter Nernst	Germany
Nitrogen fixation, electric arc	1903	C. Birkeland	Norway
Catalytic process	1911	Haber and Bosch	Germany
Cyanamid process	1908	Caro and Franke	Germany
Oleomargarine	1869	H. Mège-Mouries	France
Ophthalmoscope	1851	Helmholtz	Germany
Optophone, by which blind can read type	1914	E. E. Fournier d'Albe	England
Pen, steel	1780	Samuel Harrison	England
First successful fountain	1884	L. E. Waterman	United States
Percussion cap	1816	Shaw	United States
Percussion compound	1807	A. J. Forsythe	Scotland
Phonograph	1877	Thomas A. Edison	United States
Photography, daguerreotype process	1839	L. Daguerre	France
Bichromate process	1839	Mungo Ponton	Scotland
Use of hypo	1839	John Herschel	England
Collodion process	1851	Scott Archer	England
Gelatin-silver bromide emulsion	1871	R. L. Maddox	England
Roll-film, modern	1887	Hannibal Goodwin	United States
Piano	1709	Bartolommeo Cristofori	Italy
Piano player, first pneumatic	1863	M. Fourneaux	France
Pin-making machine	1824	L. W. Wright	United States
Plow, cast-iron, modern shape	1819	Jethro Wood	United States
Pneumatic tire	1845	R. W. Thompson	England
	1888	John B. Dunlop	Ireland
Pneumatic tool	1865	George Law	England
Portland cement	1824	Joseph Aspdin	England

MODERN INVENTIONS—Con.

Invention	Date	Inventor	Country
Printing from movable type	1450	J. Gutenberg	Germany
Printing press, cylinder	1811	F. König	Germany
Double cylinder	1845	R. Hoe & Co.	United States
Rotary	1850	Thomas Nelson	England
Gordon	1850	George P. Gordon	United States
Pulmotor	1911	Alexander B. Dräger	Germany
Radiotelegraph	1895	G. Marconi	Italy
Radiotelephone	(?)	Collins (?) DeForest (?)	United States
Long-distance	1915	American Tel. & Tel. Co.	United States
Rail, flanged T	1831	R. L. Stevens	United States
Reaper, McCormick	1831	Cyrus H. McCormick	United States
Revolver	1835	Samuel Colt	United States
Rifle, spiral grooves	1620	Koster	England
Breech-loading, successful	1810	John M. Hall	United States
Bolt action, military	1839	Dreyse	Germany
Repeating	1860	Henry	United States
Rock drill, percussion	1849	J. J. Couch	United States
Diamond bit	1854	Herman	United States
Rotor Ship	1924	Anton Flettner	Germany
Safety lamp, miner's	1815	Sir Humphry Davy	England
Saw, band, wood	1808	William Newbery	England
Circular, wood	1777	Samuel Miller	England
Screw propeller, successful application	1841	John Ericsson	Sweden
Self-binding reaper, twine	1875	J. F. Appleby	United States
Sewing machine	1846	Elias Howe	United States
Four-motion feed	1854	Allen B. Wilson	United States
Shoe-sewing machine, McKay	1858	Lyman Blake	United States
Welt-sewing	1871	Charles Goodyear, Jr.	United States
Shotgun, practical breech-loading	1836	Casimir Lefaucheux	France
Hammerless, ejecting	1874	J. Needham	England
Silencer for firearms	1909	Hiram P. Maxim	United States
Silk, artificial process of making	1889	H. de Chardonnet	France
Siphon recorder for submarine telegraph	1874	Wm. Thompson	England
Smokeless powder	1867	J. F. E. Schultze	Germany
Spectroscope	1859	Kirchhoff and Bunsen	Germany
Spinning machine, jenny	1767	James Hargreaves	England
Roll-drawing	1769	Richard Arkwright	England
Mule-jenny	1779	Samuel Crompton	England
Ring spinner	1828	John Thorp	United States
Steamboat, successful	1807	Robert Fulton	United States
Steam engine, atmospheric	1705	Thomas Newcomen	England
With separate condenser	1765	James Watt	Scotland
Double action, use of expanding steam	1782	James Watt	Scotland
Compound	1781	Jonathan C. Hornblower	England
High-pressure	1799	Oliver Evans	United States
Steam hammer	1839	James Nasmyth	Scotland
Steam turbine, modern, power	1884	Charles A. Parsons	England
Steel, Bessemer process	1847	William Kelly	United States
	1855	Henry Bessemer	England
Crucible process	1740	Robert Huntsman	England
Open-hearth process	1866	Siemens and Martin	England
Stereoscope, lenticular	1849	Sir David Brewster	England
Stereotyping	1725	William Ged	Scotland
Stethoscope	1819	Laënnec	France
Stoker, mechanical	1819	Wm. Brunton	England
Submarine boat, first successful	1900	John P. Holland	United States
Submarine detector	1917	Max Mason	United States
Tank, military	1914	Gen. E. D. Swinton	England
Telegraph, electric	1837	S. F. B. Morse	United States
Duplex system	1872	J. B. Stearns	United States
Quadruplex system	1873	Thomas A. Edison	United States
Telephone	1876	A. G Bell.	United States
Automatic	1889	A. B. Strowger	United States
Long-distance, by loading coils	1900	Michael I. Pupin	United States
Telephone transmitter, microphone	1877	Emile Berliner	United States
		Thomas A. Edison	United States
Telephotography	1925	Bell Telephone Laboratories	United States
Telescope	1608	Jan Lippershey	Netherlands
Teletypesetter	1928	Morkrum-Kleinschmidt Corp.	United States
Thermit mixtures	1897	H. Goldschmidt	Germany
Thermometer	1593	Galileo	Italy
Threshing machine	1786	Andrew Meikle	Scotland
Torpedo, self-propelled	1868	Whitehead	England
Radio controlled	1897	Bradley A. Fiske.	United States
Trolley car, practical system	1888	F. J. Sprague	United States
Tuning fork	1711	John Shore	England
Tunnel shield	1818	M. I. Brunel	England
Turret, revolving, for floating battery	1862	Theodore Timby	United States
Typewriter, first practicable	1868	C. L. Sholes	United States
Vacuum bottle	1892	James Dewar	England
Valve gear, Stephenson link	1843	William Howe	England
Walshaert gear	1844	Egide Walshaert	Sweden
Vulcanized rubber	1844	Charles Goodyear	United States
Watches, machine-made	1850	Dennison and Howard	United States
Water gas, modern process	1873	T. S. C. Lowe	United States
Wood pulp, for paper, mechanical process	1844	Keller and Voelter	Germany
Soda process	1854	Watt and Burgess	England
Sulphite process	1867	B. C. Tilghmann.	United States
Sulphate process	1883	Dahl	Sweden
Wrought iron, puddling process	1784	Henry Cort	England
X-ray machine	1895	Wm. K. Rœntgen	Germany

ENGINEERING AND BUILDING

An engineer directs the natural forces of nature to the uses of mankind. He must therefore be a scientist; for mathematics, physics, and chemistry are the foundation of most engineering training. Nevertheless, the pioneer of science who devotes his energies to solving the problems of physics or chemistry is not an engineer. To qualify as such, he must apply the knowledge obtained by research and testing, to the design, construction, and operation of works, machines, or processes.

The mathematician studies the mutual relations between the sides and the angles of a triangle; the engineer uses the knowledge thus obtained to measure the distance across a river or to the top of a distant peak. The physicist studies the laws of centrifugal force; the engineer applies these laws when he raises the outer rail at a curve, to prevent a train from leaving the track. The chemist discovers that starch can easily be changed into glucose; the engineer then designs and operates a factory where table sirups are made from corn or potatoes. Because of this practical side of his work, an engineer has been described as one who can accomplish with one dollar what an untrained worker can do, indifferently, with two.

The practice of engineering is not new, for the pyramids of Egypt with their perfectly placed masses of stone compare well with the greatest of modern structures; and some of the bridges and aqueducts constructed by the Romans are still in use. The earliest engineers were chiefly surveyors. Later, engineering became largely a military profession, because the chief demand of the time was for men who could plan strong fortifications and construct tunnels and the engines of war necessary to reduce opposing forts.

With the advance of civilization and the development of commerce, engineering projects, such as bridges and harbors, dams, roads, and canals, were required even more for civil than for military purposes. As a result, men capable of filling this need gradually developed the profession of *civil engineering*, which is now generally recognized as the first and largest division of engineering practice. Next, the rapid increase in the application of power to mechanical operations caused men to specialize in the design and the use of machines. Thus developed the second great branch of the engineering field—that of *mechanical engineering*.

Branches of Engineering. Civil and mechanical engineering represent the fundamental divisions of engineering practice. Mining, electrical, chemical, and sanitary engineering are specialized branches, each applying general engineering principles in connection with a particular division of science. The electrical engineer is probably the most highly specialized, but that each branch is closely related to every other is shown by the training given to students of engineering in the great technical schools. For the first two or three years of their work, students of electrical, mechanical, or chemical engineering study almost the same subjects; later they are permitted to specialize.

More than a hundred well recognized subdivisions might also be named, such as heat, hydraulic or water power, railway, locomotive, automotive, ventilation, highway, telephone, and aeronautical engineering.

Civil Engineering. The civil engineer may be compared to a general at war with the elements, for he strives to bring the land and the sea under his control. He is a builder, in order that commerce and industry may be more easily carried on. He designs, locates, and builds highways and railroads, and, if these are interrupted by a deep gorge or by wide rivers, bridges and tunnels are constructed under his direction. He deepens harbors, protects them from the open waters by means of breakwaters, places lighthouses to guide ships to safety, and builds docks at which cargoes can easily be handled.

Construction of canals and the development of inland waterways, the building of dams for purposes of irrigation and water power, the erection of a single skyscraper or the building of an entire city and of aqueducts to supply the city with water—all come directly within the province of the civil engineer.

Mechanical Engineering. The division of engineering which is concerned with the design, construction, and operation of machines. A civil engineer may plan and lay out a railroad, and a naval architect may design a fast and beautiful steamship, but it is the mechanical engineer who designs the locomotive that hauls the trains and the boilers and engines that drive the vessel. While an architect designs, and a civil engineer constructs, a mighty office building, the mechanical engineer provides for a suitable power plant, pumps, elevators, hot water, ventilation, heat, and often a system of refrigeration. A steel mill, with its enormous power plant and giant engines for handling and shaping iron and steel products, is one of the most impressive examples of mechanical engineering.

When a new type of machine is required for some special purpose, it must be designed by a mechanical engineer. However, standardized machines for many purposes are already on the market, so that in factory operation the mechanical engineer must frequently select and arrange the proper machines to produce a certain result in the most economical manner. The design and the improvement of automobiles have become so important that specialists in this branch of mechanical work are called *automotive engineers*.

Another important duty of the mechanical engineer is the testing of structural materials. The builder of a bridge knows that it will carry its load because a mechanical engineer has designed machines capable of testing steel beams by the application of enormous forces. In this age of machinery, no engineering problem of any considerable importance can be carried through without the aid of the mechanical expert.

Mining Engineering. A branch of engineering devoted to the surveying, testing, and evaluation of mineral deposits, and the planning and execution of the methods by which the mineral is obtained and treated. The mining engineer must decide on the methods to be used in removing the ore, in strengthening tunnel walls to prevent accidents, in providing drainage and ventilation for the mine, and in quickly and efficiently hoisting the mineral to the surface. He must, therefore, be especially trained in civil and mechanical engineering, and in chemistry, geology, and mineralogy.

Electrical Engineering. Engineering principles applied to the designing, building, and operating of dynamos and batteries, electric light and power systems, electric railways, motors, heating apparatus varying in type from a toaster to a giant furnace, telegraph and telephone systems including radio transmission, and various other types of electrical apparatus.

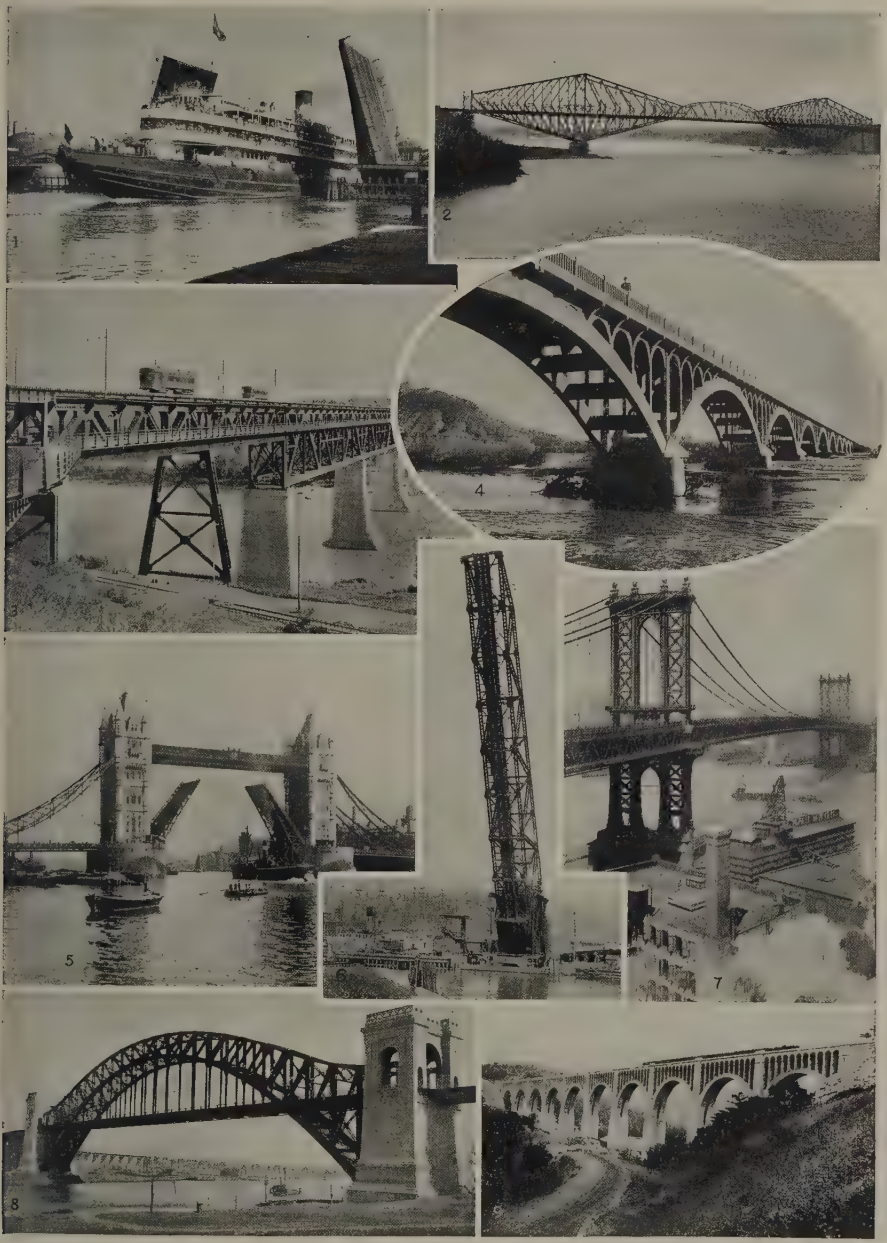
In co-operation with the mechanical engineer, the electrical engineer has done important work in providing mechanical equipment with electrical control. And, in co-operation with the chemical engineer, he has developed the important division of *electrochemical* engineering, which deals with the use of electricity in chemical processes. The products of the electrochemical industries include some of the most indispensable materials employed in manufacture, such as ferro-alloys, aluminum, electrolytic copper, caustic soda, chlorine, hydrogen, oxygen, carborundum, cyanamid, and calcium carbide.

SOME NOTED BRIDGES AND VIADUCTS OF THE WORLD

Name	Location	Completed	Kind	Length Feet	Main Span Feet	Height Feet	Approximate Cost
Al'ghanyR.,B.&O.R.R.	Pittsburgh, Pa.	1921	Simple truss	2122	434	51	$2,200,000
Ambassador	Detroit river, Detroit	1932‡	Suspension	8000	1850	152	20,000,000‡
Arlington Memorial	Potomac R., D. C.	‡‡	One-leaf bascule	2100	184		10,000,000‡
Bear Mountain	Hudson River	1924	Suspension	2257	1632	155	5,000,000
Bonn	Bonn, Germany	1898	Steel arch	1800	614	60	700,000
Britannia**	Menai Strait, Wales	1850	Tubular girder	1841½	460	104	3,000,000
Brooklyn	New York City	1883	Suspension	7580	1595½	135	18,000,000
Cabin John *	Washington, D. C.	1864	Stone arch	420	220	101	237,000
Canadian Pacific R.R.**	Sault Ste. Marie, Mich.	1914	Two-leaf bascule	426	336		
Cappelen Memorial *	Minneapolis, Minn.	1923	Concrete arch †	1032	400	88	900,000
Carquinez	Carquinez Str., Cal.	1927	Cantilever	4482	1100	135	7,800,000
Chicago River	Michigan Ave.,Chicago	1920	Two-leaf bascule	300	256	16½ (*b*)	
Cincinnati-Covington	Ohio River	1867 (*c*)	Suspension	2763	1057	106	2,500,000
Delaware River	Philadelphia-Camden	1926	Suspension	9570	1750	135	24,600,000
Detroit-Superior	Cleveland, Ohio	1920	Nickel-steel arch	2880	591	95	2,500,000
Dusseldorf	Dusseldorf, Germany	1899	Steel arch	2100	595	62	905,000
Eads	St. Louis, Mo.	1874	Cast-steel arch	6220	520	55	10,000,000
Elorn**	Elorn R., France	1927	Concrete arch†	2625	613		440,000
Fades Viaduct	Vauriat, France	1909	Steel	1446	472	434½	
Forth	Edinburgh, Scotland.	1890	Cantilever	8095	1710	152	16,000,000
Ft. Lee**	Hudson R., N. Y. City	1932‡	Suspension	8243	3500	200	60,000,000‡
Gokteik Viaduct	Gokteik Gorge, Burma	1900	Steel	2260	120	320	
Grafton	Auckland, N. Z.	1909	Concrete arch †	973	320	147	170,000
Hampden Co.Memorial	Springfield, Mass.	1922	Concrete arch †	1494	176	45	3,250,000
Harahan	Memphis, Tenn.	1916	Cantilever	4912	790½	75	5,000,000
Hardinge	Lower Ganges, India	1915	Truss and girder	5890	345	40	15,500,000
Hell Gate *	East River, N. Y.	1917	Steel arch	17,868	977½	135	15,000,000
Kinzua Viaduct	Erie R.R.,Bradford,Pa.	1882 (*d*)	Steel	2053	60	301	
Larimer Avenue	Pittsburgh, Pa.	1912	Concrete arch †	670	300½	110	
Lethbridge Viaduct	Lethbridge, Alta.,	1909	Plate girder	5327	167	314	
Loa Viaduct	Bolivia	1888	Steel	800	80	336	
London††	Thames R., England.	1831	Masonry arch	928		56	7,241,500
Manhattan	New York City	1909	Suspension	6855	1470	135	17,000,000
Market Street	Chattanooga, Tenn.	1917	Two-leaf rolling lift	2300	310		
Mississippi River	Thebes, Ill.	1904	Cantilever	3695	671	55	2,600,000
Mississippi River	Keithburg, Ill.	1910	Vertical lift.	3804	234	55	660,000
Missouri River **	Kansas City, Mo.	1912	Vertical lift.	5340	428	65	2,200,000
Missouri R., Gt.N.R.R.	Snowden, Mont.	1919	Vertical lift.		296	50	
Monongahela River	Fairmont, W. Va.	1921	Concrete arch †	1326	250	52	900,000
Monroe Street**	Spokane, Wash.	1911	Concrete arch	791	281	115	
Niagara Electric R. R.	Niagara Falls, N. Y.	1898	Steel arch	1240	840	195	
Niagara,Gd.TrunkR.R.	Niagara Falls, N. Y.	1897	Steel arch	1100	550	226	500,000
Ohio River **	Metropolis, Ill.	1917	Truss	5700	720	53	3,000,000
Ohio River, Penn. R. R.	Louisville, Ky.	1919	Vertical lift.	5262	644	79 (*a*)	
Ohio River	Wheeling, W. Va.	1849 (*e*)	Suspension		1010	97	
Ohio River	Cairo, Illinois	1888 (*f*)	Truss	7597	523½	55	8,500,000
Old Trails	Needles, Calif.	1916	Steel arch	832	592	65	
Peace	Niagara R., Buffalo	1927	Steel arch	5800	423½	100	4,500,000
Pecos Viaduct	Pecos, Texas	1891	Cantilever	2180	185	321	238,000
Plauen **	Plauen, Saxony	1903	Masonry arch	492	295½	58	125,000
Poughkeepsie	Poughkeepsie, N. Y.	1904	Cantilever	6747	548	212	
Quebec **	Quebec, Canada	1917	Cantilever	3240	1800	150	9,000,000
Queensboro	New York City	1909	Cantilever	7449	1182	135	13,000,000
Resorgimento	Rome, Italy	1911	Concrete arch †	492	328	47	238,000
Sciotoville **	Sciotoville, Ohio	1917	Continuous truss	3436	775	40	
Sidi Rached	Constantine, Algiers	1915	Masonry arch	1468	227	300	366,000
Spokane-Portland**	Portland, Ore.	1908	Swing truss	1762	521		500,000
St. Charles Air Line **	Chicago, Ill.	1919	One-leaf bascule	474	260		
St. Johns River	Jacksonville, Fla.	1921	Vertical lift.	3800	188		2,000,000
St. Louis Municipal	St. Louis, Mo.	1913	Simple truss	17,922	668	65	
Sydney Harbor**	N. S.W., Australia	‡‡	Steel arch	3770	1650	170	21,000,000
Tay	Dundee, Scotland	1887	Steel truss	10,711	245	77	2,000,000
Tower	London, England	1894	Suspension and two-leaf bascule	2980	200	141 (*a*) / 30 (*b*)	5,000,000
Tunkhannock Viaduct	West of Scranton, Pa.	1915	Concrete †	2230	180	242	12,000,000
Viaur Viaduct	France	1902	Cantilever arch	1509	721¾	385	500,000
Victoria	Montreal, Que.	1898	Cantilever	8440	1250	150	6,000,000
Victoria Falls	Africa	1905	Steel arch	640	500	400	340,000
Washington	N. Y. City, 181st St.	1889	Steel arch	2375	510	133	2,850,000
Willamette River **	Portland, Ore.	1911	Two-deck vertical lift	1623½	220½	140	2,000,000
Williamsburg	New York City	1903	Suspension	7308	1600	135	15,000,000

*Longest span of this type in America. **Longest span of this type in the world. †Re-enforced. ††Replaced earlier structure, built in 1209. ‡Estimated. ‡‡Incomplete. (*a*) Open. (*b*) Closed. (*c*) Reconstructed 1897. (*d*) Reconstructed 1900. (*e*) Reconstructed 1856. (*f*) Reconstructed 1924.

NOTE.— The Key West Extension of the Florida East Coast R. R. is carried above the ocean on what is practically a 30-mile viaduct. Six miles of the roadbed is supported by concrete and steel structures, the remainder rests on embankments placed along the Florida Keys. The 4.72-mile highway bridge over Lake Pontchartrain, near New Orleans, has approaches aggregating 10.66 miles. It cost $5,500,000. The San Francisco Bay bridge spans 7.1 miles of water.



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NOTED BRIDGES

1 Bascule Bridge, Milwaukee. 2 Quebec Bridge (cantilever). 3 Edmonton Bridge, Alta. (steel truss). 4 Tempe (Ariz.) Bridge (concrete). 5 Tower Bridge, London, Eng. 6 Jackknife Bridge, Cleveland (bascule). 7 Manhattan Bridge, New York (suspension). 8 Hell Gate Bridge, New York (steel arch). 9 Tunkhannock (Pa.) Viaduct (re-enforced concrete).













GROWING SUGAR CANE

1 Planting Sugar Cane; *copyright by Keystone View Co.* 2 Young Sugar Cane; *copyright by Ewing Galloway.* 3 Mature Sugar Cane; *photo by Keystone View Co.* 4 Harvesting Sugar Cane; *copyright by Underwood & Underwood.* 5 Loading Sugar Cane; *photo from Ewing Galloway.* 6 Trainload of Sugar Cane; *photo by Publishers' Photo Service.*

Chemical Engineering. A chemical engineer designs and operates the process and special equipment necessary for commercial preparation of chemical substances. His field includes the production of acids and alkalies, dyes, fertilizers, gases, explosives, synthetic drugs and perfumes, and also of many products, such as leather, paper, soap, starch, glucose, and sugar, which frequently do not suggest the chemical methods by which they are prepared.

Sanitary Engineering. A branch of civil engineering which deals with problems such as providing a community with pure water, and disposing of sewage, garbage, and other refuse, in such a manner as to avoid danger to the public health. In addition to the fundamental civil engineering, a sanitary engineer must, therefore, have special training in biology, bacteriology, and chemistry.

Military Engineering. This consists in the application of engineering principles to military problems. The military engineer is essentially a civil engineer who has specialized in the design and construction of permanent forts, military bridges, roads, railroads, barracks, and camps. The plans for dugouts, trenches, tunnels, barbed wire entanglements, and the placing of mines and big guns are all under the direction of the military branch called, in the United States army, the Corps of Engineers. On graduation at West Point, the cadets ranking at the head of their class are usually assigned to this corps, which, in addition to purely military duties, has charge of navigable rivers and harbors, and also of the bridges and roads in Crater Lake and Yellowstone national parks.

The mechanical engineering involved in the production of guns and ammunition for the United States army is done under the direction of the department of ordnance. The magnitude of the work may be best appreciated after considering the size of one of the 16-inch guns guarding the Panama canal. It weighs 130 tons and is 49¼ feet long, tapering from a diameter of 28 inches at the muzzle to 5 feet at the breech. The projectile weighs 2400 pounds, and, when driven by a full charge of 667 pounds of powder, leaves the bore at the rate of about half a mile per second. When the gun is fired, the gas pressure on the base of the shell equals 19 tons to the square inch, or about 180 times the pressure on the foundations of a great skyscraper. If the tallest known building were placed on top of the earth's highest mountain, ten miles away from this gun, the engineers in charge could fire a shell over the obstacle with a fair chance of striking a target 21 miles distant.

Graduates of the United States Naval Academy are all trained as mechanical engineers. Those wishing to specialize in the designing of warships are given advanced courses in *naval architecture*; those who are to have control of a ship's engines, are given special courses in *naval engineering*. It is these specialists who decide upon the number and size of the guns, the type and size of the power plant, and the thickness of armor plate on a battleship; the size and equipment of submarines; the design of torpedoes, mines, depth bombs; and similar engineering problems relating to the navy.

Aqueduct (Latin, *aqua*, "water"; *ducere*, "to lead"). An artificial channel or system of conduits through which a large volume of water may flow for a long distance under the action of gravity. Aqueducts are generally used when a city is unable to obtain a near-by supply of water. And, because water is absolutely necessary, aqueducts were used by some of the most ancient cities of which there is any record.

The earliest aqueducts were tunnels, but the Romans developed the use of masonry conduits carried across the country on tall, arched piers. It is this type of structure which is generally associated with the name aqueduct. Modern engineers are returning more and more to the use of tunnels, preferring siphons—which are U-shaped tunnels—instead of bridges, for carrying the water across a river or a low level.

Rome was supplied with water by eleven aqueducts, constructed between 312 B. C. and 226 A. D. The longest of these, the *Anio Novus*, had a length of 62 miles. The *Aqua Virgo*, or *Aqua Vergine* as it is called in the modern Italian language, was restored by the popes Nicholas V and Pius IV and now supplies water for several fountains in Rome. Among the many aqueducts built throughout the Roman Empire, that at Segovia, Spain, and the Pont du Gard at Nimes, France, are probably most famous.

There are many modern aqueducts of great length. In England, Liverpool has a 68-mile aqueduct and Manchester one of 96 miles. Vienna, Austria, obtains water through a conduit 114 miles in length. Longest of all is the Pugliese aqueduct, which supplies 536 Italian towns with water, and has a total length of 1175 miles. The city of Winnipeg, Canada, has a 100-mile aqueduct, and Denver, Colorado, brings a part of its water a distance of 20 miles through large wooden pipes.

The Catskill aqueduct, built to supply New York City with an additional 600 million gallons of water per day, was completed in 1917 at a total cost of 177 million dollars. The water, obtained from the Esopus and Schoharie watersheds, is first stored in the Ashokan reservoir, which has sufficient capacity to cover all of Manhattan island to a depth of 30 feet. The aqueduct proper, 92 miles long, is composed of 55 miles of cut-and-cover conduit, 31 miles of tunnel, and 6 miles of steel pressure tubing. The cut-and-cover sections are made by excavating a channel, in which a 17-foot concrete conduit is built and then covered with earth. The water is carried under the Hudson river at Storm King, about 4 miles above West Point, by means of a siphon consisting of a tunnel 3022 feet long, bored through solid rock at a depth of 1100 feet below sea level. The aqueduct ends at Hill View reservoir, and the water is distributed to the city from a pressure tunnel 18 miles long, which passes the length of Manhattan island and into Brooklyn at a depth of 200 to 700 feet below the streets.

The Los Angeles aqueduct, built between 1908 and 1913, begins at the Owens river, which, with about 35 contributing streams, drains an area of 2800 square miles in the Sierra Nevada. The total length of the aqueduct is about 233 miles. For 60 miles the water is carried in open canal to the Haiwee reservoir. From the end of the reservoir, which is 3760 feet above sea level, the water flows to its destination through 98 miles of covered conduit, 43 miles of tunnel, and 12 miles of steel siphon. As Los Angeles has an elevation of only 275 feet, the water, in coming from the reservoir, has a total drop of almost 3500 feet and thus serves as a source of electrical energy capable of producing 120,000 horse power. The aqueduct is designed to carry 260 million gallons of water per day, and, as there is not yet need for so great an amount, the excess is used for irrigation purposes. The total cost of the aqueduct was about 24 million dollars.

The great Hetch Hetchy project for supplying water for the city of San Francisco involves the construction of an aqueduct 170 miles long.

Bridge. The first artificial bridges were probably tree trunks or strong vines used by primitive man to cross some narrow gorge or stream. Simple bridges, consisting of logs of wood or slabs of stone supported at each end, were used by the earliest known groups of mankind.

The arch bridge was probably first used by the Chinese. Simple brick arches have been discovered among Egyptian ruins, but whether or not the Egyptians used arch bridges is unknown. Bridges are not mentioned in the Bible, but according to other records a brick arch was erected across the Euphrates river within the city of Babylon. *Pontoon*

bridges, which are carried on boats or other floating supports, were used for military purposes by Cyrus and other Persian kings as early as the 6th century B. C.

The stone arch was developed by the Romans, who used it especially for strong monumental bridges, some of which are still standing. Smaller Roman bridges usually consisted of wooden beams resting either on stone or on timber foundations. In the 16th century Leonardo da Vinci and Palladio invented the wooden truss and used it in constructing bridges. The first metal arch bridge was made of cast iron and erected at Coalbrookdale, over the Severn river, in 1776. Cast iron was displaced by wrought iron after the investigation carried out for Robert Stevenson when planning the famous tubular bridge across Menai Strait. Later, steel displaced wrought iron, and now ordinary steel is gradually giving way to special alloy steels. At the present time the principal structural materials for bridges are steel, concrete, and masonry.

Bridges may be classified, according to the methods used for supporting the weight, as girder or truss, suspension, arch, and cantilever.

A modern *girder bridge* rests upon strong beams or girders of steel or re-enforced concrete, supported by firm foundations at either end. The girders may be single steel I-beams for small crossings, or *plate girders* built up from steel plates carefully riveted together. Plate girder bridges are the standard type for distances of 20 to 100 feet. The longest plate girder is 130½ feet; another, of 122½ feet, is heavier, weighing 170 tons.

A *truss bridge* may be considered as one composed of enormous girders from which all excess material has been cut away, leaving only a network of braces and connecting members. The ribs of a truss are always arranged to form triangles, because triangular bracing gives the most rigid structure obtainable. Simple truss bridges have been built with spans up to 720 feet in length.

A *suspension bridge* is carried by ropes, chains, or cables, fastened at both ends. This type of bridge has frequently been used by primitive people; it is occasionally used for military purposes; and it has been employed for some of the most famous bridges in the world, notably those of New York City, Philadelphia, and Detroit. Of these, the new Fort Lee bridge over the Hudson will, on completion about 1932, have by far the longest span — 3500 feet. Plans call for anchor chains bedded in deep tunnels driven 250 feet into the solid rock. Of the other suspension bridges in New York City, the Williamsburg bridge is the longest, and the Manhattan bridge is the strongest. The weight of the cables supporting the Delaware River bridge connecting Philadelphia and Camden is 7000 tons. They contain a total of 25,100 miles of wire, a length exceeding the circumference of the earth.

Arch bridges are so constructed that the load imparts an outward thrust which must be carried at each end by heavy structures, called abutments. In building a bridge of this type, false work or centering of some sort is necessary to carry the load until the arch is completed. It is interesting to note that the first masonry arch across the river Tiber—the Pons Æmilius—was begun about 179 B. C., and in 1911 the longest re-enforced concrete arch then built—the Risorgimento arch, with a span of 328 feet, 1 inch—was completed over the same river. The largest arch bridge in America is that over Hell Gate, New York City. It is made of steel, with a hinge at each end to relieve excessive strains. When the foundations for one of the abutments were being sunk, it was discovered that there was a wide crack in the rock, which had been thought to be solid. In order to prevent any settling, a concrete arch was built across the gap, so that the Hell Gate bridge is partially supported by another bridge that is buried 90 feet underground. The Sydney Harbor bridge, Australia, has the longest steel arch in the world, 1650 feet.

Cantilever bridges consist of trusses arranged like a bracket on a wall, that is, they are supported at one end, while the free arm reaches out over the space to be bridged. In practice, the heavy columns which are to carry the weight are usually erected on strong foundations, with an arm extending in opposite directions so as to give a balanced structure. The shore arm is then fastened to heavy anchor foundations. By placing a cantilever on opposite sides of a river, panel after panel can be added to the free arms until they meet at the center. The greatest bridge in the world is of this type. It crosses the St. Lawrence river at Quebec, with a distance of more than one-third of a mile between the central piers. Construction was begun in 1903. In 1907, when the south cantilever was almost finished, one of the main supporting members gave way and the structure fell into the river. In the new bridge, begun in 1911, an opening of 640 feet was left between the arms. The truss to fill this span was constructed on the shore, floated out under the bridge, and lifted by means of hydraulic jacks. When about 15 feet above the water, the connections at one corner slipped, and the truss, weighing 5000 tons, collapsed and fell into the water. The following year, a second span was successfully raised into place. Seventy-four men were killed at the first accident, and eleven at the second.

The ordinary *bascule* or *jackknife bridge* is a girder or truss, hinged at one end and counterbalanced by weights so that it may be swung up like the blade of a pocketknife.

A *rolling lift bridge* is a bascule which turns up on the rounded ends of its own base instead of on a hinge.

A *vertical lift bridge* usually consists of a truss placed between two towers. Cables or levers connect the truss to counterbalancing weights, so that the power of a comparatively small motor is sufficient to raise the bridge straight up.

A *swing bridge*, erected on a turntable at its center, is sometimes preferred because it gives two channels, one on either side of the open bridge. When closed, a swing bridge is usually a simple truss, but the open bridge is a cantilever.

Viaducts, in the ordinary use of the term, are bridges carried across a valley or other low level, on towers. The towers may be high or low, and the spans are usually comparatively short.

A girder or truss bridge pushes down on its foundation piers, a suspension bridge pulls inward, and an arch pushes outward. A cantilever pushes down on its main pier, but may pull up on the anchorage. In addition to the *dead load* or weight of the bridge itself, the engineer must include in his calculations the *live load* which it is to carry, together with the added strain due to starting and stopping of trains, and a possible wind pressure of 30 or more pounds on each square foot of surface.

Canal Locks. Among the most important structures connected with a canal are the locks. These act as a step or as an elevator to raise or to lower a vessel from one water level to another. They are used where there is a change in the elevation of a canal.

An ordinary lock consists of a rectangular basin provided with heavy, water-tight gates at both ends. The sides of the lock and the top of the gates extend above the highest part of the canal. When the gates at one end are open, those at the other end must be closed in order to hold back the water.

When a vessel, traveling upstream, enters a lock, the gates are tightly closed behind it. Water is then admitted to the lock chamber, and the boat gradually rises until it reaches the upper level of the canal. The gates in front are then swung open, and the way is clear. To lower a vessel, the process is reversed, and the water flows from the lock until the lower level is reached.

Locks are occasionally constructed so that the entire chamber is raised or lowered. Sometimes two such chambers are connected and balanced so that

one is raised when the other is lowered. In such cases only sufficient water is transferred to make the upper chamber slightly heavier than the other, so that the change in position is caused by gravity.

Dam. Any barrier used to stop the flow of a liquid is called a dam. In engineering, however, the term refers to a structure built across a watercourse, and provided with a spillway over which the water confined behind the wall can flow when it rises to the proper level.

By means of a dam, the depth of a shallow stream may be increased until it is sufficient for the passage of boats and barges; water can be stored for the use of municipalities, for manufacturing, or for irrigation; and power can be generated. The last-named purpose has motivated the construction of most of the recent great dams, the power developed being transmitted in the form of electricity.

The design and construction of large dams requires a high degree of engineering skill because of the enormous pressure exerted by the water. This pressure depends not on the volume, but on the height, of the water held behind the dam. Each vertical foot of water imparts a pressure of .433 pounds on every square inch of surface, so that at the bottom of a dam where the water is 100 feet deep there is a pressure of 3.1 tons per square foot.

Few dams are more famous than that across the Nile river at Assuan. Since the dawn of civilization, the years of rich harvests and the periods of famine in the Nile valley have depended on the height to which the river would rise during the annual flood. The average rise has been about 25 feet; 30 feet meant destruction and ruin, while 18 feet meant poor crops and starvation. But now the reservoir behind the dam not only affords control of the river's flow, but supplies enough water to irrigate 6 million acres that formerly were desert.

Dams are built of timber, earth, concrete, masonry, and occasionally of steel. The Bassano dam, in the province of Alberta, consists of 7000 feet of earth embankment 35 feet high, and 750 feet of hollow re-enforced concrete dam pierced with 24 flow gates. Earth dams frequently have a thin core of concrete, which prevents the water from trickling through the earth and gradually ruining the dam. The center of the Gatun dam was pumped into place by hydraulic dredges which took up the mud from the river bottom and deposited it between walls of stone. The water drained away, leaving a very firm structure.

Automatic dams are frequently used on canals where it is desired to keep the water level as high as possible. Movable dams of the "bear-trap" type

SOME IMPORTANT DAMS OF THE WORLD

Name	Location	Completed	Type	Height Feet	Length on Top Feet	Width in Feet	
						Top	Base
Arrowhead	California	1909	Earth *	222	850	20	950
Arrowrock	Boise R., Idaho	1916	Concrete (a)	349	1100	15½	238
Ash Fork	Arizona	1898	Steel	46	300	1⅔	47½
Ashti	Ashti R., India	1878	Earth	58	12,709	6	182
Assuan	Nile R., Egypt	1912	Masonry	147	6200	36	92
Barossa	South Australia	1903	Concrete (a)	112	472	4½	42
Bassano	Bow R., Alberta	1913	Earth ‡	39	7750	20–100	99–325
Belle Fourche	South Dakota	1909	Earth	122	6493	19	650
Camarasa	Spanish Pyrenees	1920	Concrete	333	460	21	250
Castlewood	Colorado	1890	Rock-fill	92	600	8	225
Cataract	Sydney N. S. W.	1908	Concrete (a)	192	811	16½	158
Cheoah	Little Tennessee R.	1918	Concrete	225	725	12	175
Columbia	Susquehanna R., Pa.	1875	Timber	11	6847	16	30
Conowingo	Susquehanna R.	1928	Concrete	105	4700	..	105
Coolidge	Gila R., Arizona	1928	Multiple dome	251	550	4	20
Dix River	Kentucky	1925	Rock-fill	275	1020	20	650
Don Pedro	Tuolumne R., Cal.	1923	Concrete	280	1040	16	177
Elephant Butte	Rio Grande R., New Mex.	1916	Concrete (a)	305	1310	18	215
Gatun	Panama	1913	Earth	105	7800	400	2600
Gilboa	Schoharie Creek, N. Y.	1926	Concrete, earth	160	2300	15	158
Kensico	White Plains, N. Y.	1917	Masonry	307	1843	28	235
Keokuk	Miss. R., Keokuk, Ia.	1913	Concrete	53	4649	29	42
Lahontan	Carson R., Nev.	1915	Earth	124	1300	20	620
Lake Cheesman	S. Platte R., Colo.	1904	Masonry	236	700	18	176
Lake Hodges	San Dieguito R., Cal.	1919	Multiple arch	136	750	15	150
La Prele	Douglas, Wyo.	1909	Hollow concrete	135	360	10	160
Lloyd	Yelmandi R., India	1927	Rubble masonry	190	5333	..	124
Mathis	Tallulah R., Ga.	1913	Multiple arch	90	660	16	148
Möhne	Heve R., Germany	1913	Masonry	131	2100	20	112
Morena	San Diego, Cal.	1909	Rock-fill	267	520	16	357
Necaxa No. 2	Necaxa R., Mex.	1911	Earth	190	1220	54	975
New Croton	Croton R., N. Y.	1906	Masonry	297	1168	18	206
Olive Bridge(Ashokan)	Esopus Creek, N. Y.	1913	Masonry	252	1000	26	200
O'Shaughnessy(b)	Tuolumne R., Cal.	1922	Concrete	344	600	15	298
Pacoima	San Fernando, Cal.	1928	Concrete	355	640	10.4	100
Pathfinder	N. Platte R., Wyo.	1910	Masonry	218	432	10	94
Pecos Valley	Texas	1893	Rock-fill	52	1686	20	280
Periyar	India	1895	Concrete	176	1200	12	138½
Poona	India	1872	Masonry	108	5136	14	61
Redridge	Michigan	1901	Steel	74	464	2	64
Roosevelt	Salt R., Ariz.	1911	Masonry	280	1125	16	158
Saluda R.	S. Carolina	1930**	Earth	208	7838	25	1150
San Antonio	Spanish Pyrenees	1916	Concrete	300	670	13	230
Sennar	Nile R., Upper Egypt	1926	Masonry	130	9915	15	50
Shoshone	Shoshone R., Wyo.	1910	Masonry	328	200	10	108
Sukkur	Indus R., India	†	Masonry	185	4725	..	...
Tansa	India	1891	Masonry	118	8800	12	100
Tieton	Yakima project, Wash.	1925	Earth *	232	900	25	1200
Urft	Aachen, Germany	1904	Masonry	190	741	18	166
Wachusett	Nashua R., Mass.	1906	Masonry	228	1476	25	187
Waldeck	Eder R., Germany	1913	Concrete	160	900	19	166
Wilson Dam	Muscle Shoals, Ala.	1926	Concrete	95	3050	..	105
Yadkin	Stanley, N. C.	1916	Concrete	217	1400	24	160

* With concrete core. **Estimated. †Incomplete. ‡ With 750 feet of hollow concrete. (a) Called also cyclopean masonry, because, where possible, enormous bowlders are set in the concrete. (b) Otherwise known as the Hetch Hetchy dam.

are equipped at the top with hinged, floating leaves, which rise and fall with the water level so that the depth of flow over the dam is always about the same. On small structures the water usually flows directly over the top, but, in large dams, the excess water passes through control gates and over a spillway. The highest dam in North America is the Pacoima, in Los Angeles county; the highest in Europe is that at Camarassa, Spain.

The multiple arch, hollow, concrete dam is a form of structure which is coming into extensive use. The ability of this type to withstand great water pressure depends on the strength of comparatively thin, concrete arches, rather than on the weight of massive walls. The same principle is involved in the multiple dome dam, consisting of concrete forms facing upstream, each one shaped like one quarter of an egg shell cut axially.

Cofferdams are water-tight enclosures open at the top and used where it is necessary to work in places that would ordinarily be covered with water. In order to examine the sunken battleship *Maine*, which lay in Havana harbor at a depth of about 37 feet, an oval cofferdam was built around the vessel so that the water could be pumped away.

Embankments placed parallel to the course of a stream so as to prevent the flooding of the surrounding country are known as *levees*.

The term *dike* originally referred to an artificial ditch or canal. Later, it was also applied to the mound of earth thrown up beside the excavation, and eventually to any embankment or wall, especially one used to prevent floods.

Jetties are dikes built, usually at the mouth of a river or harbor, to direct the flow of the tide or the river current in such a way as to scour out a deeper channel. One of the most important uses of jetties has been to make navigable the mouth of the Mississippi river. The longest jetty in the world, 42¾ miles in length, was built to preserve a channel at the mouth of the Columbia river.

Locomotive. The first locomotive used commercially in the United States was called the *Stourbridge Lion*. It was built in England and was put into service in 1829. The first to be built in America for commercial purposes was the *Best Friend*, which was manufactured for the Baltimore and Ohio railroad in 1830. It was destroyed by an explosion after about seven months of service. In 1831, the *De Witt Clinton* was put into operation. On its first run from Albany to Schenectady, a stretch of 17 miles, it covered the distance in 1 hour and 45 minutes, but the return trip was accomplished in 38 minutes. Its weight was 12,098 pounds, or less than that of a single pair of driving wheels on a standard Pacific type engine of today.

The chief improvements in the locomotive have been devices to secure greater pulling power and more efficiency. These purposes have been effected partly by the use of stronger boilers and *greater steam pressure*. Some locomotives now operate at a boiler pressure of 250 pounds per square inch. Certain ones in Germany have been constructed to use a pressure of 750 pounds. A second improvement has resulted from *superheating the steam*. Superheated steam acts as a gas under pressure and can do a certain amount of work without condensing. A third improvement has been the introduction of *compound cylinders*, by which the engine is changed from the simple to the expansion type. See *Steam Engine*.

Among the largest and most powerful steam locomotives in the world is one built for the Northern Pacific railroad in 1928. It is 175 feet long, weighs 500 tons, generates 6000 horse power, and is capable of hauling on the level a train over two miles long. It is driven by two pairs of cylinders, each connected with eight drive wheels. Electric locomotives weighing 600 tons and having a length of 150 feet are not unusual. The greatest speed attained by a locomotive is 112 miles per hour, which was made in 1893 by the New York Central engine number 999 while hauling the Empire State Express.

In 1928, there were about 65,000 locomotives operating in the United States. This represents a decrease from the maximum of 69,486 in 1924 and indicates a trend toward fewer and more powerful locomotives. In the United States, locomotives use each day fuel to the approximate value of $1,100,000. Lubrication alone costs over 10 million dollars annually. The average life of a locomotive is 34½ years. The railroads of the United States use about 30 per cent of the bituminous coal and 5 per cent of the anthracite coal consumed in the country.

In recent years, there has been a conspicuous trend toward the electrification of railroads. The Virginia railroad, although operating in the midst of a coal mining country, decided to electrify its entire system because electrically driven locomotives were considered more efficient than locomotives that consume coal.

In a test made at Erie, Pa., an electric locomotive was pitted against two large steam locomotives of the New York Central railway in a pushing contest. It was found that the electric locomotive was able, not only to stop the two steam locomotives, which had been allowed first to develop a high speed, but forced them backward against the full force of their driving power.

The necessity of providing for locomotives and cars a level track over or through natural obstacles has set for civil engineers many of the most difficult problems they have had to solve. Most of the great bridges and tunnels of the world have been built for railways and have been among the greatest triumphs of civil engineering.

The following table shows the standard types of American locomotives:

Symbol*	Type	Special Use
0–6–0	6-wheel switcher	Switching
2–8–0	Consolidated . .	General freight
2–8–2	Mikado	General freight—sharp curves
2–10–0	Decapod	Heavy freight
2–10–2	Santa Fe	Heavy freight—sharp curves
2–10–10–2	Mallet articulated†	Heavy freight
2–8–8–8–2	Mallet articulated triplex†. . . .	Heavy freight
4–4–0	American . . .	Passenger and freight
4–6–0	Ten-wheeler . .	Passenger, fast freight
2–6–2	Prairie	Heavy passenger, fast freight
4–4–2	Atlantic	High speed passenger
4–6–2	Pacific	Fast heavy passenger, fast freight
4–8–2	Mountain . . .	Heavy passenger

* The first figure in each entry indicates the number of smaller wheels under the front; the last figure denotes the number of trailing wheels under the rear; the intermediate figures indicate the number and the grouping of the driving wheels.

† In this type, the frame is jointed, or articulated, to facilitate the passing of curves.

Skyscraper. The first requirement of a modern skyscraper, and one of the most important, is a firm foundation. If possible, the foundation should rest on bed rock, but, where a heavy structure must be located over sand, soft clay, or peat, the difficulties of obtaining a solid foundation are often very great.

One of the most satisfactory methods is to drive piles through the soft earth until they reach solid rock. Or, if the ground is comparatively firm, a great number of piles may be driven until the total resistance of the earth to further settling of the piles is sufficient to carry the weight of the building. The Illinois Central Railway passenger station in Chicago is thus supported on about 1700 wooden piles, driven to a depth of from 40 to 60 feet by means of one-ton to two-ton drop hammers. In 1920, when an American firm received a contract to build modern steel office buildings in Japan, 13,000 piles of Oregon pine were shipped across the Pacific to form foundations in the city of Tokyo.

HIGH BUILDINGS AND TOWERS

Name and Location	Height in feet
Eiffel Tower, Paris	984
Crane Tower, Chicago	880
Chrysler Bldg., N. Y. City	870
Woolworth Bldg., N. Y. City	792
Terminal Tower Bldg., Cleveland	708
Metropolitan Bldg., N. Y. City	700
Chanin Tower, N. Y. City	680
Lincoln Bldg., N. Y. City	638
Morrison Hotel, Chicago	635
Sherry-Netherland Hotel, N. Y. City	620
Mercantile Bldg., N. Y. City	617
Singer Bldg., N. Y. City	612
New York Life Insurance Bldg., N. Y. City	610
Transportation Bldg., N. Y. City	586
Municipal Bldg., N. Y. City	580
Temple Bldg., Chicago	561
Pittsfield Bldg., Chicago	557
American Insurance Union Citadel, Columbus, O.	555½
Washington Monument	555
City Hall, Philadelphia	548
Ritz Tower, N. Y. City	540
Bankers Trust Co., N. Y. City	539
Ulm Cathedral, Germany	529
Travelers Bldg., Hartford, Conn.	527
Pure Oil Bldg., Chicago	523
Mather Tower, Chicago	519
Cologne Cathedral, Germany	512
Custom House Tower, Boston	505
L. C. Smith Bldg., Seattle	495
Union Central Bldg., Cincinnati	495
Benenson Bldg., N. Y. City	487
City Investing Bldg., N. Y. City	486½
Equitable Bldg., N. Y. City	485¾
Rouen Cathedral, France	485
Church of St. Nicholas, Hamburg	482
Pyramid of Cheops, Egypt	481
Bankers Bldg., Chicago	476
Straus Bldg., Chicago	475
American Furniture Mart, Chicago	474
Strasbourg Cathedral, France	466
Tribune Tower, Chicago	462
Los Angeles City Hall	452
Roanoke Tower, Chicago	452
Bank of the United States, N. Y. City	450
St. Peters, Rome	448

Piles may be of wood, concrete, or steel. One of the most effective types consists of a hollow steel tube, driven with a pile driver. Earth and stones are blown out of the cylinder by compressed air, and the interior is filled with concrete.

When the piles are all in place, the tops are cut off at exactly the same height, and care must be taken that wooden piles are entirely below water level, because, when covered with water, wood is preserved almost indefinitely. The platform type of foundation usually consists of steel beams piled in layers to form a pyramid. Each layer is placed at right angles to that below, and all are covered with concrete.

To support the enormous weight of the skyscrapers of New York City, the foundations are sunk to bed rock by means of open cofferdams or closed pneumatic caissons. The caisson may be a huge timber box or steel cylinder, open at the bottom, but closed at a height of 8 or 10 feet so as to form a working chamber. Above the working chamber the caisson is filled with concrete, which is pierced by vertical shafts for the passage of men and materials. The top of each shaft is closed by an air lock, for, as the earth is removed at the bottom and the structure gradually sinks, the pressure of the air must be raised to prevent the surrounding water from flowing into the working chamber. A depth of 100 feet is about the limit to which the pneumatic caisson can be used, because of the difficulty of working under an air pressure of over 45 to 50 pounds. At these pressures a total of 90 minutes in the caisson is considered a full day's work. When the edges of the caisson reach rock, the working chamber and shafts are filled with concrete, thus forming a solid pillar.

After the foundations have been completed, the steel skeleton is rapidly placed in position. First the massive columns are erected and bolted temporarily to the crossbeams that form the floor. Each piece can be placed quickly in its proper position because at the steel mill, where it was rolled into shape and punched or drilled with rivet holes, it was marked with a number corresponding to the blue-printed plans. Bolts are soon replaced by red-hot rivets which are fixed in place by means of noisy pneumatic hammers.

At each floor the girders extend beyond the wall columns in order to form a short shelf, on which the wall for that floor is carried. Because of this arrangement by which each floor supports its own wall, it frequently happens that offices on one floor of a large building are occupied before the walls either above or below are placed in position. Floors are formed by brick or hollow tile arches, or by concrete slabs, placed between or over the beams. All of the steel skeleton is carefully painted to prevent rust, and, wherever possible, is covered with concrete, plaster blocks, or terra cotta, as protection against fire. The columns especially require this protection because, if they should warp or bend under the action of an intense fire, the entire building would probably be ruined.

Tunnel. An underground passage which may be used for such purposes as railroad, foot, and ordinary vehicular traffic; for conducting water, sewage, and gas; or for pipes and cables. The term tunnel, as generally used, refers to an artificial passageway, horizontal or nearly so, open at both ends, and constructed without removing the surface soil.

Tunnels cut through solid rock with the aid of simple hand tools were built by many of the ancient civilized nations, including the Egyptians, Assyrians, Greeks, Aztecs, Peruvians, and the natives of India. The oldest known tunnels were used as the entrance to a royal tomb or for religious purposes, but by 500 B. C. the Greeks were using tunnels for mining.

The Romans, who surpassed all previous nations as engineers, built tunnels for use as roads, aqueducts, sewers, and mine galleries, not only at Rome, but in what is now France, Switzerland, Spain, Portugal, Algiers, and Constantinople. In order to drain Lake Fucinus, the emperor Claudius, about 52 A. D., completed a three-mile tunnel, 9 feet wide and 19 feet high. The Romans understood *fire setting*, which consists in first heating a rock surface by means of fires and then cooling it suddenly with water in order to produce cracks.

During the middle ages every castle had a secret tunnel, serving chiefly as a means of escape in case of defeat. Most of the famous modern tunnels have been built to supply the need for a better and a quicker means of railroad or automobile transportation. But inspection of the table, *Some Important Tunnels of the World*, shows that the longest tunnels are used as aqueducts for the transportation of water and for draining water from mines.

In the construction of large rock tunnels, small sections are first drilled and blasted out. These openings are then gradually enlarged to full diameter. If the first cutting is at the top of the tunnel, it is called a *heading*; if at the bottom, a *drift*. In building the Rogers pass, later named the Connaught tunnel, great speed was required. A small pioneer tunnel, parallel to the main boring, was therefore constructed first, so that, by cutting cross passages, work could be carried on in several sections at the same time. Of an entirely different type are those of which the earliest important example was the railroad tunnel under the river between Detroit, Michigan, and Windsor, Ontario. This tunnel, consisting of two parallel tubes, was built on land, in twenty sections having the form of enormous, hollow, steel cylinders. Each section, 23⅛ feet in diameter and about 262 feet long, was closed at both ends, floated into position, and then sunk to foundations which had been dredged on the river bed. The sections were joined, covered with a huge mass of concrete, which is easily laid under water, and also given a concrete lining. The Detroit-Windsor vehicular tunnel and the Oakland-Alameda tube are later examples of this type.

The first of the great transalpine tunnels, the Mont Cenis, was driven from both ends. The work was so accurate that, when the borings met after 13 years of labor, there was a difference in alignment of only one inch. During the construction of the St. Gotthard tunnel, conditions were so severe that 800 of the workers died. The Simplon tunnel, which now consists of two parallel tunnels 16½ feet in diameter, was most difficult of all. This tunnel passes through the mountains at a depth of 5000 to 7000 feet below the peaks. The pressure was so great that in places great steel beams were necessary to hold the rock walls in place. Cold springs at times poured as much as 17,000 gallons of water a minute into the first tunnel, and, near the center, hot springs were encountered which raised the temperature of the air to such a degree that it was necessary to spray the walls with cold water. The second tube was completed in 1921.

The many miles of tunnel under New York City represent one of the greatest achievements of engineering skill. The New York City extension of the Pennsylvania railroad, which crosses from New Jersey, under the Hudson river to the Pennsylvania terminal, and then under East river to Long Island, has a total length of only 13.68 miles. Yet the average cost of this short extension was almost 6 million dollars a mile. One of the chief engineering problems in the construction of the Holland vehicular tunnel was to provide proper ventilation. Powerful fans change the air completely 42 times each hour.

Construction of tunnels, such as the Pennsylvania and the Hudson and Manhattan tubes, through clay and silt, under a river bed, is much more difficult and dangerous than blasting through solid rock. The use of compressed air is often necessary in the head of the tunnel to balance the pressure of the surrounding water. In one case, where the river bed above the tunnel was very thin, a blow-out occurred, in which a workman was carried by the escaping air up through the bed of the river to the surface of the water, where he was rescued.

One of the greatest aids in soft ground tunneling is the *shield*, which is a short, hollow cylinder slightly larger in diameter than the tunnel. The forward end is closed and is provided with several strong doors through which the workman may pass to excavate, if the nature of the ground permits. The shield is pushed forward by hydraulic rams, and the cast-iron or concrete lining of the tunnel which is thus formed is constructed under the protection of the rear walls of the cylinder. Various unusual expedients are sometimes necessary. In tunneling through soft clay, huge torches have been used to bake the ground hard. In order to drive an opening through wet quicksand, the earth has been frozen by artificial refrigeration.

The largest tunnel in the world is the Rove, which forms a part of the canal between the Rhone river and Marseille, France. It is 4½ miles long and has a cross section of 3250 square feet, almost six times as large as an ordinary railroad tunnel.

The first transportation tunnel in the United States was a part of the Schuylkill Navigation canal, opened in 1821. The first railway tunnel in the United States was 901 feet long. It was constructed in Pennsylvania, between 1831 and 1833, for the Allegheny Portage railroad. Neither tunnel is now in existence. The longest railroad tunnel in the United States is the New Cascade.

SOME IMPORTANT TUNNELS OF THE WORLD

Name	Location and Use	Length Miles	Years in Construction	Approximate Cost
Arlberg	Austrian Alps; R. R.	6.23	1880–1884	$7,500,000
Arthur's Pass	South Island, N. Z.; R. R.	5.38	1908–1912	3,000,000
Caldera	Peru, S. A.; R. R.	1.75	–1893	
Cascade	Cascade Mts., Wash.; Gt. N. R. R.	2.6	1897–1900	1,250,000
Cascade, New	Berne-Scenic, Wash.; R. R.	7.78	1925–1928	10,000,000
City	New York City; Aqueduct	18.11	1911–1914	26,400,000
Connaught	Selkirk Mts., B. C.; Can. Pac. R. R.	5.0	1913–1916	6,500,000
Detroit River	Detroit, Mich.—Windsor, Ont.; R. R.	1.6	1906–1910	10,000,000
Detroit International	Detroit, Mich.—Windsor, Ont.; vehicular	.95	1928–	10,000,000
Elizabeth Lake	Los Angeles Aqueduct, Cal.	5.1	1907–1911	1,088,000
Florence Lake	Southern Cal.; Aqueduct	12.8	1920–1925	17,000,000
Gravehals	Oslo—Bergen, Norw.; R. R.	3.3	1904–1909	
Grenchenberg	Jura Mts., Switz.; R. R.	5.3	1912–1915	3,500,000
Gunnison	Montrose, Colo.; Aqueduct	5.8	1905–1909	2,170,000
Hetch Hetchy	San Francisco Aqueduct, Calif.	18.0	1920–1923	
Holland	New York—New Jersey; under Hudson R.; vehicular	1.75	1920–1927	48,400,000
Hoosac	Hoosac Mts., Mass.; R. R.	4.31	1856–1873	11,000,000
Hudson & Manhattan	New York City—New Jersey	8.50	1875–1911	75,000,000
Jungfrau	Swiss Alps; R. R.	4.47	1897–1912	1,375,000
Khojak Pass	Quetta-Chaman, India; R. R.	2.44	1889–1891	
Lausanne	Mauch Chunk, Pa.; drain mines	3.8	1906–1912	380,000
Loetschberg	Bern-Brig, Swiss Alps; R. R.	9.05	1906–1913	10,000,000
Moffat	James Peak., near Denver, Colo.; R.R.; water system	6.1	1922–1927	14,500,000
Mont Cenis	France—Italy; R. R.	7.97	1857–1872	15,000,000
Mont d' Or	Jura Mts., France—Switz.; R. R.	3.8	1910–1915	4,060,000
Mt. Royal	Montreal, Can.; Can. North. R. R.	3.22	1910–1916	
Newhouse	Idaho Springs, Colo.; drainage and transportation	4.17	1893–1910	
N. Y. City Extension	New Jersey—Long Island; Penn. R. R.	11.7	1905–1910	100,000,000
Oakland-Alameda	San Francisco bay; vehicular, trolley	.67	1926–1928	4,500,000
Pirahy River	Rio de Janeiro, Brazil; Aqueduct	5.25	1911–1913	
Ricken	Swiss Alps	5.35	1904–1910	2,500,000
Roosevelt	Cripple Creek, Colo.; drain mines	2.98	1908–1910	428,000
Rothschönberg	Freiberg, Sax.; mine drainage	18.0	1844–1887	
Rove	On Rhone canal, France	4.5	1901–1916	27,000,000
Saint Gotthard	Switzerland—Italy; R. R.	9.33	1872–1882	11,500,000
Sasago	Tokio—Kofu, Japan; R. R.	2.9	1896–1902	
Severn	England—Wales	4.36	1873–1886	
Shandaken	Gilboa—Allaben, N. Y.; Aqueduct	18.0	1919–1923	12,138,000
Simplon	Switzerland—Italy (Second tunnel built 1912–1921)	12.45	1898–1906	21,000,000
Snoqualmie	Cascade Mts., Wash.; C. M. & St. P. R. R.	2.25	1912–1915	2,000,000
Stampede	Cascade Mts., Wash.; N. P. R. R.	1.83	1886–1888	1,250,000
Sutro	Virginia City, Nev.; drain mines	3.79	1869–1878	
Tauern	Austrian Alps; R. R.	5.31	1901–1909	6,062,500
Tequixquiac	Drains City of Mexico	6.25	1880–1898	6,760,000
Transandine	Chile—Argentina	5.0	–1911	



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COCOA INDUSTRY

1 Cocoa Tree and Fruit. 2 Opening Cocoa Pods. 3 Separating Cocoa Beans. 4 Drying Cocoa Beans. 5 Sorting Cocoa Beans. 6 Shipping Cocoa Beans. 7 Mixing Chocolate with Sugar. 8 Wrapping Chocolate by Machinery.



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COTTON INDUSTRY

1 Cotton Field. 2 Cotton Flowers. 3 Cotton Bolls. 4 Picking Cotton. 5 Delivering Cotton to Ginnery. 6 Cotton Carding Machine. 7 Weaving Cotton Cloth. 8 Spinning Cotton Yarn. 9 Starching Cotton Warp. 10 Napping Cotton Cloth.

MANUFACTURING

THE word manufacture is derived from the Latin *manus*, "hand," and *facere*, "to make." Literally, it means "made by hand." However, in modern usage, the term no longer imparts its intrinsic meaning, but almost invariably refers to the making of articles by power driven machinery rather than by hand-operated tools. This change in language is representative of far greater and more important changes in social and economic conditions, which were consequent to the Industrial Revolution that originated in England during the latter part of the 18th century.

For proper appreciation of the extraordinary effects of the Industrial Revolution, it is first necessary to consider the systems of manufacturing and the social conditions which this revolution displaced.

The Domestic System. Primitive manufacturing consists of the elemental processes involved in the preparation, for individual or family use, of food, shelter, clothing, ornaments, weapons, and tools. Manufacturing in the home, of products intended solely for domestic consumption, was customary in the earliest times of which there is any record. It was equally characteristic of the pioneers who settled the American West, and is always to be found where individual families must depend upon their own resources. The first advance in manufacturing practice came when some member of a household was able to produce a surplus of meal, cloth, leather, or other commodity, which could be sold outside of the home.

Origin of Handicrafts. Later, with the rise and development of large communities, specialization became possible. Men who were unusually skillful in building, weaving, metal working, or other handicraft were enabled to devote all their energies to their chosen occupations. Thus originated the numerous trades, such as those of carpenter, wheelwright, coppersmith, weaver, fuller, tanner, butcher, and baker. Eventually, the expert workers learned to combine for mutual benefit according to their distinctive handicrafts. Such combinations, which in Europe were known as craft guilds, gradually became very powerful and were able to exercise strict control over the individual members and their products.

As a rule, a master craftsman labored at home or in a shop connected with his dwelling place, carrying on his trade with the aid of apprentices and the help of journeymen who formed the intermediate grade of workers. His products were made to suit the demands of his customers, or were offered for sale to the public under regulations prescribed by the guild to which he belonged. The master generally owned his shop and tools, purchased his raw materials, changed them into the finished product, and disposed of the goods himself.

The Outwork System. The next step in the organization of manufacturing came with the growth of the outwork system. By this arrangement, raw materials owned by a merchant were distributed or "put out" among home workers, who made and returned the finished product and received payment for their labor. Under these conditions, the buying of raw materials and the selling of completed goods were controlled by the merchant. The workman, however, owned the tools required for production and was, to a certain extent, master of his time. He usually owned his home and a piece of ground, so that a shortage of work at his craft allowed him to give more time to his farm.

Hand Power and Machines. All of the foregoing systems of domestic production are still in existence. Bread is baked and clothing is made in many homes. And, frequently, a woman who has acquired unusual skill as a cook or as a seamstress devotes her spare time to preparing food or clothes for her neighbors. In almost every town, carpenters, cabinetmakers, tinsmiths, blacksmiths, tailors, and many other skilled craftsmen are to be found working with their own tools and in their own workshops in order to fill custom orders. Panama hats, Turkish rugs, Navajo blankets, and the fine laces of Switzerland, Italy, and Ireland are still prepared by the painstaking action of skilled fingers. Nor has the outwork system been entirely discarded. In a modified form it is still the basis of modern, successful, merchandising concerns which sell knitting machines and yarn to home workers, and buy, for resale, all of the hosiery which they are able to produce. Nevertheless, all of the foregoing examples are exceptions to the general rule that, today, manufacturing is done in factories equipped with complicated, power driven machinery. This change from handwork to the factory system of production was the outstanding feature of the Industrial Revolution.

Manufacturing before 1780. In the chapter on the history of commerce, it has been shown that manufacturing, transportation, and commerce are interdependent and have developed together from the earliest historical times. When, by 1750, England had become the chief commercial nation of the world, the most important products of her industries were woolen textiles, fabricated to a large extent from the fleece of domestic sheep.

Cloth making was a domestic industry in which the wool was washed, carded, and spun into yarn by women. The processes in use differed from those employed in the days of ancient Greece only because the spinning wheel had been substituted for the distaff and spindle sometime during the 15th century. Almost every cottage contained a loom, on which the yarn was woven into cloth by the master of the house. The methods of weaving, like those of spinning, had changed very little for centuries, although in 1733 John Kay invented the "fly shuttle," which made the process much more easy and rapid.

As several spinners were required to keep a weaver supplied with yarn, the weavers were usually glad to make cloth from yarn "put out" by a merchant. In this way the workers were able to keep continuously occupied, while the merchant insured a steady supply of cloth with which to meet the increasing demands of commerce. Fulling and finishing of woolen fabrics were generally done in a fulling mill located on the banks of a stream.

Practically all other operations were performed in the homes, although occasionally a merchant would erect and equip a weaving shed wherein a considerable number of hired weavers could work together under his supervision. Production of cotton cloth was small, the finest cotton goods being imported from India.

In the iron industry, charcoal furnaces were still extensively used, although the practice of smelting with coke, as introduced by Abraham Darby about 1735, was gradually spreading. This new demand for coke stimulated production of coal. In operating the coal mines, Newcomen's engine was found to be valuable for pumping out water which accumulated in the tunnels and galleries. Power for the operation of slitting mills and for producing the air blast for furnaces was obtained by water wheels. For this reason, ironworks were usually located beside streams.

Economic Conditions. A review of the general economic conditions existing in England about 1763 shows that commerce was actively increasing, transportation was being facilitated by the construction of turnpikes and canals, capital was accumulating, and industrial production, while very important in the aggregate, represented the contributions from farm homes and from many small shops or works, quite widely dispersed throughout the land. The country as a whole was fundamentally agricultural.

Living conditions were comparatively stable, because, if unable to obtain employment at his trade, a skilled worker could generally depend upon his small farm for the necessities of life.

At home, England possessed what seemed to be an adequate supply of coal, iron ore, and wool; her colonies were capable of producing large quantities of cotton, sugar, and natural dyes. All of these raw materials are adapted to large scale operations, and, as the demands for commercial products continued to increase, the need for machinery and improved methods of production was commonly recognized.

Epoch-making Inventions. In 1767, James Hargreaves invented his spinning jenny, capable of spinning eight threads of cotton instead of one. Arkwright, a barber by trade, followed, in 1769, with the roll-drawing spinner, which operated by water power, and therefore became known as the water frame. This machine produced thread strong enough to be used for the warp of cotton cloth, but insufficiently fine for the higher grades of muslin.

Ten years later, Samuel Crompton combined the best features of the jenny and the roll-spinner in a new power machine which, because of its hybrid origin, he called a "mule." The mule established the muslin industry in England. It also made it possible to spin cotton thread faster than the weavers could change it into cloth on the hand looms.

Improvements in the speed of weaving began in 1785 when Edmund Cartwright, a clergyman, obtained a patent for a power loom. This machine at first was far from successful; in fact, a practicable power loom did not come into use until about 1803. The great demand for cotton, caused by the application of the power loom, could not have been supplied at a reasonable cost had not Eli Whitney, in 1793, invented his cotton gin, whereby cotton fiber could be quickly separated from the seeds. It is interesting to note that these great inventions were all concerned with the manufacture of cotton, rather than of woolen, fabrics. The use of power for spinning and weaving wool did not become general for several years after the beginning of the 19th century.

Water Power and Steam. In order to use the new textile machinery, many cotton mills were erected in the northern parts of England, where water power was most available. But the necessity of locating beside a waterfall was removed by Watt's condensing engine, invented in 1765 and greatly improved in succeeding years. Steam boilers heated by coal fires became a source of unlimited power. As the cost of transporting coal was greater than that of moving textiles or other finished commodities, the coal fields gradually became the center of manufacturing industries.

The iron trade also was greatly stimulated by the use of coal and of steam power. For example, the annual production of iron was doubled within eight years after the substitution of the steam engine for water power as a source of the air blast required in smelting. In 1783, Henry Cort invented the grooved rolling mill, and, in the following year, introduced the puddling process for making wrought iron from pig iron.

Thus, in response to the demands of commerce for large quantities of cheap textiles, we find that, in the last half of the 18th century, machines were invented which permitted of an increased volume of production. Steam engines were developed to drive the machinery. Cort's inventions made possible a more extensive application of iron, and from the improved iron many new types of machines and more efficient engines were constructed.

Effects of the New Inventions. Manufacturing by machinery, in buildings especially designed for that purpose, required a far greater outlay of capital than was necessary to provide the simple tools used by manual laborers. Nevertheless, costs of production were so greatly reduced by this method that a development of the factory system was inevitable. The widespread domestic system practically disappeared, because necessity forced the workers to leave their rural homes and to concentrate near the factories. The laboring population was gradually transplanted from the land to the cities. Master craftsmen, skilled in all branches of their trade, were no longer needed. For the factory system of production depends upon the use of labor-saving machinery wherever possible, and upon a systematic division of any complete manufacturing process into the proper number of parts. Each succeeding step is then performed by a worker who is able to acquire a high degree of skill in the accomplishment of a single operation. Under this system, production increased enormously, old industries expanded, and new ones came into existence.

Industrial Advantages. Europe became the workshop of the world, and, until 1894, England surpassed all other nations in manufacturing. The advantages which caused her superiority are worthy of note because they are those which, today, will insure the success of any properly directed manufacturing concern. England controlled a plentiful supply of cheap *raw materials*. Her *workers* were skillful and adaptable. Her methods of *production*, because of the many great inventions and the early adoption of the factory system, were the most efficient known. She had, in her colonies and also in continental Europe, a ready *market* for her finished goods. And, as a means of *distribution*, her highly skilled commercial organization was second to none.

British Industrial Centers. Textiles are, as they always have been, the chief product of British manufacture. Before the advent of machinery, wool was the principal fiber used, but, early in the 19th century, cotton took the lead. Cotton was first imported into England in 1298 for use in making candlewicks. By 1801, England produced more cotton goods than did all of continental Europe. Manchester became the cotton manufacturing center of the world. Leeds is now the center of the British woolen industry, of the manufacture of ready-made clothing, and of leather. Leicester is renowned for the production of woolen hosiery, as Nottingham is for cotton hosiery and for machine-made net. Silk weaving and dyeing is located chiefly in Derbyshire.

The iron and steel industry in England is second in importance only to that of textiles. Blast furnaces and rolling mills are concentrated at Middlesbrough, Newport, and Barrow, while Birmingham and Sheffield have become world famous for their manufactures of fine steel and of steel products. An example of extreme specialization is Redditch, whence a large part of the world is supplied with needles and fishhooks. The greatest shipbuilding district in the world is located along the banks of the Clyde river. The heart of the British ceramic industry is at Burslem in north Staffordshire.

INDUSTRIAL GERMANY

Germany's industrial revolution did not begin until the formation of the empire in 1871. But, when once begun, the transformation from an agricultural to an industrial basis was the most rapid and complete ever known. In 1845 Germany mined less coal than either France or Belgium. In 1880, Spain had more steam tonnage than Germany. Even as late as 1882, more than one-fourth of the German textile workers operated under the domestic system. But, by 1895, over 90 per cent were employed in factories. In 1871, about 64 per cent of the population of Germany was rural, while 36 per cent lived in cities. During the succeeding 40 years the intensive development of manufacturing caused towns to grow rapidly while the rural population remained stationary. In 1910, 60 per cent of the people lived in cities.

Fuel and Iron. Germany possessed or controlled abundant supplies of iron and coal. Nevertheless, her iron ore, derived chiefly from Lorraine and Luxemburg, contained a high proportion of phosphorus and was thereby rendered unsuitable for the production of Bessemer steel. This difficulty was removed in 1878 when Thomas and Gilchrist invented their basic method of making steel, by which phosphorus is removed from the molten metal and retained in the slag. When finely ground, "Thomas slag" becomes valuable as a fertilizer, so that the invention stimulated both manufacturing and agriculture, and was of fundamental importance to Germany.

As coal from the Ruhr district has exceptionally good coking qualities, Gelsenkirchen became the center of the German coke industry. Blast furnaces were located to a large extent near the ore supply in Lorraine, while steel mills sprang up in the Ruhr valley. These were connected by railroad lines over which coke was carried in one direction, iron ore and pig iron in the other. Essen is the most famous of the German steel manufacturing towns. In southern Saxony and Thuringia are found extensive beds of lignite which serves as the basis of a mineral oil industry, as fuel for the operation of near-by beet sugar refineries, and as a cheap source of power for the generation of electricity. At Halle is a great factory where electricity is used to prepare fertilizers from atmospheric nitrogen.

Chemical and Other Industries. The German dye and fine-chemical industry, although depending primarily on the by-products from the coke ovens, is quite widely distributed, with the chief factories located on waterways at Ludwigshafen, Leverkusen (near Cologne), Frankfort, Hochst, and Berlin. The heavy-chemical industry is centered about the potash beds of Stassfurt. The largest salt works in the country is at Schonebeck.

Most of Germany's electrical machinery is made at Berlin and Nuremberg. Porcelain is produced chiefly at Meissen, Zwickau, and Berlin. Crefeld rivals Lyon as a center of the silk industry. Shipbuilding is important at Stettin, Hamburg, Kiel, and Lubeck. Textile factories tend to concentrate near the coal fields, but the industry as a whole is scattered over the entire country. Chemnitz is called the Saxon Manchester. As a nation devoted to manufacturing, Germany's policy has been to produce highly finished goods in which the greatest proportion of the cost is due to the application of skilled labor.

OTHER EUROPEAN NATIONS

France. In France the innovations which had so quickly transformed industrial conditions in England were adopted with much less haste. In 1848, factory methods of production were not yet customary, and typical French manufacturing was done in private workshops or in small establishments. One of the chief reasons why steam power was not more quickly applied in France was an insufficient supply of coal.

The famous French steelworks at Le Creusot were founded by royal charter in 1782, but this enterprise was not financially successful until the management was taken over by the Schneider family in 1836.

Production of textiles and of clothing is the most important branch of French manufacturing. Roubaix, Tourcoing, Fourmies, Reims, and Amiens are the chief centers of the wool industry. Mulhausen, in Alsace, and Rouen lead in the production of cotton fabrics. Paris has become the center of the production of jewelry, perfumes, gloves, shoes, and porcelain. Lyon is at the heart of the great French silk trade. Saint Etienne is known for the production of silk ribbons; Troyes, for hosiery; and Grenoble, for kid gloves. Lille is the largest manufacturing city of the North.

Switzerland. Switzerland, with very little coal or iron, is distinctly a manufacturing country which is forced, by a shortage of raw materials, to produce highly finished articles, such as silks, fine shoes, watches, and intricate machinery. The famous Geneva watches are so named because Geneva is the commercial center of the watch trade. They are made chiefly in the towns of Le Locle, La Chaux de Fonds, Bienne, Saint Imier, and Porrentruy. A shoe factory at Schonenwerd, near Olten, is said to be the largest in Europe. Saint Gallen is noted for the production of embroidered linen. Zurich and Basel are centers of the silk industry. Electricity generated by water power is extensively employed, notably in the production of aluminum at Rheinfelden.

Belgium. This country, where both coal and iron are available, was the only section of Europe which was able to follow the industrial pace set by England during the first half of the 19th century. Liege is one of the most successful metallurgical and manufacturing cities in Europe. It is famous for the production of all types of steel products, especially firearms. The production of textiles is even more important than that of steel and machinery. Cotton manufacturing is centered at Ghent, the making of linen at Ghent and Tournay, and the spinning and weaving of wool at Verviers.

Scandinavia. Sweden and Norway are noted for the production of wood pulp, matches, and paper, and for their electrochemical industries. In Norway electricity is used to manufacture large amounts of nitrogenous fertilizer at Odde, Notodden, and Sarpsborg. Stockholm, Goteborg, and Norrkoping are the chief industrial towns of Sweden. Perhaps the most famous manufactured product is the pure Swedish iron, reduced from domestic ore with charcoal from the extensive forests.

Czechoslovakia. This new nation possesses a better supply of coal than of iron. Bohemia, however, is noted for its iron industry, and especially for the manufacture of fine glassware, of which Eger is the center of production. Small articles of glass, such as buttons, beads, and imitation jewels, are produced in enormous quantities at Gablonz.

Western Europe is the most important manufacturing district of the world. In 1880, the United Kingdom led all other nations in this branch of industry; France was second, Germany third, and the United States fourth. By 1894 the United States had assumed first place among manufacturing nations, with England second, Germany third, and France fourth.

MANUFACTURING IN THE UNITED STATES

The development of successful manufacturing requires, among other things, an adequate supply of capital and of labor, a steady market for the finished products, and regular means of transportation. None of these was available in the American colonies during the early period of their existence. Furthermore, almost all of the colonies were founded as commercial enterprises which were expected to serve their promoters and the homeland by becoming a source of raw materials and a market for manufactured goods.

First Colonial Manufactures. In the early colonial days of America, each home was of necessity self-sufficient. Grain was ground, wool was spun and woven, and hides were tanned only in order to supply the needs of the family. However, as the population increased and towns developed, these industries were divided among the members of each community. Each settlement was soon furnished with mills for grinding grain, for sawing lumber, and for the fulling and finishing of woolen cloth. Tanneries, also, were erected in many communities.

SUMMARY OF MANUFACTURING INDUSTR

State	Number of Establishments	Persons Engaged in Industry*				Capital*
		Proprietors and Firm Members	Salaried Employees	Wage Earners (Average Number)	Total	
Alabama	2,349	3,914	9,816	107,159	120,889	$ 455,593,0
Arizona	294	416	1,403	8,528	10,347	101,486,0
Arkansas	1,257	3,682	4,566	49,954	58,202	138,818,0
California	9,638	12,452	40,714	243,692	296,858	1,242,980,0
Colorado	1,416	2,234	7,241	35,254	44,729	243,827,0
Connecticut	3,062	3,920	41,441	292,672	338,033	1,341,324,0
Delaware	419	593	3,344	29,035	32,972	148,208,0
District of Columbia	538	515	3,104	10,482	14,101	63,008,0
Florida	1,863	2,616	5,955	74,415	82,986	206,294,0
Georgia	2,876	4,776	12,795	123,441	141,012	448,700,0
Idaho	490	851	1,500	13,917	16,268	96,062,0
Illinois	14,117	15,282	136,409	653,114	804,805	3,366,453,0
Indiana	4,772	6,768	45,797	277,580	330,145	1,335,714,0
Iowa	3,270	5,393	19,495	80,551	105,439	403,206,0
Kansas	1,878	3,562	12,398	61,049	77,009	357,534,0
Kentucky	1,864	4,003	10,611	69,340	83,954	276,535,0
Louisiana	1,742	2,042	12,216	98,265	112,523	462,209,0
Maine	1,500	2,745	7,916	88,651	99,312	419,158,0
Maryland	3,184	5,129	20,398	140,342	165,869	619,607,0
Massachusetts	10,027	9,451	89,234	713,836	812,521	2,939,837,0
Michigan	5,600	6,762	71,065	471,242	549,069	2,340,954,0
Minnesota	3,888	5,128	26,927	115,623	147,678	690,386,0
Mississippi	1,705	2,811	4,081	57,560	64,452	154,117,0
Missouri	5,114	7,676	42,226	195,037	244,939	938,761,0
Montana	606	1,200	2,332	17,160	20,692	137,476,0
Nebraska	1,306	2,916	9,639	36,521	49,076	245,257,0
Nevada	102	136	308	3,119	3,563	16,835,0
New Hampshire	1,038	1,426	5,832	83,074	90,332	329,167,0
New Jersey	8,204	10,249	84,135	508,686	603,070	2,835,577,0
New Mexico	200	336	574	5,736	6,646	15,226,0
New York	33,393	49,484	247,147	1,228,130	1,524,761	6,012,083,0
North Carolina	2,614	6,076	11,688	157,659	175,423	669,144,0
North Dakota	320	774	902	4,472	6,148	24,550,0
Ohio	11,137	12,823	139,362	730,733	882,918	3,748,744,0
Oklahoma	1,282	2,320	6,491	29,503	38,314	277,034,0
Oregon	1,908	2,540	6,906	58,559	68,005	237,255,0
Pennsylvania	17,298	27,433	160,392	1,135,837	1,323,662	6,224,730,0
Rhode Island	1,595	2,124	14,223	139,665	156,012	594,337,0
South Carolina	1,134	1,754	5,156	79,450	86,360	374,538,0
South Dakota	504	1,410	1,242	6,382	9,034	30,933,0
Tennessee	2,162	4,892	13,241	95,167	113,300	410,203,0
Texas	3,606	5,393	17,996	107,522	130,911	585,776,0
Utah	517	1,089	3,150	18,868	23,107	140,785,0
Vermont	951	1,804	3,550	33,491	38,845	134,314,0
Virginia	2,553	5,900	13,926	119,352	139,178	463,644,0
Washington	3,216	4,195	13,356	132,928	150,479	574,235,0
West Virginia	1,395	2,524	8,128	83,086	93,738	339,190,0
Wisconsin	7,262	7,951	45,999	263,949	317,899	1,371,729,0
Wyoming	224	567	894	6,634	8,095	82,288,0
Total	187,390	270,037	1,447,221	9,096,422	10,813,680	44,665,821,0

*Figures for capital, salaries, and persons engaged in industry are from the latest decennial census, 1920, those for 192
comprising 133,054 proprietors and firm members, 1,340,382 salaried officers and employees, and 8,384,261 wage ear

THE UNITED STATES BY STATES, 1925

Salaries*	Wages	Primary Horse Power	Cost of Materials	Value of Products	Value Added by Manufacture	STATE
18,567,000	101,242,839	697,998	325,684,194	552,824,044	227,139,850	Alabama
3,112,000	11,506,159	102,127	92,270,550	138,781,477	46,510,927	Arizona
9,329,000	37,538,492	177,011	110,664,557	195,208,015	84,543,458	Arkansas
75,420,000	350,835,411	1,133,890	1,474,887,292	2,442,952,104	968,064,812	California
13,046,000	43,007,674	219,865	171,191,543	278,778,008	107,586,465	Colorado
81,785,000	301,199,566	790,087	612,642,343	1,274,951,562	662,309,219	Connecticut
7,709,000	25,072,302	107,391	70,622,434	125,406,332	54,783,898	Delaware
5,667,000	15,320,067	37,508	33,503,934	83,576,826	50,072,892	Dist. of Columbia
10,835,000	65,780,109	144,161	113,796,330	267,009,159	153,212,829	Florida
25,505,000	99,210,003	523,334	399,351,258	648,852,294	249,501,036	Georgia
2,702,000	20,708,725	82,552	53,151,610	96,989,661	43,838,051	Idaho
274,616,000	897,970,455	2,247,408	2,926,064,176	5,321,837,866	2,395,773,690	Illinois
85,116,000	365,003,314	1,420,989	1,257,960,617	2,125,023,109	867,062,492	Indiana
34,044,000	92,232,591	308,016	499,586,023	757,771,477	258,185,454	Iowa
21,796,000	59,207,393	276,874	538,201,643	706,249,994	168,048,351	Kansas
19,678,000	84,945,679	257,965	255,108,215	453,936,575	198,828,360	Kentucky
22,946,000	79,762,794	410,298	465,426,439	710,050,100	244,623,661	Louisiana
17,503,000	79,777,217	600,787	205,708,596	371,849,483	166,140,887	Maine
42,004,000	138,590,634	544,558	568,591,242	926,251,640	357,660,398	Maryland
183,435,000	716,155,593	2,013,017	1,794,643,051	3,426,617,326	1,631,974,275	Massachusetts
145,035,000	792,224,933	1,887,750	2,466,425,886	4,373,186,136	1,906,760,250	Michigan
45,360,000	123,767,442	508,021	770,723,999	1,101,855,641	331,131,642	Minnesota
7,927,000	41,231,045	211,691	103,588,476	200,453,028	96,864,552	Mississippi
79,045,000	230,690,902	590,485	980,459,091	1,607,161,018	626,701,927	Missouri
4,741,000	21,078,039	166,528	146,351,366	205,474,257	59,122,891	Montana
15,742,000	36,021,367	133,708	348,397,110	443,308,700	94,911,590	Nebraska
588,000	4,473,555	14,604	12,084,423	21,626,668	9,542,245	Nevada
13,212,000	71,725,465	370,740	192,253,411	327,400,651	135,147,240	New Hampshire
171,074,000	576,235,826	1,384,234	2,086,855,079	3,539,181,253	1,452,326,174	New Jersey
1,027,000	5,083,211	18,842	9,684,279	19,458,585	9,774,306	New Mexico
513,548,000	1,533,893,390	3,348,184	4,704,989,399	8,968,547,839	4,263,558,440	New York
23,774,000	134,237,097	800,051	550,706,965	1,050,434,117	499,727,152	North Carolina
1,434,000	4,574,698	16,711	32,306,744	44,631,516	12,324,772	North Dakota
273,714,000	975,811,976	3,482,618	3,029,686,278	5,347,522,464	2,317,836,186	Ohio
11,961,000	34,210,630	156,826	301,147,045	403,295,440	102,148,395	Oklahoma
13,999,000	78,208,774	387,749	193,609,081	352,948,841	159,339,760	Oregon
234,763,000	1,324,481,011	5,373,972	3,890,513,639	6,901,762,098	3,011,248,459	Pennsylvania
13,014,000	138,125,781	395,754	345,221,110	621,919,637	276,698,527	Rhode Island
10,513,000	67,061,783	423,359	240,303,811	373,359,810	133,055,999	South Carolina
2,076,000	6,208,088	21,463	46,941,826	63,432,674	16,490,848	South Dakota
25,268,000	95,255,480	447,529	358,097,155	601,488,472	243,391,317	Tennessee
31,504,000	116,363,302	572,798	845,143,862	1,237,952,469	392,808,607	Texas
5,680,000	18,199,536	124,735	127,543,099	177,224,538	49,681,439	Utah
7,345,000	32,326,006	178,806	74,387,398	138,269,861	63,882,463	Vermont
25,908,000	105,886,599	441,807	314,711,268	589,510,865	274,799,597	Virginia
30,374,000	146,224,608	748,110	372,758,621	659,339,836	286,581,215	Washington
17,686,000	105,892,102	431,981	260,880,407	470,821,582	209,941,175	West Virginia
87,538,000	314,883,011	1,009,015	1,084,747,480	1,859,243,930	774,496,450	Wisconsin
1,702,000	10,526,253	28,721	76,073,349	107,984,752	31,911,403	Wyoming
770,367,000	10,729,968,927	35,772,628	35,935,647,704	62,713,713,730	26,778,066,026	

ng available for individual states. Throughout the country, the number of persons engaged in industry in 1925 was 9,857,697, tal salaries paid amounted to $3,147,328,676.

The first sawmill was built at Dorchester (Mass.) in 1628. The first New England tannery was located at Lynn in 1629, and the manufacture of shoes was begun there in 1635.

Expansion of New England Industry. The American colonies as a group were essentially agricultural. But, in New England, where the land was not well adapted to farming, a large proportion of the settlers were forced to gain a livelihood by other means. Fishing, which, from the first, was an industry of primary importance, gave rise to a demand for ships. The finest materials with which to construct ships were available in the forests, and shipbuilding soon became one of the chief industries.

From fishing and shipbuilding, the New Englanders quite naturally advanced to maritime trade, which was carried on at first chiefly with the West Indies. These islands were glad to exchange their surplus sugar and molasses for salt fish and lumber. Thus, in addition to purely local manufacturing industries which sprang up in all of the settlements, New England developed others which were based on the necessity of equipping the ships, supplying food for the sailors, providing cargoes for export, and utilizing the commodites that were imported.

A ropewalk to supply vessels with cordage was erected in Boston in 1641, and, at many places along the coast, salt for the preservation of meat and fish was prepared by evaporating sea water over wood fires. Bakers found employment in shops devoted to the production of sea biscuit, or hard-tack. Rum was so extensively used on shipboard that the expense for liquor issued regularly to sailors was generally as great as the cost of their bread, and the production of rum by fermenting and distilling the West Indian molasses became a thriving New England industry. Since practically all commercial commodities, whether liquid or solid, were packed and shipped in barrels, the manufacture of barrels and barrel staves, buckets, and similar forms of cooperage from the white oak of New England became exceedingly profitable.

Ironworks. Iron was sorely needed in the colonies, not only to provide ships with anchors, bells, cannon, and shot, but also to supply the population with nails, hardware, cooking utensils, iron barrel hoops, and similar products. The earliest successful attempt to meet the demand was made at Lynn, Massachusetts, where a company organized by the son of Governor Winthrop erected a blast furnace in 1644. The first product from the furnace was a cast-iron kettle of about one quart capacity, made in 1645. In 1648 a refining forge was added to the equipment, so that refined iron products then became available. The making of nails, hammered from rods of iron obtained from slitting mills, was a domestic industry almost as widespread as the production of textiles.

Growth of Manufacturing. The colonial population, which in 1640 numbered 25,000, increased to one million during the succeeding century, and amounted to 2¼ million in 1775. Manufacturing developed at a corresponding rate. Iron furnaces and refining forges became almost as common as sawmills, gristmills, and fulling mills. The ability of the colonial foundrymen is shown by the fact that in 1753 they melted and recast the bell for the Pennsylvania statehouse, which afterward became famous as the Liberty Bell. Four of the signers of the Declaration of Independence were financially interested in the iron industry. The Washington family owned a one-twelfth interest in the Principio ironworks of Maryland.

England encouraged the manufacture of pig iron, but passed laws against the production of steel and steel products, as well as that of other articles which competed with British industry. Although these prohibitory laws checked the growth of manufacturing industries, enforcement of them was found to be almost impossible except in the vicinity of the larger cities where the crown officers were stationed.

The Revolutionary War greatly stimulated American manufacturing, because raw materials accumulated and the supply of English products, on which the country had largely depended, was cut off. Necessity caused the growth of various industries. But, when peace was concluded, English manufacturers flooded the country with their products at prices so low that many American concerns were ruined.

Textiles. Competition of American made cloth with that of British manufacture was especially difficult, because the colonies were at first unable to utilize the newly invented textile machinery. England not only prohibited the exportation of designs or models of the machines, but even endeavored to prevent the emigration of mechanics skilled in the industry. However, in 1789, Samuel Slater, who had been employed in Arkwright's factory, came to America. He went first to Philadelphia, where a comparatively large amount of cotton spinning was carried on. Failing to interest the manufacturers in that city, he went to New York and then to Rhode Island, where, in 1790, on the falls of the Pawtucket river, he built for Moses Brown the first power driven cotton spinning mill in the United States. Andrew Jackson called Slater the "father of American manufacturers."

In 1805, there were only four cotton mills in America. But the passing of the Embargo act of 1807, followed by the Nonintercourse act and the War of 1812, prevented foreign commerce and again stimulated manufacturing. Twelve new spinning mills were opened in 1808; in 1811, spindles to the number of 80,000 were in use, and 10,000 bales of cotton were spun; in 1815, the spindles numbered 500,000. In 1814, Francis Cabot Lowell devised a power loom similar to those which he had seen while visiting England, and erected at Waltham, Massachusetts, the first complete cotton factory in the world. Practically all power mills were located on waterfalls, although steam engines came into use as a source of power after 1810. Most of the early mills obtained their cotton from the West Indies, because the Southern states marketed their product in Liverpool.

Tariffs and Railroads. At the close of the War of 1812, British manufactures were for a second time thrown on the American market at prices which brought disaster to many growing industries. After 1816, these industries received protection through a series of tariff acts, and manufacturing again expanded.

Even more important than the tariff, however, in its influence upon manufactures, was the development of railroads. The iron industry was directly affected, because the railroads proved to be the greatest consumers of iron products. Iron T rails were first rolled in 1844, in Maryland. Bessemer steel was first made on a commercial scale in 1864; in the following year, the Chicago Rolling Mills produced the first American Bessemer steel rails. Besides thus stimulating iron and steel manufactures, through enlarging the market for their products, the railroads promoted many types of industry by furnishing the necessary means for the interchange of goods between manufacturing centers and distant agricultural regions. The cotton growing South and the rapidly expanding agricultural regions of the West afforded rich markets where the demand for manufactured products seemed unlimited. By 1860 the annual production of agricultural implements alone amounted to 17.8 million dollars.

Inventions and Industrial Progress. While the development of such agricultural machinery as the McCormick reaper added greatly to the farmers' ability to raise grain on a large scale, many other great inventions opened the way for new forms of manufacturing. (See table of *Modern Inventions*.) To choose a single example, the invention of the sewing machine laid the foundation for the great

modern clothes making industries, and, when the machine was developed, it revolutionized the process of making shoes.

Manufacturing after the Civil War. During the Civil War, the lack of the customary supply of raw material from the Southern states checked the production of cotton goods, although other branches of manufacturing were unusually active. The coming of peace introduced an era of industrial progress in which large scale production was developed to a degree never before attained, and the United States advanced steadily to first rank among manufacturing nations. In 1820, America produced only 2 per cent of the world's pig iron; a century later the proportion had increased to 54 per cent.

America's Chief Manufactures. Fourteen groups of related industries, each of which has an annual production in excess of one billion dollars, account for over 95 per cent of all American manufactures. In the following list, the principal groups are ranked in order of importance as shown by the census of 1925.

GREAT MANUFACTURING INDUSTRIES

Group / Important Divisions	Value
Food and Kindred products	$10,418,536,000
Slaughtering and meat packing	3,050,286,000
Flour and grainmill products	1,298,015,000
Bread and other bakery products	1,268,194,000
Butter, cheese, condensed milk	973,518,000
Canning and preserving	677,132,000
Confectionery	379,081,000
Ice cream	286,176,000
Textiles and their products	9,122,858,000
Cotton goods	1,714,368,000
Woolen and worsted goods	957,790,000
Silk goods	808,979,000
Knit goods	809,960,000
Men's clothing	1,087,238,000
Women's clothing	1,293,705,000
Iron and Steel	6,461,668,000
Steelworks and rolling mill products	2,946,068,000
Blast furnace products	765,286,000
Chemicals and allied products	6,438,027,000
Petroleum refining	2,376,657,000
Chemicals	547,003,000
Drug industries	472,494,000
Paints and varnishes	470,736,000
Gas, illuminating and heating	455,460,000
Soap	278,273,000
Fertilizers	206,773,000
Rayon	88,061,000
Transportation equipment	5,451,753,000
Automobiles and trucks	3,198,123,000
Automobile bodies and parts	1,523,280,000
Steam and electric railroad cars	390,771,000
Ship and boat building	177,182,000
Aircraft	12,525,000
Machinery	5,020,281,000
Foundry and machine shop products	2,232,986,000
Electrical machinery, supplies	1,540,002,000
Radio, apparatus and tubes	176,990,000
Paper and printing	4,143,685,000
Printing and publishing	2,482,065,000
Paper-mill products	971,882,320
Pulp-mill products	55,200,000
Lumber and its remanufacture	3,688,552,000
Lumber and timber products	1,421,162,000
Furniture	868,146,000
Planing mill products	710,861,000
Boxes, wooden packing	152,295,000
Nonferrous metals and products	2,833,770,000
Smelting and refining	1,149,264,000
Manufactured metal products	983,267,000
Aluminum manufactures	127,331,000
Leather and products	1,767,581,000
Leather, tanned, curried, and finished	462,014,000
Boots and shoes	925,383,000
Stone, clay, and glass products	1,640,652,000
Industries using stone as material	779,032,000
Cement	300,895,000
Industries using clay as material	502,770,000
Glass, and glass products	358,850,000
Railroad repair shops	1,332,679,000
Rubber products	1,255,414,000
Rubber tires and inner tubes	925,001,000
Tobacco manufactures	1,091,001,000
Musical instruments, phonographs	231,687,000
Miscellaneous industries	1,815,570,000
Laundering, power	362,295,000
Fur goods	254,266,000
Total value of manufactures	$62,713,714,000

Distribution of Manufacturing. As the preceding table shows what manufactures in the United States have the greatest annual value, the next point of interest is, "Where are these industries chiefly located?" Inspection of the table, *Summary of Manufacturing Industries in the United States*, shows that fifteen states each had in 1925 an annual production exceeding one billion dollars in value. To these states is to be credited 80.7 per cent of all national manufactures. Seven states—New York, Pennsylvania, Ohio, Illinois, Michigan, New Jersey, and Massachusetts—each manufactured commodities valued in excess of three billion dollars, and together they produced 60.4 per cent of the manufactures of the United States.

Of the chief manufacturing cities of America, only eight are each credited with more than one per cent of the country's total production. These are: New York 8.49 per cent, Chicago 5.48, Philadelphia 3.09, Detroit 2.55, Cleveland 1.75, St. Louis 1.40, Baltimore 1.08, and Buffalo 1.08 per cent. Together, these cities produce almost one-quarter of all American manufactures.

Localization of Manufacturing. Economic considerations, involving the problems of obtaining a supply of raw materials, of power, and of labor, and having to do with the facilities for distributing the finished products to the market, usually determine the location of manufacturing industries. Some industries must necessarily be situated near their source of raw materials or of fuel; others, more dependent upon a supply of skilled labor, may locate in towns where similar industries are already established. Cotton and woolen mills require a moist atmosphere for successful operation, and for this reason are usually to be found near the seacoast.

The present localization of certain American industries seems, indeed, to have been due largely to chance. For, if the manufacturers of Philadelphia had not rejected Slater's offer, Philadelphia, rather than New Bedford, would probably now be the center of the cotton industry, and, had the captains of the fleet of New Bedford whalers been willing to invest their savings in towns other than their own, Fall River would probably still possess unquestioned leadership in cotton manufacturing. When John Adam Dagys, an expert Welsh shoemaker, settled in Lynn in 1750, his skill and business ability caused that town to become the center of the American shoemaking industry. From this position it has only recently been displaced by Brockton, Mass., and St. Louis, Mo. However, the force of competition will generally cause a manufacturing industry to be located at those points which provide the most advantageous access to raw materials and to desirable markets.

Westward Movement of Industry. As the center of American population has moved westward, it has been followed, although with less speed, by the center of manufacturing. The early settler in the "West" obtained his ax, spade, and kettles from New England. Today the Western farmer obtains his plow or thresher from Illinois. The center of production of flour and gristmill products has moved from New York to Minnesota. Here the mills are close to the great wheat producing areas, power is available, and markets are easily accessible. Slaughtering and meat packing, which, as a separate industry, originated in Cincinnati about 1818, is now centered in Chicago. Kansas City, Kansas, ranks second in this industry, with Omaha, Nebraska, third. In these locations, the industry is close to the Western cattle raising area, its source of raw material.

Manufacturing in the South. One of the most notable developments connected with American manufacturing progress has been that of the production of cotton goods in the Southern states. North Carolina is second only to Massachusetts in value of cotton manufactures. In 1880, North Carolina, South Carolina, and Georgia, together

produced only 6.2 per cent of American cotton products. In 1910, their combined output equaled 29.7 per cent, and, in 1925, 43.2 per cent, of the total. Just as the competition of New England has forced Manchester to produce finer grades of cotton goods, so have the Southern states forced New England to improve her products. In the production of iron and steel also the South is advancing steadily. Alabama ranks third in blast furnace capacity and produces nearly three times as much cast-iron pipe as any other state in the Union.

Distribution of Industry. The following table shows, for each of a number of important industries, which state ranks first in value of goods produced. When figures are given, they indicate the relation which the industry within a state bears to that of the entire country. The name of a city in parenthesis indicates the municipality which leads all others in a given industry.

CENTERS OF INDUSTRIAL PRODUCTION*

Industry or Product	Leading State	Per Cent of Total
Agricultural implements	Illinois	50.8
Ammunition	Connecticut	50.4
Automobiles	Michigan (Detroit)	47.5
Bakers' machinery	Ohio	31.8
Barrel staves	Arkansas	24.8
Brass, bronze, and their products	Connecticut (Waterbury)	30.0
Buttons	New York	33.1
Canned fruits, vegetables, and soups	California	25.6
Canned tomatoes	Maryland	31.4
Chemicals	New York	24.3
Chocolate and cocoa products	Pennsylvania	41.8
Clothing, Ready-made	New York (New York)	62.8
Collars, Men's	New York (Troy)	94.6
Condensed and evaporated milk	Wisconsin	28.3
Corn sirup, corn oil, and starch	Illinois	63.4
Corsets, brassieres	New York	33.1
Cotton goods	Massachusetts (New Bedford)	20.2
Dried fruits	California	94.8
Electrical machinery	New York	15.5
Felt hats	Connecticut	37.6
Fertilizer	Georgia	13.7
Firearms	Connecticut	47.6
Flour mill products	Minnesota (Minneapolis)	16.6
Furniture	New York	17.9
Glass	Pennsylvania	28.7
Hardwood lumber	Louisiana	11.0
Hosiery	Pennsylvania (Philadelphia)	39.9
Iron and steel	Pennsylvania	36.9
Jewelry	New York	35.7
Knit underwear	New York (Cohoes)	37.0
Laundry machinery	New York	....
Leather, tanned, curried, and finished	Pennsylvania	18.9
Linoleum	Pennsylvania	....
Lumber and timber products	Washington	17.8
Meat packing	Illinois (Chicago)	22.3
Motor cycles and bicycles	Massachusetts	34.3
Oil cloth	New York	....
Paints and varnishes	New York	18.8
Paper, Book and Writing	Massachusetts (Holyoke)	19.6
Paper, Newsprint	New York	31.8
Petroleum refining	Texas	20.5
Phonographs	New Jersey	42.2
Pianos	New York	37.6
Pins, needles, hooks and eyes, snap fasteners	Connecticut (Waterbury)	44.5
Printing and publishing	New York	24.6
Printing presses	Illinois	....
Rubber boots and shoes	Massachusetts	46.3
Rubber products, total	Ohio (Akron)	46.5
Sewing machines	New Jersey	....
Shingles	Washington	84.6

CENTERS OF INDUSTRIAL PRODUCTION—Con.

Industry or Product	Leading State	Per Cent of Total
Shoe machinery	Massachusetts (Beverly)	....
Shoemaking	Massachusetts	26.0
Silk goods	Pennsylvania (Paterson, N. J.)	40.7
Smelting and refining	New Jersey	21.0
Soap	New Jersey	18.0
Steam and electric railroad cars	Illinois	29.2
Sugar, cane	Louisiana	100.0
Sugar, beet	Colorado	31.1
Sugar, refining	New York	27.1
Tanning materials	New Jersey	20.7
Telephones	Illinois (Chicago)	....
Tobacco	North Carolina	31.4
Turpentine and rosin	Georgia	42.4
Typewriters	New York	44.1
Whips	Massachusetts (Westfield)	61.6
Wood pulp	Maine	23.2
Wool textiles	Massachusetts (Lawrence)	32.3

*Based on U. S. Census of Manufactures, 1925.

GROWTH AND SPECIALIZATION OF INDUSTRY

The 20th century witnessed a remarkable increase in specialization and an extraordinary rise in industrial efficiency. These were largely the result of the application of inventive genius and scientific research to the problems of production. Of chief importance was the exploitation of the possibilities in electricity as a means of transmitting power.

The Electrical Age. Power in the form of electricity can be used *when* and *where* it is wanted far more readily than power delivered directly from steam engine or water wheel. It facilitates the ready and precise control of machine processes, thereby making possible an increasing use of automatic machinery. In the first quarter of the 20th century electrification in American industry rose from 4 per cent to 70 per cent. Electricity used in factories but developed in central stations increased from 182,562 horse power in 1899 to 15,868,828 horse power in 1925—87 fold. The result has been a pronounced growth in production accomplished by a decreasing number of workmen. Wages have risen, yet many manufactured articles have become cheaper. At the same time, by making power available at long distances from its generating source, electricity has obviated the need for locating industries in centers of congested population. New industrial communities may be semi-rural in character, with marked improvement in living conditions.

Specialization and Mass Production. While the nail industry was among the first to effect the application of costly machines to each step in the process of manufacture, the automobile industry is associated with the most extreme form of this development. Operations are analyzed into their simplest constituent parts. Each of these parts is performed by a man, with or without a special machine, who does nothing else. His work may be confined to tightening nuts on certain bolts. The work and materials are usually delivered to him automatically, often on conveyor belts. Thus the time both of men and of machinery is used to the maximum. Such economies permit of much lower prices than would be possible under earlier forms of manufacture, provided the output is sufficiently great. This proviso explains why American industry is forced to exert such powerful selling pressure in the distribution of its products. Lower prices with higher real wages explain why such pressure has been so generally successful.

New Industries and Research. Through the expenditure of many millions of dollars on organized scientific research, industrial firms have evolved or perfected many important new materials and new

products which have become the basis of new industries. Examples are the camera, synthetic lacquer, the radio, and a cheap method of producing aluminum. The electrical, rubber, and automobile industries have risen in the 20th century from very small beginnings to gigantic proportions, automobiles reaching the first place among American industries in 1925. Synthetic nitrates, rayon, and airplanes have likewise forged ahead under the powerful stimulus of well-directed research. Many laboratories supported by industrial firms have attained a world-wide reputation for their contributions to science, notably that of the General Electric Company at Schenectady and the Bell Telephone laboratories in New York City.

Manufacturing and Agriculture. In 1899, one out of every 16 persons in the United States, or 6.2 per cent of the population, was employed in manufacturing. In 1919, the proportion had increased to 8.6 per cent. Not only, therefore, is manufacturing becoming more important because of the largely enhanced value of its product, but it produces a growing proportion of the total output of the country's industries, and it employs an increasing percentage of the working population. This condition became almost inevitable when the last of the rich American agricultural lands were settled. Fear is frequently expressed that manufacturing is making progress at the expense of agriculture. For any given locality this may at times be true, but, considered more broadly, manufacturing and agriculture must develop together. The great industrial cities could not exist for more than a day, or at most a week, if their incoming supply of food should be cut off, while the agriculturist, who finds his chief market in the industrial centers, would be unable to produce and distribute his crops if he did not have the advantages afforded by countless factory products.

LEADING MANUFACTURING CITIES OF THE UNITED STATES

Arranged in the order of rank in their respective states, Census of 1925*

State and City	Value of Products, 1919	Value of Products, 1925
	Dollars	Dollars
ALABAMA:		
Birmingham	127,214,048	100,204,032
Bessemer	18,442,946	20,838,994
Gadsden	13,825,604	16,397,137
Montgomery	21,101,835	16,162,380
ARIZONA:		
Phoenix	8,140,679	8,545,796
Tucson	3,756,314	3,482,804
ARKANSAS:		
Little Rock	23,167,993	23,930,586
Fort Smith	14,813,299	15,529,700
CALIFORNIA:		
Los Angeles	278,184,143	531,827,107
San Francisco	417,321,277	399,986,444
Oakland	134,755,470	144,840,830
Richmond	75,315,608	66,385,827
San Jose	25,135,500	46,025,821
Berkeley	28,331,212	43,414,726
Fresno	48,943,823	34,762,024
Sacramento	34,198,980	34,368,260
San Diego	20,226,000	28,214,115
COLORADO:		
Denver	125,411,270	125,762,865
Pueblo	13,978,264	7,733,113
CONNECTICUT:		
Bridgeport	208,089,797	149,098,353
Waterbury	130,193,040	127,172,564
New Haven	125,455,547	110,506,218
Hartford	118,002,693	109,678,463
New Britain	63,621,960	72,676,424
Ansonia	47,736,411	45,265,639
DELAWARE:		
Wilmington	121,039,617	76,502,097
DISTRICT OF COLUMBIA:		
Washington	68,826,570	83,576,826
FLORIDA:		
Tampa	42,461,377	55,446,901
Jacksonville	31,212,494	49,314,650
Miami	2,722,612	22,207,524
GEORGIA:		
Atlanta	113,991,946	131,236,952
Columbus	35,561,512	33,601,353
Macon	57,721,238	29,478,220
Augusta	37,160,571	26,709,585
HAWAII:		
Honolulu	43,611,175	.....†
Hilo	5,612,196	.....†
IDAHO:		
Pocatello	5,328,406	5,820,773
Boise	3,883,280	3,118,028
ILLINOIS:		
Chicago	3,657,424,471	3,439,163,391
Cicero	57,918,418	92,648,470
ILLINOIS—Con.:		
Rockford	74,918,953	73,598,345
East Saint Louis	77,292,812	68,160,785
Decatur	38,683,689	50,286,294
Peoria	57,074,893	48,138,036
INDIANA:		
Indianapolis	398,666,553	344,924,907
South Bend	75,339,165	150,616,006
East Chicago	89,568,753	148,345,042
Fort Wayne	76,713,262	93,639,967
Evansville	70,230,000	67,469,886
Hammond	59,276,319	50,874,473
IOWA:		
Sioux City	146,393,134	140,241,473
Cedar Rapids	92,118,386	89,626,868
Des Moines	59,830,954	83,624,093
Ottumwa	45,029,524	45,169,330
KANSAS:		
Kansas City	468,686,423	288,544,917
Wichita	38,580,182	54,670,711
Topeka	45,707,711	37,457,732
KENTUCKY:		
Louisville	204,565,727	263,692,639
Newport	16,935,349	17,171,617
Covington	17,120,603	16,325,006
LOUISIANA:		
New Orleans	182,798,561	155,105,768
Shreveport	12,876,467	15,256,523
MAINE:		
Portland	29,167,965	25,554,496
Auburn	27,852,043	22,533,073
Lewiston	29,763,387	21,865,691
MARYLAND:		
Baltimore	677,878,492	678,947,199
Cumberland	15,842,210	50,564,230
Hagerstown	17,662,575	17,542,327
MASSACHUSETTS:		
Boston	618,921,962	585,991,717
Worcester	208,705,773	210,461,220
Lawrence	183,449,096	175,674,023
Cambridge	127,864,901	165,833,197
New Bedford	210,773,312	143,551,349
Fall River	163,246,082	142,884,764
Springfield	98,332,955	109,515,834
Lynn	160,905,792	97,143,378
Holyoke	93,426,775	88,325,281
Chicopee	89,772,534	87,057,326
Lowell	137,801,538	81,135,635
Brockton	117,855,025	69,608,677
Somerville	99,558,513	58,806,424
Haverhill	96,276,853	55,163,457
Pittsfield	41,613,356	51,880,490
Everett	35,775,728	51,517,163
Fitchburg	58,164,842	51,091,748

*Gives the leading cities in each state for which separate totals of production are published in the returns of the U. S. Census of Manufactures for the year 1925. Statistics for 1919 are from the U. S. Census of 1920.

†No census returns for 1925.

LEADING MANUFACTURING CITIES OF THE UNITED STATES—Con.

Arranged in the order of rank in their respective states, Census of 1925*

State and City	Value of Products, 1919	Value of Products, 1925
	Dollars	Dollars
MICHIGAN:		
Detroit	1,234,519,842	1,599,340,383
Flint	275,779,638	422,644,236
Highland Park	.....†	390,249,842
Hamtramck	.....†	263,285,887
Lansing	104,722,115	149,492,757
Grand Rapids	109,135,055	145,705,502
MINNESOTA:		
Minneapolis	491,382,975	338,823,703
Saint Paul	149,638,290	194,012,604
Duluth	75,261,387	54,018,615
MISSISSIPPI:		
Laurel	8,182,357	12,961,748
Jackson	11,401,869	9,681,740
MISSOURI:		
Saint Louis	871,700,438	874,557,373
Kansas City	192,815,052	221,349,016
Saint Joseph	50,697,198	46,320,121
Joplin	14,219,935	24,028,519
MONTANA:		
Great Falls	6,850,837	10,675,972
Butte	5,261,592	4,108,478
Missoula	4,296,371	3,870,703
NEBRASKA:		
Omaha	452,236,634	339,004,023
Lincoln	23,368,050	20,792,734
NEVADA:		
Reno	4,863,244	3,420,150
NEW HAMPSHIRE:		
Manchester	117,493,082	77,546,162
Nashua	48,985,184	44,541,707
Berlin	30,652,522	28,751,975
NEW JERSEY:		
Newark	577,608,564	490,046,599
Jersey City	374,182,924	340,734,818
Perth Amboy	230,658,263	232,062,673
Bayonne	260,602,109	219,971,803
Paterson	216,659,174	200,976,520
Camden	218,165,277	164,050,849
Trenton	122,477,987	126,516,024
Kearny	80,832,074	118,447,462
Elizabeth	76,440,515	116,245,464
Passaic	129,073,484	94,724,897
Hoboken	70,311,540	59,536,561
Clifton	29,430,811	51,358,862
NEW MEXICO:		
Albuquerque	3,450,000	5,016,303
NEW YORK:		
New York	5,260,707,577	5,324,413,612
Buffalo	634,409,733	675,435,651
Rochester	351,416,379	337,548,402
Syracuse	150,091,278	154,029,058
Yonkers	140,016,561	120,466,927
Niagara Falls	89,247,170	108,479,229
Schenectady	106,531,182	102,189,767
Utica	77,745,720	77,553,719
NORTH CAROLINA:		
Winston-Salem	200,484,834	.....†
Durham	70,659,339	104,665,897
Charlotte	43,095,898	54,416,558
NORTH DAKOTA:		
Fargo	6,770,575	4,944,003
Minot	5,561,236	4,829,692
Grand Forks	6,779,123	4,257,944
OHIO:		
Cleveland	1,091,577,490	1,094,779,556
Akron	558,962,067	565,391,322
Cincinnati	500,040,996	457,538,652
Toledo	293,520,900	371,120,169
Youngstown	241,458,370	236,179,720
Dayton	174,990,607	206,103,560
Columbus	184,021,849	178,289,061
Canton	124,292,924	125,830,853
Springfield	67,759,001	78,715,861
Norwood	47,947,183	57,217,181
Middletown	62,838,289	56,732,394
Hamilton	47,024,031	54,874,566
OKLAHOMA:		
Oklahoma City	69,970,788	51,028,403
Tulsa	14,050,073	14,723,319
Muscogee	8,402,888	8,414,715
OREGON:		
Portland	196,380,146	150,521,363
Salem	9,435,070	9,074,353
Astoria	13,398,627	7,745,511
PENNSYLVANIA:		
Philadelphia	1,996,481,074	1,937,414,991
Pittsburgh	614,726,978	518,963,766
Reading	141,560,831	132,405,067
Allentown	90,834,488	110,601,389
Johnstown	90,468,742	107,186,236
Erie	70,407,540	84,248,050
Chester	95,949,003	70,557,135
New Castle	91,370,618	64,128,244
York	59,588,904	62,510,816
Scranton	54,629,522	61,282,190
Altoona	53,946,093	52,764,433
PORTO RICO:		
San Juan	6,712,723	.....‡
Ponce	4,605,714	.....‡
RHODE ISLAND:		
Providence	267,629,283	212,117,987
Pawtucket	135,517,533	108,281,019
Woonsocket	93,546,778	83,357,763
SOUTH CAROLINA:		
Columbia	27,409,226	17,747,102
Charleston	18,883,120	10,182,600
Spartanburg	11,991,312	8,580,625
Greenville	10,206,363	8,013,663
SOUTH DAKOTA:		
Sioux Falls	25,232,532	36,166,431
Aberdeen	6,055,139	4,639,377
TENNESSEE:		
Memphis	117,717,829	108,876,768
Chattanooga	58,021,825	81,008,623
Nashville	71,108,252	79,330,547
Knoxville	51,694,298	62,938,445
TEXAS:		
Dallas	93,649,654	112,157,911
Fort Worth	38,160,092	100,328,849
Houston	86,874,480	87,445,460
San Antonio	35,455,578	38,633,520
UTAH:		
Salt Lake City	33,356,911	32,589,100
Ogden	18,149,831	17,112,645
VERMONT:		
Burlington	19,489,386	10,855,463
Barre	8,499,931	9,261,717
Rutland	6,668,955	5,542,239
VIRGINIA:		
Richmond	156,724,322	157,449,998
Norfolk	29,587,662	35,454,752
Roanoke	34,864,211	32,013,237
Lynchburg	27,449,656	25,579,780
WASHINGTON:		
Seattle	274,431,239	159,565,671
Tacoma	103,171,756	71,001,327
Spokane	40,149,381	43,155,747
Everett	21,886,682	24,087,142
Aberdeen	15,757,723	18,879,898
Hoquiam	11,872,031	17,658,695
WEST VIRGINIA:		
Wheeling	72,639,728	67,369,861
Huntington	37,707,241	38,092,607
Parkersburg	24,056,134	19,565,391
WISCONSIN:		
Milwaukee	576,161,312	541,911,539
Kenosha	103,725,717	124,748,272
Racine	120,027,399	89,165,253
Janesville	16,023,213	48,093,105
WYOMING:		
Cheyenne	4,749,164	4,145,332

*Gives the leading cities in each state for which separate totals of production are published in the returns of the U. S. Census of Manufacturers for the year 1925. Statistics for 1919 are from the U. S. Census of 1920.

†Not published in the census returns. ‡No census returns for 1925.

MANUFACTURES OF THE UNITED STATES

By Selected Representative Products, 1919 and 1925

Product	Value of Products	
	1919	1925
	Dollars	Dollars
Agricultural implements	304,961,265	169,467,966
Aircraft	14,372,643	12,524,719
Aluminum manufactures	75,277,948	127,830,756
Ammunition	88,038,223	41,707,396
Automobile bodies and parts	697,170,692	1,523,279,923
Automobiles	2,387,903,287	3,198,122,633
Awnings, tents, and sails	45,690,390	48,568,984
Bags other than paper	214,059,474	175,081,911
Baking powders and yeast	46,230,312	74,592,532
Belting, leather	40,480,654	31,810,926
Beverages	135,341,000	237,760,741
Bookbinding and blank-book making	66,020,677	81,600,302
Boots and shoes	1,155,041,436	925,383,422
Boots and shoes, rubber	116,917,434	115,934,554
Boxes, paper	206,419,343	281,943,969
Boxes, wooden packing	177,818,454	152,294,579
Brass, bronze, and copper products	482,312,790	519,725,195
Bread and bakery products	1,151,896,318	1,268,194,507
Brick and tile	208,422,920	335,585,000
Brooms	30,205,267	21,714,194
Brushes	39,005,607	45,824,215
Butter	583,163,011	683,593,193
Buttons	41,840,459	32,458,435
Canning, fish	77,284,412	61,060,530
Canning, fruits and vegetables	402,242,972	458,231,429
Carpets and rugs	123,253,828	188,902,890
Carriages and wagons	91,463,225	24,934,814
Cars, shop construction, and repairs, by steam railroads	1,279,235,393	1,248,867,000
Cars, steam railroad, not by railroad companies	538,222,831	376,405,000
Cash registers	31,574,000	42,326,000
Cement	175,264,910	300,895,070
Cheese	143,455,704	118,677,894
Chemicals	438,658,869	547,003,093
Chewing gum	51,240,156	47,838,150
Chocolate and cocoa	139,258,296	106,642,474
Clothing, men's	1,162,985,633	1,087,237,742
Clothing, women's	1,208,543,128	1,293,705,291
Coal tar products, dyes	135,482,161	112,290,000
Coke	316,515,838	378,633,527
Collars, men's	47,564,949	27,587,675
Condensed milk	339,506,774	171,247,000
Confectionery	447,726,103	379,081,441
Cooperage	88,236,061	67,734,662
Copper, tin, and sheet-iron work	160,313,945	175,042,925
Cordage and twine	133,366,476	100,447,564
Corn sirup, corn oil, and starch	186,256,260	132,897,974
Corsets	75,541,959	77,114,840
Cotton goods	2,125,272,193	1,714,367,787
Cutlery and edge tools	66,629,570	80,263,252
Dyeing and finishing textiles	323,967,683	432,537,416
Electrical machinery	997,968,119	1,540,002,041
Engines, steam, gas, and water	592,350,000	310,556,000
Envelopes	39,664,077	51,188,914
Explosives	92,474,813	69,668,837
Felt goods	39,229,540	43,775,618
Fertilizers	281,143,587	206,772,904
Firearms	30,181,370	15,179,363
Flavoring extracts and sirups	30,116,932	94,211,934
Flour, other grain-mill products	2,052,434,385	1,298,014,788
Food preparations*	631,598,150	649,236,979
Foundry and machine shop products*	2,289,250,859	2,232,985,974
Fur goods	173,137,739	254,265,708
Furnishing goods, men's*	107,834,695	120,867,596
Furniture	571,356,333	868,145,913
Gas and electric fixtures	42,267,953	68,841,383
Gas, illuminating and heating	329,278,908	455,460,053
Glass	261,884,080	295,959,424
Gloves and mittens, leather	46,940,511	37,164,326
Hardware*	154,524,888	225,052,644
Hats, fur-felt	82,745,308	80,066,390
Hats, straw	32,187,361	28,153,899
Ice, manufactured	137,004,798	186,989,036
Ice cream	189,483,065	286,175,686
Ink, printing	26,244,470	34,753,329
Iron and steel:		
Blast furnaces	794,466,558	765,286,229
Bolts, nuts, washers, rivets	89,743,882	75,926,000
Cast-iron pipe	50,235,101	100,388,000
Forgings	173,752,104	134,511,000
Nails and spikes	17,583,344	12,318,000
Steelworks and rolling mills	2,828,902,876	2,946,068,231
Wrought pipe	81,869,115	94,695,000
Jewelry	203,939,230	166,816,370
Knit goods	713,139,689	809,960,213
Lamps and reflectors	38,098,917	60,857,006
Laundering, power	233,815,827	362,294,749
Leather, tanned, finished	928,591,701	462,013,572
Lime	33,970,463	50,736,499
Lithographing	73,151,115	98,721,268
Locomotives	156,269,730	65,389,134
Lumber and timber products	1,387,471,413	1,421,161,836
Lumber, planing mill products	500,438,258	710,861,267
Marble, slate, and stonework	129,164,653	193,046,836
Matches	18,495,876	23,741,469
Millinery and lace goods*	255,724,922	309,856,341
Motion Pictures	36,705,000	93,636,348
Motor cycles, bicycles	53,105,895	24,257,923
Musical Instruments, organs	5,973,268	12,283,089
Musical Instruments, pianos	107,088,050	101,180,777
Needles, pins, hooks and eyes	29,304,995	18,173,574
Oil and cake, cottonseed	581,244,798	295,684,526
Oilcloth and linoleum	52,673,206	62,842,828
Oil, linseed	120,638,100	140,513,542
Oleomargarine	79,815,580	39,856,034
Optical goods	53,717,798	33,654,559
Paints and varnishes	340,346,803	470,736,264
Paper and wood pulp	788,059,377	971,882,320
Paper goods*	107,284,759	124,217,274
Patent medicines	212,162,255	247,564,046
Pencils, lead	24,134,159	25,050,757
Perfumery and cosmetics	59,613,391	129,510,453
Petroleum refining	1,632,532,766	2,376,656,556
Phonographs	158,547,870	61,057,147
Photographic Materials	115,714,179	78,653,651
Plated ware	41,634,585	54,330,033
Pottery	74,919,186	111,073,028
Printing and publishing:		
Book and job	597,663,228	806,887,417
Music	14,592,177	15,089,636
Newspapers, periodicals	924,152,878	1,447,661,177
Radio	†	176,990,000
Rayon	†	80,060,962
Refrigerators (ice)	26,048,808	57,665,842
Roofing materials	85,895,359	123,590,811
Rubber tires	987,088,045	925,001,520
Saddlery and harness	83,713,010	30,083,555
Salt	37,513,821	34,253,056
Saws	31,460,557	26,781,205
Scales and balances	20,641,038	27,237,181
Sewing machines	43,694,919	46,298,336
Shipbuilding	1,622,361,261	177,181,960
Shirts	205,327,133	225,962,922
Silk goods	688,469,523	808,979,399
Silverware	29,126,133	32,531,670
Slaughtering and meat packing	4,246,290,614	3,050,286,291
Smelting and refining:		
Copper	651,101,591	665,176,767
Lead	196,794,519	283,042,542
Zinc	104,122,938	118,905,590
Soap	316,740,115	278,273,107
Stationery goods*	58,363,244	67,809,267
Steam fitting	160,285,488	228,929,985
Stoves and hot-air furnaces	145,717,963	140,805,158
Stoves, gas and oil	55,792,029	123,497,794
Structural ironwork	294,962,419	420,997,579
Sugar, beet	149,155,892	132,339,012
Sugar, cane	57,741,320	13,434,999
Sugar refining	730,986,706	606,632,783
Sulphuric, nitric, and mixed acids	31,470,480	23,307,013
Tin plate and terneplate	97,404,720	190,918,000
Tinware	233,964,000	260,359,961
Tobacco:		
Chewing, smoking, and snuff	239,270,718	216,186,417
Cigars and cigarettes	773,662,495	874,814,564
Tools*	144,201,668	121,263,093
Toys and games	45,656,803	58,317,361
Trunks and valises	63,932,266	61,223,867
Turpentine and rosin	53,051,294	42,364,413
Typewriters and supplies	52,737,661	63,079,602
Watches	32,044,299	36,254,110
Wire	162,151,236	184,462,536
Wirework*	90,549,245	115,428,872
Wood, turned and carved	34,847,139	35,490,581
Woolen and worsted goods	1,065,434,072	957,790,338

*Not elsewhere specified. †Comparable figures for 1919 not available.

LUMBERING

Industries dependent upon forest products are widely distributed throughout the United States. Washington and Oregon, which rank first in the lumber industry, are in the Northwest; Louisiana and Mississippi, which rank next, are in the South.

The production of lumber is divided between the coniferous, or softwood, trees and the broadleaf, or hardwood, trees. In a general way, soft woods may be considered as the structural material used by carpenters, while hard woods are more extensively utilized by cabinetmakers. The distinction, however, is not sharp, because some of the so-called "hard woods" are, in fact, softer than certain of the so-called "soft woods."

The accompanying tables contain information concerning the lumber industry of the United States. This information is classified under several important heads.

In the first table, the 13 states in which the cut of lumber in 1925 exceeded one billion board feet each are arranged in the order of production. The principal timber wood cut in each of these states is given, together with figures indicating the percentage which this leading timber wood contributed to the total lumber production of the state.

In the second table, the chief species of timber trees are arranged in the order of the quantity of lumber cut from each in 1925. For purposes of comparison, the quantity of lumber cut in 1919 is also entered. Further, the states producing the largest quantity of each of these various kinds of lumber are given. Following the name of each such state are figures indicating the percentage contributed by that state to the total of that kind of lumber produced in the United States.

On the basis of the quantity cut, yellow pine is, and has been for many years, the most important timber, although the amount of Douglas fir standing in forests in the United States is greater than that of any other single kind of wood.

CHIEF LUMBER PRODUCING STATES

State	Total Cut Millions of bd. ft.	Principal Wood Cut	Per Cent Total Cut*
Washington	7,027	Douglas fir	69.9
Oregon	4,216	Douglas fir	66.2
Louisiana	3,293	Yellow pine	69.5
Mississippi	3,128	Yellow pine	81.9
Alabama	2,236	Yellow pine	87.4
California	2,043†	Western yellow pine	38.3
Arkansas	1,597	Yellow pine	56.6
Texas	1,578	Yellow pine	85.6
Georgia	1,365	Yellow pine	85.9
Idaho	1,141	White pine	34.1
Wisconsin	1,069	Hemlock	33.8
Florida	1,064	Yellow pine	74.6
North Carolina	1,041	Yellow pine	72.1

*Percentage which cut of specified wood forms of total for state. †Includes total cut for Nevada also.

PRODUCTION OF LUMBER IN THE UNITED STATES

Species of Timber Cut	Production Millions of Board Feet		Chief producing states with percentage produced by each, 1925
	1919	1925	
Yellow pine	13,063	13,236	Miss. 19.4, La. 17.3, Ala. 14.8, Tex. 10.2
Douglas fir	5,902	8,154	Wash. 60.3, Oreg. 34.2
Western yellow pine	1,755	3,127	Oreg. 32.0, Cal. and Nev. 25.1, Wash. 14.1, Idaho 12.0
Hemlock	1,755	2,140	Wash. 51.3, Wisc. 16.9, Mich. 8.9, Oreg. 6.1
Oak	2,708	2,129	Ark. 13.3, Tenn. 11.9, La. 10.4, W. Va. 9.6, Miss. 8.9
White pine	1,724	1,521	Minn. 31.5, Idaho 25.6, N. H. 10.2, Me. 8.0, Wash. 5.9
Red gum	851	1,101	La. 24.6, Miss. 20.7, Ark. 18.7, Ala. 8.0
Maple	857	922	Mich. 39.4, Wisc. 25.7
Cypress	656	903	La. 30.4, Fla. 28.5
Spruce	980	751	Wash. 27.7, Oreg. 23.4, Me. 17.8
Redwood	410	511	Cal. 95.9, Oreg. 4.1
Birch	375	412	Wisc. 50.9, Mich. 23.1
Yellow poplar	329	376	Tenn, 19.7, W. Va. 18.0, Ala. 11.3, Va. 10.0, Ga. 9.9
Cedar	332	372	Wash. 60.9, Oreg. 14.5
White fir	223	337	Cal. and Nev. 68.9, Idaho, 21.2
Chestnut	546	308	W. Va. 33.9, Va. 16.2, N. C. 13.4, Tenn. 9.6
Sugar pine	134	307	Cal. 97.5, Oreg. 2.5
Larch	388	307	Mont. 43.5, Idaho 34.3, Wash. 11.0
Tupelo	144	220	La. 45.6, S. C. 14.1
Elm	194	191	Wisc. 30.6, Mich. 14.0, Ark. 12.8, Ind. 8.2
Beech	359	181	Pa. 18.7, Mich. 15.0, N. Y. 13.5, Ind. 11.2
Basswood	184	180	Wisc. 41.9, Mich. 19.9, W. Va. 11.4
Ash	155	179	La. 18.8, Ark. 16.2, Tenn. 9.0, Wisc. 8.3
Cottonwood	144	142	Minn. 36.2, Miss. 16.9, Ark. 12.8, La. 12.5
Hickory	170	79	Tenn. 19.2, Ark. 15.5, Ky. 14.4
Walnut	39	70	Ind. 22.5, Ohio, 21.1, Mo. 14.2, Tenn. 7.2
Lodgepole pine	16	25	Wyo. 47.7, Colo. 41.9
Sycamore	28	24	Ark. 24.6, Ind. 12.9, Tenn. 11.6, Miss. 9.3
Balsam fir	68	20	Me. 43.4, Minn. 21.3, Vt. 12.4, Mich. 9.8
All lumber cut	34,552	38,339	Wash. 18.3, Oreg. 11.0, La. 8.6, Miss. 8.2

MANUFACTURES OF CANADA

Summary of Statistics by Provinces, 1925

Province	Establishments	Capital	Employees	Salaries and Wages	Cost of Materials	Value of Products
	No.	Dollars	No.	Dollars	Dollars	Dollars
Alberta	734	69,805,848	9,366	11,785,604	45,855,910	75,113,517
British Columbia*	1,434	313,494,283	43,551	49,112,628	118,826,980	218,775,835
Manitoba	769	120,342,238	20,027	25,286,173	71,683,113	124,145,763
New Brunswick	861	91,509,933	17,275	14,430,252	44,886,292	73,374,660
Nova Scotia	1,184	117,326,491	16,529	12,082,693	37,854,196	65,033,701
Ontario	9,386	1,925,593,482	262,307	307,304,007	828,939,668	1,527,154,660
Prince Edward Island	318	2,576,677	2,317	572,130	2,805,665	4,290,149
Quebec	6,995	1,136,033,133	168,237	169,686,055	412,460,003	820,563,757
Saskatchewan	650	31,607,896	4,405	5,755,629	24,353,581	40,093,273
Total Canada	22,331	3,808,289,981	544,014	596,015,171	1,587,665,408	2,948,545,315

*Includes Yukon territory.

THE history of civilization is frequently divided into periods distinguished by the materials used among the people then living. Thus a period when only skins of animals were worn for clothing is regarded as more primitive than a period when cloth was woven of wool, cotton, or some other substance.

Judged by such a standard, the present age far excels all previous ones. Materials which were used earlier are now prepared in more efficient ways and are applied to more various purposes. The ancient art of pottery, for example, has been enriched in modern times by many new processes and products. Moreover, many materials have in recent times been discovered, and many others have been created by aid of the science of chemistry. The latter include such substances as aniline dyes, linoleum, and portland cement.

Familiar as are most of these products, their source and the manner of their preparation are practically unknown to the average person. Yet there are few subjects on which information is more interesting and more generally useful.

The almost infinite number of different objects manufactured and the additions to that number which are being made practically from day to day render it quite impossible to give an exhaustive record of these products. Those, however, which are among the best-known and most widely employed have been selected and treated in the following section, where each will be found described in such a way as to show clearly and concisely its source, history, manufacture, and uses.

Arc Lamp. A device producing intense, bluish white light that is much used for illuminating streets, factories, and large, open spaces. Light is produced by the flow of an electric current between the slightly separated ends of two carbon rods. The tips of the rods become white hot and give off carbon vapor, which serves to conduct the current across the gap. This flaming path, in which the temperature is above 6500° F., is curved in the form of an arc, whence the name *arc light.*

The carbons are usually made from petroleum or gas coke. They are gradually burned away and must be renewed after from 100 to 150 hours of service. Should the arc become broken, the upper rod automatically drops against the lower and is again pulled up to the proper distance by means of a magnet. When the carbon rods contain some salt, such as calcium fluoride, the vapor becomes intensely colored and is known as a *flaming arc.*

Because the arc light requires rather frequent cleaning, and renewal of the carbons, it is being replaced in many cases by gas-filled tungsten lamps, which give more light from the same amount of electricity.

Attar, or Otto, of Roses. A rare and expensive oily perfume obtained by distilling the petals of several species of roses. It is produced chiefly in India, Bulgaria, Persia, and Turkey. About 40,000 roses are required to yield one ounce of attar, which is so fragrant that the use of one drop is often sufficient in making a gallon of cologne.

Bakelite. An artificial material used in the preparation of varnishes and as a substitute for amber and hard rubber. It is formed by chemical reactions between carbolic acid and formaldehyde, and was discovered by L. H. Baekeland. It is made in two initial forms, distinguished in name by the letters *A* and *B*. *Bakelite A* is soluble and fusible; *bakelite B* is insoluble, but plastic, so that it can easily be molded. Both of these initial forms are changed under the action of heat and pressure to *bakelite C*, which is hard, insoluble, infusible, and possessed of high insulating properties.

Baking Powder. A mixture of chemicals substituted for yeast in order quickly to make light and porous cakes, biscuits, and similar foods. Nearly all such powders are combinations of *baking soda*, or *sodium bicarbonate*, with some acid substance. Starch comprising about 25 per cent of the whole serves to keep the mixture dry. The acid material is usually cream of tartar, a salt of phosphoric acid, or alum. When the powder becomes wet, a chemical reaction takes place which results in the production of carbon dioxide. This gas is also produced when bread is raised by yeast. As the gas cannot escape when generated within a thick dough or batter, it produces a porous, open structure in the cooked product, making it lighter and more easily digestible.

Bell. A hollow, cup-shaped vessel suspended from the closed end and giving forth sound when struck. The materials used in small bells range from glass to steel, but large bells are usually cast by pouring melted *bell metal* into molds of clay. Bell metal is an alloy of copper with various proportions of tin, to which small amounts of other metals may be added. Sometimes several weeks must elapse before the metal is cool enough to allow the removal of the mold without danger to the casting. The characteristic tone by which one bell is distinguished from another depends, not only on its size, shape, and thickness, but also on the proportion in which the constituent metals are alloyed.

The largest bell ever made, the 220-ton Tsar Kolokal of Moscow, was never rung because, before it was finished, an 11-ton piece fell from its side. The first large bell, 6½ tons in weight, was cast in 1400. The largest bell in the Western hemisphere is the Bourdon, weighing 18¼ tons, in the Rockefeller carillon, Riverside church, New York City. One of the most famous is Big Ben, weighing 13 tons, in Westminster palace, London. The Liberty Bell is the most famous of all bells in the United States.

Bells, as known today, were used first during the 4th century as a summons to religious exercises. At present, most of the large and famous bells belong to churches, but the uses of bells, especially for sounding signals, are very numerous. Sound is usually caused by rocking the bell until it strikes a metal clapper. Very large bells remain at rest and are struck by a moving hammer. Many famous clocks have tuned bells that strike the hours, while, on ships, each half hour is indicated by a fixed number of strokes on a bell. Sailors are often warned of dangerous waters by a wave-rocked *bell buoy.* A *curfew* bell was sounded originally in England as a signal that it was time to "cover the fire" with ashes and to retire for the night.

Books. The earliest known records in the form of writing are the inscriptions on tablets of baked clay which were excavated from the ruins of the ancient Chaldean city of Nippur. Such tablets were probably in use about 6000 B. C. Inscriptions cut in stone, wood, or other more or less durable substances continued to be employed for special purposes long after more convenient materials were in general use. One of the earliest of these materials was papyrus, made from a plant that grew chiefly in Egypt. An extant Egyptian papyrus manuscript, called the *Papyrus Prisse*, dates from about 2000 B. C. From 400 B. C. to 600 A. D., the greater part of all writing was done on papyrus. Another material often used in this period was parchment, which was made principally from the skins of sheep, goats, or calves. Scrolls made of papyrus or parchments were prepared in the form of strips, sometimes 120 feet long. For convenience, these long strips were rolled on two sticks. The change from rolls to piles of leaves came with the more general use of parchment. The books of the Christian monasteries were usually written on this material.

Printing on paper by means of engraved blocks was practiced by the Chinese as early as 50 B. C. The name of the first European to print from movable type has been the subject of controversy for several hundred years. According to the Dutch, the

honor belongs to Lourens Janszoon Coster, of Haarlem, Holland; but works printed by Coster have never been identified. In 1450, at Mainz, Germany, Johannes Gutenberg operated a printing shop, where he first experimented with letters carved from wood and later used types carved or cast from metal. Some books may have been printed from movable type at an earlier date, but the first book known to have been so printed is the Gutenberg Bible in Latin, completed about 1455.

The first book printed in English was a history of Troy, probably made at Bruges, Flanders, in 1474, by William Caxton. Early in 1477, Caxton established a press in the almonry of Westminster, London, and the next year brought out *Dictes and Sayings of the Philosophers*, the first book printed in England. The first press in the New World was established at the city of Mexico in 1544; the first one in the territory now embraced by the United States was built at Harvard college in 1639.

The making of a book was at first a comparatively simple process. In modern times, however, it has become a complex and highly specialized form of industry.

Manuscripts and Proofs.—When the author's typewritten manuscript or copy is sent to the printer, it is placed in the hands of the operators of typesetting machines. These machines automatically cast the type and deliver it arranged in a column, face up, on a long narrow tray called a *galley*. An inking roll is passed over the type, and an imprint, or *proof*, is made on sheets of paper. These *galley proofs* are sent to the author, who makes whatever corrections he wishes.

Electrotypes.—The type in the galleys is next made up into pages; titles, headings, and page numbers are inserted; and a final proof is made in order to show how each page will look. If this proof is satisfactory, an electrotype is made of each page. This is done by pressing the type upon a wax-surfaced plate so that each letter leaves its impression on the soft surface. This wax mold is then dusted with graphite so as to conduct electricity. It is then connected with the negative pole of a battery or dynamo and is placed in a plating solution, where it receives a thin coating of copper.

In order to strengthen this thin copper shell, which is an exact duplicate of the type for one page, the wax is removed and the back is filled with electrotype metal, which is composed chiefly of lead.

Sixteen or thirty-two of these electrotyped pages are locked into a large iron frame and placed on the printing press. These *electros*, or plates, are so arranged that when a sheet of paper is printed on both sides and is folded, the pages will be in proper sequence.

Paper.—The paper for printing is selected with careful regard to the kind of printing to be done and to the number of pages in the book. Ordinary type matter may be printed on rough stock, in order to obtain greater bulk for a few pages, or on smooth stock, if a larger number of pages is to be included in the finished volume. The various grades of smooth stock are known in the trade under the names machine finish, supercalendered, thin text, and India bible.

Illustrations.—For general use, these are of two kinds: *line cuts*, which are zinc etchings in coarse line; and *half tones*, or copper etchings in fine screen. Line cuts may be printed in with the text matter on all but the very coarse papers. Finer line cuts and all half tones, whether black or in two or more colors, must be printed on specially surfaced papers.

Folding and Pressing.—As the sheets come from the presses, they are passed to folding machines, which automatically cut them apart and deliver them in folded sections called *signatures*. These signatures consist of 8, 16, 24, 32, or 64 pages, depending upon the thickness of the paper used. Heavy papers are usually folded in 8's and 16's; thinner papers in 32's; and India bible or thin text stocks in 32's and 64's.

. After folding, the signatures are compressed in bundles by machinery in order to remove the air and to make each section firm.

Tipping.—At this stage of the process, any specially prepared pages of illustrations and other *inserts* are *tipped*, or pasted, into the sections. This operation is performed by machinery if the illustration is to go on the outside of the section; handwork is necessary if the illustration goes on the inside, in which case the folded section must first be slit open to receive the insert.

While the pasting operation is under way, the white or colored flyleaves for the front and the back of the book are cut and are pasted to the first and the last section. These sections are re-enforced with muslin strips pasted around the binding edges of the first and last sections and the flyleaves. They are strengthened also by *whipstitching*, that is, by stitching through and through the section at the binding fold. These processes impart strength to the leaves which will hold the book in the cover.

Gathering.—Some books must be gathered by hand because of their peculiar size or shape or because they are printed on very thin or very thick paper. For large quantity editions, gathering is performed by machines wherever possible. Each of these machines contains a series of 32 or more *pockets*, or small bins, in which piles of the various sections are arranged in sequence; underneath the bins passes a traveling belt, or *conveyor*. This belt has an intermittent motion, each movement carrying it a distance equal to that from one bin to the next. At each movement, metal arms having fingers, or *grippers*, take from the bottom of each pocket one copy of the section it contains. This copy is dropped automatically on the traveling belt, falling upon a copy of the section carried forward from the preceding bin. In this manner, completely gathered books are delivered upon a table at the end of the moving belt.

Sewing.—Next in sequence is the operation of sewing the assembled sections together. A girl opens each section at its center and hangs it on one of a series of swinging steel arms. The arm carries the section into the sewing machine, the needles of which are curved in form and are preceded by a series of *punches*. The punches pierce the section at the back fold, and the sections are sewed together by a looped stitch, each section being *locked* to the next. As the sections thus sewed together come out of this machine, they are cut apart into separate complete books.

Smashing.—This step consists of compressing the books in powerful machines, not unlike enormous pincers. It removes the impress of the type made in printing and reduces the books to a uniform thickness in order that they may properly fit the covers which are being prepared.

Trimming, Coloring, and Gilding.—Trimming the edges is performed in machines having one or more heavy steel knives operating on the guillotine principle. Any *coloring* or *gilding* of edges is then in order. Plain coloring consists in spraying, sponging, or brushing the top or three edges with a pigment or aniline color while the books are arranged in piles on a table or are in presses. *Sprinkling* is done by spraying or brushing a pigment color over the edges through a coarse screen. *Marbling* is the most difficult and expensive of coloring processes. For this operation, books are carefully *jogged up*, that is, arranged in clamps which hold bundles of books to a thickness of 18 inches. These bundles are dipped into a vat containing a solution of gum tragacanth, upon the surface of which has been sprinkled a variety of water colors. These colors lie on the surface like oil spots upon water. Many different effects, or *patterns*, can be obtained by changing the combination of colors and by *combing* the colors in the vat with huge wooden or wire combs.

Gilding edges is the most delicate and expensive of all edge finishing. The trimmed books are placed in wooden clamps, or presses, horizontally arranged.

Edges are *scraped* with steel tools to obtain perfect smoothness, and a thin *filler* is applied, consisting of paste and a bit of color. After this coating is dry, the gold is applied in thin sheets over a *sizing* of egg albumin. When dry, the gold is burnished by hand with an agate or a bloodstone.

A thin coating of flexible glue is now applied to the backs or binding edges of the books, and superfluous thread ends are trimmed off.

Rounding and Backing.—These operations are performed in a power driven machine, into which the books are fed one at a time, horizontally, back edge first. Rollers convex the back and concave the front edge. Clamps grip the book just forward of the binding edge, compressing it to the depth of the cover thickness to be used, and, at the same time, the machine shapes the *joints* on each side of the back which provide for the fit-up of the cover.

Lining-Up.—This process consists in the reenforcing of the book with one or more thicknesses of coarse crash, or *super*, and with a strong paper on the back. The crashes and paper are applied with flexible glue. Machines do this work quite as efficiently as it can be done by hand, provided the books are not of unusual size or bulk. In order to give a finished appearance to the volumes, *headbands*, or small ornamental pieces of book cloth, striped cotton, mercerized cotton, or silk, are prepared in strips and are affixed by glue or paste to the top and bottom of the book backs.

Casing-In.—The book is now ready for the cover. The operation of combining book and cover is called *casing-in*. This is accomplished by either of two methods: (1) All ordinary cloth books are cased-in by the simple operation of *pasting-off*. First the back leaves and then the front leaves of the book are attached to the cover by paste or glue. The cover is thus left free from the back of the book. (2) Books bound in leather or artificial leather and sometimes cloth schoolbooks and catalogues are often *cased-in-tight-back*. A coating of glue is applied to the backs of such books, so that the covers are affixed only to the backs. Then, after the books have been thoroughly dried, the front and back leaves are pasted-off as in process (1).

Pressing.—After the covers have been thus attached, the books must be *built-in* in presses. The books are held between wooden boards having metal edges which project one-eighth of an inch on each side. These edges fit into the space along the back, or binding edge, between the ridge formed in the rounding and backing operation and the edge of the pulpboard used for stiffening the cover. This process imparts a neatly creased joint, or hinge, which permits the cover to open freely.

After the volumes have dried in the presses from 6 to 24 hours, they are removed, examined for defects, incased in jackets or wrapped individually, and packed in cartons or cases.

Bottle. A hollow vessel with a narrow neck and no handles. In olden times, bottles were made by sewing up the skin of some animal, leaving one natural opening, such as the leg. Today, bottles are usually made of glass, either by hand or by machinery. In the hand process, expert glass blowers collect the proper amount of molten glass on the end of a long tube; blow a bubble of air into the soft mass; drop the material into a hot mold; and, by further blowing, force the glass to the required shape. The blowpipe is then broken off, and, after the rough top of the bottle is smoothed with a special tool, the glass is slowly and carefully cooled. Bottles are now generally made by machines which automatically copy the hand process. Some of these are capable of producing 1200 dozen in one day. Small orders or special types are still made by hand.

Bread. A staple form of baked food, made from the flour or meal of some grain, in such manner that the product has a more or less porous structure. This is the modern *leavened*, or raised, bread. In general, the term bread includes any product made by baking a mixture of flour or crushed cereal and water. Wheat flour, because of its gluten, makes the best bread, although there are many special kinds made from other cereals. The common and standard form in the United States consists of a light-colored loaf made from wheat flour and raised with yeast. It is essentially a starch food as it normally contains a little more than one-half its weight of starchy compounds, about one-tenth of protein, 1.1 per cent of salts, 1 per cent of sugar, and only 1.3 per cent of fat, the remainder being water. Because of its low fat content, bread is usually eaten with butter. Corn bread and hot bread are familiar forms in those Southern states where, because of climatic conditions, the ordinary loaf will keep but a short time.

To understand the well-known process of bread making, it is necessary to know of what flour is composed and why yeast causes the dough to rise. Good wheat flour contains about 75 per cent starch and between 11 and 12 per cent of a nitrogenous material called *gluten*. Starch mixed with water must be heated to form even a weak paste; but wet gluten is very tough and elastic, acting somewhat like soft rubber in binding the flour and water into a dough. A cake of *yeast* contains thousands of microscopic vegetable cells or yeast plants. These will grow rapidly in a dilute solution of sugar if certain salts and substances containing nitrogen are also present.

When yeast is stirred into dough and warmed, it finds conditions exactly suitable for growth and proceeds to develop rapidly. During growth, the yeast produces certain substances which cause the sugar to break down into *alcohol* and *carbon dioxide*, which is the same gas that causes the bubbles in soda water. As the carbon dioxide cannot escape through the heavy elastic mass, the dough *rises*, that is, swells up, because of the internal pressure of the gas. It is then *kneaded* in order to break up the large irregular bubbles and to distribute them evenly through the mass. Raising and kneading are repeated, usually two or three times, until the dough seems sufficiently light. It is then cut, and worked into pieces which about half fill the pans. When set in a warm place, the dough rises to the top of the pan and is ready for the oven. During the foregoing process of fermentation, the gluten becomes much less tough and rubbery. A temperature between 78° and 82° F. is best for the growth of yeast. Greater heat often leads to the development of bacteria which produce acetic and lactic acids, thus causing the bread to become *sour*.

The first effect of the heat of baking is to expand the small bubbles of gas so that the loaf becomes larger, lighter, and more porous. The yeast is killed, and much of the alcohol and water are driven off as vapor. The starch grains expand and break, thereby becoming much more digestible. The starch on the surface, which is exposed to the high temperature of the oven, is largely changed to dextrin and some is still further changed to caramel. To these chemical changes are due the distinctive color and taste of the crust. Within the loaf, the temperature does not rise much above 212° F. because of the presence of water, which cannot exceed that temperature, the excess heat being exhausted in converting the water into steam.

As bread is a starchy food, it should be well chewed in order that the starch may be changed by saliva to simpler and more digestible compounds. Bread ranks among the most nutritious of staple foods; a pound loaf contains more energy-producing units (calories) than a pound of fish, a pound of potatoes, and a quart of milk, combined.

Brick. A building material made by shaping, drying, and baking a prepared mixture of clay and sand. Brick was made and used in Babylon, where there were neither forests nor quarries, over six thousand years ago, and was probably the first material used for permanent construction. The earlier forms, like the present adobe brick used by

the Indians of the Southwestern states, were merely sun dried and could be used only in regions where rain seldom fell. Straw was customarily mixed with the clay in order to bind it together. This was the case among the ancient Egyptians, who, according to the Biblical account, forced their Israelite captives, not only to make the customary number of bricks, but also to find the necessary straw.

At present, bricks are made chiefly by machinery. The clay is mixed with the proper amounts of sand and water, pressed into form, dried in the air or in drying tunnels, and finally heated to a cherry red in kilns which are usually about 30 feet in diameter by 12 feet high. The firing requires from 6 to 10 days. Some kinds of brick are formed from dry clay by enormous pressure, but most kinds are made by the wet process. In one type of machine, capable of an average daily production of 10,000 to 150,000 brick, the clay is compressed by a screw and is forced out in a long bar that is cut to the proper length by wires. The size varies somewhat but approximates $2\frac{1}{4} \times 4 \times 8\frac{1}{4}$ inches.

The red color of common brick is due to iron oxide. Brick that is almost white may be obtained by adding lime to specially selected clay. Other shades are obtained by the addition of various minerals. *Facing brick* is carefully finished by repressing and is used on the exterior of buildings where a fine appearance is desired. *Fire brick* is made from special clay which will undergo a very high temperature without softening or fusing.

Butter. A food product consisting chiefly of fat which is separated from milk by churning and is worked into a compact mass. Fat in the form of tiny globules is found in the milk of healthy cows in amounts which vary from 2 to 6 per cent, the average being somewhat under 4 per cent. The process by which it is changed into butter is much the same whether carried on in the farmhouse or at the butter factories, or *creameries*. It consists of separation, ripening, churning, and working.

Butter can be churned from milk, but it is much more satisfactorily made by separating the cream from the milk and churning the cream. This is frequently done by allowing the milk to stand until the lighter particles of fat rise to the top, where they may be collected. A much quicker and more efficient method involves the use of a *centrifugal separator*, in which the milk flows into a bowl or hollow spindle rotating from 6000 to 17,000 times per minute. The heavier skim milk is thrown towards the edge and passes out by one pipe, while the cream runs from another pipe near the center. Cream containing 30 to 33 per cent of fat is considered the best for churning.

Because sweet cream yields a butter of very mild flavor, it is usually allowed to sour or ripen, before churning. Ripening is due to bacterial growth which, to a large extent, develops the typical butter flavor and also causes better churning. Cream that has become sour in the natural way often contains harmful bacteria which produce unpleasant flavors. This danger is avoided by using, as a *starter*, a culture containing only such bacteria as have been found to give good results.

When sufficiently ripened, the cream may be churned by hand or in the large revolving, power-driven cylinders used in creameries. Churning causes the tiny particles of fat to combine and become larger, finally attaining such size that they can no longer remain suspended in the liquid. The butter then *breaks*, or separates from the buttermilk in grains about the size of wheat.

The natural yellow color of the fat is due to coloring matter absorbed from the green food of the cows. If their food is changed to dried grass and grain, as often happens in winter, the color of the butter becomes much lighter. In order that the appearance may be uniform, artificial color is often added. The most important butter color is made by boiling the seed of the *annatto* plant with an oil such as cottonseed. A small amount of this colored oil is usually added to the cream before churning. Standards for color vary greatly. Butter exported to South America is often almost red.

When churning is complete, the buttermilk is drawn off and the butter is washed with clean, cool water. Salt is then added, chiefly for flavor, in amounts which are usually between $\frac{3}{4}$ and $1\frac{1}{2}$ ounces per pound of fat. Salted butter does not become moldy so quickly as the unsalted product.

The grainy mass of butter is then worked by hand or under rollers. The purposes of this process are to eliminate any remaining buttermilk, to mix the salt evenly, and to incorporate the proper amount of water so thoroughly that it will not separate. Too much working spoils the grain and leaves a soft, oily butter. The finished product is usually packed in tubs or one-pound cartons.

Renovated, or *process* butter, is prepared by melting strong butter which is no longer acceptable for food, refining the clarified fat, and rechurning it with milk or skimmed milk.

Button. A piece of metal, bone, ivory, or other substance, usually employed for fastening clothing by being pushed through an opening called a buttonhole. The term is used also to designate any small knoblike projection or similar object.

Buttons were first used as ornaments in Europe during the 13th or the 14th century. Later, they served to hold loops of cord, a practice which led to the modern buttonhole. The two principal types are perforated buttons, meant to be attached by sewing, and buttons having on the reverse side a projection or shank, by which the attachment is made. Buttons are usually disk-shaped, but they may have many other forms.

Bone buttons have long been known, but many modern substitutes have also come into use. Several factories, located chiefly at Rochester, N. Y., and at Newark, N. J., are devoted to the production of *vegetable ivory* buttons, made from the kernels of *tagua* or *corozo* nuts, the seed of a South American palm tree. These become hard when heated. Pearl buttons are cut from the lustrous shells of certain species of oysters and mussels. Many of these come from Japan and from the Mississippi river. Disks are drilled from the shell, which is first softened by soaking. Holes are then bored in the disks, the rough back is ground or split away from the mother-of-pearl, and the back and edges are polished. The finished buttons are fastened to cards. Metal buttons and cloth covered buttons are made by machinery.

Buttons of special pattern or design are often worn to indicate membership in some organization or adherence to some political party. The rank of a mandarin is shown by the color and the material of a button worn on his hat.

Cable, Submarine. A telegraph line laid under water. The earliest experimental cables of this type were laid across rivers and ponds, but the first commercially successful cable was laid across the Strait of Dover in 1851. Scotland and Ireland were connected in 1853, and the next year saw Sweden joined with Denmark and Italy with Corsica. The success of these comparatively short lines encouraged attempts to lay a transatlantic cable. Such a line was completed in 1858, but, after a few weeks of use, it ceased to give satisfactory service.

Through the perseverance of Cyrus W. Field, a successful cable was finally completed in 1866 between Heart's Content, Newfoundland, and Valentia, Ireland. These places were selected because they permitted the smallest mileage of cable and because the intervening ocean bed was soft and level. There are now several cables between North America and Europe.

A cable consists of a central strand of twisted copper wires, called the core, which is covered with gutta percha or rubber. Next comes a layer of jute wrapping surrounded by galvanized steel wires. These add strength and afford protection against

anchors, sharp stones, and the attack of fishes. The outer layer is of jute filled with material to make it waterproof. In deep water, such a cable may be less than an inch thick, but, in shallow places, where there is more danger from waves and from ships' anchors, it is usually much better protected.

In 1902, an English cable was completed in the Pacific Ocean between British Columbia and Australia. In 1903, an American cable was laid between San Francisco and the Philippines.

A small strand of wire, over 2000 miles long, can carry only currents which are far too weak to operate ordinary telegraph instruments. The effectiveness of the current is multiplied by surrounding the copper core with a thin layer of permalloy. Two sending keys are used in cabling. One sends a signal corresponding to the dots of the telegraph code; the other sends the dashes. The receiver, called a *syphon recorder*, consists of a slender, carefully adjusted, hollow needle, one end of which dips in ink while the other marks on a moving band of paper. Dot signals move the needle to one side, and dashes pull it to the other. The result is a wavy line, from which the message can be deciphered.

With the first cables, it was possible to telegraph in one direction at the rate of about 7 words per minute. At present, messages can be automatically sent in both directions at the same time at the rate of 2500 letters each minute.

Calico. Cheap cotton cloth printed with a colored pattern. The name comes from Calicut, a city of India, whence the process of decorating cloth by means of a hand stamp moistened with dyes was introduced into Europe. Calico printing is now done almost entirely by machinery.

Cambric. A thin, finely woven, linen cloth, which receives its name from the town of Cambrai, France, where it was originally made. It is used chiefly for handkerchiefs and fine underclothing and as an embroidery linen. Cotton cambric is a similar fabric of plain weave, one surface of which is smooth and easily sheds dust.

Canvas. A strong, coarse cloth, originally made from hemp but now woven also from linen and cotton. Canvas is used to a large extent for awnings, sails, and tents. For oil painting, artists require a canvas of heavy linen. Fine, light grades, called *duck*, are made into summer clothing.

Castor Oil. A clear, thick, almost colorless oil, chiefly known as a reliable cathartic. It is obtained by crushing and pressing the seeds of the castor oil plant, which is native to Africa but grows in any warm climate. The unpleasant taste of the medicinal oil is partially overcome by means of soda water, fruit juices, or hot coffee. A refined product that is almost tasteless is now on the market.

During the World War there was a great demand for castor oil as a lubricant for airplane engines because, unlike most thick oils, it does not become thin at high temperatures. Castor oil is an important ingredient in many transparent soaps. When properly treated with sulphuric acid and ammonia, it is used, under the name of *Turkey red oil*, to prepare cotton for dyeing and printing.

Catgut. A strong, tough cord, prepared almost always from the intestines of sheep, occasionally from those of other animals, but never from those of the cat. It is made chiefly in France and Italy, the best products coming from Rome. The principal use of catgut is for the strings of rackets and of various musical instruments. It is used in surgery for closing wounds.

Celluloid. An artificial material which was invented in 1869 by the Hyatt brothers of Newark, N. J. It is used as a substitute for more expensive substances, such as bone, ivory, and hard rubber, which it can be made to resemble very closely. It is produced from some pure form of cellulose, such as tissue paper or cotton fiber, which is treated with a mixture of nitric and sulphuric acids. The resulting *nitrocellulose* is carefully dried and is then kneaded in a mixing machine with alcohols and camphor until it becomes plastic. It is then worked between rollers and afterward pressed and dried. The final product may be transparent or opaque and can be given any desired color. Celluloid can be applied to paper, cloth, or leather to produce a very smooth, waterproof surface. It has a high degree of inflammability, but this may be markedly decreased by mixing with the celluloid a proportion of plastic casein.

Cement, Portland. A fine gray or white powder made by heating and grinding definite proportions of lime and clay. After mixture with water, it gradually sets to form a rocklike mass. The white variety is made from specially selected clay. The name portland is due to Joseph Aspdin, a bricklayer of Leeds, England, who, in 1824, patented the method of making cement and thought that the hardened product bore a slight resemblance to a famous building stone found on the Isle of Portland.

Sometimes the raw materials are found already combined in the proper proportions in certain kinds of rock. But usually clay and some substance rich in lime, such as limestone, chalk, or marl, after being dried and weighed, are carefully mixed and finely ground. Then the powdered product goes to the kilns, which are revolving steel cylinders sometimes 200 feet long. These are lined with fire brick and heated within by a burning blast of pulverized coal, crude oil, or natural gas to a temperature between 2500° and 3000° F. This intense heat causes the powder to fuse slightly, and, as the kilns have a slight slope, the mass works its way downward through the flame and is discharged as clinkers. After cooling, the clinker is ground sufficiently fine to meet the standard requirement—that at least 78 per cent of it shall pass through a sieve having 40,000 holes to the square inch. Before the grinding is complete, a small amount of plaster of Paris or gypsum is added in order to control the time required for the cement to harden.

This exceedingly fine powder is portland cement. It is usually sold in bags which contain approximately one cubic foot and weigh 94 pounds each. When mixed with water, the cement sets rather slowly. Within a few hours, it becomes stiff enough to resist the pressure of a finger and thereafter gains rapidly in strength for the first 30 days, continuing to gain, though much more slowly, for at least two years. Cement sets because of a chemical action that takes place when water and the dry powder are mixed. The exact nature of this change, however, is not known.

Portland cement is used in enormous quantities in making concrete for the construction of buildings, bridges, dams, tunnels, and conduits, as well as for sidewalks and permanent roads. See *Concrete*.

Chocolate. A valuable food product obtained from the seeds of the cacao tree, which is indigenous to the tropical parts of the western hemisphere. Chocolate was used by the natives of Central America long before Columbus crossed the ocean, and it is said that, when Cortez conquered Mexico, he found the emperor of that country drinking chocolate from a golden cup. When cultivated, the cacao attains a height of about 20 feet, although the wild trees are sometimes twice this size. The fruit is a red or yellow melon-shaped pod, between 6 and 8 inches long, which grows directly from the trunk or older branches. It has a rough, thick rind that covers a mass of seeds embedded in a sweet, sticky pulp. The seeds, from which chocolate, cocoa, and cocoa butter are made, are about the size and shape of an almond kernel and are covered with a thin brown shell.

When the fruit is ripe, the rind is cut open, and the seeds and pulp are removed and thrown into piles or into sweating-boxes, where they are allowed to ferment for several days. After the fermentation, which improves the flavor and makes the pulp

easily removable, the seeds are cleaned, dried, packed in bags, and shipped to the markets of the world.

When the cocoa beans arrive at the factory, they are first roasted like coffee in long revolving cylinders. This develops a pleasant aroma and also makes the shell dry and brittle. After roasting, the beans pass first to crushing machines, where they are broken, and then to cleaners, where the germ of each bean and the shells are removed. The clean, broken kernels of the roasted beans, called *cocoa nibs*, are then ground to a smooth paste under heavy stone rollers. If this pasty mass is run into flat molds, it hardens to the well-known dark cakes of *bitter chocolate*. When the chocolate mass is ground with a large proportion of sugar, the resulting product, which is sometimes flavored with vanilla or spices, is *sweet chocolate*. When milk or milk powder is included in the mixture, the result is *milk chocolate*.

Cocoa nibs and bitter chocolate contain about 50 per cent of a hard, yellowish white fat called *cocoa butter*. Because of the large amount of fat, many people find that the drink made from chocolate is too rich. In making *cocoa*, about one-half or two-thirds of the cocoa butter is squeezed out from the warm chocolate by means of a hydraulic press. The resulting cake is broken and ground very fine, giving *cocoa powder*, which usually contains only 20 or 25 per cent of fat.

Candy is covered with a coating of chocolate by being dipped into the soft, warm material. Ordinary sweet chocolate cannot be used for this purpose because it will not melt easily. For candy making, a special product called *dipping* or *coating* chocolate is prepared by adding extra cocoa butter to sweet chocolate. This mixture can be melted in hot water.

Chocolate contains a stimulating alkaloid called theobromine, which is closely related to the caffeine of coffee and tea. For this reason, some people find it difficult to sleep after drinking cocoa. But the various drinks and other products prepared from chocolate have a high food value and are usually considered wholesome and nutritious.

Coke. The substance which remains when soft coal is heated so as to expel the volatile materials which it contains. Coke is usually hard, gray, and porous, and it burns with intense heat and a smokeless flame. It was first made to supply the need of a smokeless fuel, but today a large proportion of all coke is used for the production of iron from its ore. It is more satisfactory than anthracite for this purpose because it burns freely in the blast furnace and contains only a small amount of sulphur, which is harmful to iron.

The original method of making coke was to pile soft coal in heaps, which were lighted and allowed to burn until most of the volatile matter was given off. Next came the practice of heating the coal in dome-like furnaces, which were known as *beehive ovens* because of their shape. These ovens make good coke, but, because they allow the volatile matter to escape, they are being supplanted by modern *by-product* coke ovens, which recover gas, ammonia, and coal tar. The gas is burned for light and heat; the ammonia is used for refrigeration or is made into a valuable fertilizer; and, from the coal tar comes a long list of dyes, medicines, explosives, and roofing and paving materials. A ton of coal gives 15 to 25 pounds of fertilizer and from 5 to 14 gallons of tar.

The principal areas in the United States which supply good coking coal are the Connellsville section in Pennsylvania, the Pocahontas field in West Virginia, and the Trinidad and Glenwood Springs fields of Colorado.

Concrete. Artificial stone produced by the setting, or hardening, of a mixture of portland cement, sand, pebbles or broken stone, and water. When steel rods or other forms of steel are placed within this mass in order to add to its strength, we have *re-enforced concrete*. The sand used should be clean and free from dust. The stone, preferably sharp, should range in diameter from ¼ to not more than 1¼ inches. The cement, sand, and water form a mortar which fills up the air spaces and binds the stone to a rocklike mass. The materials are mixed in various proportions, depending on the strength required and the amount of wear the surface will receive.

A 1-2-4 mixture, so called because it contains one part of cement, two of sand, and four of stone, all by volume, is generally used for re-enforced concrete walls and engine foundations. For basement walls and foundations, grain and coal bins, and the lower layer of sidewalks and of floors, a ratio of 1-2½-4 is satisfactory. A 1-2 mixture, without stone, is used for the wearing surface of walks and floors. Walks and floors of but one layer, fence posts, and watering tanks are best made of the proportions 1-2-3. The ingredients are carefully mixed and wet with water until the mass will spread out under its own weight, but it must not be so thin that the heavier particles will settle to the bottom. In this condition, it is spaded into the molds, or *forms*, which are generally made of wood. Setting usually requires from three to ten days, but the concrete gains in strength for a year.

Concrete is a structural material of great value because it can be made into almost any desired shape and because when set, it has the strength and permanency of stone. It is comparatively cheap and can be prepared when and wherever needed from materials that are usually available. During the World War, the urgent need for transportation led to the development of practical ocean-going concrete ships as well as of concrete barges for use in canals and harbors. Concrete roads are continually gaining in favor. See *Cement*.

Corduroy. A thick, strong, cotton cloth characterized by a corded or ribbed surface of velvet-like texture. Its excellent wearing qualities make it especially suitable for clothing subject to hard usage. The name, meaning king's cord, was first applied to the material in the 17th century, when it composed the uniform of the French king's huntsmen. Because of the ridged appearance, the name corduroy is sometimes applied also to a road or bridge made of logs laid transversely.

Cork. The outer layer of the bark of an evergreen species of oak. The larger proportion of good cork comes from Spain and Portugal, although the cork oak grows throughout northern Africa and southern Europe. It attains an average height of about 30 feet with a thickness of 2 feet through the trunk.

As the tree grows, layers of dead cells accumulate on the surface of the bark. This growth is cork. It is gathered by making cuts around the trunk just below the branches and just above the ground. These are joined by several vertical cuts, so that each layer of cork can be pried loose. The first stripping, known as virgin cork, is taken when the tree is about 20 years old. It is of poor quality. Succeeding growths are cut at periods of 8 to 10 years, with an average yield of about 45 pounds. The best cork is produced after the tree is 40 years old, and, when carefully done, the process is not injurious to the tree, which lives for 150 years or more.

The slabs of cork are dried for a few days and then steamed or placed in boiling water. This treatment softens the rough outer coating so that it may be scraped off. It also extracts tannin and other soluble matter, increases the bulk and elasticity, and flattens the curved pieces so that, after drying, they may be packed in bales.

Cork is a soft, light, elastic material that is highly resistant to the passage of electricity, heat, water, or air. It is so generally used as stoppers for bottles and jugs that stoppers made of other substances are usually called corks. Because it weighs only one-fourth as much as water, it is used for floats on

fishing nets, in life preservers, and for artificial limbs. Insoles for shoes are often made from cork. Ground cork affords an excellent insulating material and, mixed with thickened linseed oil, is used in the manufacture of *linoleum*. A valuable black pigment is made from burnt cork.

Cotton. A product of the cotton plant, which is probably more generally useful than any other textile fiber. Wool is required chiefly for warm clothing, and silk is demanded because of its beauty, but, while cotton can be made into products almost as warm as wool or as attractive as silk, it also serves for countless purposes where the cost of other fabrics would be prohibitive. Under the microscope, each cotton fiber is seen to resemble a flattened, twisted tube, and it is this characteristic twisted structure which makes cotton so satisfactory for spinning into threads. Columbus found it used by the natives of South America for making cloth, and it had already been employed in India for at least 3000 years. It is a tropical plant, but grows best in a reasonably moist, temperate climate which is free from frost for at least 6 months of the year. North and South America, Egypt, China, India, and Russia all produce important parts of the world's cotton crop, most of which grows between the 36th parallels north and south of the equator.

The plant is a perennial and, in tropical countries, often produces crops for many years; but, in the southern part of the United States, where a large proportion of all cotton is grown, it is treated as an annual. Seeds are planted early in the spring, and the plant, which belongs to the same family as the hollyhock, attains a height of from 2 to 10 feet but is usually about 4 feet tall. When the flowers open, they are cream or yellow, but the color changes to pink on the second day. Before the end of the third day, they usually fall to the ground, leaving a tiny green boll, or seed pod, which grows to about the size of a hen's egg. When ripe, the bolls burst open, and the cotton is ready for gathering. If the bolls were all to ripen at the same time, a great saving could be made by mechanical picking. But, while the work of some picking machines has been very promising, none has so far been a complete success, and the expense of harvesting the crop by hand is one of the largest items in the cost of production. An expert can pick 200 pounds or more in a day, but the average is only about 100 to 125 pounds. Cotton picking time in the Southern states extends from about August 25 to December 10.

The cotton worm, the boll weevil, and the pink cotton-boll worm are the worst enemies of the cotton plant and have caused enormous losses. The most generally used remedies have been insecticides such as paris green and kerosene emulsions. More recently, calcium arsenate, applied as a dust or powder, has proved of great value.

The collected cotton is taken to a ginning mill where the fiber is separated from the seeds and compressed into bales. There are two kinds of gins,—the *saw gin*, which is most generally used, and the *roller gin*, used for treating long-fibered cotton. The saw gin, invented by Eli Whitney in 1793, consists of a set of circular saws with fine teeth which catch the fiber and pull it through an opening too small for the seed to follow. The standard domestic, 500-pound bale, of about 28 × 42 × 56 inches, is covered with coarse jute cloth and bound with steel straps. For export these bales are compressed to about 30 pounds per cubic foot. The average production of cotton in the United States is about 185 pounds per acre.

There are many varieties of cotton, all of which are graded according to the length and the fineness of the fiber. A rough commercial classification may be made into four general types. *Upland* cotton is the standard product and fills about ⅔ of the world's cotton requirements. Its fiber is between ¾ and 1¼ inches long, white, and easy to work. *Peruvian* cotton is long, rough, hairy, and well adapted for mixing with wool. *Egyptian* cotton has strong, silky fibers between 1⅛ and 1⅝ inches in length. Much of it has the tawny color characteristic of balbriggan underwear and natural ecru curtains, but one of the most widely cultivated varieties is white, so that these products are now usually dyed. Egyptian cotton of the finest quality is grown by irrigation in the Imperial valley of California and the Salt River valley of Arizona.

The finest and longest fibers are those of sea-island cotton, which grows chiefly on the sea islands and coast regions of South Carolina, Georgia, and Florida. It averages 1¾ inches in length and is suitable for the finest thread and lace. The seeds of this variety are smaller than those of the upland cotton and are black instead of green.

When the bales reach a cotton mill, they are opened as needed and are mixed so that the quality will be uniform. The packed fiber is then loosened and passed through many mechanical processes, technically known as carding, drawing, slubbing, roving, spinning, and doubling. In the various machines the cotton is formed into a lap much like that of cotton batting. The fibers are carded until they all run in the same direction, and the broad lap is divided into narrow slivers, which are reduced, combined, and redrawn until uniform in size, when they are twisted into yarn or thread. The spinning machines are of two types, called ring spinners and mules. They often have thousands of threads, or bobbins.

The finished threads are then fitted to the great looms and woven into cloth. Preparation of spool, or sewing, thread is also an important branch of the industry. *Mercerized* cotton, invented by John Mercer of Lancashire, England, is produced by treating the thread or cloth, while under tension, with caustic alkali. The fibers shrink and become stronger, more transparent, and almost like silk in appearance. *Absorbent* cotton is made by dissolving from the fibers the natural waxlike material which they contain, so that they become soft and very porous. Cotton is almost pure *cellulose* and is used in great quantities for making artificial silk, celluloid, and many explosives.

Cottonseed Oil. The most valuable product obtained from the seed of the cotton plant. It is occasionally extracted by means of gasoline or some other volatile liquid that will dissolve fat, but usually it is squeezed out of the carefully prepared seed under the enormous power of the hydraulic press. The *crude* oil so obtained is *refined* by treatment with a dilute solution of caustic soda, which removes most of the coloring matter and all of the sharp-tasting fatty acids. These impurities settle to the bottom of the refining tank in a thick, soapy mass, called *foots*, from which the oil is drawn off and washed with water to remove all traces of alkali.

The dark, foggy liquid that runs from the press becomes, by this process, a clear, golden yellow oil with a pleasant taste and odor. If it has been carefully prepared from good seed, it will probably be classed as *prime summer yellow* cottonseed oil, which is the standard grade in the markets of the world. When the color or odor is below standard, it is called *off* oil. Refined oils are classed commercially as summer yellow, summer white, winter yellow, and winter white. The white oils are made from the yellow by bleaching with fuller's earth. At a temperature of 38° to 32° F., summer oils become thick because of the formation of palmitin crystals. For this reason, they are not considered satisfactory salad oils. *Winter* oils have been chilled and pressed to remove these crystals and, consequently, will remain bright and clear at 32° F. Any of the refined products may be *deodorized* by blowing the liquid with steam at high temperatures.

Enormous quantities of prime cottonseed oil are used in the manufacture of oleomargarine and lard

compounds. The winter oils are prepared chiefly for table use. Grades below edible standard in color or flavor are usually made into toilet soap. The foots are used in the preparation of laundry soaps and soap powders. If treated with acid and distilled, the foots yield light-colored fatty acids for the soap industry and a residue of pitch used in roofing tars.

Cottonseed oil was first produced by Dr. Otto, of Bethlehem, Pennsylvania, in 1768, but its value as a food product was not generally appreciated until about 1855. Since that time, the industry has had a remarkable growth due to the continuous discovery of new uses for the various crude products.

Cottonseed Products. For every pound of cotton that is grown, about two pounds of cottonseed are produced. This seed was for many years considered a nuisance and was wasted or burned. It is now a very important part of the cotton crop because it yields food for man, food for cattle, and food, or fertilizer, for growing plants. The dark greenish seeds, about the size of a pea, are covered with short fiber, or *linters*, which is removed by machinery after the seeds have been carefully sifted and cleaned. After delinting, they pass to the *huller*, where they are cut into pieces, beaten, and sifted until the *hulls* are separated from the meats which they contain. The meats are then crushed between heavy rolls, cooked with steam, formed into cakes, and placed in a hydraulic press, where the oil is squeezed out under a pressure of almost 4000 pounds per square inch. The hard, dry cakes which remain are ground into *cottonseed meal*.

One ton of seed yields about 315 pounds of oil, 920 pounds of meal, 600 pounds of hulls, 80 pounds of linters, and 85 pounds of dirt and waste which have no value. The linters are used as a filler for pads and cushions, for making paper, for mixing with wool in shoddy and cheap felt, and in the manufacture of celluloid, guncotton, and smokeless powder. The hulls often serve, like sawdust, for a packing material and are added to concentrated cattle foods to give bulk. The meal is valuable both as a fertilizer and as a rich food for all farm animals, while the oil, which is most important of all, has many uses in the production of edible and technical products. See *Cotton*, *Cottonseed Oil*.

Dyes and Dyeing. The art of dyeing, or applying color in a more or less permanent form to cloth and other substances, is very ancient. In 1000 B. C., the city of Tyre was already famous for its purple dye, which later became the badge of royalty.

The dyes formerly used were natural products obtained from many sources. *Indigo* was prepared from a plant; *logwood*, from the heart of a tropical tree; *madder*, which gave the famous *Turkey red*, from a root; *cochineal*, from the dried bodies of female insects which live on certain cactus plants; and *Tyrian purple*, from a species of shellfish.

Artificial dyes originated in England in 1856, when Perkin first prepared from aniline the lilac color *mauve*. Similar products which followed were accordingly known as aniline dyes. The term *coal-tar dyes* is now more customary because the basis for most of these colors is benzol, carbolic acid, naphthalene, and other compounds obtained from the tar which results when coal is distilled for the production of gas and coke. Thousands of artificial dyes have been made by chemists, so that the production of madder, indigo, and other natural products is now of minor importance.

Silk and wool combine directly with dyes much more readily than does cotton. In order to produce fast colors, certain substances, called *mordants*, are often used, which can combine both with the fiber and with the dye. Alum, iron salts, and tannin are among the many materials used for this purpose. The fabric is first dipped into a solution of the mordant and is then passed to the dye vat, where it takes up the desired color.

Eau de Cologne. A famous perfume, called in English Cologne water, which was originally made in Cologne by an Italian named Farina. It consists of pure alcohol to which are added several aromatic oils that impart a pleasant and refreshing odor.

Enamel. A glasslike substance fused upon the surface of metal, glass, or other material as a means of protection or of decoration. The familiar enameled kitchen ware is made by baking a smooth coating of enamel upon an iron base. Transparent enamels are usually called glaze. The art of enameling was practiced even in the time of the Egyptians and the Babylonians. It has led to the production of exceedingly beautiful articles, many of which have the appearance of gold covered with a pattern of bright-colored jewels. Enamel is used for glazing some varieties of pottery and of brick. Clock and watch dials are usually enameled. The type of paint known as enamel gives, when dry, a hard, glossy surface resembling that obtained by fusion.

Fire Extinguisher. Any device intended for use in stopping combustion and in extinguishing flame. Under ordinary conditions, fire is due to a violent chemical reaction between combustible material and oxygen of the air. Therefore, any means which will cut off the supply of oxygen from the flame will usually put out the fire.

One of the most common and easily available fire extinguishers is a bucket of water. The water should be spread over the burning material with a sweeping motion, rather than hurled in a mass at the flame. A well-known type of extinguisher consists of a strong metal tank partly filled with a solution of baking soda in water. A hose and nozzle is connected with the top of the tank, and a small, loosely stoppered bottle of sulphuric acid is placed above the solution. When the container is inverted, the acid reacts with the soda to form carbonic acid gas under considerable pressure. This forces out the water in a steady stream.

Many of the most dangerous fires result from the careless handling of gasoline and kerosene. For fighting such fires, water is of little value, but *carbon tetrachloride* is very effective when sprayed from a hand pump or even when sprinkled from a bottle. This chemical, however, should not be used in closely confined or unventilated places, because it may generate dangerous gases. Sand is often successfully used to smother an oil fire which has spread out over a large surface. *Quick action* is most important in fighting a small fire. Consequently, the prompt application of several handfuls of flour, cement, or similar powder may often prevent serious damage.

A bucket of slightly moistened sawdust mixed with two or three pounds of washing soda will often serve to extinguish an oil fire in a deep container where sand would sink and be of no value. When clothing is afire, a blanket, a rug, or an overcoat wrapped closely about the person will usually extinguish the flame.

Fireless Cooker. A cooking device which usually consists of an oven surrounded on all sides by thick layers of insulating material. It is designed to keep the heat where it is needed and thus maintain the proper cooking temperature without wasting fuel.

Heat may be produced within the oven by means of electrical resistance coils, but it is usually supplied by placing stones, heated to the proper temperature, at the top and the bottom of the oven with the container of food between them. As the heat from the stones cannot quickly escape through the nonconducting walls, the temperature of the oven falls very slowly, and the food is thus cooked with a minimum amount of fuel.

Flour. The finely ground meal of wheat or other grains. When used alone, the word refers to wheat flour. *Graham flour* is made from the entire wheat

kernel, but, if the outer layer of bran is removed before grinding, *whole wheat* flour is produced.

The white flour most used for bread making is no longer prepared, as it was for centuries, by crushing the grain between moving stones. In a modern flour mill, wheat which has been carefully cleaned and then moistened or dried to the proper condition is passed through a series of four or five steel rolls, each of which is adjusted to break the pieces a little smaller than the one before. Between each *break*, the fine particles of flour are sifted out, and the coarser pieces, or middlings, are also cleaned and sifted. The purpose of this complicated process is to get as much high grade flour as possible and to eliminate the bran.

After being sifted through fine silk bolting cloth, as many as forty different streams of flour are finally reunited into standard grades called first patent, second patent, first clear or bakers, second clear or low grade, and red dog, the lowest grade of flour made. Standard patent flour, which is the bread flour usually found on the market, includes the first three grades. About 25 per cent of the wheat, consisting of shorts and bran, is classed as offals. Shorts are the fine particles of bran mixed with some flour. The germ is also separated because it contains much fat and, if ground into flour, is likely to develop an unpleasant flavor.

Because of the gluten which it contains, wheat flour makes better bread than that made of other cereals. But the quality of the gluten is just as important as the quantity. Red dog contains about 50 per cent more gluten than the high grade patent flours, but it will not make good bread. The quality of the bread which it yields is the final test of a flour. Crackers and macaroni are important food products made almost entirely from flour. Macaroni flour, or *semolina*, is rather coarsely ground from *durum* or other hard wheat.

During the World War, the United States Food Administration ordered that 100 pounds of wheat should be milled so as to yield at least 74¼ pounds of a product which was officially called 100 per cent flour and popularly known as *war flour*. This should not be confused with 100 per cent extraction flour, which, as previously explained, is Graham flour. Rye flour is an important food product, especially in Europe. Corn flour and potato flour find limited uses, and banana flour is well known in the countries where the fruit grows. See *Bread*.

Gas, Artificial. A combustible gas used for light or heat. It may be classified according to its methods of production as coal gas, water gas, oil gas, air gas, and acetylene.

When soft coal is heated in a closed container, it gives off inflammable gas. *Coal gas* produced in this manner was known as early as 1691, but it was first used in 1792 by William Murdock to light his home in Cornwall, England. Pall Mall, London, was, in 1807, the first street to be lighted with gas, while Baltimore, in 1821, was the first American city to use the new system.

Much coal gas is obtained as a by-product in the manufacture of coke. Large amounts are also produced in retorts built specially for that purpose. Before it can be used, the gas passes through cleaning devices which remove such impurities as tar, ammonia, sulphur, and carbon dioxide. It is then stored in huge tanks, from which it passes to the distributing pipes.

Water gas, which is used in many cities, is made by blowing steam through a furnace full of white hot anthracite or coke. The steam is decomposed and combines with the carbon of the fuel to produce hydrogen and carbon monoxide, gases which burn with great heat. Coal gas and water gas are of chief importance in public gas systems.

Oil gas is produced by heating suitable oils until they break down into permanent gases. These may be purified and compressed into cylinders. *Pintsch* and *blau* gases are of this type. *Air gas* is formed by blowing air through a volatile, inflammable liquid such as gasoline, until the air contains enough vapor to burn. This type is often used in detached houses.

When it was the custom to obtain light directly from burning gas, it was often necessary to add to the gas quantities of hydrocarbons such as ethylene and benzene in order that the flame should produce a certain fixed degree of brightness or candle power. The use of the more efficient incandescent mantles, which require only that the burning gas supply heat sufficient to make them glow, made desirable a standard for gas which should be based on *heating value* rather than on candle power. The change to such a standard was hastened by the World War, when all available benzene was needed for the production of explosives. See *Acetylene*.

Gelatin. A hard, transparent, yellowish white, nitrogenous substance, without taste or smell, which swells when in contact with cold water. It dissolves in hot water and, when the solution is cooled, sets to a stiff, jelly-like mass. Gelatin is formed by the action of boiling water on connective tissue, cartilage, ligaments and tendons, skin, hoofs, and bones. By one commercial process, the selected tissues are washed, soaked in warm diluted soda lye for about ten days, and then heated in an air-tight compartment. They are next washed in revolving drums, bleached by fumes of burning sulphur, and rewashed to remove all sulphur, after which the gelatin is dissolved out with boiling water. Color is removed by means of bleaching charcoal, and the clear hot solution is poured out in thin layers, which, after setting, are cut into small sheets and dried on nets.

Isinglass is a very pure form of gelatin, obtained from the swimming bladders of sturgeon and other fish. It should not be confused with the thin, transparent sheets of mica, which are sometimes incorrectly called isinglass. Ordinary *glue* is impure gelatin, of great value as an adhesive. Many photographic processes require gelatin, which is used to hold the sensitive silver salts on plates and films.

The value of gelatin as a food was for a long time greatly overestimated, for it has been shown that animals, when fed on it exclusively, die of starvation.

Glass. A hard, noncrystalline, artificial substance, usually transparent or translucent, made by melting together a mixture of various materials. The principal ingredients used in glassmaking are: *sand* or other forms of pure silica; *lime* or lead oxide; and some form of *alkali*. Many other materials enter into the production of special kinds of glass. Bottle glass usually contains aluminum. When the alkali used is soda, the product differs from one made with potash. The addition of manganese gives a brown color; cobalt yields a blue; and even gold has been used to produce a particularly beautiful ruby glass. One of the most important characteristics of glass is that it does not melt at any fixed temperature, but softens gradually as the heat increases, and loses plasticity as it cools.

Great care is taken that the materials used shall be as free as possible from iron, which imparts a green color to the finished product. The selected ingredients are melted in a furnace together with a small amount of broken glass or *cullet*, which lowers the melting point of the mixture. The furnaces were formerly huge pots of clay, but these are being supplanted for many purposes by large rectangular tanks.

Plate glass is made by casting molten glass upon large iron tables, where it is flattened by rollers, and then placed in annealing ovens to cool. For mirrors and windows, the sides of the rough plate are ground and carefully polished, but the unfinished plate is quite satisfactory for use as a cheap roofing glass. The term *crown glass* is used to designate a product which is made by opening a hollow ball of soft glass while it adheres to the end of a rod. By rapid rotation, the sides of the ball open out to a disk which has an elevation or crown in the center, where it was

attached to the rod. As the crown-shaped center cannot be used except for ornaments, this form of production has been practically abandoned.

In the process of making *window glass*, a large lump of the molten substance is gathered from the furnace on the end of an iron pipe and is then blown to a thick bubble by compressed air. The workman stands over a narrow pit in which he swings the pipe so that, by swinging and blowing, the bubble gradually stretches out in the form of a great bottle. The bottom is then softened by heating and is blown open by air pressure. The blowpipe is broken from the neck, and the shoulder of the bottle is cracked off, thus leaving a cylinder. The cylinder is opened by being cut on the inside with a diamond, cracked along the cut by means of a piece of hot metal, and placed in a kiln where the heat is sufficient to soften the sides so that they may be flattened out by special tools.

Flint glass, in spite of its name, is the softest of the ordinary types. It is usually made from silica, potash, and lead oxide and, because of its brilliancy, is used for tableware and cut glass. A flint glass containing a large proportion of lead forms the *strass* used for making imitation jewels. *Wire glass* is cast around a network of wire which strengthens the glass and prevents broken pieces from falling.

Expert glassblowers can work the material into almost any form. Models of flowers are accurately made from colored glass, and cloth has been woven from finely drawn glass threads. Unusual forms of solid glass are generally molded. Colored streaks or spots are produced by adding threads and pieces of colored glass while the material is still soft. Paint and enamel are sometimes used for decorating glass, while frosted effects are obtained by using a sand blast or hydrofluoric acid. Initials and delicate outlines are marked by a small, rapidly turning wheel. *Cut glass* has its designs sunk into it by sharp edged wheels, although there is a cheaper kind in which the pattern is molded, and the slightly rounded edges are sharpened on a grinding wheel.

Glassmaking as an art was more or less understood by the Egyptians 6000 years ago. The more important improvements in glassmaking, however, such as the production of hard, cooking glassware and of the wonderful varieties of glass used for optical purposes, are modern inventions.

Glucose. Commercial glucose is a clear, thick, sirupy liquid, which is about two-thirds as sweet as sugar. In Europe it is made chiefly from potato starch, but in the United States it is produced almost entirely from corn, whence the name corn sirup. The corn is ground under water to obtain the starch, which, after being cleaned, is treated with hydrochloric acid. Under the influence of the acid, the starch molecules combine with water and break down into glucose together with some dextrins and other products. The acid is then neutralized, and the thin liquid is bleached, filtered, and finally concentrated under vacuum to the required consistency.

Repeated experiments by government experts have shown that glucose is in no way inferior to cane sugar in healthfulness. For table use, it is usually flavored with about 15 per cent of sirup obtained from sugar refineries. Large amounts of glucose are required by canning and preserving industries and in the production of candy.

Glycerin. A sweet sirupy liquid without color or odor. It is the principal by-product of the soap and candle making industries, resulting from the decomposition, under heat, of fats with alkali or acid. Glycerin can be obtained from any fat, such as cottonseed oil, lard, or even butter. It is purified by distillation with superheated steam, the pure substance boiling at a temperature (554° F.) higher than the melting point of tin. It does not evaporate easily, but, instead, takes moisture from the air. For this reason, it is added to tobacco, shredded coconut, candy, and inking pads, to prevent drying.

Glycerin is a good solvent for many organic materials and may be used instead of alcohol in the preparation of flavoring extracts. Tea and coffee stains can often be removed by first moistening the spot with glycerin and then applying soap and water. Mixed with litharge, or lead oxide, glycerin makes a valuable cement. Glycerin is used in medicine to allay inflammation. It is valuable also as a cosmetic and is used extensively in the preparation of nitroglycerin for explosives.

Gold Leaf. Extremely thin sheets of gold, used chiefly for gilding. These sheets average $\frac{1}{200000}$ inch in thickness, so that, in this form, an ounce of gold will cover almost 100 square feet.

In making gold leaf, an ingot of gold about an inch wide is first flattened between steel rollers to a long ribbon having the thickness of very thin paper. This ribbon is cut into squares, which are stacked with a sheet of vellum or tough paper between adjacent pieces. The pile is enclosed in a parchment case, placed on a marble table, and beaten with a heavy hammer until each piece has spread to a square having a size of about 3½ inches. These squares are quartered.

Each small piece is next placed between layers of *goldbeater's skin*, a tough membrane prepared from the intestines of cattle. The skins are dusted with fine plaster of Paris to prevent sticking, and beating is continued with a lighter hammer until the gold is again about 3½ inches square. Another quartering and beating then yields foil of the proper thickness. The final pieces are trimmed to about 3¼ inches square and are packed between leaves of dusted paper in books, each containing 25 pieces.

Gold used for beating is usually about 23 carats fine. A small amount of alloy gives the desired color, but, as impure gold does not yield so much foil, adulteration with cheaper metals is seldom practiced.

Gunpowder. An explosive mixture of saltpeter, charcoal, and sulphur. The origin of this product is unknown, but it was probably not the invention of a single person. The Chinese apparently knew of the mixture at the beginning of the Christian era, but, in Europe, Friar Roger Bacon, of Oxford, seems to have been the first to write of its properties. About 1313, a German monk named Barthold Schwartz demonstrated that it might be used for propelling missiles. Cannons existed at least as early as 1326. However, gunpowder was not generally used in warfare until the 16th century.

Standard United States Army black powder contains 75 per cent saltpeter, 15 per cent charcoal, and 10 per cent sulphur. When such a mixture explodes in the breech of a gun, about 43 per cent of it is changed to hot gases, which, by their expansive force, exert an enormous pressure. The large amount of smoke is due to the remaining 57 per cent of solid particles which are thrown out.

In the manufacture of gunpowder, the carefully prepared materials are mixed dry. They are then moistened, and ground under heavy rollers. After grinding, the *meal* is placed between plates of hard rubber in a hydraulic press. High pressure yields a dense, quick-burning powder; lower pressure gives one that acts more slowly. The cakes from the press are broken up into grains, which are sifted and then polished in revolving barrels. After a second sifting, the grains are dried and packed in containers.

Brown, or *cocoa*, *powder* was developed for use in heavy guns. It is usually in the form of prisms about 1½ inches long and having a hole through the center in order to increase the burning surface. Partially charred rice straw, which gives a brown color to the powder, is used instead of charcoal. *Blasting*, or *mining*, *powders* are coarser products and usually contain a smaller proportion of saltpeter. Chile saltpeter, or sodium nitrate, is sometimes used instead of the more expensive potassium salt.

These explosives have been almost entirely supplanted by superior products of the smokeless powder type, which are made so that practically all the products of explosion are gases. Smokeless powders are more powerful and less bulky than the black gunpowder and do not leave a large residue of mineral matter. They are usually prepared from materials of the type of guncotton and nitroglycerin modified in such a manner as to retard the speed of explosion. The first smokeless powder for sporting purposes was made in 1867 by Schultze, a German. A Frenchman named Vieille produced the first successful military smokeless powder in 1886, and, in 1889, Richard von Freeden invented a hard-grained sporting powder.

Heating and Ventilating Systems. Heating is ordinarily accomplished by means of open fireplaces, stoves, hot-air furnaces, steam, hot-water, and the vacuum-vapor systems. The hot-air furnace is an *indirect* heater, because the air is warmed by it before entering the room. The other systems are *direct*, because they are placed within the rooms to be heated. A radiator or other heating unit located within a room at the opening of a fresh air intake would be classed as a *direct-indirect* system.

The open fire is a pleasant source of warmth, but it is exceedingly expensive because most of the heat goes up the chimney. It does, however, afford good ventilation. A base-burner stove furnishes one of the most efficient methods of heating, but it requires a large amount of space and is unpleasant on account of the dust that arises when coal is applied and ashes are removed.

With the hot-air furnace, air is generally admitted from outside the building through an intake pipe and passed over a heating surface connected with the fire box. The heated air expands, becomes lighter, and, rising up through the distributing pipes, passes through registers, or grated openings in the floor or wall, into the rooms to be warmed. This system has the advantage of providing fresh air, but it is not always reliable. When a strong wind is blowing, it is a common experience to find that rooms on the windward side cannot be heated. This is usually because the wind leaks into the room through small cracks around the windows and baseboards. The slight pressure then becomes sufficient to prevent warm air from rising in the pipes. The use of storm sash during cold weather has often seemed to double the value of a hot air furnace.

A pipeless furnace has but one large register, placed in the floor directly above the heating plant. From the center of the register, the warm air rises to the ceiling, spreading in all directions. The outer edge of the register is connected as an intake through which the cool air near the floor is drawn to the furnace. The pipeless furnace can heat thoroughly only those rooms into which the warm air finds an easy path. It is therefore most satisfactory where the rooms are few—though not necessarily small—and where the door openings extend to the ceiling.

Steam, hot water, and vacuum-vapor systems use hollow radiators to give off the heat, and a furnace to generate it. The two are connected by a series of pipes. These systems deliver heat where it is needed, without reference to the direction of the wind. Steam radiators do not operate until the water in the boiler has been heated to the boiling point and sufficient pressure generated to force the steam through the pipes. Hot-water systems begin to radiate soon after a fire is started, because, as the water in the furnace becomes warmer, it becomes lighter and is pushed upward through the radiator by the heavier, cooler water entering the furnace from below. Hot-water radiators must be larger than steam radiators to warm the same space because they usually operate at 140° F. to 180° F. compared with 212° F. for steam.

At the ordinary atmospheric pressure of 14.7 pounds per square inch, water boils at 212° F. If, by creating a partial vacuum, this pressure is reduced to 1 pound, the boiling point becomes 101.8° F. The vacuum-vapor system takes advantage of this fact and is practically equivalent to a steam system operating under a vacuum produced by automatic valves or other devices. Under these conditions the water gives off vapor at comparatively low temperatures, and the vapor, meeting but little resistance, quickly flows to the radiator.

COMPARATIVE COST OF HEATING

System	Initial Cost	Fuel Required
Hot air	1.0	1.0
Pipeless furnace	⅔	1.0
Steam	2.0	¾
Hot water	2½	⅔
Vacuum-vapor	3⅓	⅘–⅔

It is impossible to say which system is the best because the answer depends on the conditions and surroundings in which it is to be used. An approximation of the relative cost is given in the above table.

Distribution of heat from a central station as practiced in various communities is often very satisfactory, especially where exhaust steam is available from some large power plant. The use of gas for fuel is convenient, but in some regions gas is more expensive than coal. Similarly, electric heating, which, considered by itself, is almost ideal, is uneconomical except in certain districts which have a large excess of water power as a source of electricity.

According to various calculations, the hourly supply of fresh air in a living room should be from 700 to 1000 cubic feet for each person. But the problem of ventilating the house ordinarily receives very little attention because doors and windows are so frequently opened that the air seldom becomes unwholesome. However, the air in most American homes generally contains about one-half as much moisture as it should contain, or, in technical terms, the *relative humidity* is too low. A living room temperature of 68°–70° with a relative humidity of 60–70 is considered best from the standpoint of health and efficiency.

The prevalence of colds, sore throat, and pneumonia in the United States can to a large extent be attributed to the custom of living in dry, overheated rooms. If the percentage of moisture in the air of these rooms were increased, a lower temperature would be used, for, when the air is very dry, the temperature must be from 7° to 10° higher than would otherwise be comfortable.

In hospitals, theaters, and schools, fresh air is usually provided by means of power driven fans. This air is sometimes cleaned and provided with the proper amount of moisture by means of washing devices. Many commercial establishments, such as candy factories, weaving mills, and offices where color printing is done, find it necessary to install air-conditioning apparatus so that, in winter and in summer, the atmosphere of the operating rooms shall always have the same degree of temperature and humidity. By this means the quality of their product is kept uniform.

Ice, Artificial. Frozen water produced by controlled physical processes rather than by natural climatic conditions. Refrigeration is most needed in warm places where the temperature is never low enough to cause freezing. Consequently, the demand for artificial ice in America came most strongly from the Southern states. The first plant was operated in New Orleans in 1866, but the industry has since developed until the manufactured product now competes with natural ice, even in the North.

Ice-making machines operate on the principle that a liquid absorbs heat when it expands to a gas. If the gas is again compressed to a liquid, heat is given off. Ammonia is the gas most used on a large scale, while sulphur dioxide or carbon dioxide are usually employed in the small machines used in the household. The two best-known processes of refrigeration are the *compression* and the *absorption*

system. In the first, ammonia gas is compressed by means of a pump; in the second, by heating a solution of the gas in a closed boiler. This compressed gas is cooled until it becomes a liquid, which is then allowed to expand through a valve into empty pipes surrounded by brine. Cans of pure distilled water stand in the brine. The liquid ammonia again becomes a gas, and, in changing its state, absorbs heat through the pipes. The brine is thus cooled below 32° F., so that the water standing in the cans gradually freezes. Blocks of ice weighing 50 to 400 pounds are produced in from 20 to 60 hours.

So called "dry ice" or "carbice" is solidified carbon dioxide gas. Particularly for the refrigeration of food products during transit, it has important advantages over ordinary ice. Its temperature is about 110° F. below zero, so that the bulk required for a given amount of refrigeration is comparatively small. Furthermore, there is no liquid residue, and loss of heat to the surrounding air is less, since a layer of carbon dioxide gas, heavier than air, forms a protecting blanket about the solid.

Ink. A colored fluid used for writing or printing. Standard writing ink is usually prepared from an extract of nutgalls, a solution of copperas or iron sulphate, and a solution of some gum, such as gum arabic. The gum is added to the extract, which contains gallic acid, and the iron salt is then poured into the mixture. A fine, light-colored precipitate is formed, which is prevented by the gum from settling. A small amount of disinfectant is generally added to prevent the growth of molds.

Such an ink produces writing of a light blue color, which, from the action of oxygen in the air, changes in about a week to intense, permanent black. In order that the writing may immediately have a strong, dark color, a solution of some coal-tar color is often added. Fountain pen inks should contain no sediment. Therefore, in making this type of ink, certain aniline colors, especially nigrosine, are extensively used.

Red ink may be prepared by dissolving eosin and a small amount of gum in water. Gold, silver, and bronze inks may be made by grinding the metallic leaf to extreme fineness in a heavy sirup, such as honey or glucose. The powder is then washed, and suspended in a solution of gum arabic. India ink consists of a stick of finely divided carbon mixed with gum, which is rubbed with water. Lampblack made from pines and mixed with gum was the base of ink used by the Arabs.

Inks used for printing usually consist of the proper color or pigment mixed with linseed oil or resinous varnish. Lampblack and gas black are the best pigments for printing black, while the colored inks are generally made with coal-tar dyes.

Lacquer. This term is generally used today of the synthetic, quick-drying lacquers having a pyroxylin base, which came into wide use about 1923. In distinction from paints and varnishes, its base is an artificially prepared material, pyroxylin. This is made by stirring cotton linters or high grade tissue paper in sulphuric and nitric acid. The excess acid is separated out by centrifugal machines, leaving pyroxylin, a nitrate of cellulose. This is dissolved in wood alcohol, ethyl acetate, acetone, or some other solvent, and pigments are added. The first of these lacquers to be marketed was called duco.

The principal advantage in the use of lacquer is the speed with which it dries. It reduces the time necessary for finishing automobile bodies from several weeks to three days or less. It is also much more durable and less susceptible to scratching than varnish. Its employment on automobiles has made possible the use of colors at moderate prices, since baked enamel, formerly used on metal bodies, lent itself only to black, colors being affected by the baking heat. On the other hand, lacquers do not take as high a gloss as varnishes and baked enamel.

Lamp, Incandescent. A lamp in which light is given off from a filament that is heated to incandescence by the passage of an electric current.

Many men worked on the problem of producing such a lamp, the earlier experimenters using a thin platinum wire for the filament. Lamps in which a carbonized thread of paper was used instead of platinum were exhibited in 1860 by F. R. Swan, an Englishman. In America, Thomas A. Edison attacked the problem independently and produced, in October 1879, the first commercially successful incandescent light.

Lamps of this type consist of a thread of carbon contained within a sealed glass bulb from which all air has been removed. If any oxygen were present the carbon would instantly burn. Electrical connections are made by means of two tiny wires fused into the glass.

Edison's early lamps used a filament of carbonized bamboo fiber. Later, the filaments were made by forcing a solution of cotton through a fine hole. The threads thus formed were hardened and were changed to carbon by heating. Improvements followed steadily. In 1907, a lamp with a filament made from powdered metallic tungsten was placed on the market; in 1911, stronger filaments of drawn ductile tungsten appeared; and, in 1913, the efficiency was greatly increased by filling the bulb with an inert gas, formerly nitrogen but now chiefly argon. These gas-filled bulbs, unlike the vacuum lamps, become hot when in use because the gas conducts some of the heat from the center to the sides. Nevertheless, they last longer and give more light for less cost than any of the older types.

Lead Pencil. The ordinary lead pencil consists of a long, narrow stick of "lead" held in a small circular case, usually composed of wood, but which is frequently made of paper or of metal. The "lead" pencil contains no lead whatever, the marking element being in reality graphite. This was introduced about 1565, when a graphite mine was discovered at Barrowdale, in Cumberland, England. The black mark of a graphite pencil was much superior to that made by metallic lead, which had been used for this purpose from early times by the Romans, the Aztecs, and many other peoples. The new material, under the name black lead, gradually displaced the older type.

In the process of manufacture, the graphite is first reduced to an extremely fine powder by crushing. It is then suspended in water and mixed with the proper amount of fine clay. The water is removed by filtering the mixture, and the paste is then forced through perforated plates until it is sufficiently smooth. Finally, the pasty mass is forced, under hydraulic pressure, through a die, from which it emerges as a continuous string of the required size. This string is straightened and is cut into pieces which are packed in trays and baked in ovens until dry. They are then ready for the customary wooden casings or for use in the popular metallic cases equipped with a screw for advancing the lead.

Red cedar or other soft wood is prepared for the casings by being cut into slats 7 inches long, 2 inches wide, and ¼ inch thick. On the surface of the slats, grooves are cut parallel to the long side and just deep enough to receive half the thickness of the lead. Glue is then applied to the grooved surface; a strip of lead is placed in the groove; and a second grooved slat is placed over the first so as to form an oblong block. The dried blocks are then fed to a milling machine, from which they emerge as perfectly shaped lead pencils. These are varnished or painted, the ends are trimmed smooth and, frequently, tipped with a metallic cap holding a rubber eraser.

Leather. The skin from an animal, tanned or treated so that it is more or less soft and flexible when dry. It differs from raw skin in that it does not decompose quickly and does not yield glue when treated with boiling water. Leather may be prepared from any skin, but cattle, sheep, and goats are the chief sources of supply. The skins of the

larger animals, such as cattle and horses, are called hides.

A raw skin consists of three layers. That on the outside is hard and scaly; that on the inside is composed of connecting and fatty tissues. Between these is the true skin, a layer of gelatinous fibers from which leather is made.

In preparation for tanning, skins are softened by soaking in water, the hair is loosened by treatment with milk of lime, and the layers of hair and fatty tissues are scraped off with knives. Further soakings are usually given to remove any excess lime. After these preliminary treatments, the inner skin is ready to be *tanned*, or changed to leather.

This change is usually accomplished in one of three ways: by soaking the skin in a solution of tannin extracted from oak or hemlock bark, sumac leaves, quebracho, or other vegetable material; by soaking in a solution of metallic salts, such as aluminum or chromium; by treatment with fish oils. The first method is called *tanning*; the second, *tawing*; and the third, *chamoising*. As the use of tannin is much older than other methods, the word tanning is used as a general term to include all processes.

The tannin process often requires from 4 to 8 months, while tawing with chromium salts can sometimes be completed in a few hours or days. As chrome tannage yields a very durable leather that is soft, light, and almost waterproof, it has become very popular in this country. Most glazed kid, such as that used for women's shoe tops and gloves, is chrome tanned. *Vici kid* is a proprietary name now generally used to describe any black, glazed, chrome-tanned kid. *Sole leather*, *harness leather*, and *belting leather* are produced from heavy cowhides by both methods of tanning.

Chamoising yields soft, pliable, light-colored wash leather of the chamois, doeskin, and suède type. These are made by working fish oil into the skins until all of the moisture is displaced. An oxidation process then occurs, during which the skins are changed to leather. The excess fat, known as *degras* when pressed from the skins, and as *sod oil* when washed out, is highly valued for dressing leather. *Chamois* was originally made from the skin of a small antelope of that name, which lives on the highest mountains of Europe and southwestern Asia. It is now made mostly from sheepskins. *Ooze* refers to leather having a suède finish.

Patent leather is made by applying many coats of oil and nitrocellulose varnish to well tanned skins tightly stretched on frames. The process is not controlled by a patent. *Cordovan leather* is soft, firm, fine-grained, and nearly waterproof. It was originally made in the Spanish city of Cordoba, but is now prepared in many countries from horsehide. Any required color is produced by dyeing. *Russian leather* is tanned with willow and birch bark. It has a peculiar odor due to the oil of birch bark tar with which it is finished.

Morocco was originally a fine red leather made in the vicinity of Morocco from goatskins. Today it is colored leather made from sumac-tanned goatskins which have been worked to bring out the grain. It is considered by bookbinders to be both the most durable and the most beautiful covering for books. *Levant morocco* is the finest and most expensive grade. When the grain of Levant morocco is crushed until the surface is smooth and polished, it is known as *crushed levant*. *French morocco* is made from sheepskin. *Buffing* is the grain, or outside split, from calfskin. It is much used for binding books.

Artificial leather, which has the appearance and many of the characteristics of the more expensive material, is usually made of cloth coated with some waterproof, flexible substance, such as a preparation of cellulose nitrate. The surface is grained by means of a die.

Lime. A caustic, infusible material which, when pure, consists chiefly of calcium oxide. It is made by roasting limestone, chalk, marble, shells, or other forms of *calcium carbonate*, to a bright red heat. *Carbon dioxide gas* is given off and the residue is lime, or, as it is often called, *quicklime*. The burning is done in lime kilns, some types of which operate continuously while others must be cooled and emptied before another batch can be made.

When lime is mixed with water, chemical combination takes place. Much heat is given off and the lime swells to a powder known as *slaked lime*, or, chemically, as calcium hydroxide. *Milk of lime* consists of slaked lime suspended in a large excess of water. Ordinary *whitewash* is milk of lime to which a size, such as glue or flour, is usually added. *Air slaked lime* has been exposed to the atmosphere, from which it absorbs carbon dioxide and moisture until it falls to a powder. Pure lime which combines easily with water and makes a smooth stiff paste is known as a *fat lime*.

Lime is used principally for making mortar. It is also extensively employed for softening hard water, for neutralizing acid soils, for making bleaching powder and glass, for purifying sugar, in metallurgical operations, and for many other purposes.

Linen. Thread or cloth made from fibers of the flax plant. It is noted for its smoothness, luster, strength, and durability. Well preserved linen cloths have been found in Egyptian mummy cases which were more than 4000 years old. Linen is not easily dyed, consequently it does not hold stains so permanently as cotton, wool, or silk.

In preparing the fiber, the seeds are removed from the plant and the flax is placed either in pools of stagnant water, in streams, or upon a moist meadow. The wet straw ferments, and, during this process, called *retting*, the woody core becomes soft, so that it may be easily removed. When retting is complete, the flax is passed through machines which break the hard parts without injuring the fiber, which is then *scutched*, or beaten until clean and free of foreign materials. The purified flax is combed, or *heckled*, so as to separate the long, straight fibers, called *line*, from the short tangled *tow*. The line is then ready for spinning and weaving, and the tow is used in making cordage or the cheaper fabrics.

Linen thread is used almost exclusively in the manufacture of handmade lace. Table linen, when woven so as to show a pattern, is known as *damask* because of a resemblance to the famous patterned silks of Damascus. The snow white color is obtained by bleaching. Other linen fabrics include fine cambric, shirting, and handkerchief cloth, as well as the coarser butcher linen, crash, and huckaback.

Linen is much used for towels because it absorbs water quickly. As the result of this property, a spot of moisture usually shows on the opposite side of a linen fabric more quickly than it does on cotton. A more reliable method of distinguishing between the two is to put a drop of salad oil on the cloth and press it between blotting paper. Linen becomes more transparent than cotton.

Linoleum. A floor covering made by fixing on a sheet of canvas a mixture of oxidized linseed oil, ground cork, and other materials. The oxidized oil alone is also known as linoleum.

When thin layers of linseed oil are exposed to air, or when air is blown through the oil under proper conditions, oxygen is absorbed and the fluid gradually changes to a tough, elastic solid somewhat similar to rubber. This oxidized product is ground by machinery, mixed with cork, resin, and coloring materials, and fixed upon burlap by means of hot rollers. A decorative pattern is usually printed on the smooth surface.

Better grades of linoleum are made up of a mosaic of colored pieces so that the pattern extends through to the back. These pieces are united into a single layer by the pressure of hot rolls. Good linoleum provides a smooth insulating floor covering which is comfortable to walk on, easy to clean, and much more durable than oilcloth, which it has largely displaced.

Linseed Oil. The most useful of all paint oils. It was probably known in ancient times and was undoubtedly used for paint in the 7th century, but its real value was not generally appreciated until about 1400, when oil painting came into general use.

Linseed oil is obtained by cleaning, crushing, cooking, and pressing the seed of the flax plant. Cleaning is usually done by a blast of air, which removes dust and dirt. The clean seed is crushed between a series of steel rolls and is then conveyed to the cooker, in which it is carefully heated, and moistened by steam. After cooking, the material is formed into cakes of the proper size, covered with heavy camel's-hair cloth, and placed in a hydraulic press, where the oil is gradually expressed under a pressure which rises to about 4000 pounds per square inch. After settling, it is filtered.

In the "new process," the oil is dissolved from the crushed seed with naphtha, which has a low boiling point and can easily be removed from the oil by heating. When obtained by either of these methods, the product is known as *raw linseed oil*. It ranges in color from light amber to dark yellow-brown and has rather an unpleasant odor and taste. Enormous quantities are used in making paint; at least seven and one-half gallons are required for every 100 pounds of white lead. *Boiled linseed oil* is produced when the raw oil is boiled with the addition of certain chemicals, such as manganese dioxide, which hasten the rate of the drying. This form is used chiefly for interior paints. *Refined linseed oil* receives special treatment which removes any sediment-forming material and gives the lighter color which is demanded by the makers of fine varnish.

Besides its exceptional value in the paint industry, linseed oil is required for the manufacture of patent leather, for waterproofing cloth, such as oiled silk, and for making many of the imitation leathers which are often used for automobile tops and book bindings. It is an important ingredient in linoleum and oilcloth, while thousands of gallons are used in printing and lithographic inks. The value of the oil for these purposes is due entirely to its ability to absorb oxygen from the air and thereby change from a liquid to a tough, elastic solid. Oils having this property to a high degree are called drying oils. In addition, linseed oil has minor uses in medicine and in veterinary practice.

After the oil has been removed from the seed, the residue is known as *linseed oil cake*. When ground, this is called *linseed meal*, a very rich and valuable cattle food, at least four times as nutritious as hay. Linseed meal is also used to some extent as a fertilizer.

Luminous Paint. A mixture usually consisting of barium sulphide and zinc sulphide together with an exceedingly minute amount of some salt of radium. It has the valuable property of being visible in the dark. The mixture is used as a paint, or as a powder in small glass containers, to mark the hands and dials of clocks and watches, and the position of keyholes, lighting fixtures, gun sights, and other objects the visibility of which in the dark is often desirable.

Before the discovery of radium, luminous paint was generally prepared from mixtures of calcium sulphide with bismuth, from calcium tungstate, or from other materials phosphorescent only after an exposure to daylight. During the World War, the radium paint was extensively used in the front line trenches as it is visible for only a very short distance.

Radiolite is a commercial preparation containing the hexagonal zinc sulphide, called Sidot's blende, and radium. On the hands and dial of a "radiolite" watch there is less than $\frac{1}{1000}$ milligram of radium. Reckoning radium at about $100,000 per gram, there is from five to ten cents' worth of the element on such a watch. This radium gives off each second some 30,000 alpha particles, which strike the zinc sulphide and cause it to become luminous.

Match. A short, slender piece of wood or other inflammable material tipped with some combustible substance which will ignite by friction. Modern matches come under two general classes: safety matches, which must be rubbed on a specially prepared surface; and "strike anywhere" matches.

One of the earliest types of match consisted of a long splinter of wood tipped with sulphur. These were lighted by pressing the tip into glowing tinder. Later the sulphur tip was covered with a mixture of potassium chlorate and sugar, which ignited when dipped into a bottle containing asbestos saturated with strong sulphuric acid. The first true friction match was invented in 1827 by John Walker, an Englishman. It had a sulphur tip covered by a mixture of potassium chlorate and antimony sulphide. Fire was produced by drawing the head of the match between folded sandpaper which was supplied with each package.

Walker's matches were known as *congreves*, while imitations of these, called *lucifers*, were made by several competitors. White phosphorus was first used on the tips of friction matches by Walker and other manufacturers, in 1833. In the United States, improved friction matches were first made at Springfield, Massachusetts, in 1836.

For many years the tips of ordinary matches consisted of sulphur and white phosphorus, often with some chlorate or nitrate. Because of the unpleasant fumes of burning sulphur, these were largely displaced by *parlor matches*, having a more inflammable tip with much less sulphur. A machine for automatically preparing the sticks was invented in 1842.

In 1855, safety matches were introduced by a Swede named Lundstrom. He omitted white phosphorus from the tip and instead placed a friction surface of red phosphorus and sand on the side of the box. Safety matches ignite only when rubbed on this surface.

White phosphorus is an intense poison which was the cause, among match workers, of many cases of necrosis, or rotting of the jawbones. The dangers attendant on its use can be avoided by substituting in its place red phosphorus or phosphorus sesquisulphide. For this reason, the use of white phosphorus in matches has been forbidden in many countries.

Patents covering the use of phosphorus sesquisulphide in the United States were owned by the Diamond Match Company, which in 1911 surrendered these patents so that the process might be employed by anyone. The Esch-Hughes Non Poisonous Match act, passed in 1912, placed a tax of two cents per hundred on matches containing white phosphorus, thus making the use of this material commercially impossible. The exact composition now used for the tips of matches is a carefully guarded trade secret. Safety matches often have potassium chlorate and dichromate on the head, with red phosphorus, manganese dioxide, and glass powder on the rubbing surface. "Strike anywhere" matches generally contain phosphorus sesquisulphide together with such oxidizing materials as red lead, lead peroxide, manganese dioxide, and potassium chlorate. The mixture is often colored, and is held by a binder of glue or dextrin.

In North America, matches are usually made from white pine or California sugar pine which has been seasoned and dried for almost two years. The wood may be cut into planks about two inches thick, which are then sawed into blocks the length of a match. The blocks are fed into a machine which rapidly splits them into match sticks. A second important method of preparation consists in cutting the pine log into a long roll of veneer having the thickness of a match. The veneer is then reduced to splints by machinery.

The splints are automatically fixed in rows on an endless belt, which carries them until the free ends, having been heated and dipped in paraffin, receive the composition that forms the head. This

is dried by a blast of warm air. They are then mechanically packed into boxes. Ordinarily, they are from 1⅞ to 2¼ inches long. Matches made of waxed taper, called *vestas*, as well as the small books of cardboard matches so much used for advertising are also made by machinery. Impregnated matches have been dipped in solutions of alum or magnesium sulphate to prevent smoldering of burnt stems. In France the manufacture of matches is a government monopoly. Prior to 1918 practically no safety matches were made in the United States, the entire supply being imported from Norway, Sweden, and Japan.

Mortar. A building material ordinarily made by mixing slaked lime, sand, and water. It becomes hard because of chemical action in which the lime absorbs carbon dioxide from the air and changes to calcium carbonate. Lime is prepared by roasting limestone, or calcium carbonate, until the carbon dioxide which it contains is driven off. Thus the hardening of mortar is due to a change in which the lime again becomes limestone. Unlike cement, mortar does not harden until fairly dry. Consequently, it should not be used in very damp places.

Nails. Slender pieces of metal usually pointed at one end and flattened or enlarged at the other to form a head. Nails are classified, according to the method of manufacture, as wrought, cut, and wire. All nails were formerly made by hand, but, with the exception of some horseshoe nails, hand wrought products have been displaced by machine made nails.

The first machine for making cut nails was patented in 1786 by Ezekiel Reed, an American. Machines of this type cut the nails from sheets or narrow strips of heated metal, form the head by pressure or by hammering, and drop the flattened nail into a receiving trough. Wire-nail machines seem to have been a French invention, but the process received little recognition until 1876, when, at the Centennial exposition, American made machines were awarded medals over those of foreign manufacturers. These machines are fed from coils of wire, which they grasp, straighten, cut, and form into nails of any size or type, with great rapidity. At present the wire-nail industry produces the greatest proportion of all nails used.

The size of a standard common nail ranges from 2 d. or *two penny*, to 60 d. This odd method of describing nails, which originated in England, finds two explanations. One is that four penny and ten penny nails sold respectively for four pence and ten pence per hundred. According to the second explanation, 4 d. and 10 d. applied to nails, 1000 of which weighed four pounds and ten pounds respectively. The abbreviation "d.," which now means penny, was in earlier times used for pound. The standard size of the common wire nails is shown in the accompanying table.

A *spike* is three inches or more in length and is thicker than a corresponding nail. For example, a 40 d. spike has the same length as a 40 d. nail but is as thick as a 60 d. nail. *Common brads* have the same length and thickness as nails but have a small, thickened head instead of one that is large and flat. *Finishing nails*, made from 2 d. to 20 d., have the same shape and length as brads but are much thinner.

Wire nails are made into hundreds of special forms, such as roofing nails, plaster board nails, basket nails, wagon nails, hinge nails, and boat nails. Sterilized lath nails are marketed because lathers customarily carry nails in their mouths while working. Special nails may be smooth or may have rough, corrugated surfaces. Cement coated nails are extensively used because they have much greater holding power. Nails are generally sold in 100-pound kegs and in boxes of smaller weight. Those of 20 d. size and larger sell for the same price per pound; the cost of smaller nails increases as the size decreases.

COMMON WIRE NAILS

SIZE	Length Inches	Steel Wire Gauge	Diameter Inches	Number Per Pound
2 d.	1	15	.072	876
3 d.	1¼	14	.080	568
4 d.	1½	12½	.099	316
5 d.	1¾	12½	.099	271
6 d.	2	11½	.112	181
7 d.	2¼	11½	.112	161
8 d.	2½	10¼	.131	106
9 d.	2¾	10¼	.131	96
10 d.	3	9	.148	69
12 d.	3¼	9	.148	63
16 d.	3½	8	.162	49
20 d.	4	6	.192	31
30 d.	4½	5	.207	24
40 d.	5	4	.225	18
50 d.	5½	3	.244	14
60 d.	6	2	.263	11

Needle. A slender, pointed instrument of metal or other material, used to carry the thread in sewing, knitting, and similar operations. Most needles are pierced with a hole called the *eye*, through which the thread is passed. The earliest needles were really pins, for they had no eye but were used simply to make an opening through which a thong of leather or vegetable tissue could be passed. Stone needles having an eye at one end have been found among the relics of the Stone age. Delicate needlework was produced by the Egyptians and ancient Greeks, and both common and surgeons' needles were found in the ruins of Pompeii.

It is believed that the Chinese were the first to use steel needles and that knowledge of this practice was eventually carried into Europe by the Moors. By 1370 a needle making industry had become established at Nuremberg. The manufacture of needles in England began much later. It developed during the reign of Queen Elizabeth and eventually became an important industry. Most of the work was done by hand, mechanical production coming gradually, so that not until 1885 were needles made and finished by machine.

Most modern needles are made from high grade steel wire cut into pieces two needles long. The pieces are straightened, both ends pointed against a grindstone, the eyes stamped out, and the double needle broken at the center. The rough needles thus formed have the heads ground to the proper shape and are tempered and polished. The eyes may be smoothed with fine emery and waxed thread, and, in the finest needles, are often gilded. Sewing machine needles are often pressed from short blanks of thick wire.

Knitting needles have no means for holding the thread. Crochet needles have a hook on the end. Surgeons' needles are generally curved, and the needles on many welting machines are curved in the arc of a circle. Sewing machine needles have the eye near the point, with grooves on the sides to prevent binding the thread.

Nitroglycerin. A powerful explosive made by treating pure glycerin with a mixture of concentrated nitric and sulphuric acids. The oily product has a yellowish color, is about 1.6 times as heavy as water, and is slightly volatile. It was discovered by Sobrero in 1846. Both the liquid and its fumes are poisonous and usually cause violent headaches, but persons working in the nitroglycerin factories often become immune to its effects. In medicine it is used as a heart stimulant. Pure nitroglycerin is not very sensitive to friction or to a moderate blow. When frozen it is less sensitive than when liquid. A small quantity, when freely exposed to a flame, burns brilliantly without explosion. Somewhat larger amounts, under the same conditions, usually explode, so that all experiments of this sort are uncertain and dangerous.

Liquid nitroglycerin is used in torpedoes for *shooting* wells, to start or hasten the flow of oil. Because of the danger attending its transportation,

the liquid is usually absorbed in some very porous material, such as kieselguhr or sawdust, and pressed into sticks, which are carefully wrapped in paraffin paper. This product, which is known as *dynamite*, was invented by Alfred Nobel in 1866. Nitroglycerin is also an ingredient in other explosive compounds such as *gelatin dynamite* and the *smokeless powders*, which include *ballistite* and *cordite*. Dynamite, as well as nitroglycerin, is most effective when exploded by a *detonating cap* fired either by the ordinary fuse or by electricity. Such a detonator acts as a very quick, powerful blow. The safest way to destroy nitroglycerin is to treat it with a solution of ammonium sulphide.

Oleomargarine. A mixture of edible fats churned with milk, salted, and worked to a butter-like consistency. This product was invented in 1869 by a Frenchman, Hippolyte Mège-Mouries, in order to secure a prize offered by Napoleon III for a cheap and wholesome butter substitute.

Oleomargarine is made by churning carefully prepared fats with milk which has been pasteurized and then ripened or fermented until it has a strong butter flavor. Oleo oil and neutral lard, or simply *oleo* and *neutral*, are the most important ingredients used, although some vegetable oil, such as cottonseed or coconut, is often added. The term oleo oil is somewhat misleading, as the fat is not an oil at ordinary temperatures. Oleo is prepared from selected beef tallow by slowly cooling the melted fat until it begins to thicken. The pasty mass is wrapped in porous cloths and placed under pressure. This forces out the softer portion into tanks of cold water, where it is chilled to a granular, slightly yellowish solid. Neutral is made from choice lard by a similar process, which has for its purpose the removal of the crystalline portion of the fats so that the final product will be smooth instead of grainy. *Nut margarines* are prepared entirely from vegetable fats by substituting coconut and palm kernel oils for oleo and neutral.

The fats are first melted at low temperatures, weighed out in the exact amounts required by the formula, mixed, and thoroughly churned with the ripened milk. The contents of the churn are then sprayed into ice water, becoming solid so quickly that crystals do not have time to form. This chilled mass is allowed to stand for some time in order that the butter flavor may develop further. It is then salted, and worked by machinery until smooth and firm like butter, when it is ready for packing.

Much of the early objection to oleomargarine was made because unscrupulous persons colored it yellow and sold it for butter. One result of this practice is that each pound of colored margarine is taxed ten cents, while, if uncolored, the tax is only one-fourth of one cent. A household test which will usually distinguish between butter and margarine consists in heating a spoonful of the material over a small flame. Butter foams quietly, while margarine sputters noisily and produces very little foam. See *Butter*, *Cottonseed Oil*.

Paint. A suspension of finely ground pigment in a liquid or other medium, which is applied to objects for decoration or protection. Thus, calcimine and whitewash are paints in which the pigment is suspended in water. However, as generally used, paint refers to a suspension of pigment in a fatty oil. Paint was formerly used only as a means of decoration, but its value as a protection against corrosion and decay is now quite generally recognized.

A good house paint generally contains about 65 per cent by weight of pigment and about 35 per cent of a liquid vehicle, or pigment carrier. The vehicle consists of a mixture of an oil, a solvent or thinner, and a liquid drier. The oil is usually linseed oil, which has the property of absorbing oxygen from the air and of drying to a tough elastic film when spread out. China wood, perilla, soy bean, poppy, fish, and other oils are also used in paints. The solvent is added to make the product penetrate and spread more readily. Among the best solvents are turpentine and benzol. The principal driers are composed chiefly of lead and manganese soaps, which by their presence cause the oil to take up oxygen and to dry more rapidly.

The chief pigments are white lead, zinc oxide, and lithopone. Certain proportions of inert fillers such as barytes, asbestine, silica, and calcium carbonate are often added; but, as a rule, small amounts of these are found in good paint and large amounts in a cheap product. A single pigment in oil does not usually produce the best paint. White lead combined with zinc oxide, with or without a small amount of inert pigments, has been shown by many experiments to give the most satisfactory results. Any desired color may be produced by the addition of natural earth colors, such as sienna and iron oxide, or of artificial pigments, such as lead chromate, prussian blue, chrome green, and carbon black.

A great advance in the paint industry has come with the change from hand mixed paints to the general use of factory prepared products. This change has been due largely to the fact that a factory has facilities for producing a smoother and more even paint. It has been found also that white lead mixed with oil by hand is not best for all kinds of work.

In making prepared paints the pigments are thoroughly mixed by machinery with a small amount of oil. The mixture is then ground to a smooth paste between heavy revolving plates of stone or steel. One barrel of pigment, when ground with oil, yields only $\frac{1}{3}$ barrel of paste. Paint is produced by mixing this paste with linseed oil together with the proper amounts of turpentine, liquid drier, and coloring pigments, which have also been ground in oil. The finished product is then sealed in containers and is packed for shipment.

Enamel paints generally consist of zinc oxide and lithopone in blown linseed oil and high grade varnish. Flat wall paints, often called sanitary flat wall paints, usually contain lithopone and zinc oxide ground in treated china wood oil and thinned with turpentine substitute made from petroleum. Floor paint contains a larger proportion of the inert pigments barytes and silica, which are highly resistant to abrasion, while good mixing varnish is added to the vehicle in order to produce a hard, glossy surface. Paints intended for the protection of iron and steel must prevent corrosion. Red lead containing about 15 per cent litharge, zinc oxide, zinc chromate, basic lead chromate, and basic lead sulphate are especially valuable as rust preventives. Steel hulls of ships usually receive a coat of anti-corrosive paint followed by a coat of antifouling paint, which, in order to prevent the growth of animal and vegetable organisms, contains a poison such as cyanide of copper or mercuric oxide. See *Linseed Oil*, *Turpentine*, *Varnish*.

Paper. A substance composed chiefly of cellulose fibers matted or felted into thin sheets. As cellulose is of vegetable origin, the raw materials used for making paper are numerous and include cotton or linen rags, wood pulp, cotton linters, esparto grass, straw, hemp, jute, and old papers. The name paper is derived from *papyrus*, a Latin word applied to a writing material which was used by the Egyptians at least as early as 2400 B. C. Papyrus was not paper, because it was made by laying side by side narrow strips obtained from the pith of a water plant. These strips were covered by others laid at right angles; the two layers were then pressed together and dried to a firm sheet.

Paper was used first by the Chinese at an unknown date. By 156 B. C. they prepared it from a pulp of mulberry wood. Fine, handmade papers are still produced in China, Japan, and Italy, but paper making is now a highly mechanical process carried on chiefly in North America, England, France, Belgium, the Netherlands, and Scandinavia.

At least 250 kinds of paper have been made in the United States. Seventy-five per cent of the total volume is produced from wood pulp, and about five per cent, consisting of the highest grade products, from rags. The rags are carefully sorted and cut into small pieces, cleaned by boiling with lime, washed, ground in a machine called a *hollander*, bleached with some form of chlorine, and then beaten to a mass of fibers. These fibers are ready to be made into paper.

Wood pulp is classified, according to the method of preparation, as mechanical and chemical. *Mechanical pulp* is made by forcing logs of wood against a revolving grindstone, from which the torn fibers are carried away by a stream of water. *Chemical pulp* is prepared by cutting barked logs into chips, which are cooked with a liquid under pressure until most of the impurities have dissolved. The product is known as *soda*, *sulphite*, or *sulphate pulp*, according as the liquid contained caustic soda, lime and the gas from burning sulphur, or sodium sulphate. Soda pulp lacks strength, while sulphite pulp has good strength and color. Sulphate pulp gives a strong, brown product known as *kraft paper*. Spruce, poplar, pine, and hemlock are the chief pulp woods. Newspaper is usually made from mechanical pulp with which a certain amount of chemical pulp is mixed to impart strength.

The strained pulp, to which has been added any necessary coloring and filling materials, is made into paper on a complicated mechanism called a *Fourdrinier* machine. Wet pulp is first deposited on a long, endless, moving screen of fine wire, from which the water drains rapidly, leaving a soft sheet. A *water mark* is formed at this time by lightly pressing the moist layer with a roller having a raised design. From the moving wire the paper passes to felt rollers, where it is pressed; then to drying rollers; and from these to other rollers, which impart the desired finish to the surface. The edges of the sheet are trimmed and it is wound on a reel. Some Fourdrinier machines are capable of making an endless sheet of paper 180 inches wide at the rate of 1000 feet per minute.

Papers to be used for printing and writing are filled with various materials and sized with glue so they will not absorb ink. *Tissue* and *blotting paper* are loosely made without sizing. *Manila paper* was originally made from hemp, jute, or old rope, but it is now produced from wood. The genuine product is called *rope manila*. *Paraffin paper* is made by passing the material through melted paraffin and then through rolls which remove the excess wax.

The skins of various animals when treated so as to afford a smooth surface for writing are known as *parchment*, and a soft, white variety made from calf- or kidskin is called vellum. *Vegetable parchment*, which resembles the animal product, is prepared by rinsing and drying an unsized paper that has been treated with dilute sulphuric acid.

Coated paper is a development of recent years to meet the exacting requirement of the printer so that half tones may be well printed. The coating process requires a body stock of paper well made on paper machines. This paper is mechanically coated on both sides or on one side as may be desired, by either running it through a bath of coating liquid or flowing the liquid onto the paper. The paper is fed to such a machine in rolls, not in sheet form. After the coating is distributed over the surface of the paper by use of mechanical brushes, the coated paper is dried by conveying it through a drying room and then rewound. Finally the coated paper is calendered, sheeted, cased, and is ready for the printer. The materials used in the coating mixture are largely mineral in character. The mixture may have in it satin white (calcium sulphate and aluminum hydrate), English china clay, blanc fixe (barium sulphate), glue, casein, and starch.

Pins. The first pin was very probably a long thorn, pushed by some primitive man through the animal skins with which he covered himself. Pins made of bone and of bronze have been found among the remains of the ancient Lake Dwellers who inhabited central Europe in prehistoric times. Some of these relics are entirely similar to the present day safety pin. The Egyptians, the Greeks, and the Romans were all familiar with long pins of bronze, bone, and other hard materials.

Development of the process for making wire led to the production of modern pins, which were made first in France and Germany. The manufacture of brass wire pins was introduced into England in 1826. These early pins were cut and sharpened by hand, and the head was formed by wrapping fine wire around one end of the shank. Such handmade pins were expensive, but were considered so necessary an item of dress that the money received or set aside by a woman for her personal expenses came to be known as *pin money*.

The first machine for making solid-headed pins was the invention of an American, Lemuel W. Wright, in 1824. A more satisfactory machine was invented in 1831 by John Ireland Howe, a physician of New York City. A machine for sticking the pins into folded paper, invented by Samuel Slocum, was used in Howe's factory as early as 1841.

The great majority of common pins are made from brass wire; the best are made from fine steel. The process of manufacture is largely automatic. Coils of wire are placed in the machine, which cuts off and straightens a piece of proper length, holds it in viselike jaws until the head is formed by the blow of a die, moves the lower end against grinding wheels, which sharpen the point, and drops the pin into a trough. The pins are next cleaned by chemicals and then given a coating of tin, which is polished by agitating the pins with sawdust or bran. The sawdust is removed by a blast of air.

The mass of pins must now be arranged in order so that they can be conveniently handled. This is done by placing them on a vibrating platform at the top of a V-shaped chute. At the bottom of the chute is an opening wider than the body of a pin but narrower than the head. The pins drop into this slot and are delivered at the lower end, all hanging in a line with the points down. Here another automatic machine sticks the pins through the folded paper in which they are sold. Safety pins and hair pins are also produced by automatic machinery.

In England, Birmingham has become the center of the pin making industry, while a large proportion of American pins are made in Connecticut. The annual production in the United States amounts to more than 100 pins for each person.

Porcelain. The most highly valued type of fine pottery, differing from inferior grades because of its glasslike, translucent body. It is usually very hard and white. Porcelain is often called *chinaware* or *china* because it was formerly obtained from China, where it was originally produced. The time at which it was discovered is a point on which authorities disagree. This is probably because true porcelain was not invented at any one time, but was developed during many centuries of practice in making pottery. It appears that the Chinese made porcelain of a sort as early as the 7th century. But it is generally acknowledged that not until the Ming dynasty (1368–1644) did their ceramic products develop the qualities for which they became famous.

Porcelain is generally classified, according to the materials of which it is composed, as hard paste, artificial soft paste, and natural soft paste. True hard paste porcelain is made from kaolin, or china clay, and feldspar, which imparts translucency; quartz and special sands are sometimes added. The feldspar is often called Cornish stone because Cornwall, England, has been an important source of this material. From the time that Chinese porcelain first appeared in Europe, great efforts were made to produce a similar product. Articles which resembled porcelain, but were chiefly glass, were made in Florence about 1580. In France, about 1670, artificial soft paste porcelain was first produced.

This contained no kaolin, but was a glasslike substance composed of sand, niter, gypsum, alum, soda, salt, and marl or chalk. It was usually covered with a rich, waxlike glaze. Very little porcelain of this type was produced after 1780. Natural soft paste porcelain, or *bone china*, was an English invention developed during the 18th century. The standard mixture, containing ball clay, kaolin, feldspar, and notable quantities of bone ash, was apparently fixed by Josiah Spode, about 1800. Since that time, it has been the principal product of the chief English potteries.

Hard paste porcelain was first produced in Europe, about 1709, by the alchemist Johann Friedrich Böttger. The factory which he established at Meissen became the source of the famous Dresden china. Manufacture of hard paste was begun at Plymouth, England, in 1768; at Sevres, France, in 1769; and at Philadelphia, U. S. A., in 1825.

Hard porcelain ware is usually baked at a rather low temperature. The resulting biscuit is decorated if desired, covered with glaze, dried, and then fired at temperatures so high that the body almost fuses. Kiln temperatures range from 2000° to 3200° F. The glaze is composed of the same ingredients as the body, although in different proportions. Care is necessary to prepare a glaze which will not crack and separate when the piece cools. When the cracking or crazing of the enamel is uniform and is produced intentionally, the product is known as *crackle ware*.

Parian is a fine grade of thin, unglazed porcelain which receives its name from a resemblance to an ivory tinted marble found on the island of Paros. *Belleek* is thin, light weight porcelain having a beautiful iridescent or pearly glaze. It takes its name from a town in Ireland where it has been made for many years.

The French factories at Sevres and Limoges, the German potteries at Meissen and Berlin, and the Royal Copenhagen factories are recognized as producers of much of the world's finest porcelain. Japan and Austria are also known for their porcelain. The production of high grade porcelain in the United States is constantly increasing, the output of certain potteries being considered by experts equal to the best made in the Continental factories. During the World War a very satisfactory porcelain for use in scientific laboratories was developed in America. See *Pottery*.

Pottery. Any article or product formed from soft, moist clay or claylike material and hardened by means of heat. The term thus includes products ranging in character from ordinary brick to finest porcelain. In common usage, however, *pottery* generally refers to the class of clay or ceramic products which comes between these extremes.

Production of pottery depends chiefly, first, on the fact that moist clay is so plastic that it may be worked or molded into almost any form; secondly, on the fact that, under the action of heat, the plasticity is destroyed, and soft clay becomes hard and durable.

After an article of pottery has been heated or *fired*, it has either a porous, open structure or a nonpermeable, vitrified, or glasslike, body. Porous ware includes terra cotta, fired refractories such as fire brick, and earthenware. *Terra cotta* includes all permeable, unglazed, clay products which fuse or lose shape if heated to 1650° C. The term is applied more narrowly to red-brown or yellowish red ceramic ware used for architectural or decorative purposes. Refractories are similar to terra cotta but must endure a temperature of 1650° C. without fusing or losing shape. Ceramic products having a permeable body covered with a glaze or enamel are classed generally as earthenware. Pottery having a *vitrified body* is divided into *stoneware* and *porcelain*. Stoneware is *opaque* and has usually more or less color; porcelain is *translucent* or partly transparent and is generally white.

The potter's art was known thousands of years before the Christian era. Wherever clay was to be found, man learned in prehistoric times to fashion it into useful articles and to harden these by heat. Thus, pottery was developed independently by the Egyptians, the Chinese, and the Aztecs or their ancestors.

Raw clay must be purified and tempered before satisfactory pottery can be made. For this purpose weathering or exposure to the elements for several months is often practiced. Stones and coarse material may be removed by screening and washing, and uniform plasticity obtained through grinding, kneading, and mixing, usually by machinery. Fine clays are often mixed with large amounts of water so that any coarse particles settle out. The thin mixture is then pumped through filter presses, which retain the clay and allow the water to escape. There are many kinds of clay; the finest—white burning china clay—is called *kaolin*. Iron is the most common impurity, imparting the red color characteristic of terra cotta and brick. Kaolin lacks plasticity; *ball clay* is highly plastic and, when burned, gives rise to white products; *slip clay* melts at low temperatures and is often used as a natural glaze.

When clay has been reduced to proper consistency, it is formed into pottery by *throwing* on a potter's wheel, or by means of molds. A potter's wheel is merely a horizontal, rotating table driven either by power or by the foot of the operator. A lump of clay is placed on the center of the table, and, as it turns under his hands, a skillful potter can produce almost any desired circular form, such as a flat plate or hollow vessel. The surface is smoothed with a wet sponge or a piece of leather and the piece is removed from the wheel. When dry, it may be made perfectly symmetrical by turning in a lathe. Rotating forms called *jiggers* are generally used when many pieces of the same size and shape are to be produced. Irregular shapes are molded, and large vessels may be made up from several molded pieces. Thin pieces are sometimes cast from a mixture of clay and water in a porous plaster of Paris mold, which absorbs much of the moisture. Small parts, such as spouts and handles, are cemented on by means of a thin suspension of clay in water.

When the pieces have dried, they are carefully packed in oven-like, clay containers called *saggers*, which are stacked up in the kiln. Firing requires from 24 to 60 hours, after which the pottery is allowed to cool very slowly. The ware is now in the stage known as *biscuit*. It may be decorated and is then glazed by being dipped into thin, watery mixtures of enamel, dried, and again fired for several hours. During the second firing, most enamels change to a transparent glass through which any decoration is plainly seen. Decoration may also be applied to the unfired enamel or to the fired glaze. Enamels containing tin are white and opaque, while lead enamels are softer and transparent. Very hard, transparent, lead glazes are produced by addition of feldspar, borax, and flint. Salt glaze is made by volatilizing salt in the furnace. The salt vapors combine with the surface of the biscuit ware, yielding a cheap, comparatively soft, but quite effective glaze.

Particular kinds of enamel and types of decoration often characterize the products of certain potteries. Thus Delft, a town in the Netherlands, has long been famous for its decorated, tin enameled pottery. *Majolica*, named from the island of Majorca, is another highly decorative, tin enameled ware. *Yellow ware* is earthenware made from clay which burns to a buff color, covered with transparent glaze. *Rockingham ware* is usually yellow ware covered with a dark brown glaze. It resembles pottery first made on the estate of the marquis of Rockingham. *White granite* or *ironstone* is a bluish white stoneware from which most of the ordinary American crockery is made.

Building bricks were made in Virginia as early as 1612, and white ware was first produced in America about 1684. White ware with underglaze decorations was first produced about 1770, and hard porcelain in 1825. Architectural terra cotta was made in the United States about 1870, and eggshell porcelain, in 1884. Possibly the most famous pottery in America is made at the Rookwood Pottery, of Cincinnati, Ohio. See *Porcelain.*

Raisin. A dried grape of special type. All grapes will not make raisins, one requirement being a high content of sugar which not only imparts the characteristic sweet taste but also acts as a preservative. Raisins are produced chiefly in the countries which border on the Mediterranean Sea and in California. The principal varieties of grapes used are the Muscat, Thompson seedless, and Sultana, which is also without seeds.

When the grapes are ripe, the bunches are usually cut from the vines and exposed to the sun on trays, with occasional turning so that drying will be uniform. About three weeks is the average time of curing, and, to hasten the process and avoid the danger of rain, some growers complete the process in artificial dryers.

Rayon. A manufactured textile fiber resembling silk in appearance and sometimes called artificial silk. The material from which it is made is either cotton linters or wood pulp. The raw material is treated with acids or other chemicals in order to make it soluble. It is then dissolved in alcohol and ether, or other suitable solvents, and, after purification, is forced through very small openings. It emerges as fine threads, which become solidified by evaporation of the volatile solvents or by passage through a setting bath.

There are four principal processes in use, of which the above is a generalized description. All are derived from the process devised by a French scientist, Cardonnet, about 1889.

The production of rayon has grown at an amazing rate. Prior to 1910, its manufacture was largely confined to England, France, and Germany. In 1913, the United States produced only 1.5 out of a world production of 24.2 million pounds, but by 1927, United States production had grown to 74 million pounds, as compared with 176 million pounds for the rest of the world.

Rayon is smooth and lustrous, like silk, providing a beautiful fabric at a low cost. Most rayons, being pure cellulose, are very durable if not subject to wear in excess of their strength. Rayon yarn has comparatively low tensile strength, which is still further reduced when the fiber is wet. For this reason, it is frequently mixed with cotton or wool. The resulting fabric usually has better wearing qualities than rayon and is more decorative than cotton or wool.

Rifle. A firearm having spiral grooves cut on the surface of its bore. When a shot is fired, the bullet follows the path of the grooves until it leaves the barrel. It consequently receives a spinning motion, which greatly increases the accuracy of its flight.

A rifle usually means a small gun which is fired from the shoulder. But, with a few exceptions, all modern firearms, from the smallest pistol to the great guns of a battleship, are rifled. *Automatic rifles* and *pistols* are automatic only in the sense that they are self-loading; the trigger must be pulled before each shot. A loaded *machine gun,* however, continues to operate automatically as long as the trigger is depressed.

Rubber or **Caoutchouc.** An elastic gum obtained from the milky juice, or latex, of many tropical trees, vines, and shrubs. This latex contains the rubber as small suspended globules. In 1770, when it was learned that a piece of the material was useful for rubbing out pencil marks, it received the name rubber. The principal source of rubber has been the rubber tree, which is native to the valley of the Amazon.

Early experimenters tried to make shoes and clothing waterproof by covering the fabric with raw rubber. In 1823 Charles Macintosh produced rainproof garments by sewing a thin sheet of rubber between two of cloth. Such articles could not be generally useful because the gum became soft in hot weather and brittle in cold.

This difficulty was solved by Charles Goodyear in 1844, when he patented his process of *vulcanization,* in which rubber is mixed with powdered sulphur and heated. A low temperature and a small amount of sulphur produce a soft, elastic rubber; greater heat and much sulphur produce a completely vulcanized, hard rubber. *Vulcanite,* from which combs and thousands of other articles are made, contains about 32 per cent of sulphur.

Persistent experiments under British initiative in the East Indies resulted, during 1890–1900, in the successful cultivation of the Brazilian rubber tree in that region. As a result of scientific research, the quantity of the latex from each tree was increased and the quality was improved. The latex is coagulated on the plantation by the use of acetic acid or by other methods, thereby improving the texture of the rubber and shortening the time required for treatment in the factories. The coagulated rubber, washed, rolled into sheets, sun dried, and usually smoked to kill enzymes, is then shipped to the factories. Often, however, the latex itself is sent to the factory, where it is sprayed into heated chambers. The moisture evaporates from the latex in the process, and the rubber falls in flakes at the bottom of the chamber.

At the factory, the rubber is heated to make it plastic, and sulphur, fillers, accelerators, and pigments are added. When mixed to a homogeneous mass, it is then shaped into the required forms and heated with steam, which causes it to react with the sulphur and become vulcanized. Rubber spread on cloth, for producing rubberized fabrics, is vulcanized by the "cold" process, being hung in the vapor of sulphur monochloride.

By the so-called anode method, rubber may be built up in any required shape by immersing a mold in an electrolytic emulsion of rubber. The mold is attached to a negative wire of an electric circuit, and, when a current passes through the emulsion, the particles of rubber are deposited on the mold.

Rugs and Carpets. Patterned fabrics generally employed as floor coverings. A floor rug differs from a carpet by being woven usually in one piece of a definite shape and design. A rug, also, unlike a carpet, is not intended to cover the whole floor. Both fabrics are usually woven with a pile, or raised surface of tufts, either cut or looped.

The weaving of rugs is one of the most ancient of industries. Rare specimens of decorative textiles in the Cairo museum dating from the 15th century B. C. indicate that the more ancient rugs made in Egypt did not have a pile, or nap, but were woven like tapestries. The earliest extant examples of rugs having a piled surface date from the 3rd or 4th century A. D. They were made in Egypt and are now in the Victoria and Albert museum, England.

From time immemorial, China and southwestern Asia have been noted for their beautiful rugs, and this industry remains today in almost the precise form under which it was carried on thousands of years ago. The rugs are laboriously woven by hand in the most primitive manner. By reason of the skill of the weavers, however, rugs of the Orient hold a unique place in the world's markets, being unsurpassed for coloring, artistic patterns, and durability.

Oriental rugs are woven on a simple frame consisting of two poles supporting two rollers. The poles are usually fixed upright in the ground with one roller attached to the top of the poles and the other below it at a distance about equal to the desired length of the rug. To the rollers is fastened a warp of strong threads, the number of which determines the width and fineness of the rug. To each

thread of the warp, short pieces of colored wool, silk, or hair of camels or goats are knotted in such a way that the two ends project toward the worker. The arrangement of these tufts by color produces the design in the finished product. A weft thread is then run in across the warp. A second row of knots are made on the warp threads, and a second weft thread is run in. The rows of tufts and the weft threads are pressed together by a comblike instrument, thus producing a compact textile with a pile. The projecting tufts are carefully clipped to make an even surface. The number of knots to the square inch varies ordinarily from about 50 to 400, although a few rugs are still more closely woven. The royal Ispahan prayer rug, made in the 18th century for the shah of Persia, has more than 1000 knots in each square inch of surface. The designation prayer rug has reference to the wide use of rugs among Mohammedans as a fabric upon which to kneel during prayer. Their designs generally have a religious significance.

Oriental rugs are usually classified according to the geographical divisions in which they are produced. Fabrics from each locality still have a distinctive character, although, in recent years, the sharpness of the distinctions have tended to be obscured because of the demand for rugs made to order. An account of the outstanding types is given in the following paragraphs.

Chinese rugs are readily distinguished by their looser texture and beautiful background of blue, gold, red, or tan. The designs are usually detached figures of dragons, kilins, lion-dogs, the animal signs of the Chinese zodiac, or emblems of Buddhism and are wrought predominantly in grayish blues, yellows, and creams, as well as in delicate pastel pinks and shades borrowed from Chinese silks and porcelains. The warp is always of cotton.

Bokhara rugs are woven by tribes, still largely nomadic, living in Bokhara, a district of Central Asia north of Afghanistan. They are made of fine durable wool with a liberal mixture of goats' hair. A Bokhara rug may be recognized by its wide selvages and long fringes at the ends and by its octagonal patterns on a field of rich maroon or dull crimson. *Afghan rugs* have a somewhat similar design on a deep red background. The choice of red as the dominant color is said to be determined by the religion of the weavers, who are worshippers of fire. *Beloochistan rugs* also are red and have simple floral or mosaic patterns. They come from western India.

Caucasian rugs are lighter in tone than those described in the preceding paragraph. They are made in the district lying between the Caspian Sea and the Black Sea. The finest of them are the *Daghestan rugs*, which are usually made of lambs' wool. The ground color is deep blue or ivory and is always well covered by geometrical designs, including octagons, hooks, crosses, and eight- or six-pointed stars. Daghestan rugs never exceed four by seven feet in size. Other Caucasian rugs are the *Shirvan rug*, very similar to the Daghestan; the *Kazak*, made by brigand Cossack tribes and distinguished by an unusually thick, heavy pile, which gives the fabric great durability; the *Cabistan*, which is long and narrow; the *Soumak*, or *Kashmir*, known by its straight lines and somewhat whitish effect; and the *Saruk* rug, which is richly ornamented with floral designs on a warm red or brown background.

Turkish rugs include the *Bergamo rug*, made near ancient Pergamum and distinguished by an open bold design with rosettes placed here and there and by a wide selvage at each end. The warp and woof are made of colored wool. *Smyrna rugs*, having a linen or hempen warp and filling and a pile on both sides, have been extensively imitated in America by machine processes, although the patterns in the American products are much simplified.

Persian rugs are the finest rugs made. Among the finest Persian rugs are those of *Kirmanshah*, a province on the Arabian Sea. These rugs are closely woven, often having more than 400 knots to the square inch. They usually have a central figure consisting of a floriated medallion on a rich background of old ivory, rose, or blue, and the borders are variegated with a maze of floral designs.

Other Persian rugs include *Mossoul rugs*, *Mahal rugs*, *Serebend rugs*, *Serape rugs*, *Meshed rugs*, *Saruk rugs*, and *Kurdistan rugs*. The last named are readily distinguished by their field color of deep blue or strong, rich red, on which is placed a large central figure. The design of this figure is matched by similar ornamentations at the corners of the rug. The Serebend rug also is easily recognized. On a field of rich blue or red is woven a small uniform loop pattern, which is said to have been intended originally to represent a bend in the sacred river Indus. Mahal rugs come from Sultanabad, in northwestern Persia. The name means "made to order," and, in America, many weaves properly designated by other names are sold as Mahal rugs because they are made at or near Sultanabad in fulfilment of orders. Persian rugs are noticeable in general for the profusion of their conventionalized floral figures.

The weaving of rugs and carpets was introduced into Europe by the Moors, but it was not practiced on a large scale before the 17th century. Ingrain carpet was manufactured at Kidderminster, England, as early as 1735. This carpet is woven with two or more colors of yarn, the design appearing in different colors on different sides of the fabric. It is known as *Kidderminster* or *Scotch carpet*.

Brussels carpet, made in imitation of floor tapestries then manufactured at Brussels, was first produced in England in the middle of the 18th century. It has a warp and a weft of cotton or jute, which serve as a body for extra warps of worsted. These warps are looped over wires and thus produce the characteristic ridges of Brussels carpet. The designs are made by the use of one layer of worsted thread in the warp for each color required in the design, all threads being concealed in each part of the fabric except the one having the desired color.

Wilton carpets and *rugs* are made like Brussels carpet, but the loops are cut so that a velvety appearance results. The materials used are generally better, and the weaving is finer. The designs are largely adaptations of Oriental models.

Tapestry and *Velvet rugs* have only one worsted warp instead of several. The designs may be printed on the warp before weaving, allowance being made for the distortions due to looping the worsted threads over the wires. A more recent process is to print the design on the rug after the weaving is completed.

Axminster rugs are distinguished by a loose, soft texture, and the colors in the patterns are not limited by the number of layers of threads in the warp. *Smyrna rugs*, originally woven near Smyrna, Turkey, are made in America by weaving chenille, that is, tufted cords of wool, cotton, or worsted, as an extra weft into a body of cotton or jute warp and weft. They are made with Oriental patterns and are reversible. *Chenille Axminster rugs* are the richest and most costly of machine-made rugs. They are made like the Smyrna rugs, except that the chenille cord is steamed and flattened into a braid with fuzz on one side only. The pile of these rugs varies from three-eighths to seven-eighths of an inch. Most of them have plain fields with two or three tone effects.

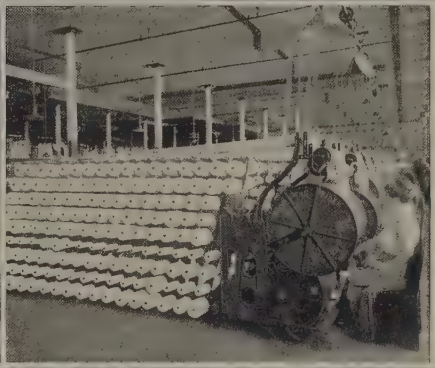
Other American rugs include those made by the *Navajo* Indians. These rugs are usually known as blankets, but, on account of their firm texture, they are often employed as floor coverings. *Fluff rugs* are loosely woven, but durable, fabrics made by a machine process from old carpets or rugs. They have no patterns, but may have end borders of a shade different from the remainder of the rug.

The first carpet factory to be established in America began operation in 1791 at Philadelphia, where now more carpets are produced than in any other city of the world. The best rugs, however, continue to come from the Orient, where machine production and standardization have not yet rendered artistic weaving obsolete.

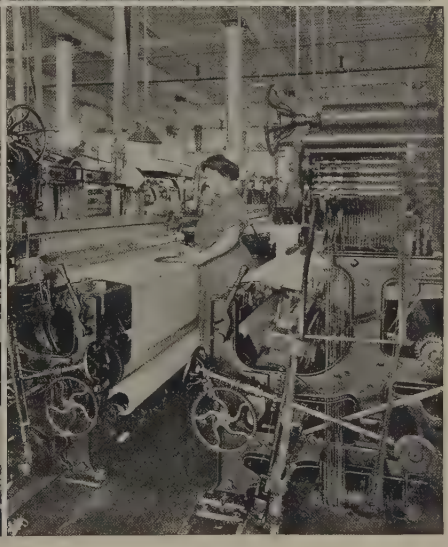












WOOL INDUSTRY

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SILK INDUSTRY

1 Silk Moth and Eggs. 2 Silkworms on Mulberry Leaves. 3 Feeding Silkworms. 4 Silk Cocoons. 5 Drying Silk Cocoons. 6 Reeling Silk. 7 Weaving Silk. 8 Packing Raw Silk. 9 Packing Silk Cloth. 10 Japanese Silk Growing Village.

Silk. A fine, strong fiber produced by certain insects, usually for the purpose of providing themselves with a protective covering, or cocoon. Most commercial silk is produced from the cocoon made by the larva of the mulberry-eating silk moth, which is cultivated chiefly in China, Japan, Syria, Persia, Italy, India, and France. According to Chinese history, the industry was begun by Si-ling-Chi, wife of the third emperor, about 2600 B. C. It developed to such a high state of perfection that Chinese silks were sold in Greece and Syria for their weight in gold. Death was the penalty for taking the eggs of the silkworm out of the country, and the secret was so well guarded that the true origin of the beautiful fabrics was unknown in Europe for many centuries. About 550 A. D., at the direction of the Roman emperor Justinian, two monks who had been missionaries in China brought to Constantinople a supply of the eggs concealed in their hollow bamboo staffs.

The silk moth is a small insect having broad, white wings marked with black lines parallel to the sides. In summer, the female, which cannot fly, lays about 500 sticky eggs and dies a few days later. The eggs hatch in the next spring, producing worms about ⅛ inch long, which feed almost continuously on fresh mulberry leaves, and grow so rapidly that they shed their skins 4 times within 6 weeks. At that time the green worms, which have reached a length of about 3 inches, begin to spin their cocoons. The thread is produced from a gluelike material secreted by two narrow glands which connect with an opening on the upper lip, called the spinneret. On exposure to air, the fluid hardens, forming a sticky thread which the worm winds about itself by a continuous, regular motion of the head.

Spinning is completed in about 3 days, and, if the cocoon is left for 2 or 3 weeks, a moth will force its way out through one end. The escape of the moth breaks so many threads that only enough cocoons are saved to provide another crop of eggs, and the remainder are heated so as to kill the pupa.

They are then assorted according to color and texture, the loose, irregular floss is removed from the outside, and the compact, creamy ovals placed in hot water in order to soften the gum which binds the threads together. Here they are stirred by means of a brush until the loose end of each coil is found. The threads from 4 or more cocoons are twisted together into one strand and then reeled into skeins of *raw silk*. A single thread is usually from 400 to 800 yards long. Only about 70 per cent of a cocoon can be reeled. The remainder, together with damaged cocoons, is combed and spun like wool into *spun silk*. There are about 35,000 silkworm eggs to the ounce. These will yield about 100 pounds of cocoons and 11 pounds of raw silk.

The skeins of raw silk are placed in linen bags and soaked in warm soapsuds to soften the gum; they are then dried and wound on spools. The next process, known as *throwing*, prepares the silk for weaving. That fiber called *organzine*, which will form the *warp* of cloth, is twisted, then doubled and twisted again so as to form a strong thread. *Tram*, or the material for filling the warp, is not twisted so tightly. The threads to be used for crêpes are very highly twisted. After throwing, the thread is stretched evenly on a special machine and then rewound into skeins to be dyed.

The dyer boils the skeins in soapy water until the gum is removed and the threads are soft and lustrous. They are then rinsed and passed to the dye vat. The boiling process causes a loss in weight of about 25 per cent. The desire to avoid this loss resulted in the process of *loading*, by which the fiber is made to unite with chemicals such as compounds of tin, which sometimes weigh several times as much as the silk. This process is generally injurious to the fabric and is not now practiced to such an extent as formerly.

Two of the chief requirements for commercial production of silk are a supply of cheap labor and of mulberry leaves. Lack of the former explains why silk growing has never been successful in the United States. However, silk weaving, performed by very complicated machinery, is a thriving industry. In modern factories two pieces of silk velvet or plush are woven face to face and then separated by a sharp knife, which cuts the pile threads. *Crêpe-de-chine* is produced by alternating right and left twisted threads in the warp and filling with a soft tram. *Georgette crêpe* has hard twisted threads in both warp and filling. Sewing silks are highly twisted threads, while floss and embroidery silks are loosely twisted.

A green tinted silk, used in China and Japan, is produced by the Japanese oak-feeding silk moth. The natives of India manufacture *tussah silk* from the hard grayish white cocoon of the undomesticated tussah moth. Several other varieties are also known.

Artificial silk is produced by several processes which usually depend on dissolving cotton or wood pulp to a thick liquid. This is forced through fine holes into some material that will cause the threads to harden. It is not usually so soft, nor has it the strength and elasticity of true silk, but improvement is taking place rapidly and the product is becoming more and more important. See *Rayon*.

Soap. A cleansing agent usually prepared by the action of caustic alkali on vegetable and animal fats. A fat is a chemical compound of glycerin with one or more fatty acids. In the presence of a caustic alkali, the fat breaks down; the acids combine with the alkali to form soap, while the glycerin remains in the solution. The alkalies used are caustic potash, which yields *soft soap*, and caustic soda, which gives the ordinary hard soap. The fats come from many sources and are usually of low grade, but some of the finest soaps are made from edible oils. Coconut, castor, corn, cottonseed, and soy bean oils are consumed in enormous quantities, together with various animal fats and tallows.

The lye and fat may be mixed in the proper proportions and allowed to react without being heated. This produces *cold process* soap. In the *Krebitz process*, the fats are saponified with milk of lime, and the resulting calcium soap is changed to soda soap by boiling with sodium carbonate. But 90 per cent of the soap used in the United States is made by boiling the fat with a solution of caustic soda. When the action is complete, salt is added until the soap is thrown out of solution and floats at the top of the kettle. The spent lye is drawn off and concentrated in vacuum pans in order to recover the glycerin. The soap is then given a second boiling with a small amount of fresh caustic, again salted out, and settled for some time before it is drawn off into *crutchers*, where it is very thoroughly mixed. *Filling*, such as water glass, washing soda, borax, or naphtha, is often added during this so-called *crutching process*. *Floating soaps* are produced by operating the crutcher in such a manner as to incorporate a large amount of air in the soap and thus make it slightly lighter than water. From the crutchers the pasty liquid is drawn into narrow iron boxes called *frames*, where it stands until cool and hard. The iron shell is then removed and the huge slab is cut into cakes by pressing against a series of tightly drawn wires.

Toilet soaps are usually produced by milling. This consists in passing the soap between heavy rollers which reduce it to narrow ribbons. The ribbons may be dried and perfumed and are then forced by a powerful screw press through an opening about the size of the cake into which the pieces are pressed. Transparent soaps are made in various ways; for example, by adding sugar to a soap made with much castor oil, or by dissolving ordinary soap in alcohol and then evaporating the solvent.

Marine soap and *hard water soaps* usually contain a large amount of coconut oil. Cold process soap contains all the glycerin of the original fat. Pure *castile soap*, named from the province of Castile in Spain, is made from olive oil. The best soaps usually result from a mixture of tallow with some

coconut and other vegetable oils. Many soaps contain rosin, but with one or two exceptions rosin is seldom used in a product intended for toilet purposes. *Shaving soap* is prepared chiefly from coconut and palm kernel oils, which impart its lathering qualities. Great care is taken to avoid retaining any free alkali, which is irritating to the skin. Small amounts of gum or other substances are often added to shaving creams in order that the lather may dry more slowly.

Just how soap washes and cleans is a problem which science has not yet answered completely. The process was formerly believed to be chemical; but, according to more recent views, soap removes the greasy particles of dirt by *emulsifying* the oil which holds them in place. That is, soap causes the oils to separate into minute globules which mix with the water and are carried off by it.

Soda Water. A slightly acid beverage having a peculiar pungent taste due to carbon dioxide gas which has been forced into the water under pressure. When the liquid is drawn into a glass and the pressure released, the gas forms characteristic bubbles as it escapes from solution.

Starch. A white, granular substance, insoluble in cold water, that is found in all green plants, where it serves as a reserve food supply. Large amounts are found in many seeds and in certain roots and tubers, especially corn, wheat, rice, beans, potatoes, sweet potatoes, and cassava, or manioc. Food starches also include *arrowroot*, obtained from a West Indian plant; *sago*, from the pith of various palm trees; and *tous-les-mois*, from certain varieties of canna. Pure starch alone will not sustain life, but, in its natural forms or as products made from them, it constitutes the greater proportion of human food.

The grains of starch from different sources generally have a characteristic shape and size by which they can be readily identified when seen under the microscope. Starch turns blue when treated with tincture of iodine, as may be shown by placing a drop of this solution upon a piece of potato or bread. Hot water causes the grains to swell until they burst, and, on cooling, the paste sets to a stiff gelatinous mass.

In Europe, much starch is produced from potatoes, but, in the United States, over 90 per cent is made from corn, usually by the sulphur dioxide process. The grain is soaked from two to four days in water containing one per cent of the gas from burning sulphur. When sufficiently soft, it is ground, and carried by a stream of pure water over sieves, which permit the starch to pass but retain the germs and husks. As the germs float, they are skimmed off and pressed to recover the valuable oil which they contain. The residue is sold for cattle food. The water with its suspended starch is passed over a series of gently sloping surfaces, on which the heavier particles are left. The remainder flows to settling tanks, from which the starchy sediment is collected to be further refined by washing and straining until sufficiently pure. The separated starch is carefully dried by artificial heat until the hard mass breaks up into the characteristic lumps. Dry starch has a peculiar, harsh feeling when rubbed between the fingers.

Besides its chief uses for food and laundry purposes, starch is employed in the preparation of glucose and dextrin, in printing and finishing calico and other cloths, and in making special kinds of paste. See *Bread*, *Flour*, *Glucose*, *Sugar*.

Sugar. A sweet crystallizable substance found in the juices of many plants. The term includes a group of chemically related compounds such as *grape sugar*, *fruit sugar*, *milk sugar*, and *malt sugar*; but, except in a technical sense, sugar means the very valuable food called *cane sugar* or *sucrose*. Any substance having a sweet taste was formerly called sugar, hence the name *sugar of lead* for poisonous **lead acetate.** A sugar of some sort appears to be the first carbohydrate formed in green plants, where it serves as a food for the growing parts or is changed into starch and stored as a reserve. The principal sources of sugar are the *sugar cane* and *sugar beet*. Smaller quantities are obtained from the sugar maple of North America and from several varieties of East Indian palm trees.

The use of sugar and of sugar cane seems to have originated in India at a very early period. During the middle ages it was carried by Arabs to Egypt and southern Europe, whence it was introduced into Louisiana in 1751. The first refined sugar was made about 1791, and the first commercial crop was harvested in 1795.

Sugar cane is a giant grass, raised chiefly in Cuba, Porto Rico, Louisiana, Hawaii, the Philippines, Java, and India. It is usually from 6 to 15 feet high, with narrow cornlike leaves at the top. The stalk is from 1 to 2 inches thick and is composed of short jointed sections which may be yellow, green, purple, or striped, depending on the variety. The plant may be raised from seed, but usually pieces of stalk are planted in shallow furrows running the length of the field. At each joint there is an eye, or bud, from which a new stalk springs up.

In Louisiana the harvesting occurs between October and January; in tropical countries, from January to June. The cane is cut close to the ground with a broad knife about 18 inches long which has a sharp hook on the back. The leaves are stripped off with the hook, the top cut away at the last mature joint, and the cane stacked until it can be taken to the factory. New crops will grow from the stubble for several seasons, but the general practice is to replant a part of the field each year.

At the factory the canes are shredded and then passed through a series of heavy rolls, which squeeze out the juice. Water is usually sprinkled upon the cane before the second pressing in order that the extraction may be as complete as possible. The crushed cane, called *bagasse*, is used for fuel. The juice is a gray or green liquid which contains, in addition to sugar, many impurities, such as glucose, gum, albumin, acids, and ash. These are removed by treatment with lime, other chemicals, and heat.

Sugar is obtained by evaporating the purified juice, usually under vacuum, to a heavy sirup. This is run to another vacuum kettle called the *strike pan*, where boiling is continued until crystals of sugar form and grow to the proper size. The mixture of sugar and sirup, called *massecuite*, is stirred and fed to centrifugal machines lined with fine screen, which retains the crystals and allows the molasses to escape. A second and a third yield of soft sugar are often obtained from the molasses, of which the uncrystallizable residue is ultimately sold to distilleries or for cattle food. A certain amount of the best grade is used in cooking. If the molasses is separated from the massecuite by draining rather than by centrifugal force, the sugar is not so pure and is called *muscovado*.

Brown, or *raw*, *sugar*, so prepared, is usually shipped in bags to a refinery, where it is dissolved, filtered, treated with chemicals, decolorized by means of bone black, and again boiled under vacuum until the small white crystals of granulated sugar are formed. These are dried and sifted into the standard sizes. *Loaf sugar* may be made by molding the sticky grains under centrifugal pressure, then drying and sawing the resulting blocks to the proper size. By a more recent process, however, the individual blocks are molded in presses, from a specially prepared soft, white grain. *Powdered* and *confectioners' sugars* are prepared by passing the crystalline variety through a disintegrator that reduces it to very fine particles, which are graded by sifting.

The sugar beet, which is extensively cultivated in Europe and the United States, grows best in a temperate climate where the soil is suitable and where the average summer temperature is about 70° F. It is white and usually contains 12 to 18 per cent sugar, compared with 10 to 16 per cent in

Louisiana cane. The seeds are usually planted in April and May. At harvest time, which begins in August or September, the beets are pulled up, and the leaves cut off just below the top or neck. The beets are then carried to the factory to be carefully washed and weighed. The clean beets are cut into very thin slices, packed into a series of tanks, and treated with warm water, which dissolves the sugar together with many impurities. The exhausted chips are pressed, dried, and sold for stock food or fertilizer.

The solution is purified with lime, bleached with sulphur fumes, crystallized, and the sugar is refined in much the same way as that from cane. Special efforts are made to obtain as much sugar as possible from the molasses. Neither the raw beet sugar nor the molasses are fit to eat, but, when the raw product has been properly refined, it is impossible to tell whether it came from beet or cane.

Jaggery, the sugar obtained from several varieties of the palm, has been used in India since very ancient times. It is obtained by tapping a hole in the tree and collecting the sap which runs out. This is boiled with a little lime, until a sirup forms which will harden on cooling. A large tree will yield 30 to 40 pounds of sugar per year. The sirup has long been an article of commerce under the name *date honey*.

Maple sugar is made in North America wherever the sugar maple is found, but Quebec, Ontario, New York, Vermont, Ohio, and Pennsylvania are the most important producing centers. Sap begins to flow in the trees at the end of winter and is collected by drilling into the base of the trunk one or more small holes about 1½ inches deep. A spile or trough is driven into each hole to conduct the sap into a bucket. The juice, which is unusually free from impurities, contains an average of 3½ per cent of sugar. It is boiled down over an open fire or in a modern evaporator to a heavy sirup, or, if sugar is wanted, until the liquid will become solid on cooling. The average amount of sugar from each tree varies from 2 to 3 pounds. Maple sugar is highly valued because of its characteristic flavor, and is sold as raw sugar and as sirup. If it were refined, it would be exactly the same as the product of the cane and beet and of no greater value.

Thermos Bottle. The trade name for a practical device invented by Sir James Dewar about 1892 for the purpose of containing intensely cold, liquefied gases. It is also called a *vacuum bottle*, as it consists essentially of a double walled bottle or flask in which there is a high vacuum between the walls. Radiation is prevented by silvering the walls, and there is of course nothing to conduct heat across the vacuum. The small opening to the flask is usually stoppered with a thick cork, this material being a very poor conductor of heat.

Hot substances stay hot for long periods in a vacuum bottle because the heat cannot get out, and cold substances remain cold because heat from the outside cannot get in. Such containers have generally been made of glass, which requires careful handling. An improved type is constructed of metal, thus avoiding the fragility of the glass product.

Turpentine. The resinous exudate of several species of pine trees. In America it is obtained during the spring by cutting and scarring the trunk of the long-leaf pine, which grows abundantly in the Southern states. The sap which runs from the cuts is collected, placed in copper stills, and heated until the volatile products are driven off as vapors. These are condensed by means of cold water to *spirits of turpentine*, which, when pure, is a colorless liquid having a penetrating, aromatic odor, and a bitter, burning taste. After distilling off the "turps," the residue, while still hot, is run into barrels, where it hardens to a brittle, transparent mass of *rosin*. This is usually amber-colored, but, depending on the care taken in its preparation, varies from almost white to brownish black.

Turpentine is much used in varnishes to hasten drying and in paints for thinning and for producing a dull surface. It is also used in medicine, internally, as an antispasmodic, as a stimulant, and to stop hemorrhages; externally, as a remedy for ringworm and to relieve inflammation. Rosin is used in the manufacture of varnish, soap, sealing wax, cement, sizing, and for many other purposes.

Varnish. A solution of gums or resins which dries to a hard, smooth, transparent film. Varnishes give a pleasing appearance to most surfaces, protect them against the weather, and bring out the beauty of wood even better than polishing. The many kinds of varnish are classified according to the solvent used. Shellac dissolved in alcohol forms the best-known example of a *spirit varnish*. It dries rapidly to a hard, brittle surface. *Turpentine varnishes* also dry rapidly and, being more brilliant and less brittle, are sometimes used in oil paintings.

Oil varnishes, the most important for general use, are made by adding the proper amount of boiling oil to melted gums and boiling the mixture until it becomes clear. It is then thinned with turpentine, cooled, filtered, and pumped to storage tanks to age for at least six months.

Linseed oil and *copal*, a hard resin found as a fossil and on living trees in Zanzibar, New Zealand, and in other places, are the principal ingredients of a good oil varnish. Poppy and china wood oils are of increasing importance, while the list of available gums includes lac, mastic, sandarac, amber, asphalt, and various synthetic resins. Coloring matter, such as dragon's blood, cochineal, or artificial dye, is often added. *Japanese lacquer* is a natural varnish prepared from the sap of a plant.

Veneer. A thin layer of valuable wood, or occasionally other material, glued to furniture or cabinetwork in order to produce a surface more attractive than that which it covers.

Veneers that are sawed from the solid wood are known as *saw cut*; those that are pared, as *knife cut*. Both are made by machinery. Saw cut veneer varies from $\frac{1}{32}$ to $\frac{1}{16}$ inch thick, while knife cut veneer is usually much thinner. The use of veneer does not imply cheapness or poor quality. It is the only method by which some rare and beautiful woods such as curly mahogany and burled walnut can be applied to surfaces.

Vinegar. A sour liquid varying in color from light yellow to brownish red, much used as a condiment and for pickling. It is made from weak alcoholic liquors such as hard cider, wine, beer, beetroot juice, or fermented molasses. When liquids of this sort stand exposed to the air at a temperature of about 76° F., a slimy scum usually forms on the surface. This scum, commonly known as *mother of vinegar*, is a bacterial growth, in the presence of which the dilute *alcohol* combines with *oxygen* of the air to form *acetic acid*. The sourness of vinegar is due to this organic acid, but the characteristic odor and taste are due to the particular flavoring materials by which malt, cider, or wine vinegar are recognized.

In the *new* or *quick* process, now generally used, vinegar is produced by draining the alcoholic liquor over some substance such as beech-wood shavings, or clean charcoal which has been previously soaked in strong vinegar. Such a material provides a very large surface on which thin films of liquid are exposed to the action of the "mother" and to the air. By this method vinegar is produced in from 24 to 36 hours as compared with several weeks required by the old process. Vinegar and foods containing it should be kept in glass or other nonmetallic containers, because acetic acid slowly attacks such metals as tin, copper, and brass, forming soluble compounds highly injurious to health.

The strength of commercial vinegar is usually expressed in *grains*. Each grain represents $\frac{1}{10}$ per cent of acid, so that a bottle of vinegar marked 45 grain contains 4.5 per cent acetic acid.

Water Glass. A heavy, colorless solution of sodium or potassium silicate, which becomes hard and glossy when exposed to the air. It is usually prepared by heating fine sand together with washing soda and charcoal, and extracting the fused mass with boiling water. Uses for the alkaline liquid include painting on glass, protecting wall decorations, glazing, and fireproofing. It is an important ingredient in fireproof cement, and is valuable as a coating material for the inside of barrels because it fills any small holes and leaves a smooth, watertight coating. Large quantities are used for filling cheap soaps. When mixed with sand, it hardens to a useful artificial stone. Eggs are often preserved by keeping them covered with a dilute solution of water glass.

Welsbach Mantle. A closed network or mantle composed of thorium and cerium oxides. It acts as a rich source of illumination when heated to incandescence by a gas flame. The first patent for such a mantle was granted to D. Karl Auer von Welsbach, an Austrian chemist, in 1885. But the gas mantle industry really had its beginning in 1893, when Welsbach disclosed that the most satisfactory light was obtained from a mantle containing 99 per cent thorium oxide and 1 per cent cerium oxide.

In making the mantle, a narrow tube of fabric knitted from ramie, cotton, or artificial silk is dipped in a strong solution of thorium and cerium nitrates. After the excess solution is removed, the tube is cut into sections of proper length, and one end of each piece is closed with asbestos thread. The mantles are then heated until the fabric is burned away and the nitrate salts are changed to a fragile skeleton of oxides. The ignited mantle receives a protective coating of collodion to prevent damage during transportation.

The first mantles were naturally placed above the flame, but in 1900 a great advance in incandescent lighting followed the introduction of the inverted mantle, which throws the light downward and thus avoids shadows.

An ordinary mantle gives 14-19 candle power for each cubic foot of gas burned, and, where gas is available, is the cheapest source of illumination. When burned with a mantle, gas gives 7 to 20 times as much light as can be obtained when it is burned as an open, fan-shaped flame.

Thorium and cerium are produced mostly from monazite sand, which is obtained chiefly from India and Brazil. One pound of thorium nitrate is sufficient for about 325 mantles.

Wool. A soft, wavy, modified form of hair, which grows on domestic sheep. No wild wool-bearing animals are known, and, when sheep are raised without care or protection from the elements, the wool rapidly becomes coarse and hairlike. Wool differs from other textile fibers and from hair chiefly in being covered with scales which can interlock and thus cause the fibers to mat together. Wool is elastic, it does not readily absorb water, and the scales hold air in the spaces of a woolen garment, making it very warm for its weight. These characteristics make wool so valuable that the quantity used each year is second only to cotton. Longer fibers very similar to wool are found on the llama and the alpaca of South America; on the Kashmir goats of India; and on the Angora goat, which yields the wool used in weaving *mohair*.

Sheep are not native to America, but were imported by the earliest settlers, who were accustomed to weave their own clothes from homespun yarn. Practically all standard breeds are now raised in this country, wool from the merino sheep being the finest but not the longest.

The wool is generally clipped from the sheep in the spring, and, when there are large flocks, the clippers are power driven, so that an experienced operator can trim 150 to 200 animals each day. All the clippings from one sheep are called a *fleece* and usually weigh from 5 to 8 pounds. Wool taken from the shoulders and back is the best in quality. Lambs' wool is softer and more wavy than sheep's wool. *Pulled wool* is that removed from pelts of dead animals. It is usually of inferior quality because of the treatment given the skins in order to loosen the fibers. Consequently it is necessary to sort the fleeces into various grades. A certain amount is sorted at the clipping sheds, but most of this work is done at the warehouses and factories.

There are many grades and qualities, and several systems of classification, but in general the fibers may be grouped as *combing wool* when over 2½ inches long and rather straight; as *carding wool* when short, fine, and wavy; and as *carpet*, or *blanket*, *wool* when coarse and stiff. *Woolen* goods are made from carding wool, while *worsteds* are woven from combing wool. The chief difference is that woolen thread is soft and composed of crisscross fibers, while worsted thread is twisted hard after the fibers have been combed until they are parallel. Worsted is firm and shows a definite pattern, while woolens are soft, having the pattern almost concealed by the nap.

When the wool reaches the factory, the fleeces are pulled apart, graded, and beaten to remove dust and dirt. The reason wool does not form a mass of felt on a healthy sheep's back is that each fiber is coated with a mixture of greasy materials called *yolk* and *suint*, secreted by the animal. This is removed from the clipped wool by careful *scouring* with soap and soft water. From the wash water *potash* and *lanolin* are obtained. Lanolin serves as a basis for salves and ointments. Most wool is white, but some is black, gray, fawn, or brown. The fiber can be dyed in the form of wool, yarn, or cloth. After scouring is complete, the material may be "dyed in the wool," and dried.

The matted wool is loosened by revolving, toothed drums, and any seeds or burs are removed either mechanically or by a chemical process, which chars the impurities. Oil is added to restore the natural softness; then all the material is uniformly mixed and passed to a series of *carding machines*. These are cylinders covered with projecting teeth, which arrange the fiber in a continuous flat band. This is divided by a *condensing* machine into narrow strips, or *slivers*, somewhat larger than heavy yarn. The sliver is usually spun into twisted thread on a *mule-jenny* and is then ready for the loom.

After weaving, various processes are used to give a cloth the desired surface and finish. In the first step, *fulling*, the fabric is wet with soap and water and pressed or worked between rolls until the shrinkage and degree of felting are satisfactory. It is then rinsed and supported on hooks until dry. The nap of woolens is raised by means of a conelike spike head covered with sharp hooks, which grows on the teasel plant. Artificial *teasels* are frequently used for this purpose.

The fibers for making worsted, unless very long, are also carded and are then put through *combing* and *gilling* machines, which leave them parallel and free from the short, curly pieces called *noil*. They are then spun to a hard, wiry thread, and are woven. *Felt* is a warm, dense fabric made by pressing and beating together unwoven wool fibers. It is much used for making hats. *Shoddy* might be called secondhand wool, for it is obtained by tearing refuse woolen fabrics into fibers which can be rewoven. It is of great value, and is objectionable only when used to adulterate new wool.

Broadcloths and *beavers* have the nap raised and spread in one direction over the face of the cloth. On *overcoatings* the nap is often formed in little curls. In some goods it is left standing as in velvet, and, in the bare-face finish, it is entirely sheared off. *Tweed* is a soft, rough-finished material, originally made in the villages along the Tweed river, Scotland. It is usually woven from two or more different colored yarns. The cloth is finally brushed, stretched on drums under hot water, and steamed while in a hydraulic press in order to develop the luster.

TEST QUESTIONS

Point out several reasons for the widespread interest in economics. Define the term economics. Discuss some industrial effects of *division of labor* 1197

Illustrate commercial co-operation among states and countries 1197–1198

From what circumstances does the conflict between capital and labor arise? 1198

Discuss the function of money as a medium of exchange 1198

What is "wealth" said to mean today? . . . 1198

Point out some characteristics of the "age of industry" 1198

COMMERCE

In what does commerce consist? What does the term commerce generally imply? Distinguish between *foreign* and *domestic* commerce. Explain the phrase "interstate commerce" 1199

State some of the conditions upon which commerce depends. Explain the interrelation between transportation and commerce . . 1199

Describe the commercial system of the ancient Phœnicians. What were the economic conditions that gave rise to the extensive commerce of the Greeks? 1199

What service to commerce did Rome render for five centuries? 1199

What people controlled commerce during the period immediately after the fall of Rome? Summarize the conditions that prevented commerce in Europe in this period 1200

Explain the rise of markets and guilds in the towns of medieval Europe. Indicate the use and importance of the medieval fairs . . . 1200

Indicate the purpose and the power of the Hanseatic league. Point out some events to which Venice owed her commercial supremacy in the Mediterranean 1200

What states became strong commercial powers in the 14th and 15th centuries? 1200

What new sea routes were opened about the end of the 15th century? To what city did commercial supremacy fall at this period? . 1200

By what influences was the commercial power of Spain destroyed? How did Portugal lose her greatness in trade? 1201

Outline the growth and decline of Dutch commerce in the 17th and 18th centuries . . . 1201

Point out the commercial advantages possessed by France between 1500 and 1800. Explain her failure in world commerce 1201–1202

To what two chief factors is the commercial success of England in the 17th and 18th centuries ascribed? Name the most important English trading companies of this period. What were the staple articles of English commerce? 1202–1203

Summarize the chief features of the growth of Canadian commerce. What are the chief articles of Canadian export? 1203

Outline the leading facts about American commerce down to 1812 1203

Describe the important economic development of the United States in the period from 1812 to 1860. Compare the list of chief exports in 1800 with that of 1860 1203–1204

Explain the phrase "triangular exchange" . 1204

What were the most notable effects of the Civil War upon the economic development of the United States? 1204

Show by statistics the growth of United States export trade from 1870 to 1892. Account for the decline of the American merchant marine. Give figures which show the growth of the foreign commerce of the United States after 1860 1204

Point out the amount, and the distribution by countries, of United States foreign commerce in 1913. Show the proportions of United States foreign trade taken by leading countries in 1927 1205

How does the internal commerce of the United States compare in importance with the foreign trade of the United States and of the world? 1205

State the changes in the ranking of leading nations in foreign commerce since the World War. How was the foreign trade of the United States affected? 1206

COMMUNICATION

What emperor first opened the postal system to private use? 1208

By whom were three early European postal systems established? Who was the first "Master of the Post" in England? By whom was he appointed? When and for what purpose was the English money order system established? 1208

Give the date of the introduction of the following in England: penny rate of postage; perforated stamps; mail boxes 1208

Outline the history and some of the regulations of the Universal Postal Union . . . 1208

Outline the history of the colonial postal system in America before the Revolution. Summarize the important reforms and extensions of the United States postal system, giving the date of each 1208–1209

Mention some of the chief conveniences afforded by the parcel post service in the United States 1209–1210

Indicate the rapid development of the air mail service 1210

State examples of the extensive practical development of radio communication 1210

TRANSPORTATION

What methods of propelling their vessels were used by ancient peoples around the Mediterranean Sea? Account for the phrase "galley slave" 1211

Review the early history of the building and use of steamships 1211

Name two Frenchmen and two Scotchmen who are famous in the history of modern road building 1211

Summarize important facts about the history of canal building 1211

State approximately in tons the size of ocean-going ships of American colonial times. Name two famous American shipowners of the beginning of the 19th century . .1211–1212

Show the conditions that brought about the building of the American clipper ships . . 1212

Outline the development of the chief types of engines used in ships 1212

Trace the increase in size of ocean-going vessels in the 20th century 1212–1213

Recount the story of the American merchant marine down to the World War. Indicate the effect of the war on American shipbuilding. Show by statistics the part played by American ships in carrying American import and export cargoes 1213–1214

Of what importance were rivers in ancient and medieval commerce? 1214

Review the most important canal building projects of modern times in France and England 1214

In what canal building plans was George Washington interested? By what different means were his purposes later realized? . . 1214

In what way did the War of 1812 influence the United States as to the internal improvement policy? 1215

Show why Federal expenditure for rivers and harbors could be renewed and enlarged after the Civil War 1215
Of what economic importance was the Erie canal? 1215–1216
Trace the history of canal development in Canada 1216
State the main features of the Saint Lawrence power-navigation project 1216
By whom was the Suez canal constructed? State its dimensions and original cost. Name the largest stockholder in the canal company 1216
Name the two men to whom the chief credit for the Panama canal construction is due. Describe the course of the canal. What is its height above sea level in Gatun lake? What was the total cost of the canal? . . 1217
Outline the proposed system of coastwise canals between Boston and Norfolk. . . . 1217
Summarize the outstanding features of American railroad building down to about 1851 1217–1218
What advantage did the North and the South realize from railroads in the Civil War? . . . 1218
Point out the remarkable growth of railroad building in the United States between 1868 and 1910. What was the track mileage of railroads in the United States in 1920? in 1925? 1218
Summarize the main facts as to the distribution of railway mileage among the various states 1219
When and where was the first railway placed in operation in Canada? Enumerate, with important dates, the chief Canadian railway projects. Outline the relations of the Canadian government with Canadian railroads 1219–1220
In what three types of service is the electric preferable to the steam locomotive? . . . 1220
Give the dates of the introduction of horse car service in various American cities; of the introduction of cable lines; of elevated roads. In what chief cities of the world have subways been constructed? . . . 1220, 1222
What year marks the beginning of commercially practicable electric railways? 1222
Trace the development of the use of the electric locomotive; of electric trains. . . 1222–1223
Give figures which indicate the extent of electric railroad mileage in the United States . 1223
Trace the history of highway building in the United States 1223–1224
Outline the extent and chief construction features of the New York State barge canal system 1224

CAPITAL AND LABOR

Name the five human factors to be taken into account in considering the problems of industrial organization. What is said to be responsible for most industrial group conflicts? 1225
Point out several modes of settlement of labor disputes. Characterize the three stages in the industrial conflict 1225
Under what conditions is collective bargaining a successful method of dealing with industrial disputes? 1226
State the attitude of Syndicalists toward collective bargaining 1226
Indicate some methods substituted by employers for recognition of the unions . . . 1226
Discuss the right of the workers to organize and choose their representatives 1226
Describe the policy of the union closed shop 1226–1227
Describe the policies of government intervention in industrial contests in Europe; in Australia; in Canada 1227
Estimate the success of these government agencies 1227
Discuss the working of the Kansas Court of Industrial Relations 1228
Upon what kind of agreement will future industrial codes be based? 1228
Upon whom does the responsibility for industrial adjustment really rest? 1228
Discuss the recent forms of co-operation in shop management. Estimate the effects of these policies on the wage earner. . . 1228–1229
Point out several advantages to workers and managers arising from scientific adjustment of work to the capacity of the workers . . 1229
Discuss the joint responsibility of workers, managers, and consumers in stabilizing and improving production 1229
Enumerate several defenses against unemployment 1229–1230
Criticize some policies which result in impairment of production 1230
Distinguish between money wages and real wages; between wages and earnings. . . . 1230
What is meant by the expression "reservoirs of labor"? 1230
Why should labor not be regarded as a commodity? 1230–1231
Discuss the practical value of studies of costs of living. Point out the difficulties in determining standards of living 1231–1232
Distinguish the following from each other: profit sharing; bonus; savings sharing . . 1232
Point out some necessary preparations for the solution of labor problems 1233
Define the following terms: trade union; strike; sympathetic strike; boycott . . . 1233
Give the date of the first recorded strike in America; of the first organized strike; of the first nation-wide strike for an eight-hour day 1233
Distinguish between a *trades union* and a *trade union* 1233
Trace the growth of national trade unions in America 1233–1234
Describe the organization of the American Federation of Labor. How does the Federation secure defense funds? 1234
Outline the objects and the policy of the A. F. of L. 1234
Describe the organization of the Industrial Workers of the World. State the aims and methods of the I. W. W. 1234

ADVERTISING

Discuss some popular misconceptions about advertising 1235
Indicate two uncontrolled channels of publicity for goods. What are the chief controlled channels? 1235
Discuss the principal ways in which manufacturers use advertising 1235
Point out some of the benefits that advertising brings to the dealer; to the consumer. . . 1236
Define advertising from the advertiser's viewpoint; from the consumer's viewpoint . . 1236
Classify advertisements upon the basis of the kinds of response desired 1237
Enumerate and describe the four groups of advertisements, determined by the kind of information each supplies. Discuss the comparative value of some of these groups . . 1237
Describe the advertising man's analysis of a product to be advertised; his analysis of the market 1237–1238
Enumerate some of the available media for advertising. Point out some of the problems of selection and economical use of these media 1238
State the mental stages which precede decision to buy 1238
Discuss the following principles in relation to advertising: favorable attention; avoiding negatives; intellectual versus emotional appeals; rationalized appeals 1239

Compare advertisements with sales letters as to typical contents and style 1239–1240
In respect to the preparation of advertising copy, what is meant by the service viewpoint? by a point of contact? by good-will copy? by concentration? 1240
Discuss methods of helping the reader's progress and of emphasizing the copy 1241
Name some conditions which demand display in the form of advertising. What are the chief functions of the headlines? 1241
For what purposes should color and illustrations be used in advertising? 1241
What is meant by the words layout and visualization? 1242
Point out some examples of the advertising of ideas 1242

INSURANCE

State the real function of insurance. Define life insurance 1251
Indicate the extent of modern business uses of life insurance 1251
In what vital respect does life insurance differ from other forms of insurance? What is the purpose of a mortality table? 1251
Distinguish between "net premium" and "gross premium." What is meant by the term "participating" applied to an insurance policy? 1252
Explain the term "reserve" 1252
State the methods taken by insurance companies to protect themselves against undesirable risks 1252–1253
Who may be the beneficiary of an insurance policy? 1253
Name four leading types of life insurance policies. Upon what does the amount of the premium mainly depend? State the difference between an ordinary whole life policy and a limited-payment whole life policy. Distinguish between these types of policies and the endowment policy 1253
Compare term insurance and whole life insurance, in respect to certain advantages and disadvantages of each 1253–1254
What are the objections to paying insurance to beneficiaries in lump sum? State some advantages of the life income plan . . . 1254–1255
Explain the phrase "cash or loan value" . . 1255
What is "paid-up insurance" and "extended insurance"? 1255
Outline the purpose and the methods of industrial insurance 1255
Point out changes that have been made in the methods of fraternal insurance 1255
What is the purpose of health and accident insurance? How many working days are said to be lost annually in the United States through illness? 1256
State some of the principal features of accident policies; of health insurance 1256
Define employers' liability insurance. How are employers' premium payments adjusted? 1256
State the three legal doctrines which formerly operated to prevent an employee from securing compensation for injuries 1257
What is the purpose of the workmen's compensation laws? State some of the provisions of these laws 1257
Give the estimated value of property in the United States protected by fire insurance. What is the computed amount of annual fire insurance premiums? 1257
Point out the importance of fire and marine insurance in our system of trade and industry 1257
Explain the personal character of the fire insurance contract; the nature of the indemnity provided under the contract 1257–1258
What classes of persons may insure against loss by fire? 1258
Trace the development of the standard policy of fire insurance in America 1258
Discuss the meaning and consequences of coinsurance 1258
Enumerate the classes of bonds issued by bonding companies. Define title insurance. What is the purpose of credit insurance? . . 1259

INVESTMENTS

Define investment. Point out, by example, a difference between an investor and a speculator 1263
Summarize the characteristics of a true investment 1263
Give two illustrations to show how the yield of an investment in stocks or bonds is determined 1263
Enumerate some classes of securities and outline the special advantages of each . . . 1263
State six attributes of a good investment. What are the three major tests? 1263
Classify public bonds. Why are Liberty bonds ranked so high for investment purposes? . 1263
What are municipal bonds? Upon what conditions does the value of a state bond depend? State some tests of the desirability of county and city bonds 1263–1264
State the relations which should exist between value, income, operating expenses, and interest charges in order to make the following securities desirable: railroad; public utility; industrial 1264
Explain three tests of the soundness of a railroad security 1264
Enumerate the types of securities issued by public utility companies 1264
State some advantages enjoyed by these companies 1264–1265
Why is the average investor advised not to purchase industrial securities? 1265
What proportion should the amount of a real estate mortgage bear to the conservative value of the property? Which are preferable, mortgages on residence property or mortgages on business buildings? 1265
Point out the effect of taxation upon investment income 1265
By what conditions are stock prices determined? What determines bond prices? Indicate the most favorable time to buy stocks; bonds 1265
Enumerate some characteristic marks of fraudulent investment offerings . . . 1265–1266
Outline the services rendered by bond houses. 1266

MONEY AND BANKING

Point out the practical relations between production and distribution on the one hand and price and profit on the other 1267
State a definition of money. Classify United States currency according to this definition. 1267
Why is gold so generally used as money? . . 1267
What four functions does money serve in commerce? Describe the use of money as a medium of exchange; as a standard of value; as a store of value; as a standard of deferred payment 1267
How is the general level of prices measured? . 1268
What establishes the value of money? From whom does the true demand for money come? What is the supply of money? . . . 1268
Illustrate the reasons for rise and fall of prices by stating the conditions governing the variations in the price of wheat 1268
Explain why the value of the German mark fell so low after the World War 1268–1269
Distinguish between credit of general acceptability and credit of limited acceptability 1269–1270

Explain the comparative values of American, British, French, and Japanese monetary units. Why did United States money remain at par during and after the World War? . . 1270
Discuss the possible effects of large United States holdings of gold upon commodity prices 1270–1271
What is interest? How is the rate determined? 1271
Discuss the history and the nature of the present monetary standard of the United States 1271
Discuss the credit money of the United States. State two advantages of credit money . . 1271
Explain the use of Federal Reserve notes . . 1272
Define legal tender 1272
Name three kinds of banks 1272
Explain why a commercial bank can loan out a large share of the funds it has on deposit. Why does such a bank prefer to make short time loans? What is a "run" on a bank? 1272–1273
Whose property are the funds deposited in a bank? 1273
Distinguish between demand deposits and time deposits 1273
What is a bank check? Indicate the importance and some of the dangers of checks . 1273
Indicate the relation of loans to bank business. 1273
From what kind of bank could a man borrow $5000 for five years to finance the purchase of a home? 1273
State some of the common rules governing the time limit and other conditions of commercial bank loans 1273
What three qualifications of the prospective borrower are considered by the banker before granting a loan? 1273
Explain the method and purpose of rediscounting loans, as allowed in the Federal Reserve system 1273
Outline the legal provisions under which national banks operate; those governing state banks 1273–1274
For what general purpose was the Federal Reserve system created? Indicate the present strength of the system 1274–1275
Give an example which shows the bank reserve practice in the Federal Reserve system . . 1275
In what ways are the deposits in savings banks safeguarded? 1275
Outline the policy of the farm loan banks . . 1275
How are savings and loan associations managed? 1275

BUSINESS, BANKING, AND LEGAL TERMS

State two meanings of the term acceptance. Explain the use of a trade acceptance. . . 1277
What is accommodation paper? 1277
Discuss the application of the term "accrued interest" 1277
What is the function of an actuary? of an agent? 1277
Define the following: amortization; arbitrage; assessed valuation 1277
State two uses of the term assessment . . . 1277
Define assets 1277
What is an audit? 1278
Discuss the phrase "balance of trade" . . . 1278
State the true nature of a bank balance; the value of a bank book; the meaning of bank discount 1278
Describe the work of a bank examiner . . . 1278
What are bank notes? 1278
Discuss bankruptcy 1278–1279
Point out two uses of the term "bank statement" 1279
Explain the following terms: bear; bear panic; bear raid; bids and offers. 1279
What is a bill of exchange? 1279
What are the chief points of difference between a "straight bill of lading" and an "order bill of lading"? 1279
Define bills payable; bills receivable 1279
What is a blanket mortgage? 1279
Explain the phrase "bonded debt" 1279
What meanings commonly attach to the term "bonus"? 1280
Indicate the effect of the action implied in the phrase "books closed" 1280
Define book value 1280
What is a broker's function? 1280
Explain the operations of a bucket shop . . 1280
In financial parlance, what is a bull? a bull market? 1280
Account for the phrase "callable bonds" . . . 1280
What is a call loan? 1280
Distinguish two meanings of the term "call" 1280–1281
How does a cashier's check differ from an ordinary check? 1281
Explain the meaning of the term "certificate of deposit" 1281
Is a certified check a direct obligation upon a bank? 1281
What property rights are conveyed by a chattel mortgage? 1281
Why should checks be presented promptly for payment? 1281
Describe the procedure of a clearing house. . 1281
What is a collateral loan? a collateral note? 1281–1282
Outline the service rendered by commercial agencies 1282
Why has commercial paper attained such high favor among banks? 1282
Explain the term "common stock" 1282
When does a broker become responsible for the sale price of goods handled on "consignment"? 1282
How is the word consols, applied to certain British securities, accounted for? 1282
In what ways is the term "controlling interest" employed? 1282
In financial usage, what is a corner? 1282
Explain the term "coupon bonds" 1282
When is a person dealing in securities said to "cover"? 1282
Account for the name "curb exchange" . . 1283
Distinguish between a quitclaim deed and a warranty deed 1283
Point out several meanings of the term discount 1283
Define dividend; dollar exchange; domestic exchange 1283
In what ways does double taxation come about? 1283–1284
How is the term draft now applied in the United States? 1284
Point out the particular effect of an anomalous endorsement; of a restrictive endorsement; of a special endorsement 1284
Discuss the liability of an endorser 1284
Define the following: exchange; excise; face value 1284
How do Federal Reserve Bank notes differ from Federal Reserve notes? 1285
What is a fiscal year? How is the term "fixed charges" applied? 1285
Explain the effect of a foreclosure 1285
Discuss the use of the expression "gold bond." 1285
Name the lowest denomination in which gold certificates are issued 1285
Explain the application of the term "gold reserve" 1286
Indicate the rank of good will among business assets 1286
How many parties must there be to a transaction in order to permit a true guarantee? . 1286
Explain the term hedging; the phrase "high finance" 1286
What is a holding company? 1286
Define the term income; income tax. Explain how there may lawfully be double income taxation 1286
Indicate the origin of the term indenture . . 1286

For what purpose are interim certificates issued? 1287
Describe the function of an investment banker. 1287
Enumerate three possible effects of a court judgment 1287
Describe the process called "kiting" 1287
Discuss legal investment 1287
By what authorities in the United States is a legal rate of interest fixed? 1287
Indicate the legal tender qualities of various forms of United States currency 1287
What is a letter of credit? Name the two classes of such instruments. Explain how letters of credit are drawn and used . . . 1288
What is a lien? 1288
Discuss limited partnership. What is liquidation? 1288
Define manifest. What must a manifest show? 1288
Explain the financial use of the term margin; of matched order 1288
Point out the important characteristics of a mechanic's lien 1288–1289
By what authorities are money orders issued? Point out the advantages of these orders. . 1289
Discuss the nature of a mortgage and some important legal provisions in respect to mortgages 1289
Explain the source and the present status of national bank notes 1289
When is a check or other similar instrument negotiable? 1289
When does a bank use the phrase "no funds"? 1289
What is a note? an option? 1289
Explain the legal application of the principle implied in the popular term "outlawed" . 1289
What does the word overdrawn, used in reference to a bank account, really mean? . . . 1289
What is the meaning of the phrase "payable to bearer"? 1290
To what things does the term "personal property" apply? 1290
Explain the operation of a pool in stock transactions 1290
What is a power of attorney? 1290
Point out the essential quality of preferred stock. Discuss some special features and provisions in respect to this type of stock . 1290
Explain the term premium 1290
What is a promissory note? 1290
What is the business of a promoter? 1291
Explain the procedure referred to as protest . 1291
Define proxy; put 1291
Outline the process known as pyramiding . . 1291
Discuss rate of exchange 1291
What constitutes real property? 1291
Discuss the practice of rebate and the legislation directed against it 1291
For what purposes is a receiver appointed? . 1291
Explain the term "registered bonds" 1291
For what purposes does a corporation maintain a reserve? 1291
What is a scalper? Define scrip 1292
Indicate the claims involved in a second mortgage against property 1292
Define the following: seigniorage; sellers' option; selling short 1292
Explain the term shave; the phrase "shoe string" 1292
Point out the status of silver certificates in the United States currency system 1292
What is a sinking fund? 1292
Define sterling; sterling exchange 1293
What is represented by the capital stock of a corporation? 1293
Explain the stock dividend 1293
What is the purpose of a stop-loss order? . . 1293
Indicate the effect of an order to stop payment on a check 1293
Define subpœna 1293
Point out some effects of the registry of a trade-mark 1293
State the functions of trust companies. . 1293–1294
What is the function of a trustee under a will? under a corporate mortgage? 1294
What is underwriting? Explain the origin of the term and the present use of it 1294
Define unearned increment 1294
Under what act were United States notes first issued? When were they first redeemable in gold? 1294
Define upset price; voucher; wash sales; watered stock 1294

AGRICULTURE

Discuss the beginnings of prehistoric agriculture 1295
By whom was agriculture developed in medieval Europe? 1295
To what are the two greatest improvements in modern agriculture said to be due? 1295
Enumerate the cultivated products raised by Indians in America before the European settlement 1296
Compare colonial agriculture in the South with that of the North 1296
Trace the early development of cotton raising in America 1296
What condition forced Americans to the scientific study of agriculture? 1300
At what dates were cattle and hogs brought to Florida? to Canada and Virginia? 1300
Outline the crop regions of the United States. 1300
Indicate the present importance of farming as a business 1300
Trace the development of the Federal department of agriculture. Summarize its activities 1300–1301
What sciences are now included under the term horticulture? 1303
What fruit in North America leads in quantity and value of production? Name the three flowers that lead in commercial production. 1303
What state ranks first in production of asparagus? of cabbages? of celery? of sweet corn? of watermelons? 1303–1304
Name the three leading field crops of Canada on the *basis of value*. Which province leads in *yield* of wheat produced? of oats? of potatoes? of barley? of hay and clover? In what province is flaxseed an important crop? . . 1304
Discuss the history and the value of land drainage 1304–1305
In what state is the greatest amount of capital invested in drainage enterprises? 1305
In what country of the world is irrigation most extensively practiced? 1305
What is the total number of irrigated farms in the United States? the total area? 1306
What is the most important crop raised on the Western irrigated lands? Point out proof of the economic value of these projects . . . 1307
Define forestry. Enumerate several valuable characteristics of forests. 1307
Summarize the history of Federal Government control of forests in the United States. 1307
What states have more than 100,000 acres each of state forests? Give the total area of state forests; of national forests . . . 1307–1309
State the total area of Dominion forest reserves in Canada. In what provinces are these reserves located? 1309

ANIMAL INDUSTRY, MINING

Name, in order, the chief swine producing countries of the world; the leading sheep producing countries. 1315
What countries lead in the raising of horses? Where is the world's greatest horse and mule market located? Name four other draft animals 1315
Name the chief beef exporting countries. Name two leading breeds of beef cattle; of dairy cattle 1315

Indicate by figures the commercial importance of the poultry raising industry 1315
State the average annual per capita consumption of meat in the United States 1318
What is meant by the pasteurizing of milk? 1318
Distinguish between a vaccine and an antitoxin. Under what conditions are these substances prepared in the United States? Describe the preparation of one kind of each . 1318
Indicate the use and value of insulin 1318
State the total value of products of animal industry in Canada in a recent year. Which province ranks first in this industry? . . . 1318
Discuss the relative importance of mining among American industries 1320
Classify mining products 1320
Describe two methods of placer mining. What is open-pit mining? How is prospecting now carried on? 1320
Describe some technical processes used in separating gold from quartz 1321
Point out the great importance of Canadian mines 1321
What is the value of the annual mineral production in the United States? State approximately the number of people engaged in the mining industry. 1321
Indicate the fundamental importance of oil and coal in modern civilization. 1321

INVENTIONS

Explain the action of the air brake 1323
Define airplane. How are airplanes usually classified? 1323–1324
To what flying machines is the term airship applied? When was the first successful dirigible built? Indicate the extent to which rigid dirigibles have been used commercially. What is a "Blimp"? 1324
Outline the chief features of construction and operation in present-day automobiles . . . 1324
Who, probably, should be called the inventor of the gasoline automobile? Who made the first commercially manufactured car? What make of automobile was the first to be sold in the United States? 1324–1325
Explain the action of the magnetic compass. 1325
Describe the use of the Sperry compass . . . 1325
Explain the meaning of the phrase "boxing the compass" 1325
Distinguish between the linotype and the monotype machine 1325, 1326
What is the meaning of the term dynamo-electric machine? 1326
To what uses is the electron tube applied? . . 1326
Describe two characteristics of a rotating gyro-top wheel 1326–1327
Outline the action of a four-cycle internal combustion engine. What are the special features of the Diesel engine? 1327
Distinguish between the simple microscope and the compound microscope 1327–1328
Explain the means by which the effect of continuous vision and motion is produced in moving pictures 1328
Give figures which indicate the extent and importance of the moving picture industry. Where was the first moving picture studio located? 1328
Summarize the services of several men to the development of modern photography. What means are used to produce photographs in natural colors? 1329
What scientists, by their discoveries, laid the foundation for modern systems of radiotelegraphy? 1329
In what year was the first transatlantic wireless message sent? 1330
How does the process of radiotelephony differ from that of radiotelegraphy? Describe the parts and construction of a receiving set for the radiotelephone 1330
How is the rotor ship propelled? 1330
Describe the operation of the chain stitch sewing machine; of the lock stitch machine. Discuss the invention of the sewing machine and various improvements upon it . . 1330–1331
Explain the principle of the talking machine. Describe the several forms of the machine. How are commercial records produced? 1331–1332
Explain the operation of the telegraph. Point out several improvements that have enlarged its usefulness. Discuss the question as to who invented the telegraph 1332
Who invented the telephone? 1333
Describe the means by which pictures may be transmitted over telephone lines 1333
Who invented the modern typewriter? 1333

ENGINEERING AND BUILDING

Enumerate the chief branches of engineering . 1337
Outline the work of the mechanical engineer . 1337
Indicate the importance of electrochemical engineering 1337
Illustrate the magnitude of the work done by United States military engineers 1339
Name and give the dimensions of several famous European aqueducts. Describe the Catskill aqueduct; the Los Angeles aqueduct 1339
Summarize the history of bridge building. Describe the following types of bridges: truss; suspension; arch; cantilever. What is a bascule? 1339–1340
Explain the use and action of canal locks. 1340–1341
Discuss the various types and uses of dams. Name the highest dam in North America; in Europe 1341–1342
Give the names of three of the first locomotives used commercially in America. Enumerate three of the chief improvements in locomotive building 1342
What is the greatest speed attained by a locomotive? State the average life of a locomotive 1342
Describe the usual methods of securing adequate foundations for skyscrapers . . 1342–1343
Explain how each floor of a skyscraper is made to carry its own wall 1343
For what purpose were the oldest known tunnels used? What special method of rock excavation did the Romans understand? . . 1343
State some of the difficulties under which Simplon tunnel was constructed. Describe methods of tunneling in soft ground. Where is the largest tunnel in the world? 1344

MANUFACTURING

Discuss the literal and the actual meaning of the term manufacturing 1345
What was the outstanding feature of the Industrial Revolution? Describe the organization of the cloth industry in England before 1780 1345
Indicate the nature of four inventions in the textile industry in the latter part of the 18th century 1346
Enumerate the industrial advantages enjoyed by England in the 19th century 1346
Outline the geographic distribution of Germany's industrial plants. 1347
What is the most important branch of French manufacturing? Name its chief centers . . 1347
Enumerate the chief manufactured products of Switzerland; of Scandinavia; of Czechoslovakia 1347
Narrate the story of the expansion of industry in colonial New England. Where and by whom was the first blast furnace set up in the colonies? 1350
Describe the beginnings of the textile industry in America. Point out the early influence of railroads on American manufacturing . . . 1350

Enumerate 10 important groups of American manufacturing industries. Name the cities each of which produces more than one per cent of American manufactures 1351
Where are the chief centers of the American cotton industry? of the shoemaking industry? of the flour industry? 1351
Indicate by statistics the growth of cotton manufacturing in the South 1351–1352
What are the chief principles of management involved in mass production? Tell two industries which exemplify it. 1352
Name the chief lumber producing states and the principal wood cut in each 1356

HOW THINGS ARE MADE

By what means is the light of an arc lamp produced? What is a flaming arc? 1357
Explain the action of baking powder in dough. 1357
What is bell metal? By what is the characteristic tone of a bell determined? 1357
Name three of the first books printed from movable types. Describe the preparation of electrotypes. What are signatures in bookmaking? 1358
Describe various methods of coloring and gilding book edges 1358–1359
To what operation in bookmaking is the term casing-in applied? 1359
Point out four steps in the manufacture of a bottle 1359
To what products is the name bread applied? Why is the dough kneaded? Outline the changes which take place in the loaf during the process of baking 1359
Describe early methods of making bricks. Outline the modern process 1359–1360
Enumerate the processes involved in making butter. Describe the effect of the processes of souring and ripening; the effect of churning. What is renovated butter? 1360
Describe the making of pearl buttons 1360
Summarize the early history of submarine cables. Describe the structure of a submarine cable. How are cable messages sent and received? 1360–1361
Describe the production of celluloid 1361
Why was portland cement so named? How is it prepared? Why does cement set? 1361
From what source is chocolate obtained? 1361–1362
Enumerate the by-products secured in modern production of coke 1362
Point out some of the advantages of concrete as a structural material 1362
Outline the process of obtaining cork. Enumerate several uses of the material 1362
Point out the characteristic that makes cotton so satisfactory for spinning 1363
How is mercerized cotton produced? absorbent cotton? 1363
Describe the production and uses of various grades of cottonseed oil. Enumerate several valuable cottonseed products 1363–1364
Name some natural products formerly used as dyes. Explain the term "coal-tar dyes". . 1364
Discuss simple fire extinguishers 1364
What is a fireless cooker? 1364
Distinguish between Graham flour and whole wheat flour 1364–1365
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GOVERNMENT AND POLITICS

INTRODUCTORY

It may be useful to distinguish between the art of politics and the science of politics. The art, ideally, is the practice of government so that it accords with justice, so that the dignity and the effectiveness of institutions are maintained and good and able men are kept in control of public affairs. The science of politics analyzes and elaborates the theory of the state and examines the various types of public administration, past, present, and proposed. The two things flow into each other. The fields of "morals and legislation" tend to become closely united. It has been a common conception, from the time of Hobbes to the period of the World War, that the state itself creates morals or standards of conduct; that what the state decides and commends is ethically right. But there is a different view; namely, that there is a Moral Order higher than any human laws, higher than the state itself, by which all acts of authority are to be judged. This, in the final analysis, was the ethical issue in the World War.

Need for Government. There is a widespread disposition, by no means of recent origin, to question the usefulness of the state. To the anarchist, laws are a stumbling block and a stone of offense, and, to radical reformers generally, governments are institutions for the exploitation of the many by the few. But a scientific canvass of society in its various stages, from savagery to civilization, reveals the certain fact that, however much governments have been and still are associated with acts of oppression, there is no escape from human ills in anarchy. Mankind, without a common authority, is predatory. Society released, as occasionally happens, from the respect and dread of government, promptly exhibits the most violent and terrible tendencies. Imperfect as governments are, discriminating in their bestowal of advantages as they too frequently are, nevertheless they are the safeguard and security for the advantages of life. The sentimental philosophers of the 18th century imagined a natural state enjoyed by savage peoples, in which the blessings of simplicity and freedom were attained. Modern study of primitive society reveals no such happy "state of nature," but everywhere a cramped and cruel savage existence in which life is never free from danger and the human mind seldom released from terror.

History of Political Philosophy. The science or philosophy of politics is one of the richest fields of human inquiry. It possesses a great and classical literature. Its scope and its form of reasoning were first clearly developed by the Greek philosopher, Aristotle, whose *Politics* lies at the base of subsequent discussion. Aristotle's studies were limited to the Greek "city-state," which, to his mind, represented the highest attainment of human freedom and law. His method was concrete and inductive. He collected hundreds of city-state constitutions, compared their provisions, and deduced general principles. The state, to Aristotle, was not a Utopia such as that imagined by Plato, but it was an actual institution realized in hundreds of examples throughout the Ægean and Mediterranean seas. No writer has stated better, or in fewer words, the purpose of civilized society. "The state," says Aristotle, "comes into existence, that man may live. It continues, that man may live well." "Good life," in all its rich and noble expressions, is the aim and object of the state.

Centuries after Aristotle, another political philosopher, the Italian statesman Machiavelli, examined the city-states of his own day, with results that offer startling contrasts. Machiavelli's political studies are embraced in two works. The first, called *The Prince*, is a discussion of the sinister principles whereby the Italian despot of that day maintained himself in power. The other, *The Discourses*, which is a far nobler and more suggestive work, examines the principles whereby a republic may endure.

A century later comes the period where national governments rise above feudal conditions. The king attains an absolute power and destroys the independence of the nobles. This monarchical movement met with opposition. In England it was overthrown by revolution. Out of the struggles of the period came several notable works—*The Republic*, of Bodin, in which is first essayed a definition of the difficult conception of "sovereignty"; *The Leviathan*, of Thomas Hobbes, who attempted to justify monarchical absolutism by the theory of a "social contract" between subjects and king; *The Patriarcha*, of Sir Robert Filmer, an attempt to found monarchy upon patriarchal authority conferred by God upon Adam.

A little later, in the 18th century, John Locke, in *Two Treatises on Civil Government*, turns the doctrine of the social contract against the monarchists, laying the basis for the "right of revolution" in the abusive exercise of a power which monarchs have contracted to use with justice and discretion. "Men are," said Locke, "by nature all free, equal, and independent." Only by free consent does man enter into the obligations of society, resigning his natural rights to a public authority in return for benefits which, if not satisfactorily conferred, he is at liberty to end. Misrule by a monarch, in Locke's view, not only justifies rebellion but makes it inevitable. Locke powerfully affected the minds of the English colonists in America, and some of his actual language appears in the Declaration of Independence. The revolutionary ideas of Locke were put into a winged form by Rousseau, whose *Social Contract* contributed incalculably to the French Revolution and has remained to the present day an inspiration to political revolt.

Modern Revolutionary Movements. The world is now so closely united that political and social movements pass from the country of their origin over the entire earth. The revolutionary movement began in America with the revolt of the English colonies; it passed thence to France and from that country to other parts of Europe. From that continent it was carried back to the New World where it resulted in the independence of Spanish America and in the rise of numerous republics through the break-up of the empire of Spain. This revolutionary movement still goes on. It has affected Asia and promises to invade Africa. The present century, particularly, is remarkable for political changes in all continents.

Politics and the World War. The World War brought to the surface much that had been germinating in secret. The empires of Central Europe and Russia disappeared. Through the disintegration of monarchical states, the number of nations

increased. In July 1914, the number of European governments was 22; in 1928, it appeared to be 33. But monarchical governments have greatly diminished, and the world is now predominantly republican. See *Monarchy* and *Republic*.

Among other effects produced in these European states by the World War was a widening of democracy. Political rights were greatly expanded, notably by their extension to women. To end inequalities of representation, electoral laws were revised in many countries, and systems of "proportional representation" were introduced. Following the war came a period of new constitution making, keeping pace with the establishment of new states and with the delimitation of new frontiers on the primary basis of nationality.

Within the vast British Empire, a comparable liberalization took place. The national status of the dominions was fully recognized, and Ireland was added to the number of self-governing commonwealths. Self-government was initiated in India; protected independence was extended to Egypt.

The unusual demands laid upon the laboring classes by the World War produced an increased concern for social welfare, which is reflected in the recent constitutions and laws of many states.

The New World felt the influences of the war far less than Europe. No new state arose and no government was altered by revolution. The number (21) of American states remained the same, all republican in character. War conditions in part, however, produced American intervention in Haiti and increased international concern over the progress of the revolutionary movement in Mexico.

Latin America. The influence of the Constitution of the United States upon the plan of governments formed throughout Latin America has been large. In greater or less degree, American ideas of republican government,—federalism, bicameral legislatures, the legal "separation of powers" between legislative, executive, and judicial departments, the commitment of executive office to a president popularly elected for a fixed term, and the constitutional guarantees of civil and political rights,—found their way into the constitutions of republics to the south.

Unfortunately, at the time of attaining their independence, these peoples lacked experience with representative legislatures. Spain, during the entire period of her empire, never established or permitted a representative legislature in any of her American kingdoms. On the other hand, the tradition of strong executive authority and of centralized initiative and direction exercised undue influence. Within these states, local government proceeds on conceptions entirely different from the local autonomy or home rule found in American county or local administration. Everywhere the Spanish conceptions of central administrative control prevail.

These forces combined with civil struggle to give rise to the Latin American "dictators," *caudillos*, who dominated many of these republics during the 19th century. The large illiterate native element in the population of many of these states, together with the practice of intimidation at the polls, made difficult the realization of the democratic franchise demanded by the political ideals which Latin America received with her independence.

Recent decades have witnessed progress in the realization of constitutional government. While the office of president is retained, the principle of "no re-election" has appeared in Spanish American public law, and in other ways the extreme power of the executive is reduced.

Asiatic Revolutions. In Asia, the constitutional movement preceded the war. Revolution triumphed in Turkey in 1908, in Persia in 1909, in China in 1911, and resulted either in the overthrow of absolute monarchy or in its limitation by constitutional enactment and by the introduction of representative institutions. New Asian states also have arisen through the dismemberment of Turkey and through aspirations of independence heightened by the course of recent events in Europe.

Social Ideals in Politics. Side by side with the liberalizing of political institutions has progressed a vast social movement designed to increase the well-being of the masses of people and to secure a more general distribution of the proceeds of industry.

The free play of individual initiative is no longer permitted in modern governments. It is limited by a vast mass of "social legislation," by organizations of workmen, and by various forms of co-operation. A new social theory has permeated politics. In its more extreme form, it looks toward the complete restraint of competition and toward the distribution of goods upon an equal basis to all members of the community. These tendencies find expression in the theory called "socialism."

Political Problems. The present age, while productive of innumerable political writings, is less occupied with theories of the state and with definition than it is with the choice and the operation of political institutions. The problem is to democratize government and at the same time to keep it vigorous and stable. Growing attention is paid to the problems of the relations between states, to expedients for solving international difficulties, preventing war, and organizing international co-operation.

A closely related problem of infinite magnitude is the government of peoples who are politically backward. In the course of recent years, the entire habitable world has been explored and vast areas heretofore politically unorganized have been brought under the jurisdiction of European powers. Perhaps it is not too much to say that the greatest political task of the immediate future includes the creation of satisfactory relations between the races, the instruction and progress of backward peoples in the practice of government, and the commitment to their hands of the shaping of their political destiny.

Politics and History. In thought, politics is often associated with history. But while history is, largely, the record of political activities, the two subjects differ widely in scope and in method. History surveys the past. The historian has the advantage of adequate accumulations of materials. He studies episodes and movements that are completed. He may separate himself from the partisanship and emotions of the time he describes. The student of politics does not have these advantages. He is dealing, primarily, not with the past, but with the present and with the future. His mind must be incessantly occupied with the morrow. Political sense comprises not only good judgment of actual events, but prescience for the future. Politics is not static, but dynamic; political forces are constantly altering, finding new directions, and attaining new balances. Institutions tend to constant change. The activity of the lawmaker is incessant. The materials for the study of politics thus constantly become obsolete and remain incomplete and unsatisfactory. Practical considerations of the highest importance, none the less, demand constant fresh examination of governments and policies and require the training of special faculties of the mind.

The Department of Politics of this work is divided into three parts. The first deals with the government of the United States, Federal, state, and local. The fundamental institutions which the American republic has developed and found serviceable are briefly described. Some attempt has been made to indicate the direction which progress is taking. In the second part are described the governments of foreign states as they exist today, while the third part is composed of a dictionary of political terms and institutions. In many cases the topic upon which the reader may desire information will be found embraced under a more comprehensive heading. For this reason, consultation of the index to the entire volume is indispensable.

THE UNITED STATES OF AMERICA

THE United States arose through the union of thirteen of the colonies of Great Britain in North America into a new nation under a federal form of government. This union was brought about by successive stages of development, after experiences with several forms of concerted action, and by a common protest and resistance to acts of the British king and Parliament.

Intercolonial Assemblies. This common resistance found expression in several intercolonial assemblies, first in the Stamp Act Congress (1765), which met at New York, was attended by delegates of nine colonies, and adopted a declaration of "rights and grievances," a petition to the king and a memorial and a petition to the House of Lords; second, by the First Continental Congress (1774), called by Massachusetts and Virginia and attended by delegates from all the colonies except Georgia. This Congress, besides preparing memorials and a petition, passed resolutions called the "Association" binding the colonies in a far-reaching boycott of British trade.

Independence of Colonies. The Second Continental Congress assembled after warfare had actually begun. It recruited a Continental army to resist the British forces, and appointed George Washington commander in chief. On July 4, 1776, it declared the independence of the colonies from Great Britain, and, in the absence of any more effectual organization, united the efforts of the colonies for the prosecution of the war until the adoption of the Articles of Confederation in 1781. See *American History*.

DECLARATION OF INDEPENDENCE

THE UNANIMOUS DECLARATION OF THE THIRTEEN UNITED STATES OF AMERICA, IN CONGRESS, JULY 4, 1776.

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the powers of the earth, the separate and equal station to which the laws of nature and of nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident—that all men are created equal; that they are endowed by their Creator with certain inalienable rights; that among these are life, liberty, and the pursuit of happiness. That, to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that, whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it, and to institute a new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and, accordingly, all experience hath shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security. Such has been the patient sufferance of these colonies; and such is now the necessity which constrains them to alter their former systems of government. The history of the present king of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute tyranny over these states. To prove this, let facts be submitted to a candid world.

He has refused his assent to laws the most wholesome and necessary for the public good.

He has forbidden his governors to pass laws of immediate and pressing importance, unless suspended in their operations till his assent should be obtained; and, when so suspended, he has utterly neglected to attend them.

He has refused to pass other laws for the accommodation of large districts of people, unless these people would relinquish the right of representation in the legislature—a right inestimable to them, and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable and distant from the repository of their public records, for the sole purpose of fatiguing them into compliance with his measures.

He has dissolved representative houses repeatedly, for opposing with manly firmness, his invasions on the rights of the people.

He has refused, for a long time after such dissolutions, to cause others to be elected; whereby the legislative powers, incapable of annihilation, have returned to the people at large for their exercise; the state remaining in the meantime, exposed to all the dangers of invasion from without and convulsions within.

He has endeavored to prevent the population of these states; for that purpose obstructing the laws for the naturalization of foreigners; refusing to pass others to encourage their migration hither, and raising the conditions of new appropriations of lands.

He has obstructed the administration of justice, by refusing his assent to laws for establishing judiciary powers.

He has made judges dependent on his will alone for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of new offices, and sent hither swarms of officers, to harass our people and eat out their substance.

He has kept among us, in times of peace, standing armies, without the consent of our legislatures.

He has affected to render the military independent of, and superior to, the civil power.

He has combined with others to subject us to a jurisdiction foreign to our constitutions and unacknowledged by our laws; giving his assent to their acts of pretended legislation:

For quartering large bodies of armed troops among us;

For protecting them, by a mock trial, from punishment for any murders which they should commit on the inhabitants of these states;

For cutting off our trade with all parts of the world;

For imposing taxes on us without our consent;

For depriving us, in many cases, of the benefits of trial by jury;

For transporting us beyond seas, to be tried for pretended offenses;

For abolishing the free system of English laws in a neighboring province, establishing therein an arbitrary government, and enlarging its boundaries, so as to render it at once an example and fit instrument for introducing the same absolute rule into these colonies;

For taking away our charters, abolishing our most valuable laws, and altering, fundamentally, the forms of our governments;

For suspending our own legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated government here, by declaring us out of his protection, and waging war against us.

He has plundered our seas, ravaged our coasts, burned our towns, and destroyed the lives of our people.

He is at this time transporting large armies of foreign mercenaries, to complete the works of death, desolation, and tyranny, already begun with circumstances of cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the head of a civilized nation.

He has constrained our fellow citizens, taken captive on the high seas, to bear arms against their country, to become the executioners of their friends and brethren, or to fall themselves by their hands.

He has excited domestic insurrection among us, and has endeavored to bring on the inhabitants of our frontiers the merciless Indian savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes, and conditions.

In every stage of these oppressions we have petitioned for redress in the most humble terms: our repeated petitions have been answered only by repeated injury. A prince whose character is thus marked by every act which may define a tyrant is unfit to be the ruler of a free people.

Nor have we been wanting in our attentions to our British brethren. We have warned them, from time to time, of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity and we have conjured them by the ties of our common kindred, to disavow these usurpations, which would inevitably interrupt our connections and correspondence. They, too, have been deaf to the voice of justice and of consanguinity. We must, therefore, acquiesce in the necessity which denounces our separation, and hold them as we hold the rest of mankind—enemies in war—in peace, friends.

We, therefore, the representatives of the United States of America, in general Congress assembled, appealing to

the Supreme Judge of the world for the rectitude of our intentions, do, in the name, and by the authority of the good people of these colonies, solemnly publish and declare that these united colonies are, and of right ought to be, free and independent states; that they are absolved from all allegiance to the British crown, and that all political connection between them and the State of Great Britain is, and ought to be, totally dissolved; and that, as free and independent states, they have full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent states may of right do. And for the support of this declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other our lives, our fortunes and our sacred honor.

The foregoing declaration was, by order of Congress, engrossed, and signed by the following members:

JOHN HANCOCK.

New Hampshire

JOSIAH BARTLETT, WM. WHIPPLE, MATTHEW THORNTON.

Massachusetts Bay

SAML. ADAMS, JOHN ADAMS, ROBT. TREAT PAINE, ELBRIDGE GERRY.

Rhode Island, etc.

STEP. HOPKINS, WILLIAM ELLERY.

Connecticut

ROGER SHERMAN, SAM'EL HUNTINGTON, WM. WILLIAMS, OLIVER WOLCOTT.

New York

WM. FLOYD, PHIL. LIVINGSTON, FRANS. LEWIS, LEWIS MORRIS.

New Jersey

RICHD. STOCKTON, JNO. WITHERSPOON, FRAS. HOPKINSON, JOHN HART, ABRA. CLARK.

Pennsylvania

ROBT. MORRIS, BENJAMIN RUSH, BENJA. FRANKLIN, JOHN MORTON, GEO. CLYMER, JAS. SMITH, GEO. TAYLOR, JAMES WILSON, GEO. ROSS.

Delaware

CÆSAR RODNEY, GEO. READ, THO. M'KEAN.

Maryland

SAMUEL CHASE, WM. PACA, THOS. STONE, CHARLES CARROLL OF CARROLLTON.

Virginia

GEORGE WYTHE, RICHARD HENRY LEE, TH. JEFFERSON, BENJA. HARRISON, THOS. NELSON, JR., FRANCIS LIGHTFOOT LEE, CARTER BRAXTON.

North Carolina

WM. HOOPER, JOSEPH HEWES, JOHN PENN.

South Carolina

EDWARD RUTLEDGE, THOS. HEYWARD, JR., THOMAS LYNCH, JR., ARTHUR MIDDLETON.

Georgia

BUTTON GWINNETT, LYMAN HALL, GEO. WALTON.

The Continental Congress. The defects of the Continental Congress as an agency for united effort were serious and were early apprehended. It rested on no constitution and commanded no support except as a revolutionary body. Its members represented the colonies from which they came, and voted under instructions, each state having one vote. The states regarded themselves as independent and able to disregard Congress when it appeared to their interest to do so.

The same session that produced the Declaration of Independence provided also a committee to draw up a plan for a better union. A committee was appointed which produced the Articles of Confederation, the first constitution of a united America. Nearly five years passed, however, before, on March 1, 1781, these articles became effective. The Congress did not adopt the committee's report until November 15, 1777. Eleven states ratified within a year following, but Delaware withheld ratification until 1779, and Maryland until 1781.

Articles of Confederation. As the precursor of the Constitution of the United States, the Articles of Confederation is a political document of first interest. As its name indicates, it provided for a "confederation," not for a "federal" government. It left the independence and the "sovereignty" of the thirteen states unimpaired (Article II). The states delegated certain powers to the national government; but, in spite of the use of the word "perpetual" in the document, they undoubtedly regarded themselves as possessing the right to withdraw if they desired.

The government created dealt only with the states. It could not act upon the individual. As in the Continental Congress, each state possessed one vote, and could send a number of "delegates," not less than two nor more than seven. These delegates the state chose and compensated in any desired manner (Article V). Action under the really important powers granted to the Congress required the assent of nine states to be effective (Article IX, 6th paragraph). The government created consisted only of the Congress, a single chamber body. A "president" was authorized (Article IX, 5th paragraph) to serve not "more than one year in any term of three," but he was simply a presiding officer. Executive functions were intrusted to "committees" of which a great number were eventually created. During recess a "Committee of the States," with one representative from each state, was authorized. To it was delegated a limited control.

The Congress had no independent power to enforce its measures. It was dependent upon the states for all resources and for troops; it had no courts nor officers to enforce its laws. Nevertheless, the government here created was an advance toward actual national union, and it furnished an experience essential to the final production of the constitution. The document in its entirety follows:

ARTICLES OF CONFEDERATION OF THE UNITED STATES OF AMERICA.

TO ALL TO WHOM THESE PRESENTS SHALL COME, WE THE UNDERSIGNED DELEGATES OF THE STATES AFFIXED TO OUR NAMES, SEND GREETING.

Whereas the delegates of the United States of America in Congress assembled did on the 15th day of November in the year of our Lord 1777, and in the second year of the independence of America agree to certain Articles of Confederation and perpetual union between the States of New Hampshire, Massachusetts Bay, Rhode Island and Providence Plantations, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina and Georgia, in the words following, viz.

ARTICLES OF CONFEDERATION AND PERPETUAL UNION BETWEEN THE STATES OF NEW HAMPSHIRE, MASSACHUSETTS BAY, RHODE ISLAND AND PROVIDENCE PLANTATIONS, CONNECTICUT, NEW YORK, NEW JERSEY, PENNSYLVANIA, DELAWARE, MARYLAND, VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA, AND GEORGIA.

ARTICLE I. The style of this confederacy shall be "The United States of America."

ARTICLE II. Each state retains its sovereignty, freedom and independence, and every power, jurisdiction and right, which is not by this confederation expressly delegated to the united states, in Congress assembled.

ARTICLE III. The said states hereby severally enter into a firm league of friendship with each other, for their common defense, the security of their liberties, and their mutual and general welfare, binding themselves to assist each other, against all force offered to, or attacks made upon them, or any of them, on account of religion, sovereignty, trade, or any other pretense whatever.

ARTICLE IV. The better to secure and perpetuate mutual friendship and intercourse among the people of the different states in this union, the free inhabitants of each of these states, paupers, vagabonds, and fugitives from justice excepted, shall be entitled to all privileges and immunities of free citizens in the several states; and the people of each state shall have free ingress and regress to and from any other state, and shall enjoy therein all the privileges of trade and commerce, subject to the same duties, impositions and restrictions as the inhabitants thereof respectively, provided that such restriction shall not extend so far as to prevent the removal of property imported into

any state, to any other state of which the owner is an inhabitant; provided also that no imposition, duties or restriction shall be laid by any state, on the property of the United States, or either of them.

If any person guilty of, or charged with treason, felony, or other high misdemeanor in any state, shall flee from justice, and be found in any of the united states, he shall upon demand of the Governor or executive power, of the state from which he fled, be delivered up and removed to the state having jurisdiction of his offense.

Full faith and credit shall be given in each of these states to the records, acts and judicial proceedings of the courts and magistrates of every other state.

ARTICLE V. For the more convenient management of the general interest of the united states, delegates shall be annually appointed in such manner as the legislature of each state shall direct, to meet in Congress on the first Monday in November, in every year, with a power reserved to each state, to recall its delegates, or any of them, at any time within the year, and to send others in their stead, for the remainder of the year.

No state shall be represented in Congress by less than two, nor by more than seven members; and no person shall be capable of being a delegate for more than three years in any term of six years; nor shall any person, being a delegate, be capable of holding any office under the united states, for which he, or another for his benefit receives any salary, fees or emolument of any kind.

Each state shall maintain its own delegates in any meeting of the states, and while they act as members of the committee of the states.

In determining questions in the united states, in Congress assembled, each state shall have one vote.

Freedom of speech and debate in Congress shall not be impeached or questioned in any court, or place out of Congress, and the members of Congress shall be protected in their persons from arrests and imprisonments, during the time of their going to and from, and attendance on Congress, except for treason, felony, or breach of the peace.

ARTICLE VI. No state without the consent of the united states in Congress assembled, shall send any embassy to, or receive any embassy from, or enter into any conference, agreement, alliance or treaty with any king, prince or state; nor shall any person holding any office of profit or trust under the united states, or any of them, accept of any present, emolument, office or title of any kind whatever from any king, prince or foreign state; nor shall the united states in Congress assembled, or any of them, grant any title of nobility.

No two or more states shall enter into any treaty, confederation or alliance whatever between them, without the consent of the united states in Congress assembled, specifying accurately the purposes for which the same is to be entered into, and how long it shall continue.

No state shall lay any imposts or duties, which may interfere with any stipulation in treaties, entered into by the united states in Congress assembled, with any king, prince or state, in pursuance of any treaties already proposed by Congress, to the courts of France and Spain.

No vessels of war shall be kept up in time of peace by any state, except such number only, as shall be deemed necessary by the united states in Congress assembled, for the defense of such state, or its trade; nor shall any body of forces be kept up by any state, in time of peace, except such number only, as in the judgment of the united states, in Congress assembled, shall be deemed requisite to garrison the forts necessary for the defense of such state; but every state shall always keep up a well regulated and disciplined militia, sufficiently armed and accoutred, and shall provide and have constantly ready for use, in public stores, a due number of field pieces and tents, and a proper quantity of arms, ammunition and camp equipage.

No state shall engage in any war without the consent of the united states in Congress assembled, unless such state be actually invaded by enemies, or shall have received certain advice of a resolution being formed by some nation of Indians to invade such state, and the danger is so imminent as not to admit of a delay, till the united states in Congress assembled can be consulted: nor shall any state grant commissions to any ships or vessels of war, nor letters of marque or reprisal, except it be after a declaration of war by the united states in Congress assembled, and then only against the kingdom or state and the subjects thereof, against which war has been so declared, and under such regulations as shall be established by the united states in Congress assembled, unless such state be infested by pirates, in which case vessels of war may be fitted out for that occasion, and kept so long as the danger shall continue, or until the united states in Congress assembled shall determine otherwise.

ARTICLE VII. When land forces are raised by any state for the common defense, all officers of or under the rank of colonel, shall be appointed by the legislature of each state respectively by whom such forces shall be raised, or in such manner as such state shall direct, and all vacancies shall be filled up by the state which first made the appointment.

ARTICLE VIII. All charges of war, and all other expenses that shall be incurred for the common defense or general welfare, and allowed by the united states in Congress assembled, shall be defrayed out of a common treasury, which shall be supplied by the several states, in proportion to the value of all land within each state, granted to or surveyed for any person, as such land and the buildings and improvements thereon shall be estimated according to such mode as the united states in Congress assembled, shall from time to time, direct and appoint.

The taxes for paying that proportion shall be laid and levied by the authority and direction of the legislatures of the several states within the time agreed upon by the united states in Congress assembled.

ARTICLE IX. The united states in Congress assembled, shall have the sole and exclusive right and power of determining on peace and war, except in the cases mentioned in the sixth article—of sending and receiving ambassadors—entering into treaties and alliances, provided that no treaty of commerce shall be made whereby the legislative power of the respective states shall be restrained from imposing such imposts and duties on foreigners, as their own people are subjected to, or from prohibiting the exportation or importation of any species of goods or commodities whatsoever—of establishing rules for deciding in all cases, what captures on land or water shall be legal, and in what manner prizes taken by land or naval forces in the service of the united states shall be divided or appropriated—of granting letters of marque and reprisal in times of peace—appointing courts for the trial of piracies and felonies committed on the high seas and establishing courts for receiving and determining finally appeals in all cases of captures, provided that no member of Congress shall be appointed a judge of any of the said courts.

The united states in Congress assembled shall also be the last resort on appeal in all disputes and differences now subsisting or that hereafter may arise between two or more states concerning boundary, jurisdiction or any other cause whatever; which authority shall always be exercised in the manner following. Whenever the legislative or executive authority or lawful agent of any state in controversy with another shall present a petition to Congress, stating the matter in question and praying for a hearing, notice thereof shall be given by order of Congress to the legislative or executive authority of the other state in controversy, and a day assigned for the appearance of the parties by their lawful agents, who shall then be directed to appoint by joint consent, commissioners or judges to constitute a court for hearing and determining the matter in question: but if they cannot agree, Congress shall name three persons out of each of the united states, and from the list of such persons each party shall alternately strike out one, the petitioners beginning, until the number shall be reduced to thirteen; and from that number not less than seven, nor more than nine names as Congress shall direct, shall in the presence of Congress be drawn out by lot, and the persons whose names shall be so drawn or any five of them, shall be commissioners or judges, to hear and finally determine the controversy, so always as a major part of the judges who shall hear the cause shall agree in the determination: and if either party shall neglect to attend at the day appointed, without showing reasons, which Congress shall judge sufficient, or being present shall refuse to strike, the Congress shall proceed to nominate three persons out of each state, and the secretary of Congress shall strike in behalf of such party absent or refusing; and the judgment and sentence of the court to be appointed, in the manner before prescribed, shall be final and conclusive; and if any of the parties shall refuse to submit to the authority of such court, or to appear or defend their claim or cause, the court shall nevertheless proceed to pronounce sentence, or judgment, which shall in like manner be final and decisive, the judgment or sentence and other proceedings being in either case transmitted to Congress, and lodged among the acts of Congress for the security of the parties concerned: provided that every commissioner, before he sits in judgment, shall take an oath to be administered by one of the judges of the supreme or superior court of the state, where the cause shall be tried, "well and truly to hear and determine the matter in question, according to the best of his judgment, without favor, affection or hope of reward": provided also that no state shall be deprived of territory for the benefit of the united states.

All controversies concerning the private right of soil claimed under different grants of two or more states, whose jurisdictions as they may respect such lands, and the states which passed such grants are adjusted, the said grants or either of them being at the same time claimed to have originated antecedent to such settlement of jurisdiction, shall on the petition of either party to the Congress of the united states, be finally determined as near as may be in the same manner as is before prescribed for deciding disputes respecting territorial jurisdiction between different states.

The united states in Congress assembled shall also have the sole and exclusive right and power of regulating the alloy and value of coin struck by their own authority, or by

that of the respective states—fixing the standard of weights and measures throughout the United States—regulating the trade and managing all affairs with the Indians, not members of any of the states, provided that the legislative right of any state within its own limits be not infringed or violated—establishing or regulating post offices from one state to another, throughout all the united states, and exacting such postage on the papers passing through the same as may be requisite to defray the expenses of the said office—appointing all officers of the land forces, in the service of the united states, excepting regimental officers—appointing all the officers of the naval forces, and commissioning all officers whatever in the service of the united states—making rules for the government and regulation of the said land and naval forces, and directing their operations.

The united states in Congress assembled shall have authority to appoint a committee, to sit in the recess of Congress, to be denominated "A Committee of the States," and to consist of one delegate from each state; and to appoint such other committees and civil officers as may be necessary for managing the general affairs of the united states under their direction—to appoint one of their number to preside, provided that no person be allowed to serve in the office of president more than one year in any term of three years; to ascertain the necessary sums of money to be raised for the service of the united states, and to appropriate and apply the same for defraying the public expenses—to borrow money, or emit bills on the credit of the united states, transmitting every half year to the respective states an account of the sums of money so borrowed or emitted—to build and equip a navy—to agree upon the number of land forces, and to make requisitions from each state for its quota, in proportion to the number of white inhabitants in such state; which requisition shall be binding, and thereupon the legislature of each state shall appoint the regimental officers, raise the men and clothe, arm and equip them in a soldierlike manner, at the expense of the united states; and the officers and men so clothed, armed and equipped shall march to the place appointed, and within the time agreed on by the united states in Congress assembled: But if the united states in Congress assembled shall, on consideration of circumstances judge proper that any state should not raise men, or should raise a smaller number than its quota, and that any other state should raise a greater number of men than the quota thereof, such extra number shall be raised, officered, clothed, armed and equipped in the same manner as the quota of such state, unless the legislature of such state shall judge that such extra number cannot be safely spared out of the same, in which case they shall raise, officer, clothe, arm and equip as many of such extra number as they judge can be safely spared. And the officers and men so clothed, armed and equipped, shall march to the place appointed, and within the time agreed on by the united states in Congress assembled.

The united states in Congress assembled shall never engage in a war, nor grant letters of marque and reprisal in time of peace, nor enter into any treaties or alliances, nor coin money, nor regulate the value thereof, nor ascertain the sums and expenses necessary for the defense and welfare of the united states, or any of them, nor emit bills, nor borrow money on the credit of the united states, nor appropriate money, nor agree upon the number of vessels of war, to be built or purchased, or the number of land or sea forces to be raised, nor appoint a commander in chief of the army or navy, unless nine states assent to the same: nor shall a question on any other point, except for adjourning from day to day be determined, unless by the votes of a majority of the united states in Congress assembled.

The Congress of the united states shall have power to adjourn to any time within the year, and to any place within the united states, so that no period of adjournment be for a longer duration than the space of six months, and shall publish the journal of their proceedings monthly, except such parts thereof relating to treaties, alliances or military operations, as in their judgment require secrecy; and the yeas and nays of the delegates of each state on any question shall be entered on the journal, when it is desired by any delegate; and the delegates of a state, or any of them, at his or their request shall be furnished with a transcript of the said journal, except such parts as are above excepted, to lay before the legislatures of the several states.

Article X. The committee of the states, or any nine of them, shall be authorized to execute, in the recess of Congress, such of the powers of Congress as the united states in Congress assembled, by the consent of nine states, shall from time to time think expedient to vest them with; provided that no power be delegated to said committee, for the exercise of which, by the Articles of Confederation, the voice of nine states in the Congress of the united states assembled is requisite.

Article XI. Canada acceding to this Confederation, and joining in the measures of the united states shall be admitted into, and entitled to all the advantages of this union: but no other colony shall be admitted into the same, unless such admission be agreed to by nine states.

Article XII. All bills of credit emitted, moneys borrowed and debts contracted by, or under the authority of Congress, before the assembling of the united states, in pursuance of the present Confederation, shall be deemed and considered as a charge against the united states, for payment and satisfaction whereof the said united states, and the public faith are hereby solemnly pledged.

Article XIII. Every state shall abide by the determinations of the united states in Congress assembled, on all questions which by this Confederation is submitted to them. And the articles of this Confederation shall be inviolably observed by every state, and the union shall be perpetual; nor shall any alteration at any time hereafter be made in any of them; unless such alteration be agreed to in a Congress of the united states, and be afterwards confirmed by the legislatures of every state.

And whereas it hath pleased the Great Governor of the World to incline the hearts of the legislatures we respectively represent in Congress, to approve of, and to authorize us to ratify the said Articles of Confederation and perpetual union. Know ye that we the undersigned delegates, by virtue of the power and authority to us given for that purpose, do by these presents, in the name and in behalf of our respective constituents, fully and entirely ratify and confirm each and every of the said Articles of Confederation and perpetual union, and all and singular the matters and things therein contained: And we do further solemnly plight and engage the faith of our respective constituents, that they shall abide by the determinations of the united states in Congress assembled, on all questions which by the said Confederation are submitted to them. And that the articles thereof shall be inviolably observed by the states we respectively represent, and that the union shall be perpetual.

In witness whereof we have hereunto set our hands in Congress. Done at Philadelphia in the State of Pennsylvania the ninth day of July in the year of our Lord, 1778, and in the third year of the independence of America.

On the part and behalf of the State of New Hampshire.

Josiah Bartlett, John Wentworth, Jun., August 8, 1778.

On the part and behalf of the State of Massachusetts Bay.

John Hancock, Francis Dana,
Samuel Adams, James Lovell,
Elbridge Gerry, Samuel Holten.

On the part and behalf of the State of Rhode Island and Providence Plantations.

William Ellery, John Collins.
Henry Marchant,

On the part and behalf of the State of Connecticut.

Roger Sherman, Titus Hosmer,
Samuel Huntington, Andrew Adams.
Oliver Wolcott,

On the part and behalf of the State of New York.

Jas. Duane, William Duer,
Fras. Lewis, Gou'r Morris.

On the part and behalf of the State of New Jersey.

Jno. Witherspoon, Nath'l Scudder, November 26, 1778.

On the part and behalf of the State of Pennsylvania.

Robt. Morris, William Clingan,
Daniel Roberdeau, Joseph Reed,
Jona Bayard Smith, July 22, 1778.

On the part and behalf of the State of Delaware.

John Dickinson, May 5, 1779, Thos. M'Kean, February 12, 1779.
Nicholas Van Dyke,

On the part and behalf of the State of Maryland.

John Hanson, March 1, 1781, Daniel Carroll, March 1, 1781.

On the part and behalf of the State of Virginia.

Richard Henry Lee, Jno. Harvie,
John Banister, Francis Lightfoot Lee.
Thomas Adams,

On the part and behalf of the State of North Carolina.

John Penn, July 21, 1778, Jno. Williams.
Corns. Harnett,

On the part and behalf of the State of South Carolina.

Henry Laurens, Richard Hutson,
William Henry Drayton, Thos. Heyward, Jun.
Jno. Matthews,

On the part and behalf of the State of Georgia.

Jno. Walton, 24th July, 1778, Edw'd Langworthy.
Edw'd Telfair,

CONSTITUTION OF THE UNITED STATES

The unsatisfactory character of the union effected by the Articles of Confederation became increasingly apparent during the period of its existence. The Congress had no power to raise money by taxation. It could borrow, issue paper money, and make requisitions on the states; but the use of these ineffective powers only added to the financial difficulties and lowered the public credit. Congress sought the right to levy tariff duties, but the opposition of one or more states defeated this amendment.

The power was lacking also of developing a national commercial policy and of controlling commerce between states. Freedom of trade within the union was essential to commercial and to industrial development; but local jealousy led the states to erect trade barriers and to set up discriminations. Above all, the Congress lacked power to compel the states to live up to their obligations under the union. Washington indicated the fundamental failure of Congress as its "absence of coercive power."

The Constitutional Convention. The increasing gravity of American affairs, the growing probability of disruption, gradually convinced the people of the states of the need of a "more perfect union." A group of talented statesmen, led by Washington, Madison, Hamilton, and Franklin, worked unceasingly to this end, and in 1787 their labors were rewarded by the convention which met at Philadelphia in May and framed the Constitution of the United States.

Seventy-three delegates in all were appointed by the states, but only fifty-five ever attended. The average number present was from thirty to thirty-five, nearly all thoroughly experienced in public affairs and representative of the varying views of the states, while among them were a group of men distinguished for greatness of character and for political sagacity. Moreover, all were practical men, interested in effective forms of government, rather than in theoretical expedients. They were interested also in the protection of those ancient civil rights for which their race had contended for centuries, rather than in vague conceptions of political felicity.

Organization of Convention. The convention organized on May 25, and George Washington was unanimously chosen president. It adjourned on September 17. The convention met behind closed doors. It imposed a bond of secrecy on its members as to the differences and disputes which divided them, and this obligation of protecting the reputation of all concerned was never violated.

The journal of the convention was not published until 1818, when Congress so ordered. Nearly all that is known of the debates and adjustments of this meeting is derived from a private journal kept by Madison and first published in 1840. But it is apparent that no body of men intrusted with a comparable responsibility ever labored with greater disinterestedness and patriotism or strove in greater loyalty to bring the different views which separated them into a common agreement and workable plan. The result justifies the high talents and the profound patriotism of these collaborators.

The First Constitution. The Constitution, which is the first of modern constitutions in point of time, is easily the first also in the praise it has evoked and in the confidence of those who live under it. It may also be said that no political instrument ever framed embodies a more remarkable series of contributions to government or has exerted a wider influence on the subsequent history of states.

Among the institutions given original form in the Constitution are (1) Federal government, subsequently initiated in such widely different states as the Dominion of Canada, the Swiss Confederation, the German Empire, the Mexican and Argentine republics, and the Commonwealth of Australia; (2) the Senate, with its principle of equality of representation of member states as contrasted with a House of Representatives based on population; (3) the office of president, a plan of government which contrasts with ministerial or parliamentary executive as one of the two predominant types of national administration; (4) the supreme court, with its august and remarkable power of judicially interpreting the provisions of the Constitution itself, and of declaring void national or state legislation in conflict with the Constitution; (5) the creation of a sphere of constitutional liberty inviolable by government and protected by judicial power; (6) the creation of complete freedom of movement and of commerce within the union of states, subject only to Federal control.

Character of the Constitution. The Constitution is remarkable for the brevity and for the exactness of its language. This is attributable in part to the thorough examination and discussion given to every article and sentence, and in part to the mastery of diction possessed by those who reduced the Constitution to its finally accepted form. While, as above stated, it is an instrument based not on theory, but on actual experience in government, extending over a long period of colonial and revolutionary statesmanship, its original character justifies the eulogy of Gladstone, that it is "the most wonderful work ever struck off at a given time by the brain and purpose of man."

The Constitution is, finally, the oldest frame of government in the world today. All other modern states rest upon constitutions that are relatively recent and which embody revolutionary changes. This is no less true of the venerable British constitution than of others.

In spite of the expansion of the United States since 1787 and the growth of the American people, the amendments to the Constitution have been relatively few and have not altered its original character as the first plan of the government. These amendments are 19 in number; their character and dates of adoption are as given below.

Ratification of Constitution. The Constitution was signed on September 17, 1787, by all members present except Mr. Gerry of Massachusetts and Mr. Mason and Mr. Randolph of Virginia. The president of the convention transmitted it to Congress and Congress on September 28 directed it to be "transmitted to the several legislatures in order to be submitted to a convention of delegates chosen in each state by the people thereof, in conformity to the resolves of the convention."

The Constitution thereupon became the subject of extended discussion and correspondence in all the states. Out of this popular debate and inquiry arose a series of articles written largely by Madison, Hamilton, and Jay, which, embodied in a volume called the *Federalist*, constitute the earliest and one of the most authoritative interpretations of the document, as well as one of the greatest contributions to political science made in America.

The Constitution (Article VII) provided that the acceptance by nine states should be sufficient for its establishment between the states so ratifying. The nine states first ratifying it were Delaware, Pennsylvania, New Jersey, Georgia, Connecticut, Massachusetts, Maryland, South Carolina, and New Hampshire.

New Government Inaugurated. The Congress of the Confederation thereupon fixed the 4th of March, 1789, for inaugurating the new government, authorized the necessary elections, and ended its own life by adjournment *sine die*. In the elections which followed, members were chosen to the Senate and to the House of Representatives, while George Washington was unanimously elected president and John Adams, vice president.

Congress assembled in New York City April 2–5, and Washington was inaugurated on the 30th of the same month. The remaining states ratified and entered the Union. Vermont, which early in the Revolution had declared her independence of Great Britain but had not entered the Confederation, ratified the Constitution January 10, 1791, and by an act of Congress, February 18, 1791, "was received and admitted into this Union as a new and entire member of the United States."

Amendment of the Constitution. The Constitution (Article V) provides the method of its amendment. The initiative may come either from Congress by a two-thirds vote of both Houses, or by the applications of the legislatures of two-thirds of the states. An amendment thus legally proposed becomes a part of the Constitution when three-fourths of the states have ratified it. This ratification may be given either by the legislatures of the states or by conventions called for this purpose. Actually, however, all amendments have been proposed by Congress and ratified by state legislatures. The alternative methods of initiative and ratification have never been employed. The dates and circumstances occasioning the amendments are as follows:

Articles I–X were declared in force December 15, 1791.

The Constitution, as originally submitted, contained no code of fundamental civil rights. To remedy what was considered a defect, as well as to make unequivocal the retention by the people or by the states of powers not expressly conferred upon the national government, these ten amendments were enacted by the first Congress and submitted to the states.

Article XI was declared in force January 8, 1798.

Article XII altered in some particulars the method of choosing the president and the vice president. It was ratified by all the states except Connecticut, Delaware, Massachusetts, and New Hampshire, which rejected it. It was declared in force September 25, 1804.

The next three amendments were the result of the Civil War and the abolition of negro slavery:

Article XIII, the emancipation amendment, was ratified by 31 of the 36 states; rejected by Delaware and Kentucky; not acted on by Texas; conditionally ratified by Alabama and Mississippi. Proclaimed December 18, 1865.

Article XIV, the reconstruction amendment, was ratified by 23 northern states; rejected by Kentucky, Delaware, Maryland, and 5 southern states; and not acted on by California. New Jersey, Ohio, and Oregon withdrew ratification. The 5 southern states subsequently ratified under pressure. Proclaimed July 28, 1868.

Article XV, Negro citizenship amendment, was not acted on by Tennessee; rejected by California, Delaware, Kentucky, Maryland, New Jersey, and Oregon. It was ratified by the remaining 30 states; New York rescinded its ratification January 5, 1870. Proclaimed March 30, 1870.

Article XVI was proposed after the supreme court of the United States had rendered a decision that the Constitution did not confer upon the United States government the right to levy an income tax. This income tax amendment was ratified by 39 states, but failed of ratification in Connecticut, Florida, Massachusetts, New Hampshire, Pennsylvania, Rhode Island, Utah, Vermont, and Virginia. It was proclaimed February 25, 1913.

Article XVII, providing for the direct election of senators, became *de facto* a part of the Constitution on its ratification by the last of the required number of states on April 8, 1913.

Article XVIII, the prohibition amendment, had on January 16, 1919, been ratified by 36 states, and on January 29, 1919, was formally proclaimed to take effect on January 16, 1920. By 1922 it had been ratified by all the states except Connecticut and Rhode Island.

Article XIX, the equal suffrage amendment, was adopted between June 10, 1919, and August 19, 1920, by three-fourths of the states, and proclaimed in effect August 26, 1920.

CONSTITUTION OF THE UNITED STATES

PREAMBLE.—We the people of the United States, in order to form a more perfect Union, establish justice, insure domestic tranquillity, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America.

ARTICLE I

SECTION I. All legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

SECTION II. 1. The House of Representatives shall be composed of members chosen every second year by the people of the several states, and the electors in each state shall have the qualifications requisite for electors of the most numerous branch of the state legislature.

2. No person shall be a representative who shall not have attained to the age of twenty-five years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that state in which he shall be chosen.

3. Representatives and direct taxes shall be apportioned among the several states which may be included within this Union, according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of representatives shall not exceed one for every thirty thousand, but each state shall have at least one representative; and until such enumeration shall be made, the state of New Hampshire shall be entitled to choose 3; Massachusetts, 8; Rhode Island and Providence Plantations, 1; Connecticut, 5; New York, 6; New Jersey, 4; Pennsylvania, 8; Delaware, 1; Maryland, 6; Virginia, 10; North Carolina, 5; South Carolina, 5; and Georgia, 3. See *Article XIV., Amendment.*

4. When vacancies happen in the representation from any state, the executive authority thereof shall issue writs of election to fill such vacancies.

5. The House of Representatives shall choose their speaker and other officers; and shall have the sole power of impeachment.

SECTION III. 1. The Senate of the United States shall be composed of two senators from each state, chosen by the legislature thereof, for six years; and each senator shall have one vote (Superseded by the 17th Amendment).

2. Immediately after they shall be assembled in consequence of the first election, they shall be divided as equally as may be into three classes. The seats of the senators of the first class shall be vacated at the expiration of the second year, of the second class at the expiration of the fourth year, and of the third class at the expiration of the sixth year, so that one-third may be chosen every second year; and if vacancies happen by resignation, or otherwise, during the recess of the legislature of any state, the executive thereof may make temporary appointments until the next meeting of the legislature, which shall then fill such vacancies.

3. No person shall be a senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that state for which he shall be chosen.

4. The vice president of the United States shall be president of the Senate, but shall have no vote, unless they be equally divided.

5. The Senate shall choose their other officers, and also a president pro tempore, in the absence of the vice president, or when he shall exercise the office of president of the United States.

6. The Senate shall have the sole power to try all impeachments. When sitting for that purpose, they shall be on oath or affirmation. When the president of the United States is tried, the chief justice shall preside: and no person shall be convicted without the concurrence of two-thirds of the members present.

7. Judgment in cases of impeachment shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust, or profit under the United States; but the party convicted shall nevertheless be liable and subject to indictment, trial, judgment, and punishment, according to law.

SECTION IV. 1. The times, places, and manner of holding elections for senators and representatives shall be prescribed in each state by the legislature thereof; but the Congress may at any time by law make or alter such regulations, except as to the places of choosing senators.

2. The Congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December, unless they shall by law appoint a different day.

SECTION V. 1. Each House shall be the judge of the elections, returns, and qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members, in such manner, and under such penalties as each House may provide.

2. Each House may determine the rules of its proceedings, punish its members for disorderly behavior, and, with the concurrence of two-thirds, expel a member.

3. Each House shall keep a journal of its proceedings, and from time to time publish the same, excepting such parts as may in their judgment require secrecy; and the yeas and nays of the members of either House on any question shall, at the desire of one-fifth of those present, be entered on the journal.

4. Neither House, during the session of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two Houses shall be sitting.

SECTION VI. 1. The senators and representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the treasury of the United States. They shall in all cases, except treason, felony, and breach of the peace, be privileged from arrest during their attendance at the session of their respective Houses, and in going to and returning from the same; and for any speech or debate in either House, they shall not be questioned in any other place.

2. No senator or representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States, which shall have been created, or the emoluments whereof shall have been increased, during such time; and no person holding any office under the United States, shall be a member of either House during his continuance in office.

SECTION VII. 1. All bills for raising revenue shall originate in the House of Representatives; but the Senate may propose or concur with amendments as on other bills.

2. Every bill which shall have passed the House of Representatives and the Senate, shall, before it become a law, be presented to the president of the United States; if he approve he shall sign it, but if not he shall return it, with his objections, to that House in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration two-thirds of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered, and, if approved by two-thirds of that House, it shall become a law. But in all such cases the votes of both Houses shall be determined by yeas and nays, and the names of the persons voting for and against the bill shall be entered on the journal of each House respectively. If any bill shall not be returned by the president within ten days (Sundays excepted) after it shall have been presented to him, the same shall be a law, in like manner as if he had signed it, unless the Congress by their adjournment prevent its return, in which case it shall not be a law.

3. Every order, resolution, or vote to which the concurrence of the Senate and House of Representatives may be necessary (except on a question of adjournment) shall be presented to the president of the United States; and before the same shall take effect, shall be approved by him, or being disapproved by him, shall be repassed by two-thirds of the Senate and House of Representatives, according to the rules and limitations prescribed in the case of a bill.

SECTION VIII. The Congress shall have power:

1. To lay and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defense and general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States.

2. To borrow money on the credit of the United States.

3. To regulate commerce with foreign nations, and among the several states, and with the Indian tribes.

4. To establish an uniform rule of naturalization, and uniform laws on the subject of bankruptcies throughout the United States.

5. To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures.

6. To provide for the punishment of counterfeiting the securities and current coin of the United States.

7. To establish post offices and post roads.

8. To promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

9. To constitute tribunals inferior to the supreme court.

10. To define and punish piracies and felonies committed on the high seas, and offenses against the law of nations.

11. To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water.

12. To raise and support armies, but no appropriation of money to that use shall be for a longer term than two years.

13. To provide and maintain a navy.

14. To make rules for the government and regulation of the land and naval forces.

15. To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions.

16. To provide for organizing, arming, and disciplining, the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the states respectively, the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress.

17. To exercise exclusive legislation in all cases whatsoever, over such district (not exceeding ten miles square) as may, by cession of particular states, and the acceptance of Congress, become the seat of the government of the United States, and to exercise like authority over all places purchased by the consent of the legislature of the state in which the same shall be, for the erection of forts, magazines, arsenals, dockyards, and other needful buildings.

18. To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the government of the United States, or in any department or officer thereof.

SECTION IX. 1. The migration or importation of such persons as any of the states now existing shall think proper to admit, shall not be prohibited by the Congress prior to the year one thousand eight hundred and eight, but a tax or duty may be imposed on such importation, not exceeding ten dollars for each person.

2. The privilege of the writ of habeas corpus shall not be suspended, unless when in cases of rebellion or invasion the public safety may require it.

3. No bill of attainder or ex post facto law shall be passed.

4. No capitation, or other direct, tax shall be laid, unless in proportion to the census or enumeration hereinbefore directed to be taken (Changed by the 16th Amendment).

5. No tax or duty shall be laid on articles exported from any state.

6. No preference shall be given by any regulation of commerce or revenue to the ports of one state over those of another: nor shall vessels bound to, or from, one state be obliged to enter, clear, or pay duties in another.

7. No money shall be drawn from the treasury, but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

8. No title of nobility shall be granted by the United States: And no person holding any office of profit or trust under them, shall, without the consent of the Congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign state.

SECTION X. 1. No state shall enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money; emit bills of credit; make anything but gold and silver coin a tender in payment of debts; pass any bill of attainder, ex post facto law, or law impairing the obligation of contracts, or grant any title of nobility.

2. No state shall, without the consent of the Congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws: and the net produce of all duties and imposts, laid by any state on imports or exports, shall be for the use of the treasury of the United States; and all such laws shall be subject to the revision and control of the Congress.

3. No state shall, without the consent of Congress, lay any duty of tonnage, keep troops, or ships of war in time of peace, enter into any agreement or compact with another state, or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

ARTICLE II

SECTION I. 1. The executive power shall be vested in a president of the United States of America. He shall hold his office during the term of four years, and, together with the vice president, chosen for the same term, be elected as follows.

2. Each state shall appoint, in such manner as the legislature thereof may direct, a number of electors, equal to the whole number of senators and representatives to which the state may be entitled in the Congress: but no senator or representative, or person holding an office of trust or profit under the United States, shall be appointed an elector.

3. The electors shall meet in their respective states, and vote by ballot for two persons, of whom one at least shall not be an inhabitant of the same state with themselves. And they shall make a list of all the persons voted for, and of the number of votes for each; which list they shall sign and certify, and transmit sealed to the seat of the government of the United States, directed to the president of the Senate. The president of the Senate shall, in the presence of the

Senate and House of Representatives, open all the certificates, and the votes shall then be counted. The person having the greatest number of votes shall be the president, if such number be a majority of the whole number of electors appointed; and if there be more than one who have such majority, and have an equal number of votes, then the House of Representatives shall immediately choose by ballot one of them for president; and if no person have a majority, then from the five highest on the list the said House shall in like manner choose the president. But in choosing the president, the vote shall be taken by states, the representation for each state having one vote; A quorum for this purpose shall consist of a member or members from two-thirds of the states, and a majority of all the states shall be necessary to a choice. In every case, after the choice of the president, the person having the greatest number of votes of the electors shall be the vice president. But if there should remain two or more who have equal votes, the Senate shall choose from them by ballot the vice president (Superseded by the 12th Amendment).

4. The Congress may determine the time of choosing the electors, and the day on which they shall give their votes; which day shall be the same throughout the United States.

5. No person except a natural born citizen, or a citizen of the United States, at the time of the adoption of this Constitution, shall be eligible to the office of president; neither shall any person be eligible to that office who shall not have attained to the age of thirty-five years, and have been fourteen years a resident within the United States.

6. In case of the removal of the president from office, or of his death, resignation, or inability to discharge the powers and duties of the said office, the same shall devolve on the vice president, and the Congress may by law provide for the case of removal, death, resignation, or inability, both of the president and vice president, declaring what officer shall then act as president, and such officer shall act accordingly, until the disability be removed, or a president shall be elected.

7. The president shall, at stated times, receive for his services, a compensation, which shall neither be increased nor diminished during the period for which he shall have been elected, and he shall not receive within that period any other emolument from the United States, or any of them.

8. Before he enter on the execution of his office, he shall take the following oath or affirmation:—

"I do solemnly swear (affirm) that I will faithfully execute the office of President of United States, and will, to the best of my ability, preserve, protect, and defend the Constitution of the United States."

Section II. 1. The president shall be commander in chief of the army and navy of the United States, and of the militia of the several states, when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments, upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offenses against the United States, except in cases of impeachment.

2. He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the senators present concur; and he shall nominate, and by and with the advice and consent of the Senate, shall appoint ambassadors, other public ministers and consuls, judges of the supreme court, and all other officers of the United States, whose appointments are not herein otherwise provided for, and which shall be established by law: but the Congress may by law vest the appointment of such inferior officers, as they think proper, in the president alone, in the courts of law, or in the heads of departments.

3. The president shall have power to fill up all vacancies that may happen during the recess of the Senate, by granting commissions which shall expire at the end of their next session.

Section III. He shall from time to time give to the Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; he may, on extraordinary occasions, convene both Houses, or either of them, and in case of disagreement between them, with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

Section IV. The president, vice president, and all civil officers of the United States shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.

ARTICLE III

Section I. The judicial power of the United States, shall be vested in one supreme court, and in such inferior courts as the Congress may from time to time ordain and establish. The judges, both of the supreme and inferior courts, shall hold their offices during good behavior, and shall, at stated times, receive for their services, a compensation, which shall not be diminished during their continuance in office.

Section II. 1. The judicial power shall extend to all cases, in law and equity, arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority;—to all cases affecting ambassadors, other public ministers and consuls;—to all cases of admiralty and maritime jurisdiction;—to controversies to which the United States shall be a party;—to controversies between two or more states;—between a state and citizens of another state;—between citizens of different states;—between citizens of the same state claiming lands under grants of different states,—and between a state, or the citizens thereof, and foreign states, citizens, or subjects.

2. In all cases affecting ambassadors, other public ministers and consuls, and those in which a state shall be party, the supreme court shall have original jurisdiction. In all the other cases before mentioned, the supreme court shall have appellate jurisdiction, both as to law and fact, with such exceptions, and under such regulations as the Congress shall make.

3. The trial of all crimes, except in cases of impeachment, shall be by jury; and such trial shall be held in the state where the said crimes shall have been committed; but when not committed within any state, the trial shall be at such place or places as the Congress may by law have directed.

Section III. 1. Treason against the United States, shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

2. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood, or forfeiture except during the life of the person attainted.

ARTICLE IV

Section I. Full faith and credit shall be given in each state to the public acts, records, and judicial proceedings of every other state. And the Congress may by general laws prescribe the manner in which such acts, records, and proceedings shall be proved, and the effect thereof.

Section II. 1. The citizens of each state shall be entitled to all privileges and immunities of citizens in the several states.

2. A person charged in any state with treason, felony, or other crime, who shall flee from justice, and be found in another state, shall on demand of the executive authority of the state from which he fled, be delivered up, to be removed to the state having jurisdiction of the crime.

3. No person held to service or labor in one state, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.

Section III. 1. New states may be admitted by the Congress into this Union; but no new state shall be formed or erected within the jurisdiction of any other state; nor any state be formed by the junction of two or more states, or parts of states, without the consent of the legislatures of the states concerned as well as of the Congress.

2. The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this Constitution shall be so construed as to prejudice any claims of the United States, or of any particular state.

Section IV. The United States shall guarantee to every state in this Union a republican form of government, and shall protect each of them against invasion; and on application of the legislature, or of the executive (when the legislature cannot be convened) against domestic violence.

ARTICLE V

The Congress, whenever two-thirds of both Houses shall deem it necessary, shall propose amendments to this Constitution, or, on the application of the legislatures of two-thirds of the several states, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this Constitution, when ratified by the legislatures of three-fourths of the several states, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress; provided that no amendment which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the Ninth Section of the First Article; and that no state, without its consent, shall be deprived of its equal suffrage in the Senate.

ARTICLE VI

1. All debts contracted and engagements entered into before the adoption of this Constitution, shall be as valid against the United States under this Constitution, as under the Confederation.

2. This Constitution, and the laws of the United States which shall be made in pursuance thereof; and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land; and the judges in every state shall be bound thereby, anything in the Constitution or laws of any state to the contrary notwithstanding.

3. The senators and representatives before mentioned, and the members of the several state legislatures, and all executive and judicial officers, both of the United States and of the several states, shall be bound by oath or affirmation, to support this Constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

ARTICLE VII

The ratification of the conventions of nine states, shall be sufficient for the establishment of this Constitution between the states so ratifying the same.

Done in convention by the unanimous consent of the states present the seventeenth day of September in the year of our Lord one thousand seven hundred and eighty-seven, and of the independence of the United States of America the twelfth. In witness whereof we have hereunto subscribed our names,

Go: Washington—
Presidt. and Deputy from Virginia

New Hampshire
John Langdon
Nicholas Gilman

Massachusetts
Nathaniel Gorham
Rufus King

Connecticut
Wm. Saml. Johnson
Roger Sherman

New York
Alexander Hamilton

New Jersey
Wil: Livingston
David Brearley
Wm. Paterson
Jona: Dayton

Pennsylvania
B. Franklin
Thomas Mifflin
Robt. Morris
Geo. Clymer
Thos. Fitzsimons
Jared Ingersoll
James Wilson
Gouv. Morris

Delaware
Geo: Read
Gunning Bedford Jun
John Dickinson
Richard Bassett
Jaco; Broom

Maryland
James McHenry
Dan of St. Thos. Jenifer
Danl. Carroll

Virginia
John Blair—
James Madison Jr.

North Carolina
Wm. Blount
Richd. Dobbs Spaight
Hu Williamson

South Carolina
J. Rutledge
Charles Cotesworth Pinckney
Charles Pinckney
Pierce Butler

Georgia
William Few
Abr. Baldwin

Attest William Jackson,
Secretary

AMENDMENTS TO THE CONSTITUTION

ARTICLE I

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances.

ARTICLE II

A well regulated militia, being necessary to the security of a free state, the right of the people to keep and bear arms, shall not be infringed.

ARTICLE III

No soldier shall, in time of peace, be quartered in any house, without the consent of the owner, nor in time of war, but in a manner to be prescribed by law.

ARTICLE IV

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

ARTICLE V

No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia, when in actual service in time of war or public danger; nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

ARTICLE VI

In all criminal prosecutions the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the state and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense.

ARTICLE VII

In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise re-examined in any court of the United States, than according to the rules of the common law.

ARTICLE VIII

Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

ARTICLE IX

The enumeration in the Constitution, of certain rights, shall not be construed to deny or disparage others retained by the people.

ARTICLE X

The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people.

ARTICLE XI

The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States, by citizens of another state, or by citizens or subjects of any foreign state.

ARTICLE XII

The electors shall meet in their respective states, and vote by ballot for president and vice president, one of whom, at least, shall not be an inhabitant of the same state with themselves; they shall name in their ballots the person voted for as president, and in distinct ballots the person voted for as vice president, and they shall make distinct lists of all persons voted for as president, and of all persons voted for as vice president, and of the number of votes for each, which list they shall sign and certify, and transmit sealed to the seat of the government of the United States, directed to the president of the Senate;—the president of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates and the votes shall then be counted; —the person having the greatest number of votes for president, shall be the president, if such number be a majority of the whole number of electors appointed; and if no person have such majority, then from the persons having the highest numbers not exceeding three on the list of those voted for as president, the House of Representatives shall choose immediately, by ballot, the president. But in choosing the president, the votes shall be taken by states, the representation from each state having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the states, and a majority of all the states shall be necessary to a choice. And if the House of Representatives shall not choose a president whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the vice president shall act as president, as in the case of the death or other constitutional disability of the president. The person having the greatest number of votes as vice president, shall be the vice president, if such number be a majority of the whole number of electors appointed, and if no person have a majority, then from the two highest numbers on the list, the Senate shall choose the vice president; a quorum for the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of president shall be eligible to that of vice president of the United States.

ARTICLE XIII

1. Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

2. Congress shall have power to enforce this article by appropriate legislation.

ARTICLE XIV

1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the state wherein they reside. No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.

2. Representatives shall be apportioned among the several states according to their respective numbers, counting the whole number of persons in each state, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for president and vice president of the United States, representatives in Congress, the executive and judicial officers of a state, or the members of the legislature thereof, is denied to any of the male inhabitants of such state, being twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion, or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such state.

3. No person shall be a senator or representative in Congress, or elector of president and vice president, or hold any office, civil or military, under the United States, or under any state, who, having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any state legislature, or as an executive or judicial officer of any state, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof. But Congress may by a vote of two-thirds of each House, remove such disability.

4. The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any state shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

5. The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

ARTICLE XV

1. The right of the citizens of the United States to vote shall not be denied or abridged by the United States or by any state on account of race, color, or previous condition of servitude.

2. The Congress shall have power to enforce this article by appropriate legislation.

ARTICLE XVI

The Congress shall have power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several states, and without regard to any census or enumeration.

ARTICLE XVII

The Senate of the United States shall be composed of two senators from each state, elected by the people thereof, for six years, and each senator shall have one vote. The electors in each state shall have the qualifications requisite for electors of the most numerous branch of the state legislatures.

When vacancies happen in the representation of any state in the Senate, the executive authority of such state shall issue writs of election to fill such vacancies: Provided, that the legislature of any state may empower the executive thereof to make temporary appointments until the people fill the vacancies by election as the legislature may direct.

This amendment shall not be so construed as to affect the election or term of any senator chosen before it becomes valid as part of the Constitution.

ARTICLE XVIII

1. After one year from the ratification of this article the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof, for beverage purposes, is hereby prohibited.

2. The Congress and the several states shall have concurrent power to enforce this article by appropriate legislation.

3. This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the legislatures of the several states, as provided in the Constitution, within seven years from the date of submission hereof to the states by the Congress.

ARTICLE XIX

1. The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any state on account of sex.

2. Congress shall have power, by appropriate legislation, to enforce the provisions of this article.

RATIFICATION OF THE CONSTITUTION

The Constitution was ratified by the thirteen original states in the following order:

Delaware, December 7, 1787, unanimously.
Pennsylvania, December 12, 1787, vote 46 to 23.
New Jersey, December 18, 1787, unanimously.
Georgia, January 2, 1788, unanimously.
Connecticut, January 9, 1788, vote 128 to 40.
Massachusetts, February 6, 1788, vote 187 to 168.
Maryland, April 28, 1788, vote 63 to 12.
South Carolina, May 23, 1788, vote 149 to 73.
New Hampshire, June 21, 1788, vote 57 to 46.
Virginia, June 25, 1788, vote 89 to 79.
New York, July 26, 1788, vote 30 to 28.
North Carolina, November 21, 1789, vote 193 to 75.
Rhode Island, May 29, 1790, vote 34 to 32.

THE FEDERAL GOVERNMENT

In framing the national government, the makers of the Constitution, as has been said above, built on American experience. But two theories of their time strongly influenced their minds and their work: one was the theory of the threefold "distribution of powers" into legislative, executive, and judicial; the other, the theory of useful "checks and balances," which, in a constitutional government, must be inserted as safeguards against undue power and encroachment on civil liberties.

THE LEGISLATIVE DEPARTMENT

THE CONGRESS

Consisting of both the Senate and the House of Representatives as co-ordinate bodies.

DURATION.—The term of each Congress is for two years, commencing March 4th of the odd years.

REGULAR SESSIONS.—Annual, beginning the first Monday in December.

SPECIAL SESSIONS.—At the call of the president.

MEMBERSHIP.—Each House is the judge of the elections and qualifications of its own members.

The Senate

NUMBER.—Two senators from each state.

ELECTED.—By direct vote of the people.

TERM.—Six years; one-third of the Senate being elected every two years.

ELIGIBILITY.—Citizen of the United States nine years; resident of state; minimum age, 30 years.

SALARY.—Fixed by law at **$10,000 per year.**

PRESIDENT OF THE SENATE.—The vice president of the United States.

POWERS OF THE SENATE:—
- Confirms or rejects nominations of the president.
- Ratifies or rejects treaties with foreign powers.
- Elects president *pro tempore* of the Senate, and its other officers.
- Elects vice president of the United States if regular election fails.
- Acts as a court for the trial of impeachments.

The House of Representatives

NUMBER.—Four hundred thirty-five members, according to the present apportionment.*

ELECTED.—By the voters of the congressional districts.

TERM.—Two years,—the entire House being elected every two years.

ELIGIBILITY.—Citizen of the United States seven years; resident of the state; minimum age, 25 years.

* There are, besides, two territorial delegates from the Philippines, and one each from Porto Rico, Hawaii, and Alaska, who have the right to speak and to make motions, but not to vote.

SALARY.—Fixed by law at $10,000 per year; the speaker, $15,000 per year.

POWERS OF THE HOUSE OF REPRESENTATIVES:—
Elects its speaker (presiding officer) and its other officers.
Elects president of the United States if the regular election fails.
Prosecutes impeachments before the Senate.
Originates all bills for raising revenue.

THE EXECUTIVE DEPARTMENT

THE PRESIDENT

HOW ELECTED.—The several steps in the election of the president are:

State electors are chosen at a general election held on the Tuesday following the first Monday of November of every fourth year, the number of electors of each state being equal to the number of senators and representatives to which the state is entitled in Congress.

The electors meet in their respective states on the second Monday in January following their election, and vote by ballot for president and vice president; at the same time they make certificates of their vote and transmit the same to the president of the Senate.

The Senate and the House of Representatives meet jointly on the second Wednesday of February next ensuing, and count the votes of the state electors, when, if there is an election, the president of the Senate declares who are elected president and vice president.

In case there is no choice by the state electors, the president is elected by the House of Representatives from the three candidates who received the most electoral votes for president, in which election the vote is taken by states, each state having but one vote, and a majority of all the states being necessary to a choice.

TERM OF OFFICE.—Four years.

ELIGIBILITY.—A natural born citizen; resident of the United States fourteen years; minimum age, 35 years.

SALARY.—Fixed by law at $75,000 per year with an allowance of $25,000 for traveling expenses.

POWERS AND DUTIES OF THE PRESIDENT:—
Commander in chief of the army and navy.
Receives representatives of foreign governments.
Communicates with Congress by message.
Approves or disapproves acts of Congress.
Calls and adjourns special sessions of Congress.
Makes treaties with advice and consent of the Senate.
Appoints public officers with the advice and consent of the Senate.
Commissions public officers of the United States.
Grants reprieves and pardons for offenses against the United States.

The Vice President

HOW ELECTED.—Elected by state electors the same as the president; or by the Senate, in case there is no choice by the state electors.

TERM AND ELIGIBILITY.—Same as for president.

SALARY.—Fixed by law at $15,000 per year.

THE PRESIDENTIAL SUCCESSION:—In case of the removal, death, resignation, or inability

Of the president, the vice president takes the president's place.

Of both president and vice president, the heads of the executive departments succeed to the presidency in the order in which the executive departments are named below; but such officer must be constitutionally eligible to the presidency, must have been appointed to the cabinet by the advice and with the consent of the Senate, and be not under impeachment.

The secretaries of agriculture, commerce, and labor are ineligible to the presidency inasmuch as these cabinet offices were created subsequent to the passage of the act providing for the presidential succession.

The Executive Departments

DEPARTMENT OF STATE.—Has charge of foreign affairs.

TREASURY DEPARTMENT.—Has charge of fiscal affairs.

DEPARTMENT OF WAR.—Has charge of the army and military affairs.

DEPARTMENT OF JUSTICE.—Has charge of the legal affairs of the government.

POST-OFFICE DEPARTMENT.—Has charge of postal affairs.

NAVY DEPARTMENT.—Has charge of the navy and naval affairs.

DEPARTMENT OF THE INTERIOR.—Has charge of domestic affairs, including public lands, pensions, bureau of education, etc.

DEPARTMENT OF AGRICULTURE.—Has charge of agricultural affairs, including weather bureau, etc.

DEPARTMENT OF COMMERCE.—Has charge of domestic and foreign affairs, relating to commerce, transportation, etc.

DEPARTMENT OF LABOR.—Has charge of immigration, naturalization, children's bureau, and labor affairs.

The Cabinet

MEMBERS.—Heads of the executive departments.

APPOINTMENT.—By the president with the advice and consent of the Senate.

SALARY.—All cabinet members, $15,000 annually.

The President and Legislation

Acts of Congress become laws:
When signed (approved) by the president; or by his failure to make objections in writing (veto) within ten days after any act is submitted to him, unless Congress by adjournment within that time prevents its return; but Congress has power to pass a law over the president's veto by a vote of two-thirds of each House.

THE JUDICIAL DEPARTMENT

JUDGES OF THE UNITED STATES COURTS

APPOINTMENT.—By the president with the advice and consent of the Senate.

TENURE OF OFFICE.—During life or good behavior; but may retire on full salary after reaching the age of seventy years, and after ten years' service on the bench.

THE SUPREME COURT OF THE UNITED STATES

MEMBERS.—A chief justice and eight associate justices.

SALARIES.—Chief justice, $20,500; associate justices, each, $20,000.

TERMS OF COURT.—One each year, beginning on the second Monday in October.

ORIGINAL JURISDICTION.—In all cases affecting ambassadors, ministers, and consuls, and in all cases in which a state is a party.

APPELLATE JURISDICTION.—In cases of law and equity where the inferior courts have original jurisdiction, with such exceptions and regulations as Congress has made.

THE CHIEF JUSTICE.—Presides over the Senate when it sits as a court of impeachment for the trial of the president.

INFERIOR COURTS

JURISDICTION:—
In cases between citizens of different states.
In cases in which the United States is a party.
In cases of admiralty and maritime jurisdiction.
In trials for crimes against the United States; but the trial of crimes must be by jury, and must be held in the state where the crime was committed.
Appeals to the supreme court may be had in all cases of law and equity, with such exceptions and regulations as Congress has made.

United States Circuit Courts of Appeals:—

Organized in 1891 to relieve the United States supreme court in appellate cases.

NUMBER.—One in each of the nine judicial circuits.

SALARY OF CIRCUIT JUDGE.—$12,500 per year.

MEMBERS.—Three judges: the chief justice, or the associate justice assigned to the circuit, or any circuit or district judge within the circuit, is competent to sit.

United States District Courts:—

NUMBER OF DISTRICTS.—One or more in each state and territory. At present there are eighty-one judicial districts within the United States and the District of Columbia, one each for Hawaii, Porto Rico, and the Canal Zone, and one for Alaska with four judges sitting in four divisions.

SALARY OF DISTRICT JUDGE.—Fixed by law at $10,000 per year.

United States Court of Claims:—

JURISDICTION.—Claims against the United States, including those referred to it by Congress.

MEMBERS.—One chief justice and four associate justices.

SALARIES.—Chief justice and associate justices, each $12,500.

United States Court of Customs Appeals:—

JURISDICTION.—Cases involving appeals from customs duties.

MEMBERS.—One chief justice and four associate justices.

SALARIES.—Fixed by law at $12,500 per year.

CONGRESS

All legislative power granted by the Constitution is intrusted to the "Congress of the United States," which consists of a Senate and a House of Representatives. The number of members of each of these bodies, method of election, term, salary, conditions of eligibility, are given above in tabulated form. Each house of the Congress has some special powers.

The Senate. To the Senate is given the power of ratifying nominations of the president to public office. The Constitution specifically mentions judges of the supreme court and "ambassadors, other public ministers and consuls" for appointment "with the advice and consent of the Senate." The Senate, however, is never formally consulted. It has no right of nomination, but it does at times reject the president's appointments, though rarely in the case of heads of executive departments or "cabinet positions."

Foreign treaties are made "by and with the consent of the Senate, provided two-thirds of the Senators present concur." These two special powers associate the Senate with the president in the determining of foreign policy and in the guidance of foreign relations. Other facts indicate the same intention: the Senate's title, derived from the Roman Senate, which was largely occupied with foreign relations; its constitutional privilege to deliberate behind closed doors or in "executive session"; its relatively small membership; the more mature age of its members and the fact that as a body it "never dies" but is reconstituted gradually. Yet this responsibility for foreign policy has been sparingly and rather negatively exercised by the Senate.

The president is considered to have the sole right of negotiating with representatives of other nations and the Senate has never received either foreign delegates or communications. The president does not formally consult the Senate upon foreign relations, though he generally seeks to maintain touch with Senate opinion through its committee on foreign affairs. The president retains complete control of a treaty until he delivers it to the Senate, and he may even then withdraw it. He is not bound to disclose to the Senate correspondence with foreign states, or even to give information within his possession. For these reasons the president, rather than the Senate, generally determines foreign policy, though subject to the severe limitation of having his treaties rejected. The president also has repeatedly conducted foreign negotiations through "personal representatives," unconfirmed by the Senate, or he may himself negotiate personally and directly, as did President Wilson at Paris.

It may also be noticed that, through the treaty ratifying power, the Senate, with the president, may end war and conclude peace, though only Congress can declare war. For the trial of impeachments, the Senate sits as a judicial body, a concurrence of two-thirds of the members present being necessary for conviction. (Article I, sec. 3, par. 6). The chief justice presides at the impeachment trial of a president.

The vice president of the United States is the constitutional presiding officer of the Senate, but a president *pro tempore* is chosen from among the senators. In presidential elections, in case no person should receive a majority of votes of the electors, the vice president would be chosen by the Senate.

The House of Representatives. The House of Representatives, likewise, has special powers. It alone can vote impeachment and prosecute the trial of an impeached officer. It alone can initiate bills for raising revenue, though such measures are frequently totally altered by the Senate. In case of a failure of a presidential election to give a majority of electors for one person, the House of Representatives is empowered to select the president by ballot, each state casting one ballot.

During the early history of Congress, the House of Representatives appeared to be the more important body and membership in it was preferred to the Senate. Gradually the Senate became the more important body, and the position of senator far exceeded in influence that of representative. This lesser rôle played by the House of Representatives is in striking contrast to the predominant position held by the chambers of deputies in France and Belgium, as contrasted with the senates of those countries.

Powers of Congress. Other than as above stated, the two houses possess equality in legislation. The Constitution limits this legislative faculty, however, to expressly defined fields.

To provide for the raising and disbursement of revenue.
To borrow money; to coin money and to regulate its value; and to fix the standard of weights and measures.
To regulate foreign and interstate commerce.
To declare war, and to maintain an army and a navy.
To establish post offices and post roads.
To enact patent and copyright laws.
To enact uniform naturalization and bankruptcy laws.
To provide for the punishment of crimes against the United States.
To establish courts inferior to the supreme court.
To provide for organizing and calling out the militia.
To admit new states into the Union.
To provide for the government of the territories.
To exercise exclusive jurisdiction over the District of Columbia, public lands, public buildings, forts, and navy yards.
To enact all laws necessary and proper for carrying into execution all the powers vested by the Constitution in the government of the United States.

SPEAKERS OF THE HOUSE

Name	State	Born	Died	Congress	Years
F. A. Muhlenberg	Pa.	1750	1801	1	1789–91
Jonathan Trumbull	Conn.	1740	1809	2	1791–93
F. A. Muhlenberg	Pa.	1750	1801	3	1793–95
Jonathan Dayton	N. J.	1760	1824	4, 5	1795–99
Theo. Sedgwick	Mass.	1746	1813	6	1799–01
Nathaniel Macon	N. C.	1758	1837	7–9	1801–07
Joseph B. Varnum	Mass.	1750	1821	10, 11	1807–11
Henry Clay	Ky.	1777	1852	12, 13	1811–14
Langdon Cheves	S. C.	1776	1857	13	1814–15
Henry Clay	Ky.	1777	1852	14–16	1815–20
John W. Taylor	N. Y.	1784	1854	16	1820–21
Philip P. Barbour	Va.	1783	1841	17	1821–23
Henry Clay	Ky.	1777	1852	18	1823–25
John W. Taylor	N. Y.	1784	1854	19	1825–27
Andrew Stevenson	Va.	1784	1857	20–23	1827–34
John Bell	Tenn.	1797	1869	23	1834–35
James K. Polk	Tenn.	1795	1849	24, 25	1835–39
R. M. T. Hunter	Va.	1809	1887	26	1839–41
John White	Ky.	1805	1845	27	1841–43
John W. Jones	Va.	1791	1848	28	1843–45
John W. Davis	Ind.	1799	1859	29	1845–47
Robert C. Winthrop	Mass.	1809	1894	30	1847–49
Howell Cobb	Ga.	1815	1868	31	1849–51
Linn Boyd	Ky.	1800	1859	32, 33	1851–55
Nathaniel P. Banks	Mass.	1816	1894	34	1855–57
James L. Orr	S. C.	1822	1873	35	1857–59
Wm. Pennington	N. J.	1796	1862	36	1859–61
Galusha A. Grow	Pa.	1823	1907	37	1861–63
Schuyler Colfax	Ind.	1823	1885	38–40	1863–69
James G. Blaine	Me.	1830	1893	41–43	1869–75
Michael C. Kerr	Ind.	1827	1876	44	1875–76
Samuel J. Randall	Pa.	1828	1890	44–46	1876–81
Joseph W. Keifer	Ohio	1836	....	47	1881–83
John G. Carlisle	Ky.	1835	1910	48–50	1883–89
Thomas B. Reed	Me.	1839	1902	51	1889–91
Charles F. Crisp	Ga.	1845	1896	52, 53	1891–95
Thomas B. Reed	Me.	1839	1902	54, 55	1895–99
David B. Henderson	Iowa	1840	1906	56, 57	1899–03
Joseph G. Cannon	Ill.	1836	1926	58–61	1903–11
Champ Clark	Mo.	1850	1921	62–65	1911–19
Fred. H. Gillett	Mass.	1851	....	66–68	1919–25
Nicholas Longworth	Ohio	1869	....	69–	1925–

Special Powers. The practice of legislation has grown and taken on new aspects through the felt necessity of extending the scope of the national government. The supreme court has usually given a liberal interpretation to these powers, especially to the power to regulate interstate commerce and to enact needed laws to carry into execution the powers vested by the constitution in the national government. In these interpretations the supreme court has frequently been guided by a doctrine of "implied powers." The court having decided, however, that the Constitution did not give the power to levy a direct tax on incomes, the 16th amendment was adopted in 1913, giving Congress this right.

Limitations on Powers of Congress. The Constitution not only limits Congress to powers expressly conferred, but it also prohibits to Congress certain acts. By these limitations, as they now stand, Congress is forbidden to:

Suspend the writ of habeas corpus unless, in case of rebellion or invasion, the public safety so requires.
Pass any bill of attainder or ex post facto law.
Lay any direct per capita tax, other than an income tax, without apportionment among the states according to population.
Lay any tax or duty on articles exported from any state.
Give any preference to the ports of one state over those of another.
Grant any title of nobility.
Create a new state within the jurisdiction of another state or out of its territory, without the consent of the state.
Make any law respecting the establishment of religion or prohibiting its free exercise.
Abridge the freedom of speech or of the press.
Forbid the right of peaceable assembly.
Forbid the right of petition.
Infringe the right to keep and bear arms.
Pass any law for the quartering of soldiers in private houses, without the consent of the owners, in time of peace.
Pass any law providing for unreasonable searches and seizures, or for the issue of warrants without the usual judicial process.
Pass any law providing for the holding of a person for a capital or otherwise infamous crime, unless on presentment and indictment of a grand jury, except in cases arising in the land or naval forces or in the militia when in actual service in time of war or public danger.
Pass any law that would subject a person to being twice put in jeopardy of life or limb or deprive him of life, liberty, or property, without due process of law.
Pass any law taking private property for public use without just compensation.
Pass any law denying or abridging the right of citizens of the United States to vote, by reason of race, color, sex, or previous condition of servitude.
Assume or pay any debt or obligation incurred in aid of rebellion or insurrection against the United States, or to pay any claim for the loss of slaves.
Pass any law denying the rights of an accused person to a speedy and public trial by a jury of the locality where the crime is committed, to be informed of the nature and cause of the accusation against him, to be confronted with the witnesses against him, and to compel witnesses to testify in his favor, and to have the assistance of a counsel.
Pass any law forbidding jury trial for suits at common law, where the value in controversy exceeds twenty dollars.
Pass any law requiring excessive bail or imposing excessive fines or cruel and unusual punishments.

The foregoing prohibitions apply to the power of Congress in legislating for the states. The supreme court has ruled that they do not generally limit the Congress of the United States in legislating for dependencies. They are, furthermore, prohibitions mainly on the powers of Congress, not of the state legislatures, but the 14th Amendment places certain of these restrictions among acts prohibited to the states.

THE PRESIDENT

The president of the United States is the highest representative of the nation. Elected by the suffrage of the voters of all the states for a fixed term of years, he is independent of Congress, the courts, and sectional demands. In spite of the theory of separation of powers, in accordance with which the constitution-makers created the office, the president has immense influence over legislation and is held responsible by the people for the work of Congress.

The president's influence springs from his power of veto; from his constitutional practice of submitting recommendations to Congress, which he may do either orally, in the presence of both houses, or by written message; and from his vast influence with the nation as the molder of public opinion. His power of appointment, with his ability to distribute "patronage" among members of Congress, serves to keep the members who are of his party in accord with his policies.

The National Leader. While dependent on his party for nomination and support, he is the recognized national leader of his party and frequently dominates its views and controls its organization. He is, moreover, the head of the entire national administration. Members of Congress, the president, and the vice president are the only elected officers of the United States. All others are appointed by the president or by heads of departments under his control. The president's removal power extends to nearly all offices, except the judicial or quasi judicial. In 1926, the Supreme Court in the case of *Myers v. U. S.* upheld the president's removal power over an office given fixed tenure by Congress.

Powers of President. The president is the commander in chief of the army and of the navy, with the right to determine their employment and to dispatch armed forces upon foreign missions. While Congress alone can legally declare war, the president has repeatedly, of his own authority, used the army or navy in acts of warfare and for hostile invasion. On his will and judgment, more even than on the attitude of Congress, seems to rest the momentous decision of peace and of war. By his direction the attorney-general undertakes judicial investigations and prosecutions. These may be suspended or abandoned by the president's direction.

He may grant pardon to convicted persons, and amnesty to political prisoners or to those in rebellion. He may commute or suspend sentences after conviction or during the trial itself.

The Cabinet. The cabinet, or conference of heads of departments, meets solely to advise with the president and may not with propriety assemble without his presence. Its views are purely consultative and in no manner bind his freedom of decision. He may at any time direct the action of the head of a department, and in the field of foreign relations frequently does so, and may alter or reverse a department's decision.

Disability of President. The president remains in office, irrespective of the attitude of Congress or of the support of the nation, until the end of his term, or until his death in office. The Constitution provides that, in case of the disability of the president, the vice president may act; but no procedure is laid down for determining the president's disability, and, while more than one president has suffered long and prostrating illness, no vice president has ever assumed office during the president's lifetime.

Place of Power. The official actions of the president need not be taken at the national capital. He may exercise any power at any place within the country or even while abroad. For more than a century no president left the national territory during his term of office, but this tradition has been broken by presidents in recent years without legally impairing their position or their actions.

Impeachment of President. There is no way of disciplining the president except by impeachment; and, while this method was once attempted (1868, Andrew Johnson), it was unsuccessful, more than one-third of the members of the Senate present at the trial having refused to vote for conviction. Furthermore, while Federal courts have in certain instances directed writs against heads of departments, such writs apparently cannot be issued against the president himself nor can his actions thus be judicially reviewed.

Authority in War. During war time, the president becomes virtually a national dictator, concentrating in his office the strength and the will of the nation. It may be observed, however, that, while Congress and the nation have given unreserved support and authority to the president during war, they have jealously limited him in the arrangement of peace. No president has been able to dictate the settlement of the issues resulting from war.

Magnitude of Power. Reviewing the office of president in the light of other national executives, it is probably correct to say that it exceeds all other modern offices in the breadth of its powers and in the respect which it commands. Since the term of Washington, it has steadily grown in independence and in influence. It has gained many functions and has surrendered none. It appears to reflect the American preference for strong, responsible, unified, executive authority. The extension of the powers of Congress has been repeatedly resisted. For many years there has been opposition to the review power of the supreme court and advocacy of its reconstitution. But no movement has ever gained head for diminishing the office of the president or for consigning him to a "responsible" rôle.

Furthermore, it may be added that no president has been tempted to the gross abuse of his power; no financial scandal has ever besmirched the chief executive, nor has any president carried into private life the ambition illegally to prolong or unconstitutionally to regain his vast authority. The keen and unrelaxing public interest which surrounds the office, the light of publicity which beats upon it, the force of the great traditions which attach to it, and the sobering effect of its occupancy have sufficed to keep the American president responsible to the Constitution and to the will of the nation.

THE EXECUTIVE DEPARTMENTS

These are now ten in number. All have been established by acts of Congress. They are as follows: State, War, and Treasury, established in 1789; Navy (1798); Post Office (head admitted to the Cabinet in 1829); Interior (1849); Justice (1870); Agriculture (1889); Commerce (1903); Labor (1913). Other departments, such as Education, Public Health, and Public Welfare, have been proposed but not created. All are organized under single heads, known usually as "secretary." (The attorney-general and the postmaster-general are the exceptions).

Heads of Departments. The departments have from one to several assistant secretaries and a chief clerk. They are divided into bureaus and divisions, each with a single head known as "director" or "commissioner," "chief," etc. Subject always to his subordination to the president, who appoints and may at any time remove him, and who is politically responsible for his official acts, a department head directs the entire service under him; appoints and removes many subordinate officials; issues "regulations" governing the administrative work; and decides a variety of disputes or controversies arising from the actions of his subordinates.

In many cases the decision of the department head is final, though in others there is appeal to the president. The list of bureaus and of other divisions as fixed by statute is given in a tabulated form below, together with the list of department heads and the years of their service. In spite of the possession of a number of important dependencies, there is no department corresponding to the ministry of colonies in other governments. Alaska and Hawaii are partly supervised by the department of the interior, though other departments are represented; the Philippines, Porto Rico, and the Panama Canal Zone are under the direction of the war department, while Guam, Tutuila (Samoa), and certain minor interests are intrusted to the navy.

THE DEPARTMENT OF STATE

The secretary of state, in event of the death of the president and in event of the death or absence of the vice president, by law becomes acting president of the United States. Thus far, no secretary of state has been called to fill this place. All treaties, other than treaties with Indian tribes, are negotiated by the secretary of state, who often conducts the discussions in person, through interviews with foreign representatives. The secretary, under the direction of the president, is charged with the duties of correspondence with ministers and consuls of the United States, and with representatives of foreign powers accredited to the United States. He is charged also with negotiations of whatever character relating to foreign affairs.

The secretary of state is also the regular medium of communication between the president and the governors of the several states of the United States. He has certain functions relating to presidential elections, such as receiving from the governors of the states the certification of appointment of presidential electors, and the receipt and the transmission to Congress of any challenge of the ballot as reported. He has the custody of the Great Seal of the United States, and countersigns and affixes the seal to all executive proclamations, to various commissions, and to warrants of extradition of fugitives from justice.

He is also custodian of the treaties made with foreign states, and of the laws of the United States. He grants and issues passports. Exequaturs (formal recognitions of power to act) to foreign consuls in the United States are issued through his office. He publishes the laws and resolutions of Congress, amendments to the constitution, and proclamations declaring admission of new states.

The distribution of labor within the department follows:

THE SECRETARY OF STATE

Policy

THE UNDERSECRETARY

Division of Latin American Affairs
Division of Western European Affairs
Division of Near Eastern Affairs
Division of Mexican Affairs
Division of Eastern European Affairs
Division of Far Eastern Affairs
Division of Current Information
Division of Publications
Office of Co-ordination and Review

THE ASSISTANT SECRETARY

Office of Economic Adviser

THE ASSISTANT SECRETARY

Office of the Chief Clerk
Bureau of Indexes and Archives
Bureau of Accounts
Division of Foreign Service Administration
Division of Foreign Personnel
Foreign Service School

THE ASSISTANT SECRETARY

Visa Office
Commercial Office

THE ASSISTANT SECRETARY

Division of Passport Control

SECRETARIES OF STATE

Presidents	Cabinet Officers	Residences	Appointed
Washington	Thomas Jefferson	Va.	1789
Washington	Edmund Randolph	Va.	1794
Washington	Timothy Pickering	Mass.	1795
Adams	Timothy Pickering	Mass.	1797
Adams	John Marshall	Va.	1800
Jefferson	James Madison	Va.	1801
Madison	Robert Smith	Md.	1809
Madison	James Monroe	Va.	1811
Monroe	John Quincy Adams	Mass.	1817
J. Q. Adams	Henry Clay	Ky.	1825
Jackson	Martin Van Buren	N. Y.	1829
Jackson	Edward Livingston	La.	1831
Jackson	Louis McLane	Del.	1833
Jackson	John Forsyth	Ga.	1834
Van Buren	John Forsyth	Ga.	1837
Harrison	Daniel Webster	Mass.	1841
Tyler	Daniel Webster	Mass.	1841
Tyler	Hugh S. Legaré	S. C.	1843
Tyler	Abel P. Upshur	Va.	1843
Tyler	John C. Calhoun	S. C.	1844
Polk	James Buchanan	Pa.	1845
Taylor	John M. Clayton	Del.	1849
Fillmore	Daniel Webster	Mass.	1850
Fillmore	Edward Everett	Mass.	1852
Pierce	William L. Marcy	N. Y.	1853
Buchanan	Lewis Cass	Mich.	1857
Buchanan	Jeremiah S. Black	Pa.	1860
Lincoln	William H. Seward	N. Y.	1861
Johnson	William H. Seward	N. Y.	1865
Grant	Elihu B. Washburn	Ill.	1869
Grant	Hamilton Fish	N. Y.	1869
Hayes	William M. Evarts	N. Y.	1877
Garfield	James G. Blaine	Me.	1881
Arthur	F. T. Frelinghuysen	N. J.	1881
Cleveland	Thomas F. Bayard	Del.	1885
B. Harrison	James G. Blaine	Me.	1889
B. Harrison	John W. Foster	Ind.	1892
Cleveland	Walter Q. Gresham	Ill.	1893
Cleveland	Richard Olney	Mass.	1895
McKinley	John Sherman	Ohio	1897
McKinley	William R. Day	Ohio	1898
McKinley	John Hay	Ohio	1898
Roosevelt	John Hay	Ohio	1901
Roosevelt	Elihu Root	N. Y.	1905
Roosevelt	Robert Bacon	N. Y.	1909
Taft	Philander C. Knox	Pa.	1909
Wilson	William J. Bryan	Nebr.	1913
Wilson	Robert Lansing	N. Y.	1915
Wilson	Bainbridge Colby	N. Y.	1920
Harding	Charles E. Hughes	N. Y.	1921
Coolidge	Charles E. Hughes	N. Y.	1923
Coolidge	Frank B. Kellogg	Minn.	1925
Hoover	Frank B. Kellogg	Minn.	1929
Hoover	Henry L. Stimson	N. Y.	1929

THE WAR DEPARTMENT

The authority of the president of the United States as commander in chief of the army is exercised through the secretary of war, who is a civil, not a military, officer. The secretary is charged by law with the supervision of all estimates of appropriations for the expenses of the department, including the military establishment; of all purchases of army supplies; of all expenditures for the support, transportation, and maintenance of the army; and of such expenditures of a civil nature as may be placed by Congress under his direction.

The secretary of war has also supervision of the United States Military Academy at West Point, of military education in the army, of the board of ordnance and fortification, of insular affairs, and of the Panama Canal Zone. He is entrusted with all matters relating to land defense and seacoast fortifications, to army ordnance, to river and harbor improvements, to the prevention of obstructions to navigation, and to the establishment of harbor lines. All plans for location of bridges authorized by Congress to be constructed over navigable waters of the United States require his approval. He also has charge of the establishment of military posts and of all matters relating to leases, revocable licenses, and other privileges upon lands under the control of the war department.

The organization of the department is as follows:

THE SECRETARY OF WAR

THE ASSISTANT SECRETARY

EXECUTIVE OFFICES

The General Staff
War Boards and Commissions
Office of the Adjutant General
Office of the Inspector General
Office of the Judge Advocate General
Office of the Quartermaster General
Office of the Chief of Finance
Office of the Surgeon General
Militia Bureau
Bureau of Insular Affairs
Office of the Chief of Chaplains
Office of the Chief Signal Officer
Office of the Chief of the Air Service
Office of the Chief of Infantry
Office of the Chief of Cavalry
Office of the Chief of Field Artillery
Office of the Chief of Coast Artillery
Office of the Chief of Engineers
Office of the Chief of Ordnance
Office of the Chief of Chemical Warfare
Board of Engineers of Harbors and Rivers
Board of Engineers, New York City
Supervisor of the New York Harbor
United States Engineer Offices
Lake Survey
Mississippi River Commission
California Debris Commission
Board of Road Commissioners for Alaska
Office of Public Buildings and Grounds and Washington Monument
Inland and Coastwise Waterways Service
Panama Canal
National Military Park Commission
United States Military Academy
Army War College
United States Soldiers' Home

SECRETARIES OF WAR

Presidents	Cabinet Officers	Residences	Appointed
Washington	Henry Knox	Mass.	1789
Washington	Timothy Pickering	Mass.	1795
Washington	James McHenry	Md.	1796
Adams	James McHenry	Md.	1797
Adams	Samuel Dexter	Mass.	1800
Adams	Roger Griswold	Conn.	1801
Jefferson	Henry Dearborn	Mass.	1801
Madison	William Eustis	Mass.	1809
Madison	John Armstrong	N. Y.	1813
Madison	James Monroe	Va.	1814
Madison	William H. Crawford	Ga.	1815
Monroe	John C. Calhoun	S. C.	1817
J. Q. Adams	James Barbour	Va.	1825
J. Q. Adams	Peter B. Porter	N. Y.	1828

SECRETARIES OF WAR—Con.

PRESIDENTS	Cabinet Officers	Residences	Appointed
Jackson	John H. Eaton	Tenn.	1829
Jackson	Lewis Cass	Ohio	1831
Jackson	Benjamin F. Butler	N. Y.	1836
Van Buren	Joel R. Poinsett	S. C.	1837
Harrison	John Bell	Tenn.	1841
Tyler	John Bell	Tenn.	1841
Tyler	John C. Spencer	N. Y.	1841
Tyler	James M. Porter	Pa.	1843
Tyler	William Wilkins	Pa.	1844
Polk	William L. Marcy	N. Y.	1845
Taylor	George W. Crawford	Ga.	1849
Fillmore	Charles M. Conrad	La.	1850
Pierce	Jefferson Davis	Miss.	1853
Buchanan	John B. Floyd	Va.	1857
Buchanan	Joseph Holt	Ky.	1861
Lincoln	Simon Cameron	Pa.	1861
Lincoln	Edwin M. Stanton	Ohio	1862
Johnson	Edwin M. Stanton	Ohio	1865
Johnson	U. S. Grant (*ad in.*)	Ill.	1867
Johnson	Lor. Thomas (*ad in.*)	Del.	1868
Johnson	John M. Schofield	N. Y.	1868
Grant	John A. Rawlins	Ill.	1869
Grant	William W. Belknap	Ia.	1869
Grant	Alphonso Taft	Ohio	1876
Grant	James Don. Cameron	Pa.	1876
Hayes	George W. McCrary	Ia.	1877
Hayes	Alexander Ramsey	Minn.	1879
Garfield	Robert T. Lincoln	Ill.	1881
Arthur	Robert T. Lincoln	Ill.	1881
Cleveland	William C. Endicott	Mass.	1885
B. Harrison	Redfield Proctor	Vt.	1889
B. Harrison	Stephen B. Elkins	W. Va.	1891
Cleveland	Daniel S. Lamont	N. Y.	1893
McKinley	Russell A. Alger	Mich.	1897
McKinley	Elihu Root	N. Y.	1899
Roosevelt	Elihu Root	N. Y.	1901
Roosevelt	William H. Taft	Ohio	1904
Roosevelt	Luke E. Wright	Tenn.	1908
Taft	J. M. Dickinson	Tenn.	1909
Taft	Henry L. Stimson	N. Y.	1911
Wilson	Lindley M. Garrison	N. J.	1913
Wilson	Newton D. Baker	Ohio	1916
Harding	John W. Weeks	Mass.	1921
Coolidge	John W. Weeks	Mass.	1923
Coolidge	Dwight F. Davis	Mo.	1925
Hoover	James W. Good	Ill.	1929

THE DEPARTMENT OF THE TREASURY

The secretary of the treasury is charged by law with the management of the national finances. He prepares plans for the improvement of the revenues and for the support of the public credit; superintends the collection of the revenue and directs the forms of keeping and rendering public accounts and of making returns; grants warrants for all moneys drawn from the treasury in pursuance of appropriations made by law, and for the payment of moneys into the treasury.

This department also handles the construction and the maintenance of public buildings, the coinage of metallic money and the printing of paper currency, the coast guard service, and the public health service.

An annual estimate of revenues and expenses of the government is prepared by the treasury department for presentation to Congress by the president. The secretary is, *ex officio*, the presiding officer of the Federal reserve board, the Federal farm loan board, and the central executive council of the Inter-American high commission. He makes an annual report direct to Congress.

The organization of the department is as follows:

THE SECRETARY OF THE TREASURY

THE UNDERSECRETARY

- Bureau of the Budget
- The Finances
- Commissioner of Accounts and Deposits
  - Division of Bookkeeping and Warrants
  - Division of Deposits
- Advances and Loans to Railroads under Transportation Act.
- Federal Farm Loan Bureau
- Section of Statistics
- Government Actuary

THE ASSISTANT SECRETARY

- Treasurer of the United States
- Comptroller of the Currency
- Commissioner of the Public Debt
  - Division of Loans and Currency
  - Register of the Treasury
  - Division of Public Debt, Accounts and Audit
  - Division of Paper Custody
- Bureau of Engraving and Printing
- Mint Bureau
- Secret Service Division
- Disbursing Clerk
- Section of Surety Bonds of the Division of Appointments

THE ASSISTANT SECRETARY

- Bureau of Internal Revenue
- Bureau of Public Health Service
- Bureau of Supply
- Division of Appointments
- Division of Mails and Files
- Division of Printing
- Chief Clerk
- Supervising Architect's Office

THE ASSISTANT SECRETARY

- Customs Service
- Coast Guard
- Prohibition Unit
- Narcotics Section

SECRETARIES OF THE TREASURY

PRESIDENTS	Cabinet Officers	Residences	Appointed
Washington	Alexander Hamilton	N. Y.	1789
Washington	Oliver Wolcott	Conn.	1795
Adams	Oliver Wolcott	Conn.	1797
Adams	Samuel Dexter	Mass.	1801
Jefferson	Samuel Dexter	Mass.	1801
Jefferson	Albert Gallatin	Pa.	1801
Madison	Albert Gallatin	Pa.	1809
Madison	George W. Campbell	Tenn.	1814
Madison	Alexander J. Dallas	Pa.	1814
Madison	William H. Crawford	Ga.	1816
Monroe	William H. Crawford	Ga.	1817
J. Q. Adams	Richard Rush	Pa.	1825
Jackson	Samuel D. Ingham	Pa.	1829
Jackson	Louis McLane	Del.	1831
Jackson	William J. Duane	Pa.	1833
Jackson	Roger B. Taney	Md.	1833
Jackson	Levi Woodbury	N. H.	1834
Van Buren	Levi Woodbury	N. H.	1837
Harrison	Thomas Ewing	Ohio	1841
Tyler	Thomas Ewing	Ohio	1841
Tyler	Walter Forward	Pa.	1841
Tyler	John C. Spencer	N. Y.	1843
Tyler	George M. Bibb	Ky.	1844
Polk	Robert J. Walker	Miss.	1845
Taylor	William M. Meredith	Pa.	1849
Fillmore	Thomas Corwin	Ohio	1850
Pierce	James Guthrie	Ky.	1853
Buchanan	Howell Cobb	Ga.	1857
Buchanan	Philip F. Thomas	Md.	1860
Buchanan	John A. Dix	N. Y.	1861
Lincoln	Salmon P. Chase	Ohio	1861
Lincoln	William P. Fessenden	Me.	1864
Lincoln	Hugh McCulloch	Ind.	1865
Johnson	Hugh McCulloch	Ind.	1865
Grant	George S. Boutwell	Mass.	1869
Grant	Wm. A. Richardson	Mass.	1873
Grant	Benjamin H. Bristow	Ky.	1874
Grant	Lot M. Morrill	Me.	1876
Hayes	John Sherman	Ohio	1877
Garfield	William Windom	Minn.	1881
Arthur	Charles J. Folger	N. Y.	1881
Arthur	Walter Q. Gresham	Ind.	1884
Arthur	Hugh McCulloch	Ind.	1884
Cleveland	Daniel Manning	N. Y.	1885
Cleveland	Charles S. Fairchild	N. Y.	1887
B. Harrison	William Windom	Minn.	1889
B. Harrison	Charles Foster	Ohio	1891
Cleveland	John G. Carlisle	Ky.	1893
McKinley	Lyman J. Gage	Ill.	1897
Roosevelt	Lyman J. Gage	Ill.	1901
Roosevelt	Leslie M. Shaw	Ia.	1902
Roosevelt	George B. Cortelyou	N. Y.	1907
Taft	Franklin MacVeagh	Ill.	1909
Wilson	William G. McAdoo	N. Y.	1913
Wilson	Carter Glass	Va.	1918
Wilson	David F. Houston	Mo.	1920
Harding	Andrew W. Mellon	Pa.	1921
Coolidge	Andrew W. Mellon	Pa.	1923
Hoover	Andrew W. Mellon	Pa.	1929

THE GENERAL ACCOUNTING OFFICE

By the act of June 10, 1921, this office under the "comptroller general" was taken out of the treasury department and made wholly independent. It has complete and general power of audit over all branches of government except the post office, which has a separate auditing service in its bureau of accounts. The decisions of the comptroller general are final and not subject to review. He is appointed for a term of fifteen years and is removable earlier only by act of Congress.

DEPARTMENT OF JUSTICE

The attorney-general is head of the department of justice and chief law officer of the government. He directs and controls a large force of attorneys and marshals, not only in the office at Washington, but also in the 85 judicial districts into which the United States and the Territories are divided. He furnishes opinions and interpretations of the laws for the guidance of the president and the heads of executive departments. In the performance of this last duty he may approve and adopt the opinions of his subordinates except upon questions involving the construction of the Constitution, but upon such questions he must give his own opinion. An increasing amount of legal business and of court procedure arises from the duty of enforcing laws of Congress which during a period of recent years have made unlawful, unfair, and dishonest practices in interstate commerce.

The duties of the attorney-general are very exacting; the details of the administration of the department are numerous, and the necessity of giving verbal advice to the president and to the other cabinet officers is so frequent that he has little time to prepare pleadings or briefs, or to conduct personally any cases except those of extreme importance. He considers all applications for executive clemency and reports them to the president, and all applications for appointment in or under the department. The department is organized as follows:

THE ATTORNEY-GENERAL

THE SOLICITOR GENERAL

EXECUTIVE OFFICES

Solicitor for the Department of State
Solicitor of the Treasury
Solicitor of Internal Revenue
Solicitor for the Interior Department
Solicitor for the Post-Office Department
Solicitor for the Department of Commerce
Solicitor for the Department of Labor

ASSISTANT TO ATTORNEY-GENERAL

Antitrust Division

ASSISTANT ATTORNEY-GENERAL

Division for the Defense of Suits
War Transactions Section

ASSISTANT ATTORNEY-GENERAL

Public Lands Division
Office of Titles
Office of Land Litigation in District of Columbia

ASSISTANT ATTORNEY-GENERAL

Divisions of Taxation and Prohibition

ASSISTANT ATTORNEY-GENERAL

Divisions of Admiralty, Finance, Foreign Relations, Territorial and Insular Affairs, Alien Property Matters, and Regulation of Commerce.

ASSISTANT ATTORNEY-GENERAL

Customs Division

ASSISTANT ATTORNEY-GENERAL

Administrative Affairs

ASSISTANT ATTORNEY-GENERAL

Criminal Division

OFFICE OF PARDONS

BUREAU OF INVESTIGATION

ATTORNEYS-GENERAL

PRESIDENTS	Cabinet Officers	Residences	Appointed
Washington	Edmund Randolph	Va.	1789
Washington	William Bradford	Pa.	1794
Washington	Charles Lee	Va.	1795
Adams	Charles Lee	Va.	1797
Jefferson	Levi Lincoln	Mass.	1801
Jefferson	John Breckinridge	Ky.	1805
Jefferson	Cæsar A. Rodney	Del.	1807
Madison	Cæsar A. Rodney	Del.	1809
Madison	William Pinkney	Md.	1811
Madison	Richard Rush	Pa.	1814
Monroe	Richard Rush	Pa.	1817
Monroe	William Wirt	Va.	1817
J. Q. Adams	William Wirt	Va.	1825
Jackson	John McP. Berrien	Ga.	1829
Jackson	Roger B. Taney	Md.	1831
Jackson	Benjamin F. Butler	N. Y.	1833
Van Buren	Benjamin F. Butler	N. Y.	1837
Van Buren	Felix Grundy	Tenn.	1838
Van Buren	Henry D. Galpin	Pa.	1840
Harrison	John J. Crittenden	Ky.	1841
Tyler	John J. Crittenden	Ky.	1841
Tyler	Hugh S. Legaré	S. C.	1841
Tyler	John Nelson	Md.	1843
Polk	John Y. Mason	Va.	1845
Polk	Nathan Clifford	Me.	1846
Polk	Isaac Toucey	Conn.	1848
Taylor	Reverdy Johnson	Md.	1849
Fillmore	John J. Crittenden	Ky.	1850
Pierce	Caleb Cushing	Mass.	1853
Buchanan	Jeremiah S. Black	Pa.	1857
Buchanan	Edwin M. Stanton	Ohio	1860
Lincoln	Edward Bates	Mo.	1861
Lincoln	James Speed	Ky.	1864
Johnson	James Speed	Ky.	1865
Johnson	Henry Stanbery	Ohio	1866
Johnson	William M. Evarts	N. Y.	1868
Grant	Ebenezer R. Hoar	Mass.	1869
Grant	Amos T. Ackerman	Ga.	1870
Grant	George H. Williams	Oreg.	1871
Grant	Edwards Pierrepont	N. Y.	1875
Grant	Alphonso Taft	Ohio	1876
Hayes	Charles Devens	Mass.	1877
Garfield	Wayne MacVeagh	Pa.	1881
Arthur	Benjamin H. Brewster	Pa.	1881
Cleveland	Augustus H. Garland	Ark.	1885
B. Harrison	William H. H. Miller	Ind.	1889
Cleveland	Richard Olney	Mass.	1893
Cleveland	Judson Harmon	Ohio	1895
McKinley	Joseph McKenna	Cal.	1897
McKinley	John W. Griggs	N. J.	1898
McKinley	Philander C. Knox	Pa.	1901
Roosevelt	Philander C. Knox	Pa.	1901
Roosevelt	William H. Moody	Mass.	1904
Roosevelt	Charles J. Bonaparte	Md.	1906
Taft	George W. Wickersham	N. Y.	1909
Wilson	James C. McReynolds	Tenn.	1913
Wilson	Thomas W. Gregory	Texas	1914
Wilson	A. Mitchell Palmer	Pa.	1919
Harding	Harry M. Daugherty	Ohio	1921
Coolidge	Harry M. Daugherty	Ohio	1923
Coolidge	Harlan F. Stone	N. Y.	1924
Coolidge	John G. Sargent	Vt.	1925
Hoover	William D. Mitchell	Minn.	1929

DEPARTMENT OF THE INTERIOR

The secretary of the interior has supervision of public business relating to pensions, and bounty lands; the public lands and surveys; the Indians; the bureau of education, the geological survey, and the reclamation service. He also controls the national parks, the capitol building and grounds, the distribution of appropriations for agricultural colleges and mechanical institutions in the states and territories, and for certain hospitals and charitable institutions in the District of Columbia.

The organization of the department, which follows, indicates the varied services which it comprises.

THE SECRETARY OF THE INTERIOR

THE FIRST ASSISTANT SECRETARY

THE ASSISTANT SECRETARY

EXECUTIVE OFFICES

Administration of Alaska and Hawaii
General Land Office
Office of Indian Affairs

Board of Indian Commissioners
Bureau of Pensions
Bureau of Education
Geological Survey
Bureau of Reclamation
National Park Service
St. Elizabeth's Hospital, D. C.
Howard University, D. C.
Freedmen's Hospital, D. C.
Alaska Railroad
Division of Capitol Buildings and Grounds

SECRETARIES OF THE INTERIOR

Presidents	Cabinet Officers	Residences	Appointed
Taylor	Thomas Ewing	Ohio	1849
Fillmore	Thos. M. T. McKennan	Pa.	1850
Fillmore	Alexander H. H. Stuart	Va.	1850
Pierce	Robert McClelland	Mich.	1853
Buchanan	Jacob Thompson	Miss.	1857
Lincoln	Caleb B. Smith	Ind.	1861
Lincoln	John P. Usher	Ind.	1863
Johnson	John P. Usher	Ind.	1865
Johnson	James Harlan	Iowa	1865
Johnson	Orville H. Browning	Ill.	1866
Grant	Jacob D. Cox	Ohio	1869
Grant	Columbus Delano	Ohio	1870
Grant	Zachariah Chandler	Mich.	1875
Hayes	Carl Schurz	Mo.	1877
Garfield	Samuel J. Kirkwood	Iowa	1881
Arthur	Henry M. Teller	Colo.	1882
Cleveland	Lucius Q. C. Lamar	Miss.	1885
Cleveland	William F. Vilas	Wis.	1888
B. Harrison	John W. Noble	Mo.	1889
Cleveland	Hoke Smith	Ga.	1893
Cleveland	David R. Francis	Mo.	1896
McKinley	Cornelius N. Bliss	N. Y.	1897
McKinley	Ethan A. Hitchcock	Mo.	1898
Roosevelt	Ethan A. Hitchcock	Mo.	1901
Roosevelt	James R. Garfield	Ohio	1907
Taft	Richard A. Ballinger	Wash.	1909
Taft	Walter L. Fisher	Ill.	1911
Wilson	Franklin K. Lane	Cal.	1913
Wilson	John Barton Payne	Ill.	1920
Harding	Albert B. Fall	N. M.	1921
Harding	Hubert Work	Colo.	1923
Coolidge	Hubert Work	Colo.	1923
Coolidge	Roy O. West	Ill.	1928
Hoover	Ray L. Wilbur	Cal.	1929

DEPARTMENT OF THE NAVY

The president exercises his authority as commander in chief of the navy through the secretary of the navy, who is a civil, not a naval, officer. The secretary has general superintendence of the construction, manning, armament, equipment, and employment of vessels of war and of the operation of the naval bases, shipyards, and training stations. The secretary of the navy also has command of the marine corps. He has supervision of the Naval Academy at Annapolis. Under authority of the president, Tutuila (Samoa) and Guam are governed by a naval officer designated by the secretary.

The following is the organization of the department, showing the various bureaus and offices of which it consists:

THE SECRETARY OF THE NAVY

THE ASSISTANT SECRETARY

THE SOLICITOR

EXECUTIVE OFFICES

Office of Naval Operations
Navy Boards
Bureau of Navigation
  Hydrographic Office
  Naval Academy
  Naval Observatory
Bureau of Aeronautics
Bureau of Yards and Docks
Bureau of Ordnance
Bureau of Construction and Repair
Bureau of Engineering
Bureau of Supply and Accounts
Bureau of Medicine and Surgery
Headquarters of Marine Corps
Judge Advocate General

SECRETARIES OF THE NAVY

Presidents	Cabinet Officers	Residences	Appointed
Adams	Benjamin Stoddert	Md.	1798
Jefferson	Benjamin Stoddert	Md.	1801
Jefferson	Robert Smith	Md.	1801
Jefferson	Jacob Crowninshield	Mass.	1805
Madison	Paul Hamilton	S. C.	1809
Madison	William Jones	Pa.	1813
Madison	B. W. Crowninshield	Mass.	1814
Monroe	B. W. Crowninshield	Mass.	1817
Monroe	Smith Thompson	N. Y.	1818
Monroe	Samuel L. Southard	N. J.	1823
J. Q. Adams	Samuel L. Southard	N. J.	1825
Jackson	John Branch	N. C.	1829
Jackson	Levi Woodbury	N. H.	1831
Jackson	Mahlon Dickerson	N. J.	1834
Van Buren	Mahlon Dickerson	N. J.	1837
Van Buren	James K. Paulding	N. Y.	1838
Harrison	George E. Badger	N. C.	1841
Tyler	George E. Badger	N. C.	1841
Tyler	Abel P. Upshur	Va.	1841
Tyler	David Henshaw	Mass.	1843
Tyler	Thomas W. Gilmer	Va.	1844
Tyler	John Y. Mason	Va.	1844
Polk	George Bancroft	Mass.	1845
Polk	John Y. Mason	Va.	1846
Taylor	William B. Preston	Va.	1849
Fillmore	William A. Graham	N. C.	1850
Fillmore	John P. Kennedy	Md.	1852
Pierce	James C. Dobbin	N. C.	1853
Buchanan	Isaac Toucey	Conn.	1857
Lincoln	Gideon Welles	Conn.	1861
Johnson	Gideon Welles	Conn.	1865
Grant	Adolph E. Borie	Pa.	1869
Grant	George M. Robeson	N. J.	1869
Hayes	Richard W. Thompson	Ind.	1877
Hayes	Nathan Goff, Jr.	W. Va.	1881
Garfield	William H. Hunt	La.	1881
Arthur	William E. Chandler	N. H.	1882
Cleveland	William C. Whitney	N. Y.	1885
B. Harrison	Benjamin F. Tracy	N. Y.	1889
Cleveland	Hilary A. Herbert	Ala.	1893
McKinley	John D. Long	Mass.	1897
Roosevelt	John D. Long	Mass.	1901
Roosevelt	William H. Moody	Mass.	1902
Roosevelt	Paul Morton	N. Y.	1904
Roosevelt	Charles J. Bonaparte	Md.	1905
Roosevelt	Victor H. Metcalf	Cal.	1906
Roosevelt	Truman H. Newberry	Mich.	1908
Taft	George von L. Meyer	Mass.	1909
Wilson	Josephus Daniels	N. C.	1913
Harding	Edwin Denby	Mich.	1921
Coolidge	Edwin Denby	Mich.	1923
Coolidge	Curtis D. Wilbur	Cal.	1924
Hoover	Charles F. Adams	Mass.	1929

POST-OFFICE DEPARTMENT

The postmaster-general is the executive head of the Federal postal service. He appoints all officers and employees of the post-office department except the four assistant postmasters-general and the purchasing agent, who are presidential appointees. With the exception of postmasters of the first, second, and third classes, who are appointed by the president with the advice and consent of the Senate, the postmaster-general appoints all officers and employees of the service at large.

Subject to the approval of the president, the postmaster-general makes postal treaties with foreign governments. A post-war addition to the department is the aerial mail service.

The organization of the department is as follows:

THE POSTMASTER-GENERAL

EXECUTIVE OFFICES

THE FIRST ASSISTANT POSTMASTER-GENERAL

Postmaster's Appointment Division
Post-Office Service Division
Dead Letter Division
Post-Office Quarters Division
Motor Vehicle Service Division

THE SECOND ASSISTANT POSTMASTER-GENERAL

Railway Mail Service Division
Railway Adjustments Division
Foreign Mails Division
Aerial Mails Division

THE THIRD ASSISTANT POSTMASTER-GENERAL

Money Order Division
Postal Savings Division
Registered Mails Division
Stamp Division
Finance Division
Classification Division

THE FOURTH ASSISTANT POSTMASTER-GENERAL

Rural Mails Division
Equipment and Supplies Division
Topography Division
Mail Equipment Shops

THE CHIEF INSPECTOR

THE COMPTROLLER

THE PURCHASING AGENT

POSTMASTERS-GENERAL

Presidents	Cabinet Officers	Residences	Appointed
Washington	Samuel Osgood	Mass.	1789
Washington	Timothy Pickering	Mass.	1791
Washington	Joseph Habersham	Ga.	1795
Adams	Joseph Habersham	Ga.	1797
Jefferson	Joseph Habersham	Ga.	1801
Jefferson	Gideon Granger	Conn.	1801
Madison	Gideon Granger	Conn.	1809
Madison	Return J. Meigs, Jr.	Ohio	1814
Monroe	Return J. Meigs, Jr.	Ohio	1817
Monroe	John McLean	Ohio	1823
J. Q. Adams	John McLean	Ohio	1825
Jackson	William T. Barry	Ky.	1829
Jackson	Amos Kendall	Ky.	1835
Van Buren	Amos Kendall	Ky.	1837
Van Buren	John M. Niles	Conn.	1840
Harrison	Francis Granger	N. Y.	1841
Tyler	Francis Granger	N. Y.	1841
Tyler	Charles A. Wickliffe	Ky.	1841
Polk	Cave Johnson	Tenn.	1845
Taylor	Jacob Collamer	Vt.	1849
Fillmore	Nathan K. Hall	N. Y.	1850
Fillmore	Samuel D. Hubbard	Conn.	1852
Pierce	James Campbell	Pa.	1853
Buchanan	Aaron V. Brown	Tenn.	1857
Buchanan	Joseph Holt	Ky.	1859
Buchanan	Horatio King	Me.	1861
Lincoln	Montgomery Blair	Md.	1861
Lincoln	William Dennison	Ohio	1864
Johnson	William Dennison	Ohio	1865
Johnson	Alexander W. Randall	Wis.	1866
Grant	John A. J. Creswell	Md.	1869
Grant	James W. Marshall	Va.	1874
Grant	Marshall Jewell	Conn.	1874
Grant	James N. Tyner	Ind.	1876
Hayes	David McK. Key	Tenn.	1877
Hayes	Horace Maynard	Tenn.	1880
Garfield	Thomas L. James	N. Y.	1881
Arthur	Timothy O. Howe	Wis.	1881
Arthur	Walter Q. Gresham	Ind.	1883
Arthur	Frank Hatton	Ia.	1884
Cleveland	William F. Vilas	Wis.	1885
Cleveland	Don M. Dickinson	Mich.	1888
B. Harrison	John Wanamaker	Pa.	1889
Cleveland	Wilson S. Bissell	N. Y.	1893
Cleveland	William L. Wilson	W. Va.	1895
McKinley	James A. Gary	Md.	1897
McKinley	Charles Emory Smith	Pa.	1898
Roosevelt	Charles Emory Smith	Pa.	1901
Roosevelt	Henry C. Payne	Wis.	1902
Roosevelt	Robert J. Wynne	Pa.	1904
Roosevelt	George B. Cortelyou	N. Y.	1905
Roosevelt	George von L. Meyer	Mass.	1907
Taft	Frank H. Hitchcock	Mass.	1909
Wilson	Albert S. Burleson	Tex.	1913
Harding	Will H. Hays	Ind.	1921
Harding	Hubert Work	Colo.	1922
Harding	Harry S. New	Ind.	1923
Coolidge	Harry S. New	Ind.	1923
Hoover	Walter F. Brown	Ohio	1929

THE DEPARTMENT OF AGRICULTURE

The secretary directs all public business relating to agricultural industry. He has an advisory relation with the agricultural experiment stations receiving support from the national treasury.

The secretary of agriculture has control of the quarantine stations for imported live stock and control of the inspection of stock ships. The inspection of domestic meats and of all imported food products is under his department. He is also charged with enforcing the laws prohibiting the illegal transportation of game and of certain noxious animals. These and other services embraced in the department are indicated by the following outline of organization:

THE SECRETARY OF AGRICULTURE

THE ASSISTANT SECRETARY

THE EXECUTIVE SECRETARY

Weather Bureau
Bureau of Animal Industry
Bureau of Plant Industry
Forest Service
Bureau of Chemistry
Bureau of Soils
Bureau of Entomology
Bureau of Biological Survey
Bureau of Dairying
Bureau of Agricultural Economics
Bureau of Home Economics
Director of Scientific Work
Director of Regulatory Work
Director of Extension Work
Director of Personnel and Business Administration
Office of Information
Office of Experiment Stations
Bureau of Public Roads
Insecticide and Fungicide Board
Federal Horticultural Board
Packers and Stockyards Administration
Grain Futures Administration
Fixed Nitrogen Laboratory
The Solicitor

SECRETARIES OF AGRICULTURE

Presidents	Cabinet Officers	Residences	Appointed
Cleveland	Norman J. Colman	Mo.	1889
B. Harrison	Jeremiah M. Rusk	Wis.	1889
Cleveland	J. Sterling Morton	Nebr.	1893
McKinley	James Wilson	Ia.	1897
Roosevelt	James Wilson	Ia.	1901
Taft	James Wilson	Ia.	1909
Wilson	David F. Houston	Mo.	1913
Wilson	Edwin T. Meredith	Ia.	1920
Harding	Henry C. Wallace	Ia.	1921
Coolidge	Henry C. Wallace	Ia.	1923
Coolidge	Howard M. Gore	W. Va.	1924
Coolidge	W. M. Jardine	Kans.	1925
Hoover	Arthur M. Hyde	Mo.	1929

DEPARTMENT OF COMMERCE

The secretary of commerce is charged with the promotion of the commerce of the United States and with the promotion of its mining, manufacturing, shipping, fishing, and transportation interests. It is his duty to investigate the organization and management of corporations engaged in interstate commerce (except railroads). He is charged with the enforcement of laws for the protection of life and property on the water.

The department also has the supervision of fisheries and of the Alaskan fur seal industry; patents; the custody, construction, maintenance, and application of standards of weights and measurements; the gathering and distribution of information upon industries and markets. Other important services are the collection and publication of statistical information; the making of coast and geodetic surveys; the encouragement of standardization in manufacture; and, in conjunction with the treasury and agriculture departments, the enforcement of the food and drug act of 1906 and the insecticide act of 1910.

The secretary makes annual reports to Congress upon the work of the department. The department maintains a staff of business experts in the capitals of countries with which trade relations are important, who, because of their relations to the diplomatic representatives, are called "commercial attachés."

The department is organized as follows:

THE SECRETARY OF COMMERCE

THE ASSISTANT SECRETARY

EXECUTIVE OFFICES

Patent Office
Bureau of Mines
Bureau of the Census
Bureau of Foreign and Domestic Commerce
Bureau of Standards
Bureau of Fisheries
Bureau of Lighthouses
Coast and Geodetic Survey
Bureau of Navigation
Steamboat Inspection Service

SECRETARIES OF COMMERCE *

PRESIDENTS	Cabinet Officers	Residences	Appointed
Roosevelt . .	George B. Cortelyou .	N. Y.	1903
Roosevelt . .	Victor H. Metcalf. . .	Cal.	1904
Roosevelt . .	Oscar S. Straus . . .	N. Y.	1906
Taft	Charles Nagel	Mo.	1909
Wilson . . .	William C. Redfield .	N. Y.	1913
Wilson . . .	Joshua W. Alexander .	Mo.	1919
Harding . .	Herbert C. Hoover . .	Cal.	1921
Coolidge . .	Herbert C. Hoover . .	Cal.	1923
Coolidge . .	William F. Whiting .	Mass.	1928
Hoover . . .	Robert P. Lamont . .	Ill.	1929

*Prior to 1913 these officers were known as Secretaries of Commerce and Labor.

DEPARTMENT OF LABOR

The secretary of labor is charged with the duty of fostering, promoting, and developing the welfare of wage earners, improving their working conditions, and advancing their opportunities for profitable employment. He has the power to act as mediator in labor disputes and to appoint commissioners of conciliation whenever in his judgment the interest of industrial peace may require. He also gathers and publishes data on labor conditions and on labor controversies in other countries.

The secretary of labor supervises the administration of the act of Congress providing for the payment of compensation to artisans or laborers of the United States injured in the course of their employment; he has the supervision of alien immigration and of the exclusion of Chinese, and also of the naturalization laws. He directs investigations pertaining to the welfare of children and to child labor. The department of labor has the following organization:

THE SECRETARY OF LABOR

THE ASSISTANT SECRETARY

EXECUTIVE OFFICES

Bureau of Immigration
Bureau of Naturalization
Bureau of Labor Statistics
Children's Bureau
Women's Bureau
Division of Conciliation
United States Employment Service
Bureau of Industrial Housing and Transportation
U. S. Housing Corporation

SECRETARIES OF LABOR

PRESIDENTS	Cabinet Officers	Residences	Appointed
Wilson . . .	William B. Wilson . .	Pa.	1913
Harding . .	James J. Davis . . .	Pa.	1921
Coolidge . .	James J. Davis . . .	Pa.	1923
Hoover . . .	James J. Davis . . .	Pa.	1929

FEDERAL BOARDS AND COMMISSIONS

Outside of the executive departments, a number of important functions of the government are intrusted to collegiate bodies. These boards have judicial or quasi judicial and legislative and quasi legislative, as well as administrative, duties. Responsibility for decisions and direction is in the group, and in certain cases the board, although appointed by the president, is beyond his administrative control.

The Civil Service Commission. The commission was created by the Civil Service act of 1883, and consists of three members, not more than two of whom shall belong to the same political party. The members are appointed by the president, with the consent of the Senate. The objects of the act are to introduce the principle of merit into government appointments, to give security of tenure against political influence, and to protect employees against demands for financial contributions to party funds. With the approval of the president, the commission classifies the public service into various grades and conducts examinations for determining the eligibility of applicants for appointment. It certifies such eligibles, the highest three being preferred, to the appointing authority. It keeps service records of employees, and may make comment upon charges of inefficiency or ill conduct preferred against any public employee.

The Interstate Commerce Commission. Created by an act of February 4, 1887, the powers and scope of the commission have been increased by later legislation. Among the important amendatory enactments are the act of March 2, 1889; the Elkins act, February 19, 1903; the Hepburn act, June 29, 1906; the Mann-Elkins act, July 18, 1910; the acts of August 24, 1912, and May 29, and August 9, 1917; and the Transportation act of 1920. The members of the commission, originally five, were increased to seven in 1906, to nine in 1907, and finally to eleven in 1920. Appointments are made by the president with the advice of the Senate. Members receive $12,000 per annum.

The commission has power to regulate the rates and service of railroads, steamboat lines, express companies, pipe lines carrying oil, gas, or water, telephone and telegraph lines, cable and wireless companies, and other "public service utilities" doing business across state boundaries. It has no jurisdiction over companies or transactions operating wholly within a single state. These fall within state jurisdiction.

The Federal Trade Commission. Created by an act of September 26, 1914. It is composed of five members appointed by the president, with the consent of the Senate, for a term of seven years with an annual salary of $10,000. It has the duty of supervising and regulating corporations, partnerships, or persons engaged in interstate commerce other than those under the jurisdiction of the interstate commerce commission. Its main purpose was to create a body to deal administratively and judicially with trusts and unfair and illegal competitive practices, as these are defined by law, and particularly by the Sherman act of 1890 and the Clayton act of 1914.

An appeal lies from its decisions to the U. S. circuit courts of appeal and to the supreme court.

The commission also is empowered to gather and to publish information and to require corporations under its jurisdiction to file reports and accounts. On application of the attorney-general it may recommend adjustments of the business of corporations to bring their conduct within the requirements of the law.

The Federal Reserve Board. The Federal Reserve act of December 23, 1913, provided new institutions entitled "Federal reserve banks" to furnish an elastic currency, rediscount commercial notes, and establish a more effective supervision of banking in the United States. The twelve banks constituting the system are located at Boston, New York, Philadelphia, Cleveland, Richmond, Atlanta, Chicago, Saint Louis, Minneapolis, Kansas City, Dallas, and San Francisco, each the center of a "district." These banks, by appointment of the secretary of the treasury, are fiscal agents of the United States. Control of policy, management, and examination of these banks is vested in the Federal reserve board, composed of the secretary of the

treasury, the comptroller of the currency, and five additional members appointed by the president with the consent of the Senate. See *Banking*.

Each bank is formed by the association of national banks and other banks of the district, who subscribe to its stock. The directors are chosen partly by the subscribing banks and partly by the Federal reserve board. The bank's chief business is to rediscount the notes or commercial paper of the member banks at rates fixed by the board. The law authorizes national banks to make loans on farm mortgages, thereby extending credit to agricultural enterprise.

The United States Shipping Board. This board was created by act of Congress September 7, 1916, to encourage and create a merchant marine to meet the requirements of United States commerce and to furnish a naval auxiliary and reserve. The board is comprised of seven members, appointed by the president, who receive an annual salary of $12,000. The board appoints its secretary and such attorneys, naval architects, and special experts as it finds necessary. Other employees are appointed in accordance with the civil service law. The board has power to regulate carriers by water, engaged in foreign and interstate commerce.

After the entry of the United States into the World War, Congress empowered the president to requisition, construct, and operate shipping without limitation. The president delegated this power to the shipping board and to the emergency fleet corporation formed under it. Power to construct vessels was given to the corporation and power to requisition and operate, to the board.

Federal Board for Vocational Education. The board was created by an act of February 23, 1917, to represent the United States government in the use of funds voted by Congress for the encouragement of vocational education in the states. It ascertains annually whether the several states are using, or are prepared to use, the money allocated in accordance with the provisions of law, and certifies to the secretary of the treasury the states which have complied with the provisions of the act and the amounts they are entitled to receive. It makes studies, investigations, and reports on the following: agriculture and agricultural workers; trades, industries, and apprenticeships; trade and industrial processes and pursuits; commerce and commercial pursuits and requirements placed upon commercial workers; home management, domestic science, etc.; vocational schools and courses of study.

The board is composed of the secretary of agriculture, who is chairman, the secretary of commerce, the secretary of labor, the U. S. commissioner of education, and three other members chosen to represent manufacturing, agriculture, and labor.

The Veterans Bureau. The bureau was created by an act of August 9, 1921, as an independent agency to take over and conduct the duties of the bureau of war risk insurance, the rehabilitation division of the Federal board for vocational education, and some of the services rendered to ex-soldiers by the public health service.

The United States Tariff Commission. The commission was created by the act of September 8, 1916, and consists of six members appointed by the president, with the consent of the Senate, for a term of twelve years at an annual salary of $7500. Its duties are to investigate the fiscal and industrial effects of the customs laws of the United States; to furnish the president, the ways and means committee of the House, and the finance committee of the Senate, when requested, any information at its command; and to make such investigations upon native and foreign industries affected by the tariff as may be requested by the president or by the congressional committees.

The Fordney tariff bill of 1922 authorizes the president to modify customs rates within prescribed limits on findings of the tariff commission as to costs of production and other factors of native and foreign manufactures.

United States Board of Mediation. This board is composed of five members appointed by the president with Senate confirmation. It has powers of conciliation between employers and employees of railway, sleeping car, and express companies. It was created by act of Congress of May 20, 1926, to take the place of the Railroad Labor Board, which was abolished.

THE FEDERAL JUDICIARY

The Constitution (Art. III) provides that the judicial power of the United States shall be vested in one supreme court and inferior courts established by Congress and that all Federal judges shall hold office during good behavior, with compensation that may not be diminished during their term of office.

Organization. Congress in 1789 passed a judiciary act providing for the organization of the supreme court, with a chief justice and five associate justices. Later laws were revised and codified in the act of March 3, 1911. Since 1863 the court has consisted of a chief justice and eight associate justices. The annual salary of the chief justice is $20,500 and of the associate justices, $20,000.

Two attempts, one in 1802 and the other in 1866, made by Congress to reduce the size of the court by enacting that the next vacancy occurring should not be filled, were repealed before the vacancies occurred.

District courts of the United States have increased from 13, in 1789, to 81 within the continental territory of the United States. There are also 7 U. S. district courts, four in Alaska and one each in Hawaii, Porto Rico, and the Canal Zone. All districts are entirely within the boundaries of single states. Twenty-four states have one district each, eighteen states are divided into two, four states into three, and New York and Texas into four districts. Usually there is one judge for each district court, but in two states one judge sits in both districts. In a number of districts there are two judges; in the district of New Jersey, three; and in the southern district of New York, four.

Since their first organization the supreme court and the district courts have remained practically unchanged. The system of circuit courts, however, has varied at different times; but, since the act of March 3, 1891, it has had the form of nine circuit courts of appeals. Each court is formed of a member of the United States supreme court, designated as circuit justice, and several circuit judges, who are frequently appointed from among the United States district judges. No more than three judges sit at a single hearing. These courts were created to relieve the supreme court from its excessive burden of appealed litigation. They hear most cases of appeals from the district courts, and, except in a narrow range of cases, their decisions are final.

Constitutional Jurisdiction. The Constitution fixes the jurisdiction of the Federal courts and limits it to:

- Cases arising under the Constitution.
- Cases under Federal laws and treaties.
- Cases affecting ambassadors, ministers, and consuls.
- Cases in admiralty and maritime jurisdiction.
- Cases in which the United States is a party.
- Controversies between states; between citizens of different states; or by a state against the citizens of another state.
- Cases between American citizens and foreign states, citizens, or subjects.

Cases between citizens of the same state claiming lands under grants of different states.

In cases affecting ambassadors, public ministers, and consuls, and in cases in which the state is a party, the supreme court has "original jurisdiction." Other cases before the supreme court come to it on appeal from the district courts, where the evidence is taken. It is thus rare for the supreme court to take evidence, its business being interpretation of the law and listening to arguments thereon.

A unique feature of the United States courts is their practice of passing upon the constitutionality of both congressional and state legislation. The Constitution (Art. VI, clause 2) provides: "This Constitution and the laws of the United States which shall be made in pursuance therewith, and all treaties made or which shall be made under the authority of the United States, shall be the supreme law of the land; and the judges in every state shall be bound thereby, anything in the constitution or laws of any state to the contrary notwithstanding."

It follows naturally from this provision of the Constitution that the supreme court and other Federal courts have been called upon to determine whether certain laws were in harmony or in conflict with the "supreme law of the land." This power has, on the whole, been sparingly exercised, in 130 years, 33 acts of Congress and some 220 state laws having been pronounced "unconstitutional." The importance, however, attached to some of these laws and the far-reaching consequences of the court's action have tended to bring into great prominence this feature of American government and to make the supreme court of the United States a tribunal of far greater authority in the field of government than any other court in the world. This system of judicial determination of the constitutionality of laws is uniquely American and has been most sparingly admitted by the governments of other countries.

It should be noted that the supreme court and other Federal courts limit their pronouncements upon state legislation to the question of whether it is in harmony with the Federal Constitution, laws, and treaties. Federal courts take no cognizance of any question of harmony between state laws and state constitutions. The Federal courts invariably accept the decisions of state courts upon the constitutionality of state legislation and confine their own jurisdiction to the determination of whether state action is in accord with Federal law.

While, as above stated, the supreme court has in a number of instances restrained the action of Congress in the exercise of its legislative authority, it may be said that on the whole the effect of the court's action has been to increase the power of the national government and by interpretation to broaden the legislative jurisdiction of Congress. This tendency was strongly marked during the long chief justiceship of 34 years of John Marshall, under whose period of service the character and prestige of the court were largely attained. Marshall laid down two principles: (1) that every power claimed by Congress must be clearly derived from the Constitution; (2) that where a power is so derived, it should receive a liberal interpretation.

A majority opinion only among the justices of the supreme court is necessary to a decision. The decision presenting the majority view is prepared and signed by a member of the court designated by the chief justice. A justice holding the majority view, but upon other grounds than those expressed in the opinion of the court, may express his view in a "concurring decision." A dissenting justice may express his opposition to the majority decision in a "dissenting opinion." Through the publication of these decisions and opinions upon the cases adjudicated by the court, in the course of its history, there has been produced a great body of learned discussion upon the Constitution of the United States, which constitutes one of the most famous treasuries of jurisprudence of the modern world.

JUSTICES OF THE SUPREME COURT

(Names of the Chief Justices in italics.)

Name	Service		Born	Died
	Term	Yrs.		
John Jay, N. Y.	1789–1795	6	1745	1829
John Rutledge, S. C.	1789–1791	2	1739	1800
William Cushing, Mass.	1789–1810	21	1733	1810
James Wilson, Pa.	1789–1798	9	1742	1798
John Blair, Va.	1789–1796	7	1732	1800
Robert H. Harrison, Md.	1789–1790	1	1745	1790
James Iredell, N. C.	1790–1799	9	1751	1799
Thomas Johnson, Md.	1791–1793	2	1732	1819
William Paterson, N. J.	1793–1806	13	1745	1806
John Rutledge, S. C.	1795–1795	..	1739	1800
Samuel Chase, Md.	1796–1811	15	1741	1811
Oliver Ellsworth, Ct.	1796–1800	4	1745	1807
Bushrod Washington, Va.	1798–1829	31	1762	1829
Alfred Moore, N. C.	1799–1804	5	1755	1810
John Marshall, Va.	1801–1835	34	1755	1835
William Johnson, S. C.	1804–1834	30	1771	1834
Brock. Livingston, N. Y.	1806–1823	17	1757	1823
Thomas Todd, Ky.	1807–1826	19	1765	1826
Joseph Story, Mass.	1811–1845	34	1779	1845
Gabriel Duval, Md.	1811–1835	25	1752	1844
Smith Thompson, N. Y.	1823–1843	20	1767	1843
Robert Trimble, Ky.	1826–1828	2	1777	1828
John McLean, Ohio	1829–1861	32	1785	1861
Henry Baldwin, Pa.	1830–1844	14	1779	1844
James M. Wayne, Ga.	1835–1867	32	1790	1867
Roger B. Taney, Md.	1836–1864	28	1777	1864
Philip P. Barbour, Va.	1836–1841	5	1783	1841
John Catron, Tenn.	1837–1865	28	1786	1865
John McKinley, Ala.	1837–1852	15	1780	1852
Peter V. Daniel, Va.	1841–1860	19	1785	1860
Samuel Nelson, N. Y.	1845–1872	27	1792	1873
Levi Woodbury, N. H.	1845–1851	6	1789	1851
Robert C. Grier, Pa.	1846–1870	23	1794	1870
Benj. R. Curtis, Mass.	1851–1857	6	1809	1874
John A. Campbell, Ala.	1853–1861	8	1811	1889
Nathan Clifford, Me.	1858–1881	23	1803	1881
Noah H. Swayne, Ohio	1862–1881	20	1804	1884
Samuel F. Miller, Iowa	1862–1890	28	1816	1890
David Davis, Ill.	1862–1877	15	1815	1886
Stephen J. Field, Cal.	1863–1897	34	1816	1899
Salmon P. Chase, Ohio	1864–1873	9	1808	1873
William Strong, Pa.	1870–1880	10	1808	1895
Joseph P. Bradley, N. J.	1870–1892	22	1813	1892
Ward Hunt, N. Y.	1872–1882	10	1811	1886
Morrison R. Waite, Ohio	1874–1888	14	1816	1888
John M. Harlan, Ky.	1877–1911	34	1833	1911
William B. Woods, Ga.	1880–1887	7	1824	1887
Stanley Matthews, Ohio	1881–1889	8	1824	1889
Horace Gray, Mass.	1881–1902	21	1828	1902
Samuel Blatchford, N. Y.	1882–1893	11	1820	1893
Lucius Q. C. Lamar, Miss.	1888–1893	5	1825	1893
Melville W. Fuller, Ill.	1888–1910	22	1833	1910
David J. Brewer, Kan.	1889–1910	21	1837	1910
Henry B. Brown, Mich.	1890–1906	16	1836	1913
George Shiras, Jr., Pa.	1892–1903	11	1832	1924
Howell E. Jackson, Tenn.	1893–1895	2	1832	1895
Edward D. White, La.	1894–1921	27	1845	1921
Rufus W. Peckham, N. Y.	1895–1909	14	1837	1909
Joseph McKenna, Cal.	1898–1925	27	1843	1926
Oliver W. Holmes, Mass.	1902–	..	1841	
William R. Day, Ohio	1903–1922	19	1849	1923
William H. Moody, Mass.	1906–1910	4	1853	1917
Horace H. Lurton, Tenn.	1909–1914	5	1844	1914
Charles E. Hughes, N. Y.	1910–1916	6	1862	
Willis VanDevanter, Wyo.	1910–	..	1859	
Joseph R. Lamar, Ga.	1910–1916	6	1857	1916
Mahlon Pitney, N. J.	1912–1923	11	1858	1924
Jas. C. McReynolds, Tenn.	1914–	..	1862	
Louis D. Brandeis, Mass.	1916–	..	1856	
John H. Clarke, Ohio	1916–1922	6	1857	
William H. Taft, Conn.	1921–	..	1857	
George Sutherland, Utah	1922–	..	1862	
Pierce Butler, Minn.	1922–	..	1866	
Edward T. Sanford, Tenn.	1923–	..	1865	
Harlan F. Stone, N. Y.	1925–	..	1872	

The Court of Customs Appeals. This court was established by an act of August 5, 1909. It consists of five judges, appointed by the president for life. It was created to review, on appeal, the decisions of the board of general appraisers upon the collection of customs duties. The decisions of the court are in most cases final, but some of exceptional importance may be reviewed by the supreme court. The court usually sits at Washington, but may sit in any of the judicial circuits.

The Commerce Court. This court was created by act of June 18, 1910, to review the orders of the interstate commerce commission. It was composed of five judges. In 1913 Congress abolished the court and transferred its jurisdiction to the several district courts of the United States. The judges of the court were assigned to act as Federal district and circuit judges.

Court of Claims of the United States. The court was established by an act of February 24, 1855, with general jurisdiction over all claims upon the United States government, except pension claims, and, since 1915, except claims growing out of the War of the Rebellion. The court consists of five judges, the concurrence of three being necessary to a decision. Where the court finds for the complainant, judgment is entered against the United States payable out of the public treasury.

AMERICAN STATE GOVERNMENT

The United States of America is a Federal union of forty-eight commonwealths, or "states." It has been defined as "an indestructible union of indestructible states." Two classes of government are created or recognized by the Constitution: the national or "Federal" government; and the state governments. Back of both of these governments is the nation, with its political sovereignty in the entire people.

The state governments are older than the Federal government, which was created by the bestowal upon it of powers previously existent in the states. These powers are definitely prescribed by the Federal Constitution. All powers not given to the Federal government are reserved to the states. This constitutional arrangement gave to the modern world its first and most impressive expression of what is known as "federalism."

Federal Expansion. The tendency of successful federal government is to augment gradually the scope and the authority of the national government as against the state governments. This tendency is observable in America. The theory that sovereignty still existed in the states and not in the national government was extinguished by the outcome of the Civil War, 1861–65. The existence of complete free trade between the states, as guaranteed by the Constitution, has built up an industrial organization within the United States that recognizes no state boundaries or lines. Transportation and commerce have become largely "interstate." The population moves unhindered from state to state, while domicile with political rights is a matter of automatic transfer of residence. These and other considerations have constantly tended to extend the Federal government and to strengthen its control over industry and transportation on a national scale.

Concurrent Powers. The result of this process at times has seemed to menace the original character of the state governments. Nevertheless, while the activity of the national government is more impressive and of much more interest to the average citizen of the United States, the authority of the state government comes closer to his person, to his business, and to his home. The field of administration exercised by the state embraces the establishment and control of local and municipal government, of public instruction (except so far as it is assisted and consequently influenced by Federal grants or subventions), and of public health (except where the Federal government may exercise authority in the case of national epidemic). It embraces also the care of dependants and defectives; the construction of highways and other communications; private law, including domestic relations, inheritance, rights of property, contracts; the exclusive control of corporate industry (except where it takes on an interstate character); the punishment of criminals; and the protection of public order.

In this last and important field the president may, on request of the governor of a state, apply the power of the national government. In cases where interstate commerce has suffered interference or the movement of the United States mails has been stopped by violent acts, the president has dispatched United States troops and placed localities under military control without application of the governor, and even in the face of his protest. While generally the police powers exercised by the Federal government and by the state governments are distinct fields, in the prohibition of the sale, manufacture, or transportation of intoxicating liquors, the 18th Amendment provides: "The Congress and the several states shall have *concurrent powers* to enforce this article by appropriate legislation."

Furthermore, since about 1906 the state governments have taken on new vigor, which has expressed itself in a large variety of social and industrial legislation, in the creation of new administrative agencies, and in movements to reorganize and strengthen state administration.

STATE CONSTITUTIONS

The written constitutions of the American states are older than the Federal Constitution. They are, in fact, an American political invention. They grew out of the colonial charters of the period of English sovereignty. They assumed their typical form during the Revolutionary War, 1775–1783. They still bear the marks of their origin and of the political theory of that day. A century and a half of growth has occasioned an extraordinary number of changes and recastings of these organic acts, without radically altering their general type.

Upon the outbreak of the Revolutionary War in 1775, the Continental Congress, a body formed by representatives of the thirteen American colonies which were united in revolution, recommended to these colonies the adoption of new constitutions, to take the place of the governments which had existed under British royal authority. Certain colonies adopted this suggestion in the following order: New Hampshire, South Carolina, Virginia, New Jersey, Delaware, Pennsylvania, North Carolina, and Maryland. Virginia was the first state to devise a constitution with a complete frame of government and with a code of popular rights.

None of these new constitutions was "popularly ratified." Massachusetts, by its constitution of 1780, inaugurated a further step. An assembly elected for that sole purpose framed the constitution, which was then submitted to the suffrage of the people of the commonwealth. Thereby was initiated the practice of popular ratification of constitutions, which, while not uniformly followed, may be regarded as the representative procedure.

Some 140 state constitutions have been prepared and put into execution during the history of American state government. Each of the 48 American states is governed by such an organic act. Some states (Louisiana, South Carolina, Virginia, Georgia) have, in the course of their history, had as many as six different constitutions. Massachusetts still retains, with some important amendments, the constitution of 1780; Maine, her constitution of 1819. "Admission to the Union" is an action taken by the Congress under one of its most important constitutional powers.

Admission to Statehood. With the exception of the 13 original states, Texas, and California, all of the states, before admission, were territories governed under acts of Congress. The territories were not members of the Union. Their people had no constitutional political rights and did not participate in national elections. "Admission" of a territory to statehood, however, was admission to full equality with all other states. Congress, when it judged the time ripe for the admission of a territory as a new state, by an "enabling act," authorized an election for the purpose of drafting a constitution.

This action, if satisfactory, led to the admission by Congress into the Union. Congress, more than once, by legislation, has prescribed conditions under which a given territory should be admitted to statehood, as, by the suppression of polygamy in the case of Utah. Such limitations, however, become invalid as soon as the state is admitted to the Union.

Arizona was admitted to statehood in 1912 only after removing from its proposed constitution, at the insistence of the president and the Congress of the United States, a provision for the recall of judges. Immediately after admission into the Union, however, the state of Arizona exercised its right to replace this provision in its constitution. The dates of admission of states since the formation of the Union, in 1789, are given in the table entitled *Data on State Governments*.

Amendments to State Constitutions. Three procedures exist for the amendment of a state constitution, two being operative in the great majority of states. These are (1) amendment on proposal of the legislature; (2) amendment by a constitutional convention; and (3) amendment by popular initiative. The oldest and most generally utilized method of amendment is by a proposal of the legislature, which is authorized in every state except New Hampshire, where all amendments must originate in a constitutional convention.

The Legislative Proposal. Differing conditions attend the legislative proposal: (1) that it must be passed by two successive legislatures (in Delaware this procedure enacts the amendment); (2) passage by an extraordinary majority—two-thirds or three-fifths vote of all members elected; (3) limitations as to the number of amendments proposed at one time, or the frequency with which the same amendment can be passed. In all states but Delaware the proposal, having passed the legislature, is submitted to popular ratification.

In most states a majority of votes cast ratifies the amendment and makes it a part of the constitution. Idaho, Indiana, and Wyoming require a majority of the electors of the state; Rhode Island three-fifths, and New Hampshire two-thirds, of those voting thereon; Nebraska requires a majority of those voting on the measure, provided votes cast in favor are not less than 35 per cent of total votes cast at the election. A majority of all votes cast at the election is required in 9 states—Alabama, Arkansas, Illinois, Minnesota, Mississippi, Indiana, Ohio, Oklahoma, Tennessee. Between 1900 and 1921, more than 1500 amendments to state constitutions were in this manner submitted to popular vote, of which approximately 900 were adopted and 600 were rejected.

Constitutional Conventions. Constitutional conventions or extraordinary legislative bodies, popularly elected for the purpose of revising the constitution, are the usual method where a *general revision* of the constitution is sought. In most states the proposal to call a constitutional convention is submitted to popular vote, and in seven states—New Hampshire, Iowa, Michigan, Maryland, New York, Ohio, Oklahoma—the constitution requires that such a proposal be submitted regularly at the conclusion of a certain interval of years. In Maine and Georgia the legislature may call a convention without popular approval.

Popular Initiative. Amendment by popular initiative is now authorized in Arizona, Arkansas, California, Colorado, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, North Dakota, Ohio, Oklahoma, and Oregon. The petition must be signed by a definite number of voters or by a number equal to a certain percentage (8 to 15) of the total vote cast for some state officer at the last preceding election. The secretary of state, having verified these signatures, places the amendment upon the list of measures to be voted upon by the people at the next general election.

In Michigan the popularly initiated amendment must receive the approval of the legislature before being placed upon the ballot. In Massachusetts it must receive the approval of at least one-fourth of all members of two successive legislatures and in both cases the legislature may submit a competing or substitute measure.

Popular Ratification. The practice of referring to popular ratification constitutions framed or revised by a convention has steadily grown. The early constitutions, except in New Hampshire and in Massachusetts, were not submitted to the people, but from 1784 to 1840 all such constitutions were submitted except in the cases of Delaware, Minnesota, and Arkansas.

During the Civil War period the practice was against submission. Between 1870 and 1890 there was a return to the pre-war practice and all constitutions drafted by conventions were submitted to popular ratification. From 1890 to 1910, of eleven constitutions adopted, five were popularly ratified. Since 1910, new constitutions or important revisions have been effected by constitutional conventions in the following states: Ohio (1912), Mass. (1917-18), Neb. (1919-20), N. H. (1918-21), La. (1913, 1921), Ill. (1920-22), and Mo. (1922-23). Arizona and New Mexico (1912) adopted constitutions before entering the Union. In all cases, except in that of Louisiana, these constitutions were popularly ratified.

CONSTITUTIONAL LIMITATIONS UPON THE POWERS OF STATE LEGISLATURES

By the Constitution of the United States, all legislative powers not expressly bestowed upon the national Congress are reserved to the states. Thus no enumeration of the powers of a state legislature is necessary in a state constitution. "All residuary legislative power" being implied, the only original restraint is that state laws must not conflict with the Constitution of the United States, with the laws of Congress, or with United States treaties.

The early state constitutions were framed at a time of great popular confidence in elected legislatures. Gradually, however, as legislatures were tempted into passing unrepresentative legislation or yielding to corrupt influences, restrictions upon the powers of legislatures were introduced by amendments to state constitutions. Louisiana in 1845 and Iowa in 1846 adopted constitutional provisions that forbade "special legislation." The constitution of Michigan (1847) and that of California (1849) contained similar restrictions on the legislature.

Special Municipal Laws. The purpose of these changes was to prohibit the legislatures from appropriating money or conferring other benefits upon private individuals or corporations. In 1850-51, the states of Ohio and Indiana prohibited state legislatures from passing special laws for municipalities. This action was to remedy a growing abuse of interfering with municipal government and even of penalizing cities in the interests of partisan politics.

The movement initiated by Ohio became general, particularly in western and southern states. Five-eighths of the states have adopted constitutional provisions that no special law shall be enacted where a general law can be made applicable. In the New England states alone are the legislatures generally free to enact laws applying to a particular person, city, town, or other corporation.

Legislative Freedom. Undeniably, the process of placing fetters upon state legislatures has been carried too far and has resulted in denying to state legislatures a discretion which is properly theirs and which it would be to the interest of state government to have exercised. A movement has become apparent to restore to state legislatures a freedom



STATE CAPITOLS. I

1 Capitol, Hartford, Conn.; *photo by Brown Bros.* 2 Capitol, Harrisburg, Pa.; *photo by J. H. McFarland Co.* 3 State House, Boston; *photo by P. J. Weber.* 4 Capitol, Springfield, Ill.; *Publishers' Photo Service.* 5 Capitol, Albany, N. Y.; *copyright by Fellowcrafts Photo Shops.* 6 Capitol, Columbus, O.; *copyright by Ewing Galloway.* 7 Capitol, Madison, Wis.; *Publishers' Photo Service.*



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STATE CAPITOLS. II

1 Capitol, Sacramento, Cal. 2 Capitol, Santa Fe, N. M. 3 Capitol, Columbia, S. C. 4 Capitol, Austin, Tex. 5 Capitol, Lincoln, Neb. 6 Capitol, Denver, Colo. 7 Capitol, Cheyenne, Wyo. 8 Capitol, St. Paul, Minn. 9 Capitol, Frankfort, Ky.

which nearly a century of constitutional amendment largely destroyed. The adoption by many states of the legislative referendum, creating, as this does, a popular check upon vicious legislation or legislative favoritism, logically would seem to call for the removal of other and hampering restrictions.

STATE LEGISLATURES

In all American states the legislative power is intrusted to a representative body consisting of two chambers and usually known as the state legislature, or general assembly. In Massachusetts and in New Hampshire it is called the general court. The bicameral or two-chamber plan has been everywhere adopted in American states in obedience to the "theory of checks and balances," one house halting and correcting the wrong or impulsive action of the other. In all states the "upper" and uniformly smaller body, being elected for a longer term and with sometimes a higher age qualification for its members, is called the Senate. The larger or more popular house in all but eight states is called the House of Representatives: in the others it is called the Assembly.

Qualifications. In all states the qualifications for voting for both houses are the same. The "aristocratic" character of the electors of the upper house long ago disappeared. Among the qualifications for election, certain states require a higher age for the Senate (frequently 30 years) than for the lower house (21 to 25 years). Residence in the state for a prescribed term before election to the legislature is a usual condition, as is residence in the district from which a member is chosen. This last requirement has the result of increasing the representative's responsibility to his constituency, since, if defeated by unpopularity in the district in which he resides, he cannot without change of residence stand for election in another. Federal officeholders are generally ineligible, as are paid officials of the state, with certain customary exceptions (notaries, national guard officers, soldiers, etc.).

Organization and Legislation. State constitutions usually provide that the lieutenant governor or vice governor shall be the presiding officer of the Senate, and provisions have been introduced into many constitutions regarding the procedure of legislation, the publication of bills, etc. Other than these, both houses are free to organize themselves in their own way. The American system of legislative committees everywhere prevails. Members of either house have an almost unlimited privilege of introducing bills, which, after being read by title, are referred to the appropriate committee for examination. The unstinted practice of introducing bills results in legislatures being burdened, at each session, with an intolerable number of projected laws which, even by the committee system, cannot be properly examined or discussed.

The interest felt by members in the passage of their bills and the political reputation made or lost by the success or failure of such measures leads to the practice of members supporting one another's projects in return for support of their own, and results in the loading of American statute books with ill-digested, unwise, and practically undebated laws.

Another embarrassment to American state legislation is the mass of detail written into statutes, the effort of the legislator being to cover every possible assumed contingency. These provisions, being frequently purely theoretical and not based upon experience with the measure, usually require a large amount of amendment or alteration by subsequent legislatures, which results in great uncertainty as to statutes and in delays and embarrassments in their enforcement.

Distrust of state legislatures and apprehensions felt as to radical action by them led, in many states, to constitutional provisions limiting the frequency of legislative meetings and the duration of their proceedings. The earlier practice of annual meetings of legislatures has given way to biennial legislatures, a provision which frequently appears to have had the result of increasing the burdens of an infrequent session and adding to the inducements of forcing through a legislature bills which have been insufficiently considered.

These and other obvious disadvantages of state legislatures have led to recent proposals for their reconstitution, the most general being to abolish the bicameral system in favor of a single legislative body. The successful practice of the provinces of the Dominion of Canada, seven of whom have single-chamber legislatures, is cited. It is sometimes overlooked, however, that in the case of the Canadian provinces, the system of ministries responsible to the provincial legislature has preserved the British practice of having most bills originate with the administration. Thus measures have the advantage of careful drafting and discussion by responsible cabinets before their introduction into the legislative assembly.

Legislative Bureaus. Another device to avoid defects of drafting, duplication, and other bad features of state legislation is the creation of the legislative reference bureau, a permanent office filled by legislative experts whose business it is to make comparative studies of state legislation, to afford information to members of the legislature, and to assist members in the preparation of their bills. Such legislative service is given in the following American states: Alabama, Arizona, Arkansas, California, Connecticut, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Missouri, Montana, Nebraska, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Texas, Vermont, Virginia, Washington, Wisconsin, and Wyoming.

Members of state legislatures receive compensation for their services; but this compensation varies greatly in different states, as may be seen from the table *Tabulated Data on State Governments*.

REFERENDUM AND INITIATIVE OF LAWS

The original sole competence of legislatures to enact laws has been modified in 20 states by the adoption of the "legislative referendum" and in 18 states by the "legislative initiative." These modifications of "representative government" are Swiss devices and were first adopted in America as joint measures by the state of South Dakota in 1898. While usually associated, the two institutions are unlike in spirit, the referendum being a conservative practice, the initiative, radical.

A referendum of constitutional measures, as stated above, dates from the early Revolutionary constitutions. The practice is old, also, of requiring local bond issues and exceptional fiscal measures to be ratified by voters of state, county, school district, or city. But, since the example of South Dakota, the practice has spread of giving to the people the right of annulling an act of the legislature or of originating laws to be submitted to popular judgment either without legislative consideration, "direct initiative," or together with a similar measure proposed by the legislature in its place, "indirect initiative."

The referendum of a law is accomplished by securing signatures to a petition to suspend the operation of the act and to submit it to popular judgment as expressed at a general election. The number of signatures required is usually 5 per cent of the votes of the state. Such a petition must be signed and submitted to the secretary of state for verification within a certain period (usually 90 days) following the adjournment of the legislature. The initiative petition requires a higher number of signatures, usually 8 per cent. Maryland and New Mexico have the referendum only.

The states possessing both initiative and referendum, with date of adoption and percentage of signatures required, are as follows: Arizona (1911, extended, 1914, referendum 5%, initiative 10%), Arkansas (1910, ref. 6%, init. 8%), California (1911, ref. 5%, init. 8%), Colorado (1910, ref. 5%, init. 8%), Maine (1908, ref. 10,000, init. 12,000), Massachusetts (1918, ref. 10% plus 15,000, init. 10% plus 20,000, plus 5000), Michigan (1908, ref. 5%, init. 8%), Missouri (1908, ref. 5%, init. 8%, ⅔ cong. dists.), Montana (1906, ref. 5%, ⅔ of counties, init. 8%, ⅔ of counties), Nebraska (1912, revised 1920, ref. 5%, init. 7% or 5% in ⅔ counties), Nevada (1904, ref. only, 1912 both ref. and init. 10%), North Dakota (1914, ref. 7000, init. 10,000), Ohio (1912, ref. 6%, ½% from ½ of counties, init. 3% plus 3% indirect, ½% from ½ of counties), Oklahoma (1907, ref. 5%, init. 8%), Oregon (1902, ref. 5%, init. 8%), South Dakota (1898, ref. 5%, init. 5%), Utah (1917, ref. and init. 10% of maj. of counties), Washington (1912, ref. 6%, init. 10%).

In a number of states a still higher requirement than that given above exists for the initiative of a constitutional amendment. Maine, Montana, South Dakota, Utah, and Washington make no provision for the popular initiative of a constitutional amendment. Between 1902 and 1918, inclusive, in 20 states, 717 legislative measures were submitted to popular judgment; of these, 187 constitutional amendments and 120 laws were adopted. In number of measures submitted, Oregon led, with 170. The largest number submitted at one election was in California, 47 in 1914.

THE GOVERNOR

The executive power in all American states is intrusted to a governor. The office, both in its functions and in its title, is an inheritance from the colonial period. The Revolution substituted the practice of popular election of the governor for that of appointment. In all states the governor is directly elected by the qualified voters, for a definite term.

Qualifications. Among the qualifications for election as governor frequently provided by state constitutions are American citizenship, previous residence in the state of from 1 year (Minnesota) to 7 years (Massachusetts, New Jersey), and minimum age usually 30 years. In thirteen states, the governor is not eligible for re-election. In Tennessee, where the term is two years, he is ineligible for more than 6 of any 8 consecutive years. The term varies from 2 years (23 states) to 4 years (24 states). In New Jersey it is 3 years.

Authority of Governor. As the period of early state constitution making showed a confidence in legislatures, so it exhibited a marked distrust of executive or gubernatorial authority. This prejudice survived the entire first century of the history of state governments. In no state had the governor an administrative power over state affairs comparable to that of the president over national administration. The executive departments were entrusted to officers popularly elected and independent of the governor's control. It was thus impossible to hold the governor responsible for the general conduct of the state's business and equally impossible for him to enforce a consistent policy throughout the state administration. The governor seldom had the power of appointment of state or local officials, nor the right to remove for negligence, inefficiency, or malfeasance. Beginning with the second decade of the present century, however, came a movement to enlarge the authority of the governor over state administration. One proposal was that of the so-called "short ballot," whereby a governor alone would be elected, other state officials being generally his appointees. More recently, in many states (Wis., Cal., Ill., Ohio, Mass., Minn., New York) radical reorganization has been effected, both by constitutional amendment and by legislation. State services have been centralized, or organized in departments, with the suppression of numerous independent boards and commissions. The department heads are made appointable and removable by the governor, and in some states now sit with the governor as an administrative and advisory "cabinet." There has been an increase in the number of officials holding office at the pleasure of the governor rather than for fixed terms.

On the political side, the position of governor is an honorable and conspicuous one. His influence in state and national politics is great, and tends to increase. It is from the class of successful state governors that strong presidential candidates are usually derived. The dignity and the influence of the position are sufficient to attract, as candidates for the office, able and representative citizens. Nevertheless American state administration remains generally "decentralized" in contrast to the national administration.

The Veto Power. Although the office of governor was originally conceived as entirely distinct from the legislative power, the "doctrine of separation of powers" being generally avowed by American state constitutions, the governor has come to possess a great influence over the legislature and its legislation. This has been accomplished in several ways. First, by the bestowal upon the governor of the veto power.

In the earlier state constitutions, the veto power was generally absent, but, by successive amendments, it has been created until now it exists in all states except North Carolina. Furthermore, in three states—South Carolina, Virginia, and Washington—the governor's veto powers may extend not only to the entire measure, but to any item in any bill, while in 38 states the governor may veto any item in an *appropriation bill*. This provision enables the governor practically to determine the state's budget, and places upon him the responsibility of defeating riders to appropriation bills. Public opinion in American states, furthermore, has come to require the governor to frame and press upon the legislature at each session an "administrative program."

Influence on Legislation. The influence possessed by the governor over legislatures, not only by the importance of his position, but by his power of vetoing bills in which members are interested and by reason of his leadership in the party, gives a special character to what are called "administrative measures" or bills proposed or supported by him, and it is hardly too much to say that the governor is today judged quite as much for the legislation which he secures as for his general conduct of the state's executive business.

A governor, faced with an unwilling legislature, frequently goes directly to the people of the state, and, through interviews or public addresses, organizes the force of public opinion to bear upon the legislature to favor measures upon which he has staked his political reputation. These practices, while they have contradicted the theory of the separation of powers, undoubtedly have introduced into American state government a necessary authority and have enabled the voters of the states to hold the government to a closer responsibility.

The Power to Pardon. Another important power of the governor is that of pardon. This power may be classified in its several forms as the power to "commute" a sentence or reduce it below the punishment fixed by a court, the power to "pardon" or entirely free a person from the consequences of guilt, the power to grant "reprieves" or postpone sentence, and the power to remit fines and forfeitures.

In 32 states the sole power of pardon, except in cases of treason or impeachment, resides in the governor; in 25 states the governor alone has the power to commute sentence. In 40 states he has the sole power to grant reprieves and in 20 states the

sole power to remit fines and forfeitures. In 12 states the governor has the power to pardon, when acting with his council, or on the recommendation of a board of pardons; in 7 states he similarly exercises the power of commuting sentence; and in 6 states he similarly exercises the power of remitting fines and forfeitures. In 5 states, however (Florida, Idaho, Nevada, New Jersey, and Utah), the pardoning power resides exclusively in a board of pardons, and in one state, Connecticut, the pardoning power is reserved to the legislature.

The power of remitting fines or forfeitures is less frequently confided to the governor, and 21 states by constitutional provision entirely prohibit its exercise.

STATE OFFICERS

Besides a governor and a lieutenant governor (in 35 states), the usual officers are a secretary of state (all states), an attorney-general (all states), a treasurer (all states except New York), an auditor or comptroller (all but 3 states), and a superintendent of public instruction (all states). These are usually popularly elected at the same time and for the same term as the governor. In a few cases the secretary of state (Delaware, Maryland, New Jersey, Pennsylvania, Texas), or the superintendent of public instruction (7 states), is appointive by the governor, while in a few states (Maine, New Hampshire, New Jersey) one or more of these officers may be elected by the legislature. In 8 states the school superintendent is elected by a board of education. Other usual officers are the adjutant general of the national guard or state militia, of which the governor is the commander in chief, and a surveyor-general, or a registrar of lands.

As stated above, by recent legislation in a few states, the heads of departments now constitute a "cabinet" of the governor. Usually, however, they perform their duties independently of him and may even represent political parties other than that with which the governor is affiliated.

Nearly all other state offices have been created, not by the constitution, but by legislation, and have come into existence gradually as the state has assumed added responsibilities or taken private professions and certain classes of business under its control.

Types of Administration. Several types of administration have been adopted to discharge new forms of state business: (1) the "*ex officio* board," composed of the governor, secretary of state, the attorney-general, an executive officer, and frequently other members; (2) the "lay board," a corporation of citizens, unsalaried, and usually appointed by the governor for fixed terms, with the power to choose the executive of a state institution (educational, penal, charitable, etc.), and to direct its conduct; (3) a "bureau type" where a branch of administration is intrusted to a single directive head (commissioner of insurance, banks, corporations, etc.); (4) the "commission type" where public business is intrusted to a salaried board whose members are considered technically qualified or expert administrators and who have a joint or "collegiate" responsibility (public service commissions, boards of control, etc.).

Boards and Commissions. Admission to the practice of certain professions is secured in most states only after examination and certification by boards composed of selected representatives of these professions (law, medicine, dentistry, pharmacy, architecture, public accounting). The number of these offices, boards, and commissions has multiplied to an astonishing degree. In 1920 Michigan had 116 such bodies, New York 187, Massachusetts over 200. In Michigan the governor was *ex officio* a member of 24 boards. The system has obvious disadvantages; viz., duplication of expense, overlapping functions, absence of responsibility, and undue independence of common administrative authority.

REORGANIZATION OF STATE GOVERNMENT

The problem of reorganizing State administration so as to assure simplicity, efficiency, economy, and responsibility is one of the most pressing needs of American government. State governments in 1926 expended more than $1,600,000,000. It is believed that much of this expense could be saved or more profitably directed by improved systems of administration. About a third of the states in the last fifteen years have made exhaustive investigations. Reorganization has however proceeded in quite different lines. New Jersey since 1915 has consolidated numerous services into departments, usually under commissions of several members, so appointed as to be quite independent administratively of the governor or any other executive control. Other states (Cal. in 1911, Kansas, West Virginia, Alabama, Texas, North Dakota among others) have experimented with "boards of control," or "boards of administration" with financial directive control over other departments or institutions, and in some cases with powers of audit, investigation, and of purchase and supply.

More recently the movement has taken the form of making the governor the head of the state administration, as the president is of national administration, with power to appoint and remove heads of departments and directors of administrative services. These ends have been accomplished both by constitutional amendment where necessary, and by legislation. Among states which have proceeded furthest in this direction are Illinois in 1917; Massachusetts, Nebraska, and Idaho in 1919; Washington and Ohio in 1921; Maryland in 1922; Pennsylvania in 1925; New York in 1926; California and Virginia in 1927.

CIVIL SERVICE

One consideration operating against the "short ballot" and the enlargement of the governor's control of state administration is fear of the misuse of this power to reward political adherents and to create "political machines." The number of employees in certain states is large (10,000 in Illinois). The unrestricted power to employ and to dismiss so great a force undeniably offers opportunities for serious abuses. While the power to appoint department staffs is legally vested in the heads of the offices, the actual choice may be made by party leaders or "bosses" regardless of the efficiency of the service. Public service has become highly specialized and can be well discharged only by trained and conscientious officials holding office for considerable terms and free from the disturbing vicissitudes of party contests.

Tenure of Office. As in the Federal service, so in the state, including local and municipal administration, advocates of civil service reform have sought to secure laws establishing a "merit system" for public office with security of tenure for competent and faithful public servants. The movement, however, has not met with wide success, and, as yet, no state has adopted a general standard for determining the fitness of aspirants to all offices, local as well as state.

Civil service laws are in force in California, Colorado, Illinois, Kansas, Maryland, Massachusetts, New Jersey, New York, Ohio, and Wisconsin. Connecticut repealed its law in 1921. In 1919, Kansas discontinued making appropriations for administering its law. The usual method of administering a civil service system is by a commission, which is given power to "classify" the public positions, fix qualifications for each grade of employment, hold examinations to determine fitness, certify "eligibles" to the appointing power, keep official service records of employees, and in some cases to try or investigate charges of unfitness. Civil service laws usually declare public positions open on equal conditions to both men and women.

THE RECALL

The recall has been defined as "a special election to determine whether an official shall be superseded before the ordinary expiration of his term." It is in use in ten states, on petition of a certain percentage of voters, as follows: Arizona (1911, 1912, 25%), California (1911, 12% at least 5 counties for state officers, 20% for local officers), Colorado (1912, 25%), Kansas (1914, 10%, 15%, and 25%), Louisiana (1914, 25%), Michigan (1913, 25%), Nevada (1912, 25%), North Dakota (1920, 30%), Oregon (1908, 25%), Washington (1912, 25% and 35%), Wisconsin (1926, 25%). California, Arizona, and Colorado apply the recall only to elected officers. Washington, Michigan, and Louisiana except judges.

LOCAL GOVERNMENT

The organization of local government (county, township, district, municipality) is entirely a function of the states. Local government serves two purposes: (1) the need of the state for agencies in conducting its adminstration and enforcing its laws in the subdivisions of the state; (2) the need of communities for organization to satisfy local or community needs. Theoretically, a county may be considered a local agency of the state and a town or city a community organization for determining and supplying its own public wants; but actually state and local activities overlap, or merge and separate in response to an altering social order.

Education, public health, charities, and communications are likely to command the interest of both the state and the town. Justice and preservation of public order are clearly state, not local, functions; but the American practice of "decentralizing" public authority and a prejudice for local self-government have influenced the state usually to leave these essential services to be performed by judges and peace officers locally elected and responsible, not to the state, but to the people of the locality.

Division into Counties. All of the 48 states are divided into counties (in Louisiana called "parishes"). Within the counties (largely rural in character), cities and towns exist as incorporated municipalities. There are more than 3000 counties in the United States, the average number for each state being more than 60. But Delaware has only 3 counties, Rhode Island has 5, while Texas has 253. In New England, county government is mainly limited to the administration of justice, though the county may be a unit of senatorial representation. Elsewhere, it is the usual unit for maintaining roads and bridges, for poor relief, for school administration, and in some states for health supervision and for agricultural aid.

County Government. County government is organized according to no general principle. Outside of Connecticut, Rhode Island, and Georgia, there is an elective board of commissioners or supervisors, with powers, in southern and western states, to assess county taxes, to care for county property, to maintain highways and roads, and to conduct county institutions. In addition, the usual officers are the judge or judges of the county or "superior" court, the sheriff, the attorney, the clerk, the recorder of deeds and other instruments, the assessor of taxes, the collector of taxes, the school superintendent, the health officer, etc. The term of office varies from two to six years.

There is an absence of any responsible head for the county administration and usually county officers are subject to a little or to no state supervision. Removal power is rarely placed in the hands of the governor.

MUNICIPAL GOVERNMENT

In 1920, nearly 26 per cent of the population of the United States lived in cities of more than 100,000, while 43 per cent lived in cities of over 8000. The United States census classifies communities having 2500 or more people as "urban," and 51 per cent of the American people live in such communities.

City government in the United States follows no accepted plan. Three chief forms are found: the mayor and council plan with separation of executive and legislative functions; the "commission" plan; and the "city manager" plan. The first is the most common. The mayor is popularly elected and may be given a veto over legislation of the council and a large control over city offices. Earlier practice was to divide the council into two chambers.

Commission Form of Government. The commission plan had its origin in Galveston in 1901. It has been adopted in all parts of the Union but particularly in Pa., N. J., Ill., Kans., Okla., and Tenn. Pennsylvania, in 1913, made commission government compulsory for all cities of the third class. Cities of largest population which have employed this form are Newark, N. J., New Orleans, La., Jersey City, N. J., Portland, Ore., St. Paul, Minn., Oakland, Cal., Omaha, Nebr., Birmingham, Ala., Memphis, Tenn., San Antonio, Tex., Dallas, Tex., Houston, Tex., Des Moines, Iowa, Trenton, N. J., Salt Lake City, Utah, Reading, Pa., Spokane, Wash. Under this plan both executive and legislative functions are entrusted to a commission, usually of five. They are popularly elected and are chosen, not by districts, but "at large," though not necessarily all at the same election. This commission employs the city officials and directs the entire administration.

City Manager Plan. This plan originated about 1908. Dayton, Ohio, in 1913, was the first to adopt it. Between that date and 1929, over 400 American cities altered their charters or ordinances to provide for city managers. This list of cities includes 30 in California, 37 in Florida, and 39 in Michigan. The maximum number of adoptions, 53, occurred in 1921. In addition to these American cities, 17 cities in Canada and 2 in New Zealand have adopted the plan. Under this plan the elected city council or commission engages a manager who is the head of the entire municipal administration and confines its attention to determining policies, raising revenue, making appropriations, and supervising the administration of the manager.

Municipal Charters. Municipal governments under the American legal system have only those powers and functions which are specifically given them by their charters or by statutes. Originally a city was incorporated and provided with a charter by an act of the legislature. This practice has been altered in two ways: first, by the provision of standard types of city government (corresponding to populations of different sizes or "classes") laid down in "general laws"; and, secondly, by allowing city populations to frame their own charters, which, when ratified by the legislature, become effective.

Such "freeholders' charters" are now provided for by the constitutions of 13 states: California, Colorado, Michigan, Ohio, Missouri (cities over 100,000), Washington, Minnesota, Oklahoma, Arizona, Oregon, Nebraska, Texas, Maryland (only Baltimore and counties), while statutory provisions granting a similar "municipal home rule" have been adopted in Iowa, South Carolina, Mississippi, Florida, and Connecticut.

DEPENDENCIES OF THE UNITED STATES

The Spanish American war of 1898 brought new responsibilities which have made the United States one of the principal "colonial powers" of the world. Cuba was given its freedom under American protection. See *Cuba*. Porto Rico and the Philippines were ceded outright by Spain to the United States by the Treaty of Paris, ratified 1899. The acquisition of the right to build the Panama canal, with other responsibilities also, flowed from the war.

Porto Rico. After a period of military rule, a liberal government was created for the island of Porto Rico, which was modified by the Organic act of Congress of 1917. This act granted American citizenship to the people of Porto Rico. Legislative power is vested in two houses, a Senate of 19 members and a House of Representatives of 39 members. The franchise is possessed by all citizens and no property qualification may be imposed. The executive power is in a governor appointed by the president of the United States, who has an executive council. In addition to other courts, there is a "United States Court," the judge appointed by the president of the United States. There is a resident commissioner of Porto Rico stationed at Washington.

Philippine Islands. In the Philippines, insurrection continued after the cession to the United States and until 1902. Military government continued until July 4, 1901, when, by authority of the president of the United States, all governmental power within the islands was vested in a civil Philippine commission, presided over by William H. Taft. This body re-established insular, provincial, and municipal government throughout the islands and authority over the pagan and Mohammedan tribes of the archipelago.

A system of civil service was early adopted to which Filipinos were admitted in increasing numbers. Public instruction in the English language was developed on a scale without precedent in the history of colonial rule. In 1907 a Philippine assembly, elected by a restricted suffrage, was created under authority of Congress, and, by a new organic act of Congress, August 29, 1916, all legislative power was intrusted to a Philippine legislature consisting of a Senate and a House of Representatives. The executive power is vested in a governor-general, appointed by the president of the United States. The governor-general has a veto power, and acts of the Philippine government may be further vetoed by the president of the United States. The vice governor-general, the supreme court, and the insular auditor are appointed by the president.

The islands are divided into "provinces" which correspond generally to those existent under the Spanish rule. The government of each province is confided to a "board," which is composed of the governor, the treasurer, and a third member, all popularly elected. The provinces are furthermore divided into municipalities or "pueblos," which are governed by elected mayors, called "presidents," and councils. A large measure of local self-government has been afforded to the Filipinos since the first organization of administration under American authority. Many important governmental services, however, are directed by insular bureaus, such as education, public health, public works (including important roads), forestry, and agriculture. All public financial accounts, including those of the provinces and of the municipalities, are subject to insular audit.

In addition to forces of the United States army and navy stationed in the Philippines, there are certain regiments composed of "Philippine Scouts"—native troops under American officers—and a constabulary with both American and Filipino officers.

Complete independence of the Philippines was recommended by President Wilson in 1921. President Harding in the same year sent a commission of investigation to the Philippines, headed by Major General Leonard Wood. After investigation of all parts of the islands, the commission reported adversely to immediate independence. The Philippines are represented in the U. S. Congress by two delegates without votes.

An additional governing body not authorized or contemplated by congressional legislation was constituted by the governor-general in 1918. It was called the "council of state" and included the members of the governor-general's cabinet, the president of the Senate, and the speaker of the House. It became the purpose of the members of this council to compel the governor-general to submit executive actions to its decision. As Congress however, by the organic act of 1916, specifically bestowed all executive powers upon the governor-general, it would seem impossible for that officer to delegate his responsibilities or subject his actions to review by a body unknown to the organic laws. In 1923, the members of this "council of state," finding that they were unable to dictate the policy of the governor-general, resigned in a body.

Guam. The largest island of the Ladrones or Marianas group, ceded to the United States by Spain in 1899. It is governed by a naval officer under authority of the secretary of the navy. Congress has never legislated for its government. Guam has long been regarded as an advantageous site for a naval base. Its geographic situation and form are such that it could probably be made impregnable, and its proximity both to the coast of Asia and to the South Seas would give great power to a fleet operating from this island as a base. By the Five Power Treaty on Limitation of Armament, negotiated at the Washington Conference, 1921-22, the United States agreed to take no steps by way of fortification or strengthening of this position for a period of ten years.

Samoa. American Samoa, the principal island of which is Tutuila, was acquired by the United States through a tripartite treaty with Great Britain and Germany, November 14, 1899, whereby the other two countries renounced claims over this part of the Samoan islands. American Samoa is governed by a naval officer responsible, through the secretary of the navy, to the president. Congress has never by legislation created a government for the island.

Hawaiian Islands. The Hawaiian islands were under a native monarchy until 1893, when a revolution deposed the queen and set up a provisional government. On application of this government and by a resolution of Congress of July 7, 1898, the islands were annexed to the United States. They have a "territorial" form of government, consisting of an elective legislature of two houses, and a governor and a secretary appointed for four years by the president. The territory is represented in Congress by a delegate without vote.

Virgin Islands. The Virgin islands, formerly known as the Danish West Indies, were purchased by the United States from Denmark in 1916, for 25 million dollars. Under an organic act of Congress, March 3, 1917, all governing powers are vested in a governor appointed by the president of the United States; and the Danish laws, so far as compatible with the new status of the islands, continue in effect until modified by Congress.

Canal Zone. By treaty with Panama, ratified 1904, the United States acquired title to the Canal Zone, a strip 10 miles wide, with use and control of waters and islands at each end of the canal for purposes of construction, maintenance, or defense of the canal. See *Panama.* This interoceanic strip is, by act of Congress of 1912, placed under the control of the president, who commits its administration to a governor, responsible to the secretary of war.

For responsibilities of the United States as a protecting power, see *Cuba, Panama, Haiti, Santo Domingo,* and *Nicaragua.*

Alaska. Alaska, including the Aleutian islands, was purchased from Russia in 1867 for $7,200,000. By an act of Congress of August 24, 1912, Alaska was made a "territory." It has an elective legislature of eight senators and sixteen representatives, and a governor appointed by the president. Congress reserves to itself a large field of legislation, and much of Alaskan administration is conducted by departments at Washington. Women participate in the suffrage.

TABULATED DATA C

State	Capital	Legislature: Size of Legislature: Sena's	Size of Legislature: Repre's	Term of Members: Sena's	Term of Members: Repre's	Frequency of Session	Limit of Session	Salaries of Members
Alabama	Montgomery	35	106	4	4	Quadrennial	50 days	$4 per diem *b*
Arizona	Phoenix	19	52	2	2	Biennial	60 days	$15 per diem
Arkansas	Little Rock	35	100	4	2	Biennial	60 days	$1000 for term; $1100 speaker of House
California	Sacramento	40	80	4	2	Biennial	None	$100 monthly during ter
Colorado	Denver	35	65	4	2	Biennial	None	$1000 per regular sessio
Connecticut	Hartford	35	262	2	2	Biennial	None	$300 per regular session
Delaware	Dover	17	35	4	2	Biennial	60 days	$10 per diem
Florida	Tallahassee	38	95	4	2	Biennial	60 days	$6 per diem
Georgia	Atlanta	51	207	2	2	Biennial	60 days	$7 per diem
Idaho	Boise	44	59	2	2	Biennial	60 days	$5 per diem
Illinois	Springfield	51	153	4	2	Biennial	None	$3500 per biennium
Indiana	Indianapolis	50	100	4	2	Biennial	61 days	$10 per diem
Iowa	Des Moines	50	108	4	2	Biennial	None	$1000 per regular sessio
Kansas	Topeka	40	125	4	2	Biennial	50 days	$3 per diem
Kentucky	Frankfort	38	100	4	2	Biennial	60 days	$10 per diem
Louisiana	Baton Rouge	39	100	4	4	Biennial	60 days	$10 per diem
Maine	Augusta	31	151	2	2	Biennial	None	$600 per session
Maryland	Annapolis	29	118	4	4	Biennial	90 days	$5 per diem
Massachusetts	Boston	40	240	2	2	Annual	None	$1500 per annum; $30 pres. of Senate & speal of House
Michigan	Lansing	32	100	2	2	Biennial	None	$3 per diem
Minnesota	St. Paul	67	131	4	2	Biennial	90 days	$1000 per regular sessio
Mississippi	Jackson	49	139	4	4	Biennial	None	$750 per regular session
Missouri	Jefferson City	34	150	4	2	Biennial	70 days	$5 per diem
Montana	Helena	56	102	4	2	Biennial	60 days	$10 per diem
Nebraska	Lincoln	33	100	2	2	Biennial	None	$800 per session
Nevada	Carson City	17	37	4	2	Biennial	60 days	$10 per diem
New Hampshire	Concord	24	421	2	2	Biennial	None	$200 per session
New Jersey	Trenton	21	60	3	1	Annual	None	$500 per annum
New Mexico	Santa Fe	24	49	4	2	Biennial	60 days	$5 per diem
New York	Albany	51	150 *g*	2	1 *g*	Annual	None	$2500 per annum
North Carolina	Raleigh	50	120	2	2	Biennial	60 days	$600 per session; presidi officers, $700
North Dakota	Bismarck	49	113	4	2	Biennial	60 days	$5 per diem *i*
Ohio	Columbus	31	133	2	2	Biennial	None	$1000 per annum
Oklahoma	Oklahoma City	44	108	4	2	Biennial	60 days	$6 per diem
Oregon	Salem	30	60	4	2	Biennial	40 days	$3 per diem
Pennsylvania	Harrisburg	50	208	4	2	Biennial	None	$2500 per annum
Rhode Island	Providence	39	100	2	2	Annual	60 days	$5 per diem
South Carolina	Columbia	46	124	4	2	Annual	None	$400 per session
South Dakota	Pierre	45	103	2	2	Biennial	60 days	$5 per diem
Tennessee	Nashville	33	99	2	2	Biennial	75 days	$4 per diem
Texas	Austin	31	150	4	2	Biennial	None	$5 per diem, first 60 $2 thereafter
Utah	Salt Lake City	20	55	4	2	Biennial	60 days	$4 per diem
Vermont	Montpelier	30	248	2	2	Biennial	None	$400 per regular session
Virginia	Richmond	40	100	4	2	Biennial	60 days	$750 per session
Washington	Olympia	42	97	4	2	Biennial	60 days	$5 per diem and mileage
West Virginia	Charleston	30	94	4	2	Biennial	60 days	$500 per annum
Wisconsin	Madison	33	100	4	2	Biennial	None	$500 per session
Wyoming	Cheyenne	27	62	4	2	Biennial	40 days	$12 per diem

*Equals, for each state, number of Congressmen plus 2 U. S. Senators. *a* Not eligible to succeed himself. *b* Also $4 per diem f six judges, $20 per diem. *g* Assemblymen. *h* Additional allowance for expenses, $3000. *i* Also 10 cents per mile going to a

ATE GOVERNMENTS

Governor		Highest Court					Votes in Electoral College.* Total, 531	State
n	Salary	Name	How Chosen	Number of Judges	Term of Judges	Salaries of Judges		
a	$ 7,500	Supreme Court .	Elected.	7	6 years	$ 7,500	12	Alabama
	7,500	Supreme Court .	Elected.	3	6 years	8,500	3	Arizona
	6,000	Supreme Court .	Elected.	7	8 years	7,500	9	Arkansas
	10,000	Supreme Court .	Elected.	7	12 years	12,000 *e* 11,000	13	California
	5,000	Supreme Court .	Elected.	7	10 years	5,000	6	Colorado
	5,000	Supreme Court of Errors	By Governor and Legislature	5	8 years	8,000	7	Connecticut
	7,500	Supreme Court	By Governor and Senate	6	12 years	7,500 *c* 7,200	3	Delaware
á	10,000	Supreme Court .	Elected.	6	6 years	9,600	6	Florida
	7,500	Supreme Court .	Elected.	6	6 years	7,000	14	Georgia
	5,000	Supreme Court .	Elected.	5	6 years	5,000	4	Idaho
	12,000	Supreme Court .	Elected.	7	9 years	15,000 *d*	29	Illinois
a	8,000	Supreme Court .	Elected.	5	6 years	10,000	15	Indiana
	6,200	Supreme Court .	Elected.	8	6 years	7,500	13	Iowa
	5,000	Supreme Court .	Elected.	7	6 years	6,000	10	Kansas
a	6,500	Court of Appeals	Elected by Dists.	7	8 years	5,000	13	Kentucky
a	7,500	Supreme Court .	Elected.	7	14 years	10,000	10	Louisiana
	5,000	Supreme Court .	By Governor and Council	8	7 years	8,000	6	Maine
	4,500	Court of Appeals	Elected by Circuits	8	15 years	11,500	8	Maryland
	10,000	Supreme Judicial Court	By Governor and conf'm'd by Coun'l	7	During good behavior	15,000 *e* 14,000	18	Massachusetts
	5,000	Supreme Court .	Elected.	8	8 years	10,000	15	Michigan
	7,000	Supreme Court .	Elected.	5	6 years	7,000	12	Minnesota
a	7,500	Supreme Court .	Elected	6	8 years	7,500	10	Mississippi
á	5,000	Supreme Court .	Elected.	7	10 years	7,500	18	Missouri
	7,500	Supreme Court .	Elected.	5	6 years	6,000	4	Montana
	7,500	Supreme Court .	Elected.	7	6 years	7,500	8	Nebraska
	7,000	Supreme Court .	Elected.	3	6 years	6,000	3	Nevada
	5,000	Supreme Court .	By Governor and Council	5	Until 70 years of age	6,500	4	New Hampshire
a	10,000	Court of Errors and Appeals	By Governor and Senate	16	7 years	19,000 *c* *f*	14	New Jersey
a	5,000	Supreme Court .	Elected.	3	8 years	6,000	3	New Mexico
	25,000	Court of Appeals	Elected.	7	14 years	22,500 *e h* 22,000 *h*	45	New York
	6,500	Supreme Court .	Elected.	5	8 years	6,000	12	North Carolina
	5,000	Supreme Court .	Elected.	5	6 years	5,500	5	North Dakota
	10,000	Supreme Court .	Elected.	7	6 years	12,000	24	Ohio
a	4,500	Supreme Court .	Elected.	9	6 years	6,000	10	Oklahoma
k	7,500	Supreme Court .	Elected.	7	6 years	7,500	5	Oregon
a	18,000	Supreme Court .	Elected.	7	21 years	13,500 *e* 13,000	38	Pennsylvania
	8,000	Supreme Court .	Chosen by Legislature	5	Life, unless removed by Legisl.	11,000 *e* 10,000	5	Rhode Island
	7,500	Supreme Court .	Chosen by Legisl.	5	10 years	4,500	9	South Carolina
	3,000	Supreme Court .	Elected.	5	6 years	3,000	5	South Dakota
	4,000	Supreme Court .	Elected.	5	8 years	7,500	12	Tennessee
	4,000	Supreme Court .	Elected.	3	6 years	8,000	20	Texas
	6,000	Supreme Court .	Elected.	5	10 years	5,000	4	Utah
	3,000	Supreme Court .	Chosen by Legisl.	5	2 years	5,500 *e* 5,000	4	Vermont
a	5,000	Supreme Court of Appeals	Chosen by Legislature	7	12 years	6,200 *e* 6,000	12	Virginia
	6,000	Supreme Court .	Elected.	9	6 years	7,000	7	Washington
a	10,000	Supreme Court .	Elected.	5	12 years	10,000	8	West Virginia
	7,500	Supreme Court .	Elected.	7	10 years	9,000 *e* 8,500	13	Wisconsin
	6,000	Supreme Court .	Elected.	3	8 years	7,000	3	Wyoming

enses. *c* Chief justice and chancellor. *d* Judges elected after 1923. *e* Chief justice. *f* Eight supreme court justices, $18,000; urning from sessions. *k* May be re-elected once.

SUFFRAGE REQUIREMENTS

A citizen of the United States includes male and female citizens of twenty-one years and over. In are admitted to vote; in other sta

State	Requirements Other Than Citizenship	Previous Residence Required			
		In State	In County	In Town	In Precin
Alabama	Ability to read and write, employment, payment of poll tax	2 years	1 year	3 months	3 mon
Arizona	Declaration of intention	1 year	30 days	30 days	30 da
Arkansas	Payment of poll tax	1 year	6 months	1 month	1 mon
California	Ability to read Constitution and write name	1 year	90 days	.....	30 da
Colorado		1 year	90 days	30 days	10 da
Connecticut	Ability to read Constitution, good moral character	1 year	.....	6 months	.....
Delaware	Ability to read Constitution	1 year	3 months	.....	30 da
Florida	Ability to read Constitution and write name	1 year	6 months	.....	30 da
Georgia	Ability to read	1 year	6 months	.....	.....
Idaho	Registration	6 months	30 days	.....	.....
Illinois		1 year	90 days	30 days	30 da
Indiana		6 months	60 days	60 days	30 da
Iowa		6 months	60 days	10 days	10 da
Kansas		6 months	30 days*	30 days†	10 da
Kentucky	Registration, cities and towns of 1st, 2d, 3d, and 4th classes	1 year	6 months	60 days	60 da
Louisiana	Property qualification, ability to read and write	2 years	1 year in	parish	4 mon
Maine	Ability to read Constitution and write name	3 months	3 months	3 months	3 mon
Maryland		1 year	6 months	6 months	1 day
Massachusetts	Ability to read Constitution and write name	1 year	6 months	6 months	.....
Michigan	Civilized Indians may vote	6 months	20 days	20 days	20 da
Minnesota	Civilized Indians may vote	6 months	30 days	30 days	30 da
Mississippi	Ability to read or understand Constitution when read, payment of poll tax.	2 years	1 year	1 year	1 year
Missouri		1 year	60 days	60 days	60 da
Montana		1 year	30 days	30 days	30 da
Nebraska		6 months	40 days	10 days	10 da
Nevada		6 months	30 days	30 days	10 da
New Hampshire	Ability to read Constitution and write name	6 months	6 months	6 months	6 mon
New Jersey		1 year	5 months	.....	.....
New Mexico		1 year	90 days	30 days	30 da
New York	Ability to read and write English	1 year	4 months	30 days	30 da
North Carolina	Ability to read and write, registration	1 year	.....	.....	4 mon
North Dakota		1 year	90 days	.....	30 da
Ohio		1 year	30 days	20 days	20 da
Oklahoma		1 year	6 months	30 days	30 da
Oregon	Ability to read and write English	6 months	No speci	fied time	
Pennsylvania	Payment of a state or county tax within 2 years	1 year	.....	.....	2 mon
Rhode Island	Registration or payment of a real estate tax	2 years	.....	6 months	.....
South Carolina	Ability to read and write for persons not registered before Jan. 1, 1898, payment of poll tax, and registration	2 years	1 year	6 months	6 mon
South Dakota		1 year	90 days	.....	30 da
Tennessee	Payment of poll tax	1 year	6 months	.....	.....
Texas	Payment of poll tax; in municipal elections only taxpayers vote on fiscal measures	1 year	6 months	.....	6 mon
Utah		1 year	4 months	.....	60 da
Vermont	Good behavior; willingness to take prescribed oath	1 year	3 months	3 months	3 mon
Virginia	Payment of poll tax	1 year	1 year	1 year	30 da
Washington	Ability to read or write English	1 year	90 days	30 days	30 da
West Virginia		1 year	60 days	10 days	.....
Wisconsin	Civilized Indians may vote	1 year	10 days	10 days	10 da
Wyoming	Ability to read Constitution unless physically disabled	1 year	60 days	10 days	10 da

*In township. †In ward.

L STATES OF THE UNION

es of Arizona and Missouri, persons who have made declaration of intention to become citizens zenship must have been fully acquired.

Grounds for Disqualification, in Addition to Idiocy, Insanity, and Conviction of Felony	Adult Population, 1920			State
	Total	Whites	Negroes	
bery, malfeasance, election crimes, vagrancy after conviction	1,143,395	702,031	441,130	Alabama
tus under guardianship	187,929	164,629	6,559	Arizona
	867,292	624,903	242,234	Arkansas
bery, malfeasance, dueling, being a Chinese	2,318,030	2,206,558	27,539	California
tus under guardianship	564,529	553,798	8,106	Colorado
bery, dueling	838,074	823,603	13,743	Connecticut
bery, pauperism	136,521	118,359	18,113	Delaware
ting on elections, bribery, dueling, malfeasance, status under uardianship	536,614	355,116	181,008	Florida
inquency in payment of taxes	1,421,606	846,028	575,330	Georgia
ction crimes, espousal of polygamy, status under guardianship	234,076	229,988	699	Idaho
itentiary sentence	3,944,197	3,812,605	128,450	Illinois
ual service in army or navy	1,779,820	1,725,449	53,935	Indiana
	1,428,682	1,415,559	12,568	Iowa
bery, dueling, status under guardianship, dishonorable discharge rom office	1,024,144	986,188	37,010	Kansas
bery	1,289,496	1,145,525	143,881	Kentucky
intenance in charitable institutions except soldiers' homes, "inter-icted" persons	924,184	564,017	359,251	Louisiana
bery, pauperism, status under guardianship, being an untaxed ndian	475,191	473,685	876	Maine
bery, election crimes	862,391	720,012	141,991	Maryland
ction crimes, pauperism, status under guardianship	2,411,507	2,378,354	30,412	Massachusetts
eling, being an Indian in tribal status	2,215,436	2,168,067	43,407	Michigan
tus under guardianship, being an Indian in uncivilized status	1,380,834	1,369,392	6,666	Minnesota
bery, dueling, delinquency in payment of taxes	876,106	421,659	453,663	Mississippi
ual service in army or navy	2,038,814	1,916,864	121,328	Missouri
	320,562	312,064	1,262	Montana
ual service in army or navy	738,310	726,652	9,437	Nebraska
eling, being a Chinese or an Indian	52,218	47,920	277	Nevada
perism, delinquency in payment of taxes	281,026	280,530	388	New Hampshire
perism	1,897,884	1,820,728	75,671	New Jersey
tus of an untaxed Indian	185,186	171,157	4,809	New Mexico
ting on elections, bribery	6,514,681	6,361,349	142,544	New York
	1,210,727	863,055	342,756	North Carolina
tus under guardianship	322,918	319,392	336	North Dakota
	3,558,481	3,430,397	126,940	Ohio
atus of a non-native Indian, maintenance in a poorhouse, except ederal and confederate (Civil War) and Spanish American War eterans (soldiers and sailors)	1,021,588	920,853	76,331	Oklahoma
ng Chinese	494,968	485,530	1,620	Oregon
bery, election crimes, delinquency in payment of taxes	5,039,091	4,845,641	191,226	Pennsylvania
bery, pauperism, status under guardianship, being an Indian of Narragansett tribe	368,637	361,782	6,554	Rhode Island
bery, dueling, election crimes, pauperism	779,991	402,796	376,930	South Carolina
tus under guardianship, treason	344,846	335,622	520	South Dakota
	1,214,947	969,444	245,395	Tennessee
bery, dueling, pauperism, actual service in army or navy	2,430,715	2,044,270	384,428	Texas
ction crimes	228,682	223,629	1,104	Utah
bery	217,042	216,674	342	Vermont
bery, dueling, pauperism	1,207,074	855,123	351,231	Virginia
tus as an Indian in tribal relations	857,079	832,523	5,208	Washington
bery in election, pauperism, conviction of treason	752,344	701,106	51,145	West Virginia
ting on elections, dueling, status under guardianship	1,527,661	1,518,973	3,609	Wisconsin
	115,739	112,682	1,065	Wyoming

POPULAR AND ELECTORAL VOTE FOR PRESIDENT AND VICE PRESIDENT FROM 1789 TO THE PRESENT

Strictly speaking, there is no popular vote for president and vice president; the people vote for electors, and those chosen in each state meet therein and vote for the candidates for president and vice president. The record of any popular vote for electors prior to 1824 is so meager and imperfect that a compilation would be useless. In most of the states, for more than a quarter century following the establishment of the government, the state legislatures "appointed" the presidential electors, and the people therefore voted only indirectly for them, their choice being expressed by their votes for members of the legislature. In this tabulation, only the electoral vote for candidates for president and vice president in the first nine quadrennial elections appears. In a few instances, candidates receiving an extremely insignificant number of votes have been omitted.

ABBREVIATIONS: Amer., American; Antimas., Antimasonic; Cm., Communist; Const. Un., Constitutional Union; D. or Dem., Democrat; D. & L. R., Democrat and Liberal Republican; Dem.-Rep., Democratic Republican; Far.-L., Farmer-Labor; Fed., Federalist; F. S., Free Soil; F. S. D., Free Soil Democrat; Gr'b., Greenback; Ind., Independent; Indep., Independence; L., Labor; Nat. Rep., National Republican; P., Populist; Prog., Progressive; Pro., Prohibition; Rep., Republican; Soc., Socialist; Soc. Dem., Social Democrat; Soc. L., Socialist Labor; Temp., Temperance; U. L., Union Labor.

YEAR	Presidential Candidates	State	Party	VOTE				CANDIDATES FOR VICE PRESIDENT		
				States Voting	Total Vote	Electoral Vote	Popular Vote	Name	State	Electoral Vote
1789*	George Washington	Va.		10†	73	69		John Adams	Mass.	34
	John Adams	Mass.				34				
	John Jay	N. Y.				9				
	R. H. Harrison	Md.				6				
	John Rutledge	S. C.				6				
	John Hancock	Mass.				4				
	George Clinton	N. Y.				3				
	Samuel Huntington	Conn.				2				
	John Milton	Ga.				2				
	James Armstrong	Ga.				1				
	Benjamin Lincoln	Mass.				1				
	Edward Telfair	Ga.				1				
	Vacancies††					4				
1792	George Washington	Va.	Fed.	15	135	132		John Adams	Mass.	77
	John Adams	Mass.	Fed.			77				
	George Clinton	N. Y.	Dem.-Rep.‡			50				
	Thomas Jefferson	Va.				4				
	Aaron Burr	N. Y.				1				
1796	John Adams	Mass.	Fed.	16	138	71		Thomas Jefferson	Va.	68
	Thomas Jefferson	Va.	Dem.-Rep.			68				
	Thomas Pinckney	S. C.	Fed.			59				
	Aaron Burr	N. Y.	Antifed.			30				
	Samuel Adams	Mass.	Dem.-Rep.			15				
	Oliver Ellsworth	Conn.	Fed.			11				
	George Clinton	N. Y.	Dem.-Rep.			7				
	John Jay	N. Y.	Ind.-Fed.			5				
	James Iredell	N. C.	Fed.			3				
	George Washington	Va.	Fed.			2				
	John Henry	Md.	Ind.			2				
	S. Johnston	N. C.	Ind.-Fed.			2				
	C. C. Pinckney	S. C.	Ind.-Fed.			1				
1800	Thomas Jefferson	Va.	Dem.-Rep.	16	138	73§		Aaron Burr	N. Y.	73
	Aaron Burr	N. Y.	Dem.-Rep.			73§				
	John Adams	Mass.	Fed.			65				
	C. C. Pinckney	S. C.	Fed.			64				
	John Jay	N. Y.	Fed.			1				
1804	Thomas Jefferson	Va.	Dem.-Rep.	17	176	162		George Clinton	N. Y.	162
	C. C. Pinckney	S. C.	Fed.			14		Rufus King	N. Y.	14
1808	James Madison	Va.	Dem.-Rep.	17	176	122		George Clinton	N. Y.	113
	C. C. Pinckney	S. C.	Fed.			47		Rufus King	N. Y.	47
	George Clinton	N. Y.	Ind.-Rep.			6		John Langdon	N. H.	9
	Vacancy					1				
								James Madison	Va.	3
								James Monroe	Va.	3
1812	James Madison	Va.	Dem.-Rep.	18	218	128		Elbridge Gerry	Mass.	131
	De Witt Clinton	N. Y.	Fusion			89		Jared Ingersoll	Pa.	86
1816	James Monroe	Va.	Rep.	19	221	183		D. D. Tompkins	N. Y.	183
	Rufus King	N. Y.	Fed.			34		John E. Howard	Md.	22
	Vacancies					4		James Ross	Pa.	5
								John Marshall	Va.	4
								Robert G. Harper	Md.	3

* Prior to 1804 each elector was entitled to vote for two candidates for president. The candidate receiving the greatest number of votes was declared elected, while the candidate receiving the next highest vote was declared vice president.

† Three states not voting. New York legislature failed to agree on electors; N. Carolina and Rhode Island had not ratified the Constitution.

‡ The Democratic-Republican (also called Republican) party was the predecessor of the present Democratic party.

†† "Vacancies" means electors absent or not voting.

§ As there was no election the choice was decided by the House of Representatives.

POPULAR AND ELECTORAL VOTE FOR PRESIDENT AND VICE PRESIDENT FROM 1789 TO THE PRESENT—Con.

Year	Presidential Candidates	State	Party	Vote				Candidates for Vice President		
				States Voting	Total Vote	Electoral Vote	Popular Vote	Name	State	Electoral Vote
1820	James Monroe	Va.	Rep.	24	235	231		D. D. Tompkins	N. Y.	218
	John Q. Adams	Mass.	Ind.-Rep.			1		Richard Stockton	N. J.	8
	Vacancy							Daniel Rodney	Del.	4
								Robert G. Harper	Md.	1
								Richard Rush	Pa.	1
1824	John Q. Adams	Mass.	No party	24	261	84§	108,740	John C. Calhoun	S. C.	182
	Andrew Jackson	Tenn.				99§	153,544	Nathan Sanford	N. Y.	30
	Henry Clay	Ky.				37	47,136	Nathaniel Macon	N. C.	24
	W. H. Crawford	Ga.				46	46,618	Andrew Jackson	Tenn.	13
								Martin Van Buren	N. Y.	9
								Henry Clay	Ky.	2
	Vacancy									1
1828	Andrew Jackson	Tenn.	Dem.	24	261	178	647,286	John C. Calhoun	S. C.	171
	John Q. Adams	Mass.	Nat. Rep.			83	508,064	Richard Rush	Pa.	83
								William Smith	S. C.	7
1832	Andrew Jackson	Tenn.	Dem.	24	288	219	687,502	Martin Van Buren	N. Y.	189
	Henry Clay	Ky.	Nat. Rep.			49	530,189	John Sergeant	Pa.	49
	John Floyd	Ga.	Ind.-Dem.			11		Henry Lee	Mass.	11
	William Wirt	Md.	Antimas.			7		Amos Ellmaker	Pa.	7
	Vacancies					2		William Wilkins	Pa.	30
1836	Martin Van Buren	N. Y.	Dem.	26	294	170	762,678	R. M. Johnson	Ky.	147
	Wm. H. Harrison	Ohio	Whig.			73		Francis Granger	N. Y.	77
	Hugh L. White	Tenn.	Whig.			26	735,651	John Tyler	Va.	47
	Daniel Webster	Mass.	Whig.			14		William Smith	Ala.	23
	W. P. Mangum	N. C.	Ind.			11				
1840	Wm. H. Harrison	Ohio	Whig.	26	294	234	1,275,016	John Tyler	Va.	234
	Martin Van Buren	N. Y.	Dem.			60	1,129,102	R. M. Johnson	Ky.	48
	James G. Birney	N. Y.	Liberty				7,069	L. W. Tazewell	Va.	11
								James K. Polk	Tenn.	1
								Thomas Earle	Pa.	
1844	James K. Polk	Tenn.	Dem.	26	275	170	1,337,243	George M. Dallas	Pa.	170
	Henry Clay	Ky.	Whig			105	1,299,062	T. Frelinghuysen	N. J.	105
	James G. Birney	N. Y.	Liberty				62,300	Thomas Morris	Ohio	
1848	Zachary Taylor	La.	Whig.	30	290	163	1,360,099	Millard Fillmore	N. Y.	163
	Lewis Cass	Mich.	Dem.			127	1,220,544	Wm. O. Butler	Ky.	127
	Martin Van Buren	N. Y.	F. S.				291,263	Chas. F. Adams	Mass.	
1852	Franklin Pierce	N. H.	Dem.	31	296	254	1,601,274	William R. King	Ala.	254
	Winfield Scott	N. J.	Whig.			42	1,386,580	Wm. A. Graham	N. C.	42
	John P. Hale	N. H.	F. S. D.				155,825	George W. Julian	Ind.	
1856	James Buchanan	Pa.	Dem.	31	296	174	1,838,169	J. C. Breckinridge	Ky.	174
	John C. Fremont	Cal.	Rep.			114	1,341,264	Wm. L. Dayton	N. J.	114
	Millard Fillmore	N. Y.	Amer.			8	874,534	A. J. Donelson	Tenn.	8
1860	Abraham Lincoln	Ill.	Rep.	33	303	180	1,866,452	Hannibal Hamlin	Me.	180
	J. C. Breckinridge	Ky.	Dem.			72	847,953	Joseph Lane	Ind.	72
	Stephen A. Douglas	Ill.	Dem.			12	1,375,157	H. V. Johnson	Ga.	12
	John Bell	Tenn.	Const. Un.			39	590,631	Edward Everett	Mass.	39
1864	Abraham Lincoln	Ill.	Rep.	36	314	212	2,213,665	Andrew Johnson	Tenn.	212
	Geo. B. McClellan	N. J.	Dem.			21	1,802,237	G. H. Pendleton	Ohio	21
1868	Ulysses S. Grant	Ill.	Rep.	37	317	214	3,012,833	Schuyler Colfax	Ind.	214
	Horatio Seymour	N. Y.	Dem.			80	2,703,249	F. P. Blair, Jr.	Mo.	80
	Not counted					23				
1872	Ulysses S. Grant	Ill.	Rep.	37	366	286	3,597,132	Henry Wilson	Mass.	286
	Horace Greeley	N. Y.	D. & L. R.			||	2,834,125	B. Gratz Brown	Mo.	47
	Charles O'Conor	N. Y.	Straight D.				29,489	John Q. Adams	Mass.	
	James Black	Pa.	Temp.				5,608	John Russell	Mich.	
	Thos. A. Hendricks	Ind.	Ind.-Dem.			42		Geo. W. Julian	Ind.	5
	B. Gratz Brown	Mo.	Dem.			18		A. H. Colquitt	Ga.	5
	Charles J. Jenkins	Ga.	Dem.			2		J. M. Palmer	Ill.	3
	David Davis	Ill.	Dem.			1		T. E. Bramlette	Ky.	3
	Not counted					17		W. S. Groesbeck	Ohio	1
								W. B. Machen	Ky.	1
								N. P. Banks	Mass.	1
1876	Ruth'd B. Hayes	Ohio	Rep.	38	369	185	4,036,298	Wm. A. Wheeler	N. Y.	185
	Samuel J. Tilden	N. Y.	Dem.			184	4,300,590	T. A. Hendricks	Ind.	184
	Peter Cooper	N. Y.	Gr'b.				81,737	Samuel F. Cary	Ohio	
	Green Clay Smith	Ky.	Pro				9,522	G. T. Stewart	Ohio	
	James B. Walker	Ill.	Amer.				2,636	D. Kirkpatrick	N. Y.	

§ As there was no election the choice was decided by the House of Representatives.
|| Owing to the death of Horace Greeley the Democratic electors scattered their vote.

POPULAR AND ELECTORAL VOTE FOR PRESIDENT AND VICE PRESIDENT FROM 1789 TO THE PRESENT—Con.

Year	Presidential Candidates	State	Party	Vote			Candidates for Vice President		
				States Voting	Total Vote	Electoral Vote	Popular Vote	Name	State	Electoral Vote
1880	James A. Garfield	Ohio	Rep.	38	369	214	4,454,416	Chester A. Arthur	N. Y.	214
	Win'd S. Hancock	Pa.	Dem.			155	4,444,952	Wm. H. English	Ind.	155
	James B. Weaver	Iowa	Gr'b.				308,578	B. J. Chambers	Tex.	
1884	Grover Cleveland	N. Y.	Dem.	38	401	219	4,874,986	T. A. Hendricks	Ind.	219
	James G. Blaine	Me.	Rep.			182	4,851,981	John A. Logan	Ill.	182
	John P. St. John	Kans.	Pro.				150,369	William Daniel	Md.	
	Benjamin F. Butler	Mass.	Gr'b.				175,370	A. M. West	Miss.	
1888	Benjamin Harrison	Ind.	Rep.	38	401	233	5,439,853	Levi P. Morton	N. Y.	233
	Grover Cleveland	N. Y.	Dem.			168	5,540,309	A. G. Thurman	Ohio	168
	Clinton B. Fisk	N. J.	Pro.				249,506	John A. Brooks	Mo.	
	Alson J. Streeter	Ill.	U. L.				146,935	C. E. Cunningham	Ark.	
1892	Grover Cleveland	N. Y.	Dem.	44	444	277	5,556,918	A. E. Stevenson	Ill.	277
	Benjamin Harrison	Ind.	Rep.			145	5,176,108	Whitelaw Reid	N. Y.	145
	James B. Weaver	Iowa	People's			22	1,041,028	James G. Field	Va.	22
	John Bidwell	Cal.	Pro.				264,133	James B. Cranfill	Tex.	
	Simon Wing	Mass.	Soc. L.				21,164	C. H. Matchett	N. Y.	
1896	William McKinley	Ohio	Rep.	45	447	271	7,104,779	Garret A. Hobart	N. J.	271
	William J. Bryan	Nebr.	Dem			176	6,502,925	Arthur Sewall	Me.	149
	William J. Bryan	Nebr.	People's					Th. E. Watson	Ga.	27
	John M. Palmer	Ill.	Nat. Dem.				133,148	Sim. B. Buckner	Ky.	
	Joshua Levering	Md.	Pro.				132,007	Hale Johnson	Ill.	
	Chas. H. Matchett	N. Y.	Soc. L.				36,274	Matthew McGuire	N. J.	
	Chas. E. Bentley	Nebr.	Nat.				13,969	J. H. Southgate	N. C.	
1900	William McKinley	Ohio	Rep.	45	447	292	7,207,923	Theo. Roosevelt	N. Y.	292
	William J. Bryan	Nebr.	Dem. & P.			155	6,358,133	A. E. Stevenson	Ill.	155
	John G. Woolley	Ill.	Pro.				208,914	Henry B. Metcalf	R. I.	
	Eugene V. Debs	Ind.	Soc. Dem.				87,814	Job Harriman	Cal.	
	Wharton Barker	Pa.	People's				50,373	Ignatius Donnelly	Minn.	
	Jos. F. Malloney	Mass.	Soc. L.				39,739	Val. Remmel	Pa.	
1904	Theodore Roosevelt	N. Y.	Rep.	45	476	336	7,623,486	Charles W. Fairbanks	Ind.	336
	Alton B. Parker	N. Y.	Dem.			140	5,077,911	Henry G. Davis	W. Va.	140
	Eugene V. Debs	Ind.	Soc.				402,283	Benjamin Hanford	N. Y.	
	Silas C. Swallow	Pa.	Pro.				258,536	George W. Carroll	Texas	
	Thomas E. Watson	Ga.	People's				117,183	Thomas H. Tibbles	Nebr.	
	Charles H. Corrigan	N. Y.	Soc. L.				31,249	William W. Cox	Ill.	
1908	William H. Taft	Ohio	Rep.	46	483	321	7,678,908	James S. Sherman	N. Y.	321
	William J. Bryan	Nebr.	Dem.			162	6,409,104	John W. Kern	Ind.	162
	Eugene V. Debs	Ind.	Soc.				420,793	Benjamin Hanford	N. Y.	
	Eugene W. Chafin	Ill.	Pro.				253,840	Aaron S. Watkins	Ohio	
	Thomas L. Hisgen	Mass.	Indep.				82,872	John Temple Graves	Ga.	
	Thomas E. Watson	Ga.	People's				29,100	Samuel Williams	Ind.	
	August Gillhaus	N. Y.	Soc. L.				13,825	Donald L. Munro	Va.	
1912	Woodrow Wilson	N. J.	Dem.	48	531	435	6,293,454	Thos. R. Marshall	Ind.	435
	William H. Taft	Ohio	Rep.			8	3,484,980	Nicholas M. Butler	N. Y.	8
	Theodore Roosevelt	N. Y.	Prog.			88	4,119,538	Hiram W. Johnson	Cal.	88
	Eugene V. Debs	Ind.	Soc.				900,672	Emil Seidel	Wis.	
	Eugene W. Chafin	Ariz.	Pro.				206,275	Aaron S. Watkins	Ohio	
	Arthur E. Reimer	Mass.	Soc. L.				28,750	August Gillhaus	N. Y.	
1916	Woodrow Wilson	N. J.	Dem.	48	531	277	9,129,606	Thos. R. Marshall	Ind.	277
	Chas. E. Hughes	N. Y.	Rep.			254	8,538,221	Chas. W. Fairbanks	Ind.	254
	A. L. Benson	N. Y.	Soc.				585,113	G. R. Kirkpatrick	N. J.	
	J. Frank Hanly	Ind.	Pro.				220,506	Ira Landrith	Tenn.	
	Arthur E. Reimer	Mass.	Soc. L.				13,403	Caleb Harrison	Ill.	
1920	Warren G. Harding	Ohio	Rep.	48	531	404	16,152,200	Calvin Coolidge	Mass.	404
	James M. Cox	Ohio	Dem.			127	9,147,353	Franklin D. Roosevelt	N. Y.	127
	Eugene V. Debs	Ind.	Soc.				919,799	Seymour Stedman	Ill.	
	P. P. Christensen	Utah	Far.-L.				265,411	Max S. Hayes	Ohio	
	Aaron S. Watkins	Ohio	Pro.				189,408	D. Leigh Colvin	N. Y.	
	W. W. Cox	Mo.	Soc. L.				31,175	August Gillhaus	N. Y.	
1924	Calvin Coolidge	Mass.	Rep.	48	531	382	15,725,016	Charles G. Dawes	Ill.	382
	John W. Davis	W. Va.	Dem.			136	8,386,503	Charles W. Bryan	Neb.	136
	Robert LaFollette	Wis.	Prog.			13	4,822,856	Burton K. Wheeler	Mont.	13
	Herman P. Faris	Mo.	Pro.				57,520	Marie C. Brehm	Cal.	
	Frank T. Johns	Ore.	Soc. L.				36,428	Verne L. Reynolds	Md.	
	William Z. Foster	Ill.	Cm.,Far.-L.				36,386	Benjamin Gitlow	N. Y.	
	Gilbert O. Nations	D. C.	Amer.				23,967	Charles H. Randall	Cal.	
1928	Herbert Hoover	Cal.	Rep.	48	531	444	21,429,109	Charles Curtis	Kans.	444
	Alfred E. Smith	N. Y.	Dem.			87	15,005,497	Joseph T. Robinson	Ark.	87
	Norman M. Thomas	N. Y.	Soc.				267,835	James H. Maurer	Pa.	
	William Z. Foster	Ill.	Workers				21,181	Benjamin Gitlow	N. Y.	

FOREIGN GOVERNMENTS

THE section on foreign governments comprises accounts of all independent states recognized as possessing "sovereignty" and capable of conducting diplomatic relations. The recognized conduct of foreign affairs through fully accredited diplomatic agents is generally regarded as a test of "sovereignty." "Protectorates," or states whose freedom of action has been limited by treaties with foreign states, in return for guarantees of external security and assistance in internal administration, are included in the list of separately enumerated countries. With these are included countries under "mandate," which, in accordance with the language of the Covenant of the League of Nations, "have reached a state of development where their existence as independent nations can be provisionally recognized"; this group originally included Egypt, Mesopotamia, Palestine, and Syria. "Dependencies," or countries fully subject to the sovereignty of a foreign state, are discussed under the title of the sovereign state.

Classification.—The distinction between a fully independent state, a protectorate, and a dependency may sometimes be difficult to make, on theoretical grounds, as certain dependent countries appear to be moving toward independence, while others tend to retrograde toward a more subordinate status. But, in general, protectorates are recognized by the fact that while some of their activities are limited by their relations to a protecting power, they do not lose their international status; they retain their own flags and armed forces and are accorded the public respect and consideration due sovereign states.

The number of modern states, sustaining relations as theoretical equals, has risen constantly during the last hundred years. In 1907, 48 states were invited to send representatives to the second Hague Conference and this was the number considered to form the "family of nations" at that date. The number of independent states was increased by the World War. The *Almanach de Gotha* for 1922 considered that, since 1914, the number of states had augmented from 57 to 73. The *Almanach's* list, however, included Memel, now incorporated in Lithuania; a number of so-called republics within the former Russian Empire now incorporated in the Union of Socialist Soviet Republics; the Apostolic See, known since 1929 as Vatican City, and the Sovereign and Military Order of Malta.

Countries internationally recognized as sovereign and independent states number hardly more than 60; but within the British Empire are 6 self governing nations, India, and native states, like Nepal and Bhutan, adherent to the Indian Empire. The tiny republics of Andorra and San Marino enjoy semi-independent status. Fiume, which claimed international attention in 1919-20, is annexed to Italy. Mongolia and Tibet are discussed under China, which still claims sovereignty over them. The Central American republics are introduced together under the heading "Central American States" and then described separately. With these exceptions, foreign nations and their dependencies are alphabetically listed in this Department.

Extent of Treatment.—The following brief descriptions of modern states aim to take proper account of past political structure and of recent change. A few paragraphs furnish the facts concerning the rise of each state to an independent position; an outline of its government; the character of its local administration; and its frontiers as defined by treaty. Where a special institution has been devised by the political experience of a country, it is treated in some detail under that country, as "parliamentary government" in Great Britain; centralized administration and the "council of state" in France; "commission executive" and the "initiative and referendum" in Switzerland. In other cases, where such institutions have been imitated, they are mentioned but not described. For data on history and geography, reference may be had to other departments of this volume.

Abyssinia (Ethiopia). The only independent state of Africa except Egypt and Liberia. The defensible mountainous character of the country and the temper of its peoples and their chiefs have checked the European domination, which has absorbed the rest of the continent, and have given Abyssinia her independence.

By the convention of Adis Ababa (the capital town), October 26, 1896, the independence of Abyssinia was recognized by Italy. Foreign rivalry in the country was adjusted by a convention signed December 13, 1906, on behalf of Great Britain, France, and Italy, the three powers to respect the integrity of Abyssinia, to abstain from intervention in internal affairs, and to proceed harmoniously in promoting the industrial development of the country. The boundaries of the country toward Somaliland and British East Africa have not yet been exactly defined, though conventions have been made for delimiting them. An American mission visited Abyssinia in 1903 and a commercial treaty was concluded.

Abyssinia is divided into a number of kingdoms or provinces, with other ill-defined dependencies. Life is largely pastoral. Government is feudal. Local rulers, or *rases*, and chieftains are united by personal allegiance to the emperor or *negus negusti*, "king of kings," to whom is attributed feudal title to the land. The royal line claims direct descent from King Solomon and the Queen of Sheba. The emperor is assisted by a state council of the most important *rases*, under whom the country is administered. Under the emperors Johannes II, 1872–89, and Menelik II, 1889–1913, something was done to unify the country politically, to create a standing army furnished with modern weapons, and to open the land to foreign trade and development. Abyssinia was admitted to the League of Nations, Sept. 28, 1923. The gradual emancipation of slaves was decreed in 1924.

Afghanistan. The government in 1922 became a constitutional monarchy, the constitution providing for legislative and state assemblies. In 1926 the title of *amir* was replaced by that of king. In 1929 the efforts of King Amanullah to introduce religious and social reforms led to civil war. The king abdicated on January 14 and rescinded his abdication on January 21. Governmental unity collapsed, and the constitution remained in abeyance.

The country is divided into 4 provinces—Turkestan, Herat, Kabul, and Kandahar, each under a *hakim* or governor with subordinate chiefs, *sirdars* or hereditary nobles, *khans* or popular representatives, and *mullahs* or leaders of the Mohammedan religion.

Afghanistan constitutes a mountainous barrier between Russia and British India. Four routes cross this barrier and, by these, invading conquerors, such as Alexander the Great and Tamerlane, have passed to the conquest of India. The defense of this frontier has long been regarded as the major task of British and Indian armies. Dread of Russian advance from the north, with its peril to the security of India, long affected British foreign policy.

Following the Afghan wars of 1839 and 1842, British Afghan relations were governed by the Treaty of Peshawar. A later war (1880) led to the establishment of British control over Afghanistan's foreign relations. In 1893, at a conference between Sir Mortimer Durand and Amir Abdur Rahman, an agreement was made for delimiting the frontier between Afghanistan and British Baluchistan and the North West Frontier Province of India. A treaty definitely providing British protection was made with Amir Habibulla Khan in 1905.

British and Russian rival interests were adjusted in 1907 by a treaty which also defined their respective interests in Persia and in Tibet. Great Britain disavowed any intention further to alter the political status of Afghanistan and promised to exert a pacific influence upon that country. Russia recognized Afghanistan as outside of her sphere of influence and engaged to conduct her relations with that country through the British government. This treaty was denounced in 1918 by the Soviet government of Russia, which sent agents to Afghanistan. In February 1921, Afghanistan made a treaty with Moscow and in April made an alliance with the Turkish Nationalist government at Angora. In November 1921, a British mission succeeded in negotiating a treaty with the new amir, restoring British predominance. A treaty with Great Britain was signed at Kabul, Nov. 22, 1921, in which the complete independence of Afghanistan is recognized. Afghanistan accepted the existing Anglo-Afghan frontier.

Albania (Skypanie). A mountainous Balkan country, facing the Adriatic. It is a little larger than the state of Vermont. Before 1912 it was part of the Turkish Empire. Independence was proclaimed at the seaport of Valona, November 28, 1912. The London Conference which followed the Balkan war accepted the independence of Albania, December 20, 1912, and decided that the country should be governed by a European prince under an international commission of control. Prince Wilhelm of Wied was selected for the crown, February 1914, but on the outbreak of the World War he left the country, which fell into anarchy. The Austrian forces in their conquest of the Balkans in 1916 overran the country, but a year later an Italian army established a foothold and declared Albania independent.

By the secret treaties of the Allies of 1915, a dismemberment of Albania was contemplated, but strong national feeling showed itself after the war; a national convention assembled; a government was created; and in Jan. 1920 a provisional constitution was promulgated. A new constitution was adopted March 3, 1925, by a constituent assembly which met at Tirana. This constitution established a republic. The legislative power was vested in a Congress of 2 chambers—a Senate of 18 members, 12 elected for 6 years and 6 appointed by the president of the republic, and a Chamber of Deputies of 57 members, elected for 4 years. The president was vested exclusively with the executive power. He possessed the veto power, the joint right with the houses of Congress to initiate legislation, and the sole right to propose constitutional amendments. This republic continued until 1928.

Following the general election of July 17, 1928, the president, Ahmed Zogu, head of the Military Party, submitted amendments to the constitution which changed the state to a constitutional monarchy. The president was proclaimed King Zogu I on September 2, 1928.

The position of Albania subjects this country to the rival interests of Jugoslavia and Italy. In November 1926, Italy made with Albania the treaty of Tirana, which gave her a predominant interest over that country. It occasioned cabinet crises in Belgrade and general European concern lest war occur. The establishment of the monarchy in 1928 was accomplished under the shield of Italian approval.

Andorra. A small, neutral, autonomous republic in the Pyrenees, on the Franco-Spanish frontier. It is a surviving specimen of the semi-independence of feudal lordship, possessed in medieval times by many valleys of these mountains. It comprises 6 parishes and is governed by a council of 24 members elected for 4 years by the heads of families. A first and a second "syndic" are chosen by the council as presiding officers and executives of the republic. The state is under the joint suzerainty of the president of France and of the Spanish bishop of Urgel who nominates the two civil judges. Both French and Catalan are spoken by the population which numbers a little more than 5000.

Argentina (The Argentine Republic). Argentina arose out of the Spanish viceroyalty of La Plata. May 25, 1810, the city of Buenos Aires revolted and elected a provisional committee. July 9, 1816, the Congress of Tucuman declared the Argentinian provinces an independent republic; but the military struggle with Spain was not ended until the victory of Ayacucho in Peru in 1824. The early decades of independence were a period of disturbance and of anarchy. It was not until 1852 that government came into the hands of those who gave it stability.

The constitution of Argentina was proclaimed May 15, 1853, and, with amendments in 1860, 1866, and 1898, has continued in force. This fundamental law shows the influence of the Constitution of the United States, particularly in its union of the provinces of the country into a federal republic. These provinces are 14, besides one federal district, Buenos Aires. In addition, there are 10 territories over which the national government has direct control. The provinces, like the American states, elect their own legislatures and governors and have a constitutional jurisdiction over provincial affairs. Powers not granted to the nation are retained by the provinces, but the Federal government has more extensive powers than those granted by the United States Constitution. This condition arises from the fact that the provinces were artificially created federal units and from the need felt for a strong central authority. The constitution is exceptionally liberal in its definition of rights. Foreigners enjoy the same civil rights that citizens enjoy.

Executive Organization.—Under the American theory of separation of powers, the Federal government is declared to be divided into executive, legislative, and judicial departments. The executive authority is conferred upon a president who occupies the position of an independent executive, but who is limited by numerous constitutional provisions to prevent the abuse of authority or the assumption of dictatorship. Both president and vice president are elected indirectly through a college of electors, equal to double the number of senators and deputies in the Federal Congress, chosen by direct vote of the citizens of the 14 provinces. The tenure is 6 years. Neither president nor vice president is eligible for re-election until the lapse of an interval of one term. The vice president becomes president *pro tempore* if the president leaves the federal capital, which he may not do without the consent of Congress. Conditions of eligibility for election as president or vice president include: the age of 30 years; membership in the Roman Catholic Church; an annual minimum income of approximately $2000; and native birth or, in case of birth abroad, native parentage.

In addition to the usual powers of an American executive, the president of the Argentine Republic makes all appointments to federal offices without the limitation of senatorial confirmation, except in the appointment of magistrates of the supreme and superior courts, diplomatic representatives, governors of provinces, and officers of the army above the rank of colonel, where the advice and the consent of the Senate are required. The president is the administrative head of the government of the federal district. He has the right of presentation for appointment to bishoprics.

The president is assisted by a cabinet of eight ministers. They are appointed by the president, may be removed by him, and in practice are responsible to him alone, although a provision of the constitution, like that in the constitution of Chile, declares that "every minister is responsible for the acts which he authorizes." Ministers cannot be members of Congress, but they may attend sessions and can be compelled to attend them. Acts of the president must bear the signature of a minister. The departments are: interior; foreign affairs and

worship; treasury; justice and public instruction; war; navy; agriculture; and public works. The president has the right of convoking Congress both in ordinary and in extraordinary sessions, and of proroguing it. There is no constitutional means to compel him to convoke Congress, a difficulty which has been severely criticized by Argentinian publicists.

The Congress.—The federal legislative authority is vested in a Congress composed of a Senate and a Chamber of Deputies. The 30 senators are elected by the legislatures of the 14 provinces and by a special body of electors in the federal district. The term is 9 years, one-third retiring every 3 years. Senators must be 30 years of age, must have been citizens for 6 years, must be natives of the province from which elected, or residents therein for 2 years preceding election, and must enjoy an income of 2000 pesos annually. The Senate is the judicial body in cases of impeachment.

Deputies are elected by the people in electoral districts based on population. A deputy must be 25 years of age, a citizen for at least 4 years, a native of the province which elects him, or a resident there for 2 years preceding his election. The term is 4 years, half of the chamber being renewed every 2 years. All tax bills and bills for the raising of troops must originate in the Chamber of Deputies. To the deputies alone belongs the right of preferring charges of impeachment, which, by an unusual provision of the constitution, extends to common crimes as well as to constitutional offenses. The president has a veto power which may be overridden by a two-thirds vote of both houses.

Judiciary.—Argentinian private law is nationalized and expressed in civil, penal, commercial, and mining codes. There is a supreme court consisting of 5 magistrates and an attorney-general, 5 federal courts of appeal, 1 circuit court in each province and 3 in the capital. The provinces maintain, in addition, their own judicial system. Trial by jury in criminal cases is provided for by the constitution, but has never been established.

All boundary disputes have, happily, been concluded. (See *Chile, Bolivia, Brazil.*) After the war with Paraguay, 1864–70, the frontier was settled by a treaty of February 3, 1876, which determined the title to part of the disputed territory, and provided that the rights over the remainder should be submitted to the arbitration of the president of the United States. The decision was rendered by President Hayes.

The Argentine Republic, by reason of the liberality of its immigration laws and by reason of the admission of foreigners to civil rights, has had its citizenship greatly enlarged and strengthened by European immigration, particularly from Italy.

In the World War, Argentina, though suffering from German submarine warfare, remained neutral. Both houses of Congress voted for the breaking of diplomatic relations with Germany, but the president refused to follow this advice and maintained strict neutrality.

Austria (The Austrian Republic). Austria, previous to November 1918, the seat of a dual monarchy (Austria-Hungary) and the center of an ancient empire embracing peoples of the German, Italian, Magyar, and Slavic races, was dismembered by defeat in the World War, and was democratized by a revolution which expelled the house of Habsburg and proclaimed the republic, November 12, 1918. A provisional democratic government was created.

By the Treaty of Saint Germain, signed September 10, 1919, the territory of the republic was reduced to the provinces of Lower Austria, Upper Austria, Salzburg, Styria, Carinthia, Tyrol, and Vorarlberg, to the city of Vienna, and to a German-populated area of Western Hungary (Burgenland). Owing to Hungarian opposition to the cession of Burgenland, an agreement was made between Austria and Hungary, October 1921, providing for a plebiscite which restored the city of Oedenburg to Hungary. The district of Klagenfurt was confirmed to Austria by a plebiscite.

A constitution, drafted by a national constituent assembly elected by universal suffrage, went into force November 10, 1920. It established a federal government, the members being the 8 autonomous provinces. The head of the state is the federal president elected for a four-year term by the two legislative chambers united for this purpose. Members of the former ruling dynasty are ineligible. Government is entrusted to ministers responsible to the lower house, or *Nationalrat*, which is elected for 4 years by popular vote. The upper house, or *Bundesrat*, is chosen by the provincial diets in proportion to population. The upper house has only limited powers. The constitution abolished all privileges and granted equal rights to all citizens. The ministry as constituted consists of a chancellor and minister of foreign affairs; a vice chancellor; and ministers of commerce and communications, social welfare, agriculture, finance, justice, education, and defense.

A certain amount of autonomy is accorded to the provinces, each of which elects its diet or provincial assembly, *Landesversammlung*, on the same suffrage basis as that which governs elections for the national assemblies.

Belgium, Kingdom of (*Royaume de Belgique*). Belgium is composed of 9 ancient provinces,—West Flanders, East Flanders, Anvers (Antwerp), Brabant, Limburg (in part), Luxemburg (in part), Liege, Namur, and Hainaut. Two French-speaking Prussian "circles," Eupen and Malmedy, and the neutral territory of Moresnet were added to Belgium by the Treaty of Versailles. The provinces were a part of the "low countries" and for centuries were the possessions of the house of Habsburg. After the French Revolution they fell under Napoleonic control. By the Treaty of Vienna, they were united to the Kingdom of Holland, with the provinces of which they had been joined during the Protestant Reformation. In 1830, the Belgian provinces revolted from Holland, and established their independence and the Belgian state. The constitution, framed in 1831 by a convention of able publicists, has been much praised as a scientific charter of liberal, representative, monarchial government.

The King.—By the constitution, sovereignty is vested in the Belgian nation, but the leadership of the state is vested in the "king of the Belgians." The kingship was conferred upon Prince Leopold of Saxe-Coburg-Gotha, who was an uncle of Queen Victoria of England. Leopold I was succeeded in 1865 by his son Leopold II; in default of sons, Leopold II was succeeded in 1909 by his nephew, King Albert. The constitution applies to kingship the strict "salic law" whereby the throne can be occupied only by a male. While the government is conducted by ministers responsible to Parliament, the king exerts large influence on national policy. The unity of the nation in defiance of Germany's demand in 1914 is attributed in no small degree to the firm attitude of King Albert, who personally commanded the Belgian army during the war.

Parliament.—Parliament consists of a Chamber of Deputies and of a Senate. The Chamber of Deputies consists of 186 members, or of not more than one to each 40,000 population. They sit for 4 years unless a dissolution is ordered. Eligibility consists of citizenship, possession of civil and political rights, age of 25 years, and residence in Belgium. The Senate is renewed every 4 years and, besides the sons of the king, is composed of 3 classes: (1) elected senators (equal to half the number of deputies), from 21 categories or walks of life; (2) provincial senators, 40 in number, chosen by provincial councils; (3) Co-opted senators, 20 in number, chosen by the Senate.

The ministry, organized with a fairly permanent body of officials, *functionnaires*, is divided into 11 departments: foreign affairs; interior; education;

agriculture and public works; industry, labor, and social insurance; justice; finance; national defense; colonies; railways, marine, posts, telegraphs, and aeronautics.

Provincial Autonomy.—The provinces, representing one-time separate principalities, have a considerable degree of autonomy which is recognized by the constitution. Each has a provincial assembly chosen by the qualified electorate. In the intervals between assembly meetings, a "permanent commission" of six representatives watches over the conduct of provincial affairs. The head of the provincial administration is a "governor," appointed by the king. In his hands particularly are all details of police. The governor, like the French prefect, is the local representative of the different ministries at Brussels. Each province, moreover, is divided into 4 or 5 *arrondissements*, each of which has a commissioner and a staff of officials responsible to the governor.

Belgian Communes.—The real Belgian local autonomy, however, is expressed in the "communes," the towns. These are among the most famous cities of Europe. In them, modern municipal life took its rise. Ghent (Gand), Bruges, Ypres, Antwerp (Anvers), Malines, Bruxelles, and Mons represent centuries of civil growth and stubborn attachment to municipal rights. In the Belgian kingdom, there are some 2672 communes. They are governed according to a common plan and are under one municipal law, but here the comparison with French communes largely ceases. The center of civic government is the *hotel de ville*, frequently a noble example of Gothic architecture. Here the council meets and here are the offices of the burgomaster, or municipal head, and of his two to four assistants, called "echevins," each of whom superintends the work of one or more branches of municipal administration. The burgomaster of the Belgian commune is more than a local official. He is the representative of the kingdom in his town, has the sole command of the police, and, in matters of public safety, exercises a jurisdiction independent of the municipal council.

The Belgian nation is composed of two distinct European peoples, the Flemish and the Walloons. The Flemish occupy the northern portion of Belgium; in speech (Flamand) and in physical appearance they are akin to the Dutch. The Walloons are a darker, less phlegmatic race who speak French. The dividing line between these two populations has not altered in centuries; it runs east and west across the country and passes directly through the field of the battle of Waterloo. The "Flemish movement" of recent decades represents a revival of the Flamand language, through its employment in literature and in public instruction. The movement has had important political aspects.

Prior to 1914, suffrage was undemocratic. A system of plural voting granted two votes to the possessor of certain means, and three votes to those having additional qualifications. Following the World War, measures were taken to democratize the suffrage. Belgium was one of the earliest countries to adopt a plan of "proportional representation." The "d'Hondt system," the plan devised, has been widely imitated.

Belgium, while a small country of less than eight million people, possesses not only extensive overseas industrial interests, but also a vast African empire—the Belgian Congo. This area, which embraces a large part of the Congo River system and the higher central plateau region of Katanga, was acquired personally by the late King Leopold II, who organized the neutralized "Independent State of the Congo," with himself at the head and as the heaviest investor. The enterprise was financially successful; but it led to cruel exploitation of the natives, and in 1908 the Belgian state took over the Congo as a national possession. The territory was increased in 1919 by a mandate over Ruanda and Urundi, formerly parts of German East Africa.

By the treaties of London of 1831 and 1839, the neutrality of Belgium was made a matter of treaty guarantee. Great Britain, Prussia, Austria, and Russia joined in this pact. Belgium herself was pledged to the agreement and, true to her obligations as well as to her national dignity, she rejected the German demands in 1914 and defended herself against German invasion. Subsequently the government repudiated the status of guaranteed neutrality, which had led to so equivocal a position and to so fatal an ending. Belgium is today in a position of complete independence.

Bolivia. The revolution against Spain, 1809-10, initiated in the territory of Bolivia, then known as Upper Peru. After the achievement of independence in 1824, the Bolivians met with representatives of Argentina to determine whether or not they would join that country. They unanimously voted to remain a separate nation under the style of the "Republic of Bolivia," the name being taken from Simon Bolivar, the liberator of South America. The independence of the republic was proclaimed August 26, 1825. The territory claimed for the new republic was that which, under Spanish authority, was subject to the Audiencia of Charcas.

Constitutional System.—Bolivia has experienced many constitutional changes—1829, 1831, 1834, 1836 (when a confederation was formed with Peru and dissolved in 1839), 1841, 1843, 1851, 1861. The present constitution dates from October 28, 1880. All of these public laws are framed upon the usual constitutional conceptions of Spanish American nations. The executive power is bestowed upon a president, who is elected by popular vote for 4 years and is ineligible for a following second term. The ministers, or department heads, are his appointees and executive agents.

The Congress is composed of a Senate of 16 members, 2 from each department into which the republic is divided, and of a Chamber of 78 deputies. All members of Congress are elected by popular vote. Senators have a 6-year term, one-third retiring every 2 years, while the deputies are elected for 4 years, one-half retiring every 2 years. There is a supreme court, with 7 judges appointed by Congress for a 10-year term, and there is a district court in each department.

For administration, the republic is divided into 8 departments, *departamentos*, administered by prefects, *prefectos*; 3 national colonial territories; 72 provinces, under subprefects; and 681 cantons, under *corregidores*. Municipal districts are headed by *alcaldes*. Prefects and subprefects are appointed by the president; the lower administrative officers, by the prefects. Municipal councils are elected by popular vote and have a certain degree of autonomy. Voting is limited to male citizens over 21 (18, if married), officially registered, literate, and with fixed income.

The mining laws accord the same rights of exploitation to foreigners as to natives. Western Bolivia is Andean, with a population largely of native Indians. Prior to the "War of the Pacific," 1879-1883, Bolivia claimed Pacific Coast territory. Chile's victory in this war against Bolivia and Peru extinguished Bolivia's rights to a Pacific port and the country still remains without direct access to the sea. Two Chilean-built railways from the ports of Antofogasta and Arica connect Bolivia with the Pacific. In 1928, in accordance with a treaty of 1904, Chile relinquished to Bolivia that part of the Arica railroad in Bolivian territory. The Tacna-Arica settlement of 1929 between Chile and Peru left Bolivia's aspirations for a Pacific port unsatisfied.

Brazil (The United States of Brazil). A federal republic, comparable in area to the United States of America. It was a dependency of Portugal from the time of its discovery in 1500 until 1822, except for a period of 60 years, 1581–1640, during which Portugal was united to Spain. The vast area comprising

the Amazon region and most of the east coast of South America was divided under Portugal into a number of jurisdictions or "captaincies," a fact which may in part explain the tendencies that have opposed centralization in government and have made Brazil a federal republic.

Brazil was the seat of the Portuguese government and the residence of the royal family from 1807 to 1821. On the return of the Portuguese royal family to Portugal, a national congress assembled in Brazil and chose Dom Pedro, the king's eldest son, as "Perpetual Defender of Brazil." In the same year, Dom Pedro proclaimed the independence of Brazil and was chosen constitutional emperor. Brazil remained an American empire until 1889, when the emperor was dethroned and the imperial family was exiled. The decree of banishment against the family was repealed August 6, 1920.

Republican Constitution.—The constitution was promulgated February 24, 1891, and bears a close resemblance to the Federal Constitution of the United States, the old provinces acquiring the position of states. The present union comprises 20 states, one national territory acquired in 1902, and one federal district. Each state is self-governing. The powers of the states in one particular are broader than in the North American federation, since they may levy export duties. Import duties, postage, and bank note circulation are reserved to the Federal government.

The executive authority is exercised by a president of the American type, who is elected by direct vote for a 4-year term and is ineligible for a succeeding term. He must be a native of Brazil and more than 35 years of age. No candidate for the presidency may be related to the president by blood or by marriage. The vice president is elected at the same time, in the same manner, and for the same term as the president, and, as in the American Constitution, he is presiding officer of the Senate. The president is commander in chief of the army and navy; he appoints and dismisses ministers, and within certain limits has the power to declare war and to make peace. With the consent of Congress, he appoints the members of the supreme federal tribunal and foreign ministers.

The departments of government are seven: finance; justice, interior, and public instruction; war; marine; foreign affairs; communications and public works; agriculture, industry, and commerce. Ministers may not appear before Congress, but must communicate with that body either by writing or by conference with commissions of the chambers. They are responsible to the president for their political actions.

Federal legislative authority is intrusted to a national Congress which consists of a Senate and of a Chamber of Deputies. Congress meets annually for a 4-months' session, beginning May the third. No member may accept a commission or a paid public office except one that is diplomatic or military, without the consent of Congress, and no member may have an interest in the administration of a company receiving a federal subsidy.

The Senate is composed of 63 members, elected by direct vote, 3 for each state and for the federal district. The term of senators is 9 years, one-third retiring every 3 years. They must be more than 35 years of age and must have been citizens of Brazil for at least 6 years.

The Chamber of Deputies consists of 212 members chosen for a 3-year term by direct vote, with a provision for minority representation. There are not less than 4 deputies from each state, in a proportion not greater than one for every 70,000 inhabitants as shown by a decennial census. The Chamber has the exclusive initiation of tax measures and of proceedings of impeachment. The franchise extends to all male citizens over 21 years of age, duly registered, except the indigent, the illiterate, soldiers actually in the service, and members of monastic orders under vows of obedience.

The supreme Federal tribunal is composed of 15 judges. As in the United States of America, there are Federal courts and a Federal jurisdiction within each state. Federal judicial appointments are for life. State courts administer state laws. A new civil code went into effect January 1, 1917. Foreigners enjoy all civil rights, but are prohibited certain professions, as stockbroking, auctioneering, and the law.

The constitution guarantees to each state a republican form of government and the separation of the powers of government into executive, legislative, and judicial branches. Governors and members of state legislatures are elected. Each state has its own constitution. The Federal constitution authorizes the armed forces of the nation to compel the states to respect the national constitutional authority.

Frontier Settlements.—The frontiers of Brazil adjoin the territory of every other South American state except Ecuador and Chile, and also touch the possessions of France, Great Britain, and Holland. A boundary dispute with France, arising from interpretation of the Treaty of Utrecht, 1713, was settled largely in Brazil's favor by an arbitration award of the president of Switzerland in 1900. A boundary dispute with England was settled by arbitration of the king of Italy in 1904. The boundary with Dutch Guiana was delimited by a treaty concluded in 1906.

The boundary between Brazil and Venezuela was settled in 1905, after a long period of negotiations, and the demarcation was made by a mixed commission in 1914. In 1872, Brazil and Paraguay signed a treaty whereby the title to Brazilian territory north of the Rio Apa was determined. The boundary with Argentina was settled by an arbitral decision by the president of the United States in 1895. The Brazilian contention was sustained. A remaining boundary difficulty between Brazil, Peru, and Colombia was settled by agreement at Washington, March 4, 1925.

In boundary negotiations with Uruguay, Brazil, by a treaty of 1851, secured rich territory that, by a treaty of 1777, had been admitted to belong to Spain. In this case, as in others, Brazil was able to acquire territories beyond those fixed during the period of Spanish domination. Thus, by means of a series of remarkable negotiations and awards, there was ended the long competition between Spain and Portugal that began in 1493, when the bull of Pope Alexander divided between these two countries the discovery and the conquest of the world.

In the World War, Brazil remained neutral until drawn into the conflict by the German submarine policy. She advanced through the various steps of protest, through the dismissal of the German diplomatic representative, and through a revocation of neutrality. Following a traditional policy of unity of action with the United States of America, Brazil declared war after the United States became a belligerent, her navy actively participating.

BRITISH EMPIRE

The British Empire embraces the numerous countries and possessions which owe allegiance to the British crown and which, in legal theory at least, are subject to the authority of the Parliament at Westminster. Their status within the Empire differs greatly but they may be classified under the following groups: Great Britain and Northern Ireland; the Irish Free State; the Dominions; the Empire of India; the crown colonies and protectorates; the mandates. The legal bond between all of these countries is allegiance to the British sovereign, whose present title was recommended by the Imperial Conference of 1926 to read as follows: "George V, by the Grace of God, of Great Britain and Ireland and the British Dominions beyond the seas, King; Defender of the Faith, Emperor of India."

By parliamentary acts of 1920 and 1922, the Irish Free State became a self-governing dominion, while Northern Ireland continued to be represented in the British Parliament besides having a parliament of her own. Great Britain comprises England, Wales,

and Scotland. The thrones of England and Scotland were united in 1707 by the Act of Union, when their Parliaments were combined into a single legislature.

Seat of Government.—Adjoining the ancient city of London is Westminster, which was chosen as a residence by the Norman kings, and is the seat of British government. Here are "Whitehall street" and "Downing street," with the residence of the prime minister; Westminster Hall and Abbey; and the modern houses of Parliament. The British sovereign lives at Buckingham palace or other royal residences, or at Windsor castle on the Thames, 21 miles from London. From this latter ancient residence of British sovereigns, the present king adopted in 1917 the family name of House of Windsor.

The British Monarchy.—Excepting the interruption of the Cromwellian period, England has been governed continuously as a monarchy since Saxon times. The monarchy, which was firmly established on a national basis by William the Conqueror and by his successors, attained its greatest power and influence under the Tudors, Henry VII, Henry VIII, and Queen Elizabeth; but their successors, the Stuart kings, aiming at an absolutism attained elsewhere in European kingdoms, were summarily checked by Parliament, which beheaded Charles I and expelled James II.

The constitutional history of England is largely the conflict between king and Parliament for state control. The result has been the complete supremacy of Parliament and the reduction of the sovereign to a symbol of national loyalty and to a position of simple influence. "The king rules but does not govern." All crown powers are exercised in his name by ministers who are no longer his choice, but who are a committee of members of Parliament, dependent upon the House of Commons for continuance of office.

Ministers.—There are some 80 high officials known as "ministers," selected by the "prime minister," the actual leader of the majority in the Commons. The chief ministries are the lord chancellor, who presides over the House of Lords and over the supreme court of judicature, and is a general minister of justice; the chancellor of the exchequer, who is the financial minister; six secretaries of state—home affairs, foreign affairs, colonies and dominions, war, air, India; the first lord of the admiralty; the presidents of the boards of trade and education; the ministers of health, labor, and agriculture and fisheries; the secretary for Scotland; and the attorney-general. Several offices,—lord president of the privy council, the first lord of the treasury, lord of the privy seal, and the chancellor of the Duchy of Lancaster,—have become sinecures; they are usually taken by the prime minister and by members left free of administrative duties, or "without portfolio."

Of these ministers, a minor group constitutes, with the prime minister, the "cabinet." The cabinet determines policies, settles the budget and financial schemes for submission to Commons, institutes practically all legislation, and takes responsibility at all times before Parliament for the conduct of affairs throughout the vast British Empire. A refusal of the House of Commons to follow the cabinet's lead or to enact its measures results either in the immediate resignation of the ministry or in "an appeal to the country," that is, the dissolution of the Commons and an election of a new House. Periods of government take the name of the prime minister; as, the "third Gladstone ministry," 1892–94, "the Lloyd George ministry," 1916–22.

Parliamentary Government.—This historically established organization for conducting the government has given to the world the widely imitated institution of "parliamentary," "responsible," or "ministerial" government, as distinguished from "presidential government" wherein the chief executive has a tenure independent of the legislative or parliamentary body.

The British Parliament consists of the House of Lords and of the House of Commons. The members of the Commons are elected for a term of 5 years, or until a dissolution of the House. A member need not, and seldom does, reside in his "constituency." Since 1911, members of Commons receive an annual compensation of £400. The House of Lords has a membership of about 740 and includes the archbishops of Canterbury and York; bishops of the English Church; and "peers," created by the sovereign on recommendation of the prime minister, comprising, in order of rank, dukes, marquises, earls, barons, and "life peers." The House of Lords has decided that a peeress in her own right is not entitled to a seat in the Lords.

Down to 1911, the Lords had a legislative position comparable with the Commons, except in initiation of financial legislation. Its opposition to legislation demanded by the Commons could be overcome only by the threat to create enough new peers favorable to the law to "swamp the Lords." In 1832, this threat was effectual in securing the passage of the "Reform act" and was used in 1911 to pass the "Parliament act" whereby the supremacy of the Commons is recognized. Under this act, if the Commons passes an act in three successive sessions within an interval of not less than two years, it may become a law without the consent of the Lords. No "money bill" may be denied assent by the Lords, and the "speaker" of the Commons is the final judge of whether or not any certain act is a money bill. The king must give assent to every bill of Parliament. To refuse would be an unconstitutional act; in fact, it would be an act of revolution.

Sovereignty.—The "King, Lords, and Commons" legally have complete sovereign powers; no political act is beyond their competence. They can legally alter, in any particular, the constitution of the British Empire. As a matter of fact, however, Parliament has ceased to legislate, except by consent, for the self-governing dominions,—Commonwealth of Australia, New Zealand, Dominion of Canada, Newfoundland, Union of South Africa, and the Irish Free State.

The constitution of Great Britain consists of a great number of separate acts, as well as of established practices which can be altered only by Parliament itself. These acts have never been codified or reduced to a single charter, and in this sense the British constitution is "unwritten." Since it can be changed by Parliament itself, it is spoken of as "flexible" as distinguished from "rigid" or "written" constitutions.

Previously to 1832, suffrage in Great Britain was restricted to the aristocratic and land-owning class. By the "Reform acts" of 1832, 1867, and 1884, it was successively extended, and, by the "Representation of the People act" of 1918, full manhood suffrage was realized, and the vote was given to women 30 years of age. By the "Equal Franchise act" of 1928, women were admitted to complete equal suffrage with men. The voting age is 21, with residential qualifications. Voting has for many years been carefully protected by a Corrupt Practices act. Thus, under the forms of a monarchy, Great Britain, now almost the last remaining kingly government of consequence, has become in fact one of the most democratic of countries. The families of the nobility, however, continue to exercise a political leadership and an influence not found today in any other country.

Local Government.—For purposes of local government, Great Britain is divided into "administrative counties" (62 in England and Wales, 30 in Scotland) and "boroughs." County government is ordered by the Local Government act of 1888, which provides elective councils to supervise local government and to appoint the county officials. Its chief responsibilities are for local communications, education, asylums, and police.

English boroughs or towns, before 1835, were close corporations, governed largely in the interests of a

narrow body of "freeholders." By the Municipal Corporations act of that year, a systematic and more liberal form of city government was introduced, whereby the borough council became the city administration. This body acts through committees and employs city officials who, while relatively few in number, are chosen for experience and qualifications. The most usual of these is the "clerk." While conforming to a general type, the powers of boroughs are expressly given by charters or by acts of Parliament, and the latter body is constantly importuned to extend the functions of boroughs. Nearly all so-called "private bills" are of this character.

The "mayor" of an English town is in no sense the head of its administration. The office, usually held for one year, is important in a social and a civic sense, and frequently imposes upon the occupant considerable expenditure for entertainment and for representation of the borough.

London.—The government of London must be described separately. At its center is the ancient "City of London," once surrounded by walls embracing about a square mile east of Charing Cross. This is still an "unreformed" English borough, governed by a close corporation of "councilmen" and "aldermen." The "lord mayor of London" is the presiding head; he resides in "Mansion House" and is an important civic figure in British life. Surrounding the city is the county of London, made up of 28 boroughs with district governments; but the London County council, created in 1888, has definite general powers over the whole area. The "Metropolitan Police Area" includes London county, and extends over adjacent territory to an extent of nearly 700 square miles. To the metropolitan police is intrusted the public order of this central part of England. This highly trained force, with its headquarters at Scotland Yard, is directly under the home secretary of Great Britain.

THE DOMINIONS

The dominions are former British colonies which have developed into practically independent nations, possessing almost a parity with Great Britain in the British Commonwealth of Nations. The ties that bind them to England are those of sentiment and interest, voluntarily accepted and patriotically guarded. The powers of their independent parliaments embrace all their national interests. Government is in the hands of ministers, responsible to these parliaments. The governor-general, who is appointed by the Crown, represents the imperial tie. His actual powers are limited and tend to disappear. At the Imperial Conference of 1926, an effort was made to define the status of the dominions in the following language: "They are autonomous communities within the British Empire, equal in status, in no way subordinate to one another in any aspect of their domestic or external affairs, though united by common allegiance to the crown and freely associated as members of the British Commonwealth of Nations. Every self-governing member of the empire is master of its destiny. In fact, if not always in form, it is subject to no compulsion whatever."

Canada, Australia, New Zealand, and South Africa have possessed dominion status for more than a generation; the Irish Free State, since 1922; Southern Rhodesia, since 1923. The support given by the dominions to the Empire in war is entirely voluntary and based upon their own actions. They have expressed their unwillingness to be bound by treaties of the British government except upon their own explicit assent. The one obligation resting upon all citizens of the dominions is common allegiance to the British king.

Australia. The Commonwealth of Australia is a federal union of six "original states," formerly British colonies, formed in 1901 in pursuance of an act of the British Parliament, passed in 1900, after five of the colonies, by acts of their legislatures, confirmed by popular referendum, had expressed themselves in favor of union. The five states are New South Wales, Victoria, Queensland, South Australia, and Tasmania; the sixth state, Western Australia, joined immediately. Northern Australia is a territory ceded to the federal union by South Australia in 1911; on the same date, New South Wales ceded a district, later named Canberra, as a federal territory to be the seat of the commonwealth government.

The Federal government consists of a governor-general, who represents the crown; of a Senate composed of 36 members, 6 chosen by each state; and of a House of Representatives having 76 members, who are chosen by each state in proportion to its population. The senators are chosen for 6 years and the representatives for 3 years, unless Parliament is dissolved earlier. As in the United States, the federal jurisdiction consists of "enumerated powers," while other or "residuary" powers are reserved to the states.

The administration is conducted by a prime minister and by 8 other ministers responsible to Parliament. There is a federal judiciary, including a high court.

The constitution may be amended by act of Parliament ratified both by a majority of the states and by a popular referendum.

Australia has a defense policy based upon universal compulsory military training. The commonwealth possesses a naval force, a unit of the British fleet, called the "Royal Australian Navy."

Each state has a governor, a Parliament of two chambers (except Western Australia, which has one chamber), and a responsible ministry. In all the states, women vote and have equal political rights.

Canada. This country was originally a French settlement ceded to England in 1763. The portion colonized by the French, known as Lower Canada, and Ontario, or Upper Canada, which was inhabited by British settlers, were united in 1867 with two other British colonies—Nova Scotia and New Brunswick—to form the Dominion of Canada. To this union were subsequently admitted, as provinces of the federation, Manitoba, 1870, British Columbia, 1871, Prince Edward Island, 1873, Alberta and Saskatchewan, 1905. The Dominion now embraces all of the British possessions on the mainland of North America except Labrador.

In Canada was developed and inaugurated the principle of self-government which is now possessed by the so-called dominions or self-governing nations of the British Empire. The early British colonial policy in America was to reserve executive power to a proprietary, or royal, governor, while granting local legislative power to a representative assembly. The laws of the colonies were subject to the approval of the governor and of the home government. This system was provocative of great friction.

Self-Government.—After the separation of the colonies composing the United States, the desire for self-government reawoke in Canada and led to continuous difficulty with the royal governors and even to local rebellion. In 1838, when political relations in Canada had reached a deadlock, the British government sent out a commission of inquiry headed by Lord Durham, who recommended the recognition of self-government in the Canadian colonies and the formation, in each colony, of a ministry that would be politically responsible to the legislature and not to the British government. This principle was adopted. The governor, or representative appointed by the British crown, became the nominal representative of imperial authority, while a "premier" responsible to the local Parliament became the actual head of government.

While all actions are still taken in the name of the British monarch, the right to veto, which is legally retained, has been most sparingly exercised. Thus was established in Canada a political order which gives free rein to the political capacities of the Canadian people and places upon them the solution of their internal problems. This concession preserved the loyalty of the Canadians to the British

crown and has made them firm supporters of the empire.

This same system has been extended to Australia, New Zealand, South Africa, Irish Free State, and Southern Rhodesia and is foreshadowed in recent changes introduced in the government of India.

Following the Civil War in the United States and the successful establishment of the federal principle, a strong movement arose in Canada looking toward the union of the several colonies into a single commonwealth. This was accomplished in 1867, as stated above, by the British North America act.

Government is federal. The organic law assigns certain powers to the provinces and reserves all other powers to the Dominion government. Thus the principle upon which functions are distributed is the reverse of that in the United States, where the Federal government possesses only "expressed powers" and the states have the "reserved powers."

Powers of Dominion.—Certain subjects are specifically enumerated as reserved to the Dominion Parliament. They are as follows:

The public debt and property.
The regulation of trade and commerce.
The raising of money by any mode or system of taxation.
The borrowing of money on the public credit.
Postal service.
The census statistics.
Militia, military and naval service, and defense.
The fixing of, and providing for, the salaries and allowances of civil and other officers of the government of Canada.
Beacons, buoys, lighthouses, and Sable island.
Navigation and shipping.
Quarantine, and the establishment and maintenance of marine hospitals.
Seacoast and inland fisheries.
Ferries between a province and any British or foreign country, or between two provinces.
Currency and coinage.
Banking, incorporation of banks, and the issue of paper money.
Savings banks.
Weights and measures.
Bills of exchange and promissory notes.
Interest.
Legal tender.
Bankruptcy and insolvency.
Patents of invention and discovery.
Copyrights.
Indians and lands reserved for the Indians.
Naturalization and aliens.
Marriage and divorce.
The criminal law, except the constitution of courts of criminal jurisdiction, but including the procedure in criminal matters.
The establishment, maintenance, and management of penitentiaries.
Such classes of subjects as are expressly reserved from the provincial legislatures.

Powers of Provinces.—The powers expressly bestowed upon the provincial legislatures are as follows:

The amendment of the provincial constitution, except as regards the office of lieutenant governor.
Direct taxation for provincial purposes.
Borrowing of money on sole credit of the province.
The organization of the provincial administration.
The management or sale of provincial lands.
Reformatory prisons.
Hospitals, asylums, and charitable institutions other than marine hospitals.
Municipal institutions.
Local excises.
Provincial works, including railways, canals, telegraph systems, shipping lines.
The incorporation of stock companies.
Solemnization of marriage.
Definition of property and civil rights within the province.
Administration of justice, including provincial courts.
Imposition of punishments for enforcing provincial laws.
In general, all matters of a merely local nature.

Immigration.—There is one important matter in which the Dominion and the provinces have acted concurrently; namely, the settlement of public lands and the encouragement of immigration. All public or crown lands belonged to the provinces, until, in 1869, the Dominion government acquired the territory of the Hudson's Bay Company. The *encouragement* of immigration and the distribution of homesteads have remained mainly provincial enterprises, but the provinces have ceased to *regulate* immigration, the Dominion code governing this matter. The government of British Columbia passed several acts restricting Oriental immigration into that province, but these acts were invalidated by the Dominion government at Ottawa.

Education.—A further subject which is the main concern of the provinces but in which the Dominion government is authorized to act, is education. In French Canada, where the population is predominantly Catholic, schools are mainly parochial. In other provinces, Protestants predominate. The organic act, while conferring upon the provinces the conduct of education, provided that nothing in provincial laws should "prejudicially affect any right or privilege with respect to denominational schools which any class of persons have by law in the provinces." This provision was intended to protect the educational rights of minorities in the different provinces. The administration of this provision has not been free from contention and has played an important part in Canadian politics.

The Senate.—The Parliament of the Dominion consists of two houses—a Senate and a House of Commons. A senator must be 35 years of age, a natural born or naturalized subject of the king, possess at least four thousand dollars in excess of liabilities, be a resident of the province for which he is appointed, and, in the case of Quebec, he must either be a resident of the district which he represents or hold the qualifying amount of real property therein. Senators are nominated for life by the governor-general, but their actual selection rests with the Canadian premier. By an amendment made to the British North America act and put into effect in 1917, the Senate consists of 96 members, 24 from Ontario, 24 from Quebec, 10 from Nova Scotia, 10 from New Brunswick, 4 from Prince Edward Island, and 6 from each of the following: Manitoba, British Columbia, Alberta, Saskatchewan. The total number may not exceed 104.

House of Commons.—The House of Commons is elected for a five-year term. It may be dissolved by the governor-general on the advice of the prime minister. Women vote and are eligible for election. The province of Quebec is guaranteed a representation of 65, the other provinces' representation being proportionate to their population, as determined by the decennial census. The Representation Act of 1924, based on the census of 1921, provides 82 members for Ontario, 65 for Quebec, 4 for Nova Scotia, 11 for New Brunswick, 17 for Manitoba, 14 for British Columbia, 4 for Prince Edward Island, 21 for Saskatchewan, 16 for Alberta, and 1 for the Yukon Territory.

Privy Council.—The imperial relation is represented in the person of the governor-general, appointed by the British government from among the most distinguished representatives of British achievement. Actual government is confided to a cabinet, called the King's Privy Council for Canada and composed of the Canadian prime minister and from 15 to 22 additional ministers. As in the British government, these ministers are members of Parliament, and the premier is the leader of the dominant political party. The premier receives $15,000 a year and $4000 allowance for each session; other ministers receive $10,000 a year.

A department of external affairs within the cabinet is the medium for conducting the relations of Canada with Great Britain and other British states. Canada accredits ministers to Washington, Paris, and Tokyo and is represented at Geneva.

Legislation.—Bills originate in either house, except finance bills, which may originate only in the House of Commons. The Senate may reject a finance bill but not amend it. Most bills are initiated by the House, except bills for divorce which, by usage, always originate in the Senate. Between 1867

and 1913 the Senate amended 21½ per cent of the bills it received from the House and rejected 2 per cent. While the position of a senator is a highly privileged one, senators have never played a political rôle comparable to that of the members of the House of Commons and are seldom offered seats in the cabinet. Members of both houses receive the same compensation—$4000 for the session, with a deduction of $25 per day for every day beyond 15 in which a member does not attend. The speaker of the House of Commons receives $6000 and the leader of the opposition in the Commons $10,000.

Courts.—Judges in Canada are appointed and paid by the Dominion government, to hold office for life or during good behavior. The supreme court of Canada receives appeals from the provincial courts and questions may be referred to it by the governor-general in council. A ruling may thereby be obtained on the constitutionality of any law without the delay and expense of litigation. In civil cases within certain limitations, appeals from the supreme court and from the highest provincial courts may be carried to the judicial committee of the privy council in England. In recent years, a strong sentiment has arisen opposing such appeals as inconsistent with the status of a self-governing nation.

National Development.—The Dominion for many years has pursued a so-called "national policy," directed toward the development of the country by means of tariff protection given to manufactures, by the encouragement of railroad building through Dominion, provincial, and municipal contributions, and by the actual construction of government lines. Outside of the Canadian Pacific railroad, most of the railroads of Canada are now operated by the Dominion government.

Immigration, largely from Great Britain and from the United States, began actively after 1891.

Provincial Governments.—The powers of provincial governments have already been noted. Each of the nine provinces has its own parliament and administration. With the exception of Quebec and Nova Scotia, the legislature consists of a single chamber. A lieutenant governor, appointed by the governor-general, represents the federal union, but actual government is in the hands of a premier and provincial ministers responsible to the provincial parliament. The territory of Yukon is governed by a chief executive office and an elected council of three members.

Ireland. Previous to 1920, Ireland was a part of the United Kingdom, with representation in the Parliament at Westminster, and was administered by a government at Dublin Castle, presided over by the lord lieutenant of Ireland. The bestowal of "home rule," provided in an act of Parliament of 1914, was prevented by the attitude of the northern or Ulster population, which opposed a united, autonomous government in which it would be a religious minority.

The World War suspended the solution of the Irish question, but it saw the culmination of the separatist movement in the "Easter Rebellion" of April 1916, in Dublin. Following the peace and the proclamation of a revolutionary "Irish Republic," Ireland again became one of the most pressing problems of the British Parliament, and the situation was met by the passage of the Government of Ireland act of December 23, 1920. This provides for two local parliaments and two administrations, one for Northern Ireland, comprising the 6 counties of Antrim, Armagh, Down, Fermanagh, Londonderry, and Tyrone, and one for the rest of the country, Southern Ireland, including 26 counties.

Northern Ireland.—This act was acceptable to the Ulster "Unionists," and a Parliament, which, according to the act, consists of a Senate with 2 *ex officio* and 24 appointed members and of a House of Commons of 52 elected members, was opened in Belfast in June 1921. A lord lieutenant, as representative of the crown, heads the administration; but, in accord with the principle of dominion autonomy, government is conducted by ministers responsible to the Parliament. Northern Ireland is represented in Parliament at Westminster by 13 members.

Irish Free State.—In the South, the Sinn Fein or Irish Republican party, which predominated over the nationalists or home rule advocates, rejected the act. The Sinn Fein stood for the complete independence of the entire island, under one Irish republic. Civil warfare between, the crown forces and the Irish republican army disturbed Southern Ireland during 1920 and the first half of 1921, but in July a truce was declared and prolonged negotiation took place, which resulted in a "treaty," signed on December 6, 1921, and later embodied in the Irish Free State act of 1922.

Ireland, outside of "Northern Ireland," became the Irish Free State, and has "the status of a self-governing dominion" with a relation to the imperial government like that of the Dominion of Canada. The Irish Free State has the complete right of taxation and finance, possesses its own courts, its armed forces for home defense, postal service, and general interior administration, including education, agriculture, mines, forests, and labor. Complete independence is limited by the following reservations made by the British government: the seas around Ireland are under the control of the royal navy; military forces of the Irish Free State shall be in the same proportion as military establishments in other parts of the British Isles; no protective duties shall be charged; Ireland accepts responsibility for her share of the debt of the United Kingdom. The British government refused to recognize any right on the part of Ireland to secede, and also rejected the Irish proposal to submit differences to foreign arbitration.

The Irish treaty was ratified by the British Parliament on December 16, 1921, and by the Irish assembly, the Dail Eireann, by a narrow majority, in January 1922. A provisional government of Irishmen was then organized and British authority was transferred. The ratification was opposed by certain Irish republican extremists, who waged guerilla warfare against the new government.

The Irish Free State was formally inaugurated on December 6, 1922. The constitution provides for a Parliament of two houses, the Chamber of Deputies, or *Dail Eireann*, and the Senate, or *Seanad Eireann*. The Chamber is composed of members elected by direct vote of citizens above the age of 21, not less than one member for each 30,000 of the population nor more than one for each 20,000. The Senate, whose constitution was changed in 1928, consists of 60 members, one-third renewed every three years by the votes of members of both houses.

Provisions for the executive power are drawn upon the plan in force in the Dominion of Canada. Executive authority is vested in the king, to be exercised by the governor-general, who is the representative of the crown. An executive council, composed of not more than 12 members, who are appointed by the governor-general, is responsible to the Chamber of Deputies.

The judiciary consists of a series of courts of first instance and of a supreme court of final and conclusive jurisdiction.

The Government of Ireland act of 1920 provides that the two parliaments of the island may at any time, by identical acts, effect the union of Ireland and of the governments. Until such action may be taken, a "council of Ireland," consisting of representatives of both parliaments, is authorized to deal with matters involving the Northern and Southern governments. The boundary dispute between Northern Ireland and the Irish Free State was settled in 1925.

Newfoundland. Together with the continental area of Labrador, Newfoundland constitutes an independent self-governing colony. The British North America act authorized its admission to the Dominion of Canada, but it has never sought this

union. The Parliament is composed of a Legislative Council and of a Legislative Assembly to which the ministry is responsible. The governor and commander in chief is appointed by the crown.

New Zealand. This country was established as a British colony in 1840 and was granted responsible government in 1852. Its designation was changed to "Dominion of New Zealand" in 1907. The legislative power is vested in the governor-general, appointed by the crown, and in the "General Assembly," composed of a Legislative Council of 41 appointed members and of an elected House of Representatives.

The governor-general may withhold consent to bills or may reserve them for decision of the crown, but this constitutional power is sparingly exercised. Administration is conducted by a prime minister and by a cabinet.

Both chambers contain representatives of the Maoris, the native race of the island. Women vote and are eligible for election.

New Zealand has both a military and a naval force, and training is compulsory for all male New Zealanders.

South Africa. The Union of South Africa comprises the former self-governing colonies of Cape of Good Hope, Natal, the Transvaal (The South African Republic, 1884–1900), and Orange Free State (Orange River Colony, 1900–1910), which, in accordance with the South Africa act of the British Parliament of 1909, were united May 31, 1910, under a general government. The legislative power of the union is vested in a Parliament consisting of the king of England, a Senate, and a House of Assembly. The king is represented in the governor-general of the dominion.

The Senate comprises 40 members. Thirty-two are elected, 8 for each province, and 8 are appointed by the governor-general, 4 of whom are selected for their acquaintance with the colored races. The lower house consists of 148 elected members. Electors must be British subjects with 5 years of residence in the Union. Each province has a legislative council, elected for 3 years, and an executive committee presided over by the provincial administrator, who is appointed by the governor-general of the Union. Ordinances of the provinces may be vetoed by the Union government.

The Union is self-governing in the sense that administration and definition of policy are in the conduct of a prime minister and a ministry responsible to the Union Parliament. The grant of a unified, self-governing status to South Africa, in 1909, with the enfranchisement of the population which had so tenaciously resisted the British armies in the Boer war, was a remarkable exhibition of bold and liberal dealing on the part of Great Britain. The results fully justified the strength of the concession; for, despite the fact that the Boer population predominates, the Union has proved a loyal element in the British Empire, and it contributed decisively to Allied success in the World War.

CROWN COLONIES AND PROTECTORATES

These present a great variety of type. A number of the possessions are mere military outposts and naval bases occupied and held for strategic reasons, to control routes of trade and to defend imperial interests. Such are Gibraltar on the Spanish peninsula at the entrance to the Mediterranean; Aden at the eastern entrance to the Red Sea; the island of St. Helena in the south Atlantic; Ascension, which in 1922 was annexed administratively to St. Helena; and the Falkland islands, east of the Strait of Magellan, the scene of the sea fight of December 8, 1914, in which Admiral Sturdee destroyed the German cruiser fleet under Admiral von Spee.

The island of Malta, strongly fortified, guards the route through the Mediterranean; Singapore guards the Straits Settlements and the passage to the Far East; and Hongkong represents British power in South China. Previously to 1901, British policy sought to control or to share control of the passageway between the two American continents; but, in that year, by the Hay-Pauncefote Treaty, Great Britain yielded political predominance to the United States. See *Panama.*

Another group of possessions, once better known as "plantations," were partially colonized by Englishmen for the cultivation of sugar and other products. Such are the American colonies of Bermudas, Jamaica, Barbados, Trinidad, the Windward islands, the Bahamas, British Honduras on the mainland of Central America, British Guiana in South America, and the island of Mauritius and the Seychelles in the Indian Ocean.

At one time, the cultivation of sugar cane gave extraordinary prosperity to the British West Indies and enriched the island planters. Slave labor was introduced from West Africa, but the competition of modern sugar cane production resulted in the economic decline of these plantations. The British population has almost disappeared, and these islands have become colonies of blacks. The freeing of the slaves and their abandonment of the plantations led to the introduction of indentured coolie labor from India, from which has followed a considerable settlement of these East Indians, especially in Jamaica, Guiana, and Mauritius.

Crown Colony Government. These colonies are all administered by English governors, usually officials of long colonial experience, who are subject politically to the secretary of state for the colonies. To a limited extent, representation is secured by administrative or legislative councils composed partly of officials and partly of local residents, British and natives, appointed or chosen; but the supreme control in all matters is at Westminster.

Protectorates. Another large class of dependencies consists of "protectorates." In these countries, British supremacy is asserted against all foreign political influence, and a greater or less control is exercised through British "residents"; but native rulers are left in place and their power is frequently strengthened and improved. Such are the Federated Malay States, and, on the mainland of Borneo, Sarawak, which was conquered about 1840 by a gentleman adventurer, Rajah James Brooke, and was thus brought under British protection. Protectorates are usually handled by the secretary of state for foreign affairs.

African Dependencies. In South Africa, Basutoland, Bechuanaland, and Swaziland are reserves for the native tribes. In the first named, the land is possessed by the natives who, in a century, have increased from 40,000 to 500,000. They are handled as protectorates under resident commissioners, who report to the high commissioner for South Africa. Northern Rhodesia was administered by the British South Africa Company from 1889 until 1924, when it became a crown colony. Southern Rhodesia, in 1923, became an autonomous colony with a responsible government.

Southwest Africa is a former German possession conquered in 1915 and administered by the Union of South Africa under a mandate of the League of Nations. In West Africa are the crown colonies and protectorates of Sierra Leone, Gambia, Gold Coast, Nigeria, and parts of the former German possessions of Togoland and Cameroon, which are divided as mandates between Great Britain and France.

British East Africa embraces a great area included in Kenya Colony and protectorate, formerly known as East Africa Protectorate; Tanganyika Territory, formerly German East Africa, which was conquered in 1918 and divided into mandates under Belgium and Great Britain; the Uganda Protectorate, which includes several native "kingdoms" supervised by British representatives; and the island of Zanzibar, governed by a native sultan under the advice of a British resident.

In the Pacific, Papua, or British New Guinea, is now a possession of Australia. The former German

possessions comprising eastern New Guinea, the Bismarck archipelago, and the Solomon islands, all lying south of the equator, were occupied by an Australian force in September 1914 and were transferred to Australia as a mandate by the League of Nations, December 17, 1920. Similarly, the German Samoan islands, ceded by the Treaty of Versailles, constitute a mandate administered by New Zealand. Nauru island, also a former German colony, rich in phosphates, is a mandate of Great Britain; it is administered under a joint agreement by the governments of Great Britain, Australia, and New Zealand.

The Fiji islands constitute a British crown colony, the governor being high commissioner for the western Pacific. Tonga, or the Friendly islands, by an Anglo-German agreement of 1899, subsequently acceded to by the United States, is a British protectorate, as are the Gilbert and Ellice Islands colony and the British Solomon islands. The New Hebrides are a protectorate of both Great Britain and France and are jointly administered under a convention of 1906. There are both British and French residents.

British colonial policy is governed by a few clear political principles: maintenance of peace and public security for natives as well as for foreigners; accessible and exact justice through British-conducted courts; respect for native religions and institutions wherever these are compatible with the rights of society and the individual; economic development and the freedom of industry and trade. The securing of markets for goods of British manufacture has been a constant motive in the upbuilding of the empire.

The success of this vast undertaking is due to close adherence to a slowly developed set of principles and traditions, to the protection of British prestige and reputation, and to the intrusting of authority to a select and trained administrative personnel, moved by a high *esprit de corps*. This great and complex empire not only completely stood the shocks and strains of the World War and emerged compacted and aggrandized, but also, in war material and in armed men, proved a military resource of most impressive proportions. These facts reveal the British Empire as probably the greatest and most extraordinary political institution in human history.

While the authority of Parliament at Westminster is constitutionally absolute over the whole empire, Parliament is seldom called upon to legislate, the dominions, as above stated, being practically autonomous, and legislation for the crown colonies usually taking the forms of decrees and statutes issued by the British ministry and known as "orders in council." Appellate courts exist in all the colonies; but the supreme court of appeal is in London, and is known constitutionally as the judiciary committee of the king's privy council.

Indian Empire. India is the most wonderful and the most wealthy of British possessions. Its more than 300 million inhabitants represent different races and many diverse peoples under British government or protection. "British India," or the regions subject to British law, comprises 15 provinces or separate administrations, each under a governor. In addition, there are more than 560 autonomous native states under hereditary rulers subject to a varying control of the government of India.

Supreme authority in India is vested in a viceroy and governor-general appointed by the British crown for a usual period of 5 years. The king of Great Britain is the "emperor of India." The governor-general is subject to direction from England by the secretary of state for India, assisted by a council, in whom political control of the Indian Empire is vested.

The present form of Indian government is determined by acts of Parliament of 1915, as amended, and by the Government of India act of 1919. These acts express a policy of association of native Indians in government and of the gradual realization of responsible government in India. An Indian legislature, consisting of the governor-general, a Council of State, and a Legislative Assembly, was formally opened in 1921. The Assembly consists of 145 members, of whom 104 are elected.

The act of 1919 also conferred upon provincial legislatures a considerable local jurisdiction, entitled "transferred subjects," including local government, public health, education, etc. These legislatures must have at least 70 per cent of elected members. The transferred subjects are administered by ministers chosen by the legislatures and acting with the governor. The "reserved subjects" are administered by the governor in council.

India was represented at the Peace Conference of 1919 and is a member of the League of Nations.

Bulgaria. Bulgaria, long a subject territory of Turkey, obtained autonomy in 1878 by the Treaty of Berlin, which ended the Russo-Turkish war. In 1885, Rumelia, the Bulgar-inhabited province south of the Balkan mountains, by a successful revolution against the Turks, obtained union with Bulgaria, and the national movement advanced strongly. In 1908, during the revolution in Constantinople, Bulgaria declared her complete independence and her reigning prince, Ferdinand, of the house of Saxe-Coburg-Gotha, proclaimed himself king of the Bulgarians. By the second Balkan war, of 1913, Bulgaria lost to Rumania a strip of territory in the Dobrudja province on the Black Sea, but retained the town of Strumitsa in eastern Macedonia and about 70 miles of Ægean seacoast, west of the Maritza river, not including the port of Kavala. By the terms of the Treaty of Neuilly, Bulgaria ceded four small strategic bits of territory to Serbia and lost her seaboard on the Ægean. By treaty agreement with Greece in 1924, Bulgaria is allowed an outlet to the sea at Kavala.

The constitution of Bulgaria was adopted in 1879 and was amended in 1893 and in 1911. The legislative power is intrusted to a national assembly of one chamber, called the *Sobranje*. Like other Balkan states, Bulgaria has not adopted the bicameral principle or constituted an "upper house." The members of the *Sobranje* are chosen by universal manhood suffrage for a 4-year term, unless the chamber is dissolved earlier by the king. The government is conducted by "responsible ministers," usually 8 in number, headed by a "premier." The authority of the king, however, exceeds that of a usual "constitutional monarch," especially in foreign relations. Centralist administrative ideas are reflected in the organization of the country into "departments" governed by "prefects," who are appointed by the national government.

In addition to the above mentioned cessions of territory, Bulgaria is obliged, by the terms of peace, to "protect alien minorities within her realm, under terms laid down by the Allied and Associated Powers," as the protection of Bulgarians in neighboring states is assured her; to reduce her armed forces to 20,000 men; and to pay an indemnity of 2¼ billion gold francs, besides furnishing additional materials to Greece, Serbia, and Rumania.

CENTRAL AMERICAN STATES

The southern portion of the continent of North America, between Mexico and the westerly boundary of Panama, is usually termed Central America. Apart from British Honduras, it is now composed of five republics. These formed a single unit of government, the "kingdom of Guatemala," during the long period of Spanish empire. The center of administration was Guatemala City, where resided the "governor and captain-general" and the *audiencia* or court. To this jurisdiction belonged also Chiapas, now a state of the Mexican republic.

The independence of this kingdom followed promptly on the revolutionary movement in Spanish America and was established in 1823 by the national constitutional convention, which met at Guatemala City July 1, 1823, and decreed the provinces to be free and independent states, confederated in a nation entitled "The United Provinces of Central America." This convention, among other liberal actions, decreed the abolition of slavery.

On November 22, 1824, it promulgated the constitution, obviously framed under the influence of the Constitution of the United States, and provided for a Federal government of Central America. The provinces, meanwhile, organized their local or state governments. Almost at once, conflict arose between the adherents of the church and of the more conservative order, and the liberals. Separatist tendencies manifested themselves between the peoples of the several districts, and in 1839 the federation was dissolved. For nearly a century following this date, efforts were made to reunify Central America; but these efforts too often took the form of coercion or warfare by one state upon another, and sprang from the personal ambition of local "dictators."

In 1906, the government of the United States interposed to stop warfare between Guatemala, Honduras, and Salvador. On the U. S. S. *Marblehead*, a convention was signed, providing for the re-establishment of peace and for the reference of future differences to the arbitration of the presidents of the United States and of Mexico. Following this action came a conference at the city of Washington in 1907, which evolved a series of treaties designed to compose the differences between the Central American states and to bind them together in a greater unity.

A Central American court of justice was established and located at Cartago, Costa Rica. It was dissolved in 1917 on expiration of its treaty term of ten years. In 1922-23, by invitation of the United States, representatives of these states met at Washington in a Conference for Limitation of Armaments. Conventions and a treaty were signed renewing and amplifying certain terms of the treaties of 1907.

Meanwhile other attempts at unification have been undertaken. On January 19, 1921, delegates of Guatemala, Salvador, Honduras, and Costa Rica signed a treaty of union providing for the unification of those republics into a "federation of Central America." A provisional constitution was formulated, which left the constitutions of the separate states in force, so far as they were not contrary to the federal instrument, and which left in vigor treaties with foreign states.

The Swiss influence showed itself in the vesting of executive authority of the federation in a "federal council" (See *Switzerland.*), to be composed of a representative and of an alternate from each state, elected by popular vote for a term of 5 years. The legislative authority was conferred upon a Senate, elected by the Congress of each state for 6 years, and upon a Chamber of Deputies chosen by popular vote from electoral districts. Judicial authority was vested in a supreme court and in inferior courts, to be established by law. This compact was not entered into by Nicaragua, and was rejected by the Congress of Costa Rica. Its undertaking by the three remaining states was prevented by a revolution in December 1921, in Guatemala City.

The somewhat obscure history of Central America well illustrates the difficulties of establishing a federal union in the face of local attachments and dissentions, a difficulty triumphed over in the United States of America only at the cost of an exhausting civil struggle. The influence of the United States, which has been at times a strong factor in Central America, has been consistently thrown on the side of the unification and strengthening of these small states into one larger republic, illustrating vividly the fact that, in the foreign relations of the United States, the vicious principle of "divide and rule" has found no place. A concise statement of the government and politics of each country follows:

Costa Rica. Because of its elevated plateau area, Costa Rica enjoys the advantage of a favorable climate. The population consists largely of descendants of white colonists. Her isolation and the character of her population have given Costa Rica a somewhat more fortunate history than is possessed by other Central American states.

This country was the last to recognize the dissolution of the "federation of Central America." Her present constitution was framed in 1871 and embodies certain features indicative of the results of the studies of Spanish American publicists in which are modifications of constitutional law as originally elaborated in the United States. The government of the republic is declared to be "popular, representative, alternative, and responsible" and to be "vested in three different powers, to be known as legislative, executive, and judicial." No hereditary office or purchasable title is permitted. Civil liberty is fully defined by a series of articles, one of which confers the right to the writ of habeas corpus. The Roman Catholic religion is declared the religion of the state, which contributes to its support. Other religious worship is permitted.

The legislative power is confided to a single body called the "Constitutional Congress" composed of deputies chosen for 4 years, one-half renewable each 2 years in the proportion of one for each 8000 inhabitants. The Congress meets annually, on May first, for a session of 60 days and may be called in extra session by the executive. In addition to possessing national legislative authority, the Congress appoints the justices of the supreme court.

In the event of the president's death or of his disability, the Congress determines the exercise of executive power, and appoints at its first session three individuals termed the first, second, and third "designates," *designados*, who succeed to the executive power in the order of appointment. The Congress, moreover, may hear charges against the president or against any member of the supreme power, and may order his trial before the supreme court of justice. The Congress ratifies all treaties and conventions and is specifically empowered, by a three-fourths vote, confirmed by a special constitutional assembly elected for that purpose, to grant a concession for an interoceanic canal. By an amendment of the year 1888, a similar procedure by Congress suffices to conclude a treaty of political union between Costa Rica and any other Central American state.

The system of elections was formerly indirect through a college of electors, but is now direct. There is universal male suffrage of all independent citizens.

During the recess of the Congress, a "permanent commission" of five deputies continues in session, with the powers of interpreting laws in cases of doubt, of preparing and putting in order unfinished business, of suspending the constitutional guarantees, and, at the request of the executive power, of passing urgent decrees. It may also be consulted by the executive on matters of importance.

The executive power is confided to a president, who must be a Costa Rican by birth and over 30 years of age. No candidate may be a relative of the actual president. The term is 4 years. He may not leave the territory of Costa Rica during his term nor for one year thereafter without the permission of the Congress. The several secretaries of state constitute a "council of government."

The territory of Costa Rica is divided for administration into provinces, cantons, and districts. In each province are a governor, appointed by the president, and his agent. In the chief town of each canton is a municipal council with powers fixed by law. Under this somewhat conservative constitution, Costa Rica has enjoyed political stability.

By a convention of March 17, 1910, a boundary dispute between the republics of Costa Rica and Panama was submitted to the chief justice of the United States for arbitrament. This arbitration was not fully accepted by either republic, and the armed forces of each state invaded the disputed territory. War was averted by the peremptory insistence of the United States upon an acceptance of the decision.

Guatemala. Like Mexico, Guatemala is a country with a large Indian population, living in highland villages. The people preserve their native speech and much of their own character in spite of their profession of Christianity. The presence of this illiterate, laborious, and militant element has influenced both the history and the institutions of the country.

The constitution was promulgated December 11, 1879, and became operative March 1, 1880. The government is based on the theory of the "separation of powers"—legislative, executive, and judicial. According to amendments effective January 1, 1928, the *asamblea nacional* consists of 69 deputies, or one for approximately 30,000 inhabitants chosen for a 4 years term, one half of the body being re-elected each 2 years.

The executive power is in the hands of a president elected for 6 years. The constitution originally provided that a president should be ineligible to succeed himself, but an amendment of 1903 removed this limitation and President Estrada Cabrera held power for over 20 years. In 1927 drastic no re-election provisions were readopted.

The constitution provides for a council of state, *consejo del estado*, composed of the heads of executive departments and of 7 councilors, 3 appointed by the assembly and 4 by the president of the republic.

The administration is highly centralized. The country is divided into 23 "departments," each governed by a "political chief," *jefe politico*, who is appointed by the president and is responsible to him.

The Indians, long subject to compulsory labor on public works and private plantations, *fincas*, have been declared by law to be freed from this obligation.

Guatemala, through the triumph of the liberal party over the clerical, carried through the separation of church and state, with the secularization of ecclesiastical property. This, as in Mexico, is known as "The Reform."

Honduras (*República de Honduras*). The government of Honduras consists of a Congress of 48 deputies, chosen by direct vote for a 4-year term, renewable by halves every 2 years, and of a president, also chosen by direct vote for 4 years, who exercises all executive authority.

The 17 departments, into which the country is administratively divided, are governed by political heads who are appointed by the president and are responsible to him.

The original constitution of 1824 was revised in 1924, a permanent commission of 5 being given extensive powers of executive supervision. Honduras has an unsettled boundry dispute with Guatemala, which became acute in 1928.

Nicaragua (*República de Nicaragua*). The present constitution of the country was promulgated in 1913. The legislative power is vested in a Congress consisting of a senate of 24 members chosen for 6 years, and of a chamber of 43 deputies, elected by popular suffrage for 4 years. The president holds the executive power and is popularly elected for a 4-year term. The 13 departments and 2 districts, *comarcas*, into which the country is divided, are governed by political heads, who are also local military commandants.

The territory of the Mosquito Indians on the Caribbean Sea, over which Great Britain claimed a protectorate, was relinquished to Nicaragua by a treaty of April 19, 1905.

Frequent revolutions which disturbed the country led to intervention by the United States, and, in 1912, to the landing of forces which remained in the country until 1925. In 1905, by an executive agreement, the president of the United States appointed a customs administrator and gave assistance in meeting the foreign obligations of the country.

By the Bryan-Chamorro treaty of 1916, the United States obtained, by payment of $3,000,000, exclusive rights to build in Nicaraguan territory an interoceanic canal, with a naval base on Fonseca bay and a leasehold of the Corn islands. The building of the proposed canal would involve rights of Costa Rica, for the purchase of which negotiations have proved fruitless.

The withdrawal of the United States Marines in 1925 was followed by the outbreak of revolution in 1926. The United States government, after landing marines for the protection of foreign life and property, was compelled to renew intervention in 1927. By mediation between the opposing forces, both armies were disbanded and an agreement reached between the rival parties to abide by the results of a general election, which was successfully held in 1928 under American supervision.

Salvador (*República de El Salvador*). Salvador became an independent republic in 1839, when the Central American Federation was dissolved. A constitution first proclaimed in 1824 remains, after repeated modifications, the organic law of the republic. The legislative power is vested in a single chamber, or National Assembly, composed of 42 deputies elected for an annual term by universal suffrage, 3 for each of the 14 departments into which the country is administratively divided. The executive power is in a president, whose term of office is limited to 4 years. He is assisted by 4 departmental ministers.

Following the Bryan-Chamorro treaty of 1916, by which Nicaragua ceded to the United States the right to a naval station in Nicaraguan territory fronting on the Gulf of Fonseca, Salvador united with the republic of Honduras in opposing in the Central American court of justice the right of Nicaragua to cede a naval base on a body of water formed by territory of all three republics. The court upheld the complaint and directed Nicaragua to cancel its treaty. Nicaragua refused to recognize this decision. The United States, however, so far respected the decision as to take no advantage of the rights conferred by Nicaragua.

Chile. The republic of Chile arose from the Spanish captaincy-general of the same name. On September 18, 1810, the inhabitants of Chile deposed the Spanish authorities and created a provisional government. Spanish arms exerted themselves to retain this province and it was not until 1818 that Chile became free. A dictatorship under General O'Higgins lasted until 1826.

The Chilean constitution of May 25, 1833, was long the oldest constitution in force in South America. For decades a stable and effective government was maintained through the active participation in politics of an aristocratic class strongly united by family associations. In more recent years, political changes of a democratic character have been evident and the country adopted a new constitution which came into effect in 1925, substantially altering the form of government and tending to vest more power in the president of the republic. This chief executive is elected by direct popular vote for a term of 6 years but is ineligible for immediate re-election. The heads of departments form a cabinet, appointed by the president and directly responsible to him, although they have the right of speaking in the Congress.

The Congress comprises a Senate and a Chamber of Deputies. The Senate consists of 45 members representing groups of provinces, each group electing 5 for a term of 8 years, one half of the body

being renewed each 4. The Chamber of Deputies consists of 132 members elected by departments or groups of departments. All registered, literate citizens of 21 years or more have the right to vote.

An unusual power, that of passing upon the ability of the president, senators, and deputies to exercise office, is entrusted to a special body called the *Tribunal Calificador*, which consists of 5 members, 1 each from past presidents and vice presidents of the deputies and senate, 2 from members of the supreme court, and 1 from the judges of the court of appeal where Congress meets.

The judiciary comprises a national high court of justice, 8 courts of appeal, departmental courts of first instance, and minor district courts. Justices of the supreme court are appointed from names proposed by the council of state, and hold office during good behavior.

The internal administration is centralized. The republic is divided into provinces governed by *intendentes* appointed by the president. The provinces are divided into departments under governors, and each department into subdelegations. In the municipal districts there are popularly elected councils.

A serious boundary dispute of long standing with Peru was settled in 1929. Another, with Argentina, was adjusted in 1902 by an arbitral award of the king of England. This was followed by a treaty of agreement between these two countries.

China. China, the oldest political society in the world, has in recent years experienced far-reaching social and constitutional changes that cannot well be appreciated without an account of the previous régime.

China before 1912.—From 1644 to 1911 the Chinese throne was occupied by a line of emperors, successors of the 17th century Manchu conquerors. It was the policy of these rulers to keep the masses of China excluded from foreign influence and to resist all change. The empire consisted of 5 main elements: China proper divided into 18 provinces; Manchuria similarly divided into 3 provinces and largely assimilated to the Chinese culture; and the outlying dependencies of Mongolia, Tibet, and Sinkiang or Chinese Turkestan. Earlier, ill-sustained sovereign rights over Burma, Indo-China, Korea, and the maritime province of Siberia were lost during the latter half of the 19th century, by the encroachments of the British, the French, the Japanese, and the Russians.

The imperial family, from their residence in the Forbidden City at Peking, governed their vast state through a bureaucracy, largely Chinese, which was recruited through a competitive examination system. The imperial administration was confided to a number of boards or commissions, while at the head of each province was a governor, or, in certain cases, a "viceroy" with jurisdiction over two provinces. These deputies of the throne had largely independent powers which extended to the armed forces under their commands and even to the minting of provincial coinage and to the construction of public works and fortifications. However, all were dependent upon the will of Peking, which could at any moment transfer or degrade them.

Within the province, authority was confided principally to district magistrates, *hsien*, beneath whom the ancient social life of town and farming village functioned with a minimum of interference and with a maximum of individual freedom. Society was essentially democratic, there being no aristocracy, beyond a few Manchu nobles, and no privileged class except the educated officialdom open to all. Caste was nonexistent. While taxes were not burdensome, public administration was venal, negligent, and wholly inefficient to meet outside pressure or violence.

A series of disastrous foreign wars and aggressions, culminating in defeat by Japan in 1895, forced concessions of territory—Kiaochow to Germany, Liaotung peninsula to Russia, Weihaiwei and Kowlun peninsula to Great Britain. The disastrous Boxer outbreak which occasioned allied invasion, the capture and sacking of Peking and the flight of the court, shook the foundations of the monarchy. The Russo-Japan war (1904-05) saw Manchuria divided into "spheres of influence" between these two nations, rivals for the spoils of China's territory.

Reform and Revolution.—The evidences of the backward and decayed position of China induced the throne to undertake a series of reforms covering particularly the educational system, the administration of justice, and the conduct of provincial governments. Representative institutions—provincial legislatures and legislative assemblies for districts, towns, and villages—were decreed. These steps seemed designed to produce a gradual development toward constitutional monarchy, but the revolutionary movement proceeded too fast; on February 12, 1912, the emperor abdicated and the republic was proclaimed. A national assembly at Nanking framed a provincial constitution which provided for a Congress consisting of a Senate and a House of Representatives; for a president and a vice president, but with executive authority confided to a premier and cabinet confirmed by Congress. A new constitution was promulgated in October 1923 providing again for ministers responsible to the lower house and recognizing the federal principle. No constitutional law, however, has been operative. Unfamiliarity with representative government, local jealousies, attempts at monarchical restoration, and ambitions of military leaders combined to defeat constitutional and republican government. The national government failed to subordinate the *tuchuns*, or military governors, who succeeded to the provincial authority and who, by maintaining large armies, defied the presidential authority and made war on one another.

Foreign Relations.—In her foreign relations, China suffers severe impediments—extraterritorial jurisdiction, indemnities payable as a result of the Japanese war and the Boxer uprising, lack of freedom in raising revenues, and serious encroachments upon her territory. Recent experiences, however, have served to change the former public apathy into a strong and widening national spirit. This has expressed itself in repeated boycotts of foreign trade, in student demonstrations, and in able and adroit appeals to conferences on international affairs. At the Conference of Washington (1922), China, generally supported by the United States, secured, from the nine powers represented, a general agreement to safeguard her rights and interests, to forbid the creation of spheres of interest, the alienation of her territory, or the practice of discriminations in the treatment of foreign commerce. Her appeals for relinquishment of extraterritoriality secured a recognition of the principle of its abandonment. Great Britain and the United States have special courts for China.

Subsequent to 1925 China was swept by a nationalist movement, in part inspired by Soviet propaganda. In the resulting fighting and contention, national authority was destroyed, the office of president becoming vacant after 1926, although a cabinet simulated office at Peking. In October 1928, the Nationalist party, *Kuomintang*, having won a military triumph, promulgated an Organic Law of the Nationalist government of the Republic of China and established a government at Nanking, which was recognized by the leading nations. This government is controlled by an executive council comprising the chief regional military leaders. The Kuomintang attempts by unilateral repudiation to terminate foreign rights and interests in China.

Chinese Dependencies. The revolution of 1911, with its weakening of the imperial prestige, loosened the hold of the government upon the outlying possessions. In December 1911, a revolution took place at Urga in Mongolia; the Chinese officials were expelled and the "Hutuktu" or "living Buddha" was proclaimed ruler of Mongolia.

In 1912, Russia recognized the autonomy of Mongolia and agreed to support this status, to which China assented in 1913. The overthrow of the Russian empire in 1917 altered the situation. In 1919 China canceled this convention and attempted to restore her authority, but a Russian army entered Mongolia in 1921 and remained until 1925. An autonomous soviet government, controlled by Moscow, governed at Urga. In 1924, Russia agreed to recognize "Outer Mongolia" as a part of the Chinese republic and to withdraw the Red Army. The same agreement provided that the Russian-built Chinese Eastern railway across northern Manchuria should be jointly managed by Russia and China.

Chinese authority in Tibet in the past was represented by two officials, *ambans*, in charge of foreign and military affairs, but administration was in the hands of Tibetans, under the Dalai Lama. In 1904, a British Indian military expedition penetrated Tibet and occupied Lassa. A convention between Great Britain and Tibet, settling various difficulties of Tibetan territory and forbidding its disposition without British consent, was adhered to by China in 1906. In 1907, Great Britain and Russia agreed to have no communication with Tibet, except through China. During the revolution of 1911, the Tibetans expelled the Chinese representatives. In 1912, China dispatched an expedition against Tibet; but this course was objected to by the British government.

The territory of Chinese Turkestan or Sinkiang (New Dominion) is largely ruled by native chiefs known as "begs." Although formerly under the viceroy of Kansu and Shensi provinces, it is now treated as a separate province under a Chinese governor.

Colombia. Upon the revolt of Spanish America from Spain, a republic was formed by the union of the "viceroyalty" of New Granada, the "captaincy-general" of Venezuela, and the "presidency" of Quito. This united state was called Great Colombia and a government was formed, based upon a constitution adopted in 1821. Venezuela withdrew from this state in 1829, forming a separate republic, and Ecuador (former presidency of Quito) seceded in 1830. The remaining territory reorganized as the Republic of New Granada, with a constitution adopted February 29, 1832. A new constitution was formed in 1843 and another in 1853. The constitution of 1858 transformed the former centralized government into a federal form, composed of eight states, styled the "Granadan Confederation," *Confederación Granadina*. In 1863, the name of the state was changed to the United States of Colombia.

Federalism and Centralization.—Colombia remained a federal republic modeled upon that of the United States, with a corresponding measure of independent authority accorded to the eight states of which it was composed, until the revolution of 1885, which brought about a new centralized government designated by the constitution of August 4, 1886, as "The Republic of Colombia." This act is the basis of the present fundamental law. By this constitution, the independence of the states was suppressed and they were transformed into "departments," with governors appointed by the president of the republic. The state of Panama protested against this suppression of its sovereignty, which action later became a ground for the justification of secession. Colombia is an example of a state (New Zealand being a second) which, having experimented with the federal principle, returned to centralized government. In the case of Colombia, it may be said that federalism was not based, like that of the United States, Germany, or Switzerland, upon a former independence of political units.

The constitution accords with political principles common to the republican governments of America. The president is popularly elected by direct vote for a term of four years and is ineligible to succeed himself. The cabinet members, who are appointed by the president and are responsible to his direction, serve as organs of communication between the president and the Congress, where they have the rights of initiation of legislation and of debate. Congress is composed of a Senate and a House of Representatives. The Senate has the right to accept or to reject the resignation of the president. In the case of the disability of the president and the vice president, Congress may select an executive termed the "designate," *designado*. Judicial authority is vested in a supreme court, in district courts, and in inferior courts. In each department the chief executive, termed the "governor," is an appointee of the president and an agent of the national administration.

Recent Reforms.—The constitutional changes of 1886 represented the triumph of conservative principles of the clerical or conservative party. They led to revolutionary outbreaks which ended in the persistent defeat of the liberals. These disturbances led to the assumption of dictatorial powers by the president from 1904 to 1910. Constitutional changes of importance followed this period. The national electoral franchise was restricted to male citizens able to read and write, or to the possessors of certain property. Capital punishment was abolished. Senators were chosen by electoral assemblies in the departments. The supreme court was given the right to determine the constitutionality of laws. The vice presidency was abolished and was replaced by two "designates" annually elected by Congress. The term of the president was reduced to 4 years and he was made ineligible for re-election until after the end of another 4-year period.

For relations with Panama and the United States, see *Panama*. For determination of boundary disputes, see *Brazil*, *Peru*, *Ecuador*, and *Venezuela*.

Colombia remained neutral to the end of the World War. She joined the League of Nations November 13, 1919, with a reservation that the acceptance of Article X would not imply recognition of the independence of Panama. For the settlement of Colombia's objections to Panama's recognition, see *Panama*.

Cuba. From the time of its discovery by Columbus to January 1, 1899, Cuba was a colony of Spain and her last important possession in the New World. The persistent revolts of the Cubans and the severities of Spanish rule during the 19th century repeatedly gave concern to the American government and to the American people and in 1898 led directly to the Spanish American war. By the Treaty of Paris, signed December 10, 1898, Spain relinquished her sovereignty over the island. The United States expressed its resolution to leave the island to the political control of the Cubans.

American Intervention.—A period of military government by American forces lasted from 1899 to May 20, 1902, during which time public administration was reorganized, yellow fever was eradicated, and Cubans were inducted into public office. A constitutional convention, sitting at Havana from November 5, 1900, to February 21, 1901, framed the organic law for the republic. In determining the relations that should subsist between Cuba and the United States, the American Congress enacted a measure known from its author, Senator Platt of Connecticut, as the "Platt amendment." It stipulates that the Cuban republic shall not incur a public debt in excess of her fiscal resources without the consent of the United States; that the sanitary measures introduced by the military administration shall be sustained; that naval stations in the island may be leased by the United States; and that, finally, "the United States may exercise the right to intervene for the protection of Cuban independence, the maintenance of a government adequate for the protection of life, property, and individual liberty, and for discharging the obligations with respect to Cuba imposed by the Treaty of Paris on the United States now to be assumed and undertaken by the government of Cuba." These provisions were accepted by the Cuban convention and were added to the constitution.

The first Cuban Congress elected under the constitution met May 5, 1902, and American rule came to an end on May 20. Great material progress followed Cuban independence, but politics were unsatisfactory. Legislative promises to grant municipal autonomy and other progressive reforms were unfulfilled, and in July 1906 revolution broke out against the government.

Second Intervention.—In compliance with the Platt amendment and in response to the urgent requests of the Cuban president, the United States again intervened and, by the presence of troops but without the use of violence, established a provisional government which lasted from September 1906 until January 28, 1909. During this period, necessary laws were decreed, including an electoral law designed to make popular suffrage free and effective. Since the latter date, the government of Cuba has remained stable, though the United States has several times lent assistance both moral and military.

The executive power is entrusted to a president, originally chosen by an electoral college for a 4-year term but, by a constitutional reform of 1928, the president's term is made 6 years without right of re-election.

Another constitutional amendment of the same year confers the right to vote upon women over 21 years of age.

Congress, as reformed, comprises two houses—a Senate of 37 members, comprising 6 chosen from each province and the retiring president of the Republic, and a House of Representatives of 118 members. Both houses sit for 6 years.

The republic is divided into 6 provinces,—Pinar del Rio, Havana, Matanzas, Santa Clara, Camaguey (formerly Puerto Principe), and Oriente. Each province has a governor and a local legislative assembly popularly chosen. Municipalities are accorded control over municipal affairs, but are subject to a power of intervention by president or governor. The suffrage is bestowed on every male Cuban 21 years of age, not incapacitated mentally or by criminal conviction, or by actual service in army or navy at the time of the election.

As in the United States, the supreme court is endowed with the power of passing on the constitutionality of laws. Church and state are completely separated.

Czechoslovakia. The new republic of Czechoslovakia embraces, with some alterations of boundary, the ancient kingdom of Bohemia and the lands of Moravia, Silesia, and Slovakia. Russinia, which is inhabited by a Russian-speaking people, is joined to the republic as an autonomous district. For nearly four centuries preceding the World War, the peoples of these territories were subjects of the house of Habsburg, Slovakia and Russinia being territory of the kingdom of Hungary. Their Slavic character separated them from the German and Magyar populations of the Habsburg Empire, and strong nationalistic aspirations found expression during the World War.

A Czechoslovakian national council to win independence for the country was formed abroad in 1918. This organization was recognized by the United States and by the Allies. On October 18, the national council proclaimed the independence of the country and, on October 28, the republic was set up at Prague. A provisional constitution was promulgated on November 13, providing for the organization of a national assembly. This body framed the permanent constitution, which was promulgated February 29, 1920.

The constitution declares the state to be a "democratic republic." The legislature comprises a Senate of 150 members chosen for 8 years, and a Chamber of Deputies of 300 members elected by universal and secret suffrage on the basis of proportional representation. A declaration of war or an amendment to the constitution requires the assent of a three-fifths majority of all members of each chamber.

A measure passed by the deputies but rejected by the Senate becomes a law on being re-enacted by the deputies. A government measure rejected by the Congress, if not an amendment to the constitution, may be submitted to popular referendum. During the interval between sessions, a permanent committee of 16 deputies and 8 senators, elected for one year on a proportional representation basis, has a limited legislative authority.

The president of the republic is chosen after the French manner, by a joint session of both chambers of the legislature, for a term of 7 years. Re-election for a second term is permitted, but not for a third term until after an interval of 7 years. This limitation does not apply to the first president, Dr. Masaryk.

While the government requires the acts of the president to be signed by ministers responsible to the Congress, the evident purpose is to give the president a stronger position than that of the president of the French republic. Among the functions which seem to strengthen his position is the right to summon Congress for extraordinary sessions and to dissolve Congress. These steps he may take without a request from the ministry. He may exercise a suspensive veto upon legislation and refuse assent to the proposals of the permanent commissions. He assigns ministers to the departments of government which they direct.

There are elaborate provisions in the constitution for the protection of the rights of minority races in the practice of their religious faiths, in the use of their languages in schools, and in the exercise of political rights.

There are high courts of justice, provincial courts, and district courts. In the large industrial centers, there are tribunals to handle disputes between employers and workmen. Special laws determine the organization and competence of local autonomous governing bodies.

The frontiers of Czechoslovakia are largely determined by the treaties of peace with Germany, Austria, and Hungary. The mountainous district of Teschen, valuable for its coal mines, was contested by Czechoslovakia and by Poland. A division of this territory was arranged in 1921.

The foreign debt of Czechoslovakia is owed largely to the government of the United States and consists of extensive credits of money and material afforded for the equipment of troops and for the needs of the civil population during the months preceding the close of the war and following the Armistice. For organizing the national economy, for administering state property and the national debt, a board of audit and control, of equal standing with the ministry, was created in 1919.

Danzig. A small internationalized "free city-state" on the Baltic Sea, near the mouth of the Vistula. It has an area of 754 square miles and a population of about 390,000. It was given an independent status and was placed under the League of Nations by the Treaty of Versailles. A high commissioner represents the League. The port of Danzig, while now inhabited largely by Germans, is the sole outlet to the sea for Poland, whose economic need and ancient dominion over the city led to its receiving its present status. An economic convention between Poland and Danzig assures to the former country the customs duties on goods destined for Poland, and railway and shipping facilities for Polish commerce.

A constituent assembly, elected May 16, 1920, framed a constitution approved by the League of Nations November 17, 1920. The government is intrusted to a diet, *Volkstag*, of 120 elected members, chosen by universal suffrage for four years, and to a Senate, chosen by the Volkstag and consisting of a president, a vice president, and 20 senators. The Senate is the highest state authority and its president is the chief executive of the state. A referendum is authorized on demand of a fraction of the voters of the state.

Denmark. The three Scandinavian countries, Denmark, Norway, and Sweden, are inhabited by a single race, speaking languages differing in the three countries, but intelligible in all. Although they are now separate kingdoms, they have at periods of their history been united. From 1381 to 1814, Denmark and Sweden were united under a common sovereign, but since 1814 Denmark has been an independent kingdom.

The constitution was enacted in written form in 1849 and has been several times amended; it was amended in 1915 and in 1920, the changes of 1915 being of particular importance. The executive power is vested in the king and in his ministers. These are constitutionally responsible to the Riksdag and have access to both houses of the legislature.

The Riksdag.—The *Riksdag* or diet is composed of an upper house, *Landsthing*, and of a lower house, *Folkething*. The Landsthing has 76 members, 19 of whom are re-elected for a successive term by the members of the retiring Landsthing. In this election a system of proportional representation of parties is provided for. Fifty-six additional members are elected by universal suffrage on the basis of proportional representation. One additional member is elected by the Faroe islands, which are an integral part of the kingdom. Electors for the Landsthing must be 35 years of age. The members are chosen for 8 years, one-half retiring each 4 years. The Folkething has 149 members, 31 of whom are distributed for election by the several political parties of the country, on a proportional basis; 117 are elected by districts on the principle of geographical representation and by universal suffrage of electors who are 25 years of age or older. One member is elected by the inhabitants of the Faroe islands. The Riksdag meets annually in October. All money bills are submitted to the Folkething by the government.

Local Government; Courts.—Denmark is divided into 22 counties, *amter*; the counties are divided into districts or "hundreds," *herreds*, and these into parishes. The county is administered under a governor and has also an elected legislative council, or *amstraad*. County government has supervision over the rural municipalities. There are 88 urban municipalities, each with a mayor and a town council elected on the basis of proportional representation.

There is a supreme court, or *högesteret*, at Copenhagen with a chief justice, 12 associate justices, and 11 special judges; a superior court, *overret*, at Viborg with 9 judges, and a second at Copenhagen with 20 judges. There are trial tribunals in the hundreds, and minor justiceships in the towns. Impeachment is provided for before a special court of impeachment, composed of the members of the supreme court and of an equal number of members of the Landsthing.

By reason of war in 1866, Denmark was compelled to cede to Prussia the provinces of Schleswig and Holstein. The Treaty of Versailles, 1919, provided for the taking of a plebiscite in northern Schleswig to determine the future of this territory. A southern demarcation voted for adherence to Germany; a northern, for admission to Denmark; and, on July 7, 1920, this latter territory was reunited to the kingdom. In 1916, Denmark sold to the United States the Danish West Indies, now known as the Virgin islands. For Denmark's relations with Iceland, see *Iceland*.

Ecuador. A republic located in high Andean country, but including territory bordering the Pacific coast and lying directly over the equator, a circumstance from which it takes its name "Ecuador." For early union with Colombia, see *Colombia*. From 1830 until 1906, Ecuador, whose political history has been much disturbed, had no fewer than 12 constitutions. The present constitution of December 23, 1906, limits suffrage to the literate; secularizes public education; establishes freedom of conscience, speech, and press; protects property against confiscation; and prohibits torture. In general, foreigners enjoy the same civil rights that citizens enjoy. Any contract made with the state by a foreigner implies renunciation of recourse to diplomatic intervention.

A Centralized Republic.—The government is a centralized republic. The president is elected by direct popular vote for 4 years and is ineligible for re-election until the lapse of 8 years. He selects the provincial governors, who are responsible to him. In the event of the death or disability of the president, his functions pass to the president of the Senate and then, if necessary, to the president of the Chamber of Deputies. The president is advised by a council of state, composed of his 5 cabinet ministers, the president of the supreme court, the president of the "court of accounts," and 7 others appointed by Congress. Throughout their independent history, the states of Spanish America generally have adhered to the "presidential" form of government. A modification of the presidential government, by a constitutional amendment permitting a senator or deputy, without relinquishing his seat in Congress, to become a member of the president's cabinet, was defeated in Congress in 1914.

Congress is composed of a Senate of 32 members, 2 from each province, who are elected for a 4-year term, and of a Chamber of 48 Deputies, elected by direct vote. Members of the president's cabinet may participate in congressional debates.

The supreme court is composed of 5 judges, who hold office for 6 years. They are chosen by the two houses of Congress sitting in joint session. The judges of the superior courts are chosen in a like manner.

Frontiers.—The territorial boundaries of Ecuador are still in part unsettled. A boundary treaty with Colombia was signed July 15, 1916, and a delimitation of the frontier was completed July 9, 1919, by a joint commission. In 1894, a three-party treaty, between Ecuador, Colombia, and Peru, was submitted for arbitration to the king of Spain. The Congress of Ecuador, however, failed to ratify the award. In 1904, Ecuador and Peru again submitted their disputes to the king of Spain. A commission was appointed by the king, but no award was given. Peru continues to occupy part of the territory in dispute.

Ecuador remained neutral during the World War and, at that time, advanced a proposal for American solidarity for the protection of the western hemisphere. Ecuador refused to receive a German minister in October 1917.

Egypt. An exceedingly ancient state, occupying the slender valley of the Nile. For several centuries a province of the Ottoman empire, Egypt was granted autonomy in 1811 under a viceroy, whose title was changed to "khedive" in 1867. Under the khedive Ismail, an active but extravagant effort to modernize the country took place. The Suez canal was built with foreign aid and was opened in 1869. Financial bankruptcy led to the appointment in 1879 (khedivial decree of November 10) of two controllers-general nominated by France and England.

In 1882, by reason of military rebellion, England intervened and her armed forces occupied the country. Administrative reorganization was placed in charge of an English financial adviser. France refused to join in this intervention and remained critical of British occupation until the Anglo-French agreement of 1904, whereby France recognized England's place in Egypt in return for support in Morocco. See *Morocco*.

During the period of British intervention, great material improvement was made in Egypt's condition, and, in 1898, the vast Egyptian possession of the Sudan was reconquered by an Anglo-Egyptian army under General Kitchener. On the entry of Turkey into the World War, a British protectorate was declared, December 18, 1914, the sovereignty of Constantinople was renounced, the actual khedive was deposed, and a new ruler with the title of "sultan of Egypt" was installed. On February 28, 1922, the

British government announced that the protectorate would be terminated and that Egypt would be recognized as an independent, sovereign state, the matters of security of communications, Suez canal, defense, protection of foreign interests, and the Sudan being reserved for future agreement.

The sultan was proclaimed king in 1922. A constitution, promulgated in 1923, provides for a Senate, two-fifths of the members nominated by the king and three-fifths elected for 10 years, and an Assembly of 210 deputies, elected for 5 years by universal suffrage. In 1925 suffrage was restricted. In July 1928 a royal decree suspended the constitution for at least 3 years. The parliament was dissolved and the royal power of legislating by decree was resumed by the king.

The Anglo-Egyptian Sudan is a joint possession of the British and Egyptian governments, and, by a convention of 1899, is administered by a governor-general appointed with the assent of Great Britain. The flags of the two countries are used together. The Anglo-Egyptian Sudan is divided into 15 provinces administered by British army officers or civil officials. District officials are largely Egyptian.

Esthonia. *The Baltic Nations.* Lying between the two great Teutonic and Slavic races in eastern Europe are three small peoples of different descent and character who are akin to the Finns,—the Esths, the Letts, and the Lithuanians. One of the results of the World War was the proclamation, by these peoples, of the independent republics of Esthonia, Latvia, and Lithuania.

By a decree of the Russian provisional government of April 12, 1917, local self-government under a national council was accorded Esthonia. In November, this council declared the independence of Esthonia and assumed sovereign powers until a constitutional assembly could meet. Following the German invasion, the national council was maintained by missions abroad and was recognized in May 1918 by the governments of Great Britain, France, and Italy. In May 1919, Esthonia was again proclaimed an independent republic and its status was recognized by the European powers represented at Paris. Recognition, *de jure*, was accorded by the United States in 1922. In 1920, Russia recognized the *de jure* independence of Esthonia.

The constitution, enacted June 15, 1920, contains several interesting features. It declares that the "supreme executor of the state power is the people itself, through the medium of the citizens having the right to vote." Authority, however, is confided to a representative legislature called the State Assembly. This body consists of 100 members elected on the principle of proportional representation, "by universal, equal, direct, and secret suffrage." It is provided, however, that the Assembly may enlarge itself by the election of additional members. The Assembly is elected for 3 years and meets annually, in October. It may be summoned in extraordinary session by the executive authority or government, by call of one-fourth of its members, or by the "presidium" of the Assembly itself.

Popular Legislation.—Both the initiative and the referendum of laws are established by the constitution. On demand of one-third of the members, any law of the Assembly remains unpromulgated for two months. If, within that period, 25,000 voters so petition, the law is submitted to the decision of a plebiscite. Twenty-five thousand voters may initiate a measure which, if it is not then enacted by the State Assembly, goes on referendum to the electorate. If the people reject a law on referendum, or enact an initiated measure rejected by the Assembly, a dissolution of the Assembly and a new election take place.

The following matters, however, are reserved from popular vote: the budget; raising of loans; the income tax laws: declaration of war, conclusion of peace; declaration of a state of defense (martial law); declaration of mobilization and demobilization of the armed forces; and the ratification of treaties with foreign states.

The executive authority is constituted in a manner that suggests imitation of the Swiss "executive commissions." A head of the state, *Riigiwanem*, and a council of ministers are elected by the State Assembly to constitute the government. The head of the state "represents the Esthonian republic, leads and unifies the activities of the Republican government, presides over the meetings of the government, and is authorized to interpellate any particular minister." This government must at all times possess the confidence of the State Assembly and must resign in the face of a declaration of lack of confidence.

The State Assembly elects the state court of justice, which constitutes the supreme judicial power. The power of the state is exercised locally through self-governing elective bodies.

Ethiopia. See *Abyssinia*.

Finland. One of the new republics that emerged as a consequence of the World War and the partial disintegration of the Russian Empire. The country, which had been autonomous under Sweden, was united with Russia by conquest in 1809. Between 1899 and 1904, through the policy of the czar and of the Russian bureaucracy to Russianize all parts of the empire, Finland lost most of her autonomous privileges. But the reforms granted as a result of Russia's defeat in the war with Japan restored to Finland in 1904 her previous status. Under the direction of the Russian government, the Finnish diet in 1906-07 acquired a new constitutional charter. This constitution was suspended during the World War, but was restored in 1917 by the revolutionary government. Independence was declared by Finland in December 1917, after the Bolshevik revolution. In June 1918, the diets elected Prince Frederick of Hesse, brother-in-law of the German kaiser, king of Finland, but in the following December the king was deposed. Finland was declared a republic. Its independence was recognized in May 1919 by the nations, including the United States, assembled at the Peace Conference.

According to the present constitution, government belongs to the people, represented by a parliament of 200 members, in the Finnish language called the *Eduskunta* and in Swedish, *Riksdag*. Its members serve for 3-year terms. The executive power is vested in a president, who is chosen for a term of 6 years by the direct vote of all Finnish citizens. The president supervises the administration, conducts foreign relations, and is commander in chief of the army. Foreign treaties, as well as the decision of peace and war, require the ratification of the Chamber. The president may initiate legislation and may dissolve the Chamber; he exercises the pardoning power and presides over the council of state, or cabinet of ministers, when present. He has a suspensive veto on legislation, during which suspensive period the president may request the counsel of the supreme court or of the supreme administrative court. If a measure is then not approved, it may become a law only after its re-enactment without alteration by a newly elected Chamber.

While these provisions would seem to create a strong and independent president of the American type, other provisions indicate a disposition to establish a parliamentary responsibility. The constitution provides that the decisions of the president, except for supervising administration and for directing the "arraignment of ministers," must be countersigned by a minister, and that ministers must decline countersignature if the president's action is contrary to the fundamental law; that, furthermore, the council of ministers must enjoy the confidence of the Chamber.

The suffrage is possessed by all citizens, men or women, 24 years or over except tax delinquents or poor-relief recipients. A system of proportional representation is provided through voters' associations, membership in which is optional.

The supreme court is established by the constitution; trial courts, by legislation. A supreme ad-

ministrative court, which is a tribunal of last resort on questions of administrative law, is established by the constitution. Both the supreme court and the supreme administrative court have the right to address the president on the subject of necessary legislation.

While the president is intrusted with the enforcement of laws, a novel office seems to have been created in the election of a "solicitor," by the Chamber of Representatives. He supervises the enforcement of laws in court proceedings and before other authorities.

The provinces into which Finland is divided are administered by governors appointed by the president. Local autonomy for the communes is established as a principle in the constitution, the details to be regulated by law.

The relations between Finland and the Soviet Russian republic were determined by a treaty which established the frontier. Following independence, Finland advanced claims to the Aland islands, which, though inhabited mainly by Swedes, were judged necessary to the naval security of Finland. The question of ownership was referred by the Allied council of premiers to the League of Nations in June 1920, and in June 1921 a decision was given, uniting these islands to Finland.

France. The French Republic (*La République Française*). The present government dates from 1870, when the second empire was overthrown by the German defeat of France and by the surrender of the emperor Napoleon III at Sedan. The government was organized provisionally in 1871 at Versailles, while German armies occupied Paris. It was at first predominantly monarchial and imperial rather than republican; but the last element grew in strength, and in 1875 France, for the third time within a century, became by law a republic.

Some thirty years were required for the consolidation of the republic's strength. It was seriously threatened in 1888-89, when the monarchial parties planned a revolution to be led by General Boulanger, a popular military hero who had been removed from his command. The threat of prosecution for conspiracy unnerved the general and he fled from the country. The clerical interests also showed themselves generally hostile to the republic. This situation led to an extended controversy, which culminated in the separation of church and state in 1905.

The development from a transitional form into a republican type is indicated by the present constitutional basis of France, which does not have the usual form of a written constitution but is expressed in three organic or fundamental laws with several amendments. These are denominated respectively the "constitutional law on the organization of the public powers" (February 25, 1875); the "constitutional law on the organization of the Senate" (February 24, 1875); and the "constitutional law on the relations of the public powers" (July 16, 1875). Much that is fundamental in French government is contained in earlier laws and in decrees which are considered to have been unabrogated by the successive changes in the form of government. Particularly is this the case with the laws which deal with the centralized system of administration. They were enacted in much their present form in 1800 when Napoleon Bonaparte became first consul.

The Departments.—Under this system, France is divided into districts called "departments," 90 in number, 3 having been recreated from the provinces of Alsace and Lorraine, regained by France at the conclusion of the World War. The island of Corsica and the fortified area of Belfort are also included in the above 90 departments. The departments are arbitrary divisions, approximately equal in area and in population and have no relation to the historic provinces, such as Normandy, Picardy, Champagne, or Gascony, which the French Revolution erased as political subdivisions. The departments are all named after physical features, such as rivers and mountains.

Each department is subdivided, for convenience of administration, into two or more *arrondissements*. In each department and in each arrondissement a town is designated as the seat of administration and is called the "chief place," *chef lieu*. In each chief place is a public building, the seat of local government, called the "prefecture" or "subprefecture."

The Prefect.—The entire public administration, national and local, within the department, is in charge of a trained official called the prefect, *préfet*, who is appointed and directed by the minister of the interior and who is never a native of the department whose affairs he directs. The prefect reports not alone to the minister of the interior, but to the other ministers of the government whose local interests he superintends. In the arrondissements, subprefects assist the prefect. To further aid and counsel this important official, there is the "prefectural council," composed of three or four trained functionaries who, presided over by the prefect, constitute an "administrative court" to hear complaints against public actions, to adjust taxation, to examine departmental and communal budgets, and to settle questions of jurisdiction.

General Council.—To supply a measure of local representation, there is a departmental assembly or local legislature called the "general council," *conseil général*, which consists of from 17 to 67 members, according to the size of the department. This council is elected by the people of the department for a term of 6 years, one-half elected each 3 years. The general council meets at least twice a year, its most important tasks being to examine the departmental budget and the rates, and to audit the economic conduct of the prefectural government. Within the arrondissements is a lesser territorial subdivision, the "canton," which has no administrative significance but is the jurisdiction of the justice of the peace, *juge de la paix*, and is an election district for the general council.

Communes.—The entire territory of France is comprised in municipal organizations called "communes," the number exceeding 36,000. They vary greatly in size and in population. All, except Paris, are governed under a single brief code, the municipal law of 1884. Each commune has a municipal council composed of from 10 to 36 members, elected by universal French male suffrage for 4 years, by "general ticket," and a "mayor," *maire*, elected by the municipal council, who may be assisted by one or more aids called "adjoints." All serve without pay. The position of mayor is, however, highly honorable, has been filled by many statesmen of distinction, and is sometimes held by one trusted individual for many years.

The mayor has large powers, not only as a local official, but also as the agent of the national government for all its interests within the commune. He controls the local police and, like the prefect above him, may issue police ordinances, *arrêtés*, covering a wide field. For the enforcement of laws and for the maintenance of public order, he is responsible, not to the government or the inhabitants of the commune, but to the prefect of the department. Against excessive or illegal actions of the mayor, ready appeal may be had to the prefectural council and from that court an appeal is made to the highest administrative court, the council of state at Paris.

Centralized Administration.—These remarks may serve to outline the remarkable system of French centralized administration, which has been found equally serviceable under empire, monarchy, and republic and has been imitated by the governments of many countries. It is a system appropriate to a people with few prejudices who are in favor of self-government or local home rule, but are imbued with strong traditions of unity, order, symmetry, and imperial glory.

The national legislature of France consists of two bodies, the Chamber of Deputies and the Senate. From 1919 to 1927, deputies were chosen by "general

ticket" within each department (*scrutin de liste*), having been previously chosen by arrondissements (*scrutin d'arrondissement*). But by legislation of 1927 the law of 1919, which included a system of proportional representation, was repealed and a plan of single member districts established (*scrutin uninominal*). The number of deputies is fixed at 612, no department having less than 2. The deputies are elected for a 4-year term and enjoy an annual compensation of 27,000 francs. The Chamber elects its "president" and, by a system of lot-chosen groups, *bureaux*, organizes the legislative committees called "commissions," through which important "projects of law" are worked into form for report to the Chamber. Each commission has a "reporter" who presents that body's bill to the Chamber and defends and explains its provisions. First-class political reputations are frequently made by "reporters" of bills.

The Chamber sits in the Palais de Bourbon, overlooking the Seine and facing the Place de la Concorde.

French laws, or *lois*, are admirably succinct, usually stating only the principles determined by the act. Details are supplied by legislative decrees, *décrets*, prepared by ministers and approved as a formality by the president of the republic.

The ministers have seats in the Chamber of Deputies, where their presence is constantly required to defend their conduct of government before a body which observes them with a quick jealousy of the great powers exercised by ministers and with an undue violence of partisan antipathy. Owing to the number of French political parties and groups, no one element controls a majority of votes in the Chamber. This fact, together with the practice of peremptory questioning of ministers ("interpellation"), makes the lives of French ministries proverbially short. On the "fall" of a ministry, the president of the republic invites, to form a government, the leader who seems most likely to command the confidence of the Chamber and, if he accepts, he chooses his colleagues to head the various ministries, he himself receives the title of "president of the council of ministers," and, subject to the support or tolerance of the deputies, undertakes to conduct the government.

The French ministries are now 14 in number: foreign affairs; justice; interior; war; marine; finance; colonies; public instruction and fine arts; public works; commerce; agriculture; pensions; air; and labor, hygiene, assistance, and social prevision. Each ministry has a "subsecretary" who retains office under successive ministers, and each ministry is divided into "divisions" and "bureaux" for the classified handling of public business. The subordinate personnel, *fonctionnaires*, are relatively permanent, are selected on the basis of educational qualifications and, while extremely numerous, are frugally paid, most gentlemen of this class possessing small private incomes which make the low government salaries satisfactory.

The Senate is a more sedate, if less influential, body than the deputies. It meets in the old aristocratic quarter, in a part of the famous Luxembourg palace. It has concurrent legislative power with the deputies, but few measures originate in it. It is organized like the deputies. The Senate consists of 314 members who must be 40 years of age or older. They are chosen for 9 years, one-third retiring each 3 years. The senators are chosen from the departments by colleges of electors. In each department, the college is made up of the deputies representing the department, the members of the general council, and delegations from the communes. Senators receive a salary of 27,000 francs.

President of the Republic.—The president of the French republic is the head of the nation. The position is one of great dignity, carrying the comparatively munificent salary of 1,800,000 francs, a like sum for his expenses, and the splendid residence of the Palais d'Elysées, but he has no control of the national administration nor an initiative or veto of legislation. Efforts by President Millerand to exert political influence forced his resignation from office in 1924. The president is elected for a term of 7 years by the "National Assembly," composed of the deputies and senators sitting jointly at Versailles and forming a body legally distinct from the national legislature. Besides choosing the president of the republic, the National Assembly has the power of amending the constitutional laws. Government is conducted by the "council of ministers," under the president of the council or premier. The ministers are responsible to the legislative branch.

It remains to speak of the council of state, *conseil d'état*. This body, historically a heritage from the "Ancient Régime," reformed by Napoleon, in recent decades has developed as the supreme administrative court into a regulatory organ of administration of the first importance. Its membership is large—over 100, composed of "councilors in ordinary service" (permanent judicial experts), "councilors in extraordinary service" (members designated from the administration), "auditors," and "masters of petitions," *maîtres des requêtes*, the last named being legal counselors who prepare and conduct much of the business. Thousands of cases are annually dispatched by the different branches of the council, and its decisions, which have grown in importance and authority, form a large legal corpus known as the administrative law, or *droit administratif*. While legally it cannot pass on the constitutionality of acts of the national legislature, as is the legal right of the supreme court of the United States, the council of state does constantly set aside administrative actions on the ground of their illegality and, at trifling expense, affords redress and indemnification to thousands of petitioners against governmental actions.

French Colonial Possessions. France possesses a "colonial empire" second only to that of Great Britain. In the main, its acquisition and its successful development are the work of the "Third Republic." Of older possessions, dating from the period of American colonization, are Guadeloupe and Martinique, small islands in the West Indies; French Guiana which is on the mainland of South America, and is notorious as a penal colony; and Saint Pierre and Miquelon, two groups of tiny islands close to Newfoundland, the sole vestiges of French Canada. These islands are under governors sent from the French service, but they have local representative institutions. Guadeloupe, Martinique, and Guiana send representatives to the French National Assembly. France, in the time of the Revolution, adopted the principle of according to colonies representation in the national legislature.

In 1830, France entered upon the conquest and the reorganization of Algeria, a country which has been greatly advanced in development and largely "assimilated" to the French pattern of government.

In 1881, Tunis was invaded and, by treaty with the "bey" or native ruler, was placed under French protection. A resident-general and a staff of French officials administer the country with native participation.

The large island of Madagascar, after a period of French protection, marked by varied military operations, became a colony in 1896. It is administered by a governor-general and by a consultative council of administration. In 1914, the Comoro islands were placed under the authority of the governor-general of Madagascar. The island of Reunion or Bourbon, north of Madagascar, has been a French colony since 1643. The bulk of the population is of French descent. On the African coast, facing the Red Sea, is the colony of French Somaliland. For the French protectorate over Morocco, see *Morocco*.

The greatest expansion of French colonizing power has been in West Africa and in the Sahara. These areas include the following colonies: Senegal, French Guinea, Ivory Coast, Dahomey, French Sudan,

Upper Niger, and Mauritania. To these the World War added the former German colony of Togoland. All these possessions are united under the administration of the governor-general of French West Africa, with residence at Dakar. France also has in Africa a Congo region—Equatorial Africa—and, on the Gulf of Aden, French Somaliland.

In Far Eastern Asia, French possessions are under one general government, French Indo-China, with capital at Saigon. It comprises the colony of Cochin-China and the protected native states of Annam, Cambodia, Tonking, and Laos. To it was added by lease from China in 1899 the island of Kwang-Chau-Wan. French intervention in Annam began as early as 1787, but the final creation of a protectorate dates from 1884, which year saw similar authority established in Tonking. Laos passed under French control in 1893.

On the coast of India, France still possesses a few small sites, vestiges of the brilliant attempt to secure an Indian empire, in which attempt she was defeated by England in 1763. The most important of these places is Pondicherry.

French possessions in the Pacific include New Caledonia and smaller dependent islands; the New Hebrides, administered jointly with Great Britain under a "condominium"; the Society islands (Tahiti); the Marquezas; the Tuamotu group; and the Leeward islands.

German Empire (*Deutsches Reich*). The term "empire" appears to signify the federal union of separate states into one imperial state rather than into monarchical headship, and the title "empire," *Reich*, has been retained under the democratic government which arose by revolution in 1918-19.

The union of Germany was effected in 1871 under a constitution framed by Prince Bismarck, which created a new German federal state under the leadership of Prussia. These states were 25 in number: 4 kingdoms, Prussia, Bavaria, Saxony, and Wurttemberg; 18 lesser principalities, grand-duchies, and mark-graviates; and 3 free "cities," Hamburg, Lubeck, and Bremen, survivors of the old "Hanseatic League" of German trading cities.

German Federalism.—Under the constitution of 1871, the states retained their own interior administrations, which differed appreciably, but, with the exception of the free cities, were strongly monarchical. Bavaria, Wurttemberg, and Saxony, besides Prussia, retained separate military forces which, in case of war, passed under the command of the emperor and under the administration of the "Great General Staff." Bavaria retained her own postal and telegraph system. The territory of Alsace and Lorraine, taken from France in 1871, was constituted an imperial possession, or *Reichsland*, and was largely administered by Prussians; in 1911, however, it was given admission to the empire as a member with somewhat limited rights. The railway systems of the states were put under national control and were developed in accordance with strategic as well as industrial considerations. One peculiarity of the federal system in Germany that distinguished it from that of the United States was its almost exclusive use of state or local administration for the execution of imperial legislation and for the discharge of federal administration. The "federal civil service," as it would be called in the United States, was limited to supervisory offices at Berlin. However, the German navy was, and is, an exclusively imperial institution.

The Reichstag.—The Federal government comprised a legislature consisting, first, of an elective body, the *Reichstag*, or diet, of 397 members chosen by popular election on the basis of universal manhood suffrage. The districting of members remained unchanged after the first apportionment, and, with the great industrial growth of Germany, resulted in the under-representation of the cities, particularly in Prussia.

The Bundesrat.—The upper house was a unique institution, the heritage of earlier German diets, and was called the *Bundesrat*, or "federal council." It was composed of 61 representatives of the federated states, of which Prussia had 17. These members were the appointees of the governments represented and were usually high ranking members of these governments, under whose instructions they acted. The Bundesrat had predominant powers. It initiated practically all legislation, and no bill could be considered by the Reichstag without the consent of the Bundesrat. It prepared the federal budget and supervised, generally, the imperial administration. It took cognizance of the failure of any state to execute imperial laws and could sanction the employment of armed force to coerce a state into obedience. Its membership represented the highest political experience and reputation of the empire. It was presided over by the imperial chancellor, who was the head of the national administration and controlled all its political departments. This official was the personal choice of the German emperor and was responsible to him alone.

The imperial chancellor was usually prime minister of Prussia as well, and head of the government of that predominant state. Bismarck established the principle that other imperial ministers, foreign affairs, finance, war, navy, etc., were responsible to the chancellor, and must report to the emperor through him. Toward the close of this régime, however, it appeared that the heads of the army and the navy were able to secure independence of the chancellor and even successfully to oppose his policies through the influence of the great general staff and through its close relations with the emperor.

King and Emperor.—Prussia, by military and political success, had achieved the unification of Germany, and the constitution provided that the king of Prussia should perpetually hold the office of German emperor, *Deutscher Kaiser*. The position constituted not a sovereignty over Germany but a "presidency," *praesidium*, of the nation and a military leadership, *Kriegsherr*. The power exercised by the German emperor sprang more from the fact that he was king of Prussia and actual head of its armies than from his position as emperor. Both as king and as emperor, however, he actually governed. The chancellor and ministers were responsible only to him. Ministerial or parliamentary government was not admitted by the constitution. The emperor chose the chief of staff, nominated the high commanders on land and sea, and had final decision as to war and peace.

In spite of the growth of democratic forces in Germany, the social and political system remained highly aristocratic. In Prussia the large, land-owning families, *junkers*, dominated both politics and the army. The German conception was one of strong social discipline, of thorough subordination to authority, and of rigorous training both for military service and for economic efficiency. Its material results were impressive. In the years between 1871 and 1914, the population rose from 41 million to 65 million; emigration to foreign countries nearly ceased; and vast industrial development took place. A great foreign commerce and carrying trade arose. A colonial empire was secured. It comprised the African possessions of Togoland, Cameroon, German South West Africa, and German East Africa; the Pacific Ocean possessions of German Samoa, German New Guinea, or Kaiser-Wilhelmsland, the Bismarck archipelago, the Solomon islands, the Caroline, Palau, Marshall, and Ladrone islands; and in China the leased territory of Kiaochow. All of these acquisitions were lost by Germany at the end of the World War.

Revolution of 1918.—Germany's defeat in 1918 produced a violent reaction against the monarchical and militarist system. On October 28, 1918, two laws, which were designed to meet the growing political dissatisfaction, were passed. The first law amended the constitution so as to make the chancellor responsible to the Reichstag. A second law permitted members of the Reichstag to become

secretaries of state. The principle of parliamentary government was thus introduced. At the same time the kaiser, in a letter to the chancellor, announced the surrender of his "fundamental rights" to the people.

These acts, however, did not prevent revolution, which broke out at the beginning of November. Soldiers' and workers' councils, in imitation of the Russian revolution, seized numerous cities. A "general strike" was declared in Berlin. On November 9, the emperor abdicated and the crown prince renounced the throne. The conduct of government was surrendered to the leaders of the Social Democrats, and the republic was proclaimed. These acts mark the end of the former régime and the beginning of a transformation of government throughout Germany.

All the monarchical governments vanished. The princes resigned or were replaced. Republics everywhere arose. Constituent conventions were held in the various states, which prepared democratic constitutions. The result is that the present German Empire or commonwealth is a federation of republics. Coburg united with Bavaria and seven small states of central Germany (Saxe-Weimar-Eisenach, Saxe-Meiningen, Gotha, Saxe-Attenburg, Reuss, Schwartzburg-Rudolstadt, and Schwartzburg-Sonderhausen), December 24, 1919, to form the state of Thuringia. The total list of German states is Prussia, Bavaria, Wurttemberg, Baden, Saxony, Mecklenburg-Schwerin, Thuringia, Hesse, Oldenburg, Brunswick, Mecklenburg-Strelitz, Anhalt, Lippe, Waldeck, Schaumburg-Lippe, Hamburg, Lubeck, and Bremen.

The Republic.—The new German constitution, by a clause which suggests a provision of the Constitution of the United States, requires in each state a republican constitution, a universal, equal, direct, and secret franchise of male and female voters, and a system of proportional representation. Thus all states have popularly elected diets or assemblies, which, except in Prussia, consist of a single chamber, *Landtag*. The conduct of government is intrusted to a commission or "cabinet" of ministers, or to a "state council," responsible to the Landtag. The chairman of this body bears the title of "president" or "premier." The German states, in forming their new executives, appear to have followed the Swiss practice of board or collegiate executives.

The Prussian constitution provides for a diet and for a state council, *Staatsrat*, elected by the assemblies of the provinces into which Prussia is divided. The state council advises and, to a degree, controls the diet, and it may veto the diet's legislation. The diet elects the "premier" of Prussia, and he chooses the other ministers. All are responsible to the diet.

The new constitution of the German Empire was framed by a constituent convention which met at Weimar. It was promulgated August 11, 1919, and became effective at once. The empire is given power to change the boundaries of states, with their consent by law, against their consent by a constitutional law. Prussia, toward whom this provision is mainly directed, was guaranteed against dismemberment for at least two years. The Reichstag, or popular legislative chamber, is elected on most liberal suffrage conditions. By the general election of May 20, 1928, it consisted of 490 members. The former Bundesrat reappears as an imperial senate, the *Reichstag*, in which Prussia has 27 votes; Bavaria, 11; Saxony, 7; Wurttemberg, 4; Baden, 3; Thuringia, 3; Hesse, 2; Hamburg, 2; other states, 1 each—a total of 68.

The powers of the national government are much enlarged. It is given full control of foreign relations, defense, customs, taxation, and railroads. The national legislature is empowered to revise and to enlarge by law the powers of the national government. This provision renders it doubtful whether the new government is still federal, since federalism connotes, for member states, a constitutional position which the central government cannot alter by legislation.

Parliamentary government is completely recognized. The "cabinet," composed of the chancellor and of ministers, must have the support of the Reichstag. War can be declared or peace can be concluded only by a law of the national legislature. The constitution guarantees equality before the law; freedom of religion, of speech, and of the press; and abolishes all class privileges of whatever kind.

The President.—The president of the empire is elected by the whole German people for a term of 7 years. He has the unusual power of ordering a referendum of laws which do not command his approval or of proposed laws on which the chambers disagree. While most executive acts must be performed through ministers, responsible to the Reichstag, the president commands the armed forces of the Reich and may declare martial law or a "state of siege." Finally, he may dissolve the Reichstag and order a new election. The president may be removed from office by vote of the people, on proposal of the national legislature.

Economic Constitution.—The German constitution is further remarkable for the place it accords to labor and to industry. It includes an "economic constitution" providing "factory workers' councils," leading up to a "national workers' council." The participation of laborers in the management of industry is guaranteed by economic councils of employers and employees. The national economic council has the right to be heard on all cabinet bills of a social or economic character before these bills are introduced into the Reichstag. The council itself may propose laws and send its representatives to support its proposals before the Reichstag. These provisions of the German constitution go a certain distance toward establishing an "economic parliament."

Germany possesses a uniform private law, the Civil Code of 1900, and a uniform system of courts, though the judges, except for the *Reichsgericht*, are appointed by the states. The imperial court, or *Reichsgericht*, consisting of 103 judges, sits at Leipzig; it has an appellate jurisdiction from all courts of Germany and an original jurisdiction for the trial of treason.

Germany suffered important losses of territory by the Treaty of Versailles (1919). Alsace and Lorraine were restored to France, from which country they had been wrested in 1871; Eupen and Malmedy, two small districts or "Kreisen," were ceded to Belgium, together with Germany's interest in a small bit of neutral territory, Moresnet; a northern sector of Schleswig was ceded to Denmark; Danzig was liberated and the "Polish corridor," together with Prussian Poland and a part of Silesia, were ceded to Poland. (See *Poland.*) Other limitations placed upon Germany by the peace treaty reduce her armed forces to 100,000 soldiers, and compel the reduction of frontier fortresses together with those of the Kiel canal and of Helgoland. Germany was forced to agree to pay reparations in an amount subsequently to be determined.

Greece (Hellenic Republic). The territory of modern Greece is composed, in part, of land freed from the Turks by revolutionary struggles that commenced in 1820, and, in part, of additions made by successful war. In 1830, the independence of Greece was recognized by the Conference of London. By a treaty of May 7, 1832, Greece accepted as king Prince Otto of Bavaria, who ruled for 11 years without a constitution and was assisted only by a council of state. A military revolution of 1843 resulted in the meeting of a constituent assembly and in the framing of the constitution of 1844, in which the influence of the French liberal monarchical charter of 1830 and that of the Belgian constitution are apparent. A revolution in 1862 altered the dynasty, and the crown was accepted June 1863, by George, prince of Denmark. In 1864,

a constitution was promulgated, which, with certain changes, notably in 1911, retained the monarch, who exercised his powers through a council of ministers responsible to a legislature consisting of a single chamber, the *Bulé*.

Following the military debacle in Asia Minor in 1922, a military revolution compelled the abdication of King Constantine on September 27, 1922. He died in exile January 11, 1923. The National Assembly, elected December 16, 1923, proved anti-Royalist, and compelled the further abdication of King George II, son of King Constantine, and the exile of the royal family. On March 15, 1924, the National Assembly voted the overthrow of the monarchy and the establishment of a republic, which was endorsed by an overwhelming majority vote of a plebiscite in April. The republic was proclaimed May 1, the regent becoming temporary governor of the state. A period of dictatorships followed. A new constitution published September 24, 1926, was revised in 1927. In addition to the Chamber of Deputies of 250 members, who are elected by universal suffrage for a 3-year term, there is provided a Senate of 120 members. The two bodies united form the National Assembly, which chooses the president of the republic.

By the Balkan wars of 1912-13, Greece obtained Macedonia, Southern Epirus, the islands of Lemnos, Samothrace, Mytilene, Samos, Nikaria, Chios, Crete, and some other smaller islands of the Ægean. Other acquisitions of Turkish territory were allotted to Greece by the Treaty of Sèvres, including Smyrna and other parts of the western coast of Anatolia. The treaty was never ratified by Turkey, however, and the Allied powers consented to a revision in favor of Turkey, which Greece was powerless to prevent, having suffered a major military disaster in the attempt.

Haiti (*République d'Haiti*). For the colonial history of Haiti, see *Santo Domingo*.

The period of French colonial possession ended in a bloody revolt of the Negro slaves, which lasted from 1791 to 1803, when the French forces withdrew. This change saw the extinction or the expulsion of the whites and the creation in 1804 of a Negro state under the aboriginal name of "Haiti."

The constitutional laws of the government purported to create a republic after the French model. In practice, however, the government for more than a century was a military despotism in the hands of the president. Following French administrative plans, the country was divided into 5 "departments"—23 "arrondissements" and 67 "communes," each department and each arrondissement being governed by an army general subordinate to the president.

American Intervention.—In 1915, the political condition became so intolerable that the United States intervened in the island, and a treaty was ratified by which an American protectorate was instituted over the republic. A *gendarmerie* was organized in 1916 under officers of the United States Marine Corps, and this force, supported by American marines, brought the territory into order.

A new constitution was ratified June 12, 1918. It vests legislative power in a Senate and a Chamber of Deputies elected by direct popular vote; the executive power is vested in a president chosen for 4 years by the two chambers in joint session.

Hejaz and the Nejd. A kingdom of Arabia, established in 1926, after Ibn Saud, sultan of the Nejd, had conquered the king of the Hejaz, thereby bringing under one head the entire northern portion of the Arabian peninsula from the Red Sea to the Persian gulf. Its boundaries have not been defined. It contains the cities of Mecca and Medina, sacred throughout the world of Islam. The existence of the conquered state of Hejaz dated from 1916, when the emir of Mecca declared his independence of Turkey and assumed the title of king of Hejaz. Hejaz was a signatory to the Versailles Peace Treaty.

The peninsula of Arabia, of which country Hejaz and the Nejd is the only fully recognized state, is largely desert and arid steppe. The interior is inhabited by Arab tribal communities quite independent of any higher allegiance. There are a number of Arab emirates, or principalities, of which Oman is an independent sultanate whose integrity has been guaranteed by England and by France.

Hungary (The Kingdom of Hungary). Revolution broke out in Hungary October 31, 1918. King Charles, the last ruler of the Habsburg family, abdicated November 13. Hungary was declared an independent republic and a government was formed with Count Michael Karolyi as president. On March 22, 1919, the Karolyi cabinet resigned and was succeeded by a soviet government under Bela Kun. With the assistance of a Rumanian army of occupation, the soviet government was overthrown and in August 1919 a national government was again set up in Budapest.

A parliament elected early in 1920 entrusted executive power to a "regent," Admiral Horthy, who declared Hungary to be a monarchy and the official style of government to be the Royal Hungarian Ministry. To this constitutional objective the country seemingly adheres, although without a king or ruling family. A second National Assembly was elected in 1922, and a third, in December 1926, comprising 245 members. This last body restored and inaugurated in January 1927 the ancient Upper House, known as the Chamber of Magnates, which includes members elected by communal and county councils, representatives of ecclesiastical organizations, of scientific and economic bodies, of high officials, of life members and "representative peers."

By the Treaty of Trianon, between the Allies and Hungary, ratified by Hungary November 13, 1920, the territory was reduced to about half the size of the old kingdom of Hungary, cessions being made on all sides to the new states of Austria, Czechoslovakia, Rumania, and Jugoslavia. Hungary regained part of the Austrian cession, Burgenland, by negotiation and by plebiscite. A separate peace treaty between the United States and Hungary was ratified by the Hungarian National Assembly on December 12, 1921.

Iceland. From 930 to 1264, Iceland was an independent republic. It was joined to Norway in 1264 and with Norway came under the rule of Danish kings in 1381. It so remained until December 1, 1918. By the act of Union of November 30, 1918, it was recognized as a sovereign state in personal union with Denmark through the monarch. Danish citizens in Iceland enjoy rights of citizenship and citizens of Iceland have the same rights in Denmark, without obligation for military duty. The foreign relations of Iceland are confided to the care of the Danish monarchy, but Iceland may appoint *attachés* at Danish legations. Co-operation between the two countries in other affairs also is agreed upon.

The present constitution of Iceland was adopted May 18, 1920. The executive power is exercised in Iceland through a ministry responsible to the Icelandic legislature, the *Althing*, which is a single chamber assembly of 42 members, 36 of whom are elected by districts, and 6 by the country at large under a system of proportional representation. The suffrage for the 36 members is limited to citizens of the age of 25 years, while for the choice of the 6 members at large the elector must have attained the age of 35. The 36 members are elected for a term of 4 years, the 6 for a term of 8 years.

The Althing meets annually and divides itself into two bodies. The upper chamber comprises the 6 members elected by the country at large, together with 8 others chosen by the members of the Althing from among themselves. The lower chamber comprises the remaining 28 members of the Althing. Budget bills must be introduced in the lower chamber. In all other legislation, the two chambers possess a parity in the initiation of laws. In cases of

disagreement, the two chambers meet in a joint session of the Althing, where a two-thirds majority is required, except for budget bills, where a simple majority suffices.

Ministers, three in number, have free access to either chamber but vote only in that chamber of the Althing of which they are members.

Iraq (ē'räk'). See *Mesopotamia*.

Italy. Italy, once the center of the Western world's political authority under the Roman Empire and again the religious center of Western civilization in the religious union of the Roman Catholic Church, was for centuries broken into fragments and subjected to foreign domination. Her unity as a modern state was delayed until 1861, when the king of Sardinia was proclaimed "king of Italy" by the first Italian Parliament. The remainders of the provinces of Mantua and Venetia were added in 1866. In 1870 Rome was entered by Italian troops, the last remnant of the papal states was incorporated in the kingdom, and the "temporal power" of the pope was suppressed. For additions to Italian territory through the World War, see *Italia Irredenta*.

The Italian constitution is the organic law, *Statuto Fondamentale*, granted March 4, 1848, to the kingdom of Sardinia and is the nucleus around which Italy was united. It was subsequently adopted as the constitution of the kingdom of Italy.

The executive power was vested in the king to be exercised by ministers responsible to a Parliament, consisting of a Senate, which includes members of the royal family and an indefinite number of members appointed for life by the king, and a Chamber of Deputies, which should be elected for a five-year term.

The Fascisti. In 1922, prolonged Communist disorders and the weakness of parliamentary government led to the taking of power by the Fascist organization headed by Benito Mussolini, whom the king appointed Prime Minister. Complete reorganization of the government followed with successive radical changes of the constitution. An electoral law of November 18, 1923, assigned two-thirds of the seats in the Deputies to the party obtaining most votes in an election. An act of December 19, 1925, made the Prime Minister responsible solely to the king.

By the law of May 17, 1928, the electoral system was reformed on unprecedented lines. The franchise was extended to all men of 21 and to certain classes, including married men, of 18.

The Chamber of Deputies was fixed at 400 members, elected for 5 years, the entire country forming a single constituency. Nominations double the number of deputies are made by syndicalized confederations, into which all productive classes are organized. From these nominees the Fascist Grand Council selects 400. This list is submitted to the electorate to be accepted or rejected as a whole. The Fascist Grand Council was legally constituted as the organ of the Fascist Party and of the state. Its president is the Prime Minister. Its membership includes public officials, party leaders, and the heads of national cultural associations. This Council is legally empowered to pass on all constitutional proposals and international treaties. As above described it nominates the Chamber of Deputies. The Senate under the Fascist regime is not radically altered. January 1, 1928, there were 347 senators besides 11 members of the royal family.

Local Government. The Fascist administration has had important effects on local government. Italy is divided into provinces which correspond in character to French departments, subprefectures or *circondaros*, districts or *mandamentos*, and communes. The provinces are governed by prefects appointed by, and responsible to, the central authority at Rome. The administrative powers of the prefects have been increased, and communes with populations of less than 5000 have been placed under administrators, appointed by the central government, known as "podestas."

Relations with the Pope. The occupation of the city of Rome by Italian troops in 1870 and the making of this city the capital of the Kingdom of Italy, suppressed the temporal powers of the pope. The papacy was unreconciled to this loss. Improved relations between the "Vatican" and "Quirinal," effected by the Fascist administration, led to the signing, on February 11, 1929, of 3 treaties whereby the Italian government recognized the full independent sovereignty of the pope over the City of the Vatican (See *Vatican City.*). A *concordat* determined the new position of the Church in Italy, and a financial convention indemnified the papacy for losses sustained by the annexation of Rome to the Italian Kingdom in 1870.

Italia Irredenta.—The unification of Italy, 1861–70, did not succeed in uniting to the kingdom the entire Italian population subject to Austria. Considerable territory remained "unredeemed" (*Italia irredenta*). Italy entered the World War (1915) with the distinct object of adding these Italian elements to her population and of securing these territories under guarantees from the Allies, through the secret treaty signed at London in 1915 with Great Britain, France, and Russia. At the end of the World War, Italy secured the Italian section of the Tyrol (Trentino and Alto Adige) and the territory at the head of the Adriatic (Trieste, Gorizia, Gradiscia, and Istria). The secret Treaty of London had also assured Italy possession of the Austrian province of Dalmatia on the Adriatic, Valona in Albania, and the Dodecanese islands.

The political situation with respect to Dalmatia was altered at the end of the war by the disintegration of the Austro-Hungarian empire and by consideration of the rights of an ally, Serbia. As a consequence, Italy received only certain islands on the Dalmatian coast, with the possession of the strategic points that give her military security and naval predominance in the Adriatic. Her controversy with Jugoslavia led eventually to the incorporation of Fiume as a part of Italy.

Eritrea and Libya.—Italy became a colonial power in 1885, when Eritrea, an African colony, was developed on the Red Sea, and Italian Somaliland, on the Indian Ocean. The Italian penetration of Abyssinia was defeated at the battle of Adowa in 1896. (See *Abyssinia.*) Italian ambitions in Africa were directed particularly toward Tunisia, directly across from the island of Sicily and the site of Rome's ancient conquest over Carthage. In the occupation of Tunisia, however, Italy was anticipated by France, who established a French protectorate in 1881. This rivalry prejudiced Franco-Italian relations for many years. The adjoining territory of Tripoli, or "Italian Libya," was secured by Italy through the war upon Turkey in 1911. The sovereignty of Italy in Tripoli was recognized by the Treaty of Ouchy, October 18, 1912. In 1924, Great Britain ceded Jubaland, a part of Kenya, to Italian Somaliland.

Japan. According to Japanese records, Japan is an ancient monarchy, dating from the emperor Jimmu Tenno (B. C. 660). In the 16th century, when foreign intercourse began through the Dutch and the Portuguese, Japanese civilization had acquired its characteristic forms. Government was organized in a feudal system. The territory was divided among great lords, *daimyos*, possessing military retainers, *samurai*, and owing allegiance to the emperor at Kyoto, but virtually independent and frequently at war with one another. Actual central power was exercised in the emperor's name by a succession of rulers called the shoguns. By one of these, in the early part of the 17th century, foreign intercourse, which at first had been welcomed, was prohibited and Japan remained closed to the outside world until the arrival of the American naval mission under Commodore Perry in 1853.

The "opening" of Japan was followed by the overthrow of the "shogunate," the restoration of

the emperor, and the introduction in 1868 of a new period of progress called the era of Meiji or enlightenment. Since that date, Japan's advance in modernization and in military power has been extraordinary. A constitutional movement followed upon the "restoration." The feudal daimyos surrendered their powers; experiment began with quasi representative institutions. A constitution was promulgated in 1889 and in the following year the first Imperial Diet, or representative legislature, convened.

Elder Statesmen.—By the constitution the emperor is sovereign, his person sacred and inviolable; he both governs and, with the consent of the Diet, legislates. Following his restoration, the emperor was guided by a small body of counsellors foremost in modernizing Japan. They were known as the Elder Statesmen, or *Gen Ro*, and, although without constitutional status, exerted great influence on policies and invariably advised the selection of the prime minister and of the cabinet.

The Diet consists of a House of Peers and of a House of Representatives. Following the abolition of feudalism, the peerage was reorganized, in accordance with European grades of nobility, and, besides princes of royal blood, it includes marquises, counts, viscounts, and barons. The upper house, March 25, 1925, passed a bill effecting reform within its own organization; among the provisions of this bill is one removing the necessity for a majority of peers in that house. At the present time, only a little more than one-fifth of the peers have seats in the upper house of the Diet, while a very large group is made up of commoners appointed because of service to the state or erudition.

Representation.—A universal manhood suffrage law of 1925 increased the electorate from approximately 2,860,000 to over 12,000,000 voters. This law became effective with the election of 1928, in accordance with which the House numbers 466 members. These are elected by single districts for a term of 4 years.

All laws require the approval of both houses. A provision of the constitution, however, prevents the diet from forcing the hand of the government by withholding financial supplies. If the budget is rejected, the previous budget continues in force. A further provision, which requires the ministers of war and navy to be selected from officers in service, makes it impossible for a ministry to carry on the government without the support of the army and the navy and of the great "clans" which largely control these two branches of the service. Under these conditions, "parliamentary government" or responsibility to the diet cannot be said to have been attained.

Local Government.—As the constitution shows the influence of the former German Empire, so local administration is modeled on the centralized system of France. The entire country, except the northern island of Hokkaido, is divided into 46 prefectures, 3 called *fu*, and the rest *ken*, each under a "governor" appointed, like the French prefect, by the national ministry. There is a local elective assembly, resembling the French "general council," but its powers are very limited. The prefectures are subdivided into districts called *gun* and these into towns, *machi*, and villages, *mura*. There are also 59 incorporated cities, or *shi*, which have limited autonomous functions.

At the beginning of her modern foreign relations, Japan granted by treaty extraterritorial rights to foreigners. These were finally revoked in 1899, and all foreigners became subject to the Japanese courts and laws. These have been modernized. There are local, district, and appeal courts, and a supreme court. There is also an administrative court for the nation, to determine disputes of jurisdiction and to grant redress against illegal executive action.

Wars and Annexations.—Japan, since her modernization, has been exceedingly successful in enlarging her territory and in advancing her national interests. An army and a navy of exceptional spirit and efficiency have won a succession of surprising victories.

In 1880, through the mediation of General U. S. Grant, then a visitor in the Far East, Japan won from China recognition of Japanese claims to the northern Riu Kiu islands.

In 1895 (Treaty of Shimonoseki), as a result of successful war against China, Japan secured Formosa island, the Pescadores, abandonment of Chinese claims to Korea, and an indemnity that enabled her greatly to augment her forces.

In 1905 (Treaty of Portsmouth), by the defeat of Russian forces in the Far East, Japan secured the Russian lease of Liaotung peninsula, the Russian-built Manchurian railway, and the southern part of the island of Sakhalin.

In 1906, Japan undertook the administration of Korea and in 1910 annexed that country. By participation in the World War, Japan secured mandates over former German Pacific colonies lying north of the equator.

During the World War and subsequently, Japan pursued a policy of aggressive penetration of Chinese and Russian territories. This policy was altered as a result of the Washington Conference, 1921-22. For the Anglo-Japanese alliance, there was substituted a "four-power pact" between the United States, Great Britain, France, and Japan, whereby territorial possessions are guaranteed and additions to fortifications on insular Far Eastern possessions are suspended for ten years.

Jugoslavia. The official title of the united Serb, Croat, and Slovene states is the Kingdom of the Serbs, Croats, and Slovenes. The kingdom is a union of several South Slav provinces about Serbia, which established its independence by the Treaty of Berlin in 1878. On the disruption of the Austro-Hungarian kingdom in November 1918, the provinces of Slovenia, Croatia, Bosnia, and Dalmatia declared their independence and voted to unite with Serbia. Montenegro joined the united kingdom March 1, 1921.

A constitutional assembly, elected in 1920, adopted a constitution for the united kingdom. Although a strong party in this constitutional assembly advocated a federal state, or at least autonomy for the different elements in the union, the partisans of a centralized state won and framed the constitution upon this basis. It is provided, however, that the "departments" into which the kingdom is divided for administrative purposes shall be formed on "natural, social, and economic bases." No department can have more than 800,000 inhabitants. It is also provided that there shall be established, on an elective basis, local civil, autonomous organizations for the city, commune, district, and department. The head of each department, who corresponds in conception to a French prefect, is appointed by the king and is called the "great zupan."

The monarchy, while constitutionally limited, retained a strong position of influence and power. A single chamber, the National Assembly or *Narodna Skupshtina*, was popularly elected. The autonomous aspirations of the Croats and the parliamentary weakness of the Skupshtina culminated in June 1928 in the assassination of Croat political leaders and the refusal of Croat parliamentary members further to attend on that body. The national integrity of the state became threatened. On January 6, 1929, the king, Alexander I, dismissed the Skupshtina, abolished the constitution, and appointed a cabinet of ministers directly responsible to himself. New decrees declared the king the sole source of power. On February 18, 1929, the king promulgated a decree or a law creating an advisory legislative council.

By association with the victorious Allies in the World War, Serbia acquired important additions of territory which form a part of the new kingdom.

These include, not only the Austro-Hungarian provinces noted above, but also four small areas on the western frontier of Bulgaria; namely, Timok, Tsaribrod, Basilegrad, and Strumitsa. The additions include also the Adrianople district and territory on the Ægean west of the Maritza river, together with the port of Dedeagatch, won by Bulgaria in the Balkan wars.

By the union of these South Slav peoples and by the additions of territory, a greatly enlarged Balkan state has been created. The weakness of the union lies in the strong local and provincial feelings, in religious differences—the population being divided among Greek Orthodox, Roman Catholic, and Mohammedan elements—and in the fact that the boundaries, as now determined, include irreconcilable alien elements, particularly of Bulgars.

Latvia. The Letts were subject to foreign rule from the 13th century to 1918, but they preserved their identity as a separate people and their national spirit was revived by the World War. After the Russian revolution in March 1917, they organized to work for independence. The movement was delayed by German invasion, but, in November 1918, Latvia was proclaimed a sovereign free state. Struggle with the bolsheviks followed; but, in February 1920, peace overtures were made and in August a treaty with the soviet republic recognized the complete independence of Latvia. The republic is formed out of former Russian territory and comprises Courland, 4 southern districts of Livonia, and 3 western districts of the government of Vitebsk.

The constitution was framed by a constituent assembly convened in 1920. The legislative power is intrusted to the *Saeima*, a single chamber of 100 members, elected for a term of 3 years by "universal, equal, direct, and secret vote on the basis of proportional representation." The age limit for electors and for members of the assembly is 21.

The executive power is confided to a "president of the state" elected by the Saeima by secret ballot with a majority of not less than 51 votes. He is eligible for but one re-election. The president represents the country internationally, is chief of armed forces, and possesses the power of reprieve. The ministers, however, take political responsibility for his actions, must countersign his orders, and must enjoy the confidence of the Saeima. The powers of the president, however, seem to be much greater than those of the French president (See *France.*) or than those of a nominal head of a republican government. He convokes extraordinary meetings of the cabinet of ministers and may initiate their business. He may submit to popular vote a proposal for the dissolution of the Saeima. If the vote is unfavorable, the president is considered to have resigned. Legislation may be initiated by the president, by the cabinet of ministers, by committees of the Saeima, by not less than 5 members of the Saeima, or by a body of voters numbering not less than one-tenth of the electorate. The president has a suspensive veto for a period of two months.

Ministers may be members of the Saeima, but in any case they have the right to sit at its meetings and those of its committees and to introduce amendments to bills. The Saeima has the decision of war and ratifies international agreements that require legislative measures.

A referendum may be invoked not only by the president but by one-third of the members of the assembly, whereupon the law is submitted to the people. The referendum, however, will not be held, should the Saeima once more vote the measure by not less than three-fourths of all the members. No referendum may be held upon a measure adopted as "urgent" by a majority of not less than two-thirds of the members. Furthermore, the following matters are not subject to referendum: the budget or laws concerning taxes and loans; customs dues; railway tariffs; military service; declaration of war; conclusion of peace; declaration of martial law; mobilization; demobilization; and foreign treaties.

The constitution may be revised by a two-thirds vote of the members of the Saeima, at a sitting at which at least two-thirds of all members are present. However, amendments to the articles declaring Latvia to be an independent democratic republic with sovereignty vested in the people, delimiting the national territory and defining the nature of the suffrage, must be submitted to a vote of the people.

The constitution does not organize the court system, but provides that judges shall be independent and subject only to the law and that trial by jury may be provided for by special laws. Local organization is fixed by special laws.

In the treaty of August 11, 1920, with Russia, Latvia, among other grants, received a timber concession of 260,000 acres and a stipulation of nonliability for Russian state debts. Russia received favorable transit rights across Latvian territory. In March 1922, a treaty was signed by Latvia, Finland, Esthonia, and Poland, providing for the arbitration of disputes, for the protection of minorities, for a benevolent attitude by the others in case any of the four is attacked, and for immediate consultation in such circumstance as to the measures to be taken.

Liberia. A Negro republic on the west coast of Africa, founded in 1822 by American and European colonization societies as a settlement to provide a permanent home for freed slaves. The educated and politically qualified element of the population lives along the coast. About 12,000 of these are descendants of American freedmen. The interior of the country is inhabited by uncivilized black tribes.

On July 26, 1847, the colony was organized as the free and independent republic of Liberia. The constitution was modeled on that of the United States, with a Congress, comprising a Senate, a House of Representatives, and a president, who, with the assistance of a cabinet of 7 "secretaries," exercises the executive power and is elected for 4 years. Electors must be of Negro blood and be owners of land. The official language is English. The coast is divided into "counties" named Bassa, Sino, Maryland, and Montserrado, administered by "superintendents."

Owing to the unorganized character of the interior, the territory was encroached upon by French penetration from Guinea and from the Ivory Coast and by British expansion from Sierra Leone; but boundaries, with some losses of territory to Liberia, were settled by the British agreement of 1911 and by a French agreement of 1910.

American Aid.—On account of financial difficulties and the inability of the republic to meet its foreign indebtedness, largely British, the aid of the United States was secured and obligations were refunded in 1912, by an international loan of $1,700,000 payable in New York City over a period of not fewer than 40 years. The customs administration and the rubber tax are confided to a receiver-general, who is also financial adviser to the government and is appointed by the United States. For the further security of the revenue, a frontier police was organized under American Army officers. Since 1912, the republic has come to occupy the position of a protectorate of the United States. Upon the entry of the United States into the World War, Liberia broke off relations with Germany and deported Germans resident in the country. Liberia was a signatory of the Treaty of Versailles and is a member of the League of Nations.

Liechtenstein. A small Alpine principality, lying between Austria and Switzerland. It has an area of 65 square miles and in 1912 it had a population of less than 11,000 people. The monarchy is hereditary in the male line. There is a diet of 15 members, elected by universal suffrage. Voting is direct and election is by proportional representation. An administrator for the state is appointed by the prince. There is a high court.

From 1867 to 1918, the principality was dependent on Austria, but, on November 7, 1918, the diet

proclaimed the complete independence of the state. According to a treaty with Switzerland signed in 1920, that country assumed the administration of Liechtenstein's postal and telegraph systems and its diplomatic and consular representation abroad; and, by a treaty signed March 29, 1923, the principality was included in the Swiss customs union.

Lithuania. From the early part of the 13th century to the year 1569, Lithuania was an independent country. At the height of its history, its frontiers extended from the Baltic to the Black Sea. A personal union existed with Poland after 1386, and in 1569 Lithuania was compelled to unite with that country under one king and a common Parliament. In the partition of Poland, in the 18th century, Greater Lithuania was secured by Russia, and Lithuania Minor by Prussia. The policy of Russification was not successful, and in 1905 the czar acknowledged this fact by granting to the Lithuanians a national assembly.

In the World War, the country was occupied by the Germans in midsummer of 1915. In 1917, a conference of Lithuanian representatives met at Vilna and elected a state council, or *Taryba*. Independence was proclaimed on February 16, 1918. In November the Taryba promulgated a provisional constitution under which it became the Lithuanian Parliament. German evacuation was not completed until December 18. War with bolshevist Russia followed and was terminated by a treaty of July 12, 1920, whereby Russia recognized Lithuanian independence. On June 2, 1920, a second provisional constitution was promulgated, declaring the state of Lithuania to be a democratic republic.

A constituent assembly adopted a constitution August 1, 1922, which declared the state to be a democratic republic. On May 26, following a military *coup d'état* of December 1926, and the dissolution of the Diet in the following April, a reform constitution was proclaimed. The legislative power is vested in a single body, the *Seimas*, which embodies the sovereign power. It consists of 85 deputies originally chosen for 3 years, but, by an amendment of 1928, for 5. They are chosen by universal direct secret suffrage, with proportional representation for party groups.

By the original terms of the constitution the Seimas elected the president for 3 years. By the reform provision of 1928, the president is elected by direct vote of the people for 7 years. He represents the republic in foreign relations, appoints the prime minister, and authorizes him to form a cabinet. He has the right to dismiss the ministers and to dissolve the Seimas. He has the pardoning power, is commander in chief of the armed forces, and may both preside over and participate in the sessions of the cabinet of ministers.

Ministers, however, are declared to be responsible to the Seimas, and the countersignature of a minister, under his political responsibility, is necessary to the president's acts.

The president may refuse to promulgate a law for 21 days, returning it to the Seimas for a second consideration. The president has no suspensive veto over a law declared "urgent" by the Seimas and passed by a two-thirds vote.

The Seimas confirms peace treaties and agreements for the acquisition, abandonment, and conveyance of territory, commercial treaties, and foreign loans. It declares and terminates war. It must be called in extra session on request of one-fourth of its members. It is especially provided that a representative may not be bound by the mandate of his constituents.

The constitution provides for a supreme court, but leaves its organization to the laws, and expressly stipulates that the court shall pass upon the legality of acts of the administration.

The constitution leaves to legislation the determining of the internal organization of the country, but it provides that autonomous units may be formed and that self-government may be guaranteed to communities and cities. It requires, however, that the administration shall supervise local government in the execution of its duties and that courts shall pass upon disputes arising between units of self-government and the administration.

The constitution provides that national minorities of citizens may have the rights, within the provisions of law, to administer autonomously education, charity, and mutual aid, and to elect the necessary bodies and collect the necessary funds to accomplish these purposes.

A state controller or auditor is appointed by the president, but is responsible to the Seimas.

The initiative of constitutional amendments rests with the executive, the Seimas, or 50,000 electors. A three-fourths vote of the Seimas will adopt an amendment; but, if the president of the republic, or one-fourth of the members of the Seimas, or 50,000 electors so request, a popular referendum must be taken.

By the Treaty of Versailles, Germany ceded to the Allied and associated powers a small district, north of the River Niemen, including the port of Memel, inhabited by a population predominantly Lithuanian. This district, under certain limitations, was legally added to Lithuania in 1924. By a treaty of July 1920, with Russia, Lithuania obtained timber concessions to the value of 100,000 hectares of forest land on the Russian side of the boundary. For the Vilna controversy, see *Poland*, page 499.

Luxemburg. A grand duchy, which borders on France, Belgium, and Germany, and was given its present rank as a principality by the Congress of Vienna in 1815. It is a little smaller than the state of Rhode Island. By the Treaty of London (1867), it was neutralized and its integrity and its independence were guaranteed. However, it was invaded and occupied by German armies at the opening of the World War (1914).

The monarchy is heritable by either male or female heir. The constitution of 1868 was modified in important respects in 1919. It was decreed by a constituent assembly elected in that year that sovereignty resides in the nation. Universal suffrage, a system of proportional representation, and the legislative referendum were introduced. The representative legislative power resides in a chamber of 52 deputies. A council of state, of 15 members, appointed by the prince, deliberates on proposed laws and administrative decisions and gives its counsel to the chamber or to the monarch.

The cabinet is chosen by the prince and consists of a minister of state, who is president of the government, and of the directors-general of finance and social welfare, of home affairs and justice; and of public works, trade, and industry.

In 1919, a popular referendum, taken to decide the political and economic future of the country, decided on continuance of the monarchy and on an economic union with France, which country declined this advantage in favor of Belgium.

Mesopotamia (Kingdom of Iraq). During the World War, British and Indian armies conquered this territory, which was a part of the Ottoman empire. Bagdad was occupied on March 11, 1917. The Treaty of Sèvres required Turkey to recognize Mesopotamia as an independent state under a "mandatory power." This mandate the League of Nations assigned to Great Britain. But the latter country gave notice of her abandonment of this responsibility and, in October 1922, concluded with Mesopotamia a treaty of alliance and protection. This treaty was renewed in 1926, the king agreeing to be guided in his international and financial obligations by the advice of a British High Commissioner. A constituent assembly enacted an organic law in June 1924 providing for a limited monarchy and a responsible government, a Senate of 20 nominated elder statesmen, and a Lower Chamber of 88 elected deputies. The king, proclaimed in 1921, was Prince Feisal, son of the King of Hejaz.

During the British military occupation and subsequently, railroads were built, port facilities were developed, and large reclamation projects by irrigation were proposed. In 1924 the "Mosul question," involving the frontier between Iraq and Turkey, was placed before the League of Nations, which submitted to the International Court of Justice the question whether the League possessed jurisdiction to determine the boundary. Turkey declined to be represented before the Court or to accept the affirmative judgment of the Court. The League awarded to Iraq most of the Province of Mosul. Turkey, after refusing to accept the decision, came to an agreement with Great Britain on the matter in 1926.

Mexico (*La República Mejicana*). The Mexican national state is a federal republic, composed of 28 states, 2 territories, Baja California and Quintana Roo, and a federal district which embraces the capital, the City of Mexico. The federal republic is modeled on the government of the United States. Federalism was first attempted in 1824, soon after independence from Spain was established and at the end of the short rule of the emperor, Iturbide. Conflict between this principle and the opposed principles of monarchy and of "centralism" led for several decades to civil wars and political disturbances, finally ending in the triumph of republicanism and in the adoption of the liberal federal constitution of 1857.

This triumph was checked by the establishment in Mexico, through French intervention, of the empire under Maximilian, archduke of Austria (1864–67). Maximilian's downfall and execution were followed by the restoration of republican government and of the federal union under President Benito Juarez.

Constitution of 1917.—The constitution of 1857, however, was succeeded in 1917 by the so-called Constitution of Queretaro, promulgated February 5, 1917. This constitution reduces the term of the president to 4 years and embodies the "no re-election" provision. It also introduces several radical measures, notably the nationalization of all subsoil products, including petroleum, and authorizes the "expropriation" of private land estates, both native and foreign-owned (Article XXVII). This constitution also provides an elaborate labor code, designed to strengthen the rights and to protect the interests of industrial workers (Article CXXIII).

Article XXVII affected American property interests so adversely that the government of the United States, as well as other countries, refused to the Mexican government political and financial support. President Obregon, elected in 1920, was not accorded recognition by the United States until Aug. 19, 1923, when an agreement was made that these provisions should not have retroactive effect.

In compliance with the federal principle, each of the Mexican states possesses its own constitution. There is a state legislature (*legislatura*, or *Congreso del Estado*), in every case of one chamber only. The members, who number from 9 to 18, according to the size of the state, are usually called deputies, or *diputados*. They are elected by districts, and an alternate or substitute deputy, *suplente*, is elected at the same time. The usual term is 4 years. A governor, *gobernador*, is chosen at intervals of 4 years.

"No re-election laws," making both president and state governors forever ineligible for a second term, were incorporated in federal and state constitutions in 1911 but were modified in 1926 to allow both national and state executives to succeed themselves after an intervening term.

The governor is the head of the state government and controls all its civil administration. A secretary of state, or *secretario del estado*, is appointed by him as are also the heads of all state institutions. These usually include a penitentiary, a state hospital, a state college, and some provision for state public schools, a public pawnshop, or *monte de piedad*, and, frequently, street railways, lighting plants, and other public utilities. The state capital overshadows the other towns and is the recognized social and political center of the state.

The towns or municipalities have elected governments, *ayuntamientos*, which conduct local affairs. Police and public security are controlled by state officers responsible to the governor. For police administration, each state is divided into districts (*distritos*, *cantones*, or *partidos*), wherein formerly a political head, or *jefe político*, oversaw the local administration and commanded the constabulary. The office of *jefe político*, which had been autocratically exercised under the long "Diaz régime" was largely suppressed during the revolution of 1910-11. The fixed inheritance of centralized authority, as well as the frequently disturbed conditions, have recommended a centralization of police administration and of government unfamiliar to inhabitants of American states.

By the constitution, the national government is intrusted to a president and to a Congress, *congreso*, composed of a Senate and a House of Representatives. The Senate consists of 58 members, 2 from each state and 2 from the federal district. The representatives are chosen by direct election for 2 years, in the proportion of one for each 60,000 inhabitants. The president is chosen by direct popular vote for a 4-year term, and is ineligible for re-election.

By a law of April 13, 1917, the national administration, responsible to the president, is organized into departments of foreign relations, finance (*hacienda*), interior (*gobernación*), war and navy, promotion (*fomento*), justice, public instruction, communication, and agriculture and labor.

Land Problem.—Throughout Mexican history, the existence of great landed estates has given Mexico a particularly difficult agrarian problem, which has largely inspired the social discontent and revolutionary movements of recent years. Mexican policy has decreed the supervision of landed estates and their distribution to peasants or to communities as commons (*ejidos*). For the achievement of this social transformation, there is a national agrarian commission of 9 members, with other commissions in the states and localities.

In accordance with the federal principle, each state possesses its own codes of law and its system of courts. As in the United States, there is, however, a federal judicial system, with a supreme court of 15 members at Mexico City. The jurisdiction of the national courts extends to all disputes to which foreigners are a party. Appeal to these courts from a state court exists under the so-called "law of protection," *ley de amparo*.

Mexico is a country of vast natural wealth, the exploitation of which, owing to the deficient economic organization and to the feeble resources of the Mexican people, has been largely in foreign hands. Recent policy is directed, as far as possible, toward the liquidation of foreign interests and possessions and toward the bringing of these resources under Mexican control. By ancient Spanish and Mexican law, the precious minerals were regarded as property of the state, to be extracted by private individuals on a percentage basis. This principle was not applied to petroleum when that mineral became an object of supreme economic interest, and, under the Diaz government, the Mexican state granted proprietary rights to foreign oil companies in oil lands. The Constitution of Queretaro, with the revolutionary conceptions which it expressed, aimed at extinguishing foreign titles acquired under previous laws. This attempt brought Mexico into conflict with the foreign governments, particularly with the United States, whose nationals possessed important Mexican oil rights. The revolutionary movement which overthrew and succeeded the Diaz régime arrested Mexico's economic progress and produced unfortunate results in other spheres. Following the revolution of 1911, Mexico defaulted in the interest upon her public debt, thereby creating a problem

which has not been settled despite an agreement in 1922 between a committee of international bankers and the Mexican government looking toward a restoration of Mexican solvency.

Mexico dislikes the influence of foreign capital in the country and stands at the forefront of those republics which resent the dominant position of the United States in the western hemisphere.

Monaco. A tiny independent principality, which, except for a small strip of Mediterranean coast, is entirely surrounded by French territory. The state is the private possession of the prince, and was governed autocratically until January 7, 1911, when a constitution, which creates a legislative council elected by universal suffrage, was granted.

Representation on a popular basis, in which women may participate, is also accorded to Monaco, La Condamine, and Monte Carlo, the three "communes" which comprise the principality. Public revenue and the income of the prince are derived almost entirely from the concessions to gambling establishments.

Morocco. An ancient empire or sultanate of northwestern Africa, now in great part under the protection and control of France. Until mitigated by French authority, the government was an absolute despotism. The sultan is also spiritual ruler and autocratic head of the Mohammedan religion in Morocco.

French penetration from Algeria began in 1904, occasioned in part by Moroccan disorders and by raids on French territory. It was twice challenged by the German emperor: in 1905, "first Morocco crisis," which led to the Conference of Algerciras, to which the United States sent a representative; and again in 1911, "Agadir incident." On both occasions, war between France and Germany was averted. After a convention, November 4, 1911, through which she received a section of the French Congo, Germany was satisfied to countenance French progress in Morocco.

In April 1912, the sultan at Fez accepted a French protectorate. A French resident-general, who is also minister of foreign affairs, directs the mixed French and Moroccan administration. The country is strongly garrisoned and the French commanding general fills the position of minister of war. The other heads of administration are "viziers" and, in addition to the "grand vizier," are viziers for justice, crown lands, pious foundations, instruction, and the president of the Shereefian high court.

In addition to the French power in Morocco, Spain holds a zone, called the "Riff," along the Mediterranean coast. The zone is garrisoned by Spanish troops and is administered, under the guidance of a Spanish high commissioner, by a "kalif," who is appointed by the sultan of Morocco from two nominees of the Spanish government. Spanish and French interests and responsibilities were adjusted by the Treaty of Madrid, November 27, 1912.

Nepal. A kingdom in the Himalaya mountains, which lies between Tibet and British India. The dominant native race is that of the Gurkhas. The state, while independent, is wholly within the British sphere of influence and protection. The relations are defined by the Treaty of Segowlie of 1816.

A British envoy lives at the capital, but does not interfere with the internal affairs of government, which are committed by the king to a military oligarchy of nobles, whose choice for the head of the government is the permanent prime minister.

The Gurkhas of Nepal are profoundly loyal to the British Indian army, into which many are recruited, and lent their full strength to the Indian government during the World War.

Netherlands, The (Kingdom of the Netherlands). The Dutch nation arose in the 16th century by the revolt of the provinces of the "low countries" against Spain. In 1579, the provinces of Holland, Zealand, Utrecht, Gelderland, Groningen, Friesland, and Overyssel joined to form the "United Netherlands" under the prince of Orange as governor, or *stadthouder*. The remaining provinces were resubjected to Spanish authority and experienced a different fortune. In 1830, they united to form the present kingdom of Belgium.

In 1815, the Netherlands was reconstituted as a sovereign state and was raised by action of the "great powers" to the rank of a kingdom. The constitution was promulgated in 1814, was revised in 1815 after the addition of the Belgian provinces, in 1840 after their secession, in 1848, in 1884, in 1887, in 1917, and in 1921. In 1917, an electoral reform act provided for universal suffrage (male and female) and for proportional representation.

The royal succession is the direct male line of descent from Prince William of Orange. In default of male heirs, the female heir becomes queen.

The legislative body is known as the "States General" and comprises a first chamber of 50 members elected by the provincial states for a term of 6 years, one-half retiring each 3 years, and of a second chamber of 100 members, chosen for 4 years by citizens of both sexes above 24 years of age, on a system of proportional representation. Voting is compulsory. Both men and women of the age of 25 are eligible for election to the States General. Initiation of laws is restricted to the government and to the second chamber, the first chamber having power only to approve or to reject but not to amend.

Government is conducted by the sovereign and by a council of ministers, one of whom is appointed president of the council. There is also a "state council," *Raad van State*, of 14 members, appointed by the sovereign. The sovereign presides over this council, which has consultative participation in both legislative and executive matters.

The Provinces.—The 11 provinces, of which the Netherlands now is composed, are North Brabant, Guelders, South Holland, North Holland, Zealand, Utrecht, Friesland, Overyssel, Groningen, Drenthe, and Limburg. They have a large autonomy and (subject to the veto of the sovereign) a local legislative power which is exercised through assemblies, "the provincial states," chosen for 4 years by the same electors as choose the national second chamber. These bodies meet twice annually, and in the intervals between sessions they are represented by permanent commissions, or "deputed states," of 6 (in Drenthe 4) members, who administer the affairs of the provinces and oversee the execution of the laws. A commissioner appointed by the sovereign presides over both the provincial states and the deputed states, and in the latter body has a deciding vote.

The Dutch "communes," or municipal corporations, number over 1100 and are governed by councils chosen by the same electors, residents in the commune, as choose the national second chamber. The by-laws of the councils are subject to the veto of the sovereign. The municipal budgets and all proposals to alienate municipal property must receive the approval of the provincial states.

A further central control is exercised through the mayor, or burgomaster, who is a state as well as a municipal officer. The police are under his authority, and he has a suspensive veto on resolutions of the council for 30 days' time, during which time the provincial states must be advised. The municipal executive power is intrusted to the mayor and to a commission of aldermen, *wethouders*, 2 to 4 in number, elected by the council. This commission is a body analogous to the "college of echevins" of the Belgian commune. See *Belgium*.

Dutch civil and criminal law is based on the Roman law and reflects its principles. Trial by jury is unknown. There are a high court of the Netherlands (court of cassation), 5 courts of appeal, 23 district tribunals, and 101 cantonal courts. The cantonal courts deal with minor offenses and have one judge each. All judges, 3 in number for appeal and district courts and 5 for the high court, are appointed by the sovereign for life. They can be removed only by a decision of the high court.

The Netherlands, while a small country, possesses a very great colonial empire, the acquisition of which dates from the 17th century. It has been tenaciously held and is scientifically governed, its conduct and trade relations being a supreme national concern. These possessions are partly in America, where they include Surinam, or Dutch Guiana, on the coast of South America, and the colony of Curaçao, consisting of two groups of small islands in the Caribbean Sea, off the coast of Venezuela. These two colonies are administered by governors, assisted by small executive councils; all are appointed by the sovereign of the Netherlands, and are responsible to the minister of colonies. Representative councils, also, ("the colonial states") of 13 members in each colony have been established. The population consists largely of Negroes, descendants of African slaves, with a considerable body of Hindus in Surinam, former contract or indentured laborers imported from India for cultivation of the plantations.

Dutch East Indies.—"Netherlands-India," the Dutch East Indies, comprises all of the really important islands of the Malay archipelago except the Philippines. Its possession makes the Netherlands a "colonial power," second only to Great Britain and to France. The colony includes Java, Sumatra, most of Borneo, Celebes, the Moluccas or Spice islands, Bali, Lombok, Sumbawa and part of Timor, the Aru and Ke islands farther east, and the western half of New Guinea, besides numerous smaller islands. Though divided into two parts, Java and the "outer possessions," the entire possession is under the administration of a single official, "the governor-general." He is assisted by a staff of department heads and is advised by a "council of the Indies" made up of five Dutch members of extensive colonial experience, whom he is obliged to consult on important matters, but who do not control his decision. In 1917, a larger advisory body called the Volksrad containing elected members was created.

Under general responsibility to the sovereign and to the minister of colonies at The Hague, the governor-general possesses the amplest authority. It extends to relations with native princes, whom he may actually depose; to command of all land and sea forces within the colony; to complete responsibility for the entire administration and for colonial finances. Under the advice of the council, or Volksrad, he possesses a wide decree or ordinance power, which must be exercised in accordance with general principles of colonial government laid down by the Netherlands legislature.

The island of Java, with Madura, possesses a native population of over 35 million and has been brought to the highest point of cultivation. It is divided into "regencies" under native princes or sultans, whose courts are maintained with ceremony. The government is actually directed by Dutch "residents," or highly trained officials, who are described as the "elder brothers" of the regents and whose advice must be followed.

For many years the policy of the Netherlands toward this great possession was one of frank exploitation. A "culture system" of forced plantings and surrender of products was imposed upon the natives of Java and upon a part of the Celebes. A national profit was derived, which was expended largely on public improvements in the Netherlands. This system was long ago discredited, and the principle seems well established that revenues derived from the natives must be expended primarily for native benefit.

Norway. By the Conference of Vienna, 1814, Norway was united to Sweden under the sovereignty of the Swedish king. The union was personal in the monarch, each country retaining its own nationality, government, and laws. On June 7, 1905, Norway declared this union dissolved and an accord to this effect was signed with Sweden in October 1905. Public opinion in Norway, to a certain extent, inclined toward a republic; but reasons of policy appear to have prevailed over the naturally democratic instincts of the Norwegians, and, by a plebiscite, the throne was offered to Prince Carl of Denmark, who took the title of Haakon VII. The constitution of Norway is that which has existed since May 7, 1814, with a number of amendments. The executive power resides in the king, who acts through ministers responsible to the Norwegian Parliament. Before 1913, the king had a qualified veto over legislation. In that year it was made simply suspensive.

The national legislature, called the *Storthing*, is elected by universal suffrage of all Norwegians over 23 years of age. In 1907, women with special qualifications were admitted to the suffrage. In 1913, they received the suffrage on the same conditions as men, and, in 1915, they became eligible for appointment to ministerial positions. The election of the Storthing, which numbers 150 members, takes place every third year, is direct, and according to proportional representation. Upon assembling, each Storthing divides itself into two bodies, one called the Lagthing, composed of one-fourth of the membership. The remainder form the Odelsthing. These two bodies ordinarily act as separate houses; but, in the case of disagreement, they meet in a joint session and a final decision is reached by a majority of two-thirds of the voters. An amendment to the constitution in 1913 gave to ministers the right to sit in the Storthing.

For local government, the country is divided into 20 districts; 2 of them, the cities of Christiania and Bergen, are urban and 18 of them are rural counties, or *fylker*. The chief executive, or *fylkesmann*, is appointed by the crown. Rural communes, or *herreder*, are governed by elective councils, with a membership of from 12 to 48, while the administration is conducted by an administrative council chosen from among the representatives. In local government, women with property qualifications gained the vote and the right to representation in 1901. In 1910, their suffrage became that of the men.

For the administration of justice, the country is divided into 105 districts in each of which is a trial court, or court of first instance. There are 3 higher tribunals with 3 judges each and a supreme court, *hoiesteret*, with 7 judges. Criminal courts are of 2 types, the *lagmandsret*, composed of a president and 10 jurors, and the *meddomsret*, with a single judge, but with 2 nonprofessional assistants sitting with the judge in the trial of each case.

Palestine. The Holy Land of the Jewish and Christian religions. It was for centuries a part of the Ottoman empire, but was conquered by British forces in 1917-18, Jerusalem being occupied on December 9, 1917. Following a period of military government, a civil administration was introduced under a British high commissioner.

By the Treaty of Sèvres, Turkey renounced her sovereignty over Palestine and in December 1920 the British "mandate" over the country was confirmed by the League of Nations. In accordance with the terms of the mandate, the country is to be opened to the establishment of a Jewish national home without prejudice to the rights of non-Jewish inhabitants.

An advisory council, including 10 unofficial members (4 Moslems, 3 Jews, and 3 Christians), has been created. The Jewish population has settled in numerous small colonies established in the country largely by the Zionist Association, has convened an elected assembly, and has appointed a national council to represent its interests before the administration of the country.

The judicial system is adapted to the varied status of the inhabitants. Courts are either civil or religious. In religious matters or in causes involving personal status, Moslems are tried in their own courts and Jews in theirs. Other religious communities retain rights enjoyed under the Turkish régime. For civil and criminal matters, there are local magistrates; 4 district courts, each having a

British president; and a court of appeal with a president and a vice president, both of whom are British. By special rules, a foreigner charged with a serious offense is tried by a British magistrate or by a court with a majority of British judges.

Panama. An independent republic since the declaration of its secession from the republic of Colombia on November 3, 1903. The territory embraces the narrow and irregular land connection between the continents of North and South America. This strip of land is frequently described as the isthmus of Darien. This locality was a separate jurisdiction under the long rule of Spain, and possessed importance by reason of the trade route between Porto Bello on the Caribbean Sea and Panama on the Pacific side. Vera Cruz and Porto Bello were the sole ports through which authorized commerce was conducted between Spain and the kingdoms of the New World. Freedom from Spain was achieved in 1821 by a bloodless revolt. Union was had with Colombia.

The Panama route attained revived importance in 1848, in connection with the gold mining and settlement in California. An American-built railroad across the isthmus from Colon to Panama was completed in 1855. In 1880, French capital, encouraged by the success which attended the building of the Suez canal, was moved to undertake the construction of the Panama canal. Work was actually begun in 1888; it continued until the company became insolvent and its affairs were liquidated in 1895.

The Spanish American war forced anew upon the attention of Americans the desirability of an American-built and owned interoceanic canal. A convention, known as the Hay-Herran Treaty, was negotiated between the United States and Colombia. It authorized the transfer of the French company's rights, modified and extended, to the government of the United States. This treaty was rejected by the Colombian Congress August 12, 1903, whereupon the inhabitants of Panama, asserting their paramount interest in the construction of the canal, revolted and declared their independence of Colombia.

The government of Panama was almost immediately recognized by the United States and was placed under its protection. The canal was constructed by the United States government, under rights which were obtained by treaty with the republic of Panama under date of November 18, 1903. By this treaty the United States guarantees and agrees to maintain the independence and internal order of the Panama republic.

The constitution of the Republic was adopted February 13, 1904. It was amended in 1918 and further amended in 1928. It provides for a legislature known as the National Assembly—*asemblea nacional*. This body is elected for 4 years on the basis of one member for every 15,000 inhabitants. It meets biennially.

The executive power is intrusted to a president, who is chosen by direct vote for a term of 4 years, and is ineligible to succeed himself. There are chosen also 3 successors to the president, who are called the first, second, and third "designates," *designados*. The republic is divided into 8 provinces, each under an elected governor.

The laws dating from the period of union with Colombia were replaced in 1917 by new civil and criminal codes. Under these codes, capital punishment is prohibited. Foreigners are prohibited from mingling in politics and may be ejected from the country for criticisms of public offices or institutions. The laws relating to mining, industry, and exploitation of land are favorable to foreign investment and enterprise.

Two international difficulties inherited by the republic have been settled only with the assistance of the United States. The republic of Colombia protested the independence of Panama and the instant assumption of protection over the country by the United States. Recognition by Colombia was refused until June 9, 1914, and was then made conditional upon the ratification by the United States of a treaty whereby the United States paid to Colombia the sum of $25,000,000. This treaty was not ratified by the United States Senate until April 20, 1921.

Panama's second difficulty was a boundary dispute with Costa Rica, involving a section of the province of Chiriqui. In 1880, King Alfonso XIII of Spain had been asked to make an arbitration between Colombia and Costa Rica. By reason of the death of this monarch, the arbitration was transferred, September 11, 1900, to President Loubet of France. The demarcation of the Loubet award had not been made when Panama became independent by revolution. In 1910, through the good offices of the United States, Costa Rica and Panama agreed to submit the interpretation of the Loubet award to the decision of the chief justice of the United States. This decision, rendered in 1914, was adverse to Panama, which refused assent. In February 1921, both republics sent armed forces into the disputed area. The United States intervened with armed forces and compelled an assent to the award as arbitrated. Panama submitted under protest. By the terms of the treaty with the United States in 1903, Panama received from the United States a purchase price of $10,000,000 and, beginning in 1912, an annual payment of $250,000 for the rights ceded to the United States in the Panama Canal Zone.

Paraguay (*Republica del Paraguay*). The republic of Paraguay, like Bolivia, is an inland country, possessing no seaboard on the South American coast. The country was settled by Jesuit missionaries to the Indians. Paraguay was included within the Spanish viceroyalty of La Plata, organized in 1776, but, on the revolt of Argentina, Paraguay declared for separate independence, August 10, 1811. The revolutionary government was established under two "consuls," but it rapidly dissolved into a typical dictatorship which continued until 1870. Under the last period of dictatorship, Paraguay was involved in sanguinary struggles with Brazil, Argentina, and Uruguay, which were ruinous to the country in loss of life and territory.

The constitution promulgated November 25, 1870, completely reorganized the government. Executive power is intrusted to a president appointed for 4 years by electors chosen for that purpose. A vice president, elected at the same time and in the same manner, is president of the Senate. The president is commander in chief of the army and the navy and chief administrator of the state. With the consent of the Senate, he may negotiate treaties, declare war, make peace, and refuse to admit papal rescripts.

The president has a cabinet which he himself appoints. It comprises 6 secretaries: interior; foreign relations; treasury; justice, worship, and public instruction; war and marine; and promotion, or *fomento*. Ministers may attend Congress and take part in debates, but without a vote. The president has a veto power over acts of Congress.

The legislative power is vested in a Congress composed of a Senate and a Chamber of Deputies, both elected by direct popular vote. The suffrage, with the exception of a few disqualified classes, is bestowed upon all male citizens over 18 years of age. An electoral law of 1916 provides that Congress shall consist of 20 senators and 40 deputies, the former elected for 6 years, the deputies for 4, the senators renewable by thirds and the deputies by half every 2 years. Congress meets annually on April first, but extraordinary sessions may be called by the president or on motion of 2 senators and 4 deputies. The Senate has exclusive power to impeach high federal officials. The two houses, acting jointly, are specifically granted a number of powers.

Judicial power is intrusted to a supreme court, to courts of appeals, 10 courts of first instance, 3 metropolitan police magistracies, and, in the rural localities, to justices of the peace. Conflicts of jurisdiction are settled by the supreme court.

The constitution contains no provisions as to local government; but by law the country is divided into two sections, the eastern, "Oriente" (east of the Paraguay river), and the western, "Occidente" (west of the Paraguay river). Oriente is divided into 12 departments, subdivided into 93 districts, or *partidos*; Occidente is divided into 3 military districts, or *comandancias militares*. The department of the interior controls all of these local governments through officers known as "political chiefs," *jefes políticos*, delegates, and commissioners. The state religion is declared to be Roman Catholic.

For the settlement of boundary disputes of Paraguay, see *Brazil*, *Argentina*, and *Uruguay*.

That part of the country lying west of the Paraguay river is a wilderness known as the "Gran Chaco." Rival claims of Bolivia to this territory led to military encounters in 1928 and the breaking of diplomatic relations. The question of responsibility for this clash was submitted to a Pan-American conciliation committee.

Persia (Irân). The former greatness of this state, both in ancient times and for some centuries of the early Christian era, is a matter of common knowledge. To understand the political importance and varied fortunes of Persia, reference should be made to the fact of its position, whereby in the past it was able to dominate adjacent territory in periods of strength, and yet was open to invasion from northern steppes and western plains in times of weakness. Its modern history is a record of decay, during which it has been and remains a field of concern to the two rival powers in western Asia—Russia and the British Empire. The former covets Persia as a pathway to southern ports, while Great Britain's concern springs mainly from dread of threat to India and her routes of empire.

Russia's military collapse in 1905 (Russo-Japanese war) allayed British fears, and this, combined with common repugnance to German advance toward Mesopotamia (Bagdad Railway project), served to bring these two governments to a compromise in 1907, which ended for the time a rivalry more than a century old. The convention signed at Saint Petersburg, now Leningrad, August 31, 1907, covered Afghanistan and Tibet as well as Persia. In the latter country, it created a northern "sphere of interest" for Russia and a southeastern sphere for Great Britain, within which neither country was to oppose the activities and the influence of the other.

Meanwhile Persia was experiencing revolution against the absolutism of the king or shah. In 1906, the shah issued a rescript for the election of a National Assembly, *Mejlis*, which should be a limitation upon the autocracy and begin a constitutional régime. This body assembled in October 1906, and on December 30, 1906, a constitution for the kingdom was accepted by the shah. The development of constitutionalism was prevented by the existence of foreign influence and by the decadence of the nation. For the history of Persian financial difficulties and the efforts of American foreign advisers in her behalf, see page 498b.

The country is divided into 33 provinces, which are ruled by governors-general directly responsible to the central government. The governors-general usually have the right of nominating lieutenant governors of the districts within their own jurisdiction. Some of the governments are very small and do not bear division into districts, while others comprise several provinces. Revenues are collected for the governors-general by chiefs of tribes residing in their governments or by magistrates, the latter being appointed by the governor for each village or each quarter of a town. In some instances these magistrates are elected by the villagers or townsmen.

The World War produced a complete suspension of the Persian constitution. Germany, through Turkey, attempted to gain control of the country, but this effort was met by the Mesopotamian expedition and the succeeding occupation of parts of Persia by British troops. These forces were withdrawn, but not until Persia had been denied representation of her claims at the Peace Conference (1919) and not until after the secret negotiation of a treaty with the Persian ministry, creating a British protectorate over Persia. The treaty failed of ratification by the Mejlis. A new Mejlis, the seventh, was elected in 1928, consisting of 128 members chosen for a two-year term. It was convened by the shah October 6, 1928.

In October 1925, the Mejlis deposed the Kajar dynasty and provided for a constituent assembly to determine the form of government. The latter, on Dec. 13, 1925, elected as hereditary shah a Persian soldier, Riza Khan, who combined the offices of premier, commander of the army, regent, and dictator.

Peru. The republic of Peru arose from the viceroyalty of Peru, which in the Spanish colonial period was considered the ranking kingdom of the New World. Here Spanish prestige and authority were more strongly entrenched than elsewhere, and it was not until 1821 that, by the combined assistance of the armies of Bolivar and of San Martín, with forces from Argentina and Chile, Spanish authority was overthrown.

Peru became an independent republic July 28, 1821. The present constitution of Peru went into effect January 18, 1920. It is the result of many and varied constitutional experiences, frequently resulting in misfortune, and may be considered one of the most modern attempts in Spanish America to remedy the difficulties of past constitutional laws. The executive authority is in the president, elected for a 5-year term. The constitution of 1920 made the president ineligible to succeed himself, but by an amendment of 1927 this limitation was removed. The cabinet ministers, through whom the president discharges the executive functions, are selected by the president and hold office at his pleasure. They include the secretaries of interior, war, marine, foreign affairs, justice, worship, public instruction, finance, and public work. The constitution provides that a cabinet member may participate in congressional debates and may not continue in office if either house expresses a loss of confidence. Furthermore, none of the president's acts is validated unless it receives the signature of a minister.

Members of either house may accept posts in the cabinet, but with privileges as congressmen suspended during occupancy of the executive office. The disposition to limit further the power of the president is indicated by the provision for a council of state of 7 members, appointed by the council of ministers with the approval of the Senate. The constitution does not determine the rôle of this council of state, but provides that laws shall determine the matters in which the government must hear the council and the cases in which the approbation of the council of state is necessary.

The legislative power is vested in the Congress, composed of a Senate of 35 members and a House of Representatives of 110 members. Both houses are totally renewed each 5 years. The number of congressmen can be altered only by an amendment of the constitution. An organic law provides for the electoral districts and for the assignment of the number of congressmen to each. All members of Congress are elected by a direct vote.

As is the case with the Senate of the United States, the Senate confirms cabinet and diplomatic appointments. Laws may be initiated by the president, and laws of a judicial nature may be initiated by the supreme court.

As regards interior or local administration, Peruvian public law has been much influenced by the example of the French republic. The country is

divided into departments; the departments are divided into provinces, and the provinces into districts. The departments are administered by prefects, the provinces by subprefects, and the districts by "commissaries," *comisionados*, responsible to the national government. All of these officials have general powers of supervision and are in control of police administration.

The constitution of 1920 contains a reform providing a certain decentralization of legislative power. Three regional legislatures are created; they are located in the north, in the center, and in the south of the republic. These bodies are composed of deputies, elected by the provinces within the region, who meet annually for legislating upon local affairs. Their legislation must be transmitted to the president for approval. If he disapproves, then he must submit the proposed laws to Congress. This provision may be considered to give to the regional legislatures the power to initiate laws for the nation.

Like many other constitutions framed since the World War, the constitution of Peru contains a number of clauses providing social legislation: the state alone may establish monopolies; a graduated income tax is imposed; disputes between labor and capital must be arbitrated; workmen must receive indemnities for industrial accidents; primary education is compulsory for all children over six years; the aborigines are placed under the protection of the state, which must promote their welfare. By provision of the constitution, foreigners have the same property rights and protection as Peruvian citizens, but are prohibited from acquiring, directly or indirectly, rights to lands, water, mines, or sources of fuel within 50 kilometers of the frontier. They may not receive special property concessions and are forbidden to resort to diplomatic aid for the support of their claims. Mining wealth is the property of the state, and possession and use alone are granted to the operator of a mineral claim.

At Lima, there is a supreme court, composed of 11 judges; superior courts sit at Lima and in 11 other judicial districts. As is frequent in the Spanish American republics, the constitution intrusts the appointment of supreme court judges to Congress rather than to the president; appointments are made from lists presented by the executive. For superior courts and minor courts, the government appoints from lists presented by the supreme and superior courts, respectively.

War and Frontiers.—The political history of Peru has been adversely affected by long-continued boundary disputes with neighboring republics. The frontiers of the old viceroyalty were not clearly delimited. The republics of Brazil, Venezuela, Colombia, Ecuador, Peru, and Bolivia each possessed an interior or "hinterland" which penetrated a vast area, partly mountainous and partly the forested headwaters of the tributaries of the Amazon, sparsely populated and, until recent decades, little explored. This condition made dubious the boundaries of the old Spanish possessions and has involved South America in conflicts and in wars.

A long controversy with Brazil over territorial claims was settled by treaty, September 8, 1909. The dispute between Peru and Colombia dates from 1831 and involves some 300,000 square kilometers in the watershed of the Caqueta river. In 1922, a treaty was signed with Colombia for the demarcation of this boundary.

A boundary dispute with Ecuador, of 90 years' standing, involves some 100,000 square kilometers of territory occupied by Peru and 400,000 held by Ecuador. Three wars have been fought over the title to this territory. In 1922, direct negotiations to end this dispute were initiated between the foreign offices at Lima and at Quito.

The boundary dispute with Chile brought upon Peru in 1880 the most lamentable incident in her history, the "War of the Pacific," resulting in overwhelming defeat. The controversy affected Bolivia as well, and has been of direct or indirect concern to all of South America. The region in dispute was the sterile coast, a long, narrow strip of rainless territory, between the foot of the Andes and the Pacific shore, separating the inhabited portions of Bolivia, Chile, and Peru. This territory proved of great value by reason of the nitrate deposits in the desert of Atacama.

By the Treaty of Ancon, March 8, 1884, Chile enforced her claims to the province of Tarapaca and to the most valuable of these mineral resources. Chile continued to occupy Tacna and Arica, the two southern provinces of Peru, under the treaty stipulation that in 1894 a plebiscite should be held to determine the possession of these provinces, in accordance with the preferences of the inhabitants. Owing to failure to agree upon a method of procedure, the plebiscite was not held and, from the war of 1879–83, the Tacna-Arica problem remained a continuing heritage of animosity.

In 1921, fresh negotiations to settle the difficulty failed. In January 1922, on the invitation of the United States government, Peru and Chile sent representatives to Washington for discussion. A protocol for the settlement by arbitration of the unfulfilled clauses of the Treaty of Ancon was signed July 1, 1922. By this protocol, the president of the United States was named arbiter, his decision to be final. The arbiter decided, in an award promulgated in March 1925, that the district of Tarata should be returned to Peru and the plebiscite held in Tacna and Arica. The plebiscitary commission met in the disputed territory in 1925, but was unable to organize the administration and conduct of an election in a manner satisfactory to the states concerned.

In 1928, however, diplomatic relations were resumed between Peru and Chile, and in 1929 an agreement was announced whereby Peru receives the district and city of Tacna while Chile retains the port and adjacent territory of Arica.

Poland. After having been extinguished as an independent state by the "partitions" of 1772, 1793, and 1795, which divided the country among Russia, Prussia, and Austria, Poland was reunited and was raised again to the rank of an independent state by the World War. The independence of the country was proclaimed and a provisional constitution was declared in November 1918. Elections for a constituent assembly were held in January 1919, and the constitution was finally adopted March 17, 1921. While opinion within the convention was overwhelming for a republic, differences existed as to the manner of constituting the legislative body, as to the election of the chief of state, the relations between church and state, the right of the state to expropriate private property, and, finally, as to the manner of the revision of the constitution.

Governing Bodies.—The legislative power is intrusted to a Chamber of Deputies, called the "Sejm," and to a Senate. Both bodies are elected by universal, secret, direct voting on a basis of proportional representation. The age limit for membership differs, being 25 for the deputies, and 40 for the Senate. The constitution declares that popular representatives may not be bound by instructions of their constituents. It further declares that no deputy may be the responsible editor of a periodical publication.

In constituting the executive power, the constituent assembly appears to have followed the model of the presidency of the French republic, but to have sought to give the position greater authority. The government is conducted by the president and by members of a council of ministers, the latter collectively and individually responsible to the Sejm, this responsibility being enforced by an ordinary majority. Ministers may be deputies, and in any case may have the right of participation in the meetings of the Sejm. The deputies have the right of interpellation of ministers, and "the Sejm may make the answer the subject of debate and vote."

The Presidency.—The president of the republic, like the French president, is elected for a term of 7 years by an absolute majority of the votes of the Senate and the Sejm sitting as the "National Assembly." He must exercise the executive power through ministers responsible to the Sejm and through officials subordinated to the ministers. The president of the council of ministers countersigns the appointments of the president of the republic, and every other governmental act of the president of the republic must be countersigned by a minister who assumes responsibility therefor. But the president may dissolve the Sejm with the consent of a three-fifths majority of the Senate. He appoints and may recall the president of the council of ministers, and may of his own discretion convoke the Sejm in extraordinary session.

The consent of the Sejm is necessary for a declaration of war, for the conclusion of peace, and for the ratification of treaties.

Local Self-Government.—Owing to more than a century of division, the three united parts of Poland present social and political differences. German Poland, centering at Posen, has a high degree of industrial development. Russian Poland, called "Congress Poland," and Austrian Poland are less developed economically and have different elements of population. Under these conditions, the advisability of local autonomy is recognized by the constitution, which declares that administration shall be decentralized and conducted through elected bodies with the rights of local self-government.

The entire state, however, is divided by statutes into areas, *voyevodzto*, which correspond to a French "department." The departments are subdivided into districts, *poviat*, and the districts into urban and rural communes. While these are all declared to be units of territorial self-government, intrusted to representative bodies, with them are joined representatives of the administrative authority of the state, who choose the chairmanship.

A project for a new constitution was published February 21, 1929. Under this plan the president would be elected as in the German Republic by the entire nation but with choice limited to two candidates, one proposed by the retiring president, the other by the parliament—the presidential term to be 7 years. This plan promises large powers to the president; he opens and dissolves parliament; appoints ministers and judges; concludes and ratifies treaties; vetoes legislation; and decides on the validity of parliamentary elections. The present Senate would be replaced by an upper chamber of 150 members, two-thirds elected and one-third appointed by the president; and the voting age would be raised from 21 to 24 years.

Poland since the World War.—Besides reuniting Poland, the Treaty of Versailles granted Poland a "corridor" to the Baltic Sea with economic rights in the port of Danzig. (See *Danzig.*) Warfare with Russia in 1920, concluded by the treaty of March 18, 1921, gained for Poland a strip of Russian territory east of the "ethnographic" frontier. The Lithuanian city of Vilna with surrounding territory was annexed to Poland March 24, 1922. This eastern frontier was recognized by the Allied Ambassadors Conference, March 14, 1923, which also recognized Poland's title to Eastern Galicia.

By the conditions of the Treaty of Versailles, a plebiscite was taken in Upper Silesia to determine the wishes of the inhabitants as to the incorporation of this territory into Poland or Germany. Following this plebiscite, the League of Nations, in October 1921, ceded a part of the region to Poland, but provided that for 15 years the disputed area was to remain under a mixed commission.

A dispute between Poland and Czechoslovakia over the Teschen district and over two other small mining areas was settled July 17, 1920, Teschen for the most part going to Czechoslovakia.

Following the World War, French influence in Poland was very strong, as is indicated not only by the type of the Polish constitution but also by a practical alliance between the two republics for joint action against Germany and Russia.

Portugal (*Republica Portuguesa*). Portugal, a recognized state since the 12th century, was a monarchy until 1910. Owing to a revolution in that year, the king fled from the country, and, on October 5, 1910, the republic was proclaimed under a provisional government. A new constitution was adopted August 20, 1911. Legislative power is vested in a Parliament of two chambers: a lower house called the National Council, of 164 members, elected for a 3-year term by direct vote of all literate male citizens over 21 years of age; and an upper chamber of 71 members, elected by the municipal councils and renewable by half every 3 years.

The executive authority is vested in the "president of the republic," who is elected by both chambers for 4 years and is ineligible for re-election. He must be at least 35 years of age. He appoints the ministers for foreign affairs, interior, finance, justice, colonies, war, marine, public works, education, labor, and agriculture, but these ministers are responsible to the Parliament. The president himself may not be present in the chambers during debate.

The judicial authority is in a system of courts, comprising a supreme court at Lisbon, two courts of appeal, *tribunales de relacao*, at Lisbon and at Oporto, and courts of first instance in 193 districts, *comarcas*, into which the republic is divided for judicial purposes.

Portuguese Colonization.—In the 15th century, Portugal led Europe in the field of exploration and colonization. Her fleets explored the coasts of Africa, established forts and depots of trade, and thence extended Portuguese colonial power to the Indian Ocean, Malaysia, China, and Formosa.

After a brief period of brilliant enterprise, decline set in; the Portuguese colonial possessions of today are mere vestiges of a once vast empire. They include the Cape Verde islands, Saint Thomas and Principe islands, Portuguese Guinea, Angola (Portuguese West Africa), and Mozambique (Portuguese East Africa); in India a few small settlements, the most important of which is Goa; in Melanesia a part of the island of Timor; and in South China the small colony of Macao.

In August 1914, a measure of autonomy was granted to all Portuguese colonies, each receiving the right to establish its own codes of law. Each colony was authorized to form its separate budget. This autonomy was further extended by a decree of May 10, 1919.

Since the peninsular campaigns of the Napoleonic wars, when England and Portugal were allied, British influence over Portugal has been strong. On March 9, 1916, Portugal entered the World War against Germany and supplied two divisions to the "western front" as well as co-operation in the conquest of German East Africa.

Rumania. The independence of Rumania from Turkey was proclaimed by an assembly of representatives of the people at Bucharest, May 26, 1877. The territory comprised the two principalities of Wallachia and Moldavia, which had established their union in 1861 under the title of Rumania. The country's independence was confirmed by the Congress of Berlin, 1878.

The constitution antedates the establishment of independence and was drafted by a constitutional assembly elected by universal suffrage in 1866. It was amended in 1879 and in 1884. The legislature consists of a Senate and a Chamber of Deputies. The Senate consists of 199 elected members and "life senators," of whom 25 are clerical and 4 are university representatives. The heir to the crown is also a member of the Senate. All Senators must be at least 40 years of age.

The Chamber of Deputies consists of 387 members elected for 4 years. Elections are partly direct and partly indirect by a system of 3 colleges, the first composed of citizens possessing different amounts of property and possessing other qualifications. Those who are unable to read and write vote indirectly, each 50 electors choosing a delegate, and the delegates voting with the direct electors of the colleges. Women are admitted to the suffrage. For the Senate, there are only 2 electoral colleges, divided between electors possessing different qualifications. A permanent commission of the legislative body studies and elaborates laws and administrative decrees.

The royal family is of a German house, Hohenzollern-Sigmaringen. The king has a suspensive veto over all laws. The executive authority is committed to a council of ministers.

The local government of Rumania is centralized and divided into districts, each of which has a prefect appointed by the central government, a receiver of taxes, and a civil tribunal.

The territory of the Dobrudja is not represented in the legislature. Since the foundation of Rumania, its territory has been practically doubled in size, through a succession of acquisitions. In 1878, it gained the northern Dobrudja, and, in 1913, southern Dobrudja by the Treaty of Bucharest at the close of the second Balkan war.

Through participation with the Allies against the Central Powers in the World War, Rumania established claims, recognized by the treaties of Saint Germaine and Trianon, to Bukowina and Transylvania, which were relinquished by Austria and Hungary. She also received a part of the district of Banat.

By an agreement of October 28, 1920, Great Britain, France, and Italy awarded also to Rumania the Russian territory of Bessarabia.

In the early part of 1920, the national councils in Transylvania, Bukowina, and Bessarabia were dissolved and these newly-acquired territories were subdivided into departments under prefects appointed by the government at Bucharest. While these new acquisitions have a large and predominant Rumanian population, their acquisition has been greatly resented by the countries from which they were taken. The government of soviet Russia has shown no disposition to accede to the cession granted by the three powers in 1920.

The language of Rumania, being of Latin derivation, differs entirely from that of the Slavic peoples who surround that country. The fact is ascribed to the long occupation of this Danubian frontier by forces of the ancient Roman Empire, from which the name "Rumania" is derived.

Russia. The vast territorial extent of Russia, under the old empire amounting to one-seventh of the land surface of the globe, combines with the strength of the Russian people, more numerous than any other white nation, to make Russia one of the greatest political factors in the world. The Russian stock excels in physical vitality and in intellectual vigor, but was held for centuries in an oppressed state, illiterate and without freedom of opportunity. Russia thus far has failed to secure a fortunate organization and to play a rôle beneficial to the world's peace.

Imperial Russia.—For centuries, and even within the present century, the government was despotic. The emperor, or czar, bore the title of "autocrat of all the Russias." Legislation was by imperial decree, or *ukaz*. The imperial power was administered by a great bureaucracy, established by Peter the Great and divided into a hierarchy of classes, at the top of which ministers and political competitors contended for the favor of the court and for position and power. Corruption and inefficiency, at times moderated by a strong-willed ruler or by the abilities of a talented minister, permeated the organization.

Abdication of Czar.—Constitutional progress was contending with bureaucracy and reaction when, in 1914, the conflict between Russian, German, and Austrian policies evoked the World War. The enormous losses of this struggle, the discrediting of the imperial power and of the bureaucracy, produced a revolution, and, on March 12, 1917, the czar abdicated. A provisional government was set up by the Duma, which strove to realize and carry forward the constitutional program inaugurated in 1905; to create "responsible government"; to invigorate the zemstvos and municipal organizations; to convoke a constituent assembly to revise the constitution; and to find within the limits of law a solution of the agrarian and social problems.

The provisional government was loyal to its allies, and sought to keep Russia in the war against the common enemy. Side by side with this constitutional movement, however, there rapidly developed a radical revolutionary movement which took advantage of the "soviets" or councils formed of soldiers within the army, and of industrial workers in the cities, to overthrow the provisional government and to seize the political power.

Bolshevik Revolution.—This revolution, which triumphed in November 1917, was affected by the extreme "left" wing of the Russian social democratic party, called the "Bolshevists." For the political ideas, tactics, and aims of this party, see *Bolshevism*. The results of the Bolshevik propaganda and seizure of power were the demoralization of the Russian armies, the overthrow of representative institutions,—constituent convention, Duma, zemstvos, etc.,—and the seizure of power everywhere by councils of propertyless workers and disbanded soldiers. In order to suppress all resistance from the reactionary and constitutional groups, terrorism was encouraged, through which thousands of civil and military leaders were destroyed.

In the early months of the communistic revolution, an extreme decentralization was advocated. Each fraction of the vast empire was by right of "self-determination" to enjoy practical independence or autonomy. Russia was to be a loose confederation of small, political communal units. The leaders of the Bolshevist movement, however, were neither anarchists nor apostles of decentralization. They believed in highly centralized authority in the hands of a limited autocratic dictatorship. This object was achieved during the year 1918 by the organization of the soviets in such a manner as to concentrate the political authority of the state in a "central executive committee"—by the limitation of suffrage to propertyless workers (proletariat), by the suppression of freedom of speech and political action, and by the annihilation of all opposing parties.

The loose, ineffective militia organization of the first months of the Bolshevik revolution was transformed into the "Red Army," which restored the organization and discipline of the former imperial force in its most draconian form. In order to detect and suppress opposition, the methods and personnel of the former imperial secret police were utilized under an inquisitorial organization, the "supreme revolutionary tribunal," popularly called the *tcheka*.

Soviet Constitution.—The "Fifth Congress of Soviets" at Moscow in July 1918 proclaimed the constitution of the new state under the title of the Russian Socialist Federated Soviet Republic. The constitution provides for local soviets or councils created in each locality or industrial unit. Each industrial unit has its own factory soviet, which sends delegates to the city soviet. The city soviet in turn sends delegates to the "All Russian Soviet Congress" on the basis of one representative to every 25,000 voters. The rural communities and villages are in like manner represented in the All Russian Congress through village soviets, district soviets, and provincial soviets respectively. The rural representation is on the basis of one to every 125,000 inhabitants. The All Russian Congress thus formed is the sovereign body and should be

convoked at least twice a year. Actual power resides in the central executive committee, which is chosen by the All Russian Congress, and in the council of people's commissars, but these bodies in turn are dominated by the "political bureau" of the Communist party.

Several nations of the former Russian Empire seceded and set up separate republics. Later, some of these federated with the Russian Socialist Federated Soviet Republic, and a constitution for this union was ratified in 1923. In 1926 there were six republics in the union: Russian Socialist Federated Soviet Republic, which, since the suppression of the Far Eastern Republic in 1922, includes all of Siberia; Ukrainian Socialist Soviet Republic; White Russian Socialist Soviet Republic; Transcaucasian Socialist Soviet Republic (including Azerbaijan, Georgia, and Armenia); Uzbekistan Socialist Soviet Republic; and Turkmenistan Socialist Soviet Republic. There are also several autonomous regions.

A Union Congress of Soviets is elected on the same basis as the All Russian Congress; but the actual power resides in the union central executive committee and the union council of people's commissars. The union central executive committee is composed of two houses: a federal council, elected by the Union Congress on the basis of population, and a council of nationalities, formed of five delegates from each autonomous republic and one from each autonomous region. A directive collegiate chairmanship, called the presidium, is chosen by the central executive committee.

The federalism proclaimed in the constitution of both the Union and the Russian Socialist Federated Soviet Republic hardly exists in reality, as all parts of the Union appear to be subjected to a centralized authority at Moscow.

Communism.—Contemporaneously with the organization of dictatorial power, the Bolsheviki undertook the establishment of communism in Russia. A series of amazing decrees abolished private property, made illegal all manner of trade, and effected a complete nationalization and requisition of property. An economic organization centering in "national controls" attempted to supervise all forms of production. A nation-wide system of accounting sought to assess to each factory, mine, or agricultural district a certain product to be produced by the workers and to be delivered to the state. Failure to make these deliveries was visited with severe penalties.

The Russian Bolshevists sought to create production by the substitution of compulsion for self-interest. Property rights, which have been the basis of human economic activity from the beginning of civilization, were annulled. The consequences of a plan so opposed to fundamental human nature were immediate. Production declined, industry became disorganized, communications failed, all classes of population were subjected to dire want, and in 1921 appalling famine visited the Volga basin and other parts of Russia.

New Economic Policy.—Faced by the failure of production, by the persistence of contraband barter and traffic (in spite of the severest penalties), and by the general economic destruction of the country, the Bolshevists in 1920 were compelled to modify their communistic program and to authorize private trade and private possession. The accumulations of capital having been exhausted and destroyed, the Bolshevists were compelled to plead for the aid of foreign capital, and they sought to excite an interest in its introduction by the offer of vast national monopolistic concessions.

Foreign Relations.—The foreign policy of Soviet Russia has had one element of genuine strength,—it has espoused the cause of national integrity and the repulsion of intervention by foreign powers. The extreme nationalist feeling of the Russian nation, based on the old religious feeling of a "Holy Russia," responded to this policy, sustained the red armies in engagements against foreign-aided counter-revolutionary efforts, and contributed greatly to the retention of dictatorial power by the Bolshevists.

At the beginning of the Soviet régime, the Bolshevists practically declared war upon all foreign governments adhering to the capitalistic system. As an instrument of propaganda, the "Third International" was established at Moscow in the spring of 1919. Propagandists of Bolshevism were sent abroad through the countries of Europe, America, and Asia, and vast sums were expended in the effort to excite revolutions and to establish communism throughout the world. The Bolshevist leaders appear early to have appreciated that a communistic Russia could not exist in competition with foreign states organized through the higher efficiency and freedom of the capitalist system. The permanence of Russian communism was dependent upon world revolution. These efforts occasioned sporadic outbreaks in several countries, but, by the beginning of 1921, they had failed everywhere to fulfill the expectations of Moscow. Diplomatic relations were resumed with most of the leading nations, but have not, in all cases, been sustained.

Santo Domingo (*República Domincana*). The Dominican Republic occupies the eastern two-thirds of the West Indian island of Haiti, or, as it was called by the Spaniards, Española—"Little Spain."

This island, discovered by Columbus in 1492, was the first seat of empire of Spain in the New World. That part of the island occupied by the Dominican Republic has remained Spanish in language and in culture; the western end of the island, however, was occupied about 1630 by French and English buccaneers, and, by the Treaty of Ryswick, 1697, was ceded to France. For the subsequent history of this colony, see *Haiti*.

In 1795, France acquired title to the entire island. In 1806, Spain established herself again in possession of the eastern end of the island, and Santo Domingo continued a Spanish possession until 1821, when, by the authority and the aid of Colombia, a republic was proclaimed. In the following year, the dictator of Haiti invaded Santo Domingo, annexed it, and ruled the entire island until 1843. In 1844, the Spanish part of the island again became independent and the present Dominican Republic was founded. The constitution of 1844, reformed in 1924, establishes a president as the chief executive, elected for a term of 6 years, and a National Congress, comprising a Senate of 12 members and a Chamber of Deputies of 32, elected for 6 and 4 years, respectively, by limited suffrage by electors of the 12 provinces into which the republic is divided.

During the history of the republic as an independent state, its political life was much disturbed and a large foreign debt accumulated. To avoid threatened intervention by European powers for the collection of this debt, President Roosevelt came to the assistance of the government in 1905, and, on February 8, 1907, a treaty with the United States was ratified, which placed the foreign indebtedness and the customs under American administration. The president of the United States appointed a receiver-general of Dominican customs. The debts were refunded by the issue of a new loan of $20,000,000. Under this administration, the republic received an assured income and the funded debt was rapidly reduced; but continuing political disorders compelled further American intervention, the establishment in 1916 of a military government by the United States, and in 1918 the issue of a new loan of more than $4,000,000 secured by a second lien on the customs revenue.

Following the adoption of the new constitution of 1924, the American military intervention was terminated, but a new American-Dominican convention of that year continues the financial protectorate, including customs collection and administration of the public debt.

Siam. A monarchy of southeastern Asia. It is notable as being the sole remaining independent "native" state within the tropical zone. The government is really an unlimited autocracy, but the power has been exercised in an enlightened manner, so that genuine and steady progress has taken place in the development of the state and even in the direction of representative government.

Without subjecting the kingdom to foreign control, foreign advisers have been advantageously engaged: an American adviser in foreign affairs, a British judicial adviser, a French legislative adviser, and legal advisers of other foreign nationalities. The state *gendarmerie* is under Danish instructors.

By royal decree of January 10, 1895, a legislative council was created. It consists of ministers of state and other appointees of the king, with a total membership of 40. Its functions are the preparation of laws and decrees for royal enactment, but it is provided that, in the case of the disability of the sovereign, the council alone may promulgate laws.

Spain (*España*). The kingdom of Spain was formed, in the latter part of the 15th century, by the union of a number of monarchies and by conquest of the southern part of the peninsula from the Moors. Under Charles V and Philip II, the ancient rights of these kingdoms and certain representative institutions which they possessed were suppressed and the basis for absolute monarchy was laid.

The modern constitutional history of Spain begins in 1808; it was followed by a period of civil conflict between liberal and reactionary forces, within which period Spain for a brief time, 1873-74, was a republic. The Bourbon family, under Alfonso XII, was restored at the beginning of 1875 and a constituent Cortes, which convened in 1876, framed the constitution now in force.

Constitution.—This constitution declares that Spain is a constitutional monarchy, the executive power being vested in the king, and the legislative in the Cortes with the king. The monarchy is inviolable, but ministers are responsible and must countersign all royal decrees. A contract of marriage by the king must have the approval of the Cortes. Hereditary succession is regulated by the constitution, and, in case of the extinction of the line, the monarch will be elected by the nation.

While certain executive powers inhere in the monarch, or rather in his ministers, certain other powers may be exercised only when authorized by law; namely, alienation, cession or exchange of Spanish territory, incorporation of new territory, admission of foreign troops into the kingdom, ratification of treaties, and abdication of the crown in favor of the heir presumptive.

The council of ministers is appointed by the monarch. Ministers may be senators or deputies and may participate in the proceedings of both chambers, voting only in that to which they belong.

The legislative power was vested in the Cortes, consisting of a Senate and a Congress of Deputies. Senators are of three classes: (1) Members in their own right, who include royal princes, "grandees of Spain," captains-general, admirals, the patriarch of the Indies, the primate of Spain, archbishops, and presidents of the highest councils of government; (2) life senators nominated by the crown from 12 limited classes of eligibles (these two groups are not to exceed 180); (3) elective senators, also numbering 180, who are elected by public corporations,—including provincial and communal governments, the church, universities, academies, etc.,—and by the largest taxpayers. Deputies were chosen for 5-year terms by male electors 25 years of age. Voting was made compulsory in 1907.

In 1923, the weakness of parliamentary government and Spanish losses, due to mismanagement of war in Morocco, led to a military dictatorship under General Primo de Rivera, who received the king's recognition. The Cortes and the provincial and municipal councils were dissolved, and the Constitution of 1876 became juridically extinct. Reconstructive measures followed: a municipal statute of March 8, 1924, giving corporate representation to the *ayuntamientos;* a provincial statute of March 20, 1925, whereby the provinces were authorized to combine for developmental undertaking into regional confederations. December 3, 1925, the military directorate became a civil dictatorship; former ministries were reconstituted and filled by members of the dictator's party, the *Union Patriotica.*

September 12, 1927, a royal decree summoned a consultative national assembly, chosen exclusively on the principle of corporate group-interest representation. It is composed of high state officials, representatives of municipal councils, provinces, the Union Patriotica, and of trade, agriculture, and industry. *Ex officio* members include bishops, captains-general, representatives of courts, governors of banks. The membership is from 375 to 400, 15 of whom are women. This body proceeded to undertake the drastic reform of the Constitution of 1876.

Spain is divided into 49 provinces, to each of which is accorded a considerable degree of local autonomy. Following a general dismissal from office of municipal councils in 1923, a royal decree of May 8, 1924, authorized municipalities to determine their own administrations.

There is a supreme tribunal, which includes an administrative court; subordinate to the supreme tribunal are 15 appeal courts, *audiencias territoriales,* 34 provincial high courts, courts of first instance, and municipal courts.

External Relations.—Of Spain's once vast empire, there remain only small vestiges, all in Africa. The most important are the Rio de Oro, Spanish Guinea, and the island of Fernando Po. Spain has a protectorate over a part of the Mediterranean coast of Morocco. The Canary islands, also a Spanish possession, are treated administratively as a part of Spain.

Sweden. For the union of Sweden and Norway between 1814 and 1905, see *Norway.*

Sweden has long been the seat of a constitutional system. The national representative legislative *Riksdag* came into existence in the 16th century. Between 1680 and 1718, however, during the period of Sweden's prominence as a military power, the monarch became well-nigh absolute. This was followed by a period of legislative dominance.

The present constitution was adopted in 1809. The amending process is simple. The passage of an amendment by the Riksdag in two successive sessions, with the approval of the monarch, is sufficient to enact. Minor changes have been frequent, the last in 1918, in 1919, and in 1921.

The king has certain independent powers. He is commander in chief of the land and naval forces. In foreign affairs, including the declaration of war and the conclusion of peace, he must advise with ministers, but is responsible for the decision. The ministers, while nominally responsible to the Riksdag for all acts of government, have also a real responsibility to the king, who has a large influence in affairs of state.

Democratic Changes.—Since the World War, the general progress in democracy has affected the Swedish constitutional system. Ministers have resigned as the result of their disagreement with the Riksdag, and, by a constitutional change, a foreign affairs committee of the Riksdag, with which the government consults on international affairs, is elected each year. The Riksdag is bicameral: the first chamber consists of 150 members elected for an 8-year term by the provincial assemblies; a second chamber of 230 members is elected for 4 years by direct vote of Swedish citizens. The suffrage extends to all citizens 23 years of age, not disqualified. Among disqualifications is failure to pay taxes for 3 years in succession. Suffrage in municipal elections

was extended to women in 1909 and full parliamentary suffrage in 1919.

The kingdom is divided into 25 administrative provinces or counties, *län*, in which the administration is confided to a prefect, or *landshofding*, appointed by the crown; but each province has a legislative assembly, *landsthing*, whose members are elected directly by voters on the principle of proportional representation. The suffrage in provincial elections is limited to those 27 years of age and, until 1918, was graduated in proportion to income, but, by constitutional changes of 1918, 1919, and 1921, the suffrage was democratized. Absentee voting is permitted; a husband may carry his wife's sealed ballot to the polls, and a wife, that of her husband. Soldiers, seamen, fishermen, and employees of railroads, ports, customs, and pilot services may vote by post. There is an optional referendum or plebiscite which may be ordered on important matters if the government and the Riksdag concur in believing it advisable.

The supreme court of Sweden, *högsta domstolen*, has a constitutional status, while courts of appeal and district courts of first instance are organized by laws. The supreme court is authorized to render an interpretation of the law, if requested by the government. The important constitutional position of the king is again indicated by his right to attend the sessions of the supreme court and to cast two votes in all decisions. If the question is one of interpretation, his two votes may be recorded in his absence.

The society of Sweden is appreciably less democratic than that of Norway, and the ancient nobility, while no longer possessing privileges or political rights, continues to have a recognized social position.

In the 17th century, Sweden was a maritime and colonial power and acquired colonies in the New World, including an early settlement in Delaware. Several small possessions still remain.

For the award of the Aland islands to Finland in 1921, see *Finland*.

Switzerland (The Swiss Confederation). Switzerland is the oldest republic of Europe and the first European state to adopt a federal form of government adapted from the American plan. This country is also the originator of several widely adopted democratic institutions, and is an example of how peoples of different race (French, German, and Italian), of different speech, and of different religious belief may form a completely harmonized nation. The unifying forces seem to have been the influence of an Alpine habitat and a common devotion to principles of freedom,—what has been nobly expressed as "the fusing power of free institutions."

The country is composed of states or "cantons." Alliances and unions between certain of these small states date from the 13th century; but it was not until 1848 that the existing union, under a true federal form of government, was achieved. This constitution was revised in 1874 and was added to by several later amendments. The central government is complete and adequate, and certain of its powers are exercised directly upon the people and upon the territory of the whole country. The cantons, however, are protected in free exercise of their local jurisdictions by the constitution. Sovereignty undoubtedly resides in the whole nation; the union is thus a federation and not a confederacy, as its official title might imply. In some respects, the Federal government's powers are more extensive than those of the United States, extending to operation of railroads, telegraph and telephone, as well as to customs, post offices, coinage, etc.

The national legislative power is conferred on the "Federal Assembly," or *Bundesversammlung*, *assemblee fédérale*, which consists of two chambers. The upper house, like the American Senate, represents the separate states and is called the "Council of States," or *Standerat*, *conseil des états*; it is composed of 44 members, 2 from each canton. The mode of their election, their term of service, and their remuneration are left to the cantons. The more popular house, or "National Council," *Nationalrat*, *conseil national*, consists of 198 representatives of the Swiss people, directly elected. Members of the National Council are paid from the federal treasury. Their term is 3 years. Every male Swiss 20 years of age is entitled to vote unless excluded by legislation of his canton.

Referendum and Initiative.—Switzerland has made fuller experiment of direct or popular legislation than has any other country. There is a national "referendum" of federal legislation, (a) obligatory for all amendments to the constitution and (b) optional upon petition of 30,000 voters or upon the demand of 8 cantons on more important acts of legislation. Perhaps the most striking instance of the exercise of this right was the proposal to enter the League of Nations, which was submitted to the voters in May 1920. Admission was approved by a popular vote of 414,000 to 322,000. An initiative procedure for amendment of the constitution on petition of 50,000 voters was adopted in 1891.

Commission Executive.—Strong democratic prejudices prevented the makers of the Swiss constitution from intrusting the executive power to a single person like the American president. In place of a presidency or a ministry, there exists a commission of 7 members, who are chosen by the Federal Assembly for a 3-year term, and are usually re-elected if competent. This commission is called the "federal council," or *Bundesrat*, *conseil federale*. It is responsible to the Assembly for its conduct of affairs, and its dispositions may be overruled. Besides administering, it prepares legislative acts to be submitted to the Assembly. While each member is charged with the administration of a separate department,—political (foreign affairs), interior, justice and police, military, finance and customs, national economy, and posts and railways,—responsibility is collegiate and matters of importance are considered "in commission."

Each year the National Assembly designates one member of the federal council to serve as "Swiss president." He becomes thereby the representative of the state at home and abroad and oversees the conduct of the business of the executive commission. He is ineligible for re-election for a consecutive term. A vice president is elected at the same time as the president and, by custom, succeeds to the chief office.

While this institution of "commission executive" might be inapplicable to republics differently situated, its practice has commended itself to the Swiss nation and has found imitation in the constitutions of German states enacted since the World War.

There is a federal court, *Bundesgericht*. The judges and their alternates are appointed for a 6-year term by the Assembly. This court decides cases of conflict of jurisdiction between federal and cantonal authorities, cases between cantons, and private complaints based on violation of constitutional or treaty rights. It also has jurisdiction in certain cases between the federation and individuals.

Cantonal Government.—The 22 cantons differ interestingly in the form in which their democratic character is politically exhibited. Five are small mountain states and are genuine democracies. There is no representative legislature, but laws are enacted by a popular assembly, or *Landesgemeinde*, even meeting by custom in the open field.

The other cantons have local unicameral legislatures usually called the "grand council" or the "cantonal council." All but one of these cantons (Freiburg) has either the obligatory or optional referendum. In all cantons the executive power is intrusted to a commission of 5 or 7 members known as the "administrative council" or the "small council." At the head of each commission is a president, *Landamman*, and a vice president, *Statthalter*.

The larger cantons are divided into administrative districts or are organized in communes. Each canton has its own judicial system, comprising justices of the peace, district courts, and a superior court. There may be also special "courts of commerce" and "industrial courts" on which sit representatives of employers and workmen. Within the jurisdiction of the cantons are such matters as poor relief, public health, labor protection, agricultural improvement, primary schools, maintenance of religious worship, citizenship, and naturalization. Proportional representation is established in several of the larger cantons.

Switzerland is a country of guaranteed neutrality by action of the "great powers" in 1815, and neutrality as well as independence is enjoined by the Swiss constitution. This status does not limit the republic in taking measures to safeguard its security, and the Swiss, always a people of high military spirit, are completely organized in a citizen army. Military training is compulsory, beginning in schools and continuing through the most vigorous years of manhood. At the age of 20, all young men receive a period of from 65 to 90 days of intensive training, and for the 12 succeeding years remain in the "line" with repeated brief periods of training and annual inspection. Thence they pass into the reserve, or *Landwehr*, and, after 8 years, into the *Landsturm*. Rifle practice is a national sport.

Switzerland has for centuries extended asylum to political and religious exiles, and is the home of a number of international associations, including the Red Cross Society and the Postal Union. The seat of the League of Nations has been placed at Geneva.

Syria. A former province of the Turkish Empire situated north of Palestine. It was occupied by the Allies in the last months of the World War. By the Paris Conference, Syria was recognized as one of those communities of the Turkish Empire which had reached a stage of development where it could be "provisionally recognized as an independent nation" subject to the mandate of a protecting state.

France has long professed an interest in Syria and by one of the "secret treaties" accomplished during the World War, the "Sykes-Picot Treaty," had secured an agreement for its annexation. A general Syrian congress held at Damascus July 2, 1919, proclaimed a program of complete political independence, requested the assistance of the United States in financial and technical matters for 20 years, opposed the separation of Lebanon and Palestine from Syria, and demanded the annulment of the secret agreements. In March 1920, at another Damascus conference, the independence of Syria was proclaimed, and the Arab prince, Emir Feisal, was offered the kingship. France succeeded in suppressing this independent movement and at the Supreme Council conference of San Remo, April 25, 1920, was given a mandate over Syria. The territories of Damascus and Aleppo were united to form the Syrian republic. A provisional government of this state was organized in February 1928. Alaouite, Great Lebanon, and Djebel Druse are autonomous territories.

The Anglo-French agreement in 1920 delimited the eastern and southern boundaries toward Mesopotamia and Palestine. The Franco-Turkish treaty of Feb. 18, 1926, provided for arbitration of disputes and the protection of the border between Turkey and Syria.

Turkey. The fortunes of the World War, in which Turkey allied herself with the Central Powers, brought the final reductions of the Ottoman empire,—the loss of Arabia, Syria, and Palestine, and the almost complete confinement of the Turkish state to Asia Minor.

By the Treaty of Sèvres, acceded to by the Turkish government at Constantinople, but denounced by the nationalist government at Angora, Constantinople was left nominally in Turkish possession, eastern and western Thrace were assured to Greece, the Dardanelles were placed under Allied control to be kept open to the free passage of shipping and to the navies of the world.

Most islands of the Ægean were assigned to Greece, though Italy secured possession of Rhodes. Turkey was not only limited to Anatolia, but her possession of Smyrna and the surrounding region of the Ionian coast was threatened by Greek occupation.

Nationalist Movement.—These losses, which were beyond those foreshadowed by the armistice of Mudros, October 30, 1918, aroused a powerful nationalist Turkish movement, headed by General Mustapha Kemal Pasha. During 1919 and 1920, a Turkish government with a capital at Angora was created to resist the partitioning of Turkey "within the armistice limits." This government repudiated the Turkish authority at Constantinople, which had submitted to the Allies. War followed, the Allies intrusting Greece with the task of reducing the Turkish nationalists.

In December 1920, the government of Venizelos was overthrown and King Constantine was recalled to Greece. The conference of the Allied premiers at London, February 21, 1921, offered new terms to Turkey. These were rejected by the Greek government, and war was resumed. The outcome of this war in 1922 was disastrous to Greece and resulted in the destruction of the Greek army in Asia Minor and in the Turkish military occupation of Anatolia up to the straits of the Dardanelles and the Bosporus.

At the opening of 1923, a conference at Lausanne, Switzerland, followed, which resulted in treaties whereby Turkey secured recognition of rights to the Anatolian coast, the city of Constantinople and adjacent territory, and gained freedom from the "capitulations" which gave certain foreign nations extraterritorial rights for their citizens in Turkey.

A new constitution was adopted April 23, 1924. Turkey was declared a republic. The sovereign power is vested in the Grand National Assembly, a single chamber elected for 4 years by all male citizens over 18 years of age. The president of the republic, elected by the Assembly for its own term, may veto a measure, but the Assembly may by majority vote override the veto. A cabinet known as the Council of Executive Commissioners is appointed by the president but is responsible to the Assembly. The latter appoints a council of state, which decides on administrative measures and gives advice on certain matters.

A three-year guarantee pact was signed with Russia on December 17, 1925.

Uruguay. The republic of Uruguay was formed from a part of the territory of the viceroyalty of La Plata, which territory was in controversy between Spain and Portugal for nearly two centuries. By the Treaty of San Ildefonso, October 1, 1777, it was finally ceded to Spain. On May 23, 1810, upon the declaration of independence, promulgated at Buenos Aires, Uruguay was declared a part of the united provinces of La Plata. This was followed by a revival of the Brazilian claims to the territory and a war resulted between Brazil and Argentina. It was ended by the treaty of August 27, 1828, both countries recognizing the independence of Uruguay.

The first constitution, adopted September 10, 1829, and promulgated July 18, 1830, provided a centralized form of republican government, which was replaced March 1, 1919, by the promulgation of a constitution adopted in 1918. This constitution has novel features. Although the separation of powers between the usual three departments is decreed, the executive power is divided. In addition to the president, there is a national council of administration of 9 members. Both president and members of the council are elected by popular vote. The president is elected for 4 years and is ineligible for re-election until after a period of 8 years; the members of the council are chosen for 6 years with the provision that one-third shall be renewed every 2 years. In both cases the Senate is the judge in disputed elections.

In the case of the disability or absence of the president, his duties are performed by the councilor receiving the largest popular vote. The duties of the president are carefully delimited under 24 heads. He represents the state, preserves order, commands the forces of the republic on land and sea (but, in person, only with the consent of the legislative power); appoints and removes the ministers of foreign relations, war and navy, interior, and their subordinates; receives foreign diplomatic representatives, and issues exequaturs to foreign consuls; declares war in response to a resolution of the General Assembly; and concludes treaties after consultation with the council of administration.

Council of Administration.—All executive powers not specifically reserved to the president are bestowed upon the council of administration. It is given specific control of public instruction, public works, labor, industry, the treasury, charity, and public health. It reviews the annual budget as framed by the president, and submits it to the General Assembly.

Legislature.—The legislative power is conferred upon the General Assembly, consisting of a Senate and a Chamber of Representatives. Senators are elected by electoral colleges, one in each of the 19 departments into which the state is divided. The term is 6 years, one-third being renewed every 2 years. The Senate tries impeachments. The representatives are 124 in number, and are elected for 3 years by direct vote, in the proportion of one to every 12,000 adult male inhabitants who can read and write. The Chamber initiates all revenue laws and may vote impeachment. The General Assembly, and not the courts, interprets the constitution. It sits in annual session from February 15 to June 15 and elects a "permanent committee" of 2 senators and 5 representatives to oversee the administration of the law during the interval between sessions.

Judiciary.—The judicial power is vested in a high court of justice of 5 judges, elected by the General Assembly; the president of the court is chosen annually by the other members. There are departmental courts in the departments and justices of the peace in the smaller judicial districts. The death penalty was abolished in 1907.

Franchise is bestowed upon all qualified male citizens 18 years of age and since 1921 upon women as well. Secret balloting was introduced by a law of 1919. Autonomous local government is granted to the departments, each of which is governed by a council of from 3 to 7 members, elected for 3 years by direct popular vote. Departments impose and collect their own taxes, control their expenditures, and administer their own public service.

For Uruguay boundary disputes, see *Brazil*, *Argentina*, and *Paraguay*.

In the World War, Uruguay broke off diplomatic relations with Germany upon the torpedoing of a Uruguayan ship on October 17, 1917. Although no military or naval aid was furnished the Allies, other means of assistance were offered.

Vatican City. For a period of nearly 1000 years, the papacy or Holy See held temporal possessions, over which it exercised despotic political control. The process of unification of the Kingdom of Italy gradually absorbed these territories including Rome. The pope retired into the Vatican Palace, whence no pope ever issued down to 1929. A unilateral settlement with compensation made by the Kingdom of Italy was declined by the pope and his successors. By an accord of February 1929 the Italian government recognized the papacy as an independent state. The pope, who again becomes a political monarch, is chosen on the death of his predecessor, by the Sacred College of Cardinals, not more than 70 in number. Two-thirds majority is necessary for election.

Venezuela. Venezuela, together with the territory comprising the republics of Colombia and Ecuador, was freed from Spain by the revolutionary operations of Simon Bolivar, "the liberator," in 1821. In 1830, Venezuela seceded from the republic of Colombia and formed a separate republic to include the territory of the former "captaincy-general" of Venezuela.

The present constitution was adopted July 1, 1925, and is the culmination of varied experiences with fundamental laws. The executive authority is vested in a president chosen by the Congress in a secret election, for a term of 7 years, and at present without restriction as to re-election. The president must be a Venezuelan by birth and over 30 years of age. In the event of temporarily vacating the executive authority, he names a cabinet officer to act for him. The president has a cabinet of 7 ministers, who head the departments of the interior, foreign affairs, finance, war and marine, promotion ("fomento"), public works, and public instruction. The cabinet is appointed and is removable by the president, and is responsible to him only.

Among the extensive powers granted to the president is authority to arrest, expel, or exclude pernicious foreigners, and to change the seat of the Federal government.

Legislature.—The legislative authority is vested in a Congress comprised of a Senate and a Chamber of Deputies. The Senate has 40 members, 2 from each state, elected by the state legislative assemblies for 3 years. The senators must be Venezuelans by birth and over 30 years of age. The deputies are elected for 3 years by direct vote, in the proportion of one for every 35,000 inhabitants, with one more for an excess of 15,000. Each state has at least one deputy. The territories elect deputies when they have the minimum population fixed by law. Deputies must be Venezuelans by birth and over 21 years of age. Congress meets annually on April 19 for a session of 70 days.

Judiciary.—Judicial authority is vested in a supreme court, *corte federal y de casación*, and in other tribunals established by law. Congress elects the 7 judges of the supreme court for a term of 7 years. This court takes cognizance of accusations against the president and other high officials. It has jurisdiction over claims against the nation, over cases relating to foreign agents in Venezuela, or over cases arising out of contracts made by the president or involving conflicts between laws, state or federal.

The Federal Union.—Venezuela is composed of 20 states, 2 territories, and a federal district. They are autonomous, politically equal, and retain all sovereign powers not delegated to the Federal government by the constitution. Each state has a president, a general secretary, and a legislative assembly chosen in accordance with its constitution. The federal district and the territories are administered by the president of the republic, through appointed governors. The constitution provides that the right of suffrage is conferred on all male citizens 21 years of age or over.

For the settlement of the boundary dispute with Brazil, see *Brazil*. By a treaty of 1881, Venezuela and Colombia submitted their disputed boundary to the arbitration of the king of Spain. This settlement failed, and war was almost precipitated by Colombian occupation of disputed territory. By a treaty negotiated in 1916 and ratified July 1917, the two countries submitted the boundary to the Swiss federal council for arbitration and for demarcation by Swiss engineers. The Swiss government accepted this arbitral responsibility May 10, 1921, and rendered a decision early in 1922.

A long boundary dispute with England over the frontier between Venezuela and Guiana resulted in Venezuela's appeal to the United States. President Cleveland's affirmation in 1895 of the bearing of the Monroe Doctrine upon the question secured an agreement by arbitration. By this award, England received the major portion of the disputed territory; but Venezuela was given clear title to a valuable region at the mouth of the Orinoco.

POLITICAL TERMS AND INSTITUTIONS

THE study of the governments of the world today is facilitated by the scientific definition of political ideas and by increasingly accurate descriptions of forms of political organization. An acquaintance with these general conceptions and facts is necessary to comprehension of any nation's history and government. This dictionary presents, with brief and authoritative treatment, a large number of the most important of such institutions and terms. They are discussed in respect to their general forms and meanings and also with regard to particular developments and usages in different countries. Significant features of American political life are given especial attention.

This section therefore has a threefold value. It supplies a convenient reference dictionary of political terms. Further, it supplements the articles upon the history and the governments of the world, adding more complete treatment of special topics than could be given in those articles. Finally, it furnishes a valuable means for comparative study of governments with respect to particular political ideas and practices, illuminating the problems as well as the progress of popular government.

Absolutism. A form of government in which the supreme power of the state is vested in a person who rules unlimited by constitutional laws.

Admiralty (*ăd'mĭ-răl-tĭ*). The branch of the law which treats of civil and criminal cases arising on the high seas. In the United States, admiralty jurisdiction is vested by the Constitution in Federal courts.

In England, admiralty denotes that department of the government which has jurisdiction over the naval forces of the empire and over all merchant vessels flying the British flag.

Air Zone. Air space above the territory and waters of belligerents. In international law, air zone is regarded as a field for military combat.

Alderman. A member of a municipal body, either popularly elected or "co-opted," that is, added by choice of the municipal council.

In Great Britain, aldermen often possess minor judicial authority as well as other powers.

Allegiance. Obligation of obedience and loyalty on the part of a citizen toward his country. An alien is under obligation of temporary and partial allegiance to a country in which he is a resident, and thereby is bound to obey its laws and answer the summons of its duly constituted authorities.

The term is also used broadly to designate the relation of loyalty and support which one has assumed toward any institution, party, movement, or leader.

Ambassador. See *Diplomatic Representation.*

Amnesty (*ăm'nĕs-tĭ*). An act of government granting exemption from criminal prosecution and punishment. It often extends to a class or group. It differs from pardon in being granted before rather than after conviction.

Anarchism. A social doctrine which advocates the abolition of all governmental authority, to the end that the individual may be free to realize his desires and aspirations without legal restraint.

Arbitration. A method of settling disputes between nations by referring the matters in question to an arbitral authority for decision. Sometimes this authority is an individual, as the head of a state; at other times it is a board, a court, or a special arbitral tribunal. International practice of arbitration has been much advocated in America.

Among important arbitrations to which the United States has been a party are the Geneva Award, 1872, which settled American claims upon Great Britain; the Venezuela Boundary Dispute of 1897; and the Bering Sea Arbitration of 1893. The United States has treaties providing for arbitration with many states. For the history of important arbitrations settling the frontiers of South American republics, see *Brazil*, page 1431c; *Peru*, page 1459b. See also *Hague Tribunal*, page 1477.

Arbitration of Industrial Disputes. Continued struggle between employers and employees in the development of modern industry has occasioned repeated resort to arbitration to settle labor disputes and to terminate deadlocks, injurious not only to those concerned but to the public as well. Many states have established public boards of industrial arbitration without providing for compulsory resort to them.

In New Zealand, and later in New South Wales and in West Australia, laws have been passed compelling submission of industrial disputes to arbitration and providing state arbitral machinery.

In the state of Kansas, a compulsory arbitration act was passed in 1920, and a court of arbitration was created. This legislation was upheld by the state courts; but, in June 1923, the United States supreme court decided that the power accorded this court to fix wages is in conflict with the 14th amendment and is therefore unconstitutional.

Aristocracy. A term used by the Greek philosopher, Aristotle, to denote government by the best qualified. He recognized the tendency of such a form to degenerate into government by the corrupt or the wealthy, to which debased type he applied the name "oligarchy." Aristotle contrasted aristocracy with "monarchy" on the one hand and with "democracy" on the other, and since his time these have remained fundamental political conceptions.

The term "aristocracy" is applied also to the nobility and gentry of states with monarchical institutions, and so, by analogy, to those people who assume superior qualities or social standing.

Army of the United States. See *National Defense.*

Attainder. The extinction, by an act of a legislative body, of all civil rights of a person, and his sentence to death, without hearing or other judicial process. The Parliament of England passed many such acts, particularly during the 15th and 16th centuries. Bills of attainder are expressly prohibited by the Constitution of the United States and by most of the state constitutions.

Bills of "pains and penalties" of the British Parliament resembled bills of attainder, but they imposed lesser punishment than death.

Autocracy. A form of government in which political power is absolute and unlimited. This form of monarchy reached its greatest pretensions in Europe in the 18th century. It generally disappeared in the 19th century. Among the great European powers, Russia was the last to adhere to it, and the title of "Autocrat of all the Russias" was held by the czar until the abdication of 1917.

Ballot. See *Voting.*

Belligerency (*bĕ-lĭj'ĕr-ĕn-sĭ*). The status whereby regularly organized fighting forces become entitled to the protection of the laws and usages of war. The Hague Convention of 1899, which codified international rules of warfare, provided that troops, to be entitled to these privileges, must be part of the military organization of a recognized "belligerent"; must be commanded by properly commissioned officers; must wear distinctive uniform; must carry arms openly and not be guilty themselves of conduct contrary to the usages of war among civilized nations. Among recognized rights of belligerents are: the right of surrender and of capture rather than death upon the field; trial by court-martial before execution, and humane treatment as prisoners of war.

Belligerency is an official recognition withheld from mere rebels or insurgents, who may be treated without regard to the laws and usages of nations.

Bicameral (*bī-kăm'ĕr-ăl*) **System.** That form of legislature which consists of two separate chambers or houses, the concurrence of both ordinarily being essential to the enactment of legislation. The bicameral system is found in the United States in both Federal and state governments, and also in most countries of Europe in the national legislature. Jugoslavia and Bulgaria have single chamber national legislatures. In state, provincial, and local governments, single chambers are now the rule, as in the German states, in Mexico, and in the Dominion of Canada.

The bicameral system is traced to the influence of the English bicameral Parliament, which, for reasons that were accidental rather than deliberate, early organized into a House of Lords and a House of Commons.

In the American state, the bicameral Congress harmonized the conflicting purposes of the framers of the Constitution, the Senate representing the states, with equal representation, and the House of Representatives, the nation, on the basis of population.

Elsewhere than in federal government, the two-chamber legislature is usually justified merely as a check upon hasty, ill-considered legislation.

Bill of Rights. An English act of Parliament of 1689, entitled "an act declaring the rights and liberties of the subject, and settling the succession to the crown." After reciting the abdication of James II and the vacancy of the crown, the act declares the ancient rights and liberties of Englishmen: (1) that it is illegal for the king to attempt to suspend laws without the consent of Parliament; (2) that levies of taxes without grant of Parliament are illegal;

(3) that subjects have the right freely to petition the king; (4) that the raising or keeping of a standing army within the kingdom in time of peace, unless it be with the consent of Parliament, is against the law; (5) that Protestant subjects may bear arms suitable for their defense and as allowed by law; (6) that the elections of members of Parliament shall be free; (7) that freedom of speech and debate or of proceedings in Parliament shall not be impeached or questioned outside of Parliament; (8) that excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted; (9) that a person accused of crime shall be entitled to a trial by impartial jurors; (10) that fines and forfeitures imposed without trial and conviction are illegal; and (11) that Parliament shall be frequently convened.

These so-called "rights of Englishmen" expressed in definite form those limitations upon the royal prerogative to which Englishmen believed they were entitled under the customs and common law of the realm. Next to Magna Charta, the Bill of Rights of 1689 is regarded as the most important constitutional document in English history. The accession of William and Mary was made dependent upon its recognition. From this fundamental statement, similar bills have been framed in the course of constitutional development in many countries.

The American colonists held to the principle of these limitations upon the power of the crown, and their revolution rested in part upon the alleged violation of them. The first ten amendments of the Federal Constitution constitute the so-called "American bill of rights," several repeating the language of the English law. (See *Constitution of the United States.*) Similar constitutional guarantees have been incorporated in the constitutions of every American state.

In 1789, the French National Assembly adopted the famous "Declaration of the Rights of Man and of the Citizen" which, more theoretical than its English predecessor, has enjoyed scarcely less influence in the progress of revolution against autocratic government.

Bloc. A French word, meaning "mass" or "group," somewhat recently introduced into political parlance, to mean an association of legislative members or of political workers of different parties, formed to support a certain measure or ministry.

One of the most famous of such combinations was the so-called "Blue-Black bloc," a union of Conservatives (blues) and Clericals (blacks) in the German Reichstag, especially between 1894 and 1907, in which latter year a new bloc was created, that of the Conservatives and the Liberals.

The term has recently been introduced into American politics through the union of members of Congress pursuing certain agrarian policies in what is called the "agricultural bloc."

Blockade. The closing or blocking of entrance to the ports of a belligerent country by hostile naval forces to shut out neutral commerce and to prevent the entrance of supplies or re-enforcements. A blockade, to be valid in international law, must be officially declared by a belligerent against the ports of another belligerent; must be officially called to the attention of neutral powers; and must be effective.

During the World War, the British, by their naval control, practiced a blockade upon German ports by proclamation rather than by the close patrol of war vessels. This system was extended to ships bound for the ports of neutral countries contiguous to the central European powers, or with which they were able to maintain communication.

Bolshevism (*bŏl'shĕ-vĭz'm*). A term derived from the Russian *bolshestvo*, meaning "majority"; hence bolshevik, plural, bolsheviki. Bolshevism is the radical extreme of Marxian socialism. It accepts the doctrine of Karl Marx, that an irreconcilable antagonism exists between the propertied class, or bourgeois, and the propertyless workers, or proletariat. It invites as inevitable and necessary the "class war," the object of which is the destruction of all classes except the proletariat, in whose interest and by whom future society will be organized and governed on a communistic basis.

Bolshevists differ from more moderate socialists by the literal interpretation they give to Marx's phrases. By the "class war," they mean actual warfare. They repudiate peaceful measures, especially parliamentary action, and advocate and employ violence for the immediate and complete attainment of the "revolution." They hold the political achievements of the last century and a half—political freedom, representative government, etc.—to be deceptive and illusory "bourgeois triumphs" inimical to the proletariat, since they have strengthened and extended the power of the propertied class.

The philosophy of Karl Marx, which was essentially materialistic and "determinist," taught that the evolution of capitalistic society into communism is inevitable, through the process of the rich becoming richer and fewer in number, while the poor become poorer and more numerous. This irresistible development would go on until the overwhelming mass of mankind would be reduced to the class of proletarians, when capitalism would be "mature" and incapable of resisting its "capture" by the propertyless.

Bolshevists appear either to have lost faith in the prediction of Marx, or to be unwilling to await its fulfillment; for they advocate an immediate violent seizure of power, the disfranchisement and dispossession of all propertied people, and the spread of the revolution to all countries of the world, irrespective of their economic stages of development.

Bolshevist Policy in Russia. The collapse of Russia in 1917 afforded the Bolshevists an opportunity to seize the power of the state, to destroy the opposition ("counter-revolutionists"), and to establish a communistic society on a gigantic, national scale. (See *Russia.*) The form of government set up to replace the constitutional and representative system was that of "soviets" (committees of propertyless workmen and soldiers) to which soviets or councils all power was attributed. (See *Soviet.*) All property was seized; all trading or commerce was penalized; all persons became the operatives or fellow laborers of the soviet state, which assigned to each individual or to his group its definite task and fixed the output or production required. An elaborate system of accounting and of control of industry was advocated by Lenine, and in part created. Severe penalties were visited upon recalcitrant bodies of laborers and upon peasant communities which failed to deliver the required production to the Soviet state.

Severity of punishment, however, proved an inadequate motive to replace self-interest and private reward of individual effort, which Bolshevism repudiates. By 1920, Russian economic production had declined to insignificance, tillage had lessened, and this, coupled with severe drought in the Volga region, brought famine to millions. The Soviet system of allotment and distribution of necessities collapsed. The Bolshevist leaders were compelled to re-establish permission for private barter and sale, to appeal to outside capital by the offer of lavish grants of Russian industrial resources, to accept famine relief from foreign philanthropy, and to admit that their country, albeit the richest in resources in Europe or perhaps in the world, could no longer operate under a condition of unmitigated communism.

Bolshevist Propaganda. Bolshevist leaders early perceived that no country could successfully pursue communism alone. On a socialized basis, competition with capitalistic states was impossible. This perception explains the assiduity with which the Soviet government at Moscow sought by propaganda and secret organization to incite the "revolution" in other countries. For this purpose, Bolshevists organized at Moscow in March 1919 the "Third International," an organization for the world propaganda of the revolution. High hopes were entertained of the early overthrow of constitutional government and of the substitution of soviets in the countries of Western Europe, particularly in Great Britain, where, in 1920, labor unrest assumed a violent form. Briefly successful bolshevist revolutions in 1919 were effected in Bavaria, in Saxony, in the Ruhr district of Prussia, and particularly in Hungary. Elsewhere the propaganda completely failed. In countries where socialism had formerly been strong, the socialist parties split on the principle of the support of the Third International, with the result that they lost most of the standing gained by 75 years of peaceful advocacy.

Bolshevism made its appeal to the war weary, to those to whom apparent comfort, gained without undue exertion, is more attractive than freedom, and to minds unbalanced by excess of sentimentality over actual experience. It broke against the robust and tenacious qualities of human nature. There is much in its career to justify the dictum of Marshal Foch that "Bolshevism is a malady of defeated nations."

Bonus. Money paid in addition to a stated compensation. A bonus system, while common in private employment, is rare in public service and usually is adopted only when a sudden rise in prices recommends a temporary increase of government pay.

Following the demobilization of armies after the World War, many governments adopted forms of aid to discharged soldiers. These embraced government assistance in resuming and continuing education, in acquiring farms and homes, or by the payment of a sum in cash, usually computed on the length of the veteran's service. This form of aid in the United States is called bonus or "adjusted compensation." Such payment has been made by a number of state governments to soldiers recruited within their territory for the World War and has been vigorously advocated as a national measure.

Boodle. Money used in bribing public officials or in improperly influencing elections. The term also signifies plunder, or wealth improperly secured by officials through abuse of public office. It is said that the word "boodle" is derived from a Dutch colonial term meaning estate or inheritance.

Boss System. A term used in the United States to describe the method by which professional politicians, or "bosses," control nominations and elections to public office, and secretly direct the policy and conduct of government, particularly in states and municipalities.

The boss exercises power through a well organized "machine" of partisan workers who seek petty public office in exchange for services at primaries and elections. He frequently controls the candidates, whom his machinery elects, in their exercise of office. Thus the boss system has been aptly termed "invisible government."

The boss system has had its greatest development in the United States where frequency of elections and the number of elective officials overtax the interest of the average citizen.

Direct primaries, the initiative, the referendum, and the recall have been tried as methods of taking from the professional politician his pernicious power.

Bounty. A grant of land or money by the government to private individuals to reward services or encourage activities deemed of public benefit.

After the Civil War, large bounties in public land were given to the transcontinental railway companies to encourage the rapid extension of their lines and to hasten the development of the West.

Bounties frequently take the form of subsidies to owners of private merchant vessels, a flourishing merchant marine being regarded as a needed naval auxiliary in time of war.

Valuable bounties of land or money have often been given to induce enlistment in the military forces of a country, or to reward military service in time of war.

Budget. A detailed statement of the estimated expenditures and revenues for the ensuing fiscal period, submitted to the legislature by an officer responsible for the financial administration of the government. In England, where the budget system has been most completely developed, the chancellor of the exchequer prepares the budget showing the receipts from every source and the expenditures of each department for the year then expiring, together with a statement of estimated expenditures for the coming year, and a scheme of taxation by which such expenditures may be met.

In the United States, fully satisfactory budget systems have not been developed. A report of past and estimated receipts and expenditures by an administrative officer is usually provided in both state and Federal governments, but American legislatures have been reluctant to let the executive branch of the government propose how moneys shall be raised and spent. In 1921, Congress enacted a budget law whereby a director of the budget prepares, under the direction of the president, a budget for submission to Congress.

Absence of a budget results in waste, duplication of expense, and extravagance in appropriations. From the same cause follows lack of businesslike correlation between the raising and expending of revenues, and the absence of a definite responsibility, either in the executive or in the legislative branch, for the financial administration of the government. See *Logrolling*.

Bureaucracy (*bû-rŏ'krà-sĭ*). Government by an elaborate system of administrative departments and officials, the lower functionaries subordinate in all matters to the higher. A bureaucracy generally tends to become unwieldy and laborious in its operation, through the absence of discretion in any but the higher officials. This produces "red tape" or over-systematization. Bureaucracy may exhibit also a tendency to disregard individual rights and to engage in arbitrary acts, but its most frequently charged defects are its rigidity, conservatism, and spirit of routine.

Cabinet Government. The form of government such as that of Great Britain, which is composed of a group of ministers, collectively called the "cabinet." Usually members of the cabinet are chosen from the leaders of the majority party of the Parliament or legislative body, and they are collectively responsible to that majority for the general policies and conduct of the government. As a rule, each member is the head of an administrative department.

Under systems of parliamentary government, the cabinet retains office only so long as it commands the support of the legislature.

Where there is more than one chamber in the national legislature, the dominant chamber, as the House of Commons in England or the Chamber of Deputies in France, is the one upon whose support the cabinet rests. Upon an adverse vote of that chamber on a material matter, the cabinet resigns. See page 1432a.

Cabinet government, which is called also "parliamentary" or "responsible" government, differs fundamentally from "presidential" government as found in the United States. Here the president is the actual executive head. The cabinet is responsible, not to Congress, but to him. The president is responsible to the nation for his policies and his administration. Members of his cabinet are merely his advisers and subordinates. See page 1404a.

Throughout Europe and in the British "dominions," cabinet government, responsible to a Parliament, has become nearly universal, but, almost without exception, the republics of the western hemisphere have followed the example of the United States, choosing their executives for a fixed term and making them independent of congressional direction.

Campaign, Political. Organized effort by a political party or group to secure the election of a particular candidate or list of candidates to political office. In the United States, formerly, the political campaign was marked by spectacular parades, campaign songs and slogans, immense gatherings of enthusiastic throngs, and by other devices calculated to arouse partisan interest and enthusiasm. More recently, however, political campaigns have been carried on principally by printed appeals, particularly through the medium of the daily newspaper.

In most American states, "direct primaries" or nominations by "primary elections" have taken the place of local and state nominating conventions. This has reduced party influence in political campaigns and has made them largely personal. It has at the same time doubled the effort necessary to secure election, as a candidate must compete at the polls twice, once for the nomination of his party and again for election to office. This system necessitates a large appeal to voters through the mails, by the circulation of personal appeals and "campaign literature," and has had the result of introducing a large element of expense not previously known.

Caucus. A meeting or conference of members of a political party or group to determine upon the candidate or policy to be supported in an ensuing election or other political contest. The term is American and is said to be derived from the Indian "kaw-kaw-was," meaning to counsel or confer.

A person entering a caucus is usually held to be honorably bound to accept the decision of the caucus, even though it be adverse to himself or to his views. He may, however, refuse to "caucus" with other members of his party or affiliation, thereby preserving independence of action and choice.

Census. An official enumeration of the population of a country, sometimes including also a tabulation of its industries and resources. In the Western world, the census is of Roman origin. In the time of Augustus, it was extended to the whole empire. The modern system, directed by the government, originated in Sweden in the 17th century. It was then adopted by France. No census was taken in Great Britain until 1800. Modern census-taking, however, may be considered to have originated in the United States. The Constitution provides that a national census shall be taken every ten years. The original purpose was to provide a basis for the periodical reapportionment of members of the House of Representatives, but the scope of the census has been extended to include the securing of data upon racial, religious, social, and economic conditions.

An incident of the American census is the determination of the "center of population" in the United States. This point has worked steadily westward since the foundation of the country. In 1920 it was located as far west as Indiana.

Charter. A grant from a sovereign or other superior authority to an individual, a company, or a territorial division, authorizing the exercise of certain functions or the enjoyment of certain privileges. In England, the crown often granted special charters to authorize individuals to exercise powers of government. Thus charters were granted to the proprietors who established colonies in America. Other colonies received direct charters from the crown empowering the people of the colonies to organize colonial governments. In more recent times, similar "chartered companies" were created for extending British rule in Africa. The British North Borneo Company is another modern example.

In the United States, charters may be granted for the creation of either public corporations or private corporations. The charter of a public or municipal corporation is today generally in the form of an act of the legislature, pursuant to which the corporation is organized, and which prescribes its form of organization and the powers which it may exercise. As a result, in England and America, municipalities have only such powers as are specifically enumerated in their charters or are bestowed by general laws.

In the case of private corporations, it was the practice until about 1860 for legislatures to pass special acts for each private corporation created, and an act constituted the charter of the company in precisely the same manner as in the case of the public or municipal corporation. However, with the growth of the corporate form of business organization, the need of a special enactment for each private corporation burdened legislatures with private bills and led to political abuses. As a result, constitutional or legislative provisions were adopted in nearly all states, providing for the organization of private corporations under general incorporation laws.

Child Labor Legislation. See *Social Legislation.*

Chinese Exclusion. See *Immigration Legislation.*

Citizenship. The relation of an individual to his state, by which he owes obedience and loyalty, and in turn receives protection. The term as now used does not necessarily include the possession of political rights. Thus minors and women are citizens regardless of their right to vote.

In the United States, there is generally a dual citizenship: that of the nation and that of the particular state of which one is a resident. By express provision of the 14th amendment, as well as by the common law, any person born in the United States, of American parentage or of alien parents temporarily resident in the United States and therefore subject to its jurisdiction, is a citizen of the United States. Persons born of American parents on the high seas, or while such parents are temporarily resident abroad, are also citizens by birth. Children of diplomatic representatives of the United States, temporarily resident in a foreign land, are likewise citizens.

Citizenship in two different countries at the same time is technically possible and frequently occurs. Thus the laws of some countries provide that a citizen by birth ever continues to be a citizen of that country and cannot divest himself of allegiance. If such an individual becomes naturalized in another country, both his native country and the country of naturalization may then claim from him the duties of citizenship. Whether he is to be regarded as a citizen of one country or of the other may depend upon whether the question arises within the territory of the old citizenship or the new. See *Naturalization.*

City Government. Frequently spoken of as "municipal government." Legally, a city is an agent created by government for a definite local area, primarily for the satisfaction of local needs. In European countries generally, outside of Great Britain, and in some non-European countries, city government is also the agent of the state for the local administration of national affairs, and the chief executive of the city is responsible not only to the city government for the conduct of its interests, but also to the national government, whose agent he is. See *France.*

Municipal Authority. In Europe, city governments seldom enjoy autonomy or complete "home rule" but are subjected to supervision from higher branches of administration. This supervision usually applies to such matters as approval of municipal budgets, the granting of franchises and particularly to the exercise of the police power wherein the city is regarded as an agent of the state, discharging state functions. In Great Britain, and to an even larger degree in the United States, city governments are autonomous, free to vote moneys, incur indebtedness, grant public franchises, and engage in municipal undertakings without superior administrative sanction or direction. It is a fundamental principle, however, of British and also of American law that a city government has no inherent or "implied powers" but can legally undertake only those activities enumerated in its charter or sanctioned by general laws. (See *Charter.*) In Great Britain, city government powers are altered or enlarged by acts of Parliament in what are called "private bills."

In Great Britain and in the United States, the courts may be invoked to restrain a city government from undertaking activities not specifically granted by law. In the countries of continental Europe, the range of the activities of municipalities is not exactly fixed by law; but a city, subject to superior administrative approval, is presumed to be competent to assume any undertaking for the better satisfaction of local needs.

In the United States and likewise in Great Britain, city government is usually confined to urban areas where the population is sufficiently dense to require that service which cities are organized to supply. The public needs of rural regions are taken care of by county government, the jurisdiction of which extends also over the cities. This leads to a certain duplication of public service within American cities, and, in a few instances, notably San Francisco, California, it has led to the creation of a special combined "city and county government." In continental Europe, usually all national territory is embraced within the jurisdiction of "city governments" as is the case with the communes of France and Belgium. The same principle applies in Spanish America, where a "municipio" is the center of government not only for an urban community but for an extensive rural community surrounding the city or town.

State Control. In the United States, originally, state legislatures possessed complete power over city governments and could alter their charters at any time or subject them to special laws and administration. Abuse of this legislative power led to constitutional limitations upon state legislatures, forbidding them to pass special laws affecting municipalities. Furthermore, in a number of American states the freeholders or citizens of a city are permitted to frame and to adopt a special charter embodying their own choice of the principles of municipal government, and this charter, when ratified by the legislature, becomes the legal basis of city government.

City Manager Plan. See *Commission Form of Government,* page 1418c.

City Planning. The orderly laying out of a city into industrial, mercantile, and residential sections, and the organization of its streets, parks, and public buildings, so as to obtain the maximum of beauty, health, and convenience, and to provide for adequate and orderly development. Washington, D. C., is an excellent example of the construction of a city in accordance with a spacious and artistic municipal plan.

Certain European cities, as Paris and Vienna, are examples of the highest order of city planning, carried out at great expense, with the demolition of ancient walls and buildings to make way for spacious boulevards, radiating streets, public parks, and buildings.

The American plan of laying out a city in squares, with streets at right angles, the so-called "checkerboard plan," seems to have originated with the laying out of Philadelphia by William Penn. The plan has certain defects. One is that it requires all traffic to proceed by two sides of a triangle rather than by a direct line. To remedy this, many cities have introduced radial avenues, converging at important points of the city. Another difficulty is that the rectangular plan gives little opportunity for the favorable location of public buildings, churches, and other splendid structures, where such imposing monuments may appear in a long vista. American cities generally have grown up through the inadequate planning of private individuals, and incalculable loss has resulted from the persistence of narrow and inadequate streets, from improperly located quarters, and from the destruction of elements of natural beauty which cannot wholly be replaced.

Spain and all American countries of Spanish inheritance exhibit a type of city planning derived directly from Roman cities. The center of city life is one or more squares or "plazas" on which front churches, public buildings, markets, and schools. From these plazas, streets radiate at right angles. The influence of this type of planning may be seen in many cities founded by Spanish colonists in the western United States.

Civic Center. The more important buildings of a municipality grouped together within an area conveniently accessible from all parts of the city form a civic center. By such grouping, an impressive architectural scheme is made possible and the transaction of public business is facilitated. See *City Planning.*

Civil Rights and Liberties. Civil rights are those explicitly conferred upon the citizens, subjects, or residents of a state by positive law, the enjoyment of such rights being secured by action of the state itself. They differ from so-called "natural rights," a much disputed body of so-called rights and privileges supposed to be ordained for man's enjoyment by divine law or by natural law or deducible by reason. So-called natural rights are purely theoretical and have no support or sanction except in the conscience and good will of individuals. While they form a large field for philosophical or ethical discussion, they have an interest for the political scientist mainly because of their influence upon revolutionary or reform movements, or after their principles are adopted in positive laws.

Growth of Modern Rights. As a matter of fact, civil rights as they exist in the Western world have been defined mainly by actual struggles of governed peoples for greater freedom against arbitrary authority, and they represent practical achievements in this direction. (See *Bill of Rights.*) The original home of most civil rights recognized in modern law was England; thence these liberties were carried to America by English colonists and there received an expansion and an emphasis through the American Revolution. From the United States these ideas were carried to France and there, by the French Revolution, were restated in the form in which they have been communicated to most peoples of the world. The American conception of civil rights may be found summarized in the amendments to the Constitution, articles I to IX inclusive, and articles XIII and XIV. To these may be added article XIX, which confers upon both sexes the political right to vote.

Political rights, which are usually enjoyed only by citizens, may be distinguished from civil rights, which it is the ideal of modern jurisprudence to bestow uniformly upon all residents within the sovereignty of a state. Political rights include, among others, voting in public elections, holding office, service in the armed forces, service upon juries, etc. By way of punishment, a citizen may be deprived of political rights without affecting his title to civil rights.

Civil Liberty in America. The United States has undoubtedly given a wider legal protection, particularly to the rights of property, than has any other country of the world. The Constitution, furthermore, has made these rights inviolable, not only by executive officers, but even by Congress or by legislatures. This condition has come

about through the supremacy of constitutional law over national or state legislation and through the practice of the courts, and particularly of the supreme court of the United States, in refusing to enforce statutes judged to be at variance with the Constitution. A vast body of judicial decisions defining and protecting civil rights has been developed by the courts of the United States and of the states. In this provision of "constitutional guarantees" for the rights of the citizen, the American people more than any other nation of the world have amply defined and effectively guarded the field of civil liberties.

Civil Service. This term includes, in its broadest sense, all positions under the government, Federal, state, and municipal, outside of the army and navy. Commonly, however, it is limited to administrative or executive positions, particularly to those that are appointed and are protected by legal safeguards against demotion or dismissal.

Beginning with the inauguration of President Jackson in 1829, for many decades the public service in the United States suffered from the carrying out of certain so-called "democratic" theories of government. The first of these was that public administration was not an expert function, but could be fitly discharged by any citizen, even though inexperienced and untrained. The second was the theory of "rotation in office," which demanded the frequent transfer of public position from one individual to another, on the theory that the right to hold office should be enjoyed by the largest possible number of citizens. It was further supposed that continuous employment led to neglect, indifference, and discourtesy on the part of public officials.

Civil Service Reform. These generally accepted political views, to which was added also the theory of "spoils" (See *Spoils System.*), long deprived American government of an efficient body of public servants and resulted in a loss of efficiency and in the corruption of politics. An office-seeking class grew up, whose purpose was to control politics, national and state, for the purpose of securing office and using its power for private advantage. This experience, while discreditable to American politics, nevertheless prevented the development in this country of an overbearing or autocratic official class. (See *Bureaucracy.*) After the Civil War, active effort was begun to secure "civil service reform," or the placing of employment under the national government upon a "merit basis," open to all candidates, irrespective of party or religious affiliation. This movement was emphasized by the deplorable assassination in 1881 of President Garfield by a disappointed office seeker.

The act of 1883 grouped Federal employees into three classes: (1) classified or competitive; (2) unclassified; (3) excepted and noncompetitive. The classified or competitive positions were to be filled by examinations under the direction of a "civil service commission" of three members appointed by the president with the approval of the Senate. Preference was given to persons "honorably discharged from military or naval service by reason of disability, wounds, or sickness incurred in the line of duty." Furthermore, a person holding a position in the competitive or classified civil service could not be dismissed without first being notified of the charges against him and given an opportunity to reply in writing. Since the enactment of this law, the class of competitive positions has steadily increased, and the proportion of unclassified and noncompetitive positions has diminished.

Statutes similar to the act of Congress have been adopted in certain states, and similar provisions have been made by numerous cities.

Closure (*klō'zhûr*) **Rule.** A method used in parliamentary bodies to close debate upon a bill or proposal, by moving "the previous question." The motion is made "that the question be now put"; and, in the event that this motion carries, the matter under discussion is immediately put to vote, without further debate. The term has its origin in the *clôture* (*klō'tür'*) of the French Parliament, where this method was used.

In the British House of Commons, a modified form of the closure was adopted in 1882. The United States Senate is one of the few great legislative bodies which long refused to incorporate the closure in its rules of procedure. A minority in that body, by occupying the floor in continuous discussion and maneuvering, was, and still is, able to delay the passage of a bill until the emergency disappears, or the session comes to a close. This procedure is called "filibustering." In March 1917, the Senate adopted a closure rule, which somewhat controls filibustering. On the other hand, the absence of the closure rule prevents the majority from imposing a "gag rule" on the minority and permits a freedom of debate which tends to disappear from modern legislative bodies.

Coalition. An alliance of persons, parties, or states. The term coalition has been used repeatedly in European history to designate a league of states for offensive or defensive purposes.

Its more common use at the present time refers to the union of parties and to a government built upon such a coalition. The necessity for "coalition governments" arises in many countries through the fact that in their legislatures there are a number of parties or groups, and no one party possesses sufficient strength to form a government that will command the support of a majority of the legislature; hence an alliance or coalition of party elements is indispensable to the formation of a government.

During the World War, in order to present a united front for the prosecution of the war and to utilize, without distinction of party, the best statesmanship available, in most of the belligerent countries a party truce was declared and a coalition government was formed, made up of representatives from all the major party groups.

Collectivism. A theory of economic and social organization in which all "productive capital" would belong to the community, and the share of each individual would be determined by the value or social utility of his contribution to the social income. Collectivism is practically synonymous with the generally accepted concept of socialism. See *Socialism* and *Bolshevism.*

Commission Government. A type of administration widely used in Great Britain and in America, whereby executive and sometimes legislative and judicial or quasi judicial functions are intrusted to a number of individuals forming a board or "college." The theory of commission government is that responsibility for all decisions and directive action rests in the group, not in any one individual, and that all members of the group are officials with expert knowledge, presumably giving their entire time to the service of the office. In these respects, commissions differ from boards, which, in the United States, are frequently used as the legal governing bodies of institutions and are composed of laymen managing the public business through an executive appointed by and responsible to the board. Where, as frequently happens, a commission is given an ordinance or legislative power or the power of judicial review, such government represents an abandonment of the popular theory of "separation of powers."

Well-known types of commission government in England are the admiralty lords, who administer the British navy, and formerly the lords of the treasury, although this commission has now become obsolete and its functions are exclusively exercised by one member, the chancellor of the exchequer. In the United States, the interstate commerce commission, the civil service commission, and public utility commissions in several states represent commission government. One of the most notable instances was the Philippine commission of 1900–1907, which was vested, first by the president and subsequently by Congress, with the powers of governing and legislating for the Philippine Islands. In 1901, following the flood which destroyed the city of Galveston, Texas, the government of that municipality was intrusted to a commission of five citizens. The success of this experiment led to the general adoption in the United States of the so-called "commission plan of city government." See *Commission Form of Government*, page 1418c.

At times, in British and in American practice, an executive office ordinarily consigned to a single minister or public official may be intrusted to a group, in which case the office is said to be "placed in commission." Such a body created for one single purpose, either temporary or permanent, is in English practice described as an "*ad hoc* commission."

Common Law. The body of rules, principles, and forms of judicial proceedings which, while not enacted in statutes, have been immemorially recognized and enforced by the courts of England and by the courts of those countries which inherited their systems of jurisprudence from England. Thus it is distinguished from "statute law" or enactments of Parliament or state legislatures.

The common law is frequently used to mean English law, as distinguished from Roman or "civil law," which was revived and put into force on the continent of Europe at the beginning of the Renaissance period. In England, by reason of the king's courts, the common law at that time was making such progress as successfully to hold the field against the Roman law revival.

In some American states, only those principles and rules of the common law which were recognized before the 6th year of James I, when Virginia was settled, are regarded as having been carried over to this country; but in most states the common law, together with certain fundamental statutes, as it existed at the time of the American Revolution, is regarded as forming a part of the law of such states.

Communism (*kŏm'û-nĭz'm*). A system of social and economic organization in which property is owned by the state or group, to be shared in common or to be distributed among members of the community equally or in proportion to their respective needs. In communism, there is practically a complete abolition of the notion of private property; the property of each is truly the property of all. Thus communism goes much farther than either collectivism or socialism, which proposes to bring all "productive capital," such as land, factories, mines, and railways, under public ownership.

Communism has been tried at various times by small communities in Europe and in America, and has constituted a basic principle of several religious communities. It has never yet proved successful in a community of any considerable size. See *Bolshevism*.

Compulsory Arbitration. See *Arbitration of Industrial Disputes*.

Concert of Powers. An understanding between the major European states for the enforcement of treaty provisions, for the maintenance of peace, for the control of minor states and peoples within the European system, and for the solution of Near Eastern problems. The concert may be said to have arisen about 1828. The "Great Powers" whose agreement gave force to its decisions were, at the time of its origin, Great Britain, France, Russia, Austria, and Prussia.

The concert was broken in 1854 by the Crimean war, and again in 1871. The most imposing exhibition of the concert was the Congress of Berlin of 1878, which composed the affairs of the Balkans and the Ottoman empire, reaffirming the sovereignty of Turkey in European possessions. Its arrangements gave Europe peace for an entire generation, and were not broken until 1908, when Austria-Hungary annexed Bosnia and Herzegovina. The concert was destroyed by the outbreak of the World War in 1914.

Conscription. The compulsory enrollment of citizens or inhabitants of a country for filling its military forces. It is also called "the draft" or "compulsory military service."

While compulsory military service is of ancient date, the French Revolution initiated the plan of commanding the entire man power of the nation for national defense. The National Assembly in 1792 decreed the *levée en masse*. While this hurried assembling of untrained men proved ineffective, it led to the practice of vast drafts upon the able-bodied men of the nation for the prosecution of the Napoleonic wars.

European Systems. The system of compulsory training of all able-bodied young men originated in Prussia, after the overwhelming defeat of that country by Napoleon in 1806. Napoleon limited the standing army of Prussia to a force numerically ineffective. Prussia met this condition by the brief but thorough training of this limited number of men and by their prompt retirement into a reserve, which could be "mobilized" or called to the colors at any crisis and would thereby many times augment the limited standing army. Out of this incident have come the modern systems of compulsory training which, before the World War, had been adopted by nearly all European countries and by Japan.

In Germany, the system was carried out in the most thorough way. Theoretically, all men were trained for appropriate duty in time of war and were classified into several categories: those undergoing active training; those in a first reserve, to be immediately mobilized on the threat of war, each man joining an assigned battalion or other unit; a *landswehr*, or second reserve, of older and less active men; and finally a *landsturm*, composed of men in middle life no longer judged capable of front line duty, but serviceable for the lines of communication, the garrisoning of fortresses, and for home guards. This system saw its most awe-inspiring exhibition in 1914. Previously to 1916, Great Britain relied upon voluntary enlistment for her army, although at an early period sailors were "impressed" into the British navy.

At the outbreak of the World War, Holland and Switzerland both possessed thoroughly developed systems of compulsory military service which safeguarded their neutrality. Belgium, relying upon the guarantee of her neutrality by the great powers, had never adopted universal military service and possessed only limited army forces with which to meet the German invasion.

American Conscription. In the United States, conscription and involuntary enlistment have twice been resorted to: first, during the Civil War in the Northern states, after a system of voluntary enlistments and bounties had failed to draw sufficient men into the Union armies. The Southern states early adopted compulsory enlistment and profited accordingly. On the entrance of the United States into the World War in April 1917, a selective draft act was passed by Congress, which required for military duty the enrollment of all men between 21 and 31, the act subsequently being extended to include all men between 18 and 45. From these a selective draft was made for active service. This statute, perhaps the most impressive act ever passed by Congress, at once afforded the nation an inexhaustible supply of men, and, before the end of the war, resulted in calling to the colors over four million men. This action not only hastened the termination of the World War but at home and abroad produced a moral effect without precedent in American history.

Conservation. The term applied to the policy of government regulation of the use and development of the natural resources of the country so as to prevent their rapid and wasteful exhaustion by private ownership. Conservation further aims to provide a systematic development of such resources in the interests of the general public and with the purpose of assuring their benefits to later generations.

Constitution. A constitution is a fundamental or "organic law," upon which the government of a nation rests. To be theoretically complete, a constitution should provide a structure of government; an enumeration of civil rights and liberties (See *Civil Rights and Liberties*.); and a provision for its own amendment. The amending provision has special significance, since it may be assumed to disclose the sovereign power within the state; for that power which is above the constitution, and which may alter or repeal it, may fairly be regarded as the "legal sovereign."

The modern practice of adopting "written" or "rigid" constitutions as a basis for national or state government is of American origin and is one of the political achievements of this country which has been generally borrowed the world over. The earliest constitutions of this typical form were those adopted by the American states, when, by the Declaration of Independence in 1776, they ceased to be colonies of Great Britain. These were followed in 1789 by the Constitution of the United States. (See *Constitution of the U. S.*, page 1395.) Nearly every government in the world today rests upon a written constitution, either granted by a monarch or framed by a national convention.

Great Britain has what is called an "unwritten constitution," in that a large part of it is not in written or statute form, but is a matter of practice. Furthermore, the various statutes underlying the government of the realm have never been codified or unified in a single document; also, it is a fundamental principle of the English constitution that it can be changed in any respect by a simple act of Parliament. In this sense, no act of Parliament is more fundamental or organic than any other. (See page 1432d.) This character gives to the British constitution a flexibility not possessed by that of the United States.

The period of active constitution-making in Europe began with the French Revolution, when numerous constitutions were devised, many of them on highly theoretical lines, and a number successively put into operation. From Europe, the revolutionary movement passed back to the Spanish colonies of America, where an active process of constitution-making arose, greatly influenced by the constitutional forms of the United States.

Following the revolution of 1848, European countries generally attained constitutions or fundamental laws limiting monarchical power and increasing the political participation of the people. A new and extremely active period of constitution-making followed the end of the World War in 1918, when many new states came into existence and when older constitutions were subjected to radical revision.

Consul. A representative of a government in a foreign country, particularly for commercial purposes and for the aid and protection of its citizens abroad. The duties of a consul include the making of reports on commercial conditions in the country to which he is assigned, various services in connection with the landing of vessels at foreign ports, the relief and protection of citizens of his country in times of distress or disturbance, and other duties, even including those of a diplomatic character in the absence of an ambassador or a minister.

For the judicial functions exercised by consuls in countries where their nation possesses rights of extraterritorial jurisdiction, see *Extraterritoriality*.

Contraband. Primarily, articles sent from a neutral to a belligerent country in time of war for military and naval use. Under generally recognized laws of war, such merchandise may be seized and confiscated if taken upon the high seas or within enemy territory. Ordinarily, confiscation follows the judgment of a prize court, in which the neutral owner may have the right to appear and to defend his title and interest. Formerly, the list of articles generally recognized as contraband was limited, and embraced mainly arms and military supplies. The World War, however, so completely engaged the entire resources of the belligerent nations, and extended the use of articles essential to armies, that it led to a great expansion of the list of contraband goods. At present it would be difficult to say what is not contraband in time of war.

Convention, Political. A gathering of party adherents or delegates for the purpose of selecting candidates for public office, for declaring their body of political principles or "platform," and for organizing party administration.

Political conventions were a relatively late development of American democracy. In the early decades of the Union, candidates were nominated in various ways, a caucus of members of the same party in Congress usually choosing the national candidates. After 1832, the national political convention became the accepted method of nominating candidates for president and vice president.

In the states, it was formerly the universal practice to hold not only state conventions for nominating candidates

for state offices, but county conventions and local primaries. The place of these conventions in American political life has been greatly reduced in recent years by primary election laws. The national party convention, however, meeting once in four years, shortly preceding the presidential election, continues to be a political institution of first importance, although almost entirely unrecognized by Federal laws. Each party, by its own rules, determines how delegates shall be chosen and how the business of the conventions shall be conducted. Election as a delegate to a national convention is an eagerly sought distinction, and, preceding and during the days of their meeting, such conventions overshadow other matters of national interest. The greater part of the time during which a national convention meets is usually devoted to the nomination of, and the successive ballotings for, candidates for the presidency and the vice presidency. In the Republican party this is accomplished by a majority vote of all delegates present. In the Democratic party a two-thirds rule provides that a candidate must receive two-thirds of the votes of the convention in order to be nominated.

Besides nominating its presidential candidates, the convention adopts a party platform and, before adjournment, chooses the national committee, made up of one representative from the party organization in each state. The national committee has great power over the organization in the period between conventions and can usually influence in a measure the proceedings of the following convention.

Corrupt Practices Legislation. The extension of the democratic franchise has induced nearly all countries to adopt laws safeguarding voting at primaries and elections. In the United States, these laws frequently prohibit contributions by corporations to political campaign funds. Other laws limit the expenditures of the candidates. The first American statute of this kind was enacted in New York in 1890 and was officially termed the "Corrupt Practices act."

De Facto Government. A government which is actually exercising governing power in a particular territory, irrespective of its legal authority. *De facto* government is distinguished from *de jure* government, the latter being a government which exists by legal right or by international recognition.

Democracy. Democracy signifies popular government. It has been happily defined in Lincoln's phrase, "government of the people, by the people, and for the people." It is distinguished from monarchy, in which the head of the state is a king or prince, and from aristocracy, or government by a privileged or superior group.

None of these words is used with entire consistency or exactness in political writings. By democracy is sometimes meant direct popular government rather than government by chosen representatives, and a distinction is then drawn between a democracy and a republic. At the present day, when the democratic ideal has made great progress, republics generally are democracies, and so are numerous countries having the form and the legal character of monarchies.

Present Meaning of Democracy. At the present time, also, the word democracy is used to indicate not only a government which is immediately or ultimately controlled by popular opinion or by the majority of the people, but also one in which society is distinguished by an absence of privileged and aristocratic classes. The theory of democracy rests upon an assertion of the worth of the ordinary man and woman and upon a confidence in the good judgment and moral rectitude of common people; upon the belief that if unwise or wrong action prevails for a time, in the long run the common sense of the bulk of society will recognize and correct the evil. Democracy further rests upon the conviction that the interests of all classes are better served when they are politically controlled by all classes rather than by a single class, even though it be superior in intelligence. Democracy is likewise of value for its educative effect, intelligence and prudence being developed by the sense of responsibility and by sharing political control.

A consistent theory of democracy requires equal suffrage of all classes and even of both sexes. The disfranchisement of any element of society because of illiteracy, the lack of property, or even the absence of a fixed residence can hardly be justified on theoretical grounds. Practically, the disfranchisement of people on any ground whatever, other than conviction for crime, creates in a community a class feeling no responsibility for government, and too frequently unreconciled to the purposes and aims of government.

Certain so-called "democratic" doctrines have been unfortunate, among them the belief that terms of office should be extremely short, that there should be frequent "rotation" in office, and that the work of government is of such a character that any ordinary man can satisfactorily discharge it. American political life has grievously suffered from adherence to these improper deductions.

Diplomatic Representation. Diplomacy is the art and the practice of international negotiation. In the early history of Europe, such negotiations were intrusted to special heralds, ambassadors, or missions. The system of keeping diplomatic representatives resident in the important countries with which they had friendly relations was first practiced by the Italian city-states and particularly by Venice.

Such representatives are of different ranks; by the Treaty of Aix la Chapelle, 1818, they were classified in the following four grades: (1) ambassadors, including papal legates and *nuncios*; (2) envoys extraordinary and ministers accredited directly to the sovereign; (3) ministers resident; (4) chargés d'affaires. The first three grades are accredited to the head of the state; the fourth, to the minister having charge of foreign relations. Consuls, when charged with a diplomatic mission, rank with the chargés d'affaires.

Embassies. "Embassies" are established between nations whose mutual interests are of the highest importance; elsewhere the diplomatic office is usually a "legation."

In 1929 the United States had embassies to 13 countries. These states, also maintaining embassies at Washington, were as follows: Argentina, Belgium, Brazil, Chile, Cuba, France, Germany, Great Britain, Italy, Japan, Mexico, Peru, and Spain. The representative is entitled "ambassador extraordinary and plenipotentiary." The former embassy to Turkey was represented by a high commissioner. Ministers were accredited to Albania, Austria, Bolivia, Bulgaria, Canada, China, Colombia, Costa Rica, Czechoslovakia, Denmark, Dominican Republic, Ecuador, Egypt, Esthonia, Finland, Greece, Guatemala, Haiti, Honduras, Hungary, Irish Free State, Latvia, Liberia, Lithuania, Luxemburg, Netherlands, Nicaragua, Norway, Panama, Paraguay, Persia, Poland, Portugal, Rumania, Salvador, Serb, Croat, and Slovene Kingdom, Siam, Sweden, Switzerland, Uruguay, Venezuela. The American consul general at the leading city of each of the following states is accredited as minister: Danzig, Ethiopia, Iraq, Palestine, and Syria. Canada and Irish Free State have ministers at Washington. Establishment of an American legation has been invited by Afghanistan. At Morocco, city of Tangiers, the United States has an "agent and consul general."

The terms "embassy" and "legation" are used also for the residence or buildings of the minister and the staff. The official residence of an ambassador is known as an "embassy"; that of a minister, as a "legation." It is customary for countries to own such buildings and to equip them for permanent occupancy and for the hospitality that is inseparable from effective representation abroad. Only a few American legations are the property of the government. Salaries of ministers are in many cases inadequate, and the expense of maintaining proper representation falls on the private means of the minister.

Diplomatic Credentials and Privileges. A diplomatic agent is usually accompanied by an official suite which may include counselors, secretaries, attachés from the army or navy, commercial attachés, interpreters, etc. A diplomatic representative carries a recommendation called a "letter of credence" and also, usually, a "letter of instructions" conferring full powers for the closing and the signing of a treaty, and a special passport. On arrival in the country to which he is accredited, he is accorded an official reception by the head of the state, if he is ranking in one of the first three classifications, and by the foreign minister if he is a chargé d'affaires.

A diplomatic representative is accorded certain immunities and privileges which extend to the members of the household and suite. These include inviolability of his person and residence,—an assault committed upon him is an injury to his nation and must be correspondingly compensated for (See *Extraterritoriality.*);—exemption from local jurisdiction; and exemption from the payment of taxes upon his personal property or official residence. From the immunity of a diplomatic representative has arisen the "right of asylum" or of taking shelter in a legation. It is questionable whether a diplomatic representative has the right to extend asylum, especially in favor of a criminal or of one seeking refuge against civil prosecution; but in certain countries such asylum is often extended to political refugees or to persons endangered by tumult or revolution.

It is a general principle that a diplomatic representative must be acceptable to the state to which he is sent, or, if his conduct becomes objectionable, that he may be sent home. This is usually done by the formality of furnishing passports. (See *Persona Non Grata.*) Diplomatic relationship is always terminated on the outbreak of war, and it may also be broken off as a protest threatening war.

The act of accrediting a diplomatic representative to a government is equivalent to recognition of that government, so that, where recognition is withheld, countries intrust the preservation of their interests to a representative of lower grade than an ambassador or minister or to a personal representative. See *Personal Representative.*

Direct Legislation. A term used to describe the enactment of law by popular vote rather than by representative legislative bodies. Direct legislation has been frequently practiced by local communities, from the Greek cities down

to New England town meetings. In certain of the Swiss cantons, it still exists in the form of popular meetings for legislative enactments. It was in Switzerland also that the modern method of direct legislation by organized balloting arose. Thence, in the form of the popular proposal of laws (initiative) and the popular ratification or rejection of laws (referendum), the institutions of direct legislation have spread to other countries and particularly to the United States.

In another form, however, direct legislation in America is older than in Switzerland, that is, in the direct vote of the people upon constitutional or organic laws, which originated in Massachusetts in 1780.

Due Process of Law. The Federal Constitution, in both the 5th and 14th amendments, and all state constitutions, contain provisions protecting the individual against the deprivation of "life, liberty, or property without due process of law."

The due process clause of the 5th amendment operates as a limitation upon the action of the Federal government only. But the similar provision, which was added to the Constitution by the 14th amendment in 1869, expressly protects every American citizen against the unlawful infringement of his life, liberty, or property by the action of any state. The latter provision of the Federal Constitution, although originally intended as a means of safeguarding the independent status of the Negro, has been construed by the courts as operating to the benefit of every citizen of the United States whatever his race or color. This clause has been the basis upon which the supreme court of the United States has declared unconstitutional numerous acts of state legislatures, particularly laws limiting freedom of contract.

Fundamentally, due process of law is merely that judicial procedure "which hears before it condemns, which proceeds upon inquiry, and renders judgment only after trial." As developed by the courts, however, the phrase has come to have a broader significance. It appears to signify the protection under the law of every individual against arbitrary and unreasonable acts of the executive and legislative branches of the government.

Electors, Presidential. The framers of the Constitution of the United States believed that the direct popular election of the president was both impractical and undesirable. They therefore provided for an indirect election of the president and the vice president by special electors, who were intended to be a select body of individuals possessing a broader acquaintance with men and a better understanding of national issues than the ordinary voter. The Constitution provides that each state shall appoint, "in such manner as the legislature thereof may direct," a number of electors equal to the state's quota of senators and representatives in Congress. No senator or representative or person holding an office under the United States government is eligible for designation as an elector.

The electors chosen in the manner provided by each state legislature were thereafter to meet in their respective states and to cast their ballots for two persons. Since the adoption of the 12th amendment, in 1804, each elector is required to designate his choice for president and for vice president. The vote thus taken is transmitted to the president of the Senate, who, in the presence of both houses of Congress, opens the certificates and counts the ballots from all states.

The choice of the president and the vice president by electors as thus provided has become a mere form. Since 1800, the electors have exercised no individual judgment, but have followed the dictates of the parties to which they have belonged. Electors are expected, as a matter of course, to cast their ballots for the regular party nominees to whose support they are virtually, if not actually, pledged. A vote for a particular elector is today in effect a vote for the nominees of his party for president and vice president. The form of indirect election, however, has been maintained.

Embargo. An order or act of a country, prohibiting vessels or merchandise from leaving its ports. The purpose of an embargo, ordinarily, is to injure another country by depriving it of its usual commerce. Where the embargo applies only to the vessels or goods of a country's own citizens, it is a "civil embargo." Where the prohibition applies also to the vessels of a foreign state against whom the embargo is particularly directed, it is a "hostile embargo." Where the embargo applies to the vessels and goods of all nations found within the ports of a country, it is an "international embargo."

Eminent Domain. The pre-eminent right of the sovereign to all of the property within its jurisdiction, by virtue of which it may appropriate any of such property, howsoever owned, to public uses. A limitation upon this right, fixed or implied in all constitutional governments and expressly incorporated in the Constitution of the United States and in the constitutions of all of the states, is that private property shall not be taken for public use without compensation.

Among the public uses for which the power of eminent domain is most frequently exercised are the creation of streets, parks, forts, docks, and public buildings. The right may be delegated by the state to public service corporations, such as railroads, telephone and telegraph companies, or corporations serving the public with water, gas, electricity, and similar utilities, which are regarded as quasi governmental functions.

Expatriation. See *Naturalization.*

Export Tax. The Constitution of the United States (Article I, Section 9) provides that "no tax or duty shall be laid upon articles exported from any state." This limitation upon the Federal government does not deprive it of the power of declaring an embargo or of otherwise regulating exports, nor does it deprive Congress of the power of imposing a tax on income derived from exports. Trade between the United States and its insular possessions, such as the Philippines, the Hawaiian islands, and Porto Rico, has been held not to be foreign commerce; but a tax laid by Congress upon such trade is not prohibited by this section of the Constitution.

The Constitution (Article I, Section 10) also prohibits the states from levying any duties on exports or imports, except such as are necessary for the execution of its inspection laws, and then only subject to the control of Congress. The effect of this provision has been to deter the states entirely from such legislation and to maintain complete free trade between states of the Union.

Ex Post Facto Law. Retroactive legislation which makes punishable an act which was lawful when committed or imposes for an unlawful act a more severe punishment than was provided by law at the time the act was committed, or otherwise retroactively affects, to his material disadvantage, the position of one accused of a crime.

The Constitution of the United States forbids both the Federal government and the governments of the states from passing any *ex post facto* legislation.

Extradition. The surrender of a fugitive from justice by one country or state to the authorities of another. Nearly all civilized countries have entered into treaties with one another providing for the extradition of persons who have committed specified crimes in one country and have then fled to another. Common limitations in these treaties are that the duty of a nation to surrender such a fugitive shall not extend to its own citizens and that persons extradited shall be tried only for the crime specified in the request for extradition. A further limitation which the United States has inserted in its treaties is that it shall not be compelled to give up persons charged with political offenses.

Extradition between nations is effected by a request of the state or foreign office of one nation upon the state or foreign office of the other. The Constitution of the United States contains an express provision requiring every state to extradite, upon demand of another state, any fugitive from justice. (Article IV, Section 2). In extradition among the states of the Union, there are no limitations with respect to the character of the crime or the citizenship of the person whose extradition may be sought. A requisition signed by the governor of the state from which the accused has fled is addressed to the governor of the state in which the accused is found, and, if honored by the latter, the person is surrendered. Not infrequently, however, a governor refuses to surrender an alleged fugitive from justice, on the ground that he will not receive a fair trial in the state where he is indicted. And, although the Constitution is mandatory with respect to delivering up offenders to sister states, the supreme court has refused to compel the extradition of a fugitive whose surrender a governor has denied.

Extraterritoriality (*ĕks'trə-tĕr'ĭ-tō'rĭ-ăl'ĭ-tĭ*). An immunity from its general jurisdiction granted by a state to the representatives or subjects of another state within its own territory. Such immunity extends, by the practices of international law, to sovereigns sojourning in an official capacity in a foreign country. The sovereign and his retinue are exempted from civil and criminal jurisdiction and from police and administrative regulations, as well as from the payment of taxes and from the performance of other duties imposed upon ordinary residents. A similar exemption is accorded by all nations to the diplomatic representatives of other states accredited to them. (See *Diplomatic Representation.*) Any foreign army within the territorial limits of a state, with that state's permission, is free from its jurisdiction, and, when a foreign vessel of war, without inconvenience to a state, enters or remains within its maritime jurisdiction, the vessel and the crew are ordinarily accorded an immunity from local jurisdiction.

Extraterritoriality may have, furthermore, a much wider scope. It was customary for European nations, in negotiating treaties of commerce with Oriental countries and in arranging for the residence of their citizens within these countries, to obtain for their citizens rights of extraterritoriality. By these treaties, foreign citizens are triable, not by the courts of the country in which they reside and travel, but by courts of their own government, usually of a consular character.

Treaties providing for extraterritorial rights within the Ottoman empire are termed "capitulations." These treaties were repudiated by Turkey during the World War. Following the World War, the Allied powers and the United States made unsuccessful efforts to require the present Turkish government to recognize these capitulations anew.

In Japan, the right of consular jurisdiction, with other privileges for American citizens, was obtained in the treaty negotiated by Commodore Perry in 1858. This action was followed by similar concessions to other Western nations. Following the reorganization of Japan, that country zealously sought the abolition of these extraterritorial rights, which were properly considered prejudicial to her sovereignty, and, after the modernization of her courts and codes of law, extraterritoriality was relinquished by all foreign states from July 1899. Similar rights still exist, however, in China and in Siam, although in the latter country such rights have largely been relinquished by France and by Great Britain. In China, in 1906, the United States created the "United States Court for China," with jurisdiction over its own nationals in all parts of that country.

Favored Nation Clause. A provision found in treaties between practically all modern countries. It assures to the citizens of a foreign state all such privileges within the territory of another state as may at any time be accorded to the citizens of the "most favored nation."

Federalism. A system of government wherein the political powers of the state are constitutionally distributed between the national government and the local governments of member units which are called "states," "provinces," "cantons," etc. Federal government is distinguished from "unitary" or "centralized" government. In centralized government, the whole authority is vested in the central or national structure; local governments have no constitutional independence or autonomy, but are vested with functions by act of the central government itself and are subordinate to the central government.

The term federal refers to the government, not to the "state." It is politically incorrect to speak of a "federal state," or of a "divided sovereignty" in the state, since sovereignty, by its very philosophical conception, is indivisible.

A federal government or a "federation" differs from a "confederacy" or a "confederation" in that it is actually the government of a sovereign state, whereas a confederation is a union of states in which sovereignty or state independence resides in the member states themselves. The one is a "perfect union"; the other, a league. In a confederation, the member states reserve the power of withdrawing from the union, and their consent must be implied or assumed to actions taken by the confederate government. A federal government is an "indissoluble union" which can be disrupted only by successful rebellion or revolution. The authority of the government in a federation is direct upon the citizens of all member units, and allegiance is primarily to the federal union and secondarily to the member units.

The long controversy in the United States, which ended in civil war, confused many of these principles and kept them in doubt. Today they seem both philosophically and actually clear. The United States of America is the first federation, in the modern sense, as well as the greatest and most remarkable. Its success was long doubted, but the fact that a type of government of extreme utility and significance was initiated in 1789 is evidenced by the development of other federal governments, largely inspired by the American Union. See *Argentina, Australia, Brazil, Canada, Mexico, Switzerland, Union of South Africa, Venezuela.*

A federal government usually arises out of the union of previously independent states or governments and the creation of a new national government through this union. The act of union preserves as separate local governments the unit members which have merged. Usually the powers bestowed upon the federal government are specified and enumerated, all others being reserved to the states or provinces. In the case of the Canadian federation, however, the reverse principle holds, where the provinces have enumerated powers.

The applicability of federalism to great states composed of elements with strong local attachments and presenting differences of type is very clear. Such may be the political evolution of China, of Russia, and even of parts of Europe other than Germany and Switzerland. The union of parts of the British Empire on a federal plan has had the attention of British publicists. See *Imperial Federation.*

Filibuster. One who engages in an unlawful military expedition into a foreign country. The word is derived from the Spanish *filibustero* which, besides connoting a "freebooter," is used also as a term of contempt for a seditious plotter.

In parliamentary slang, "filibuster" is used to designate measures employed to prolong debate and to prevent a vote. See *Closure Rule.*

Franchise Tax. A tax either upon the privilege or franchise granted by a state to a corporation empowering it to act as a legal body, or upon a special franchise granted to a public-service corporation permitting the use of the public streets or other public places for the business of the corporation.

States cannot impose a tax upon the general franchise of a corporation created by the Federal government. Nor can any state impose upon a corporation, organized under the laws of another state, a tax which is calculated upon the entire capital stock of the corporation, the courts holding that this constitutes an attempt to tax property not within the jurisdiction of the state.

Franking Privilege. A privilege possessed by members of Congress, as well as by members of other branches of the Federal government, of sending official mail free of charge.

Free City. The early states of the Mediterranean and Ægean seas were "city-states." Political life was confined to the urban community; the surrounding land, usually of limited extent, was subordinate and tributary to the city. Such were the ancient Greek states, and such in the beginning was Rome. The development of medieval commerce and manufacture again brought the city to the front, and the Italian cities, such as Venice, Florence, and Genoa, became free and independent states. In the north, the Flemish and Baltic cities, and also those of the Rhineland, attained comparable freedom of government, although nominally each was under the sovereignty of some greater political authority.

These free cities frequently leagued together in a confederacy or "hanse," for mutual protection and defense of commercial rights. The most famous of these associations was the Baltic or Teutonic Hanse, under the head of Lubeck. The development of nationalities broke up these leagues and brought the free cities under national authority. Three,—Lubeck, Bremen, and Hamburg,—retained their freedom and are still "free cities" and members of the federation of the German Empire. The Treaty of Versailles restored the city of Danzig to an independence which it had centuries ago as a member of the Hanseatic League, and also created a new free city, Fiume, although the latter arrangement lasted only until 1924. See *Hanseatic League*, page 566, and *Venice and the Hanse*, page 1200b.

Freedom of Contract. Political and economic thought at the close of the 18th century and at the beginning of the 19th century favored the complete freedom of the individual, both to employ labor and to accept employment, without interference from the state or coercive influence of other individuals. Economic teaching held that attempts on the part of public authority to limit industrial or commercial competition interfered with the law of supply and demand and violated fundamental personal rights.

Changed industrial relations and the sufferings and abuses arising from unrestrained competition have revealed the necessity of considerable limitation of the so-called right to freedom of contract. This right, although specifically protected by the United States Constitution, has always been regarded as subject to the "police power"—the regulation or limitation of actions in the interest of the public health, safety, and morals. Much of the social legislation of the 20th century, limiting hours of labor, prescribing working conditions, and fixing minimum wages, has met with the objection that it infringes freedom of contract. In most instances, such legislation has been upheld by the supreme court of the United States as within the police power of the states or of the nation.

The conception of the police power has undergone marked extension, and the once unchallenged right to sell one's labor in the dearest market or to hire at wages and terms that take no care for the safety, health, or comfort of the employed has been greatly abridged. Freedom of contract between employer and employed has further been restricted by the growth of labor unions and by the practice of "collective bargaining by organized labor." See *Social Legislation.*

Freedom of Religion. The first amendment to the United States Constitution and similar provisions in state constitutions guarantee freedom of worship as a fundamental right. This right, however, does not permit the individual to engage in practices which are regarded as inimical to the health, morals, or safety of the state.

Thus bigamy may be made a crime and may be punished as such, even though plural marriage be a tenet of a particular faith. A person is not excused from compulsory military service because his religious faith forbids bearing arms. A state may make it a crime for a parent to refuse to obtain medical attention for a child because of religious conviction that bodily ills can be cured only by aid of religion.

Freedom of Speech. Freedom of speech and of the press was one of the established rights of Englishmen; it was transported to America by English colonists and is protected by the United States Constitution.

This right in ordinary times extends to the free criticism of the government itself, and even to advocacy of revolution. Justice Holmes, in the case of *Abrams* vs. *United States*, said:

"We should be eternally vigilant against attempts to check the expression of opinions that we loathe and believe to be fraught with death, unless they so imminently threaten immediate interference with the lawful and pressing purposes of the law that immediate check is required to save the country."

The right, however, is not without limitation. Criticism that unduly hinders the government in the performance of its proper functions has been held by the same jurist to be illegal and punishable. "The question in every case is whether the words used are used in such circumstances and are of such a nature as to create a clear and present danger that they will bring about the substantive evils that Congress has a right to prevent. It is a question of proximity and degree. When a nation is at war, many things that might be said in time of peace are such a hindrance to its effort that their utterance will not be endured so long as men fight, and that no court could regard them as protected by any constitutional right." (*Schenck* vs. *United States*).

However jealous a free people properly may be to protect their right to this freedom in times of peace, sound political principle upholds the suppression of this right in time of war. The undeniable right of the state to oblige certain men to enter the armed forces, thereby to suffer the temporary loss of all freedom of action and to incur the dangers, sufferings, and casualties of war, assuredly supports the right of the state to require all other people to refrain from words or publications that may augment the dangers of the army, jeopardize its success, or weaken its morale.

Free Trade. See *Tariff*.

Functional Representation. A plan for representation in political bodies, based upon occupational or class groups rather than upon territorial units or electoral districts. Functional representation is an old institution, and parliamentary development sprang from the assembling of representatives of the different classes of medieval society. These representatives at first sat in separate bodies and deliberated and voted apart. Constitutional development in western Europe, however, has tended to draw these classes together into single chambers and to obliterate occupational divisions.

In the United States, no regard has ever been paid, in organizing voters, to the classes or professions which they represent, and parties in America have been composed of people of all walks of life. Neighborhood interests and local and sectional attachments have been the potent influences in stirring people to political activity, and it would appear to be essentially a democratic ideal that in politics men should group themselves, not according to trade or profession or degree of property possessions, but in accordance with temperamental preferences and political convictions.

Thus in a sense, the present day advocacy of functional representation appears reactionary and is opposed to the democratic spirit. Its advocates urge that men are more strongly bound together by their trade, occupation, or pursuit than by any other tie and that, politically organized in such groups, they would be most effective because sharing a common knowledge. It might be stated also that, thus organized, political groups would become highly sectarian and would be lacking in sympathy for the broad purposes of national life.

The advocates of functional representation appear, mostly, to come from the body of socialists, to whom the stimulation of "class consciousness" and the spread of "class warfare" are social ideals. To such, the organization of classes for political representation may seem to accord with the general program of socialism.

Functional representation has, so far, attained small realization, in spite of its vigorous advocacy in the constitution-making that followed the World War. In the constitution of the German commonwealth, provision is made for functional representation in workers' councils and in the economic council of the state. (See *Germany*.) Similar proposals are incorporated in the new governments of Austria, Jugoslavia, and Poland.

Fusion. A coalition or combination of political parties or groups for the purpose of defeating another party or group.

On a number of occasions in New York City, a fusion ticket of Republicans and independent Democrats has been placed in the field to secure the defeat of Tammany Hall. More recently, in districts socialistic in tendency, the Republican and Democratic parties have joined forces in a temporary fusion to defeat socialistic or other radical candidates.

Gerrymander (*gĕr'ĭ-măn'dẽr*). A form of political sharp practice, whereby electoral districts are so laid out that the party in power will possess a majority of votes in as many of them as possible.

The practice has produced districts of very eccentric appearance, one of which, attributed to Governor Gerry of Massachusetts in 1812, being likened to a salamander, was wittily dubbed a "gerrymander"; hence the name.

Government Ownership. The acquisition and operation, by a state or municipality, of public utilities, such as railroads, street railways, telephone and telegraph systems, and gas, water, and electric systems. Government operation of public utilities without public ownership has also been advocated, and publicly owned services have sometimes been leased to private control for operation.

Public ownership is much more common in European countries than in America and is more successful in its results. It is doubtful, however, if public ownership anywhere can be shown to combine equal service with more economical costs. In the United States, the general practice is public regulation of utilities, leaving them to private ownership and management.

Habeas Corpus, Writ of. In English and in American law, a writ issued by a court of justice, commanding the person to whom the writ is directed to bring before the court the body of a person detained or in custody. Failure to appear with the person of a prisoner places an officer in "contempt of court" and makes him liable to the summary imposition, by the court, of fine or other punishment. The court, once the prisoner is brought into its presence, determines whether he is being legally held and may, after due examination, set him at liberty, release him upon bail, or recommit him to prison.

The writ of habeas corpus is an ancient one in English law, antedating Magna Charta. It had the constant support of Parliament against efforts of English kings to set it aside, and was strengthened by repeated legislative acts. It was brought to America by English colonists.

The Constitution of the United States (Article I, Section IX, Par. 2) provides that "the privilege of the writ of habeas corpus shall not be suspended unless, when in cases of rebellion or invasion, the public safety may require it." The weight of learned opinion holds that the suspension of the right must be accomplished by act of Congress; but President Lincoln, during the Civil War, by executive action suspended the privilege over extensive territory. His act was subsequently ratified by Congress. See *Habeas Corpus Act*.

The constitutions of all American states contain provisions safeguarding the privilege of habeas corpus, analogous to the provision of the Federal Constitution. A state court cannot issue a habeas corpus for the discharge of a person held in the custody of the Federal government. Four states—Mass., N. H., R. I., and S. C.—provide in their constitutions that the privilege of the writ may be suspended by the state legislature. (See *Martial Law*.) The writ of habeas corpus has been carried wherever the common law has been established. It was introduced in the Philippines in 1901.

Hague Peace Conferences. Two international conferences of modern states have been held that are known by the place of their assembly, the city of The Hague, which is the capital of the Netherlands. The first was proposed by Czar Nicholas II of Russia, and met in 1899 on the invitation of the czar and the queen of the Netherlands. In a circular note of August 12, 1898, issued by the Russian government, the objects of the conference were suggested to be "the maintenance of general peace and a possible reduction of excessive armaments." The following states took part in this conference: Austria-Hungary, Belgium, Bulgaria, China, Denmark, France, Germany, Great Britain and Ireland, Greece, Italy, Japan, Luxemburg, Mexico, Montenegro, Netherlands, Persia, Portugal, Rumania, Russia, Serbia, Siam, Spain, Sweden and Norway, Switzerland, Turkey, and the United States.

Results of First Conference. The deliberations of this conference resulted in three "conventions," three "declarations," and six "resolutions." The first convention was for "pacific settlement of international disputes." This provided for a permanent court of arbitration at The Hague, a permanent administrative council, made up of the diplomatic representatives of the signatory powers to The Hague, and an international bureau, acting under the direction of this council. The second convention dealt provisionally with the laws and customs of warfare on land. The third convention sought to adapt maritime warfare to the principles expressed in the Geneva Convention of August 24, 1864. The declarations sought to prohibit, for a period of five years, the use of projectiles or explosives discharged from balloons; the use of asphyxiating or poisonous gases; and the use of expanding or "dumdum" bullets in warfare. The resolutions also expressed views on the subjects of disarmament; the rights of neutrals; security of private property in maritime warfare; bombardment of unfortified towns; and uniformity in naval artillery.

The second conference was first proposed by President Roosevelt in 1904, but his proposal was withdrawn in order to allow the czar of Russia the privilege of calling the second conference as he had called the first. This met from June 15 to October 18, 1907. The following states, to the number of 44, were represented: Argentine Republic, Austria-

Hungary, Belgium, Bolivia, Brazil, Bulgaria, Chile, China, Colombia, Cuba, Denmark, Dominican Republic, Ecuador, France, Germany, Great Britain, Greece, Guatemala, Haiti, Italy, Japan, Luxemburg, Mexico, Montenegro, Netherlands, Nicaragua, Norway, Panama, Paraguay, Peru, Persia, Portugal, Rumania, Russia, Salvador, Serbia, Siam, Spain, Sweden, Switzerland, Turkey, United States, Uruguay, Venezuela. It will be observed that, with the exception of two Central American states, Costa Rica and Honduras, the two African states of Abyssinia and Liberia, and the Central Asian monarchy of Afghanistan, the representation included practically all states then recognized as independent. Delegates from Korea, which by the Treaty of Portsmouth had recently passed under the control of Japan, failed to secure seats.

Acts of the Second Conference. This conference adopted a series of conventions, the first providing means for the peaceful settlement of international disputes and altering in certain respects the measures proposed by the first conference. The second limited the employment of force for the recovery of duties due from the citizens of one country to the citizens of another, and the third defined the procedure for the opening of hostilities in the event of war; and ten conventions which in a measure modified the laws of war on land and at sea. These conventions and declarations were only in part ratified by the participating nations, different countries excepting from the ratification of different measures.

Inasmuch as it was not contemplated that they would become effective between belligerents unless all belligerents were ratifying parties, the rules which sought to regularize the conditions of war and to mitigate its severities were completely disregarded in the World War. This was particularly noticeable in the case of the conventions forbidding bombardment of unfortified towns by naval forces, the laying of automatic submarine contact mines, the discharge of explosives from air vessels, the use of poisonous gases, and the respect for private property in warfare.

However, the war department of the United States, following this conference, revised its regulations governing the conduct of its armies in the field so as to include the provisions of the Hague Conference, thereby presumably making incumbent upon the officers and men of its own forces compliance with many of these principles. The extreme measures followed by all belligerents in the World War and the development of a public opinion that the severities of warfare cannot be softened without a prolongation of the struggle have probably rendered inapplicable the measures of the Hague Conference in this field.

Hague Tribunal. A standing court of arbitration created by the first Hague Peace Conference. Such a tribunal was proposed at the conference by the representative of the British government. The government of the United States had also specifically instructed its delegates to labor for such a court. In a convention signed at this conference, the nations agreed "to use their best efforts to ensure the pacific settlement of international differences" and, with this object in view, to undertake the organization of a "permanent court of arbitration."

By the plan then devised, each signatory state nominates four jurists for a six-year period. These jurists constitute a panel, from which judges may be selected to sit in arbitration.

The first case to be tried before this tribunal was one submitted by the United States and Mexico for the adjustment of a contention that followed the settlement of the Mexican war and was known as the "Pious Fund of the Californias." The award was made October 14, 1902, and was accepted by both governments. Three other awards were made by the Hague Tribunal, before the meeting of the second Hague Conference in 1907. This latter conference made some changes in the organization of the court and provided an alternative procedure called "arbitration by summary procedure." Between 1907 and 1914, twelve cases were submitted to the Hague Tribunal.

The agreements establishing the Hague Tribunal and the system of arbitration thereunder are still in force, at least between nations that have not been at war, and the Permanent Court of Arbitration continues to have a separate existence from the Permanent Court of International Justice, also located at The Hague, which was set up by the League of Nations after the World War.

Home Rule. Local self-government or the administration of home or local affairs in a part of a state by the people of that section. In British history, the phrase refers particularly to autonomous government for Ireland. In American politics, it is used mainly to express municipal autonomy, granted either by placing constitutional limitations upon state legislatures in favor of municipal governments or by a system of authorizing the citizens of a municipality to frame their own charter of government.

Immigration Legislation. Laws designed to exclude, limit, or select immigrants entering one country from a foreign country.

The power of a state to deny admission of a foreigner to its territory is an undoubted right under international law, and has been exercised in all times. Complete exclusion of foreigners and denial of free intercourse with foreign nations has, however, been treated as an act of unfriendly or hostile character, and against it nations have applied forceful methods. In this manner the foreign exclusion policy imposed upon China by the Manchu Dynasty was broken through by European nations, even at the cost of war; and in 1854 the United States, by a naval demonstration under Commodore Perry, coerced the government of Japan into abandoning its policy of nonintercourse with foreigners, which had been in force for nearly 250 years. In 1904 the British sent an armed mission into the "forbidden land" of Tibet and compelled the government at Lassa to modify its exclusion policy.

These instances, however, in no way affect the political principle that a state possesses unlimited power, except as modified by treaty, to decide what classes of foreigners shall become immigrants and settlers. Serious diplomatic difficulties, however, may arise, as, for example, between the United States and Japan, when immigration legislation is not uniform with respect to all races and nations.

Immigration to America. The extraordinary migrations of peoples from Europe and Asia to the Americas, Australasia, and Africa during the last hundred years, not as colonists but as immigrants to countries already politically established, is one of the noticeable and far-reaching phenomena of the present economic age. The United States, as the country which has received these immigrants in greatest numbers, has experienced the greatest perplexity over the problems they create.

Immigration into the United States has passed through several phases. Previously to 1880 the immigration was almost exclusively from peoples of northern Europe, whence the original settlers of the United States had come. After that date, immigration from northern Europe declined, and that from southern Europe and from Russia rapidly increased. This so-called "new immigration" produced a change in the American attitude toward unlimited immigration. Until the World War, the immigration laws were designed only to exclude certain undesirable classes, including feeble-minded, insane, epileptics, sufferers from certain contagious or loathsome diseases, paupers, criminals, prostitutes, polygamists, anarchists, and those convicted of, or admitting, crimes or misdemeanors "involving moral turpitude." The importation of labor under contract was also forbidden.

Restriction of Asiatic Immigration. In addition, Asiatic immigration had been restricted, first, by the Chinese Exclusion act of 1882, re-enacted in 1892 and in 1902, whereby all immigration from China, except students, merchants, and a few other classes, was forbidden. After 1900, when Japanese immigration into California became notable, an exclusion league was organized in that state and agitation was commenced to secure legislation forbidding the admission of Japanese. In 1907, when an immigration bill restricting the admission of Japanese and Korean laborers was introduced into Congress, the president secured in its place Congressional authority to suspend Japanese and Korean labor immigration coming from our insular possessions or from Canada or from Mexico. An agreement was made between the president of the United States and the government of Japan—the so-called "gentlemen's agreement"—whereby the latter government undertook to prevent, by the refusal of passports, the entrance of laborers into the United States, except former residents, parents, wives, or children of residents and settled agriculturists or of those possessing a farming enterprise in this country.

General Limitation of Immigration. In 1924 the United States Congress passed an act which reduced annual immigration to 2% of the number of foreign residents in 1890. A minimum of 100 is accorded each country, excepting those affected by Asiatic exclusion legislation. Previously excluded classes are barred, including illiterates over the age of 16, with certain exceptions. The law further makes the principal American consular officer in each country a "quota control officer," with power to assure the eligibility of applicants, exclusion and deportation after arrival being thus largely avoided. Preferences within the quota are made, in favor of members of families already resident, and of those skilled in agriculture. The law did not apply to immigration from countries of the western hemisphere, nor did it alter the previously existing regulation of immigration from China or Japan.

In Australia and in New Zealand, legislation against the admission of Oriental peoples has been more drastic than in the United States, and includes even subjects of the British Empire, if natives of Asia. In Canada, restrictive immigration laws against Asiatic populations have been checked only by the influence of the British government. A "gentlemen's agreement," like that between the United States and Japan, restricts the movement of Japanese into Canada.

Impeachment. A form of criminal procedure, involving charges and trial, by a legislative body against those in high office. Impeachment differs from attainder in being a judicial, not a legislative, measure. It originated in England through the bringing of charges by the House of Commons against oppressive acts of officials of the crown. The House of Lords, as the highest judicial body of England, judged the complaints pressed by the Commons. The right of the Commons to impeach whomsoever it will, has been recognized, though the practice has fallen into disuse in Great Britain for more than a century, the system of responsibility of ministers to the House of Commons having made impeachment unnecessary.

The earliest instances are the impeachment of Lord Latimer in 1376 and of Pole, earl of Suffolk, in 1386. The last British impeachments were those of Warren Hastings, 1788–1795, and Lord Melville, 1806.

The institution of impeachment was adopted by the framers of the United States Constitution, which provides that the president, the vice president, and all civil officers of the United States shall be removed from office "on impeachment for and conviction of treason, bribery, and other high crimes and misdemeanors." The penalty upon conviction, however, is confined to removal from office and to disqualification to hold any office of honor, profit, or trust under the United States.

Impeachment charges are brought by the House of Representatives and are tried by the Senate. If the president of the United States is impeached, the chief justice of the United States supreme court presides at the trial; otherwise, the vice president presides. A two-thirds vote of the Senate is necessary for conviction. There have been nine cases of impeachment of Federal officials and three convictions. The most famous impeachment trial was that of President Johnson in 1868, which failed of conviction by one vote.

Members of Congress are not subject to impeachment, but they may be expelled from either chamber by a two-thirds vote of its members. Impeachment of state officials is provided for in most state constitutions, the procedure being modeled upon the Federal system. In 1913 a governor of New York was impeached and was convicted on the charge of misappropriating campaign funds. In this case, the crime was committed before election to office.

Outside of Great Britain and the United States, impeachment is provided for by the constitutions of many countries which have based the institution upon British and American experience.

Imperial Federation. A plan to unite elements of the British Empire, particularly the self-governing dominions, with Great Britain under some form of federal government. The British "dominions"—Canada, Australia, New Zealand, and South Africa—are practically self-governing. While the British Parliament at Westminster has a legal or constitutional right to legislate for these countries, this right is either not exercised or is so sparingly exercised as to call for little comment. While the conduct of foreign affairs for the whole British Empire is in the British ministry, the dominions have asserted their fundamental interest in this important subject and especially in those imperial issues which determine peace and war.

Certain governing actions which Great Britain might legally take for the government of the dominions, such as the imposition of taxes upon them or the compulsory drafting of troops, would be so at variance with the principle of self-government that has been accorded the dominions as presumably to lead to resistance and to separation if these rights were exercised. The dominions are attached to Great Britain and to the empire by ties of sentiment rather than of constitutional law. While, by the aid of the dominions during the World War, this attachment was shown to be of a most loyal and profound character, nevertheless, in the minds of certain statesmen the empire might be strengthened by the creation of a federal union of these countries with Great Britain and by the creation of a federal parliament and government. If this were done, the British Parliament at Westminster would become a local legislature for Great Britain, and imperial legislation would be transferred to a new federal parliament containing representatives not only from Great Britain but from all members of the federation. The alterations that would be produced in the British constitution by such a change would be many and profound.

In 1884 the "Imperial Federation League" was formed. Its first president, Mr. W. E. Forster, had advocated federation in 1875 "to replace dependence by association." A colonial conference, the name later changed to "Imperial Conference," was convened in 1887, in 1903, in 1907, in 1909, in 1911, and in 1923. Agreements made at the 1911 conference to establish an imperial council found little support, but in the course of these conferences the British government assured the dominions of an opportunity to be heard before entering into international agreements that affected them. The imperial conferences necessarily gathered strength during the World War, and in 1918 an "Imperial War Cabinet" was formed. In 1921 there took place a meeting of the prime ministers of the dominions with the prime minister of Great Britain, at which was considered particularly the question of the renewal of the Anglo-Japanese alliance.

Inauguration Day. The day when a chief executive of a nation, state, or city assumes office.

The Continental Congress, upon the ratification of the Constitution of the United States in 1788, provided that states should choose presidential electors on the first Wednesday in January 1789; that these should choose the first president and the first vice president on the first Wednesday in February; and that the new Congress should assemble in New York on the first Wednesday in March. The first Wednesday in March was the 4th, and, although President Washington was not inaugurated until April 30, the date March 4th, following a presidential election, has continued to be inauguration day.

Industrial Court. See *Arbitration of Industrial Disputes.*

Initiative of Laws. A procedure whereby proposals of law may originate in the petition of private citizens. This measure is frequently associated with another procedure, the referendum of laws, but, as stated elsewhere, it differs from the referendum in being a radical device.

Before the adoption of the popular initiative, projects of law came from two recognized sources: (1) In countries having parliamentary or cabinet governments, they usually are initiated by ministers; and in the United States, where presidential government exists, they may originate in "executive measures" recommended to the attention of Congress by the president or to state legislatures by governors. (2) Measures arise in the legislatures themselves, either by the action of single members or by the work of committees or commissions. Under the operation of the popular initiative, a project of law may be originated by anyone, and, a sufficient number of petitioners in behalf of the measure having been obtained, the proposal goes either to the legislature under an obligation to pass upon it, or directly to the popular judgment as expressed in a general election. The second practice is the one common in the United States.

Among the objections to the popular initiative are the following: It affords opportunity for the proposal of eccentric legislation. It frequently encumbers the electoral ballot with an undue number of complicated and doubtful measures which confuse and embarrass the electoral mind. Where there is indifference or inertia of the voters, it may lead to the enactment of laws by minorities of the voting population. As a procedure, it affords no opportunity for the improvement of a bill by discussion preceding enactment, a most important parliamentary step in the proper shaping of legislation. In American states, where the practice exists of recognizing the popular enactment as superior to the legislative will, it imposes additional impediments upon legislatures and tends to bring into doubt and confusion the constitutional laws of the state.

The popular initiative was adopted by the American people from the example of Switzerland and exists by constitutional provision in 20 American states. See *Referendum and Initiative of Laws.*

Injunction, Writ of. The name for a judicial process under English law, whereby a party is "enjoined" or commanded by the court to refrain from doing some particular thing described in the writ. While injunction is properly a restraining order, it may be used to prevent persons from interrupting the normal continuance of things, as the flow of water or the movement of trains.

In the United States, the writ is issued both by Federal and by state courts. It has been issued at the instance of the president, to prevent organized obstruction of interstate commerce and, particularly, of the movement and delivery of mail. It has been used frequently in recent years to prevent labor unions and other organizations, when on strike, from interfering with the property and interests of employers. Leaders of such organizations, disobeying the writ, have been arrested by order of the court and have been severely punished for contempt of court. In such summary proceedings, the right of trial by jury does not obtain, and these court proceedings have been attacked as arbitrary. The phrase "government by injunction" has been applied to them.

The general utility of the writ of injunction is clear, since its aim is to prevent acts of damage or trespass wholly or partly irreparable, for which a suit for damages would not afford actual redress.

Intervention. The interference by one state in the affairs of another sovereign state by force or by the threat of force. Even when hostilities are avoided, intervention can with difficulty be distinguished from an act of war, since it is the coercion by one nation of the will of another by acts of violence or by menace of violence. Except where a right of intervention has been conceded by one state to another during the existence of certain crises, as is the case with Cuba and with other American states and the United

States, it is difficult to find "legal" justification for the numerous acts of intervention with which the history of states is filled. Justification must be based upon political or moral grounds, among which the most important are: to ward off imminent danger to the intervening state or to its citizens; to end a condition of violence, anarchy, or oppression, repellent to the instincts of humanity; to preserve a balance of power and to prevent the aggrandizement of the influence of a rival state. This last ground of intervention in the past has been the frequent occasion of European wars.

Modern instances of intervention, on one or another of the above grounds, are the allied intervention in China, 1900, to rescue, from the Boxers, legations and nationals under siege; the intervention of the United States to end Spanish rule and warfare in Cuba in 1898; American intervention in Cuba in 1906 in compliance with the terms of the Platt amendment (See *Cuba.*); and further American interventions in Santo Domingo, Haiti, Nicaragua, Panama, and Mexico.

Intervention in the past has been so frequently employed upon trivial and unjustifiable pretexts that a doctrine of "nonintervention" has developed, particularly associated with the name of the English Liberal, Richard Cobden, 1804–1865. Cobden's political platform was "free trade and no intervention." Noninterventionists hold that the sanctity of a state is so great and the right of a people to settle their internal affairs so sacred that intervention can never be justified on any grounds whatever, and that for one state to employ force against another to end revolution, misrule, or violations of the rights of its own nationals, is without possible moral justification.

Such extreme views are at the basis of the "anti-imperialistic" movement in the United States, which found political expression in the platform of the Democratic party in 1900, when imperialism was declared to be the "paramount issue." More recently, nonintervention arguments have been widely invoked to prevent American intervention in Mexico for the purpose of ending the disorders of revolution which began in that country in 1911.

I. W. W. "The Industrial Workers of the World," commonly known by the above abbreviation, is a radical labor organization which appeared in the United States in 1905. At a general conference in that year, its originators issued a manifesto, and the constitutional convention of the society met in Chicago on June 27.

The organization is founded upon Marxian socialist principles, as professed by the "extreme left," or radical, wing. In this respect, its doctrine is closely connected with Bolshevism. Its fundamental principle is that of irreconcilable warfare between capital and labor, to end in the destruction of capitalism and the wage system and in the appropriation of property by the workers. To accomplish this end, it advocates "direct action," that is, repeated strikes, violence, destruction of property, and sabotage, designed not to gain particular advantages, but to destroy profits and to break the spirit of employers.

The movement stands also for "industrial unionism" as opposed to "trade" or "craft unionism" and for the gradual organization of workers into "one big union" able eventually to destroy political and economic opposition by means of the "general strike." See *Syndicalism.*

Lobbying. The practice of importuning legislators for the passage or defeat of pending legislation. Formerly it was the practice of public-service corporations or other large interests to employ skilled advocates, who cultivated close relations with members of Congress, state legislatures, or municipal councils, attended their sessions, watched closely for proposals of law inimical to the interests of their employers, and endeavored by every means to secure or to defeat legislation that affected them. Such persons were called professional lobbyists.

The practice has been abused and has frequently been made the means of bribery and of corruption. To protect themselves, legislatures have enacted antilobby measures, such as prohibiting the presence of lobbyists on the floor of legislative halls, or in their anterooms. Properly controlled, the practice of lobbying may be legitimate and may even prove an assistance to a legislature struggling with a mass of proposed legislation. The preferred manner for advocates or opponents of bills is to appear before committees of the legislature and in open session to state their support or their objections.

The term is derived from the word lobby, meaning a cloakroom or antechamber wherein the so-called lobbyist is supposed to exert important influence upon the members of the legislature.

Logrolling. A system of bargaining among members of a legislative body, whereby one member, by giving his support to other members' measures, obtains the support of others for a measure in which he or his constituency is interested. Logrolling has been carried to its highest point in American legislatures, facilitated, as it is, by the practice of allowing members to introduce bills without limit. Logrolling is connected especially with "pork barrel" legislation, or with bills appropriating moneys for local improvements and for interests without reference to state or national policy. See *Pork Barrel.*

Majority. A number greater than half of a total number. In deliberative bodies or elections, a number greater than half the votes cast, or, in another sense, the excess of that greater number over the remainder of the total. The term "majority" is sometimes loosely used to designate the number of votes received by a candidate, or by one of several candidates, in excess of the vote of his nearest competitor; but this relation is properly termed a "plurality."

An "absolute majority" means, in common usage, the number greater than half of all voting, or of all present whether or not voting, or of those entitled to vote.

Marine Corps. Marines, or, as they are sometimes popularly called, "soldiers of the sea," are a military organization serving under the navy department. In the United States, they constitute a distinct corps under the secretary of the navy. Originally they were introduced into the British navy to enforce discipline over the sailors. Their employment, however, has been continued for other reasons. Marines are favored in the United States navy because of their extreme serviceability for guard duty and ceremonies aboard ships, for the defense of naval property ashore, and as landing parties from war vessels for the protection of life and property in foreign countries in times of disturbance.

They have been used especially by the United States government in foreign intervention. Forming a part of the navy and transported aboard warships, they exceed all other land forces in mobility, while their frequent employment for police or protective duty makes their use on foreign soil less likely to be misconstrued as an act of war than would the landing of elements of a regular army. Marines are equipped, drilled, and tactically employed as infantry. When with elements of the United States army, they are under the command of the ranking officer, whether army or marine.

Martial (*mär'shăl*) **Law.** Martial law must be distinguished from "military law" and "military government." While the statement is often made that "martial law has been declared" in some city or district in the United States, this does not mean the substitution of military for civil authority, which, under the American system of constitutional guarantees, cannot take place except during an actual state of war. The phrase does not correspond to what is elsewhere called "suspending constitutional guarantees" or "declaring a state of siege." In these latter cases, civil government is actually suspended, and civil authority gives place to military.

In the United States the activity of troops, either state or national, in time of civil disturbance, means no more than that the military forces have been called into action to uphold the authority of the president or of the governor of the state and to enforce his orders. Government remains civil, but acts through military organization because the ordinary administration is unable to cope with the situation. The employment of troops is not to wage war but to keep peace. In preserving life and property, troops may resist violence, even to the point of taking life, but their responsibility in such cases is not different from that of civil officers. Arrests may be made, but as measures of precaution, not for the infliction of punishment by military courts.

Undoubtedly, a state of domestic insurrection may be so serious as to justify strong measures by troops, but the authority for their employment remains with the civil head. Civil courts are not superseded nor is civil law abrogated unless action to suspend the guarantees of civil liberty is taken by Congress, or by the legislature of a state, as is permitted in a few state constitutions.

Mayor. The chief executive of a British or an American city, corresponding to the French "maire" or the German "burgomaster." See *France* and *Germany.*

In addition to administrative powers, the mayor in certain countries possesses the authority of a local magistrate: and in continental states generally he has a legislative or "ordinance" power. Outside of British and American states, he is almost invariably an agent of the national government as well as the head of municipal administration.

In Great Britain, the mayor is the presiding officer of the city council and possesses no greater legislative authority than any member. He is the official representative of the municipality and as such occupies a position of high honorary and social distinction. In the United States, under the older and more customary form of municipal government, the mayor has a veto over the legislation of the council and may have extraordinary power in budget matters. See *City Government.*

Merit System. The appointment of persons to positions in the civil service of the city, state, or nation for reasons of fitness shown in competitive examinations, rather than as a means of payment for political services to the party in power.

Military Government. Government, in either domestic or foreign territory, under army or navy commanders.

Under the constitutional system of the United States, military government is set up by order of the president as commander in chief of the army and navy of the United States. The president may prescribe such administration for domestic territory in rebellion, for foreign territory occupied in time of war by the forces of the United States, or for territory recently acquired by conquest or treaty. The president may also set up military government within or over foreign territory in which the United States has intervened, with army or navy force.

Subject to the president's authority, such government may employ the widest types of administration, may pass laws, and may create courts. While normally resorted to in time of war or during hostilities, such government may continue after peace has been secured and is legal until altered by act of Congress.

Over territory outside of the Union, such government is not limited by the prohibitions of the Constitution. Trial by jury need not be established. In such a case, to use a popular expression, "the Constitution does not follow the flag."

These principles are illustrated by the procedure during and following the Spanish-American war. The islands of the Philippines, Cuba, and Porto Rico, in which Spanish power was destroyed, were governed by military commanders under the orders of the president during the period of peace negotiations and subsequently. In the case of the Philippines, the president, on September 1, 1900, transferred the legislative authority to the Philippine Commission, leaving executive authority still with the military governor. On July 4, 1901, the executive authority, except in certain regions still in a state of insurrection, was transferred to Mr. William H. Taft, the first civil governor of the Philippines. Not until 1902 did Congress act, making other provisions for the government of the Philippines. See *Philippine Islands*.

In the cases of Guam and American Samoa, Congress has never legislated, and government continues to be exercised by naval officers under the authority of the president.

Military Law. Military law must be distinguished from martial law. As this term is used in England and in America, it means those laws and regulations which apply to soldiers and sailors, assure the discipline of armies and fleets, and are enforced not by civil courts, but by military tribunals, or "courts-martial."

In the United States, on the outbreak of the Revolutionary War, the Continental Congress issued a series of rules modeled upon English regulations, which were reissued September 30, 1776, and have been frequently revised. This code is known as the "Articles of War." They prescribe a series of offenses and infractions of discipline to which military officers and men are subject and which may be visited by various penalties, including death for certain offenses in time of war. A person becomes subject to military law upon accepting an appointment or commission or upon enlisting in, or being called or drafted into, the army or navy. He is ordinarily free from this jurisdiction upon discharge or upon the termination of his commission or appointment.

Liability to military law in no way lessens the liability of a soldier or sailor to the civil and the criminal law of the nation or state. It simply subjects him to a double jurisdiction, one as a citizen, the other as a soldier or sailor. Being thus subject, he may be tried twice and punished twice, that is, by both civil and military authority, without constitutionally being placed twice in jeopardy for the same offense. While in time of war a soldier or sailor would ordinarily be tried by a military court, in the United States it is usual to turn over to the civil court a military prisoner charged with a civil crime or misdemeanor.

Military law is usually enforced through military courts or "courts-martial." These consist of boards of officers, convened, by order of the president or a military commander, for the trial of such cases as may be submitted to them. The sentences of these courts have no effect until they are approved by the authority convening the court, or by the president of the United States.

A "summary court" consists of a single officer for the trial of minor infractions of soldierly behavior, punishment being limited to penalties not greater than one month's confinement or detention, loss of two-thirds of one month's pay, or both.

A "general court-martial" consists of a board of officers, not less than five in number, of rank appropriate to the rank of the accused, if an officer. It possesses jurisdiction over every offense triable under the Articles of War, and has power to impose a sentence of dishonorable dismissal, or of death.

Modus Vivendi (*mō'dŭs vī-vĕn'dī*). A temporary arrangement between the governments of two countries, pending the settlement of relations by a formal treaty.

Monarchy. That form of government in which, actually or theoretically, political authority is vested in a single ruler who represents the sovereign power of the state. The head of a monarchy bears the title of "king," "prince," or, in certain cases, "emperor," or the equivalent of these words in the language of the country.

Monarchy is intimately connected with the principles of "divine right" and those of "legitimacy," the latter theory maintaining that royal power can be derived only by legitimate succession from a previous ruler through blood or recognized connection. In the legitimist conception, there is at a given time only one person in the world lawfully entitled to any given throne, and the right of this person cannot be affected or taken away by Parliament, popular will, or revolution.

Legitimate monarchy is to be distinguished from the "imperialist" conception, in which a Cæsar or a Napoleon rises to a position of monarchical authority by military triumphs and by the devotion of the people or of the army. In this institution, the right to rule is derived from the unprecedented services of an individual to the nation, rather than from legitimate succession or through the claim of divine ordination.

There may further be distinguished the seizure of supreme power by a civil or a military leader and its maintenance by the ruthless suppression of opponents. Such were the "tyrants" of the Greek city-states, the princes or "despots" of the Italian cities, and the "dictators" of Spanish America.

Limitation of Monarchy. While, in theory, monarchy is an absolute power of government, practically all monarchies tend to become, or have become, limited or constitutional. In the first place, monarchies are usually limited by the presence of a nobility who may contend with the king, as the English nobles did with King John at Runnymede. Corporations arise, such as the medieval towns, which secure concessions of rights, subsequently to be tenaciously defended against royal prerogative. The religious power or organization enters, usually supporting the pretensions of the monarchy, but frequently opposing it in defense of its own sacred position.

In Europe, monarchy attained its highest pretensions in the 18th century, when the "benevolent despots" of France, Spain, Austria, Prussia, and Russia claimed and nearly succeeded in exercising unlimited power. In England, these same claims had been defeated in the 17th century by the English revolution and by the strength of the British aristocracy. These circumstances gave rise to British constitutional monarchy. The French Revolution largely destroyed popular support of unlimited monarchy and brought into force the conception of government resting upon popular will. Throughout the 19th century, however, monarchy played a leading part in European governments. It rose again in esteem, partly through the success of the British system of parliamentary government and the exercise of all crown powers by ministers responsible to a representative body, and partly through the achievements of monarchical government in unifying Italy and Germany. After 1871, for an entire generation, republican government in Europe appeared to make little progress except in France and in Switzerland.

The World War, however, produced a momentous change. At its conclusion, the monarchical governments of Central Europe and of Russia were entirely swept away, and a new era of republicanism was opened. In 1929, the monarchical governments of Europe were Great Britain, Italy, Belgium, Spain, Norway, Sweden, Denmark, the Netherlands, Rumania, Bulgaria, Jugoslavia, Luxemburg, Albania, and Liechtenstein. In all of these states, the king, prince, or duke is regarded as the titular head and personification of the nation, while actual political power rests with elected representatives of the nation. Hungary, by an order of its government, in 1920, was declared to be a monarchy; but the executive power is in the hands of a "regent," and the royal succession still remains unsettled.

Monroe Doctrine. An important declaration of policy made by President Monroe in a message to Congress, December 2, 1823, in which the president declared "that the American continents, by the free and independent condition which they have assumed and maintained, are henceforth not to be considered as subjects for future colonization by any European powers." The message called attention to what the president considered to be the difference between the political system of the monarchies of Europe and that of America, and stated that any attempt on the part of these European monarchies to extend their system to any portion of the western hemisphere would be regarded as dangerous to the peace and safety of the United States.

The doctrine, at the time, accomplished its purpose of warning the Holy Alliance, composed of European powers, from intervening to overthrow the independence of the newly arisen Spanish American republics, and it has since been repeatedly appealed to by successive presidents, though not until 1896 was it formally noticed by Congress. Following the "Venezuela incident" of that year, in which the American government interfered to stop what it re-

garded as encroachments of the British government upon territorial rights of Venezuela, the policy was overwhelmingly endorsed by the American nation and by both the great political parties. It was also strongly endorsed at this time by the governments of several Latin American states.

The Monroe Doctrine is not, as is sometimes supposed, a principle of international law. It is in fact directly opposed to a fundamental principle of international law; namely, that a state may dispose of its own territory to another state without hindrance, for the Monroe Doctrine would probably be invoked to prevent the cession of an American possession by a weak state to a stronger one. The Monroe Doctrine is simply an American policy, never directly admitted by European nations until it found mention, though not a satisfactory mention, in the Covenant of the League of Nations. As a policy, it lacks precise definition, but tends to broaden in its application, and doubtless accords with a deep, though undefined, American resolution to liquidate the possessions of European states in the New World and to prevent the political issues of the Western continents from being determined at the capitals of Europe. In the hundred years since the policy was first declared, Spain, Russia, Sweden, and Denmark have ceased to have American possessions, while the colonies of France and those of Great Britain have become of minor importance, with the exception of the Dominion of Canada, which has risen to the position of an American nation.

Municipal Ownership. The civic possession of certain properties, as streets, bridges, ferries, parks, and sewage systems, is well-nigh indispensable to urban life. Only in rare instances, and then to the prejudice of city life, are such necessities as these privately owned. In most cities, water supply is now municipally owned. Other public utilities, such as street railways and lighting systems, are either privately or municipally owned. In Europe, they are generally the property of the city and are operated by its employees. In the United States, more frequently, they are privately owned, but are controlled, with respect to service and rates, by their franchises, by ordinances of the city government, or by public utility commissions of the state. New York owns its municipal subway system, but intrusts the operation of it to private management.

The question of private ownership and operation of public utilities in cities has been one of the most important and the most perplexing problems of American government. A franchise for such a utility carries with it the creation of a virtual monopoly privilege and the right of eminent domain; it also presents, if unrestrained, the opportunity for maintaining extortionate rates for service. As such, it is a privilege that has been eagerly sought, bitterly contested for, and frequently corruptly acquired. This problem and its management has lain at the base of most municipal corruption. It was at one time the most flagrant evil in American political life. As a remedy, public opinion in the United States turned strongly toward municipal ownership of all such utilities. But the unsatisfactory conduct of such properties by city governments and the general American preference for private initiative and management have brought to the fore the above-mentioned policy of private ownership with public control.

In the United States, municipal governments do not generally engage in several kinds of services, such as public pawnshops, municipal orchestras, opera houses, etc., which are common in Europe. In America, great attention has been given to parks and to public playgrounds. The scope of municipally owned activities can hardly be settled by any theoretical principles. In each country and in each community, it is a practical matter, to be decided on practical grounds.

National Convention. Since 1832, in the United States, candidates for president and vice president have been nominated at national conventions especially convened for that purpose once in four years.

The national convention is not the creature of the law. It is an extra-legal party meeting, and its membership, machinery, and procedure are determined by party rules.

The rules of the Democratic and Republican parties provide for the selection of two delegates from each congressional district, and for four delegates at large from each state. An amendment to the rules of the Republican party, which was passed in 1916, limits full representation in the national convention to those congressional districts having a Republican enrollment of at least 7500 voters. To the Republican party convention, delegates are chosen in the same manner as that in which congressmen are nominated in the several districts. The Democratic party leaves the method of selecting delegates to the party organization of each state.

Convention Procedure. The chairman of the national committee, who has been chosen at the preceding national convention, initiates the proceedings of the convention. He is succeeded by a temporary chairman chosen by the convention. The convention committees, the most important being the committee on credentials and the committee on rules, are then chosen, the delegation from each state choosing one member for each committee.

The report of the committee on credentials, affecting contested seats, is then presented to the convention as a whole, which either approves and adopts the report in its entirety, or votes upon each contested seat separately. In the Republican convention, under the ruling of Senator Root, in 1912, every person entered upon the temporary roll of the convention by the national committee, even though his own right to sit in the convention is contested, is eligible to vote with respect to the seating of any other contested delegate.

Nominations and Platform. Next comes the report of the committee on the party platform, and then the convention proceeds to its chief task—the nomination of candidates for president and vice president. Nominations are made and seconded from the floor of the convention and are usually followed by prolonged demonstrations from supporters. In the Democratic convention, delegates from each state vote as a unit, if the rules of the state organization so provide. This may give to the majority delegates from each state control of its entire strength in the convention. This is the so-called "unit rule." The Democratic rules also require that a two-thirds vote be obtained by a candidate before he is nominated. Neither of these rules obtains in the Republican convention. Ballot after ballot is taken until a candidate is selected. Toward the conclusion of the convention, a party "platform," the work of a special convention committee, is adopted. It usually comprises a review of the party's services and a statement of the policies upon which the party seeks the election of its candidates.

The national convention completes its work with the selection of a "national committee," one member from each state. This committee directs the national affairs of the party for the ensuing four years, and calls into being the next national convention.

National Defense. This term is used to describe the established provisions of a state for protecting its rights and territory, particularly from foreign invasion or aggression. Some such provision has ever been regarded as indispensable for national existence and security. The preamble to the Constitution of the United States declares that one object of the Union is to "provide for the common defense."

The type of defense establishment varies greatly with different states, generally according to their size, their frontiers, their geographical security, their traditional friendships and enmities, and the aims of their foreign policies. The main reliance may be naval, as in the case of Great Britain, or, at an earlier date, of Holland; or it may be land forces. In the main, four types of armies have been relied upon by states for the attainment of their military policies: (1) professional armies; (2) mercenary troops; (3) "militia," or organizations of citizens trained in time of peace, and volunteer forces raised in case of emergency; (4) forces prepared by universal or general military training.

Professional Armies. The first, that of a professional army recruited voluntarily, was the general reliance of European states down to the French Revolution. Great Britain, throughout her history, has relied almost entirely upon professional armies, except where she has employed mercenary troops or has subsidized foreign troops in common wars. In the World War, an army conscription bill was not enacted by the British Parliament until 1916. A professional army may be brought to the highest state of proficiency, and, for a country possessing overseas responsibilities which have to be guarded, it is a well-nigh indispensable element in the national plan of defense.

Mercenary Armies. Mercenary armies have been employed in all times, and their use has frequently been notorious, as in the case of the mercenary bands that infested Italy in the 16th century, or in the employment of German troops by Great Britain against the American colonists in the Revolutionary War. Their use has been unsparingly condemned by practically every serious student of the art of politics or of war.

Volunteer Forces. The third, the method of volunteer forces raised in time of emergency, has been the traditional policy of the United States. Reliance upon hastily raised troops, while a congenial policy to a people little troubled by threat of war, has proved again and again in American history to be ineffective from a military standpoint, and frightfully wasteful of life and treasure. The highly technical character of modern warfare, the variety of war matériel, the extreme expenditure of munitions, and especially the need of trained officers to take command of levies of troops, have rendered obsolete and indefensible a reliance upon extemporized volunteer forces.

Universal Training. Some system of general training of all young men for military duties appears at once the most satisfactory, as it is the most just and the most democratic, of all plans of defense. It recognizes the duty of protection of nation and civilization as a common duty, from which no man of suitable age or physique may properly

be exempted. It imposes the hardships and sacrifices of warfare upon all classes of society alike, and puts at the disposal of a nation its full resource of man power without the demoralizing effects of discrimination and bounties. That such a policy is now endorsed by the American people is evidenced by the draft legislation of Congress of 1917 and by the National Defense act of 1916 and of 1920.

This latter legislation gives the country a policy of national defense and a prospective complement of forces adequate for any probable emergency. Under this act, the army of the United States is formed of three components: (1) the "regular army," a small standing body of professional soldiers whose duties are to man the coast defenses, garrison overseas possessions, care for the stores, ordnance, fortifications, camps, and other military property, supply a limited mobile body of troops as a first element for defense and, through its officer and noncommissioned officer personnel, furnish instruction to the national guard, organized reserves, reserve officers' training corps in colleges and schools, and citizens' training camps. (2) The second component is the "national guard," organized in such a manner that each state is charged with the responsibility of maintaining, in times of peace, certain units of citizen soldiers, which may be combined into a number of army divisions and corps. (3) Third, the "organized reserves," comprising officers and men of training, so developed as to form the "cadres" or skeleton structures of additional divisions, which, within a few months' time after a declaration of war, could be raised to full strength, armed, equipped, and trained for the field.

The National Guard. The national guard, with the regular army, constitutes the first line of defense and is to be so officered, equipped, and trained as to approximate, in its organization and performance of duty, the standards of the regular army. The national guard in each state is, moreover, under the orders of the governor of the state, and constitutes a constantly ready force at his command for the execution of the law and for the maintenance of public order. It may, by order of the president of the United States, be called into the Federal service to repel invasion, to suppress insurrection, or to enforce the laws of the Union.

Naturalization. A term given in law to the acquisition of citizenship in a country other than that in which one has been a citizen or a subject.

The act is necessarily voluntary on the part of the person acquiring naturalization, and must have the consent of the state in which citizenship is acquired. The consent of the state whose citizenship is renounced is not necessary to the act, and may even be refused. The act of severing citizenship is called "expatriation." It is a renunciation, by formal action, of the rights and obligations of citizenship therein. If the act of renunciation is not recognized by the state in which citizenship was formerly held, it may happen that two states may claim the same citizen or subject. See *Citizenship*.

American Naturalization: First Papers. The United States government has given great attention to naturalization of foreigners who seek permanent residence in this country. In recent years the process of naturalization has been surrounded with added precautions. It consists primarily of two steps. The first is called the "declaration of intention." This step may be taken by an alien immediately upon arrival in this country, provided he is 18 years of age or over. Certain formalities of naturalization must be complied with before a United States court or before a state or territorial court of record. The applicant takes an oath that it is his honest intention to become a citizen of the United States. He fills out a paper, giving his name, age, occupation, address, date of arrival in the United States, and the name of the vessel upon which he came.

Second Papers. After a residence in the United States of at least five years and an interval of at least two years after the declaration of intention, the candidate, if he can speak English and sign his name in his own handwriting, may apply for his "second papers." This step is called "the petition for naturalization." He takes to the office of the clerk of the court a copy of his first papers and of his "certificate of arrival," if he came to this country after June 29, 1906. He must also be accompanied by two witnesses, who are citizens of the United States and have known him for five years.

Citizenship. At least ninety days after the candidate files his petition for naturalization, he will be notified to appear in court for citizenship. He must then undergo an elementary test as to his knowledge of the American form of government. The extent of this test depends upon the views and policy of the particular court before which the applicant appears. He must also be able to satisfy the court of his good character and of his loyal purpose. When these tests have been met, the candidate takes the "oath of allegiance" to the government of the United States and receives his "certificate of citizenship."

In many states the public school system now offers special instruction for aliens desiring to prepare for the citizenship examination, and the practice of making the oath of citizenship a formal ceremony is becoming common.

Naturalization of Children and Women. Minor children of an alien become citizens upon the naturalization of their father. By a law of September 22, 1922, women do not become citizens through the naturalization of their husbands. Women of alien nationality may now obtain naturalization under the same procedure as men. However, an alien woman, married to an American citizen, need make no declaration of intention and may attain citizenship after one year of continuous residence, and so may a woman who, previous to September 22, 1922, lost American citizenship by marrying a foreigner, unless her husband is ineligible for citizenship and is still her husband. An American woman who marries a foreigner does not lose her citizenship unless her husband is ineligible to citizenship; but, if she resides with her husband in the country of his citizenship for two years, or elsewhere outside of the United States continuously for five years, she must make declaration of citizenship before an American consul or diplomatic officer in order to retain her citizenship. An alien woman married to an alien man who does not intend to become a citizen or is ineligible for citizenship must file a declaration of intention two years before petitioning for naturalization.

Naturalization is a privilege which Congress has bestowed only upon aliens who are "free white persons" or "aliens of African nativity and persons of African descent." No provision has ever been made by Congress for the naturalization of races other than the white and the black.

Neutrality. The status of a nation taking no belligerent part in a conflict between other nations, but preserving friendly relations with both or all.

By international law, citizens of a neutral nation may trade freely with a belligerent, even to the extent of furnishing arms and munitions. Such goods, however, may be seized as "contraband of war," and neutral merchant vessels are subject to "visit and search" by war vessels of the belligerent states to determine the presence of contraband in their cargoes.

A nation, to remain neutral, must be strictly impartial in the assistance which it or its citizens afford. It may not permit its territory to be used as a refuge for troops of belligerent nations, nor as a means of transit for them, nor for the recruiting of troops. Its ports may be used by the war vessels of belligerents only for a limited number of days, and that use is restricted to the making of repairs or to the securing of supplies indispensable to the continued voyage of the belligerent vessel. Similar obligations bind the neutral state with respect to the use of its territory for purposes of communication by telegraph, by cable, or by radio, and, while private citizens may freely sell their wares to a belligerent state, a nation may not dispose of its naval vessels or of war matériel to a belligerent during the actual period of the war, without violating neutrality.

The World War proved how immensely difficult it is under modern conditions for a neutral country either to defend its own rights during a prolonged period of conflict or to satisfy the public opinion in belligerent countries of its impartiality as a neutral. The war further had the result of invalidating many of the accepted principles of international law with respect to neutrality, and of discouraging the prospects of those who have believed that modern warfare would be characterized by increased respect for the rights of neutrals and noncombatants.

Nihilism (*nī'hi-liz'm*). A term given to Russian radicals who refused to recognize the validity of existing institutions, social, political, or religious. The word was first used in this sense by the novelist Turgéniev in his *Fathers and Children*, published in 1862.

The movement, which at first centered in student communities, was highly rationalistic and materialistic. It regarded religion, family life, private property, and even public administration as obstacles to the free development of the individual and of rational society. The movement had philosophical points of contact with anarchism. The repressive action of the Russian bureaucracy led to acts of retaliation and terrorism by the Nihilists, the most sensational being the assassination of the czar Alexander II in 1881.

The word is frequently applied in the United States to all "terrorists," or to those who use the assassination of officials to intimidate the government.

Oligarchy (*ŏl'i-gär'ki*). A government in which the power of the state is held by a few, as opposed to the many. It is distinguished from an aristocracy only as being a corrupt form. Of all forms of government—democratic, aristocratic, or monarchic—an oligarchy has generally been condemned as the worst, its members invariably being led to exercise their power in their own interest, unrestrained by such consideration as is felt by a king for his people, or by the traditional sentiments of honor and public responsibility that may characterize an aristocracy under the phrase, "noblesse oblige." Oligarchies have frequently been associated with the seizure of governments by violence, chicanery, fraud, or by monetary power.

Open Door Policy. The preservation of opportunity for foreign trade in a country, on a basis of fair and equal competition for all nations. Open door policy means also that, in the development of economically backward countries, all foreign nations shall have an equal opportunity to offer the services of their credit and their technical experts, and to obtain concessions for transportation construction or for mineral development upon equal terms. For the nation whose territory is being opened for commerce or exploitation, it means preservation of the right to purchase in the cheapest markets, to borrow money on most favorable terms, and to award contracts for internal development on the conditions that appear most advantageous, without coercion by foreign political authority. The principle of the "open door" is opposed to so-called "spheres of influence" or "spheres of interest."

The term "open door" appears to have been used first by Admiral Lord Charles Beresford in speeches in the United States immediately following a visit to China in 1899. The policy of the United States in the Far East was declared by Secretary Hay in the following year to be the maintenance of the "territorial integrity of China," and of the "open door." The United States, in the defense of this policy, has come into opposition with the interests of other foreign countries in the Far East, particularly Japan. The Washington Conference of 1922 resulted in certain agreements in regard to the Far East that may strengthen recognition of the open door and may encourage belief in its prospects. The principle, however, is not recognized generally. In many parts of the world, opportunities for trade and for economic development on fair terms to all peoples have been defeated.

Pacifism (*pās'i-fiz'm*). An attitude of convinced opposition to war. Pacifists vary, in their programs, from those who, like Tolstóy, teach a doctrine of pure nonresistance, to those who, admitting the justice of defense for the individual and the nation, deplore and oppose all forms of preparation for national defense, the creation of a professional military class, and particularly anything that appears to be an aggression upon the complete independence of another nation or people. For this reason, pacifists are usually opposed to all forms of intervention.

Pacifists, like anarchists, are temperamentally optimistic with regard to the general goodness of human nature and with regard to the ability of nations to make terms without resort to arms even in defense. They believe that nations and individuals are amenable to reason. The weakness of pacifism lies in the failure properly to appreciate that the forces of cupidity, self-interest, and inherited antipathy are very powerful in human society, and that a sense for the rights of a people is rapidly impaired by a knowledge that it lacks the resolution to defend those rights.

Pan-Americanism. A term produced by newspaper discussion of the international American Conference at Washington in 1889 and 1890. It is the doctrine that the states of the American hemisphere possess certain common interests and institutions not generally shared by the peoples of the Old World, and that these should be the basis of a common understanding and of common political and commercial actions among these American states. Such an idea is involved in the Monroe Doctrine. To give effect to the ideas, the first International American Conference met at the call of Secretary Blaine at Washington in 1889-90; the second conference took place at Mexico City in 1901-02; the third, at Rio de Janeiro, Brazil, in 1906; the fourth at Buenos Aires, Argentina, in 1910; the fifth at Santiago, Chile, in 1923; and the sixth, at Havana, Cuba, in 1928.

Pan-Americanism has further been advanced by international scientific congresses and by a Pan-American conference of journalists and of women.

American advocacy of the Monroe Doctrine has at times advanced the sense of Pan-American unity, and at other times has awakened in Central and South America a sense of irritation and of concern. A considerable body of writers exists in several countries of Spanish inheritance, who assert that the cultural affiliation of those countries is with Europe rather than with the United States.

Pardoning Power. The existence of an executive power of remitting the consequences of a conviction is an almost necessary provision of government. The power frequently is invoked to mitigate the severity of the law, to assume a responsibility which is beyond the competence of a court, to recognize an alteration in conditions taking place subsequent to conviction or in view of new evidence, or to recognize good behavior or reformation of character in a person who has endured a portion of his sentence. Under monarchical government, such power resides in the king, who is the fount both of grace and of justice. The development of constitutional government has transferred this authority to ministers, as to the home secretary in the British government.

In the United States, the pardoning power is constitutionally vested in the president, and, by state constitutions generally, though not invariably, in the governor. A pardoning power usually exists in the legislative branch unless, as frequently under the American system, it has been limited or denied by the Constitution.

Party Platform. A document issued by party leaders or by a party convention, setting forth the principles and the measures for which the party stands and upon which it purposes to make its appeal for the support of the electorate.

Party Whip. A member of a legislative chamber assigned by party leaders to the task of rounding up members of the party to insure their vote on important measures and to hold them in line with party policy. In the British House of Commons, the whips may act as tellers at a "division" of the chamber when important votes are taken. They have other responsible functions of keeping track of sentiment on public matters, of arranging patronage, and, in general, of promoting party solidarity.

It is customary in England for the whips of the party in power to be appointed to the ministerial offices of "junior lords of the exchequer," which offices are now sinecures.

The term whip is new in America, but it has been used recently to designate party leaders in Congress.

Passport. A certificate of identity granted by a government, authorizing the holder to leave the country he is in or to enter a foreign country, and requesting for him safe and free passage and all lawful aid and protection. Passports are issued by the foreign office of a government, or by its diplomatic agents resident abroad.

In the United States, passports may be obtained by applying to the "passport bureau" of the department of state. It is customary for passports to be "viséd" by the representative of the foreign country to which it is proposed to go, in order that any difficulties may be met and surmounted before departure from the home country.

Paternalism. A policy whereby the state assumes to enter into and to regulate the activities of individuals in their social and industrial life. The early part of the 20th century, and to a less degree the latter half of the 19th century, have been marked by an extension of the activities and functions of government, directly opposed to the policy of the 18th century in Europe, which was dominated by the doctrine of "laissez faire," or noninterference by the state. For an account of general activities of this character, see *Social Legislation*.

Patronage. Places in the government employ at the disposal of persons elected to political office. The term is also broadly used to cover contracts, franchises, and other public favors turned over to preferred individuals or localities by those in power. See *Civil Service*.

Peonage (*pē'ŏn-āj*). A form of servitude in which a laborer is compelled against his will to remain in the service of his creditor or employer. Peonage arises out of a contract whereby a debtor undertakes to serve a creditor until a debt or an advance of money or goods is paid, or it may result from the operation of law upon mere nonpayment of a debt. The word is derived from the Mexican term "peon," in which country peonage is a long established institution.

Amendment XIII to the Constitution, which prohibited "slavery or involuntary servitude except in punishment of crime," made peonage unlawful. Congress, by a law enacted March 2, 1867, further provided that "the holding of any person to service or labor known as peonage is abolished and forever prohibited in the territory of New Mexico or in any other territory of the United States." The law further made the holding of anyone in peonage punishable as a crime.

A form of bonded indebtedness similar to peonage exists in the Philippines.

Personal Representative. Heads of governments have long followed the practice of sending special and often secret agents to secure information abroad and even to negotiate treaties with foreign states. Inasmuch as the Constitution of the United States requires the consent of the Senate to the appointment of ambassadors, other public ministers, and consuls, the conduct of official relations with a foreign government by a personal representative of the president, unconfirmed by the Senate, would seem to be of doubtful constitutionality, and the practice has met with criticism and congressional opposition. Nevertheless, on numerous occasions the president of the United States has dispatched personal representatives on diplomatic missions.

President Washington, in October 1789, sent Gouverneur Morris to England to negotiate a commercial treaty, without having his appointment confirmed by the Senate. Several hundred such representatives, in all, have been dispatched by different presidents. Well-known examples are the mission of Nicholas Trist to Mexico in 1847 to negotiate a treaty of peace; of James H. Blount to Hawaii in 1893 to end a revolutionary movement of Americans against the Hawaiian monarchy; of John Lind and several other representatives to Mexico; and of Edward M. House to Europe by President Wilson. Trist was authorized by President Polk practically to order the American army

and navy to cease active hostilities against Mexico. Blount was endowed by President Cleveland with "powers paramount" to those of the American minister at Hawaii. Lind was sent to force the retirement of President Huerta from the head of the Mexican government.

A survey of the instances in which personal representatives, rather than diplomatic agents confirmed in their appointments by the Senate, have been used by the presidents of the United States reveals the following purposes for which they have been employed: to make special reports on conditions prevailing in foreign countries; to reopen relations with countries with which diplomatic relations have been broken; to interfere in the internal affairs of countries disturbed by revolution; and to negotiate treaties.

The motives that have led to such appointments are the advantages of secrecy, of expedition, and of the opportunity of avoiding a compromising situation in case of failure. Against them may be directed all the arguments in favor of open diplomacy and the constitutional privilege of the Senate to participate in developing the foreign policy of the government and of confirming the appointment of agents through which the promises of the government are expressed and the obligations of the nation are created.

Persona Non Grata (*pĕr-sō'nȧ nŏn grā'tȧ*). A term applied to a diplomatic representative who is not acceptable personally to the government to which it is proposed to send him. All countries reserve the privilege of refusing to receive any representatives accredited to them who are thus unacceptable, or to cancel for cause acceptance of such envoys.

Pigeonholing. The laying aside of a bill or other matter by a legislative committee, presumptively for future consideration, but in fact with the intent of allowing the bill to die through failure to act upon it; also similar action by an executive, where such action is equivalent to a veto.

Plebiscite (*plĕb'ĭ-sĭt*). In ancient Rome, a "plebiscitum" was the enactment of a law by the assembly of the "plebs" or common people.

In modern politics, the term plebiscite is given to an expression of the popular will, taken in various forms and for various purposes, such as an alteration in the form of government, change of rulers, or the transfer of territory from one sovereignty to another. The last purpose is of great modern interest, because of numerous provisions, in the treaties of peace that followed the World War, for the holding of plebiscites to ascertain the preference of peoples for the sovereignty of one state or another.

This application of the principle of self-determination arose during the period of the French Revolution, when a plebiscite of the inhabitants of Avignon was taken before the transfer of that city and adjacent territory from the sovereignty of the pope to that of the French republic. The practice was soon abused and discredited.

The plebiscite again came into use in the period 1848 to 1870, especially in the process of the unification of Italy. A plebiscite of the inhabitants of Nice and Savoy accompanied their cession by Piedmont to France. In 1877 a plebiscite was taken of the inhabitants of the island of Saint-Barthelemy in the West Indies, before the transfer of that island from Sweden to France, and again upon the separation of Norway from Sweden in 1905.

The following plebiscites were provided for in the peace settlements following the World War: Allenstein and Marienwerder, districts in East Prussia; Eupen and Malmedy, small districts or "kreisen" on the border of Prussia and Belgium; Upper Silesia; Klagenfurt, lying between Austria and Serbia; Northern Schleswig; and the Saar Basin. With the exception of the Saar Basin, these have all been held, resulting in the retention of Allenstein and of Marienwerder by Germany; the cession of Eupen and of Malmedy to Belgium; the division of Upper Silesia between Poland and Germany; and the retention of Klagenfurt by Austria. The plebiscite in the Saar Basin is not to take place until the end of a period of 15 years from 1920.

A plebiscite was provided also for the district of Teschen, in dispute between Poland and Czechoslovakia, but this was abandoned in favor of a diplomatic settlement ratified by the powers.

Plurality. The number of votes received by a successful candidate in excess of the number cast for the next highest candidate for the office. In the election of public officials, the law may be so framed that a plurality only may elect. In such a case, if there are more than two candidates, it may happen that a candidate is elected even though he fails to obtain a majority of the total number of votes cast. See *Majority*.

Police Power. A general term that expresses the fundamental power vested in every state to limit and to regulate the exercise of private rights in the interest of public health, public morals, public safety, and the general welfare of the community.

Under this power, it has been held that a state may absolutely prohibit the sale of intoxicating liquor (*Mugler* vs. *Kansas*) or of cigarettes (*Austin* vs. *Tennessee*), as intrinsically harmful to the health of the community. It has also been held to be within the scope of the police power of the state to prohibit the manufacture of a commodity, such as oleomargarine, which readily lends itself to fraud upon the public (*Powell* vs. *Pennsylvania*). Laws designed to prevent gambling, such as the prohibition of dealing in grain "futures" or the buying and the selling of stock on margins are also within the police power (*Booth* vs. *Illinois*; *Otis* vs. *Parker*).

Under the police power, a state, or, when properly authorized, a municipality, may prohibit within a particular locality the manufacture of bricks, the maintenance of livery stables, public laundries, billboards, public garages, coal yards, slaughterhouses, and the erection of buildings of more than a prescribed height, and may impose any other regulations which are reasonably calculated to secure the public welfare while not unreasonably interfering with the liberty of the individual.

Even the segregation of races in street cars and in schools is a constitutional exercise of this power and does not violate the 14th amendment. Where, however, the police power has been put forth merely as a cloak for an intended discrimination against the Negro, in violation of the 14th amendment, the courts have held such state acts unconstitutional.

Laws limiting the hours of labor for women and children, prescribing the conditions under which factories shall operate, laws regulating the relative rights of landlord and tenant, as well as those prescribing regulations for buildings used as tenements, are other instances of the exercise of police power. With the growing complexity of society and with the greater interdependence of individuals and classes, the theory of the police power has been extended far beyond the narrow confines to which it once was thought to be limited. Thus antitrust laws, although directly interfering with the liberty of contract, and statutes prohibiting the sale or use of trading stamps, have been upheld (*National Cotton Oil Company* vs. *Texas*; *Tanner* vs. *Little*). Zoning ordinances designed merely to promote the æsthetic interest and general welfare of the community are constitutional exercises of the police power (*Lincoln Trust Company* vs. *Williams Building Corporation*).

It is impossible today to state with any precision the limits, if there be any, upon the police power of the state. Practically all of the instances of the exercise of this power involve restraints upon rights of life, liberty, and property. In the last analysis, whether an act is within the police power of the state depends upon a judicial balancing of interests—that of the individual in the unlimited use of his property and the unrestrained pursuit of his own inclinations on the one hand, and that of the rest of the community and of the state on the other.

Populism. Term applied to the series of reforms advocated by the People's or Populist party in the United States. Chief among these reforms were the free coinage of silver at the ratio of 16 to 1, the creation of a national paper currency to replace the national bank notes, stringent government regulation of railroads and of monopolies, and a general policy of legislation directed against the alleged control of the government by financial interests.

Pork Barrel. A term applied in the United States to appropriation bills for Federal expenditures in various parts of the country. So termed because each congressman secures his "piece of bacon" to bring back to the "folks at home." See *Logrolling*.

Pourparler (*pōōr'pär'lā'*). An informal, preliminary conference of representatives of different groups, factions, or countries, looking to a formal agreement settling disputed questions between the parties.

Preferential Voting. See *Proportional Representation*.

Primary. A preliminary election, held by voters of a party to determine the party's candidates for office. When carried out by a legally prescribed election and as a substitute for local meetings or conventions, it is generally termed the "direct primary."

In the "nonpartisan primary," all aspirants to office, regardless of political affiliation, enter the primary election, and members of all parties are eligible to vote. The two candidates receiving the highest number of votes for any office are regarded as nominated, and these two then compete against each other in the final election.

Prime Minister. A term applied to the head of a ministry, particularly in Great Britain and in the dominions of the British Empire. He is called also "the premier." In France, he is legally termed "the president of the council of ministers." See pages 1432b and 1446a, b.

Privileges and Immunities of Citizens. The 14th amendment to the Constitution of the United States provides that "No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the

United States." These privileges and immunities are incidents of Federal citizenship. They include the right to protection of life, liberty, and property on the high seas and in foreign countries; the right peaceably to assemble and petition the Federal government for redress of grievances; the right of habeas corpus; the right to use the navigable waters of the United States; the right to hold office under the Federal government; and the rights secured to citizens of the United States by treaties with foreign nations.

Article IV, Sec. 2, of the Constitution provides that "Citizens of each state shall be entitled to all privileges and immunities of citizens in the several states." These rights include protection of life, liberty, and property under state law; the right to sue in the state courts; the right to engage in any lawful business; and the right to acquire and to devise or bequeath property. See *Civil Rights and Liberties*.

Prize Courts. Tribunals of a belligerent state, established for the purpose of adjudicating the title to property captured by its citizens on the high seas, and of examining the nationality of such property.

Prohibition. Governmental action which prohibits by law the manufacture and the sale of intoxicating liquors except for medicinal or sacramental uses. In the United States, the first state prohibition law was enacted in Maine in 1851. Between that date and 1920, nearly half of the states, at various times, enacted laws prohibiting or strictly limiting the manufacture and the sale of liquor. Amendment XVIII to the United States Constitution made illegal after January 16, 1920, the manufacture, the sale, and the transportation of intoxicating liquor for beverage purposes in the United States. This amendment provides that both the Federal government and the states have "concurrent power" to enforce this constitutional law.

Congress enacted a measure, the "National Prohibition act," which applies the provisions of the amendment to any liquors containing alcohol in excess of one-half of one per centum, and makes unlawful the sale or transportation of such liquors. This law superseded all conflicting state legislation enacted previously to the amendment. Several state governments passed legislation to aid the Federal enforcement of the law. This legislation in some cases was subsequently repealed. In 1926, the popular vote in six states was unfavorable to enforcement.

Proportional Representation. Any one of a variety of plans designed to give minority parties or groups representation in a legislative body, in proportion to the relative strength of each minority group as shown in elections; frequently called also "minority representation."

Such a plan was first tried on a national basis by Denmark in 1854 and was successfully adopted by Belgium in 1899. The injustice of electing a general ticket by a bare plurality of votes may be illustrated by an example taken from Belgian politics before the adoption of proportional representation: In the election of 1896 in Brussels, the clerical party polled 89,000 votes, the socialists 73,000 votes, and the liberals 40,000 votes. Although the clerical ticket polled barely one-fifth more than the next largest party, and 74,000 votes less than a majority, it elected all of the 18 candidates of that city, while the socialists and the liberals gained no representation whatever.

History of the Movement. Proportional representation was discussed and advocated for both national and local elections for about 60 years preceding the World War, but, before 1914, it was adopted only for the choice of national representatives, by several smaller states, as Denmark in part, Belgium, Sweden, Bulgaria, Serbia, Portugal, and, for the election of the lower chamber, by the grand duchy of Finland, which at that time was a constituent part of the Russian Empire.

During the World War, the system was adopted by Holland and was extended in Denmark. It appears in most of the post-War new constitutions: Germany, Austria, Czechoslovakia, Jugoslavia, Danzig, Greece, Poland, Esthonia, Latvia, Lithuania, and Bulgaria. France adopted it in 1919 but in 1927 returned to the uninominal system. In Switzerland, it was adopted nationally by an initiative proposal in 1918.

Plans in Use. Of the several plans, the following may be mentioned:

(1) The "limited vote" plan. Each constituency or district elects several representatives, but each voter therein casts a ballot for a number of candidates, less than the number of seats to be filled, giving his vote but once to any one candidate. A minority, by limiting its nominees, may be large enough to elect one or more candidates. This system was applied to certain constituencies in England in 1867 but was abolished in 1885.

(2) The "cumulative vote" plan. Each voter has as many votes as there are places to fill, but he may cast all his votes for one candidate or may distribute them between candidates, as he chooses. Here again, a minority party, by limiting its nominees, may elect. This device was used for election to the legislative council of Cape Colony before the Union of South Africa was formed. English school board elections also have used this system, and the state of Illinois employs it to elect its House of Representatives.

(3) The "single vote" plan. In each constituency, though there may be more than one place to fill, each voter is allowed to cast his ballot for one member only. Minorities, by this plan, may elect if they confine nominations to the number of candidates their voting strength represents. Japan has used this system since 1900, and her experience shows that quite close approximations to the results of more elaborate methods of proportional representation may be obtained.

(4) The "single transferable vote," known as the "Hare system." First used in Denmark in 1855 and adopted in 1909 by the Union of South Africa. Each voter indicates on the ballot his first, second, third, etc., choice. A "quota" determining the number of votes necessary for election is obtained by dividing the total number of votes by one more than the number of places to be filled and by adding one to this number. When all the first choices are counted, if a candidate is found to have the quota, he is elected. If there are surplus votes, they are transferred by various methods under various systems to other candidates as indicated by the ballot. The Hare system of preferential and proportional representation has been adopted in a few cities of the United States and Canada.

(5) The "list system." Lists of candidates are nominated by political organizations or groups of voters. Each voter has as many votes as there are places to be filled, but he may not "cumulate" them. The number of votes registered by a group or party is used to determine the number of elective candidates of the group. There are various ways of apportioning seats under this system, but the most widely copied is "the d'Hondt system" in Belgium, known from its originator. It may be made clear by illustration. Suppose an election for 5 seats, and 4 party lists obtain 24,000, 11,000, 9000, and 3000 votes, respectively. These figures are then divided by two, with results of 12,000, 5500, 4500, 1500; by three, with results of 8000, 3666+, 3000, 1000; if necessary by four, and so on. As there are 5 seats, the 5th largest of the figures thus obtained (in this case 8000) becomes the "quotient." By dividing the party votes by this quotient, we obtain the number of seats to which each party is entitled; namely, 3, 1, 1, and 0.

Protective Tariff. See *Tariff*.

Protectorate. A country or territory under the political control and protection of another. A protectorate invariably represents some restriction upon the foreign relations of the country, and may extend to complete control of them. Usually foreign authority is exercised also over the financial affairs and obligations of the protectorate. A nation claiming or exercising such protection becomes responsible to other nations for the protectorate's regard of international obligations, and the tendency is to go even further and admit responsibility for internal order and well-being. For examples of protectorates under the United States, see *Cuba, Panama, Santo Domingo, Haiti, Nicaragua, Liberia*.

Protocol (*prō'tō-kŏl*). A preliminary agreement between two or more countries, intended to form the basis of a more formal and complete treaty.

Public Lands Policy. Over two-thirds of the total area of the United States, including Alaska and consisting of over 1,800,000,000 acres, has at some time been the property of the nation. The development of this vast public domain into farms and homes, privately owned, has been one of the most important policies of the American government, and its carrying out has profoundly influenced the development of American society. Of this original domain, there remains about 600,000,000 acres, mostly arid or otherwise unfit for settlement. The rest has been distributed.

The Constitution gave to Congress the right to dispose of public lands, and under this power Congress has developed a public land policy, which, however, has taken several different forms. In the beginning it was believed that the sale of these lands would produce a considerable revenue and, among other common benefits, would extinguish the public debt. Accordingly, large tracts were sold to companies for subdivision and speculation. After 1800, small tracts were sold to settlers on credit. In 1820, a system of cash sale was adopted, the minimum price being reduced from $2.00 to $1.25 an acre. Public land was frequently occupied by settlers in advance of government surveys, and without negotiation with government agents. These settlers, known as "squatters," came to be recognized as having prior claims to the acquisition of lands which they had improved.

Homestead Policy. The policy of using the public domain to encourage national development received complete recognition in the "homestead law" of 1862. This act permitted any head of a family to secure 160 acres, or a quarter section of land, by residing on it for five years. Amendments changed the law so as to extend the privilege to any person 21 years of age or older who was a citizen or had declared his intention to become a citizen.

For homesteads in certain arid regions, Congress has extended the acquirable tract to 320 acres, without the necessity of residing on the land. On other tracts, designated as "grazing lands," the law permits the acquisition of 640 acres. An act passed in 1878, and in 1892 made applicable to all public lands, allows the outright purchase of 160 acres of unappropriated nonmineral land unfit for cultivation but valuable for timber or stone, at a minimum price of $2.50 an acre.

CONSERVATION. The "Desert Land act," as amended in 1891, enables settlers to obtain 320 acres by bringing the land under irrigation within three years' time and expending not less than one dollar an acre for improvements. The government has undertaken also the reclamation of arid and swamp lands by government projects requiring large expenditures of money.

In recent years a new policy, called "conservation," has been defined, designed to preserve the remaining public domain from wasteful exploitation. Under this policy, the timber, the minerals, and the surface of the lands are disposed of separately, and water power sites have been withheld from entry.

Congress has also granted authority to the president to withdraw the public domain from private acquisition and to create extensive reservations, either as "forest reservations" or as "national parks." Nearly 200 million acres are included in forest reservations in the West.

LAND GRANTS TO STATES. The government has also granted public land to states, to individuals, and to corporations, for specific purposes. Previously to 1850, one section out of each 36, within a state, was granted to it by the national government for support of education. Since 1850 the amount has been doubled. In 1860 the "Morrill act" granted each state an amount of land for the support of a college of agriculture and mechanic arts. This measure forms the basis of a large number of western state institutions. Extensive grants of land were made to the soldiers of the Revolutionary and Mexican wars, as compensation for their military service. To encourage the building of railways, particularly the transcontinental systems, Congress granted large areas of public land along the lines of these railways through undeveloped country, such grants amounting to more than 155 million acres.

Public Ownership. Ownership, by the state or by its political subdivisions, of various public utilities, such as railroads, street railways, telephone and telegraph systems, and gas and electric services. Such ownership may go much further, extending to mines, forests, water transport, and even to factories; but, as ordinarily used, the term does not include the acquisition of industries other than those classed as "public," nor does it embrace the more extreme doctrine of abolition of private property. See *Municipal Ownership, Socialism.*

Punishments, Cruel and Unusual. The English Bill of Rights of 1688 contained a provision forbidding the infliction of "cruel and unusual punishments." This provision has been incorporated in the Constitution of the United States, in the 8th amendment, and in the constitution of nearly every American state.

"Cruel and unusual punishments" within these provisions are such punishments as are revolting to the civilized mind, or involve torture and lingering death. However, a punishment wholly disproportionate to the crime committed may, under some circumstances, constitute a "cruel and unusual punishment"; and the phrase has been held to bear different meanings under the changing conceptions of different periods (*Weems* vs. *United States*).

Recall. A process for removing an elective official from office before the expiration of his term. This method is entirely distinct from impeachment, as the latter is applicable only in case of gross malfeasance or breach of trust. The recall is initiated by a petition signed by a designated percentage of the electorate. Within a certain period after the filing of the petition, a recall election is held, in which the official against whom the recall is directed is compelled to contest for the office with one or more candidates who have been nominated to replace him.

The recall has been adopted with respect to municipal or state officials, or both, in Arizona, California, Colorado, Idaho, Kansas, Louisiana, Michigan, Nevada, and Washington.

Recall of Judicial Decisions. A process whereby the decision of a court declaring any law unconstitutional may be submitted to a popular referendum initiated by petition, and, in the event that the popular vote is favorable to the law, the court decision is disregarded and the law is enforced notwithstanding. The incorporation of such a provision in the United States Constitution would be tantamount to providing a special method of amendment by a mere majority vote. This would effect a radical alteration in the American conception of constitutional law.

Colorado is the only state where the recall of judicial decisions has been adopted, and there only with specific limitations.

Reciprocity. An arrangement between two or more countries whereby each admits the exports of the other duty free, or at rates more favorable than those applied to similar importations from other countries.

Reciprocity provisions were incorporated in the American Tariff act of 1890. The method of making them effective was to empower the president to impose higher duties on certain imported articles if the foreign countries from which they came should appear to have imposed, upon products of the United States, duties which might be deemed to be "reciprocally unjust or unreasonable."

Referendum of Laws. (See also *Direct Legislation.*) A constitutional procedure whereby a measure enacted by a legislature may be subjected to the judgment of the people before becoming effective.

The referendum has been closely associated with the initiative of laws; but the two procedures differ in character, the referendum being conservative in its nature, and the initiative, radical. The referendum, as well as the initiative, in its modern use, has been most highly developed and employed by Switzerland, and it was from this country that the influence came which lead to the adoption of these procedures for ordinary legislation in American states.

The referendum may be "optional" or "obligatory." An optional referendum occurs when a legislature provides that a measure shall not become effective until approved by the voters of the jurisdiction affected. In this form, the referendum was common in the United States even before 1898, the year when the popular referendum of statutory laws was adopted by South Dakota, and was applied particularly in such matters as county division and creation of bonded indebtedness.

Under the obligatory use of the referendum, a law is suspended, usually for 90 days, to provide an opportunity for the voters to scrutinize the measure and, by petition of a certain number, to compel its reference to popular judgment at a general election. There may be exception of certain law, called "emergency measures," such measures usually requiring for passage an extraordinary majority of votes in the legislature.

Besides the "popular" referendum of laws, recent constitutions have provided other means whereby legislation may be submitted to the judgment of the voters. Under the new German constitution, the president may order a referendum. (See *Germany.*) In Latvia, a law passing the legislative chamber must be referred to the electorate on demand of one-third of the chamber. In Sweden, by a recent constitutional enactment, there is a referendum of laws if the government and the national legislature concur in its submission. Among other countries which have recently adopted the referendum are Esthonia, Czechoslovakia, Danzig, and, for constitutional amendments, Lithuania.

The popular referendum has made no progress in the Latin American republics, but in some of these countries, according to an old practice, acts of the government are referred to the councils of the municipalities for approval.

There appears to be a growing practice to except certain measures of the legislature from the operation of the referendum. Thus, by the constitution of Latvia, the budget, tariffs, measures affecting war and peace, and foreign treaties are not subject to popular referendum. The constitution of the state of Massachusetts, the last American state to adopt the referendum, exempts from its operation a large group of subjects.

In the United States, 22 states have adopted the referendum in some form.

The referendum is a popular safeguard against hasty or corrupt action of legislatures. In the United States its adoption was distinctly encouraged by distrust of state legislatures. This dissatisfaction, at an earlier period of constitutional amendment, took the form of placing in the state constitutions a wide variety of limitations upon the legislative power. The substitution of the referendum for this precaution would seem to recommend the repeal of many existing constitutional limitations which now unduly limit and embarrass the work of state legislatures. See *Referendum and Initiative of Laws.*

Republic. A political community which is not under monarchical government, that is, in which there is no nominal or actual emperor, king, or prince. The essential characteristic of a republic would seem to be that political power is not vested in one person or in a single line of descent. The term has been used repeatedly to cover aristocratic governments, like the medieval "Italian republics." More and more, however, the word has come to imply a government in which political authority rests on popular will and support and is exercised through representatives chosen by the people. In this sense Great Britain is sometimes referred to as a republic, and the Roman Empire was held to be a republic long after political power was consolidated in the emperor.

The word republic is frequently used as synonymous with democracy; by other writers it is distinguished from democracy as being a government where the power is

exercised by elected representatives of the people, rather than by the people themselves. Owing to these contrary usages, an arbitrary use of the word republic seems necessary; namely, to designate a state characterized by the absence of the institution of kingship and by the exercise of political power for the glory and advantage, not of a ruler, but of the commonwealth, or, to use the Roman phrase from which the word republic is derived, the *res publica*.

Republics Supersede Monarchies. A national monarch may be an impressive and useful symbol of strength, unity, and devotion, and, under such a guise, monarchy in all ages has appealed to popular admiration and has commanded intense devotion. The conception of a republic, in which the central personal leader is lacking or is transitory, undoubtedly calls for higher political development and is successful only by the display of higher popular political capacity. Thus monarchy is far older than republican forms of government and has played a far greater part in the political life of the past. The modern tendency, however, is distinctly toward the substitution of republics for monarchies. Even so ancient and conservative a state as China has, in recent years, become a republic, apparently with the preference of the vast body of the nation. The advance of republicanism as an institution has been strikingly exhibited in the change of governments since the World War.

The New World is the natural home of republics, and the United States of America, the foremost example. The Constitution of the United States not only provides a republican form for the national government, but, while, in other respects, leaving the states free to devise such political institutions as they may prefer, guarantees to every state a "republican form of government." American political and social institutions may be considered to be thoroughly implanted upon the republican ideal. Even the so-called "dictators" of Spanish American history have professed republican principles and, while holding tenaciously to dictatorial power, have actually advanced the ideals of republican society.

Republicanism rejects not only kingship, but hereditary caste, class privileges, and hereditary distinctions. The price of this repudiation and of the refusal of these great rewards to political ambition is the frequent inability of republics to command and to keep in the public service the highest talent of the nation. Republics, even more than monarchies, demand a constantly higher order of political sagacity and patriotic devotion. No republic has yet fully solved the problem of keeping at its head those best fitted to serve the interests of the commonwealth.

Residence. Legally, the place where one habitually resides or sleeps. Residence differs from "domicile" in that the latter term generally designates a more permanent attachment to a particular place, and includes the intention of remaining in that place indefinitely, while residence may connote a less permanent habitation. One may possess two residences, but he can have but one domicile, at any particular time. In the United States, voting privileges and eligibility to office usually are limited to one place of residence.

Retired List. The roster of officers of the army and navy of the United States who have served a required number of years and have been retired from active service with reduced pay. In case of need, they may be recalled to active duty by the government.

Retroactive Legislation. A law made to apply to acts performed or to conditions existing prior to its enactment.

Revolution, Right of. The right of the people to revolt against the established government whenever that government becomes tyrannical or fails to afford public satisfaction.

This right was particularly asserted by such writers as Locke in England (1689), by Rousseau in France, and by Thomas Paine during the American Revolution. The Declaration of Independence, in which the ideas and even the language of Locke are used, is based on the assertion of this right.

The right of revolution is particularly opposed to the doctrine of legitimacy of royal rule or of "divine right."

Rider. A measure, the passage or executive approval of which seeming doubtful, is "tacked on" to a bill which is assured of passage, such as an appropriation bill, in order that the doubtful measure may "ride in" on the strength of the main bill.

This device is frequently effective in the Federal government of the United States because of the inability of the president to veto a part of a bill, without invalidating the whole. In many states, however, the governor is now given the power to veto part of a bill and to ratify the remainder.

Right and Left. In legislative bodies of continental European countries generally it is the fixed habit of the conservative groups and parties to seat themselves on the right hand of the president or speaker, and of the liberal or radical elements to seat themselves on the left. The terms have thus come to be used as indicative of conservative and radical position on political matters; and, with the differentiation of positions within the group, the expressions "extreme right" or "extreme left," etc., have come into vogue. Thus the socialist party, which is always a left group, is divided into "right and left wings" according to the moderate or the revolutionary character of the group. The term "center" is used for middle parties or groups; in German politics it has long meant the clerical party, standing between the monarchical party on the right and the socialist party on the left.

Sabotage (*sá'bô'tázh'*). The wanton destruction of the property of employers by laborers, or the practice of various means to slow down or stop production, to damage machinery, to discourage employers, and to make capitalism unproductive. As a resort for the enforcement of labor demands, it is a substitute for the strike. As stated by an advocate, "it means to strike but stay on the pay roll." It is particularly advocated by the revolutionary element among the working class as a means to end private ownership of productive capital.

The modern practice of sabotage arose among the radical French labor circles known as "syndicalists" (See *Syndicalism.*), and the term is derived from the supposed practice of a French workingman of throwing his wooden shoe, *sabot*, into moving machinery, thereby causing wanton damage.

Sabotage, or the destruction of private property, began to be advocated and practiced in the United States about 1910, particularly by members of the "Industrial Workers of the World." (See *I.W.W.*) It was advocated also during the first years of the World War by sympathizers with Germany, as a means of stopping the production of munitions furnished to the Allies. During the World War and immediately thereafter, legislation, called "syndicalist laws," was passed by many American states, severely punishing the practice of sabotage and even making it a crime to advocate such doctrines.

Scratching. The practice, by American voters, of marking out from a party ballot one or more of the regularly nominated candidates. It is the opposite of voting a "straight ticket."

Sectionalism. The advocacy of measures or policies designed to promote the interests of a particular section rather than the good of the country at large.

Self-Determination. The principle or proposal that every distinct people or nation ought to have the right to determine the question of its independence, its form of government, and its political destiny. The phrase appears to have originated in the "Manifesto to the Proletariat" adopted by the conference of antinationalist socialists, held at Zimmerwald, Switzerland, in September 1915. This manifesto summoned the propertyless workers of Europe to a battle for peace "without annexations or war indemnities." Neither whole nations nor separate sections of nations were to be forcibly incorporated into states. "The right of self-determination of peoples," it declares, "must be the indestructible foundation of the creation of national relations." The Zimmerwald conference was attended by Lenine and by other Russian socialists, and among the early declarations of the Bolshevik revolutionary government in Russia was a pronouncement for "no annexations, no indemnities, self-determination of peoples."

Stated in a broad way, this declaration would seem to be equivalent to the principle of "government with the consent of the governed." On some such understanding, the principle of self-determination was championed by President Wilson in his proposals for world peace, preceding the entry of the United States into the war, and particularly in his program presented to the Paris Peace Conference. In President Wilson's mind it was associated with a league to maintain the rights of peoples and with the probable reduction of certain great states into a number of minor sovereignties. In Paris the phrase became a shibboleth leading to demands by numerous peoples for national independence. Its practical result is seen in the dissolution of the Austro-Hungarian Empire and in the emergence of new states, such as Poland, Esthonia, Latvia, Lithuania, Czechoslovakia, and Ruthenia, and particularly in the declarations of independence of numerous small republics within the area of the former Russian Empire. The phrase also had great influence on political movements in Ireland, Egypt, Persia, the Ottoman empire, and elsewhere.

Difficulties of Application. In spite of the glamour attending a declaration seemingly so democratic, the principle is difficult of application and may even lead to political reaction. Much depends upon what constitutes a small nation or people with the presumptive right to separation and self-government. Peoples are not wholly independent, economically, politically, or morally, especially where they have previously been united under a common sovereignty. Dissociation inevitably carries with it the repudiation of certain obligations involving hardship,

injustice, and, almost inevitably, economic injury to all parties. Particularly has it led to the setting up of new economic barriers, where freedom of trade and movement formerly existed, to the stimulation of animosities, and to a particularism dangerous to political unity and stability. Political progress, according to one well established ideal, is toward the uniting of the human family into larger political units, with a consequent suppression of national prejudices, rivalries, and retaliations, either political or economic. The multiplication of small states, in this point of view, must be regarded as a backward step. For the great nations, particularly when composed of peoples presenting local differences, united under some form of federal government or empire, the principle is a disintegrating one, dangerous to their existence. Strictly applied, the right of self-determination would have justified the separation of the Southern Confederacy from the American Union, or the division of any state on grounds satisfactory to the seceding portion.

Senate. The upper legislative chamber in the Congress of the United States and in each of the 48 states of the Union; also a similar body with the same name in a number of other modern governments. For the special powers of the United States Senate, see page 1402.

The happy agreement in the American constitutional convention to give to all the states equal representation in the Senate made possible the acceptance of the Federal Constitution. This feature has been successfully copied in the "senates" of other federal governments, including Canada, Australia, Union of South Africa, Mexico, and Argentina, and in the Swiss "Council of States."

In a large number of other governments, American and European, which are not federal, the upper chamber of the national legislature has been given the name of Senate. The list includes France, where in 1875 a Senate was added to the National Assembly; Spain, where the Senate is designedly an aristocratic body; Poland under the new constitution; Belgium under the constitution of 1831.

It is the general practice, following the American provision, to set a higher age qualification for eligibility to a senate, to fix a longer term than for the lower house, and to renew the senate by degrees, thus giving it a continuous life and a slowly altering membership.

Senatorial Courtesy. A custom whereby the president, in making nominations to Federal offices, is expected to consult the United States senators from the state in which the vacancies exist before submitting nominations to the Senate for confirmation. Where the senators are of a different political party from the president, the custom is not applicable.

Separation of Powers. A principle of government which sharply separates the executive, legislative, and judicial branches of the government, confining each to its special sphere and making each independent of the other two.

The principle was enunciated by the French political writer Montesquieu in his *Spirit of the Laws*, and was, actually, a misapprehension of the British constitution as it existed in the 18th century. To the supposed separation of powers and the "checks" upon arbitrary action which it secured, Montesquieu attributed the security of English freedom.

The theory of Montesquieu was much regarded by the founders of independent government in America and by them the separation of powers was proclaimed as an indispensable element of free government. Many state constitutions endeavor specifically to apply it and to make it mandatory. The constitution of the state of Massachusetts, of 1780, declares: "In the government of this commonwealth the legislative department shall never exercise the executive and judicial powers or either of them; the executive shall never exercise the legislative and judicial powers or either of them; the judicial shall never exercise the legislative and executive powers or either of them, to the end that it may be a government of laws and not of men."

As a matter of fact, the precise principle never existed in England and has not been truly realized in the United States. The president and the state governors participate actively in legislative programs and exercise a veto over laws. Courts have been intrusted with numerous executive functions, and, by judicial interpretation, they expand or nullify legislation. In the commission type of government, the theory is entirely abandoned.

Serfdom. A status of personal servitude whereby the peasant is deemed bound to the soil upon which he is born, and is required to perform certain services and to give to his lord a certain proportion of the yield of the land. On the other hand, the peasant may legally be entitled to the protection of his lord and to certain assistance, and may have rights to his holding of which he may not arbitrarily be dispossessed.

Serfdom is closely connected with the institution of feudalism. It existed generally on the continent of Europe until the close of the 18th century. The French Revolution suppressed it in France and in other countries to which the Revolution extended. In Prussia it was ended by the edict of Stein in 1807. In Russia it continued until the emancipation of the serfs by the czar Alexander II in 1861. Until the reform of the landholding system in 1871, Japan had a feudal form of society, in which the status of the tiller of the soil resembled European serfdom.

Single Tax. A principle of taxation, advocated by Henry George in his work *Progress and Poverty*, published in 1879, whereby all increase in the value of land would be appropriated by the state as a substitute for other taxes. The principle rests upon the theory that the appreciation of value of unimproved land is an "unearned increment" due to the growth of society itself, and not to the exertions or investments of the owner. Thus the owner justly may be deprived of this increased value by land taxation sufficiently heavy to absorb it.

The theory has attracted less attention in the United States than in Great Britain, where vast private estates held in an unimproved condition invite the application of the doctrine. It has been sparingly applied in certain cities of the United States and Canada.

Smuggling. Illicit importing of goods into a country without submitting them to the customs authorities or paying legal import duties.

Social Contract. The theory that the state originates in a contract between individuals, whereby the freedom and the equality of the "state of nature" are surrendered for the advantages of state protection and authority.

The theory fills a large place in the history of political philosophy, particularly in the writings of Hobbes, Locke, and Rousseau. Thomas Jefferson and many of the political thinkers of the time of the American and French revolutions rested their governmental doctrines upon this theory of the origin of the state, and from it deduced their justification of the right of revolution, or of dissolving the social compact.

As a historical explanation of the origin of political society, the social contract theory is rejected by modern students of government.

Socialism. A social program whereby private ownership of land and of all other "productive capital" would be extinguished in favor of ownership by the state.

The present day orthodox theory of socialism is that expounded by Karl Marx, particularly in his work, *Capital*, published in 1872, although the essential ideas were expressed in the *Communist Manifesto* issued in 1848 by Marx and Engel.

The distinctive feature of Marxian Socialism is the doctrine that the socialist state will arise inevitably out of the evolution of modern industrialism. Marx predicted a progressive and inescapable concentration of the means of production in the hands of the few, until there would remain but a few capitalists, or bourgeois, on the one side and the rest of the community of propertyless workers, or proletariat, on the other. The so-called "middle class" would entirely disappear. When this stage had completely evolved, modern industrialism would be "mature," and revolution, either peaceful or bloody, would be inevitable. The masses would take from the capitalists control of the means of production and would operate them in the interest of the community as a whole. The socialist state would arrive.

Economic Progress. The predictions, so confidently affirmed by Marx, do not appear to have progressed toward fulfillment. While capital has vastly increased in recent decades, and great fortunes have grown apace, the poor have not grown poorer as the rich have grown richer. The increasing social misery of all but the capitalistic class has not followed further industrial development. On the contrary, the general standard of well-being has risen in all industrial countries and the number of persons possessing property and deriving income from its possession has expanded. Furthermore, modern states have acted to bring capitalistic organization under control without invalidating private possession, and have made great drafts upon private fortunes through income, inheritance, and profit taxes. Wealth tends to become socialized without leaving private hands.

Perhaps some appreciation of the fact that the socialist revolution is not naturally evolving, as Marx prophesied, underlies the proposal of the radical wing of socialists to end the capitalistic system immediately and by violence rather than by awaiting its "maturity." See *Bolshevism*.

Socialism and the Nation. Orthodox socialism repudiates national allegiance in favor of loyalty to the "proletariat of all lands." It views the modern state as the buttress of capitalism and as the means for "imperialistic aggressions" in favor of the capitalist class. In the World War, while the socialist parties generally supported the governments of their respective countries, an extreme international wing in each belligerent state repudiated the war aims of its nation and even sought its defeat or overthrow.

These elements have united with Russian Bolshevists to create the "Third International." This socialist organization of propaganda and world revolution is so-called to distinguish it from the "First International," founded in 1864, and from the "Second International," organized after the first had been dissolved in 1876.

Underlying all of the teaching of Marx is the philosophic doctrine of "determinism," which holds that social evolution proceeds entirely from natural causes and cannot be guided or controlled by human will.

To Marx is due also an "economic interpretation of history" in which all human activity and social development are held to be controlled by economic motives and causes.

Social Legislation. Under this term is embraced a wide variety of measures designed to protect terms of employment and to improve the general well-being. Modern legislation of this character followed the rise of the factory system in England and in Continental Europe and the industrial inventions which revolutionized industry in shops, mines, and transportation.

Legislation in England. During the first decades of the 18th century, there prevailed a doctrine of *laissez faire*, or complete abstention of government from interference in the conditions of employment and in the relations between employer and laborer. Such interference was held to be an unwarranted trespass upon the freedom of employment and of labor and an unwise disturbance of the law of supply and demand. Factory and mining conditions, however, became so deplorable as to lead, in 1802, to the beginnings of English social legislation. Such legislation, for a long time, was concerned only with the health, safety, and morals of children and of women. The law of 1802, for the regulation of the labor of "bound" children in cotton factories, was followed in 1819 by legislation for the benefit of unapprenticed children, and this act by further important laws of 1825 and of 1833. The Consolidated Factory act of 1844 limited the hours of labor for children. In 1845 a law prohibited night work of women; and in 1848 a working-day of more than 10 hours for women and young persons was prohibited. In 1842 a law was passed forbidding, in mines, the underground employment of women, or of boys under 10 years of age. In the latter part of the 19th century, such legislation was further extended, and the English example was followed by other industrial countries. Protective legislation was gradually extended to men in industry as well as to women and to children.

Legislation in America. In the United States, laws have been passed for the protection of the laborer from the following hazards of employment: dangerous gases, acids, and dusts, poisonous and nonpoisonous; harmful bacteria and micro-organisms; compressed or rarefied atmospheres; improper lighting; extremes of temperature and of humidity; and excessive physical or mental strain. Many laws have been designed to prevent accidents both to employees and to the public, and to require the installation of provisions for safety in dangerous employments, such as mining.

Social Insurance. Another important field of social legislation is social insurance. This reached its highest development in Germany, where it was introduced in 1883 by a law of the empire, in the form of insurance against sickness; in 1884 for old age; and in 1889 for invalidism. Compulsory accident insurance for wageworkers injured in the course of employment was adopted by Germany in 1887; by Austria in 1887; Hungary, 1891; Norway, 1894; Finland, 1895; Great Britain, 1897; Denmark, 1898; Italy, 1898; France, 1898; Spain, 1900; New Zealand, 1900; South Australia, 1900; Netherlands, 1901; Greece, 1901; Sweden, 1901; West Australia, 1902; Luxemburg, 1902; the province of British Columbia, 1902; Russia, 1903; Belgium, 1903; the Mexican state of Nuevo Leon, 1906; Bulgaria, 1908; United States (for Federal employees only), 1908; Serbia, 1910; Switzerland, 1911; Peru, 1911; Rumania, 1912; and by about 25 states of the American Union between 1911 and 1913. Present systems of social insurance cover industrial accidents, sickness, old age, invalidism, insurance for widows and orphans against unemployment, and insurance for maternity.

Other measures regulatory of abuses are laws requiring the payment of employees in cash rather than in store credit or commodities ("truck laws"); the regulation of housing accommodations; and the protection of immigrants.

The Minimum Wage. Legislation has also been passed establishing the "minimum wage" that may legally be paid in certain industries. The theory of a minimum wage is that it corresponds to the lowest compensation which will afford a livelihood that is not destructive to health and to self-respect. Minimum wage laws were initiated by the state of New South Wales, Australia, and were followed by legislation of the British Parliament affecting the industries of Great Britain. More recently, such laws have been enacted in the United States, particularly in behalf of women, but, in April 1923, the United States supreme court, by a decision in which judicial opinion was divided, decided that the law for the District of Columbia, fixing minimum wages for women employees, is an unconstitutional interference with the freedom of contract. This decision places in doubt comparable legislation that has been enacted in some 14 states of the Union.

Sovereignty. The ultimate or supreme political authority in the state. In a democracy, sovereignty is vested in the people; in an absolute despotism, sovereignty is in the monarch.

Soviet (*sō'vyĕt'*). Russian term for a council or deliberative body; used particularly with reference to the village, city, county, and provincial councils, composed of deputies elected by the workmen, soldiers, and peasants, which form the basis of the Russian Soviet government and constitute the governing bodies of the local districts. See *Bolshevism*, *Russia*.

Sphere of Influence. A "sphere of influence" or a "sphere of interest" is a region, frequently the territory of another recognized state, within which some foreign power claims a position of preponderant or "special interest." The conception arose in the "partition of Africa" by the European states, which followed rapidly after 1884. In these settlements, which were partly arranged at the Berlin Conference of 1884-85, the entire seaboard of Africa, not already possessed, was distributed as colonial possessions or protectorates among the European states, particularly Great Britain, France, Belgium, and Germany. In addition, the interiors or "hinterland" covered by the coastal possessions were declared to be "within the sphere of influence" of these particular states. The agreement aimed to establish rights of subsequent penetration and development over areas of Africa which the colonizing powers were not at the moment prepared to occupy effectively.

Subsequently the conception was applied to China, where vast areas of that country were more or less definitely accorded by one European power to another as a sphere in which economic and political preference was recognized. The foreign country claiming a sphere in China endeavored to maintain a claim of exclusive or preferential opportunity in railroad building, in mineral development, and even in financial and political affairs. Certain of these arrangements were recognized in treaties between the several foreign states.

Following the Russo-Japanese war, Russia and Japan, by a series of three secret treaties, divided Manchuria and Mongolia into respective spheres of influence, in which each power recognized the predominant position and privilege of the other.

In 1907, Great Britain accorded Russia a sphere of influence over northern Persia, while Russia recognized a similar privilege for Great Britain over southern Persia. Other spheres of influence of a sensational character were provided for in the "secret treaties" negotiated among themselves by the Allies during the World War.

Spheres of interest are in direct conflict with the policy of the "open door." The United States has never formally recognized spheres of influence, and in the Far East and the Pacific it has vigorously protested them. It would seem to be a fundamental foreign policy of this government, while seeking no exceptional privileges for itself, to resist the creation of such privileges for other nations.

Stampede. A break in the balloting at a nominating convention, when the great majority of the delegates desert the candidates whom they have hitherto supported, and rush to the support of the candidate who appears likely to be the nominee.

State, The. The word "state" is popularly used to denote a country, such as France. It is used also, both popularly and legally, to designate the constitutent parts of the United States, as, the state of Ohio. In this latter sense, the word is applied to the parts of the commonwealth of Australia, as, the state of Queensland.

As used in political science, the term "state" implies a body of people organized for government within a definite territory, and possessing a degree of independent authority within that area. Theoretically, the state is the corporate being or legal person which, under the above conditions, is acknowledged as the supreme source of law. The distinguishing attributes of such a state are sovereignty with respect to its own affairs and independence with respect to other states.

The political state is thus to be distinguished from the territory over which it is sovereign and from the government through which it operates. Political scientists generally agree that the state is constituted by the will of the people who share in the making of laws and the choosing of officials.

Modern political thought recognizes that both sovereignty and independence are never actually absolute, but always relative, even in the greatest states. Further it is conceded that a sovereign state may delegate certain functions without impairing its sovereignty. These two considerations justify the application of the word "state" to

the constituent units of a larger state, where, as in Australia and in the United States, a federal form of government exists. By virtue of the constitutions of these countries, the individual commonwealths share in the sovereignty of the general state while retaining, in the spheres of their peculiar interests, a measure of sovereignty.

State Judiciary. In the United States, each state maintains its own judiciary, comprising courts of merely local jurisdiction in counties and municipalities and courts of various higher grades. Each state system includes courts of general civil and criminal jurisdiction as well as special tribunals for certain types of cases. Some of the courts exercise both judicial and large administrative functions, the practice varying rather widely in different states.

The law administered in a state court is, in general, that of the state statutes, the Federal statutes, and the English common law adapted to American conditions. In Louisiana, the civil law is based upon French and Spanish precedent. A state court is bound by the Federal Constitution and by the constitution of its particular state. Some judges and justices are appointed, but the general state practice is to elect judges. In state courts of general jurisdiction a jury is employed, a unanimous verdict being usually necessary.

The following summary represents, in general, the organization of the state judicial systems:

1. *The lowest grade of courts.*—(1) the justice's court, held by a justice of the peace, who may be a town, township, or county officer; (2) municipal courts (under various names) in towns and cities, presided over by judges or magistrates, who are officers of the municipality; (3) the county court, held by a judge who is, in some states, a county official and, in others, a state officer.

2. *The intermediate grade of tribunals.*—known variously as district, superior, and circuit courts. The judges of these courts are state officers, elected or appointed, either for the entire state or for particular districts. Under whatever name, these are the principal trial courts of the state. In a few states, another court, sometimes called "supreme court," either takes the place of the circuit court or is intermediate between that court and the highest tribunal of the state.

3. *The highest tribunal, or court of last resort.*—In most of the states, this is called the supreme court; in others, it is termed court of appeals, court of errors, or court of errors and appeals. The opinions rendered by this court are held to be of binding authority in the lower courts of the state.

Special Classes of Courts. (1) *Court of Probate.*—Generally, this name is applied to the court having charge of the probate of wills, the administration of estates, and the supervision of orphans. In New York and New Jersey, it is called the surrogate's court. In Georgia, the old ecclesiastical term "ordinary" is applied to the judge of probate. In Pennsylvania, Delaware, and Maryland, the name "orphans' court" is used.

(2) *Court of Common Pleas.*—Originally, in England the term "common pleas" applied to cases arising between subjects, as distinguished from those to which the crown was a party. In the United States, the name has been retained in New Jersey, Pennsylvania, Delaware, Ohio, Missouri, and Kentucky for courts whose jurisdiction is limited to a district made up of one or more counties.

(3) *Court of Quarter Sessions.*—This name arose originally from the quarterly sessions held by English justices of the peace. In Pennsylvania, a court under this title has some important administrative functions.

(4) *Juvenile Courts.*—These are sometimes called children's courts. Their jurisdiction includes cases of dependent, neglected, and delinquent children. Generally, the upper age limit is 16 years, although in some states it is 18 or even 21 years. These courts endeavor to correct the conditions responsible for a child's wrongdoing rather than merely to determine punishment for an offense.

State Rights. The field of independent action enjoyed by states in the American Union. The discussion of the exact character and scope of these rights has played a great rôle in the constitutional history of the United States. The framers of American government were divided between those who sought a strong national government and those who jealously defended state rights. Among the most extreme of state claims, advocated after the formation of the Union, were the doctrine of "nullification," or the right of a state to nullify national legislation which it might judge inconsistent with the Constitution, and the doctrine of "secession," or the right of a state to withdraw at will from the Union. These doctrines were lost by the issue of the Civil War.

Growth of Federal Power. There has been a natural and almost inevitable tendency for the Federal power to grow. This growth has been contributed to by decisions of the supreme court of the United States, which during long and important periods of its history was disposed to interpret the Constitution in favor of Federal jurisdiction. But the main factor operating to enhance the power and importance of the national government has been the extraordinary integration of the American people as a nation, the predominance of their national loyalty and interest over state and local feeling, and the binding together of all sections of the country by economic attachments.

This economic unity, which was happily provided for by the Constitution when it assured freedom of trade between the states, has made necessary an ever-increasing authority of the Federal government over economic affairs. This is particularly evident in its control of interstate commerce. It has appeared also in federal promotion of agriculture, in protection of labor, and in the enforcement of nationwide prohibition under the 18th amendment.

The 14th amendment extended the authority of the national government to the protection of life, liberty, and property, while the 15th amendment, enfranchising the colored race, and the 19th amendment, guaranteeing political rights to women, largely removed from the decision of the states the determination of the rights and privileges of citizenship. The 16th amendment, conferring upon Congress the right to levy taxes upon incomes, diverted a source of public revenue of increasing interest to state taxation. In recent years, Congress has passed a number of appropriations providing for the distribution of sums of money among the states in aid of education, agriculture, and other projects, provided additional appropriations are made by the states and a national policy is followed in their expenditure. These sums of money, appropriated out of the national treasury for objects belonging exclusively to state government, have had an undoubted tendency to bring further under Federal control matters constitutionally reserved to the state.

Present Status. The continuous growth of the power, service, and repute of the national government, while highly gratifying from many standpoints, has undoubtedly an unfortunate effect upon the vitality and activity of state governments, and prejudices popular interest in their conduct. Thus the question of state rights emerges anew in American politics, and it is now representative, not of the aims of those who desire to deny or to reduce the necessary powers of the Federal government, but rather of the purpose of those who feel the necessity of preserving an actual distinction between the scope of the national government and the functions which properly and necessarily, under a federal system, are reserved for state governments. Interest in state rights in this sense is no longer represented by party lines. While the Democratic party originally was a strong "state rights" party, since the Civil War, Democratic presidents, hardly less than Republican, have by their actions augmented the national control. And some of the American statesmen who are today most sensitive to the need of preserving state rights are members of the Republican party.

Statute of Limitations. A law which prescribes a definite limit of time within which a legal right or remedy must be prosecuted by action in the courts, or thereafter be barred. Such laws are intended to protect the individual against stale demands, when, from lapse of time, death of witnesses, failure of memory, or other causes, the true situation may be obscured.

The periods prescribed by statutes of limitations vary in the different states, and differ in the same state for different kinds of claims. Under the laws of most states, rights in regard to property must be asserted within twenty years or be barred by the continuous "adverse occupation" of another.

Steam Roller. A term descriptive of the manner in which the faction in control of a political convention or legislative body may force through a slate or program previously determined upon. The use of the "steam roller" at the Republican convention of 1912, through the control of the national committee, gave the term and the procedure wide publicity.

Steering Committee. An informal committee in each house of Congress, dominated by the leading members of the majority party in the body, which determines the order in which business shall be taken up by the house. In the House of Representatives, the steering committee is practically synonymous with the committee on rules, which is vested with the power of reporting a special rule placing any important measure ahead of ordinary business.

Still Hunt. A secret campaign on behalf of or against a candidate for office. The phrase is used also to designate secret propaganda against a particular candidate.

Straight Ticket. See *Scratching.*

Straw Vote. An informal, unofficial canvass of political votes, taken prior to a regular election, for the purpose of determining the direction of political sentiment.

Syndicalism (*sĭn'dĭ-kăl-ĭz'm*). A labor organization originating in France which has for its aim the destruction of the state and the organization of society by trade-unions ("syndicats"). The organization upon which syndicalists depended for the accomplishment of their aims was the

"General Confederation of Labor" (*Confédération Générale du Travail*, commonly known as the "C. G. T."), founded in 1895 and attaining a final form of organization in 1902. This was a national association of revolutionary labor unions.

THE SYNDICALIST PROGRAM. Syndicalism differs from socialism and the extreme form of socialism, or bolshevism, in that it entirely repudiates the state. In this respect it approaches anarchism. Syndicalism, however, adopts as a central principle the distinctive socialist doctrine of the "class war." It has developed certain tactics and policies which have been adopted also by bolshevism. These tactics completely repudiate political activity or "parliamentary action" and substitute therefor methods of industrial warfare, commonly called in America "direct action." These include the boycott, sabotage, and the "general strike." By the general strike is meant such an organization of industrial labor, embracing all crafts and industries, and so general and synchronous a cessation of labor therein as to completely paralyze industrial production and the supply to communities of the necessities of life. By so general a strike, syndicalists aim to throw existing society into chaos, to overthrow the state, and to gain social power for the federation of industrial workers.

Syndicalists have not made clear the exact form of organization which society would assume after the state had been overthrown, but they agree that it would be industrial and not political in character. They regard the modern state as a creation of the capitalist class, controlled largely for the exploitation of the propertyless laborers. Holding this view, they profess relentless hostility to the political state as it exists, under whatever form.

Syndicalism came into prominence in the great French railway strike of 1910, which was broken by the action of the French minister Briand, who arrested the strike committee, mobilized the army reserves, including strikers, and replaced striking workingmen by soldiers under military discipline.

As stated above, syndicalism differs fundamentally from socialism and communism, with which it is frequently confused, by the fact that these latter social programs have in mind the realization of a "great state" devoted not only to political objects, but also to owning and operating all productive capital, controlling the activities of all individuals, and thereby becoming the common employer.

INFLUENCE OF SYNDICALISM. Syndicalist conceptions, in some degree, appear in the program of the American "Industrial Workers of the World," particularly in their idea of "one big union."

The World War and the repressive action of the French government upon all revolutionary movements shattered French syndicalism, and, since the rise of bolshevism in Russia, revolutionary elements have turned toward the program of this socialist party rather than toward the program of syndicalism. The influence of its theory, however, is traceable in other movements than the above, and particularly in "guild socialism," which, like syndicalism, views with alarm that exaggeration of the state which pure socialism would produce, and proposes to organize society in a decentralized form around industrial groups or "guilds."

Syndicalism proper does not exist in an organized form in the United States. The term, however, has been used loosely to describe different forms of revolutionary activity directed against the state and against property, and so-called "syndicalist laws," directed at bolshevists or communists advocating the syndicalist tactics of the general strike and sabotage, have been passed by many states of the Union.

Tariff. The word is used in America in two senses: (1) It is used to describe any schedule of charges, but particularly rates for the shipment of goods by public-service corporations, or other services afforded the public. Such charges at the present day are usually controlled by the government, either through the interstate commerce commission or by public utility commissions in the states. (2) Tariff is used to designate the scale of customs duties imposed upon foreign products entering home territory. It is in this second sense that the term "the tariff" is used politically in the United States.

Broadly speaking, a tariff is devised either "for revenue only" or "for the protection of home industry." As a means of raising revenue, tariffs have been employed by nearly all governments. This form of taxation has the advantage of being "indirect." It falls upon the people in higher prices paid for such articles as they purchase and thus avoids the difficulty and the irritation arising from the collection of "direct taxes"; it is relatively easy of administration, being collected at the frontiers at certain designated points where customhouses are established; and, in the case of a highly industrial or commercial people, it may be productive of a very great revenue.

PROTECTION. A "protective tariff" rests upon different principles. It is devised not solely nor mainly for revenue, but rather as a means of building up national manufactures or other forms of production in the face of foreign competition which, if given free entry, would endanger the native industry. It is upon this basis that American tariffs have been largely framed. The effect of such tariffs is undoubtedly to bring profit to certain interests and to certain sections of the country at the cost of the purchasing public generally. Defenders of the protective system, however, urge the desirability of developing all reasonably profitable industries and forms of products as a means of bringing a nation to its highest point of economic development and of making it self-sufficient, particularly in the event of war and blockade.

FREE TRADE. Opponents of protection, or "free traders," take the broad view that the modern world is, or should be, organized internationally for industrial production. Under such a system each country would produce mainly those things which, because of its resources or its situation, it can produce most cheaply, and would purchase elsewhere, in the cheapest markets of the world, other necessities and luxuries of life. Thereby, it is argued, we should avoid the waste through excessive cost to the consumer, occasioned by an artificially stimulated domestic production of goods that can be acquired abroad more cheaply.

Taxation. Taxes are general compulsory contributions of wealth, levied upon natural persons or upon corporations, to defray the expenses of government. They are inseparable from all governments and are a part of the price paid for protection and for the advantage of society. While taxes are general in the sense that they affect all persons and all classes of society, there have been and are many exceptions to their universal payment. These take the form of "exemptions." In European feudal society, the nobility, the clergy, and their properties were untaxed. Even in democratic countries, like the United States, it is usual to exempt from the payment of certain direct taxes persons possessing small incomes or small properties. Ex-soldiers or veterans of certain wars are frequently granted tax exemptions. States that impose a "poll tax" or a per capita tax upon citizens generally exempt women, even though enfranchised, from the payment of poll tax. Taxation may take the form of money payments or of personal services, such as labor on roads or public works. A common form of taxation is a fee charged by the state for the record of a document, for an authorization to practice a profession, or for some other advantage.

KINDS OF TAXES. Taxes may be classified as "direct" and "indirect." The former embrace contributions of money or service directly furnished by those upon whom the tax is imposed. Indirect taxes take the forms of customs duties, "excises," or taxes on articles of luxury or common use, and government monopolies, where the state reserves the exclusive sale of a product at a price advantageous to the public revenue. The most common and lucrative form of direct tax is the property tax, which may be levied upon land or "real property" or upon movables or "personal property."

Two forms of taxation which have become extremely important in recent years are "inheritance taxes," or "death dues," and "income taxes." Under the former tax, the state appropriates a certain proportion of the estate of a deceased person before the balance is distributed among his heirs. In the second form of taxation, the state regularly collects a proportion of the gross or the net income of a person or of a corporation. Not only are these last two types of taxes, in certain cases, made to yield large revenues, but they have a definite social effect in limiting the accumulation of private fortunes and their succession. Usually the amount appropriated by the government increases rapidly with the size of the fortune or income. Inheritance taxes have existed in England since 1649, but they have been greatly increased since 1907. In the United States, the Federal government adopted an inheritance tax in 1862 but discontinued it after the Civil War. As a state tax in America, it has been growing rapidly in importance since 1900. At the present time, some 36 American states impose inheritance taxes.

INCOME TAX IN AMERICA. In 1894, the Congress of the United States imposed a Federal income tax, which was declared unconstitutional by the supreme court in 1895. This decision led to the adoption of the 16th amendment, empowering Congress to lay and to collect taxes on income without apportionment among the several states. The Federal income tax became an immensely valuable resource to the government, particularly in the financing of American participation in the World War. The states have made only limited use of this source of income. Such taxes, in more or less rigorous form, exist in the following states: Arkansas, Connecticut, Delaware, Massachusetts, Mississippi, Montana, New Hampshire, New York, North Carolina, North Dakota, Oklahoma, Virginia, and Wisconsin.

Tax Dodging. The practice of avoiding payment of taxes. A means frequently employed by people of wealth is that of acquiring a nominal or actual residence in a small town or village where taxes are light, or in another state,

in order to avoid the heavy personal property taxes which they would bear if legal residents of the city in which their interests are actually centered.

Tenure of Office Act. The United States Constitution, while making the president the general appointive authority to positions in the Federal service, is silent upon the method of removing such officers. In 1789, during the session of the first Congress, the question of whether the president could remove such officers without the consent of the Senate was raised, and at that time, after some discussion, it was recognized that the power of removal rested in the president without any concurring action. From that time until the administration of President Johnson, this right of the president remained unchallenged.

In 1867, however, Congress passed, over the president's veto, an act known as the "Tenure of Office act," which aimed to prevent the president from removing Federal officials without the consent of the Senate. President Johnson disregarded this law, holding it to be unconstitutional, and his conduct was the basis for charges of impeachment.

In 1869, the act was in part repealed, and the remaining provisions of the act were repealed in 1887. While the question has never been passed upon by the supreme court, most authorities on the Constitution regard the Tenure of Office act as an unconstitutional attempt to encroach upon the powers vested in the chief executive.

Theocracy (*thē-ŏk'rà-sĭ*). A form of government in which God is viewed as the supreme civil ruler, and in which government is conducted by a priesthood claiming the representation of Deity and enforcing laws supposed to be divinely inspired.

Third Parties. The American system of government, as well as the British, is considered to function properly only where two great parties divide the political field and contend for the possession of the government. So-called "third" parties have often been formed, but in the United States they have had brief existence. They have from time to time served the purpose of organizing support for new or neglected policies to the point where they have been adopted by either or both of the major parties. The Prohibition party, the Populist party, and the Progressive party are examples of this result.

Third Term. The United States Constitution provides that the president shall be re-eligible to office. No limitation against a third term is expressed or implied. President Washington, however, refused to consider a third term, and his example, resting upon a desire to prevent the possibility of a despotism, established a precedent against more than two terms.

In 1880, a strong movement within the Republican party sought the nomination of Grant for a third term, but was unsuccessful. Again, in 1912, the question of the third term arose when Roosevelt sought nomination after having occupied the presidency 7½ years. In this case the third term would have been separated from previous executive position by an interval of four years. This fact, in many minds, removed possibilities of danger. Without doubt, the example of Washington, in this as in other matters affecting the president's office, is salutary. The powers of the presidency are so great and varied that a strong tradition in favor of their surrender at the end of a second term has undoubtedly protected the nation against the temptation of usurpation.

Other nations which have adopted the institution of the presidency have in some cases limited eligibility to a single term. In Mexico, where the right to indefinite re-election was secured by President Diaz, the principle of "no re-election" has been made constitutional both for national and for state executives.

Three-Mile Limit. By general recognition, it has become a principle of international law that the territorial sovereignty of a nation bordering on the high seas is not limited to its shores at low tide, but extends out into the seas a distance of three marine miles. This understanding among nations permits a country to enforce its domestic laws within this limit and has proved of much practical value. The distance of three miles was settled upon at a time when this was regarded as the extreme possible range of guns. Owing to the difficulty experienced by the United States in preventing the landing of contraband liquor from the sea, the British government consented to an exercise of American jurisdiction over British shipping up to a distance of twelve miles from the coast.

Town Meeting. An assemblage of all of the voters or qualified inhabitants of a town, held annually for the purpose of electing administrative officials of the town and of passing upon all important legislative matters.

The town meeting, since colonial times, has been the chief organ of local government in New England. It is an example of direct popular government in its simplest form. When the community, however, reaches the proportions of a city, some form of representative government becomes essential, and many towns in New England have abandoned the town form of government.

Treason. The Constitution of the United States provides: "Treason against the United States shall consist only in levying war against them, or in adherence to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act or on confession in open court. The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood or forfeiture except during the life of the person attainted." (Art. III, Sec. 3).

The purpose of these provisions was to provide a clear definition of this crime in place of the broad and elastic interpretation given to it by English courts and to limit punishment to the actual offender.

Treason may be committed against any state of the Union as well as against the United States. The limitations given above are not limitations upon the states, but most state constitutions contain similar provisions.

Treaty Making Power. This power is quite universally recognized as an executive function. The president of the United States is vested with the power "by and with the advice and consent of the Senate to make treaties, provided two-thirds of the senators present concur." Negotiations leading to the making of a treaty are carried on exclusively by the president, usually acting through the state department. Congress has invariably refused to receive foreign missions or representatives and has not even a constitutional right of being informed of the progress of negotiations. As a means of assuring the Senate's ratification, it is the preferable practice for the president to appoint members of the Senate upon commissions of negotiation, particularly peace negotiations. This was done by McKinley in 1898, and by Harding in 1922 at the Washington Conference. The failure of Wilson to admit members of the Senate to the Paris negotiations of 1919 was an element in the hostility of the Senate to the Treaty of Versailles.

Trial by Jury. The United States Constitution, Amendment VI, provides: "In all criminal prosecutions the accused shall enjoy the right to a speedy and public trial by an impartial jury of the state and district wherein the crime shall have been committed." Amendment VII provides: "In suits of common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise re-examined in any court of the United States than according to the rules of the common law." Likewise in all the state constitutions, there are provisions which insure trial by jury to those accused of crime and to litigants in civil actions, the right being generally limited to those cases in which trial by jury was assured at the time of the adoption of the particular constitution.

Trial by jury, unless otherwise constitutionally provided, means trial by a jury of twelve men of the jurisdiction in which the case is tried, men who are impartial and who have been chosen by impartial officials, and who are sworn to render a verdict in accordance with the evidence and the law.

An essential feature of "trial by jury" is that the jury shall proceed under the guidance and instructions of the court, and that only questions of fact upon which there can be a reasonable difference of opinion shall be submitted to the jury. It is the duty of the presiding judge to "instruct the jury" as to its verdict. He may even take the case entirely out of the hands of the jury if the situation so demands.

Alongside the common law courts of England, which decided criminal and civil controversies with the aid of a jury, there grew up a system of "equity" jurisprudence, under which cases were determined by the chancellor as the representative of the king. In this field of equity jurisprudence, the right to trial by jury did not exist at the time of the adoption of the United States Constitution and the early state constitutions, and therefore is not guaranteed by them.

Civil and criminal cases of minor importance, by custom, are tried before justices with summary power, and in these cases the right of trial by jury does not exist unless expressly provided by law.

Ultra Vires (*ŭl'trà vī'rēz*). A Latin phrase meaning "beyond powers." It is used of an act beyond the authority vested in a public or private corporation exercising functions limited by law or charter.

Unwritten Law. General principles of justice, which, together with the customary rules of law and of procedure of courts in medieval England, formed the basis of the unwritten or "common law" of England and of those countries that have inherited their law from England. The term is used in contrast to the "written" or statute law passed by the legal legislative authority. The unwritten law exists in a vast and ever growing body of judicial decisions in which its principles are expounded and applied by courts.

In a popular and sensational sense, "unwritten law" is used to express a moral justification for illegal acts, like

murder under excessive provocation. This so-called "unwritten law" is entirely without legal foundation, but juries in the United States have been influenced by its appeal to find for the accused in direct disregard of positive law.

Veto. Executive refusal to approve an action, particularly a legislative enactment. The word "veto" comes from the Roman practice of conferring the same power upon two magistrates, as on the consuls, either of whom by pronouncing the word *veto*, "I forbid," could negative the action of the other.

In the constitutional development of Europe, a veto power was assumed to reside in the king, particularly as against acts of Parliament. As late as the Tudor kings of England, the monarch retained and frequently exercised the power of refusing assent to acts of Parliament, and royal assent is still nominally given. Every statute takes the form of an act of the king, but the assumption of the king's powers by ministers and the responsibility of these ministers to the House of Commons have made the royal veto an anachronism. The last employment of the royal dissent was by Queen Anne in 1707. Today, a British monarch's refusal to subscribe to a statute of Parliament would be an act of revolution.

Veto Power. The American colonists were thoroughly familiar with the veto power, as this right was exercised constantly in the name of the king by their colonial governors. It was thus adopted by them in the Constitution of the United States as a presidential power. In bestowing it upon the president, the framers of the Constitution intended to set up another of those "checks and balances" which the political theory of the time recommended. It was also felt that a president's veto was needed to protect the executive department against usurpation by the legislative. The veto, however, was not made absolute; it can be overridden by a two-thirds vote of each house of Congress.

In the early decades of the American republic, the veto power was sparingly employed by the president. It was very boldly used, however, by President Jackson, and its exercise in recent decades has become common. President Cleveland used it unsparingly to defeat private bills. The disposition today is to associate the president with congressional legislation and to hold him, as well as Congress, responsible for all legislation which he may not disapprove.

The veto power has also been finally conferred upon every state governor except in North Carolina, and, in a number of states, it may extend to items of a bill and particularly to items in an appropriation bill.

In American city charters which bestow legislative power upon a council and executive power upon a mayor, the veto power is usually given to the mayor.

The veto power has been provided generally in the constitutions of those countries adopting presidential government. Sometimes it takes the form of a "suspensive veto," whereby the executive simply returns the bill to the legislature for reconsideration, or suspends the action of the statute for a definite time, during which legislative discussion and public attention may be directed to the measure.

In the new German constitution, the veto power of the president takes the form of the right to refer a measure to the judgment of the voters.

Visa (*vē'zä*; *vē-zä'*). See *Passport*.

Voting. Voting is the formal expression of opinion or of choice, either upon some question submitted for decision or upon the election of officers or representatives. In a democratic government or society, voting is almost an essential institution for determining the will of the majority. It may, however, be expressed in a variety of ways: orally, or *viva voce*, either with or without a "call of the roll"; by some physical manifestation, as, by rising, or by a "show of hands"; by ballot.

Early forms of balloting consisted in dropping a small object, like a pellet or ball, into urns, or other receptacles; hence the word "ballot," meaning "a little ball." Balls of different colors, as white and black balls, have been and still are used to express affirmative or negative decision; from this practice comes the expression, "to blackball." For political purposes at the present time, however, a ballot is a written or printed expression of the will or choice of the voter.

In political elections, practically all countries have experienced difficulty in providing balloting machinery that would be simple, inexpensive, and protected from fraud or intimidation. In the United States, voting systems have been greatly abused down to recent decades. Agitation for an official secret ballot commenced about 1882. In 1888, Massachusetts adopted a form of ballot called, from its place of origin, the "Australian ballot," the principle of which rapidly spread until today nearly every state has some such system. Such plans of voting, while strictly controlled by law and performed with officially prepared ballots, differ considerably in different states. The main objects are secrecy, to protect the voter from intimidation and to discourage bribery, and a fair count and return of the vote.

Similar forms of voting have now been adopted by many European countries.

Short Ballot. One of the mistakes of the democratic theory in America has been to make elective too many nonpolitical administrative offices. This results in cumbering ballots with so large a number of offices and names as to make a judicious selection impossible to the ordinary voter. A wise reaction has occurred in favor of the appointment of administrative officials so that the voters' responsibility is limited to the selection of a few important executive and legislative representatives. This is the principle of the "short ballot."

Plural Voting. The democratic theory would seem clearly to limit one man to one vote in any election, on the principle that all persons and all classes should have identical political weight in all decisions. In Prussia, before the World War, a system of "three-class voting" existed, whereby electors were divided into three categories, each of which represented equal taxpaying power. Each class then chose one-third of the representation. This system is imitated in Japan. The democratic movement in Germany, which triumphed at the conclusion of the World War, has abolished this system in that country. In Belgium, before the World War, a system of plural voting prevailed, whereby two and even three votes were given to citizens possessing unusual qualifications. This system was abolished in the electoral reformation after the World War. In Great Britain, under certain circumstances, a voter may vote for two parliamentary representatives, one in the district of residence, the other in some other district in which he may have exceptional qualifications.

Compulsory Voting. The lethargy or indifference of the electorate is one of the most serious problems of democracy. Certain countries have endeavored to solve it by obliging qualified electors to vote, under penalties for abstaining. Compulsory voting was introduced into Belgium by constitutional amendment in 1893, the penalty for the first offense being a reprimand from the justice of the peace or a fine of from one to three francs, and, for subsequent delinquency, a penalty amounting to as much as the deprivation of the right of suffrage for ten years. Spain has a similar law, though it is feebly enforced. Argentina and the Netherlands have provisions making voting compulsory, while in Austria-Hungary, between 1907 and 1918, five provincial diets adopted obligatory voting.

Absentee Voting. State legislatures in the United States have repeatedly made provisions whereby citizens absent from the state on military duty have had their votes taken at important elections. Certain American states allow all voters absent from their town or election district, but within the state, to cast their votes in another electoral district. Vermont passed such a law in 1896; Kansas in 1901 provided that railway employees might vote by mail, and in 1911 extended this privilege to all voters. Among other states with similar laws are North Dakota, South Dakota, Nebraska, Minnesota, Missouri, Colorado, Iowa, Michigan, Montana, Oregon, Wisconsin, Washington, Wyoming, Virginia, Utah. In Sweden, a husband may deliver his wife's vote in a closed envelope, and a wife that of her husband. In other elections in the same country, soldiers, absent seamen and fishermen, employees of railways, ports, customs, and pilot service, may vote by mail. Absentee voting is legalized also in Australia, New Zealand, Norway, and in some of the Swiss cantons.

War. War is an act of violence inflicted by one people or nation upon another people or nation, in order to compel compliance with its will.

Coercive measures that fall short of actual employment of force and the infliction of damage and destruction are not war. Recognized "measures short of war" include: severance of diplomatic relations; "embargo," or the detention of ships in port; "reprisals," which may take the form of the seizure of property or the death of the citizens of another state, and even such extreme steps as the occupation of enemy territory and "pacific blockade," or the stoppage of communication with a country by arrest of shipping. Such measures as these last may become actual warfare, although war has neither been declared nor been legally recognized. Among such cases may be cited the German blockade of Venezuela in 1902 and the American occupation of Vera Cruz, Mexico, in 1914.

War may be carried on upon the land, upon the sea, or upon both elements at the same time. From the warfare of Rome upon Carthage to the World War, superior sea power, or the domination of ocean communication by one belligerent, has been demonstrated to be a factor of immense influence upon the prospects of victory. The actual decision, however, must almost of necessity be gained by the victory of land forces and by the destruction of the enemy's power of armed resistance. With the great advance in aerial warfare, "control of the air," or the power to deny

another enemy the employment of aircraft, is recognized as a paramount and perhaps a decisive factor in future wars.

It has long been the continued effort of supporters of international law and of humanitarian principles to confine the practices of warfare to the armed forces of the belligerents. But modern warfare is waged upon a scale so much vaster and with so much greater intensity of resolution that the undoubted theory of present day warfare is that it is a contest between the entire populations and resources of the belligerent nations. The object of warfare today, therefore, is not only the destruction or capture of the enemy's armed forces, but also the embarrassment, the injury, and the depression of the enemy's civil population to such a degree that its will for resistance may be broken.

Declaration of War. War dates from the first act of hostility and may precede a formal declaration. The declaration of war itself may take various forms, including formal advice to the enemy government, a general proclamation of hostilities, or the declaration of a blockade of the enemy's territory.

The decision to end peaceful negotiation and to embark upon war is without doubt the most weighty and the most terrible responsibility that a government may have. In the past, the power of decision usually has been vested in the sovereign or in the executive branch of government. By the constitution of the former German Empire, the final decision rested with the kaiser. But more and more the development of the sense of responsibility in governments has tended to place this decision in a representative legislative body. This is specifically done by the Constitution of the United States, which recognizes Congress alone as capable of making a declaration of war. In spite of this constitutional provision, however, it must be recognized that the issue of peace and of war rests more with the president than with Congress. The president, by his conduct of negotiations, by the movement or employment of the armed forces, practically may commit the nation to war in advance of the authorization of Congress. Congress alone, nevertheless, has the power to furnish the vast supplies of money and men whereby a war of magnitude can be waged. A similar situation exists in the British government, where, although the war-declaring power is a crown prerogative exercised by the ministry, no British government today would embark upon war without the assured or expressed support of the House of Commons. This was sufficiently indicated in the last days of August 1914, preceding Great Britain's entrance into the World War.

The confiding, to the executive branch of government, of so momentous a responsibility as the issue of war or peace springs from the necessity of prompt decision and the instant employment of war measures. The opening actions of modern warfare have an extreme, if not a decisive, influence upon the outcome. These actions embrace rapid mobilization of troops, the seizure of strategic or defensible positions, the sudden and, if possible, unexpected destruction of the enemy's forces, and the seizure of the "initiative." It is for these reasons that such an extreme proposal as the requirement of a national plebiscite, in place of an executive or legislative decision, might delay a nation in the employment of its military strength until the enemy had gained insuperable advantages.

Restrictions on Warfare. Since the time of the great jurist Grotius, the legal thought of the modern world has been consistently occupied with efforts to abate the severities and inhumanities of warfare. Numerous authoritative writings and repeated conferences of European nations have been directed to this end. Particularly was this the object sought in the agreements reached at the second Hague Conference. The practices of armies and navies in the World War, however, disregarded most of these conventions. Extreme supporters of vehement warfare have laid stress upon the expediency and justification of severity as the policy most likely to shorten war and to bring an enemy to the acceptance of peace. It must be clearly seen, however, that ruthless measures may weaken more than they may aid the nation employing them. This they do by the sacrifice of neutral sympathy, by the weakening of the moral quality of the people employing them, and by the strengthening of the passion of resistance in the people against whom they are employed. These moral elements in warfare, "the imponderables," as Bismarck styled them, are among the decisive factors in victory.

Right to Make War. Justification for warfare is a matter of wide differences of view which must be weighed from moral rather than from legal considerations, although international law writers have attempted to define acts legally warranting hostility, which are termed "casus belli." Opinion varies from the view that war may be engaged in only as an unavoidable act of national self-defense, to the view that war is but a "continuation of politics," a reenforcement to the aims of statesmen and diplomatists where these efforts are unduly obstructed or delayed. This was the view advocated by extreme partisans of war, both political and military, in Germany before the World War.

"The right to wage war" has long been recognized as one of the essential attributes of a sovereign state. In certain cases, however, this right has been surrendered by treaty, as in the case of Switzerland and of Belgium before 1914. It is furthermore a right not possessed by countries which are "protectorates."

Warfare, however it must be deplored, appears to spring not more from the ignoble passions of a people than from its noble qualities—from its national pride and high spirit; from its quickness to feel injustice and wrong; and from a moral preference for the sufferings and losses of warfare rather than for the acceptance of injustice and oppression. In the defense of national interests, all peoples not weakened by decay show intense stubbornness and resolution.

The prospects of future avoidance of war, as a practical matter, would seem to lie less in the establishment of leagues and treaty engagements than in the general diffusion of sympathy and understanding between nations, and in the cultivation, particularly among the greater peoples, of patience, restraint, and a spirit of concession. Perhaps no more effective proposal for preserving peace was ever made than the dictum of Edmund Burke that "the superior power may offer peace with honor and with safety."

Whitewash. The exoneration of officials accused of misconduct, without a sincere attempt by the investigation committee to uncover the real facts or to punish the offenders.

Wirepulling. A term used to describe the secret means whereby political bosses control legislation and political appointments.

Woman Suffrage. During the colonial period, women in Massachusetts and Virginia who possessed the necessary property qualifications were at times permitted to vote. However, under all of the state constitutions adopted during the Revolution, voting was restricted to male citizens, except in New Jersey, where women voted until an act of the legislature in 1807 expressly limited the suffrage to "white male citizens."

The woman's suffrage movement in the United States began about the middle of the 19th century. In 1848 the state of New York passed a law, soon adopted by other states, which permitted married women to hold and to dispose of property. This was the beginning of a series of laws which ultimately extended full civil rights to women.

In 1869 were formed both the National Woman's Suffrage Association and the American Woman's Suffrage Association. The latter sought suffrage for women through amendments to state constitutions, while the National Woman's Suffrage Association sought it through Federal amendment. In 1890 the two associations merged into the National American Woman's Suffrage Association.

The first victory of the American suffragists was in 1869 in the territory of Wyoming, where women were granted full and equal suffrage. The territory of Utah followed in 1870. In 1890, when Wyoming was admitted as a state, its state constitution provided woman suffrage, and Wyoming thereby became the first state in which equal political rights were extended to women. The suffrage was granted to women in Colorado in 1893; in Idaho and Utah in 1896; in Washington in 1910; in California in 1911; in Kansas, Oregon, and Arizona in 1912; in Alaska in 1913; in Nevada and Montana in 1914; in New York in 1917; and in Michigan, South Dakota, and Oklahoma in 1918. In 1917 women obtained the right to vote in primaries in Arkansas; in 1918 they obtained a similar right in Texas. In certain other states, the right to vote for president was granted.

Finally, in the fall of 1918, a resolution to amend the Constitution by providing that "the right of citizens of the United States to vote shall not be denied or abridged by the United States or any state on account of sex" was passed by the House of Representatives by the necessary two-thirds vote. It was twice defeated in the Senate and was not passed until the special session called by President Wilson in 1919. The amendment was ratified by the necessary 36 states in 1920.

Suffrage was extended to women in Finland in 1906, and in Norway and Denmark in 1907. It has been granted in Great Britain, Australia, Canada, New Zealand, Rhodesia, and other British territories; also in the Scandinavian and Baltic countries, in Germany, Netherlands, Luxemburg, Austria, Hungary, Poland, Czechoslovakia, and Rumania; and, among Latin American countries, in Porto Rico, Cuba, Uruguay, and the state of Rio Grande do Norte, Brazil.

Zoning Ordinances. Ordinances passed in American cities, dividing the municipal territory into zones or districts of several kinds, as residence zones, business zones, industrial zones, unrestricted zones, and definitely limiting the uses to which property in these districts may be devoted. The purpose of these ordinances is to insure health, beauty, and convenience in the geographical development of the city. Doubt has existed as to the power of legislatures or their agents, the municipalities, to enact such laws; but recent decisions of the courts have upheld them as within the police power of the state.

TEST QUESTIONS

Distinguish between the art and the science of politics 1389
Criticize the 18th century idea that savage peoples enjoyed an ideal freedom 1389
Compare Aristotle's idea of a state with that of Plato. What, in Aristotle's view, is the object of the state? 1389
Discuss the contributions made to political philosophy by Machiavelli and Bodin. Through what ideas did John Locke influence the American colonists? 1389
Point out some political movements produced by the World War 1389–1390
State some of the political problems of the present day. Differentiate politics from history 1390

THE UNITED STATES

Name two intercolonial assemblies, with the date of each, previous to the assembly which declared American independence 1391
What general reason for the issuance of the Declaration of Independence is set forth in the first paragraph of the document? . . . 1391
From what source are governments said to derive their just powers? 1391
Enumerate ten facts set forth in the declaration as proof of the purpose of the king of Great Britain to establish a tyranny in America 1391
By what title are the signers of the declaration described? By what authority do they affirm the declaration to be issued? 1391–1392
Whose name headed the list of signers of the declaration? 1392
Enumerate the defects of the Continental Congress as an agency of government. When were the Articles of Confederation adopted by Congress? When were they finally ratified? 1392
For what kind of united government did the Articles of Confederation provide? Of what body did the central government consist? . 1392
By what title did the members of the Congress refer to themselves in the heading of the Articles of Confederation? 1392
In what words is the confederation described in Article III? What purposes of the union are enumerated? 1392
To how many delegates in the confederation Congress was each state entitled? to how many votes? 1393
How many delegates were elected to the Constitutional Convention of 1787? How many attended the sessions? Characterize the membership of this body 1395
Enumerate the six institutions which were given original form by the Constitution. For what two characteristics of form is the Constitution remarkable? Quote Gladstone's judgment about the Constitution 1395
Upon what date was the Constitution signed? Name the nine states that first ratified it . . 1395
What methods of amendment are provided by the Constitution? How have amendments actually been proposed and adopted? For what reason were the first ten amendments proposed and adopted together? 1396
Give the dates upon which the several amendments became effective 1396
Who, according to the preamble of the Constitution, established that frame of government? Enumerate the purposes of the Constitution, as stated in the preamble 1396
Give the dates upon which each of the original 13 states ratified the Constitution. State the vote for and against in each case . . . 1400
What two theories of government strongly influenced the framers of the Constitution? . 1400
Of what two houses does Congress consist? State the length of the term of each Congress. Upon what date do the regular sessions of Congress begin? By whom are special sessions called? 1400
How many United States senators are elected from each state? By whom are they elected? State the length of a senator's term. Who are eligible for election to the Senate? . . . 1400
Outline the powers of the Senate 1400
By whom are members of the House of Representatives elected? for what term? Who is eligible for election to the House? . . . 1400
Outline the powers of the House of Representatives 1401
Summarize the method of electing the president of the United States. State the eligibility requirements of the office 1401
Enumerate the powers and duties of the president 1401
Who elects the vice president when the state electors fail to make a choice? What is the salary of the vice president? State the order of succession to office, in case of the removal, death, resignation, or inability of the president 1401
Enumerate the executive departments of the government. Summarize the particular field of each. What is the salary of cabinet members? 1401
By whom are judges of United States courts appointed? What is their term of office? . . 1401
How many members constitute the supreme court? Summarize the field of the supreme court's original and appellate jurisdiction. What especial function, outside the court, attaches to the chief justice? 1401
Over what classes of cases do the inferior courts have jurisdiction? What judges are competent to sit in a circuit court of appeals? . 1402
How many United States district courts are there? State the jurisdiction of the United States court of claims; of the court of customs appeals 1402
Point out how the Senate is associated with the president in the direction of foreign relations. What customs and practices indicate the extent of the president's power in foreign affairs? Indicate the Senate's peculiar function with respect to war and peace. What body only can declare war? 1402
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"THE HOME OF THE HERON," BY GEORGE INNESS

FINE ARTS

INTRODUCTORY

An acquaintance with the products and results of the fine arts is necessary to the well-being of every individual. In the absence of such acquaintance, there can be no balance in human life. Subconscious aspirations apparently create in the mind of even the barbarous man unrest and anxiety comparable with those sensations which are occasioned by the want of food, as evidenced in the infant and in the animal. Exercise must be provided for the play-impulse, which urges the one who receives a pleasurable impression through the avenues of sense to interpret his experience in imaginative, personal terms.

The Play-Impulse. In obedience to this impulse, the specifically gifted and instructed externalize their emotions and trains of thought in music, poetry, architecture, sculpture, or painting. Parallel with those instincts which make for the preservation and the propagation of human life, there exist the finer movements of the being whose end is nobler than self-gratification and whose most vital expressions, such as the Parthenon, the Cathedral of Amiens, the compositions of Bach and Beethoven, are sufficient to immortalize the memory of a people or a race.

Deprived of the exercise of the play-impulse, man, according to the theory of the poet Schiller, is either a slave or a dictator. His gross appetites are tempted and constrained from without. His moral sense restrains him from within. Yielding to his appetites, he lapses into a hopeless, passive state. Opposing them, he becomes a stern, vigilant guardian of law, understanding no password save duty. In either case, his existence lacks an essential. In the too passive state, his spirit is surfeited and stifled. In the too watchful attitude, it is starved. But happily he may revolt from either control to enter a third condition in which there is no question of either slave or master. There his appetites do not lure him. Nor does his combative, moralized will resist him. Governed by the play-impulse, man becomes a creator. He spontaneously produces the offspring of his imagination. He completes his existence by pursuing activities which neither subserve any necessity of nature nor fulfill any moral duty. "Only when man plays," concludes Schiller, "is man truly man."

The exercise of the play-impulse, in thus completing human existence, acts like a health-giving physical gymnastic. It eliminates the clogging poisons of grossness. It induces the mood that animated Robert Browning, when he wrote: "God's in his Heaven. All's right with the world!"

Value of Fine Arts. Influences which are soothing, curative, inspiring, essentially maternal, must be fostered in the United States, if a national life is here to be permanent. Our "melting-pot of nations" must be resolved into a laboratory, the processes of which shall eliminate and purify, disengage and recombine. And among the agents to be employed there is no doubt that the fine arts might be one of the most active. They are even now cleansing the "city slum," as the "settlement" music schools and elementary courses in drawing and modeling develop, liberating the play-impulse in the minds of those whose lives are set in sordid surroundings. By these beneficent agencies the poor and the rich are brought together, and democracy is so furthered.

In consequence of their social and economic worth, a discussion of the principles underlying the fine arts is essential to complete any reference book professing to survey the mental accomplishments of humanity.

MUSIC

As here presented, such discussion treats the major arts, beginning with music, which meets the widest appreciation among the people. From the early 19th century, this art has been progressively cultivated in the United States, its course having been directed by Germans as instrumentalists and largely by Italians as interpreters of opera and teachers of voice. Within this period, along the Atlantic seaboard and in the Middle West, there have been developed musical centers of great importance, with the result that today New York offers, during a single season, richer opportunities of hearing the newest works of all schools and a larger number of the best artists of all nationalities than any other capital of the world.

History of Music. This situation, temporarily due to the causes which make life so difficult in many European countries, is likely to become permanent. Therefore, in view of such existing conditions, and in consideration of the importance of music in our national life, the means of acquiring an appreciation of this art should be sought by the many. An elementary knowledge of rhythm, of the relations between melody and harmony, and of the families and the functions of instruments suffices, for the casual listener, to transform an orchestral performance from chaos into a cogent example of law and order. To provide such equipment, as well as to show the development of music from its primitive forms, used by ancient, civilized peoples, to its present highly specialized state, has been the aim of the makers of this book.

First to be treated are the periods in the growth of the art and the detailed history of musical notation, the latter section containing an interesting table of characters and symbols, especially useful to students of ecclesiastical music. But a larger number of readers will eagerly follow the discussion of principles—notably that of tonality, which is so important to the appreciation of modern composers.

Musical Form. Under the caption of *Musical Form*, the general reader receives a lesson in the structure of music, necessary to the adequate enjoyment of any worthy concert or recital. Met at the opening of the section by the picturesque definition: "Form is the frame which encloses the musical design," he is led, progressively, from the phrase or "motive" to the sonata, the symphony, and the concerto. At the end of this survey, through the aid of the clear, technical statements there offered in logical sequence, he will have amassed a definite and practical fund of information.

Then, as an interest awakened in musical form is always extended to correlated subjects, provision for that certainty is made by an accurate characterization of the instruments of the orchestra and of the military band, with respect to their tone-quality and their interpretative power. These explanations are given in answer to the growing demand for such knowledge occasioned by the recently and very widely increased opportunities for hearing large bodies of instrumentalists.

Finally, other popularly expressed needs are recognized by including, in the section of *Music*, a chapter of synopses of the plots or "texts" of the most frequently performed operas and a glossary of musical terms.

PAINTING

Among the arts of form, painting permits the freest play of the imagination. Through its essential element of color, it addresses itself to the child who is less easily attracted by line. Through its "counterfeit presentments" of persons and things, it is capable of awakening suspicion in the savage as an exercise of magic. Its history, when followed according to the stages in the evolution of the art, becomes a fascinating succession of movements. If otherwise treated, the same history presents a wearisome succession of names and dates, with descriptions of works having little to connect them save their association with local influences. Therefore, the material here offered upon the subject is divided according to the practice of those who have professed the art.

Two Periods. By the use of this method two divisions or periods suffice. Within the first of these are included the primitive, tentative, incomplete efforts of painters from 5000 B. C. until the beginning of the 15th century. The second period embraces the experiments in perspective, modeling, foreshortening, and the treatment of color by which painting has passed from childhood, through adolescence, to the state of a mature art.

Accordingly, a vertebrate system confronts the reader. His memory is not taxed with elaborate detail, but his imagination is quickened as he follows the solutions of problems in the art of representing things as they appear to be. Further, he reaches a clearer judgment of the individual contributions made to the art during its long development than if he should, as a beginner, study a series of masterpieces, even though they were chronologically presented. At the end of a survey so devised, one who has carefully followed it finds himself equipped to judge of the century, the school, or the movement which has called into being any given picture. For him, a gallery of exhibits chosen with an eclectic taste is no longer pathless. It is a charted sea which invites him to voyages ending in enchanted islands.

ARCHITECTURE

Alone among the major arts, architecture in its visible forms does not result solely from the exercise of the play-impulse. It involves the idea of protection. For this reason, its practice antedates the moment when the savage, beating upon a resonant surface, produced rhythm, which is the first essential of measured music. Again, the primitive dwelling was either excavated or erected long before the forms of animals were graven upon its walls. Developed principally by the Aryan races, architecture might be accepted as the expression of their constantly changing desire to make, unmake, and remake, in the hope of yet higher attainment. This art is, as well, a sensitive instrument, recording the mental fluctuations, no less than the capabilities, of those who produce it.

Four Styles. The history of architecture is here treated briefly, conformably to the structural principles which have been successively used by builders, from the beginnings of civilization in the Nile valley and in Mesopotamia down to the present time.

Classified by means of these principles, architectural development resolves itself into three styles, to which may be added a fourth, determined very recently by accomplishments in engineering and in the use of steel and concrete.

As these distinctive styles pass in historical order before the reader, he will observe that the Parthenon, with its superlative, unique beauty, derives from the cabin built from clustered reeds and clay, some three thousand years earlier, by Egyptian peasants.

The second principle, the domical, as expressed in its simplest, most excellent manifestation, the Pantheon at Rome, acquires an added interest, when traced backward to its rise in the prehistoric baking oven of Assyria and forward to its descendants, Santa Sophia at Constantinople, the cupola of Brunelleschi at Florence, and that of Michelangelo at Rome, with Saint Paul's at London offering the last structural modification.

Then, as a connecting link between the second and the third principle, appear the flexible clay-and-mortar constructions of the late Byzantines (864–1204), which are the antecedents of the complicated, balanced, pointed arch system, misnamed the Gothic.

For knowledge of the fourth, still progressing development, the North American has but to look about him. By the aid of current literature and a visit to an important commercial building, he will, without great difficulty, reach an understanding and an appreciation of the latest structural type, the "skyscraper," and be convinced that, as an expression of the period, it ranks with the airplane and with wireless telegraphy.

SCULPTURE

The art of sculpture, as the handmaiden of religion, attained its first great climax among the Hellenic Greeks. They, with their prompt translation of the abstract into the concrete, personalized and visualized all the forces of nature, all the attributes of Divinity. They rendered them in sculpture as gods in human form. But it was only under the decline of the state polytheism that the greatest works of sculpture came into existence, the prime object of their creation being to maintain and to promote patriotism.

The bloom of Hellenic art, thus dependent upon the unified state, was necessarily brief. But the study of the Greek sculptors, working between 480 and 200 B. C., fixed or all time the treatment of the nude figure. Therefore, the one seeking enlightenment upon any epoch or period of sculpture must first fortify himself by tracing the development of bony and muscular structure, of pose and facial expression, as it is set forth in the statues of the above-named epoch.

Three Periods. Adapted to this point of view, a brief history of sculpture is here presented. It is consequently divided into three periods, with the Hellenic strongly emphasized, the Renaissance being treated as a derivative, and the modern as the heir of the two preceding phases. A survey so finished could not, however, be regarded as complete, since it would leave unexplained certain strong elements resident in the sculpture of the second and of the third period. An acknowledgment is therefore made of the direction given to the art by the Romans, when, having accepted the Hellenic principles, they created a new type of monumental sculpture in the triumphal arch and in the military column. And, in the present instance, as usual, this naturally inartistic people became transmitters, so that the governmental art of all modern nations remains under a great debt to them.

Again, much less adequate would our review have been rendered through the omission of reference to the sculpture of the middle ages. For, although then reduced to a secondary rôle, as an adjunct of architecture, the statues of holy personages and kings, stiffly draped and limited in pose, developed an expressiveness, at once rugged and touching, which they bequeathed to the marvelous 15th century and again, four hundred years later, to the art of Rodin and of his disciples.

All these elements, carefully traced in our review from their beginnings, will be seen to unite in our American sculptors of Parisian training, who have inspired deep respect in the Old World and have already produced several undeniable masterpieces.

MUSIC

EACH epoch of the world's history bequeaths to its successors, together with its more material possessions, an image of its undying soul. This inheritance, "gift immortal though by mortals given," is Art, whose peculiar graces of form and endowments of spirit so truly portray the higher æsthetic life, in which is to be found the real soul character of a people. To designate all the arts over which the nine Muses presided, the Greeks used the word *μουσική*, from which our word "music" is derived. They used the word *ἁρμονία* to express what we mean by music. The early history of music is largely a matter of conjecture and deduction, if not of tradition. Nothing that is in the remotest degree significant has been contributed to music, as we practice it, by any of the ancient nations. We know that the music of antiquity was given a place of honor in the festive and religious life of the people, but of the music itself we have not the slightest trace. The true history of music, then, must treat primarily of its artistic development. The authentic record of art music, written and printed, largely found in the music itself, extends back only a few hundred years.

Origin and Traditions. Among the beauty-loving Greeks, from whom so munificent an art legacy has come, the attainment of music to the position of an independent art was as impossible as among the cultured Chinese, Hindus, or Egyptians. But it is of great interest to the student of musical matters to know in what esteem his "divine art," though still but in embryo, was held. Although its practice might be veiled in obscurity, its fame was imaged by the plastic artist, illumined by myth and tradition, and dignified by the philosopher and theorist.

In common with the traditions of the Orientals, the Greeks ascribed to their scale a divine origin. They endowed their gods with the gift of music, associated its practice with their temple rites, and, in this connection, apparently held it in sacred veneration. Later, music became more democratic, for, in the time of Plato and Aristotle, it was considered a necessary part of the education of every youth. These philosophers, serious in their convictions, speculated upon the influence of music over the mental and moral development of their nation, and deemed the matter of sufficient importance to be recommended to the legislature for regulation. For, in the melodies based upon their various scales, the sensitive Greek could discern, even at that early date, a power to elevate and ennoble or to enervate and demoralize. However, though having these presentiments of the power of music, this nation was not yet ready for the matured spiritual art.

HISTORY OF MUSIC

The high repute in which music was held by the Greeks is significant in view of the fact that our own music system is the direct descendant of the old Greek scales. But history shows that Greece gave us only a systematically arranged series of impressions which she had received from other nations. Egypt and Asia Minor were the teachers of Greece, for the oldest sarcophagal drawings, going back to an age at least 4000 years B. C., include graphic representations of harps and lutes or mandolin-like instruments, establishing the fact that the early inhabitants of the Nile country had developed these important forms of stringed instruments.

Early Trends of Development. Of the musical theory of the Egyptians we know very little by direct evidence. But Pythagoras, the founder of the mathematical musical system of the Greeks, was a scholastic and cultural disciple of the old Egyptian priests. This fact leads to the logical deduction that the salient features of the Pythagorean doctrines were acquired from the older land of culture.

Other lines of investigation have established beyond a doubt that a fundamental connection exists between the Chinese music system and that of Pythagoras, a relationship which is pointedly corroborated by many analogies. Many of the Chinese scales were used in ancient Greece, especially the *pentatonic*, "five-toned," C D F G A C and E F A B C E. The much used closing phrase, G E D, of the Chinese and Japanese, is also found in the epitaph of Seikilos, discovered in 1883 in Asia Minor. The Japanese tritone succession, B A F E, was very popular among the Greeks, as is proved by the famous "Apollo Hymn" unearthed at Delphi in 1893. Further than this, the favorite minor scales of the Greeks, E F G A B C D E and D E F G A B C D (with whole steps between 7 and 8) are also the fundamental series for many Japanese folk songs.

Tradition credits Fuhsi, the father of old Chinese philosophy, with the discovery of the two strong overtones, the octave and the fifth, leading to investigations which resulted in the establishment of the series of fifths, C G D A E. The transposition of these tones into contiguous positions within one octave resulted in the scale C D E G A, in which our 4th and 7th steps are missing. Mystic speculation as to the figure 5 is supposed to have been the reason why Fuhsi and his followers restricted the number of fifths to only five. If there is any truth in this narrative, Fuhsi doubtless obtained his knowledge from India, much in the same manner as Pythagoras, 2000 years later, gained his from Egypt. It is interesting to note that the pentatonic scale of the Chinese is also the scale of the Scotch and Irish; it is found in Assyria, Egypt, among the Jews, in Java, Sumatra, New Caledonia, New Guinea, and among certain tribes of the Hudson Bay Indians.

The Chinese did not stop at the pentatonic scales. Not without opposition, however, did Prince Tsai Yu introduce the missing 4th and 7th steps during the 14th century B.C. According to Fuhsi's symmetrical arrangement of fifths these missing steps were explained as prefixed and affixed tones: F|C G D A E|B. A rearrangement of these tones within one octave produced the scale F G A B C D E F. According to our system this is equivalent to the F major scale with the chromatically raised 4th step.

Three Periods of Growth. Music may be said to have experienced three periods of development. A review of the epoch of antiquity is a history of the scale and one part music, or simple melody, and also of the development of notation. The laborious strivings by which the 14 *ecclesiastical modes* were evolved from the complicated system of the Greek mathematical music cover many centuries, ending with the 12th or 13th. The final selection of the modes corresponding to our major and minor took place only after several more centuries of scientific and artistic demonstration. Not until the time of Johann Sebastian Bach, early in the 18th century, do we find a compromise on the pitch of tones, the so-called *tempered system*, determined upon. This led to the development of harmony, and established the association of related keys (which is the chief means of attaining unity and proportion in the perfect form). This enabled Emanuel Bach to sketch, for the great masters of the classic period which followed, the outlines of the sonata form.

The contrapuntist traces his art from the tentative efforts to *descant* with the ecclesiastical song in the 11th century, through that whole genus of polyphonic music, which was developed to such high perfection between the 14th and the 18th century. The *descantus* consisted in the trick of placing a popular melody against one of the ecclesiastical

songs, both to be sung together. In this device and the subsequently developed polyphonic music, we find the musical parallel of the history of the times, during which the laity gradually and with difficulty asserted their independence. In the ecclesiastical chant can be discerned the dominating "ego" of the ruling power, to which the people echoed in humility and subjection. In the *descantus*, in which the populace dared to combine a rather "slippery" song with the songs of the Church, is revealed the first indication of defiance and derision of power, which finally led to complete emancipation.

Nor was music itself free from servility, for, according to early tradition, music was the handmaid of poetry, and it is only in comparatively modern times that we can trace their true concordance and co-operation. Now the poem in words bears to the poem in tones the relationship of helper and inspirer. The earlier history of our art found the tones of the human voice a mere convenience for the recitation of the poet; later came the subordination to the requirements of the ecclesiastical chant. Afterward it served for the display of the contrapuntist, who treated the human voice merely as an instrument. Then, paralleling this last condition and outliving it, we find the human voice the servant of the opera *maestro*; for, in the very embellished arias written for it, the voice bore the tinsel livery bespeaking its servile position.

In more recent periods of musical history, instrumental music, commonly distinguished as absolute music because it has freed itself from all external auxiliaries, may be regarded as the most refined and genuine phase of tone expression. It is manifestly in the nature of things that this highest and most perfect product of artistic evolution should have been reserved for this period, when the consciousness of its true power had reached the befitting degree of maturity.

THE PRIMITIVE MUSIC OF ANTIQUITY

There have been handed down to us only meager details as to the musical theories of the ancients, and but few of their compositions have been preserved. However, we are tolerably well informed as to their musical instruments, and somewhat as to their musical impulses, thanks to the variety of data derived from that period.

The Egyptians. That music played an important part in the social and religious life of the Egyptians is gleaned not only from accounts of writers of a later date, but from bas-reliefs, hieroglyphics, and the remains of instruments. Their instruments of percussion were clappers and many kinds of drums, some of the more important drums being egg-shaped and flattened at the ends, over which skins were tightly stretched. These were struck with the hand or with a sort of mallet. The harp was the national instrument, and was found in all sizes, from the small, primitive forms to the large and beautifully ornamented temple harps. Their wind instruments were pipes and flutes, single and double, and trumpets for martial effects, the tones of which Plutarch compared to the bray of an ass. The Egyptians employed music at religious services, processions, dances, feasts, and other social diversions. Every larger function was ennobled and embellished by music. According to accounts of Greek writers the ancient Egyptians were a melody-loving people.

The Chinese. Many of the ancient instruments of percussion have been retained in the modern practice of music among the Chinese. Organs of variously tuned stone plates or bells suspended from framework produce a rather mellow tone when struck by a mallet. There were many kinds of drums, also the noted tam-tam. Here also we find flutes (some similar to the pipes of Pan) and stringed instruments, made of silken cords stretched over flat resonance boxes, similar to the modern zither. The musical notation of the Chinese is borrowed from their alphabet, and therefore unrecognizable as such by the uninitiated.

The Hindus. The Hindus possessed a diatonic scale of seven tones indicated by a series of signs taken from the Sanskrit. By rearranging these tones in various ways the Hindus formed 36 different tone series. It was probably at some later time that they divided the octave into 22 parts (*srutis*) and made a theoretical distinction between large and small whole and half steps.

Though the Hindus used also numerous percussion instruments, the strings predominated, chief of which is the *vina*, supposed to have been the invention of the Hindu god Siva. It consists of a long cylindrical body with seven metal strings stretched over 19 movable bridges. Besides this a primitive violin, played with a bow, and called *serinda* or *ravanastron*, is noteworthy, though the opinion has gained credence that this instrument, as well as the *magoudi*, a long-necked guitar of four strings, originated among the Arabs or Persians.

The Hebrews. It is almost a certainty that the Hebrews in Palestine derived their music from Egypt and Babylon. Being very prominent in their temple rites, the music was performed by large choirs, which sang in unison, accompanied by harsh and shrill-sounding instruments. Ancient Hebrew music was antiphonal, that is, two parts of the chorus, or the leader and the chorus, would sing responsively.

The Arabians. A scale of 17 parts, each consisting approximately of a third of a tone, and of noticeably pure intonation, was the basic system of the Arabs. The Arabic-Persian music theory is noteworthy in that it proclaimed the consonance of thirds and sixths, which intervals were represented as dissonant by the Greeks. We are indebted to the Arabs for the *kettledrum*, or *timpanum*, but above all for the lute, descriptions of which are given in the records of Al-Farabi, in the 10th century B. C. Hugo Riemann, the eminent authority on musical history, is of the opinion that the Arabs derived the idea for their lute, *el aud*, from the Egyptians. A few primitive stringed instruments, the *rebec*, *rubeb*, or *rubab*, and also the *kemangeh a guz* have been credited erroneously as being the direct ancestors of the modern violin.

The Greeks. Not only was music considered by the Greeks as an important adjunct of their culture, serving as a luxurious pastime of the nobility, but they fostered it for its own sake. The instruments of the Greeks were the *lyra*, *kithara*, *phorminx*, *magadis*, and *trigonon*, all stringed instruments and much alike. Of the wind instruments, the flute assumed a position of importance, while accounts from the year 396 B.C. state that "Timæus and Krates were the victors upon the trumpet" at the Olympic games. Other instruments of the Greeks had little bearing upon art development. The *semeiography*, "notation," of the Greeks was very involved, the vocal and instrumental music each being differently notated.

NOTATION

One of the most interesting chapters in the entire history of music is that relating to the development of notation. As has been seen, the notation used by the ancient nations of culture was confined largely to letters taken from their written language. Letter notation, however, did not meet the need of preserving melodies for religious service; accordingly, it was replaced by a system of signs called *neumes*.

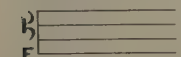
Neumes. Accents were used in rhetoric in the early centuries of the Christian era. An upward stroke from left to right indicated that the voice

should rise. A similar downward stroke indicated that the voice should fall. A combination of the two, forming a circumflex, indicated that the voice should rise and fall on one syllable. These signs were taken over into church music in connection with the use of selections from prose Scripture.

A system of such signs had gained acceptance by the 9th century. It consisted of a series of dots and short strokes, also combinations of these, forming markings, the upward or downward swing of which indicated the rise or fall of the melody. Two signs used in modern ornamentation, the trill ∿, and the turn ∾, are remnants of this system of signs. The signs were called *neumes*, from the Greek word *νεῦμα*, meaning "nod" or "sign." While more sightly than the old letter system, the neumes failed to indicate exactly how much the melody should rise or fall and were used largely as an aid to memory. Nor did they indicate a rhythmical value of the tones. Efforts to improve upon this unreliable system of signs led to further experimentation. Quite happy was the thought of the monk Hermanus Contractus (1013-54), who superimposed Latin letters above the text, to indicate the distance of a tone above or below the preceding. For instance, the letter *T*, above a given syllable of the text, indicated that the melody should rise a whole tone (*tonus*). A dot after the letter *T* indicated that the melody should descend a whole tone. Similarly, other intervals were designated by other letters: *S* (*semitonium*), a half tone, and *TS* (*tonus cum semitonio*), a tone and a half. The monk Hucbald of St. Amand in Flanders placed the text syllables between lines and indicated at the beginning where the half steps were to appear.

The Staff. But none of the above efforts assumed the importance of those of the Benedictine monk, Guido of Arezzo (995-1050). Being conscientious and exact, he used the simple expedient of drawing a red line to guide him in placing his neumes neatly and accurately above the text. This purely accidental device he soon turned to account as a means of fixing the pitch of the tones. The thicker part or head of the neume was placed so that it rested either upon the line, or just above or below. These three positions, in reference to the line, indicated the relative pitch values of three adjacent tones. This red line was first fixed to represent middle F of the bass register and was identified by the corresponding letter (F or 𝄢). From this our present sign of the F or bass clef (𝄢) has been derived. Some time later a green or yellow line was added to represent the fifth above, (C). This C line was also indicated by its letter (𝄡), which was the original sign for the C clefs. A black dotted line was soon placed between the others to mark the position of the tone A. The dotted line then gave way to a continuous line, the colored lines also being replaced by black lines. In this manner the musical staff was gradually formed. The letters F and C were consciously chosen because they directed the attention of the singer to the half step progression of the tones below F and C. This ultimately led to the use of the G clef when the half step F♯ was desired below G.

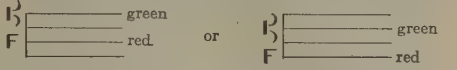
The blending of the two elements was a happy idea, and the new system was soon popular. The number of lines grew to 10 and even to 25, but was later reduced to 4 and 5.



The little thicknesses on the neumes were transformed into squares, with the evident intent of indicating note values. The 5-line staff was universally adopted with the spread of printed music toward the beginning of the 16th century. Prior to that time a 4-line staff was in common use for the Church liturgy, one of



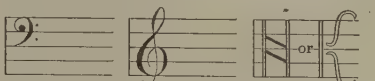
5 lines for other vocal music, and one of 6 lines for organ music. Guido always used the 4-line staff; either



He was also the first to transform the neumes so as to give them a headlike thickness, which was to show the exact location of the note on the staff.

The success of Guido's innovation was rapid and complete. This is shown in the fact that Pope John XIX called Guido to Rome in 1026 in order to satisfy himself as to the excellence of the new form of notation. The pope then ordered all churches and cloisters to accept the notation of Guido.

The Clef. The word clef is derived from the Latin *clavis*, meaning "key." During the 16th century no fewer than five clefs were in common use, and many more had been tried for various purposes. They were evolved from the practice of using Roman letters at the beginning to indicate the relative position of the tones of the scale with reference to the lines and spaces of the staff. The clefs now in common use are the F or bass clef, which indicates that the fourth line represents F below middle C; the G or treble clef, also called the violin clef, which indicates that the second line represents G above middle C; and the C clef.



(F) Bass Clef (G) Treble Clef C Clef

The G and C clefs were originally movable. When the C clef was placed upon the first line it was called the soprano or descant clef; on the second line, the mezzo-soprano or high alto clef; on the third line, the alto clef; upon the fourth line, the tenor clef. In each instance the line upon which the clef sign appears is middle C. Similarly, the treble or G clef sign, when placed upon the first line, was called the French violin clef; on the second line, the violin clef; on the third or fourth line, the low or deep violin clef. The bass clef was seldom transferred, although provision was made for indicating the baritone and the sub-bass by placing the clef upon the third and fifth lines respectively. The following tabulation will present them all in a clear manner.



French Violin Clef.

Violin Clef.

Low Violin Clefs (uncommon).

Descant or Soprano Clef.

Mezzo-Soprano or High Alto Clef.

Alto Clef.

Tenor Clef.

Baritone Clef (very uncommon).

Bass Clef.

Sub-Bass Clef (very uncommon).

Of the above, the violin clef, bass clef, alto clef, and tenor clef are in use today. The clef signs are corruptions of old Gothic forms of the letters F, C, and G.

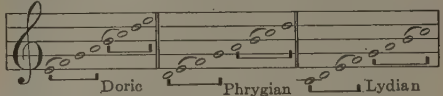
Notes. It has been seen that there was a tendency to transform the thicker part of the neumes into little squares. These *nota quadriquarta* evolved naturally though gradually from the neumes. They were not the result of a special innovation. Franco of Cologne, a monk of the 11th century, is given the credit of having invented the idea of assigning a definite time value to each of the several forms adopted. His book on measured music, *Ars Cantus Mensurabilis*, led to the establishment of an entire system, with elaborate rules for composition, called *mensurable music*, which was in vogue for 500 years. It is a peculiarity of the 14th and the 15th century that the figure 3 was assumed to be representative of the "perfect rhythm," and each note was the equivalent of three of the next lower note values. This triple rhythm typified the Holy Trinity and was marked by a circle, ○. Double rhythm, considered less perfect, was marked by the broken circle, ☾. Bar lines did not appear until after 1600, and not until the beginning of the 18th century do we find the method of writing eighth or sixteenth notes in groups,  .

Several ways of writing notes sprang up. That which finally gained general acceptance in the 12th century was:  , *maxima* or *duplex longa*, meaning greatest or double;  , *longa*, meaning long;  , *brevis*, short; and  , *semibrevis*, half of a brevis. To these were added later:  , *minima*, meaning the shortest possible; and  , *semiminima*, half the shortest possible. Conservative musicians objected to the use of the semiminima, proclaiming the minima the shortest note possible. Radicals, however, began to use two notes which were even shorter:  , the *croma*, or *lesser semiminima*, half of the semiminima; and  , the *semicroma*, half of a croma.

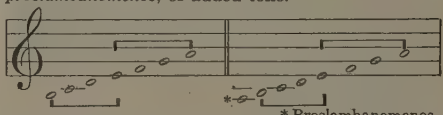
By the 15th century these forms had all become established, though the method of writing differed slightly from that used in 1100. For purposes of comparison the following table shows the notes used in the 12th century as well as those in use since the beginning of the 18th century.

Notes used 1700	American names	English names	Notes used 1400	Notes used 1100	Names used 1100
	Double Note	Breve			Maxima
	Whole Note	Semibreve			Longa
	Half Note	Minim			Brevis
	Quarter Note	Crochet			Semibrevis
	8th Note	Quaver			Minima
	16th Note	Semiquaver			Semiminima
	32d Note	Demisemi-quaver			Croma
	64th Note	Hemidemi-semiquaver			Semicroma

The Greek Modes; Gregorian Tones; Scales. The foundation of the Greek music system was not, as with moderns, a seven-tone series, but a succession of four tones covering a perfect fourth, called a *tetrachord*. It is traced to the four-stringed lyre. The tetrachord invariably includes two whole steps and one half step, and is variously named according to the relative position of this half step. It is a *Doric* tetrachord when the half step is below, B C D E, *Phrygian* when in the middle, A B C D, and *Lydian* when at the top, G A B C. From the conjunction of two tetrachords of the same sort arise the so-called *octave species*, which take their names from the tetrachord upon which each is founded.



To these, others were added, beginning upon the remaining tones of the scale. The juxtaposition of two tetrachords as above, leaving a whole step between the component halves, was called disjunctive union. By making the highest tone of the lower tetrachord the basic tone of the upper, conjunctive union resulted. This procedure, when applied to the Doric tetrachord, gave rise to a new system. An initial tone corresponding to the final tone was found necessary. This accessory tone was called *proslambanomenos*, or added tone.



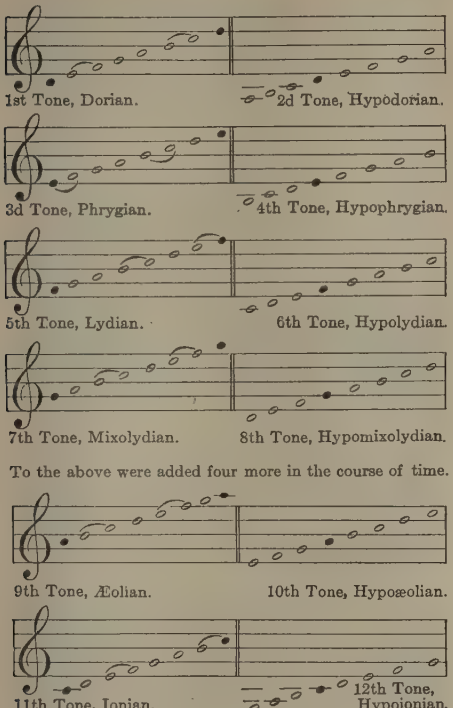
The tone common to the two conjunct tetrachords was called *synaphe*, or "point of contact"; the gap arising from disjunct union was called *diazeuxis*, or "separation."

In these octave species we have the principal points in which the Greek music theory coincides with that of the present; for up to the time that the two octave species, the Æolian (our normal minor) and the Ionian (our major), attained supremacy, the octave species collectively had been continuously in use for many centuries. They are retained in Catholic liturgy even at the present time. The use of quarter steps, as given in the chromatic and enharmonic "tone genera," and also smaller intervals called *chroiai*, or "*nuances*," led to many complexities, which finally resulted in the prohibition of the chromatic genus by Clement of Alexandria.

Music received a great impetus under Ambrose, bishop of Milan (died 397 A. D.), and, two centuries later (590), under Pope Gregory the Great. The former simplified the music system by selecting for use during divine service the four octave species beginning with D E F and G, respectively. These were subsequently called the *authentic modes*. To these Gregory added four more, respectively beginning a fourth below the authentic, which were called *plagal modes*, from the Greek word *plagios* meaning "oblique or sidewise." The plagal modes were not considered as independent scales in the same sense as the authentic. They were collaterals of the former, transpositions only, in that the lower part of the scale, the original tetrachord, remained in place while the upper part was transposed an octave lower.

Through error or possible intent the Greek modes were later changed about, the Greek Phrygian mode becoming the Dorian in the ecclesiastical modes, or Gregorian tones, and *vice versa*. These changes in nomenclature are supposed to have been made about the 10th century. Great confusion resulted therefrom, and the learned theoretician, Glarean, undertook in his Dodecachordon (Basel 1547) to establish some sort of order. He distinguished twelve modes instead of eight, six authentic and six plagal, but assigned the incorrect Greek names. However, his nomenclature has been generally followed ever since. The following are Glarean's authentic and plagal modes, with the incorrect names he assigned to them.

Table of Ecclesiastical Modes, or Gregorian Tones.



To the above were added four more in the course of time.

In all the above the black note is the initial and final tone.

As a more clearly defined sense of key developed, and the interrelation of the tones as a "family" changed the conception of "scale" to that of "key," the older modes were gradually displaced by the newer Ionian and Æolian (our major and normal minor).

The Solfeggio. To facilitate vocal instruction and sight reading, Guido of Arezzo founded a system known as *solfeggio*. Noticing that each line of the hymn to St. John began a note higher than the preceding, he adopted the first syllable of each line as the name of its corresponding note.

"Ut queant laxis
Resonare fibris
Mira gestorum
Famuli tuorum
Solve polluti
Labii reatum
Sancte Johannes."

Later the "Ut" was changed to "Do" except in France, and "Si" or "Ti" was added. So was evolved the sight reading system which is still in use, consisting of the syllable signs,—Do, Re, Mi, Fa, Sol, La, Si, Do. It was founded in the 11th century.

Accidentals and Key Signatures. That many innovations would be attributed to so eminent an authority on musical matters as Guido of Arezzo is evident. Some may have been so credited erroneously. However, Guido's musical instinct did impel him to adopt a system of scale formation which would improve upon the tetrachord basis of the Greeks. See *Greek Modes*; *Gregorian Tones*. He founded the scale upon the hexachord, or six tone succession, *with a half step in the middle* and whole steps between the three upper and the three lower tones. The hexachords, of which there were three, began upon G, C, and F.

G A B C D E
C D E F G A
F G A B♭ C D

For the hexachord on F the round (soft) *b* was necessary, because of the half step. This character had been in use as early as the 4th century, for, in adopting the four Greek modes as the authentic modes of the Church, St. Ambrose had found that the tetrachord on F would produce a succession of three whole steps (the forbidden *tritone*) if the usual *b* were used. To avoid this error the pitch of the tone B was lowered a half step whenever this tetrachord was used, the change being indicated by using the round *b* (♭) instead of the usual square *b* (♮). The former was the type of the subsequent flat, ♭, while the square *b* became the natural, ♮. These signs were subsequently applied to the inflection of any letter. Guido found that, when the hexachord on *d* was used, an accidental known as the "sharp" (♯) became necessary, in order to indicate the higher inflection of the tone *f*. It is possible that this upward inflection of *f* was indicated simply by doubling that letter, thus, *ff*, from which the character ♯ would naturally emerge. This is, however, mere conjecture, and other explanations are given.

In our modern *key signature* the required number of sharps or flats is placed at the beginning of the composition in the order in which they accumulate in successive keys. Thus it is found that the key of C major requires no accidentals; that G major requires one sharp (F♯); D major, two sharps (F♯, C♯); A major, three sharps (F♯, C♯, G♯); etc. This points to the fact that the keynote of each progressively sharper key is the 5th step of the preceding key, also that the added sharp is in every instance the 7th step.

Inasmuch as flats are the opposite of sharps in effect, it is logical to find the order of the flats to be that of the sharps reversed. Also, since the next sharper keynote was found upon the 5th step, the next flatter keynote is necessarily the *fifth step in a downward direction*, therefore the fourth step. The proper succession of whole and half steps requires the flatting of the fourth step.

The Minor Mode. One of the most stringent musical laws in old Greek theory was in regard to the formation of the tetrachord (succession of four adjacent tones). One of the intervals was required to be a half step. Thus the succession of three whole steps was interdicted. This interdiction was retained in the church modes, and designated by the pungent title *Diabolus in Musica*. Musically it is known as the tritone. Of the Greek scales which best adapted themselves to this restriction, the Ionian and Æolian were soon recognized as the most expressive, the Ionian for brighter moments, the Æolian for darker moods. Thus the Æolian, while having the same tones as the Ionian, was, to the ears that were gradually acquiring a sense of key or tonality, a basis for an entirely different key from the latter. Musicians soon perceived that these two scales seemed to permit works of art greater in extent, richer in forms and parts, more energetic in expression, and yet of strictly defined artistic consistency. It is therefore natural that, by their devotion to these scales, the highest pitch of artistic beauty therein has been attained. It is clear that our recognition of the major and minor modes involves the admission that for each signature there must be two keys, one major and one minor. Major and minor keys having the same signature are called "relative" major and minor, respectively. In this connection the following table will be of use. The relative keys, the number of accidentals in each signature, as well as the "age" (order in which they accumulate) will be noted.
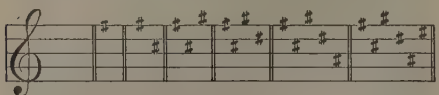
Sharps

Keys	Signatures
C major and A minor	Nothing
G major and E minor	One sharp,—f
D major and B minor	Two sharps,—f, c
A major and F sharp minor	Three sharps,— f, c, g
E major and C sharp minor	Four sharps,—f, c, g, d
B major and G sharp minor	Five sharps,— f, c, g, d, a
F sharp major and D sharp minor	Six sharps,—f, c, g, d, a, e
C sharp major and A sharp minor	Seven sharps,—f, c, g, d, a, e, b

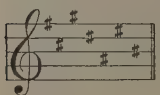
Flats

F major and D minor	One flat,—b
B flat major and G minor	Two flats,—b, e
E flat major and C minor	Three flats,—b, e, a
A flat major and F minor	Four flats,—b, e, a, d
D flat major and B flat minor	Five flats,—b, e, a, d, g
G flat major and E flat minor	Six flats,—b, e, a, d, g, c
C flat major and A flat minor	Seven flats,—b, e, a, d, g, c, f

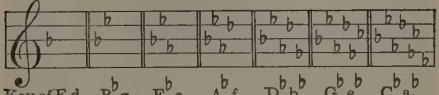
Note that the order of the flats is the reverse of the sharps.



Key of C.a.G.e. D.b. A.f♯. E.c♯. B.g♯. F♯.d♯.

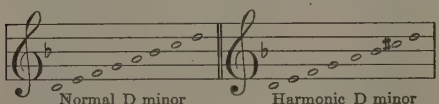


C♯.a♯.



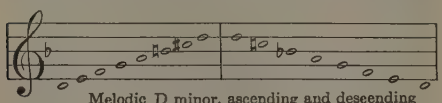
Key of F.d. B♭.g. E♭.c. A♭.f. D♭.b♭. G♭.e♭. C♭.a♭.

There are three forms of the minor scale. That which is constructed according to the signature is called *normal minor*. We expect a half step between 7 and 8 however. Raising the 7th step to meet this demand results in the *harmonic minor* scale. As indicated by its name, the harmonic minor is the one most used as a basis for the harmonies of the minor mode.



Normal D minor Harmonic D minor

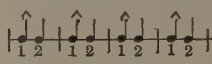
Normal minor has half steps between 2 and 3 and between 5 and 6. Harmonic minor has half steps between 2 and 3, between 5 and 6, and between 7 and 8, also a step and a half between 6 and 7. The awkward and unmelodious skip from the 6th to the 7th step in harmonic minor may be obviated by raising the 6th step, chromatically, as well as the 7th. This is done for certain melodic effects in ascending passages, but, to re-establish the integrity of the minor mode, the scale descends according to the signature. This scale is called the *melodic minor*.



Melodic D minor, ascending and descending

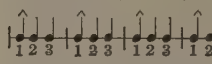
Rhythm and Time Signatures. Musical rhythm is engendered by the onward flow of the tonal effects, and manifests itself in the association of pulsations, their multiples and fractions. In short, while it embraces the division of time into regular and equal units, and the grouping of these units into symmetrical measures, the units may also be subdivided or added together. These units are called "beats," the grouping of which is effected by a regularly recurring emphasis, called "accent," always laid upon the first beat of a group.

Rhythmic groups consist of either *two* or *three* beats. When there are two beats in a group, heavy and light in alternation, the rhythm is *duple*:



, heavy, light.

When three beats constitute a group, one heavy and two light, the rhythm is *triple:*



, heavy, light, light.

Simple Rhythm consists of measures, each containing but one group, and therefore but one accent, 2–4, 3–8, 3–16, 2–2, 3–2, 3–4. Time is said to be compound when the measures contain multiplications of the simple groups, therefore as many accents as there are groups, 6–8, 9–8, 6–4, 12–8.

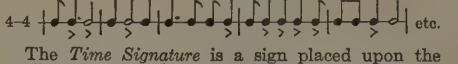
Diversity of time value is obtained by adding or dividing beats.
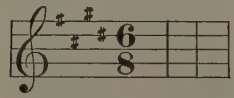


Divided beats Added beats

Rests represent the silences in music and are indicated with the same accuracy as the tones. There is, therefore, a rest sign corresponding in length to each note.

Syncopation. Where arbitrary metric accentuations do not conform to the natural accent, that is, the heavier notes occupy lighter beats or fractions, such shifting of the natural rhythm is called syncopation.



The *Time Signature* is a sign placed upon the staff, after the key signature, to indicate the rhythm in which the composition is to be played. The lower figure indicates the value of each of the time units, or beats, employed, while the upper indicates the number of such beats which constitute each and every measure. Bar lines are used to separate the measures.



This signature is a complete indication, therefore, that six beats, each an eighth note in length (or its equivalent in subdivisions) are to constitute each measure in a composition written in four sharps. In modern compositions, unusual time signatures (5–4, 7–4, 7–16) have appeared, and also the tendency to change the time frequently by alternating several measures in a given time with one or more in unusual time.

SCHOOLS OF COUNTERPOINT

Early historical records have been responsible for the erroneous impression that the famous Netherland school of counterpoint was the first and oldest center of musical practice in Christian Europe. This error is doubtless due to the great renown of the Netherland masters, which totally eclipsed the significance of the experimental labors of earlier periods.

The Old French School. The earliest school of counterpoint was the old French school, which flourished from the 12th century until the middle of the 14th. It grew out of the important experiments of Guido of Arezzo and his followers. It was the scholarly organists of the Notre Dame cathedral at Paris who subjected the ideas of melody association to systematic and persistent experimentation. The last period of the old French school includes the names of *Philippe de Vitry* (end of the 13th century) and *Johannes de Muris*, who first enunciated definite rules for contrapuntal procedure. They called their system *contrapunctus* (*punctus contra punctum*, or "note against note"). This school represents the formative period of contrapuntal art.

The Gallo-Belgian School. The Gallo-Belgian school (about 1360–1460), a vigorous offshoot of the old French school, produced a number of distinguished musicians, the first of whom was *Zeelandia* (about 1330–70), who was one of the earliest composers to regard the intervals of the third and sixth as more pleasing than the perfect fourth, fifth, and octave. The most renowned master of this period is *Guillaume Dufay* (1400?–74), composer, theorist, and teacher. *Antoine Busnois* (about 1440) ranked almost equal to Dufay.

The Old English School. Much has been claimed for the old English school, supposed to have been founded even earlier than that at Paris. But authentic testimony is very meager. That only a very skilled master hand could have written the wonderfully clever old canon, "Sumer is icumen in" (early part of the 13th century), is certain, but the identity of the composer is forever lost. *Walter Odington* and *John Dunstable* stand forth as the great figures of this school, although the latter is often placed as late as the 15th century.

The Netherland School (1460–1560). From its significant beginning by the French organists at Notre Dame cathedral, and its scholarly advancement in the Gallo-Belgian provinces, the development of counterpoint passed next into the hands of the Netherland masters. From the standpoint of purely mathematical perfection and exaggerated technical facility, the Netherland school probably represents the culmination of contrapuntal development. The great significance which this school assumes in history is that of having assembled, developed, and exploited the contrapuntal devices and resources and the methods of thematic manipulation in general. It also systematized the acquired knowledge for teaching and so was able to supply all Christendom with singers, teachers, and singing schools. A natural demand for the capable services of the Netherland masters throughout Catholic countries, together with their roving disposition, led many of them away from home. A strong and persistent emigration toward the south of Europe (about 1560) furnished Rome and other Italian cities with the rich products of their musical thought, but it was also the direct cause of the decline in activity and influence of the Netherland school.

One of the first great masters of this school was *Johannes Okeghem*, "patriarch of counterpoint" (1425–1512). His eminent pupil *Josquin des Près*, though charged with carrying his mastery of purely mathematical devices to an extreme, displayed evidences of true musical genius. He is one of the truly conspicuous figures of musical history.

Two of the most famous pupils of Des Près were *Nicolas Gombert* (b. 1495), who emigrated to Madrid in 1528, and *Jacob Arkadelt*, one of the earliest writers of madrigals. Other noted masters of this period were *Clement Jannequin* (b. about 1495) and *Benedict Dux* (1480–1540).

About 1502 the art of printing music was invented by *Ottavio Petrucci* (*da Fossombrone*),—a revolutionizing achievement of tremendous importance in the advancement of musical culture.

Orlando di Lasso.—One of the greatest musical geniuses of the contrapuntal period and of music history in general was Orlando di Lasso, the Belgian composer (1532?–94). He left his home at the age of sixteen and after many wanderings accepted the invitation of the Bavarian duke Albert V to go to Munich as chief chapelmaster. Lasso's style was majestic and dignified, and his works reflected feelings ranging from penitence to the gayest humor. Possessed of much greater versatility than his predecessors, he was momentously active in the transformation from purely linear counterpoint to the conception of that independent and powerful harmonic style which reaches down to the present day. The period of the great Netherland school practically closes with Lasso. Extending over approximately two centuries, the tremendous influence of this school is seen in the fact that it sent forth more than 300 distinguished composers, who carried a highly developed art of music into other countries, especially Germany and Italy. To the Netherland school, then, should be given the credit of having introduced art music throughout Europe and so of having been a powerful factor in forming a most essential part of modern civilization.

Pierluigi da Palestrina; Italian Schools. It was inevitable that the genius of music could not be confined to the Church. A highly significant feature of this epoch, and one destined to change the subsequent evolution of art music, was the process of *secularization* which was making its way into Church music. In time the habit of using folk songs and popular melodies as a thematic basis of masses and other sacred works was affected in such a shameless manner that the voice of the clergy was loud in its protest. This fact is cited by historians as one of the chief impulses which led to the recognition of the genius of that great champion of purity and dignity in ecclesiastical music, *Pierluigi da Palestrina* (1526–94).

Giovanni Pierluigi, whose family name was Sante, has been called Palestrina after the village of his birth. The effort to remove the abuses, and to simplify the florid style of counterpoint resulted in the decision, on the part of the Roman Church, to commission Palestrina (about 1565) to write a mass which should serve as a model of ecclesiastical music. His true genius enabled him to demonstrate the feasibility of a simple, direct style in a supreme treatment of traditional contrapuntal art. The result was an impressive and truly beautiful ecclesiastical style. All of Palestrina's works are characterized by striking originality, seriousness, and simplicity. These traits, united with an unlimited command of contrapuntal resources, confirm him, undoubtedly, as the greatest master up to the 16th century, and one of the monumental figures in the entire history of music.

The Roman School. The Roman school now became supreme. *Claudio Merulo* of Venice had introduced the organ *toccata*, but it was *Girolamo Frescobaldi* (1583–1644) who developed a style of instrumental music which was entirely free from the influence of vocal music. Frescobaldi, so-called "father of the true art of organ playing," served as organist at St. Peter's and was so famous that he is said to have been followed from town to town by his admirers. His first appearance at St. Peter's attracted 30,000 people.

To this school belongs also the honor of having originated the *oratorio*. (See *Oratorio*.) The greatest

masters of this school were *Ferrabosco, Festa, Animuccia, Palestrina, Nanini, Anerio, Allegri, Frescobaldi,* and *Carissimi.*

The Venetian School. It has been remarked that the Netherland masters migrated to the South and were instrumental in establishing a number of schools of composition, especially in Italy. Okeghem spent much of his life in Paris, Des Près divided his activities between Rome and Paris, Gombert emigrated to Madrid, while *Johannes Tinctoris,* great theorist and teacher, went to Naples. *Alexander Agricola,* a pupil of Okeghem, is found later in Spain.

The eminent *Adrian Willaert* (1480–1562) brought the music of the Netherlands to Venice when he settled there as chapelmaster at St. Mark's cathedral in 1527. The church had two organs and two choirs. This led to the invention of the double chorus, a style of composition which he developed to a high degree of perfection. Willaert also perfected the madrigal, a secular chorus form, originally a simple shepherd's song, probably deriving its name from old Italian *mandriale,* "a flock of sheep." He was one of the first to introduce instrumental accompaniment for vocal works. Other noted composers of this school were *Giuseppe Zarlino, Cyprian De Rore, Claudio Merulo, Andrea Gabrieli, Baldassaro Donati,* and *Giovanni Gabrieli. Andrea Gabrieli* (the elder), the most eminent of Willaert's pupils, extended the double chorus, for which his teacher was noted, to that of the triple chorus.

A great contemporary of Willaert was *Claude Goudimel,* teacher of Palestrina, and the actual founder of the Roman school, though historically this school is inseparably connected with the name of Palestrina. Goudimel's famous pupils were *Palestrina, Festa, Ferrabosco,* and *Animuccia,* all distinguished masters of the Roman school.

The Florentine School (1594–1676). The style of music cultivated by the early Italian composers is known as polyphonic. The style developed in Florence is called monodic, that is, it consists of vocal solos with instrumental accompaniment. It arose from the revival of interest in Greek learning, which attracted attention to the ancient Greek drama. In 1594, *Jacopo Peri* set a drama, *Dafne,* to music, after the Greek manner as he understood it. This form was first called *dramma per musica,* later *opera per musica,* and, finally, simply *opera.* "Dafne," and a later opera, "Eurydice," proved alike successful. In 1607, *Monteverde* followed with "Orpheus" and "Ariadne," and, in less than fifty years, opera became a recognized musical form throughout Europe. This school also improved the orchestra, making strings its foundation. The important representatives of the school were *Peri, Caccini, Monteverde,* and *Cavalli.*

The Neapolitan School (1675–1757). *Johannes Tinctoris* of the Flemish school settled in Naples in 1475, but a school did not arise until 200 years later. Naples imported polyphonic Church music from Rome and Venice, the oratorio from Rome, and the opera from Florence. The Florentine opera had consisted largely of recitative by a single voice, with orchestra accompaniment. The new school introduced arias, duets, trios, and choruses. It emphasized the musical element of the opera rather than the dramatic, and cultivated the concert overture. Important masters were *Stradella, A. Scarlatti, Durante, Logroscino, Leo,* and *D. Scarlatti.*

The French School (1645–1764). French music received a new impetus when an opera in the Florentine style was produced in Paris in 1645. Shortly afterward *Lully,* who was appointed court composer by Louis XIV in 1653, founded a distinct school of French opera. This school brought the dramatic element into greater prominence, raised the chorus to participation in the dramatic development, and added kettledrums and brass instruments to the orchestra. The leaders were *Cambert, Lully, Marais,* and *Rameau.*

The Italian School (1620–1800). The organ was the principal musical instrument in Europe from the 9th century to the 17th. In the beginning of the 17th century the violin was brought to a high degree of perfection, and it began to attract musicians of the highest order. About 1650 a distinction was made between the *sonata da chiesa,* or instrumental Church music, and *sonata da camera,* or instrumental music for the salon, that is, chamber music. The principal sonata composers of this period were *Legrenzi, Bassani, Torelli, Veracini, Corelli, Tartini.* and *Boccherini.* The Italian opera, like all Italian music except the sonata form, began to employ beautiful melodies for the display of vocal art, at the expense of dramatic truth. A growing desire for brilliant vocal show pieces and virtuoso colorature arias degraded the librettos, sank the characters into mere vocal instruments, eliminated ensembles, and finally caused the Italian opera to fall into discredit.

The German Schools (1540–1800). 1. Congregational singing was introduced with the Protestant Reformation. As this required simple music, sacred words were fitted to popular folk songs and the *chorale* resulted. The principal chorale writers were *Luther, Walther, Calvisius, Franck,* and *Schein.*

2. Luther translated passages which had for centuries been recited in the churches during Holy Week. and employed various composers to furnish the music. Thus arose the *passion music* to which many German composers have given their best energies. The masters of this group were *Schütz, J. C. Bach,* and *J. M. Bach.*

3. Pupils of the great Dutch organist *Sweelinck* (1562–1621) had carried the art of organ playing to the cities of northern Germany, especially Hamburg and Lubeck, about 1620. These cities became centers of a new school, whose art was based upon the chorale. The North German masters were *Scheidt, Scheideman, Reinken, Buxtehude,* and *Kuhnau.*

4. Under the influence of *Frescobaldi,* another school arose in middle and southern Germany at about the same time, which developed the Italian sonata form. The representatives of this school were *Kerl, Froberger, Pachelbel, Muffat,* and *Biber.* These prepared the way for *Johann Sebastian Bach,* who transferred the leadership in music from Italy to Germany.

5. The national German opera arose from *singspiele,* mythological dramatic representations preceded by musical dialogue, given by students. The *singspiel* was first raised to the level of art when *Hiller* placed it upon the basis of folk song. This form was developed by *Strungk, Kusser, Keiser, Mattheson, Handel, Teleman, Hiller, Dittersdorf, Schenck, Weigl,* and *Winter.*

6. While the national opera was popular among the people, the nobility, especially in Vienna and Dresden, favored the Italian opera, and many composers, including *Hasse, Graun, Doles,* and *Naumann,* composed in the foreign style.

A short summary of the salient features signalizing the evolution of artistic music up to the dawn of the classic epoch may be visualized as follows:

1. The beginning of crude efforts to combine one or more melodies	Hucbald Guido of Arezzo	9th to 11th century
2. The first actual achievements in contrapuntal art	Old French School	1070–1370
3. Further development of counterpoint, transitional stage	Gallo-Belgian School	1360–1460
4. The age of the highest technical proficiency in contrapuntal science	Netherland School	1460–1560
5. Gradual migration of the Dutch masters to southern countries	Italian Schools	1540–1725
6. Most successful and brilliant epoch of operatic music in Italy		1600–1725
7. Influence of the Netherland school in Germany	German Schools	1450–1700

SECULAR MUSIC

Troubadours and Minstrels. While the gifted students of music within the Church were striving zealously to advance the theory and practice of music, the secular world was no less active in acquiring and cultivating free musical expression. The singers of the people were not restricted by ecclesiastical rules nor by mathematical theories, but sang as their musical feelings dictated. Thus music, as a form of free expression, began to achieve a vigorous and rapid development.

The great event which transformed not only the religious and political conditions, but also the collective intellectual activities of Europe in the middle ages, was the beginning of the Crusades in 1096. The enrichment experienced by the poetry of the West, both in depth of feeling and in form of expression, came as a direct consequence of the Crusades. Long years of separation from home and family brought about a deepening of the emotional life in the members of the many knightly orders and the adventurous multitudes who responded to the summons. A new species of poetry arose, in which chivalry and love service (Ger. *minnedienst*) found expression. This was called the gay science (*gaya ciencia*), indigenous at first to the environment of Provençe. Here the grandees of the country practiced this science, the first being *Count William of Poitiers* (1087–1127) and *Chatelaine de Coucy*, followed later by *King Thibaut of Navarre* (1201–54). They were, however, only the originators of songs, and were called *trouvères* in northern France and *trobadors* in the southern parts (Ital., *trovatore*; Eng., *troubadour*). The singing of the songs, as also the instrumental accompaniment, was left to the so-called *minstrels* (Latin, *ministerialis*, "a helper") or *jongleurs* (Latin, *joculator*, "merrymaker"). The latter belonged to a lower class of society and were often ranked with buffoons.

Probably the most distinguished trouvère in northern France was *Adam de la Hale* (1240–87), named, because of his deformity and birthplace, "the humpback of Arras." In music history his name is associated with those who first succeeded in achieving genuine musical results in part writing. His "Robin and Marion," a naïve description of a rustic love affair, was performed in 1282 at the court of Robert of Artois at Naples. It is therefore the oldest specimen of musical dramatic art in France, and rightfully indicates Adam de la Hale to be the founder of the comic opera.

Minnesinger and Meistersinger. A current of intellectual and emotional activity, similar to that which called the art of the troubadours into existence, expressed itself among the Germans during the 12th and the 13th century. The Germanic bards were known as *minnesinger* (*minne*, signifying "love"), and differed from the troubadours in that they sang their own songs and accompanied them, usually upon a small three-cornered harp. The early period of minnesong was represented by *Heinrich von Veldecke*, *Spervogel*, *Dietmar von Kürenberg*, and others; the middle and best period (beginning of the 13th century), by *Wolfram von Eschenbach*, *Gottfried von Strassburg*, and *Walther von der Vogelweide*. The last and declining period presented *Konrad von Würzburg*, *Reinmar von Zweter*, and *Heinrich von Meissen*, the last named called "frauenlob" because of his gallantry in replacing the earlier word *weib*, "woman," with the more courteous expression *frau*, "lady."

The *Meistersinger*, "mastersingers," authentic accounts of whom date from the 14th century, undertook the care of musical art after it had passed from the knightly singers to the burghers and respectable artisans. Guilds of Meistersinger existed in Frankfort, Colmar, Prague, Mainz, and other cities. The meistersong attained its greatest popularity during the 15th century in Nuremberg, Augsburg, and Strasbourg; also, later, in Ulm, Munich, and Regensburg. At Nuremberg the famous cobbler and poet, *Hans Sachs* (1494–1576), was the leading spirit. The schools of the Meistersinger fell into gradual decay after the Thirty Years' war. However, the corporation did not come to an end before 1839, when the four surviving members of the school at Ulm handed their corporation badges and records to the *Liederkranz* of that city, thereby dissolving their guild. In his opera "Die Meistersinger," Richard Wagner vividly pictures the musical art of the Meistersinger and the traits of the honest but narrow-minded men who practiced it.

The Strolling Players; Folk Song. Of no inconsiderable value in the development of music is the influence wielded by the vagrant pipers, or *strolling players*, who were numerous about the time the minnesong passed over to the meistersong. Vagrant, homeless, despised, they were nevertheless welcomed on festive occasions for the amusement they offered. The strolling players became a significant influence upon the development of music because of the sacred plays which they presented. Up to the middle of the 12th century the sacred dramas, named *passion plays* in Germany and *mysteries* in France, were entirely in the hands of the clergy, but later these vagrants took part in the plays or presented them wholly themselves. One of the real benefits bestowed upon the growth of music by these simple folk was their constantly increasing dexterity in the use of their musical instruments. They performed great service in preparing for the following era of instrumental composition, which culminated in such artistic products as the symphonies of Beethoven.

But the largest class of music lovers was that composed of the people themselves. They sang unfettered by regulations or conventions, following only their own instincts and feelings. The *people's song* or *folk song* attained a high degree of significance about the end of the 14th century. Between that period and the 17th century the masters of counterpoint built their masses and other serious works upon some popular melody as a thematic basis. The old French folk song *L'homme Armé* was one of the most popular melodies, and it appears very often in the masses of the distinguished Netherland masters. It was the song of the people—not the mathematical music of the Greeks nor the rigid rules of medieval scholars—that carried the vital spark of musical development.

FROM MONODY TO HARMONY

It has been seen that the music of antiquity consisted solely of *monody*. Not only that, but, for the first ten centuries of the Christian era, both Church music and secular music were limited wholly to melody,—a single line of tones. Single part music, or monody, is the first form of music with all peoples. It still exists among the Chinese, Hindus, Arabs, Turks, and Greeks.

Extensive works of art, using music, are possible only in connection with poetry, and this is the manner in which music was applied in classical antiquity. The liturgical recitations heard in the Catholic Church doubtless are echoes of this ancient speech-song. Modern recitative has arisen from the endeavor to imitate the pitch variation in speech by musical tones. Its inventor, *Jacopo Peri*, in the preface to his opera "Eurydice," published in 1600, distinctly says as much.

The Influence of the Principle of Tonality upon Musical Development. Among the nations who possessed one part music, we necessarily find certain scales for melodies to move in. These scales are various in kind, partly, it would seem, very arbitrary. In determining the part played by these tone systems in the development of art music, one of the most essential points to consider is whether there existed a determinate relationship of all the tones of the scale to the fundamental tone, or tonic. Modern music effects an internal connection of this sort

among all the tones of a composition, by making their relationship to the tonic as perceptible as possible to the ear. This predominance of the tonic, as the link connecting all the tones of a composition, is termed the *principle of tonality*.

Ancient Greek music differed from ours in that a composition ended on the dominant instead of on the tonic. This is in full agreement with intonation of speech. From this it follows that the Greeks, who were the first to use our diatonic scale, were not without a certain æsthetic feeling for tonality, but that they had not developed it so decisively as in modern music.

The reference to a tonic is more distinctly discerned in the scales of old Christian ecclesiastical music. Originally the four so-called authentic modes were those determined upon by Ambrose of Milan. These are:

D E F G A B C D
E F G A B C D E
F G A B C D E F
G A B C D E F G

As constituted, not one of these agrees with any of our scales. Perhaps, however, the change of B into B♭ was allowed from the first, as suggested in the paragraph on avoidance of tritone under *Gregorian Tones*, and thus the first scale would coincide with our normal D minor, and the third scale with our F major. Though not strictly observed, there was a rule that songs in the first scale should end in D, those in the second in E, those in the third in F, and those in the fourth in G. This marked these tones as tonics in our sense of the word. Hence, although the rule of tonality had already been remarked in these medieval ecclesiastical scales, the rule was not clearly defined. It admitted so many exceptions, that the feeling of tonality must necessarily have been much less developed than is the case in modern music.

The Hindus also conceived the idea of a tonic, although their music is likewise unisonal. They called their tonic *ansa*. Fetis and Coussemaker in *Histoire de l'Harmonie au Moyen Age* call attention to a similar sense of tonality as prevailing in the few known remains of old German and Celtic melodies. Although, therefore, homophonic music was probably not entirely without a reference to some tonic, the sense of such relationship was not so consciously felt nor applied as in modern harmonic music. Here a few consecutive chords suffice to establish the key impression of any portion of the composition.

Counterpoint, the Stepping-Stone to Harmony. The second stage of musical development is the polyphonic music of the middle ages. It is usual to cite as the first part music the so-called *organum*, the original description of which is attributed to the Flemish monk Hucbald (840–930) at the beginning of the 10th century. In the organum two voices are said to have proceeded in parallel fourths or fifths, with occasional doublings of one or both in octaves—very unedifying to our ears.

The first undoubted form of part music was the *descantus*, which became popular at the end of the 11th century in France and Flanders. The oldest specimens of this kind of music extant are of the following description: Two entirely different melodies were adapted to each other by slight changes in rhythm and pitch, until they formed a tolerably consonant whole. Although viewed at first as a mere musical trick, the *descantus* unlocked a veritable treasure house of musical potentiality. There was no division of time in the Gregorian chant. The rhythm of dance music was probably extremely simple. But, in the *descantus*, in order to keep the various parts together, time had to be strictly observed. Hence, the art of descanting developed a system of musical rhythm, which again infused greater power and importance into melodic progression.

But, above all this, the artistic combination of different voices, at first so simple, soon developed into a new invention, which has ended by attaining predominant importance in the whole art of musical composition. This invention consisted in causing a musical phrase, which had been sung by one voice, to be repeated by another. Thus arose *canonic imitation*, which subsequently developed into a highly artistic system, especially among Netherland composers.

This kind of music, though especially suited to ecclesiastical compositions, was also applied to secular songs (madrigals). The sole harmonic music known as yet, and capable of artistic cultivation, was that founded on these canonic repetitions. The neglect of harmony manifested itself in several ways in musical composition. Composers confined themselves almost entirely to the diatonic scale; accidentals were seldom used. Modulation, as we understand it, was almost unknown. Chords, used by preference down to the end of the 15th century, were formed of the octave and fifth without third; none other might be used at the end of a piece. The only dissonances used were the result of passing or suspended tones. Chords of the dominant seventh, which are so important in establishing tonality in modern harmony, were quite unknown.

Great, then, as was the artistic advance in rhythm and the combination of parts during this period, the only progress in relation to harmony may be stated as follows: Since the involved progression of interwoven parts accidentally gave rise to chords in varied forms and sequences, the musicians of this period could not but hear these chords and become acquainted with their effects. So the strivings of this period prepared the way for the harmonic music proper, and made it possible for musicians to produce it, as soon as external circumstances forced the discovery.

Harmonic Music. The external influences which brought about the rise of harmonic music were of various kinds. The first was the Protestant ecclesiastical chorus. It was a principle of Protestantism that the congregation itself should undertake the singing. But a congregation could not be expected to perform the involved melodic interweavings of Netherland polyphony. On the other hand, the founders of the Reformation, with Luther as their leader, too well knew the power and significance of music to reduce it again to the unadorned unison. The composers of Protestant ecclesiastical music solved the problem by producing simply harmonized chorales, in which all the voices progressed simultaneously. This excluded those canonic repetitions of a given phrase in different parts, which had hitherto formed the chief unity of the whole piece.

The Protestant hymns were chiefly adapted to existing popular melodies of the German and Celtic races, which, as already remarked, showed greater feeling for tonality than those of southern nations. Thus, as early as the 16th century, the system of harmony based on the ecclesiastical Ionic mode (our major) developed itself with tolerable correctness. These hymns produced a great effect on the feelings of contemporaries. This was emphasized on all sides in the liveliest language. The impression was that of something as new as it was peculiarly powerful.

In the Roman Church also, a desire manifested itself for altering the style of its music. Polyphonic music was too rigidly canonical, and it scattered the sense of the words. At the same time, popular street ballads, not always highly proper, had crept into sacred works. In consequence of the proceedings of the Council of Trent, and by order of Pope Pius IV (1559–65), Palestrina carried out a form of simplification and embellishment of the ecclesiastical music, and the simple beauty of his compositions is said to have prevented the complete banishment of part music from the Roman liturgy.

But the most active cause of the development of harmonic music was the rise of opera. This had been occasioned by a revival of works of classical antiquity, and its avowed object was to rehabilitate ancient tragedy, which was known to have been

recited musically. Immediately, the problem arose of allowing one or two voices to execute solos, but these had to harmonize so as to fit in between choruses, which were to be treated polyphonically. These conditions first gave rise to *recitative*, invented by *Jacopo Peri* and *Caccini* in 1600, and to solo songs with airs, invented by *Claudio Monteverde* and *Viadana*. Monteverde, who was quite prolific in inventions, was the first composer to use the dominant seventh chord without preparation, for which he was severely criticized by his contemporary Artusi. In general we now find a bolder use of dissonances, which were employed independently, to express sharp contrasts of expression.

Canonic repetitions had necessarily to be abandoned as soon as simple harmonic accompaniment was used in a capacity subordinate to a melody. A powerful means of artistic connection was discovered in the principle of tonality, in making the harmonies refer their tones more definitely to one predominant tonic. This gave fresh strength to the relation between the harmonies themselves, and also to that between each chord and the tonic.

In our modern system of harmony, which is based upon the underlying principle of tonality, we therefore have the climax, the full bloom of all that the experience, ingenuity, and æsthetic feeling of European nations have labored upon for two or three thousand years. However, the actual formation of the essential features of both harmony and the principle of tonality, as we combine them, is scarcely 200 years old in the practice of musical composers. Theoretical expression was not given to the new principle till the time of Rameau, at the beginning of the 18th century. From the historical point of view, then, harmony and the basic principle of tonality are entirely the product of modern times.

The gradual transition from monody to harmony may be tabulated briefly in the following manner:

1. *One Part Music*, one line of melody, awakening sense of tonality.	Antiquity and Early Christian Period.
2. *Organum*, crude association of parts.	Medieval Period.
3. *Descantus* (early French school), greater freedom in rhythm and manipulation of parts.	
4. *Counterpoint*, the general name for the constantly improving technique of melody association. Growing appreciation of the principle of tonality.	
5. *Polyphony*, perfected contrapuntal art.	Classic Period.
6. *Harmony*, chords gradually evolved as independent forms of tone combination. Fully developed sense of tonality.	Modern Period.
7. *Homophony*, one supreme melodic part with harmonic accompaniment.	

THE GERMAN CLASSIC MASTERS
(1700–1838)

Johann Sebastian Bach (1685–1750). The work of Bach marks the beginning of a new epoch, and he is often called the "father of modern music." Bach wrote many classic compositions in all the forms except that of the opera, and to each he gave new significance. His immeasurable influence upon the progress of art was due to the concentrated power of his genius. He perfected the forms already in existence, especially conducting the chorale and fugue to their latest degree of perfection. The cantata, of which he wrote no fewer than 226, also achieved its highest artistic maturity through Bach. All of his works, whether vocal or instrumental, are distinguished by profound emotional conception, lively imagination, intense religious devotion, variety of design, and intellectual mastery and logic of applied technical resources. The entire texture and design of each work may be traced as it unfolds itself, from its thematic germ up to the climax of its expressiveness.

The tremendous scope and fertility of Bach's imagination and knowledge may be gleaned from the fact that nearly all so-called novelties and discoveries in modern compositions may be found among the harmonic and contrapuntal labyrinths of his works.

George Frederick Handel (1685–1759). The inference is justified that it was the divine purpose to create two titanic musical geniuses at this period, that the spirit of music might embrace and develop that for which one would have proved insufficient. Handel was born at Halle, Germany, in the same year as Bach and received a similar training. But, whereas Bach was of a simple disposition and domestic in his tastes, Handel loved the brilliant outer side of life, and never married. Bach was largely lyrical in his style; Handel was a dramatic genius. He held positions in Germany, visited Italy, where his operas won him laurels, and finally settled in England. He composed a number of operas, cantatas, anthems, sonatas, and concertos, but his fame rests upon his oratorios, a form which he perfected, and in which he has never been excelled.

Christoph Willibald Gluck (1714–87). Often spoken of as the "father of modern opera." Until long past middle life he cherished Italian models. But, having become convinced of the hopeless artificiality and banality of the Italian stage, he determined to make music less subservient to the demands of the singer, and so institute a proper balance between the dramatic elements and the musical resources. His innovations were not readily countenanced, and his efforts at dramatic sincerity later became the object of a bitter controversy. After the production of "Orpheus and Eurydice" in 1762, followed by "Alceste" and "Paris and Helen," he found even his own city, Vienna, divided into factions for and against him. He removed to Paris, where he produced "Iphigénie en Aulide"; also a revised version of "Orpheus" and "Armida." Gluck's sincerity appealed to many, and the worth of his work sank deep into the hearts of his local adherents, though he was bitterly opposed by a faction composed of the favorites of Nicola Piccini. When Gluck's second "Iphigénie" (en Tauride) created a profound impression, Piccini, whose reputation was high, also dared to write an "Iphigénie," which only accentuated Gluck's complete victory, for in his work Piccini unwittingly betrayed the fact that Gluck had become his model.

Gluck produced in all 54 operas and a number of other compositions, chiefly instrumental. In his triumphs, German opera assumed its place in history, and attained a power and superiority which were never again to be questioned.

Joseph Haydn (1732–1809). An Austrian by birth, he raised instrumental music to a higher degree toward perfection, and did much in the way of developing the art of orchestration. He increased the number of orchestral parts from 8 to as many as 17 in his later symphonies. To the string orchestra he added horns, oboes, bassoons, trumpets, kettledrums, and clarinets. The enormous volume of works composed by Haydn can hardly be determined. The latest list, still assumed to be incomplete, enumerates 118 symphonies, 53 piano sonatas, 83 string quartets, 24 trios, 19 operas, 5 oratorios, 24 concertos for various instruments, and many smaller works. When quite advanced in years he produced the two oratorios upon which his greatest fame rests, the "Creation" (1799) and the "Seasons" (1801).

Wolfgang Amadeus Mozart (1756–91). Probably the most universal genius in music that the world has ever seen. He was great as a writer of tragic, romantic, and comic operas, great as a composer of symphonies, quartets, and quintets, great as a writer of piano concertos and sonatas, great as a writer of songs and of Church music, and great also as an executive musician. Every measure of his music breathes the exquisite charm and tenderness of his nature, and so extraordinary was his facility and versatility that the world is still in doubt as to whether Mozart excels most in his orchestral or in his chamber music, in sacred music or in opera. In all these branches of the art he stands at the very front rank of the world's greatest musicians.

The salient characteristics of Mozart's operas are found in the truthful expression of human nature which is achieved wholly by the music, for Mozart used his librettos merely as skeletons. Even when the plot uncovers the whole gamut of emotional feeling from buffoonery to supernatural terror, as in "Don Giovanni," his touch of mastery never falters. The characters in Mozart's operas are recognizable as types, and their human nature belongs to no period, but to all time. No master was more successful in portraying the curious intermixture of tragedy and comedy, of horror and merriment, in which the emotional background seldom allowed expression of any one pure, unalloyed mood. Mozart grasped the unity of these contrasts and expressed them so surely and convincingly as to open up a new province for his art.

For orchestra, Mozart wrote 49 symphonies, but of these only three are heard often today,—that in E flat, Op. 543; that in G minor, Op. 550; and that in C major, Op. 551, commonly called the "Jupiter" symphony. A peculiarity of Mozart's style was its generous employment of free counterpoint. In the treatment of the orchestra, he produced many new combinations, and may rightly be considered the creator of what we know as tone color. His compositions for orchestra date back over 100 years, yet many of his instrumental combinations strike us with all the force of novelty.

Ludwig van Beethoven (1770–1827). The youngest of the great classic trio, Haydn, Mozart, Beethoven, this supreme musical genius carried the art of free thematic development to a point never before reached nor since surpassed. Haydn in his old age and Beethoven in his youth learned from Mozart a richer art of instrumental color and expressiveness, especially in the use of the wind instruments. Beethoven's music is characterized by vivid contrasts in themes, passages, rhythmical effects, bold dissonances and modulations, dynamic expressions, varied and massive instrumentation. The several movements of his sonatas or symphonies are held in close relation by contrast of emotions. If the first movement is conceived in a fiery or a tragic spirit, the feelings after a time will be rendered all the more susceptible to the calm mood of the slow movement which may lead through sadness and longing to the vivacity and jocular moods of the *scherzo*. This in turn may give place to the triumphant joy of the finale.

Another striking feature of Beethoven's music is its intense dramatic spirit. This is further heightened by his instrumentation. All instruments are used with greater freedom than ever before; they move in a wider compass and with greater technical execution. In instrumental coloring, in variety of solo and combined treatment, and in massive rhythmical effects, Beethoven advanced the art of orchestration very materially. Next to the symphonies, the sonatas offer the best opportunity of judging the individuality of the great master, for, in profound thought, in beauty of themes and form, in emotional and expressional truth, they are irreproachable. Beethoven wrote many styles of composition, including overtures, sonatas, concertos, chamber music, the opera "Fidelio," and an oratorio, "The Mount of Olives." In the cyclical forms of instrumental music, Beethoven was pre-eminent from all points of view—formally, technically, and æsthetically.

Franz Peter Schubert (1797–1828). One of the most extraordinary melodic geniuses of all time. Because of this fact he became the natural leader of a new lyric era, vitalizing song with pleasing melodic simplicity as well as with force and intensity of expression. His greatest instrumental compositions are probably his symphony in C major and the unfinished symphony in B minor. Among his numerous piano works, several of his sixteen sonatas are of supreme beauty and classic strength, although the "Moments Musicals" and the "Impromptus" are doubtless the most popular. But particularly in his chamber music was Schubert a great classicist; his twenty string quartets, two trios, the famous "Forellen" quintet, and the octet were almost if not quite as significant as the great chamber music works of Beethoven.

THE ROMANTICISTS

The growing tendency toward romanticism in literature was not without influence in musical circles, first showing itself in opera, where the music was affiliated with subjects of a romantic nature.

Karl Maria von Weber (1786–1826). The first and most important of this group of composers. Weber's significance lies in his dramatic works. His songs, poetical and beautiful as many of them are, have been forced into the background by those of his great contemporary, Schubert, and his successors in the field of song, Schumann, Franz, and Brahms. As a composer for pianoforte Weber long ago became archaic. His sonatas are seldom heard outside of historical recitals. The "*Concertstück*" is still heard occasionally. It is to his operas, then, that we must go to study Weber's music as an expression of artistic feeling. His principles and methods are as vital now as they were when he was alive. To Wagner's honor it must be said that he never denied his great indebtedness to Weber for his intensely Germanic nature and style.

Weber's opera music is highly emotionalized, real, true, expressive music, in which even the old-fashioned roulades have been infused with a dramatic potency equaled only by Mozart in his happiest moments. Weber was first a melodist, secondarily a colorist. His lack of constructive skill prevented his overtures from aspiring to the dramatic dignity and significance of such overtures as Mozart wrote for "Don Giovanni," and Beethoven for "Fidelio." They are largely potpourris of opera melodies idealized in a manner by the splendor of their instrumentation.

Weber's romanticism sprang from the subjects of his operas. The supernaturalism of "Der Freischütz" and "Oberon," the sentiment and chivalry of "Euryanthe," and the national tinge of "Preciosa"—all made new demands upon music. The striking feature in his treatment of the orchestra is his emancipation of the wood-wind choir. His numerous discoveries, as the result of profound study of instrumental *timbre*, have served to place new colors upon the palettes of every one of his successors. The reforms, not only in composition, but also in representation, achieved by Richard Wagner are an artistic legacy from Karl Maria von Weber.

Heinrich Marschner (1795–1861). A true romanticist with a predilection for operatic subjects of a weird nature or of those taking place in realms of enchantment. The most important of his operas are "Hans Heiling," "The Vampire," and "The Templar and the Jewess" (taken from the story of *Ivanhoe*).

Ludwig Spohr (1784–1859). Best known as a great violinist, he was a successful composer of operas, chamber music, oratorios, and symphonies, as well as concert overtures, cantatas, and hymns. Although influenced by the romantic style, Spohr may be considered also as a purely lyrical writer, but all his works exhibit a fine sense of poetic impressions and warmth of melody, together with an emotional and elegiac style. His best-known operas are "Faust," "Jessonda," "Der Berggeist," "Die Kreuzfahrer." Only "Jessonda" possessed enough dramatic strength to become famous.

Felix Mendelssohn-Bartholdy (1809–47). Mendelssohn probably occupies a position between the classic and the romantic styles, and may be said to represent them both to some extent. Great diligence and sincerity in study gave him a mastery of all the technical factors of composition, and because of this he was able to give to his works a classical perfection of structure. His amiable and exquisite method of tone expression came under the influence of the new romantic trend of thought, and is characterized by poetry, imagination, and sincere religious fervor. Mendelssohn's greatest artistic achievements were realized in the smaller song forms. His dramatic works are inspired and powerful at times: the melodramas "Antigone," "Œdipus," and "Athalia" are marked by strong and beautiful moments, but are of less value, as a whole, than his great oratorios "Saint Paul" and "Elijah," undeniably the most important works of this style since Haydn. Mendelssohn's only attempt at opera is the unfinished fragment, "Lorelei."

Robert Schumann (1810–56). Schumann may be regarded as the most powerful and significant representative of modern romanticism in music. Of striking individuality and an originality that borders on the eccentric, he clothed his thoughts in musical idiom which breathed poetic moods, humor, vivid fancy, and extravagant emotionalism. At his best in his songs, Schumann was one of the first to really co-ordinate the accompaniment and the signification of the words, so that the music and text were amalgamated into a logical and complete structure. The symphonies of this master, for the most part, suffer from inadequate orchestration and illogical formal structure. The best is that in B flat major; the one in D minor has many beautiful moments which nevertheless alternate in an irritating manner with indications of uncertain logic and lack of coherence. Schumann's best instrumental works are the quartet in E flat, the quintet, the great piano *concerto* in A minor, the sonata in G minor, and the symphonic variations for piano.

Schumann's one opera, "Genoveva," showed that he had undertaken a style of composition which his restless mind could not fathom. The cantatas, "Paradise and the Peri" and "Pilgrimage of a Rose," contain many exquisitely beautiful parts and reveal the same co-ordination of music and text that characterizes his songs.

Frédéric François Chopin (1810–49). One of the most original and important masters of composition for piano the world has ever seen. Aside from a few songs, his creations were confined to the pianoforte. Although he did not always adopt the traditional formal designs of the classic masters, his compositions seem to be the natural and appropriate settings for ideas of singularly deep feeling, poetic import, and power. The unique and vivid style of presentation, the unmistakable purity and refinement of expression, especially in the treatment of details, the originality of his melody and harmony, and the depth of poetic thought stamp Chopin as a tone poet in the most precise and beautiful sense of the term.

Chopin's music breathes the piano spirit as no music before had done; it represents the liberation of the pianoforte from traditional orchestral and choral influences. His works, especially the *scherzos*, *ballades*, and *concertos*, also the titanic *barcarolles* and *études*, mark the very boundary of piano effect and have never been surpassed.

GERMAN OPERA FROM KREUTZER TO WAGNER

After Weber's brilliant exposition of the power of romantic opera, many gifted composers devoted themselves to opera, partly in the dramatic style, partly in the romantic, but chiefly in the school of comedy. Both in Germany and in France, for a time, this style led all others. Two significant names associated with this development are *Kreutzer* and *Lortzing*.

Konradin Kreutzer (1780–1849). Kreutzer's best-known work is "Das Nachtlager von Granada," although his many other operas are also noted for their lovely melody and naïve simplicity. Of these, "Konradin von Schwaben" and "Der Verschwender" are important.

Albert Lortzing (1803–51). Lortzing achieved great fame and popularity through his delightfully humorous and musically excellent operas, "Czar und Zimmermann," "Die Beiden Schützen," "Der Waffenschmied," and "Der Wildschütz."

Otto Nicolai (1810–49). One of the few composers who were able to achieve success against the current of Lortzing's popularity. Nicolai is noted for his "Merry Wives of Windsor."

Friedrich von Flotow (1812–83). Flotow won popular esteem with "Stradella" and "Martha," the music of which is light and graceful.

OPERA IN FRANCE

In France, the era which marked Gluck's great success was followed by a coterie of distinguished composers.

Etienne Méhul (1763–1817). He is best known for his opera "Joseph," which is still a favorite in certain parts of France and Germany.

Luigi Cherubini (1760–1842). An Italian by birth, established himself in Paris, 1788, and became the most distinguished of the French school of composers after Gluck. He wrote many operas, of which only "Medea" and "Les Deux Journées" have survived, although nearly all of his overtures are still used on concert programs.

Gasparo Spontini (1774–1851). Another gifted Italian, and director of Italian opera in Paris. Of a fiery temperament, he chose operatic subjects requiring orchestral pomp, decorative splendor, and heroic effects. "La Vestale" and "Ferdinand Cortez" are his best works.

Jacques Halévy (1799–1862). Halévy achieved notable success with his excellent opera "The Jewess."

Giacomo Meyerbeer (1791–1864). A composer of remarkable talent but without artistic scruples. Though a seeker after imposing effects, he, nevertheless, wrote some truly beautiful music in his famous operas "The Huguenots," "The Prophet," "Robert le Diable," "Dinorah," and "L'Africaine."

Other French masters are *Ambroise Thomas*, whose "Mignon" is often heard; *Charles Gounod*, composer of the ever popular "Faust"; *Georges Bizet*, justly famed for his strikingly original "Carmen"; *Jules Massenet*, well known as the composer of several repertoire operas of the present day—"Le Roi de Lahore," "Hérodiade," "Le Cid," "Thaïs," "La Navarraise," and others; *Camille Saint-Saëns*, whose powerful opera "Samson et Dalila" has had great success. Of his other operas, "Etienne Marcel," "Proserpine," "Ascanio," "Phryne," and the biblical opera "Le Deluge" have enjoyed a fair measure of success.

THE ITALIAN OPERA

The Italian opera flourished in its own way in the meantime and brought out many composers of note.

Gioacchino Rossini (1792–1868). One of the most richly gifted of Italian composers. He is celebrated for his "Barber of Seville," "William Tell," "Stabat Mater," and other dramatic works, all of which are notable for their graceful and vivacious melody. Of the subsequent writers, *Vincenzo Bellini* (1801–35) and *Gaetano Donizetti* (1797–1848) were the most important and influential. The most famous operas of the latter are "Lucrezia Borgia," the immensely popular "Lucia di Lammermoor," and "The Daughter of the Regiment."

Giuseppe Verdi (1813–1901). Unquestionably the greatest master the Italian opera has ever known. After a number of youthful operas, Verdi's most brilliant successes were ushered in by the signal triumph of "Rigoletto," followed by "Il Trovatore" and "La Traviata." Further untiring study and artistic growth, lasting up to the very advanced years of the composer's life, resulted in operas of genuine dramatic vitality, richer and more elaborate style of instrumentation and harmony, melody of greater passion and poignancy, and undeniable beauty. These operas, "Aïda," "Otello," and "Falstaff," have been rightly assigned foremost rank in operatic history.

Since these great works were written, Italy has produced *Arrigo Boito, Pietro Mascagni, Ruggiero Leoncavallo,* and *Giacomo Puccini*—all dramatic composers of note. Boito's greatest success was attained with "Mefistofele"; Mascagni created a veritable sensation with his "Cavalleria Rusticana"; while Leoncavallo earned his great stage success with "I Pagliacci." Puccini, pronounced by Verdi as the most promising of his successors, has won lasting fame with his "La Bohème" and "Madame Butterfly," the great popularity of which has eclipsed the almost equal worth of "Manon Lescaut" and "Edgar."

RUSSIAN OPERA

The wider significance which Russian music in general has assumed recently has called attention to many fine but (outside of Russia) little known operas of the Russian masters. The founder of the Russian opera was *Mikhail Ivanovitch Glinka* (1804–57), famous for his "Life for the Czar."

Anton Rubinstein (1829–94). Although recognized as one of the greatest piano virtuosos the world has ever seen, and enjoying marked success as a composer of works for the piano as well as for the orchestra, Rubinstein cherished the inordinate desire to be known as a great dramatic composer. Several of his operas, especially "Nero," "The Maccabees," and "The Demon," have many admirers, but their lasting value is doubtful.

Peter Ilyitch Tchaikovsky (1840–93). The undoubted leader of the modern Russian school of composition, and one of the most original and powerful exponents of national spirit and color in music. He was at his best in his orchestral works. His operas are little known outside of Russia. A casual inspection of their scores reveals that he was not a follower of Wagner and that he adopted the old-time models. His most successful operas are "Pique Dame," "Eugene Onegin," and "Iolanthe."

Modest Mussorgsky (1839–81). A disciple of the neo-Russian school. He found a sincere reception awaiting his opera "Boris Godounov."

GERMAN OPERA FROM WAGNER TO THE PRESENT

Richard Wagner (1813–83). The most original composer and the greatest exponent of dramatic music of all times. Possessed of a powerful and virile intellect, he attained almost equal eminence as poet and musician. In grandeur of conception and in boldness of execution, Wagner was without peer among musical dramatists. Gifted with a thoroughly poetic nature, he penned his own poems from the outset, and, in all his creations, made the preservation of the dramatico-musical unity his objective. Only in the co-ordinated co-operation of musical, dramatic, and scenic means of expression could he see the realization of his idea of a genuine musical drama.

Wagner made his orchestra the exponent of the dramatic action. By means of highly individualized, reminiscent *leading motives*, used sometimes singly in bold relief, sometimes subtly intertwined and varied, he clearly presented the ever changing moods and emotions of the characters, elucidated the plot, and achieved a broader organic connection between various parts of the dramatic situation. All of Wagner's leading motives are remarkable for their realism and the exactness with which they fit that emotion, person, or situation which they are meant to represent.

Growth of Wagner's Art.—Of Wagner's first operas, "Die Feen," "Das Liebesverbot," and "Rienzi," it may be said briefly that they represent his immature, formative period. The real Wagner begins with "The Flying Dutchman." In "Tannhäuser" his melody becomes more pliable and expressive, and he shows strength in handling the orchestra, which is very significant in view of future results. In "Lohengrin" he makes still more consistent efforts to merge the poetic and musical factors; the music is written, not to exhibit the beauty and dexterity of the singers' voices, but to follow the drama into its smallest details. The customary set pieces (arias, duets, *ensembles*, recitatives, etc.) are thrown aside in the attainment of a continuous and flexible musical current.

The music dramas "Tristan und Isolde" and "Die Meistersinger" represent twin peaks of an elevation of sustained dramatic energy; poetically they are Wagner's most consistent and perfect works. "The Ring of the Nibelung" was developed by Wagner out of the dramatic ballad on Siegfried's death. In individual scenes Wagner rises to the highest pitch in this colossal work. By the power which he displays in expressing every shade of human emotion, and by the surpassing skill with which he forms, develops, and directs his vast and otherwise overwhelming material, he has constructed a masterpiece that stands alone and without equal in the entire history of music.

Like "The Ring of the Nibelung" and "Lohengrin," "Parsifal," Wagner's last work, is an allegory and shares the weaknesses of allegories. It is a sacred musical drama in which the curious blend of religious mysticism and sensuousness is represented musically with wonderful skill, the religious element being presented with utmost reverence and artistic seriousness. The panoramas in this opera are perhaps the most beautiful in the history of the modern stage.

In richness, variety, and novelty of orchestral effects, in chromatic and enharmonic modulations, in rhythmic contrast, and in the fertility and originality of contrapuntal combinations and thematic exploitation, Wagner is wholly without parallel. The supreme greatness of Wagner's musical genius is now almost universally acknowledged. His works, both literary and dramatic, are an inexhaustible storehouse of instruction and suggestion to composers. Speaking in the broadest sense, Wagner's conception of the mutual relations of music, poetry, and action will henceforth remain the basis of all opera.

Dramatic Works.—"Die Feen" 1833; "Das Liebesverbot" 1836; "Rienzi" 1838–40; "Der Fliegende Holländer" 1841; "Tannhäuser" 1844–45; "Lohengrin" 1846–48; "Das Rheingold" 1853–54; "Die Walküre" 1856; "Siegfried" 1869; "Die Götterdämmerung" 1874; "Tristan und Isolde" 1859; "Die Meistersinger von Nürnberg" 1867; "Parsifal" 1882.

Orchestral and Choral Works.—"Symphony in C"; "Faust" Overture; "Siegfried" Idyl; "Kaiser" March; "Das Liebesmahl der Apostel," for chorus and orchestra; a few piano pieces and songs.

Literary Works.—Ten volumes of prose.

Karl Goldmark (1830–1915). Among the composers who were influenced by the art theories of Wagner must be mentioned Karl Goldmark, the producer of the highly successful operas "The Queen of Sheba" and "Merlin." The instrumentation of Goldmark is very brilliant.

Hermann Goetz (1840–76). The gifted author of "The Taming of the Shrew" and two excellent symphonies. He was cut off by the grim reaper in the best years of his creative effort.

Engelbert Humperdinck (1854–1921). Humperdinck won the hearts of young and old with his charming fairy tale "Hänsel und Gretel," which, while conceived in the style of Wagner, shows the author to be an original and discerning composer. His characters are drawn true to life, and the music ranges from the naïve to the most dramatic effects.

MASTERS OF INSTRUMENTAL AND VOCAL MUSIC SINCE WAGNER

Hector Berlioz (1803–69). A composer of powerful individuality and influence. He is recognized as the originator of modern instrumentation. Although he adopted the German classics as his models, he trod a very different path. He was one of the first to let music portray and illustrate a program, and aimed to realize novel tone colors of the most vivid nature. His passion for unprecedented combinations and gigantic mass effects was unsated.

His best-known works are the music drama "The Damnation of Faust," the dramatic symphony "Romeo and Juliet," the overture "Carnaval Romain," the operas "Benvenuto Cellini," "The Trojans," "Beatrice and Benedict," and a splendid treatise on instrumentation.

Franz Liszt (1811–86). Undoubtedly the greatest piano virtuoso known to the music world. He is the founder of "transcendental" piano playing, in which the instrument is made to attempt all the resources of an orchestra. As composer he was an adherent of the new German school (free tonality, romantic realism, program music), and his especial donation to the already existing forms was the symphonic poem. In this form he makes free and original use of the leading motive, "local color," and all the arts and devices of orchestration, to interpret the inner meaning of the given poem or program. The best known symphonic poems are the "Dante" symphony, "Faust-symphonie," "Les Préludes," "Tasso, Lamento e Trionfo," "Prometheus," and "Festklänge." Liszt was personally and musically one of the grand figures in the history of music.

Charles-François Gounod (1818–93). One of the most eminent of French sacred and dramatic composers. His fine and tuneful style is best known to the public through the favorite operas "Faust" and "Romeo et Juliette," the latter being considered in France superior to the former. Gounod's compositions are of a highly poetic order; in his finest lyrico-dramatic moments he is akin to Weber, and his modulations recall Wagner; his orchestration is frequently original and masterly.

Johannes Brahms (1833–97). Brahms was an idealist of the highest and purest type, and resisted the blandishments of the Muse of Programs. He worshiped only at the shrine of absolute music. He was the true standard bearer of the classic traditions. He was looked upon by many as the successor of Schubert and Schumann, the combination of the classic and the romantic schools. His harmonization and complex rhythms, with their frequent syncopations and cross accents, are distinctly romantic; his treatment of form and his instrumentation are classical. His harmony is rich, colorful, and new in unexpected changes; his counterpoint, complex. Although a master of every emotional expression, he leaned toward somber shades, in which his serious and classic mind delighted. As opposed to the license and chaotic passion of the ultramodern school, his works point back to the models and ideals of the classic age. Brahms may be called a reflective rather than a spontaneous composer, though for real warmth of feeling, intensity, and exaltation he has no contemporary equal.

In many of his songs one would say that Schubert lives again. The best-known and, in many ways, the most beautiful of his songs is "Wie bist du, meine Königin?" His songs, chamber music, much of his piano music, and several of his choral works ("German Requiem," "Triumphlied," and the "Schicksalslied") enjoy undisputed popularity, but his four symphonies and the two piano concertos are not so unreservedly admired. This is largely because, in his larger works, his themes are led through labyrinths of intricacy, which, together with the somewhat "thick" instrumentation, make his thematic design difficult of apprehension. Moreover, the loftiness of Brahms's conception is so far above the common range of vision that comprehension and enjoyment of his large works is gained only through familiarity with his unusual idiom.

Camille Saint-Saëns (1835–1921). One of the best French composers; classed in his orchestral compositions as a program composer. His symphonic poems "Phaëton," "Le Rouet d'Omphale," "La Danse Macabre" are highly original and characteristic compositions, and have gained general popularity. His instrumentation is peculiarly brilliant and effective. His G minor piano concerto is a favorite with concert pianists.

Alexandre Guilmant (1837–1911). A French organist and composer, whose compositions, modern and highly original, are in great favor with organists. His greatest works are "Belsazar," a symphony for organ and orchestra; his organ sonatas; "Christus Vincit"; "March Funèbre et Chant Séraphique"; many concert pieces for organ; also motets, masses, and choruses.

Max Bruch (1838–1920). A sturdy German master whose style is influenced by Mendelssohn. He is famous for his two fine violin concertos and his secular oratorios. Beautiful sound effects and clear melodious invention are prominent characteristics of his style. The best known of his oratorios are "Odysseus," "Lied von der Glocke," "Achilleus," and "Normannenzug."

Peter Ilyitch Tchaikovsky (1840–93). The greatest composer Russia has produced. His compositions bear the impress of Slavonic temperament, fiery exultation, and languid melancholy. He is fond of huge outlines, bold harmonies, strongly marked rhythms, subtle melodic turns, and exuberant figuration. His music abounds in sharp contrasts of orchestration and always leaves the impression of genuine, spontaneous originality. Tchaikovsky's principal works are two masses; 6 symphonies, of which the 4th, 5th, and 6th are masterpieces; the fantasies for orchestra "Francesca da Rimini," "Romeo and Juliet," "Hamlet," and the "March Slav"; a violin concerto, and two piano concertos, the wonderful B flat minor and the G major.

Antonin Dvořák (1841–1904). A composer as eminent in the history of the music of Czechoslovakia as Tchaikovsky is in that of Russia. His ideas are quaint, original, and marked by an almost overlavish employment of Bohemian mannerisms in melody and rhythm. His best works are his chamber music, the "Stabat Mater," the "Requiem," and his last symphony, "From the New World."

Jules Emile Frederic Massenet (1842–1912). A French composer, whose operas "Le Roi de Lahore," "Le Cid," "Herodiade," and "Thaïs" are frequently heard.

Edvard Grieg (1843–1907). The most original and popular Scandinavian master, who turned with enthusiasm "against the effeminate Mendelssohnian-Gade Scandinavianism," and established the well defined path which the Northern school is now traveling. He imbued his works with a strong strain of racial characteristics, to which is due much of their charm. The weird Scandinavian harmonies and his unique skill in the treatment of small motives place his shorter pieces among the most charming and delightful compositions of their kind. Many of his songs, full of poetic feeling, are equally popular; the same may be said of his three violin sonatas and the brilliant piano concerto.

Nicholas Rimsky-Korsakov (1844–1908). A Russian composer of orchestral works. The best known are the musical tableau "Sadko," the suite "Scheherazade," and "Fairy Tales."

Vincent d'Indy (1851–). Leader of the new French school, pupil and follower of César Franck. He has been an active figure in the musical life of France. His first important work to reach the public was the "Piccolomini" overture, which forms a part of his orchestral trilogy based on Schiller's *Wallenstein*. D'Indy is an admirer of Wagner, and his "Fervaal" plainly shows the influence of "Tristan und Isolde." One can recognize in his later works the inspiration aroused by César Franck; also the effect of the novelties introduced by Debussy, such as the whole tone scale, etc. His principle,—truth to feeling,—is shown in all his works, especially in the orchestration. Though universally acknowledged to be a master of the resources of the orchestra, he never uses these resources in the spirit of sheer virtuosity, as do, for instance, Dukas and Rimsky-Korsakov.

Christian Sinding (1856–). A Norwegian teacher and composer. While couched in a brilliant and appealing style, his works show a distinctly Norwegian character. Many of his piano compositions are very well known in this country.

Richard Strauss (1864–). The most extraordinary exponent of program music and one of the striking figures in modern music history. He is a composer of ultramodern tendencies, though of undeniable power, individuality, and endowment. His symphonic poems are musical paraphrases of philosophy, knavery, or other programs—condensed dramas, in which the music is consistent to the point of cacophony. He depicts the groveling and the ugly as well as the serene and the sublime, passing from wit and irony to passion and beatific vision. No composer has handled free counterpoint with more amazing results. His most pretentious works are the symphonic poems "Death and Transfiguration," "Till Eulenspiegel," "Don Quixote," "Also Sprach Zarathustra," "Heldenleben," "Sinfonia Domestica," and his weird operas "Salome," "Elektra," and "Rosenkavalier." Strauss utilizes the best elements of the individual instruments in building up a single large instrument (the orchestra) with exhaustless tonal shades, of majestic power and dignity, brilliant in gayety, inspiring in appeal. He aims only to make music a means of expression for every conceivable mental experience.

Claude Achille Debussy (1862–1918). A painter of mood pictures, who completely permeates his music with his impressionistic ideas. In many of his works he has achieved a vagueness of effect together with an elusive charm that defies analysis. Nothing arrests the attention or dominates a mood like a fixed melody,—therefore only fragments of melody are used. These form and disappear like fleeting cloudlets, obeying no law. The harmonies are surprisingly varied, rich, clear, or sonorous, but always evanescent, avoiding that definiteness which would impose thought. There is but little of that development of motives which we have been led to associate with ideas of musical growth and unity.

However, Debussy may be regarded as one of the chief innovators of the day. His greatest works are the opera "Pelléas et Mélisande," the orchestral prelude to Mallarmé's "L'Après-midi d'un Faune," and the cantata "L'Enfant Prodigue." Many of his piano works are in a most liquid style, full of the purest and most delicate poesy. Others lack a real underlying feeling which would give them unity. But all contain curious tissues of harmonic clouds and modulations which form a sort of tonal magic, holding the interest by novel, ethereal charm alone.

Pietro Mascagni (1863–). An Italian composer, whose opera "Cavalleria Rusticana" has had a sensational success the world over. The music and text complement each other admirably in this swift and gloomy tragedy.

Sergei Vassilievitch Rachmaninoff (1873–). Russian pianist and composer, whose piano compositions are popular recital and teaching pieces. His concertos for piano are brilliant concert works. His successful operas are "Aleko" and "The Parsimonious Knight."

OTHER CELEBRATED COMPOSERS SINCE THE BEGINNING OF THE 19TH CENTURY

Michael Balfe (1808–70). Composer of "The Bohemian Girl" and other operas.

Ambroise Thomas (1811–96). Best known by his opera "Mignon."

A. S. Dargomyzhsky (1813–69). His most important work is the opera "The Stone Guest," though "Russalka" is often heard in Russia.

Adolf Henselt (1814–89). Composer of many "elegant" pieces for piano.

Stephen Heller (1815–88). Writer of many fine teaching pieces.

Robert Franz (1815–92). Noted for his splendid songs.

Robert Volkmann (1815–83). Distinguished composer of superior chamber music.

Niels Gade (1817–90). Eminent Scandinavian composer.

Jacques Offenbach (1819–80). Prolific composer of light operas, which enjoyed immense popularity.

Franz von Suppé (1820–95). The German cotype of Offenbach, writer of many fine comic operas.

Joachim Raff (1822–82). Famous through the eminence of some of his larger works. Ranks very high because of his third symphony, "In the Forest," which has many admirers.

César Franck (1822–90). Earliest pioneer in the modern art of composition, which recognizes the perfect legitimacy of any conceivable chord succession if justified by physical tone relation. A French master of rare genius, with a vigorous style, and master of harmonic and contrapuntal effects which are very fascinating and beautiful.

Edouard Lalo (1823–92). Writer of some excellent violin music.

Anton Bruckner (1824–96). Considered by many critics one of the eminent masters of the times. Has written many fine orchestral works.

Karl Reinecke (1824–1910). Highly esteemed as a composer and pedagogue.

Friedrich Smetana (1824–84). The father of Bohemian opera. His work "The Bartered Bride" paved the way for a series of national operas which are dear to the hearts of the Bohemians.

Woldemar Bargiel (1828–97). One of Schumann's most distinguished pupils; known for his orchestral compositions and chamber music.

Hans von Bülow (1830–94). Noted as piano virtuoso, as teacher, and as one of the most remarkable orchestral conductors the world has ever seen.

Alexander Borodin (1834–87). Well known in Russia as the composer of the opera "Prince Igor." His music, national in character, is also frequently heard in the concerts of famous orchestras.



WORLD COMPOSERS

Schubert	Beethoven	Brahms
Schumann	Mozart	Wagner
Chopin	Bach	Verdi



AMERICAN COMPOSERS

Horatio Parker	George Whitefield Chadwick	Victor Herbert
Walter Damrosch	Edward Alexander MacDowell	Arthur Foote
Dudley Buck	Henry Louis Reginald DeKoven	John Knowles Paine

A. Ponchielli (1834–86). Although he died as long ago as 1886, he must be classed as a composer of the young Italian school. His most famous work, the opera "La Gioconda" often obtains a hearing.

César Cui (1835–1918). He built up a fine reputation for himself among Russian composers. His works of every description have a place on the opera and concert stage of every country.

Léo Delibes (1836–91). A writer of bright, sparkling music; he was most successful in the ballet. His ballet "Sylvia" and the opera "Lakmé" are familiar in all musical circles.

Mily Balakirev (1837–1910). A self-taught musician, whose music to *King Lear*, and the oriental fantasia "Islamei" are well known.

Edward Napravnik (1839–1915). For a time the conductor of opera at Leningrad; a writer of many national operas and songs.

Joseph Rheinberger (1839–1901). Famous composer of organ music, who also achieved success in other branches of composition.

Johan Svendsen (1840–1911). Violinist and composer, writer of many fine compositions in all forms.

Victor Nessler (1841–90). Composer of popular operas in Germany. His "Trompeter von Säkkingen" enjoyed great popularity.

Arthur Sullivan (1842–1900). Practically the originator of a charming form of satiristic comic opera. Besides his grand opera "Ivanhoe," he wrote the immensely popular "H. M. S. Pinafore," "Pirates of Penzance," "The Mikado," "Ruddigore," and many other successful operas and works.

Giovanni Sgambati (1843–1914). An admirable Italian composer.

Hans Richter (1843–1916). One of the greatest of conductors, and best authority upon Wagner, whose pupil and friend he was.

Emile Paladilhe (1844–). A member of the younger French school; known chiefly through his opera "Patrie."

Ignaz Brüill (1846–1907). He has written a very large number of operas of the German school, best known of which is "The Golden Cross."

Alexander Mackenzie (1847–). A composer, concert violinist, teacher, and conductor, who has also produced operas with the English opera companies.

Augusta Holmes (1847–1903). Commonly known as Holmès; one of the few well-known women writers of opera.

Benjamin Godard (1849–95). Writer of much music in many styles, best known through his piano compositions.

Zdenko Fibich (1850–1900). A writer of many operas popularized in his own country, Bohemia, by Smetana.

Anton Seidl (1850–98). Great Wagnerian conductor.

Xaver Scharwenka (1850–1924). Distinguished pianist, and composer of many fascinating pieces for piano; his best works are the three concertos for piano, a symphony in C minor, and the opera "Mataswintha."

Robert Planquette (1850–1903). Composer of the evergreen opera, "The Chimes of Normandy," and other sparkling operettas.

A. Goring Thomas (1850–92). Writer of many favorite songs and the operas "Esmerelda" and "Nadeshda."

Frederic Cowen (1852–). Popularly known through the cantatas "The Rose Maiden" and "The Corsair." He has made several essays in opera with more or less success.

C.V. Stanford (1852–1924). He has achieved noteworthy success as a composer of the operas "The Veiled Prophet," "Savonarola," "Shamus O'Brien," and others. He has written for practically every form of music with such acclaim that he has become the strongest hope of an English school of composition.

Jean Nicodé (1853–1919). Gifted pianist and composer.

Edgar Tinel (1854–1912). Belgian composer, who has made a fine reputation as a writer of oratorios, the best of which is "Franciscus."

Moritz Moszkowski (1854–1925). Famous concert pianist and composer, widely known for his elegant and dainty salon music for piano, his concert studies, concert waltzes, etc. His compositions in the larger forms are the opera "Boabdil, der Maurenkönig," a symphonic poem "Jeanne d'Arc," his piano and violin concertos, and two orchestral suites.

Eduard Schütt (1856–). Composer of many popular piano pieces, two piano concertos, variations for two pianos, songs, etc.

Alfred Bruneau (1857–). French composer of extremely modern tendencies, whose striking works create much discussion.

Edward Elgar (1857–). Violinist, organist, and composer. Best-known works are the oratorio "The Light of Life," "Spanish Serenade" for chorus and orchestra, his organ works, and songs.

Wilhelm Kienzl (1857–). One of the best-known of contemporary Austrian composers. His fine opera "Heilmar der Narr" was very successful. His third opera, "Der Evangelimann," called a "musicalisches Schauspiel," has had a tremendous success on over 130 opera stages in Europe.

Ignace Paderewski (1860–). World-renowned pianist, also composer of much popular piano music, concertos, variations, and one fairly successful opera.

Gustave Charpentier (1860–). A follower of César Franck and Massenet, whose opera "Louise" has been well received.

Gustav Mahler (1860–1911). One of the great conductors of opera in the past century, also a successful composer. His opera "Die Drei Pintos" and the second symphony in C minor are excellent works.

Hugo Wolf (1860–1903). Famous writer of songs and ballads, whose comic opera "Corregidor" met with good success.

Ludwig Thuille (1861–1907). Well known in southern Germany through his fine operas "Theuerdank" and "Lobetanz."

Cécile Chaminade (1861–). A woman composer who has made a great name through her piano compositions, which are chiefly in the romantic style. She is also the writer of a great number of fascinating songs.

Eugen d'Albert (1864–). Famous concert pianist and composer of several good operas and other works in various styles.

Jean Sibelius (1865–). Finnish composer of many popular orchestral works and piano pieces.

Paul Dukas (1865–). A composer whose virtuoso orchestral works find much favor with modern audiences. "The Sorcerer's Apprentice" is a great favorite.

Max Reger (1873–1916). A composer of serious works in all styles except opera.

Samuel Coleridge-Taylor (1875–1912). Well known for his cantata "Hiawatha's Wedding," many excellent songs, and other works.

Maurice Ravel (1875–). A composer who shows his affiliations with Debussy, with remote hints at Richard Strauss, but his individuality is strong enough to arrive at fearless independent expression. He has composed numerous works for piano, which have gained considerable attention.

AMERICAN COMPOSERS

The musical art in America is young. A real national style does not yet exist, for the country lacks the unity of thought and feeling necessary to the expression of a truly national life. Above all, it is required to forego those deep-laid musical foundations which form the strong basis of the musical art of most European countries, the folk songs. Neither the Negro nor Indian tunes have any real relation to the gradually shaping spirit of our great national existence. Some of our later composers have indeed striven bravely to indicate the vague, composite, uncertain, and unsettled character of what we call America, but without success.

In the middle of the 19th century, interest in secular music still remained secondary to that in the music of the Church. The names of *Thomas Hastings* (1787–1872) and *Lowell Mason* (1792–1872) are associated with most of the better hymns and anthems of that day. It was not until the Garcia family began a series of operatic performances in New York in 1825 that secular music of a serious style began to be appreciated. They were followed by a stream of artists from Europe, who brought much of the musical wealth of the parent countries to America, and stimulated a more widespread interest and enthusiasm in the art of music. The

list included *Ole Bull*, famous violinist (1843), *Jenny Lind* (1850), *Henriette Sontag* (1852), *Adelina Patti* (1859), *Anton Rubinstein* and *Henri Wieniawski* (1872), *Hans von Bülow*, and a great number of others.

The rapidity and vigor of musical development may be inferred from the above-mentioned enthusiasm. The dormant art, at first kept alive by the stimulating effect of European products, slowly awakened, and has gained in momentum and vitality, until it has elevated itself to a degree of excellence and independence that compels attention.

The activity in the art of composition in America is eloquently attested by the following long list of successful and well-known composers.

Stephen Foster (1826–64), singular, untutored genius, writer of "Old Folks at Home" and other popular songs couched in melodic accents similar to the lyrics of the Southern Negro.

Dudley Buck (1839–1909); *John Knowles Paine* (1839–1906); *F.G. Gleason* (1848–1903); *Arthur Foote* (1853–); *George W. Chadwick* (1854–), whose best-known work is the beautiful and poetic overture "Melpomene"; *Edgar Stillman Kelley* (1857–), composer of the descriptive orchestral suite "Aladdin," the "Macbeth" music, and the opera "Puritania," all of which show great culture and fine taste; *Edward A. MacDowell* (1861–1908), a composer of strong individuality. His "Indian Suite," one of the composer's best creations, is one of the loveliest of all American orchestral works. MacDowell's genius doubtless reached its most complete and convincing expression in his four sonatas, "Tragica," "Eroica," "Keltic," and "Norse," and in his noble D minor concerto. These compositions disclose, in imagination, content, and workmanship, the finest and rarest traits of MacDowell's delicate spirit.

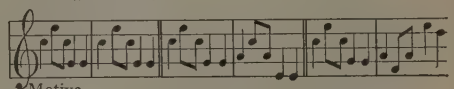
Arthur Whiting (1861–) and *Horatio W. Parker* (1863–1919), whose best work remains his religious cantata, "Hora Novissima" (even though he was given for his opera "Mona" the $10,000 prize offered by the Metropolitan Opera House), are both virile and spontaneous composers. *Mrs. H. H. A. Beach* (1867–) takes her place beside the men, for none surpasses her in competent workmanship, in elevated ideals, nor in vigorous conceptions. Her "Jubilate," a mass in E flat, a sonata for piano and violin, and the "Gaelic Symphony" are her most important works. Her best-known song is "The Year's at the Spring." *Henry T. Burleigh* (1867–), foremost composer of the colored race, is a musician of poetic imagination and profound workmanship. *Henry K. Hadley* (1871–) is best known in this country by his songs and his virile and restless orchestral compositions. *Frederick S. Converse* (1871–) is a romantic composer, whose opera "The Pipe of Desire" and symphonic works are all placed in the realm of dreams and legends.

This list is strongly re-enforced by the names of such men as *Reginald De Koven* (1861–1920), whose "Robin Hood" and "Rob Roy" are classics of operetta; *Henry Holden Huss* (1862–); *Charles Wakefield Cadman* (1881–), composer of music built largely on Indian themes; also the foreign-born composers,—*Victor Herbert* (1859–1924), *C. M. T. Loeffler* (1861–), *Walter J. Damrosch* (1862–), *Harry Rowe Shelley* (1858–), and *William Berwald* (1864–), composer of original and highly interesting works in many styles. His larger works include "Dramatic Overture" and "Waltheri," for the orchestra, and the cantatas "The Seven Last Words" and "The Way of the Cross."

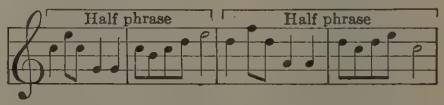
MUSICAL FORM

Musical Form is the frame which encloses the musical design. A fragment of melody that is reiterated, or transformed and developed into a phrase or period, is called a *motive*. Larger musical germs are called *themes*. In fugue forms they are called *subjects*.

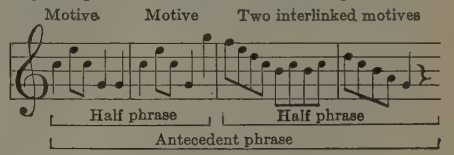
Structural Evolution of Homophonic Forms. A *phrase* is a short musical thought. There are many methods of developing embryonic musical germs into phrases. Provided the composer has a musical idea, a motive or fragment, rhythmically and melodically interesting, then the simplest form of growth is that of exact repetition. Although this method of development is often applied, a sense of *progressive* development is first aroused by a recurrence of the motive upon a different scale step, or by reversing the direction of the various melodic intervals (inversion).

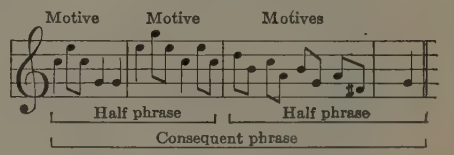


However, this sort of form fragment would become monotonous if continually repeated by itself. To develop this motive, or phrase member, into a complete thought, it is necessary to add a second phrase member, the motive of which does not imitate the first, but complements it. Two dissimilar motive measures, for instance, may be followed by a second pair, arranged in such a manner that Nos. 1 and 3 correspond, also 2 and 4. This is analogous to the 4-line stanza in poetry, in which alternate lines rime with each other.



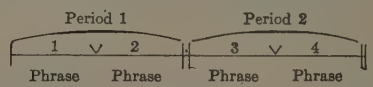
A *period* consists of two phrases, called respectively antecedent and consequent, and having the relationship of question and answer (thesis and antithesis). In a manner similar to that in which half phrases combine to form a phrase, so two phrases may complement each other to form a *period*.





This is but one of many ways in which musical thoughts may be completed, and often the arrangement of the musical germs is neither so regular nor so consistent as the above.

The *double period* results from the conjunction of two periods (and consequently four phrases) so conceived that the period relation between phrases 1 and 2 and between 3 and 4 is apparent; also the relation on a broader scale between these two pairs.



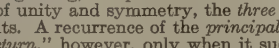
The Song Forms. A so-called "form" in music consists of a connected and related series of phrases or periods, more or less contrasted with a following

homogeneous and well-closed group (where two or more such groups are used). A *phrase*, *period*, or *double period* may be used as an example of a single form. If consisting of but one such group, a piece may properly be said to be in a *one part form*.

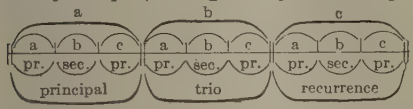
Two Part Forms.—These are composed of two *one part forms*, which stand in the relation of *principal* and *second*. It is not necessary that both "parts" be of equal length.

Three Part Forms.—When the *principal*, which is at the beginning, is repeated after the *second*, for the sake of unity and symmetry, the *three part song form* results. A recurrence of the *principal* becomes a real "*return*," however, only when it succeeds an equally distinct "*departure*." In the *two part form*, the *second* complements and co-operates with the *principal*, a certain parallelism of thought being present. It shows further that it completes the group by closing with a perfect cadence in the principal key.

In the *three part form*, however, the *second* is more in the nature of a digression than a mere continuation, its object being to represent real contrast or opposition. As middle one of three parts, it has no tendency toward a definite sense of finality, but, after giving the impression of a distinct digression, its closing strain should lead back into part III, which is the *repetition* or *recurrence* of the *principal*.



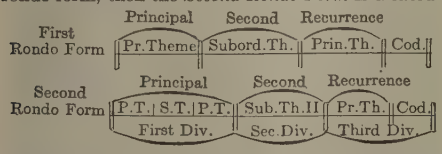
The Compound Song Forms. *Song Form with Trio.*—This larger form results when the *principal* is in itself a complete *three part song form*, possibly with a short transition leading into the middle section, called *trio*. The name trio is handed down from the time when the *principal* and its recurrence were two-voiced, the middle section three-voiced,—hence trio. The form of this *trio* or middle section is generally *three part*, although it may also be *two part*.



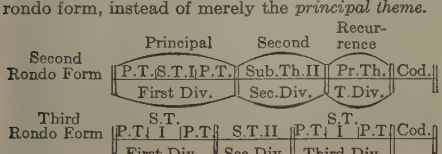
Song Form with Two Trios.—The next form evolving itself in the natural order of growth is the *song form with two trios*. The first trio is usually similar in style to the *principal*, the second may be contrasted as much as desirable.

The Rondo. The *First Rondo Form* is a direct offshoot of the *song form*. It contains a *principal theme*, one *subordinate theme*, and the *recurrence* of the *principal*. Introduction, transition, and *codetta* (a short closing group) may be added at option.

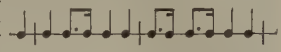
If the *principal* is enlarged into a complete first rondo form, then the *Second Rondo Form* is created.



The Third Rondo Form.—This largest rondo form is obtained by making the *recurrence* a complete repetition of the *first division*, as found in the second rondo form, instead of merely the *principal theme*.



Marches and Dances. The simplest and oldest art forms include the dances, in which the march is to be reckoned, inasmuch as it, like the dance, serves the purpose of regulating the movements of persons in large numbers. The rhythm of marches is generally duple (2–4 or 4–4). Dotted eighth notes are used, and are of value in marking a contrast with the accented beats, and in avoiding rhythmic monotony.



The first division of a march is generally a *three part song form* in itself and recurs as part III. These parts, the *principal* and the *recurrence*, are connected by a middle section (part II) called *trio*. In modern marches, the trio is similar to the *principal theme* in tempo and rhythm, though its melodic contours may be softer and more lyrical (songlike) in character, contrasting further by the use of another key. The trio may also introduce an entirely new thought.

The *polonaise* of modern times, though classed as a dance, has the character of a march. It is written in triple time, moderate tempo, with following characteristic rhythm in the melody or accompaniment, 3–4  . As the name polonaise (Ital. *polacca*) implies, this style of composition is of Polish origin.

Like the march and polonaise, the *polka waltz*, *galop*, *bolero*, *mazurka*, and *tarantelle* are dance forms and derive their names from the characteristic rhythm: march 4–4; polonaise 3–4; polka 2–4; waltz 3–4 (slow), (moderate), (fast); galop 2–4; bolero 3–4, also sometimes the same as polonaise; tarantelle 6–8 (presto).

The *march*, *galop*, *polka*, *polonaise*, and *tarantelle* are usually song forms with trio.

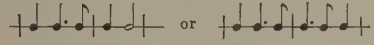
Dancing waltzes are commonly in suites. So-called *salon valses* are often in the song form with trio.

Old Dances. A knowledge of the following old dances is necessary, inasmuch as, in various combinations, they are grouped to form the *suite*.

The *allemande* was originally a German dance, taken up and developed by the French. It is written in duple time (usually 4–4) and combines a certain seriousness of style with graceful melody. It begins, as a general rule, with a preliminary upbeat (1–8 or 1–16).

The *courante* or *corrente* is in triple time (3–2 or 3–4), fairly even movement of eighth or sixteenth notes. Movement not very fast. Bach treated the courante quite freely.

The *saraband*, originally a Spanish dance, is in triple time, of slow movement and stately character, with fairly interesting change of harmony, or with many ornamental figures, but quite devoid of rapid passages. It usually begins upon the full beat and shows a preference for rhythms similar to the following.

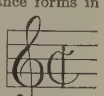


The *gigue*, or *jig*, is of a light, happy character, lively movement, and, originally, largely in the following rhythm:



The *gigue* is written preferably in an imitating style (contrapuntal).

The *gavotte* is one of the older French dance forms in *alla breve* time (two beats to a measure). It nearly always begins with a 1–2 upbeat and closes upon the accent. The character is agreeable, fairly happy, in moderate tempo. Sometimes the gavotte has added to it a sort of trio, called *musette*, which is followed by the recurrence of the gavotte proper.



The *musette* is the French name for the bagpipe, the terminology having been applied to the given form because it has a characteristic organ point bass (like the bagpipe) over which the melody moves.

The *passepied* is an old French dance composition in triple time (3–8 or 6–8). Lively and happy in character, it begins with a 1–8 upbeat. Bach often puts a passepied No. 2 in opposition to a No. 1.

The *branle* or *bransle*, an old French round dance in fast time, originally with song and a constantly recurring refrain after each strophe.

The *menuet* (Ital. *menuetto*) received its name from the French *menu*, "small." In short, it is a dance in small steps. Originally coming from Poitou, it was a rather rapid, joyful sort of dance, which, however, gradually came to be performed more and more slowly during the past two centuries, so that it is now considered a stately, serious, yet graceful, dance. The menuet is written in triple time (3–4 or 3–8). A menuet *secondo* or *alternativo* is sometimes added, as a sort of trio, to the principal. If in major, the latter is called *maggiore*, if in minor, *minore*.

Doubles were the variations of olden times, a modification of the style of movement, without change of time or harmony.

The *passacaglia* (Sp. *pasacalle*, Fr. *passacaille*) is an old Spanish and Italian dance in triple time, moderate movement, in which the melody is placed over constantly repeated bass figure (*basso ostinato*, or "obstinate bass"). In a few of the older compositions of this type the *ostinato* part is missing. *Basso ostinato* is the name of a bass part whose melody of four or eight measures is ever recurring.

The *chaconne* or *ciaconne* is hardly to be differentiated from the *passacaglia*. It is usually written in 3–4 time.

The *loure* is also an old dance in triple time (3–4 or 6–4), slow in movement, and with the characteristic rhythm.

The *rigaudon*, an old dance from Provence, in *alla breve*, lively movement. It is generally found in the form of three groups of eight measures repeated, the third of which is changed in character, for instance, to a lower register so as to bring a certain freshness to the others by contrast with the latter.

The *bourrée* is an old French dance (2–2 or 4–4), beginning with a quarter upbeat, and leaning toward a syncopation of the third and fourth quarters. Lively.

The *entrée* is a dance, usually in 4–4 time, marchlike in character. *Entrée* is also the name of the old *overture*.

The Suite. The suite is a so-called *cyclical form*, that is, a conjunction of several individual compositions to form one homogeneous whole, a certain unity being obtained by the use of the same key for all. The older suite was also called *partita* and consisted of the *allemande*, *courante*, *saraband*, and *gigue*. Before the *allemande* a *preludium*, *entrée*, or *overture* was often used, with a slow first part and a faster second. Between the *saraband* and *gigue* sometimes were inserted one or more *intermezzi* (*bourrée*, *gavotte*, *passepied*, *menuet*, *loure*, *air*, possibly with *doubles*). A *chaconne* or *passacaglia*, when used, appears as the closing number after the *gigue*.

In modern times, the compositions of a *suite* are in optional keys, and are not restricted to the old dance forms above given. Newer orchestral suites may be found to include an optional series of artistically arranged pieces of pleasant *genre* and in varying moods.

The *divertimento* (Fr. *divertissement*) is similar to the suite in that it is a cycle of more than four pieces, though usually of simpler style of workmanship.

The older *serenade*, consisting of several menuet-like pieces, one or two slow movements, *air* (*con variazione*) *adagio* or *andante*, as well as an *allegro*, or *march*, rounded out by a beginning and ending in fugue or fughetta-like style, may also be classed in this category of cyclical compositions.

The Song. The song (vocal composition) may be divided into two classes,—the *folk song* and the *art song*. A folk song is either one whose author and composer are no longer known, taking its rise among the people, or one by a known composer, which has been adopted by the general populace, because it was homefolk-like in its appeal, simple of melody, and easy of comprehension. An art song, on the other hand, makes greater demand upon the voice and accompaniment.

A song is either a *strophe song*, in which each verse is sung to the same melody, perhaps with slight modifications, regardless of possible mood changes, or a *thoroughly composed song*, in which the melody and accompaniment are governed by and changed to fit the fluctuating mood play.

The Overture. This form has gone through many phases of development. As its name implies, it has always been an *opening* or *introductory* composition. The oldest form of overture, occurring under that name, was written by the French composer *Jean Baptiste Lully* (1633–87). It comprised three sections,—a slow movement, as beginning, followed by a livelier movement, with the first part repeated.

Alessandro Scarlatti (1659–1725), the most important Italian composer, developed the opera overture—called "*sinfonia*" by him—beginning it with an *allegro* part, followed by a slower second section, and closing with a contrapuntal *allegro*. The term *sinfonia* at that time expressed nothing more than a "composition written for several instruments."

Handel (1685–1759) was the first to give the overture a specific relationship to dramatic works and to establish a certain unity of the parts. After him *C. W. Gluck* (1714–87) must be credited with having given the overture a higher significance as individual composition as well as in its connection with the opera.

In modern times, we distinguish between three different kinds of overtures: (1) *Overture in the Sonata Form* (to be explained later) with two themes, a development portion, and a *repetition* (repercussion), and with more or less elasticity of form,—in short, the so-called *concert overture*, splendid examples of which are Beethoven's "Coriolanus" or Mendelssohn's "Ruy Blas." (2) Overtures which, after the style of the *potpourris*, are formed by the loose conjunction of selected melodies of the whole opera, such as most of Rossini's overtures and modern operetta overtures. (3) Overtures which are formed by a systematic working out of the thematic materials of the opera into a logical composition, characterizing and creating a proper "atmosphere" for the works which they precede; for instance, Wagner's "Lohengrin," Weber's "Freischütz," Humperdinck's "Hänsel und Gretel."

The Sonata. Sonata was formerly the term applied to any composition which was written to be performed upon an instrument, more particularly a stringed or wind instrument, the term *toccata* being reserved for such as were written for manual (key) instruments. These terms were in contradistinction to the term used to designate compositions for the human voice, *cantate*, from *cantare*, "to sing."

The first to use the name *sonata* was *Andrea Gabrieli* (about 1510–86). Unfortunately his *Sonate a 5 Stromenti*, meaning "Instrumental Pieces for Five Instruments," were lost.

J. Kuhnau (1660–1722) was the first to apply the designation of sonata to piano compositions. In reality, the oldest sonatas were intended as preludes to vocal compositions used in religious service, and *sonata* was synonymous with *sinfonia* or *overture* of that period. As early as 1700, the distinction was drawn between *sonata da chiesa* and *sonata da camera*, "church sonata" and "chamber sonata," the former being conceived for organ and instrumental choirs, the latter, on the contrary, never making use of wind instruments. The great development of stringed instruments at the time of *Corelli* (1653–1713), who wrote for strings with accompaniment of the *cembalo* (piano of that period), established as the favorite chamber sonatas those written for the violin.

Chamber Music.—In general, chamber music is such as is suited for performance in smaller halls, as opposed to that style of music meant for concerts with orchestra or chorus. Nowadays, the name "chamber music" is given to that style of music to be performed by a few solo instruments, voices, stringed or wind instruments, or by piano, with or without accompaniment. Inasmuch as neither the volume nor the instrumentation can be as varied as in orchestra music, the compositions are conceived in what is called "chamber music style." The individual instruments are given greater significance by being introduced as solo instruments. This style of composition embraces a more minute

detail in *nuance* and figuration for the separate instruments.

Corelli it was, who gave a part of his sonata the *adagio—allegro—adagio—allegro* form. Almost simultaneously with Kuhnau in Germany, *Domenico Scarlatti* in Italy (1683–1757) developed and improved the sonata form. It was the latter who established it upon the basis of a characteristic first movement of a series; with him and following him, came *Karl Philipp Emanuel Bach* (1714–88), the cleverest of Johann Sebastian Bach's sons, *Joseph Haydn*, *Mozart*, and *Beethoven*, who molded this form, in content as well as in outline, up to its present high and imperishable standard. These masters wrote sonatas for the many different solo instruments, as well as *ensembles*, *trios*, and *quartets*. With the transference of the sonata form into the realm of the orchestra, the first movement of the symphony originated.

The Sonata as Cyclical Form.—The three part overtures suggested the principal movement (sonata piece) of the *cyclical sonata*, while the suite gave rise to the conjunction of several movements.

Our sonata cycles of the present have a general outline as follows: They consist of three or four movements, the most important of which is usually the first, an *allegro*, the *sonata-piece movement*. The second is an *adagio*, *andante*, *largo*, *grave*, or *thema con variazione*. The third is a *menuet*, or *scherzo* with *trio*. The *adagio* and *menuet* sometimes change places. The fourth movement, the *finale*, is lively or very rapid, *allegro*, *presto*, or possibly a *thema con variazione*, also a *rondo* or even a *fugue*. The *finale* is often similar in form and construction to the first movement (*sonata piece*).

The *sonata-piece movement*, from which the whole cyclical form takes its name, contains a characteristic *principal theme* in the tonic key. Opposed to this is a second theme, called *song theme*, more lyric in character and usually connected with the first by a *transition*. This song theme is generally in the dominant key, when the composition is in the major, or in the tonic relative when the composition is in the minor. These two themes, sometimes followed by a *closing group* or *coda*, comprise the *exposition* or part I. Part II, the middle or development section, variously called *fantasia* or *elaboration* (Ger. *durchführung*), makes use of the whole or of parts of the two themes, developing them, touching more remote keys; the harmonic element somewhat preponderates. This part leads back to theme I, marking the beginning of part III, the *repetition*, *recurrence* or *repercussion* of part I, with the difference that the song theme is now also placed in the tonic key. For this reason part III is sometimes referred to as the tonic section. It closes with the coda.



A *sonatina* is a small, easily understood, and easily rendered sonata of two or three movements.

The Rondo and Theme with Variations. Two forms have been mentioned as component movements of a sonata cycle form, which may however be used as independent forms of composition. They are the *rondo* and *thema con variazione*.

The Rondo (Fr. *rondeau*).—Originally a dance with song. The name *rondo* (Ger. *radel*) indicates "round song with refrain." The alternate presentation of solo and chorus, the latter giving the refrain, contains in itself an incipient rondo form, in that it adheres to a *principal theme*, alternated with contrasting interpolations of secondary themes or new material. For a description of the various rondo forms see page 1523.

Theme with Variations.—A theme may be "varied" melodically, harmonically, or rhythmically in such a manner that the underlying theme proper is still recognizable. The old *doubles*, already mentioned, varied a theme in very restricted manner, while as early as Haydn and later with Mozart and Beethoven the separate *variations* were far more individually constructed. Changes in rhythm and tonality were more freely applied, while even the theme was sometimes used as subordinate to a counter melody which was momentarily principal in importance. There are numberless kinds and methods of variation. The theme itself should not be too complicated; it should be easy of comprehension, yet interesting enough to avoid monotony.

The theme is usually a *phrase* or *period* of eight or sixteen measures, sometimes with added coda. A variation is an amplification by means of auxiliary notes, rhythmic devices, changes of movement, etc., yet made in such a manner as to leave resemblance enough to trace the relation between theme and variation.

The Symphony. As already stated, this designation applied originally to a short instrumental introduction or overture to an opera, about the beginning of the 17th century. Out of this overture of the Italian opera with its three movements (one slow between two rapid) was developed the symphony form used by *Giovanni Batista Sammartini* (about 1750), in many respects a predecessor of Haydn. Many composers adhered to his general scheme. Haydn gave to the symphony the *menuet*, with its inherently naïve, roguish, and yet graceful character, so peculiarly his own and as yet unexcelled. Mozart and Beethoven intensified the emotional content of these forms, the latter also developing the *scherzo* out of the menuet. In a similar manner, Schubert, Schumann, Raff, Mendelssohn, Brahms, Dvořák, and others have imbued these old forms with the individuality of their art conceptions, though they have done nothing to develop them further.

The *scherzo*, spoken of above as the creation of Beethoven, and since incorporated into the symphony, is similar to the menuet of Haydn and Mozart, which suggested it, for it is also a light, lively movement indicative of humor and joy, although its themes are shorter and more energetic. The content reveals greater depth of thought and a more intense medium of expression. The *scherzo* is not limited to triple time like the menuet.

The term *scherzo* is applied also to an independent composition of indefinite form prompted by humorous, burlesque, or happy mood.

The Concerto. The word comes from the Latin *concertare*, "to emulate or contest," and originated in the 16th century at the time when instrumental music disengaged itself from vocal music. There began to be used simultaneously several voices with accompaniment, or several instruments were equally treated as solos. In other words, these voices or instruments were made to contest against each other during the composition.

Ludovico Viadana, really *Ludovico Grossi*, born at Viadana (1564–1645), was the first to write *concerti da chiesa* (church concertos) for one, two, three, and four voices, with organ bass.

Giuseppe Torelli (1708) wrote *concerti da camera*, "chamber concertos," and *concerti grossi* which were conceived for two concerted violins (solo violins) with accompaniment of two violins, viola, and *basso continuo* (figured bass). The solo instruments, which grew in number to three and later more, formed the *concertino*, "little concert," as opposed to the accompanying instruments (the concerto), which gradually increased to considerable numbers.

Today the *concerto* has one solo instrument (sometimes two) usually with orchestral accompaniment. If written for two solo instruments (two violins, two pianos, two oboes, etc.) the composition may be without accompaniment. The form of the concerto in general agrees with the sonata form. The solo instruments are treated from a virtuoso standpoint.

The Mass, Messe, Missa. The term mass is used to designate the principal liturgical ceremony of the Catholic Church. The mass as a musical art form is very old, the culmination of its development having been reached in the 15th and the 16th century, while Pope Gregory the Great regulated the musical part of the Eucharistic service as early as the 6th century. The songs of this period were sung in unison, and, along with the development of polyphonic music, it was particularly in connection with the molding of an artistic mass form that the masters of the 15th and the 16th century made themselves deserving of immortal praise. No composer of note during that period missed the opportunity of writing several masses, for these particular musical forms were at that time the most ostentatious display pieces of the composer's art.

The principal parts of the *mass* are named after the various sectional beginnings of the Latin or, as in the case of the first, Greek text.

I *Kyrie*—Three parts; "Kyrie eleison."
II *Gloria*—"Gloria in excelsis Deo," etc. (Luke II: 14).
III *Credo*—"Credo in unum Deum," etc.
IV *Sanctus*—"Sanctus Dominus Deus Sabaoth," etc.
Benedictus—"Benedictus qui venit," etc.
V *Agnus Dei*—"Agnus Dei, qui tollis peccata mundi," etc.

We distinguish between *missa solemnis*, "solemn high mass" (called also *missa cantata* when sung by the priest unattended by deacon or subdeacon), and *missa brevis*, "low mass." The former is celebrated on great festivals of the Church, the latter on lesser feast days or when a moderate time is required for the musical rendition, in which case only the *Kyrie*, *Gloria*, and sometimes the *Benedictus* are sung.

Missa Pro Defunctis or *Requiem* is a mass in memory of the dead. It may contain: I, *Requiem Æternam—Kyrie*; II, *Dies Iræ*; III, *Domine Jesu Christe*; IV, *Sanctus* and *Benedictus*; V, *Agnus Dei, Lux Perpetua.*

The *Gloria* and *Credo* are omitted, and in their place are sung the *Requiem* (a prayer for the repose of the souls of those departed this life), which is rendered before the *Kyrie*; the *Dies Iræ* (the wondrous threnody of the last judgment); and the *Lux Perpetua* (perpetual light).

Aside from the masses of Palestrina (1526–94 in Italy), the "Missa Papæ Marcelli" of this master, Mozart's "Requiem," Bach's "B Minor Mass," Beethoven's "Missa Solemnis," and the "German Requiem" of Brahms are justly celebrated for their beauty.

The Oratorio. In 1551, Saint Philip Neri established in Rome a series of biblical lectures or discourses, held at first in the chapel of the monastery of San Girolamo and in Santa Maria. He introduced music into these *congregazione dell' oratorio* (chapel assemblages), and Animuccia, Palestrina, Nanini, and others wrote the music to biblical texts—so-called *laudi*, "songs of praise." Accompanied by these songs, certain scenes were presented. Cavalieri's (about 1550) *Rappresentazione di Anima e di Corpore*, "Representation of Spirit and Body," is considered to be the first *oratorio*. It consisted of choruses and solos, though the latter were really more in the character of recitatives than vocal solos, and were constructed upon a foundation of figured basses to indicate the harmonies, which proceeding was in itself a novelty for that period. The accompaniment consisted of strings,—harps, gambas, or cembalos (a sort of primitive piano),—while characters representing biblical personages performed upon a stage. This style was adhered to for some time by the followers of Cavalieri, and it was not until *Carissimi* (1604–74) that the scenic representation was dropped and the reciting voice substituted.

Handel (1685–1759) built upon the foundation laid by these predecessors and created his immortal oratorios, which will serve as a standard for all time. *Bach, Haydn, Mendelssohn, Schumann*, and others turned to this art form, without altering it in any particular. According to the character of the text we distinguish between *religious* and *secular oratorio*; the former is based upon a biblical or religious text, the latter upon some exalted secular text. The modern oratorio has an overture, and consists of solo arias, recitatives, solo-ensemble parts, and choruses. Since a scenic representation does not now take place, dramatic moments are conveyed by the music alone, in so far as this is possible and plausible.

The Passion. The name of a musical dramatic presentation of the history of Christ's Sufferings, which came into vogue in the early middle ages. These performances were usually given during Holy Week, though it is not now known just in how far the music supported or alternated with the action of the play. The culmination of a development, started by *Bartolomæus Gesius* (1555–1613) and forwarded by *Heinrich Schütz* (1585–1672), is to be found in Johann Sebastian Bach's *Passion Music.*

The Cantata. *Cantate* was in olden times the designation given to tone pieces designed to be sung. To the more extensive vocal compositions, compositions with solos and recitatives, this term was not applied until after 1600, without, even then, taking on the meaning or character of the present *cantata*. At the time of Carissimi a distinction was drawn between "*cantate di chiesa*" and "*cantate di camera.*" The cantatas which this master wrote for two or three voices, with but little of the *obbligato*, or support of accompanying instruments, are to be viewed as representing a general musical progress for that period, rather than an approach toward the modern cantata. Our cantata consists of recitatives, arias, duets, trios, etc., and choruses, with orchestral accompaniment, the latter assuming a very important part, at times acting independently in the performance of a symphony or overture. For this we are indebted directly to Johann Sebastian Bach, of whose church-cantatas (*kirchenkantaten*) some are constructed in grand, majestic style in two parts with orchestral accompaniment, and others in very modest proportions for a single voice.

Motet. The term motet was defined by Walter Odington (about 1225) as *brevis motus cantilenæ*, "short movement in song." The older motet is a vocal composition written for several (usually three) voices, of which the tenor (the principal voice) was assigned a motive or part of a Gregorian Chorale. The text is biblical. The masters of the motet form were Orlando di Lasso, Palestrina, and Johann Sebastian Bach, who also is responsible for the insertion of the chorale into the motet.

The Aria. An aria is an orchestrally accompanied vocal solo of larger dimensions, taken from an opera, oratorio, mass, or cantata. It may also be a separate composition conceived for concert purposes, and is then called *concert aria.* A so-called "*bravour*" or "*coloratura aria*" is one which is written with a certain regard for the vocal technique (Ger. *kehlfertigkeit*) of the soloist. The "big" arias, so-called "*da capo arias*," consist of two different parts, the first of which makes all the necessary concessions to technical display, contrasting in mood with a quieter second part, which, in turn, is followed by the *da capo*, return, of part I (as part III of the three part song form) with still richer and more ostentatious ornamentation.

An aria of short duration is called *arietta* or *cavatina*, agreeing for the greater part with the three part song form. It occurs with or without accompaniment. The underlying mood style of an aria is lyric, though it may at times grow quite dramatic.

Recitative (Lat. *recitare*, "to relate"). This term refers to that vocal manner which is characteristic of the singing correlative of the natural speaking voice, its inflection and accent, during the

declamation of a spoken text. It is an adjustment of pitch and cadence to text; no definite tempo or rhythm is found, as in melodic phrases. The sole task of the music is to afford an impressive and suitable delivery of the words. The accompaniment consists only of simple chords. This style admits of great pathos. Handel affords, in his "Messiah," a fine example in the tenor recitative "Thy rebuke hath broken his heart." The first upward inflections upon the word "rebuke" followed by the downward sweep of an octave in "hath broken his heart" are wondrously expressive. The style might well be designated by the term speech-song. Any composition or section which is constructed according to these principles may have conferred upon it the name recitative.

The Melodrama. A style of composition without definite form, in which music is used to accompany a spoken text. *Jean Jacques Rousseau* was (so far as is known) the first to cultivate this art form. *Benda* (1721–95) wrote well-known melodramas in German. Melodramatic scenes occur in many operas.

The Contrapuntal Forms,—Canon, Fugue. The contrapuntal style is one in which several melodies (voices or instruments) are used simultaneously to form a euphonious combination without sacrificing the melodic individuality of any voice.

The use of two or more melodies at the same time was evolved in the early part of the 9th century from the *organ point*, which consisted in placing a melody over a fixed bass tone. The first attempt to sound two distinct melodies was the so-called *organum*, in which a second voice sang along in parallel fourths or fifths with the first. Reference is first made to part music under the name organum by the monk of Angoulême (early in the 9th century) in his biography of Charlemagne. In this he relates that the Frankish singers had learned in Rome the "art of organum," *ars organandi*. Only a short time later Scotus Erigena describes the organum as something already well known. The organum has long been considered the invention of the monk, *Hucbald* of Saint Amand in Flanders (died 930). In a tract, *Musica Enchiriadis*, traditionally attributed to him, a detailed description of the organum appears. Later research reveals that this tract was not written until the 11th century instead of in the first part of the 10th, and that therefore the authorship of *Musica Enchiriadis* is to be credited to some unknown "pseudo-Hucbald." Besides describing derivative forms of the organum which appeared after the time of the real Hucbald, the *Musica Enchiriadis* refers to this sort of part music as something well known and "customarily called organum." Moreover, another tract on the subject of the organum, at present in the archives at Cologne, Germany, written in the 10th century, seems to establish beyond a doubt that the origin of the organum is to be placed much earlier than the 10th century.

From the organum the *descantus* was developed. Where the former moved entirely in parallel motion, the latter consisted of contrary motion. A regulation handed down from the 12th century exacts that over the notes of the "fixed melody," *cantus firmus*, the second melody shall alternately form octaves and fifths, although it was not long before passing notes and even free neighboring notes were inserted. From this stiff and stringent formulation a freer voice treatment was evolved until there developed that complete voice independence which established each voice as equally entitled to contest against the other. See *Concerto*.

Canon.—The imitative counterpoint, in which one voice repeats the melody of a preceding voice, while the latter goes on independently, was known and used as early as the 13th century. However, the term counterpoint was not applied to combined melodies until the 14th century. *Philippe de Vitry*, an important theoretician of the 13th and the 14th century, was the first to set up definite regulations for voice progression. Other developments came, until *Giuseppe Zarlino*, in his *Institutioni Harmoniche* (1558), gave the various kinds of counterpoint (single and double) and *canon* in their complete form. *Canon* is the name of a contrapuntal style of writing, in which the voices present the same melody, successively, each in imitation of the preceding voice. The strict manner of doing this results when each melodic interval of the original melody is exactly adhered to during the imitation; a freer style is obtained by modifying the intervals by accidentals.

When the second voice introduces the imitation (repetition) so that the entire tone series is either of the same pitch as that of the first voice, or optionally a second, third, fourth, fifth, or octave above or below the initial appearance, then the canon is accordingly called a canon in the unison, upper or lower second, third, fourth, fifth, octave, etc. For instance: *canon in the lower octave*, in which the second voice presents an exact repetition of the melody one octave below the first.

There are many different kinds of canon, each of which is minutely described in older textbooks on the subject, yet few have achieved a great importance because of outstanding distinctiveness. This is true also of the manifold species of counterpoint of this earlier period.

When a canon is so constructed that its final tones lead back into the beginning (so that it may continue indefinitely) it is called a *circle* or *endless canon* (*ad infinitum*). A *circle canon per tonos* is one in which the ending leads back into the recurrence at a given interval higher or lower, this to be continued indefinitely.

Double Counterpoint.—This species of counterpoint, doubtless the most important of all, makes use of a fixed or principal melody (*cantus firmus*) in opposition to which the second independent melody is so applied that the two melodies may change places (as upper and lower melody respectively) without impairing the euphony of the combined voices or violating the laws of counterpoint.

The Fugue (Lat. *fugare*, "to chase," or *fugere*, "to flee").—In this form the theme or subject is introduced in a given voice, then taken up in turn by the other voices, later being artfully developed. The term fugue was applied, as early as the 16th century, to the strict imitative style of counterpoint, especially the canon, while compositions conceived in a freer contrapuntal manner were designated *ricerce* (Ital. *ricercare*, "to seek again") or even more commonly, *toccata*, *sonata*, or *fantasia*. It was much later (18th century) that the term *ricerce* or *ricercata* was restricted to designate the especially clever fugue.

In classifying fugues the three following styles of workmanship are determining factors: We name them (a) according to the interval upon which the imitating voice occurs, for we speak of *fugues in the unison, second, fourth, fifth*, etc.; (b) according to the species of movement, for we distinguish between *fugues in parallel motion and contrary motion*; (c) lastly, the relative value of the notes of the imitation as compared with the initial announcement is considered. If the note values upon the second entrance of the theme are greater than those of the first (for instance, quarter notes as compared with eighth notes) then we speak of it as a "fugue in augmentation," or *fuga per augmentationem*; under reversed conditions (lesser values upon the second appearance of the theme) it is called a "fugue in diminution," or *fuga per diminutionem*.

Our modern fugue is the so-called *quintfuga* (fugue in the fifth) because the answering theme occurs a fifth above or below (*subquint*,—Ger. *unterquint*). This fugue was developed to its present form in the 17th century, and in its use Johann Sebastian Bach is confessedly the unequaled master for all time. In connection with the vocal fugue the name of Handel should be mentioned.

In every fugue the following general thematic resources and sections may be distinguished:

1. The *Subject*, or *Principal Theme*, *Subjectum* (Lat.), *Führer* (Ger.), *Sujet* (Fr.), *Guida*, *Soggetto*, *Proposta* (Ital.), more commonly called *Dux* (Lat.), is the part with which the fugue begins and upon which it is constructed.

2. The *Response*, *Comes* (Lat.), *Geführten* or *Nachsatz* (Ger.), *Riposta*, *Consequenza* (Ital.), *Réponse* (Fr.), is the answer, in the second voice, to the *subject*, and similar to it.

3. The *Countersubject* or *Principal Counterpoint*, *Gegenharmonie* or *Freie Gegenstimme* (Ger.), *Contrasubjectum* (Lat.), is the melody, often derived from figures of the subject, which acts as continuation of the subject, entering together with the response and forming a two-voiced counterpoint with it. In strictly constructed fugues the countersubject is present at each entrance of the subject or response.

4. *Episodes*, *Zwischenharmonie* or *Zwischensatz* (Ger.), are passages which serve to continue the movement, while the subject or the response rests, and which lead into renewed announcements of the thematic materials. An episode is generally inserted after the response, as a means of modulating back to the original key. Episodes are more freely used in later sections of a fugue to afford some relief from the monotony that would result from the incessant use of subject and countersubject.

5. *Development*, *Widerschlag* (Ger.), *Repercussion* (Lat.), constitutes the order and manner in which the subject and response enter during the fugue.

6. The *Exposition* is the first section of the fugue, during which there are as many entrances of subject and response, respectively, as there are voices in the fugue, each voice enunciating the theme once.

7. *Stretto* (Lat. *stringere*, "to draw close"), *Engführung* (Ger.), is that contrapuntal conditon which arises when one entrance of the subject or response occurs before another is finished, the two thus overlapping.

In the fugue, all the contrapuntal varieties of workmanship—contrary motion, augmentation, diminution—may be applied to the two, three, four, or five voices which are used.

A *double fugue* is one with two subjects, each of which is developed separately, but in which a third development is found, making use of Subject Number One, as countersubject or principal counterpoint for Subject Number Two. There are also *triple fugues*. A *fughetta* is a small fugue. A *fugato* is a contrapuntal section of any composition (for instance, the development part of a cyclical composition, sonata or symphony) in which the imitative fugue style is applied for a certain period, without extending itself into a regular fugue formation.

The subject of a fugue is usually more pretentious than a motive. It gives a decided key impression by having the keynote at or near the beginning.

MUSICAL INSTRUMENTS

It seems probable that music is the oldest of the fine arts. At any rate, we find it among all ancient nations, even those which seem to have been totally ignorant of every other art. A number of instruments are mentioned in Scripture, even before the Deluge, as being inventions of Jubal, a descendant of Cain (Gen. IV:21). Music seems to have been in practical use during biblical times, and is constantly mentioned in connection with the song and the dance (Gen. XXXI:27; Exod. XV:20). Through all periods, music was used in social meetings and in public rejoicings (I Kings I:40; Isa. V:12; XIV:11; XXIV:8; Amos VI:5; V:23; I Macc. IX:39; Judith III:8). Both David and the prophets seem to have considered music as a necessity in their worship, or for the purpose of bringing themselves into a proper frame of mind for prophetic inspirations (I Sam. X:5; II Kings III:15).

INSTRUMENTS OF THE ANCIENT HEBREWS

With respect to the nature of Hebrew music, it is assumed that it was of the same general character as that of other ancient nations, and consisted, not in harmony, as we understand it, but in melody or monody. As to the character of the Hebrew instruments we may infer only that they were not unlike some of the instruments still in use among some of the Oriental nations. The difficulty in endeavoring to identify these, however, as being associated with the Hebrew name, as given in the Bible, is apparent when we realize that the Hebrew nomenclature is now seldom to be recognized in that by which these instruments are now known, and because Scripture affords us little information respecting the form and character of the instruments which it mentions. The ancient instruments, like the modern, may be grouped under the following heads: (1) Stringed Instruments; (2) Wind Instruments; (3) Instruments of Percussion.

Stringed Instruments. The most important of the stringed instruments was undoubtedly the *kinnore*, which is rendered "harp" in the Authorized Version. Its invention is ascribed to Jubal (Gen. IV:21) and in the early ages it was employed in the expression of joy and exultation. Later the sorrowing Jews in captivity hung their *kinnores* upon the willows by the waters of Babylon, refusing to sing the songs of Zion in the strange land (Ps. CXXXVII:2). Similar passages fix the use of the instrument for all such occasions of joy as jubilees and festivals. That this instrument was in reality a sort of lyre, rather than a harp, is now generally accepted.

The *Psaltery* is another instrument of which little is to be determined with certainty. Nothing is known as to when it was invented or when it was adopted by the Jews. It is first mentioned during the reign of Saul (I Sam. X:5), after which time it continues to be mentioned in the Old Testament. The Hebrew name for it was *nay-bel*, and it was performed upon by several persons in the grand procession in celebration of the removal of the ark (I Chron. XV:16; XVI:5). When we seek for some hint as to the probable shape of the *nay-bel* we find only the concurrent testimony of Jerome, Isidorus, and Cassiodorus, that it was like the Greek letter △ (delta) inverted, ▽. The opinion is now widely accepted that one of the different varieties of *nay-bel* was the ancient harp, and that it agreed more or less in form with the harp represented in the Egyptian monuments.

The *Sackbut* (*sab-bek-aw*), mention of which occurs only in Dan. III:5, 7, 10, 15, seems to have been a species of harp or lyre. It is assumed by some that it was only a kind of *nay-bel*, distinguished by the number of strings.

The *Greek Psaltery* (*pes-an-tay-reen*) is also supposed to represent the Hebrew *nay-bel*, when mentioned in Dan. III:7, 10, 15.

The *Lute* (*makh-al-ath*) occurs in the titles of Ps. LIII and LXXXVIII and is supposed to refer to a lute or guitar-like instrument.

Wind Instruments. Happily there exists less difficulty regarding this class of instrument than in respect to stringed instruments. We may divide the wind instruments into pipes and trumpets. The Hebrews had various kinds of both.

The *Pipe* (*khaw-leel*, "bored through") denotes a pipe perforated. It is referred to in five different places in the Old Testament (I Sam. X:5; I Kings I:40; Isa. V:12; XXX:29; Jer. XLVIII:36), and it would seem to have come into use rather late among the Hebrews. It probably was of foreign origin. The single pipe of the Greeks is understood to have been brought from Egypt, whence the Hebrews probably had theirs. It was a straight tube about 18 inches in length, though sometimes longer, which, when played, was held with both hands. The double pipe consisted of two such

tubes, having a common mouthpiece, and each was played with the corresponding hand. The left pipe served as a bass, the right had more holes and emitted a sharp sound. This pipe is still in use in Palestine. The biblical references indicate that, among the Jews, the pipe was used for the expression of joy and pleasure.

The *Flute* (Chaldee, *mash-ro-kee*, "a musical pipe"). We find mention of this instrument in Dan. III: 5, 7, 10, 15, where it appears four times. The word is found nowhere else, and it seems to be the Chaldean name for the flute with two reeds.

The *Organ* (Hebrew, *oo-gawb*) is mentioned together with the *kinnore* in Gen. IV: 21, where its invention is ascribed to Jubal. It refers to the double and manifold pipe, best understood by us as the Pandean or shepherd's pipe. Our mouth organ is a modern species of this instrument. Variously called "ugab" and "syrinx," this Pan's pipe is still the festival instrument in Syria. The number of reeds varies in different instruments, from five to twenty or more.

The *Horn* (*keh-ren*) appears but seldom as the name of a musical instrument (Josh. VI: 5; I Chron. XXV: 5; Dan. III: 5, 7, 10, 15). The natural horns of animals and instruments in the shape of horns are found in every extensive collection of antiquities. At the noted siege of Jericho (Josh. VI: 5) the rams' horns are assigned to the soldiers of Gideon by Josephus.

The *Trumpet* (*sho-fawr*) is found much oftener than the word *kehren*; it refers to horns of a straighter sort and to all instruments which were later made in imitation of such horns. It seems to have been the kind of horn which was best known to the Hebrews, and was employed only in calling the populace together in times of war or upon other great occasions, or in making announcements. (Exod. XIX: 13; Judg. III: 27; I Sam. XIII: 3; II Sam. XV: 10; Isa. XVIII: 3).

The *Jubilee Trumpet* (*yo-bal*) has caused much speculation as to whether the term denoted a separate instrument, or merely indicated the particular trumpets with which jubilees were proclaimed.

Instruments of Percussion. These are such as give forth their sounds upon being struck or shaken.

The *Timbrel* (*tofe* or *toph*) was primarily a tambourine, although the word also denoted, generally, all drumlike instruments used by the Israelites. The *toph* was known to the Hebrews before they left Syria (Gen. XXXI: 27). It was played upon mostly by females, and for joyful occasions, though employed by David in all the religious festivities (II Sam. VI: 5). It receives no mention in connection with warlike preparations or battles. If the Israelites had drums as we understand them, they must have included them under the general name *toph*. Actual evidence is not forthcoming, and it is futile to speculate upon this point. The long or cylindrical drum of the ancient Egyptians was about two feet in length, made of wood or metal, the ends covered with tightly drawn parchment or leather. It was struck by hand, and was used chiefly in war. A larger drum, about two and a half feet long, made of copper, was beaten with sticks. No reproductions of it appear on the monuments, but actual specimens unearthed by D'Athanesi in 1823, are now on view in the museum at Paris. Egyptian paintings depict another kind of drum, which is funnel-shaped, made of wood or pottery, and corresponds to the *darabooka* drum still in use in Egypt and Arabia. It is supposed to be represented on one of the coins of Simon Maccabeus.

Cymbals is the word used to translate three Hebrew words which denote either the "clear cymbal" or the "resounding cymbal" (Ps. CL: 5), pointing to the fact that the Hebrews had both hand cymbals and finger cymbals (like our castanets).

Triangles (*shawl-ish-im*) is a word found only in I Sam. XVIII: 6, and is there used in the uncertain sense of "three-stringed instruments."

Sistrum (*men-ah-an-eem*) also occurs but once in the Bible (II Sam. VI: 5), where it evidently denotes a loop of iron upon which were threaded a number of metal rings. It was held upright and shaken, the rings moving with a tinkle to and fro upon the bars. Several actual specimens of these instruments have been found and are deposited in the museums of Berlin, in the British museum, and elsewhere. They were used chiefly by priests and priestesses in religious ceremonies, especially those connected with the worship of Isis.

INSTRUMENTS OF OTHER NATIONS OF ANTIQUITY

The Chinese. Tradition credits the emperor Kai-tien-chai (about 2500 B. C.) with the invention of a system of music and seven musical instruments. These were: the drum; musical stones; bells; clay whistles, or flutes, called *hiuen*; the *kin*, a lyre with seven strings; the *che*, a lyre with 25 strings; and the *siao*, made of 16 bamboo pipes bound together.

The Egyptians. Besides the drums described in *Instruments of the Ancient Hebrews* (See *Timbrel.*), the Egyptians used many harps and flutes, also lyres, mandolins, guitars, lutes, and cymbals.

The Assyrians. Our knowledge of Assyrian instruments has been gained largely from famous bas-reliefs, excavated from the mounds of Nimrud, Khorsabad, and Koyunjik, near the Tigris river, in the vicinity of the town of Mosul in Asiatic Turkey. From these bas-reliefs we learn that the Assyrians had harps, single and double pipes, dulcimers, drums, trumpets, flutes, lyres, and psalteries.

The Greeks. The lyre was the most popular and perhaps the most ancient stringed instrument used by the Greeks. There is reason to believe that the earliest lyres consisted of a tortoise shell, two horns of some animal, and a crossbar, bound together into a frame, upon which were strung three strings made from the twisted sinews of an animal. The shell served as a rude form of resonance chamber. The horns, slightly curved, no doubt determined the graceful lines the lyre assumed when, later, it was made of other materials.

The Greeks had lyres of various kinds. The *lyra*, with an oval base, was of convenient size to be held in the arms or lap. The *kithara* had a square base and was held in the arms. The *chelys* was a small lyre, the body of which was made of the shell of a tortoise, or in imitation thereof. The *phorminx* was a large lyre, used at an early period for accompanying recitations. The strings of these lyres were made of catgut or sinew, and were usually plucked with a *plectron*, a short stem of ivory or metal pointed at both ends. The *trigonon* had a triangular frame resembling the shape of the Greek △ (delta). It was a crude form of harp, without the front pillar. The *magadis* or *pektis*, probably a sort of dulcimer, had twenty strings tuned in octaves. Information as to its construction is wanting. The *barbiton* was also a stringed instrument of this kind. The *sambyke* and *simmikon*, the invention of which tradition assigns respectively to Ibykos (540 B. C.) and Simos (about 600 B. C.), were each perhaps a kind of dulcimer. The latter had 35 strings. The *nabla* had only two strings, and probably resembled the *nay-bel* of the Hebrews. The *pandoura* was a lute of three strings. The *monochord*, as its name implies, had but one string and was used in teaching singing and the laws of acoustics.

The flute, or *aulos*, was a very popular instrument. The number of finger holes varied from two to five. The *syrinx*, or Pandean pipe, had from three to nine reeds, or tubes, but seven was the usual number.

The *salpinx*, the straight trumpet, and the *keras*, a curved horn made of brass, were used only in war. In addition to these instruments the Greeks also had many kinds of drums, cymbals, bells, and rattles.

The Romans and Etruscans. The records show that the Romans derived some of their popular instruments from the Etruscans, who early excelled all other Italian nations in the cultivation of the arts, and who possessed musical instruments resembling those of the Greeks. The Romans, because of their military exploits, became acquainted with the musical instruments of many other nations, and modified them somewhat, but are credited with no original contributions. The *tibia*, or flute, early found favor with them. Stringed instruments were used especially in the Greek colonies of southern Italy. As might be expected, the Romans gave especial attention to military wind instruments and developed the *tuba*, or deep-toned straight trumpet for use in the infantry; the *lituus*, or bent, high-toned trumpet for the cavalry; and the *buccina*, probably similar to our trombone, having even a deeper tone than the tuba.

The Hindus. Almost all of the earliest instruments recorded by the Hindus have remained in popular use until the present day. The Sanskrit treatise on music, *Sangita Rathnakara*, contains a description of the ancient instruments. The *vina* is undoubtedly of great antiquity. A description of this instrument will be found in *The Primitive Music of Antiquity*. The Hindus claim to have invented the violin bow. They maintain that Ravanon, mighty king of Ceylon, who lived about 5000 years ago, invented the *ravanastron*, one of their old instruments, which was played with a bow. Indeed, Sanskrit scholars inform us that names for the fiddle bow occur in works which are not less than 1500 to 2000 years old.

The Arabs. See *The Primitive Music of Antiquity*.

MODERN MUSICAL INSTRUMENTS

Every resonant body employed by a composer is a musical instrument. The following groups may be noted:

- **Stringed Instruments**
  - Tones produced by use of a bow . . : Violin, Viola, Violoncello, Double Bass
  - Played by hand . : Harp, Guitar, Mandolin
  - Played with keys . : Pianoforte
- **Wind Instruments . . .**
  - Played with reeds . : Oboe, English Horn, Bassoon, Double Bassoon, Clarinet, Basset Horn, Bass Clarinet, Saxophone
  - Played without reeds . . . . : Piccolo Flute, Flute
  - Played with keys . : Pipe Organ, Melodian, Concertina
  - Brass instruments played with a mouthpiece . . : Horn, Trumpet, Cornet, Bugle, Trombone, Ophicleide, Bass Tuba
  - Voices of men, women, and children.
- **Percussion Instruments**
  - Of definite sonorousness (pitch). : Kettledrum, Sets of Bells, Glockenspiel, Keyed Harmonica, Bells
  - Of indefinite sonorousness and producing various characteristic noises . . . . . : Drum, Tambourine, Cymbal, Castanet, Triangle, Gong, Tam-Tam

The employment of these various sonorous elements—either for coloring the melody, harmony, and rhythm, or for producing peculiar impressions—constitutes the art of instrumentation. A brief indication of some of the effects and suggestions embodied in the tone color (timbre) of the more important of these instruments is of interest. Any attempt to proceed beyond this point would be to set foot on the domain of poetic inspiration, where genius alone may traverse. "As for combining them in groups, in small or large orchestras,—the art of uniting them, mixing them in such a manner as to modify the color of one by that of others, giving to the *ensemble* a particular composite color,—this is the endless study of orchestration. It is as little to be taught as the invention of a beautiful melody, a succession of colorful harmonies, or any other form of poetic inspiration."—Berlioz, *Treatise on Instrumentation and Orchestration*.

Instruments often reflect emotional shadings in a very definite manner. A sustained violin tone is much like a major chord in suggesting or reflecting contentment or equanimity. A tone on the English horn approaches the melancholy effect of a minor triad. On the other hand, the general serenity of a major triad may be tinged with the contradictory doubt of sadness reflected by the producing instruments. Thus it is that instruments give color lines against a background of harmonic shading, color within color, as it were, giving music its miniature tints. These few simple illustrations of the elementary musical effects and the conditions they reflect will serve to point the way to the more complex combinations of harmony, rhythm, and instrumental color which faithfully portray the details of a more involved and complicated experience or condition.

INSTRUMENTS OF THE ORCHESTRA

The Wood-Wind Instruments. The *piccolo flute* has all the shrill brilliancy associated with the highest pitch levels, and may depict great mobility, light intensity, the whistle of the wind, flash of lightning (objectively), or piercing pain, agony, shrill demonic joy, etc. (subjectively).

The Flute.—Its lower range has a color characteristic of lonesome sadness, weakness, humility, resignation, soft lament, etc. In its higher range, it is bright, sharp, incisive; good for simplicity, innocence, joy, etc.

The Oboe.—The color of the oboe tones is suitable for all wailing effects or in depicting pastoral scenes. In minor passages, it voices tediousness, pain, sadness, suffering, etc.

The English Horn.—The alto oboe is splendid for expressing pain, moral suffering, tragic thoughts. It is especially good in minor for a soft emotional wailing or deep religious feeling. It has a melancholy, dreamy, and rather noble timbre, the tone of which possesses a vague, "remote" quality that renders it superior to all others in exciting regret and in reviving images and sentiments of the past. The lowest register is well suited to color, with its menacing impression, ideas in which fear and anxiety predominate.

Clarinets.—Instruments of sympathetic, stately colors suited for pastoral or religious effects. It has been said that the clarinets have four registers, each of a distinct tone quality. The high register is

somewhat tearing, and should be used only in fortissimo for rough joy, boisterousness, gayety, lightning flashes, etc. The medium registers are suited to melodies and *arpeggios*, or to melodies expressing *naïveté*, simplicity, innocence, purity, pastoral effects, etc. The lower register is earnest and sad and may be used for religious, melancholic, dramatic, or threatening, terrorizing moments. The "A" clarinet has a soft, melancholy coloring, better for pathetic, earnest religious effects than the "B flat" clarinet, which is of a more brilliant tinge, and is suitable for passionate longing, etc.

The Bass Clarinet.—A glorious instrument, round, full, majestic in tone quality, which may borrow the wild effects that distinguish the lower notes of the clarinet, or the calm, solemn, sacerdotal accent belonging to certain registers of the organ. It is well adapted for elegiac expression, or to depict religious feelings or those of sadness, and is especially suited for dramatic moments, horror, scenes of dread, pain, sinister prophecies, etc. The character of the instrument demands the song style.

The Bassoon (Fagott).—This instrument represents the bass of the oboe, even as the English horn represents the alto. Its low notes form excellent basses to the whole group of wood-wind instruments. When playing *legato arpeggios* it may depict waves of emotion or of the sea. The low tones are splendid for expressing humor, and are very comical in effect, especially staccato. The middle-upper register has a color similar to the human voice. In minor it portrays pain, complaint, depression, fear, etc.

The Pipe Organ. An instrument with a keyboard and pipes of wood or metal, made to vibrate by means of wind forced through them from bellows. The number of series or groups of pipes of different kinds and dimensions give an organ a proportional number and variety of *stops*, by means of which the organist can change the tone quality, the power of sound, and the compass of the instrument. The mechanism by means of which the organist makes any given stop speak is called a *register*. A large modern organ will have three or possibly four manuals (keyboards for the hands) and one keyboard for the pedals, played by the feet. The first manual, nearest the performer, is the *choir organ*; the second, that of the *great organ*; the third, that of the *swell organ*. Some specially built organs have as many as six manuals, in which case the other keyboards are for the *solo organ*, the *echo organ*, and the *ethereal organ*. A complete modern organ contains, besides the many speaking stops, a piano, chimes, gongs, and a harp—all played from the grouped keyboards, called the *console*.

The art of registration on an organ depends upon the choice of stops included, and it requires taste and natural instinct on the part of the performer to find and combine the appropriate tone colors. While no two organs may present the same selection of stops, a general classification of the characteristic qualities of the various registers may be indicated briefly as follows:

Fullness of Tone. Brilliancy

All Flutes; Bourdon; Quint; Spitzflöte; Cymbal; with pedal sub-basses, 16 ft., Principal, 8 ft.

Strength of Tone. Brilliancy

Principal, Prestant with pedal Principal, 16 ft., 8 ft.

Tone Color. Solo Performance

Each 8 ft. register may be employed alone; some of those best adapted for use as solo voices are: Viol di Gamba; Salicional; Klarinet; Dulciana; Cromhorn; Violoncello; Vox Humana; Oboe; Gedackt; Geigen Principal; with pedal Violoncello 8 ft; Flöte, 8 ft.

Color and Volume

Oboe; Trumpet; Scharf; Cornet; Fagot; Doublette; with pedal trombone 8 ft., 16 ft., 32 ft; Bombard 16 ft. The registers here mentioned or their approximates are of greatest effect and power from 8 ft. to 4 ft. ranges; the most beautiful, varied, and colorful tone effects are achieved therein. The larger and smaller organ voices have no such well defined tone character.

The organ possesses effects of sonority, soft, loud, and awe-inspiring; but it is not in its nature to deliver them in rapid succession. The knowledge of the organ, the art of choosing its different stops, and of contrasting or combining them, constitutes the talent of the organist. It is doubtless possible to blend the organ with the divers constituent elements of the orchestra, and this has sometimes been done; but it seems strangely derogatory to the majestic instrument to reduce it to a secondary place. As Berlioz so aptly says: "The organ and the orchestra are both kings; or rather, one is emperor, the other pope; their mission is not the same; their interests are too vast and too diverse, to be confounded together."

Brass Instruments with Mouthpieces. *The French Horn (corno).*—This beautiful instrument has a color peculiar to itself, noble, pure, and poetic, suggesting the fragrant hills, meadows, forest (objectively); or nobility, self-reliance, trust, generosity, simplicity, purity, etc. (subjectively). The middle register, in broad tones, reflects the unknown, suspense; in short, detached tones, mystery. The "stopped" tones, forte, have a color suggestive of awakening fear, and are effective for arousing horror, revenge, fright, distress, danger, terror, demonic rage, passion, etc. In pianissimo the stopped tones reflect pain, discomfort, depression, and the like. The horns, usually four in number, in the symphony or opera orchestra, are splendidly adapted for hunting fanfares or forest scenes. Some tones are quite similar to the human voice.

The Trumpet.—An instrument which adapts itself for march effects, defiance, battle, attack, challenge. In objective music, rhythmically detached passages in punctuated notes, forte, depict scenes or conditions of confusion, turmoil, struggle. Subjectively, the trumpet reflects expressions of joy, trust, generosity, victory, boldness, ambition, courage, masterfulness. In pianissimo its effect is beautiful, and of soft melting quality. The muted tones are sad.

The Trombone.—This instrument possesses a noble, heroic quality or, if desired, a tremendous tone of majestic proportions. Formerly there were four kinds of trombones, each of which bore the name of the human voice to which it had the nearest resemblance,—soprano, alto, tenor, and bass. Of these, the tenor and bass are now most commonly used in orchestras. The tenor trombone has a tone of powerful sonority, which, in the middle and lower registers, can express energy, power, grandeur, brutality; in broad lyric passages, piano, it reflects earnestness or religious feeling. In fortissimo it is very effective for horror, terror, or for demonic, dramatic conditions. It is common to use three tenor trombones. In broad chords they have an effect of power, majesty, sublimity, grandeur, and are splendid for religious moments. The pianissimo is full of deep feeling. In fortissimo, three trombones can produce terrifying, overpowering effects. The greatest expressive power of the trombone lies in the effectiveness of the simplest triad passages.

The Bass Tuba.—This colossal instrument possesses an earnest, penetrating tone of rough quality, which is well adapted to furnish the necessary bass for the trombones and trumpets. Combined with the trombones, it is capable of expressing the most overpowering effects,—heavy, gruff, and forceful. The brass instruments combined are used in driving toward a great climax or in producing great volume.

Brass Instruments Played with Reeds. The *Saxophones* are a family of brass instruments created by Adolphe Sax, which have a single reed, with a clarinet mouthpiece, and which give new voices to the orchestra or the band. The quality of tone of the high notes of low saxophones is somewhat plaintive and sorrowful, while that of their bass notes is, on the contrary, of a calm, earnest dignity. Saxophones are seven in number; the high, the

soprano, the alto, the tenor, the baritone, the bass, and the double bass.

Stringed Instruments. *The Violin.*—The effects which may be produced on this most marvelous instrument are practically inexhaustible; they meet every subtle shade of expression. The use of the bow is a great factor in the production of the manifold effects. The manner in which the bow stroke is made and the distance from the "bridge" at which the bow touches the strings serve to influence the tone quality and the mode of expression. It may be of interest to note that of the four strings on the violin, each possesses its own peculiar color, similar to the timbre of certain wind instruments. Thus, the first, or E, string approximates the color of the flute, in part also that of the piccolo flute. The second, or A, string has a timbre like that of the oboe; the third, or D, string, like that of the bassoon; while the fourth, or G, string is similar to the horn. The *sordino* or mute, produces a tone color of veiled, suppressed, beclouded, mysterious quality. The *pizzicato* is produced by plucking the string with the finger.

When used in the modern orchestra, the violin adapts itself especially to the lyric song passage, figuration, ornamental melodies, filling and coloring. The *tremolo*, by many violins, produces some excellent effects; it expresses trouble, agitation, terror, in the respective shades of piano, mezzoforte, and fortissimo, when placed on the G, D, or A string. It has a somewhat stormy, violent character in fortissimo on the middle of the first or second string. It becomes, on the contrary, ethereal or angelic, when employed in several parts and pianissimo on the high notes of the first string. *Harmonics* are those sounds which are generated by touching the strings with fingers of the left hand so as to divide them in their length, yet not with sufficient pressure to place them in contact with the finger board, as is the case for ordinary tones. These harmonics possess a singular character of mysterious softness and delicacy, and their crystalline quality renders them appropriate to chords that may be called fairylike, evanescent.

The Viola.—As a solo instrument, in or out of the orchestra, the viola offers wonderful coloring material; its soft, noble, rich, "affectionate" quality is of dreamy magic. The song of the viola on its higher strings is strongly religious in effect. The timbre of the strings is as follows: the first, or A, string resembles the oboe; the second, or D, string has a bassoon-like quality. The third, or G, string and the fourth, or C, string have a soft, tender, earnest, and agreeable quality, which, in the middle registers, suggests the horn tones. What has been said about *pizzicato*, *sordino*, bowing, tremolo, harmonics, etc., in respect to the violin is throughout applicable to the viola—considered as a violin a fifth lower. The viola is no less agile than the violin, the sound of its low strings is peculiarly telling, its upper notes are distinguished by their mournfully passionate accent, and its quality of tone, profoundly melancholy, differs altogether from that of the other instruments played with the bow.

The Violoncello.—An instrument particularly well adapted to express pathetic scenes and conditions, broad melodies being better than superficial. However, it possesses such versatility of expression that it can reflect almost any sort of condition. In general, the color of its tones is serious, the middle range full and sonorous, the depths very agreeable, while the higher registers are of a virility and tense quality which, in song passages, is of tremendous effectiveness. The four strings of the violoncello are tuned an octave lower than the four strings of the viola. That which has been said of the violin and viola, in regard to arpeggios, bowing, etc., applies equally to the violoncello. Nothing is more voluptuously melancholy, or more suited to the utterance of tender, languishing themes, than a mass of violoncellos playing in unison upon the first string. They are also excellent for airs of a religious character.

The Contrabass.—This instrument forms the bass of the string group in the orchestra. There are two kinds,—those with three and those with four strings. Those with three strings are tuned in fifths—G D A—and those with four are tuned in fourths—E A D G. The tremolo is of good effect, also the sordino. The *pizzicato* is intensely dramatic in tense moments, picking its way, like an anxious heartbeat, under a pathetic melody of the cellos, the deep, sustained tones of the clarinets, and the convulsive shuddering of the violins. In a dark, threatening tone color, the *pizzicato* of the basses is of fear creating effect.

The Harp.—This poetic instrument is found in very many modern orchestral scores. The effect of several harps in unison is imposing. The harp tone blends very well with the various color registers of the orchestra, especially with the horns, and also with the human voice. It is suitable for march scenes, for prayer, and for idealistic, elegiac, or religious moments. Its deep tones are rich and full of unction and pathos; its higher tones, fine, clear, and bell-like. Nothing can be more in keeping with the ideas of poetic festivities or religious rites than the sounds of a large body of harps ingeniously introduced. The crystalline sound of the strings of the last upper octave, of voluptuous freshness, renders the harp fit for the expression of graceful, fairylike ideas, and for giving utterance to the tender secrets of exquisite melodies.

The Stringed Instruments Combined.—A few effects of the combined stringed instruments are here cited to indicate briefly the emotional and objective conditions suggested. (a) With the use of *sordini* (mutes), a splendid effect of secrecy is suggested or the veiled light of the moon is depicted. (b) For reverie-like conditions there is nothing more beautiful than a lovely adagio passage played by all the strings muted. (c) Deep, strong tones of the basses and cellos may portray the heavy, coarse, powerful, insolent, clownish tendencies in life, while the higher, lighter tones of the combined basses, pianissimo and staccato, fairly rival the high tones of the flute or violin in shadow-like mobility or ghostly evanescence. (d) Also of beautiful effect but a trifle more virile than (b) is a broad, songlike melody in the first violins, accompanied by the second violins, violas, and cellos muted. (e) The strings muted and combined with some of the softer wind instruments, like the flute, clarinet, horn, and bassoon, blend in rich colors for corresponding modes of expression. (f) *Pizzicato* by certain stringed instruments may be used to imitate the harp effects, as in serenades, prayers, etc.

(g) In dramatic or mysterious moments, the basses and cellos may play songlike passages *pizzicato*, an effect which is highly characteristic, especially in minor. (h) Contrasts of a tense character may be produced, and the color effects of the instrumentation greatly heightened, if *pizzicato* tones are more or less alternated with tones produced by the bow (*arco*). (i) A beautiful lyric effect is produced by a slow melody in the first violins, accompanied by arpeggiating seconds, with sustained tones in the violas, and *pizzicato* in the cellos and basses. (j) *Pizzicato* by the entire string orchestra produces an effect like a huge guitar; especially in pianissimo it is full of grace and charm. (k) If the strings are played upon very near the bridge (*sul ponticello*), a rough, somewhat disagreeable tone quality results, which, however, is often the very effect desired for dramatic moments, fear, horror, etc. (l) With strong, sustained tones for all the strings the effect of an organ may be approximated. (m) Of tremendous effect is the unison passage played by all strings in powerful strokes. (n) The *arpeggio* for all the strings would doubtless produce some splendid effects at the proper time. This effect, to the knowledge of the writer has not as yet been used by any composer.

Some Combined Colors.—(a) The combination of the clarinets and bassoons in middle registers, piano, produces a fine color which approaches that of the organ tone, and it is therefore appropriate for religious moments, festivity, pomp, etc. (b) The wood-wind instruments combine readily with the horns, resulting in very beautiful colors. (c) The wood-wind section combined with the strings produces a soft, luxurious color appropriate for devotion, suppressed passion, longing, etc. (d) The flute or oboe colors blend well with violin and cello; the clarinet and bassoon, with the viola and cello. For the clever composer the manifold mixtures of wood-wind instruments with the strings offer inexhaustible color materials. (e) The deep clarinet and bassoon tones, forte, have a menacing, demonic quality, appropriate for wild, rough scenes or conditions. (f) Many wonderful contrasts are possible in the orchestra, by having certain single instruments or groups play forte, alternating with others playing piano, or by having certain groups play forte while others flow along softly. The wood-wind and the brass instruments may alternate with the strings or with each other.

The Pianoforte. Although this instrument is familiar to most music lovers throughout the world, its importance is such, both as a solo instrument and in *ensemble* work, that a brief review of its effects is justified. It adapts itself to all styles of music and, viewed by itself, is practically an orchestra in miniature. For this reason, we find all kinds of vocal and instrumental compositions arranged for the pianoforte. As solo instrument it stands in a class by itself, and the great tone-heroes,—Mozart, Beethoven, Weber, Mendelssohn, Schumann, Liszt, and Tchaikovsky,—have shown in their works for this universal instrument the manifold effects of which it is capable.

Aside from its use as a solo instrument, the pianoforte finds its greatest usefulness in association with other instruments—either in *ensemble* works or merely in accompaniments of vocal or instrumental solos. It has found a place in the orchestra as an instrument on equal terms with other instruments in the third symphony in C minor of Saint-Saëns, where, in association with the organ and the strings, it has produced a charming and characteristic effect. Berlioz, in a chorus of airy sprites, has used the instrument for four hands, in accompanying the voices. No other instrument could produce the sort of harmonious quivering required by the composer to express the sylphlike movements of the characters.

Instruments of Percussion. *The Kettledrums* or *Timpani.*—These are the most valuable of all the percussion instruments. In most modern orchestras there are but two timpani, the larger one of which is used for the lowest sounds. There are three kinds of drumsticks, the use of which so changes the nature of the drums' sound that the composer often indicates which one he wishes the performer to use. Drumsticks with wooden ends produce a harsh, dry, hard sound. Drumsticks with wooden ends covered with leather are less hard, but still very noisy. Drumsticks with ends made of sponge or felt are the best, and give to the kettledrum a grave, velvety quality of tone, which suits a large number of gradations, soft or loud in execution. The general character of the kettledrums is nerve-racking, from its dimly menacing piano throughout the entire dynamic range up to the most terrific crescendo and fortissimo. They adapt themselves to all conditions, but are especially appropriate for stormy scenes, dirges, and dramatic moments. They splendidly exemplify the heartbeat in anxiety, or add much to the characterization of terrifying scenes. The muted timpani have a color very appropriate for requiems or similar sad occasions.

The Drum.—The so-called "bass drum" (*gran cassa*) is used in descriptive and symphonic music, forte, to aid in characterizing the approach of a climax of volume, also to imitate thunder or cannon. When used softly it is of fine effect.

The Small Drum (*tambura*).—Mostly used in music of a military or warlike character, although Halévy, Donizetti, Meyerbeer, and Rossini have incorporated it in their opera scores.

The Cymbals.—Employed usually for fantastic or characteristic effects. They have a sharp, penetrating, almost shrieking tone if struck with a wooden hammer, of good effect for dramatic climaxes.

The Tam-Tam.—Used forte, this has a terrifying tone, useful in characterizing scenes or conditions of horror, terror, or wildness. In piano it suggests dire prophecy or mystery.

INSTRUMENTS OF THE MILITARY BAND

Although most of the instruments used in a military band are found also in the orchestra, and so have already been discussed, yet it should be borne in mind that some groups are treated in a radically different manner in the band than in the orchestra. Very proficient artists are required for the wood-wind and the brass instruments in the concert orchestra, where tone quality and careful execution are highly essential. In the military band this is not so great a requisite. Inasmuch as the band usually plays in the open air, the effects to be attained are more in the nature of a bright, sonorous, and purely sensual musical beauty than fine *nuances*, tone quality, exquisite phrasing, carefully weighed contrasts, and dynamic balance.

The Piccolo Flute. This instrument has a wider application than in the orchestra. In march music it is common practice to employ the shrill little instrument in unison with or an octave above the E flat clarinet. If two are used, they are apt to play in thirds or sixths, or possibly in unison.

The Flute. In compositions written for concert purposes the flute is more apt to appear than in works of a military character. There are usually two parts for flutes in such compositions,—the first for the large flute, the second for the piccolo. In works of a more gentle character, the large second flute may be found. They are employed as in the orchestra.

The Clarinets. These instruments constitute the most important group used in military music. In the military band they occupy the same position as the violins in the orchestra. They are responsible for the peculiarly soft and sympathetic tone effects which distinguish military music and serve to mellow the vibrant, incisive tone quality produced by the brass instruments alone. The following kinds of clarinets are used:

The E Flat Clarinet.—It is customary to assign the melody to the E flat clarinets, either in unison with, or an octave above, the B flat clarinet. The melody thus gains materially in brilliancy. This instrument is excellent for solo passages. If two are used, the second usually plays in thirds or sixths with the first.

The B Flat Clarinet.—This most important band instrument is usually divided into several parts, 1, 2, 3, or even 4. Each of such parts has its own special function in representing parts analogous to the violins, violas, and violoncellos in the orchestra. The first part doubles the melody in unison or in the octave with the cornets, with the flutes, or with the E flat clarinets. Most of the better military bands have solo clarinetists, to whom are assigned important solo parts, counter melodies, lightly flowing runs—in short, anything requiring the services of a proficient artist.

The Alto Clarinets in F and in E flat, respectively sounding a fourth and a fifth lower than the B flat clarinet, also the *Bass Clarinet,* sounding an octave below the B flat clarinet, are capable of

a rich, sympathetic, even tone color which greatly softens the shriller effects of the higher wood and brass instruments. They therefore serve to give the military music a more even, balanced tone character. It is to be deplored that so many bands ignore these last named instruments, because thereby they lose some most interesting timbre shades.

The Oboe. This instrument is employed precisely as in the orchestra.

The Bassoon. It is customary to write for two bassoons, although more may be used if it is the desire of the composer to strengthen the basses or to take over parts similar to those of the viola or cello. The treatment of the bassoon in the band is much the same as in the orchestra. It is a mistake to think, because the bassoon has not a powerful tone quality, that therefore it is but of slight value in military music. It should not be overlooked that, the more varied the timbre tints are, the richer and more beautiful will be the shadings.

The Contrabassoon. The instrument is almost obsolete in the orchestra, and is but seldom found in the military band. It greatly fatigues the player, but its absence is a distinct loss to both the orchestra and the band. It sounds an octave lower than the bassoon, and it is often replaced by the contrabass (string) whereby the effect desired is totally lost. The *Tritonicon*, or metal contrabassoon in E flat, is often found in the military music of Austria, Russia, Holland, etc.

The Horn. A very important factor in good military music, and the tendency to ignore or actually crowd out this glow instrument is against the dictates of musical logic and good taste, for there is nothing which can replace the peculiar charm and noble richness of the horn tone. From two to four horns are used, commonly in rhythmical accompaniments, or for sustained chord tones.

The Trumpet. Only the chromatic trumpet is used in military music. There are generally several parts written for the trumpet, the first of which takes the solo passages of this group, also counter melodies or fanfares. It may serve also to strengthen the melody or the accompaniment. The second trumpet takes counter melodies or takes part in the accompaniment. Parts 3 and 4 complete the harmonic accompaniment, together with the alto horns and horns. Trumpets 3 and 4 are often E flat trumpets, whereas 1 and 2 are B flat trumpets. *The Bass Trumpet*, which is used in certain countries (Bavaria, Austria, Spain, etc.), takes the place of the tenor horns, and is usually in B flat.

The Piccolo Cornet in E Flat. This instrument takes in the brasses a position analogous to that occupied by the piccolo flute in the wood section of the military band. It possesses a bright, penetrating tone, and sounds a fourth higher than the B flat cornet, and the flügelhorn in B flat. It therefore serves to complete the highest tone registers of the cornet and flügelhorn timbre. The piccolo cornet can be used for the execution of the melody or the counter melody, or for lightly flowing passages.

The Cornet (à Pistons). The cornet plays a most important part in most military music, and is often assigned the most beautiful solo melodies, cavatinas, variations with double and triple tonguing, etc. In the brass band, together with the flügelhorn, it is the chief melody carrier. There are generally two parts written for the cornet, both in B flat.

The Flügelhorn.—An instrument of a trifle larger construction than the cornet, its tone, therefore, fuller and more sonorous. Its tone quality is sympathetic, soft, and rich, and adapts itself splendidly to the execution of broad, earnest, religious melodies. The tonal attack is more difficult than upon the cornet, therefore it should not be given passages requiring lip execution. Like the cornet, it is generally in B flat, and has two, sometimes three, parts written for it. The first part takes the melody in conjunction or alternating with the solo trumpet, or with the cornet. Parts 2 and 3 take the accompaniment or passages moving in thirds, sixths, or octaves, with the melody. In some rapid and difficult passages it is customary to let the instruments alternate in taking the short groups or motives comprising the passage.

The Alto Cornet or **Alto Horn.** Used in cavalry bands in place of the horns, often also in other band organizations. Its parts are written in the treble clef, and cover a range intermediate between the flügelhorns and the tenor horns. There are generally two parts, the principal function of which is to produce the accompanying harmonies, together with the second tenor horn and possibly the E flat trumpets 3 and 4. It is, however, capable of a fine, rich, penetrating tone for melodies in the lower registers, or for the support of the same. The alto horn is an E flat instrument.

The Tenor Horn in B Flat. This is a most important instrument for both brass and military bands, and sounds one octave lower than the flügelhorn or cornet. Two parts are usual: the first serves for strengthening the melody of the cornets or the basses, or for counter melodies; the second takes the accompaniment. In bass melodies, or in the upward continuation of passages which are too high for the basses, the tenor horn may play in unison with the first part.

The Baritone (Euphonium or Euphonion). This instrument is a sort of tenor horn of larger structure, has the same register as the latter, but possesses a fuller, more sonorous, and more powerful tone, especially in the depths. It is notated in the bass clef, and has a function analogous to the cello of the orchestra. Its tone is always to be heard clearly above a mass of instruments; therefore it is essential that only independent parts and passages be assigned to it.

The Trombone. Used almost as in the orchestra. There are generally three trombone parts, which take sustained tones, or expressive, majestic, or religious song passages, etc. The first trombone is used as a solo instrument. For triumphal marches, or any music of a warlike character, the trombones are of powerful effect. However, the piano tones of the trombones are also very beautiful.

The Saxophone. There is a choice among six of these instruments, differing in size and register, but quite alike in tone quality: (1) high soprano, in E flat; (2) soprano, in B flat; (3) alto, F or E flat; (4) tenor, C or B flat; (5) baritone, E flat; (6) bass, B flat. These are all alike available for military music, although composers generally use only the soprano B flat, alto E flat, tenor B flat, and baritone E flat.

The Bass Tuba. There are several bass tubas in use,—in F, E flat, C, and B flat. Passages of any degree of rapidity should not be assigned to this powerful instrument, for a clear execution of such passages would require an artist.

The *Helikon* or *Contrabass Tuba* is a bass instrument like the bass tuba, but it has a full, soft, agreeable, although powerful tone, for which reason it is often given the preference over the former. There are helikons in F, E flat, C, and B flat.

The Percussion Instruments. All the instruments of this group already mentioned in the orchestra may be used with similar results in military music. They form a characteristic and indispensable expressional factor in martial music, and are therefore more likely to be found in military music than in symphonic.

The Instrumental Groups in Military Music

Instruments of a soft, gentle, sympathetic yet sonorous timbre.—

High register	The large Flute
Middle register	Flügelhorn, Horn, Alto Horn, Tenor Horn, Baritone, Saxophone

Instruments of a bright, sharp, brilliant, penetrating timbre.—

High register	The Piccolo Flute
High and middle register	The Clarinet
Middle register	Cornet, Trumpet
Middle and lower register	Trombone
Lowest register	Bass

Instruments of a whining, nasal timbre.—

High register	Oboe
Lower register	Bassoon

The Instrumental Groups in Brass Bands

The brass instruments are divided into following groups:

Instruments of a bright, sharp, brilliant, penetrating timbre.—

Piccolo Cornet
Soprano Cornet
Trumpet
Trombone
Bass

Instruments of a softer, more sympathetic timbre.—

Flügelhorn
Horn
Alto Horn
Tenor Horn
Baritone

Instruments of a soft, mellow, yet sonorous timbre.—

Saxophone quartet

Arranging Music for Bands. In arrangements of orchestral music for military or brass band, the following general suggestions may be of value.

For Military Band.—The first violins are represented by the first clarinets; the second violins, by the second clarinets; the violas, by the alto and tenor horns; the violoncellos, by the baritones (or tenor tubas); the bass violins, by the tubas or helikons.

For Brass Band.—The first violins are represented by the piccolo cornets, the first cornets, and the first flügelhorns; the second violins, by the second cornets and second flügelhorns; the violas, by the alto horns and tenor horns; the violoncellos, by the baritones or tenor tubas; the bass violins, by the bass tubas or helikons.

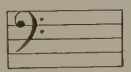
The flutes, horns, trumpets, trombones, and the percussion group nearly always retain the same parts which they have in the original orchestra score.

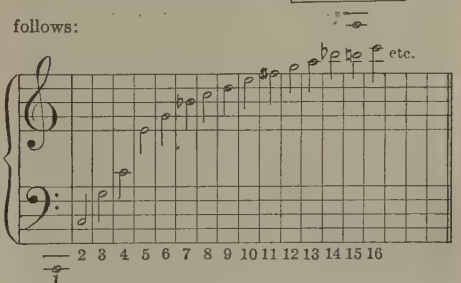
MUSICAL ACOUSTICS

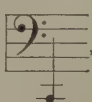
The establishment of the so-called general bass or figured bass by Rameau, D'Alembert's analyses of the construction of the keys, and the work of Euler in determining the characteristics of the tone intervals made possible the great advances in the theory of music during the 19th century. The investigations by Helmholtz threw much light upon obscure theorems, and a closer tie was thereby established between the art and the science of music. The elements of music, the characteristics of the tones from the standpoint of physics, the partials or overtones of a generating tone, the existence of combination tones—all these were long before known to science, but as representing isolated theorems of physics. Their close relationship to harmony, to the theory of consonance and dissonance, was not dreamed of by the champions of science up to that time.

Upon Helmholtz fell the honor and the distinction, not only of reducing the attributes of tone to their simplest conception from the standpoint of physics, but also of analyzing the subjective activity of the human ear. In connection with the principles of tone analysis and the functions of the ear, he developed a theory of consonance and dissonance. This part of his research was of especial importance in creating an insight into certain phenomena of tone, and was destined to add to the knowledge of instrumentation and to form the foundation of musical æsthetics. Upon such a basis the science of musical acoustics has been able to build with solid masonry, and to confirm by physical and physiological facts all the further developments that have since occurred.

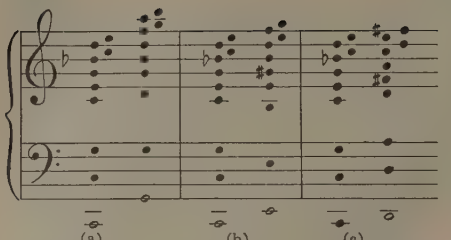
Overtones. The ear, affected by perfectly even, periodic vibrations, hears, not only the tone whose pitch is accepted as the standard for the whole tonal effect, but also its *overtones*. The combined sensation Helmholtz has called "Klang." These overtones are due to the fact that tone-producing bodies vibrate, not only as a whole, but in segments, the halves, thirds, fourths, fifths, etc. producing tones which sound with the fundamental tone produced by the whole vibrating body. The lowest of this series of tones, usually also the strongest, is called the generator or fundamental.

The series of overtones for  is as follows:



Therefore, the total effect produced by periodic vibrations is called "tone" and is composed of a series of separate impressions called partials or overtones. The number which each partial tone has in the above series indicates the ratio of its vibratory frequency to that of the generator, and also, inversely, the size of the section or segment which produces it. For example,—  is the fourth partial tone in the series which comprises the full tonal effect known as the tone  , has four times as many vibrations as its generator, and is produced by one-fourth of the vibrating body.

It is this analytical separation of a compound vibratory effect, known as tone, into its integral parts which lays the foundation for the theory of music. It explains the relationship of tones to each other, and reveals the principle of consonance and dissonance. Two or more tones are called consonant or dissonant according to the strength of the conflict caused by the generators and the respective overtones. Actually there is no absolute consonance—only a comparative proportion of more or less dissonance.
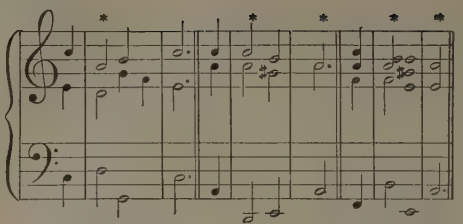


At (a), in the two tones forming the interval of a perfect fifth, the partials conflict but little. At (b), in the interval of a major third, the conflict is greater, while at (c), in the interval of a major second, conflict is experienced almost throughout the entire range of overtones. Therefore, the relationship between the tones at (a) is closer than that of either (b) or (c), since the consonance is greater. It is seen from this that the theories of tone relation and consonance (or dissonance) go hand in hand.
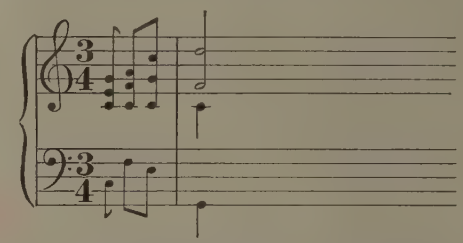
Musical Acoustics and Musical Effects. For musical acoustics only the simpler overtones (1-10) of a given generator need be considered. The higher, weaker ones (also partly nonharmonic), though perceived and recorded by the ear, merely exert an influence upon the color or timbre of the tone. This phase of the influence of overtones is treated elsewhere.

It is true that the fundamental alone is strong enough to be distinguished as a tonal entity. If, however, we were to intensify these overtones so that their dynamic strength equaled that of the generator, then we would obtain the real chord—Nature's Harmonic Chord. Because of the fact that we have adopted the tempered scale of equidistant half steps, we can only approximate this absolutely pure chord. In other words, we may substitute for the lightly intoned partials the real tones of the scale, which approximate their pitch values, and so obtain a chord which contains a root, major third, perfect fifth, minor seventh, and a major ninth, our dominant ninth chord, C E G B♭ D. If, optionally, only part of this structure is desired, the imcomplete forms, C E G B♭ or C E G would be available. From this it is obvious that the dominant ninth, the dominant seventh, and the major triad are all acoustic entities. Practice has long ignored the slight pitch variation which is known to exist between these chords, as formed from the materials of the tempered scale, and Nature's own chords. Even upon tempered instruments, as, for instance, the pianoforte, experiments reveal the fact that all diatonic tones respond to acoustic tests by sympathetic vibration clearly enough to justify the assumption that they approximate the overtones of the nature chord. In other words, they are the tempered representatives of the pure overtone chord, much in the same manner as our scale tones are all the tempered representatives of the pure scale tones. Thorough investigation of the more complicated phenomena of partial tones and the manner in which they blend with their fundamental has led modern composers, notably R. Strauss and C. Debussey, to the discovery of many of their characteristic harmonic and orchestral colors. Following are a few elementary points of influence exerted by acoustics over musical effects, which the reader may ascertain for himself.

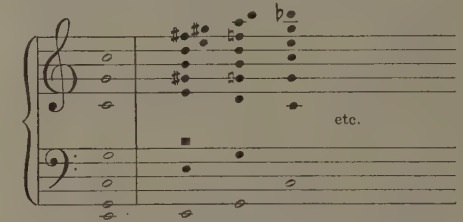
The influence of overtones is great in completing chords in which certain tones are omitted, for the ear unconsciously selects the softly sounding overtones as the natural substitutes for the missing tones. In the following chords the missing third will always be determined by the ear as being major, not minor, for the overtone third is major, and is faintly sensed by the ear in place of the omitted tone (*).



Acoustics clearly points the principle underlying the natural resolution of suspensions. On a well tuned piano the quarter note (C) in the following illustration will be heard to progress to (B), the overtone third of (G), on the last beat of the measure.



In much the same manner acoustics influences the effect of chords which are "inverted," that is to say, chords in which the root is not in the bass. In the fundamental chord form, the blending of the chord tones with the actual overtone series is of natural consequence. In chord inversions, the natural degree of consonance of each integral tone is sacrificed because the tone which is assigned to the bass becomes the lowest and most powerful generator, and its own overtones cause a more or less serious conflict with the chord tones.



Here each tone has its overtones, and the visualization of the chord tones and their respective overtones reveals that the overtones of (E), the bass note, present considerable conflict with the higher tones of the chord and their overtones.

In short, the fundamental nature chords (major triad, dominant seventh chord, and dominant ninth chord) represent in themselves the strengthening of the natural overtones of the root or principal tone of the chord, and show a minimum of conflict by blending with these overtones. The inversions are more dissonant because the bass note is doubled. The traditional rule to avoid the duplication of the third of a chord in first inversions is thus acoustically explained.

The Nature of Musical Sound. Sound is produced by vibration. The difference between musical tones and mere noise is that a musical tone is produced by vibrations which are exactly alike, and which follow one another at regular intervals of time, while noise consists of vibrations which are irregular.

A musical tone has three properties,—pitch, intensity or loudness, and timbre or quality.

Pitch is that property of musical tones which we recognize when we speak of them as high or low. It depends upon the frequency of the vibrations; the greater the number of vibrations, the higher the pitch, etc. *Intensity*, or loudness, of a tone depends upon the amplitude of the vibrations, in other words, upon the distance the vibrating body swings. In the case of a piano string, the loudness of the sound depends upon the force with which the string is struck. The tone producing agency may also consist of an air column, as in an organ pipe, flute, trumpet, oboe; of metal, as in bells, gongs, cymbals; or of stretched skins or parchments, as in the drums and the timpani. *Timbre* or quality is that characteristic of musical tones by which we distinguish from each other the tones which, for instance, are produced by violin, clarinet, cornet, piano, or human voice, although they may be of the same pitch or loudness. It was Helmholtz who discovered that the timbre of a sound depends upon the relative loudness or actual absence of the various partials or overtones which are comprised in any one tone. Helmholtz called this *Klangfarbe*, or "tone color." Tyndall called it "clang tint." Present day English writers usually call it quality.

The Perception of Sound. Vibrations of a tone producing body cause air waves to radiate in all directions. Some of these waves strike the eardrum, which in human beings is a thin membrane about two-thirds the size of a dime. From the eardrum the vibrations are transmitted through the bones and fluid of the inner ear to the wonderful "lute of 3000 strings," otherwise known as the organ of Corti, named after its discoverer. The organ of Corti consists of innumerable rods or fibers. It is situated in the cochlea, a bony structure resembling a snail in form, which is part of the inner ear. The sympathetic vibrations of the rods of Corti excite the auditory nerve, which carries the message to the auditory centers of the brain. There the vibrations are transformed, or interpreted as what we call sound.

The ear is a wonderful recording instrument. We are capable of distinguishing tones, not only as pitch vibrations, but as acoustic structures. In other words, we can clearly differentiate between tones of the same pitch but of different timbre. Even though the ability to discern several simultaneous tones varying in pitch and intensity is remarkable in itself, the faculty of differentiating between timbres, as indicated by numberless overtone effects of different strength, really borders on the wonderful. The eye possesses no such power of discernment. If we throw a pebble into a pond a ring of wavelets represents the vibrations. If we throw a handful of pebbles into the water the wavelets caused by the many pebbles cut into each other, conflicting in such a manner that the individuality of each is lost.

Not so with tones. The vibratory frequency (pitch) of each of several tones is received and recorded separately by the ear; the vibrations of every overtone also are separately received and recorded. When we endeavor to conjure up a conception of the complexity of vibratory activity discerned and analytically separated into units or partials by the ear while listening to a simple chord sounded by the different instruments of an orchestra, we realize the marvelous ability of the human ear. Not only is the pitch of the fundamental tones recorded, but the quality-giving overtones of each instrument are vibrating in the labyrinthine waters of the inner ear. A similar composite function is unknown to the eye. Two colors covering each other are not perceived by the eye as separate colors; they are blended to form one compound color. Red and yellow added together are perceived as orange, but the tones C and E do not combine to form a mixture called D, nor do the tone qualities of the clarinet and French horn combine to form the timbre of the saxophone. Each is recorded by the ear as an entity by itself.

ORCHESTRAS AND MUSIC FESTIVALS

The modern orchestra has developed from a collection of ill-assorted and poorly understood instruments into one large composite instrument of almost infinite possibilities. Its compass reaches from the profoundest depths to the most piercing heights. Its almost exhaustless tonal shades include the various timbres of a vast array of instruments, capable of expressing, either singly or in manifold grouping, every shade of human emotion. It may speak in the faintest whisper or swell to the thunderous power of its combined resources.

The Opera. The revival of Greek learning toward the close of the 16th century caused a little band of Italian enthusiasts, led by Galileo, Peri, and Caccini, to construct Italian musical plays upon the declamatory style of the ancient Greeks. This resulted in the invention of dramatic recitative and the birth of opera. It necessitated the extemporization of some sort of orchestra. Whatever instruments were at the time available were made to serve the purpose. Not until Monteverde began to explore the resources and expressional characteristics of each instrument were any definite experiments in instrumental combinations made. He discovered some of the familiar effects now used, such as the tremolo, *pizzicato*, etc., and his discoveries were quickly taken up by his successors.

The Symphony. Gradually composers began to write for small groups of instruments, and it was not long before the orchestra found its way from the playhouse into the church, and thus orchestral accompaniment to the liturgy of the mass came to be evolved. The existing sonata form was the natural one for composers to use in the overtures to their operas, and this soon led to the composition of complete sonatas for the orchestra, independent of the opera. Thus arose our symphony, for a sonata written for the orchestra is a symphony. We find Stammitz, Gossec, Sammartini, and later Haydn, producing their thinly concerted sonatas for the orchestra, and so developing the trend of independent orchestral composition.

Masters of the Orchestra. Mozart produced many new combinations, and is recognized by many as the father of what we know as tone color. Beethoven's instrumentation did not depend for its effects upon unusual combinations, nor upon unusual instruments. But he did employ the different instrumental groups in conversation, letting a single voice announce the return of the theme, or causing the whole orchestra to rage violently and then stop suddenly to listen to a far-off voice. Weber furthered the art of instrumentation materially by his study of instrumental timbre. The most striking feature in his treatment of the orchestra is the emancipation of the wood-wind choir.

Liszt, Berlioz, and Wagner each lent mighty aid to the development of the orchestral resources, and are the true exponents of the vast color schemes of the modern orchestra. New instruments were introduced, and a richer orchestration with greater variety of color resulted. The English horn, the bass clarinet, the contrabassoon, the trombones, the family of tubas, and the bass trumpet—all contributed innumerable colors to the palettes of modern composers.

We find Richard Strauss, Tchaikovsky, and other modern artists standing upon the vantage ground of these three mighty colorists and ready to avail themselves of the fullest resources of every instrument. Their handling of the orchestra is the natural outgrowth of the researches of Berlioz and Wagner. The former left nothing untouched which pertained to the capacity and expressiveness of any individual instrument, while Wagner

developed to an extraordinary degree the use of many voice parts and the colorful and striking combinations of timbres. He completed the group of wood-wind instruments by writing three parts for the flutes, three for the oboes, three for the clarinets (instead of two), by which proceeding he was enabled to obtain a complete chord in one timbre. He distributed the violins into as many as 15 parts. Strauss continues this method of obtaining many parts, using three or four each of the wood winds and subdividing his string section into many parts. He weaves and interweaves them in marvelous contrapuntal labyrinths, rising often to overwhelming crashes of dynamic power. He requires every orchestral player to be a virtuoso. This attitude has been adopted by many of the modern virtuoso writers like Dukas, Rimsky-Korsakov, and others. No concessions are made to the technical difficulties of the instruments.

The development of the modern concert orchestra since the time of Haydn may be visualized briefly as follows:

Haydn	Mozart	Beethoven	R. Wagner	H. Berlioz
Timpani	Violino I	Large Drum	(Lohengrin)	(Tuba mirum. Requiem.)
Trompeten	Violino II	Triangle	3 Large Flutes	3 Flutes
Tromboni	Viola	Cymbals	Piccolo Flute	2 Oboes
Klarinetten	Flutes	Flutes	3 Oboes	2 Clarinets
Corni (Horns)	Oboes	Oboes	English Horn	8 Bassoons
Oboes	Clarinets	Clarinets	3 Clarinets	12 Horns
Flöten	Bassoons	Bassoons	Bass Clarinet	4 Cornets
Fagotte	Horns	Horns	2 Bassoons	4 Trombones
Violino I	Trompets	Trompets	4 Horns	1 Ophicleide
Violino II	Trombones	Timpani	3 Horns on the stage	4 Trompets
Viola	Timpani	Trombones	3 Trompets	4 Trombones
Vocal Parts	Vocal Parts	Violine I	4 Trompets on the stage	4 Trompets
Violoncello	Violoncello	Violine II	3 Trombones	4 Trombones
Organ	Organ	Viola	3 Trombones on the stage	4 Trompets
Contrabasso	Contrabasso	Vocal Parts	Bass Tuba	4 Trombones
		Violoncello	Timpani in the orchestra	4 Ophicleides
(Exceptional)	(Exceptional)	Organ	Timpani on the stage	16 Timpani
Bariton	Piccolo	Basses	Cymbals	1 Bass Drum
Lyra	English Horn		Drums	1 Bass Drum with two drumsticks
English Horn	Bassethorn	(Exceptional)	Violins (divided)	50 Violins
	Contrabassoon	Contrabassoon	Violas	20 Violas
	Harp	English Horn	Organ	70 Sopranos, 60 Tenors, 70 Basses } Vocal Parts
	Glockenspiel	Posthorn	Vocal Parts	18 Violoncellos
	Large Drum		Harp	18 Contrabasses
	Small Drum		Violoncello	
	Triangle		Contrabasses	
	Mandolin			

FAMOUS ORCHESTRAS

Austria and **Hungary.**

Budapest.—Philharmonic Orchestra; conductor Stephen Kerner.

Innsbruck.—Musikverein; conductor, Emil Schennich.

Salzburg.—Mozarteum Orchester; conductor, Bernhard Paumgartner.

Vienna.—Philharmonie Orchester; conductor, Wilhelm Furtwaengler.

Symphonie Orchester; conductors, C. Krauss, L. Reichwein, W. Furtwaengler, A. Konrath, D. Foch, R. Nilius, M. Spoerr, P. Klenau, R. Heger.

Czechoslovakia.

Prague.—Ceská Filharmonia; conductors, Vaclav Talich, F. Stupka.

Denmark.

Copenhagen.—Royal Opera Orchestra; conductors, Georg Höeberg, J. Hye Knudsen.

England.

Birmingham.—Birmingham Orchestra; conductors, Adrian Boult, Sir Landon Ronald, Bruno Walter, Eugène Goosens, Joseph Lewis.

London.—New Queen's Hall Orchestra; conductor, Sir Henry Wood.

Royal Philharmonic Orchestra; guest conductors, Wilhelm Furtwaengler, Bruno Walter, Eugène Goosens, Ernest Ansermat, Felix Weingartner, Paul Klenau, Sir Hamilton Harty, Serge Koussevitzky.

Manchester.—Hallé Orchestra; conductor, Sir Hamilton Harty.

France.

Paris.—Société des Concerts; conductor, Philippe Gaubert.

Colonne Orchestra; conductor, Gabriel Pierne.

Pasdeloup Orchestra; conductors, Rhené-Baton, Albert Wolff.

Lamoureux Orchestra; conductor, Paul Paray.

Germany.

Cologne.—Guerzenich Orchester; conductor, Hermann Abendroth.

Koelner Symphonie Orchester; conductor, J. Schwartz.

Dresden.—Musikalische Kapelle der Staats Theater; conductor, Fritz Busch.

Dresden Philharmonic; conductors, E. Moericke, F. Werner.

Frankfort.—Symphonie Orchester; conductor, Ernst Wendel.

Frankfort Opera Orchestra; conductor, C. Krauss.

Leipzig.—Gewandhaus Orchester; conductor, Wilhelm Furtwaengler.

Munich.—National Opera House Orchestra; conductor, Hans Knappertsbusch.

Tonkunstler Orchester; conductor, Siegmund Hausegger.

Stuttgart.—Landestheater Orchester; conductor, Prof. Leonhardt.

Philharmonic Orchestra; guest conductor, Leo Blech.

Italy.

Rome.—Augusteo; conductor, Bernardino Molinari.

Milan.—Orchestra of the Teatro alla Scala (concerts during summer tours of foreign countries); conductor, Arturo Toscanini.

Norway.

Oslo.—Philharmonic Orchestra; conductor, Jose Eibenschütz.

Russia.

Leningrad.—State Philharmony Orchestra; conductors, A. Glazunov, V. Suk, N. Malko, C. Saradjev, V. Dranishnikov, A. Hauk, H. Knappertsbusch, E. Kleiber, B. Walter, F. Stiedry, O. Klemperer, A. Casella.

Moscow.—The Conductorless Symphony Orchestra. Plays without conductor.

State Philharmony Rosphil Symphony Orchestra; conductor, A. Medtner.

South America.

Buenos Aires.—The Orchestra of the Teatro Colon; conductor, Celestino Piaggi.

United States of America.

Atlanta, Ga.—Symphony Orchestra; conductor, Enrico Leide.

Boston, Mass.—People's Philharmonic Orchestra; conductor, William F. Hofmann.

Boston Symphony Orchestra; conductor, Serge Koussevitzky.

Chicago, Ill.—Chicago Symphony Orchestra; conductor, Frederick Stock.

Cincinnati, Ohio.—Cincinnati Symphony Orchestra; conductor, Fritz Reiner.
Cleveland, Ohio.—Cleveland Orchestra; conductor, Nikolai Sokoloff.
Denver, Colo.—Civic Symphony Orchestra; conductor, Horace Tureman.
Detroit, Mich.—Detroit Symphony Orchestra; conductor, Ossip Gabrilovitch.
Easton, Pa.—Easton Symphony Orchestra; conductor, Earle Laros.
Erie, Pa.—Erie Symphony Orchestra; conductor, Henry Bethuel Vincent.
Los Angeles, Cal.—Philharmonic Orchestra; conductor, Artur Rodzinski.
Minneapolis, Minn.—Symphony Orchestra; conductor, Henri Verbrugghen.
Nashville, Tenn.—Nashville Symphony Orchestra; conductor, F. Arthur Henkel.
New Haven, Conn.—New Haven Symphony Orchestra; conductor, David Stanley Smith.
New York, N. Y.—American Orchestral Society; conductor, Chalmers Clifton.
Philharmonic Symphony Orchestra; conductors, Arturo Toscanini and Willem Mengelberg.
Omaha, Nebr.—Symphony Orchestra; conductor, Sandor Harmati.
Philadelphia, Pa.—Symphony Orchestra; conductor, Leopold Stokowski.
Portland, Ore.—Symphony Orchestra; conductor, Willem von Hoogstraten.
Rochester, N. Y.—Philharmonic Orchestra; conductor, Eugène Goosens.
Sacramento, Cal.—Sacramento Municipal Orchestra; conductor, Franz Dicks.
St. Louis, Mo.—Symphony Orchestra; guest conductors, E. Oberhoffer, B. Molinari, C. Schwicht, W. van Hoogstraten, E. Goosens.
San Francisco, Cal.—Symphony Orchestra; conductor, Alfred Hertz.
Seattle, Wash.—Seattle Civic Symphony; conductor, Mme. Davenport Engberg.
Seattle Symphony; conductor, K. Kruger.
Springfield, Mass.—Springfield Symphony Orchestra; conductor, Arthur Turner.
Syracuse, N. Y.—Symphony Orchestra; conductor, Vladimir Shavitch.
Tacoma, Wash.—Tacoma Civic Orchestra; conductor, David P. Nason.
Utica, N. Y.—Utica Orchestral Society; conductor, Edgar Alderwick.

MUSICAL FESTIVALS IN AMERICA

One of the important influences which stimulated musical interest and enthusiasm in America was the formation of singing societies or clubs devoted to the study of secular and sacred music. Numerous societies of this character have grown into established institutions, which periodically provide opportunity and artistic stimulus for vocal soloists and orchestras in their concerts. Some of the earlier societies so founded were the Stoughton Musical Society, Stoughton, Mass., and the famous Handel and Haydn Society, Boston, organized in 1815. Of the orchestras, the "Philharmonic" founded by Gottlieb Graupner in 1799 was the very first. The Musical Fund Society of Philadelphia (1821) was devoted to both instrumental and vocal music. These were followed by the New York Choral Society (1823) and the Boston Academy of Music (1833), which later organized the Academy Orchestra (1840), the New York Philharmonic (1842), and the Germania Orchestra (1850).

The formation of orchestras and *ensemble* groups followed in all parts of the country. In 1864, Theodore Thomas organized his Symphony Soirées in New York, while Chicago produced both the Philharmonic Society (1860) and the Apollo Club. The Harvard Musical Association, established in 1865, became the firm foundation upon which the Boston Symphony Orchestra was built (1881). The New York Symphony Society (1878), the Oratorio Society of New York, and the Cincinnati Festival Association (1873) exerted a very significant influence in elevating the knowledge and appreciation of the public, and presently became potent factors in the formation and success of the musical festival idea. The first experiments along this line were probably those in Boston in 1857 and in Worcester in 1858. A choral festival was inaugurated in 1865 by the Handel and Haydn Society of Boston to commemorate its fiftieth anniversary, and this led to the formation of a triennial festival. The festival at Worcester about this time became an annual affair. The great, unwieldy peace jubilees, organized at Boston (1869) by Patrick Gilmore, and repeated in 1872, were other notable instances indicating that the festival desire had crystallized into something more or less stable.

Cincinnati, for many years the Mecca of German singing societies, held a festival in 1873, conducted by Theodore Thomas, and the festival idea thus engendered led to the regular biennial May festivals held there since that day. The success at Cincinnati led to similar enterprises in Chicago in 1882 and 1884. Portland and Bangor, Maine, have held festivals since 1897, while Springfield, Mass., inaugurated its successful series in 1903. The famous Bach Festival Association of Bethlehem, Pa., started its glorious work in 1900, but omitted its festivals from 1905 to 1911 to permit similar festivals to be given at Berkeley, Cal. The Bohemian Club of California has supported since 1902 a splendid series of festivals called "Grove Plays."

Of the great institutions of learning the University of Michigan inaugurated its festivals in 1893, Northwestern university and Cornell university in 1909. The Norfolk Festivals, Conn., were started in 1906; the Berkshire Festivals in Massachusetts in 1917. Atlanta, Georgia, has given consistent support to annual festivals for about 15 years, and for one week each spring is the center of a unique opera festival, during which grand opera is furnished by the Metropolitan Opera Company of New York, transported with all the necessary equipment for that purpose. These, together with numerous festival associations in the Middle West and South, are all eloquent attestations of the artistic success of the festival idea in America. The constantly growing number of excellent orchestras is a further stimulus in this connection.

There are active and flourishing festival associations in the following and many other cities of the United States and Canada.

Place	Name	Conductor
Ann Arbor, Mich.	Ann Arbor May Festival	Earl V. Moore
Bethlehem, Pa.	Bach Festival Ass'n.	J. Fred Wolle
Buffalo, N. Y.	National American Music Festival	A. A. van de Mark
Cincinnati, O.	May Festival	Frank V. van der Stucken
Dayton, O.	Spring Music Festival	Nikolai Sokoloff
Emporia, Kans.	All-Kansas Music Festival	Frank A. Beach
Evanston, Ill.	Chicago North Shore Ass'n.	Peter C. Lutkin
Lindsborg, Kans.	Messiah Festival	Hagbard Brase
Newark, N. J.	Music Festival Ass'n.	C. Mortimer Wiske
Oberlin, O.	Spring Festival	George Whitfield Andrews
San Francisco, Cal.	Spring Music Festival	Alfred Hertz
Spartanburg, S. C.	Music Festival Ass'n.	Frederick W. Wodell
Springfield, Mass.	Music Festival	John J. Bishop
Toronto, Canada	Toronto Festival Ass'n.	F. H. Torrington
Worcester, Mass.	Worcester Festival Ass'n.	Albert Stoessel

DICTIONARY OF MUSICAL TERMS

A ballata (It.) (*ä bäl-lä'tä*). In ballad style.

Abbandono (It.) (*äb'bän-dō'nō*). With abandon.

A battuta (It.) (*ä bät-tōō'tä*). As beaten, in strict time.

A cappella (It.) (*ä käp-pĕl'lä*). In old church style; unaccompanied vocal music.

A capriccio (It.) (*ä kä-prĕt'shō*). According to the taste; in a capricious manner.

Accelerando (It.) (*ät-shĕl'ĕr-än'dō*). Accelerating; increasing the speed.

Accent. Emphasis upon a certain note. The first beat of each measure has *primary* accent. In 4-4 time, the third beat has *secondary* accent; in 9-8 time, the fourth has secondary accent, the seventh *tertiary*; notes specially accented are marked with the sign >, called *sforzando*, abbreviated *sf.*, *sfz.*, or *fz*.

Accessory Notes. Small embellishing notes placed one degree above or one degree below the principal note.

Acciaccatura (It.) (*ät-shäk'kä-tōō'rä*). An accessory note with a diagonal line through its stem and hook, placed before a principal note. It should be played simultaneously with the note to which it is attached, but given the least possible duration.

Accidentals. Sharps, flats, double sharps, double flats, and naturals, not provided for in the signature.

Accompaniment. Secondary instrumental or vocal parts, added to the principal part to enrich the general effect. It may be either *a. ad libitum*, that is, unessential and to be used at the discretion of the performer, or *a. obbligato*, that is, an integral part of the composition.

Acoustics. The science which deals with the production, transmission, and effects of sound.

Acute. High in pitch, as opposed to grave or low.

Adagio (It.) (*ä-dä'jō*). Slow; quicker than *largo* but slower than *andante*.

Ad libitum (Latin) (*ăd lĭb'ĭ-tŭm*). At the pleasure of the performer with regard to time and expression; also, the part so marked may be omitted.

Æolian. One of the Greek modes.

Affabile (It.) (*äf-fä'bē-lĕ*). Affable. *Affabilmente.* Affably.

Affettuoso (It.) (*äf'fĕt-twō'sō*). Affectionate. *Affettuosamente.* Affectionately.

Affrettando (It.) (*äf'frĕt-tän'dō*). Hastening the time.

Afternote. A grace note taking its time from the note preceding it and therefore shortening it.

Agilità (It.) (*ä-jēl'ē-tä'*). Lightness, agility. *Agilmente.* Lightly, nimbly.

Agitato (It.) (*ä'jē-tä'tō*). Agitated; in a hurried, restless manner.

Air. A melody, or tune, with or without words; the part of a composition which carries the melody.

Allargando (It.) (*äl'lär-gän'dō*). Gradually slower, louder, and broader.

Allegretto (It.) (*äl'lā-grät'tō*). Rather light, cheerful, and quick; the diminutive of allegro.

Allegro (Fr. and It.) (*äl-lā'grō*). Quick, brisk, lively. Often used as a modifying word.

Allegro assai (It.) (*äl-lā'grō äs-sī'*). Quicker than allegro.

Allegro moderato (It.) (*äl-lā'grō mō'dĕ-rä'tō*). Moderately quick; somewhat slower than allegro.

Alto (It.) (*äl'tō*). High; formerly the highest male voice or part; now the lowest female voice or part; a tenor violin, or viola.

Amabile (It.) (*ä-mä'bē-lĕ*). Amiable, gentle, tender. *Amabilmente.* Amiably, tenderly.

Amoroso (It.) (*ä'mō-rō'sō*). Amorous, affectionate. *Amorosamente.* Amorously, affectionately.

Andante (It.) (*än-dän'tĕ*). Literally, "going"; moderately slow, but flowing easily; often qualified by other words, as, *con moto, largo, maestoso.*

Andantino (It.) (*än'dän-tē'nō*). A little faster than andante.

Animato (It.) (*ä'nē-mä'tō*). Animated; spirited.

Animoso (It.) (*ä'nē-mō'sō*). Bold, courageous. *Animosamente.* Boldly; courageously.

Anthem. A vocal composition of a religious nature with or without accompaniment, the words being selected usually from the Scriptures.

A poco (It.) (*ä pō'kō*). By degrees; gradually.

A poco a poco (It.) (*ä pō'kō ä pō'kō*). Little by little.

Appassionato (It.) (*äp-päs'syō-nä'tō*). Impassioned; passionate. *Appassionatamente.* Passionately; with intense feeling.

Appoggiatura (It.) (*äp-pōd'jä-tōō'rä*). Literally, a "leaning note"; a discordant, accessory note, placed before a principal note. If it is marked with a diagonal line through the stem and hook, it is called *short* and is played with the least possible duration; if it is without a diagonal line, it is called *long* and has definite time value as indicated.

Arabesque, Arabesk. An embellished work; in the style of highly ornamented Moorish architecture.

Arcato (It.) (*är-kä'tō*). Played with the bow.

Ardente (It.) (*är-dĕn'tĕ*). Ardent; fiery. *Ardentemente.* Ardently; vehemently.

Aria (It.) (*ä'rē-ä*). An air or melody for a single voice with or without accompaniment, usually quite elaborate, developed in connection with the opera.

Arioso (It.) (*ä-rē-ō'sō*). Melodious, graceful; in the style of an aria.

Arpeggio (It.) (*är-päd'jō*). Playing the notes of a chord in harp style, that is in succession instead of simultaneously; marked with a wavy line before the chord.

Arsis (Gr.) (*är'sĭs*). The upward stroke of the hand in beating time; hence the unaccented or weak beat of a measure; the opposite of *thesis*; some authorities reverse the meaning of arsis and thesis as here given.

Articolato (It.) (*är-tē'kō-lä'tō*). Articulated; distinctly enunciated.

Assai (It.) (*äs-sī'*). Very, as *allegro assai*, very quick.

Assoluto, -ta (It.) (*äs-sō-lōō'tō, -tä*). Absolute, free, not slurred; one voice alone; the star, as *prima donna assoluta.*

A tempo (It.) (*ä tĕm'pō*). In time; a term used to indicate a return to the regular tempo after some deviation from it.

Attack. The manner of beginning to play or sing a note, a phrase, or a movement. It should always be firm and precise.

Attendant Keys. Those keys having most tones in common; the major keys formed upon the tonic, dominant, and subdominant of any scale and their relative minor keys; the attendant keys of C major are G major, F major, A minor, E minor, and D minor.

Audace (It.) (*ä'ōō-dä'shĕ*). Audacious; bold.

Augmentation. Introducing a theme written in notes having double the value given them at their first appearance.

Authentic Cadence. See *Cadence.*

Auxiliary Notes. Usually *grace* notes one degree above or below the principal or harmonic note.

Ballad. Originally a song in dance rhythm, accompanied by dancing; now any simple, romantic, narrative, or descriptive song; instrumental music in ballad style.

Band. A group of instrumental performers playing together; as, a brass band, a military band, or a string band.

Bar. A line drawn vertically across the staff to divide it into measures; a measure is commonly but incorrectly spoken of as a bar.

Baritone. A male voice intermediate between bass and tenor; also applied to any musical instrument between bass and tenor.

Barocco (It.) (*bä-rŏk'kō*) (Ger., barock; Fr., baroque). Music abounding in unnatural modulations; grotesque.

Bass. The lowest part in a musical composition; the lowest male voice; the lowest of a family of instruments.

Baton (Fr.) (*bà'tôN'*). The stick used by a leader in beating time.

Beat. Each movement of a conductor's hand or baton, indicating rhythm; each unit division of a measure with reference to accent; a musical embellishment resembling a short trill; the throb heard when two discordant tones are sounded.

Ben marcato (It.) (*bĕn mär-kä'tō*). Well marked.

Berceuse (Fr.) (*bĕr'sûz'*). A cradle song; an instrumental composition in cradle song style.

Binary Form. The form of a movement having two themes or sections.

Bizzarro (It.) (*bĕd-zär'rō*). Bizarre, odd. *Bizzarramente.* Oddly, whimsically.

Bolero (Sp.) (*bō-lā'rō*). A Spanish dance in triple rhythm accompanied by castanets.

Bowing. The art and the act of managing the bow; the proper manner of using the bow, indicated by certain marks: ⌐ for *down bow*; ∧ for *up bow*; two dots over a note for *spiccato* or *bounding bow*.

Brace. A curved or straight line used to connect two or more staves; the leather slide on a drum chord for tightening the heads.

Bravura, con (It.) (*brȧ-vōō'rȧ, kōn*). With boldness and dash.

Brillante (It.) (*brēl-län'tĕ*). Brilliant; sparkling.

Brindisi (It.) (*brēn'dē-zē*). A drinking song.

Broken Chords. Chords whose notes are taken successively, or in *arpeggio*, not simultaneously.

Buffa (It.) (*bōōf'fȧ*). Comic; in the comic style.

Buffone (*bōōf-fō'nĕ*). The singer of a comic part.

Burden. A refrain or chorus which is repeated; the bass of any composition; the drone of a bagpipe.

Burlando (It.) (*bōōr-län'dō*). Droll, playful.

Burlescamente (It.) (*bōōr-lās'kä-mān'tĕ*). Jokingly; in a burlesque style.

Cabaletta (It.) (*kä'bä-lāt'tȧ*). A lively melody, often forming the conclusion of an aria or duet.

Cadence (*kā'dĕns*). I. The close of a strain. *Perfect C.* A closing group in which the melody returns to and ends with the tonic. This expresses complete finality or rest. *Imperfect C.* One in which the strain ends with the tonic chord in the second or third position. It has less force or weight than a perfect cadence. *Authentic C.* The perfect cadence in which the final tonic chord is preceded by the dominant. *Plagal C.* The perfect cadence in which the final tonic is preceded by the subdominant chord. *Half* or *Semi C.* Any closing strain composed of strong chords but not expressing complete finality. *Deceptive C.* A cadence composed of the chords on the fifth and sixth steps. The dominant chord suggests its natural progression into the tonic, but moves into the chord on the sixth step instead, hence its name. *Phrygian C.* A cadence in minor, ending on the dominant chord preceded by the subdominant chord.

Cadenza (It.) (*kä-dĕnt'sä*). A florid ornamental passage introduced before the cadence of a song or instrumental solo.

Calmato (It.) (*käl-mä'tō*). Calm, tranquil.

Caloroso (It.) (*käl-ō-rō'sō*). Animated, fiery.

Camera (It.) (*kä'mĕ-rä*). Chamber; a small hall, as contrasted with a large auditorium.

Canceling Sign. The natural sign (♮), used to remove the effect of a previous sharp or flat sign.

Canon. Literally, a rule or standard. A contrapuntal composition in which the melody is taken by the leading voice, and then taken up in turn by the second, third, and fourth voices at intervals of a definite number of beats or measures.

Cantabile (It.) (*kän-tä'bē-lĕ*). Melodious; lyrical; in song style.

Cantata (It.) (*kän-tä'tä*). Originally a vocal piece, in contradistinction to a *sonata* or an instrumental piece; now a large choral work, resembling an oratorio, if sacred, or a lyric opera, if secular, but shorter than either of these.

Canticle. A hymn with words taken from the Bible, used in some churches.

Canto (It.) (*kän'tō*). Song; melody; that part in a choral work which carries the melody; now the soprano, formerly the tenor.

Cantor (Latin) (*kän'tôr*). A singer; a precentor.

Canzona (It.) (*kän-tsō'nä*), **Canzone** (It.) (*kän-tsō'nĕ*). A form of Italian lyric poetry corresponding to the ode; such a poem set to music, resembling a madrigal but simpler; a similar instrumental piece.

Capellmeister (Ger.) (*kä-pĕl'mīs'tĕr*). Chapelmaster. The musical director of a chapel or church, formerly more than now a position of high honor in many large churches; organist; orchestral conductor.

Capo (It.) (*kä'pō*). Head; beginning; the top.

Caprice. A short composition, irregular in form, free and unconventional in style.

Carezzando (It.) (*kä-rĕt-tsän'dō*). Caressingly.

Carillon (Fr.) (*kȧr'ī-lôn*; *kȧ'rē'yôN'*). A set of bells upon which a melody can be played; an instrumental piece in the style of carillon music.

Carità, con (It.) (*kä-rē-tä'*, *kōn*). With tenderness.

Carol. A song of joy sung principally at Christmas and Easter; formerly, a dance accompanied by song.

Catch. A round for three or four voices, in which each singer in turn "catches" up the melody; later usually with comic effect.

Catgut. A kind of string, usually made from the intestines of sheep or goats, suitable for violins and other musical string instruments.

Cavatina (It.) (*kä'vä-tē'nä*). A song of one strain only; in instrumental music, a melodious air forming part of a larger movement.

Celerità (It.) (*tshā-lĕr'ē-tä'*). Celerity, swiftness.

Chaconne (Fr.) (*shȧ'côn'*). A slow dance in triple time.

Chamber Music. Any music suitable for a small hall, as distinct from music best adapted for a large auditorium; instrumental music in the sonata form, for a small group of string or wood-wind instruments, with or without piano.

Chanson (Fr.) (*shȧN'sôN'*). A song; a vocal solo with piano accompaniment; formerly, a ballad.

Chant (n.). A sacred song, usually in four parts, having nonmetrical biblical words, the oldest form of choral music; a song resembling a chant; (v.) to sing or recite in a chantlike manner; to intone.

Chiaramente (It.) (*kyä'rä-mān'tĕ*). Clearly, brightly, distinctly.

Chime (n.). A set of bells tuned to a musical scale; music played upon a set of bells; music or melody; (v.) to sound in harmony.

Choir. A group of singers, usually connected with a church; that part of a church edifice set apart for the singers.

Choir Organ. In a large pipe organ, that group of pipes and the corresponding manual having a soft tone and therefore suitable for the accompaniment of vocal music.

Choral. Pertaining to a chorus or to a concerted vocal composition; suitable for singing. *Choral Service.* A service in which the liturgy is sung by the clergy, choir, or congregation.

Chorale (Ger.) (*kō-rāl'*). Psalm or hymn tune; a form of sacred song introduced by Luther.

Chord. A combination of more than two tones in superimposed thirds, or any rearrangement of the tones so associated. *Common C.* A chord consisting of a fundamental tone together with its third and fifth. *Dominant C.* A chord founded upon the dominant of the key in which a musical composition is written; the leading or characteristic chord. *Fundamental C.* Same as common chord. *Inverted C.* A chord whose lowest tone is some other than the fundamental or root.

Chorus. A group of singers; a choir; a composition intended for a chorus; a refrain.

Chromatic. Derived from a Greek word meaning color; progression by semitones; any scale, chord, or music, containing tones which do not belong to the diatonic scale.

Chromatic Scale. A scale which proceeds by half steps or semitones.

Chromatic Signs. Marks used in musical notation to indicate that a note should be played a semitone higher or lower than as written. These marks are: the sharp, (♯); the flat, (♭); the natural, (♮); the double sharp, (𝄪); and the double flat, (𝄫).

Classical Music. Music possessing those qualities which entitle it to be taken as a standard of excellence, as representing the highest taste, and conforming to the best authority in art.

Clef. A character used in modern musical notation to indicate the position of the scale upon a staff. See page 1507.

Close Harmony. Harmony in which the three upper of four parts fall within an octave; opposed to *open* or *dispersed harmony*, in which one or more parts, if transposed an octave, would fall between two others.

Coda (It.) (*kō'dä*). A "tail"; formerly a few chords at the close of a composition; Beethoven developed it into a general summing up of the movement or composition; the final episode of a fugue.

Coll' arco (It.) (*kōl-lär'kō*). With the bow; a direction that the notes should be played with the bow and not *pizzicato*.

Colla voce (It.) (*kōl'lä vō't'shĕ*). With the voice; a direction that the accompaniment shall be accommodated to the tempo of the singer.

Colorature (*kŏl'ō-rä-tûr'*). Florid ornaments; in vocal music, brilliant vocalization.

Comma (It.) (*kŏm'mä*). The minutest difference in pitch recognizable by the ear; one-ninth of a whole step; the difference between, for example, true D♯ and true E♭; a sign (,) used as a breathing mark in vocal music.

Common Time. Four-four time, four quarter notes or their equivalent to a measure. *Compound c. t.* Time having a multiple of two beats to a measure; for example,

6-4 or 12-8 time. *Half c.t.* Two-four time, having the equivalent of two quarter notes to a measure.

Compass. The range of a voice or of a musical instrument.

Composition. A musical work; the act and the art of writing original music.

Compound Harmony. Harmony in which one or more of the parts are doubled; opposed to *simple harmony*, in which the three upper voices fall within an octave.

Compound Intervals. Intervals which extend beyond an octave.

Compound Times. Those composed of two or more simple times; for example, 6-8 time which may be treated as two 3-8 measures.

Concert. A public performance of music, in which a number of singers or instrumentalists, or both, take part; a group of instruments of the same kind but differing in size.

Concertmeister (Ger.) (*kŏn-tsĕrt'mīs'tĕr*). Concert master; the leader of the first violins, who is next in rank to the conductor.

Conductor. The leader or director of an orchestra or a chorus.

Connecting Note. A note common to two successive chords.

Consecutive Intervals. The progression of two or more parts in parallel sequence. *C. fifths.* The progression of two or more parts at a distance of a fifth from one another; forbidden in strict harmony.

Conservatory. A school of music.

Console. The keyboard, including pedals and stops, of a pipe organ; often placed at some distance from the organ pipes.

Consonance. A combination of sounds which is agreeable and restful; the opposite to a discord or dissonance. *Perfect C.* An octave, a fifth, or a fourth. *Imperfect C.* Major and minor thirds and sixths.

Con sordini (It. pl.) (*kōn sōr-dē'nē*). *With mutes*, a direction used in violin music; *with dampers*, a direction used in piano music, indicating that the damper pedal should be used.

Continued Harmony. Harmony that remains unchanged, though the bass varies.

Contra- (It.) (*kŏn'trä-*). A prefix meaning an octave below.

Contrabass (It.) (*kŏn'trä-bās'*). The double bass; the deepest toned stringed instrument played with a bow.

Contralto (It.) (*kŏn-träl'tō*; *kŏn-träl'tō*). The deepest female voice; the word means lower than *alto* (high), but it is now used as synonymous with alto.

Cotillon (Fr.) (*kō'tē'yŏN'*); **Cotillion** (*kō-tĭl'yŭn*). "Petticoat"; a lively French dance, similar to the "German"; a quadrille.

Counterpoint. *Point against point*, referring to points used before the invention of notes; the art of adding melody to melody; melody supported by melody instead of by chords (harmony). Counterpoint reached a high degree of perfection in the Netherlands school of the 15th and the 16th century.

Countersubject. The principal counterpoint in a fugue.

Countertenor. High tenor; the highest male voice.

Country-Dance. *Contre-danse* (Fr.); *Contradanza* (It.). A rural dance, of English origin, in which two lines of dancers facing each other perform various figures.

Courante (Fr.) (*kōō'rănt'*). "Running"; a dance of French origin in triple time; the second part in the old *suites des danses.*

Crescendo (It.) (*krĕ-shĕn'dō*). Increasing in loudness; often indicated by the sign 

Cross Relation. See *False Relation.*

Czardas (*chär'däsh*). The Hungarian national dance.

Cycle Forms. Those made up of several complete forms, movements, or compositions, such as sonata, symphony, suite.

Da capo (It.) (*dä kä'pō*). A direction to repeat from the beginning.

Da capo al fine (It.) (*dä kä'pō äl fē'nĕ*). Repeat from the beginning and end at the mark *Fine.*

Da capo al segno (It.) (*dä kä'pō äl sä'nyō*). Repeat from the beginning and play to the sign 𝄋.

Dal segno (It.) (*däl sä'nyō*). Repeat from the sign 𝄋.

D. C. The abbreviation for *Da capo.*

Debile (It.) (*dā'bē-lĕ*). Feeble, weak.

Début (Fr.) (*dā'bū'*). The first appearance of a performer; the first public performance.

Declamando (It.) (*dĕk'lä-män'dō*). In a declamatory style.

Decrescendo (It.) (*dā'krä-shĕn'dō*). Gradually diminishing in loudness; often marked with the sign 

Degree. A line or a space of the staff; the difference in pitch between two adjacent notes on the staff.

Deliberato (It.) (*dĕ-lē'bĕ-rä'tō*). Deliberate. *Deliberatamente.* Deliberately.

Delicato (It.) (*dĕl-ē-kä-tō*). Delicate, smooth. *Delicatamente.* Delicately, smoothly.

Delivery. The style of singing, with reference to tone production, articulation, expression, and general manner of presentation.

Demicadence (Fr.) (*dē'mē'kä'dăns'*; *dĕm'ĭ-kā'dĕns*). A half cadence; a cadence ending upon the dominant.

Derivative Chord. A chord derived from another by inversion; one having the same notes as a fundamental chord but in a different order.

Descant. The addition of one or more parts to a musical subject; the forerunner of counterpoint.

Desto (It.) (*dās'tō*). Brisk, lively.

Determinato (It.) (*dĕ-tĕr'mē-nä'tō*). Resolute, determined.

Development. The elaboration of a theme or musical idea by working out melodic, harmonic, or rhythmic changes; the part of a composition in which this is done.

Devoto (It.) (*dĕ-vō'tō*). Devout, religious. *Devozione.* Devotion.

Diapason (Eng.) (*dī'ă-pā'zŏn*). The interval of an octave; the consonance of that interval; the range of a voice or an instrument; a recognized standard of pitch; a rule or scale used by makers of wind instruments to determine the pitch beforehand; a class of fundamental organ stops, also called *principal.*

Diaphony. See *Descant.*

Diatonic (Gr.) (*dī'ă-tŏn'ĭk*). Pertaining to the major and minor scales of eight tones to each octave, in any key. *Major Diatonic Scale.* See *Major Scale. Minor Diatonic Scale.* See *Minor Scale.*

Diesis (Gr.) (*dī'ĕ-sĭs*). In French music, a sharp; in theory, the difference between a perfect octave and three perfectly tuned major thirds, which in terms of vibrations is 128: 125, called *enharmonic diesis.*

Dignità (It.) (*dēn'yĕ-tä'*). Dignity, grandeur.

Dilettante (It.) (*dē'lĕt-tän'tē*). One who delights in art; an amateur.

Diminished Chord. A chord composed of a fundamental, a minor third, and a diminished fifth.

Diminuendo (It.) (*dē-mēn'ōō-ĕn'dō*). Diminishing gradually in loudness.

Di molto (It.) (*dē mōl'tō*). *Very much*; an expression which augments the meaning of the word with which it is combined.

Direct Motion. Parallel motion; applied to two voices or parts when both follow the same direction, up or down.

Dirge. A vocal or instrumental composition suitable for performance at a funeral, or in commemoration of the dead.

Discord. A combination of tones which sound harsh and unpleasant; a combination of tones whose vibrations are only remotely commensurable. *Prepared d.* A chord containing a discordant note carried over from the preceding harmonious chord.

Discreto (It.) (*dēs-krā'tō*). Discreet.

Disinvolto (It.) (*dē-zēn-vōl'tō*). Offhand, free, natural.

Disjunct Succession. A succession of tones by skips, that is, with intervals greater than a second.

Disperato (It.) (*dēs'pĕr-ä'tō*). Desperate. *Disperazione.* Desperation.

Dispersed Harmony. Chords in which the treble, alto, and tenor cover more than an octave.

Dissonance. Loosely used for discord; in music, a chord, whether harmonious or discordant, which does not give the sense of rest but requires to be resolved in another tone or chord.

Divertimento (It.) (*dē-vĕr'tē-mān'tō*). A musical diversion; a kind of diminutive symphony; a short selection introduced between the acts or at the conclusion of an opera; a potpourri of airs, from an opera or other large composition, arranged for orchestra or piano.

Divisi (It.) (*dē-vē'zē*). A sign directing that, when two orchestral parts are written on one staff, half of the instruments should play the upper part and the other half the

lower. When two instruments should play the same note, the sign *a due* is used.

Dolce (It.) (*dōl'chĕ*). Sweet, soft. *Dolcemente.* Sweetly, softly.

Dolente (It.) (*dō-lĕn'tĕ*). Doleful, sorrowful. *Dolentemente.* Dolefully, sorrowfully.

Dominant. The fifth tone of the scale of any key; the most important tone of the scale after the tonic or fundamental tone.

Dominant Chord. A chord founded upon the dominant or *fifth* note of the scale. It indicates the key of a composition and demands resolution in the tonic.

Dorian (Gr.). One of the Greek modes.

Dot. A point placed after a note, the effect of which is to increase the length of the note by one-half.

Double Bar. A broad bar, or two single bars drawn vertically across the staff, denoting the end of a section.

Double Dot. Two points placed horizontally after a note to increase its length by three-fourths, (♩..).

Double Flat. A sign (𝄫) which, placed before a note, lowers that note two semitones.

Double Sharp. A sign (𝄪) which, placed before a note, raises that note two semitones.

Double Stem. A note with two stems, one pointing up, the other down, to indicate that it belongs to two parts:



Double Time. That in which the number of beats in each measure is an even multiple of two; for example, 2-4 or 4-4 time.

Doxology. A hymn of praise to God, used in Christian worship.

Drammatico (It.) (*dräm-mä'tē-kō*). Dramatic. *Drammaticamente.* Dramatically.

Drone. The largest pipe of the bagpipe, sounding only one note, which serves as a bass for every tune. *Drone bass,* a bass on the tonic, or tonic and dominant, which persists throughout a movement, as in the *musette.*

Duet. A composition for two voices, or for two instruments of the same kind, the two parts being of equal importance; a composition for two performers on one piano.

Dur (Ger.) (*dōōr*). German for major, referring to keys; the German for minor is *moll.*

Duramente (It.) (*dōō-rä-mān'tĕ*). Harshly, sternly.

Dynamics. That part of musical science which deals with differences and contrasts in loudness of tones.

Eighth. The eighth note of the diatonic scale. *Eighth note.* A note whose value is one-eighth that of a whole note.

Elegante (It.) (*ĕl-ĕ-gän'tĕ*). Elegant, graceful. *Elegantemente.* Elegantly, gracefully.

Elegy. A mournful composition; a dirge.

Encore (Fr.) (*äN'kôr'*). Again; a demand for the reappearance of a performer, as by applause; the performance given in response to such a demand.

Energico (It.) (*ĕn-ĕr'jē-kō*). Energetic, vigorous. *Energicamente.* Energetically, vigorously.

Enfatico (It.) (*ĕn-fä'tē-kō*). Emphatic. *Enfaticamente.* Emphatically.

Enharmonic. Pertaining to scales of true intonation, in which for instance F sharp and G flat do not figure as the same tone; writing the same sound in two different ways when changing from one key to another.

Ensemble (Fr.) (*äN'säN'bl'*). The united performance of voices or instruments or both in rendering a composition.

Epico (It.) (*ĕp'ĕ-kō*). Epic, heroic.

Episode. An incidental, digressive portion of a composition as contrasted with the themes and their development.

Equabile (It.) (*ĕ-kwä'bē-lĕ*). Equable, smooth. *Equabilmente.* Equably, smoothly.

Eroica (It.) (*ĕ-rō'ĕ-kä*). Heroic.

Erotic (*ĕ-rŏt'ĭk*). Amorous; in an amorous style.

Esitamento (It.) (*ĕz'ē-tä-mān'tō*). Hesitation.

Espressivo (It.) (*ĕs'prĕs-sē'vō*). Expressive.

Etude (Fr.) (*ā'tüd'*). A study; an exercise in technique. *Etude de Concert.* A difficult composition for concert performance, affording opportunity for technical display.

Exercise. A practice piece.

Expression. Interpreting the meaning and emotional quality of a composition, in rendering it. *Expression Mark.* A sign or word introduced to aid the performer to interpret a composition.

Extravaganza (*ĕks-trăv'ä-găn'zä*). A composition in burlesque style.

False Accent. An accent removed from the proper beat to another.

False Relation. Any note of a chord stands in a false relation when its chromatic alteration occurs in a different part in the following chord.

Falsetto (It.) (*fäl-sät'tō*). The false voice, which lies above the natural register; so called because it sounds forced and unnatural.

Fandango (Sp.) (*fän-dăng'gō*). A lively Spanish dance in triple time, of obscure origin, but very old. A composition in the rhythm of this dance.

Fantasia (It.) (*fän'tä-zē'ä*). Any composition not in strict form; a medley of well-known airs with florid decorations.

Fastoso (It.) (*fäs-tō'sō*). Proud, pompous. *Fastosamente.* Proudly, pompously.

Fermata (It.) (*fĕr-mä'tä*). A pause or hold marked thus, 𝄐.

Fermo (It.) (*fĕr'mō*). Firm, resolute. *Fermamente.* Firmly, resolutely.

Feroce (It.) (*fē-rō'chĕ*). Fierce. *Ferocemente.* Fiercely.

Fervente (It.) (*fĕr-vĕn'tĕ*). Fervent. *Ferventemente.* Fervently.

Festoso (It.) (*fĕs-tō'sō*). Merry, cheerful, gay.

Fifth. The interval between a fundamental tone and the fifth tone above.

Figuration. The ornamental treatment of a passage by a mixture of concords and discords.

Figure. Any group of notes or chords forming a pattern which produces a single, complete, and distinct impression.

Finale (It.) (*fē-nä'lĕ*). The conclusion; the last piece of any act of an opera; the concluding number of a concert; the last movement of a composition in the sonata form.

Fingering. The method or the act of playing with the fingers upon, for example, a piano; the characters, 1, 2, 3, 4, 5, used to indicate correct fingering.

Flat (Ger., b; Fr., bémol; It., bemolle). 1. The symbol (♭) derived from the letter *b,* lowering the pitch of the note before which it is placed a semitone; when occurring in the signature, it affects every note on its line or space. 2. Below the correct pitch; singing or playing "flat."

Flebile (It.) (*flĕ'bē-lĕ*). Sad, doleful. *Flebilmente.* Sadly, dolefully.

Flessibile (It.) (*flĕs-sē'bē-lĕ*). Flexible, pliant.

Foot. A unit used to designate the pitch of an organ pipe. A pipe two feet long sounds middle C; one four feet long, the octave below. Applied also to corresponding tones of other instruments,—thus middle C, however produced, is called a two-foot tone.

Form. The pattern or design of a musical composition, which is as essential to good music as a pattern or design is to a piece of architecture or to any other work of art.

Forte (It.) (*fôr'tĕ*). Loud, powerful.

Fortissimo (It.) (*fôr-tĕs'sē-mō*). Very loud.

Forzando (It.) (*fôr-tsän'dō*). Forced; emphasis upon one note or chord; marked ∧ or >.

Fourth. The interval between a fundamental tone and the fourth tone above.

Freddamente (It.) (*frädˈdä-mānˈtĕ*). Coldly.

Free Composition. A composition in free style, without regard for the rules of musical form.

Fugue (*fūg*). A contrapuntal composition which consists of an elaborate interweaving of one or more themes by the different parts at various intervals of pitch.

Fundamental. The lowest element of a tone, the other elements being its harmonics; applied also to the lowest note of a chord when the chord is founded upon that note.

Fundamental Tones. The tonic, dominant, and subdominant, that is the first, fifth, and fourth tones of any diatonic scale.

Fuocoso (It.) (*fwō-kō'sō*). Fiery, ardent, impetuous.

Furioso (It.) (*fōō'rē-ō'sō*). Furious, vehement. *Furiosamente.* Furiously, vehemently.

Gaio (It.) (*gä'yō*). Gay, merry.

Galop (Fr.) (*gäl'ŭp; gäl'ō*). A quick dance, in 2-4 time; a composition in the rhythm of this dance.

Gavotte (*gä-vŏt'*). A French rustic dance in quick common time, introduced at the French court in the 16th century, the step characterized by raising of the feet instead of sliding; a composition in gavotte style.

Generoso (It.) (*jĕ-nĕ-rō′sō*). Generous, noble, dignified.

Genre (Fr.) (*zhäN′r′*). Style, manner.

Gentilmente (It.) (*jĕn-tēl-mān′tē*). Elegantly, gracefully.

Gigue (Fr.) (*zhēg*). A jig, (from the German *geige*, a "fiddle"); a lively dance.

Giocoso (It.) (*jō-kō′sō*). Jocose, sportive. *Giocosamente.* Jocosely, sportively.

Giojoso (It.) (*jō-yō′sō*). Joyful, gay. *Giojosamente.* Joyfully, gayly.

Gioviale (It.) (*jō-vē-ä′lē*). Jovial.

Giubbiloso (It.) (*jōōb-bē-lō′sō*). Jubilant.

Giusto (It.) (*jōōs′tō*). Exact, precise, even, steady.

Glee. A vocal composition of three or four more or less independent parts, not necessarily gleeful, popular in England between 1760 and 1830.

Glissando (It.) (*glēs-sän′dō*). Slurred, in a gliding manner.

Grace Note. An ornamental note, not essential to the melody but adding grace to it. It is written small and is not counted as part of the measure. The principal embellishments, consisting of grace notes, now in use are *acciaccatura, appoggiatura, mordent, trill,* and *turn.*

Gradevole (It.) (*grä-dä′vō-lē*). Graceful. *Gradevolmente.* Gracefully.

Grandioso (It.) (*grän′dē-ō′sō*). Grandiose, grand, noble.

Grave. Low pitch; a slow movement; the slowest tempo used in music.

Grazioso (It.) (*grä′tsĭ-ō′sō*). Graceful. *Graziosomente.* Gracefully.

Gregorian Chant. A style of Church music without definite rhythm, written in one of the eight Church modes or scales, formerly attributed to Pope Gregory. It is now believed that he did not originate it, but merely arranged and edited such music as existed.

Grottesco (It.) (*grŏt-tās′kō*). Grotesque.

Guerriero (It.) (*gwĕr-rĭ-ā′rō*). Martial.

Gusto (It.) (*gōōs′tō*). Taste, expression.

Half Cadence. See *Cadence.*

Half Note. A note having half the time value of a whole note and twice that of a quarter note.

Half Rest. A pause equal in duration to a half note.

Harmonic Mark. A sign (0) used in violin and harp music to indicate that certain notes should be played as harmonics; also a diamond headed note, which indicates the point at which the string should be touched to produce the harmonic, placed above the note indicating the open string to be used.

Harmonic Modulation. The change from one key to another in a succession of chords.

Harmonics. Higher partial tones present in practically every musical sound, which can also be sounded separately upon many musical instruments.

Harmony. A combination of tones which, sounded simultaneously, produce a pleasing effect; the structure of music with respect to the composition and progression of its chords, as contrasted with melody and rhythm; music consisting of a progression of chords, as distinguished from counterpoint, which consists of melody added to melody.

Hold. A character (𝄐) indicating that the duration of a note or rest should be extended. See *Fermata.*

Holding Note. A note which is held through one or more succeeding chords.

Homophony. Sometimes employed to mean the same as monody, or music having a principal part supported by harmony; now usually signifies harmony, as opposed to polyphony, in which the parts or melodies move more or less independently.

Hook. The line, or flag, attached to the stems of eighth notes and those shorter than an eighth.

Hymn. A sacred song.

Hyper (Gr.) (*hĭ′pĕr*). Above.

Hypo (Gr.) (*hĭ′pō*). Below.

Idyl. A short poem dealing with simple rural life; the musical setting for such a poem.

Il più (It.) (*ēl pyōō′*). The most.

Impaziente (It.) (*ēm-pä′tsĭ-ĕn′tē*). Impatient, hurried. *Impazientemente.* Impatiently, hurriedly.

Imperioso (It.) (*ēm-pĕr′ē-ō′sō*). Imperious. *Imperiosamente.* Imperiously.

Impetuoso (It.) (*ēm-pĕt′ōō-ō′sō*). Impetuous. *Impetuosamente.* Impetuously.

Impresario (It.) (*ēm′prĕ-sä′rē-ō*). The conductor or manager of an opera or concert company.

Impromptu (Fr.) (*ăN′prôN′tü′*). An extemporaneous composition or one written in the same free and offhand style.

Improvisation. The act and the art of composing and rendering music without previous preparation.

Inconsolato (It.) (*ēn-kōn′sō-lä′tō*). Disconsolate, mournful.

Inflection. Any change in the pitch of the voice.

Insensibile (It.) (*ēn-sĕn-sē′bē-lē*). Imperceptible; by small degrees. *Insensibilmente.* Imperceptibly.

Instrumentation. The act or art of composing or arranging music for instruments, especially for the orchestra; orchestration.

Interlude. A short piece played between the acts of a drama, the sections of a cantata, the verses of a song or the parts of a church service.

Intermezzo (It.) (*ēn′tĕr-mĕd′zō*). An interlude; a short movement in the symphony; one of the parts of the old suite.

Interval. The difference in pitch between two tones; called *harmonic* if between two tones sounded together, *melodic* if between two tones sounded in succession. The intervals of the diatonic scale are: do, *unison* or *prime*; do-re, *second*; do-mi, *third*; do-fa, *fourth*; do-sol, *fifth*; do-la, *sixth*; do-si, *seventh*; do-do, *eighth* or *octave.* Of these the unison, fourth, fifth, and octave are classified as *Perfect.* The second, third, sixth, and seventh are *Major* in the major scale. *Minor Intervals.* These are a chromatic half step smaller than major intervals of the same name. *Augmented Intervals* are a chromatic half step larger than perfect and major intervals. *Diminished Intervals* are a chromatic half step smaller than perfect and minor intervals. Intervals not exceeding an octave are called *simple*; those greater than an octave, *compound.*

Intonation. The act and the art of producing tones with the voice or upon a musical instrument; chanting as employed in rendering certain kinds of Church music. *False intonation.* Incorrect intonation. *Just intonation.* Correct intonation.

Intrepido (It.) (*ēn-trĕ′pē-dō*). Bold, intrepid. *Intrepidamente.* Boldly, intrepidly.

Introduction. An opening strain or short movement which prepares the way for the main body of a composition.

Introit (Eng.) (*ĭn-trō′ĭt*). "Entrance"; a hymn forming a part of the Communion service of many churches, sung as the priest approaches the altar or the Communion table.

Inversion. Changing the position of notes forming intervals, chords, or themes.

Ionian (Gr.). One of the Greek modes.

Ironicamente (It.) (*ē-rōn′ē-kä-mān′tē*). Ironically.

Irrisoluto (It.) (*ēr-rē′sō-lōō′tō*). Irresolute.

Jubilee. A season of rejoicing celebrated by the ancient Hebrews every fiftieth year.

Jubiloso (It.) (*yōō-bē-lō′sō*). Jubilant.

Key. An ascending major or minor diatonic scale is said to be in the *key* of the note with which it starts, and that note is called the *keynote.* The word key is used also to designate the white and black finger levers by which the piano and the organ are played; also applied to the levers which cover and uncover the sound holes of such instruments as the flute and the clarinet.

Keyboard (Ger., klaviatur; Fr., clavier; It., tastatura). The white and black keys or digitals of the piano or the organ taken together. Large pipe organs have three or four keyboards, also called *manuals.*

Keynote. The tonic, or lowest note of any scale, which determines the key of the scale.

Keys, Related. Those differing by not more than one accidental in their respective signatures.

Keys, Remote. Keys having few tones in common.

Knee Stop. A knee lever of the reed organ.

Lamentabile (It.) (*lä-mān-tä′bē-lē*). Mournful. *Lamentabilmente.* Mournfully.

Lamentations. Funeral music of the ancient Hebrews, usually performed by five flutes and a female singer; similar music in Scotland played upon a bagpipe; words from Jeremiah sung in some churches at vespers during Passion Week.

Languido (It.) (*län′gwē-dō*). Languishing. *Languidamente.* Languishingly.

Largamente (It.) (*lär′gä-mān′tē*). Broadly, nobly.

Larghetto (It.) (*lär-gāt′tō*). The diminutive of *largo*; not quite so slow as *largo.*

Largo (It.) (*lär'gō*). Slow, broad; slower than *adagio*, but not so slow as *grave*.

Laryngoscope. An instrument by which the larynx may be examined.

Larynx. The organ of the voice in man and other mammals.

Leading Note. The major seventh of any scale, so called because it demands to be followed by the tonic.

Ledger or **Leger Lines** (*lĕj'ĕr*). Called also *added lines*; short lines added above or below the staff to increase its compass.

Legato (It.) (*lĕ-gä'tō*). Smooth and connected: often indicated by a slur or *legato-mark*; the opposite of *staccato*. *Legatissimo*. The superlative of *legato*; very smooth and connected.

Leggiadro (It.) (*lĕd'jä'drō*). Graceful. *Leggiadramente*. Gracefully.

Leitmotif (Ger.) (*līt'mō-tēf'*). A "guiding theme"; a musical figure or melodic phrase, which labels or represents a certain person, situation, or idea in a modern music drama or opera.

Lento (It.) (*lĕn'tō*). Slow; slower than *andante*, but not so slow as *largo*. *Lentamente*. Slowly.

Lesto (It.) (*lĕs'tō*). Quick, nimble. *Lestamente*. Quickly. *Lestissimo*. Very quick.

Libretto (It.) (*lē-brĕt'tō*). Literally *a little book*; the text of an opera or oratorio.

Lied (Ger.) (*lēt*). A song, a lay. *Volkslied*. A folk song. *Kunstlied*. An art song. *Strophenlied*. A song composed of stanzas. *Durchkomponierteslied*. A song treated musically as a whole.

Ligature. A slur; a group of notes sung to one syllable or in one breath, or bowed with one stroke.

Litany. A solemn supplication, used in liturgical churches, in which the priest sings or recites a petition and the choir or congregation makes a response.

Loco (It.) (*lō'kō*). A word canceling the sign *8va* meaning an octave above, and indicating that the notes should be played as written.

Lullaby. A cradle song.

Madrigal. An unaccompanied song, usually a love song, for three or more voices, often six or eight, making use of counterpoint and imitation; perfected about 1450 in the Netherlands.

Maestoso (It.) (*mä'ĕs-tō'sō*). Majestic, stately. *Maestosamente*. Majestically.

Maestro (It.) (*mä-ĕs'trō*). Master; composer; teacher.

Major. *Greater*; used to signify standard or normal as opposed to minor, diminished, and augmented; applied to intervals, chords, scales, and keys.

Major Scale. The scale in which the half steps occur between the third and fourth, and seventh and eighth tones, both in ascending and descending.

Manual. A key or digital of a keyboard; the keyboard of an organ played by the hands, as opposed to the pedal board played by the feet.

Marcato (It.) (*mär-kä'tō*). Marked, accented; indicated by the sign ⁀.

March. A musical composition of strongly marked rhythm, suitable for accompaniment to marching.

Marcia funebre (It.) (*märt'shä fōō'nä-brĕ*). Funeral march.

Mass. A musical setting of the liturgy of the Eucharist. The subdivisions are: Kyrie, Gloria, Credo, Sanctus, Benedictus, and Agnus Dei.

Mazurka (Pol.) (*mä-zōōr'kä*). A Polish national dance in triple rhythm, usually having a strong accent on the third beat; a composition in the rhythm of this dance.

Measure. The grouping of notes or beats into equal units of rhythm, marked upon the staff by perpendicular lines or bars; hence also the space between two adjacent bars.

Mediant. The name of the third scale step.

Medley. A mixture; a composition made up of detached passages from other compositions; usually applied to vocal music; *potpourri*, to instrumental pieces of this kind.

Melodrama. A species of music drama closely resembling opera, in which the dialogue is accompanied by instrumental music; declamation recited to musical accompaniment.

Melody. A succession of single tones varying in pitch, which produces a pleasing effect; opposed to harmony, which consists of two or more tones sounded simultaneously; the leading part of a composition.

Mesto (It.) (*mĕs'tō*). Sad, pensive.

Meter, Metre. The grouping of notes or beats into units of measure to form rhythm; the distribution of long and short, accented and unaccented notes in the measure.

Metronome (Gr.) (*mĕt'rō-nōm*). An instrument for marking time, which consists of a pendulum making one click for each swing, invented by Maelzel in 1816. The pendulum can be made to swing faster or slower by adjusting a weight.

Metronome Marks. Marks placed at the beginning of a piece of music, as for example "M.M. 90," which means that a quarter note has the value of one click on Maelzel's metronome when the indicator is placed at 90, or that quarter notes should be played at the rate of 90 per minute.

Mezzo (It.) (*mĕd'zō*). Medium, half. *M. forte*. Moderately loud. *M. orchestra*. With only half the orchestra. *M. piano*. Moderately soft.

Mezzo-Soprano (It.) (*mĕd'zō-sō-prä'nō*). A female voice, the range of which lies between the soprano and the alto.

Middle C. One-lined C; the C which is nearest the middle of a piano keyboard; written on the first leger line below the treble clef, or on the first leger line above the bass clef.

Minor. Less; smaller; applied to intervals and to chords, scales, and keys having intervals a semitone less than major.

Minor Scale. This scale has three forms: The *Normal* or *natural minor* has half steps between 2 and 3, and 5 and 6. The *Harmonic minor* is the same except that the 7th tone is raised a semitone. This makes it a scale with half steps between 2 and 3, 5 and 6, 7 and 8, and one step and a half between 6 and 7. The *Melodic minor* has half steps between 2 and 3, and 7 and 8, ascending, while in descending it usually has the form of the normal minor.

Minuet. A slow, graceful dance in triple rhythm, which originated in France about 1650; a composition in the rhythm of this dance.

Modes. A system of scales, used in ancient Greek and in early Church music, which may be described as consisting of overlapping parts of our diatonic scale in C major, or as made up of octaves beginning with various notes and using only the tones represented by the white keys of the piano.

Modulation. Changing from one key to another in a succession of chords; inflecting the voice musically.

Moll (Ger.) (*mŏl*). Minor.

Molto (It.) (*mōl'tō*). Much; very.

Monody (Eng.) (*mŏn'ō-dĭ*). Music in which one voice or part carries the melody; first used about 1600 to designate the solo parts in operas and oratorios.

Mordent (*môr'dĕnt*). An embellishment consisting of a quick alternation between a principal note and the note below, indicated by the mark (^^) placed above the note to be so rendered.

Morendo (It.) (*mô-rĕn'dō*). Dying away.

Motet. An unaccompanied contrapuntal vocal composition with sacred words, which came into vogue about 1300.

Motion. Melodic progression. 1. Motion of a single part, *conjunct* if by single degrees, *disjunct* if by skips. 2. Of two parts, *contrary* or *opposite* if one ascends while the other descends; *oblique* if one remains stationary while the other ascends or descends; *parallel* if both ascend or descend together. 3. Of several parts, *mixed* if two of these motions occur at the same time.

Motive. A musical figure or phrase which serves as the germ from which a composition or a movement is developed.

Movement. Same as *motion*; style of rhythm, as *waltz m.*; a distinct division of a composition having its own key, rhythm, themes, and general character.

Mutation. The change in the male voice occurring at the age of puberty; shifting the position of the left hand in violin playing.

Mute. A small clamp attached to the bridge of a violin, viola, or cello to muffle the tone; a pear-shaped pad inserted in the bell of a wind instrument for the same purpose. The sign for using a mute is *con sordino*; the sign for its removal is *senza sordino*.

Natural. A character (♮) used to cancel the effect of a sharp or a flat; a note so affected; a white key, as of a piano.

Natural Keys. Those having no sharps or flats in the signature, as C major and A minor.

Negligente (It.) (*nä'glē-jĕn'tĕ*). Negligent, careless. *Negligentemente*. Negligently, carelessly.

Ninth. The interval between a fundamental tone and the ninth above.

Nocturne. A "night piece"; a serenade of a dreamy and romantic character.

Nodes. The points at rest, between the loops of a string vibrating in sections of equal length.

Notation. The act and the art of representing music by means of notes and other symbols; these notes and other symbols taken collectively.

Nuances (Fr. pl.) (*nü'ănss'*). Shades of difference in rapidity, force, and expression, which serve to interpret various emotions and musical ideas.

Obbligato (It.) (*ŏb'blē-gä'tō*). *Indispensable*; applied to a part which is essential and cannot be omitted, the opposite of *ad libitum*; recently used also in the sense of "optional," as a *violin obbligato* to a song.

Octave. The interval between a fundamental tone and the eighth diatonic tone above; the whole series of tones within the interval.

Octet. A composition for eight parts or voices; the performers of such a composition taken collectively.

Offertory (*ŏf'ĕr-tō-rĭ*). In the Roman Catholic Church, an anthem or instrumental piece performed while the bread and wine are "presented" to God before consecration, and during which a collection may be taken; in Protestant churches, music performed while an offering is being taken.

Opera (*ŏp'ĕr-ä*). (1) A drama set to music consisting of recitatives, arias, duets, trios, quartets, choruses, etc., with orchestral accompaniment; performed with the aid of scenery, costumes, and action. (2) The plural form of *opus*.

Operetta. A short opera, usually in a light vein.

Opus (Lat.) A musical work or composition; as, Op. 1, the first work.

Oratorio (*ŏr'ä-tō'rĭ-ō*). A drama with Scriptural text, set to music; performed without the aid of scenery, costumes, or action.

Orchestra (*ôr'kĕs-trȧ*). 1. A band of musicians performing upon various instruments. The modern orchestra employs four kinds of instruments: (1) *stringed*, belonging to the violin family; (2) *wood-wind*,—flutes, oboes, clarinets, and bassoons; (3) *brass*,—trumpets, horns, and trombones; (4) *percussive*,—kettledrums, cymbals, triangle, and bells. 2. The space in a theater occupied by the band or orchestra.

Organ Point. See *Pedal Point*.

Ornamental Notes. Unessential notes introduced for the purpose of embellishment, such as *acciaccatura*, *appoggiatura*, *grace notes*, *trill*, *turn*.

Ostinato (It.) (*ŏs-tē-nä'tō*). Obstinate, continuous; applied to a ground bass or a melodic figure often repeated.

Ottava alta (It.) (*ôt-tä'vä äl'tä*). Marked *8va*, placed above a passage to indicate it should be played an octave higher than as written. *Ottava bassa*. Marked *8va* or *8va bassa*, placed below a passage to be played an octave lower.

Overture (Eng.) (*ō'vĕr-tûr*). An introduction to an oratorio, opera, or other large composition.

Paraphrase. The rearrangement of a composition for some other instrument than that for which it was originally written.

Parlando (It.) (*pär-län'dō*). In a recitative or speaking manner.

Part. The music for any one voice or instrument.

Partita (It.) (*pär-tē'tä*). A composition consisting of a collection of dance tunes, which came into vogue about 1700; also called *suite*.

Partitura (It.) (*pär-tē-tōō'rä*). The full score, the entire draft of a composition for voices and instruments.

Part Song. An unaccompanied song for three or four voices, which originated in Germany.

Passage. Any portion of a composition having a characteristic trait by which it may be identified.

Passepied (Fr.) (*päs'pyā'*). A lively French dance in triple time, which originated in the 16th century; a composition in the rhythm of this dance.

Passing Notes. Notes not essential to the harmony but serving to make smooth the transition from one chord tone to another.

Passionato (It.) (*päs'syō-nä'tō*). Passionate. *Passionatamente*. Passionately.

Passion Music. The story of the suffering and death of Christ set to music; similar to a cantata or an oratorio.

Pasticcio (It.) (*päs-tēt'shō*). A medley; an opera made up of selections from other operas.

Pastorale (It.) (*päs'tô-rä'lĕ*). A music drama dealing with rural life; a vocal or instrumental composition suggestive of rural life.

Patetica (It.) (*pä-tē'tē-kä*). Pathetic. *Pateticamente*. Pathetically.

Pause. A rest. See *Hold*, *Fermata*.

Pedal. A foot lever, as piano pedal, organ pedal, harp pedal.

Pedal Keys. A set of pipe organ keys played by the feet.

Pedal Point. A bass note which is held while the harmony of the other parts varies; called *inverted p.p.* if any other than the bass note is held; the passage in which pedal point occurs.

Pentatonic Scale. A five-toned scale; the same as our major diatonic scale with the fourth and seventh tones omitted.

Percussion Instruments (*pĕr-kŭsh'ŭn*). Those which are sounded by striking, as drums, cymbals, triangles, tambourines, bells, chimes, castanets, and the xylophone.

Period. A musical sentence; it is composed of two or more phrases, usually of four measures each, and closes with a cadence.

Phrase. A musical clause, corresponding to a line of a poem.

Phrasing. A musical punctuation; in piano music it refers to varieties of touch; in singing, to breathing places; in violin music, to bowing.

Phrygian (Gr.). One of the Greek modes; the name of a cadence. See *Cadence*.

Pianissimo (It.) (*pyä-nēs'sē-mō*). Very soft.

Piano (It.) (*pyä'nō*). Soft.

Pietoso (It.) (*pyĕ-tō'sō*). Compassionate, tender. *Pietosamente*. Compassionately, tenderly.

Pitch. That property of musical sounds, or tones, which we recognize when we speak of them as high or low; the vibration number of a tone; a standard of pitch, as *International p.*, now used in all civilized countries except England, in which the A above middle C has 435 vibrations a second.

Più (It.) (*pyōō*). More. *Più lento*. More slowly. *Più mosso*. More rapidly.

Pizzicato (It.) (*pēt'sē-kä'tō*). Pinched; indicating that the strings should be plucked, not bowed.

Plàcido (It.) (*plä'tshē-dō*). Placid, calm. *Placidamente*. Placidly, calmly.

Plagal. 1. Church modes beginning a fourth below the authentic and distinguished by the word hypo. 2. Also the name of a cadence. See *Cadence*.

Plain Song. A nonmetrical chant in one of the ecclesiastical modes, common in early church music; such a melody serving as *cantus firmus* in a contrapuntal composition; any simple tune or melody.

Poco (It.) (*pō'kō*). Little.

Poco a poco (It.). Little by little; by degrees.

Polka. A lively dance in 2-4 time, which originated in Bohemia about 1830.

Polonaise (Fr.) (*pŏl'ô-nāz'*). A stately Polish dance in triple rhythm, used as an instrumental form particularly by Chopin.

Polyphony. Music in which the parts or voices are melodically independent while at the same time in harmony; contrapuntal music; opposed to *homophony*, in which one part carries the melody.

Pomposo (It.) (*pōm-pō'sō*). Pompous. *Pomposamente*. Pompously.

Ponderoso (It.) (*pŏn'dĕ-rō'sō*). Ponderous, massive, heavy.

Portamento (It.) (*pôr'tä-mān'tō*). 1. A smooth gliding from one tone to another. 2. A piano touch, semi-staccato, used when notes are marked with dots over which a slur is drawn ().

Position. The place of the left hand upon the finger board of a violin or similar instrument; the place of any note in a chord in relation to the lowest note.

Postlude (*pōst'lūd*). Afterpiece; a closing piece, as a voluntary at the close of a church service. Often found at the close of compositions which begin with a Prelude, the Postlude being a counterpart of the former. See *Prelude*.

Potpourri (*pō'pōō'rē'*). A composition composed of fragments of other compositions; a medley.

Precentor. The leader of a church choir or of congregational singing.

Precipitato (It.) (*prĕ-tshē'pē-tä'tō*). Hurried. *Precipitamente*. Hurriedly.

Preciso (It.) (*prĕ-tshĕ'zō*). Precise, exact.

Prelude. An introductory strain, section, or movement, complete in itself; opposed to *introduction*, which leads directly into the following principal section of the composition.

Preparation. Preparing the way for a discordant note by using it in an immediately preceding harmonious chord.

Prestissimo (It.) (*prĕs-tĕs'sē-mō*). Very quick; the superlative of *presto*.

Presto (It.) (*prĕs'tō*). Quick, rapid.

Prima donna (It.) (*prē'mȧ dŏn-nȧ*). The leading female singer in an opera.

Program Music. Music intended to portray or suggest a definite series of objects or events; first applied to Beethoven's "Pastoral Symphony."

Progression. *Melodic* progression is the passage from tone to tone in a succession of single tones; *Harmonic p.*, the passage from chord to chord in a succession of chords.

Pronunziato (It.) (*prō-nōōn'tsy̆ä'tō*). Pronounced, marked.

Psalm. A sacred song.

Quadrille (Fr.) (*kwȧ-drĭl'*; *kä'drēl'*). A French square dance of five figures in 6-8 or 2-4 time; the music for such a dance.

Quartet (Eng.) (*kwôr-tĕt'*). A composition of four parts or voices, each part for one voice or instrument; the four performers rendering a quartet.

Quasi (It.) (*kwä'zē*). In the style of.

Quickstep. A quick and spirited march, generally in 6-8 time.

Quintet. A composition arranged for five voices or instruments.

Rallentando (It.) (*rȧl'lĕn-tän'dō*). Gradually slower.

Rapido (It.) (*rä'pē-dō*). Rapid. *Rapidamente*. Rapidly.

Recitative (*rĕs'ĭ-tȧ-tēv'*). Musical declamation. *Recitativo secco*. Declamation with but slight accompaniment. *Recitativo stromentato*. Declamation with orchestral accompaniment.

Reel. A lively dance popular in Scotland, danced by two couples. *Virginia r.* A variant form popular in the United States, requiring a large number of dancers.

Refrain. The *burden* or chorus of a song, repeated at the end of each stanza.

Register. The range of a voice or musical instrument; a portion of the range of a voice or instrument composed of tones having the same quality; an organ stop.

Religioso (It.) (*rĕ'lē-jō'sō*). Religious. *Religiosamente*. Religiously, devoutly.

Requiem (Lt.) (*rē'kwĭ-ĕm*; *rĕk'wĭ-ĕm*). A mass for the dead; a musical setting for the same.

Resolution. Placing a harmonious chord after a discordant one in order to dissolve, or resolve, the discord into concord.

Rest. A character indicating silence.

Retard. To slacken the speed gradually.

Retardation. Carrying a note of one chord over into another in which it produces a discord that must be resolved by raising the discordant note a tone or semitone. Compare with *Suspension*.

Rhapsody (*răp'sō-dĭ*). A composition, irregular in form, expressing ecstasy or wild joy.

Rhythm (*rĭ'tʜm*). Movement characterized by regular, measured, or harmonious recurrences of stress or impulse, beat, sound, accent, or motion. As a musical factor it deals with pulsations logically grouped by means of accents.

Rigoroso (It.) (*rē'gō-rō'sō*). Rigorous, exact.

Rinforzando (It.) (*rēn'fôr-tsän'dō*). Re-enforced, accented.

Risoluto (It.) (*rĭ'sō-lōō'tō*). Resolute, determined.

Ritardando (It.) (*rē'tär-dän'dō*). Retarded, gradually slower.

Ritenuto (It.) (*rē'tē-nōō'tō*). Immediately slower.

Ritornello (It.) (*rē'tōr-nĕl'lō*); **ritornelle** (Fr.) (*rĭt'ŏr-nĕl'*). A short instrumental passage in a vocal composition, as a prelude or a refrain; the *tutti*, or full orchestra parts of a concerto.

Romance. A vocal or instrumental composition of a romantic character, without a fixed form.

Rondo (It.) (*rŏn'dō*). A vocal or instrumental composition in which the first strain recurs after each of the other strains.

Root. The fundamental note of any chord; the lowest note if the chord is in its natural position, but some other, if the chord is inverted.

Roulade (Fr.) (*rōō'lȧd'*). A florid passage; in vocal music, a number of notes sung to one syllable.

Round. A vocal canon for three or more voices. The first voice sings the melody. The others sing the same melody but enter in turn, each a few measures later than the one before, thus producing the effect of a song going around in a circle.

Rubato (It.) (*rōō-bä'tō*). Robbed; stolen; that is, some tones held a trifle beyond their value, at the expense of the others.

Run. An ornament consisting of a rapid succession of notes.

Rustico (It.) (*rōōs'tē-kō*). Rustic, rural.

Saltando (It.) (*sȧl-tän'dō*); **sautillé** (Fr.) (*sō'tē'y̆ā'*). In violin music, with a skipping or bounding bow; introduced by Paganini.

Saltarella (It.) (*sȧl'tä-rĕl'lȧ*). A quick Italian dance, usually in triple rhythm, with a hop step at the beginning of each measure; music in the rhythm of this dance.

Saraband (Eng.) (*săr'ȧ-bănd*). A slow Spanish dance in triple rhythm, which originated among the Saracens; music in the rhythm of this dance.

Scale. A "ladder." A series of tones ascending by regular intervals, and descending, usually in the same order. The interval scheme of the modern scale is the octave. The standard and most common form is called *major*. Variant forms are the three *minor* scales—normal, harmonic, and melodic—and the *chromatic*.

Scena (It.) (*shä'nȧ*). The largest vocal solo form, usually part of an opera, but sometimes an independent composition.

Scherzando (It.) (*skär-tsän'dō*). Sportive, playful.

Scherzo (It.) (*skär'tsō*). An instrumental composition of a humorous, playful, or whimsical character.

Schottisch (Ger.) (*shŏt'tĭsh*). A Scotch round dance in triple rhythm, resembling the polka but slower; music in the rhythm of this dance.

Sciolto (It.) (*shôl'tō*). Light, nimble. *Scioltamente*. Lightly, nimbly.

Score (Ger., partitur; Fr., partition; It., partitura). Music written upon a number of staves, one for each instrument or voice, and so arranged, one above another, that the relation of any one to the others can be seen at a glance. See *Partitura*.

Second. The interval between a fundamental tone and the next diatonic tone above.

Section. A division of a musical period; a phrase; also a group of periods forming a complete and distinct musical idea.

Secular Music. Music intended for a theater or concert hall, as opposed to *sacred* music.

Semitone (Eng.) (*sĕm'ĭ-tōn'*). A tone separated from another by a half-step interval.

Sentimento (It.) (*sĕn'tē-mān'tō*). Sentiment; feeling.

Senza (It.) (*sän'tsȧ*). Without.

Septet (Eng.) (*sĕp-tĕt'*). A composition for seven instruments or voices; the performers of such a composition.

Sequence (Eng.) (*sē'kwĕns*). The repetition of a group of notes or chords at different intervals, usually each time a diatonic step higher or lower.

Serenade (Fr.) (*sĕr'ĕ-nȧd'*; *sä'rä'nȧd'*). Originally a song sung after sundown by a lover under the window of his ladylove; now any composition of that general character.

Sereno (It.) (*sȧ-rā'nō*). Serene, calm.

Serioso (It.) (*sȧ-ryō'sō*). Serious, grave.

Seventh. 1. The seventh diatonic tone above a fundamental. 2. The interval between a keynote and the seventh step.

Sextet. A composition for six voices or instruments; the performers of such a composition.

Sextole. A group of six equal notes, to be played in the time of four.

Sfogato (It.) (*sfō-gä'tō*). Light and airy style; a high soprano voice.

Sforzando (It.) (*sfôr-tsän'dō*). Emphasis upon a certain note or chord; marked *sf.* or /\ or >.

Shake. An embellishment consisting of a rapid alternation between two tones separated by a whole step or a half step; also called a *trill*; marked *tr.*

Sharp. 1. A mark (♯) which, placed before a note or in the key signature, raises the note or notes affected one semitone. 2. Above the proper pitch, as one sings or plays sharp.

Signature. The marks and numerals placed upon the staff at the beginning of a piece of music. *Key signature.* The clef and sharps or flats which indicate the key of a composition. *Time signature.* The numerals in fractional form which indicate the number and kind of notes composing a measure.

Sixteenth Note. A note having one-sixteenth the time value of a whole note.

Sixteenth Rest. A pause having the duration of a sixteenth note.

Sixth. 1. The sixth diatonic tone above a fundamental. 2. The interval composed of the fundamental and the sixth step.

Sixty-fourth Note. A note having one sixty-fourth the duration of a whole note.

Sixty-fourth Rest. A pause having the duration of a sixty-fourth note.

Skip. Any interval between two adjacent notes in a melody greater than a whole step.

Slargando (It.) (*zlär-gän'dō*). Gradually broader and slower.

Slentando (It.) (*zlĕn-tän'dō*). Gradually slower.

Slur. A curved line drawn over or under two or more notes to indicate that the transition from one to another should be smooth.

Smorzando (It.) (*zmôr-tsän'dō*). Quenched, suddenly dying away.

Sol-faing. Singing the tones of the scale to the monosyllables *do, re, mi, fa, sol, la, si.*

Solfeggio (It.) (*sōl-fäd'jō*). A singing exercise in which a single vowel or the syllables *do, re, mi, fa, sol, la, si* are used.

Solo (It.) (*sō'lō*). Performed alone by one voice or instrument; opposed to *concerted*; a composition for a single voice or instrument.

Sonata (It.) (*sō-nä'tä*). An instrumental composition made up of three or four movements in different though related keys and in different forms and moods. A very important musical form.

Sonatina (It.) (*sō'nä-tē'ná*). A short, simple sonata, usually in two or three movements.

Song. A lyric poem set to music. *Folk song.* A simple, popular song usually in several stanzas, the same music serving for each stanza. *Art song.* One which is the product of a cultivated taste, usually with different music for each stanza and treated as a whole musically.

Soprano (It.) (*sō-prä'nō*). The highest female or boy's voice; the treble.

Sordamente (It.) (*sōr'dä-män'tĕ*). Muffled, soft.

Sordino (It.) (*sōr-dē'nō*). See *Mute.*

Sostenuto (It.) (*sōs'tĕ-nōō'tō*). Sustained; gradually retarded.

Sotto voce (It.) (*sōt'tō vō'shĕ*). In a low voice, in an undertone.

Space. The degree or interval between two lines of the staff.

Staccato (It.) (*stäk-kä'tō*). Separated, distinct, detached.

Staff. The five horizontal lines, on and between which music is written.

Step. The interval between two adjacent tones in the scale or between two adjacent degrees of the staff.

Stop (n). A set of organ pipes having the same quality of tone, though differing in pitch; the draw knob which controls such a set of pipes; in a reed organ, a draw knob controlling a set of reeds. *Stop* (v.). To press a string of a violin or similar instrument with a finger so as to alter the pitch of its tone.

Strain. A complete period, its close being indicated upon the staff by a double bar; a melody or tune.

Strepitoso (It.) (*strĕp'ē-tō'sō*). Boisterous. *Strepitosamente.* Boisterously; impetuously.

Stretto (It.) (*strät'tō*). Compressed, contracted; in a fugue, the part composed of an overlapping of subject and answer.

Stringendo (It.) (*strēn-jĕn'dō*). Binding together; sudden accelerando with increase in loudness.

String Quartet. Music written for four stringed instruments, usually two violins, a viola, and a cello; the performers of such music.

Subdominant. The dominant below; the fourth tone of the diatonic scale, which is in the same relation to the keynote from below as the *dominant* is from above.

Subito (It.) (*sōō'bē-tō*). Sudden; immediate. *Subitamente.* Suddenly; immediately.

Subject. The theme or melodic phrase which serves as the groundwork of a movement or composition.

Submediant. The sixth tone of the diatonic scale.

Subtonic. Under the tonic; the seventh tone of the diatonic scale.

Suite (Fr.) (*swēt*). A large orchestral composition consisting of a series of movements in any one of a number of forms and in different keys, sometimes a collection of distinct compositions; formerly, a cycle of dance tunes.

Supertonic. The tone one degree above the tonic in the diatonic scale.

Suspension. Displacing a chord tone by retaining, in its stead, a tone from the preceding chord. This produces a momentary dissonance which is resolved by moving the discordant tone into the chord tone which it had displaced. An upward suspension is called a *retardation.*

Sussurando (It.) (*sōōs'sōō-rän'dō*). Whispering, murmuring.

Symphonic Poem. A large orchestral composition, originated by Liszt, which differs from the sonata and the symphony in that it is descriptive or narrative and consists of one movement instead of several.

Symphony. A sonata for orchestra, usually in four movements and never less than three.

Syncopation. The displacement of the regular metrical accent by an optional accent upon an otherwise unaccented beat or fraction of a beat, or the combining of note values upon two beats or fractions to form one note upon a nonaccent.

Tablature (Eng.) (*tăb'lä-tûr*). Now obsolete systems of notation, differing for each instrument, indicating the string, finger hole or key to be used instead of the note to be played; the tonic sol-fa system.

Tarantella (It.) (*tä'rän-tĕl'lä*). An Italian dance in rapid 6-8 rhythm, usually performed by one couple and accompanied by tambourines and castanets; a composition in the rhythm of this dance.

Technic (*tĕk'nĭk*). Manner of execution; musical skill.

Tema (It.) (*tĕ'mä*). Theme, subject, melody.

Temperament or **Equal Temperament.** The modern system of tuning instruments by modifying the pure scale so that twelve equal semitones are made to serve for all naturals, sharps, and flats.

Tempestoso (It.) (*tĕm'pĕs-tō'sō*). Tempestuous, stormy. *Tempestosamente.* Tempestuously.

Tempo (It.) (*tĕm'pō*). The rate of speed at which a composition should be played, indicated at the beginning by such words as *largo, adagio, lento, allegro,* etc. *T. giusto.* In strict time. *T. ordinario.* Ordinary or moderate time. *T. primo.* First or original time. *T. rubato.* "Stolen" or irregular time.

Tenero (It.) (*tĕ'nĕ-rō*). Tender. *Teneramente.* Tenderly.

Tenor. The high male voice; a musical instrument, the range of which corresponds to the high male voice.

Tenuto (It.) (*tĕ-nōō'tō*). Held, sustained.

Tessitura (It.) (*tĕs'sē-tōō'rä*). The average pitch of the tones in a composition, as high or low.

Tetrachord (Gr.). A scale series of four tones; half of an octave.

Theme. The subject or melody from which a composition is developed.

Thesis (Gr.) (*thē'sĭs*). The down beat; the accented part of a measure; the opposite of *arsis.*

Third. The interval between a fundamental tone and the third diatonic tone above.

Thirty-second Note. A note having a time value equal to one thirty-second of a whole note.

Thirty-second Rest. A rest having the duration of a thirty-second note.

Tie. A curved line connecting two or more notes of the same pitch to indicate they should be played as one.

Time. The rate of speed at which a piece of music should be played. See *Tempo.* Also commonly, but less properly, used as synonymous with *measure* or *rhythm.* See *Measure.*

Timoroso (It.) (*tĭ'mô-rō'zō*). Timorous, timid. *Timorosamente.* Timorously, timidly.

Toccata (It.) (*tŏk-kä'tä*). A composition for the organ or harpsichord, popular in the 16th century, free in style, resembling the *capriccio*; later a similar composition adapted to the display of technical skill.

Tone. A sound whose vibrations are sufficiently regular to give it a definite pitch.

Tonic Sol-fa. A method of teaching vocal music, invented by Miss Sarah Ann Glover, of Norwich, England,

about 1812, and perfected by the Rev. John Curwen. It employs the syllables *do, re, mi, fa, sol, la, si,* with modifications for sharps and flats.

Touch. The style of touching or striking the keys of a piano, organ, or similar instrument; the resistance of the keys, as light or heavy touch.

Tranquillo (It.) (*trän-kwēl'lō*). Tranquil, calm. *Tranquillamente.* Tranquilly, calmly.

Transition. An abrupt change from one key to another or from one theme to another.

Transpose. To change a composition from one key to another, thus raising or lowering its pitch.

Treble. 1. The highest voice or part; the soprano. 2. Often used as the name of the G clef.

Tremolo (It.) (*trĕm'ō-lō*). The rapid repetition of a note or chord which produces the effect of trembling or quivering. *Tremolo stop.* A mechanism within the pipe organ, which, when brought into use, causes the tones to tremble or flutter.

Triad. Any chord composed of a fundamental tone and the third and fifth above.

Trill (Ger., triller; Fr., trille; It., trillo; Eng., shake). See *Shake.*

Trio (It.) (*trē'ō*). 1. A composition for three voices or instruments; the performers of such a composition. 2. The second part of a march or minuet.

Triplet. A group of three equal notes played in the time of two of like time value; indicated by the sign $\overset{3}{\frown}$ or 3, placed above or below the notes affected.

Tune (n.). An air or melody. (v.) To adjust an instrument so that its tones harmonize with one another or so that the instrument harmonizes with another instrument.

Tuning Fork. A small steel instrument with two prongs sounding a fixed tone when struck; useful as a standard of pitch in tuning musical instruments.

Turn. An embellishment following a note, which consists of rapid alternation between the principal note, the note a step above, and the note a half step below; marked ∾. The turn is also used at the close of a *shake* or *trill.*

Tutti (It.) (*tōōt'tē*). All; full orchestra or full chorus; a direction that all should perform together.

Una corda (It.) (*ōō'nä kôr'dä*). One string; a direction in piano music that the soft pedal should be used.

Unison. 1. Identical in pitch; music is said to be in unison when all the voices or instruments perform the same part. 2. Another name for the interval *prime.*

Variations. Elaborations of a theme in a variety of forms differing in time, melody, harmony, or key.

Veloce (It.) (*vĕ-lō'chĕ*). Swift. *Velocemente.* Swiftly. *Velocissimo.* With extreme rapidity.

Verse. That portion of an anthem, or service, to be performed by one singer to each part; a stanza.

Vigoroso (It.) (*vē'gō-rō'sō*). Vigorous, bold. *Vigorosamente.* Vigorously, boldly.

Violento (It.) (*vē-ō-lĕn'tō*). Violent. *Violentemente.* Violently.

Virtuoso (It.) (*vēr'tōō-ō'sō*). One who is a skillful performer upon some musical instrument.

Vivace (It.) (*vē-vä'chĕ*). Lively, vivacious.

Vivamente (It.) (*vē-vä-mān'tē*). Quickly; in an animated manner.

Vocal. Pertaining to the human voice.

Voice. Sound produced by the vocal organs in singing or speaking; the faculty of uttering sound.

Voice Part. Any part for a voice or a musical instrument.

Voicing. Tuning an organ pipe.

Volteggiando (It.) (*vōl'tăd-jän'dō*). Crossing the hands in playing the piano.

Volume. The quantity or fullness of a tone.

Voluntary. An organ prelude; an organ solo, often extemporaneous, played before, during, or after a church service.

Waltz. A round dance in triple rhythm, performed by couples whirling around and advancing around the room; music in the rhythm of this dance.

Whole Note. The longest note in common use. Shorter notes are looked upon as fractional parts of the whole note.

Whole Rest. A rest equal in duration to a whole note.

Whole Step. A major second; the interval between a fundamental tone and the next diatonic tone above.

Zingaresca (It.) (*tsĭn-gä-rās'kä*). In the style of gypsy music.

STORIES OF THE LEADING OPERAS

Africaine (*äf-rĭ-kān'*), **L'.** The last and most consistent of Meyerbeer's grand operas; original text by Scribe; première Paris in 1865.

Vasco da Gama, the famous explorer, is the betrothed lover of a maiden named Inez, the daughter of Don Diego, a Portuguese grandee. When the opera opens he is still at sea, and has not been heard from for years. Don Pedro, the president of the council, takes advantage of his absence to press his own suit for the hand of Inez, and obtains the king's sanction to his marriage on the ground that Vasco must have been lost at sea. At this moment the long-lost hero returns, accompanied by two swarthy slaves, Selika and Nelusko, whom he has brought home with him from a distant isle in the Indian Ocean. He recounts the wonders of the place, and entreats the government to send an expedition to win an empire across the sea. His suggestions are rejected, and he himself, through the machinations of Don Pedro, is cast into prison. There he is tended by Selika, who loves her gentle captor passionately, and has need for all her regal authority—for on the distant island she was a queen—to prevent the jealous Nelusko from slaying him in his sleep. Inez now comes to the prison to announce that she has purchased his liberty at the price of giving her hand to Don Pedro.

In the next act, Don Pedro, who has stolen a march on Vasco, is on his way to the African island, taking with him Inez and Selika. The steering of the vessel is intrusted to Nelusko. Vasco da Gama, who has fitted out a vessel at his own expense, overtakes Don Pedro in mid-ocean, and generously warns his rival of the treachery of Nelusko, who is steering the vessel upon the rocks of his native shore. Don Pedro's only reply is to order Vasco to be tied to the mast and shot, but before the sentence can be carried out the vessel strikes upon the rocks, and the natives swarm over the sides. Selika, once more a queen, saves the lives of Vasco and Inez from the angry natives.

In the next act the nuptials of Selika and Vasco are on the point of being celebrated with great pomp, when the hero, who has throughout the opera wavered between the two women who love him, finally makes up his mind in favor of Inez. Selika thereupon magnanimously dispatches them home in Vasco's ship, and poisons herself with the fragrance of the deadly manchineel tree.

Aïda (*ä-ē'dä*). Music by Verdi; words by Locle, translated into Italian by Ghislanzoni; the most popular of Verdi's operas, except possibly "Il Trovatore"; première Cairo 1871, New York 1873; impressive open-air production at the foot of the pyramids in Egypt, 1912.

Aïda, daughter of Amonasro, king of Ethiopia, is the prisoner of the Egyptians and has been given as slave to Amneris, the king's daughter. Both love the warrior Radames, chief of the Egyptian army, but he cares only for Aïda. Amneris vows deadly vengeance against the slave.

Radames, having crushed the revolt in Ethiopia, returns in triumph, bringing a horde of prisoners, including Amonasro. The king of Egypt embraces Radames, bids Amneris crown him with a wreath of victory, and promises, as a reward, any boon he may request. Radames asks only that the prisoners be restored to liberty. The king orders that all be released except Amonasro and Aïda. He also bestows upon Radames his daughter Amneris in marriage, but Radames assures Aïda that he will be true to her.

Amonasro persuades his daughter to save her people by extracting from her lover the plan of the route the Egyptian army will take next day. At a clandestine meeting in the temple of Isis, Aïda induces Radames to tell her the secret. Amonasro, hidden behind a pillar, overhears it and escapes, exulting in his knowledge.

Then Amneris, who had entered the temple to ask a blessing upon her coming marriage, appears. Her pleas that Radames forsake Aïda being of no avail, she denounces him as a traitor. However, she offers him pardon if he will accept her love and forsake Aïda. He refuses and is condemned by a court of priests to be immured in a prison vault beneath the temple. There he finds Aïda, who has discovered a means of getting in and has made up her mind to die with her lover. With visions of heavenly bliss, of "never fading, endless love," they expire in each other's arms while the solemn chant of the priestesses in the temple above mingles with the sighs of the heartbroken Amneris.

Andrea Chénier (*än-drā'yä shā-nyā'*). A stirring tale of the French Revolution; music by Umberto Giordano; words by L. Illica; première Milan 1896.

The plot centers in the rivalry of Chénier, the poet, and Gerard, a revolutionary leader, for the hand of Madeleine. Gerard condemns Chénier to death, but is melted by Madeleine's pleading and rescinds the order for the execution. The pardon, however, comes too late, and Madeleine and Chénier ascend the scaffold together, in an ecstasy of lyrical rapture.

Barber of Seville, The. *Il Barbiere di Siviglia.* A comic opera; music by Rossini; words by Sterbini; plot from a story of Beaumarchais; première Rome 1816, New York 1825.

Count Almaviva has fallen in love with Rosina, a charming damsel, whom her guardian, Doctor Bartolo, having an eye to her dowry, keeps under lock and key, hoping to win her for himself. Figaro, ubiquitous barber, takes the count under his protection and smuggles him into the house in the guise of a soldier, announcing that he has been billeted there. An argument follows, and the scheme is frustrated by the arrival of the police. The count barely escapes.

Later, upon Figaro's advice, the count succeeds in getting into the house as a music master. In order to gain Bartolo's confidence, he shows him one of Rosina's letters to himself, pretending that he had received it from a mistress of Almaviva. Bartolo, delighted with the news of the count's infidelity, hastens to tell the scandal to Rosina. Her jealousy aroused, she agrees to marry Bartolo. A notary is sent for that the marriage contract may be signed. Happily, while Bartolo's back is turned, the count finds an opportunity of persuading Rosina of his constancy. Figaro bribes the notary to draw up the contract as between the count and Rosina, and Bartolo is duped into signing. When he finds how matters stand, he tries to make the best of it, and, as the count relinquishes Rosina's dowry to him, he is persuaded to be gracious.

Bartered Bride, The. *Prodana Nevesta.* A comic opera; music by Smetana; words by Sabina; première Prague 1866, New York 1909.

Marie lives in Bohemia. Her parents have arranged through Kezul, the marriage broker, that she shall marry Wenzel, the half-witted son of a wealthy peasant, Micha, living in another village. Marie refuses, for she loves Hans, a servant in her father's house.

The marriage broker offers Hans 300 crowns if he will give up Marie. He accepts, on condition that Marie shall marry none other than a son of Micha. Marie is in despair. She is on the point of accepting Wenzel, when Hans makes public declaration that he is the son of Micha by a former marriage, having left home because he disliked his stepmother. As the money remains in the family, there is no objection. Hans and Marie are married and live happily ever after.

Bohème, La (*là bō'ĕm'*). Music by Puccini; words by Giacosa and Illica; plot from Murger's novel entitled *Vie de Bohème*; première Turin 1896, San Francisco and New York 1898.

La Bohème is a story of the mingled joy and grief of Bohemian life in Paris. Four young men—Rudolph a poet, Marcel a painter, Colline a philosopher, and Schaunard a musician—live in a garret in the Latin Quarter. It is Christmas Eve. Marcel keeps the landlord at bay until the arrival of Schaunard with an unexpected windfall of money and provisions. After a feast at home, they decide to go to the Café Momus, leaving Rudolph to finish a manuscript.

Mimi, an embroideress, who lives in an adjoining garret, comes to ask a light for her candle. In the draft, Rudolph's candle goes out. Their hands touch. A love duet follows, and the lovers go to join their friends. At the Café Momus, Musette appears with an elderly banker, Alcindoro, for whom she had given up Marcel. She sends Alcindoro on an errand, flies into the arms of Marcel, and joins the party. The jolly revelers leave the bill for Alcindoro to pay.

Mimi and Musette soon weary of the poverty of their Bohemian lovers and accept the attentions of more affluent suitors.

A few weeks later Mimi, ill and abandoned by her viscount, is brought back by Musette. Rudolph places her upon his bed. Marcel calls a doctor; Colline goes out to pawn his overcoat and buy food. It is too late. Weakened by privations and by a dread cough, Mimi breathes her last on the little bed in the attic.

Bohemian Girl, The. Music by Balfe; words by Bunn; plot from a ballet entitled "The Gypsy," by St. Georges and Marzillier; première London 1843, New York 1844.

Thaddeus, an exiled Polish rebel, who has joined a band of gypsies to escape arrest, saves the life of Arline, the six-year-old daughter of Count Arnheim, governor of Pressburg. In gratitude the count invites him and the gypsies to a feast. Thaddeus refuses to drink to the health of the emperor. Confusion ensues. Devilshoof, the leader of the gypsies, tries to protect Thaddeus and is imprisoned. Thaddeus is allowed to go. Devilshoof escapes and carries off Arline.

Twelve years elapse. Arline is grown to womanhood, but all the other characters, strange to say, remain at precisely the same age as in the first act. Thaddeus and Arline, having long loved each other, are united by the gypsy queen, but she swears vengeance, for she too loves Thaddeus. Devilshoof robs Florestan, the count's nephew, of his jewels. The gypsies attend a fair in Pressburg. By the queen's machinations Arline is decorated with a stolen medallion. Florestan sees the trinket and accuses her of theft. Arline is brought before her own father for sentence. The inevitable recognition ensues.

Thaddeus makes known his noble birth and his heroic deeds in battle. The count accepts him as his daughter's suitor. During the betrothal feast, a gypsy assassin attempts to shoot Thaddeus. Devilshoof pushes aside the weapon, and the bullet pierces the heart of the gypsy queen.

Boris Godounov (*gō'dōō-nŏf'*). Opera by Mussorgsky, based upon a historical drama by Púshkin; première Petrograd 1873, New York 1913.

Boris Godounov, while regent, killed Dmitri, the legal heir to the throne of Russia, and had himself proclaimed czar. Gregory, a monk resembling the murdered prince, impersonates him and starts a rebellion to overthrow the usurper. Boris, who is haunted by specters and hears voices accusing him of murder, dies of fear.

Carmen. Music by Bizet; words by Meilhac and Halévy; plot from Mérimée's romance of the same name; at first received with a storm of abuse, but now counted among the three or four most popular operas in the modern repertory; première Paris 1875, New York 1879.

Carmen, a beautiful and passionate gypsy girl, is arrested for stabbing one of her comrades in a cigarette factory in Seville. She uses all her powers of fascination upon Don José, a young officer of the guard, who is in charge of her. Because of her charms and soft words, José allows her to escape, having arranged to meet her at the tavern of Lillas Pastia.

For this offense, he suffers two months' imprisonment. At the expiration of his sentence, José appears at the tavern, a resort of smugglers, though a new suitor, the bullfighter Escamillo, has laid siege to Carmen's heart. When the bugle call to duty is sounded, José starts to leave. Because of the taunts of Carmen, he decides to remain. He quarrels with an officer who commands him to go, and to escape punishment he deserts the army to join the gypsies.

At the camp of the gypsies, José repents of his folly, and Carmen tires of her love. José, who is jealous of Escamillo, fights a duel with him. He is about to kill the bullfighter when Carmen intervenes. Micaela, the boyhood sweetheart of José, arrives with a message from his dying mother. José departs, promising to return for revenge.

Escamillo has invited all his friends to attend his bullfight in Seville. José goes to plead once more with Carmen. Carmen spurns him and flings back his ring. In rage and despair, José stabs Carmen through the heart just as shouts are heard from the arena, announcing the victory of Escamillo.

Cavalleria Rusticana (*kä-väl-lä-rē'ä rŭs-tē-kä'nä*). Music by Mascagni; words by Targioni-Torzetti and Menasci; adapted from a Sicilian tale of the same name by Verga; première Rome 1890, New York 1891.

Cavalleria Rusticana is a picture of Sicilian rustic chivalry. Turriddu has returned from the war to find his sweetheart, Lola, married to a rich carter, Alfio. Though he has since paid court to Santuzza, the coquetries of Lola infatuate him, and she soon wins him back to her side.

It is Eastertide, and while the villagers are in the church the deserted Santuzza waits outside to meet Turriddu. When he arrives she appeals in vain to his love and pity. Lola, passing, mocks Santuzza and entices Turriddu away. Lola and Turriddu enter the church; Santuzza attempts to follow but falls upon the steps, just as Alfio comes up. In despair she tells him of his wife's infidelity.

Later Turriddu, in merry mood, invites Alfio to drink with him. Alfio refuses, challenges Turriddu to mortal combat, and kills him. Lola departs, on other conquests bent.

Cid (*sēd*), **Le.** *The Conqueror.* Music by Massenet; words by D'Ennery, Gallet, and Blau; based upon Corneille's drama; première Paris 1885, New York 1907.

Rodrigo, the conqueror, returning from a victory over the Moors, is betrothed to Chimène, daughter of Count Gormas. A governorship, promised to Gormas, is bestowed upon Rodrigo's father, Don Diego. Enraged, Gormas challenges him. Being old, Diego asks his son to protect his honor. In a duel, Gormas is killed accidentally. Chimène demands the death of Rodrigo. The king cannot spare him, for the Moors are again in revolt. On Rodrigo's second victorious return, Chimène demands his death. The king asks her to pronounce sentence. She cannot. The conqueror draws a dagger to kill himself. Chimène restrains him and confesses that love conquers all.

Daughter of the Regiment, The. *La Fille du Régiment.* A comic opera; music by Donizetti; words by Bayard and St. Georges; première Paris 1840, New Orleans 1843.

Marie, found as a baby upon a battlefield and adopted as the daughter of the regiment, is wooed by Tonio, a peasant who has saved her life. He is accepted, on condition that he shall join the regiment. A letter, addressed to the marchioness of Berkenfeld and pinned to the baby

Marie's clothes, is now delivered. The marchioness claims Marie as her niece, installs her in the family castle, and wants her to marry a count. Marie refuses. The marchioness confesses that she is her mother. Marie agrees to obey her wishes. The mother, touched by this mark of filial devotion, lets her have Tonio, who has risen to the rank of colonel.

Don Giovanni (*dŏn jō-vän'nē*). Adapted by Da Ponte from a Spanish tale; music by Mozart; première Prague 1787.

Don Giovanni, a licentious Spanish nobleman, who is attracted by the charms of Donna Anna, the daughter of the commandant of Seville, breaks into her palace under cover of night, in the hope of making her his own. She resists him and calls for help. In the struggle which ensues, the commandant is killed by Don Giovanni, who escapes unrecognized. Donna Elvira, his deserted wife, has pursued him to Seville, but he employs his servant, Leporello, to occupy her attention while he pays court to Zerlina, a peasant girl, who is about to marry an honest workman named Masseto. Donna Anna now recognizes Don Giovanni as her father's assassin, and communicates her discovery to her lover, Don Ottavio; Elvira joins them, and the three of them vow vengeance against the libertine.

Don Giovanni gives a ball in honor of Zerlina's marriage, and in the course of the festivities seizes and tries to seduce her. He is stopped only by the interference of Anna, Elvira, and Ottavio, who have made their way into his palace in masks and dominos.

In the next act the intended vengeance of the three conspirators is still unfulfilled, for Don Giovanni is again pursuing his vicious courses and employing Leporello to beguile the too trustful Elvira. After various escapades he finds himself before the statue of the murdered commandant. He jokingly invites his old antagonist to sup with him, an invitation which the statue, to his surprise, hastens to accept. Leporello and his master return to prepare entertainment for the evening. When the merriment is at its height, a heavy step is heard in the corridor, and the marble man enters. Don Giovanni is still undaunted and, even when his terrible visitor offers him the choice between repentance and damnation, yields not a jot of his pride and insolence. Finally, the statue grasps him by the hand and drags him down, amid flames and earthquakes, to eternal torment.

Elixir of Love, The. *L'Elisire d'Amore.* A comic opera; music by Donizetti; words by Romani; première Milan 1832, New Orleans 1842.

Nemorino, a penniless youth, loves the wealthy Adina. Sergeant Belcore also woos her. Nemorino purchases a bottle of elixir of love from a traveling quack. The elixir is wine and makes him tipsy. Adina, enraged, accepts Belcore. To get money for more elixir Nemorino enlists. The rumor spreads that Nemorino's rich uncle has left him a fortune. Many maidens show interest in him. Adina's jealousy is aroused. She learns from the quack of Nemorino's devotion and buys his ransom. They are happily united. The news of the quack's elixir brings him many customers.

Ernani (*ĕr-nä'nē*). Music by Verdi; words by Piave; based upon Victor Hugo's drama; première Venice 1844, New York 1846.

Ernani, an outlawed Spanish nobleman, loves Elvira, who is betrothed to the aged De Silva and is secretly loved by the king, Don Carlos. Silva finds Ernani and the king in Elvira's chamber. He challenges both. Discovering one is the king he apologizes to him. Ernani refuses to fight and reminds Silva that the king is their rival. They conspire to murder the king. Ernani gives Silva his hunting horn and pledges that Silva may require his life at any time by blowing the horn. The king captures the conspirators and condemns them to death. On Elvira's plea, their lives are spared. The king unites Ernani and Elvira. In the midst of their bliss, Silva blows the horn. Ernani, true to his word, bids Elvira a fond farewell and stabs himself.

Faust (*foust*). Music by Gounod; words by Barbier and Carré; the story is based upon Goethe's *Faust*; has been sung more often than any other five operas combined; première Paris 1859, New York 1863.

Faust, an aged scholar, despairing of solving the riddle of life, raises a cup of poison to his lips. He hears the merry song of peasants outside. Cursing the things of earth, he invokes Satan. Instantly Mephistopheles appears. In exchange for his soul he offers Faust anything he might ask—riches, youth, love. As an indication of what is to come, Mephistopheles conjures up the vision of a lovely maiden. Faust signs the contract.

Faust, now young, appears with Mephistopheles at a fair in the market place. There Faust sees Marguerite, a beautiful village girl. He offers to accompany her home. She declines but cannot forget his tender words.

Mephistopheles then brings Faust to the garden of Martha, Marguerite's aunt, with whom she lives. He engages the attention of Martha, that Faust may make love to Marguerite, having previously left a casket of gems for her, which puts out of mind the flowers sent by her lover Siebel. Marguerite yields at last to the passionate words of Faust.

Following one sweet night of love, Marguerite is deserted. Siebel offers to avenge her dishonor, but she defends the faithless Faust. Valentine returns and finds his sister's love affair the scandal of the town. Mephistopheles and Faust appear. The former mocks at Marguerite. Valentine draws his sword to slay his sister's seducer. In the combat, Mephistopheles interposes his sword and Valentine receives a mortal wound. He curses his sister with his dying breath. Marguerite, who has come to the scene, abandoned by every one but the faithful Siebel, kneels at a small altar outside the church, not daring to enter. Her efforts to pray are mingled with the taunts of Mephistopheles and with strains from the choir within the church.

Marguerite is in prison. In frenzy she has drowned her child. She has been condemned to die at daybreak. Her reason is gone. Mephistopheles and Faust appear in the cell though the gates are locked and barred. Faust in agony declares he loves her and asks her to flee with him. Although weak and wandering, she refuses, and dies, uttering words of prayer. Angels appear to receive her soul. Mephistopheles drags Faust away.

Favorita, La (*lä fä'vō-rē'tä*). Based upon the French drama *Le Comte de Comminges*; music by Donizetti; words by Royer and Waez; première Paris 1840, New Orleans 1843, New York 1848.

Leonora, the favorite of the king of Castile, is wooed by Fernando, who is ignorant of her relations with the king. She refuses to marry and secures for Fernando a commission in the army. He returns victorious. The king, suffering under a papal anathema, consents to the marriage of the lovers. When Fernando discovers Leonora's former relations with the king, he curses both and seeks refuge in a monastery. Leonora follows, is forgiven, and dies in his arms.

Fidelio (*fē-dā'lyō*). Music by Beethoven; words by Sonnleithner; unexampled for its moral grandeur and for the resplendent purity and ideality of its music; Beethoven's only opera; première Vienna 1805, New York 1839.

Florestan, a Spanish nobleman, has fallen into the power of his bitterest enemy, Pizarro, the governor of a state prison near Madrid. He is confined in a dungeon without light or air. Leonora, wife of Florestan, has hired herself, in man's attire, as servant to Rocco, head jailer, under the name of Fidelio.

News comes that the minister Fernando is about to inspect the prison. To escape detection of his crime, Pizarro plots to kill Florestan. He orders Rocco to dig a grave in the prisoner's cell. Leonora helps the jailer, and when their task is finished Pizarro comes down and is about to stab Florestan. Leonora threatens him with a pistol. She holds the governor at bay till the minister arrives. Pizarro is disgraced, and Florestan is restored to his lost honors and dignity.

Flying Dutchman, The. *Der Fliegende Holländer.* An opera by Wagner; based upon a legend by Heine; première Dresden 1843, Philadelphia 1876, New York 1877.

Because of blasphemy, a sea captain is condemned to sail the seas until he finds a maiden, faithful unto death. He may land once in seven years. Senta meets him and, though bethrothed to Eric, feels she is destined to save the captain. Eric begs her to remain. The captain thinks her unfaithful and goes to his ship. She dashes into the water after him. The ship sinks. The captain and Senta, surrounded by a halo of light, rise from the wreck, clasped in each other's arms.

Freischütz (*frī'shŭts'*), **Der.** Music by Weber; words by Kind; plot from an old German legend; very popular; première Berlin 1821, New York 1825.

The Freischütz is Max the huntsman. He loves Agatha, daughter of Kuno, the head ranger of Prince Ottokar of Bohemia. Max has been promised the hand of Agatha in marriage, on condition that he win a forthcoming contest in marksmanship.

Kasper, a huntsman who has sold himself to the Evil One, also loves Agatha. His soul will become forfeit unless he brings a fresh victim in his place. While Max is shooting at a target, the Evil One in the form of Zamiel causes him to miss the mark. Max becomes discouraged. Kasper hands him his rifle, loaded with a magic bullet, and bids him repeat the formula, "in the name of Zamiel." Max easily wings an eagle soaring high above.

On the suggestion of Kasper, Max meets Zamiel at midnight in the haunted Wolf's Glen deep in the forest, to procure more magic bullets. Kasper hopes thereby to deliver Max to the Evil One and as a reward to gain an extension of time for himself. Amid scenes of the wildest supernatural horror the bullets are cast in the presence of the terrible Zamiel himself. Zamiel gives Max six bullets

which he may use as he pleases and one whose course he reserves the right to direct.

Agatha makes arrangements for her wedding. A pious hermit gives her a magic garland of roses. She is troubled because she has dreamed she was a dove and Max shot at her. In her dream the dove changed into a bird of prey and dropped at her feet. She is troubled also, because, instead of the bridal wreath she ordered, a funeral wreath was sent her.

At the contest, Max, having already spent six bullets, is ordered by the prince to shoot at a dove flying past. As he shoots, the dove is transformed into Agatha. Her magic garland protects her. When the smoke has cleared away, it is found that Zamiel directed the bullet to the heart of Kasper. The Evil One carries off Kasper. Max confesses his guilt and is banished. Kuno, Agatha, and the pious hermit intercede for him. The prince reduces his sentence to one year's probation.

Gioconda, La (*lä jō-kōn'dä*). Music by Ponchielli; words by Boito; plot adapted from Victor Hugo's drama *Angelo*; première Milan 1876, New York 1883.

Gioconda is a beautiful street singer in Venice. She loves the noble Enzo Grimaldo and buys his safety from the police spy Barnaba with the promise of her own hand, only to find that Enzo uses his liberty to carry on a love affair with Laura, wife of Alvise. She is generous enough to save the lives of Enzo and his mistress, which are in danger from the vengeance of Laura's husband, and finally commits suicide to escape falling into the hands of Barnaba.

Götterdämmerung, Die (*gût'ĕr-dĕm'ĕr-ōōng*). *Twilight of the Gods.* See *Ring of the Nibelung, The.*

Hänsel und Gretel (*hĕn'sĕl*) (*grā'tĕl*). A fairy opera; music by Humperdinck; words by his sister Mrs. Adelheid Wette; story based upon Grimm's fairy tale of the same name; some critics pronounce it the most important opera since "Parsifal"; première Weimar 1893, New York 1895.

Hänsel and Gretel, the children of Peter, the poor broom maker, and his wife Gertrude, are left to keep house together. They soon tire of their work and begin to play. The mother comes home without food. While punishing the children for neglecting their work, she upsets the milk bowl, the only hope of supper. Angrily she sends the children out into the forest to pick berries. Soon Peter's voice is heard singing cheerfully in the distance. He has had good success selling brooms, and returns laden with food. He asks about the children and is horrified to learn where they are. He terrifies his wife with the story about the witch of Ilsenstein who steals children. They both hurry out to find the children.

Meanwhile out in the forest the children amuse themselves picking berries and making flower garlands until the approach of night, when, to their horror, they find that they have lost their way. Tired out they sink down on the moss beneath a spreading tree. They say their evening prayer, and the fairy sandman puts them to sleep. Fourteen angels descend on a golden stairway and guard them from danger.

The dawn fairy sprinkles dewdrops upon the children, and they wake up. Near by they discover a beautiful gingerbread house. This is where the witch lives, who bakes little children into gingerbread in her great oven and eats them up. She catches Hänsel and Gretel and almost succeeds in her wicked schemes, but, when she opens the oven door to see if the oven is hot, Hänsel and Gretel push her in and close the door. The oven explodes and the house tumbles down. The witch has been baked into gingerbread, and all the children she has stolen come back to life. While they are dancing and singing, the anxious parents arrive and are overcome with joy to find their children unharmed.

Huguenots (*hū'gē-nŏts*), **The.** *Les Huguenots.* Music by Meyerbeer; words by Scribe and Deschamps; première Paris 1836, New Orleans 1839.

Anxious to reconcile the Catholics and the Huguenots, Marguerite, who is betrothed to King Henry IV, seeks to unite Raoul, a Huguenot, and Valentine, daughter of the Catholic Count St. Bris. Raoul has saved Valentine's life. She loves him, but he unjustly suspects she has another lover. Having knowledge of the proposed massacre of the Huguenots, Valentine, torn between loyalty and love, warns Raoul. He warns his friends but is determined to share their fate and seeks refuge with them in the church. Valentine joins Raoul. All perish in the massacre.

Iris. Music by Mascagni; words by Illica; première Rome 1898, New York 1902.

Iris, a Japanese girl, named after the goddess of the rainbow, who is the messenger of peace, lives with her blind father. The rich Osaka and a dive keeper abduct her. She is brought to a luxurious apartment. Osaka makes love to her but is unsuccessful because of her innocence. The blind father finds her. Thinking she is guilty, he curses her. She throws herself into a sewer basin. Ragpickers are about to steal her clothes, when she moves and scares them away. She lifts her eyes to the sun and dies with a smile upon her lips. Flowers spring up about her body as her soul floats into the infinite.

Jewess, The. *La Juive.* Music by Halévy; words by Scribe; première Paris 1835.

The scene of The Jewess is laid in Constance in the 15th century. Leopold, a prince of the empire, in the disguise of a young Israelite, has won the heart of Rachel, the daughter of the rich Jew Eleazar. When the latter discovers the true nationality of his prospective son-in-law he forbids him the house, but Rachel consents to fly with her lover. Later she discovers that Leopold is a prince, and betrothed to the Princess Eudoxia. Her jealousy breaks forth and she accuses him of having seduced her,—a crime which in those days was punishable by death.

Rachel, Leopold, and Eleazar are all thrown into prison. There Rachel relents, and retracts her accusation. Leopold is accordingly released, but the Jew and his daughter are condemned to be immersed in a caldron of boiling oil.

Königskinder (*kûn'ĭgs-kĭn'dĕr*), **Die.** A fairy opera; music by Humperdinck; words by Ernst Romer (Elsa Bernstein); première Munich 1897, New York 1910.

The king's children are a prince and princess in the disguise of two poor and neglected children. The princess has fallen into the power of a witch who lives in the forest near Hellabrunn. The witch compels her to tend geese. An exiled prince finds her there. He knows she is a princess in spite of her ragged clothes.

The people of Hellabrunn send three men, a broom maker, a woodchopper, and a minstrel, to inquire of the witch whom to choose as a ruler. The witch replies that their rightful sovereign will pass through the city gate at noon on the morrow. The minstrel, having the eyes of a seer, recognizes the princess in the goose girl and breaks the witch's spell.

The next day at noon the goose girl, followed by a flock of geese, enters the city. The prince, who is a swineherd, alone hails her as a princess. The people, expecting to see a king in royal robes, laugh at the prince and the princess and drive them away. In anger the people burn the witch. The broom maker and the woodchopper go to live in the abandoned hut.

The poor children, after wandering in the forest a long time, find the hut. They ask for food. The prince must give his crown in exchange for a loaf of bread. The loaf has been poisoned, and the prince and princess die. The minstrel and children from Hellabrunn find their bodies in the snow and give them a royal burial.

Lakmé (*läk-mā'*). Music by Delibes; words by Goudinet and Gille; plot based upon the romance *Le Mariage de Loti*; première Paris 1883, New York 1886.

Lakmé, the daughter of a Brahman priest in India, loves Gerald, an officer of the British army. Knowing he is on sacred ground she warns him that he would be punished by death if her father should find him. Soon after he leaves, her father, Nilakantha, appears. He notices strange tracks in the soft earth and swears death to the trespasser.

Nilakantha and Lakmé, disguised as penitents, enter the public square. Nilakantha, thinking thereby to attract the trespasser of yesterday, commands his daughter to sing. Gerald falls into the trap and speaks to her. The priest tries to assassinate him, but Lakmé, with the aid of her maid, conveys Gerald to a hut in the forest, where she nurses him back to health. He has grown to love her and one day asks her to bring him a draft of the water said to make earthly love eternal. During her absence, Frederick, a brother officer, visits Gerald and exacts from him a promise to join his regiment which has received orders to march. When Lakmé returns she finds Gerald changed. A faint bugle call is heard. Gerald says duty calls and he must go. He bids Lakmé a tender farewell. She eats some flowers of the poisonous stramonium tree and falls into his arms. Nilakantha appears. Lakmé implores her father with her dying breath to forgive Gerald. One victim being thought sufficient to appease the wrath of the deity, Gerald is permitted to go unharmed.

Lohengrin (*lō'ĕn-grĭn*). Music and words by Wagner; story taken from many sources, including an old German legend and that of King Arthur and his knights; première Weimar 1850, New York 1871.

At the instigation of his wife Ortrud, Frederick of Telramund charges Elsa of Brabant with the murder of her brother Gottfried, who has disappeared. King Henry the Fowler, holding council under the great oak beside the river Scheldt is judging the case. Elsa makes denial. The king, unable to judge, calls for the judgment of God and asks Elsa to choose a champion. She speaks of a knight she has seen in a vision, who will defend her. The king proclaims the combat and orders trumpets to be sounded. No one answers. On Elsa's entreaty the trumpets are sounded again.

A boat drawn by a swan and bearing a knight clad in silver armor approaches on the river. The people declare it is a miracle. The knight disembarks and announces that

he is sent by God to defend a maiden unjustly accused. Turning to Elsa he asks if she will trust him to defend her honor. In gratitude she kneels at his feet. He asks her to become his wife and, if she will grant this boon, to promise further never to ask his name or race. If she should violate her promise he must at once return. They embrace tenderly. In the combat which follows, the strange knight strikes down Telramund but spares his life. Telramund and his wicked wife, Ortrud, are outlawed.

The king orders a royal wedding. As the procession nears the church, Telramund and his wife denounce the strange knight as a sorcerer. They are driven away. Ortrud, however, succeeds in planting seeds of doubt in the mind of Elsa. In the bridal chamber words of endearment are spoken. The knight utters passionately the name of his beloved. She deplores that she cannot speak his name. Why should he not reveal it now when there is no one to overhear? At last, in frenzy, she asks the fatal question, "Who art thou?" At that moment Telramund and four nobles rush in with drawn swords. Too late Elsa sees her mistake. She hands her lord his sword. With one stroke he strikes Telramund dead.

The last scene takes us back to the banks of the Scheldt. Surrounded by the assembled army the knight appears in silver mail before the king, who again is holding council under the great oak beside the river. The king greets him. The knight expresses regret that he cannot lead the troops. He relates how Telramund was killed. He declares sadly that the woman he loves, contrary to her promise, has demanded to know his name and race. He must answer. He is Lohengrin, son of Parsifal, lord of Monsalvat, the keeper of the Holy Grail. His mission is to succor the distressed, but his mystic power vanishes if the secret of its origin be known. Even as he speaks, the swan reappears drawing the boat which is to bear him away.

Now, in her moment of triumph, Ortrud exultingly declares she bewitched Gottfried and changed him into the swan. Lohengrin kneels and after a short prayer loosens the swan's golden chain and steps into the boat. The white dove of the Grail descends from the sky, releases the swan, and, while Elsa clasps her restored brother to her breast, swiftly draws Lohengrin's boat away over the waters of the Scheldt.

Louise. Music and words by Charpentier; a story of Bohemian life in Paris; première Paris 1900, New York 1908.

Louise, a young working girl, and Julien, a poet, fall in love. The parents of Louise twice reject their proposal to marry. Louise then goes to live with Julien. Her broken-hearted father sends for her. She goes home for a visit but is treated so unkindly that she soon returns to her kind-hearted lover.

Lucia di Lammermoor (*lōō-chē'ä dē läm-mĕr-mōōr'*). Donizetti's masterpiece; words by Cammerano; based upon Walter Scott's novel; première Naples 1835, New Orleans 1841, New York 1845.

Lucia, who is betrothed to Sir Edgar, is persuaded by her brother, Sir Henry Ashton, that her lover is unfaithful. To please her brother she reluctantly marries Lord Arthur. As the marriage contract is signed, Sir Edgar appears and denounces her. Lucia becomes insane, kills her husband, and dies of a broken heart. Sir Edgar, griefstricken, commits suicide.

Madame Butterfly. Music by Puccini; words by Illica and Giacoso; plot from story of the same name by John Luther Long; première Milan 1904; Washington 1906.

Madame Butterfly is a Japanese maiden, Cho-Cho-San, of Nagasaki, who becomes the wife of an American naval lieutenant, Pinkerton, through the aid of a marriage broker, Goro. The wedding is attended by the American consul, Sharpless, and the relatives and friends of the bride. Her uncle, a native priest, having heard that Cho-Cho-San has adopted the religion of her husband, rushes in to denounce her as an outcast. Pinkerton drives away the Japanese guests and assures his wife of his devotion to her. A few weeks after the wedding, however, Pinkerton returns to America.

Three years elapse. Butterfly waits patiently. Her husband has promised he will return when the robins nest again. Sharpless, commissioned by Pinkerton, calls to tell Butterfly that Pinkerton will soon arrive with his American wife. He advises her to marry the rich Yamadori who is suing for her hand. Butterfly scorns the advice and brings in her golden-haired boy as proof of her husband's love.

A salute of guns is heard from the harbor. Butterfly rushes to the window. It is the American warship *Abraham Lincoln*. She decorates the little house with cherry blossoms and watches throughout the night. In the morning Pinkerton, his wife Kate, and Sharpless appear. Pinkerton, realizing his baseness, turns back. Butterfly meets Kate in the garden and instantly understands. Kate, in pity, asks to have the boy. Butterfly says she may have him in half an hour, takes him in her arms, and enters the house. She places the boy upon a cushion, blindfolds him, and puts an American flag into his hands. With her father's dagger bearing the inscription, "To die with honor when one can no longer live with honor," she stabs herself. She falls at the feet of her boy and stretches her arms toward him. Pinkerton enters to ask forgiveness. Finding Butterfly dying, he is overcome with remorse and folds her tenderly in his arms.

Manon (*mä'nôN'*). Music by Massenet; words by Meilhac and Gille; plot from the novel of Abbé Prévost; première Paris 1884, New York 1885.

Manon is a pretty country girl, the cousin of Lescaut. The Chevalier des Grieux meets her at an inn while she is on her way to a convent to finish her education. He falls in love and they elope to Paris. Des Grieux not being able to supply the luxuries she craves, Manon elopes with a rich nobleman, De Bretigny.

She learns that Des Grieux is despondent and intends to enter a monastery. She goes to him and they are reconciled. Des Grieux visits a gambling place to gain riches for his love. He wins heavily, but the roué, Gillot, causes the arrest of Des Grieux for alleged cheating, and of Manon as being a dissolute woman. Manon is exiled to a prison colony. On the way Des Grieux, who has been saved from prison by his father, seeks her out. She asks his forgiveness and dies in his arms.

Martha. A comic opera; music by Flotow; words by St. Georges and Friedrich; première Vienna 1847, New York 1852.

Martha is really Lady Harriet Durham, maid of honor to Queen Anne. She is courted by her aged cousin Sir Tristan. Tired of court life, she visits the Richmond fair, dressed as a servant. Sir Tristan and her maid Nancy, dressed as peasants, accompany her.

Two farmers, Plunkett and his foster brother Lionel, attending the fair, engage the two ladies as servants. The ladies accept the customary earnest money and find, too late, that it binds them to serve for one year. In spite of the protestations of Sir Tristan, they are carried off.

The ladies, who give their names as Martha and Julia, cause much annoyance at the farmers' house by refusing to cook and spin. Nevertheless, Lionel falls in love with Martha, and Plunkett with Julia. At midnight the ladies escape with the aid of Sir Tristan who appears with a carriage.

Lionel and Plunkett, in search of their lost servants, happen upon the queen's hunting party in the forest. They recognize their servants and claim them but are haughtily denounced as mad and are arrested.

Lionel had inherited nothing from his father but a ring, which his father had bidden him show to the queen if he ever got into trouble. This ring he brings to the attention of the queen through the aid of Plunkett and the secret aid of the fair Martha. The queen recognizes the ring as having belonged to the banished earl of Derby, and acknowledges Lionel as his son. As the charges against the earl had proved false, his estates are restored to Lionel.

Lady Harriet makes advances to Lionel. He remains cold, thinking she is again merely trifling with his already wounded heart. Resolved to win Lionel, she and Nancy again go to the fair, disguised as servants. Lady Harriet meets Lionel. The clouds roll away. They are betrothed. Nancy and Plunkett unite their fortunes.

Masked Ball, The. *Il Ballo in Maschera.* Music by Verdi; words by Somma; première Rome 1859, New York 1861.

Reinhart, secretary to Count Richard, governor of Boston, seeks the governor to warn him of a conspiracy. He finds him in the forest, accompanying a veiled lady to the retreat of a sorcerer. The conspirators approach. The lady is left in Reinhart's care. By accident he discovers she is his wife, Amelia. Reinhart joins the conspirators and later, at a masked ball, stabs the governor. The dying man declares Amelia is innocent of wrong and gives Reinhart an important commission in England.

Meistersinger, Die (*mīs'tĕr-zĭng'ĕr*). *The Mastersingers.* A comic opera by Wagner, in which the composer satirizes his critics; première Munich 1868, New York 1886.

Sir Walther loves Eva. Her father, Pogner, determines that only the winner in a singing contest may woo her. To enter the contest, Walther must learn the rules of singing laid down by the fraternity of mastersingers and submit to an examination by the clerk, Beckmesser. He fails miserably. Nevertheless, he enters the contest and sings from his heart. He wins the applause of the people and the hand of Eva.

Mignon (*mē'nyôN'*). Music by Thomas; words by Barbier and Carré; plot based upon Goethe's *Wilhelm Meister*; première Paris 1866, New York 1872.

Mignon, apparently a gypsy girl, appears upon the streets of a German village. Giarno, the leader of the gypsy band, brutally compels her to dance before the inn, for the entertainment of a troupe of actors on the way to the near castle. Lothario, an old half-witted harper, interferes. He is on the point of being overpowered by the

gypsies when Wilhelm Meister rescues him. With a purse of gold Wilhelm purchases the release of Mignon.

Upon the invitation of Filina, an actress, Wilhelm accompanies the troupe to the castle. Not knowing what else to do with Mignon, he takes her along as his servant. Wilhelm soon becomes infatuated with Filina. Mignon from the first loved her master. In a fit of jealousy she tries to drown herself. Lothario, who is instinctively drawn to her, prevents this and tries to console her. Mignon expresses the wish that lightning might strike the castle. Lothario sets it on fire.

After the entertainment, the actors emerge from the castle. Filina sends Mignon back for a bouquet of flowers she had forgotten. Repenting of her sinful wish, Mignon obeys. After she has gone, the castle bursts into flames. Wilhelm rushes after her. He finds her unconscious and brings her out in his arms.

Lothario takes Mignon to Italy to nurse her back to health. Wilhelm follows. There it is found that Lothario is of noble birth, and that, when his daughter Sperata disappeared years before, he had lost his reason and had since been wandering about in search of her. The familiar scenes restore his mind. Lothario hears Mignon recite a prayer she learned in childhood and recognizes her as the daughter who was lost. Wilhelm has come to love Mignon as dearly as she loves him. On her recovery they are united.

Mikado, The (*mĭ-kä'dō*). A comic opera; music by Sullivan; words by Gilbert; première London 1885, Chicago and New York 1885.

The Mikado is the emperor of Japan. His son Nanki-Poo has run away in the garb of a strolling minstrel to escape marrying the elderly Katisha. He has become infatuated with Yum-Yum, the ward of Ko-Ko, who has a monopoly on guardianship and is also the Lord High Executioner. Ko-Ko too loves Yum-Yum and is planning to marry her.

When Ko-Ko, the tailor, was appointed to his high office, all the ministers of state resigned, and Pooh-Bah succeeded to their titles. He is also "retailer of state secrets at a low figure." This Pooh-Bah informs Nanki-Poo of Ko-Ko's intentions with regard to Yum-Yum. Nanki-Poo nevertheless sees Yum-Yum and, on revealing his high rank, wins her affections.

Ko-Ko, who is a mild-mannered man, did not have an execution even on his inauguration day. The Mikado sends him word that he must arrange for an execution of some sort within a month or he will lose his position. Nanki-Poo comes to Ko-Ko's rescue by offering himself as a victim, provided he may marry Yum-Yum and live with her during the month before the execution. Ko-Ko gratefully accepts the offer.

Yum-Yum has made all preparations for the wedding. She is having a tête-à-tête with Nanki-Poo when Ko-Ko interrupts to inform them he has discovered a law which requires that a wife whose husband is executed must be buried alive. To avoid anything so tragic, Nanki-Poo offers to commit suicide. This, however, would only complicate matters and would not save Ko-Ko, so he proposes to make a false statement that Nanki-Poo has been executed with horrible torture.

The Mikado arrives. Ko-Ko tells him about the execution which he claims has taken place. The Mikado flies into a rage and informs Ko-Ko it is the heir to the throne he has killed. As punishment for his blunder the executioner is condemned to be boiled in oil. Nanki-Poo unexpectedly appears. Ko-Ko saves himself by marrying Katisha. Nanki-Poo and Yum-Yum have a royal wedding.

Oberon (*ō'bĕr-ŏn*). Music by Weber; words by Planche; story based upon Wieland's poem; première London 1826, New York 1827.

Oberon, the king of fairyland, and his wife Titania have quarreled. He vows he will not make up until he shall find lovers constant to each other through trials and temptations. Puck, who has tried to find such lovers, enters with news. Sir Huon has been banished by Charlemagne and forbidden to return until he has slain the caliph of Bagdad's wicked councilor, Babekan, and won the caliph's daughter Rezia as his bride. Oberon's interest is aroused. He offers aid. Sir Huon's adventure succeeds. Then Huon and Rezia are successively imprisoned, shipwrecked, sold as slaves, and condemned to the death at the stake, but their love remains constant. Oberon rescues the lovers. Their constancy is rewarded. They are united. Charlemagne restores Sir Huon to favor. Oberon and Titania are reconciled.

Orpheus and Eurydice (*ôr'fŭs*) (*ū-rĭd'ĭ-sē*). Gluck's masterpiece; the oldest opera still popular; words by Calzabigi; première Vienna 1762, New York 1885.

Orpheus, the great singer, mourns his wife Eurydice, who had died and passed to the Elysian fields. Eros, the goddess of love, promises to aid him in bringing her back, on condition that he will not look at Eurydice during the journey. Orpheus descends into Hades, overcomes the demon guards by his song, and finds Eurydice among the shades. He takes her by the hand and leads her away. Wounded by his apparent coldness, Eurydice implores him to look at her. Orpheus steels himself against the temptation but finally yields and clasps her in his arms. She dies at his feet. The goddess of love, touched by his constancy, restores Eurydice to life.

Pagliacci, I (*ē päl-yä'chē*). *The Players*. Leoncavallo's masterpiece; words by the composer; première Milan 1892, New York 1894.

A troupe of players gives a play in an Italian village. Before the play, Canio, the master of the troupe, finds his wife Nedda with a secret lover who escapes. In the play a similar situation occurs. With scarcely a pretense of keeping to his rôle of Pagliaccio, Canio demands from his wife, representing Columbine, the name of her lover. She mocks him. Overcome by jealousy, he stabs her. She speaks the name of her real lover, Silvio. The latter, who formed one of the rustic audience, rushes to the stage only to receive his deathblow as well.

Parsifal (*pär'sĭ-făl*). Words and music by Wagner; the plot based upon an old legend found in many forms; Wagner's version inspired by epic written about 1300 by Wolfram von Eschenbach; première Bayreuth 1882, New York 1903.

The cup from which Jesus drank at the Last Supper, and which received His blood when He was wounded upon the cross, is called the Holy Grail. This and the spear with which His side was pierced were placed, according to legend, in the care of a pure knight, Titurel, who built for them the splendid temple Monsalvat in the fastnesses of the Pyrenees. He then chose other pure knights to serve with him as protectors of the holy relics. When Titurel became infirm with age he appointed his son Amfortas to succeed him as king of the Grail.

Near the castle dwells the magician Klingsor, who has in vain solicited entry into that company of pure knights. In revenge he has sought counsel of an evil spirit, and is now devoted to the destruction of the knights and to the capture of the Holy Grail. He has constructed a garden of wicked loveliness, peopled by beautiful sirens, through whose charms many of the knights have already fallen. Chief among these sirens is the beauteous Kundry, a strange being, over whom Klingsor exercises hypnotic power. She is that Herodias who laughed at our Savior upon the cross. She was thenceforth condemned to wander through the world, cursed to laugh at pain and suffering, praying only for the gift of tears to release her weary soul.

Amfortas too has sallied forth to subdue the sorcerer, armed with the sacred spear, but has succumbed to the charms of the siren Kundry. He has lost the spear to Klingsor, and received from its point a grievous wound which no balm can heal.

The opening scene is a cool woodland glade, near the castle, where Gurnemanz, an old knight, and two young esquires are sleeping. Upon awakening, Gurnemanz tells the esquires the story of the Holy Grail and repeats the prophecy which promises relief to their suffering king.

> Wise through pity,
> The sinless fool.
> Look thou for him
> Whom I have chosen.

Several knights and esquires rush in, dragging Parsifal, who has slain a sacred swan with his bow and arrow. Finding the youth simple and as innocent as a child, Gurnemanz leads him to the vast hall of the Grail knights in the hope that he may prove to be the sinless fool of the prophecy. There the solemn ceremony of uncovering the Grail is performed. Parsifal, who watches the whole rite, feels a sharp pang of sympathy at Amfortas' suffering, but as yet he does not understand what it means. He is not yet wise through pity, and Gurnemanz, greatly disappointed, turns him from the temple door.

Parsifal now wanders near the castle gardens of Klingsor, who, sensing danger, commands Kundry and the sirens to bewitch him. Parsifal vanquishes the knights who guard the castle, and enters the enchanted garden. Lovely maidens dance around him until dismissed by a voice sounding from a network of flowers. Parsifal turns and beholds Kundry, a woman of exquisite loveliness. She tells him of his dead mother and, drawing him toward her, presses upon his lips the first kiss of love. The touch of defilement awakens in him a throbbing compassion for a world of sin. The wounded Amfortas' cry becomes plain to him. He puts Kundry and her endearments from him, and in her discomfiture she cries to Klingsor. The latter hurls the sacred spear at him, but it stops over Parsifal's head. Parsifal grasps it and makes a sign of the cross; with a crash the enchanted garden and castle fall into ruin. The sirens become withered flowers. The spot, a moment before bright with exotic beauty, becomes a desert waste.

Years pass. Then, one Good Friday morning a warrior approaches the temple of the Holy Grail, clad in black armor. It is Parsifal returned at length after weary wanderings.

Gurnemanz, seeing him approach, recognizes the spear and salutes and anoints Parsifal as the new guardian of the Grail. Kundry, who now serves Gurnemanz, washes the feet of Parsifal and dries them with her hair. Parsifal baptizes the regenerate Kundry, redeemed at last from her curse. The three proceed to the temple where the rites have not been performed since Parsifal's former visit. The knights are gathered for Titurel's burial. Amfortas, suffering unspeakable agony from his wound and from his sense of unworthiness, still obstinately refuses to uncover the Grail. Parsifal heals his wound with a touch of the sacred spear, ascends to the altar, unveils the sacred chalice, and kneels in silent prayer. Once more the sacred glow illuminates the mystic cup. As Parsifal waves it in token of benediction alike to the pardoned Amfortas and the ransomed Kundry, a snowy dove hovers over his anointed head.

Pinafore, H. M. S. A comic opera; music by Sullivan; words by Gilbert; the most popular opera ever produced in England; première London 1878, New York 1879.

H. M. S. Pinafore lies at anchor in the harbor of Portsmouth. Captain Corcoran is the master of the ship. The Right Honorable Sir Joseph Porter, first lord of the admiralty, accompanied by sisters, cousins, and aunts, comes aboard to sue for the hand of the captain's daughter Josephine. She rejects him and tells her father she loves a common sailor though no one shall ever know it. Ralph, the common sailor, woos Josephine but is haughtily spurned. In despair, he threatens to shoot himself. She then confesses her secret love for him, and they plan to elope that night. The wicked Dick Deadeye overhears them.

The captain at night complains to the moon of his hard lot. Little Buttercup, the round and rosy bumboat woman, offers to console him. He lets her know he can never be more than her friend. She threatens that he shall have a surprise some day. Sir Joseph approaches and informs the captain he is disappointed with Josephine's behavior. The captain reminds him she is no doubt dazzled by his rank. Sir Joseph again seeks Josephine and assures her that "love levels all rank." She seems pleased and says she will hesitate no longer. Sir Joseph and the captain rejoice over the prospect when Deadeye reveals the lovers' plot. The captain confronts them as they are about to escape. Ralph declares his love. The captain swears. Sir Joseph, overhearing him, orders him to the cabin and demands from Ralph the cause of the captain's profanity. On learning the truth, he flies into a rage and sends Ralph to the ship's dungeon.

Little Buttercup relates to Sir Joseph that long ago she nursed two babies, one a patrician, the other lowborn. She got the babies mixed. The first was Ralph, the other the captain. Sir Joseph orders Ralph and the captain to appear before him. He reduces Corcoran to the rank of a common sailor and gives Ralph command of the ship. Ralph and Josephine receive consent to marry. Corcoran and Buttercup agree to unite their fortunes.

Prince Igor (*ē'gôr*). The only opera of the Russian composer, Borodin; based upon *The Epic of the Army of Igor*, a chronicle of the 12th century; première Petrograd 1890, New York 1915.

Prince Igor leaves his wife in the care of his brother, Prince Galitzky, and goes with his army to fight the Mongol chief, Kontchak. Prince Galitzky betrays his trust and stirs up rebellion. Prince Igor is captured. When the situation seems hopeless, he escapes, returns home, and restores order.

Prophet, The. Music by Meyerbeer; words by Scribe; première Paris 1849.

John, an innkeeper of Leiden, loves Bertha, a village maiden who dwells near Dordrecht. Unfortunately her liege lord, also, the count of Oberthal, has designs upon the girl and refuses his consent to the marriage. Bertha escapes from his clutches and flies to the protection of her lover, but Oberthal secures the person of Fidès, John's old mother, and, by threatening to put her to death, compels him to give up Bertha. In his rage against the vice and lawlessness of the nobles, John joins the ranks of the Anabaptists, a revolutionary sect pledged to the destruction of the powers that be. Their leaders think they recognize John as a prophet promised by heaven, and he is installed as their chief. The Anabaptists lay siege to Munster, which falls into their hands, and in the cathedral John is solemnly proclaimed the Son of God. During the ceremony he is recognized by Fidès, who, believing him to have been slain by the false prophet, has followed the army to Munster in hopes of revenge. She rushes forward to claim her son, but John pretends not to know her. To admit an earthly relationship would be to prejudice his position with the populace, and he compels her to confess that she is mistaken. The coronation ends with John's triumph and the unhappy Fidès is carried off to a dungeon. Later John visits her in her cell, and obtains her pardon by promising to renounce his deceitful splendor and to fly with her. Soon afterward he discovers that a plot against himself has been hatched by some of the Anabaptist leaders, and he destroys them as well as himself by blowing up the palace of Munster.

Queen of Sheba, The. *Die Königin von Saba.* Music by Goldmark; words by Mosenthal; première Vienna 1875, New York 1885.

Assad, affianced to Sulamith, is sent by Solomon to conduct the Queen of Sheba to his presence. Assad is dazzled by the queen's beauty and renounces Sulamith. Banished for blasphemously calling the queen his divinity, Assad wanders about in the desert. The queen visits him but is repulsed. Sulamith goes to him. A simoom sweeps across the desert. Locked in each other's arms, they perish.

Rheingold, Das (*rīn'gôlt*). *The Rhinegold.* See *Ring of the Nibelung.*

Rigoletto (*rē'gô-lĕt'tō*). Musically, Verdi's masterpiece; story based upon Victor Hugo's *Le Roi s' Amuse*; words by Piave; première Venice 1851, New York 1857.

Rigoletto, buffoon and panderer to the licentious duke of Mantua, hires an assassin to murder the duke, after his own daughter Gilda has been violated by his master. The assassin's sister lures the duke to his house, but on her plea his life is spared. As the assassin must deliver a victim to Rigoletto, he murders the first person who enters his house. It happens to be Rigoletto's daughter dressed as a page.

Ring of the Nibelung, The (*nē'bĕ-lōōng*). *Der Ring des Nibelungen.* Music and words by Wagner; based upon the *Nibelungenlied* and the Scandinavian *Eddas*; an allegorical festival drama consisting of four operas: (1) a prologue, *Das Rheingold*, première Munich 1869, New York 1889; (2) a trilogy, *Die Walküre*, première Munich 1870, New York 1877; (3) *Siegfried*, première Bayreuth 1876, New York 1877; and (4) *Die Götterdämmerung*, première Bayreuth 1876, New York 1888.

1. *Das Rheingold*, or "The Rhinegold," symbolizing earthly power, is gold which belongs to the nymphs dwelling in the waters of the Rhine. The dwarf Alberich, prince of the Nibelungs, clumsily courts the maidens, unsuccessfully trying to catch first one, then another. The nymphs incautiously reveal the secret of the gold which, if made into a ring, will make the possessor ruler of the world, provided he renounces love forever. Alberich boldly seizes the gold, carries it to his country, Nibelheim, forges from it a ring, and makes himself master of the realm.

Wotan, of the race of gods, and his wife Fricka awaken from their slumber upon a bed of flowers to gaze upon the stately castle of Walhalla which giants have built for them during the night. The giants, Fasolt and Fafner, carry off their reward, Freia, the goddess of youth and beauty, foolishly promised by Wotan. As a result the gods begin at once to age.

The fire god, Loge, brings news of Alberich's treasure-trove, and the giants agree to accept the golden treasure in place of Freia if the gods can secure it. Wotan and Loge go to Nibelheim on this quest. There they find Alberich dominating his fellow dwarfs by virtue of his magic gold. He has forced his brother Mime, a clever smith, to make a Tarnhelm, a helmet of invisibility. Wotan and Loge cunningly beguile Alberich into exhibiting the power of his new treasure. The confiding dwarf first changes himself into a huge snake, and then into a toad. While he is in the latter shape, Wotan puts his foot upon him, while Loge snatches the Tarnhelm from his head. Together they bind him and carry him off. With his treasure torn from him, his Tarnhelm, and last of all the ring with which he hoped to rule the world, Alberich is in despair. He utters a terrible curse upon the ring, vowing that it shall bring ruin and death upon every one who wears it, until it returns to its original possessors. The giants now appear to claim their reward. Wotan gives them the treasure, Tarnhelm, and the ring, in exchange for Freia. The curse at once begins to work. The giants quarrel over the possession of the ring. Fafner slays Fasolt and carries off the spoils.

Donner, the god of Thunder, calls up a storm and builds a magic rainbow bridge, over which the gods pass into Walhalla. Far below rise the despairing cries of the Rhine-maidens lamenting their lost treasure.

2. *Die Walküre*, or "The Valkyrie," Brunhilde, is one of the nine splendid daughters of Wotan by Erda, the goddess of the Earth. The mission of these valkyries is to bring dead heroes from battlefields to dwell in Walhalla and, if need be, help defend it.

Only a man without fear and without the lust for gold can wrest the ring from Fafner, who had changed into a fierce dragon. To raise up such a man, Wotan, under the name of Volse, weds a mortal who bears him two children, Siegmund and Sieglinde. The brutal Hunding murders the mother and forces Sieglinde to become his wife.

Siegmund, after years of wandering, comes to the hut of Hunding. The story of Sieglinde arouses Siegmund's pity and love. He draws from the trunk of an ash tree a magic sword, Nothung, placed there long before by a stranger (Wotan) who had said it should belong to the hero

able to withdraw it. Siegmund and Sieglinde flee, pursued by Hunding. Wotan sends the valkyrie, Brunhilde, to protect Siegmund. His wife, Fricka, the goddess of marriage, objects. Wotan then sorrowfully forbids Brunhilde to interfere. She, knowing her father's inmost desire, disobeys him. In his battle with Hunding, Siegmund is on the point of victory when Wotan interposes a lance and shatters his sword. Siegmund is pierced through by the spear of Hunding. Brunhilde collects the pieces of the broken sword and escapes with Sieglinde upon her horse, while Hunding falls dead at a contemptuous wave of Wotan's hand.

Wotan punishes Brunhilde for her disobedience by changing her into a mere woman. She is to be put to sleep upon the mountain top, to be the bride of the first man who finds and wakens her. On her entreaty, Wotan agrees to surround her with a ring of fire so that only a hero who will brave the fire can reach her. As Brunhilde's divine powers forsake her and she goes to sleep, Wotan kisses her a fond farewell. He places her upon a moss-covered rock and signals Loge to surround her with the ring of fire.

3. *Siegfried*, the second of the trilogy, advances the drama another stage. Many years have passed. Sieglinde had dragged herself to the forest and had died in giving birth to a son, Siegfried. Siegfried was brought up by the Nibelung dwarf, Mime, who hoped that the boy, now grown to manhood, might win the treasure for him by slaying Fafner, the dragon. Fafner is the former giant who had transformed himself into a dragon by means of the Tarnhelm in order to protect his hoard of gold.

Siegfried compels Mime to tell, bit by bit, the story of his mother and of his father's shattered sword, the fragments of which his mother had preserved. Mime tells also of Fafner, the dragon, ever guarding the treasure in his cave. He plans darkly that after Siegfried has killed Fafner he will drug and kill Siegfried, and gain possession of the ring.

Siegfried forges his father's sword anew, seeks out the dragon, and easily kills him. Touching his lips to the blood of the dragon on his hand, he finds that he can understand the song of the birds. As he listens, the warning voice of one of them tells him to fetch the ring and magic helmet from the dragon's cave. This he does and places the ring upon his finger. From the song of the birds he learns of Mime's dark plans. With one blow of his sword Siegfried slays the treacherous dwarf, then guided by his feathered friend proceeds to the mountain top, where Brunhilde lies within the flaming circle, awaiting the hero who shall release her. Wotan attempts to bar the way, but Siegfried shatters the spear of the god with one stroke.

Fearlessly and gayly Siegfried passes up through the fire and finds Brunhilde asleep. He awakens her by imprinting a kiss upon her beautiful lips. Siegfried speaks of love and persuades Brunhilde to become his bride.

4. *Die Götterdämmerung*, or the "Twilight of the Gods," tells of the destruction wrought by the curse of gold, and of the final triumph of love.

After a period of happy wedded life, Siegfried goes forth to do heroic deeds. Brunhilde remains within her circle of fire. Siegfried gives her the ring as a pledge of faith. She gives him her horse, Grane.

A valkyrie entreats Brunhilde to return the ring to the Rhine-maidens. Wotan had said that by so doing she would lift the curse and save the gods from destruction. Brunhilde refuses, for the ring is the symbol of Siegfried's love.

Siegfried arrives at the court of Gunther, who lives with his sister Gutrune and his half brother Hagen, the son of Alberich. Hagen has been bound by his father to gain possession of the ring. He devises a crafty scheme for getting Siegfried to do his will. He persuades Gutrune to give Siegfried a love philter which makes him forget the past. Siegfried's former love for Brunhilde is swallowed up in a burning passion for Gutrune.

According to Hagen's dark plans, Siegfried is to win Gunther's consent that Gutrune be given to him by fetching Brunhilde to be Gunther's bride. Assuming the form of Gunther by means of the Tarnhelm, Siegfried goes to Brunhilde's Rock, announces himself as Gunther, overcomes her resistance, and robs her of the ring, which he places upon his finger. When they arrive at the court of Gunther, unknown to Brunhilde, he has Gunther take his place. Hagen announces the arrival of Gunther and his bride and orders that a feast be prepared.

Hagen, pretending friendship for Brunhilde, offers to become her avenger. In despair, she reveals that Siegfried is vulnerable only in his back.

In a forest on the banks of the Rhine, Siegfried, having strayed from his companions in the chase, is asked by the Rhine-maidens to return the ring, warning him of the curse attached to it. He laughs at what he considers their womanly wiles and decides to keep it, trusting his sword.

Gunther, Hagen, and the hunters now appear on the scene, with game on their shoulders. After passing around the cup, Hagen addresses Siegfried, saying that he has heard that he understands the language of the birds. Thus invited, Siegfried tells the story of Mime, the dragon, and the forest bird. When he gets to the part where he followed the bird to Brunhilde's Rock, Hagen gives him a potion which restores his remembrance of Brunhilde. He proceeds to relate how he wooed, won, and wedded her. As Gunther listens horrified to this revelation, two ravens fly past. Siegfried turns to look at them, and Hagen stabs him in the back. Siegfried makes one last terrific effort to crush Hagen with his shield, then falls and expires with a greeting to Brunhilde, unconscious of having betrayed her. In silent grief, the vassals raise the dead body upon their shields, and carry it back to the castle through the moonlit forest, to the immortal strains of the "Funeral March."

Hagen demands the ring. When Gunther denies the request, he kills him. Hagen then attempts to take the ring from Siegfried's finger, when the corpse raises its hand in awful warning. At this moment Brunhilde appears, solemnly, majestically. She directs the young men to build a funeral pyre. After taking the ring from his finger she has Siegfried's body placed upon the pyre. With her own hand she applies a torch and, as the flames rise on high, she leaps upon her horse and rides into the burning mass. As the fire collapses, the Rhine begins to swell until it reaches the coals of the pyre, bearing on its surface the three Rhine-daughters, one of whom recovers the ring. Hagen dashes into the flood in search of the ring and is dragged down to the depths by the Rhine-maidens. The sky is seen aglow. Walhalla is in flames. The end of the gods is at hand.

Salome (*să-lō'mĕ*). Music by Richard Strauss; a setting, almost unabbreviated, of Oscar Wilde's play of the same name; première Dresden 1905; has had triumphs in Italy and Paris, but so seriously scandalized New York that it was withdrawn after a single performance. Although ethics of the story are somewhat difficult of digestion, there is a strange, exotic beauty in the weird harmonies and infinitely suggestive orchestration of the opera.

The scene is laid upon a terrace of Herod's palace, where soldiers are keeping watch while the king holds revel within. Salome, the daughter of Herodias, comes forth from the banquet chamber. The voice of Jochanaan (John the Baptist), who is imprisoned in a cistern near by, is heard. Salome commands Narraboth, a young Assyrian, to bring him forth. Dragged from his living tomb, Jochanaan denounces the wickedness of Herodias, but Salome, fascinated by the strange beauty of the prophet, has no ears for his curses. She pours forth her passion in wild accents, but is sternly repulsed by Jochanaan, who retreats once more to his cistern.

Herod and Herodias now come forth from the banquet, and Herod bids Salome dance. She extorts a promise from him that he will give her whatever she asks, even to the half of his kingdom, and dances the dance of the seven veils.

When this weird dance is finished she demands the head of Jochanaan. Herod pleads with her in vain, the executioner is sent into the cistern, and the head of Jochanaan is brought in upon a silver platter. Salome kisses the lifeless lips, but Herod in terrible wrath and horror cries to his soldiers, "Kill this woman," and, as the curtain falls, she is crushed under their shields.

Samson and Delilah. *Samson et Dalila.* Music by Saint-Saëns; words by Lemaire; a biblical opera, almost an oratorio; première Weimar 1877, New Orleans 1893, New York 1895.

The Hebrew leader, Samson, is lured by the Philistine woman, Delilah, to reveal that his hair is the secret of his strength. She soothes him to sleep, cuts off his hair, and puts out his eyes. Brought before the priest of the Philistines, Samson prays Jehovah for renewed strength and with a mighty effort pushes apart two pillars, with the result that the temple falls in ruins.

Siegfried (*sēg'frēd*). See *Ring of the Nibelung, The.*

Suzanne's Secret. *Il Segreto di Susanna.* A comic opera; music by Wolf-Ferrari; words by Golisciani; première Munich 1909, New York 1911.

Count Gil detects the odor of cigarette smoke in the drawing-room and accuses his young wife of having a secret. She does not deny it. He flies into a rage and attacks the furniture. He goes out, then returns unexpectedly, only to find more traces of cigarette smoke. He grasps his wife's hand furiously. In doing so he receives a burn from a cigarette. The secret is out. As a token that all is well, Count Gil daintily helps Suzanne light a fresh cigarette.

Tales of Hoffman. *Les Contes de Hoffman.* Music by Offenbach; words by Barbier; based upon three famous stories by Hoffman; première Paris 1881, New York 1882.

In the first act, or prologue, the poet, drinking with a group of students at an inn in Nuremberg, proposes to relate his adventures in love. The second, third, and fourth acts describe these adventures.

Olympia is an automaton made by Coppelius, who represents the Evil One. Spalanzani buys it and gives a bad check in payment. Hoffman sees Olympia through magic

spectacles supplied by Coppelius and falls in love. He is disillusioned only when Coppelius enters and smashes the automaton because he has been defrauded.

Giulietta, an accomplice of the Evil One in the form of Dapertutto, lures Hoffman to make love to her by displaying her charms and a magic gem furnished by Dapertutto. She then entices him to slay her dupe, Schlemihl, and deserts him for Dapertutto.

Antonie, the daughter of Krespel, is a good soul who stirs in Hoffman a feeling of pure affection. Her mother had been a great singer but died from treatment given by the Evil One in the shape of Doctor Mirakel. Antonie is consumptive and has been forbidden to sing, as the exertion may prove too great a strain. Doctor Mirakel provokes her to sing by conjuring up a vision of her mother. She dies in the arms of her father.

In the fifth act, or epilogue, Hoffman is again at the inn. He declares he has tried all kinds of love—that inspired by mere beauty, that inspired by sensuous charm, and pure affection. Henceforth he will devote himself to art as his only mistress.

Tannhäuser (*tän'hoi-zĕr*). Words and music by Wagner; plot from 13th century legend of contests between minnesinger arranged by the landgraves of Wartburg castle; première Dresden 1845, New York 1859.

Tannhäuser is a minstrel knight who has wasted a year at Venusberg under the spell of Venus. Wearying of his amorous captivity he would fain return to the earth once more. On the way, the pious chant of pilgrims bound for Rome wakens his slumbering conscience and bids him expiate his guilt through suffering, and his prayer mingles with the pilgrims' chant. The landgrave of Wartburg, with a retinue of minstrel knights, returning from the chase, comes upon Tannhäuser and invites him to the castle. Remorse bids him refuse, until the name of Elizabeth the landgrave's niece is mentioned. His heart moved by returning love, he gladly hastens to the castle with his newly found friends.

The landgrave arranges a contest for the minstrels in his great hall of the Wartburg. He proposes they prove their skill in song by singing the praises of love, and offers as a prize to the victor permission to seek the hand of Elizabeth. Other minstrels sing their improvisations of love in lofty strains; Tannhäuser, in brutal terms of the amorous orgies of the Venusberg. Outraged, several rush upon him with drawn swords to execute justice upon the self-convicted sinner, but Elizabeth throws herself before them and pleads for his life. Touched by her agonized pleading they lower their weapons. Tannhäuser, as his madness slips from him, realizes all that he has lost and falls repentant upon the earth. The landgrave bids him hasten to Rome where alone he may find pardon for so heinous a sin.

Elizabeth has been waiting anxiously for the return of the pilgrims. As they file past she eagerly scans their faces, but Tannhäuser is not among them. The faithful Wolfram tries to give her aid and comfort. She is grateful but indicates she must take the way which leads to heaven. Wolfram remains behind, and as darkness comes he sings to the lovely evening star whose bright rays pierce the darkness and reveal the path to the late traveler. To this star he confides her.

Tannhäuser appears, disappointed and despairing. The pope has bidden him hope for no pardon for his sin till the barren staff in his hand shall put forth leaves and blossoms. With these awful words ringing in his ears, Tannhäuser has had enough of earth and thinks only of returning to the embraces of Venus, but he cannot find the way. Venus appears in a light cloud. Through perfumed and rosy mists, seductive nymphs can be seen dancing. A voice reminds Tannhäuser of the myriad joys which await him in the realms of the goddess of love. In vain Wolfram appeals. Tannhäuser breaks from his friend and is rushing to meet the extended arms of the goddess when Wolfram adjures him once more by the sainted memory of Elizabeth. At the sound of that sinless name, Venus disappears.

The morning breaks. A funeral procession approaches. As the bier bearing the remains of Elizabeth is carried forward, Tannhäuser sinks lifeless beside it. Another group of young pilgrims advances swiftly, bearing the pope's staff which has put forth fresh leaves, the symbol of redemption and pardon for the repentant sinner.

Thaïs (*tä-ēs'*). Music by Massenet; words by Gallet; plot based upon novel by Anatole France; première Paris 1894, New York 1908.

Thaïs, an actress and courtesan, is the central figure in the gay life of Alexandria. Athanael, a monk living at the retreat of the Cenobite Order beside the Nile, returns from a visit to the city, saddened by the riotous living of his former wealthy friends. That night he has a vision of Thaïs appearing as Venus before an excited audience at the theater.

Impelled to save her from a life of sin and shame, he visits the house of Nicias, a friend of former days, and declares his purpose. Nicias invites him to remain for a party in honor of Thaïs, after the theater, and robes him in proper garments. Thaïs is attracted by the handsome stranger of stern mien. Athanael tells her he has come to teach her the way of salvation. She says she believes only in love and pleasure. Horrified by the revelry, Athanael departs, after telling Thaïs he will meet her at her home.

In the house of Thaïs, Athanael pleads eloquently that she embrace a higher love and the life everlasting. Thaïs, decked to allure him by her charms, is frightened, then becomes defiant. He commands her to follow him. She hears the voice of Nicias in an adjoining room and hesitates. Solemnly proclaiming she will yet repent, Athanael says he will await her coming on the doorstep until dawn and goes out.

Just before dawn, Thaïs, in somber dress, emerges from the house. She is ready to go but asks to retain an ivory mage of Eros, the gift of Nicias. Athanael dashes it to the pavement. He commands her to destroy all her earthly possessions. With her permission he sets fire to the house. Nicias and his friends rush out in rage. They threaten Athanael and Thaïs. Nicias, to avoid violence, scatters gold among the crowd, and Athanael and Thaïs escape.

After a long and hard journey through the desert, Thaïs is given into the care of the White Ladies at their convent. Athanael returns to his retreat, but he cannot find peace. The image of Thaïs oppresses him. He dreams of her as Venus, then as dying at the convent. Though the night is stormy he sets out for the convent. He finds Thaïs upon a couch attended by nuns. In frenzy he begs her to return to earthly life. She has already had a vision of heavenly bliss. With a smile upon her lips she dies. Athanael utters a cry of despair and falls to the ground.

Tosca (*tōs'kä*), **La.** Music by Puccini; the libretto is a clever condensation of Sardou's famous drama; première Rome 1900.

The scene is laid in Rome in the year 1800. The first act introduces Mario Cavaradossi, a painter who is at work in a church, and Floria Tosca, a famous singer with whom he is in love. She pays him a visit and teases him with her jealous reproaches. Cavaradossi befriends Angelotti, a victim of papal tyranny, who has escaped from the castle of Saint Angelo. He dispatches him by a secret path to his villa in the outskirts of Rome. Scarpia, the chief of police, who is close upon Angelotti's heels, suspects Cavaradossi of being implicated in Angelotti's escape and uses La Tosca's jealous disposition to help him in securing the prisoner.

In the next act, Angelotti is still at large, but Cavaradossi has been arrested. Scarpia, who in the meantime has fallen violently in love with La Tosca, extracts from her the secret of Angelotti's hiding place by putting her lover to torture in an adjoining room. From there, his cries penetrate to her distracted ears. La Tosca buys her lover's safety by promising herself to Scarpia. The latter gives orders that Cavaradossi's execution shall only be a sham one, blank cartridges being substituted for bullets. When they are left alone, La Tosca murders Scarpia with a knife when he tries to embrace her.

In the last act, after a passionate duet between the lovers, Cavaradossi is executed,—Scarpia having given a secret order to the effect that the execution shall be genuine after all—and La Tosca in despair throws herself into the Tiber.

Traviata, La (*lä trä-vē-ä'tä*). Music by Verdi; words by Piave; founded upon Dumas's *La Dame aux Camélias*; première Venice 1853, New York 1856.

Violetta, a courtesan of Paris, gives up her gay life to live in a humble apartment with Alfredo. His father persuades her to release him. She returns to Paris. Alfredo, ignorant of the cause of her desertion, insults her publicly. Too late he discovers the truth about the nobility of her sacrifice. Full of remorse he visits her, only to find her dying of consumption. With words of forgiveness on her lips, she expires in his arms.

Tristan und Isolde (*trĭs'tän*) (*ē-zōl'dĕ*). Music and words by Wagner; plot from an old Celtic legend; Wagner's version taken from that of the 13th century minnesinger Gottfried von Strassburg; generally considered Wagner's masterpiece; première Munich 1865, New York 1866.

Tristan is a knight of King Mark of Cornwall. He had killed Sir Morold of Ireland in battle and sent his head to Isolde, the affianced bride of the dead warrior. Wounded by the poisoned sword of Morold, Tristan disguises himself as Tantris and seeks aid from Isolde, far famed as a healer. She recognizes the stranger from a notch in his sword which matched a splinter of steel she had removed from the head of Morold. She is about to slay him, when their eyes meet and love is kindled. Tantris departs. Soon he returns as Tristan and asks her hand for King Mark. Her parents accept.

Isolde sails with Tristan for Cornwall. During the voyage she sends for him repeatedly. As the ship approaches land

he goes to her. She reproaches him with neglect and declares there is a blood debt between them. He bares his breast and offers her his sword. She proposes instead a cup of reconciliation. He suspects poison but drinks. She has ordered her maid, Brangane, to prepare a death philter. The maid disobediently has prepared one of love. When Tristan has taken half the draft, Isolde snatches the cup and drains it. They gaze into each other's eyes. There each reads the other's secret. Overcome with emotion they embrace. As the king comes aboard, Brangane confesses to the lovers what she has done. They look at each other in wild distress. Isolde swoons.

The king goes on a hunt one night. The hunting party has hardly disappeared from view when Isolde gives the signal with a torch which brings Tristan to her garden. They sing of their love, but the night is too short. Suddenly, Brangane, who has been watching in the tower, bursts in to say the king is coming. Kurwenal, the faithful servant of Tristan, comes in backwards with drawn sword, followed by the king, his courtier Melot, and others. The king looks with grief upon the couple and reproaches them bitterly. Tristan spreads his mantle to protect Isolde from the sharp glances of the intruders. He looks with pity upon the king. Turning to Isolde, he says he will go to the dreary country of his birth. There she will find asylum if she wishes to follow. He kisses her brow. Melot, enraged, draws his sword. Tristan defends himself but allows Melot to wound him.

In his old manor in Brittany, whither Kurwenal has brought him, Tristan is slowly dying from his wound. Isolde has been summoned to heal him. At last she comes, but the excitement is too great for Tristan. In delirium he tears the bandage from his wound and expires in her arms. The king and Melot arrive. Kurwenal, looking upon them as enemies, gives battle. Melot is killed; then Kurwenal is wounded and dies beside his master. The king approaches. Sadly he relates that Brangane has told all, that he holds the lovers guiltless and has come to pardon and unite them forever. Isolde does not understand. She gazes upon her dead lover, Tristan, and expires in the arms of Brangane whose rusé of the love philter had but served to intensify the tragedy.

Trovatore, Il (*ēl trō'vä-tō'rĕ*). *The Troubadour.* Music by Verdi; words by Cammerano; plot based upon Spanish drama of the same name; in popularity second only to "Aïda"; première Rome 1853, New York 1855.

Manrico, the troubadour, a chieftain of the prince of Biscay, is really Garzia, the brother of Count Luna, a young nobleman of Aragon, but nobody knows this except Azucena. When Garzia was a child an old gypsy cast a spell over him. For this she was burned to death. The gypsy's daughter Azucena, in revenge, carried off the child, and the next morning the smoldering bones of an infant were found among the charred embers where her mother had been burned. By mistake Azucena had thrown her own child upon the fire. She has brought up Garzia and named him Manrico.

Leonora, a princess of the house of Aragon, has crowned the troubadour victor at a recent tournament. Count Luna, who loves Leonora, lingers under her window at his palace, Alfiera. Leonora enters the garden to meet Manrico. Mistaking the count for Manrico she greets him warmly. At that moment Manrico appears. Seeing her with the count he charges her with being unfaithful. Leonora rushes into his arms. The count challenges Manrico to combat. As the men begin to fight, Leonora falls to the ground in a swoon. Later, thinking Manrico dead, she goes to a convent.

A messenger arrives at the gypsy camp, summoning Manrico to defend the castle of Castelar, relating also that Leonora has gone to a convent. Manrico rescues Leonora as she is about to take the vow and brings her to Castelar but is there taken prisoner by the count's forces. Azucena, brought to the count's camp as a spy, is recognized by Ferrando, the captain of the guard, as the supposed murderer of the count's brother. She calls upon Manrico for help. The count orders her burned. Manrico attempts to rescue her. Both he and Azucena are thrown into a dungeon.

Leonora pleads with the count to spare the life of the troubadour. At last she promises to marry the count if Manrico's life is spared, resolving, however, to take poison as soon as Manrico is safe. The count consents. Leonora visits Manrico in prison to tell him he is free. Having already taken poison, she dies at his feet. The count enters. Enraged at being thus robbed of his bride, he orders Manrico to be taken outside and beheaded instantly. The count drags the sick and weary Azucena to the window to witness the execution of her son. Azucena tells the count in a loud whisper: "You have killed your brother!" The count in remorse utters a wild cry and falls to the floor in a swoon.

Walküre, Die (*väl-kü'rĕ*). *The Valkyrie.* See *Ring of the Nibelung, The.*

William Tell. The last and greatest opera of the Italian composer, Rossini; words by Jouy, Bis, and Marast. The plot is based upon Schiller's drama of the same name; première Paris 1829, New Orleans 1842, New York 1888.

William Tell is the patriot who was instrumental in freeing Switzerland from the Austrian yoke in 1307. The plot deals with conditions which led up to the actual uprising. Leuthold has killed a vassal of the tyrant Gessler, the governor, in order to save his daughter from dishonor. Being closely pursued, his only escape is by way of the lake. In the raging storm, the fishermen refuse to undertake the passage. The voices of the pursuers are heard, when William Tell comes to the rescue, takes the rudder from the hands of the fisherman, and steers Leuthold safely to the other side.

For this act against the government, William Tell incurs the bitter hatred of Gessler. Arnold, the son of old Melchthal, is in love with Mathilde von Habsburg, the ward of Gessler, and is torn by the conflicting emotions of love and duty. Tell tries to win Arnold over to the cause of the fatherland, and to leave Mathilde, the Austrian born aristocrat, whose sympathies are against Switzerland. When Arnold hears that the tyrants have slain his old father, he forgets all but his love for his country, and dedicates himself to a blood revenge against the oppressors of his country.

Further to humiliate the Swiss by his tyrannical methods, Gessler places his hat upon a pole in the market place in Altdorf, and, accompanied by Mathilde, watches the poor villagers acquiesce to his latest order,—that all shall bow humbly before this symbol of his authority. Refusal to do so is to be punished by death. Tell, accompanied by his young son, passes by and refuses to bow before the hat. He is recognized as the rescuer of Leuthold. Realizing that the affairs of the country are approaching a climax, Tell secretly tries to send his son to give the signal for the uprising. Gessler, however, bids the boy remain, and then commands Tell to shoot an apple from the head of his own son. The shot is a long and difficult one, but is successfully accomplished by Tell. Perceiving that Tell had placed a second arrow in his belt before making the shot, Gessler suspiciously asks Tell why he had done so. "With this arrow I would have shot you, and, truly, I would not have missed," is Tell's answer. Again Gessler commands that Tell be bound, but the approach of the armed multitude of angry Swiss announces the beginning of the uprising which follows. It ends in the victory of the Swiss. Tell kills Gessler, and Mathilde, recognizing the cause of her lover, also turns from the Austrians and flies into the arms of Arnold.

Zauberflöte, Die (*tsou'bĕr-flö'tĕ*). *The Magic Flute.* A fairy extravaganza; music by Mozart; words by Schickaneder; plot adapted from tale by Wieland; première Vienna 1791, New York 1833.

Pamina, daughter of the Queen of Night, has been carried off by the wise master, Sarastro, priest of Isis, to protect her from evil influences. Tamino, a noble prince, who has lost his way and spent his last arrow, is attacked by a huge serpent and faints from fright. Three veiled ladies of the queen's suite kill the serpent. They are so much impressed with the beauty of the prince that they cannot decide who shall bring the message to the queen and who shall remain, so all go. When Tamino revives he sees before him the birdcatcher, Papageno, dressed in feathers, and thanks him for destroying the serpent. The birdcatcher boastfully admits his prowess.

On returning, the ladies rebuke Papageno and show Tamino a small portrait of the princess Pamina. He loves her from the first and gladly sets out on a mission to rescue her, accompanied by Papageno. Tamino receives a magic flute to protect him from danger; Papageno, a set of bells.

In Sarastro's Temple of Wisdom, Pamina is pursued by the unwelcome attentions of Monostatos, her Moorish attendant. Papageno rescues her. He frightens the Moor by his feathery dress and in turn is frightened by the Moor's dark hue. Pamina, however, is brought back by the Moor. Tamino also is caught and all are taken before Sarastro. The wise master promises to unite the lovers if they will remain at the temple until they have been purified and the constancy of their love tested. Gladly they accept. Pamina returns to her duties, and Tamino enters upon a novitiate.

The queen, suddenly rising from the earth, gives Pamina a dagger and commands her with threats to kill Sarastro. Not knowing that the ordeal of silence has been imposed upon Tamino, Pamina cannot understand his apparent coldness and is inclined to listen to the counsel of her mother. Sarastro however convinces her of his beneficent intentions. The lovers go through the ordeals of fire and water successfully and, having been purified, are united in wedlock by Sarastro. The Queen of Night and her accomplice, the Moor, try to prevent the wedding ceremony, but the scene changes suddenly to the Temple of the Sun with Sarastro on the throne. The bright light baffles the queen, and she, with her retinue, sinks into the earth.



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PAINTING

THE art of painting is wide, almost limitless in its appeal. More rapidly than its sisters, architecture and sculpture, it awakens the emotions. Purely sensuous is the pleasure to be derived from it; while mental activity is involved in the mood following upon the sight of a noble structure and, to a less degree, upon that of a successful statue. Painting works through the magic of color and of optical illusions. The other major arts of form obtain their effects by means of properly employed line and mass. They are less complicated in principle, less poignantly expressive, less representative of nature.

Development of the Art. Painting may be defined as an art whose elements are drawing, composition, light-and-shade (*chiaroscuro*), and color. Considered historically, the development of the art may be divided into periods limited by time and by separate civilizations. Or its stages may be counted by the practice of artists, accordingly as they have worked under the tyranny of rules, or have recorded the testimony of their eyes by representing things, not as they are, but as they appear to be under varying conditions of distance, and of light and shade.

Chronologically, therefore, painting may be studied under the time-honored heads: ancient, classical, medieval, Renaissance, and modern. More rationally, however, it may be regarded under two aspects only. The first includes all painting according to strictly observed traditional methods and preconceived concepts. The second phase, still operative, began with the 15th Christian century, when Italians were born who solved the problems of perspective, differentiated tactile values, and were the first to appreciate the action of light upon color.

Egyptian Painting. Among the ancient peoples, beginning with the Egyptians, painting was first used to convey information by picture writing; this limited service ending with their dominance. But their decorative system, essentially sound and true, remains to this day a valuable object lesson. They applied pigments to surfaces so as to make flat areas of color, using the primaries and secondaries and casting no shadows.

If destined for exterior surfaces, the scheme was made brilliant, in order to overcome the graying of local color by an atmosphere suffused with light. And it may be observed that the same provision is made by Nature when she peoples the tropics with bright-hued fauna and flora, reserving the neutral tints for the temperate zones. In the forecourts and in the halls thickly set with columns, like forests with trees, the Egyptian decorators adopted schemes lower in key; employing only the gravest and deepest tones in chambers approaching the sekos, or sanctuary, into which the Pharaoh alone had the right of entrance, and that at stated intervals.

The flat areas of color were heightened in effect by characteristic drawing, of which a French critic said, "The Egyptians saw as through a veil"; thus describing by a clear simile their failure to model within the contour of any object which they represented. The same critic elsewhere touches the secret of this failure, when he comments upon the apparent loss of roundness suffered by a dome, or that of the third dimension by a square tower when seen against a sunlit background. Consequently, it may be accepted that atmospheric conditions—not imperfect organs of vision—were responsible for the way in which the Egyptians saw large objects from a distance. And what more natural than to expand this necessity into a principle of universal application, and, by so doing, to create a definite, always recognizable style?

Assyrian Painting. Quite different are the atmospheric phenomena observable in Mesopotamia, in the plains watered by the two rivers which give a name to the country. There, mists obscure the contours of distant objects, so that they are seen in planes,—the foremost very distinctly and those behind gradually disappearing into the void. These conditions determined the color schemes of the ancient Assyrians, who used cool greens, opaque blues, and clear yellows, not unlike the tones chosen by Japanese decorators, who also work in an atmosphere charged with humidity.

In design the Assyrians showed their progressive, practical quality of mind. Their manner of communicating information was not by picture writing, but by means of wedge-shaped (cuneiform) letter characters. They embellished their articles of daily service, such as carpets, tents, saddles and other trappings for animals, and their tiles, glazed to prevent disintegration through dampness. All these they ornamented with *motifs* derived from those of the Egyptians, but modified always to the betterment of unity. Their flower-and-bud border, their rosette, and their overlaid (imbricated) feather pattern have still an active existence in the products of the industrial arts.

Greek Painting. From the practical Assyrians the student follows the natural historical passage to the Hellenic Greeks, who, in addition to their admirable attainments in architecture, sculpture, and the drama, excelled also in painting; using various methods, especially the encaustic (hot wax) in murals, and treating a wide range of subjects, preferably mythological and portrait.

Unhappily, examples of Greek painting are virtually nonexistent, since the substances on which they were executed were too fragile to escape destruction. Therefore, the sources from which estimates of these works must be formed are largely the reports of travelers, who saw them in antiquity, and the descriptions, accompanied by uncritical, childish tales, given by the elder Pliny.

Like the other arts of Greece, painting reached its climax in the 5th and 4th centuries B. C. In the first of these periods, murals were executed by Polygnotus at Athens in a "slip" or liquid clay. In these, the figures were isolated, and no provisions were made for optical illusions consequent upon distance or position. Their qualities, it is evident, paralleled those of contemporary vase paintings, and their interest for the modern eye would be purely historical.

At the end of the 5th century, the easel picture, painted on a wooden or marble tablet, was produced together with the mural, carrying the result of greater realism. And this quality was further emphasized by the substitution of modeled figures for mere outlines filled with flat masses of color.

In this stage of the development of Greek painting, Zeuxis and Parrhasius were the masters; both of them being natives of Asia Minor but working at Athens. After them the easel picture specialized into portraiture, and of this branch of the art Apelles, at the court of Alexander the Great, became the chief exponent; there attaining admirable results in the encaustic process (application of colors by means of hot wax), as well as in distemper (pulverized pigments attached to background by means of a viscous substance).

Of this period, two representative works remain, although they are Greco-Roman copies of far worthier originals; while the value of one has been still further diminished by its transference into mosaic. It is known as the "Battle of Issus," and was discovered at Pompeii. The second painting, under the modern name of the "Aldobrandini Wedding," is a mural of miniature proportions preserved in the library of the Vatican. Remarkable for its fine drawing and its soft, harmonized color tones, it is a precious historical document. Together with the wall decorations of Pompeii, it proves that the painters of antiquity, although masters of line, were never able to overcome the difficulties offered them by the dimension of space.

Byzantine Illumination and Mosaics. The heritage of line and composition bequeathed by the Greeks to the art of painting slowly lapsed into a long passive state as classic civilization declined. In the new capital created about 330 A. D. at Byzantium by Constantine, painting minimized itself, developing into two branches of decorative art: (1) the illumination of manuscripts, practiced by the monks primarily for the propagation of the Church ritual; (2) mosaics, that is, pictures composed of cubes of brilliantly colored stone, glass, or enamel set in a bed of cement. The latter species adorned the basilicas of the new faith and were the successors of the antique murals. They served to announce the doctrines of Christianity and to glorify its martyrs. They appeared wherever Byzantine influence extended itself, and, in Italy and Sicily, were finest in Rome, Ravenna, Venice, Palermo, and Monreale; the period of their production ranging from the 5th to the 14th century. Both these arts were limited by hard and fast conditions, which, beginning with the materials (the inks or the minerals) with which the pictures were produced, extended to the unsettled or the secluded state of life in which the artists or craftsmen lived, including even the character of the producers themselves, who were in all ways different from the freethinking Greeks and the judicially minded Romans.

Painting in Western Europe. Finally, as a consequence of the thought and skill developed in the practice of illumination and of mosaic production, among the peoples of western Europe, there rose the third and greater art: that of painting in the modern sense of the term. Its beginnings were naturally made in the most advanced region of the most civilized country—in the central city-states of Italy. It had undoubtedly two points of origin, Florence and Siena, and its rise was synchronous with that of the revival of sculpture as an independent art in the maritime Pisa. The Pisans, besides, contributed to the movement the worthy painter, Giunta.

The earliest Italian painters either had studied their profession in Constantinople or were the pupils of masters who had served a long apprenticeship in that Eastern city. Among them, to quote the authority, Salomon Reinach, "We are accustomed to regard Cimabue as the first painter, much as we regard Adam as the first man." In other words, we accept a tradition largely founded upon two famous lines of Dante (1265–1321), who was a younger contemporary of the above-mentioned artist and an equal in age with Giotto, the real founder of the Florentine school of painting.

Cimabue and Duccio. It is proved by documentary evidence that Cimabue was a mosaicist and that a much restored work by him in that medium exists in the dome of the Cathedral of Pisa. But of the paintings attributed to him in the galleries of continental Europe and of England there is not one the authorship of which is free from doubt. This stricture applies even to the picture which is widely acknowledged as the first extant monument of Italian painting and is contained in the Rucellai Chapel of the Church of Santa Maria Novella, Florence. Its subject is the enthroned Madonna and Child, flanked by adoring angels. It is painted in distemper on a wooden panel, probably of white poplar. It shows in drawing, in composition, and in flatness of color a degree of the Byzantine influence inevitable in any work of its period and the heritage of all painters then working in Italy.

Beyond these general considerations, the style of the picture is eloquent of its author, the chief of the then rising school of Siena, Duccio di Buoninsegna. Finally, these style-evidences are corroborated by documents which describe the location of the picture by Duccio so definitely as to eliminate from the question the name of Cimabue. Consequently, it is from the "Rucellai Madonna" and from the wooden triptych (folding picture of three panels) by the same artist, contained in the Palazzo Pubblico, or Town Hall of Siena, that we must date the remote, fragile beginnings of modern painting.

In the presence of either of these works, the student recognizes that the art, which was arrested in its development in the age of Augustus and then retrograded in the catacombs to the crudest, most elementary principles, guarded the germ of its vitality through the chaos of the early middle ages. He finds it among the primitive Italian masters of the 13th and 14th centuries, struggling for utterance in a less polished and perfect, but more expressive and intimate, medium.

Giotto and His School. To follow this finally successful struggle, it is necessary to return to the Florentine school, which, in the development of painting from its infancy to its adult stage, served a purpose similar to that of the vertebral column in the human body. Of this school, the real founder was Giotto, the reported pupil of Cimabue, who became an epoch-making painter. He lived at a fortunate period, when imagination was fruitful and effort generous, in the period of great churchmen and sovereigns. Dogmatic Christianity had been softened by the fraternal love of Saint Francis of Assisi. The Gothic cathedrals of France were building, and the medieval vision of hell, purgatory, and paradise was assuming concrete form in the brain of his friend, the supreme Christian poet, Dante.

The lifetime of Giotto lay between the approximate dates 1266 and 1336, and his position as the founder of the Italian schools, and through them of those of all other modern nations, may be adequately judged by his extant mural works. Of these, the best exist at three points of Italy: at Assisi in the Church of Saint Francis; at Padua, in the Arena Chapel; and in Florence in the great Franciscan Church of Santa Croce. In addition, more or less authentic examples of Giotto, and certainly of his school, exist in fragments in Rome and in Naples, together with a number of "crucifixions," intended for altarpieces, in the north of Italy.

The Giottesque Influence. From the wide diffusion of these works and the importance of their locations, it is apparent that the principles and methods of Giotto were accepted without hesitation by the governments, the nobles, and the enriched burghers, who all together then constituted in Italy the body of art patrons. But their acceptance was not based upon the love of art for its own sake. It was prompted largely by the recognition of the murals as instruments of religious propaganda; their effectiveness lying in their wonderful narrative quality, their necessity being absolute at a time when only "learned clerks" could read.

Today the value of the Giottesque murals has entirely shifted its base. The scenes portrayed in them have become a vast field of demonstration. They offer a progressive course of study for one who will follow them from the Upper Church at Assisi to the Bardi and Peruzzi chapels of Santa Croce, Florence. At their beginning they have all the dullness of the most debased period of Christian Roman art, as represented in chaotic mosaics. In the late Florentine pieces they are filled with reminiscences of the Greek art from which they sprang. At the same time they foreshadowed the decorative system of the 19th-century genius, Puvis de Chavannes. Their author must be regarded as the founder and institutor of modern painting.

To draw a simile from nature, Giotto may be likened to a river, destined to be a great one, at a point where it first assumes its proper name, having proceeded from a union of countless streams whose origin is lost in obscure, impenetrable distance. The Florentine master, equally gifted in composition, in design, and in color, had, at his death, renewed in his own art the order and symmetry, if not the suavity, of the antique. Further, like the ancients in their paintings, he had sought realism, but had surpassed them in expressiveness of gesture, making that ele-

ment almost as pliable and as comprehensible as speech itself. He had displayed also a capacity denied to ancient artists by mingling in a single scene the solemn and tragic with the intimate and humorous, to the advantage of the scene portrayed.

For at least two generations following the death of Giotto, slight advance was made in the development of painting. Originality was stifled in both the Sienese and the Florentine schools by a mistaken reverence for their founders. The composition, design, types, and technique of these first masters were copied, to the neglect of their principles, which, had they been studied, would have led to rapid progress. But owing to the position of Florence, then the financial capital of the world, the local school of painting did not decline, since the art was so useful to the burghers as a means of self-aggrandizement through the multiplication of their portraits and their gifts of great altarpieces to churches or of murals to family chapels.

Andrea del Castagno. Throughout this period of retarded growth the Giottesques kept the sound although restricted traditions of their master. But in the last years of the century two innovators rose among them. The first, in point of time, Andrea del Castagno, devoted himself to the study of "tactile values," as the subject is named by artists; in other words, he sought to render the third dimension, the thickness, of figures, so that they might appear beings, rather than phantoms, and capable of resistance to pressure.

Uccello; Ghiberti; Brunelleschi. The studies of the second of the innovators, Paolo Uccello, produced the most far-reaching and durable results. Born on the very threshold of the new century (1397), he was one of three artists to whom we practically owe the laws governing perspective, or the art of delineating solid objects on a plane surface so as to give the same impression of relative positions and magnitudes as the objects would do when viewed from a particular point. Each of the three men represented a different art. The eldest, Lorenzo Ghiberti, the sculptor (1378?–1455), showed in his reliefs the influence of both linear and aerial perspective. The second, even more distinguished than Ghiberti and, in some sense, his enemy, was the architect and engineer, Filippo Brunelleschi, author of the finest dome scheme of the Italian Renaissance—that of the Cathedral of Florence. The third and much the youngest was the painter Paolo Uccello, the apprentice of Ghiberti, to whom the master taught the new and absorbing subject; finding in the youth an extreme aptitude, which was recognized and further fostered by Brunelleschi. From this distinguished group in central Italy, interest in the study spread to the north and the east of the peninsula, and so fervent did this sentiment become that important problems, when solved, were placed on parchment and exhibited for the instruction of the public in the principal squares of the larger towns. And, as then the minor and industrial arts were more closely and worthily joined to the major than is now the fact, expert artisans in wood inlay (*intarsiatura*) treated the same problems in designs with which to embellish the furniture destined for rich interiors.

Masaccio, Pioneer of Realism. The movement toward realism was, perhaps, aided most of all by Masaccio (1402–29), whose chief murals in Florence were made objects of close observation by the masters of two generations later. Nor is it too bold to suggest that, had this man of genius been omitted from the sequence of the makers of painting, the climax of the Renaissance (1500–50) would have been delayed a half century, or indeed might never have been reached.

Masaccio has been called the Martin Luther of his art, because he wished to sweep away what seemed to him outworn traditions. As far as he was able (since he was a pioneer among the realists), he painted "according to vision." He sought to represent what he saw, rather than to record what absolute knowledge either he or his predecessors had gained of any pictorial subject. His innovations are obvious, even to the eye of an untrained observer, whose examination is limited to illustrations in black and white of his murals in the Brancacci chapel of the Church of the Carmine, Florence. In subject they are similar to the works of the primitives. In conception and, above all, from the technical point of view, they are epoch-making, as any single example will suffice to show. They present, for the most part, certain of the Apostles healing the sick, distributing alms, or administering the rites of the Church. But the holy personages, instead of being mere symbols and abstractions, as in the scenes painted by the weak imitators of Giotto, have become men among men.

Successors of Masaccio. The point of progress reached by Masaccio was advanced by two of his immediate successors, Mantegna (Vicenza, Padua, Rome, 1431–1506) and Piero della Francesca (Umbria, 1420–92). The former produced for the first time (Padua, Church of the Eremitani) ceiling decoration in correct perspective and foreshortening, as judged by the observer standing on a floor far below. He produced also the illusion of a ceiling open to the sky, since he painted figures as if they were suspended in open space; so creating a precedent for the masters of the High and the Post Renaissance, such as Michelangelo (1475–1564), Correggio (1494–1534), Paul Veronese (1528–88), and Guido Reni (1575–1642).

The advance toward modern painting made by Uccello, Masaccio, and Mantegna was supplemented by Piero della Francesca, who, in his day, apprehended the principles of the 19th century French impressionists. His contribution to the development of painting is best understood by comparing him with those of his quasi contemporaries who devoted themselves to perspective. For, while the latter could indicate the recession of planes, they could not give the impression of depth, of free space. Their pictures were representations of flat surfaces with landscapes, which, when introduced, rose vertically. On the contrary, Piero, four centuries before the French master, Claude Monet, saw, although less keenly, the effects of light under which every object momentarily changes color. He was the first painter to disclose the marvels of a world of "values" determined by degrees of luminosity.

The Study of Anatomy. To the great elements of progress in painting just discussed, the knowledge of anatomy also was added in the 15th century. The study of the nude, pursued by the ancient Greeks through observation and later through dissection, had been discredited by the early churchmen. Hostility toward this subject was long continued. Nor were there signs of a reversion to sounder judgment, until Saint Francis in his canticles praised God for the visible fairness of nature. But it was not until the invention of printing from movable types, at the middle of the 15th century, and the consequent diffusion of Greek and Latin literature, that the nude was freely represented in painting. Further, it must be acknowledged that this departure was greatly favored by the study of anatomy, inaugurated late in the 14th century at the University of Bologna.

The introduction and the rendering of the nude is one of the most obvious proofs of the age and the school of an Italian picture; the statement being equally true of the adult and of the child figure—the latter as instanced in the Infant Christ. Draped and sitting or standing on the knee of His mother, in the Byzantine and early Tuscan schools, He appears covered with a thin veil when painted by Fra Angelico (1387–1455). In the famous circular picture (*tondo* of the Pitti palace, Florence) by Fra Filippo Lippi (1406–69), He is wholly nude, with awkward articulations and the head set squarely on the shoulders, with practically no intervening transitional line of neck.

These, as well as other aggressive faults in figure structure committed by the gifted Fra Filippo, were repeated, as if in softened echo, by his son and by the pupils of the latter. They were not eliminated until Raphael (1483–1520) painted in Florence (about 1508) a perfectly formed Christ Child modeled upon the antique. As to the adult nude, it is found slender, fragile, unstable, and slightly unreal in the universally known "Spring" (Primavera) of Botticelli (1447–1515); effeminate in the youthful male saints of the Umbrian Perugino (1446–1524), master of Raphael; of a Praxitelean beauty in both the male and the female figures of the last-named painter in his Roman and final period (1508–20); emphasized and often strangely exaggerated in the murals of Michelangelo, greatest of the artistic anatomists of the High Renaissance.

The High Renaissance. Such was the state of advancement in the art of painting at the opening of the 16th century. During the hundred years just preceding, progress in that art had been almost inconceivably rapid, owing to the enthusiasm of the painters and the rivalry among them, as well as to public interest in their works. In the year 1400 Andrea del Castagno was yet a child and Uccello a mere infant, with their accomplishments lying far before them in the future. In the year 1512 Michelangelo completed the ceiling frescoes of the Sistine Chapel in the Vatican, which mark the climax of the High Renaissance, after which all the worthy accomplishments of the historic Italian schools of painting were inevitable consequences of the impetus given before that date. Further, it may be said that the very brilliancy of the artists living and working at the brief period of the climax was, in itself, a cause of the decline and sterilization of their immediate successors.

As a consequence of civic strife in Florence and the election of a strong pope, Julius II (1503–13), artistic supremacy was transferred to Rome. There the newly elected pontiff wished to glorify his family and to make memorable his own reign by the creation of great monuments. Therefore, for the adornment of his papal palace, the Vatican, he commissioned Michelangelo to decorate the walls and ceiling of the chapel named the Sistine in honor of his uncle, Pope Sixtus IV (1471–84). At the same time, he chose the more comprehensible and pliable genius, Raphael, to embellish with murals a spacious chamber (stanza) which is now believed to have been the private papal library and study. Four years later both artists had finished their commissions, which represented in the case of each his best mural work.

Sistine Chapel Frescoes. Michelangelo illustrated the history of the world from the Creation to the Deluge, as told in the Scriptures, on the flat panels of the vaulted ceiling of the chapel; filling the triangular spaces between the arches with majestic rhythmic figures, male and female, symbolizing Hebrew prophets and pagan sibyls who foretold the birth of the Christ. The whole constitutes a scheme of overwhelming grandeur, constructed upon the unit of the human figure, which is used, not merely to present the actors in the drama, but also as a purely decorative detail, in the frames of the scenes. Imposing are also the proportions of the composition and adapted to the dimensions of the chapel, which has a height of 68 feet, with an area of 132 by 44.

In both conception and execution the Sistine ceiling frescoes are the work of a superman. They, together with the statue of "Moses" and those of the four "Slaves" originally related to the first-named, represent the climax of Michelangelo's physical and mental strength. The pictorial Genesis is still charged with life, impressing with its turbulent power even the cynical, surfeited modern observer. But it belongs to a class of creations that are themselves sterile, or, if they reproduce, generate only weaklings and perverts. The influence of Michelangelo upon the painters who were his younger contemporaries or his immediate successors deflected them from the sound traditions of their art, resulting, for example, in the violent foreshortenings of the Venetian Tintoretto and in the sinister force of Caravaggio, the Neapolitan, who inspired the Spaniards of his time in their renderings of revolting martyrdoms.

The Work of Raphael. Slightly before the completion of the Sistine ceiling, Raphael also (1511) finished his first great commission from Pope Julius. Unlike Michelangelo, he had begun his murals with a thorough knowledge of the processes to be employed. He had treated, under the pope's order, subjects lending themselves to his clear, suave, and tranquil style. He was newly come from Florence, where, with his power of rapid assimilation, he had studied the great murals of Masaccio, and the then recent innovations in composition made by Leonardo da Vinci.

In the spacious study of Julius II, the artist presented the subjects of "Theology," "Philosophy," and "The Triumph of Poetry"; the first in a decorative style, with treatment of the wall as a flat, opaque substance, bringing to the mind of the observer a magnified sheet of illuminated parchment. In the second picture, "Philosophy" (later named the "School of Athens"), Raphael acknowledged the influence of the architects by whom he was surrounded at the papal court, chief among whom was his uncle Bramante. He showed in adequate perspective an imposing interior like that of an imperial Roman bath, apparently filled with atmosphere and serving as a place for discussion. Therein he pictured an assembly of Greek philosophers represented on two levels with two distinct purposes: the first of which was to show mastery of perspective; the second, to declare that speculative philosophy must be based upon scientific research. For such, without doubt, was his thought in grouping on the lower pavement the physicists, with their various instruments; while he reserved the axial point of the higher level for the figures of Plato and Aristotle, the former of whom was slightly advanced, as became one who dominated the studies of the Renaissance. In the third picture, "The Triumph of Poetry," or "Parnassus," Raphael painted like the greater pupil of his Umbrian masters, Pinturicchio and Perugino, selecting elements from each and perfecting all that he selected.

The course given to painting by Raphael could not be deflected. In the hands of Giulio Romano and of the lesser pupils of the artist, composition became a mere formula of line, applicable in a certain class of cases and replaced by another framework of rules when the occasion demanded a change.

Leonardo da Vinci. The influence of the third great master of the time, a Florentine, but founder of the second Lombard school, was too subtle to be grasped by the majority of either professional painters or laymen; while for certain of his pupils it was positively baleful. This versatile artist, Leonardo da Vinci, was undoubtedly the greatest genius of the Italian Renaissance. In painting he revolutionized composition, he developed *chiaroscuro* to limits previously unsuspected, he created figures and faces lovely in line and modeling, but challenging, like the Sphinx, or alluring, with a morbid charm, sinister and suggestive of evil.

By reason of his line—when possible, a spiral—Leonardo has been characterized by the English critic, John Addington Symonds, as an inspired experimentalist or amateur, as one who, although gifted to the highest degree, yet distrusted his own powers; thus lacking the self-assertion which is the essential quality, the convincing force of the professional. His was a power so distinctively personal that it could not be transmitted and perpetuated. By its breadth he was enabled to create in his "Cenacolo" ("Last Supper") a work uniting, in a composite expression, psychology, drama, and painting regarded from its purely technical side. In each

of these elements he showed himself different from any of his predecessors who had presented the same scene. Moreover, he copied nothing from his own previous works, nor can it be found that later he ever repeated himself.

The Last Supper. It was rare in Italian art to change the treatment of a subject, once that subject had been presented and its treatment had been received favorably by the authorities of the Church. Therefore, during the quarter millennium beginning at the time of Cimabue and Giotto, the scene of the "Last Supper" had become a historical group, varying only with the development of painting, the school of the painter, and his individual temperament. But Leonardo, with his mastery of facial expression and gesture, which was partly intuitive and partly derived from intensive study of the muscles, presented the event in the light of a trial, showing the effect of the declaration, "One of you shall betray Me," upon twelve men of differing character.

In composition the "Cenacolo" has possibly but a single equal. This is the eastern pediment of the Parthenon, from which a sufficient number of figures remain to show the rise and fall of the linear rhythm, matchless in the world of art except for its parallel in the attitudes and gestures of Leonardo's apostles grouped and seated, as if in a conventual refectory and at the farther side of a narrow, rectangular table. It may be added that in both instances the rhythm receives essential assistance from light and shade, afforded in the temple pediment by the external air and in the mural picture by the painter's own genius.

The Venetian School. Matching with almost equal steps the path of Florentine painting, the very separate and distinct Venetian school declined after the careers of Titian (1477?–1576) and Paul Veronese (1528–88). This special development was based upon color used, one might say, as an element of structure, suggested by the atmospheric phenomena, lovely and kaleidoscopic, which offered themselves ceaselessly to the inhabitants of the multiple-island city. To the atmosphere as a primary influence other contributory causes were added—such as the Oriental commerce which carried into Venice brilliantly colored fabrics, and the fact that the earliest and most authoritative group of the school had risen on the island of Murano, then, as it is today, a center of the finest mosaic production.

From the use of large, flat areas of color, from a Byzantine stiffness in the treatment of the figure, and an architecture plainly derived from that of Constantinople, the Venetians advanced to what has been called by German critics the "mood-picture." This species is exemplified in the works of Giorgione (1477–1511) who, in life and temperament, is often paralleled with the English poet Keats. The just mentioned title (in German: *Stimmungsbild*) has been applied to a picture containing figures placed in a landscape which is gay, grave and tranquil, or sinister, according to the requirements of the action for which it serves as a background. A golden light, caught and softened by shrubbery, suffuses the scene of Giorgione's "Rustic Festival"; while a threatening sky, charged, it would seem, with electricity, broods over the dramatic group of Tintoretto's "Miracle of the Slave."

Such quickening of the thought underlying the presentation was the secondary gift and legacy of the Venetians to the art of painting. It was created and bestowed during a portion of the long lifetime of Titian (1477?–1576), the greatest of his entire school, since he was the exponent and the measure of its chief characteristic. To this painter, color was an orchestra composed of many voices—strings, wood winds, brasses, and instruments of percussion—which he used to their limits in his formal compositions, like the "Presentation of the Virgin" in the Academy of Fine Arts, Venice. Furthermore, in the judgment of certain critics, he excelled in the branch of portraiture all his Italian contemporaries; while it is certain that he produced a new type of altarpiece, of bold composition, in which a populous group of figures on one side is balanced on the other by the mere folds of a floating banner. Also, he attained in landscape a distinction rare for an Italian, and partially attributable to his memories of the picturesque regions of the Dolomites, or Tyrolese Alps, in which he had passed his childhood. Of his influence upon his school the best of early 20th century Italian art critics, Corrado Ricci, has said: "With Titian the art of Venice took on a definite character . . . . The forms, the composition, the technique, all proceed from him, just as was the case with the Italian opera, when fixed once for all by Rossini."

Decline of Italian Painting. The Venetian school survived the Florentine, but at the opening of the 17th century the art of painting in Italy was far advanced in its decline. The latest school of the peninsula—that of Bologna—was frankly eclectic; that is to say, its adherents were free and even counseled to imitate whatever was acknowledged as admirable in the work of other painters. They were not taught, first of all, to seek principles and then to follow these principles to solution by personal and individual means. Facility of composition and execution, brilliancy of tone, and harmonious color-combinations were alone demanded of the painters, and these qualities attracted the superficial minds of the period, who praised extravagantly works that were still admired by the English of the 18th century.

Academy of Bologna. The beginning of the period of artificiality was recognized by those who had most hastened it in the years immediately following the death of the great masters of the High Renaissance. To counteract the unhappy influences then prevailing, an academy was established at Bologna, and principles of imitation and of universal borrowing, there announced as essential and indispensable, were incorporated into a now famous sonnet by one of the earliest masters of the Bolognese group. In this agreeable and very learned capital city of Emilia young students assembled from all parts of Italy, gaining for themselves the name of *Gli Incamminati*, "Those pursuing the right path." The conduct of the school was reasonable and wise, resembling that of our present day institutions of similar purpose.

Plaster casts, medals, and a library of books upon æsthetic subjects were provided for the use of the students, and their major instructors were members of the family Carracci, two of whom executed the frescoes of the magnificent Farnese palace in Rome. These works formulated the artistic creed of their authors by mingling the influences of the antique, of Michelangelo, as shown in the ceiling of the Sistine Chapel, and of Raphael's art in his murals which relate the myth of Cupid and Psyche in the Villa Farnesina on the Tiber. The result is a style composed of borrowed elements so harmoniously adapted to one another as to lay the foundations of a school as distinct and separate, although not so admirable, as any other of the Italian peninsula.

The Work of Guido Reni. The painters Carracci asserted a bold realism and delighted in strong effects of light and shade. And, although lacking the virile sincerity of the early Florentines or the spontaneous, individual qualities of the chiefs of other groups, they were yet far from decadent. Nor can the reproach of decadence even be cast upon their still more famous pupil, Guido Reni, whose ceiling fresco, the "Aurora" of the Rospigliosi palace, Rome, is enthusiastically admired by persons of superficial culture seeking obvious and assertive attractions. The composition illustrates a theme drawn from the *Metamorphoses* of Ovid, which served more frequently than any other work of classic literature as the source of inspiration for the Italian painters, sculptors, and medalists of the

Post Renaissance. Formal and brilliant, it impresses the eye as the ear is affected by the rapid scales of a perfectly trained musician. But the mind of the observer does not react to the structure of the scene, nor are his feelings moved by its color. The "Aurora" is the torn chrysalis of Italian painting, abandoned and left to wither through the escape of its vital principle.

However, the influence of this work, at the time of its production, was pernicious from a technical point of view only. Those who imitated it, being less gifted than Guido, fell into exaggerations or feebleness. As to the religious pictures of the same painter, their effect was far more detrimental. The "Ecce Homo," or head of the thorn-crowned Christ, the emotional "Virgin at the Foot of the Cross," the youthful "Saint Sebastian," ecstatic under harrowing torture, generated alike in the painters and in the public the thirst for revolting naturalism, or they developed, in the minds of those who studied them as aids to worship, the desire for unnatural physical suffering as a prelude to spiritual reward.

Caravaggio. Synchronous with the productions of the painters of Bologna were those of Caravaggio, a highly gifted artist born at Bergamo in northern Italy, but usually regarded as a Neapolitan. The son of a stonemason, of a nature hostile to culture, free in the use of weapons, and himself dying at the hands of paid assassins, his crimes and brutalities are today largely pardoned. They have been absorbed in his accomplishments as an artist. He is now believed to have exerted over subsequent painting a greater influence than any other of the old Italian masters, with the single exception of Michelangelo. That this should be true is surprising, since Caravaggio presented types akin to himself— plebeians and criminals—in their sordid surroundings and their ugliness. He thus defied and deflected Italian traditions, in obedience to which the noble in countenance, in bearing, and, for the most part, in garments had alone been treated.

From the point of view of foreshortening and of violent effects of light and shade, Caravaggio derived from the Venetian Tintoretto, for whose fervent, tragic, religious spirit he often substituted a baseness provoking a shuddering fear in the observer of such scenes as "The Card-Players," which is preserved in the Dresden Gallery. This picture of intense power, eminent among the works of the artist, reveals his distinctive method of study. It was not enough for him to pose his models in darkened interiors, as was the custom with certain of the Flemish and Dutch masters, his younger contemporaries. His studio, provided it can be dignified by that name, was a subterranean room, lighted through a trapdoor. And this arrangement not only permitted him to emphasize his style, but, at the same time, suggested his character as a man and his tendency toward criminal adventure.

Caravaggio stands at the end of the Italian Renaissance, resembling the ebb of a formidable tide which gathers itself for a final effort. He is powerful, sinister, and destructive, with a cruelty like that of Nature herself. His forced shadows, chief of his technical characteristics, darkened the canvases of all the artists of Bologna. They lurked in those of Sir Joshua Reynolds and of others of the classic English school. Nor were they wholly swept away until the French open-air advocates (*les plein-airistes*) of the 19th century arose to suggest the flooding splendor and the fusing power of sunlight.

The Flemish Painters. Through the accomplishments of the Italian schools, the art of painting, as we now understand it, passed from its birth at the middle point of the 13th century to full maturity in the 16th and to a grave decline during the 17th. In the meantime, certain countries of central and western Europe developed the same art from the 15th century onward, in obedience to spontaneous impulse, as well as to influences from the East and from Italy itself. Late in the 14th century, appeared the earliest masters of Rhenish Cologne, long previously the seat of pagan Roman culture, and immediately following them, the founders of the primitive Flemish school,—Hubert and Jan Van Eyck.

From the last-named, through the mediation of a traveling Sicilian student, there passed to the Venetian family of the Bellini the secret of an excellent oil technique, which, being propagated rapidly, facilitated and specialized everywhere the advance of the art. North of the Alps, the harder physical conditions of life and the responsive energy necessary to overcome them produced a strong social and civic bond, which inspired the artists to their best efforts. The industrial guilds, rather than princes or churchmen, gave commissions to the painters, all of whom, until the time of Luther, treated Bible subjects and the mysteries of the faith as frequently as did the Italians, but with an ingenuousness and intimacy far removed from the formal, emphatic Italian manner.

The schools of Ghent and Bruges and of Brussels, in the persons of the Van Eycks, Hans Memling, and Rogier van der Weyden, made the beginnings of the modeling and the atmospheric effects which later their neighbors, the Dutch, carried to so great a climax. Their realism was frank and homely, without being grotesque, as when they did not hesitate to emphasize in their portraits the distended muscles, the wrinkled skin, and the stiffened hands of old age. They literally painted "what they saw," but their vision included always a beautiful detail, like a square of idyllic landscape opened in the background, or some accessory of costume, like a full-petaled carnation or the elaborate gold chain and jewel of the Knights of the Golden Fleece.

The German School. In the school parallel with the Flemish—the German—this sensitiveness to refinement did not exist, and little advancement beyond the primitives was made during the 15th century; while, as we have seen, painting in Italy was acquiring all the characteristics of an adult art. The Germans worked in lines of bronzelike hardness and with somber color; giving to their holy figures contortions and grimaces that are revolting to the modern eye. But an exception to the general truth is found in a pupil of Flemish masters, Martin Schongauer of Colmar (1446?–88), subsequently to whom the school became concentrated in Nuremberg (Franconia), Augsburg (Swabia), and Weimar (Saxony); its chief representatives being Albrecht Dürer (1471–1528), Hans Holbein the younger (1497?–1543), and Lucas Cranach the elder (1472–1553).

Dürer. The first of these men had the good fortune to be born in Nuremberg, which, of all German cities, had the closest commercial and intellectual relations with Italy at that significant time. He reached his maturity at a proper moment to profit by the fast developing arts of printing and engraving. His life was spent before the Lutheran movement had succeeded in dissociating in his Fatherland all the arts, save music, from the service of the Church. He may be called a lesser Leonardo da Vinci, since he too treated in thesis-form geometry and perspective, military engineering, the proportions of the human figure, and other subjects involving thought and research. But his imagination was less independent, less joyous than that of the Italian; his vision less analytic, more confined, and opening upon a gloomy prospect. Technically, if he could on occasion paint like the Venetians of his period, his personality and power are best epitomized in his woodcuts of "The Apocalypse" and the "Great Passion," and in his still more famous copperplates of "The Knight and Death," "Melancolia," and "Saint Jerome in His Study." The last three, Dantesque in conception, are regarded as the "masterpieces of the greatest mind that ever expressed itself in this form of art."

Holbein. The second of the three, the younger Holbein, unlike Dürer, has retained down to our own day almost universal admiration. His art in portraiture, searching the character of the sitter, created the figures of Erasmus, Jane Seymour, Anne of Cleves, Sir Thomas More, and "The Falconer," which modern masters may still study with advantage. As judged today through the perspective of centuries, it would appear that Holbein's fame in portraiture can never be lessened. He worked upon permanent, inflexible principles and with extreme delicacy of hand. What is obsolete in his presentations does not essentially detract from their value.

Cranach. The last of the three distinguished German painters of the 16th century, Lucas Cranach, although born in Franconia, is placed in the school of Saxony, because of his long attachment to the court of the elector of that principality. Less gifted than either Dürer or the younger Holbein, Cranach yet bears a name which may not be neglected in the history of his art. He produced, like Dürer, paintings, copperplates, and woodcuts; many of the latter showing that complicated symbolism so dear to the Germans, and having either religious or mythological subjects. From the historic Church, Cranach turned to follow Luther, and it is to this painter that we are indebted largely for the portraits (engravings and woodcuts) of all the Reformers and their titled adherents. His artistic impulses hardened and became scholastic with his change of faith, and with him German painting, which from its rise had developed no essential principle, declined, partially because it yielded to Italian influence, but more largely because of the religious agitation which extended to all Teutonic lands.

Progress in Flemish Painting. In the Low Countries, which, through the marriage of sovereigns and inheritance, fell under Spanish rule, this struggle was of incredible violence, since matters of faith were there complicated with aspirations for political independence. But, during the period of stress, a group of secondary artists carefully observed the excellent traditions of their predecessors.

Rubens. The reward of their fidelity was the appearance of Rubens, the greatest of all Flemish masters, who, born during the exile of his Protestant parents in 1577, returned after his studies in Italy to his ancestral city, Antwerp. Filled with the joy of living, virile, sometimes even coarse in his conceptions, and instructed in all the principles and the processes of his art, he rose to the first rank of painters, irrespective of time and nationality. His genius has been best symbolized by Taine, who said of him: "Rubens mounted to Olympus with his heels weighted by quintals of Dutch cheese." But in spite of his occasional grossness, natural to him as a Fleming, he does not deserve the warped criticism of Ruskin: "Rubens was a courtly phrased animal." His unique art could not be paralleled nor transmitted. His grossness was more than equaled by that of his younger contemporary, Jakob Jordaens (1593–1678); while the late Italian influence was more apparent and permanent in the works of his direct pupil, Antoon (Sir Anthony) Van Dyck (1599–1641). The latter, like his younger contemporary, Sir Peter Lely, of Dutch extraction, passed overseas to England, where he became court painter to Charles I; being succeeded in his office by Lely, who maintained his popularity during the Commonwealth and until his death late in the reign of Charles II.

Rise of the Dutch School. At the middle of the 17th century, painting declined among the Flemings; while in Holland the same art rose to the highest distinction in portraiture, both single and multiple (the guild picture), as represented by Frans Hals (1584?–1666) of Haarlem and by Rembrandt van Rijn (1606–69) of Amsterdam. There appeared also a specialized landscape, the greatest examples of which were produced by Jacob Van Ruysdael (1628?–82) and by Hobbema (1638–1709). To the painters of the northern Netherlands the two above-named branches were alone open. For the Reformation had precluded the use of the altar-piece, as well as that of the great religious mural. On the contrary, the burghers, finally free from the grinding Spanish occupation and enriched by the commercial enterprises of the Dutch East India Company (founded in 1602), wished to bequeath their portraits to their descendants and to embellish their houses with scenes from the country which they had reclaimed with almost superhuman effort, alike from the encroaching sea and from the aggressive foreigner.

Guild Pictures; Hals and Rembrandt. At first, the artists and the newly enriched burghers did not agree as to the composition of the guild picture. The latter desired a monotonous procession, all members of which, similarly garbed, should be equally prominent. To these childish presentations of the civic pageants of Haarlem, Frans Hals put an end by showing the guilds as preparing for the functions in their chapter houses; introducing sometimes a spiral staircase to break the monotony of line, obtaining by other devices strong effects of light and shade, and brightening here and there the somber citizen garments by a brilliant blue or orange sash.

With the same purpose of transformation, Rembrandt painted his group of 29 life-size figures of civic guards issuing in gala attire from their quarters. The composition, known incorrectly as the "Night Watch," seems actually to move, having the form of a wedge advancing, point forwards, with its mass defined by the admirable gradation of values and the placing of great spots of color. By this single canvas, Rembrandt would have gained the right to be ranked among the greatest masters of painting. But he had, as yet, marked only two of the three phases of his art. He had already produced one of the greatest of his etchings, the "Hundred Gilder Piece" ("Christ Healing the Sick"); while 22 years later, in poverty and despair, he was to paint his masterpiece, the "Cloth Syndics."

Interiors; Vermeer, Terburg, De Hooghe. Secondary only to these great masters were the Dutch painters of interiors, Jan Vermeer of Delft (1632–75), Terburg (1617–81), and Peter de Hooghe (1632–81), all of whom set for themselves practically the same problem. They sought to display what the French sculptor Rodin called "the cubical contents of a room." Almost equally but differently fascinating are the pictures of these three painters. The eye is caressed by the soft colors and by the radiance of Vermeer's "Woman Estimating the Value of Pearls," with the figure in a delicate light which sifts through a window in the background, touching in its course masses of blue drapery and catching the rainbow surface of the gems piled upon the table. A graver but still sensuous pleasure is afforded by Terburg's groups of a lady and two cavaliers, with the figures arrayed respectively in white satin and in black velvet; the former fabric being introduced to show the power of reflecting light, as opposed to the absorption of luminosity by the other textile. The third painter, De Hooghe, set for himself a single problem, which he stated according to his opportunity and in the most varied terms. He followed the diminishing echoes of a ray of light, from the moment when it first struck, it might be, the brick pavement of an interior court, until, darting through an open door, it died away on the rounded shape of some domestic utensil of brass or copper.

Thus it was by their treatment of natural phenomena that the painters of the Low Countries, especially those of Holland, during the 16th and 17th centuries, made a most valuable contribution to the advancement of their art.

Velasquez. In the 17th century, also, a great Spaniard, like his contemporaries, Frans Hals and Rembrandt, realized the truth of space. Velasquez

(1599–1660) rose in his country single. Among his compatriots he had no prototype. His art was too personal to be transmitted. The restrictions binding him to the court were too galling to permit him either to form pupils or to diffuse broadly his influence. He was free from the asceticism of his great contemporary, Francisco de Zurbarán (1598–1662), the painter of monks in white draperies. Nor did he continue the ecstasy and the tendencies of the Spanish painters who preceded him.

Yet the insight of Velasquez into the secrets of mind was not secondary to his ability to interpret free space and degrees of distance and of light. In his portraits of the Habsburgs, one of the most baleful influences ever exercised in history is probed and laid bare, so that the face of the subject becomes the very symbol and presence of tyranny, of blighting and withering power. And again, in certain of his portraits of dwarfs, he reveals by both the facial expression and the gesture that uncompromising, cruel cynicism, inspired by envy, which is the mainspring of the mental life of those who are physically deformed.

It is, however, as a technical painter, as an absolute master of brushwork, that Velasquez, after 300 years, holds today a position unassailed by artists or critics. He was modern in his methods. He painted in single, loose strokes, which, when observed closely, appear unrelated, but which, seen from the proper distance, combine into a concrete whole having depth, solidity, and a changeful color play imitating that of Nature herself as she bathes in atmosphere and softens the edges of objects.

The contributions made by Velasquez to the progress of his art were never approached by any painter of his nation, and have very rarely been equaled by those of any single individual. Following his death in 1660, his memory received scant honor from his countrymen, until the Napoleonic wars, when their appreciation of him was largely created by foreign recognition of his greatness.

Murillo; Goya. Nor did Velasquez alone among Spaniards receive from the expert judgment of 19th century Europe the deserved, but long withheld, superlative expression of esteem. Fervent admiration was extended also to Murillo (1617–82), the artist of two manners, who, like Velasquez, first presented proletarian types ("The Beggar-Boys," "Melon-Venders"), and later passed to portray the "Holy Family" and the "Immaculate Conception" in floods of radiance, into which the rounded figures draped with luscious color seem to melt away. Considerably later the cult of Francisco Goya (1746–1828), a subtle portrait artist and mordant satirist, technically a luminist, was extended throughout Europe and among the *cognoscenti* of the United States.

Later Spanish Painting. In the meantime, the modern art of Spain had fallen into the most revolting naturalism, from which it emerged with Fortuny (1838–74), a genre painter and colorist of the first rank. The Renaissance gathered strength, and still continued under the marvelous luminist, Sorolla (born 1863), and Ignacio Zuloaga, a man who has reflected, in his many-sided art, memories of El Greco and Velasquez, while overpowering them with his own strong and piquant personality.

French Painting; Sixteenth Century. The remaining important continental nation, the French, did not show in painting the initiative and originality that had marked their great accomplishments in medieval architecture. In the 16th century, appeared the first truly French painters, the family Clouet, founders of the national school, to whom are due the portraits of Francis I, his son Henry II, and his grandson Charles IX. But, as a consequence of war and of royal marriage alliance, Italian influence penetrated France, grafting itself upon the fine and the industrial arts, upon the literature and the language of the transalpine country. The native French painters hastened to eliminate from their work traces of Flemish teaching. As a consequence, their portraits, whether shown in three-quarter length or as mounted figures, if deprived of documentary evidence, might appear to have been painted by the 14th century Italians who were then developing their sense of tactile values.

"The Italianate" in France, or supremacy of principles and points of view derived and accepted so joyously from the anciently cultured peninsula, was slow in passing away. In the 17th century, Simon Vouet (1590–1649), while reflecting in his own composition, drawing, and accentuated shadows the contemporary, artificial school of Bologna, developed three painters, his pupils, whose murals and easel pictures form one of the chief artistic glories of the period to which they belong. Two of them, Eustache Le Sueur (1617–55) and Pierre Mignard (1610–95), overshadowed by the personality and the official position of the third, Charles Lebrun (1619–90), did not have at the proper moment of their careers the opportunity to assert their talents.

Le Sueur. The first-named, of deeply religious nature, presented with intensity of expression the more tragic of the Church subjects, such as the "Scourging of the Christ," in which he combined the pose of Michelangelo (the "Slaves") with the line and the modeling of Raphael. Again, in the fine series of murals portraying the life of Saint Bruno, founder of the Carthusian order, Le Sueur recalls Raphael's tapestries (*Gli Arrazzi*) and the lower group of the scene of "The Transfiguration."

Owing to the date of his death (1655), Le Sueur can scarcely be ranked among those whose accomplishments gave luster to the reign of Louis XIV, the most brilliant portion of which was included between the years 1661 and 1690.

Lebrun. During this triple decade, Lebrun occupied at the French court a position somewhat comparable with that held by the Greek sculptor Phidias, under the Periclean democracy of Athens, in the 5th century B. C. Possessed of extreme versatility, Lebrun became almost a dictator in the arts. He was author and executant of great mural schemes in the Louvre (Gallery of Apollo), at Saint Germain en Laye, and at Versailles (Hall of Mirrors). He directed the royal manufactures of tapestry (*Les Gobelins*) and gave numerous designs for landscape gardening, for architectural ornament, and even for pottery. By the eminent critic and professor, Henry Lemonnier, he is placed "side by side with Louis XIV and his prime minister Colbert in the general history of the age, but before them in the history of art."

Judged specifically as a painter, however, the rank of Lebrun is much lower. His conceptions are superficial, his color is almost negative, his line lacks vigor. But, in spite of these faults, he still maintains a place among the great decorators, owing to his vivacity of composition, his arrangement of masses, and his ability to maintain a focal point.

Mignard. As director of the Royal Academy of Painting and in other official posts, Lebrun was succeeded by his enemy Mignard, who was already 78 years of age. Nor was he, it must be admitted, of the artistic stature of Lebrun. On the contrary, Mignard possessed a power of appeal, of awakening emotion in the minds of those who observe his works, that was quite denied to his successful rival. Among the Madonnas painted in the 17th century, his beautiful "Virgin of the Grapes" (now in the Louvre) holds a high place, even if it be compared with those of Murillo, with which it has a certain affinity, at least in composition and line. With these qualities the resemblances cease, for the thicker paste and the colder color of the French painter lose their charm, if brought to the eye or the mind, beside the ethereal touch and warm tones of the Spanish master in his second manner. The religious pictures of Mignard also wholly lack mysticism and ecstasy. To them he brought the point of view of the man of the world, which made him so successful

in his portraits of royalty and of nobles, especially of highly placed women. His masterpiece, however, is his decorative scheme in the Val-de-Grâce, which, when death closed his career at the age of 83, he hoped yet to surpass in the other church of the architects Mansart, the now more widely known structure, Les Invalides.

Watteau; Lancret; Pater. In French painting, the connecting link between the 17th and the 18th century was Antoine Watteau (1684–1721), born in the northeast on a wavering line of nationality and reacting throughout his artistic career to the impulses of both the Latin and the Teuton. The half of his short life he passed in Paris, and by his art there exercised for 20 years, he stabilized for the outside world the symbol of the city. A scene painter by profession, he gave to his figures the movement, the expressive quality, the aloofness from daily life, which belong to the stage. Nor did he fail to indicate by subtleties possible to the painter alone the bitterness and futility of existence. By a shadow, a gesture, a modulation of color value, he was able to turn comedy to tragedy with a dramatic power suggestive of Molière.

To repeat the delicate art of Watteau was the aim of Lancret (1690–1743) and of Pater (1693–1736), who were, like the first-named, Flemings. They too painted, in small proportions, figures dressed in silk garments and powdered wigs, projected against a background of formal gardens or parks. While in such scenes there is no room for the display of the classical nude so dear to French artists, yet in Watteau there is much vitality, as shown by the figure of the Punchinello, "Gilles," garbed in white, which is one of the treasures of the Louvre. There is also in his work a progressive movement which, as explained by the subtle sculptor-critic Rodin, served as an inspiration for rendering the complicated "action" in his own statue, "The Age of Bronze." As to the color used by these painters, it is suggestive of Rubens,—warmer, softer, and more luminous than had been characteristic of the French school up to that moment.

The Art of François Boucher. Later in the 18th century the purely national traits were revived. The nude reappeared in the decorative panels of François Boucher (1703–70), the favorite painter of Madame de Pompadour. This artist was an accomplished classical scholar, and in his time the artificial life of the court had already begun to pall upon the courtiers, in whose minds there rose a longing for the open spaces of nature. Therefore, two classes of subjects presented themselves to the decorator. Either he pleased himself in portraying youthful deities attended by cupids, who in drawing and pose were reminiscent of the later Italians, or he painted lords and ladies disguised as shepherds and shepherdesses, in whom his noble observers delighted to recognize themselves.

As his drawing and foreshortening savored of Correggio, so also did his effects of light. These it was his custom to concentrate in the body of a nymph or shepherd; surrounding this focal point with trees or draperies painted in the soft, attractive tones of rich, silken, faded fabrics.

Conventional and unreal as was the art of the 18th century for at least two-thirds of its course, it satisfied the play-impulse of the nobles and of the scholars of France who were the observers of a political and social system in decline. But upon the accomplishment of the Revolution (1789–1800) there followed a new order of things.

David and His Period. Under the Consulate (1799–1804), in each of the three great arts of form, austerity succeeded sportiveness. Form contracted its curves, and color grew somber or paled, as a face composes itself after a smile. In painting, the new school was guided by a single master, David, whose control over his pupils was more absolute than that of any of the great Italians of the High Renaissance, excepting Raphael. David was himself a revolutionist, and, wearing the red "liberty cap," sat in judgment upon the aristocrats during the "terrible year" of 1793. Later, he devised the republican festivals and pageants after the manner of those of ancient Rome.

Apart, however, from the permanent interest attaching to him as the official court painter of the First Empire, David is æsthetically unattractive today. He was in the strictest sense a classicist. That is, he generalized; presenting no realistic figures and no specific backgrounds. With a model before him, and the attitudes of antique statues in his memory, he eliminated from his subjects all effect of movement and even the suggestion of the power to move. During the early part of his career he set his figures symmetrically against the bare, dark backgrounds of Roman interiors; while later he placed them under a cold, gray light which for him symbolized the open air.

By this system and by his commanding position, David impoverished the power of painting. He left nothing to represent, except the harmonized and generalized proportions of the body, purity of modeling, and a studied beauty of attitude. Therefore, the reactions of events and of temperaments to such principles could not fail to be both interesting and most important.

The Reaction from David. The empire, resulting from the Revolution, and the supremacy of the Davidian studio ended together. But the greatest of the pupils of David, Baron Gros (1771–1835), was, without doubt, the forerunner of the new movement, Romanticism. Thoroughly trained and, at the same time, impetuous, he broke the hard and fast rules of composition. An ardent admirer of Rubens, who of all artists had most vividly rendered battle scenes, he painted in thin, brilliant color certain of the most telling episodes of the Napoleonic wars. Reaction, violent but ineffective, appeared also in Girodet (1767–1824), who, in his poetic canvases, enveloped his figures in strange lights; while in his "Deluge" and his "Battle of Cairo" he sought to render overwhelming passion by exaggerated attitudes.

Ingres, Classicist. Meanwhile, the classic influence persisted in Jean Auguste Ingres (1780–1867), the great draftsman whose figures, like "Œdipus" and the "Nymph of the Rivulet" ("La Source"), are triumphs of pure rhythmic outline, rather than of modeling. The same artist also, by virtue of his very long, direct study of 15th century Italian frescoes, became the founder of a school of mural painting adapted to an architectural frame and having the characteristics of flat and low relief.

The Romantic Movement. At the beginning of the third decade of the 19th century the painters of France were divided into two hostile groups, one of which was headed by Ingres, the other by Eugène Delacroix, styled by his opponent the "Apostle of Ugliness." Around the latter gathered the Romanticists of every degree or, in other words, those painters to whom the artificialities of the Davidian studio had become hateful. Their spirit is best expressed in the exclamation of their chief: "I hate systematic painting." Their passion was for color and the indication of violent action and emotion, as is witnessed by Delacroix's massacres, shipwrecks, revolutionary scenes, lion hunts, and wild beasts seeking their prey.

Realism; Courbet. At the middle point of the century, realism, or rather naturalism, asserted itself, with Gustave Courbet (1819–77) as its champion. The affiliations of this painter were not with his compatriots, either historical or contemporary. His family tree as an artist spread its roots in Holland and in Spain. As Ribera in the 17th century presented the figure of Cato in the act of tearing out his own entrails, so Courbet in his "Quarry" painted the cadaver of a noble stag, lying beneath a great forest tree, with gaping flanks and as the prey of devouring hounds. Others of his

subjects, like "The Wave," show nature in cruel mood, or again they declare the hard necessity of human labor, as in the "Stonebreakers." But all were the results of direct visual observation, differing from the works of *les pleinairistes* (open-air school) solely in having been painted in the studio.

Corot and His Associates. Within the walls of a studio also Jean Baptiste Corot (1796–1875) painted what may be called his synthetic landscapes, the *motifs* of which, after having closely observed nature, he modulated into compositions whose chief factors were light and atmosphere. His processes were those of reduction, and his chief objective was to obtain a gamut of luminous values. He developed from the Dutch masters of the 17th century, as the man understands and explains with a broadened intelligence the impressions of his childhood. He gathered, besides, the heritage of that other northern luminist, Claude Lorrain (1600–82), to whom Italy and antique legend were so eloquent and so wholly divested of archeological pedantry.

While excelling all others in treating the phenomena of light, Corot was not the only Frenchman of his time to interpret nature through painting. Théodore Rousseau (1812–67) was, perhaps, the chief of the greatest of all schools of landscape in the history of art, but his two associates in the villages of Barbizon and Fontainebleau—Dupré (1812–89) and Huet (1804–68)—each added materially to the sum of beauty created by the highly specialized movement which more than atoned for the frequent coarseness and brutality of the gifted Courbet.

Rousseau established himself at Fontainebleau, that he might paint the monarch oaks of the forest attaching to the royal château of historic fame. His manner as an artist was grave and, if the expression be allowed, that of a portraitist intent to shadow forth the character of his sitter. He descended in more direct line than did Corot from the 17th century Dutch painters of trees, but his renderings were more devout and more individual. To borrow the words of a judgment of Rousseau passed by a French critic: "Ruysdael and Hobbema have left no such varied gallery, no such powerful portraits of forest personalities." Of the two remaining masters, Huet, influenced by Constable, but more dramatic than the Englishman, produced his masterpiece by studying the destructive forces of nature in his "Inundation at Saint-Cloud."

As for Dupré, the close friend of Corot, he gave solidity to his composition, and produced from his knowledge of the chemistry of color a tranquilizing harmony of tones. Always watchful of the *ensemble*, and logical to the degree of his talents, he showed, together with his admirable art, the best qualities of the French mentality. He had the power of extracting from a rapid sketch of a single natural object a principle which, under his treatment, amplified and assumed a majestic beauty.

Millet, Painter of Peasant Life. With the names of these four landscapists, who contributed so richly to the evolution of their art, must be joined that of Jean François Millet (1814–75), painter of peasants at their toil. In spirit he was a 19th century Saint Francis, apprehending poetically the just relations between the laborer and nature. As a painter, he was the exponent of telling gesture, showing how far that mute language had progressed since Giotto painted in the Arena Chapel at Padua the presentation of the Infant Christ in the Temple. Further, Millet was the master of the dark silhouette cast upon a luminous background. Himself of peasant origin, his first instructor was his uncle, a priest, and his most treasured books throughout his life were the Bible and Virgil. His pictures, like the *Georgics* of the pagan poet, show the "works and days" of husbandmen, and were conceived in artistic ecstasy, undisturbed by envy or hatred of another class. For years blindly praised by propagandists of social revolt, Millet has already resumed his place in the France of his time as an artist pure and simple.

Impressionism. Before the passing of this great group and that of the chief naturalist Courbet, all of whose deaths occurred between the years 1867 and 1889, impressionism appeared in the work of its pioneer, Edouard Manet (1832–83). This, the most recent of the legitimate, authoritative movements of French painting, includes within its sweep many and differing points of view. However, the term does not defy definition. Impressionism is the translation of a play of light and shade into a play of color. To be more explicit: the painter may imitate the luminous effects of nature by reversing the process as illustrated in the prism. By the use of a highly colorful palette he may bring together the elements of white light. But he cannot combine them, as the prism separates them. The fusion must be made in the eye of the spectator, and, as in the prism, nature is the operative agent.

Of impressionism, Manet was but the forerunner. Its greatest exponent was Claude Monet, who, by amplifying or withdrawing luminosity, presented in infinite variation and charm the same scene at different hours of the day or under different conditions of weather. The movement as it appears in the work of the latter, and in that of Sisley, Pissarro, and Renoir (to a certain extent his disciples), implies an advance in the point of view from which the painter contemplates nature as great as that made by the scientists of the Renaissance, who opened and revealed a previously hidden universe. What Claude Debussy accomplished for the physics of music, Claude Monet paralleled in the physics of painting.

With this survey of impressionism the history of modern painting stands complete in skeleton at least, from its beginnings at the middle of the 13th century down to our own day. It remains only briefly to indicate the achievements of the British and the American schools, as well as those of recent individual Germans.

Continental Painters in England. The play-impulse of the men of the British Isles has externalized itself more powerfully in creative literature than in other forms of art. Nevertheless, in architecture and in painting, native genius, further quickened by contact with continental Europe, has produced results that are most admirable. As expression in painting was not spontaneous among the British, it required to be fostered by those in power. Hans Holbein the younger became the court painter of Henry VIII, dying in London late in the reign of that monarch, and in the following century the Fleming, Sir Peter Lely (Van der Faes), advanced to a similar honor under Charles I.

Hogarth. Early in the 18th century, painting in England passed to the control of native artists, and a truly national master made himself felt in the personality of William Hogarth (1697–1764). Necessarily much of his art is today obsolete, because it is narrative, as it was his clearly expressed intention that it should be. By nature he was a humorist, by profession a painter and engraver. Yet critics delight to place him in the company of Cervantes, Molière, and Fielding, those masters of literature "who lashed the morals of their times with laughter." Outside of his social and moral series, which it was his custom first to paint and then to engrave for financial profit, Hogarth executed a number of fine portraits, and he occasionally treated a romantic subject. And it is especially in these two latter species that he shows brilliant pictorial qualities.

Reynolds and Gainsborough. The late Italian influence, visible in Hogarth, was accentuated in the work of the great portrait artist, Sir Joshua Reynolds (1723–92), recognized as the head of the first English school. Self-centered, persistent, and restrained, after the manner of his race, he patiently created an effective style, and gave to the national branch of his special art a distinction, an aristocratic tone, which it has never lost. The painters of Bologna, Rubens, and Van Dyck were his masters,

as is proved by his still existent notebook, which he compiled during his period of foreign study. His success, most brilliant in his portraits of men, was also marked in full-length figures of women, expressive of arrested motion. Further, in his pictures of children, he far excelled his greatest rival, Thomas Gainsborough (1727–88), who failed unexpectedly in delicate observation, and painted diminutive men and women.

On the contrary, Reynolds never painted a landscape background suggestive of mood, which was often so eloquent in the portraits of Gainsborough, nor was he capable of portraying the pathos of solitude and advancing age, as it exists in the "Parish Clerk" of the other artist. Again, the modern eye prefers Gainsborough's rendering of Mrs. Siddons, in graceful pose, society dress, and soft Van Dyke color, to Reynolds's treatment of the same subject, represented as a queen of tragedy in classic drapery, seated on a throne, and drawn in the lines of Michelangelo's sibyls of the Sistine Chapel. Finally, it is Gainsborough who is the prophet of the French impressionists in his sparkling canvases of broken lights and color, such as the "Blue Boy" and "The Honorable Mrs. Graham."

Lawrence; Romney; Raeburn. Possessed of certain very attractive and individual qualities, Sir Thomas Lawrence, George Romney, and Sir Henry Raeburn were also distinguished painters of portraits during the Georgian period. The first of these three, gifted for the stage, and in drawing able quickly to catch resemblances, became noted in his early adolescence and before he had studied seriously. A lesser Reynolds in his talents, at the death of that painter, he succeeded to his position at the court and also as president of the Royal Academy. The art of the second of the three, Romney, has a subtle, continental flavor reminiscent of both France and Italy. Unforgetable are his aristocratic children dancing in a ring and posed against the park scenery of a great English estate. The last of the group, the Scotchman, Raeburn, was simple and virile in manner, somewhat lacking in the treatment of light and shade, but in brushwork recalling Velasquez.

Constable and Turner. As the reign of George IV ended, British painting fell into such decline that in 1830 one of its two living champions, John Constable (1776–1837), asserted that in a few decades it would have ceased to exist. As a corrective to a long prevailing usage, he had himself changed the conventional English landscape into one of possibility, by the substitution of verdure for brown foliage. He set himself to reproduce the charms of his moist and rainy island. Constable derived from the Dutch painters, especially from Cuyp the younger (1620–91), and in his turn influenced strongly the French landscapists of Barbizon and Fontainebleau. But in no instance is the difference between talent and genius better illustrated than in the comparison between Constable and his contemporary Turner (1775–1851), that enigmatic man of more than Stevensonian duality, whose sordid personality gave forth with small loss the sunsets of Venice, and differentiated with extreme nicety vapor, smoke, and rain.

The Pre-Raphaelites; Rossetti. The decline in British painting ended with the very year of Turner's death, since the Royal Academy exhibition of 1851 contained a canvas expressive of a new movement. This was the "Annunciation" of Dante Gabriel-Rossetti (1828–82), the son of a Neapolitan political exile and of a half-Tuscan, half-English mother. Conspicuous for its archaic quality and for its faults of drawing, attractive through its color, spiritual in content, the picture was, so to speak, the formulated creed of the body of young artists represented by it. These were a group of seven men naming themselves the Pre-Raphaelite Brotherhood and following the professions of painting and sculpture, with among them one literary critic.

These artists believed that they justified both themselves and the name of their association by rejecting the suave line and elaborate composition characteristic of Raphael, adopted by his pupils and subsequently bound firmly into the traditions of painting. Gradually the pictures of the Brotherhood, especially those of Rossetti and Holman Hunt, awakened overtones in the hearts of mystics, or they excited a ridicule so trenchant and witty as to make them known throughout the world.

Burne-Jones and Morris. Therefore the new movement persisted through its own vitality. It was also powerfully aided by John Ruskin in his lectures at Oxford (1870–79), since by his influence two remarkable young students of Merton college were led to follow the principles of English Pre-Raphaelitism, although its founders had long since ceased to work in common. These youths were Burne-Jones and William Morris, whose names have become household words in all civilized countries; that of the first because he created pictures, which readily translated themselves into tapestries and stained glass; that of the second because his versatile talents, manifested in all the industrial arts, revolutionized the interiors of Victorian England.

The experiments of Morris in dyeing and weaving greatly advanced these crafts, or, to speak better, restored them to medieval honesty and excellence. His designs for textiles were carried through continental Europe, where they especially influenced Belgium and France. In the latter country the Pre-Raphaelite movement, modified and broadened, assumed the title of *l'Art Nouveau* at the beginning of the 20th century and came gradually to include all the arts, major and minor. Thus, for the first time in the history of British painting, covering a period of two centuries, had the current of influence flowing from the art been strong enough to reach a foreign shore.

First American Painters. From this statement, exclusion must naturally be made of the relations between the mother country and the North American colonies during the first three quarters of the 18th century. The first group of American painters consisted of Copley (1737–1815), West (1738–1820), Trumbull (1756–1843), and Stuart (1755–1828), all of whom were at first self-taught and afterward strengthened by study in England; West becoming one of the founders of the Royal Academy and later its second president (1792–1820). Of the four men, the Bostonian Copley, of Irish extraction, and Gilbert Stuart were the most gifted; the portraits of the former—even those painted before he transferred his residence to London (1777)—showing his affinities with the Flemish and the English masters.

The second of the group, Benjamin West, aspiring to be a painter of large canvases and of historical scenes, failed in his ambition, and the interest still attaching to his work has its principal source in our patriotism. Trumbull, later born by two decades than the first two of the group, was the son of a colonial governor of Connecticut, a graduate of Harvard, and a soldier of the American Revolution.

The war ended, Trumbull went to London, there to place himself under the instruction of Benjamin West in historical and battle pieces, two branches of painting which he subsequently studied in Paris. Certain of his works then produced, both portraits and episodical pieces, were purchased by the United States government, and others, to the number of fifty, by Yale university (then college), where they now constitute the Trumbull gallery. And at the time of their acquisition (1831), the institution granted the artist an annuity of one thousand dollars, upon which he established himself in New York, there to practice his profession until his death twelve years later.

Gilbert Stuart. The last and greatest of the group, Stuart of Rhode Island, while having less soaring ambitions than West and Trumbull, made

finer achievements than either of these men. His profile head of Washington, projected on an unfinished canvas, is known to every North American school child as the accepted likeness of the first president of the United States, and his portraits of other early presidents and patriots are regarded as scarcely less admirable. During the residence of Stuart in England and in France, George III and Louis XVI, Lords Clinton and Lyndhurst, Sir Joshua Reynolds, and Copley became his sitters. Through these patrons, he acquired the reputation of being one of the most skillful of the then living representatives of his chosen branch of art, in all that pertained to technique and to the judgment of character.

Second Period of American Painting. The first period of American painting was practically ended by the War of 1812. There followed the half century of a second development, during which the eyes of artists turned away from political events to the phenomena offered by nature. There resulted an admirable school of landscape, among the best painters of which were John Kensett, Sandford Gifford, a close observer of values, Alexander Wyant, and George Inness (1825–94), who interpreted his subjects with the delicacy of a Corot and with the same French painter's subordination of outline. The landscapes of this American, with their distinctive and lovely green, their water, and their sunset effects, are unmistakable. Nor, once seen, can they be forgotten. They served, as did many other pictures of the so-called Hudson River school, greatly to raise the art of the United States in the estimation of European critics.

Hunt and La Farge. The long supremacy of the landscape was broken by the first American figure painters of thorough French training. These were William Morris Hunt (1824–79) and John La Farge (1835–1910), both of whom turned to mural decoration, and the latter also to the production of painted glass windows. The majority of their contemporaries, when desirous of European instruction, had studied under Schadow or his pupils at Dusseldorf or, somewhat later, in the studios of Munich. But they, for intimate reasons, had chosen differently, so that at the opening of the third period of our national art, consequent upon the Centennial exposition at Philadelphia, in 1876, they stood equipped for their work. The murals of Hunt executed in the State capitol at Albany, N. Y., were destroyed in order to render possible necessary alterations in the building. Those of La Farge exist in the Church of the Ascension, New York City, and at Trinity, in Boston, where they show fruitful evidences of the artist's study of Venetian painting, as well as of his color experiences in the Far East.

Whistler; Sargent. Also to the third period (from which we have not yet emerged) belongs the genius of Whistler (1834–1903), whose portraits of Carlyle and Sarasate are projections of the spirits of his subjects, rather than presentments of their corporeal substance. Opposed to the Oriental subtlety of Whistler's differentiation of obscure tones, as displayed in his "Nocturnes," appears the superb Occidental color gamut of his more superficial and overwhelming rival, John Sargent, a kaleidoscopic artist in whom the close student may discover a never-ending procession of historic masters. Unsurpassed as a technician, Sargent will hereafter be partially ranked upon his murals in the public library of Boston that glow with reminiscences of Michelangelo, the Spanish painters, and the Byzantine mosaicists. Yet it is regrettable that a comparison should be invited through their proximity to the panels of Puvis de Chavannes, that tranquil genius who spoke in the simplest symbols of line and in the most sublimated color.

But both Puvis and Sargent harmonized their subjects to the architecture, as also to the color of the structural materials, with far greater skill than Edwin Abbey, the third of the painters who are represented in the Boston Library. The last-named came to his commission as an illustrator who had scarcely ventured into decorative painting. Already very highly esteemed in Great Britain and the United States for his pen-and-ink drawings, his water colors, and his pastels, his ability to produce successfully in a greater field and with the most distinguished competitors still lay open to doubt. The critics restrained by their admiration of the artist's previous achievements, suspended their judgment until the "Quest of the Holy Grail" stood developed before their vision in impassioned color which echoed, if the comparison be allowed, the "Parsifal" of Wagner. A flaming poppy-red, attuned to an incandescent white and carried throughout the long series, made a spiritual appeal, like a *leitmotiv* winding through the labyrinth of the Wagnerian orchestra. An atmosphere laden, as it were, with consecrated incense, attracted the multitude to the great hall of the Abbey murals, and the story-telling pictures awakened and held the admiration of those incapable of grasping the thought of Sargent so dominantly expressed in line and color, or the pure abstract, analytic art of Puvis de Chavannes. But, after a lapse of several decades, the public judgment has righted itself. The relative values of the three series of murals are acknowledged. Of these, two are masterpieces, while the third, that of Abbey, of lesser absolute worth, is injured in effect by its failure to agree with its setting.

As a last tribute to Sargent, it may be said that he had the largest share in advancing American painting to its present enviable position in the art of the world. And, at the same time, it must be remembered that, although of colonial New England ancestry, he was born in Florence, trained in France, and long a resident of London; that he was, in truth, a citizen of the world. In him certain authorities discover the greatest painter of portraits in the Anglo-American succession since Reynolds and Gainsborough. Yet even if of more restricted attainment and of less versatile talent, William Chase, John W. Alexander, and Cecilia Beaux have sometimes equaled and, in several instances, have surpassed Sargent.

Formed as an artist in the studios of Munich, Chase grafted upon his training his own brilliant personality; producing both figures and superb pieces of still life that cannot be mistaken for the work of any other painter. His portrait of a lady in black, with a voluminous shawl of white crêpe, while unobtrusive as a subject, remains in the memory like a theme of Grieg. Again, in his combinations of pearly shells and fish with scintillating scales he recalls the subdued harmonies of Chardin, which he appears to have removed from their bourgeois environment.

In the work of Alexander quite other affinities are observable. He shows the suggestiveness and the synthesis of the Japanese, examples of which exist in his "Isabella and the Pot of Basil." Finally, Miss Beaux, while holding her place among our modern and distinguished group of painters, does not hesitate to evidence her admiration of earlier phases of art, as when, in her "New England Woman" she plays with differing shades and reflections of white with the dexterity of a Flandrin.

Our masters have been Europeans; first, the English, who gave us the taste for distinction; later, the Germans, who taught equal respect for subject and treatment; finally, the French, who freely disclosed to the willing student the secrets of their incomparable technique. Having thus gained a solid historical, traditional basis, it is to be expected that our national art will not be deflected from its direct path by "cubists," "futurists," or other Bolshevists of the æsthetic world who seek to destroy "the conventions of the Renaissance." Let these Goths and Vandals remember that principles continue to exist only as long as they are vitalized.







FAMOUS CATHEDRALS

Amiens Cathedral (France)

Lichfield Cathedral (England)

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Milan Cathedral (Italy)









NOTED MADONNAS

Madonna della Tenda, by Raphael
Madonna and Child, by Murillo
Madonna and Child, by Raphael (Lord Cowper's)
Sistine Madonna, by Raphael

ARCHITECTURE

Among the fine arts, architecture alone does not proceed from the "play-impulse"—from the desire of the creative artist to communicate to others an idea, which has arisen within his spirit, in terms of sound, line, or color. The origin of this art is almost synchronous with that of the family, since its practice is necessary to the protection and maintenance of life. The man of the later Stone age, when he had learned to polish his crude implements, used them to construct his dwelling according to one of the two types—the rectangular and the domical—out of which all architecture has expanded.

The Primitive Cabin of the Egyptians. In the valley of the Nile, the primitive builder with his rude ax cut the papyrus reeds at the river bank, clustered them, bound them together, and set the clusters deeply into the earth, at rhythmic intervals,—as the pulsations of his heart, regulating all human activity, taught him to do. Then, with the easily worked clay, accumulated by the yearly inundations of the region, he reared walls between the columns, until he had reached a desired height, when he laid other reed clusters horizontally upon his supports, in order to form with more clay, used as before, the ceiling of his habitation. The walls of his completed structure, viewed externally, suggested by their inward inclination the later pyramids and pylons. Finally, the builder finished his dwelling by drawing his spatula over the roof, without, however, heeding to cut the damp overhang. This overhang, depending from the edges and hardening, became the forerunner of the temple cornice of stone—sometimes called the hawk-beak, from its sharp concave profile—so effective in casting shadow against the atmosphere saturate with light.

The Ancient Mesopotamian Oven. The second architectural type, known as the domical, has, according to certain French archeologists of great authority, been developed from the oven, fashioned of concentric rings of clay, which decrease in circumference as they rise, leaving an aperture at the summit for the escape of smoke. Ovens of this type are still built by the women of the alluvial plains lying between the Tigris and the Euphrates, and they are unquestionably of a traditional form whose origin dates from a past too remote to be realized.

These two structural types of differing principles being accepted, it is easy to follow the progress of each throughout the history of architecture. But, before engaging upon this long sequence, it is necessary to understand the principles underlying the forms beneath which they present themselves to the eye.

The Lintel. The primitive Egyptian, in providing himself with shelter, used the column and the beam—in other words, the *lintel principle*, which, developing to maturity in ancient Greece, where stone was available in large masses, has in our own day and country advanced to new favor, owing to the skillful and extensive employment of concrete. The lintel may be defined as a horizontal bar of solid material (stone or wood), which spans an opening, such as a door or window, with its extremities resting upon two uprights. Against this bar the weight of the wall above presses vertically, causing it, if too heavily loaded, to crack or split about midway in its span,—a danger which, early in the use of the principle, was averted by voiding a triangle directly over the horizontal. Examples of this construction are to be seen in the entrance to the subterraneous tomb chambers of the Egyptian sovereigns of the Old Kingdom (about 3000–2400 B. C.), and over the city gate at Mycenæ in the Peloponnesus.

The Dome and the Arch. The second or *domical principle*, with its close relative, the arch, contains within itself a disruptive force, commonly known as the thrust, tending to make it spread, and requiring an equal opposing force to assure the stability and permanence of the structure. The true dome exerts its thrust equally at all points of the circumference, while the arch, which is a collection of interdependent wedge-shaped solids held in place by the central, or key, stone, demands that the resisting masses, the buttresses, be concentrated at certain accurately determined points.

Therefore, judged from the point of view of structure, the column and lintel produce inert masses and dead weight. Domes and arches, on the other hand, are the visible expression of unseen elements constantly active and mutually hostile, constrained, like turbulent individuals beneath a strong government, to concur in shaping a fabric and in maintaining it in equilibrium.

Both these principles, so early apprehended, were either advanced or hindered by the physical environment of the ancient peoples who, successively holding power, developed architecture, in order to meet their own special religious, civic, and domestic requirements.

Egyptian and Greek Use of the Lintel. Therefore, if the beauty worshiping Greeks perfected the column and lintel, the achievements of the Egyptians cannot be disregarded. The inhabitants of the Nile valley were earlier by at least a thousand years in their use of the simpler of the two fundamental principles of architecture, as exemplified in their great temples, such as those of Karnak and Luxor, and in the structures of Queen Hatshepsut, all of which were erected between the 16th and the 12th century before our era. Compared with the Greek temples of the 5th century B. C., the Egyptian temples of a thousand years earlier are like the skeletons of certain great animal species, preserved or imitated in our museums, but now extinct, because they could not adapt themselves to the progress of terrestrial life.

The Temple of Karnak. This comparison cannot but suggest itself to one who observes the plan and the proportions of the Temple of Amen-Ra at Karnak, which so conspicuously lacks co-ordination and cohesion, but, at the same time, conveys a sense of the superhuman. To the propagation of fear and awe among a craven people, the works of the Egyptian builders, at the very first, lent themselves, as is instanced in the pyramids and in the rock-cut tombs of the Old and the Middle Kingdom. The same intention animates the structures of the Empire (1580–1150 B. C.), although it is hidden beneath the exuberance of display then demanded by the arrogant, splendor loving Pharaohs.

The Confused Plan of Karnak. Symptoms of an inorganic state of society are visible in the colossal House of Amen-Ra, which lacks a co-ordinated plan, created once for all and admitting of no material change. Here pylon has been added to pylon, so weakening the first impression of an entrance to a holy place. Other temples, with their smaller forecourts, hypostyle halls, and sanctuaries, have been allowed to meet or to pierce the lateral walls of the great structure or even to rise within its very body, to the detriment of order and symmetry. It remained for the Greeks, the creators of the city-state, to formulate an architectural expression, the harmony of whose parts should attest corporate effort, and whose elevated, restrained beauty should be eloquent of an elect people daring to converse with Divinity in terms of philosophy, of ethics, and of art.

The Architecture of Ancient Persia. But, in passing, there must be mentioned very briefly the use of the column and lintel made by the first Indo-European people to hold dominating power in western Asia. These were the Persians, who seem to have been in many ways the forerunners of the Hellenic Greeks, as appears particularly in their

religion, Zoroastrianism, which required each man to choose a positive position in the fundamental questions of life and faith.

Religion, as exercised by the Persians, demanded no temples, properly speaking, nor even tombs; for their sacred writings, the *Avesta*, far from encouraging the preservation of the bodies of the dead, prescribed their exposure. This custom, however, was not followed by the great sovereigns of the 6th century B. C.; so that the royal sepulchers of this period are among the important remains of ancient Persian architecture—those at Persepolis having columnar porches, entablatures, and gable roofs. But it was in the palace type that the Persians put forth their best structural efforts. They united in one area of different levels fortress, residence, and audience halls. The Palace of Darius contained a hypostyle hall, which served as a throne room, set with a hundred columns nearly as high as those of Karnak, and far more slender; while the Palace of Xerxes, son of the preceding monarch, covered a site of 7500 feet, and was, therefore, larger than any Gothic building subsequently erected in Europe, with the exception of the Cathedral of Milan.

Persian Porticoes. In these Persian structures, the open porticoes occasion comment, as having no precedent or models in either Egyptian or Assyrian architecture. They are originals, the principle of which was destined to modification and splendid expansion under the supremacy of the Greeks and the Romans. And, quite apart from the architectural principle here involved, interest attaches to the special form under which it is displayed. First, the spacing of the columns in the palace at Persepolis is much wider than in the hypostyle hall at Karnak. Thirty-six columns suffice in the former for the area occupied by one hundred thirty-four in the Egyptian temple. The small number used by the Persians is permissible because their roofs appear to have been formed by timber beams reaching from one column to another, rather than by massive stone blocks, supported, as in Egypt, by the enclosing walls and the closely set stone columns of great diameter.

Egyptian and Persian Gifts to Greece. Toward the attainment of Hellenic perfection in the use of the column and lintel, the legacies of the Egyptians and the Persians contributed. The primitive clustered reeds of the Nile cabin, the colossal stone roof-supports at Karnak, the slender, widely spaced columns, and the open porticoes at Persepolis and Susa, as well as the structures of the Homeric cities of Asia Minor, were groping, tentative efforts toward the perfect results attained on the Acropolis at Athens in the second half of the 5th century B. C.

Greek Architecture. But the Hellenic perfection in architecture did not suddenly manifest itself in maturity, as Pallas Athena, according to the myth, issued in full panoply of armor from the head of her all-powerful father, Zeus. The development of the column-and-lintel principle among the historic Greeks was gradual, although constant, for at least two centuries. It was effected by two tribes of opposing qualities, whose concurrence produced the most happy results, not alone in architecture, but in sculpture and in the drama as well, with the work and influence of each tribe distinct and parallel in the three arts. From the second quarter of the 8th century, the Olympic games called together at stated, not infrequent, intervals the male population of the Greek world. Gradually, other similar festivals were inaugurated through the enterprise of various leagues, the objects of which were religious, political, and athletic. And, for the use of such corporations, temples and treasuries were needed.

Early Greek Temples. The earliest of these structures were of wood, for which stone was substituted when the tools of the builders had become more accurate. The periods of the use of the two materials overlapped each other in the Temple of Hera at Olympia, where the archeologists discovered that the older wooden parts, as they decayed, had been separately replaced by corresponding members of the more durable substance. It is accepted also that the earliest Hellenic temple constructed entirely of stone was erected on the isthmus of Corinth in the middle of the 7th century B. C., and was dedicated to Apollo, the god especially revered by the Dorians. But of this building no traces remain, and for archaic architectural types it is necessary to pass outside of Greece proper, eastward to Asia Minor and westward to Sicily and to lower Italy, known in classical geography as Magna Græcia. These latter lands were colonized by the Dorians, who, four centuries previously, had, as barbarians, come to peninsular Greece. They had been attracted by the riches of the race who, between 1600 and 1100 B. C., built the polygonal walls and the "beehive tombs" of Mycenæ, besieged and conquered Troy, and wrought the marvelous objects in gold unearthed in 1876 by the German excavator, Schliemann.

The Dorians, on their arrival in the Peloponnesus, either enslaved or expelled the conquered inhabitants, and closed their ports to foreign commerce. Then, during the so-called Homeric age (900–750), while a cognate people on the shores of Asia Minor, leavened to a certain degree by the exiles from peninsular Greece, were producing the *Iliad* and the *Odyssey*, the greatest of epics, the Dorians were developing militaristic states and were rapidly multiplying their own numbers. At last, but a single way remained open for their further development. This was colonial expansion, the main current of which turned to the fertile, volcanic lands lying toward the Pillars of Hercules, the western limits of maritime enterprise, named from the national hero of the Dorians.

Dorian Temples in Sicily. The eastern and southern coasts of the island of Sicily received their earliest important colonies, which became the cities of Syracuse, Selinus, Segeste, and Akragas (Agrigentum), the last three being noted for their archaic temples still existing in a ruined state. Of these ancient cities the most interesting architecturally is Selinus, with its acropolis and neighboring areas, the site of seven temples of uncertain dedication.

Greek Democracy and Art. The structural elements of the Greek temple having been chosen in the column and lintel, and the plan definitely fixed before the middle of the 6th pre-Christian century by the Dorian race, nothing more was required, in order to bring these barely formulated ideas to maturity, but a great event which should unify the rising city-states into a strong federation and create a common treasury by means of which to advance civilization. This event was provided by the wars which rose between Persia and Greece in the early years of the 5th century and continued for two decades. Toward their close, occurred the naval battle of Salamis (480 B. C.), fought in the bay of Athens and won largely through the sagacity and brilliancy of the men of that city, who, as a result of the brief conflict, obtained a leadership of the Greek world, which lasted for eighty years.

Age of Pericles. From this victory, as from the hand of a sower, a sentiment of national consciousness was broadcast, and, where it penetrated most deeply, it was subjected to a gradual, healthy period of germination. Then it bloomed in the three arts which, during the age of Pericles, attained, each of them, one of the greatest climaxes of its history: in architecture, the Parthenon; in sculpture, the group in the eastern pediment of that temple, representing the birth of Pallas Athena; in the drama, the Orestean trilogy of Æschylus, the *Œdipus King* of Sophocles, the *Alcestis* of Euripides, and the satiric comedies of Aristophanes.

Under the Athenian democracy, immortal types of art were created, as they were also called into being in France of the 13th, and in Italy of the 15th

and 16th centuries. For in these periods also genius and talent were supported by the esteem, the understanding, and the applause of the entire people,—as when the problems of the rapidly developing art of perspective, drawn in large proportions, were exhibited in the public squares of Tuscan towns.

But the Hellenic art of the 5th pre-Christian century—especially the art of the Parthenon—differs from all other climaxes that have followed it, in the possession of two qualities: simplicity and subtlety, both carried to the extreme. The plan of the temple is easily read by a child, while for more than a century and a half its curves have given to mathematicians material for discussion and even acrimonious controversy.

The Parthenon. The ruins of the Periclean Parthenon are those of the fourth building to occupy on the same site. The older foundations were skillfully treated by the last architect, Ictinus, who changed the long rectangle of the archaic period into a more compact structure, the proportion of length to breadth standing as nine to four. Further, in place of the porous limestone of the 6th century, readily absorbent of polychrome, marble from the quarries of the not distant Mount Pentelicus was chosen for its close texture and brilliancy. The chief architect had as his coadjutor Callicrates, designer of the beautiful miniature Temple of the Wingless Victory, destined a few years later also to rise on the rock of the Acropolis. The director of the entire work was Phidias, one of the greatest of sculptors, irrespective of time, nation, or school.

Plan of the Parthenon.—The conception of the Parthenon would seem to have been the result of a brief artistic ecstasy, since it is a whole, concentrated and co-ordinated, such as could not have been impeded by hesitations and afterthoughts. Its actual construction, begun in 447 B. C., was advanced nine years later to a point which permitted the use of the temple; detail work and embellishment were continued upon it until 432. But in 438, as we know from documents, the colossal gold-and-ivory statue of the titular goddess, Pallas Athena, created by Phidias, was placed in position in the cella, facing the eastern entrance.

The western façade of the structure was first seen by the visitor to the Acropolis after he had passed through the monumental gateway called the Propylæa. It presented to him a breadth corresponding in our system of measurement to 101 feet, and, because of this considerable expansion of an older proportion, eight columns were aligned across the porches at front and rear, instead of the traditional six of the true Doric type.

The Colonnade.—The peristyle, or fully surrounding colonnade, was completed by seventeen columns at the sides, making a total of forty-six, the treatment of which presents a refinement already observable in archaic temples, although there existent in a much less developed state. These supports, having a height of thirty-four feet, incline inward three inches toward the cella walls; the latter also following the same direction, and the whole thus offering the suggestion of a pyramid, as the Greek architects intended their structure should do, in order to proclaim its stability. Further, the upward diminution of the shafts was such that the diameters just below the capital measured more than one-third less than that of their base; while the angle columns were made slightly thicker than those ranged between them, in order to overcome what a French critic has called the "devouring" quality of the sunlit atmosphere of Athens.

Again, every apparently horizontal line of the Parthenon, as, for instance, the three steps of the stylobate (platform serving as the continuous base of the colonnade) show, if measured, an exceedingly slight convex curvature. This device appears to have been used by the architects in order to correct the optical illusion of "sagging," produced in a horizontal when seen from a distance, provided the line be extended and met by a number of evenly spaced verticals. At least, such is the explanation accepted by most experts, although a certain few—among them the American, Professor Goodyear, in his *Greek Lines*—present other reasons for the existence of these curvatures.

Sculpture and Color on the Parthenon.—To these subtleties on the part of the architects, the sculptors who were employed to embellish the temple responded with an equally delicate appreciation of the possibilities of their own art. In the external frieze of *triglyphs* (projecting blocks marked by vertical grooves) and *metopes* (intervening spaces filled with figures in relief), they emphasized rhythm, the basic principle of architecture, as well as of music. But, lest the clear, firm uprights of the triglyphs should appear too aggressive, these marks of accent were tinted to a deep blue, which the Greeks regarded as no color, since it belongs naturally to free space and makes the objects which it clothes seem to retire into the background. Blue also was given to the *tympana* (triangular areas enclosed by the cornices of the pediments or gables), and, within this refined setting, groups of superb figures, representing myths of intense patriotic interest to the Athenians, were so placed that, to use borrowed words, "the sun played melodies upon them from dawn to dusk." Nor was red excluded from the scheme of color. It was used in the metopes to receive the shadows cast by the relief sculptures, just as the Moorish ornamentalists of the 13th Christian century placed it on the walls of the Alhambra in the lowest plane of their starlike linear combinations, so that the rich gold applied to the highest level might, with its fusing power, eliminate crudity of tone.

Greek Ornament Independent of Structure. All these embellishments, so exquisite in themselves and so harmoniously adapted to one another, as well as to the structure regarded as a whole, nevertheless played no functional part in the building. The pedimental groups could have been removed without injury to the prevailing fineness of line and of profile. The Panathenaic frieze, compassing the cella walls at their top, was an applied ornament, serving the same purpose as a detachable tapestry. Finally, the metopes of the exterior or Doric frieze were mere artistic treatments of former voids, the purpose of which in archaic temples was the admission of light. Consequently, it is plain that in the column-and-lintel or trabeate (beam) construction, all embellishments are nonstructural; that the Greek architects, having secured stability, sought in their designs to emphasize the column to which that essential was due; that they allowed no detail, however beautiful in itself, to impede the "vertical movement" of these supports; that their chief aims were clarity, simplicity, restraint, and accurate, harmonious expression,—precisely those qualities that are found in the language, the drama, and the sculpture of the Periclean age.

Decline of Greek Architecture. But perfection is of brief duration. In common with the other arts cultivated by the Hellenic Greeks, architecture reached its highest development during the eighty years following the battle of Salamis (480 B. C.). And, as the political supremacy of Athens ended with the 5th century, so, beyond that point, the productions of the artists, if they did not wholly cease, were hybrids, departing farther and farther from type and becoming more and more wayward; although, especially in the 4th century, they were often most attractive, brilliant, and beautiful. Of the truth of these statements the second Temple of Artemis (Diana) at Ephesus and the Temple of Apollo at Miletus bear abundant evidence.

Transition to Rome. It is useless to follow the column-and-lintel system farther than its appearance in the Doric temple erected on the Acropolis at Athens, with its extreme, virile qualities harmonized and softened by Ionian influence. For, as world leadership transfers itself to the Romans,

it becomes necessary to seek among them the development of a second architectural principle capable of varied application, as well as to observe its fruitful union with the first.

The founders of Rome were a pastoral people who, having exhausted the grazing lands of an earlier residence, were attracted by a site set with hills and watered by a stream sufficient to supply their flocks. To their first stockade, dedicated to Pales, the god of sheepfolds, they gave the name of *Roma*, "city by the river." And, within this primitive citadel, their leader established in crude form a paternal government.

From the time of this early settlement (about 753 B. C.), there have been preserved, deep in the accumulated débris of the Roman Forum, small earthen receptacles, containing human ashes, which have been named by the archeologists "hut urns." These objects have, significantly, the form of the primitive dwellings of those who fashioned and dedicated them. They represent in their incised ornament a structure built of river reeds or tree boles supporting a thatched roof and having walls, supposedly of clay, filling the spaces between the uprights. To complete the resemblance between the model and the suggestion of the original, but one detail is lacking,—an aperture at the summit of the domical roof for the escape of smoke. This detail, it is plain, could not be repeated in the cinerary urn.

Another variant of the same structural idea appears in two so-called temples of Vesta—one in Rome and the other not far from Hadrian's Villa, Tivoli. Both of them are cylindrical structures and also lack the aperture. Of these, the prototype, according to Lanciani, was the hut containing the single fire of the stockade village on the Palatine hill, which was devoutly tended by the girl children, while the adult members of the community, with their young sons, were away feeding their flocks.

The Pantheon. The temples of Vesta, although important in the history of the dome, must yet yield in point of interest to the rotunda of the Pantheon. In this building we find the simplest, most logical application in all architecture of the principle which it represents, not excepting the admirable example occurring in the Basilica of Santa Sophia, Constantinople, which is later than the Pantheon by four full centuries.

The great rotunda was erected in 124 A. D., under the reign of Hadrian (117–138), whose architect destroyed an older, rectangular three-cella (Etruscan type) temple, standing on a portion of the same site and having as a frontispiece a portico of ten granite columns, over 45 feet in height, with capitals of Pentelic marble. In order to preserve these valuable materials, the later builder had them transferred to his rotunda, that they might aid in the composition of a new portico. But, he used only eight columns, in accordance with his adopted scale. In the *tympanum*—the triangular field enclosed by the horizontal and the inclined cornices—raised to a very acute angle, he placed a superb bronze group. Above this group on a screen wall of the same length as the portico, he set a triumphal chariot (*quadriga*), also of bronze, together with a number of human figures, arranged so as not to mask the outline of the dome. The last named feature had as its object internal lighting, rather than external effect. Therefore, it is without exaggerations and without structural error, such as mar the integrity of the majority of the domes of the Italian Renaissance.

Origin of the Dome. All the later experiments grew, the one from the other, responding to the personal imprint of the architects who designed them or to the demands of the people who bore the expense of erecting them. The rotunda of the Pantheon, however, sprang directly from a model which, although allied to that of the temples of Vesta, and, like it, of domestic origin, had never an acquired religious significance. This dome, in the opinion of Perrot and Chipiez, repeats exactly, in more resistant, durable materials, the clay baking oven of prehistoric Mesopotamia, which was built of stepped rings of river clay, with provision made for the escape of smoke.

Source of Roman Dome. The oven, so fashioned, would seem to be an invention of northern Mesopotamia, that is, of Assyria: consequently of Semitic origin. Therefore, the student of the history of architecture gropes his way through centuries, seeking to connect the humble baking oven with that imperial Temple of All the Gods which was erected in the wealthy and populous quarter of the Campus Martius at the period of the greatest splendor of Rome.

At first thought, the column-and-lintel system would seem the one traditionally to have been preferred, especially because of the style of the earlier Pantheon and of the valuable materials remaining from it, which were to be employed in the newer temple. On the other hand, the emperor Hadrian was widely traveled and of necessity had mingled with Semites during his visits to Alexandria. Besides, one important cylindrical building of concrete already existed in Rome,—the mausoleum of Augustus, which, from the death of that emperor in 14 A. D., had continued to serve as an imperial burial place until the last vacancy was filled in the year 98 by the ashes of Nerva. Then, after the interval of the reign of Trajan (98–117), its functions were replaced by a similar structure erected by Hadrian himself, and described by the Byzantine historian Procopius as a work of great magnificence, having its tufa walls faced with Parian marble and being surrounded by a colonnade enriched with many statues.

Significance of the Pantheon. Although of the first of these cylindrical structures only the bare core now remains, and although the second, defaced from the time of the Gothic sieges of the 6th century, serves today as a municipal fortress (*Castel Sant' Angelo*), the Pantheon is structurally intact and has never lost its sacred character. This great rotunda has been called by the eminent Englishman, Frederic Harrison, in his book, *The Meaning of History*, "the central building of the world." Lest this assertion should appear to be rhetorical and unwarranted, it is well to justify it, apart from its general historical sense. For architecture also the statement is valid, understood in reference to the structural type represented by the rotunda. The statement being so interpreted, no critic will venture to deny the following claims made for the dome of the Pantheon:

First, that it is unique in showing in a building of prime importance one of the three existing principles of architecture, presented in its primitive form.

Second, that it is the parent of all structural (not *apparent*) domes which have been created since the date of its erection in the year 124 of our era.

The Pantheon Dome; Primitive Form. To prove the former of the two claims, one has but to glance at a sectional drawing of this dome and then to call to mind the clay oven earlier described as of immemorial use in Mesopotamia. Both structures, it will be seen, rise in stepped circles toward a summit never realized; its attainment being forbidden by practical requirements in both instances, and, in the case of the Pantheon, also by the necessity for impressing the visitor with his proximity to God and Nature. Further, in the two constructions—the one small and domestic, the other monumental—the materials used are the same, except that in the Pantheon they have been subjected to processes devised by man in order to render his work more permanent. Therefore, the masonry of the great dome was made of Roman brick, set in almost horizontal courses, which were interrupted, perhaps, near the summit, by a series of arches to relieve pressure upon the interior substructure, and again resumed just below the *oculus*

(the aperture at the summit); the whole, through the use of concrete, gradually becoming monolithic.

Pantheon, Parent of Structural Domes. As to the second claim made for the rotunda of the Pantheon, it cannot be questioned. To prove that this dome is the parent of all structural devices of its kind that have followed it in the history of architecture, only a few words of explanation are necessary.

Santa Sophia. Its first descendant is the admirable construction occurring in the Basilica (now mosque) of Santa Sophia, Constantinople, erected more than 400 years later than its parent. The authors of the scheme were two architects, uncle and nephew, of the cities of Tralles and Miletus, Asia Minor. Like the dome of the Pantheon, that of Santa Sophia was devised for internal lighting. Therefore, when viewed from the outside, it offers a flattened aspect, rendered yet more massive by flanking semidomes which are each buttressed by paired smaller ones of similar figure. This assemblage, disappointing as it may seem in description, is but a necessary preparation for the interior, acknowledged to be one of the finest in existence, by reason of its proportions, its curves, and what may be termed the buoyancy of its soaring ascent. The small half domes pass into the larger, and these in turn apparently evaporate into a great central canopy, which is smaller in diameter than that of the rotunda at Rome, but the summit of which marks a height of 179 feet above the pavement.

The dome of Santa Sophia is without oculus. The function of this opening, through which, in the Pantheon, the serious mind escapes to reflect upon the Infinite, is here assumed by a series of windows encircling the base of the dome. The latter, instead of rising from a circular wall, is set upon pendentives—that is, spherical triangles of masonry with downward pointed apex, springing from four great piers to support the concave mass above them.

Byzantine Central and Subsidiary Domes. The massing of domes, entailing the opposition of abutting to disruptive forces, is the principal structural legacy of the Byzantine builders to architecture. By such means they pointed the way toward the Gothic, as they did also by giving lightness and flexibility to their domical constructions, such as those at Ravenna, notably San Vitale, by making an ascending spiral of slender clay jars closely fitted one into the other and held in place by cement. The thin shell so devised did not require the heavy centerings of the Roman vault; while the menacing thrust was still further averted by binding the sturdy supporting piers of the octagonal dome to arches leaping to the external wall, and by strengthening the salient angles with buttresses.

Therefore, because of their clever devices tending to diminish and distribute thrust, through the employment of the impost block (an inverted truncated pyramid of stone placed above a capital of similar form) to receive the load weighing down upon it from above, the Byzantines have come to be regarded by the most modern and discerning critics as the creators of the second of the three structural types which have developed during the entire course of civilization. Before them the Greeks perfected the use of the column and lintel. After them the stonemasons of western Europe, following a long period of experiment, brought into being the elastic, truly vitalized Gothic or pointed-arch system. But they, receiving in heritage the clay dome from prehistoric Eastern peoples and having present in their imagination the example of Hadrian's Pantheon, proceeded to mathematical subtleties; displaying a genius quite apart from that of the sturdier, more candid, and more materialistic Romans of the West. They succeeded in giving the name of Byzantine to the domical principle, and of late their architecture has been recognized, not only as a logical transitional style, but also as "a powerful and self-sufficient art."

The Dome Set on a Drum. The dome on pendentives, the second stage in the evolution of the principle, was followed inevitably by the dome set on a drum. This latter arrangement was conditioned in great measure by the plan of the building of which it was to form the most striking feature. The circular Roman plan had given place to the Greek cross, in which were inscribed five domes raised on spherical triangles and presenting a complicated assemblage of reciprocally hostile forces assuring equilibrium. In the same way, the Byzantine dome, dating, in its chief example, Santa Sophia, from the 6th century (532–548), gradually yielded to a third device, which contained an element of instability, greater or less, according to the skill of the constructing engineer. In the new phase, the dome rose singly, as if free from restraining lines, soaring with pointed section far upward into space. Its object was external effect, as was demanded by the citizens of the Florentine Republic, at the beginning of the Renaissance, from Filippo Brunelleschi (1377–1446), architect and engineer of the dome of the Cathedral of Florence.

Construction of Brunelleschi's Dome. When Brunelleschi received his commission, he had already visited Rome and had studied the rotunda of the Pantheon. But to seek direct inspiration from this scheme was impossible, since a low dome would have been rejected by the authorities in charge of the work. His problem, as he correctly saw it, was to create a monument which should be conspicuous far away in the valley of the Arno, rising as a just assertion and acknowledgment of the power of republican Florence. Beyond this, he should obey the warnings of his intuitions, in order to produce a lasting memorial to his own genius. He took as his model a building of disputed age, an adjunct of the cathedral, which, before the erection of the latter, had itself served as the seat of the bishop. This building is a baptistery, which had been made separate from the church, properly speaking, according to early Christian precedent.

The Lombard or Comacine Builders. The example studied by Brunelleschi, in common with all others of its class, is of Lombardic type, owing its origin to those progressive Comacine builders who, in the 8th century, received letters patent from the pope, permitting them to pass into any country where their services might be required.

Developing from stonemasonry, their work, if massive and rigid, was yet honest and durable. From their rise in a body of Eastern Roman legionaries defending their island in Lake Como from barbarian invaders, they had been acquainted with the domical principle. This they later applied, though at first in crude fashion, to their own constructions.

The Baptistery of Florence. But experience teaches. By force of constant practice, the untutored masons acquired skill, especially in adapting an interior dome to an exterior polygonal covering or roof. This device appears in modification in the Baptistery of Florence, and, if intelligently observed, offers no difficulties to the layman who would understand it. Here the building material is stone, and plan, dome, and roof exactly correspond in form; the octagonal dome being sprung from a level below the top of the enclosing walls. Therefore, the roof, rising from the vertical wall, meets the dome after it has passed more than halfway to its summit, and forms with it a solid stone construction; leaving, however, a void between the wall and the point at which the dome springs. This void widens to the top of the wall and then narrows to the junction of roof and dome. The upright walls of the octagon are re-enforced by strong buttresses at the angles, between each two of which two secondary buttresses are placed. Each side is thus divided into three equal spaces. Upon the buttresses, barrel vaults are set, properly inclined to the roof, under which all voids are filled with masonry; the whole constituting a thoroughly stable construction.

The Baptistery and Brunelleschi's Dome. The device in the baptistery, by which the dome and the roof are partially consolidated, suggested to Brunelleschi a dome with double shell, which he proceeded to construct in the character of a really great translator, who first seizes the spirit of the original and then clothes it in his own idiom. At the same time, he created one of the most admired monuments in the history of architecture. Moreover, as if to mark the Renaissance apart from the middle ages, Brunelleschi, although without intention, succeeded in attaching his name to his work; while the Gothic masterpieces which preceded it must always be regarded as results of corporate effort and of the travail of many minds.

The mere structure of the dome of Brunelleschi is a very clever adaptation of the roof and dome of the baptistery, as may be determined from a comparison of cross-section drawings of the two systems. But to end the judgment of the former at this point is to spurn that imponderable quality of genius which vitalizes and gives wings to the heaviest matter. This the most prosaic of observers must realize, when his eye follows the soaring, elastic curve of the great cupola, from its springing at a level of 175 feet above the pavement to its crown at an additional height of 120 feet, where it is surmounted by a "lantern," the Renaissance device for closing the aperture (oculus) of a dome.

The Lantern. Nor is the lantern itself so unimportant in domical construction as to need no word of comment. As used by Brunelleschi and his successors, Bramante and Michelangelo, it is a cylinder or polygon built of stone, provided with openings for light, encircled by engaged columns or pilasters, and capped by a finial ornament. To this feature, allusion was made by Brunelleschi in his discourse before the building committee of the cathedral, when he argued: "Most worthy gentlemen: Having considered the difficulties of this construction, I find it absolutely impossible to build a hemispherical dome, since the upper surface, there where the lantern is set, would be so extensive that, if weight were applied to it, the structure would soon collapse"—a remark which in itself is a criticism of the second Renaissance scheme for a great dome, produced a century later by Bramante, at the court of Pope Julius II (1503–13), but never executed.

Weakness of the Dome of the Renaissance. From these examples, the truth may be inferred that the dome of the Renaissance tended toward instability; that its new object, external effect, had in a measure deprived it of the admirable qualities imparted to it by the Roman and the Byzantine builders. Its thrusts were no longer opposed by stepped rings of masonry, as in the Pantheon. Neither was it firmly upheld on pendentives, nor was it flexible and elastic in itself, as at Constantinople and at Ravenna. It was now set upon a high drum, and, in the first great instance, all the mathematical and mechanical ability of a Brunelleschi was required to render it measurably self-sustaining, both by its shape and by its structure. These technical points were ignored by the contemporary public, except such few engineers as were delegated from time to time to report upon the stability of certain buildings. Consequently, the dome of the Cathedral of Florence, externally imposing, majestic, suggestive of aspiration, was praised for its very defects. Milizia, one of its enthusiastic admirers, wrote of it: "It is worthy of special mention that in the construction of this cupola there are no visible abutments."

The marvelous and the mysterious were the natural, nourishing intellectual food of the Italians of the Renaissance, which dawned during the lifetime of Brunelleschi. The soaring dome was of right demanded by the men who conquered the outer world by navigation and the inner world by speculative philosophy set on the bases of physical science. The form and setting of the dome in its third phase was determined as much by instinct as by considerations of structure and material.

The Roman Renaissance. A half century after the death of Brunelleschi (1446), Florence yielded her artistic supremacy to Rome, as the result of complex, interdependent causes, prominent among which was the civic strife prevailing in the former city and rendering it unfit as a place of productive labor. Men of genius, not only those of declining Florence, but others from northern Italy, answered the call of Pope Julius II, who, from the moment of his election (1503), determined to make memorable his own reign and to glorify his family by fostering the production of works of art with rapidity and in great number. His principal schemes were to restore the old basilica of Saint Peter, which he had chosen as his burial place, and to enlarge the Vatican, which, although the residence of the popes from the time of the barbarian invasions, owed to Nicholas V its development into a palace at the middle of the 15th century. Lastly, it was the intention of Julius II to commission the first painters of Italy to decorate with the utmost magnificence the chapel built by and named from Sixtus IV (uncle of Julius, who had preceded his nephew in the papal office by only a few years), as well as to illustrate the history of the Church on the walls of the *Stanze*, or series of ceremonial chambers in the same palace of the Vatican.

Restoration of the Old Basilica of Saint Peter; Bramante. To restore the Church of Saint Peter, choice fell upon a native of Urbino, who, according to unverified rumor, was an uncle of Raphael. This was Bramante, in his early youth a student of perspective and a painter, who was destined to be remembered chiefly for his work as an architect. Obeying the promptings of his positive nature, he left his own province of Umbria, then subject to the sensuous, ecstatic art of the painter Perugino. He traveled northward, pausing to study the instructive architecture of the Lombard plain, and finally fixed his residence in Milan, where he remained for more than twenty years. From this city, whose brilliancy had been obscured by the French wars, he traveled to Rome, where he established himself under the pontificate of the Borgia pope, Alexander VI (1492–1503).

The Tempietto. According to the most authoritative historians, a miniature domical building, called the Tempietto, is the first attested work of Bramante in Rome. This interesting little monument is situated in the cloister of the church erected at the supposed place of Saint Peter's martyrdom (San Pietro in Montorio), in the district beyond the Tiber (Trastevere). Intended as a receptacle of sacred relics and providing the focal point of an architectural composition, it demanded a design corresponding to its importance. Bramante, therefore, employed the dome and took as his model the Temple of Vesta at Tivoli, which, like the Pantheon, has the thrusts of its dome abutted by stepped rings of masonry, and a circular cella surrounded by a colonnade of the Corinthian order. This model, plainly of the period of the Pantheon, suffered, at least in structural integrity, through interpretation by Bramante. For the Italian, aiming, like all his artist contemporaries, for external effect, set a dome of hemispherical section on a high drum without abutment. He was saved from disaster only by the toylike proportions of his scheme.

By order of Pope Julius II, Bramante prepared plans for erecting on the site of an early Christian chapel a great basilica dedicated, as was the original building, to Saint Peter, apostle and martyr. At the middle of the 15th century, the chapel was included in a great scheme for the reconstruction of Rome planned by Pope Nicholas V (1447–55). But that enlightened pontiff, prevented from realizing his projects, died a broken-hearted man, and the work

of his architect Rossellino counted for nothing. So that when, after the lapse of a half century, Bramante received his commission from Julius II, he entered upon a new scheme which, when completed by his successors, constituted one of the most noted works in the history of architecture.

Bramante's Model for the Dome. Following Byzantine precedent, Bramante submitted a plan showing a Greek cross with a dome at the junction of the arms. The dome, as may be seen from the model which is still preserved, was to be hemispherical and abutted, like that of the Pantheon, with stepped rings of masonry. But, in order to gain an imposing external effect, which he sought as an architect of the Italian Renaissance, he transferred the interior colonnade surrounding the base of the dome in the Pantheon to the exterior of his own model, adding also the Renaissance feature of a crowning lantern.

Construction of Saint Peter's Begun. Having produced the plan and the model, Bramante engaged in the actual construction of Saint Peter's, building one bay of the nave and the piers which now support the great dome. He worked with the utmost diligence and fervor. The complicated influences of the court interfered to slacken the interest of Pope Julius, and prevented him from urging the completion of either the basilica or the monumental sarcophagus. The latter, for which a commission had been given to Michelangelo, was, from its position beneath the dome, to present in contrast Moses, the lawgiver of the Hebrews, and the pope, the successor of Saint Peter.

Errors in Bramante's Model for the Dome. In the opinion of the competent, Bramante's scheme is excellent in so far as it follows Roman precedent, as exemplified in the Pantheon. On the other hand, all departures from that model are to be condemned as weakening the structure. Such is the transfer of the Order to the exterior, since the colonnade, being so placed, interrupts the solidity of the masonry. Such, also, is the higher level at which the dome is made to spring, losing thereby an important part of the support of the abutting wall. Such, again, is the use of metal clamps to avert the danger of collapse, which should have been eliminated by a dome of proper shape—in this case, one of pointed section—since it would have exerted a greatly diminished thrust.

Bramante's scheme, although it failed to be realized, yet occupies an important place in the evolution of the architectural principle which it represents. It allies itself, so to speak, with the Roman and the Byzantine dome, as compared with the Florentine example of Brunelleschi, which served to inspire the last and most ambitious of the series of three devised in the Italian Renaissance—the existing cupola of Saint Peter's.

Michelangelo, Architect of Saint Peter's. Under Pope Paul III, a member of the Farnese family, distinguished as nobles and as patrons of art, Michelangelo was appointed chief architect of the basilica. He had finished his career as both sculptor and painter. His spirit had been broken by long litigation with the heirs of Pope Julius, as his physical frame had been weakened by difficult journeys. Yet he did not in his decline abandon the practice of mural painting, an art which, at that period, demanded such assurance and dexterity of touch. He continued to work in the Pauline Chapel of the Vatican, with interruptions caused by grave illnesses, until he finished his commission at the age of 75. His advanced age is made the subject of comment by the contemporary art historian Vasari, who said: "Painting, and above all, painting in fresco, is beyond the capacity of old men."

This comment cannot so forcefully be applied to architecture, the least imaginative of the major arts, and Michelangelo was justified in his acceptance of the great work left unfinished by Bramante more than thirty years before. The plans and the model of his predecessor he praised with a warmth quite foreign to his nature, which would seem to indicate a diplomatic action on his part, especially since he changed them immediately and so radically.

Precedents Followed by Michelangelo. For Bramante's hemispherical dome, Michelangelo substituted one of pointed section, recalling in outline that of Brunelleschi, which had lived in his mind from childhood. Furthermore, he replaced the dome of solid masonry, conceived by the former architect, by one of three shells, the inner of which was to be hemispherical and the two above it of pointed section. And, recalling the Lombardic Baptistery of Florence, in which dome and roof are fitted together, leaving voids, Michelangelo's small extant model shows the cap as solid up to a point nearly at the level of the haunch, and there separating into three shells which diverge from one another; the lowest one being semicircular and the two upper ones of pointed section. Still following Brunelleschi, Michelangelo used eight heavy ribs to pierce the two outer shells and bind them together, but he did not continue the resemblance by carrying the internal structure to the extreme of security, as did the earlier Florentine architect.

The innermost shell, destined to be of hemispherical section, but never executed, was probably so devised in order to assure an interior effect similar to that of the vault of the Pantheon, whose spreading expanse is much more inspiring to one who passes under it than is the steep, contracting ascent of Brunelleschi's cupola.

One other feature Michelangelo adapted from a Roman precedent. As Bramante, in his design, transferred to the exterior the interior colonnade surrounding the base of the dome of the Pantheon, so Michelangelo changed Bramante's colonnade into a series of sixteen isolated buttresses masked by coupled columns. By these changes, both the Italian architects, in their desire for external effect, weakened their structures. But Michelangelo committed the far greater error. By isolating his buttresses, he did not oppose the continuous resistance to the thrust of the dome. What is still more to be regretted, he placed his columns at too low a level to receive properly the thrust of the enormous ribs which it was their task to buttress.

Delay in Execution. This design, commissioned in 1546, was committed to drawing and long remained in that state, owing partly to the artist's press of occupations, but largely to his habits of delay. A number of years elapsed before he could be brought to prepare a wooden model, and, when he finally proceeded to the execution of his scheme, his life was nearing its end.

Death of Michelangelo (1564). Michelangelo died in 1564, at the age of 89, leaving his dome completed only to the top of the drum. The cap remained to be finished. It was constructed, under the direction of Fontana and Giacomo della Porta, according to the original models and drawings; but two small lateral domes, which are fine in themselves, although ineffective in their relation to the whole composition, were added by the noted architect Vignola (1507–73).

The Petrine Construction. As completed, the dome has an internal diameter of 137½ feet, and the apex of its lantern measures a height of 405 feet from the pavement. The entire scheme, including the revised plan of a Latin cross, under the name of the Petrine Construction, became a world model. It gave the inspiration for the French domes of the 17th and the 18th century, as well as for that of Saint Paul's, London.

The Church of Saint Peter has an outside length of 727 feet. Its façade is 369 feet wide and 145 feet high. Its interior width across the transepts is 451 feet. The floor covers an area of 163,728 square feet, or nearly 4 acres.

Threatened Disruption of the Dome. Michelangelo's dome was admired by his contemporaries, like the creation of Brunelleschi before him, because it rose high in the air without visible abutments. But, for the reasons already given, it was faulty in construction and lacking in stability. Nor were its defects long in betraying themselves.

By the middle of the 17th century it threatened disruption, and a council of experts was called by Pope Innocent XI (1676–89) to devise means by which to avert a possible disaster. This first commission seems not to have acted, but the dangers increased so progressively that, in 1742, three distinguished mathematicians were charged by Pope Benedict XIV to examine the dome and to make drawings of the lesions existing in its fabric. Their work finished, these mathematicians declared the disruptive cause to be the form of the dome itself rather than any weakness of the piers and pendentives constituting the substructure. As a substitute for efficient buttressing, the commissioners recommended the use of iron clamps and of additional chains, as they believed those originally employed to have fallen into the masonry with an entire loss of their restraining power. Still later, the same pope appealed to one of the most competent engineers of the period, the marquis di Poleni of Padua, who, while expressing a more hopeful opinion of the stability of the dome than the three earlier commissioners, criticized its shape and suggested that a new system of chains be applied to it.

This suggestion came like a match to inflammable material. Advice, ranging from serious to the most radical, suggested expedients of equal diversity, until a revolutionary spirit demanded that both dome and drum be demolished, for the purpose of rebuilding the former in a more pointed form, by which to diminish the thrust. It is enough to add that Poleni's advice prevailed and that today the much discussed structure is stanchioned by the binding chains which he advocated, in order to supply a resistance to disruption which should have resided in the fabric itself and rendered it entirely self-supporting.

Transference of Artistic Capital from Rome to Paris. Like Florence at the end of the 15th century, so Rome, in the 16th, lost the artistic supremacy of the world, which passed to the French people. Wars politically disastrous for France began when Charles VIII, king of that country, invaded the duchy of Milan in 1494. They continued for thirty years, during which period the changeful relations among the principal European states resembled the interesting combinations of a kaleidoscope in being no sooner formed than dissolved. These wars had the beneficent result of advancing the economic development of France, as is demonstrated in the Cluny Museum, Paris; since there the industrial products of France, such as pottery and textiles, are placed side by side with those of Italy and show a progressive refinement as a result of contact with the country south of the Alps.

Finally, long after the restoration of peace, when the heir of Francis I, the prince who succeeded as Henry II, married the Florentine Catherine de' Medici, Italian influence became dominant. The Gothic cathedrals, perhaps the greatest artistic glory of France, were condemned as barbarous, while the charming impetuosity of the French tongue submitted temporarily to the more rhythmic suavity of the closer Latin derivative.

The So-called Italianate in France. This period, often called the Italianate, culminated under the widowhood of Catherine de' Medici, when she commissioned Philibert Delorme to build the Tuileries (1564); bidding him create an Italian palace with flower gardens and fountains, rather than a feudal castle with moat and drawbridge. The queen could command but not control. In the work of Delorme, the French genius asserted itself, as it had done before in Pierre Lescot's Louvre of the preceding reign (that of Francis I, 1515–47). A new style was born naturally, as are all styles worthy of the name. And it was original, although it was made up from borrowed elements: a statement capable of being proved in few words, were it not outside the present purpose, which is to deal exclusively with structural principles.

Early or Valois Renaissance in France. The palaces above mentioned struck, as it were, a modulating chord. The Early French or Valois Renaissance passed into the Bourbon Style, the most important subdivision of which was the period of Louis XIV (1643–1715). Under this absolute monarch, architecture assumed a grandeur and dignity that were neither hollow nor absurdly pompous. The Louvre was continued, and Versailles, as we now know it, was planned and executed, with its ruinously extravagant water system, and its landscape gardening. The latter was the work of Le Nôtre, perhaps the greatest of his profession until his time, as well as the artistic ancestor of those who plan the embankments and the boulevards of our modern cities.

Use of the Domical Principle by the Architects of Louis XIV. Under Louis XIV the domical principle was twice used in Paris to create imposing external effects, and in both instances by members of a family whose name, Mansart (Anglicized, Mansard), has become a household word. The earlier of these two domes is that of the Val-de-Grâce, a votive church erected as a thank offering by Anne of Austria, wife of Louis XIII, for the birth of the heir to the throne who became the "*Grand Monarque.*" This church, as a whole, is the work of three distinguished architects. Levau and Le Muet each had a part in its creation, but Mansart (François) the Elder began the dome, which was completed by his nephew, who was much the greater of the name. The latter, Jules Hardouin-Mansart, erected also the second building of the Hôtel des Invalides, entirely distinct from the original plan and known in his time as the Church of the Dome.

Dome of the Hôtel des Invalides. This cupola, judged by the critics of today as showing externally the most graceful lines of all similar structures in France, recalls Michelangelo's dome. When seen from a distance sufficient to obliterate an overelaborate ornament, which has been scathed by expert French opinion, the lines of the structure as a whole assert themselves as a pyramid which apparently retracts its sides to spring the higher into the air above. At such points of view, the composition has a dignity which belongs to Roman, rather than to Renaissance, architecture.

Dome of the Pantheon by Soufflot. From the cupola of the Invalides, the student passes naturally to consider that of the Pantheon, Paris, a work executed in the 18th century by the architect Soufflot (1713–81). Externally, the dome of the Pantheon marks a new departure for the continent. Except for the pointed section of its cap, it only remotely suggests its predecessors in Florence and Rome or even the dome of the Invalides. The reason for the departure or difference lies in the influence which had arisen during the intervening century, consequent upon the erection of the dome of Saint Paul's, London.

The dome designed by Soufflot shows a very high drum surrounded by a continuous colonnade: a treatment for which the first suggestion was derived by Bramante from the interior of the ancient Pantheon of Rome and transferred to the exterior of his model for the cupola of Saint Peter's. Through the emphasis given by Soufflot to the free standing colonnade, the parts above it suffer by comparison; yet the transitions are well effected, and the outline of the whole, as it contracts in ascent, is very agreeable to the eye. It is not, however, harmonized with the cruciform building, to which it appears to be applied and from which it is easily removable,

instead of being an essential, even the principal, part of the composition, as are the domes of the Cathedral of Florence, of the Invalides, and of Saint Paul's, London. But, in spite of certain obvious faults, the exterior of the Pantheon is imposing in both architecture and position. It is not unworthy of its neighbors—that picturesque anachronism, the Church of Saint Etienne du Mont, and the Library of Sainte Geneviève, the rhythmic, modern design of Labrouste, comparable in effect with a Greek temple of the best period.

Dome of Saint Paul's, London. The final European example of the dome to be treated is that of Saint Paul's, London, completed within the half century following the Great Fire of 1666. Even before that disastrous event, Sir Christopher Wren had been commissioned by Charles II to examine the Norman (1066–1154) and Early English (1189–1273) structure of Old Saint Paul's and to report upon its condition, a work which the architect-mathematician accomplished with great thoroughness and detail. He included in his demonstrations the plan, elevation, and section of the cathedral, all of which he had formulated as the results of his survey.

Together with his report, Wren submitted a radical scheme for the restoration of Saint Paul's, which was never executed, owing to the outbreak of the plague, a few months later, and to the rapidly following fire. As a consequence of changed conditions, he almost immediately presented plans for the reconstruction of London. These, owing to their disregard of former property lines, were never realized; but the same architect was appointed to restore the churches of the Strand and to build a new and greater Saint Paul's. The latter, as completed in 1710, ranks as one of the finest Renaissance cathedrals in Europe and is the masterpiece of Wren. Externally, it is majestic and restrained, unmarred by the elaboration so characteristic of the late 17th century. It has, however, been unduly praised by certain Englishmen, who have lacked the sense of justice and the breadth of view shown by Sir Christopher himself in his judgments of foreign art and artists, as expressed in his letters from Paris in 1665.

Wren's Designs for New Saint Paul's. Obedient to his admiration for continental design, Wren presented, for the restoration of Saint Paul's after the fire, a scheme which was censured by the clergy. The architect, following Bramante and Michelangelo, had proposed the plan of a Greek cross, with a great dome at the intersection of the arms, and an emphasized narthex at the western end. But this simple and familiar figure of his predecessors Wren complicated with the visual power of a geometrician. He filled the spaces between the arms of the cross with segmental curves struck from the corners of an imaginary square enclosing the entire composition; setting also small domes on pendentives between the great cupola and the curved walls of enclosure.

The model, constructed from this plan and showing a dome with double shell, may still be seen at Saint Paul's. It was regarded by its author as his best conception and was approved by King Charles II. But it is open to the same criticism as is Bramante's model for the dome of Saint Peter's. The section of the cupola is such that it would have lacked stability, had it been executed in large dimensions and in heavy building materials.

For ecclesiastical rather than for technical reasons, this first scheme was rejected. Then, to satisfy ritual requirements, as defined by the clergy, Sir Christopher reverted to a so-called cathedral form; that is, a long nave with a short transept near the middle, a semicircular apse (eastern end), and two western towers. Finally, in obedience to the king's command that Saint Paul's should be "conspicuous above the houses of the City," he created the great existent dome, quite similar in outline to his first conception, but differing essentially from it in structure.

Structural Details of the Dome of Saint Paul's. Following architectural precedent, the architect first formed a circular bed by means of arches sprung from eight piers, and on these supports set a tall and massive drum. From this point, Wren became original, making the drum double and using its external wall as a stylobate or platform on which to set the lofty, imposing Corinthian colonnade already mentioned. The inner wall of the drum, separated from the outer by a passage and strongly abutted, he used to carry a dome of masonry which springs at a point much below the top of the wall. This dome, moderately elliptical in shape, with a circular aperture at its summit, he surmounted with a hollow cone of masonry devised to bear the weight of a heavy stone lantern fifty feet in height.

Finally, having assured the stability of his construction, he raised the wall of the inner drum above the entablature of the colonnade set on the outer drum wall; giving to the exterior surface of the former an antique attic or frieze treatment, above which he erected a wooden dome covered with lead and appearing to support the lantern.

By these devices, the architect-engineer obeyed at once the king's command and the voice of his own conscience. By the revision of his plans, he gained the approbation of the clergy, the jealous guardians of tradition. By the sustained dignity of the completed edifice, he won the admiration of his compatriots, which is expressed in a Latin inscription carved on his tomb and repeated over the door of the north transept of Saint Paul's: the adjuration to the reader being in translation, "If thou seekest a monument, look about thee."

This great Renaissance cathedral, completed at the end of the first decade of the 18th century, contains the latest example of domical structure necessary to be treated; the more recent domes presenting no interesting problems and certain of them, notably that of the Capitol at Washington, being of metallic substance.

Third and Last Architectural Principle. From the achievements of the Roman, Byzantine, Italian, French, and English engineers who successively treated or modified the principle of the hemispherical or half-ovoid roof, the student is now free to pass to the third architectural element which, properly speaking, has created a style; that is, an outward manifestation of an inner shaping and determining force. This element is the arch, developed in its most interesting form by the builders—it were better to say by the master masons—of the middle ages.

Arch Principle in Its Primitive Form. But as all the world knows, the arch principle was used in remote antiquity. The arch appears as a voided triangle (to lighten superincumbent weight) over the entrance to sepulchral chambers in the Pyramids. Later, when the Egyptians and the Assyrians had mingled in war and trade, the developed arch marked the structures of Rameses II (Empire, 13th century B. C.). Further, it is now recognized that a system of arches, some of which were 75 feet high, supported the Hanging Gardens of Babylon, which were constructed nearly 600 years before our era. Again, the excavations of Dr. Schliemann in peninsular Greece (1876) demonstrated the use of the voided triangle by the builders of the Mycenæan age (about 1600–1000 B. C.). This device appears above the lintel of the Lioness Gate at Mycenæ and also similarly placed in the neighboring "Treasury," the finest of the domical or so-called "beehive" tombs. Finally, the same archeologist, in association with another learned German, Dörpfeld, laid bare the palace at Tiryns (1884-85), in the circuit wall of which occur pointed-arch openings. These shapes are secured by setting massive stones separated by a wide void at the lowest tier and then by gradually narrowing the void until the topmost stones meet. In this instance, the arch principle is

ignored, but the attainment of the shape is in itself significant.

Consequent upon the Dorian invasion of peninsular Greece (about 1100–1000 B. C.), an age of chaos followed, and, when the Hellenic civilization rose, experiments upon the arch principle were not renewed. It remained for the Romans, through the influence of their Etruscan builders, to revive and develop them.

Lintel and Arch in the Colosseum. Toward the end of the 1st Christian century (69–96), the Flavian Amphitheater, more commonly, but incorrectly, called the Colosseum, was constructed by the order of those emperors whose name it bears in adjective form. Built of concrete, brick, and travertine, it joined in fruitful union the arch and the lintel. It was erected at a period when the building principles of the Greeks and the Orientals had met in Rome, that great crucible of the antique civilizations.

The arch, although used in developed form in the 3d pre-Christian century, within the limits of the Hellenized world, at Pergamum, Asia Minor (arched bridge with span of 27 feet), was yet a device of Eastern origin. On the other hand, the column-and-lintel was, as we have seen, an element brought to perfection in Greece during the age of Pericles. When the two opposite structural principles were united in Vespasian's amphitheater, their union formed a point of departure at which the student of today may begin a survey of the architecture of at least fifteen centuries. A unit or single bay of the great building just named is the first member of a progressive, practical series by which the free standing column was gradually taught to maintain the arch in equilibrium.

In the Flavian Amphitheater, the arch appears as if framed within columns and their entablatures; the whole constituting the so-called "arch order." In this instance, the element is not counteracted by buttresses but, to a very considerable degree, by the great thickness of the walls and by the vertical pressure of the uppermost story, which is not arched, but is a solid wall pierced at regular intervals by windows.

Before the middle of the following century, in the Pantheon of Hadrian, the entablature served as an impost for the arch. Still later, in the Baths of Caracalla (211–217), a fragment of the entablature increased the height of the column and made a larger bearing upon which to spring the arch. In the buildings of Diocletian, erected on the Dalmatian coast about 300 A. D., the entablatures disappear and the arches spring from the Corinthian capitals.

Within the limits of the succeeding century, Christianity was legalized (313) and the Empire was divided (395). These two events completely changed the course and the purpose of architecture. Byzantium, under its new name, Constantinople, became the capital; while Rome, beginning with the 5th century (410), suffered repeated siege and sacking. Thus threatened, the rich patricians fled toward the Adriatic coast, Ravenna becoming their principal place of refuge. This seaboard city served as a dike against the barbaric invasions, which, however, with the coming of Theodoric the Ostrogoth, in the last decade of the 5th century, ceased to be destructive and began to upbuild a new civilization whose religious faith demanded and determined new expressions of art.

Establishment of the Lombard Kingdom (568–774). Among these invaders were the Lombards, of Scandinavian origin, who descended into the fertile valley of the Po, like "a stream of stagnant mud," as the English historian Hodgkin has described them. Still pagans, they brought with them the cruel myths of the North, and, in the scathing opinion of Pope Gregory the Great (590–604), they were in all things *nefandissimi*, "most abhorrent." Overcoming the population, they did not mingle with it, yet they established themselves securely at points reaching from Pavia in the North, which they made their capital, to Naples in the South; everywhere giving evidence of their will to supplant and to dominate. Gradually, however, responding to climatic as well as to moral influences, they so softened their natures as to accept Arianism, a Unitarian form of Christianity, and they finally became orthodox toward the end of the 7th century. A hundred years later, they began to erect crude temples of their faith. In certain instances, as at Brescia, they converted those of the pagans to their own uses.

The leader of this movement was Queen Theodolinda, wife of the grandson of the invading king Alboin. The builders themselves have already been described under the name of the Comacine masters and as the architects of domes. Furthermore, they were the creators of the Lombard or northern Italian Romanesque; the relation between the creators of the style and the style itself being such as to recall the lines of Victor Hugo in his drama *Hernani*, when he describes the Teutonic Charlemagne molding anew in his powerful hand a formless mass of bronze, which, in this instance, corresponds to the ruined institutions of the antique world.

The Lombard Basilica, Baptistery, and Campanile. The barbaric Lombard style was created spontaneously. Its birth was inevitable. Its very name explains the principles upon which it was based. Its elements were the round arch, the barrel vault, and the dome, crudely fashioned and covered externally by a conical or polygonal roof. Combining or choosing from these elements, the Romanesque builders of upper Italy, between the 8th and the 12th century, aligned across the Lombard plain, from Milan to the Venetian territory, a series of religious structures, consisting in many instances of basilica (church proper), baptistery, and campanile (detached bell tower), which render that region one of the three or four of the world most interesting from the point of view of architecture.

The Basilica. The first member of the trifold type, the basilica, is the Greco-Roman law court applied to a new use. This the Lombard received from the early Christian architects of the 4th century. In its primitive form, as a church, the basilica was rectangular in plan with a width not exceeding two-thirds its length and at one end a semicircular expansion called the apse. The latter was set at a level slightly higher than the rectangle and was separated from it by a breast-high wall with entrance gates, beyond which the laity could not advance. Further, the rectangle was divided by columns into three longitudinal sections; the central being the most spacious. The early roof was flat, but subsequently the lateral divisions (aisles, that is, "wings") were covered with barrel vaults, and, still later, the central space (nave, "ship or keel") was similarly treated. Properly to vault the wide nave and to assure, at the same time, stability to the buildings, as well as sufficient light to the interior, became the chief architectural problem of the middle ages. But the solution was not reached until the 13th century had half passed and the principles of the Lombardic Romanesque had been absorbed into the French Gothic.

The second member of the tripartite type is already known to the reader by the previous reference made to the Baptistery of Florence. The third member, the campanile, must be omitted, since it does not involve the arch principle.

The Lombardic Façade. But it is the Lombardic façade which vitally interests the student of the history of architecture, since it is so obviously the forerunner of the same imposing and distinctive feature of the French Gothic. The same structural elements, displayed at their beginning and at their highest stage of development, may be seen in the western front of Saint Michael's at Pavia (the

old Lombardic capital), in the façade of the Abbaye-aux-Dames at Caen (Normandy), and in those of the cathedrals of Paris, Amiens, or Reims.

The Façade, Exponent of the Interior. The Romanesque—that is, the barbaric—example states, with the distinctness of words, the divisions of the interior into nave and aisles. And this fact is expressed twice: first, by the three separate and distinct portals, each serving one of the longitudinal divisions of the interior rectangle; then by the slightly raised, narrow bands of masonry running from base to cornice at the ends of the façade, and also between the portals. One glance of the observer suffices to explain to him the interior arrangement and to invite comparison with a clear sentence construction, the strength of which is increased by proper punctuation. Further, the western front of Saint Michael's is pierced by a number of round-arched windows and by one unimportant circular opening; while later Lombardic examples show a more precise and concentrated manner of lighting in the great oculus, opening immediately above the central portal.

Façade of the Abbaye-aux-Dames. In the French Romanesque example of a structural façade—that of one of the two Norman abbeys built at Caen by William the Conqueror and his queen Matilda—the pilaster strips have become strong tower buttresses. In this form, they serve to resist the thrust of the interior and to consolidate the building into an indivisible organic whole, instead of allowing the façade to remain a mere screen wall without function, as is true of many vaulted structures in England, notably of the Cathedral of Peterborough.

Façades of Notre Dame, Amiens, and Reims. In the third example, the façade of Notre Dame, Paris, of the Cathedral of Amiens, or of the Cathedral of Reims, now ruined by ruthless warfare, the organic quality is still stronger, still more visible, even to the examiner of slight training. Furthermore, it appears to be progressive in the above-named sequence. For the solid, massive masonry of Notre Dame, Paris, producing a definite rectangular effect, Amiens substitutes a more elastic, springing line, firm and tense as living sinews; while Reims, with its piercings, bold and beautiful, suggests the body of a perfectly trained athlete from whose frame judicious exercise has removed every ounce of superfluous, clogging flesh.

Once again it must be insisted that the structural problem of the middle ages was to vault the basilica; also, that only by following the stages of this problem can the nonarchitect hope to realize the significance of the third and last historic style and then to proceed to the study of modern buildings.

But, before discussing the problem and the devices which led to its solution, it is necessary to understand the function and the nature of the arch, as well as its relations to the dome and the barrel vault, together with which it constitutes a single principle.

The Arch Defined. The arch, so strong in its æsthetic appeal to all classes of observers, is a necessary means of spanning openings too wide to permit the use of the lintel. And, unlike the latter principle, which depends for its stability upon adequate support, the arch demands proper abutment or resistance. Also, while the lintel, if too heavily pressed from above, yields and breaks near its middle point, incurring the vertical fall of the pressing mass, the arch, insufficiently resisted, spreads laterally and succumbs to a disruptive force inherent in its form. Consequently, this effort, called the "thrust," must be counteracted by immovable masses which will permanently assure equilibrium and stability.

Gothic Arch and Buttress. The arch-device, as used for centuries by the Romanesque and the Gothic architects, was an interior feature; leaving the buttresses, that is, the resisting masses, for the exterior. This arrangement, according to an English authority, is, to a large degree, responsible for the singular interest excited in the minds of the sensitive by the sight of a Gothic structure. For, seeing at first only the supporting members, the observer desires to enter the portals that he may determine, by means of his own senses, the concealed, ponderous burden so mysteriously announced.

Opposition to thrust, as understood by the Romans, was passive resistance: such, for example, as that offered by walls of great thickness in the Flavian Amphitheater and the Pantheon at Rome. But, by means of constant, patient experiment continued for centuries, the medieval architects, in dealing with the arch problem, were able to transform the passive resistance to thrust into an activity equal to that of the disruptive force itself.

Development of Vaulting. The medieval experiments in vaulting began naturally with the aisles, or narrower, lower, lateral, longitudinal sections of the interior. The architects threw a continuous barrel vault over the aisles. This construction was really but an arch prolonged laterally, whose usefulness was found to be greater than was at first suspected. By this means the nave, or central division, could be raised much higher, forming a clerestory (clear, light) which could be pierced by numerous windows, as is implied in its name.

When the builders had succeeded in vaulting the nave by means of diagonally intersecting arches (first example at Vezelay, Burgundy), the half barrel vaults over the aisles were found to act in the most effective way as buttresses, counteracting the "thrust" or disruptive force of the nave arches. Then, only the following and final step remained to be taken in the development of a device which was to be the most striking, as well as the sole original, *structural* contribution made by the Gothic system to architecture. The half barrel vault, in principle at least, and in the form of an arm of masonry, was transferred to the exterior. It was set firmly on the top of each of the massive buttresses which indicated, along the sides of the building, the interior division into bays, a bay being the space between two supports. It was then flung over the aisle roof to meet and to re-enforce the pier buttress or mass of masonry whose function was to resist the thrust of the soaring arches of the nave.

The Complete Flying Buttress. Thus transferred and having assumed a new form, the arm of masonry acquired also a new name. It is known in English as the flying buttress, while in French it is designated more picturesquely and accurately by *l'arc boutant*, a phrase which suggests the idea of an aggressive animal, like the ram or goat, in the act of thrusting back the enemy with his horns. So treated, this device served to transmit the thrust to the aisle buttress below it. In instances of extreme development, as in the Cathedral of Reims, it appears in two stories and in two flights, with an intermediate upright; so that the second exterior buttress, which receives the remnant of the thrust, stands at a considerable distance from the walls.

Through the development of the flying buttress, that is, the organ of the transmission of thrusts, the Gothic system became complete. The strains were directed and carried by the ribs to certain points, where they were met by masses of stone, which, if not sufficient in themselves to prevent the collapse of the interior arches, were re-enforced by other arms of masonry reaching to other supports; these latter being weighted at their summits by pinnacles or cone-shaped figures, at once structural in their function and most ornamental in aspect.

The Ribs and Their Functions. The ribs of the Gothic structure were named from the offices which they exercise: the "wall" or lateral; the transverse, or those springing at right angles to the wall; finally, the diagonal or groin ribs, which are the most important. This arrangement can be

easily visualized without the aid of a diagram, and its meaning is at once clear if the definition of a bay be remembered as the space between two supports or buttresses. Each of these buttresses, consequently, receives from the ribs five thrusts: two from the wall or lateral ribs, one from the transverse, and two from the groin ribs, or diagonals. To assure stability, therefore, became a matter of simple calculation. Through the proper direction of the ribs and the accurate transmission and annulment of the thrusts by means of the flying buttresses and of the real or supporting buttresses, it became possible to tear away the mass of wall between each two of these organs of resistance; so leaving a skeleton recalling that of the human body.

Climax of Gothic System. The wide voids left by the suppression of the masonry could now be filled by arched windows corresponding in form to the interior vaults. The entire structure so became, as defined by the great French authority of the 19th century, Viollet-le-Duc, "a framework of stone with walls of glass." The architect absolutely controlled the forces brought into play by the use of the vault. Having eliminated all inert masses, he had reduced the structure to its active parts.

By means of a static mechanism constructed from point to point as laboriously as a legal argument, he had overcome the comparative poverty of his materials and resources. He had produced a system of skillful, ingenious devices in which the principle of poise was substituted for that of dead weight; thereby perfecting one of the most admirable schemes ever conceived in the history of architecture, as well as one of the greatest creative works of the human imagination.

The Gothic system reached its climax in the 13th century. The years 1220–22 witnessed the foundation of cathedrals in several widely separated cities: Amiens, France; Salisbury, England; Toledo, Spain; and Cologne in the Rhineland. And each of these edifices symbolizes in its own terms that wonderful hundred years of great actions and great thought.

The Gothic System Developed in France. Although practiced widely on the continent of Europe and in the British Isles, the Gothic structural system was developed in France. Like the roots of a great tree, so its nourishing sources are concealed and interwoven with an intricacy defying solution. They are flung far backward into the building art of the Romans and of the Byzantines, absorbing massiveness from the former, and, from the latter, flexibility and elasticity. These sources became, as it were, the trunk of the tree, when the Comacine or Lombard master masons reared their churches and baptisteries across the breadth of upper Italy. But there the growth lost its vigor, and its life was transferred into France, to be fostered in Burgundy, in Normandy, and in the monarchical lands of the Capetian kings, whose capital was Paris.

From France the germinating Gothic principles were carried into England by the clerical architects of William the Conqueror, and they, in their adopted country, showing advancement in their art, gave color to the unfounded belief that the system there received earlier development than in their motherland. Later, but for a brief time only, France, England, and the regions threaded by the Rhine became a single architectural country. The Rhineland, however, was reluctant to abandon its impressive Romanesque, which had produced the cathedrals of Worms, Speyer, Bonn, and a group of interesting churches at Cologne similar in all essentials to those erected in northern Italy by the Lombards.

The Rhineland and Spain Learn from France. The Germans, it would appear, were three-quarters of a century later than the French in producing complete Gothic. No church east of the Rhine shows a groin rib before the beginning of the 13th century; while the apsidal vaults of the Abbey at Morienval date from the end of the first quarter of the 12th. In Spain, the Romanesque of the just mentioned period was robust and massive, with many Lombardic resemblances. But even stronger in these Spanish examples are the Burgundian influences, which had been carried from France into the Iberian peninsula by the architect monks of Saint Bernard, the reformed Benedictines, renamed Cistercians. Further, it is true that the development of structural Gothic was not progressive in Spain; since, in the same building, the earliest devices are frequently to be observed side by side with the more advanced. Nor can it be denied that the great Gothic art of France, as it is evidenced in Paris and Bourges, Amiens and Reims, is reproduced in the practically contemporaneous cathedrals of Toledo, Burgos, and Leon. These are, as to French influence, the parallels of the Cathedral of Cologne on the Rhine. They furthermore offer proofs that French architects and workmen had some share in their actual construction.

English and French Gothic. In England, for three centuries following the Romanesque period (1189–1519), architecture followed an independent development. The designer and the builder were not united in one and the same person, as on the continent of Europe, the former being often a bishop or the prior of a monastery. From this fact resulted strong individuality, each cathedral receiving a treatment different from that of every other and so impeding the progress of structural, organic Gothic.

The Chapter House. On the contrary, the English Gothic architects vindicated themselves admirably by the creation of their distinctive chapter house, polygonal in plan, with its stone vaults supported by one immense clustered pier. Of this great member, each of the multiple colonnettes becomes, above the foliage capital, a vaulting rib; so that little imagination is required to make the visitor believe himself to be standing beneath a tall palm tree whose fronds extend in graceful lines to touch the enclosing walls. Also, in the later secular Gothic, the English again produced a most useful and beautiful device in the "hammerbeam truss," a fine example of which occurs in the Hall of the Middle Temple, London, dating from the reign of Queen Elizabeth, when the pointed style was rapidly passing into that of the Renaissance.

Estimate of English Cathedrals. Supported by these two very important contributions to structure, especially by the creation of the polygonal chapter house, the English producers of Gothic have claims to distinguished consideration. To them is due also the 13th century Cathedral of Salisbury, a structure of such perfect consistency and proportion that, in these qualities at least, it invites comparison with the Parthenon itself. But even if the great Gothic piles of England—Canterbury, Ely, York, Durham, Lincoln, and Westminster—could be denuded of their historical associations, their architectural attractions would not appreciably diminish for the majority of Anglo-Saxons. Their irregular plans with chantries and chapels—added apparently as by afterthought, but in reality to fulfill the vows of the pious or the penitent—their tranquil arcaded cloisters, their stylistic stone tracery and wonderful foliage treatment of the same material, satisfy the demands of the majority of observers.

The French Cathedrals. Students of architecture alone are able fully to enjoy the frankness and the simplicity of structural statement which prevail in the cathedrals of northern and eastern France. They only can appreciate the logical reasoning, the patient experiment, which governed the progress of French Gothic in such details as the successive profiles of the buttress, or, best of all, in the panel-and-rib system arrested at the very moment of its functional maturity, and not allowed,

as in English Gothic, to decline into ornamental tracery, like the fan vaulting of the Chapel of Henry VII at Westminster. Receptive and trained observers are compensated for the absence of the English close and cloister, with all their green serenity, by the powerful suggestiveness of the French exterior, which to them reveals in clear, concise terms the structure, nay, even the arrangement of the interior.

Corporate Effort in French Cathedrals. The very setting of the religious edifice in the turbulent market place becomes acceptable to the student of history, when he reflects that the French cathedrals of northern and eastern France are the material expression of the corporate and civic impulse of the 13th century. They were not only the temples, but, in reality, the museums and the communal guild houses of the great middle class developed in the age of charters. Theirs is an art actually created by the people for the people. For, in the local absence of proper stone for building, nobles and peasants, abbots and abbesses with their subservient bodies of monks or nuns, allowed themselves to be harnessed to the heaviest of carts, which they drew to the nearest quarry, where they excavated and loaded the blocks. Then, having transported the stone to the chosen site, with their own hands they constructed the walls of the House of God. Of these so-called "cart cathedrals," that of Chartres, with its interesting towers and unrivaled painted glass, is perhaps the most brilliant example.

The Slow Growth of English Cathedrals. In contrast to this prompt and telling effort, the growth of the English cathedrals was long protracted and often interrupted. It began when the monk Augustine, sent by Pope Gregory I in the year 597 to Christianize or re-Christianize England, landed with his companions near the present city of Canterbury and founded the first of the many Benedictine abbeys established by that order along the coasts of the island. Not only were these religious houses places of prayer and study, but they were the abodes of self-sustaining communities. They were schools of instruction in the industries and in agriculture. They were, so to speak, oases in the deserts of barbarism. Throughout the period of Scandinavian invasion they served as fortresses, into which flocked those who were pursued by fire and sword, and, in memory of these times of peril and distress, the English cathedrals, as an architectural survival, still frequently show battlements on tower and wall.

Ecclesiastical Architects. At the coming of the Normans, late in the 11th century, certain of the French prelates, appointed to the bishoprics formed from the abbey communities, were both churchmen and architects. They, it would seem, concentrated their deflected natural affections upon the growing buildings committed to their charge, shaping them with paternal pride, and, at their death, bequeathing them to successors similar to themselves in condition and sentiment. Thus it was that Canterbury, with its Saxon foundation and the French influence given to its plan in the 12th century by the French archbishop, William de Sens, came to show in its now venerable body examples of each successive period of English medieval architecture, until, in the latest phase of insular Gothic, the Tudor, it stood practically complete.

French and English Cathedrals. By thus setting the typical example of Canterbury against any similar structure of the Ile de France, the student may immediately realize the differences separating the English from the French cathedral. The stone fabrics may be likened to two plants. One grew perennially, surviving the rough storms of winter, overcoming the stress of tempests, and seeming to acquire therefrom a peculiar beauty, subtle and intimate. The other was of brief development, rising in response to a single season of favoring influences and attaining the perfection of its species. The English appeals through its very waywardness. The French impresses by the concurrence of its parts to the formation of a plainly visible whole. As a last word, one may say that in France alone Gothic reached a thoroughly active, vitalized state of being. But it is not true that the French is the only Gothic worthy to be admired. Like the music of Bach and of César Franck, it is favored by the professional and by the critic; while the English interpretations of the system allure all artistically sensitive persons with a romantic charm like that of Chopin.

The Gothic Legacy to Architecture. Neither species can grow stale or wither, and Gothic, as a whole, has bequeathed much of itself as a legacy to our own day. Its lessons in equipoise, flexibility, and skill in masonry, and in economy of material have become an integral part of every modern student's instruction in the art of building. But they cannot be separated from the knowledge which has been subsequently added to the practice of that art. They lie hidden from the world's appreciation, like the names of the majority of those who put them into visible form throughout western Europe of the middle ages.

Architecture and Modern Invention. The principles of Gothic, although they have changed their outward aspect, their envelope, as it were, still live and act. But the frail devices of that system represent a society of limited resources and an age of faith almost inconceivable to the minds of the present day, emboldened by the miracles accomplished in science and biased by the habit of seeing all things in large.

This point of view is not unnatural, nor is it wholly unjustified, in view of the conditions that for the last three or four decades have prevailed in the world, and especially in the United States. The annihilation of space effected by wireless telegraphy, the great development of systems of transportation by land and water and through the air, are the outward manifestations of the conquest and permanent control of forces which, but a century ago, were believed to be not only hostile to man, but absolutely invincible.

The Skyscraper; the Metallic Frame. As a corollary to the inventions able easily and quickly to assemble the necessary materials, the immense building called playfully the "skyscraper" has risen in the American cities. It possesses characteristics which are, perhaps, destined to pass into history as those of a fourth distinctive structural system in architecture. To the series, which heretofore had included the lintel, the dome, and the pointed arch (Gothic), there is now added the problem of the metallic frame.

Predecessors of the Skyscraper. Within the present limited space, it is impossible to trace the origin and descent of this latest species. But it will suffice to say that it differs from the European building of somewhat similar frontal aspect in the retention of a shell of masonry necessary because of its appalling height. Steel combined with brick, concrete, mosaic, and colored glass began to be used by the architects of Belgium in the last decade of the 19th century and in the style known as *l'Art Nouveau*. Thence passing westward into France, the same style appeared in the entrance to the subway stations in Paris, constructed of glass and steel, designed by Hector Guimard, and erected at the beginning of the present century. In Austria and in Germany, less subject to tradition than the Latin countries, the new structural system and the new material, concrete, obtained a wider use and a more durable popularity. A noted example of a steel framework masked beneath a marble plating or veneer occurs in the Postal Savings Bank, Vienna, built in 1905, after the designs of Otto Wagner, the pioneer of the artistic movement known as the "Secession"—that is, the revolt against historical precedent. To

Wagner, also, are due the stations of the Metropolitan railway of Vienna, constructed largely of concrete and showing almost no affinity with any authorized building type.

Turbine Factory in Berlin. The North German parallel of the subway stations in Vienna, although of later date than they, is the Turbine Factory of the General Electric Company in Berlin, the design of the architect Hoeber. This building, in its exterior, displays yet more fully than the Austrian examples the character called by the modern critics functionalism; that is, it reveals unmistakably the manner of its construction and the part contributed to the whole by each structural member. Its materials are glass, concrete, and steel, and the façade at first shocks the observer by reason of what he regards as its crudity—pretentious, affected, and only partially achieved. He reasons that the vertical space division is faulty, as including the species of temple or hall, besides an extension on one side, which throws the composition out of axis. Further, he scorns the pediment with its indistinctly polygonal contour. He seeks, without finding, an emphasized entrance or approach, and, at the end of his survey, is quite willing to rank the modern movement in architecture, as here represented, with the results of the ultra "futurists" in painting and in sculpture.

However, before voicing his condemnation, his opinion wavers. His eye, recovering from the shock of the unadorned—in some cases, obtuse—contours, accepts them as characteristic, perhaps necessary, expressions of materials newly combined in architecture. He grasps the meaning of the single hall of the interior whose space is actually permeated with light by means of great areas of glass set in masses of concrete. He is made to feel the solidity of the structure as set forth in the steel columns and in the very forms of the hard-pressed trusses. At last, he cannot but acknowledge that architecture has passed into a new phase, into a fourth style, if that word may be applied to active, informing principle, rather than to external effect.

Functionalism in Architecture. However, properly to study functionalism one must pass to the steel-frame or steel-skeleton building, as it exists in the larger cities of the United States, in the financial areas of New York, Chicago, Philadelphia, Boston, and other centers of population. In these cities, some thirty years since, there began a movement to increase the height of office structures; the then existing laws permitting such increase, if the successive floors were supported adequately on iron or steel columns and the walls left with only their own weight to maintain.

The World Building. This system produced in New York the World building, with its height of 375 feet above the pavement. But, in order to attain such a point with safety, it was necessary to thicken the walls at their base to such an extent that the area—consequently the rental value—of the lower stories was diminished. To eliminate this defect, the architect-engineers began to support the wall itself at intervals on the steel frame, and to reduce the masonry to a thin shell. By this means, they effected a distinct difference between the European and the American combination of steel with stone and glass. At the same time, they protected the tall structures from peril in the case of exposure to fire, the destructive element which had previously caused the metal work to twist and bend.

This advance in stability and safety having been made, the problem entered a new stage. Functionalism, or structural sincerity, demanded that the façade should reveal the truth that the masonry was no longer self-supporting. This demand was first met by the distinguished architect, Louis Sullivan, who substituted for the squared and finished building stone of previous similar structures a mere casing of the metallic members of the frame. To avoid a false expression of structure in the casing, instead of employing stone or concrete, he used terra cotta with a molded surface ornament; while, to announce the great functional importance of the supports, he emphasized the vertical line throughout the design of his elevation.

The Woolworth Building. The vertical accentuation devised by Sullivan, so descriptive, so transparently truthful, was at once accepted and followed by his brother designers, not always successfully, but so widely as often to give monotony to the entire financial area of a city. For such depressing uniformity, the corrective was found by an architect whose name, already honored in both hemispheres, will have a permanent place in the history of his art. For, while expressing the function of his elements as clearly as his predecessors, Cass Gilbert, the designer of the Woolworth building, New York, has been able to create a masterpiece of external effect which has been styled, not ineptly, the "cathedral of commerce." He appears to have produced in stylistic architecture a parallel of the Venus de Milo in sculpture.

Almost may one follow the development of the design in the mind of its creator. To him, at some especial moment, the verticals of a skyscraper suggested those of perpendicular Gothic. After conceiving this thought, the man of genius easily clothed the structural frame with a garment able to satisfy, at one glance, both the most materialistic of modern financiers and the most imaginative of students living in the world of the past. Having, a few years earlier, used Gothic line and detail in his West Street design, the architect gave them a more masterly treatment in the Woolworth building, his work of 1910–12, which is still regarded as the finest existing example of its type.

The Tower, Panoramic in Character. Especially is this judgment true of the tower, which is a synthetic study of the medieval architecture of different countries and periods. It is really panoramic in character, displaying to the trained observer a rapid succession of vanishing pictures of English, German, and Lombard types, extending backward to the ponderous Romanesque and forward to the light, bold, and aspiring late Gothic. Its stability, according to certain proofs, would not be shaken by a wind of inconceivable velocity (200 miles an hour), although its height of 780 feet above the pavement exceeds by three hundred that of the Great Pyramid in its original state and that of the spire of Saint Stephen's, Vienna, among the tallest on the continent of Europe. Adequately to set forth the Woolworth building from the point of view of either architect or engineer would require a volume of technical description. But the most unemotional observer of its proportions cannot but feel that the New World has added another member to the great series of the "thoughts of men builded into stone," represented until now by the Parthenon, the Pantheon, and the Cathedral of Amiens.

From the New World the "skyscraper" has passed eastward over the Atlantic to London, where it has been skillfully adapted to its surroundings and made actually to chord with the Wren-Gibbs type of church, emphasized by a narrow, classic porch and a conical "steeple." In this trying location the great American office building daily proves its usefulness, as well as its æsthetic value. So that one gifted with imagination, whether a lover of his kind or an economist pure and simple, may look forward to an East End cleansed of its purlieus and set, instead, with space-conserving buildings, offering to those who labor in them by day air, light, warmth, and all other essentials of sanitation.

With New York as a field of vision the prophecy seems even surer of fulfillment: a city surpassing in population many small countries; a place of uplifting beauty; an immense area from which the frightful dangers incident to travel and transportation shall be eliminated.



MODERN SKYSCRAPERS

Metropolitan Building, New York
Copyright by Ewing Galloway

Municipal Building, New York
Copyright by Irving Underhill

Woolworth Building, New York
Copyright by Irving Underhill

Tower of Singer Building in distance



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AMERICAN MONUMENTS AND MEMORIALS

1 Peace Memorial, British Col.-Wash. Boundary. 2 Garfield Monument, Cleveland. 3 Soldiers and Sailors Monument, New York. 4 McKinley Memorial, Canton, O. 5 Amphitheater, Arlington, Va. 6 Grant Monument, Washington. 7 Statue of Liberty, New York. 8 Statue of Nathan Hale, New York. 9 Lincoln Memorial, Washington. 10 Tomb of Unknown Soldier, Arlington, Va.

SCULPTURE

The history of sculpture may be reduced to the development of the two figures, male and female. These appear among all peoples in the early stages of their worship and cults. They represent the qualities and attributes of Divinity divided and apportioned among many separate individualities, since the concept of a Supreme Being, a Great First Cause, cannot yet be understood. The symbolic figures progress in resemblance to human forms as the tools by which they are fashioned pass from rough to smooth stone and thence through bronze to iron.

Portrait Sculpture in Egypt. As in architecture the cabin of reeds and clay built in the Nile valley offers to the student the first structural type; so the sculptures in clay and wood of the Old Kingdom of Egypt (3400–2400) afford the beginnings of the art which they represent.

For many reasons, the most important extant example of such works is "The Sheik," a figure, now in the museum at Cairo, portraying a high official of the government. Its substance is wood, with the body and head of a single block, while the arms are carved separately and attached; the left one, since it is bent at the elbow, being formed from two pieces. As finished by the sculptor, this device was concealed by a thin sheet of the finest linen glued to the surface of the wood and itself covered with stucco, to which various pigments were applied. Still further to heighten the appearance of life, the artist did not leave the eyes "blind," but inserted in the socket cavities fragments of opaque white quartz with pupils of rock crystal, at the centers of which are highly polished bronze nailheads; the whole outline of the eyes being traced by narrow rims of the just mentioned metal. Realism and portraiture, it is plain, were the aims of the author of this figure, as they were also the qualities demanded by the authorities for whom he labored. But he attained his object and has been able, after 4000 years, to communicate with the descendants of his race. So permanent and accurate was his realism that, upon the excavation of the portrait statue of the official, the modern Egyptian peasants, as the features and the pose of the statue were revealed to them, exclaimed: "Sheik el Beled" (The Village Chief)!

Of the same period there remain two other admirable pieces which, like "The Sheik," are self-explanatory—"The Scribe" and "The Dwarf." The former of the two, carved from limestone (colored red), is widely familiar, because of its conspicuous position in the Louvre, where it is observed by thousands of visitors, instead of being reserved for the enjoyment of the comparatively few travelers who exert themselves to study Egyptian art in its birthplace. The scribe is represented, as a specialist should be, in the exercise of his office. He is seated on the ground, with his legs crossed beneath his body. He holds on his knees a tablet, and his face is slightly lifted, as if he were receiving dictation from a person standing before him. Without the slightest claim to beauty, of uneven—in some parts of the crudest—execution, and in spite of the repellent Orientalism of its attitude, this figure is yet interesting to the modern eye. The face suggests a clear, receptive, and alert intelligence. It is plainly the portrait of an efficient accountant.

"The Dwarf Knemuhetep" is another primitive masterpiece. Carved from limestone, the disproportions of his ugly shape are reported with the faithfulness of a Dutch painter, but he is quite free from any flavor of the sinister, which is so pronounced in the portraits of dwarfs by the Spanish masters. The head is consistently and abnormally large, with a face expressing patience and determination. The subject of this admirable portrait was an upper servant of the royal household, perhaps the keeper of the linen, as has been suggested by the Egyptologists. His personality has been preserved through at least 45 centuries, so that it is still instantly comprehensible, the artist having pierced through a hesitating technique and attained a precision of statement rare even in periods of high development.

Egyptian Colossal Sculpture. Nor among the early Egyptians was successful portraiture limited to the representation of middle-class or humble subjects. The figures of the sovereigns were presented in awe-inspiring proportions, either standing or advancing or else seated in an attitude which suggested eternal, avenging, merciless, and immutable presences; the elevated spirit of art dissolving, as it were, the obstacles offered by the narrow mind and the limited resources of the artist. And not only do the statues in the round, of the Old Kingdom, awaken an admiration almost inconsistent with their archaic quality, but a similar emotion is produced by the sight of the contemporary relief sculptures. In these, the clear contours, the broad, slightly raised surfaces, and the vigorous action offer a pleasing stimulus which is afforded only by masterpieces.

Later in Egyptian history, under the building Pharaohs of the 18th, 19th, and 20th dynasties (1580–1150 B. C.), the desire for the colossal in sculpture prevailed at the court, as it did also in temple architecture. In fact, the seated figures of Rameses II, projecting from the rock-cut façade of the Temple of Abu-Simbel, nearly equal in height the tallest columns of the Great Hall at Karnak erected by the same Pharaoh. This taste, refined by its entrance into the Greek mind, prompted the creation of the gold-and-ivory statues of the age of Pericles (450–400 B. C.), and the very technique of the last-named works was developed from that of the bronze figures of the Egyptians, made by carefully fitting and fastening a thin sheet of metal to a wooden core. But this strong tendency toward display did not vitally injure the art of the empire, which, in spite of a certain lack of vigor and spontaneity, is to be regarded as the best produced in the long course of Egyptian history; since the expressions of the Ptolemaic period were Hellenized and those of the period of Roman domination were hybrids.

Mesopotamian Animal Sculpture. Among the peoples whose supremacy succeeded that of the Egyptians, the Mesopotamians—especially the Semitic Assyrians—excelled in the minor or decorative, rather than in the major, arts. They, although remaining primitives in the sculpture of the human figure, treated the larger animal forms with great impressiveness, as may be learned from the reliefs in stone of the 9th to the 7th century B. C., representing hunting scenes, and now in the British Museum. Of these, the finest example is the widely known "Wounded Lioness," with her body transfixed by a spear, and other javelins hanging from her flanks; with her hind legs useless and dragging, and the line of her back hollow, indicating that her spine is broken. The agony of the beast is noble and pathetic. Surely, the sculptor who portrayed it was among those from whom the 19th century Frenchman Barye learned his art!

One masterpiece of advanced modern spirit, such as this is, even were it not companioned by many others of equal merit, would atone for the archaic conventions long used by the Assyrians and copied by them from the Egyptians. Included among such devices is the eye seen as from the front, with the head in profile, and the introduction of a fifth leg in animal forms, so that, when viewed in frontal aspect, they might not appear to have but three. Yet again, it is only justice to add that these careful and childish provisions were no longer in force at the moment when the "Wounded Lioness" was created.

Finally, in order to distinguish between the methods of sculpture of the two most ancient

peoples whose art is yet today deserving of study, the remark of a French archeologist, M. Perrot, will suffice: "The Egyptians saw as through a veil; the Assyrians as through a microscope." Or, less figuratively stated, the sculptors of the Nile valley emphasized outline, which formulated itself in black against an atmosphere saturate with light; while the Assyrians in the misty Mesopotamian plain naturally observed the projections and depressions of objects and translated them into modeling.

From the Assyrian reliefs to the Hellenic Greek statues the passage is not one of time, but of place; since Ashurbanipal, or Sardanapalus, reigned at a period considerably later (668–626 B. C.) than that of the foundation of the Olympic games (776 B. C.).

Genesis of Greek Sculpture. From the moment of that great event the male population of the Greek world flocked every fourth year, in the late summer, to Olympia in the northwest of the Peloponnesus. There, the sight of the youthful, pliant bodies of athletes, seen in the most graceful exercises and poses, caused the rapid development of sculpture. Dorian centers of this art were created in the not distant cities of Argos and Sicyon. Thence, as well as from certain islands, went out figures, the earliest of which are classed under the one title of "Apollo types"; the god of light (intellect) and of music (rhythm—that is, law and order) being the patron of the Dorian race.

Simultaneously, on the shores of Asia Minor, on many islands of the Ægean, and on the mainland of Greece, another wholly different figure was developing. This was the female draped type, not, like the athlete, original with the Greeks, but showing resemblances to the cult statues of early Eastern peoples. In this creation, necessarily, the energy of the sculptor was concentrated upon the face and the drapery; the whole evidencing much more plainly than the Apollo type the evolution of the statue from the rudely carved tree trunk, which had served as an object of worship for earlier generations. The difference separating the two figures is a significant one and is paralleled by the other contributions of the Dorians and the Ionians to the remaining two arts in which the Hellenic Greeks excelled. For in each instance the former gave force, structure, restraint; while the latter refined the force of the opposite race, embellished structure, and, for restraint, substituted emphasis.

The earliest stone statues in the Greek world probably appeared toward the middle of the 7th pre-Christian century. And from that point of time down to our own day the history of sculpture can be followed as easily as the growth of a tree with widely divergent branches.

The Apollo Type. From the first, the Apollo type, that is, the Dorian statue, was conceived as walking. It suggested, rather than represented, a human form. The arms hung closely pressed to the sides and ended in hands clenched and presented in displeasing triangular form. The torso or trunk was flat, seeming to be the result of four views taken separately from the front, the back, and the two sides, and then clumsily combined. The neck gave the effect of a cylinder set on the shoulders, and was made thus heavy to avoid fracture of the stone through imperfect tools and unskillful manipulation. The face aggressively displayed widely opened eyes and a mouth of which the two lips followed the same concave curve, so producing the grimace known as the archaic smile; both of these effects being unsuccessful efforts on the part of the sculptors, who were endeavoring at once to follow nature and to master their chisels.

The Ionian Figure. In the Ionian type the pose was similar, but the figure was conceived as stationary, so far as may be determined from an archaic, fully clothed body and from the idea of a goddess presented in a shrine and demanding adoration. The drapery was interesting in its accurately defined, perpendicular folds, which, without doubt, represented the grooves of the bark in the tree trunk stage of the racial statue. Further, the texture of the drapery was indicated as that of a fine woolen fabric, a product of the looms of the East.

In the Ionian type the arms were not invariably both pendent at the side; one being sometimes laid on the breast with the hand holding a fruit or flower. As to the faces of preserved examples, they are coarse of feature, and they have the archaic conventions already noted in the Apollo statues. Also, as in the latter, the heads are set on the same columnar necks, and the hair similarly falls in strands on the breast or the back, in order to lessen still further the danger of breaking the stone.

Archaic types, such as those just described, are not earlier than the middle of the 6th century B. C. These, having lost their religious and symbolic significance, offer no interest today except for the deep student. They are mere links in a long chain of development. They were produced in a formative period of society, which ended in the almost fortuitous naval victory over the Persians, at Salamis, in 480 B. C.

After that decisive event in world history, as was logical, the rise of national consciousness tended to fuse together the differing types of Hellenic art. In sculpture, the Dorian and the Ionian influences acted reciprocally, and a new spirit came to inhabit and vitalize the bronze and the marble figures of the Periclean age. During the 80 remaining years of the 5th century, the Greek sculptors produced, almost exclusively, monumental types, such as were fitted to adorn the temples and served to foster the religion of the state.

Myron. Pre-eminent among these master sculptors are three, each of whom contributed to what may be termed the capital fund of sculpture. The oldest of the three, Myron, working largely in Athens, chose preferably the athletic figure, showing it set for action, but in the brief instant which precedes the act, or, in one remarkable instance at least, in the first overwhelming instant of defeat, with the muscles responding to the mental shock. Yet Myron did not seek to leave the spectator with an impression of violence. Had he done this, he would have been unworthy of his period and of Athens. The poses and gestures so emphatic in themselves, when accepted merely as parts of a whole, concur in the production of sweeping, contrasting, and harmonious curves, grateful and tranquilizing to the eye. Myron was above all else an accurate, profound observer of life and movement. In common with the architects of the period, he made his eyes his chief instruments. As the builders scorned the use of the compass, so did he, without ever having dissected, render the play of muscle with a precision that has never been surpassed. Judging him correctly, the ancient critics wrote: "Myron gave *anima* (the appearance of life) to his statues, but he failed to give them *animus*," that is, the suggestion of mentality. The decision still stands, affirming the admirable qualities and recognizing the limitations of the man who may with propriety be called the first world sculptor.

Phidias. The second who deserves the same title was Myron's contemporary, Phidias, the close friend of Pericles, and the director of public works at Athens. Master of both bronze and marble, as also, on occasion, in gold and ivory, he possessed the rare ability of treating with equal success the male and the female figure. More distinctly Ionian than Myron, he usually presented majestic, clothed figures, standing at rest; expending his artistic energy upon the head and upon the drapery, considered both as mass and as texture. But, since it is from Greco-Roman copies, more or less remote or debased from the originals, that we know his single statues, we have no means of judging his quality of linking "the human with the Divine," as it was described by the observers of antiquity.

The Parthenon Frieze. However, we may form a direct opinion of this master's power of composition from the partially destroyed processional frieze which surrounded, like a tapestry, the exterior walls of the Parthenon. It was intended to be seen by the visitor who followed it either by walking around the pteroma (passage between the columns and the wall) or by looking through the spaces between the columns themselves; his position, in the latter case, being at a point more than 40 feet below the sculptures. Of its special class, this frieze is the most successful example ever produced. Its problem was to join fast and slow moving bodies of human figures and animals in unbroken sequence, and, also, to reach a climax over the eastern entrance, through which access was obtained to the statue of the patron goddess, Pallas Athena.

To accomplish this result, the festival procession was divided at the northwestern angle of the temple; one division moving across the western end and up the northern side, while the other paralleled its passage along the southern side; the two going forward to meet the company of the Olympic council of the gods seated in calm dignity above the principal portal. As participants in the procession, youthful knights are represented, now tying a sandal, now restraining a restive horse, again cantering or in full gallop. Then, crowned victors of the great games are seen advancing proudly in their chariots; following are old men and aliens bearing tokens of their submission to Athens; cattle to be sacrificed, sent from the colonies to the mother city. Here we see aristocratic young girls who had embroidered the mantle of the goddess, to be dedicated on the day of the ceremonial; lastly, there are the frequently recurring marshals and magistrates, whose gestures act, so to speak, as modulations between each two differing units.

One such personage marks the beginning of the procession and, by his gestures of head and arms, invites the youths nearest him to follow the bodies moving along the southern side, although they evidently belong to the company of horsemen gathering on the western end, who will eventually pass northward. Similar gestures effect the transition between the rearing, bounding horses of the knights and the dragging chariots. The pose of the marshal at this point indicates that the horsemen must further accelerate their pace—a subtlety which deflects momentarily the attention of the observer and maintains his interest in the procession, even though the climax of movement be past.

This subtlety of composition was equaled by the fineness of technique. Further, calculation was made to assure the visibility of the design from below and under reflected light, by deeply incising a line around the lower portion of the figures and by making the relief greater at the top than at the bottom, although at no point did it exceed the depth of one and a half inches; while the height of the frieze was slightly less than three and one-half feet.

The Parthenon Pediment. Beyond all doubt, the design and, in part also the manual work of Phidias, the processional (Panathenaic) frieze has its peer in the composition of the eastern pediment or gable of the Parthenon. Here, too, the artist, defiant of established rules, plays with difficulties: setting the statues toward or away from the axis, as he wills; but, by the force of his genius, attaining a rhythm as clear to the mind of the student, as if it were beaten out by the baton of an orchestral leader. In point of mere execution, this pediment far exceeds the frieze. In the group wrongly styled the "Three Fates," it contains the finest draped statues of antiquity, and, in the carving of the horses' heads of the chariots of "Day" and "Night," delicacies of texture, such as may be detected only at the closest range of vision and by touch.

The works just described should be regarded as those determining the rank of Phidias among the sculptors of history. But his fame, as it is affirmed in popular oratory, rests upon his two decorative statues of Zeus and Pallas Athena, intended as cult objects, of colossal proportions, and formed from gold, ivory, and precious stones, applied upon a wooden core. After some thousand years of existence, these figures disappeared, but their types of countenance are still renewed in every modern drawing whose author seeks to present the idea of supreme power or of wisdom under an austere and noble aspect.

Polyclitus. Thus enriched by Myron, who gave vitality to his figures and an inspiring eloquence to the represented action of muscle, and enriched still more amply by the monumental works of Phidias, the art of sculpture advanced to further development by Polyclitus.

The last-named master, younger than the other two, seems yet to have reached his artistic maturity midway in the 5th century B. C., and he is known to have had an exceptionally long career. He was typical both as a Greek and as a Dorian. As a Greek, he sought perfection within a narrow frame, choosing to repeat proportions and poses with a uniformity which, except for his skill, would have been monotonous. As a Dorian sculptor, he naturally treated the athletic male figure; developing the traditional "Apollo type" into such statues as his "Youth with the Fillet" (*Diadumenos*) and his "Lance Bearer" (*Doryphorus*), the latter of which was an epoch-making work. In fact, it illustrated perfectly the principles to the elaboration of which Polyclitus devoted his life, and he gave it the name of the "*Kanon*" (Law), in allusion to his own table of anatomical proportions. These he studied after the manner of an architect of his own race, with the result that the "Lance Bearer" can be compared to a Doric temple, in all that concerns the adaptation of parts to a given whole, constructed upon a unit of measurement. For Polyclitus, this unit was the head, which he made one-seventh the height of his figure, precisely as the semidiameter of the column employed had been accepted as a constructive gauge for the temple.

Innovations of Polyclitus. But the chief interest of the figure does not lie today in the more or less academic question of proportions. Instead, it resides in an innovation which, as now regarded, carried Polyclitus to a position equal to that of Phidias, as a sculptor (not of course as a master of composition), and, perhaps, even to a higher level. Abandoning the traditional pose, the Dorian master threw the weight of the body upon one foot; thus creating a contrast between the two sides, emphasizing on one the contracted and supporting muscles and, on the other, those which were supported and elongated. The right leg was thus made to resemble a column, upright and firm; while the left, bent at the knee, offered a pleasing curve, and the toes of the raised left foot grazed the ground.

This pose, also adapted by the sculptor to the female figure, as in the "Wounded Amazon," was the principal legacy of Polyclitus to his art. A secondary contribution, and one permanently valuable to students, was his practice of breaking his muscular structure into large, clear, and distinct masses, grateful to the eye and conducive to the quick grasp of the sculptor's meaning by the observer. The same treatment he extended to drapery, which, as a Dorian, he used very rarely, and never indicating the texture, woolen or silken, as was the custom of Ionian artists.

Nor were athletes and maiden warriors his only themes. In his old age, he turned to the gods, leaving as the chief accomplishment of his second manner the colossal gold-and-ivory statue of Hera (Juno), seated on a throne and wearing a crown adorned with figures of the Graces and the Hours. This work equaled in richness of material the Zeus and the Athena of Phidias, and it was as highly esteemed as they by the critics of the Periclean age. It fixed for all time the features and the figure of the

consort of Zeus, such as we know them through the statues and medals of the Roman Empire and the period of the Renaissance.

The beginning of the 4th century was marked by a lessening of restraint in Hellenic life, under whatever aspect it may be regarded. In sculpture, the masters of the two contributing races had already given the impetus and direction which the younger enthusiasts followed without question. Again two Ionians and one Dorian distinguished themselves above all their contemporaries, creating masterpieces whose charm cannot wither.

Praxiteles. The name of the first of the three, the Athenian Praxiteles, recalls the marble "Hermes," discovered during the excavations conducted in 1876 at Olympia, under the auspices of the German government. This, a statue of the utmost distinction, is, in fact, a natural evolution from the Dorian figures of Polyclitus. But it is the work of an Ionian artist whose preferred medium was marble, instead of bronze. The pose, that is, the disposition of the weight, is merely emphasized by causing the figure to lean on a support, like a pillar or tree bole, in order to obtain an undulating line and a greater contrast between the two sides, one of which now presents a strong convex and the other a deeply concave curve. The face reflects the intellectual and social culture of Athens. The glance is meditative, bespeaking elevated thought, and concurring with the physical pose to awaken immediately in those who stand before it a sense of tranquillity, like that which is secondarily produced by the "Discobolus" of Myron, but more intimate and more rarefied.

Of the female figure treated by Praxiteles numerous reflections and reminiscences remain; the most trustworthy being variants of the "Aphrodite (Venus) of Cnidus." For the goddess, the sculptor used a pose similar to that of his "Hermes" as to the torso and lower limbs, which entailed the extraneous support, but gave a different position to the arms. He heightened the sensuous appeal of the face, as befitted the subject. But, while making the head admirable in construction and outline, he omitted the slightly projecting bar of muscle which accentuated the brow of Hermes; purposing by this omission to diminish the suggestion of intellect and thoughtfulness.

This statue and that of "Eros" (Cupid), similarly conceived, were held in antiquity to be the masterpieces of Praxiteles. The "Aphrodite of Cnidus" especially became the parent of a long series of derivatives, of which the Vatican statue of the same title is, perhaps, the most faithful to the nonexistent original. Another example is the "Bathing Venus" of the Capitoline Museum, Rome, and a third, the universally known "Venus de' Medici," now in the Uffizi Gallery, Florence.

The last-named would appear to be a Roman work of the 2d Christian century, which, while retaining certain qualities of the Praxitelean type, displays aggressively the affectation and falsity of the empresses and the imperial favorites of that period. An additional blemish upon the beauty of this Venus is made by the forearms and hands added in the 17th century by the architect and sculptor Bernini, who copied the excessively tapering fingers of some mincing aristocrat received at the papal court. Apart from these flaws, the "Venus de' Medici" is an invaluable example of classical art. The undulations of its modeling were a source of the deepest delight to the great French sculptor, Auguste Rodin, who used the figure as a proof that, contrary to the general belief, the Greeks did not limit themselves to the rendering of the essential and the typical; but, at the climax of their civilization, presented, in all forms of their art, individuality and detail, according to the demands of their chosen subjects.

Scopas. To the school of Praxiteles, with its contemplative figures radiating the joy of living, that of Scopas stood in direct contrast, portraying tragic incidents and climaxes of enthusiasm, although none of these lacked the truly Greek quality of restraint. The master of the new movement, although presumably a native of the island of Paros, seems to have studied first in the Peloponnesus, where he is known to have executed the pediments of the temple of Tegea, one of which represented a battle and the other a heroic hunting scene. Of these two compositions, each of which contained 15 figures, there remain fragments of compelling interest. These are heads massive in structure and breathing a sentiment unknown in previous Hellenic sculpture. They are inclined upward, with the eyes made short, round, and having above them a projecting muscle, which rolls about the outer corners. In observing them, one cannot but recall the tragic playwright Euripides, who, less than 50 years earlier than this work of Scopas, had introduced into Greek drama characters human and pathetic, which are modern because they are universally significant. A different passion, rising from the practices of nature worship, was also portrayed by Scopas, in his figure of a mænad (maiden votary of Bacchus), which is known from a copy in small proportions preserved in Dresden. From the statuette may be developed in imagination the larger figure, with the backward strain of the legs, torso, and, above all, of the neck, which causes the head to lie in an almost horizontal line. This pose, it must be admitted, did not originate with Scopas. It was traditional in Greek art, and probably first appeared in vase paintings long prior to the 4th century. But in these the intention was purely decorative, so that the figure was merely mapped out in flat, black blocks on a smooth, light background. The rudimentary suggestion does not detract from the elaborated figure or even from the inspiration of the sculptor who conceived it in such evident ecstasy of spirit.

In the most monumental labor of his career, the royal tomb of King Mausolus at Halicarnassus, Asia Minor, Scopas was associated with three other sculptors of great reputation. This information, together with a description of the structure, was given by the Roman writer, Pliny the elder (died 79 A. D.), whose statements are too general to be adapted to the remaining mutilated fragments. But among these are blocks from a frieze representing battles of Greeks with Amazons, which have, to a degree, the emphasis and the exalted quality of the "Mænad" of Scopas. The same characteristics are apparent also in the dignified portrait statue of King Mausolus, treated correctly as a non-Hellenic type, with beard, long hair, and distinctive robe.

The Niobe Group. Thus it will be seen that at the middle of the 4th century two schools of sculpture, equal in advancement and refinement, but of opposed sentiment, were active in the Greek world about to be extended by the conquests of Alexander. Their influences mingled to produce the interrelated figures interpreted as "Niobe and Her Children," a work in which the emotional power of Scopas is joined to the incomparable Praxitelean line. Among these figures is that of a youth in profile, with his body, from head to extended right foot, making a single, sweeping curve. His right forearm and hand are enveloped in drapery, projecting far beyond his brow: a device used to create an emphatic shadow, which reappears in Michelangelo's "Thinker," as also in a modern figure of "Grief," by the American sculptor, Augustus Saint-Gaudens.

Lysippus. In observing the results of the mingling of the Praxitelean and Scopian schools, we have passed the limits of the 4th century. But a return must be made, in order to note the influence of the Dorian master, Lysippus, who became the court sculptor of Alexander the Great. As the heir of the traditions of Argos and Sicyon, he excelled in the portrayal of the athlete. He was, in fact, a reincarnated Polyclitus who, working under new conditions, produced a new ideal figure, more slender, more sinewy, and with smaller head than the "Lance Bearer" of the earlier sculptor.

Like his great predecessor, Lysippus preferred bronze to marble, according to the traditions of his school and as better showing the relations of the muscular to the bony structure of the body. In that metal he wrought exclusively, from a figure of Zeus, 60 feet in height, to a statuette of small proportions. But none of his original works has survived until the present day, although several of them were standing in the public squares of Constantinople at the beginning of the 13th Christian century, when the doge, Enrico Dandolo, having seized the city, sent them to the crucible, that he might coin them into money wherewith to pay his soldiery.

In marble, however, the "Youth with the Strigil" of the Vatican museum, until recent years, was believed to be a very close, if not a studio, copy of the masterpiece of Lysippus. But this error was rectified from a discovery made by the French, at Delphi, of a series of marble statues known to be replicas of bronze originals in Thessaly, one of which bears on its base the name of the pancratiast (wrestler and boxer) Agias, as also that of the sculptor Lysippus. It is, therefore, upon this figure, rather than upon the "Youth with the Strigil," that an acquaintance with and estimate of the Dorian master must be based. In the "Agias" the muscles have a more even flow, as if observed from the exterior by a sympathetic artistic eye. In the Vatican figure they are rendered with a knowledge which savors of the dissecting room and is characteristic of the decline of Greek art.

These athletic figures strongly influenced the sculptors contemporary with Lysippus and still more strongly those who followed him in the Hellenistic (declining) period. But during his lifetime his peculiar prestige was due to his position at the court of Alexander, and it is principally from his portrait statues and busts, through many replicas and variants, that we derive our knowledge of the features of the youthful conqueror.

The Dying Gaul. Lysippus was the last of the six great masters; the minority in numbers being on the side of the Dorians, although possibly not the lesser excellence and influence. For, if the school of emotion and passion produced, after the death of the major artists, the "Niobe Group" and, as well, the "Victory of Samothrace" vibrant with wind-swept motion and poising as if her wings were of feathers rather than marble, these masterpieces did not stand alone. Out of the first school of Pergamum, Asia Minor, at the middle of the 3d century B. C., came the figure of the "Dying Gaul," Lysippan in type and technique. Noble and restrained, although representing death agony, this statue, as it is treated, shows its descent from the great art of the two preceding centuries. It was created at the order of King Attalus I, who shared in the distribution of Asia Minor among the successors of Alexander. And its purpose was to commemorate the king's victory over the predatory Gauls who had harassed the Mediterranean countries for more than a century. As presenting death in a cruel, physical aspect, and as conducive to sentiments quite different from those evoked by the pediments of the Parthenon, or even by tragic works with death imminent, the "Gaul" belongs to a declining civilization. But the sculptor has given to the face, to the pose of the head, and even to the action of the muscles, a reflection, as it were, of supreme fortitude.

Altar of the Gods, Pergamum. Another work of the same school, and later than the "Dying Gaul" by a half century, continues the superb Dorian technique, while, at the same time, it carries passion to the maddest paroxysms of violence. This is the frieze of the "Altar of the Gods" at Pergamum, which was discovered by German excavators late in the 19th century and is now in the former Kaiser Friedrich Museum, at Berlin. It is a continuous series of relief sculptures portraying battles of gods with giants. These scenes are artistically infinite in variety, and they display all the resources of Hellenic sculpture; ranging in type from the most dignified to the ultra grotesque, and including nearly every deity and every monster known to classical mythology. The finest of the blocks represent Zeus and Pallas, evidently developed from Phidian concepts, and each in conflict with a misshapen giant. The subjects reflect the turbulent, irrational spirit of a period following upon decisive wars. But the composition and the execution have the incomparable beauty attaching alone to Greek masterpieces.

The highest qualities of this work are rightly placed emphasis and the suggestion of rapid motion, a combination which a French sculptor of the 19th century presented, with the same superb results, in a strangely similar composition. The latter is a relief executed on one of the eastern piers of the Napoleonic Arch of Triumph, Paris. But the modern artist, François Rude (1784–1855), cannot be charged with imitation, since he died more than 20 years before the discovery of the Greek marbles.

Laocoön; Farnese Bull. The frieze of the "Altar of the Gods," produced toward the middle of the 2d pre-Christian century, shortly before the reduction of Greece to a Roman province, had few worthy successors, since the once highly praised "Laocoön" and the "Farnese Bull," dating from approximately 100 B. C., cannot be counted as such. The first of these is a work of the school of the island of Rhodes; the second, of that of the city of Tralles, Asia Minor; each of them presenting an act of vengeance and a revolting scene of torture.

Venus of Melos. But consolation and atonement for such brutality exist in a statue belonging to the time which has been called, not inaccurately, the "Autumn Days" of Greek art. This is the "Venus" or, better, the "Aphrodite," discovered a century since by a peasant who was digging a well on his own holdings in the island of Milo (Melos). To the critical estimate of this figure, Furtwängler, a high modern authority, devotes much space in his *Masterpieces of Greek Sculpture*. He believes it to date from about 100 B. C.; describing it as the production of an artist who had studied the works of his great predecessors, and who, with a rare selective power, combined their best qualities into a figure of more than human beauty. The critic further observes that, had the "Aphrodite" belonged to the 5th century, she would have been fully draped, like the statues of Phidias; that in the 4th century she would have been wholly nude, like the figures of Praxitelean type; but that by being partially draped, without emphasis upon the texture of the draping material, she evidences a master who lived late in the course of Hellenic art—indeed at the very end of its independent course. Finally, Furtwängler, in assigning her, by reason of pose and countenance, to the victorious Venus type, places her in a long series of variants from a lost original by Scopas. This argument is worthy of consideration, at least, and that the "Venus of Melos" is a "Victory," rather than an "Aphrodite," appears credible. Especially does this seem true if one recalls the silver bronze statue in the museum of Brescia, also a "Victory," which embodies an ineffable virginal charm, and appears to be a younger sister of the "Venus of Melos."

The figure at Brescia is the chief treasure of a small collection of objects of art and archeology, salvaged from the ruins of a temple dedicated to the emperor Vespasian (69–79), who established at this point of Italy a Roman colony on lands taken from a Celtic tribe.

It is regrettable that these statues capable of awakening fervent emotion should not have been the only ones to mark the end of Hellenic sculpture. Yet, they, in their small number, are able to compensate the lover of art for the many decadent and vicious products of their times; while, beyond all doubt, they themselves stood on a level with the masterpieces of the 5th and 4th centuries.

Transition to Rome. This hybrid art, properly called Hellenistic, with its excellences and its great defects, gradually transferred its seat in the Greek world to the single city of Rome, after Corinth had been seized by the consul Mummius, and Greece politically had ceased to be (146 B. C.).

When established in Italy, the Greek art came into contact with the Etruscan, in which Phœnician influences were blended, especially in all that concerns the technique of bronze. In this metal the native artists executed their public statues, such as the dignified "Orator" (preserved in Florence) draped in mantle and tunic, with his right hand and arm raised in exhortation. For family tombs, they employed stone, often placing on the covers of the sarcophagi or coffins figures resting on one elbow, as if they were reclining at a banquet. They also produced in terra cotta much sculpture in relief and in the round, destined to embellish the pediments and the roofs of temples which they built for the Romans, such as that of Jupiter Capitolinus, widely familiar through illustration.

Sculpture under Augustus. As in architecture the Roman style grew out of the union of the Greek with the Etruscan, so from these same elements Roman sculpture developed. The latter, under Augustus (27 B. C.–14 A. D.), became an official art, the object of which, like that of the Egyptian graving, was to glorify the emperor. Consequent upon the utter destruction of Carthage and the fall of Corinth, both of which events occurred at the middle of the 2d century B. C., Rome became the crucible in which all peoples were fused together. The majority of foreigners in the capital were slaves, with among them many literary men and artists, who served their masters devotedly in the hope that some exceptionally successful effort on their part might give them freedom. At the same time, the Roman poets were glorifying, in measures founded upon Greek prosody, the one-man power that had replaced the republican form of government. Therefore, the *Æneid* of Virgil, the *Carmen Sæculare* of Horace, and the Vatican (*Prima Porta*) statue of Augustus in armor intone the same hymn of praise.

This last work betrays what might be termed a *petrified* Greek manner. The figure is of heavy proportions and the pose labored and awkward, if compared with that of Greek masterpieces. Further, the narrative ornament of the armor, although beautifully carved, dulls the effect of the *ensemble* and would have been rejected from the design by Hellenic sensitiveness. Yet the statue is dignified and imposing. It must have afforded an intimate satisfaction to the people for whom it was a symbol. The gesture of the uplifted arm would seem to accompany the lines of the *Æneid*:

> "Remember, O Roman, to rule the nations with thy power! These shall be thine arts: to create the permanent habit of peace, to spare the subdued and to defeat the haughty."

The same spirit appears in the Altar of Peace, erected by Augustus, which is interesting to the art student because of its processions in relief treated in different planes, as are those of the Panathenaic frieze of the Parthenon.

The Arch of Titus. Both artistically and historically however, the sculptured reliefs of the Altar of Peace yield to those of the Arch of Titus, finished in the closing years of the 1st Christian century. In these the imperialistic propaganda is seen at its climax. The sculptures occur in two opposite panels beneath the vault of the archway, and the interest of each composition is strongly centralized with a view to political and moral effect. No spiritual triumph is here chosen for portrayal like the victory of a Greek over a bestial centaur. In its stead there are war, pillage, and desecration. In one panel the emperor stands in his quadriga, attended by Victory. In the other the Romans are bearing away from the altar of the Temple of Jerusalem the sacred seven-branched candlestick. However, from the point of view of technique, these panels contain admirable features. The relief is so treated as to give an impression of space and air. The pulse of the observer is quickened by the implied resistless advance of the horses. But the artist failed in perspective, since, in the one panel, the four aligned animals move at right angles to the emperor's chariot, and in the other composition the soldiers are directed toward the side, rather than to the entrance, of the arch.

The Column of Trajan. In common with these reliefs, the spiral, sculptured bands of the Column of Trajan (98–117 A. D.) offer enlightenment in history, but of a nature quite different from the species presented in the Arch of Titus. Winding like a ribbon about the column (the height of which is 140 feet), scenes illustrating the Roman conquest of the Danubian regions show in detail the landscape, the races of men, the military and domestic customs there existent. In these subjects—and quite correctly—natural proportions have been destroyed and everything, except the figures, reduced to the minimum in size and detail. This treatment, which has been named the "continuous style" and is adapted especially to bronze, has been frequently used in modern times, and most successfully, perhaps, in the Colonne Vendôme, Paris.

Roman Portrait Sculpture. In another branch of sculpture, that of portraits—figures and busts—the Roman artists gained distinction. There remains today a varied series of imperial likenesses, reaching from Julius Cæsar to Constantine and including many of the empresses and favorites, which corroborates written history. No visitor to the galleries of Rome can possibly forget the typical Latin (brachycephalic) head of Augustus, the lustful face of Agrippina the younger, and the swinelike mask of Caracalla.

Symbolic Sculpture. From the works of the decadent Empire of the West, sculpture passed into another phase, the symbolic, consequent upon the new ideals of Christianity, the barbaric invasions of Italy, and the Oriental influences emanating from Constantinople.

In the 8th century, figure sculpture in the round virtually ceased to be practiced, through the decree of the emperor of the East, which forbade the use of images in worship and commanded the destruction of those then adapted to such purposes. This decision was to a greater or less degree opposed by successive popes, but marble and bronze were largely discarded as artistic materials. For these, ivory was substituted, in which plant forms, birds, and monograms, all of symbolic meaning, were carved in relief and most delicately upon sheets or plates of slight thickness. The ivory was afterward applied to a foundation of wood, in order to form chests, chairs, and missal covers, examples of which are still extant in Byzantine centers like Ravenna.

As a result of the controversy between the Eastern and Western churches, thousands of Byzantine craftsmen passed into Italy, where they worked side by side with crude artisans of untamed spirit, as is evident in the Basilica of Saint Mark, Venice. There capitals of almost melon shape with finely undercut netlike ornament may be contrasted with others which issued from the hands of clumsy semi-barbarians. But it is emphatically in the cathedrals of Parma and Modena and in Saint Michael's, Pavia, that Italian Romanesque sculpture, 5th to 11th century, shows itself to be reduced to a system of animal symbolism.

Sculpture Tributary to Architecture. This decline and transformation of sculpture, verging even upon the semblance of death, was but a season, like winter in the natural world, justifying Robert Browning's aphorism, "Decay is richer life." When the year 1000 had passed without bringing the long announced destruction of the world, Christendom

wakened from its lethargy, and churches multiplied throughout western Europe. Architecture, which, as necessary to human existence and to worship, had never ceased its activity, called sculpture to its service. The latter art became, as it were, the qualifying adjective of the former.

In France, where the questions of structure were most deeply studied, a long line of heavily draped, bearded figures, wearing crowns, were deployed across the façades of cathedrals. Again, other figures, with heads projected against great disks which proclaimed them to be saints, were aligned on the sides of monastic cloisters. Architecturally, they served to emphasize the horizontals of the building on which they were seen and so gave the appearance of solidity to the design.

Similar figures, always accompanied by special attributes, such as the picturesque miter and staff of the bishop, followed the moldings (archivolts) of the faces of the arches. These moldings were placed one behind the other (recessed), sometimes to the number of seven, and the arch head itself rested on a great pier, the face of which was thrown back at the same angle and was carved on its upper half with closely set figures. Those of the moldings stood within delicately chiseled shrines, with the whole scheme of ornament obedient to the structural lines; so that, while the first members of the series were upright at the springing of the arch, they inclined inward as the curve contracted, until the upper figures were rendered at an improbable inclination. In the 12th and 13th centuries, sculpture was truly the handmaiden of architecture and virtually without a separate existence. Its function was not purely æsthetic. Through its agency the cathedral front was a pictorial Bible, an open encyclopedia before the age of printing. There were offered the stories of the Creation and the Redemption, the genealogy of the Virgin, the procession of the seasons, the signs of the Zodiac, and, most frequently, above the principal portal, the terrors of the Last Judgment. Sculpture then concurred with the pulpit and the liturgical drama to instruct and direct the illiterate.

Influence of Medieval French Sculpture. In the Latin countries the art struggled to resume its independent position, the attainment of which the student is pleased to follow from the blunted contours of a Romanesque relief to a statue in the round. And, while the first successes were unavoidably obtained by Italians, the Abbey of Saint Trophime, Arles, and the cathedrals of Paris and of Chartres contain most valuable examples of progression.

In the first-named edifice, the figures of ecclesiastics show a flat, blocklike, angular modeling, a Byzantine elaboration of details, a lack of suggestion of skeleton or flesh beneath the drapery, an absolute *stoniness* of rendering. At Chartres, another body of sculptors, as if they had discarded a formula of production, recorded their perceptions of persons and things in a rounder, softer, more detailed modeling of bare forearms, hands, and faces, and in a simpler, more truthful presentation of fabrics and folds. Still more vitality appears in the beautifully calculated statue of the Virgin in the porch of the northern transept of Notre Dame, Paris. Although yet, beyond denial, an adjunct of architecture, this statue marks the renewed independence of sculpture. The figure is no longer perfectly upright, with shoulders level to assure the vertical fall of the drapery: Rather, one knee is slightly bent, one shoulder lowered, and the cloak so disposed as to give on one side a swelling curve, which is finely emphasized by the severity of the architectural support made very assertive on the other. In consonance with the subject, the face of this statue, framed in crown and wimple, expresses a sympathy, a sweetness, and a fortitude that Hellenic sculptors could not give and that would not have been fitting to the countenances of their divinities.

As a whole, the architectural sculpture of medieval France surpassed that of Germany and Spain, and in many cases the first-named country lent its workmen, as well as its inspiration, to its neighbors of the east and of the southwest. But, in the study of the work of the 11th and 12th centuries, too much stress should not be laid upon the imitation of French work by the Germans, since both peoples then derived much of their art from the Neo-Greeks or Byzantines. Later, since the Germans, satisfied with their fine Romanesque, did not themselves develop the Gothic, they accepted from the French, not alone structural principles, but also the ornament which so well harmonized with them. To a certain degree, the same statement is true of Spain. Into that country French influence spread through immigration and through the transference of bodies of Burgundian monks (Cluniacs and Cistercians); so that Spanish Romanesque, as well as Spanish Gothic, reflects in its accompanying sculpture the skill in composition, the dramatic power, and the poetry possessed by the artist masons of France.

Of the Romanesque, the finest Spanish example exists in the portals of the cathedral of Santiago (Saint James) de Compostella (Gallicia), signed by a certain Master Matthew in 1183 and recalling the porches of Chartres and of Vezelay. The subjects portrayed in this great work are the 4 evangelists, the 24 elders of the Revelation, the Tree of Jesse (genealogy of the Christ), scenes from the life of the Savior, and the Last Judgment, all of which were later treated by Gothic and Renaissance sculptors with more delicate but not more expressive chisels. Among Spanish works dating from the 13th century, several portals of the cathedrals of Burgos and Leon show the purest French influence of the period. In the second of the two buildings especially, the figures stand clearly detached one from another, with a considerable intervening space. The anatomy is felt beneath the churchly vestments, but with no suggestion of the swollen abdomen or leg muscles so prominent in German work of the same age, as in the choir of Saint George, Bamberg, Westphalia.

Medieval English Sculpture. Of the architectural sculpture of medieval England we possess less extended and detailed knowledge. Originally less important than in France, partly because of the relatively secluded situation of the monastery-cathedral, it suffered in the 16th century from the bitter dissensions between the historic and the reformed Church and, in the 17th, from the fury of the Puritans. Nevertheless, in spite of wanton destruction, much beautiful material remains at Canterbury, Lincoln, Exeter, and Wells, and at other points of the island. These examples illustrate the exterior use of statues made by the English, as differing from the custom prevailing on the continent, where recessed portals were usual. On the façades just mentioned, the figures are ranged in rows, but not as in the French "gallery of kings" to emphasize horizontal effect. Instead, each is set beneath a hood and in a niche or tabernacle contained between two projecting perpendiculars either rounded or angular. Then, since in a porch composition the rows of figures are superposed, sometimes to the height of four stories, the perpendiculars are continued from base to cornice, and the whole assumes the character of a magnified reredos, or altar back, erected in the open air.

Sculpture Independent in Italy. Thus, to the north of the Alps, sculpture continued to be an accessory art until the end of the first quarter of the 16th century. But, early liberating itself from architecture in Italy, it there progressed continuously, until, while the Valois kings were reigning in France and the Tudor sovereigns in England, it attained spiritual and emotional qualities which it had never before evidenced.

The anatomy of the human figure attracted the early Italians as the inheritors of the classical tradition, but it was not until the end of the 14th century that this branch of instruction was given forth from the University of Bologna. With the revival of

pagan learning, the presentation of the nude became more and more frequent, until the last years of the 15th century, when, through the influence of the Dominican, Savonarola, it received a temporary check, affecting painting only.

Throughout the Renaissance the sculptural nude alternated with draped figures, which were appropriate to certain biblical and historical subjects. Yet, early in the 15th century, in the work of the Sienese, Jacopo della Quercia (1371–1438), the figures of "Adam and Eve" in the nude are much more agreeable to the modern eye than is the same sculptor's archaic Madonna swathed tightly in the twisting folds of her mantle.

Donatello's "David." The next stage of advancement is apparent in the "David" of the Florentine Donatello (1386–1466), the sculptor whose great influence upon modern art has been second only to that of Michelangelo himself. In this bronze statue, the pose is Praxitelean Greek, with the head of Goliath supplying the place of the tree trunk in the "Hermes," the "Faun," and other antique works. But above the hips the figure ceases to be stylistic. The torso, the attenuated arms, and the face are those of a scantily nourished Tuscan peasant; the straw hat and its garland of vine leaves adding the last realistic detail. As a composition, the "David" is disappointing through its lack of unity. On the contrary, it incarnates the working principle of Donatello: "One should labor always with the antique in mind and the living model before the eye." And further, between the beginning of the 6th and the middle of the 15th century, the "David" was the first statue to be executed wholly in the round and free of architectural setting.

Just as painting developed in Italy, so sculpture advanced in a straight, progressive path for more than 200 years—from Niccola Pisano (1206?–78) until the death of Verrocchio (1435–88). Its course—which may be compared to that of an impetuous river ending in a delta—was then deflected and weakened by Michelangelo (1475–1564), whose genius in this one art was immeasurably superior to that of all other Italians of the Renaissance.

Michelangelo. Rising from the virile school of Donatello, Michelangelo first revealed his own genius in the "Pietà," or group representing the Virgin supporting on her knees the dead Christ, which he finished during his first residence in Rome (1496–1501). Open to criticism in the disproportionate size of the two figures and the archaic complication of drapery, this work is yet pathetic and powerful. Further, the rendering of the cadaver evidences accurate, impassioned study, differing from the Greek in being founded upon dissection rather than upon observation.

But this group, while profoundly emotional, is self-explanatory and strictly traditional. The latter comment applies also to the following major work of the young sculptor, the "David," which is a freer, more modern interpretation of the adolescent male than the still rising Italian art had yet been able to produce. To the same period is to be attributed the lost cartoon of the "Battle of Cascina," or "Bathers," which was a purely artistic study of figures in violent action, absolutely statuesque in treatment.

Thus far had Michelangelo been constructive in his art. As he approached maturity, his genius turned aside to enter a new path wherein no sculptor could follow him without loss of mental poise. Struggling with heavy personal griefs, but titanic in power, he expressed himself in the "Moses," the "Slaves," and the "Thinker," and in the "Day" and the "Night."

"Moses".—The first of these statues, which has been alternately ridiculed and ignorantly praised, is not wholly an enigma. As a man of his century, Michelangelo confused classic and Semitic archeology. For the head of the supreme Jewish lawgiver he chose a modified Phidian Zeus, emphasizing the lionlike frontal locks and adding the beard of a Roman river god. The lower drapery of the figure he imitated from the statues of barbarian kings on the Arch of Constantine; while the torso, arms, and hands have immortalized those of some humble man of toil who served as a living model. Such is the genesis of the "Moses," from the point of view of its physical proportions. As to its informing spirit, it sprang from the godlike, travailing brain of Michelangelo in an effort which could not be repeated or imitated by artists of weaker imagination.

"Slaves" and "Thinker".—The element of grotesqueness, undeniably present in the "Moses," is entirely eliminated in the "Slaves" and the "Thinker." In rendering the former figures, Michelangelo forgot all save to make them artistically expressive. Swerving aside the torso, he drew the legs together and bent them forward in order to produce deep shadow and also an effect of struggle quite unwarranted by the slight band which either girdles the body or binds the arms behind it. The "Slaves" mark a new period in the history of sculpture, in which some psychic process is implied in the statue presented. The men of the Renaissance had opened for their own higher necessities new worlds of matter and of thought. To these men the concepts of Michelangelo's maturity made their appeal.

The anguish of spirit so acute and paroxysmal in the "Slaves" relaxes into an absorbing introspection in the "Thinker" of the Tomb of the Medici (new sacristy of Saint Lawrence, Florence), executed by Michelangelo between the years 1523 and 1531. In this statue the meaning of the attitude is instantly clear. The extremities are contracted and drawn inward; the face, lest, if fully visible, it should fail in expression, is partially thrown into shadow by the advanced visor and cast downward, with the index finger of the right hand placed on the lips. Less subtle than the "Slaves," the "Thinker" has received more ample admiration, and has been the object of much resonant oratory. But the presence indwelling in the statue chides idle words with authority and invokes silence.

"Day" and "Night".—The opposite wall of the mortuary chapel serves as a background for the remaining tomb, on the entablature of which are sculptured in reclining poses the figures of "Day" and "Night." These accompany the statue of the "Warrior," symbol of the active life, as "Dawn" and "Twilight" amplify the significance of the "Thinker." The feminine figure, "Night," like all others (if youthful) of its sex created by the same master, can be passed over in silence. The "Day," on the contrary, is rightly criticized by the most uninstructed observer for its faults in anatomy. Together with other details of the entire composition, it was never finished, but its incompleteness fails to account for its departure from all that is normal. Its trunk is so swollen as to dwarf the head and the extremities and to defy the laws of nature. That this challenge was made voluntarily must be admitted, for Michelangelo was the first draftsman and the first artistic anatomist of his time. Therefore, his irrepressible desire to set forth the intense, individual, necessarily secret anguish incident to human life must have overpowered his sculptural vision. It has been suggested that he expanded the seat of the vital organs in order to express a grief too great to be borne by normal man.

Michelangelo's affinities with the Greek poets and philosophers were strong, in common with those of many other Italians of his time, but they lay more deeply and obscurely in his being. His purpose, never for a moment abandoned, was to deprive art of its power to produce sensuous pleasure. As a consequence, he but lightly esteemed painting. He worshiped form as conveying an idea denuded of everything foreign to its nature. By infinite variations of line he expressed differences in thought which make his compositions comparable to the throngs of a populous city. Logically, therefore, he was a solitary man seeking only to incarnate the

crowding concepts of his brain. His energies and his time thus absorbed, he developed no pupils. Nor, had he sought these, could he have formed them, since receptivity for what he offered would have been lacking in those who might have attempted to learn from him.

Influence of Michelangelo. Upon all artists of Latin race who were his immediate successors, Michelangelo's influence was nothing short of baleful. The most talented of them, such as John of Bologna (1530–1608), comprehending at least the former's mastery of the human figure, produced admirable studies of pose and poise, mere physical expressions of the joy of living, like the "Flying Mercury" and the "Rape of the Sabines" (both preserved in Florence). But none of them was moved to interpret a thought, an emotion, or a state of being, purely by line or by the presentment of a specialized muscular condition. In the 17th century, to overemphasize and overelaborate became the chief purpose of Italian sculptors, among whom Bernini holds the first place.

Bernini. He is remembered, above all, for his group of "Apollo and Daphne" in the Villa Nazionale (Borghese) Rome. The sculptor has here treated with great delicacy the myth of the nymph pursued by the god and of her transformation into the laurel tree; making to the impossible occurrence the slightest allusion that is compatible with the universally known tale. And further, his group is clearly a study of line based upon late Hellenic treatment, rather than upon the work of his epoch-making predecessor. It is regrettable that the taste shown by Bernini in the just mentioned group was not one of his stable qualities. In his sacred subjects he was wont to represent, in the heavy substance of marble, clouds and draperies symbolizing the vaporous dwelling places and diaphanous garments of angels. Such inanities multiplied rapidly in Italian sculpture until at the middle of the 18th century it had lost, not only its grandeur, but even its serious qualities.

Renaissance Sculpture in France. In the other continental countries the development of sculpture during the Renaissance was influenced by Italy to a greater or less degree. In France the beautiful Gothic architectural subsidiary figures continued to be created until far into the 16th century, culminating in the work of Ligier Richier (1506–67), whose last piece, a free standing "Entombment" (Church of Saint Stephen, Saint Mihiel, near Verdun), derives almost equally from the French and from the Italian schools, adding a German element in the faces of the personages represented.

Jean Goujon. This truly racial style died, it may be said, by strangulation, and under the so-called Italianate a sculptor of genius appeared in Jean Goujon (about 1515–66), whose still existent works maintain today an almost popular admiration. As court sculptor to Henry II, he collaborated with the celebrated architect, Pierre Lescot, in transforming the feudal castle of Charles V (1364–80) into the palace of the Louvre. Under this commission he executed the four superb "Caryatides" of the tribune in the Hall of the Renaissance, which many critics have regarded as Hellenic in spirit, although in Goujon's time the treasures of the Acropolis at Athens were unknown to the French. It is certain that his knowledge of such figures was derived from the Roman architect Vitruvius, who, in his great treatise, devotes an entire chapter to their proper treatment. But to the antique theory Goujon, in practice, added a flexibility, a fluidity of line, characteristic of his own genius.

Germain Pilon. Among the artists of the French Renaissance, Goujon is numbered with the strict classicists, while his gifted contemporary, Germain Pilon, is reckoned as a descendant of the naturalistic native carvers (*imagiers*). True to his artistic ancestry, the latter sculptor preferred the individual to the type, and excelled in portrait statues. These he executed in bronze for monumental tombs, and, while giving the faces striking resemblance to their originals, in disobedience to the spirit of antique art, he rendered the draperies with a stylistic elegance gained from the Italian masters of his own period. To this division of his work belongs the imposing, kneeling figure of the persecutor of the Huguenots, the "Cardinal René de Birague," which is now in the Louvre, together with his beautiful mortuary piece, known as the "Three Christian Graces" (Virtues). Recalling vividly the Greco-Roman statue, at Naples, called "The Farnese Flora," Pilon's "Graces" are lighter of limb and more suggestive of agile motion. Their draperies are rhythmically disposed, and a contrast to their marble bodies is offered by the bronze casket, balanced on their heads, which was destined to receive the heart of Henry II of France and that of his queen, Catherine de' Medici.

Judged by the characteristics of his work, Pilon is associated in the mind of the student with the architect Philibert Delorme, designer of the palace of the Tuileries, which was destroyed by the Paris Communists of 1871. Consequently, in the third quarter of the 16th century there were two highly distinguished Frenchmen who, had they lived three hundred years later, would have ranged themselves on the side of the Romanticists in the artistic-literary controversy which in 1830 began to divide Paris. Both refused to accept the brilliant generalities of external form which then represented the classic. The architect anticipated modern structure and reached out toward new combinations of materials. The sculptor recognized the claims of individuality as superior to a formula by which an insipid, monotonous beauty, falsely called antique, could be given to all statues.

The Versailles Sculptures. Within the following century, this significant, incipient romanticism was blighted for a season by the political development of France. Art became, as in Imperial Rome, a governmental instrument, the principal use of which was to glorify the ruler. The absolute monarchy expressed itself through all æsthetic mediums, especially during the fifteen years (1670–85) when Mansart, Le Nôtre, and Lebrun were concentrating their efforts at Versailles. The last-named of the three, endowed with surprising versatility, designed much of the ornamental sculpture there required, but the relief of the "Bathing Nymphs" of François Girardon (1628–1715) shows the unmistakable touch of an artist who thought in terms of solids. In this work the gradations of relief, marking the various figures, the rocks, water, and aquatic plants, indicate the study of the Italian *quattrocento*; while the drawing, developed beyond that period, is without exaggeration and has the French realism. The scene is a possible one, yet it is abundantly provided with poetry emanating from sheer line.

Another sculptor of the Versailles group was Antoine Coysevox, the mention of whose attainments cannot be omitted from any history of his art. Born in Lyon, he possessed the vivacity associated with the natives of that city of France, and by his assertive originality he forms a link in the chain of those self-reliant exponents of his art, who have rejected the binding traditions of the French school. He worked in both marble and bronze, modeling portraits in the latter medium with the Florentine spareness suggestive of "plain living and high thinking."

This spirit of analysis and penetration rarely found utterance under the reign of Louis XIV. It was the natural language of the talent of Coysevox, but, as an artist favored at Versailles, he expressed himself admirably in decorative sculpture, as is witnessed by the winged horses mounted by Fame and Mercury, which are now in the gardens of the Tuileries. The same spacious open area also contains the widely known "Horse Tamers" ("*Les Chevaux de Marly*") of Guillaume Coustou (1677–1746), pupil of the previously mentioned sculptor.

These are two spirited groups, each composed of a man and a horse, placed facing each other at the entrance from the Place de la Concorde to the Avenue of the Champs Elysées. The nude youths are so posed that one displays a superbly modeled back with outstretched arms, while the other presents a straining profile, as he grasps the cords of the bit in the mouth of his rearing animal, which is evidently of Spanish breed.

Pierre Puget. In contrast to this official art, polished as the elaborated, balanced prose of the writers of the "great century," the gifted sculptor, Pierre Puget (1622–94), stands alone. Born of humble parentage at Marseille, he became a wood carver of figureheads, and later worked at the actual construction of ships. He appears to have been equally talented in the three arts of form, but his modern reputation rests upon his sculpture, to which a room, bearing his name (*Salle Puget*), is devoted in the museum of the Louvre. Strictly classical in subject, the statues in this collection are rendered in the style of Michelangelo, but with greater exaggeration. Into all his figures Puget infused a certain boastful quality peculiar to the populace of Marseille, and his models would seem to have been chosen from among the sailors frequenting the docks of that city.

True to that type is his "Gallic Hercules" and, above all, his "Milo of Crotona," which represents, according to the legend, an aged athlete of Magna Græcia trying, with his ebbing strength, to rend asunder the trunk of a tree. Having inserted his hand into a yawning crevice, the wood has suddenly closed upon him, and all efforts to free himself prove unavailing. Then, alone in the forest, he is attacked and dismembered by beasts of prey. Skillfully condensing the story into a single attitude, Puget has thrown the head and torso of the man into the pose of one of the "Slaves" of Michelangelo; while the tree trunk and the lion lacerating the thigh of his victim afford necessary support, without confusing the composition. This group, still often reproduced in statuettes, is regarded as the masterpiece of perhaps the greatest French sculptor of his time, who was a realist and did not disdain to flavor his art with the crudities of his region and of his original station in life.

The careers of the three preceding sculptors being ended, their art was continued worthily, to some degree, by their immediate pupils, who resembled them, as in painting Boucher resembled Lebrun. But, as a consequence of social conditions and in common with the other arts, French sculpture declined, until the great Revolution (1789–1800) fanned it into new flame. In truth, the 19th century witnessed in all countries a new departure in the fine arts. But, before considering this general movement, we have briefly to follow the progress of sculpture in Spain, Germany, and the Netherlands, from the end of the middle ages to the first effort of the common people toward "liberty, equality, and fraternity."

Spanish Renaissance Sculpture. As might be inferred, the Spanish sculpture of the Renaissance was submitted to many influences. Elements of the Moorish (*mudejar*) ornament were still strong in the 15th century, when there also developed the plateresque (*plata*, silver) style, resembling metal smithing in precious substances and finely adapted to architecture. Through political and commercial relations, Flemish, Dutch, and German art became most highly esteemed, and much of the fine wood carving of altarpieces, screens, and stalls was executed by foreigners from the North; while marble and alabaster were freely used by the Italians—principally Florentines and Milanese—who worked on altarpieces and tombs at Valencia, Saragossa, Granada, and Seville.

Among the native sculptors, the greatest were those of northern origin, under the primacy of the school of Burgos, which gave three masters to the specialized art of the altarpiece (*retablo*) and the tomb of the sovereign or grandee. The earliest of the three was Gil de Siloa, whose work (1489–99) in the Carthusian monastery at Miraflores (near Burgos) is that of an artist occupying the border line between the Gothic and the Renaissance. An almost contemporary work by Felipe de Borgoña is the very important altar screen in the Cathedral of Burgos, which includes several hundred figures, arranged with perfect clearness; one of the panels—the "Crucifixion"—constituting a superb emotional piece.

The third sculptor, regarded as the greatest of the Spanish Renaissance, Alonso Berruguete (1480–1561), studied at Rome under Michelangelo, and, on his return to Spain, worked in the Italian style, although emphasizing and exaggerating the characteristics of his master. His marble tombs gave him a high rank among his contemporaries, but modern opinion gives preference to his wood carving in the choir stalls of the Cathedral of Toledo.

The influence of Berruguete, spreading from Castile into Aragon, dominated the Iberian peninsula before the end of the 16th century. Late in the 17th, Spanish sculpture was oppressed by the overelaboration introduced from Italy, which, long raging like a virulent pestilence, subsided, to be succeeded by the mannerisms of affected simplicity then prevailing in the art of France.

The German Renaissance. In Germany the liberation of sculpture from architecture was slowly accomplished, but it was attended with many happy intermediate results. Such, for example, is the Tabernacle or Sacrament-House of Adam Krafft (about 1455–1507), in the Church of Saint Lawrence, Nuremberg. If judged too lightly, the classification of this work under the period of the Renaissance would seem to be an error. Yet it came into being during the early youth of Michelangelo, and it must be remembered that the northern development was much slower, the temperament less sanguine, than in the Tuscan and Lombard regions.

Nor was the sculpture of the German Renaissance unmolested in its growth. It was first blighted by the Reformation and then thrown into premature decadence by the Thirty Years' war (1618–48), which began as a religious struggle among the peasants of Bohemia. But during a brief period of bloom the schools of Franconia and of Swabia were fruitful in good works. The former, besides Adam Krafft, produced Veit Stoss (1440?–1533) the wood carver who delighted to represent the Tree of Jesse, as appropriate to the Altar of Mary (Cathedral of Cracow), or to frame the Virgin with the Angel of the Annunciation in a wreath of roses (Church of Saint Lawrence, Nuremberg). And if by the emphasis placed upon these details he, at times, seems to retire to the class of expert craftsmen, just as clearly he elevates himself to the title of sculptor by his treatment of the figure and the face.

Somewhat younger than Stoss, and of much broader artistic vision, was the metal smith, Peter Vischer (1455–1529), whose masterpiece, or that of his school, is the statue of the Celtic King Arthur. This work stands in the Franciscan church at Innsbruck in the Tyrol, and is one of 28 bronze statues surrounding the sarcophagus (vacant) of the Habsburg emperor of Germany, Maximilian, who died in 1519. Of all these figures, "King Arthur" is beyond comparison the finest, and, in technique, it ranks as one of the best ever produced in its substance. In pose, however, it is ungraceful, and, in contrast to the lifelike quality of the magnificent head and torso, the legs suggest museum pieces of armor.

Later in the 16th century the school of Swabia produced masters working in both metal and wood, who showed strong affinities with the earlier Burgundian sculptors of France. Such resemblances are especially evident in the choir stalls of the Cathedral of Ulm and in the splendid oaken busts of the Abbey of Weingarten, one of which presents a workman whose features and expression are those of many northern French peasants of the present day.

The Baroque Style. From this robustness of style and an informing love of nature manifested in the introduction of realistic specimens of fauna and flora, German sculpture declined, to experience, a century later, a period of revived activity. Unhappily, the new movement cannot be described as an awakening. It was rather a nightmare which, sweeping over Europe, destroyed the balance of the artistic mind and gave birth to the malformed, abnormal Baroque. While everywhere pompous and abounding in ill-adapted ornament, this style assumed in Germany a violence which is most displeasing when displayed in the resistant substances of stone and metal. Therefore, the Baroque disfigured the public monuments of the time and blinded to its glaring faults highly gifted artists, such as Andreas Schlüter, sculptor of the monument at Berlin to the "great elector" of Brandenburg (ruler of the nucleus of territory which in 1701 became the kingdom of Prussia).

This unhappy influence exhausted itself after the middle of the 18th century. Its overemphasis was succeeded by a style lacking in masculine qualities, dominating all the arts and derived from France, the country in which, after a few decades, was destined to begin the third great period of sculpture in all history.

Canova and Thorvaldsen. The modern point of departure was not, however, fixed by Frenchmen. The honor of making this definite step belongs almost equally to two men of widely differing nationality. The elder of these, Antonio Canova, born in 1757, was a Northern Italian descended from several generations of fine marble cutters. The younger, of even more humble parentage, was the Dane, Bertel (Albert) Thorvaldsen, born in 1770, and in his boyhood a carver of figureheads in Copenhagen. The former, reared in surroundings favorable to his development, possessed untiring diligence and an unusual capacity for labor. He applied himself persistently to the study of anatomy, which he regarded as "the secret" of his art, as also to that of pose and expression, as they were demonstrated in the theaters which he constantly frequented. At length, formed as a sculptor largely by his absolute reliance upon nature, the young man came to realize the absurdities offered in the work of his older contemporaries and to emphasize in his own a long neglected simplicity. The reinstatement of that quality so accentuated by the 5th and the 4th pre-Christian century Greek and the 15th century Italian masters is now recognized as Canova's contribution to modern sculpture. By a change of taste resulting from political events, as well as from a satiated, cloyed artistic palate, not only Italy, but all cultured Europe, accepted his point of view.

Throughout the range of his works, mythological, heroic, and sepulchral, Canova has best expressed himself in the chaste figure of Psyche, who symbolizes the immaterial part of man. Praxitelean in type and pose, she bends her head over a butterfly, which she balances on her left hand, while she restrains it with her right by pressing together its wings. Many cognate figures he produced either singly or in groups of two or three, as also statues of heroes in combat with animals. By means of his tombs for the popes Clement XIII and XIV and the archduchess Maria Christina of Austria at Vienna and by his portrait bust of Napoleon, Canova widened his reputation and amassed a considerable fortune, the whole of which he expended in gracious and unusual acts of charity.

As one who returned to the stable principles of his art and, at the same time, pointed a new and safe direction for its further development, his name will never be forgotten. But seen through the perspective of a century the greatest of his works appear artificial. The same censure can be applied to those of Thorvaldsen, whose career, in all that concerns honors and recognition, closely paralleled that of Canova. But for the Dane the spirit of the classic was an acquisition, not a heritage; so that his renderings of the Greek pose and balance are often faulty.

On the contrary, his touch is of the lightest and his humor sparkling in his reliefs which relate the pranks of Cupid. His chief monumental work resides in the dignified but lifeless models for a frieze symbolically named the "Triumph of Alexander," which was destined to adorn a hall in the Quirinal palace, on the occasion of a visit to Rome purposed by Napoleon in 1812. He gave also the design for the memorial lion which was afterward cut in the living rock at Lucerne, Switzerland. Finally, he restored, for the king of Bavaria, the Hellenic marbles which were removed from the island of Ægina in 1811, and he erected them in the Glyptothek, at Munich, in a rigid arrangement which has since been greatly improved.

French Realism; Houdon. Thus, through the influence of Canova and Thorvaldsen, sculpture in all Europe had become classical in both subject and treatment. It remained for the French to render it vital and emotional. And it is but just to state that in France the reversion from the Baroque to realism was begun by a sculptor even older than Canova, although the new spirit is evidenced in but one phase of his art.

To illustrate the awakening of marble to life beneath a metal tool, a single example from the works of Jean Antoine Houdon (1741?–1828) will suffice. This is the seated statue of the aged Voltaire (now in the *foyer* of the *Comédie Française*), whose body beneath a loose robe is felt to be almost a skeleton. The legs from the knees to the ankles and the feet flatly posed on the base suggest the heavy slowness of old age. But the hollow chest appears to stir with life; the personalized hands grasp the chair, as if with feverish effort; while the head, although of marble, if compared with those of passing persons, seems more alive than theirs. The play of the facial muscles, the structure of the hands, are technically of such value as to serve as models in the art schools. But this accuracy is their minor excellence. As a study of the controlling, directing mind they are unique. Irrespective of time or country, Houdon's "Voltaire" is one of the greatest of statues.

François Rude. This power to penetrate a soul and then to render it visible was lost after Houdon, until it reappeared late in the 19th century in Auguste Rodin. In the intermediate time, however, several distinguished French sculptors made advances which can never be ignored in the history of their art. The first of these, François Rude (1784–1855), was a modern Scopas, a sculptor of passion, differing from the Greek in presenting emotion in a more objective, concrete form. His masterpiece, the relief of the southeastern pier of the Napoleonic Arch of Triumph, is known as the "Marseillaise" or the "Departure." Judged by its power of expression, it is a collective monosyllable. Within its pyramidal contour there is no single detail contributory to a secondary effect. In line, in light and shade, it vibrates, like the sentiment of patriotism visualized in the figures of three generations of Frenchmen, who are garbed symbolically as Romans, in order the more clearly to announce them as republicans.

Jules Dalou. The careers of Houdon and Rude added immeasurably to the glory of French sculpture, but the natural gifts of these men were such as to awaken despair rather than the spirit of emulation among their immediate successors. The analyzing power of the one, the communicable passion of the other, could never again be possessed. In compensation, Jules Dalou (1838–1902), as a man of the 19th century, made a contribution to his art such as would have been earlier impossible. At first a decorative sculptor in the style of the Renaissance, he abandoned work of this character, to choose his models among men and women of the people. He represented them in their acts of toil and in their working-day garments. From their bodies strained in useful effort, he derived results

more significant to a truly modern eye than the gestures of a Greek athlete or of a hero of romance. Under his plastic hand the ill-fitting clothing of the humble acquired an intensity of meaning, which of late years has been denied to the mantle and the peplos.

Dalou in his figures of peasants and artisans expressed himself purely as a sculptor, as did the Belgian, Constantin Meunier (1831–1905), in his industrial types, the "Stevedore" and the "Smith." But younger Frenchmen with the chisel and mallet began to plead the cause of the proletariat. And how effective is their language one may judge from the paired figures of the group named "Cold" by Roger Bloch in the gallery of the Luxembourg. For, with a power instantaneous in its action, but denied to the writer and even to the painter who deals with optical illusions, the sculptor, with his three dimensions, presents an entire tragedy, requiring no time for its comprehension. The faces, the quivering outline, the very folds and creases of the garments of the figures, express a despair appalling even to witness.

Auguste Rodin. By works such as this, French sculpture reached what may be called a climax of clear statement. But in the last quarter of the 19th century it suddenly advanced to a new phase developed by the art of Auguste Rodin (1840–1917). At the very beginning of the period just named died the greatest of the pupils of Rude, Jean Baptiste Carpeaux (1827–75), who in sculpture paralleled the naturalist painter Courbet, except that his art was less gross. Scorning the smooth surface treatment and the formulas of modeling employed by the French classicists, he delighted to indicate the reaction of the human body to impressions received through the senses. In this one aspect of his art he prepared the way for the genius whose existence was not recognized by French authority until he himself had passed from life.

But Rodin, poor, unschooled, deprived of guiding artistic counsels, developed in his long period of neglect and from sole observation a system of modeling which, in homely terms, he named the "art of the lump and the hole." Translated into conventional speech, these words explain that a muscle, called into action by the brain, expands so as to alter temporarily the outline of the member in which it is placed; also, that, by the act of rising, it causes depression in the adjacent region of tissue. In thus following nature, Rodin proved that he followed the ancient Greek sculptors, the undulating surfaces of whose marble figures Michelangelo, when blind, craved daily to caress with his groping hand. Pursuing this system, Rodin might often be surprised in his studio, circling his clay model, and bombarding it from a distance, after moments of deep study, with handfuls of wet material which he afterward kneaded into proper form.

However, in the formation of an adequate judgment of this sculptor, his surface treatment is a minor, almost negligible element. He was, above all, subjective, as compared with Houdon, Rude, and Carpeaux. And it was this quality that often forced him to neglect what he estimated as "a toe or a curl," but which, in truth, extended to leaving almost undetached from the marble important members of the frame. Rodin was an impressionist. He was satisfied with his work, if it but shadowed forth the concept of his theme. The workings of his spirit are most clearly revealed in his statue of Balzac, which certain critics regard as stirring and majestic, while it has been denounced by others as grotesque, revolting, almost base. Happily the latter opinion is passing, as the interest in psychology increases. A thinker may see in the statue the wraith, the disembodied spirit of the man who, throughout his life, wrestled with his own genius for expression and with the world for a bare subsistence. The sensual mouth is eloquent of the mortal struggle; the pose is that of a figure moving forward as if hypnotically controlled; the robe is without definite form, wholly concealing the form beneath it and, with a few long spiral folds, guiding the eye of the observer to the tragic countenance above. The genius of Rodin has fixed in this, its own creation, some reflection of the soul of Balzac, as the modern telephone reacts to the individual voice. Such impressionism is phenomenal. Its recurrence is not to be desired in sculpture, whose terms are too definite to be affronted save in exceptional instances. Therefore, in spite of Rodin, the traditional French school has continued for 40 years to develop as a hardy growth, which has nourished to an adult, independent state of existence our North American art.

Early American Sculpture. The first native sculptors worthy of their profession in the United States were Horatio Greenough (1805–52), Hiram Powers (1805–73), and Thomas Crawford (1814–57), all of whom studied long in Rome under the influence of the already dead Canova and the still living Thorvaldsen. Like their masters, these Americans were the authors of very numerous figures which now appear to the casual frequenter of our museums as dull, rhetorical studies of classical or of sacred subjects. Youth avoids them as it does the minutely printed footnotes of a textbook.

Following the strict conservatives came Thomas Ball, born in 1819, who, at the age of 35, transferred his residence to Florence, but still devoted himself to patriotic subjects. He was the author of the equestrian statue of Washington in the Public Gardens, Boston, the "Daniel Webster," in New York, and the "Emancipation Group" in Washington, all of which are well studied and dignified, although not great productions. A contemporary of Ball, and like him of long residence in Italy, was William Wetmore Story (1819–95), a classicist in art, a lawyer by education, and gifted as a writer of prose and verse. His art is scarcely fresher than that of the first American sculptors, and the same reproach of dryness can be extended to the ideal subjects of William Henry Rinehart of Baltimore (1825–74), whose reputation as a monumental sculptor is heightened by his seated statue of the much revered Chief Justice Taney (Annapolis and Baltimore). Finally, within this group may be mentioned Harriet Hosmer (1830–1908), whose graceful talent brought forth the "Will-of-the-Wisp" (Boston Museum of Fine Arts) and its companion piece "Puck."

American Memorial Sculpture. The work of the American classicists, necessarily imitative and therefore weak to some degree, was yet thoroughly refined. These sculptors were followed, as a consequence of the Civil War (1861–65), by a generation of commercial makers of monuments, whose commissions were obtained largely through political favor. But this censure cannot be applied to all the patriotic memorials erected in the decade 1865–75. For even apart from several undeniable masterpieces among those of later production, a number of the earlier ones witness the excellent training, as well as the talent, of their designers.

So to be distinguished are the figures of military and naval heroes by Launt Thompson (1833–94), an Irishman by birth, but American by the artistic education which he received almost equally in the office of a doctor of medicine and the studio of the sculptor Erastus Palmer, at Albany, New York. Another Irishman, Martin Milmore (1844–83), a pupil of Thomas Ball, was the author of the Soldiers' and Sailors' monument, standing on the declivity of Beacon Hill, Boston Common. Admirably proportioned and of a design understood at a first glance, it has served, since its erection in 1874, as a model for most frequent imitation. And in this capacity it has been no less unfortunate than its not too distant neighbor, Trinity church, whose marked and noble individuality so quickly produced throughout the United States that regrettable vegetation having "no root of earth," the "Richardson Romanesque."

Although of slightly earlier birth than either Thompson or Milmore, John Quincy Adams Ward (1830–1910) belonged to the same group of monumental sculptors. Less talented, perhaps, than the Irishmen, this native American, who received no foreign training, attained technical excellence, as is shown in the draped body of his Washington, erected on the steps of the Subtreasury, New York City, and in his treatment of the nude in his "Good Samaritan" (monument commemorative of the discovery of ether as an anesthetic) of the Public Garden, Boston. He was a sculptor of simple lines and quiet gesture. Like his chief instructor, Henry Kirke Brown (1814–86), he must be numbered within the older school, but also like the former, he was among the best progressives of his time.

Augustus Saint-Gaudens. With the Centennial exposition at Philadelphia in 1876 new æsthetic influences reached us. In sculpture, France was discovered to be the leading force, and thereafter American youth gifted for that art turned to her. Then succeeded in our country a generation of sculptors, numbers of whom produced works of great distinction, while one, at least, has taken rank with the geniuses who belong to the world, rather than to any segregated portion of it. This exceptional man was Augustus Saint-Gaudens (1848–1907), who, born in Dublin of French-Irish parentage, was brought to the United States in infancy and at thirteen apprenticed to a cameo cutter. For six years he followed the minor art, throughout the period receiving evening instruction in drawing. At twenty he entered the Ecole des Beaux-Arts, Paris, and submitted for three years to the hard, practical, persistent work there demanded of students. The Franco-Prussian war of 1870-71 was responsible for ending his residence in Paris, and after another three years of study and labor in Rome he returned to New York, there to enter upon his remarkable career. His fame rests principally upon three monumental works, the first of which advanced him to the first place in American sculpture.

This piece is the "Admiral Farragut" of Madison square, New York City: a single statue standing on a high plinth which is itself the center of an exedra or widely extended seat. Rectangular, strongly accented, harmonious, and in effect tranquilizing, the composition by these qualities recalls the Parthenon; while the study of the figure does honor to the French training of the sculptor, and the delicate low reliefs, although of modern line, are founded upon study of 15th century Italian ornament.

For the fine architectural mass of this monument Saint-Gaudens was much indebted to the designer of the exedra, one of the most talented of American architects, the late Stanford White. With the latter, the sculptor also collaborated to the same degree in his great "Lincoln" in Lincoln park, Chicago, which has been too widely and authoritatively discussed to require further comment, as is true of the "Shaw Memorial" under the old elms of Beacon street, Boston. But the monument to General Sherman, Central park, New York City, cannot be so dismissed. In this work the concurrence of the elements—so different one from another—is marvelous. There is a single direction of line. The Victory, the man, and his mount appear to be drawn forward by a Divine, irresistible force, and the mere observer of their action wishes to follow them.

Daniel Chester French. The second place in American sculpture of the third or present period belongs without question to Daniel Chester French, a New Englander of the strong, original type. His matured art, broad, simple and serene, less profound, less ecstatic than that of Saint-Gaudens, has rendered him the most widely appreciated sculptor of our national school. Like the French master, Rodin, he has been largely self-taught, not however because of poverty, but consequent upon the somewhat late manifestation of his talent and the lack of adequate art instruction in even the most cultured portions of the United States a half century ago. For the latter reason, his early works may be passed in silence and left to play an important part in the elevation of children to ideals of patriotism. But the statues and reliefs produced in the fullness of his powers have in them a heroic or a humanitarian quality that removes one who contemplates them from the actual world of contention and bolshevism. Moreover they show the technical education of the sculptor to have been based upon sound principles and unerring taste.

To this class belong the "Gallaudet Group" in Washington, which is a monument to the French doctor who devoted his life to bettering and making happier the existence of deaf-mutes. This work for the many is but a tribute to humane service. For the more thoughtful minority it is a suggestion, both strong and subtle, of psychic control, reflected in the countenance and the pose of the man who is seeking to bring to birth the struggling powers of the undeveloped child. The response equals the appeal. The face of the little girl is inspired with effort and expectation; while her forearm and her hand, the latter clenched to form a letter, reach a climax of expression.

Pathos of a more lyric quality resides in the design of Mr. French for the memorial to Martin Milmore, known as "Death Staying the Hand of the Sculptor." Its characteristics are strength of line, breadth of surface treatment, and, as a resultant, exquisite play of light and shade. It is worthy of the Hellenic art of the 4th century B. C., but, unlike that art, it has no flavor of decadence. Restraint is present in every element of the composition and the faces are left uncertain. That of "the sculptor" is turned in profile; while that of the majestic, yet gracious "Death" is darkened by overhanging drapery, like the head of the "Niobid" of Scopas and the brow of Saint-Gaudens's "Grief."

Frederick MacMonnies. While the two men just discussed are as yet the greatest of American sculptors, several others of native birth and Parisian training are but secondary to their distinction. Such is Frederick MacMonnies, the master of bronze technique, as seen in his figure of "Nathan Hale," in the City Hall park, New York, and the "Bacchante" of the Metropolitan Museum. Masterpieces of pose they both are, and, in this essential of sculpture, the first-named would appear to have no prototype. The youthful patriot is presented as bound, at the arms and ankles, for execution, yet the constrained attitude is aristocratic and even graceful; while the slightly drawn facial muscles offer the most delicate suggestion of torture. The statue is the performance of a virtuoso.

Far less original than the "Nathan Hale," the "Bacchante" is a brilliant study of line, tension, and balance. And, as the former statue has the refinement of certain phases of French art, this exuberant figure recalls the bronzes of Pompeii, but above all the female form in John of Bologna's "Rape of the Sabines." As a display of sculptural knowledge and skill, the "Bacchante" does singular honor to its author, who received no censure from the council that declined to place it in the interior court of the Boston Public Library. In that gravely cloistered atmosphere it would have struck a note of joy too acute and shrill.

George Barnard. In contrast to MacMonnies, American sculpture possesses in George Barnard an artist akin in spirit to Rodin. This relationship is expressed in the varied treatment of marble aiming at a wide range of effects, as when the more distant members of a figure in relief or portions of a drapery or of some other accessory are left in the rough or even are barely indicated. But, beyond this material resemblance of Barnard to Rodin, a more subtle, intangible likeness exists between the "Count Ugolino" of the French sculptor and "The Two Natures" of the American. In these allied pieces there is the same tragic presentment of triumphant animal instinct,

coupled with what, at a first glance (but only apparently), is a defiance of the artistic laws of balance and symmetry. In another figure of his youthful years, "The Hewer" (1902), Mr. Barnard suggests a Hellenistic combatant, like the "Fighting Persian," who might have been transformed into a modern toiler by the touch of a Dalou. Yet the conception itself has nothing of the reasoned submission to racking labor which, but yesterday, was characteristic of Europe. It breathes out the freedom of wide spaces and of liberty belonging to a new world.

Lorado Taft. In contrast with the militant, struggling figures of Barnard, Lorado Taft, a sculptor of the Middle West, has expressed in several groups and single figures and in hopeful, joyous terms the spirit of his native region. Among such groups the one named "The Great Lakes" is the most widely familiar. But the talent of Taft is not restricted to idyllic subjects, as he has shown in his colossal statue in concrete of the Indian "Black Hawk."

For his accomplishments as a sculptor, Taft was honored in 1911 with full membership in the National Academy of Design. Furthermore, his standing as both artist and man has raised him to the directorship of the transformation into a superb boulevard of the Midway Plaisance at Chicago, one of the greatest of modern schemes for municipal embellishment.

A notable contribution toward the fulfillment of this ambitious plan was the erection on the Midway of this sculptor's own monumental "Fountain of Time," with its imposing procession of colossal figures.

Paul Wayland Bartlett. The subjective and the abstract in sculpture give place to the objective in the work of Paul Wayland Bartlett, who has been able with vital force to recreate historical personages in his "Lafayette," his "Columbus," and his "Michelangelo." A master of bronze technique and faithful to the 15th century traditions of his art, he has added to these his own modern power of psychical research. Especially typical is the third of the above-mentioned figures. For, from the resistant metal, simulating the misshapen frame and the sordid, outworn garments of the gloomy, solitary Italian genius, the sculptor has sent forth the familiar, almost audible plaint: "I live meanly, nor do I care for the life or the honors of this world."

Herbert Adams. In characterization lies also the strength of Herbert Adams, whose best works are portrait busts of women interpreted with intimate yet reverent sympathy. Of these pieces, the most noted and one of the earliest (1890?) is the bust of Miss Pond, who afterward married the sculptor. The portrait, it would seem, was called into being under the control of Houdon and of Rodin, yet the marble has plasticity and tonal effects that are all its own. The bony structure of the delicate neck and face appears to be covered with yielding, elastic flesh, and the eyes illuminated with the life of the spirit. The whole has the rarefied, ineffable charm attaching to the elect of New England girls.

Cyrus E. Dallin. A strong contrast to these busts and reliefs, with their delicate aroma of tradition, resides in the American Indian types of Cyrus E. Dallin, easily the best among our sculptors who have devoted themselves to the portrayal of the Red race. Born in 1861, in the Far West, he grew to adolescence among the primitive people whose life, both material and psychical, he has reflected in "The Medicine Man," "The Scout," "The Hunter," and, most clearly, perhaps, in the "Appeal to the Great Spirit." In this equestrian statue the rider and the horse show equally the sound technical training received by the artist from Parisian studios. The lithe anatomy of the Indian, the structure of his head, and his manner of bestriding his mount instantly awaken admiration. On the other hand, the location of the work is deplorable. It has been placed before the entrance of the Boston Museum of Fine Arts, although its subject and treatment demand the environment of a spacious park, such as is enjoyed by its companion piece, "The Medicine Man," in Philadelphia.

The Borglums. Devoted also to the delineation of aboriginal American types, but episodical in choice of subject, the younger (Solon) of the two Danish brothers Borglum has opened to his admirers a romantic life of perilous adventure. His earlier works portray scenes of frenzied movement, such as the "Stampede of Wild Horses"; while his later productions, "Burial on the Plains" and the "Last Roundup," show the sympathy of a Virgil or a Saint Francis with primitive man and Nature.

The elder of these brothers, Gutzon Borglum, through long study in France, has learned to drape his thought with impressionism. In common with the French master Rodin, he presents to the student a concept of his subject, rather than a counterfeit of its semblance. Unconscious of imitation, he has, in the opinion of an authoritative critic, approached Rodin's "Burghers of Calais" in his Apostles for the Cathedral of Saint John the Divine, New York City.

Anna Vaughn Hyatt. In pure animal sculpture, a number of contemporary Americans have excelled, in several instances beginning their careers in this branch of their art, later to develop into students of the human figure. Among such is Anna Vaughn Hyatt, whose finely studied descending "Panther" and "Butting Goats" were but a technical prelude to her "Joan of Arc," which invites comparison with the equestrian types of the great modern Frenchmen, especially with the statue by Frémiet, best known of all these from its commanding position in Paris. In the latter the face and pose of the Maid are consistent with her condition as a peasant; while the horse, regarded as one of the finest in the whole history of sculpture, is specialized as of historic French breed. In Miss Hyatt's work, the figure is more slender, lithe, and tense, and the highly intellectual face is seen to be obedient to a heavenly vision. Again, the control of the horse by the rider is admirable and the union between them complete. Finally, the animal anatomy is rendered with a masterly, virile hand, and the head, excepting the mane, is conventionalized after the Greek manner of Phidias.

Malvina Hoffman. Another American woman of great talent, Malvina Hoffman, has been signally honored in the acceptance of her group, "The Russian Bacchanale," as a gift from a wealthy amateur for the garden of the Luxembourg, Paris. The two figures of the composition are intended to perpetuate the impression made by Pavlowa and Mordkin, as they entered upon their interpretation of the dance which, in the infancy of civilization, fixed the basis of the Greek drama. The modeling of the figures, with its undulating surfaces and the consequent elusive play of light and shade, reveals instantly the influence of Rodin. The clear, bold, balanced composition proves the studies of the sculptor to have been exceptionally thorough and broad. The faun and the nymph sing, in mass and line, a lyric ode.

Other than Miss Hyatt and Miss Hoffman, at least twenty women sculptors, through their ideal figures and their decorative designs, deserve extended mention in the history of American art. But no survey of contemporary American sculpture can exclude mention of Paul Manship (1885–) who, as yet, has won distinction largely through his vital interpretations of primitive Hellenic art. In these he reveals the modern spirit which has brought forth post-impressionism, cubism, and futurism. At the same time, he resists all temptations toward the exaggerations and incoherence of those deplorable movements. Certain similarities, also, mark him as kindred to the patriotic Jugoslavic sculptor Meštrović, although the latter is a close follower of his own master Rodin along all the paths of impressionism. Again, while Meštrović is brutal, Manship evinces delicacy and purity. And in him many center their hopes as the successor of Saint-Gaudens, chief of the American school.

ART TERMS AND SUBJECTS

THE material in this section comprises a dictionary of the more frequently used terms belonging to the arts of painting, architecture, and sculpture, together with a reference list of noted works in these arts. The general discussions in the preceding sections are thus supplemented by more explicit definitions of the terms which are there used, and by brief descriptions of many masterpieces in addition to those works treated in the longer articles.

Each paragraph devoted to a painting or to a piece of sculpture contains the name of the artist, the collection or the locality in which the work is to be found, and a brief characterization of the subject. The list represents the great schools of art and the principal art galleries of the world. It is especially valuable because it includes a large number of the masterpieces, of both American and foreign artists, that are accessible in the numerous excellent and growing American galleries and museums of art.

Abacus (*ăb'ă-kŭs*). A tablet placed horizontally upon the capital of a column. By increasing the upper surface of the capital, it enables the column to afford better support to the architrave.

Abigail Meeting David with Presents. Rubens; Museum of Art, Detroit, Mich. A picture which tells vividly the biblical story, with an oriental richness of costumes and coloring.

Abutment. A solid piece of masonry used to support a body which has a tendency to thrust outward. Examples of the abutment are the solid pier, against which an arch of a building abuts, and, in bridge construction, the supports which connect the bridge with the river bank.

Accessories. Theoretically speaking, the accessories of a picture are all those details which are necessary for the realization of a scene, but which at the same time play a secondary part in the composition. In a portrait, for example, the drapery, the furniture, and the ground on which the subject is represented are accessories.

Acropolis (*ă-krŏp'ō-lĭs*). The name applied to the citadel in ancient Greek towns. The most famous acropolis is that of Athens, on which stood the Parthenon, the Erechtheum, the Propylæa, and the temple of Nike Apteros.

Adobe (*ă-dō'bē*). Sun-dried bricks, such as are in use in Egypt and in other countries of warm and dry climate. The use of such bricks was introduced into Spain from Africa. In Mexico and in the southwestern United States, the name is applied both to the bricks and to the clay from which they are made, as well as to structures composed of these materials.

Adoration of the Kings. Quentin Massys; Metropolitan Museum, New York City. The Madonna, holding the Child Jesus, is on the left. One king kneels; the other two, bearing jeweled vessels, stand behind him.

Age of Innocence, The. Sir Joshua Reynolds; National Gallery, London. A charming picture of a child, by one of the greatest of portrait painters.

Alhambra, The. A fortified Moorish palace on a hill near Granada, Spain. Built in the 13th and 14th centuries. The structure is notable for its elaborate architectural decoration, which is chiefly of wood and plaster rather than of more durable materials.

Alice. William M. Chase; Art Institute, Chicago, Ill. Portrait of a young girl, remarkable in treatment of figure and in technique.

Alice Freeman Palmer Memorial. Daniel Chester French; Wellesley College chapel, Wellesley, Mass. A marble relief representing a mature woman, the college, sending forth with her benediction a younger woman, the student. The student bears a lamp, lighted at the altar in the foreground.

All's Well. Winslow Homer; Museum of Fine Arts, Boston, Mass. A sailor, the lookout, stands beside the ship's bell, calling his signal.

Amicitia. Charles Keck; Rio de Janeiro, Brazil. A statue surmounting a monument; the entire memorial being a gift of the United States to the people of Brazil on the first centennial of Brazilian independence.

Anatomy Lesson, The. Rembrandt van Rijn; Royal Museum, The Hague. Dr. Tulp is explaining the action of muscles and tendons in the human arm. This picture, painted in 1632, brilliantly marks the close of the first of the three periods constituting the artist's career.

Anchor. In religious art, the anchor is employed as the symbol of hope.

Angel Heads. Sir Joshua Reynolds; National Gallery, London. A group of five lovely faces, studies of one little child, Frances Gordon.

Angels. In devotional art, angels are represented with the following characteristics: They are human in form, winged, always young, of the male sex, and generally draped in white. They are the messengers of God, the rulers of the stars and the elements, the guardians of the just, and the choristers of heaven. In this last function, they are frequently represented with various musical instruments.

Angelus, The. Jean François Millet; the Louvre, Paris. The peasant man and woman pause in their work in the field and stand with bowed heads, while a church bell rings in memory of the greeting of the Angel Gabriel to Mary, announcing the birth of the Savior. This picture has been criticized for its suggestion of sound.

Annunciation, The. A favorite subject in early Italian art, a widely known example of which is the mural painting by Fra Angelico (1387–1455), in the Museum San Marco, Florence. At the right of the picture kneels the Virgin and at the left stands the angel, facing her; both figures being set against the background of an arcade most interesting to the student of the history of architecture.

Antique (substantive and adjective). This term was originally applied to Greek and Roman works of art, such as statues, bas-reliefs, engraved gems, and medals. By extension of sense it now includes all objects of æsthetic value having the minimum age of a century.

Apollo Belvedere. A marble copy of a probable bronze original, now in the Museum of the Vatican, Rome. The statue bears the marks of the latest, or Hellenistic, period of Greek art. It was found in 1455, at Frascati, near Rome, among the ruins of an ancient villa. It is named from its present location in the *belvedere* (open-gallery, literally, "fair view") of the architect Bramante (1444–1514). It is the most famous of all Apollo statues and represents the god in successful conflict with a python or dragon. Reduced to a symbol, it signifies the sun triumphing over pestilence.

Appliqué (*ă'plē'kā'*). A general designation for ornament which is let into or fixed upon the surfaces of objects. For example, a wood panel may be thus treated with *appliqués* of bronze.

Apse (*ăps*). The semicircular or polygonal projection of the end of a church, behind the choir. In Roman Catholic architecture, when the long axis of the church extends from west to east, the apse is at the eastern end.

Arabesque (*ăr'ă-bĕsk'*). Ornament in which garlands of foliage and realistic or fantastic figures are combined in a capricious style, delicately interlaced and describing graceful curves. Arabesques are painted, inlaid, or carved in low relief.

Arch. Fundamentally, an arch is a structural device for spanning an opening and supporting an overlying wall by means of a number of wedge-shaped units arranged in a curve convex upward. The name is extended to any structure or ornament having the form and appearance of an arch.

Architrave (*ăr'kĭ-trāv*). In classical architecture, the architrave is the lowest of the three divisions of the entablature, that portion which rests directly upon the capitals of the columns. The name is applied also to the moldings around a doorway, especially if the opening is rectangular in form.

Ashlar (*ăsh'lẽr*). The name applied to stones hewn and squared for use in buildings, in distinction from rough, undressed stones.

At the Shrine of Venus. Alma-Tadema; Mendelssohn collection, Berlin. An excellent example of the artist's ability to paint marble, silk, and other beautiful materials.

Attic. That part of the entablature of a building above the cornice. Its purpose is to hide the roof and thus add dignity to the design.

Aureole (*ô'rē-ōl*). This word, derived from the Latin (*corolla*) *aureola*, "golden crown," refers to the luminous golden circles placed by painters about the heads or figures of deities in order to indicate their divinity. It was so used by Egyptian and Greek painters. Christian artists extended its use to indicate also the glory of angels and saints.

Aurora. Guido Reni; Rospigliosi Palace, Rome. Painted on the ceiling of the garden-house of the palace in 1609, this famous picture represents Aurora, goddess of dawn, preceding the advancing chariot of the sun god. The hours, as nymphs, accompany the chariot.

Autumn. Anton Mauve; Metropolitan Museum, New York City. A flock of sheep are being driven along a road over brown moors.

Autumn Oaks. George Inness; Metropolitan Museum, New York City. A group of oaks in red, brown, and yellow foliage; cattle in the foreground.

Avenue of Middelharnis. Meindert Hobbema; National Gallery, London. A roadway, bordered by tall trees, leading from the foreground into the distant background of flat country.

Aviator, The. Charles Keck; Charlottesville, Va. A sculptural work erected at the University of Virginia in 1919, the gift of Paul G. McIntyre.

Baby Stuart. Detail of the picture of the three children of Charles I of England by Antoon Van Dyck, in the Royal Gallery, Turin. The portrait here indicated is that of the child who became James II and was copied from the original by the Italian painter Canevari.

Bacchantes (*bă-kăn'tēz*). The female worshipers of Bacchus, the wine god, and equivalent to the mænads of Greek mythology. They were popular subjects in every branch of ancient art.

Background. The term applied in painting to the portion of space in a picture which is so rendered as to appear to be farther from the spectator than the principal object or group of objects in the composition.

Baldachin (*băl'dă-kĭn*). A structure in the form of a richly ornamented canopy, supported by columns, suspended from the roof, or projecting from the wall of a building,—for example, above an altar.

Bambino (*băm-bē'nō*). Italian word for "child." In art, this name is given to representations of the Infant Christ wrapped in swaddling clothes and bound by ligatures, according to the custom prevailing in southern Europe.

Baptistery (*băp'tĭs-tĕr-ĭ*). A circular or polygonal building anciently placed near the basilica, or church, and used for the performance of the rite of baptism. Among separate buildings serving as baptisteries that at Florence must be placed first. It is celebrated for its bronze gates designed by Andrea Pisano and Ghiberti.

Baroque (*bă-rōk'*). A term applied in architecture to grotesque or whimsical ornamentation.

Basilica (*bă-sĭl'ĭ-kă*). The name, among the early Greeks, for a royal palace. Later it designated a court of law and place of assembly. It was a large oblong building with double colonnades and a semicircular apse at the end. Buildings of this type were frequently consecrated for religious uses by Christian emperors of Rome, so that Christian churches were often called basilicas.

Bas-Relief (*bä'rê-lēf'*; *bäs'rê-lēf'*). See *Low Relief*.

Bayeux (*bä'yû'*) **Tapestry.** A roll of canvas over 70 yards long and more than half a yard wide on which is embroidered a representation of the conquest of England by the Normans. It is in the public library of Bayeux, Normandy, France. Tradition ascribes it to Matilda, the queen of William the Conqueror. She is said to have presented it to the cathedral of Bayeux.

Beaching the Boat. Sorolla y Bastida; Metropolitan Museum, New York City. A group of brown oxen standing in the white surf. A sailboat in bright sunlight is in the background.

Bismarck. Franz von Lenbach. In the painter's studio, Munich. A famous portrait that reveals the very character of the "Iron Chancellor."

Black. In medieval art, black symbolized darkness, death, mourning, evil, falsehood, and despair. In heraldry, black is termed sable.

Black Hawk. Lorado Taft; near Oregon, Ill. A heroic statue of the famous Indian chief, Black Hawk.

Blue. In the symbolism of early Christian art, blue, as suggesting the sky, represents heaven and eternity, as well as piety and faith. It is commonly the color used by painters for the Virgin's mantle, her tunic or underrobe being red.

Blue Boy, The. Gainsborough; W. E. Huntington estate, Pasadena, Cal. This picture of a youth in blue satin is said to have been painted to disprove Reynolds' opinion that the predominance of blue in a picture is incompatible with good color effect. It was purchased from the duke of Westminster, London, in 1921, for about $650,000 by W. E. Huntington.

Bolivar. Sally James Farnham; New York City. A statue of the great South American liberator, a gift from the government and people of Venezuela.

Boston Public Library. Boston, Mass. Architects: McKim, Mead and White. A granite structure in the Italian Renaissance style, inspired by the Library of Sainte Geneviève, Paris, and built around a central court. The interior is richly decorated with colored marbles, with statues, and with mural paintings by Abbey, Sargent, Puvis de Chavannes, and John Elliott.

Boyhood of Lincoln, The. Eastman Johnson; University of Michigan, Ann Arbor, Mich. The boy Lincoln, seated on a rude stool, is reading by firelight.

Boyhood of Raleigh, The. Sir John E. Millais; Tate Gallery, London. Two lads, Raleigh and a companion, seated by the sea, listen with rapt attention to a sailor's story.

Breaking Wave, The. Winslow Homer; Worcester Art Museum, Worcester, Mass. An excellent example of this painter's power to interpret the moods of the sea.

Bringing Home the Calf. Jean François Millet; Art Institute, Chicago, Ill. Two men are entering a farm gate, carrying a newborn calf on a litter, followed closely by the mother.

Bronze. Antique bronzes are works of art of the highest value. Whatever be their form or their dimensions, they invariably give evidence of extraordinary science and widely extended practical knowledge. After them must be noted the bronzes of the 12th and 13th centuries, as well as those of Florentine artists of the 14th century, such as Ghiberti and Donatello, who produced absolute masterpieces. In the time of Louis XIV (1643–1715), immense vases, such as those in the garden at Versailles, were cast in bronze; while the best examples of the art during the last two centuries are equestrian statuettes and Chinese and Japanese bronzes, in which the arts of founding and chiseling the metal have reached their highest limit.

Buhl (*bōōl*). A kind of furniture which was invented and made by André Charles Boulle, or Buhl (1642–1732), cabinetmaker to the court of Louis XIV. It is richly inlaid with gold, copper, and tortoise shell, under the last named of which a crimson fabric is often placed.

Bunker Hill Monument. Charlestown, Mass. Memorial on the site where General Warren fell in the battle of Bunker Hill. It is a plain granite shaft, 220 feet high and 31 feet square at the base. The corner stone was laid by Lafayette in 1825, and the monument was completed in 1843.

By the River. Henri Lerolle; Museum of Fine Arts, Boston, Mass. A stream in the background; in the foreground, two women walking along a path.

Calvary. A cross of stone or iron, generally richly decorated and sometimes raised upon a platform which is reached by steps. Some calvaries, especially those of Brittany, are ambitious monuments supported by arcades and surmounted by numerous statues. The term is applied also to pictures representing the scenes of the Passion.

Cameo. A gem upon which a figure or an ornament is cut in relief.

Campanile (*kăm'pă-nē'lā*). A bell tower. As built in Italy, the campanile is usually placed near a church but not actually attached to it. The most famous example of this type is the campanile built by Giotto in Florence. The term is applied also to certain lofty towers which form parts of buildings. In America, conspicuous examples of the campanile are found in the new Old South Church, Boston, at Cornell university, at the Iowa State college, and at the University of California.

Capital. The head, or crown, placed at the summit of a column, pillar, or pilaster, and usually ornamented with various projecting moldings. As an architectural member, the capital immediately supports the entablature.

Capital, Composite. A combination of the acanthus ornament of the Corinthian capital with volutes or scroll-like patterns closely resembling those of the Ionic capital, with the difference that the four sides of the composite capital are absolutely symmetrical. The composite capital occurs in typical form on the Arch of Titus, Rome, erected toward the end of the 1st Christian century.

Capital, Corinthian. The characteristic of the Corinthian capital is the pattern of rows of acanthus leaves placed one upon the other, with volutes above them, one at each corner, supporting the projecting abacus. The Corinthian is the richest of the pure orders of architecture. The Greek type was produced in the 4th century B. C., and was later much simplified in the Tower of the Winds (100 B. C.), Athens. In this second form, it often appears in modern concrete buildings. The Roman type is of looser composition than the Greek. It reached its finest form in the Temples of Castor and of Mars Ultor erected in the Roman Forum during the 1st Christian century.

Capital, Doric. The Greek Doric capital is the simplest of the classical orders. It consists of an *abacus*, or block, an *echinus*, a swelling, bowl-shaped member, and *annulets*, or rings, just above the neck of the shaft.

Capital, Ionic. This capital is characterized by spiral volutes placed immediately underneath the abacus.

Capitol, The. Washington, D. C. An imposing building of mingled classic and Renaissance design. Fronting the east, it stands on an eminence, 97 feet above the Potomac



AMERICAN SCULPTURE

Abraham Lincoln, by Augustus Saint-Gaudens
Photo, copyright by A. W. Elson & Co.

Alice Freeman Palmer Memorial, by Daniel Chester French
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Black Hawk, by Lorado Taft

The Fountain of Time, by Lorado Taft













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MUSEUMS OF ART AND SCIENCE

1 Corcoran Art Gallery, Washington. 2 Memorial Museum, San Francisco. 3 Field Museum of Natural History, Chicago. 4 Museum of Fine Arts, Boston. 5 State Art Museum, Santa Fe, New Mexico. 6 Metropolitan Museum of Art, New York City.

River level. The entire length of the building is 751 feet, 4 inches; the width, 350 feet. The colossal statue of Freedom, surmounting the lantern which crowns the dome, rises 307½ feet above the ground level.

The central structure is of Virginia sandstone, painted white; the extensions are of Massachusetts marble. A hundred and twenty-four Corinthian columns, the shaft of each a monolith 30 feet high, adorn the porticoes of the fronts and ends of the building.

The corner stone of the central building was laid by President Washington, September 18, 1793. The wings, completed in 1811, were partially burned by the British in 1814. In 1827, the entire central building was completed, crowned by a low dome. The extensions were first occupied in 1857 and 1859. The present dome was completed in 1865.

The Capitol is occupied chiefly by the hall of Representatives, the Senate chamber, and the Supreme Court room. Many notable works of sculpture and painting adorn these halls as well as the splendid staircases and corridors of the building.

Caricature (*kăr'ĭ-kà-tûr*). A representation in which the peculiarities of a person or of an object are so far exaggerated as to produce a grotesque effect.

Caritas. Abbott H. Thayer; Museum of Fine Arts, Boston, Mass. The painting of a gracious female figure standing with arms extended above two children who cling closely to her.

Carmencita. John S. Sargent; Luxembourg Gallery, Paris. A brilliant portrait of the famous Spanish dancer, contrasting with another of the same subject by William M. Chase.

Cartoons. A name given to the studies made by artists before they undertake the execution of pictures or frescoes. Since frescoes have to be executed on a fresh ground, retouching is impossible. Therefore, fresco painters are obliged to make full-sized designs which have only to be traced upon the ground. The paper used for this purpose was called in Italian *cartone*. Thence arose the application of the term cartoon to all preparatory sketches of pictures.

Caryatides (*kăr'ĭ-ăt'ĭdz*; L. *-ĭ-dēz*). Sculptured female figures which, in some classical and Renaissance buildings, serve as supports, taking the place of columns or pilasters. The most noted of such figures stand in the ruins of the Erechtheum, Athens, and in a hall of the Louvre, Paris, devoted to French art of the 16th century.

Catacombs (*kăt'ă-kōmz*). Underground burial places. The most famous catacombs are those at Rome, in which the early Christians interred their dead, and in which they took refuge to celebrate their services. There Early Christian art took its rise. Catacombs exist also at Syracuse, at Palermo, and in Tuscany.

Cathedral. A cathedral is a church in which the *cathedra*, or bishop's throne, is placed. Architecturally speaking, however, a cathedral need not differ in any respect from an ordinary parish church.

Cathedral. City of Mexico. One of America's largest and richest churches. The edifice is 426 feet long and 203 feet wide. It was begun in 1667 and completed in the 19th century, at a cost of over $2,000,000. The interior, of Doric style, is richly ornamented.

Cathedral, Saint Patrick's. New York City. The Roman Catholic cathedral, located on Fifth avenue, between 50th and 51st streets, is one of the most noted structures in America. The corner stone was laid August 15, 1858, and the building was dedicated May 25, 1879. Its greatest length is 398 feet; its width, 174 feet; the towers are 330 feet high. The cathedral is built upon the plan of a Latin cross, in Gothic style. Its architect was Renwick, who gave also the design for Grace church, at Broadway and 11th street.

Cathedral of Saint John the Divine. New York City. The Protestant Episcopal cathedral on Morningside heights. The corner stone was laid December 27, 1892. In 1911, the choir and crossing were completed in Romanesque style. For the construction of the nave a modified Gothic style was later adopted. The plans called for a total length of not more than 520 feet, a width of 290 feet, and a height of 425 feet to the top of the spire. Its present directing architect is Ralph Adams Cram, of Boston.

Cathedral of Saints Peter and Paul. Washington, D. C. Protestant Episcopal cathedral on Mount Saint Albans. The plans for this church present a Gothic structure, 500 feet in greatest length, with towers 262 feet high. Its elevated situation is said to be more beautiful than that of any other existing cathedral.

Cathedral of the Assumption. Moscow. One of the several notable structures in the Kremlin. It is built in the Lombardo-Byzantine style, although its cupolas are of Indian pattern. The interior is richly adorned with gems. The church was erected in the 15th century by the architect Aristotele Foraventi.

Cattle. Constant Troyon; Institute of Art, San Francisco, Cal. The group of cattle in pasture occupy the center of the picture; a splendid background of sky distinguishes this painting.

Charles I and His Horse. Antoon Van Dyck; the Louvre, Paris. A picture portrait, presenting a masterly treatment of the English king with his horse and attendants.

Chiaroscuro (*kyä'rô-skōō'rō*). Distribution of light and shade so effected in a picture that these elements are of mutual aid. This term is applied especially to the devices by which a figure or any object is made to appear as if enveloped in atmosphere. Among the masters of *chiaroscuro* must be mentioned Correggio (School of Parma, 1494–1534), regarded as its inventor, and Rembrandt, who developed it to its farthest limits.

Children of the Shell, The. Murillo; Prado Museum, Madrid. The Child Jesus is represented giving Saint John water from a shell.

Christ at Emmaus. Rembrandt van Rijn; the Louvre, Paris. The moment is that in which the two disciples recognized the risen Christ at the supper table.

Christ with the Doctors. Hofmann; Royal Gallery, Dresden. The youthful Christ, in the center of the picture, commands the attention of the learned men.

Church at Old Lyme. Childe Hassam; Albright Art Gallery, Buffalo, N. Y. A white New England church amid the lacelike shadows of slender trees.

Classical. This adjective in the strict sense is applied to the best periods of ancient Greek art, when great architects and sculptors united in their works ideality and imagination, close observation of nature, and the power to incorporate in clear terms their conceptions or impressions of grandeur and beauty. The term classical is also extended to later works of art whose excellence has caused them to be regarded as standards and models of special styles or schools. At the present time the same term is used to denote the character of any composition, either artistic or literary, in which the principal stress is laid upon structure and form.

Cloth Syndics. Rembrandt van Rijn; Royal Museum, Amsterdam. The group in the picture includes the five directors and the secretary of the Amsterdam cloth makers' guild. The canvas was painted in 1661 and is ranked as the masterpiece of the artist.

Colonel Thomas Cass. Richard E. Brooks; Boston, Mass. Bronze memorial in the Public Garden. A fine example of the "quiet, soldierly figure."

Colors, Primary. The colors which cannot be produced by mixture of others; they are three,—red, yellow, blue.

Colors, Secondary. Three colors, each produced by mixing two others: orange, a mixture of red and yellow; green, of blue and yellow; purple, of red and blue.

Columbus at the Court of Ferdinand and Isabella. Vaclav von Brozik; Metropolitan Museum, New York City. A room crowded with courtiers; the king and queen are about to sign the contract with Columbus, April 17, 1492.

Column. In architecture, a vertically placed support, consisting generally of three parts: the base, the shaft or cylindrical portion, and the capital.

Coming of the White Man, The. G. A. Reid; privately owned. A group of Indians amid trees watch the approach of Champlain's fleet.

Coming Storm, The. George Inness; Albright Art Gallery, Buffalo, N. Y. Level fields against a background of trees and threatening sky.

Communion of Saint Jerome, Last. Domenichino; the Vatican, Rome. The central figure is the aged Jerome, realistically portrayed. A symbolic lion reclines at the feet of the saint.

Composition. The harmonious combining of all the parts or elements in a work of art. The composition of a statue or that of a picture is good or bad in proportion as the lines are rhythmical in arrangement, the attitudes probable, and the scene free and apparently unstudied. A view of a town, for example, *composes* well when the succession of buildings exhibits a graceful and picturesque outline. A landscape is well *composed* when the trees, the distances, and the foreground represent masses well balanced and pleasant to the eye.

Corcoran Gallery of Art. Washington, D. C. A white marble building in the Neo-Grecian style of architecture, which houses the art collections and the art school founded by William Wilson Corcoran.

Cornice. In classical architecture, the highest of the three parts of the entablature, so molded as to project beyond the frieze. The term is applied generally to the highest portion of a wall, when treated as a crown or finish.

Creation of Man. Michelangelo; Sistine Chapel, Rome. The recumbent human form awakens to life under the touch of the outstretched hand of God.

Cumæan Sibyl. Michelangelo; Sistine Chapel, Rome. The ancient sibyl, said to have prophesied the Nativity, is consulting her book.

Dance of the Nymphs. Corot; the Louvre, Paris. Background of trees and sky; in the foreground are groups of dancing maidens. Also called "Matinée." This is a famous picture in Corot's "first manner," or the period in which he introduced figures into his landscapes.

Dante. Ettore Ximenes; Washington, D. C. A memorial statue, the gift to the United States from the Italians of the country.

Dante, Portrait of. Giotto; National Museum of the Bargello, Florence. Perhaps painted from life. The picture formed part of a large fresco painted by Giotto early in the 14th century, long hidden by whitewash but recovered about 1840.

Dash for Timber, A. Frederic Remington; Museum of Fine Arts, Saint Louis, Mo. A group of horsemen, pursued by Indians, riding toward a clump of trees.

Deer in the Forest—Twilight. Rosa Bonheur; Metropolitan Museum, New York City. A sheltered nook in woodland. Glow of sunset is seen between blue-gray trees in the background.

Descent from the Cross. Rubens; Cathedral, Antwerp, Holland. A painting especially notable, technically, for the white light that bathes the dead body of the Christ as it is lowered on a stretch of linen.

Design. An outline or pattern, which serves as the basis of a composition and indicates the more important points in it. Specifically, the term means the preliminary sketch of a picture.

Diaper (*dī'ȧ-pẽr*). A term derived from a late Greek word meaning, probably, "pure white," and formerly applied to a fine linen cloth into which ornamental devices, such as geometric or conventional patterns and scroll or lattice work, were woven. From this system of ornament, the word diaper came to be used to denote an architectural decoration which consists in the continued repetition of a geometric pattern or a conventionalized floral design. It is applied to a flat surface, such as a panel or a wall, in color, gilding, or low relief.

Dignity and Impudence. Sir Edwin H. Landseer; National Gallery, London. A large, dignified dog and a little, saucy one in the door of a kennel.

Distemper. A method of coloring surfaces, such as walls or panels. The colors for the process are mixed with a solution of water and size, or, for small surfaces, of water and gum or the albuminous matter of eggs.

Dome. A roof formed by a series of arches springing from consecutive points on a circular or polygonal plane base and crossing one another at the summit. The solid figure thus formed may be roughly described as hemispherical. If, for example, the plane base were a true circle, and the arches true semicircles, the dome would then be a true hemisphere. During the Renaissance period, this structural device was made more or less pointed in section, following the precedent of Brunelleschi, the architect and engineer of the dome of the Cathedral of Florence.

Doric. An order of ancient architecture, characterized by simplicity of ornament. In Greece, this order combines strength and elegance, but the Roman Doric style appears heavy and inert. The Doric column has no base; toward the middle of the shaft it shows a swelling or entasis.

Dove. In Christian art, the dove is the symbol of the Holy Spirit, as well as the emblem of love, innocence, purity, and peace.

Dryness. The name applied to the quality of painting in which the outlines are hard and formal, the modeling stiff, and the color harsh.

Dry Point. A sharp steel needle with which an engraver draws directly upon a copper plate. In proportion to the pressure used, the dry point sinks more or less deeply into the metal. The name "dry point" is used also of the engraving made by this method and of a print from such an engraving.

Dying Gaul. The original figure in marble is in the Capitol, Rome. The name of the ancient sculptor of this work is unknown.

Earl of Clarendon, The Second. Sir Peter Lely; Institute of Art, Minneapolis, Minn. An attractive portrait of a little child with a dog as companion.

Echinus (*ẽ-kī'nŭs*). The convex member placed beneath the abacus of the Doric capital. The artistic function of the echinus is to afford a transition between the verticals of the columns and the horizontals of the entablature.

Elgin (*ĕl'gĭn*) **Marbles.** The collection of ancient sculptures brought together by the earl of Elgin about the beginning of the 19th century, and now preserved in the British Museum. It represents the finest work of ancient Greek sculptors, including the greater part of the surviving sculptured decorations of the Parthenon, together with fragments of the Erechtheum, Athens, and of the Mausoleum at Halicarnassus, Asia Minor.

Elizabethan. The style of architecture transitional between Gothic and Renaissance, which prevailed in England in the Elizabethan era. The best examples of this style are found in the great country houses built during that queen's reign. Characteristic features of these mansions are long galleries, large windows, and tall decorated chimneys.

Emancipation Group. Thomas Ball; Washington, D. C., and Boston, Mass. The work represents President Lincoln and a kneeling slave. The group in Boston, from the same model as that in Washington, was erected shortly after the latter had been completed.

End of the Trail. James E. Fraser; Golden Gate park, San Francisco. A statue depicting an Indian warrior bowed in deep dejection, seated on a weary pony, which crouches forward in dumb dismay. It typifies the American Indian driven to the wall by a stronger race.

Engraving. The art of representing objects by incised lines on wood, metal, or stone. Engraving, as it is understood today, dates probably from the 15th century, in the early part of which woodcuts are known to have been produced.

Entablature (*ĕn-tăb'lȧ-tûr*). In classical architecture, the entablature is the portion of wall resting upon the columns and supporting, at the ends of the building, the pediment or, at the sides, the roof plate. It consists of an architrave, a frieze, and a cornice. Its height is from four to five times the diameter of the shaft of the column.

Entasis (*ĕn'tȧ-sĭs*). The swelling at the middle of the shaft of a column. Entasis is one of the characteristics of the Doric order; the swelling of the columns gives an effect of lightness to a structure.

Etching. A process of engraving, in which the incised lines are obtained, not laboriously by working directly upon metal with the graving tool, but by the action of acid. The metal plate to be etched is covered with an etching ground, such as a varnish, which resists the action of acid. Great care must be taken to lay this ground equally over the whole plate. The drawing or picture to be reproduced is then traced with an etching needle, which, wherever it is applied, removes the ground and so exposes the plate. The plate is then put into acid, which corrodes the exposed parts. The design is thus bitten into the metal. The prints in ink, also taken from this etched plate, are called etchings.

Evolution of the Book. John W. Alexander; a series of six mural paintings in the Library of Congress, Washington, D. C. The subjects are "The Cairn," "Oral Tradition," "Egyptian Hieroglyphics," "Picture Writing," "The Manuscript Book," "The Printing Press."

Façade (*fȧ-sȧd'*). A term applicable to any important face of a building. It designates usually, however, the principal front, which is the most exposed to view and is more richly decorated than the rest of the edifice. The chief entrance to a building is usually placed in this façade.

Fates, The. Pitti Gallery, Florence. Probably drawn by Michelangelo and painted by Rosso. The three figures are said to have been studied from a single model.

Feeding Her Birds. Jean François Millet; Museum, Lille, France. A woman is pictured seated on a stool, feeding from a long spoon three children ranged on the doorstep.

Feeding the Sheep. Charles Jacque; the Louvre, Paris. A flock of sheep grouped about a feeding rack and a tub of water.

Fighting Téméraire, The. J. M. W. Turner; National Gallery, London. The famous ship, about to be broken up, is being towed to a berth at Deptford.

Figure. A drawn, painted, or sculptured representation of a human being or of an animal.

Figurine. A small molded figure or statuette, generally in terra cotta or similar material less durable than marble. The term is applied especially to little figures, decorated in color or gilt, found in ancient tombs. The finest of these are the Tanagra figurines, from Tanagra, Greece.

First Burial, The. Louis Ernest Barrias; Palais des Beaux-Arts, Paris. A nude marble group, representing a man carrying a dead child, accompanied by a mourning woman. The figures of the group are usually identified as those of Adam, Eve, and the dead Abel.

Fish. An elliptical symbol frequently found on Early Christian monuments and tiles. It is the emblem of Christ, and the usual explanation of its use is that the letters in the Greek word ἰχθυς, meaning "fish," are the initials of the words, Ἰησοῦς Χριστὸς Θεοῦ Υἱὸς Σωτήρ, that is, "Jesus Christ, Son of God, Savior." Used without the inscription, the ellipse is an emblem of baptism.

Flying Buttress. In Gothic architecture the organ of the transmission of thrust. It is an arm of masonry rising from the buttress or exterior support of an aisle arch and springing over the aisle roof to meet the support of the loftier nave and add resistance to the greater disruptive force there active. The flying buttress is the only new principle introduced into the building art by the men of the middle ages. Its development is most interesting. It began in Normandy when the monkish builders of Caen threw a half barrel vault over the aisles to counteract the thrust of the nave. This device proving successful, it was in principle transferred to the exterior and isolated in space, as in the church of Saint Martin at Laon, France. In this edifice the flying buttress reached the limit of its functions, but in a later structure, the Cathedral of Reims, it was given two stories and a double flight.

Fog Warning, The. Winslow Homer; Museum of Fine Arts, Boston, Mass. A fog bank looms on the horizon. A fisherman in his boat pulls sturdily for his ship.

Foreground. That portion of a picture, and sometimes of a relief sculpture, on which the objects nearest to the spectator's eye are represented.

Foreshortening. The term applied to the apparent diminution in the length of an object in proportion as the direction of its length coincides with the observer's line of sight. The word is used also of the method of drawing by which objects in a picture are made to conform to this law of perspective.

Forge of Vulcan, The. Velasquez; Prado Museum, Madrid. Vulcan, at his forge, is listening to Hermes, who is delivering a message from the gods.

Forging the Shaft. John F. Weir; Metropolitan Museum, New York City. A foundry, where workmen are drawing a white-hot shaft from the furnace.

Fountain of Time, The. Lorado Taft; Chicago, Ill. An imposing sculptural work erected on the Midway, representing ninety colossal figures passing before the veiled figure of Time. The material used is a kind of concrete.

Fresco. In its strict sense, a fresco is a mural painting executed on a fresh, damp ground of plaster. The ground soon becomes unfit to paint on, and therefore retouching is impossible. This is the chief difficulty in the process. On the other hand, as the color combines with the lime in the ground, it is of great durability in pure, dry air. The term fresco is now used loosely to designate any manner of painting on plaster.

Frieze. The part of the entablature placed, in the ancient orders of architecture, between the architrave and the cornice. In the Doric order, the frieze is decorated with metopes and triglyphs; in the Ionic and Corinthian orders, it is ornamented with bas-reliefs which form a continuous design.

Galahad, Sir. George Frederick Watts; Eton college, England. The knight of the pure heart is represented standing by his horse, at the moment when he has caught the vision of the grail.

Garfield. Charles H. Niehaus; Cincinnati, Ohio. An excellent portrait statue of James A. Garfield. The president is represented as speaking, a manuscript in his right hand, his left hand raised in an impressive gesture.

Gargoyle (*gär'goil*). A term derived from a French word meaning throat, and applied to the spouts placed usually on the roof gutters of Gothic buildings for the purpose of carrying the rain water far from the walls. Gargoyles came into use about the end of the 12th century. From the 13th to the 16th century, they were commonly carved fancifully, terminating in grotesque shapes of animal or human heads.

Genre (*zhäN'r'*) **Painting.** This French term was formerly preceded by the word "*bas*"; the whole denoting the low or domestic as distinguished from the religious or the historical style. Under it are classed all those pictures in which subjects taken from everyday life are treated realistically.

Giralda Tower. Seville, Spain. A beautiful square tower, 330 feet in height, the upper 100 feet being a belfry. A statue of Faith crowning the structure moves in the wind like a vane, in Spanish *giralda*, whence the name.

Gleaners, The. Jean François Millet; the Louvre, Paris. Bent figures of three toiling women are represented in the foreground of a harvest field.

Golden Stairs, The. Sir Edward Burne-Jones; privately owned. A procession of tall, slender figures of women on a curving staircase. Called also "The King's Wedding" and "Music on the Stairs."

Gothic (*göth'ik*). Originally a term of reproach, synonymous with "barbarous," first used by the Italian artists of the Renaissance. The style of architecture, determined by the use of the pointed arch, which was developed in western Europe between the second quarter of the 12th and the end of the 15th century. The sculpture contemporary with this structural style was a subservient art. It followed the lines of the building, the figures being cramped between emphasized verticals and horizontals. But, as Gothic architecture approached its climax, figure sculpture attained great expressiveness, especially in the portrayals of the Christ and the Virgin. At the same time and to an equal degree this quality marked the grotesques surcharged with symbolism, which were set in a profusion sufficient to people the roofs and the tower-balconies of the Gothic church.

Grand Canal, Venice. J. M. W. Turner; Metropolitan Museum, New York City. A picture famous for its color effects. Painted about 1834.

Grant, Ulysses S. H. M. Shrady; Washington, D. C. A heroic equestrian statue, forming the chief feature of the imposing Grant memorial.

Great Lakes, Fountain of the. Lorado Taft; Chicago, Ill. Sculptured female figures, symbolical of the five lakes, form the principal part of this important work, placed at the south front of the Art Institute.

Greek Slave. Hiram Powers; Corcoran Gallery of Art, Washington, D. C. A nude marble figure, representing a girl captive taken by the Turks during the Greek revolution of 1821.

Grief. Also called "Death" or "Peace of God" or "Mourning." Memorial to Mrs. Henry Adams; Rock Creek cemetery, Washington, D. C. One of the masterpieces of Augustus Saint-Gaudens. Bearing no inscription, the countenance of the bronze figure, seated, with closed eyes as in a dream, is mysterious and awe-inspiring.

Groin. The edge, or arris, formed by the intersection of two barrel vaults.

Group. In art, this term implies two or more figures or objects so placed and related as to form a unit. The groups in a picture should present well balanced masses. In sculpture, a group is a collection of figures, each of which is necessary to the effect of the whole. The outline and arrangement of such a group should present a harmonious effect.

Gulf Stream, The. Winslow Homer; Metropolitan Museum, New York City. A broken-masted sailboat lies in the trough of the waves; a Negro is prone on the deck. Sharks appear in the foreground; at the right, a waterspout; at the left, on the horizon, a sailing vessel. The sea is blue-green, under a copper sky.

Gypsy. Murillo; Crocker Art Gallery, Sacramento, Cal. A masterly character sketch of a gypsy woman, revealing Murillo's genius as a *genre* painter.

Hard. A term applied to pictures which exhibit stiffness of drawing and harshness of outline.

Harp of the Winds. Homer D. Martin; Metropolitan Museum, New York City. A view of the Seine; a row of tall poplars on a flat shore. In the distance is a town.

Harvest, The. Léon L'Hermitte; Museum of Fine Arts, Saint Louis, Mo. A realistic picture of peasants harvesting grain by hand.

Harvesters at Rest. Léon L'Hermitte; Wilstach collection, Philadelphia, Pa. A peasant woman is bringing a midday meal to two men who are seated on the ground. A similar group, by the same artist, under the title "Harvesters' Meal," is in the Institute of Arts and Sciences, Brooklyn, N. Y.

Hatchings. Lines, either parallel or crossed, by means of which the modeling of objects is indicated in engraving. By these lines, according to their size and closeness, the engraver is able to suggest tones, to render the effect of vibrating lights, and to mark distinctly the form and even the texture of an object.

Hay Wain, The. John Constable; National Gallery, London. A wagon is being driven through a shallow stream in the foreground; cottage and trees beyond.

Heart. In Christian symbolism the heart represents the greatest of the three Christian virtues, charity; the symbols of faith and hope are, respectively, the cross and the anchor.

"Herringbone and Dots." A very frequent *motif* found in Oriental rugs. It is a simplified representation of a reptile from which all features have been eliminated except the indication of the spine and the scales.

Hewer, The. George Grey Barnard. A heroic, kneeling figure in marble, representing a primitive man hewing wood with a stone hatchet. In conception and execution, this is one of the best productions of American sculpture.

High Light. In a picture, the high light is that spot which appears to the eye to be of the greatest brilliance. Since this high light is always a reflected light, it is found only on such surfaces as reflect and do not absorb the light. A high light, for instance, may appear upon a burnished metal plaque or in an eye, but it is never seen upon materials of dull, heavy texture.

High Relief. A piece of sculpture executed upon a flat or curved surface, from which it projects more than half

the apparent total thickness of the figures, or so far as to resemble a sculpture in the round.

Hille Bobbe. Frans Hals; Berlin Museum, Berlin. Portrait of a fishwife of Haarlem, with an owl perched on her shoulder. A work which well illustrates this artist's comic power. A similar portrait of this woman, the work of Hals or one of his pupils, is in the Metropolitan Museum, New York City.

Historic Painting. The painting of historic scenes, or of scenes in which historical personages are represented.

Holy Family. Murillo; the Louvre, Paris. The Virgin, robed in blue, seated in the center of the picture, holds the Infant on her knees before the adoring Saint Elizabeth and the child Saint John.

Holy Night. Correggio; Royal Gallery, Dresden. Bright light in the center of the picture radiates from the Christ Child lying upon a bed of straw. The morning is just breaking over the hills in the distance.

Hope. George Frederick Watts; Tate Gallery, London. A single figure, seated on a segment of a great globe, eyes blindfolded, all but one of the strings of her harp broken, is represented as clinging alone to a deserted world.

Horse Fair, The. Rosa Bonheur; Metropolitan Museum, New York City. Heavy white and sorrel Percheron horses are being led or ridden by men in blue blouses.

Horses of Achilles, The. Henri Regnault; Museum of Fine Arts, Boston, Mass. The horses, conscious of their master's approaching death, resist the charioteer's attempts to harness them.

Immaculate Conception. Murillo; the Louvre, Paris. This is accounted one of the greatest of Spanish paintings. A graceful figure in blue mantle, with the crescent moon beneath her feet, surrounded by throngs of cherubs, is gazing into heaven.

Impasto (*im-päs'tō*). The application of very thick oil color to the surface of a canvas. The purpose of impasto is to give the effect of relief, force, and solidity to the objects represented.

Indian Hunter. John Q. A. Ward; Central park, New York City. A fine bronze group of an Indian and his dog, both in alert attitude.

Inlaying. A method of decorating objects, such as weapons or furniture. It consists in incising patterns on the surface of the object and filling the spaces thus formed with pieces of variously colored wood, ivory, metal, or mother-of-pearl.

In Pasture. Jules Dupré; City Art Museum, Saint Louis, Mo. A background of field and trees. In the foreground a cow is straining at the rope held by a peasant.

Interior of a Cottage. Josef Israëls; Corcoran Gallery of Art, Washington, D. C. Light from the cottage window bathes the figures of a sleeping child and a woman sewing.

January Day, A. W. Elmer Schofield; Museum, Cincinnati, Ohio. A canvas of tall gray trees, mingling with evergreens; on the ground, broken patches of snow, the sky blue and cloud flecked.

Joan of Arc. Anna V. Hyatt; Riverside drive, New York City. Replicas of this statue have been erected at Gloucester, Mass., and at Blois, France. It is a work worthy of comparison with the best of modern French sculpture.

Joan of Arc. Julien Bastien-Lepage; Metropolitan Museum, New York City. Joan stands in listening attitude by a tree. In the background, vague figures suggest her vision of Saint Michael, Saint Catherine, and Saint Margaret.

Joan of Arc at Domremy. Chapu; the Louvre, Paris. Marble statue. The maid is seated on the ground, hands clasped on her knees, spiritual exaltation expressed on her upturned face.

Keokuk, Chief. Nellie V. Walker; Keokuk, Iowa. A notable heroic bronze statue of the famous Indian, erected on a high bluff overlooking the Mississippi river.

King Lear. Edwin A. Abbey; Metropolitan Museum, New York City. Cordelia stands in the center with the king of France; Goneril and Regan at the left. At the right, Lear, with his dog, is being led away.

Lake, The. Jean Baptiste Corot; the Louvre, Paris. The shore of a lake, overshadowed by great trees. Three human figures in the foreground. This canvas is sometimes called "Spring."

Landscape. A picture which represents natural scenery, and in which the interpretation of nature is the predominant feature; figures of men or of animals being introduced only as accessories, to give a tone of reality to the scene or to furnish a scale of dimensions.

Landscape with Windmill. Jacob Ruysdael; Royal Museum, Amsterdam. The masterpiece of this artist; counted by many as the finest landscape painting of the 17th-century Dutch school.

La Source. Jean A. D. Ingres; the Louvre, Paris. A painting of a young girl standing by a rock, while a stream of water pours from a jar on her shoulder into a pool at her feet.

Last Day of the Condemned Man. Munkácsy; Wilstach collection, Memorial Hall, Philadelphia, Pa. The picture illustrates the old Hungarian custom of allowing visitors to visit a prisoner on the day before his execution. This painting first brought fame to the artist.

Last Judgment. Michelangelo; Sistine Chapel, Rome. First exhibited on Christmas Day, 1541. The great fresco, lacking in unity of design, is filled with clouds and human figures, and centers about the Christ, who sits in judgment. It is literary rather than artistic in character. It declares itself as the work of an aging and fatigued man and it lacks the inspiration of the ceiling pictures.

Last Supper. Andrea del Sarto; in the refectory of the monastery of San Salvi, Florence. A treatment of this subject, surpassed only by that of Da Vinci.

Last Supper. Leonardo da Vinci; Church of Santa Maria delle Grazie, Milan. This famous picture embodies a wonderful character study of the apostles. In order, from left to right, the faces are those of Bartholomew, James the Less, Andrew, Judas, Peter, John, the Christ, Thomas, James the Greater, Philip, Mathew, Thaddeus, Simon. The moment is that when Jesus said, "One of you shall betray Me."

Latona and Her Children. William H. Rinehart; Metropolitan Museum, New York City. A marble group representing the queen mother bending over her children.

Law, The. Edwin H. Blashfield; mural painting in the Federal building, Cleveland, Ohio. The central figure symbolizes law; at the sides are portraits of personages notable in legal history.

Leonardo Loredano, Portrait of. Giovanni Bellini; National Gallery, London. One of the greatest of painted portraits. The subject, who was doge of Venice 1501–21, is posed wearing his official robe and cap of cloth of gold.

Lewis and Clark. Charles Keck; Charlottesville, Va. A monumental group of sculpture erected at the University of Virginia in 1919, the gift of Paul G. McIntyre.

Library of Congress. Washington, D. C. A monumental building in the style of the Italian Renaissance, begun in 1887 and completed in 1897, at a cost of over $6,000,000. Other than being one of the best planned and equipped library buildings in the world, it contains valuable examples of painting, sculpture, and mosaic.

The building forms a rectangle 340 feet by 470, enclosing a cross; the exterior walls are of granite. Many artists have contributed to the ornamentation and the enrichment of the interior in the mediums of marble, bronze, and color.

Lincoln. Augustus Saint-Gaudens; Chicago, Ill. A bronze statue in Lincoln park. This work is called "the greatest portrait statue in the United States." President Lincoln is represented standing in front of a great chair, as if about to address a multitude.

Lincoln Memorial. Washington, D. C. An imposing building, in the form of a Greek temple, constructed of a Colorado marble of extraordinary whiteness. The edifice, which was 10 years in building, stands upon a platform 204 by 134 feet wide, and rises 122 feet above the level of the Potomac. The memorial contains a colossal seated figure of Lincoln, by Daniel Chester French, cut in Georgia marble. The mural decorations are by Jules Guérin.

Lincoln Monument. Springfield, Ill. A granite structure 120 feet high, surmounted by a bronze statue of Lincoln, and flanked by bronze groups representing arms of the government service. Erected in 1874, at a cost of $200,000.

Line of Beauty. A term applied, in accordance with certain artistic theories, to a graceful curved or undulating line, which is held to be absolutely beautiful in itself. Such a line is commonly represented as a double curve, resembling an elongated letter S.

Lithography. A branch of the art of engraving in which the drawing to be reproduced is traced upon a stone with oily ink or crayon. The surface of the stone is wetted, and the printer's ink, which contains oil, adheres only to those portions of the stone where the design is drawn. Prints are struck off in the usual manner.

Loggia (Italian, "balcony"). Development of the antique bema and the rostrum. In medieval Italian towns a structure of considerable dimensions, roofed, slightly elevated, and open on three sides, from which orators addressed the people on the conduct of the city-states. Of such structures the best existing example is the *Loggia dei Lanzi*, Florence, with its imposing round arches, forming one side of the great square, on which fronts also the Old Town Hall (Palazzo Vecchio), erected in the early years of the 14th century.

Long Pond. Henry W. Ranger; Museum of Fine Arts, Syracuse, N. Y. A quiet sheet of water seen through openings in a fringe of trees.

Lost Pleiad (*plē'yăd*; *plī'ăd*). Randolph Rogers; Art Institute, Chicago, Ill. A marble figure of a girl, posed as if intently gazing into the distance.

Lotus. The Egyptian and Asiatic water lily. The first plant-form to be used in decorative design. It was introduced by the Egyptians into the mural painting of their tombs and temples (Old Kingdom, about 3400–2400 B. C.), not by reason of its beauty, but because, as a perennial, it represented to them the principle of immortality. In their art it was colored blue, like the Nile lily (*Nymphæa cerulea*), but, when it passed into Buddhistic symbolism, it imitated the white variety (*Nymphæa alba*), indigenous to India. As is true of the acanthus, its course may be traced without break through the history of ornament. From it was developed the honeysuckle pattern (anthemion) of Greek architecture and Greek ceramics, while numerous other derivatives appear in modern wall-decoration and in textiles.

Low Relief. A piece of sculpture so executed, upon a flat or curved surface, that the figures project less than half their apparent total thickness.

Luke, Saint. Tradition says that Luke, the disciple and companion of Saint Paul, was a physician and also a painter. Portraits of the Virgin were ascribed to him in the early Christian centuries. He has, therefore, always been regarded as the patron saint of artists. In pictorial art he is often represented as an evangelist, holding the book of his gospel, and with an ox at his side. In pictures of the Byzantine school and the schools derived from it, he appears as a youthful painter, with a portrait of the Virgin in his hand.

Luxembourg, Palace of the. Paris. Now the meeting place of the French Senate. The structure was built in the Florentine style by Jacques Debrosse for Marie de' Medici, widow of King Henry IV. It was erected 1615–20 and occupied the site of the old palace of the dukes of Luxembourg, from which it takes its name.

Macabre (*mȧ-kȧ'b'r*). A term applied to subjects, either painted, sculptured, or engraved, in which a representation of Death figures. Death may be delineated under either the form of a skeleton or that of an *écorché*, that is, a figure representing a body from which the skin has been removed.

Madame Lebrun and Her Daughter. Madame Lebrun; the Louvre, Paris. A noted and charming portrayal of motherhood and childhood.

Madame Récamier. Jacques Louis David; the Louvre, Paris. A portrait distinguished by its purity and simplicity. The lady, in white gown, reclines on a couch of pale yellow.

Madeleine, Church of the. Paris. A structure in the form of a Roman temple; resembling the Maison Carrée at Nimes, France. It has no windows, the gorgeously decorated interior being lighted through three cupolas. The exterior is distinguished by a colonnade of 54 massive columns. It was erected in the early years of the 19th century, the last directing architect being Vignon.

Madonna, The (Our Lady). Since the 6th Christian century, the mother of the Christ, accompanied by the Divine Infant, has been one of the most frequent subjects of religious art. At the time of Francis of Assisi (1182–1226) this theme received a further impetus through the highly spiritual and gentle character of the saint. It was he who established the ringing of the Angelus, commemorative of the Angel Gabriel's salutation to Mary, and who showed a truly maternal love for all created things, as is manifest in his canticles to the various forces of nature.

For purposes of identification, a madonna may be named from its original or later location, as the "Sistine," painted for the monastery of San Sisto, or the "Cowper," long in Cowper house, England. Some accessory in the picture may give it a title, as the "Madonna of the Harpies," named from figures of harpies on the pedestal upon which the Madonna is standing.

The following are among the most famous Madonnas:

"Madonna of San Sisto" (Sistine Madonna). Raphael; Dresden Gallery, Dresden.

"Madonna of the Goldfinch." Raphael; Uffizi Gallery, Florence.

"Madonna of the Chair." Raphael; Pitti Gallery, Florence.

"Madonna of Burgomeister Meyer." Holbein; museum at Darmstadt (copy in Dresden Gallery).

"Madonna of Murillo." Murillo; Pitti Gallery, Florence.

"Madonna of the Sack." Andrea del Sarto; S S Annunziata, Florence.

"Madonna, *La Belle Jardinière*." Raphael; the Louvre, Paris.

"Virgin of the Rocks." Leonardo da Vinci; the Louvre, Paris.

"Madonna." Bodenhausen; Leipzig Museum.

"Virgin in the Carpenter Shop." Dagnan-Bouveret.

"Madonna of the Carpenter Shop." Edward Simmons.

"Madonna of Bruges," group in sculpture; Cathedral of Bruges, Belgium.

"Madonna of the Candelabra." Raphael and certain of his pupils; Walters Gallery, Baltimore, Md.

Maison Carrée (*mâ'zôN' kȧ'râ'*). Nimes, France. A beautiful Roman temple of the rectangular Greek model. The building is 45 feet wide by 85 feet long; 30 Corinthian columns are spaced along the sides of the cella and around the entrance porch. Dating probably from the early years of the Christian era, the structure was long used as a church. It now serves as a museum.

Man with the Glove. Titian; the Louvre, Paris. A famous and powerful portrait painted in the "first manner" of the artist.

Marriage. Gari Melchers; Institute of Art, Minneapolis, Minn. A bride and groom standing, as if at the marriage altar.

Marriage à la Mode. William Hogarth; National Gallery, London. A series of six paintings, illustrating the agitated, unhappy married life of a wealthy citizen's daughter, wedded to the dissipated son of a peer.

Marriage at Cana, The. Paul Veronese; the Louvre, Paris. Painted in 1563. A very large canvas in which several of the figures are portraits of 16th-century sovereigns, among which are those of the emperor Charles V, Francis I of France, and the sultan.

Marriage of Saint Catherine. Correggio; the Louvre, Paris. The Holy Child is placing the ring upon the saint's finger as a symbol of spiritual union. The attendants are Saints Catherine and Christopher.

Massasoit. Cyrus E. Dallin; Plymouth, Mass. A bronze statue of the famous Indian friend of the New England colonists.

Mater Dolorosa (*mâ'tĕr dō'lō-rō'sȧ*). The Latin phrase means "mother of sorrows." It is applied to the Virgin, when she is represented as sorrowing for her crucified Son. In art, the Mater Dolorosa is generally represented alone, sometimes with one sword in her breast, sometimes with seven, in allusion to the seven sorrows which she endured.

Medicine Man, The. Cyrus E. Dallin; Fairmount park, Philadelphia. A bronze work representing an Indian medicine man on horseback in an attitude of authority. It is a companion piece to the equally admirable equestrian statue "The Appeal to the Great Spirit" by the same sculptor.

Meeting of Air and Water. Isadore Konti; New Orleans, La. A fountain of stone and bronze erected in Audubon park, 1919.

Member of the Humane Society, A Distinguished. Sir Edwin H. Landseer; National Gallery, London. The subject is a large dog lying on a pier by the waterside.

Metope (*mĕt'ō-pē*). The space between two triglyphs in the frieze of the Doric order. In the primitive wooden structure this space was left open. In the later stone temple the window so formed was blocked by a panel (Greek *meta*, upon; *opé*, aperture). Metopes were decorated with either paintings or bas-reliefs. The term is applied also to the bas-reliefs found on metopes.

Mezzanine (*mĕz'ȧ-nĭn*; *-nēn*). Synonym of the French *entresol*. A small story placed midway between two floors of a building. Generally a mezzanine is found between the first and second higher ones. The term is applied also to the small windows, generally of greater length than height, which light an intermediate story.

Michelangelo. Paul Wayland Bartlett; Library of Congress, Washington, D. C. An impressive bronze representation of the great sculptor, standing with chisel in hand, as if meditating upon some great conception.

Middle Distance. The term used to designate that part of a picture which lies between the background and the foreground.

Milton Dictating Paradise Lost. Munkácsy; Public Library, New York City. The blind poet, seated in an armchair, dictates to his daughter, who is writing at a table in the foreground.

Minuteman, The. Daniel Chester French; on the battlefield at Concord, Mass. This sculptor's first important work, modeled from a cast of the "Apollo Belvedere." It represents a young patriot standing, alert, one hand on his plow, the other grasping a musket, as if awaiting a summons.

Modeling. In the art of sculpture, the process which consists in constructing, in clay or wax, the model which is to be reproduced in plaster, terra cotta, bronze, marble, stone, or wood. The term has also another meaning. The modeling in a painted portrait is good, when the painter has successfully indicated the various planes of the figure which he has represented.

Mona Lisa (*mō'nä lē'zä*). Leonardo da Vinci; the Louvre, Paris. The portrait of the wife of Francesco del Giocondo. The picture is remarkable for its firm, pyramidal structure and for the finest hands painted during the Italian Renaissance.

Monochrome. A painting, drawing, or print executed in one color.

Mormon Tabernacle. Salt Lake City, Utah. A remarkable elliptical building, 150 feet in extreme width by 250 feet in extreme length. The roof of the structure, shaped somewhat like a turtle's shell, is self-supporting. This construction uses one of the largest self-supporting arches in the world. The auditorium seats 8000 people.

Motive. In music the word "motive" is a synonym of "musical phrase." In architecture it applies to a subject or theme of ornament. So also in decorative design. In the vocabulary of sculpture and painting it is less significant and less frequently used.

My Mother. James A. McNeill Whistler; Luxembourg Gallery, Paris. Called by Whistler "The Mother—Arrangement in Grey and Black."

Napoleon, 1814. Jean L. E. Meissonier; the Louvre, Paris. Napoleon returning from the battle of Laon. Behind him, on lower ground, appears a group of officers.

National Museum. Washington, D. C. A massive white granite structure with a frontage of 561 feet, a lateral extension of 365 feet, and a height of 82 feet. It is designed as part of the new grouping of public buildings in Washington. The museum contains the government collections and laboratories of natural history.

Nebraska State Capitol. Lincoln, Nebr. Architect, Bertram Grosvenor Goodhue. A notable innovation in American state edifices. A broad, low main building, 400 feet square, is constructed around four courts. In the center rises an impressive square tower, 400 feet high. The façade, with its setback, suggests that of the Pitti Palace at Florence (1430); while the tower indicates modern German influence, recalling, at the same time, the turreted structure over the crossing in the older cathedral at Salamanca, Spain.

Neutral. A vague color which does not present any predominant tone is said to be neutral. The term denotes particularly a gray of bluish violet tint used in water colors. Neutral tints form excellent grounds for pictures, since they increase the value of striking colors and cause the latter to stand out with peculiar brilliance.

New Mexico Art Museum. Santa Fe, New Mexico. A unique adaptation of Spanish-Indian Pueblo architecture. With the co-operation of the artist colony at Santa Fe and Taos, the building and its furnishings have been made representative of the art and life of the Southwest.

Night Watch. Rembrandt van Rijn; Royal Museum, Amsterdam. Called also "The Civic Guard" and "The Day Watch." This picture marks the "second manner" of the painter and is remarkable for its treatment of light and shade.

November Morning. Dwight W. Tryon; John Herron Art Institute, Indianapolis, Ind. Landscape in rich brown tones, in which the summer's green is still felt.

Nydia. Randolph Rogers; Art Institute, Chicago, Ill. A graceful marble figure, representing the blind girl of Bulwer-Lytton's *Last Days of Pompeii*.

Old Woman Cutting Her Nails. Rembrandt van Rijn. Altmann collection, Metropolitan Museum, New York. This homely subject is painted with great luminosity and renders with wonderful vitality the pose and action of the figure. Its attribution to Rembrandt, until recently unquestioned, is now disputed by Professor John Van Dyke of Rutgers college, New Brunswick, New Jersey. This critic, who is not without authority, asserts that the picture is the work of Nicolaes Maes (1632–93), a younger contemporary of Rembrandt, who for years employed a single model. The same face, the writer further affirms, appears in the later artist's "Sleeping Woman," Brussels Museum; "Praying Woman," Royal Museum, Amsterdam; and finally in "A Dead Woman," Brussels Museum.

Order. The term applied to the three principal styles of Greek architecture. They are entitled *Doric*, *Ionic*, and *Corinthian*. A combination of the Ionic and Corinthian is known as the composite order. In Roman times another and simplified order, the Tuscan, was developed from the Greek Doric.

Original. A term used to designate a picture, a drawing, or a statue from which copies or reproductions have been made.

Ornament. The term applied to a painted or sculptured motive, enclosed by regular or irregular lines, which contributes to the richness and effect of a work of art.

Oxen Going to Labor. Constant Troyon; the Louvre, Paris. In the foreground of a broad expanse of land, oxen are walking sturdily and calmly.

Oxen on the Beach. Sorolla y Bastida; Memorial Art Gallery, Rochester, N. Y. A yoke of oxen in the foreground, ready to haul the boat at the right of the picture to the stretch of sand above.

Palette (*păl'ĕt*). The palette is one of the principal requirements of the painter. It consists of a thin oval or rectangular board or tablet, generally of walnut or pear wood. It is hollowed out at one end, and provided with a hole through which the thumb is passed, in order that the palette may be held conveniently. Upon the palette the artist lays and mixes his colors.

Pan-American Building. Washington, D. C. A beautiful marble structure, the headquarters of the Pan-American Union. This edifice, designed by Albert Kelsey and Paul Cret, was completed in 1910, at a cost of $1,000,000. Among its many artistic features are the typical Latin American *patio* and the hall of the Americas, the latter said to be the most beautiful room of its kind in the United States.

Panel Picture. A picture painted upon a wooden tablet or panel, rather than upon a canvas. Altar pictures were so painted by the earliest medieval artists, and many specimens are to be seen in modern galleries.

Pastel (*păs'tĕl'*; *pās-tĕl'*). A process of drawing in color by the use of crayons. The drawing is made upon paper having a rough surface or upon a canvas covered with a kind of distemper. The colors are laid on with hard crayons, while the lights, masses, and planes are indicated with soft crayons, which can be crushed and spread with the finger or stump. Drawings in pastel are easily effaced, since the whole surface may be destroyed with one stroke of the brush. They should be set, therefore, with a special fixative, and carefully shielded from air or dampness.

Patriotism Guarding the Flag. Paul Wayland Bartlett; Duluth, Minn. A statue carved in red Minnesota granite and erected at the foot of a great flagstaff designed by Cass Gilbert, architect.

Pediment (*pĕd'ĭ-mĕnt*). In classical architecture, the triangular portion of wall, above the entablature, forming the gable at the end of a building. The term is applied also to rounded construction having similar position and use. The façades of ancient temples were always crowned by pediments, the two sides of which marked the slope of the roof.

Perseus with the Head of Medusa. Benvenuto Cellini; bronze statue in the Loggia dei Lanzi, Florence. The hero stands over the body of the Gorgon, with a sword in his right hand and the severed head in his left.

Perspective. The art of representing, upon a plane surface, objects as they appear to the eye of the spectator viewing them from one fixed point.

Philip II, Portrait of. Attributed to Titian; Museum, Cincinnati, Ohio.

Philip IV of Spain. Velasquez; Metropolitan Museum, New York City. A full-length, life-size figure of the artist's royal patron.

Photo-Engraving. The general name for a variety of processes in which advantage is taken of the action of light upon sensitized surfaces to produce plates from which facsimiles of drawings and photographs may be printed. Photo-engraving processes all depend upon the preparation of metal plates for etching. The etching ground is a coating of gelatin or similar substance sensitive to the action of light. Exposed to light through a properly prepared photographic negative, portions of the coating become insoluble. When the soluble portion has been removed by washing, the etching of the unprotected portions of the plate with acid produces the desired printing surface.

In the *half-tone process*, a plate, usually of zinc or copper, is so treated that a printing surface composed of fine dots *in relief* is secured. The *photogravure process* consists in producing upon a copper plate an *incised* or intaglio pattern from which the picture is printed. The recently developed *rotogravure* is an adaptation of the photogravure to the rapid processes of the rotary printing press.

Pietà (*pyā-tä'*). The Virgin Mother mourning for the dead Christ. The incident is represented as occurring at the foot of the cross. The most famous example of this frequently treated theme is the marble group by Michelangelo, in Saint Peter's, Rome. The technical excellence of this work resides in the study of the living body as contrasted with the cadaver.

Examples in painting are: by Titian, in the Academy, Venice; by Fra Angelico, in Museum San Marco, Florence; by Carlo Crivelli, in the Metropolitan Museum, New York City.

Pilgrim, The. John Q. A. Ward; New York City. A heroic bronze statue in Central park.

Pilgrims Going to Church. George H. Boughton; Public Library, New York City. A group of Puritans in a snow-covered forest clearing; the men of the party are armed and watchful. Called also "Puritans Going to Church."

Pioneer, The. A. Phimister Proctor; Eugene, Oregon. A bronze statue erected on the grounds of the University of Oregon, 1919.

Plein Air. The term "plein air" is applied to a school of modern French painters because of their practice of painting in the open air.

Polychrome. A term applied to art works in which several colors are used. Greek sculpture was polychrome, that is to say, gilded and painted in a variety of tones, principally blue, green, and red.

Ponte Vecchio di Firenze, Il (The Old Bridge at Florence). Title of a sonnet written in both Italian and English by the poet Longfellow. In these few lines the Bridge, imaginatively endowed with life and speech, relates the history of the city of Florence, whose two parts, separated by the river Arno, it has joined since the middle of the 14th century. Considered as a work of architecture, this bridge is interesting, since, supporting shops at either end of the central arcade, it shows the economy of space practiced in the medieval walled town. Bridges with houses, like the superposed stories of the roofs in buildings north of the Alps, were the modest ancestors of the American skyscraper.

Pot of Basil (*băz'tl*), **The.** John W. Alexander; Museum of Fine Arts, Boston, Mass. A picture inspired by the story told in the poem "Isabel" by Keats, which was itself derived from the Italian of Giovanni Boccaccio (1313–75).

Reading from Homer. Alma-Tadema; privately owned. The faces of the listeners reflect the enchantment of the tale from the ancient poet, read from a scroll by a youth seated on a dais at the right of the picture. The figure of the woman with luxuriant auburn hair is a portrait of the second wife of the painter.

Relief. The term relief as applied to painting designates the apparent projection of objects, an effect produced by modeling or by a gradation of tints. In sculpture, a relief is a work executed on a flat ground, from which the figure or series of figures projects in a greater or less degree. According to their degree of projection, the sculpture is said to be in high or low relief. In architecture, the moldings and systems of ornament which project from the surface of a wall are termed reliefs.

Republic, The. Daniel Chester French; Chicago, Ill. A heroic, ideal sculptured figure, erected in Jackson park.

Retreat from Moscow. Paul Gustave Doré; Metropolitan Museum, New York City. A group of Napoleonic soldiers seated in a cart are being followed by a squad of Russian cavalry.

Rising Storm, The. George Inness; Art Institute, Chicago, Ill. Clouds darkening a broad landscape; in the right foreground a man driving a horse and cart.

Rococo (*rō-kō'kō*). (French *rocaille*, "shell-work.") A decorative style popular in Europe in the 17th and 18th centuries. It was characterized by a profusion of riotous ornament, consisting of scrolls, foliage, and fantastic animal forms, intermingled and often confused.

Rood Screen (rood, or rod, signifying the Cross of the Crucified). A low wall of stone or an iron grill used to separate the clergy in the apse from the laymen in the nave. It sometimes supports a gallery from which portions of the service are read, and it is capped by a Crucifix with the attendant Virgin and Saint John the Evangelist.

Roosevelt, Theodore. A. Phimister Proctor. An equestrian statue erected in Portland, Oregon, 1922.

Saint Anthony and the Infant Christ. Murillo; Berlin Museum, Berlin. The saint is kneeling, and holds the Christ Child in his arms.

Saint Mark's Basilica. Venice. This structure is called the most splendid piece of polychromatic architecture in Europe. It is 250 feet long, and measures 170 feet from north to south at the transepts. Byzantine in style, its construction, alteration, and reconstruction date from successive periods between the 12th and the 16th century. The basilica is especially famous for its mosaics representing scenes from the Bible and ecclesiastical history.

Salon (*sá'lôN'*). The exhibition of the works of living artists held annually in Paris, by the Society of French Artists. The title *salon* comes from the *salle carrée* of the Louvre, in which exhibitions were formerly held.

Scarab (*skăr'ăb*). A stone carved in a conventionalized form of the scarabæus, or dung beetle, which was regarded by the ancient Egyptians as a symbol of resurrection and immortality. Scarabs were prized among the Egyptians as seals and amulets.

Scottish Rite Temple. Washington, D. C. A notable building modeled after the Mausoleum erected by Queen Artemisia at Halicarnassus, Asia Minor, in the 4th century B. C., and accounted one of the wonders of the ancient world.

Scumbling. The process of softening the colors of a picture by blending them with a neutral tint, applying this neutral tint over the colors with a nearly dry brush.

Shade. That part of a picture, a drawing, or an engraving representing objects which, not being struck by luminous rays, are relatively obscure. The term is used also to denote the result of the mixture of several colors, with special reference to the degrees of luminosity produced by mixing black or white with pure color.

Shadow, Cast. A shadow projected upon a surface by a body interposed between it and a source of light.

Shaft. The part of a column, of cylindrical form, between the base and the capital. The surface of the shaft is sometimes smooth, sometimes decorated with flutings or with foliage patterns arranged in spirals. Half the diameter of a shaft, measured at its base, is called a *module*, and serves as the scale, according to which the other parts of the column and the entablature are proportioned.

Shakspere. Frederick W. MacMonnies; portrait statue in the Library of Congress, Washington, D. C.

Shaw Memorial. Augustus Saint-Gaudens; Beacon street opposite the Statehouse, Boston, Mass. Bronze relief group representing the colored regiment commanded by Colonel Robert Gould Shaw in the Civil War. The marching men form a background for the figure of Colonel Shaw on horseback.

Siddons, Mrs. Gainsborough; National Gallery, London. The great actress wears a blue gown and the typical Gainsborough hat.

Siddons, Mrs., as the Tragic Muse. Sir Joshua Reynolds; Grosvenor house, London. The pose and action of the figure recall the Sibyls of Michelangelo in the Sistine Chapel, Rome.

Sizing. The process of coating drawing paper with a glutinous solution, to render it fit to receive a wash of color.

Slave Ship, The. J. M. W. Turner; Museum of Fine Arts, Boston, Mass. A storm-driven ship on a luridly lighted sea strewn with human bodies. This picture has occasioned much controversy.

Son, Her. Nellie V. Walker; Art Institute, Chicago, Ill. A marble group, representing a mother seated, intently gazing with mingled pride and wonder at the boy who stands beside her.

Song of the Lark, The. Jules Breton; Art Institute, Chicago, Ill. A girl, on her way to work in the fields, pauses to listen with rapt attention to the song of a lark.

Sower, The. Jean François Millet; privately owned. Often said to be Millet's most successful picture. It represents a vigorous figure of a man, striding across a field, broadcasting the grain with his hand.

Sphinx. A monster represented in art as having the head and breasts of a woman, the body of a lion, and the wings of an eagle.

Spirit of '76. Archibald M. Willard; Town hall, Marblehead, Mass. Painted in 1876. The old man in this familiar picture is said to be a portrait of the artist's father.

Spring. Anton Mauve; Metropolitan Museum, New York City. In the foreground a shepherd with his dog facing a flock of sheep in green pasture; a row of young trees at right.

Spring. Botticelli; Academy, Florence. An allegorical picture founded upon a literary theme first treated by the Latin poet Lucretius and, during the Renaissance, by the Florentine Poliziano. It contains the figures of Flora, the Graces, and the god Mercury. It was produced as a wedding gift for Lucrezia Tornabuoni, daughter of a powerful family of Florence.

Statehouse, Massachusetts. Conspicuously located on Beacon Hill, Boston. The design of the original Georgian and central portion of the building is the work of Charles Bulfinch. The structure is distinguished by its large gilded dome.

Stele (*stē'lē*). An upright stone used by the Greeks as a monument commemorative of persons or historical events. Certain relief sculptures found on Athenian stelæ take high rank among the remains of Hellenic art.

Stenciling. A simple method of executing decorative paintings. A piece of stiff card in which the desired pattern has been cut is laid upon paper. Color is then applied, reaching the paper only where the card has been cut away.

Still Life. A term applied to pictures which have for their subjects fruit, flowers, vases, and such other inanimate objects as usually form the accessories rather than the main interest of pictures.

Stippling. The process of executing a painting, a drawing, or an engraving by a series of small touches, strokes, or dots, instead of long strokes or hatchings.

Strigil (*strĭj'ĭl*). An instrument of bronze or ivory, with which the ancients scraped their limbs after bathing, and which the ancient athletes employed to remove the oil after anointing their bodies.

Summit of the Sierras. William Keith; Institute of Art, San Francisco, Cal. A foreground of green slopes and storm-twisted trees; snowy summits rise in the distant background.

Sun Vow, The. Hermon A. MacNeil; privately owned. A bronze group, said to be the most perfect production of this artist. "An old Indian, seated, watches the effort of a boy who shoots an arrow toward the sun."

Swastika (from the Sanskrit "fortunate"). Originally a Hindu symbol composed of a cross with equal arms, the ends of which are turned and prolonged in the form of the Greek letter Gamma. This symbol is found in the art of many primitive peoples, by all of whom it has been specially cherished. It is now universally accepted as a presentiment and promise of good luck.

Sycamore Hill. Edward W. Redfield; Carnegie Institution, Pittsburgh, Pa. An excellent example of this artist's power in painting winter landscapes. Promise of new life lurks in the stream and the trees.

Symbol. In art, a conventional representation of figures or objects, which serve as the signs of ideas.

Tanagra (*tăn'ȧ-grȧ*) **Figurines.** Small terra cotta figures made in classical antiquity, the most beautiful specimens having been found at Tanagra in Bœotia. Figurines from this place, either painted or gilded, are highly prized by collectors for delicacy of execution and their inexpressible charm. They represent divinities, ladies of fashion, or animals.

Technique (*tĕk'nēk'*). This term, in painting and sculpture, denotes manipulative skill, mastery of material, and all those qualities of hand and eye which contribute to the achievement of excellence in a work of art.

Tempera (*tĕm'pȧ-rȧ*). See *Distemper*.

Terra Cotta (*tĕr'ȧ kŏt'ȧ*). A baked clay, specifically that of a brownish red color, which has always been used by sculptors for their less important works. In the 15th century, when variously colored and glazed, it was used with great success by the Della Robbia family of Florence.

Texture. A term applied to the arrangement of neighboring tones, or of different shades of the same color in alternation or juxtaposition. The word texture is used also to denote the quality of the surface of textiles.

Thrust. The force exerted by an arch against a supporting pier.

Tone. A term applied to a variation of color or tint, produced by admixture of white or black. The same hue is retained, but it becomes lighter or darker when white or black is added. The word is applied also to the brilliance, the intensity of tint, or the dominant effect observable in the colors of a picture. In this sense, we speak of warm tones, cold tones, or energetic tones.

Tottenham Church. John Constable; Metropolitan Museum, New York City. An expanse of green lawn, beyond which the square church tower rises.

Transfiguration, The. Raphael; the Vatican, Rome. Two scenes, that on the mount and that in the valley, are presented with a very evident lack of unity.

Tribute Money, The. Titian; Dresden Gallery, Dresden. Jesus answering the questions of a Pharisee regarding the justice of paying tribute to Rome.

Triglyph (*trī'glĭf*). An ornamental element in the frieze of the Doric order. It consists of a block with two complete vertical grooves, or glyphs, incised in its face. The two beveled vertical edges each form half of the third groove. Hence the name, meaning three-grooved. The stone triglyph recalls the ends of the ceiling beams in the primitive wooden cabin.

Trinity Church, Boston, Mass. Noted church standing in Copley square. Designed by H. H. Richardson in French Romanesque style, with the tower inspired by that of the older cathedral of Salamanca, Spain. The interior wall decorations are by John La Farge, one of the first American mural painters. The stained-glass windows represent the best artists of the modern American, French, and English schools.

Tuscan. An order of architecture of the Etruscan style, called also the Rustic order. The Tuscan order is generally regarded as differing from the Doric only in being less refined in its proportions.

Two Natures, The. George Grey Barnard; Metropolitan Museum, New York City. A group of two figures; "a victor, half erect, half bending over a prostrate foe."

Valley Forge. Edwin A. Abbey; mural painting in the Pennsylvania State capitol, Harrisburg, Pa. Baron Steuben is drilling a squad of troops. Washington's headquarters can be seen in the background.

Values. The term applied to the relationships of light and dark parts and color intensities in a picture.

Vehicle. In the art of painting, the liquid with which pigments are diluted in order to render them of a usable consistency is termed the vehicle. In water color, the vehicle is water; in oil painting, oils of various kinds; while wax is the vehicle in encaustic painting.

Venus and Adonis. Correggio; Crocker Art Gallery, Sacramento, Cal. Venus admonishes the huntsman Adonis to avoid danger.

Venus of Melos. A Greek original statue discovered on the island of Melos in 1820 and now in the Louvre, Paris. It is a descendant of the nobler type of Aphrodite (Latin, Venus), created in the 4th century B. C., and dates most probably from approximately 100 B. C.

Vibrating. A term applied to a strongly marked, nervous, living effect of color in pictures.

Victory of Samothrace. Sculptor unknown; the Louvre, Paris. This statue of a female figure is said to be the most exquisite expression of movement left to us by antique art. It was executed to celebrate a naval victory of the Macedonian ruler Demetrius Poliorcetes over the Egyptian general Ptolemy in 306 B. C. The statue was discovered in Samothrace in 1863.

Washington. John Q. A. Ward. Bronze statue in front of United States Subtreasury building, New York City.

Washington. Thomas Ball; Boston, Mass. A bronze equestrian group which is a conspicuous feature in the Public Garden.

Washington Crossing the Delaware. Emanuel Leutze; Metropolitan Museum, New York City. A large historical canvas, depicting Washington and his forces on their way to surprise the Hessian troops at Trenton, N. J., December 25, 1776.

Washington Monument, The. Washington, D. C. An imposing obelisk, interior of granite, exterior of white marble, erected as a national memorial to the first president of the United States. It is one of the loftiest masonry structures of the world, having a height of 555 feet, 5½ inches. The shaft alone is 500 feet, 5⅛ inches high, 55 feet square at the base, and 34 feet at the summit. The pyramid surmounting the shaft is 55 feet high, with a cap of aluminum.

The architect was Robert Mills. In 1848, the corner stone was laid, and during the next seven years the walls rose to a height of 152 feet, but, in 1855, work was suspended for lack of funds. The money, until this time, had been raised by popular subscription. In 1878, Congress having appropriated funds for the purpose, work was resumed, and the completed monument was dedicated in 1885. Robert C. Winthrop, who 37 years before had delivered the oration at the laying of the corner stone, was the orator at the dedication.

Washington, Portrait of. Gilbert Stuart; Metropolitan Museum, New York City. Painted in 1795. This picture represents a life-size figure, seen almost to the waist, and turned slightly to the right. It is known as the Gibbs-Channing-Avery portrait.

Willows, The. Corot; Cleveland Museum of Art, Cleveland, Ohio. A small canvas, with a cottage at the left, pollard willows at the right and in the background.

Windmill, The. Jules Dupré; Cleveland Museum of Art, Cleveland, Ohio. Landscape with windmill in center; background of cloudy sunset.

Woodcut. An engraving made upon wood; the term is applied also to the prints made from such an engraving.

Woodcutting. The art of woodcutting consists in drawing, or photographing, a design on the flat surface of a block of wood, generally boxwood, and in cutting away all that portion of the block upon which the design does not appear. The part of the block which is left in relief is covered with ink, and impressions of it are taken.

Wood-Gatherers, The. Corot; Corcoran Gallery of Art, Washington, D. C. A group of peasants at work on the edge of a forest. The picture was signed by Corot only a few days before his death.

Wood Sawyers. Horatio Walker; City Art Museum, Saint Louis, Mo. Two men in a farmyard are working with saw and sawbuck. Wood is piled against a fence behind the figures. The subject and the treatment have been described as those of an American Millet.

Young Bull, The. Paul Potter; National Museum, The Hague. A picture of powerful realism, held by many critics to be one of the greatest of animal paintings.

Young Woman with Water Jug. Jan Vermeer; Metropolitan Museum, New York City. An interior, lighted through a casement. On a table a brass basin, in which a young woman places a jug of the same metal.

TEST QUESTIONS

Point out the relation of the play-impulse to the rise of the fine arts 1503
How may the fine arts serve in furthering the development of democracy? 1503
Explain the advantage of the method used in this department in treating the history of painting. 1504
Characterize the four historic styles of architecture 1504
Discuss the method of treating in this department the history of sculpture 1504

MUSIC

Indicate the esteem with which the Greeks regarded music 1505
Point out some evidences of relationships between Greek and Chinese music. What part is Fuhsi said to have had in the development of Chinese music? 1505
Summarize the styles and developments of music in its three periods of growth . . 1505–1506
Characterize the uses of music among the Egyptians 1506
Discuss the use of the musical scale among the Hindus. State a distinguishing characteristic of Hebrew music. What kind of musical scale did the Arabs develop? 1506
What two wind instruments were important among the ancient Greeks? 1506
Describe the origin of the neumes. In what respects were they found unsatisfactory? Explain the way in which Guido of Arezzo used the neumes. Show how the musical staff developed from his device . . . 1506–1507
Indicate the origin of the word clef. What clefs are now in common use? 1507
Who is credited with having first assigned definite time values to the neumes? What kind of rhythm was peculiar to the 14th and 15th centuries? 1508
Name the notes used in 12th century music . 1508
What grouping of notes was the foundation of the Greek music system? 1508
Point out the musical services of Ambrose of Milan; of Pope Gregory the Great 1508
Enumerate the ecclesiastical modes 1509
Explain the origin of *solfeggio*. How did the accidentals, signs for flats and naturals, originate? 1509
What is a key signature? 1509
Discuss the tritone in Greek musical theory. What two Greek scales, in their relations and quality, suggest the modern major and minor scales? 1509
What are relative major and minor keys? . . 1509
Distinguish between normal minor, harmonic minor, and melodic minor scales 1510
Of what are rhythmic groups in music composed? What is duple rhythm? triple rhythm? simple rhythm? 1510
Define syncopation. Point out the meaning of a time signature 1510
Name some of the leaders in the old French school of counterpoint 1511
Give the name of a famous composition of the early 13th century in England 1511
Describe the achievements of the Netherland school of counterpoint 1511
Outline the career and indicate the importance of Orlando di Lasso in musical history. . . 1511
What is meant by the secularization of Church music? Point out the bearing of this process upon the career of Palestrina. Indicate the character of his work 1511
For what style of music was Frescobaldi famous? 1511
Summarize the important work of Adrian Willaert in Venice 1512
Describe the origin of the opera in the Florentine school 1512
In what ways was the opera developed by the Neapolitan school? by the French school?. 1512
Point out the origin of passion music in Germany 1512
From what musical form did the national German opera arise? 1512
Discuss the rise of troubadours and minstrels in Europe. Who is said to be the founder of the comic opera? 1513
Indicate the importance of the strolling players in the development of music in medieval times 1513
Show how folk song influenced Church music between the 14th and the 17th century . . 1513
Explain the meaning of the term "principle of tonality" 1513–1514
Point out an important difference between ancient Greek music and modern music . . 1514
What was the *organum*? Describe the *descantus*. Show how canonic imitation arose. In what way did this type of music prepare the way for harmonic music proper? 1514
Summarize the influence of the Protestant ecclesiastical chorus upon harmonic music. 1514
What was the most active cause of the rise of harmonic music? 1514–1515
Outline the steps in the transition from monody to harmony 1515
Explain why J. S. Bach is called the "father of modern music". 1515
Compare the careers and powers of Handel and J. S. Bach 1515
What place does Gluck occupy in the history of modern opera? Give the titles of several of his operas. How many operas did he write? 1515
Name the two most famous oratorios by Haydn 1515
Indicate the variety of musical composition in which Mozart excelled 1516
Point out two distinguishing characteristics of Beethoven's music. Name one opera and one oratorio by this master 1516
Name two groups of Schubert's most popular compositions. 1516
In what type of music is the work of Weber of greatest importance? What other composer was largely indebted to Weber for the style of his productions? 1516
Characterize the work of Mendelssohn-Bartholdy. Enumerate several of his most important works 1517
Define Schumann's position in musical history. In what kind of composition is his best work found? 1517
For what instrument chiefly did Chopin write? 1517
Name three famous operas by Meyerbeer; two by Saint-Saëns 1517
What is the notable characteristic of Rossini's most celebrated compositions? Enumerate the most famous operas by Donizetti. Account for the mastery of art shown by Verdi in "Aida" and "Otello" 1518
Who is called the undoubted leader of the modern Russian school? Name his most successful operas 1518
Indicate the place in musical history assigned to Richard Wagner. Characterize Wagner's use of the orchestra. Point out the position of "The Flying Dutchman," "Tannhäuser," and "Lohengrin" in the growth of Wagner's art 1518
Around what fairy tale did Humperdinck write a famous opera? 1519
State the most important contribution of Berlioz to musical art. Enumerate several of his most successful compositions 1519
Describe the type of piano playing and the musical form originated by Franz Liszt. . 1519

Indicate the relation of Brahms to romanticism and classicism in music. Characterize the compositions of Tchaikovsky 1519
To what nation did Dvořák belong? Name three of his best works 1520
Describe the unusual characteristics introduced by Grieg into his shorter compositions 1520
Characterize the program music of Richard Strauss. Name four of Strauss's more important works 1520
Describe the compositions of Debussy. Indicate two of his greatest works 1520
Who was César Franck? 1520
Name two works by each of the following composers: Delibes; Sullivan; Scharwenka; Moszkowski; Elgar 1521
Name the two men associated with the earlier American Church music. With what performances and with what date is American appreciation of serious secular music said to have begun? 1521
Name three famous European musicians who appeared in America before 1875. . .1521–1522
What type of music did Stephen Foster produce? Give the titles of the greatest works of Edward A. MacDowell 1522
Define musical form; motive; phrase. Describe a musical period 1522
Distinguish between one-part forms and two-part forms. Describe the song form with trio. What is a rondo? 1523
Describe the usual structure of a march . . 1523
Name and indicate the character of three old dances 1523–1524
Outline the structure of a musical suite. What is a folk song? 1524
Name three great composers of overtures. Describe the three types of overture that are recognized today 1524
What is the meaning of the term "chamber music"? 1524–1525
Outline the structure of the modern sonata cycle 1525
Point out the development of the symphony by various composers. Trace the origin of the concerto. For how many instruments is this form written today? 1525
Describe the form of composition known as a mass 1526
Name the first oratorio. Describe its structure 1526
Of what parts does the present day cantata consist? 1526
Define the term aria 1526
Characterize the vocal manner called recitative 1526–1527
What is the contrapuntal style? In what musical form did it originate? 1527
Describe the musical form known as canon. What is double counterpoint? Indicate the distinctive characteristic of the fugue. How are fugues classified? Who is the greatest master of the fugue? 1527
Name two of the chief musical stringed instruments used by the ancient Hebrews; four of the principal wind instruments . . .1528–1529
Describe the drums with which the Hebrews might have become familiar in Egypt. . . 1529
Enumerate several of the ancient Chinese instruments; of the ancient Assyrian instruments 1529
Characterize the typical ancient Greek lyre. Name several forms of this instrument . . 1529
Of how many tubes did the syrinx consist? . . 1529
From what sources did the Romans derive musical instruments? 1530
To what important invention do the Hindus lay claim? 1530
Name the three classes of modern musical instruments 1530
Characterize the tone qualities of the flute; of the oboe 1530
For what musical effects is the English horn appropriate? the bass clarinet? the bassoon? 1530–1531
Describe the equipment of a modern pipe organ 1531
Indicate the musical capacity of the tenor trombone 1531
Discuss some of the varied musical effects that may be produced on the violin. Indicate the characteristic timbre of the strings of the viola 1532
For what scenes and ideas is the music of the harp especially appropriate? Outline some of the tonal effects produced by various combinations of the stringed instruments of the orchestra 1532
What two composers have made notable use of the pianoforte in orchestral compositions? . 1533
Describe the kinds of drumsticks used with kettledrums. Characterize the emotional effects of the kettledrums 1533
Outline the uses of the piccolo flute and the clarinets in the military band 1533–1534
Discuss the uses and qualities of the following military band instruments: horn; trumpet; cornet; alto cornet; tenor horn in B flat. . 1534
Summarize the contributions of Helmholtz to the theory of music. What are overtones? . 1535
Distinguish between musical tones and mere noise 1536
Define pitch, intensity, timbre 1537
Describe the manner in which the ear receives and records sounds 1537
Indicate the circumstances which give rise to opera. From what form was the symphony developed? 1537
Name several composers who have developed the range and the capacities of the orchestra 1537–1538

OPERAS

What famous historical character is the central figure in Meyerbeer's opera "L'Africaine"? Describe the conduct of the island queen, Selika 1549
How does "Aïda" rank in popularity among Verdi's operas? Where is the location of the story? Describe the final scene of the opera. 1549
Summarize the story of "Andrea Chénier" . . 1549
Outline the plot of "The Barber of Seville" . 1550
Name the characters in "The Bartered Bride" 1550
In what setting is the story of "La Bohème" placed? 1550
Tell the story of "The Bohemian Girl" . . . 1550
How was "Carmen" first received by the public? Recount the story of this opera. . 1550
From what source is the plot of "Cavalleria Rusticana" derived? Upon what dramatist's work is the opera of "Le Cid" founded? 1550
By whom was the music of "The Daughter of the Regiment" composed? Summarize the plot of the story 1550–1551
Tell how fate overtakes Don Giovanni in the opera of that name 1551
What motive prompts the suicide of the hero Ernani? 1551
Who wrote the music of the opera "Faust"? What fact indicates the popularity of this opera? Recount the story of the opera . . 1551
Characterize the opera of "Fidelio" by Beethoven. Outline the story 1551
Whence is the plot of "Der Freischütz" derived? What character represents the supernatural element in the story? 1551–1552
Who is the composer of "Hänsel und Gretel"? Estimate the importance of this opera. Tell the story 1552
Recount the story of "Die Königskinder". . 1552

In what country is the setting of "Lakmé" placed? 1552
Describe the leading scenes in "Lohengrin" 1552–1553
Who wrote the music for "Lucia di Lammermoor"? 1553
Name the leading characters in "Madame Butterfly." Summarize the plot of "Manon" 1553
Tell the story of "Martha" 1553
Upon what work is the plot of "Mignon" based? 1553–1554
Who were the authors of "The Mikado"? . 1554
Indicate the position of "Orpheus and Eurydice" among operas 1554
Recount the story of "Parsifal" 1554–1555
Who wrote the opera "H. M. S. Pinafore"? . 1555
Who is the prophet in Meyerbeer's opera of that name? What fate overtakes him? . . 1555
Name the operas included in "The Ring of the Nibelung." Tell the story of each . . 1555–1556
Upon what play is Strauss's opera of "Salome" based? 1556
Outline the opera "Tales of Hoffman" . 1556–1557
Recount the story of "Tannhäuser" 1557
Summarize the story of Athanael in the opera "Thaïs" 1557
Describe the final scene of "Tristan und Isolde" 1557–1558
What is the rank of "William Tell" among Rossini's operas? 1558
Characterize Mozart's opera, "Die Zauberflöte" 1558

PAINTING

Define the art of painting. Outline two plans for the historical study of this art 1559
Describe the use of color in the decorative system of the Egyptians. Compare the effects of atmospheric conditions upon Egyptian and Assyrian painting 1559
Estimate the character of the paintings of Zeuxis, Parrhasius, and Apelles in ancient Greece. Name two famous Greco-Roman copies of Greek paintings 1559
For what purpose were mosaics employed by Byzantine artists? In what period did this type of art flourish? 1560
In what Italian cities did the modern art of painting take its rise? 1560
Show that Duccio rather than Cimabue is the true father of modern painting. Who was the founder of the Florentine school? Where are the best examples of Giotto's work to be found? 1560
What reason prompted general acceptance of Giotto's murals in his own time? 1560
Estimate the influence of Giotto on modern painting. 1560–1561
To what three artists do we owe the laws of perspective? 1561
Estimate the service of Masaccio to the development of painting. What great advance did Piero della Francesca make? 1561
What influences favored the introduction of the nude into painting in the 15th century? 1561
Characterize the treatment of the adult nude by several painters just before the High Renaissance 1561–1562
What two commissions given by Pope Julius II signalize the High Renaissance? 1562
Describe the theme and style of Michelangelo's frescoes in the Sistine Chapel 1562
What themes did Raphael treat in the study of Pope Julius? Describe his method of presentation. 1562
Characterize the genius and the work of Leonardo da Vinci 1562–1563
In what respect is Leonardo's "Last Supper" different from the portrayal of the scene by preceding painters? 1563
By what circumstances was the use of color in Venetian painting of the 16th century influenced? Illustrate by examples the meaning of the term "mood-picture" applied to some Venetian paintings. Indicate the respects in which Titian surpassed his contemporaries. 1563
For what purpose was the academy of Bologna established? Who were the chief instructors? 1563
Estimate the work of Guido Reni and his influence upon later painters. 1563–1564
Describe the training and character of Caravaggio. What is said of his influence in the history of painting? Name one of his famous pictures 1564
Who were the founders of the primitive Flemish school of painting? Characterize the Flemish choice and treatment of subjects . 1564
In what points is Albrecht Dürer compared with Leonardo da Vinci? Name his most famous and characteristic works 1564
For what work is the younger Holbein famous? 1565
Indicate the rank of Rubens in the art of painting. Discuss the rise of the Dutch school. . 1565
Describe the methods used by Hals in the guild picture. What are the titles of the three most famous paintings by Rembrandt? 1565
Name three Dutch painters of interiors, and characterize their methods. 1565
Discuss the genius and the historical position of Velasquez. Give the names of three other famous Spanish painters 1565–1566
Characterize the painting of Le Sueur. Discuss the achievements of Lebrun. Estimate the genius and the work of Mignard . . . 1566–1567
Describe the chief qualities of the art of Watteau 1567
What classes of subjects did Boucher paint? . 1567
Discuss the influence of the painting of David. Describe the reaction from his style . . . 1567
Name two famous works of the classicist painter, Ingres 1567
Who was the leader of the Romantic movement in French painting? 1567
In what paintings did Courbet exhibit his realism? 1567–1568
In what characteristic did Corot excel his contemporaries? Compare Rousseau and Diaz in their methods of painting trees 1568
Characterize the training and the spirit of Jean François Millet 1568
Explain the use of the term impressionism in painting. Who is reckoned the greatest exponent of impressionism? 1568
Characterize the work of William Hogarth . 1568
Compare the painting of Reynolds with that of Gainsborough 1568–1569
Who were the Pre-Raphaelites? Describe the work and the artistic influence of Burne-Jones and William Morris 1569
Name the first three notable American painters. What type of paintings did Trumbull produce? 1569
Outline the work of Gilbert Stuart. . . . 1569–1570
Point out the notable features of the paintings of George Inness 1570
Who were the first notable Americans to produce mural decorations? 1570
Describe the painting of Edwin Abbey in the Boston Library. Estimate the position of Sargent in American art. 1570
Point out leading characteristics of the work of William Chase, John W. Alexander, and Cecilia Beaux 1570

ARCHITECTURE

In what respect does the origin of architecture differ from that of the other fine arts? . . . 1571
Describe the structure of the primitive Egyptian cabin; of the Mesopotamian oven. Distinguish between the lintel principle and the domical principle in architecture 1571

Characterize the achievements of the Egyptians in the use of the column-and-lintel structure as exemplified in the Temple of Karnak 1571
Upon what type of buildings did the Persians expend their best efforts? 1571–1572
Point out the notable features of Persian porticoes. Summarize the architectural gifts of Persia and Egypt to Greece 1572
Of what material were the earliest Greek temples constructed? When was the first temple of stone erected in Greece? Where are the oldest architectural remains of Greek civilization to be found? 1572
In what age did the climax of Greek art appear? 1572–1573
Who was the director of the building of the Periclean Parthenon? What other architects were engaged in the work? 1573
Describe the architectural features of the colonnade of the Parthenon. For what purposes was color used on the building? . . . 1573
Enumerate the chief aims of Greek architects in the Periclean age 1573
Indicate the importance of "hut urns" in the study of Roman architecture 1574
In what year was the Pantheon erected? To what origin is the dome form of the Pantheon traced? What two claims are made as to the importance of this dome in the history of architecture? 1574
State the evidence for the primitive form of the Pantheon dome 1574–1575
Describe the general dome scheme of the mosque of Santa Sophia. What is the principal contribution of Byzantine builders to architecture? 1575
What was the object of the dome set on a drum, as it appeared in Florence? 1575
Upon what building did Brunelleschi model his dome for the Cathedral of Florence? . . 1575
Describe the lantern as built by Brunelleschi and his successors. Indicate the weaknesses of the dome of the Renaissance period . . . 1576
State the purposes of Pope Julius II with respect to art in the city of Rome 1576
Criticize Bramante's plans for the Tempietto. What large commission did Pope Julius give to Bramante? 1576–1577
What type of dome did Bramante plan for Saint Peter's? How much of the construction did he carry out? 1577
Indicate the changes made by Michelangelo in the plans for the dome of Saint Peter's. Point out the errors by which he weakened the dome. Who supervised the completion of the dome after Michelangelo's death? . . 1577
State the influence of the Petrine Construction upon later building 1577
What method has been used to prevent the disruption of Saint Peter's dome? 1578
When was artistic supremacy in Europe transferred from Rome to Paris? 1578
What two architects of one family built notable domes in the reign of Louis XIV? 1578
Estimate the architectural quality of Soufflot's dome of the Pantheon in Paris . . . 1578–1579
Summarize the work of Sir Christopher Wren in respect to old Saint Paul's before the Great Fire of 1666. How does the new Saint Paul's rank among the European cathedrals? 1579
What plan did Wren first submit for the new church? What requirements led to a change of plan? Describe the construction of the dome erected by Wren 1579
Enumerate some instances of the use of arch forms in ancient times 1579–1580
What two architectural forms were combined in the Colosseum? 1580
Under what Lombard queen did the Lombards begin to build churches? What name attaches to the Lombard builders? 1580
Name the elements of the Lombard style of architecture 1580
Describe the structure of the early basilica . . 1580
Discuss the architectural interest of the Lombardic façade 1580–1581
Compare the façades of Notre Dame, Amiens, and Reims 1581
What is required to insure the stability of an arch? 1581
Trace the development of Gothic construction through the barrel vault to the flying buttress 1581
Point out the functions of the ribs in a Gothic structure 1581–1582
In what century did the Gothic system reach its climax? 1582
Discuss the development of the Gothic style in France and its spread to England, the Rhineland, and Spain 1582
Describe the plan of the English chapter house. Estimate the distinctive qualities of English cathedrals 1582
Explain what is meant by corporate effort in French cathedrals 1583
Illustrate the slow growth of English cathedrals. Show how Canterbury exhibits the work of successive ecclesiastical architects. 1583
Compare French and English cathedrals. State the Gothic legacy to architecture . . 1583
Enumerate some of the predecessors of the American skyscraper 1583–1584
Show how the Turbine Factory in Berlin illustrates the principle of functionalism . . . 1584
Discuss the new methods of construction as illustrated in the World Building in New York. Explain what is meant by the panoramic character of the tower of the Woolworth Building 1584

SCULPTURE

Describe the ancient Egyptian sculptured figure called "The Sheik." Point out notable qualities of the two statues known as "The Scribe" and "The Dwarf" 1585
Discuss the colossal sculpture of ancient Egypt. Point out its influence upon the art of Greece 1585
In what arts did the Mesopotamian peoples excel? Describe a splendid example of Assyrian animal sculpture 1585
Discuss the relation of the Olympic games to the genesis of Greek sculpture 1586
From what source was the early female draped figure of Greek sculpture derived? 1586
Point out the characteristic features of the early Apollo type of sculpture; of the archaic Ionian figure 1586
Characterize the art of Myron. To what position in the history of sculpture is he assigned? 1586
Indicate the range and quality of the genius of Phidias 1586
Describe the location and the composition of the Parthenon frieze 1587
Indicate the rank of the Parthenon pediment among ancient works of sculpture. Upon what two works does the popular fame of Phidias rest? 1587
Name two sculptures representing the development of the early Apollo type by Polyclitus. 1587
Describe the important innovation in the pose of the sculptured figure introduced by Polyclitus 1587
Characterize the statue of Hermes attributed to Praxiteles 1588
Discuss the relation of several famous statues to Praxiteles' treatment of the female figure. 1588
Compare the sculpture of Scopas with that of Praxiteles and his school. What was the greatest labor of the career of Scopas? . . . 1588
Indicate the place of the "Niobe Group" in the history of Greek sculpture 1588

In what type of figures did Lysippus excel? What was his relation to Alexander the Great? 1588–1589
Discuss the origin and the quality of the statue known as the "Dying Gaul" 1589
Describe the scenes portrayed on the so-called "Altar of the Gods" at Pergamum 1589
To what type of statue is the "Venus of Melos" said to belong? 1589
Describe the general style of sculpture with which Greek art came into contact in Rome. Discuss the purpose for which sculpture was employed under Augustus 1590
Compare the sculptures on the Arch of Titus with those on the Column of Trajan . . . 1590
Outline the development of symbolic sculpture after the decline of Rome 1590
Describe the use of sculpture as tributary to architecture 1590–1591
Indicate the significance of the figure of the Virgin in the porch of Notre Dame, Paris, in the history of medieval sculpture. 1591
Point out the extent of French influence in the sculpture of Germany and Spain 1591
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Describe the statue "David" by Donatello. Indicate its place in the development of modern sculpture. 1592
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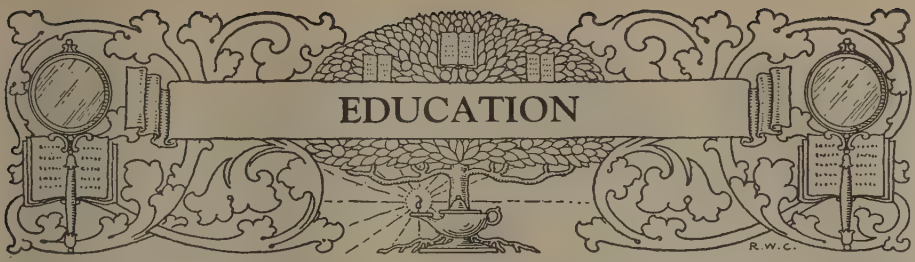
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INTRODUCTORY

An organized educational system, carried on by professional teachers and provided with suitable material equipment, such as special school buildings, textbooks, maps, and scientific apparatus, is a product of modern civilization. Primitive peoples and societies in the earlier states of civilization had no institution such as the school which we know today. They did, indeed, give their youth some preparation for the later activities of adult life, but this training was acquired through imitation of the older members of the family or tribe, and the process of education was in no wise separated from the general life of the group. The savage boy learned to use the implements of war and the hunt by being a part of the tribal group that engaged in these activities. Girls were trained in domestic duties by the older women. There was no special body of knowledge that required for its transmission an institution and a teacher.

Beginnings of Special Education. The first demand for a definite type of education, which appeared as civilization advanced and as the earlier unsystematic type of education became inadequate, was the demand for religious training. Primitive tribes frequently organized elaborate ceremonies at the time when the boy became a candidate for admission to adult society, and through these ceremonies initiated him into the secrets of tribal religion. Special education of the girls was never as fully organized as was the special education of boys. Indeed, even in modern times, the informal imitative type has more commonly prevailed in the training of girls than in the training of boys.

The special ceremonies which were developed in primitive tribes for the education of boys were usually reserved for the privileged classes. In those primitive societies where the distinction between the ruling class and the slaves was marked, it was only the upper class that enjoyed the advantages of initiation into tribal practices. The sons of the warriors who were to become the priests or the military leaders of the tribes were the ones who were given special education, and this instruction was usually imparted by the priests.

Development of Secular Education. From institutionalized education under the supervision of the church to public education under the control of the state is a step which can readily be understood. One has only to recognize the fact that, as civilization became more complex, special bodies of knowledge accumulated, which were not religious in character and were not susceptible of transmission through simple imitation. As soon as any nation began to develop a literary language which was more complex than the primitive language of the semi-barbarous tribe, it was natural that there should be set aside a certain group of individuals to cultivate and transmit the literary traditions of the nation.

Throughout the history of educational systems, the transmission of literary material has been one of the main functions of the school. The result is that the content of the course of study in schools of all grades is very largely literary. Training in industry and instruction in the ordinary practices of social life are, even in modern times, left very largely to the family or to the intimate social group in which the child grows up; but the family is not able to give to the child the amount of attention which is necessary to provide him with the full knowledge of language, history, literature, and other similar literary subjects.

Growth of Public Education. What originated as the practice of the nobility has gradually come to be the general practice of the community. Schools have been set up by all modern communities, and their children have been brought together under the supervision of teachers trained to handle large groups and thus relieve parents of the necessity of individual training or private tutoring of their own offspring. So significant has it become for modern society that children be properly introduced to the special bodies of knowledge necessary for successful living, that the state has finally taken over the whole matter and has even gone so far as to prescribe that every child must be in attendance at a public school. All modern nations have educational laws of more or less complete compass, and are prepared to enforce these laws in such a way as to provide, with a high degree of certainty, that no child shall escape training in the fundamentals necessary for social intercourse.

For example, it is intolerable in modern society that any considerable number of persons shall be unable to read. Reading is necessary in order that there may be ready communication between a government and its citizens.

What has been said with regard to reading can be repeated with reference to the ability to use numbers. Modern society cannot be carried on unless its members are able to count and to execute with accuracy some of the simpler calculations which are necessary for commerce and trade. Here, again, it is not possible to depend on the individual family to prepare its children in the use of numbers. Consequently, society has provided by law that every child shall attend the organized school long enough to acquire at least the rudiments of number.

Expansion of the Curriculum. One must be able to write, as well as to read and perform correctly simple calculations. A century ago these activities, commonly known as "the three R's," were all that society demanded as essential to an elementary or common education; but the commercial relations into which every one must now enter and the social activities which every citizen must share are gradually making it necessary that every citizen shall have knowledge that extends far beyond the rudimentary branches. One must know something about geography if he is to be an intelligent member of a community such as we have in the United States. One must know something about the history of one's country. For these and like reasons, we find that state legislatures have been prescribing in recent years a large number of subjects to be taught in the schools.

American and European Schools. A study of the schools of the United States will bring out characteristics which most Americans do not know to be unique. It is proper therefore at the outset to call attention to the important fact that the schools of this nation have characteristics which could appear only in a democratic educational system.

First European University. The European schools took on their present form during the late medieval period. As late as the 12th century there

were in Europe no educational institutions other than the monasteries within the Church, where the clergy received such training as was held to be necessary for their calling. During the 12th century the first great schools of Europe were organized. These were not schools for the common people nor for the training of youth for any of the common activities of life. Special institutions were not regarded as necessary for the training of ordinary children. The first schools were intended only to give that special type of education which would raise the individual to a position of unusual influence and power.

The first of these institutions was a law school at Bologna, Italy, chartered in 1158. One Irnerius had succeeded in translating the codes of law of the northern Italian cities. He lectured on these codes to students who came from all parts of Europe to prepare themselves to maintain their places as members of the governing classes of the nations to which they belonged. This was the beginning of the first of the great medieval universities.

It will be seen from this brief description that the institution was what we call in modern terms a higher professional institution. Other similar institutions were organized for instruction in medicine and theology.

Preparatory Schools. In connection with these great centers of learning, there grew up in the provinces preparatory schools, where boys who were going to attend the universities acquired a knowledge of the Latin language, which was necessary in order to understand the university lectures. These preparatory schools had to secure their teachers from the only educated class that was in existence at the time, namely, the clergy. The Church, therefore, exercised throughout the educational scheme a very large influence. Many of the clerical orders of the Roman Catholic Church were established for the purpose of organizing and conducting schools.

The preparatory schools, like the universities, received only boys from the upper classes of society. They were schools for the aristocracy, not for the common people. The courses of study which they offered were also determined by the special purpose for which they were organized. There was in these schools no disposition to deal with the common facts of ordinary life. Like the universities, they were highly restricted in spirit and in content of instruction.

Origin of Common Schools. Schools for the common people were not organized until much later than the universities and the preparatory schools. These schools grew up in part under the control of the Church. There were so-called cathedral schools, which were gradually organized at the great centers of population, within the cathedrals themselves, for the purpose of training the boys who were to serve in the choir. The boys who were to render such service were sons of the common families. They had to be trained in reading and music in order to take part in the Church services. Sometimes a charitable priest would extend instruction in these cathedral schools beyond reading and music, so as to give the boys some special help in preparation for their relatively simple lives. A little arithmetic was added to the other lines of teaching. The catechism also was taught in these schools. Indeed, the clergy frequently taught the catechism to the common people in direct connection with the Church services and in special classes. The catechism classes became the nuclei of schools for the boys and girls who were in no wise related to the higher schools.

These religious schools gradually were extended, and, at the time of the Reformation, the leaders of that movement saw the importance of giving religious instruction to all the common children. They therefore organized numerous schools in connection with the religious centers even in the smaller communities. The common school, which thus grew up, frequently had the support of some intelligent ruler who recognized the desirability of giving religious and general instruction to the common people in his province. Common schools were not intended, however, to raise the common people above the level of their ordinary lives. None of the common schools led into the universities or into the professions.

Dual European School System. From what has been said, it will be understood why Europe in the modern period has two distinct types of schools,—one for the aristocracy and one for the common people. Just as society in Europe is divided into distinct classes which are perpetuated by heredity, so the schools of that continent are divided. Indeed, the perpetuation of the class system is dependent on the continuation of a class school system. We see here a very striking illustration of the parallelism between general civilization and the schools which grow out of it. In England, which is the most democratic of the European countries, a slight modification of the general class system of education has been devised, which again reflects the special spirit of a nation's civilization. A system of examinations has been developed which allows bright pupils to pass into the higher schools from the common schools.

Early Division in American Educational System. American practice differs from that of Europe. Originally, the schools of the United States were so organized that there was a common school for the ordinary people and a higher school for the clergy. When Harvard college was first organized in Massachusetts, it was a school for the upper classes, that is, for the boys who were going to enter the ministry. A preparatory school in connection with Harvard was organized in the Boston Latin school, which, like the college, was not intended for the training of the ordinary boys and girls of Boston, but was an exclusively classical school preparatory to college.

The common school which grew up in Massachusetts and the other colonies was a semireligious institution with a much less pretentious curriculum than that of the Latin school. The reading matter used in the common school was the catechism and extracts from the Bible. Indeed, the common school was described in the early statutes of the Massachusetts colony as an institution set up for the purpose of training children in reading, so that they might come into direct contact with the Scriptures.

The dual school system thus inaugurated in early colonial days broke down in the course of time, because the small groups of migrating families who went westward to what then was the frontier were so democratic in spirit and organization that they could not maintain any of the distinctions which had been common in Europe between the upper classes and the common people. The small villages which grew up in Massachusetts and Connecticut could maintain only a single school. This situation was due in part to the expense of maintaining schools, but in a larger measure it was occasioned by the absence of distinctions between the different classes of people of these village communities.

After the single school system was started in the villages of the colonies, it was natural that its expansion should be along lines that would maintain the democratic character of the original organization. When the community grew rich enough to set up a higher school, this also was open to all classes of boys and girls. The result has been that in the United States the common school and the higher schools have been organized with a unit plan of education for all the people. The American high school is an institution which follows directly upon the common school and is open to all comers, without regard to social classification. In the same way the colleges and universities of this country, especially the state universities which have grown up in the Western commonwealths, are expressions of the democratic demand for a universal higher education. The spirit of class division is thus eliminated in the schools of the United States.

The practices of modern schools can be understood only in the light of history. Enough has been said in the introductory section to make it clear that the administrative units of modern American and European schools are descended directly from earlier forms of organization which grew up in various nations in response to the needs of the special types of civilization cultivated by these nations. But we may go much further than was indicated in the introduction. The details of instruction, including the materials in the course of study and the methods of classroom instruction, are dependent in all educational systems on the traditions which have come down from earlier times. Striking examples of this fact can be seen in the high respect in which the classics are held in American higher schools. This pre-eminence of the classics can be understood only when reference is had to the educational traditions of Europe. Furthermore, the methods of teaching in American and European schools are alike while the methods of Oriental schools are of a wholly different order.

In treating the history of education, it becomes necessary to draw a distinction between the school as an institution and certain personal influences which from time to time have appeared and have operated to reform institutional practices. The school as an institution tends to be conservative. Once its practices are established, it is natural for each succeeding generation of teachers to follow the examples of those who trained them. Progress or change in methods of teaching and in the courses of study usually depends on the vigorous efforts of some reformer who sees the inappropriateness for a later period of the educational procedures which have been brought down from an earlier age.

Reformers are seldom able to overcome altogether the conservatism of established institutions. The history of education is accordingly the account of a series of compromises between new ideas of what ought to be done and traditional practices which are thoroughly established.

For the purposes of our treatment, it is legitimate to treat in separate subdivisions first the institutions which have appeared in various countries at different times, and second the reformers who have labored to improve these institutions.

EDUCATIONAL INSTITUTIONS

Ancient systems of education must be understood as parts of the religious and governmental organization of the nations to which they belonged. Numerous glimpses into the educational system of Egypt are given by passages in the Old Testament. It is recorded that Moses was trained in all of the wisdom of the Pharaohs. This means that Moses, as a member of the royal family, was given the benefit of such knowledge as the governmental officials and priests of the day were able to accumulate and transmit.

Egyptian Education. Moses was in this respect absolutely separated from the other Hebrews, who, as slaves, enjoyed no privileges of education whatsoever. Moses was a member of the ruling class. His associates were the priests and princes. The priests had a body of knowledge which the common people did not possess. A curious and striking illustration of this can be given in the fact that these priests apparently knew enough about the science of optics to project from concave reflectors images of people on the walls of their temples and on the columns of smoke which rose from their altars. The projected images appeared to the common people like apparitions of their gods. The priests who knew how to make these projections are not to be charged with insincerity. They, undoubtedly, regarded these scientific secrets as gifts from the Deity, given them for the purpose of maintaining their control over the common people. They transmitted their knowledge of optics and other sciences, such as astronomy and architecture, to the rulers of the nation and to the members of their own priestly class, the training of princes and of novices for the priesthood being an important part of the work of every clerical community.

The educational system of Egypt was thus strictly a religious and royal institution carried on through the priests. The records show that schools for the young noblemen were organized in the palaces. Here discipline was severe and flogging was common. Instruction dealt largely with good manners, with ethical and political principles, and with such sciences as the priests and other teachers could command. The measurement of land was one subject taught. This was especially important in view of the necessity of relocating property after the inundations of the Nile. The boys were also taught swimming and gymnastics.

Greek Education. Greek education was of a somewhat different type. There had been developed in the Greek states a form of government which called for participation on the part of all the members of the aristocracy. Public debates among the members of the aristocracy were the common form of procedure in arriving at public decisions. Anyone who wanted to be a leader in the state must accordingly be prepared to speak in public and to maintain himself in an argument with his contemporaries. Training in rhetoric was, therefore, essential to the youth of the Greek states, and we find that special teachers of this subject exercised great influence in public affairs. Socrates (469–399 B. C.) was charged with having corrupted the youth of the land by the special form of logic and debate which he inaugurated. He was a philosopher and a teacher. He gathered about him a group of the younger men, taught them morals, and prepared them for participation in public life. Following his example, Plato (429–347 B. C.) and Aristotle (384–322 B. C.) conducted training classes for the young men of the aristocracy. The records of the sayings and teachings of these philosophers constitute a major contribution to European intellectual life. Again we must recognize the fact that these teachers were not connected with any public institution, but were influential because they gave a special type of training which was needed by the upper classes to maintain their social and political positions.

There was another important aspect of Greek education; it consisted in physical training in preparation for participation in the great national Olympic games. The Greeks prized perfection of bodily development most highly. They celebrated this perfection in the plastic art which still remains the wonder of the world. The youth of Greece were trained to run and to participate in other forms of physical exercise, and thus to perfect their bodies. In this way they were prepared to become formidable soldiers when they grew to be men. The prizes awarded at the Olympic games were regarded as great civic honors and were eagerly contested for by the young men from all the Grecian states.

Although the institutions which grew up among the Greeks were not perpetuated in the later periods of European education, the writings and teachings of the Greek philosophers exercised an enormous influence, furnishing in no small measure the materials which were used in all the higher schools of medieval and modern Europe. Thus the writings of Aristotle were the basis of scholastic education. The system of logic laid down by him was perfected until it became the chief subject of attention on the part of scholars.

The University of Alexandria. A part of the Greek influence came into Europe indirectly through the University of Alexandria where many great scholars worked. It was here that Euclid formulated about 300 B. C. the system of geometry which set forth in the form of strict Aristotelian syllogisms the

principles of land measurement which had been developed in Egypt and Greece. The Euclidean geometry which is still taught in our modern schools is a combined product of Greek and Egyptian education.

In theology as well as in the mathematical sciences, the influence of the University of Alexandria and the Greek schools was strong. Plato as well as Aristotle was accepted by many of the medieval scholars as an authority on matters of government and philosophy. His theory of the state which included a definition of education has been cited even in modern times as a proper basis for social organization. Plato was one of the authorities much studied in Alexandria and his doctrines were there worked over into a system of religious dogma.

Chinese Education. If we go to the Orient and consider the development of education in China, we find something which is a cross between the type of education found in Egypt and that which appeared in Greece. The great philosopher and teacher of China, Confucius (551–478 B. C.), laid the foundation for the political system of the Chinese state. His writings came to be of the greatest importance to anyone who intended to share in the government of China. Hence, the educational system of China centered about the writings of Confucius, and the young men of the country sought to make themselves masters by a process of merely memorizing all the maxims laid down by the great teacher.

There was a peculiar difficulty in the transmission of the maxims of Confucius, because the written language of the Chinese is clumsy and requires the very highest degree of specialization in order that the student may learn to read. Chinese written symbols were never simplified into a single alphabet, as were the written symbols of the Greeks. Each Chinese word is represented by a separate symbol. The labor of learning to read is, therefore, very considerable. A Chinese student is obliged to spend a much longer time in acquiring this art than is the boy of any European nation. The result was the development in China of a scholastic system which very rapidly became highly formal because of the difficulties involved in learning to read.

Furthermore, the isolation of China from other nations seems to have prevented the development of any large body of sciences such as geography and comparative politics, which in Europe played an important part in the building up of the courses of study in higher institutions. China has, therefore, for centuries been content to train its youth in the art of reading the maxims of Confucius and similar teachers. Its educational system became stagnant—stranded, so to speak, on the inherent difficulty which the learner encountered in securing a broad view of knowledge. The formal system of training was rendered even more sterile by the erection of an examination system under the control of the state, through which boys were selected for the civil service. This examination system dealt with the maxims of early writers and operated to discourage altogether the development of anything like a modern and progressive attitude toward intellectual matters.

In recent years the Chinese schools have undergone a radical change through the stimulus of European and American models. The old formal scholastic training in Confucianism has rapidly given way, but there are at the present time very few Chinese public schools, and the support of these schools is so meager that there is little prospect of China's developing in any reasonable length of time an educational system at all comparable with that which is to be found in European countries.

Education in India. The educational system of India is to be compared with that of China. Schools of the native type are very scantily equipped, and the teachers deal only with formal subjects largely of a religious type. England has in recent years introduced many schools modeled after the pattern of her own schools. These exist in addition to the native schools.

A curious contrast exists between the methods of instruction in the native schools of India and the methods of instruction common in European and American schools. The pupils in the schools of India prepare their lessons by reading aloud the text which they are supposed to learn. All of the members of the class read at the top of their voices, and there is endless confusion in one of these schools. By listening to the reading, the schoolmaster is able to tell which one of his pupils is doing his duty most earnestly. The best pupil in the class is the one who reads the most persistently and in the loudest tones. Notions with regard to classroom discipline and classroom order are, therefore, wholly different from those which we entertain and those which have been traditional in European schools.

Roman Schools. The Roman boy of the earliest period was educated by his father. After 300 B. C. he was generally educated by a Greek slave. When the Roman state came into ascendancy and conquered the European provinces, Greece was gradually breaking up, and in 146 B. C. she became a conquered state. Learned Greeks came to Rome, in many instances as slaves of rich families. These learned Greeks were able to read; they knew the ancient literature of their race, and had some equipment in scientific knowledge. The Roman aristocracy was made up chiefly of warriors. There was, at the outset, no Roman literature to compare with the perfection of the writings of Homer and the other Greeks. The Greek slave was, therefore, a great asset in the Roman home. He took the boy in hand and gave him a type of knowledge which the father did not possess. From time to time, groups of families united in employing some especially competent Greek to instruct their boys.

Apparently, from the records, the boys in the Roman state were not especially eager to take on the training which the learned Greeks were prepared to offer them. Like the boys of all generations—but it seems in an unusual degree—the Roman boys were unruly and disorderly. Furthermore, from the conditions that have been described, it will be seen that the course of study which could be offered by the Greek was hardly suited to the taste and the future activities of most of the Roman boys. We have here one of the first examples of an imported education. The conditions found in Rome are not unlike those which appeared in Europe when a classical education, borrowed from older civilizations, was imposed upon a people who in their common lives had very little contact with these older types of thinking and writing.

There were other forms of education in Rome, especially the military types of training. The boys were prepared for the army by strenuous physical exercises and by games, through which they were made vigorous in body and skillful in the use of all sorts of weapons Physical education was, therefore, an important part of the training of the Roman youth. As contrasted with the Greek physical education, it aimed less at æsthetic development, and sought more to produce powers of resistance.

Charlemagne's Palace School. With the disintegration of the Roman state, Europe broke up into a number of half-civilized nations and tribes. As any one of the rulers in the early medieval period succeeded in enlarging his state and solidifying his government, he was compelled to set up some of the institutions of civilization. The most notable example of the establishment of a school in these early days is to be found in the Palace School of Charlemagne. Charlemagne had conquered a very large part of the western countries of Europe.. He employed an English monk named Alcuin (735–804) to conduct a school which was attended by his sons and by the other princes of the royal group.

Alcuin prepared material for this school, and we have some curious examples of the textbooks which were used at that time. One of these is an arithmetic. The numbers were all expressed in Roman

numerals. It is not easy to carry on the more complex arithmetical operations if one uses Roman numerals. For example, if one tries to state a problem in multiplication in these numerals, one will readily see the difficulty that was encountered by Alcuin and his pupils. Take the problem, XXVII multiplied by XLIV; the multiplication thus expressed suggests no regularity of relations between the different numbers. As a matter of fact, Alcuin found it necessary to devise an elaborate system of addition which would give the results that the modern boy, who has the advantage of the Arabic numerals, can readily work out according to the modern multiplication tables. Alcuin gave the princes of Charlemagne's court, in spite of the difficulties which he encountered, the best training in arithmetic and in letters that his broad knowledge could command.

It is probably true also that at about this period some of the art and wisdom of the Arabs, who came into Europe by way of Spain, began to influence the intellectual life of the European nations. At all events, it is certainly true that, after the withdrawal of the Moors from Spain, literature and the sciences of mathematics and medicine developed more rapidly than they had in earlier years, and that schools of the higher type, referred to in the introduction as medieval universities, began to develop.

MEDIEVAL AND MODERN EUROPEAN SCHOOLS

The latter period of medieval education in Europe exhibits a number of different kinds of schools. There were the schools for knights, in which the younger members of the aristocracy learned to ride and hunt and to carry on the arts of war; there were medieval universities, which were schools of law, medicine, and theology. Later, various reform movements arose within and without the Church, yielding in many cases organized systems of education.

Jesuit Schools. Notable among the later systems of this type were the Jesuit colleges which flourished for centuries and are influential even in modern times, especially in Roman Catholic countries. These schools were maintained by the religious order established by Loyola, who was born in 1491. They were highly organized, with a carefully planned course of study designed not only for the training of novices who were to enter the religious order but also for the training of boys of the better families, who were to be governors and military leaders. The course of study always included liberal quantities of the Latin language, which was in universal use among the educated classes in the medieval period.

Latin. The Latin language had a unique place in medieval Europe, and the whole history of European education revolves around this subject. Not only was Latin taught because of its utility as a medium of communication, but it was the bearer to the medieval world of the older and vastly influential Roman civilization, which dominated the religious, legal, and military organization of every European state. The great cultural movement known as the Renaissance can be understood only when it is remembered that the nations of northern Europe were very dependent for their culture upon the art and literature of an earlier age.

The enthusiasm for the study of Greek and Latin during the 14th and 15th centuries reflects the dependence of the northern European nations upon the culture of the South. There are many indications that the intellectual awakening of the northern nations was accomplished by devoted study on the part of the clergy, as well as on the part of those who had literary tastes and who were not satisfied with the intellectual life provided by the Church. In a poem entitled "The Grammarian's Funeral," Browning has given a picture of the enthusiasm of the Renaissance for knowledge of Greek and Latin. The Grammarian is pictured as an old man who has devoted himself in his later years to the arduous studies necessary to master the Greek language. He had gathered about him a group of enthusiastic students, who, in the poem, are represented as following their master to his grave and celebrating in this ceremony their appreciation of the intellectual world which his studies had opened up to them.

The Classical Traditions. Classical and theological subjects were the chief studies in the higher schools of Europe. The establishment of the classical course was so complete that, throughout all of the later generations of European civilization, this course has been the characteristic feature of the higher schools. For example, in England it is only within recent years that the modern languages have had any adequate attention. In Germany, it required the personal influence of the former kaiser Wilhelm II to give standing in the higher schools to subjects other than the classical languages. The best higher schools of Europe today are still devoted to the classical traditions, and the classical languages have been brought over to the United States as important elements of the high school and college curriculum.

Secondary Education and the Classics. What is true of the universities is true of the schools which prepare students for the universities. Such schools are commonly called, following the French terminology, secondary schools. This term has come to have very general use. We speak of the American high school as a secondary school. In like fashion we speak of the French *lycée* and the German *Gymnasium* as secondary schools.

The development of secondary schools in Europe was first a succession of efforts to organize instruction in the classical languages, afterwards a slow growth of additional subjects, such as mathematics, and, at length, science and the modern languages. The various periods of this development are characterized by recurrences of enthusiasm for the content of Greek and Roman culture. The enthusiasm for the classics degenerated from time to time into mere attention to the grammatical and rhetorical forms of Latin authors. The periods of devotion to the content of classical culture are called periods of humanism.

There was a period, for example, during which the teachers of Latin were more interested in the use of a vocabulary and a style copied from Cicero than in the facts of Roman life or the facts of Greek culture. Formalism in expression dominated this period. It made very little difference what were the subjects of discourse so long as most of the phrases were of the Ciceronian type.

After each period of interest in form, there came a period of interest in the content of that which was read. For example, in Germany in the latter part of the 18th century the intellectual leaders of the nation, such as Goethe (1749–1832), Herder (1744–1803), and their contemporaries, rebelled against instruction in the mere forms of expression and inaugurated a reform which is known as "neo-humanism." This neo-humanism sought to find serenity and balance of life in a revival of Greek art and an imitation of Greek literature.

Similar alternations of interest in form and content have marked the whole history of the study of the classics. Even in modern times this same contrast appears. There are some teachers who defend Latin today on the ground that it is a perfected form of expression; while there are others who point out that a study of the classics is justified only in the degree in which it makes students acquainted with the experiences of earlier and highly developed nations.

New Secondary Subjects of Instruction. The later periods of secondary education have been complicated by the fact that many new subjects have been developed and are demanding a place in the scheme of education. The natural sciences developed rapidly after the 17th century, and it has

become increasingly important in modern times for every student who is going to be a leader in social and political life to know something of the natural sciences. Within the last century, the scope of scientific inquiry has vastly increased through the development of the biological as well as of the physical sciences. Commercial and industrial life have been modified and reorganized through the influence of these sciences, with the result that a higher education is altogether incomplete if it does not include a generous amount of training in natural science. Moreover, within the last two generations, the social sciences have been added to the natural sciences, and it has become apparent that in a complex society, such as that in which we live, it will be necessary, even in the lower schools, to give instruction in economics and the theory of government.

Among the purely literary subjects, also, there has been competition. Modern languages and the culture of modern nations, as well as the earlier civilizations of Rome and Greece, have come to be important for students. Secondary schools have accordingly adopted modern languages into their curriculum, and in some instances the effort has been made to substitute the modern for the ancient languages.

Slow Change in Traditions. Whatever have been the changes in the curriculum and in the organization of the secondary schools, these institutions have maintained their place in Europe as entirely separate from the schools for the common people. Thus, in England there are a number of famous and ancient endowed schools which still continue to train the aristocracy and still maintain the traditions of the medieval educational system. These schools are called "public schools." This name was adopted in the early history of such institutions as Rugby, Winchester, and Eton, because these schools differed from the tutorial system that was practiced in many of the homes of the aristocracy. Furthermore, it was common for the patrons who endowed these schools to give certain scholarships and to permit bright boys from among the common people to enjoy the advantages of a special education without cost to themselves. The institutions are not public in the sense in which free schools are public. Indeed, all European secondary schools charge a tuition. Furthermore, the so-called public schools of England continue to give a formal, classical course of study. It is the traditional theory of these English schools that, by studying Greek and Latin, boys can acquire the type of mental concentration and moral discipline necessary to make them competent officers in the army and satisfactory members of the civil service corps.

It has been the contention of many reformers, on the other hand, that the same ends could be much more advantageously attained if science and modern literature were substituted for the classics. Such a substitution, it is argued, would provide mental discipline and, at the same time, give the information necessary for intelligent participation in the activities of modern society. One writer whose essays have been a very large influence in promoting reform in English and American education in the direction of science and modern literature is the philosopher Herbert Spencer (1820–1903). His essays on education, published in 1861, were a vigorous attack upon the traditional classical system and a powerful plea in favor of science in secondary education.

The English municipalities have in recent years contributed to the reorganization of secondary education by establishing a new type of higher schools. These schools are known as municipal secondary schools. They are maintained by the industrial cities of England, such as Liverpool, Leeds, Birmingham, and Sheffield, and they give instruction in the sciences that are necessary for the maintenance of the industries in these various centers. They are open also, on a much more liberal scale than are the traditional schools, to the boys of the cities who are going into the industries and commercial life.

European Universities and Scholasticism. The European university has been from the first typically a professional school. At the outset, as was indicated in the introduction, each university center had its characteristic course. It was a school of theology or a school of medicine or a school of law. Later each institution set up a number of branches. The branches which were most common were those which have been mentioned, namely, theology, law, and medicine. There was also a general branch, known as the philosophy division of the university, in which a miscellaneous collection of literary and scientific subjects was provided. In this division of the university most of the new developments have taken place.

The universities of the medieval period were the homes of so-called "scholasticism." This word is often used as a term of reproach, from the point of view of modern educational thinking. It is commonly implied that scholasticism means mere formalism in thinking, as a substitute for productive originality.

There is ground for this notion that scholasticism was altogether formal. The common type of instruction was that which emphasized logical forms. The Aristotelian syllogism was the pattern which was adopted for all thinking. A science of logic was cultivated to the exclusion of interest in any real facts. The scholastics often debated purely artificial questions with a view to increasing their critical knowledge of the possible uses of the syllogism. Given certain premises for an argument, it made no difference to them whether the argument was practically productive or not. They merely wanted to make sure that the consequences of the premises assumed were carefully worked out. History tells of debates, between great leaders in this scholastic period, which continued day after day, and the debater who received the highest academic awards after one of these debates was the logician who was most competent in the use of syllogistic forms and in the exercise of criticism which attached to these forms.

While, however, there is ample ground for the statement that scholasticism was excessively formal, it should not be overlooked that this period devoted to the study of logic was of great significance in the development of the power to think in fine distinctions. The scholastics created, in the languages which they developed, an instrument for a later type of discriminating scientific thinking.

They also established the practice of research, that is, they set aside a group of people whom society was prepared to support for the purpose of developing an intellectual life which had no immediate practical bearings. There has always been some prejudice on the part of practical people against university organization, because it has been felt that the universities are in many instances remote from practical life; but the later history of higher institutions has shown that it is altogether to the advantage of society that science be cultivated for its own sake. The scholastics furnished the example which has been followed in later academic organization, and developed communities where intellectual life was pursued, first of all for its own sake and secondarily for the applications of science and letters to the needs of civilization.

Academic Freedom. One of the great struggles carried on in the universities of Europe was the contest for academic freedom. The patrons who supplied resources for the maintenance of universities tried from time to time to dominate the thinking of the teachers in these institutions. Great theological controversies sometimes arose in the universities. It will be remembered that Luther was in the University of Wittenberg when he first made his attack upon the theological doctrines which became the issues of the Reformation. Political issues also arose from time to time when some ruler objected to the teachings of those who were connected with the universities. But from the earliest

periods it was the contention of the universities that the teacher must be entirely free to follow the truth wherever he sees it, and the tradition has finally come to be thoroughly established that universities are to be free from any outside control.

English Academic Social Life. The English universities, in addition to the establishment of the right of the teacher to think freely, developed a social life of the most intense sort. One of the reasons why American students under the Rhodes scholarships find it advantageous to go to Oxford in England is that they are brought into close contact with a group of students who, during their university lives, are intimately associated in the dining halls and living quarters of the colleges of that university.

The English universities go so far in their emphasis on social life that they are hospitable to students who pursue their studies with such leisure that they are called mere "pass students." It is not uncommon for members of the wealthier classes to look upon the university life chiefly as a social opportunity. As distinguished from the "pass students" there are "honor students" who are looking forward to professional or academic careers which require rigorous scholarly preparation. It has been suggested by students of American higher institutions that a similar distinction to that made in English universities might advantageously be adopted in this country. It is asserted that there would then be a frank recognition of what is now in fact the true condition. It would relieve college authorities also of the necessity of living under the shadow of the pretense that all American students are hard-working scholars.

American Colleges. As compared with the European universities, the American college is a somewhat detached institution. It does not aim to give professional training, but is higher in its scholastic requirements than the secondary schools. We shall have occasion later to discuss more fully the development of this unique American institution, but it is to be noted here that the American college is in part borrowed from the English university. It is the social life of the American college which is frequently emphasized when one attempts to describe its relation to its students and its importance in our educational system.

Common Schools as Missionary Enterprises. The European school for the common people was in all of its earlier stages a missionary enterprise. As indicated in the introduction, the common school began as a result of the desire on the part of the Church authorities to train choir boys or to give general religious instruction to the common people. Luther and his colleagues in the Reformation recognized the importance of making the common people independent in their religious faith. Luther's translation of the Bible is a clear indication of his desire that they should have access to the means of religious independence. The training of the people to read the Bible was quite as important as the making of the translation. We find, therefore, that the leaders of the Reformation were in favor of schools and exercised their influence in the direction of the development of schools on a large scale for the common people.

What is true of the Reformation applies also to the efforts of later religious sects which developed in Europe and England, and it is true also in the Roman Catholic Church from which these various bodies separated. A few illustrations will serve to indicate the character of these movements for the establishment of mission schools for the common people. One of the most noted of these institutions was the school established at Halle by Francke (1663–1727). In 1695, Francke, who had had a broad academic and theological training, established in a suburb of the city in which he lived an evangelical organization which conducted as one of its major enterprises an orphan asylum and training school for teachers.

Francke was a member of the sect known as the Pietists. This religious group held to certain austere doctrines with regard to human nature, not unlike the doctrines held later by the Puritans. They believed that all children are born with an evil nature inherited from Adam and Eve and that it is necessary to change this nature by the most rigorous discipline, if the child is to be saved from eternal damnation. The rigor of Francke's discipline is illustrated in the following statement which he makes about children's play:

"Play must be forbidden in any and all of its forms. The children shall be instructed in this matter in such a way as to show them, through the presentation of religious principles, the wastefulness and folly of all play. They shall be led to see that play will distract their hearts and minds from God, the eternal Good, and will work nothing but harm to their spiritual lives. Their true joy and hearty devotion should be given to their blessed and holy Savior and not to earthly things, for the reward of those who seek earthly things is tears and sorrow."

In France, the common school was promoted by the activities of the religious order known as the Christian Brothers. This was an order of monks, founded in 1684 by Jean Baptiste de la Salle (1651–1719), which devoted itself to the betterment of the poor children of the country by giving training in the rudiments of knowledge to the boys and girls of the common people. The rule of the schools conducted by this order was that both pupils and teachers should keep silent throughout all of the day. Corporal punishment was common. The curriculum consisted in the rudiments of reading, writing, arithmetic, and religion.

In England, similar movements were carried forward, and led to the organization of schools which were, as will be seen by their very name, efforts on the part of philanthropic organizations to provide for the poorer people. The common schools of England were known as "pauper schools" or as "ragged schools." They were supported by various societies, such as the British and Foreign Missionary Society, and the Society for Bettering the Conditions and Increasing the Comforts of the Poor. A number of interesting experiments in the conduct of cheap schools were made under the auspices of these societies.

The so-called "monitorial" system was developed under the auspices of the society first mentioned above. In 1797, Dr. Andrew Bell (1753–1832) had suggested that the older boys in the orphan asylums could be used as instructors for the younger boys. At about the same time, Joseph Lancaster (1778–1838) organized a school in which a series of gradations was introduced, by which the teacher could come into direct contact with the older pupils, who in turn carried to the lower classes the instruction which they received from their teacher. Each child was provided with a knapsack in which he kept such books and material as he needed. A huge room was fitted with benches on which the children could sit, and in this way the teacher sometimes was able to take care of 1000 children.

The Lancastrian movement, as it is called, is of special interest because it was brought to New York and contributed to the early stages of development in American education. It provided one great advantage over schools which had preceded it. It compelled the grading of the children. The older groups, who were more mature and able to take instruction directly from the teacher, constituted the upper grades, and the younger children were organized in groups of different levels to receive instruction from these monitors.

Common Schools under Civil Patronage. A second type of development, acquaintance with which is of the greatest importance for an understanding of the history of common schools in Europe, is that which flourished first in Germany. Here, the rulers of political states very frequently united with the Church authorities in maintaining schools for

the training of the common people. The advantages of this combined action soon began to make themselves apparent in both the economic and the political life of the state. The taking over of the function of education by the political government was an innovation which ultimately exercised very great influence in the life of the nation.

In 1763, at the close of the Seven Years' war, Frederick the Great (1712–86) gave this general movement of state education a great impetus by issuing what is known as *The General School Regulation.* This order established for the first time the principle of compulsory attendance on the part of the children. It also provided that the teachers who conducted the schools should be specially trained for their duties and adequately compensated, and that the state would assume responsibility for this compensation. A policy of religious tolerance also was proclaimed in the *Regulation.* It is to be noted that religious instruction was not eliminated from the school curriculum by this proclamation of tolerance, but it was provided that families of different types of religious affiliation should be allowed to receive in public institutions the type of religious training which conformed to their beliefs.

The *Regulation* of Frederick drew the most violent opposition from the clergy and from many people who had come to think of the schools as strictly religious institutions, but it marked the beginning of a new era in educational matters. Because of their adequate support and strong organization, the Prussian schools have been the model for all other European school systems; and in many respects they furnish also the pattern for American schools.

The Influence of Prussian Schools. The direct influence of these Prussian schools on the other systems of Europe can be traced through a report which was prepared in 1833 by a French commissioner named Cousin (1792–1867). The French schools, as indicated in an earlier paragraph, were first maintained by religious orders, but at the time Cousin made his report there was great interest in the organization of public support for schools which should admit children of all classes. Cousin went to Prussia, and made an exhaustive report on the organization and course of study of the common schools. This report was widely distributed in France. It was translated into English, and had a large influence in England and the United States in bringing about a new type of organization of public schools.

The Prussian school for the common people had at this time come to be a school which took charge of the children from six to fourteen years of age. It is interesting to comment on the reason for the adoption of fourteen years of age as the upper limit for school attendance. The original practice in German schools was to leave to the pastors the decision as to when children were mature enough to leave the school and be confirmed in the Church. Pastors gradually found that the age of fourteen was approximately the age at which they could approve the conclusion of the training course in the schools and could admit children to the Church. Throughout the civilized world, compulsory education laws have been passed, following the example of these German pastors in setting the age of fourteen years as that at which common school training is regarded as completed. Many of the reforms which are being suggested at the present time in American school organization will be more clearly understood if it is remembered that the upper limit of the common school was thus determined through a European organization which is in fact wholly different in character from the common school of the United States.

The secular organization of education in Germany prepared the way for a modern development which has been of great importance. These schools were among the first to be supplemented by a system of industrial education. The secular ruler was naturally much interested in the economic welfare of his people. Accordingly, he was willing to provide for the training of children in the trades.

The tendency to provide practical education was further powerfully re-enforced by the writings of some of the educational reformers who will be discussed in another section.

EDUCATION IN AMERICA

The educational system of America, during the Colonial period, was in part an imitation of the European system. Three grades of schools were to be found in the American colonies. There was, first of all, the highest institution, or college. The three institutions of this type which have exercised the greatest influence in American education are Harvard (founded in 1636), Yale (founded in 1701), and Princeton (founded in 1746). These institutions were organized by the clergy for the purpose of training boys to become members of their own profession. Closely connected with the colleges were the Latin grammar schools. These were modeled on the European secondary schools which administered a classical course of study and accepted pupils of the better social grades from the families which could afford to pay tuition. Finally, there was a common school which in its organization was influenced from the beginning by the European people's school.

Local Control of American Schools. The American common school differed from the European school in that it was from the outset an expression of the desire on the part of the American colonies to develop a type of intellectual freedom not prevalent in Europe. There are two further characteristics of the American common school which have distinguished it from its European predecessors. In the first place, the school was, from the beginning, controlled by local authority. Communities were indeed compelled by early legislation in the colonies to maintain an educational institution of some kind for the young people, but the details of organization were left to the communities.

We find that there was the greatest variety in the method of controlling these schools. In New England the town meeting determined the policy of the school. It set the salary of the teacher, and very frequently went so far as to select the teacher, although it commonly delegated supervision of the school to a trustee or to a committee. This committee often included the pastor of the church and one or more of the leading citizens.

The southern colonies differed from the New England colonies in their attitude toward education. To these southern colonies, especially to Virginia, had come Englishmen who brought with them the traditions of the English aristocracy. They usually lived on plantations so large that their neighbors were far removed, and the demand for any community life was, accordingly, much reduced. Virginia, therefore, did not have any town meeting which could control the school, and, because of the great distances between families having children of the same social level, schools were not organized. The young people were sent from the Virginia plantations back to England for their education, or they were trained by tutors at home.

In New York, the Dutch company which had large concessions sometimes provided schools as part of the inducement to immigrants to settle its lands. In Pennsylvania, William Penn (1644–1718) saw the importance of providing education for the children as a part of the general scheme of social organization. In these cases, however, the schools were left to the control of the community to a degree unknown in the European countries.

American Schools, Reading Schools. A second distinguishing fact about American schools is that they were reading schools. Instruction in the European schools was given orally by a teacher who was professionally trained and authorized to instruct the children. The colonies, unprovided with skilled teachers and unable to equip these teachers

with any technical preparation for their work, were satisfied to conduct schools as best they could, employing anyone to teach who could be secured for the relatively small wage which the community was able to provide. But there was one ambition which prompted the organization of the schools, especially in the New England colonies. It is clearly expressed in the preamble of the school laws of these colonies. A quotation from the school law of Connecticut, adopted in 1650, and resembling very closely the early law of Massachusetts, adopted in 1647, will make clear the purpose of the colonies in establishing their first common schools.

"It being one chief project of that old deluder, Satan, to keep men from a knowledge of the Scriptures, as in former times, keeping them in an unknown tongue, so in these latter times, by persuading them from the use of tongues, so that at least, the true sense and meaning of the original might be clouded by false glosses of saint-seeming deceivers; and that learning may not be buried in the grave of our forefathers," (the court decreed that whenever a township increased to fifty householders they should employ some one) "to teach all such children as shall resort to him, to write and read."

The influence of this legislation has been of great importance in the American schools. Throughout our history, emphasis on reading has controlled the form of organization of all classroom instruction. Reading books have been provided, in contrast to the oral instruction which is typical of European schools. The method of instruction has included preparation of lessons at home out of books, and the recitation has been from the first the typical form of classroom exercise in these schools.

Industrial Training. There was one further ambition in the minds of the New England colonists as to the training of their young people. It is expressed in the statute adopted at about the same time as that quoted above. This second statute aimed to provide training in industry for all of the children. The statute is as follows:

"All parents and masters do breed and bring up their children and apprentices in some honest lawful labor, or employment, either in husbandry or some other trade profitable for themselves and the commonwealth, if they will not nor cannot train them up in learning, to fit them for higher employment, and if any of the selectmen, after admonition by them given to such masters of families, shall find them still negligent of their duty . . . the said selectmen, with the help of two magistrates, shall take such children or apprentices from them, and place them with some masters for years, boys until they come to be twenty-one, and girls to eighteen years of age complete."

This statute did not exercise any large influence, because it did not provide adequate administrative machinery for enforcement. It is not until a relatively late period in the history of American education that industrial training reappears as an important part of the system.

Early Methods of Paying for Schools. In the matter of support, there was great variety of practice in the different colonies and in the different grades of schools. In the main, it may be said that higher education was never free, and in many instances the elementary schools were supported in part by payments made by the pupils. There was practically no full community support of schools until long after the establishment of the present Federal government of the United States. Indeed, as late as 1873, the last of the Northern states to abandon pupil payment was still receiving some support for the teacher from so-called "rate bills" paid by the pupil. Even in colonial times, however, partial support of the school out of the community treasury had begun. Accordingly, common schools have been from the first, so far as the public could make them so, free schools.

Early Schools and Lack of Organization. By way of negative statement, it may be pointed out that the early colonial schools were not graded. They were one-teacher schools, and in the form of their organization were of the type known even in modern times as "the district school." The teacher organized such classes as he or she was able to conduct, and the pupils were distributed according to their various abilities in the different subjects. The school term was often very short. Sometimes, the school year was divided into a winter term and a summer term; the latter was attended by the younger children, and the former by the older children. The original school laws of the northern colonies very frequently prescribed 4 to 21 as the ages for attendance on school. Later the European model of closing the elementary schools to students at about 14 years of age came to be adopted, but the original plan of American school organization was at once loose and comprehensive.

Early Schools, Religious but Secular. The schools of the American colonies were secular; that is, they were set up by the law of the colonies and were governed by the community rather than by the church. They were at first, however, religious in the content of their teaching. The reading books were full of quotations from the Bible and the catechism. The religious content of instruction reflects the main interest of the community. Nevertheless, the control and organization were secular. The consequence of this has been that, in modern times, the separation of the public school and the Church has been complete, and religious teaching has gradually disappeared.

The development of parochial schools in this country reflects the desire on the part of certain religious bodies to control, more completely than is possible in the public schools, the religious and moral education of their children.

Schools in the Early National Period. Between the Colonial period and the present, there is a pronounced break in the history of American schools. The Revolutionary War left the colonies in many cases financially weak and detached from the sources of their earlier social life and traditions. The Constitutional Convention, which established the national government, did not include education as one of the matters to be dealt with by the new Federal government. There was in fact so much disagreement between the practices of the northern and the southern colonies in matters of school organization that it was deemed wiser to leave schools to local control. The tendencies toward decentralized organization which appeared in the colonies thus became a part of the national policy. It was not until the middle of the last century that the Federal government made any provision for the consideration of educational problems. In 1867 a bureau of education was established, first as an independent department and in 1868 as a bureau of the department of the interior. This bureau, however, has no authority of any kind whatsoever over the schools in the different states. It is merely an agency for collecting information. The fact that the Federal Constitution does not mention education leaves the control of public schools to the states.

Since, during the early years of American history, the states were busily engaged in developing the material resources necessary for the life of the people, education was carried on in a somewhat irregular fashion, in accordance with the plans which had been set up during the Colonial period; but it was very meager. The United States bureau of education has estimated that in 1800 the average American citizen was not receiving more than 82 days of schooling in his lifetime. Many communities had no schools, sometimes because families were so isolated, and sometimes because teachers could not be found. The educational situation during the first decades of American national life was wholly chaotic.

A Typical Report. A report prepared by the committee which visited the schools of Taunton, Massachusetts, in 1801 throws so much light on the general situation early in the last century that parts of it may be quoted as exhibiting the conditions common at that time:

"The committee chosen by the town to inspect the schools beg leave to report their situation and examination . . . ." January 6th, 1801. Your committee visited a school kept in Rueben Richmond's house instructed by Mrs. Nabby Williams of 32 scholars. This school appeared in an uncultivated state the greater part of the scholars.

"On the 26 of Feb. visited Mrs. Nabby Williams' school the second time and found that the scholars had made great proficiency in reading, spelling, writing and some in the grammar of the English language.

"On Nov. 10th, the committee visited and examined two Schools just opened: one kept in a school house, near Baylies works, of the number of 40 scholars, instructed by Mr. Philip Lee. This School we found to have made but small proficiency in reading, spelling and writing, and to be kept only six or seven weeks; upon inquiry why it should be taught no longer, we were informed that the ratio of school money for this School was and had been usually expended in paying the Master both for his service and board, and in purchasing fire wood which is contrary to the usual custom of the town.

"The other School, visited the same day, was kept near John Reed's consisting of the number of between 30 and 40 Scholars instructed by Mr. William Reed; This School, being formed into regular classes, appeared to have made a good and pleasing proficiency in reading, spelling, writing, some in arithmetic and others in the Grammar of the English language. This School's share of school money is expended to pay the Master for his service only, so that the School will be continued three months.

"On the 8th day of December they visited a School kept in a School house near Seth Hodges, in number 30 Scholars instructed by Mr. John Dunbar. This School appeared in a good way of learning, and to be kept four months.

. . . . .

"On the 22d of December your Committee visited two more schools just opened, one in a School house near Samuel Pett's of the number of 40 Scholars instructed by Mr. Rufus Dean, and to be kept three months. This School appeared to be in a promising way of learning in reading spelling and writing and to be regularly taught.

"The other school is kept in the home of Mr. Paul Chase and taught by Mr. Nicolas Stephens, consisting of 30 Scholars, and appears quite in a good way of learning especially in Spelling for scarcely a word passed a scholar misspelled, in writing some did very well and others in arithmetic appeared attentive.

"January 8th, 1801 visited two Schools for the first time, one in the home of Mr. William Hodges of the number of 37 Scholars, instructed by Mr. Lovet Tisdale, the other in the home of Mr. Daniel Burt, of the number of 25 Scholars, instructed by Mr. Benjamin Tubbs. These Schools appeared in good order and attentive to their learning.

. . . . .

"Feby. 26th, visited Mr. Dean's School 2 time, the Scholars were crowded into a small room, the air was exceedingly noxcious. Many children were obliged to tarry at home for want of room and though the school was kept only a few weeks they were deprived of its advantages. A want of books was the complaint. The committee were anxiously desirous that this evil might have a remedy and were of opinion it may be easily done. The Scholars appeared to increase in knowledge & claim our approbation.

"March 5th, visited two schools, one kept at Mr. Aaron Pratt's of the number of 30 scholars, instructed by Mr. Philip Drown. This school appeared quite unimproved and uncultivated in reading and spelling, some of them did better in writing.

"This uncultivated state did not appear to be from a fault in the children but, as your committee were informed, from the disadvantage of having had masters illegally qualified for their instruction; of which class is their present master unauthorized by law."

Beginnings of State Supervision. Shortly after the appearance of Cousin's report, the English translation of which was distributed in this country in 1835, a movement was started in Massachusetts and the other New England states and in Ohio—the first state to be organized out of the Northwest Territory—for a better organization of common schools. In 1837, the state of Massachusetts organized a state board of education and appointed as secretary of this board Horace Mann (1796–1859). In the meantime, Connecticut was moving in the same direction, and in 1838 appointed Henry Barnard (1811–1900) secretary of the state board of education. Ohio, under the influence of a group of organized educators in the city of Cincinnati, appointed a state superintendent of schools in 1837.

These were the beginnings of state supervision of public education. The local districts had found it impossible to give proper training to teachers, and even the selection of teachers, when left to local authorities, was carried on in a fashion that frequently led to complete failure in school organization. The state now began to assert its rights to insure good schools by establishing normal training classes and by compelling the various communities to employ teachers who had the approval of the state department and to submit to supervision by a central state authority.

Beginnings of Compulsion of Pupils. After the organization of state boards of education, came the movement to control attendance through the exercise of central state authority. In 1852, Massachusetts passed a compulsory educational law which differed from the earlier laws adopted in this country, in that it not only compelled communities to provide schools but also compelled pupils to attend school. The other states in rapid succession followed the example of Massachusetts,—the District of Columbia in 1864, Vermont in 1871, and other states later. It was not, however, until the '80's that even the most advanced compulsory educational laws began to be enforced. Since that time, compulsory education has been the accepted practice in the Northern states. The Southern states have been much slower in adopting compulsory education. Indeed, until after the Civil War the South had practically no public school system. It was not until very recently that the last Southern state adopted compulsory education, and in many cases the laws which are now in force are relatively weak.

The situation in the South is seriously complicated because this section of the country is compelled, in its effort to deal with this matter, to maintain two school systems—one for the whites and one for the blacks. The Southern states are handicapped also because of lack of resources, with the result that most of the developments in common school education have been slower in the Southern than in the older Northern states of the country.

Grading and Better Organization. As soon as the state boards of education began to deal with the problems of school organization, there appeared a tendency to grade the pupils better and to provide more definite courses of study for the common school. There was great interest during the decades between 1830 and 1850 in the example of Prussia. Many of the leading educators of this country visited the Prussian schools. Calvin Stowe (1802–86) of Cincinnati was compensated by the state legislature of Ohio for preparing a report highly favorable to the Prussian common school. Mann and Barnard also visited Germany and reported vigorously in their state documents on the virtues which they had observed in those schools.

There was also going forward in Europe a series of reforms, which will be referred to in later sections, under the stimulation of the writings of Pestalozzi (1746–1827) and Rousseau (1712–78). These reform movements in Europe were brought to America during the early years of the century, and encouraged the better arrangement of the course of study and the improved organization of the pupils.

Furthermore, there were growing up during the middle of the last century a number of municipalities which could afford to maintain better schools than those which had been possible in the rural districts prior to 1840. All these influences were operative at about the time that state departments were organized. The result in point of organization was that the common school of the United States took on its present form as an eight-year graded school during the decade between 1840 and 1850. The graded school has not yet entirely superseded in all parts of the country the native district school; but, in the main, the district school has disappeared, and the eight-year elementary school has come to be the typical form of the public school.

In the South, where resources were meager, a seven-year school was adopted after the Civil War,

as the typical organization of the elementary grades. In New England, there are some exceptional school systems which conduct a nine-year elementary school. These departures from the rule, however, merely go to emphasize the importance of the general movement which resulted in the eight-year organization of elementary education.

Academies and Union Schools. Parallel with the development of common schools and of state control in these schools, was the development of secondary education. The early years of the 19th century saw the establishment of numerous private academies. There had grown up also in some of the larger communities in Massachusetts and in the other states so-called union schools, which offered a higher grade of education than did the common district school. There emerged slowly out of this development of secondary education an institution which did not begin to appear in any large numbers until after the Civil War, but which is one of the unique creations of the American educational system, namely, the public high school.

Characteristics of the Public High School. The public high school differs from the secondary schools of Europe in that it follows the elementary school. As has been shown in earlier paragraphs, the common school of Europe is separate from the secondary school. In this country, the high school takes the graduates of the eighth grade and continues their training through a period of four years. Furthermore, the American high school is free, the cost of maintenance being paid by the community in the same way in which the community pays for the maintenance of elementary education.

The high school began to flourish after 1870, and its history from that date has been one of phenomenal growth. Statistics in regard to this development will be presented in a later section. The curriculum in these schools began as a classical course modeled closely after that of the secondary schools of Europe, but in this respect also there has been a tremendous expansion in the years since 1870. The modern American high school offers a very wide range of courses and makes numerous adjustments to the students who enter the institution.

In 1893, a committee of the National Education Association, known as "The Committee of Ten," rendered a report on the organization of the high school curriculum, which defined the practice in these schools in a way which has been of the greatest influence in determining the development of the institution. Since that date, the high schools of the United States have followed a fairly uniform path. There is in recent years some indication that the standard pattern will undergo a modification in the direction of an expansion of its lower and upper grades; but the high school, as a typical institution in American life and altogether different in its organization and character from any secondary institution to be found in Europe, may be said to have been finally established in the early '90's.

City Superintendencies. One other line of development in American public educational systems may be commented on briefly. The cities of the United States have gradually developed a complex organization for the control and supervision of schools. In 1837, the cities of Buffalo, New York, and Louisville, Kentucky, each appointed a school officer known as a superintendent of schools. In 1839, Saint Louis, Missouri, and Providence, Rhode Island, did the same. Since that time it has become altogether common for the larger and even the smaller cities to support such a supervisory officer. Today, cities commonly organize their school systems under separate charters granted them by the state, and these independent school districts confer on their chief educational executive various powers and duties which differ greatly from city to city and are still in most cases in process of complete definition. The main fact for us to notice at this time is that a group of technical officers has been created for the management of the larger school systems of the country. In some instances these officers have had jurisdiction over both the elementary and the high schools. In other cases their jurisdiction has been limited to the elementary schools.

With the appearance of the graded elementary school, the high school, and the modern system of organization presided over by a superintendent, the modern American school system may be said to be launched.

Normal Schools. Standing somewhat apart from the elementary and high schools of the country are the institutions which provide the teachers for the elementary schools, namely, the normal schools. During the early periods of American education no special provision was made for the training of teachers. It was assumed that anyone who was educated was competent to take care of little children and to give them appropriate instruction. Indeed, during the Colonial period and the Early National period, it was altogether common to assume that very little training was necessary for any adult to qualify as a school-teacher. Accordingly, the public esteem for the pedagogue was relatively slight, and the social and literary traditions of our people have reflected the attitude that the teacher is an individual who cannot succeed in the competition of the business or professional world and is therefore assigned to the trivial task of caring for little children.

A different tradition grew up in Europe, especially after the development of a group of followers who attempted to put into practice the principles of some of the educational reformers. The school established by Francke in Halle became a center for the training of teachers, and the old castle at Yverdun, where Pestalozzi gathered about him a group of followers, became a center for educational reform in a new and important sense. These schools devoted much attention to the training of teachers, and set the example which in Europe and America has led to the organization of special institutions for this purpose.

The first moves in the United States for the training of teachers were in New England and New York. In 1823, the Reverend Samuel R. Hall conducted classes for the training of teachers in Concord, Vermont, and afterwards in Andover, Massachusetts. In 1827, James Carter opened at Lancaster, Massachusetts, a normal institution which he conducted privately. At about this same time Governor Clinton recommended to the legislature of New York state the establishment of a seminary for the education of teachers. Governor Clinton was especially interested in developing through such an institution the monitorial system which had been imported to this country with the Lancastrian schools. It was, however, the European influence which ultimately led to the development of normal schools as public institutions. The publication of Cousin's report in 1835, together with the enthusiasm of Mann and Barnard and Charles Brooks for German education, led to the acceptance in 1839 by the legislature of Massachusetts of a gift of $10,000 to be devoted to the establishment of a normal school. This school was opened at Lexington, Massachusetts, in the town hall, with one teacher and three pupils. From this date, normal schools were established in the various Northern states, as follows:

1839 Massachusetts (1st)	1854 Massachusetts (4th)
1839 Massachusetts (2d)	1854 Rhode Island
1840 Massachusetts (3d)	1855 New Jersey
1844 New York	1857 Illinois
1849 Connecticut	1859 Pennsylvania
1849 Michigan	1860 Minnesota

The normal schools thus established were supported by the states. In later years some of the large city systems have found it necessary to supplement the state normal schools by city training schools for teachers. Conspicuous examples of such institutions are to be found in New York City, Philadelphia, Saint Louis, and Cleveland. In some cases the state normal school is located in a city, and serves the double purpose of a state normal school

and a city training school. Examples of this type are to be found in Montclair, New Jersey; in New Britain, Connecticut; and in Milwaukee, Wisconsin.

The curriculum of the normal school ordinarily consists of a review of the subjects taught in the elementary school, such as arithmetic and spelling. This review is intended to prepare teachers to give instruction in these subjects. There are also courses entitled "methods," which deal with the best modes of presenting the various school subjects. Finally, there are certain general professional subjects, such as psychology and history of education. These strictly professional subjects are treated in a great variety of ways. Sometimes the psychology is of a general type, corresponding closely to the ordinary academic treatment of this subject. In some cases the effort is made to apply psychology directly to the study of the school subjects. The history of education has been very largely a history of the theory of education, and has been not infrequently replaced in recent years by more practical studies of classroom management and of the school laws of the state in which the student is preparing to teach.

Teachers' Colleges. The normal school has usually been a highly independent institution, its character being determined by its president and faculty. In some instances the normal school has taken on the character of a people's college. This is especially true in the Western states where no other institution of higher learning is easily accessible from the section of the state in which the normal school is located. In recent years, normal schools have been transforming themselves into teachers' colleges and have extended their curriculum from two years, which has traditionally been the length of the normal school training, to four years.

Most of the Western normal schools are permitted by their charters to give degrees, and many of them have taken advantage of this provision. More than one hundred normal schools of the country are at the present time classified as teachers' colleges. The curriculum ordinarily covers four years, the first two years being devoted to the typical normal professional training, but including a liberal amount of general training; the last two years being in many cases given largely to general training like that provided in the ordinary college.

Colleges. American colleges were originally established, as was pointed out in an earlier paragraph, for the purpose of training the clergy. The first of these institutions was Harvard which was founded in 1636. This institution was an imitation of Emmanuel college in Cambridge, England. Yale was the second institution of this type, and was established by a group of Congregational ministers in 1701. The charter granted to Yale, like that granted to Harvard, indicates a desire to uphold and propagate the Christian Protestant religion. Both charters express also the wish that the youth of the country may be instructed in the arts and sciences and may through the blessing of God be fitted for employment in both church and state.

In 1746 Princeton was founded; in 1754 King's college in New York, afterwards known as Columbia university. In 1757 the University of Pennsylvania was established. This institution has a special significance for public education, because it grew out of a somewhat more secular motive than had prompted the organization of the earlier institutions. Benjamin Franklin wrote a tract entitled *Proposals Relating to the Education of Youth in Pennsylvania.* Soon after the appearance of this pamphlet, 24 public-spirited citizens of Philadelphia organized an academy and chose Franklin for its president. The University of Pennsylvania was built on this foundation, graduating its first class in 1757. Its curriculum is described as including Latin, Greek, mathematics, chemistry, philosophy, history, ethics, and civil and international law. Especially in the last-named subjects the University of Pennsylvania went beyond the original curriculum of most of the American colleges.

These institutions were followed in later years by a group of public foundations. Perhaps the most famous—and certainly one of the most influential—of these, was the University of Virginia, which was established in 1817, when Thomas Jefferson was elected rector of the board of an institution which had been in existence as an academy since 1803. The board authorized in 1817 the purchase of a farm of 200 acres near Charlottesville, Virginia. The corner stone of the building of the so-called Central college was laid in October of the same year. Jefferson was very eager to have this institution adopted by the legislature as the state university. The example thus set has been of great influence in determining the practices of communities which in later years have developed, especially throughout the Central and Western states of the country, state-supported institutions.

The early colleges were by no means large institutions. As late as 1815, Harvard graduated a class of 66; Yale, of 69; Princeton, of 40; Williams, of 40; Pennsylvania, of 15; and the University of South Carolina, of 37. It was not until after 1820 that the rapid development of American colleges began.

Denominational Colleges. During the decade between 1820 and 1830 a large number of institutions were established, especially by the independent religious denominations, which began to feel the necessity of providing themselves with trained ministers to carry on the work of their churches. So vigorous has been the energy of churches in setting up these institutions of higher learning, that they may be said to have dominated the development of American higher education, in spite of the efforts of Jefferson and of later organizers to bring higher institutions under the control of the state. The statement has been made that, of the 750 institutions of higher learning in the United States and Canada nominally termed colleges, at least two-thirds were originally under the control of religious denominations.

College Graduates and the Professions. The purposes of colleges can be clearly defined in terms of the professions taken up by their graduates. For many years after the founding of Harvard the largest percentage of its graduates went into the ministry. During the early years, more than 70 per cent of all the graduates entered this profession. Later the profession of law became important, and, finally, medicine, engineering, and the modern profession of business took their places, both in society in general and in the colleges, along with the ministry.

A bulletin published in 1912 by the United States bureau of education has canvassed the gradual change in the character of professional choices by college graduates, and summarizes the whole matter as follows. Between 1642 and 1780 the ministry was the chief profession for which the colleges prepared. Up to 1720, the percentage of graduates entering this profession was somewhat more than fifty. After this time a rapid decline is shown in the number of graduates entering the ministry, and in 1780 the percentage fell to about twenty. The percentage of graduates entering that profession during the last period of the 19th century was only five and nine-tenths. Though surpassed by law between 1780 and 1820 in the number of college graduates entering, the ministry again led between 1820 and 1840. It is significant of the final decline of the interest among college students in preaching, that at the close of the 19th century the ministry is overtopped by teaching, commercial pursuits, law, and medicine.

During the first century of higher education in this country, training for law received scant attention, inasmuch as the governing class came directly from England, where they received their legal training. Between 1745 and the period of the Revolutionary War there was a slight increase. This increase was greatly accelerated immediately after the Revolution by reason of the change in government, which removed the English-trained lawyers

and created a demand for lawyers trained in American institutions. Law, accordingly, was in the ascendancy in the colleges during the early part of the 19th century, and once more between 1840 and 1885, perhaps because of litigations growing out of the Civil War. For a hundred years after the Revolution the law attracted a greater percentage of graduates than any other profession except the ministry. At the close of the century, however, it is surpassed by teaching and commercial pursuits.

Before 1705 medicine was an extremely variable profession. After 1705 the profession has a much more constant tendency, and thence to 1745 the percentage of college students entering medicine is approximately seven, rising to about twelve per cent from 1745 to 1780. While the profession of law was attracting many college graduates after the Revolutionary War, medicine fell off slightly, with an average percentage between the years 1781 and 1805 of about nine. Since 1850 this average has been further reduced by the growth of teaching and the commercial pursuits, with the result that this profession closed the century with an average of only six and six-tenths per cent of the graduates of colleges, a lower percentage than that of any other five-year period since 1735. It may be said that medicine has been the most constant of all the professions, for, disregarding the conspicuous variations during the early years, no five-year period has less than seven and two-tenths per cent or more than thirteen and four-tenths per cent, with the general average between nine and ten per cent.

Recent Changes in Professions. Within one hundred years the profession of teaching has grown from about one-twentieth to about one-fourth of the graduates of colleges. Previously to 1835 it was outnumbered by the ministry, law, and medicine, but after this date the curve for medicine is lower. Since 1880 the line for teaching has crossed that of the ministry, and since 1890 that of law. Thus, at the close of the century it is the dominant profession into which college graduates go, with business as its closest competitor.

The general trend of the curve for college graduates entering commercial pursuits since 1825 has been upward. At the end of the century the commercial group took one-fifth of the graduates, and was exceeded only by the group of teachers. The general rise of this curve is one of the most striking facts brought out by a study of the colleges, and one to which too little attention has been given by those responsible for the curricula of colleges and universities.

The profession of engineering scarcely appears until after 1825. Its rise from that time until the end of the century is steady, but never rapid. At no point does the profession attain a percentage as high as five. A larger proportion of the graduates of the collegiate departments of institutions maintaining special engineering schools enter this profession, but the aggregate percentage is kept down by the small colleges, only a very small percentage of whose graduates, as a rule, pursue this vocation.

In spite of the comparatively large number of agricultural courses, farming does not attract and never has attracted a very large number of college graduates. Its greatest percentage for the institutions included in this study, all of which are arts colleges, is three and nine-tenths per cent, which covers the years 1836–40. Although the number of graduates entering agricultural pursuits is increasing, it is not increasing among graduates of arts colleges as rapidly as the number entering other professions.

Prior to 1830, the profession of letters did not take more than one per cent of the graduates. Between 1830 and 1855 the percentage rose from one to two per cent, and by 1885 it had touched its maximum of three and three-tenths per cent. It must be remembered, however, that many men do not adopt the pen as a means of livelihood until comparatively late in life, and the result is that this series of records stops before the date at which a considerable number of the more recent college graduates can have qualified for inclusion in this group. Thus the apparent decline of letters as a life work is probably explained.

An examination of the whole series of statistics discloses the following facts:

1. Teaching, as a result of a phenomenal rise during a quarter of a century, is taking at the present time 25 per cent of the graduates, or about 5 per cent more than any other profession.

2. Commercial pursuits, after an almost equally phenomenal rise, are taking about 20 per cent.

3. Law, although taking one-third of the graduates at the beginning of the century, takes but 15 per cent at its close.

4. Medicine takes between 6 and 7 per cent and has manifested a slight tendency to decline.

5. The ministry takes between 5 and 6 per cent, which marks the lowest point for that profession during the two and one-half centuries of American college history.

6. Engineering pursuits, after a slow but certain rise, take between 3 and 4 per cent.

Growth of Colleges. The recent development of colleges and universities has been very rapid. A quotation from the latest bulletin of the United States bureau of education on colleges and universities gives the figures showing the extent to which this movement has progressed.

"For the school year 1923-24, reports were received from 913 universities, colleges, and professional schools. Of this number 144 are under public control and 769 under private control; 150 are independent professional schools. There are 165 schools of theology, 124 schools of law, 80 schools of medicine, 43 schools of dentistry, 63 schools of pharmacy, 6 schools of osteopathy, and 12 schools of veterinary medicine.

"The total number of students enrolled in all the institutions is 726,124, of which number 457,701 are men and 268,423 are women. Of the total number, 38,825 men and 23,033 women were enrolled in preparatory departments; 289,817 men and 196,482 women in collegiate departments; 18,444 men and 10,355 women in graduate departments; 85,865 men and 5,651 women in professional departments; and 33,144 men and 39,759 women were registered as unclassified and special students. Schools of theology enrolled 12,358 students; schools of law, 35,732; schools of medicine, 18,900; schools of dentistry, 12,947; schools of pharmacy, 9,951; schools of osteopathy, 1,117; and schools of veterinary medicine, 511. Schools of engineering enrolled 57,699 students. Institutions under public control enrolled 166,860 men and 88,770 women; those under private control enrolled 290,841 men and 179,653 women. There were also enrolled 189,943 additional students in summer schools, 4,012 in winter short courses, and 140,846 in extension and correspondence courses.

"The total receipts of universities, colleges, and professional schools for 1923-24 are reported as $388,242,587, including $46,726,677 for endowments. The total income for the year for public institutions, including additions to endowments, is $153,228,195; for private institutions, $235,014,392."

American Universities. The distinction between the terms college and university has never been strictly observed in America. A university is a higher institution of learning including such professional schools as law, medicine, engineering, agriculture, journalism, and so on, and including also the graduate schools of letters and sciences. Many American institutions call themselves universities though they are in reality colleges.

Special reference is usually made when speaking of universities to the advanced work of a research type leading to the degree of doctor of philosophy. This kind of work was first emphasized at Johns Hopkins university incorporated in 1867. The first president of this institution, Daniel Coit Gilman, is usually regarded as the founder of graduate work in this country.

At the present time, all of the leading higher institutions include advanced courses and the types of professional schools referred to above.

HISTORY OF EDUCATIONAL REFORMERS

Along with the development of educational institutions, there have appeared from time to time educational theorists and writers who have exercised an influence upon the course of subsequent school organization, through their criticisms of existing practices and their suggestions of new types of organization which should be set up. In general, it may be said that these educational reformers reflect the thinking of their times only indirectly. Usually they are significant in the history of the world because they recommend radical departures from tradition and from ordinary views about education. In many instances they have been teachers who have seen from their experience the fallacy of existing methods and have, therefore, thought out new modes of school organization. Very frequently their suggestions are so far removed from the possibilities of realization that the reform suggested is nothing but a theory. Even in such instances, however, the extreme theory has often operated to modify existing methods, and, while the plan proposed by the reformer has never been fully achieved, the modifications which have been attained have been sufficiently radical to justify his efforts.

In a few instances the writings of the educational reformer have led to the organization of a group of disciples who have carried his ideas into effect. Sometimes, indeed usually, the disciples have not followed exactly in the steps of their masters. For example, when Froebel developed the philosophical plan for the training of little children, which led to the organization of the kindergarten, he set in operation a movement which, especially in recent times, has developed in directions other than those implied in his suggestions. The kindergarten has had an independent history reaching far beyond the writings and immediate teachings of its founder. At the same time there can be no doubt that Froebel's writings were the source and original inspiration of the whole movement. The question has arisen within the kindergarten group from time to time whether Froebelian doctrines should be adhered to closely, or should be accepted as mere suggestions of a general type of thinking to be worked out by practical teachers who have to deal with the training of little children. In the course of this discussion, kindergartners have separated into conservative and radical groups.

Similarly, various groups of modern educators have attempted to interpret the general ideas which were laid down by Herbart. In many instances, these interpreters have been in disagreement with each other, but have expressed full acknowledgment of their dependence upon the original teachings of Herbart.

In considering, therefore, the life and writings of any reformer, it is necessary, first, to refer briefly to the conditions under which he did his work. It is then essential to summarize his views on education. Finally, it is important to estimate, as far as possible, the type of influence which he exerted on subsequent periods.

Socrates (469–399 B. C.). One of the earliest educational reformers was Socrates, the Greek philosopher who lived in the 5th century B. C. He was a teacher of morals, logic, and political philosophy; and he attempted to lead the young men of Athens to a clearer conception of their duty to the state, to their parents, and to their associates. His fundamental belief was that knowledge leads to virtue.

His system of teaching consisted in a series of questions which, step by step, followed up any assertion made with regard to any fundamental matter of conduct. The so-called Socratic method consists in drawing out from the individual the necessary consequences of any statement made by him. The teacher is not supposed to contribute directly any information; his business is to stimulate the student to think for himself and to be thoroughly critical of every conclusion at which he arrives.

Socrates did his teaching in a small state in which the young men to whom he appealed were members of the aristocracy which governed the state. The effect of his teaching was to spread broadcast among these young aristocrats skepticism in regard to contemporary practices and forms of social thinking and organization. So influential was this skepticism that in many instances the followers of Socrates became political radicals who sought, not only to criticize existing governmental policies, but to modify them in actual legislation and in the interpretation given to the laws of the state and to the customs of their times.

At length, aroused by the radical tendencies of Socrates' followers, the conservative party in Athens brought about his execution as a false teacher.

Socrates never wrote out any of his own views with regard to the state. It was his followers who gave expression to his doctrines. The writings of Plato and Aristotle, therefore, have been among the chief vehicles through which the influence of Socrates has been brought to the modern world.

Plato (429–347 B. C.). Plato wrote on philosophy, on social subjects, and on government, developing ultimately a general theory of the state. This theory distinguishes between the different classes of society, and defends the general position, which he borrowed from Socrates, that knowledge and clear thinking are the only possible bases of good conduct. Practical writers have sometimes criticized Plato by pointing out that knowledge is not always immediately expressed in action. A man may think clearly on social matters and yet not be just in his social behavior. Plato, on the other hand, emphasized very explicitly the relation between knowledge and action, and devoted his writings and teachings to the development of this theory.

Plato's doctrine of the state distinguishes between the slaves who are to carry on the ordinary activities necessary to provide society with the necessities of life, the warriors who are to defend the state, and the philosophers who through meditation develop a system of laws and practices which shall embody all of the principles of justice.

His influence was very great over a large group of followers, whom he taught in the school which he founded and called the Academy. Here he taught not only his system of philosophy but the higher branches of mathematics, which he deemed an important part of the mental equipment of youth.

Plato's writings and teachings were accepted in the later medieval period as the chief authority on educational organization.

He divides higher education into four main branches—arithmetic, geometry, astronomy, and music. This subdivision of the subjects of instruction, known in the medieval period as the quadrivium, was long the basis of study of the school curriculum. Plato's discussion emphasizes, not only the importance of these particular subjects, but also the necessity of developing a unity and symmetry of thought which can be arrived at only by mastering the full round of the curriculum.

Plato was an idealist—an ardent advocate of the æsthetic and the moral in education. He was especially congenial to the religious leaders of the medieval period and to the later thinkers who, in the Renaissance, sought to restore Greek culture with all its artistic accompaniments.

Aristotle (384–322 B. C.). Aristotle was a much more practical and scientific teacher than was Plato. He was the instructor of Alexander the Great, and in later life he received from his royal pupil many additions to his materials of knowledge. It is said that Alexander sent to Aristotle, from all parts of the world into which he carried his expeditions, samples of the things which he found. He sent, for example, actual specimens of strange animals, with the result that the science of zoology de-

veloped in Aristotle's hands. In like fashion, other natural sciences were opened up by Aristotle because of the breadth of material which he found available.

Aristotle organized the Lyceum as a place where he trained the young legislators and statesmen of Athens. It became a center of research in biology, history, and the science of government. Aristotle developed numerous systems of knowledge which were of great influence during the medieval period, and his discussions on the nature of the mind were the bases of the psychology and of much of the theology of this time. He formulated the principles of logic, which were taken over to the great school at Alexandria and were later utilized by Euclid in the formulation of geometry. Through geometry the Aristotelian logic was carried into the medieval schools and became the most important subject of higher education in Europe, both in the medieval and in the early modern period. The disputes of the scholastics are based upon the principles of this logic.

Aristotle advocates the beginning of education when the child is seven years of age. He mentions and evaluates the various subjects to be taught, namely, reading and writing, gymnastics, music and drawing. He lays great stress on physical training and on reading and music.

Aristotle's theories about education were much less completely formulated than were those of Plato. He contributed new content for education rather than new methods of giving instruction.

Quintilian (35–100? A. D.). Quintilian was a teacher of rhetoric in Rome. He formulated a theory of education for the orator, which became the classic of subsequent organization of training in language and letters during the medieval and modern periods. Quintilian may be regarded as the father of classical education. In his day classical education meant, of course, the transfer of Greek learning to Roman soil. He pointed out quite explicitly that the study of Greek is not so important in its content as in the training which it gives to the young orator.

Quintilian wrote his educational works late in life, after a period of successful experience as a teacher of Roman boys. It was his theory that the proper training of the orator must begin with infancy. He therefore devotes much of his writing to the theory of training the child from infancy up. He wrote a series of books entitled *De Institutione Oratoria*, in which he gave in great detail the methods of literary training. For example, he discussed the teaching of writing, and advocated teaching the forms of letters by requiring the child to trace letters which had been written for him. He afterwards discussed in equally great detail the method of teaching Greek grammar and the methods of teaching literary style. Quintilian favored also, as had Plato, the teaching of geometry and music as parts of a liberal education. He discussed the matter of corporal punishment, and advocated an abandonment of frequent floggings, on the grounds that the child's individuality must be respected.

Quintilian's influence in formulating the modern classical curriculum is perhaps greater than that of any other single writer.

Alcuin (735–804). Alcuin has been mentioned in the earlier paragraphs. He was educated in the Cathedral of York in England, and came to the continent as educational adviser of Charlemagne. In this capacity he exercised a great influence, not only over the princes who were his pupils, but in the political matters with which his master was always engaged. His influence was felt in the more vigorous and systematic organization of education and of the intellectual side of civilization wherever his pupils went.

Anselm (1033–1109). Anselm has been called the father of scholasticism. He was archbishop of Canterbury in England. For a time he did his work in the monastery of Bec, which he made the chief center of learning in western Europe. His teachings were chiefly upon religious doctrines. His fundamental principle was that Christianity can be founded on stable grounds only if reason guides. He trained his followers, therefore, to cultivate methods of correct and vigorous thinking. From Bec there issued, as a result, the most vigorous disputants of the age.

Peter Abelard (1079–1142) was the most famous teacher of the 12th century. Like all teachers of that day he was trained for theology, and his fame rests in large part upon his ability as a disputant on theological topics. He was an opponent of William of Champeaux, whom he seriously worsted in theological debate. He became a hermit in Champagne but hundreds of students flocked to him and were influenced by his liberal and spirited teachings. He is one of the important forerunners of the school of theology which afterwards became the great University of Paris. Much of the teaching which he did in his early years was at Notre Dame in Paris.

Saint Thomas Aquinas (1227–1274). Aquinas was undoubtedly the greatest and most influential philosopher of the middle ages. He adopted the method of teaching which later came to be universal in European universities, namely, the so-called commentary. He read Aristotle's works to his students and followed the reading by critical comments. This method is reflected in the lecture method of instruction which is common today in all higher institutions of learning in Europe and America.

Aquinas was a voluminous writer on theological and philosophical topics. His writings, like his oral methods of teaching, have exercised a lasting influence. No single authority has contributed more to the fixed teachings of the Roman Catholic Church and its schools than Aquinas.

Erasmus (1466–1536) was one of the leaders in the Northern Renaissance. He was educated in the schools of the Brethren of the Common Life in France and later was himself a teacher of the classics in various parts of Europe, and the author of many of the textbooks used in the teaching of Latin. He was the author of several treatises on education. In these he points out the importance of beginning education early and developing the powers of the child in the natural order. He also maintains that it is the business of the Church and state to see that there is an adequate number of properly qualified teachers. He himself exemplified throughout his life devotion to the profession which he thus aimed to promote in these writings. He was at home in all parts of Europe because of his command of the classical languages and to have been known in all of the schools of his time and during the century following his life.

Martin Luther (1483–1546). Luther was the father of the Reformation in Germany. The essentials of Luther's teaching were independence of religious belief and reliance on individual faith. Luther championed the cause of the common people and by his writings strove to improve the intellectual condition of his fellow citizens. He and his followers, like many of his lay and clerical contemporaries, were friendly to the classics, but he advocated the establishment of vernacular schools for the common people. He combatted vigorously the pseudoscience of astrology.

The main subject of Luther's interest was religious teaching, and he is regarded as the pioneer of Protestant household instruction. His influence has undoubtedly been of prime importance in keeping in the curriculum of the common schools of Germany, even though they are under secular control, instruction in religion.

Ignatius Loyola (1491–1556). Loyola was a Spanish youth brought up in the court of Ferdinand and Isabella. He was wounded while engaged in military operations against the French. During the period of his convalescence he read certain religious treatises and resolved to give his life to the Church.

He became the leader in a movement for reform within the clergy. With a number of his followers, he founded, under a charter granted by Pope Paul III, the Order of Jesus, which has been throughout its history a teaching and missionary order.

The object of the order is described as "The progress of souls in good life and knowledge of religion, the propagation of faith by public preaching, spiritual exercises, and works of charity, and particularly the instruction of youth and ignorant persons in the Christian religion."

In the accomplishment of this purpose, the order established schools and colleges, and developed the so-called *Ratio Studiorum*, or plan of studies, which prescribed a rigid training in the classics and in religion. Latin and Greek were the backbone of the curriculum, but science and mathematics were also included. Where the order undertook missionary enterprises, the scope of the curriculum was enlarged to include instruction in the vernacular and in rudimentary subjects. The characteristic of all the teaching was its systematic and carefully planned organization.

Ignatius Loyola was not a reformer in the sense that he revolted against earlier ideals; he aimed rather at realizing ideals for which the Church already stood. His companion Peter Canisius strove to check the progress of Luther's social and religious teaching in Germany. Loyola's labors gave to the Catholic Church the order which has continued to exert the greatest influence over its educational activities. See *Jesuits*, page 2051.

Johannes Sturm (1507–1589) was a German educator of the extreme classical type. He was educated in the school of the Brethren of the Common Life at Liege. His chief work was carried on in the Gymnasium at Strasbourg. He was a rigid disciplinarian and a devoted classicist. He was an organizer of large ability and, by virtue of the fact that he wrote extensively on methods of education and organization of secondary education, his influence spread to other cities and to other countries. The modern organization of the German Gymnasium is to be attributed in very large measure to the influence of the school which he conducted in Strasbourg.

Roger Ascham (1515–1568) wrote in 1570 an educational work entitled *The School Master*. It is one of the most representative Renaissance writings in England. It is full of a liberal spirit and exhibits a large interest in physical education as well as intellectual training. In this book Ascham describes the method of teaching Latin which is known as the method of double translation. The Latin author is to be translated first into English and afterwards to be translated back again into Latin. Ascham's book on school teaching is interesting, not merely because of the liberal reforms he suggested in teaching, but also because of its literary style and because of the insight which it gives into the social and political life of the day in which he wrote.

Francis Bacon (1561–1626) was an English philosopher, statesman, and man of letters. He was one of the brilliant group who gathered around Queen Elizabeth. He advocated the development of science through observation and direct contact with objects as distinguished from the acceptance of statements made by writers of books.

His educational influence is general rather than specific. He inaugurated the period of sense-realism. His methods of scientific investigation were indeed much less productive than those of some of his contemporaries, but his writings were of such an impressive character as to attract the attention of readers and to give prestige to his theory that education should be based on direct observation.

John Amos Comenius (1592–1670). Comenius, or Komensky if the Bohemian form of his name is used, ushered in the change in attitude which came naturally after the long period of formal classical education. He was interested in making knowledge concrete and definite. He criticized the schools in the most severe terms, pointing out that they dealt in words rather than in useful forms of knowledge. He characterized the schools as "the slaughterhouses of the mind where ten or more years are spent in learning what might be acquired in one." "They are," he said, "places where minds are fed on words." These criticisms he made because of his experiences in the gymnasium in Prerau and his observation of the attitude of his fellow pupils in that and other schools which he attended.

He began his work as an educational reformer by preparing new materials for the teaching of Latin. He selected the names of common objects and arranged this selected vocabulary in simple sentences which the pupils could understand. Later he added to the concreteness of his teaching by preparing a pictorial encyclopedia called *Orbis Pictus*, in which lists of words are given. Each word is defined and accompanied by an illustration.

In order to change the practices of the schools, he organized a school at Sarospatak near Tokay. Here he made education thoroughly interesting to his pupils by instruction that was concrete rather than abstract.

He is to be described as the father of realism in modern education. He ushered in a period in which education was to cease being austere and remote and was to become sympathetic and helpful to the pupil, interesting and congenial to the child's native tendencies.

John Locke (1632–1704). Locke was one of a group of essayists who wrote on education though their chief interests were in other matters. He was an English philosopher who spent his time and energy chiefly in discussing the issues of philosophy. His great work is his *Essay concerning Human Understanding*. This, together with his political writings, gave him an influential position among the serious readers of his day.

His book entitled *Thoughts on Education* is a protest against too close devotion to books and bookish knowledge. He would have the young English gentleman, on whom his "thoughts" are concentrated, travel and become acquainted with things rather than merely learn languages.

Locke was a modern realist in every sense of the word. He belonged to a period when natural science was flourishing in England. His philosophical system was realistic in its interests, and he was thus one of the early advocates of a new type of education which breaks away from the severely classical traditions of an earlier period.

Jean Jacques Rousseau (1712–1778). Rousseau wrote at a time when education was dominated by the idea that the younger members of the court of France must be trained in the social arts which would make them acceptable in court life. The strictly court type of training which had been evolved was not primarily a system for the training of the intellects of the pupils. It was a course in manners. The breach between the common people, who had to work, and the aristocracy, who idled about the court and cultivated artificial manners, was daily growing wider; and Rousseau, as he wrote on education, was writing also on political issues.

Indeed, his two great works deal, one with political theory, the other with the theory of the training of the individual. We may, perhaps, gain a better view of his educational theory by referring first to his chief political essay, entitled the *Social Contract*. Rousseau held, in this essay, that the rights of the sovereign arise from the consent of society. In a primitive state men are at war with one another; but seeing that war is destructive they come together and form a group, agreeing each in his turn to surrender some of his individual rights to the group as a whole. The social contract thus formed is held to be the basis of civilized government. Rousseau's doctrine of the social contract was a

powerful influence in the French Revolution. It has been said that this book helped more than anything else to precipitate the Revolution.

On the side of individual training, Rousseau held that all of the false institutions which have grown up in modern society must first be eliminated if the individual is to come to the full development of his powers and personality. He wrote a book entitled *Emile*, in which he expressed his educational doctrines in the form of a life history of a boy who is supposed to have been properly educated. This book begins with the famous statement that all things are good as they come from the hand of the Creator. It is man who has destroyed the natural goodness of everything. Rousseau advocates, therefore, a return to nature. The boy who is to be properly educated must be taken away from association with society. He must never see a book until he is sufficiently mature to escape all the evil consequences which result from the use of books. Freed, in this way, from contact with society and books, the child must wander in the woods and open country and gather up knowledge which will satisfy his natural curiosity. In order that this boy may have the advantage of such knowledge as the race has accumulated, he is to be accompanied by a sympathetic tutor whose business it is merely to help him answer the spontaneous questions which arise in his mind. After the child has reached a certain stage of maturity, he should be led to see the importance of cultivating some type of skill which, in case of necessity, will provide him in later life with the means of livelihood. Still later, he may be brought back into the society from which he has been separated during the earlier period, and may now be introduced to books and men. He will be able to adjust himself to the social conditions which he thus encounters, because of the intelligence and the strength of physique which he has cultivated through his early training.

Rousseau's *Emile* was so fascinatingly written that it was accepted by Europe as a philosophy of life as well as a scheme of education. His teachings have also been of influence in subsequent generations where the general principle of the return to nature has seemed most attractive to those who are critical of modern society and the modes of life which modern education has developed. There are constant references to Rousseau's doctrine of education in such modern theories as that developed by Madame Montessori.

In many quarters of Europe, immediately following the appearance of his book, the education of children was organized on the free plan suggested by Rousseau. Not only were children taken out into the open fields and woods, but mature individuals attempted to give themselves a freedom of life and a detachment from the difficult problems of modern society by accepting Rousseau's doctrine as a philosophy of life.

From the nature of the case, Rousseau's teachings did not lead to the organization of a school system or a group of teachers. His writings tended, however, to modify the practice of existing schools in the direction of greater freedom and the recognition of natural impulses of children.

Johann Basedow (1723–1790). Basedow is the educational reformer of the post-Reformation period who is to be compared in general character with Comenius of the pre-Reformation era. Basedow, like Comenius, conceived of education as an appeal to the natural interests of children. He sought to promote nature study and contact with objects.

He devoted himself assiduously to the preparation of suitable textbooks for use in schools. In order to secure the funds for the preparation and publication of these books, he made an appeal to men of property for a public subscription and received a generous response. His movement was termed from this time on Philanthropinism.

The influence of Rousseau is very marked in the writings of Basedow. His motto was, "everything according to nature." A description of the new type of school which he established is given by Herr Schummelas as follows:

"I have just come from a visit with my father to the Philanthropin, where I saw Herr Basedow, Herr Wolke, Herr Simon, Herr Schweighauser, and the little Philanthropinists. I am delighted with all that I have seen, and hardly know where to begin my description of it. There are two large white houses, and near them a field with trees. A pupil—not one of the regular scholars, but of those they call Famulants (a poorer class, who were servitors)—received us at the door, and asked if we wished to see Herr Basedow. We said 'Yes,' and he took us into the other house, where we found Herr Basedow in a dressing gown, writing at a desk. We came at an inconvenient time, and Herr Basedow said he was very busy. He was very friendly, however, and promised to visit us in the evening. We then went into the other house, and inquired for Herr Wolke."

By him they were taken to the scholars. "They have," says Fred, "their hair cut very short, and no wigmaker is employed. Their throats are quite open, and their shirt-collar falls back over their coats." Further on he describes the examination. "The little ones have gone through the oddest performances. They play at 'word-of-command.' Eight or ten stand in a line like soldiers, and Herr Wolke is officer. He gives the word in Latin, and they must do whatever he says. For instance, when he says *claudite oculos*, they all shut their eyes; when he says *circumspicite*, they look about them; *imitamini sartorem*, they all sew like tailors; *imitanini sutorem*, they draw the waxed thread like the cobblers. Herr Wolke gives a thousand different commands in the drollest fashion.

"Another game, 'the hiding game,' I will also teach you. Some one writes a name, and hides it from the children—the name of some part of the body, or of a plant, or animal, or metal—and the children guess what it is. Whoever guesses right gets an apple or piece of cake. One of the visitors wrote *intestina*, and told the children it was a part of the body. Then the guessing began. One guessed *caput*, another *nasus*, another *os*, another *manus*, *pes*, *digiti*, *pectus*, and so forth, for a long time; but one of them hit it at last. Next, Herr Wolke wrote the name of a beast, a quadruped. Then came the guesses: *leo*, *ursus*, *camelus*, *elephas*, and so on, till one guessed right—it was *mus*. Then a town was written, and they guessed Lisbon, Madrid, Paris, London, till a child won with St. Petersburg. They had another game, which was this: Herr Wolke gave the command in Latin, and they imitated the noises of different animals, and made us laugh till we were tired. They roared like lions, crowed like cocks, mewed like cats, just as they were bid."

Johann Heinrich Pestalozzi (1746–1827). Pestalozzi is one of the world's greatest educational reformers. He was born in Zurich, Switzerland, and did his work in the little Alpine republic, but his influence has spread to every civilized country on the globe.

He was in temperament and behavior erratic and unsystematic. He failed to hold together the schools which he founded, and so far as his personal affairs were concerned he was always unfortunate. But in his insight into the needs of the common people, in his sympathy for children, and in his genius for devising methods of teaching, he is one of the foremost leaders of modern times.

After drifting from one enterprise to another, Pestalozzi wrote and published in 1781 the work on which his fame chiefly rests, a book entitled *Leonard and Gertrude*. In this book the author gives first a picture of the deplorable condition of a poor family in a Swiss village. The picture shows how the family lacked all the comforts of life and all prospects of securing even the barest living necessities. In the midst of these squalid conditions, the brave mother, Gertrude, takes up the task of teaching her children. Gertrude turns out to be such a genius in getting her children to carry on the simple industrial and domestic activities to which she directs their attention that, through their co-operation, she relieves the condition of the family and ultimately the poverty of the whole village.

Gertrude's method is that of organizing the children's activities and at the same time instructing them in the intelligent comprehension of all that is about them. She reads to them as they work. The language of her school concerns itself with the commonplace facts of everyday life, and yet it raises these facts to the level of understood and clearly

explained matters. The moral tone of the home and of the village is raised through this intellectual clarification of the facts of life. Skill which is cultivated at the same time that minds are trained makes it possible for the children to develop comfortable and wholesome surroundings.

Pestalozzi's message came as a great inspiration to an age which was impoverished by wars and by the lack of trained workers in industry. All over Europe the effort was put forth by rulers and religious leaders to bring the common people up to the level described in *Leonard and Gertrude*.

His teachings were brought to America and were eagerly accepted, especially at the normal school at Oswego, N. Y. Under the leadership of its principal, Edward Austin Sheldon (1823–97), this school became a great center for the dissemination of the doctrine of sense training, observation, and the cultivation of practical knowledge.

Charles Maurice Talleyrand-Périgord (1754–1838) was a French statesman. To his influence may be attributed the compact organization of the educational system of France. Napoleon adopted the suggestions which he made with regard to the organization of the educational system, and made it in this way a part of the public policy of France. To Talleyrand himself the organization of the educational system was a mere side issue. He was engaged in important diplomatic and political missions at different times during his life and seems not to have been seriously interested in carrying out the reforms which he had suggested in his writings. His personal influence, therefore, is relatively slight, although his statesmanship appears in the organization which he suggested and which was adopted by the French state.

Johann Friedrich Herbart (1776–1841). Herbart was a German philosopher and teacher. He was the first educational reformer to enunciate clearly the idea that education must be organized on the basis of carefully ascertained scientific principles. There are two sciences, he pointed out, on which education must be based—psychology and ethics. The first supplies an analytical account of the nature of the human mind which is to be educated; the second works out the social goals toward which educational systems must direct their efforts.

Herbart had experience as a tutor of boys in the home of the governor of Interlaken, and he was thoroughly acquainted with the sciences on which he proposed to base education. Indeed, his occupation was that of professor of philosophy in various German universities.

The system of psychology of which he was author stimulated the empirical studies of the last century which resulted in the establishment of laboratories for the development of an experimental and physiological science. The system was not in itself especially productive for education. The pedagogical writings of Herbart seem to have grown more out of his practical experience than out of his system of psychology.

Herbart laid great stress on the importance of arousing the pupils' interests and then extending these interests in many directions, until there should result what he calls many-sidedness of interest.

Herbart's doctrine of apperception is another of his leading contributions to educational theory. All experiences, in order to be clear, must be introduced into the learner's experience in such a way as to be fully assimilated.

In order that ideas may be apperceived, teachers must have a regular method of getting ideas into the pupil's mind. The method involves five steps, which are known as formal steps because they can be adopted as the proper form for any content whatsoever. These steps are preparation, presentation, assimilation, generalization, and application. Put in other words, the experience of the pupil must be so marshaled that the mind is ready to take in the new idea. This must then be presented in clear form. The mind must have time to receive the idea and put it into its proper relations. The mind must then contemplate it until the general nature of the new idea is recognized. Finally, the mind must carry over what it has absorbed into all productive new relations or applications.

Herbart's influence has been very great in America. Through the school at the University of Jena in Germany, over which Professor Wilhelm Rein (1847–) for many years presided, a great many Americans, notably Charles DeGarmo and Frank and Charles McMurry, were introduced to Herbartianism. They have been prolific writers on educational methods.

Friedrich Froebel (1782–1852). Froebel was the founder of the kindergarten. He was powerfully influenced on the one side by Pestalozzi, whose school at Yverdun he visited for a period, and on the other side by the idealistic philosophy of Schelling and Fichte.

Unlike Pestalozzi, he was not especially interested in the practical aspects of human training, but he was absorbed in the attempt to bring into complete harmony the inner experience of the child and the natural world in which the child lived. Prompted by his idealistic philosophy, he sought to bring about this harmonizing of the inner and outer worlds by finding the universal principles in nature and exposing the child to these at the earliest possible age.

There is much mysticism in Froebel's thinking and writing. This fact has led to confusion in the development of the institution which he founded. Indeed, it has permitted a certain sentimentalism to come into the kindergarten, which has tended to inhibit the careful study of children and their needs.

Froebel's Principles.—A number of extracts from Froebel's writings will serve to bring out the leading principles of his educational philosophy:

"A life of more than thirty years with nature, often, it is true, falling back and clouded for great intervals, has taught me to know this, especially the plant and tree world, as a mirror, I might say, an emblem of man's life in its highest spiritual relations; so that I look upon it as one of the greatest and deepest conceptions of human life and spirit when in Holy Scripture the comparison of good and evil is drawn from a tree. Nature, as a whole, even the realms of crystals and stones, teaches us to discriminate good from evil; but, for me, not so powerfully, quietly, clearly, and openly as the plant and flower kingdom.

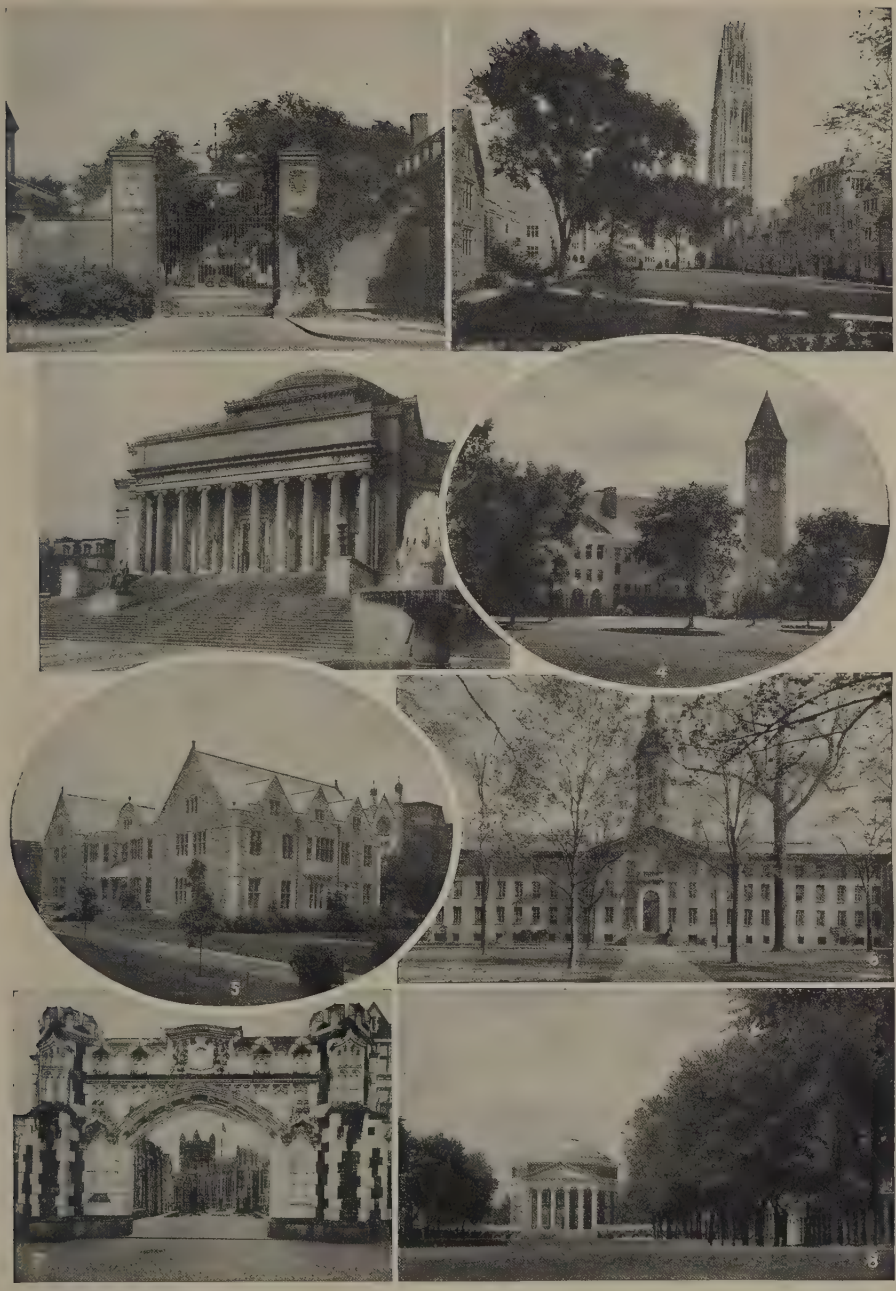
"The child . . . perceives in the ball the general expression of each object as well as of itself (the child) as a self-dependent whole and unity . . . so the child likes to employ himself with the ball, even early in life, in order to cultivate and fashion himself, though unconsciously, through and by it, as that which is his opposite and yet resembles him.

"The cube is to the child the representative of each continually developing manifold body. The child has an intimation in it of the unity which lies at the foundation of all manifoldness and from which the latter proceeds.

"The pleasure with which the children play these games and others of a similar kind may therefore have its ground in a presentiment of what is symbolic and significant in them. May not their delight in these encircling movements, for example, spring from the longing and the effort to get an all-round or all-sided grasp of an object? . . . I am convinced that the exalted and often ecstatic delight of children in their simple movement plays is by no means to be explained through the exertion of mere physical force—merely bodily activity. The true source of their joy is the dim premonition which stirs their sensitive hearts that in their play there is hidden a deep significance; that it is, in fact, the husk within which is concealed the kernel of a living spiritual truth.

"Experience and history, too, teach that men truly and effectively promote human welfare much more by what they put forth from themselves than by what they may have acquired. Every one knows that those who truly teach, gain steadily in knowledge and insight . . . Again, to learn a thing in life and through doing is much more developing, cultivating and strengthening than to learn it merely through verbal communication of ideas. Similarly, plastic material representation in life and through doing, united with thought and speech, is by far more developing and cultivating than the merely verbal representation of ideas.

"The young growing human being should, therefore, be trained early for outer work, for creative and productive activity . . . play, building, modeling are the first tender



Photos from Brown Bros., New York

VIEWS OF UNIVERSITIES AND COLLEGES. I

1 Johnston Gate, Harvard. 2 Harkness Memorial Quadrangle, Yale. 3 University Library, Columbia. 4 Library and Campanile, Cornell. 5 Houston Hall, Pennsylvania. 6 Nassau Hall, Princeton. 7 Amsterdam Avenue Gate, College of the City of New York. 8 The Rotunda, Virginia.

















Photos (except No. 1) from Brown Bros., New York

VIEWS OF UNIVERSITIES AND COLLEGES. II

1 The Campanile, California; *copyright by Ewing Galloway.* 2 Main Hall and Library, Texas. 3 Denny Hall, Washington (Seattle). 4 Pillsbury Hall, Minnesota. 5 The Columns and Campus, Missouri. 6 Administration Building, Iowa State College. 7 Bird's-eye view of Campus, Wisconsin. 8 Ryerson Physical Laboratory, Chicago.

blossoms of youth . . . Every child, boy and youth, whatever his condition or position in life, should devote daily at least one or two hours to some serious activity in the production of some definite external piece of work. It would be a most wholesome arrangement in schools to establish actual working hours similar to the existing study hours; and it will surely come to this.

"A universal and comprehensive plan of human education must, therefore, necessarily consider at an early period singing, drawing, painting, and modeling; it will not leave them to an arbitrary, frivolous whimsicalness, but treat them as serious objects of the school. Its intention will not be to make each pupil an artist in some one or all of the arts, but to secure to each human being full and all-sided development, to enable him to see man in the universality and all-sided energy of his nature, and, particularly, to enable him to understand and appreciate the products of true art.

"This school (he said) will be based on the interdependence of doing and thinking, representation and knowledge, art, and science . . . on the student's personal efforts in work and expression, making these again the foundation of all genuine knowledge and culture. Joined with thoughtfulness, these efforts become a direct medium of culture; joined with reasoning, they become a direct means of instruction, and thus make of work a true subject of instruction."

Thomas Arnold (1795–1842) was head master of Rugby for 14 years, from 1828 to 1842. During this period he exercised on the organization of secondary education in England an influence which was of the greatest importance. He assumed in an intimate way the social and intellectual leadership of Rugby. He contributed very largely to the establishment of the type of discipline which has come to be regarded as characteristic of the English so-called public schools. He was in favor of classical studies but he also provided, in the curriculum of his school, for modern history and modern languages and mathematics. In all these subjects he maintained the highest standards of scholarly exactness. The integrity of his character and the great influence which he exercised over the boys who attended Rugby is reflected in Thomas Hughes's *Tom Brown's School Days*. The influence of his methods of administration spread to the other schools of England.

Horace Mann (1796–1859). Mann was the first secretary of the state board of education in Massachusetts. In this position he exercised an enormous influence during the critical period of reconstruction which brought into being the American graded elementary school as a substitute for the older district school.

Mann was an indefatigable worker and a prolific writer. His annual reports deal with all kinds of problems, such as illiteracy, school buildings and sanitation, the training and employment of teachers, methods of teaching, methods of local school control, and public financing of education.

He was greatly impressed by the organization of German schools, and advocated the conservative importation of some of the practices which he observed there. He pointed out fearlessly the faults which he found in existing schools and suggested many reforms.

His criticisms aroused much animosity among the schoolmasters, especially those in the Boston schools, and brought him into sharp controversies. However, he was able to secure the establishment of the first normal school to have a continuous existence in his country. He modified the district school; he greatly improved public respect for education; and he fundamentally changed the methods of teaching in the schools.

Henry Barnard (1811–1900). Barnard was successively the head of the school systems of Connecticut and Rhode Island. He was also the editor of the *American Journal of Education*, which during the period of its publication in the middle of the last century was one of the leading factors in bringing about far-reaching reforms in American education. With Mann, Stowe (1802–86), and others, Barnard labored for the more definite organization of instruction, especially in elementary schools. He visited the schools of Europe, helped to acquaint American educators with the teachings of Pestalozzi, and contributed through his administrative activities to the improvement of elementary education.

Herbert Spencer (1820–1903). Herbert Spencer conceived early in his career the idea of preparing a comprehensive statement of the philosophy of the world. In order to develop this complete system of philosophy he began with an investigation of biological science, and from this point progressed through a study of society and its nature and of the individual and his nature to a treatment of the problems of ethics, or human conduct. Spencer laid the foundation for sociology and the modern studies of society. In the course of his inquiry he naturally came upon the problems of educational organization.

He found the English higher schools devoted to classical training, which had been traditional throughout the medieval and modern periods, on the theory that, through this type of training, the discipline of the mind can be secured more effectively than by any other means. Against this classical scheme of education Spencer rebelled. His interest in the sciences was so keen that he defended scientific training as superior to classical training for all purposes, even for the discipline of the mind. His discussion of education was embodied in four essays which were published in 1861 and have been widely read. They were perhaps more effective in the United States than in England, because in this country the classical tradition was less firmly established.

The first of Spencer's educational essays was entitled *What Knowledge is of Most Worth?* His answer to the question is that scientific knowledge is much more significant than any training in mere letters. In the course of his discussion he mercilessly criticized existing schools as utter failures in preparing children for the practical duties of life. Especially he points out that in such important matters as preparation for parenthood the school curriculum is silent. Science, he contends also, is even more useful than the classics for the discipline of the mind.

The second essay lays down the proper principles of *Intellectual Education*, such as progression from the simple to the complex and from the concrete to the abstract. The third of his essays is on moral training, and expresses the general view that punishment is justified only when it follows the pattern of nature and gives the child the training which will improve his adaptation to the world about him. The fourth essay advocates a better physical training for pupils.

Spencer's essays have done much to promote the development of the modern scientific curriculum in American high schools and colleges. His influence has also been large in the development in higher institutions of the social studies, such as sociology and political science.

William Torrey Harris (1835–1909). Harris contributed to educational reform through his work in the city of Saint Louis, where he was for years superintendent of schools, and in the Federal bureau of education where, during the later years of his life, he was commissioner.

In Saint Louis he introduced the kindergarten, reorganized the elementary schools and their curriculum, set up an eight-year graded system in the elementary schools, and promoted secondary education.

In the bureau of education, he elaborated the reports and laid the foundation for the most complete system of school statistics published by any government.

In his contributions to education, Harris labored to accomplish three great purposes. The first was to psychologize education. Along with other leaders in the school world, he showed the futility of the old-time psychology, with its so-called "faculties of the mind," and demonstrated the worth of the new. His second purpose was to establish faith in the school as an institution having sociological functions and value. In the *Report of the Committee of Fifteen*

he discussed four bases for the correlation of studies: (1) the logical order of topics and studies; (2) the symmetrical whole of studies in the world of human learning; (3) psychological symmetry; (4) the pupil's natural and spiritual environment. His final purpose was to place education upon an enduring foundation. He subjected the whole field to critical analysis, interpreting and justifying the school and assigning to it its proper place in the scheme of institutional life.

Alfred Binet (1857–1911). Binet was a French psychologist and director of the laboratory of physiological psychology at the Sorbonne. Prior to 1905, he had made numerous investigations of the deficiencies exhibited by children in the course of their development. At this date he was asked by the school authorities of Paris to undertake the study of children in the public school systems, for the purpose of detecting the various forms of mental deficiency which interfered with school work. He devised a series of tests, with the co-operation of Thomas Simon. These tests have been very widely used in Europe and in the United States as a means of determining the intellectual possibilities of children. The characteristic of these tests is that they are arranged in such a way as to determine the intellectual age of the child. By a series of trials, Binet assembled those tests which should be passed by a child three years of age if he is entirely normal in his mental development. Other series were developed for other ages, so that it is possible by means of this scale to compare any given child with other children of his chronological age. Various revisions of the Binet scale have been made by Terman and others who have taken up the work, especially in the United States.

Granville Stanley Hall (1846–1924). Hall was an American psychologist and writer on education. In 1881 he established at Johns Hopkins university one of the earliest psychological laboratories in the United States. He was the chief leader in the child study movement. In 1888 he became president of a university established in Worcester, Massachusetts, and named after its chief patron, Clark university. This institution was devoted entirely to graduate work, and, during the first two decades after its establishment, developed chiefly research in education under Hall's personal leadership. Hall was a severe critic of formalism in the schools. He advocated the abandonment of the ordinary types of teaching in the primary grades and a substitution, for the academic training in those grades, of physical education and observation of natural objects.

For the higher schools, he advocated a complete reorganization of the curriculum on the basis of studies he made of the adolescent period. His most influential work is a treatise on *Adolescence*, in which he describes this period as a distinct phase in the child's development, analogous to the periods of evolution which have led from time to time to the production of new species in the animal kingdom. The great emphasis which Hall laid upon the fundamental change which comes with the adolescent period in human life made him one of the chief exponents of the doctrine of periodicity in education.

During the later years of his presidency at Clark university, Hall's influence distinctly diminished, because of the lack of scientific methods in his work and the development in other quarters of more productive lines of educational research.

Charles William Eliot (1834-1926). Eliot became president of Harvard college in 1869. He found a conservative institution devoted chiefly to classical instruction. He reconstructed the college and transformed it into a great university.

Among his most notable educational reforms is the development of an elective system. Through this system, which has now become universal in American colleges and high schools, a student can so select subjects of study as to give himself the specific training which he needs for the calling in life which he intends to take up.

Eliot also labored for the enlargement of the college curriculum. He brought about the introduction of a great variety of subjects. The result is that a college is no longer the home of a small group of selected students who are intending to enter the learned professions,—it is the resort of all classes.

As the chairman of the Committee of Ten of the National Education Association, Eliot contributed to the organization of the American high school.

He retired at seventy years of age from the active presidency of Harvard, universally recognized as the Nestor of American education. His opinion continued to be sought on all matters of public, social, and political importance. He is undoubtedly one of the leading figures in American educational history.

John Dewey (1859–). Dewey is first of all a teacher of philosophy. His contributions in the fields of logic and ethics have been of major importance in determining the trend of current thinking. His philosophical system is characterized by its devotion to the accomplishment of practical ends. Thus, in his theory of logic he points out that it is the solution of problems which in all cases stimulates human intellectual effort. In the field of ethics he has shown himself to be interested in practical social reforms of all types. Especially has he emphasized the influence of industrial and economic life on human conduct.

In the field of education he has been an untiring critic of formalism of every type. He began by objecting to the type of reading matter which is taken up in the schools, where very frequently words are substituted for fruitful ideas. Teachers, he points out, have been content to carry children through many series of exercises which have no meaning to the children themselves. Education ought to deal with the living interests of children and ought to use books only when children, of their own initiative, see the importance of going to this source of information.

In order to make concrete his educational doctrines, Dewey established a school which was entirely unconventional in its form of organization and in its practice. In this school the ordinary forms of discipline were abandoned, and the children were allowed freedom to ask questions as they occurred to them and to move about without restraint in seeking materials with which to answer these questions. For example, the children were given opportunity to cook their own meals, in order that they might come into contact with practical problems of social institutions. They were, for the same reasons, given training in the woodworking shop and in the garden.

In his most important educational book, *School and Society*, Dewey points out that the industrial revolution has completely transformed the life of civilized society. It has, among other changes, removed the child from his natural contacts with the sources of his material welfare and from his opportunities for natural activity. The school must restore to the child what has been taken away. This calls for a complete reorganization of the curriculum and of the methods of teaching.

Dewey has contributed greatly to the reform of conventional school practice and to the extension of the curriculum of the elementary school into practical fields. In the last few years he has exercised a large influence, not only in the United States, but also in China. He spent three years in Peking, on the invitation of the Chinese government, and taught his doctrine of freedom and practical training to the Chinese, who are just awakening to the necessity of developing a modern system of education. The Chinese have been enormously aroused by Dewey's theories and have in some instances put his recommendations into practice with much greater completeness than have any of his American followers.

RECENT EXPANSION IN AMERICAN EDUCATION

During the past fifty years, American education has expanded so rapidly that a special section may with propriety be devoted to the discussion of this period. Furthermore, it is possible to make very exact statements with regard to this development because, for the past half century, the United States bureau of education has kept careful statistical records of the various phases of educational activity in the country. Our knowledge of educational institutions prior to 1870 is based largely on the facts which are known with regard to certain typical educational institutions. Subsequently to this date a full body of statistics is available.

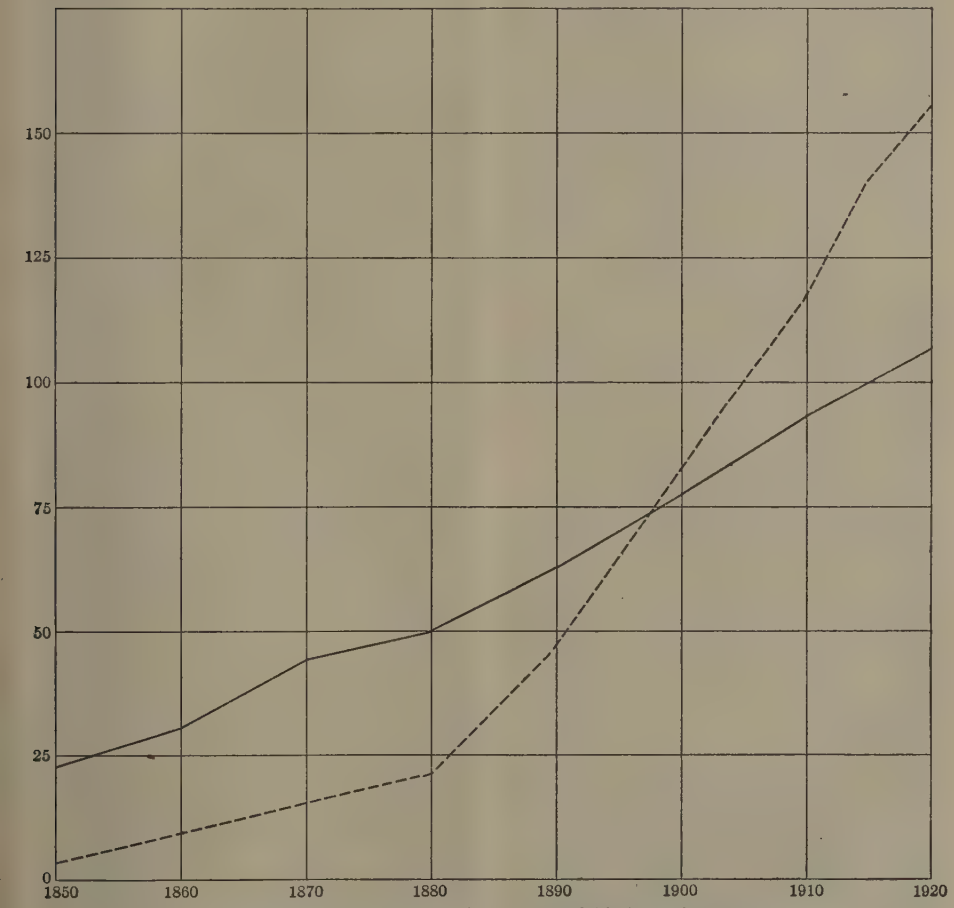
INCREASE IN AVERAGE SCHOOLING

One of the most striking of the tables that have been prepared by the bureau of education sets forth the average number of days of schooling of the ordinary American citizen. This table is as follows:

AVERAGE NUMBER OF DAYS OF SCHOOL ATTENDANCE OF AMERICANS AT DIFFERENT PERIODS

Year	Days
1800	82
1840	208
1850	450
1860	434
1870	582
1880	690
1890	770
1900	934
1910	1080
1920	1212

The significance of these figures may be pointed out in the following terms. As late as 1840 the American school taught the ordinary pupil practically nothing but "the three R's." The school term was very short, and attendance was very irregular. The result was that the ordinary man got his preparation for adult life chiefly through the domestic activities which he encountered as a child in the home and in which he participated to a



– – – Number of copies of newspapers and periodicals published in various years.

——— Number of inhabitants in the United States, according to the decennial censuses.

The figures on the vertical scale indicate, for the continuous line, *millions*; for the dotted line, *hundreds of millions*.

greater or less extent. Since that date the average schooling demanded for intelligent participation in the commercial and industrial activities of ordinary life has been increasing more rapidly than in any other period in the world's history. The use of machinery in all phases of life and the rapid expansion of transportation are the important economic causes which have developed this situation. The school may be said to have contributed in some measure to this general change in the character of public life; in some degree it has merely followed the development of civilization in its effort to prepare young people for participation in the activities of commerce and industry.

Reading. Whatever is assigned as the cause of the development of the school, it is altogether clear from an examination of the facts that instruction has come to be in recent years a very much more important part of the individual's life than it was in the middle of the last century. A concrete illustration of this is to be found in the changes which have taken place in respect to the ability of the common man to read and write.

A very illuminating graph can be drawn from figures supplied by the bureau of the census, showing the number of issues of newspapers and periodicals published in the United States in different years. This graph is shown on page 1635. The corresponding graph for increase in population is shown in the same figure.

A comparison of these graphs and attention to the sudden change which takes place in the rate of increase in the publication of newspapers and periodicals subsequent to 1880 cannot fail to impress the student of American intellectual institutions. It is perfectly clear that reading becomes a very much more common fact in the years following 1880 than it ever was before. It is also clear that the impetus toward extensive reading has continued to operate since 1880 with constantly increasing effect.

The importance of this fact as describing the special character of the civilization of the United States is further brought out by the statement that in 1910 there were published in this country over 18,000 periodicals of all kinds. Of this number 2226 were daily papers. The total number of periodicals published in the world during that year was less than 50,000. Germany had 7000, Great Britain 9000, Japan 4300, and other countries smaller numbers.

Some of the objective reasons for the development of American periodical publications are mentioned by the author of the special census report on newspapers and periodicals. He writes:

"This sketch of the rise and development of the American newspaper has now reached the period of time which marks the commencement of the third and present era in its history. It is not possible to assign the beginning of this era to any particular year or event, its coming being due to a variety of causes, which may be enumerated in the following order: First, the establishment of the penny press; second, the development of railroads as a means for the distribution of newspapers, the transmission of news reports, and the reduction of heavy postage rates; third, the discovery of telegraphy, and its immediate application to the purposes of journalism; and fourth, but not less important than other causes, the improvements of the printing press, which have rendered it possible to print large editions of newspapers in a short time."

Writing. Before commenting on the significance of these facts for education, it will be well to include in our discussion certain statistics which show that the more general use of reading has been accompanied by an equal demand for the mastery of the second of "the three R's," namely, writing.

A very definite knowledge of the extent to which writing has gained ground as a common art in the last three-quarters of a century can be obtained from an examination of the statistics of the post office. If we take all of the money paid for letter postage in 1843 and assume that it was spent for the cheapest letter that could be forwarded through the mails, it will be found that the average letter writing of each inhabitant of the United States during the full year amounted to less than four letters of one sheet each. This estimate is altogether extravagant, because the lowest letter postage of that date, namely, 6 cents, would carry only one sheet of paper within a radius of 30 miles. If letters went more than 30 miles, or were made up of more than one sheet, the cost was greater, reaching a maximum at 400 miles or more, when each sheet cost 25 cents. Letters sent at rates of postage higher than the minimum would reduce the average computed. It is fair to assume, therefore, that letter writing in 1843 was not a common practice.

Other facts of the same import are as follows: In 1840 the revenue of the post office for all classes of mail was 27 cents per year for each inhabitant of the United States. This amount had not doubled in 1870, when it was 49 cents. It rose to the point where in 1890 it was $0.97; in 1900, $1.34; and in 1910, $2.43. Not all of this was for letters, but the figures show that reading and writing are much more commonly used today than a generation ago. This conclusion is overwhelming when account is taken of the steady reduction in rates which has characterized the history of the post office.

Overcoming Illiteracy. Such statistics emphasize the fact that our modern life is utterly dependent on means of communication. This social fact is not merely an external material fact; it has to do with human habits and human education. It has to do with the common expectations of life. There was a time, not very far back in the history of this nation, when writing was not thought of as essential to the practical equipment of a man. Indeed, if we consider only the most highly authentic figures on this matter, we find that, in 1880, 17 per cent of our population could not write or read. Back of this date, the statistics are largely matters of speculation, but it is certain that the percentage increases rapidly. We find, for example, in a message of Governor Campbell to the legislature of Virginia in 1839, the statement that "almost one-quarter part of the men applying for marriage licenses were unable to write their names." If we go a little farther back, the fraction of illiterates undoubtedly puts in the majority those who did not command the art of writing.

The attitude of modern society is such that a percentage of illiteracy even as high as that of 1880 is wholly intolerable. Today no man willingly admits that he cannot read or write. The expectation of the nation is that all its members are to go to school long enough to be part of a common social whole which is held together by written and printed means of communication.

With regard to reading, modern expectations are even more far-reaching than are those with regard to writing. Public signs are used on every hand, on the assumption that all who make use of the streets will be able to follow written directions. The man who cannot read can hardly take care of himself in a crowded city.

Inadequacies of Early Schools. If one stops to translate these various expectations into definite terms regarding education, one begins to realize that the modern school has a task which the old-fashioned school with its simple expectations never faced. The school of 1840, with its brief period of contact with the pupils, with its untrained teachers, with its meager supply of books, and with its inadequate schoolrooms, was not in most cases a place where the type of fluent reading and writing demanded by modern society could be imparted.

Such statements about the schools of the last century can be abundantly verified by reference to contemporary literature. Thus, in 1838 Horace Mann, in his second report to the Massachusetts board of education, wrote:

"I have devoted especial pains to learn, with some degree of numerical accuracy, how far the reading, in our schools, is an exercise of the mind in thinking and feeling, and how far it is a barren action of the organs of speech upon the atmosphere. My information is derived, principally, from

the written statements of the school committees of the respective towns,—gentlemen who are certainly exempt from all temptation to disparage the schools they superintend. The result is, that more than eleven-twelfths of all the children in the reading-classes, in our schools, do not understand the meaning of the words they read; that they do not master the sense of the reading-lessons; and that the ideas and feelings intended by the author to be conveyed to, and excited in, the reader's mind, still rest in the author's intention, never having yet reached the place of their destination."

The major part of the report from which the foregoing passage is taken is devoted to a discussion of the reasons for this deficiency in reading ability. Mann finds that one important reason for the failure of pupils of that day is to be found in the emphasis laid on formal spelling and mere pronunciation. A quotation from a later part of the report reveals the practices of that time and also one important reason why instruction in reading was ineffective. The quotation is as follows:

"Another device to fill vacuity by pouring in vacuity, is this:—a book is prepared, in which the spelling and reading lessons alternate. First come a few columns of words, and then a page of apothegms and synopses of universal truths, not occupying, perhaps, more than a line each; some one word in the spelling columns being incorporated into each of these short sentences. The force of the reasons against the preceding mode is but little abated when applied to this. This motley company of sentences repels all interest on the part of the learner. Topics, more alien from each other, and more bewildering to the mind, could not be found, if one were to stick a pin through all the leaves of a book, and then to read continuously all the sentences through which the puncture was made. As many-colored and diverse-shaped objects, flitting swiftly before the eye, will make no stable impression upon the retina; so a multitude of incongruous ideas and feelings, trooping hurriedly before the mental vision, can leave no enduring traces of outline, aspect or quality upon the mind. A rapid succession of discordant images will inflict distraction upon the mind of an adult;—how much more certain are they to do it upon that of a child! The power of passing abruptly from one subject of thought to another, without mental disturbance, requires long habit and familiarity with the matters presented. Children can have neither.

"Another reason is to be found in the inappropriate character of the reading exercises offered to children.

"And yet, in many of the reading-books now in use in the schools, the most pithy sayings of learned men; the aphorisms in which moralists have deposited a life of observation and experience; the maxims of philosophers, embodying the highest forms of intellectual truth, are set down as First Lessons for children;—as though, because a child was born after Bacon and Franklin, he could understand them of course. . . . Using incomprehensible reading-books draws after it the inevitable consequence of bad reading."

Demand for Reading Ability. Other passages might be quoted from this significant report, but perhaps enough has been repeated to indicate the fact that in the middle of the last century the pupils who went out from the schools were not fluent, intelligent readers. The expectations of society with regard to the attainments of the individual were slight, and the use of the art of reading in after life was correspondingly meager.

It would, of course, be out of keeping with the facts to assert that defects of the kind described by Horace Mann made no serious difference in the lives of men and women in 1840. But such a statement is much more nearly true of that time than would be a statement that today we can look with complacency on the crudities of our treatment of reading in the schools. In 1840 the average citizen was called on very little to read. His political affiliations were fairly direct; he usually voted for representatives whom he knew. His correspondence was very light; and the contacts of his daily life were simple. It is not unqualifiedly true that it made no difference at all whether he could read or not, but it is true that he was required to use the art very little in his ordinary routine.

In contrast with all these facts, are the expectations of modern society. Today one must read if he is to share in the life of his times. Correspondingly, there has been an enormous increase in the amount of attention given to the education of the common man.

School Support. Another way of showing the expansion of schools is to present the summary figures with regard to school cost. A table prepared by the bureau of education setting forth the cost of public education for each of eight years within the period 1870–1924 is as follows:

EXPENDITURES FOR PUBLIC EDUCATION

Year	Public Elementary and Secondary Schools	All Teacher Training Institutions	All Colleges and Universities (Public and Endowed)
	Dollars	Dollars	Dollars
1870	63,000,000	202,000	5,000,000
1880	78,000,000	873,000	6,000,000
1890	141,000,000	2,466,000	10,802,000
1900	215,000,000	4,518,000	24,000,000
1910	426,000,000	14,000,000	78,000,000
1915	605,000,000	15,885,000	101,752,000
1920	1,015,000,000	27,000,000	182,000,000
1924	1,800,000,000	39,000,000	241,000,000

These figures must be interpreted as indicating a great change in the public attitude toward education. For example, the recent liberal support of normal schools indicates that the people of the United States consider a technical education so significant for teachers that such education must be provided at public expense. Formerly, as indicated in an earlier section, it was not thought necessary to give special training to teachers. In the same fashion the public has come to esteem highly the importance of a college or technical school education for those who are going to conduct its great business enterprises. A college education has therefore come to be a relatively common form of preparation for later life, and the public attitude and expectation in this matter express themselves in the great increase in the support of higher institutions.

GENERAL EXPANSION

Turning from these tables to a general statement of the whole matter of expansion of public education, the following elaborate table prepared by the bureau of education gives the facts for public school buildings, number of teachers, number of pupils, days of schooling, and other matters.

It is interesting, with this table in hand, to carry out a number of comparisons showing the extent to which public schooling has changed in the period covered by the table.

Changes in School Buildings. In 1870 there were in the United States 116,312 school buildings. The average value of school property per building was $1121. In 1915 the number of buildings had a little more than doubled; to be exact, it was 279,941 but the value of property per building had risen to $5599. Using the number of days of school attendance as a base and dividing by the number of buildings, we find that in 1870 each building provided on the average for 4634 days of attendance, while in 1915 each building provided on the average for 8177 days of attendance.

The figures with regard to buildings show that, as a physical unit, the school in 1915 was a very different sort of social institution from the school of 1870. This difference is not exceptional. It is not merely the great modern urban school which is different from the meager rural schoolhouse of the earlier period; the average for the whole country has been visibly changed.

With the change in the school plant has come a change in the method of conducting the school. In many of the buildings there are walls to separate groups of pupils from others of different attainments. The change in the physical plant has thus been accompanied by the change in the administrative handling of pupils. The further consequence of this kind of development has been the creation of a system of supervision which was very little known in 1870. Buildings have principals. Furthermore,

STATISTICAL SUMMARY OF ELEMENTARY AN

Items	1870	1880	1890	1895
I.—GENERAL STATISTICS				
Total Population (a)	38,558,371	50,155,783	62,622,250	68,844,341
Children 5 to 18 years of age (a)	12,055,443	15,065,767	18,543,201	19,911,050
Pupils enrolled (excluding duplicates)	6,871,522	9,867,505	12,722,581	14,243,765
Pupils enrolled in public high schools	(b) (c) 80,227	(c) 110,277	(c) 202,963	(c) 350,099
Average daily attendance	4,077,347	6,144,143	8,153,635	9,548,722
Total number of days attended by all pupils	539,053,423	800,719,970	1,098,232,725	1,331,775,201
Men teachers	77,529	122,795	125,525	129,706
Women teachers	122,986	163,798	238,397	268,336
Total teachers	200,515	286,593	363,922	398,042
Number of schoolhouses	116,312	178,122	224,526	239,630
Value of all school property	$130,383,008	$209,571,718	$342,531,791	$440,666,022
II.—FINANCIAL STATISTICS				
Revenue Receipts:				
From income of permanent funds and lands			$ 7,744,765	$ 7,800,740
From local taxes and appropriations			97,222,426	118,915,304
From state taxes and appropriations			26,345,323	34,638,098
From all other sources			11,882,292	15,210,769
Total			$143,194,806	$176,564,911
Expenditures:				
For sites, buildings, furniture, libraries, and apparatus			$ 26,207,041	$ 29,436,940
For salaries of superintendents, principals, and teachers	$ 37,832,566	$ 55,942,972	91,836,484	113,872,388
For all other purposes			22,463,190	32,499,951
Total	$ 63,396,666	$ 78,094,687	$140,506,715	$175,809,279
III.—DERIVATIVE STATISTICS				
Ratio of school population to total population	31.3	30.1	29.6	28.9
Per cent of total population enrolled	17.82	19.67	20.32	20.69
Per cent of children 5 to 18 years of age enrolled	57.00	65.50	68.61	71.54
Per cent of pupils in high school	1.2	1.1	1.6	2.5
Per cent of children enrolled attending each day	59.3	62.3	64.1	67.0
Average number of days the schools were in session	(f) 132.2	130.3	134.7	139.5
Average number of days attended by each pupil enrolled	78.4	81.1	86.3	93.5
Average number of days attended by each child 5 to 18 years of age	44.7	53.1	59.2	66.9
Per cent of men teachers	38.7	42.8	34.5	32.6
Average annual salaries of all teachers	(g) $189.00	(g) $195.00	(g) $252.00	(g) $286.00
Per cent of revenue derived from:				
Permanent funds and lands			5.4	4.4
State taxes			18.4	19.6
Local taxes			67.9	67.3
All other sources			8.3	8.7
Per cent of expenditure devoted to:				
Sites, buildings, etc.			18.6	16.7
Salaries	59.7	71.6	65.4	64.8
All other purposes			16.0	18.5
Total expenditure per capita of population	$ 1.64	$ 1.56	$ 2.24	$ 2.55
Total expenditure per pupil in average attendance	$15.55	$12.71	$17.23	$18.41
Average total expenditure per day for each pupil attending (cents)	11.8	9.7	12.8	13.2

(a) United States census reports or estimates thereon.
(b) For 1871.
(c) From reports of public high schools.
(d) From reports of state departments of education.

ECONDARY SCHOOLS COMBINED, 1870-1925

1900	1905	1910	1915	1920	1925
75,602,515	82,584,061	91,972,266	100,399,318	105,710,620	113,493,720
21,404,322	23,410,800	24,239,948	26,425,100	27,728,788	29,705,264
15,503,110	16,468,300	17,813,852	19,704,209	21,578,316	24,650,291
(c) 519,251	(c) 679,702	(c) 915,061	(d) 1,328,984	(d) 2,199,389	(d) 3,650,903
10,632,772	11,481,531	12,827,307	14,985,900	16,150,035	19,838,384
1,534,822,633	1,732,845,238	2,011,477,065	2,389,084,558	2,615,161,151	3,362,821,608
126,588	110,532	110,481	118,449	95,654	131,164
296,474	349,737	412,729	485,852	583,648	646,781
423,062	460,269	523,210	604,301	(e) 679,533	777,945
248,279	256,826	265,474	279,941	271,319	258,859
$550,069,217	$733,446,805	$1,091,007,512	$1,567,391,225	$2,409,719,120	$4,252,328,900
$ 9,152,274	$ 13,194,042	$ 14,096,555	$ 17,079,977	$ 26,486,735	$ 24,096,268
149,486,845	210,167,770	312,221,582	456,956,495	758,896,451	1,343,583,623
37,886,740	44,349,295	64,604,701	91,104,045	134,278,753	240,114,707
23,240,130	34,107,962	42,140,859	24,511,076	50,908,896	97,373,162
$219,765,989	$301,819,069	$433,063,697	$589,651,593	$970,570,935	$1,705,167,760
$ 35,450,820	$ 56,416,168	$ 69,978,370	$102,756,375	$153,542,852	$ 433,584,559
137,687,746	177,462,981	253,915,170	345,006,445	613,404,578	1,006,408,536
41,826,052	57,737,511	102,356,894	157,697,965	269,203,779	506,103,817
$214,964,618	$291,616,660	$426,250,434	$605,460,785	$1,036,151,209	$1,946,096,912
28.3	28.4	26.4	26.3	26.2	26.2
20.51	19.94	19.56	19.63	20.4	21.7
72.43	70.35	73.49	74.57	77.8	83.0
3.3	4.1	5.1	6.7	10.2	14.8
68.6	69.7	72.1	76.1	74.8	80.5
144.3	150.9	157.5	159.4	161.9	169.6
99.0	105.2	113.0	121.2	121.2	136.5
71.8	74.0	83.0	90.4	94.3	113.2
29.9	24.0	21.1	19.6	14.1	16.9
(g) $325.00	(g) $386.00	(g) $485.00	(g) $543.00	(h) $871.00	(i) $1252.00
4.2	4.4	3.2	2.9	2.7	1.4
17.2	14.7	14.9	15 5	13.8	14.1
68.0	69.6	72.1	77.5	78.2	78.2
10.6	11.3	9.8	4.1	5.3	5.7
16.5	19.3	16.4	17.0	14.8	22.3
64.0	60.9	59.6	57.0	59.2	51.7
19.5	19.8	24.0	26.0	26.0	26.0
$ 2.84	$ 3.53	$ 4.64	$ 6.03	$ 9.80	$17.15
$20.21	$25.40	$33.23	$40.43	$64.16	$98.10
14.0	16.8	21.1	25.4	39.6	57.9

) Includes 231 part-time teachers in Massachusetts. (f) Several states not included in this average.
) Computed from number of teaching positions.
) Computed from number of teaching positions plus 6583 supervisors and 13,638 principals whose salaries are included.
) Computed from number of teaching positions plus 7809 supervisors and 24,734 principals whose salaries are included.

they now have, as part of their personnel equipment, full-time janitors, who very often complicate greatly the administrative conduct of the school.

The facts which have been reviewed up to this point have been brought together for the purpose of concentrating attention on the fact that expansion necessitates new forms of organization. The schools of the United States are not what they were in 1850 or in 1870. They have undergone radical changes. These changes have received public sanction in the form of tangible support and have given rise to types of school activity which were not present in any degree in the earlier school. There has been produced in this way a new type of public education, called into being by a new and modern type of public demand.

Growth of High Schools. Perhaps the most remarkable growth among American educational institutions is that of the public high school. In 1870, only a very small portion of the population of the United States sought the advantages of an education above the elementary schools. Of those who went to the high schools in 1870, the girls were, for the most part, preparing to become teachers, and the boys expected to enter one of the learned professions. The high school was very exclusive in this sense, and was supported at relatively small cost by a few of the larger communities.

The bureau of education did not at that time collect special statistics with regard to the high schools. It was not until 1890 that the figures for the high school began to be collected with any degree of exactness. From that time the growth of the secondary school has been phenomenal. The following table gives the major facts in this development.

This table should not be passed over without some comment on its significance. Whereas in 1870 the average man found it possible to enter upon his life work with a little knowledge of reading and writing, the modern boy finds that it is quite impossible for him to secure any advantageous position in the commercial or industrial world without a knowledge which extends very far beyond the rudimentary subjects taught in the elementary schools. If he is going to enter industry, he must know something of the source of the raw materials with which his industry deals; he must be prepared to understand something of the scientific principles on which his industry depends. If his activities are in commerce, he must have some knowledge of other countries, even to the extent of having some command of their languages.

Increasing Complexity of Civic Relations. Citizenship has also come to be a very much more complex matter than it was in former days. Formerly, where communities were small and every one knew personally the man who was sent to the legislature, voting was a matter of choice among acquaintances. As communities expanded, however, the problem of government became more complex, and the selection of the individual who should serve as a representative in the legislative assembly became infinitely more complicated, because of the lack of direct contact between voter and legislator. As a result, public intelligence with regard to governmental policies must in the present period be cultivated through a broader knowledge of history and civics.

To be sure, American schools have not always developed these broader forms of knowledge as fully as they might, but we have come to the belief that they must if our citizenship is to be intelligent. At the same time the conviction has certainly gained general acceptance that it is quite impossible for a modern state to be conducted on the basis of an elementary school training. As a result, pupils in ever increasing numbers have left the elementary school with the expectation of going on to higher institutions. Especially has it been true that after every great economic and social disturbance attendance in the high schools has increased. It may be said, almost literally, that the high school sprang into existence after the Civil War. Later panics and depressions in the economic world have driven

SUMMARY OF STATISTICS OF PUBLIC HIGH SCHOOLS, 1890–1924*

Items	1890	1900	1910	1920	1924
Schools reporting	2,526	6,005	10,213	14,326	14,827
Per cent reporting (based on all secondary schools reporting)	60.8	75.2	85.2	87.3	87.5
Teachers:					
Men	3,597	10,172	18,890	34,396	48,359
Women	5,280	10,200	22,777	63,258	85,036
Total	(a) 9,120	20,372	41,667	(b) 97,654	(b) 133,395
Pupils (not including pupils in seventh and eighth grades in junior high schools):					
Boys	85,451	216,207	398,525	822,967	1,183,067
Girls	116,351	303,044	516,536	1,034,188	1,355,314
Total	(a) 202,963	519,251	915,061	1,857,155	2,538,381
Total population of continental United States	62,622,250	75,997,687	91,972,266	105,710,620	112,078,611
Per cent of total population in high schools	0.32	0.68	1.00	1.76	2.26
Per cent of all secondary pupils in public high schools	68.1	82.4	88.6	91.0	90.7
Colored students, included above:					
Boys	2,512	2,655	4,306	9,497	18,898
Girls	3,397	5,740	8,330	18,134	32,847
Total	(a) 5,933	8,395	12,636	27,631	51,745
Graduates:					
Boys	7,692	22,575	43,657	90,516	155,698
Girls	14,190	39,162	67,706	140,386	206,538
Total	21,882	61,737	111,363	230,902	362,236
Teachers to a school	3.6	3.4	4.1	(c) 6.8	(c) 9.0
Pupils to a school	80.4	86.5	89.6	(d) 139.5	(d) 199.0
Pupils to a teacher	22.3	25.5	22.0	(c,d) 20.5	(c,d) 22.1
High schools for boys only	....	....	34	39	52
High schools for girls only	....	....	26	39	50

* Excludes statistics of elementary grades in junior high schools, apart from exceptions indicated in footnotes.
(a) Includes teachers or pupils not classified as to sex.
(b) Includes teachers in junior high schools: for 1920, 1361 men and 5069 women; for 1924, 3299 men and 11,697 women.
(c) Computation includes teachers in elementary grades in junior high schools.
(d) Computation includes pupils in elementary grades in junior high schools.

REVIEW OF STATISTICS OF UNIVERSITIES, COLLEGES, AND TECHNICAL SCHOOLS

Items	1890	1900	1910	1920	1924
Professors and Instructors					
Preparatory departments:					
Men	....	2,572	2,807	2,714	2,615
Women	....	1,506	1,741	1,568	1,757
Total	2,803	4,078	4,548	4,282	4,372
Collegiate departments:					
Men	....	9,014	14,051	21,644	28,872
Women	....	2,205	3,230	6,469	9,153
Total	6,198	11,219	17,281	28,113	38,025
Professional departments:					
Men	....	....	12,886	10,603	13,381
Women	....	....	399	312	422
Total	3,995	8,277	13,285	10,915	13,803
Total, excluding duplicates:					
Men	10,676	18,341	28,477	34,111	44,345
Women	2,889	3,791	5,154	8,771	11,934
Total	13,565	22,132	33,631	(*a*)42,882	(*b*)56,279
Students					
Preparatory departments:					
Men	29,530	34,814	42,616	38,398	38,825
Women	22,219	21,471	23,426	20,911	23,033
Total	51,749	56,285	66,042	59,309	61,858
Collegiate departments:					
Men	44,650	68,047	113,074	212,405	289,817
Women	20,624	36,051	61,139	128,677	196,482
Total	65,274	104,098	174,213	341,082	486,299
Graduate departments:					
Men	1,973	4,112	6,504	9,837	18,444
Women	409	1,719	2,866	5,775	10,355
Total	2,382	5,831	9,370	15,612	28,799
Professional departments: (*c*)					
Men	32,034	55,926	65,569	53,295	85,865
Women	977	2,144	5,688	3,836	5,651
Total	33,011	58,070	71,257	67,131	91,516
Total number, excluding duplicates:					
Men	119,860	162,899	227,995	334,226	457,701
Women	53,831	61,385	104,701	187,528	268,423
Total	173,691	224,284	332,696	(*d*)521,754	(*e*)726,124
Collegiate and resident graduate students:					
Men	44,926	72,159	119,578	222,242	....
Women	20,874	37,770	64,005	134,452	....
Total	65,800	109,929	183,583	356,694	....
Undergraduate and graduate students:					
In public institutions—					
Men	....	26,147	49,919	102,711	....
Women	....	7,820	17,707	53,915	....
Total	....	33,967	67,626	156,626	....
In private institutions—					
Men	....	46,012	70,663	119,531	....
Women	....	29,950	46,423	80,537	....
Total	....	75,962	117,086	200,068	....
Students in engineering courses:					
General engineering	....	....	....	10,231	12,360
Civil engineering	1,195	3,140	7,889	8,859	10,024
Mechanical engineering	....	4,459	6,377	11,789	10,637
Electrical engineering	....	2,555	5,450	9,469	14,002
Mining engineering	....	1,261	2,656	3,048	2,771
Chemical engineering	....	....	869	5,743	4,141
Degrees Conferred (*f*)					
Baccalaureate:					
Men	....	9,547	15,267	23,272	36,258
Women	....	4,471	7,420	15,280	25,027
Total	6,853	14,018	22,687	38,552	61,285
Graduate:					
Men	....	1,628	1,939	3,457	6,447
Women	....	324	602	1,396	2,814
Total	1,135	1,952	2,541	4,853	9,261
Honorary	735	702	679	989	1,096
Ph. D. degrees, on examination:					
Men	....	322	365	439	914
Women	....	20	44	93	150
Total	126	342	409	532	1,064

(*a*) Includes 982 men and 1239 women teaching in other departments. (*b*) Includes 1073 men and 1255 women teaching in other departments. (*c*) Includes students in theology, law, medicine, dentistry, pharmacy, osteopathy, and veterinary medicine. (*d*) Includes 27,533 men and 38,326 women in other departments. (*e*) Includes 33,144 men and 39,859 women in other departments. (*f*) Exclusive of professional degrees, that is, first degrees in theology, law, medicine, dentistry, pharmacy, osteopathy, and veterinary medicine. Of these degrees, there were granted in 1890, 8686; in 1900, 13,392; in 1910, 14,512; in 1920, 8774 (8272 to men and 502 to women); in 1924, 18,297 (17,357 to men and 940 to women).

people to seek a broader education. Finally, the World War made the importance of intellectual and technical training so obvious that, since 1918, the higher institutions of the country have been flooded with students seeking better training than that which could be afforded by the elementary school.

Expansion of the Colleges. What has been said with regard to the expansion of the secondary schools can be repeated with regard to the expansion of the college. The table on page 1641 gives the details in this matter.

EMPHASIS ON HIGHER EDUCATION

The facts which have been summarized in the foregoing paragraphs can be presented in a striking comparative form to show that the emphasis in American education has gradually been moving toward the higher schools. If the expenditures for the different types of schools are studied, it will be found that there has been a steady increase, but that this increase has been in different ratios for different grades of schools. Two tables will make this matter clear.

DISTRIBUTION OF FUNDS AMONG DIFFERENT TYPES OF SCHOOLS IN THE UNITED STATES, 1910–1926

Expenditures in Millions of Dollars

	1910	1920	1922	1924	1926
Elementary Schools	375	795	1240	1318	1464
High Schools	51	240	450	633	753
Normal Schools	12	18	40	44	61
Universities, Colleges, and Professional Schools	34	107	272	341	404
Totals	472	1160	2002	2336	2682

PERCENTAGE DISTRIBUTION OF FUNDS AMONG DIFFERENT TYPES OF SCHOOLS, 1910–1926

Percentage of Total Expenditures

	1910	1920	1922	1924	1926
Elementary Schools	79.50	68.53	61.94	56.42	54.59
High Schools	10.81	20.69	22.48	27.05	28.11
Normal Schools	2.54	1.55	1.99	1.88	2.27
Universities, Colleges, and Professional Schools	7.14	9.22	13.59	14.60	15.06

The first of these tables shows that the expenditures for elementary schools have increased in sixteen years 290.4 per cent, while the expenditures for high schools have increased 1376.5 per cent. The expenditures for colleges have likewise increased in the period from 1910 to 1926 by more than 1000 per cent; the 4-year period from 1922 to 1926 shows an increase of 44.9 per cent. In 1910 the elementary schools received 80 per cent of the support which was given to education. These schools received in 1926 only 55 per cent. High schools and colleges, on the other hand, have increased steadily in the relative share of public support which they enjoy for their maintenance, rising from 11 to 28 per cent in the case of high schools and from 7 to 15 in the case of colleges. This shows the trend of emphasis at the higher levels of education.

The following table leads to like conclusions in that it shows the shift in emphasis, through both a steady increase in attendance in the upper grades of the elementary school and a much greater expansion of the registration in high school and college.

Increases of this type have been unusually large since the World War. It became evident to every one that advanced training such as is secured in the high school and college is essential to leadership. The army was officered by men of education. The result was that a great impetus was given to higher education. The effects of this impetus continued to be evident even ten years after the close of hostilities.

ENROLLMENT IN VARIOUS GRADES IN 1916 AND 1926 AND PER CENT OF INCREASE AT EACH LEVEL

Grades	Enrollment		Percentage of Increase
	1916	1926	
6	1,901,865	2,204,276	15.90
7	1,568,781	1,901,408	21.20
8	1,307,660	1,462,274	11.82
H. S. I	679,314	1,343,259	97.74
H. S. II	456,675	946,774	107.32
H. S. III	317,036	693,878	118.86
H. S. IV	247,812	557,343	124.90
Higher Institutions	441,059	821,052	86.15

Higher Education and Democracy. The final conclusion to be drawn from all these comparisons is that the school system of the United States has been seeking to attain the general democratic ideal of a higher education for every one who is willing to spend the time and effort in securing such an education. The distinction which has been maintained historically in Europe between the upper classes of society and the common people is being entirely eliminated in this country through an expansion of the upper schools. It required a long period of development in American national life to bring even the common schools to the level where the average man could be trained in subjects other than the rudiments of "the three R's." Once the common school reached its development, however, the ambition for a higher education has exhibited itself with phenomenal rapidity, and the development of the school system of the United States during the last two or three decades has been much more rapid than the corresponding development in any other country.

REORGANIZATION OF EDUCATION

There are certain natural consequences which issue from these expanding ideals of a democratic school system. In the first place, there is a growing impatience with any delay in the introduction of useful subjects, such as natural science and civics. Formerly, the elementary schools did not attempt to teach the common people very much science or very much about the principles of government. These subjects were first introduced in the higher institutions of the American educational system. It was assumed that only people of the higher degrees of intellectual maturity could understand them.

Now that even the common people are sharing in a higher education, however, there is a disposition to introduce science and civics and all of the other subjects at the earliest possible moment. The result is that a reorganization of the curriculum of the lower schools is being carried forward very rapidly.

In general, therefore, the statistics which have been studied should be interpreted to mean that the content of education in all grades of schools has been evolving rapidly in the direction of a richer and broader course of study.

The Elective System. The administration of this broader course of study requires some flexibility in the arrangement of the program of individual pupils. Not all pupils will want the same type of training. Some of them are preparing to enter professions, while others are attending the higher schools with the expectation of entering upon industrial or commercial careers. The enriched course of study includes material appropriate to all of these different expectations, but no single individual can take advantage of all the different opportunities offered. The common practice in all higher institutions is, therefore, to allow the student to select those types of training most directly related to his individual needs. This is perhaps the most radical change which has taken place in the relations of the student and the school administration.

THE beginnings of the scientific study of education are to be traced to the German philosopher and educator, Herbart (1776–1841), who did his work between 1800 and 1841. He pointed out the fact that educational operations must be guided by scientific principles derived from the study of human nature, or psychology, and from the study of that science which deals with the rules of proper conduct, namely, ethics.

EXPERIMENTAL PSYCHOLOGY

The movement which Herbart inaugurated was effective in Germany in stimulating a number of lines of scientific inquiry. In the first place, it gave rise to a more careful study, in laboratories designed for that purpose, of the mental processes of adults and children. The development of the science of psychology during the last century is in a very large measure to be traced directly to the influence of Herbart. The movement was accelerated and augmented by the contributions of the physiologists and of those who were interested in measuring the processes of sensation.

The Child Study Movement. In 1881 G. Stanley Hall, who had just returned to Johns Hopkins university from a period of training in the psychological laboratory in Leipzig, Germany, began to collect and publish material on child psychology. He attracted a great deal of attention among teachers and school administrators for the views which he developed in regard to the reorganization of schools.

The "child study movement," as it was called, was carried forward vigorously by Hall and his students for a period of twenty years, and was one of the important sources of the present scientific study of education.

This movement suffered, however, because its methods of investigation were somewhat unsystematic and likely to lead to erroneous conclusions. The chief method of this school was that which has been called the "questionnaire" method. Various series of questions in regard to different aspects of children's mental lives were formulated. These were sent to parents and teachers in different parts of the country, and their answers were tabulated. Conclusions were drawn from these answers without very serious regard to the validity of the answers themselves. The results of the use of this method were numerous collections of interesting material about the development of children; but it was found that educational practice could not rely upon the relatively loose information thus collected.

Culture Epochs Theory. Herbart's influence was effective along lines other than those briefly traced in the foregoing statements about psychology. Numerous practice schools were set up in Germany, and theories in regard to education were tried out in these schools. One important theory of this sort was known as the "culture epochs theory." It was held that the line of development followed by children parallels closely the line of development which has been followed by the race. Thus, the race began with no ability to write and gradually evolved this ability. The race began with very crude graphic art and gradually refined this art through the cultivation of taste in color and through studies of form and perspective. Children's drawings show the same crudities as do those of primitive peoples, and the same stages of gradual development appear as children refine their taste for color and their knowledge of form. Such analogies as these encouraged the followers of Herbart to reach the general conclusion that they could lay out a course of study appropriate for the schools, provided they could find by a careful study of the history of the race the different stages or epochs through which civilization has passed. A vigorous effort was accordingly made in Germany and in this country to prepare natural courses of study on this pattern. The result was an interest in such matters as the habits and abilities of children and primitive peoples, and much new and stimulating study was undertaken both of human nature and of materials to be used in instruction.

The culture epochs theory, like the child study movement, spent itself because of its crude generalizations; but, before it was abandoned, it had stimulated so much skepticism about the older traditional methods of teaching and had aroused so much interest in the possibilities of a new course of study that later generations of teachers and supervisors have profited greatly by its impulse.

Studies of Teaching Methods. Furthermore, the experimental schools which were set up by the followers of Herbart gave a great deal of attention to methods of teaching and developed new formulas to guide teachers in their work. The Herbartian movement came to the United States in very vigorous form during the '80's and led to the organization of a society of educators who called themselves the Herbart Society. The members of this group produced numerous books on methods of teaching and aroused the teachers of the country to the realization of the possibilities of improving their work.

Encouragement of Scientific Studies. In addition to the suggestions looking toward a science of education which can be traced directly to Herbart, there were natural forces at work in American civilization tending in the same direction. In the first place, as has been pointed out in an earlier section, great expansion was going forward in the American school. The secondary school was developing rapidly, and teaching was becoming a more and more highly specialized type of activity. By the early '90's, therefore, everything was ready for the launching of a movement which gradually gained impetus during the decades between 1890 and 1910, and which has gone forward rapidly since that time.

The Tests of J. M. Rice. In the early '90's an editor, Mr. J. M. Rice, began to collect for the magazine called *The Forum* a series of descriptive accounts of the great school systems of the country. He found such wide differences in the methods of work and in the achievements of the school systems which he visited that he ultimately decided to undertake a measurement of results secured in some of the subjects of instruction. He went to the leading cities of the United States and asked for permission to test the pupils in spelling and arithmetic. This he did during the years 1894 and 1895. The results were very astonishing. He found in his tests in spelling that, while there were the greatest differences in the amounts of time devoted to this subject in the school systems of different cities, the results seemed to show uniformly that children of a certain age can spell correctly about the same percentage of words. That is, it makes no difference how much time is given to instruction in spelling, children of the sixth grade will always show about the same degree of efficiency. Mr. Rice concluded that spelling develops as the child matures, almost independently of the work in the school.

His tests in arithmetic were no less astonishing in their results. They showed that children are by no means so well trained in this subject as their teachers had been in the habit of assuming. Furthermore, he found that the personality of the teacher is much more significant than any other factor in determining the success of instruction. He was therefore critical of the ordinary methods of organizing arithmetic, and was able to show that school systems are in the main highly deficient in this field. When he reported his results to the department of superintendence of the National Education Association, his statements were received with great skepticism.

School people thought that the methods of testing were inadequate. But the facts were so impressive that, from that time on, numerous other investigators were led to devise tests and to examine in detail the results of instruction, not only in arithmetic, but in other subjects as well. Mr. Rice's investigation constituted, therefore, in a very definite sense, the starting point in the measurement movement, which in recent years has included all the subjects of the curriculum of the elementary school, and is now rapidly spreading into the high school and even into the field of college education.

Superintendent Maxwell's Reports. Superintendent Maxwell of New York City was another of the pioneers in the scientific movement in education. In the early years of this century, he called attention to the fact that numerous assumptions with regard to the progress of children through the grades of the elementary school were entirely without support in fact. His most striking pronouncement in regard to this matter was a statement that in New York schools a very considerable percentage of the pupils, instead of being in the grade in which they should be, according to their ages, were very far behind. To be exact, he said that 39 per cent of the children in the schools of New York City were below the grade in which they might normally be expected to be found.

The statements made by Superintendent Maxwell, with the tests which had been made by Rice and others who immediately followed him, proved to school people and to students of psychology and related subjects that there must be a very much more definite knowledge with regard to the actual success or failure of schools than that which could be gathered from the assumptions of teachers about the effectiveness of their work. Studies began to be made with regard to all of these matters, and the modern scientific movement was launched.

Biological and Anthropological Measurements. The scientific movement in education was influenced very early in its course by a parallel type of scientific development which was going on in biology and anthropology. Students of biology and of anthropology, who in the early stages of their sciences had depended on mere observation of the facts of life, began, about two decades ago, to realize that they must be much more exact in their information regarding plants and animals and human beings, if their sciences were to develop. They therefore began to measure and to make comparisons which were based on these exact measurements. They soon reached certain generalizations which have proved to be of very great importance in the study of education, as well as in the study of phenomena of other types. An example will serve to illustrate the type of measurement to which reference is here made.

The Normal Distribution of a Group. If, in a given large group of people, measurements of the heights of the individuals are made, it will be found that there are in the group a few very tall and a few very short persons. Between these two extremes, there is a distribution of the people, such that a gradual increase in the number of each class appears as one passes from the extremes, made up of very tall and very short people, toward the middle group, which is made up of those who are of average height. That is, while there are a few exceptionally tall people, there are a somewhat larger number who are very tall; there are a still larger number who are tall enough to attract attention but are neither exceptionally tall nor very tall. When we come to the average group, we find that it includes the largest number of individuals. Facts of this sort appear in any field in which a biological characteristic is measured.

Mental characteristics, like physical characteristics, seem to follow the same law of distribution. There are a few geniuses in the world and a few idiots; between these two extremes, the average members of society group themselves around the average ability.

This general discovery that individuals of a group distribute themselves around a center, or average, according to a definite law, has served to guide in a very important way the measurements which have been made in education. In measuring the ability of children to read or spell, it is found that members of any large group exhibit a tendency to collect around the average ability.

Stimulated by the early studies of the workers in sciences, the names of which have been mentioned, and by the criticisms of schools made by Maxwell and other practical school people, students of education began to gather all of the available facts about school situations. They began to collect and compile school statistics on various matters. It may be well to follow their work in some detail.

Studies of Retardation. The term "retardation" was devised, by those who measured the progress of children through the schools, to indicate the fact that certain children fail of promotion in their school work, and hence fall behind the grades in which they ought to be if they had progressed steadily and successfully each year of their school lives. Thus, a child who is six years of age and just entering school may be accepted as a normal individual. If he fails to complete the work in the first grade satisfactorily, he becomes what is known as a "repeater," and he will be, not seven years of age, but eight, when he enters the second grade.

Acceleration. Acceleration is the opposite of retardation. If a child who is ten years of age and is in the fourth grade is allowed to pass directly into the sixth grade, thus gaining a year over children of like age, he is said to be accelerated. Theoretically, if the course of study administered in the elementary school were of average difficulty, bright children ought to be able to complete it in less time than dull children, and there ought to be as many accelerants as there are retards. The school, however, is not so organized as to push forward those who can do the work rapidly, and in most systems retardations accumulate without any balancing accelerations.

Elimination. When a child leaves school he is said to be eliminated, especially if he leaves before completing the eighth grade. Elimination is heaviest among retarded pupils. These retarded pupils often reach the legal limit of compulsory education while in the lower grades. Thus a child who has lost two or three years through non-promotion may be found in the fifth or sixth grade at the time when he is fourteen years of age. Under the laws of many of the states, he is now allowed to leave school and enter upon some industrial task. A very large proportion of the children who are retarded and allowed under the law to leave school at fourteen years of age do so.

The present average age of completion of the eighth grade is 14.7 years. This average would be much higher if all who are eliminated remained in school.

Some of the most productive scientific studies carried on in the field of education in the early part of this century were studies of retardation and elimination. Great practical interest is attached to these studies. E. L. Thorndike and L. P. Ayres were leaders in this movement. Ayres prepared in 1909 a book entitled *Laggards in Our Public Schools*, as a summary of the studies which had been made up to that time. The influence of this book has been very large indeed. Most school systems now publish in their annual reports tables known as "age-grade tables," setting forth the number of children of different ages in each of the grades. Such a table calls attention to the retardation in the schools and stimulates teachers and administrators to try to improve the situation. So great has been the influence of such tables and studies of this matter, that the number of children who now complete the eighth grade is double that which it was before these scientific studies began.

AGE-GRADE DISTRIBUTION OF PUPILS ON THE 12-YEAR PLAN *
Reported by the U. S. Bureau of Education, 1927

Grade	Ages									
	4	5	6	7	8	9	10	11	12	13
1	173	14,167	75,366	41,887	13,194	4,018	1,432	534	306	154
2	1	250	10,087	48,025	35,088	13,898	5,062	1,909	844	345
3	. . .	5	375	9,868	41,131	32,109	15,948	6,623	2,941	1,251
4	. . .	. . .	17	563	10,289	37,000	30,199	16,407	8,583	3,897
5	. . .	. . .	. . .	24	722	10,418	33,298	28,974	17,448	9,161
6	. . .	. . .	. . .	. . .	41	934	10,152	30,834	27,473	16,741
7	. . .	. . .	. . .	. . .	3	41	1,018	9,952	27,458	24,555
8	. . .	. . .	. . .	. . .	. . .	3	60	1,150	9,395	24,002
9	. . .	. . .	. . .	. . .	. . .	. . .	2	82	1,467	9,513
10	. . .	. . .	. . .	. . .	. . .	. . .	. . .	5	93	1,205
11	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	6	99
12	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	5
Total	174	14,422	85,845	100,367	100,468	98,421	97,171	96,470	96,014	90,928

Ages								Total	Average age	Grade
14	15	16	17	18	19	20	21 and over			
76	37	10	3	3	4	1	58	151,423	7.02	1
160	60	16	5	1	2	1	11	115,765	8.22	2
509	176	53	11	6	3	2	14	111,025	9.37	3
1,648	592	126	19	7	3	0	4	109,354	10.47	4
4,215	1,529	278	40	18	5	1	3	106,134	11.50	5
8,291	3,101	610	81	22	7	3	6	98,296	12.41	6
14,025	5,761	1,372	213	36	9	3	4	84,450	13.27	7
20,727	10,411	3,131	587	98	25	6	28	69,623	14.11	8
22,313	18,089	7,996	2,365	605	158	61	57	62,708	15.02	9
6,740	14,853	11,297	4,806	1,400	375	117	60	40,951	15.94	10
1,031	4,835	10,185	7,710	2,986	923	261	130	28,166	16.89	11
71	824	4,017	7,967	5,956	2,296	706	263	22,105	17.85	12
79,806	60,268	39,091	23,807	11,138	3,810	1,162	638	1,000,000	. . .	Total

*Based on returns from about 900 cities and reduced to the basis of 1,000,000 pupils.

DEVELOPMENT OF STANDARDS

A second type of scientific study in education is that which issued in the creation of scales and standards of school work. One of the earliest standards prepared was that which was worked out by E. L. Thorndike in 1909 in the form of a handwriting scale. Thorndike collected a large number of specimens of children's handwriting. These he submitted to competent judges, asking them to arrange the specimens in order of excellence. By a mathematical calculation of the judgments which he thus secured, Thorndike arranged the specimens in a series of equal steps from the poorest handwriting to the best. He then reproduced the selected specimens, which were separated from each other by equal steps of excellence, and published them as samples with which teachers could compare the work of their pupils. Any specimen of handwriting which was to be rated by the teacher could be held near the scale which had been prepared by Thorndike, and its relative position in the scale could be readily determined. The scale was marked with certain figures which made it possible to describe any given specimen in numerical terms.

The Handwriting Scale in Use. The importance of the handwriting scale consists in the fact that teachers no longer need to make the assumption that children in the different grades can write perfectly. It has long been known, of course, that third-grade children cannot equal the copy of the writing books, but just how far third-grade children commonly depart from that copy was not easily decided before the handwriting scale was perfected. It is now possible to compare the work of the third-graders, or that of any other children, with the standard scale, and to determine quite definitely the level of excellence which in general can be expected from pupils of the grade in question.

It may be remarked in passing that some people think of standardization as the reduction of all school work to absolute uniformity. That is not the significance of the term. School work can never be made absolutely uniform. One child's handwriting will differ in many ways from the handwriting of other children, but school work can be standardized in the sense that the teacher can ascertain the degree of excellence which has been attained and can govern his or her methods of instruction with this knowledge clearly in mind.

After Thorndike prepared the handwriting scale, numerous other workers perfected this and other scales for the study of children's work. There are scales for the measuring of excellence in English composition, scales for the measurement of various kinds of drawings, scales for the study of reading, and so on.

Courtis Arithmetic Tests. One of the most widely used instruments of educational measurement is the series of Courtis tests for the measurement of ability in arithmetic. By an ingenious composition of various number groups, S. A. Courtis prepared a series of exercises in the fundamental arithmetical operations of addition, subtraction, multiplication, and division. These are presented in such form that the pupils are asked to carry out at as rapid a pace as possible the various operations. The ability of any given child is measured by the number and accuracy of the operations which he can complete in a given period of time. The achievement of the whole grade can be measured by ascertaining the ability of the average child.

Spelling. Standard tests have been devised in other fields. A striking illustration may be found in the field of spelling. Formerly, the practice of schools was to teach spelling by resorting to the dictionary and selecting words in alphabetical order, arranging them in groups of gradually increasing length and complexity and making children learn them. There was no limit to the number of words that the schoolmaster attempted to use in his drill of children.

Ayres conceived the idea of attempting to determine what words are needed in ordinary life. To this end he brought together the results of various studies of words. He ascertained what words recur in business correspondence by going through numerous business letters and tabulating the words which he found. The same thing was done with the Sunday newspaper and with the Bible. When all of these different lists of commonly used words were brought together, the astonishing result appeared that about

one-half of the ordinary usage of words is limited to 50 common words, and the first 1000 words encountered in such a list exhaust the ordinary probabilities of use.

Ayres established, therefore, a list of 1000 most commonly employed words. He then gave these words to children in 84 school systems and found how far children of different grades are likely to be in error in spelling these common words. Through these measurements of error, he was able to arrange the words in ascending order of difficulty and to prepare a scale which can be used by any teacher to determine whether a given child or a given class has ordinary ability to spell common words.

Scales and Tests in Various Subjects. The preparation of scales and standards has gone forward in recent years very rapidly. Numerous authors have improved upon the original handwriting scales and the scales in other fields, and accurate tests have been prepared, not only in "the three R's," but also in such subjects as algebra, history, geography, and Latin, and in other subjects of instruction both in the elementary school and in the high school.

An Arithmetic Test. Perhaps the best method of showing the character and content of both the scales and the standard tests is to reproduce portions of one of the widely used series of tests in arithmetic. For the purpose of the school survey in the city of Cleveland an arithmetic test was devised, based on the materials prepared by Courtis. This test is made up of eight pages, the first page of which is reproduced below in full. On the last page one-half of the space is devoted to instruction for examiners. This also is reproduced. The remaining pages of the test contain numerous examples of different degrees of difficulty. One set of each type of examples is reproduced. It should be understood that these are mere specimens of the types of examples of which the full test is made up.

First Page

CLEVELAND SURVEY ARITHMETIC TESTS

Devised by Cleveland Survey Staff

City..... County..... State..... Date.....

Name..... Age today..... (years months)

Race..... Sex..... School.....

Grade..... Teacher.....

Instructions to Examiners

After telling the children not to open the papers, ask the children on the front seats to distribute the papers, placing one upon the desk of each pupil in the class. Have each child fill in the blank spaces at the top of this page. Then say to them: "Inside this folder are examples which you are to work out when the teacher tells you to begin. Work rapidly and accurately. There are more examples in each set than you can work out in the time that will be allowed. Answers do not count if they are wrong."

"Begin and stop promptly when the signal is given."

Additional instructions are given on the last page of this folder.

Record Scores in Spaces Below

Set	A	B	C	D	E	F	G	H
Ats.								
Rts.								

Set	I	J	K	L	M	N	O	
Ats.								
Rts.								

Ats. = attempts; Rts. = rights.

Last Half of Last Page

Instructions for Examiners

Have the children start and stop work together. Let there be an interval of half a minute between the sets of examples. Take two days for the test; give down through I the first day, and complete the test on the next day. The time allowances below must be followed exactly.

Set A ..... 30 seconds	Set F ..... 1 minute	Set K ..... 2 minutes
Set B ..... 30 seconds	Set G ..... 1 minute	Set L ..... 3 minutes
Set C ..... 30 seconds	Set H ..... 30 seconds	Set M ..... 3 minutes
Set D ..... 30 seconds	Set I ..... 1 minute	Set N ..... 3 minutes
Set E ..... 30 seconds	Set J ..... 2 minutes	Set O ..... 3 minutes

Have the children exchange papers. Read the answers aloud and let the children mark each example that is correct, "C." For each set let them count the number of problems attempted and the number of C's and write the numbers in the appropriate columns at the right of the page.

The record should then be transcribed to the first page. Please verify the results set down by the pupils.

Specimens of Various Types of Examples

SET A—Addition

1	6	9	0	4	1	7	9	3	2	1	3	6
2	6	5	1	2	3	7	6	0	4	5	8	9

SET B—Subtraction

9	7	11	8	12	1	9	13	4	12
9	3	6	1	3	0	7	8	3	6

SET C—Multiplication

3	4	9	0	5	4	2	7	4	9
2	7	8	2	6	1	9	6	0	5

SET D—Division

3)9 4)32 6)36 2)0 7)28 9)9 3)21

SET E—Addition

5	2	9	2	6	1	4	9
2	8	8	8	3	4	6	7
2	8	0	5	4	2	5	1
0	5	7	0	8	5	3	5
4	1	6	6	8	4	4	3

SET F—Subtraction

616	1248	1365	1092	716
456	709	618	472	344

SET G—Multiplication

2345	9735	8642	6789	2345
2	5	9	2	6

SET H—Fractions

$\frac{3}{5} + \frac{1}{5} =$ $\frac{6}{9} - \frac{4}{9} =$ $\frac{4}{9} + \frac{1}{9} =$ $\frac{8}{9} - \frac{7}{9} =$

SET I—Division

4)55424 7)65982 2)58748 5)41780

SET J—Addition

7	9	4	7	2	9	6	7	7	8	9	4	3	2
5	2	5	1	9	6	9	1	8	0	5	3	1	1
4	4	8	9	4	2	6	5	5	7	3	7	7	6
2	8	1	4	8	4	7	1	4	1	4	7	6	6
6	2	4	3	5	7	0	4	1	8	6	0	9	1
0	7	8	2	1	1	4	6	8	5	2	2	6	8
5	5	5	8	5	3	3	5	2	1	3	9	3	6
1	3	1	5	2	9	7	3	1	3	9	5	4	9
8	6	3	2	4	2	1	3	3	7	2	6	5	7
3	1	9	7	3	3	6	7	9	4	2	3	4	5
2	4	6	7	6	8	0	6	8	9	8	4	2	2
9	8	3	1	7	5	6	1	4	4	5	8	9	2
9	8	5	9	6	5	6	7	5	4	6	8	9	4

SET K—Division

21)273 52)1768 41)779 22)462 31)837

SET L—Multiplication

8246	3597	5739	2648
29	73	85	46

SET M—Addition

7493	8937	8625	2123	5142	3691
9016	6345	4091	1679	0376	4526
6487	2783	3844	5555	4955	7479
7591	4883	8697	6331	9314	2087
6166	1341	7314	6808	5507	8165

A Silent Reading Test. A second example of a standard test in a somewhat more complex field than that of arithmetic may be taken from the scale for the measurement of silent reading published by the Russell Sage Foundation of New York City. The directions for the tests and three samples of the reading passages used are given herewith:

DIRECTIONS

Giving the Tests.—1. See that each child has a pencil and that the teacher has a watch. 2. Distribute scales, face down. 3. Have children write on backs of sheets their names, grade, and date. 4. Tell children they are to have a test in reading. Hold scale up and explain that each paragraph tells them to do something to the picture above it with their pencils. They must read carefully, to make sure just what they are to do. They are to read and mark the paragraphs in order, starting at the top and working down, through the first, second, third, and so on. They must do as many as they can in five minutes. 5. Make sure that the pupils understand; then tell them to turn papers over and begin. Allow exactly five minutes. Collect papers.

Marking the Papers. Count every paragraph correct in which the marking, no matter how crude it may be, exactly follows instructions. Count every paragraph wrong in which the marking does not exactly follow instructions. Remember this is a test of reading, not of drawing. The pupil's score is the number of paragraphs correctly marked. Write this number at the top of the paper.

Giving Credit. The credit to be assigned in each grade for each number of paragraphs correctly marked is shown in the table given below. A third-grade child having ten paragraphs right should be marked 80, a fourth-grade child having seven right, 50, and so on. Credits in table are for February 1. To adjust for other periods add or subtract from each child's mark as follows:

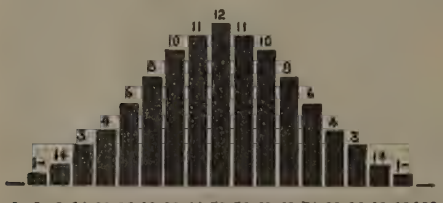
Grade 3	Oct. 1, +6	Dec. 1, +3	April 1, −3	June 1, −6
Grades 4–8	+2	+1	−1	June 1, −2

Give no marks less than 0 or more than 100. Write the credit the child receives at the top of his paper.

Results Usually Found. In the diagram shown under the table, columns show per cent of children in the average grade receiving each mark from 0 to 100. Figures below columns show marks or credits, and figures above columns show per cents of children commonly receiving those credits. Thus 12 per cent usually receive a mark of 50, eight per cent one of 68, and so on. The lowest third in the average class receive marks of from 0 to 38; the middle third, from 44 to 56, and the best third, from 62 to 100.

CREDIT CORRESPONDING TO EACH NUMBER OF PARAGRAPHS MARKED IN EACH GRADE

Grade	Number of Paragraphs Read and Marked Correctly																			Grade
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
3	0	26	32	38	44	50	56	62	68	74	80	86	92	98	100	..	..	..	..	..	..	3
4	0	14	20	26	32	38	44	50	56	62	68	74	80	86	92	98	100	..	..	..	..	4
5	0	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92	98	100	..	..	..	5
6	0	2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92	98	100	..	..	6
7	..	0	2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92	98	100	..	7
8	..	..	0	2	8	14	20	26	32	38	44	50	56	62	68	74	80	86	92	98	100	8



SPECIMENS OF TEST PASSAGES



1. This naughty dog likes to steal bones. When he steals one he hides it where no other dog can find it. He has just stolen two bones, and you must take your pencil and make two short, straight lines, to show where they are lying on the ground near the dog. Draw them as quickly as you can, and then go on.



2. This man is an Eskimo who lives in the far north where it is cold. There has just been a big storm, and all the ground is white with snow. The man has been walking and has made many footprints in it. With your pencil quickly make four of these in the snow just behind him.



3. This book is lying on the desk, but it is hard to make it stay open. With your pencil draw a single straight line to represent a ruler lying across the book to hold the pages open. Be sure to make the line from one side to the other, across the book, instead of making it go up and down.

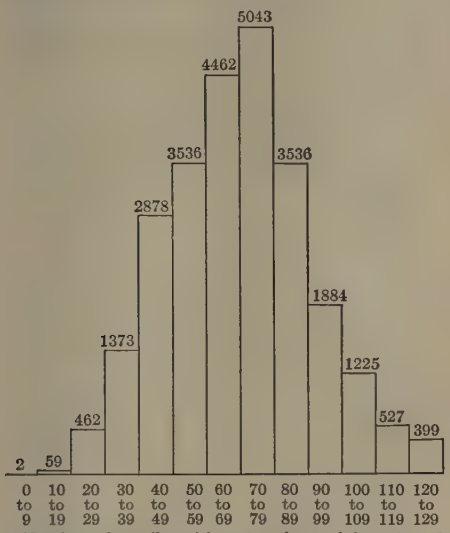
Methods of Employing Tests. Such tests as have been described are used in various ways by different school officers. Teachers very frequently succeed in discovering by their use those pupils who are in need of special attention. They can then direct instruction to the remedy of the defects thus found. Such a use for the diagnosis of school difficulties is perhaps the most productive to which tests can be put.

Sometimes the superintendent of schools uses tests to find out whether teachers are getting on well with their classes. Such measurement of results for administrative purposes has proved to be very helpful in standardizing the practices of large school systems where the superintendent cannot come into personal contact with all of the teachers. The results in such cases must however be interpreted with great caution if injustices are to be avoided; for a teacher may very often have a class of low ability or of especially difficult type, as when she attempts to teach English to a group of children from homes where the English language is not spoken.

Tests have also been used in general school surveys where experts from outside a school system have been called in by the board of education or by the citizens in order to make a study of the virtues and defects of the system.

Typical Results of Measurements. Turning from the scales and tests to some of the results which have been secured by their application, we may at the same time give an illustration of the way in

which people distribute themselves in any field in which measurement has been made. The following graph, taken from the survey of the Cleveland schools, shows how pupils distribute themselves with respect to the rate of handwriting:



Number of pupils writing at each speed from 0 to 9 letters per minute to 120 to 129 letters per minute. Data for 25,387 pupils in four upper grades.

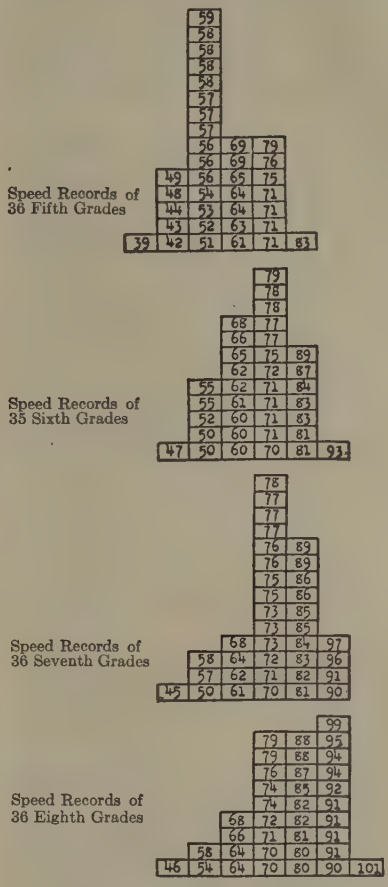
The numbers at the tops of the columns in this figure indicate the number of pupils who write in a minute the number of letters indicated at the bottom of the figure.

Quality of handwriting can be measured by comparing examples with the standard scale. In the case of the series of determinations of quality shown in the following figure, the scores are based on the so-called Ayres handwriting scale. The figure shows the distribution of pupils in the Cleveland schools with respect to quality of their handwriting:



Number of pupils writing at each quality from 20 to 90. Data for 10,528 pupils in four upper grades.

In order to show how different grades and different schools vary in the results which they show in speed of handwriting the following figures are reproduced.



Average handwriting speed in letters per minute in four upper grades of 36 schools.

Improvements Based on Measurements. Schools have been greatly stimulated by the results of these studies. Measurement has given, first, a better understanding of what ought to be expected at the different levels of education. No teacher, however isolated, needs to be in any doubt as to the success or unsuccess of his work, because it is now thoroughly known what may be expected of children of different ages. Secondly, the tests and experiments have served as a means of deciding between different methods of instruction. Some methods are good and produce excellent results rapidly; other methods of teaching are less satisfactory, and students make slower progress when these less satisfactory methods are employed. With the scales and tests it is possible to determine accurately the rates of progress. It is, therefore, becoming increasingly difficult for a poor method of teaching to survive in a school. It is also becoming increasingly difficult for individual teachers to escape the necessity of cultivating at all times acquaintance with the best methods that have been devised for the treatment of the various topics in the course of study.

GENERAL INTELLIGENCE TESTS

A type of test which has come into great prominence in recent years and has been very much discussed in connection with the work in the schools is the so-called general intelligence test. This has been applied in schools, and it has been employed also in industry in determining the efficiency of different sorts of workers. It was used on a large scale in the United States army, during the World War, for the purpose of classifying recruits and officers.

This type of test originated many years ago in the experimental studies of the psychologist Ebbinghaus (1850–1909). Ebbinghaus devised a so-called completion test. He took a simple narrative and dropped out a word here and there. He then asked the person whose general intelligence he wanted to test to supply the omitted words. A comparison of different individuals showed that the persons of largest intelligence were those who could supply most rapidly and most correctly the missing words in the narrative. It is obvious that great service will be rendered to society if it is possible to devise some plan by which the general intelligence of a person can be rapidly measured, in the same way that his physical condition can be measured by his strength and endurance. Psychologists have, therefore, steadily pursued this matter in the effort to improve on the tests of Ebbinghaus and enlarge their application.

Cattell attempted to make use of the general intelligence test in the classification of college freshmen at Columbia university, during the late '90's, but his tests proved to be too crude for the purpose, and the results did not at that time seem very satisfactory. However, Cattell and his students pursued the matter until now numerous tests have been devised and are in use for measuring the general intelligence of all classes of students, as well as of persons who are to be selected for professional and business positions.

Binet and His Scale. In 1905 the Paris authorities asked the eminent psychologist Binet to devise some way of picking out the defective children in the elementary school. Binet devised, in response to this invitation, the now famous scale which bears his name.

The special character of Binet's scale lies in the fact that he brought together a number of questions and a number of tests of skill for each age. He thus set up a series of tests which ought to be passed by an ordinary child of three years of age and another set somewhat more difficult for children of four years of age, and so on up the scale. The way in which he determined the appropriateness of these tests for different ages was to try them out on a large number of pupils. He thus determined how far three-year-old children under ordinary circumstances can go in solving the various questions which he laid down in his series.

Various revisions of the Binet scales have been prepared, and a formula has been developed by means of which the relative intelligence of an individual can be expressed in a single numerical term. If the age of a person is compared with his achievements in the Binet series of tests, it can be determined whether the individual compares favorably with those of his own age or is above or below expectation. Thus, if a ten-year-old child passes the ten-year-old test and no higher, he has exactly fulfilled expectations. By dividing ten, the intellectual age of the child according to the expectations of the Binet scale, by his chronological age ten, we get the quotient one. This is known as the intelligence quotient and is commonly expressed by the letters I. Q. Another child of ten years of age might succeed in passing the test for twelve-year-old children; his I. Q. would then be 1.2. A third child of ten years of age might show a deficiency and be able to pass only the eight-year-old test. His I. Q. would be .8.

Stanford Revision of the Binet Scale. The following summary of the tests to be used with children of different ages constitutes the so-called Stanford revision of the Binet tests. The examples here given cover years three, four, five, and six. Similar lists have been prepared for the later years of the child's life.

THE STANFORD REVISION AND EXTENSION

"YEAR III. (6 tests, 2 months each.)

1. Points to parts of body. (3 of 4.)
   Nose; eyes; mouth; hair.
2. Names familiar objects. (3 of 5.)
   Key, penny, closed knife, watch, pencil.
3. Pictures, enumeration or better. (At least 3 objects enumerated in one picture.)
   (a) Dutch Home; (b) River Scene; (c) Post-Office.
4. Gives sex.
5. Gives last name.
6. Repeats 6 to 7 syllables. (1 of 3.)

Al. Repeats 3 digits. (1 success in 3 trials. Order correct.)"

"YEAR IV. (6 tests, 2 months each.)

1. Compare lines. (3 trials, no error.)
2. Discrimination of forms. (Kuhlmann.) (Not over 3 errors.)
3. Counts 4 pennies. (No error.)
4. Copies square. (Pencil. 1 of 3.)
5. Comprehension, 1st degree. (2 of 3.)
   (Stanford addition.) 'What must you do': 'When you are sleepy?' 'Cold?' 'Hungry?'
6. Repeats 4 digits. (1 of 3. Order correct.)
   (Stanford addition.)

Al. Repeats 12 to 13 syllables. (1 of 3 absolutely correct, or 2 with 1 error each.)"

"YEAR V. (6 tests, 2 months each.)

1. Comparison of weights. (2 of 3.)
   3–15; 15–3; 3–15.
2. Colors. (No error.)
   Red; yellow; blue; green.
3. Æsthetic comparison. (No error.)
4. Definitions, use or better. (4 of 6.)
   Chair; horse; fork; doll; pencil; table.
5. Patience, or divided rectangle. (2 of 3 trials. 1 minute each.)
6. Three commissions. (No error. Order correct.)

Al. Age."

"YEAR VI. (6 tests, 2 months each.)

1. Right and left. (No error.)
   Right hand; left ear; right eye.
2. Mutilated pictures. (3 of 4 correct.)
3. Counts 13 pennies. (1 of 2 trials, without error.)
4. Comprehension, 2d degree. (2 of 3.) 'What's the thing for you to do':
   (a) 'If it is raining when you start to school?'
   (b) 'If you find that your house is on fire?'
   (c) 'If you are going some place and miss your car?'
5. Coins. (3 of 4.)
   Nickel; penny; quarter; dime.
6. Repeats 16 to 18 syllables. (1 of 3 absolutely correct, or 2 with 1 error each.)

Al. Morning or afternoon."

Note.—Al. signifies alternative.

The following examples will serve to illustrate the way in which each of these lists of tests is elaborated in the instructions prepared for those who are to give the tests:

"III, 1. POINTING TO PARTS OF THE BODY

Procedure. After getting the child's attention, say: 'Show me your nose.' 'Put your finger on your nose.' Same with the eyes, mouth, and hair.

"Tact is often necessary to overcome timidity. If two or three repetitions of the instruction fail to bring a response, point to the child's chin or ear and say: 'Is this your nose?' 'No?' 'Then where is your nose?' Sometimes, after one has tried two or three parts of the test without eliciting any response, the child may suddenly release his inhibitions and answer all the questions promptly. In case of persistent refusal to respond it is best not to harass the child for an answer, but to leave the test for a while and return to it later. This is a rule which applies generally throughout the scale. In the case of one exceptionally timid little girl, it was impossible to get any response by the usual procedure, but immediately when a doll was shown the child pointed willingly to its nose, eyes, mouth, and hair. The device was successful because it withdrew the child's attention from herself and centered it upon something objective.

"Scoring. Three responses out of four must be correct. Instead of pointing, the child sometimes responds by winking the eyes, opening the mouth, etc., which is counted as satisfactory.

"Remarks. Binet's purpose in this test is to ascertain whether the subject is capable of comprehending simple language. The ability to comprehend and use language is indeed one of the most reliable indications of the grade of mental development. The appreciation of gestures comes first, then the comprehension of language heard, next the ability to repeat words and sentences mechanically, and finally the ability to use language as a means of communication. The present test, however, is not more strictly a test of language comprehension than the others of the 3-year group, and in any case it could not be said to mark the *beginning* of the power to comprehend spoken language. That is fairly well advanced by the age of 2 years. The test closely resembles III, 2 (naming familiar objects), and III, 3 (enumeration of objects in a picture), except that it brings in a personal element and gives some clue to the development of the sense of self. All the data agree in locating the test at year III.

"III, 2. NAMING FAMILIAR OBJECTS

Procedure. Use a key, a penny, a closed knife, a watch, and an ordinary lead pencil. The key should be the usual large-sized doorkey, not one of the Yale type. The penny should not be too new, for the freshly made, untarnished penny resembles very little the penny usually seen. Any ordinary pocketknife may be used, and it is to be shown unopened. The formula is, 'What is this?' or, 'Tell me what this is.'

"Scoring. There must be at least three correct responses out of five. A response is not correct unless the object is named. It is not sufficient for the child merely to show that he knows its use. A child, for example, may take the pencil and begin to mark with it, or go to the door and insert the key in the lock, but this is not sufficient. At the same time we must not be too arbitrary about requiring a particular name. 'Cent' or 'pennies' for 'penny' is satisfactory, but 'money' is not. The watch is sometimes called 'a clock' or 'a tick-tock,' and we shall perhaps not be too liberal if we score these responses plus. 'Pen' for 'pencil,' however, is unsatisfactory. Substitute names for 'key' and 'knife' are rarely given. Mispronunciations due to baby-talk are of course ignored.

"Remarks. The purpose of this test is to find out whether the child has made the association between familiar objects and their names. The mental processes necessary to enable the child to pass this test are very elementary, and yet, as far as they go, they are fundamental. Learning the names of objects frequently seen is a form of mental activity in which the normally endowed child of 2 to 4 years finds great satisfaction. Any marked retardation in making such associations is a grave indication of the lack of that spontaneity which is so necessary for the development of the higher grades of intelligence. It would be entirely beside the point, therefore, to question the validity of the test on the ground that a given child may not have been taught the names of the objects used. Practically all children 3 years old, however poor their environment, have made the acquaintance of at least three of the five objects, and if intelligence is normal they have learned their names as a result of spontaneous inquiry.

"Always use the list of objects here given, because it has been standardized. Any improvised selection would be sure to contain some objects either less or more familiar than those in the standardized list. Note also that three correct responses out of five are sufficient. If we required five correct answers out of six (like Kuhlmann), or three out of three (like Binet, Goddard, and Huey), the test would probably belong at the 4-year level. Binet states that this test is materially harder than that of naming objects in a picture, since in the latter the child selects from a number of objects in the picture those he knows best, while in the former test he must name the objects we have arbitrarily chosen. This difference does not hold, however, if we require only three correct responses out of five for passing the test of naming objects, instead of Binet's three out of three. All else being equal, it is of course easier to recognize and name a real object shown than it is to recognize and name it from a picture.

"III, 3. ENUMERATION OF OBJECTS IN PICTURES

Procedure. Use the three pictures designated as 'Dutch Home,' 'River Scene,' and 'Post-Office.' Say, 'Now I am going to show you a pretty picture.' Then, holding first one before the child, close enough to permit distinct vision, say: 'Tell me what you see in this picture.' If there is no response, as sometimes happens, due to embarrassment or timidity, repeat the request in this form: 'Look at the picture and tell me everything you can see in it.' If there is still no response, say: 'Show me the ....' (naming some object in the picture). Only one question of this type, however, is permissible. If the child answers correctly, say: 'That is fine; now tell me everything you see in the picture.' From this point the responses nearly always follow without further coaxing. Indeed, if rapport has been properly cultivated before the test begins, the first question will ordinarily be sufficient. If the child names one or two things in a picture and then stops, urge him on by saying, 'And what else?' Proceed with pictures (b) and (c) in the same manner.

"Scoring. The test is passed if the child enumerates as many as three objects in one picture spontaneously; that is, without intervening questions or urging. Anything better than enumeration (as description or interpretation) is also acceptable, but description is rarely encountered before 5 years and interpretation rarely before 9 or 10.

"Remarks. The purpose of the test in this year is to find out whether the sight of a familiar object in a picture provokes recognition and calls up the appropriate name. The average child of 3 or 4 years is in what Binet calls 'the identification stage'; that is, familiar objects in a picture will be identified but not described, their relations to one another will not be grasped.

"In giving the test, always present the pictures in the same order, first Dutch Home, then River Scene, then Post-Office. The order of presentation will no doubt seem to the unitiated too trivial a matter to insist upon, but a little experience teaches one that an apparently insignificant change in the procedure may exert a considerable influence upon the response. Some pictures tend more strongly than others to provoke a particular type of response. Some lend themselves especially to enumeration, others to description, others to interpretation. The pictures used in the Stanford revision have been selected from a number which have been tried, because they are more uniform in this respect than most others in use. However, they are not without their difference, picture (b), for example, tending more than the others to provoke description.

"There seems to be no disagreement as to the proper location of this test."

UNITED STATES ARMY TESTS

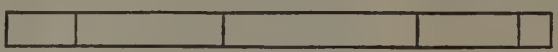
Since the perfection of the Binet scale a great many experiments have been made in the effort to measure intelligence. The organization of the army furnished the largest opportunity to perfect the system of intelligence measurements. It was desirable that the army should be freed of any persons who were so incompetent that they could not understand and follow orders. Very shortly after the army was organized, the psychologists of the country prepared plans for the testing and elimination of incompetents. The movement extended, however, much further than the elimination of those of low intelligence. It soon became obvious that in an army organization it was desirable to select those of the highest degree of intelligence for positions of command. Furthermore, it was necessary in the officers' training camps to grade the men with reference to their promotion, and to do this in an impersonal way, so as to avoid political influence and the other social complications that would have impeded the organization of the army. Tests were therefore devised which would serve the purpose of indicating rapidly those men who had the highest degree of intelligence.

Occupational Tests. The army also had need of a system of classification whereby it could place men in the industrial activities which were necessary for carrying on the war. For example, some men were needed who were expert mechanics; some were needed to keep the army accounts. The locating of men suited to these lines of occupation could be effectively handled, in part, through a knowledge of the earlier occupations which the men had followed. In many instances, however, it was necessary to put men into lines of work which were different from those that had been familiar to them in civilian life, and tests were needed in order to avoid, so far as possible, misfit assignments. Fortunately the psychological methods for making such tests had been worked out in a great deal of detail in a number of centers before the war came. The psychologists of the country promptly came forward with the experience which they had accumulated in these earlier experiments and became an important part of the army organization. Special series of tests were devised by a number of commissions.

The Army Alpha Test. This is the most extensively used of the army tests.

REPRODUCTION OF ARMY ALPHA, FORM 5.

TEST 1

1. ○ ○ ○ ○ ○
2. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
3. 
4. 
5. ○ ○ ○ Yes No
6. ○ ○ ○ ○ ○
7. A B C D E F G H I J K L M N O P
8. ○ ○ ○ MILITARY GUN CAMP
9. 34-79-56-87-68-25-82-47-27-31-64-93-71-41-52-99
10. 
11. 7F △ 4 ○ 3 △ 5A ○ 8 □ 2 △ 6 ○ 9B □ 3
12. 1 2 3 4 5 6 7 8 9

This is an oral directions test. The directions given are as follows:

TEST I, FORM V

1. "Attention! 'Attention' always means 'Pencils up.' Look at the circles at 1. When I say 'go,' but not before, make a cross in the first circle and also a figure 1 in the third circle.—Go!" (Allow not over 5 seconds.)

2. "Attention! Look at 2, where the circles have numbers in them. When I say 'go,' draw a line from Circle 1 to Circle 4 that will pass *above* Circle 2 and *below* Circle 3.—Go!" (Allow not over 5 seconds.)

3. "Attention! Look at the square and triangle at 3. When I say 'go,' make a cross in the space which is in the triangle, but not in the square, and also make a figure 1 in the space which is in the triangle and in the square.—Go!" (Allow not over 10 seconds.)

4. "Attention! Look at 4. When I say 'go,' make a figure 1 in the space which is in the circle, but not in the triangle or square, and also make a figure 2 in the space which is in the triangle and circle, but not in the square.—Go!" (Allow not over 10 seconds.)

(N. B. Examiner.—In reading 5, don't pause at the word CIRCLE as if ending a sentence.)

5. "Attention! Look at 5. If a machine gun can shoot more bullets a minute than a rifle, then (when I say 'go') put a cross in the second circle; if not, draw a line *under* the word No.—Go!" (Allow not over 10 seconds.)

6. "Attention! Look at 6. When I say 'go,' put in the second circle the right answer to the question: 'How many months has a year?' In the third circle do nothing, but in the fourth circle put any number that is a wrong answer to the question that you have just answered correctly.—Go!" (Allow not over 10 seconds.)

7. "Attention! Look at 7. When I say 'go,' *cross out* the letter just before C and also draw a line *under* the second letter before H.—Go!" (Allow not over 10 seconds.)

8. "Attention! Look at 8. Notice the three circles and the three words. When I say 'go,' make in the *first* circle the first letter of the *first* word; in the *second* circle the *first* letter of the *second* word; and in the *third* circle the last letter of the *third* word.—Go!" (Allow not over 10 seconds.)

9. "Attention! Look at 9. When I say 'go,' *cross out* each number that is more than 20, but less than 30.—Go!" (Allow not over 15 seconds.)

10. "Attention! Look at 10. Notice that the drawing is divided into five parts. When I say 'go,' put a 3 or a 2 in each of the two largest parts and any number between 4 and 7 in the part next in size to the smallest part.—Go!" (Allow not over 15 seconds.)

11. "Attention! Look at 11. When I say 'go,' draw a line through every even number that is not in a square and also through every odd number that is in a square with a letter.—Go!" (Allow not over 25 seconds.)

12. "Attention! Look at 12. If 7 is more than 5, then (when I say 'go') cross out the number 6 unless 6 is more than 8, in which case draw a line under the number 7.—Go!" (Allow not over 10 seconds.)

TEST 2

Get the answers to these examples as quickly as you can. Use the side of this page to figure on if you need to.

Samples
1. How many are 5 men and 10 men? Answer . . . . . (15
2. If you walk 4 miles an hour for 3 hours, how far do you walk? Answer . . . . (12

1. How many are 30 men and 7 men? Answer . . . (
2. If you save $7 a month for 4 months, how much will you save? Answer . . . . . (
3. If 24 men are divided into squads of 8, how many squads will there be? Answer . . . . . (
4. Mike had 12 cigars. He bought 3 more, and then smoked 6. How many cigars did he have left? Answer . . . . . (
5. A company advanced 5 miles and retreated 3 miles. How far was it then from its first position? Answer (
6. How many hours will it take a truck to go 66 miles at the rate of 6 miles an hour? Answer . . . . (
7. How many cigars can you buy for 50 cents at the rate of 2 for 5 cents? Answer . . . . . (
8. A regiment marched 40 miles in five days. The first day they marched 9 miles, the second day 6 miles, the third 10 miles, the fourth 8 miles. How many miles did they march the last day? Answer. (
9. If you buy two packages of tobacco at 7 cents each and a pipe for 65 cents, how much change should you get from a two-dollar bill? Answer . . . . (
10. If it takes 6 men 3 days to dig a 180-foot drain, how many men are needed to dig it in half a day? Answer . . . . . (
11. A dealer bought some mules for $800. He sold them for $1,000, making $40 on each mule. How many mules were there? Answer. . . . . (
12. A rectangular bin holds 400 cubic feet of lime. If the bin is 10 feet long and 5 feet wide, how deep is it? Answer . . . . . (
13. A recruit spent one-eighth of his spare change for post cards and four times as much for a box of letter paper, and then had 90 cents left. How much money did he have at first? Answer . . . . . (

14. If 3½ tons of coal cost $21, what will 5½ tons cost? Answer . . . . . (

15. A ship has provisions to last her crew of 500 men 6 months. How long would it last 1,200 men? Answer . . . . . (

16. If a man runs a hundred yards in 10 seconds, how many feet does he run in a fifth of a second? Answer . . . . . (

17. A U-boat makes 8 miles an hour under water and 15 miles on the surface. How long will it take to cross a 100-mile channel, if it has to go two-fifths of the way under water? Answer . . . . . (

18. If 241 squads of men are to dig 4,097 yards of trench, how many yards must be dug by each squad? Answer . . . . . (

19. A certain division contains 3,000 artillery, 15,000 infantry and 1,000 cavalry. If each branch is expanded proportionately until there are in all 20,900 men, how many will be added to the artillery? Answer . . . . . (

20. A commission house which had already supplied 1,897 barrels of apples to a cantonment delivered the remainder of its stock to 29 mess halls. Of this remainder each mess hall received 54 barrels. What was the total number of barrels supplied? Answer. (

TEST 3

This is a test of common sense. Below are sixteen questions. Three answers are given to each question. You are to look at the answers carefully; then make a cross in the square before the best answer to each question, as in the sample:

Sample

Why do we use stoves? Because
- ☐ they look well
- ☒ they keep us warm
- ☐ they are black

Here the second answer is the best one and is marked with a cross. Begin with No. 1 and keep on until time is called.

---

1. Cats are useful animals, because
   - ☐ they catch mice
   - ☐ they are gentle
   - ☐ they are afraid of dogs
2. Why are pencils more commonly carried than fountain pens? Because
   - ☐ they are brightly colored
   - ☐ they are cheaper
   - ☐ they are not so heavy
3. Why is leather used for shoes? Because
   - ☐ it is produced in all countries
   - ☐ it wears well
   - ☐ it is an animal product
4. Why judge a man by what he does rather than by what he says? Because
   - ☐ what a man does shows what he really is
   - ☐ it is wrong to tell a lie
   - ☐ a deaf man cannot hear what is said
5. If you were asked what you thought of a person whom you didn't know, what should you say?
   - ☐ I will go and get acquainted
   - ☐ I think he is all right
   - ☐ I don't know him and can't say
6. Streets are sprinkled in summer
   - ☐ to make the air cooler
   - ☐ to keep automobiles from skidding
   - ☐ to keep down dust
7. Why is wheat better for food than corn? Because
   - ☐ it is more nutritious
   - ☐ it is more expensive
   - ☐ it can be ground finer
8. If a man made a million dollars, he ought to
   - ☐ pay off the national debt
   - ☐ contribute to various worthy charities
   - ☐ give it all to some poor man
9. Why do many persons prefer automobiles to street cars? Because
   - ☐ an auto is made of higher grade materials
   - ☐ an automobile is more convenient
   - ☐ street cars are not as safe
10. The feathers on a bird's wings help him to fly because they
    - ☐ make a wide, light surface
    - ☐ keep the air off his body
    - ☐ keep the wings from cooling off too fast
11. All traffic going one way keeps to the same side of the street because
    - ☐ most people are right handed
    - ☐ the traffic policeman insists on it
    - ☐ it avoids confusion and collisions
12. Why do inventors patent their inventions? Because
    - ☐ it gives them control of their inventions
    - ☐ it creates a greater demand
    - ☐ it is the custom to get patents
13. Freezing water bursts pipes because
    - ☐ cold makes the pipes weaker
    - ☐ water expands when it freezes
    - ☐ the ice stops the flow of water
14. Why are high mountains covered with snow? Because
    - ☐ they are near the clouds
    - ☐ the sun seldom shines on them
    - ☐ the air is cold there
15. If the earth were nearer the sun
    - ☐ the stars would disappear
    - ☐ our months would be longer
    - ☐ the earth would be warmer
16. Why is it colder nearer the poles than near the equator? Because
    - ☐ the poles are always farther from the sun
    - ☐ the sunshine falls obliquely at the poles
    - ☐ there is more ice at the poles

TEST 4

If the two words of a pair mean the same or nearly the same, draw a line under same. If they mean the opposite or nearly the opposite, draw a line under opposite. If you cannot be sure, guess. The two samples are already marked as they should be.

Samples	good—bad	same—<u>opposite</u>	
	little—small	<u>same</u>—opposite	
1	wet—dry	same—opposite	1
2	in—out	same—opposite	2
3	hill—valley	same—opposite	3
4	allow—permit	same—opposite	4
5	expand—contract	same—opposite	5
6	class—group	same—opposite	6
7	former—latter	same—opposite	7
8	confess—admit	same—opposite	8
9	shy—timid	same—opposite	9
10	delicate—tender	same—opposite	10
11	extinguish—quench	same—opposite	11
12	cheerful—melancholy	same—opposite	12
13	accept—reject	same—opposite	13
14	concave—convex	same—opposite	14
15	lax—strict	same—opposite	15
16	assert—maintain	same—opposite	16
17	champion—advocate	same—opposite	17
18	adapt—conform	same—opposite	18
19	debase—exalt	same—opposite	19
20	dissension—harmony	same—opposite	20

21	repress—restrain	same—opposite	21
22	bestow—confer	same—opposite	22
23	amenable—tractable	same—opposite	23
24	avert—prevent	same—opposite	24
25	reverence—veneration	same—opposite	25
26	fallacy—verity	same—opposite	26
27	specific—general	same—opposite	27
28	pompous—ostentatious	same—opposite	28
29	accumulate—dissipate	same—opposite	29
30	apathy—indifference	same—opposite	30
31	effeminate—virile	same—opposite	31
32	peculation—embezzlement	same—opposite	32
33	benign—genial	same—opposite	33
34	acme—climax	same—opposite	34
35	largess—donation	same—opposite	35
36	innuendo—insinuation	same—opposite	36
37	vesper—matin	same—opposite	37
38	aphorism—maxim	same—opposite	38
39	adjure—renounce	same—opposite	39
40	encomium—eulogy	same—opposite	40

TEST 5

The words A EATS COW GRASS in that order are mixed up and don't make a sentence; but they would make a sentence if put in the right order: A COW EATS GRASS, and this statement is true.

Again, the words HORSES FEATHERS HAVE ALL would make a sentence if put in the order ALL HORSES HAVE FEATHERS, but this statement is false.

Below are twenty-four mixed-up sentences. Some of them are true and some are false. When I say "go," take these sentences one at a time. Think what each **would** say if the words were straightened out, but don't write them yourself. Then, if what it **would** say is true, draw a line under the word "true"; if what it **would** say is false, draw a line under the word "false." If you can not be sure, guess. The two examples are already marked as they should be. Begin with No. 1 and work right down the page until time is called.

Samples	a eats cow grass		true—false	
	horses feathers have all		true—false	
1	lions strong are		true—false	1
2	houses people in live		true—false	2
3	days there in are week eight a		true—false	3
4	leg flies one have only		true—false	4
5	months coldest are summer the		true—false	5
6	gotten sea water sugar is from		true—false	6
7	honey bees flowers gather the from		true—false	7
8	and eat good gold silver to are		true—false	8
9	president Columbus first the was America of		true—false	9
10	making is bread valuable wheat for		true—false	10
11	water and made are butter from cheese		true—false	11
12	sides every has four triangle		true—false	12
13	every times makes mistakes person at		true—false	13
14	many toes fingers as men as have		true—false	14
15	not eat gunpowder to good is		true—false	15
16	ninety canal ago built Panama years was the		true—false	16
17	live dangerous is near a volcano to it		true—false	17
18	clothing worthless are for and wool cotton		true—false	18
19	as sheets are napkins used never		true—false	19
20	people trusted intemperate be always can		true—false	20
21	employ debaters irony never		true—false	21
22	certain some death of mean kinds sickness		true—false	22
23	envy bad malice traits are and		true—false	23
24	repeated call human for courtesies associations		true—false	24

TEST 6

Samples	2	4	6	8	10	12	*14*	*16*
	9	8	7	6	5	4	*3*	*2*
	2	2	3	3	4	4	*5*	*5*
	1	7	2	7	3	7	*4*	*7*

Look at each row of numbers below, and on the two dotted lines write the two numbers that should come next.

3	4	5	6	7	8	....	....
10	15	20	25	30	35	....	....
8	7	6	5	4	3	....	....
3	6	9	12	15	18	....	....
5	9	13	17	21	25	....	....
8	1	6	1	4	1	....	....
27	27	23	23	19	19	....	....
1	2	4	8	16	32	....	....
8	9	12	13	16	17	....	....
9	9	7	7	5	5	....	....
19	16	14	11	9	6	....	....
2	3	5	8	12	17	....	....
11	13	12	14	13	15	....	....
29	28	26	23	19	14	....	....
18	14	17	13	16	12	....	....
81	27	9	3	1	⅓	....	....
20	17	15	14	11	9	....	....
16	17	15	18	14	19	....	....
1	4	9	16	25	36	....	....
3	6	8	16	18	36	....	....

TEST 7

Samples
- sky—blue : : grass—**table green warm big**
- fish—swims : : man—**paper time walks girl**
- day—night : : white—**red black clear pure**

In each of the lines below, the first two words are related to each other in some way. What you are to do in each line is to see what the relation is between the first two words, and underline the word in heavy type that is related in the same way to the third word. Begin with No. 1 and mark as many sets as you can before time is called.

1	gun—shoots : : knife—**run cuts hat bird**	1
2	ear—hear : : eye—**table hand see play**	2
3	dress—woman : : feathers—**bird neck feet bill**	3
4	handle—hammer : : knob—**key room shut door**	4
5	shoe—foot : : hat—**coat nose head collar**	5
6	water—drink : : bread—**cake coffee eat pie**	6
7	food—man : : gasoline—**gas oil automobile spark**	7
8	eat—fat : : starve—**thin food bread thirsty**	8
9	man—home : : bird—**fly insect worm nest**	9
10	go—come : : sell—**leave buy money papers**	10
11	peninsula—land : : bay—**boats pay ocean Massachusetts**	11
12	hour—minute : : minute—**man week second short**	12
13	abide—depart : : stay—**over home play leave**	13
14	January—February : : June—**July May month year**	14
15	bold—timid : : advance—**proceed retreat campaign soldier**	15
16	above—below : : top—**spin bottom surface side**	16
17	lion—animal : : rose—**smell leaf plant thorn**	17
18	tiger—carnivorous : : horse—**cow pony buggy herbivorous**	18
19	sailor—navy : : soldier—**gun cap hill army**	19
20	picture—see : : sound—**noise music hear bark**	20
21	success—joy : : failure—**sadness success fail work**	21
22	hope—despair : : happiness—**frolic fun joy sadness**	22
23	pretty—ugly : : attract—**fine repel nice draw**	23
24	pupil—teacher : : child—**parent doll youngster obey**	24
25	city—mayor : : army—**navy soldier general private**	25
26	establish—begin : : abolish—**slavery wrong abolition end**	26
27	December—January : : last—**least worst month first**	27
28	giant—dwarf : : large—**big monster queer small**	28
29	engine—caboose : : beginning—**commence cabin end train**	29
30	dismal—cheerful : : dark—**sad stars night bright**	30
31	quarrel—enemy : : agree—**friend disagree agreeable foe**	31
32	razor—sharp : : hoe—**bury dull cuts tree**	32
33	winter—summer : : cold—**freeze warm wet January**	33
34	rudder—ship : : tail—**sail bird dog cat**	34
35	granary—wheat : : library—**desk books paper librarian**	35
36	tolerate—pain : : welcome—**pleasure unwelcome friends give**	36
37	sand—glass : : clay—**stone hay bricks dirt**	37
38	moon—earth : : earth—**ground Mars sun sky**	38
39	tears—sorrow : : laughter—**joy smile girls grin**	39
40	cold—ice : : heat—**lightning warm steam coat**	40

TEST 8

Notice the sample sentence:

People **hear** with the **eyes ears nose mouth**

The correct word is **ears**, because it makes the truest sentence.

In each of the sentences below you have four choices for the last word. Only one of them is correct. In each sentence draw a line under the one of these four words which makes the truest sentence. If you can not be sure, guess. The two samples are already marked as they should be.

Samples
- People **hear** with the **eyes ears nose mouth**
- **France** is in **Europe Asia Africa Australia**

1 **America** was discovered by **Drake Hudson Columbus Balboa** 1

2 **Pinochle** is played with **rackets cards pins dice** 2

3 The most prominent industry of **Detroit** is **automobiles brewing flour packing** 3
4 The **Wyandotte** is a kind of **horse fowl cattle granite** 4
5 The **U. S. School for Army Officers** is at **Annapolis West Point New Haven Ithaca** 5
6 **Food products** are made by **Smith & Wesson Swift & Co. W. L. Douglas B. T. Babbitt** 6
7 **Bud Fisher** is famous as an **actor author baseball player comic artist** 7
8 The **Guernsey** is a kind of **horse goat sheep cow**. 8
9 **Marguerite Clark** is known as a **suffragist singer movie actress writer** 9
10 **"Hasn't scratched yet"** is used in advertising a **duster flour brush cleanser** 10
11 **Salsify** is a kind of **snake fish lizard vegetable**. . 11
12 **Coral** is obtained from **mines elephants oysters reefs** 12
13 **Rosa Bonheur** is famous as a **poet painter composer sculptor** 13
14 The **tuna** is a kind of **fish bird reptile insect**. . . 14
15 **Emeralds** are usually **red blue green yellow** . . 15
16 **Maize** is a kind of **corn hay oats rice** 16
17 **Nabisco** is a **patent medicine disinfectant food product tooth paste** 17
18 **Velvet Joe** appears in advertisements of **tooth powder dry goods tobacco soap** 18
19 **Cypress** is a kind of **machine food tree fabric**. . 19
20 **Bombay** is a city in **China Egypt India Japan**. . 20
21 The **dictaphone** is a kind of **typewriter multigraph phonograph adding machine** 21
22 The **pancreas** is in the **abdomen head shoulder neck** 22
23 **Cheviot** is the name of a **fabric drink dance food**. 23
24 **Larceny** is a term used in **medicine theology law pedagogy** 24
25 The **Battle of Gettysburg** was fought in **1863 1813 1778 1812**. 25
26 The **bassoon** is used in **music stenography bookbinding lithography** 26
27 **Turpentine** comes from **petroleum ore hides trees** 27
28 The number of a **Zulu's legs is two four six eight** 28
29 The **scimitar** is a kind of **musket cannon pistol sword** 29
30 The **Knight engine** is used in the **Packard Lozier Stearns Pierce Arrow** 30
31 The author of **"The Raven"** is **Stevenson Kipling Hawthorne Poe** 31
32 **Spare** is a term used in **bowling football tennis hockey** 32
33 A **six-sided figure** is called a **scholium parallelogram hexagon trapezium** 33
34 **Isaac Pitman** was most famous in **physics shorthand railroading electricity** 34
35 The **ampere** is used in measuring **wind power electricity water power rainfall** 35
36 The **Overland car** is made in **Buffalo Detroit Flint Toledo** 36
37 **Mauve** is the name of a **drink color fabric food** . 37
38 The **stanchion** is used in **fishing hunting farming motoring** 38
39 **Mica** is a **vegetable mineral gas liquid** 39
40 **Scrooge** appears in **Vanity Fair The Christmas Carol Romola Henry IV** 40

Interpreting Results of the Alpha Test. The results of the army tests have been compiled by various writers in an effort to bring out the mental characteristics of the army recruits from different sections of the country and from different nationalities. One author has compiled the results of these tests in such a way as to show very definitely that the immigrants who come to the United States from the southeastern European countries are not able to pass the test with as high a grade as the immigrants who come from the northern European states. In view of the fact that recent immigration has been predominantly from the countries in the southeastern part of Europe, these findings raise grave social questions.

Another general fact brought out by these tests is that the average recruit was able to answer the tests only about as well as school children between 13 and 14 years of age. On the basis of this fact, the statement is sometimes made that the average American citizen is intellectually between 13 and 14 years of age. Against this statement it has been argued that the tests include only those types of intellectual effort which belong to a school training. Beyond 13 years of age the ordinary man does not continue to cultivate the same type of thinking which he cultivated in the school. Consequently, the test does not uncover the mental development which has been going on, for example, in business or in practical mechanics. There is nothing in the test to show what a man who works in a foundry has been learning since he left school.

Controversy as to the meaning of the test has arisen at another point also. There are some who regard the test as a measure of native ability, while others regard it as a measure of acquired information. If the test measures native ability, then it is not to be expected that anyone who passes the test well at any given time will be of low mental ability at any other time in his life. Conversely, anyone who is not able to pass the test at a level that comports with his age cannot be expected to show intellectual ability of a higher order later. Those who believe that the test measures acquired information, on the other hand, interpret the results to mean that a man has had certain intellectual opportunities if he passes the test well, and that he has been deprived of these opportunities if he does not pass well.

It has been shown very clearly that the ability of recruits from different states parallels closely the efficiency of the school systems of these states. This fact would seem to indicate that the test measures school training quite as much as it does native intelligence. In general, this latter conclusion is probably more nearly the exact truth than the statement that the test measures only native ability.

Applications of Intelligence Tests. There can be no doubt that the experience of the army demonstrated the value of the various tests which were used. Some people were so much impressed by the success of the army tests that they believed a method had been found of classifying all human beings for all sorts of purposes, and the most extreme positions have been taken with regard to the use of these tests.

For example, it has been asserted by some that anyone who passes with a low grade should not be educated in a high school, and certainly not in college, on the theory that it is uneconomical for society to bestow its training on those who are endowed with only moderate degrees of intelligence.

Furthermore, extremists have appeared in some school systems who would rearrange the classification of pupils, sometimes even to the extent of ignoring the judgment of teachers, putting into a given grade only those children who stand at the same level in a general intelligence test.

These extremists have been met by vigorous objectors who hold that it is quite impossible on the basis of a single test to determine a person's intelligence and his probable achievements in the intellectual world. The objectors have marshaled a large body of evidence to show that the tests are in need of elaboration if they are to be relied upon at all, and that it is necessary to administer more than one test before any reliance can be placed upon the classifications which they suggest.

As a matter of actual practice, these tests are now extensively used to supplement the judgments of teachers in classifying students in all grades of schools. This is undoubtedly the legitimate use to which they can be put. They cannot be used to the exclusion of the other evidences in regard to students' achievements, but they are proving in their refined forms to be very much more reliable than any other single type of evidence, and because of their extended use they certainly supply a basis for the comparison of educational institutions and of teachers.

Furthermore their extensive use has led to a careful scrutiny of all the other devices for measuring human ability, such as examinations and teachers' judgments. The net result has been a refinement of the methods of placing pupils in the school and of graduating them at the completion of their courses. The indirect advantages have therefore often equaled the direct.

LABORATORY STUDIES

Another and somewhat more elaborate form of scientific study which has contributed to the better organization of schools and to improved methods of teaching may be described under the name "laboratory studies." There are certain types of investigation which teachers cannot readily carry on in the classroom, the results of which are yet very useful in directing educational work. An illustration of this type is to be found in the studies which have been made on the maturing of the child's physical organism. A little child is immature in his physical structures in the same degree as he is immature in his intellectual development. The physical changes through which he passes are in some respects easier to observe and record than are the intellectual changes. A good deal of energy has therefore been devoted to taking physical measurements of children.

It is found that in a little child the bones of the wrist are largely cartilaginous in structure. As the child matures, these cartilaginous structures become ossified, and X-ray photographs show the rate at which this ossification goes forward. The immature child is one whose cartilages show very little ossification. The mature child, on the other hand, is more like the adult. In adult life the bones are entirely ossified, the cartilage having disappeared through the process of maturing. Physical measurements of this type are now used in some experimental schools in studying pupils.

Reaction Measurements. Direct laboratory measurements of children's special abilities are also made. One of the earliest of these, which has been influential in affecting school practice, is the measurement of so-called "reaction times." The amount of effort necessary to carry out a certain intellectual process is indicated by the length of time which it requires. Thus it requires more time to work out an elaborate problem in multiplication than to solve a simple problem in addition. The exact measurement of time required for various mental processes can be made by means of elaborate time measuring devices used in the laboratory By the use of such apparatus, it is found that a child can recognize a word in the same length of time that is required for him to recognize a single letter. This being the case, it is evidently much more economical, in the early stages of reading, to train him to recognize word-wholes rather than to require him to recognize the letters which make up words. Guided by these laboratory experiments and by practical experience, teachers have found it advantageous to abandon the A-B-C method of teaching reading in favor of the word-whole method.

Reading and Eye Movements. The most productive laboratory studies that have been made of school subjects are the studies of the reading of pupils. The mental processes through which a child passes in looking at a series of words have been measured by photographing the movements of his eyes. If the eyes move rapidly across a page, the indication is that the child has been able to recognize the successive words fluently. If, on the other hand, the eyes move very slowly across a line of printed matter, it is evident that the child has not been able to recognize the successive words fluently.

Photographs of eye movements have brought out the fact that no one looks at each individual letter of a line of printed matter; the eye moves forward in steps of greater or less length. The reader takes in at each step a number of letters or words, and then moves forward to the next position, from which a new group of letters or words may be taken in. The length of the steps made by the reader is a fair measure of his range of recognition. It has been found that little children move their eyes in short steps along a line of printed matter. The trained adult, on the other hand, is able to take in whole phrases at a time, and his eye movements are rapid and long.

By means of similar photographs it has been possible to discover the various types of difficulty which arise in training children to read. It has also been possible to study minutely the effects of various methods of teaching, and in this way to devise ways to remedy defects in children who show incompetency in school work.

SCHOOL SURVEYS

The scientific methods which have been reviewed up to this point deal with particular aspects of school work. It is highly desirable that some method be developed by which a general measure of the efficiency of an educational institution or of a school system can be secured. A productive suggestion of the way in which this broader problem could be solved came to educators from the experience of communities which conducted what are known as social surveys. A number of the earlier social surveys were organized to investigate such matters as the housing conditions in cities or the situation regarding employment. Following the examples of these social surveys, educators organized a number of general school surveys.

The New York Survey. The first great school survey was that of New York City, made in 1912. The city board of estimate and apportionment found itself in disagreement with the board of education with regard to the funds which could be legitimately apportioned from the budget of the municipality to the maintenance of schools. The board of education, which was directly responsible for the organization of the schools, demanded more money than the financial board thought it ought to have. The financial board thereupon raised the question whether the schools were being efficiently conducted, and proceeded to organize a survey. They appointed as director of this survey Professor Hanus, head of the department of education of Harvard university. They made it possible for him to employ some of the leading students of education in the country, and directed him to look into all of the activities of the New York City schools.

The results of this general survey were published in three large volumes, and excited a tremendous amount of controversial discussion among school officers of the city. The schools were severely criticized in a number of respects, and the organization of the school administration was criticized. Wherever it seemed necessary to the surveyors to suggest changes, they encountered protests from the school officials which raised pointedly the question whether the methods employed by the surveyors were adequate to the task of evaluating the work of a great school system.

The Portland Survey. Shortly after the New York survey, a survey was organized in the city of Portland, Oregon. The taxpayers of that city found that their school expenditures had grown very rapidly, and they employed experts to look into the situation. Professor Cubberley, head of the department of education at Stanford university, was made director of the survey.

The report of this inquiry, published in 1913, is notable for the very full statement it makes of the theory of administrative organization which ought to prevail in a city system like that of Portland. It was found that the relations between the board of education, the superintendent, and the principals were not satisfactory, and the report recommended a complete reorganization. Here again much discussion followed the publication of the report.

The Springfield Survey. After 1913, there appeared in rapid succession reports of surveys of cities in all parts of the United States. Conspicuous among them and constituting a turning point in their methods of inquiry and publication is the survey of Springfield, Illinois, conducted by the department of education of the Russell Sage Foundation under the leadership of L. P. Ayres. The Spring-

field survey gave unusual attention to the school buildings. It was found that many of the buildings were in bad condition, and it was also found that the management of the finances of the board of education in respect to building construction was not of the most efficient type. The Springfield survey used the methods of measurements and tests, which up to that time had been devised, with more completeness than did any of the earlier surveys. The result was a report much less open to question than any of the earlier reports and much more significant as an illustration of exact scientific methods of evaluating school organization.

The Cleveland Survey. The survey movement reached its climax in a very elaborate study which was made of the school system of Cleveland, Ohio. This survey was conducted under the financial auspices of the Cleveland Foundation and had as its director L. P. Ayres. The results of this survey are published in a series of 25 volumes, which covers in detail every aspect of school organization and classroom work. The Cleveland survey includes also a very full account of the industrial demand of the city of Cleveland and of the methods which should be adopted by the school system to train young people for their places in the industrial activities of the city.

Since the Cleveland survey, a great many other systems have taken advantage of the methods exhibited in that survey and have repeated many of the inquiries which are there exemplified.

Survey Agencies. One difficult question which has arisen in the later surveys is that of securing suitable experts to perform the work. The United States bureau of education has been the agency to which a number of cities and states have appealed, and a long series of bulletins issued by the bureau have reported inquiries in different sections of the country. The General Education Board, founded by John D. Rockefeller, has recently conducted a number of surveys of state systems. The first of these state surveys was that of Maryland, made in 1912. The General Education Board has recently organized a separate division of state surveys and has undertaken in Kentucky, Indiana, and elsewhere general studies of the state systems. Certain state departments also have made surveys.

Bureaus of Measurement in Cities. Finally, it is becoming common for school systems to provide themselves with agencies that can make continuous studies of their school operations. Forty-two of the leading school systems of the country now have bureaus of investigation which are continually examining the work of the schools and measuring results.

All these indications of the mature application of the science of education make it certain that the preliminary stages of this movement have passed, and that the schools of the country will from this time on depend increasingly on scientific methods for the determination of their efficiency. A striking example of the use of scientific methods in administering a school system can be found in the city of Detroit, where the whole supervisory scheme is based on systematic tests, and where the organization of the classes in the schools is controlled by the measurements made by a department of research.

Studies of the Curriculum. A review of the development of the science of education would not be complete without indicating some of the newer lines of inquiry which in recent years have been pushed forward. The most productive of these relate to the curriculum of the schools. For a long time the courses administered in schools of all grades have simply followed traditions. Additions have, indeed, been made to the older curriculum, but these additions have come very slowly and they have not changed the essential character of the fundamental courses. There have been changes also in the fundamental courses, but these have been in the nature of slight revisions here and there, rather than radical reconstructions of the whole course.

In recent years, it has become apparent that a very large body of new instructional material must be put into the schools. The changes in social and industrial life, which have come with expanding civilization, require training of the young people of the country in lines which were never thought of when the school course was first laid down. The question immediately arises, under these conditions, as to what new subjects are most urgently demanded and how the time can be found for inserting them into the school program. Obviously, revision of the older courses must involve an elimination of any material which is not essential to a complete education. Additional material of value must be found. Studies of the curriculum have aimed, therefore, to discover what parts of existing courses may be dispensed with and what new material must be added in order to make the school serviceable to the modern community.

The methods which have been employed can be illustrated as follows: For the purpose of discovering what topics should be emphasized in geography, newspapers and periodicals have been carefully scanned with a view to determining those places in the world with which the public of today is most concerned. It is evident, for example, that the people of the United States must have some knowledge of the geography of the countries with which they carry on commercial relations. It is more important that the young people of this country know intimately about South America and the Orient than that they be fully informed about the interior of Africa. Practical needs of this sort are influential in determining the references made by the newspapers and magazines to the states and cities of the world. It is argued, therefore, that the course of study can properly be modified, in the light of the examination of current publications, so as to emphasize those centers most frequently referred to in these publications.

Job Analysis. Another type of study which is common is described by the term "job analysis." The children who go out of the schools must be prepared, as far as the school can prepare them, for the activities of life. If a boy is to become a salesman or a printer, the training which is given him during the last few years of his schooling ought to be intelligently directed toward these activities. This will be possible only if the actual demands of these activities are fully understood. Various educational agencies, therefore, have attempted to analyze the demands made upon the printer and the salesman. Careful tabulations of the daily routine of these and other occupations are undertaken, and in the light of these tabulations an effort is made to determine exactly what knowledge of a literary and scientific sort will best prepare one to deal with these demands.

This method of job analysis has suggested that schools include in their training much material which has been overlooked or ignored. For example, it is perfectly clear that the salesman must know how to meet people in such a way as to get their attention. The school has not ordinarily attempted to deal with such social matters and has nowhere in its curriculum provided for training in social leadership. The modern school is beginning to realize that success in life may depend upon direct emphasis on personal and social qualities, quite as much as on spelling, arithmetic, and literature.

The Science of Education and Educational Reorganization. Enough of the scientific movement in education has been described to justify the assertion that schools in the United States are in process of constructive reorganization under the guidance of scientific investigators. The defects and virtues of the American educational system are being demonstrated by exact methods, and significant improvements are being introduced at a rate never before equaled in the history of schools.

MODERN SCHOOL SYSTEMS OF FOREIGN COUNTRIES

MODERN GERMANY

THE educational system of modern Germany consists of a common school known as the *Volksschule* and a higher educational system in which the *Gymnasium* is followed by the university or the higher technical school.

Pupils enter both the *Volksschule* and the *Gymnasium* at six years of age. The one group is made up of the common people; the other, of those who are able to pay a tuition and who are on the way to one of the higher callings. Before the World War, the *Volksschule* educated 92 per cent of the populace.

Since the war, a special school has been organized for those children who show themselves to be especially bright. These children are allowed to go further than the common children, and arrangements have been made in some of the German states for especially bright children to pass over from this type of common school into the *Gymnasium*.

In some of the states there is an intermediate school which gives a somewhat broader education than the *Volksschule*.

There are, in addition to the institutions mentioned, industrial schools of lower grade, known as *Fortbildungsschulen*, and higher technical schools.

The Volksschule. This is an eight-year institution supported by the state and free to all pupils. Boys and girls are taught in the same class in the smaller communities and in separate classes or separate schools in the larger centers. The course of study includes "the three R's" and other rudimentary subjects. Pupils who graduate from this course go into lower technical schools, *Fortbildungsschulen*, where they are prepared for the trades. There is no possibility of passing from this lower school into the higher institutions; nor is there any way of passing from the *Volksschule* into the *Gymnasium*.

The purpose of the *Volksschule* and the *Fortbildungsschule* is to train the people for the simple duties of ordinary life. There is no intention or expectation that the common people will change their social status through education. Indeed, the whole social system of Germany is so stable that the natural expectation of every youth is that he will follow in the footsteps of his father. The educational system is intended, therefore, to make a contented, conservative populace, stable in its industrial organization.

The common school is under the control of the various states, and the courses of study in different parts of Germany are somewhat diverse, but in general they resemble the courses of study in the American elementary schools.

Mittelschule. This type of school is relatively uncommon in the German system, but exists to some extent in the southern states. It is to be found in communities which are able to provide a somewhat more liberal education for the boys and girls than that which is provided in the *Volksschule*. It usually provides nine years of training and includes in its curriculum all of the subjects of the elementary school and also one foreign language.

Industrial Education. Special notice is due to the industrial schools of Germany. They grew at first out of the keen industrial competitions in which communities found themselves, and they were gradually enlarged until they became leading factors in the educational system of the country.

The industrial schools were organized in Prussia as separate in their management from the ordinary schools. This fact has often been cited by advocates of a dual school system in the United States.

The Gymnasium. The higher division of the German school system begins with the so-called *Vorschule*. This is the primary division of the *Gymnasium* and is three years in length. In some of the smaller centers of population the *Vorschule* is amalgamated with the common school, but in general this is not the case. The *Vorschule* gives the rudiments of reading, writing, and number work, and leads directly in the fourth year into the *Gymnasium*.

The curriculum of the *Gymnasium* proper is what is called in American schools the classical curriculum. Certain other schools of the same grade introduce science and modern subjects, substituting these for Greek and, to some extent, for Latin.

It may be noted that in the *Gymnasium* the study of Latin begins in the first year following the *Vorschule* and continues throughout the curriculum of the *Gymnasium*, so that in the aggregate a pupil spends 68 year-hours in the study of this language. The result of this intensive study of Latin is that the graduate of the *Gymnasium* is able to read any Latin text with ease. As compared with American institutions, these higher schools in Germany secure much more efficient results of the type just described than are secured in American colleges or universities, even among students who specialize in the classical languages. The advantages of early specialization and continued study of a given subject are thus secured in full measure. It is the universal attitude of the teachers in the higher institutions in Germany that the training which they give is very superior to that which is given in the American high school. On the other hand, it is to be pointed out that the breadth of training which is given in the *Gymnasium* is relatively less than the breadth of training given in an American school. For example, the opportunities for the study of general history are very slight. So also are the opportunities for the study of natural science. The curriculum of the *Gymnasium* is very heavily loaded on the literary side, and, while it is intensive, it lacks in possibilities of general training.

The American high school, by contrast, aims at the cultivation of many different kinds of interests on the part of students. The adoption of the elective system in American high schools is in striking comparison with the spirit exhibited in the *Gymnasium*.

The Universities. The highest institutions of the German educational system following the *Gymnasium* are the universities. These are professional schools. German universities have been famous for their cultivation of research. The method of instruction is the lecture method. The degree granted by these institutions is that of doctor of philosophy. Commonly, such a degree may be taken by a student only after three years of residence, and very frequently a German student takes a much longer period to complete the work for the degree. It is the habit of the German student to migrate from institution to institution, spending a semester in each of a number of the leading universities, thus coming in contact with the prominent lecturers in the different fields.

The German student life is very free. The university has complete jurisdiction over its students. A regular university court adjusts all matters of student discipline, and the student is answerable not to the city police but to the university court, it being assumed that as a nonresident of the city he is under the jurisdiction of the university rather than the municipality.

The universities are maintained by royal grants, by student fees, and by appropriation from the state. An instructor receives a certain fee for each student who registers in his courses.

The Training of Teachers. The system of training teachers for the various schools in the German educational system is thoroughly organized. The teachers in the *Volksschule* are prepared in an institution maintained by the government, known as the *Lehrerseminar*. This institution with its preparatory branch requires six years of study beyond the *Volksschule*. The *Lehrerseminar* is not a division of the university and is not related to the *Gymnasium*. The *Lehrerseminar* served in the middle of the last

century as the model on which the American normal school was organized. The separate character of the American normal school and its isolation from the universities of this country will be readily understood when the dual organization of the German school system is understood.

The teachers of the *Gymnasium* are prepared in the universities and by a period of two years of trial work in the *Gymnasium* itself. The teachers of the *Gymnasium* have no relation whatsoever with the teachers of the *Volksschule*. The two groups of teachers belong to social classes that are entirely different, and their training, their associations, and interests are entirely separate.

The University Professor. The German university professor is socially of the highest rank. In many instances the rulers of Germany have decorated professors with civic honors. Their salaries are superior to those of any except the governmental officials of highest rank. There is a long period of apprenticeship before the professor can secure his appointment. He is first allowed to give lectures in the university in a capacity which is almost purely private. The title which attaches to his position at this stage is *Privatdocent*. If the young instructor is successful in his lectures at this level, he may be appointed to an assistant professorship, as it would be called in America. Ultimately, from this level he may be advanced to a full professorship.

The universities of Germany have no officer corresponding to the president of an American college. The academic professors meet from year to year and appoint one of their number as *rector*. But the duties of this *rector* are not at all those of the American college president; he is merely a temporary representative of the academic group without authority over them.

Each department of a German university is independent, and, as indicated in an earlier paragraph, there is the most extreme insistence upon freedom of thinking and teaching after a man has reached the level of university professor.

German Education of Women. The education of women under the German system is much less adequately provided for than the education of men. Girls enjoy all of the privileges of the *Volksschule* equally with the boys. There are some women teachers for girls. Since the World War, the number of women teachers has greatly increased. At the higher levels, there are some special schools organized on the pattern of the *Gymnasium*, but these schools are far less numerous than the schools for boys and are much less complete in their courses of study. In recent years women have been admitted to the German universities, but the professional opportunities for women in Germany are such that a higher education for a woman is there sought after much less frequently than in the United States.

Finances of the German Schools. The maintenance of public schools in Germany is provided for by the state in various ways. In all the higher institutions the state collects from the individual student a fee, which constitutes an important part of the revenue of the institution. In some instances the ruler of a German state made an educational institution a subject of his personal patronage. Most of the higher institutions have thus accumulated certain endowment funds, the income from which is utilized for their current expenditures. The common school is usually free, although in some instances a fee is collected for these schools from those families which are able to make payment. For example, in the free city of Hamburg, each parent comes to the school and makes an arrangement with the head of the school to pay as much as the family seems able to afford. In this case it is a matter of pride on the part of the family that it can make a contribution to the maintenance of the school.

It is very difficult to secure figures that make possible any direct comparison of the costs of maintaining the schools in Germany with costs in this country. Since the beginning of the war the fluctuating character of the currency has increased still further the difficulty of making any such comparison. The most reliable figures are probably those which date from before the war. These figures will be presented as serving the purposes of comparison very much better than any reported for later years.

Costs of the Lower Schools. Professor T. Alexander has summarized the facts for the lower schools as follows:

The total expenditures in Prussia in 1911 for *Volksschulen*, middle schools, and higher schools, were 420,898,192 M., 25,760,324 M., and 113,287,974 M., respectively, with a total of 559,946,490 M. Of the total number of pupils, 89.7 per cent were in the *Volksschulen*, 2.9 per cent in the middle schools, and the remainder, 7.4 per cent, were in the higher schools. As for the relative expenditures on these three types of schools, it is found that the *Volksschulen* got 75.2 per cent of each one thousand marks expended, the middle schools 4.0 per cent, and the higher schools 20.8 per cent.

The cost of a pupil of the *Volksschule* for one year is 64 M., or less than $16, while pupils in the middle and higher schools cost 143 M. ($34) and 296 M. ($70) respectively. In other words, it costs on the average four and a half times as much to educate a boy in the higher school as it does in the *Volksschule*, and over twice as much as it costs in the middle school. The causes for the great differences lie in the higher cost of instruction and the smaller number of pupils per teacher. Likewise the equipment in the higher schools is more expensive, but not decidedly so. The chief cause is the small numbers in the classes of higher schools. The lower schools prepare their pupils for the humbler walks of life, the higher schools for the leadership of the nation. Nevertheless, it is questionable whether the average product of the *Gymnasium* is mentally, morally, and economically worth as much more than the average product of the *Volksschule* as the ratio of the costs of their education would indicate or ought to indicate.

EDUCATION IN FRANCE

The description of the school systems of European countries other than Germany can be given in much less space than has been devoted to that country, because the typical facts for the other countries are the same as those which have been described for the German schools.

The French *lycée* is very closely related in the character of its instruction to the German *Gymnasium*, and the traditional secondary school of England is of the same type. The common schools of France and England have been very largely affected by the example of Prussia both in their mode of organization and in their courses of study. With these facts in mind, we may turn to the examination of the other school systems, utilizing the German example as a basis for the explanation of the characteristics of all the systems.

French Elementary Schools. The French school system consists, as does the German system, of two distinct branches. The *école primaire* is the common school. It carries the pupil to his twelfth or thirteenth year and in some of the better conditioned centers to the fourteenth year. It gives training in "the three R's" and in other rudimentary subjects. It may be followed in the case of the brighter children by the *école supérieur*.

Secularization of the French Schools. There is one striking characteristic in which the French public schools differ from those of Germany. The French schools do not teach religion. Formerly the Church was dominant in the public schools of France as it was throughout Europe. After many struggles a law was passed in 1881, secularizing the French schools and substituting training in civics and morals for the earlier course in religion. In 1886 a

law was passed providing that no clerical teachers shall give instruction in the common schools. In 1904, teaching by the clerical congregations was suppressed, and public schools were substituted for those which had been controlled by the Church. The laws thus successively enacted are very strict in providing that no teacher shall deal with religious matters.

In other respects the curriculum of the *école primaire* is closely comparable with the German *Volksschule*. It is, like the German school, organized for the training of the common people, who are not to rise above the level of their family station, but are to be equipped as well as the state can equip them for the ordinary activities of common life.

Lycées, Collèges, and Universities. The higher schools of France include the *lycées*, the *collèges* scattered throughout the country, and the universities, chief among which is the University of Paris.

The curriculum of the *lycée* is the traditional classical curriculum, and leads to the baccalaureate degree which corresponds roughly to the American bachelor's degree. Lately a scientific course, corresponding to that of the *Realschule* of Germany, has been organized in some of the *lycées*.

At the colleges, and especially at the universities, instruction is made easily accessible to all comers. The method is that of the lecture. A great many students go through these lectures without attempting to secure any degree. The degree of doctor of philosophy conferred by the French universities is a higher degree than the degree of the same name conferred by the German universities. Indeed, before the World War it was so difficult for a foreign student to qualify for this doctor's degree that very few such students were to be found in the French universities. Since the war, an effort has been made on the part of the French universities to interest foreign students in attendance on French institutions, and certain degrees have been provided which can be taken by foreign students.

Control. The control of the French educational system is vested in a ministry of the central government. This minister of education prescribes in great detail the courses of study and the form of organization of all the institutions. Support of the lower schools is secured from taxation, while the support of the higher schools is derived very largely from student fees.

The Training of Teachers. In each so-called department or subdivision of the French state, there is a normal school for the training of boys and another for the training of girls who are to enter the teaching profession in the lower schools. Progress through one of these schools is dependent upon the success of the candidate in passing competitive examinations. Positions in the teaching profession are eagerly sought after, as they are permanent when once they are secured, and at the end of his professional career the teacher receives a pension for life.

The Training of Teachers for Higher Institutions. The normal school method of training teachers has been carried by France into its higher educational system. There is a special advanced school for those who are to teach in the *lycées* and in the *collèges*. Here the higher subjects of instruction are taught. This advanced normal school now has connection with the University of Paris.

Costs of Education. As in the case of Germany, so here it is difficult to find recent figures which give any accurate estimate of the costs of maintaining schools in France. The following statements from the year 1910 show that the costs of education in France are altogether comparable with the costs in Germany and much lower than the costs in American schools.

Cost of Primary Education. No general figures are available regarding the expenditures for elementary education in France. Certain items are reported officially as follows:

	Francs
Salaries (not including towns with more than 150,000 inhabitants)	177,193,800
Contributed by the state to towns of over 150,000 population	5,000,000
Higher primary education	4,878,246
Normal schools, salaries	4,300,235
Normal schools, equipment	4,866,000
Higher primary normal schools	325,600
Inspection	2,466,350
General inspection	130,000
Bursaries (for traveling and foreign visits)	800,000
Expenses of substitutes and sick pay	1,043,200

This gives a total of expenditure amounting close to 200,000,000 francs. To this must be added the expenses of the communes, first those with a population over 150,000, which contribute a large share toward the salaries of teachers, and then all the communes which must pay compensation for rent and lodgings. Further, an annual credit is inscribed in the budget for the creation of schools and posts. The state has spent enormous sums on this for the last thirty years, and in 1910 set aside 680,000 francs.

Cost of Secondary Education. Although secondary education is not free, the receipts from fees are far from sufficient to cover expenses, which in the *lycées* amount to about 9,000,000 francs for the *externats*, or day pupils, and 8,500,000 francs for the *internats*, or boarding pupils. The state must, therefore, intervene on behalf of the *externats*, the accounts for *internats* and *externats* being kept distinct. A boarder costs the state almost nothing, since the fees are high enough, but each *externat* student costs the treasury at least 261 francs ($52.20). The state subsidy in 1910 was as follows: To supplement the receipts of the *externats*, 8,400,000 francs; of the *internats*, 584,560 francs. To these sums must be added various sums in aid of salaries, 5,377,650 francs; for allowances to *agrégés*, or fully qualified and permanently appointed teachers in the *lycée*, 702,000 francs; for general expenses, 177,800 francs. If to this be added the subsidy to the *collèges*, which are for the most part maintained by the communes, of about 6,500,000 francs, and 3 or 4 millions for national scholarships, and various expenses, the state contributes to secondary education 23 or 24 millions of francs.

Private Resources of the Universities. The law of 1896 gave the universities the rights of civil persons, that is, the right of accepting gifts and legacies, of holding private property, and of administering it without restrictions. Each university has a budget in which are included the receipts from fees for courses, from registration, and from library and laboratory fees paid by the students in accordance with the regulations. The income from this source may be spent on the following objects: expenses for laboratories, libraries, and collections; erection and maintenance of buildings; establishment of new courses; grants in the interest of students, as, for example, subsidies to student associations. The French universities have not, up to the present time, met with such generous donors as those of the American universities. A good beginning, however, has been made, and at the University of Paris the names of benefactors are inscribed on a marble tablet; while Lyon, Montpellier, Bordeaux, and others have also received important gifts.

State Expenditure. The French universities do not enjoy complete financial autonomy, and in fact they could not exist on their own resources. The contribution of the state toward their expenses is considerable, the salaries, for example, coming from this source. But the state, on the other hand, benefits from certain sums which are deposited by the universities, and which cannot be freely disposed of

by them. According to Article IV of the law of 1896, "Fees for examinations (for *baccalaureate, licentiate,* and *doctorate*), the *certificats d'aptitude,* diplomas or titles, paid by candidates for the degrees or titles established by the law, shall continue to be collected for the benefit of the treasury." In 1907 the receipts of the state from this source amounted to 5,184,775 francs ($1,036,955).

The University of Paris is provided for in the budget to the extent of 3,920,199 francs ($784,039.80), for salaries of professors and assistant instructors, library, other services, and payment of minor officials. The cost of the provincial universities to the state is 7,520,580 francs ($1,504,316). To this must be added the expenses for equipment, which amounted to 2,229,827 francs ($445,965.40). (The figures here given are from the budget for 1910.)

ENGLISH EDUCATIONAL SYSTEM

Education in England is much less compactly organized than in Germany and France. There is a central board of education with a minister in the cabinet, but there are also many private institutions which are only loosely supervised by this central authority. It has been the habit of the English government, in dealing with educational institutions, to take over the control through subsidies. If the central board of education gives grants of money to a certain institution, the grant is accompanied by a demand for a corresponding degree of control of the policy and course of study of this institution. Any institution which is willing to forego public support in this fashion can carry on its operations with very little supervision by the board of education.

Furthermore, the English system is much less rigorous in its requirements for the training of teachers. As one contrasts this situation with that which is to be found in continental countries, one notes that there is a gradual approximation to the condition which has been arrived at in the United States, where local control is so independent of central governmental authority that there is little or no uniformity in the training or qualifications of American teachers.

Whatever is said, accordingly, regarding the English system must be discounted in recognition of the general fact that there are frequently departures from typical organization in the system, both in matters of control and also in the course of study and methods of instruction.

English Common Schools. In general, it may be said that the common schools of England, or the so-called board schools, like the schools for the common people on the continent, teach the children up to their thirteenth and fourteenth years. The courses deal with rudimentary forms of knowledge. The better classes of society do not send their children to these board schools. The course of study in the lower schools is like that of the *Volksschule* and the *école primaire.*

Secondary Schools and Universities. The higher system of education in England, like the higher systems on the continent, is an exclusive tuition system which begins with the earliest school years of the pupils. This system is made up of the so-called secondary school and the university. The curriculum of all these institutions is typically the traditional classical curriculum.

The Examination System. The higher system of England is, however, not as exclusive as the systems on the continent. England is unique in the fact that it has a system of examinations by which children who are especially competent and who have taken their lower training in the common, or board, schools may transfer when ten years of age or older to the secondary schools. The examinations are usually competitive, and frequently carry, not only the right to enter the secondary school, but a stipend which provides the successful candidate with the money necessary to pay his tuition and sometimes with enough to pay for his books and lodging in the institution to which he goes. In some of the districts of England, enough has been accumulated in the way of endowments for these stipends so that practically any competent boy who can pass an examination may transfer to the secondary school system.

In this way England has succeeded in recruiting its upper classes from the lower levels of society much more liberally than have any of the other European nations. It is the pride of England that its civil service officers are drawn from all levels of society, and this fact is to be explained by the examination system just described. Matthew Arnold (1822–88), who was a school inspector, gave a name to this examination system which is commonly used everywhere in England. He called it the "educational ladder."

Inspection. Another characteristic of the English educational system is its method of inspecting schools in all parts of the country and helping them to conform to the standards of the board of education. About 200 inspectors are employed by the central board of education; these officers are continually visiting schools which receive public grants, and are bringing them into line with the policies of the central government.

Municipal Secondary Schools and Universities. In recent years there has developed very rapidly in the great industrial cities of England a series of schools known as "municipal secondary schools" and "municipal universities." These institutions differ from the older secondary schools and universities in the fact that they lay much greater stress on the physical sciences and the practical engineering subjects. There has come up accordingly a sharp cleavage between the older classical type of training and the newer scientific type represented by these newer institutions.

Oxford (1110 or 1120?) and Cambridge (1229). At the head of the conservative type of higher education are the two great universities, Oxford and Cambridge. Both these universities were established in the medieval period, and are made up of separate colleges. These separate colleges can be traced back to religious orders. The whole organization can be understood by observing that the English university is an assemblage of living quarters or fraternity houses that have descended from the religious communities which originally established many of the colleges. As time went on, new colleges were established and endowed by wealthy patrons, some of them royal personages. The English university system thus provides for an intimate social life on the part of its students. The lectures which are conducted in these institutions are not regarded as the major contribution to the student's training. A tutorial system has gradually been evolved, which provides for each undergraduate the opportunity to associate intimately with a tutor who guides the student's readings and who engages him in discussions of what he has read. The student attends such lectures as interest him, but in the main his business is to read and to work independently in the field of his choice under the supervision and partial guidance of his tutor.

The result of this system is that a great many boys attend Oxford and Cambridge with no intention of studious effort. They go to the college merely for the purpose of spending a few years of their youth in pleasant intellectual surroundings. For these young men the college has a so-called "pass" course. On the other hand, those students who devote themselves to strenuous intellectual effort take what is known as the "honors" course. The examinations in these courses are very rigid, and the standards are so high that only a well trained specialist can complete the course.

Examining Universities. There are also in England certain examining institutions. Thus the University of London is not altogether a teaching institution; it awards degrees to candidates who present themselves for examination after independent study in some particular field.

Education of Girls. England has, in addition to the schools for boys, certain special secondary schools designed for the education of girls. For the most part, these institutions give courses of a somewhat more restricted range than those offered in the schools for boys. The older universities did not until recently admit women to examinations for degrees, and, of course, the residence colleges are wholly closed to women. Consequently, there have grown up in the immediate neighborhood of Oxford and Cambridge, women's institutions. The newer municipal universities admit women to their courses.

The Fisher Act. During the World War, English enthusiasm for a more liberal type of education ran very high, and there was enacted into the law by the British Parliament an educational code known as the Fisher act. This code provided that every child in Great Britain should be under the supervision of the board of education until the age of 18 years. The board was empowered to develop certain forms of industrial education for many of the pupils and to supervise the employment of all those children less than 18 years of age who were taken into the industries of Great Britain.

The plan laid down in the Fisher act has never been put into actual operation. The costs were found to be too great, and a commission which canvassed the matter two years ago reported that it would not be possible under present economic conditions to begin operating under the act. The probabilities are that in due time an elaborate system combining general and vocational education will be developed.

Training of Teachers in England. England has numerous institutions for the training of teachers for the lower schools. These institutions are known as teacher training colleges. They are maintained in part by the localities in which they are situated, and in part by grants made by the central board of education for the maintenance of the individual students who are taking the courses.

The system is much looser than that of either Germany or France, and the government assumes no responsibility for permanent employment and pensioning of teachers appointed in the schools. England has no system for the training of teachers for the higher institutions. In this respect, England is very much like the United States, and depends on extralegal forces to insure the training of those who enter the teaching profession in the higher institutions.

Costs of English Elementary Education. The traditions of England are such that religious organizations of various types not uncommonly bear some share of the expense of the maintenance of elementary schools. In fact, in England, prior to the passage of the Educational act of 1918, local boards of education were permitted to charge fees for instruction even in the elementary schools, but the fee was small. According to recent statistical reports for 1919, the amount expended on elementary education in England was 26 million pounds. Of this amount, one and seven-tenths per cent was derived from such sources as minor appropriations by local authorities, fees, the sale of books and other articles, and endowments. More than 98 per cent was derived from Parliamentary grants and local taxation.

Costs of English Higher Institutions. All of the British institutions for higher training receive contributions from public funds, the leading universities, which are in part supported by contributions from their incorporated colleges, receiving the least support from public sources. Reports for Oxford, Cambridge, and Durham show that in 1912 the receipts from fees constituted 32 per cent of the total expenditures of the three universities, while only about 15 per cent of the funds came from local, Parliamentary, and treasury grants. The six provincial universities, on the other hand, received (1913) a little more than half the amount of their total expenditures from local and Parliamentary grants, and only about 25 per cent from student fees. The University of London, with its colleges, collected in the same year 48 per cent of its funds in student fees, and was supported by local and Parliamentary grants to the extent of one-third the amount of its necessary expenditures. Reports of four independent university colleges, that is, colleges which are not incorporated within one of the greater universities, show receipts from local and Parliamentary grants in 1913 amounting to 74 per cent of their expenditures, fees supplying 26 per cent.

Rather liberal support is given also to the agricultural and technical colleges. Reports from twelve of these schools in 1913 indicated receipts from local and Parliamentary grants amounting to 60 per cent of the costs for the year. Approximately 28 per cent of their funds came from student fees.

The relative amounts contributed to the total income of each of the principal types of higher institutions of England and Scotland by fees and by appropriations from public funds are shown in the following table. The data for Oxford, Cambridge, and Durham are for the year 1912. Those for the other institutions relate to the year 1913.

Institutions	Percentage of Income	
	Fees	Public Funds
Oxford, Cambridge, and Durham	32	15
University of London	48	33
Provincial universities	25	52
Independent university colleges	26	74
Agricultural and technical colleges	28	60
Scotch universities	29	40

All of the higher institutions, with the exception of the independent university colleges, have other sources of income besides fees and grants. The larger universities receive considerable contributions from their incorporated colleges, in addition to the income from endowments, which are large as compared with those of most other European universities.

The Scotch universities receive about the same public support as is given the provincial universities in England, five of these institutions reporting receipts from local, Parliamentary, and treasury grants in 1913 amounting to 40 per cent of the expenditures. Student fees were in that year approximately 30 per cent of the expenditures.

SCHOOLS IN OTHER COUNTRIES

The contrast which is to be drawn between Germany and England is expressed in the statement that the German school is a rigid and well organized system, with each part of the system clearly defined and distinct from the other branches. In England adjustments are very much freer and less highly systematized. The success of the English school system depends upon the success of the examination system, which is organized with a view to permitting individual readjustments on a liberal scale.

European States. Other countries have been dominated in their educational organization by the German and English examples in varying degrees. Those countries in which the influence of Germany has been most pronounced, such as Austria, Hungary, and the southeastern European states, have adopted the German system so far as their social and economic development would permit. Usually these countries have failed to reach a complete

realization of the German ideals in education, but their systems have been modeled on the German plan.

British Dominions. The colonies of England, such as Canada, Australia, and South Africa, have developed an educational system modeled on the English plan. In many instances these school systems have secured their examinations from the examining boards of England, thus aiming to follow the standards set up in the mother country. The very freedom of the organization has, however, resulted in a departure both in standards and in exact form from the example of England. Thus, we find that in Canada the higher institutions have in some cases approached, in the form of their organization, the high schools of the United States, departing radically from the traditions of English organization of secondary schools. This departure from English models, however, is not complete, and there are many secondary schools in Canada which closely approach the English type. The Canadian high school is in some cases paid for entirely out of public funds, thus also departing from the practice of the English higher schools, which always charge a fee for admission.

Asia and South America. The example of the European schools has been imitated in Asiatic countries and in South America, even where the political influence of Germany and England has been somewhat weaker than in the cases already mentioned. Recently the influence of the school systems of the United States is beginning to be felt in a number of these countries, and there is promise that the European traditions will be modified in favor of a freer organization of schools, and the more elaborate development of a curriculum similar to that which is to be found in American schools.

American and Foreign Schools. In one respect, all of the European systems are radically different from the schools of the United States, that is, in the emphasis which is given to higher education for the common people. The facts with regard to this matter have been stated recently by Mr. Lee Byrnes, who has prepared a table showing the extent to which the various countries of the world emphasize higher education. A portion of the text relating to the table and the table as a whole are here reproduced.

To appreciate the extent to which education has been socialized in our democracy, we might compare the proportion of our people who go into the high school grades with the proportions in corresponding grades in foreign countries. A comparison is not easy to make, because of the variations in educational arrangements even within one European country. The following table gives estimates based on the latest European figures obtained and compared with the situation at corresponding dates (and other dates) in the United States.

Before trying to interpret this array, some qualifications should be made. Calculations for Germany and France are based on definite facts. Those for England and Wales and several other countries are more conjectural. In general, the European figures probably represent the situation in the dominant types of schools and not in all the schools.

Considerable additions could probably be made for industrial and commercial schools of secondary grade in central European countries. This addition would be largest of all for Germany; possibly it would double the German figures. Sweden seems to approximate the educational situation of Germany. Moreover, European countries do more for their boys than for their girls, and a comparison based on boys alone would give Europe a better showing. The Germans enroll about 61 boys to 39 girls, the French 72 boys to 28 girls, the English 54 boys to 46 girls.

But, when all is said and every possible allowance made, the contrast with the United States is startling. However efficient the German secondary schools may have been in what they did, they could not have been enrolling more than a fourth as large a proportion of the people at the time of their latest report as were in the high schools of the United States. Germany was admittedly autocratic, and did not desire advanced education for the masses. But France, with its republican form of government, has never had democratic education either. England in 1915 was about where the United States was in 1890 as regards secondary school enrollments. England has made a strenuous effort since the war to provide as extensively as possible free scholarships for bright pupils and has as a result done much to popularize higher education.

RATIOS OF ENROLLMENTS IN UPPER FOUR YEARS (HIGH SCHOOL) TO ESTIMATED FOUR-YEAR AGE POPULATIONS*

Nation	Enrollment Upper Four Years	Date	Estimated Four-Year Age Population	Date	Ratio Four-Year Enrollment to Four-Year Age Population
United States	80,227	1870	2,930,436	1870	2.7
	202,963	1890	4,759,288	1890	4.2
	635,808	1904	6,174,332	1904	10.3
	984,677	1911	7,128,230	1911	13.8
	1,105,360	1912	7,251,198	1912	15.2
	1,134,771	1913	7,374,165	1913	15.3
	1,218,804	1914	7,497,133	1914	16.2
	1,328,984	1915	7,630,308	1915	17.4
	1,645,171	1918	7,999,252	1918	20.5
England and Wales	120,266	1915	3,037,012	1915	3.9
Scotland	32,942	1914	360,784	1914	9.1
Ireland	14,348	1901	332,986	1914	4.3
France	72,328	1913	3,009,714	1911	2.4
Belgium	14,362	1912	575,425	1912	2.5
Germany	83,126	1911	4,934,304	1910	1.7
Austria	44,465	1911	2,203,684	1912	2.0
Hungary	24,785	1912	1,587,373	1910	1.5
Switzerland	6,457	1912	291,172	1912	2.2
Netherlands	12,459	1913	472,165	1913	2.6
Denmark	11,426	1911	210,905	1911	5.4
Norway	7,373	1912	181,775	1910	4.5
Sweden	6,164	1912	431,650	1914	1.4
Italy	19,670	1911	2,705,431	1914	.7
Spain	16,667	1913	1,519,653	1910	1.1
Russia	128,249	1911	12,457,844	1911	1.3
Japan	54,070	1914	2,899,630	1912	1.8

* Total population of ages corresponding to ages of students enrolled in upper four school years.

COMPULSORY SCHOOL ATTENDANCE LAWS

States	Date of First Enactment	Present Age Limits	Minimum Period of Compulsory Attendance	Average Number Days in School Term, 1924-25	Average Days Attended by Each Child	Percentage of Attendance for School Population	Percentage of Illiterates in Population 10 to 14 Years of Age		
							1900	1910	1920
United States				169.6	136.5	80.5	7.1	4.1	2.3
Alabama	1915	8–16	100 days	132.2	96.3	72.9	28.9	16.4	7.7
Arizona	(a) 1899	8–16	Full school year	166.0	123.2	74.2	22.2	15.2	11.3
Arkansas	1909	7–15	Three-fourths of school year	135.0	98.7	73.1	16.2	8.2	5.4
California	1874	8–16	Full school year	181.9	125.5	69.0	1.0	.6	.6
Colorado	(a) 1889	8–16	Full school year	178.0	134.6	75.6	1.5	.9	.8
Connecticut	(a) 1872	7–16	Full school year	182.7	155.5	85.1	.6	.3	.3
Delaware	1907	7–17	160 days (b)	183.4	155.9	85.0	4.5	1.5	.4
District of Columbia	1864	7–16	Full school year	171.8	144.3	84.0	1.8	.4	.2
Florida	1915	7–16	Full school year	142.2	106.8	75.1	13.8	10.3	5.8
Georgia	1916	8–14	120 days	143.0	110.3	77.1	22.8	13.6	8.2
Idaho	(a) 1887	(c) 8–18	Full school year	165.0	135.0	76.7	1.2	.4	.4
Illinois	1883	7–16	Full school year	184.0	153.7	83.5	.8	.3	.2
Indiana	(a) 1897	7–16	Full school year	174.0	164.5	94.5	.5	.3	.2
Iowa	1902	7–16	120 days	176.0	148.2	84.2	.4	.2	.2
Kansas	1874	7–16	Full school year	175.0	146.1	83.5	.5	.3	.3
Kentucky	1896	7–16	Full school year	164.0	117.1	71.4	8.4	6.0	2.7
Louisiana	1910	7–14	140 days	151.1	118.1	78.1	32.9	24.6	13.8
Maine	(a) 1875	(d) 7–16	Full school year	176.0	155.6	88.4	2.1	.8	.7
Maryland	1902	7–16	Full school year	185.1	149.8	81.0	4.6	2.5	1.4
Massachusetts	(a) 1852	7–16	Full school year	183.9	153.0	83.2	.7	.2	.2
Michigan	1871	7–16	Full school year	177.0	142.5	80.5	.7	.3	.2
Minnesota	1885	8–16	Full school year	180.6	145.3	80.4	.7	.3	.3
Mississippi (e)	1918	7–14	80 days	136.9	98.7	72.1	22.4	12.8	9.3
Missouri	1905	7–16	Full school year	169.3	137.0	80.9	3.4	1.2	.7
Montana	1883	8–16	Full school year	172.3	144.8	84.0	1.9	1.3	.4
Nebraska	1887	7–16	120 days (f)	178.5	143.5	80.4	.3	.3	.2
Nevada	(a) 1873	(g) 7–18	Full school year	174.0	137.4	79.0	8.1	4.3	1.6
New Hampshire	(a) 1871	8–16	Full school year	177.0	147.1	83.1	1.7	.3	.3
New Jersey	1875	7–16	Full school year	189.0	159.7	84.5	1.2	.5	.2
New Mexico	(a) 1891	6–16	Full school year	174.0	133.7	76.8	19.9	11.1	5.6
New York	1874	(h) 8–16	Full school year	189.4	163.8	86.4	.7	.3	.2
North Carolina	1907	7–14	Full school year	144.7	106.9	73.6	21.8	10.1	4.0
North Dakota	1883	(i) 7–15	Full school year	165.0	134.9	81.7	2.4	1.2	.3
Ohio	(a) 1877	(j) 6–18	Full school year	177.4	148.8	83.9	.5	.3	.3
Oklahoma	1907	(k) 8–18	Two-thirds of school year	154.4	124.3	80.5	13.9	2.4	1.9
Oregon	1889	9–15	Full school year	172.8	152.0	87.9	.4	.2	.2
Pennsylvania	1895	8–16	Full school year	180.4	151.2	84.1	1.0	.5	.3
Rhode Island	1883	7–16	Full school year	186.0	156.8	84.3	1.9	.6	.3
South Carolina	1915	8–14	80 days	142.0	99.1	69.8	29.6	17.1	5.7
South Dakota	(a) 1883	8–17	Full school year	172.0	140.2	81.5	1.0	.7	.3
Tennessee	1905	7–16	Full school year	153.2	107.2	69.9	14.9	7.5	5.2
Texas	1915	8–14	100 days	145.0	122.5	84.4	9.3	6.3	4.9
Utah	1890	(l) 8–18	100 days (m)	170.7	143.6	84.2	.7	.7	.5
Vermont	1867	8–16	170 days	168.9	142.3	84.3	1.0	.3	.3
Virginia	1908	8–14	Full school year	158.6	121.0	76.3	15.7	9.2	5.4
Washington	1871	8–16	Full school year	179.1	142.4	79.5	.7	.4	.2
West Virginia	1897	7–16	Full school year	151.5	128.0	84.4	5.3	2.7	1.8
Wisconsin	1879	7–16	120 days (n)	(o) 177.0	150.3	84.9	.7	.3	.2
Wyoming	1876	7–16	Full school year	175.0	139.2	79.5	.9	.5	.3

(a) True date may be earlier than the one given.
(b) Children of 14, 15, and 16 years of age must attend 100 days if they have not completed the eighth grade.
(c) Liberal exemptions are granted to children over 15 years of age.
(d) If illiterates, 7–17.
(e) Any county can release itself from the state law by a majority vote.
(f) Full school year in cities.
(g) Children above 14 are exempt if they have completed the eighth grade or if their services are needed for themselves or their families.
(h) Age limits 7–16 in cities of over 4500 inhabitants.
(i) Pupils must attend until their 17th birthday if they have not completed the eighth grade.
(j) The lower age limit may be changed to 7 years by local school boards. Exemption may be granted to children above 16 if they have completed the seventh grade, but part-time schooling is required of them.
(k) Liberal exemptions are granted to children over 14 years of age.
(l) Exemption is granted to children over 16 years of age if lawfully employed, but part-time attendance is required of them.
(m) In cities, 150 days, of which 50 are required to be consecutive.
(n) Full school year in cities of the first class; 8 months in all other cities; 6 months in towns and villages.
(o) Figures for 1924.










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VIEWS OF UNIVERSITIES AND COLLEGES. III

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ADULT EDUCATION

Evening Class in Americanization, Public Schools
Evening Class in Arithmetic, Knights of Columbus Vocational School
Evening Class in Accounting, Y. M. C. A. Institute

EDUCATION IN THE UNITED STATES

THE PUBLIC SCHOOL SYSTEM

A DESCRIPTION of the public school system of the United States is difficult to give, because all institutions included within this system are under the control of the various states or of local units, and as a result there is great diversity of practice and standards. Some similarity of organization has resulted from the natural tendency to imitation, which leads a given institution to follow the example of similar institutions about it. Furthermore, the decisions of the courts have established a body of common school law which has tended in some measure to render uniform the practices of different communities. In the main, however, variability rather than uniformity is characteristic of American schools.

Absence of Federal Control. As has been pointed out in earlier sections, there is no central Federal control of schools in the United States. The Constitution makes no provision for participation by our Federal government in school activities. The result is that each of the states has gone its way without interference or supervision from the central government. The only way in which Federal authority has entered into educational matters is through subsidies of various forms, given either to the states or to particular types of institutions within a state.

THE STATE AND THE LOCAL DISTRICT

Within the states very large authority has been left to the local district. Originally the entire control of the school was in the hands of the local district. Even the definition of the boundary of the district was a matter of relatively little concern to the state as a whole, because in the early days communities were so distinct from one another that their boundaries were obvious and natural. It was only after the states came to be somewhat thickly populated that problems of school support and school efficiency which concerned the larger community began to arise and the states assumed the authority which belongs to them. We find, accordingly, that schools were at first controlled by local officers rather than by the sovereign state. The result is that the states seem of late to have taken away from the local districts rights which the latter had long exercised.

Authority of the State. The movement toward centralization of authority in state departments of education has in some cases created friction with communities which regard this modern policy as a usurpation of their rights. Constitutionally, there can be no doubt that the state has a right to prescribe to the local districts in any degree which it will. It may define the extent of the local district and may determine in all detail what shall be done within this district. While this is the constitutional right of the state, the practical fact, even today, is that the local district conducts its school in very large measure according to its own desires, and local officers often look upon state supervision as indefensible interference.

Certification of Teachers. A conspicuous illustration of increasing state control is to be seen in the matter of the certification of teachers. In the colonies and in the older states the community selected the teacher. The trustee or the committee of the district not only employed the teacher but determined whether the qualifications of a given candidate were satisfactory; in other words, the local officers licensed the teacher. When the states began to organize more compact school systems, it immediately became apparent that local districts are not competent to license teachers. The judgment of the trustee is frequently biased by purely personal considerations. The various states, therefore, gradually assumed more or less control in this matter.

Since the assumption of control has been gradual and partial, there are a great many different practices in different parts of the country. There are still local districts which virtually select their own teachers without any large degree of state supervision. In many other cases a unit smaller than the state but larger than the local district has the power of certification. Especially common is certification by the county superintendent. The general tendency, however, is to prescribe by state law the qualifications necessary for a license to teach, and to enforce the requirement through the state department of education.

The results of the older and looser system are present, however, on every hand. It has been estimated that not more than 20 per cent of the teachers of the United States have any professional training. Forty per cent or possibly more have had only a common school education. High school teachers are less definitely controlled by state law than are elementary school teachers. In short, the situation regarding teacher certification is only a little less chaotic than it was when local districts acted without state supervision.

Compulsory Attendance. In other respects, as well as in the employment of teachers, the state has found it necessary to assume control over the local districts. For example, the state has enacted compulsory attendance laws. This has been necessary because some districts are negligent and allow their children to grow up without proper schooling. When these children become adults, it is not the local district alone which suffers, but the whole commonwealth. The state can be economically and socially efficient only if its citizens are trained. The state, therefore, takes the local district and the family in hand and compels the education of all children.

The table on page 1664 shows the diversity of practice in different parts of the country in the matter of compulsory attendance legislation. Special attention is called to the dates at which the different states acted in this matter. No clearer example could be given of diversity of organization in the public school systems of this country.

State Departments of Education. Every state has now for its educational activity a chief executive officer, usually designated state superintendent or commissioner of education. In 1920, 34 of these officers were elected by popular vote along with the major state officers, 8 were appointed by the governors, and 6 were appointed by the state board of education. In 31 of the states the method of appointment is fixed by the state constitution and is consequently very little open to revision.

In several of the Western states, especially since women received the franchise, state superintendents have been women.

The state superintendent is frequently associated, in the execution of the duties of his office, with a state board of education. In 1920, 39 states had state boards, while 9 did not. In three of the states there is a chancellor or commissioner whose duty it is to co-ordinate the work of the state superintendent with that of the officers in charge of the state institutions of higher learning.

State Participation in School Finance. The state always takes some share in the financial support of schools. Usually there is a state fund, derived from the sale of school lands or from certain forms of taxation, which is distributed to the local districts in proportion to the school population or as an incentive to the organization of some particular form of education, such as classes in agriculture or in physical culture. The relation of states to the local units in this matter is set forth in the table which appears on page 1666.

This table shows that the extent to which the state shares with the local district in the support of schools varies in different parts of the country.

PERCENTAGE ANALYSIS OF RECEIPTS 1924-1925

	Total Revenue Receipts			Total Revenue Receipts			Receipts from Taxation and Appropriation		
	State*	County	Local	Permanent School Funds and Leases of School Lands	Taxation and Appropriation	Other Sources	State	County	Local
Continental U. S.	16.0	10.1	73.9	1.4	92.9	5.7	15.2	10.6	74.2
Alabama	33.2	39.9	26.9	1.2	81.4	17.4	38.1	35.8	26.1
Arizona†	25.2	32.6	42.2	3.6	90.0	6.4	20.4	33.3	46.3
Arkansas	35.5	. . .	64.5	.7	96.8	2.5	35.2	. . .	64.8
California	20.8	35.2	44.0	.5	96.1	3.4	20.8	36.6	42.6
Colorado	4.0	19.1	76.9	3.4	69.6	27.0	.8	27.4	71.8
Connecticut	9.5	. . .	90.5	.8	95.3	3.9	43.5	. . .	56.5
Delaware	81.5	. . .	18.5	1.7	96.8	1.5	81.8	. . .	18.2
Dist. of Columbia	21.1	. . .	78.9	. . .	99.9	.1	21.1	. . .	78.9
Florida	5.6	40.5	53.9	1.0	83.0	16.0	5.1	48.8	46.1
Georgia	32.7	55.5	11.8	. . .	94.5	5.5	33.6	58.7	7.7
Idaho	8.0	27.2	64.8	7.7	84.5	7.8	. . .	32.2	67.8
Illinois	6.9	. . .	93.1	1.2	93.4	5.4	7.0	. . .	93.0
Indiana	10.3	. . .	89.7	1.7	96.0	2.3	9.1	. . .	90.9
Iowa	3.8	. . .	96.2	. . .	92.6	7.4	3.9	. . .	96.1
Kansas	1.4	. . .	98.6	1.3	98.6	.1	. . .	. . .	100.0
Kentucky	29.3	27.8	42.9	.9	98.5	.6	28.2	28.2	43.6
Louisiana	21.0	71.4	7.6	.9	91.7	7.4	22.5	77.5	. . .
Maine	27.0	. . .	73.0	.6	96.8	2.6	27.4	. . .	72.6
Maryland	20.7	32.0	47.3	.1	98.3	1.6	20.5	31.5	48.0
Massachusetts	9.4	. . .	90.6	.5	98.0	1.5	8.8	. . .	91.2
Michigan	20.5	. . .	79.5	.5	92.3	7.2	21.5	. . .	78.5
Minnesota	18.8	. . .	81.2	4.0	87.6	8.4	16.6	. . .	83.4
Mississippi	27.4	26.7	45.9	2.2	91.0	6.8	28.8	27.4	43.8
Missouri	6.6	.4	93.0	. . .	99.6	.4	6.2	.5	93.3
Montana	7.8	37.3	54.9	6.7	90.3	3.0	1.0	41.3	57.7
Nebraska	3.8	. . .	96.2	2.3	95.1	2.6	1.3	. . .	98.7
Nevada	23.3	56.6	20.1	8.6	89.1	2.3	14.8	62.7	22.5
New Hampshire	11.1	. . .	88.9	.4	98.4	1.2	10.3	. . .	89.2
New Jersey	22.5	.6	76.9	.7	96.0	3.3	22.6	.5	76.9
New Mexico	18.3	65.3	16.4	7.6	90.3	2.1	9.7	72.1	18.2
New York	20.7	. . .	79.3	. . .	94.5	5.5	21.7	. . .	78.3
North Carolina	7.1	65.1	27.8	.2	96.9	2.9	6.3	66.1	27.6
North Dakota	21.4	5.3	73.3	6.6	85.3	8.1	17.2	6.2	76.6
Ohio	4.8	30.9	64.3	.4	94.2	5.4	4.4	32.8	62.8
Oklahoma	10.3	12.7	77.0	7.1	91.4	1.5	3.2	13.9	82.9
Oregon	16.9	17.3	65.8	2.7	87.7	9.6	15.8	19.8	64.4
Pennsylvania	14.8	. . .	85.2	.1	93.7	6.2	15.4	. . .	84.6
Rhode Island	5.5	. . .	94.5	.3	97.3	2.4	5.2	. . .	94.8
South Carolina	26.4	24.1	49.5	.0	89.5	10.5	28.9	26.9	44.2
South Dakota	9.9	. . .	90.1	9.7	80.2	10.1	. . .	. . .	100.0
Tennessee	21.7	51.7	26.6	.8	88.8	10.4	22.9	48.0	29.1
Texas	45.6	1.0	53.4	6.9	71.7	21.4	39.3	. . .	60.7
Utah	37.8	. . .	62.2	3.9	93.6	2.5	35.7	. . .	64.3
Vermont	20.5	. . .	79.5	1.6	92.4	6.0	20.4	. . .	79.6
Virginia	27.9	19.0	53.1	.9	86.9	12.2	30.4	21.9	47.7
Washington	27.2	13.9	58.9	3.8	92.5	3.7	24.5	15.0	60.5
West Virginia	7.4	. . .	92.6	.2	97.0	2.8	7.1	. . .	92.9
Wisconsin	11.0	8.5	80.5	.4	98.7	.9	10.5	8.6	80.9
Wyoming†	34.1	13.1	52.8	12.6	83.1	4.3	25.6	15.7	58.7
Outlying Possessions									
Alaska	76.8	. . .	23.2	. . .	100.0	. . .	76.8	. . .	23.2
American Samoa	. . .	. . .	. . .	. . .	100.0	. . .	. . .	. . .	. . .
Canal Zone	100.0	. . .	. . .	. . .	. . .	100.0	. . .	. . .	. . .
Guam	100.0	. . .	. . .	. . .	. . .	100.0	. . .	. . .	. . .
Hawaii	17.4	82.6	. . .	. . .	100.0	. . .	17.4	82.6	. . .
Philippines	100.0	. . .	. . .	. . .	100.0	. . .	100.0	. . .	. . .
Porto Rico	3.5	. . .	1.8	5.3	94.7	. . .	. . .	. . .	. . .
Virgin Islands	100.0	. . .	. . .	. . .	100.0	. . .	100.0	.	. . .

*Including Federal aid for vocational education. †Figures for 1924.

No less divergent are the facts with regard to other matters, such as supervision of teaching and of building construction. In some states the central department is very active and very powerful, as, for example, in New York and New Jersey. In other states the central control is very slight, as in Iowa and Missouri.

THE ELEMENTARY SCHOOL

Enough has been said of state educational organizations to make it clear that the schools of the United States are characterized by local differences. With this general qualification in mind, the following statement may be made with regard to the typical form of school organization in this country. In the main, the system is a *unit system*, that is, there are no parallel lines in the lower grades, as there are in Europe, designed to keep apart different classes of the population. All pupils begin in the same elementary school and progress into the high school.

Curriculum of Elementary Schools. The elementary school is usually divided into a primary division and one or more higher divisions. The primary division commonly consists of three grades. These three grades teach "the three R's" and give the children some opportunity to cultivate observation of nature and to learn something of the fundamental laws of health. Following the primary training, the elementary-school program becomes very different in different parts of the country. In the Southern states the elementary school is usually seven years in length. In the Northern states, it is commonly eight years in length. In a few cases it is nine years in length. The course of study includes subjects which have gradually been added in the course of the development of American schools. The following table borrowed from Professor Cubberley shows this historical development of the elementary course and indicates at the same time numerous improvements in methods of teaching as well as in content of the school curriculum.

DEVELOPMENT OF ELEMENTARY SCHOOL COURSE

1775	1825	1850	1875	1900
READING	(READING *	(READING	(READING	(READING *
	(*Declamation*	(DECLAMATION	(*Literary Selections*	(LITERATURE *
Spelling	SPELLING *	SPELLING	SPELLING	*Spelling*
Writing	Writing	WRITING	PENMANSHIP *	*Writing* *
(*Catechism*	(*Good Behavior*	(Manners		
(BIBLE	(*Manners & Morals*	(Conduct	Conduct	. . . .
		(MENTAL ARITH.*		
Arithmetic	ARITHMETIC*	(CIPHERING	(PRIMARY ARITH.	ARITHMETIC
			(ADVANCED ARITH.	
	Bookkeeping	Bookkeeping	. . . . .	
		(Elem. Language	(*Oral Language* *	(ORAL LANGUAGE
	GRAMMAR	(GRAMMAR	(GRAMMAR	(Grammar
			(Home Geography *	(*Home Geography*
	Geography	*Geography*	(TEXT GEOGRA-	(TEXT GEOGRA-
			(PHY	PHY*
			(U. S. HISTORY	(*History Stories* *
		History U. S.	(Constitution	(TEXT HISTORY *
		Object Lessons	(Object Lessons *	(*Nature Study* *
			(Elementary Science *	(Elem. Science
			Drawing *	*Drawing* *
			Music *	*Music* *
				(Play
			Physical Exercises	(Physical Training *
				(Sewing
				(Cooking
	Sewing and Knitting	. . . . .	. . . . .	(Manual Training

Capitals—Most important subjects. Roman —Least important subjects.
Italics —Subjects of medium importance. * —New methods of teaching now employed.

Forms and Duration of Elementary Schools. The elementary school in rural districts is organized in the form commonly known as the one-room school. A single teacher is in charge of the whole curriculum, and promotes the individual children as in his or her judgment they are ready to go forward with their work. In the larger communities the elementary school is graded; that is, children of different states of maturity and school attainments are assembled in separate rooms, and each room has a teacher in charge of the work in that particular grade. The more highly organized elementary schools usually have, as stated above, eight separate grades. In the larger cities a single school building often houses duplicate grades and includes 32 separate rooms. In some of the less thoroughly organized schools two or three grades are assembled in a single room and put in charge of a single teacher.

The elementary school is conducted in different communities for different numbers of days during the year. In the more highly organized states, 200 days a year constitute the regular program. In rural districts this number is often reduced to 120 days and even less. The following table shows the diversity of practice in this matter:

THE STATES AND EDUCATIONAL OPPORTUNITY

States	Average Number of Days Schools in Session 1919-1920	Rank 1920	Average Number of Days Schools in Session 1924-1925	Rank 1925
1	2	3	4	5
United States . .	161.9		169.6	
Alabama . . .	123.1	46	132.2	49
Arizona . . .	162.6	31	166.0	33
Arkansas . . .	126.3	45	135.0	48
California . .	174.0	13	181.9	9
Colorado . . .	167.9	19	178.0	14
Connecticut . .	183.5	3	182.7	8
Delaware . . .	181.7	5	183.4	7
Dist. of Columbia	178.0	8	171.8	29
Florida	133.1	44	142.2	45
Georgia . . .	145.0	40	143.0	44
Idaho.	172.7	15	165.0	34
Illinois	170.9	17	184.0	5
Indiana . . .	155.8	34	174.0	23

THE STATES AND EDUCATIONAL OPPORTUNITY—Con.

States	Average Number of Days Schools in Session 1919-1920	Rank 1920	Average Number of Days Schools in Session 1924-1925	Rank 1925
1	2	3	4	5
Iowa	174.0	14	176.0	19
Kansas	164.0	28	175.0	21
Kentucky	123.0	47	164.0	36
Louisiana	148.9	38	151.1	41
Maine	169.2	18	176.0	19
Maryland	179.6	6	185.1	4
Massachusetts	179.4	7	183.9	6
Michigan	172.0	16	177.0	16
Minnesota	160.0	33	180.6	10
Mississippi	122.0	48	136.9	47
Missouri	162.8	30	169.3	31
Montana	166.4	23	172.3	27
Nebraska	164.0	28	178.5	13
Nevada	167.0	20	174.0	23
New Hampshire	174.0	12	177.0	16
New Jersey	189.0	1	189.0	2
New Mexico	165.0	26	174.0	23
New York	188.0	2	189.4	1
North Carolina	134.0	42	144.7	43
North Dakota	166.9	22	165.0	34
Ohio	165.0	26	177.4	15
Oklahoma	166.4	23	154.4	38
Oregon	152.0	37	172.8	26
Pennsylvania	176.8	9	180.4	11
Rhode Island	182.1	4	186.0	3
South Carolina	109.6	49	142.0	46
South Dakota	167.0	20	172.0	28
Tennessee	133.5	43	153.2	39
Texas	155.6	35	145.0	42
Utah	166.4	23	170.7	30
Vermont	162.0	32	168.9	32
Virginia	147.0	39	158.6	37
Washington	176.4	10	179.1	12
West Virginia	138.9	41	151.5	40
Wisconsin	175.3	11	177.0	16
Wyoming	152.0	36	175.0	21

Control of Elementary Schools. The method of control of the elementary school differs according to the size of the community. In smaller communities a school trustee is usually in charge of the school. He has the power to employ the teacher and to provide for the material equipment of the school. In some cases, even in the smaller districts, government is in the hands of a committee rather than in the power of a single trustee. The local lay school authorities are elected by the community, either at a town meeting or at a regular election. In the larger communities a board of education is substituted for the committee of the smaller districts. This board of education usually operates under a special charter from the state and has full administrative authority over the schools. It usually appoints, in addition to the teachers, a principal of each school building and a superintendent.

In some instances the smaller districts, and even the larger towns which are not able to support a superintendent of their own, are provided by the state with a supervisory officer. In many of the states the counties are organized under a county superintendent of schools who, like the state superintendent, is usually elected by popular vote.

Powers of the Board of Education. Where there is a board of education it is sometimes elected by vote. More commonly it is appointed by some civil officer, such as the mayor or one of the judges. The board of education in many cities is historically descended from a committee of the common council. It is still very common for the board of education to be dependent on the city government in matters of finance. Thus, in New York City the board of education must submit its budget to the board of assessments and apportionments, which has charge of the finances of all branches of the city government. In other cases the board of education is constituted by state charter into an independent taxing body. This is true, for example, in the city of Denver, Colorado.

The Superintendent of Schools. The relation of the board of education to the officers which it appoints has never been worked out with satisfactory clearness. The superintendent of schools is sometimes the executive officer of the board; that is, he carries out the resolutions of the board and is very definitely restricted in his activities by the votes of the board. In other cases the superintendent has powers assigned to him by law and is, in certain functions, independent of the board. For example, in the city of Saint Louis, Missouri, which has one of the most progressive school charters in the country, the superintendent of schools is empowered to nominate all teachers. The board of education can act in the appointment of teachers only on the nomination of the superintendent. In some other cities the board of education makes the appointments without even consulting the superintendent.

The relation of the board of education to the building principal and to the teacher who has charge of the individual classroom is ordinarily indirect. In most cases the superintendent is authorized by the board to direct the activities of these persons. On the other hand, there are cases where the board of education exercises direct supervision over the details of school organization. In general, this is regarded by students of school problems as a bad form of organization. It survives from the time when the lay officials of the school were in full charge of the employment of teachers and the equipment of the classroom.

Organization of the Board of Education. In the history of American schools, boards of education have differed greatly in their size and in their mode of conducting business. As cities grew up during the last decades of the 19th century, many school boards became unwieldy bodies. Membership had formerly been on the basis of representation of city wards or on some other basis which led, during the rapid growth of the city, to the expansion of the number of the board to a point where the large size of the assembly made it almost impossible to do business. There has been a marked tendency in recent years, therefore, to reduce the size of the board to seven in the larger cities and to five or three in the smaller cities.

Another major item in this connection is the internal organization of the board. In some cases, boards of education have divided themselves into standing committees, each committee being in charge of some aspect of school work. Thus, a committee on finance and a committee on school buildings have been very common in such cases. Practical experience has shown that such a division of the board very frequently results in the assignment to these standing committees of all the business of the board in respect to the matter over which a committee has charge. The board as a whole then loses something of its effectiveness. Students of school organization recommend that boards be not divided into standing committees, and that committees be created only when it is necessary to make a study of some particular problem.

The Business Manager. Boards of education have frequently found it advantageous, especially in the larger cities, to appoint an officer whose duty it is to carry on all of the business operations of the schools, such as purchasing supplies and keeping accounts. In many instances, this business manager has been made independent of the superintendent, on the theory that the superintendent is in charge of instruction, while the business manager is in charge

of material equipment. Such a separation of business management from the instructional activities of the school is unfortunate, since the material equipment is always provided with a view to meeting educational needs. The best practice is that in which a special business officer is made responsible to the superintendent and through him to the board. In the smaller towns, it has been found advantageous to give the superintendent direct charge over the business organization of the schools.

THE JUNIOR HIGH SCHOOL

In recent years, a radical reform has taken place in the course of study and in the administration of the last two years of the elementary school. A new institution, commonly known as the junior high school or intermediate school, has been organized to include the seventh and eighth grades and very frequently to unite these grades with the first year of the high school. The fundamental motive for this new organization is to be found in the fact that formerly the elementary school did not include in its program the advanced studies, such as higher mathematics and foreign languages, nor any of the subjects which lead directly into professional training. In this respect, American schools have been far behind European education.

In all European countries the boys who are destined to enter the professions are introduced to the study of Latin at the beginning of the fourth school year and to higher mathematics by the sixth year. The postponement in American schools of all higher subjects to the high school, which lies beyond the elementary school, has handicapped seriously the pupils who go into the higher institutions. Thus, the failure of the elementary school to include Latin in any of the earlier grades has resulted in a very limited and defective knowledge of this subject on the part of boys and girls in the United States. What has been said with regard to Latin can be said also with regard to algebra, geometry, and numerous other subjects which have been excluded from the elementary school program.

Purpose of Elementary School. The reason why these subjects were originally excluded is that, at the time the elementary program was first formulated, the ordinary pupil usually went to school for only a very short period, and American parents were satisfied if their children enjoyed a relatively meager training in "the three R's" and other rudimentary subjects. Furthermore, the example of the common school of Europe was at first strong in determining the practices of American elementary schools, and the common school of Europe, unlike the schools for the better classes, was very limited in its course of study. The American elementary school was originally organized, in respect to its subjects of instruction, with a very meager program, as though it were intended to serve only the common people, although as a matter of fact it has served to train all classes of pupils, including those who are to go forward to higher institutions.

The Upper Grades. The limitations under which the American elementary school has operated in the past have in recent years been overcome in some measure through the sheer expansion of the educational system. Children have attended school so much more regularly and for so long a period that they have mastered the rudimentary subjects and, by the time they have entered the seventh grade, are ready to take more advanced work than they could have taken in earlier years. The demand has come to be very insistent, therefore, that the seventh and eighth grades shall include the beginnings of work which formerly belonged to the high school. Furthermore, in the course of practical school experience, it has been found that pupils in the seventh and eighth grades are mature enough to be dealt with in matters of discipline and social organization in a fashion wholly different from the way in which primary children and children in the fourth, fifth, and sixth grades ought to be handled.

New Types of Organization. The external organization of the seventh and eighth grades has accordingly undergone a modification in the direction of greater liberalizing of discipline. These pupils have been allowed to move about the building more freely than the younger children, and have been brought into contact with what is known as the departmental organization of their studies; that is, they have a number of teachers who are specialists in the different fields. The departmental form of organization has removed pupils from the close supervision of a single teacher which is common in the lower grades.

The reconstruction of the upper grades of the elementary school has been carried out in every possible degree and manner in different school systems. Sometimes the name junior high school has been applied to seventh and eighth grades when no changes except possibly a slight beginning of departmentalization has been made. In other cases, the junior high school has been housed in its own building, and radical changes have been introduced in the courses of study and in the mode of organization.

An investigation conducted by Professor C. O. Davis in the North Central states shows the extent to which the ordinary curriculum of the seventh and eighth grades has been modified through the organization of junior high schools. The following table shows the percentage of such schools offering the subjects listed:

PER CENT OF JUNIOR HIGH SCHOOLS IN THE NORTH CENTRAL STATES OFFERING SEVERAL SUBJECTS AS ELECTIVES

Latin	27.6
Modern foreign language	27.3
Algebra	24.2
General science	30.4
Manual training	88.7
Domestic science and arts	88.4
Drawing	75.4
Music	71.7
Agriculture	25.9
Ancient history	3.8
General history of modern Europe	6.5
Commercial work	16.7
Distinctive vocational work	5.1
Printing	8.2

Many junior high schools devote themselves in large measure to technical subjects. Indeed, it is the belief of some of the advocates of this school that one of its major functions should be that of preparing for industrial life students who are not likely to go into the high school. In the same investigation to which reference was made in the last table, Professor Davis reports a number of schools in the North Central states which have added technical courses in the junior high school.

PUBLIC HIGH SCHOOLS

Turning from the elementary school and the junior high school to the high school, which is the highest unit of the public school system, we find diversity of practice and of organization even more pronounced than it was in the lower school.

The high school is typically four years in length, and conducts its course with a view to preparing pupils either to enter directly upon the duties of adult life or to enter a college or other high institution. It obviously requires for its maintenance a somewhat larger district than that which supplies pupils to the ordinary elementary school. Cities and large towns have, therefore, been the centers which have most commonly maintained high schools. In recent years, however, rural communities have become very enthusiastic about organizing high schools, and there are striking examples to be found of rural high schools which serve districts lying entirely outside of any large centers of population.

Curriculum of High Schools. The courses of study in the high school cover a great variety of subjects. This condition is traceable directly to the fact that, at this higher level of education, there are few subjects which are regarded as essential to the training of every pupil, and there are evident differences in the individual needs of pupils. Similarities which appear among high schools in the matter of curriculum arise very largely out of the fact that the tradition of higher education, as borrowed from Europe, is that of a classical training. Foreign languages, especially the ancient, and higher mathematics have therefore long been accepted items in the curriculum of American high schools. Even where the high school is organized by a community which is not preparing its pupils to go into the learned professions, there has been a disposition to continue the classical tradition, because the community did not want to deprive its young people of any of the opportunities which young people have had in neighboring schools.

In addition to the classical tradition or in some instances in direct opposition to it, there has been a growing tendency in American communities to provide courses which shall acquaint students with modern civilization. Since the high schools of the country have not been centrally controlled, this desire to enlarge the course of study has expressed itself in the greatest variety of experiments. Courses in science and in literature and in history and civics have been rapidly incorporated into the curriculum.

Latterly, commercial and industrial interests have demanded better training for those who are to enter these callings, and the high school in its effort to meet this new social demand has introduced technical courses. In response to the commercial demand, typewriting, stenography, and bookkeeping have been organized, especially in the early years of the high school curriculum. In response to the industrial demand, home economics, agriculture, and technical courses have been opened upon an astonishingly large scale. The following table, borrowed from the last report of the bureau of education which summarized this matter, gives some insight into the complexity of the organization of the high school curriculum.

High School Districts. In the matter of control, the high school is in some cases included in the jurisdiction of the same lay officials as have charge of the elementary school. In other cases special high school boards have been organized. This latter type of organization is very common in rural districts where the high school pupils are to be drawn from a number of elementary school districts. The uniting of a number of such districts to maintain a higher institution has sometimes led to the chartering of a new type of district. In this way there have come into existence community high schools. Sometimes the district of a community high school coincides with the territory of a pre-established political unit, such as a township. The school is then called a township high school. Sometimes the high school district includes a whole county.

Consolidated Schools. Very frequently the establishment of a high school in a rural district has been the motive for a reconstruction of the elementary school district. The general term which is applied to such reconstructions is "consolidation" of schools. Not every consolidated school offers high school courses, but in general the motive for consolidation is enrichment of instruction, and leads ultimately to the establishment of a high school department.

The problems and results of consolidation can be illustrated in a concrete way by quoting at length from a bulletin of the bureau of education a description of a case in which successful organization of this type was carried out in a Southern state.

THE WOOL MARKET SCHOOL

"In Harrison County, Miss., about 8 miles out from the Gulf and in a typical south Mississippi rural community, may be found the Wool Market consolidated school, the subject of this brief study. Three medium-sized one-teacher schools—Coalville, Kind, and Oakhead—were brought together two years ago to form this school near the Wool Market post office, on the Biloxi River.

"The new house, built by private subscription at a cost of about $2000, was located within 2 miles of all the children in two of the old districts, while a transportation wagon was used to bring in from 25 to 30 pupils from the Oakhead district, about 3 miles from the new schoolhouse. The territory of the new school covers 27 square miles and now has within its bounds 134 children of legal school age.

STUDENTS IN CERTAIN STUDIES IN PUBLIC HIGH SCHOOLS, 1890–1922*

	1890		1900		1905	
	Students	Per cent of total	Students	Per cent of total	Students	Per cent of total
Students in schools reporting on studies	202,963		530,425		679,702	
Students in—						
Latin	70,411	34.69	262,767	50.61	341,248	50.21
Greek	6,202	3.05	14,813	2.85	10,002	1.47
French	11,858	5.84	40,395	7.78	62,120	9.14
German	21,338	10.51	74,408	14.33	137,661	20.25
Spanish						
Algebra	92,150	45.40	292,287	56.29	390,893	57.51
Geometry	43,294	21.33	142,235	27.39	191,393	28.16
Trigonometry			9,915	1.91	11,651	1.71
Astronomy			14,435	2.78	8,307	1.22
Physics	46,184	22.21	98,846	19.04	106,430	15.66
Chemistry	20,503	10.10	40,084	7.72	45,980	6.76
Physical geography			121,335	23.37	146,275	21.52
Zoology						
Botany						
General biology						
Geology			18,743	3.61	15,914	2.34
Physiology			142,401	27.42	149,262	21.96
Psychology			12,368	2.38	8,910	1.31
Rhetoric			199,803	38.48	329,895	48.54
English literature			218,613	42.10	335,348	49.34
History	55,427	27.31	198,125	38.16	277,864	40.88
Civil government			112,465	21.66	122,186	17.97
Civics						
Agriculture						
Domestic economy						
Industrial						
Manual training						
Drawing						
Vocal music						
Bookkeeping						

STUDENTS IN CERTAIN STUDIES IN PUBLIC HIGH SCHOOLS, 1890–1922*—Con.

	1910		1915		1922**	
	Students	Per cent of total	Students	Per cent of total	Students	Per cent of total
Students in schools reporting on studies	739,143	....	1,165,495	....	2,155,460	....
Students in—						
Latin	362,548	49.05	434,925	37.32	593,086	27.52
Greek	5,511	.75	3,351	.29	1,873	0.09
French	73,161	9.90	102,516	8.80	333,162	15.46
German	175,083	23.69	284,294	24.39	13,918	0.65
Spanish	4,920	.67	31,743	2.39	242,715	11.26
Algebra	420,207	56.85	569,215	48.84	865,515	40.15
Geometry	228,170	30.87	309,383	26.55	488,325	22.68
Trigonometry	13,812	1.87	17,220	1.48	32,930	1.53
Astronomy	3,915	.53	3,224	.28	1,474	0.07
Physics	107,988	14.61	165,854	14.23	192,380	8.93
Chemistry	50,923	6.89	86,031	7.38	159,413	7.40
Physical geography	142,948	19.34	169,911	14.58	92,146	4.28
Zoology	59,253	8.02	37,456	3.21	32,956	1.53
Botany	124,380	16.83	106,520	9.14	82,241	3.82
General biology	....	....	80,403	6.90	189,288	8.78
Geology	8,538	1.16	5,558	.48	3,520	0.16
Physiology	113,252	15.32	110,541	9.48	109,519	5.08
Psychology	7,109	.96	13,626	1.17	18,748	0.87
Rhetoric	422,051	57.10	680,871	58.42	....	....
English literature	421,980	57.09	650,613	55.82	1,693,928†	78.59†
History	406,784	55.03	589,067	50.54	††	††
Civil government	114,965	15.55	100,736	8.64	416,329‡	19.32‡
Civics	....	....	82,558	7.08	....	....
Agriculture	34,418	4.66	83,573	7.17	110,242	5.11
Domestic economy	27,933	3.78	150,276	12.89	307,553	14.27
Industrial	....	....	9,424	.81	....	....
Manual training	....	....	130,155	11.17	226,023	10.49
Drawing	....	....	266,492	22.87	317,825	14.75
Music	....	....	367,188	31.50	544,764	25.27
Bookkeeping	....	....	39,816	3.42	270,517	12.55

* Beginning with 1910 the percentage of students is based upon the number of students reporting studies; in previous years, upon the total number of students in the schools. ** Subjects regarding which statistics for 1922 only are available include: General Science, students 393,885, percentage 18.27; Typewriting, students 281,524, percentage 13.06; Arithmetic, students 226,918, percentage 10.53. † Includes Rhetoric. †† American History, students 329,565, percentage 15.29; English History, students 61,766, percentage 2.87; Ancient History, students 371,392, percentage 17.23; Medieval and Modern History, students 330,836, percentage 15.35. ‡ Includes Civics.

Former Conditions. "Each of the teachers in the abandoned schools, having from 30 to 40 recitations daily, to cover the eight grades of the elementary and grammar grades, had no time to do high school work, and on that account had no high school pupils. As a result of those conditions, the patrons who were able financially to bear the expense sent their children out of the community to school as soon as they were ready for the high school, at an annual cost of from $150 to $200, while the larger number were forced to turn aside to take up life's duties and responsibilities with only the meager training obtained in these little schools. Such conditions obtain in three-fourths of the schools in the South. The Wool Market consolidated school, now serving the same territory, has 23 high school pupils—16 in the ninth grade, 5 in the tenth grade, and 2 in the eleventh grade—and 20 pupils in the music and expression classes under special teachers.

New Working Plan. "The aggregate average attendance for the original schools was 60 pupils, according to the records, while the average attendance now in the consolidated school is 110 pupils, with an enrollment of 125. There are only 9 children of school age in the district not in school. In the old schools the number was too small to form an attractive social center and to justify the employment of special teachers, but the new school is fast becoming the center of all social activities of this larger community, employs special teachers in music and expression, and has in the faculty teachers qualified to give instruction in practical agriculture and domestic science. In the inter-high school contests last spring the Wool Market consolidated school, though only two years old, captured a fair share of the medals in declamation and recitation, while the girls' basket-ball team claims the county championship.

"The school is located on 5 acres of land, which are used for playgrounds, school garden, and practical agricultural demonstration work. Dr. Welch, the community physician, lectures to the school once a week on hygiene and school and home sanitation; and Mr. W. A. Cox, a trustee of the school and a practical farmer and horticulturist, gives the school weekly lectures on agricultural, horticultural, and allied subjects.

"After trying the consolidated school two years, the patrons and other citizens of the Wool Market community voluntarily levied a tax of $7 per thousand on the property of the district to support the school for an eight or nine months' session.

COMPARATIVE STATISTICS

Cost of the three teachers in old school per month $128.

Aggregate attendance in the three schools	60.
Average cost per pupil per month	2.13
Cost of the three teachers in the elementary and grammar school grades of the consolidated school, per month	$150.
Entire cost of the one transportation wagon per month	50.
Average cost per pupil per month in same grades	2.22
Cost of the four teachers in entire school and of the school wagon, per month	280.
Average cost per pupil for the elementary and high school	2.54

"The Wool Market school, with its four teachers and adequate high school advantages, cost the community only 41 cents per pupil, or a total of $45 per month, more than the three little one-teacher schools. To send the 23 high school pupils out of the community for their high school education would cost the community at least $1000 more than this entire school cost the community and county for eight months. Mr. W. A. Cox, referred to above, is authority for the statement that the value of land in the community had increased during the two years, as a result of the good school, from $10 per acre to $25 per acre.

"What has been accomplished in the Wool Market school can be done in almost any community in the South. This and similar instances that might be mentioned lend strength to the contention that adequate school advantages can be provided for the country children in the community hear the farm home."

Transportation of Pupils. In a number of the Northern states, such as Iowa and Colorado, consolidation has gone forward on even a larger scale than is indicated in the quotation given. The returns which the communities receive for additional expenditures in these cases are enlarged opportunities for rural children. It is perfectly clear that rural communities are increasingly demanding a share in those superior social facilities which formerly belonged to the towns and cities, not only in the consolidation of schools, but in such matters as the free delivery of mail and improvements of highways. The rural people of the nation are in this way overcoming the isolation which formerly was characteristic of the farming districts. The development of consolidated schools with superior facilities has,

in some states, followed the adoption of laws which provided at first only for transportation from rural districts to the centers where high schools existed.

Break between Elementary and High Schools. Where the high school is part of the same system as the elementary schools, it is common for the pupils who complete the work of the eighth grade to pass without examination into the high school. At this point there is, however, in spite of the unit type of organization, a distinct educational break. The methods of instruction and the social atmosphere of the high school are much freer than were those of the elementary school, and many pupils experience difficulty in adjusting themselves to the new type of environment.

The break encountered by students in passing from the lower to the high schools is due in part to the fact that the teachers in the two institutions are entirely different in preparation and outlook. Elementary school teachers have usually prepared for their professional careers in normal schools, while, especially in the better grade of high schools, the teachers are college graduates. Even though a single board of education controls both schools, and even though there is a single superintendent in charge of the whole system, the elementary school and the high school represent two different types of education.

Types of High Schools. Whenever a community is able to provide an enriched curriculum for its high school, the question arises as to the types of courses to be included. The solution of this problem is very different in different cities. Thus in Cleveland, Ohio, the older high schools were those which devoted themselves to the academic curriculum and prepared students for college. As the curriculum expanded, Cleveland erected technical high schools equipped with shops and laboratories, in which special training was offered with a view to preparing boys for industrial and engineering pursuits. These technical high schools became very popular indeed, but they did not prepare students for some of the colleges which had received the graduates of the academic high schools. Cleveland developed also, in addition to the technical high schools, a special commercial school in which the student population, for the most part, was made up of young women preparing to be stenographers and typists.

As contrasted with Cleveland, the city of Saint Louis has organized its high schools on a plan known as the cosmopolitan plan of organization. The Saint Louis high schools include in each of the institutions both academic and technical courses. The theory on which these cosmopolitan schools have been organized is that every child in every district of the city ought to be given an unlimited opportunity to get all of the varieties of high school training. The system is somewhat more expensive than the differentiated plan of Cleveland, but it suits more fully than does the Cleveland system the demands of each locality.

In such cities as Chicago and New York a compromise between the Cleveland and Saint Louis plans has been adopted. A few schools which are predominantly technical have been established in these cities, but even in the technical schools the courses of study are sufficiently numerous and varied to make it possible for students who want the conventional academic training to secure it. At the same time, there has been introduced into each of the academic schools a limited amount of technical work, so that pupils who are studying academic subjects may secure some training in the practical arts.

The High School Unit. The process of standardizing high schools, which began with the report of the Committee of Ten referred to in the historical section, has gone so far as to develop a definite uniformity in the credits administered by these schools. Formerly it was the practice of high schools to give a number of different kinds of courses. Some of these consisted of two class exercises a week throughout the year; others were made up of four or five class exercises. Much confusion arose because of the variable programs of different schools. The colleges and secondary schools of the country were led by the Committee of Ten to approve a plan whereby each course should be of standard length.

A number of agencies have in recent years powerfully re-enforced the movement toward standardization. The result is that a so-called high school unit is now defined as 120 hours of classroom work in the course of a year, and all secondary schools are supposed to report their work in these terms. The agencies which have co-operated in this process of standardization are certain associations in different parts of the country, which have prepared approved lists of secondary schools and colleges. The Carnegie Foundation also has been very influential in defining the unit.

This foundation became involved in the discussion of high school courses, although it was originally founded for the purpose of granting pensions to college teachers. The administration of pensions required that the foundation should determine when a given institution is an acceptable college. This in turn led back to the entrance requirements of the college, and so to a determination of the type of high school from which the college received its students. The Carnegie Foundation insisted, in its dealings with the colleges, that the entrance requirements should be definitely and clearly standardized.

This was the same demand which was made by such bodies as the North Central Association of Colleges and Secondary Schools. This association includes the colleges and more fully developed secondary schools in the territory from Ohio on the east to Colorado, Wyoming, and Montana on the west; from the Ohio river north, and west of the Mississippi as far as the Rocky mountains and as far south as New Mexico and Arizona. Texas, Louisiana, and Arkansas are the only Southern states west of the Mississippi and east of the Rocky mountains not included in the territory of the North Central Association. This association has annual meetings at which it receives reports from its inspectors and from agents, and it publishes annually a list of approved colleges and high schools. Its standards for these institutions have been very influential in guiding the practice of similar co-operative associations in other parts of the country. These other associations are the Northwestern Association, including Washington, Oregon, Idaho, and part of Montana; the Southern Association of Colleges and Preparatory Schools, covering the states south of the Ohio river; the Association of Colleges and Secondary Schools of the Middle States and Maryland; and the New England Association.

In addition to the activities of these associations which select the higher grades of secondary schools for their approved list, the state education departments and the state universities are active in preparing lists of lesser high schools which organize their courses in standard units even though they are not able to meet the complete standards of the major associations. The results secured by the preparation of these approved lists is a relatively high degree of uniformity, at least on the quantitative side of the administration of high school courses.

Methods of College Admissions. Prior to the organization of the standardizing associations, the common practice of American colleges was to administer entrance examinations to all students passing from the secondary school into college. The entrance examination system came to this country from England, where it is the chief means of regulating the work of all educational institutions. It is still the dominant method of college admission in the states east of the Allegheny mountains. The University of Michigan, established in 1837, devised the method of admission by certificate and

thus broke away from the examination system of the older American institutions.

The theory on which the University of Michigan proceeded was that, as the highest institution of learning in the state, it had responsibilities which obligated it to provide through inspection and advice for the development, not only of its own courses, but also of the courses of the other institutions in the state. The University of Michigan, therefore, began to send members of its faculty to visit the high schools and encourage them in perfecting their methods of organization. When a student came from one of these inspected high schools he was received into the college as a satisfactory student, because the institution from which he came was known to conform to the requirements of the university. The certificate system has spread rapidly, especially in the Middle West and the West, and is today the accepted mode of college admission west of the Allegheny mountains.

In recent years the use of general intelligence tests has been advocated as a much better device than examination or certification to determine who shall pass from the high school into college. Elaborate studies have been made of the success with which the work of college students can be prognosticated on the basis of their school records, by entrance examinations in the particular subjects, or through general intelligence tests. It has been found that the school record and general intelligence tests are distinctly superior to examinations in particular subjects. General intelligence tests serve also to correct the estimate of the student based on his school record. The school record is determined in many instances by other considerations than native intelligence. Thus, an industrious student who is dull may sometimes make a better record than a bright student who is not attentive to his work. College officials have found it advantageous, therefore, in dealing with students, to collect the information supplementary to the school record, as a basis of the classification and administration of the school body.

Educational Guidance. With the growing complexity of the high school curriculum and with the influx into the high school of a student population that includes a great many different kinds of young people who are looking forward to all sorts of careers, it has become necessary to add to the administrative machinery of these schools agencies which shall be able to give students more advice than was formerly necessary in the choice of studies. As was pointed out in an earlier section, the high schools of 1870 had a very meager course of study, and students were very much of the same type. The very fact that they came to the schools showed that they had selected their careers and were prepared to fit into the very definite régime of the school.

The point has now been reached where one-third of the population of the country which is of high school age is attending high school. In the more thickly settled sections of the country this proportion sometimes runs as high as 60 or 70 per cent of the young people of high school age. It is evident from these figures that there is no such definiteness in the expectations of students or of their teachers as was common at an earlier date. High school administrators are finding it necessary, therefore, to study the problem of course elections very carefully and to offer advice to students about the best ways of preparing themselves for those activities to which their capacities and desires lead them. Most of the larger high schools of the country have recently added to their staff, for the purpose of giving such advice to girls, an officer not formerly found in the schools, that is, a dean of girls. It is the business of this officer to supervise in an intimate way the social and personal activities of the young women in the schools. An assistant principal is usually provided in the larger schools, who performs the same functions for boys; and in an increasing degree the principal of the high school devotes himself to the solution of the personal problems of the pupils.

One of the most urgent problems of guidance is the choice of technical courses and the selection of suitable industrial opportunities for a given pupil. As a special phase of educational guidance, so-called vocational guidance has been provided in many schools. Vocational guidance in some cases has gone to the extent of providing courses in the industries of the city, so that pupils may become aware of the opportunities which are open to them in later life. Whether such special courses are given or not, it has been found desirable to give personal advice to students and to help them choose their courses and prepare themselves definitely for callings which are open to them.

In a later paragraph vocational guidance will be briefly discussed. It is mentioned here as one of the important lines of organization of secondary schools.

Extracurricular Activities. The high school recognizes its obligation to the community in social as well as intellectual lines, and has accordingly provided, under the supervision of the school, social and athletic opportunities which were uncommon in the secondary schools of two decades ago. Many different types of clubs have been set up, with the view to drawing out the student's powers and encouraging him to take part in social activities which would not be aroused by the regular classroom exercises. Various forms of student self-government have in some cases arisen out of these social activities. Not infrequently the high school has come to be a center of organization, not only for the young people of the community, but also for adults. Reference to this general matter will be made again in a later section dealing with the social center movement.

Federal Encouragement of Technical Courses. In recent years the Federal government has encouraged the organization within high schools of special courses in agriculture and technical subjects. This encouragement has been given through certain supervisory agencies which have been provided from Washington, and through appropriations to the different states by the Federal government for the support of these special courses. The Federal government has no direct control over the secondary schools of the country, but it has set up elaborate machinery for approving plans made in various communities for the introduction of technical courses, and thus indirectly has exercised a great influence in the enlargement of the high school curriculum. Special reference will be made to this matter in a later section dealing with industrial education.

COLLEGES AND UNIVERSITIES

The lack of uniformity in American standards and practices, which has been a subject of frequent comment in earlier paragraphs, is nowhere more strikingly exhibited than in the organization of higher institutions of learning. Even the terms college and university are frequently interchanged, and in many cases the institutions which call themselves by these names are in reality devoting all of their energy to work of a grade which should be classified as belonging to the secondary school.

College. The college is typically a four-year institution, and is devoted to nonprofessional instruction or, as it is called, instruction in the liberal arts. Formerly the colleges, like the secondary schools, were dominated by the tradition of a classical education, but, as the various sciences have expanded and as modern languages have come to be recognized as equally important with classical languages, the range of college subjects has been enormously expanded. Furthermore, the adoption of the elective system has brought about a condition in American colleges, especially since 1880, which has encouraged the expansion of the curriculum into every possible field of human experience. The older significance of

college graduation has thus been lost. The degree which used to be conferred in American colleges as a mark of the completion of a classical course, namely, the A. B. degree, or bachelor of arts, has been extended in its significance until now it is awarded in many institutions after four years of study in science or even in technical subjects.

The differentiation of the college course has taken place most conspicuously in the junior and senior years. Many institutions have found it necessary, in order to meet the needs of their students, to introduce into these years professional courses leading into the schools of law and medicine to which their graduates are going. Those institutions which have been unable to provide professional courses in the upper years have found that competition has led to the withdrawal of their students.

University. The term university, when strictly used, designates an institution which differs from the college in that it is a composite institution including a number of professional schools. In almost every case, the universities of the country include a college of liberal arts and a graduate school as subdivisions of their organization, and also schools of law, medicine, theology, and agriculture. Not all so-called universities have the full equipment of the schools indicated. Indeed, there are many colleges which style themselves universities without attempting to do work other than that which belongs to the liberal arts and sciences.

Degrees. With the multiplication of divisions in American universities, there has come a very great expansion of the list of degrees granted. A number of bachelors' degrees have been invented for different types of courses. The most common of these, other than the bachelor of arts, is the bachelor of science. There are also degrees of bachelor of philosophy and bachelor of letters.

The universities which give courses beyond the regular four years of the colleges confer numerous advanced degrees. The first of these, following the bachelor's degree, is the master's degree. This is usually conferred on the basis of one year of graduate study, and it may be a master of arts or a master of science degree. The additional year of study required for the master's degree is very commonly spent in a single department or in a narrow range of closely related departments. Formerly the master's degree was given by American institutions, as it is given by the English universities, to any graduate who had been pursuing one of the liberal professions. The conferment of the degree in these earlier cases did not imply any resident study in the university. It is coming to be very uncommon for American institutions to grant the master's degree on any basis other than the actual taking of courses in the institution itself.

Above the master's degree is the degree of doctor of philosophy. The character of this degree is very largely determined by the example of the German universities to which many American students went during the decades between 1880 and 1910. The doctor of philosophy degree is usually conferred after three years of resident study beyond the bachelor's degree. One of the essential requirements for this degree, in addition to the completion of graduate courses, is the preparation of a thesis which shall demonstrate the ability of the candidate to produce an original piece of work in the field in which he is specializing. The degree of doctor of philosophy is not conferred at the present time in America as an honorary degree, and has therefore come to have a very high standing as an academic degree. Universities and colleges are seeking for their faculties persons who have a doctor's degree, and many of the associations which are attempting to standardize colleges are insisting that this degree shall be held by a reasonable proportion of the faculty members in all higher institutions.

American universities confer a number of honorary degrees, chief among which is the degree of doctor of laws. This is conferred upon anyone who has contributed, especially in an administrative or civic way, to the betterment of the community. Other degrees on this same level are the degree of doctor of science, conferred for conspicuous attainments in natural science, and doctor of letters, conferred upon those who have attained eminence in the field of literature or literary research.

Types of Higher Institutions. Three classes of universities and colleges may be distinguished from the point of view of their support and government. These are: privately endowed institutions; state institutions; and municipal institutions.

The most common form of American college is that which is dependent for its support upon endowments. Two-thirds of the colleges of this country derived their initial support from religious bodies. In recent years the endowments of many institutions have come from single donors. Funds thus given to higher institutions are usually committed to a board of trustees. Frequently the trustees are representatives of the religious bodies which organized the institution. In many instances, on the other hand, they constitute a self-perpetuating body. The board of trustees appoints in all cases a president of the college. He is the administrative head of the institution and is in some measure also its intellectual leader. The trustees appoint also the members of the faculty. In this action they usually follow the nominations of the president, who in turn seeks the advice, either of the various departments in the institution or of some organized council which canvasses all matters of faculty appointment.

Three main grades of faculty appointments are usually recognized. The lowest is that of instructor; above the instructor is the assistant or the associate professor. In some of the larger institutions both of these classes of partial professorial ranks are to be found. Finally, the professor with a full appointment is the highest rank in the instructional staff of the institution. Professors usually hold what is known as an indefinite or permanent appointment, that is, they are not reappointed from year to year. Below the rank of instructor there are associates and assistants who render minor service but who are not in independent charge of classes of students. Above the professor in rank are administrative officers in charge of the various divisions of the institution. These administrative officers are commonly called deans.

State Universities. Institutions of the type described have in recent years receded somewhat in importance in face of the fact that the state and Federal governments, and in some instances municipalities, have put themselves in the place of the religious denominations or the private donors in supplying funds for maintenance. Beginning with the state of Virginia and extending rapidly through the area which was at one time the Northwest Territory, this movement has given rise to institutions which have grown to be great state universities. Institutions like the universities of Ohio, Michigan, Wisconsin, Illinois, Minnesota, Iowa, Kansas, Nebraska, and California are conspicuous leaders in American education. The funds for their buildings and current expenses are supplied by the legislatures of their states. They have boards of trustees, appointed in some instances directly by the governor and in some instances by the legislature.

These institutions are universities in organization and are usually equipped with a full quota of professional schools. In many instances they derive support for some of their professional work, especially in agriculture and engineering, from subsidies granted by the Federal government. In some states, as in Iowa, Washington, and Michigan, the school of agriculture is a separate institution not under the immediate jurisdiction of the state university. The state is thus supplied with two, and in some instances more than two, higher institutions

which are partially under state control and partially under the subvention of the Federal government.

In external organization the state universities are not unlike the private universities. Each is presided over by a president, elected by the board of trustees. Faculties are appointed by the boards of trustees on the nomination of the president.

Municipal Universities. The third type of organization which has become increasingly common is the municipal university. The first municipal university in this country was organized in the city of Cincinnati. A citizen gave a fund for the organization of a university, which was later supplemented by an appropriation by the city government. The success of the University of Cincinnati led the state of Ohio to provide by legislation for the organization in other cities of institutions of similar type. There is a municipal university at Akron and one at Toledo. In states other than Ohio, special charters have in a few instances been granted to municipal institutions. New York City has two municipal institutions which grew up originally to supply the demands in that city for higher education before there was a system of public high schools. Louisville, Kentucky, has a municipal university; Buffalo, New York, has developed an institution which is not supported by municipal taxes but is municipal in its range of operations and in the fact that it is supported by the people of that city.

These municipal institutions grow out of the natural demand in large centers of population for easily accessible educational opportunities of a type higher than that which is provided in the public high schools.

The College Year. The college year, or university year, has ordinarily consisted of 36 to 40 weeks, the sessions beginning in the middle of September and ending with graduation exercises late in June. President Harper, at the time of organization of the University of Chicago, pointed out vigorously the lack of economy in an arrangement which left the college buildings and equipment unused from the end of June until the middle of September. He accordingly proposed the plan of a continuous session, which has been gradually adopted until now it may be said to be, in one form or another, the common form of organization of the larger institutions of the country. His original proposal was for four quarters of twelve weeks each, with a week of vacation after each quarter.

It has not been feasible to carry out this program, because other educational and social institutions do not close and open at dates which would make it possible to arrange sessions strictly in accordance with the quarter plan advocated by President Harper. The result is that the four quarters of the academic year are somewhat irregular in length. In some institutions the summer session is not a full quarter, but is either six or eight weeks in length and is designated as a summer school rather than as a regular quarter of the university work. In other cases the summer quarter is equal in length to the other quarters. Whatever the details of organization, it has come to be very general for universities and colleges to continue their activities during the summer months. During these months the student constituency of the college or university is very different from that during the other months of the year. Teachers of high and elementary schools attend these summer sessions in such large numbers that the universities become, during this period, training places for the teachers of the lower schools. So vigorous has this movement become that city boards of education are cognizant of it, and they frequently offer inducements for their teachers to continue study by giving them additional compensation for it or by basing promotion within the school system on such study. During the war a number of universities adopted the four quarter plan in order to make the fullest possible use of their material equipment and of the time of students.

THE JUNIOR COLLEGE

The junior college is an institution offering training on the level of the first two college years, that is, the two years immediately following the close of the typical high school period. Although, as related below, the beginnings of the movement reach back into the 19th century, the actual development of junior college units unassociated with universities covers a period of little more than two decades. The state of the movement by 1922-23, exclusive of its manifestation within the university, is shown in the accompanying table, which indicates the total number of recognized junior colleges in the United States—well over 200.

Public Junior Colleges. These are institutions which have developed in association with the public school system and which, with few exceptions, are maintained in connection with public high schools, usually with some attempt at separation. They are for the most part under the direction and control of local school authorities, and constitute an upward extension of the public school system, a natural step in evolution in communities which, in something like a satisfactory manner, have taken care of education on the lower levels. The development of these schools at the present time is chiefly a phenomenon of the Mid-Western states and California.

DISTRIBUTION OF THE THREE MAIN TYPES OF JUNIOR COLLEGES

Section	Public	State	Private	Totals
New England and Middle Atlantic	2	. .	9	11
Southern	1	3	69	73
Middle Western	25	11	44	80
Western	18	10	15	43
Totals	46	24	137	207

Most of the junior colleges classified here as being on state foundations are maintained in connection with normal schools and teachers' colleges. These again are to be found almost exclusively in states of the West and Mid-West. They are not to be confused with normal schools offering only typical teacher-training curricula two years in length. The graduates of such normal schools are indeed given third year standing in certain colleges and universities, but the schools do not aim to give general academic courses. The normal schools which are to be classified as junior colleges maintain, in addition to teacher-training curricula, more or less distinct curricula similar to those of other higher institutions. Junior colleges of this type grow out of the motive of expansion from the normal school to the fully developed college or university.

In this group of state institutions are included also a small number of junior colleges not originally established as teacher-training institutions, such as the polytechnic institute in Idaho, and Grubbs vocational college and John Tarleton agricultural college in Texas. Some of the curricula in the two institutions last named are four years in length, extending from the third high school year through the second college year.

Private Junior Colleges. These institutions outnumber the public junior colleges three to one, and the institutions on state foundations approximately six to one. A small proportion are private-venture schools, while a large majority are on denominational foundations. Sectionally the private junior college is a southern institution, although between forty and fifty are to be found in Mid-Western states, fully a third of these being in Missouri, where this type had its first notable development. Although several factors have operated to bring about the rapid increase in the number of private junior colleges, the chief one has been the movement for standardizing higher institutions, which found many colleges unprepared to qualify in respect to staff,

equipment, finances, etc. To many of these the junior college movement seemed to offer a way out of a difficult situation.

Junior Divisions in Universities. Another form of reorganization, which has something in common with the three main types of junior college referred to, is the horizontal separation of the first two from the last two years in certain universities, the lower unit being designated as the "junior college," "junior division," or "lower division," and the upper by corresponding names. By 1922, six universities had introduced this line of cleavage; namely, the University of Chicago, the University of California, the University of Minnesota, the University of Washington, Stanford university, and the University of Nebraska.

The History of the Movement. The beginnings of the junior college movement, as already intimated, reach far back into the 19th century. As early as 1851, the year before he assumed the presidency of the University of Michigan, Henry Phillips Tappan recommended a differentiation between what he designated the "collegial" and the "executive" parts of education, terms which may be taken to have meant with him what we regard as, respectively, preparatory and professional education. He saw the organization for which he was contending exemplified in the relationship between the *Gymnasien* and the universities of Germany.

Another of the earlier educational leaders who clearly foreshadowed the junior college movement of today was William Watts Folwell, installed as president of the University of Minnesota in 1869. In his inaugural address he proposed the upward extension of the public secondary schools and the relegation to these institutions of the first two years of college work. In 1875, in an address before the National Education Association, bearing the caption "The Minnesota Plan," he explained the proposal in greater detail, some of which was provided by a program of reorganization which had been adopted on his recommendation by the regents of the university. Subsequently this plan was only partially put into operation.

Perhaps the most influential of those who have fostered the junior college movement was William Rainey Harper, first president of the University of Chicago. This was the first of the universities named above to institute the junior-senior line of division. President Harper was largely influential in the establishment, during the early years of the present century, of the first public junior colleges,—those maintained in connection with the high schools at Goshen, Indiana, and Joliet, Illinois (a township high school), the latter having maintained an uninterrupted existence to the present day. He encouraged also the establishment of junior colleges on private foundations, and contended that by becoming junior colleges many of the smaller colleges could find a logical place and function in the school system. Among others who gave significant encouragement to the junior college, previously to and during the earliest stages of its actual development, are Edmund J. James, Alexis Lange, and David Starr Jordan.

The Place of the Junior College. The claims made for the junior college by its friends are many, among them the following: (1) that it will be able to give satisfactorily the first two years of college or university work; (2) that it will do much to popularize education on this level; (3) that it will hasten the provision of general and occupational training on this level for those who cannot or should not aspire to higher levels of training; (4) that it will accelerate the impending and desirable reorganization of higher education; and (5) that it will help in obviating the large amount of overlapping of high school and college courses which is known to exist at the present time.

That junior colleges are doing satisfactorily the first two years of college work is attested by the fact that most colleges and universities are admitting graduates of properly accredited junior units to third year standing. Comparison of the teaching staffs of junior colleges with those of other higher institutions shows the former to be somewhat less well prepared for the work, when consideration is given to periods of graduate study. At the same time, even in the present early stage of development, teachers in junior colleges are, on the average, much better prepared than are typical high school teachers, and they compensate to some extent for their present lack of graduate training by having had more experience than college and university teachers and by manifesting in class some superiority in teaching procedure. Salaries of teachers in public junior colleges are not so low as to lead to a misgiving that these institutions will not be able soon to compete with other higher institutions in order to secure a satisfactory teaching personnel. Most junior colleges do not and cannot now give the first two years of pre-professional and professional curricula, beginning with the freshman college year, but they are not likely to find serious obstacles to rendering this service if there is a tendency to encourage only units of good size, that is, those enrolling two hundred or more students.

There is evidence to indicate that, because of lowered costs and proximity to the prospective student, the public junior college is in a position to provide education on this level for a much larger proportion of the total population than now receive it.

Reorganization. The tendencies of reorganization in secondary and higher education during a century have been in the direction of making a place for the junior college. The age of freshmen at Harvard experienced an advance of more than two years in the five decades from 1830 to 1880, and in other older Eastern colleges between the same dates large proportions of students entered at 12 to 17 years of age. During the same period and subsequently (by 1900), the extent of subjects required for admission increased from what was the equivalent of seven to nine units of work to fifteen or sixteen units. This is another way of saying that at least two more years of liberal education were being required for admission to college at the close of the last century than near its opening. While these changes were taking place, collegiate subjects were shifting downward, so that courses formerly open to upperclassmen only, like chemistry, physics, and history of English literature, were available for lowerclassmen, and had even been included in enriched rather than in diluted form in the upper high school years.

The operation of similar forces is seen in the gradually decreasing proportion of students enrolled in the upper years of separate colleges of liberal arts. The tendency of students of such institutions when transferring to other schools is to enroll predominantly in professional curricula. In consequence, there is a decreasing proportion of men in the upper years of colleges of liberal arts, while in universities the number of men in the upper years increases out of proportion to the lower classes.

All these changes seem to point to a typical period of general (nonoccupational) education, for those continuing through our higher institutions, somewhat shorter than the full period of strictly liberal collegiate education. This in turn indicates a place for the junior college line of demarcation between the secondary and higher schools.

There can no longer be doubt that high school and freshmen and sophomore college courses have much in common. This means two things: first, that, being much alike, the line that divides secondary from college work as at present administered is artificial, for, if the work in the lower unit is "secondary" in character, that in the first two years of the upper unit is also largely secondary; second, that this identity involves much actual repetition for the individual student. The repetition results from

giving similar work in two institutions, the upper of which knows little of what is going forward in the lower.

Other types of claims which appear acceptable on behalf of the junior college are: (1) that, owing to smaller enrollments, there will appear in it less of the "depersonalization" of instruction which now tends to characterize the larger colleges and universities; (2) that in the new unit there will be better opportunities for laboratory training in leadership than in institutions in which leaders are largely selected from upperclassmen.

The Junior College and the Public School. From what has been said in description of the public junior college, it may be judged that, for the most part, it is an upward extension of the secondary school, with some measure of separation from the unit below. In communities with four-year high schools this means a 6–4–2 organization of public education. The junior-senior high school organization beginning with the seventh grade is, however, gaining such headway that in most cities, unless there is to be a regrouping of grades, we shall have a 6–3–3–2 organization, including in effect three secondary school units, two of them three years in length and the third two years in length.

It does not require much consideration of this plan or long experience with it to make one aware of its unwieldiness. In consequence, there has appeared an advocacy of a redistribution of the eight years of the new secondary school into two units of equal length,—a lower one to include the grades from the seventh through the tenth, and an upper to include the last two high school and the first two college years. Such a plan may be seen to be in harmony with the considerations supporting junior college reorganization already discussed. Small school systems will not, of course, even with generous provisions for state aid, be able to justify the support of the full eight-year period of secondary education. In this respect, however, the situation will in no wise differ from that now obtaining, in which communities maintain differing amounts of training beyond the elementary school, according to their resources and the number of children of secondary school age.

UNIVERSITY EXTENSION

The university extension movement began in England more than a century ago. Its motive was described by one of its early advocates in the question: "Though it may be impossible to bring the masses requiring education to the university, may it not be possible to carry the university to them?" After the movement had made much progress in England, it was brought to this country in 1887 through a discussion at a library conference in Albany, N. Y. Very shortly, centers were established in several cities, and in 1890 a society known as the American Society for the Extension of University Teaching was established and maintained by subscriptions in Philadelphia. In 1891 a number of important steps were taken: the state of New York appropriated $10,000; the newly established University of Chicago took over a local society and began extension work on a large scale; and in December a national congress on university extension was held in Philadelphia.

Scope of the Movement. Following these early steps, the movement has spread over the whole country. The state universities especially have taken it up and are now engaged in a great variety of enterprises which are intended to carry opportunities of intellectual improvement to the people of their states. The work of the state universities is in many cases generously supported by appropriations made by the legislature. Local centers also contribute through payment of fees to the maintenance of classes or lecture courses, and many endowed colleges and universities co-operate with the state universities by sending out lecturers or conducting correspondence courses.

The following paragraph from a bulletin published in 1919 by the bureau of education indicates something of the variety of service rendered and the number of persons reached.

"The reports from the extension divisions do not generally give exact figures as to the number of persons affected by the various activities, chiefly because such figures necessarily must be only approximate; but estimates show that in the aggregate the number of persons who benefit from lectures, courses, institutes, conferences, package libraries, visual instruction, and other devices is very high and is growing from year to year. One rough estimate of the scope of four different kinds of service in the field totals several million persons served. The figures were taken from the reports of only part of the total number of institutions performing similar service."

EXTENT OF EXTENSION SERVICE

	Number of States	Number of Individuals
Extension lectures (1918-19)	24	2,026,330
Debates and discussions	20	936,550
Institutes and conferences	19	308,800
Requests for information answered	14	179,900

Variety of Extension Service. A brief summary of the types of service rendered may be attempted. First, there are bureaus of information. These prepare bibliographies and outlines for schools, clubs, and civic associations which are pursuing systematic studies, supply information on public health, child welfare, municipal problems, and like matters. Second, aid is given in organizing various forms of community activities, such as pageants, community exhibits, farm demonstrations, and other general occasions. Third, bulletins are published on legislation, on civic and state problems, and on recent scientific advances. Fourth, educational and entertainment films are supplied to clubs, churches, and schools. Fifth, packages of books are made up and lent to persons or organized groups who do not have access in their own towns to public libraries. Sixth, debates in schools or in clubs are organized and directed. In many cases selected reading material is supplied with the plans.

Seventh, classes are conducted in all kinds of subjects. Teachers' classes are conducted in educational subjects; farmers' classes in the mechanics of farm machinery; mothers' classes in the care of infants; general classes in literature, history, and science. These classes are conducted either wholly or in part by lecturers who come from the university, and often are made the basis of regular credit toward the degrees of the university. Eighth, correspondence courses are conducted. These also are often made the basis of credit toward graduation.

Securing Extension Work. Detailed information regarding the opportunities offered through the extension divisions of various universities can be secured by writing to any of the state universities. The bureau of education of the United States published in 1919 a series of bulletins which can be secured from the superintendent of documents, government printing office, Washington, D. C., by calling for bulletins numbers 61, 62, and 84 for the year 1919. Information regarding correspondence courses can be secured through bulletin number 56 for the year 1919. The universities which carry on a great deal of correspondence work are the University of Chicago, and the state universities of Kansas, Minnesota, Wisconsin, Utah, and North Dakota. Several state departments of education participate actively in extension work. This is especially true of the Massachusetts department. Any of the state departments can supply information about opportunities for correspondence work or in regard to methods of securing extension lectures.

It may be remarked that the correspondence study phase of extension education has in recent years been developed by several large private institutions

which devote their entire energy to this line of activity. These private correspondence schools usually specialize in commercial and mechanical courses with a view to giving practical education to students who have terminated their schooling early.

PROFESSIONAL SCHOOLS

The colleges and universities of the country lead into the professional schools. There was a time when training in law and medicine depended upon a general plan of apprenticeship training, whereby the candidate for admission to the profession associated himself with some experienced member of that profession and studied with him in private. Young men "read law," as the phrase put it, in the office of some law firm, or the prospective doctor acted as an assistant to some practitioner. Later the professional men organized institutions where a number of candidates came together and paid fees for training. Professional schools thus grew up on a quasi private basis and in many instances were very profitable because the instruction was given by men who secured their main salaries from the regular professions and took the student fees as additions to their incomes.

As the demands for professional training became more rigid, and especially after legal enactments began to prescribe more in detail the requirements for admission into the professions of law and medicine, the private professional schools found that they had to reconstruct their organization. It was no longer possible to give adequate instruction under conditions which were attractive to the instructors who devoted most of their time to other professional duties. Gradually professional schools began to be assimilated by universities, until finally the private professional training school has very largely disappeared.

Standardization in Medicine. The standardization of professional education is being pushed forward rapidly at the present time. The most vigorous movement of this type is exhibited in the schools devoted to the training of physicians. Under the guidance of the American Medical Council, a survey of the medical schools of the country was made in 1910 and it was found that most of the private institutions were very meager in their equipment and inadequate in their instruction. The Medical Council set up a system of grading medical schools, and, while it had no authority to enforce its grading and classification, the significance of its pronouncements was so great that most of the private medical schools were forced to close their doors. In this way a professional group acting without authority enforced a high standard upon institutions for professional training.

In the professions other than medicine the movement has taken the same general direction, but somewhat more slowly and without any concentrated effort on the part of any single powerful board.

Economy in Professional Training. One of the important problems with which these standardizing bodies for the professional schools have had to deal is that of the relation of professional education to the general training given in the college of liberal arts. In this country the training of a candidate is so far behind that of European candidates in point of time that the professional man in the United States usually enters upon his productive activities two years later than the European candidate. The reasons for this delay in American professional education have already been given in the preceding discussions of the organization of elementary and secondary schools. Elementary education in this country has never been so related to higher education as to introduce those who are going on into higher schools to the advanced subjects as early as do the European institutions.

The professional schools of the United States, however, have not in general gone back in their consideration to the high or the elementary schools, but have attempted to adjust their own relations with the college in such a way as to enable young men to get into the professional courses at a somewhat earlier date. There has been from time to time very vigorous discussion of the possibility of reducing the college course to two or three years. In many cases professional schools have been advised to accept students directly from the high school. At the present time there is no definite solution of this difficulty, and the probabilities are that a solution will not be reached until the professional schools and the higher institutions of learning canvass the whole problem of the organization of American education, from its elementary stages through the professional schools.

Technical Schools. Technical education of a higher grade has developed very rapidly in the United States in recent years. There are a number of engineering schools which are of university grade. These have been especially fostered by the land-grant colleges, and in some instances have come to be such important parts of the educational system that their courses have eclipsed in large measure the liberal arts training which formerly was characteristic of all higher institutions.

SCHOOL FINANCE

The funds for the maintenance of the educational system described in the foregoing pages are derived from public taxes, Federal grants of land, student fees, and donations. In general, it may be said that the revenues for the support of elementary schools and high schools are all derived from taxes and grants of land. Revenues for higher education come from a variety of sources.

A table presented on page 1666 shows the percentage of public school support derived from state taxes, from local taxes, and from permanent school funds. We turn now to consider more directly the revenues devoted in the various states to school purposes.

Available Wealth. The first consideration in dealing with the school revenues of any state is to determine what resources the state has, against which taxes may be levied.

It is very impressive to note that the per capita wealth of the states ranges from a maximum of $7603 to a minimum of $909, and that per capita school expenditures vary correspondingly, from $17.87 to $4.74.

Inequality of Educational Opportunity. These figures clearly indicate that the education which can be supplied to American children varies according to the available financial resources of the different states.

What is true of states is equally true of districts within the states. Several state surveys which have been made in recent years have found it necessary to dwell on this fact. Neighboring districts having equal school registrations often differ in wealth in the most extreme degrees. If the educational system of the United States is to be truly democratic, some method must be found of counterbalancing the inequalities in wealth among localities and states. The present fact is that the annual expenditures per child vary from $75.84 to $7.84.

Bonded Indebtedness. In addition to the revenues for current expenses which are derived from taxes, the public schools of the United States have developed a method of securing funds for making payments on buildings and permanent improvements through the sale of bonds which must in the long run be paid for out of public funds. The amount of bonded indebtedness incurred for schools is very difficult to ascertain, but it is altogether certain that in many communities obligations have been assumed which constitute a very heavy burden for the future to carry. It is especially true in connection with the erection of rural high schools that communities have been led through a spirit of competition with neigh-

boring communities to invest large sums in the equipment of relatively very elaborate buildings when the prospect of a student population for these high schools is comparatively slight.

Distribution of Funds. The distribution of school funds to the different grades of education is one of the grave problems of school finance. It may be said roughly that high school education costs twice as much as does elementary education. Practices differ very greatly in different parts of the country.

Rapidly Increasing Costs. The increase in school expenditures in recent years has been a source of great anxiety to those who are in charge of public revenues. It has been necessary to pay a much higher rate of salaries to teachers since the war, and the cost of erecting public schools has been very great. The question has been seriously raised in many quarters whether the public schools of this country can be carried forward on the scale which has been set by earlier practices of American committees. One of the chief problems which has led to this discussion in recent years is the problem of financing high schools. A few years ago the attendance on high schools was relatively small, and, though the per capita expenditures were high, the aggregate expenditure for these schools was within easy possibility of support by the public. But, since the high schools have increased in population so rapidly in recent years, they have made a very heavy demand on public resources.

American communities do not usually understand why the cost of education in this country is so much higher than it is in other countries. The reason has been clearly set forth, however, at numerous points in the preceding discussions. No other nation has attempted to maintain a system of free high schools. Furthermore, no other nation has brought into its high schools anything like the proportion of the youth of the country represented in the high schools of the United States. Those who are disposed to advocate a curtailment of expenditures for public education in this country should recognize clearly the fact that they are asking the country to give up an experiment in popular education which is one of the unique characteristics of this democracy.

On the other hand, communities will have to recognize the fact that it is quite impossible to maintain public schools of the sort which exist in the United States without making very heavy demands upon public funds. It is estimated that in many of the cities of the United States from one-third to one-half of the public revenues of the municipalities are expended in the maintenance of public schools. Grave problems of political interference with the schools have arisen in recent years because of the large financial draft made on public resources by this educational system. The whole problem of maintenance, therefore, becomes a problem of public control and political policy as well as of school policy.

Support of Endowed Colleges and Universities. The funds which have been given in the form of endowment to higher institutions of learning are summarized as follows in the report of the bureau of education, published in 1923. It should be borne in mind that these figures do not include appropriations made to state and municipal universities.

GIFTS AND BEQUESTS TO EDUCATION, 1912–1920

Institutions	1912	1914	1916	1918	1920
Universities and colleges	$24,783,090	$26,670,017	$30,196,006	$27,450,945	$65,286,159
Schools of theology	1,680,754	1,558,281	2,257,359		
Schools of law	425,867	203,067	128,588		
Schools of medicine	1,296,288	1,495,773	2,253,598		
Public normal schools	479,624	607,431	758,998	40,548	34,310
Private normal schools	133,472	116,283	143,012	616,817	2,096,687
Private high schools	1,262,215	706,546	1,357,719	1,748,258	(a)
Total	$30,061,310	$31,357,398	$37,095,280	$29,856,568	$67,417,156

(a) No data.

GIFTS AND BEQUESTS TO EDUCATION, 1871–1920

1871	$ 8,593,740	1889	$ 6,942,058	1906	$23,347,070
1872	10,072,540	1890	8,011,019	1907	28,585,780
1873	11,225,977	1891	8,519,233	1908	19,763,421
1874	6,053,804	1892	8,721,902	1909	21,192,450
1875	4,126,562	1893	8,207,690	1910	24,755,663
1876	4,691,845	1894	10,855,365	1911	27,634,029
1877	3,015,256	1895	8,240,376	1912	30,061,310
1878	3,103,289	1896	11,677,048	1913	29,651,379
1879	5,249,810	1897	10,049,141	1914	31,357,398
1880	5,518,501	1898	10,981,209	1915	26,023,246
1881	7,440,224	1899	25,332,792	1916	37,095,280
1883	7,141,363	1900	15,066,561	1918	29,856,568
1884	11,270,286	1901	21,158,400	1920	67,417,156
1885	9,314,081	1902	20,348,739		
1886	5,976,168	1903	17,915,075		
1887	7,512,910	1904	17,261,375	Total, excluding 1882, 1917, and 1919	$744,810,332
1888	6,646,368	1905	21,827,875		

Total Annual Cost of Education. The table shown on page 1680, prepared by the bureau of education, gives a general summary of educational expenditures for all grades of institutions.

Federal Appropriations. As a part of the support of public schools and state institutions of higher learning, certain funds given by the Federal government must be included. These funds will be referred to in the next section, which deals with the participation of the United States government in education. At this point it should be noted that the aggregate of such grants is very large, and the effects of Federal appropriations have in many cases been important in determining educational policy.

State Appropriations for Universities. Appropriations are made by state legislatures for the support of higher institutions. It is estimated that the income of public universities from state, Federal, and municipal sources for the year 1918 was approximately 30 million dollars. The receipts of these institutions from fees and other incidental sources of income was approximately 13 million dollars.

Individual Responsibility and Costs. These figures raise an interesting and important question regarding the individual's responsibility for the cost of his education. The student undoubtedly gains great personal advantage from his schooling. He is prepared to earn a higher wage than he would

SCHOOL ENROLLMENT AND ESTIMATED COST, 1919-20

Classification	Enrollment	Estimate per capita cost	Estimated total cost (including outlays)
Public elementary schools (including kindergartens)	19,378,927	(a) $39.12	(b)$756,390,383
Public high schools	2,186,862	(a) 127.20	(b) 278,179,100
Private elementary schools (including kindergartens)	1,515,244	. . . . .	(c)
Private high schools	184,153	. . . . .	(c)
Universities, colleges, and professional schools:			
Public	195,876	466.13	(d) 91,304,185
Private	325,878	456.72	(d)148,837,809
Teachers' colleges and normal schools:			
Teachers' colleges	61,906	130.96	8,107,359
State normal schools	78,899	190.76	15,050,611
City and county normal schools	12,527	126.27	1,581,726
Private normal schools	9,464	252.61	2,390,740
City evening schools	586,843	. . . . .	(e)
Private commercial and business schools	336,032	. . . . .	(e)
Nurse training schools	54,953	. . . . .	(e)
Government Indian schools	25,396	213.94	5,432,930
Schools in Alaska supported by the government	3,457	72.22	249,688
Other public schools in Alaska	3,360	102.33	343,822
Total	24,959,777	. . . . .	. . . . .
Total, including only those items where enrollment and cost are both given	(f)22,282,552	$58.69	$1,307,868,353

(a) Slightly augmented by expenses of instruction in evening schools.
(b) Computed on basis of expenditures for elementary and secondary schools reported by 12 states, in Table 28, p. 46, Bul. 1922, No. 29, *Statistics of State School Systems, 1919-20.*
(c) No data.
(d) Income.
(e) Included with cost of public elementary and secondary schools.
(f) Not including enrollment in private elementary and secondary schools, city evening schools, private commercial and business schools, and nurse training schools.

receive if he were uneducated. It is a perfectly legitimate question, therefore, to ask how far he should pay for this improvement in his earning capacity by paying tuition for his education. Especially in the higher institutions does this question become an immediate one in view of the fact that the resources of the higher schools are limited and the population of these institutions is rapidly increasing.

While it may be argued that the lower schools are necessary for the maintenance of the state and may legitimately be paid for by public moneys, it becomes very much more difficult to defend public demands for higher education, especially if such education prepares the individual for professional activities from which he derives returns that are distinctly superior to those received by the ordinary workman. The contrast between 30 million dollars appropriated out of public funds and 13 million dollars derived from fees puts the matter in very concrete terms.

FEDERAL PARTICIPATION IN PUBLIC EDUCATION

It has been indicated a number of times in the foregoing discussions that the Federal government of the United States has no direct control over the school systems of the country. On the other hand, the Federal government is constantly involved in one way or another in scientific and educational problems.

In the first place, the various departments of the Federal government find it necessary to employ experts. For example, the government must have at its disposal the services of expert engineers for its harbor service and for its management of public lands. The government has also found it necessary in recent years to employ a great many experts who are competent to develop standards of the type needed in commerce and agriculture. There must be experts to prepare crop reports in the department of agriculture, and in the bureau of standards of the department of commerce there must be experts competent to deal with all sorts of scientific problems, such as those which arise in the generation and distribution of electricity. The bureau of standards must be prepared also to test the various raw materials which are imported into this country and distributed to American manufacturers. These illustrations make it clear that the Federal government must participate in the scientific work of the nation. Indeed, the resources of the Federal government are necessary in many cases if scientific work is to be carried forward on the scale which is required to insure adequate general information for the conduct of modern enterprises.

It becomes a matter of vital importance to the nation that experts be trained for these lines of public service. Furthermore, when they undertake their work they must be supplied with suitable scientific equipment. The government has been forced, therefore, into the most intimate and vital contact with all the educational institutions of the country, especially the universities and technical schools.

Not only so, but in the dissemination of scientific information various bureaus in the Federal departments become, in a very important sense of the word, educational institutions. It has frequently been suggested that a national university be established at Washington to unify all the productive and educational activities of Federal departments. George Washington was so impressed with the desirability of such a move that he gave a sum of money toward the foundation of a national university.

Land Grants. For reasons entirely foreign to those which were cited in the last paragraph, however, the Federal government was drawn into the support of public education. A recent publication of the bureau of education written by Professor F. H. Swift states the case as follows:

"On May 20, 1923, will occur the one hundred and thirty-eighth anniversary of the passage of one of the most famous and most significant ordinances ever enacted by the Congress of the United States. Out of this Ordinance of 1785 arose a national policy which has resulted in providing the states with vast grants for public education. This policy was not, however, positively assured until two years later, when Manasseh Cutler, one of the directors of the Ohio Company, held up the Congress of 1787 with the threat to buy land from some individual state unless his demands for school, university, and church lands should be granted.

"Congress, badly in need of money and fearful lest Cutler should carry out his threat, passed, on July 23, 1787, an ordinance authorizing the board of treasury to contract for the sale of lands to the Ohio Company on the terms demanded by Cutler, which included the following grants of land: Two townships for an institution of higher learning, and, within each township, one section of land for the ministry and one for schools. Thus began a national policy which resulted in granting to the states, Federal lands and moneys for public schools. Every one of the 30 public land states, i. e., states carved out of Federal domain, received

extensive grants of Federal lands for endowing schools, which have been largely devoted to establishing permanent state endowments for public schools.

Extent of Grants. "Some Federal lands granted to the states have been given specifically for public schools; others, such as swamp lands, salt lands, and internal improvement lands, although not given specifically for schools, were devoted to schools by many states. Every public land state admitted prior to California, in 1850, received from the national government for the support of public schools the section numbered 16 in each congressional township. California and every subsequently admitted state, except Utah, Arizona, New Mexico, and Oklahoma, received sections 16 and 36. The first three of these states received sections 2 and 32 as well as 16 and 36. Oklahoma offers a special case also.

"In addition to township school sections aggregating approximately 73 millions of acres (73,155,075) (*a*), Congress, under separate acts, has granted to public land states approximately 11,000,000 acres of public domain for purposes of internal improvement; salt lands aggregating over 606,000 acres, and swamp lands aggregating more than 64,000,000 acres. It should be noted that lands granted as swamp lands, as in the case of Minnesota, sometimes proved to contain rich mineral deposits which made them among the most valuable lands granted to a state. From these various grants there have been given in all to the 30 public land states approximately 147,000 square miles of school lands, 101,000 square miles of swamp lands, 17,000 square miles of internal improvement lands, and 900 square miles of salt lands.

Colonial School Lands. "The policy of reserving for schools one or more sections of land in newly surveyed townships had become fairly well established in colonial days. As early as 1659, the general court of Massachusetts granted the towns of Charlestown and Cambridge 1000 acres of land each on condition that they be forever appropriated to maintain a grammar school. In 1672, Connecticut granted 600 acres each to the four county towns of Fairfield, New London, New Haven, and Hartford for the support of a grammar school. In 1687, the Connecticut colony granted more than one-half of what is now Litchfield county to the towns of Hartford and Windsor to save this land from the cupidity of the royal governor Andros. Hartford and Windsor refused to restore this land to the colony when the troublesome times ceased. A controversy arose which resulted in a compromise. In 1726, the territory was divided in half. The eastern half was given to Hartford and Windsor. The colony took the western half, which it laid out in seven townships. Five of these townships were divided into 53 parts each. One of these 53 parts in each town was reserved for the support of a town school, and two for the support of the ministry. In 1733, the assembly of the colony of Connecticut enacted that seven towns belonging to the colony be sold and the proceeds divided among the towns already settled, in proportion to their list of polls and ratable estate, the proceeds to be set apart by each town as a permanent school fund.

"From the proceeds of this policy of Connecticut two classes of permanent funds arose: (1) The fund belonging to the colony which was distributed among the towns of the colony; (2) funds belonging to new towns, arising from reservations of school lands within the towns.

"The colonial policy of reserving lands in each town was adopted soon after the formation of the Union by several states. Georgia, in 1783, provided for the reservation of 1000 acres of land in each county for the support of free schools. New York, in 1786, and Massachusetts, in 1788, provided for the reservation, in state-owned lands, of lots for schools and for the ministry."

"(*a*) Exclusive of approximately 21,000,000 acres of school lands reserved in Alaska; approximately 94,000,000 acres if Alaskan reservations be included."

Land-Grant Colleges. The interest of the Federal government in science, together with its method of appropriating land as a device for aiding the states in promoting education, led during the Civil War to the adoption of the so-called Morrill act of July 2, 1862. This act gave to each state 30,000 acres of public land for each senator and representative to which it was entitled in Congress, the states not having enough public lands within their borders receiving land scrip for the deficit. The money derived from the sale of these lands was to constitute an endowment fund, the interest of which was to be used for the support of "at least, one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." The legislative assent of a state to the provisions of the act was made necessary before the state could participate in the benefits of the act.

On March 2, 1887, Congress appropriated $15,000 annually to each state, to be used by the state in conducting researches and in verifying experiments in the agricultural experiment stations under the direction of the land-grant colleges. The appropriations were made from money arising from the sale of public lands.

The second Morrill act, of August 30, 1890, appropriated annually, out of money derived from the sale of public lands, $15,000 to each state and territory for the further endowment and maintenance of the land-grant colleges, this to be increased annually by $1000 for ten years, after which time the amount for each state and territory was to be $25,000 annually. This money was to be applied only to instruction, and none of it could be used for buildings.

Subsequent acts have increased from time to time the appropriations to the institutions established under the acts mentioned in the foregoing paragraphs.

The effect of these acts has been far-reaching. Beginning in the '60's, when the principle of taxation to support even high schools, much less colleges and universities, was by no means accepted in all the states, this Federal policy gave a decided impetus to the movement for state supported higher education. Each state now has some tax supported agency for higher education, other than schools for the training of teachers and schools solely for the education of Negroes. A number of these stand among the leading and largest American higher educational institutions. For the year 1916-17 the total enrollment reported for land-grant colleges and universities was 122,053, exclusive of institutions for colored students, with a total enrollment of 11,352.

On the curriculum of higher education this movement has had a profound and liberalizing influence. In technical education the land-grant colleges and universities have assumed the leadership. They have promoted agricultural development in a remarkable way.

Subsidies for Special Education. Extending its influence into the field of public high school education, Congress in recent years has passed two laws which give support to agricultural and industrial education.

"The Smith-Lever act, providing Federal subventions for extension work in agriculture and home economics, was approved May 8, 1914. On February 23, 1917, the Smith-Hughes vocational education law was passed, which marked the entrance of the Federal government upon a national policy of subsidizing vocational education. This law was followed by the Smith-Sears act, approved June 27, 1918, and the Smith-Bankhead act, June 2, 1920; the former provided funds for the vocational rehabilitation of disabled soldiers and sailors; the latter, funds for the vocational rehabilitation of civilians disabled in industry or otherwise.

"Those who had urged Federal aid to foster vocational training on the broad scale contemplated by the Smith-Hughes and Smith-Sears laws had not refrained from asking the question: Ought not the Federal government to aid the states in other educational fields, notably that of elementary education? Out of a strong conviction in the affirmative arose, in 1918, the Smith-Towner bill, which sought to provide an annual Federal fund of $100,000,000, to be distributed among the states for subsidizing education. The Smith-Towner bill failed of passage, but was succeeded by the Towner-Sterling bill.

"Those strongly advocating Federal aid on any such scale as that contemplated in the Smith-Towner bill, point out the great inequalities existing among the states as to the educational opportunities provided, and more particularly as to ability to support schools. In 1920, the lengths of school terms in the United States varied all the way from approximately nine months in New Jersey to five months in South Carolina, and the annual salary of teachers from $1279 in Arizona to $291 in Mississippi."

A table, summarizing the contributions of the Federal government to education through national grants other than the recent grants to agricultural and industrial education, follows.

TOTAL OF NATIONAL GRANTS FOR EDUCATION

Grant and Purpose	Acres Granted	Fund Derived from Sales	Probable Future Income	Total Income
1. *For Common Schools:*				
Sections for Schools	81,064,300	$103,000,000	$410,000,000	$513,000,000
Saline Grants	(c.) 900,000	(c.) 1,000,000	. . . . .	1,000,000
Five per cent of Land Sales	. . . . .	7,187,316	(c.) 7,000,000	14,000,000
Surplus Revenue	. . . . .	(c.) 14,000,000	. . . . .	14,000,000
Internal Imp. Act	5,000,000	(c.) 6,000,000	(c.) 8,000,000	14,000,000
Swamp Land Grants	(c.) 45,000,000	(c.) 15,000,000	(c.) 2,000,000	17,000,000
Forest Reserve Per Cent	. . . . .	(c.) 1,000,000	(c.) 25,000,000	(a) 26,000,000
Totals	(c.) 131,964,300	(c.) $147,187,316	(c.) $452,000,000	$599,000,000
2. *Aid to Higher Education:*				
University Grants	3,407,643	(c.) 5,000,000	(c.) 27,500,000	32,500,000
Land-Grant Colleges				
Grants of Land	11,367,832	13,736,178	(c.) 25,000,000	39,000,000
Exp. Station Grants	. . . . .	(c.) 14,000,000	30,000,000	(a) 44,000,000
Laws 1890 and 1907	. . . . .	23,920,000	62,500,000	(a) 86,420,000
Totals	14,775,475	(c.) $56,656,178	(c.) $145,000,000	$201,920,000
3. *Grants for Other Types of Schools:*				
Normal Schools	(c.) 1,500,000	(c.) 2,500,000	(c.) 17,500,000	20,000,000
Deaf, Dumb, and Blind	560,000	. . . . .	5,600,000	5,600,000
Reform Schools	(c.) 500,000	. . . . .	5,000,000	5,000,000
Totals	2,560,000	(c.) $ 2,500,000	(c.) $ 28,100,000	$ 30,600,000
4. *Summary of Grants*	(c.) 149,299,775	$206,343,494	$725,100,000	$829,520,000

(a) Calculated for twenty years into the future, at present rate of increase.
(c.) Estimated approximately.

United States Bureau of Education. The Federal government comes into direct contact with public school problems through a special bureau in the department of the interior, known as the bureau of education. This bureau prepares elaborate statistical reports, which have been so frequently drawn upon in the course of the earlier discussions of this paper that it is hardly necessary to do more than refer to its statistical activities. The bureau has absolutely no authority over public schools. It does not have authority even to demand statistical reports. In spite of this handicap, however, it has succeeded in developing the most valuable educational reports published by any government in the world.

The bureau of education carries on also certain activities in connection with the educational system of Alaska. As a part of its duty in that territory, it supervises one of the sources of public revenue, namely, a herd of reindeer. This is said to be the only function of the bureau which is authoritative. The bureau of education does not have control over the school systems of the outlying possessions of the United States. For example, the school system of the Philippine Islands is under the supervision of the war department and not of the bureau of education. The bureau of education has been seriously limited in its operations because each time the question of expanding its work has come up, the objection has been raised that the Federal government ought not to interfere with the states in this purely social and local responsibility.

Federal Department Proposed. Every Congress since 1918 has considered seriously the proposal to establish a Federal department of education. Accompanying this proposal, has been the further demand that the government of the United States contribute to the payment of the expenses of schools in the various states, in order to equalize educational opportunities.

The bills presented to Congress, favoring legislation of the type referred to in the foregoing paragraph, were formulated by the National Education Association.

VOCATIONAL EDUCATION

The term "vocational education" has been used in recent times to cover those school courses which prepare for commercial and industrial pursuits. This is a very limited meaning of the words, because preparation for the professions is also in a very proper sense vocational education. If the broader meaning be attached to the term, all education is vocational. Harvard college, the first American institution of higher education, was a vocational school organized to train the clergy. Every college or technical school has in like manner been a school for the training of young men and women to enter upon the duties of adult life.

Considered in a narrower sense, vocational education, or preparation for commercial and industrial positions, is of comparatively recent origin in the United States. Formerly boys and girls were trained for such positions by being apprenticed to individual employers from whom they learned by imitation and without systematic instruction. The apprenticeship system began to break down, however, as soon as modern economic conditions became complex and especially when machine industry replaced the older and simpler handcrafts.

The first type of special training for practical business pursuits in this country was commercial education. The manufacturing processes by which raw materials are worked over were developed on an extensive scale in Europe rather than in this country. Europe, therefore, is the home of industrial and mechanical training, America the home of commercial education or training for clerks.

Commercial Schools. As early as 1843, a man named Bartlett established in Philadelphia a school for the training of bookkeepers. Bartlett was followed by others, and soon every large city was supplied with a private business school or college which taught the elements of accounting and gave training in penmanship. These schools flourished because they supplied an urgent practical demand of the business world. Their courses were of short duration and highly intensive. The students were eager and hard working, and there was a ready market for the product.

As business methods evolved, the courses of study in the private business schools also developed. When the typewriter came into common use, the schools transformed themselves in many cases into schools of typewriting and stenography.

In the early '90's, the interest in commercial education had become so widespread that the attention of the public and of educators was drawn to it, and commercial courses for the public began to be advocated. In 1894 a group of commercial teachers met in Asbury Park and launched the movement.

Since that date, high schools have rapidly developed courses in typewriting, stenography, and business methods, until now commercial education is one of the leading lines of instruction.

Manual Training. The first types of technical training to be adopted in this country were drawing and manual training. The exhibits of skilled workmanship brought from Europe to the Centennial exposition in Philadelphia in 1876 attracted the attention of Americans and convinced them that this country was far behind in the training of artisans. There was at that time no provision in the public schools for training pupils in manual skill. The European systems of woodworking, especially the sloyd system, were therefore borrowed and put into the school programs. Special schools were organized for the purpose of giving manual training courses. The first of these was the manual training school connected with Washington university at Saint Louis.

Manual training was advocated by its early promoters as a useful form of general training appropriate for all pupils, whether they were going into industry or the professions. Skill of hand, these promoters said, is just as important as reading and the sciences for a full development of personality.

The manual training movement has resulted in the introduction of handwork of some type into all schools. As a device for satisfying the demands of the business world for the training of workers, however, it has been superseded by a later and more distinctly technical type of education.

Technical Industrial Schools. In 1906 the state of Massachusetts appointed a commission on industrial and technical education. This commission pointed out that boys and girls were urgently needed in the machine industries, and that they were utterly unprepared by the ordinary schools for their places in factories. Indeed, it was clearly the belief of this commission that the ordinary forms of education are in many cases detrimental to industry. With the report of the Massachusetts commission there began a controversy which has been waged continuously from that time. On the one side have been arrayed the industrial leaders of the country, who have advocated two systems of schools, one for industrial workers, and one for the children of the upper classes of society who are to enter the professions. On the other side are the educators and other citizens, who hold that American public education must be a unit system unlike the dual system of Europe. This latter group advocates a reconstruction and liberalizing of common education, but insists that all the children of the United States shall be educated in the same school.

The National Society for the Promotion of Industrial Education, organized shortly after the Massachusetts commission had made its report, was the chief agency in inducing Congress to pass in 1917 the law creating the Federal board for vocational education. This board at first devoted its energy to the promotion of a dual system of education, but has since receded somewhat from that position and is at present co-operating with the high schools of the country in the establishment of industrial courses.

Agricultural Education. Parallel with the growth of technical education in industry, the schools have developed courses in agriculture. The department of agriculture has been influential in promoting such courses, and since 1914 has used a large Federal fund provided under the Smith-Lever act for this purpose.

Home Economics. Special training for girls in the arts of home making, cooking, and dressmaking has developed rapidly in recent years in the upper grades of elementary schools and in the high school.

Part-time and Co-operative Courses. Schools and industrial concerns have arranged to employ students on part-time programs so that there may be opportunities for these students to study and at the same time come into contact with practical processes.

Extent of Agricultural and Industrial Education. The extent to which agricultural and industrial education has been carried under the stimulus of Federal subvention is stated in the following extracts from a bulletin published by the bureau of education in 1923.

SMITH-LEVER SUBVENTIONS EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS

The Smith-Lever act, approved May 8, 1914, provides Federal subventions to aid the states in promoting extension work in agriculture and home economics. This work is carried on partly among adults and partly among children of school age.

According to the report on co-operative extension work in agriculture and home economics, 1920, page 1, issued by the United States department of agriculture, 1922:

"There were engaged in extension work in the United States on June 30, 1920, 2359 in county agent work, 1039 in home demonstration, and 442 club-work agents working exclusively with boys and girls, together with specialists and others, totaling 5630 extension workers in all."

The source of the funds devoted to co-operative extension work in 1920, with the expenditure of the same, is summarized in the same report, pages 1 and 2, as follows:

"The total amount used for co-operative extension work in the United States in 1920 was $14,658,000, of which the Federal government contributed $4,464,000 under the provisions of the Smith-Lever act. In addition, Congress, by direct appropriation to the department of agriculture, made available $1,021,000 for farmers' co-operative demonstration work, and $406,000 for extension work by the several bureaus of the department, co-operating with the states Relations Service, making a total from Federal sources of $5,891,000. The remaining $8,767,000 was derived from sources within the states, including $3,406,000 appropriated by the state legislatures, $3,960,000 provided by the different counties, $470,000 allotted to the extension work by the state colleges of agriculture, and $930,000 from other sources, mostly local.

"Over one-half of the total funds available, or $7,665,000, was spent for county agricultural agent work, $2,180,000 for home demonstration work, $885,000 for club work, $995,000 for administration, and $308,000 for publications. In addition to these items, $2,400,000 was spent for the salaries and expenses of subject-matter specialists, as follows: For live-stock improvement, $740,000; for crop improvement, $600,000; for agricultural engineering, $125,000; for farm management work, $115,000; for marketing, $180,000; and for home economics, $330,000."

SMITH-HUGHES SUBVENTIONS FOR VOCATIONAL EDUCATION

The passage, on February 23, 1917, of the Smith-Hughes act, or, as it is often called, the Federal Vocational Education act, marked the entrance of an entirely new policy on the part of the Federal government toward education. By the passage of the Morrill act the Federal government had begun, as long ago as 1862, subsidizing industrial and agricultural work, but prior to 1917 the moneys had been devoted to work conducted in or through colleges of agriculture and mechanic arts. With the Smith-Hughes act, "the Federal stimulus passed from the colleges to the public schools." The Smith-Hughes act provides subventions, not merely for fostering industrial training and studies in public schools, but for providing professional training for teachers of these subjects. The act is further significant through the machinery it established, and through the conditions it attached to the subventions. By means of these latter, it has been able to determine to a considerable degree the efforts, policies, equipment, methods, and teaching qualifications in the field of vocational education in secondary schools.

We may well conclude the account of the Smith-Hughes subventions by presenting in condensed form a statement of what has been accomplished through them for vocational education. These results were recently summarized in the news letter of the National Society for Vocational Education, June 1922, as follows:

"1. Before January 1, 1918, every state in the Union had accepted the provisions of the Federal Vocational Education act.

"2. During the same period every state in the Union submitted plans for accepting the provisions of the Federal act and the rulings of the Federal board for vocational education.

"3. Every state in the Union created a definite state board for the administration of vocational education.

"4. In 1916, only two states in the Union, Wisconsin and Pennsylvania, had compulsory part-time or continuation school laws. As a result of the Smith-Hughes act, 21 states now have compulsory part-time education laws.

"5. The total of all expenditures for vocational education in schools subsidized from Federal funds has increased from $2,683,639.52, in 1918, to $10,649,852.11, in 1920-21. The far-reaching influence of the Federal Vocational Education act is indicated further in the very large increase in appropriations for vocational education work by local communities, which increased from $1,201,542.38, in 1918, to $5,182,818.22, in 1921.

"6. The enrollment in Federally aided vocational schools increased from 164,186, in 1917, to 323,028, in 1921.

"7. The number enrolled in Federally subsidized teacher training courses increased from 6589, in 1918, to 13,358, in 1921."

Corporation Schools. Many industrial concerns have found it necessary to supplement the training given in the public schools by special courses for their own employees. Thus, department stores have found that they must train their salesmen, first, by giving them general information with regard to the duties of salespeople and, second, by giving them special instruction in regard to the particular commodities handled in that special establishment.

Another type of corporation school has been organized by industrial concerns. For example, there are schools for the training of printers. Young boys are taken into these schools and brought up in the trade. Instruction in such schools is much more systematic than was the training formerly given to an apprentice in the trade, and it is also more elaborate in that the boy who is attending the school is given some instruction, not only in the particular activities of the trade itself, but in the use of language and in the simpler elements of the sciences which contribute to the trade.

Continuation Schools. The general term "continuation school" has been used to refer to numerous types of organized education, sometimes conducted by the public school system itself, and very frequently conducted by institutions like the Young Men's Christian Association and the Young Women's Christian Association. A continuation school is a school in which students who have completed the ordinary course are carried further and are given training especially suited to the industrial and commercial activities which they are to take up in adult life. The states of Massachusetts and Wisconsin have been very active in organizing continuation schools. In both of these states a requirement has been made by law that children either shall go forward in the regular educational system beyond the ordinary age limit of 14 years required for common school attendance or shall attend continuation courses. The laws in these states, and in other states where similar measures have been adopted, require employers to release their minor workers for attendance on continuation schools during the regular working hours in the week. Continuation classes are therefore to be distinguished from the evening courses often organized in public schools for the training of adults who are engaged in industry. Continuation classes are one phase of the general movement, which has been going on in recent years in this country, for the education of industrial workers.

Vocational Guidance. The recorded history of vocational guidance in connection with education and philanthropy begins about the year 1908, and is associated with the names of Frank Parsons in Boston and E. W. Weaver in New York. Parsons' initial efforts were sponsored by philanthropy, and placed major emphasis on two units of the guidance program,—occupational choice and the selection of training programs. The High School Teachers' Association, under the leadership of Mr. Weaver, sponsored the New York movement. The dissemination of occupational information and placement received equal emphasis with occupational choice and selection of training programs. Case study was employed in both cities. Neither effort received financial support from, or administrative recognition by, the public educational system.

Philanthropic-educational interest, however, did not reign supreme in the personnel field even in 1908. The records of industry and of education reveal a number of coincident movements which, in the course of development, have made genuine contributions to the evolution of a scientific personnel program. An analysis of accidents occurring in shops and a study of methods of accident prevention brought out the importance of a careful selection by employers of the kinds of persons whom they should trust in various positions in their factories. Special ability tests suggested an experimental basis for vocational selection and gave experimental direction to vocational guidance. The low output and high labor turnover in industry paralleled low percentage of graduation and high percentage of elimination in education. An examination of educational records also showed that regard must be had to individual differences in capacity if people are to be properly placed. In some cases people should doubtless be debarred from attempting to enter upon courses of training, because it is evident from the outset that they do not have the capacity to take on the necessary training.

The Personnel Problem. Between 1908 and 1918 many educational systems and a large number of industrial plants instituted and operated a considerable variety of personnel units, or "special features," more or less independent of one another, but each intended to assist in the solution of some phase, or some phases, of the personnel problem. During the same period three or four national organizations came into being with the solution of personnel problems as their major objective. National vocational guidance conferences met in 1910 and 1912, and a permanent organization was perfected in 1913. Local associations of employment managers held several conventions between 1913 and 1918.

Organization on a national basis was a war-time accomplishment, and at the close of the war the association paid the penalty of overdevelopment on a nonprofessional basis and disbanded. The American Association of Public Employment Offices was launched in 1913 under the auspices of practical students of employment problems. Each of these organizations has been reorganized, and two have changed their names, but none has made any outstanding contribution to the solution of personnel problems. In addition to the above organizations a considerable number of national associations, with major objectives in other or allied fields, have been interested in and have made minor or local or national contribution within the personnel field. The Young Men's Christian Association, The Young Women's Christian Association, the Knights of Columbus, chambers of commerce, the American Association for Labor Legislation, and the Federated American Engineering Societies are illustrations.

World War and Personnel Programs. The war brought into prominence all the operating units of personnel programs and broadened the vision of both employer and educator relative to the interrelation of such units and the desirability of unification. The study of individual differences, which had long commanded the attention of educators, was applied to army personnel service under the direction of nationally known experts. Rating scales were developed, and the beginnings of job analysis, job classification, and job specification were borrowed from industry and were adapted to war emergencies. Rehabilitation programs tended to renew guidance activities in connection with vocational education; and training programs for counselors and personnel directors were offered by a number of colleges and universities. The United States Employment Service, the Training and Dilution

Service, the War Labor Policies Board, the War Industries Board, and the Women in Industry Service are examples of war-time governmental services which were instituted to deal with personnel problems.

Overvaluation of war-time experimentation and results has tended to discredit the entire personnel movement, and the re-establishment of public confidence now confronts professional students of personnel problems. The standardization of personnel terminology and a fundamental philosophy of personnel service in its relation to all of the varied experiences which an individual meets in the process of occupational preparation and adjustment, demand scientific determination. In the meantime, vocational guidance is still quite generally applied to educational and philanthropic efforts, while employment management, industrial relations, and personnel service are correspondingly common terms in industry. The Second International Conference, Barcelona, 1921, unanimously adopted the terms "vocational guidance" and "vocational selection." Vocational guidance was defined as the choice of an occupation for an individual; vocational selection, as the choice of an individual for a given occupation.

No agency has, as yet, instituted a unit program covering the entire personnel field. It is, however, generally conceded that when such a program is formulated it should co-ordinate all personnel functions and should include the study and interpretation of individual differences, methods of personality culture, and a number of other units. The problem is one of general estimation of all personal traits and of general education. The term "vocational guidance" seems too narrow to cover the whole series of broad considerations that thus appear to be important. The term "personnel guidance" has accordingly been suggested.

Personnel Guidance. The increasing complexity of the industrial activities and of the educational opportunities of the country have tended to confuse the individual in making a choice of his life work. Industrial concerns have found, also, that the securing and placement of workers is a complex and difficult task. This is the justification for emphasizing in schools and in industry personnel guidance.

Evening Schools. In the large cities evening classes are very commonly conducted by the public school system. These are attended either by those who seek a continuation of the regular school training or by adults who have had only a limited opportunity of education. In many cases the evening classes are especially organized for immigrants, to whom instruction in the use of the English language and in the facts about American institutions is given. In some cases these classes are organized into systematic curricula, especially by the Y. M. C. A. and similar organizations, and a student may pursue a systematic course leading to high school graduation or to very definite diplomas of a similar type.

Americanization Classes. The Americanization movement is the name given to a group of educational efforts which were greatly stimulated by the World War, and are aimed at the training of immigrants in a knowledge of American institutions. It became a matter of very keen social consciousness during the war that a great many communities made up of foreign-born persons are not acquainted with the institutions of government and social life in the United States. It was found in some of these communities, which have in a measure segregated themselves, that the cultivation of foreign languages has prevented even the children from becoming acquainted with American ways.

In the army, it became apparent that a great many foreigners did not use the English language with sufficient freedom to carry on intercourse with their American neighbors or to make use of the American newspaper. All of these discoveries with regard to the ineffectiveness of ordinary methods of instruction led the public schools and the Federal government, through its department of the interior, to undertake vigorous efforts for the training of all foreigners in the knowledge of American institutions and in the use of the English language. Many industrial concerns allowed their workers a certain amount of time each day to attend classes. These industrial concerns in many instances also provided space in which classes could be held. Sometimes the public school system supplied teachers; again volunteer workers gave instruction in classes of this type.

A special agent was appointed by the department of the interior, and, in many states, state agents organized the activities of the commonwealth and of municipalities. Congress has appropriated from time to time sums of money to support this type of education, and has been urged to organize the work on a much more extensive scale. Recent curtailment of immigration has reduced somewhat the urgent necessity for this type of training, but it is quite certain that in all parts of the country the Americanization movement has stimulated attention to the need of training for citizenship.

Illiteracy. The most common device for indicating the extent of popular education in any country is to state the extent of illiteracy. The term illiteracy is variously defined. In the United States census, illiteracy means inability to write. Evidently anyone who can write can also read. Therefore, the term as employed in ordinary statistics in this country means inability to read and write. On the other hand, in other countries the term illiteracy is much less clearly defined and sometimes means merely the inability to read printed matter. The bureau of census has recently compiled a table showing the percentage of illiteracy for the various countries of the world. The table is reproduced herewith.

ILLITERACY IN PRINCIPAL COUNTRIES

The term "illiterate," as used in the table below, includes all persons unable to write their own language, except in the case of figures marked with an asterisk (*), where the basis is inability to read. In some instances, however, the figures for army recruits are taken from Otto Hübner's Geographisch-Statistische Tabellen for 1913, in which the use of the term "illiteracy" is not in most cases defined.

Country	Per Cent Illiterate	Basis	Year
Europe			
Austria	13.7	Pop. over 11 years.	1910
Belgium	a12.7	Pop. over 10 years.	1910
	7.9	Army recruits	1913
Bulgaria	65.5	Pop. over 10 years.	1905
	25.4	Army recruits	1909
	58.4	Marriages	1901–10
Denmark	0.2	Army recruits	1907
England and Wales	1.8	Marriages	1901–10
France	14.1	Pop. over 10 years.	1906
	4.3	Army recruits	1912
	4.1	Marriages	1901–10
German Empire	b 0.05	Army recruits	1912
Greece	c57.2	Pop. over 10 years.	1907
	30.0	Army recruits	No date
Hungary	d33.3	Pop. over 6 years	1910
Ireland	* 9.2	Pop. over 9 years	1911
	8.1	Marriages	1901–10
Italy	* 37.0	Pop. over 10 years.	1911
	a31.1	Army recruits	1910
	38.7	Marriages	1901–10
Maltese Islands	e57.5	Pop. over 5 years	1901
The Netherlands	f 0.8	Army recruits	1912
	2.2	Marriages	1901–10
Portugal	*g68.9	Pop. over 10 years.	1911
Prussia	b 0.02	Army recruits.	1910
	0.4	Marriages	1901–10
Rumania	f60.6	Pop. over 7 years	1909
	c41.0	Army recruits	1911
Russia	h69.0	Pop. over 10 years.	1897
	h61.7	Army recruits	1894
Scotland	1.6	Marriages	1901–10

ILLITERACY IN PRINCIPAL COUNTRIES—Con.

Country	Per Cent Illiterate	Basis	Year
Europe—Con.			
Serbia	78.9	Pop. over 11 years.	1900
	43.4	Army recruits	1911
	36.7	Marriages	1901–10
Spain	58.7	Pop. over 10 years.	1900
Sweden	0.2	Army recruits	1911
Switzerland	*i* 0.3	Army recruits	1911
United Kingdom	1.0	Army recruits	1903–04
America			
Continental United States:			
Total pop.	6.0	Pop. over 10 years.	1920
Native white.	2.0	Pop. over 10 years.	1920
Native parentage	2.5	Pop. over 10 years.	1920
Foreign or mixed parentage	0.8	Pop. over 10 years.	1920
Foreign-born white	13.1	Pop. over 10 years.	1920
Negro	22.9	Pop. over 10 years.	1920
Indian	45.3	Pop. over 10 years.	1910
Chinese	15.8	Pop. over 10 years.	1910
Japanese	9.2	Pop. over 10 years.	1910
Argentina	54.4	Pop. over 6 years	1895
Bolivia	82.9	Pop. over 7 years	1900
Brazil	85.2	All ages	1890
British Honduras	68.8	All ages	1901
Canada	11.0	Pop. over 5 years	1911
Chile	* 49.9	Pop. over 10 years.	1907
Colombia	* 73.0	Males of all ages	1912
Costa Rica	80.2	All ages	1892
Cuba	* 43.4	Pop. over 10 years.	1907
Guatemala	92.7	All ages	1893
Mexico	70.7	Pop. over 12 years.	1910
Newfoundland	45.8	Pop. over 5 years	1901
Porto Rico	66.5	Pop. over 10 years.	1910
Uruguay	*a*39.8	Pop. over 5 years	1908
Australia			
Commonwealth of Australia	**j* 1.8	Pop. over 10 years.	1911
New South Wales	**j* 2.0	Pop. over 10 years.	1911
	1.0	Marriages	1901–10
New Zealand	**k* 0.9	Pop. over 10 years.	1911
	0.3	Marriages	1901–10
Queensland	**j* 2.5	Pop. over 10 years.	1911
	2.0	Marriages	1901–10
South Australia	**j* 1.8	Pop. over 10 years.	1911
	0.8	Marriages	1901–10
Tasmania	**j* 3.3	Pop. over 10 years.	1911
	2.4	Marriages	1901–10
Victoria	**j* 1.1	Pop. over 10 years.	1911
	0.4	Marriages	1901–10
Western Australia	**j* 1.6	Pop. over 10 years.	1911
	0.6	Marriages	1901–10
Asia and Oceania			
Ceylon:			
All races	78.3	All ages	1901
European race	11.9	All ages	1901
Other than European	78.4	All ages	1901
India	*l*92.1	Pop. over 10 years.	1911
Philippine Islands	*m*55.5	Pop. over 10 years.	1903
Russia	*n*87.3	Pop. over 10 years.	1897
Hawaii	26.8	Pop. over 10 years.	1910
Africa			
Algeria	13.0	Army recruits	1912
Cape of Good Hope:			
All races	64.0	Pop. over 10 years.	1911
European race	3.8	Pop. over 10 years.	1911
Other than European	82.8	Pop. over 10 years.	1911
Egypt	*c*92.7	Pop. over 10 years.	1907
Natal:			
All races	86.7	Pop. over 10 years.	1911
European race	1.6	Pop. over 10 years.	1911
Other than European	94.8	Pop. over 10 years.	1911
Orange Free State:			
All races	58.0	Pop. over 10 years.	1911
European race	2.7	Pop. over 10 years.	1911
Other than European	85.8	Pop. over 10 years.	1911

ILLITERACY IN PRINCIPAL COUNTRIES—Con.

Country	Per Cent Illiterate	Basis	Year
Africa—Con.			
Transvaal:			
All races	69.4	Pop. over 10 years.	1911
European race	2.5	Pop. over 10 years.	1911
Other than European	91.1	Pop. over 10 years.	1911
Union of South Africa:			
All races	69.7	Pop. over 10 years.	1911
European race	3.0	Pop. over 10 years.	1911
Other than European	88.2	Pop. over 10 years.	1911

a Based on number unable to read and write.
b Based on number without schooling.
c Based on number illiterate; but this term is not defined in the census report.
d Based on number over 6 not reported as able to read and write.
e Native Maltese population.
f Based on number unable either to read or write.
g Including Azores and Madeira.
h Exclusive of Finland.
i Based on number without any proficiency in writing.
j Exclusive of full-blooded aboriginals.
k Exclusive of Maoris and Chinese and of population of annexed Pacific islands.
l Illiteracy, as here used, represents inability to write a letter to a friend and read his reply.
m Civilized population.
n Caucasia, Siberia, and Central Asia.

The Meaning of Illiteracy. In order to understand fully the significance of this table, it should be remarked that many cases are found in which a person is not illiterate according to the definition used in this table although he is not competent to use written or printed material in any practical way. Thus it was found in dealing with recruits in the American army that the percentage of illiteracy was very much higher than any of the percentages officially reported in the census. The army figures run as high as 24 per cent. These figures mean that the recruits were unable to read a newspaper or write a letter. In other words, the standard is very much higher in the army figures than in the report of the bureau of census.

Undoubtedly the method of classifying recruits in the army is nearer the true statement of the case. If one has learned to write and read but very slowly, one's practical advantage from these arts will be small, and unless the individual keeps himself in constant practice he will lose what he acquired in the schools. The distinction may, therefore, be drawn between the ability to write and the ability to read fluently, or with such fluency that the art is of practical value in ordinary life. When the term illiteracy is thus interpreted, it is undoubtedly true that the common people of the United States read a great deal more fluently and a great deal more intelligently than do the people in many of the European countries where the percentage of illiteracy is reported as lower than in the United States. For example, in such a country as Germany, where the percentage is reported as only a fraction of one per cent, the actual use of such reading matter as newspapers and magazines is comparatively much less than in the United States.

SCHOOL BUILDINGS

When American educational organization was relatively simple, the school buildings reflected the simplicity of the course of study and of the organization of the classes. The buildings were one-room structures supplied with simple desks and with very little equipment in the way of books, maps, or other apparatus. As the ideals of education have enlarged, the one-room school has been replaced by a much more elaborate structure with fuller equipment. Some of the typical enlargements may be

mentioned as follows: Additional rooms have been provided for laboratory and shop activities; playgrounds have been enlarged and equipped with apparatus; the heating and ventilating apparatus and the sanitary equipment of the school have been perfected; desks have been provided which fit the pupils and furnish better conditions for school work. Especially has enlargement taken place in the school buildings since communities grew to the size where they require buildings made up of a number of different rooms.

At this stage in school construction many problems arise. In cities where land values are high, it is sometimes necessary to erect a school building of several stories. It becomes difficult also to secure outdoor space in which a school playground can be opened up for children. The larger buildings must of necessity be equipped with fire protection devices, and must have corridors, stairways, and other means of communication between rooms. The evolution of the modern school building has thus been in the direction of an increasingly commodious housing for complex educational activities.

Standard Buildings. In recent years a number of devices have been developed for scoring school buildings, so that communities may have a basis for judging the efficiency of any particular building. A recent example of such a building score card is presented in the work of the New York rural school survey, which canvassed on an extensive scale the school buildings of the state of New York and prepared a report on this matter for the information of citizens of that state. It is not possible here to reproduce fully the New York survey score card prepared by Professor Butterworth of Cornell university. One portion of it, however, may be reproduced to show the general type of requirements laid down for school buildings. This score card was designed for application to one-room buildings, and requires elaboration if used for larger structures. The fundamental standards, however, for lighting, floor space, etc., are the same for one-room buildings and for buildings with numerous rooms. The various points on the cards are scored with numbers which indicate the relative importance of each item in making up an estimate of the building as a whole. These numbers indicate also the maximum scores which would be given to a school building properly equipped in respect to the various items.

THE STANDARDS (*a*)

1. ESSENTIAL STANDARDS:

These standards represent the least that may be expected of an effective one-teacher school building and its grounds.

1. Size Score: 40
- (a) 15 square feet of floor space per pupil of room capacity (number of sittings).
- (b) 200 cubic feet of air space per pupil of room capacity (number of sittings).

2. Shape of Room Score: 20
- (a) Rectangular: width 4 to length 5; or width 2 to length 3 (approximately).

3. Window Placement Score: 35
- (a) Windows grouped on left of pupils. Ventilation windows may be permitted if they are placed well toward the top of the rear or right walls, are small, and are covered with opaque curtains.
- (b) Any large area without windows to be at front end of side wall. Windows should not extend beyond front row of seats.
- (c) Not over ten inches between windows.
- (d) Windows between 3 and 4 feet from floor, with distance from floor to top of window equal to one-half width of room.

4. Glass Area Score: 30
- (a) Ratio to floor space 1:5 (1:4 if light comes from north or side that is considerably shaded).

5. Shades Score: 15
- (a) Translucent.
- (b) Fastened so as to protect from sun without shutting off light unnecessarily; movable or double mounted with one curtain at top of window and one at bottom.

6. Floor Score: 15
- (a) Rift-sawed, hard pine relatively free from knots, closely laid (or equivalent material).
- (b) Double floor.

7. Walls Score: 15
- (a) Ordinary plaster or commonly accepted substitutes, such as beaver board or plaster board.

8. Color Scheme Score: 20
- (a) Walls and ceiling in some light reflecting color pleasing in its general effect.

9. Inside Finish Score: 15
- (a) Good quality material, local or otherwise.
- (b) Tastefully painted or varnished.
- (c) Good workmanship.
- (d) Without unnecessary carving or fluting.

10. Blackboard Score: 30
- (a) Slate.
- (b) Minimum of about 20 linear feet for school with 15 or more pupils, or about 10 linear feet for school with fewer than 15 pupils; none on window wall.
- (c) Chalk and eraser tray.
- (d) Two heights from floor; 26 inches and 32 inches. One height will be acceptable if not over 28 inches from floor and if board is at least 3½ feet wide.

11. Bulletin Board Score: 10
- (a) Soft wood covered with burlap or beaver board.
- (b) Minimum size 500 square inches.
- (c) Within reach of children so they may read material on it readily.

12. (a) Desks Score: 40
- (1) Single desks.
- (2) 5 sizes except in small schools. Judge this factor by whether there are enough sizes to provide adequately for proper seating of all children. (*b*)
- (b) *Teacher's Desk*
  - (1) Well constructed, attractive, with two or more drawers fitted with locks.
  - (2) Substantial office chair.

13. Seating Arrangements Score: 25
- (a) On long axis of room; so faced that light comes from left if the windows are on one side only.
- (b) At least 18 inches between rows with at least 30 inches between seats and walls.
- (c) So far as possible, rows should be made up of seats of same size.
- (d) Desk set at such distance from seat that pupil may work while sitting in an upright position. In general, desk should overlap seat by about two inches.

14. Closet Score: 15
- (a) Cabinet with door for various kinds of teaching supplies.

15. Clock Score: 5
- (a) Small clock on teacher's desk.

16. Fuel Room Score: 20
- (a) Outside fuel shed; well lighted; substantial structure; painted to match school building, or
- (b) Cellar under building; well lighted; thoroughly dry.

17. Cloakroom Score: 25
- (a) Sanitary wardrobes within the classroom or single cloakroom.
- (b) Wall space per pupil at least 8 inches with hooks adjusted to size of children.
- (c) So located as to be under direct supervision of teacher.

18. Workroom

19. Storeroom Score: 15
- (a) Compartment (e. g., in cloakroom) for broom, mop, dustpan, etc.
- (b) Sufficiently large to care for all materials (except teaching supplies) needed for building.

20. Library Score: 20
- (a) Bookcase with glass doors.

21. Teacher's Room

22. Playroom

23. Neighborhood Room

24. Heat and Ventilation Score: 30
- (a) Type:
  - (1) Jacketed stove.
- (b) Adequacy: Score: 30
  - (1) Maintain heat at 68° in every part of room and supply 30 cubic feet of air per pupil per minute. These indicated by:
    - (a) Grate area of at least 210 square inches for room containing 8000 cubic feet or less.
    - (b) Fresh air intakes of at least 175 square inches for room containing 8000 cubic feet or less.
    - (c) Foul air flue of at least 240 square inches for room containing 8000 cubic feet or less.
- (c) Heat control: Score: 10
  - (1) Thermometer.

25. Fire Extinguisher

26. Cleaning System Score: 20
(a) Sweeping with floor brush or broom and sweeping compound; or oiled floor.
(b) Dusting with oiled cloth.

27. Water Supply Score: 25
(a) Source:
(1) Well on school grounds or within 200 yards of schoolhouse.
(2) Located at least 100 feet from nearest barn, outhouse, or other possible source of contamination; slope away from well.
(3) Covered with concrete platform resting on concrete wall sunk at least two feet in ground.
(4) Analysis of water at least once each year is desirable.
(b) Drinking facilities: Score: 20
(1) Closed water jar with faucet.
(2) Individual drinking cups with closed cabinet for keeping them; or paper cups.
(c) Washing facilities: Score: 15
(1) Wash basin at proper height for children; in warm room.
(2) Soap.
(3) Mirror.
(4) Individual towels or paper towels.

28. Artificial Lighting Score: 10
(a) Oil lamps.
(b) Enough in classroom to permit reading without strain; at least one light in each cloakroom, inside toilet room, etc.

29. Toilets Score: 20
(a) Kind:
(1) Chemical system, or
(2) Septic tank system.
(b) Placement: Score: 10
(1) In rooms, conveniently located attached to the building.
(2) Boys' and girls' toilets completely separated, even as to approaches.
(c) Condition: Score: 20
(1) Lighted, and well ventilated.
(2) Walls and ceiling constructed and finished as other rooms in building.
(3) No markings.
(d) Adequacy: Score: 15
(1) One seat for each 25 pupils of each sex.

30. Telephone

31. Bell Score: 5
(a) Hand bell.

32. First Aid Outfit Score: 10
(a) Cabinet with bandages, ointment, adhesive plaster, iodine, etc.

33. Mail Box Score: 5
(a) Waterproof.
(b) Large enough for bulletins, etc., addressed to school.
(c) Located on mail route at point most convenient to school.

34. Flag and Pole Score: 10
(a) On building.
(b) Equipped with rope and pulley.
(c) Flag at least 3 x 5 feet.

35. Vestibule Score: 20
(a) Size at least 6 x 8 feet.
(b) Substantial floor; inside walls of matched lumber; outside walls same as building proper.
(c) Well lighted.
The vestibule may be dispensed with when adequate protection from storms is provided by means of a porch, use of weather strips on door, or location of building.

36. Material of Construction Score: 25
(a) First-quality lumber.

37. Foundation Score: 15
(a) Stone (or equivalent local material).
(b) Height: 18 to 30 inches.

38. Roof Score: 20
(a) Shingle roof.

39. Condition of Repair Score: 30
(a) Paint in good state of preservation.
(b) No broken windowpanes, steps, boards on siding, etc.
(c) No markings on buildings.

40. Location on Grounds Score: 20
(a) Building so located that
(1) The effectiveness of the grounds for play purposes is not interfered with. For example, unless grounds are considerably larger than the minimum given in Item 43, the building should be toward one side and the front of the grounds.
(2) It looks well; not too near the road nor yet too far back on the grounds.

41. Orientation (*c*) Score: 25
(a) Classroom placed so as to
(1) Receive direct sunlight sometime during the day (not north).
(2) Avoid direct sunlight during entire day (not south).
(b) Factors to be considered:
Whether mornings are foggy (favoring western exposure); whether high hills or trees affect lighting; whether mornings are less cloudy than afternoons (favoring eastern exposure); direction of prevailing winter winds; attractive outlook.

42. Architectural Appearance

43. Size of Grounds Score: 25
(a) About 160 square rods—sufficient to provide:
(1) Site for building.
(2) Small lawn with a few trees and some shrubbery.
(3) Playground providing for games and apparatus indicated in Item 49. Where conditions make necessary a barn or shed for horses or cars, more space must be provided.

44. Shape of Grounds Score: 10
(a) Of such shape that there is little waste space. In general a rectangular form is most desirable.

45. Slope and Drainage Score: 25
(a) Natural elevation with grounds sloping away from building.
(b) Grounds well drained.
(c) Quick-drying, fertile soil.

46. Condition Score: 20
(a) No ashes or other refuse.
(b) No weeds.

47. Fencing Score: 5
(a) Board or woven wire field fence.
(b) About 4 feet high.

48. Walks Score: 10
(a) Gravel or cinder walks, well drained, from road to building, building to well, etc., or
(b) Board walks in good condition.

49. Playground Apparatus Score: 25
(a) At least the following or equivalent apparatus: swing; sand pile; volley ball and net; baseball and bat; teeter board; horizontal bar. Where school has not over 10 pupils, less may be accepted.

50. Environment Score: 25
(a) Freedom from nuisances such as odors from barnyards, etc.
(b) Freedom from dangers such as railroads, high cliffs, dangerous bodies of water, etc.
(c) A reasonably attractive view considering the opportunities of the vicinity in this respect.

51. Accessibility Score: 25
(a) Located near main highway.
(b) As near center of district as possible but not over 1½ miles from farthest home except where transportation at public expense is provided.

Notes

(*a*) The score card is published by the World Book Company, Yonkers, N. Y. Copies of these standards may be secured without cost by asking the New York State College of Agriculture, Ithaca, N. Y., for the bulletin entitled: "Improving the School Building Facilities in One- and Two-Teacher Districts through Measurement."

(*b*) The seat should be of such height as will permit the pupil's feet to rest squarely on the floor, and the desk should be so placed that he can write easily while sitting upright.

(*c*) The orientation of a building is the direction from which light enters the classroom, not the direction which the building faces.

Community Centers. There is a widespread movement in this country in the direction of the use of school buildings for purposes other than the instruction of children. Some years ago attention was drawn to the fact that there is a great waste in public resources when school buildings are left empty during the late afternoon and evening after the children have gone home. Proper use of the buildings, it was pointed out, will make it possible for a community to carry on various lines of useful social activities at hours when the school building would otherwise be unused. It is especially true in rural districts, where there are scant accommodations for social gatherings, that the school building furnishes a natural center for community gatherings of all types. Particularly where a rural community has erected a consolidated school building it can also use this larger building for various community purposes.

As a result of the agitation for the wider use of school plants, many school buildings have been equipped with auditoriums and other accommodations for social purposes. These auditoriums serve the regular school for assemblies and the community for all kinds of gatherings. For example, in the city of Rochester, New York, the school buildings have been extensively used for political meetings, social meetings, lectures, stereopticon and moving picture exhibitions, and other similar purposes. In the schools of the city of New York a regular system of free public lectures has been carried on for years, through which people in various parts of the city have been given access to types of information which can be contributed only by specialists in various fields of science and literature.

In the consolidated schools of Colorado, extensive programs of community betterment have been centered. These large consolidated schools are in some cases used for community church services; they have equipment for motion picture exhibitions; and they are used in many cases for meetings leading to the improvement of roads and to other civic undertakings. In one of the rural districts of Wisconsin a school became the center for a dairying business which was carried on co-operatively by all of the patrons of the school. In North Dakota, the consolidated schools have been used for dramatic exhibitions, and the people have found that various forms of public entertainment can be provided economically through these institutions. School buildings have been used also as demonstration centers for the extension courses given by state universities and by the Federal department of agriculture. Physical education has been stimulated through these community meetings, and in many cases the community has been led through these social gatherings to increase very greatly the school equipment.

It is to be pointed out that in this use of school buildings for community purposes there is sometimes danger of the community becoming so enthusiastic about activities for adults that the funds necessary for the instruction of the children will be invaded in order to support these additional activities. Wherever the school is used for community purposes, it should be clearly understood that the community must supply the funds needed for carrying on additional activities without reducing in any wise the resources of the school itself.

EDUCATIONAL FOUNDATIONS

Gifts for the endowment of educational institutions have been common in America since the earliest colonial times. Recently several large donors have preferred to give, not to particular institutions, but to a general foundation empowered to distribute the funds to various institutions as may seem wise.

Peabody Education Fund. The first of the educational foundations was established in 1867 when George Peabody, of Massachusetts, gave to a board of trustees composed of fifteen men the sum of $3,000,000 to be used in the development of education in the more destitute portions of the Southern and the Southwestern states.

John F. Slater Fund. In 1882 John Slater set up a foundation which was to help in uplifting the "lately emancipated population of the Southern states."

The Carnegie Foundation. In 1905 Andrew Carnegie gave to a board of trustees $10,000,000 to be utilized for the purpose of pensioning college professors. The original plan adopted by this foundation, known as the Carnegie Foundation for the Advancement of Teaching, contemplated the retirement of college professors after 25 years of active service. It was assumed that after such a period of service it would be better for institutions to recruit their faculties by appointing younger men. At the same time the retired men would be able to carry on productive literary work which would increase the materials of instruction and promote the intellectual life of the nation.

Closely related to the Carnegie Foundation were certain scientific organizations set up by the same donor. The Carnegie Institute was established in 1902 for the purpose of promoting scientific research and publishing the results. It was assumed that many scientific and literary workers could greatly increase their output if they were supplied with research assistance. Carnegie also established a technical school in Pittsburgh, and ultimately created what is known as the Carnegie Corporation, holding large funds to be dispensed for any educational or charitable purpose.

The Carnegie Foundation has been a highly influential body in determining educational practice in this country. It was obliged to abandon its original plan for the pensioning of college professors. In lieu of this program, it has adopted a system of insurance which is much less expensive than the pension scheme originally projected.

In the course of its operations, the Carnegie Foundation has made numerous studies which have been useful in defining the character of higher institutions. Reports have been prepared on schools of medicine, schools of law, and schools of engineering, and the regular reports have contained much information in regard to the organization of colleges and universities.

Rockefeller Boards. A great educational foundation was endowed by John D. Rockefeller in 1902, under the name of the General Education Board. This organization is closely related to the Rockefeller Institution of Medical Research and the Rockefeller Foundation, the latter being a general corporation supplied with large funds and devoting its major energies to the development of medical education. The General Education Board has used its funds in large measure for the encouragement of colleges and universities. This encouragement has been rendered through direct donation to the endowments and through gifts to maintain higher salary schedules, the latter being a special type of appropriation which was undertaken in order to meet emergencies which arose in most institutions of higher learning after the World War.

The General Education Board has also carried on a number of investigations of educational institutions. Especially notable are the investigations of state school systems in the form of surveys. The board recently organized a special division of state school surveys, and is engaged at the present time in co-operating with a number of states in carrying on this type of investigation.

The reports of the General Education Board indicate that, from 1902 to 1927, appropriations to the amount of $111,549,540 were made for various phases of educational work. More than $95,900,000 of this amount was paid to colleges and other institutions for whites, and more than $11,000,000 to institutions for Negroes.

The Russell Sage Foundation. The Russell Sage Foundation was established in 1907 by Mrs. Russell Sage after the death of her husband, and has co-operated with numerous social agencies for the improvement of the administration of charities and other social enterprises. For a period during its history, the Russell Sage Foundation conducted a division of educational investigations. This division issued numerous reports, notably certain reports comparing the activities of different states in educational matters and showing the rank of these states in educational achievements. It also published elaborate studies and scales for measuring various types of school work such as scales for the measurement of handwriting, for spelling, and for reading. The last mentioned is reproduced on page 1648 in this volume.

The Cleveland Foundation. The Cleveland Foundation is a community organization established in 1914 by Mr. F. H. Goff in the city of Cleveland. At the time of the establishment of this foundation Mr. Goff was president of the Cleveland Trust Company. His experience with many of the large estates in Cleveland showed him that there are many persons of wealth who do not know how to dispose advantageously of such funds as they are willing to give to worthy enterprises. He induced a number of these persons to turn over their estates to a corporation made up of a board of trustees, appointed in part through public officials and in part by representative bodies of citizens. This board of trustees was constituted into a community trust, and was authorized by its charter to utilize such funds as came into its possession for any worthy social undertaking, especially in the city of Cleveland.

Acting under this charter, the Cleveland Foundation carried on an extensive survey of the public school system of the city. Reference has been made in an earlier paragraph to this survey, which is one of the most complete scientific studies of a school system that have been made in the United States. Following the school survey, came a survey of the recreational opportunities of the city, and then a survey of the administration of criminal law through the courts.

The activity of the Cleveland Foundation has been extensively imitated. The New York City Community Trust is organized on the same general plan as the Cleveland Foundation. In other parts of the country, also, bankers have seen in the example of the Cleveland Foundation the possibilities of such a proper and permanent organization of the estates of the country as will benefit the communities in which they have been accumulated. It seems probable that this type of foundation will be set up in a great many communities.

The Commonwealth Fund. The Commonwealth Fund is a relatively new foundation established in 1917 by the Harkness estate and chartered in New York. This foundation devotes itself to various philanthropic and educational enterprises. It has organized a special committee to deal with juvenile delinquency, is carrying on demonstration clinics in a number of cities, and is co-operating with juvenile courts. It has also organized a special committee to deal with the problems of educational research. This committee receives and acts upon various proposals made by students of education in different parts of the country, and subsidizes from time to time investigations which seem to be promising for the promotion of educational organization and research.

EDUCATIONAL SOCIETIES

Professional workers, engaged in the cultivation of literary and scientific subjects, are organized into numerous national societies. The American Historical Association, for example, includes those who are professionally connected with departments of history in colleges and universities and also many of those who give instruction in secondary schools. This association meets once a year in sessions at which papers are presented by its members, reporting the lines of research in which they are engaged. It also publishes a journal, the *Historical Review*, which includes original articles and reviews of all the publications in the field of history. The association appoints from time to time committees which make reports on various professional topics connected with the development of history as a subject of instruction. Especially significant have been the reports of committees outlining programs for history courses in secondary schools.

The statements which have been made about the American Historical Association can be repeated for a long list of learned societies both in the fields of the humanities and in the domains of the natural sciences.

American Association for the Advancement of Science. The associations which bring together representatives of the natural sciences are affiliated in one general organization known as the American Association for the Advancement of Science. This larger and more comprehensive organization is patterned after the older British association and is made up of a number of sections, such as the sections for chemistry, physics, mathematics, anthropology, and so on. The American association meets once a year for a winter session, at which time there are general sessions and sessions of each of the sections. In addition, there are occasional summer meetings which bring together certain divisions of the association.

National Education Association. Besides the special professional societies, there is an organization which includes all of the teachers in all grades of schools. This is known as the National Education Association. This association, under various names, has been in existence since 1857. It is organized under a Federal charter, and has recently reconstructed its internal government so that the national meeting is now a representative body made up of delegates from the various state and local associations of teachers. The general association is subdivided for professional purposes into certain groups, such as the department of superintendence, the classroom teachers, the department of higher education, and so on. These various divisions and departments organize programs at which papers are read, dealing with the special interest represented by the department. The general association, or representative assembly, deals with legislative matters and appoints committees and listens to their reports.

State Teachers' Associations. Affiliated with the national education organization are state associations. These in turn are made up in some states of sectional associations. Annual meetings are held by these associations, at which speakers present professional topics and committees report on various interests of the teaching body.

National Research Council. During the World War the National research council came into existence as a group of scientists contributing to the activities of the departments of war and navy and to the scientific inquiries which were necessary to provide the material resources of the country for the war. So significant were the contributions of the research council to the national war policies, that it was continued and has received generous endowments for its work. It now administers a series of fellowships and funds for the development of scientific research. It has its seat in Washington, and is directed by a staff of central officers, who not only administer the various divisions of the council but promote in general ways the development of science throughout the country.

The American Council and Other Bodies. Numerous other educational organizations have their seats in Washington. Notable among these are the American Academy of Science which is made up of 100 selected scientists; the American Geographical Society, which publishes a journal of geography but is otherwise only a loosely organized society; and, finally, the American Council on Education, which is one of the newest national educational organizations. The American Council is made up of representatives from various educational associations. It has a director and meets in annual session for the transaction of business. Among the constituent organizations which send delegates to the meetings of the American Council are the Association of American Universities, the Association of Land-Grant Colleges, the Association of State Universities, and other similar organizations.

Standardizing Associations. Mention has been made in an earlier paragraph of certain standardizing associations, such as the North Central Asso-

ciation of Colleges and Secondary Schools. These standardizing associations, while having no authority, prepare approved lists which designate selected colleges and secondary schools in various sections of the country as of high grade. The desire of institutions to appear on such lists is so keen that the associations have acquired very wide influence, even though they have no official public standing.

Mention may be made in this connection of certain professional organizations such as the American Medical Association. This is an organization, including all the physicians in the country, which publishes both a technical journal and a journal of a popular type intended to promote the interests of public sanitation and health. It has, through its central council, standardized medical schools. Similar professional associations exist among the lawyers, dentists, and other professional groups.

Parent-Teacher Associations. Numerous associations have been organized with a view to making the community more intelligent on school problems. Sometimes these organizations are initiated by school officers who find it desirable to get into closer communication with their patrons; sometimes they originate in the spontaneous desire of parents to improve the conditions which surround their children in the schools. They represent in a sense a revival of the town meeting, which was the original civic organization in control of the school district. While the town meeting has been replaced by representative assemblies for the enactment of ordinances and statutes, these newer forms of organization are felt by the community to be too remote from so vital an interest as the protection and schooling of children. While people are willing to leave property and public interests such as roadmaking and policing to their representatives, they want to be fully informed about the teachers who have charge of their children and about the organization of the school. The following statements are quoted from or based on bulletins published by the bureau of education, which describe the rise and development of these organizations:

Mothers' meetings inaugurated in 1855, in connection with the kindergarten movement in the United States, seem to have been the precursors of the parent-teacher associations. A mothers' conference was called by a kindergarten training teacher in Chicago in 1894. Three years later a national congress of mothers was called in Washington, D. C., by a group of mothers, in which the interests of all little children, the home, and the community were discussed. A permanent organization of mothers was formed at that time, and plans for the study of problems relating to child welfare were developed. In 1900, a formal charter was granted this organization in the District of Columbia.

National Organizations. Mothers and teachers discovered that they could accomplish more if united into a co-operative organization than was possible when each worked separately. Parent-teacher associations came into existence in response to the expressed need. Other organizations with various names but similar purposes came into existence also and united in this national organization. Among them were the parents' leagues, home and school associations, mothers' leagues, mothers' unions, preschool circles, reading circles, etc. In 1908, the National Congress of Mothers changed its name to include parent-teacher associations, and in 1915 a new charter was secured.

The movement has developed until the parent-teacher association has become the dominant national activity of parents and teachers. Membership grew from about 200,000 in 1920 to more than 1,000,000 in 1927. Summer courses for training leaders were given in colleges for the first time in 1923 at Columbia university.

The conditions under which the national organization operates may be briefly summarized as follows:

(1) The *annual convention* has all power over the conduct of the organization and is a delegate-voting body representing the state branches.

(2) The *board of managers* (composed of officers, state presidents, and the bureau managers and committee chairmen whom they elect) is authorized by the convention to carry on its work between the annual meetings, and must report annually to the convention.

(3) The *executive committee* is the servant of the board of managers and performs for it such duties as the board may assign to it, reporting to the board and the convention and having no independent authority.

(4) The *state branch* is the representative of the congress in the state and is pledged to carry out the objects and policies of the national organization.

(5) The *district organization* is the representative of the state branch in the district and is therefore pledged to carry out the state and national objects and policies in its territory.

(6) The *county council* represents the state branch in the county and carries the congress work to the individual members in every locality.

(7) The *local association* unites the members for carrying out the plans of the congress and for the promotion of the welfare of the children in the community.

(8) The *individual member* belongs directly to both the state and the national congress and is responsible for the attainment of its objects.

ACTIVITIES OF ORGANIZATIONS

A study of the reports of activities in parent-teacher associations in many states reveals a diversity of activities, but one general aim,—to surround children with conditions favorable to their growth. Among other things, this involves the education of parents in caring for the physical and mental health of preschool children. As one means of pursuing this object, the national organization, or congress, sponsors a so-called summer round-up of children, the purpose of which is to send to school in the first grade a class of children 100 per cent free from remediable defects. The method employed is to induce parents to secure in May a physical examination of their children who will begin school the following September, a second examination in September being held to determine the extent of corrections made.

Other objects, sponsored by special committees of the national congress, include safeguarding the health of school age children and the guidance of high school children by means of a study of social hygiene. For the latter purpose there is a committee on mental hygiene, headed by a competent psychologist.

The following list sets forth some of the concrete results of parent-teacher activities as reported by county superintendents:

1. Terms of schools lengthened.
2. School attendance improved.
3. System of uniform textbooks established.
4. Improvement in schoolhouses in sanitation and apparatus.
5. New school buildings erected.
6. Schools standardized.
7. Playground equipment purchased.
8. Instruments purchased for the schools.
9. Library books and pictures purchased for the schools.
10. School grounds beautified.
11. Warm noon lunch served.
12. Milk provided for underweight children.
13. Dental clinics established.
14. Physical examination of school children and remediable defects corrected.
15. Cases of tardiness lessened.
16. Junior banks organized.
17. Picture shows censored and supervised.
18. Reading rooms sponsored.
19. Health crusades sponsored.
20. Scholarships created.
21. Standard of home life raised through child study.
22. Friction in community eliminated.
23. A friendly relationship between parents and teachers established, thus making discipline easier for teachers and creating a stimulus for better work among students.
24. The moral standard of the community improved.
25. Parents visit school, becoming acquainted with modern methods of education and curriculum.
26. Phases of child amusement and recreation in community improved.
27. Night schools established.
28. Splendid work accomplished in Americanization.
29. Community halls built.
30. More students finish eighth grades and high schools.
31. Kindergartens established.
32. Equipment for school lunches purchased.
33. As a whole, the parent-teacher association acts as a socializing and educating project in any community.

Preschool Circles. Two important activities which are the outgrowth of parent-teacher associations are the preschool study circles and reading circles. These consist of mothers of little children under school age. Programs for these circles include the subjects of child care and training, proper diet for the young child, proper clothing, advice to expectant mothers.

The activities of the Co-operative Education Association of Virginia are, as indicated by the name, largely concerned with raising money in order to improve the school plant. They finance school lunches, improve the social and recreational life of the community, and co-operate with the school board in its efforts. Many libraries have been installed as a result of the efforts of these organizations.

SPECIAL TYPES OF AMERICAN SCHOOLS

It is pointed out in earlier paragraphs that European higher schools were originally organized for boys only. In America, higher schools exclusively for boys were organized in the early colonies, and all of the older institutions, such as Harvard, Yale, and Princeton, are institutions exclusively for the training of boys.

Coeducation. The common schools have always been open to girls as well as to boys, but in some cases the secondary schools in the older sections of the country have followed the example of the colleges and opened their doors to boys only. As the Western states organized higher institutions supported by public taxation, it became politically impossible to exclude women from the privileges of any public institution. All of the Western state universities are coeducational, and, in keeping with the policy of these institutions, all high schools are of the same type. In the South the practice of separating the boys and girls at the higher levels of education has been more common. The city of Louisville, Kentucky, for example, has a girls' high school which is separate from the boys' high school. The same division appears in Atlanta, Georgia, and in many other Southern cities.

Special Schools for Women. The practice of excluding girls from the older, Eastern schools led to the establishment of a group of secondary schools and colleges designed to give higher education to women. In 1820 Mrs. Emma Willard secured $4000 for the establishment of a female seminary in Troy, New York. In 1836 Miss Mary Lyon secured $27,000 in small subscriptions ranging from six cents to one thousand dollars for the establishment of Mount Holyoke seminary and college. Since that time a number of great endowments have been devoted to the education of women at Vassar, Wellesley, Smith, and other centers.

Correspondence Schools. The university extension movement in England, among other forms, took that of the giving of courses through correspondence. In this country, the enthusiasm of President Harper of the University of Chicago, and of others interested in wider education of all classes of people, led to the organization of correspondence courses under the supervision of universities and of special schools organized to administer such courses.

The story of the organization of a correspondence school in the mining region of Pennsylvania shows how the movement became influential in circles entirely untouched by university instruction. An editor of a daily paper began publishing scientific articles intended to be useful to workers and foremen in the mines. Evidently the miners of that region are engaged in an industry which is especially dependent upon scientific knowledge. The newspaper articles referred to became so popular that the editor gradually extended his efforts and ultimately established a correspondence school.

This school has grown into a great corporation which publishes numerous textbooks and gives instruction in all parts of the country to individuals who are willing to work out certain lessons and to return to the correspondence-study school such answers as they can give to test questions. The answers received from the student are systematically examined at the correspondence-study center and returned with suitable comments, encouraging the student to go ahead with his studies and correcting any errors into which he may have fallen in his private reading.

The success of the Pennsylvania institution has led to the organization of numerous other correspondence-study schools. Many of them are very successful. One of the great limitations in their work is to be found in the fact that many students start courses but do not have the persistence to carry them on. In some cases it has become a source of large profit to the organization to have students drop out and therefore make no demand upon the school for the supervision of complete courses. The better organizations are finding in recent years that it is advantageous to follow up their students much more vigorously than was formerly the case.

Numerous correspondence-study courses of higher grade have been organized for business men. Books are being prepared and are now in circulation which furnish elaborate information on all sorts of business and industrial subjects.

Experimental Schools. Many schools have been organized in different parts of the United States for the purpose of demonstrating the feasibility of some educational reform. In recent years experimental schools have been organized also in connection with teacher-training institutions, for the purpose of demonstrating the advantages of the methods of teaching advocated in these institutions. The general term "experimental school" covers, therefore, a wide range of institutions. One of the famous schools of this sort was the Dewey school, organized by John Dewey in Chicago for the purpose of correcting the formal practices which this educational leader criticized in all his writings, and for the purpose also of cultivating broader social aspects of education. This school was later merged with the School of Education of the University of Chicago.

The University of Missouri has an experimental school which has attempted to develop its course without the use of textbooks. One of the recent schools which has attracted a great deal of attention through its efforts in the reorganization of education is Mrs. Johnson's school at Fairhope, Alabama. This school is organized on the general principle that children should be allowed much greater freedom than they have been allowed in the past. In the normal school in San Francisco, President Burke, the head of that institution, has set up a school which conducts individual work and has abandoned the ordinary forms of classroom method. The General Education Board set up the Lincoln school of New York City, which was afterwards affiliated with Teachers' college of Columbia university, as an institution to demonstrate the value of newer methods in teaching.

EDUCATION OF DEFECTIVES

There are certain types of physical and mental deficiencies which debar a student from participation in the ordinary activities of school life. Thus, a child who is blind is of necessity excluded by that defect from many of the ordinary school opportunities. The larger cities and most of the states have accordingly provided special institutions for the training of the blind. It is even more necessary to provide for children who are deaf.

Schools for the Blind. Various systems of training have been provided for the blind. It has been necessary to prepare a special type of book which can be read by touch. The earlier forms of letters used in books for the blind were reproductions of the ordinary alphabet, but it was soon found that this form of letters is not especially adapted to recognition through touch, and a point system was substituted.

Schools for the Deaf. In the training of the deaf there are two systems: one attempts to make the deaf person as nearly like a normal individual as possible by teaching him to understand what other people are saying through a careful observation of lip movements; the other system resorts to communication through hand movements, where various positions of the hand and fingers reproduce either the alphabet or word-wholes. Deafness is very frequently accompanied by inability to speak, and many of the schools for the deaf attempt to train their pupils, not only to recognize language when it is used by normal individuals, but also to

participate in conversation through articulation which is acquired without the advantage of the sense of hearing. A deaf person has to learn to control his vocal cords by watching his own mouth and the vocal organs of others and by thus imitating the positions which produce sounds that he never hears.

Deficiencies in General Intelligence. Another group of defects which appear in abnormal individuals are very much more difficult to deal with. These are imbecility and feeble-mindedness. The most extreme cases in this group are of the custodial type and cannot be dealt with in the schools at all. For pupils who have some intelligence, but not a normal degree, special classes or special schools have been organized in many centers, and industrial training has been given as a substitute for ordinary school training, in the hope that the abnormal individuals may be made independent of charity. Formerly it was assumed that children of inferior intelligence should be associated with normal children in order that they might get the advantage of such association. It was also argued that normal children benefit by contact with slower children. It has become entirely evident, however, on the basis of accumulating experience, that the mixing of children of different degrees of intelligence is not an advantage, and methods have been developed of segregating children of inferior ability so that they may receive the special instruction necessary for their training.

RELIGIOUS EDUCATION

The secular character of American schools has led to an elimination of religious instruction from the public schools. It is contended by many citizens that this is a misfortune, not merely because religion is thus in a measure eliminated from the common body of knowledge dispensed through the schools, but also because there is withdrawn from the schools the opportunity for the teaching of moral maxims and principles which would be advantageous in the training of the children. There has been a constant effort on the part of certain groups to reintroduce into the system of public instruction the teaching of the Bible and other forms of moral and religious subject matter. The result is that much legislation has been proposed and enacted, and numerous court decisions have been rendered on the general matter of the use of the Bible in the public schools. In some cases this legislation restricts the use of the Bible to a reading from the text without comment of any kind whatsoever. In other cases the decisions of the courts, based on legislation, have eliminated the Bible altogether from the school, making it illegal to read from the Bible even for opening exercises.

Various experiments are being tried in the hope of finding a way of providing instruction in religion while not attempting to modify the secular character of the schools. The experiments of this type which have been most successful have arranged some form of religious teaching outside of the regular school hours. In some cases the school authorities have co-operated with this plan and have permitted the use of school buildings for these exercises. In other cases, children have been excused from the school for a period in the day when they were not engaged in regular school exercises, and have gone to some neighboring church where religious instruction of suitable type has been given.

Other plans have arranged for instruction in Sunday schools to be supervised and credited by the public schools. The so-called Colorado plan is of this type. High schools approve the work of Sunday classes and treat such work as regular courses to be counted toward high school graduation.

Religious instruction has in recent years been greatly improved in Sunday schools as well as in classes of the type mentioned above. Many Protestant churches now provide normal classes for the training of teachers and a number of commissions have been active in reorganizing and enriching the courses of study used in Sunday schools.

Parochial Schools. Throughout its history, the Roman Catholic Church has been a patron of education. During the medieval period the clergy of this Church were the only teachers of the people. At the present time, the priests give a great deal of attention to teaching. Not satisfied with the instruction given in secular schools, the Church conducts numerous parochial schools and colleges. In these institutions, instruction in the conventional subjects is supplemented by instruction in religion and in Church history. Members of the religious orders of the Church are usually in charge of these schools. In some of the larger cities, the parochial schools enroll a considerable fraction of the children of school age. In general, Catholic children are expected to attend such schools at least during the period immediately before Confirmation.

TEXTBOOKS

From the beginning, American common schools have been reading schools. In this respect they differ from the common schools of Europe, where instruction is given largely in oral form by the teacher. American schools have therefore needed from the outset a supply of reading books. As the curriculum was extended, reading material in each subject was put into the hands of the pupils, and they were required to prepare their lessons from this reading material.

The publication of textbooks, throughout American school history, has been left very largely to private initiative, and as a result there have grown up in connection with the schools of the country numerous large publishing houses which specialize in the preparation and publication of textbooks. These publishing houses have exercised an unofficial but very powerful control over schools. In recent years a number of the states have taken the position that the influence of these independent publishing houses ought in some measure to be reduced; and legislation has been passed providing for the official adoption by some authorized public body of a list of books which may be used in different grades of schools.

State Regulation. State textbook commissions are defended because they secure uniformity throughout the state, and this is regarded by some as an advantage, in that it permits children to move from center to center without being compelled to supply themselves with an entirely new equipment of school textbooks. On the other hand, state adoption is criticized because, at the time of adoptions, competition between various publishing houses frequently runs very high; and charges are sometimes made that practices of an irregular sort are employed in order to secure adoptions for a particular firm. Texas, some years ago, took drastic action against the book companies on the ground that they had set up an illegitimate monopoly.

Kansas and California, moved by considerations which seemed to the legislatures adequate, have provided for state publication of textbooks. In both of these states it is held by friends of the present system that the state can furnish textbooks more economically than independent publishing houses. It is objected, on the other hand, by those who are opposed to the plan of state publications, that the preparation of high-grade textbooks becomes increasingly difficult when the incentives of royalty and financial profit are withdrawn.

Quite apart from the discussion of the methods of publishing books, it can be asserted without any danger of contradiction that in recent years there has been an enormous improvement in the mechanical make-up of textbooks and in their type of content. No other country is supplied with textbooks as good as are to be found in the United States. The books are very full in their content, well illustrated, and well made.

BIBLIOGRAPHY

Within recent years the available literature upon various phases of education has been very greatly increased. Equally notable has been the multiplication of treatises and investigations in the fields of educational practice. The following list of books for reading and reference includes representative works in the various divisions of the entire subject of education, as these are indicated in the preceding discussion.

EDUCATIONAL INSTITUTIONS

Education in the United States, Richard G. Boone
The Making of Our Middle Schools, Elmer E. Brown
The History of Education, Ellwood P. Cubberley
A Text-book in the History of Education, P. Monroe
A History of Education before the Middle Ages, Frank P. Graves
History of Education during the Middle Ages, and the Transition to Modern Times, Frank P. Graves
A History of Education in Modern Times, Frank P. Graves
The History of Modern Elementary Education, Samuel C. Parker
The Rise and Early Constitution of the Universities, Simon S. Laurie

EDUCATIONAL REFORMERS

The School of Infancy . . Johann Amos Comenius
Aristotle and the Ancient Educational Ideals, Thomas Davidson
Herbart and the Herbartians . . Charles DeGarmo
Great Educators of Three Centuries, F. P. Graves
Life and Work of Pestalozzi . John Alfred Green
Horace Mann and the Common School Revival in the United States . . . Burke Aaron Hinsdale
Loyola and the Educational System of the Jesuits, Thomas Hughes
Great Pedagogical Essays from Plato to Spencer, Franklin V. N. Painter
Leonard and Gertrude, Johann Heinrich Pestalozzi
Emile . . . . . Jean Jacques Rousseau
School and Society . . . . . John Dewey
Essays on Education . . . . . Herbert Spencer
The Education of Man. . . . . Friedrich Froebel
Education for Efficiency . . . . Charles W. Eliot
Democracy and Education . . . . . John Dewey

EXPANSION OF AMERICAN EDUCATION

Reports of the United States Commissioner of Education . . . United States Bureau of Education
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The Elementary School Journal . Univ. of Chicago
Journal of Educational Research, Public School Publishing Co., Bloomington, Ill.
The Educational Review . Doubleday, Page & Co.
The Evolution of a Democratic School System, Charles H. Judd

THE SCIENCE OF EDUCATION

Laggards in Our Schools . . . . Leonard P. Ayres
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A Measuring Scale for Ability in Spelling, Leonard P. Ayres
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Introduction to the Scientific Study of Education, Charles H. Judd
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School Surveys

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Saint Louis, Mo. . . . . World Book Co.
Gary, Indiana . . . . General Education Board
Maryland . . . . . General Education Board
San Francisco, Cal. . . U. S. Bureau of Education
Butte, Mont. . . . . World Book Co.

MODERN SCHOOL SYSTEMS IN COUNTRIES OTHER THAN THE UNITED STATES

The Prussian Elementary Schools . . T. Alexander
The Educational Systems of Great Britain and Ireland . . . . . Graham Balfour
German Higher Schools . . . . James E. Russell
The Public Primary School System of France, Frederic E. Farrington
French Secondary Schools, Frederic E. Farrington
The Training of Teachers in England, Scotland and Germany . . . . . Charles H. Judd
The Educational System of Rural Denmark, Harold W. Foght
European Schools . . . . . Louis Richard Klemm
Comparative Education, Peter Sandiford & Others

EDUCATION IN THE UNITED STATES

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The Elementary School

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Method of the Recitation, Charles A. McMurry and Frank M. McMurry
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Department Teaching in Elementary Schools, V. E. Kilpatrick
Types of Teaching . . . . . Lida B. Earhart

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The Junior High School . . . . Leonard V. Koos
The Junior High School . . . Thomas H. Briggs
The American High School . . . . John F. Brown
Introduction to High School Teaching, S. S. Colvin
Methods of Teaching in High Schools, S. C. Parker
Principles of Secondary Education . . A. J. Inglis
The Modern High School, Charles H. Johnston and Others
The High School Age . . . . . Irving King
Supervised Study . . . . . A. L. Hall-Quest

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Professional Distribution of College and University Graduates . . . . . Bailey B. Burrett
University Administration . . . Charles W. Eliot
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Reports of the Carnegie Foundation, New York
Reports of the General Education Board, New York
Measurement in Higher Education, Ben D. Wood

TEST QUESTIONS

Discuss the beginnings of special education. Account for the usual literary character of instruction in the schools 1615
Why must the modern state provide for the teaching of reading and the use of numbers in its schools? 1615
Indicate the reasons for the expanding curriculum of the modern school 1615
When did European schools take their present form? 1615
Characterize the schools organized in Europe in the 12th century. What was the first of these institutions? 1615–1616
From what ranks of society did the students of these early schools come? 1616
Describe the rise of the common schools in Europe 1616
Indicate the part taken by the Church in the development of the first common schools . 1616
Compare the early common and higher schools of Massachusetts as to purpose and curriculum. Show the circumstances under which a single system of schools grew up in the colonies 1616

EDUCATIONAL INSTITUTIONS

Indicate the character of the special knowledge transmitted by ancient Egyptian priests . 1617
What two classes of students were taught in the priestly schools? 1617
Why was training in rhetoric essential to the youth of the Greek states? Account for the immediate influence of Plato and Aristotle. 1617
Point out the regard in which the Greeks held physical training 1617
What great mathematician worked in the University of Alexandria? 1617–1618
Outline the wide influence of the University of Alexandria 1617–1618
Whose writings have long formed the basis of Chinese education? 1618
Discuss the reasons for the traditional formal character of Chinese education 1618
Indicate the present status of Chinese school systems 1618
Describe the curious conduct of a school in India 1618
Show how the Greeks came to be the teachers of Rome. Point out the obstacles encountered by the imported Greek education. Compare Roman physical training with that of the Greeks 1618
Illustrate the work of Alcuin in the Palace School of Charlemagne 1618–1619
State evidence of Arab influence upon the intellectual life of Europe 1619
Enumerate the classes of schools in the later medieval period 1619
Describe the organization and the purpose of the Jesuit schools 1619
Discuss the unique place of the Latin language in medieval Europe. Outline the later influence of the classical traditions 1619
Name three examples of secondary schools. . 1619
Describe the process of development of secondary schools in Europe 1619
Characterize the movement known as "neo-humanism" 1619
Who were the leaders in this movement in Germany? 1619
Point out the reasons for the introduction of many new subjects into the secondary school curriculum 1619–1620
Explain the application of the term "public school" in England 1620
What is the nature of the "public school" course of study? 1620
What is the purpose of the English municipal secondary school? 1620
Outline the general character of the European university. Discuss the service rendered to education by scholasticism 1620
Summarize the contest for academic freedom in European universities 1620–1621
Point out a special advantage that Rhodes scholars find in Oxford university 1621
Distinguish between "pass students" and "honor students" in English universities . 1621
Indicate a relationship between the American college and the English university 1621
Why is the earlier common school in Europe said to have been a missionary enterprise? Describe the school methods pursued by Francke. What order promoted the common school in France? 1621
Describe the school organized by Joseph Lancaster in England 1621
State one great advantage of the so-called Lancastrian movement 1621
What important development of common schools took place in Germany? . . .1621–1622
Outline the provisions of the *General School Regulation* issued in Prussia by Frederick the Great 1622
Indicate the importance of the *Regulation* in educational history 1622
Why was the age of 14 adopted as the upper limit for compulsory school attendance in Prussia? 1622
Show the influence of the Prussian common school system upon the compulsory attendance laws of modern states 1622
Enumerate the three grades of schools which existed in the American colonies 1622
State two points of difference between the early American common school and the European schools. 1622
Compare the educational policies of the various colonies 1622
Discuss the causes which led to emphasis on reading in American schools 1622–1623
Point out the effect of this emphasis in the typical form of classroom exercise in American schools 1623
Indicate the attitude of the American colonists in Connecticut toward industrial training . 1623
How were early American schools paid for? Point out the lack of organization in these early schools. Indicate the combined secular and religious character of these schools . . 1623
Why did the Constitutional Convention leave schools to local control? 1623
When did the Federal government first make provision for education? Indicate the extent of popular education in the year 1800. 1623
Summarize the conditions of schools found by the committee in Taunton, Mass., in 1801 1623–1624
In what states and at what dates was provision for state supervision of schools first made?. 1624
Indicate two particulars in which the states undertook to insure good schools 1624
Outline the progress made in compulsory education laws in the various sections of the country 1624
What European influences affected American schools before 1850? To what typical form of organization did these influences give rise? 1624–1625
Name the two types of secondary schools most common before the Civil War 1625
Outline the development and the distinctive features of the high school 1625
Indicate the significance of the report of the Committee of Ten 1625
What cities, in 1837 and in 1839, appointed superintendents of schools? 1625
By what European teachers was the modern teacher training movement inspired? . . . 1625

Where and by whom were private normal schools established before 1830? Outline the history of the establishment of state supported normal schools down to 1860 . . 1625
Summarize the content of the usual normal school curriculum. To what extent have normal schools become teachers' colleges? . 1626
Outline the usual content of the curriculum in the teachers' college 1626
For what purpose were the first American colleges established? How did the University of Pennsylvania differ from others in origin and curriculum? 1626
When and under whose influence was the University of Virginia established? 1626
Indicate the importance of denominational colleges in the history of American higher education 1626
Review the changes that have taken place in choice of professions by college graduates 1626–1627
State the percentages of college graduates taken by six leading pursuits 1627
Cite figures from the bureau of education report to show the large enrollments of colleges and professional schools 1627
In what American university was advanced research work first emphasized? 1627

EDUCATIONAL REFORMERS

Summarize the work of reformers in the history of education 1628
Indicate the relation of the kindergarten to the teachings of Froebel 1628
Point out some of the effects of Socrates' method of teaching 1628
Account for the hostility which brought about his death 1628
Summarize Plato's doctrine of the state. . . 1628
Into what four branches did Plato divide higher education? 1628
Account for Plato's popularity with the medieval religious leaders 1628
Outline the ways in which Aristotle influenced medieval and modern education in Europe 1628–1629
Compare Aristotle's contribution to educational thought with that of Plato 1629
Show the importance of Quintilian's influence in education 1629
Cite some methods of literary training advocated by Quintilian 1629
State the specific effects of the teaching of Alcuin; of Anselm; of Peter Abelard . . . 1629
Indicate Abelard's relation to the University of Paris 1629
Describe the method of teaching employed by Saint Thomas Aquinas 1629
Indicate the position of Aquinas among the teachers of the Roman Catholic Church. . 1629
Upon what subjects did Erasmus write? . . 1629
What type of schools did Martin Luther advocate? 1629
Discuss the object and the educational practice of the Order of Jesus established by Loyola 1629–1630
Point out the extent of the influence exercised by Johannes Sturm 1630
Estimate the value of Roger Ascham's book, *The School Master* 1630
Describe Ascham's method of teaching Latin. 1630
In what way did Francis Bacon influence modern education? 1630
How is the influence of Comenius on modern education best stated? 1630
Name two important books by John Locke. Indicate his position in respect to classical education 1630
In what book did Rousseau develop his political theory? Outline his plan of education for the individual. Indicate the influence of *Emile* in Europe 1630–1631
Outline the principal work of Johann Basedow. Describe some of the methods of teaching employed in his school 1631
Estimate the rank of Pestalozzi among educational reformers. Summarize the story and the teaching of *Leonard and Gertrude* .1631–1632
What school in America became especially famous for its dissemination of the doctrines of Pestalozzi? Who was the principal of the school? 1632
Outline the chief psychological teachings of Herbart 1632
What men led in the introduction of Herbartianism in America? 1632
Compare the educational interests of Froebel with those of Pestalozzi. Summarize Froebel's leading educational principles . .1632–1633
State the character of Thomas Arnold's influence upon English education 1633
Summarize the contributions of Horace Mann and Henry Barnard to American education. 1633
Outline the contents of Herbert Spencer's four famous essays on education 1633
Estimate the comparative influence of Matthew Arnold upon English schools . . 1633
Outline the valuable contributions of W. T. Harris to American educational thought. 1633–1634
Describe the special educational work carried out by Alfred Binet 1634
What is the title of G. S. Hall's most influential work? 1634
Summarize Charles W. Eliot's notable reforms at Harvard university 1634
Give the title of John Dewey's most important educational book 1634

RECENT EXPANSION IN AMERICAN EDUCATION

State the increase in the average schooling of Americans from 1800 to 1920. What causes have stimulated this increase? 1635–1636
Show that, after 1880, reading became a much more common fact than ever before in America. Compare the number of periodicals published in the United States in 1910 with the number in the world and in Great Britain 1636
Prove, from postal statistics, that writing ability has been greatly extended since 1840. 1636
What was the percentage of illiteracy in the United States in 1880? 1636
Indicate the expectations of modern society with respect to reading ability 1636
Outline Horace Mann's criticism of the teaching of reading in Massachusetts schools in 1838 1636–1637
Contrast the demands of the present day upon a person's reading ability with those of 1840 1637
State the total expenditures for public schools in the United States in 1870; in 1920. State the expenditures for colleges and universities for the same years 1637
Explain the great increase in the public support of these institutions in recent years. . 1637
Compare the school buildings of 1870 with those of 1915 as to number, average value, and average days of attendance per building 1637
Point out accompanying changes in the methods of conducting schools 1637–1640
Indicate some industrial changes which have occasioned the rapid growth of high schools. Show how changes in civic relations have called for more general high school education 1640
Compare the increase in expenditures for colleges between 1910 and 1920 with the increases for elementary schools and for high schools 1642

Discuss higher education and democracy in America 1642
Outline some notable features of the reorganization of elementary education 1642

SCIENCE OF EDUCATION

To whose teaching is the scientific study of education to be traced? 1643
Outline the general method and the results of the child study movement. Discuss the weakness and the value of the culture epochs theory 1643
State the services of the Herbart Society to American education 1643
Show how other forces in the '90's were preparing the way for scientific study of education 1643
Describe the tests conducted by J. M. Rice. What effects followed the publication of his conclusions? 1643–1644
Summarize the reports of Superintendent Maxwell of New York City 1644
Show how the launching of the modern scientific movement followed the work of Rice and Maxwell. What impetus to this movement came from biology and anthropology? 1644
Explain the meaning of the phrase "normal distribution" in a group 1644
Point out the meaning of "retardation" and its effect on the average age of pupils completing the eighth grade 1644
Discuss the significance of acceleration and elimination 1644–1645
What two investigators have led in studies of retardation and elimination of pupils? What is an age-grade table? 1645
Describe the use of the handwriting scale devised by Thorndike 1645
State the meaning of the term standardization as used in respect to school work 1645
How is the ability of a child measured by the Courtis arithmetic tests? 1645
Indicate some practical results of the use of the Courtis tests 1645
State two striking results of the Ayres studies of spelling and use of words 1646
Describe the method of giving to pupils the silent reading tests. Outline the results usually found 1648
Summarize the most productive uses to which the tests have been put 1648
Point out some improvements arising from the use of educational measurements 1649
Summarize the early work of Ebbinghaus and Cattell upon general intelligence tests. Recount the methods used by Binet in developing his scale. How is the intelligence quotient, or I. Q., determined? 1650
Outline the method of giving to children the Stanford revision of the Binet tests for the third year 1650–1651
For what purposes were the United States army tests devised? 1651
Discuss the interpretation of the so-called Alpha test. Point out some of the advantages arising from the application of intelligence tests 1655
Give an illustration of laboratory studies of the physical development of small children. 1656
What important conclusions with respect to reading have followed laboratory studies of reaction and of eye movements? 1656
Indicate the bearing of these conclusions upon the use of the A-B-C method of teaching reading 1656
Discuss the methods and the results of the New York school survey 1656
To what matters did the Portland survey give particular attention? 1656
Why was the Springfield survey superior to the preceding surveys? 1656–1657
Indicate the outstanding values of the Cleveland survey 1657
What agencies are now active in conducting educational surveys? 1657
Outline some reasons for new studies of the school curriculum. Describe the methods used in these studies. What is meant by job analysis? Outline the methods employed in job analysis 1657

SCHOOLS IN FOREIGN COUNTRIES

Outline the general composition of the German school system. Describe the organization and the purpose of the *Volksschule* 1658
What is the *Mittelschule*? 1658
Discuss the organization and the curriculum of the *Gymnasium*. Compare its method and the scope of its instruction with those of the American high school 1658
Characterize the operation and the student life of the German university 1658
Summarize the provisions made in Germany for the training of teachers. What influence from German practice accounts for the separate character of American normal schools? 1658–1659
Indicate the extent of education for women in Germany 1659
How are German schools financed? 1659
What is the function of the *école primaire* in France? 1659–1660
Outline the history of the secularization of French schools. Compare the *école primaire* with the German *Volksschule* 1659–1660
What are the higher educational institutions of France? 1660
Discuss the system of instruction in the French colleges 1660
Discuss the training of French teachers . . . 1660
Summarize the costs of French primary education. State the public expenditures for the secondary institutions 1660
From what sources do the French universities draw their financial support? 1660–1661
Discuss the English examination system. . . 1661
What name did Matthew Arnold give to this system? 1661
Characterize the recently developed municipal schools and universities 1661
Describe the organization of the universities of Oxford and Cambridge 1661
Outline the provisions for the higher education of girls in England 1662
Summarize the costs of elementary education in England. From what sources do the colleges and universities draw financial support? 1662
Contrast the English school system with the German 1662
Characterize in general the school systems of the British dominions 1663
Compare the American system with foreign systems in respect to the extent of higher education 1663

EDUCATION IN THE UNITED STATES

Indicate the difficulty in describing the school system of the United States 1665
In what way does Federal authority affect education in America? By what governmental units were American schools originally controlled? 1665
Discuss the authority of the state in education. 1665
Illustrate the growth of state control of education in certification of teachers; in compulsory attendance laws 1665
Summarize the prevalent plans of organization in state departments of education 1665
In what ways does the state directly contribute to the financial support of schools? . . . 1665
What is meant by the term "unit system" applied to American schools? 1667

Outline the growth of the elementary school curriculum 1667
Over how many years does the elementary school course extend? 1667
Discuss the prevalent forms and duration of elementary schools 1667–1668
How are elementary schools controlled?. . . 1668
Outline the usual powers of the board of education 1668
Point out the functions of the superintendent of schools. Discuss the organization of the board of education 1668
What is the approved relation of the business manager to the board of education and the superintendent? 1668–1669
What is the fundamental motive prompting the organization of the junior high school?. 1669
State the original purpose of the elementary school 1669
Point out the considerations that have brought about reorganization of the upper grades of the elementary school 1669
Indicate some of the forms that this reorganization has taken 1669
Enumerate the elective subjects offered in junior high schools 1669
Characterize the typical high school as to length of course and purpose. 1669
Discuss the consolidation of schools, as illustrated by the Wool Market school . .1670–1671
State the advantages which are said to have resulted from this plan of consolidation in the Wool Market district 1671
To what is the so-called break between the elementary and the high school said to be due? 1672
Describe several types of city high schools. Explain the high school unit 1672
Discuss methods of college admission . .1672–1673
State one of the chief problems of educational guidance 1673
Discuss extracurricular activities 1673
Define the term college. Point out the recent changes in college organization and curriculum 1673–1674
How is the typical university distinguished from the college? 1674
Summarize the usual requirements for the advanced university degrees 1674
What three types of universities and colleges are recognized? Describe the organization of the privately endowed college. How are state universities financed? 1674–1675
Name several cities which have municipal universities 1675
Outline the recent changes in the length of the college year 1675
How does the summer session differ, in most institutions, from the other terms or quarters of the year? 1675
What is a junior college? 1675
Characterize the public junior colleges as to development and scope. With what institutions are junior colleges on state foundations maintained? Account for the rapid increase in the number of private junior colleges. 1675–1676
Summarize the history of the junior college movement 1676
What well-known educational leaders have supported and encouraged the movement?. 1676
Outline the functions of the junior college. Indicate the present equipment of these institutions for their work 1676
Show the bearing of the junior college upon general reorganization of our educational system 1676–1677
Discuss the relation of the junior college to the public school 1677
Where and when did the university extension movement begin? Outline its early growth in America 1677
Indicate the variety of extension service in communities 1677
How may specific information about opportunities offered in extension work be obtained? 1677–1678
Narrate the history of the rise of professional schools. Indicate the standardizing work of the American Medical Council 1678
Discuss the problem of economy in professional training 1678
Summarize the development of technical schools 1678
Point out a fundamental cause of inequality of educational opportunity in America . . . 1678
Criticize the incurring of bonded indebtedness for school improvements 1678–1679
Discuss the problems raised by the increasing costs of schools. 1679
Why is public education more costly in America than in other countries? 1679
Show how the Federal government becomes involved in educational problems 1680
How did Manasseh Cutler compel the Congress of 1787 to set apart school lands in the Northwest Territory? 1680–1681
Outline the history of Federal and colonial land grants for school purposes. Summarize the history of the policy of Federal land grants for colleges 1680–1681
What Federal subsidies for special education have recently been granted? 1681
State the total value of national grants for education 1682
Describe the work of the bureau of education. 1682
Define vocational education 1682
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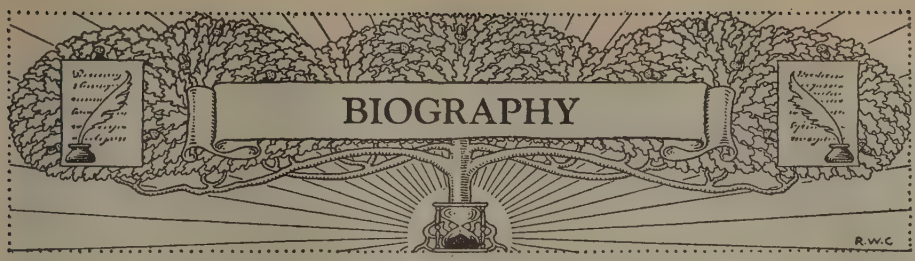


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INTRODUCTORY

THE word biography is derived from the Greek words *bios*, meaning "life," and *grapho*, meaning "write." The term means a written account of one person's life. When the person whose life is described is also the author of the description, the work is designated by the word autobiography, which is formed by a prefix derived from the Greek *autos*, "oneself."

Biography differs from history in having its interest restricted to one person. History is concerned with movements, institutions, and social or national events in which the part of any one man is often extremely small. A biographical narrative, on the other hand, has its center of interest in the individual and in his pathway through the midst of larger events. It takes cognizance of his personal qualities, of his intimate words and thoughts, of his disappointments as well as of his achievements. Thus, from the point of view of history, the Civil War and the emancipation of the slaves are of more interest than the personal fortunes of any one man, even of Lincoln. In a biography of Lincoln, however, these great events are merely the setting, or background, of a narrative of his life.

It is the part of the more extended biographies to record all that is known regarding a person, and even the most trivial details are of value provided that they bring into relief his essential qualities. Biographical narratives of smaller compass, however, which are adapted more especially to meet the needs of the general reader, must, in order to be helpful, seize upon the central features of the larger narratives and must indicate the rôle which the subject of the narrative has played, or is now playing, in the drama of the world's activities.

Value. Although biography differs from history, nevertheless it is one of the most valuable aids to that study. To read history only is to see but one aspect of the drama of human life; the more intimate and, in many respects, the more interesting aspect can be seen only by acquaintance with the individual actors. It is through biography that an intimate knowledge of their lives may be obtained, and this knowledge in turn infuses a new and more personal interest into history.

To no less a degree, biography is essential to a complete understanding of literature and of art. Although great masterpieces have a universal appeal, nevertheless they are cast in a mold determined by the circumstances and experiences of the writer or artist. The pictures of women painted by Rembrandt, for example, would have been much different had he loved a different woman. The poetry of Whittier cannot be fully appreciated without a knowledge of his lifelong devotion to the abolitionist cause. Prescott's masterly *History of Peru* is invested with a certain tragic interest when we realize that it was written after the author had become blind.

It is hard to exaggerate the part played in people's lives by the example of the great. Alexander is said to have been inspired throughout his career by the recollection of the Homeric Achilles; every ambitious young scientist hopes some day to be a second Newton; and before each schoolboy in every country are held up, for his emulation, those eminent men who are felt to be typical of the best qualities of the nation. Often a hint obtained from a biography opens a young reader's mind to previously undreamed possibilities and leads into wide usefulness a life that might otherwise have been common and uninspired.

Early Biographies. Biography is, in a sense, one of the most ancient forms of literature. In its earlier forms, it was often written to minister to the pride of the great. The Homeric poems and other early epics are chiefly accounts of heroes. Kings and warriors frequently hired poets or chroniclers to record the deeds of their lives. A Greek writer was paid by the Roman statesman and orator Cicero to write down the acts of the latter's administration, and Cicero requested him not to be sparing in the use of high colors.

Another class of biography that leaves much to be desired in the matter of veracity is that undertaken for the purpose of teaching moral lessons. Lives of famous or notorious characters are described in order to excite emulation or to arouse repulsion. The famous *Parallel Lives* of Plutarch are in part open to this criticism. The *Lives of the Emperors* by Suetonius represents the Roman rulers in a character much blacker, in all probability, than that in which they would appear to a disinterested inquirer. The numerous lives of the saints also were plainly written as much for the edification of the reader as for his enlightenment.

Modern Biography. With a few exceptions, such as Xenophon's *Memoirs* of Socrates, there was until modern times, no work of genuinely biographical interest. Beginning with the 17th century, however, a vast literature has arisen consisting of books each of which aims to give a faithful account of the experiences and activities of one person from the cradle to the grave. Such works naturally differ greatly in value according to the abilities of the biographer. Among those of outstanding merit is Boswell's *Life of Johnson*, which, perhaps in all literature, has never been excelled in courage, picturesqueness, and mastery of portraiture.

In addition to individual biographies, a number of monumental dictionaries of biography have been written in recent times. The earliest of these was a Swedish work of 23 volumes completed in 1857 and embracing the lives of notable people of Sweden. The *Dictionary of National Biography* in 67 volumes contains biographies of more than 30,000 outstanding figures in Great Britain. The chief work of this type in America is Appletons' 8-volume *Cyclopædia of American Biography*.

Scope. This Department of Biography contains about 3700 sketches of noteworthy men and women who have lived in the course of 4000 years of recorded history. The earliest lives narrated are those of the Babylonian Hammurabi and Tutankhamen, king of Egypt, and the biographies of people still living are brought up to the date of printing.

The list of biographies will be found to contain the greatest figures in history, literature, art, science, invention, religion, commerce, discovery, and the other chief fields of human activity. A very large number also are treated who cannot be ranked among the greatest but who are remembered for some specific reason. These include Epicurus, the founder of Epicureanism; Vasco da Gama, who, in modern times, first sailed around the southern extremity of Africa; and Sholes, the inventor of the typewriter.

Among people still living or who have recently died, the leaders in every field of activity have been included. Thus biographies will be found of those who have been elected to the American hall of fame and to the American academy of arts and letters; of the winners of Nobel prizes in all parts of the world; of the rulers and the chief statesmen, scientists, scholars, writers, artists, engineers, administrators, philanthropists, and religious leaders in all the principal countries.

Biblical characters have been purposely omitted, with the exception of Moses and Saint Paul. Moses was retained in order to complete the ranks of the great lawgivers, such as Lycurgus, Solon, Justinian, and Alfred. It appeared desirable, also, that a biography of Saint Paul should be included, who, as the chief founder of ecclesiastical Christianity, is ranked in the history of religion with Confucius, Mohammed, and other great leaders in that field.

Method of Treatment. The biographies in this department recount the salient facts in the life of each person, including their nativity, education, chief positions held, accomplishments, and, for those not living, the date of their death. These sketches, however, are not gazetteer items, containing a mere catalogue of events. While written with a rare degree of conciseness, they approach more nearly the fullness of an encyclopedia article than the skeleton-like brevity of a biographical dictionary.

Wherever possible, the significance of each person's work has been briefly indicated. The relation of statesmen to the events of their time has been made clear; the nature and value of a scientist's contribution to knowledge have been estimated in accordance with the best authorities in the field; a concise outline has been given of philosophies or religions originated by leaders in these fields; and artists' works have been appraised as far as the world has arrived at a settled opinion regarding their value. In making all such statements, the utmost care has been taken to avoid partisanship of all kinds. Neither fulsome praise nor malice has any place in a work of this character.

In the case of authors, a representative list of their writings is set forth. The chief masterpieces of painters, sculptors, and architects are listed, as well as the location of many of their works. The style and other qualities of composers are briefly characterized according to the judgment of eminent critics of music. In a word, this department has gone far toward being a complete guide to the vast field of human achievement.

Suggestive Groups. Throughout this department, the biographies are arranged alphabetically with a view to the readiest reference. At the end of the section, a second grouping of the names will be found, which is based on the field of achievement to which the different personages belong.

The first advantage of this suggestive grouping is that the reader is thereby enabled to see at a glance who are the coworkers, associates, or opponents of any one man in whom he may be interested. Moreover, since, within each group, the names are arranged chronologically, the development in any one field may be readily followed by consulting in order the biographies of the different people in this group.

It is, of course, impossible that each group should contain all the biographies that a specialist might look for in studying the development of his own field. Nevertheless, the *representative character* of the selection is such that, for biographies of people in fields outside the specialist's own department, these groups will be found no less valuable for the specialist than for the general reader.

Up-to-dateness. Many of the large encyclopedias do not contain information regarding events subsequent to the World War. Yet it is precisely the men and women who have recently come into prominence regarding whom people interested in present events need to be informed. Many life histories in this department have been secured only by special efforts made to obtain the facts from the persons themselves. In other words, the biographies of these people were not, at the date of printing, available in any other biographical reference work.

Illustrations. No small part of a reader's impression of a notable personage is a knowledge of his appearance. For this reason, photography may be a valuable aid to biography and, in this department, it has been laid under contribution to an unusual degree. Throughout this volume will be found a large number of portraits of men and women whose lives are described in the text. This number exceeds that found in the largest encyclopedias.

In addition to the portraits, there are numerous other illustrations which add to the effectiveness of biography. These include such pictures as the homes of noted Americans and reproductions of masterpieces in painting, sculpture, or architecture.

Cross References. In order to preserve the necessary conciseness and at the same time to enable the reader to learn as much as possible about the achievements of each person described, cross references have been inserted directing attention to other passages of this volume in which will be found a more complete account of some aspect of the person's work. Thus under Einstein there is a cross reference to the *Theory of Relativity*, which is appropriately treated more fully under Physics than in the Department of Biography. Similarly, under inventors, cross references are frequently given to articles in the section entitled Inventions; under authors, cross references direct the reader to articles on books or characters treated separately in the section on Literary Plots, Characters, and Allusions or in other parts of the Department of Literature; under artists, musicians, or educators, appropriate references are appended referring to instructive articles in the departments devoted to fine arts, education, or other subjects.

The enormous amount of material in this work would permit of an extraordinarily large number of cross references of this sort. To insert all those possible, however, would be distracting to many readers. Consequently, only those have been appended which appear to be the most imperative. They will serve as examples, showing how the careful user may obtain the maximum value from this department.

Spelling of Names. Personal names that come from certain foreign languages are often spelled in many different ways in English. This is especially true of Russian and Chinese names. To them might be applied the words of H. G. Wells, who, in speaking of Egyptian names, said that few self-respecting scholars in this field would tolerate the spelling of their colleagues. The form of such names used in this department is based in each case on the preference of one or more outstanding scholars.

The spelling of geographical names, as stated in the introduction to Geography, follows, in general, the decisions of the United States geographic board. To this fact is due, among other variations from certain familiar spellings, the suppression of all accents, umlauts, and other diacritical marks.

Test Questions. One of the distinguishing marks of an educated person is the range of notable people, in past ages or in the present, with whom he is acquainted. For extending and testing one's acquaintance with the great a stimulating means will be found in reading the test questions at the end of this department and consulting the text wherever the questions call for information not already familiar to the reader.

Bibliography. In order to meet the needs of those who desire to read more extensively regarding the lives of eminent personages, a bibliographical list has been added at the end of the department. This list contains the names of the finest biographical works in the English language as well as the names of the chief biographical reference works.

Abbey, Edwin Austin, artist, was born in Philadelphia, Pa., in 1852 and began his art studies at the academy of fine arts in his native city. He attained foremost rank among modern painters of historical and subject pictures. His works are remarkable for correctness of detail. He acquired great fame as an illustrator of Shakspere, whose plays also supplied him with the subjects for some of his most successful pictures. After 1881, he resided in Great Britain. His principal works include "Richard III and Lady Anne," "King Lear's Daughters," "Hamlet," "Crusaders Sighting Jerusalem," "Fiammetta's Song," the decorative panels illustrating the "Quest of the Holy Grail," in the Boston public library, "Coronation of King Edward VII," and "Columbus in the New World." He was a member of the American academy of arts and letters. Died in 1911. See *Painting.*

Abbott, Lyman, American clergyman, author, and editor, was born in Roxbury, Mass., in 1835; was graduated at the University of New York in 1853; studied and practiced law; was ordained Congregational minister in 1860; resigned his pastorate in 1869 to devote himself to literature. He edited the "Literary Record" in *Harper's Magazine*; was associate editor of *The Christian Union* with Henry Ward Beecher, whom he succeeded as pastor of Plymouth church, Brooklyn, in 1888; resigned in 1899; became editor of *The Outlook* in 1893. Among his principal publications are *Old Testament Shadows of New Testament Truth, How to Study the Bible, A Study in Human Nature, Evolution of Christianity, The Theology of an Evolutionist, Christianity and Social Problems, Life and Literature of the Ancient Hebrews, Personality of God, Industrial Problems,* and *Twentieth Century Crusade.* Died, 1922.

Abel (*ā'bĕl*), **Niels Henrik,** Norwegian mathematician, was born at Findo, Norway, in 1802. He completed a course at the University of Christiania and spent two years in further study in Paris and Berlin. In 1828, he was made instructor at the university and the military school in Christiania. He made important contributions to mathematical science, particularly by his work on the theory of functions, of which he was the originator. He died near Arendal in 1829. See *Mathematics, Modern.*

Abelard (*ăb'ē-lärd*), **Peter,** scholastic philosopher and theologian, was born at Pallet, near Nantes, France, in 1079. The doctrines advanced by Abelard in his controversy with Saint Bernard have a decidedly rationalistic tendency; he and his predecessor, Erigena, may be looked upon as the first avowed representatives of that school. Abelard laid down the principle that nothing is to be believed but what has been first understood, while the more orthodox writers held that we must believe in order to understand.

When Abelard was 38 years of age, he fell in love with his pupil Héloïse, whose uncle later brought about a separation of the lovers. The story of this romantic attachment, preserved by extant letters, is unique among all historic love affairs. Abelard died in 1142.

Abercromby, Sir Ralph, British general,was born in Scotland in 1734. He served with much ability in Holland and in the West Indies, and, in 1800, he was chosen to command the forces to be sent against the French in Egypt. On March 8, 1801, he landed his army at Abukir bay, near Alexandria, though strongly opposed by the French, and, on the 21st, fought the battle of Alexandria, in which he was victorious. He was struck by a musket ball in the thigh early in the action, but remained on the field giving his orders until the battle was over. He was then carried off in a hammock, cheered by the soldiers as he passed, and taken on board a ship in the bay, where he died, 1801.

Abernethy (*ăb'ĕr-nĕ-thĭ*), **John,** British surgeon, was born in London in 1764. In 1787, he was elected assistant surgeon to Saint Bartholomew's, London, an office which he filled for 28 years, at the end of which time he was appointed surgeon. He was famous as an investigator and a lecturer and has left many valuable works. One popular book is *Surgical Observations*, which became known among his patients as "My Book" from his frequent reference to it. He was brusque to the degree of rudeness but his wit and shrewdness made him popular. A rich, gouty patient once asked him for a remedy. "Live on sixpence a day and earn it," he answered. Died in 1831.

About (*ă'bōō'*), **Edmond François Valentin,** French novelist and miscellaneous writer, was born in 1828. He was educated at the Lycée Charlemagne and the École Normale, Paris; was sent at government expense to the French school at Athens; on his return to Paris, devoted himself to literature. His principal novels include *Le roi des montagnes, Le Fellah, L'Infame, Les mariages de Paris, Le roman d'un brave homme.* Among his miscellaneous works are *La Grèce contemporaine, La question Romaine,* and *Rome contemporaine.* He was elected a member of the French academy in 1884. Died, 1885.

Abruzzi (*ä-brōōt'sē*), **Luigi Amadeo, Duke of the,** Italian prince, scientist, explorer, naval officer, and litterateur, was born at Madrid, Spain, in 1873; traveled around the world as a youth; ascended Mount Saint Elias, Alaska, 1897; and led an arctic expedition in 1899, which penetrated nearest to the north pole up to that time. In 1906, he ascended the topmost height in the Ruwenzori range, East Africa, and, in 1909, ascended some of the highest peaks of the Himalayas. His writings include *On the Polar Star in the Arctic Sea, The Ascent of Mt. St. Elias,* and *Ruwenzori.* In the World War, he was commander of the Italian fleet until 1917. After the war, he undertook a colonization scheme in Italian Somaliland. See *Polar Exploration.*

Acheson, Edward Goodrich, American inventor, was born at Washington, Pa., 1856. After two years at Bellefonte academy, he began work in an iron furnace and, at 18, joined a civil engineering corps. Becoming interested in electricity, he went to New York and secured a position in Edison's laboratories, where he constructed valuable instruments in electric lighting work. In 1884, he invented an anti-inductive telephone wire. In 1891, he made his important discovery of carborundum and, in 1895, built a plant at Niagara Falls, where carborundum production has developed in excess of 50 million pounds yearly. In connection with this he invented a process for extracting the metal silicon from sand. In 1896, he obtained a patent for a method of making a pure graphite known as "dag" and used extensively as a lubricant. In 1907, the American academy awarded him the Rumford medal, and, later, he was honored with the Perkin gold medal. See *Carborundum, Graphite, Silicon.*

Acton (*ăk'tŭn*), **Sir John Emerich Edward Dalberg, First Baron,** English historian, was born at Naples, Italy, 1834. In 1895, he was made professor of modern history at Cambridge university, and as a liberal Catholic exerted profound influence. He wrote *The War of 1870, Wolsey and the Divorce of Henry VIII,* and *Schools of History in Germany.* He also planned the *Cambridge Modern History,* written by eminent historical scholars after his death. Died, 1902.

Adams, Charles Francis, statesman and economist, son of John Quincy Adams, was born in 1807; was nominated by the Free-Soil party for the office of vice president in 1848; was elected member of Congress, 1858 and 1860, by the Republicans; was minister to England, 1861–68; and was appointed one of the arbitrators of the Alabama claims, 1871-72. His position in England during the Civil War was a most difficult one, but the duties were performed with tact and discretion. He was Democratic candidate for governor of Massachusetts in 1876. He died in 1886.

Adams, Charles Francis, Jr., historical writer, son of Charles Francis Adams, was born in Boston, 1835; graduated at Harvard, 1856; was admitted to the bar, 1858. He served in the Union army through the Civil War. He later became identified with railway interests; was appointed member of the board of railway commissioners of Massachusetts, 1869; and was president of the Union Pacific railway, 1884–90. As an active publicist his extensive writings show marked clearness of style and independence of thought. Among his works are: *Railroads, their Origin and Problems*; *Notes on Railway Accidents*; *Massachusetts, Its Historians and Its History*; *Richard Henry Dana, a Biography*; *Lee at Appomattox*; *The Monroe Doctrine and Mommsen's Law.* He was a member of the American academy of arts and letters. Died in 1915.

Adams, Charles Kendall, American educator and historian, was born at Derby, Vt., in 1835 and was educated at the University of Michigan. He also studied in Germany, France, and Italy. From 1867 to 1885, he was professor of history in the University of Michigan; from the latter year until 1892, was president of Cornell university; from 1892 to 1901, was president of the University of Wisconsin. His writings include *Democracy and Monarchy in France, Manual of Historical Literature,* and a monograph entitled *Christopher Columbus, His Life and Work.* From 1892 to 1895, he acted as editor in chief of *Johnson's Universal Cyclopædia.* Died in 1902.

Adams, Franklin Pierce, American editor, was born at Napa, Cal., 1868. He received his education at Stockton (Cal.) high school and in a private electrical laboratory in Indianapolis. He was engaged as an engineer in electrical construction from 1890 to 1900. He then traveled extensively, studying conditions in Mexico and other portions of Latin America from 1900 to 1912. During 1912-13, he continued similar studies in Spain and Portugal and, during 1913-14, studied the Philippine Islands. During 1908–19, he was editor of the *Bulletin of the Pan-American Union* and, in 1920, was appointed first counselor of the Pan-American Union.

Adams, George Burton, American educator and historian, was born at Fairfield, Vt., in 1851. He was educated at Beloit college, Yale university, and at the University of Leipzig. He became professor of history at Drury college in 1877 and at Yale in 1888. He edited Duruy's *Middle Ages*, Bémont and Monod's *Medieval Europe*, and the *American Historical Review*, 1895–1913. The chief works from his pen include *Civilization During the Middle Ages, The Growth of the French Nation*, and *The British Empire*. Died, 1925.

Adams, Henry, American historian, son of Charles Francis Adams, was born in Boston, 1838; was graduated at Harvard, 1858; and became private secretary to his father, who was American minister at London, 1861–68. He was assistant professor of history at Harvard, 1870–77, and editor of the *North American Review*, 1870–76. He then located in Washington, where he made a detailed study of the administrations of Jefferson and Madison, which he embodied in a valuable work of original research entitled *History of the United States from 1801 to 1817*. His other writings include *Essays in Anglo-Saxon Law, Documents Relating to New England Federalism*, and *The Education of Henry Adams*. He was a member of the American academy of arts and letters. Died, 1918.

Adams, Henry Carter, American economist, was born in Davenport, Iowa, 1851; was graduated at Iowa college (now Grinnell), 1874, and at Johns Hopkins, 1878. He studied at Heidelberg, Berlin, and Paris, 1878–79; was lecturer in Cornell university and the University of Michigan, 1880–87; also in Johns Hopkins university, 1880–82. In 1887, he was elected to the chair of political economy, University of Michigan, which he filled with distinction for thirty years. He was statistician of the interstate commerce commission, 1887–1911. In 1913–16, he was appointed adviser to a commission on Chinese railways and, when in China, assisted in organizing the ministry of communication, statistics, and accounts. His publications include *Taxation in the United States, Public Debts, Relation of the States to Industrial Action*, and *American Railway Accounting*. Died, 1921.

Adams, Herbert, American sculptor, was born at West Concord, Vt., 1856. He was educated at the institute of technology, Worcester, in the normal art school of Boston, and in Paris, where he was a pupil of Mercié. He then became instructor in art at Pratt institute, Brooklyn; was made a member of the national academy of design, 1899, and vice president in 1906; was later elected to the American academy of arts and letters. While modern and original in style, his fresh and refined realism resembles that of early Renaissance sculptors. He became distinguished for his beautiful busts of women, numerous statues, and for bronze doors at Saint Bartholomew's church, New York, and at the Congressional library, Washington.

Adams, John, second president of the United States, was born at Quincy, (formerly Braintree), Mass., in 1735; was graduated at Harvard in 1755; and was admitted to the bar in 1758. He was one of the delegates to the Continental Congress at Philadelphia, 1774; was one of the signers of the Declaration of Independence; and throughout supported the Revolution, in which, as chairman of the board of war, he took an active part. He was commissioner to the court of France, 1778, and was sent on an embassy to England, 1779. He was elected vice president of the United States in 1789; succeeded Washington as president in 1797; but, in 1801, failed to gain re-election and retired from public affairs. He died, July 4, 1826, on the 50th anniversary of the birth of the nation which he devoted his best energies to establish. Elected to American hall of fame, 1900. See *American History: Presidency of John Adams*.

Adams, John Couch, English astronomer, was born at Laneast, Cornwall, in 1819. He was graduated at Saint John's college, Cambridge, in 1843. After graduation he was made mathematical tutor at Cambridge; was appointed professor of astronomy in 1858; and, in 1860, succeeded Challis as director of the Cambridge observatory. With Leverrier of France, Adams shares the honor of discovering the planet Neptune. Working independently, each without knowledge that the other had attacked the problem, they each computed, in 1843–46, from observed irregularities in the motions of Uranus, the mass, orbit, and location of a supposed new planet. This new member of the solar system, later named Neptune, was first recognized by Galle of Berlin from Leverrier's calculations, though it had actually been seen but not recognized a few weeks earlier by Challis from Adams's calculations, Challis's failure being due to an imperfect star map. Adams made also important researches on the motions of the moon and on the November meteors. He died in 1892. See *Neptune*.

Adams, John Quincy, sixth president of the United States and son of the second president, was born in Quincy (formerly Braintree), Mass., in 1767. In his boyhood, he accompanied his father on an embassy to Europe, and he passed a considerable part of his youth in Paris, at The Hague, and, lastly, in London. When his father was elected president, the younger Adams was sent on an embassy to Berlin and traveled through Silesia. On his return to America, he was engaged as professor of rhetoric at Harvard university and was later chosen United States senator for Massachusetts. By President Madison he was sent as plenipotentiary to Russia and afterward to England. On this embassy, he took part in the negotiation of peace with England and assisted with his counsel the deputies sent from America to Ghent.

When Monroe was elected president, he recalled Adams from Europe and made him secretary of state. On the retirement of Monroe from office, Adams gained the presidency after a hard contest against Jackson in 1825. On the expiration of his term of office, he retired to Quincy, near Boston, but, in 1830, was chosen as representative of his district. He now joined the party of the Abolitionists, and frequently raised the whole House of Representatives against himself by his incessant petitions on the slavery question. On one occasion, in 1842, in order to assert strongly in the abstract the right to petition, he went so far as to present a petition for the dissolution of the Union. He died at Washington, 1848, and was elected to the American hall of fame in 1905.

Adams, Maude, American actress, was born at Salt Lake City in 1872; her family name was Kiskadden, but she adopted her mother's maiden name, Adams. She appeared on the stage in child's parts; joined E. H. Sothern's company, New York, at 16; played an ingénue rôle in the *Midnight Bell*; afterward joined Charles Frohman's stock company. She later was leading lady with John Drew for five years; achieved notable distinction and popularity as Lady Babbie in *The Little Minister*; as Juliet in *Romeo and Juliet*; also in *Peter Pan, What Every Woman Knows, Joan of Arc, The Ladies' Shakespeare, Chantecler, The Legend of Leonora*, and many other plays.

Adams, Samuel, one of the American Revolutionary leaders, was born in Boston, Mass., 1722. He displayed on all occasions an unflinching zeal for popular rights and was placed in the legislature by the patriotic party in 1766. Adams was a member of the First Continental Congress, and signed the Declaration of Independence in 1776; took an active part in framing the constitution of Massachusetts; and was for several years president of the senate of that state. He held the office of lieutenant governor, 1789–94, and of governor, 1794–97. Died, 1803.

Adams, William T. See "*Optic, Oliver*."

Addams, Jane, social reformer and head resident of Hull House, Chicago, was born at Cedarville, Ill., in 1860; was graduated at Rockford college, 1881; spent two years in Europe, 1883–85; studied in Philadelphia, 1888; and, in 1889, with Miss Ellen Gates Starr, opened the social settlement of Hull House. By her practical methods, notable executive gifts, and admirable humanitarian spirit, she became one of the foremost leaders of social settlement work in America. In 1919, she was elected president of the international congress of women at Washington and attended the peace conventions at Zurich in 1919 and at Vienna in 1921. Her publications include *A New Conscience and an Ancient Evil, The Spirit of Youth and the City Streets*, and *The Long Road of Women's Memory*.

Addison, Joseph, English essayist, was born at Milston, England, in 1672; was graduated at Oxford; and held for some years a fellowship at the university. Here some of his early writings brought him into notice and secured him a pension of $1500 a year. He traveled on the continent, observing, studying, and writing. In the winter of 1701, amid the stoppages and discomforts of a journey across Mont Cenis, he composed his *Letter from Italy*, which contains many fine touches of description and is by far the best of his poems. His poem *The Campaign*, written in celebration of the battle of Blenheim, 1704, won him, as a reward, the office of excise commissioner. He held other public offices, which kept him from writing much for the next six years. In 1710, he began writing a series of essays, upon which his fame chiefly rests. These he contributed to the *Tatler*, next to the *Spectator*, and afterward to the *Guardian*, which he published in conjunction with his friend, Richard Steele. Of these periodicals, the *Spectator* ran only a few months, but, mainly on account of Addison's essays, it still lives in the history of English literature. Died, 1719. See *English Literature: Eighteenth Century*.

Ade (*ād*), **George,** American humorist and playwright, was born at Kentland, Ind., 1866; was graduated at Purdue university, 1887; was engaged in newspaper work in Lafayette, Ind., 1887–90; and was with the Chicago *Record*, for which he wrote his widely popular *Fables in Slang*, 1890–1900. He is the author of *Artie, The Girl Proposition, Breaking into Society*, and *In Pastures New*. His plays, which display cleverness and much satirical humor, include *The Sultan of Sulu, The College Widow, The Bad Samaritan, Father and the Boys, Just out of College, Marse Covington*, and *Nettie*.

Adler, Cyrus, American orientalist and archeologist, was born at Van Buren, Ark., 1863; was graduated at the University of Pennsylvania, 1883, and at Johns Hopkins university, 1887, where he was consecutively fellow, instructor, and associate professor of Semitic languages, 1884–93. He was librarian of the Smithsonian institution, 1892–1905, and curator of historic archeology, United States national museum, 1889–1908. He was thereafter president of Dropsie college for Hebrew and cognate learning until 1916, when, for eight years he acted as president of the Jewish Theological Seminary of America. In 1924 he was officially appointed to the presidency of the institution.

Adler, Felix, educator and lecturer, was born in Alzey, Germany, 1851; came to America in 1857; was graduated at Columbia university, 1870; studied at Berlin and Heidelberg; and was professor of Hebrew and Oriental literature at Cornell university, 1874–76. In 1876, he established the New York society for ethical culture, to which he continued to give regular Sunday discourses. He became professor of political and social ethics, Columbia university, in 1902 and, in 1908-09, was exchange professor at the University of Berlin. His publications include *Creed and Deed*, *Life and Destiny*, *An Ethical Philosophy of Life*, and *The Reconstruction of the Spiritual Ideal*.

Adrian IV (*ā′drĭ-ăn*), named Nicholas Breakspeare, the only English pope, was born about 1100. He left England a poor man, went to Paris, became an ardent student, and was soon known for his learning and zeal. He was chosen abbot, then cardinal, and lastly pope in 1154. He was vigorous in maintaining his authority at Rome and throughout Europe. He died in Italy in 1159.

Æschines (*ĕs′kĭ-nēz*), Athenian orator, who vied with Demosthenes in eloquence, was born, 389 B. C. As head of the peace party at Athens, Æschines was the chief opponent of Demosthenes, who advocated strenuous opposition to Philip of Macedon, then pursuing his designs for the subjugation of the Greek states. Events justified the sagacious fears of Demosthenes. When, however, it was proposed by Ctesiphon to reward Demosthenes with a golden crown, Æschines indicted Ctesiphon for bringing forward an illegal proposal. Demosthenes replied in perhaps the greatest of his speeches,—*On the Crown*,—and Æschines, defeated, had to leave Athens. He went into exile at Rhodes where, tradition says, he established a school of eloquence. Died at Samos, 314 B. C.

Æschylus (*ĕs′kĭ-lŭs*), Greek tragedian, was born at Eleusis in Attica, 525 B. C. His father, Euphorion, brought Æschylus as a youth under religious influences which distinctly affected the tone of his dramatic works.

In 499 B. C., Æschylus made his first appearance as competitor for the prize offered annually at Athens to the poet producing the best tragedy, but it was not until 484 B. C. that he achieved his first victory. In the course of 40 years, he competed nearly 20 times, each time with a trilogy of three related tragedies followed by a so-called satyr play, having a comic character. He won the first prize on 13 occasions.

Æschylus took part in three famous battles against the Persians—Marathon, Salamis, and Platæa. He undertook three journeys to Syracuse—in 476, 471, and 456 B. C.—visiting the court of Hiero, the tyrant of the city. His absence from Athens has been attributed to political expediency, for Æschylus belonged to the conservative, aristocratic party, which was then on the decline in the growing democracy of Athens.

Before the days of Æschylus, Greek tragedy consisted of dramas acted by a chorus, a chorus leader, and one actor. There was little plot and no scenery or other accessories Æschylus added a second actor; invented costumes, including mask, mantle, and the so-called tragic boot; had the plays produced on a regular stage; and used the services of the scene painter. He also gave to Greek tragedy its characteristic literary form. Such innovations entitled him to be called "the father of tragedy."

Æschylus was serious, bold, and often sublime in his style and originality of phrase. He stoutly upheld reverence for the gods, the sanctity of oaths, the duties of hospitality, and the inviolability of marriage. His plays have simple plots, for he does not represent the complex subtleties of human character; he rather depicts his heroes as victims of destiny, their struggles against which involve them in situations of great tragic intensity.

Only 7 of his 70 tragedies are extant. These are *The Seven against Thebes*, *The Suppliants*, *The Persians*, *Prometheus Bound*, *The Choëphori*, *The Eumenides*, and *Agamemnon*. Died, 456 B. C. See *Tragedy, Greek*.

Æsop (*ē′sŏp*), celebrated fabulist, is said to have been born at Phrygia about 620 B. C. He was as deformed in body as he was accomplished in mind. Originally a slave at Athens and at Samos, he gained freedom by his wit, traveled through Asia Minor and Egypt, and later attached himself to the court of Crœsus, king of Lydia. Sent by that monarch upon an embassy to Delphi, he so offended the inhabitants by the keenness of his sarcasms that they are said to have hurled him from a rock into the sea about the year 560 B. C.

Agassiz (*ăg′a-sē*), **Alexander,** naturalist, son of Louis Agassiz, was born in Neuchatel, Switzerland, 1835. Taken to America in 1848, he was graduated at Harvard, 1855, and at Lawrence scientific school, 1857. He took part in a coast survey of California, 1859; became assistant in zoology, Harvard, 1860–65; and, in 1865–69, was connected with a successful copper mining enterprise. In 1874, he became curator, and, in 1902, director, of the museum of comparative zoology, Cambridge. He was a member of the academy of sciences, Paris, and president of the national academy of sciences. His publications include *Explorations of Lake Titicaca*, *List of the Echinoderms*, *Pacific Coral Reefs*, and *Panamic Deep Sea Echini*. Died, 1910.

Agassiz, Louis Johann Rudolph, naturalist, was born in Switzerland in 1807, the son of a Swiss Protestant clergyman. He studied medicine and graduated at Munich, but devoted himself principally to ichthyology, and was employed to classify and arrange the collection brought from Brazil by Martius and Spix. In 1846, he came to America, where he was well received, and, in 1848, accepted the chair of zoology and geology at Harvard college. In 1865, he visited Brazil and, on his return, placed in the museum of Cambridge the large collection he had made. He wrote *Glaciers*, *Outlines of Comparative Physiology*, *An Essay on Classification*, and numerous other valuable works. He was to the last a disbeliever in the Darwinian theory of evolution. He was one of the most gifted teachers of his time, and the list of his pupils includes many distinguished names in American biological science. Died, 1873. Elected to American hall of fame, 1905.

Agesilaus (*ă-jĕs′ĭ-lā′ŭs*), king of Sparta about 401–360 B. C. and one of the most notable soldiers of antiquity, was born about 444 B. C. Called on by the Greeks of Asia Minor to assist them against Artaxerxes, he commenced a splendid campaign in Asia; but the Corinthian war recalled him to Greece. At Coronea, he defeated the forces allied against his native city, and peace was concluded in favor of Sparta. Afterward, in the Theban war, he successfully defended his city against Epaminondas. Died when on an expedition to Egypt about 360 B. C.

Agricola (*ă-grĭk′ō-lă*), **Cnæus Julius,** a Roman of the imperial times, distinguished not less by his great abilities as a statesman and a soldier than by the beauty of his private character; born at Forum Julii (now Frejus, in Provence, France), 37 A. D. Having served with distinction in Britain, Asia, and Aquitania, and gone through the round of civil offices, he was elected consul in 77 A. D., and, in the following year, proceeded as governor to Britain—the scene of his military and civil administration during the next seven years. He was the first Roman general who effectually subdued the island and the only one who displayed as much genius and success in training the inhabitants to the amenities of civilization as in breaking their rude force in war. Died, 93.

Agrippa (*ă-grĭp′ă*), **Marcus Vipsanius,** Roman statesman and soldier, was born in 63 B. C. He was the chief instrument of Octavius in establishing the Roman Empire. In 40, he took Perusia from Lucius Antonius and Sipontum from Mark Antony. In 36, he defeated Sextus Pompey at Mylæ and Naulochus and, in 31, chiefly contributed to the great victory at Actium. Agrippa was prætor in 41; consul in 37, 28, and 27, when he built the Pantheon; ædile in 33; and tribune in 18–12. Rome owed to him the restoration or construction of several aqueducts and the erection of the Pantheon, besides other public works of ornament and utility. Died, 12 B. C.

Aguinaldo (*ä′gē-näl′dō*), **Emilio,** Filipino general, was born near Cavite, Luzon, in 1869 and was educated at Saint Thomas university, Manila. During the rebellion of the Filipinos against Spain, he was the chief of the insurgents, over whom he assumed dictatorial powers. In the Spanish American war, he turned his arms against the Americans, but, in 1901, he was captured by General Frederick Funston. Aguinaldo then pledged allegiance to the United States and lent his influence to strengthening the American administration. See *Philippine Insurrection*.

Aikin (*ā′kĭn*), **John,** English physician, was born at Kibworth, Leicestershire, in 1747. After studying at Edinburgh and London, he took his medical degree at Leiden in 1780, and practiced in Chester, Warrington, Yarmouth, and London; in 1798, he retired to Stoke Newington. A friend of Priestley, E. Darwin, John Howard, and Southey, he was a voluminous author. His works include biographies of Howard, Selden, and Usher; the *General Biography* (10 vols.); and the well-known *Evenings at Home* (6 vols.), written in conjunction with his sister, Mrs. Barbauld. Died, 1822.

Aikins, Sir James Albert Manning, Canadian statesman and jurist, was born in Peel county, Ont., 1851; graduated at the University of Toronto; and was admitted to

the bar in 1878. Going to Winnipeg the following year, he soon rose to prominence, being elected president of the Canadian bar association in 1880 and the 12 succeeding years. He represented Canada at the international congress on moral education at The Hague in 1912 and was a member of the Canadian House of Commons from 1911 to 1915, resigning then to lead the Conservative party in Manitoba. He was lieutenant governor of Manitoba from 1916 to 1926. Died, 1929.

Ainsworth (*ānz'wŭrth*), **William Harrison,** English novelist, was born at Manchester, England, in 1805, and was educated at the grammar school there. He studied for the law, but in 1826 he married a publisher's daughter, and turned publisher himself for 18 months. He had contributed some articles to magazines prior to 1822, and his earliest literary success was *Rookwood*, with its vivid description of Dick Turpin's ride to York. By 1881, he had published no fewer than 39 novels. Seven of them, including *Tower of London*, *Guy Fawkes*, *Miser's Daughter*, and *St. James's*, were illustrated by Cruikshank. Died in 1882.

Airy (*ār'ĭ*), **George Biddell,** English mathematician, astronomer, physicist, and engineer, was born at Alnwick, England, in 1801; was graduated at Trinity college, Cambridge, in 1823; and, soon after, published his *Mathematical Tracts on the Lunar and Planetary Theories*, the *Figures of the Earth*, and the *Undulatory Theory of Optics*. In 1825, he discovered astigmatism; in 1826, was appointed Lucasian professor of mathematics; and, in 1828, became Plumian professor of astronomy at Cambridge and director of the observatory. In 1836, he succeeded Pond as astronomer-royal at the Greenwich observatory, a post which he held for 46 years, equipping the observatory with an entirely new outfit of instruments, which were mostly of his own design and were for a long time the most accurate in use. Here he introduced the systematic observation of the magnetic elements and investigated the lunar theory, the magnetism of iron ships, the density of the earth, the length of the seconds pendulum, and a great variety of other subjects. Died, 1892.

Aitken, Robert Ingersoll, American sculptor, was born in San Francisco, 1878; received high school education and studied under Douglas Tilden at Mark Hopkins institute of art in his native city, where he afterward became professor of sculpture. Later he devoted several years to study in Paris and upon his return established a studio in New York. In originality, virility, and technique he ranks high among American sculptors. His more important works include the Dewey, Bret Harte, and McKinley monuments, San Francisco; the Liberty memorial, Kansas City; the monument to Robert Burns, St. Louis; portrait busts of David Warfield, Augustus Thomas, and W. H. Taft; and the ideal works, "A Creature of God Till Now Unknown," "Athlete," and "The Flame."

Akbar (*ăk'bär*), Mogul emperor, was born at Amarkote in Sind, 1542. When he ascended the throne, only a small part of what had formerly belonged to the Mogul Empire acknowledged his authority, and he devoted himself with wonderful success to the recovery of the revolted provinces. He encouraged commerce, and had the land carefully measured so that the taxes should be fair. His people were of different races and religions, but he was just and tolerant to all. He founded schools and encouraged learning. Such measures gained for him the title of "guardian of mankind," and caused him to be held up as a model to Indian princes of later times. He died in 1605.

Akenside (*ā'kĕn-sīd*), **Mark,** English poet and physician, was born at Newcastle on Tyne in 1721. He studied theology and then medicine at the University of Edinburgh. Later, he completed his medical education at Leiden. He owes his rank among poets chiefly to his *Pleasures of the Imagination*, published in 1744, which at once became famous. In 1745, he settled in London, and, in 1761, he became physician to the queen. Died in 1770.

Alarcón y Mendoza (*ä'lär-kōn' ē mĕn-dō'sä*), **Don Juan Ruiz de,** Spanish dramatic poet, was born in Mexico toward the end of the 16th century and, in 1600, went to Spain. In 1628, he published a volume containing eight comedies and, in 1634, another containing twelve. One of them, called *La Verdad Sospechosa*, "The Truth Suspected," furnished Corneille with the groundwork and greater part of the substance of his *Menteur*. His *Tejedor de Segovia*, "Weaver of Segovia," and *Las Paredes Oyen*, "Walls Have Ears," have been very popular on the Spanish stage. He died in 1639.

Alaric I (*ăl' ă-rĭk*), king of the Visigoths, was born about the middle of the 4th century. He is first mentioned in history in 394, when Theodosius the Great gave him the command of his Gothic auxiliaries. The dissensions between Arcadius and Honorius, the sons of Theodosius, inspired Alaric with the intention of attacking the Roman Empire. In 396, he ravaged Greece, from which he was driven by the Roman general, Stilicho, but made a masterly retreat to Illyria, of which Arcadius, frightened at his successes, appointed him governor.

In 400, Alaric invaded Italy, but was defeated by Stilicho at Pollentia, in 403, and induced to transfer his services from Arcadius to Honorius on condition of receiving 4000 pounds of gold. Honorius having failed to fulfill this condition, Alaric made a second invasion of Italy, during which he besieged Rome thrice. The first time, in 408, the city was saved by paying a heavy ransom; the second, in 409, it capitulated, and Honorius was deposed, but was shortly afterward restored. His sanction of a treacherous attack on the forces of Alaric brought about the third siege, and the city was taken in 410 and sacked for six days. Alaric, however, did everything in his power to restrain the violence of his followers. He quitted Rome with the intention of reducing Sicily and Africa, but died at Cosenza in 410. See *Rome: German Invasions*; *Visigoths.*

Albani (*ăl-bä'nē*), **Madame,** née Emma Lajeunesse, dramatic soprano, was born in 1852, at Chambly, Quebec. She was trained in music by her father, and at twelve made her début at Albany, N. Y., whence she assumed the professional name of Albani. She studied at Paris and Milan; in 1870, sang successfully at Messina and subsequently at London, Paris, Petrograd, Berlin, and in the United States. In 1878, she married Ernest Gye, the impresario, and took up her residence in London, where she later became a teacher of singing. In 1911, she published *Forty Years of Song.*

Albeniz (*ăl'bā-nēth'*), **Isaac,** Spanish pianist and composer, was born at Camprodon in 1860. He displayed precocious musical talent and became a pupil of Marmontel at the age of six. Two years later, his father, a distinguished musician, took him on concert tours in Europe and America. He then continued his study in the conservatory at Brussels and later received instruction from Jadassohn, Reinecke, and Liszt. As a concert performer, he achieved distinction and was made court pianist to the king of Spain. His compositions include the operas *The Magic Opal*, *Enrico Clifford* and *Pepita Jimenez*; the oratorio *Cristo*; many zarzuelas; and numerous compositions for the piano. His later works show the influence of Debussy and the modernists to a marked degree. Died in 1909.

Albert, prince of Saxe Coburg Gotha and husband of Queen Victoria of England, was born near Coburg, Germany, in 1819. He married Queen Victoria in 1840; soon after, he was made field marshal in the British army and, in 1857, received the title of prince consort. As the prudent and trusted adviser of the queen, he acquired great influence in public affairs and became popular throughout England. Died, 1861.

Albert I, king of the Belgians, was born in 1875. He was carefully educated, traveled widely, and became well versed in politics and economics. In 1898, during a visit to the United States, he made a study of American railroads. Later he investigated conditions in the Belgian Congo and urged many improvements and reforms. In 1900, he married the Duchess Elizabeth of Bavaria. Upon the death of his uncle Leopold II in 1909, he was made king. By reason of his democratic tastes, he became one of the most popular of sovereigns. His heroic leadership in resisting the brutal German invasion of 1914 made him the idol of the Belgian people. With his equally devoted queen, he shared throughout the ensuing struggle the perils and hardships of his soldiers, re-entering Brussels on November 22, 1918, after the expulsion of the invaders. The continued confidence reposed in the king was evidenced by the action of the nation in 1926, when dictatorial powers were conferred upon him to be used in stabilizing the Belgian currency.

Albert, Eugen Francis Charles d', pianist and composer, son of a French musician, was born in Glasgow, Scotland, in 1864. He studied first in London under Sullivan, Prout, and Pauer, winning the Mendelssohn scholarship in 1881. Later, he studied under Richter in Vienna and also under Liszt at Weimar, where he was soon made court pianist. He appeared in concert with great success in Berlin, 1883, and afterward traveled in Russia, Italy, France, Germany, England, and the United States, giving concerts. By his masterful technique and intellectual grasp, he won foremost rank among the world's pianists and was especially distinguished for his interpretations of Bach and Beethoven. His compositions include the operas, *The Ruby*, *Ghismonda*, *The Departure*, *The Improviser*, *Im Tiefland*, and *Liebesketten*; also string-quartets, concertos, a symphony, and many songs and smaller works.

Albert, Joseph, German photographer, born at Munich, 1825. He established a photographic studio in Augsburg in 1850 but, in 1858, returned to Munich where he became interested in the application of photography to printing. About 1867, he discovered and introduced an improvement of great importance in photomechanical printing. Albert found that gelatin, by exposure to the action of light, could be hardened and rendered sufficiently durable for photomechanical printing. In place of the old metallic plates he

substituted transparent gelatin plates. Prints made by this process were called "albertypes." After this process was perfected, it was possible to obtain more than a thousand albertype copies from one plate. Albert died in 1886.

Alberti (*ăl-bär'tē*), **Leon Battista,** an Italian architect and writer on art and poetry, was born at Florence in 1404. He was much employed by Pope Nicholas V. He completed the Pitti palace at Florence and designed the church of Saint Francis at Rimini. His chief book, *De Re Ædificatoria,* is highly valued. He died at Rome in 1472.

Albertus Magnus (*ăl-bĕr'tŭs măg'nŭs*), the *Doctor Universalis* of the schoolmen, was born at Lauingen, in Swabia, about 1193. He studied at Padua, and, entering the newly founded Dominican order, taught in the schools of Hildesheim, Ratisbon, and Cologne. In 1245–54, he lectured at Paris; in 1254, he became provincial of the Dominicans in Germany; and, in 1260, was named bishop of Ratisbon. But, in 1262, he retired to his convent at Cologne to devote himself to literary pursuits. Of his works the most notable are the *Summa Theologiæ* and the *Summa de Creaturis.* Albertus excelled all his contemporaries in the wideness of his learning; in medieval legend, he appears as a magician. He died at Cologne in 1280.

Alcæus (*ăl-sē'ŭs*), of Mytilene, one of the greatest lyric poets of Greece, flourished about the end of the 7th or the beginning of the 6th century B. C. He was the inventor of the form of verse which after him is called the Alcaic, and which Horace, the happiest of his imitators, adapted to the Latin language.

Alcibiades (*ăl'sĭ-bī'ă-dēz*), Athenian general, was born at Athens, 450 B. C. He was educated in the house of Pericles, his uncle. In his youth, he gave evidence of his future greatness, excelling both in mental and in physical qualities. His handsome person, his distinguished parentage, and the high position of Pericles procured him a multitude of friends and admirers. Socrates was one of the former, and gained considerable influence over him, but was unable to restrain his love of luxury and dissipation. This found ample means of gratification in the wealth that accrued to him by his union with Hipparete, the daughter of Hipponicus. After a distinguished military career in Greece and in Persia, he was put to death in Phrygia by request of the thirty tyrants of Athens, 404 B. C. See *Periclean Age.*

Alcott, Louisa May, American juvenile writer, daughter of Amos Bronson Alcott, was born in Germantown, Pa., in 1832. Her first volume was *Flower Fables,* published in 1855. During the Civil War, she was a volunteer nurse in the South and, in 1863, wrote *Hospital Sketches. Little Women* was published in 1868, and was followed at short intervals by *An Old-Fashioned Girl, Eight Cousins, Silver Pitchers, Under the Lilacs, Little Men, Rose in Bloom, Jo's Boys,* and other stories. These rank among the most highly esteemed American fiction for young people. She died in 1888 at Boston, Mass.

Alcuin (*ăl'kwĭn*), or **Flaccus Albinus,** a scholar of the 8th century and the confidant and adviser of Charlemagne, was born at York about 735. At his death in 804, he left, besides numerous theological writings, a number of elementary works on philosophy, mathematics, rhetoric, and philology; also poems and numerous letters.

Alda, Frances, is the stage name of Frances Davis, operatic soprano, born in Christchurch, New Zealand, 1883. She was educated in private schools in Melbourne, Australia. Later, she studied singing under Marchesi in Paris, where she made her début at the Opéra Comique in 1904. In the following year at Brussels she created the leading part in an operatic production founded on the *Sleeping Beauty,* and sang Marguerite in *Faust.* In 1908, she made her début in New York as Gilda in *Rigoletto,* singing several seasons at the Metropolitan opera house and winning notable success on the American concert platform. In 1910, she married Giulio Gatti-Casazza, director of the Metropolitan opera house.

Alden, Henry Mills, American editor, author, and classical scholar, was born at Mount Tabor, near Danby, Vt., in 1836. He was graduated at Williams college in 1857 and at Andover theological seminary in 1860. In 1861, he settled in New York. He was managing editor of *Harper's Weekly* from 1863 to 1869, when he became editor of *Harper's Magazine,* which position he held until his death. As editor of this magazine for a half century, his influence was notably pervasive and distinctive though at all times unobtrusive. His Lowell lectures at Boston, 1863-64, on *The Structure of Paganism* and his first published writings, *The Eleusinian Mysteries,* display high classical scholarship. His writings include also *God in His World, A Study of Death, Harper's Pictorial History of the Great Rebellion* (with A. H. Guernsey), and *Magazine Writing and the New Literature.* In 1910, he was elected a member of the American academy of arts and letters. Died in 1919.

Alden, John, one of the Pilgrims to Plymouth, Mass., was born in England in 1599. He was one of the 41 signers of the compact for the government of the colony drawn up in the cabin of the *Mayflower* before the landing at Plymouth. Alden married Priscilla Mullens, to whom, according to popular legend, he first proposed in behalf of Miles Standish, but she indicated her preference for Alden over the soldier. A poem by Longfellow, entitled *The Courtship of Miles Standish,* has this incident for its theme. Alden was a magistrate for more than 50 years, and greatly assisted in the government of the infant colony. He died at Duxbury, Mass., in 1687. See *Priscilla.*

Alderman, Edwin Anderson, American educator and university president, was born at Wilmington, N. C., in 1861. He was graduated at the University of North Carolina, 1882; was professor of pedagogy in his alma mater, 1892–96, and president of same, 1896–99. He served as president of Tulane university from 1899 to 1904, when he was made president of the University of Virginia. He has become widely known as a speaker, lecturer, and writer. His published works include *Obligations and Opportunities of Citizenship, Southern Idealism, The Spirit of the South, The Growing South, Causes of the European War,* and *Some Tests of an Educated Man.*

Aldrich, Thomas Bailey, poet and editor, was born in Portsmouth, N. H., in 1836. While engaged in the office of a New York merchant, he began to write verses, the success of which soon induced him to enter on a literary career. His first volume, consisting of miscellaneous poems and called *The Bells,* was published in 1855. Later, he published several other volumes of poems, *The Story of a Bad Boy, Marjorie Daw,* and other stories. Aldrich was an industrious contributor to the best periodicals. From 1881 to 1890, he served as editor of the *Atlantic Monthly.* He was a member of the American academy of arts and letters. Died at Boston, Mass., 1907.

Alembert (*ă'lăN'bär'*), **Jean le Rond d',** French mathematician and philosopher, the natural son of Madame de Tencin and the poet Destouches, was born in Paris in 1717. He was the friend of Voltaire and of Diderot, and acquired high esteem by his scientific works, which fill many volumes. Among the most important of these are his *Treatise on Dynamics, Theory of the Winds, Precession of the Equinoxes,* and *Essay on the Resistance of Fluids.* Died, 1783.

Alexander the Great, Macedonian king, military commander, and conqueror, was born at Pella, the capital of Macedonia, in the autumn of 356 B. C. His education was committed first to Leonidas, then to Lysimachus, and, about 342 B. C., to Aristotle. Alexander was 16 years old when his father, Philip, marched against Byzantium and, during his absence, left the government in his son's hands. In 338 B. C., Alexander displayed conspicuous courage at the battle of Chæronea, whereby Macedonian supremacy was established in the Hellenic world. Philip was about to conduct an expedition of all the Greeks against the despotism of Persia, when he was assassinated, leaving Alexander as his heir.

Conquests. Alexander ascended the throne in 336 B. C. and immediately punished his father's murderers. In 335 B. C., he destroyed Thebes and brought the Grecian states under his command. He crossed the Hellespont in 334 B. C. and, as a result of the battle of Granicus, liberated all the Greek cities of Asia Minor from the Persian yoke. Proceeding on his way of conquest, he cut, at Gordium, the so-called Gordian knot, of which an oracle had said that he who untied it would be the lord of all Asia. In 333 B. C., in the neighborhood of Issus, he defeated Darius, king of the Persians.

Alexander now turned toward Syria and Phœnicia, in order to cut off Darius' escape by sea. The next year witnessed Alexander's capture of Tyre, his victorious march through Palestine, and his conquest of Egypt. In Egypt, he restored the old customs and religious institutions of the country and, in 332 B. C., founded Alexandria.

Meanwhile, Darius had collected another army, and, in the spring of 331 B. C., Alexander advanced against him in Assyria. In October 331 B. C., Alexander conquered the forces of the Persians, notwithstanding the great numerical superiority of his adversaries. In the following two years, Media, Parthia, and Bactria fell before him. As the conqueror of Asia, he now proceeded to Babylon, Susa, and Persepolis, where he was received by the inhabitants as their sovereign.

In 329 B. C., Alexander penetrated to the farthest known limits of northern Asia and overthrew the Scythians on the banks of the Jaxartes. Two years later, he proceeded to the conquest of India, then known only by name. He crossed the Indus and marched as lord through that part of India which is now called the Punjab. He wished to advance to the Ganges and conquer the whole of India, but, when he reached the Hyphasis river, the murmuring of his troops induced him to retreat. Meanwhile his friend Nearchus, who was made admiral of the

fleet, had successfully accomplished the hazardous voyage from the Indus up the Persian gulf to the Euphrates river. This campaign marked the extreme limit of his conquests.

RESULTS. Both by arms and by policy, Alexander, for the first time, brought the East and the West into close contact with each other. Aiming at the fusion of Greek and Oriental by intermarriage and by exchange of customs, he set an example himself by marrying a Persian princess and by encouraging the payment of divine honors to himself as to an Oriental despot. On the other hand, he lost no opportunity to spread the Greek language and the Greek civilization. His empire, it is true, was broken up, but Greek cities and colonies were founded everywhere, and the Greek tongue became the universal speech of government and of literature. His impress on Greece itself was no less important. His conquests marked definitely the passing of the Hellenic city-states and heralded the period of rule by empires. Through him, also, a road was opened to India, and Europeans became acquainted with the knowledge and economic products of the remote East.

CHARACTER. More perhaps than any other commander, Alexander combined the chivalry of the heroic age and the more careful strategics of later times. His career not only excited romantic enthusiasm in his contemporaries, but later became the subject of legends propagated in most of the languages of medieval Europe. His genius and policy are variously estimated by historians, but there is no disagreement as to the magnitude of his designs. He is said to have planned the subjugation of Italy and of Carthage when his ambitious projects were cut short by his death in Babylon, 323 B. C. See *Greece*: *History*.

Alexander I, emperor of Russia, 1801–25, was born at Petrograd in 1777. Possessing a humane and benevolent disposition, he was imbued by Laharpe with the enlightened principles of the age. Professor Kreft instructed him in experimental physics, and Pallas, in botany. In 1793, he married Elizabeth, daughter of Karl Ludwig, crown prince of Baden, and, on the assassination of his father, Paul, in 1801, succeeded him upon the throne. Alexander encouraged education and science and carried out many reforms. In 1805, he joined the coalition against Napoleon, and was present at the battle of Austerlitz. In 1808, he conquered Finland and, in 1806–12, waged a successful war against Turkey. He died in 1825.

Alexander II, emperor of Russia, 1855–81, was born in 1818. He was carefully educated by his father, Nicholas I, traveled through Germany, and there, in 1841, married the princess Marie, daughter of the grand duke of Hesse. He succeeded to the throne in 1855. The grand achievement of his reign, which was in great measure his own deed, was the emancipation of the serfs—23 million souls—in 1861. Legal and municipal reforms followed, and, in 1865, Alexander established elective representative assemblies in the provinces. In his reign, the Russian Empire was widely extended in the Caucasus and in central Asia.

During the Franco-Prussian war of 1870-71, Alexander maintained a sympathetic attitude toward Germany, a policy which was continued in subsequent alliances both with that country and with Austria. The czar took the field with the army during the victorious war between Russia and Turkey in 1877-78. By his establishment of schools and by his policy of internal improvements, he did more to build up Russia than any other emperor had done since Peter the Great. He was assassinated at Petrograd in 1881. See *Russia*: *History*.

Alexander, John White, American painter, was born in Allegheny City, now Pittsburgh, Pa., 1856. He was left an orphan in infancy; became a telegraph boy in Pittsburgh where his marked talent in drawing aroused the interest of an employer who assisted him to study art. At eighteen, he was an artist's apprentice on *Harper's Weekly*, where he worked with Abbey, Pennell, and Pyle. In 1877, he went to Germany, where he worked with Duveneck; he continued his studies in Venice, Florence, Holland, and Paris. After his return to New York in 1881, he achieved marked success with portraits of Oliver Wendell Holmes, John Burroughs, Walt Whitman, and other noted men. He exhibited in Paris in 1893, and was elected to the national society of fine arts in France.

Among his best-known paintings are: "The Pot of Basil," in the Boston museum; "Study in Black and Green" and "The Engagement Ring," in the Metropolitan museum, New York; "Pandora" and "In the Café," Philadelphia Academy; "La Femme Rose," Carnegie institute, Pittsburgh; his portrait of President Loubet, in the Elysée palace, Paris; and "The Green Bow," in the Luxembourg, Paris. Among his mural paintings are: "Evolution of the Book," Congressional library, Washington, and the "Apotheosis of Pittsburgh," Carnegie museum, Pittsburgh. He excels in portraits of women, displays marked individuality in method, and is notably modern in technique. He was a member of the American academy of arts and letters. Died, 1915.

Alexander Nevsky (*nyĕf'skĭ*), Russian hero and saint, was born at Vladimir in 1219. He received the surname of Nevsky on account of the splendid victory over the Swedes which he achieved in 1240 on the Neva, in the province where Petrograd now stands. In 1242, on the ice of Lake Peipus, he defeated the Livonian knights of the sword. At the death of his father, in 1247, he became grand duke of Vladimir. To the end of his life he remained a vassal of the Tatars, or Mongols. He died in 1263.

Alexander Severus, Roman emperor, 222–235, born about 202, was the cousin, adopted son, and successor of Heliogabalus. Although a pagan, he reverenced the doctrines of Christianity and often quoted the "golden rule." His expedition against Artaxerxes, king of Persia, was terminated by a speedy overthrow of the enemy. But during a campaign against the Germans on the Rhine, to defend the frontiers of the empire from their incursions, an insurrection broke out among his troops, headed by Maximin, in which Alexander Severus was slain, 235.

Alexius I Comnenus (*ă-lĕk'sĭ-ŭs kŏm-nē'nŭs*), Byzantine emperor, was born at Constantinople, 1048. He was the nephew of the emperor Isaac Comnenus. In 1081, was elevated to the throne by his soldiers. At the beginning of his reign, he was encompassed by many foes. The Scythians and Turks were pouring down from the north and northeast and the Normans were menacing his western provinces. In 1096, the warriors of the First Crusade invaded his empire on their way to Palestine. Alexius died in 1118.

Alfieri (*ăl-fyā'rē*), **Vittorio, Count,** Italian dramatic poet, was born in Piedmont in 1749. At Turin, in 1772, he left the military service and devoted himself to literary pursuits. He became one of the foremost writers of Italian 18th-century literature. Among his most important tragedies are: *Virginia*; *Agamemnone*; *Oreste*; *Timoleone*; and *Saul*, his masterpiece. His literary ideal was to unite "artistic truth with moral truth, beauty with morality." He is honored in Italy, not only as a great dramatist, but as the reviver of a national spirit. He left 21 tragedies and six comedies, besides various odes and sonnets. Died, 1803. See *Italian Literature*: *The Regeneration*.

Alfonso X, surnamed "the astronomer," "the philosopher," or "the wise," king of Leon and Castile, was born in 1221 and succeeded his father, Ferdinand III, in 1252. Alfonso was one of the most learned princes of his time, and acquired lasting fame through the completion of the code of laws commenced by his father and called *Leyes de las Partidas*. He improved the Ptolemaic planetary tables, is credited with a history of the Church and of the Crusades, and is said to have ordered a translation of the Bible into Spanish. Died at Seville, 1284.

Alfonso XIII, king of Spain, is the son of King Alfonso XII. He was born in 1886, after his father's death; his childhood was spent at Madrid and at the palace of Miramar in San Sebastian. In Spain the sovereign becomes of age at sixteen; during the king's minority his mother reigned as queen regent. On May 17, 1902, the regency ceased, and Alfonso XIII assumed his full powers. In 1906, he married Princess Ena of Battenberg. As the king and the queen were returning to the palace after the wedding ceremony, they narrowly escaped death from a bomb thrown by an anarchist. The king has proved a courageous and liberal monarch, maintaining an anticlerical policy, and using his pardoning power with marked independence.

Alfred the Great, king of the West Saxons, was born at Wantage, Berkshire, England, in 849. With his father, Ethelwulf, the young Alfred spent much time in Rome. Later, through his stepmother, Judith, he became imbued with the culture, knowledge, and traditions of the great Frankish courts. In his 20th year, he married, and assisted his brother Ethelred in repelling the Danes.

VICTORIES. In 871, Alfred succeeded to the crown. Four years later, he defeated the Danes at sea, and, in 876, he made peace with them at Wareham. They broke the peace by capturing Exeter. The city was retaken by Alfred in 877; but, soon afterward, the invaders, under Guthrum, completely overran the whole kingdom of the West Saxons. Alfred was for a time obliged to seek refuge in a cowherd's hut. He kept up communication with his friends, however, and, as soon as the people began to arm themselves against the Danes, he built a stronghold at Athelney. From this base, he attacked and defeated the invaders, who at length capitulated. By the peace of Wedmore in 878, Alfred accepted hostages and exacted a solemn oath from the Danes that they would quit the territory of Wessex and receive baptism.

Alfred's power now steadily increased by land and also by sea. He is credited with the construction of England's first fleet. The weakness of the other kingdoms in England, which had been likewise attacked by the Danes, left Alfred as the strongest ruler in the island. By 886, he was recognized, without formal installation, as the sovereign of all England. His position was maintained, however, only at

the cost of further struggles. These engaged much of his energies from 893, when a large body of Danes under Hastings landed in Kent, until the complete dispersal of the aggressors in 897.

CONSTRUCTIVE ACHIEVEMENTS. Alfred made a compilation of laws, in which, for the first time, no discrimination was made against the Welch people. The laws were characterized by an intensely religious tone.

One of the most noteworthy features of Alfred's character was his zeal for learning. He caused a collection of the old Saxon poems to be made. Asser, Erigena, and other scholars were invited to his court. He established and directed a school for young nobles and founded abbeys for those of lower rank. He labored also himself as a scholar and a teacher. About 888, he began the adaptation and translation into Saxon of four important Latin works—the *Compilation* of Orosius, the *History* of Bede, the *Consolation* of Boethius, and the *Pastoral* of Pope Gregory. With these translations, English prose literature begins. English history also may be said to have originated when, in his reign, the *English Chronicle* received its final form. Died, 901. See *England: History, Danish Incursions.*

Algardi (*äl-gär'dē*), **Alessandro,** Italian sculptor, was born at Bologna, Italy, 1602. His chief work is a colossal relievo, one of the largest in the world, in Saint Peter's, entitled the "Retreat of Attila from Rome." Died, 1654.

Allen, Ethan, American soldier, was born at Litchfield, Conn., about 1737. He distinguished himself early in the Revolutionary War by the surprise and capture of Fort Ticonderoga in 1775. He did good service in Montgomery's expedition to Canada, but was taken prisoner, and not exchanged until 1778. Allen was afterward a member of the Vermont legislature. He was author of *Reason the Only Oracle of Man*, and other works. Died, 1789.

Allen, James Lane, American novelist, was born near Lexington, Ky., in 1849. He was educated at Transylvania university; taught in Kentucky university; and later was professor of Latin and higher English, Bethany college, W. Va. Beginning with 1886, he devoted his entire attention to literature, using Kentucky scenery and its vanishing pioneer, ante bellum, and social types as a background for his admirable fiction. In his novels he portrays various struggles and problems of the human soul in a refined prose style somewhat in the manner of Hawthorne.

His works include *Flute and Violin, The Blue Grass Region and Other Sketches of Kentucky, A Summer in Arcady, The Reign of Law, The Heroine in Bronze, The Last Christmas Tree, The Sword of Youth, A Cathedral Singer, The Landmark*, and numerous sketches. Died, 1925.

Allen, Viola, American actress, was born in Huntsville, Ala., 1867. She was educated in Boston, Toronto, and New York, and, at the age of fifteen, made her début at Madison Square theater, New York, in *Esmeralda*. Subsequently, she played leading classical, Shaksperian, and comedy rôles with Lawrence Barrett, Tommaso Salvini, Joseph Jefferson, and William J. Florence. She won notable success in 1898 as Gloria Quayle in *The Christian*, by Hall Caine. In 1900, she produced *In the Palace of the King*, by F. Marion Crawford and Lorimer Stoddard. In 1902, she created the part of Roma in Hall Caine's *The Eternal City*. In 1903, she began a series of Shaksperian revivals, producing *Twelfth Night*, in which she played Viola; in subsequent seasons, she appeared in *A Winter's Tale, The School for Scandal*, and *The Lady of Coventry*. In 1906, she married Peter Duryea.

Allenby, Sir Edmund, English general, was born in 1861, and was educated at Haileybury. Entering the Inniskilling dragoons, he served in the Bechuanaland expedition, 1884–85; in the Zulu war, 1888; in the South African war, 1899–1902; and, on the outbreak of the World War, was placed in command of cavalry. In 1917, he was made commander of the Egyptian expeditionary force. Under his direction, British armies invaded Palestine and captured Jerusalem from the Turks, Dec. 9, 1917. At the battle of Samaria, Sept. 18–22, 1918, Allenby, by skillful use of his cavalry, utterly crushed a Turkish army of 100,000 under command of the German field marshal Liman von Sanders, capturing more than 75,000 prisoners and 350 guns. This notable victory virtually destroyed the military power of Turkey and hastened the collapse of the Teutonic nations and their allies in the World War. He served as British high commissioner for Egypt, 1919–25. See *World War*, pages 540b, 542b.

Allibone (*ăl'ĭ-bōn*), **Samuel Austin,** American author, was born at Philadelphia in 1816. He was the compiler of *A Critical Dictionary of English Literature and British and American Authors* and other valuable works of reference. He was also a contributor to periodical literature and, from 1879 to 1888, was librarian of the Lenox library, New York. Died at Lucerne, Switzerland, 1889.

Allward, Walter Seymour, Canadian sculptor, was born at Toronto in 1875. He was educated in the public schools, became an architect's apprentice in 1889, and developed talent for architectural figure-work. His first sculpture was the figure of "Peace" for the Northwest rebellion monument in Toronto. He executed busts of noted Canadians for the provincial art gallery, Toronto, and increased his reputation as an artist by several statues in various Canadian cities. Among his most notable works are the Boer war commemoration monument in Toronto and memorials of the World War erected in various cities throughout Canada.

Al-Mansur (*ăl-măn-sōōr'*), second caliph of the house of the Abbasides, was born in 712. Upon his accession to the caliphate in 754, he carried on successful wars against the peoples of Asia Minor, established the finances of his kingdom, regulated the post, and patronized learning. His greatest achievement was the founding of the city of Bagdad, to which he transferred his seat of government. He died on a pilgrimage to Mecca in 775.

Alma-Tadema (*ăl'mȧ-tȧd'ē-mȧ*), **Sir Laurence,** British painter of classical subjects, was born in Dronryp, Friesland, in 1836. He studied at the royal academy of Antwerp, and was afterward pupil and assistant of Baron Henry Leys. In 1873, he settled in England, where he achieved great distinction for his exquisitely executed pictures portraying the life of the ancient Greeks and Romans and other historical subjects. Among his numerous works are "Phidias and the Elgin Marbles," "The Roses of Heliogabalus," "Hadrian in Britain," "The Way to the Temple," "The Shrine of Venus," "Caracalla," "Egyptians 3000 Years Ago," "Reading from Homer," "Pyrrhic Dance," "The Vintage," and "The Conversion of Paula." Died, 1912.

Almqvist (*ălm'kvĭst*), **Karl Jonas Ludvig,** Swedish author, was born at Stockholm in 1793. He had an erratic career; was once convicted of forgery and charged with murder; he fled from Sweden to the United States and, for a time, was private secretary to Abraham Lincoln. His novels are romantic in type and display notable power of language, while his dramas are marked by masterly dialogue and great tragic force. Among the best of his writings are *The Book of the Thorn-Rose, Araminta May, The Palace*, and *It's All Right*. He died at Bremen in 1866.

Alsberg (*ălz'bĕrg*), **Carl Lucas,** American biochemist, was born in New York City, 1877. He was graduated from Columbia university in 1896 and from the college of physicians and surgeons, Columbia, in 1900. From 1900 to 1903, he studied at intervals in the universities of Strasbourg and Berlin, Germany. He served as assistant in physiological chemistry, 1902–05, and as instructor in biological chemistry, 1905–08, in Harvard university. He was chemical biologist in the bureau of plant industry, 1908–12, and chief of the bureau of chemistry, 1912–21, United States department of agriculture, Washington. In 1921, he was made director of the American food research institute, Stanford university.

Alstroemer (*ăl'strē'mĕr*), **Jonas,** Swedish industrial reformer, was born in 1685. Of very humble origin, he was for a time unable to surmount the obstacles which poverty placed in his path. He visited England, and, having minutely noticed the sources of its manufacturing prosperity, returned to Sweden, and obtained permission to establish a manufactory at Alingsas, in West Gothland, his birthplace. So extensive and successful were the manufacturing and agricultural improvements which he introduced that the state conferred on him a patent of nobility, made him chancellor of commerce, and erected a statue to his honor on the Stockholm exchange. Died, 1761.

Altman, Benjamin, American merchant, art collector, and philanthropist, was born in New York City in 1840. Beginning in his father's dry-goods store and later trading in a small way for himself, he developed an immense retail mercantile business. Early in life he became interested in European paintings and in Oriental art. He made remarkably fine collections of Chinese porcelains and of Oriental rugs. Of Rembrandt's paintings he possessed probably the largest private collection ever assembled. His collections embraced also many choice works of Velasquez, Van Dyck, Cuyp, Ruysdael, Vermeer, and other masters. He bequeathed this magnificent collection, the value of which was estimated at 15 million dollars, to the Metropolitan museum of art, New York. This was one of the greatest gifts ever received by a public museum of art. Shortly before his death, he established the Altman foundation for the benefit of the employees of the department store of which he was the head. He died in 1913.

Alva, Fernando Alvarez de Toledo, Duke of, Spanish governor of the Netherlands under Philip II of Spain, was born in 1508. He was notorious for the merciless manner in which he exercised his dictatorial power. During his rule, 1567–73, he claimed to have sent 18,000 persons to the scaffold. A revolt, headed by the prince of Orange, broke out, which, after nearly forty years of war, resulted in the independence of the provinces. In 1580, Alva was given the command of a campaign against Portugal, which he quickly conquered. Though his cruelty was excessive, he was one of the ablest generals of his time. Died, 1582. See *Netherlands: Spanish Rule.*

Alvarado, Pedro de, Spanish cavalier, was born in Badajoz about 1486. He took part in the expedition and victories of Cortez, was intrusted with the command of the city of Mexico, and afterward made governor of Guatemala and Honduras. He explored California, and, soon after his return, was killed in an expedition against Jalisco, 1541.

Alverstone, Sir Richard Everard Webster, First Viscount, lord chief justice of England, 1900–13, was born in 1842. He was educated at King's College school, at Charterhouse, and at Trinity college, Cambridge. He was member of Parliament, 1885–1900; attorney-general, 1885–92 and 1895–1900; master of the rolls, 1900. He was knighted in 1885, created baronet in 1899, baron in 1900, and viscount in 1913. Lord Alverstone was the English representative on the Alaskan boundary commission. He voted in support of the claims of the United States, resulting in a decision in favor of the United States. He died in 1915. See *Alaska Boundary Commission.*

Alzog (*äl'tsōĸ*), **Johann Baptist,** Roman Catholic historian, was born at Ohlau, Silesia, 1808. He was professor of church history in the university of Freiburg, and wrote a *Manual of Church History*, which is known in many languages. He was also the author of *Outline of Patrology*, and in 1869 was a member of the commission on dogma which prepared the work for the Vatican council. Died at Freiburg, Baden, 1878.

Amato, Pasquale, Italian operatic baritone, was born at Naples, 1879. He made his début in Naples in 1900 and later toured Italy, Germany, England, Egypt, and South America. His first appearance in the United States was in 1908 at the Metropolitan opera house. He created the leading baritone rôles in *Armide*, *Germania*, and *The Girl of the Golden West.*

Ambrose, Saint, doctor in the Latin Church, was born at Treves, Arles, or Lyon, probably in 340. Consecrated archbishop of Milan in 374, Ambrose was repeatedly, in the discharge of his duty to the Church, brought into direct conflict with the highest secular authority. He rebuked Valentinian, defied Maximus, and, after the massacre of Thessalonica, compelled the great Theodosius to a humiliating penance before admitting him to Christian communion. To Saint Ambrose we owe the noble hymn, "*Te Deum Laudamus.*" He died at Milan in 397.

Amerigo Vespucci (*ä'mâ-rē'gō vĕs-pōō'chē*). See *Vespucci, Amerigo.*

Ames, James Barr, American educator and legal scholar, was born in Boston, 1846. He was graduated at Harvard college in 1868 and at Harvard law school in 1872. In the latter, he became associate professor of law, 1873; professor of law, 1877; and dean, 1895. He exerted a profound influence in the development of the study of American law. Died, 1910.

Amherst, Jeffrey, Lord, British general, was born at Riverhead, England, 1717. As major general, he served in America, where he succeeded Abercrombie as commander in chief. He was remarkably successful, and, after many victories, Montreal surrendered and Newfoundland was recovered from the French. He was raised to the peerage, 1776, and was appointed field marshal, 1796. Died, 1797.

Ampère (*äN'pâr'*), **André Marie,** French mathematician and naturalist, was born at Lyon in 1775. In 1805, he was called to Paris, where he distinguished himself as a teacher in the polytechnic school, and began his career as an author by his essay on the *Mathematical Theory of Chances.* In 1814, he was elected a member of the academy of sciences; in 1824, he was appointed professor of experimental physics in the Collège de France. He invented the astatic needle, which made the astatic galvanometer possible. The ampere, a unit of electrical current, is named after him. Died, 1836.

Amundsen (*ä'mŭn-sĕn*), **Roald,** Norwegian explorer, was born in Borge, Norway, 1872. In June 1903, he sailed in the *Gjöa* and, after two years of exploration, located the north magnetic pole and the northwest passage. Sailing in June 1910, in Nansen's famous ship, the *Fram*, he led the Norwegian antarctic expedition which resulted in the discovery of the south pole, December 14, 1911. After an unsuccessful attempt to fly to the north pole by airplane in 1925, he succeeded, 1926, in passing over the pole in the dirigible *Norge*, traveling from Spitzbergen to Alaska. With Nobile, one of his associates in this trip, Amundsen was later involved in a bitter controversy. When Nobile in 1928 was lost in an attempt to repeat the feat, Amundsen flew by airplane to his rescue, but perished in the Arctic Ocean.

Anacreon (*ă-nāk'rē-ŏn*), celebrated Greek lyric poet, was born at Teos in Ionia about 563 B. C. He was patronized by Polycrates, the tyrant of Samos, and by Hipparchus, the tyrant of Athens. His poems, chiefly devoted to the praises of love, pleasure, and wine, are characterized by marked simplicity and sweetness of style. The authentic fragments of his verse have been paraphrased in English by Thomas Moore. He died at Abdera about 478 B. C.

Anaxagoras (*ăn'ăk-săg'ô-răs*), Greek philosopher, was born at Clazomenæ about 500 B. C. He studied under Anaximenes, and, after traveling through all the known parts of the world in search of knowledge, established himself at Athens, where he opened the first school of philosophy. He taught that mind rules the universe. Pericles, Socrates, and Euripides are said to have been among his pupils. He was condemned to die for alleged impiety. The sentence was changed to exile, however, and he retired to Lampsacus, where he continued to teach philosophy until his death about 428 B. C.

Anaximander (*ăn-ăk'sĭ-măn'dĕr*), Greek mathematician, astronomer, and philosopher, was born at Miletus, 610 B. C. He was a pupil and friend of Thales, whom he succeeded as head of the Ionian school. He taught the obliquity of the ecliptic, which he is reputed to have discovered. He introduced the gnomon for determining solstices, and the sundial. He is also given credit for the invention of geographical maps. By some ancient writers he is said to have determined approximately the size and the distance of the planets and to have constructed astronomical globes. He appears to have imagined the universe as a number of concentric cylinders with the earth at the center. As a philosopher, he speculated upon the origin of the material universe, which he found to be an infinite, indeterminate substance, from which all material objects arise. He died about 546 B. C.

Andersen, Hans Christian, novelist, children's poet, and writer of fairy tales, was born at Odense, in Denmark, 1805. He early displayed a talent for poetry and was known in his native place as "the comedy-writer." He was placed in an advanced school at the public expense and began his academic education in 1828. He completed his *Agnes and the Merman* in Switzerland; one of his best works, *The Improvisatore*, a series of scenes depicted in a glowing style and full of poetic interest, was the fruit of a visit to Italy. In 1840, he commenced a somewhat protracted tour through Italy and the East, an account of which he gave in *A Poet's Bazaar*, 1842. In 1844, he visited the court of Denmark by special invitation, and, in the following year, he received an annuity which placed him in comfortable circumstances. His works have all been translated into German and into English; in 1900, the Danish government stood sponsor as patron to a fine edition of his *Tales* in six languages. He died in 1875. See *Danish Literature.*

Anderson, Rasmus Björn, author and diplomat, was born at Albion, Wis., of Norwegian parentage, 1846, and was educated at Luther college, Decorah, Iowa, and at the University of Wisconsin. He was professor of Greek and modern languages, Albion academy, 1866; instructor in languages, 1869–75; and professor of Scandinavian languages and literature, 1875–83, at the University of Wisconsin. In 1885, he was appointed United States minister to Denmark, and was editor and publisher of *Amerika*, 1898–1922. His publications include *Norse Mythology*, *America not Discovered by Columbus*, and *First Chapter of Norwegian Immigration, 1821–40.*

Anderson, Robert, American soldier, was born near Louisville, Ky., 1805. He graduated at West Point in 1825, and was colonel of the Illinois volunteers in the Black Hawk war of 1832. He became instructor of artillery practice at West Point in 1835 and fought in the Seminole war in 1837-38. He served in the Mexican war, being severely wounded at Molino del Rey. In November 1860, he took command of Charleston harbor, where he was confined to Fort Sumter by the Confederates, and, on April 14, 1861, after a bombardment of 36 hours, he was compelled to evacuate the fort. He was then appointed brigadier general, but, owing to failing health, he retired from active service in 1863. In 1865, he was brevetted major general. He wrote *Reminiscences of the Black Hawk War*, and his letters were published in 1911 under the title *An Artillery Officer in the Mexican War, 1846-47.* Died in France, 1871.

Anderson, Sherwood, American author, was born at Camden, Ohio, in 1876 and was educated in the public schools. His works, which belong to the more radical wing of modern American literature, reveal a high degree of originality and force. They include *The Triumph of the Egg*, *Many Marriages*, *Black Laughter*, and *A Story Teller's Story.* In 1927 he purchased and became editor of two weekly newspapers in Marion, Va.

Andrássy (*ŏn'drä-shē*), **Count Gyula,** Hungarian statesman, was born in 1823, of an ancient and noble family; espoused the popular cause in the revolution of 1848; was condemned to death in 1849, but escaped and went into exile. In 1867, when the right of self-government was conceded to Hungary, he was appointed premier of the new Hungarian ministry. He was member of the Pressburg diet in 1847-48 and later became Hungarian ambassador to Constantinople. He was member of the diet of 1861, vice president of the diet of 1865-66, and minister of foreign affairs, 1871–79. Died, 1890.

André (*ăn'drĕ* or *ăn'drĭ*), **John,** British soldier, was born in London, England, 1751; served in the war with America, and rose to the rank of major. He conducted the negotiations with Benedict Arnold for the betrayal of West Point, but, being discovered in disguise, was arrested and put to death as a spy in 1780. His remains lie in Westminster Abbey, where a monument was erected to his memory.

Andréiev (*ăn-drā'yĕf*), **Leonid Nikolaevitch,** Russian writer, was born at Orel, 1871. He studied law at the universities of Petrograd and Moscow and, while struggling to establish practice, became a police court reporter for a Moscow newspaper. About 1900, he began writing stories with notable success, producing in rapid succession a profusion of short stories, sketches, and dramas. The sales of his first volume of stories, appearing in 1901, soon exceeded a quarter of a million copies. He achieved great popularity throughout Russia, and his work is perhaps better known outside his own country than that of any present-day Russian writer, translations having been made into all European languages. He was a mystic whose work reflects a fatalistic philosophy of life, and he possessed unusually searching powers of analysis. Among his stories available in English are *The Red Laugh, The Burglar, The Seven Who Were Hanged, Judas Iscariot and the Others,* and *Silence.* Of more than twenty dramas, the following have been translated into English: *King Hunger, Anathema, The Pretty Sabine Women, The Love of One's Neighbor,* and *Savva.* He died in 1919. See *Russian Literature.*

Andrews, Roy Chapman, American naturalist and explorer, was born at Beloit, Wis., in 1884. He was graduated at Beloit college in 1906 and later received a master's degree at Columbia university. In 1908, he made explorations in Alaska. He was attached as naturalist to the U. S. S. *Albatross* on a voyage to the Dutch East Indies, Borneo, and Celebes in 1909-10. In 1911-12, he made explorations in northern Korea, and, in 1913, he accompanied the Borden Alaska expedition.

For the American museum of natural history, New York, he conducted important scientific expeditions to Asia. These included an expedition in 1916-17 to Tibet, southwestern China, and Borneo; an expedition in 1919 to north China and outer Mongolia; and expeditions in 1921–25 to central Asia and Mongolia. Among the most striking results of these highly fruitful expeditions was the finding of fossil dinosaur eggs and of skeletal remains of the baluchitherium, the largest known land mammal.

His writings include *Whale Hunting with Gun and Camera, The California Gray Whale, The Sei Whale, Camps and Trails in China,* and *Across Mongolian Plains.*

Andros (*ăn'drŏs*), **Sir Edmund,** was born at London, England, in 1637. He was governor of the colony of New York for eight years, beginning in 1674; subsequently he was governor of New England for three years. He was deposed by the colonies and then, for six years, was made governor of Virginia, where he founded William and Mary college. He was harsh, and ruled without any regard to the wishes of the colonists. This made him disliked, in spite of his acknowledged honesty and uprightness. His demand for the charter of Connecticut is famous. To get it, he went to Hartford with a band of soldiers. The general assembly kept him talking in their hall until night, when candles were lighted and the charter was brought in a box and was laid on the table. Suddenly the lights were blown out. They were quickly lighted again, but the charter was gone. For three years no one knew where it was, but, in 1789, when the new king, William III, had recalled Andros, the charter was carefully taken from the hollow of an oak tree, where it had been hastily put on the night it disappeared. This tree was known as the "charter oak." Died in 1714.

Angelico (*ăn-jĕl'ê-kō*), **Fra,** is the name by which we best know the great friar-painter, Guido di Pietri, whose monastic name was Giovanni. He was born in 1387 at Vecchio in Tuscany. In 1407, he entered the Dominican monastery at Fiesole; in 1436, was transferred to Florence; and, in 1445, was summoned by the pope to Rome, where he resided during most of his remaining years. His most important frescoes are those in the Florentine convent of San Marco (now a museum), at Orvieto, and in the Nicholas chapel of the Vatican. Others were painted at Cortona and Fiesole. Of his easel pictures, the Louvre possesses a splendid example, "The Coronation of the Virgin." This picture, as well as his "Glory, or Christ," now in the London national gallery, was originally at Fiesole. There are fine examples of his art in the Uffizi at Florence. He died at Rome in 1455.

Angell (*ān'jĕl*), **James Burrill,** American educator and diplomat, was born at Scituate, R. I., 1829, and was graduated at Brown university, 1849. He became professor of modern languages and literature, Brown, 1853; editor of the Providence *Journal,* 1860; president of the University of Vermont, 1866; and president of the University of Michigan, 1871. He was United States minister to China, 1880-81; a member of the Anglo-American international commission on Canadian fisheries, 1887; and minister to Turkey, 1897-98. During his long and able administration, the University of Michigan was brought to high rank among American institutions of learning. His writings include *Progress in International Law, The Higher Education,* and *Selected Addresses.* Died, 1916.

Angell, James Rowland, American educator, was born at Burlington, Vt., 1869, son of James Burrill Angell. He was graduated at the University of Michigan and at Harvard; studied also at Berlin, Halle, Leipzig, and Paris. Beginning as assistant professor of psychology, University of Chicago, 1894, he became professor and head of the department, 1905. In 1911, he was made dean of the faculties, and, during 1918-19, was acting president, of the University of Chicago. In 1921, he was chosen president of Yale university.

Anglin (*ăng'glĭn*), **Margaret Mary,** Canadian actress, daughter of T. W. Anglin, former speaker of the Canadian House of Commons, was born at Ottawa, Canada, 1876; was educated at Loretto abbey, Toronto, and the Convent of the Sacred Heart, Montreal; graduated from the Empire school of dramatic acting, New York, and made her professional début in *Shenandoah,* New York, 1894. She was leading lady with James O'Neil in *Virginius, Hamlet, Monte Cristo,* 1896-97; leading woman with E. H. Sothern, 1897-98; with Richard Mansfield, 1898-99; and with Henry Miller in *The Great Divide,* 1906-07. She toured Australia in 1908-09; in 1911, married Howard Hull of New York; during 1913–16, appeared in a Shaksperian repertoire. She took leading parts in various Greek dramas at the Greek theater, Berkeley, Cal., and, in 1919, played the title rôle in *The Woman in Bronze.*

Anna Comnena (*kŏm-nē'nà*), Byzantine princess and historian, daughter of the emperor Alexius I (Comnenus), was born, 1083. She received the best education that Byzantium could give. During the last illness of her father, she entered into a scheme, which her mother, the empress Irene, also favored, to induce him to disinherit his eldest surviving son, John, and to bestow the diadem on her husband, Nicephorus Briennius. Failing in this, she framed a conspiracy against her brother in 1118. Her brother spared her life, but punished her by confiscation of her property, which, however, he soon afterward generously restored. She withdrew from the court and devoted herself to the composition of the *Alexiad,* a valuable historical work covering the period of her father's reign. Died about 1148.

Anne of Austria, daughter of Philip III of Spain, was born at Madrid in 1601 and, in 1615, became the wife of Louis XIII of France. The marriage was so far from being a happy one that the royal pair lived for 23 years in a state of virtual separation, a result due chiefly to the influence of Cardinal Richelieu, whose fixed determination to humble the house of Austria led him to spare no means for alienating the affections of Louis from his queen. On the death of the king in 1643, Anne became queen regent and evinced her discernment by choosing as her minister Cardinal Mazarin, by whose able management the young king, Louis XIV, came, on attaining his majority, into possession of a throne firmly established on the ruins of contending parties. Died, 1666.

Anne, Queen of England, was the second daughter of King James II by his first wife, Anne Hyde, and was born in London, England, in 1665. In 1683, she married Prince George, brother to the king of Denmark, by whom she had a large family of children, all of whom died young. Anne ascended the throne on March 8, 1702. She established a fund, known as "Queen Anne's bounty," for the augmentation of the livings of the poor clergy. During her reign, which was made illustrious by the military triumphs of the duke of Marlborough, Sir George Rooke and Sir Cloudesley Shovel conquered the fortress of Gibraltar, a possession which Spain has never been able to regain. During her reign also, the legislative union of Scotland with England was effected. The glorious galaxy of writers, in almost every branch of learning, who flourished in her time has caused it to be considered the Augustan age of English literature. Died, 1714.

Annunzio (*ăn-nōōn'dzê-ō*), **Gabriele d',** Italian poet, novelist, and dramatist, was born at Pescara in 1864. In his 15th year, while a student at Prato, he published his first volume of verse, *Primo vere,* followed in the ensuing 10 years by other volumes, which established his fame as a rising poet. His first novel, *Il piacere,* translated into English as "The Child of Pleasure," showed the influence of Maupassant and Bourget. Other famous novels from his pen include *L' innocente, Giovanni Episcopo, Il Trionfo della Morte,* and *Fuoco.* In the drama too, d'Annunzio attained a place in the front rank of Italian writers. His plays include *The Dream of a Spring Morning, The Dead City, Francesca da Rimini, Greater than Love, The Ship, Pisanella* or *The Perfumed Death,* and *The Honeysuckle.* His later poems are notably popular in Italy, where he is

assigned equal rank with Carducci. While a "decadent," and regarded by Borgese as a product of a materialistic age, d'Annunzio is the most powerful writer and the greatest literary artist in modern Italian letters. When picturing the former glories of Italy, he rises to the level of a great classic writer.

Upon the outbreak of war with Austria in 1915, he entered the Italian army and became notable as an aviator. In 1919, he placed himself at the head of a volunteer army and seized Fiume in order to prevent its becoming a part of Jugoslavia. He established the city as an independent state and, for 15 months, refused in the face of all Europe to submit to agreements made regarding the city by the Treaty of Rapallo. Driven from the city by an Italian army in 1921, he went into retirement.

Anselm, Saint, archbishop of Canterbury, a scholastic philosopher, was born at Aosta, Lombardy, 1033. He led at first a dissipated life. He was later attracted by the reputation of Lanfranc and went in 1060 to study under him at the monastery of Bec, in Normandy. Three years later, he became prior and, in 1078, abbot of this monastery, the most famous school of the 11th century. Lanfranc, who in the meantime had gone to England and become archbishop of Canterbury, died in 1089, and, in 1093, Anselm was appointed his successor. He was distinguished both as a churchman and as a philosopher. His numerous embroilments with William Rufus and Henry I and the unbending spirit which he displayed even when subjected to banishment indicate the vigor and resoluteness of his character as much as his writings exhibit the depth and acuteness of his intellect. Died in 1109.

Anthony of Padua, Saint, was born at Lisbon, 1195. He was at first an Augustinian monk but, in 1220, he entered the Franciscan order and became one of its most illustrious members. He preached in the south of France and in upper Italy. Numerous miracles were attributed to him, and he won great popularity by his effective preaching against the vices of luxury, avarice, and tyranny. According to legend, he preached to the fishes when men refused to hear him; hence he is the patron of the lower animals and is often represented as accompanied by a pig. Died at Vercelli in 1231 and was canonized by Gregory IX in the following year.

Anthony the Great, Saint, the founder of Christian monasticism, was born, 251, at Coma near Heraclea in upper Egypt. In 285, having sold all his property and given the proceeds to the poor, he withdrew into the desert. While there, he was frequently tempted, as he said, by the devil, who appeared in such forms as a beautiful woman or a wild animal. A number of disciples, attracted by his reputation for sanctity, gathered about him and formed the first community of monks. He afterward went to Alexandria in order to encourage the Christians to endure the persecutions of 311 and again, about 350, in order to preach against the Arians. He then returned to the desert, where he died in 356 at the age of 105.

Anthony, Susan Brownell, American reformer, was born at Adams, Mass., 1820; was educated at Battenville, N. Y., and, 1837-38, at Friends' boarding school, West Philadelphia. She taught school from the age of 15 to 30; aided in organizing the first state woman's temperance society in 1852; was active in the antislavery cause; and was organizer and secretary of the women's national loyal league during the Civil War. After the war, she devoted herself to the woman's suffrage movement; founded, in 1868, *The Revolution,* which she managed for several years; in 1869, organized, with Mrs. Stanton, the national woman suffrage association. She was widely known as a lecturer and wrote a large part of the 4-volume work entitled *History of Woman Suffrage.* Died, 1906.

Antiochus (*ăn-tī'ō-kŭs*) **III,** surnamed **the Great,** was born about 238 B. C. He succeeded his father, Seleucus Callinicus, as king of Syria in 223 B. C. and was the most distinguished of the Seleucidæ. He failed to recover Parthia and Bactria, but waged war with success against Ptolemy Philopator, and, though defeated at Raphia near Gaza, 217, he afterward obtained possession of all Palestine and Coele-Syria, dowering therewith his daughter Cleopatra on her betrothal to the young king, Ptolemy of Egypt. He afterward became involved in war with the Romans, who had conquered Macedonia; but he declined to invade Italy at the instigation of Hannibal, who had taken refuge at his court. He crossed into Greece, but was defeated in 191 at Thermopylæ and, in 190, by Scipio at Magnesia. Peace was granted him only on condition of his yielding all his dominions east of Mount Taurus and paying a heavy tribute. To raise the money, he proceeded to rob a rich temple in Elymais, but the people rose against him and killed him in 187 B. C. See *Seleucidæ.*

Antoinette, Marie. See *Marie Antoinette.*

Antoninus (*ăn'tō-nī'nŭs*), **Marcus Aurelius.** See *Aurelius, Marcus.*

Antoninus Pius, Titus Aurelius Fulvus, Roman emperor, was born in 86 A. D. of a family which came originally from Gaul. He inherited great wealth and early gave proof of excellent qualities. In 120, he was made consul; afterward he was sent by Hadrian as proconsul into Asia, where the wisdom and gentleness of his rule won for him a higher reputation than had been enjoyed by any of his predecessors. In 138, he was adopted by the emperor Hadrian in consequence of merit alone and he came to the throne in the same year. The reign of Antoninus was proverbially peaceful and happy. The persecution of Christians, which was continued during his reign, was partly stayed by his mild measures. Died in the year 161.

Antony, Mark, Roman general, was born at Rome in 83 B. C. He fought bravely as a soldier in Syria and Egypt, and in Gaul under Cæsar, whose firm friend he became. He took part in Cæsar's great victory of Pharsalia and was made consul with him in 44 B. C. After Cæsar was killed, Antony with Augustus and Lepidus formed a government called the Second Triumvirate, which defeated the republican army of Brutus and Cassius at Philippi. Some time after, Antony visited Alexandria, where he met the fascinating Cleopatra, queen of Egypt. His love for her caused him to neglect his duties of state. His rule became despotic, and he was eventually attacked by Augustus, who defeated him in the naval battle of Actium. During the battle, he was deserted by the Egyptian fleet. Soon afterward he took his own life, 30 B. C. See *Rome: History, Rise of Octavius.*

Apelles (*à-pĕl'ēz*), Greek painter, flourished in the latter part of the 4th century B. C. He was probably a native of Colophon, in Asia Minor. He united the fine coloring of the Ionian with the accurate drawing of the Sicyonic school. During the time of Philip, Apelles visited Macedon, where he became the intimate friend of Alexander the Great. It was probably at the Macedonian court that the best days of Apelles were spent. The most celebrated of his paintings were "Anadyomene," or "Venus Rising from the Sea," and similar subjects; but he cultivated the heroic as well as the graceful style. His ideal portrait of Alexander wielding a thunderbolt was highly esteemed and was long preserved in the temple of Diana at Ephesus. The date of his death is not known.

Apollodorus (*à-pŏl'ō-dō'rŭs*), a Greek architect of the 2d century, was born at Damascus. He was employed at Rome by the emperor Trajan, for whom he built the forum and the column which bear that monarch's name. His greatest work was a huge bridge over the Danube at its confluence with the Alt. He was banished and put to death by Hadrian for criticizing the latter's architectural plans.

Apollonius (*ăp'ō-lō'nĭ-ŭs*) of Perga, in Asia Minor, called "the great geometer," lived in the second half of the 3d century B. C. He was educated at Alexandria, and wrote a treatise on *Conic Sections* in eight books. He is justly considered one of the founders of the mathematical sciences.

Apollonius, called the Rhodian (Apollonius Rhodius), was born in Alexandria about 295 B. C. He presided over an academy at Rhodes and was an eminent rhetorician. He wrote poems, one of which, the *Argonautica,* is an epic poem containing an account of the mythical expedition in search of the golden fleece. Died about 215 B. C.

Apollonius of Tyana, was born about 3 B. C. in Tyana, Cappadocia. He was a zealous Neo-Pythagorean teacher, regarding whom many miraculous stories are told. He traveled widely and became acquainted with much of the religious knowledge of the Brahmans. Both in ancient and in modern times, biographical accounts of Apollonius have been written with a view to showing the superiority of his life to that of Jesus. Died about 100 A. D.

Apponyi (*ŏp'pō-nyē*), **Count George,** Hungarian statesman, was born in 1808. He was a member of the Pressburg diet of 1843 and became chancellor of Hungary in 1847. His opposition to the revolutionary movement of 1848-49 resulted in his retirement. In 1859, he was made a member of the imperial council in Vienna. He was instrumental in bringing about the reconciliation between Austria and Hungary that led to their union into Austria-Hungary. Died, 1899.

Apuleius (*ăp'ū-lē'yŭs*), Greek satirical writer, was born at Madaura, Africa, about 125 A. D. and was educated at Carthage. He went later to Athens, where he entered keenly upon the study of philosophy, displaying a special predilection for the Platonic school. He visited Italy and Asia, and was initiated into numerous religious mysteries. The knowledge of the priestly fraternities which he thus acquired served as material for his *Golden Ass,* one of the earliest romances in European literature. It narrates the adventures of a man who was temporarily transformed into an ass. The date of his death is unknown.

Aquinas (*à-kwī'nàs*), **Saint Thomas,** theologian and saint of the Roman Catholic Church, was born near Aquino,

in the kingdom of Naples, 1227. He received his earliest instruction at the monastery of Monte Cassino and, about 1240, went to the University of Naples. He was without worldly ambition and longed for the seclusion and quiet of the monastic life. He made profession as a Dominican in 1243; studied at Paris; and, in 1245, became a pupil of Albert the Great at Cologne.

In 1253, Aquinas began his studies at the University of Paris and, four years later, received there his degree as doctor of theology. Thoroughly imbued with the scholastic, dialectic, and Aristotelian philosophy, he gained prominence as a teacher in Paris. In 1261, Urban called him to Rome to assist in the difficult task of reconciling the Greek and Latin churches. In 1269, he was again in Paris; three years later, he went to Naples, where he taught until shortly before his death.

The *Summa Theologiæ*, "Compendium of Theology," is Saint Thomas's greatest work. It remains to this day the most comprehensive and complete of all expositions of the Catholic system. His commentaries on Scripture and his devotional treatises also have a high reputation. He united theology with ethics and clearly set forth the philosophy of Christian morals. All his works were written in Latin.

Saint Thomas sought, in his writings, to effect a harmony of reason and revelation by means of an orderly, consistent, and comprehensive system of theology. To this purpose, he invoked all the power and subtleties of Aristotle's logic. By nature and training, Saint Thomas was the very embodiment of the scholastic method of intricate analysis, yet his style was so clear that his writings are intelligible and interesting to the modern reader.

Aquinas died in 1274 when on his way to attend the General Council that Gregory X had convoked at Lyon, France. He was canonized in 1323 and, two centuries later, Pius V named him the fifth doctor of the Church.

Arago (*ăr'ă-gō*), **Dominique,** French philosopher, was born at Estagel, France, 1786. In 1806, he was engaged with Biot in measuring an arc of a meridian. His subsequent life was distinguished by an ardent and successful devotion to science. In 1816, with Gay-Lussac, he established the *Annales de chimie et de physique*, and demonstrated the value of the undulatory theory of light. In 1818 appeared his *Recueil d'observations géodésiques, astronomiques, et physiques*. In 1820, he made several important discoveries in electro magnetism. He was also eminent as a liberal politician. Died, 1853.

Arbaces (*ăr-bā'sēz*) was one of the generals of Sardanapalus and the founder in 876 B. C. of the Median empire. In conspiracy with a Chaldean priest who commanded the troops from Babylon, he revolted, gained the assistance of several prominent officers, and defeated Sardanapalus, who then committed suicide. The dynasty of Arbaces lasted until 559 B. C., when Cyrus overthrew it.

Arc, Joan of. See *Joan of Arc.*

Archimedes (*ăr'kĭ-mē'dēz*), Greek scientist and inventor, was born in Syracuse, Sicily, about 287 B. C. He is said to have visited Egypt in early life, and to have invented there several hydraulic machines, including the Archimedean screw, which he applied to drainage and irrigation. He discovered the law of specific gravity, still called Archimedes' principle. His purely mathematical works show that he far excelled all who preceded him. The most celebrated are on the ratio of the sphere and cylinder, on the ratio of the circumference to a diameter, on spiral lines, and on the parabola. In his old age, he defended Syracuse against the Romans under Marcellus with great mechanical skill, and was killed at its capture in 212 B. C. See *Archimedes' Principle.*

Arensky (*ä-rĕn'skē*), **Anton Stepanowitch,** Russian composer, was born at Novgorod, 1861. He received his musical education at the conservatory in Petrograd, where he studied under Rimsky-Korsakov, 1879–82. In 1883, he was made professor of composition in the imperial conservatory of Moscow. In 1895, he succeeded Balakireff as conductor of the imperial court chorus in Petrograd. While associated with the younger Russian school of composers, his compositions are modeled more nearly according to the musical ideals of Glinka and Tchaikovsky. His works include the operas *The Dream on the Volga*, *Raphael*, and *Nala and Damayanti*; also symphonies, chamber music, numerous piano pieces, choruses, and songs. He is the author of *Treatise on Harmony* and *Handbook of Musical Form.* Died at Tarioki, Finland, 1906.

Ariosto (*ă'rē-ŏs'tō*), **Ludovico,** Italian poet, was born at Reggio, 1474. His education was intended to fit him for law, but this study proved uncongenial, and he spent much of his time in the composition of verse. In 1503, he was introduced to the court of the cardinal Ippolito d'Este, who employed him in many negotiations. Here he produced his famous poem, *Orlando Furioso*, which was published at Ferrara in 1516. Died, 1533. See *Italian Literature: The Renaissance.*

Ariovistus (*ă-rĭ-ō-vĭs'tŭs*), a chief of the Marcomanni, a German tribe, who crossed the Rhine to aid the Sequani against the Ædui in the 1st century B. C. He occupied a considerable territory in Gaul, but was finally defeated by Cæsar at Vesontium (Besançon) in 58 B. C. Ariovistus himself escaped over the Rhine into his own country.

Aristarchus (*ăr'ĭs-tär'kŭs*) of Samos, an Alexandrian astronomer, flourished about 280–264 B. C. He is said to have anticipated Copernicus in maintaining that the earth moves round the sun. He wrote a treatise on the relative distances of the sun and the moon from the earth.

Aristides (*ăr'ĭs-tī'dēz*), surnamed "the just," was the son of Lysimachus. He was one of the ten leaders of the Athenians against the Persians at the battle of Marathon, 490 B. C. He later supported a military policy as opposed to the naval policy of Themistocles. A popular vote decided against Aristides, who retired into exile. Recalled in 480 B. C., he had a share in the victories at Salamis and Platæa. He was instrumental in organizing the Delian confederacy and was charged with assessing the contributions to be made by each state. Died, 468 B. C.

Aristippus (*ăr'ĭs-tĭp'ŭs*), the founder of the Cyrenaic, or hedonistic, school of philosophy among the Greeks, was born about 425 B. C. at Cyrene, in Africa. He was a pupil of Socrates. His system, based on the doctrine that pleasure is the highest good, was further developed by his daughter Arete and by her son Aristippus the Younger. The date of his death is unknown.

Aristophanes (*ăr'ĭs-tŏf'ă-nēz*), Greek comedian, was born at Athens probably about 445 B. C. He began writing when very young, and his first plays were brought out under another name because he was not old enough to contend for the prize. He wrote, in all, 54 comedies, but only 11 have come down to us. *The Knights* and *The Clouds* are among his most admired pieces; others are *The Wasps*, *The Birds*, and *The Frogs*. Aristophanes was conservative and aristocratic in sympathy, and he mercilessly ridiculed the newer movements in politics and thought. One of his finest plays, *The Clouds*, is a satire against Socrates. His plays contain passages of the most beautiful and finished poetry. Died about 385 B. C. See *Greek Literature: Comedy.*

Aristotle, founder of the celebrated Peripatetic school of philosophy at Athens, was born at Stagira, Macedonia, in the year 384 B. C., the son of Nicomachus, a court physician of Macedon. Having lost both parents while he was quite young, Aristotle was brought up under the care of Proxenus, a friend of the family. When he had completed his 17th year, Aristotle repaired to Athens, where, for three years, he pursued his studies by books and teachers as best he could. On the return of Plato from Syracuse, Aristotle placed himself under his instruction and became the most distinguished member of the Academy, as Plato's school was called.

Career. The death of Plato in 347 B. C. was the occasion of Aristotle's departure from Athens. He went to Atarneus in Asia Minor, where, at the small but interesting court of Hermeias, he spent three years, enjoying the society of intellectual friends and devoting himself with unremitting assiduity to the study of nature. Aristotle subsequently married Pythias, the sister of Hermeias. To their son, Nicomachus, he dedicated his chief work on ethics, called the *Nicomachean Ethics*.

While residing at Mytilene in Lesbos, whither he went about 344 B. C., Aristotle received from Philip, king of Macedon, the flattering invitation to superintend the education of the latter's son, who later was called Alexander the Great. In 342 B. C., Aristotle took up his residence at the Macedonian court in Pella. It was for the use of his pupil that he wrote his *Rhetoric* in 338 B. C. From the death of Philip until the time of Alexander's Asiatic expedition, Aristotle continued to live with the youthful king as his friend and counselor.

Returning to Athens in 334 B. C., Aristotle opened a school called the Lyceum. From his habit of walking up and down in the garden during his lectures arose the other name of his school, Peripatetic, derived from *perípateo*, "walk about." It was his custom to give a morning lecture on the more abstruse subjects to select pupils, and then, in the evening, one of a more popular nature to a general audience. It is probable that, at this time too, he composed his principal works. Aristotle's connection with Macedon made him unpopular in Athens. He was charged with impiety and sedition, and, wishing to avoid the fate of Socrates, he made his escape to Chalcis in 323 B. C.

Comparison With Plato. Although a student under Plato for many years, Aristotle, in his writings, frequently criticized his master's views, sometimes unfairly. Plato was an artist and poet as well as a thinker, while Aristotle had a greater interest in reducing facts or methods to a system. Most of Aristotle's systematized results are to be found in Plato's works, but in a form dictated by artistic considerations. Plato was an expert mathematician, while Aristotle was a biologist.

Writings. The most important of Aristotle's writings are the *Organon*, *Rhetoric*, *Poetics*, *Ethics*, *Politics*, *History of Animals*, *Physics*, *Metaphysics*, *Psychology*, and *Meteorology*. It may be said with justice that there was not one subject discussed in his day which Aristotle did not touch and clarify. He laid the foundations, also, of many new biological and social sciences. In his *Organon*, or "Logic," one finds the basis and nearly the whole substance of syllogistic logic, which became, with the schoolmen, the method of Catholic theology. Died, 322 B. C. See *Greek Education*.

Arius (*ā-rĭ'ŭs; ă'rĭ-ŭs*), founder of Arianism, was born in Libya about 256 A. D.; was trained in Antioch; and became a presbyter in Alexandria. Here, about 318, he maintained, against his bishop, that the Son was not co-equal or co-eternal with the Father, but was only the first and highest of all finite beings, created out of nothing by an act of God's free will. He secured the adherence of clergy and laity in Egypt, Syria, and Asia Minor, but was deposed and excommunicated in 321 by a synod of bishops at Alexandria. Eusebius, bishop of Nicomedia, absolved him and, in 323, convened another synod in Bithynia, which pronounced in his favor. He defended his views before the council of Nicæa, 325, but they were condemned. Died at Constantinople, 336.

Arkwright, Sir Richard, inventor of the spinning frame, was born at Preston, England, December 23, 1732, of poor parents, the youngest of thirteen children. In boyhood he was apprenticed to a barber, and his educational advantages were very limited. Settling at Bolton Willows near Manchester in 1750, he followed his trade for ten years; then, having invented a process of dyeing human hair, he became a hair merchant.

Little is known regarding the steps by which Arkwright was led to make the important invention that brought him fame and fortune. The first hint was received, however, according to his own account, from seeing a red-hot iron bar drawn through two sets of rollers, the second moving more rapidly than the first. As he lived in a district where cotton fabrics were extensively manufactured and was endowed with keen inventive genius, this process suggested to him that cotton, when cleaned and carded, might be dealt with in the same manner. In 1769, Arkwright obtained a patent for his spinning frame, by means of which a large number of threads might be spun at the same time, instead of the single thread produced on the ordinary spinning wheel.

The rise of the modern cotton manufacturing industry dates from the introduction of this labor-saving machine. At the time of its invention, however, Arkwright was too poor to buy clothing suitable for his appearance in public. Moreover, he was greatly hampered by the bitter opposition of jealous employers and hostile workmen. But, by reason of his earnestness, energy, and perseverance, which surmounted all obstacles, Arkwright won the support of able partners and built a mill at Nottingham in 1769. In 1771, he erected a much larger mill at Cromford.

Later, Arkwright established other factories and invented additional cotton-working machines, which produced for him and his associates fortunes then considered prodigious. The results of his discoveries were multiplied a hundredfold by the introduction of the steam engine. His patents were nullified by the courts in 1785, but wealth from his well managed factories continued to flow upon the inventor, who eventually amassed property valued at about $2,500,000. In 1786, he was knighted. Arkwright revolutionized the textile industry, not only by designing machines which immensely increased production, but also by organizing the system which made the modern factory possible. Died, 1792. See *Inventions, Epoch-Making*.

Arliss, George, actor, was born in London, Eng., 1868. He made his first appearance on the stage in 1887 at London and his first tour of America in 1901. His more notable triumphs have been made in the title rôles of the *Devil* and *Disraeli* and in the *Green Goddess*.

Arminius (*ăr-mĭn'ĭ-ŭs*), a German chieftain, prince of the Cherusci, was born about 18 B. C. He became a Roman citizen and served as a soldier in the Roman army. Coming home, in 9 A. D., he found the whole country stirred up by the cruelties of Varus, the Roman governor. Arminius then became the head of a conspiracy and induced the Roman general to scatter his troops in small detachments, saying that it would keep better order among the Germans. News of the conspiracy caused Varus to march into the interior; the scattered Roman troops were murdered, and the main body was surrounded and killed almost to a man, Varus taking his own life. Rome was filled with shame. The emperor Augustus kept crying for days: "Varus, give me back my legions!"

In 15 A. D., Germanicus marched against the Cherusci, but accomplished nothing. The next year, he marched again with 80,000 men and a fleet. Arminius artfully led him into narrow passes; then, falling upon him, cut off his cavalry, almost destroyed four legions, and forced him to retreat. The next year, the undaunted Germanicus came with 100,000 men and 1000 ships. On a plain, called "no-man's meadow," a great battle was fought. The Germans were beaten at first, but, the next morning, they compelled the Romans to retreat. From this time no Roman army ever marched beyond the Rhine, and Arminius is, therefore, justly called the "German liberator." He was assassinated in 21 A. D. See *Germany: History*.

Arminius, Jacob, Dutch theologian and author of the system of Arminianism, was born, 1560, at Oudewater, a small town in Holland. He studied at the University of Leiden, attended the school of theology in Geneva, and later studied at Basel. He was ordained at Amsterdam in 1588, and soon became distinguished as a preacher. In 1589, he consented to answer a book which attacked the doctrine of Calvinism, and, while preparing to do so, embraced the doctrine which he was trying to refute. From 1603 to 1609, he was professor in the University of Leiden. He was a gifted scholar, a preacher of great popular power, and an author of ability. Died, 1609.

Armour, Jonathan Ogden, American capitalist and meat packer, son of P. D. Armour, was born in Milwaukee, Wis., 1863. He entered Yale but did not complete his course. Yielding to a request of his father, he returned to Chicago and relieved him of some of his business cares. On the latter's death in 1901, he succeeded him as president of Armour and Company, packers. Post-War readjustments greatly reduced his fortunes. Died, 1927.

Armour, Philip Danforth, merchant and capitalist, was born at Stockbridge, N. Y., 1832. His fortune was made largely in the immense commission business he conducted in Chicago and elsewhere, and in railways. For many years, he was the head of the firm of Armour and Company, pork packers and dealers in dressed meats and provisions. At his death, his wealth was estimated at about forty millions. The chief objects of his benevolence were the Armour institute of technology in Chicago, opened in 1893, and the Armour mission. He died at Chicago, 1901.

Armstrong, Sir William George, English inventor and manufacturer, was born in 1810 at Newcastle, England. In 1840, he produced an improved hydraulic engine and, in 1845, the hydraulic crane. Shortly afterward, he began the erection of the Elswick engine works at Newcastle. This large establishment at first produced chiefly hydraulic cranes, engines, and bridges, but later became noted for the production of ordnance, and especially of the Armstrong gun. Armstrong offered to his government all his inventions. He was knighted in 1859 and was created Baron Armstrong in 1887. He wrote *Electric Movement*. Died, 1900.

Arne (*ärn*), **Thomas Augustine,** English composer, was born in London in 1710. His father, an upholsterer, intended him for the bar, but young Arne became skillful as a violinist, forming his style chiefly after Corelli. His zeal in the study of music induced his sister, Mrs. Cibber, to cultivate her excellent voice. He wrote for her a part in his first opera, *Rosamond*, which was performed with great success in 1733. Next followed his comic operetta, *Tom Thumb*, and afterward his *Comus*. The national air, "Rule Britannia," originally given in the masque of *Alfred*, is his composition, as are also two operas, *Eliza* and *Artaxerxes*. He died in London, 1778.

Arnold, Benedict, American soldier and traitor, was born in Connecticut, 1741. He joined Ethan Allen's expedition against Ticonderoga, and later succeeded Montgomery after the latter's death in an unsuccessful assault on Quebec, 1775. Refused promotion by Congress, he consented to remain in the army only at Washington's request. While in command of Philadelphia, 1778-79, his actions were severely criticized, and he was court-martialed and reprimanded.

In 1780, Arnold secured command of West Point and entered into treasonable negotiations with Sir Henry Clinton for its betrayal. The capture of Major André exposed the plot, and Arnold escaped to a British war vessel. He became a brigadier general in the British army and commanded several minor attacks during the last months of the war. He was pensioned by the English government, but was despised and neglected by the English people. He was a soldier of remarkable daring and ability, but unscrupulous. Died, 1801.

Arnold, Sir Edwin, English author and journalist, was born in 1832. He was educated at King's college, London, and at Oxford university. After teaching for a time in King Edward's school, Birmingham, he became principal in the Sanskrit college of Poona, British India. He is noted as the author of several books, among them *The Poets of Greece* and the well-known poem, *The Light of Asia*. Died, 1904.

Arnold, Matthew, English poet and critic, oldest son of Thomas Arnold, the noted head master of Rugby, was born in Middlesex, England, 1822. He was educated

at Winchester, Rugby, and Oxford. In 1845, he was elected fellow of Oriel college and, in 1851, he was appointed lay inspector of schools. For ten years, 1857–67, he held the chair of poetry at Oxford. Among Arnold's productions may be noted his Newdigate prize poem *Cromwell*, *The Strayed Reveller*, and a volume entitled *New Poems* published in 1869.

As a critic, Arnold holds a high place and, as a poet, he is ranked by some as second only to Tennyson and Browning among Victorian writers. His later prose works were chiefly theological, being attempts to grapple with the supernatural aspects of Christianity from a rationalistic standpoint. His writings include also *St. Paul and Protestantism*, *Literature and Dogma*, and *God and the Bible*. He died in 1888. See *English Literature*: *Victorian Age*.

Arnold, Thomas, English educator and historian, was born in 1795 in the Isle of Wight. He was educated at Winchester, and at Corpus Christi college, Oxford. In 1815, he became fellow of Oriel, obtaining in that year the chancellor's prize for the Latin essay. After taking holy orders, he passed nine years at Laleham, near Staines, in literary occupations, and in preparing young men for the universities. Appointed, in 1828, head master of Rugby school, he raised that institution beyond all precedent, both by the remarkable success of his pupils and by the introduction of new branches of study. He was of the Broad church school of thought and a vigorous opponent of the tractarian movement. In 1841, he was appointed professor of modern history at Oxford. His best-known works are his edition of *Thucydides*, his *History of Rome*, and his sermons delivered in the chapel of Rugby school. Died, 1842.

Arnoldson, Klas Pontus, Swedish publicist and peace advocate, was born at Goteburg, Sweden, in 1844. He devoted a long, active life to the causes of religious liberty, woman's equality before the law, Scandinavian unity, and international peace. As editor of various newspapers and periodicals and as member of the Swedish Riksdag for several terms, he ably advocated his principles. In recognition of his efforts to promote international peace, he was awarded the Nobel peace prize for 1908 jointly with Fredrik Bajer of Denmark. Died in 1916.

Arrhenius (*ăr-rā'nĭ-ŭs*), **Svante August,** Swedish chemist, was born at Wijk, Sweden, in 1859, and was educated at the University of Upsala. In 1895, he was appointed professor of physics in Stockholm and, in 1905, he was made director of the physicochemical department of the Nobel institute, Stockholm. His most important researches are in physical chemistry, particularly in the theory of solutions, resulting in some of the most valuable recent contributions to chemical science. He received the Nobel prize for chemistry, 1903, and the Faraday medal, 1914. His works include *Worlds in the Making*, *Theories of Chemistry*, and numerous monographs and lectures. Died, 1927.

Arrian (*ăr'ĭ-ăn*), or **Flavius Arrianus,** Greek historian, was born in Nicomedia, Bithynia, about 100 A. D. He is best known by his history of the campaigns of Alexander the Great, which, in imitation of Xenophon, he called the *Anabasis of Alexander*. The emperor Hadrian made him a Roman citizen and governor of Cappadocia in 136. When fifty years old, he settled in his native city. Besides the *Anabasis*, he wrote an account of a voyage in the Black Sea, an account of India, and other works. Died about 180.

Artemisia (*ăr'tê-mĭsh'ĭ-ȧ*), daughter of Hecatomnos and wife of Mausolus, king of Caria, Asia Minor, whom she succeeded as ruler of Caria upon his death in 353 B. C. She defeated an attempt of the Rhodians to free themselves and surprise her capital. She immortalized her name by the honors which she paid to the memory of her husband, erecting for him in Halicarnassus a splendid tomb, called the Mausoleum. This was one of the seven wonders of the ancient world, and from it the name mausoleum was given to all tombs distinguished for their magnificence. She built also a monument in Rhodes in commemoration of her conquest of the island. There are statues of Mausolus and Artemisia in the British museum. According to tradition, her death, in 351 B. C., resulted from grief for the loss of her husband.

Arthur, Chester Alan, twenty-first president of the United States, was born in Franklin county, Vt., 1830. He was graduated at Union college in 1848, studied law, and was admitted to the bar. In 1861, he was appointed inspector general and later quartermaster-general of New York State. From 1871 to 1878, he was United States collector of the port of New York. He was elected vice president of the United States in 1880 and, on the death of President Garfield, September 19, 1881, he became president. Died, 1886.

Arthur, Julia, is the stage name of Ida Lewis, American actress, who was born at Hamilton, Ontario, in 1869, of Irish and Welsh parentage. At 11, in amateur dramatics, she played Portia in *The Merchant of Venice*. Three years later, she made her professional début as the prince of Wales in *Richard III*. A few years afterward she scored her first New York success in *The Black Masque*. In 1895, she appeared in London in Henry Irving's company, playing rôles with Ellen Terry. Returning in 1896 to the United States with Irving and Terry, she was very successful as Rosamond in *Becket*. In 1897, she produced *A Lady of Quality*, and, in 1898, she appeared as Rosalind in *As You Like It*. In 1899, she was notably successful as Josephine in *More than Queen*, which was the last rôle created by her on the American stage until 1915-16, when she appeared in *The Eternal Magdalen*. In 1898, she married B. P. Cheney, Jr.

Asbury (*ăz'bĕr-ĭ*), **Francis,** the first bishop of the Methodist Episcopal Church ordained in America, was born in Staffordshire, England, 1745. At the age of 14, he was apprenticed to a mechanic; two years later he began work as a local preacher. Later, he joined the itinerant ministry and after three years of service was sent to America as a missionary. In 1772, he was appointed general assistant by John Wesley. He brought new life into the work, and, at the outbreak of the Revolution, when many other ministers returned to England, he kept on in his labors. At the end of the war, it was decided to found an independent Methodist Episcopal Church for America, and, in 1784, Asbury was ordained bishop by his colleagues, who had already been ordained by Wesley in England. For more than 30 years, he worked earnestly and successfully. The rapid progress of Methodism in America was due largely to his efforts and ability. He helped to lay, in 1785, the foundation of the first Methodist college in America. Died at Spottsylvania, Va., 1816.

Ascham (*ăs'kăm*), **Roger,** English writer and classical scholar, was born in 1515 at Kirby Wiske, in Yorkshire. His reputation as a classical scholar brought him numerous pupils, and he was appointed by Cambridge university to read lectures in the public schools. He wrote, in 1545, a treatise entitled *Toxophilus*, the pure English style of which entitles it to rank as a classic in English literature. For this treatise, which was dedicated to Henry VIII, he was awarded a pension. In 1548, he became master of languages to Lady Elizabeth, afterward queen, and was subsequently appointed Latin secretary to Edward VI and Queen Mary. After the death of Mary, Elizabeth retained him at court as secretary and tutor. Died, 1568.

Ashburton, Alexander Baring, Lord, English diplomat, second son of the noted merchant, Sir Francis Baring, was born in 1774. Having been employed as special ambassador from England to the United States, he concluded in 1842 the famous treaty, called the Ashburton Treaty, by which the frontier line between the state of Maine and Canada was definitely settled. He died in 1848.

Asoka (*ȧ-sō'kȧ*) was an emperor of India from 264 to about 228 B. C. and was chiefly responsible for the spread of the Buddhist religion in India. He conducted many remarkable missionary enterprises and set up in the country numerous inscriptions outlining Buddhist doctrines. Asoka is often compared to Constantine, who played a similar rôle in the establishment of Christianity in Europe.

Aspasia (*ăs-pā'shĭ-ȧ*), a beautiful Athenian woman, a native of Miletus in Asia Minor, noted for her genius, wit, and political influence, flourished about 440 B. C. After her marriage to Pericles, who repudiated his wife in order to wed her, her house became the meeting place for the learned men of Athens. Socrates is said to have been one of her admirers. She was indicted for impiety, but Pericles successfully defended her in court. After his death, she lived for a year with a sheep owner. Later details of her life are unknown.

Asquith (*ăs'kwĭth*), **Herbert Henry,** prime minister of England, 1908–16, was born at Morley, Yorkshire, in 1852. He was educated at Balliol college, Oxford, and, in 1876, was admitted to the bar. He entered Parliament in 1886 and rose rapidly to first rank as a debater, becoming one of the most effective speakers on the Liberal side. He was chancellor of the exchequer, 1905–08, and, on the death of Sir Henry Campbell-Bannerman, 1908, became prime minister.

For a long period, Asquith tactfully controlled the contentious elements of his own party and placated the Labor members and the Irish Nationalists. To meet war conditions, he formed a coalition cabinet in May 1915, which continued in power until December 1916, when it was superseded by the virtual though authorized dictatorship of Lloyd George at the head of a special war council. Asquith was member of Parliament for East Fife, 1886–1918, and, in 1920, was elected member of Parliament for Paisley. His *Genesis of the War* is an important historical document. Died, 1928.

Asquith, Margot, English writer and wife of Herbert Henry Asquith, is known chiefly for her *Autobiography*. In this she gives intimate descriptions of people prominent in government circles during the time when her husband was prime minister of Great Britain.

Asser (*ä'sĕr*), **Tobias Michael Carel,** Dutch statesman, born in Amsterdam, 1838. He was made professor of law in the atheneum of Amsterdam in 1862, and from 1876 to 1893 he occupied a similar chair at the university. He was appointed counselor to the foreign office in 1875, and member of the Dutch council of state in 1893. At the Peace Conference at The Hague in 1899 and in the International Court of Arbitration, he was the delegated representative of Holland.

Asser's profound researches in internationa law and his distinguished efforts in behalf of the peaceful adjustment of international problems extended his reputation far beyond his own country. In 1911, he received the Nobel peace prize jointly with A. H. Fried. His published works include *Outlines of Dutch Commercial Law*, *Outlines of Private International Law*, *Codification of Private International Law*, and *International Arbitration between the United States and Russia*. Died, 1913.

Aston, Francis William, English physicist and chemist, born in 1877, was educated at Malvern college, Mason college, and at Birmingham university. In 1910, he entered Trinity college and the Cavendish laboratory, Cambridge university, receiving, in 1912, a research degree and, in 1913, a Clerk-Maxwell studentship. From 1914 to 1919, he was technical assistant in the royal aircraft establishment at Farnsworth. In 1920, he was made fellow of Trinity college, Cambridge, and became president of the Cambridge Philosophical Society. His researches include investigations of mass spectra, electric discharges in gases, isotopes, and of other physical and chemical subjects. In 1922, he published *Isotopes* and was awarded the Nobel prize for chemistry. See *Atomic Numbers*, *Isotopes*.

Astor, John Jacob, American merchant, founder of the American Fur Company, was born near Heidelberg, Germany, 1763. After spending some years in London, he sailed to America in 1783, and soon invested his small capital in furs. By economy and industry, he so increased his means that after six years he had acquired a fortune of $200,000. Although the increasing influence of the English fur companies in North America was unfavorable to his plans, he ventured to fit out two expeditions to Oregon, one by land and one by sea. The purpose of these was to open up regular commercial intercourse with the natives.

After many mishaps, Astor's object was achieved in 1811, and the fur-trading station of Astoria was established. From this period, in spite of the war of 1812 and other temporary obstacles, his commercial connections extended over the entire globe. He died in 1848, leaving property valued at about 30 million dollars. See *Astoria*.

Astor, John Jacob, capitalist and inventor, great-grandson of John Jacob Astor, was born at Rhinebeck, N. Y., 1864. He was graduated from Harvard in 1888; traveled abroad, 1888–91; and was manager of the family estates, 1891–1912. In 1897, he built the Astoria hotel, New York, adjoining the Waldorf hotel, which was built by William Waldorf Astor, his cousin, the two forming one building under the name Waldorf-Astoria hotel, at the date of completion one of the largest and most costly hotels in the world.

In May 1898, he was commissioned lieutenant colonel of United States volunteers and presented to the government a mountain battery, said to have cost over $100,000, for use in war against Spain. He was assigned to duty on the staff of Major General Shafter, and served in Cuba during operations ending in the surrender of Santiago. Among his inventions were a bicycle brake, a pneumatic road improver, and an improved turbine engine. Author: *A Journey in Other Worlds* and *A Romance of the Future*. Died at sea in the sinking of the *Titanic*, 1912.

Astor, Lady Nancy Langhorne, first woman member of the British Parliament, was born in Virginia, U. S. A., 1879. She married Robert Gould Shaw in 1897. Obtaining a divorce in 1903, she married Viscount Astor in 1906. In 1919, she was elected to the House of Commons, where she took a prominent part in various debates and successfully sponsored a bill prohibiting the sale of liquor to minors.

Astor, William Waldorf, Baron, capitalist and author, was born in New York, 1848. He was a son of John Jacob, second, and great-grandson of John Jacob, founder of the Astor fortune. He was educated by private tutors, finishing in Europe. In 1871, he entered the office of the Astor estate and, in 1890, succeeded his father as head of the Astor family, with personal fortune estimated at $200,000,000. He served as United States minister to Italy, 1882–85; removed to England, 1890; purchased *Pall Mall Gazette* and *Pall Mall Magazine*, 1893; became British subject, 1899; and was created baron, 1916. His writings include *Valentino, a Story of Rome*; *Sforza*; *Pharaoh's Daughter and Other Stories*. Baron Astor died in 1919, and was succeeded in the title by his oldest son, Waldorf Astor, born in 1879.

Atahualpa (*ä'tä-wäl'pä*), was the last Peruvian Inca. In 1525, he succeeded his father, Huayna Capac, on the throne of Quito while his half brother, Huascar, although the rightful heir, obtained only the kingdom of Peru. The two brothers engaged in a struggle for supremacy, in which Huascar was defeated.

The Spaniards under Pizarro, taking advantage of these internal dissensions, invaded Peru. By an act of deliberate perfidy, they obtained possession of the person of Atahualpa and attempted to compel him to acknowledge the king of Spain as master, and to embrace the Christian religion. His refusal was made a pretext for a massacre of the Peruvians and the imprisonment of their king, whom the Spaniards induced to raise an enormous treasure in the hope of regaining his throne. After a mock trial, however, he was condemned and executed in 1533. See *Peru: History*.

Athanasius (*ăth'ä-nā'shĭ-ŭs*), **Saint,** was born in Egypt about the year 296. Entering the Church at an early age, he was chosen bishop of Alexandria in 326. He is esteemed one of the most eminent among the ancient fathers of the church. He was an energetic opponent of Arius. His earnest advocacy of the Catholic faith, more particularly of the doctrine of the Trinity, subjected him to much persecution from the emperors Constantine and Julian, by both of whom he was several times exiled.

The writings of Athanasius are numerous, but consist chiefly of controversial treatises against his opponents and against Arianism. The more important of his writings are his *Apologies*, *Two Books on the Incarnation*, *Conference with the Arians*, *The Life of St. Anthony*, *The Abridgment of the Holy Scriptures*, *Letters to Those that Lead a Monastic Life*, and *Letters to Serapion*. He died in 373.

Athenagoras (*ăth'ĕ-năg'ō-răs*), a Christian philosopher, born at Athens, lived toward the close of the 2d century. His conversion to Christianity has been likened to that of Saint Paul. Writing against the Christians, in order to render his attacks more formidable, he referred to the Scriptures, and by reading them was converted to the true faith. His writings include a *Discourse on the Resurrection of the Dead* and an *Apology for Christians*.

Atherton, Gertrude Franklin (Horn), American novelist, great-grandniece of Benjamin Franklin, was born at San Francisco, Cal., in 1857. She was educated at Saint Mary's Hall, Benicia, Cal., and Sayre institute, Lexington, Ky. She married G. H. B. Atherton, and soon after his death, she began, in 1892, her literary career with a series of valuable studies of her native state and people. These included *Before the Gringo Came*, later revised as *The Splendid Idle Forties*; *American Wives and English Husbands*; *A Daughter of the Vine*; and *California*.

Later, she pictured, with notable skill, eastern scenery, social conditions, and history in *Patience Sparhawk, Aristocrats*, and *Senator North* and presented an epic portrayal of Alexander Hamilton in *The Conqueror*. Among her other writings are *Tower of Ivory*, *Julia France and Her Times*, *Rulers of Kings*, *The Valiant Runaways*, *The Gorgeous Isle*, *Perch of the Devil*, *The Living Present*, *The White Morning*, *The Avalanche*, and *Black Oxen*.

Atholstan, Lord. See *Graham, Hugh*.

Atticus Herodes, Tiberius Claudius, a rich Athenian, born about 101 A. D. To a vast sum of money left him by his father, he added much more by marriage. He was educated by the best masters, devoting special attention to oratory, in which he greatly excelled. He was also a noted teacher of rhetoric, having for pupils Marcus Aurelius and Lucius Verus. From Aurelius he received the archonship of Athens and the consulate of Rome.

The fame of Atticus rests mainly upon his immense expenditures for public purposes. In Athens, he built a race course of Pentelic marble and a splendid theater. In Corinth, he built a theater; in Delphi, a stadium; at Thermopylæ, hot-baths; at Canusium, in Italy, an aqueduct. He contemplated a canal across the isthmus of Corinth, but gave it up because Nero had tried and failed. He also restored several of the partially ruined cities of Greece. Later, he met with family misfortunes, the Athenians became his enemies, and he left the city for his villa near Marathon, where he died, 177 A. D.

Attila (*ăt'ĭ-lä*), king of the Huns, lived in the 5th century. He styled himself "the scourge of God," and, for a period of about 20 years, ruled central Europe practically from the Caspian Sea to the river Rhine. In 451, he sacked Belgic Gaul and invaded what is now northern France, but was defeated by the armies of Theodoric and Aëtius in the terrible battle of Chalons. In 452, Attila attacked northern Italy, devastating Milan, Padua, and other cities. The city of Venice was founded by those who fled before him. He died in 453. See *Huns*.

Atwood, George, English mathematician and physicist, was born at London in 1746. He was educated at Cambridge university, became tutor of Trinity college, Cambridge, and later held a position in the customs service. He made many important calculations and wrote various scientific treatises and papers. He also invented a machine

to illustrate the relations of time, space, and velocity in the motion of a body falling under the action of gravity. This has become widely known as "Atwood's machine." He died in 1807.

Atwood, Wallace Walter, American geologist and physiographer, was born in Chicago, 1872. He was graduated in 1897 and received the degree of doctor of philosophy in 1903 from the University of Chicago, in which, during the ensuing 10 years, he was successively instructor, assistant professor, and associate professor of physiography and general geology. From 1913 to 1920, he was professor of physiography at Harvard university, resigning in the last-mentioned year to become president of Clark university. During various periods after 1901, he was connected as geologist with the Illinois geological survey and with the United States geological survey. His writings include numerous scientific and educational papers; also *Glaciation of the Uintah and Wasatch Mountains, Mineral Resources of Southwestern Alaska,* and *New Geography.*

Auber (*ō'bâr'*), **Daniel François Esprit,** French composer, was born at Caen, in Normandy, 1782. His father was a print seller in Paris, and, being desirous that his son should devote himself to business, he sent him to London to acquire a knowledge of the trade. But his irresistible passion for music obtained the upper hand, and he became a pupil of Cherubini. His opera *Masaniello* is considered his best work. Among his other works are the well-known operas *Fra Diavolo* and *Manon Lescaut.* In 1842, after the death of Cherubini, he was appointed director of the conservatory of music, Paris. Died, 1871.

Aubigné (*ō'bēn'yā'*), **Jean Henri Merle d'.** See *Merle d' Aubigné, Jean Henri.*

Audubon (*ô'dŏō-bŏn*), **John James,** American naturalist of French descent, was born near New Orleans, La., in 1780. From childhood, he was devoted to natural history, but it was not until 1830 that the first of the four volumes of his great work, *The Birds of America,* appeared. This magnificent collection of colored plates, which was sold for $1000 a copy, was quickly followed by an explanatory work entitled *American Ornithological Biography.* Audubon also projected a similar work on the *Quadrupeds of America,* but much of this work was done by his sons, John and Victor.

Audubon was not a learned scientist or a great artist, but his self-denying enthusiasm for his subject and the uniformly pleasing qualities of work made him the most distinguished and best beloved of pioneer American naturalists. Died in New York, 1851; was elected to American hall of fame, 1900. See *Audubon Society.*

Auenbrugger von Auenbrug (*ou'ĕn-brŏŏg'ĕr fŏn ou'ĕn-brŏŏĸ*), **Leopold,** Austrian physician, was born at Graz in 1722. He originated the method of examining the lungs by percussion of the chest, and published the results of his investigations in a treatise which marks an important advance in the history of medicine. He died in Vienna, 1809.

Auerbach (*ou'ĕr-bâĸ*), **Berthold,** German writer, was born at Nordstetten in 1812. Having abandoned the study of Jewish theology, he devoted his attention to literature. His first publications were *Judaism and Modern Literature* and a translation of the works of Spinoza. In his *Educated Citizen* and *Village Tales of the Black Forest* he applied himself to the portraiture of real life. By some, his *Auf der Hohe,* "On the Heights," is regarded as his best novel. Many of his works have been translated into English, Swedish, and Dutch. *Das Landhaus am Rhein* is known under its English title, *The Castle on the Rhine.* He died at Cannes, France, in 1882.

Augereau (*ō'zh'-rō'*), **Pierre François Charles,** duke of Castiglione, marshal and peer of France, was born in Paris, 1757. He was one of the most brilliant and intrepid of the noted band of general officers whom Napoleon gathered around himself. In 1792, he volunteered in the French revolutionary army intended for the repulsion of the Spaniards. His services were so conspicuous that in less than three years he was made general of a division. He took an active part and gained much reputation in the battles of Millesimo, Ceva, Lodi, Castiglione, Roveredo, and Bassano.

In 1797, Augereau was appointed to the command of the army of the Rhine. In 1800, he received the command of the army in Holland, and was active in several engagements. In 1804, he was made a marshal and, in the following year, he commanded a division of the army which reduced the Vorarlberg. He was afterward engaged in the battles of Wetzlar, Jena, and Eylau; also in campaigns in Italy, Spain, Berlin, Bavaria, and Saxony. Died in 1816.

Augier (*ō'zhyā'*), **Guillaume Victor Emile,** French dramatist, was born at Valence, 1820. He was of prosperous middle class parentage, a grandson of Pigault Lebrun, the novelist. After receiving a good education, he prepared for the bar but, upon the success of his play, *La ciguë,* in 1844, began a notable literary career, producing a long series of plays which had a great influence upon the French drama.

In 1854, Augier produced, in collaboration with Jules Sandeau, *Le gendre de M. Poirier,* said to be the best modern French comedy, in which he definitely broke away from the artificial methods of Scribe. Thenceforward, he enjoyed a series of dramatic triumphs and, with Dumas, the younger, and Sardou, held front rank on the French stage during the Second Empire. He was elected to the French academy in 1857. Among his plays are *L'aventurière, Le mariage d'Olympe, Gabrielle, Les lionnes pauvres, Les effrontés, Le fils de Giboyer, Contagion, Maître Guérin, Lions et renards, Philiberte, Jean de Thommeray, Madame Caverlet,* and *Les Fourchambault.* Died at Croissy, 1889. See *French Literature: Nineteenth Century.*

Augustine (*ô-gŭs'tĭn*; *ô'gŭs-tīn*), **Saint,** one of the Latin church fathers, was born at Tagaste in Numidia, November 13, 354 A. D. He was sent to school at Madaura and, subsequently, at Carthage, where he mastered rhetoric, logic, geometry, arithmetic, and music. He became a lecturer on rhetoric first at Tagaste and, in 379, at Carthage. Four years later, he departed for Rome, shortly afterward proceeding to Milan, where he continued to pursue his profession.

At Milan, Augustine came under the influence of Neo-Platonism and also heard Christianity preached by Ambrose, the bishop of Milan. His mind was deeply reflective and had led him, as early as 373, to embrace Manichæism, a religion which was, in that age, a rival of Christianity. He deserted this sect and, after a long period of perplexity, decided to become a Christian. Leaving the woman with whom he had lived for about 17 years in what he came to regard as a sinful state, he was baptized with his son, Adeodatus, on April 25, 387 A. D.

In 391, Augustine was ordained a priest. Four years later, he was made colleague of Valerius, as bishop of Hippo. His activity was engaged throughout the remainder of his life in three great religious controversies—against the Manichæans, the Donatists, and the Pelagians. In the course of these controversies, he developed many of the theological doctrines upon which both the Catholic and the Protestant Church are based. As a philosopher, he may be regarded as the father of medieval scholasticism.

His best-known works are his *Confessions* and *De Civitate Dei,* "City of God." The latter, finished in 426, constitutes the first attempt to write a comprehensive philosophy of history. It compares this world with the City of God and describes the triumph of the latter. Died, August 28, 430, at Hippo, which, at that time, was being besieged by the Vandals.

Augustus, Caius Julius Cæsar Octavianus, Roman emperor, was born in 63 B. C. He was the son of Caius Octavius and Atia, niece of Julius Cæsar, by whom he was adopted when but four years of age. He was in Epirus when Julius Cæsar was assassinated, but speedily returned to claim his inheritance. Connected with Antony and Lepidus, Octavianus shared the guilt which stains the record of the Triumvirate. His colleagues in the Triumvirate put aside, he became emperor at the age of 36, with the title of Augustus. His reign was fortunate, good laws were framed in it, and the arts flourished under his protection. After his death in 14 A. D., temples and altars were erected to his memory. See *Rome: History.*

Aurelianus (*ô-rē-lĭ-ān'ŭs*), **Claudius** or **Lucius Domitius,** emperor of Rome, was born in Pannonia, 212 A. D., the son of a peasant. He entered the Roman army, in which his exploits attracted the notice of the emperors Valerian and Claudius. On the death of the latter in 270, Aurelianus was proclaimed emperor.

His short reign was a series of brilliant victories: the Goths and Vandals were subdued; the Alemanni, who threatened Rome itself, were exterminated; and Palmyra was sacked. Zenobia, the renowned queen of the East, and Tetricus, the deposed emperor of Gaul, Britain, and Spain, were led captive in the splendid triumph of the emperor. A formidable rebellion at home was crushed with terrible sternness. His severity made him feared even by his friends, who, as they deemed, in pure self-defense, conspired against him and put him to death, 275 A. D.

Aurelius, Marcus, surnamed **Antoninus,** Roman emperor and philosopher, was born at Rome, 121 A. D. His original name was Marcus Annius Verus. His qualities attracted the notice of the emperor Hadrian, who conferred high honors on him even while a child. When 17 years of age, he was adopted, with Commodus, by Antoninus Pius, the successor to Hadrian; and Faustina, daughter of Pius, was selected to be his wife. He was made consul in 140, and from this period to the death of Pius, 161, he continued to discharge the duties of his various offices with the greatest promptitude and fidelity.

On his accession to the throne, he illustrated the magnanimity of his character by sharing the government with young Commodus, who henceforth bore the name of Lucius Verus and to whom he gave his daughter Lucilla in marriage. Lucius died in 169, leaving Marcus Aurelius the sole ruler.

Although devoted to peace, the emperor was compelled to engage in wars throughout the whole of his reign. He was successful in repelling invasions of the barbarians on the northern and the eastern frontiers and in crushing insurrections in the East. His administration was vigorous and able.

As a thinker, Aurelius was the flower of the Stoic philosophy, and his love of learning was insatiable. His range of studies was extensive, embracing morals, metaphysics, mathematics, jurisprudence, music, poetry, and painting. He was the author of an elevated ethical work known as the *Meditations*. Though gentle and tolerant by nature and creed, he was actively hostile to Christianity, which, at that time, was threatening the culture and thought to which he was devoted. His death, occurring in 180, was felt to be a national calamity; he was deified, and for more than a hundred years his image was found among the household gods of the Romans.

Ausonius (*ô-sō'nĭ-ŭs*), **Decimus Magnus,** Latin poet, was born at Bordeaux, Gaul, about 310 A. D. He was appointed by Valentinian tutor to his son Gratian; he afterward held the offices of quæstor, prefect of Latium, and consul of Gaul. On the death of Gratian, Ausonius retired to his estate at Bordeaux, where he occupied himself with literature and rural pursuits. It is most probable that he was a Christian. His works include epigrams, poems on his deceased relatives and on his colleagues, epistles in verse and prose, and idyls. Died, 394.

Austen, Jane, English novelist, was born in 1775, at Steventon, Hampshire, England, of which parish her father was rector. Her principal productions are *Pride and Prejudice*, *Sense and Sensibility*, and *Persuasion*. They are distinguished for originality, naturalness, and fidelity of delineation, qualities in which the literature of her time was notably deficient. Her family removed successively to Bath and to Chawton. Died at Winchester in 1817.

Austin, Alfred, English poet laureate, novelist, and journalist, was born near Leeds, 1835; was educated at the University of London; and was admitted to the bar, 1857. His published works include *The Human Tragedy*, *Savonarola*, *The Tower of Babel*, *Prince Lucifer*, and many other poems, besides plays and various political papers. In 1896, he was made poet laureate of England, succeeding Tennyson. He produced much graceful verse and interesting literary criticism. Died, 1913.

Avebury (*āv'bĕr-ĭ*), **Lord.** See *Lubbock, Sir John.*

Averroës (*ȧ-vĕr'ō-ēz*), otherwise known as Ibn Roshd, Arabian philosopher, was born at Cordoba, Spain, 1126. He was appointed successor to his father as chief mufti and afterward became chief judge in the province of Mauritania. Accused of a departure from the orthodox doctrines of Mohammedanism, he was dismissed from his office and was condemned by the ecclesiastical tribunal of Morocco to recant his heretical opinions and do penance. He later returned to Cordoba and was reinstated in his offices. His commentaries on the works of Aristotle had a great influence on the scholastic philosophy. Died about 1198.

Avery, Samuel, American chemist and educator, was born at Lamoille, Ill., in 1865. He was graduated at the University of Nebraska in 1892 and at Heidelberg university in 1896. After being connected with the department of chemistry in the University of Nebraska from 1896 to 1908, he was chancellor of that institution until 1927, when he became professor of research in chemistry. He wrote a textbook and many technical articles on chemistry.

Avicenna (*ăv'ĕ-sĕn'ȧ*), otherwise known as Ibn Sina, Arabian physician and philosopher, was born, 980, at Efsene, a village near Bokhara. He was physician to several of the Samanide and Dilemite sovereigns, and was also for some time vizier in Hamadan. His work on medicine, *Kanun fi'l tibb*, based on Greek texts, long held first place in Europe, and it is still highly regarded in the Orient. He died at Hamadan in 1037.

Avogadro (*ȧ'vō-gȧ'drō*), **Amadeo,** Italian chemist and physicist, was born in 1776 at Turin, where for many years he was professor of higher physics in the university. In 1811, he formulated and published his celebrated law that under the same conditions of temperature and pressure equal volumes of gases and vapors contain equal numbers of molecules. This is one of the fundamental principles of chemistry and furnishes the chief method of determining atomic weights. He died at Turin, 1856.

Ayeshah (*ī'ê-shȧ*; *ā'ê-shȧ*), the favorite wife of Mohammed, was born at Medina in 610 or 611 A. D. She was only nine years of age when she married the prophet. Although she bore no children to Mohammed, she was so tenderly beloved by him that he was wont to say that she would be the first of his wives to whom the gates of paradise would be opened. It is stated by Mohammedan historians that to the charms of her beauty she added a knowledge of mathematics, rhetoric, and music. In his last illness, Mohammed, by his request, was carried to her house and expired in her arms. After the prophet's death, Ayeshah headed a force to resist the accession of Ali. She survived Mohammed for 46 years. Died in 678.

Ayres, Leonard Porter, American educator and economist, was born at Niantic, Conn., 1879. He received his college and graduate education at Boston, Harvard, and Columbia universities. In 1902, he began teaching in Porto Rico, where he later became superintendent of all public schools of the island. Returning to New York in 1908, he became prominent in the work of the Russell Sage foundation, first in connection with the backward children investigation and afterward as director of the educational department. During the World War, he rendered valuable service to the government as a statistician. In 1920, he became vice president of the Cleveland Trust Company, and his analytical studies of economic and investment trends gained for him a wide reputation. One of the most influential of his publications on education is *The Effect of Promotion Rate on School Efficiency*.

Babbitt, Isaac, American inventor, was born at Taunton, Mass., 1799. Following the trade of a goldsmith, he became interested in the manufacture of alloys. In 1824, he produced the first britannia ware made in the United States. In 1839, he made the discovery of the widely-known antifriction alloy of copper, tin, and antimony, which bears his name, "Babbitt metal." For this valuable discovery, he was given a gold medal by the Massachusetts charitable mechanics' association. In further recognition of his service to the mechanic arts, Congress voted him $20,000. He died in 1862. See *Babbitt Metal*.

Baber (*bä'bĕr*) (Zehir-Eddin Mohammed), the first of the great moguls in India, was born in 1483. He was a descendant of Timur and was barely twelve when he became ruler of the countries lying between Samarkand and the Indus. Having made himself master of Kashgar, Kunduz, Kandahar, and Kabul, he routed at Panipat, in 1526, the vast army of the Afghan emperor of Delhi and entered the capital. Agra shortly after surrendered. Baber died in 1530.

Babson, Roger Ward, American statistician, was born at Gloucester, Mass., in 1875 and was educated at the Massachusetts institute of technology. He founded the Babson statistical organization, which, under his direction, won for itself the leading place among business forecasting agencies. During the World War, he was director general of information and education for the United States. Among his publications are *Business Barometers*, *Bonds and Stocks*, and the "Future Series," books dealing with the future of the working class, investments, the churches, world peace, and other topics.

Baccio della Porta. See *Bartolommeo, Fra.*

Bach (*bäκ*), **Johann Sebastian,** founder of modern music, was born at Eisenach in Saxe Weimar Eisenach, Germany, March 21, 1685. In the household of his father, the court and city musician, he early learned to love music; but, after his father's death, he received no sympathy from his guardian brother in his ardent devotion to it. This brother died soon, and Bach, destitute and without a protector, went to Luneburg in 1700, where he sang in the choir of Saint Michael's school. Here, also, he began the study of the organ under Boehm and laid the foundation for his career as the greatest master of composition for the organ, and one of its greatest players. The seriousness with which he studied is attested by the fact that several times he walked 25 miles to Hamburg to hear Reinken, a noted organist.

When he was eighteen, he was engaged to play the violin in the orchestra of the duke of Weimar. It was probably then that he became acquainted with the concertos of Vivaldi, to which he later attributed his ideas of the principles of music.

In 1704, he accepted the office of organist at Arnstadt. Three years later, he became organist at Muhlhausen, where he married Maria Barbara Bach, and, in 1708, he returned to Weimar, now as court organist. His new environment quickened his already active musical faculties, and some of his best organ compositions and cantatas were written at Weimar.

In the years 1717–23, he was chapelmaster for Prince Leopold, and here he composed numerous works for the clavichord and orchestra. In 1721, Bach, being now a widower, married Anna Magdalena Wulkens, who, by reason of rare musical gifts, proved to be an industrious helper for her husband. The next year his well-known *Forty-eight Preludes and Fugues* was published.

In 1723, Bach received his most important appointment, that of choirmaster of Saint Thomas's school in Leipzig. His playing became more famous, he had constant opportunity for the production of important works, he had many pupils in composition and instruction, and his income was soon increased by his additional appointment as composer to the duke of Weissenfels. In 1736, he was made chapelmaster to the court of Dresden. This office gave Bach occasion to write his masses and other religious pieces.

Bach was persuaded to visit Frederick the Great at Potsdam in 1747, and he extemporized a fugue which he afterward elaborated for the monarch. Bach finished his *Art of Fugue*, and then his eyesight failed.

Bach was the greatest master of counterpoint in the history of music. He disregarded the prevailing custom of writing in a few keys only, and tuned keyed instruments so as to render them nearly perfect for all keys. He was the first to use the thumb and fourth finger on the pianoforte keyboard. His melody is sometimes fantastic, but never commonplace; his harmony is very effective; his integrity and conscientiousness in composition are unsurpassed. Nowhere is the grandeur of religion more worthily felt than in his sacred compositions. All succeeding composers have acknowledged in him the creative mind that placed music on a deep, scientific basis. Died, July 28, 1750. See *Music: German Classic Masters.*

Bach, Karl Philipp Emanuel, German composer, second son of Johann Sebastian Bach, was born at Weimar in 1714. He was probably the most highly gifted of the eleven brothers, and his influence on the development of certain musical forms gives him a prominent place in the history of the art. He studied in the Thomas school, and afterward in the University of Leipzig. In 1738, he went to Berlin, and soon afterward was appointed chamber-musician to Frederick the Great. In 1767, Bach became chapelmaster at Hamburg, where he passed the remainder of his life. His most ambitious composition is the oratorio *Israel in the Wilderness.* His essay on *The True Method of Harpsichord Playing* was long a standard work. He died in 1788.

Bache (*bāch*), **Franklin,** American physician and chemist, was born at Philadelphia, 1792. He published a *System of Chemistry* in 1819; was professor of chemistry in the Philadelphia college of pharmacy, 1831, and held same chair in Jefferson medical college, Philadelphia, in 1841. With G. Wood, he prepared a *Pharmacopœia* in 1830 and, in 1851, published Wood and Bache's *United States Dispensatory,* a standard work which has been continued through many editions. Died, 1864.

Bacheller, Irving (Addison), American novelist, was born at Pierrepont, N. Y., 1859. He was graduated from Saint Lawrence university, 1882, and entered journalism. For many years, he was actively connected with the press of New York and, 1898–1900, was one of the editors of the New York *World.* His writings include *The Master of Silence, Eben Holden, D'ri and I, Darrel of the Blessed Isles, The Hand-Made Gentleman, The Master, Keeping up With Lizzie, "Charge It," Marryers, The Light in the Clearing, A Man for the Ages, In the Days of Poor Richard,* and poems entitled *In Various Moods.*

Bacon, Augustus Octavius, American lawyer and politician, was born in Bryan county, Georgia, 1839. He was graduated from the University of Georgia, 1859, and studied law. After service in the Confederate army, he began law practice in Macon, Georgia, 1866. Engaging in politics, he was several times elected member of the Georgia house of representatives, between 1870 and 1893, serving as speaker, 1873-74 and 1877–81. In 1894, he was chosen United States senator and served continuously until 1914. In his re-election in 1913, he was the first United States senator ever chosen by direct vote of the people. Died in 1914.

Bacon, Francis, English philosopher, jurist, and statesman, was born of distinguished parentage at London, January 22, 1561. At the age of 12, he was sent to Trinity college, Cambridge. Three years later, he left, strongly convinced of the futility of the Aristotelian philosophy, which was then taught in the schools. In revolt against it, his later intellectual efforts were bent on working out and declaring a philosophy which might confer greater benefits on mankind.

In 1576, his father sent him to France in the suite of the British ambassador, Paulet. Three years later, his father died, and Bacon diligently devoted himself to the study of law. In 1582, he was admitted to the bar and, in 1588, received from Queen Elizabeth the title of "counsel learned in the law extraordinary." In 1596, Bacon wrote his *Maxims of the Law.* The following year, he published the *Essays,* the work by which he is best known to the reading public.

Bacon's political advancement was due in a considerable degree to the favor of James I, by whom he was knighted on July 23, 1603. In 1605, Bacon published the first part of *Advancement of Learning,* which, expanded into *Advancement of Science,* may be said to have introduced a new era in English science. In 1606, he married Alice Barnham, and, the next year, he was appointed solicitor-general of the kingdom. In 1609, he published his *Wisdom of the Ancients.*

In 1611, Bacon was appointed joint judge of the knights marshals' court; in 1613, attorney-general; in 1617, lord keeper of the great seal; and, in 1618, he was made lord high chancellor and created Baron Verulam. The next year, Bacon received the title of Viscount Saint Albans and opened that fatal Parliament which brought charges of bribery against him, deprived him of his speakership and his seat in Parliament, imposed a heavy fine, and sentenced him to the Tower in disgrace. When he was pardoned, he retired to Gorhambury, where he devoted the remainder of his life to scientific experimentation and the cultivation of philosophy.

The *Novum Organum,* or "New Instrument of Logic," of 1620, has done more perhaps than any other single book toward inculcating into science the spirit of unbiased, careful observation and experimentation. Bacon insisted that all prepossessions were to be abandoned and that nature was to be interrogated by the devising of experiments with a view to discovering the laws of her action. His enthusiasm for science was due to a belief that knowledge is power.

A persistent attempt has been made to prove that Bacon was the author of Shakspere's plays, the principal supporters of the view being Delia Bacon, Nathaniel Holmes, and Ignatius Donnelly. The theory has not been accepted, however, by any of the great Shaksperian scholars. Bacon died in 1626 as the result of a cold caught during an experiment on the refrigeration of fresh meat. See *English Literature: The Elizabethans.*

Bacon, Henry, American architect, was born at Watseka, Ill., in 1866. He was graduated from the University of Illinois in 1888. In the same year, he entered the offices of McKim, Meade, & White, New York City. Winning the Rotch traveling scholarship, he spent two years, 1889–91, of study in Europe. Returning to America, he continued with McKim, Meade, & White until 1897, when he became a member of the firm of Brite and Bacon. In 1903, he began practice alone. The most notable of many important buildings designed by Bacon is the beautiful Lincoln memorial in Washington. In recognition of his attainments in architecture, he was elected member of the American academy of arts and letters. Died, 1924.

Bacon, Nathaniel, American colonist and insurrectionary leader, was born in England about 1642. As a member of Governor Berkeley's council in Virginia, he became the leader of an alleged insurrection against the colonial government under pretense of resisting aggressions of the Indians. Berkeley was forced to make many concessions to demands for better government; but he broke his promises. A brief civil war followed, in which Jamestown was burned, 1676, and the governor took shelter in an English vessel. Before completing plans for re-establishing the government, Bacon died, 1676, and the rebellion soon came to an end.

Bacon, Roger, English scientist and publicist, was born about 1214. The most learned man of his day, he is reputed to have advocated the change since made in the calendar, to have invented gunpowder, and to have manufactured magnifying glasses. His great work, *Opus Majus,* which urges philosophical reform, is noted for its learning and prophecy. Died, 1294.

Baden-Powell (*bā'dĕn-pō'ĕl*), **Sir Robert Stephenson Smyth,** British general, was born in 1857, and was educated at Charterhouse, London. In 1876, he joined the English hussars and served as adjutant in India, Afghanistan, and South Africa. In 1887–89, he served in South Africa on the military staff and took part in the operations in Zululand and in the Matabele war. With a force of 1200 men he was besieged in Mafeking, which he held against the Boers from the outbreak of the war, October 12, 1899, until May 17, 1900. In recognition of this successful defense, he was made major general.

In order to promote good citizenship in the rising generation, he founded, in 1908, the organization of boy scouts. His writings include *Reconnoissance and Scouting, Pig-Sticking or Hog-Hunting, Sketches in Mafeking and East Africa, Scouting for Boys, My Adventures as a Spy, Indian Memories, The Wolf Cub's Handbook, Girl Guiding,* and *Rovering to Success.* See *Boy Scouts.*

Baekeland (*bā'kĕ-lănd*), **Leo Henrik,** chemist and inventor, was born at Ghent, Belgium, in 1863. He was educated at the university of his native city and won a traveling scholarship which enabled him to visit various universities in England, Scotland, Germany, and the United States. Later he specialized in the study of electrochemistry in the polytechnical school at Charlottenburg, Germany. He taught chemistry and physics in the University of Ghent and in the normal school of science at Bruges until 1889, when he migrated to the United States. In 1893, he established the Nepera Chemical Company for the manufacture of velox and other photographic papers of his invention. He sold his holdings in this enterprise to the Eastman Kodak Company in 1899. Thereafter he devoted himself chiefly to chemical research and to the development of new chemical industries.

Baekeland's most widely known invention is bakelite, a synthetic chemical compound of phenol and formaldehyde. This is very extensively used as a substitute for hard

rubber, amber, and various other substances and is especially valuable in the construction of electrical apparatus. Baekeland has secured patents covering numerous inventions in the field of organic chemistry, electric insulation, synthetic resins, plasters, lacquers, and varnishes. In recognition of his valuable researches, he received the Willard Gibbs medal, the Perkin medal, and other rewards of scientific distinction. In 1924, he was made president of the American chemical society.

Baer (*bär*), **Karl Ernst von,** Russian naturalist, one of the founders of modern embryology, was born in Esthonia, 1792. He was educated in Germany and became a professor in the University at Konigsberg. In 1828, he published *The Development of Animals*, a work which is remarkable for clearness and thoroughness. This book led to an important advance in the science of the development of animal life. He died at Dorpat in 1876. See *History of Biology*.

Baeyer (*bā'yĕr*), **Adolf von,** German chemist, was born at Berlin, 1835. In 1872, he became professor of chemistry at the University of Strasbourg, and, in 1875, he was appointed Liebig's successor at Munich. He discovered cerulein, eosin, and indol, besides making other valuable contributions to the chemistry of dyestuffs. In 1905, he was awarded the Nobel prize for chemistry. Died, 1917.

Baffin, William, English navigator, was born in 1584, probably at London. He accompanied James Hall in his search for a passage to Asia north of North America in 1612. Three years later, he explored the inlet now named after him, Baffin bay. Baffin was killed in 1622 when fighting with the Persians against the Portuguese on the island of Ormuz, Persia.

Bagehot (*băj'ŭt*; *bāg'ŭt*), **Walter,** English economist and journalist, was born at Langport, Somerset, 1826. From a school at Bristol he passed, in 1842, to University college, London, where he took his master's degree in 1848. In 1852, he was admitted to the bar, but joined his father as a banker and shipowner at Langport. In 1858, he married a daughter of James Wilson, founder of the *Economist* newspaper, and, from 1860 until 1877, he was its editor. His works include *The English Constitution*, *Physics and Politics*, *Lombard Street*, *Literary Studies*, *Economic Studies*, and *Biographical Studies*. He died in his native town, 1877.

Bailey, Florence Augusta Merriam, American ornithologist and writer, sister of Clinton Hart Merriam, was born at Locust Grove, N. Y., 1863. She was graduated at Smith college in 1886, and, in 1899, married Vernon Bailey. In 1889, she began writing of bird life somewhat in the manner of John Burroughs. Her published works include *Birds Through an Opera Glass*, *My Summer in a Mormon Village*, *A-Birding on a Broncho*, *Birds of Village and Field*, *Handbook of Birds of the Western United States*, and *Wild Animals of Glacier National Park*.

Bailey, Liberty Hyde, American botanist and horticulturist, was born in South Haven, Mich., 1858. He was graduated at Michigan agricultural college, 1882; was assistant to Asa Gray, Harvard, 1882-83; and was professor of horticulture at Michigan agricultural college, 1883–88. From 1888 to 1903, he was professor of horticulture, and, from 1903 to 1913, was dean of the college of agriculture, Cornell university. In addition to extensive researches in botany and horticulture, he has devoted special attention to rural problems and to rural education.

His writings include *Evolution of our Native Fruits*, *Lessons with Plants*, *Principles of Fruit Growing*, *Plant-Breeding*, *Principles of Agriculture*, *Outlook to Nature*, *The State and the Farmer*, *The Country Life Movement*, *Wind and Weather*, and *The Holy Earth*. He was editor of *Cyclopedia of American Horticulture*, *Rural Science Series*, *Garden-Craft Series*, *Cyclopedia of Agriculture*, and the *Standard Encyclopedia of Horticulture*.

Baillie (*bā'lĭ*), **Joanna,** Scotch poet and dramatist, was born, 1762, in Bothwell manse. In 1784, she went to reside in London and, in 1806, took up her residence at Hampstead, where she remained until her death. She received an excellent education and, at an early age, began to write poetry. Her greatest achievement is undoubtedly the nine *Plays on the Passions*, which, though erroneous in conception, are full of impressive poetry and are often characterized by intense dramatic power. The most popular as well as the most powerful of these, the tragedy *De Monfort*, was brought out at Drury Lane, London, in 1800, with Kemble and Mrs. Siddons taking the leading parts. Her *Family Legend* was produced at Edinburgh in 1810 under Sir Walter Scott's auspices. She died in 1851.

Bailly (*bā'yĕ'*), **Jean Sylvain,** French astronomer and politician, was born in 1736. His studies and investigations in astronomy were interrupted by the Revolution. During the earlier part of it, he occupied a very prominent position. He was elected president of the National Assembly, 1789, and was mayor of Paris, 1789–91. He was seized at Melun by the Jacobin soldiery, accused of being a Royalist conspirator, and executed, 1793. He is best known by his works on the history of astronomy.

Baily, Edward Hodges, English sculptor, was born in Bristol, 1788. His works, which were greatly in demand during his lifetime, are still much admired. The statue of Nelson in Trafalgar square, London, and the bas-reliefs on the south side of the marble arch in Hyde park are the work of Baily. Among his finest pieces are "Eve at the Fountain," "Eve Listening to the Voice," "Maternal Affection," and "The Graces Seated." He died in 1867.

Bainbridge, William, American naval officer, was born at Princeton, N. J., 1774. In the War of 1812, he was given command of a squadron, consisting of the *Constitution*, *Essex*, and *Hornet*, which sailed from Boston in that year. When cruising off the coast of Brazil toward the close of 1812, he captured the British frigate, *Java*, for which act Congress voted him a gold medal together with a share in the prize money. He died at Philadelphia, 1833.

Baird, Spencer Fullerton, American naturalist, was born at Reading, Pa., 1823. He was educated at Dickinson college, Carlisle, Pa., and was afterward professor of natural science in that institution. He became secretary of the Smithsonian institution at Washington, and later was commissioner of fisheries. Under his direction the national museum was begun in 1850. He wrote many papers on birds, reptiles, and fishes, and, in connection with other editors, he published *The Birds of North America*, *The Mammals of North America*, and a *History of the Birds of North America*. Died, 1887.

Bajazet I (*băj'ă-zĕt'*), sultan of the Turks, was born in 1347. In 1389, he succeeded his father, Murad I, who fell in battle near Kossovo, fighting against the Serbians. In three years he conquered Bulgaria, a part of Serbia, Macedonia, and Thessaly; he also subdued most of the states of Asia Minor. From the rapidity with which these extraordinary conquests were effected he received the name of Ilderim, "Lightning." He even blockaded Constantinople for ten years, thinking to subdue it by famine. In 1396, Bajazet defeated Sigismund of Hungary at Nicopolis. Overthrown by Timur at Angora in 1402, Bajazet died in the camp of his conqueror, 1403.

Bajer, Fredrik, Danish parliamentarian, was born at Vesteregade, Denmark, 1837. Like Passy in France, Cremer in England, and Moneta in Italy, he became the foremost worker for international peace within his own nation at the beginning of the 20th century. Long a member of the Danish parliament for the town of Horsens, he did conspicuous service for the cause. He was active in establishing the international peace bureau at Bern, Switzerland, and became its president. In 1908, he was awarded the Nobel prize for peace jointly with his colleague in the movement, K. P. Arnoldson of Sweden. Died, 1922.

Baker, George Pierce, American educator, was born at Providence, R. I., in 1866. He was educated at Harvard university, where he began to teach English in 1888, becoming professor in 1905. His course in the drama, known as "English 47," attained a celebrity that passed far beyond the college walls. It was the inspiration of a large number of American dramatists who later won distinction in the theater. In 1925, he became head of a newly organized department of dramatic arts at Yale university. He was elected to the American academy of arts and letters in 1925.

Baker, Newton Diehl, American cabinet officer, was born at Martinsburg, W. Va., 1871. He was graduated at Johns Hopkins university in 1892 and at the law school of Washington and Lee university, 1894. After serving as private secretary to Postmaster-general Wilson, 1896-97, he began legal practice at Martinsburg. Later, he removed to Cleveland, where he was city solicitor from 1902 until 1912. He was elected mayor for the term 1912–14, and was re-elected for the term of 1914–16. On March 7, 1916, he was appointed secretary of war by President Wilson and served until the end of Wilson's administration.

Baker, Ray Stannard ("David Grayson"), American journalist and author, was born at Lansing, Mich., 1870. He was graduated at Michigan agricultural college in 1889 and studied law and literature at the University of Michigan. He was a reporter on the Chicago *Record*, 1892–97; was associate editor, *McClure's Magazine*, 1899–1905; and was an editor of *The American Magazine*, 1906–15. As a magazine writer, he contributed many articles on social and economic conditions and numerous stories to American and English periodicals.

Baker's writings include *Boys' Book of Inventions*, *Our New Prosperity*, *Following the Color Line*, *New Ideals in Healing*, *Seen in Germany*, *The History of the Peace Conference*, and *The Life and Letters of Woodrow Wilson*. Under the pseudonym of David Grayson, he wrote *Adventures in Friendship*, *Hempfield*, and *Great Possessions*.

Baker, Sir Samuel White, British African explorer, was born at London, 1821. He explored the western arm of the Nile and, in 1864, discovered Albert lake. In company with his wife and a force of picked men, he made, 1869–73, an expedition to the equatorial region of the Nile for the purpose of suppressing the slave trade. He wrote *Eight Years' Wanderings in Ceylon*, *The Albert Nyanza*, *The Nile Tributaries*, and *Ismailia*. Died, 1893.

Balakirev (*bä'lä-kē'rĕf*), **Mili Alexeyevich,** Russian composer, was born at Nizhni Novgorod, 1837. He received his first musical instruction in his native city. In 1855, he was graduated at the University of Kazan. He then went to Petrograd where, encouraged by Glinka, he made a brilliant début as a pianist. During the revival of patriotic enthusiasm following the Crimean war, he enlisted Cui, Mussorgsky, Rimski-Korsakov, and Borodin in an effort to create a modern Russian school of music based on "truth and nationalism." While his compositions were not numerous, they were of high merit and through his leadership a national school of musical composition was developed. He died in 1910.

Balard (*bä'lär'*), **Antoine Jérôme,** French chemist, was born in Montpellier, 1802. Beginning his career as a pharmacist, he became professor of chemistry at the Sorbonne, and later was appointed to a chair at the Collège de France. In 1826, while experimenting with salt obtained from the waters of the Mediterranean, he discovered bromine. Died, 1876.

Balboa, Vasco Nuñez de, Spanish conqueror, was born at Jeres de los Caballeros about 1475. In 1501, he took part in the expedition of Rodrigo de Bastidas to the New World. He established himself in Santo Domingo, and began to cultivate the soil. Fortune proving adverse, in order to escape from his creditors, he had himself smuggled on board a ship and joined the expedition to Darien in 1510.

An insurrection obtained for Balboa the supreme command in the new colony, but, owing to intrigues at the Spanish court, he was succeeded by Pedrarias Dávila. In a subordinate position, Balboa made several successful expeditions. Accounts of a great western ocean reaching him, he set out in 1513 in quest of it. On September 25 of that year, from a mountain top in the isthmus of Panama, he obtained the first sight of the Pacific Ocean. He took possession of it in the name of his sovereign. He was executed in 1517 on the charge of a contemplated revolt.

Baldwin, James Mark, American psychologist, was born at Columbia, S. C., 1861, and was graduated at Princeton university, 1884. After a period of study in the universities of Oxford, Leipzig, Tubingen, and Berlin, he held professorships in several American universities.

He was professor of philosophy, Lake Forest university, Ill., 1887–89; professor of philosophy, Toronto university, 1889–93; professor of psychology, Princeton, 1893–1903; professor of philosophy and psychology, Johns Hopkins, 1903–09; and professor of philosophy and psychology, National University of Mexico, 1909–13. In 1915-16, he was Herbert Spencer lecturer at Oxford university, and, in 1919, was made professor in the school of advanced social study at Paris. His extensive writings include *Hand Book of Psychology*, *Mental Development in the Child and the Race*, *Thought and Things*, *Darwin and the Humanities*, *The Individual and Society*, and *The Super-State*.

Baldwin, Stanley, British statesman and prime minister, was born in Worcestershire, England, in 1867 and was educated at Cambridge university. On his mother's side, he is a cousin of Rudyard Kipling and a nephew of Edward Burne-Jones. Until 40 years of age, he was engaged in the iron manufacturing business. As a manufacturer, he favored close co-operation between capital and labor. He became member of Parliament in 1908 as a Conservative, and was financial secretary of the treasury from 1917 to 1921. During the World War, he made a voluntary contribution of 25 per cent of his private fortune to the national treasury. He was appointed member of the privy council in 1920; was chosen president of the British board of trade in 1921; sat as member of the British commission which, early in 1923, arranged for the funding of the British war debt to the United States; and, in May 1923, assumed the leadership of the British government. Following the defeat of the Conservatives in the elections held late in 1923, Baldwin resigned the premiership early in 1924 only to be returned to power in November of the same year. Among the achievements of his second administration are to be numbered a leading part in the negotiation of the Locarno treaties and the successful weathering of a general strike in 1926. The settlement of the latter without compromise and with little bitterness was due largely to the statesmanship of the prime minister.

Balfe (*bälf*), **Michael William,** operatic composer and singer, was born at Dublin, Ireland, in 1808. At 16, he was engaged in the Drury Lane orchestra in London. While there, he attracted the attention of an Italian nobleman, Count Mazzara, who took him to Italy to study music. After singing at Paris in the Italian opera under Rossini, Balfe returned to Italy and produced, in 1830, several operas. In 1835, he went to England as a vocalist and composer of opera. His most popular work, *The Bohemian Girl*, appeared at Drury Lane in 1844 and was followed by several other operas. Died, 1870.

Balfour (*bäl'fo͝or*), **Arthur James, Earl,** British statesman and author, was born in Scotland in 1848. He was educated at Eton and at Trinity college, Cambridge. During 1878–80, he was private secretary to Lord Salisbury, attending him at the Congress of Berlin, 1878. He was secretary for Scotland, with a seat in the cabinet, 1886-87; was chief secretary for Ireland, 1887–91; was first lord of the treasury and leader of the house, 1891, and again in 1895–1906.

On the retirement of Lord Salisbury in 1902, Balfour became prime minister, serving until the end of 1905. In May 1915, he became first lord of the admiralty in Asquith's coalition cabinet, and, in December 1916, was made secretary of state for foreign affairs in Lloyd George's war cabinet, serving until 1919. In 1917, he headed the British mission to America and, in 1921-22, was the leading member of the British delegation to the Washington Conference. His writings include *A Defense of Philosophic Doubt*, *The Foundations of Belief*, *Economic Notes on Insular Free Trade*, *Reflections Suggested by the New Theory of Matter*, *Speeches on Fiscal Reform*, *Criticism and Beauty*, and *Theism and Humanism*.

Balfour, Francis Maitland, British biologist, was born at Edinburgh in 1851 and was educated at Trinity college, Cambridge. His investigations, especially in embryology, were of great importance. Between 1879 and 1882, he brought together all that was then known concerning the developmental stages of animals in his *Comparative Embryology*, a work of the highest value to students. He perished in the Alps while attempting to climb an unscaled spur of Mont Blanc, 1882.

Ball, Sir Robert Stawell, astronomer and mathematician, was born in Dublin, Ireland, in 1840, and was educated at Trinity college, Dublin. He was astronomer of Ireland, 1874–92, and professor of astronomy at Cambridge university, England, 1892–1913. His writings include *The Story of the Heavens*, *Starland*, *Time and Tide*, *The Cause of an Ice Age*, *Atlas of Astronomy*, *Great Astronomers*, *The Earth's Beginning*, and *Popular Guide to the Heavens*. Died in 1913.

Ballou (*bă-lo͞o'*), **Hosea,** American preacher and one of the founders of Universalism, was born in New Hampshire, 1771. He was self-educated; was expelled from his father's church on declaring his belief in the final salvation of all men; began to preach at 21, and became minister of the Second Universalist church in Boston, in which he preached 35 years. He started the *Universalist Magazine* in 1819, and, in 1831, began the *Universalist Expositor*. It is said that he preached over 10,000 sermons, none of which was written before delivery. Died, 1852.

Baltimore, George Calvert, first Lord, was born at Kipling, in Yorkshire, about 1580. He entered Parliament in 1609, was knighted in 1617, and, in 1619, became secretary of state. In 1625, he declared himself a Catholic and, resigning office, was created Baron Baltimore in the Irish peerage and retired to his Irish estates. As early as 1621 he had dispatched colonists to a small settlement in Newfoundland, and, in 1627, he visited the place. The next spring, he returned with his family, and remained until the autumn of 1629. The severe winter induced him to sail southward in search of a more genial country, but his attempts to settle in Virginia led to disputes, and he returned home to obtain a fresh charter. He died in 1632. See *American History: The Founding of Maryland*.

Balzac (F. *bäl'zăk'*; E. *bäl'zăk*), **Honoré de,** French novelist and founder of the realistic school of fiction, was born at Tours, France, May 16, 1799. When twelve years old, he was sent to the College of Vendôme, near Blois. Here he devoted himself so intensely to mystic books and reveries that he injured his health. He next studied law at the Sorbonne, Paris. Being employed as clerk to a notary, he gathered a knowledge of chicanery which was later turned to account in his romances. His occupation, however, proved intolerable, and he was left by his family to work, starve, and struggle for the next ten years on a scanty pittance. He read omnivorously and tried to make money by scribbling unpromising novels under assumed names.

In 1826, he formed a partnership with the printer Barbier and published various works. This business turned out ill, however, and he was laden with a debt which harassed him until the end of his career. His first successful novel was *The Chouans*, which appeared in 1829. His next works, *The Physiology of Marriage* and *The Wild Ass's Skin*, produced in 1830, also proved popular.

Between the years 1831 and 1850, Balzac produced those stories which composed his great *Human Comedy*. Of these, the most widely read was *Father Goriot*. The others include *Eugenie Grandet* and *Lost Illusions*. He was phenomenally industrious and productive, writing 85 novels in 20 years. In them, he aimed to represent all ranks, professions, arts, and trades, and all phases of manners in town and country. He exhibited an extraordinary range of knowledge, observation, and sympathy, a steadfast determination for thoroughness, and a keen analysis of character and conduct. His faults lie in an overinsistence on detail and a fondness for the morbid pathology of human nature. It is impossible to judge justly any one of these tales separately, because each is only a fragment in the development of the *Human Comedy*.

In 1849, Balzac traveled to Poland and visited the rich Countess Hanska, to whom he had dedicated his novel *Seraphita* and whom he had loved for 15 years. In 1850, they were married, and his famous debts were paid.

The most striking feature of Balzac's genius is the immensity of his imaginative achievements. He wrote in all, 97 books. Self-centered and self-absorbed he doubtless was; but he could not have produced his work without sufficient independence to endure such isolation. His name is one of the greatest in the literature of France since the era of the Revolution. Died, 1850, three months after his marriage. See *Comédie Humaine*.

Bancroft, George, American historian, was born in 1800, at Worcester, Mass. He was graduated at Harvard college in 1817 and, in 1818, went to Gottingen, where he studied history and philology. At Berlin, he attended the lectures of Hegel and had frequent intercourse with Schleiermacher, Humboldt, Savigny, and other literary men of note. Subsequently, he traveled in Germany, France, Italy, and England. Returning to the United States, he spent some time in teaching and then devoted himself to politics. He rose to prominence as a Democratic politician, and was made collector of customs at Boston. He still continued his literary labors, especially in lectures upon German literature and philosophy.

When Polk was elected president, in 1845, he appointed Bancroft secretary of the navy. While in this office, he established an observatory at Washington and a naval school at Annapolis. In 1846, he was sent by Polk as ambassador to England, where he remained until 1849, collecting additional materials for his monumental *History of the United States*, a work of solid excellence, the last volume of which appeared in 1874. From 1867 to 1874, Bancroft was minister to Germany. For some years, he was a leading contributor to the *North American Review*. He died, 1891; was elected to the American hall of fame, 1910.

Bancroft, Hubert Howe, American historian, was born at Granville, Ohio, 1832. He worked in a bookstore in Buffalo, N. Y., in 1848, and, from 1852 to 1868, was a book dealer and publisher in San Francisco. In connection with his book trade, he made large collections of historical material and finally retired from business in order to devote himself to the production of historical works. With the aid of collaborators, he published *Native Races of the Pacific States* and a monumental *History of the Pacific States of North America*, in 21 volumes, and other historical works. In 1905, his vast historical library, consisting of 60,000 volumes, was acquired by the University of California. He died in 1918.

Bancroft, Wilder Dwight, American chemist, was born at Middleton, R. I., in 1867. He was graduated at Harvard university, 1888, and, during the ensuing five years, continued postgraduate studies at the universities of Strasbourg, Leipzig, Berlin, and Amsterdam. In 1895, he was made assistant professor and, in 1903, professor of physical chemistry, Cornell university. He was chairman of the subcommittee on electrochemistry, 1917-18, and chairman of the division of chemistry, 1919-20, of the national research council. During 1918-19, he was prominently identified with the chemical warfare service. His writings include *The Phase Rule*, *Applied Colloid Chemistry*, and numerous scientific articles.

Bandinelli (*bän'dē-nĕl'lē*), **Baccio,** Italian sculptor, the son of a famous goldsmith, was born at Florence in 1488. He was a jealous rival of Michelangelo, who is said to have repaid his enmity with contempt. His talent, however, secured him many patrons, and Pope Clement VII bestowed on him an estate. Among his works are his colossal "Hercules and Cacus," his "Adam and Eve," his copy of the "Laocoön," and the exquisite *bassirilievi* in the cathedral of Florence. He died in 1560.

Bangs, John Kendrick, American author, humorist, and lecturer, was born at Yonkers, N. Y., 1862. He was graduated from Columbia university, 1883; studied law, 1883-84; was associate editor, *Life*, 1884-88; was editor of *Literature*, 1898-99, *Harper's Weekly*, 1899-1902, *Metropolitan Magazine*, 1902-03, and *Puck*, 1904-05. Among his numerous writings are *New Waggings of Old Tales*, *The Water Ghost*, *A House Boat on the Styx*, *Ghosts I Have Met*, *The Enchanted Type Writer*, *Alice in Municipaland*, *The Foothills of Parnassus*, *The Fatal Message*, *From Pillar to Post*, *Hours with the Idiot*, *The Cheery Way*, and also many stories contributed to syndicates and magazines. He died in 1922.

Banks, Sir Joseph, English naturalist, was born in London in 1743. He was educated at Oxford university, where the first lectures on natural history were later established through his efforts. In 1766, he made a voyage to Newfoundland and Labrador, collecting plants; from 1768 to 1771, he sailed with Cook around the world in the capacity of naturalist. The marsupial animals of Australia were made known to science by this expedition. In 1772, he explored Iceland and discovered the great geysers. For 42 years, he served as president of the royal society. His valuable library and collections are preserved in the British museum. He died in 1820.

Banting, Frederick Grant, Canadian scientist, was born near Alliston, Ont., in 1891. He was educated in the University of Toronto and served as a captain in the medical department of the Canadian army in the World War. He was wounded at Cambrai and was awarded the military cross for bravery.

Banting later began practice at London, Ont., and, in 1920, became a demonstrator in Western university. Shortly afterward he went to the University of Toronto and, with the help of facilities there made available, carried out investigations that led to the discovery of the insulin method for the treatment of diabetes. This drug was first obtained from the pancreas of cattle and hogs and, more recently, has been prepared from certain fish and clams. In 1923, Banting was awarded, jointly with J. J. R. MacLeod, the Nobel prize for medicine, his share of which he divided with a collaborator, C. H. Best. The Canadian government conferred on Banting an annuity of $7500 in consideration of his contribution to medicine, and the Ontario government provided $10,000 a year for a chair in medicine at the University of Toronto, Banting being appointed the first occupant.

Bantock, Granville, English composer and conductor, was born in London, 1868. He was educated for the East India service but his interest in music led him to enter the royal academy of music in 1889, where he won the Macfarren prize during his first year. After editing *The New Quarterly Musical Review*, 1893–1896, he began his career as conductor of opera, attracting attention by producing only English compositions of the most recent date. In 1908, he was made professor of music in Birmingham university. He became one of the most vigorous champions of modern English music and a prolific and able composer. His works include operas, symphonic poems, overtures, an oratorio, a choral symphony, and various other vocal and orchestral compositions.

Barany, Robert, Austrian physiologist and pathologist, was born in Vienna, 1876. He received his education at the university of his native city. After serving as an assistant in military hospitals and clinics at Frankfort on the Main and at Freiburg, he became assistant professor at the University of Vienna. He has written numerous works on ear surgery, on the physiology and pathology of acoustics, and on nervous diseases of the ear. In recognition of his valuable researches in the physiology and pathology of the inner ear, he was awarded the Nobel prize for medicine in 1914. Upon the outbreak of the World War, in 1914, he entered the medical service of the Austrian army. In 1915, he was captured by the Russians and served as physician to Austrian prisoners in Russia.

Barbarossa (*bär'bà-rŏs'à*). See *Frederick I.*

Barbauld (*bär'bôld*), **Anna Letitia,** English author, was born at Kibworth-Harcourt, in Leicestershire, 1743. In 1773, she published *Miscellaneous Pieces in Prose* and her first volume of poems. Following her marriage in 1774, she taught ten years in a boys' school, during which she wrote *Early Lessons for Children* and *Hymns in Prose*, which have been translated into several languages. Other well-known works are her *Devotional Pieces*, *Evenings at Home*, and *Ode to Life*. In 1795, she edited Akenside's *Pleasures of the Imagination* and Collins's *Odes*, and prefixed to each a critical essay. In 1804, she edited Samuel Richardson's letters and, in 1810, published a collection of the British novelists. Died, 1825.

Barbour (*bär'bẽr*), **John,** early Scottish poet and historian, was born about 1316. He was archdeacon of Aberdeen from 1357, or earlier, until his death in 1395. His national epic, *The Brus*, was first printed at Edinburgh in 1571.

Barclay de Tolly (*bär'klā' dē tŏ'lē'*), **Michael, Prince,** Russian general, was born in Livonia, 1761. He fought with great bravery in the Turkish war of 1788-89, in the campaign against Sweden in 1790, and in the campaigns against Poland, 1792 and 1794. In 1806, at Pultusk, he commanded Benningsen's advance guard. He lost an arm at the battle of Eylau. After the defeat of the Russians at

Smolensk in 1812, he yielded the chief command to Kutuzov, led the right wing of the army at Borodino, did brilliant service at Bautzen, and afterward took part in the battles of Dresden, Culm, and Leipzig. Although severely disapproved by the Russians at the time, Barclay de Tolly's Fabian military policy in the end accomplished the ruin of Napoleon. Died in 1818.

Barham, Richard Harris, "Thomas Ingoldsby," English poet and humorist, was born at Canterbury, 1788. He was a clergyman of the Church of England, and, in the latter part of his life, was rector of Saint Augustine's in the city of London. The *Ingoldsby Legends*, which constitute his chief claim to fame, were first contributed to *Bentley's Miscellany*. Some of Barham's previously uncollected writings were published under the title of the *Ingoldsby Lyrics*. He died in London, 1845.

Baring-Gould, Sabine, English divine, novelist, and miscellaneous writer, was born at Exeter in 1834. He was educated at Clare college, Cambridge, and, after graduation, spent some years in travel. In 1864, he was appointed curate of Horbury; in 1871, he became rector of East Mersea; and, in 1881, he succeeded to his father's estate, which had been in the family for nearly three centuries, and was made rector of Lew Trenchard. He was a versatile writer, with an attractive style, and published numerous books of fiction, history, travel, religion, folklore, and mythology. Among his best noyels are *Mehalah*, *John Herring*, *Court Royal*, *Pennycomequicks*, *The Red Spider*, and *Broom Squire*. His interesting contributions to folklore and antiquities include *Book of Were-wolves*, *Curious Myths of the Middle Ages*, and *Curious Survivals*. He wrote also "Onward Christian Soldiers," "Now the Day is Over," and other well-known hymns. Died in 1924.

Barker, Harley Granville, English actor, manager, and playwright, was born in London, 1877. Beginning under Ben Greet, continuing with the Elizabethan stage society, and later appearing with Mrs. Patrick Campbell, he worked his way to the front in the theatrical world. For many years he acted and produced plays for the stage society, presenting several of Bernard Shaw's plays for the first time. In 1904, he began the management of the court theater, where he introduced new plays by Shaw, Hankin, Barrie, Galsworthy, and himself. Combining keen observation with remarkable talent for dramatic expression, his plays are notably faithful portrayals of character. *The Voysey Inheritance* gives a fine picture of modern, middle-class English family life; *Waste* is a tragedy with a timely theme; *The Madras House* is a searching comedy of character.

Barkla, Charles Glover, English physicist, born in 1877, was educated at Liverpool institute, at University college, Liverpool, and at Cambridge university. He became demonstrator in physics, 1905, lecturer in advanced electricity, 1907, and professor of physics, 1909, in the University of London. In 1913, he was made professor of natural philosophy, University of Edinburgh. He has conducted extensive researches in electric waves, X-rays, and secondary rays, publishing various papers in scientific periodicals. In 1917, he was awarded the Nobel prize for physics.

Barlow, Joel, American poet and politician, was born in Connecticut in 1754. He served as a military chaplain during the war for independence. In 1787, he published a poem called *The Vision of Columbus*, which, in 1807, appeared anew in an enlarged form as *The Columbiad*. He spent some years in Europe in political, literary, and mercantile pursuits. For a short time he was American consul at Algiers. In 1811, he was appointed ambassador to France. Died, 1812.

Barnard (*bär'närd*), **Edward Emerson,** American astronomer, was born at Nashville, Tenn., 1857. He was graduated at Vanderbilt university, 1887. From 1887 to 1895, he was astronomer at Lick observatory, California. In 1895, he became professor of practical astronomy, and astronomer of the Yerkes observatory, University of Chicago. His discoveries include the fifth satellite of Jupiter and 16 comets. He also did important work in celestial photography, making photographs of the milky way, comets, and nebulæ. In recognition of these achievements, he received the Lalande, the Arago, and the Janssen gold medal of the French academy of sciences; the gold medal of the royal astronomical society of Great Britain; and also the Bruce gold medal of the astronomical society of the Pacific. He died in 1923.

Barnard, Frederick Augustus Porter, American mathematician, physicist, and educator, was born at Sheffield, Mass., 1809. He was graduated at Yale in 1828; was professor in the University of Alabama, 1837–54; and was successively professor, president, and chancellor, 1854–61, University of Mississippi. In 1864, he was elected president of Columbia college, New York, and served until 1888. Barnard college, affiliated with Columbia university, is named after him because of his notable interest in higher education for women. His published writings are mostly scientific and educational. Died, 1889.

Barnard, George Grey, noted American sculptor, was born at Bellefonte, Pa., 1863. He was educated at the art institute, Chicago, and at Paris. His style is distinctly idealistic and is characterized by marked originality and admirable technique, particularly in marble. Among his more noted works are "Two Natures," in the Metropolitan museum, New York; "God Pan," in Central park, New York; "Adam and Eve," in the Boston museum of fine arts; "Father and Son," in the Carnegie museum, Pittsburgh; the bronze statue of Lincoln, in Lytle park, Cincinnati; and a group of 31 figures of heroic size in the State capitol at Harrisburg, Pa.

Barnard, Henry, American educational reformer, was born in Hartford, Conn., 1811. He was graduated at Yale in 1830 and was admitted to the bar in 1835. As a member of the state legislature, 1837–40, he was an energetic advocate of prison reform. As school commissioner of Rhode Island, 1843–47, he reorganized the educational system of the state. He became state superintendent of schools for Connecticut in 1850, serving until 1854, and was principal of the state normal school at New Britain during the same period.

In 1857, Barnard was made president of the University of Wisconsin and, in 1865, president of Saint John's college at Annapolis. From 1867 to 1870, he was United States commissioner of education, the first to occupy that position. In 1855 he founded the *American Journal of Education*, of which he was editor until 1886. His *American Library of Schools and Education* contains over 800 of his papers and treatises and fills 52 volumes. He ranks as one of the foremost educational pioneers of America. Died in 1900.

Barnby, Sir Joseph, English composer and organist, was born at York, England, 1838. At seven, he was chorister in York minster. He was educated at the royal academy of music, and, from 1863 to 1871, was organist at Saint Andrew's church, London. In 1864, he was made conductor of "Barnby's choir," and, from 1871 to 1896, he was conductor of the Albert hall choral society. In 1875, he was made precentor and director of music at Eton. In 1892, he became principal of the Guildhall school of music. His *Rebekah* and *The Lord is King*, both with orchestra, numerous hymn tunes, services, and anthems, such as *King All Glorious*, for the church, as well as several secular choruses and songs, have made him widely known in both England and America. Among his part songs is the widely popular *Sweet and Low*. He was knighted, 1892; died, 1896.

Barnes, Mary Sheldon, American educator, daughter of E. A. Sheldon, was born at Oswego, N. Y., 1850. She was educated at the Oswego normal school and the University of Michigan, graduating in the first class which admitted women. After further study at Newnham college, Cambridge, England, and at the University of Zurich, she was professor of history at Wellesley college, 1876–80, at Oswego normal school, 1882–84, and at Stanford university, 1891–96. Following her marriage to Earl Barnes in 1884, she spent seven years in study and travel.

Mrs. Barnes was the first instructor in America to apply the Pestalozzian method to the teaching of history. Her adaptations are embodied in her books entitled *Studies in General History*, *American History*, and *Studies in the Historical Method*. She was also the pioneer American teacher to develop the source method of instruction in history. Died in 1898.

Barneveldt (*bär'nē-vělt*), **John van Olden,** Dutch statesman, was born in 1547. He was pensionary of Rotterdam in 1576, at a time when the Spanish arms were victorious everywhere in the united provinces. In 1585, he was sent at the head of an embassy to offer the sovereignty of the Netherlands to Queen Elizabeth of England. On his return, he was appointed grand pensionary of Holland. After a severe contest with the stadholder Maurice of Nassau and his party, he obtained from the Spaniards the recognition of the independence of Holland, and, in 1609, concluded a truce for 12 years.

Barneveldt courageously opposed the ambition of Maurice, who aimed at the supreme power, and supported Arminius against the Calvinists, the sect to which Maurice belonged. Arrested in 1618, he was tried by a special commission and condemned to death. This sentence, though illegal and unjust, being confirmed by the synod of Dort, the venerable statesman was beheaded, 1619.

Barnum, Phineas Taylor, American showman, was born in Bethel, Conn., 1810. At the age of 13, he was employed in a country store, and, about five years afterward, went into the lottery business. When only 19 years old, he married and removed to Danbury, Conn., where he edited *The Herald of Freedom*. In 1834, he removed to New York, where, hearing of Joyce Heth, nurse of General Washington, he bought her for $1000 and exhibited her, realizing considerable profit.

In 1841, Barnum bought the American museum in New York, which he raised at once to prosperity by exhibiting a Japanese mermaid (made of a fish and a monkey), a

white negress, a woolly horse, and, finally, a noted dwarf, styled "General Tom Thumb," whom he exhibited later in Europe and elsewhere. He introduced Jenny Lind to the American public, and then became proprietor of "the greatest show on earth." He made and lost several fortunes, and his show was twice destroyed by fire. He published *The Humbugs of the World*, *Struggles and Triumphs*, and an *Autobiography*. Died, 1891.

Barr, Amelia Edith, novelist, was born at Ulverston, England, 1831, and was educated at the high school, Glasgow, Scotland. In 1850, she married Robert Barr; subsequently, she came to the United States, settling in Texas, where her husband and three children died of yellow fever at Galveston in 1867.

Removing to New York, she began to write for religious periodicals and to publish a series of semihistorical tales and novels. Among these are *Jan Vedder's Wife*, *Bow of Orange Ribbon*, *A Border Shepherdess*, *Remember the Alamo*, *Prisoners of Conscience*, *The Maid of Maiden Lane*, *A Song of a Single Note*, and *Sheila Vedder*. In 1913, she published *All the Days of My Life*, an autobiography. Died in 1919.

Barras (*bȧ'rȧ'*), **Count Paul François Jean Nicolas,** French revolutionist, was born, 1755, in the department of Var. An original member of the Jacobin club, he represented Var in the national convention, voted for the king's execution, and had a share in the Girondists' downfall. He conducted the siege of Toulon, and suppressed, with great cruelty, the revolt in the south of France. Hated by Robespierre, he played the chief part in the tyrant's overthrow, and by the terrified convention was appointed virtual dictator.

In 1795, being again appointed dictator, Barras called to his aid his young friend Bonaparte, who assured his own future with the historical "whiff of grapeshot." The directory being appointed, Barras was nominated one of the five members. Once more dictator in 1797, he guided the state almost alone until Bonaparte, with the help of Sieyès, overthrew him, 1799. Compelled to remove from Paris, he resided in Brussels, Marseille, Rome, and Montpellier; in 1815, he returned, and purchased an estate near Paris with part of the great fortune acquired during the Revolution. He died in 1829. See *France*: *History*.

Barrett, John, American journalist and diplomat, was born at Grafton, Vt., 1866. He was graduated at Dartmouth college, 1889, and, after teaching for some time, he was associated with several important newspapers on the Pacific coast. In 1894, he was appointed American minister to Siam and later served as American minister successively in Argentina, Panama, and Colombia. He did much to promote American commercial interests in Asia and in South America and was director general of the Pan-American Union, 1907–20. In 1921-22, he served on the general commission for the limitation of armaments. His publications include *Admiral George Dewey*, *Pan-American Union*, *The Panama Canal and What it Means*, and books on Asia and South America.

Barrett, Lawrence, American actor, was born at Paterson, N. J., 1838. His first appearance was at Detroit, 1853. He was leading actor in the Boston museum, 1858; served as captain of the Massachusetts volunteers in the Civil War; from 1864, continued as leading actor and manager; and, beginning in 1866, was closely associated with Edwin Booth. His most notable rôle was that of Cassius; but he played Hamlet, Shylock, King Lear, and Richelieu with great distinction. He did much to elevate the American stage and to encourage dramatic authorship. He wrote *The Life of Edwin Forrest* and the biography of Booth in *Actors and Actresses of the Time*. Died, 1891.

Barrie (*bȧr'ĭ*), **Sir James Matthew,** British novelist and dramatist, was born at Kirriemuir, Scotland, 1860; was educated at Edinburgh university; and, after a year and a half as a journalist in Nottingham, settled in London, becoming a regular contributor to leading periodicals. His first volume, *Better Dead*, was largely a satire on London life; in *Auld Licht Idylls*, he opened a new and rich vein, the humor and the pathos of his native village. *The Little Minister*, his first novel, came out in 1891 and was dramatized in 1897. *Walker, London*, a farcical comedy, had a prodigious run in 1892; *Jane Annie* was written with Sir Conan Doyle. Other pieces, nearly all notably successful, have been *The Professor's Love Story*, *The Admirable Crichton*, *Peter Pan*, *Quality Street*, *What Every Woman Knows*, *Sentimental Tommy*, *Der Tag*, and *Mary Rose*. See *English Literature*: *Contemporary Drama*.

Barrows, David Prescott, American educator and ethnologist, was born in Chicago, 1873. He graduated at Pomona college in 1894 and studied at the University of California, Columbia university, and the University of Chicago. He became city superintendent of schools at Manila, P. I., in 1900, chief of the bureau of non-Christian tribes in 1901, and was director of education for the Philippine Islands, 1903–09.

In 1910, he was made professor of education at the University of California and, in 1911, was elected to the chair of political science. He served as a cavalry officer in the Philippines and in Siberia in 1917–19. From the latter year until 1923, he was president of the University of California. His publications include *The Ethno-Botany of the Coahuilla Indians*, *A History of the Philippines*, and *A Decade of American Government in the Philippines*.

Barrows, John Henry, American educator and clergyman, was born at Medina, Mich., 1847; graduated from Olivet college, Mich., 1867; studied at Yale, Union, and Andover theological seminaries; and, from 1881 to 1896, was pastor of the First Presbyterian church, Chicago. He organized and was made president of the world's parliament of religions, held in Chicago, 1893.

In 1896, he resigned his pastorate and proceeded to India to lecture on religious subjects under the auspices of the University of Chicago. On his return, he became lecturer on comparative religions at the University of Chicago and at Union theological seminary, New York, and, in 1898, he was made president of Oberlin college. His publications include *History of the Parliament of Religions*, *Life of Henry Ward Beecher*, and *The World Pilgrimage*. Died, 1902.

Barrows, Samuel June, American prison reform leader, was born at New York, 1845; was graduated at Harvard divinity school, 1875, and at Howard university, Washington, 1897. Before graduation, he was a stenographer and journalist; became pastor of the First church (Unitarian), Dorchester, Boston, 1876; was editor of the *Christian Register*, 1881–97; sat as member of Congress, 1897–99; represented the United States on the international prison commission, 1896; and was president of the international prison congress, 1905. His publications include *Shaybacks in Camp*, *Isles and Shrines of Greece*, and *Crimes and Misdemeanors in the United States*. Died, 1909.

Barry, John, American naval officer, was born in Ireland, 1745. Coming to America about 1766, he acquired wealth as a vessel owner. He was appointed to command the brig *Lexington* in 1776. By taking the tender *Edward*, he was one of the first commissioned officers of the United States navy to capture a ship. Subsequent exploits led to his choice, in 1794, as ranking captain of the United States navy. Died, 1803.

Barrymore, Ethel, American actress, a niece of John Drew, was born at Philadelphia, 1879. Barrymore is a stage name, adopted in place of Blythe. She was educated at the Convent of Notre Dame, Philadelphia. She made her first appearance as Julia in *The Rivals*, 1894; played Priscilla in *Secret Service*, London; later appeared in leading rôles with Henry Irving; first starred in *Captain Jinks*, 1900; later appeared in *Cousin Kate*, *A Doll's House*, *The Silver Box*, *The Twelve Pound Look*, *The Witness for the Defense*, *A Slice of Life*, *The Shadow*, and other plays.

Her two brothers, Lionel and John (b.1882), won distinction on the stage. John made his first appearance in Chicago, 1903, and Lionel in 1893. They achieved fame both on the legitimate stage and in motion pictures, John being well known also in the rôle of Hamlet.

Barth (*bärt*), **Heinrich,** German geographer and explorer, was born in Hamburg, 1821. He was educated at the University of Berlin. After visiting Italy in 1845, he began explorations in Tunis, Tripoli, and Barca. Later he extended his journeys into Egypt, Palestine, and Greece, publishing a valuable account of these researches in 1849.

With Dr. Overweg and James Richardson he set out for central Africa early in 1850. They covered a region previously almost entirely unknown, nearly two million square miles in extent. After the death of both Overweg and Richardson, who succumbed to the climate, Barth continued alone. He returned to Tripoli in 1855, after having traveled more than 12,000 miles. In this notable journey he revealed the true nature of the Sahara desert, determined the course of the Niger and its tributaries, and made many other important discoveries. The scientific thoroughness and vast extent of his investigations placed him in the front rank of African explorers. Died, 1865.

Bartholdi (*bär'tôl'dē'*), **Frédéric Auguste,** sculptor, was born in 1834 at Colmar, Alsace, of Italian ancestry on his father's side. His best-known work is the colossal bronze "Liberty Enlightening the World," which was unveiled on Bedloe island, New York harbor, in 1886; the statue itself is 151 feet high, and the top of the torch rises over 305 feet above low-water mark. His chief sculptural works are likewise conceived on a colossal scale, combined with massive architectural effects. Among these are the group presented by France to Switzerland and "The Lion of Belfort," an immense monument, generally regarded as his masterpiece. Statues of Lafayette in New York and of Lafayette and Washington in Paris are representative of the patriotic and national spirit of his work. He received the cross of the legion of honor in 1887. Died, 1904.

Bartlett, Paul Wayland, American sculptor, was born at New Haven, Conn., 1865; studied at Boston under Frémiet and in Paris under Cavelier. At first he devoted himself to animal sculpture, notable examples of which are his "Dying Lion" and "Bear Tamer." In nearly all his work, he preferred the realistic to the symbolic, and his thoroughly modern technique is fundamentally French in character. He produced statues of General McClellan, General Joseph Warren, Columbus, Michelangelo, and Benjamin Franklin in this country; Lafayette in Paris; the pediment over the House wing of the Capitol; and many decorative groups and numerous other works in the art collections of Philadelphia, Boston, Chicago, and Paris. He was made an officer of the legion of honor and a member of the American academy of arts and letters. Died, 1925. See *Sculpture*, page 1598.

Bartolommeo (*bär'tô-lôm-mē'ō*), **Fra,** otherwise known as Baccio della Porta, Italian painter, was born near Florence, 1475. His first teacher was Cosimo Rosselli; but he owed his more advanced training to the study of the works of Leonardo da Vinci. He won considerable fame in early life. After the tragic death of Savonarola, however, with whom he enjoyed an intimate friendship, he renounced painting and became, in 1500, a Dominican monk.

The visit of young Raphael to Florence in 1504 appears to have stimulated Bartolommeo to resume his art. He imparted to Raphael his own method of coloring and acquired from him a more perfect knowledge of perspective. His subjects are mostly devotional and the greater part of his pictures belong to the later period of his life. His figures are clothed with finely treated masses of drapery, and he is said to have been the first painter to use the lay figure. His most important works are preserved in Italy, chiefly in Florence, where he died, 1517.

Barton, Clara, American philanthropist, was born in Oxford, Mass., 1821. She graduated from Clinton Liberal institute, New York; taught school ten years; during the Civil War, did relief work on battle-fields and organized search for missing men; and aided in the founding of hospitals during the Franco-Prussian war.

By her efforts, the American Red Cross society was founded in 1881, and she was its president until 1904. She secured adoption of the Treaty of Geneva, 1882; was appointed to represent the United States at various international conferences, 1884–1903; inaugurated an amendment empowering the Red Cross society to provide relief during great calamities; and superintended relief activities at the Johnstown flood, 1889, the Russian famine, 1892, the Armenian massacre, 1896, and on various other occasions. She wrote *History of the Red Cross, America's Relief Expedition to Asia Minor*, and *Story of My Childhood*. Died, 1912.

Bartram, John, American botanist, was born at Darby, Pa., 1699, of Quaker parentage. He was appointed American botanist to George III and corresponded extensively with Linnæus and the leading naturalists of Europe, exchanging his collections of American plants for scientific books. At Kingsessing, in 1728, he established the first botanical garden in America. Linnæus styled him "the greatest natural botanist in the world." Among his published works are numerous papers on the natural history of his region. He died in 1777.

Baruch (*bā'rŭk*), **Bernard Mannes,** American financier, was born at Camden, S. C., 1870. During the World War, he discharged many important duties connected with the supply of war materials. In 1919, he was made a member of the supreme economic council of the Peace Conference at Paris.

Barye (*bá'rē'*), **Antoine Louis,** French sculptor of animals, was born at Paris in 1795. He was at first an engraver and metal worker. In 1831, he exhibited his widely known "Tiger Tearing a Crocodile," and, in 1832, his still more famous "Lion Battling with a Serpent," which secured for him the cross of the legion of honor. He excelled in accurate delineation of the anatomy, character, and movements of animals. His sculptures have been widely popular in the United States. Died, 1875.

Bascom, John, American educator, was born at Genoa, N. Y., 1827; graduated in 1849 from Williams college and six years later from Andover theological seminary; was for 20 years professor of rhetoric at Williams college, and, for 13 years, president of Wisconsin university. He retired from Wisconsin in 1887 and occupied the chair of political science at Williams, 1887–1901. He wrote *Political Economy, Philosophy of Rhetoric, Comparative Psychology, Evolution and Religion, Growth of Nationality in the United States*, and numerous papers and addresses. Died, 1911.

Basedow (*bá'zē-dō*), **Johann Bernhard,** German educational reformer, was born at Hamburg, 1723. He was educated in philosophy and theology at the University of Leipzig. He became professor of moral philosophy at Soro, Denmark, in 1753 and at Altona in 1763. At Altona, he fell under the influence of Rousseau's *Emile*, which resulted in his abandoning theology for educational work in 1767.

His *Elementarwerk*, issued in 1774, combining the methods of Comenius with the principles of Bacon and the revolutionary ideas of Rousseau, met with wide approval and led to the establishment of his celebrated Philanthropinum at Dessau in 1774. This continued in existence until 1793, exerting a great influence on the education of children throughout Germany. The fundamental idea of his reform was "education according to nature." Many of his ideas were later carried out by more practical educators, such as Pestalozzi and Froebel. He died in 1790. See *History of Educational Reformers*.

Bashford, James Whitford, American preacher, was born at Fayette, Wis., 1849. He was educated at the University of Wisconsin, Boston university, and Wesleyan university; was a tutor in Greek at the University of Wisconsin, 1874; and was pastor of the Methodist Episcopal churches at Boston and Auburndale, Mass., at Portland, Me., and at Buffalo, N. Y., 1876–89. In 1889, he became president of Ohio Wesleyan university, resigning in 1904, when he was elected bishop, to promote missionary efforts in China and India, both of which he visited in 1907. He wrote *Science of Religion, China and Methodism*, and *God's Missionary Plan for the World*. Died, 1919.

Basil (*bāz'il* or *bā'zĭl*), **Saint,** surnamed the Great, bishop of Cæsarea, was born there about 329. He was one of the most eminent of the Christian fathers, succeeding Eusebius in the see of Cæsarea in 370. By his opposition to Arian doctrines, he offended the emperor Valens. Saint Basil made several unsuccessful attempts to reunite the two hostile churches of the East and the West. Died, 379.

Baskerville, Charles, American chemist, was born in Noxubee county, Miss., 1870; graduated from University of Virginia, 1890; studied at Vanderbilt university, 1891, and at the University of Berlin, 1893; was instructor, 1891–94, assistant professor of chemistry, 1894–1900, and professor of chemistry, 1900–04, at the University of North Carolina; and became professor of chemistry at the College of the City of New York, 1904. He is known as the inventor of various commercial processes, including one for the refining of vegetable oils. He wrote *School Chemistry, Radium and Its Applications in Medicine*, and *General Inorganic Chemistry*; also numerous scientific, educational, and technological articles. Died, 1922.

Bassett, John Spencer, American historian and educator, was born at Tarboro, N. C., 1867; was educated at Trinity college, N. C., and Johns Hopkins; became professor of history at Trinity college, 1893, and at Smith college, 1906. In 1907–08, he was a lecturer at Yale university, and, in 1909, at New York university. His publications include *The Federalist System, A Short History of the United States*, and *The Lost Fruits of Waterloo*. In 1928 he was killed by a street car.

Bates, Henry Walter, English naturalist and traveler, was born at Leicester, 1825. He began life as a hosiery clerk, but became interested in natural science through early acquaintance with A. R. Wallace. In 1848, he joined Wallace on a collecting trip to the Amazon, paying expenses by the sale of specimens. He spent three years collecting in the vicinity of Para and seven years on the upper Amazon, discovering, at Ega, 550 new species of butterflies. After many hardships, he returned to England in 1859, having found 8000 species of insects new to science.

Like Darwin, he was much afflicted by dyspepsia after returning from the tropics. In 1863, he published a delightful book, *The Naturalist on the River Amazons*, which is a classic of scientific travel. In 1864, he became assistant secretary of the royal geographical society, editing the *Transactions* and numerous books, including Belt's *Naturalist in Nicaragua*. In his paper on *Fauna of the Amazon Valley*, he stated and solved the problem of mimicry and protective coloration. According to Darwin, Bates is second only to Humboldt in describing the animal and plant life of the tropical forest. Died in 1892.

Bates, Katharine Lee, American author and educator, was born in Falmouth, Mass., 1859. Following graduation from Wellesley college, 1880, she taught in Natick high school, 1880–81, and in Dana Hall, 1881–85. She became instructor in English at Wellesley college in 1885 and was professor of English literature there from 1891 to 1925. Her writings include *Rose and Thorn, English Religious Drama, Spanish Highways and By-ways, Sunshine and Other Verses for Children, Hermit Ireland, From Gretna Green to Land's End, America the Beautiful and Other Poems, Fairy Gold, Sigurd, The Golden Collie and Other Comrades of the Road*, and *Yellow Clover*. She also edited numerous English and American classics, and translated (with Cornelia Frances Bates) Bequer's *Romantic Legends of Spain*. Died, 1929.

Bateson, William, British biologist, was born at Whitby, England, in 1861. He was educated at Rugby school and at Saint John's college, Cambridge. He was professor of biology, Cambridge university, 1908-09, and,

in 1910, he became director of the John Inness horticultural institution, Merton Park, Surrey. During 1912–14, he was Fullerian professor of physiology at the Royal institution, London. He became noted for his extensive biological investigations, which embrace important researches on Mendelism and on the determination of sex. His published works include *Materials for the Study of Variation, Mendel's Principles of Heredity*, and *Problems of Genetics*. Died, 1926.

Bayard (*bā'yärd'*), **Pierre du Terrail, Chevalier,** French knight, was born near Grenoble in 1476. In an expedition against Naples, serving under Charles VIII, and in the wars against the English and the Spaniards, he distinguished himself by his bravery and nobleness of character. In the reign of Francis I, he gained a great victory for the king at Marignano and defended the city of Mezieres against Charles V, for which he was called the "savior of his country." He is known as "the knight without fear and without reproach," without rival as an exemplar of chivalric virtue. He was killed in a battle at the river Sesia, Italy, in 1524.

Bayle (*bāl*), **Pierre,** French philosopher and critic, was born at Carlat, 1647. He studied philosophy under the Jesuits at Toulouse and, for a year and a half, turned Catholic. To escape ecclesiastical censure, he withdrew to Geneva and from there to Coppet, on the lake of Geneva, where he studied the philosophy of Descartes. After a few years, he returned to France; in 1675, he was elected to the chair of philosophy at Sedan and, in 1681, at Rotterdam.

In 1684, Bayle began to write *Nouvelles de la république des lettres*, one of the most successful attempts at a popular journal of literary criticism. The revocation of the edict of Nantes led him to write a strong defense of toleration. He devoted much of his leisure to the *Dictionnaire historique et critique*. This work, the first published under his own name, exercised an immense influence over literature and philosophy; its destructive criticism of accepted history and philosophy became the foundation of 18th century rationalism. Died in 1706.

Bayliss, Sir William Maddock, British physiologist, professor of general physiology, University college, London, was born in 1860. He was educated at University college, London, and at Wadham college, Oxford university. He became widely known for his investigations, lectures, textbooks, and other writings on physiological subjects. His published works include *Introduction to General Physiology, Principles of General Physiology, The Nature of Enzyme Action, Intravenous Injection in Wound-Shock*, and *Properties of Colloidal Systems*. Died, 1924.

Beach, Amy Marcy Cheney, , American composer, daughter of C. A. Cheney, was born at Henniker, N. H., in 1867. She received her early training in music from her mother. Later she studied under Perabo, Hill, and Baermann in Boston. Following her pianistic début in 1883, she appeared in recitals and also in concert with the Boston symphony and other orchestras. After her marriage in 1885 to Dr. H. H. A. Beach of Boston, she devoted her musical activities chiefly to composition. Her compositions include the choral works *The Minstrel and the King, Rose of Avontown, The Chambered Nautilus*, and *Panama Hymn*; *Gaelic Symphony*, for piano and violins; and numerous songs and piano pieces.

Beach, Rex Ellingwood, American author and playwright, was born at Atwood, Mich., 1877; was educated at Rollins college, Winter Park, Fla.; studied law in Chicago two years between 1896 and 1900. Devoting himself to writing, he became widely known for his stories of adventure, which include *Pardners, The Spoilers, Going Some, The Ne'er-Do-Well, The Net, The Auction Block*, and *Oh, Shoot*. He dramatized *Going Some* (with Paul Armstrong) and *The Spoilers* (with James McArthur).

Beaconsfield, Earl of. See *Disraeli, Benjamin*.

Beattie (*bē'tĭ*; *bā'tĭ*), **James,** Scottish poet and writer on philosophy, was born at Laurencekirk, 1735. He was professor of moral philosophy in Marischal college, Aberdeen, 1760–97. His writings include an *Essay on the Nature and Immutability of Truth, The Elements of Moral Science*, and *Essays on Poetry and Music*. His fame, however, now rests almost wholly on *The Minstrel*, a descriptive poem on the progress of genius, written in the Spenserian stanza and marked by great harmony of style, rich imagery, and delicate sentiment. Died, 1803.

Beatty (*bē'tĭ*), **Sir David,** British admiral, was born in Wexford, Ireland, 1871. Entering the navy in 1884, he served with distinction in Sudan operations, 1896–98, and in China, 1900, rising to the rank of captain. In 1901, he married Ethel Field, only daughter of Marshall Field, the noted Chicago merchant. In 1910, he was made rear admiral and, in 1912, was placed in command of the first British battle-cruiser squadron.

Beatty played a distinguished part in the World War. On January 24, 1915, his squadron encountered a German squadron of fast cruisers. After sinking the German cruiser *Blücher*, Beatty drove the remaining enemy vessels to the shelter of their mine fields. On May 31, 1916, he led his squadron against the entire German high seas fleet in the great battle of Jutland, suffering and inflicting terrible losses, until the arrival of the main British fleet. Following this action, which forced the German fleet to disastrous flight to its protected base never to reappear in battle formation, Beatty was made vice admiral and was placed in command of the grand fleet. On November 21, 1918, he received, off the coast of Scotland, the surrender of all the important components of the German navy, 90 ships in all, besides 87 U-boats—the greatest naval surrender of modern times. In 1919, he became an earl and also first sea lord of the British admiralty, in which capacity he attended, in 1921, the Washington Conference on the limitation of armaments. He was succeeded in the admiralty by W. C. Bridgeman in 1924. See *World War: The Battle of Jutland*.

Beaumarchais (*bō'mär'shĕ'*), **Pierre Augustin Caron de,** French dramatist and poet, the son of a watchmaker named Caron, was born at Paris, 1732. He married a widow, Madame Franquet, in 1757 and from a little property of hers took the aristocratic name of Beaumarchais. In 1768, he married a second time, obtaining on this occasion a splendid fortune with his wife. Meanwhile devoting himself to literature, he produced *Eugénie*, a drama in five acts; *Les deux amis, ou Le négociant de Lyon*; *Le barbier de Séville*; and *Le mariage de Figaro*. On the last two of the foregoing his fame now rests. These brilliant comedies inspired the noted operas of Rossini and Mozart that bear the same names as the dramas. In plot, construction, and dialogue, his works represent the culmination of 18th century dramatic writing in France. He died in 1799.

Beaumont (*bō'mŏnt*), **Francis,** English poet and dramatist, best known by his literary partnership with John Fletcher, was born at Grace Dieu, Leicestershire, in 1584. He was educated at Oxford. At 19, he became the friend of Ben Jonson. About 1607, his famous friendship with Fletcher began, and so intimate did the two friends become that they lived in the same house until Beaumont's marriage in 1613. Their joint works comprise some fifty plays, among the best of which are *Philaster, The Maid's Tragedy*, and *The Faithful Shepherdess*. In some of their plays Massinger collaborated, and certain passages in *The Two Noble Kinsmen* are by Shakspere. Died, 1616. See *English Literature: The Elizabethans*.

Beauregard (*bō'rē-gärd*), **Pierre Gustave Toutant,** general of the army of the Confederate states during the Civil War, was born near New Orleans, La., 1818. He was graduated at West Point in 1838 and served with distinction in the Mexican war. He resigned the superintendency of West Point to join the Confederate army early in 1861; was assigned command at Charleston, S. C., where, on April 12-13, he began the war by the bombardment of Fort Sumter; July 21, he won the battle of Bull Run; was defeated, April 7, at Pittsburg Landing; in 1863, he defended Charleston and aided in the defense of Richmond. After the war, he became a railroad president and, in 1878, adjutant general of Louisiana. Died, 1893.

Beaux (*bō*), **Cecilia,** American painter, was born at Philadelphia in 1863, of French descent. She studied painting in her native city under William Sartain, and, in 1889–90, she worked at Paris under Bouguereau and other masters. Returning to America, she settled in New York, where she attained distinction as a portrait painter, especially of women and children. She won many prizes and, in 1902, was made a member of the national academy. Among her best-known paintings are "Last Days of Infancy," "Mother and Daughter," "The Dreamer," "A New England Woman," "Dorothea and Francesca," "Banner Bearer," and "The Cynthia."

Bebel (*bā'bĕl*), **Ferdinand August,** German Social Democrat, was born at Cologne, 1840. In 1860, he removed to Leipzig, where, in 1864, he established himself as a master turner. Entering politics in 1862, he became, by 1871, the most influential leader of the Social-Democratic movement in the Reichstag and in the press. In 1872, he was imprisoned on charges of treason and *lèse-majesté* against the German emperor, but his incarceration only heightened the esteem of his party associates. He was a notably effective speaker and writer. His works, from the sale of which he amassed a considerable fortune, include *Der Deutsche Bauernkrieg, Die Frau und der Socialismus, Die Socialdemokratie, Für Volkswehr gegen Militarismus*, and his memoirs *Aus meinem Leben*. He died in 1913.

Becket, Thomas à, English prelate, son of a merchant, was born at London about 1118; studied at Oxford, Paris, and Bologna; and, on his return home, entered the Church. Henry II made him high chancellor and preceptor to Prince Henry in 1155, admitted him to the closest intimacy and confidence, and, in 1162, raised him to the archbishopric of Canterbury. Becket immediately gave up his

courtier habits, assumed a rigid austerity of manner, and became an uncompromising champion of the privileges of the clergy A violent contest ensued between the sovereign and the prelate, and the latter was at length obliged to flee from the kingdom. In 1170, however, he was restored, and he instantly renewed his resistance to the monarch. Irritated by this fresh provocation, Henry uttered a hasty speech, which four of his knights not unnaturally construed into a command to rid him of the pertinacious archbishop. They accordingly hastened to Canterbury and murdered Becket in the cathedral in 1170. He was canonized in 1772. See *England: History, Beginnings of Constitutional Government.*

Becque (*bĕk*), **Henri François,** French dramatist, was born at Paris, 1837. He was a journalist and, for a time, was engaged in banking. His literary abilities were first made known by his libretto for the opera *Sardanapale* in 1867; but his earliest plays, *Michel Pauper* and *The Elopement*, written about 1870, met with little recognition, and his most important plays were rejected for several years. The production of *The Crows*, however, at the national theater at Paris in 1882, together with that of *The Parisian Woman* in 1885, marked the beginning of the modern French naturalistic school, of which Becque is now universally acknowledged as the originator. He wrote also *The Merry-go-round*, *Honest Women*, and *The Buffoons*, together with some miscellaneous pieces. Died, 1899.

Becquer (*bā-kâr'*), **Gustavo Adolfo,** Spanish poet and novelist, was born at Seville in 1836. His weird and fantastic tales, written after the manner of Poe and Hoffmann, have proved very popular. He wrote several volumes of poems and legends. Of these, the best-known is his *Leyendas españolas*. An excellent translation of this work, under the title *Romantic Legends of Spain*, was published in 1909 by Cornelia Frances Bates and her daughter Katharine Lee Bates. Becquer died in 1870.

Becquerel (*bĕk'rĕl'*), **Alexandre Edmond,** French physicist, son of Antoine César Becquerel, was born in Paris, 1820. He manifested scientific tastes and talents similar to those of his father, with whom he collaborated in important investigations, succeeding him as professor of physics in the Conservatoire des Arts et Métiers in 1878. He conducted researches on electricity, light, and phosphorescence; invented the phosphoroscope; and did important work on the solar spectrum and the spectrum of the electric light. He published numerous scientific papers, was the author of *La Lumière, ses causes et ses effets*, and, jointly with his father, produced *Eléments de physique terrestre et de metéorologie* and other works. Died, 1891.

Becquerel, Antoine César, noted physicist, the first of three generations of eminent French scientists, was born at Loiret, 1788. While studying the physical properties of yellow amber, he had occasion to make experiments on the liberation of electricity by pressure. The result of his inquiries was the overthrow of Volta's theory of contact and the construction by him of the first constant pile. He next discovered a method of determining the internal temperature of human and animal bodies and, by physiological applications, demonstrated that when a muscle contracts there is a development of heat. He was one of the creators of electrochemistry, and he invented a method of electrotyping. Died, 1878.

Becquerel, Antoine Henri, French physicist, son of Alexandre Edmond Becquerel, was born in Paris, 1852. He received his education in scientific schools in Paris and became professor of physics in the museum of natural history in 1878 and at the Ecole Polytechnique in 1895. His researches were chiefly concerned with optical subjects, including phosphorescence, magnetic rotation of polarized light, ultra-red rays, and the invisible radiation from uranium, now named Becquerel rays in honor of his discovery, for which he received the Rumford medal. In 1903, the Nobel prize for physics was divided between M. Becquerel and M. and Mme. Curie in recognition of the value of their researches in radioactivity. He died in Paris, 1908. See *Radioactivity.*

Bede (*bēd*), or **Bæda** (*bē'dà*), surnamed "the Venerable," English monk, scholar, and church historian, was born about 673 in the county of Durham. He is said to have been the most learned Englishman of his day. In the seclusion of his cell, he wrote his important *Ecclesiastical History of England*, which was translated from the Latin into Anglo-Saxon by King Alfred; also a number of commentaries, homilies, hymns, and lives of the saints. Died, 735.

Beebe, William, American ornithologist and author, was born at Brooklyn, New York, in 1877 and was educated at Columbia university. In 1899, he was appointed honorary curator of ornithology by the New York zoological society and became director of the British Guiana zoological station in the same year. His publications include *Two Bird Lovers in Mexico*, *Tropical Wild Life*, *Monograph of the Pheasants*, and *Edge of the Jungle.*

Beecher, Henry Ward, preacher, theologian, lecturer, orator, third son of Lyman Beecher, was born at Litchfield, Conn., 1813; was graduated at Amherst college in 1834; and studied theology under his father at Lane seminary, Cincinnati. After a pastorate of ten years in two churches in Indiana, he removed to Brooklyn and assumed charge of Plymouth church, "an organization of orthodox Congregational believers." For many years he drew one of the largest and most influential regular congregations in the United States, and his published sermons became a power throughout the United States and in other countries. On the slavery question, he was emphatically an abolitionist. He visited Great Britain in 1863 with the avowed object of enlisting sympathy for the people of the North; and, although very unfavorably received at first, he succeeded in effecting no inconsiderable change in public opinion. For nearly 20 years, he was editor of the New York *Independent*, and, in 1870, he became editor of the *Christian Union*. His most important works include *Lectures to Young Men, Industry and Idleness*, and the *Life of Christ*. He also edited the *Plymouth Collection of Hymns*. Died at Brooklyn, N. Y., 1887.

Beecher, Lyman, preacher and theologian, was born at New Haven, Conn., 1775; was graduated at Yale college; studied theology for a year; and began preaching at East Hampton, L. I., where he remained until 1810. He then went to Litchfield, Conn., where were born his two most famous children,—Henry Ward and Harriet (Mrs. Stowe),—though nearly all his thirteen children became well known. All his sons, of whom there were seven, became clergymen. In 1826, he became pastor of Hanover Street church, Boston, from which he went to Cincinnati as head of Lane theological seminary. He remained there 20 years, in the course of which he was tried and acquitted by the Church courts on the charge of preaching false doctrine. Beecher ranked among the foremost orators and preachers of his time. Died at Brooklyn, N. Y., 1863.

Beerbohm, Max, writer and caricaturist, was born in London, 1872; was educated at Oxford; in 1910, married Florence Kahn, of Memphis, Tenn.; and afterward took up his residence in Rapallo, Italy. His publications include *The Happy Hypocrite*, *Zuleika Dobson*, and *And Even Now*. His caricatures, noted for their delicate and incisive satire, have been exhibited in art galleries at London and elsewhere. Many of them have been collected and published under various titles, including *The Second Childhood of John Bull*, *The Poets' Corner*, and *Fifty Caricatures*.

Beernaert (*bâr'nârt*), **Auguste Marie François,** Belgian statesman, was born at Ostend, 1829. He began public life as a member of the Chamber of Deputies in 1874; was advanced, in 1884, to the portfolio of agriculture, industry, and art; and soon afterward was appointed minister of finance. He rendered important service in connection with the revision of the constitution and the adoption of proportional representation in the elections. In 1895, he was elected president of the Chamber of Deputies. He was a prominent member of the International Peace Conference during the sessions of 1899 and 1907. In 1909, he was awarded the Nobel peace prize jointly with Baron d'Estournelles de Constant. Died in 1912.

Beethoven (*bā'tō-vĕn*; *bāt'hō-*), **Ludwig Van,** German composer of instrumental music, was born at Bonn, Prussia, about December 16, 1770. In his fourth year, he was compelled by his father to practice daily on the harpsichord. Beethoven's musical taste was intellectual rather than intuitive, and it had to be awakened before his interest was excited. Pfeiffer and Van der Eden laid the foundation of his technical skill, and Neefe made him familiar with the grand conceptions of Bach and Handel.

When eleven years old, Beethoven appeared in Holland as a piano virtuoso, chiefly in Bach's music, and was made the assistant of Neefe at the organ in the elector's chapel. In 1787, he went to Vienna, at the expense of the elector of Cologne, to study with Mozart; but he was soon recalled to Bonn by the illness of his mother, and, at her death, he became the main support of the family. His natural talent and refinement asserted themselves, and he now began giving lessons and making occasional public appearances.

Life in Vienna. In 1792, Beethoven went to Vienna, where, with the exception of a few short journeys for business or pleasure, he remained for the rest of his life. The first five years of his residence there were the happiest he ever knew. He had excellent patrons; he was received in the best society; and, in his study under Haydn and Albrechtsberger, he made rapid progress in the study of musical form.

About 1795, he made his début in Vienna as a pianist, and, with his "Concerto in C major," he won instant recognition. His "Opus I," containing three trios for the piano, appeared this same year. As a relaxation from music, Beethoven's ardent interest in general literature received a fresh impetus at this time. His absorption in

reading tended in some measure to soften the afflictions which afterward fell to his lot. From about 1798, he was troubled with a defect in hearing, and his sensitive nature was greatly perturbed. By 1814, the loss of his hearing was complete, and this so sorely affected him that his compositions were tinged with a passionate melancholy.

Before the end of 1800, Beethoven had composed twenty sonatas for the pianoforte, a large number of trios and quartets, and his first and second symphonies. A pension was at length settled upon him on condition that he continue to reside in Austria. These years were productive; among his works were a sonata containing the well-known funeral march, the "Moonlight Sonata," the "Kreutzer Sonata," the "Heroic Symphony," and his one opera *Fidelio*, written in 1805.

Beethoven's fourth, fifth, and sixth symphonies were composed between 1805 and 1810; the music to Kotzebue's "Ruins of Athens" was first performed in 1812; the "Battle Symphony," in 1813; the cantata "The Glorious Moment," in 1814; and the eighth symphony was written in 1814, when he was totally deaf. The principal productions of the last ten years of his life were several sonatas for the pianoforte; the grand "Mass in D," a three years' labor; the "Overture in C, opus 115"; the ninth symphony with chorus, the greatest of his productions, completed in 1823; and the last grand quartets.

Though he was surrounded in Vienna by friends and admirers, Beethoven led a solitary life. During his last four years, he lived in want and privation in order that he might bequeath more to a nephew, who, although ungrateful for kindnesses, nevertheless continued to receive from the musician a lifelong and extravagant affection.

Character and Genius. Beethoven was characterized by genuine simplicity and sincerity. His temperament, reacted upon by his deafness, led him to turn the energies of his soul within, and it is to his music that we look for the deepest expressions of his heart. He felt all phases of human emotion and expressed all. The simple emotion of confiding youth, then a sense of life's perplexities with the courage that surmounts them, and, finally, the exhaustion of a soul broken by struggle, which renounces earthly affections and thirsts for ideal, solitary communion with the Infinite—such is the immense circle which his genius embraced. Beethoven's principal title to fame lies in his unchallenged superiority as a composer of symphonies. In the symphony, music finds its highest intellectual dignity; in Beethoven, the symphony found its loftiest master. Died in Vienna, March 26, 1827. See *Music*: *German Classic Masters*.

Begin, Louis Nazaire, Canadian cardinal, was born at Levis, Quebec, 1840. He received his education at Laval university, winning the Prince of Wales prize. He studied also at Rome and Innsbruck; was ordained, 1865; and was professor of theology at Laval, 1868–84. He was made bishop of Chicoutimi, 1888; archbishop of Quebec, 1894; and was created cardinal in 1914. His writings include *La primauté et l'infaillibilité des souverains pontifes*; *Aide-mémoriste, ou chronologie de l'histoire du Canada*; and *Catéchisme de Controverse*. Died, 1925.

Behring (*bā'ring*), **Emil Adolf von,** German physician, was born at Hansdorf, 1854. He studied medicine in Berlin, became an army surgeon in 1880, and was appointed professor at the University of Halle in 1894. In 1895, he accepted the directorship of the hygienic institute at Marburg. His greatest contributions to medical science were his discovery of diphtheria antitoxin and his researches in the study of immunity. In 1905, he announced the discovery of a substance produced from the virus of tuberculosis and called bovi-vaccine, which prevents tuberculosis in cattle. His publications include *Die Blutserumtherapie*, *Bekämpfung der Infektionskrankheiten*, and *Die Beiträge zur experimentellen Therapie*. In 1901, he received the Nobel prize in medicine in recognition of his discovery of diphtheria serum. Died, 1917.

Belasco (*bē-lăs'kō*), **David,** dramatic manager and playwright, was born at San Francisco, 1859 and was educated at Lincoln college, California. Through his skill in training actors for specific rôles and the remarkable success of his methods of stage lighting and stage setting, he has become widely known as a producing manager. He is also the author or collaborator of 200 plays, including *Zaza*, *The Wife*, *The Girl of the Golden West*, and *The Return of Peter Grimm*.

Belisarius (*bĕl'i-sā'ri-ŭs*), Byzantine general under Justinian, was born in Illyria about 505. After commanding an expedition against the king of Persia about 530, he suppressed an insurrection at Constantinople, conquered Gelimer, king of the Vandals, and put an end to the latter's dominion in Africa. In 535, he was sent to Italy to carry on war with the Goths, from whom he captured Rome in 536. He was afterward sent against the Persians and the Huns. In 563, he was charged with conspiracy against Justinian, but was acquitted. Died, 565.

Bell, Alexander Graham, scientist and inventor, was born at Edinburgh, Scotland, in 1847, the son of Alexander Melville Bell, whose system of "visible speech," a universal phonetic alphabet, has been widely used in teaching deaf-mutes to speak. He received a professional training from his father, a lecturer at Edinburgh university from 1843 to 1865. His formal education was obtained at the universities of Edinburgh and London, his father having removed to the latter city in 1865. His family settled in Brantford, Canada in 1870, and in the following year he delivered lectures on vocal physiology at Boston university, taking up his residence in Boston in 1872. He applied for American citizenship in 1874, becoming later a naturalized citizen of the United States.

After some three years of experiment, Bell succeeded in constructing a practical device for transforming the sound vibrations of speech into equivalent variations of electric current, which, after transmission over a wire, might be reconverted to sound waves and heard as speech. He obtained a patent for the process, the basic telephone patent, on March 7, 1876. The first telephone line was installed at the residence of his father at Brantford, Ontario, June 25, 1876. Despite many years of litigation, Bell realized a substantial fortune from his invention, receiving also numerous honors from scientific societies and universities of various countries, as well as from the French government.

Bell's life thereafter was devoted mainly to further inventions, to the encouragement of scientific research, and to promoting the proper education of deaf-mutes. Among the many patents he secured were those for the telephone probe, an electrical device for detecting the presence of foreign metal masses in the body; the Volta graphophone; the photophone, by which variations of light may be registered as sounds; the spectrophone, enabling invisible colors of the spectrum to be detected by means of sounds; and a device for stabilizing the balance of flying machines.

Bell devoted much of his wealth to scientific and humanitarian projects. With donations of over $300,000, he founded the American Association to Promote the Teaching of Speech to the Deaf. His other benefactions include $50,000 to found *Science*, later the official journal of the American Association for the Advancement of Science; $30,000 to conduct investigations in the art of flying; and $5000 to found the Astrophysical observatory at the Smithsonian Institution. He died at his summer residence in Nova Scotia, 1922. See *Telephone*, page 1333.

Bell, Andrew, Scottish educational reformer, was born at Saint Andrews, 1753 and was educated at the University of Saint Andrews. He was a tutor in Virginia, 1774–81, but returned to Great Britain and took orders in the Church of England.

In 1787, he went to India, becoming an army chaplain, and, in 1789, was placed in charge of an orphan school at Madras. Being unable to secure competent teachers, he conceived the plan of conducting the school by the aid of the pupils themselves, thus originating the famous "monitorial system." He wrote numerous books on education and left £120,000 to found educational institutions in Scotland. Died, 1832.

Bellamy (*bĕl'ă-mĭ*), **Edward,** American novelist and economist, was born at Chicopee Falls, Mass., 1850. He was educated in Germany; was admitted to the bar; was on the staff of the New York *Evening Post* in 1871-72; and, on his return from the Hawaiian islands in 1877, founded the Springfield *News*. He is best known by his novels *Looking Backward* and *Equality*, both socialistic works. Died, 1898.

Bellini (*bĕl-lē'nē*), **Gentile,** Venetian painter, son of Jacopo Bellini, was born about 1427. He was employed with his brother Giovanni to decorate the great council chamber of the Venetian senate house. Among his most important works are "Procession of Corpus Domini" and "Miracle of the True Cross" at Venice; "Sermon of St. Mark," now in the Brera gallery, Milan; and portraits in the academy, Venice, and in the Louvre, Paris. Died, 1507.

Bellini, Giovanni, Venetian painter, brother to Gentile Bellini and, with him, the founder of the Venetian school of painting, was born in 1426. He first studied with his father, Jacopo Bellini. He was greatly influenced in his work by his famous brother-in-law, Andrea Mantegna, and by the sculptures of Donatello. His best works are altarpieces. Among his more famous pictures are his "Infant Jesus," "Holy Virgin," and "Christ and the Woman of Samaria." There is a well-known picture of Bellini's, "Christ on the Mount," in the national gallery, London, and another, "The Circumcision," at Castle Howard. Among Bellini's many pupils the most distinguished were Giorgione and Titian. Died, 1516.

Bellini, Vincenzo, Italian composer of operas, was born at Catania, Sicily, in 1802. He was sent to the conservatory of Naples, where he studied composition. After a

number of early operas had made him known in Italy, he wrote, in 1827, the opera *Il Pirata*, which gave him a name in the musical world. Bellini's music is notably well adapted to the voice, and the greatest singers from Jenny Lind and Lilli Lehmann to Patti, Nilsson, and Sembrich have included rôles from his operas in their repertoires. Among his best works are *Norma*, *I Puritani*, and *La Sonnambula*. Died, 1835.

Bellman (*bĕl'mân*), **Karl Mikael,** Swedish poet, was born at Stockholm, 1740. He became court secretary in 1775. His later and more brilliant pieces are chiefly idyllic or humorous songs, for which he also furnished original melodies. The best specimens of his genius, which is of a rare order, are to be found in the collections prepared by himself—*Bachanaliske Ordenskapitlets Handbibliothek*, *Fredmans Epistlar*, and *Fredmans Sånger*. He died in 1795, and a monument was erected to his memory at Stockholm in 1829. See *Swedish Literature*.

Belloc (*bĕ-lŏk'*), **Hilaire Joseph Peter,** English writer and politician, was born in France, 1870, of French-English parentage. He was graduated at Balliol college, Oxford, 1895, and soon devoted himself to writing. By the range and the quality of his novels, essays, books of travel, and other works, he won an enviable position in English letters. He was member of the House of Commons, 1906–10. Among his numerous writings are *The Bad Child's Book of Beasts*, *More Beasts for Worse Children*, *The Moral Alphabet*, *The Historic Thames*, *Mr. Clutterbuck's Election*, *High Lights of the French Revolution*, *The Path to Rome*, *General Sketch of the European War*, and *A Contrast*.

Bell-Smith, Frederic Marlett, artist, was born at London, 1846; studied drawing in London and painting in Paris; went to Canada, 1867; was a charter member of the society of Canadian artists; became director of fine arts, Alma college, 1881; taught drawing in public schools, London, Ont., 1882–89; and, in the latter year, was made director of the Toronto art school. He was also a popular lecturer and writer on art subjects. His principal pictures include "Queen Victoria's Tribute to Canada," "Landing of the Blenheim," and "Lights of a City Street." He exhibited at the royal academy and at other leading exhibitions. Died, 1923.

Bem (*bĕm*), **Joseph,** Polish general, was born in Galicia in 1795; served in the French campaign against Russia, 1812; took part in the Polish insurrection of 1830; and joined the Hungarian army in 1848. He defeated the Austrians on several occasions, but, after the disastrous battle of Temesvar, he took refuge in Turkey, became a Mohammedan, and was made a pasha. Died, 1850.

Bembo (*bĕm'bō*), **Pietro,** Italian scholar, was born at Venice, 1470. In 1513, he was made secretary to Pope Leo X and, in 1539, was made a cardinal by Paul III, who afterward appointed him to the dioceses of Gubbio and Bergamo. Bembo was the restorer of the classic style in both Latin and Italian literature. Among the most famous of his works are a short treatise on Italian prose, which marked an era in Italian grammar; *Gli Asolani*, a dialogue; and a *History of Venice*. Died, 1547. See *Italian Literature*: *The Renaissance*.

Benavente, Jacinto, Spanish poet and dramatist, was born at Madrid in 1866, son of a noted physician. He was educated in his native city and studied law at the university there. Upon his father's death in 1885, he gave up plans for a legal career and devoted himself to literature. From 1885 to 1892, he traveled in France, England, and Russia, and later became an actor. In 1893, he published a small book of verse and a volume of plays entitled *Teatro Fantastico*. This was the beginning of a career of great brilliance and fertility as a dramatic writer. During the ensuing 30 years, Benavente produced more than 90 plays. The production in 1913 of *La Malquerida*, which won him great popularity, was followed by his election to a chair in the Spanish academy. In 1922, he was awarded the Nobel prize for literature.

Benedict XV, Pope, Giacomo della Chiesa, successor of Pius X, was born at Pegli, near Genoa, 1854. He was the son of a nobleman of wealth; was educated in Genoa and Rome; and was ordained to the priesthood in 1878. He was associated with Cardinal Rampolla at Madrid, 1883–87, and later at Rome, where he became consultor of the holy office in 1901; was appointed archbishop of Bologna in 1907 and cardinal in May 1914; became pope later in the same year. He was known as a determined foe of modernism in religion. During the World War, he made repeated efforts to bring about peace among the warring nations. Died, 1922.

Benedict, Saint, one of the originators of monastic institutions in the West, was born at Nursia, in Italy, about 480. Early in life he retired into a desert and spent three years in a cavern. Being discovered, his sanctity drew to him such numbers of people that he founded twelve convents. In 529, he went to Monte Cassino; built a monastery, afterward one of the most famous in Italy; and established the Benedictine order. He died about 543.

Beneke (*bā'nĕ-kĕ*), **Friedrich Eduard,** German psychologist and educator, was born in Berlin, 1798. He was educated at the universities of Halle and Berlin. In 1832, he was made a professor of philosophy in the University of Berlin. His most important works were psychological treatises, in which he insisted that psychology must be formulated after the methods of physical science. He opposed the idea of formal discipline in education.

Beneke's influence on German teaching was second only to that of Herbart. His most important writings include *Theory of Education and Instruction* and *Textbook of Psychology as a Natural Science*. In 1854, he disappeared from his home, and, in 1856, his body was found at Charlottenburg.

Benes (*bĕ'nāsh*), **Edward,** Czechoslovak statesman, was born at Kozlany, Czechoslovakia, in 1884. Despite the handicap of early poverty, he acquired an education at the University of Prague and principal French universities. Prior to and during the World War he took a leading part in the agitation for Czechoslovak independence, and, in 1918, became foreign minister of the newly formed nation of Czechoslovakia. In this office he made himself one of the most influential statesmen of Europe, being the chief organizer of the Little Entente and an important promoter of the Locarno agreements.

Bennett, (Enoch) Arnold, English novelist, was born at Hanley in the Potteries, 1867. He was educated at Newcastle middle school and at the University of London. He began life as a law clerk; became editor of a woman's magazine; and, beginning with 1900, devoted himself entirely to literary work, producing, besides numerous essays and plays, a group of novels which rank among the most notable in recent English fiction. This series includes *Anna of the Five Towns*, *The Old Wives' Tale*, and *The Matador of the Five Towns*. Among his other novels are *Sacred and Profane Love*, *Whom God Hath Joined*, *The Grim Smile of the Five Towns*, and *The Lion's Share*. His principal plays are *Cupid and Common Sense*, *What the Public Wants*, and *The Love Match*. Among his essays and miscellaneous writings are *The Truth about an Author*, *How to Live on Twenty-Four Hours a Day*, *Your United States*, *Paris Nights*, and *Our Women*. See *English Literature*: *Contemporary Prose*.

Bennett, James Gordon, journalist, was born in Scotland in 1795. He studied for the Roman Catholic priesthood, but never took orders. In 1819, he emigrated to America; after teaching in Halifax and later serving as proof reader in Boston, he became a journalist in New York. In 1825, he purchased the *Sunday Courier*; subsequently, 1832, he started the *Globe*, neither project succeeding. In 1835, he issued the first number of *The Herald*, a journal which, through his great ability and enterprise, soon commanded world-wide attention.

His paper was the first to publish the stock lists and a daily financial review; many other original features were afterward added. The collection and dissemination of news was ever his paramount object. His news-gathering staff for four years during the Civil War involved an expense of a half million dollars. At the time of his death, *The Herald* was the most valuable newspaper property in the United States. The first speech ever reported in full by telegraph was sent to *The Herald*. Died, 1872.

Bennett, Sir William Sterndale, English composer and pianist, was born at Sheffield, 1816. He first studied music at the royal academy, London, and later at Leipzig, where he appeared in concerts with great success, 1837–39, and established a lifelong friendship with Mendelssohn. Upon his return to London, his brilliant piano playing aroused great enthusiasm. In 1842, he again went to Germany, where he associated with both Mendelssohn and Schumann. He helped to found the Bach society in London in 1849 and, in 1855, he succeeded Richard Wagner as conductor of the philharmonic society. In 1856, he was elected professor of music at Cambridge; in 1868, was made principal of the royal academy of music, London, and was knighted in 1871.

He was among the foremost English musicians of his time, a pianist of distinction, and a composer of much graceful music. His works include the pastoral cantata *The May Queen*; the oratorio *The Woman of Samaria*; the overtures *The Naiads*, *Wood Nymphs*, *Parisina*, and *Paradise and the Peri*; also several concertos and symphonies. Died, 1875.

Benson, Frank Weston, American painter, was born at Salem, Mass., in 1862. He studied art at the Boston museum, 1880–83, and with Lefebvre and Boulanger in Paris, 1883–85. In 1889, he was made instructor of drawing and painting in the art school of the Boston museum. He excels as a painter of women and children, usually in outdoor scenes abounding in light and color. His influence

as a teacher has been far-reaching and beneficial, and his paintings have won high rank in present-day American art. His works include "My Little Girl," "In the Spruce Woods," "Pomona," "Against the Sky," "Moonlight at Sea," "Eleanor," "My Daughter," and decorations in the Congressional library, Washington, entitled "The Seasons" and "The Three Graces."

Bentham, Jeremy, English writer on ethics and jurisprudence, was born at London in 1748. He was admitted to the bar in 1772. Turning from the practice of law to its theory, he became the greatest critic of legislation and government in his day. In all his ethical and political writings the doctrine of utility is the leading and pervading principle, and his favorite vehicle for its expression is the phrase, "the greatest happiness of the greatest number." This phrase was coined by Priestley, though its prominence in politics was due to Bentham. He died in 1832.

Benton, Guy Potter, American educator, was born at Kenton, Ohio, 1865. He was educated at Ohio Wesleyan university, Baker university, and the University of Wooster, and studied also in Berlin. He became professor of history and sociology at Baker university in 1896; president of Upper Iowa university, 1899; president of Miami university, 1902; and president of the University of Vermont in 1911. During the World War, he was the chief organizer of the activities of the American branch of the Y. M. C. A. He was president of the University of the Philippines from 1919 until 1924. Died, 1927.

Benton, Thomas Hart, American statesman, was born near Hillsboro, N. C., 1782; began legal practice at Nashville, Tenn., in 1811; settled at Saint Louis, Mo., in 1815; and was elected United States senator in 1820, becoming a prominent supporter of General Jackson. Re-elected in 1826, he became a noted advocate of the gold and silver monetary policy and supported Jackson in the latter's antagonism to the United States bank. He held a seat in Congress for a period of thirty years, voting for the annexation of Texas and against the doctrines of nullification and states' rights. He wrote *A Thirty Years' View*, a valuable political retrospect. Died, 1858.

Béranger (*bā'räN'zhā'*), **Pierre Jean de,** French lyric poet, was born of humble parentage in Paris, 1780. He became apprenticed to a printer. In 1815, he began to bring out a series of national and other songs, which created a powerful sensation; many of them were satires upon the government and procured for their author a heavy fine and several months' imprisonment. Admiring friends paid the fine, and his cell was the reception room for many of the most distinguished men of the time. His poems contributed in no small degree to the revolution of 1830. In 1848, he was elected to the constituent assembly, but declined to serve. He was an intense believer in democracy. Died in 1857.

Beresford, Lord Charles William de la Poer, British admiral, was born in Waterford county, Ireland, 1846. He was educated in private schools and, in 1859, entered the school ship *Britannia* as a cadet. Elected to Parliament in 1874, he sat as member for a large part of the period up to 1902.

Beresford commanded the *Condor* at the bombardment of Alexandria in 1882 and served on Lord Wolseley's staff on the Nile expedition of 1884-85. He subsequently held various commands, rising to the position of rear admiral of the British fleet in 1897 and of admiral in 1906. Shortly afterward, he retired on account of friction with the naval board, which he criticized severely in *The Betrayal*, published in 1912. He wrote also *Life of Nelson and His Times* and *The Break-up of China*. Died at London in 1919.

Berger, Victor L., American socialist editor and leader, was born in Nieder Rebbuch, Austria-Hungary, 1860. He received his education at the universities of Vienna and Budapest, but before graduation came to the United States, where he first worked at various trades and later became a teacher in the public schools of Milwaukee. He began to edit the Milwaukee *Daily Vorwaerts* in 1892 and later became editor in chief of the Milwaukee *Leader*, a daily devoted to socialism. In 1911, he was elected to Congress, the first socialist to occupy a seat in that body. From 1918 until 1923 he was excluded from Congress for alleged disloyalty.

Bergerac (*bĕr'zhĕ-räk'*), **Savinien Cyrano de,** French novelist and dramatist, was born in Perigord, 1619. He attended the Collège Beauvais, later studied science with Gassendi, and learned some astrology from Campanella. In youth, he divided his time between literature and adventure; served two years as a soldier, in the course of which he was twice wounded, and carried through life the reputation of a reckless duelist.

During his short and restless career, he published a volume of letters; a political satire on Mazarin; *Agrippine*, a tragedy; and *La pédant joué*, a comedy that was followed by his most famous book, *The Comic History of the States and Empires of the Moon and of the Sun*. He was the earliest writer to employ the novel to teach natural science and was thus a forerunner of Jules Verne and H. G. Wells. He was also the first writer of French drama to break with the rule of the unities in tragedy, which Victor Hugo so triumphantly discarded in 1830. In his comic histories, he made startling forecasts of modern discoveries, such as the phonograph, and of a universal language, such as Esperanto. He has been immortalized in Rostand's famous drama *Cyrano de Bergerac*. He died in 1655. See *French Literature: The Nineteenth Century, Rostand*.

Bergson (*bĕrg'sôN'*), **Henri,** French philosopher, was born in Paris, 1859. He was graduated at the Ecole Normale in 1881, and became a teacher. He was made professor of philosophy in the Collège de France in 1900 and, in 1901, was elected to the institute. His books, *Time and Free Will*, published in 1889, *Matter and Memory*, 1896, and *Creative Evolution*, 1907, attracted wide attention and placed him in the front rank of contemporary philosophers.

According to his view, nearly all previous philosophies have been developed either by intellect alone or by intellect chiefly. He endeavors to avoid the limitations of intellect by depending upon intuition, maintaining that intellect is unable to comprehend the nature of life and of spirit. He asserts that instinct would empower us to understand life except that its object is not concerned with understanding it. He argues that what is needed for full understanding is intuition, which has at once the immediate certainty of instinct and the wide range of intellect. He was elected to the French academy in 1914, and received the 1927 Nobel prize for literature. His works include also *Le rire* and *L'énergie spirituelle*.

Bergström (*bĕr'strōm*), **Hjalmar,** Danish playwright, was born in 1868. He completed a university education, obtaining the degree of Ph. D. in 1893, and became a teacher in the Brockske commercial school, where he taught until 1905. Turning his attention to the drama, he became a director of the Danish dramatic society and member of an organization for preserving neglected writings of Danish playwrights. Among his plays are *When King David Grew Old*, *Karen Borneman*, *Together in the Dance*, and *The Way to God*—all of which were presented in the royal theater. *Karen Borneman* was forbidden by censor, but the ban was afterward removed. Died, 1914.

Bering, Vitus, Danish navigator, was born at Horsens, Denmark, in 1680. He was employed on an expedition planned by Peter the Great to determine the limits of Asia. Setting out in 1725, he crossed Siberia and, after three years, reached the northeastern extremity of Asia. In 1741, under the instruction of Empress Anne of Russia, he crossed the strait later known as Bering and landed in North America. On his return voyage, his ship was wrecked on the desert island still known by his name, and he died there of exposure, December 19, 1741.

Bériot (*bā'rē-ō'*), **Charles Auguste de,** Belgian composer and violinist, was born in Louvain, 1802. He displayed precocious and original talent, and his playing was distinguished by refined taste and purity of tone. In 1836, he became the husband of the famous singer, Mme. Malibran. About 1842, he was made professor in the Brussels conservatory, but resigned nine years later in consequence of failing eyesight. He wrote a complete manual for the violin, and many popular compositions for that instrument. Died, 1870.

Berkeley, George, distinguished British divine and philosopher, was born in Ireland in 1685. He was educated at Kilkenny school and Trinity college, Dublin, where he enjoyed the society of Dean Swift. On his return from a visit to America, he was made bishop of Cloyne. In philosophy, he was an idealist. He held that all things exist only in so far as they are perceived or known and that the existence of the universe is due to its being known by God. His most important works are the *Principles of Human Knowledge*, *Minute Philosopher*, and *Theory of Vision*. Died, 1753.

Berkeley, Sir William, colonial governor of Virginia, was born at London, England, 1610. He was appointed governor of Virginia in 1641, but resigned in 1651 upon Cromwell's rise to power. He remained in the colony, however, and, in 1660, was chosen governor by the general assembly. Some years later, he lost the favor of the people by failing to protect them from the Indians, and a rebellion led by Nathaniel Bacon broke out against the governor. It failed, however, in consequence of Bacon's sudden death. Berkeley was recalled in 1676. He wrote *A Discourse and View of Virginia* and a drama called *The Lost Lady*. Died in England, 1677.

Berlichingen (*bĕr'lĭx-ĭng-ĕn*), **Götz or Gottfried von,** German knight and soldier of fortune, was born in Jagsthausen, 1480. He took part in the war of the peasants against the nobles and was sentenced by Maximilian I to pay a heavy fine. He wore an artificial hand which replaced one lost in battle, and was surnamed the "Iron Hand." He was a staunch supporter of Luther; took part

in a campaign against the Turks in 1542; and espoused the cause of Charles V against Francis I in 1544. While in retirement, he wrote his celebrated autobiography. He is regarded as a typical feudal knight, and Goethe made his achievements the subject of his famous drama *Götz von Berlichingen*, which initiated the notable "*Sturm und Drang*" movement in German literature. He was mortally wounded defending his own castle and died in 1562. See *German Literature: The Classic Period, Goethe.*

Berliner (*bûr'lĭn-ẽr*), **Emile,** inventor, was born at Hanover, Germany, 1851; was graduated at Samson school, Wolfenbuttel, 1865; and came to the United States, 1870. In 1878, he was appointed chief inspector of instruments for the Bell Telephone Company, where his inventive skill was applied to perfecting various features of the telephone. In 1877, he invented the loose contact telephone transmitter, known as the Berliner microphone, and was the first to use an induction coil in connection with transmitters, 1878. In 1887, he invented the gramophone. He invented also the present method of duplicating disk records and was the first to construct and employ in aeronautical experiments the revolving cylinder internal combustion motor, extensively used on airplanes. See *Talking Machines.*

Berlioz (*bĕr'lê-ôz'*), **Hector,** French composer, was born at La Cote Saint Andre, 1803. While inferior in melodic invention to the leading composers of his century, his accurate knowledge of instrumentation enabled him to make great advances in orchestral technique. The notable progress made by Wagner, Liszt, and Richard Strauss is founded on developments originally worked out by Berlioz. Among his most notable productions are *The Damnation of Faust, Harold, Romeo and Juliet,* and *The Trojans.* His *Treatise on Instrumentation* was for a long period the best work of its kind. He was chief of the romantic school of music and a prominent figure in the romanticist movement in France. Died, 1869.

Bernadotte, Jean Baptiste Jules. See *Charles XIV John.*

Bernard (*bûr'närd*; *bĕr-närd'*), **Saint,** of Clairvaux, was born of a noble family at Fontaines, near Dijon, France, 1091; in 1113, he entered the Cistercian monastery of Citeaux and, in 1115, became the first abbot of the newly founded monastery of Clairvaux, in Champagne. His studious, ascetic life and stirring eloquence made him the oracle of Christendom. He founded 160 monasteries. The "mellifluous doctor" is regarded by the Catholic Church as the last of the fathers. He drew up the statutes of the Knights Templars in 1128; secured the recognition of Pope Innocent II; and, by his glowing eloquence at the council of Vezelay in 1146, kindled the enthusiasm of France for the Second Crusade.

The influence of Saint Bernard as a spiritual teacher, through his fervid piety and living grasp of Christian doctrine, was a wholesome antidote to the dry and cold scholasticism of the age. His writings consist of more than 400 epistles, 340 sermons, and 12 theological treatises. He was one of the greatest of the Latin hymn writers, many modern hymns being based on his *Jesu Dulcis Memoria.* He died at Clairvaux in 1153; was canonized in 1174; and the title of doctor of the church was bestowed upon him by Pius VIII.

Bernard of Cluny, Benedictine monk, was born of English parents at Morlaix, Brittany, about 1122. He is known principally for a poetical description of heaven which, translated, has given rise to three famous hymns—"Jerusalem the Golden," "The World is Very Evil," and "For Thee, O Dear, Dear Country." The original description was in Latin verse, the introduction to his *De Contemptu Mundi,* "On Contempt of the World." Died about 1156.

Bernhardt, Rosine Sarah, French tragic actress, was born at Paris in 1845. Her parents were Jewish, of French-Dutch descent, but she was educated in Grandchamp convent at Versailles. She made her first appearance on the stage in 1862 at the Théâtre Français, but at first attracted little notice. In 1867, her playing of the part of the queen in Victor Hugo's *Ruy Blas* made her famous. The war of 1870-71 interrupted her career, and for a while she became a nurse. She then won a position in the Théâtre Français, the troupe of which she accompanied in 1879 to London, where her triumphs were repeated in succeeding years and where, in 1882, she married Jacques Damala, a Greek actor, who died in 1889. She broke her contract with the Théâtre Français in 1880 and was condemned to pay a forfeit of $20,000. She then toured with great success in America and in all the principal countries of Europe. In 1893, she established a theater of her own in Paris. Endowed with a matchless voice and a remarkable gift of artistic poise and movement, she was excelled in dramatic art by no actress of her time. She was also a painter and sculptor and she wrote two plays—*L'aveu* and *Adrienne Lecouvreur*—in addition to a volume of memoirs. Died in 1923.

Bernini (*bĕr-nē'nē*), **Giovanni Lorenzo,** known as the Cavalier Bernini, was born at Naples in 1598. He was eminent as a painter, an architect, and a sculptor, and his merit entitled him to the rewards which he had the good fortune to receive from Louis XIV. His "Apollo and Daphne," produced from a single block, when he was but 18 years of age, was considered a masterpiece, but his finest works are found in the colonnade at Rome. He became one of the architects of Saint Peter's at Rome, completed the famous Barberini palace, restored the bridge of Sant' Angelo, designed or completed about 40 busts, over 50 statues, and some 50 architectural works. During his lifetime, he was loaded with honors such as few artists have ever received. His ideals of sculpture profoundly influenced the art of Europe for a century. Died in 1680.

Bernoulli (*bĕr'nōō'yē'*), **Daniel,** Swiss mathematician and physicist, was born at Groningen in 1700. He was the son of John Bernoulli; like his father, he devoted himself to medicine as well as to mathematics. The family reputation early helped him to the professorship of mathematics at Petrograd, whence he went to Basel much against the will of the czar. At Basel, he occupied the chairs of botany and philosophy. In his most important published work, *Hydrodynamica,* he first developed the kinetic theory of gases. Died, 1782.

Bernoulli, James, Swiss mathematician, was born at Basel in 1654. He devoted his life to the study of mathematics, of which he became professor in the University of Basel. Among his first works were *A Method of Teaching Mathematics to the Blind* and *Universal Tables on Dialling.* These were followed by *Conamen Novi Systematis Cometarum* and an essay *De Gravitate Ætheris.* Among his triumphs are to be recorded his solution of Leibnitz's problem of the isochronous curve, his determination of the catenary, and his investigation of the properties of isoperimetrical figures. Died, 1705.

Bernoulli, John, brother of the preceding, was born at Basel, 1667. He and James were the first two foreigners honored by the academy of sciences at Paris. John devoted himself to chemical as well as to mathematical science. In 1694, he became a doctor of medicine and, soon after, professor of mathematics at Groningen, whence he later removed to succeed his brother James in the University of Basel. His forte was pure mathematics, in which he had no superior in Europe in his day. Among his achievements were the determination of the "line of swiftest descent" and the invention of the "exponential calculus." He died in 1748.

Bernstein (*bĕrn'stīn*), **Henry Leon Gustave Charles,** French dramatist of Jewish parentage, was born in Paris, 1875. He received his education in Paris and early turned his attention to the drama. Beginning in 1900, he produced many popular plays, several of which have been presented on the English and the American stage. He possesses much technical skill in the construction of plots and his work is characterized by bold execution and intense emotion. His first play, *Le marché,* was produced at the Free theater in Paris by Antoine. His subsequent plays include *La détour, La griffe, La rafale, Le voleur, Samson, Israel,* and *L'assaut.* Of these *Le voleur, Samson, Israel,* and *L'assaut* were translated and produced in America and in England.

Berthollet (*bĕr'tô'-lĕ'*), **Claude Louis, Count de,** French chemist, was born at Talloire, in Savoy, 1748. He studied medicine at the university of Turin. After obtaining his degree in 1768, he proceeded to Paris, where he studied chemistry, becoming associated with Lavoisier. In 1785, he pointed out the use of chlorine for bleaching purposes. He was appointed professor at the Ecole Normale in 1794 and accompanied Napoleon's expedition to Egypt, 1798-99. Returning, he was made senator, count, and grand officer of the legion of honor. Among his many inventions and discoveries were processes for preserving water in ships, glazing linen, bleaching fabrics, and the artificial production of niter. He was the first to introduce the idea of equilibrium into chemical theory, and he did much to reform chemical nomenclature. He died in 1822.

Bertillon (*bĕr'tē'yôn'*), **Alphonse,** French anthropologist, was born at Paris, 1853. He was long head of the identification department in the prefecture of police of Paris and, in 1880, founded the "Bertillon system" for identifying people by means of bodily measurements. It has been widely adopted in American penal institutions. His publications include *La photographie judiciaire, Identification anthropométrique,* and *Anthropologie métrique et photographique.* Died, 1914.

Berzelius (*bĕr-zē'lĭ-ŭs*), **Jöns Jakob,** Swedish chemist, was born at Westerlosa, in East Gothland, Sweden, 1779. He was permanent secretary of the academy of sciences at Stockholm and was made baron in recognition of his scientific discoveries.

He is the author of the dualistic (binary) theory of the chemical constitution of compounds and devised the system of chemical symbols now in use. He determined with great accuracy the combining weights of a number of elements and thus placed Dalton's atomic theory on a firm quantitative basis. He discovered the elements selenium, cerium, and thorium and was the first to produce columbium, tantalum, and silicon in an isolated state. The range, number, and accuracy of his investigations were remarkably great, and the science of inorganic chemistry largely rests upon his theories and discoveries. Died, 1848. See *Selenium*; *Symbols, Chemical*.

Besant (*bĕs'ănt*; *bĕz'ănt*), **Annie,** née Annie Wood, English theosophist, was born in London, 1847. She was educated privately in England, Germany, and France. At first, a devout ritualist, she married Rev. Frank Besant, from whom she was separated in 1873. In the following year, she joined the national secular society and worked in the free thought and radical movements led by Charles Bradlaugh, with whom she was coeditor of the *National Reformer*. She joined the theosophical society in 1889, became a devoted pupil of Mme. Blavatsky, and traveled to all parts of the globe in service of theosophy. She founded the Central Hindu college in 1898 and, in 1904, the Central Hindu girls' school, Benares. She also helped to found the Hindu university; organized the India home rule league; and, in 1917, was president of the Indian national congress. Her publications include *Reincarnation, Death and After, Karma, Man and His Bodies, The Religious Problem in India, Theosophy and the New Psychology*, and *Essays and Addresses*.

Bessel (*bĕs'ĕl*), **Friedrich Wilhelm,** German astronomer, was born at Minden, Prussia, 1784. He attracted attention by his computation of the orbit of the comet of 1607. In 1810, he was appointed director of the new observatory at Konigsberg, where the rest of his active life was passed. His *Fundamenta Astronomiæ* and *Tabulæ Regiomontanæ* were epoch-making works. His determinations of the parallax of stars ushered in a new era in sidereal science. He has been called the father of modern observational astronomy. Died, 1846.

Bessemer, Sir Henry, English engineer and inventor, was born at Charlton, England, in 1813. Of his many inventions, the chief is the process, named after him, of converting pig iron into steel by blowing a blast of air through the iron while in fusion until everything extraneous is expelled and only a definite quantity of carbon is left in combination. This process revolutionized the iron and steel industry throughout the world, enormously increasing production and reducing the cost to a small fraction of that of earlier methods. He was knighted in 1879. Died in 1898. See *Bessemer Steel*.

Bessey, Charles Edwin, American scientist, was born on a farm near Milton, Ohio, 1845; was a graduate of Michigan agricultural college, 1869; studied with Dr. Asa Gray at Harvard, 1872-73 and 1875-76; and became professor of botany in Iowa agricultural college, 1870. In 1884, he was appointed to the chair in botany at the University of Nebraska. His publications include *The Essentials of Botany, Plant Migration Studies, The Phylogeny and Taxonomy of Angiosperms, Outlines of Plant Phyla, New Elementary Agriculture*, and many scientific papers and reviews. Died, 1915.

Bethmann-Hollweg (*bāt'män-hŏl'vāĸ*), **Theobald von,** German statesman, was born of Jewish lineage at Hohenfinow, near Berlin, in 1856; was educated at the College of Pforta and at the universities of Strasbourg, Leipzig, and Berlin; and was elected to the Reichstag in 1890. In 1909, he became chancellor of the German Empire and, as such, was a friend and adviser of Emperor William II. In an interview with Sir Edward Grey in 1914, Bethmann-Hollweg referred to the Belgian neutrality treaty as a "scrap of paper"—a phrase that has since become historic. Died, 1921. See *World War, Immediate Occasion of*.

Beveridge, Albert Jeremiah, American publicist, was born on a farm in southwestern Ohio, 1862. His family removed to Illinois after the Civil War. He was graduated at De Pauw university, Indiana, 1885, read law, was admitted to the bar, and began practice. He was identified with many important cases and, in 1899, was elected to the United States Senate, continuing to sit until 1911. He was well known as an orator and Republican campaign speaker and became a leader of the Progressive party in 1912. His publications include *The Young Man and the World, The Meaning of the Times*, and *Life of John Marshall*. He was elected to the American academy of arts and letters in 1924. Died, 1927.

Bewick (*bū'ĭk*), **Thomas,** English wood engraver, was born near Newcastle, 1753. He was apprenticed to Ralph Beilby at Newcastle at the age of 14. His first important work was a series of cuts for Gay's *Fables* in 1775, followed by enlarged editions in 1779 and 1784. His first cuts from his own original designs appeared in the *General History of Quadrupeds* in 1790. His greatest work is the *History of British Birds*. He also illustrated many books, including Thomson's *Seasons*, Burns's *Poems*, and Æsop's *Fables*.

Bewick revived the art of wood engraving. He was the first to cut into the end of the block instead of the side and was the inventor of the white line, which is the characterizing feature of modern engraving, the design being cut into the block instead of remaining in relief. Died, 1828.

Bialik, Hayim Nahman, Russian poet, was born at the village of Radi, in Volhymia, Russia, 1873. A profound student of Jewish life, he interpreted it in poems that rank him with the foremost Hebrew masters. In classic verse, he sounded the hope of the Jewish national revival. In his jeremiads entitled *Songs of Indignation* and *Scroll of Fire*, he described the tragedy of Jewish pogroms. His word pictures of the Jewish past, nature poems, and folk songs are notable literary achievements. In collaboration with I. H. Rabnitzky, he published a series of textbooks, including the *Sefer Haggadah*, or *Legends and Maxims from the Talmud and Midrash*, in five volumes. An edition of his poems, stories, and essays together with his translations of *Don Quixote* and *Wilhelm Tell* appeared in Berlin in 1923.

Bichat (*bē'shä'*), **Marie François Xavier,** French physician and anatomist, was born at Thoirette, 1771. He began the study of medicine under his father, and, after spending two years at Lyon, went, in 1793, to Paris where he attended the lectures of Desault and became his assistant. After the death of Desault in 1795, Bichat devoted himself to lecturing on anatomy, physiology, and surgery. He established *La Société Médicale d' Émulation*, through which he gave to the world many important memoirs, notably those on the tissues of the human body. His three chief works are the *Traité sur les membranes*, in which he classifies the different kinds of tissues; the *Recherches physiologiques sur la vie et la mort*, in which he defines life to be the "sum-total of the functions which resist death"; the *Traité d'anatomie générale*, in which he summarizes his now generally received principles. He died in 1802.

Biddle, John, founder of English Unitarianism, was born in 1615, at Wotton under Edge, Gloucestershire. Having embraced certain opinions in regard to the personality of the Holy Spirit, at variance with those held by the majority of Christians, he was thrown into jail in 1645. Twice during the commonwealth he suffered for his creed, and even the protector himself, in order to save Biddle's life, was compelled to banish him to one of the Scilly islands. After three years of imprisonment, he was permitted to return, and continued to preach in London until 1662, when he was again committed to jail, where he died in September of the same year.

Biela (*bē'lä*), **Wilhelm von,** German astronomer and military officer, was born near Stolberg, Germany, 1782. He is noted chiefly for his discovery, in 1826, of the comet named for him. Died, 1856.

Bierstadt (*bēr'stät*), **Albert,** landscape painter, was born near Dusseldorf, Germany, 1830, and, in infancy, came to New Bedford, Mass. After studying in Europe, and making repeated visits to the western United States, he specialized in pictures of scenes in the Rocky mountains, Sierras, and Switzerland. With F. E. Church and Thomas Moran, he introduced the panoramic manner into American landscape art. Among his most noted pictures are "El Capitan, Merced River," "Rocky Mountains," "Valley of the Yosemite," "Mount Corcoran," "The Discovery of Hudson River," and "The Settlement of California." Died, 1902.

Bigelow, John, American author and diplomat, was born at Malden, N. Y., 1817. He graduated from Union college, 1835, studied law, was admitted to the bar, and then turned to journalism. From 1849 to 1861, he was one of the editors of the New York *Evening Post*. He was consul at Paris, 1861–64, and minister to France, 1864–67. His writings include *France and Hereditary Monarchy, Life of Samuel J. Tilden, Life of Benjamin Franklin, Life of William Cullen Bryant, Molinos the Quietist*, and *Retrospections of an Active Life*. He was a member of the American academy of arts and letters. Died, 1911.

Bigelow, Poultney, American author and journalist, was born in New York, 1855. He was graduated from Yale, 1879, and from Columbia law school, 1882; was admitted to the bar, 1882, but gave up law practice for travel and journalism. During 1875-76, he went around the world in a sailing ship, visited shores of New Guinea, and was wrecked on the Japanese coast. He circumnavigated the world three times, studying tropical colonization, and lectured at leading universities on colonial administration. During the Spanish American war, he was correspondent for the London *Times*. His writings include *The German Emperor and his Eastern Neighbors, Paddles and Politics Down the Danube, The Borderland of Czar and Kaiser*,

History of the German Struggle for Liberty, White Man's Africa, Children of the Nations, and *Prussianism and Pacifism.*

"Billings, Josh." See *Shaw, Henry Wheeler.*

Binet (*bē'nĕ'*), **Alfred,** French psychologist, was born at Nice, France, 1857. He was one of the editors of *L'Année Psychologique,* and director of the psychological laboratory at the Sorbonne, Paris. His works treat many subjects in physiological psychology, particularly with reference to the study of practical, social, and educational questions. In this field, he collaborated with Thomas Simon, endeavoring to find a standard by which degrees of intelligence may be measured. Their combined researches resulted in the publication, in 1905, of the *Binet-Simon Tests,* which have been widely employed by educators. Died, 1911. See *Education: General Intelligence Tests.*

Biot (*b'yō'*), **Jean Baptiste,** French astronomer and physicist, was born at Paris, 1774. He is noted for his researches in the circular polarization of light and was the founder of saccharimetry by use of the polariscope. He died in 1862.

Bird, Remsen du Bois, American educator, was born in New York City, 1888. He was graduated at Lafayette college in 1909 and at Princeton theological seminary in 1912. In 1913, he studied at the University of Berlin. He was an instructor in Princeton theological seminary, 1913–15, and was professor of church history in San Francisco theological seminary, 1915–21. In 1921, he became president of Occidental college, Los Angeles.

Birge, Edward Asahel, American educator, was born at Troy, N. Y., in 1851. He was graduated at Williams college in 1873 and received the degree of doctor of philosophy at Harvard university in 1878. From 1879 until 1911, he was professor of zoology in the University of Wisconsin. He served as dean of the college of arts and letters, University of Wisconsin, from 1891 to 1918, and was president of the university until 1925. His writings include many papers on zoology and limnology.

Birmingham, George A. See *Hannay, James Owen.*

Bishop, Sir Henry Rowley, English composer, was born at London, 1786. At an early age, he devoted himself to the composition of dramatic music, and, in 1809, produced his *Circassian Bride,* which was a marked success. In 1810, he became director of music at Covent Garden theater, and, while engaged in this position, produced many operas, including *The Lady of the Lake, Guy Mannering,* and *The Slave.* In 1840, his dramatic piece, *The Fortunate Isles,* was produced in honor of Queen Victoria's wedding. In 1842, he was knighted and, in 1848, became professor of music at Oxford. He wrote the familiar melody to John Howard Payne's "Home, Sweet Home." Died, 1855.

Bishop, Joseph Bucklin, American journalist and author, was born at East Providence, R. I., in 1847 and was educated at Brown university. He was connected in an editorial capacity with several New York newspapers and, from 1905 to 1914, served as secretary of the isthmian canal commission. His publications include *Cheap Money Experiments, The Panama Gateway,* and *Theodore Roosevelt and his Time.* Died, 1928.

Bismarck-Schönhausen (*bĭs'märk-shŭn'hou'zĕn*), **Prince Karl Otto Eduard Leopold von,** German statesman and the creator of German unity, was born at Schonhausen, Prussia, April 1, 1815. He studied at the universities of Gottingen and Berlin. He obtained his degree in jurisprudence in 1835 and, the next year, entered the army. In 1839, his help was needed at home to settle the property left in sadly embarrassed circumstances by his father. There he developed the shrewd business tact and knowledge of men, the provident calculation, and the habit of organizing and commanding others that operated toward his later success as diplomat, economist, and chief of a government.

In 1847, Bismarck married Johanna von Puttkamer. In the same year, he won attention in the new Prussian diet as an ultraroyalist, and, in 1849, he was elected to the second chamber of the diet. His diplomatic career began in 1851, when he was appointed Prussian member of the resuscitated Germanic diet at Frankfort. There he manifested the zeal for the interests and aggrandizement of Prussia that undeviatingly guided him thereafter.

In 1859, Bismarck was sent as minister to Saint Petersburg, now Leningrad. In the spring of 1862, he was transferred as ambassador to Paris, and he had interviews with Palmerston and Disraeli in London. In the autumn, he was recalled to take the portfolio of the ministry for foreign affairs and the presidency of the cabinet. Throughout the events that ended in the humiliation of Austria at Königgratz in 1866 and in the reorganization of Germany under the leadership of Prussia, Bismarck was the guiding spirit, and he logically became chancellor in 1867. It was he who obtained the neutralization of the Luxemburg territory at this time.

During the Franco-Prussian war of 1870-71, Bismarck was the spokesman for Germany. By falsifying a telegram, he had been largely responsible for the war, and he dictated the terms of peace to France. These included the cession of Alsace and Lorraine to Germany and an indemnity of one billion dollars, which was paid in gold in two years. He had been made a count in 1866, and he now became a prince. He was the first chancellor of the German Empire. The sole aim of his policy, domestic and foreign, was to consolidate the young empire by stabilizing its institutions and by making it secure, through alliances and political combinations, from attack by other nations.

Soon after the accession of William II, differences arose between him and the chancellor, and Bismarck resigned in March 1890. He spent the remainder of his life in open denunciation of the government, although a formal reconciliation took place between him and the emperor in 1894. Died at Friedrichsruh, July 30, 1898. See *History: Germany.*

Bispham (*bĭs'făm; '-păm*), **David Scull,** operatic baritone, was born at Philadelphia, 1857. He graduated at Haverford college in 1876, studied singing, and made his début as the Duc de Longueville in *The Basoche,* given by the royal English opera, 1891. Later, he appeared with the royal opera, Covent Garden, London, and with the Metropolitan opera company, New York, singing principal rôles in German, French, and Italian. He was also remarkably successful as a concert singer and was the earliest prominent American singer to advocate and make use of English translations of German songs. He published *A Quaker Singer's Recollections.* Died in 1921.

Bissell, George Edwin, American sculptor, was born at New Preston, Conn., 1839. He was educated at Northville academy, Conn., and at the "Gunnery," Washington, Conn. After teaching, clerking, and serving as a private in the Civil War, he entered the marble business at Poughkeepsie, N. Y., 1866, and there began his career as a sculptor. After studying at Paris, Rome, and Florence, 1875-76, he had a studio in Paris for about six years and in Florence for about four years. Bissell's numerous works include a portrait statue of Horatio Gates on the Saratoga battle monument, statues of John Watts and Abraham de Peyster, New York, and of Abraham Lincoln, Edinburgh, Scotland; reliefs of James Kent, Congressional library, Washington, and of President Arthur, New York; the group entitled "The Navy," New York; and many other statues. He died in 1920.

Bitter, Karl Theodore Francis, sculptor, was born at Vienna, Austria, 1867. He studied sculpture in the Vienna academy under August Kuehne and Edmund Heller. In 1889, he came to the United States and soon rose to distinction as a sculptor. He won the competition for the Astor memorial bronze doors in Trinity church, New York. He executed sculpture on the Administration building, World's Columbian exposition, Chicago, and on the residences of C. P. Huntington and Cornelius Vanderbilt, New York.

In 1901, he was director of sculpture at the Pan-American exposition, Buffalo, and, in 1904, was chief of department of sculpture, Saint Louis exposition, contributing his notable "Louisiana Purchase" group. He designed much decorative sculpture for great commercial buildings in New York and other cities, and executed many fine marble and bronze statues and busts, such as the Hubbard memorial, "Thanatos," and statues of Franz Sigel, Carl Schurz, and others. Died, 1915.

Bizet (*bē'zĕ'*), **Georges,** French composer, was born at Paris, 1838. He studied at the Paris conservatory under Halévy, and in Italy. His best-known works are *Les pêcheurs de perles, La jolie fille de Perth, L'Arlésienne, Djamileh,* the overture *Patrie,* and *Carmen.* The last named, which is founded on Mérimée's novel, has become one of the most popular of modern operas. Died, 1875.

Björnson (*byûrn'sŭn*), **Björnstjerne,** Norwegian poet, novelist, and dramatist, was born in Kvikne in 1832. He entered the University of Christiania in 1852 and soon after began work as a journalist and dramatic critic. His first novel, *Synnöve Solbakken,* a story of peasant life, published in 1857, was followed by *Arne, A Happy Boy, The Fisher Maiden,* and many other pieces. In 1858, he became director of the theater at Bergen and produced two dramas, *Between the Battles* and *Lame Hulda,* both treating of national subjects. Among his later well-known plays are *Mary Stuart in Scotland, Sigurd Slembe,* and *The Newly Married.* Besides his dramas, he wrote a series of folk plays, an epic, and much beautiful lyric poetry. Björnson was the foremost novelist and poet and, excepting only Ibsen, the chief dramatist of his time in Norway. He received the Nobel prize for literature in 1903. Died, 1910. See *Norwegian Literature.*

Black, William, British novelist, was born at Glasgow, 1841. He studied art with the view of becoming a landscape painter but later he adopted journalism. During the

Prusso-Austrian war of 1866, he was war correspondent for the *Morning Star*, and in a novel, *Love or Marriage*, he utilized some of his experiences. *In Silk Attire* and *Kilmeny* were fairly successful, but it was *A Daughter of Heth* that established his reputation. Later novels were *The Strange Adventures of a Phaeton*, *A Princess of Thule*, *Madcap Violet*, *Macleod of Dare*, *Briseis*, and *Wild Eelin*. He laid his scenes chiefly in northern Scotland and contrasted the simple life of country folk with that of Bohemian London. He died at Brighton in 1898.

Black Hawk, American Indian warrior, was born at the Sauk village on Rock river, near the Mississippi, in what is now Illinois, 1767. He was chief of the Sacs and Foxes, who attempted in 1831 to recover their tribal lands east of the Mississippi, which previously by treaty had been ceded to the United States government. This caused the "Black Hawk war," which resulted in the defeat and surrender of Black Hawk in Wisconsin in August 1832. The capture of Black Hawk terminated all serious resistance and the rapid settlement of Iowa and other disputed territory followed. Black Hawk died on the Sauk and Fox reservation on the Des Moines river, in Iowa, 1838. See *American History: Black Hawk War*.

Blackie, John Stuart, Scottish scholar and man of letters, was born at Glasgow in 1809. He was educated at Marischal college, Aberdeen, and at the University of Edinburgh. For three years, he was a student of theology at the University of Aberdeen. In 1829, he went to Germany, studying at Gottingen and at Berlin. Returning to Scotland, he made extensive preparations for the law, but his strong love of the classics and his taste for letters led him to adopt a literary and scholastic career. In 1839, he was made professor of Latin in Marischal college, and from 1852 to 1882 was professor of Greek at Edinburgh university.

Blackie was a zealous educational reformer, took an active interest in the remodeling of the Scottish universities, founded a Celtic chair in Edinburgh university, and spoke and wrote much on manifold subjects. Among his works, which are numerous, are *Self-Culture*, *Four Phases of Morals*, *The Language and Literature of the Scottish Highlands*, *Life of Burns*, *Christianity and the Ideal of Humanity*, a translation of Æschylus, and several volumes of verse. He died in 1895.

Blackmore, Richard Doddridge, British novelist, was born at Longworth, Berkshire, in 1825. He graduated at Exeter college, Oxford, in 1847; afterward studied law; was admitted to the bar; and practiced for a time as a conveyancer. Of his novels the earliest were *Clara Vaughan* and *Cradock Nowell*; but his greatest success was *Lorna Doone*, a 17th-century romance with notably beautiful descriptions in rhythmic prose, which has become a classic of English fiction. Blackmore's other novels include *The Maid of Sker*, *Alice Lorraine*, *Cripps the Carrier*, *Erema*, *Mary Anerley*, *Christowell*, *Tommy Upmore*, *Springhaven*, *Perlycross*, and *Dariel*. He died in 1900.

Blackstone, Sir William, English jurist, was born at London in 1723. He was a judge, a member of Parliament, and author of the well-known *Commentaries on the Laws of England*. At the bar, after seven years' practice, his prospects were so indifferent that he retired to Oxford on his fellowship and there gave public lectures on English law. Their success is supposed to have suggested to Viner the propriety of establishing a professorship of law in the university, to which office Blackstone was elected in 1758, being the first Vinerian lecturer. In 1770, he became one of the judges of the common pleas. Died, 1780.

Blackwell, Elizabeth, physician and writer, was born in Bristol, England, 1821. She emigrated to the United States in 1832, was educated in private schools in New York, and taught school in Kentucky and in the Carolinas. After being refused admission to several medical colleges, she entered the medical school at Geneva, N. Y., 1847. She was the first woman in the United States to receive the degree of doctor of medicine.

After establishing a practice in New York, 1851, she founded a hospital and, in 1867, with her sister, Dr. Emily Blackwell, organized the Woman's medical college of New York infirmary. She lectured in England, 1858-59; registered as a physician in England, 1859; and, after 1869, practiced in London and in Hastings. Her writings include *Physical Education of Girls*, *Religion of Health*, *Counsel to Parents on Moral Education*, *Pioneer Work in Opening the Medical Profession to Women*, *The Human Element in Sex*, and *Scientific Method in Biology*. Died, 1910.

Blaine, James Gillespie, American statesman, was born at Brownsville, Pa., 1830. At 17 he graduated from Washington college, Pa.; he taught school at Georgetown, Ky., 1848–51, and in Philadelphia, 1852–54. In 1854, he went to Maine to engage in journalism, which he relinquished four years later for a seat in the legislature. He served there until 1862, when he was elected to Congress, where he remained 18 years. From 1869 to 1875, he was speaker of the House of Representatives. At the Republican national convention of 1876, Blaine was balloted on for the presidency and received 351 votes out of a total of 754. He was then elected United States senator, and four years later was again an unsuccessful aspirant for nomination to the presidency.

In 1881, President Garfield appointed him secretary of state but he resigned from the cabinet soon after Garfield's death. In 1884, he received the Republican nomination for president, but was defeated by Grover Cleveland by a very narrow margin. A change of less than a thousand votes in New York State would have made Blaine president. In 1889, he again became secretary of state, in the cabinet of President Harrison. Blaine was a parliamentarian of great ability, a brilliant orator, and a notably resourceful and popular party leader. He wrote *Twenty Years of Congress* and *Political Discussions*. Died in 1893. See *Mugwumps*, *Mulligan Letters*.

Blaisdell, James Arnold, American educator, was born at Beloit, Wis., in 1867. He was graduated from Beloit college, 1889, and from Hartford theological seminary, 1892. Ordained Congregational minister in 1892, he served as pastor at Waukesha, Wis., 1892–96. He was professor of Biblical literature and ancient Oriental history in Beloit college, 1903–10, and president of Pomona college, 1910–27. He became president of Claremont colleges in 1927.

Blake, Edgar, American preacher, was born at Gorham, Maine, 1869. He was graduated from the school of theology, Boston university, in 1898. Ordained Methodist Episcopal minister in 1899, he was pastor at Lebanon, N. H., 1899–1903, and at Manchester, N. H., 1903–08. From 1908 to 1912, he was assistant secretary and, from 1912 to 1920, corresponding secretary, board of Sunday schools. In 1920, he was made bishop.

Blake, Robert, English admiral, who, more than any other, contributed to render England mistress of the seas, was born at Bridgewater, in Somersetshire, 1599. In 1649, in conjunction with two other officers of equal rank, he was appointed "general of the sea." This was Blake's true sphere, and in it he exhibited conspicuous ability. After practically destroying the squadron of Prince Rupert, which had sought safety in the Tagus in 1651, Blake forced the royalists to surrender Guernsey, Jersey, and the Scilly islands.

In 1652, Blake was made sole admiral of the fleet and, during this year, fought four engagements with Dutch fleets under Tromp, Ruyter, and DeWitt. In the first, on May 19, the Dutch retreated under cover of darkness, with the loss of one man-of-war captured and another sunk. In the next engagement, a squadron of twelve ships was captured; in the third, on September 28, three Dutch vessels were destroyed and the rear admiral was taken.

In 1654, Blake was appointed by Cromwell to command an English fleet in the Mediterranean, where he soon made the British flag respected by Dutch, Spanish, and French alike. He next sailed to Algiers and Tripoli, and set free all the English who were detained as slaves. With Venice and Tuscany he concluded alliances highly favorable to England. In 1657, he defeated the Spaniards at Santa Cruz, one of the most daring actions in his career. Died at Plymouth harbor in 1657.

Blake, William, English artist and poet, was born at London, 1757. After studying art for some years, he began to paint in water colors and to engrave illustrations for magazines. At the same time, he wrote poetry which showed great power and beauty. His *Poetical Sketches*, *Songs of Experience*, and *Songs of Innocence* are among his best works. Most of his other poems are valuable chiefly because of the wonderful way, which he said had been revealed to him, of illustrating and printing them in various colors. He firmly believed that he held converse with the spirits of Homer, Virgil, Dante, and other great men. Among these quaint and now rare editions are *Books of Prophecies*, *Gates of Paradise*, *Vision of the Daughters of Albion*, and *America*. Died, 1827.

Blakelock, Ralph Albert, American painter, was born in New York City in 1847. He was graduated from the College of the City of New York in 1869. He early abandoned the career of a physician and determined to become a painter. With no training in art and without guidance or assistance, he opened a studio in New York. The story of his life is one of the saddest in the history of American art. While at length he produced many excellent pictures, recognition of their merits was exceedingly slow. Finally, the hardships and privations which he endured unsettled his mind. For about 18 years he was confined in an insane asylum. In 1916, he was released, seemingly completely recovered, and resumed painting.

Blakelock ranks with Inness, Wyant, and Homer among the foremost American painters of landscape. He is essentially a colorist and is distinguished for his evening and moonlight scenes and for his studies of the Indians of the West.

Characteristic landscapes are his "Autumn," "Sunset," "Navarra Range," "Solitude," "Abode of the Stately Deer," and "Morning." Among his notable Indian pictures are "The Pipe Dance" (in the Metropolitan museum of art, New York), "Uintah Tribe," "Indian Girl," and "Shooting the Arrow."

Eleven paintings, for which Blakelock received less than $2000, were sold in the Lambert collection during Blakelock's lifetime, for nearly $47,000. His "Brook by Moonlight," which he sold for $500, was later bought by the Toledo museum of art for $20,000. Another "Moonlight," which he sold for $50, was subsequently purchased by an art collector for $14,000. He died in 1919.

Blanc (*blăn*), **Jean Joseph Louis,** French historian and socialist writer, was born at Madrid, Spain, in 1811. He began life as a journalist, founded the *Revue du Progrès*, and published in 1840 *Organization of Labor*, a work which gained the favor of the working classes. He was member of the provisional government of 1848, and eventually of the National Assembly. Threatened with impeachment, he fled to England. On the fall of the empire, 1871, he returned to France and was elected to the Chamber of Deputies. Blanc produced an elaborate and well written history of the French Revolution. Died at Cannes, 1882.

Blasco Ibañez (*blăs'kō ē-bā'nyāth*), **Vicente,** Spanish novelist, was born in Valencia, 1867. His earliest works, such as the *Mayflower*, are sketchy pictures of life in his native province. Later, he developed a more minute and realistic style, somewhat resembling that of Zola, and produced novels which are characterized by great keenness of observation and descriptive power. Among his works, several of which have been translated into English, French, and other languages, are *Sonnica*, *The Shadow of the Cathedral*, *The Four Horsemen of the Apocalypse*, *Our Sea*, *Woman Triumphant*, and *The Temptress*. His *Alfonso XIII Unmasked*, in 1925, led to his exile from Spain. Died, 1928. See *Spanish Literature: Contemporary Writers*.

Blashfield, Edwin Howland, American artist, was born in New York, 1848, and was educated in Boston Latin school. He studied painting at Paris, 1867, under Léon Bonnat; exhibited at several Paris salons, 1874–92, and also at the royal academy, London. He returned to the United States in 1881 and produced many genre pictures, portraits, and mural decorations. Among his paintings are "Christmas Bells" and "Angel with the Flaming Sword." He decorated the central dome of the library of Congress, portions of the State capitols of Minnesota, Iowa, South Dakota, and Wisconsin, and other public buildings, and executed much private work. In recognition of his achievements, he was elected a member of the American academy of arts and letters. He wrote *Mural Painting in America*, and, with his wife, Evangeline Wilbur Blashfield, was coauthor of *Italian Cities*. Jointly with Mrs. Blashfield and A. A. Hopkins, he edited Vasari's *Lives of the Painters*.

Blavatsky (*blă-văts'kĭ*), **Helena Petrovna,** theosophist, was born in Ekaterinoslav, 1831. She was of noble descent and married a Russian councilor of state, from whom she separated soon after their marriage. She visited Tibet, where she claims she received the theosophical doctrines connected with her name. From 1873 to 1879, she was a resident of New York, became a naturalized American citizen, and founded the theosophical society. In 1876, she published *Isis Unveiled*. Her other writings include *The Key to Theosophy*, *The Secret Doctrine*, and *The Voice of Silence*. Died, 1891.

Bliss, Tasker Howard, American general, was born at Lewisburg, Pa., 1853. He was educated at Lewisburg academy, Lewisburg university (now Bucknell), and at the United States military academy at West Point, from which he graduated in 1875. Entering the army, he rose steadily, becoming divisional chief of staff in the Porto Rican campaign, 1898. He was collector of customs, Havana, 1898–1902. He was then promoted brigadier general and made member of the army war college board. After serving on the general staff, 1903–05, he commanded departments in the Philippines until 1909, when he became assistant chief of staff. Following service in various commands, including the Mexican border, 1911, he was made major general, 1915, chief of staff, 1917, and general, 1917, in the United States army. He was also made member of the supreme war council in France and, in 1919, served as military delegate of the United States to the Peace Conference at Versailles.

Blücher (*blü'kĕr*), **Gebhard Leberecht von,** Prussian field marshal, was born at Rostock, Germany, 1742. He first entered the Swedish army but soon passed to the Prussian army, in which he served during the Seven Years' war. He went through the Polish campaign of 1772, and gained rapid promotion during the struggle with the French invaders, which began in 1792. In the campaign of 1814, Blücher held high command and, though defeated by Napoleon, he beat Marshal Marmont and entered Paris with the allies. In the Waterloo campaign, he commanded the Prussian army in Belgium, and was severely defeated by Napoleon at Ligny. However, by outmaneuvering Grouchy, he was able to arrive at Waterloo in time to decide the victory for the allies and to pursue the routed French army. Died, 1819. See *Napoleonic Wars*.

Blumenbach (*blōō'mĕn-bäĸ*), **Johann Friedrich,** German physiologist and anthropologist, was born at Gotha in 1752. He studied medicine at Jena and at Gottingen. In 1776, he was made professor of medicine in the University of Gottingen, a chair which he filled with distinction for nearly 60 years. He was the founder of anthropology and his works gave a great impulse to scientific research. His chief writings are *Institutiones Physiologicæ*, *Manual of Natural History*, and *Manual of Comparative Anatomy and Physiology*. He made craniology a special study and was the first to classify the human species as Caucasian, Mongolian, African, American, and Malay. Died, 1840.

Bluntschli (*blōōntsh'lē*), **Johann Kaspar,** Swiss jurist and economist, was born at Zurich in 1808. In 1833, he became professor in the newly founded University of Zurich. In 1848, he went to Munich as professor of civil and international law; in 1861, he accepted the same chair in Heidelberg. Among his works are *Allgemeines Staatsrecht*, on which his reputation chiefly rests, and *Deutsches Privatrecht*. His library was acquired by Johns Hopkins university, Baltimore. He died at Karlsruhe in 1881.

Blythe, Samuel George, American writer, was born at Geneseo, N. Y., 1868. He was educated at Geneseo state normal school and entered journalism. He was managing editor of Buffalo *Express*, 1893–96; editor in chief of Buffalo *Enquirer* and *Courier*, 1897-98; managing editor *Cosmopolitan Magazine*, 1899; chief Washington correspondent New York *World*, 1900–07; and became a staff writer on the *Saturday Evening Post* in 1907. His writings include *Who's Who and Why*, *The Senator's Secretary*, *We have With Us Tonight*, *The Price of Place*, *The Making of a Newspaper Man*, *The Fakers*, *The Manikin Makers*, and many special articles for magazines.

Boabdil (*bō'ăb-dēl'*), properly Abu-Abdallah, was the last Moorish king of Granada. He dethroned his father, Abu-l-Hasan, in 1481, and, two years later, was defeated and taken prisoner by the Castilians near Lucena. He was set free on condition of paying tribute, and returned to Granada to struggle with his father and with his uncle for the throne. The fall of Malaga was but the prelude to the siege of the capital itself, which was finally starved out in 1491, in spite of the reckless courage of the Moors and of Boabdil, whose weak and vacillating nature fell from him in the hour of battle. The spot from which he looked his last on Granada, after giving up to Ferdinand the keys of the city, still bears the name of *el ultimo sospiro del Moro*, "the last sigh of the Moor." Boabdil soon crossed to Africa, where he died in battle, 1536.

Boas (*bō'ăs*), **Franz,** anthropologist, was born at Minden, Germany, in 1858. He was educated at the universities of Heidelberg, Bonn, and Kiel. In 1883-84, he explored Baffin land; in 1885-86, was a teacher of geography in the University of Berlin. Removing to the United States, he was instructor in anthropology in Clark university from 1888 to 1892. In 1896, he became lecturer and, in 1899, professor of anthropology, Columbia university. From 1901 to 1915, he was curator of anthropology in the American museum of natural history, New York. He spent much time among American Indian tribes, and was a member of the Jesup North Pacific expedition for scientific research. During 1910–12, he conducted anthropological investigations in Mexico. His works include *The Growth of Children*, *Changes in the Form of Body of Descendants of Immigrants*, *Kultur und Rasse*, *The Mind of Primitive Man*, and numerous articles on North American anthropology.

Boccaccio (*bōk-kät'chō*), **Giovanni,** Italian story-teller, was born probably in Paris in 1313. From an early period he displayed a love for poetry. In 1350, he formed an intimate friendship with Petrarch, and, following his friend's example, collected books and copied rare manuscripts which he could not afford to buy. It is said that he was the first Italian who ever procured from Greece a copy of the *Iliad* and of the *Odyssey*. Boccaccio was not only one of the most learned men of his time, but he was also one of the most enlightened in his scholarship.

While in Naples, about 1334, Boccaccio fell passionately in love with a young woman, called by him Fiammetta, who was generally supposed to be a daughter of King Robert. His passion was returned, and, to gratify her, he wrote *Il Filocopo*, a prose romance, and afterward *La Teseide*, the first attempt at romantic epic poetry, of which Boccaccio may be considered the inventor. In 1344, he wrote his *Amorosa Fiammetta*. He composed his famous *Decameron* in Naples, to please Joanna, the daughter and successor of King Robert. In abundance of incident it is almost inexhaustible, though many of the stories are taken from older

collections. He died in 1375. See *Italian Literature: Early Period.*

Böcklin (*bûk'lên*), **Arnold,** Swiss painter of romantic subjects, was born at Basel, Switzerland, 1827. His principal pictures are the "Sea Idyl," "Chase of Diana," "The Isle of the Blessed," "Venus Reposing," "Centaur Struggle," "A Nymph and Fauns," and several landscapes. In a certain element of fancy, fantastic and weird rather than notably imaginative, Böcklin excels all his contemporaries. Died at Fiesole, Italy, 1901.

Bode (*bō'dē*), **Johann Elert,** German astronomer, was born at Hamburg, 1747. At the age of 18 he calculated an eclipse of the sun. The next year he wrote an elementary treatise on astronomy which was especially successful. In 1774, he commenced the *Astronomical Year Book.* His fame rests chiefly on the *Uranographia,* published in 1801, in which he gives observations on 17,240 stars, or about 12,000 more than can be found in any previous charts. He reproduced the statement of the relations of the planetary distances, previously made known by Titus of Wittenberg, but afterward called "Bode's law." He died at Berlin in 1826.

Bodin (*bō'dăN'*), **Jean,** French publicist and economist, was born at Angers in 1530. According to Bodin's greatest work, *Les six livres de la république,* property and the family form the basis of society, and a limited monarchy is the best possible form of government. His *Methodus ad facilem historiarum cognitionem* is regarded by some as the foundation of the true philosophy of history. He died at Laon, 1596.

Bodley, Sir Thomas, the restorer of the library originally established at Oxford by Humphrey, duke of Gloucester, now called the Bodleian library, was born in 1545. His family being forced to flee from England during the persecutions of Mary, he settled at Geneva. On the accession of Elizabeth, he returned to England and completed his studies at Oxford. He was employed by the queen in diplomatic missions to Denmark, France, and Holland, whence he returned to Oxford in 1596 and devoted himself to the extension of the library. Died, 1613.

Boehm-Bawerk (*bûm bä'vĕrk*), **Eugen von,** Austrian political economist, was born at Brunn, Austria, 1851. He was educated at the universities of Vienna, Heidelberg, Leipzig, and Jena. In 1884, he was appointed professor at Innsbruck; at intervals from 1889 to 1904 was minister of finance. By his researches on value, and especially for his contribution to the theory of capital and interest, he became a leader of the so-called Austrian school. Some of his views have found wide acceptance among American economists. His works include *Capital and Interest, The Positive Theory of Capital, Karl Marx and the Close of his System, Recent Literature on Interest.* He died in 1914.

Boerhaave (D., *bōōr'hä-vĕ*; E., *bōr'hāv*), **Hermann,** Dutch physician, was born near Leiden, Holland, 1668. In 1689, he was made doctor of philosophy; in 1693, he gained his medical degree at Harderwijk and returned to Leiden, where, in 1701, he was appointed lecturer on the theory of medicine. To combine practice with theory, he caused a hospital to be opened, where he gave clinical instructions to his pupils.

In 1718, he undertook the professorship of chemistry, and published, in 1724, his *Elementa Chemiæ,* a work which occupies a high place in the history of chemistry. Peter the Great of Russia visited him at Leiden. His best-known works are his *Institutiones Medicæ* and *Aphorismi de Cognoscendis et Curandis Morbis.* He died in 1738.

Boethius (*bō-ē'thĭ-ŭs*) or **Boetius** (*bō-ē'shĭ-ŭs*), **Anicius Manlius Torquatus Severinus,** Roman statesman and philosopher, was born about 480; was profoundly learned; and filled the highest offices under the government of Theodoric the Goth. He became consul in 510 and was long the oracle of his sovereign and the idol of the people; but his strict integrity and inflexible justice incited enemies, to whose machinations he at last fell a victim. Falsely accused of a treasonable correspondence with the court of Constantinople, he was imprisoned and condemned to death. His *Consolations of Philosophy,* written in prison, and his translations of Aristotelian writings formed for centuries Europe's chief source of a knowledge of Greek philosophy. Executed in 524. See *Latin Literature: Period of Decline.*

Bogardus, James, American inventor, was born in Catskill, New York, 1800. He became a watchmaker and engraver, and manifested a marked aptitude for invention. His improvements on timepieces include the eight-day, three-wheeled chronometer clock. He invented the ring-flyer for cotton spinning, the eccentric mill where both stones turn in the same direction but with different speeds, and an engraving machine for engine turning. In 1833, he invented the dry gas meter; in 1839, he won the prize offered by the British government for the best machine for making postage stamps. In 1847, he built in New York for his factory the first structure erected entirely of cast iron. He also constructed implements for working india rubber and for deep sea sounding. He died in 1874.

Bohr, Niels Henrik David, Danish physicist, was born at Copenhagen in 1885. He entered the University of Copenhagen in 1903. In 1907, he won a gold medal offered by the Danish society of sciences for an essay in physics. After receiving, in 1911, the degree of doctor of philosophy from the University of Copenhagen, he studied in England, first at the University of Cambridge under J. J. Thompson and later at the University of Manchester under E. Rutherford. He was an instructor in physics in the University of Manchester from 1914 to 1916, when he was elected professor of physics at the University of Copenhagen.

Bohr has made important researches in the theoretical structure of matter. As a result, he has indicated how to fix mathematically the orbit of the electrons in the inner part of the atom and how to calculate the processes taking place there. These processes disclose themselves by radiating and by absorbing light and X-rays, by absorbing and by emitting electrical rays, and also in the chemical affinity and cohesion of matter. In 1922, Bohr was awarded the Nobel prize for physics.

Boito (*bō'ē-tō*), **Arrigo,** Italian composer and librettist, was born at Padua, 1842. His father was an Italian painter and his mother was a Polish woman. He received his musical education at the Milan conservatory where, about 1856, he composed parts of his great opera *Mefistofele* which was a pronounced failure as first produced in 1868 at La Scala, Milan. After extensive remodeling and revision, it was presented in Bologna in 1875 with notable success, following which it was repeated in other European cities, and was first given in New York in 1880. While not widely popular, it is based on true principles of modern opera and when adequately presented is notably effective.

Boito has won deserved fame as the author of the excellent librettos for Verdi's *Otello* and *Falstaff* and for Ponchielli's *Gioconda.* He also published several novels. He owes his chief distinction to the fact that his *Mefistofele* marks the epoch-making change in Italian opera from mere tunefulness and coloratura display to the new dramatic school exemplified by the later works of Verdi and by Ponchielli, Mascagni, Puccini, and Leoncavallo. Died in 1918. See *Italian Opera.*

Bok (*bŏk*), **Edward William,** editor, was born in Helder, in the Netherlands, 1863. He came to the United States at the age of six; was educated in the public schools of Brooklyn, N. Y.; and was employed for a time by Henry Holt & Co. and by Charles Scribner's Sons, publishers. In 1886, he organized the Bok syndicate press, which handled Beecher's sermons with notable success. In 1887, he edited *The Beecher Memorial.* From 1889 to 1919, he was editor in chief of *The Ladies' Home Journal.* His writings include *The Young Man in Business, Successward, The Young Man and the Church, Keys to Success, Why I Believe in Poverty, The Americanization of Edward Bok,* and *The Man from Maine.* In 1923, he offered a prize of $100,000 for an essay containing the most promising suggestion for the insurance of world peace.

Boleyn (*bōōl'ĭn*), **Anne,** queen of England and daughter of Sir Thomas Boleyn, was born about 1507, and was brought up at the French court. She became maid of honor to Queen Catharine of England. King Henry VIII, attracted by her beauty, had his marriage with Catharine declared void, and was married privately to Anne. She soon lost his favor, and, on a charge of unfaithfulness, was tried, condemned, and beheaded, 1536. She was the mother of Queen Elizabeth.

Bolingbroke (*bŏl'ĭn-brōōk*), **Henry Saint John, Viscount,** English statesman, was born in Battersea in 1678. Having studied at Eton, he entered Parliament in 1701, and, in 1704, became secretary for war. He afterward became secretary of state for foreign affairs, and negotiated the Treaty of Utrecht. In 1712, he was raised to the peerage. On the accession of George I, he was impeached of high treason, fled from the country, and became secretary of state to the first pretender. He was attainted and his estate seized, but, in 1723, he was permitted to return. His estates were restored, but he was not allowed to sit in Parliament. He wrote against the ministry, and his productions were admired for their eloquence and vigor. He died in 1751.

Bolivar (*bŏl'ĭ-vär*; Sp., *bō-lē'vär*), **Simon,** South American statesman, founder and first president of the republic of Colombia, is known as "the liberator of South America." He was born in Caracas, Venezuela, 1783; was educated in Madrid; and traveled in Europe and the United States. When the revolt against the Spanish yoke broke out in Venezuela, he joined the rebels, but was compelled to flee. In 1813, he returned and, gathering a force, defeated General Monteverde at Caracas. The tide then turned against Bolivar, who fled to Jamaica. He soon returned and, after varying fortunes, won decisive battles in 1819. These victories resulted in the establishment of the republic of Venezuela, to which was afterward united New Granada.

In 1822, Bolivar went to the aid of the Peruvians in their struggle for liberty, and was given the chief command. After long campaigns, the Spaniards were driven from Peru in 1825. A large area in southeastern Peru, called Upper Peru, was constituted a separate republic with the title of Bolivia in honor of the liberator. Later, Bolivar became president of Colombia. While circumstances compelled him to use dictatorial power, there is no proof that he was ever insincere in his devotion to the cause of liberty for which he spent his large fortune. He died in 1830. In 1921, an equestrian statue of Bolivar was erected in Central park, New York. See *History*: *Latin America, Bolivia, Colombia, Venezuela.*

Bonaparte, Charles Joseph, American lawyer, grandson of Jérôme Bonaparte, king of Westphalia, was born in Baltimore, 1851. He was graduated at Harvard university in 1871 and at Harvard law school in 1874. He engaged in law practice in Baltimore and became prominent in reform movements. He was a member of the council of the national civil service reform league; was president of the national municipal league; and was member of the United States board of Indian commissioners, 1902–04. From 1891 to 1903, he was overseer at Harvard and, in 1904, was appointed trustee of the Catholic University of America. He was secretary of the navy, 1905-06, and attorney-general of the United States, 1906–09. His publications include *The Essential Element in Good City Government, Some Duties and Responsibilities of American Catholics,* and *Civil Service Reform a Moral Question.* He died in 1921.

Bonaparte, Charles Louis Napoleon. See *Napoleon III.*

Bonaparte, Charles Lucien Jules Laurent, prince of Canino and Musignano, son of Lucien Bonaparte, was born at Paris in 1803. He never exhibited any inclination for political life, preferring the more quiet pursuits of literature and science. He acquired a considerable reputation as a naturalist, especially as a writer on ornithology. During his residence in Philadelphia, 1822–28, he studied the birds of the United States and published his *American Ornithology.* This formed the basis for subsequent editions of Alexander Wilson's well-known work. Died, 1857.

Bonaparte, Jérôme, youngest brother of Napoleon I, was born at Ajaccio in 1784. He served as naval lieutenant in the expedition to Haiti. When war broke out between France and England in 1803, Jérôme was cruising off the West Indies, but he was soon compelled to take refuge in New York. While in the United States, he married, in 1803, Elizabeth Patterson, daughter of a Baltimore merchant. Subsequently, he was employed by Napoleon in the liberation of Genoese prisoners who had been captured by the dey of Algiers. In the war with Prussia, he commanded an army corps in Silesia, and, in 1807, was made king of Westphalia.

After his brother's abdication, Jérôme left Paris, 1814, and visited Switzerland and Austria, but ultimately settled in Florence. His request to be allowed to return to France was at first rejected, but was afterward granted. In 1848, he was appointed governor of the Invalides and, in 1850, was made a French marshal. Died, 1860.

Bonaparte, Joseph, oldest brother of Napoleon I, was born at Corte, in Corsica, 1768, and was educated at Autun. On the death of his father, he returned to Corsica, exerted himself to support the younger members of the family, and removed with them to Marseille in 1793. In 1797, he was elected a member of the council of five hundred and, in the same year, was sent as ambassador from the republic to Rome. In 1800, having proved his ability in several offices of state, he was chosen by the first consul as plenipotentiary to conclude a treaty of friendship with the United States.

After the coronation of Napoleon, Joseph was made commander in chief of the army of Naples and, in 1806, king of Naples. In 1808, he was summarily transferred by his brother to the throne of Spain, and Murat took his place as king of Naples. For Joseph this was an unfavorable change; he found himself unprepared to cope with the Spanish insurgents, and, after the defeat of the French at Vitoria, he returned to his estate at Morfontaine, in France. From 1815 to 1832, he lived in the United States. Died in 1844.

Bonaparte, Josephine (wife of Napoleon I). See *Josephine, Marie Josèphe.*

Bonaparte, Louis, brother of Napoleon I and father of Napoleon III, was born in 1778. After receiving various honors, he was nominally made king of Holland, being, however, little more than a subordinate to his brother. Whatever may have been the faults of his reign, it is highly to his credit that, although a foreigner, he administered the affairs of the kingdom in the interest of his people. He refused to accept the crown of Spain, and did not enrich himself by his reign. After the restoration of the house of Orange, Louis considered himself free from all responsibility, and returned to Paris, 1814. He died in 1846.

Bonaparte, Lucien, brother of Napoleon I, and prince of Canino, was born in 1775. He received his education in the College of Autun. Rising gradually from one office to another, he was elected deputy for the department of Liamone, and in the council of five hundred spoke against the squandering of state property, and formed a party favorable to the views of his brother Napoleon. Shortly before the 18th Brumaire, 1799, he was elected president of the council of five hundred, and was of great assistance to his brother in securing the dictatorship of France.

As ambassador to Madrid, 1800, Lucien contrived to gain the confidence of King Charles IV. It is said that for his services in the treaty of peace concluded between Spain and Portugal, 1801, he received five million francs. His opposition to Napoleon's progress toward monarchy involved the brothers in many quarrels and, finally, Lucien was exiled from France. In 1810, he sailed for America, was captured, and was taken to England. There, after a debate in Parliament, he was declared a prisoner, but was treated with distinction. After his brother's downfall, he lived for some years in or near Rome. Died, 1840.

Bonaparte, Napoleon. See *Napoleon Bonaparte.*

Bonar (*bŏn'ăr*), **Horatius,** Scottish preacher and hymn writer, was born at Edinburgh, 1808. He was educated at the university of his native city. After doing mission work at Keith, he was appointed, in 1837, minister of the Free church at Kelso, where he served until 1866, when he became minister of Chalmers memorial church, Edinburgh. While the author of much religious literature, he is best known as a writer of hymns. Among them are "What a Friend We Have in Jesus," "I Was a Wandering Sheep," "I Heard the Voice of Jesus Say," and many others. He died in 1889.

Bonaventura (*bŏ'nȧ-vĕn-tōō'rȧ*), **Saint,** cardinal, surnamed the "seraphic doctor," his real name being Giovanni Fidanza, was born in Tuscany in 1221. He entered the Franciscan order in 1238; was chosen general of the order in 1257; and was made cardinal in 1273. On account of his stainless character and the miracles ascribed to him, he was especially venerated, even during his lifetime. Dante soon after placed him among the saints of his *Paradiso.* He died at Lyon in 1274; was canonized in 1482.

Bond, Carrie Jacobs, American song writer, was born at Janesville, Wis., 1862. She was educated in the public schools and, in 1887, married Dr. Frank L. Bond of Iron River, Mich., who died in 1895. In 1903, she published a group entitled *Seven Songs,* which became widely popular. These were followed in 1904 by the groups entitled *Ten Songs* and *Eleven Songs.* She won success as a program entertainer, singing her own songs and reading her own sketches and poems, which are simple in style and wholesome in sentiment. Her published works include also *Path o' Life, Stories in Verse,* and numerous songs, among which are "A Perfect Day," "God Remembers When the World Forgets," and "Do You Remember." Jointly with her son, she established a music publishing business in Chicago, producing chiefly her own compositions.

Bonheur (*bŏ'nûr'*), **Marie Rosalie** (more commonly called Rosa), French artist and noted painter of animals, was born at Bordeaux in 1822. Her first master was her father, Raymond Bonheur, an artist of merit, who died in 1853. In 1841, she contributed two small pictures entitled "Two Rabbits" and "Goats and Sheep" to the French exhibition. These were followed by a succession of highly finished compositions. In 1849, she produced what some consider her finest picture, "Tillage in Nivernais," which was placed in the Luxembourg. In 1853, her famous "Horse Fair" was the principal attraction of the Paris exhibition, and, in 1865, she exhibited a new landscape of large dimensions, "Hay-making Season in Auvergne."

During the siege of Paris, 1870-71, her studio and residence at Fontainebleau were spared by special order of the crown prince of Prussia. The "Horse Fair" came into the possession of A. T. Stewart, of New York, and at the sale of his pictures in 1887 was bought for $55,500 by Cornelius Vanderbilt, and by him presented to the Metropolitan museum, New York. Died, 1899.

Boniface (*bŏn'ĭ-fās*), **Saint,** was born at Crediton, in Devonshire, England, 680. His real name was Winfrid. He is a noted saint of the Roman Catholic Church, generally styled "the apostle of Germany." He was made bishop by Pope Gregory II in 722, archbishop of Germany by Pope Gregory III, 732, and archbishop of Mainz and primate of Germany by Pope Zachary, 748. For many years, he engaged with much success in preaching and establishing churches in Germany, but was finally killed by a mob of armed pagans at Dokkum, in West Friesland, 755.

Bonnat (*bŏ'nȧ'*), **Léon Joseph Florentin,** French painter, was born at Bayonne, 1833. He studied painting in Madrid, in Paris, and in Italy and became widely known for his religious pictures. Later, he attained eminence as a portrait painter, and included among his sitters the most

distinguished men of France and many noted Americans. His portraits of Thiers, Victor Hugo, and Jules Grévy are highly esteemed. He died in 1922.

Bonner, Edmund, English prelate, was born about 1500. The reputation he gained at Oxford by his knowledge of the canon law recommended him to the notice of Wolsey, who promoted him to several offices in the Church. After the fall of Wolsey, Bonner took an active share in the work of the Reformation and received due promotion from Henry VIII. In 1533, he was deputed to appear before the pope at Marseille, to appeal for the excommunicated monarch to a general council. In 1540, he was made bishop of London. The death of Henry cooled his Protestant zeal; having given proofs of his lukewarmness in the cause of the reformation, he was at length, in 1549, committed to the Marshalsea, and deprived of his bishopric.

The accession of Queen Mary restored Bonner to office, and gave him the opportunity of revenge. As vicegerent and president of the convocation, he was the principal agent in the persecution which was directed against the Reformers during the reign of Mary. After the accession of Elizabeth he refused to take the oath of supremacy. He was accordingly ejected from his bishopric and imprisoned in the Marshalsea, where he died in 1569.

Bonnet (*bō'nĕ'*), **Charles,** Swiss naturalist and philosopher, was born at Geneva, 1720. His *Recherches sur l' usage des feuilles dans les plantes* contained the result of much observation on important points of vegetable physiology. In his *Considérations sur les corps organisés,* he examines the theories of generation. He originated the term "evolution," but employed it in a sense entirely different from its present meaning. Died, 1793.

Bonnivard (*bō'nē'vär'*), **François de,** Swiss patriot and hero of Byron's *Prisoner of Chillon,* was born at Seyssel, 1496. He was educated at Turin, and became prior of Saint Victor, near Geneva, 1510, at the age of 14 years. An ardent republican, he took sides with the Genevese against Duke Charles III of Savoy. Having fallen into the hands of robbers who delivered him into the power of the duke of Savoy, he was imprisoned in 1530 in the castle of Chillon. The Genevese, aided by the Bernese, effected his liberation in 1536. On his return to Geneva, he enjoyed the honors due to his patriotism, and was awarded a pension. His real character and history both vary widely from the legendary account popularized by Byron. Bonnivard died about 1570.

Boone, Daniel, American hunter and pioneer, was born near the present city of Reading, Pa., 1735. His father, a farmer, moved to North Carolina when Daniel was 18 years old. The boy had little education, but he knew the woods and Indian life. When 34 years old, he went with five others into the wilds of Kentucky. He had many adventures and fights with the savages, and was once captured by them, but escaped. In 1775, he moved his own and five other families from North Carolina to Kentucky.

On the Kentucky river he built a fort, which he named Boonesboro. The Indians attacked the fort several times, but were driven off. In 1778, they caught Boone while away from the fort and carried him to Detroit, where one of them adopted him as a son. Hearing of a plan to attack Boonesboro, he ran away and, reaching his fort, made ready and defended it with about 50 men against a large force of Canadians and Indians. He lived at Boonesboro until about 1790, when he lost his lands through defective title. Removing to Point Pleasant, on the Kanawha river, in what is now West Virginia, he remained there until 1795. He then moved to Spanish lands west of the Mississippi river in what is new Missouri. Died in 1820; elected to the American hall of fame, 1915.

Booth, Ballington, religious reformer and philanthropist, son of William Booth, founder of the Salvation Army, was born in London, England, 1859. After being associated with his father in Salvation Army work in England, he was commander of the Salvation Army in Australia, 1885–87, and in the United States, 1887–96. In 1896, he founded the Volunteers of America, an organization devoted to religious reform and philanthropic relief. In 1886, he married Maud Charlesworth, also active in the work of the Volunteers of America.

Booth, Edwin Thomas, American actor, son of Junius Brutus Booth, was born in Bel Air, Md., 1833. He first appeared on the stage in 1849 in *Richard III* and speedily rose in his profession. He visited England and the continent of Europe in 1861, 1880, and 1883, and met with enthusiastic receptions. From 1886 to 1891 he appeared with Lawrence Barrett. His last appearance was in *Hamlet* in 1891. He opened Booth's theater in New York, 1869, and did more than any other individual to keep the tone of dramatic art up to a moral and literary standard. He played Hamlet, Lear, and Othello with notable distinction. In his efforts to improve the American stage, he founded and endowed the Players' club. Died in 1893 and was elected to the American hall of fame, 1925.

Booth, Evangeline Cory, Salvation Army commander, was born in England, the daughter of William Booth, who founded the organization. She was director of field operations for the Salvation Army in London for five years, commander of the Army in Canada for eight years, and, after 1904, was commander for the United States and its possessions. She composed the words and music of many Salvation Army songs. In 1921, she received an honorary degree of M. D. from Tufts Medical college.

Booth, William, founder and commander in chief of the Salvation Army, was born in Nottingham, England, 1829. He was converted among the Wesleyans and became a minister of the Methodist New Connection in 1852. He resigned in 1861, began evangelistic work, and, in 1865, organized the Christian mission in the densely populated east end of London. Out of this grew, in 1878, the Salvation Army, whose ramifications spread later throughout the world.

He wrote *Orders and Regulations for Officers and Soldiers, Letters to my Soldiers, Religion for Every Day, Salvation Soldiery Visions, In Darkest England and the Way Out,* and numerous other books and pamphlets. He also published the newspapers entitled *War Cry, Young Soldier, Social Gazette,* and *Bandsman and Songster,* some of which were issued in as many as 20 languages, with a joint weekly circulation of nearly a million copies. He repeatedly visited the United States, Canada, Australasia, South Africa, India, Japan, and several European countries. Died, 1912.

Borah, William Edgar, American lawyer and statesman, was born in 1865, in Wayne county, Ill. He was educated at Southern Illinois academy, Enfield, Ill., and at Kansas State university. He was admitted to the bar in 1889, practiced law at Lyons, Kans., 1890-91. In 1891, he removed to Boise, Idaho, and devoted himself to the practice of law until he was elected to the United States Senate in 1907. He was re-elected for succeeding terms and in 1925 became chairman of the Foreign Relations Committee. In this capacity he pressed strongly for early settlement of Allied debts owing to the United States. While favoring the "outlawry" of war, he consistently opposed both the entry of the United States into the League of Nations and American adherence to the World Court.

Borchgrevink (*bôrk'grĕ-vĭngk*), **Carsten Egeberg,** Norwegian scientist and antarctic explorer, was born in Christiania, 1864. He was educated at Gjertsen college, Christiania, and at the royal college, Tharandt, Saxony. Emigrating to Australia in 1888, he became a surveyor, and, later, an instructor in Cooerwull college, New South Wales, where he founded the Cooerwull museum.

Sailing from London in 1898 in command of the *Southern Cross* expedition, Borchgrevink landed in South Victoria Land early in 1899. There he spent a year in exploration, mapping the coast, studying the flora and fauna, locating the south magnetic pole, and with sledges attaining the then "farthest south," latitude 78° 50′. The results were published in 1901 in his *First on the Antarctic Continent.*

Borden, Sir Frederick William, Canadian minister of militia and defense, 1896–1911; was born at Cornwallis, Nova Scotia, in 1847. He was educated at King's college, Windsor, and Harvard medical school. He began the practice of medicine, 1868; was surgeon, lieutenant colonel, and honorary colonel of Canadian army medical corps. He was first elected to the Dominion Parliament in 1874 and, except during 1883–86, represented Kings county, N. S., continuously until 1891. As a member of the imperial council of defense, he assisted every endeavor to promote co-operation between the Imperial and the Canadian forces. He was knighted, 1902; died, 1917.

Borden, Gail, American inventor, was born at Norwich, N. Y., in 1801. During boyhood he emigrated with his parents to Kentucky and thence to Indiana. On account of impaired health, he removed in 1822 to Mississippi, where he became a teacher and a land surveyor. In 1829, he went to Texas. There he engaged in land surveying; compiled topographic maps;* conducted a land office; and, with his brother, established at Houston the only newspaper published in Texas during the war for the independence of that colony from Mexico. After the establishment of the republic of Texas, Borden was appointed first collector of the port of Galveston and made the first surveys for laying out the city.

At the time of the gold rush to California in 1849, Borden turned his attention to providing suitable food supplies for emigrants crossing the plains. He produced the "pemmican," which Dr. Kane took with him on his arctic expeditions of 1850 and 1853. At this time Borden invented also the "meat biscuit," a highly concentrated portable food. In 1856, he secured a patent for producing condensed milk by evaporation in a vacuum, and soon afterward he established condensed milk factories in New York and Illinois. During the Civil War, his condensed milk was widely used in the army and navy. Borden experimented extensively upon condensing various other staple foods and produced

an extract of beef of superior quality and many valuable preparations of condensed coffee, cocoa, tea, and fruit juices. From his various patents Borden amassed a large fortune. He died in 1874.

Borden, Sir Robert Laird, Canadian statesman, was born at Grand Pre, Nova Scotia, 1854. He was educated at Acacia Villa academy, Horton; began the study of law, 1874; and was admitted to the bar, 1878. He had an extensive practice in the supreme court of Nova Scotia and in the supreme court of Canada. Entering the Dominion Parliament in 1896, he took a leading part in important debates. In 1901, upon the resignation of Sir Charles Tupper, he was elected leader of the Conservative party in the Dominion House of Commons. Upon the defeat of the Laurier government in the elections of 1911, he became premier of Canada, and continued in the premiership until his resignation in 1920. He was member of the Imperial war cabinet, 1917-18; was the representative of Canada at the Peace Conference at Versailles, 1919, and at the Washington Conference, 1921-22. In 1924, he was made chancellor of Queen's university.

Bordet (*bôr'dĕ'*), **Jules,** Belgian physician and bacteriologist, was born in 1870, at Soignies, Belgium. He was educated in Brussels, receiving the degree of doctor of medicine in 1892. From 1894 to 1901, he was a member of the Pasteur institute of Paris. In 1901, he was made director of the Pasteur institute of Brussels. He has conducted various researches and published numerous papers on medical and bacteriological subjects. In recognition of his scientific contributions, he received the Nobel prize for medicine for 1919.

Borgia (*bôr'jä*), **Cesare,** Italian ecclesiastic and soldier, of great but evil fame, was born in 1476. He was the fourth son of Pope Alexander VI by Rosa Vanozza. In 1493, he was created a cardinal, though, in 1498, he divested himself of the office to suit his purposes. He is said to have caused the death of his brother Giovanni, who was the duke of Gandia, in order to gain complete ascendency in the papal government. In 1498, having been sent as nuncio to Louis XII of France, he was created duke of Valentinois and married, in 1499, the sister of Jean d'Albret, king of Navarre.

After accompanying Louis XII in his Italian campaign, Borgia conceived the idea of founding a kingdom in central Italy, and, by force, treachery, and murder, he had almost succeeded in obtaining ascendency throughout the Roman states, when the death of his father deprived him of his great source of power. In 1504, he was sent as a prisoner to Spain by Pope Julius II, but escaped and joined the king of Navarre's army against Castile. In this campaign he was killed, 1507.

Borgia, Lucrezia, sister of Cesare Borgia, and, like him, the possessor of an infamous reputation, was born in 1480. Her father compelled her twice to marriage and divorce before she became the wife of the duke of Bisceglie. After her third husband had been murdered by Cesare Borgia, she married Alfonso of Este, and passed her life in the court of Ferrara, cultivating literature and art. Recent historical research has refuted many of the extravagant tales concerning her vices. Died, 1519.

Borglum (*bôr'glŭm*), **Gutzon,** American sculptor and painter, was born in Idaho, 1867. Beginning the study of art in San Francisco, he went to Paris in 1890 and studied in the Académie Julien and in the Ecole des Beaux-Arts. After exhibiting both paintings and sculptures in Paris, London, and Spain, he returned to America and became established in New York in 1902. In painting, his works include figures, animals, portraits, and mural decorations. His sculptural works comprise figures, horses, and groups in bronze. Among these are the gargoyles of the dormitory at Princeton university, and "North America," the Sheridan monument, the Smithson statue, and the colossal head of Lincoln in the Capitol, at Washington. Borglum was chosen as the sculptor for the Stone Mountain memorial to the army of the Confederacy, near Atlanta, Ga. After work had begun, however, disagreements with the association sponsoring the work led to his retirement in 1925. Borglum reflects the influence of Whistler in his painting and of Rodin in his sculpture.

Borglum, Solon Hannibal, American sculptor, brother of Gutzon Borglum, was born at Ogden, Utah, 1868, and spent his early life on a cattle ranch; at 24 he began to study art with his brother Gutzon. Later, he became a pupil in the Cincinnati art school and studied under Louis Rebisso and Frémiet, Paris. He made special study of Western life, living among cowboys and Indians. In 1899, he was awarded honorable mention at the Paris salon for his "Lame Horse." Among his chief works are "Stampede of Wild Horses," "The Last Roundup," "On the Borders of White Man's Land," "The Bucking Broncho," "Burial on the Plains," "Just Born," and "Evening." His later works include numerous statues and portrait busts. He died in 1922.

Borodin (*bä'rô-dĭn'*), **Alexander Porfiryevich,** Russian composer and chemist, was born at Petrograd, 1834. He studied medicine and chemistry, practiced medicine, and was made professor of chemistry at the medico-surgical academy. He went to Paris, Heidelberg, and Italy to prepare for his duties in this chair, in connection with which he made important researches and wrote many valuable monographs. About 1860, he championed the cause of university education for women in Russia and from 1872 until his death gave free instruction in chemistry at the medical school for women.

As a recreation from professional duties, Borodin devoted himself to musical studies and composition. While studying in Germany, he met Liszt, who regarded him highly and made his compositions known. He composed symphonies, orchestral pieces, piano music, and songs, but his most important work is the opera, *Prince Igor*, which he left unfinished at his death. It was completed by Rimski-Korsakov and Glazunov, and met with great success. Borodin ranks high among modern Russian composers. Died in 1887.

Bosanquet (*bō'săn-kĕt*; *bō'săn-kā'*), **Bernard,** English philosopher, was born near Alnwick, Eng., 1848. Educated at Harrow and Oxford, he was for 10 years a lecturer at University college, Oxford. In 1881, he went to London and engaged in lecturing and social work. During 1903–08, he was professor of moral philosophy at Saint Andrews university. Bosanquet was a Hegelian in philosophy and a disciple of T. H. Green. Among his published works are *Knowledge and Reality, Education of the Young in Plato's Republic, Social and Internal Ideals,* and *The Meeting of Extremes in Comparative Philosophy.* He died in 1923.

Boscawen (*bŏs'kä-wĕn*; *-kwĕn*), **Edward,** English admiral, familiarly styled "Old Dreadnought," was born in Cornwall, 1711. He distinguished himself at the taking of Porto Bello, 1739, and at the siege of Cartagena, 1741. In command of the *Dreadnought*, in 1744, he captured the French *Médée*, taking 800 prisoners. He had an important share in the victory of Cape Finisterre, 1747, and, in command of the East Indian expedition, displayed high military skill in the retreat from Pondicherry. In 1755, he intercepted the French fleet off Newfoundland, capturing two 64-gun ships and 1500 men; in 1758, he was commander in chief of the successful expedition against Cape Breton. Boscawen crowned his career by his victory over the French Toulon fleet in Lagos bay, 1759. He received the thanks of Parliament, a pension of £3000 a year, a seat in the privy council, and the command of the marines. He died in 1761.

Bossi (*bŏs'sē*), **Enrico Marco,** Italian composer, was born at Salo, 1861. He was educated in music at the Milan conservatory, and became organist at Como and later professor in the conservatory at Naples. He was director of the conservatory at Venice, 1895–1902, and of the Liceo Musicale at Bologna, 1902–13. His intensely modern style entitles him to a high rank among recent composers in Italy. His works include the dramatic oratorio *Cristus*, the cantatas *Paradise Lost* and the *Song of Songs*, the one-act opera *Paquita*, and organ and chamber music. Died, 1925.

Bossuet (*bŏ'sü'ĕ'*), **Jacques Bénigne,** French orator and prelate, was born in Dijon, France, 1627. He became bishop of Condom and of Meaux, and tutor to the dauphin, the son of Louis XIV. He wrote several controversial works, all in defense of the Roman Catholic doctrine; but his fame rests chiefly on his *Sermons*. As an ecclesiastical orator he has had no superior in France. Several of his compositions, written for the use of the dauphin, and especially his *Discourse on Universal History*, long retained a high reputation. He died in 1704.

Boswell, James, Scottish writer and biographer, was born in Edinburgh, 1740. He early showed a penchant for writing and an admiration for literary men. He fell in with Dr. Samuel Johnson on a visit to London in 1763, and conceived for him the most devoted regard. In 1773, Boswell made a tour with him to the Hebrides, the *Journal* of which he afterward published. Boswell settled in London and was admitted to the English bar. In 1782, he succeeded to his father's estate, Auchinleck, in Ayrshire, with an income of 1600 pounds a year. Johnson died in 1784. In 1791 appeared Boswell's *Life of Johnson*, a unique biography which has done more to perpetuate Johnson's fame than any of the latter's celebrated writings. Boswell died in 1795. See *Johnson, Dr. Samuel*, page 1878.

Botha (*bō'tä*), **Louis,** Boer soldier and statesman, was born in 1862 at Greytown in Natal. He was a member of the Transvaal Volksraad, succeeded Joubert as commander in chief of the Boer forces in the South African war, 1899–1902, and, from 1907 to 1910, was prime minister of the Transvaal colony under the new constitution. In 1907, he visited England, attended the British colonial conference,

and received various honors. During 1914-15, he commanded the united British and colonial forces in southwest Africa with notable success, and received the surrender of the German army. Died in 1919.

Böttger (*bŭt'gĕr*), **Johann Friedrich,** Saxon alchemist and inventor, was born in Schleiz, 1628. While apprenticed to an apothecary in Berlin, he became interested in the search for the philosopher's stone and later conducted extensive investigations at Dresden. He was led to make use of the chemical knowledge he had thus gained in experimenting upon clays to ascertain their suitability for the manufacture of porcelain. Factories for this purpose were built under royal patronage and the discovery of the process of making Meissen, or Saxon, porcelain was the result. In 1708, Böttger was employed to superintend the factories and soon afterward Meissen porcelain was brought out. He died in 1719.

Botticelli (*bŏt'tē-chĕl'lē*), **Alessandro,** properly Alessandro Filipepi, Italian painter, was born in 1444. He was a pupil of Fra Filippo Lippi and became one of the most important Florentine painters of the early Renaissance. In response to the invitation of Pope Sixtus IV, he went to Rome and executed some fine paintings for the chapel of the Vatican. Among his most noted works are "Allegory of Spring," "Calumny," "Adoration of the Magi," "Birth of Venus," "Mars and Venus," "Magnificat," and several frescoes and madonnas. Died, 1510. See *Painting: The Study of Anatomy.*

Bougainville (*bōō'gȧN'vēl'*), **Louis Antoine de,** French navigator, was born in Paris, 1729. In 1755, he went to London as secretary of the French embassy. In 1756, he acted as aid-de-camp to the marquis de Montcalm, to whom the defense of Canada was intrusted. He made a voyage around the world, 1766–69, the first circumnavigation accomplished by a French navigator. The details of this voyage are described in his *Voyage autour du monde.* The scientific and geographic discoveries made on this expedition won fame for France similar to that secured for England by Cook's circumnavigations. He died, 1811.

Boughton (*bō'tŭn*), **George Henry,** English painter, was born near Norwich, England, 1834, and was brought to the United States when three years old. He studied art in New York, Paris, and London, and, after 1861, resided in London. He became an associate of the royal academy in 1879 and a member of the royal academy in 1896. Among his paintings are "The Return of the Mayflower," "Evangeline," "Milton Visited by Andrew Marvell," "Passing into Shade," "Coming from Church," "Cold Without," "Morning Prayer," "The Scarlet Letter," "The Idyl of the Birds," "Puritans Going to Church," and "Clarissa Harlowe." He died in London, 1905.

Bouguereau (*bōō'gē-rō'*), **William Adolphe,** French painter, was born at La Rochelle in 1825. After a youth of hardship, he succeeded in reaching Paris, where he obtained admission to the studio of Picot, and later to the Beaux Arts. In 1850, he won the *prix de Rome,* and went to Italy to study. His first notable success was "The Body of St. Cecilia Borne to the Catacombs," exhibited in the Paris salon of 1854 and later placed in the Luxembourg. From that time his reputation was made. He painted some portraits, but his subjects are chiefly ideal, idyllic, and religious. Many examples of his work are found in American galleries. He died in 1905.

Bourbon (*bōōr'bŭn*; *bōōr'bôN'*), **Charles,** French general, known as "the constable de Bourbon," was born in 1490. For his bravery at the battle of Marignano in 1515 he was made constable of France. But powerful enemies strove to undermine him in the favor of Francis I. Threatened with the loss of some of his lands and dignities, he renounced the service of France and concluded a private alliance with the emperor Charles V and with Henry VIII of England.

At the head of a force of German mercenaries, Bourbon joined the Spanish army in Lombardy in 1523, but, invading France in 1524, failed at the siege of Marseille. The next year, however, he was chief commander at the great victory of Pavia, in which Francis I was taken prisoner. But Charles V distrusted him, though he made him duke of Milan and Spanish commander in northern Italy. With George of Frundsberg, he led the mixed army of Spanish and German mercenaries that stormed and plundered Rome in 1527. In this fierce struggle, Bourbon was mortally wounded by a bullet said to have been fired by Benvenuto Cellini.

Bourdaloue (*bōōr'dȧ'lōō'*), **Louis,** French preacher, was born at Bourges, 1632. After being educated for the Church by the Jesuits, he lectured for some time on humanity and theological ethics. In 1669, he began to preach at Paris, where Louis XIV soon brought the court to hear him. Bourdaloue's popularity lasted many years. His sermons, based chiefly on the texts of Isaiah, Saint Paul, and Saint Augustine, were marked by profound moral earnestness and great logical power. They were delivered with shut eyes and with a sonorous but uninflected voice. He advocated a return to primitive evangelicism and spoke plainly about the vices of the court. He died at Paris in 1704.

Bourgeois (*bōōr'zhwȧ'*), **Léon Victor Auguste,** French statesman and publicist, was born in Paris in 1851. He was educated for the law, and, after serving in various minor political positions, he became, in 1886, a director in the ministry of the interior. From this time until after the close of the World War, he was a prominent figure in public affairs. He was repeatedly elected deputy, was also elected senator, and occupied important positions in the French cabinet. In 1899 and in 1907, he headed the French delegation to the Peace Conference at The Hague. He was also a member of the Permanent Court of Arbitration at The Hague. His published works include *The Education of Democracy, The Declaration of Rights, The Compact of 1919 and the League of Nations,* and *The Treaty of Versailles.* In recognition of his efforts in behalf of international peace, he was awarded the Nobel prize for peace for 1920. Died, 1925.

Bourget (*bōōr'zhĕ'*), **Paul,** French poet, critic, and novelist, was born at Amiens, 1852. In 1873, he first showed his gifts as a critic in an article contributed to the *Revue des Deux Mondes.* In a collection of poems which followed and in his prose *Studies,* he revealed the chief characteristics of his style and thought. He has written many realistic and analytical books, chiefly studies of the scientific and pessimistic tendencies of the time. Among these are *Cosmopolis, Pastels of Men, Antigone and Other Portraits of Women, Domestic Dramas, Outre-Mer, Impressions of America, The Two Sisters, The Emigrant, A Divorce, The Night Cometh, A Saint, The Sense of Death,* and *Lazarine.* In 1894, Bourget was elected to the French academy.

Bourinot (*bōō'rĭ-nō'*), **Sir John George,** Canadian historian, was born at Sydney, Nova Scotia, in 1837. He was educated at Trinity college, Toronto, established the Halifax *Reporter,* and, in 1880, became clerk of the Dominion House of Commons. His publications deal with both the political and the constitutional history of the Canadian dominion. Among them are *How Canada is Governed, Constitutional History of Canada, Parliamentary Practice and Procedure, History of Canada* (in the Story of the Nations series), and *Canada Under British Rule.* He died in 1902.

Bourne, Jonathan, Jr., American lawyer and politician, was born at New Bedford, Mass., 1855. He entered Harvard university in 1873 and remained until the end of his junior year. After traveling around the world, he settled in Portland, Oregon, 1878, where he read law and was admitted to the Oregon bar in 1881. He became largely interested in mining enterprises of the Northwest; became president of a number of Oregon corporations and of the Bourne cotton mills at Fall River, Mass. He was a member of the Oregon legislature in 1885, 1886, and 1897. From 1907 to 1913, he was United States senator. He is the author of the bill which created the parcel post.

Bowditch (*bou'dĭch*), **Nathaniel,** American astronomer, was born at Salem, Mass., in 1773. At an early age, he showed an inclination for mathematics, in which he attained great proficiency without attending a university. His work, *The New American Practical Navigator,* became the standard authority for the United States navy. He published also an admirable translation of Laplace's *Mécanique céleste,* to which he added valuable annotations. He died in 1838.

Bowles (*bōlz*), **Richard Pinch,** Canadian educator, was born near Brampton, Ont., 1864. He was educated in Brampton high school and at Victoria university, graduating from the latter with honors in 1885. In 1888, he was ordained to the Methodist ministry and, after filling minor charges, became pastor of leading churches in Toronto and Winnipeg. In 1905, he was appointed professor of homiletics in Victoria university of which he was subsequently made president and chancellor.

Bowles, Samuel, American journalist, was born at Springfield, Mass., 1826. He was the son of Samuel Bowles (1779–1851), who, in 1824, founded the Springfield *Republican.* In 1844, this became a daily newspaper, and to it Samuel Bowles junior devoted practically all his life, serving as editor for more than 30 years. He traveled widely over the United States and was always warmly interested in political affairs, though never holding office.

As a practical editor, Bowles stood in the first rank, satisfied with nothing less than the best work, sparing neither his own nor his subordinates' strength, not hampered in his work by either fear or friendship. He was an accomplished and fascinating conversationalist, cosmopolitan in taste, and liberal in opinion. He wrote *Across the Continent, Our New West,* and *The Switzerland of America,* which, with his numerous editorial writings, show his mastery of clear and vigorous English. As publisher and editor in chief of the Springfield *Republican,* he was succeeded by his son Samuel Bowles (1851–1915). Died in 1878.

Bowman, John Gabbert, American educator, was born at Davenport, Iowa, in 1877. He was graduated at the State University of Iowa in 1899 and carried on post-graduate work at Columbia university, 1904-05. He was instructor in English at the State University of Iowa, 1902–04, and at Columbia university, 1905–07. From 1907 to 1911, he was secretary of the Carnegie Foundation for the advancement of teaching; from 1911 to 1914, he was president of the State University of Iowa. He served as director of the American college of surgeons from 1915 until 1921, when he became chancellor of the University of Pittsburgh.

Boyesen (*boi'ĕ-sĕn*), **Hjalmar Hjorth,** Norwegian American novelist, was born at Frederiksvarn, Norway, in 1848. He was educated in Christiania and Leipzig, and came to America in 1869. After editing *Fremad*, a Scandinavian journal in Chicago, he was professor of German at Cornell university, 1874–80. He held a professorship in Columbia university from 1880 until 1895. He mastered English with remarkable facility and became a widely popular writer of English prose. Among his best-known works are *Gunnar, Tales from Two Hemispheres, Falconberg, Ilka on the Hilltop, Queen Titania, A Daughter of the Philistines, Social Strugglers,* and *The Golden Calf.* His *Ilka on the Hilltop* was dramatized in 1884 and met with notable success. He wrote also a play entitled *Alpine Roses,* published a volume of poems called *Idyls of Norway,* and achieved wide reputation as a lecturer. Died in 1895.

Boyle, Robert, English physicist and chemist, was born at Lismore castle, Waterford, Ireland, 1627. After studying at Eton and under the rector of Stalbridge, Dorset, he went to the continent for six years. On his return in 1644, he found himself in possession, by his father's death, of the manor of Stalbridge, where he devoted himself to chemistry and natural philosophy. Settling at Oxford in 1654, he experimented in pneumatics, and improved the air pump. As a director of the East India company, he worked for the propagation of Christianity in the East, circulated at his own expense translations of the Scriptures, and by bequest founded the "Boyle lectures" in defense of Christianity.

In 1660, Boyle formulated the important law of physics that the volume of a gas varies inversely as the pressure. This is known in English-speaking countries as Boyle's law, and in most other countries as Mariotte's law, although Mariotte in France did not publish his discovery until 1676. Boyle died in 1691.

Bozzaris (*bŏt'sä-rēs*; *bō-zär'ĭs*), **Marcos,** Greek patriot who distinguished himself in the early part of the struggle for Greek independence, was born at Suli, in the mountains of Epirus, about 1790. He died in battle, in 1823, while successfully leading a small body of men against the vastly stronger Turco-Albanian army. This battle is the subject of a noted poem by Fitz-Greene Halleck. Bozzaris has been styled the "Leonidas of modern Greece."

Bracton, Henry de, British ecclesiastic and jurist, was born at Breton Clovelly, England, and was educated in law at Oxford. He was a "justice itinerant" in 1245 and soon after became judge. In 1264, he was made archdeacon of Barnstaple and chancellor of Exeter cathedral and is said to have become chief justice of England in 1267. His *De Legibus et Consuetudinibus Angliæ* was the earliest attempt at a systematic treatment of the body of English law and had no successor until Blackstone published his celebrated *Commentaries* 500 years later. The dates of his birth and his death are unknown.

Braddock, Edward, British general, was born in 1695. He commanded against the French in America in 1755. With a force of 2000 British regulars and provincials, he moved forward to invest Fort du Quesne, now Pittsburgh, Pa.; his troops, in passing through a deep forest ravine, fell into an ambuscade of Indians, while they were attacked in the front by the French, and half of them were slain. The survivors effected a hasty retreat under Colonel, afterward General, Washington, Braddock's aid-de-camp. Braddock, mortally wounded, was carried 50 miles to Great Meadows, where the baggage had been left, and there died, July 13, 1755.

Bradford, William, one of the Pilgrims and second governor of Plymouth colony, was born in Austerfield, England, in 1589. He sailed from Leyden, Holland, in the *Mayflower,* 1620. One of his first acts, as the successor of Governor Carver in 1621, was to confirm the treaty with Massasoit just in time to suppress a dangerous Indian conspiracy. By his tact, sound judgment, and marked ability as an administrator, he contributed greatly to the success of the struggling colony. He was governor, with some brief interruptions, for 31 years. He wrote a valuable *History of Plymouth Plantation* (*from 1602 to 1647*). Died, 1657. See *Mayflower.*

Bradlaugh (*brăd'lô*), **Charles,** English politician, was born in London, 1833; in 1853, he entered a solicitor's office, and soon achieved a great influence with workingmen, as a radical and an antagonist of the Christian religion. His lectures in the hall of science, London, on social, political, and religious questions, were very popular. In 1860, he started the *National Reformer,* against which a futile government prosecution was instituted. In 1872, he published his *Impeachment of the House of Brunswick.* In 1880, he was elected to Parliament, but, refusing to take the oath, he was not allowed to take his seat until after the election of 1885, although he was repeatedly returned by his constituency. Afterward he earned a high reputation in the House of Commons, and, though a radical, opposed the advocates of socialism. Died, 1891.

Bradley, James, English astronomer, was born in Sherborne, 1693. He was educated at Oxford and studied with his uncle, James Pound, who was a prominent astronomer. In his 29th year, he became Savilian professor of astronomy at Oxford; in 1727, he published his theory of the aberration of the fixed stars and announced the important discovery of the aberration. His discovery that the inclination of the earth's axis to the ecliptic is not constant enabled him to explain the precession of the equinoxes and the nutation of the earth's axis. Later he became astronomer-royal at Greenwich, where he did much to lay the foundations of modern astronomy. Died in 1762.

Brady, Mrs. W. A. See *George, Grace.*

Bragg, Braxton, American general, was born in Warren county, N. C., 1817; served with distinction under General Taylor in the Mexican war; and retired to private life in 1859. He became a brigadier general in the Confederate army in 1861 and succeeded General Beauregard in command of the army in Mississippi, with the rank of general, May 1862. He fought against General Buell a disastrous battle at Perryville; met a reverse at the hands of General Rosecrans in the sanguinary battle of Murfreesboro, or Stone River; inflicted a defeat on the army of Rosecrans at Chickamauga; and was defeated by General Grant at Chattanooga, after which he was relieved of his command and was appointed chief of staff to Jefferson Davis. Died at Galveston, Tex., 1876.

Bragg, Sir William Henry, English scientist, was born at Wigton, Cumberland, 1862. He was educated at King William college, Isle of Man, and Trinity college, Cambridge. He was professor at Adelaide university, Australia, 1886–1908, and Cavendish professor at Leeds university, 1909–15, when he was appointed professor in the University of London. In 1915, he received, jointly with his son, W. L. Bragg, the Nobel prize in physics for valuable researches on X-rays and crystals. In 1923, he was made Fullerian professor of chemistry at the Royal institution and director of the Davy-Faraday laboratory. Besides numerous papers, chiefly on radioactivity, his publications include *X-rays and Crystals, Concerning the Nature of Things,* and *The World of Sound.*

Bragg, William Lawrence, English physicist, was born at Adelaide, South Australia, in 1890, son of Sir William Henry Bragg. He was educated at Saint Peter's college, Adelaide, and Trinity college, Cambridge. In 1914, he was made fellow and lecturer in natural sciences at Cambridge; in 1919, he was appointed professor of physics at Victoria university, Manchester. For researches on X-rays and the structure of crystals, he was in 1915, jointly with his father, awarded the Nobel prize for physics.

Brahe (*brä*; Dan., *brä'ĕ*), **Tycho,** Danish astronomer, was born at Knudstrup, Denmark, 1546; studied at Copenhagen; attended law classes at Leipzig in 1562; but soon devoted himself wholly to astronomy. After some years of travel abroad, he returned to Denmark and obtained the patronage of the Danish king, who, in 1576, built for his use a commodious observatory, called Uraniborg, on the island of Hven. On the death of the king, in 1588, Brahe's position became insecure, and, in 1597, he was forced to leave the country. Having obtained the protection of Emperor Rudolph II, he settled at Prague, where Kepler joined him in 1600.

The great merit of Brahe as an astronomer lies in the rare industry and accuracy with which he observed and recorded the position of stars and planets. He introduced precision in astronomical measurement, and it was due largely to the exactness of his observations that Kepler was led to the conception of the three fundamental laws of planetary motion. Died at Prague, 1601.

Brahms (*brämz*), **Johannes,** German composer, was born at Hamburg, 1833. Schumann early expressed the highest opinion of Brahms's genius, which, however, for many years, was not appreciated by the general public. In 1861, Brahms went to Vienna, where he acquired a high reputation and held several important musical posts. In 1868, he composed the *Deutsches Requiem,* which, after the Franco-Prussian war, was performed throughout Germany. His compositions include four great symphonies; many overtures, serenades, and other orchestral pieces and concertos; much chamber and piano music; also organ pieces, choral works and numerous songs.

His music belongs to the classical school; seeks intellectual effects, but with intense underlying feeling; is always sane, well balanced, and never commonplace. Von Bülow ranked him with Bach and Beethoven, and the realization of his greatness is increasing throughout the world. Died, 1897. See *Music: Masters Since Wagner.*

Braille (*brá'y'*), **Louis,** French teacher of the blind, was born at Coupvray in 1809. He became blind in his third year and, at the age of ten, went as a foundling to the institute for the blind at Paris. He became proficient in music and held the position of organist in a church in Paris. He began teaching the blind in 1828 and, while professor at the national institution, devised and perfected his system of point writing for literature and music, known as the Braille system. It is now widely used in institutions for the instruction of the blind throughout the world. Died in 1852.

Bramante (*brä-män'tā*), otherwise known as Donato d'Agnolo and often called Lazzari, Italian architect, was born near Urbino, Italy, in 1444. He was employed at Rome by Popes Alexander VI and Julius II, for the latter of whom he planned, and partly executed, the buildings connecting the Belvedere and the Vatican. He subsequently designed the great Church of Saint Peter's, completed by Michelangelo. Bramante first introduced Raphael at the court of Rome. Died, 1514. See *Architecture.*

Brandeis (*brăn'dīs*), **Louis Dembitz,** American jurist and publicist, was born in Louisville, Ky., 1856. He was educated in Louisville; at Dresden, Germany; and at Harvard law school, where he graduated in 1877. Although a successful lawyer, he became more widely known by reason of his active interest in social, economic, and political questions.

He was one of the first advocates of a radical policy of conservation of natural resources by the government. He acted as counsel for the people throughout proceedings testing the constitutionality of the Oregon and Illinois ten-hour laws for women. He was chairman of the arbitration board for the New York garment-workers' strike in 1910. In 1916, he was appointed justice of the United States supreme court. He is the author of numerous articles on wage-earners' life insurance, public franchises, and scientific management of labor problems.

Brandes (*brän'dēs*), **Georg,** Danish literary critic, was born of Jewish parentage, 1842, in Copenhagen, where he graduated at the university in 1864. He taught at the University of Copenhagen, 1872–77, and lived in Berlin, 1877–82, where he wrote biographies of Lasalle, Tegner, and Beaconsfield. In 1882, he resumed residence in Copenhagen as a public lecturer with a subscribed guarantee.

Brandes ranks as one of the great systematic literary critics of modern times, along with Taine, Sainte Beuve, and Brunetière. As a disciple of Comte, Taine, and Spencer, he provoked much controversy by the boldness of his views and became the leader of the more aggressive thinkers of northern Europe. In his work *Main Currents in Nineteenth Century Literature,* he clearly depicts the chief tendencies in European literature from the beginning of the past century. His excellent sympathetic study of *William Shakespeare* has been translated into English. Among his other works are *French Romanticism, Impressions of Poland,* and *A Study of Ibsen.* Died, 1927.

Brant, Joseph, Indian chief of the Mohawk nation, was born in Ohio about 1742; held a commission in the British service; and fought against the American colonists in the Revolution. After the war, he was influential in preserving peace between the whites and the Indian tribes. He afterward went to England, where he became acquainted with Burke and Sheridan. He translated the gospel of Saint Mark into Mohawk. According to John Fiske, "he was perhaps the greatest Indian of whom we have any knowledge." He died in 1807.

Branting, Hjalmar, Swedish socialist, was born in 1860 and, at an early age, engaged in journalism. As the editor of the *Social Democrat,* of Stockholm, he acquired wide influence. During and immediately following the close of the World War, he was a leading figure at socialist conventions and took a prominent part in discussions of international policy. At the Peace Conference at Versailles, in 1919, he was a strong advocate of peace in accordance with the plans proposed by Woodrow Wilson. In 1920, Branting was made prime minister of Sweden, being the first socialist to be chosen for that office. Jointly with Christian Lange of Norway, Branting was awarded, in 1921, the Nobel prize for peace. Died, 1925.

Brassey, Thomas, English engineer and railroad contractor, was born in 1805 at Buerton, England. After receiving a common school education, he was, at the age of 16, apprenticed to a surveyor, whom he succeeded in business. After building part of the Grand Junction and also the London and Southampton railroad, he contracted, 1840, in partnership with another, to build a railroad from Paris to Rouen. In a few years, he held ten railroads under contract in England and France, his contracts involving a capital of $175,000,000 and giving employment to 75,000 men. In partnership with Betts and Peto, he undertook to build the Grand Trunk railroad of Canada, 1100 miles in length, including a great bridge at Montreal. His army of men was employed in Europe, South America, Australia, and India. Died in 1870.

Braun (*broun*), **Alexander,** German botanist, was born in 1805. He became professor of botany successively at the University of Freiburg, at Giessen, and at Berlin, where he was made director of the botanical gardens. He made many important contributions to plant morphology, which, however, are notably influenced by the idealistic nature philosophy of his period. He was the brother-in-law and lifelong friend of Louis Agassiz. He stood in the foremost rank among the scientific investigators of his time, and his influence as a teacher was extensive. Died in 1877.

Braun, Ferdinand, German physicist, was born at Fulda, 1850. He was educated in the universities of Marburg and Berlin. After graduation in 1872, he occupied various positions as an instructor in the universities of Wurzburg, Marburg, and Strasbourg. In 1895, he became professor of physics at the University of Strasbourg. His extensive researches in electricity resulted in many notable improvements in wireless telegraphy. In 1902, he discovered a method of increasing at will the energy of the sending station and gained control of effective radiation by the arrangement of the antennæ. He also made important investigations concerned with the electromagnetic theory of light and invented a cathode ray tube. In 1909, he was awarded the Nobel prize for physics jointly with Marconi. Died, 1918. See *Radiotelegraphy.*

Breasted, James Henry, American Oriental scholar and archeologist, was born at Rockford, Ill., in 1865; he was educated at Northwestern college, Chicago theological seminary, Yale university, and the University of Berlin. He became a member of the faculty of the University of Chicago in 1894, rising, by 1915, to be chairman of the department of Oriental languages there. He was the director of archeological expeditions to Egypt, Mesopotamia, and Palestine. His *History of Egypt* has been translated into a number of foreign languages. Among his other publications are *Development of Religion and Thought in Early Egypt, Survey of the Ancient World,* and *Victorious Man.*

Breckinridge, John Cabell, American politician and soldier, was born near Lexington, Ky., in 1821; entered Congress in 1851; and, in 1856, was elected vice president under Buchanan. In 1860, he was the presidential candidate of the extreme proslavery Democrats, but was defeated by Lincoln. He denounced Lincoln's address as a declaration of war and was expelled from the House of Representatives. He was immediately elected United States senator, but resigned to accept a command in the Confederate army, where he rose to the rank of major general. In 1865, he was Confederate secretary of war. Died, 1875.

Bremer (*brē'mĕr*), **Fredrika,** Swedish novelist, was born in Finland, 1801, but was brought up near Stockholm, Sweden. Her novel *The Neighbors* was published in 1837 and gave her wide fame. She traveled through many countries and wrote descriptions of the people for her *Homes of the New World, Life in the Old World,* and many other works. She spent two years in the United States. She has been called the "Jane Austen" of Sweden. Among her best books are *The Diary, The President's Daughters,* and *Brothers and Sisters.* Died, 1865.

Brent, Charles Henry, American clergyman, was born at Newcastle, Ont., 1862; was graduated from Trinity college, Toronto, 1884; and was ordained deacon of the Protestant Episcopal Church in 1886 and priest in 1887. After a distinguished ministry in Buffalo and Boston, he was elected, 1901, bishop of the Philippine Islands, where he later became actively identified with the antiopium crusade. In 1918, he was elected bishop of western New York and, in 1918-19, was head of the chaplain service of the American army in France. In 1927, he was chairman of the world congress on religions, held at Lausanne, Switzerland. His publications include *With God in the World, The Consolations of the Cross, The Splendor of the Human Body,* and *The Sixth Sense.* Died, 1929.

Breton (*brē'tôN'*), **Jules Adolphe,** French painter and author, was born in 1827. His reputation greatly increased after the extraordinary sale of one of his pictures, "The First Communion," which brought $45,000 in 1886. His pictures usually represent scenes from rural life and are much admired for their sweet, pathetic sentiment. Among the most noted of his works are "Blessing the Grain," "Return of the Gleaners," and "The Reaper," in the Luxembourg; "The Pardon of Kergoat," in the Metropolitan museum, New York; and "The Song of the Lark," in the art institute, Chicago. Died, 1906.

Bretón de los Herreros (*brä-tōn' dā lōs ĕr-rā'rōs*), **Don Manuel,** Spanish poet, was born, 1796, at Quel, in Logrono. As early as his 17th year he wrote a comedy entitled

A la vejez viruelas, which, in 1824, was staged with great success. From that time, he furnished theatrical managers with over 150 pieces, some of which were original, while others were adaptations from the older Spanish classics or translations from Italian and French. Most of them were highly popular. Died, 1873.

Brewer, David Josiah, American jurist, was born at Smyrna, Asia Minor, 1837. He was graduated from Yale college in 1856 and from the Albany law school in 1858; established himself in his profession at Leavenworth, Kansas, in 1859; and, during 1863 and 1864, was judge of the probate and criminal courts. He held successively various other judicial positions and, in 1889, became a justice of the United States supreme court; was president of the Venezuelan boundary commission appointed by President Cleveland; and sat as member of arbitration tribunal to settle the boundary between British Guiana and Venezuela. His publications include *The Twentieth Century from Another View Point, American Citizenship*, and *The United States a Christian Nation*. Died, 1910.

Brewster, Sir David, Scotch physicist, was born at Jedburgh, Scotland, 1781. He was educated for the Church of Scotland, but undertook instead the editorship of the *Edinburgh Encyclopædia*. He invented the kaleidoscope in 1816 and shares with Wheaton the honor of inventing the stereoscope. In 1817, in conjunction with Professor Jameson, he established the *Edinburgh Philosophical Journal*; in 1831, he was one of the chief originators of the British association for the advancement of science.

In 1819, the royal society awarded him the Rumford gold and silver medals for his discoveries on the polarization of light; in 1832, he was knighted and had a pension conferred upon him; in 1849, he was elected one of the eight foreign associates of the French institute, the highest scientific distinction in Europe. He was also a member of the imperial and royal academies of Leningrad, Berlin, Copenhagen, and Stockholm; presided over the British association and, in 1851, over the peace congress held in London. In 1859, he was chosen vice chancellor of Edinburgh university. Died, 1868. See *Polarization of Light*.

Brian Boroihme (*bō-roim'*), or **Brian Boru** (*bō-rōō'*), king of Ireland, was born, 926; ascended the throne of both Munsters—answering to Tipperary and Clare—in 978. Some time afterward, he became supreme ruler of Ireland. The vigor of his reign brought prosperity to his country. He defeated the Danes in many pitched battles and greatly restricted their influence. In the battle of Clontarf, 1014, in which he was killed, he gained a signal victory over a united army of revolted natives and Danes, the power of the latter receiving a shock from which it never recovered.

Briand (*brē-äN'*), **Aristide,** French statesman, was born at Nantes, 1863. He was educated for the law, which he abandoned for journalism and politics; became a contributor to radical and socialist journals, and, in 1902, was elected to the Chamber of Deputies as a Socialist Radical. By his brilliant handling of difficult governmental problems, he advanced rapidly, becoming minister of public instruction in 1906 and prime minister in 1909. He settled the great railway strike in 1910 by calling the workmen to the colors, making them their own strike breakers.

His ministry fell in 1911, but he was again prime minister for a brief period in 1913. In October 1915, he became premier and minister of foreign affairs and held these posts again in 1921, in which year he acted as spokesman for France at the Washington disarmament conference. His part in negotiating the Locarno treaties in 1925 enormously increased his prestige and won him the award of one-half the Nobel peace prize for 1926.

Bridges, Robert, English poet, was born at Walmer, England, in 1844; was educated at Eton and Oxford; studied medicine in London and practiced in hospitals until 1882, after which he devoted himself to literature, writing numerous plays, poems, and essays on English verse. The list of his plays includes *Ulysses*, *Christian Captives*, *Achilles in Scyros*, *Humours of the Court*, *Feast of Bacchus*, *Demeter*, and *Nero*, the last of which is perhaps most widely known. Of his poems, *Prometheus* and *Eros and Psyche* are ranked among the best produced in the late Victorian period. In 1913, he was appointed 18th poet laureate of England, succeeding Alfred Austin. See *English Literature: Contemporary Poetry*.

Brieux (*brē'ĕ'*), **Eugène,** French dramatist, was born in Paris, 1858. Upon the death of his parents in his 15th year, he began to earn his livelihood. At the age of 21, he produced a one-act play in verse entitled *Bernard Palissy*. He began journalism as a reporter and became editor of a newspaper at Rouen. His deep interest in social reform led him to resume play writing.

In 1892, he scored his first great success with *Blanchette*, following which he became one of the most prolific of modern French dramatists and the leader of the naturalistic school. He was elected to the French academy in 1909. Many of his plays have become well known throughout the world. Nearly all of them deal with modern social problems which he treats with marked seriousness of purpose and notable insight. The list of his plays includes *Les bienfaiteur*, *L'Evasion*, *Les trois filles de M. Dupont*, *La robe rouge*, *Maternité*, *La française*, *La femme seule*, and *Les Amêricains chez nous*. Translations of several of his plays have appeared in English.

Briggs, Charles Augustus, American theologian, was born in New York, 1841; studied in the University of Virginia, the Union theological seminary, and the University of Berlin. He was pastor of the Presbyterian church, Roselle, N. J., 1870–74, and, in the latter year, became a professor at the Union theological seminary.

He was editor of the *Presbyterian Review*, 1880–90, and was tried for heresy and acquitted in 1892. Although he was suspended by the general assembly, 1893, the seminary refused to remove him, and he was ordained priest by the Protestant Episcopal bishop of New York, 1900. He wrote *Messianic Prophecy*; *Whither? A Theological Question for the Times*; *The Authority of Holy Scripture*; and *The Bible, the Church, and the Reason*. Died in 1913.

Briggs, Henry, English mathematician, was born in Warley Wood, Yorkshire, 1561. He was educated at Cambridge university, where he was made lecturer in 1592. In 1596, he became professor of geometry in Gresham college, London, and, in 1619, was appointed professor of astronomy at Oxford. While he made other interesting contributions to mathematics and astronomy, his great gift to the world was his invention of the decimal system of logarithms now in use. He devoted many years to the calculation of logarithmic tables and published several books on the subject. Died in 1631. See *Logarithms*.

Bright, John, English orator and statesman, was born at Rochdale, 1811, of Quaker parentage. After receiving a limited schooling, he entered his father's business at the age of 15. In 1835, he went abroad, visiting Palestine, and, after his return, began to lecture on travel and economic subjects. With his friend Cobden, he first became prominent in the agitation for the repeal of the corn laws; entered Parliament for Durham, afterward for Manchester, but lost his seat through his opposition to the Crimean war. In 1857, he was returned for Birmingham and held that seat until his death.

Bright joined Gladstone's government which disestablished the Irish Church, but opposed his home rule policy in 1886, dying in the unshaken conviction that it was a fatal error. By his notable eloquence and burning moral appeal, he rendered inestimable service to the cause of the North during the American Civil War, although the continuance of hostilities was disastrous to his interests as a cotton spinner. As a master of pure Saxon English in all its power and pathos, Bright has seldom been surpassed. Died, 1889.

Bright, Richard, English physician, was born, 1789; was educated at Edinburgh; and practiced with great success in London. He discovered that an albuminous condition of the urine accompanied with dropsical effusions is often dependent on a peculiar degeneration of the kidneys. The disease in which these conditions occur was called after him, "Bright's disease." His first publications on this subject were made in 1827. Died, 1858.

Brinton, Daniel Garrison, American ethnologist, was born at Thornbury, Pa., 1837. He graduated from Yale in 1858 and from Jefferson medical college in 1861, after which he studied in Germany. He served in the Union army as surgeon and medical director. In 1865, he settled in Philadelphia, where he undertook the professorship of ethnology in the academy of natural sciences and, in 1886, became professor of American linguistics and archeology in the University of Pennsylvania. He wrote extensively on the ethnology and antiquities of the Indian tribes of America and on the myths of the New World, including a valuable *Library of Aboriginal Literature* in 8 volumes. Died, 1899.

Brisbane, Arthur, American newspaper editor, was born at Buffalo, N. Y., 1864. He was educated in the public schools and devoted five years to study in France and Germany. He began newspaper work in 1882 as a reporter for the New York *Sun*, later being made its London correspondent. He then became editor of the *Evening Sun* and, later, managing editor of the *World*. In the 25 years following 1896, he became editor of the New York *Evening Journal*, the Chicago *Herald and Examiner*, and other newspapers of the Hearst group, through which he exerted great influence as an editorial writer. The popularity of his forcible and direct style notably affected the form of American newspaper editorials.

Britton, Nathaniel Lord, American botanist, was born at New Dorp, Staten island, 1859. He was educated at Columbia university, where he taught for many years following 1879. Retiring as professor emeritus in 1896, he assumed the directorship of the New York botanical garden. From 1888 to 1898, he edited the *Bulletin of the*

Torrey Botanical Club. He has done extensive and important work in taxonomic botany. In 1896–98, he wrote, in collaboration with Addison Brown, an *Illustrated Flora of Northern United States and Canada*, which was revised and enlarged in 1913. This was the most important work on the region since the publication of Asa Gray's classic manual. Among his other important works are *North American Trees* and *Studies in Cactaceæ*.

Brock, Sir Isaac, British officer, was born in Guernsey, 1769. In the war of 1812, when an American army under General Hull invaded Canada, the measures adopted by Brock were so effectual that the Americans surrendered at Detroit without striking a blow. He did not long enjoy the fame he had won. He was killed in the battle of Queenston Heights, 1812. There is a monument to his memory on the western bank of the Niagara river.

Brockhaus (*brŏk'hous*), **Frederick Arnold,** German publisher, was born in Dortmund, 1772. He was the founder of the Leipzig firm bearing his name, chiefly associated with the encyclopedia entitled *Brockhaus's Konversations-Lexikon*. This work has been the pattern for nearly all modern encyclopedias. In 1808, he purchased this work in an unfinished form. He completed the first edition in Altenburg in 1811 and began the second edition in 1812. In 1818, he removed the business to Leipzig, where his sons and grandsons have carried the *Konversations-Lexikon* through the 14th edition, and have also published Ersch and Gruber's gigantic *Universal Encyclopædia*, of which more than 165 volumes have already appeared. He died at Leipzig in 1823.

Brongniart (*brôn'nyär'*), **Adolphe Théodore,** French botanist, son of Alexandre Brongniart, was born at Paris, 1801. He studied medicine and received his doctor's degree in 1826, but soon turned his attention exclusively to plant physiology and paleobotany. In 1834, he was elected to the academy of sciences. In 1839, he became professor of botany at the museum of natural history in Paris. His work on fossil plants, entitled *Histoire des végétaux fossiles*, gave him wide fame. His catalogue of the genera of the plants cultivated at the Paris museum of natural history had a marked influence on modern systems of classification. Among his published researches are *Essai d'une classification naturelle des champignons* and *Memoire sur la structure et les fonctions des fenilles*. He died at Paris, 1876.

Brongniart, Alexandre, French naturalist, was born in Paris, 1770. After serving for a time on the medical staff of the army, he devoted his attention to porcelain manufacture, making a scientific examination of mines and pottery works in Derbyshire, England. In 1797, he was made professor of natural history in the École Centrale. In 1800, he became director of the noted porcelain manufactory of Sevres, where he revised and developed the art of painting on glass.

Brongniart was elected member of the academy of sciences in 1815 and, in 1822, was made professor of mineralogy in the Paris museum of natural history. He collaborated with Cuvier in classifying the fossils newly discovered at Montmartre. His *Classification of Reptiles* and his *Elementary Treatise on Mineralogy* were long considered authoritative works. With Cuvier, in 1811, he published the celebrated *Mineralogical Geography of Paris*. He published also a *Treatise on Ceramic Arts and Pottery*. He died at Paris, 1847.

Brontë (*brŏn'tē*), **Charlotte,** English novelist, was born at Thornton, England, 1816. She was the eldest of three sisters, all of whom were notable as writers. After some experience as a governess, she published in 1846, with her sisters Emily and Anne, a small volume of poems under the names of Currer, Ellis, and Acton Bell. In 1847, she published the story *Jane Eyre*. Its success was instantaneous. Although adversely and severely criticized, it is admitted to be one of the most remarkable of English novels. Her second story, *Shirley*, was published in 1849, and her third and last, *Villette*, in 1853. Another story, *The Professor*, which had been refused by the publisher before *Jane Eyre* had made its author famous, was published after her death. In 1854, she married Arthur Bell Nicholls. Died, 1855. See *English Literature*.

Brooke, Rupert, English poet and writer, was born at Rugby, 1877. He was educated at Rugby school and Cambridge university. He manifested marked poetic talent at an early age and, while residing in the vicinity of Cambridge, wrote a volume of verse, which appeared in 1911. At the outbreak of the World War, he enlisted in the British army. His premature death in the Dardanelles campaign removed one of the most promising literary figures in England. A number of his verses inspired by the war display remarkable poetic power. A posthumous volume, entitled *Poems of Rupert Brooke*, was published soon after his death in 1915.

Brooke, Stopford Augustus, British preacher and man of letters, was born at Letterkenny, Ireland, 1832; was educated at Trinity college, Dublin; and was a minister in the Church of England until 1880, when he seceded and became a Unitarian. Among his works are *Unity of God and Man*, *History of English Literature*, *Study of Tennyson*, *Life and Writings of Milton*, *The Gospel of Joy*, and *Poetry of Robert Browning*. Died in 1916.

Brooks, Fred Emerson, American author and poet, was born at Waverly, N. Y., 1850; was educated at Colgate university; and resided in California, except for the period 1891–1910, when he lived in New York. He became a contributor of verse to current periodicals, wrote librettos for comic operas, and achieved wide reputation as a reader of his own poems on the lyceum platform. His writings include *Battle Ballads*, *Buttered Toasts*, *The Gravedigger*, *The Land of Arcadie*, and *Father Goose and Other Poems*. He died in 1922.

Brooks, Phillips, American preacher and orator, was born at Boston, Mass., 1835; graduated from Harvard, 1855; was rector of Episcopal churches in Philadelphia and Boston, 1859–91; and became bishop of Massachusetts in the latter year. He was celebrated as a pulpit orator and as a vigorous and independent thinker. His freedom from the usual sectarian limitations, his liberal ideas concerning doctrine, together with his profound convictions as to vital Christian truths and his notably spiritual yet intensely practical preaching, gave him a wide popularity. He died, 1893; was elected to the American hall of fame, 1910.

Brooks, Samuel Palmer, American educator, was born at Milledgeville, Ga., 1863; was graduated at Baylor, Yale, and Chicago universities; and became president of Baylor university in 1902. He was a contributor to *The South in the Building of the Nation* and has been prominently identified with the Y. M. C. A. in the South and with movements for world peace.

Brooks, Stratton Duluth, American educator, was born at Everett, Mo., 1869; was graduated at the University of Michigan and at Harvard university; and held successively positions as superintendent of schools at Cleveland and Boston. In 1912, he was chosen president of the University of Oklahoma, and, in 1923, he was made president of the University of Missouri.

Brooks, William Keith, American zoologist, was born in Cleveland, Ohio, 1848. He graduated at Williams college in 1870; studied two summers under Louis Agassiz at Penikese; and took his degree of doctor of philosophy at Harvard in 1875. In 1876, he was made associate in Johns Hopkins university, where he became professor of biology in 1883. In this position, he trained many of the prominent embryologists of the country. His researches in invertebrate zoology emphasized throughout the bearing of animal structure on evolutionary problems. His publications include *Handbook of Invertebrate Zoology*, *Heredity*, *Lucifer*, and *Foundations of Zoology*. Died, 1908.

Brougham (*brōō'ăm*; *brōōm*), **Henry Peter,** Baron Brougham and Vaux, British jurist, philosopher, and statesman, was born at Edinburgh, 1778. After graduating at Edinburgh university, he was called to the Scottish bar and, in 1802, became one of the founders and editors of the *Edinburgh Review*. In 1808, he joined the English bar and speedily acquired a high reputation.

In 1810, Brougham entered Parliament, where he became a chief of the Liberal party. In 1820-21, he was engaged as attorney-general for Queen Caroline and succeeded in obtaining her acquittal. In 1830, he became the acknowledged champion of parliamentary reform; was called to the House of Lords; and was appointed lord high chancellor of England, which office he resigned in 1834. He devoted the remainder of his life almost exclusively to science and literature at his château at Cannes, France. He was one of the foremost men of his age and country, and his fame rests principally upon his achievements in the cause of popular education and political and legal reform. Died, 1868.

Brown, Alice, American writer, was born at Hampton Falls, N. H., 1857. She graduated from Robinson seminary, Exeter, N. H., 1876. Her writings include travels, verse, and biography, but her most important productions are her short stories and novels, which display an excellent analysis of New England character. In 1915, her play, *The Children of Earth*, was awarded the Winthrop Ames prize. Other works from her pen include *The Day of His Youth*, *The Story of Thyrza*, *The One-Footed Fairy*, *Vanishing Points*, and *The Wind Between the Worlds*.

Brown, Charles Brockden, American novelist, was born at Philadelphia, Pa., 1771. His two best-known stories are *Wieland, or the Transformation* and *Arthur Mervyn*. His other novels are *Ormond*, *Edgar Huntley*, *Jane Talbot*, *Philip Stanley*, and *Clara Howard*. While his stories are morbid, sentimental, and improbable, they contain scenes of great power and were immensely popular in their time. He is considered the chief American writer of fiction before Cooper and Hawthorne. Died, 1810.

Brown, Elmer Ellsworth, American educator, was born at Kiantone, N. Y., 1861; graduated from the Illinois State normal university, 1881, and from the University of Michigan, 1889; and studied in Germany from 1889 to 1890. He was appointed associate professor of pedagogics in the University of California in 1892 and professor in 1893. Thirteen years later, he became United States commissioner of education, resigning in 1911 to accept the chancellorship of New York university. He wrote *The Making of Our Middle Schools* and *Origin of American State Universities*.

Brown, Ford Madox, English historical painter, was born in 1821 at Calais, France, where his parents were temporarily residing. In 1835, he was placed in the academy at Bruges; studied also at Ghent and Antwerp and later in Paris and Rome; settled in London in 1845. He was associated with Rossetti, Millais, and the rest of the pre-Raphaelite brotherhood. He is credited with producing the first plein-air picture with figures. Among his best pictures are the famous "King Lear," "The Last of England," "Work," and an aggregation of pictures illustrating the general subject of labor. Died, 1893.

Brown, Henry Kirke, American sculptor and painter, was born in Leyden, Mass., 1814. He is the author of the colossal statue of General Washington in Union square, New York; "The Angel of the Resurrection," in Greenwood cemetery, Brooklyn; the statue of Governor Clinton at Washington; and numerous other sculptures. Although he spent four years, 1842–46, in Italy, his entire artistic life was a protest against Italian influence. To this end he studied distinctively American subjects, producing, among other works, his widely known "Indian and Panther," probably the first bronze sculpture cast in the United States. Died, 1886.

Brown, John, American abolitionist, was descended from a Puritan carpenter, one of the *Mayflower* emigrants, and was born at Torrington, Conn., in 1800. In 1855, he went to Kansas, where he took a conspicuous part in the border warfare. After the slavery agitation in that state was settled by a general vote, he traveled through the southern and eastern states, declaiming against slavery and endeavoring to organize an armed attack upon it.

In 1859, at the head of 17 white men and 5 blacks, Brown commenced active hostilities by a descent upon Harpers Ferry, where there was an arsenal containing from 100,000 to 200,000 stand of arms. The arsenal was easily captured, and 40 or 50 of the principal inhabitants were made prisoners; but, instead of retreating to the mountains with arms and hostages in accordance with his original design, Brown lingered in the town until evening. By this time, 1500 militiamen had arrived. He was captured, tried for treason, and executed in 1859. See *John Brown's Raid*.

Brown, Robert, Scottish botanist, was born at Montrose, 1773. He was educated at Marischal college, Aberdeen, and studied medicine at the University of Edinburgh. In 1801, he was employed as naturalist for the survey expedition in charge of Captain Flinders to the Australian coasts, where he collected and brought to England in 1805 nearly 4000 species of Australian plants, most of which were new to science. In 1810, he published the first volume of his great work on the plants of Australia and Tasmania.

Brown was the first English botanical author who adopted the natural system of Jussieu and led the way to its universal substitution for the Linnæan method. By making the microscope and the study of development the basis of classification, he notably advanced the scientific knowledge of plants. Humboldt called him the first botanist of his time. He discovered gymnospermy and made the separation of gymnosperms and angiosperms that is now universally recognized. He also first detected the so-called Brownian movements in pollen grains. Died in London, 1858.

Browne, Charles Farrar, American humorist, known by the pseudonym of "Artemus Ward," was born at Waterford, Maine, 1834. His first literary effort was that of writing as a showman to an imaginary traveling menagerie. He later traveled over America lecturing, carrying with him a whimsical panorama which afforded texts for his numerous jokes. He also spent some time among the Mormons, gathering material for comic lectures in which he defined their religion as singular, but their wives plural. In 1866, he undertook a highly successful tour of England, where he died in 1867. See *American Literature: Humor*.

Browne, Sir Thomas, English physician and philosopher, was born at London in 1605. After studying at Winchester, at Oxford, and on the continent, he settled as a physician at Norwich, where he spent the rest of his life. During the civil wars and the protectorate, he remained in learned seclusion, indifferent to either party. He was knighted in 1671. His chief works are *Religio Medici*; *Pseudodoxia Epidemica, or Inquiry into Vulgar and Common Errors*; *Hydriotaphia, or the Urn Burial*; and *The Garden of Cyrus*. He possessed a wonderful charm of style. In richness and majesty of diction, the concluding chapter of his *Urn Burial* is ranked with the finest passages of Jeremy Taylor and Milton. Died, 1682.

Brownell, William Crary, American author and art critic, was born in New York City, 1851. He graduated from Amherst college, 1871, and was awarded the degree of Litt. D. by Columbia university, 1910. From 1879 to 1881, he was art critic on the staff of *The Nation*. In 1890, he became a literary adviser of Charles Scribner's Sons. His essays on French life and art are sympathetic and suggestive, and his studies of English and American prose writers won widespread praise. He was elected to the American academy of arts and letters. The list of his works includes *French Traits, Newport, American Prose Masters*, and *Democratic Distinction in America*. Died, 1928.

Browning, Elizabeth Barrett, English poet, was born in Durham county, 1806. Her first important essay in authorship was a translation of the *Prometheus* of Æschylus in 1833. *The Seraphim and Other Poems* appeared in 1838. In 1846, she married Robert Browning, with whom she resided in Italy throughout the remainder of her life. In 1850, Mrs. Browning published her collected works together with several new poems, including *Sonnets from the Portuguese*, which rank among the finest love poems in English. In 1851 appeared the *Casa Guidi Windows*, a poem whose theme was the struggle made by the Tuscans for freedom in 1849. *Aurora Leigh*, her longest production, was published in 1856. *Poems Before Congress* appeared in 1860. Her poetry is distinguished by its depth of feeling and generous sentiment. Died, 1861.

Browning, John M., American inventor, was born in Utah, 1855, the son of a gunsmith. He obtained numerous patents for rapid fire guns, including the machine rifle which bears his name and which was adopted for army use by the governments of the United States and several other countries. He was decorated with the Order of Leopold of Belgium in consideration of the value of his inventions. Died, 1926.

Browning, Oscar, English historian and critic, was born at London, 1837; was educated at Eton and at Cambridge university; and taught at Eton, 1860–75, and at Cambridge from 1876 to 1909. Works edited or written by him include *Modern England, Modern France, History of Educational Theories, Life of George Eliot, Milton's Tractate on Education, Guelphs and Ghibellines, Life of Peter the Great, The Fall of Napoleon, General History of the World*, and *General History of Italy*. He died in 1923.

Browning, Robert, English poet, was born at Camberwell, London, May 7, 1812. His education was most informal, largely under private tutors, until he entered University college, London, for the session of 1829-30. His boyhood foreshadowed exceptional intelligence and literary qualities, though his first poem, *Pauline*, written at the age of 19, did not evince extraordinary powers. The most important event of his youth was his sojourn in Russia and in Italy, 1833-34.

Earlier Work. After the appearance of his *Paracelsus* in 1835, Browning determined to devote himself to the art of poetry and ordered his life to this calling. His drama *Strafford* was produced, but without success, in 1837. *Sordello*, which, for its involutions of thought and its obscure allusions to medieval history, has given more trouble to Browning's readers than any other of his works, appeared in 1840. For the next six years, Browning was engaged in writing a series of plays, tragedies, and lyrics, issued, at irregular intervals, under the title *Bells and Pomegranates*. This series contained his famous *Pippa Passes, A Blot in the 'Scutcheon*, and "The Pied Piper of Hamelin." Some of the lyrics in this group are the most popular of Browning's works.

Marriage. In 1846, Browning married, in London, Elizabeth Barrett, herself a gifted poet, and with her he went to Florence, where they lived for 15 years and where, in 1849, their only son was born. After the death of his wife in 1861, Browning settled permanently in London.

Later Poems. In 1850, Browning published *Christmas Eve and Easter Day* and, in 1855, his volume entitled *Men and Women*, which contains some of his finest works. These poems, which included "Fra Lippo Lippi," "Childe Roland," "Andrea del Sarto," and "Evelyn Hope," are unsurpassed in the English language for their profound analysis of character. In 1864, he issued the volume entitled *Dramatis Personæ*, which attested his dramatic gifts in monologue and unfolded his views upon higher questions affecting life and immortality. His generally accepted masterpiece, the product of stupendous intellectual labor, *The Ring and the Book*, was written in epic form and published four years later. It deals searchingly with the most powerful passions of humanity.

From that time, works by Browning appeared in rapid succession; among them was *Fifine at the Fair*, in 1872, which handled a question in morals very powerfully. In

1879-80 came the two volumes of *Dramatic Idyls*, which may be described as vigorous character sketches. His last volume of poems, *Asolando: Fancies and Facts*, was published December 12, 1889.

Qualities. Browning is distinguished for the depth of his spiritual insight, his dramatic energy, his power of psychological analysis, and his capacity to create real men and women. Besides being one of the most erudite of poets, he has intense human sympathies, high imaginative gifts, and a profound and vigorous faith. On the other hand, his style is frequently obscure and difficult, his versification hard and rugged, and his rimes forced or fantastic. He died while visiting his son in Venice, December 12, 1889. His remains were placed in Westminster Abbey.

Bruce, James, Scottish traveler and explorer, was born in Kinnaird, Stirlingshire, 1730. He received his education at Harrow and at Edinburgh university. In 1763, he became consul at Algiers, resigning in 1765 to travel in Tunis, Tripoli, Cyprus, and Asia Minor, where he studied, and secured drawings of the ruins of Palmyra, Baalbek, and other noted remains of antiquity. In 1768, he began a journey of exploration through Abyssinia. In 1770, he discovered the sources of the Blue Nile, then supposed to be the main stream, and, after great hardships, reached Egypt late in 1772. His interesting *Travels to Discover the Source of the Nile*, in five massive volumes, has been translated into several languages. He died at Kinnaird, 1794.

Bruce, Robert, king of Scotland, was born in 1274; did homage for a time to Edward I, king of England, but joined the Scottish national party and became one of a regency of four, with Comyn for rival; stabbed Comyn in a quarrel at Dumfries, 1306; and was that same year crowned king at Scone. He was defeated by an English army sent against him and was obliged to flee to Ireland; returned and landed in Carrick; cleared the English out of all the fortresses except Stirling and, in 1314, defeated them under Edward II at Bannockburn, after which, in 1328, Scotland's independence, as well as Bruce's right to the crown, was acknowledged. Suffering from leprosy, Bruce spent his last two years at Cardross castle on the Clyde, where he died in 1329, in the 24th year of his reign.

Bruce, Stanley Melbourne, Australian statesman, was born in Victoria in 1884. He was educated at the Melbourne grammar school and at the University of Cambridge, England. Upon leaving the university, he studied law; was admitted to the bar; and practiced in London. He devoted considerable time also to the London branch of the mercantile business of which his father was a founder.

At the outbreak of the World War, Bruce joined a British regiment and fought side by side with his fellow countrymen, the Anzacs, at Suvla bay. He was wounded, but returned to Gallipoli. After winning the military cross and the *croix de guerre*, he was again wounded and was sent home to Australia. There he did effective work in sustaining the patriotic spirit of his countrymen and became more and more a public figure. During this period, he became also managing director of his mercantile firm in Melbourne.

In 1917, Bruce was elected to the Australian Parliament; in 1921, he represented Australia at the League of Nations in Geneva; and, in 1922, he was appointed treasurer of the Commonwealth of Australia. Following the success of the National party in the Australian elections held early in 1923, he became prime minister.

Bruch (*brōōĸ*), **Max,** German composer, was born in Cologne, of Jewish parents, 1838. He manifested early a great talent for music, producing a symphony at the age of 14. From 1853 to 1857, he studied under Hiller, Reinecke, and Breuning and later became musical director successively at Coblenz, Berlin, Liverpool, and Breslau. In 1883, he visited the United States and conducted his oratorio *Arminius* in Boston. His four concertos for the violin and orchestra are classed among the greatest works of their kind; he is also pre-eminent as a composer of the epic cantata. His works include the operas *Jungfrau von Orleans* and *Hermione*; the cantatas *Frithjof*, *Salamis*, *Beautiful Ellen*, *Odysseus*, and *Achilleus*; also orchestral works, concertos, and chamber music. Died, 1920.

Bruckner (*brōōk'nĕr*), **Anton,** Austrian organist and composer, was born at Ansfelden, 1824. Although an orphan and largely self-instructed, in 1855, in open competition, he won the post of organist at Lienz. He then frequently visited Vienna. There he studied under Sechter, whom he succeeded in 1867 as court organist at Vienna; at the same time he was also made professor in the conservatory. In 1869, he made a concert tour of France and, in 1871, toured England, establishing his fame as one of the leading organists of his time. Bruckner was also one of the greatest recent masters of counterpoint.

The large plan and serious purpose of his compositions entitle him to a high rank among modern composers. In his works, chiefly instrumental, he attempts to adapt Wagner's principles of dramatic art for the opera to the orchestral symphony. The result is a certain lack of coherence and unity in Bruckner's works, notwithstanding their notable brilliancy and power. His reputation rests chiefly upon eight important symphonies. He composed a masterly *Te Deum* in 1886 and wrote masses, a requiem, and choral works. Died in 1896.

Brummell (*brŭm'ĕl*), **George Bryan,** "Beau Brummell," an Englishman of wealth and fashion, was born at London in 1778. He was educated at Eton and Oxford, where already he posed as the prince of dandies. He was patronized by the prince of Wales, afterward George IV. During the heyday of royal favor, he was immensely popular as a story-teller and wit, and became the recognized arbiter of fashion. At length, his means were exhausted; he quarreled with the prince; and fled from his creditors to Calais, where, reduced to destitution, he yet lived some years in the same reckless fashion. He settled at length in Caen, where he died insane in 1840. He is the subject of the successful comedy, *Beau Brummell*, by Clyde Fitch, in which Richard Mansfield won great popularity acting the title rôle.

Brunelleschi (*brōō'nĕl-lĕs'kē*), **Filippo,** Italian architect, was born at Florence in 1377. He is reckoned the first who established on a sound basis the theory of perspective. When still a young man, he went to Rome, where he acquired a profound knowledge of ancient architecture. In 1407, he returned to Florence. In 1420, it was proposed to complete the structure of the cathedral of Santa Maria del Fiore, founded in 1296 and then wanting only a dome. The work was intrusted to him and was finished in his lifetime with the exception of the lantern designed to crown the whole. This lantern was later added according to his plans. Brunelleschi's dome, measured diametrically, is one of the largest in the world and served as a model to Michelangelo for that of Saint Peter's. His final masterpiece was the Pitti palace in Florence. Died, 1446. See *Architecture*.

Brunetière (*brün'tyâr'*), **Ferdinand,** French literary critic, was born at Toulon, 1849. He was educated in Toulon and Paris. His literary criticisms published in the *Revue des Deux Mondes*, 1875, established his reputation. In 1886, he became professor of literature at the Ecole Normale in Paris and, in 1893, lecturer at the Sorbonne. In 1895, he was made editor of the *Revue des Deux Mondes*. His chief service to the critical study of literature was to place the classical and romantic periods in the right relation to the 18th century and to the present day. Among his most valuable works are *Manuel de l'histoire de la littérature française*, *Evolution des genres dans l'histoire de la littérature*, *Les époques du théâtre français*, and *Le roman naturaliste*. In addition, he published several volumes of critical essays, began a voluminous history of classic French literature, and wrote a monograph on Balzac. Died, 1906.

Brunhilde (*brün'hĕld'*) (Brunehaut, Brunhilda, or Brunhildis), daughter of the Visigothic king, Athanagild, was born about 550; married King Sigebert of Austrasia; and was afterward regent for her two grandsons—Theodebert II, king of Austrasia, and Theodoric II, king of Burgundy. She divided the government of the whole Frankish world with her rival Fredegond, who governed Neustria for the youthful Clotaire II. On Fredegond's death in 598, Brunhilde seized Neustria and, for a while, united under her rule the whole Merovingian dominions. She was overthrown, however, in 613 by the Austrasian nobles under Clotaire II and was put to death by being dragged at the heels of a wild horse.

Bruno, Saint, founder of the Carthusian order, was born at Cologne about 1030; became rector of the cathedral school at Reims; but, oppressed by the wickedness of his time, withdrew in 1084 to the wild mountain of Chartreuse, near Grenoble. Here, with six friends, he founded the austere order of the Carthusians. In 1094, he established a second Carthusian monastery, at Della Torre in Calabria, where he died, 1101.

Bruno (*brōō'nō*), **Giordano,** Italian philosopher, was born at Nola, near Naples, in 1548; was trained as a Dominican; but, doubting the Christian dogmas, fled to Geneva, whence Calvinist suspicion of his skepticism drove him to Paris. Here the zeal of the orthodox Aristotelians forced him to withdraw to London in 1583 and to Oxford, where he repeatedly gave lectures. In 1585, he was in Paris again; in 1586, in Wittenberg; in 1588, in Prague; then in Helmstedt, Frankfort, Padua; in 1592, in Venice, he was arrested by the officers of the Inquisition and was conveyed in 1593 to Rome, where he was imprisoned and condemned to death as a heretic.

Bayle styled him "the knight-errant of philosophy." His teachings embodied the essentials of pantheism later expressed by Spinoza. His published writings display throughout a strong, courageous soul, susceptible of deep enthusiasm and laboring to attain the truth. Of his works (written mainly in Italian), the most famous is the *Spaccio della bestia trionfante*. He was burned at the stake in 1600.

Brush, George de Forest, American portrait painter, was born in Shelbyville, Tenn., 1855. He was a pupil of Gérôme in Paris and first became known to the American public in 1883 by "The Silence Broken," "The Indian and The Lily," "The Moose Chase," and other pictures of Indian life. After returning from further study in Paris, he devoted his efforts chiefly to figure composition, particularly to the portrayal of mother and child, producing many admirable family groups and portraits which won well-deserved popularity. He was elected to the national academy of design and to the American academy of arts and letters. Excellent examples of his work are found in the Boston museum, Metropolitan museum of art, New York, Pennsylvania academy of fine arts, Philadelphia, and the Corcoran gallery, Washington.

Brutus, Marcus Junius, was born about 85 B. C. He joined Pompey in his war against Cæsar; but, after Pompey's defeat, he was kindly treated by Cæsar and was made governor of Cisalpine Gaul. In 44 B. C., in his eagerness to preserve the republic, he was persuaded by Cassius to join a conspiracy against Cæsar, who had become virtually an emperor. Brutus aided in the assassination of Cæsar. The people, instead of rejoicing at Cæsar's death, were enraged, and Brutus fled from Rome. Soon after, he and Cassius were defeated at Philippi by Antony and Octavius. Feeling their cause was lost, Brutus fell upon his sword and died, 42 B. C. He was an earnest student and something of a philosopher.

Bryan, Elmer Burritt, American educator, was born at Van Wert, Ohio, 1865; was graduated at Indiana, Harvard, and Clark universities; and, in 1896, became professor of social and educational science at Butler college. He was connected with the department of pedagogy in Indiana university, 1897–1905, resigning in the latter year to become president of Franklin college. He accepted the presidency of Colgate university in 1909 and, in 1921, became president of Ohio university. His publications include *The Basis of Practical Teaching* and *Fundamental Facts for the Teacher.*

Bryan, William Jennings, American political leader and orator, was born in Salem, Ill., 1860; was graduated at Illinois college, Jacksonville, and at Union college of law, Chicago; practiced at Jacksonville, Ill., 1883–87; then at Lincoln, Nebr. He was a member of Congress, 1891–95; received the Democratic vote for United States senator in Nebraska legislature, 1893; and edited the Omaha *World-Herald,* 1894–96.

He was a delegate to the national Democratic convention, 1896; wrote the "silver plank" in its platform; and was nominated for president of the United States. He received 176 electoral votes against 271 for William McKinley. In May 1898, he raised the 3d regiment of Nebraska volunteer infantry for the war against Spain, becoming its colonel. He was nominated for president in 1900 by the Democratic, Populist, and Silver Republican conventions, but was again defeated by William McKinley. After the election, he established a weekly political magazine, *The Commoner.* He was again nominated for president in 1908, but was defeated by W. H. Taft.

In 1913, President Wilson appointed Bryan secretary of state, in which office he negotiated 30 treaties of arbitration. He resigned in 1915 in protest against the administration's attitude toward Germany. In 1921, he identified himself with the Fundamentalist movement and with popular efforts to prevent the teaching of Darwinian evolution in the schools. He died suddenly in 1925 at Dayton, Tenn., while assisting at the prosecution of J. T. Scopes, charged with violating an anti-evolution law in that state. See *Free Silver Movement,* page 401.

Bryan, William Lowe, American educator, was born near Bloomington, Ind., 1860; was graduated at Indiana university and Clark university; studied also at Berlin, Paris, and Wurzburg; and became instructor of Greek at Indiana university in 1884. The following year, he was made professor of philosophy, and, in 1902, he became president of the university. His publications include *Plato the Teacher* and *The Spirit of Indiana.*

Bryant, William Cullen, American poet and journalist, was born at Cummington, Mass., 1794. At the age of 10, he published translations from Latin poets; at 13, he wrote a terse and vigorous political poem, entitled *The Embargo;* and, at 18, he composed his *Thanatopsis.* He established *The New York Review,* to which he contributed many of his best poems. In 1826, he became principal editor of *The Evening Post,* a leading paper of New York. The first collected edition of his poems appeared in 1832 and was regarded as the highest effort of the American muse up to that time. In 1842, he published *The Fountain, and Other Poems.* He visited Europe several times and recorded his observations in *Letters of a Traveler in Europe and America.* In 1870 appeared his metrical translation of the *Iliad,* followed in 1871 by that of the *Odyssey.* He collaborated with Sydney Howard Gay in writing the *History of the United States.* Bryant died in 1878 and was elected to the American hall of fame in 1910.

Bryce (*brīs*), **James, Viscount,** British historian, diplomat, and statesman, was born at Belfast, Ireland, in 1838; was educated at Glasgow university and Oxford; and was elected member of the Institute of France and of the royal academies of Turin, Stockholm, Naples, Brussels, and Rome. He was admitted to the bar, 1867; became regius professor of civil law at Oxford university in 1870; and sat in Parliament, 1880–1907. He also served successively as chancellor of the duchy of Lancaster, president of the British board of trade, chief secretary for Ireland, and ambassador to the United States. In 1913, he was appointed member of the Permanent Court of Arbitration at The Hague and was created viscount, 1914. He was a conspicuous advocate of home rule for Ireland and of international copyright, supporting the Liberal party throughout his parliamentary career.

While a prominent figure in political affairs, he became still more widely known as a writer, notably for his *American Commonwealth,* a valuable treatise on the political institutions of the United States, which has become a classic and ranks with De Tocqueville's *Democracy in America.* His other works include *The Holy Roman Empire, Impressions of South Africa, Studies in History and Jurisprudence, Studies in Contemporary Biography, South America,* and *Modern Democracies.* He died in 1922.

Buchanan (*bū-kăn'ăn*; *bū-kăn'ăn*), **James,** 15th president of the United States, was born near Mercersburg, Pa., 1791; graduated at Dickinson college, 1809; was admitted to the bar, 1812; and was a member of Congress, 1821–31. He also served successively as minister to Russia, United States senator, secretary of state, and minister to England. He became president in 1857. In his last message, President Buchanan censured the Northern people for the imminent disruption of the Union, holding that neither the executive nor Congress had power to coerce a state. He spent the remainder of his life at his home in Lancaster, Pa. In 1866, he wrote a book to defend his administration. Died, 1868.

Buchner (*bōōk'nĕr*), **Eduard,** German chemist, was born in Munich, 1860. He was educated at the universities of Munich and Erlangen. In 1893, he became professor at Kiel; in 1896, at Tubingen; and, in 1898, at the agricultural college in Berlin. He was appointed professor at Breslau in 1909 and was made privy councilor in 1910. He made the remarkable discovery that the alcoholic fermentation of sugars is not caused by the physiological processes going on in living yeast plants but by the purely chemical action of an enzyme. In recognition of this contribution to science, he received the Nobel prize for chemistry in 1907. In 1903, he published, jointly with his brother Hans, *Die Zymasegdhrung.* Died, 1917.

Buck, Dudley, American organist and composer, was born in Hartford, Conn., 1839; studied at Trinity college; then at Leipzig conservatory of music and at Dresden and Paris. For several years, he was organist at Music hall, Boston; was organist at Holy Trinity church, Brooklyn, and director and organist at the Apollo club for 25 years, retiring in 1903. Among his compositions are the *Centennial Cantata, Golden Legend, Voyage of Columbus, Light of Asia, Deseret, Marmion,* and *The Christian Year.* He wrote a valuable work entitled *Illustrations in Choir Accompaniment.* Died in 1909.

Buckley, James Monroe, American clergyman and editor, was born in Rahway, N. J., 1836; was educated at Pennington, N. J., seminary, and Wesleyan university; studied theology at Exeter, N. H.; and joined the New Hampshire conference of the Methodist Episcopal Church, 1859. After a pastorate of 20 years in Detroit and New York, he was editor of the New York *Christian Advocate* from 1880 to 1912. Among his writings are *Oats or Wild Oats, Supposed Miracles, The Wrong and Peril of Woman Suffrage,* and *Theory and Practice of Foreign Missions.* Died in 1920.

Budæus, or **Budé** (*bü'dā'*), **Guillaume,** French scholar, was born in Paris, 1467. He was educated in Paris and Orleans. Beginning with his 24th year, he devoted himself to belles-lettres, philosophy, and Greek. As a Greek scholar, he attained notable fame, and he was held in great esteem as a citizen and man of affairs. He became royal librarian, and, at his suggestion, Francis I founded the library at Fontainebleau which, upon being removed to Paris, became the celebrated Bibliothèque Nationale, the national library. Likewise at his suggestion, Francis established the corporation of the royal readers, out of which grew the Collège de France. His *Commentarii Linguæ Græcæ* greatly stimulated the study of Greek literature in France, and his *Annotationes in XXIV Libros Pandectorum* marked an era in the modern study of Roman law. He also wrote a valuable treatise on ancient coins and measures. Died, 1540.

Buddha (*bōōd'ä*) is the title of the Hindu sage Gautama, or Siddhartha, the founder of Buddhism. The term signifies "the wise, or enlightened" and is applied in the East as an analogue of our word "saint." Oriental scholars concur in fixing the time of the great Buddha in the 6th century B. C. He was the son of a king, named Suddhodana.

His father, fearing lest his son should desert his high station and take to a religious life, had him early married to a charming princess and surrounded with all the splendor and dissipation of a luxurious court. Twelve years spent in this environment only deepened his conviction that all that life could offer was vanity, and he therefore resolved to learn whether a life of austerity would not lead to peace.

Search for Spiritual Peace. Gautama escaped from the palace and entered on the life of a religious mendicant when about 30 years of age. He began by studying all that the Brahmans could teach him, but, finding their doctrine unsatisfactory, he turned to asceticism. He resolved to conquer the secret of peace by sheer force of thinking. He arrived at the conclusion that ignorance is the ultimate cause of existence and that, therefore, with the removal of ignorance, existence and all its anxieties would be cut off at their source. Passing through successive periods of contemplation, he realized this truth in his person and attained the perfect wisdom of the Buddha, "the Enlightened."

Ministry. Having acquired the knowledge of the causes of misery and the means by which these causes are to be counteracted, the Buddha was now ready to lead others on the road to salvation. He first preached at Benares; but the most important of his early converts was the sovereign of Magadha, whose dynasty continued for many years to encourage the new faith. Buddha traversed a great part of northern India, combating the teaching of the Brahmans and everywhere making numerous converts.

Spread of Buddhism. His disciples, well trained and organized, continued his work after him. The doctrines and rules of discipline were settled in general councils, the most important of which convened about 250 B. C. in the reign of Asoka. Buddhism was carried into Ceylon, Burma, and Siam. By the beginning of the Christian era, it had become the religion of the northwesterly parts of India and adjacent regions. It was adopted in China in 62 A. D., whence it extended into Korea and Japan.

Doctrines. Buddha was one of the first religious leaders to proclaim universal brotherhood. It was this doctrine of equality which gave Buddhism so strong a hold in caste-ridden India. He taught that salvation came to all through self-denial and charity. Purity of conduct, suppression of desire, and continuous contemplation were sufficient to raise one to the highest state of bliss, or Nirvana, which amounted eventually to the extinction of consciousness.

The three main doctrines of Buddhism are: the transmigration of souls, the desirability of Nirvana, and the chain of cause and effect. As a result of this last doctrine, the idea of sin has little place in the religion. Buddhism is highly philosophic, yet, modified and combined with other systems, it is today one of the great religions of the world. Hundreds of millions find in it, not only intellectual light, but spiritual nourishment and lofty moral guidance. Buddha died at Kusinagara, India, at the age of 80.

Budge, Ernest A. Wallis, English archeologist, was born in Cornwall, 1857, and was educated at Christ's college, Cambridge. He conducted excavations in Egypt and in Mesopotamia. Among the numerous books of which he is the author are *Babylonian Life and History, Egyptian Ideas of the Future Life, Egyptian Magic, By Nile and Tigris,* and *The Queen of Sheba and Menyelek.*

Buffon (*bŭf'ŭn; bü'fôn'*), **Georges Louis Leclerc, Count de,** French naturalist, was born in Montbard, 1707. He was educated for the law but, after traveling for a time, devoted himself to science. In 1739, he was elected a member of the academy of sciences and was appointed director of the royal garden. His *Natural History,* in fifteen volumes, is written in the finest literary style and created a great popular interest in the subject. Rousseau is said to have kissed the steps of the pavilion in which the book was written. Buffon was one of the pioneers of the modern doctrine of evolution. *The History of Birds, History of Minerals,* and *Epochs of Nature* are other works of his which are well known. He died in Paris, 1788.

Buisson (*bwē-sôn'*), **Ferdinand,** French educator and pacifist, was born in 1841. Throughout his career as a teacher, professor at the Sorbonne, and officer of the educational department in Paris, he devoted his spare time to advocacy of peace. In 1927, he was awarded one-half the Nobel prize for peace.

Bulfinch, Charles, American architect, was born in Boston, Mass., 1763. He graduated from Harvard, 1781, and was the first American to prepare himself for his profession by careful study abroad. His chief works are the Massachusetts state house, Boston; McLean hospital, Somerville; Massachusetts general hospital, Boston; and the west porticoes of the Capitol at Washington. Died, 1844.

Bull, Ole Bornemann, violinist, was born in Bergen, Norway, in 1810. By his wonderful playing he won great triumphs throughout Europe and America. He amassed a fortune, which he lost in a scheme to found a colony of his countrymen in Pennsylvania, and he had to resort to his violin to repair his crippled means. He afterward settled at Cambridge, Mass., and had also a summer residence in Norway, where he died in 1880.

Bulwer (*bōōl'wĕr*), **Edward George Earle Lytton.** See *Lytton, Edward George, Bulwer-Lytton, Lord.*

Bulwer, Sir William Henry Lytton Earle, Baron Dalling and Bulwer, English diplomatist and author, an elder brother of Lord Lytton and usually known as Sir Henry Bulwer, was born in London, 1801. In 1837, he became secretary of the British embassy at Constantinople, where he negotiated and concluded a treaty that is the foundation of the present commercial system of England in the East. In 1843, he was made minister plenipotentiary to the court of Madrid and concluded peace between Spain and Morocco in the following year. In 1849, he came to Washington, where he evinced equal art in negotiating the Clayton-Bulwer Treaty. In 1852, he was sent to Tuscany as envoy extraordinary and, in 1856, was nominated by Lord Palmerston commissioner at Bucharest for investigating the state of the Danubian principalities. Among his works are *An Autumn in Greece; France: Social, Literary, and Political; Life of Byron;* and *Historical Characters.* Died at Naples, 1872.

Bunner, Henry Cuyler, American humorist and short-story writer, was born in Oswego, New York, 1855, and was educated in New York City. He began journalism as a reporter and, in 1877, joined the editorial staff of *Puck,* which soon after, under his editorship, assumed a dignity and influence unusual in the comic press. His satirical editorials became a powerful social and political force.

In 1886, he published a novel, *The Midge,* followed in 1887 by *The Story of a New York House,* but his permanent fame will rest upon his mastery of the short story. The best of his short stories are included in volumes entitled *Short Sixes, Zadok Pine, Love in Old Cloathes,* and *Made in France,* which are models of story-telling and character drawing. His verses, *Airs from Arcady and Elsewhere, Rowen,* and *Poems,* display imagination and facile workmanship. The best of his several plays is *The Tower of Babel,* published in 1883. He continued as editor of *Puck* until his death in 1896.

Bunsen, Robert Wilhelm, German chemist, was born at Gottingen, 1811. He was the first to produce magnesium in large quantities, and, in 1860, he invented the magnesium light, important in photography. His greatest discovery was that of spectrum analysis, made in conjunction with Kirchhoff. Bunsen will always be remembered by physicists and chemists for the much-used photometer and gas burner which bear the Bunsen name. The principle of the Bunsen burner is now widely utilized in gas stoves for cooking purposes. He also made valuable discoveries in organic chemistry and invented the ice calorimeter, a filter pump, and other useful apparatus. Died, 1899.

Bunyan, John, English writer, was born at Elstow, near Bedford, in 1628. For some years, he followed his father's trade of traveling tinker. After a short service in the parliamentary army, he married at the age of 19. His marriage was followed by his conversion, or religious "awakening." In 1655, he became a member of the Baptist congregation at Bedford and subsequently its pastor.

After the Restoration, he was convicted in 1660 under the act forbidding divine services other than those of the Anglican Church and was thrown into Bedford jail, where he remained for more than 12 years, supporting his family by making tagged laces. There he wrote his most famous book—*The Pilgrim's Progress.* He was released from prison in 1672 and again became pastor of the Bedford congregation. Of Bunyan's other works, the chief are his *Grace Abounding to the Chief of Sinners,* an autobiography, and the allegorical *Holy War.* He wrote also a volume of verse entitled *Divine Emblems.* Died in London, 1688.

Burbank, Luther, American plant breeder and horticulturist, was born in Lancaster, Mass., 1849; was educated at Lancaster academy; and early devoted himself to the study of plant life. He removed to Santa Rosa, Cal., 1875, where he established experiment farms and was later appointed special lecturer at Leland Stanford university. His success in developing valuable new forms of plant life aroused wide interest in plant breeding. These new varieties include the Burbank potato; gold, Wickson, apple, October purple, chalco, America, and climax plums; giant, splendor, sugar, and stoneless prunes; a new fruit, the plumcot; peachblow, Burbank, and Santa Rosa roses; gigantic forms of amaryllis; the Shasta daisy; giant and fragrance callas; various new apples, peaches, nuts, and berries; and other valuable plants. He wrote *Training of the Human Plant* and *How Plants are Trained to Work for Man.* Died, 1926.

Burdett-Coutts (*bûr-dĕt'kōōts'*), **Angela Georgina, Baroness,** English philanthropist, the daughter of Sir Francis Burdett, was born in 1814 and succeeded in 1837 to the great wealth of her grandfather, Thomas Coutts. The shoeblack brigade, the Nova Scotia gardens, model lodging houses, and Columbia market are of her foundation.

The poor and distressed at home and abroad had a constant benefactress in her; the east-end weavers, the Irish fishermen of Cape Clear, the Turkish peasantry after the Russo-Turkish war were among those who received her help. In 1871, the queen made Miss Coutts a peeress; in 1881, the baroness married William Ashmead-Bartlett. She died in 1906.

Burdette (*bûr-dĕt'*), **Robert Jones,** American journalist, humorist, and lecturer, was born in Greensboro, Pa., 1844. He served as a private in the Civil War; was for a time connected with the Peoria *Transcript*; and later became associate editor of the Burlington (Iowa) *Hawkeye* and of the Brooklyn *Eagle*, in which his humorous sketches won him a wide and admiring public. He began to lecture in 1876; was licensed a minister of the Baptist Church, 1887; and held a pastorate at Los Angeles until 1909. His writings include *The Rise and Fall of the Moustache, Hawkeyes, Life of William Penn, Smiles Yoked with Sighs,* and *Old Time and Young Tom.* Died in 1914.

Burgess, Frank Gelett, American humorous writer and illustrator, was born in Boston, 1866; graduated at Massachusetts institute of technology, 1887; and became a draftsman with the Southern Pacific railway in 1887. He was instructor in topographical drawing at the University of California, 1891–94. In the latter year, he became designer and associate editor of *The Wave* and later was editor of the *Lark* in San Francisco and writer for various magazines in New York. In 1898, he removed to London and resided later successively in San Francisco, Boston, and New York. He is the author and illustrator of many delightfully whimsical books, among which are *The Purple Cow, Burgess Nonsense Book, The Rubaiyat of Omar Cayenne, The Cat's Elegy,* and *Why Men Hate Women.*

Burgoyne (*bûr-goin'*), **John,** British general, was born, 1722; early entered the army and, in 1762, displayed much talent and enterprise in command of British troops in Portugal. In the American war, he led the army which was to penetrate from Canada into the revolting provinces. At first he was successful, but was ultimately compelled to surrender at Saratoga, 1777. Displeased by the conduct of the ministry after his return to England, he retired and devoted himself to writing, producing several successful books and a comic opera. Died, 1792.

Burke, Billie, American actress, was born at Washington, D. C., in 1886. She was educated in France; appeared for the first time on the regular stage in London, 1902, and made her début at New York in 1907, playing the rôle of Beatrice Dupré in *My Wife.* Other dramas in which she appeared with conspicuous success include *Mrs. Dot, The Amazon,* and *Jerry.* She married Florenz Ziegfeld, Jr., in 1914.

Burke, Edmund, British statesman and orator, was born at Dublin in 1729 and was educated at Trinity college in his native city. Going to London, he attracted attention by his essays on the *Sublime and Beautiful,* and devoted himself to literature, founding, in 1759, *The Annual Register.* In 1761, he became private secretary to Hamilton, the chief secretary for Ireland and served Lord Rockingham in the same capacity when that nobleman became prime minister. In 1766, Burke entered Parliament, where his speeches on American affairs created a deep impression.

In 1782, Burke became paymaster in Lord Rockingham's government. He again took office in the duke of Portland's coalition ministry, when he made a famous speech on the India bill. In the impeachment of Warren Hastings, Burke played a leading part, his opening speech extending over four days. The outbreak of the French Revolution was the occasion of one of his finest efforts of oratory. Burke's hostile attitude to the Revolution severed many of his political friendships, and he seceded from the Whig party. In 1794, he retired from parliamentary life, though he continued to produce pamphlets on political affairs. His other chief works are *A Vindication of Natural Society, Thoughts on the Causes of Present Discontents, Reflections on the Revolution in France,* and *Letters.* Died, 1797.

Burleigh (*bĕr'lĭ*), **William Cecil, Lord.** See *Cecil, William, Lord Burleigh.*

Burne-Jones, Sir Edward, English painter, was born of Welsh ancestry at Birmingham, England, 1833. He was educated at Exeter college, Oxford, where William Morris, the poet, was his friend. In 1856, they left Oxford to devote themselves to art and settled in London, where they studied together under the guidance of Rossetti until 1859. In 1860, Burne-Jones married Georgiana McDonald; in 1862, traveled in Italy with John Ruskin; and, in 1865, removed from London to Fulham.

He is properly classed with the pre-Raphaelite group of English painters. His pictures, which are half-classic, half-romantic in character, are highly decorative and notably excellent in color. Among them are "The Days of Creation," "The Beguiling of Merlin," "The Mirror of Venus," "Pan and Psyche," "The Golden Stairs," "The Wheel of Fortune," "King Cophetua," and "Briar Rose." He furnished striking designs for stained glass at Christ church, Oxford, and elsewhere, and powerfully influenced decorative art in England. Died in London, 1898.

Burnett (*bûr'nĕt*), **Frances Hodgson,** née Frances Eliza Hodgson, author and playwright, was born in Manchester, England, 1849 and, at 7 years of age, was brought to Knoxville, Tenn. In 1873, she married Dr. L. M. Burnett, from whom she obtained a divorce in 1898, and, in 1900, married Stephen Townesend, an English author who died in 1914. Her story, *Surly Tim's Trouble,* in *Scribner's Magazine,* 1872, attracted attention and, in 1877, she won wide literary recognition by *That Lass o' Lowrie's.* Her most successful book, *Little Lord Fauntleroy,* which she later dramatized, appeared in 1886. Among her numerous other works are *Kathleen, A Fair Barbarian, A Lady of Quality, The Secret Garden,* and *Good Wolf.* Her plays include *Phyllis, The Showman's Daughter, Esmeralda,* and *The First Gentleman of Europe.* Died, 1924.

Burnham, Daniel Hudson, American architect, was born in Henderson, N. Y., 1846. He received his education in Chicago and under tutors at Waltham, Mass. In 1872, he formed a partnership with John W. Root, a designer of taste and ability and, upon the death of the latter, in 1891, was joined by C. B. Atwood.

The planning of the World's Columbian exposition at Chicago, 1893, was commissioned to this firm. The excellent administrative generalship, professional skill, and artistic taste which he displayed in this vast project, as well as in the various other undertakings of his firm, won him a world-wide reputation, and his influence upon contemporary architects was exceedingly great. He designed many notable public and commercial structures such as the Rookery, Masonic temple, and Railway Exchange in Chicago, the Flatiron building in New York, the Pennsylvania railway station, Pittsburgh, and the union passenger station at Washington. He also gained great fame as a city planner and was chairman of the national committee for beautifying Washington. Died, 1912.

Burns, John, English labor leader, was born in London, 1858; was educated at Battersea and at night schools; led a notable strike of London dock laborers in 1892; and in the same year was elected to the House of Commons. He became member of the British cabinet, 1905, acting as president of the local government board. By resisting a policy of doles, he drew upon himself much criticism from the Labor party. In 1914, he resigned in protest against the government's declaration of war on Germany. His published works include *The Unemployed, Municipal Socialism, Labor and Drink,* and *Labor and Free Trade.*

Burns, Robert, Scottish poet, was born at Alloway, near Ayr, Scotland, 1759. He was the son of a small farmer and was brought up amidst indigence and adversity. He received, however, the advantages of a common school education, though his chief advances in general knowledge he owed to the books he read, among which were *The Spectator,* the works of Pope, and the poems of Allan Ramsay. He was familiar also with songs and ballads, mostly of unknown authorship, which then circulated in that part of Scotland.

When 16 years of age, he fell in love, and his feelings, as he tells us, at once burst into song. His first volume of poetry was issued in 1786, and it at once became popular. The success of this volume, which was speedily republished in Edinburgh, induced him to take the farm of Ellisland, near Dumfries, where he married his "bonny Jean" in 1788. Farming proving a failure, he removed to Dumfries in 1791 and, having been appointed to a position as excise-man which had been obtained for him by a friend, he subsisted entirely upon his income from that office, which yielded approximately £70 a year. In 1792, he wrote about 100 songs as accompaniments to the melodies of Scotland, and for these, which are now among the world's priceless possessions, he received the sum of £5.

Disappointment now embittered him; in his office, a dangerous one to men of his tendencies, intemperance gradually gained upon him, while want threatened him, and, in his 38th year, he sank into an untimely grave. During his short and sad life, he wrote some of the finest poems in the language, the appreciation of which has become world-wide and has made sure his lasting fame. Died, 1796.

Burnside, Ambrose Everett, American soldier, was born at Liberty, Indiana, 1824; served an apprenticeship to a tailor; but graduated at West Point in 1847. He left the army as first lieutenant in 1852, but returned as colonel of volunteers for the Federal cause in 1861; commanded a brigade at Bull Run; and, in February 1862, captured Roanoke island. Having rendered important services at South Mountain and Antietam, he, in November, reluctantly superseded McClellan as general of the army of the Potomac. In December 1862, he crossed the Rappahannock and attacked Lee near Fredericksburg, but was

defeated with a loss of over 10,000 men. In 1863, he successfully held Knoxville and, in 1864, led a corps under Grant through the battles of the Wilderness and Cold Harbor. He resigned in April 1865; was governor of Rhode Island, 1866–68; and was elected United States senator in 1875. Died at Bristol, R. I., in 1881.

Burr, Aaron, American statesman, was born at Newark, N. J., 1756. He was a lieutenant colonel in the Revolutionary War; became attorney-general of New York in 1789 and was United States senator, 1791–97 and vice president of the United States, 1801–05. In a duel, the culmination of bitter political animosity, he mortally wounded Alexander Hamilton, 1804. In 1807, he was charged with treason on the ground that he intended to subdue and rule Mexico, but was acquitted. After unsuccessful attempts to raise money in Europe for various ambitious schemes, he returned in poverty to New York and practiced law there until shortly before his death in 1836.

Burr, William Hubert, American engineer, was born in Watertown, Conn., 1851. He was graduated in 1872 at Rensselaer polytechnic institute, where he became professor of mechanics in 1876. He was connected with the Phoenix Bridge Company, 1884–91, and was later appointed professor of engineering at Harvard. In 1893, he became professor of civil engineering at Columbia university. For some years following 1899, he served as a member of the isthmian canal commission; was awarded first place in a competition for plans of a memorial bridge across the Potomac at Washington; and was a member of the advisory board of engineers for the New York State barge canal. Among his writings are *The Stresses in Bridge and Roof Trusses, Ancient and Modern Engineering and the Isthmian Canal,* and *Suspension Bridges, Arch Ribs and Cantilevers.*

Burritt, Elihu, "the learned blacksmith," was born at New Britain, Conn., 1810. He worked as a blacksmith in his native place and at Worcester, Mass., but devoted all his leisure to mathematics and languages—Latin, Greek, Hebrew, Arabic, and most of the modern European languages. He was best known to the world as an earnest apostle of peace, through his *Christian Citizen,* and by lectures given in Europe and in the United States. Among his works are *Sparks from the Anvil, Olive Leaves, Peace Papers, Walks in the Black Country,* and *Chips from Many Blocks.* He took a prominent part in advocating an ocean penny-postage. For many years he lived in England, and from 1865 to 1870 he was United States consul at Birmingham. Died in his native city, 1879.

Burroughs (*bŭr'ōz*), **John,** American essayist and naturalist, was born in Roxbury, N. Y., 1837; received an academic education and taught school about eight years; became a treasury clerk in 1864; and was a national bank examiner, 1873–84. In 1874, he retired to a farm at Esopus, N. Y., where he devoted his time to literature and fruit culture. Besides numerous essays, studies of nature and animal life contributed to magazines, he wrote many books. Among his writings are *Birds and Poets, Locusts and Wild Honey, Indoor Studies, Squirrels and other Fur Bearers, Literary Values, Bird and Bough, The Breath of Life,* and *Field and Study.* In 1904, by an article in *The Atlantic Monthly,* he criticized sham natural history and precipitated a widespread controversy over "nature fakers." He was a member of the American academy of arts and letters. Died, 1921.

Burt, William, preacher, was born at Padstow, Eng., in 1852 and was educated in America at Wesleyan university and Drew theological seminary. He served under the Methodist Episcopal Church in Brooklyn pastorates from 1881 to 1886. In the latter year, he was transferred to Italy, where he pursued an aggressive campaign for religious education. In 1904, he was made resident bishop of the Methodist Episcopal Church in Europe, where he remained until 1912, and was then transferred to Buffalo, N. Y. He is the author of several books in the Italian language.

Burton, Ernest DeWitt, American theologian and educator, was born at Granville, Ohio, 1856. He was educated at Denison university, Rochester theological seminary, the University of Leipzig, and the University of Berlin. He became instructor in Rochester theological seminary in 1882. In 1883, he began to teach in the Newton theological institution, where he was made professor of New Testament interpretation in 1886. He was editor of the *Biblical World,* 1906–20. In 1922, he was made president of the University of Chicago and in 1924 initiated a campaign for the substantial increase of its endowment. Among his writings are *A Short Introduction to the Gospels* and *Handbook of the Life of Paul.* Died, 1925.

Burton, Marion LeRoy, American educator, was born at Brooklyn, Iowa, 1874. He graduated from Carleton college and Yale university. After teaching, preaching, and traveling in Europe, 1907–10, he was president of Smith college, 1910–17, and of the University of Minnesota, 1917–20. In 1920, he was elected president of the University of Michigan. His publications include *The Problem of Evil, The Secret of Achievement,* and *Our Intellectual Attitude in an Age of Criticism.* Died, 1925.

Burton, Sir Richard Francis, English traveler, was born in Hertfordshire, 1821, and was educated in France and England. In 1842, he entered the Indian army and served in Sind under Sir Charles Napier. Having mastered Hindustani, Persian, and Arabic, he disguised himself as an Afghan pilgrim and made the daring journey described in his *Pilgrimage to El Medinah and Meccah.* After visiting Somaliland and serving in the Crimea, he set out in 1856 with Speke on the journey that led to the discovery of Lake Tanganyika, 1858; he afterward traveled in America. In 1861, he was consul at Fernando Po and went on a mission to Dahomey. He was subsequently consul at Santos in Brazil, at Damascus, and at Trieste. In 1876–78, he visited Midian, and Guinea in 1882. He was knighted in 1886. Among Burton's many works are *First Footsteps in East Africa, City of the Saints, The Nile Basin, Vikram and the Vampire,* and his celebrated translation of the *Arabian Nights.* Died at Trieste, 1890.

Burton, Theodore Elijah, American lawyer and politician, was born in Jefferson, Ohio, 1851; graduated at Oberlin college, 1872; was admitted to the bar, 1875; and began practice at Cleveland. A member of Congress, with several interruptions, from 1889 to 1915, he served at different times as chairman of the inland waterways commission, national waterways commission, and chairman of the committee on Canadian relations. He was re-elected to Congress in 1924 and for several later terms. Burton was president of the American peace society, 1911–15, and was again elected to this office in 1925. His publications include *Financial Crises and Periods of Industrial and Commercial Depression, Life of John Sherman,* and *Corporations and the State.*

Bury (*bĕr'ĭ*), **John Bagnell,** British historian, was born in Ireland, 1861; graduated at Trinity college, Dublin; became professor of modern history in Dublin university in 1893, regius professor of Greek there in 1898, and regius professor of modern history at Cambridge university in 1902. Among his numerous works are *History of the Later Roman Empire from Arcadius to Irene, Student's History of the Roman Empire from Augustus to Marcus Aurelius, History of Greece to the Death of Alexander the Great, The Science of History, Life of St. Patrick and His Place in History, The Ancient Greek Historians,* and *The Idea of Progress.* He also edited Pindar's *Odes* and Gibbon's *Decline and Fall of the Roman Empire.* Died, 1927.

Bushnell, Horace, American theologian, was born at New Preston, Conn., 1802. He was graduated at Yale, 1827; was for some time an editor of the New York *Journal of Commerce,* and, in 1833, was ordained to the Congregational ministry. He preached with distinction at Hartford, Conn., from 1833 to 1859, when, on account of protracted ill health, he resigned from the ministry. While his "moral-power" view of the atonement has not been acceptable to most evangelical Christians, his moral and spiritual earnestness and the suggestive force of his thought and style greatly influenced his Protestant contemporaries. His works include *God in Christ, Christ in Theology,* and *Vicarious Sacrifice.* He died at Hartford in 1876.

Busoni (*bōō-zō'nē*), **Ferruccio Benvenuto,** pianist and composer, son of an Italian father and a German mother, was born at Empoli, near Florence, Italy, 1866. He received his early musical education from his parents, who were excellent musicians. His only other instruction was received from Dr. W. Mayer at Graz. After residing two years in Leipzig, 1886–88, he taught piano at the conservatory at Helsingfors, Finland, until 1890, when he won the Rubinstein prizes for composition and piano playing, resulting in his appointment as professor at the conservatory of Moscow.

During 1891–93, Busoni taught at the New England conservatory in Boston. Beginning with 1894, he resided chiefly at Berlin until 1913, when he became director of the conservatory of Bologna. In his numerous concert tours in Europe and the United States he won pre-eminence by his mastery of the piano, best shown in intellectual and classic works. He wrote an opera and numerous compositions for the piano, violin, and orchestra. Died, 1924.

Butler, Benjamin Franklin, American politician and general, was born in Deerfield, N. H., 1818. He studied law and settled in Massachusetts, where he became recognized as one of the leading Democrats of New England. A delegate to the Charleston and Baltimore nominating conventions, he took a prominent part in the movement which nominated Breckinridge and divided the party. At the outbreak of the Civil War, he promptly entered the Union army and had command of the departments of the Gulf and of the South Atlantic. He acquired no military fame but achieved much undeserved notoriety for his civil regulations.

In 1866 and again in 1868, he was elected to Congress by the Republicans of his district in Massachusetts. Defeated in 1874, he deserted the Republican party, and, in 1882, was elected governor by the Democrats. In 1884, after bitterly opposing the nomination of Grover Cleveland for the presidency by the Democratic party, he became the presidential nominee of the Greenback party. He was an able but erratic administrator and soldier. Died, 1893.

Butler, Joseph, English theologian, was born in 1692 at Wantage, in Berkshire. At the age of 22, he gave proof of high metaphysical ability in a letter to Dr. Samuel Clarke. After graduating from Oriel college, Oxford, in 1718, he was appointed preacher at the Rolls chapel, where he delivered a series of remarkable sermons. In 1733, he was made bishop of Bristol; in 1740, he became dean of Saint Paul's; and, in 1750, he was appointed bishop of Durham. In 1736, he published his *Analogy of Religion*. In the eyes of his eloquent disciple, Chalmers, this great work entitles Butler to be called "the Bacon of theology." Died, 1752.

Butler, Nicholas Murray, American educator and publicist, was born at Elizabeth, N. J., in 1862. He graduated at Columbia college in 1882, was fellow in philosophy, 1883-84, and spent a year in advanced study in Berlin and in Paris. Returning to Columbia in 1885, he became assistant in philosophy and, later, professor of philosophy and education. Upon the reorganization of Columbia college as Columbia university in 1890, he was chosen dean of the faculty of philosophy, ethics, and psychology. In 1887, he organized the New York college for the training of teachers, now Teachers college, affiliated with Columbia university. Butler was made acting president of Columbia university in 1901 and, in 1902, was chosen president. His administration has been characterized by marked interest in the broader relations of the university to public life.

In 1911, he was elected member of the American academy of arts and letters, becoming president in 1928. After the death of J. S. Sherman in 1912, Butler was selected by the Republican national committee as candidate for vice president of the United States. In 1925, he was chosen in succession to the late Viscount Bryce as a foreign member of the French Academy of Moral and Political Sciences. His writings include *The Meaning of Education, Philosophy, The International Mind,* and *The Faith of a Liberal.*

Butler, Samuel, English satirist, was born at Strensham, Eng., 1612; in his 17th year, he became attached to the household of the earl of Kent, when he frequently attended meetings at the house of a Sir Samuel Luke, a strict Puritan and Parliamentarian. The experiences of this time furnished him with the material for his famous work *Hudibras,* a kind of Don Quixote in verse, in which the Puritans were the subject of ridicule. Died, 1680.

Byng (*bĭng*), **Sir Julian Hedworth George,** British general, son of the earl of Strafford, was born in 1862. He served in the Sudan expedition, 1884, and in the South African war, 1899–1902. For services at the Dardanelles, 1915, he was made lieutenant general and, in 1916, had command of the Canadian division on the western front.

In November 1917, Byng won a signal victory at Cambrai, breaking through the strongest trench systems by means of tanks, which he was the first to employ on a large scale. In March 1918, following the disaster to Gough's army in Picardy, Byng thwarted the efforts of the Germans to extend their gains, crushing their most powerful attacks against Arras and Vimy Ridge. For this and his subsequent service in dislodging the German forces from French territory, he was made, in 1919, earl of Vimy and of Thorpe le Soken. He served as governor-general of Canada, 1921–26, and was made head of Scotland Yard in 1928.

Byrd, Richard Evelyn, American aviator, was born at Winchester, Va., in 1889. At the age of 12 he made a trip alone around the world. He entered the Navy and, although retired in 1916 on account of an injury, he continued the service of an officer on active duty, organizing the Navy department's commission on training camps and, in 1918, commanding the U. S. naval forces in Canadian waters. He learned to fly and, after the War, devoted himself to aviation. The rank of commander was conferred on him by special act of Congress. In 1926, he made the first flight over the north pole and, on June 29-30, 1927, he flew from New York to France, where, on account of the fog, he brought his plane down in the water near the shore. His instruments included a bubble sextant invented by himself. In 1928 he organized and led to Antarctica an elaborately equipped expedition for polar exploration.

Byron, George Gordon, Lord, English poet, was born in London, 1788. In his 11th year, he succeeded his grand-uncle, William, Lord Byron, and took possession of Newstead abbey, the ancient seat of the family, situated a few miles distant from Nottingham. Byron was placed in a private school at Dulwich and afterward was sent to Harrow. In 1805, he removed to Trinity college, Cambridge, and, two years thereafter, his first volume of verse, entitled *Hours of Idleness,* was printed at Newark.

This volume was fiercely assailed by Lord Brougham in the *Edinburgh Review,* and his sarcasms stung Byron into writing *English Bards and Scotch Reviewers.* In the babble of praise that immediately arose, Byron withdrew from England, visited the shores of the Mediterranean, and sojourned in Turkey and Greece. On his return in 1812, he published the first two cantos of *Childe Harold,* which met with immediate success, and its author was at once enrolled among the great poets of his country. Six months' stay at Geneva resulted in the third canto of *Childe Harold* and *The Prisoner of Chillon. Manfred* and *The Lament of Tasso* were written in 1817. The next year, he was at Venice and finished *Childe Harold* there. In the gay and witty *Beppo,* he made an experiment in the new field which he was afterward to cultivate so successfully.

In the next three years, he produced the first five cantos of *Don Juan* and a number of dramas of differing merit, *Cain* and *Werner* being at opposite poles. In 1822, he removed to Pisa and worked there at *Don Juan,* which poem, with the exception of *The Vision of Judgment,* occupied his pen almost up to the close of his life.

In the summer of 1823, Byron sailed for Greece, to aid in that country's struggle for independence. In three months he succeeded in evoking some kind of order from the turbulent, patriotic chaos which he found there. His health, however, began to fail and he died on April 19, 1824. His body was conveyed to England and was interred in Hucknell-Torkard churchyard near Nottingham.

Cabet (*kà'bĕ'*), **Etienne,** French communist, was born at Dijon, 1788. In 1848, he went to Texas to found an "Icarian community," so named after his *Voyage en Icarie,* a "philosophical and social romance" describing a communistic utopia. The Texas project was soon abandoned, but the colony was successfully re-established at Nauvoo, Ill., in 1852. In 1856, Cabet was deprived of the directorship of the colony and withdrew to Saint Louis. He was the founder and inspirer of modern communism in its best form. Died, 1856. See *Icarian Community.*

Cable, George Washington, American author, was born in New Orleans, 1844; was educated in the public schools; served in the fourth Mississippi cavalry of the Confederate army, 1863–65; and was clerk in a cotton factor's office. He was a reporter on the New Orleans *Picayune,* 1865–79, and, from the latter year, devoted himself to literature. Among his writings are *Old Creole Days, Madame Delphine, The Creoles of Louisiana, The Negro Question, Gideon's Band,* and *The Amateur Garden.* Cable founded, 1887, the home culture clubs, now called the Northampton people's institute, for the educational and æsthetic improvement of wage earning people. He was elected a member of the American academy of arts and letters in 1908. Died, 1925.

Cabot, John, Italian navigator in English service, was born at Genoa, 1450. Being compelled by his business to reside much in Bristol, England, he was appointed by Henry VII, 1496, to the command of a squadron of five vessels on a voyage of discovery in the Atlantic Ocean. In this expedition, he is said to have been accompanied by his sons—Ludovico, Sebastian, and Sanzio. In June 1497, Cabot landed on the North American coast, probably near Cape Breton island. He is, therefore, entitled to be called the discoverer of North America. Died about 1498.

Cabot, Sebastian, Italian navigator, was born at Genoa, 1474; was a cartographer of repute; and is said to have accompanied his father, John Cabot, on the latter's voyage of discovery to North America. In 1526, he headed an expedition to South America, where he discovered and named the Rio de la Plata. He spent three years in an unsuccessful attempt to find large silver deposits near this river. Died about 1558.

Cadman, Charles Wakefield, American composer, was born at Johnstown, Pa., 1881. He received his musical education in harmony, organ playing, and orchestration in Pittsburgh. He became musical critic on the Pittsburgh *Dispatch* and later an organist in the city and the conductor of the Pittsburgh male chorus. His first published compositions appeared in 1904. He wrote many popular Indian songs as well as several Indian operas. These include *The Land of the Misty Water, The Garden of Death,* and *Shanewis.* His other compositions include *The Vision of Sir Launfal* and *From Wigwam* and *Tepee.*

Cadman, Samuel Parkes, American preacher, was born in Wellington, England, in 1864 and was educated at London university. He was called to the Metropolitan Temple in New York, 1895, and to the Central Congregational church, Brooklyn, in 1901. From 1924 to 1928 he was president of the federal council of churches of Christ in America. Through the force of his preaching and widely syndicated writings, he became one of the most influential forces in American Protestantism.

Cadorna (*kà-dôr'nà*), **Count Luigi,** Italian general, member of a famous noble family, was born at Pallanza, 1850. He began his military education at the age of 10 and,

in 1868, graduated at the head of his class from the military academy at Turin. In 1883, he was made major of infantry; in 1896, he was called to the general staff; and, in 1910, was designated commander of an army corps. After the declaration of war against Austria-Hungary in 1915, Cadorna was placed in command of the Italian armies, conducting the operations which led to the capture of Gorizia. After the great Italian retreat of October-November 1917, he relinquished the chief command to Diaz and became a member of the supreme war council of the Allies. He was made a field marshal in 1924. Died, 1928.

Cædmon (*kăd'mŭn*; *kăd'-*), "the father of English song," was the first Anglo-Saxon who composed in his own language works that are extant. Born in the early 7th century, he was originally a cowherd, attached to the monastery of Whitby. According to a legend, he was commanded in a dream to sing "the beginning of created things." He accordingly produced metrical paraphrases of *Genesis* and other parts of the Bible. Other religious verses have been credited to him, but their authorship is uncertain. Died about 680.

Cæsar, Caius Julius, Roman general and statesman, was born July 12, 100 B. C. The marriage of his aunt to Marius, an outstanding popular leader, probably helped to determine Cæsar's sympathies in favor of the democratic faction. At the age of 17, he married Cornelia, the daughter of Lucius Cinna. This alliance with Cinna, who headed the popular party, brought upon Cæsar the anger of Sulla, the leader of the victorious oligarchic party. Sulla, who, by 81 B. C., had become dictator of Rome, proceeded to offer rewards for the death of his political enemies. Cæsar was called on to divorce Cornelia. With characteristic intrepidity, however, he refused, preferring to sacrifice his rank and property and even to risk his life rather than to submit. He escaped death only by flight.

Political Career. On his return to Rome after the death of Sulla, 78 B. C., Cæsar found the popular party in a state of great ferment, but he took no part in the attempts of Lepidus to overthrow the oligarchy. To improve his eloquence, Cæsar went to Rhodes to study under the rhetorician Apollonius Molo. In 74 B. C., once again in Rome, he was elected pontifex maximus, and, for the first time, he threw himself earnestly into public life.

In the year 70 B. C., Cæsar first attached himself to Pompey, whose political actions at this time were extremely democratic. In 68 B. C., Cæsar obtained a quæstorship in Spain. In 67 B. C., having divorced Cornelia, he married Pompeia, a relative of Pompey, with whom he was daily becoming more intimate. Two years later, Cæsar entered upon the office of curule ædile and greatly increased his popularity by lavishing money on games and public buildings. In 63 B. C., he was elected pontifex maximus and, shortly afterward, prætor. At the expiration of his prætorship, he was assigned the governorship of Hispania Ulterior.

By rare tact and sagacity, Cæsar effected a reconciliation between the two strongest statesmen of Rome, Pompey and Crassus, and, in 60 B. C., he made with them an alliance, known in history as the First Triumvirate. Both of these men aided him in carrying an agrarian law, by which he consolidated his position in the popular favor. In 59 B. C., Cæsar was elected consul. On the expiration of his term of office, he obtained for himself, by popular vote, the governorship of the province of Gallia Cisalpina and Illyricum for five years, to which the senate added the province of Gallia Transalpina. The term was later extended to ten years.

Military Campaigns. When Cæsar took up his duties as governor of Transalpine Gaul, the province was a small strip of territory north of Italy. Nine years later, it consisted of the whole of what is now France. He had also twice invaded Britain and had received the submission of the principal British tribes. The German migrations, which, for several generations, had intimidated the Gauls and beaten against the walls of Rome itself, were so effectively checked that Italy was never again invaded by a barbarian leader until the 5th century A. D. Moreover, Gaul was so completely pacified that, after the last desperate revolt under Vercingetorix in 52 B. C., the province never renewed its effort to separate its fortunes from those of Rome.

Meanwhile, Pompey, partly from jealousy of Cæsar's growing power, turned to the aristocracy. The senate carried a motion that Cæsar should disband his army by a certain day or else be regarded as an enemy of the state. Perceiving that the time for decisive action had come, Cæsar led his army across the little river Rubicon, by which act he stepped over the boundary between his province and Italy. He then moved swiftly toward Rome amid the acclamations of the people. Pompey fled to Greece, 49 B. C., and in three months Cæsar was master of all Italy.

He next subdued Pompey's legates in Spain, and then, on the plains of Pharsalia in Thessaly, August 9, 48 B. C., Pompey's army was utterly routed. Cæsar was appointed dictator for a year and consul for five years. He did not at once return to Rome, however, but went to Egypt, where he established Cleopatra on the throne of Egypt. Then followed victories in Africa against Scipio and Cato, and Cæsar was received in triumph on his return to Rome.

Character and Achievements. Like all the greatest military leaders, Cæsar inspired in his army and his officers the most absolute devotion to himself. Always daring and decisive in action, he nevertheless showed, particularly in the war with Pompey, a magnanimity in victory which contrasted strongly with the implacable hatred exhibited by his enemies. Besides being one of the greatest generals, Cæsar was, after Cicero, the greatest orator of his day. His *Gallic War* and *Civil War* are models of clear and vigorous historical narrative. He was known also as a mathematician, philologist, jurist, and architect.

When he became head of the state, he effected, besides many other improvements, the reform of the calendar. He did not live, however, to carry out the vaster designs of his statesmanship—the codification of Roman law, the founding of libraries, the draining of the Pontine marshes, the enlargement of Rome's harbor, the construction of a canal through the isthmus of Corinth, and the suppression of inroads made by the barbarians on the eastern frontiers. He was assassinated on the Ides (15th) of March 44 B. C. by a conspiracy of nobles.

Cagliari (*kăl'yä-rē*), **Paolo Veronese,** Italian painter, was born at Verona in 1528. He was a contemporary of both Titian and Tintoretto and was held in equal admiration with these famous painters. The church of San Sebastiano in Venice contains many of his productions, which are reckoned the most important of his earlier period, before he became acquainted with the masterpieces of Raphael and Michelangelo. The influence of these artists on his style was so happy that, on his return, he received the honor of knighthood from the doge. Among his celebrated productions are the "Marriage of Cana," in the Louvre, Paris; "Feast of the Levite," Venice academy; "The Feast of Simon," Brera gallery, Milan; "Family of Darius," national gallery, London; and "Mars and Venus," Metropolitan museum, New York. Died in 1588.

Cailletet (*kā'yĕ-tā'*), **Louis Paul,** French chemist, was born at Chatillon sur Seine, 1832. He studied at the school of mines in order to prepare himself to conduct an iron industry in his native town. In connection with his business as ironmaster, he devoted himself to chemical researches, particularly to metallurgy and the liquefaction of gases. In 1877, he succeeded in liquefying oxygen and nitrogen. For this work, he was made a member of the French academy of sciences in 1884 and an officer of the legion of honor in 1889. A few days after Cailletet's success, Raoul Pictet, a Swiss chemist, liquefied the same gases by another method. Died in 1913.

Caine, Sir Thomas Henry Hall, British novelist and dramatist, was born in 1853, of Manx and Cumberland parentage; was educated at schools in the Isle of Man and Liverpool; was brought up as an architect, but never practiced; became a journalist; and was, for six years, an editorial writer on the Liverpool *Mercury*. He went to London at the invitation of D. G. Rossetti and lived with the poet-painter until the latter's death in 1882. He began his literary career in that year, publishing *Sonnets of Three Centuries*, *Recollections of Rossetti*, *Life of Coleridge*, and *Cobwebs of Criticism*. His first novel was the *Shadow of a Crime*. Later ones include *Son of Hagar*, *The Bondman*, *The Christian*, *The Eternal City*, *The Prodigal Son*, *The Woman Thou Gavest Me*, *The Master of Man*, and *The Woman of Knockaloe*. Many of his novels have been dramatized for the stage and the screen. Other works from his pen are *The Eternal Question*, *The Drama of 365 Days*, and *Scenes in the Great War*. He made his home in the Isle of Man, where, in 1901, he was returned by a large majority to the legislature of the island.

Cajori (*kä-yō'rē*), **Florian,** mathematician, was born at Saint Aignan, Switzerland, in 1859. At 16 years of age, he came to America and attended successively the University of Wisconsin, Johns Hopkins university, and Tulane university. At different times, he was a lecturer in mathematics at Colorado college and Tulane university, and he became professor of the history of mathematics at the University of California in 1918. His works include *A History of Mathematics*, *A History of Physics*, and *A History of the Logarithmic Slide Rule*.

Calderón (*kăl'dĕr-ŏn*), **de la Barca, Pedro,** Spanish dramatist, was born at Madrid in 1600. He was educated at the University of Salamanca. At 14, he wrote his first drama. He entered the army and served in several campaigns in Italy and in Flanders, gaining a knowledge of men and things which he afterward made use of in his plays. He became a priest and royal chaplain, devoting

his leisure hours to literary labors. He wrote about 500 dramas, of which the greater ones include *The Constant Prince*, *Love Is No Joke*, *Life Is a Dream*, and *The Physician of His Own Honor*. In later life, he wrote many religious plays. His imagination was brilliant, and his writings abound in beautiful passages. Died, 1681. See *Spanish Literature: The Drama*.

Calhoun (*kăl-hōōn'*), **John Caldwell,** American statesman, was born in Abbeville district, South Carolina, 1782. He graduated at Yale, 1804, and became a successful lawyer. He was elected to Congress, 1811, where he supported the measures that led to the War of 1812 with Great Britain. He also supported the protective tariff. In 1817, he entered Monroe's cabinet as secretary of war, and did valuable work in reorganizing the war department. He was vice president under John Q. Adams, 1825–29, and then under Jackson.

Calhoun declared in 1829 that a state can nullify unconstitutional laws, and his *Address to the People of South Carolina* in 1831 set forth his theory of state sovereignty. On the passing of the nullification ordinance by South Carolina in 1832, he resigned the vice presidency and entered the United States Senate, becoming a leader of the state rights movement and a champion of the slave-holding states. In 1844, as secretary of state, he signed a treaty annexing Texas, but he strenuously opposed the war of 1846-47 with Mexico. Calhoun, Henry Clay, and Daniel Webster are often called "the great triumvirate" of American political orators of their time. Died, 1850.

Caligula (*kă-lĭg'ū-lă*), **Caius Cæsar Augustus Germanicus,** Roman emperor, 37–41 A. D., was born, 12 A. D., at Antium. He was educated in the camp, where the soldiers gave him the by-name Caligula, from the *caligæ*, "military shoes," which he wore. On the death of Tiberius, 37 A. D., it was found that Caligula had been appointed coheir with the grandson of Tiberius, but the senate and the people allowed Caligula supreme and sole authority. The first eight months of his rule was marked by lavish generosity, but, after a serious illness, he displayed the most barbarous cruelty. Among other extravagant absurdities, he had his favorite horse raised to the consulship. He was assassinated by his soldiers, 41 A. D.

Calkins, Norman Allison, American educator, was born at Gainesville, N. Y., 1822. He received his education in the district schools and at local academies. He became a teacher and later superintendent of schools at Gainesville. The natural science movement introduced into America by the New Harmony community greatly interested him and he became a lecturer on object teaching at teachers' institutes and also editor of the *Student and Schoolmaster*. From 1862 until his death, he served as assistant superintendent of schools in New York City. He was notably active in founding the national educational association. He is the author of *Primary Object Lessons*, *Phonic Charts*, *Manual of Object Teaching*, and *From Blackboard to Books*. He also wrote, in collaboration, *How to Teach*. Died in New York, 1895.

Callicrates, a Greek architect, who lived at Athens in the 5th century B. C. In conjunction with Ictinus, he constructed the famous Parthenon, the sculptures and decorations of which were the work of Phidias. The exact date of his birth and of his death are unknown. See *Parthenon*.

Callimachus (*kă-lĭm'ă-kŭs*), Greek artist, a native of Corinth, flourished toward the end of the 5th century B. C. and was celebrated as an architect, sculptor, and painter. To him is ascribed the invention of the Corinthian column, or capital, and he is said to have been the first to use the running drill in cutting folds of drapery and other deep lines in sculpture. He made a famous gold lamp for the Erechtheum in the Acropolis at Athens and produced a noted group of dancing maidens.

Calvé (*kăl'vā'*), **Emma de Roquer,** soprano opera singer, of Franco-Spanish origin, was born in France in 1866. In 1882, she made her début at Brussels in Gounod's *Faust*, and her subsequent career has been an uninterrupted triumph. Her chief successes have been rôles in *Cavalleria Rusticana*, *Sapho*, *L'Amico Fritz*, and *Carmen*. She has made successful tours through most of the capitals of Europe as well as through the chief cities of the United States.

Calvert, George, Lord Baltimore. See *Baltimore, George Calvert, Lord*.

Calvin, John, religious reformer, was born at Noyon, France, July 10, 1509. He entered the Collège de la Marche at Paris in 1521 and there laid the foundation of his wonderful mastery of Latin. He was then sent to Orleans university to study law under Peter de Stella. Religious instinct was awakened in him at this time and proved to be the master principle of his life. Later he continued his studies at Bourges. He learned Greek, began to preach the reformed doctrines, and, in 1528, openly avowed himself a disciple of the Reformation. The next year, he preached at Noyon, and, shortly afterward, he proceeded to Paris, whence he was obliged to flee because of a sermon which he preached on justification by faith.

Religious persecution forced Calvin to betake himself to Basel, where, in 1536, he published in Latin the first edition of the *Institutes of the Christian Religion*. In this work, he elaborated a system of theology based upon the sovereignty of the will of God and including as integral parts the doctrines of predestination, election, and reprobation.

From Basel, Calvin went to Ferrara. Driven thence by the Inquisition, he returned to Paris, and, as he still found no security there, he went to Geneva in August 1536, intending to proceed shortly to Basel. In Geneva, he was constrained to join Farel in his struggle to establish over that city a theocratic government, in which license and frivolity should be replaced by a strict moral severity. Calvin and Farel were successful for a time; but a rebellion broke out in 1538, and Calvin was expelled from the city. He went to Strasbourg, where, the next year, he married Idelette de Bure.

In 1541, Calvin was recalled by the Genevans and established a thoroughly theocratic rule under his own direction. It was marked by controversies with various heretics, one of whom, named Servetus, was burned at the stake in 1553. The party opposed to Calvin, known as the Libertines, was expelled two years later. The power of Calvin, thus firmly established, was used vigorously for the defense of Protestantism throughout Europe.

The amount of Calvin's literary work seems incredible, when considered with his other labors. He established an academy at Geneva in 1559, where he taught theology. His zeal brought into one body of doctrine the scattered and unsystematized reformed opinions of Europe. As a religious teacher, social legislator, and writer, Calvin's fame is second to none in his age. Died, May 27, 1564.

Cambacérès (*kăN'bă'sā'rĕs'*), **Jean Jacques,** duke of Parma, French statesman and jurist, was born in Montpellier in 1753. He was educated for the legal profession and became president of the French convention in 1792. He voted for pronouncing Louis XVI guilty, but denied the right of the convention to execute the king, wishing that the unfortunate monarch might be detained in prison and put to death only in case of invasion. He was afterward president of the committee of public safety and of the council of five hundred. When Napoleon Bonaparte was named first consul, Cambacérès was made second consul. During the hundred days after Bonaparte's return, he was president of the chamber of peers. He left France when the Bourbons were a second time restored, but was permitted to return. His *Projet de code civil* formed the basis of the *Code Napoléon*. Died, 1824.

Cambyses (*kăm-bī' sēz*), king of the Medes and Persians, succeeded his father Cyrus in 529 or 528 B. C. He put his brother Smerdis to death and, in 527 or 525, invaded and conquered Egypt. He meditated a conquest of Carthage, but the Phœnician mariners refused to serve against their kindred. An army sent to seize the temple of Ammon perished in the desert, and one which Cambyses led in person to Nubia purchased some conquests at the price of myriads of lives. According to Herodotus, the king gave himself up to drunkenness and hideous cruelties. In 522, news came that Gaumata, a Magian, had assumed Smerdis's character and had usurped the Persian throne. Cambyses marched against him from Egypt, but died on the way, 521 B. C.

Camillus (*kă-mĭl'ŭs*), **Marcus Furius,** Roman soldier and statesman, was born about 445 B. C.; took Veii, a rival town, after a ten-years' siege; and retired into voluntary exile at Ardea on account of the envy of his enemies in Rome. Recalled from exile, he saved Rome from destruction by the Gauls under Brennus; was five times elected dictator; and gained a succession of victories over rival Italian tribes. He died of the plague, about 365 B. C., at 80 years of age, lamented by the whole nation, and remembered for generations as one of the noblest and most heroic figures in Roman history.

Camoëns (*kăm'ō-ĕns*), **Luiz Vaz de,** Portuguese poet, was born of an illustrious family at Lisbon about 1524. He studied the ancient classics at Coimbra. His rashness, self-confidence, and unwise conduct brought him into disfavor with the authorities and with the court. Rejected by Catherina de Ataide, who was destined to become in his life what Beatrice was to Dante, he joined the army. After campaigning two years and losing an eye, he sailed in 1553 for further service in India. Offended by certain abuses of the Portuguese authorities at Goa, he ventured to expose them in a satire entitled *Follies in India*, which led to further clashes with the ruling class.

In 1556, Camoëns went to Macao, where he lived several years and was engaged in writing his epic masterpiece, *Os Lusiadas*, "The Lusitanians," generally styled the *Lusiad*. Returning to Spain about 1770 after many years of hardships, which included shipwreck and imprisonment,

he dedicated the *Lusiad* to the young king Sebastian, who granted him a small pension and permission to remain at the court of Lisbon. Besides his epic, which has an assured place in the world's literature, he wrote numerous sonnets, odes, elegies, satires, and comedies. Died, 1580. See *Lusiad*, page 297.

Camp, Walter, athletic specialist and author, was born at New Haven, Conn., 1859; graduated at Yale, 1880; became active in the management of Yale's athletics; and was made a member of the Yale University council. He took a prominent part in the direction of athletics in training camps. His publications include *Book of College Sports*, *American Football*, and *Drives and Puts* (with Lillian Brooks). He was also editor in chief of the *Library of Young People*. Died, 1925.

Campanella (*kăm'pā-nĕl'lä*), **Tommaso,** Italian poet and philosopher, was born in Stilo, Calabria, 1568, and was educated in Naples and Cosenza. He published his first work on philosophy in 1591 and began to apply his principles to politics and religion, teaching at Naples and at Rome. In 1599, he was accused of heresy and of conspiracy against the Spanish rule. In consequence, he was imprisoned at Naples for 27 years, during which time he wrote the *City of the Sun*, other philosophic writings, and numerous sonnets. Through the intervention of Pope Urban VIII, he was set free and found refuge in France. In his *City of the Sun*, a utopia modeled somewhat after Plato's *Republic*, he advocated education as the best guarantee of capacity. While he devoutly accepted the authority of faith in theology, he considered philosophy to be based on perception. Died in Paris, 1639.

Campbell, Alexander, American theologian, was born at Shane's Castle, Ireland, 1788; attended Glasgow university; came to the United States; and served as pastor of a Presbyterian church in Washington county, Pa. He later became a Baptist. In 1810, he adopted the Bible as the sole recognized creed of his church and, in 1827, founded the Disciples of Christ, a sect that grew rapidly, especially in Virginia, Tennessee, and Kentucky, and now numbers over a million members. His followers are known also as Christians, Church of Christ, and Campbellites. In 1841, Campbell founded and became the first president of Bethany college, West Virginia. He was an ardent believer in the imminent second coming of Christ. Died, 1866.

Campbell, Sir Colin, Lord Clyde, British general, was born in Glasgow, 1792. His father was a cabinetmaker named Colin Macliver. In 1808, he entered the army as an ensign, taking, to please an uncle, the name of Campbell. He greatly distinguished himself in wars in the Spanish peninsula, the United States, China, India, and the Crimea. He reached the summit of his fame in 1857, when, as commander of the forces in India, he brilliantly relieved Lucknow, thoroughly subdued the Sepoy mutiny, and saved the English empire in India. In 1858, he was created a peer under the title of Baron Clyde. He died in 1863 and was buried in Westminster Abbey. See *Sepoy Mutiny*.

Campbell, Mrs. Patrick, née Beatrice Stella Tanner, English actress, was born in London, 1867. In 1884, she married Patrick Campbell, who was killed in the South African war, 1900. After much amateur encouragement, she made her professional entrance upon the stage in 1888. She achieved notable success in *The Second Mrs. Tanqueray*, 1893, following which she played in *The Masqueraders* and *John-a-Dreams*, 1893, and in *The Notorious Mrs. Ebbsmith*, 1895. She appeared with Forbes-Robertson in the rôles of Ophelia, Juliet, and Lady Macbeth, 1895–98; also in *Fédora* and *Little Eyolf*. Subsequently she made several visits to the United States, playing with marked distinction in *Magda*, *The Joy of Living*, *The Whirlwind*, *The Bondman*, *Hedda Gabler*, *The Thunderbolt*, *Bella Donna*, *Lady Patricia*, and *Pygmalion*. In 1904, she appeared with Sarah Bernhardt in *Pelléas et Mélisande*. In 1914, she married George Cornwallis West.

Campbell, Thomas, British poet, was born in Glasgow, 1777. His first poem, *The Pleasures of Hope*, was published in 1799 and went through four editions within a year. His *Gertrude of Wyoming* and the short poem *The Last Man* are well known; but it is for his war lyrics, such as *Hohenlinden*, *Ye Mariners of England*, and *The Battle of the Baltic*, that Campbell will be best remembered. He died in 1844 and was buried in Westminster Abbey.

Campbell, William Wallace, American astronomer, was born in Hancock county, Ohio, in 1862 and was graduated at the University of Michigan. After teaching successively at the University of Colorado and the University of Michigan, he became associated in 1891 with the Lick observatory, of which he was appointed director 10 years later. Campbell became president of the University of California in 1923. He has conducted many expeditions to different parts of the world in order to observe solar eclipses, and his scientific work has brought him numerous marks of distinction in his own country and abroad. His publications include *The Elements of Practical Astronomy* and *Stellar Motion*.

Candler, Asa G., American capitalist, was born near Villa Rica, Ga., 1851. He was educated in the common schools and learned the drug business in Carterville. In 1873, he located in Atlanta and, in 1878, became a member of the firm of Hallman and Candler, laying the foundation for his large fortune by the manufacture of coca cola. In addition to extensive interests in connection with banking, warehousing, and investment companies, he became active in movements to improve the public school system. He contributed a million dollars toward establishing Emory university at Atlanta and made many donations to other philanthropic enterprises. Died, 1929.

Candler, Warren A., American preacher, was born in Carroll county, Ga., 1857; was educated at Emory university; and entered the North Georgia conference of the Methodist Episcopal Church in 1875. He was president of Emory university from 1888 to 1898 and, in the latter year, was made a bishop. His publications include *History of Sunday Schools*, *High Lives*, *Practical Studies in the Fourth Gospel*, and *Christ and the Creed*.

Canfield, Dorothy. See *Fisher, Dorothy Canfield*.

Canisius (*kä-nē'sē-ŭs*), **Petrus,** Dutch Jesuit missionary and scholar, was born at Nimwegen, Netherlands, 1521. He was the first provincial of the Jesuits in Germany; distinguished himself at the council of Trent, 1545; and was appointed court preacher to Ferdinand I. He wrote the celebrated catechism entitled *Summa Doctrinæ Christianæ*. Died, 1597, and was beatified in 1869.

Canning, George, British statesman and orator, was born in London, 1770. He entered the House of Commons for Newport, Isle of Wight, in 1793 as the protégé and supporter of the minister Pitt. In 1796, he was appointed an undersecretary of state. In 1801, Pitt resigned office, and Canning joined the opposition against the Addington ministry. When Pitt again became premier, in 1804, Canning was made treasurer of the navy, an office which he held until Pitt's death, in 1806. When the Portland ministry was formed, in 1807, Canning was appointed minister of foreign affairs.

In the course of his public life, he arranged the relations of Brazil and Portugal; drew the French cabinet into agreement with the British respecting Spanish American affairs; was the first to recognize the free states of Spanish America; promoted the treaty by which England, France, and Russia undertook to settle the affairs of Greece in 1827; protected Portugal from Spanish invasion; contended earnestly for Catholic emancipation; and prepared the way for the repeal of the Corn laws. Died, 1827.

Cannizzaro (*kän-nē-tsä'rō*), **Stanislao,** Italian chemist, was born in Palermo, 1826. He was educated in chemistry and medicine at Palermo and Pisa and was made professor of chemistry at Alexandria in 1851, at Geneva in 1855, at Palermo in 1861, and at the University of Rome in 1871. He defined with notable clearness the difference between atomic and molecular weights and thereby became one of the most influential agents in establishing Avogadro's law as a working rule in chemical science. He was the first to discover benzyl alcohol and cyanamid and was the author of valuable works on theoretical chemistry. He died in 1910.

Cannon, Annie Jump, American astronomer, was born at Dover, Del., in 1863. After graduation from Wellesley college in 1884, she pursued special studies in astronomy at Radcliffe college. In 1897, she became assistant astronomer at Harvard college observatory and, in 1907, was made also curator of astronomical photographs. For a long period she carried on extensive observations of variable stars, of which she discovered 200. She discovered also 3 new stars and numerous stars having variable spectra. In addition to preparing a bibliography of variable stars, comprising 50,000 references, she completed a catalogue of more than 200,000 stellar spectra.

Cannon, Joseph Gurney, American politician, was born in Guilford, N. C., 1836; was admitted to the Illinois bar; and became state's attorney for the 27th judicial district of Illinois in 1861. He became a Republican member of Congress in 1873, and, with two interruptions, continued to sit until 1923, thereby spending nearly 46 years as a Federal legislator. He was speaker of the House of Representatives from 1903 to 1911. He was popularly known as "Uncle Joe" Cannon. Died, 1926.

Canova (*kä-nō'vä*), **Antonio,** Italian sculptor, was born, 1757, at the Venetian village of Possagno and studied at Venice and Rome. His "Theseus," 1782, was one of the most important works in modern sculpture and marked the return from the baroque to the classic style. Other noted works followed, and Canova soon became the foremost sculptor of his day and one of the greatest of modern times. His "Cupid and Psyche" was produced soon after he had completed, in 1787, the monument of Pope Clement XIV.

Among his most widely known works are "Winged Cupid," "Venus and Adonis," "Psyche Holding a Butterfly," "Penitent Magdalen," and "Perseus with the Head of the Medusa." In 1802, he was called to Paris to model a colossal statue of Napoleon. In 1815, the pope sent him to Paris to recover the works of art that the French had taken from Rome. He was created marquis of Ischia. Died in Venice, 1822. See *Sculpture.*

Cantù (*kän-tōō'*), **Cesare,** Italian author, was born, 1804, at Brivio in northern Italy and was educated at Sondrio, where he was appointed professor of belles-lettres. Having been imprisoned for the offense of expressing liberal tendencies in a historical work on Lombardy, he spent his leisure hours in describing the sorrows of a prisoner, in the form of a historical romance. His great work is the *Storia Universale* in 35 volumes. Other important writings are *History of Italian Literature, History of the Last Hundred Years,* and *History of the Italians.* Died at Milan, 1895.

Canute (*kə-nūt'*), or **Cnut** (*k'nōōt*), king of the English, Danes, and Norwegians, was born about 995. On the death of his father, Sweyn, king of Denmark, he proclaimed himself king of England. After a struggle with the Saxon king Ethelred and, later, with Ethelred's son Edmund, Canute agreed to divide the sovereignty of all England with Edmund. On the subsequent death of the latter, Canute became king of England and administered the country in an enlightened spirit. In 1019, he went to claim the kingdom of Denmark and, in 1028, extended his rule also over Norway, becoming one of the most powerful rulers of Europe. Died, 1035.

Capen, Samuel Paul, American educator, was born at Somerville, Mass., 1878. He was graduated at Tufts college in 1898, at Harvard in 1900, and at the University of Pennsylvania in 1902. He also studied at the University of Leipzig. After teaching modern languages and educational administration at Clark university until 1914, he was employed in the United States bureau of education, Washington. In 1922, he was appointed chancellor of the University of Buffalo.

Capper, Arthur, American editor and publisher, was born at Garnett, Kans., 1865. Upon graduation from Garnett high school in 1884, he entered newspaper work as a compositor on the Topeka *Daily Capital,* of which he became, at different times, reporter, city editor, Washington correspondent, publisher, and proprietor. He also became publisher and proprietor of the *Farmers' Mail and Breeze, Household Magazine,* and *Capper's Weekly,* of which the last named attained, under his management, a wide influence and a total circulation exceeding a million. He published other agricultural and household periodicals of local importance. He was governor of Kansas from 1915 to 1919 and, in the latter year, became a United States senator.

Caracalla (*kăr'ə-kăl'ə*), **Marcus Aurelius Antoninus Bassianus,** Roman emperor, the son of the emperor Septimius Severus, was born at Lyon, 188 A. D. By his father he was playfully named Caracalla from his wearing of a long-hooded tunic, so called in the Gallic language. After his father's death, 211, he ascended the throne as coregent with his brother Publius Septimius Antoninus Geta, whom he afterward caused to be murdered. Having bribed the pretorians to make him sole emperor, Caracalla next directed his cruelty against all the friends and adherents of Geta, of whom 20,000 of both sexes—including the great jurist Papinianus—were put to death. He bestowed Roman citizenship on all free inhabitants of the empire, probably in order to levy a greater amount of taxes. He was assassinated in 217 at the instigation of Macrinus, prefect of the pretorians.

Cardan (*kär'dăn*), **Jerome,** Italian mathematician, naturalist, physician, and philosopher, was born at Pavia, 1501, and graduated in medicine at Padua. In 1534, he was made professor of mathematics at Milan. In 1559, he became professor of medicine at Pavia and later at Bologna, where he remained from 1562 until 1570. While in Bologna, he was imprisoned for heresy or debt, or both. Having regained his liberty in 1571, he went to Rome, where Gregory XIII pensioned him. He wrote a large number of treatises on mathematics, astronomy, astrology, rhetoric, history, ethics, natural history, music, and medicine. His *Ars Magna,* 1545, contains the celebrated solution of the cubic equation. This was first discovered by Tartaglia in 1541 but Cardan published it as his own, precipitating a notable controversy which remained unsettled at Tartaglia's death. Consequently this, the greatest mathematical discovery of the 16th century, is known as Cardan's method. His autobiography, *De Propria Vita,* was completed a few weeks before his death at Rome in 1576.

Carducci (*kär-dōōt'chē*), **Giosuè,** Italian poet, was born at Valdicastello in the province of Pisa, 1836. In 1861, he became professor of Italian literature at Bologna; in 1876, was returned to the Italian Parliament as a Republican; and, in 1890, was made a senator. A complete edition of his poems in 20 volumes appeared at Bologna. He was awarded the Nobel prize for literature in 1906. Died, 1907.

Carew, Mrs. James. See *Terry, Ellen.*

Carissimi (*kä-rēs'sē-mē*), **Giacomo,** Italian composer, was born at Marino about 1604. He first studied music in his native town; was Kapellmeister at Assisi from 1624 to 1628 and at Saint Apollinaris in Rome from 1628 until his death. He was the originator of the chamber cantata and developed the instrumental accompaniment. He composed many cantatas, masses, motets, and even comic music. His works mark the transition from the polyphonic style of the Palestrina school to the monodic style of the originators of opera, and he is regarded as one of the chief founders of the oratorio. His published works include "Jephthah," "Judicium Salomonis," "Baltazar," and "Jonas," in Chrysander's *Denkmäler der Tonkunst*; *Arie de Camera*; and *Ars Cantandi.* He was a noted instructor, Scarlatti, Buononcini and Charpentier being among his pupils. Died in 1674.

Carlin, James Joseph, American educator, was born at Peabody, Mass., in 1872. He was educated at Boston college and the Woodstock seminary. He joined the Society of Jesus in 1892 and, in 1899, became professor of Latin, Greek, and English at Georgetown university. In 1907, he was ordained a priest of the Roman Catholic Church and later became lecturer on scholastic philosophy at Holy Cross college, of which he was appointed president in 1918.

Carlyle (*kär-līl'*), **Thomas,** British essayist, historian, and philosopher, was born at Ecclefechan, Scotland, December 4, 1795. Having acquired an elementary education from his parents, he entered Annan academy in 1805. Eight years later he completed indifferently well his academic course at Edinburgh university. He subsequently taught in several small schools; but, considering this occupation intolerable, he removed to Edinburgh in 1818. Here he found the study of law as uncongenial as that of theology. During this period, he was harassed by religious problems and was absorbed in the study of Schiller and of Goethe.

Carlyle now had the intention of making literature his life work. He planned a history of England under Cromwell and a translation of Goethe's *Wilhelm Meister.* In 1824, he went to London and superintended the publication of his *Life of Schiller.* The following year he spent translating German romances on a farm near Hoddam Hill.

Carlyle married Jane Welsh in October 1826. They settled in Edinburgh, where he completed several translations from German and contributed to the *Edinburgh Review.* In 1828, they removed to a small estate at Craigenputtoch, which Mrs. Carlyle had inherited. Here Carlyle wrote various magazine articles and his *Specimens of German Romance.*

Carlyle's chief work, *Sartor Resartus,* occupied him in 1833-34. It contains his own manifold opinions, inward agonies, and speculations, and its theme may be described as an assumption that all creeds, rituals, and systems of philosophy are only the successive garbs in which the human intellect has been clothed. In 1834, Carlyle removed to London, where he published his fiery prose epic, *The French Revolution,* in 1837. Then followed, in 1839, an arraignment of contemporary society, entitled *Chartism. Past and Present* came in 1843, and *Cromwell's Letters and Speeches,* two years later.

Henceforth, Carlyle dedicated himself to his largest work, *History of Frederick the Great,* which was completed in 1865. This same year, he was elected lord rector of Edinburgh university. Carlyle wrote no important work after his wife's death in 1866; he lived quietly in London, devoting himself to various reminiscences and articles. In 1874, he accepted the Prussian order of merit, awarded him in recognition of his *Frederick the Great,* though he declined both the grand cross of the bath and a pension which Disraeli offered him.

Carlyle exercised an unrivaled influence on British literature during the mid-19th century and on the contemporary moral, religious, and political beliefs. His critical biographical essays were the first to place the riches of modern German thought before the English-reading world. The power of his eruptive, ejaculatory style is thoroughly individual and in accord with the calm courage, utter truthfulness, and uncompromising nobility of his mind. Died, February 5, 1881. See *English Literature: Victorian Age.*

Carman (*kär'măn*), **William Bliss,** journalist and poet, was born at Fredericton, New Brunswick, Canada, 1861; graduated at the University of New Brunswick, 1881; and studied also at Edinburgh and Harvard. At different times, he taught school, practiced engineering, and, beginning in 1890, was an editor on the New York *Independent.* By his first book of verse, *Low Tide on Grand Pré,* 1893, he won wide recognition, which was extended by many subsequent volumes. Among them are *Behind the Arras,*

Songs from Vagabondia (with Richard Hovey), *By the Aurelian Wall, Pipes of Pan, The Friendship of Art, The Poetry of Life, Sappho, The Rough Rider, Daughters of Dawn, April Airs,* and *Far Horizons.* Died, 1929.

Carnegie (*kär-nĕg'ĭ*), **Andrew,** capitalist, manufacturer, philanthropist, and author, was born in Dunfermline, Scotland, 1835; came with his family to the United States in 1848, settling in Pittsburgh; and first worked as a weaver's assistant in a cotton factory. He became a telegraph messenger boy in 1851; learned telegraphy; entered the employ of the Pennsylvania railroad; and became a telegraph operator, advancing by promotions until he became superintendent of the Pittsburgh division of the Pennsylvania system. He joined Woodruff, the inventor of the sleeping car, in organizing the Woodruff Sleeping Car Company and thereby gained the nucleus of his fortune.

After the Civil War, he developed ironworks of various kinds and established at Pittsburgh the Keystone bridge works and the Union ironworks. He introduced into the United States the Bessemer process of making steel, 1868, and, a few years later, was the principal owner of the Homestead and Edgar Thomson steelworks and other large plants, which were consolidated, 1899, in the Carnegie Steel Company. In 1901, this company was merged in the United States Steel Corporation.

Carnegie then retired from business and devoted himself to philanthropic and literary activities. He gave libraries to many towns and cities in the United States, Canada, and Great Britain, and contributed large sums to other benefactions, the total exceeding $300,000,000. He built, also, the Peace Palace at The Hague and, in Washington, a home for the international bureau of American republics, later known as the Pan-American Union. At the close of 1912, his philanthropic gifts exceeded those of any other American, his gifts for that year alone amounting to $130,000,000. In 1912, he announced that he had given all his remaining fortune except $25,000,000 to the Carnegie corporation, organized in New York in 1911. His writings include *Triumphant Democracy, The Gospel of Wealth,* and *The Life of James Watt.* Died, 1919.

Carnot (*kär'nō'*), **Lazare Nicolas Marguerite,** was born in 1753 at Nolay, France. In 1791, he became a member of the National Assembly and voted in the Convention for the death of Louis XVI. After taking command of the army of the North and gaining the victory of Wattignies, he was made a member of the committee of public safety; was intrusted with the chief direction of military affairs; and contributed greatly to the successes of the French army. In 1797, having opposed the extreme measures of Barras, his colleague in the Directory, Carnot was suspected of favoring the Royalists and was sentenced to deportation. He escaped into Germany and wrote his defense, which conduced to the overthrow of his colleagues in 1799. On his return to Paris, he was made minister of war, 1800. He succeeded so brilliantly in this office that he was called the "organizer of victory." He was also a noted mathematician and was the author of numerous writings on mathematics and military tactics. He died in 1823.

Carnot, Marie François Sadi, French statesman, was born at Limoges, France, 1837. He was educated as an engineer and introduced several improvements in railroad and bridge building. In 1871, he was elected a member of the Assembly; was twice a cabinet officer; and, upon the resignation of President Grévy, was chosen president of France, 1887. He was assassinated by an anarchist in 1894.

Carnot, Nicolas Leonard Sadi, French scientist, was born at Paris, 1796. In his *Reflexions sur la puissance motrice du feu,* he described his cycle and reversible engine and announced important principles of thermodynamics. He stated that motive power is invariable in nature and that, accurately speaking, it is never produced or destroyed. He thus made clear that he appreciated the great law now known as the conservation of energy. His pioneer work was extended and adapted to modern theories by Lord Kelvin. Died, 1832.

Carpaccio (*kär-pät'chō*), **Vittore,** Italian painter, was born in Venice about 1455. He was influenced by Vivarini and Gentile Bellini. His works, though sometimes faulty in drawing, are harmonious in color and abound in charming pictorial qualities. Among his most noted paintings are "The Presentation in the Temple," and scenes in the life of Saint Ursula, now in Venice; "Death of the Virgin," in Ferrara; and "Enthroned Madonna," in London. He died about 1525.

Carpenter, Frank George, American journalist, traveler, and author, was born in Mansfield, Ohio, 1855; graduated at Wooster college in 1877; and began newspaper work for the Cleveland *Leader.* He spent 1881 in European and Egyptian travel and later served as correspondent for different newspapers and periodicals, in the interests of which he made a trip round the world and undertook special tours to Mexico, Russia, Germany, England, China, Japan, and South America. Among his books are *Carpenter's Geographical Readers, How the World is Clothed,* and *Around the World with the Children.* Died, 1924.

Carpenter, John Alden, American composer, was born at Park Ridge, Ill., 1876. He graduated from Harvard in 1897 and studied music under Bernard Ziehn and Sir Edward Elgar. He then entered business in Chicago, devoting his leisure time to music. With his wife, he is the coauthor of *When Little Boys Sing* and *Improving Songs for Anxious Children.* In 1912, he published a sonata for violin and piano, and, in 1914, he produced a large orchestral suite entitled *Adventures in a Perambulator,* picturing the impressions of an infant, in six movements for the full modern orchestra. This work, which displays remarkable mastery of orchestral technique and decided originality and inspiration, placed Carpenter in the forefront of American composers. His publications include a concertino for piano and orchestra, numerous songs, *The Birthday of the Infanta,* and the jazz opera *Skyscraper,* produced in 1926.

Carr, Gene, American caricaturist and illustrator, was born in New York, 1881, and was educated in the public schools of New York. He was employed as an illustrator on the New York *Recorder* in 1894 and, later, on various other papers of the eastern United States. He created many pictorial comic series, including *Prodigal Son, Father, Willy Wise,* and *Flirting Flora.*

Carracci (*kär-rät'chē*), or **Caracci, Agostino,** Italian painter, was born at Bologna in 1557. He became a disciple of his uncle Lodovico, but he was too versatile to devote himself continuously to any subject, though his "Communion of Saint Jerome," at Bologna, is an admirable work. He was the most intellectual of the Carracci; was devoted to poetry and literature; and became a great engraver on copper. With his brother Annibale, he executed the celebrated frescoes in the Farnese palace, Rome. He died in Parma, 1602.

Carracci, Annibale, was born at Bologna in 1560. He was brought up as a tailor, but under the instruction of Lodovico Carracci he rapidly became a great painter. The influence of Correggio and of Raphael largely molded his style. His fame reached Rome, where he was employed with his brother to execute the frescoes in the Farnese palace. One of his most celebrated easel pictures is the "Three Marys," now in Castle Howard, Yorkshire, England. He is considered the greatest painter of the Carracci family. Died, 1609. He was buried near Raphael in the Pantheon at Rome.

Carracci, Lodovico, Italian painter, the son of a butcher was born at Bologna in 1555. He studied at Venice and Parma and, with his two nephews, Agostino and Annibale, established in Bologna an "eclectic" school of painting. Some of his finest works are preserved at Bologna. They include the "Madonna and Child Throned," "Madonna and Child Standing," the "Transfiguration," and the "Nativity of Saint John the Baptist." Died, 1619.

Carranza (*kär-rän'sä*), **Venustiano,** former president of Mexico, was born in Cuatro Cienegas, Coahuila, 1859, of an old Mexican family of pure Spanish blood. Although educated for the law, he devoted himself chiefly to the agricultural affairs of his estates. He became a senator from Coahuila and resided in Mexico City for many years.

He was a lifelong friend and supporter of Felix Madero, after whose assassination in 1913 he published the plan of Guadalupe, which disavowed the newly established Huerta government. The revolt against the Huerta government was supported by Villa, Obregon, and Gonzalez and spread until, in July 1914, Huerta was forced to resign and Carranza was made minister of foreign relations under Carbajal as president.

Carranza soon openly took the position of leader, but differences among his associates led to the open revolt of Villa and Zapata. Nevertheless, Carranza's government was recognized late in 1915 by leading nations, and, in March 1917, Carranza was elected president of Mexico by an overwhelming majority. Decrees which he issued for the nationalization of petroleum lands caused strained relations with the United States, Great Britain, and France. A successful revolt led by Obregon resulted in the flight and death of Carranza in May 1920.

Carrel (*kä-rĕl'*), **Alexis,** American biologist and surgeon, was born in France, 1873, and was educated at the University of Lyon, where he received his medical degree in 1900. He came to America in 1905 and took charge of laboratory investigation first at McGill university and later at the University of Chicago. In 1909, he was appointed fellow of the Rockefeller institute for medical research in New York, where his brilliant discoveries in experimental surgery won world-wide recognition.

His investigations have proved that life in tissues may be prolonged after removal from the body; also, that certain arteries, organs, and even limbs may be successfully transplanted. In 1912, he received the first Nobel prize

for medicine bestowed upon an American. During 1915–19, he was engaged in medical work in France. Among his most valuable publications are *Anastomosis and Transplantation of Blood Vessels, The Preservation of Tissues, The Transplantation of Limbs*, and *The Transplantation of Veins and Organs.*

Carreño (*kär-rän'yō*), **Teresa,** Venezuelan pianist, was born in Caracas, 1853. She was the daughter of a minister of finance and niece of Simon Bolivar, the liberator. She received her first musical instruction from her father and, at the age of nine, performed at a concert in New York, where she attracted the attention of Gottschalk and became his pupil. Later she studied in Paris under Mathias and played with notable success in musical centers of Europe and the United States.

Possessing remarkably versatile talents, she composed string quartets, salon pieces for the piano, and the Venezuelan national hymn; achieved distinction as a concert singer; and managed and conducted an opera company. Among her distinguished pupils was MacDowell, whose compositions she admired, and rendered with notable appreciation. She was a player of great brilliancy and vigor with an intellectual grasp in interpretation that placed her in the highest rank among her contemporaries. Died, 1917.

Carrère (*kà'râr'*), **John Merven,** American architect, was born of American parents in Rio de Janeiro, Brazil, 1858. He received his early education in Switzerland and studied architecture four years at the Ecole des Beaux-Arts, Paris. After two years' work in the office of McKim, Mead, and White in New York, he entered into partnership with Thomas Hastings, forming the distinguished firm of Carrère and Hastings.

Among the first noteworthy buildings designed by this firm were the Ponce de Leon hotel and the Alcazar, both at Saint Augustine, Fla. These were followed by many fine buildings, the most important of which was the public library of New York, built, at a cost exceeding eight million dollars, from their designs, which received the award in open competition with leading architects. They jointly designed notable buildings for the Saint Louis exposition of 1904 and the marble office building for the Senate at Washington. In 1911, Carrère died and his body was placed in state in the then unfinished public library, New York.

Carroll, Charles, of Carrollton, American patriot, was born at Annapolis, Md., 1737. When the Revolutionary War began, he was one of the richest men in the English colonies; but, though he had much to lose, he made the most daring speeches and helped the patriot cause in every way. He was elected a member of Congress, 1776, and was among the first signers of the Declaration of Independence. When he wrote his name, some one said: "There are many Charles Carrolls, and the British will not know which one it is." He at once added to his name "of Carrollton," and was ever afterward known by that title. He outlived all the other signers of the Declaration of Independence and died in 1832 when 95 years old.

Carroll, Lewis, is the pseudonym of Rev. Charles Lutwidge Dodgson, English humorist and author, who was born in 1832. He graduated at Christ Church, Oxford, 1854; took orders in the Anglican Church, 1861; and was a lecturer at Oxford, 1855–81. He wrote *Alice in Wonderland, Through the Looking-glass, The Hunting of the Snark, Sylvie and Bruno*, and other classic juvenile works. Died, 1898.

Carson, Christopher, popularly known as Kit Carson, American frontiersman, was born in Kentucky in 1809. He was successively a saddler's apprentice, trapper, hunter, guide in Frémont's explorations, lieutenant in the rifle corps of the army, and Indian agent. During the Civil War he rendered important services in the territories and was brevetted brigadier general. He had many remarkable adventures and was everywhere regarded as a typical frontiersman, fearless in danger, unerring with the rifle, and excelling even the Indians in woodcraft. Died, 1868.

Cartier (*kär'tyā'*), **Jacques,** French explorer, was born at Saint Malo, Brittany, 1491. Employed by Francis I of France to make explorations on the North American coast, he completed, in three successive expeditions, 1534–43, the discovery and the exploration of the Gulf of Saint Lawrence and the river as far as Quebec, Montreal, and Lachine rapids. Died about 1557.

Cartwright, Edmund, inventor of the power loom, was born at Marnham, England, 1743. He was educated at University college, Oxford. In 1779, he became rector of Goadby Marwood, Leicestershire, where he made improvements in agriculture. A visit in 1784 to Arkwright's cotton-spinning mills resulted in his power loom. Attempts to employ it at Doncaster and Manchester met with fierce opposition, and it was not until the 19th century that it came into practical use. Cartwright took out patents also for combing wool and for various other inventions; he even joined Robert Fulton in his efforts toward steam navigation. All these labors brought him no direct gain, but, in 1809, the government made him a grant of 10,000 pounds. He died at Hastings, 1823.

Carus (*kā'rōōs*), **Paul,** philosophical writer, was born at Ilsenburg, Germany, 1852 and graduated at the University of Tubingen. He settled in Chicago, where, as editor of *The Open Court* and *The Monist*, he performed notable service in making many valuable philosophical and religious works available for the general public. He wrote, besides numerous other works, *The Ethical Problem, The Soul of Man, Truth in Fiction, The Philosophy of the Tool, The Gospel of Buddha, The History of the Devil, Eros and Psyche, History of the Cross, Greek Mythology, The Principle of Relativity*, and *Venus and Woman as the Cosmic Principle.* Died, 1919.

Caruso (*kä-rōō'zō*), **Enrico,** Italian tenor, was born at Naples in 1873 and began life as an engineer with no thought of singing until a friend assured him that there was a fortune in his voice. He studied under Lamperti and Concone and sang at Naples in 1896 with great success in *Traviata*, following which he made engagements in leading cities of the world. His first appearance at the Metropolitan opera house, New York, was in 1904 and met with immediate and extraordinary success. His voice was one of unusual beauty and power, and his repertoire included more than 40 operas. He originated rôles in *Fédora, Germania, La Bohème, Madame Butterfly*, and *The Girl of the Golden West.* Died, 1921.

Carver, John, the first governor of Plymouth colony, was born in England about 1575. He was one of the Pilgrims who came over in the *Mayflower* and was chosen governor soon after landing. He assisted in settling his people in their new homes, but died within a few months, April 1621.

Cary, Alice, American poet and prose writer, was born near Cincinnati, O., in 1820. She began writing at 18. Jointly with her sister Phœbe, she published her first volume in 1850, in which year the two sisters removed to New York. Her publications include *Lyra and Other Poems, The Lover's Diary*, and *The Adopted Daughter.* Both sisters died in 1871.

Cary, Henry Francis, English writer, was born at Gibraltar, 1772. He was educated at Oxford and, in 1796, took holy orders. In 1805, he published a translation of Dante's *Inferno* and, in 1814, of the whole *Divine Comedy*, a translation remarkable for fidelity, force, and expressiveness. He afterward translated Pindar's *Odes* and Aristophanes' *Birds*, and wrote memoirs in continuation of Johnson's *Lives of the Poets.* He died in 1844 and was buried in Westminster Abbey.

Cary, Phœbe, American poet, sister of Alice Cary, born near Cincinnati, 1824. She wrote about a third of the *Poems of Alice and Phœbe Cary*, published in 1850, and many other poems, including the well-known hymn beginning "One sweetly solemn thought." Her death quickly followed that of her sister, in 1871.

Casals (*kà-sälz'*), **Pablo,** Spanish violoncellist, was born in Vendrell, Catalonia, 1876. After receiving instruction from his father, he studied at Barcelona, 1888–91, and in Madrid, 1894–96. He achieved such success in his first concert in Paris, 1898, that he devoted himself exclusively to concert work and toured Europe and North and South America, performing with increasing distinction and establishing his rank as the foremost living master of his instrument. He has also composed symphonies, poems, and other works for the orchestra and numerous pieces for the violoncello and violin.

Casaubon (*kà-sô'bŭn*; Fr., *kà'zō'bôN'*), **Isaac,** scholar and critic, was born, 1559, at Geneva, where, in 1582, he was appointed professor of the Greek language. Subsequently he held professorships at Montpellier and at Paris, but the death of Henry IV of France rendered his position very insecure, and he therefore gladly accepted an offer to visit England. King James received him with distinction and, some time after, appointed him prebendary of Canterbury and Westminster. He wrote many valuable works and, with Scaliger and Lipsius, is regarded as the greatest of 16th-century classical scholars. Died in London, 1614.

Case, Anna, American soprano singer, was born at Clinton, N. J., in 1893. She received her musical education in New York and made her début with the Metropolitan Opera Company in 1909, being the first member of the company with a musical training obtained entirely in America. She has appeared in *Tales of Hoffmann, Carmen, The Magic Flute*, and various other operas.

Case, Ermine Cowles, American paleontologist, was born at Kansas City, Mo., 1871, and was educated at the University of Kansas, Cornell university, and the University of Chicago. He taught at different times in the University of Kansas, the University of Chicago, the

Milwaukee state normal school, and the University of Michigan, where he became professor of paleontology in 1912. He was also made research associate of the Carnegie institution at Washington. His publications include *Geology and Physical Geography of Wisconsin* and many papers and monographs, chiefly on vertebrate paleontology.

Casimir-Périer (*kä'zē'mēr' pā'ryā'*), **Jean Paul Pierre,** French statesman, was born at Paris in 1847; served with distinction at the siege of Paris, 1871; and was elected to the Chamber of Deputies in 1876. He served as both vice president and president of that body; became premier of France, 1893; and was made president in 1894. He resigned in 1895 and died, 1907.

Cass, Lewis, American statesman, was born at Exeter, N. H., 1782; was admitted to the Ohio bar in 1802; and became brigadier general in the War of 1812. He was then for 18 years governor of Michigan, which, under his skillful administration, became a settled state. In 1831–36, he was secretary of war and, in 1836–42, minister at Paris. He sat in the United States Senate, 1845–57; was an unsuccessful candidate for the presidency in 1848; and was secretary of state, 1857–60. He was a great American statesman who stood with Webster and Clay for conciliation, for union, and for the Constitution as then established. While he was called a "Northern man with Southern principles" and unreservedly supported the slaveholding party, his attitude was that of conviction, not of subserviency. He died at Detroit, 1866.

Cassini (*kăs-sē'nē*), **Giovanni Domenico,** Italian astronomer and savant, was born at Perinaldo, near Nice, 1625. In 1650, he was appointed to the astronomical chair in the University of Bologna and later became director of the Paris observatory. He discovered four of Saturn's satellites; determined the rotations of Jupiter, Venus, and Mars; determined the parallax of the sun and the eccentricity of the earth's orbit; and discovered the curve known as the Cassinian oval. Died, 1712.

Cassiodorus, Flavius Magnus Aurelius, Roman statesman and writer, was born at Scylaceum in southern Italy, 490 A. D. He held many public positions under the reigns of Odoacer and Theodoric. About 450, he retired from public life and devoted himself to literature. The extant fragments of his *History of the Goths* and his *Letters* mark him as the most profound scholar of his age. In a monastery which he founded, he required the monks to copy manuscripts as part of their duty. The practice thus instituted resulted in the preservation of most of the classical literature. · Died, 580.

Cassius (*kăsh'ĭ-ŭs*), or, in full, **Gaius Cassius Longinus,** Roman general and politician, was quæstor to Crassus in the Parthian war, 54-53 B. C., and saved the credit of Roman arms after the commander's disastrous defeat and death. As tribune of the people in 49 B. C., he attached himself to Pompey. After the battle of Pharsalus, he was taken prisoner and pardoned by Cæsar. In 44 B. C., he organized the conspiracy which resulted in Cæsar's assassination. Driven from Rome by the enraged populace, Cassius fled to the East; united his forces with those of Brutus; and, being routed at Philippi, compelled his freedman to kill him, 42 B. C.

Castelar (*kăs'tă'lär'*), **Emilio,** Spanish orator, statesman, and writer, was born at Cadiz, 1832; was for some years professor of history and philosophy in the University of Madrid; and took part in several political uprisings, including that which brought about the downfall of King Amadeus in 1873. He became dictator, but, when Alfonso XII was crowned in 1874, Castelar went into voluntary exile. He returned to Spain in 1876 and devoted himself more to literature than to political and social questions. He was a strong advocate of universal suffrage. His writings include many volumes on history and politics, also essays, novels, and travels. He died in 1899.

Castlereagh (*kăs'l-rā'*; *kăs''l-rā*), **Robert Stewart, Viscount,** British statesman, eldest son of the marquis of Londonderry, was born in 1769. At an early period he entered public life and was appointed keeper of the signet, or privy seal, in Ireland in 1797; president of the board of control in 1802; and secretary of war in 1805. A difference having arisen between him and his colleague, Canning, a duel was the consequence, and both quitted office. During Lord Liverpool's administration, Lord Castlereagh again became a member of the government as foreign secretary and negotiated the Treaty of Paris in 1815. He died in 1822.

Cather, Willa Sibert, American author, was born at Winchester, Va., 1875. She graduated at the University of Nebraska in 1895 and began literary work by serving on the staff of the Pittsburgh *Daily Leader*, 1897–1901. She was associate editor of *McClure's Magazine*, 1906–12. In addition to numerous contributions to magazines, the list of her works includes *April Twilight, Alexander's Bridge, O Pioneers, The Bohemian Girl, The Song of the Lark, Youth and the Bright Medusa,* and *One of Ours,* the last being the novel which won the Pulitzer prize for 1922.

Catherine II, the Great, empress of Russia, was born at Stettin, Prussia, in 1729. She was married in 1745 to the prince who, in 1762, ascended the Russian throne as Peter III. Threatened with repudiation by the emperor, she seized the reins of government and had Peter III put to death. She gave the country a strong administration and furthered the process of "westernization." During her reign, Russian territory was extended at the expense of the Turks, and she took a leading part in the three partitions of Poland. Her court was one of the most brilliant in Europe, due to her liberal patronage of art and literature. It was also the most immoral, her ministers being openly her lovers. She died in 1796.

Catherine, Saint, of Siena, Italian saint, was born about 1347. She is said to have been favored with extraordinary revelations, and the wounds of Christ were believed to have been impressed upon her body. She wrote many devotional works, letters, and poems, which rank among the classics of the period. Died, 1380.

Catherine de' Medici (*dā mā'dē-chē*) was born in Florence, Italy, 1519. She was a great-granddaughter of Lorenzo the Magnificent, niece of Pope Clement VII, and queen to Henry II of France. She acted as regent during the minority of her second son, Charles IX. Her policy was to play off the parties of the Guises and the Condés against each other. She entered into a plot with the Guises which led to the massacre of Saint Bartholomew. Three of her sons became kings of France. Died, 1589.

Catherine of Aragon, former queen of England, the daughter of Ferdinand of Aragon and Isabella of Castile, was born in 1485. She married Arthur, prince of Wales, and subsequently his brother, afterward Henry VIII. She was beautiful and virtuous, yet the king in 1527 sought a divorce on the ground that the marriage was uncanonical. After much temporizing on the part of the pope, the marriage was in 1533 pronounced invalid by Cranmer, archbishop of Canterbury, and his sentence was ratified by act of Parliament. Catherine spent her last years in Kimbolton castle. Died, 1536.

Catiline (*kăt'ĭ-lĭn*), or **Lucius Sergius Catilina,** Roman politician, was born about the year 108 B. C. During his youth, he attached himself to the party of Sulla. His bodily constitution, which was capable of enduring any amount of labor, fatigue, and hardship, allied to a bold and unscrupulous mind, fitted him to take the lead in a revolutionary plot that has made his name infamous to all ages. After an unsuccessful attempt to gain the consulship, he entered into a conspiracy in 63 B. C. to murder the elected consuls and to burn and ravage the city of Rome. The conspiracy was discovered and frustrated by Cicero. Catiline fled from Rome and took refuge with Manlius, who was in command of the conspirators' army in Etruria. In 62, the army of the senate encountered that of Catiline near Pistoia, and after a desperate battle, in which Catiline displayed almost superhuman courage, he was defeated and slain.

Cato, Marcus Porcius, Roman statesman, surnamed the Elder to distinguish him from his later namesake, was born at Tusculum in 234 B. C. Induced by Lucius Valerius Flaccus to remove to Rome when that city was in a transition epoch from severe frugality to the luxury and licentiousness of Grecian manners, Cato severely denounced the degeneracy of the philhellenic party and set for Rome a pattern of sterner and purer character.

In 184 B. C., he was elected censor, and discharged so rigorously the duties of his office that the epithet *Censorius*, formerly applied to all persons in the same station, was made his permanent surname. He repaired the watercourses, paved the reservoirs, cleansed the drains, raised the rents paid by the publicans for the farming of the taxes, and diminished the contract prices paid by the state to those who undertook public works.

In 175 B. C., Cato was sent to Carthage to negotiate on the differences between the Carthaginians and the Numidian king, Masinissa; but, having been offended by the Carthaginians, he returned to Rome, where ever afterward he described Carthage as the most formidable rival of his country and concluded all his addresses in the senate—whatever the immediate subject might be—with the well-known words: "*Celerum censeo Carthaginem esse delendam.*" ("For the rest, I vote that Carthage should be destroyed.") Died, 149 B. C.

Cato, Marcus Porcius, often called Cato the Younger, Roman statesman, was born, 95 B. C. He entered the army and, in 72, served with distinction in the campaign against Spartacus. From Macedonia, where he was military tribune in 67, he went to Pergamum, whence he brought the Stoic philosopher Athenodorus to Rome. In 63, as tribune, he delivered a famous speech on the Catiline conspiracy, in which he denounced Cæsar as an accomplice of that political desperado and determined the policy of the senate. Fearing the effects of unrestrained greatness, he steadily opposed Pompey, Cæsar, and Crassus. Upon

the rupture between Cæsar and Pompey, Cato joined Cæsar's opponents and became governor of the Pompeians in Africa. When Cæsar finally defeated the Pompeian army under Scipio at Thapsus, Cato committed suicide, 46 B. C.

Catt, Carrie Chapman, American suffrage leader and lecturer, was born at Ripon, Wis., in 1859. She was educated at the State College of Iowa and took a special course in law. She became principal of the high school and superintendent of schools, Mason City, Iowa. In 1884, she was married to Leo Chapman, who died in 1886, and, in 1890, to George William Catt, who died in 1905.

In 1890–92, she was lecturer and organizer of the Iowa woman suffrage association. In 1892, she began similar service for the national woman suffrage association, of which she became president, succeeding Dr. Anna Howard Shaw in 1916. She also became president of the international woman suffrage alliance and, in 1913, attended the international woman suffrage congress at Budapest. She was a leader in the campaign that resulted in the adoption of the 19th amendment to the Federal Constitution. According to this amendment, ratified in 1920, women were granted the suffrage on the same terms as men.

Cattell (*kă-tĕl'*), **James McKeen,** American educator and psychologist, was born in Easton, Pa., 1860; graduated at Lafayette college and at the University of Leipzig; and studied also at Gottingen, Paris, Geneva, and Johns Hopkins university. At different times, he lectured in Cambridge university, the University of Pennsylvania, and Columbia university, holding the professorship of psychology at the last named institution from 1891 to 1917. He has been editor of many scientific periodicals, including *Science*, the *Scientific Monthly*, and the *American Naturalist*, acting also as treasurer of the Science Service, Washington, D. C.

Catullus (*kă-tŭl'ŭs*), **Gaius Valerius,** Roman lyric poet, was born at Verona about 87 B. C. He wrote over 100 poems, chiefly lyric and elegiac, which rank among the most original and imaginative in Latin literature. A large number of them record phases of his love for "Lesbia," which became the consuming passion of his life. He is intensely personal in his poetry and utterly without reserve. His poems breathe the deepest affection for his friends, with the most bitter invective for his enemies. Died, 54 B. C.

Cauchy (*kō'shē'*), **Augustin Louis, Baron,** French mathematician and founder of the theory of functions, was born in Paris, 1789. His *Mémoire sur la théorie des ondes* helped to establish the undulatory theory of light. At Prague he published his *Mémoire sur la dispersion de la lumière*. He was professor of astronomy at Paris, 1848–52, but refused the oath of allegiance to Napoleon III and went into voluntary exile. His works, which have been collected and published in 27 volumes, occupy a leading place in mathematical science. Died, 1857.

Cavalieri (*kä'vä-lyä'rē*), **Emilio del,** Italian composer, was born in Rome about 1550. He was of excellent family and well educated. In 1589, he was made inspector general of art and artists at the court of the Medici in Florence. In 1590, he wrote *Disperazione di Filene* and *Il satiro* and, in 1595, *Guioco della cieca*, which are among the very earliest operas. His chief work, *Rappresentazione di anima e di corpo*, performed in Rome in 1600, is regarded as the first oratorio. He developed the monodic style by supplying an accompaniment in figured bass and emphasized the melody, which he ornamented with trills. Died in Florence, 1602.

Cavalli (*kä-väl'lē*), **Francesco,** Italian composer, was born in Crema about 1600. His musical talent gained him the patronage of the podestà of Crema, whose support enabled him to study under Monteverde. He later became Monteverde's most noted pupil and follower. In 1665, he was appointed organist in San Marco, Venice, and, in 1668, became *maestro di cappella*, holding this post until his death. While he wrote much Church music, he is most noted as a dramatic composer. He introduced solos and set numbers into his operatic compositions and was thus the forerunner of Scarlatti and the modern opera. Died, 1676.

Cavell, Edith, English nurse, was born in Norfolkshire, 1866, the daughter of a clergyman. In 1907, she was appointed matron of a training school for nurses in Brussels which, in 1914, became a Red Cross hospital. In August 1915, under the German occupancy of the city, she was arrested, charged with facilitating the escape of Belgian and British men of military age. She admitted the charge and was sentenced to be shot immediately along with a Belgian named Baucq. In spite of the most earnest representations of Brand Whitlock, the American minister of Belgium, the sentence was carried out. This precipitate execution of a Red Cross nurse was a powerful psychological factor in creating hostility to the German cause. In 1919, Edith Cavell's body was taken to England and was interred in Norwich cathedral after a service in Westminster Abbey.

Cavendish (*kăv'ĕn-dĭsh*), **Henry,** English chemist and physicist, was born at Nice, France, 1731. His most important work included the discovery of the composition of water, the composition of nitric acid, and the determination of the mean density of the earth. Since the discovery of argon by Rayleigh and Ramsay, it has become evident that Cavendish in his studies on the composition of air had, at that early date, isolated argon without knowing it. He was a man of great wealth, lived in retirement, and devoted his entire life to scientific experiment. Died, 1810.

Cavour (*kä'vōōr'*), **Count Camillo Benso di,** Italian statesman, was born at Turin, 1810. He was educated for a military career, but, as his liberal tendencies appeared likely to prove an insuperable barrier to his promotion, he retired and devoted himself to agriculture. While a resident in England, he made himself intimately acquainted with the political and industrial organization of the country. With Count Cesare Balbo in 1847, he established a daily political journal, in which he advocated a representative system somewhat after the pattern of the English constitution.

On Cavour's suggestion, the king of Sardinia was petitioned for a constitution, which was granted in February 1848. Cavour became a member of the Chamber of Deputies and served successively as minister of agriculture and commerce, minister of marine, and minister of finance; in 1852, he was made premier. From this time, he directed Sardinian policy and devoted himself to securing the independence and unification of all Italy. He made an alliance with Napoleon III of France, but when war broke out between Sardinia and Austria and Austrian forces were all but driven from the Italian peninsula, Napoleon deserted his ally and made peace in 1859. Cavour resigned in chagrin. He was recalled in the next year to direct the government and, with the help of Garibaldi, enabled various Italian states to throw off the Austrian yoke. The first Parliament of all Italy met at Turin a few months before Cavour's death in 1861.

Caxton, William, the founder of English printing, was born in the Weald of Kent, 1422. During a residence in Flanders he acquired the new typographic art and, on his return, set up a press in the almonry, Westminster, where, in 1477, he brought out the earliest known book printed in England, *Dictes and Sayings of the Philosophers*. He printed about a hundred works, many of which were translations made by himself. His notable pioneer work in the new art helped to fix the English speech and to prepare the way for the Elizabethan era. Died in 1491.

Cazin (*kä'zăN'*), **Jean Charles,** French landscape painter and ceramic designer, was born at Samer in 1841. In 1868, he became director of the art school and curator of the museum at Tours. In 1871, he went to England, where he designed ceramics for the Fulham pottery. After his return to France, he devoted himself to landscape art, in which he attained the foremost rank among French artists of his time. His subjects are chiefly moonlight, twilight, and dusk scenes, which he invests with remarkable feeling and charm. He also became a painter of landscape with religious sentiment in such well-known works as "Judith," "La Terre," "Tobit," and "Hagar and Ishmael," which are now in the Luxembourg. Excellent examples of his paintings are found in the national gallery of Berlin; the Metropolitan museum, New York; and the art institute, Chicago. Died, 1901.

Cecil (*sĕs'ĭl*; *sĭs'ĭl*), **Lord Edgar Algernon Robert,** English statesman, was born in 1864; was educated at Oxford university; served, 1886–88, as a private secretary to his father, the marquis of Salisbury; and practiced law for 19 years prior to his election to Parliament as a Conservative in 1906. He was chosen chancellor of Birmingham university in 1918. In his public career, he opposed any abridgment of the powers of the Church; fought all socialist measures; favored woman suffrage; during the World War, served as minister of blockade; and later became one of the strongest supporters of the League of Nations, receiving, in 1924, the first award of the Woodrow Wilson peace prize of $25,000. He was one of the British representatives in the abortive naval disarmament conference of 1927.

Cecil, William, Lord Burleigh, English statesman, was born at Bourne, 1520. Entering Gray's Inn at the age of 21, he devoted himself assiduously to the study of law. His manifold abilities recommended him to the notice of Henry VIII, who presented him with an office in the common pleas. In 1547, he was appointed master of requests, and his talents soon procured for him the office of secretary of state. When Queen Mary ascended the throne, Cecil, being a Protestant, resigned his official employment, but, as a private gentleman, he maintained amicable relations with the Roman Catholic party. Elizabeth made him secretary of state upon her accession in 1558, and, for 40 years, he was responsible for the wise constructive policy that made her reign famous. Died in 1598.

Cellini (*chĕl-lē'nē*), **Benvenuto,** Italian goldsmith and sculptor, was born at Florence in 1500. He first became known as a chaser and goldworker. At an early period, having been banished from Florence in consequence of a duel, he went to Rome, where he was employed by many distinguished patrons of art. He was afterward allowed to return to Florence. Another affray compelled him to go to Rome, where he secured the favor of Clement VII. Later he accompanied Cardinal Ferrara to France and entered the service of Francis I. He executed many fine works in metal and marble, among them the celebrated bronze group of "Perseus with the Head of Medusa," now in the market place in Florence. His *Autobiography* furnishes one of the most valuable pictures of life in the period of the Renaissance. Died, 1571.

Celsius (*sĕl'sĭ-ŭs*), **Anders,** Swedish astronomer, was born at Upsala, 1701. He studied in prominent observatories in Germany, Italy, and France; published papers on the aurora borealis; and advocated the adoption of the Gregorian calendar. In 1730, he became professor of astronomy at Upsala, where, in 1740, a splendid observatory was erected for him. In 1742, he constructed the scale of the centigrade thermometer, now in general use for scientific purposes. Died, 1744.

Cervantes (*sẽr-văn'tēz*) **Saavedra, Miguel de,** Spanish novelist, was baptized October 9, 1547, at Alcala de Henares, a town of New Castile. The exact date of his birth is not known. He sprang from noble, but not wealthy, parents and was sent to the University of Salamanca and afterward to Madrid. His attention was often diverted from his studies by a strong propensity for writing verse. Cervantes perused anything that attracted his attention and thus gained, besides much other information, an intimate knowledge of the Old Spanish literature.

Cervantes left Spain in 1569 to seek his fortune in Rome. Here he entered the service of Cardinal Giulio Acquaviva; the next year, he enlisted as a private for the relief of Cyprus. In 1571, in the battle of Lepanto, Cervantes received a wound that deprived him of the use of his left hand. Returning to Spain in 1575, he was captured by the Moors and was kept prisoner for five years in Algiers.

Literary Career. After these vain pursuits of fortune, Cervantes dedicated himself to literature. In 1584, he published *Galatea*, a pastoral novel. This same year, he married Dona Catalina de Palacios Salazar and settled in Madrid. He wrote several dramas, none of which was received favorably on the stage.

His *Moral Tales* were supposedly written in Seville, where he was employed for several years following 1588. Subsequently, he resided at intervals in La Mancha, the province which he rendered famous in his great work, *Don Quixote*.

In 1604-05, Cervantes lived with his family at Valladolid, where Philip III held court. In 1605, the first part of *Don Quixote* appeared at Madrid and ran through four editions in one year. For seven years after its appearance Cervantes published nothing. He maintained a studious retirement, yet gained two powerful friends, the count de Lemos and the archbishop of Toledo, whose patronage and money kept him from actual want though not from poverty.

In 1613, Cervantes published his *Moral Tales*, much esteemed for their purity of language and true depiction of life and character. His *Journey to Parnassus* appeared in 1614, and, in the same year, was published at Tarragona a spurious continuation of *Don Quixote*. This sequel Cervantes repudiated in the second part of his *Don Quixote*, (1615), which met with universal applause. His last work was *Persiles y Sigismunda*.

Don Quixote. Cervantes' most celebrated work, *Don Quixote de La Mancha*, has immortalized Spanish literature and language. The interest which it excites never dies; it is interwoven with the very nature of man. Cervantes wrote it to extirpate by ridicule the mass of imitations of the older tales of chivalry, which were then so perniciously affecting the minds and tastes of the people. An unfailing source of amusement lies in the contrast between the lofty, single-minded knight, Don Quixote, and his simple, yet shrewd and earth-seeking squire, Sancho. Cervantes waged literary warfare against the false and improbable, and his genius championed the sublimity of nature and truth. Died, April 23, 1616, the day of Shakspere's death. See *Don Quixote*.

Cesnola (*chĕs'nō-lȧ*), **Count Luigi Palma di,** archeologist, was born near Turin, 1832. He served with the Sardinians in the Crimean war; went to New York in 1860; and fought in the Civil War. Appointed American consul at Cyprus in 1865, he carried out a series of fruitful excavations there; in 1873, his splendid collection of statues, lamps, vases, and inscriptions was purchased by the Metropolitan museum, New York, of which he became director in 1879. He wrote *Cyprus: Its Ancient Cities, Tombs, and Temples*. Died, 1904.

Chadwick, George Whitefield, American composer, was born in Lowell, Mass., 1854. He began musical study under Eugene Thayer and later, in Europe, was a pupil of Jadassohn, Reinecke, and Rheinberger. In 1897, he became director of the New England conservatory of music at Boston. He was elected to the American academy of arts and letters in 1909.

Among American composers, Chadwick ranks second only to MacDowell, whom he surpasses in the treatment of the higher instrumental forms of music, although he is inferior in fertility of invention. His lyric drama, *Judith*, and the comic operas, *Tabasco* and *The Quiet Lodging*, are his most ambitious works for the stage. His musical compositions include also three symphonies; the overtures, *Rip Van Winkle*, *Thalia*, *The Miller's Daughter*, *Euterpe*; the choral works, *The Viking's Last Voyage*, *Lovely Rosabelle*, *Phœnix Expirans*, *The Lily-Nymph;* and some fifty songs and compositions for organ and piano.

Chaliapin (*shȧ-lē-ä'pĭn*), **Theodore,** Russian operatic singer, was born at Kazan, Russia, 1873. Without previous training in music, he joined a comic opera company in 1890, and the natural quality of his voice immediately attracted attention. In 1894, he appeared in grand opera at Petrograd. His intense portrayal of national types in Russian operas made him a prime favorite among his countrymen and abroad. His repertoire includes prominent rôles in *A Life for the Czar*, *Ivan the Terrible*, and *Faust*.

Chamberlain, (Joseph) Austen, English statesman, the son of Joseph Chamberlain, was born at Birmingham, 1863. Educated at Cambridge, Paris, and Berlin, he was elected to Parliament in 1892 as a Liberal Unionist and entered Lord Salisbury's cabinet in 1895. In 1900, he became financial secretary to the treasury, in which capacity he supported his father's unsuccessful efforts for the imposition of import tariffs with preferential rates for British dependencies. Among the important cabinet posts which he filled was the chancellorship of the exchequer, 1903–05 and 1919–21. He became leader of the Unionist party in 1921 and, in 1924, entered Stanley Baldwin's cabinet as secretary of state for foreign affairs. The leading part which he took in negotiating the Locarno treaties in 1925 placed him in the front rank of European statesmen and won for him the award of one-half the Nobel peace prize for that year.

Chamberlain, Joseph, British statesman, was born in London, 1836; was educated in a private school and at University college, London; and joined the firm of Nettlefold, screw makers of Birmingham. He became a member of the town council and was three times mayor, 1873–76, in which capacity he made Birmingham conspicuous among British cities for its municipal improvements. In 1876, he entered Parliament and took his seat with the radicals. He was a member of the cabinet from 1880 until 1886, when his disapproval of Gladstone's Irish policy led to his resignation.

He went to Washington to negotiate regarding the dispute between the United States and Canada on the fisheries question. In 1895, he took office as colonial secretary; was largely responsible for the British attitude preceding the Boer war; and advocated a system of preferential tariffs for British dominions. This policy, however, met defeat at the polls. Died, 1914.

Chamberlin, Thomas Crowder, American geologist and astronomer, was born at Mattoon, Ill., 1843. He graduated at Beloit college in 1866 and later at the universities of Michigan and Wisconsin. He became professor of natural science at the state normal school in Whitewater, Wis., 1869; professor of geology at Beloit college, 1873; president of the University of Wisconsin, 1887; and head of the department of geology at the University of Chicago in 1892, from which position he retired in 1919. He also conducted much special research in geology, being connected with the Carnegie institution. With F. R. Moulton, he formulated the planetesimal theory which has succeeded the theory of Laplace as a working hypothesis in astronomy. Died, 1928. See *Cosmogony*.

Chambers, Charles Haddon, British playwright, was born at Stanmore, New South Wales, Australia, 1860. He entered the New South Wales civil service, 1875. In 1880, he visited England, where he definitely settled in 1882. He became a journalist and story-writer, and later a dramatist. His first play, *One of Them*, appeared in 1886, followed by *The Open Gate* in 1887, which was performed in New York in 1890. These were the first of a series of successful plays, chiefly sentimental comedies of manners, which made him one of the most popular playwrights of England. Among his works are *Captain Swift*, *The Idler*, *The Golden Silence*, and *The Impossible Woman*. Died, 1921.

Chambers, Robert, Scottish publisher, was born in Peebles, 1802. He began business as a bookseller in Edinburgh in 1818 and gave his leisure to literary composition. In 1824, he produced the *Traditions of Edinburgh*, and,

between 1822 and 1834, he wrote 25 volumes. The success of the *Journal* was materially promoted by his essays and his literary insight. In 1844, he published anonymously the *Vestiges of Creation*, which prepared the way for Darwin's *Origin of Species*. The labor of preparing the *Book of Days* broke his health. Among his works are *Popular Rhymes of Scotland*, *History of the Rebellions in Scotland*, *Ancient Sea Margins*, *The Life and Works of Robert Burns*, and *Domestic Annals of Scotland*. Died, 1871.

Chambers, Robert William, American author and artist, was born in Brooklyn, 1865; studied art in Paris, 1886–93; first exhibited in a salon, 1889; and was an illustrator for *Life*, *Truth*, *Vogue*, and other journals. Giving up illustrating for writing, he produced, in the years following 1893, a large number of works, chiefly stories and novels in popular magazines. They include *The Red Republic*, *The Maker of Moons*, *Ashes of Empire*, *Outsiders*, *The Maids of Paradise*, *The Tree of Heaven*, *The Hidden Children*, *The Restless Sex*, *Slayer of Souls*, and *Little Red Foot*; also, the drama *Witch of Ellangowan* and *Iole*, a musical comedy.

Chambers, William, Scottish publisher, was born at Peebles in 1800. In 1814, he was apprenticed to a bookseller in Edinburgh, and, in 1819, he started a business of bookselling for himself, afterward adding printing. Between 1825 and 1830, he wrote the *Book of Scotland* and, in conjunction with his brother Robert, a *Gazetteer of Scotland*. In 1832, he started *Chambers's Edinburgh Journal*; soon thereafter he united with Robert in founding the business of W. and R. Chambers, the best known of whose many publications are, besides the *Journal* and a large series of educational works, a *Miscellany*, *Papers for the People*, the *Cyclopædia of English Literature*, and *Chambers's Encyclopædia*. In 1859, William founded and endowed an institute in his native town. Died at Edinburgh in 1883.

Chaminade (*shä'mē'näd'*), **Cécile Louise Stéphanie,** French composer, was born in Paris, 1861. She made her début as a pianist at the age of 18, later studying under Le Couppey, Savard, and Godard. She composed a large number of songs and instrumental pieces which attained great popularity by reason of their melodiousness and charm, yet without rising to the rank of the greater styles of music. Her works became well known in the principal concert centers of France and England, and, in 1908, she made a successful tour in the United States. The list of her best-known instrumental pieces includes *La lisonjera*, *Pas des amphores*, *Pas des écharpes*, *Au matin*, *Callirhoë*, and *Les amazones*.

Chamisso (*shä'mĭ-sō*), **Adelbert von,** lyric poet and naturalist, was born in 1781 in Champagne, France. He fled during the French Revolution to Germany, where he became a page to the queen of Prussia in 1796. During 1804–06, he collaborated in the publication of the *Musen Almanach*. In 1806, he returned to France and led an unsettled life until 1812, when he began to study medicine in Berlin. In 1813, he wrote the novel *Peter Schlemihl*. During 1815–18, he accompanied, as naturalist, Kotzebue's Russian polar expedition, his *Journal* of which is ranked among the classics of travel. Subsequently he obtained a situation in the botanical garden of Berlin, and was made a member of the academy of sciences. His poems include some of the finest lyrics and ballads in German literature. Died, 1838. See *Peter Schlemihl*.

Champlain (*shăm'plān'*), **Samuel de,** French naval officer and explorer, was born at Brouage, 1567. During the reign of Henry IV of France, he visited many parts of America and formed the first French establishments at Quebec and Montreal. He was made governor of Quebec, from which he was driven by the English in 1631. When peace was restored, he was reinstated. He wrote *Voyages and Travels in New France, called Canada*. Died in 1635.

Champollion (*shän'pôl'yôn'*), **Jean François,** French Egyptologist, was born at Figeac, France, 1790. He was professor of history in the lyceum of Grenoble and afterward professor of Egyptian antiquities in the College of France, Paris. We are indebted chiefly to Champollion for the discovery of the method of interpreting Egyptian hieroglyphics. Among his principal works are *Egypt under the Pharaohs*, *Monuments of Egypt and Nubia*, and an *Egyptian Grammar*, edited by his elder brother, Jean Jacques Champollion, who was also a distinguished archeologist. Died, 1832.

Channing, Edward, American historian, was born in Dorchester, Mass., 1856. He graduated at Harvard, where he taught in the years following 1883, becoming professor of history in 1897. His publications are scholarly works, chiefly in the field of early American history. The most important is his *History of the United States* in several volumes. He was elected to the American academy of arts and letters in 1926.

Channing, William Ellery, founder of American Unitarianism, was born in Newport, R. I., 1780; graduated from Harvard in 1798; and was ordained minister of the Federal Street church in Boston in 1803. During the earlier years of his ministry, he stood upon friendly terms with all orthodox churches. In 1819, however, he preached a sermon in which he advocated the Unitarian doctrine with so much zeal and ability that he was termed the "apostle of Unitarianism." This involved him in controversy despite his antipathy to everything one-sided and dogmatic, whether Unitarian or Trinitarian.

In 1821, he received the title of D. D. from Harvard university. He visited Europe in 1822 and made the acquaintance of several great authors, notably Wordsworth and Coleridge, both of whom were strongly impressed by his personality. His publications include *Evidences of Christianity*, *Address on War*, *Essays on National Literature*, and *Self Culture*. Both his writings and his public discourses were characterized by a vigorous eloquence and a lofty moral earnestness. He died in 1842 and was elected to the American hall of fame in 1900.

Chaplin, Charles Spencer, motion picture actor, was born in London, Eng., 1889. Both his parents were actors. He entered a stage career at seven years of age, displaying a remarkable talent for humorous acrobatic acts. Coming to New York in 1911 with the Fred Karno Company, he was there engaged by George Kessel to play in moving picture productions. Through this medium, Chaplin shortly became a world-wide celebrity. In 1918, he formed his own company and produced *A Dog's Life*, *The Kid*, and other successful comedies. He joined later with Douglas Fairbanks, Mary Pickford, and D. W. Griffith to form the United Artists' Corporation. Under his direction in 1923 was produced *A Woman of Paris*. *The Gold Rush*, 1925, in which Chaplin took the leading rôle, was widely acclaimed as a masterpiece of motion-picture acting.

Chapman, Alvan Wentworth, American botanist, was born at Southampton, Mass., 1809. He graduated from Amherst college in 1830 and studied medicine in Georgia and Florida. He settled at Apalachicola, Fla., in 1846, where he was collector of internal revenue and customs, 1865–69. He devoted his attention to the study of plants and rose to high rank as a systematic botanist. The genus *Chapmannia* was named in his honor, and his *Flora of the Southern United States*, published in 1860, revised and enlarged in 1883, is a standard descriptive work upon the plants of the southern region. Died, 1899.

Chapman, Frank Michler, American ornithologist, was born in Englewood, N. J., 1864. From 1887, he was connected with the American museum of natural history, of which he became curator in 1908. He was the originator there of habitat bird groups. Among his many publications are *Handbook of Birds of Eastern North America*, *Bird Studies with a Camera*, *The Economic Value of Birds to the State*, and *Our Winter Birds*.

Chapman, George, English poet, was born about 1559. He published a translation of the *Iliad* in English ballad measure; afterward translated the *Odyssey* and portions of Ovid, Terence, and Petrarch; and also wrote many plays. He was associated with Jonson, Marston, and others in writing the comedy of *Eastward Ho!*, for which they were imprisoned by King James I. Died, 1634.

Charlemagne (*shär'lĕ-mān*) is the French name of Charles the Great, king of the Franks and Roman emperor. He was born in 742, the son of Pepin the Short and grandson of Charles Martel. His birthplace, according to different traditions, was either Aix la Chapelle or Ingelheim. In 768, he became joint ruler of the Franks with his brother Carloman, whose death three years later left him as sole king in Francia. Opening war against the Saxons in 772, Charles began a series of conflicts which was to last more than thirty years.

Conquests. Crossing the Alps, Charles completely subdued northern Italy as far as the Neapolitan duchy and was acknowledged as king of Lombardy in 774. At Easter of this same year, he visited Rome, where the pope conferred upon him the title "Patrician of Rome." Charles endowed the Church with immense territorial possessions, which were later known as the States of the Church.

His next expedition took him into Spain. He was invited there by an offer of alliance with a Saracen emir, who had revolted from the caliph of Cordoba in 778. On the return of his army through the valley of Roncesvalles near Pamplona, the Gascons fell upon his rear guard and killed one of the Frankish leaders, named Roland, and many other nobles. This defeat was the historical basis of the poetic legend known in the middle ages as the *Ballad of Roland*. From 778 to 812, the Franks made six other expeditions into Spain, the main result of which was finally to deliver France from any further danger of Saracen invasion.

Other conquests awaited the king beyond his eastern frontiers. Charles defeated the Saxons under Wittekind in 780 and, in 788, carried his arms into Bohemia, Bavaria, and Hungary. The Frankish dominion now comprised the whole of France; all Germany and Austria except East

Prussia, eastern Hungary, and Croatia; the northwest corner of Spain; and the entire peninsula of Italy save the kingdom of Naples. Such success called for formal consecration. On Christmas day, 800, the king in great state attended Mass in Saint Peter's at Rome, where Pope Leo III, placing an imperial crown on his head, thrice hailed him as "Augustus, crowned by God, great and pacific emperor of the Romans." The Church became the spiritual guide of the revived Roman Empire of the West, and the Frankish king was the right hand of the Church.

CONSTRUCTIVE ACHIEVEMENTS. Great as a warrior, Charles was even greater as an administrator and civil ruler. He divided the whole empire systematically, placing each division under military, judicial, and civil authority. A real, but short, renascence of learning also took place in the Frankish kingdom. From this reign, the Church became a vast, independent power, co-ordinate in authority with the civil government.

Charles entertained a plan for the union of the newly revived Western Empire with the Eastern Empire through his marriage with the Byzantine empress, Irene. The plan failed, however, by reason of Irene's overthrow. Charles left his dominion to his only remaining son, Louis. Placing the imperial crown upon the altar, he ordered Louis to take it with his own hands, thereby giving him to understand that he wore it in his own right and under no authority but that of God. Charles died on January 28, 814.

Charles I, former king of England, was born in 1600. He was proclaimed king on the death of his father, James I, in March 1625. He was a firm believer in the "divine right of kings." His attempts to rule independently of his subjects, taxing them without the consent of their representatives, precipitated civil war in 1642 between Parliament and the king's supporters. Charles was eventually captured; brought to trial before a court constituted for the purpose; sentenced to death on a charge of treason; and, January 30, 1649, was beheaded. The boldness of this assault on the institution of monarchy created a profound sensation throughout Europe.

Charles I, Charles Francis Joseph, former emperor of Austria and King Charles IV of Hungary and Bohemia, was born in 1887. He was the grandnephew of Emperor Francis Joseph, upon whose death, November 21, 1916, he succeeded to the throne. The empire, then involved in the World War, was suffering from the military strain that ended in defeat two years later. On the dissolution of the country into various new states, Charles retired to a castle on the Danube and later to Switzerland. In 1921, he attempted twice to regain the throne of Hungary, the second time coming with his wife by airplane from Switzerland. After an unsuccessful attempt to take Budapest, he was captured and handed over to the Allies for internment. Died, 1922, in the Portuguese island of Madeira.

Charles II, former king of England, son of Charles I, was born in 1630. He was at The Hague, Holland, when his father was beheaded. He assumed the royal title and was proclaimed king by the Scots. Marching into England, he was defeated by Cromwell at Worcester, 1651, and fled to France. By the policy of General Monk, after Cromwell's death, he was restored to his crown and kingdom in 1660, an event known as the Restoration. In 1662, he married Catherine of Braganza. Charles II was an easy-going man, and is known in history as the "merry monarch." His reign was an inglorious one for England, though it is distinguished by the passing of the Habeas Corpus act, one of the great bulwarks of English liberty next to the Magna Charta. Died, 1685.

Charles V, emperor of Germany and king of Spain, was born at Ghent, February 24, 1500. From his father, Philip of Burgundy, he inherited the Netherlands and Franche Comte. In 1516, on the death of his grandfather Ferdinand, he succeeded, under the title of Charles I of Spain, to the crowns of Aragon and Castile with all their possessions in the New World and in Sicily and Naples. In 1519, on the death of his grandfather Maximilian, Charles was elected German emperor, and, the following year, he was crowned as Charles V of Germany.

Germany was in a state of unprecedented agitation concerning the doctrines proclaimed by Luther. Charles made it his aim to restore tranquillity, and, with this end in view, he summoned, in 1521, the famous diet of Worms, over which he presided in person. The conference, however, failed of its main purpose. In 1522, he reduced to subjection the towns of Castile, which had risen against him. He was likewise successful in his war against the Turks under Soliman the Magnificent and in a long struggle with France. In 1525, the French king, Francis I, became his prisoner at Pavia. The emperor's forces took Rome itself in 1527 and made prisoner Pope Clement VII, who had allied himself with France and with the principal Italian towns. In 1529 at Cambrai, peace was concluded with the pope and France, and, in 1530, Charles was crowned king of Lombardy and emperor of the Romans.

A diet summoned at Augsburg in 1530 for the purpose of settling the religious controversy ended in failure. In 1535, Charles undertook a successful expedition from Spain against the pirate Barbarossa, then established at Tunis. Peace with France was patched up in 1538. Charles then hastened to suppress a revolt in Ghent. In 1542, war about Milan was renewed with France, and, two years later, Francis I was forced to make the unfavorable peace of Crepy.

Though the Council of Trent, in 1545, seemingly made Catholic and Protestant union impossible, Charles still aimed at it. In the second diet of Augsburg, 1548, he proposed a common platform, which was rejected by both parties. The Lutherans rose in arms, and Charles narrowly escaped capture at Innsbruck in 1552. This same year, he made an unsuccessful venture to recover from Henry II of France the bishopric of Metz.

The emperor's principal aim in life had been hopelessly crossed. In 1554, he gave up the kingdom of Naples to his son Philip, and, the next year, he resigned to him the Netherlands. In 1556, Spain and the West Indies passed into the same hands; the imperial dignity was renounced; and the crown was sent to Charles's brother Ferdinand. Broken in health and with no worldly ambitions, Charles sought repose in the sequestered monastery of Saint Yuste, near Plasencia in Estremadura, Portugal. There he died September 21, 1558.

Charles VII, former king of France, was born in 1403. He was a son of Charles VI, on whose death in 1422 Henry VI of England was proclaimed king of France. Henry proceeded to assert his authority by force of arms and had almost succeeded when, in 1428, Joan of Arc came forward and inspired new ardor in the French armies, which she led in person against the English. A series of victories enabled her to have Charles crowned king of France at Reims in 1429. The English were gradually driven from France until, in 1453, Calais alone remained in their hands. Peace and order were restored, a regular army was organized, and commerce was encouraged. Charles VII was timid and irresolute in character and has been much censured for failing to save Joan of Arc from the hands of the English. Died, 1461.

Charles IX, former king of France, son of Henry II and Catherine de' Medici, was born in 1550. He succeeded his brother Francis II in 1560, under the regency of his mother. His reign was marked by almost uninterrupted civil war between the Huguenots led by the Condé and the Catholics headed by Guise. Barbarities and outrages were practiced by both sides, but all other atrocities were eclipsed by the massacre of Saint Bartholomew in 1572. This massacre of the Huguenots received the assent of Charles under the influence of his mother, who planned it for political reasons. Charles continued to be subject to her influence until his death in 1574.

Charles X Gustavus, king of Sweden, son of the count Palatine, was born at Nykoping, 1622. He took part in the Thirty Years' war, and, on the abdication of his cousin Queen Christina, 1654, succeeded to the throne of a kingdom impoverished by her extravagance. He overran Poland in 1655; forced the elector of Brandenburg to enter into an alliance with him; and crushed the forces of the Polish king in a terrible three days' battle at Warsaw, late in July 1656. His next war was with the Danes, when he crossed two arms of the sea on the ice and extorted the Treaty of Roeskilde, 1658, which gave to Sweden the southern parts of the Scandinavian peninsula, previously Danish. In 1659, he was driven from a new attack on Copenhagen by help of the Brandenburgers and the Dutch. Died in 1660.

Charles XII, king of Sweden, son of Charles XI, was born in 1682. He ascended the throne at the age of 15. He had to cope with the combined power of Denmark, Russia, and Poland. He foiled the Danes at Copenhagen, the Russians at Narva, and Augustus II of Poland at Riga; but, being trapped in Russia and compelled to spend a winter there, he was, in July 1709, attacked and defeated by Peter the Great at Poltava, so that he had to take refuge with the Turks at Bender. Here he was again attacked, captured, and conveyed to Demotica, but, escaping, he succeeded in effecting a precarious return to Sweden. Making peace with the czar, he commenced an attack on Norway, but was killed by a musket-shot at the siege of Frederikshald, 1718.

Charles XIV John, king of Sweden and Norway and known before his election to the throne as Jean Baptiste Jules Bernadotte, was born at Pau, France, 1763, the son of a French lawyer. In 1780, he joined the French army; fought in the Revolutionary wars with distinction; became general in 1794 and minister of war in 1798. In 1800, he suppressed an uprising of the Chouans, commanding the army in La Vendée. In 1804, Napoleon made him one of the 18 marshals of France. For brilliant services at Austerlitz in 1805, he was made prince of Pontecorvo, and, in 1809, he won new fame at Wagram.



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AMERICAN SINGERS

Geraldine Farrar	Lillian Nordica	Mary Garden
Alice Nielsen	Louise Homer	Alma Gluck
Ernestine Schumann-Heink	Emma Eames	Olive Fremstad



NOTED AMERICAN WOMEN

Jane Addams
Photo by P. Thompson

Carrie Chapman Catt
Photo by Brown Bros.

Anna Howard Shaw
Photo by Brown Bros.

Alice Freeman Palmer
Photo by Brown Bros.

Ella Flagg Young
Photo by Brown Bros.

Frances Elizabeth Willard

Charlotte Cushman

Sarah Platt Decker

Harriet Beecher Stowe

Being chosen crown prince of Sweden by the Swedish diet in 1810, he accepted, going immediately to Stockholm and changing his name to Charles John. He became powerful and popular and soon joined the allies against Napoleon, contributing materially to his defeat at Leipzig in 1813. He compelled Denmark to give up Norway, which he annexed to Sweden. Upon the death of Charles XIII in 1818, he became king of Sweden and Norway. His reign was able, uniformly peaceful, and resulted in great progress and prosperity. He was the only one of Napoleon's generals to found a dynasty. Died, 1844.

Charles Martel, duke of Austrasia, was born about 689. He was the natural son of Pepin d'Heristal and succeeded his father in the dukedom in 714. As mayor of the palace, he possessed a regal power, which he employed with little interference from the titular Frankish kings. He gained many victories, the principal of which was that over the Saracens under their general, Abd-er-Rahman, whom he defeated with great slaughter between Tours and Poitiers in 732. It was in consequence of this victory that he was called *Martel*, or "The Hammer." At his death in 741, he divided his dominions between his sons, Carloman and Pepin. The latter became the first king of France of the Carlovingian race.

Charles the Bold, the last duke of Burgundy, was born in 1433 and succeeded his father Philip the Good in 1467. He conceived the ambition of restoring the kingdom of Burgundy. This involved the defeat of the king of France, his feudal superior, and the conquest of territories including Lorraine and part of Switzerland. Louis XI was compelled to sign a treaty by which he gave up part of his territory. Alsace and Lorraine were won, partly by the help of Charles's father-in-law, Edward IV of England. In Switzerland, however, Charles suffered three severe defeats, in the last of which, 1477, he was slain. With his death terminated the long resistance of the great French vassal chiefs to the centralized power of the monarchy.

Charnwood, Lord Godfrey, English author, was born at Alresford, England, in 1864. He was graduated at Oxford university with high honors in 1887 and, from 1892 to 1895, was a Liberal member of Parliament, representing Oxford. In 1909, he was elected mayor of Lichfield, England. His best-known publications are biographical works entitled *Arbaham Lincoln* and *Theodore Roosevelt.* He was created baron in 1911.

Charpentier (*shär'päN'tyā'*), **Gustave,** French composer, was born at Dieuze, Lorraine, 1860. He received his musical education at the Paris conservatory, studying under Massenet and winning the *grand prix de Rome*, 1887. He composed songs, orchestral pieces, and a symphonic drama, *The Poet's Life*, which was produced in 1892. In 1898, he captivated musical Paris by the production of his opera *Louise*, of which he wrote both words and music. This distinctly modern work, characterized by a dramatic libretto and music of notable beauty and originality, won him high rank among the French "impressionists." In 1912, he was elected to the first Paris academy of fine arts.

Chase, Salmon Portland, American jurist and statesman, was born in Cornish, N. H., 1808. After graduation from Dartmouth in 1826, he taught in a boys' school at Washington, D. C., where he studied law under William Wirt. He was admitted to the bar in 1829; began practice in Ohio; and, in 1834, was appointed solicitor in Cincinnati for the bank of the United States. His defense of J. G. Birney in 1837 for harboring a fugitive slave brought him into prominence as an antislavery advocate.

In 1849, the Democrats and Free-Soilers elected him to the United States Senate, where he was a vigorous opponent of slavery extension. He joined Sumner and Seward in opposing the Kansas-Nebraska bill. In 1855, he was elected governor of Ohio by the Republicans. Chosen secretary of the treasury by President Lincoln at the outbreak of the Civil War, he conducted the finances of the government during this trying period with rare skill and success, ranking among the nation's greatest secretaries of the treasury. In 1864, he was appointed chief justice of the United States supreme court and as such presided in 1868 over the impeachment trial of President Andrew Johnson. Died, 1873.

Chase, William Merritt, American painter, was born at Franklin, Ind., 1849. He began art study in Indianapolis, continuing at New York and, under Wagner and Piloty, in Munich. He established a studio in New York, 1878, and rose to the foremost rank among American artists, painting figures, portraits, and still life with remarkable skill. Many examples of his work are found in the leading American art galleries. Among the best known are "A Broken Jug"; "Ready for a Ride"; "Alice," art institute, Chicago; "Lady in Black," Metropolitan museum, New York; "Flying Clouds"; "The Orangery"; and numerous paintings of still life, especially fish, which are of notable excellence. He was also a distinguished teacher, a national academician, and a member of the American academy of arts and letters. Died in 1916.

Chateaubriand (*shà'tō'brē'dăN'*), **François Auguste, Vicomte de,** French author and statesman, was born, 1768, at Saint Malo in Brittany. He traveled in America, 1791-92, and, while still there, learned of the flight and arrest of Louis XVI. He immediately returned to France, but found himself unable to stem the revolutionary tide and so retired to England. In 1800, he returned to Paris and wrote for the *Mercure de France.* In this journal, he first printed his tale of *Atala* with a preface lauding the first consul, Bonaparte. Its success was remarkable, but his *Génie du Christianisme* was even more successful. Bonaparte appointed Chateaubriand secretary to the embassy in Rome.

In 1806, Chateaubriand commenced a pilgrimage to the Holy Land; visited Greece, Palestine, Alexandria, and Carthage; and returned through Spain to France in 1807. He was created a peer of France, 1815; was ambassador at London in 1822, and became minister of foreign affairs in 1823. His *René* and *Atala*, like Goethe's *Werther* in Germany and Byron's *Childe Harold* in England, marked the inception of the romantic movement in France and a new era in literary art. Died at Paris, 1848.

Chatham, William Pitt, first earl of. See *Pitt, William.*

Chatrian, Alexandre. See *Erckmann-Chatrian.*

Chatterton, Ruth, American actress, was born in New York, 1893. She was the leading woman with Henry Miller in *The Rainbow* in 1912 and starred later in *Daddy Long Legs, Marriage of Convenience, Moonlight and Honeysuckle,* and other popular plays.

Chaucer (*chô'sẽr*), **Geoffrey,** the "father of English poetry," was born most probably about 1340, though the traditional date is 1328. He is believed to have studied at Cambridge and later at Oxford. While a student, he wrote *The Court of Love* and *The Book of Troilus and Cressida.* In 1359, he served under Edward III in his French campaign and was made prisoner. After his release and subsequent marriage, he entered public life. He was sent on an embassy to Genoa in 1372. On his return, he was appointed comptroller of the customs for wools, and, in the same year, the king granted him a pitcher of wine daily for life. In 1377, he proceeded to Flanders in the retinue of Sir Thomas Percy, afterward earl of Worcester, and, for several years thereafter, he was employed in embassies and other business connected with the public service.

Chaucer was thus a man of affairs as well as a poet. He was learned in the science, the theology, and the literature of his time. His poems are numerous and exhibit great poetic excellence. They include *The Flower and the Leaf, The Romaunt of the Rose, The Canterbury Tales, The Book of the Duchess, The House of Fame,* and *The Legend of Good Women.* He died at London in 1400 and was buried in Westminster Abbey. See *Canterbury Tales, The.*

Chékov (*chĕ'kôf*), **Anton,** Russian novelist and dramatist, was born at Taganrog, southern Russia, 1860. He first worked as an assistant to his father, a former serf, who was a provision merchant. At 17, he wrote a tragedy in verse, and shortly after entered the University of Moscow to study medicine. At the same time, he began writing short stories, which soon became successful. His collections of *Humorous Stories* and *In Twilight,* published in 1887, and *Morose Folks* in 1890 attracted wide attention; his reputation increased so that he soon occupied, with "Gorky" and Andréiev, the foremost place among contemporary Russian writers.

In 1887, Chékov was compelled by ill health to go south and, in 1890, he became resigned to a life of sickness. He spent his remaining years in the Crimea, where he wrote five plays which have established him as a dramatist of the first rank. The list of his stories includes *Memoirs of a Stranger, Fires, Ward No. 6, A Tedious Story,* and *The Steppe.* Among his most important plays are *The Swan Song, A Proposal, Ivanoff, The Boor,* and *The Cherry Orchard.* Died, 1904. See *Cherry Orchard, The.*

Cheops (*kē'ŏps*), or **Khufu,** was a king of Egypt of the fourth dynasty. He built the greatest of the pyramids, and the foundation of many temples is attributed to him. According to Herodotus, he was an oppressive ruler, but, as nearly as can be ascertained, the Egyptians regarded him a wise and powerful monarch. He reigned about 56 years. According to Lepsius, he lived about 2800–2700 B. C.

Chesterfield, Philip Dormer Stanhope, Earl of, English politician, writer, and man of fashion, was born in 1694, and educated at Cambridge. He represented Saint Germans, Cornwall, in the House of Commons, and in 1726 succeeded to the earldom. He was distinguished at the court of George II, and, in 1728, was sent as ambassador extraordinary to Holland. Politically, he was among the opponents of Sir Robert Walpole. In 1745, he was appointed lord lieutenant of Ireland, and afterward became secretary of state. He is now far more widely known by his letters of *Advice to His Son* than by his public services. Died, 1773.

Chesterton, Gilbert Keith, English journalist and author, was born at Campden Hill, Kensington, in 1874. He was educated at Saint Paul's school and for a time studied art. He began his literary career by reviewing art books for the *Bookman*. Subsequently, he contributed to magazines and reviews in both England and America. By his attractive, piquant prose style and by the notable range and brilliancy of his fiction, essays, biography, and criticism, he soon firmly established himself in the front rank of English writers.

Among Chesterton's numerous works are *Twelve Types, Browning, Heretics, Dickens, The Man who was Thursday, Orthodoxy, Defendant, The Wild Knight, Greybeards at Play, Tremendous Trifles, The Victorian Age in Literature, Magic, The Flying Inn, The Wisdom of Father Brown, Irish Impressions, The Superstition of Divorce, Evils of Eugenics,* and *What I Saw in America.*

Chevreul (*shĕ-vrûl'*), **Michel Eugène,** French chemist, was born at Angers, 1786. He studied chemistry at the Collège de France in Paris. Later, he lectured at the Lycée Charlemagne, and held a technical post at the Gobelins. In 1826, he became a member of the academy of sciences, and, in 1830, was made professor at the museum of natural history. Among his discoveries were those of margarin, olein, and stearin. The results of his researches, especially the practical applications of his theory of saponification, led to the establishment of vast industries. In addition to his notable researches on animal fats, he conducted valuable investigations on color contrasts. His hundredth birthday was celebrated in 1886 with great enthusiasm, Harvard university awarding him the degree of doctor of laws. He died in 1889.

Cheyne (*chā'nē*), **Thomas Kelly,** English biblical scholar, and joint editor of the *Encyclopædia Biblica*, was born in London, 1841. He was educated at Merchant Taylors' school and at Worcester college, Oxford. He was rector of Tendring in Essex from 1880 to 1885, when he became Oriel professor of the interpretation of Scripture at Oxford and canon of Rochester. A member of the Old Testament Revision Company, he contributed much to magazines and reviews. His numerous writings include *Job and Solomon, Founders of Old Testament Criticism, Introduction to Isaiah, The Veil of Hebrew History, The Christian Use of the Psalms,* and *Critica Biblica.* Died in 1915.

Childs, George William, American publisher and philanthropist, was born in Baltimore, 1829. He began mercantile life as a clerk in a bookstore in Philadelphia. In 1847, he established an independent business and, in 1849, became partner in the publishing firm of Childs and Peterson. In 1864, he purchased the Philadelphia *Public Ledger*, which he developed into a journal of great influence. He devoted his wealth to beneficence, erecting a memorial window in Westminster Abbey to Cowper and George Herbert, a monument to Leigh Hunt at Kensal Green, and a fountain to Shakspere at Stratford-on-Avon. He is said to have educated 800 boys and girls. Died, 1894.

Choate (*chōt*), **Joseph Hodges,** American lawyer and diplomat, was born in Salem, Mass., 1832. He was graduated from Harvard college, 1852, and from Harvard law school, 1854. In 1855, he was admitted to the bar, and, in 1856, he began law practice in New York City. He was identified with many famous legal cases, and was one of the committee of seventy which, in 1871, broke up the Tweed ring. From 1899 to 1905, he was the ambassador of the United States to England, and, in 1907, he sat as the first United States delegate to The Hague Peace Conference. He was noted as a public and after-dinner speaker. His writings include *Addresses on Abraham Lincoln, Admiral Farragut,* and *Rufus Choate.* Died, 1917.

Choate, Rufus, American lawyer, statesman, and orator, was born at Essex, Mass., in 1799. After graduating at Dartmouth college, he entered upon the study of law at Cambridge and in Washington. He practiced at Danvers, Salem, and Boston, successively, and, in 1841, was elected to the Senate, which he quitted in 1845. After the death of Daniel Webster, Choate became the recognized leader of the Massachusetts bar, and acquired a national reputation. His foresight led him to anticipate the Civil War, and to do more to conciliate the South than was by some considered wise. As an advocate and orator, he may be classed with the most distinguished masters of modern eloquence. He died at Halifax, N. S., 1859, and was elected to the American hall of fame in 1915.

Chopin (*shō'pĭn'*), **Frédéric François,** distinguished Polish pianist and composer, was born near Warsaw, 1810, of French-Polish parentage. He appeared in public with great success when only nine years old and was hailed as "the new Mozart." In 1830, he started upon a proposed world tour, proceeding through Germany to Paris where he was warmly encouraged by Cherubini and Liszt. Remaining in Paris, he met in 1836 the noted author, George Sand, with whom he lived in close connection for ten years.

Chopin composed almost exclusively for the piano. In the field of emotional music he has been justly styled "the poet of the piano." His waltzes, mazurkas, nocturnes, preludes, and other compositions are peculiar in melody, rhythm, and harmony, and possess great and enduring charm. He was a pianist of the first rank, and his playing, like his music, had a most captivating grace. After a trip to England in 1847, he fell ill and died of consumption in Paris, 1849. See *Music:* · *The Romanticists.*

Chown, Samuel Dwight, Canadian clergyman, was born at Kingston, Ont., in 1853. He received his education in Kingston and at Victoria university. He was ordained to the Methodist ministry in 1879 and occupied prominent pastorates in Montreal and Toronto conferences. He became an active advocate of temperance, prohibition, and other moral and social reforms, and contributed numerous articles on these subjects to magazines.

Christian IV, king of Denmark and Norway, and duke of Schleswig-Holstein, was born in Zealand, 1577, and was elected successor to the throne in 1588. He became King in 1593. Beginning in 1611, he carried on against Charles IX of Sweden and his successor, Gustavus Adolphus, a successful war, known as the Kalmarian war, which, in 1613, ended in an advantageous peace. As leader of the Protestants in the Thirty Years' war, Christian was not successful. His legislative and financial reforms, together with his love and patronage of the arts and sciences, gained the esteem of his people. He founded the present capital of Norway which bears his name. Died, 1648.

Christian X, Carl Frederik Albert Alexander Wilhelm, king of Denmark, the son of Frederik VIII, was born at Charlottenlund, 1870. In 1898, he married Alexandrine, duchess of Mecklenburg. Upon the death of his father in 1912, Christian X succeeded to the throne of Denmark.

Christina (*krĭs-tē'nă*), queen of Sweden, was born at Stockholm in 1626. She succeeded her father, Gustavus Adolphus, in 1632. After her coronation in 1650, she fell under the influence of favorites, and ceased to interest herself in state affairs. She resigned the crown to her cousin, Charles Gustavus, in 1654, embraced Catholicism, and lived for some time at Paris. On the death of Charles Gustavus, in 1660, she vainly endeavored to regain the throne. Christina was one of the most accomplished women of her time, a remarkable linguist, and the friend and correspondent of many famous *literati* and scientists. She died at Rome in 1689.

Christy, Howard Chandler, illustrator and writer, was born in Morgan county, Ohio, 1873. He studied art in New York at the national academy and also at the art students' league under W. M. Chase. He became an illustrator on New York periodicals. During the Spanish American war, he went to Cuba with the "rough riders," and won wide notice by his letters and illustrations. He is known by his illustrations of contemporary authors, executed with marked facility and spirit, and by his picturesque types of society women. Among his portraits are those of Presidents Harding and Coolidge and of Charles Evans Hughes.

Chrysler, Walter Percy, American motor car manufacturer, was born at Wamego, Kans., in 1875. He was apprenticed to a mechanic in a Union Pacific machine shop at 17. Rising rapidly, he was superintendent of motive power for the Chicago and Great Western system at 33. By 1912, he had become manager of the Pittsburgh works of the American Locomotive Company.

As early as 1905, Chrysler purchased an automobile to study its mechanical construction. In 1916 he became president of the Buick Motor Car Company, later a division of General Motors. Following a difference with W. C. Durant, president of General Motors, he reorganized the Willys-Overland Company. A similar service for the Maxwell Motor Corporation led to the formation of the Chrysler Corporation in 1923. This organization forged rapidly ahead to the front rank. In 1928, it acquired the Dodge Bros. properties and became the third largest unit of the American motor car industry.

Chrysostom (*krĭs'ŏs-tŭm; krĭs-ŏs'tŭm*), **Saint John,** one of the Greek fathers of the Church, was born about 347. From an early age, he devoted himself to a life of prayer and asceticism, and, in 398, was made bishop of Constantinople by the emperor Arcadius. As an orator and theologian, Chrysostom ranks among the most important doctors of the early Church. His zeal as a reformer made him many enemies, among them the empress Eudoxia. He was summoned before a synod at Chalcedon, deposed and banished, but an insurrection of the people led to his immediate recall. He was soon afterward deposed again, and conveyed to the Taurus mountains, whence he was ordered to proceed to Pityus, on the Euxine, but died of hardships on the journey, at Comana, in 407.

Church, Frederick Edwin, American landscape painter of the Hudson River school, was born at Hartford, Conn., 1826. He was a pupil of Thomas Cole and first attracted

notice by his scenes from the Catskill mountains. Later, he traveled in South America, and painted his "Heart of the Andes," "Morning on the Cordilleras," and "Cayambe." He also made a sketching trip to Greece and Palestine. His "Tropical Scenery" and "View of Niagara Falls from the Canadian Shore" are among his best works. Died in 1900.

Churchill, John. See *Marlborough, John Churchill, Duke of.*

Churchill, Winston, American novelist, was born at Saint Louis, Mo., in 1871. He was graduated from the United States naval academy, 1894. After serving as an editor of the *Army and Navy Journal* of New York, 1894, and as managing editor of the *Cosmopolitan Magazine*, 1895, he devoted himself to the production of historical fiction. By careful, substantial work, he has won high rank as a historical novelist and has also admirably portrayed contemporary life. His works include *The Celebrity, Richard Carvel, The Crisis, The Crossing, Coniston, Mr. Crewe's Career, A Modern Chronicle, The Inside of the Cup, A Far Country,* and *The Dwelling Place of Light.*

Churchill, Winston Leonard Spencer, English statesman and writer, was born in 1874. He was educated at Harrow and at Sandhurst, entered the army in 1895, and fought with distinction in India, 1897, and in the Sudan, 1898. During 1899-1900, he acted as South African correspondent of the London *Morning Post.* He was present at the battles of Spion Kop, Vaal Krantz, and Pieters; also at the engagements of Johannesburg and Diamond Hill, and at the capture of Pretoria. Elected to Parliament in 1900, he rapidly rose to prominence. He was undersecretary of state for the colonies, 1906–08; president of board of trade, 1908–10; home secretary, 1910-11; first lord of the admiralty, 1911–15; minister of munitions, 1917; and secretary of state for war, 1918–21. In 1921, he was made secretary of state for the colonies and, in 1924, became chancellor of the exchequer, in which capacity he was largely responsible for the restoration of British currency to a gold basis in 1925. His numerous writings include *The River War, My African Journey, Liberalism and the Social Problem,* and *The World Crisis—1915.*

Cibber (*sĭb'ẽr*), **Colley,** actor, manager, dramatist, and poet, was born in London, 1671. He was educated at Grantham. In 1690, he joined the theatre royal, where he remained, except for short intervals, during his whole theatrical career of 43 years. In 1696, his first comedy, *Love's Last Shift,* was produced, the author playing Sir Novelty Fashion; it established his fame as both dramatist and actor. Cibber also prepared the acting version of Shakspere's *Richard III* now commonly used on the stage. He was made poet laureate in 1730. Died, 1757.

Cicero, Marcus Tullius, the foremost orator of ancient Rome, was born in Arpinum, Italy, 106 B. C. He inherited a large estate from his father and, as a boy, went to Rome, where he studied law, oratory, Greek philosophy, and Greek literature. At the age of 17, he served a few years in the Social war under Sulla. After his return, he devoted several years to the further study of law and of oratory. At 26, he attained his first brilliant success in the law courts; but poor health sent him to travel for the next few years in Greece and Asia Minor, where he profited by the society of eminent professors of rhetoric and letters.

Political Career. At the age of 30, Cicero entered public life in Rome and soon became quæstor of Sicily, where he obtained the information that enabled him, in 70 B. C., to impeach Verres, the corrupt governor of Sicily. This success gave him a high reputation, and, in 66 B. C., he became prætor. In that year, he delivered his speech in support of the Manilian law.

In 63 B. C., at the age of 44, Cicero was elected consul, in which capacity he checkmated the dangerous conspiracy of Catiline, delivering in the senate his famous *Orations against Catiline* and having some of the conspirators executed. The vigor and courage with which he conducted himself at this crisis won for him, by popular acclamation, the title of "father of his country."

Cicero's fortune had now reached the culminating point. His archenemy, the demagogue Clodius, assailed him with the charge of acting contrary to the constitution by putting citizens to death without appeal to the people. Thus in 58 B. C. he was obliged to go into exile in Thessalonica, and his countryseats were torn down. Pompey and Cæsar had suffered Cicero to undergo this humiliation for their own purposes; but the following year, wearied by the arrogance of Clodius, they let it be understood that the persecution should cease, and Cicero was recalled from exile.

Cicero returned to Rome; but he felt powerless in the presence of the leaders of factions, and henceforth he vacillated in his allegiance between Pompey and Cæsar. In 53 B. C., he attained a seat in the college of augurs, and, two years later, he was sent as proconsul to Cilicia, a post in which he conducted himself so meritoriously that he was received in triumph on his return to Rome.

When civil war was imminent between Cæsar and Pompey, Cicero first endeavored to reconcile the two rivals. This hope proving vain, he gave his allegiance to Pompey after a period of vacillation. Following the defeat of Pompey, however, at the battle of Pharsalus, he recommended himself to Cæsar.

The next few years Cicero devoted to literature and philosophy. He was divorced from Terentia, his first wife, and married the heiress Publia. His beloved daughter Tullia died. Upon the assassination of Cæsar in 44 B. C., Cicero hoped to regain political influence, and he opposed Antony in admirable orations called *Philippics* from their analogy to the orations of Demosthenes against Philip of Macedon. His eloquence won him Antony's implacable animosity.

Writings. Cicero's works may be classed as political, philosophical, and personal. The political works comprise 56 speeches delivered in the forum and courts, among which are *For the Manilian Law, Against Catiline, Against Verres, For Milo,* and the *Philippics.* Cicero also produced several treatises on the subject of oratory, of which *On the Orator* is the most important. From his philosophical treatises we derive most of our knowledge of the Greek systems of thought and culture as they were diffused in the Roman world. His *Familiar Letters,* half of which are addressed to his lifelong friend Atticus, possess consummate literary style.

Character. Cicero was not a great nor a wise politician, but, throughout his whole career, he was a true patriot. His chief fault was his vanity. He presents to us the Latin language at the highest stage of its development, and he will ever stand pre-eminent as an example of the best moral and intellectual culture of the ancient world. He was slain in 43 B. C. by order of Antony. The hired assassin was a man whom Cicero, as a lawyer, had successfully defended.

Cimon (*sī'mŏn*), Athenian commander, was the son of Miltiades, the conqueror at Marathon. With his patron Aristides, he was placed over the Athenian contingent to the allied fleet, which, under Pausanias, continued the war against Persia, 477 B. C. His greatest exploit was his encounter with a Persian fleet at the river Eurymedon, 466, when he destroyed or captured some 200 out of 350 ships, and defeated the land forces on the same day. He advocated a close alliance with Sparta; and, when the Helots revolted, he twice led an army to support the Spartans. But the second time, having lost the confidence of his allies, he was ignominiously dismissed. At Athens he was opposed by the democracy, headed by Pericles, who procured his ostracism. He was recalled about 454, and was instrumental in obtaining a five years' armistice with Sparta. He died in 449 B. C.

Cincinnatus (*sĭn'sĭ-nā'tŭs*), **Lucius Quinctius,** Roman consul, was born about 519 B. C. About 460, he was chosen consul, and two years later was made dictator. When the messengers from Rome arrived to tell him of his new dignity, they found him plowing on his small farm. After a dictatorship of 16 days he returned to his simple country life. When 80 years old, he was again made dictator and put down a threatened insurrection. By the later Romans, Cincinnatus came to be regarded as the model of old-fashioned virtue. He died about 430 B. C.

Claflin, Horace Brigham, American merchant, was born at Milford, Mass., in 1811. Locating in early life at Worcester, Mass., he built up one of the leading mercantile establishments in New England. In 1843, he removed to New York, where he organized the firm which, in 1851, became known as Claflin, Mellin and Company. Despite the fact that his business interests were injured thereby, Claflin publicly expressed strong antislavery views. At the beginning of the Civil War, the firm was seriously affected, because of its extensive trade in the South. Yet, owing to Claflin's business ability and to his reputation for square dealing, the firm's trade increased immensely during the war, reaching, in 1865, a total volume of more than 70 million dollars for the year. From 1865 until Claflin's death in 1885, the sales of the firm were probably greater than those of any other American mercantile establishment.

Clairaut (*klĕ'rō'*), **Alexis Claude,** French mathematician, was born in Paris, 1713. He displayed remarkable precocity, read works on infinitesimal analysis and conic sections at the age of 10, presented a memoir on curves to the French academy in his 13th year, published a work on curves of double curvature at 16, and was elected to the academy at 18. In astronomy he solved the celebrated problem of three bodies in the case of the sun, the earth, and the moon. He demonstrated the figure of the earth, proving the flattening toward the poles; explained the motion of the moon; and computed the return of Halley's comet. In mathematics he contributed valuable studies in curves and differential equations. He was the author of important scientific works. Died in 1765.

Clark, Alvan Graham, American optician and astronomer, was born at Fall River, Mass., in 1832. He was the son of Alvan Clark (1808–87), maker of astronomical instruments, and was associated with his father in the

manufacture of telescopes. The chief refracting telescopes of recent times are the product of their establishment. The great lenses for refracting telescopes made by Alvan Graham Clark include those of the Naval observatory at Washington (26 inches in diameter), of the Nicholas central observatory at Pulkovo, Russia (30 inches in diameter), of the Lick observatory, Mount Hamilton, California (36 inches in diameter), and of the Yerkes observatory of the University of Chicago (40 inches in diameter). The last mentioned is the largest lens in actual use in a refracting telescope. He was an active astronomical observer and made numerous discoveries of double stars. Died in 1897.

Clark, Champ, American politician, was born in Anderson county, Kentucky, 1850. He was educated in Kentucky university, Bethany college, and at the Cincinnati law school. During 1873-74, he was president of Marshall college. He worked as a hired hand on a farm, was clerk in a country store, was editor of a country newspaper, and became prosecuting attorney of Pike county, Missouri. In 1893, he was elected to Congress and, except for the term 1895–97, was re-elected continuously until 1921. He was chairman of the Democratic national convention at Saint Louis in 1904. At the Democratic national convention in 1912, he was a prominent candidate for the presidential nomination but was defeated on the 46th ballot by Woodrow Wilson. From 1911 to 1919, he was speaker of the House of Representatives. Died, 1921.

Clark, Francis Edward, American clergyman and founder of the United Society of Christian Endeavor, was born of New England parentage at Aylmer, Quebec, 1851. He was graduated from Dartmouth college in 1873 and from Andover theological seminary in 1876. From 1876 to 1883, he was pastor of Williston Congregational church, Portland, Maine. In February 1881, he organized the Williston Young People's Society of Christian Endeavor. He was pastor of Phillips church, South Boston, from 1883 to 1887. Thereafter he devoted his time to the Christian Endeavor work as president of the United Society of Christian Endeavor, as president of the world's Christian Endeavor Union, and as editor of the *Golden Rule*.

In this work, he made five journeys around the world. His writings include *Our Vacations, Looking Out on Life, Danger Signals, Our Journey Around the World, The Mossback Correspondence, World-Wide Endeavor, The Continent of Opportunity, The Holy Land of Asia Minor*, and other works. Died, 1927. See *Christian Endeavor*.

Clark, John Bates, American economist, was born at Providence, R. I., 1847. He was graduated at Amherst college, 1872, and carried on special studies in economics and history in the universities of Heidelberg and Zurich. After serving as professor of political economy at Carleton college, Smith college, and Amherst college, he became in 1895 professor of political economy at Columbia university, where he rose to foremost rank among American political economists. He retired in 1923.

The prominent features in his system are his distinction between static and dynamic factors in the economic field, his derivation of value from effective utility, and his interpretation of interest in terms of the productivity of capital. His writings include *The Philosophy of Wealth, The Distribution of Wealth, The Control of Trusts, The Problem of Monopoly, Essentials of Economic Theory, Wages, Capital and Its Earnings*, and numerous articles in economic reviews and journals.

Clark, or **Clarke, William,** American explorer, was born in Virginia, 1770. In 1804–06, in company with Meriwether Lewis, he conducted a notable exploring expedition from Saint Louis to the mouth of the Columbia river. He was governor of Missouri territory, 1813–21, and superintendent of Indian affairs at Saint Louis from 1822 until his death in 1838.

Clarke, Adam, British Methodist preacher and author, was born at Moybeg, Ireland, about 1762. He was sent out as a Methodist preacher by Wesley in 1782 and was president of the conferences of 1806, 1814, and 1822. A thorough student of Church history, Oriental languages, the classics, and natural science, he published many works and assisted in the preparation of an Arabic Bible. His most important work was his *Commentary on the Bible*. He died at London, 1832.

Clarke, Charles Cowden, English writer and critic, was born at Enfield, Middlesex, in 1787. He early developed a passion for the theater, and made frequent visits to London, where he formed the friendship of Leigh Hunt, Shelley, Hazlitt, and Charles and Mary Lamb. In 1820, he became a bookseller in London, and shortly after partner as music publisher with Alfred Novello, whose sister, Mary Victoria, he married in 1828. A year later, Mrs. Cowden Clarke began her famous *Concordance to Shakespeare's Plays*. In 1834, Clarke entered on a twenty years' course of public lectures on Shakspere and other dramatists and poets which brought him much celebrity and profit.

Some of Clarke's lectures were published, including his *Shakespeare Characters* and *Molière Characters*. The joint productions by Clarke and his wife were the valuable *Shakespeare Key, Cassell's Illustrated Shakespeare, Recollections of Writers*, full of reminiscences of Keats, Lamb, Dickens, and other literary friends. In 1856, Clarke and his wife removed to Nice and, in 1861, to Genoa, where Charles died in 1877 and his widow in 1898.

Clarke, James Freeman, American theologian and writer, was born at Hanover, N. H., 1810. He was graduated at Harvard in 1829 and at Cambridge divinity school in 1833. He was pastor of a Unitarian church, Louisville, Ky.; professor of natural theology at Harvard, 1867–71; and lecturer on ethnic religions, 1876–77. In 1841, he aided in founding the church of the disciples, Boston, of which he was pastor from 1841 to 1850 and from 1854 to 1888. Among his writings are *The Ten Great Religions, Events and Epochs in Religious History, Self-Culture, Manual of Unitarian Belief, Essentials and Nonessentials in Religion*, and *Anti-Slavery Days*. He died in 1888.

Clarke, John Hessin, American jurist, was born at Lisbon, Ohio, in 1857. He was educated at Western Reserve university where he graduated in 1877 and received his master's degree in 1880. He was admitted to the bar in 1878 and practiced law in his native town, 1878–80. He practiced law in Youngstown, Ohio, from 1880 to 1897 and in Cleveland from 1897 to 1914, when he was made United States district judge. From 1916 to 1922, he was associate justice of the United States supreme court.

Claude (*klōd*) **Lorraine,** or **Claude Gelée,** early French landscape painter, was born at Chamagne in Lorraine, 1600. Left an orphan at the age of 12, he found a home with an elder brother, who was a carver in wood at Freiburg, and there showed some signs of genius. He afterward studied at Rome and at Naples. In return for his teaching, in the house of Agostino Tassi at Rome, he ground his master's colors and did all the drudgery of the house. He made a tour of Italy, France, and Germany, suffering much through poverty; but, in 1627, he returned finally to Rome where he speedily made himself famous.

Lorraine's works are remarkable for their warm, rich coloring and brilliant light effects. He painted Italian landscapes with unsurpassed perfection and notable poetic feeling. He was the foremost painter of classic landscape in his century and one of the world's greatest landscape artists. Most of his paintings are in England, but his work is also represented in the principal galleries of Europe. He died at Rome, 1682.

Claudius (*klâ'dĭ-ŭs*), or **Tiberius Claudius Drusus Nero Germanicus,** Roman emperor, was born at Lugdunum, 10 B. C. He was weak and timid in his youth, and was treated with neglect even by his mother. When Caligula was killed, 41 A. D., Claudius was made emperor by the soldiers. This was the first time that an emperor was chosen by the army. He was disposed to be a kind and just ruler, but by his wives and favorites was led to do some cruel things.

The conquest of Britain was begun by Claudius, and it would probably have become a Roman state had he not been recalled to Rome. From his conquests in Germany he took the title of Germanicus. He did much good for his people and greatly improved Rome, building the harbor of Ostia and the Claudian aqueduct. In 54 A. D. he was poisoned by his wife Agrippina, who wanted the empire for her son Nero.

Clausius (*klow'zē-ŭs*), **Rudolf Julius Emanuel,** eminent German physicist, was born at Koslin, Pomerania, 1822. He was educated at Berlin, and held professorships in physics at Zurich, Wurzburg, and Bonn. In 1850, he stated the second law of thermodynamics, namely, that "heat cannot of itself pass from a colder to a hotter body," and is regarded as one of the founders of thermodynamics. In his theory of electrolysis he assumed that the ions are not in complete union, but are in part free, and that the uncombined ions are brought by the action of the electric current to the anode and cathode. He was one of the most eminent mathematical physicists of his century and made many notable researches in electricity, heat, and molecular physics. Died, 1888.

Clauss-Szavardy, Wilhelmina, Czeck pianist, was born in Prague, 1834. She received her musical education at the Proksch institute at Prague. At the age of 15 she made a successful concert tour in Germany, but in Paris was not immediately successful, notwithstanding the admiring support of Berlioz. Later, under the special tutelage of Madame Ungher-Sabastier, the singer, she took musical Paris by storm, and soon achieved great popularity throughout France, Germany, and England. She excelled as an interpreter of Bach and Beethoven, and ranks with Clara Schumann and Arabella Goddard as one of the three greatest women pianists of the 19th century. In 1857, she married Frederick Szavardy, the author, who died in 1882. After 1852, she resided permanently in Paris. Died, 1907.

Claxton, Philander Priestly, American educator, was born in Bedford Co., Tenn., 1862. He received his education at the University of Tennessee, at Johns Hopkins, and in Germany. He was superintendent of schools in North Carolina from 1883 to 1893, when he was made professor of pedagogy at the North Carolina state normal and industrial college, where in 1896 he became director of the practice and observation school. From 1897 to 1901 he edited the *North Carolina Journal of Education*. He was professor of education, 1902–11, at the University of Tennessee. From 1902 to 1911 he served as superintendent of the Summer school of the South. He was appointed United States commissioner of education in 1911 and held this position until 1921, when he was made provost of the University of Alabama. In 1923, he was made superintendent of schools in Tulsa, Okla.

Clay, Henry, American statesman, was born in Hanover county, Va., 1777. He studied law and was admitted to the bar, 1797, thereafter taking up his residence in Lexington, Ky. In 1806, he was appointed senator and, in 1809, was again chosen to fill a vacancy. In 1811, he was sent to the House of Representatives, where he was immediately elected speaker. A strong advocate of nationalism, he denounced the claims put forth by England as to right of search. He was a strenuous supporter of the war with that country and in consequence was sent, in 1814, as one of the commissioners to sign the treaty of peace at Ghent. On his return he exerted all his talents in favor of the independence of South America, and labored hard to eradicate all European influence from the American continent.

Clay, however, is best known as the author of the famous Missouri compromise, and of the compromise of 1850, known as Clay's "omnibus" measure. In 1824, he was an unsuccessful candidate for president, but was made secretary of state by J. Q. Adams, the successful candidate. In 1832, he ran against Jackson and was defeated. He was then returned to the United States Senate, in which he played a leading part for many years ensuing, especially in the tariff compromise of 1833 whereby a conflict with South Carolina was averted.

Clay was a candidate for president before the first Whig national convention in 1839, but Harrison was nominated and elected. Harrison's death and Tyler's course brought Clay forward as the choice of his party in 1844, when an unsuccessful effort was made to elect him. Clay's name was once more presented to the Whig national convention of 1848, but Taylor was nominated over him and elected. In 1842, he resigned his seat in the Senate, but was persuaded to return to it after 1844, and bore a leading part in effecting the slavery compromise of 1850.

Though not successful as an aspirant to the presidency, he was a gallant party chief, an eloquent orator, a skillful legislator, wielding unsurpassed influence not only over his friends but even over his political antagonists. He died, 1852; was elected to the American hall of fame, 1900.

Clayton, John Middleton, American statesman and diplomat, was born at Dagsboro, Del., 1796. He was graduated from Yale, 1815, and became a noted lawyer. He was United States senator, 1829–37, 1845–49, and 1851–56. During 1849–50, he was secretary of state under President Taylor and negotiated with the British government the historic Clayton-Bulwer Treaty. Died, 1856.

Clemenceau (*klā'mäN'sō'*), **Georges,** French statesman, was born in Vendee in 1841. He migrated to the United States in 1865 and, as a war correspondent, entered Richmond with Grant's army. In 1869, he returned to France and practiced as a physician in Montmartre. Entering politics, he became an ardent supporter of Gambetta, whom he succeeded as leader of the Extreme Left. He was a member of the Chamber of Deputies, 1876–93. In 1902, he was elected senator, retaining his seat until after the end of the World War. In 1880, he established a daily newspaper, *La Justice*, and thereafter displayed great ability and influence as a journalist. Espousing the cause of Dreyfus, he founded, in 1903, a daily to defend him called *L'Aurore*, in which Zola wrote his famous letter "I Accuse."

After 1890, Clemenceau came to be regarded as a destroyer of ministries, his effective oratory, brilliant editorials, and biting epigrams causing even the most powerful political leaders to fear him. In 1906, he was chosen premier, resigning in 1909. During his ministry, he carried out with great firmness the law separating the church and the state and, although a radical, put down a great miners' strike by prompt use of the military.

Pledged from the days of the French defeat in 1870 to the ultimate restoration of Alsace-Lorraine, Clemenceau, during the World War, became one of the most inspiring patriotic leaders of France. At the critical period following the downfall of the Painlevé ministry, Clemenceau was again chosen premier (November 16, 1917) and, by unflagging energy, united the French nation for the supreme effort which, within a year, led to complete victory for the Allies. In 1919, Clemenceau was made leader of the French delegation to the Peace Conference at Versailles and was chosen to preside over its sessions. He undertook a tour of the United States in 1923, speaking in various cities in defense of the French foreign policy. See *Peace Conference*.

Clemens, Samuel Langhorne ("Mark Twain"), American humorist and novelist, was born at Florida, Mo., in 1835. He was educated in the common schools, Hannibal, Mo.; was apprenticed to a printer when about 12 years of age; and served for a time as a Mississippi pilot. He engaged in 1861 as private secretary to his brother when the latter was appointed territorial secretary of Nevada. In 1862, he became editor of the Virginia City (Nev.) *Enterprise*. Here he first displayed his powers as a writer of humor and sarcasm. He then alternated between mining and newspaper work until he began lecturing and writing books.

In 1884, Clemens engaged in the publishing enterprise of C. L. Webster and Co., the failure of which some ten years later involved him in heavy losses. He paid much of the firm's indebtedness and restored his own fortune by proceeds of lectures and books. While his characteristically American humor sometimes offends good taste, its originality and comic force counterbalance its defects. Few other novelists have so clearly pictured the irresponsible American boy as has Clemens in the escapades of Tom Sawyer and Huckleberry Finn. He lived abroad for many years and was greatly admired in England, where the University of Oxford conferred upon him the degree of doctor of letters. In 1904, he was elected member of the American academy of arts and letters.

His works include *The Jumping Frog*, *The Innocents Abroad*, *The Gilded Age* (with C. D. Warner), *Roughing It*, *Adventures of Tom Sawyer*, *A Tramp Abroad*, *The Prince and the Pauper*, *Life on the Mississippi*, *Adventures of Huckleberry Finn*, *A Yankee at the Court of King Arthur*, *Pudd'nhead Wilson*, *Tom Sawyer Abroad*, *A Dog's Tale*, *Eve's Diary*, *A Horse's Tale*, *Christian Science*, and *Autobiography of Mark Twain*. He died in 1910 and was elected to the American hall of fame in 1920. See *Innocents Abroad*; *Prince and the Pauper, The*; *Pudd'nhead Wilson*; *Sellers, Colonel Mulberry*; *Tom Sawyer*, in *Literary Plots, Characters, and Allusions*.

Clement of Alexandria, or Titus Flavius Clemens, Greek theologian of the early Church, was born about 150 A. D. He was educated under many teachers, and finally studied in a Christian school at Alexandria, where he entered the Church. About 190, he succeeded Pantænus as the head of the catechetical school, which became renowned on account of his own and Origen's teachings.

Clement was thoroughly versed in Greek philosophy, literature, and history and ranked high as a theologian, although overshadowed by Origen, his celebrated pupil. In his view Greek philosophy was a divinely inspired preparation for Christianity. His chief works are *Exhortation to the Greeks*, *The Instructor*, and *The Stromata*. He wrote also a tract entitled *Who is the Rich Man that Shall be Saved?* During the persecution, about 203, he left Alexandria, visiting Palestine and Asia Minor, but the place and the date of his death, which occurred about 215, are unknown.

Clements, Frederic Edward, American botanist, was born at Lincoln, Nebr., in 1874. He was educated at the University of Nebraska, from which he graduated in 1894 and received the degree of doctor of philosophy in 1898. From 1894 to 1906, he was assistant professor of botany, and, during 1906-07, was professor of plant physiology, University of Nebraska. He was head of the department of botany, University of Minnesota, from 1907 to 1917, when he became an associate of the Carnegie institution of Washington. In the field of plant ecology, he has made many valuable contributions to science. Among his published works are *The Phytogeography of Nebraska* (with Roscoe Pound), *Research Methods in Ecology*, *Plant Physiology and Ecology*, *Genera of Fungi*, *Minnesota Mushrooms*, *Plant Succession*, *Plant Indicators*, *Aeration and Air Content*, and *Flower Families and Ancestors*.

Cleon, Athenian politician and advocate of democracy, son of Cleænetus, was by occupation a leather dealer. He first became known by his opposition to Pericles, causing the latter's conviction for misuse of public funds. In 427 B. C., he urged severe penalties against the revolting populace of Mytilene. In 425, he induced the Athenians to impose harsh terms upon Sparta, and, in co-operation with Demosthenes, he ended the siege of Sphacteria in 20 days. In 422 B. C., while in charge of a campaign to recover the city of Amphipolis, he was defeated and slain. Although denounced as a demagogue by Aristophanes and Thucydides, he was for some years the leading man in Athens, able in public administration, and a zealous advocate of war with Sparta.

Cleopatra (*klē'ō-pā'trà*), queen of Egypt, celebrated for her beauty, was born in 69 or 68 B. C. She was the daughter of Ptolemy Auletes, by whose will she was left joint sovereign with her brother Ptolemy, 51 B. C. Expelled by the latter, she sought the assistance of Julius Cæsar, who restored her to the throne in conjunction with a younger brother. She

afterward followed Cæsar to Rome, and, in 41 B. C., captivated Mark Antony, who rejected Octavia for her sake. A quarrel with Octavius ensued. The fleet of Antony and Cleopatra was defeated at the battle of Actium, and Cleopatra, followed by Antony, fled to Egypt, where they committed suicide in the year 30 B. C.

Cleveland, (Stephen) Grover, 22d and 24th president of the United States, 1885–89 and 1893–97, was born in Caldwell, N. J., 1837. He received an academic education, and, in 1855, went to Buffalo, N. Y., where he became clerk in a law office. He was admitted to the bar in 1859, was assistant district attorney from 1863 to 1866, sheriff of Erie county from 1870 to 1873, and, in 1881, was elected mayor of Buffalo. His veto of extravagant appropriations directed outside attention to him and led to his nomination and election as governor of New York in 1883.

In 1884, Cleveland was elected president of the United States, Democrat, over James G. Blaine, Republican. In 1888, he was again the Democratic nominee, but was defeated by Benjamin Harrison. He then returned to law practice, locating in New York City. In 1892, he was again elected president as a Democrat, defeating President Harrison. In 1896, the Democratic party having declared for the free coinage of silver, Cleveland withheld his support from the ticket and the platform. After his second retirement from the White House, he took up his residence at Princeton, N. J., where he died, 1908.

Clews, Henry, banker, was born in Staffordshire, Eng., 1836. He was intended for the ministry, but he left school at 15 to enter mercantile life in New York, where his father had taken him for a visit. At the outbreak of the Civil War, he was invited by the secretary of the treasury to become agent to sell government bonds. He rose to prominence in finance and, in 1877, organized the firm of Henry Clews and Company, its members pledging themselves never to take any speculative risk. He wrote *Twenty-eight Years in Wall Street* and *The Wall Street Point of View.* Died, 1923.

Clinton, De Witt, American statesman, was born at Little Britain, N. Y., 1769. He graduated at Columbia college, and, after studying law, entered the lower house of the New York legislature in 1797, where he soon became the leader of his party in the state. He was chosen United States senator in 1802, but left the Senate to become mayor of New York City. On the question of war with England, he competed for the presidency with Madison in 1812, receiving 89 electoral votes. He was elected governor of New York four times. His greatest service to the state was in urging the construction of the Erie canal and pushing the measure assiduously until he saw that great enterprise completed and the canal open for traffic. He died at Albany, N. Y., 1828.

Clinton, George, American general and statesman, was born in 1739. In the French and Indian war he served as lieutenant at the capture of Fort Frontenac, 1758. After the war he practiced law. During the struggle for independence, he sat in the Colonial Congress, and was made a brigadier general. He was the first governor of New York, serving, 1777–95, and again, 1801–04. Objecting to some of the provisions of the Federal Constitution, he did all in his power to prevent New York from adopting it. In 1805, he was chosen vice president of the United States and served continuously until his death in 1812.

Clinton, Sir Henry, an English general, was born about 1738. He succeeded Sir William Howe as commander in chief in America, fought at Bunker Hill and at Long Island, and captured Charleston. His course was marked by bravery and good conduct, but not with success. After his return to England he was appointed governor of Limerick and later of Gibraltar, where he died in 1795.

Clive (*kliv*), **Kitty,** British actress, the daughter of William Raftor, a Jacobite lawyer from Kilkenny, was born in London in 1711. She appeared at Drury Lane about 1728, and continued to play chiefly at that theater until 1769, when she quitted the stage. In 1732, she married George Clive, a barrister, but they soon parted. She was a friend of Garrick, Handel, Horace Walpole, and Dr. Johnson, the last remarking to Boswell that "in the sprightliness of humor he never had seen her equaled." She died at Strawberry Hill, 1785.

Clive, Robert, Baron, English statesman and soldier, founder of the British Indian Empire, was born at Styche, in Shropshire, 1725. He went to India in 1744 as a writer under the East India Company, but three years later relinquished the civil for the military service, in which he greatly distinguished himself. In 1753, he visited England and, in 1755, returned to India with rank of lieutenant colonel. Scarcely had he arrived when the nabob of Bengal captured Calcutta, and threw some of his prisoners into the memorable "black hole of Calcutta," from which very few came out alive. The victory of Plassey, 1757, was Clive's retaliation for these wrongs. He was then made governor of Bengal, but two years afterward returned once more to England, when he was created Baron Clive of Plassey. In 1765, he went again to Bengal, as president, but finally returned to England in 1767. His last years were embittered by the attacks of his enemies. In a fit of gloom he committed suicide in London, 1774. See *Black Hole of Calcutta.*

Clovis I (*klō'vis*), son of Childeric I, was born about 466, and is regarded as the real founder of the French monarchy. He succeeded Childeric in 481. The victory of Soissons, which he gained over Syagrius in 486, rendered him master of all the Roman possessions in the center of Gaul. Victorious when opposed to the Germans at Tolbiac near Cologne in 496, he is said to have made a vow embracing Christianity, and to have kept his promise. With 3000 Franks, he was baptized by Saint Remigius, archbishop of Reims. He conquered Alaric II, king of the Visigoths, in 507, and gained most of the south provinces. Died in Paris, 511.

Cobb, Henry Ives, American architect, was born at Brookline, Mass., 1859. He was educated at the Massachusetts institute of technology and Harvard university, graduating from the latter in 1880. In 1881, he removed to Chicago. He was architect for the Newberry library, the University of Chicago, the Church of the Atonement, and many other prominent buildings in Chicago and other cities. He was one of the board of architects for the World's Columbian exposition, 1893, and, from 1893 to 1903, was special architect for the United States government. Throughout the country he acquired a large general practice, his commissions including the Pennsylvania State capitol; the United States government buildings at Chicago, League island, and Annapolis; the new city hall and courthouse building, Chicago; the American university at Washington, and many other notable buildings.

Cobb, Irvin Shrewsbury, American writer and correspondent, was born at Paducah, Ky., 1876. He was educated in public and private schools, and at an early age became a reporter and a contributor to comic weeklies. At 19 he edited the Paducah *Daily News.* In 1904, he became special writer and editor of the humorous section of the New York *Evening Sun,* and occupied a similar position with the New York *Evening World* from 1905 to 1911. In 1911, he was engaged as staff contributor to the *Saturday Evening Post,* which he represented as war correspondent in Europe, 1914-15.

Cobb is the author and collaborator of several plays and musical comedy skits, among them *Funabashi, Mr. Busybody, Back Home,* and *Guilty as Charged.* His published books include *Back Home, Cobb's Anatomy, The Escape of Mr. Trimm, Roughing It De Luxe, Europe Revised, Local Color, The Thunders of Silence, The Abandoned Farmers, One Third Off,* and *Sundry Accounts.* He also wrote the *New York Through Funny Glasses* series, *The Hotel Clerk* series, *Live talks with Dead Ones, Making Peace at Portsmouth, The Belled Buzzard, The Island of Adventure,* and numerous contributions to magazines.

Cobden, Richard, English statesman and economist, was born at Heyshott, Sussex, in 1804. He was the son of a poor farmer, went to an inferior school in Yorkshire, and began life as a clerk. At 21 he became a commercial traveler, and at 24 set himself up at Manchester in the calico-print business, in which he was notably successful. By systematic self-education and travel he prepared himself for a larger field. His pamphlet, *England, Ireland and America,* published in 1835, revealed a new force in the political world. He was active in forming the Anti-Corn-Law league in 1839, and was elected to Parliament in 1841.

Cobden devoted his energies and sacrificed his fortune to secure the repeal of the Corn laws, which was effected in 1846. His supporters came to his financial aid with a national testimonial of £75,000. He continued in Parliament until 1857, always advocating a peace policy, the reduction of armament, and international arbitration. His name will be forever identified with free trade, of which he was the most effective advocate of his time. He died in 1865.

Cockran, William Bourke, lawyer and orator, was born in County Sligo, Ireland, 1854. He came to the United States in 1871, taught in a private academy, and, later, was principal of a public school in Westchester county, N. Y. He then became a lawyer and rose to prominence in New York City politics. At the Democratic national conventions of 1884 and 1892, he made noteworthy speeches, opposing the nomination of Cleveland. He was a member of Congress, 1887–89 and 1891–95, as a Democrat. In 1896, he became advocate of the gold standard and campaigned for McKinley. On issue of anti-imperialism, he returned to the Democratic party, 1900, and campaigned for Bryan. He again served in Congress, from 1904 to 1909, when he resumed the practice of law. In 1920, he was once again elected to Congress. Died in 1923.

Cody, Henry John, Canadian prelate and educator, was born at Embro, Ont., 1868. He was educated at the University of Toronto and, having entered the Anglican ministry, became rector of Saint Paul's church, Toronto,

in 1899 and was later appointed a canon of the diocese. He helped to found Ridley college at Saint Catharines, Ont., and Havergal college, Toronto; was professor of systematic theology at Wycliffe college, Toronto; and, in 1918, having been elected to the Ontario legislature, became minister of education, resigning the next year. In 1921, he was elected archbishop of Melbourne, but declined the honor.

Cody, William Frederick, American frontiersman, scout, and showman, known as "Buffalo Bill," was born in Scott county, Iowa, in 1846. In 1851, his parents removed to Kansas, where his father was killed five years later in the border warfare. He found himself the head of the family at the age of ten. In 1860, he became a rider of the pony express. At the outbreak of the Civil War he served as government scout and guide and, in 1863, enlisted in the cavalry. At the end of the war he entered into a contract with the Kansas Pacific railroad to supply buffalo meat to its laborers, whence he was named "Buffalo Bill."

He served in the army as a scout from 1868 to 1872, when he became a member of the Nebraska legislature. In 1876, he served in the Sioux war and, at the battle of Indian creek, killed Chief Yellow Hand in personal combat. In 1883, he organized his noted "Wild West" show, which he took to Europe in 1887. In 1901, he established a school of rough riders on his lands in Wyoming. He wrote several books on frontier life including *The Adventures of Buffalo Bill* and *True Tales of the Plains.* He was the last notable frontier scout in American history. Died, 1917.

Coffman, Lotus Delta, American educator, was born in Salem, Ind., 1875. He was educated at Indiana State normal school, Indiana State university, and Columbia university. From 1896 to 1907, he was principal and superintendent of schools in Indiana, and, from 1907 to 1909, he was supervisor of the Training school at Charleston, Ill. Following a period of study at Columbia university, he was professor of education in the University of Illinois, 1912–15. In 1915, he was made dean of the college of education in the University of Minnesota, and, in 1921, he was chosen president of the university.

Cohan (*kō-hăn'*), **George Michael,** American comedian and playwright, was born at Providence, R. I., 1878. He first appeared on the stage at 9 years of age in *Daniel Boone,* and, when 12 years old, appeared in *Peck's Bad Boy.* Later, in *The Four Cohans* he became notably popular on the vaudeville stage. From 1899 to 1914 he wrote, produced, and acted in a large number of plays and musical comedies, all of which were very popular, and, while not dramatically pretentious, possessed the merit of wholesome humor.

Among Cohan's plays are *The Wise Guy, The Governor's Son, Little Johnny Jones, Forty-five Minutes from Broadway, The Yankee Prince, Get-Rich-Quick Wallingford, Broadway Jones, Seven Keys to Baldpate,* and *The Miracle Man.* He wrote also *Popularity, Fifty Miles from Boston, The Honeymooners, The American Idea, The Man Who Owns Broadway,* and many popular songs.

Coke (*kōōk; kōk*), **Sir Edward,** English jurist and law writer, was born at Mileham, in Norfolk, in 1552. He was educated at Norwich grammar school and at Cambridge university. Admitted to the bar in 1578, he early acquired a high reputation. He became solicitor-general in 1592 and attorney-general in 1594. In his prosecution of Essex, Raleigh, and others, he showed much harshness, but his loyalty gained him, in 1606, the chief-justiceship of the common pleas. In this position and in that of chief justice of the king's bench, 1613, he opposed the claim of King James I to exercise prerogatives and was temporarily deposed in 1616. Entering Parliament in 1620, he there resisted the king's encroachments; was imprisoned in the Tower in 1622; and, in 1628, took the chief part in drawing up the petition of right. The remainder of his life was spent in compiling his famous legal commentary, *Coke upon Littleton.* Died, 1634.

Colbert (*kōl'bâr'*), **Jean Baptiste,** French statesman and minister of finance in the reign of Louis XIV, was born at Reims, France, 1619. His whole life was devoted to financial and fiscal reforms, and to the encouragement of commerce and manufactures. To him the kingdom was indebted for the enlargement of its navy, for the acquisition of many of its foreign possessions, and for a large number of internal improvements. He reorganized the royal academy of painting and sculpture, and founded the academy of sciences and the academy of architecture. The gardens of the Tuileries, the Hôtel des Invalides, the façade of the Louvre, and several of the quays along the Seine were all the work of Colbert. He died in 1683.

Colburn, Warren, American educator and textbook writer, was born at Dedham, Mass., in 1793. He was graduated at Harvard in 1820, and, in the same year, opened a private school in Boston. His *First Lessons in Mental Arithmetic,* published in 1821, was a standard school text for more than half a century. It was translated into many languages and had an enormous sale. He published also other textbooks on arithmetic and algebra and prepared a series of school readers. Died in 1833.

Colby, Frank Moore, American editor and educator, was born at Washington, 1865. He was graduated from Columbia university, New York, in 1888. After serving as acting professor of history, Amherst college, 1890-91; lecturer of history, Columbia, 1891–95; instructor of history and economics at Barnard college, 1891–95; and professor of economics, New York university, 1895–1900, he resigned to become an editorial writer. He was on the editorial staff of the *Commercial Advertiser,* 1900–02. In 1900, he became editor of the *New International Encyclopædia.* During 1905-06, he was American editor of *Nelson's Encyclopædia.* His published works include *Outlines of General History, Imaginary Obligations,* and *Constrained Attitudes.* Died, 1925.

Cole, Rossetter Gleason, American musician and composer, was born at Clyde, Mich., 1866. He was graduated at the University of Michigan in 1888, and, after teaching languages in high schools, 1888–90, he studied composition and organ, 1890–92, in Berlin. He became musical director at Ripon college in 1892; was professor of music at Grinnell college, 1894–1901; acted as musical editor in Chicago, 1902–07; and was director of the school of music, University of Wisconsin, 1907–09. In 1908, he was made professor of music for summer sessions in Columbia university. His published compositions include *The Passing of Summer* (a lyrical cantata), *Hiawatha's Wooing, King Robert of Sicily,* a *Fantaisie Symphonique* and a *Rhapsody* for the organ, and some 70 other compositions for chorus, piano, organ, and orchestra. He wrote *Choral and Church Music* in *The Art of Music* series.

Cole, Thomas, pioneer American landscape painter, was born at Bolton, England, 1801, and came to America in 1819. He studied in Philadelphia and New York; associated with Durand and Trumbull; traveled three years in Europe, but strongly preferred American scenery to that of the Old World. He was the founder of the Hudson River school of painting, from which American landscape art has developed. Among his best-known allegorical works are "The Voyage of Life," "Course of Empire," and "Expulsion from Eden." His landscapes are mostly in private collections. Five of his paintings, however, are in the Metropolitan museum, New York. Died at Catskill, 1848.

Cole, Timothy, American wood engraver, was born at London, England, 1852, and came to the United States, 1857. He studied in New York under Bond and Chandler, and, in 1875, entered the employment of the *Century Magazine,* then called *Scribner's.* In 1883, he went to Europe to engrave the old masters. He finished the Italian series in 1892, the Dutch and Flemish series in 1896, the English series in 1900, the Spanish series in 1907, and the French series in 1910. Later, he began to engrave a series of old masters in American public and private galleries.

By many critics, Cole is regarded as the foremost modern wood engraver. He is notably effective in his use of the white line, in his appreciation of light and shade, and in reproducing the personality and atmosphere of his subject. His writings include *Notes to Old Italian Masters, Monograph on the Lives of Dutch Masters,* and *Notes to English Masters.* In 1913, he was elected member of the American academy of arts and letters.

Coleridge, Samuel Taylor, British poet, critic, and philosopher, was born in Devonshire in 1772. He was sent to Christ's Hospital school and subsequently studied at Cambridge, where he obtained the prize for the best Greek ode. He was the founder of modern Shaksperian study; introduced German literature and Kant's philosophy into England; and won enduring fame as a poet by a small volume of notably excellent verse. His *Christabel, The Rime of the Ancient Mariner,* and *Kubla Khan* rank among the finest poems in English. Like De Quincey, he fell short of the highest attainments of his genius through long enslavement to opium. Among his other works are *Sibylline Leaves, Biographia Literaria, Remorse,* and *Aids to Reflection.* He died in London, 1834. See *Ancient Mariner, The.*

Coleridge-Taylor, Samuel, English composer, was born in London, 1875. He was of African descent through his father, a native of Sierra Leone. His mother was an English woman, and he received his education under English influence. He entered the royal academy at 15 and made a distinguished record, winning the composition scholarship in 1893. After studying three years with Villiers-Stanford, he turned his attention entirely to musical composition. His principal works are symphonies, ballads, and waltzes for the orchestra; the operetta, *Dream-Lovers;* choral pieces with orchestra, including *Hiawatha's Wedding, The Atonement, Endymion's Dream,* and *A Tale of Old Japan;* chamber music, piano pieces, and many songs. He died at London in 1912.

Colet (*kŏl'ĕt*), **John,** English theologian and educator, was born probably in London about 1467. He was educated at Oxford, and traveled in Paris and Italy, where he made the acquaintance of Budæus and Erasmus. Upon his return to England, he lectured on the various books of the New Testament until 1505, when he was made dean of Saint Paul's in London. In 1509, he devoted a part of a large inheritance to the establishment of Saint Paul's school in London where William Lily was first head master. By his liberal opinion and his frankness in denouncing corruption in the Church, he was influential in paving the way for the Reformation. Died, 1519.

Coligny (*kō'lēn'yē'*), **Gaspard de,** French admiral and general, was born at Chatillon sur Loing, 1517. Introduced at court, he served under Francis I in Italy. Under Henry II he was made an infantry colonel and, in 1552, admiral of France. On the death of Henry II, Coligny became a Protestant and a friend of the prince of Condé. Coligny went to court and was apparently well received by Charles IX, but the enmity of the Guises was stirred up against him, and an attempt was made to assassinate him. This attempt at individual murder was but a preliminary step to the general massacre of the Huguenots, which took place soon afterward, and in which Coligny was basely slaughtered, 1572.

Collier (*kŏl'yēr*), **Jeremy,** English clergyman and controversialist, was born in Cambridgeshire, 1650. He was educated at Caius college, Cambridge, afterward becoming rector of Ampton, near Bury Saint Edmunds, and lecturer at Gray's Inn. His reply to Burnet's defense of King William, 1688, cost him some months in Newgate prison. He next waged warfare on the crown with incisive pamphlets and, in 1692, was arrested on suspicion of being a partisan of the Stuarts. In 1698, he published his *Short View of the Immorality and Profaneness of the English Stage*, which fell like a thunderbolt among the playwrights. Collier continued to preach and, 1713, was consecrated bishop. He died in London, 1726.

Collingwood, Cuthbert, Lord, English admiral, was born at Newcastle upon Tyne, 1750. He entered the navy at eleven, and from 1778 his career was closely connected with that of Nelson, whom he followed up the ladder of promotion step by step. Among the great naval victories in which he took a prominent part were those of Lord Howe off Brest in 1794, of Lord Jervis off Cape Saint Vincent in 1797, and of Nelson at Trafalgar in 1805, where he held the second command. A peerage was his reward. After several years' uneventful service in the Mediterranean, he died at sea, 1810, and was buried beside Nelson in Saint Paul's.

Collins, Michael, Irish patriot and military officer, was born at Woodfield, Klonakilty, Ireland, 1892. He was educated in the local schools, and, at 15, entered the civil service as a clerk. In the Easter rebellion of 1916, he was a member of the party that seized the general post office in Dublin. He was made prisoner and, after his release some months later, became one of the most active workers for Irish freedom. In 1918, he was imprisoned for a time in Sligo jail for sedition. While still a refugee, he was elected to the Dail Eireann, and later became finance minister. He was an active advocate of the Sinn Fein cause and took a prominent part in the party councils. After the ratification of the treaty with Great Britain, Collins was made commander in chief of the forces of the Irish Free State. While repelling an attack by a party of irregulars, he was killed near Crookstown, 1922.

Collins, William Wilkie, English novelist, was born in London, 1824. He was educated at a private school. Early in life he adopted the profession of the law, became a student at Lincoln's Inn, and was called to the bar. He soon inclined to literature and a meeting with Dickens, in 1851, decided his career. In the creation of baffling mystery, Collins had no superior in his time. His first novel was called *Antonina, or the Fall of Rome*. This was followed by *Basil, Hide and Seek, After Dark, The Dead Secret, The Woman in White, No Name, Armadale, The Moonstone, Man and Wife, The New Magdalen, The Law and the Lady, The Two Destinies, The Fallen Leaves, Heart and Science, The Legacy of Cain*, and *Blind Love*. He died in London, 1889.

Colonna (*kō-lŏn'nä*), **Vittoria,** Italian poetess, daughter of Fabrizio Colonna, grand constable of Naples, was born in the year 1490. When four years old she was betrothed to a boy of the same age, Ferrante d'Avalos, son of the marchioness Pescara. At 17 they were married. After her husband's death in the battle of Pavia, 1525, she found her chief consolation in the cultivation of her poetical genius. Her Platonic friendship with Michelangelo, who addressed many of his sonnets to her, is well known. Cardinal Bembo, Luigi Alamanni, and Baldassare Castiglione were among her literary friends. Tender melancholy and spiritual exaltation characterize her poems. Died in Rome, 1547.

Colt, Samuel, American inventor, was born in Hartford, Conn., 1814. He early conceived the idea of revolving firearms, and, in 1835, took out a patent for the weapon since known as "Colt's revolver." He established a company for the working out of his patent and built at Hartford one of the most extensive armories in the world. Died, 1862.

Columbus, Christopher, navigator and discoverer, was born at Genoa, Italy, in 1451, the son of a weaver. Little is known definitely about his early life. In 1472, he was a weaver in Savona. Two years later, he made a voyage to Chios, and, in 1476, to England. On the latter voyage, his ship was attacked by pirates and he was compelled to take refuge for a while in Lisbon. He settled there the following year, and, in 1479, he married the daughter of Perestrello, a distinguished Italian navigator in the Portuguese service. The charts and memoranda of his father-in-law were placed in the hands of Columbus, who was inspired by them to devote his life to geographical discovery.

Preparations for Great Voyage. Letters of dubious authenticity exist, purporting to be a correspondence between Columbus and Toscanelli in 1481 on the feasibility of a western passage to Asia. In 1482, Columbus is supposed to have made several voyages to the coast of Guinea, and he claimed to have measured the length of a degree at the equator. This claim implies that Columbus was familiar with the view of the Greek geographer Ptolemy that the earth was a sphere.

Columbus saw important authority and illimitable wealth as the reward of his proposed discovery; but all earthly gains were subordinated to the anticipated triumphs of the cross among new and vast populations. He first vainly applied for financial aid to Genoa and then to John II of Portugal he proposed unsuccessfully his daring scheme of reaching India by the western ocean. In 1485, in the south of Spain, Columbus carried his project to the great dukes of Medina Sidonia and Medina Celi. But his only direct gain was a recommendation to Queen Isabella of Castile, who, with her husband, Ferdinand of Aragon, was then occupied in campaigns against the Moors. They half-heartedly entertained the schemes of Columbus, 1487–90. At length, in the summer of 1490, he pressed with such earnestness for a distinct reply to his application that a conference was held, which reported unfavorably on his scheme of discovery.

Through Juan Perez de Marchena, a former confessor of the queen, Columbus ultimately succeeded in convincing Martin Alonzo Pinzon, the head of a family of navigators at Palos. More interviews with Isabella followed, and, at last, on April 17, 1492, she and Ferdinand signed the so-called capitulations, by which Columbus was authorized to search for and take possession of certain islands. Three vessels were made ready: the *Pinta* and *Niña*, commanded by the brothers Pinzon, and the *Santa Maria* under Columbus himself. They sailed August 3, 1492.

Discovery of America. After the ships had passed beyond the Canary islands, lamentations and great fear broke out amid the crew. The admiral, however, courageously suppressed all mutiny. At last, they picked up riverweeds and a branch of thorn with red berries. Joy and hope ran high, for they knew land must be near. On Friday, October 12, 1492, they landed on an island of the Bahamas, where Columbus solemnly planted the cross; called it San Salvador; and took possession of it in the name of Spain. To his dying day, Columbus believed that he had reached the confines of India, and, for this reason, the aborigines of the New World have ever since been called Indians.

Later Voyages. Henceforth the biography of Columbus is unimportant, when compared with the grand and primal fact of the discovery itself. Intrigue and mortifications saddened his triumph, and he was continually harassed by disputes and greed among the colonists who accompanied his later expeditions.

Having returned to Palos from his first voyage on March 15, 1493, he sailed again in September from Cadiz with 17 ships. He discovered Jamaica and the Caribbee islands, but calumnies at home forced him to return in 1496. A third voyage, undertaken in 1498, led to his discovering Trinidad and touching for the first time the American continent near the mouth of the Orinoco river. Intrigues of his enemies in Spain, however, especially of Fonseca, bishop of Palencia, resulted in the arrest of Columbus in 1500, when he was brought back to Spain in chains. He was released, but found it impossible to secure the honors originally promised him by his royal patrons. Betrayed, impoverished, and broken in health, Columbus still planned a fourth expedition. Setting out in 1502, he discovered Cape Honduras and Puerto Bello. On November 7, 1504, he again reached Spain.

Weary arbitrations and disheartening months followed. Columbus died at Valladolid, May 20, 1506, and, to make amends somewhat for his injustice, Ferdinand gave him a pompous funeral. He was first buried at Valladolid; then, for a time, his body rested in a monastery near Seville. After some years the body was removed to Santo Domingo, Haiti; thence later to Havana, Cuba. Since 1898, the remains have rested in the Cathedral of Seville in Spain.

Columella, Lucius Junius Moderatus, Roman writer on agriculture, was born at Cadiz in Spain and flourished about the middle of the 1st century A. D. For some time he resided in Syria, but lived chiefly at Rome, and died, most probably, at Tarentum. His work, *De Re Rustica*, in twelve books, treats of arable and pasture land, culture of vines and olives, and the respective duties of masters and servants.

Comenius (*kō-mā'nē-ŏŏs*; *kō-mē'nĭ-ŭs*), or **Komensky, John Amos,** educational reformer, was born in Moravia in 1592. His parents belonged to the Moravian brethren. He studied at Herborn and later at Heidelberg. He became a minister of the Moravian sect at Fulnek, but lost all his property in 1621, when that town was taken by the invading Spaniards. Settling at Lissa in Poland, he worked out his new theory of education, wrote his *Great Didactic*, and was chosen bishop of the Moravian brethren in 1632.

In 1641, Comenius was invited to England by Parliament to assist in reforming the system of public instruction; but, owing to the outbreak of the civil war, he went instead to Sweden, 1642. He returned to Lissa in 1648 and, in 1650, went to Saros Patak, Hungary. Here he composed his *Orbis Sensualium Pictus*, the first picture book successfully adapted to the teaching of children. By his early formulation and practical adaptation of educational principles, though but little known for two centuries, Comenius ranks as a leading figure in the history of education. He died at Amsterdam in 1670. See *History of Educational Reformers*.

Commons, John Rogers, American economist, was born in Darke county, Ohio, 1862. He was graduated from Oberlin college in 1888, and pursued postgraduate study at Johns Hopkins university, 1888–90. After serving as professor of sociology, Oberlin college, 1892, Indiana university, 1893–95, and Syracuse university, 1895–99, he was expert for the Industrial commission and assistant secretary of the National civic federation. In 1904, he became professor of political economy in the University of Wisconsin. His works include *The Distribution of Wealth*, *Social Reform and the Church*, and *Trade Unionism and Labor Problems*.

Comnena, Anna. See *Anna Comnena*.

Compton, Arthur Holly, American physicist, was born at Wooster, Ohio, in 1892. Graduating from Wooster college in 1913, he continued his studies at Princeton and Cambridge universities. He was professor of physics at Washington university, 1920-23, and, from 1923, at the University of Chicago. His principal work is in the X-ray field. Among other things he showed that, when X-rays are scattered by a material object, the scattered rays have a longer wave length than the incident rays. This is the so-called Compton effect, for which he received one-half the Nobel prize for physics in 1927.

Comstock (*kŭm'stŏk*), **Anna Botsford,** naturalist and wood engraver, was born at Otto, N. Y., in 1854. She was graduated at Cornell university in 1878 and studied art at Cooper union, New York. In 1878, she married John Henry Comstock, the entomologist. She exhibited wood engravings at the World's Columbian exposition at Chicago in 1893, at the Paris exposition of 1900, and at the Pan-American exposition, Buffalo, in 1901. After wide experience in university extension work in nature study, she was made assistant professor of nature study at Cornell university in 1913 and was professor from 1920 to 1922. Her writings include *Ways of the Six-footed*, *The Pet Book*, and *Bird, Animal, Tree, and Plant Notebooks*.

Comstock, Anthony, American reformer, was born in New Canaan, Conn., 1844. He was educated at Wyckoff's academy, New Canaan, and at high school, New Britain, Conn. His brother Samuel having been killed at Gettysburg, he volunteered to fill his place in the regiment, enlisting in 1863 and mustered out in 1865. As secretary of the New York society for the suppression of vice, 1873–1915, and as post-office inspector, he became prominent for his energetic crusade against books, papers, and pictures which he regarded harmful to public morals. His writings include *Frauds Exposed*, *Gambling Outrages*, *Morals vs. Art*, and *Traps for the Young*. Died, 1915.

Comstock, John Henry, American entomologist, was born at Janesville, Wis., 1849. After graduation from Cornell university in 1874, he was instructor in entomology there, 1875–77, and assistant professor, 1877-78. He was United States entomologist at Washington, 1879–81. In 1882, he was made professor of entomology in Cornell university and held the chair until 1914, when he became professor emeritus. By his extensive and valuable researches on insects, he rose to foremost rank among American students of the science. Important parts of his work were done in collaboration with his wife, Anna Botsford Comstock, also an entomologist and prominent in the extension of nature study. His works include *Insect Life*, *How to Know the Butterflies* (with his wife), *The Spider Book*, and *The Wings of Insects*.

Comte (*kôNt*), **Auguste,** French philosopher, founder of the "positive philosophy," was born at Montpellier, France, 1798. He studied at Paris, and attracted the attention of his associates by the boldness and the novelty of his speculations, maintaining that the time was come when philosophy must undergo another great change, such as it had done in the days of Bacon. He published several philosophical works of which the most important was his *Cours de philosophie positive*, in which he aimed to found not only a new philosophy but also a new religion. Died, 1857.

Conaty (*kŏn'ā-tĭ*), **Thomas James,** Roman Catholic prelate, was born in Ireland, 1847. He was educated at Montreal college, the College of the Holy Cross, Montreal theological school and, in 1872, was ordained priest. From 1880 to 1897, he was pastor, church of the Sacred Heart, Worcester, Mass. He was rector of the Catholic University of America from 1897 to 1903, when he was appointed bishop of Monterey and Los Angeles. He was long and actively identified with educational and social movements, and he founded and, for a time, edited the *Catholic School and Home Magazine*. He was the author of *Bible Studies*, for use in colleges and schools. Died, 1915.

Condé (*kôN'dā'*), **Louis I de Bourbon, Prince de,** younger brother of Antoine of Bourbon, king of Navarre, was born in 1530. During the wars between Henry II and Spain, he distinguished himself at the siege of Metz, the battle of Saint-Quentin, and the capture of Calais from the English. On the accession of Francis II in 1559, Condé, like his brother, joined the Huguenots, took part in the unlucky conspiracy of Amboise against the Guises, and escaped execution only by the death of the king.

The regent, Catherine de' Medici, made concessions to the Huguenots, and Condé became governor of Picardy. After the massacre of Huguenots at Vassy, 1562, Condé and Coligny took up arms against the Guise faction, but they were defeated at Dreux the same year and Condé was taken prisoner. In the second Huguenot war, 1567–69, Condé had coins struck with the inscription "Louis XIII, first Christian king of France," but at Jarnac, 1569, he was defeated, taken prisoner, and shot.

Condé, Louis II de Bourbon, Prince de, French general, commonly termed "the great Condé," was born at Paris in 1621. By the death of his father, 1646, he became head of his family and one of the highest personages in the state. At the head of troops collected in the Netherlands, he gained the battle of Bleneau, 1652. After a fruitless effort to seize Paris, he left the country, and, on the outbreak of war between France and Spain, he became generalissimo of the Spanish forces, but was unable to gain the advantage over Turenne. After commanding the French troops against Spain in the Netherlands, 1673, he retired to Chantilly, where he enjoyed the society of such men as Molière, Boileau, Racine, and La Bruyère. While notably proud and actuated by selfish ambition, he ranks as one of the great men of his time. Died at Fontainebleau, 1686.

Condillac (*kôN'dē'yäk'*), **Etienne Bonnot de,** French philosopher, the founder of sensationalism, was born of a noble family at Grenoble, 1715. In youth he numbered among his friends Rousseau, Diderot, and Duclos. Many of his works were composed for his pupil the duke of Parma, grandson of Louis XV. He was chosen a member of the French academy of sciences in1768. He based all knowledge on the senses and denied the existence of innate ideas. Among his works were *Essai sur l'origine des connaissances humaines*, *Traité des systèmes*, *Traité des sensations*, *La logique*, and *Langue des calculs*. Died, 1780.

Confucius (*kŏn-fū'shĭ-ŭs*) is the Latinized name of the religionist and sage, Kung-fu-tse, whose influence has held uninterrupted sway over the Chinese people for almost 2500 years. He was born, according to tradition, in the village of Tsou, state of Lu, now in the province of Shantung, China, 551 B. C. At the age of 19, Confucius had married and held an office as district inspector of agriculture. His unwonted zeal and honesty brought abundance and thrift among the people.

Early Life. When he was 22, his mother died. Confucius then resigned his office and lived in retirement for three years, mourning his loss. This act of filial piety made a strong impression upon his fellow citizens, and it is said to have led to the restoration of ancient funeral rites in honor of the dead. Confucius believed that the ancient usages and moral doctrines of the Chinese nation contained the germ of all social and political virtues. He conceived the desire to establish a school, educate disciples, and publish books for the purpose of spreading his opinions and regenerating his countrymen. In his 30th year, he began to put this plan into execution.

Labors. About 501 B. C., Confucius was appointed governor of the state of Lu. The next year, he became minister of works; the next, minister of crime. The success of his efforts to improve the condition of the people aroused the jealousy of a neighboring kingdom, and through intrigues Confucius was finally compelled to retire from office and to seek refuge in the province of Wei.

He proffered his services as a reformer there and elsewhere, but met with refusal in each case. Finally, when he was in extreme poverty, he was recalled to Lu. He was well received, but did not re-enter political life.

In his last years, Confucius is said to have completed his collection of the ancient writings. The work had been undertaken in order that posterity, at least, might be instructed. His work consisted in gathering together the documents that make up the *Shu King*, "*Canon of History*," and writing an introductory commentary on it. The direct teachings of Confucius are to be found in the *Analects*, compiled after his death by his immediate disciples.

Doctrines. It is often said that Confucianism is a system of morality without religion, because it is a system of political and social life built upon a very slight foundation of philosophy. Its distinctive feature, however, is its emphasis on ceremonies, most of which were of a distinctly religious character. In all that Confucius did or thought, the useful and practical, in a broad sense, formed the sole object of his labor and consideration. First, let every man govern himself according to the sacred maxims; then his family according to the same; and, finally, let him render to the emperor, who is the father of his people, such filial obedience as he demands of his own children, and worship him with the same veneration that he pays to his own ancestors.

Confucius wished to promote domestic peace, social order, and the safety of the commonwealth. To further this end, he inculcated the necessity of universal education. Schools arose throughout the empire where the maxims of his philosophy were taught, and his influence was perpetuated from generation to generation. Died, 478 B. C., in his 74th year.

Congreve (*kŏng'grēv*), **William,** English dramatist, was born at Bardsley, 1670. He entered as a student at the Middle Temple, but abandoned the law for literature. His first piece was a romance entitled *Incognita, or Love and Duty Reconciled*. In 1693, he wrote his first comedy, *The Old Bachelor*. This established his reputation as a playwright. His comedies, which brought him much money and fame, are intricate in plot, but the characters play their parts brilliantly and the dialogue abounds in sparkling wit. His writings include *Love for Love*, *The Double Dealer*, *The Mourning Bride*, *The Way of the World*, and poems. He died in 1729.

Conkling (*kŏngk'lĭng*), **Roscoe,** American politician, was born at Albany, N. Y., 1829. In 1846, he removed to Utica, N. Y., where he became district attorney, and was mayor in 1858. In the latter year he was elected to Congress and, in 1867, became a member of the United States Senate. He took a prominent part in the practical business of both houses, served on important committees, and was instrumental in the passing of many useful legislative measures. After the war he took an active part in the reconstruction of the Southern states, and advocated the resumption of specie payments. He opposed President Johnson's policy, and was a zealous champion of Grant's administration. In 1881, he resigned his seat in the Senate, owing to Garfield's assumption of the control over appointments in his native state. He sought re-election to vindicate his action but was defeated and retired to private life. Died at New York, 1888. See *Stalwarts*.

Connaught, Arthur William Patrick Albert, Duke of, third son of Queen Victoria, was born in 1850. He was educated at Woolwich; entered the army, 1868; became captain, 1871, major, 1875, colonel and major general, 1880; accompanied the expedition to Egypt, 1882; became lieutenant general, 1889, and general, 1893. He commanded the Bombay army in India, 1886–90; the southern district of England, 1890–93; and that of Aldershot, 1893–98. In 1900, he succeeded Lord Roberts in command of the forces in Ireland, became inspector general in 1904, and was commander in chief of Mediterranean, 1907–09. He was created duke of Connaught and Strathearn and earl of Sussex in 1874; married Princess Louise of Prussia, 1879. From 1911 to 1916, he was governor-general of Canada.

"Connor, Ralph." See *Gordon, Charles William*.

Conrad, Joseph, English novelist, was born in Poland, 1856. He is known by his first two names—his family name was Korzeniowski. His father was a Polish revolutionist, and, upon his death, Conrad, then 13 years of age, made his way to Marseille, entered the French merchant marine and advanced to the rank of captain. Somewhat later, he became mate on an English ship. Although he did not learn English until comparatively advanced in life, he acquired a stirring descriptive style which has won him increasing reputation as a master of English.

Conrad's novels vividly depict seafaring life in the Orient and faithfully reflect the effects of Eastern influences on Western character. Among his writings are *The Children of the Sea*, *An Outcast of the Islands*, *Tales of Unrest*, *Typhoon*, *The Mirror of the Sea*, *Nostromo*, *Chance*, *The Secret Agent*, *Under Western Eyes*, *The Shadow Line*, *Rescue*, *The Arrow of Gold*, and *The Rover*. Died, 1924. See *English Literature*, page 219b.

Constable (*kŭn'stă-b'l*), **John,** landscape painter, was born in East Bergholt, Suffolk, England, 1776. He studied at the royal academy, began with portraits and historical subjects, but finally fixed upon landscape. By his introduction of new principles, he became the father of modern landscape art, profoundly influencing all subsequent painting in England. The national gallery, London, has his best pictures—"The Cornfield," "The Valley Farm," and "The Hay Wain." Other good examples of his art include "Hamstead Heath," in the Louvre; and "The Bridge on the Stour" and "The White Horse," in the Metropolitan museum, New York. Died, 1837.

Constantine I (*kŏn'stăn-tĭn*), called the Great, was born about 274 A. D. in Naissus, now Nish, Jugoslavia, the son of Constantius Chlorus by Helena. On the death of his father at York, in Britain, 306, where he had accompanied him, Constantine was proclaimed emperor by the troops. This title being challenged by Maximian, his father-in-law, and by Maxentius, his brother-in-law, he took up arms against first the one and then the other and defeated them. During these campaigns Constantine is said to have seen a cross in the sky with the words "By this conquer" in Greek.

Under this sign, known as the labarum, which he adopted as his standard, Constantine marched to Rome, where he was acknowledged emperor by the senate in 312, and, in 313, the edict of Milan was issued granting toleration to the Christians. He then proceeded to extend his dominion over the East and transferred the seat of his empire to Byzantium, which was thereafter called Constantinople, i. e., Constantine's city. Constantine was baptized in 337 as a Christian, having three years before proclaimed Christianity the state religion. Died, 337.

Constantine I, former king of Greece, was born in Athens, 1868. He was the eldest son of King George I and Olga, niece of Czar Nicholas I. He was educated at the universities of Berlin and Leipzig, and, in 1889, married Princess Sophia, sister of Emperor William II of Germany. He was commander in chief of the Greek forces in the unfortunate Turkish war, 1897, and was compelled by the unmerited criticism of the military league to leave Greece in 1909. In the Balkan war, 1912-13, he led the Greek armies in Macedonia against the Turks with such success that he was acclaimed a national hero. Upon the assassination of his father in 1913, he became king.

In 1917, in response to the demands of France, Great Britain, and Russia, Constantine abdicated in favor of his second son, Alexander. On the death of Alexander and the defeat of the Venizelos party at the polls in 1920, Constantine returned to Athens as king in defiance of the Allied powers. In 1921, he took command of the Greek army in a disastrous war against the Turks in Asia Minor. In 1922, he abdicated in favor of his son George. Died, 1923.

Constantine XIII, Palæologus, the last Byzantine emperor, was born in 1394. His father and his brother had been emperors before him, and he did not come to the throne until he was 54 years old, 1448. At that time the Turks had conquered almost all of the Byzantine empire, and but little was left besides Constantinople and a few other cities. The Turkish sultan, Mohammed II, determined to take Constantinople also and laid siege to it with a great army. Constantine, who had fewer than 10,000 soldiers, resisted bravely for a time but finally, May 29, 1453, the Turks battered down part of the walls and rushed in. The emperor and his little band of nobles were all slain.

Converse, Frederick Shepherd, American composer, was born at Newton, Mass., 1871. He received his education at Harvard university and at the royal academy of music, Munich. He was instructor in harmony in the New England conservatory of music, 1899–1901; instructor in music at Harvard, 1901–04, and assistant professor, 1904–07; and later became professor of theory and composition in the New England conservatory of music. The list of his compositions includes the symphonic poems, *The Festival of Pan*, *Endymion's Narrative*, *Ormazd*, and *Night and Day*; the fantasy, *The Mystic Trumpeter;* the overture, *Youth;* the oratorio, *Job*; the baritone ballad, *La belle dame sans merci*; the operas, *The Pipe of Desire*, *The Sacrifice*, and *The Immigrants*; the cantata, *The Peace Pipe*; and songs.

Conway, Sir William Martin, English traveler and art critic, was born at Rochester, England, 1856; graduated at Trinity college, Cambridge; and was professor of art at University college, Liverpool, in 1885–88. In 1889, he began a series of travels which took him over a large part of the world. He ascended a peak of the Himalayas 23,000 feet high; also several Alpine peaks and, in South America, Sorata, Illimani, and Aconcagua. His publications include *Early Flemish Artists*, *Literary Remains of Albrecht Dürer*, *Dawn of Art in the Ancient World*, *The Alps from End to End*, *The First Crossing of Spitzbergen*, *With Ski and Sledge*

over Arctic Glaciers, The Bolivian Andes, Aconcagua and Tierra del Fuego, The Crowd in Peace and War, Mountain Memories, and *The Van Eycks and Their Followers.*

Conwell, Russell Herman, American educator and clergyman, was born at Worthington, Mass., 1843. He was educated at Wilbraham academy and Albany law school; served in the Union army, 1862–65; and practiced law in Minneapolis, 1865–67. In 1867, he went abroad and served as foreign correspondent for several American newspapers. On his return, he practiced law in Boston for some years, and, in 1879, was ordained to the Baptist ministry. In 1888, he founded Temple university, Philadelphia, and became its first president. He was widely known as a lyceum lecturer, his earnings amounting to about $11,000,000, nearly all of which he devoted to the education of deserving young people. His publications include *Woman and the Law, Acres of Diamonds, Lives of the Presidents,* and *The Romantic Rise of the Temple University.* Died, 1925.

Cook, Captain James, English navigator, was born in Marton, Yorkshire, 1728. He made three principal voyages, in the course of which he made many important discoveries, particularly in Australia, New Zealand, and the antarctic region. These were described in his *Three Voyages Round the World.* In 1778, he discovered the Sandwich (Hawaiian) islands, and explored the west coast of North America to Bering strait. He returned to Hawaii, where he met his death at the hands of hostile natives early in 1779. Many honors were paid to his memory, including the erection of an obelisk on Kealakekua bay at the place where he was slain.

Cooke, Sir William Fothergill, British electrician, was born at Ealing, England, 1806; was educated at Durham and Edinburgh; served in the Indian army from 1826 to 1831; and, after studying medicine at Paris and Heidelberg, took up telegraphy. In 1837, he entered into a partnership with Professor Wheatstone, which resulted in notable advances in electrical engineering and telegraphy. In 1838, he built the first English telegraph line. In 1845, Wheatstone and Cooke patented the single needle apparatus. In 1846, Cooke formed a company, which paid £120,000 for the partners' earlier patents. In 1867, Cooke and Wheatstone received the Albert gold medal. Cooke was knighted in 1869. He died, 1879.

Coolidge, Calvin, 30th president of the United States, was born at Plymouth, Vt., in 1872, of early New England ancestry. He was graduated from Amherst college, 1895, entered the law office of Hammond and Field, Northampton, Mass., and was admitted to the bar, 1897. He served as city councilman, 1899, as city solicitor 1900-01, and as clerk of courts, 1904. He was elected to the Massachusetts house of representatives, 1907-08, was mayor of Northampton, 1910–11, member of the state senate, 1912–15, president of the senate, 1914-15, and lieutenant governor, 1916–18. Elected governor of Massachusetts in 1919, he attracted nation-wide notice by his firm stand for law and order during the Boston police strike and was overwhelmingly re-elected for 1920. At the Republican national convention held at Chicago in June 1920, he was nominated for vice president with Warren G. Harding of Ohio as the presidential nominee. Harding and Coolidge carried the election. On the death of President Harding, August 2, 1923, Coolidge became president. He was re-elected in 1924.

His administration was one of marked governmental economy, which, together with general prosperity, permitted a drastic reduction of income taxes. A soldier bonus act was passed over his veto; immigration was severely restricted; Allied debts to the United States were funded; and the Senate, at presidential request, voted, with reservations, for adherence to the World Court. The Paris Pact, or multilateral treaty renouncing war as an instrument of national policy, was negotiated and ratified during his administration. He declined to stand for renomination and, on the expiration of his term in 1929, retired to private life.

Coolidge, Charles Allerton, American architect, was born in Boston, 1858. After graduating at Harvard university in 1881, he studied architecture at the Massachusetts institute of technology. In 1882, he entered the office of H. H. Richardson at Boston and, following 1886, was partner in various firms of architects. Among the many noted structures and groups of buildings designed by him are Leland Stanford university; the Southern railway station and the new Harvard medical school, Boston; the public library and art institute, Chicago; the law school and commons, University of Chicago; and the new buildings for the Rockefeller institute, New York.

Cooper, Anthony Ashley. See *Shaftesbury, Earl of.*

Cooper, Sir Astley Paston, English surgeon, was born in Norfolk, 1768; studied under Henry Cline, surgeon to Saint Thomas's hospital, London, and was appointed demonstrator of anatomy there, 1789. In 1793, he was appointed professor of anatomy at Surgeon's hall and, in 1800, surgeon to Guy's hospital. In 1813, he received the professorship of comparative anatomy in the college of surgeons. He was the earliest to attempt the tying of the carotid artery, a bold experiment at the time. In 1802, he was awarded the Copley medal; in 1805, he was made fellow of the royal society and, in 1830, vice president. Died, 1841. A colossal statue to his memory stands in Saint Paul's cathedral, London.

Cooper, James Fenimore, American novelist, was born in Burlington, N. J., 1789. When very young, he was taken to Cooperstown, Otsego county, N. Y., where he lived in the frontier wilds until he went to sea. In 1811, after six years' experience in naval life, he settled in Westchester county, N. Y., his wife's home, where he began to write.

In 1820 appeared his first work, *Precaution,* which was followed in 1821 by *The Spy,* a tale which at once secured for him a place in the first rank of novelists; then appeared his almost unequaled sea stories,—*The Red Rover, Pilot,* and *Waterwitch,*—and his famous "Leatherstocking series" of Indian life and adventure, including the *Pioneers, Last of the Mohicans, Pathfinder, Deerslayer,* and *Prairie.* A *History of the Navy of the United States* was one of his last works.

Cooper was regarded in America as an aristocrat and a snob, but in Europe, where he spent seven years, he was criticized for his blatant republicanism. His works exhibit a rare power of narrative and entitle him to rank as one of the greatest literary geniuses of America. He was practically the first writer to extend the domain of fiction over the sea, the primeval forest, and the prairie. His books have been translated into nearly every European language and have exhausted numerous editions. He died in 1851 and was elected to the American hall of fame in 1910. See *Leatherstocking Tales.*

Cooper, Peter, American inventor, manufacturer, and philanthropist, was born in New York City, 1791. His early life was laborious. His first invention was an improvement in a machine for shearing cloth. In 1828, he erected ironworks in Baltimore, and here constructed after his own designs the first locomotive engine ever made in this country. He took a great interest in the first telegraph, in state canals, and many mercantile enterprises, from which he amassed considerable wealth.

One of the most noteworthy of his achievements was the founding of an institution for the instruction of working people—the Cooper Union, New York, whose corner stone he laid in 1854. It contains a school of art for women, taught in the daytime, and a free school of telegraphy. Free schools of science, art, mathematics, and practical engineering are open to youths of both sexes every evening; lectures are given; and a free reading room and library are open to the public at all hours. In 1876, the Independent party nominated him for president of the United States, and he received nearly 100,000 votes. He died in 1883 and was elected to the American hall of fame, 1900. See *Greenback Party.*

Cooper, Sir Pope Alexander, Australian jurist and educator, was born at Willeroo, Australia, in 1848. He was educated at Sydney university and London university and was admitted to the English bar in 1872. He returned to Australia in 1874; became attorney-general in 1883; was chosen chief justice of Queensland, 1903; and was made chancellor of the University of Queensland. Died, 1923.

Cope, Edward Drinker, American zoologist and paleontologist, was born at Philadelphia in 1840. He was educated privately, studied at the University of Pennsylvania and at the Smithsonian institution, and devoted a year to research in the great museums of Europe. From 1864 to 1867, he was professor of natural sciences at Haverford college. He made immense collections of fossils, notably of extinct vertebrates, and did important work in herpetology and ichthyology, establishing the basis of the modern classification of North American reptiles, amphibians, and fishes. In 1891, he became professor of geology and paleontology at the University of Pennsylvania. In the field of theoretical science, he was the leader of the American Neo-Lamarckian evolutionists. His more important publications include *Origin of Genera, Origin of the Fittest,* and *Primary Factors of Organic Evolution.* He was editor of the *American Naturalist* from 1878 until his death in 1897.

Copernicus (*kō-pûr'nĭ-kŭs*), or **Koppernigk, Nicolas,** mathematician and the founder of modern astronomy, was born at Thorn, Poland, February 19, 1473. He was instructed in the Latin and Greek languages at home. In 1491, he entered the University of Krakow, where later he received the diploma of doctor in arts and medicine. His early taste for mathematical studies, especially astronomy, was furthered by an acquaintance with the works of the astronomer John Müller, known as Regiomontanus.

The years 1496 to 1500 Copernicus spent in Bologna as pupil, assistant, and companion of the professor of astronomy, Domenico Maria Novarra.

CAREER. In 1500, Copernicus was appointed to a professorship of mathematics in Rome. The following year, he continued his studies at Padua, and, in 1503, he was made doctor of canon law by the university at Ferrara. Returning to Poland in 1505, Copernicus entered into holy orders and was enrolled by his uncle, the bishop of Ermeland, as a canon of his chapter. This chapter became the center of violent political struggles, and, in the ensuing years, Copernicus paused frequently from his speculative inquiries to serve actively the interests of the bishopric.

There appears little doubt that, at least as early as 1507, Copernicus began to meditate on the ideas which led him to the theory of the solar system propounded in his book, *De Revolutionibus Orbium Coelestium*, "*The Revolutions of the Celestial Spheres.*" This work seems to have been practically completed about 1530, but various political and religious considerations delayed its publication until 1543. Upon it rests the fame of Copernicus, though he wrote also a noteworthy treatise on trigonometry and several other minor works.

COPERNICAN SYSTEM OF ASTRONOMY. Before Copernicus, it was generally believed, in accordance with the Ptolemaic theory, that the earth occupies the center of the universe; that the changes of day and night are produced by a rapid revolution of the heavens; that the sequence of seasons and the apparent motions of the planetary bodies are caused by the revolution of the sun and planets in orbits of various complexity, subject to the common daily motion of all from east to west. The Copernican system represents the sun to be at rest in the center of the solar system, and the earth and planets to move round it in elliptical orbits.

The most brilliant and valuable part of *The Revolutions of the Celestial Spheres* is that in which are explained the variations of the seasons, the precession of the equinoxes, and the stations and retrogradations of the planets. As a whole, the explanations given by Copernicus are right as to the general nature of the causes of the phenomena. But Copernicus had neither mathematical nor mechanical knowledge sufficient to enable him to explain more than the mean motions of the solar system. To account for irregularities, he introduced a system of epicycles, not yet having discarded the false notion, current in his time, that all motions must be compounded of circular ones. Yet, despite such inadequacies, Copernicus laid the foundation upon which Kepler, Galileo, Newton, and other men of genius could build the structure of modern astronomical science. Died, May 24, 1543.

Copley (*kŏp'lĭ*), **John Singleton,** American portrait and historical painter, was born at Boston, Mass., 1737. In painting, he was practically self-taught. At the age of 17, he ranked as a prominent artist and soon became the recognized portrait painter of Boston. At Benjamin West's invitation, he went in 1774 to London, where he painted the king and the queen and other notable personages. After studying in Italy, he became celebrated in England for his popular historical paintings "The Death of Lord Chatham," "The Death of Major Pierson," and the "Siege of Gibraltar." His portraits typically represent the New England society of his time, and he ranks as one of the chief painters of the period. Among his noted portraits are those of John Hancock, Samuel Adams, and John Quincy Adams. He died at London, 1815.

Coppée (*kô'pā'*), **François Edouard Joachim,** French poet, dramatist, and novelist, was born in Paris, 1842. For three years, he was a war-office clerk. He early gave himself to poetry and with *Le reliquaire* and *Les intimités* gained prominent rank among the writers of the Parnassian group. Later volumes of his poetry were *Les humbles*, *Le cahier rouge*, *Olivier*—his one long poem,—*Les récits et les élégies*, and *Contes en vers*. His earliest dramatic poem, *Le passant*, owed much to Sarah Bernhardt. It was followed by *Deux douleurs*, *Le luthier de Crémone*, *La guerre de cent ans*, and *Le Pater*. Coppée was elected to the French academy in 1884. He was the poet of the Parisian working classes and an accomplished master of the short story. He described himself as "an aristocrat who loves the masses." Died at Paris, 1908.

Coquelin (*kôk'lăN'*), **Benoît Constant,** French actor, was born at Boulogne, 1841; was admitted to the conservatory in 1859; and, having gained the second prize for comedy, made his début at the Théâtre Français, 1860. For over a quarter of a century, he played there with unbroken success both in classical pieces and in rôles created by himself. In the broader aspects of comedy he stood without a rival. In 1897, he produced Rostand's *Cyrano de Bergerac*, which became his most noted rôle. In 1900-01, he toured America with Sarah Bernhardt, playing Flambeau to her Duc de Reichstadt in Rostand's *L'Aiglon*. He was also a lecturer and writer, publishing *L'Art et le comédien*, *Les comédiens par un comédien*, and *L'Arnolphe de Molière*. Died in 1909.

Corbin, John, American novelist and dramatic critic, was born at Chicago, 1870; graduated at Harvard and at Oxford university; and was an instructor in English composition at Harvard, 1895-96. In 1897, he became assistant editor of *Harper's Magazine* and later was connected with various New York newspapers. His publications include *The Elizabethan Hamlet*, *An American at Oxford*, *A New Portrait of Shakespeare*, *The First Loves of Perilla*, *The Cave Man*, *The Husband and the Forbidden Guests*, and *The Edge*.

Corday d'Armont (*kôr'dĕ' dàr'môN'*), **Marie Anne Charlotte,** generally known as Charlotte Corday, French heroine, was born of a noble family at Saint Saturnin, Normandy, in 1768. She sympathized with the ideas of the French Revolution, but was horrified at its excesses. She visited Paris in July 1793 with the purpose, it is said, of assassinating Marat or Robespierre. Obtaining an interview with the former while in his bath, she stabbed him with a knife. She was immediately apprehended and was executed four days afterward. Her beauty added to the interest which her sanguinary heroism inspired.

Corelli (*kô-rĕl'ĭ*), **Marie,** English novelist, was born in 1864 of Italian and Scotch parentage. She was adopted in infancy by Charles Mackay, the well-known song writer and *littérateur*, and spent her childhood in England. She was afterward sent to France and educated in a convent, where she received, with other instruction, excellent musical training. Her first book, *A Romance of Two Worlds*, was an instant success, and from that time she devoted herself entirely to literature. She never, however, abandoned her love of music. Her fiction, which is romantic, melodramatic, and sensational, nevertheless displays a genuine gift of story-telling and is widely popular. Her books include *Thelma*, *Soul of Lilith*, *The Sorrows of Satan*, *The Murder of Delicia*, *A Study in Supremacy*, *God's Good Man*, *The Devil's Motor*, and *The Secret Power*. Died, 1924.

Corey, William Ellis, American capitalist and steel manufacturer, was born in Pennsylvania, 1866. At 16, he entered the chemical laboratory of the Edgar Thomson steelworks; studied bookkeeping and chemistry at home; was superintendent of a plate mill at 23; and invented the Carnegie reforged armor. He became, at different times, president of the Carnegie Steel Company, the National Steel Company, the American Steel Hoop Company, the United States Steel Corporation, and numerous other firms.

Corliss, George Henry, American inventor and manufacturer, was born at Easton, N. Y., 1817. He received an academic education and, in 1844, removed to Providence, R. I. There, after patenting several devices which he had invented for the improvement of steam engines, he organized a company in 1856 and established engine works. His inventions for securing uniformity of motion revolutionized the construction of stationary steam engines. A single colossal engine built by him furnished the power which moved all of the machinery in the centennial exposition at Philadelphia in 1876. This famous "Corliss engine" was later transferred to Pullman, Ill., where it furnished motive power to the Pullman Car Company's works. Corliss died at Providence, 1888.

Corneille (*kôr'nā'y'*), **Pierre,** creator of French tragedy, was born at Rouen in 1606. He studied for the legal profession. A love affair, in which he became the rival of a friend, first prompted him to write verses, and *Mélite*, the comedy founded on this incident, was performed with success in 1629. It was quickly followed by other dramatic pieces. In 1635 appeared his *Médée*, a declamatory drama written in imitation of Seneca.

Cardinal Richelieu, who aspired to be the patron of the stage, kept in his pay a number of writers for whom he dictated plots, and he wished to number Corneille among his retainers; but Corneille was so audacious as to alter the plan of a comedy and thus lost the cardinal's favor. He then returned to his native place, where M. Chalon, once secretary to Marie de' Medici, suggested that he should turn his attention to tragedy. The result was *The Cid*, 1636, which was received with enthusiastic applause. In 1639, he composed *Horace* and *Cinna*, which were followed by a worthy successor, *Polyeucte*, a tragedy of Christian martyrdom. Soon afterward appeared *La Mort de Pompée* and *Le Menteur*, the latter a comedy, the only one he wrote worthy of his great genius. Died, 1684. See *Cid, The*.

Cornelia, Roman matron of the 2d century B. C., was celebrated as the highest type of early Roman womanhood. She was the daughter of Scipio Africanus and the wife of Tiberius Sempronius Gracchus, who left her, at his death, a widow with 12 children. She was still in the prime of life, but she refused many offers of marriage, including one from King Ptolemy of Egypt, and devoted herself to the training and education of her children. These included the democratic leaders Tiberius and Gaius. A lady, after displaying her jewels, asked to see those of Cornelia, who, producing her sons Tiberius and Gaius, said, "These are mine." She devoted her last years to the study of Greek literature and to the society of men of letters in Misenum.

Cornelius (*kôr-nā'lē-ŭs*), **Peter von,** German historical painter, founder of the Munich school, was born at Dusseldorf in 1783 and studied under Langer in the academy of his native town. His first work of importance was his series of illustrations of Goethe's *Faust*. In 1811, he went to Rome, where he gained a wide reputation by two cartoons, "Joseph's Interpretation of the Dream" and "Joseph's Recognition of his Brethren," in which he notably revived fresco painting. He was then called to Berlin and became the head of the Dusseldorf academy. He attracted many distinguished pupils and became the most influential figure in German art for several decades. His paintings, which are colossal and executed in the cartoon style, emphasize design rather than color. His chief works are frescoes in the Glyptothek and Ludwigskirche at Munich. Died in Berlin, 1867.

Cornell, Ezra, American capitalist and philanthropist, was born in 1807 at Westchester Landing, N. Y. He began life as a mechanic and miller at Ithaca, but spent most of his active years in the extension of the telegraph service throughout the northern and western states. He was a delegate to the first Republican national convention in 1856; president of the New York State agricultural society, 1862; member of the assembly, 1862-63; and state senator, 1864-67. In 1865, he founded Cornell university at Ithaca, intending it to be "an institution where any person can find instruction in any study." He endowed it with $500,000 and subsequently devoted an additional $500,000 to the purpose. He also established the Cornell library at Ithaca. Died, 1871.

Cornwallis, Charles, Marquis, English statesman and general, was born at London in 1738. He entered the British army in 1756, the House of Commons in 1760, and the House of Lords in 1763. He was promoted major general, and, in 1776, he joined Sir William Howe in command of the British forces during the American Revolution. He defeated General Gates at Camden in 1780; won the battle of Guilford courthouse, 1781; and surrendered to Washington at Yorktown, October 19, 1781. He was afterward governor-general and commander in chief in India, where he greatly distinguished himself by his victories over Tippoo Sahib; still later, in 1798, he was lord lieutenant of Ireland; and, in 1802, he was plenipotentiary of Great Britain to negotiate the peace of Amiens. Appointed, in 1805, governor-general of India a second time, he died in the same year at Ghazipur, in the province of Benares, while on his way to assume the command of the troops.

Corot (*kô'rō'*), **Jean Baptiste Camille,** French painter, was born in Paris, 1796. He began to exhibit in 1827; but his early pictures were in the classic manner, and it was not until 1843 that he began to paint in the delicate, romantic style, not inaccurately called "painted music," which won him fame throughout the world. He has been styled the lyric poet among the eminent painters of the Barbizon-Fontainebleau group, among whom were Rousseau, Millet, Dupré, and Diaz. In the Louvre are about 80 of his pictures, including the well-known "Dance of the Nymphs," "Paysage," and "Souvenir of Castelgandolfo." Excellent examples are found in many American art galleries. Died, 1875.

Correggio (*kôr-rĕd'jō*), **Antonio Allegri,** Italian painter, was born in 1494 at Correggio, a small town near Modena from which the painter received his name. He was the first among the moderns who displayed that grace, general beauty, and softness of effect and that combined excellence of design, color, taste, and expression in which he is still unsurpassed. His mastery of light and shade is notably perfect.

Almost before he had seen the great masters, he became a master in a style all his own. He was the founder of what is called by some the Parma school of painting. His best works are prized as highly as those of the greatest masters and he is ranked with Michelangelo, Leonardo da Vinci, Raphael, and Titian among the five most eminent painters of Italy. It has been said that only Leonardo da Vinci and Correggio among great artists have ever painted the smile of woman. His "Holy Night" (Dresden museum) is classed among the world's twelve greatest pictures. Other noted works are "The Marriage of Saint Catherine," Louvre; "La Danaë," Borghese gallery; "Holy Family"; "Ecce Homo"; and many frescoes at Parma. Died, 1534.

Cortés (*kôr-tās'*), or **Cortez** (*kôr'tĕz*), **Hernando,** Spanish adventurer, was born in Medellin, Estremadura, in 1485. He was first intended for the law, but, a passion for arms carrying him to the military profession, he went early in the 16th century with Velásquez to Cuba and subsequently obtained the command of an expedition sent against Mexico.

With 700 men under his command, he landed at San Juan de Ulloa and founded the town of Vera Cruz in 1519. He then burned his ships so that his followers might have no hope but in victory. He advanced to Mexico, where he was at first received with friendly demonstrations but, on his seizure of Montezuma, the Mexican king, a struggle ensued, in which many thousands of lives were lost. He eventually succeeded in putting down all opposition and in overrunning Mexico. In 1536, he discovered Lower California. For his conquests in Mexico, he was rewarded with the title of marquis and with a grant of land. He died in 1547. See *Noche Triste*.

Cortissoz (*kôr-tē'sōs*), **Royal,** American art critic, was born in New York City, 1869. He had a common school education and entered the office of the architects McKim, Mead, and White. While there, he began to write for the press criticisms of art, music, drama, and books. These led to his appointment as art critic on the New York *Commercial Advertiser* and, in 1891, on the New York *Tribune*. He also lectured widely before universities and museums. His thorough knowledge of art and keen discrimination gave him a foremost place among art critics of the day. His published works include *Augustus St. Gaudens, Art and Common Sense, Nine Holes of Golf,* and *American Artists*. He was elected to the American academy of arts and letters in 1924.

Cosgrave, William Thomas, Irish statesman, was born in Dublin, 1880. He was educated at a Christian Brothers' school and, in 1918, was elected a member of the Irish Parliament, or the Dail Eireann. He became a member of the provisional government in 1922 and, the same year, was elected president of the executive council of the Irish Free State.

Coues (*kouz*), **Elliott,** American ornithologist, was born at Portsmouth, N. H., 1842; graduated at Columbian (George Washington) university, 1861; and became a surgeon of the United States army in 1863. He studied the flora and fauna at various posts where he was located until 1880, when he resigned to devote himself exclusively to natural science. He became a prominent writer on ornithology and a leading authority on American birds. His chief works include *Field Ornithology* and *Dictionary of North American Birds*. Died, 1899.

Coulomb (*kōō'lôn'*), **Charles Augustin,** French physicist, was born at Angouleme, 1736. He experimented on friction and invented the torsion balance for measuring the force of magnetic and electric attraction. He was elected to the French academy in 1781. His services were employed on all the most difficult problems in mechanics. The unit of electric quantity was named the coulomb in his honor. Died, 1806.

Coulter (*kōl'tẽr*), **John Merle,** American botanist, was born at Ningpo, China, 1851; graduated at Hanover college, Indiana, 1870; and subsequently studied at Harvard. He was botanist of the United States geological survey in the Rocky mountains in 1872-73 and subsequently taught at Hanover college and Wabash college, and was president successively of the University of Indiana and Lake Forest university. From 1896 to 1925, he was head of the department of botany in the University of Chicago and in the latter year became adviser to the Boyce Thompson institute of plant research, Yonkers, N. Y. Among his works are *Manual of Rocky Mountain Botany, Plant Relations,* and *Plant Genetics*. Died, 1928.

Couperus, Louis, Dutch novelist, was born at The Hague in 1863. His early boyhood was spent in the Dutch East Indies, where his father was a government official. His novels have been translated into many languages, and their tragic power and psychological realism entitle their author to a place in the first rank of European novelists. Among his works are *The Small Souls, The Later Life, The Twilight of the Souls, Old People and the Things that Pass,* and *Iskander*. He wrote also a collection of poems and several books of travel. Died, 1923.

Courbet (*kōōr'bĕ'*), **Gustave,** French painter and founder of the modern realistic school of painting, was born at Ornans, 1819. In 1839, he was sent by his father to study law in Paris, but the bent of his nature was toward art. In 1841, he took up landscape work, painting in the forest of Fontainebleau. In 1844, he began to exhibit at the salon, and his works created a great sensation in 1850. His hunting scenes and animal subjects are especially vigorous and spirited. In 1871, he joined the commune. He was implicated in the destruction of the Vendôme column, for which act he was sentenced to six months' imprisonment and a fine for its restoration, his pictures being sold in 1877 to raise funds for that purpose. On his release, he retired to Switzerland, where he died, 1877.

Courtois (*kōōr'twâ'*), **Bernard,** French chemist, was born at Dijon, 1777. He became Fourcroy's assistant in the polytechnic school in Paris. With Séguin, he discovered the alkaloids of opium. In 1812, while investigating the products of mother liquors prepared by leaching the ashes of burnt seaweed, he discovered the element iodine. He did not communicate his discovery to other scientists until late in 1813. Within a month after Courtois had made his communication to the institute, Gay-Lussac published an account of the properties of the new element, which he

named iodine on account of its violet color. Notwithstanding his discovery, Courtois was ignored and forgotten until the academy of sciences, in 1832, awarded him a prize of 6000 francs in appreciation of his important discovery, which has been of great value in the arts, notably in medicine. He died at Paris, 1838.

Cousin (*kōō'zăN'*), **Victor,** French philosophical writer, was born in Paris, 1792. After a literary and educational career extending over many years, he was made, in 1830, a member of the council of public instruction in France. In 1832, he was chosen a peer of France and, in 1840, became minister of public instruction. He published a celebrated translation of *Plato*, and a *Course of the History of Philosophy*, which was his largest original work. Besides these, he published, among other works, *Philosophical Fragments* and *Lessons from the Philosophy of Kant*. For a time, he inclined to the views of the German idealists, but his later teachings reflected a modified Cartesianism. Died, 1867.

Couzens, James, manufacturer and capitalist, was born at Chatham, Ont., 1872. For some years he was associated with Henry Ford in the manufacture of automobiles at Detroit. He was later a director of the United States Chamber of Commerce and, in 1919, became mayor of Detroit. In 1922, he was appointed by the governor of Michigan to succeed Newberry in the United States Senate, and was later elected for the term 1925-31.

Coverdale (*kŭv'ĕr-dāl*), **Miles,** translator of the English Bible, was born in Yorkshire, 1488. He was a monk of Norwich, but early devoted himself to the promotion of the Reformation. In 1551, he was appointed bishop of Exeter, but was ejected and imprisoned on the accession of Mary in 1553. In the subsequent reign of Elizabeth, until within two years of his death, he was rector of the church of Saint Magnus in the city of London. In 1535, he published his first translation of the Bible, which was the earliest complete Bible printed in the English language. The *Psalms* of this translation are those still used in the *Book of Common Prayer*. In 1540, he edited a second edition, known as Cranmer's Bible. Died, 1568.

Cowen, Sir Frederic Hymen, English musician and composer, was born at Kingston, Jamaica, 1852. At the age of four, he was taken to London, where he began his musical education. In 1865, he went to Leipzig, where he continued his study under Hauptmann, Moscheles, Reinecke, and Richter. He was made director of the Edinburgh academy of music in 1882 and later was a conductor successively in London and Glasgow. He was knighted in 1911. While he is most widely known for his songs, of which he composed over 300, he won fame also with his *Sleeping Beauty*, *Saint John's Eve*, *The Water Lily*, and his Scandinavian, Welsh, and Idyllic symphonies. He also wrote four oratorios, *The Deluge*, *St. Ursula*, *Ruth*, and *The Veil*; the operas, *Pauline*, *Thorgrim*, *Signa*, and *Harold*, and numerous piano and orchestral pieces. His autobiography, *My Art and My Friends*, appeared in 1913.

Cowles, Henry Chandler, American botanist, was born at Kensington, Conn., 1869. He was educated at Oberlin college and the University of Chicago. He taught at Gates college and later at the University of Chicago, where he became professor of botany in 1915. In his studies of the vegetation of the dune region of Lake Michigan, he did noteworthy pioneer work in plant ecology. His publications include *Vegetation of Sand Dunes of Lake Michigan*, *Textbook of Plant Ecology*, and *Plant Societies of Chicago and Vicinity*.

Cowley, Abraham, English poet and essayist, was born in London, 1618. He was attracted to poetry by the *Faery Queen*. He wrote excellent verses at 10 years of age. From Westminster school he proceeded in 1637 to Trinity college, Cambridge, and there wrote, among many other pieces, a large portion of his epic, the *Davideis*, the hero of which was King David. His poetry abounds in metaphysical subtleties and niceties of expression, which were very popular in his time. Among his longer poems his elegies are the most worthy, and some of his most natural verses are found scattered through his essays, which are graceful and beautiful. He died at Chertsey, 1667, and was buried in Westminster Abbey.

Cowper (*kōō'pĕr; kou'pĕr*), **William,** English poet, was born in Hertfordshire, 1731. He was admitted to the bar in 1754, but did not practice. He passed many years at Olney, Buckinghamshire, in the society of Mrs. Unwin, Lady Austen, and the Rev. John Newton, engaged in religious exercises and charities. Lady Austen turned his attention to poetry, and, after contributing extensively to the *Olney Hymns*, he published in 1782 his first volume, which was tolerably well received. The ballad of *John Gilpin* gave him wide renown. His longest original poem, *The Task*, 1785, also gained general popularity. He next translated *Homer* into English blank verse and undertook a new edition of Milton with translations of the Latin and Italian poems. In 1799, he wrote his last poem, *The Castaway*. Besides possessing great gifts as a poet, Cowper was one of the most charming of letter writers, his epistles ranking among the finest in the English language. Died, 1800. See *Gilpin, John.*

Cox, James Middleton, congressman and governor, was born at Jacksonburg, Ohio, 1870; grew up on a farm; and received a public school and high school education. In early life he taught country school and worked in a printing office. Later he became a newspaper reporter and rose to the position of editor on the staff of the *Cincinnati Enquirer*. In 1898, he bought the *Dayton Daily News* and, in 1903, he purchased the *Springfield Press-Republic*, forming the News League of Ohio and making a record as a successful newspaper man. He was a member of Congress, 1909–13, and governor of Ohio for the terms 1913–15, 1917–19, and 1919–21. At the Democratic national convention, held at San Francisco in July 1920, he was nominated for president of the United States.

Cox, Kenyon, American mural and figure painter, was born in Warren, Ohio, 1856; studied in Cincinnati and Philadelphia, and later in Paris under Carolus-Duran and Gérôme, 1877–82. His works consist principally of portraits, figure pieces, and mural decorations. Among his mural paintings, which rank with the greatest in America, are "Art and Science" in the Library of Congress, Washington; "The Progress of Civilization" in the capitol, Des Moines, Ia.; and "Venice" at Bowdoin college, Me. His finest pictures include "Hope and Memory," "The Hunting Nymph," "October Afternoon," "A Vision of Moonrise," and "A Book of Pictures." His "Harp Player" and portrait of Saint-Gaudens are in the Metropolitan museum, New York. He wrote, among other books, *Mixed Beasts*, *Old Masters and New*, *Painters and Sculptors*, *Artist and Public*, and *Concerning Painting*. He was elected to the American academy of arts and letters in 1908. Died, 1919.

Cox, Louise Howland King, American painter, was born in San Francisco, 1865. She was a pupil at the New York academy and studied at the art students' league under Kenyon Cox, whom she married in 1892. Her graceful decorative work is similar in style to that of her husband. Her mural painting of "The Fates" and the decorative canvases, "The Annunciation," "Psyche," and "Pomona," are noteworthy examples of her art in this field. She excels in her paintings of children. Her charming naturalism in portraying them is well shown in "Master Austin Smithers," "Lucile," "The Wonder Book," "Goldilocks," "My Children," and "Mrs. Homer Saint-Gaudens and Child."

Cox, Palmer, author and artist, was born in Granby, Quebec, Canada, 1840; graduated at Granby academy; lived in San Francisco, 1863–75, contributing to *Golden Era* and *Alta California;* and, in 1875, removed to New York. His specialty was the execution of original pictures illustrating his own books of humorous fancy, of which the most characteristic are his widely known *Brownies*. Among his other books are *Squibs of California*, *Hans von Pelter's Trip to Gotham*, *How Columbus Found America*, *That Stanley*, and *Queer People with Paws and Claws*. Died, 1924.

Crabbe (*krăb*), **George,** English poet, was born at Aldeburgh in 1754. He was a surgeon, but abandoned his profession for literary pursuits and went to London in 1780. Edmund Burke secured a publisher for his poem *The Library* in 1781 and advised him to take holy orders. He was ordained in 1782 and became chaplain to the duke of Rutland at Belvoir castle. He published *The Village* in 1783 and, in 1807, *The Parish Register*. These, his best works, were followed by *The Borough*, *Tales in Verse*, and *Tales of the Hall*. His verse was greatly admired by Johnson, Wordsworth, Scott, and Byron, and he holds a worthy place in English poetry. His last days were spent as rector of Trowbridge, Wiltshire. Died, 1832.

Craddock, Charles Egbert. See *Murfree, Mary Noailles.*

Craigie (*krāg'i*), **Mrs. Pearl Mary Teresa.** See *Hobbes, John Oliver.*

Craik (*krāk*), **Mrs. Dinah Maria.** See *Mulock, Dinah Maria.*

Cranach (*krä'năĸ*), **Lucas, the Elder,** German painter, was born near Bamberg, Germany, 1472. Besides following other lucrative trades, he acted as court painter to Frederick the Wise, elector of Saxony, and to his two successors. In 1520, he bought an apothecary's business at Wittenberg, where he was also a bookseller and paper maker, became councilor and chamberlain, and was twice chosen burgomaster of the town. He was an intimate friend of Luther and Melanchthon, whose portraits he several times painted. He has been styled the painter of the Reformation. His best works are his portraits and madonnas, some of which rank among the noblest in German art. Other well-known works are "Christ Blessing the Children," "Repose in Egypt," "Samson and Delilah," "Marriage of Saint Catharine," and "Fountain of Youth." Cranach died at Weimar, 1553.

Cranch (*kränch*), **Christopher Pearse,** American painter and poet, was born at Alexandria, Va., 1813. He studied in France and Italy, 1846–63; returned to New York; and became a member of the national academy in 1864. He was also a graceful writer in prose and verse, and published a book of *Poems, The Bird and the Bell, Ariel and Caliban,* and prose tales for children, which he illustrated. His best pictures are "October Afternoon," "Venice," and "Venetian Fishing Boats." Died at Cambridge, Mass., 1892.

Crane, Frank, American journalist, was born at Urbana, Ill., 1861. He studied at Wesleyan university and was ordained to the ministry of the Methodist Episcopal Church in 1883. He occupied pastorates in Chicago and Worcester, Mass., and, in 1909, entered journalism, becoming an editorial writer for the Associated Newspapers and editor of *Current Opinion.* His published works are voluminous and include *The Religion of Tomorrow, Human Confessions, Foot Notes to Life, The Looking Glass, War and World Government, Four Minute Essays, The Crane Classics,* and *Everyday Wisdom.* Died, 1928.

Crane, Walter, English illustrator, was born at Liverpool, 1845. He was educated privately and, although influenced by Rossetti, Holman Hunt, and Millais, was in the main self-taught. In his painting, his style reveals his study of the Florentine masters, particularly Botticelli. He was pre-eminently an illustrator and is considered the leader of the romantic movement in decorative art in England. His drawings, chiefly in outline, are distinguished by imagination, humor, and notable mastery of method. Among the finest are: "The Baby's Opera," "Pan Pipes," "Echoes from Hellas," "Queen Summer," and illustrations for Shakspere's works. Among his paintings, which are classed with those of the Pre-Raphaelites, the best-known are "The Birth of Venus," "The Chariot of the Hours," "Mask of the Four Seasons," and "Prometheus Unbound." He made designs for tapestry and glass windows, and wrote many articles on art subjects, including *India Impressions* and *William Morris and Whistler.* Died in 1915.

Crane, William Henry, American actor, was born at Leicester, Mass., 1845; was educated in Boston; and made his début at Utica, N. Y., 1863. He was with the Holman Opera Company for eight years and with the Oates Opera Company for four years. He appeared with Stuart Robson, 1877, in *Our Boarding House,* his first great success, which was followed by numerous others, including Shakspere's *Comedy of Errors* and Bronson Howard's *Henrietta.* He separated from Robson in 1889 and subsequently appeared in leading rôles in *The Senator, For Money, The American Minister, A Virginia Courtship, David Harum, Father and the Boys, Peter Stuyvesant, She Stoops to Conquer,* and other popular plays. Died, 1928.

Cranmer, Thomas, archbishop of Canterbury, was born in Nottinghamshire, 1489, and was educated at Cambridge university. He obtained the favor of Henry VIII by furthering his divorce from Catherine of Aragon and was appointed archbishop of Canterbury in 1533. He favored the reformed doctrines during the reign of Henry VIII and in that of Edward VI. Under his guidance, Protestantism was thoroughly established and the *Book of Common Prayer* was compiled and issued, 1549. He was committed to the Tower on the accession of Mary; condemned at Oxford for heresy in 1554; and, after two years' imprisonment, was burned there in 1556, openly rejecting the recantations of Protestantism which he had been induced to sign.

Crassus (*krăs'ŭs*), **Lucius Licinius,** Roman orator and statesman, was born in 140 B. C. He was the greatest orator of his age, and was as distinguished for his wit as for his rectitude. He was consul in 95 and censor in 92 B. C. Died, 91 B. C., of excitement in consequence of a debate in the senate.

Crassus, Marcus Licinius, Roman general and statesman, was born about 115 B. C. He was the wealthiest citizen of Rome in his day, having made much of his wealth by purchasing houses when burning and then extinguishing the flames with the help of a body of slaves trained for the purpose. The buildings were then repaired and sold at a huge profit.

During his consulate, he gave to the people a feast which was spread on 10,000 tables, and he distributed a three months' supply of grain. In 60 B. C., Cæsar, Pompey, and Crassus formed the First Triumvirate. In 55 B. C., as consul with Pompey, Crassus received Syria to govern and made preparations for war against the Parthians; after being defeated, he was beguiled into a conference with the Parthian general Surenas and was slain at the appointed place of meeting, 53 B. C.

Crawford, Francis Marion, American novelist, son of Thomas Crawford, the sculptor, was born at Bagni di Lucca, Italy, in 1854 and was educated in the United States, Italy, England, and Germany. In 1879, he edited *The Indian Herald* at Allahabad, India. From 1881 to 1883, he was in America, and subsequently he resided at Sorrento, Italy.

Crawford published over forty novels, including *An American Politician, Zoroaster, Saracinesca, With the Immortals, Love in Idleness,* and *The Heart of Rome.* He wrote also a play, *Francesca da Rimini,* and several historical romances, including *Ave Roma Immortalis* and *The Rulers of the South.* His *Saracinesca* series is regarded as his most worthy work in fiction. It is of the romantic type, ingenious in plot, with characters and scenes charmingly portrayed in the style of an experienced and discerning man of the world. He was a member of the American academy of arts and letters. Died, 1909.

Crawford, Thomas, American sculptor, was born at New York in 1814. He early manifested a taste for art and, in 1835, repaired to Rome, where he entered the studio of Thorvaldsen. His principal works are a bronze bust of Beethoven, executed for the Boston music hall; the colossal equestrian statue of Washington at the capitol, Richmond; the marble and bronze statuary for the Capitol, Washington. Among his works in American art collections are "The Indian," belonging to the New York historical society; "Orpheus" and "Adam and Eve after the Expulsion," in the Boston museum; "Josiah Quincy," a bust in the Boston atheneum; and "The Dancer," "Dying Indian Maiden," and "Flora," at the Metropolitan museum. Died in London, 1857.

Creasy (*krē'sĭ*), **Sir Edward Shepherd,** English historian, was born at Bexley, Kent, in 1812. From Eton he passed to King's college, Cambridge, and, in 1834, was elected a fellow there. Admitted to the bar in 1837, he served as a judge for some years and, in 1840, was appointed professor of history at London university. In 1860, he was knighted and appointed chief justice of Ceylon, a post which he held for ten years. He is the author of *The Fifteen Decisive Battles of the World, Invasions of England, History of the Ottoman Turks, Imperial and Colonial Constitutions,* and a novel entitled *Old Love and the New.* He died at London, 1878.

Creighton, Mandell, English prelate and historian, was born at Carlisle, 1843; graduated at Merton college, Oxford; and was elected a fellow there in 1866. He became vicar of Embleton, Northumberland, in 1875; first professor of ecclesiastical history at Cambridge in 1884; and bishop of Peterborough in 1891 and of London in 1897. His striking personality and ability made him one of the most notable divines of his century in England. His chief works are *Life of Simon de Montfort, History of the Papacy during the Reformation Period,* and *The Age of Queen Elizabeth.* Died, 1901.

Cremazie, Octave, French Canadian poet, was born at Quebec in 1827. Financial involvements, arising from an unsuccessful bookselling enterprise, led him, in 1862, to seek refuge in France under an assumed name. His poems, written in French and inspired by intense religious and patriotic sentiment, were first published in complete form in 1882, three years after his death in Havre, France. He has been called "the father of French Canadian poetry."

Cremer (*krē'mĕr*), **Sir William Randal,** English advocate of international peace, was born at Fareham, 1838. From 1860 to 1870, he was a prominent figure in English trade unions. He was elected to the House of Commons as a Liberal in 1885 and was repeatedly re-elected until 1906. In 1887, he founded the interparliamentary conferences which have frequently convened to advance the cause of universal peace. For 37 years, he was secretary of the international arbitration league, in the support of which he traveled throughout Europe. He frequently visited the United States in the interest of an Anglo-American treaty of arbitration and was editor of the *Arbitrator,* a periodical advocating the cause of peace. In 1903, he was awarded the Nobel peace prize, which he gave as an endowment to the international arbitration league. He was knighted in 1907. Died, 1908.

Crillon (*krē'yŏn'*), **Louis des Balbes de Berton de,** French general, surnamed "le brave," was born at Murs in Provence, 1541. Under Francis of Lorraine, duke of Guise, then the model of chivalry, he was trained for war and, while still a boy, covered himself with glory at the siege of Calais and at the capture of Guines. He distinguished himself further at Dreux, Jarnac, and Moncontour. Though wounded at Lepanto, 1571, he was sent to carry the news of victory to the pope and the French king. He abhorred the massacre of Saint Bartholomew, but took part in the siege of La Rochelle in 1573. Loyal in support of Henry III, he became also the sincere friend and adviser of Henry IV, who called him "the bravest of the brave." When peace with Savoy was concluded, Crillon retired to Avignon, where he died in 1615.

Crispi (*krēs'pē*), **Francesco,** Italian statesman, was born at Ribera in Sicily, 1819. He was admitted to the bar at Palermo, but, joining the revolutionary movement

of 1848, was obliged to take refuge in France. He organized the successful movement of 1859-60 and re-entered Sicily with Garibaldi. In the restored kingdom of Italy he became deputy, president of the chamber, minister, and eventually premier. He was a strong advocate of the triple alliance between Germany, Austria, and Italy. In 1896, the Abyssinian disaster of Adowa compelled his resignation as premier, and, in 1898, he withdrew from the lower chamber in consequence of charges connecting him with a series of bank scandals. While much misunderstood and maligned, he was the greatest constructive statesman that southern Italy gave to the unified kingdom. Died in Naples, 1901.

Crockett, David, American pioneer and politician, was born in Tennessee, 1786. He was noted chiefly for his adventures and eccentric habits. He was a member of Congress from 1827 to 1831 and from 1833 to 1835. He joined the Texans in their revolt against Mexico; was taken prisoner at Fort Alamo in 1836; and, with the five other survivors of the battle, was massacred by order of Santa Anna. *A Narrative of the Life of David Crockett,* an autobiography probably authorized or dictated by him, was published in 1834; also *A Tour to the North and Down East,* in 1835.

Crœsus (*krē'sŭs*), last king of Lydia, lived in the 6th century B. C. He was celebrated for his wealth, his name becoming a synonym for a man possessing extraordinary riches. It is said that Solon visited his court and was asked by Crœsus whether one possessed of so great riches might not be deemed the happiest man in the world. Solon replied that no man can be called happy until his death. Crœsus was later defeated and captured by Cyrus, king of Persia, and was condemned to be burned to death. When surrounded by flames, he thrice called the name of Solon in recollection of the sage's remark. Cyrus, on inquiry, learned the occasion of Crœsus' exclamation and, moved by pity, ordered the fire to be extinguished. Crœsus was thereafter retained among the counselors of Cyrus.

Crofts, Ernest, English painter, keeper of the royal academy, was born in Yorkshire, 1847. He studied art in London and later at Dusseldorf, where he lived many years. His historical paintings range over a wide period and deal mainly with military subjects. The chief ones include "Napoleon at Ligny," "On the Morning of the Battle of Waterloo," "Oliver Cromwell at Marston Moor," "George II at Dettingen," "Wallenstein," "Marlborough after Ramillies," "Napoleon Leaving Moscow," and "Execution of Charles I." Died, 1911.

Croker, Richard, politician, was born at Black Rock, Ireland, 1843; was brought to the United States when two years old; and was educated in the public schools of New York. He rose to great prominence in the politics of New York City, where he stoutly opposed the Tweed ring and was long recognized as the leader of the Tammany forces. He retired from politics in 1902 and, soon after, took up residence in Ireland where he devoted much time to the turf. He was a Derby winner in 1907. Died, 1922.

Croly, Herbert, American editor and author, was born at New York in 1869 and was educated at the College of the City of New York and at Harvard university. He was editor of the *Architectural Record* and the *New Republic.* His publications include *Promise of American Life* and *Progressive Democracy.*

Crome, John, English landscape painter, was born at Norwich, 1768. He was the first English landscape painter to place himself in intimate touch with nature, and he founded the so-called Norwich school of painting. His art is characterized by a genuine English realism, and his landscapes contain a true appreciation of light and air. He is usually called "Old Crome" to distinguish him from his son, John Berney Crome, usually called "Young Crome." He died in his native town, 1821.

Cromer (*krō'mẽr*), **Evelyn Baring, first Earl,** British statesman and diplomat, was born at Cromer Hall, Norfolk, 1841. He was educated at the ordnance school, Carshalton, and at the royal military academy, Woolwich. After serving with distinction in the royal artillery, he became private secretary to the earl of Northbrook; governor-general of India, 1872; commissioner of the Egyptian public debt, 1877; controller general of Egypt, 1879; and finance minister of India in 1880. From 1883 to 1907, he was agent and consul general in Egypt. In this capacity he was virtually British viceroy and, by reason of his notably constructive administration, was called the "maker of modern Egypt." After his return to England in 1907, he became active in Parliament. His writings include *Staff College Essays, Paraphrase and Translations from the Greek, The War Game, Modern Egypt,* and *Ancient and Modern Imperialism.* Died in 1917.

Crompton, Samuel, inventor of the spinning mule, was born near Bolton, England, 1753. For five years, he devoted all his spare time and money, including his earnings from playing the violin at Bolton theater, to work upon his project. He at last sold it under an unfortunate arrangement, from which he realized a total of only about £60. The spinning mule revolutionized the manufacture of British muslin, but brought little wealth to the inventor, whose only substantial recognition was a grant of £5000 from the House of Commons in 1812. He died in comparative poverty, 1827.

Cromwell, Oliver, lord protector of England, Ireland, and Scotland, was born at Huntingdon, England, April 25, 1599. Educated at the Huntingdon grammar school, he entered Sidney Sussex college, Cambridge, in 1616. He later went to London to study law. In 1620, he married Elizabeth Bourchier and embraced Puritanism in its most uncompromising form.

Parliamentary Career. In 1628, Cromwell sat for Huntingdon in the stormy third Parliament of Charles I, and, in 1640, when 41 years of age, he was sent to Parliament for the town of Cambridge. As a member of the so-called Long Parliament, which met in that year, Cromwell warmly supported all measures that tended to disarm royalty and to invest Parliament with the supreme power. When the hopes of reconciliation between the king and Parliament failed through the perfidy or vacillation of the former, Cromwell was among the first to offer of his substance to defend the state. Ranking as captain of a troop of cavalry in 1642, he exhibited astonishing military genius. He was promoted to the rank of colonel and then to that of lieutenant general.

Military Campaigns. Cromwell served at Winceby, October 11, 1643; at Marston Moor, July 2, 1644; and in the second battle of Newbury, October 27, 1644. When, by a self-denying ordinance, the army had been rid of its grandees, it was remodeled, and the war was pushed forward with new vigor. In the capacity of lieutenant general, Cromwell commanded the right wing of the Parliamentary army at Naseby, June 14, 1645. Everywhere the royal cause was failing, and Charles himself was given up to the Parliamentary commissioners in 1646.

With characteristic sagacity, Cromwell perceived that the advantage would lie with that party which held possession of the king's person, and he had Charles removed from the commissioners into the hands of the army, June 1647. At this time, the country was in a critical situation. The Welsh had risen in insurrection; a Scotch army was bearing down from the north; and Rupert was threatening a descent from Holland. There was extensive royalism also in Ireland. Prompt measures alone could prevent anarchy, and Cromwell was not afraid to employ them.

In 1648, the Scotch were utterly defeated at Preston Moor. Then came the execution of Charles I on January 30, 1649, and Parliament established the Commonwealth. The abolition of the House of Lords followed speedily, and Cromwell became a powerful member in the new council of state. In August 1649, he quelled the rebellion in Ireland and established unexampled prosperity in that country. Affairs in Scotland now claimed his attention. Charles II was declared king in the north of Scotland and, on September 3, 1650, Cromwell routed the Scotch army at Dunbar. A year later to the day, September 3, 1651, he defeated Charles II at Worcester. This battle, which ended the civil war, placed Cromwell at the head of public affairs in England.

Protectorate. In April 1653 came the dissolution of Parliament. Cromwell now convened a parliament, which consisted wholly of Puritans and Dissenters, numbering 154 persons. It assembled July 4, 1653, and immediately invested Cromwell with the supreme power under the title of lord protector. When Parliament met again, its two houses fell into a disagreement which compelled Cromwell to dissolve it. His power thenceforth rested upon the army, though it was his constant desire to revert to constitutional government.

His protectorate was a continual struggle between Royalist plots and Republican resistance, yet Cromwell was able to maintain a strong policy, home and foreign. He united Scotland and Ireland to England, giving to each representation in Parliament. He upheld toleration and curbed the persecuting tendencies of the time. He saved the universities from the fanatics, put capable men at their head, and encouraged letters. Under Cromwell, the Commonwealth became the head and protectress of Protestant Europe. He made peace with Holland and, in the interest of religious liberty and commerce, allied himself with France against Spain. By the hand of Blake, he chastised the pirate states of Barbary. His boast, that he would make the name of Englishman as fully respected as that of Roman, had been fulfilled. Died at Whitehall, September 3, 1658.

Cromwell, Thomas, earl of Essex, English statesman, was born about 1485. He was in the service of Wolsey for several years before the cardinal's downfall in 1529 and remained his steady friend in adversity. His fidelity to his patron and his superior talents commended him to Henry

VIII, who appointed him his secretary and his spokesman in the House of Commons. He thus became the leader of the English Reformation. He received a succession of honors and was clothed with great administrative authority. In 1535, he was made visitor general of all the country's monasteries, religious houses, and universities, and, in 1536, he became lord privy seal, baron, and ecclesiastical vice regent.

The visitorial power was executed with great vigor, and sweeping changes were made in the religious system of England. He was created earl of Essex, received valuable estates from the spoils of the monasteries, and was the king's most powerful subject. But he had enemies on all sides, and, having lost the king's favor by his promotion of the marriage with Anne of Cleves, with whom Henry became disgusted, he was beheaded in 1540.

Cronstedt (*krōn'stĕt*), **Axel Frederic, Baron,** Swedish scientist, was born at Stropsta Nykoping, 1702. He was councilor of mines and member of the academy of sciences at Stockholm. In 1751, he discovered nickel, isolating the metal in impure form from niccolite. His results were verified by Bergman in 1775. With Wöhler's invention, 50 years later, of a method for extracting the metal in commercial quantities, the foundation was laid for the present day nickel industry with its innumerable applications in the arts. In 1753, he published an important work on mineralogy, making chemical composition the basis of classification. He was the first to draw a clear distinction between minerals and rocks. He died in 1765.

Crookes (*krōōks*), **Sir William,** British chemist and physicist, was born in London, 1832; was educated at the royal college of chemistry; and became professor of chemistry in the training college, Chester, in 1855. He discovered thallium, a new element; repulsion resulting from radiation; radiant matter; radiant matter spectroscopy; and new elements in gadolinite. In 1865, he worked out the sodium amalgamation process for separating gold and silver from their ores. By inventing improvements in the Sprengel air pump, he was enabled to make the famous high vacuum tubes known as "Crookes tubes," used in the production of the Roentgen or X-rays. This discovery also made the incandescent electric light commercially practicable. Crookes also devised the radiometer, the otheoscope, and the spinthariscope. In 1907, with Eduard Buchner, Crookes received the Nobel prize for chemical researches. He was proprietor and editor of the *Chemical News* and editor of the *Quarterly Journal of Science*. Besides numerous scientific papers, his writings include *Select Methods in Chemical Analysis, Manufacture of Beetroot Sugar in England, A Solution of the Sewage Question, The Wheat Problem,* and *Diamonds*. Died, 1919.

Crosby (*krŏz'bĭ*), **Fanny** (Mrs. Frances Jane Van Alstyne), blind writer of popular hymns, was born at Southeast, N. Y., 1820. When 6 weeks old, she lost her eyesight during an illness. At 15, she entered an institution for the blind, New York, and taught there, 1847–58. Among the best-known hymns written by her are "Safe in the Arms of Jesus," "Jesus, Keep Me Near the Cross," "Pass Me Not, O Gentle Savior," "Jesus is Calling," "I am Thine, O Lord," and "Jesus the Water of Life Will Give." Among her songs are "There's Music in the Air" and "Hazel Dell." She wrote, among other works, *The Blind Girl, A Wreath of Columbia's Flowers,* and *Memories of Eighty Years*. Died in 1915.

Cruikshank (*krōōk'shăngk*), **George,** English artist and caricaturist, was born in London, 1792. The works illustrated by him include, among hundreds of others, Grimm's *Fairy Tales, Peter Schlemihl,* Dickens's *Oliver Twist* and *Sketches by Boz,* and Ainsworth's *Jack Sheppard*. Like Hogarth, he was a moralist as well as an artist, and he used his art to dramatize the downward career of the drunkard. His last important work, done in oil, is the "Worship of Bacchus," which is a vigorous protestation against intemperate drinking. Died, 1878.

Cui (*kū-ē'*), **Cēsar Antonovitch,** Russian composer and military engineer, was born at Vilna, 1835. He received his early education at Vilna, where his father, a survivor of Napoleon's army of invasion, was an instructor in French. He studied music for a brief period and then took up engineering at Petrograd, later becoming a professor in the military academy and attaining the rank of lieutenant general. He was the instructor of many noted military leaders and wrote valuable textbooks on fortification. He continued musical study with Balakirev and became a champion of the new Russian nationalistic school, in advancing which he wrote much excellent music. He composed the operas *The Prisoner of the Caucasus, William Ratcliff, Angelo, The Saracen, The Captain's Daughter,* and *Le Filibustier*; also symphonies, orchestral and piano pieces, choruses, and songs. Died, 1918.

Cullen, Sir William Portus, Australian lawyer and educator, was born in 1855. He received his academic education at Sydney university; was admitted to the bar in 1883; and became lieutenant governor of New South Wales in 1910. Four years later, he was made chancellor of Sydney university.

Cullom, Shelby Moore, American politician, was born in Kentucky, 1829; studied law, 1853; was admitted to the bar, 1855; and began to practice law at Springfield, Ill. He was elected to the state legislature in 1856, thereby beginning a political career that culminated in his election to the United States Senate in 1883. He sat in the Senate continuously for 30 years, becoming prominent as the author of the interstate commerce law and chairman of the Senate committee on interstate commerce. Died, 1914.

Culp, Julia, Dutch contralto, was born in Groningen, 1881. At the age of 14, she attracted attention by her possession of a voice of unusual quality, although she had previously appeared in public as a violinist. She studied voice at the conservatory at Amsterdam and continued vocal training with Etelka Gerster in Berlin. She made her début as a singer at Magdeburg in 1901 and, in 1902, appeared with great success in Berlin. Throughout Europe she made tours, which established her reputation as one of the greatest concert singers. On her first American tour in 1913, she was enthusiastically received and has since appeared in recitals with the leading symphony orchestras.

Cummins, Albert Baird, American lawyer and politician, was born near Carmichaels, Pa., 1850. He was admitted to the Illinois bar, 1875, and practiced at Chicago, 1875–78. In the latter year, he removed to Des Moines, Iowa. He entered politics and, after attaining the governorship of the state, was chosen, in 1908, as a United States senator and was re-elected for succeeding terms until 1926. He was coauthor of the Esch-Cummins Railroad bill, which, as the Railroad Transportation act, was put into effect in 1919. When Vice President Coolidge succeeded to the presidency in 1923, Cummins acted as president of the Senate until the succeeding vice president, General Dawes, took office in 1924. Died, 1926.

Cunard (*kū-nărd'*), **Sir Samuel,** civil engineer and founder of the Cunard steamship line, was born at Halifax, Nova Scotia, 1787; succeeded early as a merchant and shipowner, and removed to England in 1838; joined with George Burns, Glasgow, and David M'Iver, Liverpool, in founding, 1839, the Royal Mail Steam Packet Company; and obtained a contract for the mail service between Liverpool and Halifax, Boston, and Quebec. The first passage, 1840, was made by the *Britannia* in 14 days, 8 hours. Iron steamers were introduced in 1855, and paddle wheels gave way entirely to the screw after 1862. Since then the Cunard line has been known as one of the leaders in transatlantic travel. Cunard was created a baronet in 1859. Died at London, 1865.

Curie (*kū'rē'*), **Madame,** née Marie Sklodowska, Polish-French chemist and physicist, was born in 1867 at Warsaw, Poland, where her father was professor of physics. She studied physical sciences at Warsaw and later at the Sorbonne, Paris, with Pierre Curie, whom she married in 1895.

She discovered the element polonium and, with her husband, the element radium. In the investigations on radioactivity and radioactive substances which made her husband and herself renowned throughout the scientific world, she performed a fully equal share. She carried out with monumental patience the innumerable fractional crystallizations which at last yielded a minute quantity of pure radium salt and was thereby enabled to determine the exact atomic weight of radium. In 1903, with her husband and A. H. Becquerel, she was awarded the Nobel prize for physics. She also received the La Case prize and the Davy medal jointly with her husband. In 1906, she was appointed to the position at the Sorbonne made vacant by the death of her husband. In 1911, she was honored with the full Nobel prize in chemistry, the first woman scientist to win it and the only person at that time who had shared in two Nobel prizes. See *Radioactivity, Radium.*

Curie, Pierre, French chemist, was born in Paris, 1859. He was educated at the Sorbonne. In 1895, he became professor of physics at the École Municipale, where, in 1896, he and his wife began a series of investigations upon the Becquerel rays which resulted in the discovery of polonium and radium. In 1901, they jointly received the La Case prize and, in 1903, the Davy medal. In 1903, they were awarded, with Becquerel, the Nobel prize for physics. In 1904, Curie was appointed professor of physics in the Sorbonne and, in 1905, was made member of the institute of France. He was instantly killed in a street accident, 1906.

Curran (*kŭr'ăn*), **John Philpot,** Irish legal and parliamentary orator, was born at Newmarket, Ireland, 1750. He was educated at Trinity college, Dublin. In 1773, he went to London and studied law at the Middle Temple. Two years later he was admitted to the Irish bar, where his humorous, flowery, and sarcastic speech secured him immediate success, which his attractive social qualities did

much to extend. About 1782, he obtained a seat in the Irish Parliament, where he supported a liberal policy. His fearless defense of Robert Emmet led to his examination before the privy council in 1803. Fox appointed him master of the rolls with a seat in the privy council in 1806, from which office he retired in 1813. He died in 1817.

Currelly, Charles Trick, Canadian archeologist, was born at Exeter, Ont., 1876. He was graduated at the University of Toronto and joined the staff of the Egypt exploration fund. He made several notable discoveries in Egypt, including the tomb of Aahmes and of Mentuhotep III. Between 1902 and 1919, he spent eight years in Europe and Egypt collecting for a possible museum and, in the latter year, was made the first curator of the Royal Ontario museum of archeology in Toronto. He was later appointed professor of the history of industrial art at the University of Toronto and was made chairman of the board of governors of the Ontario college of art.

Currie, General Sir Arthur William G., Canadian military leader and educational administrator, was born at Napperton, Ont., 1875; was educated at Strathroy collegiate institute; and taught school in British Columbia for five years. From 1900 to 1914, he was engaged in the business of insurance and real estate. Having been connected with the Canadian militia 17 years prior to 1914, he volunteered for service on the outbreak of the World War and was made commander of an infantry brigade. Currie was promoted to the rank of brigadier general in 1915 and, in 1917, became commander of all the Canadian forces in France. The more decisive battles in which he took part were those in 1918 at Amiens, Arras, and Cambrai. In 1920, he resigned from the army and became principal of McGill university.

Curtis, Charles, American politician, was born at Topeka, Kansas, in 1860, of Kaw Indian blood on his mother's side. His early upbringing was with the Kaw Indian tribe. Having studied law, he began practicing at Topeka in 1881. He was elected to Congress in 1892, serving in the House until 1907, when he entered the Senate. With one brief interruption in 1912-14, he continued as senator until 1928, being Republican leader of the Senate from 1924. In 1928, he was nominated to the vice presidency as the running mate of Herbert Hoover and was elected by a large majority.

Curtis, Cyrus Herman Kotzschmar, American publisher, was born in Portland, Me., 1850. He received his education in the public schools and removed to Philadelphia, where he became publisher of the *Tribune* and the *Farmer*. Later he established the *Ladies' Home Journal*, which, under his management, became one of the most successful periodicals in the United States. The Curtis Publishing Company, of which he became head, undertook the publication of the *Country Gentleman* and the *Saturday Evening Post*, the latter established in 1728 by Benjamin Franklin. Under the management of Curtis, the *Saturday Evening Post* attained a larger circulation than any other American periodical of the time. In 1913, he purchased, with John Gribbel, the Philadelphia *Public Ledger*.

Curtis, George William, American journalist, essayist, and critic, was born at Providence, R. I., 1824. After four years in Europe and the Orient, he joined the staff of the New York *Tribune* and became one of the editors of *Putnam's Monthly* in 1852. He began the "Editor's Easy Chair" papers in *Harper's Monthly* in 1853 and became editor of *Harper's Weekly* on its establishment in 1857. He possessed an attractive, graceful style, was a polished lecturer and orator, and exhibited a notably progressive and patriotic spirit. Among his numerous writings are *Nile Notes of a Howadji*, *Lotus Eating*, *Potiphar Papers*, *Prue and I*, and *Trumps*. Died, 1892.

Curtiss, Glenn Hammond, American aviator, was born at Hammondsport, N. Y., 1878. He became interested in mechanics, and, in 1906, at Ormond Beach, Fla., in a special motorcycle of his own construction, he covered a mile in 26⅘ seconds. In 1907, he took up aeronautic experiment. In 1908, he won the *Scientific American* cup in airplane competition at Hammondsport, N. Y.; in 1909, the international cup in the airplane competition at Reims, France; in 1910, the New York *World's* $10,000 prize in a flight from Albany to New York in a biplane of his own design. In 1911, he invented and demonstrated the hydro-airplane and, in 1912, he invented the flying boat. In 1913, the Smithsonian institution awarded him a medal. In 1914, he built the *America*, designed for transatlantic flight; also the Navy-Curtiss machine, which was the first to fly across the Atlantic Ocean. He became actively engaged in the commercial side of aviation and, in 1915, established extensive works for making airplanes. With the exception of the Wright brothers, no one else has accomplished so much for aviation in America. See *Airplane*.

Curtius (*kōōr'tsē-ōōs*), **Ernst,** German archeologist, was born at Lubeck in 1814. He studied at Bonn, Gottingen, and Berlin; visited Athens in 1837; and later accompanied Otfried Müller in his travels through Greece. In 1844–50, he was tutor to the crown prince Frederick of Prussia, afterward Emperor Frederick III. In 1856, he became professor at Gottingen, whence he was called in 1863 to the University of Berlin. He was one of the most distinguished scholars of modern Germany and a writer and teacher of great force and influence. Among his works are *Klassische Studien*, *Peloponnesos*, *Olympia*, *Ephesos*, *Altertum und Gegenwart*, *Griechische Geschichte*, and *Die Ausgrabungen zu Olympia*. Died, 1896.

Curtius, Georg, German philologist, brother of Ernst Curtius, was born at Lubeck, Germany, 1820, and studied at Bonn and Berlin. After teaching at Dresden and Berlin, he became professor of classical philology at Prague in 1851, at Kiel in 1854, and at Leipzig in 1862. The chief of his many works are *Griechische Schulgrammatik*, *Grundzüge der Griechischen Etymologie*, and *Das Verbum der Griechischen Sprache*. Died, 1885.

Curwood, James Oliver, American author, was born at Owosso, Mich., in 1878. He was educated at the University of Michigan and, for several years, was associated with the *News-Tribune*, Detroit. He traveled extensively in the Canadian northland, being the only American ever employed by the Canadian government as an exploratory and descriptive writer. His best-known books include *The Danger Trail*, *God's Country and the Woman*, *The Valley of Silent Men*, and *The Ancient Highway*. Died, 1927.

Curzon (*kûr'zŏn*), **George Nathaniel,** first **Earl Curzon of Kedleston,** English statesman and author, was born in Kedleston, 1859. He graduated at Balliol college, Oxford. In 1885, he was assistant private secretary to the marquis of Salisbury and entered Parliament the next year as a Conservative. He traveled extensively in Asia in the succeeding years; became secretary of foreign affairs in 1895; and was made governor-general of India in 1899, resigning in 1905 as a result of a disagreement with Lord Kitchener. As chancellor of Oxford university, in 1908, he promoted the cause of reform there. The same year, he was made a peer and became a member of the House of Lords, of which he was leader from 1916 to 1924. He advocated universal military service and opposed woman suffrage. During the World War, he was president of the British air board, and he served as secretary of foreign affairs, 1919–24.

Lord Curzon married Miss Leiter of Chicago, who died in 1906. Eleven years later, he married the daughter of J. Munroe Hinds, former United States minister to Brazil. His publications include *Russia in Central Asia*, *Problems of the Far East*, and *Tales of Travel*. Died, 1925.

Cushing, Frank Hamilton, American ethnologist, was born at Northeast, Pa., 1857. He entered the national museum at Washington and, in 1875, began making collections of Indian relics for the department of ethnology. He lived among the Zuñi Indians and wrote extensively on their traditions, customs, and remains. He also discovered the remains of an aboriginal people on the coast of Florida in 1896. He wrote *Zuñi Fetiches*, *Adventures in Zuñi*, and *Zuñi Folk-tales*. Died at Washington, 1900.

Cushman (*kōōsh'măn*), **Charlotte Saunders,** American actress, was born in 1816 at Boston, Mass. She appeared first in opera in 1835 and later in the same year as Lady Macbeth, which she afterward made one of her most celebrated rôles. Among her many parts, both tragic and comic, which included Bianca, Rosalind, Goneril, Nancy Sikes, Lady Teazle, and Cardinal Wolsey, her Meg Merrilies was of unusual distinction. In 1844, after a tour in America with Macready, she made a successful trip to England, which she revisited many times. In 1856, she went to Rome. During the Civil War she showed a notably patriotic spirit, and throughout her distinguished career she was esteemed not only as a great artist but as a noble woman. She retired from the stage in 1875. She died in 1876 and was elected to the American hall of fame, 1915.

Custer, George Armstrong, American soldier, was born at New Rumley, Ohio, in 1839. He graduated at West Point in 1861 and served with distinction through the Civil War. As a cavalry commander in the West, he several times defeated the hostile Indians; but, on June 25, 1876, he attacked, on the Little Big Horn, Mont., a force of Sioux who outnumbered him ten to one, and he and five companies of cavalry were surrounded and killed to the last man. As a brilliant, daring cavalry officer, Custer had few equals, but, in the Little Big Horn engagement, he undoubtedly permitted his impetuosity to master his judgment. His wife, Elizabeth Bacon Custer, accompanied him in many campaigns and became well known as the author of *Boots and Saddles*, *Tenting on the Plains*, and *Following the Guidon*.

Cuvier (*kü'vyā'*), **Georges Chrétien Léopold Frédéric Dagobert,** French naturalist and the founder of comparative anatomy, was born August 23, 1769, at Mompelgard, now Montbeliard, France. In 1784, he was

admitted to the Academy in Stuttgart, where he distinguished himself for great receptivity and brilliancy of mind.

At the age of 19, Cuvier became tutor to the only son of Count d'Héricy in Normandy. Here Cuvier became intimate with the Abbé Tessier, a noted authority on agriculture, who had fled from Paris during the Revolution to a small town near the residence of the count. Under the stimulation of Tessier, Cuvier devoted himself assiduously to the study of natural phenomena.

In 1795, Cuvier was invited to Paris as a member of the commission of arts, newly organized by the Revolutionary government. At the Jardin des Plantes, he soon became professor of natural history and assistant superintendent of the botanical gardens. There he continued his studies on the structure of animals and, in 1798, produced his *Elementary View of the Natural History of Animals*. Other investigations made at this time enabled him subsequently to write the important *Researches on Fossil Bones*.

Cuvier was made a member of the national institute of France in 1796, and, four years later, he was appointed professor of the philosophy of natural history in the Collège de France. He continued, however, to act as professor at the Jardin des Plantes. Napoleon soon detected Cuvier's administrative skill and made him one of six inspectors to establish public schools in the principal towns of France. Cuvier opened the lycées of Marseille, Nice, and Bordeaux and organized the universities of Piedmont, Genoa, Tuscany, and Rome. His labors extended also into Holland and the Hanseatic towns.

In 1814, Cuvier was appointed councilor of state, and, the following year, he became chancellor of the University of Paris. In 1817, he published *The Animal Kingdom* and, in 1818, was elected a member of the French academy. His last 10 years were equally crowded with honors. In 1822, he was chosen grand master of the faculties of Protestant theology in the University of Paris. In 1826, Charles X bestowed upon him the decoration of grand officer of the legion of honor, and, in 1831, he was created peer by Louis Philippe.

Through Cuvier's careful and laborious observation of the analogies of internal structure, the whole animal kingdom was brought into systematic arrangement. To him is due the conversion of natural history into a science of exact and severe induction. He originated the classification that is the basis of modern zoology. He is accredited also with the foundation of the new science of paleontology. Died, May 13, 1832.

Cyrus the Great, commonly called Cyrus the Elder, founder of the Persian empire, was born about 600 B. C. Much of a legendary character attaches to his birth and early youth. According to Herodotus, he was the son of Cambyses, a Persian noble, and of Mandane, daughter of Astyages, the Medo-Persian king. His birth was a source of alarm to his grandfather, Astyages, who had previously had a dream the interpretation of which portended that the offspring of Mandane would one day be the ruler of all Asia. He therefore contrived to get the infant into his own hands and gave it to Harpagus, his chief servant, with orders to put it to death. Harpagus promised to do so, but intrusted it secretly to the care of a herdsman, who brought it up together with his own children. The young Cyrus quickly distinguished himself among his companions.

Meanwhile the tyranny of Astyages had made him hateful to his subjects, and, by the help of the crafty Harpagus, Cyrus formed a party among the Medes favorable to his designs. Putting himself at the head of his Persian troops, Cyrus advanced into Media and overthrew the forces of Astyages, 550 or 549 B. C. After consolidating his dominions, Cyrus proceeded to conquer the surrounding nations. The kingdom of Lydia first yielded, 546 B. C., and its king, the famous Crœsus, fell into his hands. Ultimately, the whole of Asia Minor was subdued.

Cyrus's crowning triumph, however, was his capture of the city of Babylon, the metropolis of Assyria, 539 or 538 B. C. The city is said to have fallen without fighting and Nabonidus, the king, was entirely overthrown. Bel-sar-usur, son of Nabonidus, may have been the Belshazzar of *Daniel*. Through the instrumentality of Cyrus, the Jews were delivered from their captivity and were allowed to return to Palestine. He wished his power to overshadow all Asia and began an unjust war with the Massagetæ, a nation or tribe dwelling to the northeast of the Caspian. At first Cyrus was successful, but, in the second engagement, he was defeated and slain, 529 or 528 B. C.

Cyrus the Younger, son of Darius and governor of the western provinces of Asia Minor, was born about 424 B. C. After unsuccessfully plotting against his elder brother, Artaxerxes, he raised a large army, including about 13,000 Greek soldiers, and marched against him. Cyrus was slain in the moment of victory at Cunaxa, 401 B. C. The victory was due mainly to Cyrus's Greek force, which, after being treacherously deprived of its generals and reduced in number to about 10,000, was led back to Greece by Xenophon.

Czerny (*chĕr'nē*), **Karl,** Austrian pianist and composer, was born in Vienna, 1791. He received his first musical instruction from his father. He was a favorite pupil of Beethoven and studied also under Clementi. At an early age, he won great fame both as a pianist and as a teacher, numbering among his pupils Liszt, Thalberg, and Kullak. He was a prolific composer and his instructive works, such as *The School of Velocity, Daily Studies, The School of Virtuosity,* and *The School of Fingering,* are of permanent value. At his death, in 1857, his fortune was left largely to the Vienna conservatory.

Dabney, Charles William, American educator, was born in Hampden Sidney, Va., 1855. He graduated from Hampden Sidney college and from the University of Virginia, and studied also at Berlin and Gottingen. He was connected with the University of North Carolina as professor of chemistry and later was state chemist and director of the agricultural experimental station at Raleigh until 1887, when he was chosen president of the University of Tennessee. In 1893–96, he also acted as assistant secretary of agriculture for the United States. He discovered phosphate deposits and tin ore in North Carolina and made them known to science and commerce. From 1904 to 1920, he was president of the University of Cincinnati. His writings include *Old College and New, Agricultural Education, The Problem in the South, The Relation of Agriculture to Other Sciences,* and *Fighting for a New World.*

Daguerre (*dă'gâr'*), **Louis Jacques Mandé,** French inventor, was born at Cormeilles in 1789. He discovered the daguerreotype process of photography, by which the portrait was fixed on a plate of copper thinly coated with silver, by the successive action of the vapors of iodine, bromine, and mercury; in this invention he was associated with M. Nièpce. He was also celebrated as a dioramic painter; was named by the French government as an officer of the legion of honor; and was granted a pension of 6000 francs. Died near Paris, 1851.

Daingerfield, Elliott, American religious and landscape painter, was born at Harpers Ferry, Va., 1859; studied drawing and painting at the art students' league, New York. He first exhibited at the national academy of design, 1880; studied in Europe, 1897; and later became professor of painting in the school of design, Philadelphia. Among his religious subjects are the paintings in the church of Saint Mary the Virgin, New York, a "Madonna and Child," "The Child of Mary," and "The Story of the Madonna." His landscapes include "Slumbering Fog," in the Metropolitan museum, New York; "The Midnight Moon," Brooklyn museum; and "Pearls of the Morning."

Dalberg-Acton, Sir John Emerich Edward. See *Acton, Baron.*

D'Albert. See *Albert, Eugen Francis Charles d'.*

Dale, Alan is the pseudonym of Alfred J. Cohen, dramatic critic and author, who was born in Birmingham, England, 1861. He was educated at King Edward's school, Birmingham, and Oxford university. Coming to the United States, he engaged in journalism in New York and was dramatic critic for several New York newspapers. He wrote later for the Cosmopolitan news service. His publications include *A Marriage Below Zero, My Footlight Husband, An Old Maid Kindled, His Own Image, The Great Wet Way,* and *When a Man Commutes.* Died, 1928.

D'Alembert. See *Alembert, Jean le Rond d'.*

Dalén (*dă'lĕn*), **Nils Gustaf,** Swedish engineer, was born in Stenstorp, 1869. He was educated at Gothenburg and Zurich and rose to eminence as a consulting engineer. Among his inventions are improvements in hot-air turbines, air compressors, and milking machines. He also invented a method of dissolving acetylene in acetone used for automatic lighting in lighthouses and for railway signals. In 1912, he was awarded the Nobel prize in physics. He is the author of numerous technical papers and a work entitled *Chemische Technologie des Papiers.*

Dallin, Cyrus Edwin, American sculptor, was born at Springville, Utah, 1861. In his early years, he was closely associated with Indian life, in the portrayal of which he has excelled all other American plastic artists. He studied under Truman Bartlett in Boston and under Chapu in Paris. His "Signal for Peace," now in Lincoln park, Chicago, was inspired by a visit of Buffalo Bill's wild west show to Paris. "The Medicine Man," in Fairmount park, Philadelphia, is ranked among the most notable efforts of American sculptural art. Among his other works are a statue of Sir Isaac Newton in the Congressional library, "Don Quixote," "Peace or War," and "The Appeal to the Great Spirit." See *Sculpture.*

Dalou (*dă'lōō'*), **Jules,** French sculptor, was born in Paris in 1838. He studied sculpture under Carpeaux and Duret and, in 1867, exhibited examples of his work at the

French salon. During the troublous period of the Commune, 1871, he took refuge in England. Through his appointment as instructor in the national art training school at South Kensington, he rapidly won a high reputation and took a leading part in the revival of English sculpture. While in England, he executed a remarkable series of groups and statuettes in terra cotta, including "Maternity," "The Reader," and "Woman Telling Her Beads."

After Dalou's return to France in 1879, he produced a long series of notable sculptural works, characterized by picturesque conception and masterly execution. Of these, the "Triumph of Silenus," in the Luxembourg, is a fine example. Another striking work is "The States General," in the Chamber of Deputies, Paris. His most elaborate achievement, "The Triumph of the Republic," erected after 20 years' work, was executed for the city of Paris. Other notable works are the monument to Alphand and the bronze statue of Delacroix. For his later work, Dalou chose subjects chiefly among peasants, artisans, and other classes representative of the common people. His work in portraiture is also of a high order. He died in 1902.

Dalton (*dôl'tŭn*), **John,** British chemist and physicist, was born near Cockermouth in 1766. He taught mathematics and physics in Manchester; made his first appearance as an author in 1793 in a volume of his observations and essays; and, in 1808, published *A New System of Chemical Philosophy*, which he finished in 1810. He became famous for his experiments on the elastic force of steam; for his researches on proportional weights of simple bodies; and for his discovery of the atomic theory, which revolutionized the science of chemistry and led to many of the most valuable developments in physical science. Died, 1844. See *Atom, Atomic Theory.*

Damien de Veuster (*dā'myăn' dē vû'stâr'*), **Joseph,** better known as "Father Damien," Roman Catholic missionary, was born near Louvain, Belgium, 1840. Sent on a mission to Honolulu and learning of the neglected state of the lepers, he volunteered to cast his lot with theirs; he became physician of their souls and bodies, their magistrate, teacher, carpenter, gardener, cook, and even gravedigger at need. He long worked single-handed, but was ultimately joined by other priests. For 12 years he escaped the contagion; in 1885, the malady appeared in him, yet he continued unabated his heroic labors until near his death in 1889.

Damrosch (*dăm'rŏsh*), **Leopold,** composer and conductor, was born in Posen, Prussia, 1832. After graduating in medicine at the University of Berlin, he began practice in Posen, but, in 1854, he gave up medicine to study music. In 1855, he appeared as a concert violinist in Magdeburg. Under the personal influence of Liszt, he began to write for musical journals. He became director in Posen and in Breslau. In 1871, he came to New York as director of the Arion society, where, in 1873, he founded the oratorio society and, in 1877, the symphony society, both of which have had an important part in the musical life of the city. In 1884, he successfully established German opera at the Metropolitan opera house, producing *Fidelio, Tannhäuser, Lohengrin, Die Walküre,* and other notable works. His musical compositions comprise works for the violin, an overture, several cantatas, and songs. He died at New York in 1885.

Damrosch, Walter Johannes, American musician, son of Leopold Damrosch, was born in Breslau, Prussia, 1862. He began to study the piano under his father before coming to the United States in 1871. He continued his musical education in New York and, in 1881, was made conductor of the harmonic society of Newark, N. J. In 1884, he became organist of Plymouth church, Brooklyn, and, in 1885, succeeded his father as conductor of the oratorio and symphony societies. In 1894, he organized the Damrosch Opera Company, devoted chiefly to the production of Wagner opera, which appeared under his direction in many cities of the United States. Through his efforts in 1903, the New York symphony society was reorganized as a permanently established orchestra, and he was its director until 1927. His musical compositions include two operas, *The Scarlet Letter* and *Cyrano de Bergerac*; *Manila Te Deum*; a sonata for violin and piano; and a number of songs. He reformed the bands of the American expeditionary force in the World War. He wrote *My Musical Life.*

Dana (*dā'nà*), **Charles Anderson,** American journalist, was born at Hinsdale, N. H., 1819. From 1849 to 1862, he was managing editor of the New York *Tribune* and, from 1863 to the close of the Civil War, was assistant secretary of war. In 1868, he became part owner and editor in chief of the New York *Sun*, and for the remainder of his life continued the successful management of that paper in the interests of the Democratic party. By his brilliant intellect, incisive style, and thorough knowledge of the art of newspaper making, he became one of the foremost journalists of his time. Together with George Ripley he planned and edited the *American Cyclopædia.* He edited also the *Household Book of Poetry.* Among his works are *The Art of Newspaper Making, Lincoln and His Cabinet,* and *Recollections.* He died in 1897.

Dana, James Dwight, American geologist and educator, was born at Utica, N. Y., 1813, and graduated at Yale, 1833. From 1838 to 1842, he was a member of the Wilkes exploring expedition, sent out by the United States government. His collections, chiefly from little-known parts of the Pacific Ocean, were so extensive that he devoted almost 13 years to their study and described nearly 900 new species of marine life. In recognition of his important services to science, he was made professor of natural history at Yale and occupied the chair with distinction from 1855 to 1890.

Dana possessed a vivid scientific imagination and remarkable keenness of perception and analysis. His discussions of continents, mountain building, and volcanoes are invaluable contributions to knowledge and establish his position among the most eminent scientists of the 19th century. He was an inspiring instructor and the author of authoritative textbooks and other scientific works, including *A System of Mineralogy, Manual of Geology, Corals and Coral Islands,* and *The Geological Story Briefly Told.* He also edited the *American Journal of Science* from 1846 until his death in 1895.

Dana, Richard Henry, American lawyer and author, was born at Cambridge, Mass., 1815. He entered Harvard college in 1832, but suspended his studies in 1834 on account of the weakness of his eyes. He then shipped as a common sailor on a Pacific voyage, a record of which is given in his narrative *Two Years Before the Mast,* a book of sailor life which has become a classic. He was graduated at Harvard, 1837; studied law and was admitted to the bar in 1840; in 1861, was United States attorney for Massachusetts; and, in 1867-68, was counsel for the United States government in the proceedings against Jefferson Davis. He published *The Seaman's Friend* and *To Cuba and Back*; edited Wheaton's *International Law*; and contributed to the *North American Review.* Died in 1882.

Daniels, Josephus, American editor and politician, was born at Washington, N. C., 1862. He was educated at the collegiate institute at Wilson, N. C., where he became editor of the *Advance* in 1880. Later he studied law and was admitted to the bar in 1885. He subsequently became editor of the Raleigh *State Chronicle*, which he combined in 1894 with the *News and Observer.* From 1887 to 1893, he was state printer and, from 1893 to 1895, was chief clerk in the department of the interior at Washington. He was made Democratic national committeeman from North Carolina in 1895 and, in 1912, managed the publicity department of Woodrow Wilson's presidential campaign. He was appointed secretary of the navy by President Wilson in 1913. In this capacity, he favored a large navy; provided training in various trades for enlisted men; and abolished the sale of intoxicating liquors within the navy. In 1921, he resumed his editorial activities.

Dannecker (*dăn'ĕk-ĕr*), **Johann Heinrich von,** German sculptor, was born near Stuttgart, 1758; was educated by the duke of Wurttemberg, who had become his patron; and was made professor of sculpture in the academy at Stuttgart. His earlier subjects were from Greek mythology, and his later ones were religious, the principal of the latter being a colossal "Christ." He executed many fine busts of contemporaries, such as those of Schiller, Lavater, and Gluck. "Ariadne on the Panther" is his best-known work. He was one of the most eminent sculptors of the classic school. His work, which reveals a continual struggle between the classic and the naturalistic style, stands midway between that of Canova and that of Thorvaldsen. Died, 1841.

D'Annunzio. See *Annunzio, Gabriele d'.*

Dante (*dăn'tā*; It., *dän'tā*) **Alighieri,** Italian poet, was born in Florence, Italy, in May 1265. His father was a lawyer, whose family was of honorable though not of noble descent. Of Dante's youth little is known. The first fact of importance is the extraordinary affection he conceived, when only nine years of age, for Beatrice Portinari. He is said to have studied at Bologna, Padua, and Paris; Boccaccio described him as skilled in painting and music. About 1297, some years after the death of Beatrice, Dante married Gemma Donati, a lady of noble family.

Political Career. All Italy was then divided between the Guelphs and the Ghibellines. Florence was also distracted by dissensions between the Whites, the party of the ennobled rich led by the Cerchi family, and the Blacks, the conservative nobility supported by the proletariat and led by the Donati family.

Dante appears to have taken an active part in public affairs. In Italian politics, he sided with the Guelphs, and, as a citizen of Florence, he was one of the Whites. When quite young, he fought against the Ghibellines at Campaldino in 1289 and also in the wars against the Pisans in 1290. In that year, the Whites came into power in Florence. The fame of Dante's studies and his reputation for inviolable

firmness and honesty raised him, in the prime of life, to the highest dignities of the republic. In 1300, he was elected one of the priors of Florence, and, probably in that year, he began the *Divine Comedy*.

His political honors were short-lived. That same year, the party of the Whites was overthrown, and Dante was banished. He found himself forced to wander for several years, afflicted by poverty and suffering. In 1306, he was at Padua; in 1307, at Casentino; in 1309, at Paris; in 1313, at Pisa. When, some time later, he was offered permission to return to his beloved Florence, he refused in a magnificent letter that is still extant. The last of his wanderings, apparently, led him to the house of Guido Novello da Polenta in Ravenna. Through the influence of Guido, Dante was sent as ambassador to the republic of Venice in 1321. Failing to obtain an audience, he returned to Ravenna, where he spent the few remaining months of his life.

Works. The dates and sequence of Dante's various works are matters of conjecture. Doubtless, the *New Life* is the earliest. It is an account of his love for Beatrice, written after her death. This exquisite little book is the outpouring of the incense of Dante's soul in gratitude to God for the joy of loving. Its prose is a finished model of language and style.

The *Banquet*, which takes the form of a commentary on some short poems of the author, is one of Dante's most important works. *On Monarchy*, in Latin, expounds his theory of the divinely intended government of the world by a universal emperor acting in harmony with a universal pope. As a sincere patriot alarmed at the symptoms of decay visible in Christian society, he wrote to point out to his compatriots the way of salvation.

The unfinished work *On the Vernacular* discusses the origin of languages and of the Italian dialects in particular. The *Ballads* is a collection of short poems, sonnets, and other verse; and, finally, there are a dozen epistles addressed to leading statesmen or rulers.

By far the most celebrated of Dante's works is the *Divine Comedy*, in which he gives a description of hell, purgatory, and heaven. It is expressed in the sublimest and most exquisite poetry. This poem may be said to have made the Italian language, which before was so rude and unformed that Dante himself, hesitating to employ it on such a theme, is said to have begun his poem in Latin. Probably no work in the world, except the Bible, has given rise to so vast a literature. The poem, as a whole, is a complete personification of the intense religious spirit of the middle ages, and it fully justifies the title "the Christian Homer," which posterity has bestowed upon its author. Dante died September 14, 1321. See *Divine Comedy*.

Danton (*dän'tôn'*), **Georges Jacques,** French Revolutionist, was born at Arcis sur Aube, France, 1759. He was one of the most prominent figures in the first French Revolution and one of its most famous orators. As a member of the National Convention, he used all his influence to hasten the execution of the king; subsequently, as the president of the committee of public safety, he united with the other Revolutionary leaders to establish that fatal tribunal under whose authority so many sanguinary judicial murders were committed. He quarreled, however, with Robespierre, by whom he was supplanted; and, by that very tribunal which he himself had established, he was condemned and guillotined in 1794.

Darius I (*dȧ-rī'ŭs*), king of Persia, was born in 558 B. C. and became king in 521 B. C. He captured Babylon after a siege of 20 months and conquered Thrace, but his expedition against the Scythians failed. He sent two armies to Greece to avenge the destruction of Sardis by the Athenians, the first of which was repulsed by the Thracians and the second by the Athenians at Marathon in 490. He died in 486 B. C., while organizing a third expedition, and was succeeded by his son Xerxes. He was a ruler of marked caution, skill, and energy.

Darius III, Codomannus, the last ruler of the Persian empire, 336–30 B. C. Shortly after ascending the throne, he had to resist the advance of the Greeks under Alexander. His satraps were defeated at the river Granicus in 334, and Darius, having collected an immense army, was himself defeated at Issus, 333, where his mother, wife, sister, and other members of his family were made captive. At the battle of Arbela, 331, the Persian army was completely routed. Darius fled to Ecbatana, where he collected a new force. Alexander pursued him there, but, before being overtaken, Darius was assassinated by Bessus, satrap of Bactria, in 330 B. C.

Darley (*dȧr'lĭ*), **Felix Octavius Carr,** American artist, was born at Philadelphia, Pa., 1822. Though a water color painter of merit, he is especially known for his vigorous work as an illustrator. Among his best-known works are his outline drawings for Irving's *Legend of Sleepy Hollow* and *Rip Van Winkle*. He also illustrated Cooper's and Dickens's novels and many other books. His paintings of incidents in American history are remarkably spirited; he is also noted for his fine vignette designs for bank notes. In 1868, he published, after a visit to Europe, *Sketches Abroad with Pen and Pencil*. Died at Claymont, Del., 1888.

Darling, Grace Horsley, English heroine, was born in 1815. With the assistance of her father, who was keeper of the Longstone lighthouse on one of the Farne islands, she rescued nine of the survivors of the wreck of the steamer *Forfarshire*, September 7, 1838. By a remarkable exhibition of courage, strength, and skill, the father and the daughter reached the sinking vessel and returned with five survivors. Two of these then joined the father in rescuing the other four persons from the ship. This deed of daring made Grace Darling and her father famous. Over £1000 was raised for them by popular subscription, and they were awarded gold medals commemorating their bravery. Died, 1842.

Darwin, Charles Robert, English naturalist and biologist, was born at Shrewsbury, England, February 12, 1809. His father was a physician and wished his son to adopt that profession. Accordingly, Darwin, at the age of 16, entered the University of Edinburgh; but repugnance to the practice of medicine sent him, in 1828, to Christ's college, Cambridge, with the expectation of preparing for the ministry. There he became acquainted with Henslow, the professor of botany, who did much to mold Darwin's dominant qualities and to shape his career.

Career. The zeal and proficiency that Darwin displayed in every department of natural science won him such distinction that he was offered the opportunity of traveling with Captain Fitzroy on the surveying voyage of the *Beagle*. Darwin had at last won his father's consent that he should not enter the Church. After receiving his bachelor's degree, he sailed in December 1831 and did not return until October 1836. During this long voyage to the southern islands and South America, Darwin obtained an intimate knowledge of the fauna, flora, and geology of many climes, which admirably equipped him for the great task he was to perform. His contributions to geology, made in his subsequent reports to the government, showed his unlimited patience and careful habits in reaching conclusions through personal observation.

In 1839, Darwin married his cousin, Emma Wedgwood. In the same year, he published his *Journal of Researches* and was made a member of the royal society. In 1842, he settled at Down, Kent, where he carried on experiments in greenhouse, garden, and paddock. Here he collected a library and wrote his books. Happily, he was possessed of an ample private fortune, so that he had no need to undertake any teaching work or to expend his energy in gaining a livelihood. Darwin suffered from impaired health due to a form of dyspepsia and, in his later years, had to limit carefully his work and his recreation. In 1878, he was elected to the French academy.

Scientific Achievements. As early as 1834, while contemplating a law by which both derivation and diversity might be explained, Darwin conceived that "by patiently accumulating and reflecting on all sorts of facts that could possibly have any bearing on the matter, some light might be thrown on the origin of species." This became the chief object of his investigations. In 1859, he published *On the Origin of Species by Means of Natural Selection*. The work created a profound sensation both in the scientific and in the nonscientific world.

Upon the specific doctrine laid down in *The Origin of Species*—particularly that of "natural selection," or the "survival of the fittest"—has been founded what is commonly known as "Darwinism." The popular conception that Darwinism is simply the theory of evolution applied to the origin of man is far from correct. Its novelty lies, not in the conception of evolution, but in an exposition of a probable cause of evolution so clear and cogent as to remove the theory from the sphere of philosophical speculation to that of practical life.

Darwin continued to work unremittingly on a great series of supplementary treatises. *The Fertilization of Orchids* appeared in 1862, *The Variation of Plants and Animals under Domestication* in 1868, and *The Descent of Man* in 1871. The last named work, hardly less famous than *The Origin of Species*, derives the human race from a hairy quadrumanous animal belonging to the great anthropoid group and related to the progenitors of the orang-utan, chimpanzee, and gorilla. In it Darwin also developed his theory of sexual selection.

In addition to these and other volumes, his *Emotion in Man and Animals* was published in 1872, *Movement in Plants* in 1880, and *The Formation of Vegetable Mould* in 1881. He wrote many papers, besides, on minor phases of the great scientific issues of the day. To the end of his life he continued his painstaking and elaborate researches into the facts of nature. He died at Down April 19, 1882, and was buried in Westminster Abbey. See *Biology, History of*.

Darwin, Erasmus, English poet and physician, was born in Elton, Nottinghamshire, 1731. He studied at Cambridge, obtained a degree in medicine at Edinburgh,

and settled at Lichfield as a physician. He was a man of great and varied talent, and, although some of his opinions were deemed extravagantly eccentric at the time, his ideas have been appreciated and utilized by later writers. His *Botanic Garden* was admired as a fine specimen of polished verse, and his *Zoonomia, or The Laws of Organic Life*, though discredited at the time, anticipated some of the tenets of the modern theory of evolution. He died at Derby, 1802. His third son, Robert Waring Darwin, an eminent physician, was the father of the famous Charles Robert Darwin.

Darwin, Sir Francis, English botanist, son of Charles Robert Darwin, was born at Down, Kent, 1848. He was graduated at Trinity college, Cambridge; studied medicine in London; and assisted his father in his investigations at Down. In 1888, he was appointed reader in botany at Cambridge. He was made foreign secretary of the royal society in 1903; became president of the British association in 1908; and was knighted in 1913. His published works include *Life and Letters of Charles Darwin, Elements of Botany, Foundation of the Origin of Species*, and *Springtime*. He also assisted his father in the preparation of *Power of Movement in Plants*. Died, 1925.

Darwin, Sir George Howard, English geologist and astronomer, son of Charles Robert Darwin, was born at Down, Kent, 1845. He graduated at Trinity college, Cambridge, 1868; and was admitted to the bar. He did not practice, however, but devoted his attention instead to mathematical science and to researches on geological problems. In 1883, he was made professor of astronomy at Cambridge. He was a member of the royal society, president of the royal astronomical society in 1899, and later president of the British association. He did important and authoritative work on tides. His publications include contributions on *The Harmonic Analysis of Tidal Observations, The Effects of Tidal Friction on the Earth and Moon, Periodical Orbits*, and *Tides and Kindred Phenomena*. Died in 1912.

Daubigny (*dō'bēn'yē'*), **Charles François,** French landscape painter, the youngest of the five great landscape artists of the Barbizon school, was born in Paris, 1817. He first studied art under his father and with an uncle; entered the studio of Delaroche in 1840; and thereafter exhibited almost annually at the salon. From the first, he was a landscape painter and became noted for his pictures of river scenery, fields, orchards, and the coasts of the English channel. He chose subdued light effects, which he executed with a fine sense of color values and of harmony. Among his best-known paintings are "Lock of the Optevoz," "Springtime," and "The Vintage," in the Louvre; also "Pool of Gylien," "The Harvest," "Beach at Villerville," "The Sheepfold," "Banks of the Oise," "Moonrise," and "Apple Orchard." Examples of his work are found in leading American galleries. Died in Paris, 1878.

Daudet (*dō'dĕ'*), **Alphonse,** French novelist and humorist, was born at Nimes, France, 1840; was educated at the Lyon lycée; and, when only 17, settled in Paris. In the charming extravaganzas *Tartarin de Tarascon, Tartarin sur les Alpes*, and *Port Tarascon*, he good-naturedly caricatured his fellow southerners of the Provence. He described the sufferings of his early life in *Le petit chose* and in *Jack*. His *Lettres de mon moulin* and *Contes du lundi* contain prose sketches which rank among the greatest French classics. Daudet is noted for his charming, polished style, marked originality, and fine sense of humor. His characters are real and typical, and, like Dickens, whom he has been charged with imitating, he possessed the gift of laughter and tears. Among his works are *Fromont jeune et Risler aîné, Le nabob, Les rois en exil, Sapho, La Belle Nivernaise, Trente ans de Paris*, and *Souvenirs d'un homme de lettres*. Died in Paris, 1897.

Davenport, Charles Benedict, American zoologist, was born at Stamford, Conn., 1866. He graduated at the Brooklyn polytechnic institute and at Harvard university, where he was instructor in zoology from 1888 to 1899. He then became assistant professor of zoology at the University of Chicago and, in 1904, was made director of the station for experimental evolution at Cold Spring Harbor, L. I., where he conducted important researches in heredity. He was for many years also director of the biological laboratory of the Brooklyn institute of arts and sciences and was editor of many anthropological and other scientific periodicals. Among his published works are *Experimental Morphology, Introduction to Zoology, Inheritance in Poultry, Heredity in Relation to Eugenics*, and, with A. G. Love, *Army Anthropology*.

Davenport, Homer Calvin, American cartoonist, was born in Silverton, Ore., 1867. In his early life, he was at different times jockey, railroad fireman, and clown in a circus. In 1892, he was employed on the San Francisco *Examiner*; was taken to New York by W. R. Hearst, 1895, and placed on the New York *Journal*; originated the Mark Hanna $-mark suit of clothes and the giant figure of the trusts in 1899. While sometimes crude in draftsmanship, his cartoons are noted for vigor, directness, and stern satire. His "Uncle Sam" ranks among the best ever produced. He was the author of *Davenport's Cartoons; The Bell of Silverton, and Other Short Stories of Oregon*; and *The Diary of a Country Boy*. Died, 1912.

Davey, John, American tree surgeon, was born in Somersetshire, England, in 1846, and was largely self-educated. He learned floriculture and landscape architecture in Torquay, England, 1866–72. In 1873, he came to the United States, first settling at Warren, Ohio, whence, in 1881, he moved to Kent, Ohio, which became his permanent place of residence. In 1890, he introduced tree surgery, and, in 1908, organized the Davey institute of tree surgery and also the Davey Tree Expert Company, of which he was president. Among his writings are *The Tree Doctor, A New Era in Tree Growing, Primer on Trees and Birds*, and *Instruction Books on Tree Surgery and Fruit Growing*. He died in 1923.

David (*dȧ'vĕd'*), **Félicien César,** French composer, was born at Cadenet, 1810. He was a chorister and later chapelmaster in the cathedral at Aix, and, at the age of 20, entered the Paris conservatory. He became a member of the commune of Saint Simonists and, after its dissolution, joined a party of enthusiasts who visited Turkey, Egypt, and Syria, returning after two years of hardships and suffering. *Oriental Melodies*, his first musical production following this journey, failed to attract notice and his first symphony, in 1838, shared a like fate; but, in 1844, his symphonic ode *The Desert* scored a notable success. In 1851, his opera *The Pearl of Brazil* was enthusiastically received, and, in 1867, he was awarded a prize of 20,000 francs for his *Herculaneum*. He became known as the "musical orientalist," and, by his skillful use of quaint and weird Eastern melodies, he inaugurated a new movement in French music and greatly influenced the work of Bizet, Massenet, and Délibes. Besides operas and symphonic odes, he composed chamber music and songs. Died, 1876.

David, Jacques Louis, French historical and portrait painter, founder of the modern French classical school, was born at Paris, 1748; studied at Paris and Rome; and, during the Revolution, was artistic superintendent of those grand national fêtes and solemnities that recalled the customs of ancient Greece. In 1804, Napoleon appointed him his first painter and gave him commissions. Among his most celebrated works are several historic portraits of the emperor, such as "Napoleon Crossing the Alps." While his art is cold and severe, it possesses a grandeur and a nobility that compel admiration. His pictures excel in composition and draftsmanship, and no modern artist devoted to classic ideals has exercised a wider influence. Among his most famous pictures are "Coronation of Napoleon and Josephine," "Rape of the Sabines," "Death of Socrates," "Leonidas at Thermopylæ," and a portrait of Madame Récamier. He died at Brussels in 1825. See *Painting*.

David, Pierre Jean, French sculptor, known also as David d'Angers, was born at Angers, France, 1789. In spite of the opposition of his father, a wood carver, he resolved to become an artist. Tramping to Paris in 1808, he placed himself under Jacques Louis David, the painter. In 1811, his *rilievo* of the "Death of Epaminondas" gained the *grand prix*, and David proceeded to Rome, where he became intimate with Canova. In 1816, he returned to France. A statue of the great Condé established his reputation, and, in 1826, he was elected to the institute. He exercised an epoch-making influence upon French sculpture. While trained in the classical school, he portrayed nature with freedom and truth, excelling in portrait sculpture, in which he was the first to insist upon contemporary costume. Among his works are busts of Washington and Lafayette, a statue of Jefferson, and the tomb of Marco Bozzaris, at Missolonghi, Greece. He died in Paris, 1856.

Da Vinci, Leonardo. See *Vinci, Leonardo da*.

Davis, Henry Winter, American lawyer, legislator, and orator, was born at Annapolis, Md., in 1817. He practiced law in Virginia and later in Baltimore and served as a member of Congress from Maryland, 1855–61 and 1863–65. He was an eloquent speaker; acted with the American party and later with the Republicans; and was conspicuous for his devotion to the Union. He strenuously advocated the emancipation of the slaves and the extension to them of the rights of suffrage. Died, 1865.

Davis, Jefferson, American statesman and soldier, was born in Kentucky, 1808; was graduated from West Point, 1828; and came into prominence first as a member of the House of Representatives and afterward of the United States Senate, in which he represented the state of Mississippi. At the commencement of the Mexican war, he left Congress, engaged actively in the contest, and soon acquired distinction as a soldier. When Pierce was elected president in 1853, Davis was appointed secretary of war. At this period, he exercised a powerful influence in the administration—ruling, in fact, the president as well as the greater number of the members of the cabinet,

When Buchanan became president, Davis left the cabinet, but was returned to the Senate by the legislature of Mississippi, which office he retained until the secession of his state. In February 1861, Davis was chosen president of the Confederate states for one year and, in 1862, was re-elected for six years. The manner in which the new constitution was drawn up by Davis, his military skill, administrative capacity, and unwearied activity fully justified the choice; his disinterestedness endeared him to the South. After the fall of Richmond, in 1865, he was captured when endeavoring to escape and was imprisoned in Fort Monroe for two years. He was released on bail in 1867 and was finally set at liberty by the general amnesty of 1868. He published *The Rise and Fall of the Confederate Government*, 1881. Died at New Orleans, 1889.

Davis, or **Davys, John,** English navigator, was born at Sandridge, near Dartmouth, about 1550. During 1585–87, he undertook three arctic voyages in search of a northwest passage to Asia. In the last voyage, he sailed as far as 73° N.; explored the coasts of Baffin bay and Greenland; and discovered Davis strait. He next made a voyage to the South Seas and discovered the Falkland islands in 1592. After his return, he published valuable works entitled *The Seaman's Secrets* and *The World's Hydrographical Description*. He invented the Davis quadrant, long used by navigators. With Baffin and Hudson, he ranks as one of the greatest early arctic explorers. While serving as pilot of an English ship, he was killed by Japanese pirates off Bintang, near Sumatra, 1605.

Davis, Rebecca Harding, American novelist, was born at Washington, Pa., 1831. In 1863, she married L. Clarke Davis, a Philadelphia journalist. Her sons, Richard Harding Davis and Charles Belmont Davis, achieved literary success while she was still an active writer. She was the earliest American author to introduce the labor question into fiction. Her numerous writings embrace novels, short stories, and sketches, including *Life in the Iron Mills, A Law unto Herself, Dr. Warrick's Daughters, Bits of Gossip*, and *Silhouettes of American Life*. Died, 1910.

Davis, Richard Harding, American novelist and journalist, son of Rebecca Harding Davis, was born in Philadelphia, Pa., 1864. He graduated from Lehigh university; subsequently studied at Johns Hopkins; and began his journalistic career on Philadelphia papers. He served as war correspondent in the Turko-Greek, Spanish American, South African, Russo-Japanese, and World wars. His novels and stories, which abound in incident and adventure, are fresh and animated in style, while his sketches and books of travel admirably reflect his excellent journalistic training. His works of fiction and travel include *Soldiers of Fortune, Three Gringos in Venezuela, Cuba in War Time, Exiles, The King's Jackal, The West From a Car Window, In the Fog, The Bar Sinister, With the Allies*, and *Somewhere in France*. He wrote also the following plays: *Taming of Helen, The Dictator, Blackmail*, and *Zone Police*. Died, 1916, from a disease brought on by the hardships he suffered in the retreat from Serbia when with the British and French armies there.

Davis, William Morris, American geographer and geologist, was born in Philadelphia, Pa., 1850, and graduated from Lawrence scientific school, Harvard, 1869. From 1870 to 1873, he was assistant astronomer at the Argentine national observatory, Cordoba, Argentina. He taught at Harvard from 1876, becoming professor of geology there in 1899. His lectures and writings on physiography have given him high rank among American scientists. He was a member of Pumpelly's Carnegie institution expedition to Turkestan in 1903 and made an investigation of Pacific coral reefs in 1914. His publications include *Elementary Meteorology; Whirlwinds, Cyclones, and Tornadoes; Physical Geography; The Triassic Formation of Connecticut*; and many scientific essays. He was a member of numerous scientific societies in America and Europe. Died, 1921.

Davison, Henry Pomeroy, American banker, was born at Troy, Pa., in 1867; was educated at an academy; and received honorary degrees from Yale, Harvard, Columbia, Princeton, Williams, Bowdoin, and New York university. Beginning as a teller of the Astor Place National bank in 1891, he rose, by 1899, to the presidency of this bank and became a director of many other financial institutions and a member of the firm of J. P. Morgan and Company. He was elected chairman of the governing board of the World League of Red Cross societies, Paris, in 1919; became treasurer of the American museum of natural history; and was made knight of the order of the crown of Italy and a commander of the legion of honor, France. Died, 1922.

Davitt (*dăv'ĭt*), **Michael,** Irish journalist and political leader, was born at Straid, Ireland, in 1846. The family emigrated to Haslingden in Lancashire, England, 1851. In 1857, the boy lost his right arm through a machinery accident. He joined the Fenian movement, and was sentenced, in 1870, to 15 years' penal servitude. He was released in 1877, and began an antilandlord crusade, which culminated in the Irish land league, 1879. In 1881-82, Davitt was again imprisoned. His *Leaves From a Prison Diary* was published in 1885. He was elected to Parliament in 1892, where he favored a more extreme Irish policy than that supported by Parnell. Died in Dublin, 1906. See *Land League*.

Davout (*dà'vōō'*), **Louis Nicolas,** French marshal, was born in 1770 at Annoux, France; was educated with Bonaparte at the military school of Brienne. As general, he accompanied Bonaparte to the East, and was chiefly instrumental in winning the victory at Abukir. Created a marshal of France in 1804, he acted a brilliant part at Austerlitz, Auerstadt, Eckmuhl, Wagram, and in the Russian campaign of 1812. After Waterloo, Davout received the command of the remnant of the French army. At the Second Restoration, he was deprived of all his titles; but, in 1817, these were restored, and, in 1819, he was made a peer of France. Died, 1823.

Davy, Sir Humphry, English chemist, was born at Penzance, in Cornwall, 1778. He was educated at various local schools and, in 1798, was made laboratory assistant in Beddoes institution at Bristol. Two papers on nitrous oxide in 1801 led to his appointment as lecturer at the royal institution, London, and, in 1802, he was made professor. His Bakerian lecture in 1806 entitled *On Some Chemical Agencies of Electricity* was regarded as one of the most valuable contributions ever made to chemical science. In this he advanced the view that chemical affinity is nothing but the mutual electrical attraction of the ultimate particles of matter.

Davy's electrolytical experiments enabled him to decompose potash and to secure the pure metal potassium in 1808. In 1809, he obtained the metal sodium and alloys of calcium, strontium, and barium, and proved that hydrochloric acid is a compound of hydrogen and chlorine. In 1815, he invented the miner's safety lamp, one of the most valuable gifts of science to humanity. He was knighted in 1812, made a baronet in 1818, and elected president of the royal society in 1820. His chief works are *Elements of Chemical Philosophy* and *Elements of Agricultural Chemistry*. He died in 1829.

Dawes (*dôz*), **Charles Gates,** American financier, soldier, statesman, and diplomat, was born at Marietta, Ohio, in 1865. He was educated at Marietta college and the Cincinnati law school; practiced law from 1887 to 1894; and thereafter became financially interested in the gas business in a number of American cities. Supporting McKinley's presidential candidacy in 1896, he was made comptroller of the currency from 1897 to 1902, thereafter becoming president of a trust company founded by himself and of a hotel association, the latter operated for the benefit of men and women with limited means. In 1917, he was made a brigadier general and chairman of the general purchasing board for the American army in France, later serving on the liquidation commission of the Allies. Under an appointment in 1921, he organized a budget system for the United States government. In 1923, an international committee under his chairmanship drew up the so-called Dawes plan for solving the economic problems connected with German reparations. He was elected vice president of the United States in 1924. Receiving the award of one-half the Nobel peace prize for 1925, he donated the money to the Walter Hines Page school of international relations. In 1929, he accepted an invitation to reorganize the finances of the Dominican Republic. In the same year, he was appointed ambassador to Great Britain. His writings include *The Banking System of the United States* and *A Journal of the Great War*.

Dawson, Sir John William, Canadian geologist and naturalist, was born at Pictou, Nova Scotia, 1820; studied at Edinburgh; and afterward devoted himself to the natural history and geology of Nova Scotia and New Brunswick. He was appointed superintendent of education in Nova Scotia, 1850; from 1855 to 1893, he was professor of natural history and vice chancellor of McGill university, Montreal. He was knighted in 1884. He was an authority on Canadian geology and one of the ablest opponents of the Darwinian theory of the origin of life forms. Among his works are *Archaia, Story of the Earth and Man, Dawn of Life, Origin of the World*, and *Relics of Primeval Life*. Died at Montreal, 1899.

Day, William Rufus, American statesman and jurist, was born in Ravenna, Ohio, 1849; graduated at the University of Michigan, 1870; and, entering the profession of law, became a judge in 1886. He was appointed assistant secretary of state by President McKinley, 1897; succeeded John Sherman as secretary of state, 1898; but, in a few months, resigned to become chairman of the United States peace commissioners at Paris at the close of the war with Spain. He was appointed to the United States supreme court in 1903. He resigned in 1922 and died in 1923.

Deák (*dā'ăk*), **Ferencz,** Hungarian statesman, was born at Sojtor, Zala, Hungary, 1803; practiced as an advocate; entered the national diet in 1832; and played the part of a moderate in the revolution of 1848. He did more than anyone else to establish, in 1867, the Austro-Hungarian empire

and is regarded as one of the ablest European statesmen of his century. As an orator, he won distinction by the sheer force of his logic. Died, 1876.

Deakin (*dē'kĭn*), **Alfred,** Australian statesman and orator, was born in Melbourne, Australia, 1856; graduated from Melbourne university; and practiced law. He was elected to the parliament of Victoria in 1879. He took a leading part in the organization of the Commonwealth of Australia and became its first attorney-general in 1901. In 1903, he became premier and continued to hold that office, with two interruptions, until 1910, when he led the opposition party. He favored a protectionist policy and the development of a navy. For many years, he was a reconciling influence between the Conservatives and the Labor party. His published writings include *Temple and Tomb* and a number of works on irrigation. Died, 1919.

Debs (*dĕbz*), **Eugene Victor,** socialist, writer, lecturer, and organizer, was born in Terre Haute, Ind., 1855; received a common school education; and, after some years spent as a workman and a clerk, became a member of the Indiana legislature, 1885. He held high offices in various railway unions and was nominated as the candidate of the Social Democratic party for president in 1900 and as the Socialist party's presidential candidate in succeeding presidential elections. He managed several important strikes for railway unions. In 1918, he was convicted of a violation of the Espionage act and was sentenced to 10 years' imprisonment. He was pardoned in 1921 and resumed his activities in behalf of the Socialist party. Died, 1926.

Debussy (*dē-bü'sē'*), **Claude Achille,** French composer, was born at Saint Germain, 1862. At the age of 11 years, he entered the Paris conservatory, where he was a pupil of Marmontel, Guiraud, and Lavignac. In 1884, he won the *grand prix de Rome* with his cantata *L'Enfant prodigue*, a work of notable beauty. This was followed by a symphonic suite, *Printemps*, which was pronounced unduly modern. His next compositions were *La Demoiselle élue*, for female voices and the orchestra; *Petite Suite*, for the piano; and *Suite Bergamesque*. In 1902, his symphonic poem *L'Après-midi d'un faune* elicited much discussion but enhanced his reputation. This was followed in the same year by his first dramatic work, *Pelléas et Mélisande*, which gave him unquestioned leadership of the new French school. Despite adverse criticism it came to be recognized as one of the most important musico-dramatic works since the death of Wagner.

Debussy's later important works include three symphonic sketches entitled *La Mer*; the ballets *Jeux* and *Crimen Amoris*; *Chimène*; *Histoire de Tristan*; *Le diable au Beffroi*; and *La chute de la maison Usher*. He also composed a number of piano pieces and songs. He excels in refined, fascinating instrumentation and, by using the higher overtones and the whole-tone scale, has achieved many new musical effects. He stands in the front rank of 20th century composers and has exerted great influence upon musical composition in England and the United States as well as in France. Died, 1918.

Decamps (*dē-kän'*), **Alexandre Gabriel,** French painter, was born at Paris in 1803 and studied in a desultory manner under Pujol, David, and Ingres. In 1827-28, he journeyed in Italy and the Levant. He excelled in genre and landscape pictures, in which he introduced Oriental subjects saturated in sunlight and rich, warm color. With Delacroix, he laid the foundation of orientalism in French art. His "Defeat of the Cimbri" had a great success. Other well-known works from his brush are "Café in Asia," "Street of a Roman Village," and "The Monkey Connoisseurs." Many fine examples of his paintings are in the Louvre, Paris; in the Wallace collection, London; in the Metropolitan museum, New York; and in other European and American galleries. Died in 1860.

De Candolle (*dē kän'dōl'*), **Augustin Pyrame,** Swiss botanist, was born at Geneva in 1778 and studied in Geneva and Paris. He first lectured on botany at the Collège de France in 1804. His *Flore Française* appeared in 1805. He traversed France and Italy in 1806–12, investigating their botany and agriculture and, in 1807, was appointed to a chair at Montpellier. In 1816, he retired to Geneva, where a professorship of botany was founded for him. His chief work, which has been of great value to the botanists of the world, was his monumental *Prodromus Systematis Regni Vegetabilis*, of which he was able to complete only 7 volumes. To these his son Alphonse de Candolle added the remaining 14 volumes. He died in 1841.

Decatur (*dē-kā'tŭr*), **Stephen,** United States naval officer, was born at Sinnepuxent, Md., 1779, and entered the navy in 1798. In 1804, he led a small party which burned, in the harbor of Tripoli, the American frigate *Philadelphia* after its capture by the Tripolitans. For this exploit, which Admiral Nelson pronounced "the most daring of the age," he was raised to the rank of captain. Having taken command of the frigate *United States*, he captured the British frigate *Macedonian*, 1812. In 1815, he captured two Algerine vessels of war and compelled the dey of Algiers to sue for peace. He was killed in a duel by Commodore James Barron, 1820.

Decker, Sarah Platt, American woman suffragist and social reformer, spent her early years in Holyoke, Mass.; later removed to Denver, Colo., where she first came into prominence as president of the women's club of that city. In 1898, she was elected first vice president of the general federation of women's clubs and afterward served four years as president of the organization. She took an active interest in civic affairs, doing effective work for five years as president of the Colorado state board of charities and corrections. She also became a member of the state civil service commission, the first woman to hold an office of this character. Died in 1912.

Defoe (*dē-fō'*), **Daniel,** English novelist and political writer, was born in London about 1660. Little is known of his early life. In 1685, he took part in the rebellion of the duke of Monmouth, but luckily escaped being punished on its suppression. After this, he engaged in trade, but a series of misfortunes finally led him to forsake it. About 1697, he became a prolific writer of pamphlets on political and religious subjects. In 1701, he published a satirical poem, *The True-born Englishman*, which was written in vindication of King William. In 1703, he was pilloried and imprisoned on account of statements in his pamphlet *The Shortest Way With Dissenters*. In 1704, he established a newspaper, *The Review*, and also acted as a secret agent for Lord Oxford. In 1719 appeared *Robinson Crusoe*, the most popular of all his works, which has become one of the world's classics of fiction. Defoe, in rapid succession, produced other notable works of fiction, including *Moll Flanders*, *Journal of the Plague Year*, *Adventures of Roxana*, and the *Memoirs of a Cavalier*. He died at London, 1731.

De Forest, Lee, American inventor, was born at Council Bluffs, Iowa, 1873. He graduated at Yale university in 1899 and, devoting his attention to wireless telegraphy, became one of the pioneers of its scientific and industrial development in America. Among his many inventions is the so-called audion, by means of which transcontinental wire telephony and radiotelephony became practicable. Since 1902 he has been prominently connected with firms manufacturing his inventions. See *Electron Tube*, *Radiotelephony*.

Defregger (*dā'frĕg-ĕr*), **Franz von,** Austrian genre and historical painter, was born at Stronach, Tyrol, 1835. He studied under Piloty at Munich in 1867, and his "Speckbacher," a picture of the Tyrolese uprising under Hofer, brought him immediate fame. In 1878, he was made professor of painting at the Munich academy. The subjects of almost all his pictures are drawn from the Tyrolese peasant life, which he portrays with keen insight and quaint humor. Among his noteworthy pictures are "Before the Dance," "The Prize Horse," "Victors' Return," "Hofer Going to His Death," "The Last Summons," "The Fortune Teller," and "The Zither Player." Died, 1921.

De Garmo (*dē gär'mō*), **Charles,** American educator, was born at Mukwonago, Wis., 1849; graduated from Illinois State normal university in 1873 and from the University of Halle, Germany, 1886; and taught in the Illinois State normal university, where he became professor of modern languages in 1886. In 1890, he was made professor of psychology, University of Illinois. The following year, he was chosen president of Swarthmore college, Pennsylvania, and, in 1898, became professor of the science and art of education at Cornell university, retiring in 1914. He attained prominence as the leader of the Herbartian school of educators in the United States. His publications include *Essentials of Method*, *Herbart and Herbartians*, *Interest and Education*, *Laboratory Exercises in the Art of Appreciation*, and *Æsthetic Education*.

De Gogorza (*dē gō-gōrtz'ô*), **Emilio Edwards,** American baritone singer, was born of Spanish parentage in Brooklyn, New York, 1874. He studied music in France and England and made his début in New York with the Metropolitan Opera Company in 1897. He has made many transcontinental tours, his repertoire including classic and folk songs and solos from operas.

De Kalb. See *Kalb, Johann, Baron de.*

De Koven (*dē kō'vĕn*), **Henry Louis Reginald,** American light opera and song composer, was born in Middletown, Conn., 1861; graduated at Saint John's college, Oxford, England, 1879; and studied music in Stuttgart, Florence, Paris, and Vienna. Upon returning from Europe in 1882, he located in Chicago and subsequently in New York. In 1902, he founded the Washington symphony orchestra, which he conducted until 1904, thereafter serving as musical critic for the New York *World* and other publications. His opera *Robin Hood* was notably successful, and several of his songs, including "Oh, Promise Me," have become widely known. Among his operas are *The Begum*, *Don Quixote*, *The Fencing Master*, *The Mandarin*, *Papa's Wife*, *Foxey Quiller*, *The Snowman*, *The Golden Butterfly*, *The Beauty Spot*, and *The Canterbury Pilgrims*. Died, 1920.

Delacroix (*dĕ-là'krwä'*), **Ferdinand Victor Eugène,** French painter, chief of the romantic school, was born near Paris, 1798. At the age of 18, he entered the studio of Pierre Guérin. In 1822, his first work, "Dante and Virgil," attracted much attention; his second picture, "Massacre of Chios," won him fame. He subsequently painted many Moroccan canvases with novel effects of light and costumes. He also decorated many public buildings and churches. He was one of the greatest painters of his period. As a colorist, he ranks with the foremost masters of all times, being frequently compared to Rubens, whose style notably influenced him. Among his best pictures are "Milton and his Daughters," "The Barricade," "Algerian Women," "Jewish Wedding in Morocco," "The Bark of Don Juan," and "The Abduction of Rebecca," the last mentioned picture being now in the Metropolitan museum, New York. Died at Paris, 1863.

Delambre (*dĕ-läN'br'*), **Jean Baptiste Joseph,** French astronomer, was born at Amiens, 1749; he studied first under Delille and afterward under Lalande. After the discovery of the planet Uranus by Herschel in 1781, he computed tables of its motion, which obtained the annual prize of the academy of sciences. He later constructed new solar tables and, at a still later period, tables of the motions of Jupiter and Saturn. He was appointed by the French government, in 1792, to measure the arc of the meridian between Dunkirk and Barcelona. This task was completed in 1799, and the results appeared in his *Basis of the Decimal Metric System*. In 1807, he obtained the chair of astronomy at the Collège de France rendered vacant by the death of Lalande, his master and friend. His most valuable publication is the *History of Astronomy*. Died at Paris, 1863.

Deland (*dē-länd'*), **Margaretta Wade,** née Campbell, American novelist, was born at Allegheny, Pa., 1857; was educated at private schools in New Rochelle, N. Y.; and married, 1880, Lorin F. Deland, Boston. While she is most widely known for her stories of "Old Chester," which are grouped around the admirable character of Dr. Lavendar, she produced also novels and verse which established her position among the foremost American woman writers. Among her works are *The Old Garden and Other Verses, The Story of a Child, The Awakening of Helena Richie, The Iron Woman, The Voice, The Hands of Esau, The Rising Tide,* and *The Vehement Flame.*

De la Ramée. See *Ramée, Louise de la.*

De la Rive (*dĕ là rēv'*), **Auguste Arthur,** Swiss physicist, was born at Geneva, 1801. He was made professor of natural philosophy at the academy of Geneva at the age of 22. He devoted himself for a time to investigations on the specific heat of gases and on the temperature of the earth as disclosed by operations in artesian wells. He then turned his attention entirely to electricity, making original discoveries in connection with magnetism, electrodynamics, the properties of the voltaic arc, and the passage of electricity through rarefied air and gases. He presented a new theory of the aurora borealis and discovered a method of electrogilding for which he was awarded the *grand prix* by the French academy of sciences. His extensive treatise on electricity was translated into other languages and was long regarded as a standard work. He died at Marseille, 1873.

Delaroche (*dĕ-là'rôsh'*), **Paul,** French historical painter, was born at Paris in 1797 and studied under Watelet and Gros. Many of his subjects are drawn from English and French history, and they are usually of a somber character. They include "The Children of Edward IV in the Tower," "The Death of Lady Jane Grey," "The Death of Queen Elizabeth," "Joan of Arc," "Napoleon at Saint Bernard," "Strafford Going to the Scaffold," and "Napoleon at Fontainebleau." His most important work is the hemicycle covering the semicircular wall of the hall in the Ecole des Beaux-Arts, Paris. During his last 15 years, he was the most popular portrait painter in France. He sought to combine the strong points of the classic and romantic schools, uniting the excellent line of the one with the fine color of the other. Died, 1856.

Deledda, Grazia, Italian novelist, was born in 1875 at Nuaro, Sardinia, where she lived until her marriage. Removing to Rome, she won fame by her novels of Sardinian peasant life, which include *Ashes, Reeds in the Wind,* and *The Mother*. She was chosen for a place in the Italian academy of immortals and received the Nobel prize in literature for 1926.

Dell, Floyd, American author, was born at Barry, Ill., 1887, and was educated in the public schools. After four years spent as a reporter in Davenport, Iowa, and in Chicago, he joined the editorial staff of the Chicago *Evening Post* in 1908 and became literary editor in 1911 He was associate editor of *The Masses*, New York, in 1914–17 and, in 1918, became an editor of *The Liberator*. Among his published works are *Women as World-Builders*; the novels *Moon-Calf, Briary-Bush, Janet Marsh,* and *Runaway*; and various one-act plays, including *The Angel Intrudes* and *Sweet-and-Twenty.*

Democritus (*dē-mŏk'rĭ-tŭs*), Greek philosopher, called "the laughing philosopher," was born at Abdera, in Thrace, about 470 or 460 B. C. He lived seven years in Egypt and traveled widely in the East. Showing, throughout his long life, a tireless zeal for knowledge, he collected numerous works of earlier philosophers and developed a system of his own, known as the atomic system. He taught that matter consisted of innumerable atoms, which, by their different motions and arrangements, produced the varied phenomena known collectively as nature. Even consciousness and the gods were explained as the result of the concourse of atoms. Only a few fragments of his works are extant. The date of his death is unknown.

De Morgan, William Frend, English novelist, son of August de Morgan, the mathematician, was born in London, 1839. He was educated at University college, London, and studied art in the school of the royal academy. From about 1864 to 1871, he worked on stained glass and then, for a period of 30 years, he devoted himself to pottery, making numerous experiments in glazes and luster. He also invented a bicycle and a smoke-consuming grate, wrote articles on pottery, and illustrated fairy tales. In his 66th year, he wrote the long novel *Joseph Vance*, which won immediate success on its appearance in 1906, and others followed with increasing popularity. He excels in naturalness of dialogue, in picturing groups of people, and in his sketches of children. His novels include *Alice-for-Short, It Never Can Happen Again, An Affair of Dishonor, A Likely Story,* and *When Ghost Meets Ghost.* Died in 1917.

Demosthenes (*dĕ-mŏs'thē-nēz*), Greek orator, was born at Pæania, Attica, about 385 B. C. His father, a cutler and cabinetmaker, died when the boy was seven years old, leaving him well off. His property was squandered, however, by his guardians, whom Demosthenes, on attaining his majority, prosecuted in the law courts at Athens. Encouraged by the success of this lawsuit, he ventured to speak before the Athenian assembly, but his feeble voice and ungraceful gestures excited general ridicule. Determined to succeed, he subjected himself to the most rigorous training in voice culture and rhetoric. He again appeared in public in 355 B. C., this time with such success that he was generally acknowledged to be an orator second to none in the city of Athens. The remainder of his life was devoted to the task of rousing the Athenians to combat the power of Macedon, then ominously threatening the liberties of the free cities in Greece.

Demosthenes strove in vain to inspire his countrymen with the ardor and energy of former days. His crowning triumph came when he confronted the ambassadors of Philip of Macedon at Thebes and, by his patriotic eloquence, prevailed upon the Thebans to join the Athenians in striking a last blow for the liberties of Greece. The allied cities were defeated in 338 B. C. at Chæronea, and Demosthenes' chief hope was thus extinguished.

After the accession of Alexander as king of Macedon in 336 B. C., Demosthenes still continued his efforts in behalf of Athenian independence. In 324, however, his enemies had him convicted of accepting a bribe from Alexander's agent. He was imprisoned, but escaped to Ægina. When Alexander died in 323 B. C., Demosthenes returned and succeeded in persuading the Greeks to revolt. The insurrection was quickly suppressed, and the conquerors demanded the surrender of Demosthenes. The orator made his escape, however, to the island of Calauria.

The name of Demosthenes is a synonym for eloquence. He possessed a gift of keen satire, a vivacious humor, and a majesty of style that entitle him to rank among the foremost orators of the world. His courage, his disinterested patriotism, and his services as a statesman distinguish him as one of the noblest men of antiquity. The story of his declaiming by the sea with pebbles in his mouth in order to overcome an impediment of speech has passed into tradition as the classic example of persistent and energetic application to self-improvement.

The orations upon which chiefly rests Demosthenes' fame as a statesman are the three *Philippics*, three *Olynthiacs, On the Peace, On the Embassy, On the Affairs of the Chersonese,* and *On the Crown*. The last is a defense of his career and by many is considered his masterpiece. Died in 322 B. C. on the island of Calauria, where he is believed to have taken poison in order to avoid falling into the hands of the Macedonians. See *Philippic.*

Deniker (*dĕn'ĭ-kĕr'*; Fr., *dē-nē'kâr'*), **Joseph,** French anthropologist, was born at Astrakhan, Russia, in 1852, of French parents. He was educated in Petrograd and Paris. For some years, he was an engineer in various European oil fields and was later made librarian of the Paris museum of national history. His *Races of Man* is one of the most important books on ethnology in English. His publications in French include *Anatomie et embryologie des singes anthropoides* and *Les six races de l'Europe.* Died, 1918.

Denison, George Taylor, Canadian soldier and author, was born in Toronto, 1839. He graduated at Toronto university in 1861 and was called to the bar. He entered the

volunteer militia and, in 1866, was in active service during the Fenian raids. In 1885, he was again in military service during the Riel rebellion in the Northwest Territories. In 1877, his *History of Cavalry* won the prize of 5000 rubles offered by the czar for the best work on the subject. His writings on imperial policy, military matters, and problems of defense include *The Fenian Raid at Fort Erie, Cavalry Charges at Sedan, Canada and her Relations to the Empire,* and *The Struggle for Imperial Unity.* Died, 1925.

Depew, Chauncey Mitchell, American lawyer, railroad executive, legislator, and orator, was born at Peekskill, N. Y., 1834; graduated at Yale college in 1856; studied law; and was admitted to the bar in 1858. He began his career as a railroad official and attorney for the New York and Harlem railroad and subsequently was prominently connected with various other railroads, becoming, in 1898, chairman of the consolidated board of directors of the New York Central system. In 1888, he was candidate for the presidential nomination in the Republican national convention. He was elected to the United States Senate in 1899 and was re-elected in 1905. He won an international reputation as an orator; was a famous after-dinner speaker; and delivered many addresses of public importance, including the oration at the unveiling of the statue of Liberty in New York harbor. He is the author of *My Memories of Eighty Years.* Died, 1928.

De Quincey, Thomas, English essayist, was born in Manchester, England, in 1785. He was educated at Bath, where, at 15, he read and spoke Greek fluently, and afterward at Winkfield and the Manchester grammar school, from which he ran away, subsequently encountering the adventures and privations which he described, in 1821, in the *Confessions of an English Opium Eater.* In 1803, he entered Oxford, which he left after five years' study without taking the final examinations for a degree. He soon after became acquainted with Coleridge and Wordsworth; took a cottage at Grasmere; and became a member of the famous "lake school." He subsequently resided in London and Edinburgh. While at Oxford he acquired the habit of taking opium by using it to cure an attack of neuralgia but finally shook it off after years of misery.

De Quincey's literary works fall into two classes,—critical articles and autobiographical sketches, nearly all contributed to magazines. These reveal profound scholarship and remarkable keenness of intellect, and are written in a brilliant, luminous style which, at its best, is unsurpassed in English prose. He made the famous distinction between "the literature of knowledge and the literature of power," the former to *teach,* the latter to *move,* maintaining that the literature of power is "triumphant for ever as long as the language exists in which it speaks." Besides the *Confessions,* the following works may be mentioned: *Literary Reminiscences, Autobiographic Sketches, Murder Considered as One of the Fine Arts, Suspiria de Profundis, Joan of Arc,* and *The English Mail Coach.* Died at Edinburgh, 1859.

Derby (*dûr'bĭ*; *dûr'bē*), **Edward George Geoffrey Smith Stanley, 14th Earl of,** British statesman, was born at Knowsley, Lancashire, 1799. He entered Parliament in 1820 and, in 1827-28, was undersecretary for the colonies. In the reform government of Lord Grey, he became, in 1830, chief secretary for Ireland and, in 1833, secretary of state for the colonies. In 1841, he was made colonial secretary in Peel's cabinet. In 1844, he was called to the House of Lords as Baron Stanley and assumed the leadership of the Conservative party in that body. On the death of his father in 1851, he succeeded to the earldom and vast estates in England and Ireland. In 1852, he became premier, resigning in the same year; in 1858, he again assumed the premiership, resigning in 1859. He was prime minister for the third time, 1866–68, resigning in favor of Disraeli shortly before his own death.

He was a statesman of great ability; advocated free trade with the colonies; and, with Disraeli, transformed the Tories into the modern Conservative party. He was also a distinguished scholar, famous for his Latin speeches. In 1852, he became chancellor of Oxford university and, in 1864, published a translation of the *Iliad* in blank verse. Died at Knowsley, 1869.

De Reszke, Edouard. See *Reszke, Edouard de.*

De Reszke, Jean. See *Reszke, Jean de.*

Derzhavin (*dyĕr-zhä'vĕn*), **Gavril,** Russian lyric poet and statesman, was born at Kazan, 1743. He rose from the ranks as a common soldier to high offices in the state under the empress Catherine II, and was made minister of justice by Alexander I. In 1803, he retired to private life and gave himself up to poetry. He is best known by his *Address to the Deity.* For sublimity of thought and expression, this ode has rarely been surpassed. He was the greatest and most highly original Russian poet before Pushkin and is most widely known as the "singer of Catherine." Died, 1816.

Descartes (*dā'kärt'*), **René du Perrot,** French philosopher and founder of modern philosophy, was born at La Haye, near Tours, France, March 31, 1596. When about eight years of age, Descartes was sent to the Jesuit college at La Flèche, where he devoted himself to physics, philosophy, mathematics, and poetry. Later, in Paris, he acquired the general education usually given to a youth of noble origin.

He was early influenced by a desire to see an entire reconstruction of all sciences. After two years of solitude and study, he entered the military profession. What philosophy failed to teach him, he hoped to learn through personal experience. He served as a soldier in Holland in 1617 and later took part in the Thirty Years' war. In 1621, he returned to France to pass his time in meditation and the study of mathematics. In 1624-25, he made excursions into Switzerland and Italy and finally, in 1629, he settled in Amsterdam. In this retreat, he composed all his principal works. His *Discourse on Method* he published in 1637, *Speculations on Fundamental Philosophy* in 1641, and *Principles of Philosophy* in 1644.

Descartes devoted himself to mathematics, optics, meteorology, anatomy, chemistry, and mechanics, as well as to the reform of philosophy itself. He attracted many disciples and became involved in several learned controversies. In 1649, he went to Sweden as private tutor to Queen Christina.

Descartes departed from the prevailing custom of publishing all learned works in Latin. His own appeared in French, thereby being made accessible to a wider public. His *Discourse on Method* may be considered the foundation of modern scientific investigation. He insisted upon the necessity of a new method of reasoning and then laid down the rules on which it should be founded. He held that the only basis of absolute certainty was the consciousness of mental activity. This belief he expressed in the memorable sentence, "I think, therefore I am."

With the new criterion that "Whatever is clearly and distinctly thought, must be true," he passed to the study of material and spiritual phenomena. His doctrine gave rise to the system called occasionalism. His intellectual vigor left its marks on many departments of knowledge, and his method ruled universally until his physical theories and metaphysical conclusions were brought into disfavor by Newton's results in physics and by Locke's philosophy of sensationalism. His application of algebra to geometry, which is the basis of analytical geometry, has been pronounced the most important mathematical invention of the 17th century. Died at Stockholm in 1650.

Desmoulins (*dā'mōō'lăN'*), **Camille Benoît,** French Revolutionist, was born at Guise, France, in 1760. He was a schoolmate of the notorious Robespierre and was a man of great talent. In 1789, he delivered many speeches in favor of liberty, winning great admiration for his eloquence. He was a deputy to the Convention in 1792, but his companions sent him to the scaffold with Danton and others, April 5, 1794.

De Soto. See *Soto, Hernando de.*

De Staël. See *Staël, Madame de.*

D'Estaing. See *Estaing, Charles Hector, Count d'.*

D'Estournelles de Constant. See *Estournelles de Constant, Paul Henri Benjamin Baron d'.*

Detaille (*dĕ-tä'y'*), **Jean Baptiste Edouard,** French military painter, was born at Paris in 1848. He was a pupil of Meissonier; his pictures, chiefly of soldiers and battle scenes, have gained him much fame. Among them are "A Reconnaissance," "Salute to the Wounded," "Victims to Duty," "Evening at Rezonville," "The Conquerors," "Bonaparte in Egypt," "The Retreat," and "The Soldier's Dream." His "Passing Regiment" is owned by the Corcoran gallery, Washington, and his "Defense of Champigny," called by the artist his best work, is in the Metropolitan museum, New York. He served in the Franco-Prussian war, during which he made many sketches for his pictures. His work is finished and accurate like Meissonier's but broader in style and with better atmospheric effects. Died, 1912.

De Tocqueville. See *Tocqueville, de.*

De Valera (*dĕv-ŭ-lĕ'rä*), **Eamonn,** Irish Republican leader, was born in New York City in 1882, the son of a Spanish father and an Irish mother. His childhood was spent in Ireland, where he was educated, specializing in languages and mathematics. He taught in several Catholic colleges of Dublin prior to 1916, when he took part in the so-called Easter rebellion. He was captured and was condemned to death by the British government, but, being released the following year, became the most popular leader in the campaign for an independent Irish republic. He was rearrested in 1918, but escaped to the United States in 1919, where he endeavored to enlist American support for the Irish Republicans.

Although De Valera conducted the negotiations leading to the treaty by which the Irish Free State was established

in 1922, he refused to assent to the terms. Being superseded in the leadership of the State, he led against the Irish government a rebellion, which was suppressed in 1923.

De Vigny. See *Vigny, Comte de.*

Devine (*dē-vīn'*), **Edward Thomas,** American sociologist and educator, was born in Union, Iowa, 1867; graduated from Cornell college, Iowa, and from the University of Pennsylvania; and, after some years spent as secretary of the charity organization society of New York and as editor of *Charities*, later *The Survey*, was professor of social economy, Columbia university, from 1905 to 1919. He was director of the New York school of philanthropy in 1904–07 and in 1912–17, and was placed in charge of the American national Red Cross relief in San Francisco, 1906; in Dayton, Ohio, 1913. In 1926, he accepted the professorship of social economy at the American University, Washington, D. C. His publications include *Economics*, *The Principles of Relief*, *Misery and Its Causes*, and *Social Work*.

De Vinne (*dē vĭn'ē*), **Theodore Low,** American printer and writer on the printer's art, was born at Stamford, Conn., 1828; learned the printer's trade; and was an employee, later a partner, of Francis Hart, New York. After the latter's death, the firm, in 1883, became Theodore L. De Vinne and Company. He began to print the *Saint Nicholas Magazine* when it was established in 1873, and the *Century Magazine* when it was founded in 1874. He organized the national typothetae society and became its president in 1896.

De Vinne made notable improvements in American typography; his publications ranked as the best examples of American presswork; and his firm achieved an international reputation. His books on printing include *Invention of Printing*, *Historic Types*, *Title Pages*, *Book Composition*, and *Notable Printers of Italy during the Fifteenth Century*. Died, 1914.

Devonshire, Victor Christian William Cavendish, Duke of, was born in 1868. He was educated at Eton and at Trinity college, Cambridge, and sat in Parliament from 1891 to 1908, when he succeeded his uncle as 9th duke of Devonshire. After holding various distinguished offices in England, he was, in 1916, appointed governor-general of Canada. Returning to England in 1921, he served as secretary of state for the colonies from 1922 to 1924.

De Vries (*dē vrēs*), **Hugo,** Dutch botanist, was born at Haarlem, 1848. He was educated at Leiden, Heidelberg, and Wurzburg. In 1871, he became lecturer, and later professor of botany, at the University of Amsterdam. His most notable work was done in connection with researches on the theory of mutations as a method of evolution. These contain the most satisfactory explanation of organic evolution advanced since Darwin proposed the theory of natural selection. To De Vries also belongs the credit of discovering, and revealing to the scientific world, the importance of the obscure and unnoticed publications of Mendel which now constitute the basis of modern genetics. He has also changed the method of studying evolution from observation to experimental work. Among his many publications the following are the most widely known: *Intracellular Pangenesis*, *Die Mutationstheorie*, and *Plant Breeding*. See *Mendel's Law*.

Dewar (*dū'ẽr*), **Sir James,** British scientist, was born at Kincardine, Scotland, in 1842 and was educated at Dollar academy and Edinburgh university. In 1875, he was made professor of experimental philosophy at Cambridge university and, two years later, became professor of chemistry at the royal institution, London.

Dewar was the coinventor of cordite with Sir Frederick Abel. He distinguished himself also by his investigations into the properties of matter at low temperatures and into the nature and properties of atmospheric air. He was the first to liquefy and solidify oxygen and hydrogen gases. By means of evaporating liquid hydrogen under reduced pressure, he obtained the lowest temperature reached up to that time, namely, 13° absolute or -470° F., at which point air becomes a rigid solid and only helium of known gases remains uncondensed. He also introduced the silvered vacuum vessels, known as thermos flasks, for keeping foods hot or cold for comparatively long periods of time. In recognition of the value of his discoveries, he was knighted in 1904 and received numerous prizes and medals from scientific societies. Died, 1923.

De Wet (*dē vĕt'*), **Christian Rudolf,** Boer general, was born in 1854. He acquired fame in the Transvaal war of 1880-81; and, in the South African war, 1899–1902, he was of all the Boer commanders the most audacious, the swiftest in movement, and the most fertile in expedients. After the submission, he went to Europe as a commissioner to raise money for the distressed Boer families. In 1907, he became member of the new parliament of the Orange River colony and also minister of agriculture; in 1912, he was appointed to the South African council of defense. Soon after the outbreak of the World War, in 1914, he rebelled against British rule, was defeated, taken prisoner, and condemned to six years' imprisonment with a fine of £2000. He is the author of a work on the South African war, entitled *Three Years' War*. Died, 1922.

Dewey, George, American admiral, was born in Montpelier, Vt., 1837. He graduated at the United States naval academy in 1858 and began active service on the Mediterranean station. He took part in Farragut's naval operations leading up to the capture of New Orleans in 1862. In the succeeding years, he held various commands and was promoted to the rank of commodore in 1896.

In 1898, on the outbreak of the Spanish American war, Dewey was made commander of the Asiatic station. He destroyed the Spanish fleet in Manila bay without any loss on his part. For this action, Congress immediately appointed him rear admiral. He subsequently co-operated in the capture of Manila. On his return to the United States, he was made "admiral of the navy," the only man who ever held that title, Farragut and Porter having been admirals but not admirals of the navy. Died, 1917.

Dewey, John, American philosopher and educator, was born in Burlington, Vt., 1859. He was educated at the University of Vermont and Johns Hopkins university. He was professor of philosophy at the University of Minnesota in 1888-89 and at the University of Michigan, 1889–94. He then became professor of philosophy at the University of Chicago, where he was also director of the school of education from 1902 to 1904. In the latter year, he was called to the chair of philosophy in Columbia university.

Dewey devoted much study to educational theory with the view of relating teaching more closely to the environment of pupils. On the invitation of the Chinese government, he spent three years in China, where he was engaged on adaptations of his methods to the Chinese educational system. His *School and Society*, outlining his educational views, has been translated into nearly every European language as well as Japanese.

With William James, Dewey ranked as one of the two foremost American leaders of the pragmatic movement in modern philosophy. His first original philosophical work was in the domain of ethics, and he later applied to the field of logic the methods which he had developed in the study of morality. His publications include *Critical Theory of Ethics*, *Significance of the Problem of Knowledge*, *How We Think*, *Influence of Darwin on Philosophy*, *Interest and Effort in Education*, *German Philosophy and Politics*, and *Reconstruction in Philosophy*. See *Educational Reformers*.

Dewey, Melvil, American librarian and educator, was born at Adams Center, N. Y., 1851. He graduated in 1874 from Amherst college, where he was acting librarian until 1876. In that year, he published his *Decimal Classification and Relative Index*, in later editions called the *Decimal Classification*. He also established the *Library Journal* in the same year and was active in founding the American library association, serving twice as president and for 15 years as secretary. In 1883, he was made librarian at Columbia college. In 1884, he established a school of library economy, which was transferred to Albany in 1890 and, reorganized as the state library school, remained under his directorship until 1906. From 1888 to 1900, he was secretary of the University of the State of New York and, from 1888 to 1906, was director of the New York State library. His cataloging works are extensively used and his *Decimal Classification*, followed in nearly all American libraries, has been adopted in many foreign countries.

De Witt (*dē vĭt'*), **Jan,** Dutch statesman, was born at Dort, Holland, 1625. He was carefully educated and soon exhibited remarkable ability. He was one of the deputies sent by Holland in 1652 to Zealand for the purpose of dissuading that province from adopting the democratic cause supported by the house of Orange. In 1654, a secret article was inserted in the treaty drawn up between De Witt and Cromwell, by virtue of which the house of Orange was to be permanently deprived of all state offices.

After the restoration of Charles II, De Witt leaned more to the side of France. Upon the renewal of hostilities between England and Holland in 1665, De Witt acted with great vigor, but his influence was diminished and his party was compelled to concede a larger measure of power to the house of Orange. De Witt's prospects became still more clouded when the designs of Louis XIV upon the Spanish Netherlands became manifest. On the invasion of the Netherlands by Louis XIV in 1672, the prince of Orange was appointed commander of the Dutch forces and the popular clamor against De Witt greatly increased. His brother Cornelius, accused of conspiracy against the life of the stadholder, was imprisoned and tortured. De Witt went to see him on his release. As they were coming out of prison they were attacked and murdered, 1672.

Diaz (*dē'ăz*), **Armando,** Italian general, was born in 1861. Following the disastrous battle of Caporetto, October 24, 1917, in which all the fruits of earlier campaigns were lost, Diaz succeeded Cadorna as commander in chief of the Italian armies. In nine days, June 15–23, 1918, Diaz decisively repulsed a great Austrian offensive designed to

crush the Italian armies, driving the Austrians back across the Piave and inflicting enormous losses. After four months' preparation, Diaz began, October 24, a tremendous offensive against the Austrian lines in Italy. A series of increasing successes resulted, at the end of 10 days, in the total collapse and rout of the Austrian forces. When Austria, on November 4, accepted terms of truce, the Italian armies under Diaz had captured 300,000 prisoners, 5000 guns, and military booty valued at about a billion dollars. This victory by Diaz ranks as one of the most overwhelming in military history. He was made Duke of Victory in 1921; served as minister of war, 1922-24; and received the newly created title of marshal in 1924. Died, 1928.

Diaz (*dē'ȧs*), or **Dias, Bartholomew,** Portuguese navigator, flourished in the 15th century. His residence at the court of John II of Portugal brought him into contact with many scientific men, and, in 1487, the king gave him the command of three vessels to follow up the discoveries already made on the west coast of Africa. Driven by a violent storm, he sailed round the southern extremity of Africa and the Cape of Good Hope, without immediately realizing the fact, and discovered Algoa bay. The discontent of his crew compelled him to return, and he arrived in Lisbon, December 1488. He joined the expedition of Cabral, the discoverer of Brazil. In May 1500, he was lost in a storm off the great cape that he had discovered.

Diaz (*dē'ȧs*), **Porfirio,** Mexican statesman, was born at Oaxaca in 1830. He studied law; was an officer in the war between Mexico and the United States; and, in 1863, was military governor of the state of Vera Cruz and the Mexican commander in the war with France. He was captured and sent to France, but escaped and was in command of the army which overthrew Maximilian in 1867, thus ending the war with France. In 1876, he rebelled and overthrew the president Lerdo de Tejada and was himself made president in the same year. In 1884, he was re-elected president and served continuously until May 1911. Mexico prospered greatly under his administration, and his achievements entitle him to a high place among the world's statesmen. Opposition to his rule culminated in a successful revolution led by Francisco Madero. He then resigned and went to Europe. Died in Paris, 1915.

Diaz de la Peña (*dē'ȧz' dē lȧ pĕn'yȧ'*), **Narcisse Virgile,** called **Diaz,** French landscape painter of the Barbizon school, was born at Bordeaux, of Spanish parentage, 1808. Left an orphan at 10, he was educated by a Protestant pastor at Bellevue, near Paris. A poisonous insect bite received while wandering in the woods necessitated the amputation of one of his legs. At 15, he was apprenticed to a porcelain painter, and, in 1831, he began to exhibit in the salon. In 1841, he formed a friendship with Rousseau, who taught him how to paint trees in the forest of Fontainebleau. He then devoted himself chiefly to landscape painting, winning both fame and fortune. He equipped a magnificent studio in Paris and was noted for his hospitality.

While his personality was less powerful than that of Dupré, Rousseau, or Corot, he was a painter of exquisite taste in both design and coloring. His pictures have been popular in the United States. Many fine examples are found in the Metropolitan museum, New York; in the art institute, Chicago; and in other American collections. Among his best pictures are "The Fairy with Pearls," "Sunset in the Forest," "The Storm," and "The Forest at Fontainebleau." Died at Mentone, 1876.

Dickens, Charles, English novelist and humorist, was born at Landport, England, 1812. He was first a parliamentary reporter and soon became distinguished for his uncommon ability. After a literary apprenticeship on the *True Sun*, he attached himself to the staff of the London *Chronicle*. In this newspaper, he gave the first evidence of his talents in the lively essays entitled *Sketches by Boz*, published in 1836. This was followed by the immortal *Pickwick Papers*, *Oliver Twist*, and *Old Curiosity Shop*. After a visit to the United States, he published, in 1842, his *American Notes*, but a much more admirable result of his visit was *Martin Chuzzlewit*, the greatest of his humorous works since the *Pickwick Papers*.

In his later novels Dickens's humor, except in some rich creations such as Mr. Micawber, was no longer so apparent, while, on the other hand, his wit and pathos increased. *Dombey and Son* was below the standard of his other works, but for this he made amends in *David Copperfield*, which is considered by many his greatest work. *Bleak House*, *Hard Times*, *Little Dorrit*, *Tale of Two Cities*, *Great Expectations*, *Our Mutual Friend*, and other equally celebrated novels followed, and an audience larger than that of any other English author awaited each.

His unparalleled popularity was due to the directness of his appeal to simple and common emotions and to his gift for caricature. He had no well-defined literary ideals, but he unerringly sought the interest and the sympathy of his readers. Besides arousing a sentiment that made for many reforms in prisons, workhouses, and schools, he wrote the finest Christmas stories in the language, and, by his appreciation of the dignity and the worth of homely virtues, gave the common people in all English-speaking lands a new pride in themselves. In 1867, he again visited the United States, gave numerous readings, and met with a brilliant reception. His last novel, *The Mystery of Edwin Drood*, was left unfinished. He died in 1870 and was buried in Westminster Abbey. See *Literary Plots, Characters, and Allusions* under the titles of his principal works.

Dicksee, Margaret Isabel, English painter, was born in London, 1858. She devoted her talents chiefly to painting genre pictures and scenes from the lives of celebrated artists. From 1883 to 1901, she was a frequent exhibitor at the royal academy. Several of her pictures have attained wide popularity as engravings. Among her works are "Angelica Kauffmann and Sir Joshua Reynolds," "Young Handel," "Swift and Stella," "The May Queen," "The Village Blacksmith," "A Dawning Life," "The Conscript," "In Memoriam," and "Miss Angel." Died, 1903.

Diderot (*dēd'rō'*), **Denis,** French encyclopedist and philosophical writer, was born at Langres, France, 1713. His great work was the *Encyclopédie*, published in 28 volumes, 1751–72, of which he and D'Alembert were the joint editors. Besides revising all the articles, Diderot wrote the departments of history, ancient philosophy, and mechanical arts. While not primarily written in the interests of any school of ethics or philosophy, it became a most influential organ of intellectual freedom.

Diderot also wrote dramas, novels, and art criticisms on the annual exhibitions at the salon. Toward the end of his life he determined to sell his library to provide a dowry for his daughter. The empress Catherine of Russia, having been informed of his intention, bought the library, on condition that he himself should be librarian and undertake the care of it at a yearly salary. He devoted his remaining years to writing and to the enjoyment of social intercourse in the cultivated society of the day. Died, 1784.

Dielman (*dēl'mȧn*), **Frederick,** artist, was born in Hanover, Germany, 1847. He came to the United States in childhood. After studying art at the royal academy, Munich, he opened a studio in New York, 1876. He designed the mosaic panels, "Law" and "History," in the Congressional Library, the large mosaic, "Thrift," in Albany savings bank, the decorations in the building of the Washington *Evening Star*, and a series of mosaic panels in the Iowa State capitol at Des Moines. As an instructor and as a painter, he has exercised an important influence in promoting American art.

Diesterweg (*dēs'tĕr-vāĸ*), **Friedrich Adolf Wilhelm,** German educator, was born at Siegen, 1790. He was educated at the universities of Herborn and Tubingen and became a tutor at Mannheim, where he first endeavored to apply the methods of Pestalozzi. Later, at Frankfort and at Elberfeld, he was greatly influenced by other followers of Pestalozzi. In 1820, he became head of the teachers' seminary at Mors, where he worked out a course of study which became a model for all other Prussian training schools. In 1838, he was made director of the Berlin teachers' seminary, where he established a practice school and revolutionized elementary school methods in the city.

The dominant idea in his system was the principle of self-activity. He labored unwearyingly for the freedom of the school and the betterment of the teacher. He emphasized the social function of the school. His work for German education is comparable to that of Horace Mann in America. Died, 1866.

Dillon, Clarence, American investment banker, was born at San Antonio, Texas, in 1882. After graduation from Harvard university in 1905, he was connected with several mining and manufacturing firms, and spent two years, 1908–10, in Europe, traveling and studying art. In 1912 he became connected with the Chicago office of Wm. A. Read & Company, investment bankers of New York City, and advanced so rapidly in the esteem of William A. Read that he became virtually the head of the organization on Read's death in 1916, and five years later was chosen head of the firm, thereafter known as Dillon, Read & Company. By a rare combination of courage, energy, and thoroughness, he successfully financed a number of the largest industrial corporations of America, certain steel industries of the Ruhr District in Germany, and various other enterprises abroad, and floated many foreign government loans. During 1919–25, securities to the amount of approximately two billion dollars were underwritten by the firm.

Dillon, John, Irish politician and leader, was born in 1851 and was educated at the Catholic University of Dublin. He early identified himself with the Parnellite movement and, in 1880, was elected to the British Parliament for County Tipperary, where, with a brief interruption in 1883–85, he sat for over 35 years. In Parliament, he distinguished himself by the violence of his language. He was one of the chief promoters of the "plan of campaign," a political conspiracy, and was imprisoned in 1891. Between

1891 and 1896, he opposed Parnell's leadership and, in the latter year, succeeded Justin McCarthy as head of the Irish Nationalist party. With the rise of the Sinn Fein party in Ireland, Dillon's leadership appeared too moderate and he was defeated at the polls in 1918. He then devoted himself chiefly to journalism. Died, 1927.

Dinwiddie, Albert Bledsoe, American educator, was born at Lexington, Ky., 1871. He was graduated at the University of Virginia and at the University of Gottingen. In 1896, he became professor of mathematics at Southwestern Presbyterian university and went, ten years later, to Tulane university, where he was made professor of mathematics and astronomy in 1910 and was chosen president in 1918.

Diocletian (*dī'ō-klē' hăn*), or **Valerius Diocletianus,** Roman emperor, was born in Dalmatia in 245 A. D. and reigned from 284 to 305. He entered the army and held important commands under the emperors Probus and Aurelian. After the death of Numerianus, he was chosen emperor by the troops at Chalcedon. With his reign began a new form of government in Rome. He appointed Maximian as his companion in authority under the title Augustus and, soon after, he appointed Constantine and Galerius as subordinate rulers, each with the title of Cæsar. Each of the four rulers had a different capital and governed a different region. In the year 305, Diocletian resigned as emperor and went to Salona, in Dalmatia, where he died eight years later. His reign has become memorable for the persecution of Christians.

Diogenes (*dī-ŏj'ĕ-nēz*), Greek philosopher of the school of cynics, was born at Sinope, Asia Minor, about 412 B. C. Becoming a citizen of Athens, he made himself conspicuous by his abnegation of all social laws and customs, lived upon alms, and took up his abode in a tub. His life was a protest against the conventions. Of his cynicism many well-known anecdotes are related. Died at Corinth, 323 B. C.

Dionysius (*dī'ō-nĭsh'ĭ-ŭs*), **the Elder,** tyrant of Syracuse, in Sicily, was born about 431 B. C. When Sicily was invaded by the Carthaginians, he became a general in the service of Syracuse, which was then a republic. In the year 405, he made himself tyrant of Syracuse. He engaged in many military expeditions and was one of the most distinguished rulers of his time. He wrote poems and tragedies, and, at one time, gained a prize at Athens for the tragedy *Ransom of Hector*. He died at Syracuse in 367 B. C.

Dioscorides (*dī'ŏs-kŏr'ĭ-dēz*), **Pedanius,** Greek physician, was born in Anazarbus, Cilicia, and flourished in the 1st century A. D. As physician to the Roman armies, he traveled through many countries and gathered a vast mass of information concerning plants which he embodied in his great work entitled *De Materia Medica*, in five books, in which he described all of the medical substances then known, together with their properties. For 1500 years, this work was an undisputed authority in botany and materia medica and is still so regarded by the Turks and the Moors. It was translated into Latin at a very early date and later into Arabic and the languages of western Europe.

Disraeli (*dĭz-rā'lĭ*), **Benjamin,** earl of Beaconsfield, English statesman and novelist, was born in London, 1804, of Jewish parentage. He entered the House of Commons in 1837 and remained a member until his elevation to the House of Lords in 1878. He made himself famous by his brilliant attacks upon Sir Robert Peel. He became the leader of the old Tory, or protectionist, party on the death of Lord George Bentinck in 1848. As chancellor of the exchequer, he was chiefly instrumental in carrying the Reform act of 1867. The following year, he became premier. Defeated at the polls the same year, his party again came into power in 1874. His administration was notable for its vigorous foreign policy. He acquired control of the Suez canal and made Queen Victoria empress of India. He retired from leadership in 1876 and was created earl.

Disraeli was an orator and debater of unusual skill and his statesmanship was of a high order. In his domestic policy, while a Tory in theory, he was a Liberal in practice. His numerous novels, chiefly political, are remarkable for their brilliancy and for their epigrammatic style. Died, 1881.

Dixon, Thomas, American lecturer, novelist, and playwright, was born in Shelby, N. C., 1864; graduated from Wake Forest college, N. C., and from Greensboro law school; and was admitted to the bar in 1886. After studying a year at Johns Hopkins university, he was elected to the North Carolina legislature in 1885, but resigned the next year to enter the Baptist ministry. He occupied important pastorates in Raleigh, Boston, and New York, and became a popular lyceum lecturer. Among his books are *The Leopard's Spots*, *The One Woman*, *The Clansman*, *The Traitor*, *The Foolish Virgin*, and *The Fall of a Nation*. In his play *The Sins of the Father*, produced in 1910-11, Dixon himself appeared in the principal rôle. In 1915, his novel, *The Clansman*, was made the basis of a notably elaborate photoplay entitled *The Birth of a Nation*.

Doane (*dōn*), **William Croswell,** Protestant Episcopal clergyman, was born at Boston, Mass., 1832; graduated at Burlington college, N. J., 1850; and was ordained priest by his father, Bishop G. W. Doane, 1856. He was rector of churches at Burlington, Conn.; Hartford, Conn.; and Albany, N. Y.; and was consecrated first bishop of the diocese of Albany, 1869. He organized the cathedral of All Saints and founded Saint Agnes school for girls. He was a strong advocate of the cathedral system and actively promoted religious education through various institutions founded in his diocese. His published writings include *Mosaics, or the Harmony of the Collect, Epistle, and Gospel*; *A Catechism of the Christian Year*; *The Manifestations of the Risen Jesus*; and many sermons and convention addresses. Died, 1913.

Dobson, Henry Austin, English poet and man of letters, was born at Plymouth in 1840; was educated at Coventry and Strasbourg; and turned his attention to literature, although he held a clerkship in the board of trade continuously from 1856 to 1901. He began publishing poems in 1868 and won wide notice by his skillful and pleasing rondeaus, ballades, and other verses in the French forms. He became active as an editor of 18th century authors and made extensive contributions to magazines, encyclopedias, and the *Dictionary of National Biography*. His prose works include *Thomas Bewick and His Pupils*, *Four Frenchwomen*, *Eighteenth Century Vignettes*, *Old Kensington Palace*, and *At Prior Park*. Among his volumes of poems are *Vignettes in Rhyme*, *Proverbs in Porcelain*, *Old-World Idylls*, and *At the Sign of the Lyre*. His work is distinguished throughout for its scholarship, literary finish, and graceful style. Died, 1921.

Dodge, Mary Elizabeth Mapes, American editor, poet, and juvenile writer, was born in New York, 1838. She married William Dodge, after whose death she devoted herself to literature. From 1873, she ably edited the juvenile periodical *Saint Nicholas*. She also wrote several volumes of juvenile verse and prose, of which the more noteworthy include *Hans Brinker, or The Silver Skates*; *Theophilus and Others*; *The Land of Pluck*; and *The Golden Gate*. Died, 1905.

Dodgson, Charles Lutwidge. See *Carrol, Lewis.*

Doheny (*dō-hē'nĭ*), **Edward Laurence,** American producer of petroleum, was born at Fond du Lac, Wis., in 1856. After spending 20 years prospecting for gold, silver, and oil, his efforts were eventually rewarded, in the years following 1892, by the discovery of several oil districts in California and in Mexico. He later became the president of a number of important petroleum companies.

Dolbear (*dōl'bēr*), **Amos Emerson,** American educator and inventor, was born at Norwich, Conn., 1837; graduated from Ohio Wesleyan university, 1866; and became professor of physics at Tufts college, 1874. He made valuable investigations and inventions in connection with the writing telegraph, the electric gyroscope, the magneto-telephone, wireless telegraphy, and the application of electric waves to photography. In 1873, he discovered the convertibility of sound into electricity. Among his works are *The Art of Projecting*; *The Speaking Telephone*; *Matter, Ether, and Motion*; and *The Machinery of the Universe*. Died, 1910.

Dolci (*dōl'chē*), or **Dolce, Carlo** or **Carlino,** Florentine painter, was born at Florence, 1616. He devoted himself chiefly to sacred subjects and excelled in small pictures, which he painted with exquisite taste and feeling. Among his best works are the "Magdalen," Munich gallery; "Ecce Homo," Pitti palace, Florence; "Saint Cecilia," Dresden gallery; "Angel of the Annunciation," Uffizi gallery, Florence; and "Madonna and Child," Borghese gallery, Rome. Died, 1686.

Dole, Nathan Haskell, American author, editor, and translator, was born at Chelsea, Mass. in 1852 and graduated from Harvard, 1874. After a brief period devoted to teaching, he became an editor of the Philadelphia *Press*. His works include *Young Folks' History of Russia*; *Famous Composers*; *Not Angels Quite*; *The Hawthorne Tree and Other Poems*; *Joseph Jefferson at Home*; *Omar, the Tent-Maker—A Romance of Old Persia*; *Life of Count Tolstoy*; *The Spell of Switzerland*; and *How to Write Verse*. He also made numerous translations from Russian, Spanish, French, and Italian literature, and edited many large and diverse compilations of literature, poems, orations, and reference books.

Dole, Sanford Ballard, Hawaiian statesman and jurist, was born in Honolulu in 1844; was educated at Oahu college, Hawaii, and Williams college, Mass.; studied law in Boston; and was admitted to the bar. He practiced in Honolulu, where he became a member of the legislature, a leader in the reform movement of 1887, and a judge of the supreme court. He was placed at the head of the provisional government in 1893 and held the presidency until 1901. In 1898, he visited the United States on the commission for recommending the annexation of Hawaii. He was appointed

governor of the territory in 1900, after its annexation to the United States; resigned the governorship in 1903; and was then made United States district judge of the territory.

Döllinger (*dûl'ĭng-ẽr*), **Johann Joseph Ignaz von,** German theologian, was born at Bamberg, Bavaria, in 1799. In 1826, he was appointed professor of ecclesiastical history and canon law at the University of Munich. Here he became the recognized leader of the "Old Catholic" movement. He was prominent in the discussion which took place in the Roman Catholic Church over the dogma of the infallibility of the pope. He wrote a large number of works, many of them of great value, among which are *Paganism and Judaism*, *The Church and the Churches*, and *The Reformation*. Died at Munich, 1890.

Dolliver, Jonathan Prentiss, American lawyer and politician, was born near Kingwood, W. Va., 1858; graduated from West Virginia university, 1875; was admitted to the bar, 1878; and established a practice at Fort Dodge, Iowa. He was elected to Congress in 1889 and became a United States senator in 1901. He assumed the leadership of the so-called "insurgent" senators and, with his colleague, Senator A. B. Cummins, aggressively opposed the tariff and other policies of the administration. He was a public speaker of unusual power and ability, and was notably effective in his opposition to the Payne-Aldrich Tariff bill, 1909-10. Died, 1910.

Dollond (*dŏl'ŭnd*), **John,** English optician, inventor of the achromatic object glass for telescopes, was born in London in 1706. He was originally a silk weaver of Spitalsfield, London, but studied science and, with his son, established a manufactory of optical instruments. After many years of experiment and research, he succeeded in constructing lenses where a concave lens of flint glass was fitted to a convex lens of crown glass, with the result that images were formed without any colored border. This was the greatest improvement made in the telescopic lenses. Died, 1761.

Domenichino (*dō-mā'nê-kē'nō*), or **Domenico Zampieri,** Italian painter of the eclectic school, with Guido Reni the greatest of the pupils of the Carracci, was born at Bologna in 1581. His masterpiece is the "Communion of Saint Jerome," now honored with a place opposite Raphael's "Transfiguration" in the Vatican and considered one of the great pictures of the world. Other noted works are "Diana and Nymphs" and "Cumæan Sibyl," Borghese gallery, Rome; "Guardian Angel," Naples gallery; "Saint John," Hermitage gallery, Petrograd; and the "Four Evangelists," in the cupola of Sant' Andrea della Valle, Rome. Died, 1641.

Dominic (*dŏm'ĭ-nĭk*), **Saint,** founder of the order of monks called Dominicans, was born at Calaroga, Old Castile, Spain, about 1170. He studied at the University of Palencia and, about 1195, became canon of the cathedral at Osma. In 1204, he went to Languedoc, France, and preached with much vehemence against the Albigenses. As a result of this crusade, he founded the order of the Dominicans, which was confirmed by papal decree in 1216. He was a self-denying man, tireless and earnest in his efforts for the faith. He died in Bologna in 1221 and was canonized by Gregory IX in 1234.

Donatello (*dŏn'ă-tĕl'lō*), properly **Donato di Betto Bardi,** one of the revivers of sculpture in Italy, was born in Florence about 1386. An associate of Ghiberti and Brunelleschi, he became the most important sculptor of the early Renaissance. He was a realist who broke away from classic models and is considered the founder of modern sculpture. He did not hesitate to delineate character even at the sacrifice of beauty and excelled in portraying dramatic action. His immense influence on the sculpture of the Renaissance reached its culmination in the art of Michelangelo. Among his very numerous works are the statue "Saint George," in the national museum, Florence; the statues "Saint Peter," "Saint Mark," "John the Baptist," and "David"; and the fine rilievos "Worshipping Angels," "Burial of Christ," "The Ascension," and the "Annunciation." He died in Florence, 1466.

Donizetti (*dŏ'nê-dzĕt'tē*), **Gaetano,** Italian operatic composer, was born at Bergamo, Lombardy, 1797, and studied at Bologna. In 1835, he settled in Paris and wrote for the French stage. He devoted himself chiefly to dramatic music and produced over 60 operas. His *Lucia di Lammermoor*, *Daughter of the Regiment*, *Lucrezia Borgia*, and *La Favorita* are well known and possess a melodic quality of the first order. Died, 1848.

Donnay (*dŏ'nā'*), **Maurice Charles,** French dramatist, was born in Paris, 1859. He was educated in Paris and early displayed a talent for literature. However, following the wishes of his parents, he entered a contractor's office, where he worked six years. On account of having recited some of his own verses in a cabaret in Montmartre, he was compelled to resign his place. He then appeared for two years at the "Chat Noir," where his graceful verses and dialogues gave him much local popularity.

Donnay's first play, *Lysistrata*, produced in 1892, was an adaptation from Aristophanes. His *Lovers*, still his best-known and most highly esteemed play, appeared in 1895 and gave him national fame. He was elected to the French academy in 1907. He produced about 20 dramas, all essentially Parisian in tone and treatment. The list includes *Family Hotel*, *The Emancipated Woman*, *A Prince's Education*, *The Clearing*, *The See-saw*, *The Other Danger Birds of Passage*, *Molière's Household*, and *The Man Hunt*.

"Dooley, Mr." See *Dunne, Finley Peter*.

Dora d'Istria (*dō'rä dēs'trê-ä*). See *Ghika, Helena*.

Doré (*dŏ'rā'*), **Paul Gustave,** French painter and illustrator, was born at Strasbourg in 1833 and was educated at a Parisian lycée. He became known by his illustrations of *Rabelais* and *Don Quixote* and, for some years, was a constant contributor to the *Journal pour Rire*. At the time of the Crimean war, he produced "Alma" and "Inkermann"; in 1861, he published the first of his popular illustrations to Dante's *Divine Comedy*. These were followed by illustrations to the Bible, *Paradise Lost*, *The Ancient Mariner*, and *The Idylls of the King*. These works secured for him a greater reputation in England than was accorded to him in his native country. He afterward devoted himself to the production of large pictures on religious and historical subjects, such as "Christ's Entry into Jerusalem," "Francesca da Rimini," and "The Neophyte." Died, 1883.

Dorr, Thomas Wilson, American politician, was born at Providence, R. I., in 1805 and graduated from Harvard, 1823. He was the leader of a party, 1840-41, whose object was to extend the right of suffrage in Rhode Island. The charter granted by King Charles had arbitrarily fixed the legislative representation of the parts of the state. With the growth of population, the more populous parts had fewer representatives than the less populous.

Under Dorr's leadership, a new constitution was drawn up, submitted to the electors, and declared to have been carried. In April 1842, an election for state officers was held under this constitution, and Dorr was chosen governor. His attempts to assume power were resisted by the regular state government, although there was no actual fighting. Dorr was arrested, tried for treason, and sentenced to imprisonment for life, June 1844. In 1845, he was released and later was restored to civil and political rights. The abuses which he had opposed were soon rectified in large part. Died in 1854.

Dostoiévsky (*dŏs'tô-yĕv'skê*), **Fiódor Mikháylovitch,** Russian novelist, was born at Moscow in 1821. His *Poor Folk* had not long appeared when he became involved in communist plots and, in 1849, was condemned to enforced labor in the Siberian mines. In 1855, he was permitted to return and, in 1861-62, published *Memoirs of a Dead House*, describing his life in prison. His masterpiece, *Crime and Punishment*, is one of the most powerful realistic works of modern fiction. Other novels that have appeared in English are *Injury and Insult*, *The Idiot*, *The Friend of the Family*, *The Gambler*, *The Permanent Husband*, *Uncle's Dream*, and *The Brothers Karamazov*. He died at Petrograd, 1881.

Dou, Dow, or **Douw, Gerard,** Dutch genre painter, was born at Leiden in 1613. He studied under Rembrandt in 1628–31 and at first occupied himself mainly with portraiture, but soon turned to genre. Dou excelled in small pictures, representing scenes or subjects from Dutch peasant life, soft and harmonious in color, with picturesque light effects, carefully drawn with great exactness of detail. He ranks high among the Dutch masters of painting. His numerous works, represented in all the great European collections, include his own portrait; that of his wife; "The Poulterer's Shop," in the national gallery, London; and his celebrated "Woman Sick of the Dropsy," in the Louvre. Died in 1675.

Doubleday, Frank Nelson, American publisher, was born at Brooklyn, N. Y., in 1862. He entered the employ of Charles Scribner's Sons in 1877, remaining with them 18 years. He refounded and edited the *Book Buyer*. He was successively manager of *Scribner's Magazine*; member of the firm of Doubleday and McClure Company; and president of Doubleday, Page and Company, the publishers of the *World's Work*, *Country Life in America*, *The Garden Magazine*, and *Farming*.

Dougherty, Dennis J., American prelate, was born in Girardville, Pa., 1865. He was ordained as a priest of the Roman Catholic Church in 1890; became bishop of Nueva Segovia in 1903; was transferred to Buffalo, N. Y., in 1915; and, in 1918, was appointed archbishop of Philadelphia. In 1921, he was created cardinal priest.

Doughty, Charles Montagu, English writer and traveler, was born in Suffolk, Eng., 1843. He was educated at the Portsmouth naval school and Cambridge university. His *Arabia Deserta*, written after a period of travel in the Near East, is one of the most graphic books of travel in the

English language. Its author was presented with a medal by the royal geographical society. His other works include *The Dawn in Britain*, *Adam Cast Forth*, and *Mansoul, or the Riddle of the World*. Died, 1926.

Douglas, Stephen Arnold, American statesman, styled the "little giant," was born at Brandon, Vt., 1813. His early youth was one of poverty; but he managed to spend three years at the Canandaigua academy, having the study of law in view. In 1833, he settled in Jacksonville, where he entered the practice of law. He was soon chosen state's attorney; was elected to the legislature; and, in 1840, became secretary of state for Illinois. He was judge of the Illinois supreme court from 1841 to 1843, when he resigned and was elected to Congress as a Democrat.

Douglas was at once recognized as one of the ablest men of his party. He denied the right of the Federal government to legislate on slavery in the territories; favored the Mexican war and the annexation of Texas; opposed the Wilmot proviso; and defended the compromise measure of 1850. In 1854, he introduced the Kansas-Nebraska bill, which created civil war in Kansas.

In 1858, he was a candidate for the United States Senate and held a series of notable debates with Abraham Lincoln, his opponent. He won the senatorship, but was forced by Lincoln to make statements which doomed his presidential ambitions to defeat. In 1860, the Democratic party split into two divisions, one of which nominated Douglas for president and the other John C. Breckinridge. Douglas was strongly opposed to secession and, after the outbreak of the Civil War following Lincoln's inauguration, staunchly supported the Union cause. Died at Chicago, 1861.

Douglas, William Lewis, American manufacturer and politician, was born in Plymouth, Mass., 1845. When he was but 5 years old, his father died. At the age of 7, he went to work for an uncle, who set him to pegging shoes; worked in a cotton mill at Plymouth at 15; and afterward went to Hopkinton and South Braintree, Mass., where he learned bootmaking. At Brockton, in 1876, he began with a small shop, from which he built up a business with a total capacity of about 20,000 pairs of shoes daily. These were distributed to 78 retail shoe stores owned by him in large cities for the purpose of selling the "Douglas" shoe. He was elected to the Massachusetts house of representatives in 1884; the Massachusetts senate in 1887; and the governorship of Massachusetts in 1905. Died, 1924.

Douglass, Frederick, American orator, a mulatto slave, was born at Tuckahoe, near Easton, Md., in 1817. In 1838, he escaped from a Baltimore shipyard to the Northern states and changed his name from Lloyd or Bailey to Douglass. He lectured on slavery with great success during 1845–47 in Great Britain, where £150 was collected to buy his freedom. In 1847, he established *The North Star*, afterward called *Frederick Douglass's Paper*, a weekly Abolition newspaper, at Rochester, N. Y. In 1855, he rewrote his earlier autobiography, which was published later as *The Life and Times of Frederick Douglass*. After the outbreak of the Civil War, he was one of the earliest to propose the use of Negro troops by the United States. He served in various offices under the government, 1871–91. Died at Washington, 1895. A bronze statue of Douglass stands in a public square of Rochester, N. Y.

Doumergue (*dōō'mĕrg'*), **Gaston,** French statesman, was born at Aigues Vives, France, in 1863. He was educated at Nimes and Paris, qualifying for a legal career. After practicing at Nimes from 1885 to 1890, he served as colonial magistrate in Indo-China and in Algeria. Returning to France, he was elected in 1893 as a Radical-Socialist to the Chamber of Deputies, of which he was secretary in 1905-06. After holding various other ministerial posts, he was prime minister in 1913-14; minister for the colonies, 1914–17; president of the Senate, 1923-24; and, in 1924, on the enforced resignation of Alexandre Millerand, was elected president of the French republic.

Dow, Neal, temperance reformer, was born in Portland, Me., 1804, of Quaker parentage. In 1851, through his efforts while mayor of Portland, he secured the passage of what is called the "Maine law," which, under severe penalties, prohibited the sale of intoxicating liquors. In 1884, this provision was incorporated in the constitution of the state. He was twice chosen mayor of Portland and, during the Civil War, served as brigadier general of volunteers. He traveled widely, speaking on temperance problems and organizing temperance societies. In 1880, he was the candidate of the National Prohibition party for president of the United States. Died, 1897.

Dowie, John Alexander, religious leader, was born in Edinburgh, Scotland, 1847, and studied in the university there. His family removed to Sydney, Australia, in 1860, and he entered the ministry of the Congregational Church in South Australia. He went into evangelistic work in 1878 and later began faith healing. He came to the United States in 1888 and, in 1896, organized a group of converts, who, in 1901, settled 42 miles north of Chicago at a place given by Dowie the name Zion City. In 1906, Dowie was suspended from the Church by his followers, who charged him with tyranny, misuse of investments, and other offenses. Died, 1907.

Doyle, Sir Arthur Conan, British novelist and physician, was born at Edinburgh in 1859 and was educated at Stonyhurst and Edinburgh university. From 1882 until 1890, he was a practicing physician, in the meantime writing short stories. He also traveled in the arctic regions and in western Africa. In 1887, he wrote *A Study in Scarlet*, in which he created the famous detective Sherlock Holmes, who also appears in *The Sign of the Four*, *The Adventures of Sherlock Holmes*, *The Memoirs of Sherlock Holmes*, *The Hound of the Baskervilles*, and *The Return of Sherlock Holmes*. In imaginative invention, fascinating mystery, and power to create an atmosphere of horror, these tales rival those of Poe.

In 1888, he published *Micah Clarke*, his first successful historical novel, which was followed by *The White Company*, *The Refugees*, *The Great Shadow*, *Rodney Stone*, *The Adventures of Gerard*, and *Sir Nigel*. *Songs of Action*, a book of poems, appeared in 1898, and a play entitled *Halves* was published in 1899. Among his volumes of short stories are *Round the Red Lamp*, *The Stark Munro Letters*, and *The Green Flag and Other Stories*.

During the Boer war, Doyle served as head physician in a field hospital in South Africa. Upon his return, he wrote a military history, *The Great Boer War*, and a defense of British policy, entitled *The Cause and Conduct of the War*, which was translated into many languages. For his services during this period, he was knighted in 1902. His later works include *The Crime of the Congo*, *The Poison Belt*, *History of the British Campaign in France and Flanders*, and *The Wanderings of a Spiritualist*. In 1920, he began lecturing in support of the belief that it is possible to communicate with the spirits of those who have died. See *Sherlock Holmes*.

Draco, Athenian lawgiver, lived in the last half of the 7th century B. C. He set a certain limit to the tyranny of the powerful citizens by committing the laws to writing and establishing the ephetæ, or court of appeal, 621 B. C. His code, which prescribed death for nearly all offenses, appeared harsh to later ages, but was probably a mere codification of contemporary usage. The laws, written "not in ink but in blood," were repealed by Solon, with the exception of the law on homicide. It is said that Draco was smothered to death in the theater by the hats and cloaks showered on him as a popular mark of honor for reducing the laws to writing.

Drake, Edwin L., American oil producer, was born in 1819. In August 1859, he sank, at Titusville, Pa., the first oil well in America. He died in 1880 and was buried in Woodlawn cemetery, Titusville, where he is commemorated by a monument erected in 1902 and further adorned in 1923 by a statue, "The Driller."

Drake, Sir Francis, English admiral and navigator, was born of obscure parentage about 1545 at Tavistock, England; he first commanded at sea under Sir John Hawkins, his relative. From 1570 to 1572, he commanded three expeditions to the West Indies and the Spanish Main, in the last of which he gained large booty. He next fought with such bravery in Ireland under Essex that he was introduced to Queen Elizabeth. With five small vessels, he sailed, in 1577, to attack the Spaniards in the South Seas. In this expedition, he ravaged the Spanish settlements, coasted the North American shore as far as Puget sound, and took possession of the country under the name of New Albion. He then returned home by the Moluccas and the cape, after a voyage of nearly three years, the first Englishman to circumnavigate the globe.

Elizabeth dined on board his ship at Deptford, and knighted him in 1580. In 1585-86, he successfully attacked the Spaniards in the West Indies; in 1587, destroyed many ships at Cadiz; and, in 1588, as vice admiral, participated in the destruction of the Spanish armada. He died off Porto Bello in 1596.

Draper, Andrew Sloan, American educator, was born at Westford, N. Y., in 1848 and was educated at the Albany academy and Albany law school. He practiced law for some years and, in 1886, became state superintendent of public instruction, New York. He was later superintendent of instruction, Cleveland, Ohio, and, in 1894–1904, was president of the University of Illinois. He rendered important service to the advance of education and wrote valuable works and papers on educational subjects, among which are *American Schools and American Citizenship* and *Conserving Childhood*. He was editor in chief of *Self-Culture for Young People*. Died, 1913.

Draper, John William, chemist, physiologist, and author, was born in England, 1811. He was educated at London university and the University of Pennsylvania, and became professor of natural sciences in Hampden-Sidney

college, Virginia. In 1841, he was made professor of chemistry in New York university, and, in 1850, was chosen professor of physiology. For many years he was president of the New York medical college. He was a noted investigator in spectrum analysis and in photography. His improvements on Daguerre's crude methods made photography of the human countenance possible. He took his first photograph in 1839. Of his numerous works the following are the chief: *Human Physiology, Statical and Dynamical*; *History of the American Civil War*; *Textbook on Chemistry*; *History of the Intellectual Development of Europe*; and *Scientific Memoirs*. Died in 1882.

Dreiser (*drī'sĕr*), **Theodore,** American editor and author, was born in Terre Haute, Ind., 1871. He received his education in the public schools of Warsaw and at Indiana university. He began newspaper work in Chicago in 1892 and was traveling correspondent for Saint Louis newspapers, 1892–94. He then engaged in special work for magazines; became editor of *Smith's Magazine* in 1905; managing editor of the *Broadway Magazine* in 1906; and editor in chief of the Butterick publications, 1907–10. In addition to numerous magazine articles, he is the author of several novels which have claimed wide attention, among which are *Sister Carrie*, *The Financier*, *A Traveler at Forty*, *The Titan*, *Twelve Men*, *The Genius*, and *An American Tragedy*.

Drew, John, American comedian, was born in Philadelphia, Pa., 1853, of a family of distinguished actors. He made his first theatrical appearance at Philadelphia, 1873, under his mother's management, in *Cool as a Cucumber*; joined Augustin Daly's company, 1875, as Bob Ruggles in *The Big Bonanza*; joined Edwin Booth, 1876, in Shaksperian plays; supported Fanny Davenport, 1877-78; and played in *Diplomacy*, 1878-79. Other plays in which he appeared include *The Masked Ball*, *The Butterflies*, *Rosemary*, *The Squire of Dames*, *His House in Order*, *My Wife*, *The Scrap of Paper*, and *The Prodigal Husband*. He excelled in portraying society characters of a half-serious, half-ironical type. Died, 1927.

Dreyfus (*drā'fŭs'*), **Albert,** French army officer, the son of a rich Jewish manufacturer, was born about 1859 at Mulhausen in Alsace. He was an artillery captain, attached to the general army staff, when, in 1894, on a charge of delivering to a foreign government documents connected with the national defense, he was court-martialed, degraded, and transported to Devil's island, French Guiana.

The efforts of his wife and friends to prove him an innocent victim of malice, injustice, and forgery plunged France into a chaos of militarism and anti-Semitism. Early in 1898, the novelist Emile Zola came to his defense with his famous *J'accuse*, "*I Accuse*," and, soon afterward, an officer in the war department confessed the forgery of documents incriminating Dreyfus. In 1899, President Loubet pardoned Dreyfus and, in 1903, he was restored to his former rank in the army and promoted major by vote of the Senate and Deputies—an outcome which was regarded as a notable triumph over militarism in France.

Drinkwater, John, poet and dramatist, was born in England, 1882. For twelve years, he was employed by various assurance companies. Turning his activities toward the drama, he became a founder and manager of the Pilgrim Players and of the Birmingham Repertory theater. Among the best known of his numerous plays are *Pawns*, *Loyalties*, *Abraham Lincoln*, and *Robert E. Lee*. Numerous poems from his pen were published in periodical literature, principally in England. He published also *The Outline of Literature*.

Drisler (*drĭs'lĕr*), **Henry,** American classical scholar, was born on Staten island, N. Y., 1818. He graduated in 1839 from Columbia university, where he became tutor in Greek and Latin in 1843; adjunct professor in 1845; professor of Latin in 1857; and professor of Greek in 1867. He also served as acting president in 1867 and again in 1888-89, and was the first dean of the Columbia school of arts, 1890–94, retiring in the latter year. He collaborated with Anthon in the preparation of numerous textbooks; edited an American edition of Liddell and Scott's *Greek-English Lexicon*; and contributed important editorial work on three Oxford editions of that work. Died, 1897.

Droysen (*droi'zĕn*), **Johann Gustav,** German historian, was born at Treptow, Prussia, 1808. He became a lecturer on history in the University of Berlin in 1833; was made professor at Jena in 1851; and was again called to Berlin in 1859, where he became distinguished as one of the great historians of the century. He published, among other important works, *History of Alexander the Great*, *History of Hellenism*, and *History of Prussian Politics*. Died, 1884.

Drummond, Henry, Scottish clergyman and author, was born in Stirling, Scotland, 1851; was educated at Edinburgh and Tubingen; studied for the Free Church ministry; and lectured on natural science. He became famous by the publication of *Natural Law in the Spiritual World*, a book which had an enormous sale. This was succeeded by *Tropical Africa*—a book of travel—and by a series of booklets commencing with *The Greatest Thing in the World*, intended to expound and commend the first principles of the Christian faith. In his *Ascent of Man*, he insisted that altruism was an essential element in the evolution of man. He also wrote *The Ideal Life*. Died at Tunbridge Wells, 1897.

Drummond, William Henry, poet, was born in Ireland, 1854, but came to Canada at an early age. Obtaining a medical education at McGill university and at Bishop's college, Lennoxville, Quebec, he established a practice in a French Canadian community. He was especially successful in portraying the French *habitant*. Among his best-known works are *The Habitant and Other French-Canadian Poems* and *The Voyageur and Other Poems*. Died, 1907.

Drusus (*drōō'sŭs*), **Nero Claudius,** commonly called Drusus Senior, stepson of the emperor Augustus and younger brother of the emperor Tiberius, was born in 38 B. C. As he grew up, he developed splendid personal qualities as well as the highest capacity for civil and military affairs. He began his public career in 19 B. C., distinguishing himself by the defeat of the Rhætians and other Alpine tribes. In 13 B. C., he was sent into Gaul, then in revolt, and, after crushing the rebels there, he pushed across the Rhine in pursuit of their German allies. In this campaign, he subdued the Sicambri and Frisii and forced his way to the North Sea, being the first Roman general who had done so. From this time, he made it the business of his life to establish the Roman supremacy in Germany, partly by conquest and partly by the execution of great military works. A fall from his horse cut short his brilliant career in 9 B. C.

Dryden, John, English dramatist, poet, and critic, was born in Aldwinkle, Northamptonshire, 1631. After graduating at Cambridge, he entered upon a literary career and succeeded Sir William Davenant as poet laureate in 1670. His *Essay on Dramatic Poesy* established his reputation as a critic. Dryden, by his dramas and political satires, especially his *Absalom and Achitophel*, occupies a high place among English poets. He also made numerous translations from the classics, especially Virgil, Juvenal, and Ovid. His finest poem, *Alexander's Feast*, was written in 1697. By his new uses of the heroic couplet in poetry, his direct prose style, and his development of literary criticism, he became the foremost writer of the Restoration and exercised a great influence on 18th century English literature. Died in London, 1700.

Du Barry (*dü bà'rē'*), **Marie Jeanne Bécu, Countess,** favorite of Louis XV of France, was born in 1746 at Vaucouleurs, the daughter of a dressmaker. Brought up in a Paris convent, in 1769, as Mademoiselle Lange, she won the notice of Louis XV, who married her to Count Guillaume du Barry, brother of her former protector. Her influence henceforth reigned supreme until the death of Louis in 1774, when she was dismissed from court. She was tried before the revolutionary tribunal for having wasted the treasures of the state and for having worn mourning for the late king, and was guillotined, 1793.

Du Chaillu (*dü shà'yü'*), **Paul Belloni,** American traveler, was born at New Orleans, La., 1835. In 1855, he sailed to western Africa, where he spent four years. His *Explorations and Adventures in Equatorial Africa* made important contributions to geographical, ethnological, and zoological science, but was received at first with much distrust. He was the first white man to secure specimens of the gorilla, and he obtained valuable information concerning the almost unknown Pygmies of the interior. In 1863–65, he revisited his old hunting grounds, vindicated his former discoveries, and described his second expedition in *A Journey to Ashango Land*. Among his other books are *The Land of the Midnight Sun*, *The Viking Age*, *The Gorilla Country*, *Country of the Dwarfs*, *The World of the Great Forest*, and *My Apingi Kingdom*. Died at Petrograd, 1903.

Ducommun (*dü'kō'mŭN'*), **Elie,** Swiss journalist, was born at Geneva, 1833. When 22 years old, he took charge of the *Revue de Genève*. He also contributed articles reflecting the boldness and liberality of his ideas to *Progrès*, *Helvétie*, and *Etats-Unis d'Europe*. He became chancellor of the canton of Geneva and later was secretary of the Jura-Simplon railroad. In 1891, he received a commission from the Congress of Rome to organize the international bureau of peace at Bern. In recognition of the completion of this task and for other efforts toward the furtherance of world peace, he was awarded the Nobel peace prize with Albert Gobat in 1902. Died in 1906.

Dudevant (*dŭd'vȧN'*), **Aurore.** See *Sand, George*.

Dufay (*dōō'fà'*), **Guillaume,** Flemish composer, was born probably at Chimay about 1400. He was a singer in the papal chapel, 1428–37, and lived in Paris from 1442 to 1449. He was the leading master of the earliest Flemish school of composers and developed four-part writing to such a degree that his work is regarded as the foundation of all choral writing. He died in Cambrai, 1474.

Du Guesclin (*dü gĕ'klăN'*), **Bertrand,** French general, was born in 1320. He gained his first reputation as a soldier in 1338 at a tournament in celebration of the marriage of Charles de Blois with Jeanne de Penthièvre. He unseated all the famous competitors.

Becoming a soldier of fortune under Charles, he gained great distinction at the siege of Vannes in 1342. He was knighted and, in 1354, went with the lords of Brittany to England in order to secure the release of his captive master. He gallantly relieved Rennes in 1356, and, by his help, the city held out until the truce of Bordeaux, 1357. He soon took service under the French king and, after several brilliant actions, was made marshal of Normandy and count of Longueville. In 1370, he was made constable of France and, for ten years, was active and successful in driving the English from the south and west of France. In 1373, he seized and held most of the strongholds in the duchy of Brittany. Died, 1380.

Dumas (*dü'mä'*), **Alexandre, the Elder,** French novelist and dramatist, was born in Villers Cotterets, 1802, son of General Dumas, a creole. After his father's death in 1806, he led for a time a desultory life until, driven by poverty, he went to Paris to seek his fortune. He early made his mark in literature and became perhaps the most prolific and widely read story-teller in the world. His capacity for production was prodigious, and in addition he employed assistants to write portions of books under his direction. In all, he was responsible for nearly 300 closely printed volumes, including a series of historic romances, or "Chronicles of France," comprising nearly 100 volumes.

Dumas reached the climax of his fame in *Monte Cristo* in 1844 and in *The Three Musketeers,* which followed soon after. His creative faculty was greater than his artistic genius, although he found many admirers among cultured readers. Besides producing novels, he was a forceful writer of romantic drama, and, by his *Antony* in 1831, he introduced the modern social play. He was unhappy in his marriage, and he squandered his enormous earnings in reckless extravagance. His last years he spent at Dieppe, broken in health and impaired in intellect, ministered to by his son and his daughter. Died, 1870. See *Three Musketeers, The.*

Dumas, Alexandre, the Younger, French dramatist, was born in Paris in 1824. He was an illegitimate son of the preceding, and, like him, became a distinguished novelist and dramatist. After a neglected and bitterly unhappy childhood, he became the companion and literary associate of his brilliant but Bohemian father, whose bankruptcy in 1848 left the son penniless, facing a debt of 50,000 francs. He then renounced his unfortunate associations; vividly described the world in which he had been living in a celebrated novel, *La dame aux camélias;* and devoted himself industriously to authorship. He won both fame and fortune.

By dramatizing *La dame aux camélias* in 1852, he popularized the realistic study of social problems which has profoundly modified all subsequent drama. He created the so-called problem play, of which he wrote a notable series beginning with *Le demi-monde* in 1853 and including *Le fils naturel, La question d'argent, La femme de Claude, Monsieur Alphonse, Une visite de noces,* and his celebrated *L'Etrangère,* in which Sarah Bernhardt, Coquelin, and Mounet-Sully played.

As a moralist, Dumas took himself very seriously, and his dramas with their incisive prefaces are frank and forceful social sermons. As a dramatist, he possessed great gifts, and, with Augier and Sardou, whom he excelled in purposefulness and vigor, he dominated the French drama during the latter half of the 19th century. His novels and poems are relatively unimportant. In 1874, he was elected to the French academy. Died near Paris, 1895.

Dumas, Jean Baptiste, French chemist, was born at Alais, 1800. He was apprenticed to an apothecary in Geneva, and engaged in some scientific investigations that attracted the attention of De Candolle and Prévost. In 1821, he went to Paris, where he became professor of chemistry in the Athenæum, afterward at the Sorbonne, and was made a member of the academy of sciences. His researches on atomic weights, sulphuric ether, and the law of substitutions in organic compounds attracted the attention of all Europe. In 1848, he was a member of the Legislative Assembly and, in 1849–51, held the portfolio of agriculture and commerce. After the *coup d'état,* he was made a member of the Senate. Died at Cannes, 1884.

Du Maurier (*dü mō'ryā'*), **George Louis Palmella Busson,** British artist and novelist, was born in Paris in 1834 and was educated in London, Belgium, and the Netherlands. For many years, he was a valuable art contributor to *Punch,* at the same time illustrating many other books and magazines. His mode of satirizing the extravagances of the so-called æsthetic school and other society foibles procured for him a high reputation. In 1891, he published the novel *Peter Ibbetson,* followed in 1894 by *Trilby,* which was a great success and was dramatized in both England and America. In 1896, he published *The Martian.* Died in London, 1896. See *Little Billee.*

Dumouriez (*dü'mōō'ryā'*), **Charles François,** French general, was born at Cambrai, 1739; entered the army in 1757; and served in Germany during the Seven Years' war. In 1791, he became lieutenant general in the army of the north, commanded by Marshal Luckner. A winter campaign in Belgium followed, and, in 1792, he overthrew the Austrians at Jemappes. The campaign of 1793 aimed at the complete conquest of the Netherlands, but at Neerwinden he sustained a severe defeat from the Austrians under Coburg, with whom he entered into a plot to restore the monarchy. Reports of his meditated treason reached the government at Paris and an order of arrest was issued against him, but he escaped across the border. A reward of 300,000 francs was set upon his head, but, after wandering through many countries of Europe, he finally settled in England, where he died an exile in 1823.

Dunant (*dü'năN'*), **Jean Henri,** Swiss philanthropist, was born in Geneva, 1828. While visiting the scene of the battle of Solferino, he determined to found a society for aiding wounded soldiers. The result was the establishment of the Red Cross society. He wrote *Un souvenir de Solferino* in 1862 and lectured, advocating relief in war. These efforts led to the Geneva convention in 1864 and, after the co-operation of ten governments had been secured, the international Red Cross society was officially established. In 1901, he shared the first Nobel peace prize with Frédéric Passy. Dunant devoted his entire fortune to the establishment and support of various charities. His published works include *Fraternité et charité internationales en temps de guerre, L'esclavage chez les musulmans et aux Etats-Unis de l'Amérique,* and *La rénovation de l'Orient.* Died in 1910.

Dunbar, Paul Laurence, American poet of the African race, was born at Dayton, Ohio, 1872. After graduation at the Dayton high school in 1891, he worked as an elevator boy, mechanic, and journalist. In 1897, he was employed on the staff of the Congressional library, resigning in 1898 to give his attention entirely to literary work. His earliest volume of poems appeared under the title of *Oak and Ivy;* but his poetical genius was first introduced to American readers by W. D. Howells, who contributed an introduction to his *Lyrics of Lowly Life,* published in 1896.

Dunbar's dialect poems of the soil form a distinctive contribution to American literature and fairly entitle their author to leadership as the poet of his race in America. Besides the foregoing, the volumes of verse entitled *Majors and Minors, Poems of the Cabin and Field, Lyrics of the Hearth Side, Candle Lightin' Time, Lyrics of Love and Laughter, Li'l Gal,* and *Lyrics of Sunshine and Shadow* were collected in his *Complete Poetical Works,* published in 1913. Died at Dayton, 1906.

Dunne, Finley Peter, American humorist, was born in Chicago, 1867, and, after a public school education there, entered newspaper life as a reporter in 1885. He served on various Chicago papers and first attracted attention by sketches in which he passed humorous comment upon topics of the day in the crisp Irish brogue of one Martin Dooley, a publican of the great Chicago thoroughfare, Archey road. His *Mr. Dooley in Peace and War* was widely read in America and England and established his rank among the foremost present day American humorists. His works include also *Mr. Dooley in the Hearts of his Countrymen, Mr. Dooley's Philosophy,* and *Mr. Dooley Says.*

Dunsany (*dŭn-sā'nĭ*), **Edward John, Lord,** Irish author, was born at London, 1878. He was educated at Eton and Sandhurst; took part in the South African war; and was wounded in the World War. His books include *The Gods of Pegana, Tales of Wonder,* and *Tales of Three Hemispheres.* Among the dramas of his authorship are *The Glittering Gate, A Night at an Inn, The Laughter of the Gods, The Prince of Stamboul, A Good Bargain,* and *If.*

Duns Scotus (*dŭnz skō'tŭs*), **John,** Franciscan monk and divine, one of the greatest thinkers of the middle ages, was born about 1265. He appears to have been educated at Oxford, where, in 1301, he became professor of theology. He afterward removed to Paris and then to Cologne. Duns Scotus, as one of the most eminent of the Franciscans, was a chief opponent of the teachings of the Dominicans, the two parties representing at that time two different schools of theology. He was also a chief advocate of realism as opposed to nominalism. For his defense of the doctrine of the immaculate conception, since declared a dogma of the Roman Catholic Church, he was styled "*doctor subtilis.*" His writings comprise many volumes. Died, 1308.

Dunstable, John, English composer, was born probably at Dunstable, Bedfordshire, about 1370. A three-part song, *O Rosa Bella,* was his only known surviving work until about 1900, when several of his compositions were discovered in the libraries of Oxford, London, Bologna, and Modena. The most important discovery was that by Haberl, of six volumes of manuscript in the cathedral library at Trent, which included masses, motets, and antiphones; also French and Italian songs with instrumental accompaniments.

These reveal a high development of musical art in England during the early part of the 15th century. Dunstable died in 1453 and was buried at Saint Stephen's in London.

Dunstan (*dŭn'stăn*), **Saint,** English prelate, was born at Glastonbury about 925. Under several kings, he wielded great influence. He was made archbishop of Canterbury in 959 by Edgar. On Edgar's death, he raised Edward to the throne, but, on the accession of Ethelred, his power was broken. Dunstan built up the power of the Church; introduced the Benedictines into England; and manifested sagacity and farsightedness in matters of state. Died 988.

Du Pont, (Thomas) Coleman, American manufacturer, was born at Louisville, Ky., in 1863. Educated as an engineer at the Massachusetts institute of technology, he engaged in coal mining, steel manufacturing, street railway operation, and the manufacture of explosives, serving as president of the E. I. du Pont de Nemours Powder Company, 1902–15, during which time the company's annual income increased from 10 million to 200 million dollars. Du Pont purchased a controlling interest in the Equitable Life Insurance Company, erecting the Equitable building, New York City, and operated a chain of famous hotels, including the Waldorf-Astoria, New York City; Bellevue-Stratford, Philadelphia; New Willard, Washington; and Windsor, Montreal. He was made, 1921, a senator from Delaware, to which state he had donated a 4-million dollar highway constructed at his own expense. Ill health led to his resignation in 1928.

His cousin, Pierre Samuel du Pont (b. 1870), became, in 1915, the executive head of the Du Pont Company, which expanded its activities to the manufacture of other products, including rayon, ammonia, varnishes, paints, celluloid, dyes, and industrial alcohol. This company was the controlling interest in the re-organization of the General Motors Corporation, 1920, a merger of about 60 automobile companies. He donated over $4,500,000 for the building of public schools in Delaware.

Dupré (*dü'prā'*), **Jules,** French painter, was born at Nantes in 1812. He studied in Paris and formed a fast friendship with Rousseau who greatly influenced his style of painting. He became one of the foremost landscape painters of the Barbizon school and excelled in portraying the terrible and the tragic aspects of nature. His "Old Oak," "Hay Wagon," "Summer," and "Midday" are in the Metropolitan museum, New York. The Walters gallery, Baltimore, contains "A Bright Day," "Sunset on the Coast," and "At Sea." Died, 1889.

Duran (*dü'răN'*), **Carolus,** was the name adopted by Charles Auguste Emile Durand, French portrait painter, who was born at Lille, 1838. His first important work, "The Evening Prayer," was painted in 1863 at Rome. In 1866, he produced "The Assassination," which displayed much dramatic power. Duran's chief works are likelife portraits of women and children, painted with fine handling of color and draperies. Died, 1917.

Durand, Asher Brown, American painter and engraver, was born at South Orange, N. J., 1796. Early in life he became an apprentice of the engraver Maverick, with whom he later formed a partnership. His engravings of Trumbull's "Declaration of Independence" and of Vanderlyn's "Ariadne") brought him wide reputation. After 1841, he painted landscapes chiefly and, with Thomas Cole, founded the American school of landscape painting. His "Mountain Forest," in the Corcoran gallery, Washington, and "In the Woods," in the Metropolitan museum, New York, are among his best landscapes. Died, 1886.

Durant, William Crapo, American automobile manufacturer, was born at Boston in 1861. He organized the Durant-Dort Carriage Company at Flint, Mich., in 1886, a corporation which reached a yearly output of 150,000 carriages. In the years following 1904, he organized the Buick Motor Car Company, the General Motors Company, the Chevrolet Motor Company, and the Durant Motors, Incorporated. Following a forced resignation from the General Motors Company in 1920, he organized the Durant companies, building the Locomobile, Durant, Star, Flint, and Princeton cars. In 1929, he withdrew from the active management of his automobile properties in order to attend to his speculative interests, which were among the most influential in Wall Street.

Dürer (*dü'rĕr*), **Albrecht,** German artist, was born at Nuremberg in 1471. He was apprenticed to a painter in his native town and, some years later, began designing on wood and engraving on copper. In 1505, he went to Venice, where he formed a friendship with Bellini. Titian and Raphael greatly admired his work. He was much employed by the emperor Maximilian I. In 1520, he went to the Netherlands, and while there he was appointed court painter by Charles V.

Dürer was the most important and the most representative artist that his country has produced. He possessed creative imagination, marked originality, and endless capacity for minute details. He was not only the most prominent engraver of his time but one of the world's greatest engravers. The invention of etching and of printing woodcuts in two colors is also ascribed to him.

Besides portraits, his works include "Crucifixion," Dresden gallery; "Four Pillars of the Church," Munich, said to be the first Protestant picture; "Burial of the Savior" and "Nativity," also at Munich; "Adoration of the Trinity," Belvidere gallery, Vienna; "Adoration of the Magi," Uffizi gallery, Florence; and "Adam and Eve," gallery at Madrid. Died, 1528. See page 1564d.

Duse (*dōō'zā*), **Eleonora,** Italian actress, was born in Vigevano, 1859. She appeared about 1880 on the Italian, chiefly the Roman, stage as leading lady in the plays of Dumas and Sardou, but afterward played parts of greater depth. She earned high praise by her combined force and gracefulness. In 1892, she appeared at Vienna and Berlin and, later, in New York and England. While acting chiefly in tragedies, her versatility enabled her to please in the lighter vein of Dumas's *Francillon* and as the hostess in Goldoni's *Locandiera.* Her later successes included D'Annunzio's *Francesca da Rimini.* Died, 1924.

Duveneck (*dü'vĕn-ĕk*), **Frank,** American painter and sculptor, was born at Covington, Ky., in 1848. He studied at Munich, where he lived over ten years and formed a school of influential artists. After 1881 he spent much of his time in Florence, Italy, although he was also director of the McMicken art school in Cincinnati, Ohio. His style at first was marked by great brilliancy and dash, but later became quiet in color. Representative of his better known works are "A Circassian" and "The Professor." The Cincinnati Museum contains the largest collection of his paintings in America. Died, 1919.

Dvořák (*dvôr'zhăk*), **Antonín,** Bohemian composer, was born at Muhlhausen, Czechoslovakia, 1841. His *Stabat Mater,* first produced in London in 1883, won for him the ear of all Europe. His most ambitious work is orchestral and choral—a cantata, *The Spectre's Bride,* an oratorio, *Saint Ludmilla,* and several operas; also much chamber music and many sacred compositions. His piano music includes the well-known *Humoresque.* In 1892–95, he was director of the national conservatory at New York, where he wrote his beautiful *New World Symphony.* He subsequently lived at Prague, where he died in 1904.

Dwight, Theodore William, American jurist, was born at Catskill, N. Y., in 1822; graduated at Hamilton college, 1840; and studied at Yale law school. In 1846, he was elected Maynard professor of law in Hamilton college, and there he established a law school. In 1858, he was chosen professor of municipal law in Columbia college and founded its school of law, of which he served as warden until 1891. His important publications include *Trial by Impeachment* and, with E. C. Wines, *Prisons and Reformatories in the United States.* Died, 1892.

Dwight, Timothy, American educator and theologian, was born at Northampton, Mass., in 1752 and graduated from Yale, 1769. He became an army chaplain during the Revolutionary war and was minister of Greenfield Hill, Conn., 1783, where he also successfully conducted an academy. In 1795, he was elected president of Yale college, which position he held until his death. His principal works are his *Theology Explained and Defended*; *The Conquest of Canaan,* an ambitious epic poem; and *Travels in New England and New York.* Died, 1817.

Eads (*ēdz*), **James Buchanan,** American engineer, was born at Lawrenceburg, Ind., 1820. He constructed the steel arch bridge over the Mississippi river at Saint Louis, completed in 1874; developed and carried out a plan of deepening the Mississippi by means of jetties; and was engaged, at the time of his death, in planning a ship railway over the isthmus of Tehuantepec. Died at Nassau, Bahama islands, 1887, and was elected to the American hall of fame in 1920.

Eames (*āmz*), **Emma,** American prima donna soprano, was born at Shanghai, China, of American parentage, 1867. In 1891, she married Julian Story, the painter, from whom she was divorced. In 1911, she married Emilio de Gogorza. After studying in Boston, she was a pupil of Marchesi in Paris, 1886–89, where she made her début in grand opera with great success as Marguerite in *Faust,* 1889. She sang regularly in important rôles for many seasons in New York and London after 1903. She resides chiefly at Torre de Campiglioni, Vallombrosa, Italy.

Early, Jubal Anderson, American soldier and lawyer, was born in Franklin county, Va., 1816. He practiced law in Virginia and saw service in the Seminole and Mexican wars. At the opening of the Civil War, he was appointed a colonel in the Confederate army. Proving his ability as a military officer at Bull Run and Williamsburg, he was promoted to the rank of major general and held important commands at Fredericksburg and Gettysburg. In 1864, operating against Sheridan, he was defeated near Winchester and at Fishers Hill, Va., and, in 1865, was routed by General Custer at Waynesboro. He subsequently practiced

law in Richmond and published *A Memoir of the Last Year of the War for Independence in the Confederate States.* Died at Lynchburg, Va., 1894.

Eastlake, Sir Charles Lock, English painter, was born at Plymouth, 1793. From 1809, he studied in the royal academy schools and in Paris. When the *Bellerophon* put into Plymouth, Eastlake took rapid sketches from a shore boat and produced a full-length portrait of Napoleon. From 1817 to 1830, he lived in Rome, executing pictures of banditti and various other subjects. In 1839 appeared "Christ Blessing Little Children," now in the national gallery, London. He was knighted in 1850 and, in 1855, was appointed director of the national gallery. His lectures and inspiring personality did much to advance British art. Died at Pisa, 1865.

Eastman, George, American inventor, was born in Waterville, N. Y., 1854, and was educated in Rochester, N. Y. He carried on a series of experiments in photography, perfecting a process for making dry plates, and, in 1880, began to manufacture dry plates on a small scale. He invented the kodak and entered extensively into its manufacture, becoming head of the Eastman Kodak Company, Rochester, N. Y. He donated to the University of Rochester over 25 million dollars, including over 6 million to the school of music. His benefactions to the Massachusetts institute of technology totaled over 15 million dollars, bringing his donations to the cause of education to an amount exceeding 58 million by 1925. See *Photography.*

Eaton, Timothy, Canadian merchant, was born at Clogher, Ireland, 1835. He emigrated to Canada in 1857 and opened a store at Kirkton, Ont., later at Saint Marys, Ont., and finally in Toronto. The last venture proved eminently successful and his business developed into the largest department store and mail order house in Canada, with branches at Winnipeg, Montreal, and elsewhere. Died, 1907.

Eaton, Walter Prichard, American author, was born at Malden, Mass., 1878. He was graduated at Harvard university in 1900 and entered newspaper work as a reporter for the Boston *Journal,* later becoming dramatic critic for different New York papers and, in 1909, for the *American Magazine.* His published works include *The American Stage of Today, The Idyll of Twin Fires, The Bird House Man,* and *On the Edge of the Wilderness.*

Ebers (*ā'bĕrs*), **Georg Moritz,** German novelist and Egyptologist, was born at Berlin, 1837. He studied jurisprudence at Gottingen and Oriental languages and archeology at Berlin. In 1870, he was made professor of Egyptology at Leipzig. His most important works are *Egypt and the Books of Moses, Through Goshen to Sinai, Uarda, An Egyptian Princess, Homo Sum, The Burgomaster's Wife,* and *The Emperor.* He died at Tutzing, Bavaria, 1898.

Ebert (*ā'bĕrt*), **Friedrich,** first president of the German republic, was born at Heidelberg in 1871. For some years, he was a saddler by trade. Becoming an editor of a Socialist paper, he rose rapidly to a position as head of the Socialist party in Germany. In 1919, he was elected president of the German republic, in which capacity he exerted his influence for a general policy of moderation. Died, 1925.

Ebner-Eschenbach (*āb'nĕr-ĕsh'ĕn-bäĸ*), **Marie, Baroness von,** Austrian novelist and poet, was born in Moravia, 1830. Her first publications, a drama and some comedies, are now unimportant. Her fame rests on her prose fiction, which was begun in *Erzählungen* in 1875 and was continued in *Lotti die Uhrmacherin, Alte Schule, Agave,* and *Die arme Kleine.* She wrote also a popular collection of *Aphorismen* and *Parabeln, Märchen und Gedichte.* She became the foremost German woman writer of the day, possessing remarkable power of description, keen humor, and polished precision of style. Her novels are notable for their psychological insight and for the exact sense of proportion in their construction. Died, 1916.

Echegaray (*ā'chā-gā-rī'*), **José,** Spanish dramatist, was born in Madrid, 1832. He was educated in Madrid, and, after a brief experience as an engineer, he was appointed professor of mathematics in Madrid. Becoming interested in politics, he took an active part in the revolution of 1868 and served as minister of education and finance for seven years. Upon the restoration of the monarchy, he withdrew from politics and won a reputation in literature.

His first success was with the drama *At the Hilt of the Sword,* which was followed by a long series of tragedies, comedies, and thesis plays. In Spain, he is ranked as the greatest dramatist since Lope de Vega and Calderón, and he occupies a high position among the modern dramatists of the world. Between 1874 and 1905, he produced more than 50 plays, of which *The Great Galeotto, Madman or Saint,* and *Mariana* have become widely known in other countries and were the first to be translated into English. In 1904, he shared with Frédéric Mistral the Nobel prize for literature. Died, 1916. See *Great Galeoto,* page 288.

Eckermann (*ĕk'ĕr-män*), **Johann Peter,** German writer and the literary executor of Goethe, was born in Winsen, Germany, 1792. After serving in the war of 1813-14, he was employed in the war office at Hanover and studied at Gottingen. The publication of his *Beiträge zur Poesie* in 1823 led to his removal to Weimar, where he assisted Goethe in preparing the final edition of his works. He won for himself a lasting name by his invaluable *Conversations with Goethe.* Died at Weimar, 1854.

Eddy, Mary Baker Glover, née Mary Baker, American religious leader, was born in Bow, N. H., in 1821 and was educated at an academy and under private tutors. She was connected at first with the Congregationalist Church. Her first husband, G. W. Glover, died in 1844, one year after their marriage. In 1853, she became the wife of Daniel Patterson. About 1867, she came forward as a healer by means of faith, basing her teaching on the Bible and on the principles that spirit alone is real and that matter and disease are subjective states and delusions.

In 1875, Mrs. Eddy published *Science and Health, with Key to the Scriptures* and, in the following year, organized the Christian Scientist association. In 1877, she married Dr. Asa Gilbert Eddy, having divorced her previous husband in 1873. In 1879, she became the pastor of the "church of Christ, scientist" in Boston and, in 1881, founded there the Massachusetts metaphysical college for the furtherance of her tenets. From this beginning, the Christian Science Church spread widely in America and elsewhere.

Mrs. Eddy was decorated by the French government as an *officier d'academie* in 1907. Besides *Science and Health,* the authoritative book of the faith, she wrote *Unity of Good, No and Yes, Rudimental Divine Science,* and *Manual of the Mother Church.* She died in 1910, leaving her entire fortune to the Church.

Edgeworth, Maria, English novelist, was born at Black Bourton, Oxfordshire, 1767. She began to write fiction early in the 19th century, though she had previously taken an interest in educational topics. Her chief books, which treat mainly of the virtues and vices of humanity, with a high moral aim, embrace *Popular Tales, Moral Tales, Castle Rackrent, Belinda, Ormond, Tales of Fashionable Life,* and an *Essay on Irish Bulls.* Died in Ireland, 1849.

Edgeworth, Sir Tannat William, Australian geologist and physiographer, was born in 1858; educated at Oxford university; and appointed professor of geology in the University of Sydney in 1891. He was connected, as leader or scientific officer, with several notable expeditions, including one to the Ellice islands in 1897, the Shackleton antarctic expedition of 1907–09, and the expedition which discovered the south magnetic pole in 1909. In 1918-19, he was geologist to the British armies on the western front.

Edison, Thomas Alva, American inventor and manufacturer, was born in 1847 at Milan, Ohio, whence his family removed to Port Huron, Michigan, in 1854. He was employed on the Grand Trunk railway when 12 years of age, first as newsboy and later as telegraph operator.

Edison's first important invention was a device by which a telegraphic message could be transmitted automatically from one wire to another without the presence of an operator. It was followed shortly by others, including a vote recorder. The lack of demand for such an instrument led him afterward to investigate the need of any invention before reducing it to a practicable form. His subsequent success in adapting inventions to ready use placed him at the head of those who apply scientific truths to practical ends.

In 1869, Edison came to New York City. He obtained patents for a device making possible quadruplex telegraphy, by which four messages could be transmitted on a wire at the same time. Subsequently, he invented the automatic printing "ticker," for which he received $40,000. He established a laboratory at Newark, N. J., removing in 1886 to Orange, N. J. The long list of his inventions includes the carbon telephone transmitter, the megaphone, the phonograph, the incandescent lamp with a carbon filament, improvements in the cinematograph, and the nickel-iron storage cell, with a high storage capacity for use in propelling vehicles. During the World War, he built and operated several chemical plants for the government. His achievements brought him many honors from scientific societies, and he was made commander of the legion of honor by the French government. See *Moving Pictures, Phonograph.*

Edmund, or **Eadmund,** known also as Ironside, king of the English, was born about 981. He was the son of Ethelred "the Unready," and was chosen king by the Londoners on his father's death, 1016, while Canute was elected at Southampton by the witan. Edmund hastily levied an army in the West, defeated Canute twice, raised the siege of London, and again routed the Danes. Levying a fresh army, he defeated them at Otford—his last victory. At Assandun in Essex, after a desperate fight, he was routed. By a compromise with Canute, the latter retained

Mercia and Northumbria; Edmund received all the south and the headship, the survivor to succeed to the whole. A few weeks later Edmund died, 1016.

Edmunds, George Franklin, American lawyer and statesman, was born at Richmond, Vt., 1828; received a public school education; studied law; and began practicing when 21 years old. He removed to Burlington in 1851. After sitting in the state legislature, 1854–59, he was made a United States senator from Vermont in 1866. He was author of the act to suppress polygamy and to disfranchise those who practiced it, 1882. He resigned the senatorship in 1891; practiced law in Philadelphia; and attained great eminence as a constitutional lawyer. Died, 1919.

Edward, or **Eadward,** "the Confessor," king of the English, was born about 1004, son of Ethelred "the Unready" and Emma, daughter of Richard "the Fearless," duke of Normandy. He was brought up at the Norman court and, after his accession in 1042, showed a preference for Norman customs and ideas. In 1052, Godwine, who had been outlawed, rose in rebellion, and, during the rest of the reign, all real power was in the hands of the house of Godwine. Edward codified the legal usages of the Anglo-Saxons, which thus became known as the "laws of King Edward." Died, 1066.

Edward, Prince of Wales, heir to the throne of Great Britain, was born in 1894 at White Lodge palace, Surrey, England. He was baptized as Edward Albert Christian George Andrew Patrick David. His university course at Oxford was interrupted by the World War, in which he played an active part on the staffs of various divisions of the army. Since the War, he has visited President Coolidge at Washington and his own ranch in Canada. Throughout his several tours of the New and Old worlds, he won popularity everywhere by his democratic affability.

Edward I, king of England, was born in 1239 and succeeded his father, Henry III, in 1272. Imbued with high notions of feudal sovereignty, he sought to establish his supremacy throughout the island of Britain. His expeditions against Llewelyn, prince of Wales, 1282, and against the latter's brother David, 1283, resulted in the reduction of the principality, the government of which he settled by the statute of Wales, 1284. He made a partially successful attempt to conquer Scotland.

A man of strictly legal but somewhat narrow mind, Edward secured order and good government. In his reign, Parliament met regularly for the first time, and to it was conceded the right of levying taxes. Although jealous of his royal prerogatives and cruel to the Jews, he was, on the whole, one of the most able and enlightened rulers of his age. Died, 1307.

Edward II, king of England from 1307 to 1327, son of Edward I, was born at Carnarvon, 1284. In 1301, he was created prince of Wales, being the first heir apparent to the English throne who bore that title. In 1308, he went to France to conclude a marriage with Isabella, daughter of Philip "the Fair," leaving the dissolute Piers de Gaveston in charge at home. The nobles rose against the latter and hanged him in 1312. Two years later, Edward invaded Scotland with an immense army, but was defeated at Bannockburn on June 24, 1314, by Robert Bruce.

The rest of his reign was a succession of disputes with the nobles and with Charles IV of France. Finally his queen and the nobles revolted against him successfully in 1327, and Edward was murdered in Berkeley castle.

Edward III, king of England, eldest son of Edward II and Isabella of France, was born in 1312. He was proclaimed king, 1327, during his father's captivity, and soon after marched with a large army against the invading Scots, but concluded an inglorious campaign by a treaty in which the entire independence of Scotland was recognized. The war was subsequently renewed by Edward, who several times invaded Scotland.

As the son of Isabella, daughter of Philip "the Fair," Edward claimed the crown of France against Philip of Valois. His subsequent invasion of France began the Hundred Years' war. Edward defeated a French fleet off Sluis, defeated Philip at Crecy, and captured Calais. King David of Scotland took advantage of Edward's French campaigns to invade England, but was defeated and captured. Edward then proceeded to ravage Scotland, and his son the Black Prince defeated and captured King John of France in 1356 at Poitiers. Edward's resources were exhausted, however, and he concluded peace with Scotland and France, restoring nearly all his conquests. Died, 1377.

Edward IV, king of England, was born in Rouen about 1442, the son of Richard, duke of York. After the death of his father in 1460, Edward became the head of the Yorkist party, then struggling with the Lancastrians in the civil conflict known as the Wars of the Roses. He was declared king by his party in 1461.

Edward won a victory over the Lancastrian king, Henry VI, at Towton, but, in 1470, he was compelled to flee to Holland. Returning with foreign aid, he won the decisive victories of Barnet and Tewkesbury in 1471, and, on Henry's death a few months later, Edward's rule was generally acknowledged.

The remaining years of Edward's reign were comparatively peaceful. Printing and silk manufactures were introduced into England. The king was debonair and popular, yet he steadily pursued the policy of strengthening the royal power, thereby preparing the way for the absolute monarchy of the Tudors. Died, 1483.

Edward VII, king of Great Britain and Ireland, eldest son of Queen Victoria, was born at Buckingham palace, 1841. He studied at Edinburgh and subsequently at Oxford and Cambridge. In 1860, he visited the United States and Canada; in 1862, traveled with Dean Stanley in the East; in 1863, married the princess Alexandra, eldest daughter of Christian IX of Denmark. He constantly manifested a lively interest in exhibitions, charitable institutions, the housing of the poor, and agriculture. He assisted in promoting the royal college of music, and the imperial institute was founded at his suggestion. On January 22, 1901, he succeeded his mother as Edward VII. By visits to continental capitals, the king did much to allay international animosities and promote peace and good will, especially between Britain and France. Died, 1910.

Edward, the Black Prince, eldest son of Edward III, was born in 1330, and was created prince of Wales in 1343. In 1346, though only a boy, he fought at Crecy, and is said to have won from his black armor his popular title. In 1355-56, he undertook two expeditions in France, the second signalized by the great victory of Poitiers. In 1361, he married his cousin, Joan, the "fair maid of Kent," who bore him two sons, Edward and the future Richard II; in 1362, his father created him prince of Aquitaine; and, in 1363, he departed to take possession of his principality. In 1367, he espoused the cause of Pedro the Cruel and, at Navarrete, won a great victory, taking Du Guesclin prisoner; in 1370, he mercilessly sacked Limoges. Died, 1376.

Edwards, Amelia Blandford, British novelist and Egyptologist, was born in London, 1831. Her first novel, *My Brother's Wife*, 1855, was followed by a dozen others, among them *Barbara's History*, *Debenham's Vow*, and *Lord Brackenbury*. She published also a volume of ballads, and, besides books of holiday travel in Belgium and the Dolomites, *A Thousand Miles up the Nile*, in 1877. Miss Edwards was the founder of the Egyptian exploration fund and contributed papers on Egyptology to the principal European and American journals. She visited the United States in 1889, lectured at a number of places, and received the degree of LL. D. from Columbia university. She died in 1892.

Edwards, Jonathan, American preacher and theologian, was born at East Windsor, Conn., 1703. He was graduated from Yale in 1720 and was tutor there, 1724–26. He accepted an invitation to a church at Northampton, Mass., and was ordained in 1727. Here he labored with intense zeal for more than 23 years, at the end of which period he was dismissed by his congregation. The immediate cause of the rupture was his insistence that no unconverted persons should be allowed to approach the Lord's table.

Edwards was a powerful and impressive preacher; somber, and even gloomy in his religious opinions and sentiments; but earnest, unaffected, and nobly conscientious. His fame as a theologian rests upon his defense and development of the evangelical system. In 1734, a local manifestation of religious enthusiasm took place in his parish, of which he published an account entitled *A Faithful Narrative of the Surprising Work of God in the Conversion of Many Hundred Souls in Northampton*. After his dismissal in 1750, he became a missionary among the Indians of Massachusetts. While residing at Stockbridge, in that state, he composed his famous treatises on the *Freedom of the Will* and *Original Sin*. The former is the most famous American book on theology. In 1757, he became president of Princeton college, but died in the following year. He was elected to the American hall of fame, 1900.

Egan, Maurice Francis, American educator, author, and diplomat, was born in Philadelphia, Pa., 1852; graduated at La Salle college; and was on the editorial staff of McGee's *Illustrated Weekly*, the *Catholic Review*, and *Freeman's Journal*. He became professor of English literature at the University of Notre Dame in 1888 and, in 1895, at the Catholic University of America. He was later a lecturer at Johns Hopkins university and at Harvard. His publications include *A Garden of Roses*, *Modern Novelists*, *Lectures on English Literature*, *A Marriage of Reason*, *The Flower of the Flock*, *The Chatelaine of the Roses*, *In a Brazilian Forest*, *The Watson Girls*, *Belinda*, *Everybody's St. Francis*, and *Ten Years on the German Frontier*. In 1907, he was appointed United States minister to Denmark and served until 1918. In the following year, he was elected to the American academy of arts and letters. Died, 1924.

Eggleston (*ĕg"lz-tŭn*), **Edward,** American author, was born at Vevay, Ind., 1837. He became a Methodist preacher in 1856 and subsequently edited for various periods the

New York *Independent* and *Hearth and Home*. In 1879, he retired from the ministry and devoted himself entirely to literature. Among his best-known books are *The Hoosier Schoolmaster*, *The Circuit Rider*, *Pocahontas and Powhatan*, *History of United States*, and *The Transit of Civilization*. Died at Lake George, N. Y., 1902. See *Shocky*.

Ehrlich (ār'lĭĸ), **Paul,** German physician, was born in Strehlen, Silesia, 1854. He was educated at Breslau, Strasbourg, Freiburg, and Leipzig, graduating in medicine in 1878. In 1885, he became assistant in the university clinic at Berlin and, in 1890, was appointed professor in the university. In 1896, he was made director of the royal institute for experimental therapeutics at Frankfort.

Ehrlich made important researches in the histology of the blood, in immunity reactions, and in cancer; greatly improved the technique of serum propagation; and devised a valuable method of staining nerve tissue for microscopic study. His greatest achievement was the discovery of salvarsan and neo-salvarsan, arsenic compounds of marked efficacy in the treatment of certain blood diseases. For his remarkable contributions to medicine he received honorary degrees from Gottingen, Chicago, and Oxford, and many orders and decorations. In 1908, he was awarded the Nobel prize for medicine with Elie Metchnikoff. Died, 1915.

Eichelberger (īĸ'ĕl-bĕrĸ'ĕr), **William Snyder,** American astronomer, was born in Baltimore, Md., 1865, and graduated from Johns Hopkins, 1891. He was assistant in the *Nautical Almanac* office, 1889–90, and 1896–98; instructor in mathematics and astronomy, Wesleyan university, Conn., 1890–96; and computer in the United States naval observatory, 1898–1900. He was appointed professor of mathematics for the United States navy, 1900, and was in charge of the United States eclipse stations at Fort de Kock, Sumatra, 1901, and at Daroca, Spain, 1905. In 1910, he became director of the *Nautical Almanac*.

Eiffel (ī'fĕl'), **Alexandre Gustave,** French engineer, was born at Dijon, 1832, and early gained a reputation for bridge construction. He constructed the iron bridge over the Garonne at Bordeaux in 1858, and was one of the first to utilize air caissons. The bridge over the Douro at Oporto, the great viaduct of Garabit in Cantal, and that over the Tardes near Montluçon were designed by him. In the huge framework erected by him for Bartholdi's statue of Liberty may be seen the germ of the iron Eiffel tower, 984 feet high, erected in 1887–89 on the Champ de Mars in Paris at a cost of $1,000,000. In 1893, he was condemned to a fine and imprisonment for breach of trust in connection with the Panama canal works, but the sentence was annulled by the court of cassation. Died, 1923.

Einhard (īn'härt), or **Eginhard** (ā'gĭn-härt), Frankish scholar and biographer of Charlemagne, was born at Maingau in east Franconia about 770. He was sent to the court of Charlemagne, where he became a pupil of Alcuin and a favorite of the emperor. Louis, successor of Charlemagne, continued his father's favor. Einhard's *Vita Caroli Magni* is the greatest biographical work of the middle ages. He died about 840, and was buried beside his wife, Emma, whom a baseless tradition makes a daughter of Charlemagne.

Einstein (īn'stīn), **Albert,** physicist, was born in Germany, 1874, of Jewish parentage. At the age of 16, he went to Switzerland and became a naturalized citizen. He early displayed a genius for mathematics and, after graduating at the University of Zurich, became a professor of theoretical physics there. In 1914, he was called to Berlin. He was given a stipend to enable him to devote himself exclusively to investigative work and was made director of the Kaiser Wilhelm academy for research. In 1923, he accepted the chair of physics at the University of Leiden.

Einstein propounded in 1905 the so-called theory of relativity, which he generalized in 1915. This theory is regarded as the most important contribution to physics since the discoveries of Isaac Newton. He also devised a satisfactory explanation of the phenomenon known as the Brownian movement in liquids, and he made valuable contributions to the quantum theory. In 1921, he received the Nobel prize award in physics. See *Relativity*, page 929.

Einthoven, Willem, Dutch physiologist, was born in Java, Dutch East Indies, in 1860. He became professor of physiology at the University of Leiden. He devised an electrical instrument for measuring the action of the heart. For his researches in this field, he was the recipient of the Nobel prize for medicine in 1924. Died, 1927.

Elgar (ĕl'gär), **Sir Edward William,** English musician and composer, was born at Broadheath, near Worcester, 1857. He received his education at Littleton house and studied privately, devoting himself to the violin and the organ. He became conductor of the Worcester instrumental society in 1882 and succeeded his father as organist at Saint George's, 1885. His first works, *The Black Knight*, *Lux Christi*, *Te Deum*, and *Caractacus*, gave him wide recognition. He was selected to write, for the Birmingham festival of 1900, an oratorio, *The Dream of Gerontius*. This met with notable success and placed him in the front rank of living English composers. He was knighted in 1904 and, from 1905 to 1908, was professor of music in the University of Birmingham. Among his later works are *The Apostles*, *The Kingdom*, *Froissart*, *Cockaigne*, *In the South*, *Carillon*, *Polonia*, and *Falstaff*.

Elgin (ĕl'gĭn) **and Kincardine** (kĭn-kär'dĭn), **James Bruce, Earl of,** was born in London, 1811. He succeeded his father, the seventh earl, who, in 1812, brought from Athens the Elgin marbles. As governor of Jamaica, 1842–46, and as governor-general of Canada, 1847–54, he displayed great administrative abilities. While on his way to China in 1857, as plenipotentiary, he heard at Singapore of the Indian mutiny, and diverted the Chinese expedition thither—thus delaying his own mission, which, after some military operations and diplomacy, issued in the Treaty of Tientsin in 1858. He also negotiated a treaty with Japan. On his return to England, he became postmaster-general. In 1860, he was again in China to enforce the treaty, and, in 1861, became governor-general of India, where he died, 1863.

Eliot, Charles William, American educator, was born at Boston in 1834 and was graduated from Harvard university in 1853. He taught mathematics and chemistry at Harvard and, in 1863, went to Europe to study chemistry and to investigate the educational institutions of that continent. In 1865, he was chosen professor of analytical chemistry in the Massachusetts institute of technology, which post he filled for a period of four years.

In 1869, Eliot succeeded Thomas Hill as president of Harvard, and continued at its head until 1909, when he became president emeritus. During his administration, many notable changes in the government of the university occurred; its scope was broadened, and there was a great increase in the number of its professors and students. By gifts and benefactions, its wealth was greatly increased. The elective system as now known to American education was devised and developed by him. He also became widely known as a speaker and writer on educational subjects, and, after 1909, devoted much attention to the cause of international peace.

Besides numerous addresses and chemical memoirs, he published in conjunction with F. H. Storer a *Manual of Inorganic Chemistry* and a *Manual of Qualitative Chemical Analysis*. Later he published *American Contributions to Civilization*, *Educational Reform*, *More Money for the Public Schools*, *John Gilley*, *The Happy Life*, *Four American Leaders*, *The Durable Satisfactions of Life*, and *The Road Toward Peace*. Died, 1926.

Eliot, George, is the pen name of Mary Ann Evans, English novelist, who was born at Arbury, in Warwickshire, 1819. She received an ordinary school education but later became very proficient in Latin, German, and the higher mathematics. She began her literary career by a translation of Strauss's *Life of Jesus*, and became, in 1851, an assistant editor of the *Westminster Review*. During this time she formed the acquaintance of George Henry Lewes, with whom she subsequently lived as wife, though unmarried, and who, it would seem, discovered her latent faculty for fictional work.

Her first work in fiction was *Scenes of Clerical Life*, contributed to *Blackwood's* in 1857. The stories proved a signal success, and encouraged the production of a series of novels, beginning in 1859 with *Adam Bede*, which attained great popularity and at once secured for the writer undisputed rank with the eminent novelists of the day. This was followed in 1860 by *The Mill on the Floss*, which amply sustained the high reputation of the writer, and in 1861 by *Silas Marner*, a tale which is perhaps the most perfect of any of this series. In 1863, *Romola* appeared; *Felix Holt* was published in 1866 and *Middlemarch* in 1872; *Daniel Deronda* and *Impressions of Theophrastus Such* appeared later. These, with two volumes of poems, make up her works. Lewes died in 1878. In 1880, George Eliot formally married an old friend, John Cross. She died in the same year. See *Mill on the Floss*, *Silas Marner*.

Eliot, John, the "Indian apostle," was born probably at Widford, Herts, England, in 1604. He was graduated from Jesus college, Cambridge, in 1622. After his ordination in the Church of England he left the country for conscience' sake, and, in 1631 landed at Boston. Next year he settled at Roxbury, and, in 1646, began to preach in the native dialect to the Indians at Nonantum. Shortly afterward, he established his converts in regular settlements, and in England a corporation was founded in 1649 for propagating the gospel among the Indians of New England.

In 1674, the number of "praying Indians" was estimated at 4000, but the decay of the "praying towns" was rapid after King Philip's war in 1675, in which the converts suffered equal cruelties at the hands of their countrymen and of the English. Eliot assisted in preparing an English metrical version of the psalms, *The Bay Psalm-Book*, the first book printed in New England. His greatest work was the translation of the Bible into the Indian tongue. He died at Roxbury in 1690.

Elizabeth, queen of England from 1558 to 1603, was born at Greenwich palace in 1533. She was the daughter of Henry VIII and Anne Boleyn; she was scarcely three years of age when her mother was beheaded, and only 13 at the death of her father. As Princess Elizabeth, she had the advantage of the best teachers and masters, especially under the supervision of Catharine Parr, the last of Henry's queens.

Elizabeth was in her 26th year when she obtained the crown. Her first act was to release the imprisoned Protestants and to re-establish Protestantism. Next she concluded a peace with France and Scotland, entering into an undertaking with the Reformers in the latter country to protect them from the Catholics. In her own country, while zealously maintaining Protestantism and severe in her proceedings toward those of her subjects who adhered to the formerly established religion, she was not less severe toward the Puritans, who were the most Protestant of all the sects.

Very early in her reign Elizabeth was troubled by the pretensions of the friends of Mary Queen of Scots, who was now the next heir to the throne. As Mary was a zealous Catholic, the counselors of Elizabeth were anxious that she should marry in order to secure the Protestant succession. She finally refused to marry, though it is believed that she would have accepted her favorite, the earl of Leicester, for a husband, if she had not been prevented by her counselors. In 1586, the Babington conspiracy was formed, the object of which was to re-establish the papacy and to set Mary Queen of Scots on the throne of England. It led, however, only to the execution of Mary after she had been imprisoned in England for 19 years.

In 1588, Elizabeth had to contend with a more formidable enemy in Philip II of Spain, who avowed his resolution to annihilate Protestantism, but his threatened invasion of the country was prevented by the defeat and destruction of the armada. At the close of her reign, which lasted for 45 years, England was stronger and greater than it had ever been before. To this reign belong the discoveries of Hawkins, Drake, and Sir Walter Raleigh. Spenser, Shakspere, and Bacon belong also to the Elizabethan age. She died in 1603.

Elliot, Daniel Giraud, American naturalist, was born in New York, 1835. He studied zoology and traveled extensively in Europe, Africa, Palestine, and Asia Minor, as well as in North America and South America. He led an expedition into the interior of East Africa in the interest of the Field Columbian museum, 1896, and into the recesses of the Olympic mountains, 1898, being the first naturalist to penetrate that little-known range. He was a member of many learned societies and was decorated by several European governments for his achievements in natural science. His publications include *Monograph of the Pittidæ, or Ant-Thrushes*; *New and Heretofore Unfigured Birds of North America*; *The Phasianidæ, or Pheasants*; *Paradiscidæ, or Birds of Paradise*; *The Felidæ, or Cats*; *Bucerotidæ, or Hornbills*; and *Shore Birds of North America*. Died in 1915.

Elliott, Maxine, is the stage name of Jessie Dermot, American actress, who was born in Rockland, Me., 1871. She received a convent education and married George A. McDermott, from whom she was divorced in 1896. In 1898, she married Nathaniel C. Goodwin, but was divorced in 1908. She made her début with E. S. Willard in small parts, 1890; soon afterward, played leading parts in Rose Coghlan's company; and was under Augustin Daly's management, playing leading rôles for two seasons. In 1898, she became leading woman in Nat Goodwin's company and later appeared in *Her Own Way*, *Her Great Match*, and other light comedies. She became owner and manager of the Maxine Elliott's theater, New York, in 1908, where she has starred in many plays, including *The Chaperon* and *Deborah of Tods*.

Ellis, Henry Havelock, English scientist and literary scholar, was born in Croydon, Surrey, 1859. He was educated for a medical career. After teaching in Australia, 1875–79, he practiced medicine in England for a brief period and then devoted himself exclusively to literary and scientific work. His researches have been chiefly in the psychology and sociology of sex. His scientific works include *The Criminal*; *Man and Woman*; and a monumental work on the psychology of sex, including the volumes entitled *Sexual Inversion*, *The Evolution of Modesty*, *Sexual Selection in Man*, *Erotic Symbolism*, and *Sex in Relation to Society*. Among his other works are *The New Spirit*, *A Study of British Genius*, *The World of Dreams*, *Kanga Creek*, and *The Dance of Life*.

Elman, Mischa, Russian violinist, was born at Talnoje, 1891. He displayed precocious musical talent, and, at the age of five, he was taken to Odessa, where he studied five years with Fidelmann. In 1902, Leopold Auer prevailed upon the czar to suspend, in his case, the rule barring Jewish pupils from the imperial conservatory at Petrograd. Here he continued studying for two years under Auer with great success. He made his first appearance in concerts in 1904, at the age of 13, and was immediately acclaimed a violinist of the first rank. He made his first visit to the United States in 1908 and thereafter made frequent concert tours with increasing popularity.

Elphinstone (*ĕl'fin-stŭn*), **Mountstuart,** British statesman and historian, was born in 1779. He was educated at Edinburgh and Kensington, and entered the Bengal civil service in 1795. He served with distinction on Wellesley's staff, and was appointed resident at Nagpur in 1804. In 1808, he was sent as envoy to Shah Shuja at Kabul. As resident at Poona, 1811–19, he ended the Mahratta war of 1817 and organized the newly acquired territory. During his governorship of Bombay, 1819–27, he founded an improved system of administration and greatly advanced public education. He returned to England in 1829, and, declining the governor-generalship of India, he lived in comparative retirement. His valuable *History of India* appeared in 1841. He died in 1859.

Ely (*ē'lĭ*), **Richard Theodore,** American economist and educator, was born in Ripley, N. Y., 1854. He was graduated from Columbia in 1876 and received the degree of doctor of philosophy, Heidelberg university, 1879. He was professor of political economy, Johns Hopkins university, from 1881 to 1892, when he was appointed professor of political economy, University of Wisconsin. He retired with the title of honorary professor in 1925. In 1904, he founded and became director of the American bureau of industrial research. He was one of the earliest professional economists to hold that government interference with economic affairs is not always an evil and to advocate state or national regulation.

His extensive writings include *French and German Socialism in Modern Times*, *Introduction to Political Economy*, *Monopolies and Trusts*, *Labor Movement in America*, *Problems of To-day*, *Social Aspects of Christianity*, *The Coming City*, *Studies in the Evolution of Industrial Society*, and *World War and Leadership in a Democracy*.

Emanuel I (*ĕ-măn'ū-ĕl*), king of Portugal, called "the Great" or "the Fortunate," was born in 1469, and became king in 1495. His reign is known as the golden age of Portugal. He prepared the code of laws which bears his name, and made his court a center of chivalry, of art, and of science. Vasco da Gama's voyage round the Cape of Good Hope, Cabral's discovery of Brazil, and the expeditions of Albuquerque and others that so widened Portuguese possessions were all authorized and encouraged by Emanuel. He died at Lisbon, 1521.

Emerson, Harrington, American efficiency engineer, was born at Trenton, N. J., 1853. He studied at the royal Bavarian polytechnic school, 1872–75, and in universities in Italy and Greece, 1875-76. He was professor of modern languages, University of Nebraska, from 1876 to 1882, after which he engaged in banking and land business until 1896. He was president of the Emerson Company, efficiency engineers, from 1900 to 1923. He examined many industrial plants and mines in the United States, Mexico, and Canada, 1896–98; established long distance mail routes in Alaska, 1898–1901; made reports on coal deposits on the western coast of North America; and indicated the route largely followed by the war department in laying the Alaskan cables. The success of the efficiency methods which he applied to the Santa Fe railway system won wide recognition. His published works include *Efficiency as Basis for Operation and Wages*, *The Twelve Principles of Efficiency*, and *Lessons in Personal Efficiency*.

Emerson, Ralph Waldo, American essayist, philosopher, and poet, was born at Boston, Massachusetts, May 25, 1803, the descendant of a long line of ministers. After attending the Boston Latin school and receiving his degree in arts at Harvard university in 1821, he taught for a short time in Boston. In 1823, he began to study for the ministry.

In 1829, he married Ellen Louisa Tucker and became minister of the Second church of Boston, a Unitarian congregation. From this ministry he resigned for conscientious reasons in 1832. In December of that year, after the death of his wife, he sailed for Europe. There he made the acquaintance of many English men of letters and began his lifelong friendship with Carlyle.

Emerson returned to America in 1833 and, in the following year, took up his permanent residence at Concord, Massachusetts. In 1835, he married Lydia Jackson. He led a quiet, meditative life, preparing the lectures that he delivered subsequently in Boston and the vicinity, writing essays, and preaching occasionally in various churches.

The year 1836 was signalized in his life by the publication of his tractate *Nature*, perhaps the most important of his works, and by those meetings of a few like-minded thinkers who became known as the transcendental school of philosophy. This year, also, he wrote the memorable "Concord Hymn." In 1837, he delivered his oration *The American Scholar*, which Doctor Holmes pronounced the "intellectual declaration of independence" of America. These two productions strike the keynote of his teachings. He pleaded

for making the individual consciousness and the soul of each man the supreme judge in spiritual matters.

His first series of *Essays* appeared in 1841; the second, in 1844. These met with gratifying success on both sides of the Atlantic. He assisted in founding *The Dial*, the journal of the transcendentalists. In 1846, a collection of his poems was published. His second journey to England, the next year, resulted in the publication of *English Traits* in 1856.

In 1850, he issued the important volume *Representative Men*. A decade later appeared *The Conduct of Life*, which brought into view his exalted moral and ethical principles. Harvard university gave him the degree of doctor of laws in 1866. *Society and Solitude* appeared in 1870. The ripest fruit of his culture was the paper *Sovereignty of Ethics*, which was published in 1878. His last years were spent in revising his unpublished manuscripts and in preparing a complete edition of his works.

Though he was not, in the technical sense of the word, a reformer, his habits and tastes being rather those of a scholar and a man of letters, every earnest movement for the welfare of humanity had his sympathy. One of his greatest services is to have embodied a characteristically American type of thought and feeling. Died, April 27, 1882. See *Representative Men*.

Emin Pasha (*ā'mēn pä-shä'*) was the adopted name of Eduard Schnitzer, who was born at Oppeln, Silesia, in 1840. He studied medicine and, in 1864, went to Turkey, where he became a well-known physician. He learned to speak Turkish and Arabic and adopted Turkish habits and customs. He also adopted the name Emin, which means "faithful one." In 1876, he joined the Egyptian service and proceeded as chief physician to the equatorial province, of which he was made governor in 1878 by "Chinese" Gordon. Here, on the sudden uprising of the Mahdi, he was cut off from the outside world. After great privations, a rescue party from the west coast, led by H. M. Stanley, reached him early in 1888. He refused, however, to return to Egypt and remained only to be deposed by a revolt in 1889, after which he reluctantly abandoned his province. In 1890, he entered the German service and at once made his way again to central Africa. In 1892, at Kinena, in the region of Stanley falls, he was killed by Arabs.

Emmet, Robert, Irish revolutionist, was born at Dublin in 1778, the son of a doctor. He resigned from Dublin university in 1798 in protest against political domination, and was henceforth an ardent partisan of Irish independence. His impulsive patriotism led him in 1803 to make an unsuccessful attack on Dublin castle, but he escaped into Wicklow. He was subsequently captured and executed the same year. His fate is the subject of a poem by Moore.

Empedocles (*ĕm-pĕd'ō-klēz*), Greek philosopher, was born at Agrigentum in Sicily about the middle of the 5th century B. C. He was poet, priest, physician, and philosopher, and followed Pythagoras in his teaching. In philosophy he was an eclectic and endeavored to combine the teachings of the Eleatic school with the doctrine of Heraclitus. He assumed four indestructible elements—earth, air, fire, and water—and two primal causes of all change—"friendship" and "strife," or the uniting and the dividing principle. He was the first to teach that the mind can know only what is akin to it. He is credited with performing various miracles, including the restoration of a girl to life. The date and the manner of his death are unknown. According to a tradition, he threw himself into the crater of Etna.

Encke (*ĕng'kē*), **Johann Franz,** German astronomer, was born at Hamburg in 1791. Entering the University of Gottingen in 1811, he devoted himself to the study of astronomy under Gauss. In 1816, he became assistant in the observatory of Seeberg, near Gotha. In 1817, the Cotta astronomical prize was awarded to Encke for his determination of the orbit of the comet of 1680. This led him to solve the problem of the sun's distance from the earth, and his value of the solar parallax, giving a distance of about 95 million miles, was for a long time accepted as the most accurate known. He showed that the comet discovered by Pons in 1818 revolves around the sun in the remarkably short time of 3.3 years, being identical with those observed in 1786, 1795, and 1805. This comet has ever since been known by Encke's name. In 1825, he was made director of the Berlin observatory. Died in 1865.

Endicott (*ĕn'dĭ-kŏt*), **John,** Puritan governor of Massachusetts, was born at Dorchester, England, about 1588. He settled near Salem as manager of a plantation in 1628; headed an expedition against the Indians in 1636; was deputy governor, 1641–44, 1650, and 1654, and governor from 1644 to 1665, except 1650 and 1654. In 1658, he was president of the united colonies of New England. He died at Boston, 1665.

Endlicher (*ĕnt'lĭĸ-ĕr*), **Stephan Ladislaus,** Hungarian botanist and linguist, was born in Pressburg in 1804. In 1836, he was appointed curator of botany in the museum of natural history, Vienna, and, in 1840, professor of botany and director of the botanic garden of the university. He was a chief founder of the Vienna academy of sciences, made valuable contributions to the study of Old German and classic literature, and published several linguistic works. The most important of his botanical works is his *Genera Plantarum*. Died, 1849.

Ennius (*ĕn'ĭ-ŭs*), **Quintus,** Roman poet, the father of Roman literature, was born at Rudiæ, Calabria, 239 B. C. Cato "the Elder" took him to Rome, where he taught Greek and Latin and gained the friendship of the noblest Romans of his day. He was famous for his learning and his charming conversation. His writings were a poem on Roman history; plays for the theater, many of them adapted from the finest Greek plays; and short poems, a few of which remain. He died in Rome about 169 B. C.

Epaminondas (*ē-păm'ĭ-nŏn'dăs*), Theban general and statesman, was born about 418 B. C., and led a retired life until his 40th year. After the stratagem by which his fellow citizens expelled the Spartans in 379, he joined the patriots, and, when sent to Sparta in 371 to negotiate peace, displayed as much firmness as eloquence. When war was resumed, he received the command, and with 6000 men defeated a much larger force at Leuctra. In 370, with Pelopidas, he marched into the Peloponnesus and incited several of the allied tribes to desert Sparta.

On his return to Thebes, Epaminondas was accused of having retained the supreme power beyond the lawful time, but was acquitted in consequence of his able defense. In 368, war was renewed. After indecisive campaigns he advanced into Arcadia and near Mantinea finally broke the power of Sparta, but was mortally wounded, 362 B. C. Epaminondas was one of the noblest characters in Grecian history. His life was written by Cornelius Nepos.

Epée (*ā'pā'*), **Charles Michel, Abbé de l',** a philanthropic priest, one of the founders of the modern system of instruction for the deaf and dumb, was born at Versailles, France, 1712. In 1765, he began to occupy himself with the education of two deaf and dumb girls. Meeting with success with his system of manual signs, he founded at his own expense, in 1770, an institution for the deaf and dumb which through his labors attained international fame. Died, 1789.

Epictetus (*ĕp'ĭk-tē'tŭs*), Greek Stoic philosopher, who flourished in the 1st century A. D., was born at Hierapolis, Phrygia, and was originally a slave to Epaphroditus, one of Nero's freedmen. Having obtained his freedom, he gave himself up wholly to the study of philosophy. Being banished from Rome with certain other philosophers by Domitian, 90 A. D., he settled at Nicopolis, in Epirus. His pupil Arrian collected the maxims of Epictetus in the work entitled *Encheiridion*.

The peculiar excellence of the writings of Epictetus is simple and noble earnestness. The real, heartfelt love of good and hatred of evil, which are often thought to be exclusively Christian feelings, manifest themselves very beautifully in the philosophy of Epictetus, yet there is no evidence that he knew anything of Christianity. The date of his death is unknown.

Epicurus (*ĕp'ĭ-kū'rŭs*), Greek philosopher, was born about 342 B. C., probably in Samos. His youth was spent in that island, whence he removed to Athens when about 18 years of age. He afterward taught at Colophon, Mytilene, and Lampsacus, but returned to Athens about 306 B. C. He was founder of the Epicurean school, who held that the highest good consists in pleasure. Epicurus was a man of amiable character, to whom his friends and pupils were warmly attached. None of his exceedingly numerous works have been preserved, but the great poem *De Rerum Natura*, by Lucretius, contains the substance of the Epicurean philosophy. Died, 270 B. C.

Epinay (*ā'pē'nĕ'*), **Louise d',** French writer, was born, 1726. In 1745, she formed a close intimacy with Rousseau, and presented him with a small house, the now famous Hermitage, which stood on one of her husband's estates in the woods of Montmorency. An unfortunate jealousy, however, which Rousseau conceived for Grimm, another friend of Madame d'Epinay, was followed by an open rupture with his benefactress. With the assistance of Diderot she carried on Grimm's celebrated *Correspondence with European Courts*. She wrote *Les conversations d'Emilie, Mémoires et correspondence, Correspondence de l'abbé Galiani, Lettres à mon fils*, and *Mes moments heureux*. Died at La Briche, 1783.

Erasistratus (*ĕr-ă-sĭs'trā-tŭs*), Greek physician and anatomist, who flourished in the 3d century B. C. and is said to have been born in the island of Ceos. He was a pupil of Theophrastus and resided for some time at the court of Seleucus Nicator, king of Syria. He founded a school of medicine and wrote several works on anatomy and practical medicine, some fragments of which have been preserved by Galen. Erasistratus was the first anatomist to distinguish between motor and sensory nerves and to trace both sets back to the brain.

Erasmus (*ê-răz'mŭs*), **Desiderius,** Dutch scholar, was born in Rotterdam about 1466. On his parents' death he entered a monastery, which he left to become a teacher at Paris. At the invitation of his pupil Lord Mountjoy, he went to England; settled at Oxford, where he became the friend of More; and studied divinity under Colet and Greek under Grocyn and Linacre. In 1506, he visited Italy, staying at Bologna and Rome, where he was warmly received, but returned to England and became a teacher of Greek at Cambridge. In 1513, he again visited the continent and, after a journey to the low countries, settled at Basel, where he published his edition of the New Testament. Erasmus was in favor of moderate reform in the Church, as is shown by his *Enchiridion Militis Christiani* and *Encomium Moriæ*. Died at Basel, 1536.

Eratosthenes (*ĕr'ă-tŏs'thê-nēz*), Greek geographer and astronomer, was born at Cyrene, Africa, about 276 B. C. He was called to Alexandria by Ptolemy Euergetes to superintend the great library. He measured the obliquity of the ecliptic, and the result at which he arrived, namely 23° 51′ 20″, must be reckoned a very fair observation, considering the age in which he lived. Eratosthenes' greatest claim to distinction is as a geographer, his work on geography being the first scientific treatise on the subject. He knew that the earth was round, and, in order to measure its circumference, he employed some of the means used at the present day. Died about 196 B. C. See *Geographical Discovery: Greeks.*

Erckmann-Chatrian (*ĕrk'măn-shă'trê-ăN'*) (Émile Erckmann and Alexandre Chatrian), two French men of letters, the first of whom was born at Pfalzburg, 1822, the second, in the village of Soldatenthal, 1826. The two friends employed their pens in the same works, which they signed with the two names united in one; it was not until about 1863 that the authors informed their readers that these numerous works of fiction were the fruits of their friendly collaboration.

The story "The Famous Doctor Matthew" was their first success and was followed by a widely popular series of which *Histoire d'un conscrit de 1813*, *L'Ami Fritz*, and *Waterloo* are the best-known. They dramatized *L'Ami Fritz* and wrote another play of merit, *Le juif polonais*, adapted in English as *The Bells*, long one of the most effective plays in Sir Henry Irving's repertoire. Their fiction shows humor, fine character drawing, local color, and patriotic spirit. Erckmann died in 1899; Chatrian, in 1890.

Ericsson (*ĕr'ĭk-sŭn*), **John,** Swedish-American engineer and inventor, was born in Vermland, Sweden, 1803. At the age of 12, he became cadet of engineers, and, at 17, he entered the Swedish army; in 1826, he was promoted captain. In 1828, he constructed a flame engine and went to London to introduce it. He also produced in succession an instrument for sea sounding, a hydrostatic weighing machine, a tubular steam boiler, a steam fire engine, a caloric engine, a pyrometer, and other important devices.

In 1836, Ericsson invented and patented the screw propeller. In 1839, he came to the United States where, in 1841, he designed for the government the screw-propelled warship *Princeton*, the pioneer screw-propeller warship. In 1861, he built for the United States government, in 100 days, the ironclad *Monitor*, which, on March 9, 1862, in Hampton roads, defeated the Confederate ironclad ram *Merrimac*. His scientific investigations included computations of the influences that retard the earth's rotary motion, and the intensity of solar heat. He died in New York, 1889.

Erigena (*ê-rĭj'ê-nă*), **Johannes Scotus,** philosopher and scholar, was born probably of Scottish parents in Ireland during the 9th century. He appears to have resided principally in France at the court of Charles the Bald. He took part in the controversies of his time regarding predestination and transubstantiation. His philosophic opinions were those of a neo-Platonist rather than of a scholastic. He uttered his opinions with boldness, and evinced great subtlety and strength of intellect in their defense. In logic he was a realist and insisted that "authority originates in reason, not reason in authority." His chief work was *De Divisione Naturæ*, a system in which pantheism is everywhere apparent. Died, about 897.

Erskine (*ûr'skĭn*), **Thomas, Lord,** British jurist and orator, was born in Edinburgh, 1750. He entered the army but, seeing little chance of promotion, decided to study law and was admitted a student of Lincoln's Inn, 1775. His rise was immediate and brilliant. Without the advantage of a business training, he rose into practice with unprecedented rapidity. After his first speech, the attorneys actually flocked around him with their retainers. Erskine's good fortune as an advocate was uninterrupted. In 1786, he was made attorney-general to the prince of Wales.

Erskine was a strong Whig and acted for the defense in the political trials of the time, giving his aid to Horne Tooke, Thelwall, and Thomas Paine; his defense of the last named cost him the post of attorney-general. He was now regarded as the defender of popular liberties and constitutional rights. Beginning with 1790, he sat in Parliament as a supporter of Fox; in 1806, he became chancellor under Fox and was raised to the peerage. Died, 1823.

Ervine, Saint John Greer, Irish dramatist and novelist, was born in Belfast, 1883. He went to London at the age of 17 and entered the insurance business, in which he remained until 1913. He has written novels, short stories, essays, and plays and for a brief period was dramatic critic on a daily newspaper. He is one of the members of the Irish literary group who depict life in the cities and small towns, the scenes of his principal plays being located in and around Belfast. He excels in plays of character. His writings include the plays entitled *The Magnanimous Lover*, *Mixed Marriage*, *John Ferguson*, *Jane Clegg*, *The Ship*, *The Wonderful Visit* (with H. G. Wells), and *Mary, Mary, Quite Contrary*; also the novels *Mrs. Martin's Man*, *Changing Winds*, and *The Foolish Lovers*.

Esch, John Jacob, American politician, was born at Norwalk, Wis., in 1861. He was graduated from the University of Wisconsin, 1882, was admitted to the bar, 1887, and immediately began the practice of law at La Crosse, Wis. In 1899, he was elected to Congress and was re-elected for 10 consecutive terms, serving until 1921, when he was made member of the interstate commerce commission. With A. B. Cummins, United States senator from Iowa, he was joint author of the Esch-Cummins bill, which became the Railway Transportation act of 1920.

Espy (*ĕs'pĭ*), **James Pollard,** American meteorologist, was born in Westmoreland county, Pa., 1785. His *Philosophy of Storms*, published in 1841, was commended by the French academy of sciences. Appointed in 1842 to the Washington observatory, Espy laid the basis of the weather bureau and was the founder of modern physical, or theoretical, meteorology. He died in 1860.

Estaing (*ĕs'tăNz'*), **Charles Hector, Count d',** French admiral, was born in Auvergne, 1729. After serving in the army in India, he entered the navy; was made lieutenant general in 1763 and vice admiral in 1777. In 1778, he was placed in command of a squadron sent to aid the United States against England; he captured the island of Grenada, but, failing in his attack on Savannah, 1780, returned to France. In 1792, he was chosen admiral. Notwithstanding his work in behalf of the Revolution, he was condemned as a noble and guillotined, 1794.

Esterházy (*ĕs'tĕr-hă'zê*), **Prince Nicholas,** Hungarian patron of arts and sciences, was born in 1765. He traveled over a great part of Europe and resided for a considerable time in England, France, and Italy. He founded a splendid collection of pictures, which is preserved at the Vienna museum. When Napoleon, in 1809, entertained the notion of weakening Austria by the separation of Hungary, he made overtures to Prince Esterházy respecting the crown of Hungary, which, however, were declined. Haydn composed most of his works at the court of Prince Esterházy. Died, 1833.

Estournelles (*ĕs'tōōr'nĕl'*) **de Constant, Paul Henri Benjamin, Baron d',** French publicist, was born at La Fleche, 1852. He was educated in Paris, where he graduated in law and Oriental languages. He entered the diplomatic service, in which he achieved distinction, being for some time French ambassador to England. In 1895, he became actively engaged in politics, serving as deputy for the Sarthe until 1904, when he was elected senator. He took a prominent part in the peace congresses held at The Hague and elsewhere. In 1909, he was awarded with Auguste Beernaert the Nobel prize for the advancement of peace. Died, 1924.

Ethelbert (*ĕth'ĕl-bûrt*), first Christian king of Kent, England, was born about 552. He was converted in 597 by his wife, Bertha, of France, and by Saint Augustine. Ethelbert gave the English their first written code of laws. He reigned from 560 until his death in 616.

Eucken (*oik'ĕn*), **Rudolf Christoph,** German philosopher, was born at Aurich, East Friesland, 1846. He was educated at the universities of Gottingen and Berlin. In 1871, he was made professor of philosophy at Basel and, in 1874, at the University of Jena. He became a prominent leader of philosophical protest against purely materialistic conceptions of man and life and the tendency to narrow the point exclusively to that of the physical and biological sciences. His emphasis of spiritual interests and the inspirational quality of his writings have given them wide popularity. In 1908, he received the Nobel prize for literature. He was exchange professor at Harvard in 1912-13 and at the University of Tokyo in 1914.

Eucken's writings include *The Fundamental Concepts of Modern Philosophic Thought*, *The Life of the Spirit*, *The Problem of Human Life as Viewed by the Great Thinkers*, *Main Currents of Modern Thought*, *Religion and Life*, and *Can We Still be Christians?* Died, 1926.

Euclid (*ū'klĭd*), Greek geometrician, said to have been a native of Alexandria, in which city he taught mathematics during the reign of Ptolemy Soter about 300 B. C. Euclid

wrote on music, optics, and other subjects; but the work which has immortalized his name in mathematical science is his *Elements*, the basis of all modern textbooks on geometry.

Eugène (*ū'zhĕn'*; Eng., *ū-jēn'*), **François,** usually called Prince Eugène of Savoy, Austrian general, was born in Paris, 1663. He was a son of Eugène Maurice, count of Soissons. His application for a commission in the army of France having been refused, in consequence of a difference between Louis XIV and Eugène's mother, a niece of Cardinal Mazarin, he left France for Vienna and offered his services to the emperor of Austria, in whose court and army he spent the whole of his remaining life.

For 50 years, and under three emperors, Prince Eugène was one of the greatest and most successful of the Austrian generals, and was regarded as one of the most distinguished soldiers of his time. He was also eminent as a statesman, and inaugurated some important reforms in the constitution of the Austrian monarchy. In later life he took much interest in art and learning, and formed a valuable collection of paintings and books. Died, 1736.

Eugénie-Marie de Montijo (*ū'zhā'nē' mà'rē' dĕ mōn-tē'hō*), empress of the French, 1853–70, was born in Spain, 1826. She was the granddaughter of William Kirkpatrick, American consul at Malaga, whose daughter married Count de Montijo, an officer in the Spanish army. Her mother, the comtesse Teba, took her to Paris where she attracted the attention of Louis Napoleon, who had just been crowned emperor. The latter, after the failure of his efforts to enter the circle of European royalty through a dynastic marriage, proposed to the charming young Spaniard, whom he married in 1853.

The empress became the leader of the fashions of Europe and maintained a brilliant court. Not content with her triumphs in this line, she interfered in politics with most disastrous results. She forced on the war with Germany, which she spoke of as "my war," and in many ways her influence was harmful to France. She was appointed regent when Napoleon III went to fight the Germans, and was in Paris when the revolution broke out after Sedan. In 1870, she escaped from the Tuileries and sought refuge in England, where she established her permanent residence at Chislehurst. Died in 1920.

Euler (*oi'lĕr*), **Leonhard,** Swiss mathematician, was born at Basel in 1707. At the age of 16, he received the master's degree from the University of Basel. In 1727, he went to Petrograd, where he became professor of physics and higher mathematics. In 1741, he was called to Berlin by Frederick II to take the chair of mathematics in the academy of sciences. Returning to Petrograd in 1766, he spent the remainder of his life there. His contributions to higher mathematics were exceedingly numerous and valuable, notwithstanding that his later years were spent in total blindness. He died in 1783.

Euripides (*ū-rĭp'ĭ-dēz*), Greek tragedian, was born at Salamis about 480 B. C. The first play of Euripides which was performed was the *Peliades*. In 441 B. C., he gained the first prize for tragedy and continued to write for the Athenian stage until about 409, when he accepted an invitation to reside at the court of Archelaus, king of Macedonia.

In marked contrast to his two great predecessors, Æschylus and Sophocles, Euripides represents the new movements in the Athenian life of the time. His characters, although drawn from the ancient mythology, are treated in a realistic fashion with much psychological subtlety. His sentimentalism, tenderness, romanticism, and skepticism, combined with his exquisite lyrical qualities, made him, in later ages, by far the most popular of the Greek tragic poets. In his own day, however, his merits were the subject of sharp controversy, and he succeeded in winning the first prize in tragedy only five times.

Of his 92 plays, 18 are extant. These include *Alcestis*, *Hecuba*, *Medea*, *Bacchæ*, *Electra*, *The Trojan Women*, *Hippolytus*, and *Iphigenia Taurica*. He is said to have been killed in 406 by dogs, which were set upon him by envious courtiers. See *Iphigenia*.

Eusebius (*ū-sē'bĭ-ŭs*) **of Cæsarea,** ecclesiastical historian, was born in Palestine about 264. He took the surname Pamphili. About 313 he became bishop of Cæsarea, and took a prominent part in the council of Nice. Eusebius was regarded the most learned father of the Early Church, except Origen, and was one of the most voluminous writers of antiquity. His *Ecclesiastical History* relates the principal occurrences in the Christian Church to the year 324. He died about 340.

Eustachio (*ā'ōōs-tä'kyō*), **Bartolommeo,** Italian anatomist, was born about 1510. Little is known regarding his life, but in 1562 he was professor of medicine in the Collegio della Sapienza at Rome. His name is indelibly associated with anatomical science through his discovery of the Eustachian tube of the ear and the Eustachian valve of the heart. He was also the first to give an accurate description of the thoracic duct. Eustachio is regarded as one of the founders of modern anatomy. Died, 1574.

Evans, Sir Arthur John, English archeologist, was born at Nash Mills, England, in 1851; was educated at Oxford and Gottingen universities; and, beginning in 1873, traveled extensively in Europe, pursuing archeological and ethnological investigations. He was imprisoned in 1882 by the Austrian government on the charge of complicity in an insurrection. In 1884, he became keeper of the Ashmolean museum, Oxford, and, after 1893, he was engaged in excavations at Crete, where he discovered a pre-Phœnician script and unearthed the prehistoric palace of Cnossos.

Evans, Mary Ann or **Marian.** See *Eliot, George*.

Evans, Oliver, American inventor, was born at Newport, Delaware, 1755. He was apprenticed to a wheelwright in early youth and soon developed much inventive genius. At 22 he invented a machine for making the wire card-teeth used in carding cotton and wool. In 1779, he entered the milling business with his brothers and soon afterward invented machinery which revolutionized the flour milling industry, enabling the miller to make 20 pounds more to the barrel of finer flour at one-half the former labor cost.

In 1786, Evans asked for a patent on his invention of a steam engine adapted to mill machinery and to a steam carriage. In 1800, he built the first high pressure steam engine, and, in 1803-04, he constructed by order of the Philadelphia board of health the first steam dredge used in the United States. This steam dredge propelled itself on a carriage to the Schuylkill river, near which it was built. This is the first instance of land travel by steam in America. Evans built many steam engines and has been called the "Watt of America." He died in New York, 1819.

Evans, Robley Dunglison, American admiral, was born in Floyd county, Va., 1846. He graduated from the United States naval academy in 1863. In the Civil War he participated in both attacks on Fort Fisher, 1865, and in land attacks received four severe rifle-shot wounds. When in command of the *Yorktown* at Valparaiso, Chile, 1891, his actions in connection with various incidents earned him his popular name of "Fighting Bob." As commander of the *Iowa* in Sampson's fleet off Santiago, he took an active part in battle with Cervera's fleet, July 3, 1898. He was made rear admiral, 1901, and commanded the Asiatic expedition, 1907-08. Died, 1912.

Evarts, William Maxwell, American lawyer and statesman, was born at Boston, Mass., 1818. He was graduated at Yale in 1837 and, in 1841, was admitted to the bar in New York City, where he built up a notable practice. He was chief counsel for President Johnson in the impeachment trial in 1868, and was United States attorney-general to the close of Johnson's administration in 1869. At Geneva, Switzerland, in 1872, he was United States counsel before the Alabama claims tribunal. He was secretary of state, 1877–81, and served as United States senator for the term 1885–91. Died in 1901.

Everett, Edward, American statesman, orator, and scholar, was born at Dorchester, Mass., 1794. He was graduated from Harvard, 1811, and was for some time a Unitarian clergyman. He became professor of Greek at Harvard in 1815; traveled in Europe from 1815 to 1818; was editor of the *North American Review*, 1820–24. From 1824 to 1834, he was a member of Congress; from 1836 to 1840, he was governor of Massachusetts; and, from 1841 to 1845, he was minister to England. He was president of Harvard university, 1846–49; became secretary of state in 1852, and was elected to the United States Senate in 1853. In 1860, he was the candidate of the Constitutional Union party for vice president.

Everett was one of the foremost orators of his time and with his oration on Washington earned nearly $100,000, which he gave to the purchase of Mt. Vernon. The last of his great orations was delivered at Gettysburg in 1863 at the same time with Lincoln's immortal speech. Died at Boston, 1865.

Ewing (*ū'ĭng*), **Sir James Alfred,** Scottish physicist and engineer, was born at Dundee, 1855. He was educated at the University of Edinburgh and was for several years assistant to Lord Kelvin. In 1878, he became professor of mechanical engineering at the University of Tokyo, where he made important studies of earthquakes and devised seismographs to record their vibrations. In 1883, he became professor of engineering at University college, Dundee, and, from 1890 to 1903, he was professor of applied mechanics in the University of Cambridge. From 1903 to 1916 he was director of naval education and then became principal and vice chancellor of the University of Edinburgh.

Ewing conducted many investigations in magnetism and invented a magnetic curve tracer, a hysteresis tester, and a permeability bridge of great service to electrical engineers and steel makers in testing the iron used in making dynamos and transformers. His writings include *Earthquake Measurement*, *The Steam Engine and Other Heat Engines*, *The Strength of Materials*, *The Mechanical Production of Cold*, and *Thermodynamics for Engineers*.

Eyck (īk), **Hubert** and **John van,** two painters of the old Flemish school, were born at Maeseyck between 1350 and 1400. They resided chiefly at Bruges and Ghent, and became the founders of the Flemish school of painting. Tradition credits them with the invention of the modern method of oil painting with a drying varnish, with which they were the first to achieve success. With the exception of his work on their greatest painting, the altarpiece at Ghent, nothing by Hubert has been preserved. Among the important works by John van Eyck are "St. Ursula," Antwerp museum; "Salvator Mundi" and "Man with Pinks," Berlin museum; "Triumph of the Church," Madrid; portrait of John Arnolfini and his wife, London, and a madonna in the Louvre.

Faber (*fā'bĕr*), **Frederick William,** English composer of hymns, was born at Calverley in Yorkshire, 1814; graduated from Balliol college, Oxford; in 1834, was elected a scholar of University college; and, in 1837, became a fellow there. He came under the influence of Newman and, in 1845, after three years' tenure of the rectory of Elton in Huntingdonshire, he adopted Catholicism. He founded a community of converts at Birmingham—"the Wilfridians." With his companions, he joined, in 1848, the oratory of Saint Philip Neri; the next year, a branch under his care was established in London; and, in 1854, he finally located at South Kensington. Faber wrote many theological works; but his fame rests chiefly upon his hymns, such as "The Pilgrims of the Night" and "The Land Beyond the Sea." Died, 1863.

Faber (*fā'bĕr*), **Johann Lothar von,** German manufacturer of lead pencils, was born in 1817 at Stein, Bavaria, where he became the proprietor of a small lead pencil factory. He enlarged the establishment to international proportions, opening branches in France, Great Britain, and the United States. To the manufacture of lead pencils he added that of other writing and drawing materials. He received a patent of nobility and was made a counselor of state for his services to German industry. Died, 1896.

Fabius (*fā'bĭ-ŭs*), **Maximus Quintus,** Roman general, was born about 275 B. C. He was surnamed Cunctator, "Delayer," because, having in 217 been appointed dictator and intrusted with the defense of Italy against the victorious Hannibal, he pursued a course of cautious and patient generalship, now proverbially known as "Fabian policy." He never risked a general engagement with his opponent, but cut off his enemy's supplies and gradually wore him out, in the end meeting with signal success. Before his appointment to the dictatorship he was five times consul. Died, 203 B. C.

Fabre (*fä'br'*), **Jean Henri,** French entomologist, was born at Saint Leons, Aveyron, 1823. He became a teacher in the lycée of Avignon and later professor of physics at the College of Ajaccio. After retiring to Serignan, he produced, 1879–1907, his *Souvenirs entomologiques*, a monumental work on insects in 10 volumes, which was crowned by the French institute. His other scientific works include *La science élémentaire, Notions préliminaires de physique, Astronomie élémentaire, Les serviteurs, La plante, L'Industrie*, and *La vie des insects*. His books contain some of the most interesting discoveries yet made in the life history of insects and have been widely translated into other languages. The following works of Fabre are available in English: *Insect Life, The Life and Love of the Insect, Social Life in the Insect World, The Life of the Spider*, and *The Life of the Fly*. He died in 1915.

Fabricius (*fä-brĭsh'ĭ-ŭs*), or **Fabrizio** (*fä-brēt'syō*), **Hieronymus,** Italian anatomist and surgeon, was born in 1537. He graduated from the University of Padua, where, in addition to the usual instruction in the classics, he studied anatomy and surgery under Fallopius. On the death of the latter in 1562, Fabricius was appointed to fill the vacant professorship. Among his students was William Harvey, who derived from Fabricius' observations on the valves of the veins the first clue to his own discovery of the circulation of the blood. He was a most laborious investigator in comparative anatomy and made comparative studies of the eye, the larynx, the ear, the intestinal canal, the development of the fœtus, and many other subjects. His chief work was his *Opera Chirurgica*. Died, 1619.

Faed (*fād*), **John,** Scottish painter, brother of Thomas Faed, was born at Barley Mill in 1819. He began miniature painting at the age of 12 and, in 1839, attended art classes in Edinburgh, where he settled, painting miniature portraits for 40 years. He later produced many historical and literary subjects. His pictures, many of which have been widely popular as engravings, include "The Cruel Sisters," "Shakespeare and his Contemporaries," "Tam o' Shanter," "Hadden Hall of Old," "The Stirrup Cup," "The Gamekeeper's Daughter," "Blenheim," "The Poet's Dream," and "The Hiring Fair." Died, 1902.

Faed, Thomas, Scottish painter, brother of John Faed, was born at Barley Mill in 1826. He studied art at Edinburgh and, about 1849, executed his attractive work entitled "Scott and his Friends at Abbotsford." In 1852 he removed to London, where his "Mitherless Bairn," exhibited in 1855, was declared by the critics to be "the picture of the season." His subsequent works include "Home and the Homeless," "The First Break in the Family," "Sunday in the Backwoods," "From Dawn to Sunset," "Baith Faither and Mither," "The Last o' the Clan," "Faults on Both Sides," and "Rest by the Stile." His pictures of humble Scottish life are excellent in draftsmanship and have become well known through reproduction as engravings. He was made a member of the royal academy in 1864. Died, 1900.

Fahrenheit (*fä'rĕn-hīt*), **Gabriel Daniel,** German physicist, was born at Danzig, 1686. In 1720, he conceived the idea of using quicksilver instead of alcohol in the construction of thermometers, by means of which the accuracy of the instrument was greatly improved. His method of graduating thermometers, known as the Fahrenheit scale, is in general use in Holland, Great Britain, the United States, and other countries. Died, 1736.

Fairbairn (*fâr'bârn*), **Sir William,** Scottish engineer, was born at Kelso, Scotland, 1789. He was the first to use iron instead of wood in the shafting of cotton mills. He was also among the earliest of iron shipbuilders, and made many improvements in ship construction. Fairbairn built the tubular bridge across the Menai strait, after a plan of Robert Stephenson's; also the Britannia and Conway bridges, and many other bridges. He also devised improvements for steam boilers and other steam machinery. In 1869, he was made a baronet and also a chevalier of the legion of honor. He published many works and papers on iron, bridges, boilers, and mills. Died in 1874.

Fairbanks, Arthur, American educator and author, was born in Hanover, N. H., 1864. He graduated from Dartmouth college, 1886; studied also at Yale divinity school, Union theological seminary, Berlin, and Freiburg. He was professor of Greek literature and archeology at the University of Iowa, 1900–06; professor of Greek at the University of Michigan, 1906-07; and director of the Boston museum of fine arts, 1907–25. His publications include *Introduction to Sociology, First Philosophers of Greece, A Study of the Greek Pœan, The Mythology of Greece and Rome*, and *Handbook of Greek Religion*.

Fairbanks, Douglas, American actor, was born at Denver, Colo., in 1883. He was educated at the Denver high school and at the Colorado school of mines. He made his first appearance on the regular stage at New York in 1901. Later, he played leading parts in *Frenzied Finance, All for a Girl, A Gentleman from Mississippi, Hawthorne of the U. S. A., He Comes Up Smiling*, and *Show Shop*. Entering the motion picture drama, he starred in various motion pictures. In 1916, he became the head of his own producing company. His productions include *His Majesty the American, The Mark of Zorro, The Three Musketeers, Robin Hood, The Thief of Bagdad*, and *The Black Pirate*. In 1920, he married Mary Pickford. He later became a member of the United Artists' Corporation.

Falconer (*fô'k'n-ẽr*), **Sir Robert Alexander,** Canadian educator, was born at Charlottetown, Prince Edward Island, in 1867. He was educated at Queen's Royal college, Trinidad, at the universities of London and Edinburgh, and also at Berlin, Leipzig, and Marburg. In 1892, he was ordained a Presbyterian minister. The same year, he began to teach in the Presbyterian college, Halifax, where he became professor of New Testament exegesis in 1895 and principal in 1904. In 1907, he was made president of Toronto university. In 1925, he was special lecturer on American history in British universities. He published *The Truth of the Apostolic Gospel, Idealism in National Character*, and *The United States As a Neighbor*.

Falconio (*fäl-kō'nyō*), **Diomede,** Catholic prelate, was born in Pescocostanzo, Italy, 1842. He entered the Franciscan order, 1860. In 1865, he was sent as a missionary to the United States; was ordained priest, 1866, by Bishop Timon, of Buffalo; and became professor of philosophy at Saint Bonaventure's college, Allegany, N. Y., 1866, being made president two years later. After 10 years' residence in Newfoundland, he returned to Italy, 1883, and held important posts in the Franciscan order. He was consecrated bishop in 1892 and archbishop in 1895; was apostolic delegate to Canada, 1899–1902, and to the United States in 1902–11; and became cardinal in the last named year. Died, 1917.

Fallières (*fäl'yâr'*), **Clément Armand,** French statesman, was born near Agen, South France, 1841. He received his education at Angouleme and Paris; settled as a barrister at Nerac, of which he became mayor; and was elected to the Chamber of Deputies, 1876. He held many important posts in that body and was elected president of the Senate eight times. He became president of France in 1906, in which capacity he accorded notable recognition to the working classes by placing Poincaré, Savrien, Clemenceau, and Briand in the same ministry. In 1913, he was succeeded as president by Raymond Poincaré.

Fallopius (*făl-lō'pĭ-ŭs*), or **Fallopio, Gabriello,** Italian anatomist, physician, and naturalist, was born about 1523 at Modena, where he began his career as an ecclesiastic. He abandoned the priesthood for the pursuit of science, which he studied at Ferrara and Padua. At Pisa, he was for three years professor of anatomy, and afterward he went to Padua to accept the chair of anatomy and surgery and to take charge of the first botanical garden established there. He acquired great fame by being the first to describe the anatomical structure of the fœtus and by his discovery of the function of the oviducts, called after him the Fallopian tubes. *Observationes Anatomicæ* is his principal work. Cuvier characterizes him as one of the three *savants* who restored, rather than created, the science of anatomy in the 16th century, the other two being Vesalius and Eustachius. Died, 1562.

Faneuil (*făn''l* or *făn'yĕl*), **Peter,** founder of Faneuil hall, Boston, Mass., was born in New Rochelle, N. Y., 1700. He was a rich merchant in Boston and gave to the city a building for a market and town hall. The building was finished just before his death in 1743. It was burned in 1761, and the present hall was built two years later by the town. So many important patriotic meetings were held in Faneuil hall during the Revolution that it has been called the "cradle of American liberty."

Faraday (*făr'ă-dā*), **Michael,** English chemist and physicist, was born in 1791 near London. He was largely self-educated and, in 1833, became professor of chemistry in the royal institution, London, where his lectures attracted the admiring attention of both Europe and America. His manner, his happy illustrations, and his felicitous choice of expression, even in the most abstruse subjects, were such as to charm and attract all classes of hearers. The great work of his life is the series of *Experimental Researches in Electricity*, published in the *Philosophical Transactions*.

Faraday was one of the most brilliant experimentalists in the history of science, and his notable discoveries laid the foundation for many of the most important applications of electricity, as in magneto and dynamo machines and in electrolysis. He was the first to use the terms "anode" and "cathode." He also discovered benzol, the basis of aniline dyes. He died in 1867.

Fargo, William George, pioneer American expressman, was born at Pompey, N. Y., 1818. After working as a grocery clerk, freight agent, express messenger, and resident agent at Buffalo, he organized, with Henry Wells, a carrying company to operate between Buffalo and western points. The company was later reorganized as the American Express Company, of which Fargo was the first secretary and, from 1868 to 1881, the president. Wells, Fargo and Company was formed in 1851 to carry express between New York and San Francisco by way of the Panama isthmus. An overland service was also instituted, operated by horses and popularly known as the "pony express." Fargo served as mayor of Buffalo, 1862–66, and was a director of several railroads. Died, 1881.

Farley, John Murphy, Catholic prelate, was born in Newton Hamilton, Ireland, in 1842. He made his primary studies at Saint McCartan's college, Monaghan, and, after coming to New York, continued his education at Saint John's college, Fordham, and at the provincial seminary, Troy. He later studied at the American college, Rome, where he was ordained as priest, 1870. In 1872, he became secretary to Archbishop McCloskey, serving until 1884, when he was made pastor of Saint Gabriel's church, New York. In 1891, he became vicar-general in the archdiocese of New York; in 1895, was made prothonotary apostolic; and, soon afterward, became assistant bishop. On the death of Archbishop Corrigan in 1902, he was unanimously chosen his successor, and, in 1911, was made cardinal. He did much to promote Catholic education in his diocese, increasing the number of primary and high schools and founding Cathedral college and a preparatory seminary. Died, 1918.

Farragut (*făr'ă-gŭt*), **David Glasgow,** American admiral, was born near Knoxville, Tenn., 1801. He entered the navy at nine years of age and first saw action in 1814, when the *Essex*, on which he served, engaged the English ships *Phœbe* and *Cherub*. In 1841, he was raised to the rank of commander and, with his ship, the *Saratoga*, helped to maintain a strict blockade of Tuxpan in the Mexican war.

When his native state seceded from the Union prior to the Civil War, he removed his residence to Hastings upon Hudson and placed his services at the disposal of the Federal government. In 1862, under orders from Porter, he brought a flotilla of ships past the Confederate batteries at New Orleans and destroyed a hostile fleet. In 1863, by controlling the Mississippi river from Vicksburg to Port Hudson, he aided materially in the capture of those strongholds. Finally, in 1864, he succeeded in annihilating a Confederate fleet in Mobile bay. Congress appointed him vice admiral and later admiral, having created these grades expressly for him. Died, 1870.

Farrand, Livingston, American educator, was born in Newark, N. J., 1867. He was educated at Princeton university and Columbia university, and studied also at Cambridge, Eng., and at Berlin. Beginning in 1893, he was connected with Columbia university, where he became professor of anthropology in 1903. He was president of the University of Colorado, 1914–19, and, in 1921, after two years devoted to the American Red Cross as chairman of its central committee, was chosen president of Cornell university. He has long been associated with work for the prevention of tuberculosis and for the improvement of public health. He wrote *The Basis of American History*.

Farrar (*făr'ar*), **Frederic William,** English clergyman and author, was born in Bombay, India, 1831; was educated at London and Cambridge; and was ordained in the Church of England in 1857. He became a master of Harrow and, from 1871 to 1876, was head master of Marlborough college. In 1876, he became canon of Westminster; in 1883, archdeacon; and, in 1895, dean of Canterbury. He was one of the most eloquent of English pulpit orators, and he published many works on educational, theological, and other subjects. The chief of these are *Seekers After God, Witness of History to Christ, The Silence and the Voices of God, Life of Christ*, and *Eternal Hope*. Died, 1903.

Farrar (*făr-ar'*), **Geraldine,** American dramatic soprano, was born at Melrose, Mass., 1882. She began her musical education in Boston and New York and studied further under Trabadello in Paris and Lilli Lehmann in Berlin, where she made her début with notable success at the royal opera house as Marguerite in *Faust*, October 1901. She was offered a three years' contract and became one of the favorite singers in grand opera at Berlin. In 1906, she made her début at the Metropolitan opera house, New York, where she was a leading soprano, creating principal rôles in new productions and achieving marked distinction in standard repertoire. She possesses a voice of unusual beauty, which she uses with great dramatic power.

Faunce (*fŏns*), **William Herbert Perry,** American educator, was born at Worcester, Mass., 1859. He was graduated from Brown university in 1880 and from Newton theological seminary, 1884. He occupied prominent pastorates in the Baptist Church and lectured at the University of Chicago prior to 1899. In that year, he was elected to the presidency of Brown university; he retired in 1928. His publications include *The Education Ideal in the Ministry, What Does Christianity Mean? Social Aspects of Foreign Missions*, and *Religion and War*.

Faure (*fōr*), **François Félix,** former president of France, was born in Paris, 1841. He was a self-made man, the son of a cabinetmaker, and ultimately became a successful merchant and shipowner at Havre. He served as a volunteer in the Franco-Prussian war; in 1881, became deputy for Havre; and, after holding posts in several administrations, succeeded Casimir-Périer as president in January 1895. He died in 1899.

Faure (*fōr*), **Jean Baptiste,** French baritone singer and composer, was born at Moulins, 1830. He entered the Paris conservatory at the age of 13 and became a chorister at the Madeleine. He made his first professional appearance as a singer at the Opéra Comique in 1852 and, in 1861, began a long series of triumphs in grand opera. His best-known compositions are sacred songs, some of which, such as "The Palms," have become widely popular. Died in 1914.

Favre (*fa'vr'*), **Jules Claude Gabriel,** French statesman and orator, was born at Lyon in 1809 and studied for the bar. He took part in the July revolution of 1830 and thereafter played a prominent rôle in politics as an uncompromising Republican. The *coup d'état* interrupted his political career, and he returned to his profession. His defense of Orsini in 1858 procured his election to the legislature for Paris, and he became one of the leaders of the Republicans against Napoleon III. After the fall of the Empire in 1870, he was appointed minister of foreign affairs, and, in 1871, settled the terms for the capitulation of the capital. He resigned office in 1871 and resumed practice at the bar. Died, 1880.

Fawcett (*fô'sĕt*), **Henry,** English statesman, was born at Salisbury in 1833. He graduated with honors at Cambridge in 1856 and began to read for the bar. In 1858, by an accident, shots from his father's gun entered both of Fawcett's eyes, totally blinding him. His *Manual of Political Economy* led to his election to the chair of political economy at Cambridge in 1863. Other works from his pen are *The Economic Position of the British Labourer* and *Protection and Free Trade*. He was elected to Parliament in 1865. He opposed legislative restrictions upon the industry of women and was a warm supporter of their claims to representation. In 1880, he became postmaster-general, in which capacity he introduced the parcel post, postal orders, sixpenny telegrams, and the banking of small savings by means of stamps. He died at Cambridge in 1884.

Fawcett, Millicent Garrett, wife of Henry Fawcett, was born at Aldeburgh, Suffolk, 1847. She took a keen interest in the higher education of women and was one of the most prominent leaders of the woman suffrage movement in England, heading the constitutional as opposed to the militant group. She wrote *Political Economy for Beginners, Janet Doncaster, Life of Queen Victoria, Five Famous French Women, Women's Suffrage,* and *Women's Victory.*

Fawkes (*fôks*), **Guy,** or **Guido,** English conspirator, was born of a Protestant family in Yorkshire, 1570. He became a zealous Roman Catholic at an early age and served in the Spanish army in the Netherlands. On his return to England, he entered into a plot to blow up the king, his ministers, and the members of both houses of Parliament, November 5, 1605. This conspiracy, known as the "gunpowder plot," was discovered when barrels of gunpowder had already been placed in the building and were prepared for ignition. Fawkes was tried, tortured, and publicly executed in 1606. Parliament set aside November 5 as a day of thanksgiving known as Guy Fawkes day, which continues to be celebrated in parts of England to the present day. The celebrations are often marked by the public burning of effigies representing Fawkes.

Fechner (*fĕκ'nĕr*), **Gustav Theodor,** German physicist and psychophysicist, was born at Gross-Sarchen, in lower Lusatia, 1801. He became professor of physics at Leipzig in 1834, but afterward devoted himself to psychology. He laid the foundations of the science of psychophysics in his *Elements of Psychophysics.* Besides poems and essays, he wrote on æsthetics, on the theory of color, and on galvanism. Died in 1887.

Fénelon (*fā'n'-lôNʳ*), **François de Salignac de la Mothe,** French preacher and author, was born at the château de Fénelon, in Perigord, France, 1651. As a preacher, he was remarkable for his persuasive eloquence; as a writer, he was distinguished for his tender and mystic devotion and for the purity of his style. He was, for some years, tutor to the grandson of Louis XIV, for whom he composed several works, among them a preliminary sketch of his best-known work, *Telemachus.* In 1695, he became archbishop of Cambrai. His *Maxims of the Saints* was strongly denounced by his great contemporary Bossuet and was condemned by Pope Innocent XII on account of its tendency to mysticism. As a man, Fénelon was distinguished for the simplicity of his character and for his Christian piety and charity. Died, 1715.

Ferber, Edna, American writer, was born at Kalamazoo, Mich., 1887, of Jewish parentage. At 17, she began writing as reporter on the Appleton *Daily Crescent* and was later employed on the Milwaukee *Journal* and the Chicago *Tribune.* She then took up short story writing. She produced *Dawn O'Hara* in 1911, followed by *Buttered Side Down, Personality Plus, Half Portions,* and *The Girls.* Her first successful novel, *So Big,* won a Pulitzer prize award in 1925.

Ferdinand I, the Great, king of Castile and Leon, was the second son of Sancho the Great, king of Navarre. His success against the Moors extended the Christian frontiers to the Mondego, and by him also the rulers of Toledo, Saragossa, and Seville were reduced to vassalage. He was one of the most powerful monarchs of his age and disputed with Henry III of Germany for the crown of Spain. In 1056, he assumed the title of Emperor of Spain. Died, 1065.

Ferdinand I, emperor of Germany, son of Philip I of Spain and younger brother of Charles V of Germany, was born in 1503. On the death of his grandfather Maximilian, he received the archduchy of Austria and the other German possessions of the house of Habsburg. He succeeded his brother-in-law Louis II of Bohemia and Hungary, and waged a long and bloody war with Zapolya for the possession of Hungary, only partly succeeding. In 1531, Ferdinand was elected king of the Romans, and, in 1556, he succeeded Charles V as emperor. He was tolerant toward the Protestants, whom he tried to reconcile with Rome. Died, 1564.

Ferdinand I, king of Rumania, was born at Sigmaringen, 1865. He was the second son of Prince Leopold of Hohenzollern Sigmaringen. His father and his elder brother renounced their title to the throne in 1888, whereupon he was declared heir presumptive. He became senator in 1889, and was designated prince of Rumania and, by the Legislative Assembly, was pronounced successor to the throne. In 1893, he married Marie Alexandra Victoria, daughter of the duke of Edinburgh. Upon the death of Charles I in 1914, he succeeded to the throne of Rumania. Died, 1927.

Ferdinand II, emperor of Germany and king of Hungary and Bohemia, was born in 1578. He was a grandson of Ferdinand I. His cousin the emperor Matthias, in 1617, surrendered to him the rule of Bohemia, and Ferdinand became emperor in 1619. His intolerance had shortly before kindled the Thirty Years' war. The Bohemians now offered their crown to the elector palatine, Frederick V, and joined forces with Bethlen Gabor of Transylvania. After the overthrow of Frederick in 1620, Ferdinand abolished the charter of Bohemia, oppressed the Protestants of Bohemia, and prosecuted with vigor the war against the Protestant powers of Europe. Died, 1637.

Ferdinand V of Castile, surnamed the Catholic, son of John II, was born in 1452, and succeeded his father on the throne of Aragon and Sicily in 1479. In 1469, he was married to Isabella, sister of Henry IV of Castile, and, in 1474, became, through her, king of Castile, Isabella sharing with him the royal dignity. The reign of Ferdinand and Isabella was signalized by the discovery of America by Columbus, the conquest of Granada from the Moors, and the expulsion of the Jews from Spain. Ferdinand died in 1516, Isabella having died 12 years before him.

Fergusson, James, Scottish historian of architecture, was born at Ayr, 1808. After ten years as an indigo planter in Bengal, he extensively explored India, studying the rock temples, which were illustrated in his earliest works. His *History of Architecture* appeared first as a handbook in 1855. Besides works on fortification, he also published *The Palaces of Nineveh and Persepolis Restored, Tree and Serpent Worship,* and *Rude Stone Monuments in All Countries.* He died at London in 1886.

Ferreira (*fĕr-rē'ē-rā*), **Antonio,** Portuguese poet, was born at Lisbon in 1528. He is considered the reformer of the national poetry of Portugal and is known as the Portuguese Horace. He was brought up to the law, but devoted his attention mainly to literature. He obtained an important office at court and won great celebrity by his *Castro,* the earliest Portuguese tragedy and the second regular tragedy produced after the revival of letters in Europe, being preceded only by Trissino's *Sophonisba.* Died, 1569.

Ferrero (*fĕr-rā'rō*), **Guglielmo,** Italian historian, was born near Naples in 1872. He lectured at Milan on militarism and in the Collège de France, Paris, on Roman history. While in Paris he received the cross of the legion of honor. He has traveled extensively in Europe and America and is known in the latter for his acute observations on American manners and institutions. His publications include *Symbols, The Greatness and Decline of Rome, Between Two Worlds, Ancient Rome and Modern America,* and *The Women of the Cæsars.* He collaborated with Professor Lombroso in the *Female Offender.* His *Words to the Deaf* and other writings unacceptable to the Fascist party occasioned his forced detention by governmental order.

Ferris, Woodbridge Nathan, American educator and politician, was born at Spencer, N. Y., 1853. He was educated at the University of Michigan and taught in business colleges and other schools prior to 1884, when he founded and became president of the Ferris institute, a highly successful school at Big Rapids, Mich. He became president of Big Rapids savings bank and, in 1913, was elected governor of Michigan. In 1922, he was elected to the United States Senate. Died, 1928.

Ferry (*fĕ'rē'*), **Jules François Camille,** French statesman, was born at Saint Die, in the Vosges, 1832. He was admitted to the Paris bar in 1851 and plunged into the politics of the time, offering uncompromising opposition to the party of Louis Napoleon. He opposed the war with Prussia, but, as central mayor of Paris, he rendered signal service during the siege by the Germans.

While minister of public instruction in 1879, he was instrumental in bringing about the expulsion of the Jesuits and, in 1882, secured passage of the law making primary education free, nonclerical, and compulsory. As prime minister in 1880 and again in 1883–85, he involved France in war in Madagascar and brought about his downfall. He was elected to the Senate in 1891 and became its president one month before his death in 1893.

Fessenden (*fĕs'ĕn-dĕn*), **William Pitt,** American statesman, was born at Boscawen, N. H., in 1806. He was graduated at Bowdoin college in 1823, was admitted to the bar in 1827, and settled in Portland, Me. He entered Congress in 1841, serving one term; was United States senator, 1854–64; was secretary of the treasury, 1864–65; and was again United States senator, 1865–69. He was one of the founders of the Republican party, distinguished himself as a debater in the Senate, and ranked among the leading lawyers of his time. Died in 1869.

Fetter, Frank Albert, American educator, was born in Peru, Ind., 1863. He was graduated at Indiana university, 1891, and at the University of Halle, Germany, 1894. From 1895 to 1898, he was professor of political economy at Indiana university and, from 1898 to 1900, at Stanford university. He was professor of political economy at Cornell university from 1901 to 1911, when he was made professor of economics at Princeton. His publications include *Relations Between Rent and Interest, The Principles*

of Economics, Source Book in Economics, Economic Principles, Modern Economic Problems, and many articles and monographs on economic subjects.

Fewkes (*fūks*), **Jesse Walter,** American ethnologist, was born at Newton, Mass., in 1850. He was graduated from Harvard university in 1875 and studied zoology at the University of Leipzig, Germany, 1878–80. He was editor of the *Journal of Ethnology and Archæology,* 1890–94, and ethnologist of the bureau of American ethnology, Smithsonian institution, Washington, from 1895 to 1918, and chief of that bureau until 1928. In 1908-09, he had charge of the excavation and repair of Casa Grande ruin, Arizona, and of Spruce Tree House, Cliff Palace, Sun Temple, Fire Temple, and Far View House in Mesa Verde national park, Colorado. His writings include *Snake Ceremonials at Walpi, Two Summers' Work in Pueblo Ruins, Archæological Expedition to Arizona, Aborigines of Porto Rico,* and *Casa Grande.*

Fibiger, Johannes, Danish physiologist, was born at Silkeborg, Denmark, in 1867. He was appointed professor of medicine at the University of Copenhagen. The researches on cancer which he carried on there won for him the award of the Nobel prize in medicine and physiology for 1927. Died, 1928.

Fichte (*fĭk'tĕ*), **Johann Gottlieb,** German philosopher, was born at Rammenau, in upper Lusatia, 1762. He studied at Jena and supported himself in a precarious way as tutor. In 1791, he went to Konigsberg, where he had an interview with Kant, of whom he had become an ardent disciple. Here he wrote, in 1792, his *Tentative Critique of all Revelation.* In 1794, he was appointed to the chair of philosophy at Jena, where he expounded with extraordinary zeal his system of transcendental idealism.

In 1799, Fichte removed to Berlin. In 1800 appeared his notable work *Vocation of Man.* In 1805, he obtained the chair of philosophy at Erlangen. The victories of Napoleon at Auerstadt and Jena drew forth the patriotic *Addresses to the German Nation.* On the restoration of peace, the Prussian king requested him to draw up a constitution for the newly founded Berlin university. In 1810, the university was opened with a host of brilliant names. By the votes of his colleagues, Fichte was unanimously elected rector. He died in 1814.

Field, Cyrus West, projector of the first Atlantic telegraph cable, was born at Stockbridge, Mass., 1819; brother of David Dudley Field and Stephen J. Field. He began commercial life as a clerk in New York, but soon developed a prosperous business of his own. Being joined by Peter Cooper, Moses Taylor, and other American capitalists, he organized, in 1854, the New York, Newfoundland, and London Telegraph Company, and, in 1856, the Atlantic Telegraph Company. Devoting himself entirely to the work of uniting the Old and New worlds, he crossed the ocean nearly 30 times in its prosecution. On the final success of the cable, laid in 1866, he received a gold medal from Congress and a vote of thanks from the American nation. Died, 1892. See *Cable, Submarine.*

Field, David Dudley, American jurist, was born at Haddam, Conn., 1805, brother of Stephen J. Field and Cyrus W. Field. He was graduated at Williams college, 1825, studied law, and was admitted to the bar in 1828. He settled in New York, and soon made his way into the front rank of his profession. In 1847, he was appointed by the legislature of New York one of a commission to reform the legal practice of the state. In this work he was engaged for nearly a quarter of a century, at the same time carrying on a large professional practice. In 1866, he brought before the British association for social science a proposition to frame an international code. This led to the preparation of his *Draft Outlines of an International Code,* one feature of which was the principle of arbitration to settle disputes between nations. Died, 1894.

Field, Eugene, American poet and journalist, was born at Saint Louis, Mo., 1850. He removed to New England, but was educated later in Missouri. At 23, he entered journalism and 10 years later became editor of the "Sharps and Flats" column of the Chicago *Daily News.* His humorous sayings therein during the following decade established his reputation in newspaper work. He was an author and poet of rare sympathy. His poems of childhood, which exhibit unusual qualities of appreciation and power of expression, gained for him the title "the child's poet." Among his works are *The Denver Tribune Primer, Culture's Garland, Love Affairs of a Bibliomaniac, Little Book of Western Verse, Little Book of Profitable Tales, Echoes from the Sabine Farm* (with R. M. Field), *With Trumpet and Drum,* and *Poems of Childhood.* He died in 1895.

Field, Henry Martyn, American religious editor and author, was born at Stockbridge, Mass., 1822, brother of David Dudley Field, Stephen J. Field, and Cyrus W. Field. He was graduated at Williams college, 1838, prepared for the ministry and was pastor of churches in Saint Louis, Mo., and West Springfield, Mass., 1842–54. He then became editor and later owner of the *Evangelist,* a Presbyterian journal in New York. He traveled extensively and described his experiences in numerous volumes, among which are *From the Lakes of Killarney to the Golden Horn, Among the Holy Hills, The Barbary Coast, On the Desert,* and *Old Spain and New Spain.* He also wrote the *Story of the Atlantic Telegraph* and a life of David Dudley Field. He died at Stockbridge in 1907.

Field, Marshall, American merchant, was born at Conway, Mass., 1835. He spent his boyhood on a farm; studied at an academy until 1852; and was a dry goods clerk at Pittsfield, Mass., 1852–56, and Chicago, 1856–60. He was junior partner, 1860–65, then senior partner in the firm which became, 1865, Field, Palmer, and Leiter. Potter Palmer retired in 1867 and Levi Z. Leiter in 1881. Field then becoming head of Marshall Field and Company, which under his management became the largest wholesale and retail dry goods business in the world. He founded with a gift of $1,000,000 the Field museum of Chicago, to which he bequeathed the further sum of $8,000,000. He also gave money and land to the amount of $400,000 to the University of Chicago. Died in 1906, leaving an immense fortune.

Field, Stephen Johnson, American jurist, was born at Haddam, Conn., 1816, brother of David Dudley Field, Cyrus W. Field, and Henry Martyn Field. He was graduated at Williams college in 1837, studied law, and began practice in New York. In 1849, he went to California and took up legal practice at Marysville. In 1857, he was elected judge of the state supreme court, of which he was made chief justice in 1859. In 1863, he was appointed associate justice of the United States supreme court, and served with marked usefulness and distinction for 34 years, a period of service equaled only by that of John Marshall, Joseph Story, and John Marshall Harlan. He was a member of the electoral commission, 1877, which decided the presidency in favor of Rutherford B. Hayes. Died at Washington, 1899.

Fielding, Henry, English novelist, often called the father of the modern novel, was born near Glastonbury, England, 1707. He was educated at Eton and at the University of Leiden. On his return from Leiden he began writing for the stage and, for ten years, was a prolific play writer. In 1737, he entered as a student of the Middle Temple, and, in 1740, was called to the bar; but, his new profession not proving remunerative, he returned to literature. Fielding's literary reputation rests upon four noted novels: *Joseph Andrews, Jonathan Wild, Tom Jones,* and *Amelia.* While possessing much genuine humor, wit, and wisdom, all his works contain much looseness of scene and coarseness of language offensive to many modern readers. He died at Lisbon, 1754.

Fiesole (*fyĕ'zō-lā*), **Fra Giovanni da.** See *Angelico, Fra.*

Fildes (*fīldz*), **Sir Luke,** English painter, was born at Liverpool, 1844. He studied at South Kensington art schools and at the royal academy, London. For several years he was an illustrator of books and magazines. Later, he painted English and Venetian subjects and also portraits, which he executed with strong realism and fine, manly sympathy. Among his paintings are "Fair, Quiet, and Sweet Rest," "The Casual Ward," "The Return of the Penitent," "The Widower," "The Village Wedding," "Venetian Life," "The Al Fresco Toilette," "The Doctor," "The State Portrait of the King," and "The State Portrait of the Queen." Died, 1927.

Fillmore, Millard, American statesman, 13th president of the United States, was born in Summerhill, N. Y., 1800. He was apprenticed to a wool carder, but became a clerk in a judge's office; removed to Buffalo, N. Y.; and, in 1823, was admitted to the bar. He entered Congress in 1832, was appointed chairman of the committee of ways and means in 1840, and was author of the Tariff act of 1842. He became comptroller of the state of New York in 1847, was elected vice president of the United States in 1848, and succeeded to the presidency on the death of Zachary Taylor in 1850. Diplomatic relations with Japan were established for the first time during his administration. By signing the act for the surrender of fugitive slaves, Fillmore brought about the utter defeat of the Whig party in 1852. In 1856, he was nominated for the presidency by the American, or Know-Nothing, party, but received only the electoral vote of Maryland. Died at Buffalo, 1874.

Finch, Francis Miles, jurist and poet, was born at Ithaca, N. Y., 1827. He was graduated at Yale, 1849; studied law; and began practice at Ithaca. In 1880, he was appointed to the New York court of appeals to fill a vacancy, and in the following year was elected for the term of 1881–95. He assisted materially in the organization of Cornell university, of which he was an original trustee. In 1892, he became dean of the Cornell law school. Besides some legal compilations, he wrote numerous poems, including *Nathan Hale* and *The Blue and the Gray.* Died, 1907.

Finck, Henry Theophilus, American musical critic, was born at Bethel, Mo., 1854. He was graduated at Harvard in 1876 and continued postgraduate study in

sociology, 1877-78. Going abroad, he studied psychology at Berlin, Heidelberg, and Vienna, 1878–81. In 1881, he became musical critic and general writer for the New York *Evening Post*, continuing in this capacity for more than 40 years. As musical critic, he was a special partisan of Wagner, Chopin, Liszt, Grieg, and MacDowell.

His extensive writings include *Romantic Love and Personal Beauty, Chopin, Pacific Coast Scenic Tours, Spain and Morocco, Lotos Time in Japan, Pictorial Wagner, Primitive Love and Love Stories, Songs and Song Writers, Fifty Masterssongs, Edvard Grieg, Massenet and His Operas, Success in Music and How It Is Won, Food and Flavor, Richard Strauss,* and *One Hundred Songs by Ten Composers*. Died, 1926.

Finley, John Huston, American educator, was born at Grand Ridge, Ill., 1863. He was graduated at Knox college in 1887 and pursued postgraduate study at Johns Hopkins, 1887–89. He was secretary of the state charities aid organization, New York, 1889–92; president of Knox college, 1892–99; editor of *Harper's Weekly* and *McClure's Magazine*, 1899-1900; professor of politics, Princeton, 1900–03; and president of the College of the City of New York, 1903–13. From 1913 to 1921, he was commissioner of education for New York State. In 1921, he became an editorial writer on the New York *Times*. With Richard T. Ely he wrote *Taxation in American States and Cities*. His writings include also *The French in the Heart of America, The Life of Grover Cleveland, French Schools in War Time,* and *A Pilgrim in Palestine*. He was elected to the American academy of arts and letters in 1927.

Finley, Martha, "Martha Farquharson," author, was born at Chillicothe, Ohio, 1828. She was educated in the schools of Philadelphia and later became a teacher. She is well known for her numerous Sunday school books, and especially for the series of more than 25 "Elsie Books," and a companion series of seven, the "Mildred Books." Among other works are *Wanted—A Pedigree, Signing the Contract, The Thorn in the Nest,* and *An Old-Fashioned Boy*. Died at Elkton, Ind., 1909.

Finsen (*fĭn'sĕn*), **Niels Ryberg,** Danish physician and inventor, was born in Thorshavn, Faroe islands, in 1860. He received his early education at Reykjavik, Iceland. Owing to impaired health, he was obliged to spend eight years to complete his course at the University of Copenhagen, from which he was graduated in medicine in 1890 and in which he later became demonstrator in anatomy. After much research he demonstrated that the effects of light upon the body are due to the chemical, or violet and ultra-violet, rays. By filtering the light of the room through red glass, he shut off the chemical rays from smallpox patients. This so modified the disease that the vesicles did not suppurate and scars and pitting were avoided.

Finsen found also that the chemical, or actinic, rays could be used to cure skin diseases, particularly lupus, or tuberculosis of the skin. The light institute established under his supervision in 1896 met with such success that Finsen institutes were soon established in other countries. The Finsen lamp, which he invented for the treatment of skin diseases, has been widely used in hospitals. In 1894, he wrote *Chemical Rays and Variola* and, in 1901, a work entitled *Phototherapy*. He was awarded, in 1903, the Nobel prize for medicine. Died in Copenhagen, 1904.

Firdousi (*fĕr-dōō'-sē*), pseudonym of Abu 'l Qasim Mansur, the greatest epic poet of Persia, was born near Tus, in Khorassan, about 935. He spent 30 years in writing the *Shah Namah*, or *Book of Kings*, a national epic, but, having received for his monumental literary labors only a meager reward from Sultan Mahmud, he gave vent to bitter satire against his royal master and fled from the court. For some time he led a wandering life until at length he returned to his birthplace, where he died about 1020.

Fischer (*fĭsh'ĕr*), **Emil,** German chemist, was born at Euskirchen, 1852. He was educated at Strasbourg, became professor of chemistry at Munich, Erlangen, and Wurzburg respectively, and, in 1892, succeeded Hofmann as professor of organic chemistry, University of Berlin. The synthetic production of the simple sugars and the complete demonstration of their chemical constitution is his most important achievement. His *Anleitung zur Darstellung Organischer Präparate* is a well-known work. He wrote also *The Chemistry of the Carbohydrates and Their Significance in Physiology* and *Chemical Research in its Bearing on National Welfare*. He received, in 1902, the Nobel prize for chemistry. Died, 1919.

Fischer, Ernst Kuno Berthold, German historian of philosophy, was born at Sandewalde, Silesia, 1824. After graduation at Halle, he went to Heidelberg and established himself as a private lecturer. He was eminently successful, but, in 1853, he was deprived of his lectureship by the government, probably on account of the alleged pantheistic trend of his teaching. In 1856, however, he was elected to the chair of philosophy in Jena and, 16 years later, was called back to Heidelberg as Zeller's successor. His philosophical viewpoint is essentially Hegelian, and his chief work is a *History of Modern Philosophy*, which is one of the most authoritative works of its kind. Died, 1907.

Fish, Hamilton, American statesman and diplomat, was born at New York in 1808. He was graduated at Columbia in 1827 and was admitted to the bar in 1830. He was elected congressman in 1842, lieutenant governor of the state in 1847, governor in 1848, and, in 1851, United States senator. As secretary of state under Grant from 1869 to 1877, he signed the Washington Treaty of 1871 and completed the settlement of the Alabama question. Died in 1893. See *Alabama Claims*.

Fisher, Dorothy Canfield, American author, was born at Lawrence, Kans., 1879. She was graduated at the Ohio State university, 1899, and received the degree of doctor of philosophy at Columbia, 1904. She studied and traveled extensively in Europe and, after serving three years as secretary of the Horace Mann school, devoted herself to writing. In 1907, she married John Redwood Fisher of New York. Besides contributing numerous short stories to magazines, she wrote various essays and novels. In 1912, she produced *The Squirrel Cage*, a novel of distinct merit, which met with wide appreciation.

The list of her writings includes *Corneille and Racine in England, What Shall We Do Now? Gunhild, The Montessori Mother, Mothers and Children, Hillsboro People, The Bent Twig, Self-Reliance, The Real Motive, Fellow-Captains, Understood Betsy, Home Fires in France, Her Son's Wife,* and *Why Stop Learning?* She also translated Papini's *Life of Christ* from the Italian.

Fisher, Frederick Bohn, American clergyman, was born at Greencastle, Pa., 1882. He was graduated from Asbury college, Wilmore, Ky., in 1902, and later studied at Harvard and at Boston university. Ordained to the Methodist Episcopal ministry in 1903, he was a missionary in India, 1904–06, and pastor of the First Methodist Episcopal church, Boston, 1908–10. He was connected with the board of foreign missions and the laymen's missionary movement from 1910 to 1920, when he was elected bishop. His published writings include *The Way to Win, Gifts from the Desert, India's Silent Revolution,* and *Garments of Power*.

Fisher, George Park, American theologian and historian, was born at Wrentham, Mass., 1827. After graduation from Brown university, 1847, he studied theology at Yale divinity school, at Andover, and in Germany. From 1854 to 1861, he was professor of divinity and college pastor at Yale. In 1861, he became professor of ecclesiastical history at Yale and occupied the chair with distinction until 1901, when he was made professor emeritus. He was a teacher of marked ability and a fertile writer.

Among his numerous works are *The Supernatural Origin of Christianity, History of the Reformation, The Beginnings of Christianity, History of the Christian Church, Colonial History of the United States, History of Christian Doctrine,* and a *Brief History of Nations*. Died, 1909.

Fisher, Harrison, American illustrator, was born in Brooklyn, N. Y., 1877. He was educated in San Francisco, and at an early age evinced fine capabilities in drawing and illustration. He illustrated *The Market Place,* by Harold Frederic; *Three Men on Wheels,* by Jerome K. Jerome; *The Eagle's Heart,* by Hamlin Garland; and other books. Much of his work has appeared also in the *Saturday Evening Post, McClure's Magazine, Life, Puck, Ladies' Home Journal, Scribner's, Cosmopolitan,* and other magazines. He became widely popular for his type of the "American girl" and for his facility and skill in executing details of dress. In 1907, he published *The Harrison Fisher Book*, a collection of drawings.

Fisher, Irving, American political economist, was born at Saugerties, N. Y., 1867. He was graduated at Yale, 1888; received the degree of doctor of philosophy, 1891; and studied at Berlin and Paris, 1893-94. He became an instructor in mathematics and later in political economy, Yale university, in which, in 1898, he was made professor of political economy. From 1896 to 1910, he was editor of the *Yale Review*. His published writings include *A Brief Introduction to the Infinitesimal Calculus, The Nature of Capital and Income, The Rate of Interest, National Vitality, The Purchasing Power of Money, Elementary Principles of Economics, Why is the Dollar Shrinking?* His *Stabilizing the Dollar* is an exposition of his proposal to vary the gold content of the dollar according to the fluctuations in a standard commodity price index, thereby keeping the purchasing power of money constant.

Fisher, John Arbuthnot, Lord, British admiral, was born at Rombodde, Ceylon, in 1841. He entered the navy in 1854, saw service in the Crimean and Chinese wars, and distinguished himself in the Egyptian war of 1882. He was appointed rear admiral in 1890, and, from 1904 to 1910, he was first sea lord of the admiralty. In 1909, he was raised to the peerage as Baron Fisher of Kilverstone. In 1914-15, he was again first sea lord and was active in the preparation and equipment of the British fleet for its part in the World War. He published, in 1919, a volume of *Reminiscences*. Died in 1920.

Fiske, Bradley Allen, American naval officer and inventor, was born at Lyons, N. Y., 1854. In 1870, he was appointed cadet midshipman in the United States navy. He became lieutenant commander in 1900 and was made rear admiral in 1911. At the battle of Manila, 1898, as navigator of the *Petrel*, he was reported for heroic conduct by Admiral Dewey. In connection with the navy, Fiske made many valuable inventions. Of these, the most important is the naval telescope sight, which revolutionized naval gunnery. This has been adopted by all navies and has made possible the great improvement in the accuracy of modern naval gunfire. He obtained also the basic patent for the invention of the wireless controlled torpedo. His writings include *Electricity in Theory and Practice*, *War Times in Manila*, *The Navy as a Fighting Machine*, *From Midshipman to Rear Admiral*, and *The Art of Fighting*.

Fiske, Harrison Grey, American editor, dramatic manager, and playwright, was born at Harrison, N. Y., 1861. He was educated in private schools and spent two years in New York university. In 1890, he married Minnie Maddern, the actress. He was editorial writer and dramatic critic on the Jersey City *Argus*, and later on the New York *Star*. In 1879, he became contributor to the New York *Dramatic Mirror*, of which he later was proprietor and editor until 1911. He has been manager for Mrs. Fiske, the Manhattan Company, and various dramatic organizations. He wrote the plays *Hester Crewe*, *The Privateer*, and *A White Pink*.

Fiske, John, American philosopher and historian, whose original name was Edmund Fiske Green, was born at Hartford, Conn., 1842. He was graduated from Harvard in 1863 and from Harvard law school in 1865. From 1869 to 1871, he was lecturer on philosophy at Harvard, and assistant librarian, 1872–79. He wrote much on evolution. His *Cosmic Philosophy* is an expansion of Herbert Spencer, and in *The Destiny of Man* he defended spiritual religion.

Fiske's writings include *Myths and Mythmakers*, *Outlines of Cosmic Philosophy*, *The Unseen World*, *Darwinism and other Essays*, *Excursions of an Evolutionist*, *The Idea of God*, *American Political Ideas*, *Discovery of America*, *The Critical Period of American History*, *The Beginnings of New England*, *The War of Independence*, *The American Revolution*, *Old Virginia and Her Neighbors*, *Dutch and Quaker Colonies in America*, *New France and New England*, and *The Mississippi Valley in the Civil War*. Died, 1901.

Fiske, Minnie Maddern, American actress, was born in New Orleans, La., 1865, of theatrical parents. She appeared in child's parts when 3 years old; at 12 was alternately playing leading rôles and old women's parts, and at 15 became a star under the name of Minnie Maddern. In 1890 she retired for a period of study and married Harrison Grey Fiske, journalist and playwright, in whose *Hester Crewe* she returned to the stage in 1894.

She afterward appeared in *A Doll's House*, *Tess of the D'Urbervilles*, *A Bit of Old Chelsea*, *Little Italy*, *Frou Frou*, and other plays with increasing success. In 1899, she won distinction by her *Becky Sharp*, regarded as her greatest achievement. In 1901, she opened the Manhattan theater as an independent playhouse. Here she produced *Leah Kleshna*, *Rosmersholm*, *The Pillars of Society*, *Hannele Himmelfahrt*, and other plays, appearing in leading rôles. She did much to popularize Ibsen's dramatic works in America. Her best-known play of recent years was *Miss Nelly of N' Orleans*.

Fitch, John, American inventor, was born at Windsor, Conn., 1743. He received a common school education, was a sailor for a brief period, and during the Revolution was a sutler with the American army, realizing extensive profits. In 1785, he completed a model steamboat with wheels at the sides. Larger vessels were built in 1788–90. In 1793, he went to France, to find his projects frustrated by the Revolution. Penniless, Fitch worked his passage back to America, and, disheartened by further reverses, poisoned himself, 1798.

Fitch, William Clyde, American dramatist, was born in New York in 1865, and graduated at Amherst college, 1886. He immediately began writing poems, short stories, and sketches. In 1890, he commenced his dramatic career with *Beau Brummell*, written for Richard Mansfield, and soon rose to distinction. With Bronson Howard, Augustus Thomas, and William Vaughn Moody, he ranks among the foremost American dramatists of his time. He wrote about 40 plays, of which the best-known are *Nathan Hale*, *Barbara Frietchie*, *The Climbers*, *The Stubbornness of Geraldine*, *The Girl with the Green Eyes*, *Her Own Way*, *The Woman in the Case*, *The Truth*, *The Straight Road*, and *The City*. Died at Chalons sur Marne, France, 1909. See *Truth, The*.

Fitzgerald, Edward, English poet and translator, was born at Woodbridge, in Suffolk, 1809. In 1826, he entered Trinity college, Cambridge, where he took his degree in 1830. With the exception of periodical visits to London, he led a quiet country life, his chief amusements being gardening and yachting. In 1851, he published anonymously his *Euphranor*, which was followed in 1852 by *Polonius*. In 1853, the first of his noted translations, *Six Dramas of Calderón*, appeared. About this time he took up Persian and, in 1856, published an anonymous version of Jami's *Salaman and Absal*. In 1859 appeared his famous version of the *Rubaiyat*. The quatrains of Omar Khayyam were then little known, but Fitzgerald at once recognized their beauty, and his and Omar's names will remain indissolubly linked together through his exquisite rendering of them. Died, 1883.

Flagg, Ernest, American architect, was born at Brooklyn, N. Y., 1857. After preparing for his profession at the Ecole des Beaux-Arts, Paris, he began practice as an architect in New York City in 1891 and soon attained prominence. Notable buildings designed by him include Saint Luke's hospital and the Singer building, New York; Corcoran gallery of art, Washington; and the United States naval academy, Annapolis, Md. The tower of the Singer building, 612 feet high, designed in modern French style of architecture, was the highest commercial structure in America at the time it was erected in 1908. His writings include *The Economic Design and Construction of Small Houses* and numerous articles on modern tenements, pavements, roads, and related subjects.

Flagg, James Montgomery, American illustrator, portrait painter, and writer, was born at Pelham Manor, N. Y., 1877. He studied at the art students' league, New York, also in England and in Paris. He published his first drawing in *Life* at the age of 14 and soon attained prominence as an illustrator for various magazines. His work is characterized by keen observation, marked technical ability, and never-failing humor, showing equal skill in charcoal, crayon, pen and ink, and oils. Among his best portraits is that of Mark Twain in the Lotos club, New York. Among the volumes of prose and verse written and illustrated by him are *Tomfoolery*, *If: A Guide to Bad Manners*, *Why they Married*, *All in the Same Boat*, *City People*, *I Should Say So*, *The Mystery of the Hated Man*, *Girls You Know*, and *Boulevards All the Way—Maybe*.

Flagler (*flăg'lẽr*), **Henry M.,** American capitalist, was born at Canandaigua, N. Y., 1830. After working as a clerk in a country store, he went to Saginaw, Mich., and became a salt manufacturer. Later, he removed to Cleveland, becoming partner in Rockefeller, Andrews, and Flagler, oil refiners, who were succeeded by the Standard Oil Company, with the management of which he was long prominently connected. He built the Ponce de Leon and Alcazar hotels, Florida, at a cost of about $3,000,000; also owned about 600 miles of railroad in Florida. He was a director of the Standard Oil Company until 1911; was chairman of the board of directors, Florida East Coast Railway Company; and was also a director of the Western Union Telegraph Company, the Peninsular and Occidental Steamship Company, and other corporations. Died, 1913.

Flammarion (*flà'mà'rê-ôN'*), **Camille,** French astronomer and writer, was born at Montigny le Roi, 1842. He was educated at Langres, the Paris observatory, and the Sorbonne, Paris. Among his many contributions to astronomical science are *The Plurality of Inhabited Worlds*, *Celestial Marvels*, *The Atmosphere*, *The Lands of the Heavens*, *The Planet Mars*, *Popular Astronomy*, *The End of the World*, and *The Unknown*. He also wrote several astronomical and spiritualist romances. As an astronomer he did important work on double and multiple stars and on the physical constitution of Mars and of the moon. Died, 1925.

Flamsteed (*flăm'stēd*), **John,** English astronomer, was born at Denby, near Derby, 1646. His success in mathematics and astronomy procured for him the appointment of astronomer to the king in 1675. The following year, Greenwich observatory was built, and Flamsteed began the observations that mark the rise of modern practical astronomy. He formed the first trustworthy catalogue of the fixed stars and furnished those observations by which Newton verified his lunar theory. His great work is *Historia Cœlestis Britannica*, an account of astronomical observation. Died, 1719.

Flanagan, John, American sculptor, was born at Newark, N. J., 1865. He was a pupil of Augustus Saint-Gaudens, New York, and of Henry Chapu and Alexandre Falguière, Ecole des Beaux-Arts, Paris. He executed the monumental clock in the Library of Congress, Washington; the statue of Joseph Henry and the decorative groups for the Saint Louis exposition; the tinted marble relief "Aphrodite" in Knickerbocker hotel, New York; the design for the Verdun medal, presented by President Harding to the French city of Verdun; and various works now in the Metropolitan museum, New York, and the Luxembourg, Paris.

Flaubert (*flō'bâr'*), **Gustave,** French novelist, was born at Rouen, 1821. After long hesitation between medicine and literature, he chose literature, beginning with poetry, which he soon gave up for prose. He possessed means

which enabled him to write at leisure and, owing to an obscure mental disease he lived largely in seclusion near Rouen. Here he produced, by devoting several years to the writing of each, a series of novels which are masterpieces of literary style and artistic precision.

His work formed the connecting link between the romantic and the realistic school of fiction and profoundly influenced the writings of French novelists for a generation. As a literary exponent of art for art's sake, he imbued his famous godson and pupil, Guy de Maupassant, with his own spirit and ideals. His works include *Madame Bovary*, *Salammbô*, *L Education sentimentale*, *La tentation de St.-Antoine*, *Le candidat*, and *Bouvard et Pécuchet*. Died, 1880.

Flaxman, John, English sculptor, was born at York, 1755. At the age of 15, he became a student in the royal academy. For a time, he worked in the pottery of Josiah Wedgwood and was associated with the poet William Blake. In 1782, he became established in London and, in 1787, went to Rome, where he worked, and studied the great masters until 1794. In 1800, he was elected to the royal academy, in which he was made professor of sculpture in 1810. Of his numerous sculptures, the best-known in England are his monument to the poet Collins at Chichester, the monument to Lord Mansfield in Westminster Abbey, and that to the Baring family at Micheldeaver church, Hampshire. His model for the shield of Achilles, though quite un-Homeric, is one of the finest achievements of modern art. He produced outline illustrations of Homer, Æschylus, and Dante, and also one of scriptural scenes. Died in 1826.

Fleming, John Ambrose, English physicist and electrical engineer, was born at Lancaster, 1849. He was educated at University college, London, and Saint John's college, Cambridge, and began his scientific career as professor of mathematics and physics at University college, Nottingham. In 1881, he became electrical engineer to the Edison Electrical Lighting Company and, in 1885, accepted an appointment as professor of electrical engineering in University college.

He was intimately connected with the development of the most important applications of electrical science to the telephone, electric lighting, and wireless telegraphy. He is the author of numerous scientific papers and wrote many articles on electrical subjects for the *Encyclopædia Britannica*. His published works include *Short Lectures to Electrical Artisans*, *Electric Lamps and Electric Lighting*, *Magnets and Electric Currents*, *A Manual of Radiotelegraphy and Radiotelephony*, and *The Wonders of Wireless Telegraphy*.

Fleming, Sir Sandford, Canadian civil engineer, scientist, and imperialist, was born in Scotland in 1827. He removed to Canada in 1845 and built up an extensive practice as chief engineer of railways and other public works; constructed the Intercolonial railway through the provinces of Nova Scotia, New Brunswick, and Quebec; was engineer in chief of the Canadian Pacific railway, 1871–80, exploring and locating the route across the continent; and, for many years, took an active interest in the movement for establishing the Pacific cable and a Pan-Britannic telegraph service encircling the globe.

In 1880, Fleming began advocating the adoption of a universal time system for railway schedules, and his system, which was approved by international action in Washington in 1884, has been widely adopted throughout the world. In 1880, he was made chancellor of Queen's university, Kingston, and he was knighted in 1897. Among his published works are *England and Canada*, *Old to New Westminster*, *Time and Its Notation*, *Memoirs on Universal Time and a Prime Meridian for All Nations*, *An Imperial Intelligence Union*, and *The Beginning of the Empire*. Died, 1915. See *Standard Time*.

Fletcher, Horace, author, food expert, and lecturer, was born at Lawrence, Mass., 1849. He was educated at Dartmouth college; traveled widely after 1865; and engaged in numerous occupations. In 1895, he began to devote his attention to sociology and especially to research in human nutrition. His views concerning the mastication of food gave rise to the cult of Fletcherism, for which he became widely known. He wrote *A B C of Snap Shooting*; *Menticulture*; *What Sense? or Economic Nutrition*; *Nature's Food Filter, or What and When to Swallow*; *Optimism*; and *Fletcherism, or How I Became Young at Sixty*. Died, 1919.

Fletcher, John, English dramatist, whose name is inseparably associated with that of his friend and coworker, Francis Beaumont, was born at Rye, in Sussex, 1579. He was educated with Beaumont at Cambridge, and there began the intimacy that led to their future collaborations. It is said that Beaumont supplied the judgment and Fletcher the fancy for the plays, nearly 50 in number, which they produced jointly. The chief piece largely of Fletcher's own unaided composition is a dramatic pastoral entitled *The Faithful Shepherdess*. Others of their joint authorship include *Philaster* and *The Maid's Tragedy*. Fletcher is now believed to have written portions of Shakspere's *Henry VIII*, and Shakspere is thought to have assisted Fletcher in writing *The Two Noble Kinsmen*. Died, 1625.

Fleury (*flü'rē'*), **Claude,** French church historian, was born at Paris, 1640; was tutor to various princes, prior of Argenteuil, and confessor to young Louis XV. Among his numerous works were *Mœurs des Israélites*, *Mœurs des Chrétiens*, *Droit ecclésiastique*, and the great *Histoire ecclésiastique*,—the first complete church history,—on which he labored 30 years. Fleury's own work brought the history to the year 1414, but it was continued by other writers to the year 1768. Died, 1723.

Flexner, Abraham, American educationist, was born at Louisville, Ky., in 1866 and was educated at Johns Hopkins, Harvard, and the University of Berlin. He taught high school until 1886; then was employed by the Carnegie foundation for the advancement of science; and, from 1912, was associated in a secretarial capacity with the general education board. He wrote, among other works, *The American College*, *Prostitution in Europe*, and *A Modern School*, the last of which occasioned much discussion in educational circles.

Flexner, Simon, American pathologist, was born at Louisville, Ky., 1863. He graduated in medicine at the University of Louisville, 1889, studying later at Johns Hopkins and at the universities of Strasbourg and Berlin. He was associate professor and later professor of pathological anatomy at Johns Hopkins prior to 1899, when he became professor of pathology at the University of Pennsylvania. In 1903, he was made director of laboratories in the Rockefeller institute for medical research, New York, where he has conducted important investigations. He is the author of various monographs and papers relating to pathology and bacteriology, snake venom, bubonic plague, cerebrospinal meningitis, bacillary dysentery, infantile paralysis, and other infectious diseases.

Flinders (*flin'dẽrz*), **Matthew,** English navigator and hydrographer, was born at Donington, Lincolnshire, 1774. His first knowledge of geometry and navigation was acquired without regular schooling, and, in 1789, he entered the navy as a midshipman. In 1795, he sailed with the *Reliance* to Australia, where he spent five years in geographical explorations and coast surveys.

Returning to England, he was placed in command of the *Investigator* with instructions to complete the coastal survey of Australia, where he devoted two years to mapping the coast line from Cape Leeuwin to the Gulf of Carpentaria. On his return to England, he unfortunately stopped at Mauritius, where he was detained as a prisoner by the French for nearly seven years. Reaching England broken in health, he lived but a short time after completing his account of his discoveries under the title *A Voyage to Terra Australis*. Flinders was one of the world's greatest hydrographers, and his monumental survey is still the foundation of modern Australian coast charts. He died in London, 1814.

Flint, Austin, American physician and medical writer, was born at Petersham, Mass., 1812. After graduation from the medical department of Harvard, he settled to practice in his native state. In 1836, he removed to Buffalo, N. Y., where, in 1847, he assisted in founding the medical department of the University of Buffalo, filling the chair of principles and practice of medicine. In 1859, he removed to New York, where he became professor of medicine in Bellevue Hospital medical college. His publications include *Diseases of the Heart*, *Principles and Practice of Medicine*, *Manual of Auscultation and Percussion*, and other medical works. Died, 1886.

Flint, Austin, American physician and physiologist, a son of the preceding, was born in Northampton, Mass., 1836. He was brought to Buffalo in infancy and was educated at Harvard, the University of Louisville, and Jefferson medical college. He practiced in Buffalo and lectured at the University of Buffalo prior to 1859, and was later connected successively with New York medical college, New Orleans school of medicine, Bellevue Hospital medical college, and Cornell University medical college. He assisted in establishing the glycogenic function of the liver and determined the nature of cholesterin and stercorin. His publications include *Physiology of Man*, *Physiological Effects of Severe and Prolonged Muscular Strain*, and *Source of Muscular Power*. Died in 1915.

Flint, Charles Wesley, preacher and educator, was born at Stouffville, Ont., 1878. He was graduated at the University of Toronto, Drew theological seminary, and Columbia university. He entered the ministry of the Methodist Episcopal Church in 1900 and, for 15 years, occupied important pastorates. In 1915, he became president of Cornell college at Mount Vernon, Iowa, and, in 1922, was made chancellor of Syracuse university.

Flotow (*flō'tō*), **Friedrich, Freiherr von,** German composer of light opera, was born at Teutendorf in Mecklenburg, 1812. He studied musical composition under Reicha in Paris and made his reputation by *Le Naufrage de la*

Méduse, *Stradella*, and *Martha*, the last two conspicuously characterized by pleasing melodies. His introduction of "The Last Rose of Summer" in *Martha* made both the opera and the old Irish melody immensely popular. His later operas were *Indra* and *L'Ombre*. From 1856 to 1863, he was director of the theater at Schwerin. Died, 1883.

Foch (*fŏsh*), **Ferdinand,** French general, was born at Tarbes, France, 1851, of Basque-Alsatian parentage. He joined the French army in 1870 and fought in the war against Prussia. In 1898, he was appointed lieutenant colonel and professor of strategy and tactics in the war college at Paris. In 1905, he was made regimental commander of artillery and, in 1910, commandant of the war college.

In the early stages of the invasion of France in 1914, Foch stopped the great German drive toward Calais and later won the victories of Ypres and La Bassée. The plan whereby Joffre defeated the German armies in the great battle of the Marne was largely due to Foch, who came to be regarded as the master tactician among the Allied commanders.

On March 26, 1918, following the gigantic German attacks which drove back the Allied line in Picardy, jeopardizing Paris and Calais, Foch was placed in supreme command of the Allied armies. Holding the enemy's powerful thrusts to local gains, he organized for the counter-offensive. On July 18, he inflicted a stunning defeat upon the Germans, blocking their fifth great drive of the year, and began a campaign of continuous attack against all the Teutonic allies. His consummate ability as a strategist was shown in an uninterrupted series of victories on all fronts. By well timed offensives, the military power of Bulgaria, Turkey, and Austria was crushed. Under relentless pressure, the great German army, beaten in every important battle, was practically driven out of France. To escape the impending annihilation of her forces, Germany, on Nov. 11, 1918, signed an armistice, surrendering enormous war supplies and yielding the military occupation of the Rhine. In recognition of his distinguished services, Foch was created marshal of France. He was later made a marshal in the British army. Died, 1929. See *World War*.

Foix (*fwä*), **Gaston de,** French general, was born in 1489. When 23 years old, he was made commander of the French army in Italy. He defeated the army of Venice near Brescia and took the city by storm on the same day. A few weeks afterward, he won a victory over the Spanish forces at Ravenna in one of the fiercest battles ever fought. The victory was so splendid that the hot-blooded young hero grew impatient when he saw some of the enemy's infantry leave the field slowly and in good order, and madly rushed after them in person, followed by Bayard and about 20 knights. He broke the enemy's line, but was killed in the encounter, April 11, 1512.

Foley, John Henry, Irish sculptor, was born in Dublin, 1818, and studied art at Dublin and at the royal academy, London, of which he was elected member in 1858. While he produced some ideal works, he excelled in portrait statues which are noted for their strength of characterization. Among them are the statues of Hampden and Selden, in the houses of Parliament at Westminster; of Prince Albert, which forms a part of the Albert memorial in Hyde Park, London; and of Burke, J. S. Mill, and Goldsmith. He designed the seal of the Confederate states of America and executed a bronze statue of Stonewall Jackson for Richmond, Va. Died at Hampstead, England, 1874.

Folk, Joseph Wingate, American lawyer and politician, was born in Brownsville, Tenn., 1869. He was graduated at Vanderbilt university and was admitted to the bar in 1890. He was circuit attorney at Saint Louis in 1900–04, and attracted wide attention by his vigorous prosecution of numerous bribery cases. He was governor of Missouri in 1905–09 and became, in 1913, solicitor of the department of state and, in 1914, counsel of the interstate commerce commission. Died, 1923.

Fontana (*fŏn-tä'nä*), **Domenico,** Italian architect, was born on the borders of Lake Como in 1543. He obtained the favorable notice of Cardinal Montalto, who engaged him to erect a chapel in the church of Santa Maria Maggiore and also the Villa Negroni. In 1585, after the cardinal had become Pope Sixtus V, he employed Fontana to plan the dome and lantern of Saint Peter's substantially in accordance with Michelangelo's design. He erected the obelisk near Saint Peter's, Rome, in 1586, and built the Lateran palace and the Vatican library. Contracts for other important works were also given to him by the pope. He died at Naples, 1607.

Fontenelle (*fŏN'nĕl'*), **Bernard le Bovier de,** French writer, was born at Rouen, 1657. He was a nephew of Corneille, the tragic poet. In 1699, he was appointed perpetual secretary of the academy of sciences. His reputation rests chiefly upon *Dialogues of the Dead*, *Discourse on the Plurality of Worlds*, and an *Essay on the Geometry of the Infinite*. His long life, extending over nearly 100 years, was filled with literary activities, and, as a frequenter of the famous salons of Madame de Tencin and others, he was the literary arbitrator of his time. He died in 1757.

Foote, Andrew Hull, American naval officer, was born in New Haven, Conn., 1806. Entering the United States navy in 1822, he became a commander in 1852, saw service in China in 1856, and, after the outbreak of the Civil War, acted with signal credit in the reduction of Fort Henry and Fort Donelson, 1862. In the same year, he was promoted rear admiral. Died at New York, 1863.

Foote, Arthur, American composer, was born at Salem, Mass., 1853. He graduated from Harvard in 1874 and later studied music under S. A. Emery, J. K. Paine, and B. J. Lang. He settled in Boston as a teacher of music and was organist at the First Unitarian church, 1878–1910. His compositions include an overture, *In the Mountains*; *Serenade in E*; a prologue, *Francesca da Rimini*; chamber music; suites; the cantatas *The Skeleton in Armor*, *The Wreck of the Hesperus*, and *Farewell to Hiawatha*; much church music; numerous organ and piano pieces; and more than 50 songs. Foote's music, classic rather than romantic in style, entitles him to high rank among American composers.

Foote, Mary Hallock, American author and artist, was born in Milton, N. Y., 1847. She married Arthur D. Foote, a civil engineer, and lived some years in Colorado, Idaho, and California. She studied art at New York and produced many drawings in black and white for magazines and for book illustrations. Among her books are *John Bodewin's Testimony*, *Cœur d'Alène*, *The Little Fig Tree Stories*, *The Prodigal*, *The Royal Americans*, *A Picked Company*, and *The Valley Road*.

Forbes-Robertson, Sir Johnston, English actor, was born in London in 1853. He was educated at Charterhouse, London, at Rouen, and at the royal academy of arts. An actor from the age of 21, he became a member of prominent companies, including those of Sir Henry Irving and Sir Squire Bancroft. In 1895, he appeared in *The Notorious Mrs. Ebbsmith* and also in *Romeo and Juliet*. In 1898, he achieved the greatest successes of his career in *Othello* and *Hamlet*. He appeared in America also as Orlando in *As You Like It*, in Shaw's *Cæsar and Cleopatra*, and in *The Passing of the Third Floor Back*. He was knighted in 1913. He wrote *A Player under Three Reigns*.

Ford, Henry, American manufacturer, was born at Greenfield, Mich., 1863. He received his education in the district schools and learned the machinist's trade. In 1887, he removed to Detroit, where he later became chief engineer of the Edison Illuminating Company. In 1903, he organized and became president of the Ford Motor Company, which under his management and control has become the largest automobile manufacturing establishment in the world. Twenty years after the organization of the original company, his establishment employed more than 75,000 persons and turned out about 8500 automobiles a day. This result was secured by standardizing and quickly assembling parts, thereby securing economies that made possible the progressive reduction of prices and consequent widening of markets. Beginning in 1914, Ford established a profit-sharing plan, providing for the distribution of from 10 to 30 million dollars annually among his employees.

Prior to America's entry into the World War, Ford was a pronounced pacifist and endeavored by a peace mission to bring the warring nations of Europe into conference. When war had been declared against Germany, however, he promptly placed his resources at the disposal of the government.

In 1923, with his son Edsel, Ford perfected an efficient, economical farm tractor, which won instant leadership in its field. The Ford Motor Company also, with its tri-motor monoplanes, promoted rapidly the popularity of air transportation. The original Ford motor car (model T) was replaced by a new, low-priced type (model A) in 1927.

The Ford factories demonstrated the value of mass production. This method soon spread to other industries and became a prime factor in the increase and wide distribution of wealth in the United States. He wrote *My Life and Work* and *Today and Tomorrow*.

Ford, John, English dramatist, was born at Ilsington, Devonshire, 1586. He studied at Exeter college, Oxford, and entered the Middle Temple in 1602. His first literary work was an elegy on the earl of Devonshire entitled *Fame's Memorial*. The tragedies *'Tis Pity* and *The Broken Heart* are considered his masterpieces. His other dramas include *Honour Triumphant*, *The Lover's Melancholy*, and *The Lady's Trial*. Died about 1640.

Ford, Paul Leicester, American historian and novelist, was born in Brooklyn, N. Y., 1865. He was educated privately, owing to physical deformity, and early devoted himself to literature. His works include *The Honorable Peter Sterling*, *The True George Washington*, *The Many*

Sided Franklin, Janice Meredith, Wanted: A Chaperon, Tattle Tales of Cupid, The Story of an Untold Love, and *Wanted: A Matchmaker.* He also edited the works of Thomas Jefferson. Died, 1902. See *Janice Meredith.*

Fordney, Joseph Warren, American politician, was born in Blackford county, Ind., 1853. He received a common school education, living with his parents on a farm until 16 years of age. In 1869, he removed to Saginaw, Mich., began life in the lumber woods, logging and estimating pine timber, thus acquiring a thorough knowledge of the pine land and lumber industry, in which he became extensively engaged. Entering political life, he was elected alderman in 1895 and member of Congress continuously, 1899 to 1923. During the administration of President Harding, he took an active part in tariff legislation.

Forgan, James Berwick, American financier, was born at Saint Andrews, Scotland, 1852. He was educated at Madras college and Forres academy, Scotland. His first employment was with the Royal bank of Scotland for about three years. Later, he was with the bank of British North America, with assignments to Montreal, New York, and Halifax. Being made inspector of agencies for the bank of Nova Scotia, he established an agency in Minneapolis, of which he was manager for three years. About 1888, he became cashier and manager of the Northwestern national bank. In 1892, he came to the First national bank, Chicago, as vice president, and, in 1900, he succeeded Lyman J. Gage as president. For five years he was a director of the Federal Reserve bank of Chicago and for six years served as president of the Federal advisory council of the Federal Reserve board, Washington. Died, 1924.

Forrest, Edwin, American tragedian, was born in Philadelphia, Pa., 1806. He went on the stage at 14, and finally made his way to New York, where his rendering of Othello at the age of 20 raised him to the front rank among actors. He made three tours in England, but, during his last, in 1845, he lost popular favor through his conduct in an embittered quarrel with Macready. After his final appearance on the stage in 1871, he continued for a short time to give Shaksperian readings. In the parts of Richard III, Macbeth, and Othello, his acting was of the highest order. In his professional career, he amassed a large fortune, built a stone castle on the Hudson, and established an asylum for aged and indigent actors. He left a splendid library exceedingly rich in Shaksperian literature. Died, 1872.

Forster, John, English political and historical writer, was born at Newcastle, 1812. He was educated for the bar, but, in 1832, became the dramatic critic of the *True Sun.* Later, his political articles in the London *Examiner* attracted attention. He edited successively the *Foreign Quarterly Review,* the *Daily News,* succeeding Dickens, and, 1847–56, the *Examiner.* He wrote many admirable biographical and historical essays, also *Lives of the Statesmen of the Commonwealth, Debates on the Grand Remonstrance, Arrest of the Five Members,* and *Sir John Eliot: a Biography.* His literary memoirs include *Life and Times of Oliver Goldsmith, Life of Landor, Life of Dickens,* and *Life of Swift.* He died in 1876.

Fortuny (*fôr-tōō'nē*), **Mariano,** Spanish painter, was born at Reus in Catalonia, 1838, and grew up in poverty. Displaying artistic talent, he received an allowance from his native town which enabled him to study at Barcelona, whence he went to Rome in 1857. His pictures, painted with brilliance of color and dazzling effects, include many studies of Eastern life.

Previous to the rise of impressionism, Fortuny's style was the dominating influence in modern Spanish art. Among his celebrated pictures are "The Spanish Marriage," "Praying Arab," "Tribunal of a Cadi," "The Butterfly," and "Trial of the Model." Many of his works are found in American collections, including "An Ecclesiastic," "Don Quixote," "Mendicant," and "Rehearsal" in the Walters gallery, Baltimore, and "Arab Fantasia at Tangiers," "A Court Fool," and "Lady in Black" in the Metropolitan museum, New York. He died at Rome, 1874.

Fosdick, Harry Emerson, American clergyman and religious writer, was born at Buffalo, N. Y., in 1878. He was graduated from Colgate university in 1900 and from Union theological seminary in 1904. Ordained to the Baptist ministry in 1903, he was pastor at Montclair, N. J., 1904–15. In 1908, he became instructor in homiletics, and, in 1915, was made professor of practical theology, Union theological seminary. He also occupied, at the same time, the pulpit of the First Presbyterian church, New York City, which he left in 1924 as the result of a controversy growing out of his leadership in the so-called modernist school of religious thought. He accepted the pastorate of the Park Avenue Baptist church, New York City. His writings include *The Second Mile, The Manhood of the Master, The Assurance of Immortality, The Meaning of Prayer, The Challenge of the Present Crisis, The Meaning of Faith,* and *Twelve Tests of Character.*

Fosdick, Raymond Blaine, American lawyer and publicist, was born at Buffalo, N. Y., in 1883. He was graduated at Princeton university in 1905 and at New York law school in 1908. In 1908–10, he was assistant corporation counsel, and in 1910–13 was commissioner of accounts, New York City. He spent 1913 in Europe in the study of police organization. In 1915-16, he was a member of the New York City board of education. He was chairman of the commission on training camp activities of the war and navy departments, 1917-18, was civilian aid to General Pershing in France, 1919, and was undersecretary-general of the League of Nations, 1919-20. Among his writings are *European Police Systems, Keeping Our Fighters Fit,* and *American Police Systems.*

Foss, Sam Walter, American editor and writer of humorous verse, was born at Candia, N. H., 1858. He was graduated at Brown university in 1882 and entered journalism. He was editor of the *Saturday Union,* 1883–87, and of the *Yankee Blade,* 1887–95, at Lynn, Mass. From 1888 to 1895, he was editorial writer on the Boston *Globe* and from 1898 to 1911, he was librarian, Somerville, Mass., public library. He was a lecturer and gave readings of his own poems. His published works include *Back Country Poems, Whiffs from Wild Meadows, Dreams in Homespun, Songs of War and Peace,* and *Songs of the Average Man.* He died in 1911.

Foster, John Watson, American lawyer and diplomat, was born in Pike county, Ind., 1836. He was graduated from Indiana university, 1855; studied at Harvard law school; was admitted to the Indiana bar; and practiced at Evansville, 1857–61. He entered the Union army in 1861 as major of volunteers and was promoted colonel and brevetted brigadier general. After the war, he was editor of the Evansville *Daily Journal,* 1865–69; was postmaster, Evansville, 1869–73; and was minister to Mexico, 1873–80, and to Russia, 1880-81.

In 1881, he established legal practice in international cases in Washington, representing foreign legations before commissions and arbitration boards. He was secretary of state, 1892-93; was agent for the United States in the Bering Sea arbitration at Paris, 1893; was member of the Anglo-Canadian commission, 1898; and was agent for the United States Alaskan boundary tribunal, at London, 1903. Among his writings are *Biography of Mathew Watson Foster, A Century of American Diplomacy, American Diplomacy in the Orient, Arbitration and The Hague Court,* and *Diplomatic Memoirs.* Died, 1917.

Foster, Stephen Collins, American song composer, was born at Lawrenceville, now a part of Pittsburgh, Pa., 1826. He first wrote Negro melodies, "Old Uncle Ned" and "Oh, Susanna," which immediately gained a wide popularity. Of his song "Old Folks at Home" 300,000 copies were sold. "Nelly Bly," "My Old Kentucky Home," "O, Boys, Carry Me 'Long," "Come Where My Love Lies Dreaming," "Louisiana Belle," "Massa's in the Cold, Cold Ground," and "Ellen Boyne" were among the most popular. He published 175 songs, many of which have been translated into other languages. He died in New York, 1864.

Foucault (*fōō'kō'*), **Jean Bernard Léon,** French physicist, was born at Paris, 1819. He began the study of medicine but soon turned to physical science. In 1851, he demonstrated the rotation of the earth on its axis by means of a long pendulum and, in 1852, he invented the gyroscope. By means of a revolving mirror, he demonstrated that the velocity of light is greater in air than in water. In 1862, he determined that the velocity of light is about 185,000 miles per second. He also invented a polarizing prism and made applications of physics to the study of astronomy. Died, 1868.

Fouché (*fōō'shā'*), **Joseph,** French Revolutionist and statesman, was born near Nantes in 1763. In 1792, he obtained a seat in the national convention, and on the trial of Louis XVI voted for death without appeal. He became president of the Jacobins but was expelled by Robespierre and afterward imprisoned as a dangerous terrorist. At a later period, he became Napoleon Bonaparte's minister of police, and, in 1809, was created duke of Otranto. He incurred Napoleon's displeasure by using on one occasion these words, "Let us prove that Napoleon's presence is not necessary to repel our enemies," and was deprived of office.

After Napoleon's return from Elba, Fouché again became minister of police. He advised Napoleon to abdicate after the battle of Waterloo, was placed at the head of the provisional government by the chambers, and negotiated with the allies. In 1816, Fouché was exiled from France by the edict against regicides, became an Austrian subject, and lived at Trieste until his death in 1820. It was Fouché who made the famous remark on the execution of the duke of Enghieu: "It is worse than a crime; it is a blunder."

Fouqué (*fōō'kā'*), **Friedrich Heinrich Karl, Baron de la Motte,** German novelist and poet, was born in Brandenburg, 1777. When young, he was a soldier and

fought against Napoleon, but ill health obliged him to leave the army. He then gave himself up to study, and wrote many charming stories. *Undine*, *Sintram*, *Aslauga's Knight*, and *The Enchanted Ring* are the best of these. The fairy tale *Undine* ranks among the most exquisite in literature. He died in Berlin, 1843. See *Undine*.

Fourier (*fōō'rē-ā'*), **François Charles Marie,** French socialist, was born in Besançon, 1772. He served on the Rhine during the revolutionary period. Afterward he engaged in trade, at the same time earnestly studying the problems involved in the modern social system. In 1808, he disseminated his peculiar views on socialism by the publication of a work entitled *A Theory of Four Movements and General Destinies*. In 1822, this was reproduced in a completed form under the name of *A Treatise on Domestic and Agricultural Association*. A supplement to it appeared later styled *The New World of Industry and Society*. In 1831, he established a newspaper called the *Phalange* for the better exposition of his doctrines. Died, 1837.

Fourier, Jean Baptiste Joseph, Baron, French geometrician, was born at Auxerre in 1768. He presented a mathematical memoir to the French academy at the age of 19, and, in 1795, was made professor in the Ecole Polytechnique, Paris. He accompanied the French expedition to Egypt in 1798 and conducted explorations on the upper Nile. In 1802, he was appointed prefect of the Isere and, in 1815, of the Rhone. Being afterward displaced, he gave himself up entirely to scientific studies.

In 1817, Fourier became a member of the academy of sciences and exercised with Cuvier the functions of perpetual secretary. His chief works are *Annales de physique*, *Théorie analytique de la chaleur*, *Récherches statisques sur la ville de Paris*, and the *Analyse des équations déterminées*. Fourier was one of the foremost mathematicians and physicists of his time and made valuable contributions to the theory of heat and to the solution of numerical equations. He died in 1830.

Fox, Charles James, English statesman, was born in Westminster, 1749. He was educated at Eton and at Hertford college, Oxford. He entered Parliament at the age of 19 and immediately made his mark as a debater. From 1772 to 1774, he was lord of the treasury. In 1782, he became foreign secretary under Lord Rockingham. The regency, the trial of Warren Hastings, the French Revolution, and the events which followed it gave ample scope to the talents and energies of Fox, and on all occasions he employed his influence to modify, if not to counteract, the policy of his great rival, William Pitt. Fox was a strenuous opponent of the war with France and an advocate of nonintervention.

On the death of Pitt, in 1806, Fox became foreign secretary in Grenville's ministry. But the term of his life had nearly run out, and he had no time to realize the high expectations of his followers. After carrying in Parliament his motion for the abolition of the slave trade, he died a few months before the measure became a law. He was admittedly the foremost orator of his time; was a man of wide reading and fine literary tastes; and showed himself equal to sacrifices to principle such as few statesmen have cared to make. Died at Cheswick, 1806.

Fox, George, founder of the Society of Friends, was born at Fenny Drayton, England, 1624. Early adopting the peculiar tenets and manners known as Quakerism, he suffered for many years continual persecution. His leading doctrines or convictions were the futility of learning for the work of the ministry, the presence of Christ in the heart as the "inner light" superseding all other lights, and the necessity of trying men's opinions and religions by the Holy Spirit and not by the Scriptures.

In 1655, Fox was brought to London and examined before Cromwell, who quickly saw that there was nothing in Quakerism to excite apprehension and pronounced the doctrines and the character of its founder to be irreproachable. In 1671, Fox sailed for the West Indies and the American colonies to propagate the doctrines of the sect he had originated. On his return to England, in 1673, he was imprisoned at Worcester for 14 months because of his refusal to take the oath of supremacy. During the remaining years of his life, which he spent chiefly in London, the public worship of the Society of Friends became tolerated. He died in London, 1691.

Fox, John William, Jr., American novelist, was born in Kentucky, 1863. He was graduated from Harvard in 1883 and, after some experience in journalism, he traveled in the Southern states and in California. Subsequently, he engaged in business at Cumberland Gap and availed himself of the opportunity to study mountain life, which he described in novels that attained much popular success. His works include *A Mountain Europa*, *A Cumberland Vendetta*, *Hell-for-Sartain*, *The Kentuckians*, *Crittenden*, *Blue Grass and Rhododendron*, *The Little Shepherd of Kingdom Come*, *Following the Sun Flag*, *Knight of the Cumberland*, *The Trail of the Lonesome Pine*, *The Heart of the Hills*, and *In Happy Valley*. Died, 1919.

Foxe, John, English martyrologist, was born at Boston, in Lincolnshire, 1516. At 16 he entered Brasenose college, Oxford. He was a fellow of Magdalen college, 1539–45, and became tutor to the orphan children of the earl of Surrey. During the reign of Mary, he retired to the continent, where he met Grindal and Aylmer. On Queen Elizabeth's accession he was made a prebendary of Salisbury cathedral, 1563. He lived chiefly in London and often preached. He published numerous books, but the one upon which his fame rests is popularly known as *Foxe's Book of Martyrs*. Died, 1587.

Fragonard (*frà'gô'nàr'*), **Jean Honoré,** French painter, was born at Grasse, 1732. He early displayed marked artistic talent, studied under Chardin and Boucher, and, in 1752, won the *prix de Rome*. In 1765, his "Callirhoe" secured his admission to the academy and was commissioned for reproduction in Gobelin tapestry. He painted, with a loose touch and luscious coloring, genre pictures of contemporary life; he is also known for his landscapes. His art is the culmination of the rococo style of painting in France. In recent years his pictures have commanded high prices; his small "Billet Doux" sold for more than $90,000 after its exhibition in London in 1906.

In 1771, Fragonard was commissioned to decorate a pavilion for Madame du Barry with a series of subjects depicting the "Romance of Love and Youth." His work, rejected by Du Barry, was preserved by descendants of the artist's friend Maubert and sold in 1898 for $240,000. The series was purchased by J. P. Morgan, exhibited in the Metropolitan museum, New York, in 1914, and, in 1915, was bought by H. C. Frick of Pittsburgh. Fragonard is represented by numerous works in the Louvre and in other collections. Died, 1806.

France (*frăns*), **Anatole,** is the pen name of Jacques Anatole Thibault, French critic and author, who was born in Paris, 1844, and educated at Collège Stanislaus. Through a long series of poems, dramas, stories, and critical essays, he attained an eminent position in French letters, being generally regarded as the most distinguished novelist, the keenest satirist, the most pleasing humorist, and the finest stylist of his time. In 1896, he was elected to the French academy and, in 1921, he was awarded the Nobel prize for literature.

Of his numerous works, the following are among those that have been translated into English: *The Crime of Sylvestre Bonnard*, *At the Sign of the Reine Pedaque*, *The Red Lily*, *Mother of Pearl*, *Baltasar*, *The Wickerwork Woman*, *Joan of Arc*, *The Gods Are Athirst*, *The Revolt of the Angels*, *Thäis*, *The White Stone*, *Jocasta and the Famished Cat*, *On Life and Letters*, *Marguerite*, and *The Human Tragedy*. Died, 1924.

Franchetti (*fràn-kĕt'tē*), **Baron Alberto,** Italian operatic composer, was born at Turin, 1860. After studying in his native city, he continued his musical education in Dresden and at Munich conservatory. He became one of the foremost representatives of the new Italian school, and his compositions show marked German influence. His first opera, *Asraële*, was produced in 1888, followed by *Cristoforo Colombo* in 1892, *Fior d'Alpe*, 1894, *Il signor di Pourceaugnac*, 1897, *La figlia di Jorio*, 1906. His greatest success is his opera *Germania*, produced in 1902, picturing the uprising of Germany against Napoleon and closing with a scene on the battle field of Leipzig.

Francis I, king of France, was born at Cognac, France, 1494, and became king in 1515. His first act was to reconquer Milan. Charles V, Henry VIII, and the pope were in alliance against him, driving his troops out of Italy and invading France on the north. Taken prisoner at the battle of Pavia, 1525, Francis was kept a year at Madrid, gaining his freedom only by renouncing Flanders, Artois, the duchy of Burgundy, and all his Italian possessions. His struggles with Charles V continued until the Peace of Crespy, 1544. His reign is marked by the French Renaissance, the beginning of the Protestant Reformation, and the strengthening of the power of the monarchy. He fostered learning and art, invited painters and scholars to his kingdom, founded libraries, opened schools, and built several of the finest palaces in France. He died in 1547.

Francis I, emperor of Germany, was born in 1708, son of Leopold, duke of Lorraine. On the death of his father, 1729, Francis succeeded to the dukedom, which, in 1735, he ceded to Stanislaus Leszczynski, father-in-law of Louis XV, to revert after his death to the crown of France. In 1736, he married Maria Theresa of Austria, the only daughter and heiress of the emperor Charles VI. In 1740, Charles died, and Maria Theresa succeeded him; she made her husband coregent with herself, but gave him little share in the administration.

Francis fought bravely for his wife's rights in the wars carried on against Frederick the Great. In 1745, he was elected to the once important dignity of emperor of Germany, and was crowned at Frankfort. The famous Seven Years' war, 1756–63, now broke out between Austria and

Prussia; but the cares which it imposed fell mainly upon his leonine consort, Maria Theresa. Francis died at Innsbruck, 1765.

Francis II, emperor of Germany, the last Holy Roman emperor, was born at Florence, Italy, 1768. He succeeded his father, Leopold II, in 1792. His reign was a series of wars against Napoleon, in which, with the exception of the last, he was defeated. In 1806, he formally abdicated the crown of the Holy Roman Empire, which was thereby dissolved after an existence of 1000 years. Although narrow-minded, Francis was a popular ruler. He died at Vienna, 1835.

Francis, David Rowland, American merchant, was born at Richmond, Ky., 1850. He was graduated at Washington university, 1870; became partner in a commission house; in 1877, established the commission and grain company of which he became president. He was mayor of Saint Louis, 1885–89; governor of Missouri, 1889–93; and secretary of the interior in President Cleveland's cabinet, 1896-97. He was president of the Louisiana Purchase Centennial exposition of 1904. In 1916, he was made ambassador to Russia, serving until 1921. He published *Russia from the American Embassy*. Died, 1927.

Francis, John Oswald, Welsh dramatist, was born at Merthyr Tydfil, South Wales, 1882. His early education was received in the vicinity of his native town and later at the University College of Wales. He then taught school in Wales, in Paris, and, beginning with 1907, in London. He made literary contributions to *The College Magazine* and some ventures in journalism. His first full length play, *Change*, brought him considerable reputation, winning the Welsh drama competition in 1912. Francis represents the new Welsh movement in the drama. Besides *Change*, the list of his plays includes *The Bake-House*, *The Poacher*, and *For France*.

Francis, Sir Philip, reputed author of the "Junius letters," was born in Dublin, 1740. Leaving Ireland at 12, he entered Saint Paul's school in London, and at 16 became a junior clerk in the secretary of state's office. In 1758, he was a secretary in the expedition against Cherbourg; in 1760, he was secretary on a mission to Portugal; in 1761, he acted as amanuensis to the elder Pitt; and, in 1762, he was made first clerk in the war office. In 1773, Lord North made him a member of the council of Bengal; in 1780, he fought a duel with Warren Hastings, with whom he was always at enmity, and was seriously wounded.

Francis entered Parliament in 1784, and was energetic in the proceedings against Hastings. He was made a knight commander of the bath in 1806, and he was the author of many pamphlets. In 1816, John Taylor wrote a book identifying Francis with "Junius" by remarkably strong circumstantial evidence. Francis, however, never acknowledged having written the 69 letters which appeared in the *Public Advertiser*, 1772. He died in 1818. See *Junius, Letters of*.

Francis de Sales (*sālz*), **Saint,** theologian, orator, and writer, bishop of Geneva, was born at Sales, Savoy, in 1567. He studied law at the University of Padua, where he graduated with distinction but soon gave up the law for the church. He received holy orders in 1593, and, in 1602, was made bishop of Geneva. Together with Saint Jane Frances de Chantal he founded the institute of the Visitation in 1607. His *Introduction to the Devout Life* ranks with the *Imitation of Christ* among the most widely read books of devotion. He wrote also a *Treatise on the Love of God*. He died, 1622, and was canonized, 1665.

Francis Ferdinand of Austria, archduke, was born at Graz, 1863. By the death of Crown Prince Rudolph and of his own father, he became the heir apparent to the Austrian throne. In 1900, he contracted a morganatic marriage with Countess Sophia Chotek, who was made Princess von Hohenburg after renouncing for her children the right of succession to the throne. As a result of a political plot, both were assassinated at Serajevo, Bosnia, June 28, 1914. This tragic event was the precipitating cause of the World War.

Francis Joseph Charles, former emperor of Austria, was born in 1830, son of the archduke Francis Charles and nephew of the emperor Ferdinand I. The revolution of 1848 compelled Ferdinand to abdicate, and at the early age of 18 Francis Joseph was called to rule an empire shaken by civil war. Restored to the mastery of his dominions, he proceeded to undo the work of 1848. The Hungarian constitution was suspended and the absolute authority of the Habsburg monarchy in the Austrian dominions was proclaimed.

It was not until Austria had sustained severe reverses abroad that this absolute régime established by Francis Joseph fell. The demand of Napoleon III that the question of the Lombardo-Venetian states should be referred to a European conference being refused, war was declared. The Austrians were defeated at the battle of Solferino in 1859, and the emperor was compelled to resign all claims to Lombardy. A partial return to constitutionalism was then attempted, and representative diets were restored in the different states.

After suffering defeat by Prussia in 1866, the emperor restored national self-government to Hungary and, in 1867, was declared king of that country. In later years, the emperor's influence in foreign politics was directed chiefly to forming a closer alliance with Germany and Italy. In 1878, the Treaty of Berlin allowed Austria to occupy Bosnia and Herzegovina. Francis Joseph died in 1916 and was succeeded by his grandnephew, Charles I.

Francis of Assisi (*ăs-sē'zē*), **Saint,** founder of the Franciscan order, was born at Assisi near Perugia, Italy, in the year 1182. His father was a rich merchant, named Pietro Bernardone. His baptismal name was Giovanni, "John," but he was renamed Francesco, "Frenchman," by his father, who cherished a fondness for France. As a youth, Francis shared eagerly in the exercises of chivalry and arms. In one of the petty feuds of the time, he was taken prisoner and detained for a year in captivity at Perugia. An illness, which he had contracted during his confinement in prison, forced on him those first religious musings which led to his pilgrimage to Rome in 1206.

Thereafter, Francis renounced his inheritance, broke from his family, and consecrated himself to poverty and religion. No humiliation, no self-sacrifice was too extreme for him. Arrayed in a single brown tunic of coarse woolen cloth, girt with a cord of hemp, he begged at the gates of monasteries, discharged the most menial duties, and served the lepers at Gubbio. He worked with his own hands at the building of the churches of Saint Damian and Santa Maria degli Angeli. His biographers record the celebrated legend of his receiving upon his own person, while in an ecstasy of prayer at Monte Alverno, September 17, 1224, the stigmata of the wounds of his divine Redeemer.

The foundation of the Franciscan order dates from the year 1208. When his brotherhood had increased to eleven, he drew up for them a rule, which was approved at Rome by word of mouth in 1210 by Pope Innocent III. Francis himself returned to Assisi in 1212 and settled the simple constitution of his order, the church of Santa Maria degli Angeli being assigned to him as their home.

In common with the older orders of monastic life, the Franciscan order was founded on the three vows of chastity, poverty, and obedience. Poverty, in the thought of Francis, was first in importance and in spiritual efficacy, and he repudiated all ideas of property, alike for his order and for its members. The passionate fervor and mystic tenderness of the Franciscans spread with irresistible contagion over Europe, and, in 1216, the order was solemnly approved by Pope Innocent. At its first general assembly, held in 1219, 5000 members were present. The order was confirmed in 1223 by Pope Honorius.

The extant writings of Saint Francis consist of letters, sermons, ascetic treatises, proverbs, moral apothegms, and hymns. He also established an order of nuns, generally called, from its first abbess, Clara of Assisi, the order of Poor Clares. Another branch consisted of the tertiarians, or penitents of the third order of Saint Francis. The influence of the Franciscans in the disorganized social condition of the time can scarcely be overestimated. As a literary order, they have been eminent chiefly in theology. They were also the earliest missionaries to America, having come over with Columbus on his second voyage in 1493. Saint Francis died near Assisi, October 4, 1226, and was canonized by Pope Gregory IX in 1228.

Francis of Paola (*pä'ô-lä*) or **Paula, Saint,** founder of the order of Minims, was born in 1416 at Paola in Calabria. At 13 he was a Franciscan; at 19 he retired to a cave and gave himself up to prayer and self-mortification. The fame of his piety having attracted emulators, he obtained permission to erect a convent, and the new order came to be known as the Minim-Hermits of Saint Francis of Paola. Communities were established throughout Europe, but the order did not become extensive and is now limited chiefly to Sicily, Italy, and southern France. Louis XI of France summoned Saint Francis to his deathbed, and Charles VIII built him a convent at Plessis les Tours. He died, 1507, and was canonized in 1519.

Francis Xavier, Saint. See *Xavier, Saint Francis*.

Franck (*frăNk*), **César,** French composer and organist, was born at Liege, 1822. He received his musical education at the conservatories of Liege and Paris. He became organist at Sainte Clotilde. His early compositions met with limited recognition, and, throughout his life, the circle of his admirers remained small though select. In 1872, he succeeded his former instructor Benoist at the Paris conservatory, where his teaching influenced many of the later French composers. After 1900, his greatness as a composer received increasing appreciation, and, by many, he is accorded rank with Berlioz, whom he surpasses in originality. His greater works include the oratorios *Ruth*, *The Redemption*, *The Beatitudes*, and *Rebecca* and the operas *Hulda* and *Ghisèle*. He died in 1890.

Franck (*frănk*), **Harry Alverson,** American traveler and writer, was born at Munger, Mich., in 1881. After an education at Michigan, Harvard, and Columbia universities and in Europe, he taught high school, interrupting his work in 1904-05 to make a journey around the world, largely on foot. Following 1911, he traveled extensively in Central and South America and in the Orient. He was with the American army in France in 1917–19. He wrote fascinating accounts of his travels, heightened in interest by the narration of many daring adventures. His works include *A Vagabond Journey around the World*, *Working North from Patagonia*, and *On the Fringe of the Moslem World*.

Franck (*frănk*), **James,** German physicist, was born in 1882. In 1912, while at the University of Berlin, he, with a colleague, Dr. Gustav Hertz, devised the first experimental verification of Planck's theory that light and other forms of radiation travel, not in continuous waves, but in bundles, or "quanta." Franck later became professor of physics at the University of Gottingen. With Dr. Hertz, he received the Nobel prize in physics for 1925.

Frank, Glenn, American educator, was born at Queen City, Mo., in 1887. He was educated at Northwestern university, and was assistant to the president there from 1912 to 1916. After several years' connection with the Century magazine, he was editor in chief from 1921 to 1925, attracting wide attention by reason particularly of his forward-looking views on education. In 1925, he was chosen president of the University of Wisconsin.

Franklin, Benjamin, American statesman, diplomatist, author, and philosopher, was born in Boston, Massachusetts, January 17, 1706. After two years at school, he was obliged to leave his studies and assist his father, a dyer, tallow chandler, and soap boiler. In his twelfth year Franklin was apprenticed to his brother, a printer, in a business which promised to afford better opportunities to gratify his thirst for knowledge.

Original articles written by Franklin were accepted for publication in his brother's paper, the editor not knowing the source. His brother became jealous, and Franklin determined to leave him and begin in the world for himself. He consequently sold some of his books, ran away from Boston in October 1723, went to New York, and later to Philadelphia, where he soon found employment with a printer named Keimer.

Publishing Enterprises. In 1724, under the patronage of Sir William Keith, governor of the province, who proposed to set him up in business, Franklin embarked for London to buy type. He soon found that he had relied too confidently upon Sir William's promises, and he was compelled to find employment in London printing houses. He returned to Philadelphia in October 1726, and, shortly afterward, he joined with a fellow workman, Meredith, in establishing a newspaper, the Pennsylvania *Gazette*. Poverty and disappointments continued with him for a time, but ultimately his skill and industry prevailed.

His subsequent efforts in pursuit of fortune and independence were eminently successful. The circulating library in America was established by him. In 1732, he first issued his celebrated almanac, commonly known as *Poor Richard's Almanac*. He continued this publication for 25 years, and its pithy sentences won him great popularity. In 1733, Franklin began to study languages, and became familiar with French, Italian, Spanish, and Latin.

Political Activities. In 1736, he was chosen clerk of the general assembly of Pennsylvania, and, in the following year, he became postmaster of Philadelphia. These preferments turned his attention to statecraft. He effected a reformation in the system of city police and promoted the establishment of a fire company, the first in America. He also organized a militia for the defense of the province. In 1743, he initiated the plans for an academy, which became the germ of the University of Pennsylvania.

Scientific Work. Notwithstanding the multiplicity of his public duties, Franklin found leisure to pursue scientific investigations on electricity. In 1752, he demonstrated the identity of electricity and lightning and announced a plan for defending houses from lightning by the use of pointed conductors. His renown spread over the whole civilized world. The universities of Oxford, Saint Andrews, and Edinburgh made him doctor of laws, and he was elected an associate of the academy of sciences at Paris.

Diplomatic Career. In 1753, Franklin was made deputy postmaster-general for the British colonies in America, and, in the same year, he established the academy of sciences in Philadelphia. In 1757, he was sent to England as the agent for Pennsylvania and was employed in the same capacity by three other colonies. He returned to America in 1762 and took his seat in the colonial assembly. But, two years later, he was again sent to England as an agent for Pennsylvania. He remained abroad until 1775. He was a member of the Continental Congress and signed the Declaration of Independence on July 4, 1776.

During the whole period of the Revolution, Franklin was active in a civil capacity at home or abroad. Congress sent him as a commissioner to the French court in 1776. He was one of the most accomplished and adroit diplomats at Versailles, where he was received enthusiastically as a *savant* and patriot. In 1778, he induced the French government to form with the colonies the alliance that eventually compelled England to concede their independence.

In 1785, Franklin returned to Philadelphia. Two years later, he was a delegate to the Federal Constitutional convention, and, in 1788, he retired from active public life, using his pen, however, as vigorously as before.

Character and Genius. Franklin was never deliberately an author. All his writing was done with a practical aim. He was deficient in poetic imagination and appreciation of the spiritual side of human nature, but he was endowed with distinctive humor and wisdom. Throughout his life, he exhibited to a marked degree the virtues of industry, perseverance, generosity, and self-command. His most important achievements were in the field of diplomacy. Died in Philadelphia, April 17, 1790.

Franklin, Edward Curtis, American chemist, was born at Geary City, Kans., 1862. He was graduated at the University of Kansas, 1888, and studied at the University of Berlin and at Johns Hopkins. He was assistant, associate professor, and professor of chemistry, University of Kansas, 1888–1903; was associate professor of chemistry, Leland Stanford Jr. university from 1903 to 1906, when he was appointed professor of organic chemistry. In 1906, he served also on the United States assay commission and, during 1911–13, was chief of the division of chemistry of the United States public health service. In 1918, he was physiological chemist to the United States bureau of standards. He was president of the American chemical society for the year 1923. His writings include various papers on liquid ammonia as an electrolytic solvent, on ammoniacal compounds, and on other chemical subjects.

Franklin, Sir John, English rear admiral, arctic explorer, and colonial governor, was born at Spilsby, Lincolnshire, 1786. He was appointed to command the *Trent* in the expedition sent out in 1818 for the discovery of a northwest passage. He made a second expedition, during 1825–27, and for his achievements was knighted in 1829. In 1845, he commanded another expedition for the discovery of the northwest passage. He had with him two ships, the *Erebus* and the *Terror*, with 129 chosen officers and men. He sailed from Greenhithe, May 19, 1845, and was last seen July 26.

Many expeditions were sent out in search of the missing boats and their crews. The relics and skeletons found later proved that Sir John Franklin and his men perished by starvation and exposure in 1847. He is entitled to the honor of being the discoverer of the northwest passage from the Atlantic to the Pacific. A monument was erected to him, 1875, in Westminster Abbey.

Franklin, William Suddards, American physicist, was born in Geary City, Kansas, 1863. He was graduated at the University of Kansas in 1887 and later studied at Cornell university and at the University of Berlin. He was assistant professor of physics at the University of Kansas, 1887–90, and professor of physics and electrical engineering at Iowa State college, 1892–97. From 1897 to 1915, he was professor of physics at Lehigh university. After serving in various capacities as a scientific specialist during the World War, he was made professor of physics at the Massachusetts institute of technology. Besides numerous scientific papers, his works include *Elements of Physics* (jointly with B. MacNutt), *Elements of Alternating Currents*, *Elements of Electrical Engineering*, *Dynamo Laboratory Manual*, *Elements of Mechanics*, *Practical Physics*, *Electric Waves*, and *Electric Lighting*.

Franz (*frănts*), **Robert,** German song composer, was born at Halle, 1815. He studied music for two years at Dessau and returned to Halle, where he devoted himself to the works of Bach, Handel, and Schubert. His first published songs, 1843, won warm praise from Schumann, Liszt, and Mendelssohn. He later became organist, conductor of singing, and musical director at the university. He published about 250 songs, a kyrie, chorales, and arrangements of the vocal masterpieces of Bach and Handel. Franz's best songs rank with those of Schubert and Schumann. He died in 1892.

Franzén (*frän-sān'*), **Frans Michael,** Swedish poet, was born in Ulealborg, Finland, 1772. He was educated at Abo, became librarian of the university there, and, in 1801, was made professor of history and ethics. After the conquest of Finland by the Russians, he settled in Sweden as a clergyman, finally removing to Stockholm, where he was made bishop. He wrote *Emili, or an Evening in Lapland*; *Columbus*; *Gustav Adolf in Germany*; and many religious songs. He died in 1847.

Franzos (*frän'tsōs*), **Karl Emil,** Austrian novelist, was born in Russian Podolia of Jewish parentage, 1848. He passed his earliest years in the Polish-Jewish village of

Czortkow in Galicia. Left an orphan at an early age, he was educated at Czernowitz. He studied law, but afterward settled as a journalist in Vienna. Among his principal works are *Aus Halb-Asien*—sketches of South Russia and Rumania—and the novels *Junge Liebe, The Jews of Barnow, Moschko von Parma, For the Right, Mann und Weib, Tragische Novellen,* and *Der Wahrheitsucher.* Franzos's tales are full of deep pathos. He died in 1904.

Frasch, Herman, chemist and inventor, was born at Gaildorf, Germany, in 1852. He was educated as a pharmacist; came to America in early youth; and, in 1874, established a laboratory at Philadelphia. His earlier inventions were concerned chiefly with the production of oil, salt, wax, and white lead. In 1885, he engaged in petroleum refining in Canada. In connection with the processes which he developed for producing oils of great purity, he secured many important patents. These inventions were later purchased and extensively utilized by the Standard Oil Company. In 1890, Frasch patented an apparatus which largely revolutionized the sulphur industry. For his many achievements in chemical engineering, he was awarded the Perkin medal in 1912. Died in 1914. See *Sulphur.*

Fraser, James Earle, American sculptor, was born at Winona, Minn., in 1876. He was educated in the public schools of Minneapolis and studied sculpture at the art institute, Chicago, and under Falguière in Paris. From 1906 to 1911, he was instructor at the art students' league, New York. Among his principal works are the bust of Theodore Roosevelt, Senate Chamber, Washington; a statue of Bishop Potter, cathedral of Saint John the Divine, New York; "End of the Trail," a statue now in San Francisco; the John Hay memorial, Cleveland; a statue of Alexander Hamilton, Washington; and war memorials for the Bank of Montreal at Montreal and Winnipeg. He designed, in 1913, for the United States government, the nickel five-cent piece having an Indian head and a buffalo; the Victory medal in 1919; and the medal of the American academy of arts and letters. He was made a member of this academy in 1927.

Fraunhofer (*froun'hō-fĕr*), **Joseph von,** German optician and physicist, was born at Straübing in Bavaria, 1787. In 1807, he was employed to found an optical institute at Benediktbeuern, which, under his management, was removed in 1819 to Munich. He invented many optical instruments, but is most celebrated for his improvements in telescope prisms, in the mechanism for manipulating large telescopes, and especially for his discovery of the dark lines in the sun's spectrum, called Fraunhofer's lines. Died, 1826.

Frazer, Sir James George, British anthropologist, was born at Glasgow in 1854. He was educated at Glasgow university and at Trinity college, Cambridge. In 1879, he was elected fellow of Trinity college and was later called to the bar. In 1907, he was made professor of social anthropology at Liverpool. His published works are of great importance in the study of anthropology, especially those concerned with the development of religion and myth, which he connects closely with magic. His principal work is *The Golden Bough.* This was first published in 1890 and was reissued with enlargements under several titles between 1907 and 1915. It contains an elaborate study of the Greek cults, their varied origins, and their place in the comparative history of religion. Among his other works are *Totemism, Pausanius's Description of Greece, The Scope of Social Anthropology, Folklore in the Old Testament, Sir Roger de Coverley,* and *Apollodorus.*

Frederick I, called Barbarossa or "Redbeard," was born about 1121 and became emperor of Germany in 1152. His reign was a long struggle with powerful vassals at home and with Lombardy and the pope in Italy. He captured and razed Milan in 1162 and took Rome by storm five years later. His army was, however, smitten with the plague, and Lombardy again revolted, winning independence by defeating Frederick at Legnano in 1176. At home, he managed his vassals by conciliation and by keeping the balance of power among them equal. He asserted his power over Poland, Hungary, Denmark, and Burgundy. At the height of his fame and influence, he took the cross to fight against Saladin. He defeated the Mohammedans in two battles, but was drowned in Cilicia, 1190.

Frederick VI, king of Denmark, son of Christian VII, was born in 1768. In 1784, he was declared regent on account of his father's incapacity. With the help of his minister Count Bernstorff, he abolished serfdom, reformed the criminal code, removed the disabilities of the Jews, and prohibited the slave trade. By the advice of Bernstorff, he strove to maintain strict neutrality in the wars of the epoch. But, for refusing the demands of the English, the Danish fleet was almost destroyed in 1801, and, in 1807, Copenhagen was bombarded, and the remnants of the fleet were transferred to England. Denmark then became an ally of Napoleon and shared his fortune. Frederick ascended the throne on the death of his father in 1808. In 1814, Norway was taken from Denmark by the states allied against Napoleon and was given to Sweden. The country had become bankrupt in 1813, but, by Frederick's wise measures, financial order was finally restored. Died, 1839.

Frederick the Great, or **Frederick II,** king of Prussia, was born in Berlin, January 24, 1712. In 1730, he endeavored by flight to escape from his father's control, but was arrested, tried as a deserter, and condemned to death. He was pardoned, however, through the intercession of Charles VI of Austria. In 1733, Frederick was compelled by his father to marry Elizabeth Christina of Brunswick. From 1732 to 1740, his time was devoted principally to literary amusements and society.

Conquest of Silesia. Frederick became king of Prussia on May 31, 1740, and his dormant energies at once awoke to action. In October, he marched an army into Silesia, most of which he obtained for Prussia by the Treaty of Breslau in 1742. This action was opposed by Austria, which proceeded to form, with England and Sardinia, the so-called Triple Alliance. Frederick executed a countermove by concluding a treaty with France and the elector of Bavaria. In 1744, Frederick anticipated the designs of Austria upon Silesia by marching into Bohemia. At the end of 1745, he found himself in possession of Dresden, the capital of Saxony, and in a position to dictate terms of peace to Austria and Saxony, thereby confirming himself in the possession of Silesia.

Patronage of Literature. During the next ten years, Frederick resided chiefly at Potsdam, exercising a minute superintendence over every branch of government, but without depriving himself of social pleasure or abandoning his literary pursuits. At this time, he began his *History of My Age* and wrote his *Memoirs of the House of Brandenburg.* He restored the academy of sciences of Berlin and was eager to enroll distinguished foreigners among its members and to induce them to resort to his capital. Among the notable men attracted to his court were Euler and Voltaire. The latter, after a three-year sojourn, quarreled with the monarch and returned to France. Frederick ignored German writers and consistently fostered French culture at his court.

Later Activities. In 1756, Frederick learned that a new coalition, including Russia and his former ally, France, was forming against him. England was his only ally during the bitter struggles of the ensuing Seven Years' war, in which Frederick proved himself to be a brilliant military leader. Ultimately, by the Treaty of Hubertusburg, signed February 15, 1763, Frederick was again left in possession of Silesia. To cure the evils inflicted by warfare, Frederick set himself to restoring the strength of the exhausted population. He emancipated the peasants from hereditary servitude and then began a gradual alteration of the fiscal system. His *History of the Seven Years' War* was written at this period.

In 1772, Frederick joined in the nefarious project for the first partition of Poland. He gained a territory of no great extent, but of considerable value for strategic purposes. In 1778, he led an army into the field to prevent the illegal partition of Bavaria, and, in 1785, he again found cause to oppose Austria, this time in defense of the integrity of the German constitution. To secure his purpose, he found it sufficient to negotiate a confederation among the chief powers of Germany, known as the Fürstenbund, which was bound to support the constitution of the empire and the rights of the several princes. Frederick died at Sans Souci, near Potsdam, August 17, 1786.

Frederick William, elector of Brandenburg, was born in Berlin, 1620. On his accession in 1640, he found the state disorganized and exhausted by the Thirty Years' war. He carefully regulated the finances, made a treaty of neutrality with Sweden, organized an army, and strove to repeople his deserted towns and villages.

By the Treaty of Westphalia, 1648, he recovered eastern Pomerania, Halberstadt, Minden, and the archbishopric of Magdeburg. Out of a quarrel between Sweden and Poland he contrived to secure the independence of the duchy of Prussia from Poland, 1657. Alarmed by the aggressions of Louis XIV on the Rhenish frontier, he organized a league against France and defeated the Swedes, the allies of Louis, at Fehrbellin, 1676. However, deserted by his friends, he was obliged to agree to the Treaty of Saint Germain, 1679, by which he restored all his conquests to the Swedes on the payment to him of 300,000 crowns.

The remainder of the elector's reign was devoted to the consolidation of his dominions and to the development of their resources. He encouraged the immigration of exiled French Protestants, Dutchmen, and other foreigners. He founded the royal library at Berlin, reorganized the universities, opened canals, established posts, greatly enlarged Berlin, and left a well filled exchequer and a highly organized army. He made Brandenburg virtually an absolute monarchy only less powerful than Austria. Died at Potsdam in 1688.

Frederick William I, king of Prussia, son of Frederick I, was born, 1688. On his accession in 1713, he became embroiled in the war waged by Sweden against Russia, Poland, and Denmark, at the end of which he acquired Pomerania with Stettin. The remainder of his reign was devoted to improving the internal condition of Prussia. He was sternly practical, blunt, and determined; he despised the arts and sciences, was rigidly economical, and strict in his ideas of justice. He fostered industry and agriculture, secured an adequate income for the state, and established an army of more than 80,000 men, the best disciplined force in Europe. Died, 1740.

Frederick William III, of Prussia, son of Frederick William II, was born in 1770. The truculent policy of Napoleon roused the spirit of the nation, and the king saw himself obliged, in 1805, to agree to a convention with Russia, the real object of which was to drive Napoleon out of Germany. By the intervention of the emperor Alexander of Russia, a peace was concluded, known as the Treaty of Tilsit, by which Frederick William lost the greater part of his realm and was deprived of all but the semblance of royalty.

The disastrous termination of Napoleon's Russian campaign was the turning point in the fortunes of Prussia. The part taken by the Prussian army under Blücher in gaining the victory of Waterloo, by which Napoleon's power was finally broken, raised the kingdom from its abasement. From that time, Frederick William devoted himself to the improvement of his exhausted states. He concluded the German commercial league known as the *Zollverein*, which organized the German customs and duties into one uniform system. Died, 1840.

Freeman, Edward Augustus, English historian, was born at Harborne, 1823. He was educated at Trinity college, Oxford. His first work was a *History of Architecture*, 1849. After several minor works, his most important one, *The History of the Norman Conquest*, appeared between 1867 and 1879 and was followed by *The Reign of William Rufus*. He also wrote histories of the Saracens and of the Ottoman power in Europe, *General Sketch of European History*, *Growth of the English Constitution*, *Comparative Politics*, *Historical Geography of Europe*, and various other works. In 1884, he was appointed regius professor of modern history at Oxford. Died in 1892.

Freeman, Mary Eleanor Wilkins, American novelist, was born at Randolph, Mass., 1862. She was educated there and at Mt. Holyoke seminary; for many years, was secretary to Oliver Wendell Holmes; and came into prominence as a writer for magazines, contributing poems, short stories, and novels. She married Dr. Charles M. Freeman, 1902. Her fiction, which is devoted chiefly to interesting portrayals of New England life, ranks among the best of its kind. Her writings include *Young Lucretia*, *Evelina's Garden*, *The Love of Parson Lord*, *The Portion of Labor*, *The Wind in the Rose Bush*, *By the Light of the Soul*, *Shoulders of Atlas*, and *A New England Nun and Other Stories*.

Frémiet (*frā'myĕ'*), **Emmanuel,** French sculptor, was born at Paris, 1824. He studied at La Petite Ecole and under Rude; made drawings at the Jardin des Plantes; and later drew plates for medical works. His first sculptural work was a gazelle. His masterpiece is an equestrian statue of Joan of Arc. His other pieces include "Gorilla Abducting a Woman," "Saint Michael," "Faun and Young Bear," "Dachshund," "The Man of the Stone Age," "Meissonier," and statues of De Lesseps, Du Guesclin, Napoleon, and Condé. At the Saint Louis exhibition in 1904, his work was represented by bronze statues of Saint George, a "Gorilla of Gabun," and "Race Horses." Frémiet's work is marked by power, realism, and originality, and he ranks with Barye among the leading modern sculptors of animals. Died, 1910.

Frémont (*frē-mŏnt'*), **John Charles,** "the pathfinder," distinguished explorer of the Rocky mountains, was born at Savannah, Ga., 1813, and was educated at Charleston college, S. C. He taught mathematics on a warship for two years and, in 1838, began surveying. In 1842, he crossed the Rocky mountains and demonstrated the feasibility of an overland route across the continent. In 1843, he explored Great Salt lake, advancing to the mouth of the Columbia river; in 1845, he examined the watershed between the Mississippi and the Pacific.

During the Mexican war, he cleared northern California of Mexican troops, but, quarreling with his superior officers, resigned his captaincy. In 1848, he started upon a fourth expedition, along the upper Rio Grande, but was compelled to return to Santa Fe after unspeakable sufferings. In 1849, he crossed over to California, where he settled and, in the following year, became United States senator from the new state. In 1856, he was the Republican and Antislavery candidate for the presidency. In 1861 62, he served in the regular army as major general, but resigned rather than serve under General Pope. He was governor of Arizona, 1878–82. Died, 1890.

Fremstad (*frĕm'stăd*), **Olive,** dramatic soprano, was born at Stockholm, Sweden, about 1870. She received her early musical education in Christiania and, at the age of 12, came with her parents to America, settling in Minneapolis. At 16, she sang in choirs, and, in 1890, she began musical study in New York. After making her début as a concert singer in 1892, she studied for two years with Lilli Lehmann in Berlin. In 1895, she made her first appearance in opera as Azucena in *Il Trovatore* at Cologne, where she was a member of the opera, 1897–99, also appearing in Vienna, Antwerp, and Amsterdam. From 1900 to 1903, she was engaged by the royal opera in Munich, singing also at Covent Garden, London.

Late in 1903, with notable success, she made her first American appearance in opera as Sieglinde in *Die Walküre* at the Metropolitan opera house, New York, where, for many seasons, she appeared in all the great Wagnerian rôles, of which she ranks among the world's foremost interpreters. She also created the part of Salome in the opera by Strauss and was a *lieder* singer of distinction.

French, Alice, "Octave Thanet," American novelist, was born at Andover, Mass., 1850, and received her education there at Abbott academy. Her life has been spent largely in the South and the West, chiefly in Arkansas and Iowa. Although inclined to social and economic themes, she won her first literary success with short stories, particularly those descriptive of the newly settled regions in which she had located. Among her writings are *Knitters in the Sun*, *Otto the Knight*, *An Adventure in Photography*, *A Book of True Lovers*, *The Heart of Toil*, *A Slave to Duty*, *The Lion's Share*, *A Step on the Stair*, and *And the Captain Answered*.

French, Daniel Chester, American sculptor, was born at Exeter, N. H., 1850. He was educated in Exeter, N. H., and at the Massachusetts institute of technology, Boston; studied art with William Rimmer in Boston, with J. Q. A. Ward in New York, and with Thomas Ball in Florence, Italy. After a short residence in Boston and in Concord, Mass., he became permanently established in New York, 1887.

Among his best-known earlier works are "The Minute Man of Concord," at Concord, Mass.; a statue of General Cass, in the Capitol at Washington; a statue of Rufus Choate, Boston courthouse; one of John Harvard, at Cambridge, Mass.; "Dr. Gallaudet and His First Deaf-Mute Pupil"; "Death and the Sculptor"; and the colossal "Statue of the Republic," at the World's Columbian exposition. Among his later works are the statue of Washington presented to the French nation; "Alma Mater," at Columbia university; the four groups of the "Continents," New York customhouse; Alice Freeman Palmer memorial, Wellesley college; the Melvin memorial, "Mourning Victory," at Concord, Mass.; the Marshall Field memorial, Chicago; the seated figure of Emerson at Concord library; and a statue of Lincoln, Lincoln, Nebr.

His style is distinctly American and combines beautiful technique and fine sculptural composition with high intellectual qualities. By his versatility and the sustained excellence of his numerous works, he ranks next to Saint-Gaudens among American sculptors. He was elected a member of the American academy of arts and letters in 1905.

French, Lord John Denton Pinkstone, British soldier, was born at Ripple Vale, Kent, 1852. He served first in the navy; entered the army in 1874; and was in the Sudan campaign, 1884-85. He became lieutenant general in the Boer war, having command of the British cavalry forces, and was made general in 1907 and field marshal in 1913. He resigned early in 1914 as a protest against an impending coercion of Ulster, but, on the outbreak of the World War in 1914, he immediately rejoined the army. He led the British expeditionary forces in France until December 1915, when he was made commander in chief of the armies in the United Kingdom and was created earl of Ypres. At the end of the war, he published his personal narrative in *1914*. He was lord lieutenant of Ireland from 1918 to 1921. Died, 1925.

Freneau (*frē-nō'*), **Philip,** American poet, was born in New York City, 1752, of French Huguenot descent. He graduated at Princeton in 1771. In 1776, he visited the West Indies and, in 1778, went to the Bermuda islands. In 1780, during the Revolutionary War, he again sailed for the West Indies, but was captured by a British cruiser. After the return of peace, Freneau became in succession editor of a newspaper and captain of a ship that plied between New York, the West Indies, and the Southern states. When Jefferson was secretary of state, Freneau was made translator for the state department. He also became editor of the *National Gazette* and the *Jersey Chronicle*.

Freneau was the earliest American poet of genuine ability. His finest poems are lyrics, among which are *The Indian Burying-Ground*, *The Wild Honeysuckle*, and *Eutaw Springs*. His effective satires include *The Prison Ship*, *The Midnight Consultation*, and *America Independent*. Died, 1832.

Frère (*frâr*), **Pierre Edouard,** French painter, was born at Paris, 1819, and studied under Delaroche and at the Ecole des Beaux-Arts. His paintings are mostly figures and scenes from domestic life, excellent in color and true and wholesome in sentiment. They are good subjects for engraving and are well known in art stores. Ruskin was enthusiastic in praise of several of his works. "The Seamstress," "Little Gourmand," "Preparing for Church," and the "Gleaner Boy" are among his best-known pictures. "Preparing for Church" is in the Corcoran gallery at Washington. Died in 1886.

Fresenius (*frâ-zā'nē-ŏŏs*), **Karl Remigius,** German chemist, was born at Frankfort on the Main, 1818. He studied at Bonn and Giessen under Liebig and, in 1845, became professor of chemistry at Wiesbaden. The laboratory founded by him in 1848 subsequently gained great celebrity in chemical science. He was a skillful analyst, and his works have been translated into many languages. Many of his valuable and original papers were published in *Zeitschrift für analytische Chemie*, which he founded in 1862 and edited until his death in 1897.

Fresnel (*frâ'nĕl'*), **Augustin Jean,** French physicist, was born at Broglie, Eure, France, 1788. He was educated at the polytechnic school in Caen and, in 1816, received a permanent appointment in Paris, where he collaborated with the celebrated Arago. He distinguished himself by his experiments on the inflection and polarization of light and, in 1819, gained the prize offered for the best treatise explanatory of the phenomena of light.

Independently of Thomas Young, he disproved Newton's corpuscular theory of light by brilliant experiments which confirmed the undulatory theory. He advanced the theory that light is due to wave motion and that these waves are perpendicular, or transverse, to the direction of the propagation of the waves. He invented the compound lighthouse lens. He died in 1827. His works were published in 1866 by the French government.

Freud (*froit*), **Sigmund,** Austrian physician and the founder of psychoanalysis, was born at Freiberg, now in Czechoslovakia, 1856, and was educated at the University of Vienna and in Paris. In 1892, he became assistant professor of neuropathology at the University of Vienna, in which capacity he attained wide celebrity for a method of treating hysteria and other nervous disorders by recalling to consciousness certain groups of ideas normally submerged. Related to this method is a theory of dreams formulated by him. His chief publications include *Studies on Hysteria, Wit and Its Relation to the Unconscious, Interpretation of Dreams*, and *Psychoanalysis*.

Freund (*froint*), **Wilhelm,** German philologist, was born of Jewish parents at Kempen in Posen, 1806. He studied at Berlin, Breslau, and Halle; taught at Breslau, Hirschberg, and Gleiwitz; and finally settled down to a literary life at Breslau. On his monumental *Wörterbuch der lateinischen Sprache* most Latin-English dictionaries are based. He died in 1894.

Freytag (*frī'tăk*), **Gustav,** German novelist and dramatic writer, was born in Silesia, 1816. He studied at Breslau and Berlin; lectured on German literature in the University of Breslau; and edited a newspaper at Leipzig, 1848–70. He wrote poems, successful plays, novels, and dramatic criticism. His best-known novel is *Soll und Haben*, "Debit and Credit," which has appeared in several English translations. *The Lost Manuscript* and the historical series called *Our Ancestors* were almost as popular. His other important works include *Die Journalisten*—one of the finest of German comedies—and *Die Technik des Dramas*. Died at Wiesbaden, 1895.

Frick, Henry Clay, American manufacturer and capitalist, was born in West Overton, Pa., 1849. He began business life as a clerk for his grandfather, a flour merchant and distiller, and later embarked in a small way in the coke business. He was president and, in 1897, was made chairman of the board of directors of the H. C. Frick Coke Company, which became the largest coke producer in the world, operating nearly 40,000 acres of coal and 12,000 coke ovens, with a daily capacity of 25,000 tons. He came into public notice by his vigorous management during the strike at Homestead, 1892, when he was several times shot and stabbed by one of the strikers. He was elected chairman of the board of managers of the Carnegie Steel Company in 1892; he was also director or officer in numerous other business enterprises. On his death in 1919, he bequeathed his New York mansion with its art collection to the city. This bequest had an estimated value of 50 million dollars, and to it Frick added an endowment fund of 15 million dollars. He bequeathed also a handsome park to the city of Pittsburgh.

Friday, David, American economist, was born at Coloma, Mich., in 1876 and was educated at the University of Michigan, where he began to teach in 1908 and became professor of economics in 1912. After three years spent as professor of economics in New York university, he returned to the University of Michigan as professor of political economy in 1919. He was president of Michigan agricultural college, 1921-23, and was then made professor of economics in the New School for Social Research. He was statistical adviser to the United States treasury in 1918 and has rendered similar service to many important corporations. His publications include *Problems in Accounting* and *Profits, Wages and Prices*.

Fried (*frēt*), **Alfred Hermann,** German publicist, was born in Vienna, 1864. In 1883, he settled in Berlin as a bookseller and later became an author. In 1891, he began to devote himself to the peace movement. In 1892, he founded the German peace society and undertook the editorship of the *Friedenswarte*. In 1911, he was awarded the Nobel peace prize with Tobias M. C. Asser. His numerous published works include *Friedenskatechismus, Tagebuch eines zum Tode Verurteilter, Handbuch der moderne Friedensbewegung, Pan-Amerika, Der kranke Krieg*, and *Der Kaiser und der Weltfrieden*, the last published in English in 1912 as *The Kaiser and World Peace*. Died, 1921.

Frobisher (*frŏb'ĭsh-ĕr*; *frō'bĭsh-ĕr*), **Sir Martin,** English navigator, was born about 1535 and was brought up to the sea. Persuaded that there was a northwest passage to the Indies, he obtained three vessels from the government of Queen Elizabeth in 1576, explored portions of the arctic coast, and, passing through the strait which has since borne his name, returned to England.

He was enabled by the queen to make two more voyages of exploration, in 1577 and 1578. In 1585, he went with Sir Francis Drake to the West Indies. He contributed by his gallantry toward the defeat of the Spanish armada in 1588 and received the honor of knighthood. In 1590 and 1592, he successfully commanded squadrons against the Spaniards, and, in 1594, having been sent to the aid of Henry IV of France, he was wounded and died on his homeward voyage. Frobisher was one of the ablest navigators of his time and ranks among England's great naval heroes.

Froebel (*frû'bĕl*), **Friedrich Wilhelm August,** German educator, founder of the kindergarten system, was born at Oberweissbach, Thuringia, 1782. He studied at Jena, Gottingen, and Berlin; served in the German army against the French, 1813-14; and, in 1816, founded a school at Griesheim, which he removed in 1817 to Keilhau, near Rudolstadt. He also founded a kindergarten at Blankenburg in 1837.

His system was based on the principles advocated by Pestalozzi,—under whom he worked from 1807 to 1809,—which combined physical, moral, and intellectual training, beginning with the early years of childhood. Froebel's influence upon modern education, by emphasizing the value of motor-expression and social participation, has been notably effective, particularly in the United States, where it has led to the kindergarten system, the manual training movement, and other radical changes in elementary school methods. His chief works are *The Education of Man* and *Mother's Songs, Games, and Stories*. Died at Marienthal, 1852. See *Educational Reformers*.

Frohman, Charles, American theatrical manager, brother of Daniel Frohman, was born at Sandusky, Ohio, 1860. He was educated in the public schools of New York; in 1877, took charge of a company playing *Our Boys*; was with Wm. Haverly's minstrels in United States and Europe, 1879-80. In 1888, he saw *Shenandoah* at Boston museum; organized a company and bought rights to that play, outside of Boston; enjoyed great success with that and succeeding ventures; and, in 1890, organized the Charles Frohman Stock Company. He became proprietor and manager of the Empire, Criterion, Lyceum, Garrick, Savoy, and Knickerbocker theaters, New York, and the Duke of York's, Comedy, Globe, and Adelphi theaters, London. As manager, he brought out Maude Adams, Julia Marlowe, John Drew, and other prominent actors. In 1905-06, he managed the fine Shaksperian productions of E. H. Sothern and Julia Marlowe. Was drowned on the *Lusitania*, 1915.

Frohman, Daniel, American theatrical manager, brother of Charles Frohman, was born at Sandusky, Ohio, 1853. He received a common school education and became office boy of the New York *Tribune*, 1866. He remained in the newspaper business for five years; then appeared as manager of theatrical companies traveling through the United States and later as manager of Fifth Avenue, Madison Square, Lyceum, Daly's theaters, New York. He was also manager of English and American stars and theatrical companies and president of the actors' fund of America. He wrote *Memories of a Manager*.

Froissart (*frwŏ'sär'*), **Jean,** French poet and chronicler, was born at Valenciennes, 1338. He was educated for the Church, but early devoted himself to poetry, to tales of chivalry, and to travel. In 1361, he went to England to present a poem to Queen Philippa and became secretary to King John. In 1365, he visited the Scottish court and, in 1368, traveled in Italy. About 1370, he entered the service of Duke Wenceslas of Luxemburg. For 10 years, he

was devoted to the writing of his famous *Chronicles*. He again traveled for 15 years, after which he revised the *Chronicles*.

The most valuable part of this work is that describing events and wars from 1325 to 1400. While often inaccurate in details, it presents a remarkably faithful picture of the general character and manners of the age. He wrote many verses and a long poem of chivalry, *Meliador*. He is said to have died at Chimay about 1410.

Fromentin (*frō'măn'tăn'*), **Eugène,** French painter and author, was born at La Rochelle, France, 1820. He was a pupil of Rémond and Cabat; traveled in Algeria, Egypt, and the East in 1846 and 1848; and was made an officer of the legion of honor, 1859. He wrote the successful romances *Dominique* and *Les Maîtres d'autrefois*. He became distinguished for his paintings of the Sahara and his portrayals of Arab life. Some of his best pictures are "Crossing the Ford," "Arabs Watering Horses," "Encampment in Atlas Mountains," "The Falcon Hunt," and "An Arab Camp." Many fine examples of his work are in American collections, particularly in the Walters gallery, Baltimore, and the Metropolitan museum, New York. Died, 1876.

Frontenac (*frŏn'tē-năk*; Fr. *frôn'tē-nàk'*), **Louis de Buade, Comte de,** French colonial officer, governor of Canada, was born in 1620. He served in the French army and, in 1672, was appointed governor of the French possessions in North America. He was recalled after ten years of controversy with the Jesuits, but he had gained the confidence of the settlers and the respect of the Indians; in 1689, when to constant attacks from the Iroquois a war with England was added, he was again made governor. He carried his punitive expeditions to the New England villages, repulsed a British attack on Quebec, and completely broke the power of the Iroquois. He died at Quebec, 1698.

Frost, Arthur Burdett, American illustrator and author, was born at Philadelphia, Pa., 1851. He worked as an engraver and lithographer, but was mainly self-taught in art. In 1876, he entered the employ of Harper and Brothers, New York, where he was associated with Abbey, Alexander, and Reinhart. Naturalness, fine draftsmanship, and good humor characterize his extensive illustrative work. He published *Bull Calf and Other Tales, Golfer's Alphabet, Stuff and Nonsense, Sports and Games in the Open, Book of Drawings*, and *Carlo*. Died, 1928.

Frost, Robert, American poet, was born in San Francisco, 1875, and studied at Dartmouth and at Harvard. He engaged in farming at Derry, N. H., 1900–05; taught English at Pinkerton academy there, 1905–11; and was instructor in psychology at the state normal school, Plymouth, N. H., 1911-12. He then spent three years in England, during which time he published two volumes of poems,—*A Boy's Will* and *North of Boston*,—which display much poetic ability and won wide recognition. He served as professor of English at Amherst college from 1916 with intervals of association with the University of Michigan in 1921-23 and 1925-26. He won the 1924 Pulitzer prize for poetry.

Froude (*frōōd*), **James Anthony,** English historian, was born at Dartington, 1818. He was educated at Oriel college, Oxford, and was intended for the church, but he abandoned this career and a fellowship on account of a change of views explained in his *Nemesis of Faith*. In 1892, he became professor of history at Oxford university.

His chief historical work is *The History of England from the fall of Wolsey to the Defeat of the Spanish Armada*; he wrote also *The English in Ireland*. In literature, his best-known works are those on the Carlyle family and *Erasmus*. He wrote also a novel—*The Two Chiefs of Dunboy*—and many miscellaneous works, including *Cæsar, Life of Lord Beaconsfield, Life of Carlyle*, and *Oceana*. His accuracy in detail has been greatly criticized, but his brilliant yet lucid style and his power of presenting broad effects have secured for his histories great influence and popularity. Died, 1894.

Fry, Elizabeth, English philanthropist, was born in Norfolk, 1780, of Quaker parentage. When she was 18 years old, she heard a sermon in a Friends' meetinghouse that turned her thoughts toward philanthropy. She began working among the poor and founded a school for poor children. She married and later became a preacher among the Friends. In 1813, she first saw the miserable condition of the women in the Newgate prison, and her attention was turned to prison reform. By her efforts, a school and a manufactory were begun in the prison; an association was formed to improve the prisoners and provide them with religious instruction; and a matron was appointed. Mrs. Fry visited prisons in different parts of Great Britain and on the continent, everywhere effecting improved conditions. Died, 1845.

Frye, William Pierce, American legislator, was born in Lewiston, Me., 1831. He graduated at Bowdoin college, 1850, and studied and practiced law. He entered the Maine legislature in 1861 and later became attorney-general of the state. He was a representative in Congress, 1871 to 1881, when he was elected United States senator to succeed James G. Blaine, and served with distinction for 30 years. He was chairman of the commerce commission of the Senate and president *pro tem.* of the Senate, 1896. At the end of the Spanish American war, he was a member of the peace commission at Paris. He exercised a great constructive influence upon national legislation, especially in regard to commerce and American shipping. Died, 1911.

Fryer, John, educator, was born at Hythe, Kent, England, 1839, and was graduated from Highbury college, London, 1860. After teaching in Hongkong, Peking, and Shanghai, 1861–67, he took charge of the translation of foreign scientific works into Chinese for the imperial arsenal at Shanghai until 1896. Among his efforts for the promotion of education in China were the establishment of a Chinese scientific book depot and the founding of an institution for the Chinese blind at Shanghai. He was also general editor and chairman of the executive committee of the educational association of China, 1887–96. In the latter year, he was appointed professor of Oriental languages at the University of California. Among his writings are *Educational Directory for China*; *Translator's Vade-Mecum, or Vocabulary of Scientific Terms in Chinese and English*; various essays and reports; and upward of 100 books published at Shanghai in the Chinese language.

Fuertes (*fwâr'tās*), **Louis Agassiz,** American painter, was born at Ithaca, N. Y., 1874. He was graduated at Cornell university in 1897. His most pronounced success has been in the painting of birds. Besides illustrating numerous books, he constructed the habitat groups in the American museum of natural history, New York, and executed many mural paintings in various public buildings. He was killed in a railroad crossing accident in 1927.

Fukushima (*fōō'kōō-shē'mä*), **Baron,** Japanese general, was born at Matsumoto, 1853. He began life as a drummer boy; studied later in Tokyo university; and afterward entered the judicial department but was soon transferred to the general staff office. He became a lieutenant in the army, 1877, and traveled in Mongolia and India. After serving five years as military attaché at Berlin, he traveled on horseback during 1892 and 1893 from Berlin to Vladivostock, a journey of 9000 miles. He was made chief of the administrative bureau of the territory occupied by Japan during war with China and was sent on numerous important missions to foreign countries from 1895 to 1897. During the Russo-Japanese war, 1904-05, he was general staff officer of the Manchurian army. In 1912, he was appointed governor-general of Kwantung. Died in 1919.

Fuller, Sir George Warburton, Australian statesman, was born at Dunmore, Australia, in 1861, and was educated at the University of Sydney. He was elected for the first time to the legislature of New South Wales in 1889 and later sat in the Federal Parliament. In 1916, he became premier of New South Wales. He held the office until 1920, and, after acting as leader of the opposition for two years, he was again premier until 1925.

Fuller, Melville Weston, American jurist, was born in Augusta, Me., 1833. He was graduated from Bowdoin college in 1853, and studied at Harvard law school. Admitted to the bar in 1855, he formed a law partnership at Augusta and became associate editor of *The Age*, a Democratic paper. He went to Chicago in 1856 and practiced law there until 1888, when he was appointed chief justice of the United States supreme court, which office he held until his death. He was chancellor of the Smithsonian institution, was one of the arbitrators to settle the boundary line between Venezuela and British Guiana, Paris, 1899, and was appointed member of the permanent court of arbitration at The Hague. Died in 1910.

Fuller, Sarah Margaret, Marchioness Ossoli, American critic and essayist, was born at Cambridgeport, Mass., 1810. At 25 she assisted her family by school and private teaching. In Boston she edited *The Dial*, the organ of "transcendentalism," made translations from the German, and wrote *Summer on the Lakes*. In 1844, she published *Woman in the Nineteenth Century*; in the same year she removed to New York, and contributed to the *Tribune* a series of miscellaneous articles, republished as *Papers on Literature and Art*.

In 1847, she married the Marquis Ossoli at Rome. In 1849, during the siege of Rome, she took charge of a hospital. After the capture of the city by the French, she and her husband sailed with their infant for America and all were drowned in the wreck of the vessel off Fire island, near New York, July 16, 1850.

Fulton (*fōōl'tŭn*), **Robert,** American inventor and engineer, was born at Little Britain, Pa., 1765. He was apprenticed to a jeweler in Philadelphia at an early age, and, in addition to his labors at this trade, he applied himself to painting. The sale of his portraits and landscapes enabled him, in the space of four years, to purchase a small farm, on which he placed his widowed mother. At the age of 22, he

went to London, where he studied painting under Benjamin West; but after several years thus spent he abandoned painting and applied himself wholly to mechanics.

In 1794, Fulton obtained from the British government a patent for an inclined plane, the object of which was to set aside the use of canal locks; in the same year, he invented also a mill for sawing and polishing marble. His next invention was a machine for spinning flax, followed by one for making ropes. He became qualified as a civil engineer in 1795, and wrote a work on canals. Accepting an invitation from the United States minister at Paris, he proceeded to that city in 1796 and remained there for seven years, devoting himself to new projects and inventions.

In 1803, Fulton constructed a small steamboat, and his experiments with it on the Seine were attended with great success. He returned in 1806 to New York and pursued his experiments there. In 1807, he launched on the Hudson his steam vessel, the *Clermont*, which made a successful start in the presence of thousands of astonished spectators. From this period, steamers came into general use upon the rivers of the United States. In 1815, he launched the war steamer *Fulton*. He died, 1815; was elected to the American hall of fame, 1900.

Funk, Frank Hamilton, American agriculturist and politician, was born at Bloomington, Ill., in 1869. He was graduated at Yale in 1891 and devoted himself to farming and live stock raising on the family farm, "Funk's Grove," in McLean county, Ill. From 1906 to 1908, he was a member of the Republican state committee and, from 1908 to 1912, he was a member of the state senate. In 1912, he was the Progressive nominee for governor. From 1914 to 1921, he was a member of the Illinois public utilities commission. In 1921, he was elected to Congress.

Funk, Isaac Kaufman, author, publisher, and clergyman, was born at Clifton, Ohio, 1839. He was graduated at Wittenberg college, 1861, and from 1867 to 1872 filled various pastorates, the last of which was Saint Matthew's English Lutheran church, Brooklyn. In 1878, he entered into a partnership with A. W. Wagnalls, and became editor in chief of various periodicals of the Funk and Wagnalls Company. He was editor in chief of the *Standard Dictionary*, chairman of the editorial board that produced the *Jewish Encyclopædia*, and founder-editor of *The Metropolitan Pulpit*, later the *Homiletic Review*. In connection with his house, he founded *The Voice*, 1880, *The Missionary Review*, 1888, and *The Literary Digest*, 1889. He also published numerous works of reference. He wrote *The Next Step in Evolution*, *The Widow's Mite and Other Psychic Phenomena*, and *The Psychic Riddle*. Died, 1912.

Funston (*fŭn'stŭn*), **Fred,** American soldier, was born at New Carlisle, Ohio, 1865. He studied in the University of Kansas for two years and in 1890 became a newspaper reporter in Kansas City. In 1891, he was botanist in the United States Death Valley expedition. In 1893, he was appointed commissioner for the department of agriculture to explore Alaska and to report on its flora. In carrying out this work, he crossed Alaska to the Arctic Ocean, traveled from the Mackenzie river to Bering Sea, 3500 miles, camped on the Klondike in winter of 1893-94, and floated down the Yukon, alone, in a canoe. In 1896-97, he was an officer in the insurgent army in Cuba.

At the beginning of the Spanish American war, in 1898, Funston was commissioned colonel of the 20th Kansas infantry. He went with his regiment to the Philippines, took part in several battles, and, for signal bravery at Calumpit, was promoted to brigadier general of United States volunteers and awarded a medal by Congress, 1899. He organized and commanded the expedition which resulted in the capture of Aguinaldo, head of Filipino insurrection, and was appointed brigadier general of United States army, 1901. During 1905–07, he commanded the department of California, with headquarters at San Francisco, and performed valuable services for the city at the time of the earthquake-fire, 1906. In 1914, he commanded the military occupation of Vera Cruz, Mexico, and was promoted major general. In 1916, he was placed in chief command of the United States forces mobilized on the Mexican border. Died at San Antonio, Tex., 1917.

Furness (*fûr'nĕs*), **Horace Howard,** author, editor, and Shaksperian scholar, was born in Philadelphia, Pa., 1833. He was graduated from Harvard, 1854, and from the University of Halle, Germany, 1856. He studied law in Philadelphia and was admitted to the bar in 1859. His great work in literary scholarship was contributed as editor of the Variorum edition of Shakspere's plays, of which the following appeared: *Romeo and Juliet*, *Macbeth*, *Hamlet*, *King Lear*, *Othello*, *Merchant of Venice*, *As You Like It*, *The Tempest*, *Midsummer Night's Dream*, *The Winter's Tale*, *Much Ado About Nothing*, *Twelfth Night*, *Love's Labor's Lost*, *Anthony and Cleopatra*, and *Cymbeline*. In recognition of this achievement, he was awarded honorary degrees by Columbia, Yale, and Harvard universities and, in 1905, was elected member of the American academy of arts and letters. Died, 1912.

Furnivall (*fûr'nĭ-vâl*), **Frederick James,** English philologist, was born at Egham, Surrey, 1825. He was educated at University college, London, and at Trinity hall, Cambridge. He also prepared for the law and was called to the bar. In early life he associated himself in the Christian Socialist movement and was one of the founders of the Workingmen's college, in which he taught every term for ten years. He devoted himself to English philology and founded the Early English Text society in 1864, the Chaucer society in 1868, the Ballad society in 1868, and the New Shakespeare society in 1874. He was active in starting the Browning society, 1881, the Wycliffe society, 1882, and the Shelley society, 1885. He personally edited many works, chiefly in connection with the foregoing societies. He was one of the original promoters of the Oxford *New English Dictionary* and was for a time its chief editor. His best works are his "six-text" edition of Chaucer's *Canterbury Tales*, and the *Century Shakespeare*. Died, 1910.

Fust (*fōōst*) or **Faust** (*foust*), **Johann,** German printer, a citizen of Mainz, Germany, who was associated with Gutenberg in the first introduction of printing. He probably had nothing to do with the invention of printing, but furnished the capital to introduce the new art. In 1455, he sued Gutenberg for money he had advanced. Upon nonpayment, it is claimed by some that Fust seized enough of the apparatus to satisfy the mortgage and continued the business of printing with his son-in-law, Peter Schöffer. There is, however, no direct evidence of such seizure. A Latin Bible in the Mazarin library is the best-known book printed by Gutenberg and Fust. The best-known publication of Fust and Schöffer is a *Psalter*, 1457, the first book published with a complete date. Fust died at Paris about 1466.

Gabrilovitch (*gä-brē'lô-vĭch*), **Ossip,** pianist and conductor, was born at Petrograd, 1878. He entered the conservatory when a child; became one of Rubinstein's favorite pupils; won the Rubinstein prize in 1894; and continued his studies with Leschetizky in Vienna. In 1896, he made his first public appearance in concert at Berlin and afterward made extended tours in Russia, Sweden, Austria, and England. He began the first of a long series of successful tours in the United States in 1900. In 1909, he married Clara Clemens, the daughter of Mark Twain. In 1918, he became conductor of the Detroit symphony orchestra.

Gade (*gä'dĕ*), **Niels Wilhelm,** Danish composer, was born at Copenhagen in 1817. He was court organist at Copenhagen and wrote several symphonies, overtures, and cantatas, as well as many choral and solo productions. His overture *Ossian* has received high praise, as have also his musical sketches *Aquarellen* and *Volkstänze*. His cantatas *The Crusaders*, *Comala*, *Psyche*, and *The Message of Spring* gave him a wide reputation. While greatly influenced by Mendelssohn, with whom he spent five years at Leipzig, his works show much originality and he is regarded as one of the founders of the Scandinavian school of music. Died, 1890.

Gadsden (*gădz'dĕn*), **Christopher,** American patriot, was born in Charleston, S. C., 1724. He was a member of the First Continental Congress, 1774; became brigadier general during the Revolution; and was lieutenant governor of South Carolina at the time of the surrender of Charleston to Sir Henry Clinton in 1780. He died in 1805.

Gadsden, James, grandson of Christopher, was born at Charleston, S. C., 1788. He served in the War of 1812 and against the Seminoles. In 1853, he was appointed minister to Mexico and negotiated the purchase of part of Arizona and New Mexico, known as the "Gadsden Purchase," for the sum of $10,000,000. He died in 1858.

Gadski (*gät'skĭ*), **Johanna,** German dramatic soprano, was born at Anklam, Prussia, 1871. She received her musical education at Stettin under Madame Schroeder-Chaloupka and, at the age of 17, made her début in the title rôle of *Undine* in Berlin, where she was immediately engaged for several seasons. She made a tour through Holland and Germany in 1894 and, in 1895, made her first American appearance under Walter Damrosch at the Metropolitan opera house, New York, as Elsa in *Lohengrin*. In 1898, she was engaged as a member of the Metropolitan Company, alternating between Covent Garden, London, and New York. She has since appeared in the principal cities of Europe and America, winning notable distinction in Wagnerian rôles. She has sung extensively in recitals, in concert, and with leading orchestras. In 1892, she married Hans Tauscher, an officer in the Austrian army.

Gage, Lyman Judson, American financier, was born at De Ruyter, N. Y., 1836, and was educated at Rome academy. At 17, he entered Oneida Central bank and served as office boy and junior clerk until 1855, when he went to Chicago, becoming bookkeeper and later cashier of the Merchants' Loan and Trust Company. In 1868, he was made cashier, in 1882 vice president, and in 1891 president,

of the First National bank of Chicago, which under his management became a leading bank in the Middle West. He was on the board of directors of the World's Columbian exposition, and attained national prominence by his notable efforts toward its success. In 1897, he was appointed secretary of the treasury by President McKinley and served until 1902, when he became president of the United States Trust Company, New York. He retired from active life in 1906. Died, 1927.

Gage, Thomas, English general and the last royal governor of Massachusetts, was born in 1721. In 1763, he was made commander in chief of the British forces in America. His inflexible character led the British government to regard him as well fitted to end the disturbances in the American colonies. In 1774, he was nominated governor of Massachusetts, a post of peculiar difficulties.

In April 1775, he dispatched an expedition to seize a quantity of arms which had been stored at Concord. On the way thither, the detachment came upon a number of militia drilling and attacked them because of their refusal to lay down arms. This encounter, known as the battle of Lexington, was the signal for a general uprising throughout the colonies. On June 17, the battle of Bunker Hill was fought, which resulted in a dearly bought victory for the English; but, numerous complaints being lodged against Gage, he was recalled by the British government in October 1775. Died, 1787.

Gaillard, David Du Bose, American engineer, was born in Sumter county, S. C., 1859. He graduated at West Point in 1884; served on the boundary commission of the United States and Mexico, 1891–94; and became colonel of volunteer engineers during the Spanish American war. In 1907, he was made member of the Isthmian Canal commission and engaged in dredging harbors and constructing breakwaters. In 1908, he was appointed engineer of the Gatun-Pedro Miguel division of the Panama canal, where he demonstrated notable efficiency. After his death in 1913, the celebrated Culebra cut was renamed Gaillard cut by order of President Wilson in recognition of Gaillard's eminent services.

Gailor (*gāl'ŏr*), **Thomas Frank,** prelate of the Protestant Episcopal Church, was born at Jackson, Miss., 1856. He graduated at Racine college and at the General theological seminary, New York. He was rector of Pulaski, Tennessee, Episcopal church, 1879 to 1882, when he became professor of ecclesiastical history in the University of the South, of which he was made vice chancellor in 1890 and chancellor in 1908. He wrote *Manual of Devotion, The Puritan Reaction, Christianity and Education, Apostolic Order,* and *The Episcopal Church.*

Gainsborough (*gānz'b'rŏ*), **Thomas,** English portrait and landscape painter, was born at Sudbury, Suffolk, 1727. He early displayed a decided talent for painting and began life as a portrait painter, producing during his successful career more than 200 portraits. These are distinguished by great nobility and refinement, and several rank among the greatest masterpieces of English portrait painting. His later genius found adequate expression in the delineation of the rich and quiet scenery of his native country, and to this he mainly devoted himself after settling in London in 1774. Among his finest productions are "The Shepherd's Boy," "The Fight Between Little Boys and Dogs," "The Sea-Shore," "The Woodman in a Storm," and "Duchess of Devonshire." The most celebrated of his pictures is "The Blue Boy," which was bought by an American and exhibited in the United States in 1921. Died, 1788. See page 1569a.

Gaius (*gā'yŭs*), or **Caius,** Roman jurist, flourished in the 2d century of the Christian era. He is the author of numerous legal works, of which the *Institutes* is the most important. This is supposed to have been the first instance of a popular manual of Roman law in the sense of modern elementary textbooks. It was incorporated almost bodily into the celebrated *Institutes* of Justinian. The work was long lost, but a large part of it was recovered in 1816-17 from a much defaced palimpsest found by Niebuhr in the cathedral library at Verona.

Galdós, Benito Pérez. See *Pérez Galdós, Benito.*

Gale, Zona, American writer, was born at Portage, Wis., 1874, and graduated from the University of Wisconsin, 1895. She did newspaper work in Milwaukee until 1901 and, from 1901 to 1904, was engaged on the staff of the New York *World,* also contributing to other newspapers. She has given public readings and lectures. Her writings include *The Loves of Pelleas and Etarre, Friendship Village, Mothers to Men, When I Was a Little Girl, Birth, Miss Lulu Bett, The Secret Way,* and *Faint Perfume.*

Galen (*gā'lĕn*), or **Claudius Galenus,** Greek physician, was born at Pergamum, in Mysia, 130 A. D. He studied medicine first at Pergamum and afterward at Smyrna, Corinth, and Alexandria. He returned to his native city in his 29th year and was at once appointed physician to the school of gladiators. In his 34th year, he went to Rome, where, in four years, he gained such a reputation that he was offered, but declined, the post of physician to the emperor. After a brief sojourn in his native country, he returned to Italy, where the sons of Marcus Aurelius were intrusted to his care.

His voluminous writings, believed to comprise nearly 500 treatises, covered the entire field of ancient medicine. Of these over 80 are still extant. His anatomical and physiological writings are the most important and indicate some knowledge of dissection. In diagnosis, he was the first to place great stress on the pulse, on which subject he was long considered an authority. In materia medica, he was inferior to Dioscorides, but his works dominated Greek, Roman, and Arabic medical practice for many centuries. Died about 201.

Galileo (*găl'ĭ-lē'ō*; It. *gä'lē-lā'ō*) **Galilei,** Italian physicist and astronomer, was born at Pisa, Italy, February 15, 1564. When a young boy, he exhibited a genius in mechanical construction and a fondness for the classics, music, and painting. In 1581, he was sent to the University of Pisa. He first directed his attention to medical studies and to the prevailing Aristotelian philosophy, the dogmas of which he soon ventured to disbelieve.

At the age of 18, Galileo made one of his most important discoveries, the law of the vibration of the pendulum, which he subsequently utilized in constructing a clock for astronomical purposes. From 1586, he appears to have abandoned medicine and to have concentrated his attention upon mathematical sciences. He studied Euclid and Archimedes, and the first fruit of his geometrical investigations was the invention of a hydrostatic balance.

Life at Pisa and Padua. The years 1589–92 Galileo spent as lecturer and professor of mathematics at the University of Pisa. About this period, he turned his attention to the then very imperfectly comprehended laws of bodies in motion. In opposition to all received systems, he propounded the novel theorem that all falling bodies, great or small, descend with equal velocities. This soon led him to the discovery of "the three laws of motion" and the law regulating the motion of falling bodies. Enmity arising from disputes with his colleagues made him gladly accept, in 1592, the professorship of mathematics at Padua. There, under the shelter of the Venetian republic, he spent the following 18 years and did most of his constructive work.

Galileo dwelt upon the importance of measuring all natural forces so as to bring them within the range of geometry and thus adapt them to the service of man. Among his notable discoveries were a thermometer, a proportional compass or sector, and a refracting telescope. He completed the last-named instrument in 1609 and soon discovered Jupiter's four moons, the irregular surface of our own satellite, the phases of Saturn, and the solar spots. These discoveries were made known in 1610 through his work entitled *Sidereal Messenger.*

Persecution. Galileo left Padua for Florence in 1610. The next year, he visited Rome, where he freely advocated the Copernican conception of the universe. Early in 1616, the propositions of the sun's fixity and the earth's diurnal motion were formally condemned by the Church; the work of Copernicus, published 70 years before, was placed in the list of prohibited books; and a promise was extorted from Galileo not to defend the Copernican theory. Galileo remained silent for seven years, but he went to Rome in 1624 and strove, though unsuccessfully, to get the edicts reversed. He still persisted in writing his celebrated *Dialogue on the Two Chief Systems,* which was printed in 1632. The author was summoned to Rome, and, on June 22, 1633, he was forced to read and sign a formal abjuration of his belief in the Copernican doctrine. A tradition arose later to the effect that, on this occasion, after publicly declaring that the earth was stationary, he whispered to one of his friends, as he rose from his knees, *E pur si muove,* "It does move, though."

Galileo was sentenced to an indefinite imprisonment, but he finally obtained permission to return under surveillance to his villa at Arcetri near Florence. His strenuous activity continued, and his greatest book, the *Dialogues on the Two New Sciences,* was completed at this time and was published in 1638 in Holland. In the course of 1636-37, he became blind. The strictness of his confinement was then relaxed, and he was allowed to receive his friends. He was visited by many distinguished foreigners, among them Milton. During this period, he co-operated with Torricelli in the investigation of the nature of percussion.

Greatest Achievements. The inventions due to his acute industry, his use of the telescope, the brilliant discoveries to which it led, and his patient investigation of the laws of weight and motion must all be looked upon as forming but a part of Galileo's real merits. He claimed, and helped to establish, the right of exercising one's faculties in examining the universe which surrounds us. Died, January 8, 1642. See *Pendulum, Telescope.*

Gall (*gôl*; Ger., *gäl*), **Franz Joseph,** German physician, founder of phrenology, was born at Tiefenbronn, Baden, 1758. He studied medicine at Strasbourg and established himself as a physician in Vienna, where, for many years, he carried on a series of elaborate investigations on the nature of the brain and its relation to the outer cranium. In 1796, he gave publicity to his views in a series of lectures in Vienna, which were, however, condemned as subversive of morality and religion. Being joined by Spurzheim, who adopted his theories, he undertook, in 1805, a lecturing tour through a large part of Europe and, in 1807, settled at Paris, where he published his phrenological work, *Fonctions du cerveau.* His chief work, however, is his *Anatomy and Physiology of the Nervous System.* Died, 1828.

Gallait (*gà'lā'*), **Louis,** Belgian historical painter, was born at Tournai, 1810. He became famous by pictures on subjects from the history of the Netherlands, such as "The Abdication of Charles V," "Last Honors to Egmont and Horn," "The Plague at Tournai," and "Last Moments of Egmont." Other works of his include "Tasso in Prison" and "The Temptation of Saint Anthony." Gallait represented the new art tendencies of his time in Belgium and exercised a great influence on painting in his native country. Died, 1887.

Galland (*gà'läN'*), **Antoine,** French Orientalist, was born at Rollot in Picardy, 1646. Attached to the French embassy at Constantinople in 1670, he traveled in Syria and the Levant, and made two subsequent journeys. In 1709, he became professor of Arabic in the Collège de France. He wrote on archeology, Eastern proverbs, and Indian fables, but is best known by his translation of the *Arabian Nights,* the first ever made into a European language, published in 12 volumes, 1704–17. Died at Paris, 1715.

Gallatin (*găl'ă-tĭn*), **Albert,** American financier and statesman, was born at Geneva, Switzerland, 1761. He graduated at Geneva in 1779; came to the United States in 1780; taught French at Harvard; bought land in Virginia and Pennsylvania; and entered political life in 1789. In 1793, he was elected to the United States Senate, but was not permitted to retain his seat on the ground of ineligibility under the Constitution. In 1795, he entered Congress from Pennsylvania and, in 1801–13, was secretary of the treasury. He took an important part in the peace negotiations with England in 1814 and signed the Treaty of Ghent. In 1816–23, he was United States minister at Paris and in 1826 at London. From 1827, he devoted his time to historical and ethnological researches, writing on finance, politics, and the Indian tribes. He was one of the founders and the first president of the ethnological society of America. Died at Astoria, N. Y., 1849.

Gallaudet (*găl'ô-dĕt'*), **Edward Miner,** American educator, was born at Hartford, Conn., 1837, a son of T. H. Gallaudet; graduated at Trinity college, 1856; taught in his father's institution for deaf mutes, Hartford, 1856–57; and organized, 1857, the Columbia institution for the deaf, dumb, and blind, at Washington. He developed from it the Gallaudet college for the deaf, of which he became the first president, serving from 1864 to 1911. His writings include *Popular Manual of International Law* and *Life of Thomas Hopkins Gallaudet.* Died, 1917.

Gallaudet, Thomas Hopkins, American educator of the deaf and dumb, was born in Philadelphia, Pa., 1787. He was educated at Yale college and Andover theological seminary, and, in 1814, was licensed to preach. He then studied the systems of deaf-mute instruction in London, Edinburgh, and Paris and, on his return to America in 1817, founded and became superintendent of the American asylum for deaf mutes at Hartford. He held the office of president of the institution, 1817–30. In 1832–33, he was professor of education in New York university—the first American professorship of education. He published numerous sermons, addresses, and juvenile works. Died at Hartford, Conn., 1851.

Galle (*gäl'ĕ*), **Johann Gottfried,** German astronomer, was born in Prussian Saxony in 1812. He studied at Berlin, 1830–33; became director of the Berlin observatory; and shares with Leverrier the honor of discovering the planet Neptune, 1846. He afterward became professor of astronomy at Breslau. He published several works on astronomy and climatology. Died at Potsdam, 1910.

Galli-Curci (*gäl'lē-kōōr'chē*), **Amelita,** coloratura soprano of Italian-Spanish parentage, was born at Milan, Italy, 1890. She was educated at the Liceo Alessandro Manzoni and the International institute of languages, from which she graduated with first honors as a linguist. She studied music at the Milan conservatory, graduating as a pianist. As Gilda in *Rigoletto* she made her operatic début in Rome, 1910, and thereafter sang in leading theaters in Europe, and also in South America with Caruso and Titta Ruffo. Her first appearance in the United States, at Chicago in 1916, was a sensational success, and her subsequent engagements with the Metropolitan Opera Company have sustained her fame. Her voice, cultivated largely without instruction, is of surpassing quality and remarkably even register. Her repertoire includes such operatic rôles as Lucia, Rosina, Violetta, and Juliette, and an immense range of concert music.

Gallieni (*gà'lyā'nē'*), **Joseph Simon,** French soldier and military writer, was born at Saint Beat, Haute Garonne, 1849. He graduated from the military school, Saint Cyr, in 1870; served in the Franco-Prussian war, 1870-71; and, in 1878, went to Senegambia as captain. From 1883 to 1886, he was in service in Martinique, when he was made governor of Upper Senegal. From 1893 to 1895, he was in command of a division in Tongking, where he extirpated brigandism. From 1896 to 1905, he was governor-general of Madagascar and, upon his return to France, became military governor of Lyon.

During the first year of the World War, he performed a gigantic work as military governor of Paris. At the crisis in September 1914, he rushed 80,000 reserve troops in motor cars to the relief of General Manoury, thereby enabling him to drive von Kluck's attacking army back upon the Marne. Gallieni was gratefully acclaimed the "savior of Paris." In 1915, he became minister of war and, in 1916, assumed direction of the department of aviation. He died at Versailles, 1916.

Galsworthy (*gôlz'wûr-тнĭ*), **John,** English dramatist and novelist, was born at Coombe, Surrey, 1867. He attended Harrow and then went to Oxford, where he graduated in 1889. He planned at first to practice law, but disliked the profession and gave it up for travel in various parts of the world. Later he became interested in writing. He published the novel *Jocelyn* in 1899. It was followed by *The Country House, The Man of Property, The Dark Flower, Beyond, The Freelands, The Forsyte Saga,* and other novels, which stand in the front rank of recent literary achievements. In 1906, he produced his first play, *The Silver Box,* which was followed by essays, stories, novels, plays, and poems.

Galsworthy is one of the most sincere and straightforward of modern writers—clear, simple, direct, and unerring in conveying the meaning he desires to impress. His plays are of high merit and he is one of the finest dramatic forces of the contemporary English stage. The list of his plays includes *Joy, Strife, Justice, The Pigeon, The Eldest Son, The Mob, A Family Man, Loyalties,* and *Windows.* See *Strife.*

Galton (*gôl'tŭn*), **Sir Francis,** English scientist and traveler, cousin of Charles Darwin, was born near Birmingham, 1822. He studied medicine and was graduated at Trinity college, Cambridge, 1844. In 1846, he traveled through North Africa and on the White Nile; in 1850–52, assisted in exploring Damaraland in South West Africa; and afterward entered the British civil service in the board of trade. He turned his attention to meteorology and in his *Meteorographica,* 1863, laid the basis of the now widely known weather maps.

Galton's most important contributions to knowledge were in the field of anthropology and heredity, in which he established the foundation for the new science of eugenics. His works include *Narrative of an Explorer in Tropical South Africa, Art of Travel, Hereditary Genius, Human Faculty, Natural Inheritance, Finger Prints, Essays on Eugenics,* and numerous memoirs. He was knighted in 1909. Died, 1911.

Galvani (*gäl-vä'nē*), **Luigi,** Italian physician and physicist from whom "galvanism" derived its name, was born in Bologna, 1737. He was educated for the profession of medicine and, in 1762, was appointed lecturer on anatomy in the University of Bologna, in which city he practiced. While holding this lectureship, he made the discoveries, partly by means of experiments on the muscles of frogs, 1786, which he published in 1791 in his treatise entitled *De Viribus Electricitatis in Motu Musculari Commentarius.* The now fully established doctrine of animal electricity owes its origin to his patient and laborious investigations. Died, 1798.

Gama (*gä'mä*), **Vasco da,** Portuguese navigator, was born about 1460 at Sines in Alemtejo. He early distinguished himself as an intrepid mariner and was selected by King Emanuel to discover the route to India around southern Africa. His expedition of four vessels with 168 men left Lisbon in July 1497, but was four months in reaching Saint Helena. After rounding the Cape of Good Hope, despite hurricanes and mutinies, he made Melinde early in the following year. Here he found a skillful Indian pilot, crossed the Indian Ocean, and arrived at Calicut in May 1498. The ruler of Calicut soon became actively hostile, and Da Gama had to fight his way out of the harbor. In September 1499, he arrived at Lisbon and was ennobled.

Emanuel immediately dispatched a fresh squadron of 13 ships under Cabral, who founded a factory at Calicut. But the Portuguese who had been left there were murdered,

and, to avenge them, the king fitted out a squadron of 20 ships under Da Gama, 1502. The latter founded the colonies of Mozambique and Sofala, bombarded Calicut, and, late in 1503, reached the Tagus with 13 richly laden vessels. Twenty years later, Da Gama was again sent to India, this time as viceroy to reform abuses in the Portuguese administration there. Soon after his arrival, he died at Cochin, 1524.

Gambetta (*găm-bĕt'ä*), **Léon,** French statesman, was born at Cahors, France, 1838. He studied law and rose to prominence through his able defense of political offenders prosecuted by supporters of the Second Empire.

In the Franco-Prussian war, after the investment of Paris, Gambetta escaped from the city by balloon and, as minister of war, exerted himself to the utmost to effect the relief of the capital. He showed himself a violent partisan of Republicanism in the civil strife following the war and later as a political leader in the Assembly. He became premier in 1881, but his radical anticlerical program occasioned his defeat a few months later. Died, 1882.

Gandhi, Mohandas Karamchand, Indian political leader, was born at Porbandar, Western India, the son of a statesman. He went to England in 1881 and was called to the bar there. After practicing in India for 18 months, he went to South Africa in 1893, where he led a campaign of "passive resistance" against various government enactments aimed at Asiatics. He returned to India in 1914.

Partly under the influence of Tolstóy's writings, Gandhi devoted himself, in 1918, to uniting the Mohammedan and Hindu elements of India in a "non-co-operation" movement directed against British rule. Subsequent conflicts of his followers with the government tended to discredit his gospel of "soul force." He was arrested on a charge of sedition and, in 1923, was condemned to a term of imprisonment, but was released in 1924.

Gandier (*găn'dēr'*), **Alfred,** Canadian clergyman and educator, was born in Hastings county, Ont., 1861. He graduated with highest honors at Queen's university, Kingston, 1884, and studied theology at Edinburgh university. He entered the Presbyterian ministry in 1889 and held various important pastorates until 1908, when he was made principal of Knox college. In this capacity and as chairman of the board of foreign missions, he became an outstanding figure in Canadian Presbyterianism. After the formation of the United Church of Canada, he became principal of Emmanuel college, 1927.

Gannett (*găn'ĕt*), **Henry,** American geographer, was born at Bath, Me., 1846. He graduated from Harvard, 1869, and from Hooper mining school, 1870. After serving as an assistant in Harvard observatory, 1870-71, he was made topographer for the Hayden survey. In 1882, he was appointed chief geographer and statistician of the United States geological survey, where he served with distinction for 30 years. Among his valuable published works are *Gazetteer of Cuba*, *Dictionary of Altitudes*, *Commercial Geography*, *Building of a Nation*, and *Contour Map of United States*. Died in 1914.

García (*gär-thē'ä*), **Manuel,** singing teacher, son of Manuel del Pópolo García, was born in Madrid, Spain, 1805. He studied singing under his father and successfully appeared on the stage, but his voice was not remarkable. In 1829, he settled in Paris to devote himself to teaching and to the scientific investigation of the voice. In 1840, he presented to the French academy a *Treatise on the Human Voice*, and, in 1847, he wrote his valuable *Traité complet du chant*. In 1855, he won wide recognition by his invention of the laryngoscope. In 1850, he became professor of singing at the royal academy of music in London, where he continued to teach until 1895, after which he gave private instruction until his death. Among his many distinguished pupils were Jenny Lind, Salvatore Marchesi, and Henrietta Nissen. Died, 1906.

García, Manuel del Pópolo Vicente, famous Spanish tenor and singing master, was born at Seville, 1775. He manifested great talent at an early age, winning distinction at 17 years of age as a singer, composer, and conductor. After establishing his reputation in Cadiz and Madrid, he went to Paris in 1808, where he won marked success in Italian opera. A tour of Italy in 1811 increased his reputation. Subsequently he studied five years in Spain, returning to Paris in 1816 and proceeding to London in 1817, where he was enthusiastically received. He then toured England, South America, Mexico, and the United States, with unqualified success.

He published numerous compositions, including many operas, but his enduring fame rests upon his sterling work as a teacher of singing, his well tested theories forming the basis of the best present-day teaching. Among his most noted pupils were his son Manuel and his two daughters, Mme. Marie Malibran and Mme. Pauline Viardot. He died in 1832.

Garcilaso de la Vega (*gär'thē-lä'sō dä lä vä'gä*). See *Vega, Garcilaso de la.*

Garden, Mary, American operatic soprano, was born at Aberdeen, Scotland, 1877. At the age of six, she came to America with her parents, who located in Chicago in 1888. In 1893, she began instruction for the voice and, in 1896, went to Paris, where she studied under Trabadello, Chevallier, and Fugère. She made her début at the Paris opéra comique in 1900 in Charpentier's *Louise*. Her success was immediate, and, in 1902, she was selected for the title rôle of *Mélisande* in Debussy's opera.

From her first appearance in the United States in *Thaïs* at the Manhattan opera house in 1907, she was extremely popular and won merited success for impersonations of Marguerite, Griselidis, Mélisande, Salome, Thaïs, Sappho, and Louise. While her repertoire is confined almost exclusively to modern French opera, she is a dramatic singer of power and distinction, and excels in spontaneity, artistic detail, and striking delineation. She was appointed general director of the Chicago opera association in 1921.

Gardiner, Samuel Rawson, English historian, was born at Ropley, Eng., in 1829 and was educated at Winchester and Christ Church, Oxford. In 1884, he was elected fellow of All Souls and was for some years professor of modern history at King's college, London. He was the first English writer to treat the Cromwellian period from a nonpartisan viewpoint. Although originally published continuously under the titles of the separate volumes, his monumental work on the Puritan revolution is included in the series: *History of England from the Accession of James I to the Outbreak of the Civil War, 1603–1642*, in 10 volumes; *History of the Great Civil War, 1642–1649*, in four volumes; and *History of the Commonwealth and Protectorate, 1649–1660*. This work is characterized by notable accuracy, fairness, and critical ability. He also wrote many other historical works and textbooks. Died, 1902.

Garfield, Harry Augustus, American educator, was born at Hiram, Ohio, 1863, the son of James Abram Garfield. He graduated at Williams college, 1885, and studied law at Columbia; at Oxford, England; and at Inns of Court, London. He practiced law in Cleveland, 1888–1903, in which period he organized and became president of the Cleveland municipal association. During 1898-99, he was president of the Cleveland chamber of commerce. He was professor of politics at Princeton university, 1903–08, and became president of Williams college in the latter year.

Garfield, James Abram, 20th president of the United States, was born in Orange, Ohio, 1831. He was left fatherless when two years of age and his early schooling was frequently interrupted by periods of labor necessary for earning the means of support and of education. He finally succeeded in graduating with high honors at Williams college in 1856. He taught for a period, studying law in the meantime, and was admitted to the bar in 1861.

His political career began in 1859, when he was elected as a Republican to the state senate. During the Civil War, he rose from the rank of colonel of volunteers in 1861 to be major general in 1863, resigning at the end of that year to occupy the seat in Congress to which he had been elected. There he supported the draft law and, in the years following the war, he took a strong stand against inflation of the currency. In 1880, he became a member of the United States Senate and, later the same year, was elected president of the United States. After holding office a few months, he was shot in Washington by the assassin Guiteau, whose vanity had been offended by the refusal of an office. Garfield died three months later and was buried at Cleveland, where his tomb is marked by a memorial erected in 1890 at a cost of about $225,000.

Garfield's early poverty, his manly independence, his hard-won attainments, and his incorruptible integrity had caused his career to be watched as one of exceptionally brilliant promise, and his untimely death was mourned not only by his own countrymen but by the whole civilized world.

Garfield, James Rudolph, American lawyer and government official, was born in Hiram, Ohio, 1865, a son of James Abram Garfield. He graduated at Williams college, Massachusetts, 1885; studied at Columbia law school; and was admitted to the bar in 1888. He began to practice law in Ohio in 1888 and was elected a member of the Ohio senate in 1896. He also served as a member of the United States civil service commission, 1902-03; commissioner of corporations in the department of commerce and labor, 1903–07; and secretary of the interior, 1907–09. During 1905-06, he extensively investigated the methods of the packing industry and of the Standard Oil Company. During his secretaryship of the interior, he devoted much attention to land office reforms. In 1912, he took an active part in the organization of the Progressive party.

Garibaldi (*gä'rē-bäl'dē*), **Giuseppe,** Italian patriot, was born at Nice, France, 1807, and began life as a sailor. He associated himself enthusiastically with Mazzini for the liberation of his country, but, being convicted of

conspiracy, fled to South America, where, both as a privateer and as a soldier, he gave his services to the young republics there struggling for life.

Returning to Europe, he took part in the defense of Rome against France, but, being defeated, fled to New York, to return to the isle of Caprera, biding his time. He joined the Piedmontese against Austria and, in 1860, set himself to assist in the overthrow of the kingdom of Naples and the union of Italy under Victor Emmanuel. Landing in Calabria, he entered Naples and drove the royal forces before him without striking a blow, after which he returned to his retreat at Caprera, ready still to draw the sword and occasionally unsheathing it again in the cause of Republicanism. In 1870-71, he commanded a French force in the Franco-Prussian war. Died at Caprera, 1882.

Garland, Hamlin, American novelist and poet of Scotch descent, was born at West Salem, Wis., 1860. After attending the common schools, he went to Cedar Valley seminary, Osage, Iowa, and later worked on farms and taught school until 1884, when he located in Boston and devoted himself to literary work for nine years. He then returned to the Middle West, where he has chiefly resided. In 1890, his first volume of fiction, *Main-Traveled Roads*, written in frankly realistic style, attracted wide notice. Besides a collection of verse entitled *Prairie Songs*, his books include *Jason Edwards*, *A Member of the Third House*, *Crumbling Idols*, *Wayside Courtships*, *The Trail of the Gold Seekers*, *Boy Life on the Prairie*, *The Eagle's Heart*, *Her Mountain Lover*, *The Tyranny of the Dark*, *The Long Trail*, *Cavanaugh Forest Ranger*, and *A Daughter of the Middle Border*. He was elected to the American academy of arts and letters in 1918. See *Yarpe*.

Garnier (*gär'nyā'*), **Jean Louis Charles,** French architect, was born at Paris, 1825. He studied at the school of fine arts; in 1848, won the *prix de Rome*; and, after considerable travel in Italy and Greece, set up as an architect in Paris. In 1861, he competed for the design of the new grand opera house in Paris. His design was accepted, and, in 1875, he completed the building, now world-famous for its ornamental façade, magnificent staircase, and foyer He also built the conservatory at Nice and the casino at Monte Carlo, and designed the tombs of Bizet, Offenbach, and Victor Massé. Garnier's work has exercised a great influence upon monumental architecture in France and in other countries. Died, 1898.

Garrick, David, English actor and theatrical manager, was born in Hereford in 1717. He went to London with Dr. Samuel Johnson in 1736 to study law, but an irresistible instinct urged him to the stage. He made his first appearance under the name of Lyddal, at Ipswich, in 1741, and afterward played *Richard III*, his success in which enabled him to get an engagement at Drury Lane. In 1742, he went to Dublin; in 1747, he became joint manager of Drury Lane; and, two years later, married Mademoiselle Violette. He acted at Drury Lane until 1776, when he retired and sold his share in the concern.

In 1763, Garrick visited the continent and, in 1769, projected and conducted the memorial jubilee at Stratford on Avon in honor of Shakspere. His last appearance was as Don Felix in *The Wonder* Garrick ranks as the greatest of English actors, his versatile genius enabling him to impersonate with great naturalness and power the whole range of characters from high tragedy to farce. He died in 1779 and was buried beneath the Shakspere monument in Westminster Abbey.

Garrison, William Lloyd, American abolitionist, was born at Newburyport, Mass 1805 As a young man, he was engaged chiefly in newspaper work and soon made himself obnoxious to the then ruling powers by the boldness of his denunciation of slavery. In 1829, while editing *The Genius of Universal Emancipation*, which was published at Baltimore, his articles on this subject led to his being convicted and imprisoned for libel He was released from prison on the payment of his fine by a friend, and thereupon commenced his career as an antislavery lecturer, which he continued until such agitation was no longer necessary.

In 1831, Garrison founded the *Liberator*, which he published at Boston for 35 years His whole course met with the most malignant opposition. His life was frequently threatened, and more than once he was assaulted and roughly treated; but his courage, energy, and ability were inexhaustible, and he lived to see slavery abolished. He made several visits to England on antislavery missions. On the abolition of slavery in 1865, he was presented by his friends in the United States with the sum of $30,000. He spent his last years in journalistic and reform work. Died, 1879. See *Abolitionists*.

Gary, Elbert Henry, lawyer and financier, was born at Wheaton, Ill., 1846. He was educated at Wheaton college and Chicago university, and was admitted to the bar, 1867. He was chosen first mayor of Wheaton, and was elected county judge. After practicing law in Chicago 25 years, chiefly as counsel for railroad and manufacturing corporations, he retired to become president of the Federal Steel Company, 1898. He was actively identified with the organization of the United States Steel Corporation and, as a responsible official, was prominent before the public during the government prosecution of the Steel Corporation. He later became chairman of its board of directors and of its finance committee. The city of Gary, Ind., which contains one of the largest steel producing plants in the world, was named for him. Died, 1927.

Gaskell, Elizabeth Cleghorn Stevenson, English novelist, was born at Chelsea, 1810. She married, in 1832, William Gaskell, a Unitarian minister in Manchester. Here she studied the lives of working men and women. In 1848, she published anonymously *Mary Barton*. It was followed by *Moorland Cottage*; *Cranford*, the most popular of her works; *Ruth*; *North and South*; *Sylvia's Lovers*; *Wives and Daughters*; and other stories. Besides her novels she wrote *The Life of Charlotte Brontë*, a masterpiece of English biography. Died, 1865.

Gassendi (*gà'sän'dē'*), or **Gassend, Pierre,** French philosopher and mathematician, was born at Champtercier in Provence, 1592. He studied and taught at Aix, but revolted from the scholastic philosophy and applied himself to physics and astronomy. In 1623, he was appointed provost of Digne cathedral and, in 1645, became professor of mathematics in the Collège Royale at Paris.

He attacked Aristotelian philosophy, revived the doctrines of Epicurus, and controverted the new philosophy of Descartes with such vigor that French savants became divided into two groups, Cartesians and Gassendists. Kepler and Galileo were among his friends, and he was the personal instructor of Molière. He wrote extensively on Epicurus; gave, in his *Institutio Astronomica*, a clear view of the science in his day; and published lives of Tycho Brahe, Copernicus, and Regiomontanus. His chief philosophical work is *Syntagma Philosophicum*, dealing with logic, physics, and ethics. Died, 1655.

Gaston de Foix. See *Foix, Gaston de*.

Gates, Horatio, American general, was born in England, 1728. Sent to America in 1755 as a captain of infantry, he served under General Braddock and with difficulty escaped in the defeat in which that officer was slain. On the peace of 1763, he purchased an estate in Virginia, where he resided until the Revolutionary War, when he sided with his adopted country.

In 1775, he was made adjutant general in the Colonial army. In June 1776, he received the chief command of the army which had just retreated from Canada. In 1777, he superseded Schuyler in the command of the army of the North and soon compelled the entire British army to surrender at Saratoga. This brilliant success gained for him a great military reputation, and his considerate conduct toward his compatriots won for him the esteem of even his enemies. In 1780, he was called by Congress to the command of the army of the South, but in the unfortunate defeat at Camden he lost the laurels he had already won. He then retired to Virginia until 1790, when he emancipated all his slaves and settled in New York. Died, 1806.

Gatling, Richard Jordan, American inventor, was born in Hertford county, N. C., 1818. While a boy, he assisted his father in the invention of a machine for sowing cottonseed. Subsequently he invented a machine for sowing rice, which he later adapted to sowing wheat in drills. He graduated in medicine at Cincinnati in 1850, but, before establishing himself in practice, conceived the idea of his principal invention, which afterward made him famous.

Stimulated by the outbreak of the Civil War, he built, in 1861, the first types of the revolving battery gun, now known throughout the world as the Gatling gun. This was greatly improved in 1865 and was immediately adopted by the United States government. In 1886, he invented a new gun metal of steel and aluminum. Congress soon afterward voted him $40,000 to perfect a new method of casting cannon. He died in 1903.

Gatti-Casazza (*gät'tē-kä-zät'sä*), **Giulio,** operatic manager, was born at Udine, Italy, 1869. He was educated in the universities of Ferrara and Bologna and the naval school of engineering at Genoa. In 1893, he gave up his career as an engineer and became director of the municipal theater at Ferrara. In 1895, he was appointed director of La Scala, in Milan, which in ten years he raised to the foremost opera house in Italy. In 1908, he was made general manager of the Metropolitan opera house of New York, which achieved notable financial and artistic success under his administration.

He inaugurated the policy of encouraging many American singers and of producing every year one new opera by an American composer. In 1908, he offered a prize of $10,000 for the best opera submitted in competition by an American composer; it was won by H. W. Parker and B. Hooker, 1911, and was produced at New York, 1912. In 1910, he married Frances Alda, a prima donna in his company.

Gauss (*gous*), **Karl Friedrich,** German mathematician, was born in Brunswick, Germany, 1777. He graduated at the Collegium Carolinum in his native city in 1795 and at the University of Gottingen in 1798. At the age of 19, he demonstrated that a circle can be divided into 17 equal arcs by elementary geometry, the first discovery of the kind since the ancient Greeks. In 1801, he completed his celebrated *Disquisitiones Arithmeticæ*, which at once stamped its author as a most profound and original mathematician. In 1809 appeared his *Theoria Motus Corporum Cœlestium*, in which was contained the exposition of his newly discovered method of least squares. In 1807, he was called to the chair of mathematics in the University of Gottingen.

His investigations at Gottingen took a wide range, and much of his time was occupied with work in the field of terrestrial magnetism. Laplace regarded him as the foremost mathematician in Europe, and he is considered the founder of the mathematical theory of electricity. His complete works fill seven large quarto volumes with titles as follows: *Disquisitiones Arithmetica*, *Higher Arithmetic*, *Analysis*, *Geometry and Method of Least Squares*, *Mathematical Physics*, *Astronomy*, and *Theoria Motus*. Died at Gottingen, 1855.

Gauthier, Charles Hugh, Canadian prelate, was born at Alexandria, Ont., 1843. He was educated at Regiopolis college, Kingston, where for some years he was professor of rhetoric. He was ordained in 1867 and became parish priest at Gananoque, and later at Westport, Williamstown, Glen Nevis, and Brockville. He was made dean in 1886 and vicar-general in 1891. In 1898, while still serving at Brockville, he was appointed archbishop of Kingston. In 1910, he was transferred from his see, was made archbishop of Ottawa, and became apostolic chancellor of University of Ottawa. Unwearying in his pastoral labors for his people, he also acquired wide reputation as an impressive and convincing speaker, using English, French, and Gaelic with equal facility. He died in 1922.

Gautier (*gō'tyā'*), **Théophile,** French poet and novelist, was born at Tarbes, 1811. From painting he turned to literature, and became a "romanticist" of an extreme type. In 1830, he published his first long poem, *Albertus*; in 1832, the striking *Comédie de la mort*; and, in 1856, *Emaux et camées*, his best poetic work. In 1835 appeared his celebrated novel *Mademoiselle de Maupin*, with its defiant preface. He wrote many other novels and shorter stories, among which are *Les Jeunes-France*, *Fortunio*, *Une larme du diable*, *Militona*, *Le peau de tigre*, *Jettatura*, *Le capitaine Fracasse*, *La Belle Jenny*, and *Spirite*.

Gautier's theatrical criticisms were in part collected as *L'Histoire de l'art dramatique en France*. He devoted his leisure to travel, of which he published characteristic accounts in his delightful *Caprices et zigzags*, *Constantinople*, *Voyage en Russie*, and *Voyage en Espagne*. His other works include *Les grotesques*, *Honoré de Balzac*, *Ménagerie intime*, *Histoire du romantisme*, *Portraits et souvenirs littéraires*, and *L'Orient*. He died at Paris, 1872.

Gay, John, English poet, was born at Barnstaple in 1685. He wrote a large number of poems and ballads besides several operas; but little of his poetry is now read. His greatest success was *The Beggar's Opera*, which ran 62 nights, made the actors celebrated, and in the popular phrase "made Rich (the manager) gay and Gay (the author) rich." His *Fables* and his ballad of *Black-eyed Susan* also deserve mention. Died, 1732.

Gayley, Charles Mills, author and educator, was born at Shanghai, China, 1858. He was graduated at the University of Michigan, 1878, and was a student at Giessen and Halle, 1886-87. After teaching Latin and English at the University of Michigan for nine years, he was made professor of English in the University of California in 1889. He held this chair for more than 30 years, and, in 1918–20, served as dean of the faculties of the university.

Gayley's published works include *Guide to the Literature of Æsthetics* (with F. N. Scott), *Classic Myths in English Literature*, *Methods and Materials of Literary Criticism* (with F. N. Scott), *Representative English Comedies*, *The Poetry of the People* (with M. C. Flaherty), *The Principles and Progress of English Poetry* (with C. C. Young), *Plays of Our Forefathers*, *Beaumont the Dramatist*, and *Shakespeare and the Founders of American Liberty*. He also edited *Songs of California*.

Gay-Lussac (*gā'lü'sāk'*), **Joseph Louis,** French chemist and physicist, was born at Saint-Leonard le Noblat, 1778. He was educated in Paris, studied chemistry under Berthollet, and became his assistant. Later, in conjunction with Biot, he made important researches on the composition of the atmosphere. These resulted in his important discovery that the proportions by volumes in which gases combine are simply related, both to each other and to the volume of the product. This is now known as the law of volumes, and is one of the most important in the domain of chemistry.

In collaboration with Humboldt, Gay-Lussac investigated the composition of water. He made important discoveries regarding the expansion of gases, the expansion of fluids, and the process of evaporation. With Thénard, he discovered a method of obtaining metallic potassium, and was the first to obtain hydriodic and iodic acids and cyanogen. He devoted many years to practical applications of chemistry in connection with fermentation, bleaching, and the manufacture of sulphuric acid and gunpowder. He published many valuable scientific works, and, for 30 years, was editor with Arago of *Annales de chimie*. He died in Paris, 1850.

Gaza (*gā'zä*), **Theodorus,** Italian scholar, one of the earliest to revive Greek learning in the West, was born at Thessalonica about 1398. About 1430, he fled before the Turks to Italy, and became teacher of Greek at Ferrara and afterward of philosophy at Rome. His principal work was a Greek grammar issued in 1495. He translated into Latin portions of Aristotle, Theophrastus, Saint Chrysostom, Hippocrates, and other Greek writers. Died about 1478.

Ged (*ged*), **William,** inventor of stereotyping, was born in Edinburgh, 1690. He developed his invention by soldering together loose types, securing a patent in 1725. Notwithstanding his success in obtaining casts of type pages in similar metal, Ged was unable to induce the printers of Edinburgh to make use of his invention. Finally he formed a partnership in London to promote it but this resulted disastrously. While Ged failed to see the process adopted in Great Britain during his lifetime, owing to trade jealousy and the dislike of compositors toward the new idea, he steadfastly refused, from patriotic motives, repeated offers from Dutch printers to establish it in Holland. His sons endeavored to carry out the patent, which was ultimately perfected by Andrew Wilson. Died, 1749.

Geddes (*ged'is*), **Sir Auckland Campbell,** British scientist, administrator, and diplomatist, was born in Scotland, 1879. He received a medical education, having studied at Edinburgh university, at London hospital, and at the University of Freiburg, Germany. He held professorships successively at Edinburgh university, at Trinity college, Dublin, and at McGill university, Montreal. At the outbreak of the World War, he returned to Great Britain, where he served as director of recruiting in 1916, minister of national service from 1917 to 1919, and, in 1919, as minister of reconstruction and president of the British board of trade. He was British ambassador to the United States from 1920 to 1923.

Geddes, Patrick, Scottish biologist and educator, was born at Perth, 1854. He was educated at University college, London, at Edinburgh, and at the Sorbonne in Paris. After teaching and lecturing at London, Aberdeen, and Edinburgh, he was successively professor of botany at Saint Andrews university and professor of sociology at Bombay university, later retiring to devote his energies to city planning. While making valuable contributions to biological science, he also sought to embody fundamental principles of biology in sociological work and devoted much attention to art, social economy, and civics. His works include *Chapters in Modern Botany*, *The Evolution of Sex*, *Evolution and Study of Sex* (with J. A. Thompson), *A Study in City Development*, *Cities in Evolution*, *The Coming Polity* (with V. V. Branford), *Our Social Inheritance* (with V. V. Branford), and *Ideas at War* (with Gilbert Slater).

Gegenbaur (*gā'gĕn-bour*), **Karl,** German comparative anatomist, was born at Wurzburg in 1826. He studied medicine at the university in his native city and was a pupil of Kölliker and Virchow. He received a chair at the University of Jena in 1855 and at the University of Heidelberg in 1873. By his masterly and comprehensive researches he took rank with Huxley and Owen among the great comparative anatomists of his time. He was the first to place the study of anatomy upon an evolutionary basis, and thereby became the founder of modern anatomy. His chief works are *Elements of Comparative Anatomy*, *Text-book of Human Anatomy*, and *Comparative Anatomy of the Vertebrates in Relation to the Invertebrates*. In 1875, he founded the *Yearbook of Morphology*. Died at Heidelberg, 1903.

Geikie (*gē'kĭ*), **Sir Archibald,** British geologist, was born at Edinburgh, 1835. He was educated at the University of Edinburgh. In 1855, he was appointed assistant on the geological survey, and, in 1867, he became director of the survey in Scotland. From 1871 to 1882, he was professor of geology and mineralogy at Edinburgh. He was director general of the geological survey of the United Kingdom and head of the geological museum, London, 1882–1901. From 1908 to 1913, he was president of the royal society. Among his works are *Story of a Boulder*, *Phenomena of the Glacial Drift of Scotland*, *Ancient Volcanoes of Britain*, *Text-Book of Geology*, *The Founders of Geology*, *Types of Scenery and Their Influence on Literature*, and *Love of Nature Among the Romans*. Died, 1924.

Geikie, James, British geologist, brother of Sir Archibald Geikie, was born at Edinburgh, 1839. He was educated at Edinburgh university, was appointed assistant on the

British geological survey in 1861, and became director of the survey in Scotland in 1869. In 1882, he succeeded his brother in the Murchison chair of geology, Edinburgh university, which he filled with distinction until his death. He wrote extensively on glacial geology. His works include *Earth Sculpture*; *Structural and Field Geology*; *Mountains: Their Origin, Growth and Decay*; and *The Antiquity of Man in Europe*. He died in 1915.

Geissler (*gīs'lĕr*), **Heinrich,** German scientific-instrument maker, was born at Igelshieb in 1814. After becoming an expert glass blower, he established at Bonn, in 1854, his noted factory for making chemical and other scientific apparatus, which were widely known throughout the scientific world for their excellence. He invented the mercurial high vacuum air pump known as the Geissler pump. He also constructed the well-known Geissler's tubes, which enable investigators to examine incandescent gases with the spectroscope. He died at Bonn, 1879.

Gelée (*zhĕ-lā'*), **Claude.** See *Claude Lorraine*.

Gellius (*jĕl'ĭ-ŭs*), **Aulus,** Latin author, supposed to have been born at Rome about 130 A. D. After studying philosophy at Athens, he practiced law at Rome. He wrote the *Noctes Atticæ*, or "Attic Nights," a medley on language, antiquities, history, and literature, in 20 books, of which the 8th is wanting. The work contains many extracts from lost Greek and Latin authors and is a rich source of curious knowledge. He died about 180.

Gelon (*jĕ'lŏn*), tyrant of Gela and Syracuse, was the son of Dinomenes and a native of Gela. He figures in history first as one of the bodyguards in the service of Hippocrates, tyrant of Gela. On the death of the latter, he obtained the supreme power, 491 B. C., and, about 485, made himself master of Syracuse. His influence soon extended over the half of Sicily. Gelon refused to aid the Greeks against Xerxes, as they declined to comply with his demand that he should be appointed commander in chief.

In alliance with Theron, Gelon resisted the Carthaginians, and, on the same day on which the Greeks won the battle of Salamis, in 480, he gained a complete victory over the invaders at Himera. His clemency and the wisdom of his measures rendered him so generally beloved that, when he appeared unarmed in an assembly of the people and declared himself ready to resign his power, he was unanimously hailed as the deliverer and sovereign of Syracuse. Died, 478 B. C.

Genest, or **Genêt** (*zhĕ-nĕ'*), **Edmond Charles Edouard,** called "Citizen Genêt," French diplomat, was born in Versailles in 1765. He entered the French diplomatic service as *chargé d'affaires* at Petrograd in 1789, but was sent home in 1791, and, in December 1792, was accredited to the United States. He transgressed the laws of neutrality by issuing commissions to privateers to prey upon English commerce, France being then at war with England. He complained of the lack of sympathy displayed by the young republic to its old ally, and did his best to embroil the United States with Great Britain. Washington demanded and obtained his recall, but Genêt decided to become a naturalized citizen. He settled in New York and married a daughter of Governor George Clinton. Died at Schodack, N. Y., 1834.

Geneviève (*zhĕn'vyĕv'*), **Saint,** patroness of Paris, was born at Nanterre, near Paris, about 422. She took the veil, and acquired an extraordinary reputation for sanctity. This was increased by her assurance that Attila and his Huns would not touch Paris and by an expedition for the relief of the starving city during Childeric's Frankish invasion. In 460, she built a church over the tomb of Saint Denis, where she herself was buried. The Pantheon in Paris is built on the supposed site of her tomb and adjoining it is the noted library of Saint Geneviève. The Pantheon contains the noted mural paintings of the saint by Puvis de Chavannes. She died in 512.

Genghis Khan (*jĕn'gĭz kän'*), celebrated Mongol conqueror, was born in the region of Lake Baikal, 1162, the son of a Mongol chief. His career as a soldier began at the age of 13, when he boldly assumed the reins of government in succession to his father. By his military skill and daring example he gradually raised his people to a position of supremacy in Asia, and established a kingdom which, at his death, stretched from the Volga to the Pacific and from Siberia to the Persian gulf. While his vast empire dissolved soon after his death, leaving no permanent institutions or remains, one direct result of his rule is the presence of the Turks in Europe. Driven out of their Asiatic homes by his armies, they fled westward and invaded Europe. He died in 1227.

Genseric (*jĕn'sĕr-ĭk*), or **Gaiseric,** king of the Vandals, was born about 400 A. D. He was the son of Godigisdus and natural brother of Goderic, whom he succeeded in 428. From Spain he crossed to Africa, and in conjunction with the Moors added to his kingdom the land lying west of Carthage, ultimately gaining possession of Carthage itself, which he made his capital in 439. He next set himself to organize a naval force, with which he systematically from year to year pillaged Spain, Italy, Greece, and the opposite lands of Asia Minor, sacking Rome in 455. He continued master of the seas until his death, despite strenuous efforts of the Roman emperors to crush his power. He died in 477.

Geoffroy Saint-Hilaire (*zhô'frwä' sănt'tē'lâr'*), **Etienne,** French zoologist, was born at Etampes, 1772. He was a pupil of Haüy at the College of Navarre, Paris, and, in 1793, became professor of zoology in the museum of natural history. He accompanied Napoleon's expedition to Egypt, for the collection of specimens. After his return, he laid the basis of scientific anatomy by enunciating his theory of the unity of organic structure. He was appointed to the chair of zoology at the faculty of sciences, 1809, and evoked a great controversy with Cuvier by the publication of his *Philosophie Anatomique*, 1818–22. Died at Paris, 1844.

George, Saint, the patron saint of England, Portugal, and Aragon. His true history is not clearly known. Some say the real Saint George was a soldier in the army of Diocletian, 300 A. D., and that he suffered death in Palestine for the Christian faith. English crusaders brought home his fame from the East, and Edward III made him patron of his new order of the garter. His name became the English battle cry; he has been also a highly honored saint in Russia, and the Russians have an order of Saint George. There is a story that he slew a dragon, which had been sent by a magician to devour an Egyptian princess. In pictures he is generally shown in the act of killing the monster.

George I, king of Great Britain from 1714 to 1727, was born in 1660. He was the son of Ernest Augustus, elector of Hanover, and of Sophia, the granddaughter of James I of England. On the death of Queen Anne, he ascended the throne, being the first monarch of the house of Hanover. The early part of his reign was troubled by the conspiracies and rebellions of the Jacobites, which were aggravated by foreign wars. In 1720, the collapse of the famous South Sea scheme occurred, and thousands of families were ruined. He had one son, George Augustus, who succeeded him, and one daughter, Sophia Dorothea, who, in 1706, was married to Frederick II of Prussia, and became the mother of Frederick the Great. George I died in 1727.

George II, king of Great Britain from 1727 to 1760, was born in 1683. He succeeded his father George I, ascending the throne when 44 years of age. He had the advantage over his father of being able to speak English, which George I could never do. But he had to cope with Jacobite conspiracies and also to contend with Charles Edward Stuart, the young pretender who was not entirely defeated until the battle of Culloden, 1746. In this reign occurred the war of the Austrian succession, the object of which was to secure Maria Theresa of Hungary from the partition of her Austrian dominions. King George espoused the cause of Maria Theresa and the war was brought to a close by the Treaty of Aix la Chapelle, 1748. In 1756, the Seven Years' war broke out, in which England sided with Prussia. The last years of the king's reign saw the British victors in India, Canada, and on the seas. He died, 1760.

George III, king of Great Britain from 1760 to 1820, was born in London, 1738. In 1761, he married Princess Charlotte Sophia of Mecklenburg Strelitz, by whom he had fifteen children. More English in sentiment and education than his two predecessors, George's main interest was centered in his English kingdom, and never during his long life did he set foot in his Hanoverian possessions. At his accession he found the Seven Years' war in progress; he was later involved in the war of the American Revolution and in the Napoleonic wars. In 1801, the legislative union of Great Britain and Ireland was effected. He became insane, 1811, and died, 1820.

George V, king of Great Britain and Northern Ireland and emperor of India, was born at Marlborough house, London, 1865. The death of his elder brother, Albert, in 1892 made him heir apparent to the British throne, and he took his seat in the House of Lords as duke of York. Upon the accession of Edward VII in 1901, he received the title of duke of Cornwall. At this time he made a tour of all the chief British dominions and gained great popularity. On his return he was created prince of Wales. In 1893, he married Princess Victoria Mary of Teck, and six children were born to them. On the death of Edward VII, the new king ascended the throne under the title of George V, May 7, 1910. The coronation took place, June 22, 1911. He was crowned emperor of India at the durbar at Delhi, December 12, 1911. The chief events of the early part of his reign were in connection with the World War, 1914–18.

George, Grace, American actress, was born in New York, 1880. She received a convent education, and married William A. Brady, 1899. She made her début in *The New Boy*, New York, 1894; played prominent parts in *The Girl*

I Left Behind Me, Charley's Aunt, and other plays until 1899, when she starred in *The Princess Chiffon,* and later in *Under Southern Skies, Frou Frou, Pretty Peggy,* and *The Two Orphans.* In 1907 and again in 1913, she appeared with great success as Cyprienne in Sardou's *Divorçons.* Among her later rôles are leading parts in *Sylvia of the Letters, Just to Get Married, School for Scandal, Sauce for the Goose, A Woman's Way,* Barrie's *Half-an-Hour,* and Clyde Fitch's *The Truth, The New York Idea, The Earth, Captain Brassbound's Conversion,* and *L'Elevation.*

George, Henry, American economist and sociologist, was born in Philadelphia, 1839. After being successively at sea, in a countinghouse, and in a printer's office, he settled in California and, in 1866, joined the staff of a San Francisco paper. He afterward became editor of two papers there and, in 1871, published his first essay on the land question in *Our Land and Land Policy.* In 1880, he removed to New York and the next year visited Ireland on his way to England. He wrote *Progress and Poverty* in 1879, and undertook lecturing tours in 1883 and 1889 in support of his principles.

His widely discussed theory of a single tax on land to equalize extremes of wealth and poverty has not been approved by scientific economists. But his theory that wages are paid out of the value that the laborer himself creates has been adopted by high economic authorities. He published also *The Irish Land Question, Social Problems, Protection and Free Trade,* and *The Science of Political Economy.* Died, 1897.

George, W. L., English author, was born in Paris, 1882. He was educated successively as a chemist, engineer, barrister, soldier, and business man, but entered journalism in 1907. Known as a vigorous exponent of feminism, he wrote also on art, politics, finance, and labor problems. His publications include *Woman of Tomorrow; Eddies of the Day; Hail, Columbia!; A London Mosaic;* and, among his novels, *A Bed of Roses, Caliban,* and *The Confession of Ursula Trent.* Died, 1926.

Gérard (*zhā'rär'*), **François Pascal, Baron,** French painter, was born in Rome, 1770. Nearly the whole of his life was spent in Paris, where he was a pupil of and later an assistant to David, but he speedily acquired a reputation of his own. Most of the leading men and women of the French empire were painted by Gérard, and he became known as the "painter of kings." Among his famous portraits are those of Napoleon, Talleyrand, Moreau, and Mme. Récamier. Among his most noted paintings are the "Battle of Austerlitz" and the "Entry of Henry IV into Paris." He was appointed court painter to Louis XVIII, from whom he received the rank of baron. All his historical paintings were executed in the then dominant classical style. Died, 1837.

Gerard (*jē-rärd'*), **James Watson,** American jurist and diplomat, was born in Geneseo, N. Y., 1867. He was graduated from Columbia university in 1890 and from Columbia law school in 1892. From 1908 to 1911, he was associate justice of the supreme court of New York. He acted as chairman of the Democratic campaign committee of New York for four years. In 1913, he was appointed ambassador to Germany by President Wilson, and he served with marked distinction and ability during the difficult period following the outbreak of the European conflict in 1914. When the United States declared war against Germany in 1917, Gerard was recalled. After his return to America, he published *My Four Years in Germany* and *Face to Face with Kaiserism.*

Gerhardt (*zhā'rärt'*), **Charles Frederic,** French chemist, was born at Strasbourg in 1816. At the time of his death he was professor of chemistry in the University of Strasbourg. He was one of the most famous of the pupils of Liebig. In 1838, he went to Paris, where he made researches with Cahours at the Jardin des Plantes, and, in 1844, he became professor of chemistry at Montpellier. Together with his contemporary Laurent, he exercised great influence on the development of modern chemical theory.

Gerhardt and Laurent were the joint authors of the system of chemical notation now in use. Their views regarding the formation and the constitution of salts are now generally accepted. Gerhardt invented the theory of types, a most valuable method of classifying chemical compounds and of showing their mutual relationships. His theories and discoveries are embodied in his *Treatise on Organic Chemistry.* Died, 1856.

German, Edward, English orchestral composer, was born at Whitchurch, Shropshire, 1862. He began his musical education under local teachers and then studied at the royal academy, 1880–87. After 1899, he devoted himself entirely to composition. He is best known by his incidental music to various Shaksperian plays, including *Richard III, The Tempest, Romeo and Juliet, As You Like It,* and *Henry VIII.* He composed also the operas *Merry England, The Princess of Kensington,* and *Tom Jones;* the operetta *The Rival Poets;* two symphonies; and chamber music. He finished Sullivan's *Emerald Isle,* has employed the folk-song style with marked success, and, with Rudyard Kipling, produced the *Just So Song Book.*

Gérôme (*zhā'rōm'*), **Jean Léon,** French painter and sculptor, was born at Vesoul, Haute Saone, 1824. After studying at Paris with Delaroche and traveling in the East, he was appointed professor of painting in the school of the fine arts at Paris. His reputation was established by his picture "Gladiators Before Cæsar." Among the best known of his works are "Phryne before Her Judges," "Cleopatra and Cæsar," "Thumbs Down" (a companion to his "Gladiators Before Cæsar"), and his Oriental pictures "Turkish Prisoner," "Prayer," "The Slave Market," and "The Promenade of the Harem."

Gérôme was an artist of great versatility and his work stands midway between the work of the classicists and that of the romanticists. After 1878, he attained eminence as a sculptor, producing, among other notable works, "Napoleon Entering Cairo," "Frederick the Great," "Tamerlane," "Tanagra," and "The Dying Eagle," a monument for Waterloo. Important examples of his works are found in American museums. Died, 1904.

Gerry, Elbridge, American statesman, 5th vice president of the United States, was born in Marblehead, Mass., 1744. He was graduated at Harvard college, 1762. In 1776, he was elected a delegate to the Continental Congress, signed the Declaration of Independence, and was placed on the most important committees. He retired from Congress in 1780, but resumed his seat in 1783. As delegate to the convention in 1787 to revise the Articles of Confederation, he refused to sign the Constitution as proposed, but afterward supported it.

Gerry was member of Congress, 1789–93, and, in 1797-98, was special envoy to France, with Pinckney and Marshall. He was governor of Massachusetts in 1810 and 1811. In the latter term, he signed the famous act redistricting the state so as to destroy the Federalist representation in the legislature. From this act the term "gerrymander" has its origin. In 1812, he was elected vice president of the United States. Died, 1814.

Gervinus (*gĕr-vē'nōōs*), **Georg Gottfried,** German critic and publicist, was born at Darmstadt, 1805. In 1836, he became professor of history at Gottingen. In 1837, he was one of the seven Gottingen professors who protested against the abolition of the Hanoverian constitution, and was ordered to leave the country. In 1844, he was appointed honorary professor in Heidelberg, and, from this period forward, wrote in behalf of constitutional liberty. In 1847, he helped to establish the *Deutsche Zeitung;* in 1848, was elected to the national assembly. His commentaries on Shakspere were translated into English in 1862. Besides these, he published a *History of German Poetry* and a *History of the 19th Century.* He died at Heidelberg, 1871.

Ghiberti (*gē-bĕr'tē*), **Lorenzo,** Italian sculptor, was born in Florence about 1378. He was engaged in painting in fresco at Rimini, in the palace of Prince Pandolfo Malatesta, when the merchants' guild of Florence invited artists to propose models for one of the bronze doors of the baptistery of San Giovanni. The offering up of Isaac was to be executed in gilt bronze, as a specimen of the work. The judges selected the works of Brunelleschi and Ghiberti as the best, but the former voluntarily withdrew his claims, giving the preference to Ghiberti.

After 21 years' labor, Ghiberti completed the door, and, at the request of the merchants' guild, executed a second after almost as long a period. Michelangelo said of these that they were worthy of adorning the entrance to paradise. During these 40 years, Ghiberti completed also a statue of John the Baptist for the church Or San Michele, two bas-reliefs for the baptistery of the cathedral of Siena, and other works. He died in 1455.

Ghika (*gē'kä*), **Helena,** or "Dora d'Istria," daughter of Prince Michael Ghika, was born at Bucharest, 1828. Thoroughly instructed in the classics, she gained by travel an extensive knowledge of modern languages and literature. At 15, she translated the *Iliad* into German, and not long afterward wrote several pieces for the theater. On her marriage, in 1849, with Prince Koltzoff-Massalsky, she accompanied him to Petrograd, but after 1855 she lived mainly at Florence. Her works include *La vie monastique dans l'église orientale, La Suisse allemande, Les lacs Helvétiques, Gli Albanesi nella Rumenia, La Poésie des Ottomans, Pélerinage au tombeau de Dante,* and *Des femmes par une femme.* She died in 1888.

Ghirlandajo (*gēr'län-dä'yō*), **Domenico,** Florentine painter, was born in 1449. He assisted in the decoration of the Sistine chapel in Rome, and executed a series of frescoes in the Sassetti chapel in Santa Trinità, Florence, which are regarded his most important work. He painted also many easel pictures in oil and distemper, but his frescoes are incomparably his finest works. In artistic ability he ranks with Giotto, Masaccio, Lippo Lippi, and Botticelli among early Florentine painters. He was the instructor of Michelangelo. Died, 1494.

Ghirlandajo, Ridolfo, noted Italian painter, son of Domenico Ghirlandajo, was born in 1483. He was educated in art in his father's studio. About 1503, he began to study the works of Leonardo da Vinci and produced many fine paintings that are hardly distinguishable from those of that great master. The "Annunciation" in the Uffizi gallery, Florence, the "Goldsmith" in the Pitti palace, and other paintings attributed to Da Vinci were painted by Ghirlandajo. His best works in this style are the "Coronation of the Virgin," in the Louvre, and the "Betrothal of St. Catherine." Later, he came under Raphael's influence. This is reflected in his noted portrait of an "Old Woman" in the Pitti palace. According to Vasari, he assisted Raphael in painting the draperies of "La Belle Jardinière." Died in 1561.

Giacosa (*jä-kō'sä*), **Giuseppe,** Italian dramatist, was born at Colleretto Parella, 1847. He was educated for the law at Turin, but began in 1872 to devote his attention to writing. After residing some years in Turin, he continued his career at Milan, writing numerous dramas and conducting a literary magazine. *As the Leaves*, published in 1900, had an immense success in Italy, where it was considered epoch making in its influence upon the modern drama. Besides his longer plays, Giacosa collaborated the libretti for the operas *La Bohême* and *Madame Butterfly*, and wrote many one-act plays.

Among Giacosa's dramas are *A Game of Chess, An Old Story, Bank Affairs, The Sons of the Marquis Arturo, Sad Doubts, Gallant Intrigues, The Triumph of Love, Nocturnal Surprises, A Candidate, Teresa, Mountain Showers, The Brothers-At-Arms, The Red Count, Luise, The Thread, The Siren, A Surrender to Discretion, The Honorable Ercole Mallardi, Sad Loves, The Belated Repentance*, and *The Lady of Challont*. He died in 1906.

Gibbon, Edward, English historian, was born at Putney, in Surrey, England, April 27, 1737. On account of his delicate health, his early education was carried on with difficulty at Kingston on Thames and later at Westminster school. Having been fully restored to health at Bath, he entered Oxford and matriculated at Magdalen college in 1752. His erudition at this time was enormous; his readings took a serious, religious turn.

His father sent him to Lausanne, Switzerland, for further training. When he returned to England in 1758, he brought with him the first pages of his *Essay on the Study of Literature*, a work which served as his card of admission to the society of notable literary men when he made his trip to France and Italy in 1764. While in Rome, in October of that year, he conceived the idea of writing his great book on the decline of that empire.

When once again in England, Gibbon devoted a portion of each year to the army, where he had risen to the rank of lieutenant colonel, and the remainder to literary activities in London. His father died in 1770, leaving him in comparatively easy circumstances. In 1774, he was elected to Parliament, but he entered a public career without ambition and proved an indifferent politician.

Meanwhile, the first volume of the *Decline and Fall of the Roman Empire* appeared in 1776 and was received with unbounded admiration. Gibbon's reputation was firmly established. Two more volumes of this work were ready in 1781. He then settled in Lausanne and there completed his great history, of which the last two volumes were published in May 1788. It is virtually a history of the world for 13 centuries,—from the reign of Trajan to the capture of Constantinople by the Turks,—during all which time Christianity was superseding paganism.

Gibbon's brain was vigorous, and he had a vast capacity for both work and enjoyment. His style is polished and elegant. His most unique merit is his supreme power of unifying a bewildering multitude of details and giving life and sequence to the whole. Died in England, January 16, 1794.

Gibbons, Grinling, English sculptor and wood carver, was born probably at Rotterdam, 1648. He had for some time practiced his art in England, when, discovered by Evelyn, he was appointed by Charles II to a place in the board of works and was employed in the chapel at Windsor. Here and in Saint Paul's, London, his work displays great taste and delicacy of finish. At Chatsworth, Burleigh, and other mansions, he executed an immense quantity of carved embellishment. The ceiling of a room at Petworth is considered his masterpiece. He died in London, 1721.

Gibbons, James, American Roman Catholic cardinal, was born in Baltimore, Md., 1834. At an early age, he was taken by his parents to their former home in Ireland, where he began his education. He returned to the United States and resided with his family in New Orleans, 1848. He entered Saint Charles college, Maryland, in 1855 and transferred in 1857 to Saint Mary's seminary, Baltimore. Ordained priest in 1861, he became assistant at Saint Patrick's, Baltimore, then pastor of Saint Bridget's at Canton, a suburb of Baltimore, and later private secretary to Archbishop Spalding and chancellor of the archdiocese.

In 1868, he was made vicar apostolic of North Carolina, with rank and title of bishop. He became archbishop of Baltimore in 1877, and, in 1886, was created cardinal. His writings include *The Faith of Our Fathers, Our Christian Heritage, The Ambassador of Christ*, and *A Retrospect of Fifty Years*. He died in 1921.

Gibbs, Josiah Willard, American physicist, was born at New Haven, Conn., 1839. He was graduated at Yale in 1858, was an instructor there for three years, and then studied in Berlin, Heidelberg, and Paris. In 1871, he became professor of mathematical physics at Yale, continuing until his death 32 years later. In 1878, he completed the publication of a paper *On the Equilibrium of Heterogeneous Substances*, which laid the basis of the science of physical chemistry. This publication contained the important formula called the "Gibbs phase rule," the use of which has greatly increased scientific knowledge of solutions, alloys, and crystallizations.

For his notable original researches, Gibbs was awarded the Copley medal of the royal society, the Rumford medal of the American academy, and numerous honorary degrees in America and Europe. Ostwald called him the founder of chemical energetics. Between 1881 and 1884 he developed his system of vector analysis. He published numerous papers on mathematical physics. His final work was on the *Elementary Principles of Statistical Mechanics*. Died, 1903.

Gibbs, Sir Philip, English author and journalist, was privately educated and, in 1902, entered journalism, acting as editor of various London newspapers. From 1915 to 1918, he was war correspondent with the British armies in France and achieved distinction by his graphic accounts of the great conflict. His extensive writings include the novels *Venetian Lovers, The Individualist*, and *The Reckless Lady*; the historical works *Founders of Empire, The Battles of the Somme, The Way to Victory*, and *Ten Years After*; also *Adventures in Journalism* and numerous essays. He was knighted in 1920.

Gibson, Charles Dana, American illustrator, was born in Roxbury, Mass., 1867. He was educated at Flushing, L. I., at the art students' league, New York, and under Saint-Gaudens. In 1886, he began his career as an artist with illustrations for periodicals. After a period of further study in Paris in 1889, he returned to New York. He resumed illustrating work for *Life, Scribner's, Century, Harper's*, and other magazines, and became a master of black-and-white pictorial art. He created the so-called "Gibson girl" type.

In 1905, Gibson began to study color painting in Europe, but later he again returned to black-and-white illustration work. He purchased a controlling interest in *Life* in 1920 and took active charge. In 1921, he was elected member of the American academy of arts and letters. Among his published works are *People of Dickens, Pictures of People, Sketches in Egypt, The Americans, A Widow and Her Friends, The Social Ladder*, and *Our Neighbors*.

Gibson, Sir John Morison, Canadian administrator, was born near Toronto in 1842. He graduated at the University of Toronto with highest honors, 1863; was admitted to the bar in 1867; and entered politics in 1879, sitting in the Ontario legislature almost continuously until 1905. He held various cabinet positions and secured the passage of laws restricting the liquor traffic, protecting dependent children, protecting fish and game, and readjusting the insurance system. He was lieutenant governor of Ontario, 1908-14, and was knighted in 1912. Died, 1929.

Gifford, Sandford Robinson, American painter, was born in Greenfield, N. Y., 1823. He studied with J. R. Smith, a water-color painter, in New York, and was much influenced by the methods of Thomas Cole. In 1855–57, he sketched in England, Scotland, France, Belgium, Holland, Switzerland, and Italy, and, in 1868–70, in Italy, Syria, Greece, Turkey, and Egypt.

Among Gifford's best pictures are "Morning in the Adirondacks," "Mansfield Mountain," and "Sunset on the Sweetwater." Among his most noted paintings of foreign subjects are "Ruins of the Parthenon" in the Corcoran gallery, Washington, and "Tivoli" and "Near Palermo" in the Metropolitan museum, New York. Gifford made artistic effect rather than pictorial detail his controlling aim. He was one of the best-known of the Hudson River school of painters. Died, 1880.

Gilbert, Cass, American architect, was born at Zanesville, O., 1859. He was educated at Massachusetts institute of technology, and began practice as an architect in 1883. Among notable buildings designed by him are the Minnesota capitol at St. Paul, the New York customhouse, and the central public library, St. Louis. He was one of the architects of the new Union club, New York, and made plans for the Arkansas capitol and for the universities of Minnesota and Texas. His most noted achievement is the Woolworth building, New York. In 1914, he was elected member of the American academy of arts and letters.

Gilbert, Seymour Parker, American economist, was born at Bloomfield, N. J., in 1892. After an education at Rutgers college and Harvard university, he engaged in law practice in New York City. Having served on the war loan staff of the secretary of the treasury in 1918–20, he was made assistant secretary of the treasury in 1920. In 1924, he was appointed agent general for reparations payments under the Dawes plan, a difficult task which he performed with eminent ability and tact.

Gilbert, William, English physicist and physician, was born at Colchester, 1540. He was educated at the University of Cambridge. Settling in London about 1573, he began medical practice, joined the college of physicians, and was appointed physician to Queen Elizabeth. He became president of the college of physicians in 1600, and, upon the death of Queen Elizabeth in 1603, he was made court physician by James I.

Gilbert devoted his spare time to scientific experiments, particularly in connection with the magnet. He demonstrated the bearing of magnetic phenomena on navigation and was the first investigator to use the terms "electric force," "electric attraction," and "magnetic pole." His treatise *De Magnete* was the earliest great work on physical science in England. He died in London, 1603.

Gilbert, Sir William Schwenck, English dramatist, was born in London, 1836. He was graduated at London university; was a clerk in the privy council office from 1857 to 1862; and, in 1864, was admitted to the bar. He wrote much for the magazines, and was for many years on the staff of *Fun*, in whose columns his *Bab Ballads* first appeared. His stage work began with a Christmas burlesque, *Dulcamara*, 1866, which was followed by a succession of burlesques, dramas, comedies, fairy comedies, and operas.

Gilbert won a world-wide reputation for the series of comic operas collaborated in conjunction with Sir Arthur Sullivan. Among these are *Thespis, Trial by Jury, The Sorcerer, H. M. S. Pinafore, The Pirates of Penzance, Patience, Iolanthe, Princess Ida, The Mikado, Utopia Limited,* and *The Grand Duke.* He died, 1911. See *Bab Ballads.*

Gilder, Richard Watson, American editor and poet, was born in Bordentown, N. J., 1844. He was educated at his father's seminary at Flushing, L. I. After a brief engagement in railway service, he entered journalism in Newark, N. J. In 1870, he became managing editor of *Scribner's Monthly* and, from 1881 to 1909, was its editor in chief under its later name, *The Century Magazine.*

Gilder took an active interest in social reform, was president of the public art league of the United States, and was a member of the council of the national civil service reform league. In 1905, he was elected member of the American academy of arts and letters. Among his writings are *The New Day, The Celestial Passion, Lyrics, In Palestine, The Great Remembrance, A Christmas Wreath,* and *A Book of Music.* He died in 1909.

Gildersleeve, Basil Lanneau, American classical scholar, was born in Charleston, S. C., 1831. He was graduated from Princeton, 1849, and later studied at the universities of Berlin, Bonn, and Gottingen. He was professor of Greek at the University of Virginia from 1856 to 1876, when he was called to the chair of Greek in Johns Hopkins university, which he filled with distinction until 1915. He founded and, in 1880, became editor of the *American Journal of Philology.*

Gildersleeve's contributions to Greek and Latin syntax and to the history of Greek literature are exceedingly valuable, and rank among the best products of modern scholarship. He is the author of several works, including a *Latin Grammar, Essays and Studies, Hellas and Hesperia,* and editions of Persius and Pindar. In collaboration with C. W. E. Miller, he produced the important work entitled *Syntax of Classical Greek from Homer to Demosthenes.* In 1908, he was elected member of the American academy of arts and letters. Died, 1924.

Gill, Theodore Nicholas, American zoologist, was born in New York, 1837. He was privately educated and early turned his attention to natural history. He was librarian at the Smithsonian institution, 1865–67, assistant librarian at the library of Congress, 1866–75, and professor of zoology at George Washington university, 1884–1910. His writings, chiefly on fishes, include *Principles of Zoogeography, Parental Care Among Fresh-Water Fishes, Synopsis of Fresh-Water Fishes, Arrangement of the Families of Mollusks,* and *Bibliography of the Fishes of the Pacific Coast.* Died in 1914.

Gillett, Frederick Huntington, American lawyer and politician, was born at Westfield, Mass., 1851. He was graduated at Amherst college in 1874, at Harvard law school in 1877, and immediately began the practice of law at Springfield, Mass. After serving as member of the lower house of the state legislature, 1890-91, he was elected member of Congress continuously for the period 1893–1925, becoming Republican floor leader. In 1919, he was chosen speaker of the House of Representatives, and, in 1921 and again in 1923, was re-elected. He was elected to the Senate for the term 1925–31.

Gillette, William, American actor and playwright, was born at Hartford, Conn., 1855. He received an academic education with special university courses. He won much popularity playing with stock companies in many cities of the East and South and wrote several plays which were notably successful. Among these are *Digby's Secretary, Too Much Johnson, Held by the Enemy, Secret Service, Because She Loved Him So, Settled Out of Court,* and *Clarice.* He is most widely known by his dramatization and impersonation of Sir Conan Doyle's *Sherlock Holmes,* first produced in 1899. In 1915, he was elected member of the American academy of arts and letters.

Gilman, Charlotte Perkins, American author and lecturer, was born in Hartford, Conn., 1860. In 1884, she married C. W. Stetson and, in 1900, G. H. Gilman of New York. She began giving lectures on economics, sociology, and ethics in 1890. She contributed numerous articles on similar subjects to magazines and became known for her efforts to improve labor conditions and for her interest in the advance of woman. She edited the *Forerunner* from 1909 to 1916. In 1914 her lectures entitled "The Larger Feminism" attracted wide attention. Among her writings are *Woman and Economics, In This Our World* (verse), *Concerning Children, The Home, Human Work, The Crux, The Man-Made World,* and *His Religion and Hers.*

Gilman, Daniel Colt, American educator, was born in Norwich, Conn., 1831. He was graduated at Yale in 1852 and continued studies at Yale, Harvard, and Berlin. He was librarian, secretary of the Sheffield scientific school, and professor of physical and political geography, Yale, 1856–72. From 1872 to 1875, he was president of the University of California. In 1875, he was made president of Johns Hopkins university and served with distinction until 1901. From 1901 to 1904, he was president of the Carnegie institution, Washington. During his presidency of Johns Hopkins university, he did much to establish high standards of university education in the United States. His writings include *James Monroe, University Problems, Introduction to De Tocqueville's Democracy in America, Life of James D. Dana, Geologist,* and *Science and Letters in Yale.* He was editor in chief of the *New International Encyclopædia.* In 1908, he was elected member of the American academy of arts and letters. Died, 1908.

Ginn (*gĭn*), **Edwin,** American publisher, was born at Orland, Me., 1838. He was graduated at Tufts college in 1862; engaged in publishing, and became head of the firm of Ginn and Company, publishers of school and college textbooks. The first book which he produced was Allen's *Latin Grammar,* published in 1868. Under his constructive policy, his house rose to foremost rank among American textbook publishers. He became deeply interested in social problems and in the movement for universal peace. In 1909, he set aside $1,000,000 for the endowment of a world peace foundation and, in 1913, established an international school of peace. Died, 1914.

Giorgione (*jôr-jō'nā*), or **Giorgio Barbarelli,** Italian painter, was born at Castelfranco about 1477. He studied at Venice under Giovanni Bellini, and soon developed a free and large manner, characterized by intense poetic feeling and by great beauty and richness of coloring. Several early portraits by him have disappeared, but his "Enthroned Madonna" is an altarpiece at Castelfranco. In Venice he was extensively employed in fresco painting, but some fragments in the Fondaco de' Tedeschi are all that now remain of this work.

Of his existing works, "The Family of Giorgione" at Venice, "The Three Philosophers" at Vienna, "The Concert" at the Pitti palace, Florence, and the "Sleeping Venus" in the Dresden gallery are representative canvases. Giorgione ranks with the greatest of Venetian painters and powerfully influenced his contemporaries, including Titian. Died, 1511.

Giotto (*jŏt'tō*) **di Bondone,** Italian painter and architect, was born at Colle about 1266. He is said to have been a pupil of Cimabue and a friend of Dante, whose portrait he painted at Ravenna. He painted a series of fine frescoes at Assisi, and was probably the founder of the modern school of portrait painting. About 1298, he went to Rome, where he painted and worked in mosaics; he subsequently was employed at Padua and Florence, where he painted frescoes in the Peruzzi chapel of Santa Croce.

Giotto painted also the "Miracle of the Loaves and Fishes," at Naples, and designed the beautiful campanile at Florence, often called "Giotto's Tower." Giotto was the greatest and most influential painter in Italy before the Renaissance. He humanized and vitalized Italian painting, imbued it with natural action and feeling, and thereby ranks as a notable figure in the history of art. He died in 1336. See *Painting.*

Girard (*zhē'rär'*), **Jean Baptiste,** "Le Père Girard," Swiss educator, was born at Fribourg, 1765. At the age of 16, he entered the Franciscan order, and, although somewhat engaged in teaching, did not devote himself definitely to education until 1798. He then published a *Projet d'éducation pour toute l'Helvétie*, and, in 1805, became director of primary schools at Fribourg, where he remained until 1823. He then taught philosophy at Lucerne until 1834, retiring in that year to Fribourg, where he wrote his noted *Enseignement regulier de la langue maternelle*, published, 1844–46.

Girard's theory of teaching is embodied in Villemain's statement: "The only, the really popular school is one in which all the elements of study serve in the cultivation of the mind, and where the child is led himself by the things he learns and by the way in which he learns them." His influence has been very great in elementary teaching in France, Italy, and Switzerland. He stands next to Pestalozzi among Swiss educators. Died, 1850.

Girard (*jĭ-rärd'*), **Stephen,** banker and philanthropist, was born near Bordeaux, France, 1750. He became a sailor and, before the Revolution, engaged as the master of vessels in the American coasting and West Indian trade. During the Revolutionary War, he was a grocer and sutler in and near Philadelphia. He was again in the West Indian and coastwise trade in partnership with John, his brother, in 1780–90. Eventually, he became a banker, and amassed a large fortune. He was eccentric in his habits, a freethinker, ungracious in manner and ill-tempered, but a liberal benefactor of public charities. During several yellow-fever seasons in Philadelphia, no citizen was more active in relieving distress. At his death, nearly all his estate was bequeathed to various charitable and municipal institutions of Philadelphia and New Orleans and to the founding of Girard college. He died in 1831.

Giulio Romano (*jōōl'yō rō-mä'nō*), Italian painter and architect, the most eminent of Raphael's pupils, was born at Rome about 1492. He assisted Raphael in the execution of several of his finest works, and at Raphael's death completed the "Apparition of the Cross" in the Vatican.

In 1524, Giulio Romano went to Mantua on the invitation of the duke. The drainage of the marshes and the protection of the city from the inundations of the Po and the Mincio attest his skill as an engineer, while his genius as an architect found scope in the restoration and adornment of the Palazzo del Tè, the cathedral, and a ducal palace. In Bologna, he designed the façade of the church of San Petronio. Among his representative works are the "Martyrdom of St. Stephen," a "Holy Family," "Apollo and the Muses," "The Education of the Muses," and the "Madonna della Gatta." He died at Mantua, 1546.

Gjellerup (*gĕl'ĕ-rŏp*), **Karl,** Danish writer, was born at Roholte in 1857. During a large part of his literary career, he resided in Dresden, and his writings evince great interest in German art and music. His works include many novels, among which are *En Idealist*, *Det unge Danmark*, *Antigonos*, *Minna*, *Germanernes Lærling*, and *Pastor Mors*. His novel *The Pilgrim Kamenita*, dealing with the mystic life of India, has been translated into English. In 1917, Gjellerup, jointly with Henrik Pontopiddan, was awarded the Nobel prize for literature. Died, 1919.

Gladden, Washington, American clergyman and author, was born in Pottsgrove, Pa., 1836. He was graduated at Williams college, 1859. He held several pastorates and editorships prior to becoming, in 1882, pastor of the First Congregational church, Columbus, Ohio, where his forceful, direct, and practical sermons and writings for more than 30 years won him wide reputation and esteem. He was awarded the degree of doctor of divinity by Roanoke college, Va., by the University of Wisconsin, and by Notre Dame university. His numerous writings include *Plain Thoughts on the Art of Living*, *Workingmen and Their Employers*, *The Young Men and the Churches*, *Who Wrote the Bible*, *Tools and the Man*, *Art and Morality*, *How Much is Left of the Old Doctrines*, *Social Salvation*, *Christianity and Socialism*, *Present Day Theology*, and *Live and Learn*. He died in 1918.

Gladstone (*glăd'stŭn*), **William Ewart,** English statesman, orator, and man of letters, was born in Liverpool, 1809. He was graduated at Oxford, and, in 1832, entered the House of Commons. In 1838, he published his first work, *The State in Its Relations with the Church*. In 1845-46, he was colonial secretary under Peel and this was the only break in his remarkable parliamentary career, which extended from 1832 to 1894. In 1847, he was elected a member of Parliament for the University of Oxford, which he represented for 18 years. In 1858, he published an elaborate work on *Homer and the Homeric Age* in three volumes.

In 1860, Gladstone carried through Parliament a commercial treaty with France. In 1866, as leader of the House of Commons, he brought in a reform bill, the defeat of which caused Earl Russell to resign. Gladstone, in 1869, disestablished the Irish Church; in 1870, he carried his Irish Land bill; and, in 1872, he carried the Ballot bill. In 1874, he dissolved Parliament, and, on the unfavorable result of the ensuing election, the Gladstone ministry resigned. In 1876, he strongly denounced, by voice and pen, the Turkish cruelties in Bulgaria. On the defeat of the Disraeli administration at the polls, 1880, he became premier, but resigned in 1885.

Early in 1886, after the short-lived administration of Lord Salisbury, Gladstone again came into power, and signalized his return to office by presenting in 1886 a dual scheme of Irish government—a land bill and a home rule bill. Intense and bitter opposition from Liberals and Conservatives alike greeted the measure, and the bill was rejected. In consequence, Parliament was dissolved and Gladstone and his colleagues appealed to the country, but were defeated. During the succeeding years, 1887–91, Gladstone was in opposition, the chief incident in his career being his outspoken advocacy of home rule in Ireland and his consequent alliance with the Irish party. Following the general election of 1892, he became prime minister for the fourth time. He resigned in 1894 on account of advanced age and spent his last days chiefly in literary work. He died at Hawarden, 1898, and was buried in Westminster Abbey.

Glasgow, Ellen Anderson Gholson, American novelist, was born at Richmond, Va., 1874. She received a private education and began early to devote herself to literary work. By her interesting studies of Southern life, picturing the transition from the ante bellum days to the new order, she has won wide attention. Her writings include *The Descendant*, *Phases of an Inferior Planet*, *The Voice of the People*, *The Freeman and Other Poems*, *The Battle-ground*, *The Deliverance*, *The Wheel of Life*; *Ancient Law*, *The Romance of a Plain Man*, *The Miller of Old Church*, *Virginia*, *Life and Gabriella*, and *The Builders*.

Glass, Carter, American politician and cabinet officer, was born at Lynchburg, Va., 1858. He was educated in private and public schools in his native town. After learning the printer's trade and working for eight years in a printing office, he became owner of daily newspapers at Lynchburg. Entering politics, he served in the Virginia senate, 1899–1903. In 1902, he was made member of Congress and was continuously re-elected for the period 1903–19. On December 16, 1918, he was appointed secretary of the treasury, retiring January 27, 1920, to enter the United States Senate.

Glass, Montague (Marsden), American story-writer, was born at Manchester, England, of Jewish parentage, 1877. He came to the United States in 1890, and was educated at the College of the City of New York and at New York university. He began the practice of law, but soon became a writer of short stories. He is most widely known as the author of *Potash and Perlmutter*, which appeared in 1910. This diverting story of the Jewish wholesale clothing trade in New York City was successfully dramatized in 1913. Among his other books are *Abe and Mawruss*; *Elkan Lubliner, American*; *The Competitive Nephew*; *Worrying Won't Win*; and *Potash and Perlmutter Settle Things*. His plays, written chiefly in collaboration with other dramatists, include *Abe and Mawruss, Object: Matrimony*, *Business Before Pleasure*, *Why Worry?* and *His Honor Abe Potash*.

Glauber (*glou'bĕr*), **Johann Rudolph,** German chemist and physician, was born at Karlstadt in Bavaria, 1604. In 1648, he discovered hydrochloric acid, and he was probably the first to procure nitric acid. His name lives in Glauber's salt, hydrated sodium sulphate, discovered by him in 1658 by treating sodium chloride (common salt) with sulphuric acid. He was a voluminous writer on chemical subjects. Died at Amsterdam, 1668.

Glazunov (*glä'zōō-nôf'*), **Alexander,** Russian composer, was born in Petrograd, 1865. He received his early education at the polytechnic institute and soon determined upon a musical career. He studied under Rimski-Korsakov, and at 19 he wrote a symphony, which was produced at Weimar under the auspices of Liszt. In 1889, he publicly conducted his own compositions in Paris with notable success. In 1899, he became professor in the Petrograd conservatory and, in 1900, was made director. With Rimski-Korsakov, he completed Borodin's famous opera *Prince Igor*. He is one of the most fertile and gifted of modern Russian composers and a prominent leader in the new Russian national school. His numerous compositions include symphonies, overtures, suites, orchestral cantatas, ballets, chamber music, and small pieces.

Glendower (*glĕn'dōōr*), or **Glendwr, Owen,** Welsh chief, was born about 1359. He studied law at Westminster, and became esquire to the earl of Arundel, but, in 1401, fell into dispute with Lord Grey over some lands, and, unable to obtain redress from Henry IV, carried on warfare against the English. In 1402, he captured Lord Grey and Sir Edmund Mortimer, both of whom married daughters of the Welsh chieftain (now proclaimed prince of Wales).

and joined Mortimer in the coalition with Harry Percy (Hotspur). That coalition ended in the battle of Shrewsbury, 1403, won by King Henry.

In 1404, Glendower entered into a treaty with Charles VI of France, who, in 1405, sent a force to Wales. The Welsh prince, though often defeated, kept up a desultory warfare until his death. Wales was never nearer independence than when under his leadership and he is justly regarded as a national hero. Died about 1415.

Glinka (*glĭng'kä*), **Mikhail Ivanovitch,** Russian composer, pioneer of the modern national school and forerunner of Tchaikovsky, was born near Novospaskoi, 1804. He studied at Petrograd, Rome, and Berlin. In 1836, he wrote *A Life for the Czar*, the first Russian national opera. His second opera, *Russlan and Ludmilla*, similar in character, was also a great success. His compositions include symphonies, piano music, and songs. He died in Berlin, 1857.

Gluck (*glŏŏk*), **Alma,** stage name of Reba Fierson, American dramatic soprano, was born at Bucharest, Rumania, 1884. Her parents came to New York in 1890. She received her education in the public schools and at Union college, Schenectady, N. Y. After studying music under Buzzi-Peccia from 1906 to 1909, she was engaged by Gatti-Casazza for the Metropolitan opera house, New York. She made her first appearance as Sophie in Massenet's *Werther*, and, during the first season, sang with notable success in eleven rôles. Later, her popularity as a concert singer increased so that she practically withdrew from the operatic stage. Her career is noteworthy in that she attained high rank in grand opera and on the concert stage without European training. In 1914, she married Efrem Zimbalist, the violinist.

Gluck, Christoph Willibald, German composer, was born at Weidenwang, in Bavaria, 1714. He studied at Prague, Vienna, and Milan, and began his musical career at Vienna at the age of 22. His best-known works are *Alceste, Paride ed Elena*, and *Orfeo*, composed in Vienna, and *Iphigénie en Tauride*, composed in Paris. Gluck sought to reform the opera by putting into the music real expressive power and dramatic force. He cleared the way for the modern opera and was a forerunner of Wagner and the later dramatic composers. Died, 1787.

Gobat (*gô'bä'*), **Charles Albert,** Swiss parliamentarian, was born at Tramelan, 1843. After practicing law at Delemont for 14 years, 1868–82, he was elected to the great council of Bern. He became a member of the federal council of states in 1884 and of the national council in 1890. During this period he rose to prominence as an advocate of international peace. In 1902, jointly with Elie Ducommun, he was awarded the Nobel prize for peace. In 1907, he was appointed head of the international bureau of peace in Bern. His writings include a history of Switzerland and *Sketches and Impressions of America*. He died in 1914.

Godard (*gô'dăr'*), **Benjamin,** French composer, was born in Paris, 1849. He displayed marked musical talent at an early age. After receiving private instruction, he entered the Paris conservatory, where he studied violin under Vieuxtemps and composition under Reber. At the age of 16, he published a violin sonata and soon thereafter was awarded a prize by the French institute. His most successful opera was *La Vivandière*. Among his other compositions are *Pedro de Zalamèa, Jocelyn, Le Dante, Jeanne d'Arc*, and many symphonies, concertos, suites, and songs. Died, 1895.

Goddard, Arabella, English pianist, was born at Saint Servan, Brittany, 1836. She played to Chopin at the age of seven, and at eight received lessons from Kalkbrenner in Paris. Later she studied under Thalberg, and also with J. W. Davison, whom she married in 1859. She made her first public appearance in 1850 at the grand national concerts. During 1854-55, she traveled in Italy and Germany giving concerts, and won enthusiastic applause at the Gewandhaus concerts in Leipzig. In 1856, she appeared in the philharmonic concert in England, and, later, in the Monday popular concerts. During 1873–76, she toured America, Australia, and India, and, in 1876, appeared in Sir Arthur Sullivan's concerts at the Paris exhibition, after which she retired. She ranked among the great pianists of her time, attaining distinction for her interpretations of Beethoven. Died in 1922.

Godfrey de Bouillon (*bōō'yŏn'*), duke of lower Lorraine, "a worthy representative of Charlemagne, from whom he was descended in the female line," was born about 1061. He gained distinction in the armies of the emperor Henry IV and was the great leader of the First Crusade. According to the chroniclers, he performed prodigies of strength and valor against the infidels, and was unanimously proclaimed king of Jerusalem on its capture in 1099, but declined the title. At Ascalon, with 20,000 men, he defeated the sultan of Egypt, who is said to have had a vastly greater force. He then devoted himself to organizing his government, and drew up, for his courts of justice, the assizes of Jerusalem, a code of laws which was the fullest embodiment of feudal jurisprudence. His many virtues are extolled in Tasso's *Jerusalem Delivered*. He died in 1100.

Godowski (*gô-dŏv'skē*), **Leopold,** Polish pianist, was born at Vilna, 1870. He received his early instruction from local teachers. From 1881 to 1884, he studied at Berlin, after which he made a concert tour in America. He studied with Saint-Saëns in Paris from 1886 to 1890, following which he made a tour of two years in the United States. In 1895, he became director of pianoforte teaching at the Chicago conservatory. In 1900, he resumed concert playing in Europe, and, in 1909, was made director of the imperial piano-teachers' school in Vienna. After a notably successful concert tour of the United States in 1912, he took up his residence in this country. Godowski's playing is characterized by brilliant technique, and he has made many paraphrases of works by Chopin, Weber, and Strauss which require unusual technical skill.

Goethals (*gō'thălz*), **George Washington,** American military and civil engineer, was born in Brooklyn in 1858. He was a student at the College of the City of New York, 1873–76, and was graduated from the United States military academy, 1880. He was appointed second lieutenant of engineers, 1880, and rose by successive promotions to major general of engineers, 1915. His early river and harbor work was the construction of the Mussel Shoals locks and dams on the Tennessee river.

In 1907, Goethals was appointed chief engineer and chairman of the military board of engineers authorized by President Roosevelt to construct the Panama canal. His notable services in the performance of this great task, which he completed in 1914, a year in advance of his schedule, won him unqualified praise throughout the civilized world and the thanks of Congress. In 1914, he was appointed civil governor of the Canal Zone by President Wilson.

During the American participation in the World War, 1917-18, he was successively general manager of the emergency fleet corporation, acting quartermaster-general of the United States, and chief of division of purchase, storage, and traffic. He was also a member of the war industries board. In 1918, "for especially meritorious and conspicuous service" in reorganizing the quartermaster's department, he was awarded the distinguished service medal. Died, 1928. See *Panama Canal*.

Goethe (*gû'tĕ*), **Johann Wolfgang von,** German author, was born at Frankfort on the Main, Prussia, August 28, 1749. His father was a traveled and distinguished doctor of laws; his mother, a woman of noble and wide sympathies. He was a precocious, handsome, and sensitive child. Before he was ten years of age, he wrote in several languages and had a considerable familiarity with works of art. The circumstances of his early life favored the development of his great and varied powers. His boyhood came at the period when Germany was in the throes of the Seven Years' war and when Lessing was laying the foundation of philosophical literary criticism.

Education. Besides the common branches of education, Goethe busied himself with drawing, music, and natural history. He was sent to the University of Leipzig in 1765 to prepare for the legal profession. To law, however, he gave little heed, and he had a disgust for speculative philosophy. He paid more attention to classical studies and read extensively in French and English. The discrepancies existing between the different poetical schools, which he could not reconcile as yet by any critical theory he had met, almost gave him a distaste for poetry. He made some attempts at play writing and relieved somewhat the uneasy state of his mind by the study of fine arts.

In 1768, Goethe left Leipzig and resided in the country, where he studied alchemy, chemistry, and occult philosophy. A couple of years later he went to Strasbourg university and devoted himself earnestly to chemistry, anatomy, literature, antiquities, and law. At Strasbourg, he formed the acquaintance of Herder, who influenced Goethe's mind greatly and directed his reading to Ossian, Homer, Shakspere, Goldsmith, and the Hebrew poets.

Earlier Literary Works. In 1771, Goethe took his degree of doctor of laws and went to Wetzlar, the seat of the imperial chamber of the German Empire, which afforded peculiar facilities for young men engaged in the study of public law. His profession, however, had less attraction for him than his literary pursuits. Wetzlar became to him the scene of the famous *Sorrows of Young Werther*, which was published in 1774. He returned to Frankfort in 1772, and, in the following year, published *Götz von Berlichingen*. This was cast in the mold of Shakspere's dramatic histories. The novelty of the undertaking was as attractive as the force of imagination behind it. Here, as in *Werther*, the poet poured forth his emotions with infectious enthusiasm.

In its design, *Werther* was nothing more than a sentimental novel, and it thus bid for a popularity much wider than that of *Götz*. The German language possessed previously nothing comparable with either of these works. Goethe's fame immediately enabled him to devote his energies, without interruption or anxiety, to literary study and composition.

Life at Weimar. In 1774, in the course of his travels, Goethe met the young son of the duchess of Saxe Weimar and later accepted an invitation to the court at Weimar, then the intellectual center of Germany. Goethe was the leading spirit of the group, which included Wieland, Herder, and, later, Schiller. Here he met Charlotte von Stein, who became his dearest friend and the object of his homage. He was ennobled, made privy councilor in 1779, and received other appointments; but, in the period of his greatest activity, his most important office was that of theatrical director.

In 1786, a visit to Italy gave fresh impetus to Goethe's literary and poetic interests, and he visited Italy again in 1790. At Rome, he finished his *Iphigenia at Taurus*, that "marriage between philosophy of Germany and the ancient Greek tragedy." *Egmont* followed *Iphigenia*, and *Tasso* appeared in 1790.

Goethe had returned to Weimar in 1788, and at that time he met Schiller. That autumn, he met Christine Vulpius, whom he married in 1806. He accompanied the duke of Saxe Weimar in 1792, when the Prussian army invaded France. The most productive period of Goethe's life was between 1794 and 1805, during his intimacy with Schiller, the poet. This friendship gave a literary stimulus to the activities of each.

Wilhelm Meister's Apprenticeship was completed in 1796. In 1796-97, the charming epic idyl *Hermann and Dorothea* was written; also much of the first part of *Faust*, which, however, was not completed until 1808. It is impossible not to feel the singular poetic beauty of this wonderful poem, its unsurpassed felicities of imagery and diction, and the impressiveness of the despondent melancholy, which is the ruling temper of the whole. Philosophically considered, *Faust* is a propounding of the enigma of human life, with a refusal to accept the solution offered by religion.

Later Works. Now occurred in Goethe's career a long interval marked by nothing of distinguished note. *Elective Affinities*, of 1809, disclosed a falling off in creative genius and a decline of moral sentiment. In 1811, he published his interesting autobiography, *Poetry and Truth*. In 1821, *Wilhelm Meister's Traveling Years* was completed. After this, Goethe's only sustained effort in poetry was the second part of *Faust*, which was finished near the end of his life.

Goethe was so versatile and initiated so much that it is difficult to say in what he was greatest. His *Götz* founded the romantic school; *Werther*, the sentimental school; *Metamorphosis of Plants* was one of the pillars of Darwinism; and, in *Faust*, Goethe appears as at once the representative and the prophet of the modern spirit. He died, March 27, 1832 and was buried near Schiller in the ducal vault at Weimar. See *Faust*.

Gógol (*gō'gôl*), **Nikolai Vasilievitch,** Russian novelist, was born at Sorochintsi in Poltava, 1809. In 1828, he went to Petrograd, and became famous through two series of stories of Little Russia. One of the best Russian comedies is his *The Inspector-General*, exposing the corruption, ignorance, and vanity of the provincial officials. His masterpiece, *Dead Souls*, or better *Dead Serfs*, is a story reflecting the more sordid aspects of provincial life. After unsatisfactory trials of official life and of public teaching, including university history lectures at Petrograd in 1834, Gógol left Russia in 1836 to live abroad. He resided chiefly in Rome until 1846, when he again settled in Russia. He was the first great master of the Russian novel and is regarded as the founder of realism in modern Russian literature. Died at Moscow, 1852.

Goldoni (*gôl-dō'nē*), **Carlo,** Italian dramatist, was born at Venice, 1707. He studied for the law, but his heart was set upon play writing. A tragedy, *Belisario*, proved successful, but he soon discovered that his forte was comedy, and set himself to effect a revolution in the Italian comic stage. He spent several years in wandering over northern Italy until, in 1740, he settled in his native city, where for 20 years he produced comedy after comedy.

In 1761, Goldoni undertook to write for the Italian theater in Paris, and became Italian instructor to the king's children. He wrote a successful comedy in French, *Le bourru bienfaisant*, for Marie Antoinette's wedding, and was attached to the French court until the Revolution. In all, Goldoni produced about 150 comedies, among the most noted of which are *La donna di garbo*, *La bottega di caffe*, *Pamela nubile*, *La casa nova*, *Todero Brontalon*, *Gli innamorati*, and *La locandiera*. He did much to improve the comic stage and ranks as the foremost Italian writer of comedy. Died, 1793.

Goldsmith, Oliver, British poet and novelist, was born in Ireland, 1728. He was graduated at the University of Dublin, 1749, studied medicine for a time at Edinburgh, and then led a wandering life on the continent, visiting Holland, France, Switzerland, and Italy. He returned to England but, failing in practice as a physician, became an usher in an academy. During this period he supported himself by contributions to the *Monthly Review*. His first publication of note, an *Inquiry into the Present State of Polite Learning in Europe*, was published in 1759. In 1764, *The Traveler* appeared and at once placed him in the front rank of English authors.

Two years later, Goldsmith published the classic novel *Vicar of Wakefield*, which permanently established his rank in the literary world. In rapid succession he produced his other works, including the comedy of the *Good-Natured Man*, in 1768; the *Roman History*, in 1769; *The Deserted Village*—the finest of all his poems—in 1770. In 1773, his noted comedy *She Stoops to Conquer* was produced at Covent Garden with great success. During the short period of his literary activity he wrote the most charming novel, the finest poem, and one of the best comedies of his time. He died at London in 1774.

Golgi (*gōl'jē*), **Camillo,** Italian biologist, was born in Corteno, 1844. He was educated at the University of Pavia. He studied and practiced medicine and taught at Siena and then at Pavia. In 1870, he was the first to use silver nitrate to color nervous tissue for histological study. In 1885, he proved that there is not a network but only an interlacement of nerves, which revolutionized the theory of nervous physiology. A group of nerve endings found in tendons are called the "organs of Golgi." His greatest work in pathology was the discovery of three varieties of the protozoan blood parasite which causes malaria. His writings include important works on histology and pathology, together with numerous articles for medical encyclopedias and journals. In 1906, jointly with Ramón y Cajal, he received the Nobel prize for medicine. Died, 1926.

Gómez y Báez (*gō'mās ē bā'ās*), **Maximo,** Cuban patriot, was born at Bani, Santo Domingo, 1826. He served in the Spanish army in Santo Domingo and in Cuba; became disgusted with Spanish rule; and retired as a farmer. In the insurrection of 1868–78, he became a colonel and later commander of the insurgent forces in Port au Prince, retiring to Santo Domingo after the war. In 1895, on the breaking out of the second revolution, he returned to Cuba, became general in chief of the Cuban army, and later put his force at the disposal of the American troops when they landed in Cuba. He aided the United States materially in the re-establishment of the civil government of the island. Died, 1905.

Gompers (*gŏm'pĕrz*), **Samuel,** American labor leader, was born in London, England, in 1850. At the age of 10, he began work for a shoemaker, but was soon after apprenticed to a cigar maker and learned the cigar maker's trade. In 1863, he came to New York City with his parents. In his 15th year, he became an advocate of the rights of labor and took an active part in the organizing work of the Cigar Makers' international union. In 1881, he assisted in founding the American Federation of Labor, and, in 1882, became its president. With the exception of one year, he held this office continuously for more than 40 years.

During this long period of leadership, Gompers maintained a policy of firmness and moderation, steadfastly opposing the formation of a labor party but urging the members of the organization to vote for candidates who were friends of labor. Some of the results of this policy are seen in the employers' liability laws, in the eight-hour day on government contracts, and in other legislation for the benefit of the laboring man. He took a vigorous stand in support of American participation in the World War, and, after its close, fought determinedly against Bolshevism and other radical movements.

His writings include *Labor in Europe and America*, *American Labor and the War*, *Labor and the Common Welfare*, *Labor and the Employer*, and *Out of Their Own Mouths*. Died, 1924.

Goode, George Brown, American zoologist, was born in New Albany, Ind., 1851. He was educated at Wesleyan university, Middletown, Conn., graduating in 1870, and then studied under Louis Agassiz. In 1873, he was made an assistant in the United States fish commission, and from 1881 to 1887 was assistant director of the United States national museum. In 1887, he became assistant secretary of the Smithsonian institution in charge of the national museum. He was an able, methodical, and conscientious naturalist, and his contributions to American ichthyology are extensive and important.

Goode's scientific publications include about 400 titles, among the chief of which are *Catalogue of Fishes of the Bermudas*, *History of the Menhaden*, *American Fishes*, and *Oceanic Ichthyology*. He was also an authority on museum management, concerning which he wrote *Museums of the*

Future and *Principles of Museum Administration*. Died, 1896.

Goodhue, Bertram Grosvenor, American architect, was born at Pomfret, Conn., in 1869. He was educated at Russell's collegiate and commercial institute, New Haven, Conn., and studied architecture for six years under James Renwick. From 1891 to 1914, he was a member of the architectural firm of Cram, Goodhue, and Ferguson. He then began professional practice alone. Among noteworthy buildings designed by him are the Dominican church of Saint Vincent Ferrer, in New York City, the Baltimore cathedral, and the new State capitol at Lincoln, Nebraska. His writings include *Mexican Memories* and contributions to the work entitled *Spanish Colonial Architecture in Mexico*, by Sylvester Baxter. Died, 1924.

Goodnow, Frank Johnson, American legal scholar and educator, was born at Brooklyn, N. Y., 1859. He was graduated at Amherst college in 1879, and at Columbia law school in 1882. He then studied at the Ecole libre des sciences politiques, Paris, and at the University of Berlin. In 1883, he was made instructor in history and lecturer in administrative law in Columbia university; in 1891, he was made full professor, and, from 1903 to 1913, was Eaton professor of administrative law and municipal science. In 1906, he investigated municipal ownership undertakings in Europe in connection with the work of the national civic federation. He served as legal adviser to the Chinese republic, 1913-14. In 1914, he was elected president of Johns Hopkins university, resigning in 1928.

Among his writings are *Comparative Administrative Law*, *Politics and Administration*, *City Government in the United States*, *Social Reform and the Constitution*, and *Principles of Constitutional Government*.

Goodrich, Samuel Griswold, American juvenile writer, better known as "Peter Parley," was born in Ridgefield, Conn., 1793. He was a book publisher, first in Hartford, Conn., and afterward in Boston, Mass. After settling in Boston, he began to write, under the name of "Peter Parley," books for young folks, of which he published more than a hundred. His "Peter Parley" books comprised geographies, histories, travels, stories, and works on the arts and sciences, and won him much fame. He died, 1860.

Goodspeed, Edgar Johnson, American Greek scholar, was born at Quincy, Ill., 1871 and was educated at Denison, Ohio, Yale, Chicago, and Berlin universities. Subsequently to 1898, he was connected with the University of Chicago as a lecturer, being made professor of Patristic Greek in 1915 and serving as secretary to the president in 1920–24. He is the author of *The Conflict of Severus*, *The Story of the New Testament*, *Things Seen and Heard*, and, in collaboration with E. D. Burton, *Harmony of the Synoptic Gospels*. In 1923, he published *The New Testament: An American Translation*.

Goodwin, Nathaniel Carl, American actor, was born in Boston in 1857. He studied under Wyzeman Marshall, manager of the Boston theater, and made his début with Stuart Robson, at Boston, 1874, in *Law in New York*. Later, he starred as Captain Crosstree in *Blackeyed Susan* in New York. He subsequently starred in *Evangeline*, *Hobbies*, *The Member from Slocum*, *In Mizzoura*, *Nathan Hale*, *The Rivals*, *When We Were Twenty-one*, *The Merchant of Venice*, *The Genius*, *A Celebrated Case*, *Never Say Die*, *Oliver Twist*, and other plays. In 1914, he published an autobiography. Died in 1919.

Goodwin, William Watson, American Greek scholar and educator, was born in Concord, Mass., 1831. He was graduated at Harvard in 1851 and subsequently studied at the universities of Gottingen, Berlin, and Bonn. He was tutor at Harvard from 1856 to 1860, when he was elected to the Eliot chair of Greek, in which he taught with increasing distinction for 40 years, becoming professor emeritus in 1901. In 1860, he published his valuable *Syntax of the Moods and Tenses of the Greek Verb*, which was followed in 1870 by his widely used *Greek Grammar*. He edited Demosthenes *On the Crown* and *Against Meidias*, and contributed to philological journals. Died in 1912.

Goodyear, Charles, American inventor, was born in New Haven, Conn., 1800. In 1844, after ten years' labor, amidst every disadvantage of poverty and privation, he completed his invention of vulcanizing rubber by means of sulphur. He immediately became involved in a fresh series of troubles consequent to the infringement of his patents, which reached about 60 in number. Because of these infringements, he remained poor while others were enriched by his inventions. Died in New York City, 1860.

Gordon, Charles George, British soldier, familiarly known as "Chinese Gordon," was born in 1833. He served in the Crimean war, 1854–56, and was wounded at Sebastopol. Later, he entered the Chinese service and assisted in suppressing the Taiping rebellion, 1863-64, whence his sobriquet of "Chinese Gordon." In 1874, he took command of the forces employed to follow up Baker's African explorations, during which time he totally suppressed the slave traffic on the Red Sea.

In 1884, Gordon went to the Sudan, in lower Egypt, as an emissary of England to quiet the insurgent tribes under El Mahdi, the "false prophet of the Sudan." His memorable journey to Khartum with one or two attendants and the influence which his presence exercised over the tribes of the desert form one of the most thrilling episodes in his career. He was killed when Khartum was captured by El Mahdi, 1885.

Gordon, Charles William, "Ralph Connor," Canadian clergyman and novelist, was born in County Glengarry, Ontario, 1860. After graduation at Toronto university in 1883, he was classical master at Chatham high school, 1883-84. Upon graduating from the theological course, Knox college, Toronto, in 1887, he continued postgraduate study in New college, Edinburgh, Scotland, and spent a year in travel on the continent. He was a missionary to Banff and elsewhere in the Rocky mountains from 1890 to 1894, when he became minister of Saint Stephen's church, Winnipeg. In 1915, he became chaplain to Canadian forces at the front in France. His works include *Black Rock*, *Beyond the Marshes*, *The Sky Pilot*, *Ould Michael*, *The Man from Glengarry*, *Glengarry School Days*, *The Prospector*, *The Doctor*, *The Foreigner*, *The Recall of Love*, and *The Gaspards of Pine Croft*, all written under the pen name of Ralph Connor.

Gordon, George Angier, Congregational clergyman and religious writer, was born in Scotland, 1853. He was educated in common schools, Insch, Scotland, and was graduated at Harvard in 1881. He was pastor at Greenwich, Conn., 1881–84, when he was called to the pastorate of Old South church, Boston. He was lecturer in the Lowell institute course, 1900; was Lyman Beecher lecturer, Yale, 1901; university preacher to Harvard, 1886–90, and to Yale, 1888–1901; and overseer at Harvard, 1897–1916, and again in 1925. His writings include *The Witness to Immortality*, *The Christ of To-day*, *Immortality and the New Theology*, *Ultimate Conceptions of Faith*, *Through Man to God*, *Religion and Miracle*, and *My Education and Religion*.

Gordon, John Brown, American soldier and legislator, was born in Upson county, Ga., 1832. He was graduated at the University of Georgia, 1852; studied law; and was admitted to the bar. He served with distinction in the Confederate army, 1861–64, and rose to the rank of lieutenant general. From 1873 to 1879 and from 1891 to 1897, he was a member of the United States Senate; and, from 1886 to 1890, he was governor of Georgia. He became widely known for his successful lecture "The Last Days of the Confederacy." He wrote *Reminiscences of the Civil War*. Died, 1904.

Gore, Thomas Pryor, American lawyer and politician, was born in Webster county, Miss., 1870. He lost the sight of both eyes by accident when a boy. He attended a local school at Walthall, Miss., and graduated from the law department of Cumberland university, Lebanon, Tenn., 1892. He removed to Texas in 1895 and to Oklahoma in 1901. After serving one term in the territorial senate, he was appointed United States senator by the governor, 1907; was elected by the legislature in the same year; and was re-elected for the terms 1909–15 and 1915–21. In 1921-22, he was member of the Federal joint commission on short time rural credits.

Gorgas (*gôr'găs*), **William Crawford,** American sanitarian, was born at Mobile, Ala., 1854. He was graduated from the University of the South in 1875, from Bellevue medical college in 1879, and became a surgeon in the army in 1880. As chief sanitary officer at Havana, Cuba, 1898–1902, he eliminated yellow fever from the city. From 1904 to 1913, as chief sanitary officer of the Panama canal, he established and maintained remarkably healthful conditions for the workers, thereby preventing the enormous sacrifice of life that otherwise would have ensued among men not acclimated to the tropics.

In 1914, he was made surgeon-general in the United States army with rank of brigadier general. In 1916, he was made major general, and, in 1918, was retired. He then became director of the yellow-fever work of the international health board established by the Rockefeller foundation. In 1919, he accepted a contract to carry out a sanitary program for the government of Peru. He died in 1920.

Gorgias (*gôr'jĭ-ăs*), Greek sophist and rhetorician of the time of Socrates, was born at Leontini about 483 B. C. and settled in Greece, residing for the most part at Athens and at Larissa in Thessaly. He has been immortalized by Plato in a dialogue which bears his name. Two works attributed to him are extant, *The Apology of Palamedes* and the *Encomium on Helen*. He is known for a highly ornamented style abounding in balance and assonance. Died about 380 B. C.

Gorky (*gôr'kĭ*), **Maxim,** is the pen name of Alexei Maximovitch Pyéshkov, a self-educated Russian novelist, born in Nizhni Novgorod, 1868, the son of an upholsterer. After the death of his parents he was engaged in various occupations until his attention was turned to literary work. His first story, *Makar Chudra*, appeared in 1892 and, in 1895, his *Chelkash* met with great success. He is one of the most original and popular of modern Russian writers, excelling in the short story but not so successful in his longer works. In 1914, he enlisted in the Russian army, and was identified with the movement that led to the dethronement of Czar Nicholas in 1917. He opposed the Bolshevik regime at first but later became an enthusiastic supporter. Among his works are *The Song of the Falcon*, *The Song of the Petrel*, *The Orloff Couple*, *Malva*, *Foma Gordeyeff*, *Children of the Sun*, *The Barbarians*, *Three Men*, *The Spy*, *My Childhood*, *In the World*, *A Confession*, and *The New Russia*.

Gosnold (*gŏs'nūld*), **Bartholomew,** English navigator, was born in England about the middle of the 16th century. He was associated with Sir Walter Raleigh in his attempt to found a colony in Virginia, and later headed an expedition to found a colony in New England. In 1602, he left Falmouth for this purpose with a ship and 20 colonists, attempting to cross the ocean in a direct line. After a tedious voyage of seven weeks, he reached the coast of Maine. Following the land line in a southwesterly direction, he discovered Cape Cod and Marthas Vineyard. In 1606, Gosnold united with a company, of which Captain John Smith was one of the leaders, to locate in Virginia. Through their joint efforts the settlement at Jamestown was established in 1607. He died in Virginia, 1607.

Gosse (*gŏs*), **Edmund William,** English poet, critic, and biographer, son of Philip Henry Gosse, was born at London in 1849. He was privately educated and, in 1867, he became assistant librarian in the British museum. In 1884, he was made lecturer in English literature at Trinity college, Cambridge, and from 1904 to 1914 he was librarian to the House of Lords. While a writer of graceful lyrics and of admirable prose, he is notably conspicuous for bringing deserving foreign literature to the attention of English readers. In 1891, he translated Ibsen's *Hedda Gabler*; in 1893, with William Archer, translated *The Master Builder*; and, in 1908, wrote *Henrik Ibsen*. His critical work is of a high order.

Among his other writings are *On Viol and Flute*, *Thomas Gray*, *History of Eighteenth Century Literature*, *The Secret of Narcisse*, *The Jacobean Poets*, *Short History of English Literature*, *Jeremy Taylor*, *French Profiles*, *Sir Thomas Browne*, *Two Visits to Denmark*, *Inter Arma*, and *Some Diversions of a Man of Letters*. Died, 1928.

Gosse, Philip Henry, British naturalist, was born at Worcester, 1810. He went to Newfoundland as a clerk in 1827 and afterward was a farmer in Canada, schoolmaster in Alabama, and naturalist in Jamaica. Returning to England, he published, in 1840, the *Canadian Naturalist*, the first of many valuable works in which he popularized zoology, particularly marine life. Among his other books are included *A Naturalist's Sojourn in Jamaica*, *A Naturalist's Rambles on the Devonshire Coast*, *Aquarium*, *Manual of Marine Zoology*, and *The Romance of Natural History*, his best-known work. Died, 1888.

Gottschalk (*gŏt'shâlk*), **Louis Moreau,** American pianist and musical composer, was born in New Orleans, 1829. He studied in Europe and, from 1845 to 1852, made successful tours of the continent. Returning to America in 1853, he toured the country with notable success, playing and conducting his own compositions. His reputation now rests upon his piano pieces, among which are *Bamboula*, *Bananier*, *Savane*, *Ojos Creolas*, *Ossian*, and *The Last Hope*. He died at Rio de Janeiro, 1869.

Gough (*gŏf*), **John Bartholomew,** American temperance lecturer, was born at Sandgate, Kent, England, 1817. He came at 12 to America, and, in 1831, found employment in New York, but lost it by dissipation, and was reduced to singing comic songs in grogshops. In 1842, he was induced to take the pledge. Devoting the rest of his life to the cause of temperance, he became a singularly effective lecturer, making several visits to England. He published an *Autobiography*, *Orations*, *Temperance Addresses*, and *Sunlight and Shadow*. Died, 1886.

Goujon (*gōō'zhôn'*), **Jean,** French sculptor and architect, was born in Paris about 1515. He was employed on the church of Saint Maclou, at Rouen, 1540, and on the cathedral there, 1541. With Pierre Lescot, architect of the Louvre, he worked on the restorations of Saint Germain l'Auxerrois, 1542–44. On the accession of Henry II, he entered the royal service. In the Louvre, he executed the reliefs of the Escalier Henri II, the carvings at the southwestern angle of the court, and the Tribune des Cariatides. He is the author of what is considered the masterpiece of French Renaissance sculpture, the "Diane Chasseresse," now in the Louvre collection. Died probably at Bologna about 1566. See *Sculpture*.

Gould, Benjamin Apthorp, American astronomer, was born at Boston, Mass., 1824. He was graduated at Harvard college in 1844, afterward studied at Gottingen, and was an assistant in the observatory at Altona, Germany. From 1855 to 1859, he was director of the Dudley observatory at Albany, N. Y. In 1866, he established an observatory at Valentia in Ireland, and made the first determination of transatlantic longitude by telegraph cable. In 1870, he established an observatory at Cordoba, Argentina, where he did valuable work in southern celestial astronomy until his return in 1885. His principal works are *Report on the Discovery of the Planet Neptune*, *Smithsonian Institution Reports*, *Investigation of the Orbit of the Comet V*, *On the Transatlantic Longitude*, and many charts of stars. He died in 1896.

Gould, Helen Miller. See *Shepard, Helen Miller Gould*.

Gould, Jay, American financier, was born at Roxbury, N. Y., 1836. He was brought up on his father's farm, attended Hobart academy a short time, and acquired a taste for mathematics and surveying. Shortly after the panic of 1857, he began his railroad career. He first invested in bonds of the Rutland and Washington railroad, and became president, treasurer, and superintendent of the road. Soon afterward he effected a consolidation of his road with the Rensselaer and Saratoga road. He then withdrew his capital, removed to New York, opened a broker's office, and began dealing in Erie stocks and bonds.

In association with James Fisk, Jr., he entered the directory of the Erie Railroad Company, and was elected president. On the reorganization of the company, 1872, he lost official connection with it. He then invested heavily in the various Pacific railroads, secured control of a number of important lines, built branches, and effected combinations which resulted in the establishment of what is known as the "Gould system," controlling 10,000 miles of road. At his death in 1892, he left an estate of 80 million dollars.

Gounod (*gōō'nō'*), **Charles François,** French composer of sacred and dramatic music, was born at Paris in 1818. He studied music at the Paris conservatory, and, in 1839, gained the prize for composition. He then visited Rome and Vienna, and, in 1849, became an organist in Paris. He first attracted attention by his *Messe solennelle* and by his opera *Sappho* in 1851. These were followed by *Ulysse*, *La nonne sanglante*, and *Le médicin malgré lui*. In 1859, he brought out his noted opera *Faust*, his greatest success and one of the most enduringly popular operas of the modern stage. His next greatest success in dramatic music was the opera *Roméo et Juliette*, 1867.

Among other operas by Gounod are *Philémon et Baucis*, *Mireille*, *La reine de Saba*, and *La Colombe*. In sacred music, his most notable compositions are the *Messe de Sainte Cécile* and the oratorios *Mors et Vita* and *The Redemption*. He wrote many beautiful songs, including the widely known *Ave Maria* based on Bach's first prelude. His influence on contemporary French music was very great. He died at Saint Cloud, 1893. See *Faust*.

Goya (*gō'yȧ*), **Francisco José de,** Spanish painter, was born at Fuendetodos, near Saragossa, 1746. He is said to have first studied under Martinez at Saragossa. Later, he went to Madrid, where he was influenced by the works of Velasquez and Tiepolo, and, after some years, he went to Rome. He was unrivaled as a painter of Spanish national customs, stood first among Spanish designers of tapestries, and achieved great distinction as an etcher. While he inclined to grimly realistic scenes of battle, bullfighting, and torture, his work is characterized by great emotional intensity and power. Representative examples of his works are found in leading American collections. He died at Bordeaux, France, 1828.

Graaf (*grȧf*), **Regnier de,** Dutch physician and anatomist, was born in Schoonhoven, 1641. He studied under Sylvius at the University of Leiden, also at Lowen and Utrecht, finally settling at Delft. He became especially distinguished by his discovery that all animals are oviparous. He also discovered the Graafian vesicles named after him, though he mistook their functions. He was the author of works on the functions of the pancreas and on the generative organs. Died, 1673.

Grace, Eugene Gifford, steel manufacturer, was born at Goshen, New Jersey, in 1876. He was educated as an electrical engineer at Lehigh university. Entering the employ of the Bethlehem Steel Company in 1899, he rose rapidly and was elected president of the company in 1913. In 1917, he became president of the Bethlehem Shipbuilding Corporation. He was active during the World War in supplying the government with cannon, ammunition, and armor plate for ships.

Grady, Henry Woodfin, American journalist and orator, was born at Athens, Ga., 1851. He was graduated at the state university at Athens in 1868 and took a postgraduate course at the University of Virginia. He began his journalistic career in 1870, winning wide notice by a series

of articles in the Atlanta *Constitution* describing the resources of Georgia. For some time he acted as Southern correspondent of the New York *Herald*, and, in 1880, became part owner and managing editor of the Atlanta *Constitution*, which he conducted until his death. He was an eloquent speaker, a man of broad and liberal views, and during his brief public life did much to advance the interests of Georgia and the South. He was widely known for a brilliant after-dinner oration entitled *The New South*. Died in 1889. See *New South, The*.

Graetz (*grĕts*), **Heinrich,** Jewish historian, was born in Posen, Poland, 1817. He was mostly self-educated, became a teacher in the Jewish seminary at Breslau, and, in 1870, was made professor in the University of Breslau. His principal work is *Geschichte der Juden*, begun in 1853 and completed in 1875. This has been translated into many languages and has won for him the position of recognized master of Jewish history. He died at Munich in 1891.

Grafly (*grăf'lĭ*), **Charles,** American sculptor, was born in Philadelphia, Pa., 1862. He was educated at the Pennsylvania academy of fine arts, Philadelphia, and studied under Chapu and Dampt in Paris. In 1892, he became instructor in sculpture at the Pennsylvania academy of fine arts, and, in 1917, he accepted a similar position in the school of the Boston museum of fine arts. His works include "General Reynolds," Fairmount park, Philadelphia; "Fountain of Man," made for the Pan-American exposition at Buffalo; "From Generation to Generation," "Symbol of Life," "Vulture of War," and "Truth," in the Saint Louis museum; "Mauvais Présage," in the Detroit museum; "England" and "France," in the New York customhouse; "In Much Learning," in the Pennsylvania academy; and many portrait busts. He ranks high among American sculptors for his strong, thoughtful work, simply and truthfully modeled. Died, 1929.

Graham, Hugh, Canadian journalist, was born in Huntingdon, Quebec, 1848, and received his education at the Huntingdon academy. Early in life he began newspaper work in Montreal, where he became editor and publisher of the *Commercial Advertiser* and the *Evening Telegram*. In 1869, he founded the Montreal *Star*, which, under his constructive management, became one of the most influential and widely circulated Canadian journals, independent in politics and devoted to civic improvement and the promotion of humanitarian projects. He assisted in founding the good government association of Montreal and took active interest in all movements for improving social conditions. In 1909, he was delegate to the imperial press conference in London. He was knighted in 1908 and was created baron in 1917 with the title of Lord Atholstan.

Grainger, Percy Aldridge, British pianist and composer, was born at Melbourne, Australia, 1882. He studied music with his mother in Australia until his tenth year and then went to Frankfort on the Main where he studied several years. He then removed to London and has since given concerts in all parts of the world, for many years producing over one hundred concerts annually on the continent and winning notable distinction as a musical artist. By his artistic settings he has done much to revive interest in folk music. He has written many compositions for the piano, voice, chorus, orchestra, and also chamber music. His publications include *British Folk-music Settings*, *Room-music Tit-bits*, *Kipling Settings*, *Father and Daughter*, and numerous piano pieces and songs.

Grand, Sarah, is the assumed name of Frances Elizabeth Clarke, British novelist, born in Ireland of English parents. At 16, she married Lieutenant Colonel McFall, who died in 1898. In 1893, she published *The Heavenly Twins*, which established her literary reputation. Her writings include *Singularly Deluded*, *A Domestic Experiment*, *Our Manifold Nature*, *The Beth Book*, *The Modern Man and Maid*, *Babs the Impossible*, *Emotional Moments*, *Adnam's Orchard*, *The Winged Victory*, and *Variety*.

Grant, Robert, American essayist and novelist, was born at Boston, 1852. He was graduated at Harvard college in 1873, received the degree of doctor of philosophy in 1876, and was graduated at Harvard law school in 1879. In 1893, he became probate judge for Suffolk county. In 1880, he published *Confessions of a Frivolous Girl*, which was followed by *The Lambs* and other volumes of trivial verse.

Grant's serious work includes many volumes of essays and novels, among which are *The Carletons*, *Mrs. Harold Stagg*, *An Average Man*, *A Romantic Young Lady*, *Face to Face*, *The Reflections of a Married Man*, *The Opinions of a Philosopher*, *The Art of Living*, *Unleavened Bread*, *The Law-Breakers*, *The Chippendales*, *The High Priestess*, *Their Spirit*, and *Law and the Family*. In 1915, he was elected member of the American academy of arts and letters.

Grant, (Hiram) Ulysses Simpson, 18th president of the United States, was born at Point Pleasant, Ohio, 1822; graduated at the military academy, West Point, in 1843; and served under General Taylor in the war with Mexico, 1846, up to the capture of Monterey. His regiment was then transferred to the expedition under General Scott; he took part in every action from Vera Cruz to Mexico, and was brevetted first lieutenant and captain for meritorious conduct at Molino del Rey and Chapultepec. In 1852, he served in Oregon, but, in 1854, resigned his commission and settled in Saint Louis, Mo., whence, in 1860, he removed to Galena, Ill., and engaged in the leather trade.

At the beginning of the Civil War in 1861, Grant volunteered his services and was appointed colonel of an Illinois regiment. In August, he was appointed brigadier general, commanding the important post of Cairo, occupied Paducah, and led an expedition on the Mississippi. In February 1862, he distinguished himself in the capture of Fort Donelson, on the Tennessee river, and was made major general. On April 6 following, he won a great battle over the Confederates at Pittsburg Landing, or Shiloh.

Succeeding General Halleck in the West, Grant commanded the land forces which, in conjunction with the navy, captured Vicksburg. This action was followed by the fall of Port Hudson and the opening of the Mississippi. He then took command of the army of Tennessee, and defeated General Bragg at Chattanooga in September 1863. In the next year, Grant was appointed lieutenant general and commander in chief, and personally directed the operations of the great final struggle in Virginia. In this campaign, the Northern forces, though often repulsed with heavy losses, finally compelled the evacuation of Richmond, April 2, 1865. This was followed on the 9th by the surrender of the Confederate army under General Lee, and soon after of the entire Confederate forces.

Congress, in recognition of Grant's eminent services, passed an act reviving the grade of "general of the army of the United States," to which Grant was immediately appointed. In 1868, he was elected, on the Republican platform, president of the United States, and, in 1872, was re-elected over a notable opponent, Horace Greeley of the New York *Tribune*. In 1877, after completing his second presidential term, Grant visited Europe, and toured the world, receiving an enthusiastic welcome, especially in England and France.

Simple, reticent, earnest, and persevering in his character, he owed his military success to singleness of purpose, relentless vigor, grim courage which rose higher with each obstacle, and, above all, to clear judgment as to the objects and issues of the war. Having lost his moderate fortune in an unfortunate investment, Grant wrote his *Personal Memoirs*, which now ranks among the best military biographies. The sales of this work earned for him and his family about a half million dollars. He died in 1885; was elected to the American hall of fame in 1900.

Grattan (*grăt'ăn*), **Henry,** Irish orator and statesman, was born in Dublin in 1746. He was educated at Trinity college, Dublin. In 1772, he was admitted to the Irish bar and, in 1775, was elected to the Irish parliament. Here he assisted in effecting the partial abolition of the heavy restrictions on Irish commerce. In 1800, he was elected to the Irish parliament from the borough of Wicklow to oppose the union with England. But the union was effected despite his efforts, and, in 1805, he was made member of the British Parliament. He was repeatedly re-elected and labored for Catholic emancipation until his death. His eulogy on Chatham and his invective against Bonaparte are not surpassed in British eloquence. Died, 1820.

Grau (*grou*), **Maurice,** American impresario, was born in Brunn, Moravia, in 1849. In 1854, he came to New York, where he was educated in the city schools and later graduated from the College of the City of New York. He entered the employ of his uncle, who was a successful dramatic manager. In 1872, he undertook his first independent venture by bringing Aimée to the United States. In 1873, he organized the Kellogg English Opera Company and acted as American manager for Salvini and Rubinstein. In 1891, he organized the Maurice Grau Opera Company and was made the manager of the Metropolitan opera house, where he continued until his resignation in 1903. He was for a time manager of the royal opera in Covent Garden, London. He died in 1907.

Graves, Frank Pierrepont, American educator, was born in New York City, 1869. He was graduated from Columbia university in 1890 and received the degree of doctor of philosophy in 1912. After teaching Greek and classical philology in Tufts college, 1891–96, he was president of the University of Wyoming, 1896–98, and of the University of Washington, 1898–1903. From 1904 to 1907, he was professor of the history and principles of education, Teachers' college, University of Missouri; from 1907 to 1913, he was professor of the history and philosophy of education, Ohio State university; and, from 1914 to 1921, he was professor of the history of education and dean of the school of education, University of Pennsylvania. In

1921, he was made president of the University of the State of New York and commissioner of education for the state.

His writings include *Burial Customs of the Ancient Greeks*, *The Philoctetes of Sophocles*, *A First Book in Greek* (with E. S. Hawes), *The State University Idea*, *History of Education Before the Middle Ages*, *History of Education during the Middle Ages*, *Great Educators of Three Centuries*, and *History of Education in Modern Times*.

Graves, John Temple, American journalist and orator, was born at Willington Church, S. C., 1856. He was graduated at the University of Georgia, 1875, and entered journalism. He was editor of several newspapers in Florida and Georgia during the period from 1881 to 1905, when he became editor in chief and proprietor of the Atlanta *Daily Georgian*. From 1907 to 1915 he was editor of the New York *American*. In 1915, he was made editorial representative of the Hearst newspapers. Graves became widely known as one of the most vigorous, progressive, and eloquent leaders in the South. He advocated universal peace by arbitration, national preparedness as the surest guarantee of peace, and also the separation of the black and the white races. His writings include *History of Florida of To-Day*, *Twelve Standard Lectures*, *Platform of To-Day*, and *The Negro*. Died, 1925.

Gray, Asa, American botanist, was born at Paris, N. Y., 1810. He was graduated in medicine at Fairfield college, and, in 1834, became botanist of the United States exploring expedition. He was afterward appointed professor of botany in the University of Michigan, but, before he had entered upon the duties of that office, he was elected in 1842 Fisher professor of natural history at Harvard university. His most important work was his now classic *Manual of the Botany of the Northern United States*, which passed through numerous editions. By its clearness, compactness and accuracy, it was long indispensable to the student of eastern American botany.

Gray was the ablest and most influential of the early American advocates of Darwin's theory of evolution. His contributions to American scientific knowledge were monumental, and his personal influence upon two generations of American botanists was profound. He ranked among the leading botanists not only of America but of the age. He wrote *Elements of Botany*; *Flora of North America*; *How Plants Grow*; *Field, Forest, and Garden Botany*; *Darwiniana*; *Synoptical Flora of North America*; and *Natural Science and Religion*. Died, 1888; was elected to the American hall of fame, 1900.

Gray, Elisha, American inventor, was born at Barnesville, Ohio, 1835. He attended Oberlin college, where he supported himself by working as a carpenter. Becoming interested in electricity, he left college to devote himself to the improvement of electrical apparatus. In 1867, he received his first patent for a self-adjusting telegraph relay. He afterward invented the telegraphic switch and annunciator for hotels, the telephonic repeater, and the private telegraphic line printer. In all, he secured about 50 patents, chiefly for electrical inventions, among which were a system of multiplex telegraphy, a type-printing telephone, and the telautograph.

Gray claimed to be the inventor of the speaking telephone, which resulted in long litigation with Alexander Graham Bell, whose patent and rights were sustained by the supreme court. Among his most important writings are *Experimental Researches in Electro-Harmonic Telegraphy and Telephony* and *Elementary Talks on Science*. He died at Newtonville, Mass., 1901.

Gray, Thomas, English poet, was born in London, 1716. He was educated at Cambridge and, after many years of study and travel, was appointed professor of history and modern languages there in 1768. He had a just appreciation of the natural beauty of his native country, made notes wherever he went, and to his literary friends wrote copious descriptions of what he had seen. Gray was the most scholarly of early English romantic poets. He wrote but little, but some of his poems are notably perfect in form and finish. He published his *Ode to Eton College* in 1747 and his *Elegy Written in a Country Churchyard*, by which he is best known, in 1751. On the death of Colley Cibber, 1757, he was offered, but declined, the post of poet laureate. Died at Cambridge, 1771.

Greeley, Horace, American journalist, was born at Amherst, N. H., 1811. He entered a printing office as an apprentice at East Poultney, Vt., 1826. On the completion of his apprenticeship, he worked for some time as a journeyman printer and, in 1834, founded the *New Yorker*, a literary weekly paper, for which he wrote essays, poetry, and other articles. After one or two other attempts at editorship, he founded, in 1841, the New York *Tribune* and became the leading editor. He was assisted by associates of unusual ability, including Bayard Taylor, Charles A. Dana, and George Ripley, and, for a quarter of a century, exercised a powerful influence in national affairs. The *Tribune*, under his editorship, was an earnest advocate of such causes as temperance, woman's rights, the abolition of slavery, capital punishment, and a protective tariff, and was recognized as the organ of the extreme or radical Republican party.

In 1848, Greeley was elected to Congress. His aspirations to high political position were defeated by the more conservative party leaders, and he, in turn, influenced the nomination of Lincoln instead of Seward in 1860. On the secession of several of the Southern states from the Union, Greeley at first admitted their right to secede, in accordance with the principles of the Declaration of Independence; but, when war broke out, he became its most zealous advocate. Later, however, he sought to effect a compromise and, in 1864, with Lincoln's consent, arranged a fruitless conference with pretended Confederate delegates in Canada.

At the end of the war, he urged universal amnesty and signed the bail bond of Jefferson Davis. This brought upon him much hostile criticism and when, in 1872, he became presidential candidate against Grant, many of his stanchest friends accused him of conspiring to place the government in the control of the men who had recently sought to destroy it. Overwork and mortification at his overwhelming defeat hastened his death, which occurred, Nov. 29, 1872.

Greely, Adolphus Washington, American soldier, arctic explorer, and scientist, was born at Newburyport, Mass., 1844. Entering the volunteer service, he attained the rank of captain during the Civil War, and at its close was transferred to the regular army with the rank of lieutenant.

In 1881, he was assigned to the command of the Lady Franklin Bay expedition to northern Greenland. His expedition attained the then "farthest north," 83° 24′ N. He published an account of the expedition, in 1885, under the title of *Three Years of Arctic Service*.

In 1887, he became chief of the United States signal service. Under his direction, 21,000 miles of military telegraph lines were built in the United States, Cuba, Porto Rico, China, the Philippines, and Alaska. In 1906, he was made major general and was in command at San Francisco after the earthquake and fire. Besides many valuable scientific works, he wrote *American Explorers and Travelers*, *Handbook of Polar Discoveries*, and *Handbook of Alaska*. He retired in 1908.

Green, Anna Katharine, is the pseudonym of Anna Katharine Green Rohlfs, American novelist, who was born at Brooklyn, N. Y., 1846. She is the daughter of James Wilson Green, a lawyer, and was educated at Ripley college, Poultney, Vt. She married Charles Rohlfs in 1884. In 1878, she published her first novel, *The Leavenworth Case*, a fine detective story which won immediate success. Her numerous stories, chiefly of the same type, include *A Strange Disappearance*, *The Sword of Damocles*, *The Defense of the Bride*, *That Affair Next Door*, *The Millionaire Baby*, *The Amethyst Box*, *The House of the Whispering Pines*, and *The Mystery of the Hasty Arrow*.

Green, Hetty Howland Robinson, American financier, was born in New Bedford, Mass., 1835, daughter of Edward Mott Robinson, who died in 1865 leaving her a large fortune. In 1867, she married Edward H. Green, who died in 1902. She was reputed to be the richest woman in America and was probably the greatest woman financier in the world. She personally managed a property of many millions in stocks, bonds, and real estate in Chicago, New York, and elsewhere. Died, 1916.

Green, John Richard, English historian, was born at Oxford, 1837, and was educated at Magdalen College school and Jesus college. He was ordained as a minister in 1860 and was for some time vicar of Saint Philip's, Stepney, becoming librarian at Lambeth in 1869, after which he turned his entire attention to history and politics. Among his valuable works are *A Short History of the English People*, *A History of the English People*, *The Making of England*, and *The Conquest of England*. The last was published after his death by his wife, Alice Stopford Green, who assisted him in various works and herself wrote *Henry II.* in the "Twelve English Statesmen" series. Died, 1883.

Green, Thomas Hill, English philosopher, was born in Yorkshire, 1836. He was educated at Balliol college, Oxford, where he was elected to a fellowship in 1860 and became professor of moral philosophy in 1878. He was the most influential English representative of the Neo-Hegelian school of thought. His noble character, philosophical profundity, and strong interest in social questions drew around him many of the best men at Oxford. In 1874, he contributed his masterly introduction to the Clarendon press edition of Hume's *Treatise on Human Nature*, subjecting Hume's philosophy in detail to searching and hostile analysis from an idealist point of view. His *Prolegomena to Ethics*, left incomplete at his death, was edited by A. C. Bradley. His scattered essays in *Mind* and elsewhere were edited by R. L. Nettleship as *The Works of T. H. Green*. He died in 1882.

Greene, Nathanael, American general, was born in Patowomut, R. I., 1742, son of a Quaker preacher. In 1770, he was chosen a member of the Rhode Island assembly and, to the great scandal of his fellow Quakers, was among the first to engage in the military exercises preparatory to resisting the mother country.

In 1774, he enlisted as private and, in 1775, was appointed to the command of the Rhode Island contingent to the army at Boston with the rank of brigadier general. At the battle of the Brandywine, he commanded a division and, by his skillful movements, saved the American army from utter destruction. In 1780, he succeeded Gates in the command of the army of the South. In 1781, with an army of new recruits, he entered upon active operations and finally defeated the English at Eutaw Springs, the hardest-fought field of the Revolution, which put an end to the war in South Carolina.

Congress presented him with a medal in honor of his services, and the Carolinas and Georgia made him valuable grants of land. When peace was restored in 1783, Greene returned to Rhode Island, where he received numerous testimonials of the public admiration. He was one of the ablest generals of the war, second, perhaps, only to Washington, whose intimate friend he was. In 1785, he retired with his family to his estate in Georgia, where he died of sunstroke in 1786.

Greenough (*grēn'ō*), **Horatio,** American sculptor, was born in Boston, Mass., 1805. He graduated at Harvard in 1825 and, from that year until 1851, lived chiefly in Italy. His principal work is the colossal statue of Washington formerly in front of the Capitol. Others are "Medora," "Venus Victrix," and a group of four figures, "The Rescue." His works are all in the severe classical style of the period, without personality or emotion. He died at Somerville, Mass., 1852.

Gregor, William, English chemist and mineralogist, was born at Trewarthenick, Cornwall, 1761. He was educated at Saint John's college, Cambridge, where he graduated in 1784, winning a Latin prize. He entered the ministry and, in 1793, became rector of Creed, Cornwall, where he remained throughout his life. He was a painter and etcher of distinction and, after hearing a series of lectures on chemistry, devoted much time to analytical mineralogy. In 1791, in a peculiar black sand of the Menacchan valley in Cornwall, he discovered a new metallic element, called by him menacchine, which Klaproth five years later described, and named titanium, although crediting the original discovery to Gregor. He conducted valuable researches in the analysis of minerals and published numerous papers. Died, 1817.

Gregorovius (*grĕg'ō-rō'vĭ-ŭs*), **Ferdinand,** German historian, was born at Neidenburg in East Prussia, 1821. He studied theology, but devoted himself chiefly to poetry and literature. In 1852 he settled in Rome. His great work—the standard work on the subject—is the *History of the City of Rome in the Middle Ages*. He wrote on Italian geography and history, on Corsica, Capri, the graves of the popes, Lucrezia Borgia, Urban VIII, Athens, and the Byzantine empress Athenais; he also wrote a tragedy on the death of Tiberius and an epic, *Euphorion*. Died, 1891.

Gregory I, called "the Great," pope, was born in Rome about 540. He was appointed governor of Rome, but, on inheriting his father's wealth, resigned and became abbot of Saint Andrew's, Rome. After being secretary to Pelagius II, he succeeded him as pope in 590. Few pontiffs have surpassed Gregory as a constructive administrator. He organized the public services of the Church, perfected the ritual, and systematized sacred music. He composed chants, established a musical school in which he himself taught, and collected and arranged fragments of ancient hymns. He is the author of numerous sacred works, the chief of which is his *Morals from the Book of Job*. Gregory is the most notable figure in the ecclesiastical history of the middle ages and exercised a powerful and permanent influence on doctrine, organization, and discipline, being now regarded as one of the greatest doctors of the Church. Died, 604.

Gregory VII, otherwise known as Hildebrand, a Roman pontiff, was born about 1020 at Saona, near Siena, Italy. His youth was passed at Rome in the monastery of Saint Mary on the Aventine, of which his uncle was abbot. About 1045, he was made chaplain to Pope Gregory VI, whom he shortly afterward accompanied on his exile into Germany.

He attended the Diet of Worms in 1049, where Bruno, bishop of Toul, was elected pope as Leo IX. Hildebrand there came under the favorable notice of the new pope, over whom he won an ascendancy that he never thereafter lost. He virtually directed the conduct and succession of the Holy See through the reigns of five pontiffs, 1048–73. In 1050, he became a cardinal subdeacon, and, in the following years, he was intrusted with many important missions.

In 1073, Hildebrand was himself compelled by the tumultuous demands of the mob to accept the vacant tiara, and he was established on the papal throne under the title of Gregory VII. He lost no time in giving the utmost practical effect to the two leading ideas of his life: the establishment of the supremacy of the papacy within the Church and the assertion of the supremacy of the Church over the state. He repressed simony and enforced the observance of strict discipline among the clergy.

It was determined that any ecclesiastic who in the future should accept office from the hands of a layman should incur the penalty of deposition, while the secular lord who bestowed investiture should be excommunicated. Emperor Henry IV of Germany defied the ruling and, in 1076, declared Gregory deposed. Gregory lost no time in pronouncing against Henry a sentence of excommunication, which, according to the law of the Empire, involved a loss of the imperial prerogatives. Seeing that resistance was impossible, Henry yielded, and sought absolution from the pope at Canossa in 1077. This triumph of Gregory's is regarded as the greatest temporal victory ever won by the papacy.

When Henry found his position sufficiently strong, he renewed his attitude of defiance and, in 1080, was again excommunicated. On this occasion, he retaliated by appointing the antipope Guibert, and proceeded to lay siege to Rome. In 1084, Gregory was compelled to take refuge in the castle of San Angelo, while Guibert was established on the pontifical throne as Clement III. Gregory retired to Salerno, where he spent his last days under the protection of Robert Guiscard. "I have loved justice and hated iniquity; therefore, I die in exile," were the last words he is said to have uttered before his death on May 25, 1085.

Gregory, Augusta Lady, Irish dramatist, was born at Roxborough, County Galway, 1859. She worked many years for the creation of a national Irish theater and drama. With Yeats and others, she helped found the Irish national theater society, and she became director of the Abbey theater, Dublin. She reconstructed ancient Irish legends, has lectured extensively, and has written numerous plays. She excels in one-act plays which are at once quaintly humorous, truly comic, kindly satirical, and intensely human. She has translated plays by Molière, Sudermann, and Goldoni. Her publications include *Poets and Dreamers, Gods and Fighting Men, Saints and Wonders, The Kiltartan History Book, The Full Moon, The Golden Apple,* and *Aristotle's Bellows*.

Grenfell, Wilfred Thomason, English missionary physician, was born in 1865. After graduation at Oxford university, he took a course in medicine at the London hospital, Whitechapel, after which he devoted himself to reform work among the mariners of the North Sea, establishing homes on land and mission vessels at sea. In 1892, he began similar work on the coast of Labrador, erecting hospitals, co-operative stores, factories, an orphans' home, and a school. In 1912, he opened a seaman's institute at Saint Johns, Newfoundland. While primarily evangelistic in purpose, he laid great stress from the first on improving the physical, social, and economic conditions of the seamen of the northeast coast. Among his books are *Off the Rocks, Adrift on an Icepan, Down to the Sea, The Adventure of Life,* and *Labrador Days*.

Gresham (*grĕsh'ăm*), **Sir Thomas,** English financier and philanthropist, was born in 1519. After studying at Cambridge he became connected, in 1543, with the Mercers Company, and, in 1551, was employed as king's agent at Antwerp. In two years, he paid off a heavy loan and restored the king's credit. As a Protestant, he was dismissed by Queen Mary but was soon reinstated. He was knighted by Queen Elizabeth in 1559 and was, for a time, ambassador at Brussels. The troubles in the Netherlands compelled him to withdraw in 1567 from Antwerp and thereafter he lived in London. Having lost his only son, Richard, he devoted a portion of his great wealth to building an exchange in imitation of that of Antwerp. He also made provision for founding Gresham college. He formulated Gresham's law regarding debased currency, according to which bad money drives out good money. Died, 1579.

Greuze (*grŭz*), **Jean Baptiste,** French painter, was born at Tournus, Burgundy, 1725. He studied under Grandon at Lyon and at the academy in Paris. His first notable works were historical. After a visit to Italy, 1755, he painted Italian subjects; but he is seen at his best in such studies of girls as "The Broken Pitcher," the "Girl with Doves," and "Girl with Dead Canary." His art, though full of delicacy and grace, is marred by its pursuit of mere prettiness. His works, which are still very popular, are excellent in line, and he ranks among the best French painters of the 18th century. Died, 1805.

Grévy (*grā'vē'*), **François Paul Jules,** French statesman, was born at Mont sous Vaudrey in 1807 and attended school and college near his native place. He went to Paris to study law and, becoming interested in politics,

took part in the revolution of 1830, which drove Charles X from the French throne. In 1848, when Louis Philippe was dethroned and a Republican government set up, Grévy became prominent. He was elected to the Constituent Assembly of 1848 and took a prominent part in the organization of the government.

Opposed to Louis Napoleon as president and still more bitterly against him as emperor, Grévy was obliged to keep out of public affairs from 1852 to 1868. After Napoleon's downfall, he was chosen president of the National Assembly which met in 1871, and he earnestly advocated democracy as the only hope of France. In 1879, he was chosen president of the Republic. In 1885, he was re-elected but, on account of a scandal in which his son-in-law was implicated, he was forced to resign, 1887. Died, 1891.

Grey, Albert Henry George, former governor-general of Canada, was born in 1851. He was educated at Trinity college, Cambridge, and succeeded to the title of his uncle, the third Earl Grey, in 1894. He was a Liberal member of the House of Commons, 1880–85, and became governor-general of Canada in 1904, holding this office until 1911. Died, 1917.

Grey, Charles, second Earl Grey, English statesman, was born at Fallodon, Northumberland, in 1764 and was educated at King's college, Cambridge. He became a Whig member of Parliament for Northumberland, 1786, and was one of the managers of the impeachment of Warren Hastings. In 1806, Grey, now Lord Howick, became first lord of the admiralty and, on the death of Fox, foreign secretary and leader of the House of Commons. In 1807, he succeeded his father as second Earl Grey.

Grey became prime minister in 1830 and immediately introduced a reform bill extending the right of franchise. Its defeat and the subsequent dissolution of Parliament were followed by the return of a government more favorable to the bill. A second bill of reform was introduced in 1832, passed the Commons, but was defeated in the House of Lords. Grey resigned, but returned to office with the power to have a sufficient number of peers created to pass the measure. The duke of Wellington, who had led the opposition in the House of Lords, yielded and allowed the bill to pass. This bill was one of the chief landmarks in the growth of British democracy. Another important measure due to Grey's statesmanship was the act for the abolition of slavery in British territory. He resigned in 1834. Died, 1845.

Grey, Edward, Viscount, English statesman, was born in Northumberland, 1862. He graduated at Balliol college, Oxford, and succeeded to the baronetcy in 1882; entered Parliament in 1885; and was undersecretary for foreign affairs, 1892–95. In 1905, he became secretary of state for foreign affairs and soon rose to commanding prominence in European diplomacy.

He brought about the triple entente uniting Great Britain, Russia, and France. Although he suffered diplomatic defeat in the international conference over the annexation of Bosnia and Herzegovina by Austria in 1908, his firmness in the Morocco affair of 1911 prevented unwarranted concessions to Germany by France. His masterly handling of Balkan problems at the London Conference of 1912 greatly hastened peace. In 1914, his efforts to secure arbitration of the Austro-Serbian quarrel failed, and the World War followed. He was created Earl Grey of Falloden in 1916 and, in 1919, served as British ambassador to Washington. He wrote his memoirs, *Twenty-five Years—1892–1916*.

Grey, Lady Jane, eldest daughter of Henry Grey, duke of Suffolk, and second cousin of Edward VI, was born at Bradgate, England, 1537. She was early distinguished for her scholastic ability. Before the death of Edward VI, the duke of Northumberland had her married, at 16 years of age, to his own son, Lord Dudley and persuaded the king to leave the crown to Lady Jane Grey. She was kept in innocence of the plan and fainted when, on the king's death, she found herself proclaimed queen. She later consented to the arrangement, but the late king's sister Mary intervened vigorously and secured the succession to herself. Lady Jane Grey was imprisoned and, her friends having revolted, she was put to death in 1554.

Grey, Zane, American author, was born at Zanesville, Ohio, in 1875. He was graduated as a dental surgeon at the University of Pennsylvania. He practiced for six years in New York City, thereafter devoting himself to literature. His books include *Betty Zane*, *The Last Trail*, *The Heritage of the Desert*, *Desert Gold*, *U. P. Trail*, *The Mysterious Rider*, *Day of the Beast*, and *The Vanishing American*.

Grieg (*grēg*), **Edvard Hagerup,** Norwegian composer, was born at Bergen, 1843. In 1858, he began a four years' course of study at Leipzig under Hauptmann, Richter, Reinecke, and Moscheles, and, in 1863, continued his studies at Copenhagen under Gade. His nationality became a strong element even in his earliest compositions. He spent the winter of 1865-66 and some months of 1870 in Rome, where he inaugurated a Norse music concert. He settled in Christiania, later at Bergen, and devoted himself to musical composition.

Of his larger works the best-known are the *Peer Gynt* suites, the overture *Im Herbst*, the suites *Sigurd Jorsalfar* and *Aus Holberg's Zeit*, the choral work *Olaf Trygvason*, and a fine piano concerto. His piano music is characterized by melodic freshness, rich harmony, and piquant rhythm, while his numerous songs rank among the most beautiful in modern music. Bülow styled him the "Chopin of the North." Died, 1907.

Griffis (*grif'is*), **William Elliot,** American clergyman and educator, was born in Philadelphia, Pa., 1843. He served in the Civil War and was educated at Rutgers college and Union theological seminary. In 1870, he went to Japan to organize schools and later became professor of physics at the Imperial university, Tokyo. Returning to America, he held important pastorates under the Reformed and later the Congregational Church from 1877 to 1903, after which he devoted himself to lecturing and writing. Among his many books are *Japanese Fairy World*, *The Religions of Japan*, *Romance of Discovery*, *Romance of Conquest*, *America in the East*, *A Maker of the New Orient*, *The Japanese Nation in Evolution*, *A Modern Pioneer in Korea*, and *Swiss Fairy Tales*. Died, 1928.

Griffith, David Wark, American motion picture producer, was born at La Grange, Ky., in 1880; was educated in the public schools; and was an actor on the regular stage for two years. Beginning in 1908, he was identified with the moving picture business, first as actor, then as producer. His pictures are noteworthy for their spectacular and their emotional effects. Among the most noteworthy are *Birth of a Nation*, *Intolerance*, *Hearts of the World*, and *Way Down East*.

Grignard (*grē'nyär'*), **Victor,** French chemist, was born at Cherbourg, 1871. He was educated in the Ecole Normale at Cluny and at the University of Lyon, where he attained the degree of doctor of science in 1901. He lectured and taught at Besançon and Lyon in 1905–09 and, in 1910, became professor of chemistry at Nancy. In his doctor's thesis, he announced the discovery of new organometallic compounds of magnesium and demonstrated reactions which have proved valuable in synthetic chemistry, particularly in the preparation of organic compounds, including hydrocarbons, alcohols, aldehydes, and acids. For this discovery and for subsequent researches with what is known as the Grignard reaction, he was awarded one-half of the Nobel prize for chemistry in 1912.

Grillparzer (*grĭl'pär-tsĕr*), **Franz,** Austrian dramatic poet, was born at Vienna, 1791. He studied law and, in 1813, entered the imperial civil service, in which he remained until 1856. He first attracted notice in 1817 by a tragedy, *Die Ahnfrau*, which was followed by *Sappho*, *Das goldene Vlies*, *Des Meeres und der Liebe Wellen*, and *König Ottokars Glück und Ende*. He produced much meritorious lyric poetry and one good prose novel, *Der Arme Spielmann*. Grillparzer ranks as the greatest modern Austrian dramatist, and, in German literature, he is the link between Lessing, Goethe, Schiller, and Herder and the more modern school. Died at Vienna, 1872.

Grimm, Friedrich Melchior, Baron von, critic and writer, was born at Ratisbon, 1723. After studying at Leipzig and failing with a tragedy, he accompanied a nobleman to Paris and became reader to the crown prince of Saxe Gotha. He became acquainted with Rousseau in 1749 and, through him, with Diderot and Madame d'Epinay.

His connection with the encyclopedists, added to his own acquirements, opened to him a brilliant career. In 1753, he began to write for several German princes the now famous literary bulletins, which for nearly 40 years gave the most trenchant criticism of all important French books. This correspondence was confidential, but, after his death, it was collected and published in 17 volumes. In 1775, he was made a baron by the duke of Gotha and was appointed minister plenipotentiary at the French court. At the Revolution, he withdrew to Gotha and afterward to the court of Catherine II, whence he was sent in 1795 as Russian minister to Hamburg. He died at Gotha, 1807.

Grimm, Jakob Ludwig Karl, German philologist and antiquary, was born at Hanau, in Hesse-Nassau, 1785. Though holding at various times important public offices, his life was devoted to philological and antiquarian studies. His German *Grammar*, in four volumes, is one of the greatest philological works of the age.

After 1814, in company with his brother Wilhelm, he published numerous popular works, the best known of which is *Kinder- und Haus-märchen*, known in English as "Grimm's Fairy Tales." From 1830 to 1837, they were joint professors at Gottingen; subsequently were joint librarians at Cassel; and, in 1841, settled in Berlin at the invitation of the king of Prussia. The greatest joint undertaking of the two brothers was the *Deutsches Wörterbuch*, begun in 1852. Jakob Grimm died in 1863, four years after his brother's death.

Grimston (*grĭm'stŭn*), **Mrs. Margaret R.** See *Kendal, Margaret Brunton Robertson.*

Grisi (*grē'sē*), **Giulia,** Italian dramatic soprano, was born in Milan, 1811. She studied music under Giacomelli, Marliani, and Madame Pasta, and became one of the greatest singers of the 19th century, attaining remarkable success in grand opera on the Paris and the London stage, 1834–49. She married Mario, the distinguished tenor, and sang with him and with Tamburini and Lablache in the "Puritani" quartet, which made Bellini's opera exceedingly popular in Paris. In 1854, she made a tour of the United States with Mario as her principal operatic support. She died at Berlin, 1869.

Grose (*grōs*), **George Richmond,** American educator, was born in Nicholas county, W. Va., 1869. He was educated at Ohio Wesleyan university and Boston university and was ordained to the Methodist Episcopal ministry in 1896. After serving in various important pastorates, he was, in 1912, chosen president of De Pauw university. Made a bishop in 1924, he was assigned to Peking, China. He wrote, among other works, *Religion of the Mind.*

Grosvenor (*grō'vĕ-nẽr*), **Gilbert Hovey,** American editor, was born at Constantinople, Turkey, in 1875, of American parents. He was educated at the Presbyterian college, Constantinople, and Amherst college. After a brief period of teaching, he became connected with the *National Geographic Magazine* in 1899, being made editor in chief in 1903. He was also director of the national geographic society, 1902–1920, in which period the society became numerically the strongest scientific society in the world. He was made president of the society in 1920. Among his writings are *Young Russia, Flags of the World,* and *Discovery and Exploration.*

Grote (*grōt*), **George,** English historian, was born at Clay Hill, Kent, 1794. He was educated at Charterhouse; entered the family banking house; but devoted his leisure time to literary work. He published many pamphlets on reform and contributed to the *Westminster Review.* In 1832, he was elected to Parliament, and he continued to sit until 1841 as one of the "philosophical radicals." His valuable *History of Greece* appeared between 1846 and 1856 and was followed by *Plato and the Other Companions of Socrates.* During his parliamentary life, he made himself conspicuous by his advocacy of the ballot. He took an active part in the foundation of the University of London, of which, at the time of his death, he was vice chancellor. He died in 1871 and was buried in Westminster Abbey.

Grotius (*grō'shĭ-ŭs*), **Hugo,** otherwise known as Hugo de Groot, Dutch jurist and the founder of international law, was born of noble parentage at Delft, Holland, April 10, 1583. At 12, he entered the University of Leiden and, at 15, received his doctorate in law from the University of Paris. His *Martianus Capella,* a prodigy of juvenile learning, was published when he was but 16. In 1599, he issued a treatise for the instruction of seamen in ascertaining the exact situation of a ship at sea, and enrolled himself as an advocate at The Hague. In 1607, he was nominated advocate general of the provinces of Holland and Zealand. He married Mary Reygersburgh.

In 1608, Grotius composed his *Mare Liberum,* which undertook to show that the sea was open to all without distinction. He was advanced in 1613 to the judicial station of pensionary of Rotterdam. Two years later, he went to England on an embassy representing the rights of fishing for whales in the Northern Seas, and there he formed many delightful connections at court and with eminent churchmen.

Shortly afterward, Grotius became deeply involved in the religious animosities which, at that time, vexed Holland. He had adopted the principles of the Arminian party in opposition to the tenets held by the followers of Gomar, the Calvinistic controversialist. Participation in the subsequent popular tumults caused Grotius to be arrested. In 1619, he was sentenced to life imprisonment and was confined in the castle of Loevestein. During his two years of captivity, he employed much time in legal studies and wrote a treatise entitled *The Truth of the Christian Religion.* By the aid of his wife, he escaped from prison in 1621.

Grotius made Paris his city of refuge. There he wrote, in 1622, his *Apology,* and, in order to place himself more fully under the protection of the French government, he obtained naturalization papers from Louis XIII. In 1625, he completed his greatest work, *De Jure Belli et Pacis,* "The Law of War and Peace," which long remained the standard authority on international law. In order to estimate the magnitude and value of his labors, it must be considered that, before he wrote, the ground in this field was wholly unbroken.

In 1631, Grotius was invited by Prince Frederick of Orange to return to his native country, but a decree of perpetual exile was passed against him through the intrigues of his enemies. He was induced, partly by reason of Queen Christina's taste for literature, to enter the Swedish service. In 1635, he became resident ambassador for Sweden at the court of France, where he gained universal favor. He found himself at the Swedish court again in 1645, but the literary dilettantism there did not suit him. On his way to Lubeck, he died at Rostock, Germany, August 28, 1645.

Grouchy (*grōō'shē'*), **Emmanuel, Marquis de,** French marshal, was born in Paris, 1766. He entered the French army in 1781, rising, by 1794, to the rank of brigadier general. Because of his noble birth, he was compelled by the supporters of the Revolution to retire from the army but he was reinstated shortly and took a prominent part in many of Napoleon's victories.

For his services to Napoleon's cause on the latter's return from Elba, he was made marshal. He defeated the British and Prussian force at Ligny, but, by following to the letter Napoleon's order to pursue Blücher, he is believed to have caused the French defeat at Waterloo. On the return of the Bourbons to the throne, he was banished, and lived for five years in Philadelphia, 1814–19. He was later permitted to return and was restored to his estates and titles. Died, 1847.

Grove, Sir George, British engineer and writer on music, was born at Clapham, 1820. He was trained as a civil engineer; erected lighthouses in the West Indies; and assisted on the Britannia tubular bridge over Menai strait. He was secretary to the society of arts, 1849–52, and then secretary and director of the crystal palace exhibition. He was editor of *Macmillan's Magazine;* was a large contributor to Smith's *Dictionary of the Bible;* became editor and part author of the great *Dictionary of Music and Musicians;* and published a work on Beethoven. He was knighted in 1883 on the opening of the royal college of music, of which he was director until 1894. He died in 1900.

Guericke (*gā'rĭ-kĕ*), **Otto von,** German physicist, was born at Magdeburg, 1602. He studied at Leipzig, Jena, and Leiden, and traveled in France and England. As a physicist, he is known chiefly for his discoveries relative to the nature and effects of air. The experiments of Galileo and of Pascal on the weight of air led Guericke to attempt the creation of a vacuum. This resulted in the first air pump, invented about 1650. Guericke's invention soon became famous, and, in 1654, he was summoned to the presence of the emperor Ferdinand III of Germany at Ratisbon, at which time he made the famous experiment commonly known as the "Magdeburg hemispheres," in demonstration of atmospheric pressure. Died, 1686.

Guesclin, Bertrand du. See *Du Guesclin, Bertrand.*

Guest, Edgar Albert, American press humorist, was born at Birmingham, England, in 1881. He was brought to America at ten years of age and received a high school education at Detroit, Mich. Following 1895, he was connected with the Detroit *Free Press* in various capacities. His publications include *A Heap o' Livin', Just Folks, Path to Home,* and *When the Day is Done.*

Guido d' Arezzo (*gwē'dō dā-rĕt'sō*), or **Guido Aretino,** medieval musician and Benedictine monk, was born probably near Paris about 995 and was educated at Saint Maur des Fosses. At the Benedictine monastery at Pomposa, he taught singing and introduced new methods in music. These met with local disfavor, which resulted in his flight to Arezzo, whence, about 1030, he was summoned to Rome to demonstrate his musical discoveries to Pope John XIX.

The invention of musical notation and the *solfeggio* are ascribed to him. He introduced the names Ut, Re, Mi, Fa, Sol, and La for the first six notes of the scale and originated the four-line staff, employing extra lines above and below whenever necessary. He used both lines and spaces, designating them by the first letters of the alphabet and thus insuring uniformity of pitch. He substituted fourths for the parallel fifths in the primitive harmonies of Hucbald. This innovation soon led to the use of the remaining intervals and hastened the development of harmony and measured rhythm, which distinguish modern musical composition from the purely melodic music of the ancients. In 1029, Guido became prior of the monastery at Avellano, where he died probably about 1050. See *Solfeggio, The.*

Guido Reni. See *Reni, Guido.*

Guillaume (*gē'yōm'*), **Charles Edouard,** Swiss physicist, was born at Fleurier, Switzerland, about 1860. Many important discoveries of alloys have been due to him. In 1896, he found a cheap alloy more stable than platinum. This alloy, called invar from its invariable quality, was found to be a suitable material for surveying instruments, reducing the cost to about 2 per cent of what it had been 20 years before. Invar was used also in place of platinum in electric light bulbs when platinum became scarce during the World War. Guillaume was made director of the international bureau of standards in 1915 and, in 1920, received the Nobel prize in physics. He is the author of many technical publications on alloys and related topics.

Guilmant (*gēl'mäN'*), **Félix Alexandre,** French organist and composer, was born at Boulogne, 1837. His father, a professional musician, gave him his first musical instruction, and, at the age of 12, he began to play the organ as his father's substitute at the church of Saint Nicholas. He studied further under Carulli and, in 1853, was made organist at the church of Saint Joseph. In 1871, he became organist at La Trinité and, in 1896, was made professor of the organ at the Paris conservatory. He was the foremost representative of the French school of organ music, a brilliant performer with a marvelous gift of improvisation. He made numerous successful tours in England, Russia, Italy, and the United States. His compositions include many works for the organ and orchestra, together with numerous choruses and masses. Died in 1911.

Guise (*gü-ēz'*), **Henri de Lorraine, Duke of,** French Catholic leader, was born in 1550. At the age of 15, he distinguished himself fighting against the Turks in Hungary. He later took an active part in the wars against the Huguenots and in the massacre of Saint Bartholomew. Using his popularity with the Parisians, he formed the Holy league, which was designed to bring his family to the throne and to exclude that of Henry of Navarre. His ambitions were cut short by assassination in 1588.

Guiteras (*gē'tē-räs*), **Juan,** physician, was born at Matanzas, Cuba, 1852. He was educated at La Empresa, Matanzas, and graduated in medicine at the University of Pennsylvania, 1873. He was in the United States marine hospital service, 1879–89; served as an expert in yellow-fever epidemics; was professor of pathology at the University of Pennsylvania; served on the staff of General Shafter as yellow-fever expert in the Santiago campaign, 1898; and, in 1900, became professor of general pathology and tropical diseases at the University of Havana. In 1921, he resigned to become president of the national board of health for Cuba. He became widely known for his important researches and discoveries in connection with yellow fever and other tropical diseases. Died, 1925.

Guizot (*gē'zō'*), **François Pierre Guillaume,** French statesman and historian, was born at Nimes, 1787. In 1805, he went to Paris, studied law, became a professor at the Sorbonne in 1812, and devoted himself to literature. His first work, the *Nouveau dictionnaire universel des synonymes de la langue française*, appeared in 1809. After the Second Restoration, he became general secretary to the minister of the interior and afterward to the minister of justice.

After the revolution of 1830, he became minister of the interior and, in 1832, minister of public instruction, an office which he held, with two interruptions, until 1837. On the outbreak of the Eastern disturbances in 1840, under Soult's administration, he was sent as ambassador to London; in 1847, became the official leader of the cabinet; was forced by the revolution of 1848 to flee to England; returned in 1849; but retired completely from politics after the *coup d'état* of 1851. Among his numerous works are his *History of the English Revolution*, *Life of Oliver Cromwell*, *History of Civilization in Europe*, and *History of Civilization in France*. He died in 1874.

Gulick, Luther Halsey, American educator and author, was born at Honolulu, Hawaii, 1865. He was educated at Oberlin academy and Sargent normal school of physical training, and, in 1889, graduated in medicine at New York university. He specialized in physical education and became superintendent of physical training at the Y. M. C. A. training school, Springfield, Mass., in 1887, continuing until 1900. After teaching three years at Pratt Institute high school in 1900–03, he took charge of physical training in the public schools of New York City, continuing until 1908. From 1908 to 1913, he directed the child hygiene department of the Russell Sage foundation.

In addition to the editing of journals on physical education and of the Gulick hygiene series, he wrote *Manual of Physical Measurements*, *Physical Education by Muscular Exercise*, *The Efficient Life*, *Mind and Work*, and *The Healthful Art of Dancing*, and was coauthor with L. P. Ayres of *Medical Inspection of Schools*. In 1913, he became national president of the camp fire girls. Died, 1918.

Gullstrand (*gōōl'stränd*), **Allvar,** Swedish physicist, was born in Landskrona, 1862, the son of a physician. He was educated at the universities of Upsala, Vienna, and Stockholm. In 1894, he became professor of ophthalmology in the University of Upsala and, in 1913, professor of physiological and physical optics. In recognition of his researches he received honorary degrees from Upsala, Dublin, and Jena universities, and, in 1911, was awarded the Nobel prize for medicine. His scientific writings include *Allgemeine Theorie der monochromatischen Aberrationen*, *Die reelle optische Abbildung*, and *Einführung in die Methoden der Dioptrik des Auges des Menschen*.

Gunsaulus (*gŭn-sô'lŭs*), **Frank Wakeley,** American clergyman and educator, was born at Chesterville, Ohio, 1856. He graduated at Ohio Wesleyan university and was ordained a Methodist minister, but became a Congregationalist in 1879. He held many prominent pastorates and, in 1893, was made president of the Armour institute of technology, Chicago, at the same time continuing to occupy pulpits in the city. He became widely known as a pulpit orator and as a lecturer on "Savonarola," "John Hampden," and other subjects. His publications include *Phidias and Other Poems*, *Songs of Night and Day*, *Transfiguration of Christ*, *Monk and Knight*, *Metamorphosis of a Creed*, *Paths to the City of God*, and *The Minister and the Spiritual Life*. Died, 1921.

Gunter (*gŭn'tẽr*), **Edmund,** English mathematician, was born in Hertfordshire about 1581. He was educated at Westminster and Christ Church, Oxford, and, in 1619, became professor of astronomy in Gresham college, London. He invented the sector, with the lines known as Gunter's scale. His principal works are *Canon Triangulorum*—a table of logarithmic sines and tangents—and *New Projection of the Sphere*. He invented the widely used surveying chain called Gunter's chain, and made the first observation of the variation of the compass. Died, 1626.

Gustavus I Vasa (*gŭs-tā'vŭs vä'sä*), former king of Sweden, was born at Lindholmen, 1496. In 1518, during the patriotic struggle with Christian II of Denmark, Gustavus was treacherously carried off to Denmark as a hostage. After a year, he escaped to Lubeck and thence to Sweden, where he strove in vain to rouse a spirit of resistance against the Danes. Retreating to Dalecarlia, he wandered for months, with a price set on his head, and worked on farms and in mines. At last the massacre at Stockholm, 1520, roused the Swedes, and soon Gustavus had an army large enough to attack the enemy. His capture of Stockholm in 1523 drove the Danes from Sweden. Thus ended the great Scandinavian union which had existed for 126 years, and Gustavus I was elected king of Sweden.

He found the whole country demoralized. Yet, after a 40 years' rule, he left Sweden a peaceful and civilized realm, with a full exchequer and a well organized army. He promoted trade, fostered schools, and made roads, bridges, and canals. Died in 1560.

Gustavus II Adolphus, was born at Stockholm, 1594. He was the grandson of Gustavus Vasa and the son of Charles IX, at whose death, in 1611, Gustavus Adolphus succeeded to the throne of Sweden. He had been strictly brought up in the Lutheran faith, carefully trained in habits of business, and was one of the most accomplished princes of his age. He was acquainted with eight languages, five of which he spoke and wrote fluently, and he was well read in the classics and ancient history. He was proficient in music and excelled in all warlike and manly exercises.

Having made various administrative reforms and availed himself of the short interval of peace to promote the material prosperity of the country, he intrusted the charge of the government to his chancellor, Oxenstierna, and set sail, in the summer of 1630, with an army of about 13,000 men, to aid the Protestants of Germany in their struggle against the Catholic league, which was backed by the power of the Empire. With and for the Germans he fought until his death on the battlefield of Lutzen, 1632. He was one of the greatest generals of modern times and made Sweden a power in northern Europe.

Gustavus III, king of Sweden, was born at Stockholm, 1746, and succeeded his father, Adolphus Frederick, in 1771. At this period the country was distracted by the intrigues of the rival political parties of Horn and Gyllenborg, known as the "hats" and "caps." A revolution was effected without the shedding of blood, and, by a stroke of the pen, Gustavus recovered all the legal powers that had been gradually lost by his immediate predecessors. In 1788, he entered upon a profitless war with Russia, and, in 1789, secured additional war powers from the diet. This so incensed the nobles that finally a conspiracy was formed against his life. In 1792, he was mortally wounded at a masked ball in the opera house which he himself had built. Gustavus was a man of varied learning and wrote several dramatic works and poems.

Gustavus V, king of Sweden, was born at Drottningholm in 1858. He was educated at the University of Upsala, traveled extensively, entered the army, and, in 1881, married Princess Victoria of Baden, first cousin of the German emperor and a descendant of the old Swedish royal family of Vasa. He succeeded his father, King Oscar II, on December 8, 1907, having several times previously acted as regent.

Gutenberg (*gōō'tĕn-bĕrĸ*), **Johannes,** the inventor of printing from movable types, was born of noble parentage at Mainz, Germany, about the year 1400. Recent investigations tend to show that he changed his true name Hans Ganzfleisch de Sulgelock and, for political reasons, assumed the name of his mother's family, Gutenberg.

In 1434, Gutenberg was in Strasbourg, where, two years later, he formed a partnership with Andrew Dritzehn in the business of polishing stones and manufacturing

mirrors. Subsequently he entered into a second compact with Dritzehn and others "for the working out of certain secret processes invented by him." The "secret processes" undoubtedly comprehended the first steps in the art of printing. There is mention in the written agreement of "materials and utensils, of lead, of a press, of a vise for holding the parts together," and of the plan to complete the work for the fair at Aix la Chapelle in 1438.

In 1439, the death of Andrew Dritzehn involved Gutenberg in an unfortunate lawsuit with the former's brother George. About 1446, Gutenberg permanently located at Mainz. His means were exhausted, but, in 1450, he formed a new partnership with a rich goldsmith, Fust, for the further exploitation of his invention. A third partner, Schoeffer, entered the firm later. In 1455, a financial adjustment forced Gutenberg to abandon his claims and to sacrifice his apparatus and nearly all his stock. Fust and Schoeffer continued to print.

Ultimately, by the aid of Conrad Humery, a councilor of Mainz, Gutenberg again established himself in the same city and brought out the first printed Bible. Four editions of a work by Donatus are likewise ascribed to him, and, in 1457, Gutenberg issued the Latin *Psalterium*. Hard work and poverty rendered his last years exceedingly unhappy. In 1465, Adolph of Nassau, elector of Mainz, named him one of his courtiers and raised him to the rank of noble.

The obscurity of the early history of printing is increased through the precautions necessarily taken by the inventor and his partners to conceal their proceedings. Printing from engraved wooden blocks had been in use for more than half a century, especially in Germany and the Low Countries, but it was obviously inapplicable to works of considerable length. The comparative rapidity of the new method gave rise to grave suspicions among the authorities, for, to them, it was apparently due to magic. The immediate effect of printing was to make accessible the literature of Greece and Rome. By facilitating the spread of ideas, this invention has exerted an influence of incalculable magnitude on the history of the world. Gutenberg died in 1468.

Guth (*gŭth*), **William Wesley,** American educator, was born at Nashville, Tenn., in 1871. He was graduated at Leland Stanford university in 1895, studied law, was admitted to the bar, and for three years practiced law in San Francisco. He then studied theology in Boston university. Following his graduation from the theological school in 1901, he studied in Berlin and at the University of Halle, from which, in 1904, he received the degree of doctor of philosophy. He was ordained to the Methodist Episcopal ministry in 1900. In 1900-01, he was pastor at West Chelmsford, Mass. and, from 1904 to 1908, at Cambridge, Mass. He was president of the College of the Pacific from 1908 to 1913, when he became president of Goucher college, Baltimore. He traveled extensively in England, on the continent of Europe, and in Egypt, Asia Minor, and Palestine. His published writings include *Die Ältere Schicht in den Erzählungen über Saul und David*, *The Assurance of Faith*, *Revelation and its Record*, *Spiritual Values*, and *The Teachers' Teacher*. Died, 1929.

Guthrie (*gŭth'rĭ*), **Samuel,** American physician and chemist, was born at Brimfield, Mass., 1782. He studied medicine with his father and began practice at Sherburne, N. Y., where he became a pioneer in the introduction of vaccination. After the War of 1812, during which he served as examining surgeon, he established a vinegar factory, conducted experiments in the manufacture of gunpowder, and produced the first successful percussion powder.

In 1830, Guthrie invented a process for the rapid conversion of potato starch into sugar. Soon afterward he produced what is now known as chloroform by distilling a mixture of alcohol and chloride of lime. Concerning this discovery, he wrote an article in July 1831. Chloroform was independently discovered by Soubeiran in France, October 1831, and by Liebig in Germany, November 1831. Guthrie was one of the earliest American investigators in practical chemistry and contributed his discoveries to the *American Journal of Science*. Died, 1848.

Guyot (*gē'yō*), **Arnold Henry,** Swiss-American geographer and geologist, was born at Neuchatel, Switzerland, 1807. He came to America in 1848 and devoted his life to science. From 1855 to 1884, he was professor of geology and physical geography at Princeton college. He formed an intimacy with Agassiz, and made numerous maps, mathematical tables, and textbooks. His chief works are *The Meterological and Physical Tables*, issued by the Smithsonion institution, and his *Earth and Man*. Died, 1884.

Haber (*hä'bĕr*), **Fritz,** German chemist, was born at Breslau in 1868. He was educated in the universities of Heidelberg, Charlottenburg, and Berlin, receiving the degree of doctor of philosophy from the last named in 1891. In 1894, he became assistant in the institute of chemical technology at Karlsruhe and, in 1896, was made instructor in the polytechnical school there. In 1898, he was appointed professor at Dahlem, near Berlin, and later became director of the Kaiser Wilhelm institute for physical and electrical chemistry. His works include *Fundamentals of Electrochemical Technology* and *Thermodynamics of Gas Reactions*. In 1918, he was awarded the Nobel prize for chemistry.

Hackett, James Keteltas, American actor and manager, was born of American parents at Wolfe island, Ont., 1869. He was graduated at the College of the City of New York in 1891 and studied at the New York law school. He made his début in 1892 and became leading man at the New York Lyceum at the age of 24. His most notable earlier successes were in *The Prisoner of Zenda* and its sequel, *Rupert of Hentzau*, and in *The Pride of Jennico*, under the management of Daniel Frohman. His most noted later production was *Macbeth*. In 1918, he played the part of the Canadian in an all-star cast of *Out There* for the American Red Cross, through which that organization netted $700,000 in 3 weeks. Other plays in which he appeared include *A Grain of Dust*, *The Crook*, *Othello*, *Craig Kennedy*, and *The Better 'Ole*. Died, 1926.

Hading (*à'dăN'*), **Jane,** is the stage name of Jeanne-Alfrédine Tréfouret, French actress, born at Marseille in 1859. She studied at the Marseille conservatory, where she won considerable distinction. On leaving, she entered upon an engagement at the Algiers theater. From Algiers she went to Cairo to perform at the Khedival theater. She returned to Marseille in 1876 and, for a time, devoted herself to drama and comedy; but the lyric stage again attracted her, and she went to Paris.

At the Palais Royal she played *La Chaste Suzanne*, and at the Renaissance she appeared in Ohnet's *La Maître de Forges*, winning great popularity, which she increased in *Frou Frou*. In 1892, she contributed to the success of Lavedan's *Prince d'Aurec*. She entered the Comédie Française, and, in 1896, Sardou selected her for the title rôle in *Marcelle*. She subsequently appeared in London and, in 1888 and 1894, made successful tours of the United States, accompanied by M. Coquelin.

Hadley (*hăd'lĭ*), **Arthur Twining,** American educator and economist, was born in New Haven, Conn., 1856. He was graduated at Yale in 1876 and later studied at the University of Berlin. He was tutor and lecturer at Yale from 1879 to 1886, when he became professor of political science. In 1891, he was made professor of political economy serving until 1899, when he was elected president of the university. He filled this office with distinction until his retirement in 1921, as president emeritus.

Hadley's work on railway transportation established his position as an authority on the subject. His writings include *Railroad Transportation: Its History and Laws*, *Connecticut Labor Reports, 1885-86*, *Economics*, *The Education of the American Citizen*, *Freedom and Responsibility*, *Undercurrents in American Politics*, and *Standards of Public Morality*. In 1908, he was elected member of the American academy of arts and letters.

Hadley, Henry Kimball, American composer, was born at Somerville, Mass., 1871. He studied music with G. W. Chadwick and S. A. Emery in Boston, and completed his training in Vienna. Returning to America in 1895, he became instructor of music at Saint Paul's school, Garden City, L. I. He was conductor of the San Francisco symphony orchestra, 1911–15, and toured Europe as guest conductor of his own works. His symphony *The Four Seasons* won the Paderewski prize in 1901. The list of his works includes a cantata, *In Musical Praise*; the symphonic poems *Salome*, *Lucifer*, and *The Culprit Fay*; the lyric drama *Merlin and Vivian*; and the operas *Safie*, *Azora*, *Bianca*, and *Cleopatra's Night*. He excels in descriptive music and ranks among the leading American composers. In 1924, he was elected to membership in the American academy of arts and letters.

Hadrian, or Publius Ælius Hadrianus, Roman emperor from 117 to 138, was born in 76 A. D. He was elected by the army successor of Trajan. His reign was one of the happiest periods in Roman history, the only important war which broke out during the reign being a rebellion of the Jews, which lasted for three years. He erected many magnificent works in various parts of his empire, the remains of some of which are still standing. He also founded several cities, including Hadrianopolis, now Adrianople. He was a lover of philosophy, poetry, and the fine arts. The mausoleum, which he built for himself in Rome forms the groundwork of the present castle of Saint Angelo. He died at Baiæ, 138 A. D.

Haeckel (*hĕk'ĕl*), **Ernst Heinrich,** German naturalist and writer, was born at Potsdam, Prussia, 1834. He studied medicine and science at Wurzburg, Berlin, and Vienna. In 1859, he went to Italy, and studied zoology at Naples and Messina, returning in 1861 to Jena, where he was appointed professor of zoology. He was a widely known exponent of monistic philosophy and was long

regarded as the foremost supporter of Darwinism and the theory of evolution in Germany. Among his works are *The History of Creation*, *The Origin of the Human Race*, *Life in the Deep Seas*, *The History of Man's Development*, *Popular Lectures on Evolution*, and *Voyage of H. M. S. Challenger*. He died in 1919.

Hafiz (*hä'fĭz*; *hä-fēz'*), **Mohammed Shamsuddin,** or **Shams-Ud-Din,** was a Persian lyrical poet. He was eminent also as a teacher of theology and mystic philosophy, but it was his poetic genius which gained for him a world-wide fame. The name of Hafiz is a household word throughout Persia, and his songs are recited in every social assembly, so that he who can most frequently garnish his conversation with quotations from Hafiz is held in the highest esteem and admiration. The date of his birth is unknown, but he is said to have died at an advanced age in 1388 A. D.

Haggard, Sir Henry Rider, English novelist, barrister, and social reformer, was born in 1856. He accompanied Sir Henry Bulwer, as secretary, to Natal in 1875, and formally hoisted the British flag over Transvaal territory, 1877. He retired from the colonial service in 1879; returned to England; and became a barrister. His first book, *Cetywayo and His White Neighbors*, appeared in 1882. Subsequently he published *Dawn*; *The Witch's Head*; *King Solomon's Mines*, the work by which he established his reputation; and *She*, a novel of great power. These were followed by *Ayesha*, *Jess*, *Cleopatra*, *Beatrice*, *Eric Brighteyes*, *Red Eve*, *Marie*, *Child of Storm*, *The Wanderer's Necklace*, *The Holy Flower*, *Love Eternal*, *Moon of Israel*, *She and Allan*, *The Virgin of the Sun*, and numerous other works. He wrote also *Rural England* and *A Farmer's Year*, and made studies in socialistic settlements. Died, 1925.

Hahnemann (*hä'nē-män*), **Samuel Christian Friedrich,** German physician, founder of the homeopathic system of medicine, was born at Meissen, Saxony, in 1755. He completed a course in medicine at Erlangen in 1779. While translating Cullen's *Materia Medica* from English into German, 1790, he noticed a similarity between the effects of Peruvian bark, or cinchona, upon a healthy person and the results of certain diseases for the cure of which that drug was used. In other words, he rediscovered, quite independently, Hippocrates' old "law of similars." After many experiments, he became convinced of the truth of the principle *similia similibus curantur*—that is, the cure for a disease is the very drug that would in a healthy individual produce the symptoms of such disease.

Further investigation caused Hahnemann to conclude that the conventional doses of his day were injurious, and this led him to another principle, that of very minute doses, made by a process of "potentization," described by him at length in his *Organon*, 1810, which was translated into many languages. Although opinions differ very widely concerning the accuracy and scientific value of Hahnemann's investigations, it is undeniable that he was a man of great courage and perseverance. He not only sacrificed his financial interests for the sake of his convictions, but he made many painful experiments upon his own person. Died in 1843.

Haidinger (*hī'dĭng-ĕr*), **Wilhelm von,** Austrian mineralogist and physicist, was born at Vienna, 1795. He was educated at Gratz and at Freiberg, and lived for a time at Edinburgh. After returning to Austria, he engaged in porcelain manufacture at Elbogen. In 1840, he was made curator of the imperial mineralogical collections at Vienna, and, about 1845, began his lectures on mineralogy. He was appointed director of the geological institute in 1849 and, in 1865, was knighted.

Haidinger wrote many books on mineralogy and crystallography, and discovered the phenomenon known as "Haidinger's brush," affording a means of detecting plane polarized light. During his sojourn in Edinburgh, he translated Mohs's work on mineralogy, which he enlarged, improved, and published under the title *Treatise on Mineralogy*. He also wrote *Handbuch der bestimmenden Mineralogie* and edited a geological map of Austria. He died in 1871.

Haig, Douglas, Earl, British soldier, was born in 1861, and was educated at Clifton and at Brasenose college, Oxford. He joined the 7th Hussars in 1885, served with distinction at Atbara and Khartum in the Sudan campaign in 1898, and was chief of staff to General French during the Colesberg campaign in South Africa, 1899-1900. He was promoted to inspector general of the cavalry in India in 1903, was made major general in 1904, and general commander of the officers at Aldershot in 1912. In the early stages of the World War, he commanded a division of the British expeditionary forces in France with marked ability. Late in 1915, he succeeded Sir John French in the command of all British armies at the front in France.

Haig continued in command of the British expeditionary forces in France during the great campaigns and battles of the ensuing three years. In 1917, he was made field marshal. The culmination of his generalship came on September 28, 1918, when, in conjunction with a co-ordinated attack by the American, French, and Belgian armies on other parts of the front, the British army broke through the Hindenburg line between Cambrai and Saint Quentin. Thereafter, there was a steady and victorious advance along the whole British front until the day of armistice.

In recognition of his services, he was created Earl Haig of Bemersyde and was given a grant of 100,000 pounds. Died, 1928.

Hakluyt (*hăk'lōōt*), **Richard,** English author, was born about 1553. He was lecturer on geography at Oxford university, and was the first to teach the use of globes. He was afterward professor of divinity, and, in 1584–89, was in Paris, where he published several works. On his return, he joined Raleigh's company of gentlemen adventurers and merchants for colonizing Virginia. His chief work is *The Principal Navigations, Voyages, and Discoveries of the English Nation*, commonly called *Hakluyt's Voyages*. Died, 1616.

Hakon VII (*hō'kŏn*), king of Norway, was born in 1872. He is the second son of King Frederick of Denmark and a nephew of Queen Alexandra of Great Britain. His baptismal name was Karl, but he assumed the above title when he became king, November 18, 1905, on the separation of Norway and Sweden. The king married Princess Maud Alexandra, daughter of King Edward VII, in 1896. His son and heir apparent is Prince Alexander, born, July 2, 1903, and renamed Prince Olaf on his father's accession to the throne.

Haldane (*hôl'dān*), **John Scott,** British physiologist, was born in Edinburgh, 1860. He was educated at the universities of Edinburgh and Jena. Beginning with 1885, he devoted himself to scientific investigation and teaching. He became fellow of New college, Oxford, and honorary professor and director of the mining research laboratory, Birmingham university. Among his writings are *Bluebooks on the Causes of Death in Colliery Explosions*, *Organism and Environment*, *The New Physiology*, *Respiration*, and *Mechanism, Life, and Personality*.

Haldane, Richard Burton, Viscount, British statesman and philosophical writer, was born at Cloanden, Perthshire, Scotland, in 1856. He was educated at the universities of Edinburgh and Gottingen and, in 1879, was called to the bar. From 1885 to 1911, he was continuously elected to Parliament as a Liberal. In 1911, he was created Viscount Haldane of Cloanden. He was secretary of state for war, 1905–12, and lord chancellor, 1912–15. His influence effected a reorganization of the army and important reforms in education. Because of his German affinities, Haldane withdrew from political activity during the World War, devoting himself to philosophical studies and to the promotion of national education. He served as rector of Edinburgh university and as chancellor of the University of Bristol. In 1924, he became lord chancellor in Ramsay MacDonald's Labor cabinet. Among his writings are *Essays in Philosophical Criticism*, *Life of Adam Smith*, *The Pathway to Reality*, *Education and Empire*, *The Reign of Relativity*, and *The Philosophy of Humanism*. Died, 1928.

Hale, Edward Everett, American clergyman and writer, was born in Boston, Mass., 1822. He was graduated at Harvard university in 1839, studied theology, and was ordained to the Unitarian ministry. He was pastor of the church of the Unity, Worcester, Mass., from 1846 to 1856. He then became pastor of the South Congregational (Unitarian) church in Boston, and for a half century was an active and forceful figure in the philanthropic movements of his city and time. In 1901, he became pastor emeritus of this church, and, in 1903, he was appointed chaplain of the United States Senate.

He wrote *My Double and How He Undid Me*, his first widely popular story; *The Man Without a Country*, a classic of patriotic fiction; *Ten Times One is Ten*, his most influential book, which with *In His Name* led to the formation of lend-a-hand clubs, king's daughters, and similar organizations. Among his other stories are *His Level Best*, *The Ingham Papers*, *Ups and Downs*, *Philip Nolan's Friends*, *Fortunes of Rachel*, *Crusoe in New York*, *Christmas Eve and Christmas Day*, *Christmas at Narragansett*, and *Our Christmas in a Palace*.

His general writings include *Sketches in Christian History*, *The Story of Massachusetts*, *Sybaris and Other Homes*, *For Fifty Years*, *A New England Boyhood*, *If Jesus Came to Boston*, *Memories of a Hundred Years*, *Ralph Waldo Emerson*, *New England Ballads*, and *Foundations of the Republic*. In 1908, he was elected member of the American academy of arts and letters. Died, 1909.

Hale, Eugene, American legislator, was born in Turner, Oxford county, Me., 1836. He received an academic education, studied law in Portland, and, in 1857, was admitted to the bar. In 1867, he became a member of the Maine legislature. From 1869 to 1879, he was a member of Congress. He served on the committee on appropriations and from 1877 to 1879 was chairman of the Republican Congressional committee. In 1881, he was elected to the

United States Senate, succeeding Hannibal Hamlin, and was re-elected for four successive terms. During the two years preceding his retirement in 1911, he, with Senator Aldrich, was majority leader of the Senate. Died in 1918.

Hale, George Ellery, American astronomer, was born at Chicago, Ill., 1868. He was graduated at the Massachusetts institute of technology in 1890; studied at Harvard College observatory, 1889-90, and at the University of Berlin, 1893-94. He was director of the Kenwood astrophysical observatory in Chicago from 1890 to 1896. From 1892 to 1905, he was at the University of Chicago, first as associate professor of astrophysics, then as professor, and, from 1895 to 1905, as director of the Yerkes observatory. In 1905, he became director of the Mount Wilson observatory at Pasadena, California. He invented the spectroheliograph, first used in 1892, with which he discovered the solar vortices and magnetic fields of sun spots. By his solar and stellar spectroscopic work, Hale has achieved an international reputation. In 1895, he became editor of the *Astrophysical Journal*. Among his numerous scientific writings are *The Study of Stellar Evolution*, *Ten Years' Work of a Mountain Observatory*, and *The New Heavens*. See *Sun Spots*.

Hale, Sir Matthew, English lawyer and jurist, was born at Alderley, 1609. He graduated at Oxford, studied law at Lincoln's Inn, and was admitted to the bar in 1637. He became a judge of common pleas in 1653, and sat in Parliament until the Restoration in 1660, when he was made lord chief baron of the exchequer. In 1671, he became lord chief justice, and resigned shortly before his death. His *Analysis of the Law* provided Blackstone with an outline for his famous commentaries, and his *History of the Pleas of the Crown* is highly regarded. Died, 1676.

Hale, Nathan, American patriot, was born in Coventry, Conn., 1755. He was graduated at Yale college in 1773, and devoted himself to the cause of the colonies in the contest with Great Britain. After the defeat of the patriot army on Long Island, he endeavored to obtain knowledge of the enemy's plans and position for the information of Washington. He obtained the knowledge, but was arrested by the British before he could return. The papers containing the information being found on his person, he was hanged as a spy, by order of Sir William Howe, 1776. His last words were, "I only regret that I have but one life to lose for my country." Statues to his memory have been erected in Hartford and New York City.

Hale, Sarah Josepha, American writer, author of *Mary's Lamb*, was born at Newport, N. H., 1788. On her husband's death, in 1822, she devoted herself to authorship, and became, in 1828, editor of the *Ladies' Magazine* (afterward *Godey's Lady's Book*). She helped to procure the employment of woman medical missionaries, to complete the Bunker Hill monument, and to secure the observance of Thanksgiving Day in all the states. Her works include poems, novels, and biography. She died in 1879.

Halévy, Ludovic, French novelist and dramatic author, was born at Paris, 1834. He received his education at the Lycée Louis le Grand and entered the service of the government but resigned to devote himself to the drama. He was the librettist of many of Offenbach's operettas. With Henri Meilhac, he produced *La Belle Hélène*, which had a great success; *La Barbe Bleue*; *La Grande Duchesse*; and *Frou Frou*, which was one of the notable theatrical successes of the century. In 1873, appeared the first of his three clever volumes on the *Cardinal Family*. In 1882, he wrote the novel, *L'Abbé Constantin*, which became widely known for its fresh and wholesome charm. While he wrote many trivial and farcical pieces, his serious literary work is characterized by exquisite taste, refinement, and pathos. He was elected to the French academy, 1884. Died, 1908.

Haliburton (*hăl'i-bûr'tŭn*), **Thomas Chandler,** Canadian humorist, was born at Windsor, Nova Scotia, 1796. He was judge of the supreme court of Nova Scotia, but is best known as a satirical writer. In 1837, he published *The Clockmaker, or the Sayings and Doings of Samuel Slick of Slickville*, which became very popular. He is also the author of *The Attaché, or Sam Slick in England*, which was the result of a visit to that country in 1841. In 1856, he went to England to reside permanently, and, in 1859, entered the House of Commons as member for Launceston, which seat he held until within a few months of his death. Besides the works already mentioned, he wrote *The Old Judge*, *The Letter Bag of the Great Western*, *Traits of American Humor*, and several other books. He died in 1865. See *Sam Slick*.

Halifax, Charles Montagu, Earl of, English statesman and financier, was born at Horton, 1661. He was educated at Trinity college, Cambridge. He first attracted attention, in 1685, by a poem in praise of Charles II. His most notable poetical achievement thereafter was *The Town and Country Mouse*, which, in 1687, he wrote with Matthew Prior as a parody on *Dryden's Hind and Panther*. He was a member of Parliament in 1689; a lord of the treasury in 1692; and in that year proposed to raise a million sterling by way of loan. By the placing of this loan, the British national debt was established.

In 1694, money was again wanted, and Montagu supplied it by originating the bank of England. For this service Montagu was appointed chancellor of the exchequer. His next work was the recoinage in 1695. In 1697, he became premier, but his arrogance and vanity soon made him unpopular. He was impeached in 1701, but was protected by the lords and the proceedings against him fell to the ground. Died, 1715.

Hall, Asaph, American astronomer, was born in Goshen, Conn., 1829. He began life as a carpenter. In 1854-55, he attended Central college, McGrawville, N. Y., for a year and a half, acquiring some knowledge of mathematics. He then studied for a term under Brunnow at the University of Michigan, where he became interested in astronomy. In 1857, he was made assistant to Professor Bond at Harvard observatory. He continued private study of mathematics and German. In 1862, he became an assistant and, in 1863, was made professor of mathematics in the United States naval observatory at Washington, continuing in this office until 1891.

Hall accompanied an eclipse expedition to Bering strait in 1869, to Sicily in 1870, and to Colorado in 1878. He went to Vladivostok in 1874 to observe the transit of Venus. In 1877, he made his notable discovery of the two satellites of Mars, in recognition of which he received a gold medal from the royal astronomical society and the Lalande prize from the Paris academy. From 1895 to 1901, he was professor of astronomy at Harvard. He died in 1907.

Hall, Charles Cuthbert, American theologian, was born in New York City, 1852. He was graduated at Williams college, 1872, and studied theology at Union theological seminary and also in London and Edinburgh. He entered the Presbyterian ministry and was pastor at Newburgh, N. Y., 1875–77, and at Brooklyn, 1877–97. As president of Union theological seminary from 1897 until his death, he did much to encourage higher criticism and to induce a more liberal and broadminded attitude on the part of the clergy. His writings include *Christian Belief Interpreted by Christian Experience*, *Universal Elements of the Christian Religion*, *Christ and the Human Race*, *The Witness of Oriental Consciousness to Jesus Christ*, and *Christ and the Eastern Soul*. Died, 1908.

Hall, Charles Martin, American inventor, was born at Thompson, Ohio, 1863. He was graduated from Oberlin college in 1885. In February 1886, he invented an electrolytic process for obtaining aluminum, and, in 1888, a company was organized for the commercial manufacture of the metal, later utilizing extensive water power at Niagara falls. The priority of his invention and the validity of his patents were upheld by the courts so that until 1912 his company controlled the production of the metal in the United States. By his process, aluminum, formerly as expensive as silver, became a common article of commerce, extensively employed in the arts, and largely used for cooking utensils. He was awarded the Perkin medal for chemistry in 1911. Died, 1914. See *Aluminum*, page 968.

Hall, Frederic Aldin, American educator, was born at Brunswick, Maine, in 1854. He was graduated at Drury college in 1878, and later studied at the University of Gottingen, Germany. After serving as principal of Drury academy, 1878–91, he was professor of Greek in Drury college, 1892–1901. He was professor of Greek in Washington university, Saint Louis, from 1901 to 1917, when he was made chancellor of the university. His writings include *Homeric Studies for Young Readers*, *Outline of the Odyssey*, *Outline of the Orestrian Trilogy*, and *Iphigenia in Literature*. Died, 1925.

Hall, Granville Stanley, American educator and psychologist, was born in Ashfield, Mass., in 1846. He was graduated at Williams college in 1867 and received the degree of doctor of philosophy at Harvard university in 1878. From 1872 to 1876, he was professor of psychology at Antioch college. He then pursued further studies in Berlin, Bonn, Heidelberg, and Leipzig. He was professor of psychology in Johns Hopkins university from 1881 to 1888, when he was elected president and made professor of psychology in Clark university. For 32 years he filled this chair and office with marked distinction, resigning in 1920.

As a champion of the culture-epoch theory of mental development, he won wide attention, and, by his important work on *Adolescence*, rose to an authoritative place among American educators. His writings include also *Aspects of German Culture*; *Youth—Its Education, Regimen, and Hygiene*; *Educational Problems*; *Founders of Modern Psychology*; *Jesus the Christ in the Light of Psychology*; *Recreations of a Psychologist*; and *Morale: The Supreme Standard of Life and Conduct*. He founded and, in 1887–1921, was editor of *The American Journal of Psychology*. His later works include *Senescence* and *Life and Confessions of a Psychologist*. Died, 1924. See page 1634.

Hall, James Norman, American writer, was born at Colfax, Iowa, in 1887. He was graduated from Grinnell college in 1910, entered journalism, and rose to prominence as a writer during the early period of the World War. His earlier writings include *Kitchener's Mob*, published in 1916, and *High Adventure*, which appeared in 1918. After an extended journey in the Australasian region, he wrote, jointly with C. Nordhoff, an interesting book of travel entitled *Faery Lands of the South Seas*, which was published in 1921.

Hallam, Henry, English historian and critic, was born at Windsor, 1777. He was graduated at Christ Church, Oxford, 1799, and subsequently was called to the bar. His first writings were published in periodicals, especially the *Edinburgh Review*. He became distinguished for the extensive learning, powers of generalization, taste, judgment, and conscientiousness exhibited in a succession of notable works, the chief of which are *Europe during the Middle Ages*, *The Constitutional History of England*, and *Introduction to the Literature of Europe*. During the greater portion of his life he lived in London, devoting himself to linguistic and historical studies. Died, 1859. His son, Arthur Henry, was the "A. H. H." of Tennyson's *In Memoriam*.

Halleck, Fitz-Greene, American poet, was born in Guilford, Conn., 1790. He began life as a clerk in a store in Guilford, but when 21 years old he was employed in a banking house in New York, where he remained for 20 years. Later, for a long period, he was the confidential agent of John Jacob Astor, who left him in his will an annuity for the rest of his life and named him one of the original trustees of the Astor library. Halleck then retired from active life and passed the rest of his days at Guilford. His earliest poem, *Twilight*, was printed in 1818. In 1827, a volume of his poetry appeared. This included *Marco Bozzaris*, a spirited lyric, by which he will probably be longest remembered. He died in Guilford, 1867. A bronze statue to his memory has been erected in Central park, New York.

Haller (*häl'ĕr*), **Albrecht von,** Swiss anatomist, botanist, physiologist, and poet, was born at Bern, 1708. He began practice in 1729, but, in 1736, was called to a chair at Gottingen. Here he organized a botanical garden, an anatomical museum and theater, and an obstetrical school. He also assisted in founding the academy of sciences, and took an active part in the literary movement. In 1753, he resigned his professorship and returned to Bern. After this he wrote his valuable *Elements of Human Physiology* and prepared four large works on the bibliography connected with botany, anatomy, surgery, and medicine. His poems are descriptive, didactic, and lyrical. Died, 1777.

Halley, Edmund, English astronomer, was born at London in 1656. He studied at Oxford and, in 1676, went to Saint Helena to study the southern heavens. In 1679, he published his *Catalogus Stellarum Australium*. In 1680, he discovered the comet known by his name. His prediction of its return was the first of the kind that proved correct. In 1683, he published his *Theory of the Variation of the Magnetic Compass*, and from an examination of Kepler's laws of the planetary motions inferred that the centripetal force always varies inversely as the square of the distance.

Halley prevailed on Sir Isaac Newton to complete his *Principia*, the first volume of which was printed by Halley at his own expense. In 1703, he was chosen Savilian professor of geometry at Oxford. In 1720, he was appointed astronomer royal and for 20 years carried on the operations of the Greenwich observatory. He made many astronomical discoveries including the proper motions of the fixed stars and the acceleration of the moon's mean motion. Died, 1742. See *Comet*.

Hals (*häls*), **Frans,** the elder, Dutch portrait and genre painter, was born, probably at Antwerp, between 1580 and 1584. He settled in Haarlem about 1604. Hals is regarded as the founder of the Dutch school of genre painting. His subjects of feasting and carousal are treated with marvelous vivacity and spirit. He is the first great painter of the Dutch national school, equaling Rembrandt in technical skill though inferior in imagination. His works are distributed among the chief galleries of the continent, England, and America. Excellent examples may be seen in the Metropolitan museum, New York, in the art institute, Chicago, and in the museum of fine arts, Boston. He died, 1666. See *Painting*.

Hamilcar Barca (*hă-mĭl'kär bär'kă*), Carthaginian general, was born shortly before the first Punic war. While very young he was appointed to the command of the Carthaginian forces in Sicily in 247 B. C., at which time the Romans had possession of almost all the land. His first care was to discipline his infantry thoroughly; he then established himself on Mount Ercte (now Pellegrino, near Palermo), and from this point made pillaging excursions in all directions. From this position the Romans endeavored to dislodge him, but in vain. After three years, he left Ercte and established himself on Mount Eryx, keeping up his communication with Drepanum and the sea. Here the same tactics were repeated on both sides and with the same want of success on the part of the Romans.

But, in 241 B. C., the Carthaginian admiral having been totally defeated off the Ægates islands, Hamilcar was compelled to abandon his fortress and evacuate Sicily. He was next appointed commander in chief of the Carthaginian army, and was engaged for some time in wars with the neighboring tribes. These local wars were abruptly ended by his entrance upon the Spanish campaign in (probably) 236. He spent nine years endeavoring to found a new empire in Spain, and finally, in 228, while fighting against the Vettones, met his death on the field of battle. His military genius is considered scarcely inferior to that of his son Hannibal.

Hamilton, Alexander, American statesman, was born in the West India island of Nevis, 1757, son of a Scotch father and a French mother of Huguenot descent. His father failed in business and his mother died in 1768. In consequence, Alexander at the age of 12 entered the employ of an American merchant. His extraordinary abilities, however, induced some of his friends to procure for him a better education than could be secured at home. He was accordingly sent to a grammar school at Elizabethtown, N. J., and shortly afterward entered Columbia college, New York.

On the first appearance of disagreement between Great Britain and her colonies, Hamilton, still a schoolboy and barely 18, wrote a series of papers in defense of the rights of the latter. These articles were at first taken for the production of the statesman Jay, and secured for the writer the notice and consideration of the popular leaders. On the outbreak of the war, Hamilton obtained a commission as captain of artillery, gained the confidence of Washington, was made his aid-de-camp in 1777, and acquired great influence with him as his friend and adviser. On the termination of the war, he left the service with the rank of colonel, and, betaking himself to legal studies, soon became one of the most eminent lawyers in New York.

In 1782, Hamilton was elected by the state of New York a representative to the Continental Congress. In 1786, he became a member of the New York legislature, and, in 1787, he was appointed one of the delegates to the convention which met at Philadelphia for the purpose of revising the Articles of Confederation. In conjunction with Madison, he had the most important share in drawing up the Constitution afterward adopted. He was a strong supporter of the Federal as opposed to the Democratic party, and, along with Jay and Madison, defended the Constitution against all attacks by a series of letters in the New York *Daily Advertiser*. These letters were afterward collected and published under the title of *The Federalist*. It is due more to Hamilton than to any other one man that the Constitution was adopted in its present form and that the United States received a strong central organization.

On the establishment of the new government in 1789, with Washington as president, Hamilton was appointed secretary of the treasury. The disorder of the public credit and the lack of official accounts of the state treasury rendered this office one of peculiar difficulty. In order to re-establish public credit, he carried, in spite of much opposition, a measure for the funding of the domestic debt, founded a national bank, rearranged the system of duties, and altogether showed himself one of the greatest of American financiers. In 1795, he resigned his office and resumed the practice of law in New York.

When the conflict with France arose in 1798, Hamilton was made major general of the United States army; and, on the death of Washington, he succeeded to the chief command. When peace was restored, he returned to his civil duties, but became involved in a political quarrel with Aaron Burr. This finally culminated in a duel, in which Hamilton was fatally wounded. He died July 12, 1804; was elected to the American hall of fame, 1905.

Hamilton, Allan McLane, American physician, grandson of Alexander Hamilton, was born in Brooklyn, N. Y., 1848. He was graduated at the college of physicians and surgeons, New York, in 1870, became a health inspector in 1873, and later was physician in charge of the New York State hospital for diseases of the nervous system. He attained high rank as a specialist in nervous diseases. His writings include *Clinical Electro-Therapeutics*, *Nervous Diseases*, *Medical Jurisprudence*, *A System of Legal Medicine*, *Railway and Other Accidents*, *The Intimate Life of Alexander Hamilton*, *Recollections of an Alienist*, and many articles in medical journals. He died in 1919.

Hamilton, John William, American preacher and educator, was born at Weston, Va., in 1845. He was graduated at Mount Union college, Ohio, in 1865 and at the theological school, Boston university, in 1871. He was licensed to preach in the Methodist Episcopal Church in 1865. He was pastor at Newport, Ohio, 1866–68; at Maplewood, Mass., 1868–70; at Somerville, Mass., 1870–72; and at First M. E. church, Boston, 1872–75. In 1875, he founded the People's church, Boston, of which he was

pastor until 1884. He again served as pastor at Somerville, Mass., 1884–88. From 1888 to 1892, he preached in the church in East Boston. In 1892, he organized a mission in Alaska and, in 1896, a mission in Hawaii. He was corresponding secretary of the Freedmen's Aid and Southern educational society from 1892 to 1900, when he was elected bishop. In 1916–22, he was chancellor of the American university at Washington. From 1902 to 1906, he edited the *Christian Educator*. His writings include *Lives of the Methodist Bishops*, *People's Church Pulpit*, *American Fraternal Greetings*, *Gordon Battelle*, and *The Three Nations at the American University*.

Hamilton, Sir William, Scottish metaphysician, was born at Glasgow, 1788. He studied at Glasgow and at Oxford; was admitted to the bar, but rarely practiced. In 1821, he became professor of history at Edinburgh, and was professor of logic and metaphysics there, 1836–56. After 1836, when he accepted the latter professorship, he was widely known as a philosophical writer. His chief books were *Discussions in Philosophy, Literature and Education*, *Metaphysics*, *Logic*, and *Lectures*. He left his library to the University of Glasgow. Died, 1856.

Hamilton, Sir William Rowan, British mathematician, inventor of quaternions, was born in Dublin, 1805. He was educated at Trinity college, Dublin, and, at 19, undertook original investigation in conical refractions. In 1827, he was appointed professor of astronomy at Dublin and Irish astronomer royal. His earlier essays connected with caustics and contact of curves grew into the *Theory of Systems of Rays*. He wrote many important treatises and papers, including his *Lectures on Quaternions* and *Elements of Quaternions*. He died in 1865.

Hamlin, Hannibal, American statesman, was born in Paris, Me., 1809. He studied law, was admitted to the bar, and, in 1833, began practice at Hampden, Me. In 1835, he was elected member of the state legislature, and entered upon an active political career of nearly 50 years. In 1842, he was elected to Congress; was United States senator from 1848 to 1856, when he was elected governor on the Republican ticket, but resigned immediately on again being elected senator. In 1861, he became vice president under Lincoln, serving until 1865. He was again senator from 1869 to 1881, and, from 1881 to 1883, he was minister to Spain. He was chiefly instrumental in passing the Wilmot Proviso through the House of Representatives. During the Civil War, he was a valued adviser of President Lincoln, whose views he shared and whose policy he staunchly supported. Died, 1891.

Hammer, William Joseph, American consulting engineer, was born in Schuylkill county, Pa., 1858. He was educated in public schools of Newark, N. J., and studied in various European universities and technological schools. In 1879, he became an assistant to Thomas A. Edison in the laboratory at Menlo Park, N. J. In 1881, he was sent to England to become chief engineer of the English Edison Company. He installed in London the first central station in the world for incandescent electric lighting. He had charge of Edison's exhibits at the Paris exposition of 1889. In 1890, he began practice as a consulting engineer. Besides various papers on electrical engineering, his writings include *Radium and Other Radioactive Substances*.

Hammerstein (*hăm'ẽr-stīn*), **Oscar,** American impresario, was born in Berlin, Germany, 1847. At the age of 16 he came to America and, after a varied experience as inventor and playwright, he became, in 1870, manager of the Stadt theater in New York. Prospering in this undertaking, he built, in 1888, the Harlem opera house, his first theater. He established several other successful playhouses, among them the New York theater, the Belasco, and the Victoria.

In 1906, Hammerstein opened the Manhattan opera house with artists of the first rank as a rival of the well established Metropolitan opera house. This greatly stimulated operatic interest and production in America, and to Hammerstein is due the credit of establishing French opera in the United States. He built the Philadelphia opera house in 1908, and, in 1911, opened the London opera house, which he was compelled to abandon on account of lack of interest in French opera in England. In 1912, he built the American opera house in New York, which he opened in 1914 as the Lexington theater. He became involved in unfortunate litigation and in his last years was beset with financial difficulties. Died in 1919.

Hammond, James Bartlett, American inventor, was born in Boston, 1839. He was graduated at the University of Vermont in 1861; was newspaper correspondent during the Civil War; and was graduated at Union theological seminary in 1865. Later, he studied philosophy and science at the University of Halle, Germany, and devoted many years to mechanical experiments. In 1880, he patented a typewriting machine constructed on new scientific principles. In the Hammond typewriter, he introduced the "ideal" keyboard and a device for securing accurate alignment. He placed his machine on the market, 1884, and realized a substantial fortune from its sale. Died, 1913.

Hammond, John Hays, American mining engineer, was born in San Francisco, 1855. He was graduated at the Sheffield scientific school, Yale, in 1876 and later pursued a mining course at the royal school of mines, Freiberg, Saxony. In 1880, he was appointed special expert of United States geological survey, examining California gold fields. Later, he became consulting engineer of the Union Iron Works, San Francisco, and of the Central and the Southern Pacific railway. He examined mining properties in all parts of the world. In 1893, he became consulting engineer for Barnato Bros. in South Africa, and later for Cecil Rhodes, of whom he became a strong supporter.

Hammond was made consulting engineer of the consolidated gold fields of South Africa, of the British South Africa Company, and of the Randfontein Estates Gold Mining Company. He was one of the leaders in the reform movement in the Transvaal, 1895-96. After the Jameson raid, he was arrested and sentenced to death. Sentence was afterward commuted to 15 years' imprisonment and later he was released by the Boer leaders on payment of a fine of $125,000. He then went to London and became interested in many large mining companies. In 1900, he returned to the United States and became associated with important financial groups, purchasing and promoting extensive mining properties in the United States and Mexico. He has also been active in the development of hydroelectric enterprises and irrigation projects.

Hammurabi (*hăm'ōō-rä'bē*), king of Babylonia, flourished about 2150 B. C., the sixth of the so-called first dynasty, and seems to have extended his suzerainty over Assyria, whose great cities of Assur and Nineveh he mentions as part of his domain. He became famous as an organizer of his empire, and, in his inscriptions, he makes record of building canals, of granaries for wheat, and of many other constructive undertakings in Babylon and other cities of his domain. In order to establish justice and promote prosperity, he made an extensive classification of the laws embodied in the famous "code of Hammurabi." These laws and many records revealing the social life of Babylonia at that remote period have been extensively preserved. Hammurabi was one of the greatest and best of the Babylonian kings.

Hampden (*hăm'dĕn*), **John,** English patriot, was born in London in 1594. He was graduated at Oxford, studied law, and, in 1621, entered the House of Commons. In 1627, for refusing to pay his proportion of the general loan which the king attempted to raise on his own authority, Hampden was committed to close imprisonment. Subsequently, he was unconditionally liberated by order of council. After the dissolution of the Parliament of 1628-29, he retired to his country estate.

In the Short Parliament of 1640, Hampden took a prominent part in the great contest between the crown and the House of Commons. For his resistance to the king's proceedings, he was one of the five members whom Charles, in 1642, rashly attempted in person to seize in the House of Commons. On the outbreak of the Civil war he raised and became colonel of a regiment in the Parliamentary army under the earl of Essex. Prince Rupert having attacked a Parliamentary force at Chinnor, near Thame, Hampden put himself at the head of a small troop of cavalry that was rallied in haste to oppose him. In the fight that ensued at Chalgrove Field, Hampden received a wound, of which he died, 1643.

Hampden, Walter, known in private life as Walter Hampden Dougherty, American actor, was born at Brooklyn, New York, in 1879. He was educated at Harvard university and the polytechnic institute, Brooklyn. His first appearance on the stage was in 1901 at London, where, in the following six years, he acted many classic rôles, including that of Hamlet. He appeared with Nazimova at New York in 1907 in the *Comtesse Coquette*. Other plays in which he took part in America are *A Doll's House*, *The Servant in the House*, and *Salome*.

Hampson, William, English inventor, was educated at Manchester, Liverpool college, and Oxford. Early in 1895 he invented, practically at the same time with Linde in Germany and Tripler in the United States, a machine for the self-intensive refrigeration of gases, by which air was first liquefied cheaply, thereby rendering it commercially available for numerous purposes in the arts. Hydrogen and helium were subsequently liquefied by his machine, which is now widely used by physicists. He invented also a radiometer for measuring doses of X-rays for physicians' use and an apparatus for making surgical pencils of carbonic acid snow. His writings include *Radium Explained*, *Paradoxes of Nature and Science*, *Modern Thraldom—a New Social Gospel*, and numerous contributions to scientific journals. Died, 1926.

Hampton (*hăm'tŭn*), **Wade,** American politician and soldier, was born at Columbia, S. C., 1818. He was a grandson of General Wade Hampton, and, though opposed to secession, he joined the Confederate army and raised a force called "Hampton's legion." These troops he led with distinction at the first battle of Bull Run. He subsequently served at Seven Pines, at Antietam, and at Gettysburg. In 1865, he commanded a body of cavalry. He attained the rank of lieutenant general, and was four times wounded. In 1877–79, he was governor of South Carolina; from 1879 to 1891, he was United States senator; and, from 1893 to 1897, he was commissioner of railroads. Died, 1902.

Hamsun (*hăm'sŏŏn*), **Knut,** Norwegian writer, was born at Loni, Norway, in 1860. Receiving practically no school education, he engaged in farming, was a clerk in a store and post office, and became a teacher of small children. In early life, he spent several years in the United States, and, for a time, he was a street car conductor in Chicago. His experiences in various difficult and unhealthful occupations led him to return to Norway in 1888 with very unfavorable impressions of America. In consequence, his early work on *American Spiritual Life* and his novel entitled *Hunger* contain severe criticisms of American institutions and manners. His works of fiction include also *Mysterier, Redaktör Lynge, Pan, Siesta, Victoria, Munken Vendt,* and two novels which have been translated into English under the titles *Shallow Soil* and *Growth of the Soil.* He settled at Grimstad, Norway, and devoted himself to writing and to farming. Besides fiction, his works include plays and a book of travel in the Caucasus. In 1920, he was awarded the Nobel prize for literature.

Hancock, John, American patriot, was born at Braintree, now a part of the city of Quincy, Mass., in 1737. He was one of the leaders in the revolt in Massachusetts; was very active in denouncing the "Boston massacre"; and was one of the persons whose seizure was attempted by the expedition which led to the battle of Lexington. He was president of the Continental Congress, 1775–77; was governor of Massachusetts, 1780–85 and 1787–93; and was the first signer of the Declaration of Independence. He presided at the state constitutional convention of 1788, and favored the adoption of the proposed Federal Constitution. Died, 1793.

Hancock, Winfield Scott, American general, was born at Montgomery Square, Pa., 1824. After graduating at West Point in 1844, he served with great gallantry during the Mexican war. Appointed brigadier general of volunteers in 1861, he took part in the campaign on the Potomac, fought at Antietam, and commanded a corps in the battle of Gettysburg, where he was wounded, 1863. In 1864, he became brigadier general in the regular army, and, in 1866, major general. In 1880, he was the unsuccessful Democratic nominee for president. At his death, in 1886, he was in command of the department of the East.

Handel (*hăn'dĕl*), **George Frederick,** German composer and chief founder of oratorio, was born at Halle, Prussian Saxony, February 23, 1685, though for almost half a century he resided in England, his adopted country.

In his eighth year, he played for the duke of Saxe Weissenfels, who was so impressed with his genius that he persuaded Handel's father to renounce his plan of training him for the law and to place him under the instruction of the organist Zachau. Handel now composed cantatas, learned all the orchestral instruments, and familiarized himself with the works of the most celebrated German composers. His education was furthered at the University of Halle, which he entered in 1702. He subsequently took a place in the orchestra of the Hamburg opera house. Here he composed several operas and various works for the church and gave lessons to many pupils.

In 1707–08, Handel visited Italy. During the first year, he produced his *Rodrigo* at Florence, and his journey was continued with triumphal progress. On his return to Germany in 1709, Handel became chapelmaster at the court of the elector of Hanover.

In 1710, he visited London, where he performed his *Rinaldo* and was charmed with his reception by Queen Anne and the nobility. Compelled by his engagement to return to Hanover, he quitted England only to return in 1712. When, in 1714, his patron, the elector of Hanover, ascended the throne as George I of England, Handel again secured his favor by the composition of a symphony and several instrumental pieces and determined to remain in England. He was appointed musical director to the duke of Chandos, for whom he composed the celebrated *Chandos Anthems* and his first English oratorio, *Esther.*

He next attempted to place Italian opera upon a firm foundation in London, and, through the royal academy of music, he successfully produced many Italian operas of his own composition. From 1728 to 1734, Handel produced several operas in partnership with Heidegger of the Haymarket theater. During the following three years, he produced independently at Covent Garden, but in the end he was forced by heavy financial losses to abandon this project.

With shattered health and bankruptcy before him, Handel applied himself to sacred music and his famous oratorios—the works by which he achieved his lasting reputation. *Deborah* was composed in 1733, *Israel in Egypt* in 1738, and his superb masterpiece, the *Messiah,* at Dublin in 1742. Handel became blind in 1751, yet he continued to give concerts of sacred music and to compose.

Handel's art was universal, but he was also greatly influenced by the national spirit of his adopted land. He was in a singular degree the musical expression of the English, who at that time were saturated with biblical ideas and accustomed to public demonstrations of national and patriotic enthusiasm. His music is characterized by grandeur and sublimity. The operas are now seldom performed, but his oratorios hold a place in music similar to that of Shakspere's plays in English drama. Handel died on April 13, 1759, and was buried in Westminster Abbey.

Hanna, Marcus Alonzo, American merchant and politician, was born in New Lisbon (now Lisbon), Ohio, 1837. He was educated in the Cleveland public schools and at Western Reserve university, leaving college, however, before graduation. He began his career in his father's wholesale grocery house. In 1867, he entered the firm of Rhodes and Company, dealers in coal and iron, and, 10 years later, the firm name was changed to M. A. Hanna and Company. He subsequently engaged in lake transportation, banking, mining, and railroading. In 1897, Hanna was appointed to the United States Senate as a Republican by Governor Bushnell, to fill a vacancy caused by the resignation of John Sherman, and, in 1898, he was elected for a full term, serving until his death. He proved a remarkable political organizer, was a man of excellent judgment, and for many years exercised an extraordinary influence in the Republican party. Died in 1904. See *Standpat Policy.*

Hannay, James Owen ("George A. Birmingham"), Irish novelist, the son of a Belfast clergyman, was born in the north of Ireland, 1865. He received his education at Haileybury, England, and at Trinity college, Dublin. He took orders and was made rector at Westport in 1892, and, in 1912, was made canon of Saint Patrick's cathedral, Dublin. In 1922, he was made British chaplain at Budapest; two years later he became rector of Mells, England.

In his novels *The Seething Pot, Hyacinth, The Red Hand of Ulster* and *Northern Iron,* Hannay made serious studies of contemporary life in Ireland. *The Lighter Side of Irish Life, The Major's Niece,* and *Spanish Gold* contain more or less fantastic stories and comic sketches. In his earlier novels he introduced, as easily recognizable characters, numerous Irishmen prominent in literature and politics. His later works include *Adventures of Dr. Whitty, Irishmen All, Eleanor's Enterprise, From Dublin to Chicago, Minnie's Bishop and Other Stories, Gossamer, The Island of Mystery, Up the Rebels,* and *The Lady of the Abbey.*

Hannibal, Carthaginian general, the son of Hamilcar Barca, was born about 247 B. C. He remained with his father when the latter was building up in Spain a strong Carthaginian colony to dispute with Rome the mastery of the peninsula. When the boy was nine years old, he took an oath at his father's instance, swearing eternal enmity to Rome. After his father's death, he was employed by his brother-in-law Hasdrubal in military undertakings, and, when Hasdrubal was assassinated in 221, Hannibal was made commander in chief.

Hannibal began his activities against Rome by attacking one of that city's allies, Saguntum. After an eight months' siege, the city was taken, and the Romans declared war against the Carthaginians in 218. Hannibal took the initiative by setting out to invade Italy immediately with 90,000 foot and 12,000 horse. His passage of the Alps with unprecedented rapidity and in spite of hostile tribes was costly, but it stands as one of the most celebrated exploits in military history.

In Italy, Hannibal forced into his service the Celtic tribes in the north and hastened to meet the Roman forces sent against him. He defeated successively three Roman armies at the river Ticenus, the river Trebia, and Lake Trasimenus. In 216, he virtually annihilated a Roman army of 90,000 men at Cannæ. One Roman consul was slain, and the city itself remained without effective protection. The victor hesitated, however, to march against the city, waiting to receive the capitulation of various Latin towns throughout Italy. The delay enabled Rome to organize a defense, and most of the Italian towns remained loyal. This miscalculation and the subsequent defeat of re-enforcements under his brother Hasdrubal, at Metaurus river in 207, heralded the failure of Hannibal's enterprise. After maintaining himself in Italy for upward of 15 years, he was recalled to Carthage, whither the Roman general Scipio had led an army of invasion. In the battle of Zama, 202, Hannibal met Scipio and was defeated.

Although his power was broken, he undertook to renew it in order finally to crush Rome. But upon the defeat of Antiochus, whom he had joined at Ephesus, the surrender of Hannibal to the Romans was stipulated as a condition

of peace. Foreseeing such a result, he fled to Bithynia, and, seeing no hope of escape, he committed suicide by taking poison about 183 B. C.

Hapgood, Norman, American editor, author, and critic, was born in Chicago, Ill., 1868. He was graduated at Harvard in 1890. He was dramatic critic of the New York *Commercial Advertiser* and of the *Bookman*, 1897–1902. From 1903 to 1912, he was editor of *Collier's Weekly*, and, from 1913 to 1916, he was editor of *Harper's Weekly*, attracting wide attention by the force and versatility of his editorials. He edited *Hearst's International* in 1923-25. His writings include *Literary Statesmen, Daniel Webster, George Washington, Abraham Lincoln, The Stage in America, Industry and Progress*, and *The Advancing Hour*.

Hard, William, American writer, was born at Painted Post, N. Y., in 1878. He was educated at University college, London, and at Northwestern university, Illinois. He was head of the Northwestern University settlement in 1901-02, and, later, was an editorial writer for the Chicago *Tribune* and a contributing editor for the *Metropolitan Magazine*, the *New Republic*, and other periodicals. He established the William Hard service, reporting Washington news for various evening papers. He is the author of *The Women of Tomorrow* and coauthor with Raymond Robins of *The Story of Bolshevist Russia*.

Harden, Maximilian, was the adopted name of Isador Witkowski, German journalist, born of Jewish parentage in Berlin, 1861. At the age of 16, he adopted the Christian faith. After receiving a high school education, he began writing essays and critical articles on dramatic and other literary subjects for the *Frankfurter Zeitung*, the *Gegenwart*, and the *Nation*. His article over the signature of Apostata on political and social topics brought him prominently into public notice. In 1892, he founded *Zukunft*, a notably successful weekly, which continued publication until 1923, when Harden was wounded by a would-be assassin. His frank expressions of opinion and keen satire frequently aroused the hostility of the imperial government and its supporters. In association with Otto Brahm, he established a free theater in Berlin in 1899. In 1900, he was sentenced to six months' imprisonment on the charge of *lèse majesté*.

During the World War, Harden continued to criticise the German government, his attacks being written from the standpoint of a liberal democrat or reformer rather than of a revolutionist. His writings include *Apostata, War in Peace*, and *From Versailles to Versailles*. Died, 1927.

Hardenberg (*härʹdĕn-bĕrK*), **Karl August von, Prince,** Prussian statesman, was born at Essenrode in Hanover, 1750. On Bayreuth's union to Prussia in 1791, he became a Prussian minister and, in 1804, first Prussian minister. His policy was to preserve neutrality in the war between France and England; but, in 1806, under Napoleon's influence, he was dismissed. In 1810, he was appointed chancellor, and addressed himself to the task of completing the reforms begun by Stein. In the war of liberation he played a prominent part, and after the Treaty of Paris, in 1814, was made a prince. He took part in the Congress of Vienna and in the treaties of Paris. To Hardenberg Prussia is mainly indebted for the improvements in her army system, the abolition of serfdom and the privileges of the nobles, the encouragement of municipalities, and the reform of education. Died, 1822.

Hardie (*härʹdĭ*), **James Keir,** British labor leader, was born in Scotland, 1856. He was a worker in the coal mines from the age of 7 to 24; became secretary of a miners' union; edited the Cumnock *News*, 1882–86, and the *Labor Leader*, 1887–1903. He was elected to Parliament in 1892; founded the Socialist Independent Labor party in 1893; and, in 1896, became the leader of the Labor party in the House of Commons. He traveled and lectured in India, Australia, Canada, and the United States. His writings include *Labor Politics, From Serfdom to Socialism, India: Impressions and Suggestions*, and *After Twenty Years*. He died in 1915.

Harding, Warren Gamaliel, 29th president of the United States, was born at Corsica (then Blooming Prairie), Morrow county, Ohio, in 1865. He attended Ohio Central college at Iberia, 1879–82. He taught a country school for a year and read law for a short time. In 1884, he entered the newspaper business at Marion, Ohio, and later became editor and publisher of the Marion *Star*.

Encouraged to enter political life by Senator Foraker, Harding was elected to the Ohio senate, 1900–04; was lieutenant governor of Ohio, 1904–06; and was Republican candidate for governor in 1910. In 1914, he was elected United States senator for the term 1915–21.

During his term in the Senate, Harding urged preparedness for national defense. He gave his support to the declaration of war against Germany and to all the important war measures, including the Selective Draft bill and the Espionage bill. He favored the prohibition amendment and voted for the Volstead act enforcing war time prohibition, over President Wilson's veto. He stood for the exemption of American shipping from Panama Canal tolls and supported woman suffrage. He was opposed to the Covenant of the League of Nations, favored the Lodge reservations to it, and voted against the ratification of the peace treaty as submitted by President Wilson.

In 1920, at the Republican national convention held in Chicago, he was nominated for president. Strongly opposing the unconditional ratification of the Versailles peace treaty, he won overwhelming endorsement at the polls. Out of a total vote of about 27 million, he received over 16 million, giving him about 7 million more votes than J. M. Cox, his Democratic opponent. The electoral vote was 404 to 127 in Harding's favor.

In his first message to Congress, President Harding urged a "return to normalcy," advocating retrenchment in national expenditures, reduction of war-time taxation, the enactment of an emergency tariff, and the adoption of a national budget system. Upon President Harding's invitation, authorized by Congress, delegates from the leading nations met at an Arms Conference in Washington, November 1921, to consider the immediate reduction of naval armaments and the status of international relations in the Pacific.

Among important legislative and executive enactments supported and approved by President Harding were the declaration of peace between the United States and Germany, the Fordney-McCumber tariff, the restriction of post-war immigration, the restoration of the railways to private control, the refunding of the British war loans, and the withdrawal of the remaining American forces from Germany.

In 1923, President Harding made an extensive tour of the western United States, in connection with which he also visited Alaska, with the view of furthering the development of the territory. While returning from this journey, he became ill and died suddenly at San Francisco, August 2, 1923. See *Washington Conference.*"

Hardy, Arthur Sherburne, American diplomat and author, was born at Boston, Mass., 1847. He was graduated at West Point in 1869, served one year in the United States artillery, and was professor of civil engineering, Iowa college, 1871–73. He studied at Ecole des Ponts et Chaussées, 1873-74. From 1874 to 1878, he was professor of civil engineering and, from 1878 to 1893, was professor of mathematics, Dartmouth college. After serving as editor of the *Cosmopolitan Magazine*, 1893–95, he was United States minister to Persia, 1897–99, to Greece, Rumania, and Serbia, 1899–1901, to Switzerland, 1901-02, and to Spain, 1902–06.

His mathematical works include *Elements of Quaternions, Elements of Calculus, Elements of Analytic Geometry, New Methods in Topographical Surveying*, and *Imaginary Quantities*. He is better known, however, for his novels, among which are *But Yet a Woman, Diane and Her Friends*, and *No. 13, Rue du Bon Diable*. He wrote also the poetical works *Songs of Two* and *Francesca of Rimini*.

Hardy, Thomas, English realistic novelist, was born in Dorsetshire, 1840. He was educated as an architect, but, in 1868, gave up his profession to devote himself to literature, and won a high place among modern writers of fiction. He achieved his first success in *Far from the Madding Crowd*, published anonymously in 1874 and generally attributed to George Eliot. *The Return of the Native* and *The Woodlanders* are usually considered his masterpieces, but his later novels, *Tess of the D'Urbervilles* and *Jude the Obscure*, more accurately reflect his style and spirit. He combined the technique of the Victorians with a frank objectivity which was more characteristic of his younger contemporaries.

Hardy's numerous works include *Desperate Remedies, Under the Greenwood Tree, Life's Little Ironies, The Pursuit of the Well-Beloved, Wessex Poems, Poems of the Past and the Present, The Dynasts, Time's Laughingstocks and Other Verses, Satires of Circumstance, Moments of Vision*, and *Late Lyrics*. He died in 1928 and was buried in Westminster Abbey.

Hare, Sir John, English actor and manager, was born in London, 1844. He was educated in Yorkshire, and obtained an engagement at a London theater, 1865. In 1875, he became manager of the Court theater, and, from 1879 to 1888, maintained a partnership with W. H. Kendal. From 1889 to 1895, his tenancy of the Garrick theater was important for his production of *La Tosca, A Pair of Spectacles, The Profligate, The Notorious Mrs. Ebbsmith*, and *Lady Bountiful*. He visited the United States, 1896-97, and again in 1900-01. He died in 1921.

Hargreaves (*härʹgrēvz*), **James,** English mechanic and inventor, was born probably at Blackburn about 1745. He was an illiterate weaver and carpenter of Stanhill, near Blackburn. In 1760, he invented a carding machine and, about 1764, the spinning jenny, although the first machine of the latter type was not known to the public until 1867. His fellow spinners, prejudiced against machinery, broke into his house and destroyed his frame in 1768. He removed to Nottingham, where he erected a spinning mill, but his

patent proved invalid. He continued to carry on business as a yarn manufacturer until his death in 1778.

Harker, Joseph Ralph, American educator, was born in the county of Durham, England, in 1853. He worked in coal mines in England from 1863 to 1871, when he emigrated to the United States. Settling at Duquoin, Illinois, he continued to work in coal mines until 1874, devoting his leisure time to study. He then began teaching in the public schools, and became successively principal and superintendent of schools. From 1884 to 1893, he was principal of Whipple academy, Jacksonville, Ill. During this time, he carried on a course of study in Illinois college at Jacksonville, from which he was graduated in 1888 and received the degree of doctor of philosophy in 1893. In 1891, he was ordained to the Methodist Episcopal ministry, and, in 1893, he was elected president of Illinois woman's college. He became a member of the education board of the Methodist Episcopal Church, and, in 1920, served as president of the Illinois federation of colleges.

Harkness (*härk'nĕs*), **Albert,** American classical scholar, was born at Mendon, Mass., 1822. He was graduated at Brown university in 1842 and subsequently studied at Berlin, Bonn, and Gottingen. In 1855, he became professor of Greek in Brown university. He published a series of Latin classics and a standard *Latin Grammar*, which has been widely used. Died, 1907.

Harlan (*här'lăn*), **John Marshall,** American jurist, was born in Boyle county, Ky., 1833. He was graduated at Centre college, Ky., in 1850 and studied law at Transylvania university. After practicing at Frankfort, Ky., he was elected county judge in 1858. He removed to Louisville in 1867 and practiced law there. He served as colonel in the Union army, 1861–63; was attorney-general of Kentucky, 1863–67; and then returned to practice. He was a member of the Louisiana commission in 1877 and one of the American arbitrators on the Bering Sea tribunal, which met in Paris in 1893. In 1905, he was vice moderator of the general assembly of the Presbyterian Church. In 1877, he became associate justice of the United States supreme court, a position which he filled with marked ability for 34 years, sharing with John Marshall, Joseph Story, and S. J. Field the honor of the longest term of service. He died in 1911.

Harley, Robert, earl of Oxford and Mortimer, British statesman, commonly called Lord Oxford, was born in 1661. He entered Parliament in 1689, and, in 1701, was elected speaker by a large majority. He retained this post until 1704, when he became secretary of state. The principal act of his administration was the Treaty of Utrecht. When, in 1714, he ceased to pay court to Lady Masham, Bolingbroke succeeded in getting him dismissed.

After the dismissal of Lord Oxford, Bolingbroke became premier. On the subsequent death of Queen Anne, both of the rivals, formerly colleagues, were justly suspected of having conspired to restore the Stuarts. When George I was proclaimed king, Bolingbroke fled to France, but Oxford remained to meet his fate. He was sent to the Tower, and, after two years' imprisonment, was brought to trial, acquitted, and released. He spent the remainder of his life in retirement. Died, 1724.

Harnack (*här'näk*), **Adolf,** German church historian, was born in Dorpat, Esthonia, in 1851. He studied at Dorpat university, 1869–72, became professor of church history at Leipzig in 1876, at Giessen in 1879, at Marburg in 1886, and at Berlin in 1889. His strong and inspiring personality attracted to his lectures many hundreds of students from Europe and America. His writings include many standard works on theology, among the most important of which are *Das Wesen des Christenthums*, translated "What is Christianity?" and *Das Lehrbuch der Dogmengeschichte*, translated "History of Dogma."

Haroun-al-Raschid (*hă-rōōn'ăl-rä'shĕd*), famous caliph of Bagdad, the fifth of the Abbasside dynasty, was born about 765, and became caliph in 786. He invaded Greece and obtained from the empress Irene 70,000 gold dinars. He was successful also in numerous Byzantine wars, and, in 801, he sent presents to Charlemagne. With the help of the Barmecides Jahia and Jiaffar, whom he murdered in 803, he raised Bagdad to unprecedented eminence in learning, commerce, and splendor. He is a character in the *Arabian Nights* and in other Oriental tales. When on an expedition against Khorassan, he died, 809.

Harper, William Rainey, American educator and Hebrew scholar, was born in New Concord, Ohio, 1856. He was graduated at Muskingum college in 1870 and received the degree of doctor of philosophy at Yale university in 1875. He was instructor in Masonic college, Macon, Tenn., and in the preparatory school of Denison university until 1879, when he became professor of Hebrew, Baptist Union theological seminary, Chicago, where he developed a method of teaching Hebrew by correspondence. From 1886 to 1891, he was professor of Semitic languages at Yale. He was then made president and head of Semitic languages at the University of Chicago and occupied this chair and office until his death.

President Harper was one of the foremost American Hebraists, and, in addition to high scholarship, possessed great ability as an organizer and administrator. The rapid and substantial growth of the University of Chicago was due largely to his constructive leadership. The Harper memorial library was erected in his honor. He is the author of many textbooks and philological papers, founded and edited several publications, and notably extended the work of the university by offering correspondence instruction. Died, 1906.

Harraden (*hăr'ä-dĕn*), **Beatrice,** English novelist, was born at Hampstead, 1864. She was educated at Dresden and in Cheltenham, Queen's, and Bedford colleges, finally taking her degree with honors in mathematics and classics at the University of London in 1883. She came into prominence first in 1893 by her novel entitled *Ships that Pass in the Night*. Her subsequent writings include *In Varying Moods*, *Hilda Strafford*, *Untold Tales of the Past* (for children), *The Fowler*, *Katharine Frensham*, *The Scholar's Daughter*, *Interplay*, *Out of the Wreck I Rise*, *The Guiding Thread*, *Where Your Treasure Is*, *Spring Shall Plant*, and *Thirteen All Told*.

Harriman, Edward Henry, American capitalist and railroad administrator, was born at Hempstead, Long Island, N. Y., 1848. He was the son of a clergyman and received a common-school education. At 14, he became a broker's clerk in Wall Street and later a stock broker on his own account. He was a member of the New York stock exchange from 1870 until his death. He became president and director of the Southern Pacific railway; director of Union Pacific railway, Illinois Central railway, Western Union Telegraph Company, Pacific Mail Steamship Company, Oregon Railroad and Navigation Company, Wells-Fargo Express Company, Colorado Fuel and Iron Company, National City bank, and many other important corporations.

Harriman possessed a remarkable genius for railroad organization and administration and, despite occasional use of reprehensible methods, such as his notorious exploitation of the Chicago and Alton railway, his policy was constructive. At his death in 1909 his estate, valued at more than $200,000,000, was left entirely to his wife. A biography of Harriman by George Kennan was published in 1922.

Harris, Corra May (White), American writer, daughter of Tinsley Rucker White, was born at Farm Hill, Georgia, in 1869. She was educated at home and, in 1887, married Reverend L. H. Harris, who died in 1910. In 1899, she began writing for the *Independent* and, during 1906–09, contributed the "Brasstown Valley Stories" to the *American Magazine*. Her writings include *The Jessica Letters* (with Paul Elmer More), *A Circuit Rider's Wife*, *Eve's Second Husband*, *Recording Angel*, *In Search of a Husband*, *Co-Citizens*, *Making Her His Wife*, *Happily Married*, *A Circuit Rider's Widow*, and various stories for magazines and motion pictures.

Harris, Joel Chandler, American author, was born in Eatonton, Ga., 1848. He served an apprenticeship to the printing trade, and, for 25 years, was one of the editors of the Atlanta *Constitution*. Here he produced his Afro-American folklore studies which brought him world-wide popularity. His *Uncle Remus* tales have become classic, and no writer has more admirably pictured the humorous and imaginative side of Negro character.

Among his many books are *Uncle Remus: His Songs and His Sayings*, *Nights with Uncle Remus*, *Mingo*, *Little Mr. Thimblefinger*, *Mr. Rabbit at Home*, *Stories of Georgia*, *Aaron in the Wildwoods*, *Tales of the Home Folks*, *Evening Tales*, *Chronicles of Aunt Minervy Ann*, *On the Wings of Occasion*, *Gabriel Tolliver*, *Wally Wanderoon*, *A Little Union Scout*, *The Tar-Baby and Other Rhymes*. In 1905, he was elected a member of the American academy of arts and letters. Died, 1908. See *Br'er Rabbit*.

Harris, Robert, Canadian painter, was born in the Vale of Conway, North Wales, 1849. He received his education at Prince of Wales school, Charlottetown, Prince Edward Island, and became a land surveyor. After practicing as a self-taught painter for a time, he studied under Legros in London and with Bonnat in Paris. Following a period of travel in Italy and other European countries, he located in Toronto but soon removed to Montreal, where he was director of the art school, 1883–87. He became an original member of the Canadian royal academy in 1884 and is known chiefly as a genre and portrait painter. Among his best-known works are "The Fathers of the Confederation," in the Parliament building, Ottawa, "The School Trustees," in the national gallery, and "A Man of Small Importance," in the Montreal museum. He died in 1919.

Harris, William Torrey, American educator and philosophical writer, was born at North Killingly, Conn., 1835. He entered Yale with the class of 1858, but was not graduated. From 1867 to 1880, he was superintendent

of the Saint Louis public schools. He was an ardent Hegelian and contributed much to make Hegelian philosophy influential in America. In 1867, he established the *Journal of Speculative Philosophy*. He edited the department of philosophy in *Johnson's Cyclopædia*, writing many important articles, and was editor in chief of *Webster's New International Dictionary*.

In the field of education, Harris was one of the most vigorous American advocates of Froebel's principles. Under his leadership, assisted by Miss Susan Blow, the kindergarten was first made a part of the public school system in Saint Louis in 1873. As United States commissioner of education for 17 years, beginning in 1889, he rendered distinguished service. His works include *Introduction to the Study of Philosophy*, *The Spiritual Sense of Dante's Divina Commedia*, *Hegel's Logic*, and *Psychologic Foundation of Education*. He died in 1909.

Harrison, Benjamin, 23d president of the United States, was born in North Bend, Ohio, 1833. He was a great-grandson of Benjamin Harrison, signer of the Declaration of Independence, and grandson of William Henry Harrison, 9th president of the United States. He was graduated at Miami university in 1852 and studied law in Cincinnati. He removed to Indianapolis, Ind., in 1854, and laid the foundation of a fine legal practice. Entering the Union army in 1862, he served with conspicuous gallantry in the Atlanta campaign, finally returning to civil life at the close of the war with the rank of brevet brigadier general.

In 1881, he entered the United States Senate and, in 1888, was nominated for the presidency of the United States by the Republican national convention. He was elected in the ensuing November and was inaugurated in 1889. His administration was quiet, successful, and measurably popular. It was marked by the amicable settlement of the trouble with Chile and by the passage of the McKinley Tariff bill. In 1892, he again received the nomination in the national Republican convention. By this time, however, the able and persistent attacks of the Democrats on the high tariff policy led to a general repudiation of it, and, at the election, he was defeated by Grover Cleveland. He was the chief representative of the United States at the Hague Conference, 1899. Died in 1901.

Harrison, Constance Cary (Mrs. Burton Harrison), American author, was born in Vaucluse, Va., 1846. She was privately educated; lived in Richmond, Va., during the Civil War; and went abroad with her widowed mother to complete her studies. She married Burton Harrison, a Virginia lawyer, former private secretary to Jefferson Davis. Thereafter, she resided in New York and devoted herself to writing fiction and plays. She traveled in Europe, Asia, Africa, and spent much time in London, Paris, and other capitals.

Among her numerous writings are *Woman's Handiwork*, *Bar Harbor Days*, *The Anglomaniacs*, *Crow's Nest and Bellhaven Tales*, *A Daughter of the South*, *A Bachelor Maid*, *An Errant Wooing*, *A Son of the Old Dominion*, *Good Americans*, *Little Comedies for Amateur Acting*, *A Princess of the Hills*, *Latter-Day Sweethearts*, *Transplanted Daughters*, and *Recollections, Grave and Gay*. She died in 1920.

Harrison, Frederic, English essayist and philosophical writer, was born in London, 1831. He was educated at Wadham college, Oxford, and was fellow and tutor of his college, 1854–56; studied law and was called to the bar in 1858. He practiced conveyancing. Later, in the courts of equity, he served on important commissions and, from 1877 until 1889, was professor of jurisprudence and international law at Lincoln's Inn. A positivist and an advanced liberal, he wrote many works of distinction, among the most valuable of which are *The Meaning of History*, *Order and Progress*, *The Present and the Future*, *The Choice of Books*, *Oliver Cromwell*, *Early Victorian Literature*, *William the Silent*, *Byzantine History*, *Realities and Ideals*, and *The Positive Evolution of Religion*. His *Autobiographic Memoirs* appeared in 1911, and, in 1915, at the age of 84, he wrote *The German Peril*. Died in 1923.

Harrison, Henry Sydnor, American novelist, was born at Sewanee, Tenn., 1880. He was educated at the Brooklyn Latin school and at Columbia university, where he was graduated in 1900. In 1914, he was elected member of the national institute of arts and letters. In addition to various contributions to the *Atlantic Monthly* and other magazines, the list of his works includes *Queed*, *V. V.'s Eyes*, *Captivating Mary Carstairs*, *Angela's Business*, and *When I Come Back*.

Harrison, John, British inventor, was born at Foulby, 1693. By 1726, he had constructed a timekeeper with compensating apparatus for correcting errors due to variations of climate. In 1713, the government had offered three prizes for the discovery of a method to determine the longitude accurately. After long perseverance, Harrison invented and constructed a chronometer which, in a voyage to Jamaica in 1761-62, determined the longitude within 18 geographical miles. After further trials, he was awarded the largest prize of £20,000. He made other inventions and improvements for timepieces and wrote a work on his chronometer and also various pamphlets concerning his discoveries. Died, 1776.

Harrison, Thomas Alexander, American landscape painter, was born in Philadelphia, 1853. He studied art at the Pennsylvania academy of fine arts in his native city and later under Gérôme and Bastien-Lepage in Paris. He became noted for his fine marine paintings. After many visits to the United States, he finally established himself in Paris, where he attained high rank among the American group of artists. In America he is represented by "Castles in Spain," in the Metropolitan museum, New York; "Amateurs," in the art institute, Chicago; "Twilight," the Saint Louis museum; and "The Great Mirror" and "Marine" in the Wilstach collection, Philadelphia. His "Arcady" and "Solitude" are in the Luxembourg museum, Paris. Among his other important works are "Setting Sun," "Golden Sands," and "Caressing Waves." With Winslow Homer and C. H. Woodbury, he ranks among the leading American marine painters.

Harrison, William Henry, 9th president of the United States, was born in Virginia, 1773, son of Benjamin Harrison, who signed the Declaration of Independence. In 1791, he joined the army which Wayne was leading against the Indians of the Northwest and served until 1798. In 1801, he became governor of Indiana territory, and, as its representative in Congress, succeeded in passing a law relating to the sale of the Federal land in sections or parts of sections. To this act the Western states owe much of their prosperity.

In the war against the Indians in 1811, which soon became also a war against the English in Canada, Harrison, as commander in chief of the American army, showed great military talent. He defeated the Indians in an important battle at Tippecanoe, and, by the victory of Perry on Lake Erie, was enabled to pursue the British invaders into Canada, where, in 1813, he totally routed them in the battle of the Thames. In 1814, he resigned his commission in the army; in 1816, he was elected to Congress; and, in 1825, became a member of the United States Senate. The Whig party tried in vain to make him president of the United States in 1836, and succeeded in 1840. He died in 1841 after serving one month.

Hart, Albert Bushnell, American educator and historian, was born in Clarksville, Pa., 1854. He was graduated at Harvard in 1880 and received the degree of doctor of philosophy from the University of Freiburg in Baden, Germany, in 1883. He was successively instructor, assistant professor, and professor of history in Harvard university from 1883 to 1910, when he was made professor of government. He became prominent as a leader in developing the method of studying history direct from original sources. Among his numerous works are *Introduction to the Study of Federal Government*, *Formation of the Union*, *Practical Essays on American Government*, *Studies in American Education*, *Salmon Portland Chase*, *Foundations of American Foreign Policy*, *Slavery and Abolition*, *Manual of American History*, *The Southern South*, *The Monroe Doctrine*, *America at War*, and *Causes of the War*.

He was editor of *Epochs of American History*, *American Citizens Series*, *Source-Book of American History*, *The American Nation*, and other works. He was joint editor of *American History Leaflets* and the *Cyclopædia of American Government*.

Harte (*härt*), **Francis Bret,** American poet and novelist, was born in Albany, N. Y., 1839. He was at different times a miner, school teacher, printer, and editor. From 1864 to 1870, he was secretary of the United States mint at San Francisco. From 1868 to 1871, he edited the *Overland Monthly*. In 1870, he published his famous poem "The Heathen Chinee." He was appointed American consul at Crefeld in 1878, at Glasgow in 1880, and, after leaving Glasgow in 1885, he lived in London. His most widely known stories and poems depict frontier life on the Pacific slope in the early gold mining days. He was a realist and portrayed life, as he saw it, with great vividness and vigor.

In his best stories, *The Luck of Roaring Camp*, *The Outcasts of Poker Flat*, and *Tennessee's Partner*, Harte introduced an entirely new type of fiction, which still retains an immense popularity. In his later work he did not sustain his early success. Among his other writings are *Condensed Novels*, *Poetical Works*, *Tales of the Argonauts*, *The Twins of Table Mountain and Other Stories*, *By Shore and Sedge*, *A Millionaire of Rough and Ready*, *Devil's Ford*, and *A Ward of the Golden Gate*. Died, 1902. See *Luck of Roaring Camp*.

Hartmann (*härt'män*), **Karl Robert Edouard von,** German philosopher, was born at Berlin, 1842. He served as an artillery officer from 1861 to 1865. From 1867 until his death, he lived in Berlin, working out his philosophical scheme, a synthesis of Hegel, Schelling, and Schopenhauer, in which "the Unconscious" plays the rôle of creator and providence. His great work was *The Philosophy of the*

Unconscious. This was followed by books on the ethical consciousness, the development of the religious consciousness, German æsthetics, Lotze, and Kant, besides a work on the self-destruction of Christianity, criticisms of Neo-Kantianism and contemporary philosophies, defenses of his own system, and political and educational treatises. He was a pessimist as regards the inevitable misery of existence, but an optimist as champion of evolutionary progress. He died in 1906.

Harvard, John, founder of Harvard college, was born in Southwark, England, 1607. He was graduated at Emmanuel college, Cambridge, in 1631, and, in 1637, was married and came to America. He was made a freeman of Massachusetts, and received a tract of land in Charlestown, where he began preaching as a Congregational minister. He bequeathed about £400 and about 300 volumes from his library for the establishment of a college. This was added to £400 which the colony in 1636 had voted to establish "a schoale or colledge," which, in 1637, was ordered to be at "New Towne." In 1638, the town was named Cambridge, and, in 1639, the school was named Harvard college. He died in 1638.

Harvey, Edmund Newton, American physiologist, was born in Philadelphia, 1887. He was graduated from Germantown academy in 1905 and from the University of Pennsylvania in 1909. Pursuing postgraduate study, he received the degree of doctor of philosophy from Columbia university in 1911. He was instructor in physiology from 1911 to 1915 and assistant professor from 1915 to 1919, when he was made full professor, at Princeton university. He has made extensive researches in bioluminescence, regulation in plants, cell permeability, and nerve conduction. In 1920, he published a valuable work entitled *The Nature of Animal Light*.

Harvey, George Brinton McClellan, American editor and diplomat, was born at Peacham, Vt., in 1864. He was educated at Peacham academy, entered journalism, and, during the period 1882–86, was reporter for several leading newspapers. In 1890-91, he was insurance commissioner of New Jersey. From 1891 to 1893, he was managing editor of the New York *World*. During the period 1894–98, he was the constructor and president of various electric railways. In 1899, he purchased and became editor of the *North American Review*, and, in 1903, he bought the *Metropolitan Magazine*. He edited *Harper's Weekly* from 1902 to 1913. Harvey is said to have been the first to suggest Woodrow Wilson as a presidential possibility. He later became one of Wilson's bitterest critics. In 1921, he was appointed ambassador to England and served until his resignation in 1923. His writings include *Women* and *The Power of Tolerance and Other Speeches*. Died, 1928.

Harvey, William, English anatomist and discoverer of the circulation of the blood, was born at Folkestone, England, April 1, 1578. He was graduated at Cambridge university in 1597. The next four years he spent at Padua, Italy, in the study of medicine under Fabricius, Casserius, and Galileo.

Harvey married in 1604 and settled down to the practice of medicine in London. He devoted himself assiduously to his professional duties and rose rapidly to distinction. When, in 1615, he was chosen lecturer on anatomy and surgery to the college of physicians, he began to expound orally his views on the action of the heart and the motion of the blood through all parts of the body in a continuous circle.

It was not until 1628 that he gave wider publicity to his discoveries by the appearance at Frankfort on the Main of his *Treatise on the Motion of the Heart and Blood*. Harvey availed himself of the discovery, made by Fabricius, of the valves in the veins, which favor the flow of blood in a special direction. He then showed the precise manner in which the mechanism worked. It was the first application of the laws of mechanical science to biology. Being at variance with current and long-accredited notions, Harvey's inferences were at first unanimously rejected by the authorities of continental Europe.

Though his scientific inquiries led to the decline of his general practice, Harvey's reputation grew steadily at court and in the world at large. He was physician to James I and later to Charles I. In 1636, at Nuremberg, he met Hoffmann, the chief opponent of his theory, and demonstrated conclusively its anatomical particulars and necessary conclusions.

Oxford university conferred upon Harvey an honorary degree, and, in 1645, he was made warden of Merton college. In 1651, he published his *Treatise on Generation of Animals*. This was a new field, in which he presented a mass of carefully classified observations on the reproduction of human beings and other animals. He was one of the first to perceive the relations between the simplest and the most highly organized beings and, by means of the simplicity of structure and function of the lower orders, to explain the complexity of the others.

In 1654, he was elected president of the college of physicians, but he declined the office on account of his age. Died in London on June 3, 1657.

Hassam, Childe, American artist, was born in Boston, 1859. He was educated in Boston public schools and studied art in Boston and under Boulanger and Lefebvre in Paris, 1886–89. He has exhibited widely in this country and in Europe, and follows generally the methods of the French impressionist school. His pictures are represented in many American galleries. Among his most important works are "Evening Bells," "The Little June Idyll," "Winter," "Manhattan's Sunset Towers," "Aphrodite," "Lorelei," and "The Summer Sea." He was elected to the American academy of arts and letters in 1920.

Hastings, Thomas, American architect, was born in New York City, 1860. He graduated from the Ecole des Beaux-Arts, Paris, in 1884, and at once entered into partnership with J. M. Carrère, forming the firm of Carrère and Hastings. Among the notable buildings designed by them jointly are the Ponce de Leon and Alcazar hotels at Saint Augustine, Fla.; the Edison building, the Century opera house, and the New York public library, New York City; and the Senate office building at Washington, D. C. Hastings was elected a member of the American academy of arts and letters and was made chevalier of the legion of honor.

Hastings, Warren, English statesman and administrator, was born in 1732. He went to Bengal as a writer in 1750, and, seven years later, was appointed agent of the East India Company at the court of the nabob of Bengal. In 1764, he returned to England, where he remained four years studying Eastern literature. On his return to India, he became a member of the council of Madras and, in 1772, governor of Bengal, an office which, in 1774, became that of governor-general of India. He was continuously involved in quarrels with his council, which seemed determined upon his downfall. In order to obtain money, he took measures against the rajah of Benares and the nabob of Oudh, which were afterward charged against him, but he left the affairs of the company in a very prosperous condition.

Three years after his return to England, he was impeached before the Lords for high crimes and misdemeanors, but, after a trial which proceeded at intervals for seven years and in spite of the eloquence of Burke and Sheridan, he was acquitted in 1795. He was ruined by the expense, but was granted an annuity by the East India Company. To him the British government is largely indebted for its political and judicial organization in India and for its method of Indian administration. Died, 1818.

Haupt (*houpt*), **Lewis Muhlenberg,** American civil engineer, was born at Gettysburg, Pa., 1844. He was educated at Harvard and West Point and, in 1868, became lieutenant engineer in lake surveys. For 20 years, 1872–92, he was professor of civil engineering at the University of Pennsylvania. He was chief engineer of the survey for the ship canal across New Jersey, 1894; a member of the Nicaragua canal commission, 1897–99; and one of the isthmian canal commissioners, 1899–1902. He was also professor of civil engineering at the Franklin institute. He patented the "reaction breakwater," for creating channels through ocean bars, and invented devices for reclaiming eroded beaches. Among his publications are *Engineering Specifications and Contracts, Physical Phenomena of Harbor Entrances, Canals and Their Economic Relation to Transportation*, and *A Move for Better Roads*.

Haupt, Paul, Semitic scholar and pioneer American Assyriologist, was born at Gorlitz, Germany, 1858. He studied at Leipzig and Berlin universities and at the British museum. He was tutor at the University of Gottingen, 1880 to 1883, when he became professor of Semitic languages at Johns Hopkins university. He edited *The Polychrome Bible* and a *New Critical Edition of Hebrew Text of the Old Testament*. Among his numerous publications are *The Sumerian Family Laws, The Babylonian Nimrod Epic, The Cuneiform Account of the Deluge, Ancient Protest Against the Curse on Eve*, and *Tobit's Blindness and Sara's Hysteria*. Died, 1926.

Hauptmann (*houpt'män*), **Gerhart,** German dramatist and novelist, was born in Salzbrunn, Silesia, 1862. At 18, he decided to become a sculptor and studied at Breslau and Jena, and later in Italy. In 1885, he settled in Berlin and devoted himself to literary work. His first play, *Before Dawn*, inaugurated a new dramatic movement in Germany and brought him wide reputation. This was followed by *The Festival of Peace, Lonely Lives*, and *The Weavers*, which reflect the influence of Zola, Ibsen, and Tolstoy in their realistic protest against social conditions in a capitalistic and militaristic state.

In *The Sunken Bell*, his best-known work, which he calls a "fairy drama," in *Florian Geyer*, and in *Hannele*, he changed from naturalism to mysticism. By these and many other powerful plays, he attained the foremost rank in German drama, and is recognized as one of the finest

poets and strongest novelists of modern times. His works include *Drayman Henschel, Rose Bernd, The Rats, Pippa Dances, Gabriel Schilling's Flight, The Bow of Odysseus, Atlantis,* and *The Heretic of Soana.* He was awarded the Nobel prize for literature in 1912. See *Sunken Bell, The.*

Havelock (*hăv'lŏk*), **Sir Henry,** English general, was born at Bishop Wearmouth, in Durham, 1795. He entered the army a month or two after the battle of Waterloo; went to India in 1823; and honorably distinguished himself in the Afghan and Sikh wars.

On the outbreak of the Indian mutiny in 1857, Havelock was directed to organize a small movable column at Allahabad and to push on to the relief of the British at Lucknow. He made a forced march to Futtehpur, where, at the head of 2000 men, he engaged and broke the rebels. He continued his march upon Cawnpore and twice defeated the enemy. The consequence of the latter victory was the massacre of all the European women and children in the hands of Nana Sahib. After fighting eight battles with the rebels, in all of which he was victorious, his little army found itself so thinned by fatigue and sickness that it was obliged to retire upon Cawnpore.

Early in September 1857, General Outram arrived with re-enforcements, and Havelock again advanced to the relief of Lucknow. The army fought its way with desperate bravery through streets of houses, each forming a separate fortress, until they gained the British residency, to the indescribable joy of the beleaguered garrison. The victorious army was now in turn besieged, but held its own until November, when Sir Colin Campbell (Lord Clyde) forced his way to its rescue. Havelock died in 1857 five days after the relief.

Hawkins, Sir Anthony Hope, English novelist, widely known as "Anthony Hope," was born in London, 1863. He was educated at Marlborough and at Balliol college, Oxford, and was admitted as a barrister of the Middle Temple, 1887. In 1894, he achieved immense popular success with his *Prisoner of Zenda,* which ran to 60 editions in 20 years. His other works, similarly semimodern and semiromantic, include *The God in the Car, The King's Mirror, Tristram of Blent, The Intrusions of Peggy, A Servant of the Public, Second String,* and *Lucinda.* He was knighted in 1918.

Hawkins, Sir John, English naval commander, was born at Plymouth, 1532. He followed the sea from an early age, making several voyages to the Canaries before 1561. Between 1562 and 1567, he made voyages to the west coast of Africa, taking Negro slaves to the West Indies and South America and exchanging them for merchandise. In 1568, his fleet of six ships, one of which was commanded by Francis Drake, was attacked by a large Spanish fleet in the harbor of Vera Cruz, Mexico; but Hawkins and Drake succeeded in escaping with two ships. Hawkins was elected to Parliament in 1572 and, in 1573, was made treasurer of the navy. In 1588, as rear admiral commanding the *Victory,* he took part in the defeat of the Spanish armada and was knighted for bravery in action. In 1595, he accompanied Sir Francis Drake on a voyage to the West Indies and died at sea off Porto Rico.

Hawthorne, Nathaniel, American novelist, was born at Salem, Mass., 1804. He graduated at Bowdoin college in 1825 and, three years later, published his first novel, *Fanshawe.* He then wrote a number of stories for the journals, which he afterward collected and published under the title of *Twice-told Tales.* In 1843, he took up his residence in the village of Concord, in a manse which had formerly been the dwelling of William Emerson and which suggested the title of his next work, *Mosses from an Old Manse,* published in 1843. These sketches, in which he gives some interesting recollections of his boyhood, first made his name known in Europe.

In 1842, he published *The Liberty Tree* and, in 1845, *The Journal of an African Cruiser.* After a three years' residence at Concord, he accepted a place in the customhouse at Salem and removed to that city. This, however, did not stop his literary work. His masterpiece, *The Scarlet Letter,* appeared in 1850 and was received with universal approbation, as was likewise *The House of the Seven Gables,* published in 1851. His *Blithedale Romance,* published in 1852, may be regarded as a kind of autobiography and is founded on incidents in his own life. In 1853, he was appointed consul at Liverpool by his friend President Pierce, whose life he had written.

Hawthorne resided in Liverpool discharging the duties of his office for five years and afterward went to Italy to recruit his impaired health. This journey furnished him with material for his fantastic romance *The Marble Faun,* generally regarded as one of the best of his works. After his return to America, he published a sketch of England and the English.

As a writer, Hawthorne combined a true poetic spirit with a charming style and displayed a deep knowledge of human nature. As a character analyst, no American writer excels him and he holds a place in the foremost rank among American novelists. He died in 1864 and was elected to the American hall of fame in 1900. See *Marble Faun, Scarlet Letter, Twicetold Tales.*

Hay, John, American statesman and writer, was born in Salem, Ind., 1838. He graduated from Brown university, 1858, and settled in Illinois as a lawyer. He went to Washington in 1861 as one of Lincoln's private secretaries. He served under generals Hunter and Gillmore and was subsequently in the United States diplomatic service, stationed at Paris, Vienna, and Madrid. In 1897, he was made ambassador to England and, in 1898, became secretary of state.

As secretary of state, Hay inaugurated the "open door" policy for all nations, in China, and laid the foundation for subsequent diplomatic relations with the Orient. In coolness, foresight, and statesmanlike appreciation of current and coming events, he had no superior among contemporary diplomats. His literary reputation rests upon *Pike County Ballads; Castilian Days,* a volume of travel; and the *Life of Abraham Lincoln,* of which he was coauthor with J. G. Nicolay. He was chosen one of the seven original members of the American academy of arts and letters. Died, 1905.

Hayden (*hā'd'n*), **Ferdinand Vendeveer,** American geologist, was born in Westfield, Mass., 1829. He graduated at Oberlin college. Prior to the Civil War, in which he served as a surgeon, he explored the Bad Lands of Dakota in search of fossils of extinct animals. After spending the years from 1865 to 1872 as professor of geology in the University of Pennsylvania, he acted as director of the territorial survey and, after 1879, as a geologist on the United States geological survey. His explorations in Dakota, Wyoming, Colorado, and Utah had, as a direct result in addition to their scientific value, the establishment of Yellowstone park. Died, 1887.

Haydn (*hā'd'n*; G., *hī'd'n*), **Joseph,** Austrian composer, was born at Rohrau, Austria, 1732, the son of a poor wheelwright. He early manifested great musical talent and was received at the age of eight into the choir of the cathedral of Saint Stephen's at Vienna. Subsequently Metastasio introduced him to the celebrated singer Porpora, who employed Haydn to accompany him on the piano during his singing lessons and from whom Haydn obtained the instruction in composition he so anxiously desired. In 1760, Prince Paul Esterházy placed him at the head of his private chapel. For him Haydn composed his beautiful symphonies and the greater number of his magnificent quartets. He is often called "Father Haydn," as having been the inventor of the symphonic form essentially as we now know it.

After the death of Prince Nicholas Esterházy, in 1790, Haydn accompanied Salomon, the violinist, to England, where, in 1791-92, he produced six of his "Twelve Grand Symphonies." In England, he first obtained that recognition which afterward fell to his share in his own country. On his return to Austria, he purchased a small house with a garden in one of the suburbs of Vienna. Here he composed his oratorios, the *Creation,* and the *Seasons.* The former work, the harmonies of which are pervaded with the fire of youth, was written in his 65th year, while the *Seasons* was almost his last work. Died in Vienna, 1809.

Hayes, Patrick Joseph, American prelate, was born in New York City in 1867. He was educated at Manhattan college, New York, and at the Catholic University of America. Having been ordained a Roman Catholic priest in 1892, he acted as president of Cathedral college from 1903 to 1914, when he was consecrated auxiliary bishop of New York. In 1917, he was made Catholic chaplain bishop for the United States army and navy. He became archbishop of New York in 1919 and cardinal in 1924.

Hayes, Rutherford Birchard, 19th president of the United States, was born at Delaware, Ohio, 1822. He graduated at Kenyon college and at Harvard law school, and began the practice of law at Fremont in 1845. He removed in 1849 to Cincinnati, where he was city solicitor, 1858–61. At the outbreak of the Civil War, he was appointed major of infantry, and shortly afterward he became lieutenant colonel. He distinguished himself in the campaigns of West Virginia and in the battles around Winchester, and was severely wounded at South Mountain. In 1864, he was made brigadier general and, in 1865, was brevetted major general.

Hayes was elected to Congress from Ohio, 1864–66, and was governor of that state, 1868–72 and 1876-77. He was the Republican candidate for the presidency in 1876 and, after a memorable contest with Samuel J. Tilden, was inaugurated in 1877. As chief magistrate, his career was marked by moderation and wisdom. His independence of character, however, was strongly shown by his vetoes, his steady adherence to principle, and his refusal to pander to partisan politics. Died, 1893.

Hayne (*hān*), **Paul Hamilton,** American poet, was born at Charleston, S. C., 1831. He was educated at South Carolina college and studied law, but gave up practicing to

follow his literary bent. Between 1850 and 1855, he edited *Russell's Magazine* and made notable contributions to the *Southern Literary Messenger*. He became a prominent figure in a brilliant literary group led by William Gilmore Simms, and he published, between 1855 and 1859, three volumes of poems. During the Civil War, in which he engaged in active service, he suffered the loss of health and fortune, and his library was burned. In 1865, he removed to a small cottage home near Augusta, Ga., which he named Copse Hill, and there he continued literary work in partial invalidism. Hayne belongs in the first rank among Southern poets, and his graceful verse reflects the spirit of the land and the people. His books include *Legends and Lyrics*, *The Mountain of the Lovers*, and his complete *Poetical Works*. Died, 1886.

Hayne, Robert Young, American statesman, was born in South Carolina, 1791. He was admitted to the bar in 1812; served in the war with Great Britain; and, at its close, returned to his practice in Charleston. He sat in the United States Senate from 1823 to 1832. He was a vigorous opponent of protection and, in 1832, boldly supported in Congress the doctrine of nullification. The great debates between Daniel Webster and Hayne on the principles of the Constitution, the authority of the general government, and the rights of the individual states are of unusual historical value. In November 1832, South Carolina adopted an ordinance of nullification; in December, Hayne was elected governor, and the state prepared to resist the Federal power by force of arms. A compromise, however, was agreed upon, and the ordinance was repealed. He was mayor of Charleston, 1835–37. Died, 1839. See *Nullification, Right of*.

Hays, Will H., former postmaster-general of the United States, was born at Sullivan, Ind., in 1879. He was educated at Wabash college and practiced law for several years. Prior to his appointment as postmaster-general in 1921, he was a director of the People's state bank at Sullivan, Ind., and the chairman of numerous committees of the Republican party. In 1922, he resigned his official position to become president of the Motion Picture Producers and Distributors of America.

Hazen, Charles Downer, American historian, was born at Barnet, Vt., in 1868. Educated at Dartmouth, Johns Hopkins, and various European universities, he occupied a chair in history at Smith college, 1894–1914, and in 1916 became professor of history at Yale university. His *Modern Europe*, following a number of other able historical works, established him in the foremost rank of American historical writers. He was elected to the American academy of arts and letters in 1924.

Hazlitt (*hăz'lĭt*), **William,** English essayist and critic, was born in Kent, 1778. In 1802, he visited Paris and studied in the Louvre. On his return, he attempted to support himself by portrait painting; but, as he could please neither himself nor his patrons, he relinquished the easel and devoted himself to literature, for which he was much better adapted. In 1803, he went to London and, shortly afterward, published his *Essay on the Principles of Human Action*. In conjunction with Leigh Hunt, he wrote essays in the *Examiner*, which were afterward republished in a volume entitled *The Round Table*. He wrote also *Characters of Shakespeare's Plays*, *Review of the English Stage*, *Life of Napoleon*, and *The Spirit of the Age*. His translations are among the most admirable, especially that of Thierry's *Norman Conquest*. Died, 1830.

Hearn, Lafcadio, writer on Japan, was born in the Ionian islands, 1850, of Irish and Greek parentage. Educated in England and France, he came, at the age of 19, to the United States, where he engaged in journalism, exhibiting picturesque descriptive powers. In 1891, he went to Japan, where he taught English in Tokyo university. He became a citizen of Japan and married a Japanese wife. His principal writings include *Out of the East*, *Gleanings in Buddha Fields*, and *Japan: An Attempt at an Interpretation*. He died in 1904.

Hearst (*hûrst*), **Phebe Apperson,** American philanthropist, was born in 1842. She taught school for a short period and, in 1862, married George Hearst, United States senator from California, a man of large wealth. She established and maintained kindergarten classes in San Francisco several years; also classes and a training class for kindergarten teachers in Washington, D. C., and later at Lead, S. D., where she had important mining interests. She made donations to the American University at Washington, the National Cathedral school for girls at Washington, the University of California, and free libraries at Lead, S. D., and Anaconda, Mont., which she had founded. Died, 1919.

Hearst, William Randolph, American newspaper publisher and politician, was born in San Francisco in 1863. He was educated in the public schools of San Francisco and at Harvard. He became editor and proprietor of the San Francisco *Examiner*, 1886; bought the New York *Journal*, 1895; and later purchased the New York *Advertiser* to secure a news franchise, changing its name to the New York *Morning American*. He started the Chicago *American* in 1900 and, in 1902, the Chicago *Morning Examiner*. In 1904, he acquired the Boston *American* and the Los Angeles *Examiner*, and he later bought various other newspapers and several magazines. He was elected to Congress, 1903–07, as a Democrat; was candidate for mayor of New York in 1905 and 1909, and for governor in 1906.

Hearst's group of newspapers became known for its sensational features. Among his innovations was the "spread news head." He also developed the syndicate known as the international news service.

Heber (*hē'bēr*), **Reginald,** English hymn-writer and bishop, was born at Malpas, Cheshire, 1783. He entered Brasenose college, Oxford, 1800, and, in 1803, wrote his prize poem, *Palestine*. He was ordained for the ministry in the English Church in 1807; was appointed a prebendary of Saint Asaph in 1812; and became Bampton lecturer in 1815 and preacher of Lincoln's Inn in 1822. In 1823, he accepted the see of Calcutta, serving there as bishop throughout the remainder of his life. He published *Sermons*, *A Journey Through India*, and *A Life of Jeremy Taylor*. As a poet, his fame rests upon *Palestine* and his hymns, which include "Lord of Mercy and of Might," "From Greenland's Icy Mountains," "Holy, Holy, Holy," and "The Son of God Goes Forth to War." Died, 1826.

Hébert (*ā'bâr'*), **Louis Philippe,** French Canadian sculptor, was born in the province of Quebec, 1850. He studied sculpture in Montreal and afterward in Paris, and, in 1882, won a prize given by the Dominion government for a statue of Georges Cartier. His chief works consist of statues and monuments, among which are the statues to Maisonneuve and Chénier, Montreal; the McKenzie, Macdonald, and Queen Victoria monuments in Parliament square, Ottawa; the Laval monument, Quebec; and the Howe monument, Halifax. Died, 1917.

Hecker, Isaac Thomas, founder and superior of the order of Paulist fathers, was born in New York in 1819. His brothers established the well-known Hecker mills; but he was not content to labor in mercantile pursuits, and, in 1843, he joined the Brook Farm community in West Roxbury, Mass. Later he established a similar society at Fruitlands, Mass., then took up study for the Episcopal ministry, but, in 1845, joined the Roman Catholic Church and became a Redemptorist father. Much of his time was devoted to literature. He founded the *Catholic World*, organized the Catholic publication society, and wrote *Questions of the Soul*, *Aspirations of Nature*, and *The Church and the Age*. Died, 1888.

Hedin (*hĕ-dēn'*), **Sven Anders,** Swedish traveler and geographer, was born in Stockholm, 1865. He was educated at Stockholm, at Upsala, and in Germany. He began his explorations in Persia in 1885, traveled through Khorassan and Turkestan, and several times through Tibet and other parts of Central Asia. His books, some of which have been translated into many languages, include *Through Asia*, *Scientific Results of a Journey in Central Asia*, *Trans-Himalaya*, *From Pole to Pole*, *With the German Armies in the West*, and *Southern Thibet*.

Hegan, Alice Caldwell. See *Rice, Alice Caldwell Hegan*.

Hegel (*hā'gĕl*), **Georg Wilhelm Friedrich,** German philosopher, was born at Stuttgart, Wurttemberg, August 27, 1770. The gravity, straightforwardness, and perseverance that he inherited from a long line of Swabian ancestors declared itself early in his life and conversation. His student days evidenced indefatigable industry rather than precocity of genius.

At the University of Tubingen, to which he proceeded in 1788, he met Schelling, the philosopher, who proved a kindred spirit and lifelong friend. After completing his university course, Hegel devoted himself to tutorial duties in Switzerland and Frankfort and to the study of ancient history and the philosophy of religion. In 1801, he began lecturing on philosophy at the University of Jena as an instructor. Here, by careful thought, he laid the foundations of his rigorous and logical system, which first found expression in *The Phenomenology of the Spirit*. This work he completed after he had accepted the chair of philosophy at Jena and on the eve of the victory of Napoleon over the Prussians.

In 1808, Hegel was made rector of the *Gymnasium* at Nuremberg. In 1811, he married Marie von Tucher. He remained at Nuremberg, seeing the first two volumes of his *Logic* through the press and giving elementary courses in philosophy and religion, until 1816, when he accepted the professorship of philosophy at Heidelberg. In the ensuing years, he completed his *Logic* under the title of *Encyclopedia of the Philosophical Sciences*. His entire scheme of philosophy is comprised in this work.

In 1818, Hegel accepted the chair of philosophy in the University of Berlin. His fame now increased rapidly and his lectures attracted hearers from all ranks and professions.

He rose to great political influence by reason of his defense of existing political institutions. The noted aphorism in which he summed up his teaching, "The rational is the actual, and the actual is the rational," was taken to imply that the Prussian organization was the perfection of reason and freedom. In 1829, he became rector of the university.

Hegel's system, which is usually termed the "philosophy of the absolute," falls into three departments: logic, or the science of thought in its pure unity with itself; the philosophy of nature, in which the ideal principle is shown to underlie even the material world; and the philosophy of spirit. Hegelianism compelled men to think and to stand for or against it. Its influence has been extensive throughout Europe and America. Hegel died on November 14, 1831.

Heidenstam (*hī'dĕn-stăm*), **Karl Gustav Verner von,** Swedish novelist and poet, was born at Olshammar, 1859. He studied painting at the Stockholm academy, but, after extensive travel, devoted himself to literature. He published, in 1888, *Vallfart och Vandringsår*, which quickly established his rank as a poet. He published his first story, *Endymion*, in 1889 and, in 1892, produced his fantastic romance, *Hans Alienus*, by which his literary style is best known. His *Charles XII and His Wars* brought him great popularity and was followed by *Saint George and the Dragon*, *The Pilgrimage of the Holy Bridget*, *Classicism and Teutonism*, *Folkungaträdet*, *Dagar och händelser*, *Stridsskrifter*, and other novels and essays which assured his position in Swedish literature. In 1916, he was awarded the Nobel prize for literature.

Heifetz (*hī'fĕts*), **Jascha,** violinist, was born at Vilna, Poland, in 1901. He began learning the violin at the age of three and made his first public appearance when five years old. Four years later, at Petrograd, he gave his first recital, later touring the greater part of Europe and visiting Australia and New Zealand. Following his first performance in America, at New York in 1917, he obtained recognition in all musical centers of the country as a master of the violin.

Heine (*hī'nĕ*), **Heinrich,** German lyric poet and satirist, was born at Dusseldorf, of Jewish parents, 1797. He was educated privately by Catholic monks and French intellectuals, and early exhibited a spirit of daring skepticism. He learned English, French, and Italian, and began his career as a merchant in Hamburg. The venture failed, and he devoted himself to study successively at Bonn, Gottingen, and Berlin, obtaining an advocate's license in 1825. Five years later, he went to Paris, where he resided throughout the remainder of his life.

Heine possessed two incompatible elements in his character—a Greek joy of life and a congenital Hebrew earnestness. The lack of harmony between these elements resulted in a spirit of mocking irony which, combined with an extraordinary keenness of wit and a capacity for writing the most exquisite lyrics, made Heine one of the most striking figures in European literature. His preference for French culture prevented his full recognition in Germany during his life and for many decades later.

His *Gedichte*, which appeared in 1822, contains many of the finest lyrics in the German language. The *Nordsee Cyclus* places Heine among the best poets of the sea. The *Reisebilder*, largely in prose, was banned by the Prussian censor for its revolutionary tendency. His *Buch der Lieder* was published in 1827. *Die romantische Schule* procured him great popularity in France, where he met Madame Récamier, "George Sand," Balzac, Béranger, Chopin, Liszt, and other famous people. About 1845, he was attacked by a disease of the spine and was thereafter almost continuously bedridden. Nevertheless, in this period were written some of his wittiest satires and most delicately graceful songs. Died, 1856.

Heins (*hīnz*), **George Lewis,** American architect, was born in Philadelphia, 1860. He was educated at the University of Pennsylvania and studied architecture at the Massachusetts institute of technology, where he graduated in 1882. In 1883, he began practice in Minneapolis with C. G. LaFarge. In 1886, the firm was established in New York, where, in collaboration with his partner, Heins designed the Protestant Episcopal cathedral of Saint John the Divine. He was the architect of numerous other buildings in New York, including those of the New York zoological park. He was first state architect of New York from 1898 until his death in 1907.

Heller, Stephen, Hungarian composer and pianist, was born in Budapest, 1815. He displayed marked musical ability at an early age and, when only 9, was sent to Vienna to continue his studies. At 13, he played publicly in Vienna and, at 15, began with his father an extensive concert tour through Europe. This was interrupted in the following year, 1830, by his serious illness at Augsburg, where he remained, continuing his musical studies, until 1838. He then went to Paris, where he formed intimate friendships with Chopin, Liszt, and Berlioz and soon became well known as a pianist. His compositions, characterized by exquisite melody and by fresh and vigorous treatment of theme, won their way to fame much more slowly. In style, Heller much resembles Mendelssohn, whom he surpasses in the originality of his themes. His studies for the piano rank among the very best and are still in universal use. Died in Paris, 1888.

Hellriegel (*hĕl'rē-gĕl*), **Hermann,** German agricultural chemist, was born at Mausitz, Saxony, 1831. From 1857 to 1873, he was director of the agricultural experiment station of Brandenburg at Dahme. He was traveling instructor at Bernberg from 1873 to 1882, when he was made director. While he made many agricultural investigations, his permanent fame rests upon his demonstration of the ability of the leguminous plants—such as peas, beans, clover, and alfalfa—to assimilate free nitrogen from the air, in connection with which he made his momentous discovery of the tubercles on the roots as the means whereby this process takes place. He died at Bernberg in 1895.

Helmholtz (*hĕlm'hōlts*), **Hermann Ludwig Ferdinand von,** German physiologist and physicist, was born at Potsdam, Prussia, August 31, 1821. In 1838, he entered the royal medicochirurgical institute of Berlin, at which he was graduated in 1842. The thesis which he presented at that time was itself an important contribution to the minute anatomy of nerve cells and fibers. For several years he acted as assistant surgeon in the army. Being then relieved of further military duties, he became assistant at the anatomical museum at Berlin, lecturer on anatomy at the academy of arts, and professor extraordinary of physiology at Albert university. The first of his scientific writings to attract general attention was his famous essay on the *Conservation of Force*, published in 1847. It proved to be one of the most important scientific contributions of the 19th century.

In 1849, Helmholtz was appointed to the chair of physiology and general pathology in the University of Konigsberg. From 1851 to 1856, his researches were confined mainly to physiological optics, with an occasional paper on electrical problems. His systematic investigation of the eye resulted in the invention of the myograph, the ophthalmometer, and the ophthalmoscope, thus making possible the examination of the inmost recesses of the living eye.

Helmholtz was appointed professor of physiology at the University of Bonn in 1855, and, in 1858, he accepted a similar chair at Heidelberg. In 1863, he published his great work on the *Sensations of Tone as the Physiological Basis of Music*. He was at work on optics while still engaged in the study of sound, and his *Handbook of Physiological Optics* appeared in sections in 1856, 1860, and 1867.

In 1871, Helmholtz became professor of physics at the University of Berlin, a post which, after 1887, he held concurrently with that of director of the physicotechnical institute at Charlottenburg, near Berlin. During his last 23 years, he devoted his energies almost entirely to the investigation of physical problems. His greatest researches fall under the following heads: the conservation of energy; hydrodynamics; electrodynamics and theories of electricity; meteorological physics; optics; and the principles of dynamics. In these fields, he succeeded, by the technical merits of his work, in establishing for himself a foremost place among the scientific thinkers of the world.

Honors of all sorts were showered upon him. He was ennobled by William I in 1883. The kings of Sweden and Italy, the grand duke of Baden, and the president of France bestowed the insignia of various orders. Academies, universities, and learned societies sent representatives and addresses to the national celebration of his 70th birthday. Died, September 8, 1894.

Helmont (*hĕl'mŏnt*), **Jan Baptista van,** Belgian chemist, was born at Brussels about 1577. He studied at Louvain, where he graduated in medicine in 1599. In 1609, he settled at Vilvorde, near Brussels, where he practiced medicine gratuitously for 30 years and carried on notable experiments in chemistry. He paid much attention to the study of the gases, and is supposed by some authorities to have been the first to apply the term *gases* to elastic aeriform fluids. Of these gases he distinguished several kinds. His works were published under the title *Ortus Medicinæ*. Died about 1644.

Hemans (*hĕm'ănz*), **Felicia Dorothea,** English poet, was born in Liverpool, 1793. She was the daughter of George Browne, a Liverpool merchant, and became the wife of Captain Hemans. A few years after their marriage, Captain Hemans removed to Italy, and they never afterward met. Mrs. Hemans's subsequent life was spent in North Wales, in Lancashire, and in Dublin. Her shorter pieces are by far the most popular. Many of these, such as *The Better Land*, *Casabianca*, *The Treasures of the Deep*, *The Homes of England*, and *The Lost Pleiad*, have become standard English lyrics, and upon them almost exclusively depends her claim to remembrance. She died in Dublin, 1835.

Henderson, William James, American musical critic, was born at Newark, N. J., 1855; graduated at Princeton university, 1876; and entered journalism. He was on the staff of the New York *Times* from 1883 to 1902, when he became music critic for the New York *Sun*. Besides the libretto to Damrosch's *Cyrano de Bergerac*, his writings include *Story of Music*, *Preludes and Studies*, *What is Good Music?* *The Orchestra and Orchestral Music*, *Richard Wagner, Some Forerunners of Italian Opera*, *Early History of Singing*, and the novel *The Soul of a Tenor*.

Hendrix, Eugene Russell, American churchman, was born at Fayette, Mo., 1847. He was educated at Wesleyan university and Union theological seminary, and was ordained in 1870 to the ministry of the Methodist Episcopal Church, South. He held many important pastorates and, in 1886, was made a bishop of the Church. His ecclesiastical activities included official visits to China, Japan, Mexico, Brazil, and Chosen, in the last of which he founded a mission. Among his publications are *Around the World*, *Christ's Table Talk*, and *If I Had Not Come*. Died, 1927.

Heney, Francis Joseph, American lawyer, was born in Lima, N. Y., 1859. He was educated at the University of California and Hastings law school and was admitted to the bar in 1883. He was engaged in cattle business in Arizona, 1885–89, and, for the following six years, practiced law in Tucson, becoming attorney-general for the state in 1893. In 1895, he began a law practice in San Francisco.

Heney was employed by United States Attorney-General Knox to undertake certain land fraud cases at Portland, Oreg. He discovered a conspiracy of United States Attorney J. H. Hall to protect guilty politicians and secured the indictment and removal of Hall and the indictment and conviction of Senator Mitchell and others. In 1906, his investigation of municipal corruption in San Francisco resulted in the conviction, among others, of Mayor Eugene Smitz and of the political "boss" Abe Ruef. During this action, he was shot and wounded in the open court room.

Henley, William Ernest, English poet, playwright, critic, and editor, was born at Gloucester, 1849. While enduring months of illness in Edinburgh infirmary, 1873–75, he wrote *Hospital Rhymes* and *A Book of Verse*, which won much attention and were followed by *Views and Reviews*, *The Song of the Sword*, *For England's Sake*, and *Hawthorn and Lavender*. He edited the *Magazine of Art*, the *Scots Observer*, and the *New Review*, besides an edition of Burns. He also collaborated with R. L. Stevenson in four plays: *Deacon Brodie*, *Beau Austin*, *Robert Macaire*, and *Admiral Guinea*. He was a brilliant writer with a vigorous, pungent style and, while his poems are egotistical, their originality, power, and intensity insure them a permanent place among modern lyrics. He died in 1903.

Hennepin (*hĕn'ê-pĭn*; Fr., *ĕn'pĂN'*), **Louis,** French priest, missionary, and traveler, was born in Ath, Belgium, 1640. He served in the army as chaplain and, in 1675, went to Canada as a missionary priest. When La Salle undertook his exploration of the Mississippi valley, Father Hennepin was assigned to his command. They visited Niagara falls and Hennepin wrote the first description of it. The party traveled west as far as Mackinac, proceeding thence to Peoria, on the Illinois river. From this point Father Hennepin and two companions in a canoe went down the Illinois river to its mouth in the Mississippi, where they fell into the hands of a party of Sioux Indians. He spent three months among the Indians and was finally rescued by Du Lhut, after whom Duluth was named. Hennepin discovered and named the falls of Saint Anthony, now in Minneapolis. Upon his return to Europe, he published a history of his travels, which is of the greatest value in dealing with the early explorations of the Mississippi valley. Died in Rome shortly after 1701.

Henri (*hĕn'rĭ*), **Robert,** American painter, was born at Cincinnati, Ohio, 1865. He studied art in Philadelphia and in Paris. After an extensive period of travel in Italy, France, and Spain, he established himself in New York, where he became the leading representative of the radical movement in American art. As the head of the "independent" school, he exercised a marked influence upon the younger group of American painters. His style is characterized by bold originality, sincerity of purpose, and simplicity. Among his best-known paintings are "Snow," in the Luxembourg gallery, Paris; "Spanish Gypsy," in the Metropolitan museum, New York; "Young Woman in Black," art institute, Chicago; and "Equestrian," Carnegie institute, Pittsburgh. His work includes portrait, landscape, and figure paintings. He wrote *The Art Spirit*.

Henry I, former king of England, the youngest son of William the Conqueror, was born in 1068. When his predecessor, William II, was found slain, Henry's brother Robert, duke of Normandy, was in Italy. Henry seized the opportunity and had himself crowned king, maintaining his position against Robert, whom he defeated at Tinchebrai in 1106 and thereafter kept imprisoned. Henry thereby secured control of Normandy, which he held at the cost of a struggle with the French king Louis VI. He was called Beauclerc, or "The Scholar," in allusion to his learning, which entitled him to some distinction in his day. The death of his only son, William, in 1120 is said to have permanently darkened the king's life. Died, 1135.

Henry II, former king of England, grandson of Henry I, was born in 1133 and, in 1154, was crowned with his queen, Eleanor, who was countess of Poitou and duchess of Aquitaine. These territories of France, together with others inherited by Henry from his father, were thus brought under the crown of England.

The chief obstacle to Henry's authority was the Church. In the hope of rendering it subject to the civil power, he appointed his trusted chancellor, Thomas à Becket, to the see of Canterbury. Becket refused, however, to be subservient to the king and a long struggle between the two was terminated only by the murder of Becket, for which Henry could not entirely escape blame. The king did penance for the crime, but, for the future, enjoyed a power unchallenged by the Church. Henry's later years were clouded by a rebellion on the part of his three sons. Died, 1189.

Henry III, king of England, grandson of Henry II, and eldest son of King John, was born in 1207. He came to the throne in 1216 when a minor, and, in the course of a long reign, provoked much hostility by his fondness for foreign favorites and by his submission to papal exactions. This discontent culminated in the Barons' war, 1262–65, in which he was defeated and compelled to submit to the control of the government by De Montfort and his friends. De Montfort summoned, in 1265, the first Parliament to which representatives from both towns and counties were called. De Montfort was later defeated by Henry's son Edward, who continued to control the government. Westminster Abbey was almost entirely rebuilt in Henry's reign. Died, 1272.

Henry III, king of France, third son of Henry II and Catherine de' Medici, was born in 1551. In 1569, he gained victories over the Protestants at Jarnac and Moncontour, and he took an active share in the massacre of Saint Bartholomew. In 1574, he succeeded his brother Charles IX on the French throne.

Henry showed fickleness and want of courage in his public conduct; his private life was spent in an alternation of dissolute excesses and wild outbreaks of religious fanaticism. His reign was a period of almost incessant civil war between Huguenots and Catholics, the duke of Guise having formed the Holy league to assert the supremacy of Catholicism and secure the reversion of the throne to the Guises. In 1588, the assassination of the duke of Guise roused the Catholics to the utmost pitch of exasperation; Henry threw himself into the arms of Henry of Navarre, and the two marched upon Paris at the head of a Huguenot army. But, in August 1589, Henry was stabbed by a fanatical Dominican named Jacques Clément; he died, the last of the house of Valois, on the following day, nominating Henry of Navarre as his successor.

Henry IV, emperor of the Holy Roman Empire, was born at Goslar, Prussia, 1050, son of Henry III. He was crowned emperor in 1084 by Clement III. His reign was notable for the struggle with Gregory VII, with whom he began the investiture disputes. During this celebrated controversy, Henry was excommunicated and was obliged to submit. Gaining absolution from the pope at Canossa, he recovered his power by the defeat of Rudolph of Swabia and other enemies in Germany and invaded Italy. He took Rome and deposed Gregory. He was dethroned by his son Henry in 1105. Died, 1106. See *Canossa*.

Henry IV, former king of England, the first of the house of Lancaster, was born in 1367 and was surnamed Bolingbroke from his birthplace. Before his accession, he won considerable fame by his military prowess. He led an expedition that compelled the ruling monarch, Richard II, to dismiss his foreign favorites, and he fought in Lithuania and in the Holy Land. He was later banished by Richard II, but, taking advantage of Richard's absence in Ireland, he landed and was acclaimed ruler by Parliament in 1399. Richard, finding himself deserted, was compelled to abdicate.

Henry's reign was marked by wars, finally successful, with Owen Glendower of Wales, with James I of Scotland, and with Hotspur, leader of the Percy family in England. Another unhappy feature of his time was the campaign of persecution against the Lollards. Died, 1413.

Henry IV, king of France, was born in 1553. He was founder of the Bourbon dynasty, succeeding Henry III in 1589. His marriage with Marguerite de Valois, in 1572, was the occasion for the massacre of Saint Bartholomew. In 1576, he quitted the court and became leader of the Huguenots and opponent of the Holy league, being the rival of the Guises for the succession. He defeated them at Arques and Ivry, but was unable to conquer Paris without becoming a Roman Catholic. He accordingly changed his

faith in 1593 and was accepted as king by the city. He concluded peace with Philip II at Vervins and, in 1598, issued the edict of Nantes, allowing the Protestants liberty of conscience. The rest of his reign was occupied by domestic reforms. He was assassinated by Ravaillac, 1610.

Henry V, former king of England, was born at Monmouth, 1387, the eldest son of Henry IV. He won considerable celebrity in the wars against Owen Glendower and Hotspur before his father's death, but, on his accession, took steps to conciliate his father's enemies. The persecutions of the Lollards, however, continued throughout his reign.

Henry V began the Hundred Years' war against France, claiming the French crown through his great-grandfather Edward III. He invaded France in 1415 with 30,000 men; took Harfleur; defeated the French at Agincourt; and, by 1418, reduced Normandy to subserviency. He was recognized as regent and "heir of France" in 1420; but hostilities were renewed in 1421, and he died in 1422 before bringing his enemies into final submission.

Henry VII, former king of England, the first of the Tudor dynasty, was born in 1457. He became head of the Lancaster house and, by his defeat of the Yorkist Richard III at Bosworth in 1485 and by his subsequent marriage with the Yorkist princess Elizabeth, he brought to a close the Wars of the Roses. He was crowned by Parliament in 1485.

Yorkist risings in Scotland led Henry to arrange a marriage alliance between his daughter and the king of Scotland, the result of which, a century later, was the union of England and Scotland under one ruler. Disturbances in Ireland led to the passing of Poyning's law, by which acts of the English Parliament were applicable also to Ireland. Henry crushed the power of the nobles by a secret court called the Star Chamber. Parliament was subservient to his wish, and the royal power notably increased during his reign. Died, 1509.

Henry VIII, former king of England, was born in 1491 and succeeded Henry VII on the throne at the age of 18. Being handsome and generous, he was popular with all classes and exercised, through his ministers, an almost unlimited power over the kingdom. Europe was at this time divided between the hostile camps of Francis I of France and the emperor Charles V. Henry took some part in this struggle, usually favoring Charles, and he defeated the French at Guinegate, Therouanne, and Tournay. James IV of Scotland invaded England, but was defeated and killed at Flodden.

Henry had married, at 19, his brother's widow, Catherine of Aragon. Failing to obtain a son by her and being fascinated by a court maid, Anne Boleyn, he requested the pope to declare his marriage void. His minister Wolsey, who was charged with obtaining the papal decision, failed and was dismissed. Henry took a new minister, Cranmer, who advised Henry to abrogate the papal power in England and have the sovereign recognized as head of the Church in the kingdom. Henry brought about this change through Parliament and then married Anne Boleyn. Each succeeding sovereign, except Mary, has been the head of the Church of England. The Bible was translated into English and was introduced into the churches. Henry deviated little from the orthodox doctrine, but it was made a treasonable act to deny his supremacy as head of the Church in England. The property of many monasteries was seized and was used to enrich the national treasury.

Anne Boleyn was charged with infidelity in 1536 and was executed. Henry's next wife was Jane Seymour, who died in 1537 and was succeeded by Anne of Cleves. He divorced her shortly and married Catherine Howard, who was beheaded for alleged infidelity. His last wife, Catherine Parr, survived his death in 1547.

Henry, Joseph, American physicist, was born in Albany, N. Y., 1797; was appointed professor of natural philosophy in the college of New Jersey at Princeton, 1832; and, in 1846, was called to the office of director of the Smithsonian institution at Washington, to the organization and wide reputation of which he had greatly contributed.

Henry made most important discoveries in electromagnetism and disputed with Morse the invention of the electric telegraph. He originated the principle and Morse perfected the method of using the electromagnet for commercial telegraphy. His most notable contribution to electrical science was his discovery of the method of producing induced currents, 1829-30. This is the underlying principle governing the construction of dynamos and transformers. In 1842, he discovered that the discharge of a Leyden jar would induce discharges in other circuits at a distance. This anticipated the essentials of modern wireless telegraphy. Later he became interested in meteorology and suggested using the telegraph to collect and distribute weather information. He was an original member and president of the national academy of sciences. Died in 1878 and was elected to the American hall of fame, 1915.

Henry, Patrick, American orator and statesman, was born in Virginia in 1736. After receiving a common school education and spending some time in trade and agriculture, he commenced the practice of law with only six weeks of preparatory study. After several years of poverty, he rose to distinction in managing the popular cause in a controversy between the legislature and the clergy touching the stipend which was claimed by the latter.

In 1765, he was elected a member of the Virginia house of burgesses, with express reference to an opposition to the British Stamp act. In this assembly, he obtained the honor of being the first to commence that opposition to the measures of the British government which terminated in the Revolution. He was one of the delegates sent by Virginia to the First Continental Congress of the colonies, in 1774, and, in that body, he distinguished himself by his boldness and eloquence. In 1776, he was appointed the first governor of the commonwealth, and to this office he was repeatedly re-elected. In 1786, he was appointed by the legislature one of the deputies to the convention held at Philadelphia for the purpose of revising the Federal Constitution. In 1788, he was a member of the convention which met in Virginia to consider the Constitution of the United States, and he exerted himself strenuously against its adoption. He retired from the bar in 1794.

Without extensive information upon legal or political topics, he was a natural orator of the highest order, possessing great powers of imagination, sarcasm, and humor, united with great force and energy of manner and a deep knowledge of human nature. Died, 1799. He was elected to the American hall of fame in 1920.

Henry the Lion, duke of Saxony and Bavaria, was born in 1129. He was the son of Henry the Proud, a rebellious noble who had been deprived of his estates by Conrad III. On the death of Conrad, these dukedoms were restored to Henry the Lion, who became the strongest of all the German princes. Great improvements were made by him in his dominions, and he became so powerful that he determined to be no longer subject even to the emperor. At the battle of Legnano, he caused the emperor Frederick Barbarossa to be defeated by withdrawing his own troops from the field. For this, Frederick took away his estates and banished him to England for three years. Died, 1195.

Henry the Navigator, son of John I, king of Portugal, was born in 1394. He distinguished himself at the capture of Ceuta in 1415; took up his residence at Sagres, in Algarve; and devoted himself to extending geographical discovery. He erected an observatory and a school for navigation and dispatched some of his pupils on voyages that resulted in the discovery of the Madeira islands in 1420. Henry's thoughts were now directed toward the gold producing coasts of Guinea. In 1434, one of his mariners touched Cape Bojador; in 1441, Cape Blanco was reached; Cape Verde was doubled in 1445; and, in 1455, Cadamosto sailed to the mouth of the Gambia. This maritime enterprise continued for a half century after Henry's death and resulted in the rounding of the Cape of Good Hope and the founding of Portuguese empires in India and Brazil. Died, 1460.

Hepburn, James Curtis, American medical missionary and scholar, was born at Milton, Pa., 1815. He graduated at Princeton college and at the University of Pennsylvania medical department. He went to China as a medical missionary in 1840; returned to New York, 1846; went to Japan, 1859, residing in Yokohama until 1892; and returned to the United States, 1893, and retired. He compiled the first English dictionary of the Japanese language; published an *English-Japanese Dictionary*; wrote a grammar of the Japanese language; translated the Bible into the Japanese language, 1872-88; and published a Japanese *Dictionary of the Bible*, 1891. Died, 1911.

Heraclius (*hĕr-ā-klī'ŭs*), Byzantine emperor, was born in Cappadocia about 575. In 610, he headed a revolt against Phocas, slew him, and mounted his throne. At this time, the Avars threatened the Empire on the northwest, and the Persians invaded it. Chosroes II captured Damascus in 613 and Jerusalem in 614; then all Syria, Egypt, and Asia Minor were conquered. At length Heraclius, having, in 620, concluded a treaty with the Avars, took the field against the Persians in 622, routed them in a series of brilliant campaigns, won back his lost provinces, and shut up Chosroes in Ctesiphon, 628. But soon the followers of Mohammed won from Heraclius nearly all he had gained from the Persians, he meanwhile spending his time in self-indulgence and theological disputes. Died, 641.

Herbart (*hĕr'bärt*), **Johann Friedrich,** German philosopher and educationist, was born at Oldenburg, 1776. He studied at Jena, became the pupil of Fichte, and received his philosophy with enthusiasm; but, after reflection, he found himself obliged to reject much of Fichte's system and formed one of his own. In 1805, he was appointed professor at Gottingen and, in 1809, obtained the chair of philosophy at Konigsberg. In 1833, he returned to Gottingen.

Herbart's system has exercised a great influence in philosophy and in education. He taught that character, the moral end of life, is the aim of education and that it has its beginning in knowledge and its end in action. His principles of interest, correlation, apperception, method of the recitation, and moral education, introduced into the United States under the leadership of Charles DeGarmo and C. A. McMurry, have been widely adopted in normal and elementary schools. Died in 1841. His collected works were published, 1850–52. See *Educational Reformers.*

Herbert, Victor, composer and conductor, was born in Dublin, Ireland, 1859. He studied music in Germany and gained his first position of prominence as principal violoncello player in court orchestra, Stuttgart. He came to the United States as solo violoncellist in the Metropolitan orchestra, New York, 1886. Subsequently he was connected with Theodore Thomas's, Seidl's, and other orchestral organizations as soloist and conductor. He founded and was conductor of the Pittsburgh symphony orchestra, 1898–1904, and became conductor of his own New York orchestra, 1904. Among his compositions are the comic operas *Prince Ananias, The Wizard of the Nile, The Serenade, Cyrano de Bergerac, The Ameer, The Viceroy, The Idol's Eye, The Fortune Teller, Babette, Babes in Toyland, It Happened in Nordland,* and *Hearts of Erin.* He also wrote the oratorio *The Captive*; the operas *Natoma* and *Madeleine*; compositions for the orchestra; and songs. Died, 1924.

Herder (*hĕr'dĕr*), **Johann Gottfried von,** German critic and poet, was born at Mohrungen in East Prussia, 1744. He studied at Konigsberg and there became acquainted with Kant. In 1764, he became a teacher in a school and assistant pastor of a church at Riga. Between 1766 and 1769, he wrote two works, in which he maintained that the truest poetry is the poetry of the people. In 1769, he made the acquaintance of Goethe at Strasbourg; in 1771, was appointed court preacher at Buckeburg; and, in 1776, was made first preacher in Weimar. In 1802, he was ennobled by the elector of Bavaria. Herder's notable work in æsthetics, philosophy, philology, and literature exercised a profound influence on German thought. Among his many important works are *Fragments of the More Modern German Literature, Origin of Language, The Oldest Record of the Human Race, Folk-Songs, Voices of the Nations in Songs,* and *Letters for the Advancement of Humanity.* Died in 1803.

Hergesheimer, Joseph, American author, was born at Philadelphia in 1880. He was educated at a Quaker school in Philadelphia and in the Pennsylvania academy of fine arts. His numerous popular novels and short stories include *The Lay Anthony, Gold and Iron, Steel,* and *Cytherea.*

Herkimer (*hûr'kĭ-mĕr*), **Nicholas,** American general, was born in New York about 1715. In 1758, he was appointed a lieutenant of militia, and he commanded Fort Herkimer at the time the French and Indians attacked German Flats. In 1775, he was made colonel of militia and chairman of the Tryon County committee of safety. In 1776, he was made brigadier general. In the next year, when Colonel Saint Leger, sent out by General Burgoyne, was besieging Fort Stanwix, Herkimer, with 800 militia, marched to its relief. In this movement, he fell into an ambuscade at Oriskany in August 1777. Herkimer's horse was killed and he himself was fatally wounded. In 1884, a monument was erected to his memory on the field of Oriskany.

Herne (*hĕrn*), **James A.,** American actor and dramatist, was born at Troy, N. Y., 1840. He appeared mainly in his own plays, the chief of which are *Hearts of Oak, Margaret Fleming, The Rev. Griffith Davenport,* and *Sag Harbor.* His rural comedy *Shore Acres,* one of the most successful dramas of the American stage, was played almost continuously for six years. He was an actor of great ability and a skillful stage manager. Died, 1901.

Herod (*hĕr'ŭd*) **the Great,** king of Judæa, son of Antipater, became governor of Galilee about 47 B. C., and through the influence of Mark Antony ascended the throne of Judæa in 37. In his reign occurred the birth of Jesus. He rebuilt the temple in Jerusalem and did much for Judæa; but his last years were embittered by intrigue and were so stained by his cruelty that for deeds of blood and violence his name became a proverb. Died, 4 B. C. See *Chronology.*

Herodotus, Greek historian, was born in Halicarnassus, a Doric colony of Asia Minor, about 484 B. C. His father, Lyxes, belonged to a prominent family there. The epic poet Panyasis was his uncle, from whom probably Herodotus acquired the familiarity with Greek poetry that he showed later in his writings. In 457 B. C., Panyasis was put to death for conspiring against Lygdamis, the tyrant of Halicarnassus, and Herodotus went into exile, taking up his abode temporarily in the island of Samos. He later resided in Athens.

The work on which rests the fame of Herodotus is called *Histories.* It is an account of the wars waged by the Persians against the Greeks from 500 B. C. to 479 B. C. These wars, however, are regarded by the author merely as the culmination of a long struggle between the East and the West that arose as early as the period of the Trojan war. In the *Histories,* Herodotus undertakes to describe this struggle and thereby has occasion to narrate the whole history of the world as then discoverable. Writing of a period in which accurate records were conspicuously lacking, he was obliged to rely much on traditions, regarding which he adopted a critical attitude. His work is a rich storehouse of fascinating stories and interesting facts.

In order to describe adequately the peoples and places mentioned in his *Histories,* he traveled over the greater part of the known world, including what is now southern Russia, the Balkan countries, Turkey, and Egypt. His shrewd geographical and anthropological observations add a scientific value to a work otherwise distinguished by a singular charm of narrative. Herodotus was the first writer who so unified the record of facts as to raise historical narrative to the level of literature. On these grounds, he merits the title first given him by Cicero, "the father of history."

Herodotus is said to have read his composition amid marked approbation at the Olympic games and to have received 10 talents from Athens in recognition of his literary services to Greece. In 444 B. C., he joined an Athenian colony then being founded at Thurii, Italy, where he died about 424 B. C.

Herrick, Robert, English poet, was born in Cheapside, London, 1591. He was educated at Cambridge. After taking orders as a clergyman of the Church of England, he was presented by Charles I to the vicarage of Dean Prior. After about 20 years' residence, his living was sequestered in the Civil war, and he went to reside in Westminster. After the Restoration, he was replaced in his vicarage. In 1648, he published his celebrated collections of lyric poems entitled *Hesperides* and *Noble Numbers.* His poems, which include some of the best-known lyrics in the language, are distinguished for their freshness, sweetness, and melody. Died, 1674.

Herrick, Robert, American educator and novelist, was born at Cambridge, Mass., 1868. He graduated at Harvard, 1890; taught at Massachusetts institute of technology, 1890–93; and was instructor in rhetoric and English at the University of Chicago, 1893 to 1905, and professor of English until 1923. His fiction presents broad pictures of American life, discussing the conflict of commercialism and idealism, and problems of sex discord, somewhat in the manner of Ibsen and Sudermann. His first novel of note was *The Gospel of Freedom,* 1898. His other works include *The Man Who Wins, Love's Dilemmas, The Web of Life, The Real World, Their Child, A Life for a Life, The Master of the Inn, The Healer, One Woman's Life, His Great Adventure, The Conscript Mother,* and *Chimes.*

Herschel (*hûr'shĕl*), **Caroline Lucretia,** sister of the astronomer Sir William Herschel, was born in Hanover, 1750. When William was appointed astronomer to George III, she acted as his assistant, living with him during his entire career, and in that character received a small salary from the king. She discovered seven comets, for five of which she has the credit of priority of discovery. Several remarkable nebulæ and clusters of stars included in her brother's catalogues were described from her original observations. In 1798, she published, with an introduction by her brother, *A Catalogue of Stars Taken from Mr. Flamsteed's Observations.* This valuable work was published at the expense of the royal society and contained 561 stars omitted in the British catalogue. She was made an honorary member of the royal society. Died in 1848.

Herschel, Sir John Frederick William, English astronomer, son of Sir William Herschel, was born in 1792. About 1825, he began his observations in sidereal astronomy, to which he chiefly devoted himself. His great enterprise was his expedition, in 1833, to the Cape of Good Hope to take observations of the southern firmament. In 1847 appeared his *Results of Astronomical Observations at the Cape of Good Hope,* one of the most valuable works of our time. His residence at the Cape gave valuable additions not only to astronomy but also to meteorology. His observations on the milky way, on the brightness and the color of stars, on variable stars, on the sun's rays, on the atmospheric air, and on the Magellanic clouds are all very important.

Herschel made valuable researches also in light, sound, and celestial physics. In chemistry, he discovered the solvent power of sodium hyposulphite upon the salts of silver, which was the prelude to its important use in photography; and he was the first to apply the now universally known term "positive" and "negative" to photographic images. His best-known work is *Outlines of Astronomy.* Died, 1871.

Herschel, Sir William, astronomer, was born in Hanover, 1738. He was educated as a professional musician. In 1757, he went to England, where he became a teacher of music in the town of Leeds, from which he went to Halifax as organist and subsequently in the same capacity

to Bath. Here he turned his attention to astronomy. Wanting a telescope and unable to afford a reflector, he made one for himself. In 1781, he discovered the planet Uranus, which discovery resulted in his appointment as private astronomer to George III with a salary of £200 a year. He was knighted and was made a D. C. L. by the University of Oxford. He added greatly to our knowledge of the solar system; discovered six satellites of Uranus and two satellites of Saturn; detected the rotation of Saturn's rings, the period of rotation of Saturn itself, and the existence of the motion of binary stars—the first revelation of systems besides our own. He contributed to our knowledge of the Milky Way and the constitution of nebulæ. He was, in fact, the first to give the human mind a proper conception of the immensity of the universe. He erected a monster telescope, as it was then considered, of 40 feet focal length. It was begun in 1785 and was finished in 1789. Died, 1822.

Hertwig (*hĕrt'vĭĸ*), **Oscar,** German embryologist, was born at Friedberg, 1849. He was educated at the University of Jena, where he studied under Haeckel and Gegenbaur. He also studied at the universities of Zurich and Bonn. In 1878, he became professor of anatomy at Jena and, in 1888, at Berlin, where he was made rector in 1904. He was one of the most influential embryologists of his time. He published, in 1876, his work on *The Animal Egg*, in which he demonstrated that fertilization consists of the conjugation of two equivalent sexual cells. He is author of numerous biological works, including a *Text-book of Embryology* which has been widely translated. Died, 1922.

Hertz (*hĕrts*), **Alfred,** German musical conductor, was born at Frankfort, 1872. He received his musical education at Raff conservatory. From 1892 to 1895, he was conductor at Altenburg; from 1895 to 1899, at Elberfeld; and, from 1899 to 1902, at Breslau. In 1902, he was made conductor at the Metropolitan opera house in New York, where, in 1903, he conducted the first performance of Wagner's *Parsifal* given outside of Bayreuth and, in 1910, directed the first performance of Humperdinck's *Königskinder*. In 1915, he conducted notable orchestral concerts in connection with the Panama exposition at San Francisco, including the production of Horatio Parker's prize opera, *Fairyland*. He later became director of the San Francisco symphony orchestra.

Hertz, Gustav, German physicist, born in 1887, shares with Dr. James Franck the honor of devising, in 1912, the first experimental verification of Planck's theory that light and other forms of energy travel, not in continuous waves, but in bundles, or "quanta." Hertz was later made professor of physics at the University of Halle. With Dr. Franck, he was awarded the Nobel prize in physics for 1925.

Hertz, Heinrich, German physicist, was born in Hamburg, 1857. He was educated at the University of Berlin, receiving his final training under Helmholtz. While professor of physics at the technical high school at Karlsruhe, 1885–89, he made his remarkable experiments on electric waves. By inventing an apparatus which might be called an electric eye, he detected the electromagnetic waves now known as Hertzian waves. After proving the existence of electric waves propagated through space, he proved also that they could be reflected, refracted, polarized, and diffracted just as light is, and that they travel at the same speed as light. Wireless telegraphy is the direct practical outcome of this momentous discovery. In 1889, Hertz succeeded Clausius as professor of physics at Bonn. He died at Bonn, 1894. See *Hertzian Waves*.

Hertz, Henrik, Danish poet and dramatist, of Jewish descent, was born in Copenhagen, 1798. He was educated at the University of Copenhagen, traveled abroad, and returned as a professor of the university. His first important work was *Letters of a Ghost*, a rimed satirical poem. His subsequent works include *Amor's Strokes of Genius*, *Love and Policy*, and *The Youngest*. Hertz ranks among the foremost Danish lyric poets, and his romantic dramas, *Svend Dyring's House* and *King René's Daughter*, have become classics of the Danish theater. Died, 1870.

Hervieu (*ĕr'vyû'*), **Paul Ernest,** French author and dramatist, was born at Neuilly sur Seine in 1857. He was educated for the law and began practice, but soon devoted himself to literature. He wrote several novels, but his most notable achievements were in the drama. In 1895, he published *The Nippers*, a powerful play, which established his reputation. His dramas are thesis plays which treat of phases of life that need correcting, and are developed with notable directness and sincerity. His dramatic works include *Words Remain*, *The Law of Man*, *The Passing of the Torch*, *Modesty*, and *Know Thyself*. He was elected to the French academy, 1900. Died, 1915.

Herzog (*hĕr'tsôĸ*), **Johann Jakob,** German theologian, was born at Basel, 1805. He was professor at Lausanne, 1835–47, at Halle, 1847–54, and at Erlangen, 1854–77. He wrote books on the Waldenses, lives of Calvin and Œcolampadius, and a church history. He edited the great *Realencyklopädie für Protestantische Theologie und Kirche*. Died, 1882.

Hesiod (*hē'sĭ-ŏd*), Greek poet, lived probably in the 8th century B. C. Of the works ascribed to him, the principal are the *Works and Days*, the *Theogony*, and the *Shield of Hercules*. His poems treat of the quiet pursuits of agricultural life, the origin of the world, and the genealogy of the gods and heroes. They are pervaded by a certain pessimism and a sense of the hardness of the human lot.

Hewitt, Peter Cooper, American inventor and capitalist, son of Abram S. Hewitt, was born in New York City, 1861. He was educated at Stevens institute and at Columbia college. After entering his father's business, he invented improvements in the manufacture of glue. Turning his attention to electricity, he invented the Cooper Hewitt lamp, which consists of a glass tube filled with mercury vapor with suitable electrodes at each end. Upon passing a direct current through the tube, the vapor becomes incandescent, giving off a brilliant greenish light which is of great value as an artificial illuminant in photography. He was a director of several manufacturing concerns, a trustee of Cooper Union, and a member of various scientific societies. Died in 1921.

Hewlett, Maurice Henry, English novelist, was born at London, 1861. He was educated for the law and was called to the bar in 1891. He turned his attention to literary work, and, in 1898, won his first success with a novel entitled *The Forest Lovers*. He excels in historical romance, his quaint, picturesque style being notably effective in portraying medieval and Renaissance scenes and characters. His writings include *Pan and the Young Shepherd*, *Little Novels of Italy*, *New Canterbury Tales*, *The Queen's Quair*, *Fond Adventures*, *The Fool Errant*, *The Stooping Lady*, *Half-way House*, *A Lover's Tale*, *The Little Iliad*, *Frey and his Wife*, *The Song of the Plow*, *Peridore and Paravail*, *The Village Wife's Lament*, *Flowers in the Grass*, *In a Green Shade*, and *Wiltshire Essays*. Died, 1923.

Heyne (*hī'nē*), **Christian Gottlob,** German classical scholar, was born in Chemnitz, 1729. He was educated at the University of Leipzig. In 1753, he became underclerk in the Brühl library at Dresden. While there he prepared his edition of *Tibullus*, which appeared in 1755. In 1756, unfortunately for Heyne, the Seven Years' war broke out. Frederick the Great marched against Dresden, and among other things burned the Brühl library, but not before Heyne had edited, from a *codex* there, the *Encheiridion* of Epictetus. In 1763, following the death of Gesner, professor of rhetoric at Gottingen, Heyne was appointed his successor. Among his other works were editions of Virgil, Pindar, Apollodorus, and Homer's *Iliad*; six volumes of *Opuscula Academica*; and some 7000 reviews of books in the *Göttinger Gelehrte Anzeigen*. Died, 1812.

Heyse (*hī'zē*), **Paul Johann,** German poet, dramatist, and novelist, was born in Berlin, 1830. He was educated at Berlin and Bonn, settled at Munich in 1854, and devoted himself to literature, becoming a dominant figure among German men of letters. His short stories, of which he wrote over 150, are miniature masterpieces of fiction. *Das Buch der Freundschaft* is the best single volume of these stories and the widely admired *L'Arrabbiata* is the most noted single example. His poetic works include narrative poems, such as *Urica*, epics such as *Die Braut von Cypern* and *Thekla*, and many lyrics. He wrote also many plays, but these lack genuine dramatic action. Among some 60 dramas, the most noteworthy are *Die Sabinerinnen*, *Maria von Magdala*, *Der Heilige*, and *Die Tochter der Semiramis*. Among his successful novels are *Kinder der Welt*, *Im Paradiese*, *Merlin*, and *Ueber Allen Gipfeln*. He received the Nobel prize for literature, 1910. Died, 1914.

Hibben, John Grier, American educator, was born at Peoria, Ill., in 1861. He was graduated from Princeton university in 1882, studied at the University of Berlin, 1882-83, and at Princeton theological seminary, 1883–86. Ordained to the Presbyterian ministry, he was pastor at Chambersburg, Pa., from 1887 to 1891. Returning to Princeton university, he was successively instructor, assistant professor, and professor of logic from 1891 to 1912, when he was made president of the university. His works include *Inductive Logic*, *Problems of Philosophy*, *Hegel's Logic*, *Deductive Logic*, *The Philosophy of the Enlightenment*, *A Defence of Prejudice*, and *The Higher Patriotism*. He also edited *Epochs of Philosophy*.

Hichens (*hĭch'ĕnz*), **Robert Smythe,** English novelist, was born at Speldhurst in Kent, 1864. He received his education at Clifton college, the royal college of music, and the London school of journalism. At first he devoted himself to music, but he began early to write lyrics and stories and soon gave up music for literature. In 1894, he published anonymously *The Green Carnation*, satirizing the decadents. It was attributed to Oscar Wilde and produced a great sensation.

The list of Hichens' works includes *An Imaginative Man, Flames, The Slave, The Prophet of Berkeley Square, Felix, The Garden of Allah* (later elaborately presented as a drama), *Bella Donna* (also dramatized), *The Dweller on the Threshold, The Way of Ambition, The Spell of the Holy Land, The Fruitful Vine, In the Wilderness, The Daughters of Babylon* (with Wilson Barrett), and *The Spirit of the Time.* Among his volumes of short stories are *Tongues of Conscience* and *The Black Spaniel and Other Stories.* He wrote also the plays entitled *The Real Woman*, adapted from a French drama, and *The Voice from the Minaret.* He assisted in writing the successful plays *The Medicine Man* and *Becky Sharp.*

Hicks, Elias, American minister of the Society of Friends, was born at Hempstead, L. I., in 1748. At 27, he was a well-known and influential Quaker preacher, and for many years traveled through the United States and Canada. He exercised great influence among his coreligionists until his Unitarianism brought him into disfavor with orthodox Friends. He defended his views with perseverance, and, at 80, he still preached. The result was a schism of the society into two divisions, known as the Orthodox and the Hicksite Friends. Died, 1830.

Hicks, Frederick Charles, American economist, was born at Capac, Mich., in 1863. He was graduated in 1886 at the University of Michigan, from which, in 1890, he received the degree of doctor of philosophy. In 1891-92, he was instructor in political economy in the University of Michigan, and, from 1892 to 1900, he was professor of history and economics in the University of Missouri. He was professor of economics and commerce at the University of Cincinnati from 1900 to 1920, when he became president of the university. His writings include *Lectures on the Theory of Economics, Competitive and Monopoly Price*, several monographs, and various contributions to economic journals.

Higginson, Henry Lee, American banker, was born in New York, 1834. He entered Harvard in 1851, but did not complete his course. He became an employee in the countinghouse of S. and E. Austin, Boston; then went to Vienna; studied music; served in the United States volunteers in the Civil War, becoming major. In 1868, he entered the firm of Lee, Higginson and Company, bankers, Boston, and later became an officer and director in many important corporations. In 1881, he founded the symphony orchestra in Boston, and, for a long period, he contributed to its support. His patronage of music, extensive donations to Harvard university, liberal benefactions to charities, and prominence in civic affairs caused him to be styled "Boston's first citizen." He died in 1919.

Higginson, Thomas Wentworth, American writer, was born in Cambridge, Mass., 1823. He was graduated at Harvard in 1841. After several years in the ministry he entered keenly into the movement against slavery. He took part in the Civil War first as captain of volunteers and later as colonel of colored troops. After the war he devoted himself to literature, education, and the political rights of women. He was a clear, graceful, vigorous writer and his books reflect his manly, generous ideals and the power and courage of his convictions.

Among Higginson's numerous works are *Outdoor Papers, Army Life in a Black Regiment, Oldport Days, Young Folks' History of the United States, Short Studies of American Authors, Common Sense About Women, Larger History of the United States, Women and Men, Concerning All of Us, English History for Americans, Cheerful Yesterdays, Old Cambridge, Contemporaries, Henry W. Longfellow* (in American Men of Letters series), *John G. Whittier* (in English Men of Letters series), *A Reader's History of American Literature*, and *Part of a Man's Life* (autobiographical). In 1908, he was elected member of the American academy of arts and letters. Died, 1911.

Hildebrand, Saint. See *Gregory VII.*

Hildreth (*hĭl'drĕth*), **Richard,** American historian, was born in Deerfield, Mass., 1807. He was graduated at Harvard college in 1826, studied law, and was admitted to the bar in 1830. He entered journalism and, after being connected with various newspapers, he joined the editorial staff of the New York *Tribune.* In 1861, he became United States consul at Trieste, Austria. Among his most notable works are the *History of the United States, Despotism in America, Theory of Morals*, and *Theory of Politics.* He died in 1865.

Hilgard (*hĭl'gärd*), **Eugene Woldemar,** chemist and geologist, was born at Zweibrucken, Bavaria, in 1833. He was brought to America by his parents in 1836, but returned to Germany for his education. He was graduated at the University of Heidelberg in 1853 and studied also at Zurich and at Freiberg in Saxony. He was state geologist of Mississippi from 1855 to 1873; was professor of chemistry in the University of Mississippi from 1866 to 1873; and was professor of geology and natural history in the University of Michigan, 1873-75. From 1875 to 1904, he was professor of agriculture in the University of California.

Hilgard's important investigations on the chemistry and physics of soils and especially on the reclamation of alkali lands in the West led to valuable applications of agricultural science. In 1894, he received the Liebig medal for distinguished achievements in agricultural science from the academy of sciences, Munich. He died in 1916.

Hill, Albert Ross, American educator, was born in Nova Scotia, 1869. He was graduated at Dalhousie university in 1892, was awarded the degree of doctor of philosophy at Cornell university in 1895, and studied also at Heidelberg, Berlin, Strasbourg, and Clark university. He was professor and director of the psychological laboratories, 1898-1903, in the University of Nebraska. From 1903 to 1907, he was professor of educational psychology in the University of Missouri, to which he returned as president in 1908, after one year as dean at Cornell university. He resigned in 1922 and became general manager of the Ward Investment Company in Kansas City, Mo.

Hill, Ambrose Powell, American soldier, was born in Virginia, 1825. He was graduated at West Point in 1847, served in the Mexican war, and, in 1861, entered the Confederate army as colonel. He served in Johnston's command at the first battle of Bull Run, commanded a brigade at Williamsburg, and, in 1862, became a major general. He took part in the seven days' battle around Richmond and in the second battle of Bull Run. At Fredericksburg, he commanded the right wing of Jackson's corps. In 1863, he was promoted lieutenant general and commanded a corps at Gettysburg. In 1864, he temporarily repelled the attack on Weldon railroad. While reconnoitering, he was killed near Petersburg, Va., in 1865.

Hill, Archibald Vivian, English physiologist, was born in 1886. After graduating from Trinity college, Cambridge, in 1909, he was made a fellow of that university and was appointed professor of physiology, 1910, at Manchester university, from which he accepted an invitation to a similar chair at University college, London, in 1923. His contributions to science relate chiefly to the production of heat due to muscular contraction. For his work in this field, he was awarded one-half of the Nobel prize for medicine in 1922.

Hill, David Jayne, American diplomat and historian, was born in Plainfield, N. J., 1850. In 1874 he was graduated at Bucknell university, Pa., of which he was president in 1879-88. After eight years' service as president of Rochester university, 1888-96, he studied international law at Berlin and at Paris. Following his return to the United States, he was assistant secretary of state, 1898-1903; minister to Switzerland, 1903-05; minister to the Netherlands, 1905-07; and ambassador to Germany, 1908-11.

Hill's numerous works include *Life of Washington Irving, Elements of Psychology, Genetic Philosophy, International Justice, A Primer of Finance, The Life and Work of Hugo Grotius, The Contemporary Development of Diplomacy, World Organization as Affected by the Nature of the Modern State, The People's Government, The Rebuilding of Europe*, and *American World Politics.* In 1920, he was elected member of the American academy of arts and sciences.

Hill, James Jerome, American railway promoter and capitalist, was born near Guelph, Ont., 1838. He was educated at Rockwood academy; left his father's farm for business life in Minnesota; engaged in a general fuel and transportation business, becoming head of Hill, Griggs and Company. He established in 1870 the Red River Transportation Company, which was the first to maintain communication between Saint Paul and Winnipeg. In 1878, he secured control of the Saint Paul and Pacific railroad from the Dutch owners of the securities. He reorganized the system as the Saint Paul, Minneapolis, and Manitoba Railway Company, was its general manager, 1879-81, and president from 1882 to 1890, when this railway became part of the Great Northern system.

Hill then interested himself in building the Great Northern railway, completing, 1888-93, the main line from Lake Superior to Puget sound, with northern and southern branches and a direct steamship connection with China and Japan. He became president of the entire Great Northern system, 1889; was chief promoter and president of the Northern Securities Company, and director of many important corporations. He gave $500,000 toward establishing the Roman Catholic theological seminary at Saint Paul, Minn., was interested in many philanthropies, and made notable art collections. In 1910, he published *Highways of Progress.* Died in 1916.

Hill, Sir Rowland, originator of penny postage, was born at Kidderminster, England, in 1795. From an early age to 1833 he was a teacher. He was one of the founders of the society for the diffusion of useful knowledge, 1826; interested himself in the socialistic schemes of Robert Owen; and took an active share in the colonization of South Australia. Realizing the urgent need for reducing the high rates of postage, he published in 1837 a pamphlet,



GREAT BUSINESS BUILDERS

Henry Clay Frick

Andrew Carnegie

James Jerome Hill

Elbert Henry Gary

Cornelius Vanderbilt

Thomas Coleman du Pont
Photo by Brown Bros.

Montgomery Ward

Philip Danforth Armour

Henry Ford
Photo by Brown Bros.



EMINENT AMERICAN EDUCATORS

Henry Barnard

William Torrey Harris

Charles William Eliot

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Mark Hopkins

Horace Mann

David Starr Jordan

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Abbott Lawrence Lowell

James Burrill Angell

William Albert Wirt

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Post-office Reform, in which he advocated an adhesive postage stamp and a low and uniform rate between all places in the British isles.

In 1839, Hill was attached to the treasury department for the purpose of putting his projected reforms into execution, and, in the year 1840, a uniform penny rate came into force. In 1841, the Conservative government, which had opposed the reduction, came into office, and, in 1842, Hill was dismissed. Four years later a sum of £13,000, raised by public subscription, was presented to him. The Liberals, returning to power, made Hill secretary to the postmaster-general, and, in 1854, secretary to the post office. In 1864 he resigned, owing to ill health, and was awarded a pension of £2000 for life, together with a parliamentary grant of £20,000. He died in 1879 and was buried in Westminster Abbey.

Hill, Thomas, American educator and writer, was born at New Brunswick, N. J., 1818. He was graduated at Harvard college in 1843 and at the Harvard divinity school in 1845. He was pastor of the Unitarian church at Waltham, Mass., 1845-59; president of Antioch college, 1859-62; and president of Harvard, 1862-68. He then accompanied Agassiz to South America on a scientific expedition. In 1873, he became pastor of a Unitarian church at Portland, Me. He was an able mathematician, an authority on natural sciences, and a gifted classical scholar. He invented various mathematical machines. He published *Geometry and Faith, Curvature, Jesus the Interpreter of Nature, Statement of the Natural Sources of Theology*, and was coeditor of the Hill-Wentworth series of mathematical textbooks. Died in 1891.

Hillel (*hĭl'ĕl*), surnamed Hababli, "the Babylonian," and Hazaken, "the Elder," one of the greatest doctors of the Jewish law, was born in Babylonia about 60 B. C. He was president of the sanhedrin in Jerusalem, through appointment of Herod I, 30 B. C. to 10 A. D., and was distinguished for his humility, gentleness, and humane spirit. He founded the Talmudic Judaism and wrote extensively on law and morals. Died, 10 A. D.

Hillis (*hĭl'ĭs*), **Newell Dwight,** American clergyman and author, was born in Magnolia, Iowa, in 1858. He was educated at Iowa college, Lake Forest university, and McCormick theological seminary. He entered the Presbyterian ministry; was pastor at Peoria, Ill., 1886-89, and at Evanston, Ill., 1889-95. He succeeded David Swing as pastor of Central church, Chicago, in 1895 and became pastor of Plymouth church, Brooklyn, in 1899, retiring in 1924. He achieved wide reputation as a speaker and writer. Among his many books are *A Man's Value to Society, Great Books as Life Teachers, Quest of Happiness, The Fortune of the Republic, Prophets of a New Era, Story of Phaedrus, Lectures and Orations of Henry Ward Beecher*, and *The Better America Lectures*. Died, 1929.

Hillquit, Morris, American socialist, was born at Riga, Russia, 1869. He was educated in the schools of his native city, 1881-86. In 1886, his parents brought him to the United States. He was graduated at the New York University law school in 1893. He joined the socialists in 1888 and rose to prominence in the organization through his ability as a writer, speaker, and debater. He served as a member of the national committee, and was a delegate to several international socialist congresses. He was appointed representative on the international socialist bureau at Brussels, Belgium, in 1904. His writings on socialism include *History of Socialism in the United States, Socialism in Theory and Practice, Socialism Summed Up*, and *From Marx to Lenin*. In 1914, he contributed to a series of debates with Rev. J. A. Ryan entitled *Socialism—Promise or Menace?*

Hindenburg (*hĭn'dĕn-bo͝orĸ*), **Paul von,** German soldier, was born in Posen, 1847. He was educated in the cadet corps and became a subaltern. In 1866, he served in the Austrian war, participating in the decisive battle of Koniggratz. In the Franco-Prussian war, 1870-71, he took part in the battles of Gravelotte and Sedan and in the siege of Paris, winning his first iron cross. In 1875 he entered the general staff, serving as captain and major, and, in 1888, became head of a bureau of the war department. In 1900, he was made major general; in 1903, lieutenant general; and, in 1911, he retired from active service.

At the outbreak of the World War, in 1914, he was recalled and made commander in chief of the campaign in East Prussia against Russia. At Tannenberg, he won one of the greatest German victories against Russia. He was again decorated with the iron cross and made field marshal. In 1915, he commanded the campaign against Russia in Poland with notable success; in 1916, he was made chief of the imperial general staff, succeeding von Falkenhayn, and was intrusted with the direction of all armies of the Empire with Ludendorff as his chief adviser. He retired from active service in 1919. His character, temperate in victory and steadfastly courageous in defeat, was a source of moral strength to the German people, by whom he was elected president of the republic in 1925. See *World War*, pages 528a, 532c.

Hipparchus (*hĭ-pär'kŭs*), first great Greek astronomer, flourished between 160 and 125 B. C. He was born at Nicæa in Bithynia. His astronomical observations were made at Rhodes. He discovered the precession of the equinoxes and the eccentricity of the sun's path, determined the length of the solar year, and estimated the distances of the sun and the moon from the earth. He invented the astrolabe, founded the science of trigonometry, drew up a catalogue of 1080 stars, and fixed the position of places on the earth by giving their latitude and longitude.

Hippocrates (*hĭ-pŏk'rà-tēz*), Greek physician, the most celebrated of antiquity, was born in the island of Cos, probably about 460 B. C. After traveling through different parts of Greece he began practice at Cos. Seventy-two works bear his name. His writings were first printed in a Latin translation in 1525. The first Greek impression appeared in 1526. He seems to have gathered up all that was sound in the history of medicine; was good in diagnosis and prognosis; and believed that the four fluids or humors of the body — blood, phlegm, yellow bile, and black bile — are the primary seats of disease. He was a man of great nobility of character and possessed high ideals of medical ethics. These have been perpetuated to the present time in the world-wide reverence of physicians for the "Hippocratic oath." Died about 357 B. C.

Hirohito (*hē'rô-hē'tô*), emperor of Japan, was born at Tokyo in 1901. He acted as regent from 1921 to 1926, during which time his father, Yoshihito, the reigning emperor, was incapacitated. After the latter's death in 1926, Hirohito ascended the imperial throne.

Hiroshige (*hē'rô-shē'gē*), **Ando**, Japanese landscape artist, was born of a Samurai family at Tokyo in 1797. At the age of 10, he attracted attention by his lifelike painting. At 15, he sought instruction from Toyokuni, who refused him; but he was received as a pupil by Toyohiro, upon whose death in 1828 he began an independent career. With his pictures of the Tokaido, the celebrated highway between Tokyo and Kyoto, he sprang into great fame, and his style was widely imitated.

In contrast with the designs of the Chinese, Hiroshige's method shows European influences, though his technique is Japanese throughout. He complies partially with rules of perspective and composition. His chief distinction is in rendering the mood of the landscape before him. Notable color prints illustrating his work are on exhibition in the Metropolitan museum, New York. He died in 1858.

Hirsch (*hûrsh*; G. *hĭrsh*), **Emil Gustav,** American rabbi, was born in Luxemburg, 1852, son of a noted Jewish theologian. Following his graduation from the University of Pennsylvania in 1872, he studied four years in Berlin. After serving as rabbi in Baltimore and Louisville, he became, in 1880, minister of Sinai congregation, Chicago, where he achieved distinction as a leader of advanced Judaism and philanthropy. He was president of the Chicago public library board, 1888-97, and became professor of rabbinical literature in the University of Chicago, 1892. He edited the Milwaukee *Zeitgeist*, 1880-87, and, in 1894, began editing the *Reform Advocate*. Died, 1923.

Hitchcock, Charles Henry, American geologist, son of Edward Hitchcock, was born at Amherst, Mass., 1836. He was graduated at Amherst college in 1856; was assistant state geologist, Vermont, 1857-61; was state geologist, Maine, 1861-62; and state geologist, New Hampshire, 1868-78. He was professor of geology in Dartmouth college from 1868 to 1908, when he became professor emeritus. In 1870, he established on Mt. Washington the first high mountain observatory in the United States. He was one of the founders of the geological society of America, and became widely known as compiler of several geological maps of United States and for researches in glacial geology. His works include *Elementary Geology* (with Edward Hitchcock), *Mt. Washington in Winter, Report on Geology of New Hampshire, Geological Map of the United States, Hawaii and its Volcanoes*, and about 150 articles in various reports and pamphlets on geology. He died in 1919.

Hitchcock, Edward, American geologist, was born at Deerfield, Mass., 1793. He was educated at Yale and, in 1821, was ordained to the Congregational ministry. He was pastor of the Congregational church, Conway, Mass., 1821-25. From 1825 to 1845, he was professor of chemistry and natural history in Amherst college. From 1845 to 1854, he was president of Amherst college and professor of natural theology and geology. Subsequently he held the chair of geology until his death. In 1824, he published *The Geology of the Connecticut Valley*. In 1830, he was appointed state geologist, and as such made a thorough survey of the geology and mineralogical resources. This included also the botany and zoology of Massachusetts, of part of New York, and of Vermont. In 1850, he was appointed agricultural commissioner for his native state. He visited and examined the chief agricultural schools of Europe and published his report on them. Died, 1864.

Hittorf (*hĭt'ŏrf*), **Johann Wilhelm,** German physicist, was born at Bonn, 1824. In 1852, he was called to the chair of chemistry and physics at Munster, which he filled with distinction for 50 years. His first important researches were in electrolysis, and his method of determining the mobility of ions was of the highest importance to physical chemistry. In 1869, while studying the passage of electricity through tubes containing a rarefied gas, he noticed the fluorescence produced by the cathode rays, and found that those rays could be deflected by a magnet, thus anticipating Crookes, who published his celebrated researches with vacuum tubes and, in 1878, gave to the rays so produced the name of radiant matter. He wrote numerous valuable papers on chemistry and physics. His paper "On the Migration of Ions during Electrolysis" is contained in *The Fundamental Laws of Electrolytic Conduction*, published in New York in 1899. He died in 1919.

Hoar (*hôr*), **George Frisbie,** American statesman, was born in Concord, Mass., 1826. He was graduated from Harvard college, 1846, and afterward from the Dane law school. He practiced law at Worcester; was elected to the state legislature in 1852 and to the state senate in 1857. He was a member of Congress from 1869 to 1877 and United States senator from 1877 until his death about 37 years later. He was an able lawyer, a keen debater, and a man of scholarly attainments. His valuable *Memoirs* contain observations made during his long career. In the Senate he was a steadfast opponent of President McKinley's policy in the Philippines. Died, 1904.

Hobbema (*hŏb'ĕ-mă*), **Meindert,** Dutch landscape painter, was born at Amsterdam in 1638. He was the friend and pupil of Ruysdael, and, until his marriage at the age of 30, after which he discontinued painting to become a city official, they often worked together. In his brief artistic career, devoted entirely to scenic painting, he produced some of the most highly prized landscapes of his century. He ranks second only to the more versatile Ruysdael among the great landscape artists of the Dutch school.

Hobbema portrayed quiet woodland scenes, romantic water mills, streams, and ponds in rich, warm colors, with remarkable atmospheric and sunlight effects. His widely known "Avenue of Middelharnis" and "Ruins of Brederode Castle" are in the national gallery, London. In America he is represented by "Entrance to a Village" in the Metropolitan museum, New York, by "Water Mill" in the art institute, Chicago, and by works in private collections. Died, 1709.

Hobbes (*hŏbz*), **John Oliver,** is the pen name of Mrs. Pearl Mary Teresa Craigie, née Richards, English novelist, born at Boston, Mass., 1867. She removed to England when very young; was educated at University college, London, and in Paris. In 1887, she married R. W. Craigie, from whom she secured a divorce in 1895. She published her first novel, *Some Emotions and a Moral*, in 1891 and won success by her brilliant, epigrammatic, and somewhat cynical style. She wrote the novels *A Study in Temptations, The Herb-moon, The School for Saints, Robert Orange, A Bundle of Life, The Serious Wooing, Love and the Soul Hunters, The Vineyard, The Flute of Pan, The Dream and the Business.* She wrote also the plays *Journeys End in Lovers' Meeting, The Ambassador*, and *A Repentance.* Died in 1906.

Hobbes, Thomas, English philosopher, was born at Malmesbury, 1588. He was graduated at Oxford. In 1610 he went abroad with the earl of Devonshire as his pupil and made a tour of France and Italy. Meantime he was occupied with classical, political, and philosophical studies, and prepared for publication his first work, a translation of Thucydides, which appeared in 1628. His first original work, *De Cive*, was printed in Paris in 1642. He published soon afterward two small treatises entitled *Humane Nature* and *De Corpore Politico.* After the meeting of the Long Parliament, he lived in Paris for a time on account of his dread of the civil troubles. Then followed his *Leviathan*, embodying his famous "social compact" theory, and also his work entitled *Liberty and Necessity.* His old age was marked by some sharp controversies. His last works were a translation of Homer and a history of the civil wars in England. He died in 1679.

Hobson, Richmond Pearson, American naval constructor and politician, was born in Greensboro, Ala., 1870. He was graduated from the United States naval academy in 1889 and studied at the Ecole Nationale Supérieure des Mines and Ecole d'Application du Génie Maritime, Paris. In the Spanish American war he served on the flagship *New York.* He commanded the collier *Merrimac*, which he sank in Santiago harbor to prevent the exit of the Spanish fleet. As a result, he was captured and kept a prisoner in a Spanish fortress from June 3 to July 6, 1898. In 1899-1900, he was on naval duty in the Far East.

Hobson resigned from the United States navy, 1903, and was a member of Congress from Alabama, 1907–15. He was the first to introduce in Congress an amendment for nation-wide prohibition. Among his writings are *The Disappearing Gun Afloat, The Sinking of the Merrimac, Why America Should Hold Naval Supremacy, Buck Jones at Annapolis, Fortification of the Panama Canal, The Great Destroyer, Our Country's Destiny, Destroying the Great Destroyer, America and the World War, The Great Reform*, and *Alcohol and the Human Race.*

Hodges, George, American theologian and writer, was born in Rome, N. Y., 1856. He was graduated from Hamilton college in 1877 and was ordained to the Protestant Episcopal ministry in 1882. From 1881 to 1889 he was assistant and from 1889 to 1894 he was rector of Calvary church, Pittsburgh, Pa. In 1894, he was made dean of the Episcopal theological school at Cambridge, Mass., and served in that office with distinction until his death.

His numerous writings include *The Episcopal Church, Christianity Between Sundays, The Heresy of Cain, Faith and Social Service, The Path of Life, William Penn, The Cross and Passion, The Year of Grace, The Apprenticeship of Washington, Everyman's Religion, Saints and Heroes, A Child's Guide to the Bible, The Early Church, Henry Codman Potter*, and *Religion in a World at War.* He died in 1919.

Hodgkin (*hŏj'kĭn*), **Thomas,** English historian, was born at Tottenham in 1831. He was graduated at University college, London; entered banking; and was a partner in a large banking firm at Newcastle on Tyne from 1859 to 1902. In 1874, he began to devote his leisure time to historical writing. His works include *Italy and her Invaders, Letters of Cassiodorus, The Dynasty of Theodosius, Life of Theodoric, George Fox, Life of Charles the Great, Political History of England*, and *The Trial of Our Faith.* He died in 1913.

Hoe, Richard March, American inventor, was born in New York, 1812. He was the son of Robert Hoe (1784–1833), and, in 1827, began the practical study of making printing presses. In 1833, he became the senior partner in the Hoe firm. He invented many improvements in the presses and also produced a steel saw of excellent quality. In company with his brothers, he took over, in 1841, the entire management of the business.

Hoe's first great invention, a rotary press, widely known as Hoe's lightning press, was brought out in 1846 and was extensively adopted by newspapers. Later he invented the web perfecting press, printing on both sides of the sheet, with an intricate apparatus for folding and cutting. These two great mechanical achievements revolutionized newspaper printing. Improvements were constantly added and the business developed by him and carried on by his sons and nephews grew to vast proportions. In 1903, the factory in New York was considered the largest printing press works in the world. Hoe died in 1886.

Hoe, Robert, American inventor, was born in Leicestershire, England, 1784. He was apprenticed to a joiner; came to the United States in 1803; and worked for a time at his trade and later in partnership with his brothers-in-law in the manufacture of a hand printing press. In 1823, he became exclusive owner of the business, and constructed and introduced the original Hoe press. Hoe is considered the first American machinist to make use of the steam engine for motive power in his factory. The business founded by him was carried on with notable success by his sons and their descendants. He died in 1833.

Hoe, Robert, American manufacturer and inventor, was born in New York, 1839. He was educated in the public schools and entered the printing press factory of R. Hoe and Company, founded by his grandfather, Robert. During his association with the firm, he developed the printing press from the "Hoe cylinder" of the 1846 patent to the later double-sextuple Hoe and invented presses of a greatly improved type for printing in colors. He engaged also in the manufacture of circular saws and saw bits, with large factories in New York and London. He was one of the founders of the Metropolitan museum of art and made collections of rare books, manuscripts, silverwork, and other objects of art, valued at several million dollars. Died in 1909.

Hofer (*hō'fĕr*), **Andreas,** Tyrolese patriot, was born at Saint Leonard, 1767. In 1796, he led a body of Tyrolese against the French on the lake of Garda. In 1808, secret deputies, among whom was Hofer, arrived at Vienna to represent to the archduke John the sufferings of the people and their wish to be reunited to Austria. By the desire of the archduke, Baron von Hormayr sketched for them a plan of insurrection, which met with such success that in three days, from the 11th to the 13th of April 1809, nearly the whole country was liberated.

Napoleon, however, at once marched three armies to the Tyrol to subdue the rebellious peasantry. At first Hofer concealed himself, but later issued from his retreat and took the leadership of the Tyrolese. At the battle fought August 13 on the Iselberg, Lefebvre, the French general, was driven from the Tyrol. Hofer continued to conduct

the civil and military administration until the peace of Vienna. The French and Bavarians again poured into the country, and, after a brief struggle, Hofer was obliged to take refuge in concealment. After a lapse of two months, he was betrayed into the hands of the French, conveyed to Mantua, tried, condemned, and shot, 1810.

Hoff, Jacobus Henrik van't. See *Van't Hoff*.

Höffding (*hûf'dĕng*), **Harald,** Danish psychologist, philosopher, and educator, was born in 1843. He was graduated from the University of Copenhagen, from which he received the degree of doctor of philosophy in 1870. He was lecturer at the university from 1880 to 1883 and professor of philosophy from 1883 to 1915. He became a positivist in philosophy and a utilitarian in ethics. Among his works are *Psychology, Ethics, History of Modern Philosophy, Philosophical Problems, Modern Philosophers, The Philosophy of Religion, Human Thought, Henri Bergson's Philosophy, The Concept of Totality, Spinoza's Ethics,* and *The Concept of Relation.*

Hoffman, John Washington, American educator, was born at Noblestown, Pa., in 1867 and was educated at Washington and Jefferson college, Yale, and Princeton. He was ordained a minister of the Methodist Episcopal Church in 1897 and held successively pastorates in Pittsburgh, Duluth, and other places until 1916, when he was elected president of Ohio Wesleyan university.

Hoffmann, Ernst Theodor Wilhelm, German writer, composer, critic, and caricaturist, was born at Konigsberg, 1776. In 1797, he was appointed assessor at Posen; but his love of caricature got him into trouble, and he was degraded to an inferior post. For the next 10 years, he led a precarious existence; he spent his leisure time in literary studies and in musical composition, writing the opera *Liebe und Eifersucht* and, in 1808, directing the theater in Bamberg. In 1815, he resumed his career in the Prussian service and, from 1816 until his death, held a position in the supreme court at Berlin.

Hoffmann was the high priest of German romanticism. He waged incessant war upon the sticklers for routine and conventionalism. His wit bubbled over in irony, ridicule, sarcasm; his imagination was inexhaustible, but utterly undisciplined, wild, and fantastic. His shorter tales were published mostly in the collections *Phantasiestücke, Nachtstücke,* and *Die Serapionsbrüder.* His longer works include *Die Elixiere des Teufels, Seltsame Leiden eines Theaterdirektors,* and *Lebensansichten des Katers Murr,* the last partly autobiographical. Of his fairy tales, *Der Goldene Topf* was translated into English by Carlyle. Died, 1822.

Hofmann, August Wilhelm von, German chemist, was born at Giessen, 1818. He became assistant to Liebig at Giessen, and, when the royal college of chemistry was established in London in 1845, Hofmann was made superintendent. From 1856 to 1865, he was chemist to the British royal mint. In 1865, he went to Berlin as professor of chemistry. He was ennobled in 1888. His contributions to the scientific journals were mainly on organic chemistry. In the course of his researches, he obtained aniline from coal-tar products and made further discoveries which revolutionized the art of dyeing. He devoted much labor to the theory of chemical types. His *Introduction to Modern Chemistry* led to great reforms in the teaching of chemistry. He wrote *The Life-work of Liebig, Handbook of Organic Analysis,* and *Chemische Erinnerungen.* Died, 1892.

Hofmann, Heinrich, German historical painter, was born in Darmstadt, 1824. After studying in Dusseldorf and at the Antwerp academy, he resided in Italy, 1854–58. He finally settled, 1862, in Dresden, where he became professor of art in the academy. While he chose his subjects from the whole field of literature and mythology, Hofmann is most widely known for his idealized scenes from the life of Christ. Several of these have been extensively reproduced in engravings, especially his "Christ in the Temple," painted in 1882. Died, 1902.

Hofmann, Josef Casimir, pianist, was born in Krakow, Poland, 1877. His father, a Kapellmeister and composer, began teaching him the piano in infancy and, at the age of 7, his talent attracted the attention of Rubinstein. At the age of 10, he came to the United States for a concert tour. Upon returning to Europe, he studied under Urban, Moszkowski, and Rubinstein, achieving marked distinction as a musical artist. He made many successful concert tours in America and Europe before locating in New York, where he has written extensively on musical topics and has composed a number of musical works. He was made director in chief of the Curtis institute of music, Philadelphia, in 1927.

Hofmannsthal (*hōf'mâns-tăl*), **Hugo von,** Austrian poet and dramatist, was born in Vienna, 1874. He was educated at the university in Vienna, where he studied law and literature. In 1892, he wrote a dramatic poem, *Yesterday,* and his first play, *The Death of Titian,* attracted considerable attention. His subsequent poems and plays entitle Hofmannsthal to a place in the foremost rank among Austrian poets.

His strength lies in lyric rather than in dramatic lines, and his characters, which never approach real life, exemplify his dictum that art and life lie far apart. His writings include numerous volumes of poems, tales, and plays, 15 of which are poetic dramas. *Death and the Fool* and *Electra* have been translated into English.

Hogarth (*hō'gärth*), **William,** English painter, engraver, and pictorial satirist, was born at London, 1697. He served an apprenticeship to a silversmith; about 1720, began business for himself, first being employed in engraving coats of arms and designing plates for booksellers; and, in 1724, entered the art school of Sir James Thornhill. He made the illustrations for Gray's edition of Butler's *Hudibras.* He secretly married the daughter of Sir James Thornhill in 1729. In 1730, he began the painting of the satirical pictures which made him famous, among them being "The Harlot's Progress," "A Midnight Modern Conversation," "A Rake's Progress," "The Distressed Poet," and his masterpiece, the famous "Marriage à la Mode." Died in 1764. See *Painting.*

Holbein (*hōl'bīn*), **Hans** or **Johann,** called "the Younger," German painter, was born at Augsburg, 1497. He went to Basel with his brother Ambrosius, also a painter. About 1526, he contracted an intimacy with Erasmus, whose portrait he painted, and afterward visited England, where he spent most of his remaining years. Henry VIII made him court painter.

Holbein is distinguished as a historical and portrait painter and an engraver on wood. As an engraver, he is known chiefly by the celebrated series of woodcuts entitled "Dance of Death." Among his most important paintings are "Madonna of the Burgomaster Meyer," "The Ambassadors," "The Last Supper," "The Dead Christ," "The Nativity," and "The Adoration of the Magi." In portrait painting, he ranks among the world's greatest artists. His portraits are not only absolutely truthful and charming in workmanship, but they are also records of character. With Albrecht Dürer, Holbein stands at the head of early German artists. Died, 1543.

Holberg (*hōl'bĕrg*), **Ludvig, Baron,** creator of modern Danish literature, was born at Bergen in Norway, 1684. He studied at the University of Copenhagen; became professor of metaphysics at Copenhagen in 1718; and maintained his connection with the university throughout the remainder of his life.

His first notable works were satirical poems, among them *Peder Paars,* in which he ridicules the pedantic stiffness and stupidity of contemporary life and thought. In 1721, the first Danish theater was opened at Copenhagen, and Holberg began to write comedies for it with marvelous success. After 1724, he turned to history and wrote, among other books, a *History of Denmark, General Church History, History of the Jews,* and *Comparative Biographies of Great Men and Women.* In 1741, he produced another classic, the romance *Niels Klim's Subterranean Journey.* He also published the serious reflective works *Moral Thoughts* and *Epistles* and his own *Autobiography. Peder Paars,* the *Subterranean Journey,* and the *Autobiography* have been translated into English. Died, 1754. See *Danish Literature.*

Holden, Perry Greeley, American agricultural educator, was born in Dodge county, Minn., 1865. In 1889, he graduated at Michigan agricultural college, Lansing, where he was instructor in agriculture, 1889–93. He was professor of agronomy at the University of Illinois, 1896–1900. In 1902, he organized a company for scientific breeding of corn and was elected to the chair of agronomy in Iowa State college. In 1904, he conducted the first railroad train for carrying agricultural instruction to farmers. He was in charge of agricultural extension work at Iowa State college from 1906 to 1912, when he became head of a similar department conducted by the International Harvester Company of America for the world-wide extension of scientific agriculture. His efforts for crop improvement have been notably influential. Among his writings are many articles on potato and sugar-beet culture and on the selection and preparation of seed corn.

Holder, Charles Frederick, American naturalist and author, was born in Lynn, Mass., of Quaker parents, 1851. He was educated in Providence, R. I., and at the naval academy, Annapolis. He decided early to study natural science and became assistant in zoology at the American museum of natural history, New York City, 1871. He turned his attention to writing, publishing *Marvels of Animal Life* in 1880. He removed to California and was made professor of zoology in Throop polytechnic institute, Pasadena, in 1891. Here he wrote many books on natural science for young people. His published works include also *Elements of Zoology, The Pasadena Highlands, San'n Catalina Island, Distinguished American Scientists,* and *Game Fishes of the World.* Died, 1915.

Holinshed (*hŏl'ĭnz-hĕd*; *hŏl'ĭn-shĕd*), **Raphael,** English chronicler, was born probably in Cheshire. He is noted as the author of a history of England, Scotland, and Ireland, which furnished Elizabethan dramatists with historical material for their plays. *Raphael Hollingeshed's Cronycle*, which was the completion of a work originally begun by Wolfe, was issued in 1577. From this work Shakspere obtained much of the data for his great series of historical plays, and portions of *Macbeth*, *King Lear*, and *Cymbeline* can be traced to it. He died in 1580.

Holland, John Philip, inventor, was born at Liscannor, Ireland, 1844, and was educated at Limerick. After teaching 10 years, he came to America and joined the Fenian movement. Seeking means of destroying the British navy, he turned his attention to the construction of submarine torpedo boats. In 1877, he built a clumsy wooden vessel which demonstrated his principles of submersibility and control. Following 20 years of ridicule and failure, he finally constructed, 1898, the successful submarine torpedo boat *Holland*. This was purchased by the United States, 1900, and became the type for all subsequent submarines. Although not the originator of the idea, Holland is justly regarded as the father of the modern submarine torpedo boat. Died, 1914.

Holland, William Jacob, American zoologist and paleontologist, was born in Bethany, Jamaica, West Indies, 1848, of American parentage. He graduated at Amherst college, 1869, and at Princeton theological seminary, 1874. He was a Presbyterian pastor at Pittsburgh, Pa., 1874–91, and the chancellor of Western University of Pennsylvania, now the University of Pittsburgh, 1891–1901. He was director of Carnegie institute, Pittsburgh, from 1898 to 1922, and is regarded as an authority on zoology and museum administration. His publications include *The Moth Book, To the River Platte and Back, The Butterfly Guide*, and many scientific papers on Jurassic dinosaurs and Tertiary fauna.

Holley, Alexander Lyman, American engineer, was born in Lakeville, Conn., 1832. He graduated at Brown university in 1853 and, in 1856, became editor of the *Railroad Advocate*, the name of which he changed to *The American Engineer*. In 1865, he introduced the Bessemer steel making process into the United States, erecting at Troy, N. Y., the first Bessemer steel plant in the country. In 1879, he became a lecturer at Columbia university on the manufacture of iron and steel. He secured numerous patents for improvements in the manufacture of steel, chiefly connected with the Bessemer process, the most important of which was for a detached converter shell. He wrote *American and European Railway Practice* and *A Treatise on Ordnance and Armor*. He died in 1882.

Holmes, Oliver Wendell, American author, was born in Cambridge, Mass., 1809. He graduated at Harvard in 1829; studied law for a period, but subsequently devoted himself to medicine and, after attendance in the hospitals of Europe for several years, received his degree in medicine in 1836. In 1838, he became professor of anatomy and physiology in Dartmouth college and, from 1847 to 1882, held the same chair at Harvard. He gained some reputation as an anatomist and was, besides, an able microscopist and a skillful auscultator; but his widest fame is as a poet, a wit, and a man of letters.

Holmes's wit and humor are transcendent; his poetry is the perfection of conception and finish; and all his literary efforts are of rare originality and excellence. He was also a fascinating and instructive lecturer, while his admirable social qualities endeared him to a large and intellectual circle.

At 21, he wrote the well-known, vigorous verses "Old Ironsides." Then followed his Phi Beta Kappa poems *Poetry*, *Terpsichore*, *Urania*, and *Astræa*, all of which added to his reputation. In 1857-58, he contributed to the *Atlantic Monthly* his *Autocrat of the Breakfast Table*, a connected series of prose essays, which was followed by *The Professor at the Breakfast Table*, *The Poet at the Breakfast Table*, and *Over the Teacups*. This brilliant series, which was in his happiest vein, was interspersed with poems and was fraught with humor, pathos, practical wisdom, and a healthy sentiment.

Holmes's after-dinner poems and other short lyrics are not surpassed by any productions of their kind in the language. His various medical addresses, papers, and pamphlets are a part of our scientific literature. He established the fact that puerperal fever is contagious. His other writings include *Currents and Counter-Currents in Medical Science*; *Elsie Venner*, a romance; *Songs in Many Keys*; *Soundings from the Atlantic*; *The Guardian Angel*; and *Mechanism in Thought and Morals*. Died, 1894. He was elected to the American hall of fame in 1910.

Holmes, Oliver Wendell, American jurist, son of Dr. O. W. Holmes, was born in Boston, Mass., 1841. He graduated from Harvard, 1861, and from Harvard law school, 1866. He served three years during the Civil War; was wounded at Ball's Bluff, 1861; at Antietam, 1862; and at Marye's Hill, Fredericksburg, 1862. After the war, he engaged in practice at Boston and was editor of the *American Law Review*, 1870–73. In 1882, he was made professor of law at Harvard and was made justice of the Massachusetts supreme court, becoming chief justice in 1899. In 1902, he was appointed associate justice of the United States supreme court. His published works include an edition of Kent's *Commentaries*, his own valuable lectures entitled *The Common Law*, and a volume of *Speeches*.

Holst (*hôlst*), **Hermann Eduard von,** historian, was born in Fellin, Livonia, Russia, 1841. He came to the United States in 1866; engaged in literary work and lectured for several years; returned to Europe; and became professor in the University of Strasbourg, 1872, accepting an appointment later at the University of Freiburg. He was appointed professor of history in the University of Chicago, 1892, which post he retained until 1900, when he returned to Freiburg and retired. He published *Constitutional and Political History of the United States*, *Constitutional Law of the United States*, and *Life of John Calhoun*. Died, 1904.

Holt, Henry, American publisher and author, was born at Baltimore, Md., 1840. He graduated at Yale and at the Columbia law school; entered the publishing business with G. P. Putnam, 1863; and, in 1873, became president of Henry Holt and Company, publishers, New York. In 1913, he founded and became editor of the *Unpopular Review*, later called the *Nonpartisan Review*. His writings include *Calmire—Man and Nature*, *Talks on Civics*, *Sturmsee—Man and Man*, *On the Civic Relations*, *The Cosmic Relations and Immortality*, and many articles on social and literary subjects. Died, 1926.

Holt, Luther Emmett, American physician, was born at Webster, N. Y., in 1855. He graduated at the University of Rochester in 1875 and at the college of physicians and surgeons, Columbia, in 1880. He was professor of the diseases of children at the New York polyclinic from 1890 to 1901 and thereafter at the college of physicians and surgeons. He served also as attending physician to children's hospitals and was secretary of the Rockefeller institute for medical research. Besides numerous articles on the diseases of children, he wrote the valuable works entitled *The Care and Feeding of Children* and *Diseases of Infancy and Childhood*. Died in 1924.

Holyoake (*hŏl'yōk*; *hŏl'ĭ-ōk*), **George Jacob,** English reformer, was born at Birmingham, 1817. He taught mathematics for several years at the mechanics' institution in Birmingham; lectured on Robert Owen's socialist system; was secretary to Garibaldi's British contingent; edited the *Reasoner*; and promoted the parliamentary bill legalizing secular affirmations. He is known as the founder of secularism, or the doctrine that all forms of religion should be abandoned. Holyoake was the last person imprisoned in England on a charge of atheism. He wrote *The Rochdale Pioneers*, *History of Coöperation in England*, and *Self-help a Hundred Years Ago*. Other works are *The Limits of Atheism*, *Trial of Theism*, *Sixty Years of an Agitator's Life*, *Public Speaking and Debate*, and *Bygones Worth Remembering*. Died, 1906.

Homer, Greek epic poet, is believed to have flourished about 900 B. C. Smyrna, Chios, Argos, Athens, Salamis, and other places claimed the honor of being his birthplace. Nothing is known of his life. The accounts representing him as a blind bard who begged his daily bread are purely legendary.

The chief works attributed to Homer are the *Iliad* and the *Odyssey*. These two epics are the first works of extant European literature, and they still rank with the greatest.

The *Iliad* deals mainly with the consequences of the wrath of Achilles at the siege of Troy. This chief hero of the Greeks, wronged by Agamemnon, the Greek commander, withdrew from the fight. He refused to return in spite of the reverses suffered by the Greek army, until, finally, his dearest friend Patroclus was slain by the Trojans. Then, eager for vengeance, he entered the battle and eventually succeeded in slaying Hector, the leader of the Trojans.

The *Odyssey* relates the adventures of the Greek hero Odysseus during a ten-year period of wandering homeward from Troy to Ithaca. The construction of the plot is perhaps superior to that of any other long poem in existence. For simplicity of thought, rapidity of action, and sustained nobility of tone, these two poems of Homer are unique in literature. His depiction of character is convincing, and his versification shows a rare mastery of the epic verse form.

The poems of Homer exerted an enormous influence over Greek education, literature, and culture. They were regarded as a basis of morality, a source book of knowledge, a textbook for oratory, and a standard of literary taste. They provided, also, an element of cultural unity among

the numerous independent states of Greece. In modern times, these poems have served to throw much light on the earliest Ægean civilization.

It has been argued that Homer did not exist as an individual, but that each of the Homeric poems is a compilation of many isolated episodes composed by different and unknown poets. Their uniform excellence of style, however, and their unity of plot, particularly as exemplified in the *Odyssey*, imply a master artist second to none among the writers of epic poetry. See *Trojan War*.

Homer, Louise Dilworth, née Beatty, American dramatic contralto, was born in Pittsburgh. She began musical study in Philadelphia. In 1894, she continued the study of singing with Wm. L. Whitney in Boston and of harmony with Sidney Homer, the composer, whom she married in 1895. She then studied two years with Madame Koenig in Paris and made her début at Vichy as Leonora in *La Favorita* in 1898. In 1899, she appeared as Amneris in *Aïda* at Covent Garden, London. In 1900, she appeared with great success at the Metropolitan opera house, New York. She continued as a regular member of the company for many successive seasons and appeared also in Chicago, San Francisco, and Los Angeles opera companies. Her rôles include Laura in *La Gioconda*, Azucena in *Il Trovatore*, Ortrud in *Lohengrin*, Dame Quickley in Verdi's *Falstaff*, and Delila in *Samson et Delila*.

Homer, Winslow, American marine painter, was born at Boston, 1836. While young he worked at lithography in Boston and, in 1859, went to New York and became a student of art at the academy of design. In 1861, he went to the front as war artist for *Harper's Weekly*. He was elected to the national academy in 1865 and exhibited several oil paintings with success. In 1867, he visited Europe; studied in Paris; and, upon returning, continued to illustrate for *Harper's* until 1875. In 1880, he turned his attention to marine painting and, in 1884, began his notable career as leading American painter of the ocean and of seafaring folk.

His paintings include "The Life Line," in the Elkins collection, Philadelphia; "The Fog Warning," "Lookout—All's Well," both of the Boston museum; "The Maine Coast," "Northeaster," "Cannon Rock," in the Metropolitan museum, New York; "On a Lee Shore," Providence museum; and "Undertow," "Eight Bells," "The West Wind," and "A Summer Night," in the Luxembourg, Paris. Homer is among the most characteristically national of American painters, excelling in composition, color, and absolute fidelity to nature. He was elected a member of the American academy of arts and letters in 1905. Died, 1910.

Hood, John Bell, American general, was born in Owingsville, Ky., 1831. He graduated from the United States military academy in 1853 and was appointed lieutenant of infantry in the same year. He was actively engaged on frontier duty until 1861, when he entered the Confederate army. He served in every position from that of first lieutenant to that of division commander with the rank of lieutenant general. He took a conspicuous part in the second battle of Bull Run, Antietam, Gettysburg, and Chickamauga, where he lost a leg. In 1864, he succeeded Johnston in command of the army resisting Sherman's invasion of Georgia. He was repulsed by the Federal forces in battle at Franklin, Tenn., 1864, and was decisively defeated at Nashville, December 15-16. After the war, he engaged in business in New Orleans. Died, 1879.

Hood, Thomas, English poet and humorist, was born in London, 1799. In 1821, he was offered a post on the editorial staff of the *London Magazine;* he at once entered upon its duties and acquired an extensive literary acquaintance. His first separate publication was entitled *Odes and Addresses on Great People*. In 1826, he published *Whims and Oddities*, of which a second and third series appeared during the following two years. In 1830, he began the *Comic Annual* and continued it for nine years. He edited the *Gem* for one year, contributing to its pages his striking poem entitled "Eugene Aram's Dream." In 1834, he wrote the novel *Tylney Hall*. In 1838, he commenced the publication of *Hood's Own*, to which his portrait was attached. In 1844, he began *Hood's Magazine* and contributed to its pages until within a month of his death. His "Song of the Shirt" and "Bridge of Sighs" are among the most perfect poems of their kind in the English language. Died in 1845.

Hooker, Joseph, American general, was born in Hadley, Mass., 1814. He graduated at West Point in 1837, and fought in the Florida and Mexican wars. In 1853, he resigned and became a farmer in California.

When the Civil War began, he entered the Union army and soon became a major general. He fought under McClellan on the peninsula and afterward in northern Virginia and Maryland, receiving a wound at the battle of Antietam. His bravery in action brought him the nickname "Fighting Joe Hooker." In January 1863, he was made commander of the army of the Potomac, and, in May, he fought and lost the bloody battle of Chancellorsville. On account of growing dissatisfaction with his generalship, he resigned as ranking general, June 28, 1863, just before the battle of Gettysburg. He still served as major general and fought with great distinction under Grant at Chattanooga and under Sherman at Atlanta. In 1868, he retired from the army. Died in 1879.

Hooker, Sir Joseph Dalton, English botanist, was born at Halesworth, Suffolk, in 1817. He graduated in medicine, but devoted his attention chiefly to botany. In 1839, he joined as botanist the antarctic expedition of the *Erebus* and *Terror*, commanded by Sir James Ross. When he returned, in 1843, he brought with him over 5000 species of plants, which were described and published under the title of *Flora Antarctica*. His *Himalayan Journals* and the *Rhododendrons of the Sikkim-Himalaya* were important additions to our knowledge of botany.

In 1871, he made an expedition to Morocco; ascended the Great Atlas, the summit of which had never before been reached by a European; and secured a valuable collection of plants. He was appointed assistant director at Kew gardens in 1855 and, on the death of his father in 1865, succeeded him as director. In 1877, he made a trip across America to California with Asa Gray. He was knighted in the same year.

His greatest work, which he undertook in conjunction with George Bentham, is the *Genera Plantarum*. He made important contributions to plant geography and ranks among the greatest English botanists. He was an intimate friend of Darwin and influenced Darwin to publish his paper on natural selection in 1858. Died, 1911.

Hooker, Richard, English theologian and writer, was born near Exeter about 1553. He graduated from Oxford in 1574 and became a fellow of Corpus Christi college and deputy professor of Hebrew. The archbishop of York promoted him to the mastership of the Temple in London, 1585. The morning and afternoon services belonged respectively to him and to Walter Travers, the one inclining to the Arminian view and maintaining the Anglican form of worship, the other maintaining Calvinistic opinions and inclining to the Presbyterian form. A controversy arose, which was the occasion of Hooker's great work, *Ecclesiastical Polity*. In 1591, he became rector of Boscombe, Wiltshire. From 1595, he was rector of Bishopsbourne, Kent. Died, 1600.

Hooker, Thomas, English clergyman and American colonist, was born at Markfield, Leicester, about 1586. He became a fellow of Emmanuel college Cambridge, and was for three years a Puritan lecturer at Chelmsford. In 1630, he retired to Holland; in 1633, he sailed for Massachusetts and received a charge at Cambridge. In 1636, he removed with his congregation to Connecticut and founded Hartford. He published many sermons and books, including the *Survey of the Summe of Church Discipline*, an influential work in the development of American Congregationalism. Died, 1647.

Hoover, Herbert Clark, American mining engineer and statesman, was born at West Branch, Iowa, 1874. Graduating in mining engineering at Stanford university in 1895, he engaged in the practice of his profession in various parts of the United States, Australia, and China, taking part in the defense of Tientsin during the Boxer disturbances. In 1902, he located in London, where he became identified with several mine-operating companies. With his wife, Lou Henry Hoover, he co-operated in translating Agricola's *De Re Metallica*.

On the outbreak of the World War, he was made chairman of the American relief commission in London. He was also made chairman of the commission for relief in Belgium, directing the work with marked efficiency. In 1917, he was appointed food administrator for the United States, and, after the Armistice, his services were extended to the destitute populations of different European countries. In March 1921, he became secretary of commerce. With characteristic energy, he expanded the work of the department, extending the helpfulness of its statistical service and co-operating in the elimination of waste through unnecessary diversity in manufactured articles. He did much also to regulate radio broadcasting and strove to lessen American dependence on foreign sources of raw materials. He directed relief operations on the occasion of the disastrous Mississippi flood in 1927.

In 1928, Hoover received the Republican nomination for the presidency. He was elected and took office in March 1929. Among his first acts was an order forbidding the lease of Federal oil lands. He planned a wide and thorough survey of law enforcement conditions. By proposing through an American delegate to the League of Nations disarmament committee a new formula for naval reduction, he initiated a more hopeful stage in the discussion of this problem. A special session of Congress was summoned by him in April 1929 for the purpose of enacting legislation in aid of agriculture and for tariff revision.

Hope, Anthony. See *Hawkins, Sir Anthony Hope*.

Hopkins, Esek, first commodore of the American navy, was born at Scituate, R. I., 1718. At the age of twenty, he went to sea and, during the Seven Years' war between

Great Britain and France, made a brilliant record as captain of a privateer. In 1775, he was chosen commander in chief of the navy by the Continental Congress. When he stepped on the deck of his flagship, the *Alfred*, early in January 1776, Lieutenant John Paul Jones ran up a yellow silk flag bearing the device of a pine tree and a rattlesnake together with the motto "Don't Tread on Me." This was the first flag raised on an American man-of-war. Soon afterward, Hopkins captured the British naval station in the Bahama islands, obtaining nearly 100 cannon. In April 1776, his little fleet attacked the British war vessel *Glasgow*, but after an indecisive battle the *Glasgow* escaped. Hopkins was severely criticized and, in 1777, was relieved of his command. Died, 1802.

Hopkins, Mark, American educator, was born at Stockbridge, Mass., 1802. He graduated in 1824 at Williams college, where he became professor of moral philosophy in 1830. He held this chair throughout the remainder of his life. From 1836 to 1872, he was also president of the college, which he made well known throughout America. In 1857, he became president of the American board of commissioners for foreign missions.

Hopkins was one of the greatest American educators of his time and possessed remarkable ability to inspire and develop the best powers of the individual student. He is the author of *Evidences of Christianity, Law of Love and Love as a Law*, and *An Outline Study of Man*. Died, 1887. He was elected to the American hall of fame in 1915.

Hopkinson, Francis, American politician and author, was born in Philadelphia, Pa., 1737. He was a delegate to the Continental Congress from New Jersey and was one of the signers of the Declaration of Independence. He wrote *The Battle of the Kegs, The Pretty Story, The Political Catechism*, and other works in prose and verse. Died, 1791. His son Joseph, judge of the United States district court, wrote "Hail Columbia." See *Battle of the Kegs*.

Hopper, William De Wolf, American comedian, was born in New York, 1858. He made his first professional appearance in *Our Boys*, 1878; for several years, starred in comedy rôles; and became famous in *Wang* and in *Happyland*. He also played popular rôles in *Mr. Pickwick, Panjandrum, The Pied Piper*, and *A Matinée Idol*. In 1911–13, he participated in a notable revival of Sullivan's *Pinafore, Patience, The Mikado, Iolanthe*, and *The Pirates of Penzance*, displaying remarkable ability in the portrayal of comic parts. He headed his own company in a revival of Gilbert and Sullivan operas in 1921–25 and starred in *The Student Prince*, 1925–26.

Horace, or **Quintus Horatius Flaccus,** Roman poet, was born at Venusia, Italy, 65 B. C. Athens was at this time one of the chief educational centers of the world, and thither Horace repaired in his 19th year to complete his education by a course of philosophy and science under Greek masters. But the civil wars which followed the death of Julius Cæsar, in 44, interrupted him in his studies. The arrival of Brutus at Athens roused the patriotic feelings of the youthful Romans, and, along with others, Horace ardently embraced the cause of the republic. Though entirely inexperienced in war, he was promoted to the rank of military tribune, with the command of a legion, and in this character shared in the defeat at Philippi, 42 B. C.

After the battle of Philippi, Horace returned to Rome, and, by acting as clerk in the quæstor's office, he contrived to live until he found means of making himself known to the poets Varius and Virgil. Virgil recommended him to the patronage of Mæcenas, the prime minister of the emperor Augustus. Horace was soon on terms of familiarity with Augustus and enjoyed his friendship and patronage during the remainder of his life. But the friendship of Mæcenas, who gave him an estate in the Sabine territory about 34 miles from Rome, made him financially independent.

Horace added Roman urbanity, a refined critical faculty, and a temperate philosophy to an unsurpassed gift for lyric poetry, and he ranks next to Virgil among the great Latin masters of verse. His works consist of two books of *Satires*, a book of *Epodes*, four books of *Odes*, two books of *Epistles*, and a treatise on the *Art of Poetry*. Died, 8 B. C.

Hornaday (*hôr'nȧ-dā*), **William Temple,** American naturalist, was born in Plainfield, Ind., 1854. He was educated at Iowa agricultural college; studied zoology and museology in America and Europe; and, as collecting zoologist, visited Cuba, Florida, the West Indies, South America, India, Ceylon, and Malaysia, 1875–79. He was chief taxidermist of the United States national museum, 1882–90, thereafter entering the real estate business in Buffalo, N. Y. He was director of the New York zoological park, 1896–1926. He wrote *Two Years in the Jungle, The Man Who Became a Savage, Camp-Fires in Canadian Rockies, Our Vanishing Wild Life, A Democracy of Crocodiles*, and *Old-fashioned Verses*.

Hornung (*hôr'nŭng*), **Ernest William,** English novelist and journalist, was born at Middlesborough, 1866. He was educated at Uppingham school and spent two years in Australia, 1884–86, after which he engaged in literary work, producing a series of adventure novels. These include *A Bride from the Bush, Under Two Skies, The Rogue's March, Dead Men Tell No Tales, A Thief in the Night, Mr. Justice Raffles, Fathers of Men, Witching Hill*, and *The Crime Doctor*. Died, 1921.

Hosmer (*hŏz'mẽr*), **Harriet,** American sculptor, was born in Watertown, Mass., 1830. She early showed a talent for sculpture by modeling figures in clay. To prepare herself for her chosen career, she studied anatomy at the medical school at Saint Louis. In 1852, she went to Rome, where she studied seven years with the English sculptor John Gibson. In his studio, she executed her "Daphne," "Œnone," "Beatrice Cenci," and "Medusa." Her most ambitious work is a colossal statue of "Zenobia in Chains." "The Sleeping Faun," exhibited at Paris in 1867, is one of her best works. Among her other works are a fountain in Central park, New York, a statue of Queen Isabella in San Francisco, and "The Queen of Naples" and "Heroine of Gaeta."

She was the first American woman to attain prominence as a sculptor. Like her teacher, Gibson, she was a classicist. Hawthorne describes her in his *Italian Notes* and refers to her again in his *Marble Faun*. She died in 1908.

Houdon (*ōō'dôn'*), **Jean Antoine,** French sculptor, was born at Versailles about 1741 and studied in Paris and Rome. He executed, among other works, numerous busts and statues of prominent persons, which placed him in the front rank of French sculptors. In 1785, he accompanied Franklin to the United States to prepare the model for the statue of Washington ordered by the state of Virginia and now in the capitol at Richmond. He worked with great facility and skill in both marble and bronze, and produced a series of more than 200 portrait busts, which form a notable contribution to French sculpture. Among the best-known of these are busts of Diderot, Gluck, Rousseau, Molière, and Benjamin Franklin. His celebrated portrait statue of Voltaire in the Théâtre Français is one of the finest in modern art. Died, 1828. See *Sculpture: French Realism*.

Hough (*hŭf*), **Emerson,** American author, was born at Newton, Iowa, 1857. He graduated at the State University of Iowa, 1880. He traveled over the wildest portions of the West. During the winter of 1895, he explored Yellowstone park, and his trip bore fruit in the act of Congress protecting the park buffalo. Among his numerous writings are *The Singing Mouse Stories, The Story of the Cowboy, The Girl at the Half-way House, The Mississippi Bubble, The Way to the West, Heart's Desire, The Way of a Man, Young Alaskans on the Trail, Lady and the Pirate, The Sagebrusher*, and *The Web*. Died, 1923.

Houghton (*hō'tŭn*), **Stanley,** English dramatist, was born at Ashton upon Mersey, 1881. He worked as a salesman in his father's office from 1897 until 1912, when the success of his play *Hindle Wakes*, produced during the latter year, induced him to give up business for play writing. He visited Paris and Venice in 1913. Houghton was one of the most promising British dramatists of his generation. While seeking liberty of thought rather than freedom of dramatic form, he never sacrificed form for the sake of an idea. He possessed a remarkable gift for dialogue and a penetrating insight into human character, combined with a fine sense of the theater. His plays include *The Dear Departed, Independent Means, The Master of the House, The Younger Generation, Fancy Free, Phipps, The Perfect Cure, The Fifth Commandment*, and *Trust the People*. Died in 1913.

House, Edward Mandell, American politician, was born at Houston, Texas, in 1858. He was educated in the schools of New Haven, Conn., and at Cornell university, graduating in 1881. He never sought office, but, as a trusted adviser, he became influential in Democratic politics and often acted as a personal representative of President Wilson. In 1919, he was one of the American delegates to the Peace Conference at Versailles. House later visited Europe as a correspondent of the Philadelphia *Public Ledger*. He was coauthor with Charles Seymour of *What Really Happened at Paris*.

Housman, Alfred Edward, English scholar and poet, was born, 1859; was educated at Oxford; and, from 1882 to 1892, was higher division clerk in the patent office, London. He became professor of Latin at London university in 1892 and, in 1911, resigned to accept a similar chair at Cambridge university. While best known as a poet by his striking series of lyrics entitled *A Shropshire Lad*, he edited *Manilius* and *Juvenal*, besides writing many papers for scholarly journals and reviews.

Houston (*hū'stŭn*), **David Franklin,** American editor and cabinet officer, was born at Monroe, N. C., 1866. He was educated at South Carolina college and Harvard university. After teaching in South Carolina college 1887-88, and serving as superintendent of schools at

Spartanburg, S. C., 1888–91, he became adjunct professor of political science at the University of Texas in 1894. He was full professor of political science, 1900–02, and, 1905–08, was president of the University of Texas. He served as chancellor of Washington university, Saint Louis, from 1908 until 1913, when he was appointed secretary of agriculture by President Wilson. He was later secretary of the treasury and held other offices of importance in public or private finance. He published *A Critical Study of Nullification in South Carolina.*

Houston, Sam, American soldier, was born in Virginia, 1793. He enlisted in the War of 1812, was chosen ensign, and fought under Jackson with a courage that won his lasting friendship. In 1823, he became a member of Congress and, in 1827, governor of Tennessee. In 1829, he married the daughter of ex-Governor Allen. In the following April, he abandoned civilization; was adopted as a son by the chief of the Cherokee nation; and was formally admitted as a chief.

In 1832, Houston went to Washington and procured the removal of several United States Indian agents on charges of fraud. The Texan war offered a new field to his ambition, and he was made commander in chief. He fought the remarkable and decisive battle of San Jacinto, 1836, in which, at one blow, he annihilated the Mexican army and achieved the independence of Texas. The "hero of San Jacinto" was elected first president of Texas. He was re-elected in 1841 and, on the annexation of Texas to the United States in 1845, was sent to the United States Senate, where he remained until 1859, being then elected governor of Texas. He opposed secession; refused to take the oath to support the Confederacy; was deposed from the governorship in 1861; and retired to private life. He died in 1863.

Hovenden (*hō'vĕn-dĕn*), **Thomas,** painter, was born in Dunmanway, Ireland, 1840. He studied art first in Cork. Coming to America in 1863, he studied in the national school of design, New York, and was later a pupil of Cabanel in Paris for six years. While in France, he painted many pictures of life in Brittany and, after returning to America, made excellent studies of Negro life. His "Jerusalem the Golden" and "Last Moments of John Brown" are in the Metropolitan museum, New York. His widely admired "Breaking Home Ties" portrays, with notable truth and fine sentiment, a country boy leaving home. He lost his life attempting to rescue a child from death by a moving train, 1895.

Howard, Bronson, American dramatist, was born at Detroit, 1842. He prepared to enter Yale university but took up journalism instead, devoting five years, 1867–72, to newspaper work in New York. In 1870, Augustin Daly produced Howard's first important play, *Saratoga,* the first of a long series of dramas which placed him in the front rank of American dramatists of his time. *Aristocracy,* satirizing Anglomania in American society, the war drama *Shenandoah,* and the sentimental comedy *Old Love Letters* are considered his best plays. Among other well-known plays are *The Banker's Daughter, Young Mrs. Winthrop, One of Our Girls,* and *The Henrietta.* Howard was the only American dramatist of eminence previous to 1890. As an able disciple of the progressive French school, he did much to elevate public taste in the drama and exercised a profound influence upon American play writing. He was a member of the American academy of arts and letters. Died in 1908.

Howard, Sir Esme William, British diplomat, was born at Greystoke castle, Cumberland, in 1863. He was educated at Harrow and, in 1885, entered the diplomatic service. In 1900, he served with distinction in the South African war. Thereafter he was attached to various embassies and other diplomatic posts until 1911, when he was appointed minister to Switzerland. From 1913 to 1919, he served as minister to Sweden. In 1924, he became ambassador to the United States.

Howard, John, English philanthropist, was born near London, 1726. In 1756, after the Lisbon earthquake, he sailed for that city to relieve the sufferers and, on his voyage, was captured by a French privateer and imprisoned. When he was sheriff of Bedford in 1773, his attention was called to the condition of the prisons of the county. The sufferings of the prisoners aroused his sympathies, and he made inquiries into the treatment of prisoners over the whole kingdom, bringing to light an amount of misery and degradation of which previously his countrymen had had no conception. In 1774, he was questioned before a committee of the House of Commons, and many reforms were the result.

In 1775, Howard set out on an extended tour through France, Holland, and Germany with the view of acquainting himself with the state of continental prisons. In 1777, after another tour through England, he published a volume entitled *The State of the Prisons in England and Wales, with Preliminary Observations, and an Account of Some Foreign Prisons.* The philanthropic work thus entered upon engaged him wholly for the rest of his life, during which he traveled more than 50,000 miles and expended £30,000 of his own fortune. His later years were spent in visiting the principal lazarettos and hospitals of Europe, an account of which he published in 1789. Died, 1790.

Howard, John Galen, American architect, was born at Chelmsford, Mass., 1864. He studied at the Boston institute of technology, in different architectural firms, and at the school of fine arts in Paris. He established a practice in New York and designed a number of hotels and public buildings in different cities of the Eastern states. He was the architect of the electric tower at the Pan-American exposition in Buffalo, 1901, in which year he was made professor of architecture at the University of California, becoming later the director of its school of architecture. He designed many buildings for the university, including the Greek theater on the campus.

Howard, Leland Ossian, American entomologist, was born at Rockford, Ill., 1857. He graduated at Cornell university, 1877, and entered the bureau of entomology of the United States department of agriculture in 1878, becoming chief of the bureau in 1894. He was made consulting entomologist of the United States public health and marine hospital service, 1904. He was for some years editor of *Insect Life,* a journal of the department of agriculture. His writings include *Mosquitoes, The Insect Book, The House Fly—Disease Carrier, Mosquitoes of North America,* and many government publications on insects.

Howard, Oliver Otis, American soldier, was born at Leeds, Me., 1830. He graduated at Bowdoin college, 1850, and at West Point, 1854. He served in the Florida war and in many actions of the Civil War, losing an arm at the battle of Fair Oaks, 1862. He took a prominent part in the battle of Antietam and was engaged in the battle of Fredericksburg; commanded a corps at Chancellorsville and Gettysburg; fought under Grant in the battle of Chattanooga; and accompanied Sherman on his march to the sea. He was made brigadier general in the regular army, 1864. At the close of the Civil War he was placed at the head of the freedmen's bureau.

From 1869 to 1873, Howard was president of Howard university; was superintendent of West Point military academy, 1881-82; and became commander of the department of the East, 1888, retiring in 1894. In 1895, he founded Lincoln Memorial university, Cumberland Gap, Tenn. His publications include *Donald's School Days, Life of Zachary Taylor, Isabella of Castile, Fighting for Humanity, Our Wild Indians,* and *Autobiography.* Died, 1909.

Howe, Elias, American inventor, was born at Spencer, Mass., 1819. He worked at Lowell and Boston as a mechanic. At the latter place, he developed, constructed, and, in 1846, patented the lock-stitch sewing machine. He made an unsuccessful visit to England to introduce his invention and, returning in 1849 to Boston, found his patent had been infringed. Harassed by poverty, he then entered on a five years' war of litigation to protect his rights and was ultimately successful, in 1854. By his royalties, he in time obtained $200,000 per annum and amassed a fortune of $2,000,000. During the Civil War, he served as a private. Died, 1867 and was elected to the American hall of fame, 1915. See *Sewing Machines.*

Howe, Joseph, Canadian statesman and journalist, was born near Halifax, N. S., 1804. He edited the *Nova Scotian* for many years and attained celebrity for his vigorous advocacy of responsible government. He was a Liberal member of parliament in Nova Scotia, and became premier in 1863. He opposed Confederation, having in mind a plan of broader imperial union. He gave his qualified support, however, to Confederation when he had secured favorable terms for Nova Scotia. He entered the Dominion cabinet in 1869 as a Conservative and, in 1873, was made lieutenant governor of his province. Died, 1873.

Howe, Julia Ward, American author, was born in New York, 1819. She received a private education and, in 1843, married the philanthropist Dr. Samuel Gridley Howe. With him she conducted the Boston *Commonwealth,* an antislavery paper, prior to the Civil War. After the slavery question was settled, she became active in woman suffrage, prison reform, and the cause of peace. She was a Unitarian preacher, lecturer, and writer. Her best-known poem, the "Battle Hymn of the Republic," was written in 1861. Her writings also include *Passion Flowers, A Trip to Cuba, The World's Own, Sex and Education, Memoir of S. G. Howe, Is Polite Society Polite? From Sunset Ridge,* and *Reminiscences.* She was the first woman to be elected a member of the American academy of arts and letters. Died, 1910.

Howe, Richard, Earl, British admiral, was born in 1726. He left Eton at 14 and went to the South Seas in the squadron under Anson. He was with Admiral Vernon in 1745 and took part in the siege of Fort William. In 1755, his ship, the *Dunkirk,* captured the *Alcide.* He next served under Sir E. Hawke in the expedition against Rochefort. He was commodore of the squadron which sailed in 1758 for Saint Malo. In the same year, he took Cherbourg and

also succeeded to the Irish title of viscount. He took part in the defeat of the fleet under Marquis de Conflans, capturing the *Hero*.

In 1776, he commanded an English fleet on the American coast and, in 1778, defended the American coast against a superior naval force under D'Estaing. He was made first lord of the admiralty in 1783 and received an earldom in 1788. When war with France broke out in 1793, he took the command of the channel fleet and, the following year, gained a signal victory off Ushant. Died, 1799.

Howe, Samuel Gridley, American philanthropist, was born in Boston, 1801. He graduated from Brown university, 1821, and from Harvard medical college, 1824. He organized the medical staff of the Greek army, 1824–27; returned to America to raise contributions; and, returning with supplies, formed a colony on the isthmus of Corinth. In 1831, he went to Paris to study the methods of educating the blind, and, becoming involved in the Polish insurrection, he was compelled to spend five weeks in a Prussian prison. On his return to Boston, he established schools for the blind and for idiots, and was the teacher of the famous Laura Bridgman, who was blind, deaf, and dumb. In 1851–53, he edited the antislavery *Commonwealth*, assisted by his wife, Julia Ward Howe. In 1867, he revisited Greece with supplies for the Cretans. He was the originator and served as chairman of the Massachusetts state board of charities, 1865–74. Died, 1876.

Howe, Sir William, English general, was born in 1729. He served at Quebec under Wolfe and succeeded General Gage in command of the royal troops during the American Revolution. In 1775, he was made commander in chief of the English army in North America and had command at the battles of Bunker Hill, Long Island, White Plains, and Brandywine. Failing to crush the rebellion, he was superseded by Sir Henry Clinton in 1778. He died in 1814.

Howell, Clark, American editor and politician, was born in Barnwell county, S. C., 1863. He graduated from the University of Georgia, 1883, and entered newspaper work, succeeding Henry W. Grady as managing editor of the Atlanta *Constitution*, 1889, and succeeding his father as editor in chief in 1897. He was a member of the Georgia house of representatives for six years and was speaker in 1890-91; became a member of Democratic national committee, 1892; and was a member of the Georgia senate, 1900–06. For many years, he served as a director of the Associated Press.

Howells, William Dean, American novelist, was born at Martins Ferry, Ohio, 1837. His early education was gained largely in newspaper offices. In 1860, he published his first volume, *Poems of Two Friends*. He was United States consul at Venice, 1861–65, and wrote *Venetian Life*, a book of genuine charm, followed by *Italian Journeys*. From 1866 to 1881, he was editorially connected with the *Atlantic Monthly*. He contributed to *Harper's Magazine*, 1886–91, and became the writer of "Editor's Easy Chair" for *Harper's*. Besides much editorial and critical work and many poems, he published about 40 volumes of novels, essays, and sketches.

By his sincerity, his graceful, flexible style, and his high literary ideals, he became a leader of the realistic school and the foremost figure in contemporary American literature. Among his representative works are *The Rise of Silas Lapham*, *A Hazard of New Fortunes*, *A Modern Instance*, *The Quality of Mercy*, *Criticism and Fiction*, *My Literary Passions*, and *Years of My Youth*, an autobiography. His first novel, *Their Wedding Journey*, appeared in 1871, and he completed *The Leatherwood God* in his 80th year. He was elected the first member and became president of the American academy of arts and letters. Died, 1920.

Howison (*hou'i-sŭn*), **George Holmes,** American educator and writer, was born in Montgomery county, Md., 1834. He graduated at Marietta college and at Lane theological seminary. He taught mathematics and political economy at Washington university, Saint Louis, 1864–69; was professor of logic and the philosophy of science at the Massachusetts institute of technology, 1871–79; and lectured on ethics at Harvard, 1879-80, going later to the University of Michigan, 1883, and to the University of California, 1884, as professor of philosophy. He became notably successful as a teacher of Kantian philosophy, which he developed along original lines, and exercised a profound intellectual influence on the Pacific Coast. He wrote *Limits of Evolution* and was joint author with Royce of *The Conception of God*. Died, 1916.

Hoxie, Vinnie Ream, American sculptor, was born in Madison, Wis., 1847. She displayed precocious talent and studied under Bonnat in Paris and under Majoli at Rome. While she was still in her teens, she won in open competition a $30,000 commission for a life-size statue of Lincoln, now in the rotunda of the Capitol at Washington. Congress later employed her to execute the heroic statue of Farragut, now in Farragut square, Washington. Her works include the ideal statues of "Miriam," "The West," "Sappho," and portrait busts of Lincoln and other distinguished Americans and Europeans. In 1911, she was selected sculptor for the statue of Sequoyah, to represent Oklahoma in Statuary Hall, Washington. In 1878, she married Gen. R. L. Hoxie. Died, 1914.

Hrdlicka (*dlĭch'kă*), **Ales,** anthropologist, was born at Humpoletz, Czechoslovakia, 1869. He came to New York City and studied at Eclectic college and Homeopathic college. He made special studies of the insane and accompanied anthropological expeditions in various parts of North America and in Siberia, Mongolia, Peru, Japan, China, and Hawaii. His investigations led him to advance the theory that most of the American Indians are of Asiatic origin. He was connected with the United States National museum in the years following 1903, becoming curator in 1910. His publications include *The Eskimo Brain*, *Ancient Man in North America*, *Tuberculosis among Indians*, and *Anthropological Work in Peru in 1913*.

Hubbard, Elbert, American author, journalist, and lecturer, was born in Bloomington, Ill., 1859, and received a common-school education. He established and edited *The Philistine*, a periodical of shrewd philosophy, devoted in part to the exposition of his ideas of co-operation and social service and in part to trenchant criticism of fads and foibles. He became widely known also as a lecturer and as the originator of the Roycroft shop for artistic bookmaking and the revival of ancient handicrafts, which he conducted with notable success in accordance with his theory of work and service. Among his best-known writings are the long biographical series published as *Little Journeys*, *Time and Chance*, *Contemplations*, *Hollyhocks and Golden Glow*, *The Book of Business*, and numerous pamphlets, including the famous *Message to Garcia*. Died on the *Lusitania*, 1915.

Huber (*ü'bâr'*), **François,** Swiss naturalist, was born in Geneva, 1750. He studied physics under Saussure, but began to lose his sight at the age of 15 and later became entirely blind. With ample means from his father and the devoted assistance of his wife, Marie Aimée Lullin, and his servant, François Burnens, he conducted a series of notable original researches on the life and habits of honeybees and laid the foundation of the scientific knowledge of their life history.

Among his notable discoveries were the aerial impregnation of the queen bee, the rivalry of the queens, the killing of the males by the workers, the use of antennæ, the origin of the propolis, and the ventilation of the hives. With the assistance of his son, he made researches on the origin of wax and the construction of cells. The results of his investigations were published in his *Nouvelles observations sur les abeilles*. He died in 1831.

Huber, Hans, Swiss dramatic composer, was born at Schonewerd, 1852. He received his musical education at the Leipzig conservatory; became a noted teacher of music; and, in 1896, was appointed director of the music school at Basel. The number and excellence of his compositions, both instrumental and vocal, entitle him to rank as the leading composer of his day in Switzerland. His works include the operas *Gudrun*, *Weltfrühling*, and *Der Simplicius*; the beautiful orchestral works *Pandora* and *Nordseebilder*; three fine symphonies; and concertos for the violin and the piano. Died, 1921.

Huc (*ük*; *hăk*), **Evariste Régis,** Roman Catholic missionary, was born at Toulouse, France, 1813. In 1839, he joined the mission of the Lazarist fathers to China. In 1844, with Père Gabet and a single native convert, he set out for Tibet, and, in January 1846, he reached Lassa. Scarcely had a mission been started there when an order for their expulsion was obtained by the Chinese resident, and they were conveyed back to Canton. Huc's health having broken down, he returned to France in 1852. He wrote *Souvenirs* of his great journey, *L'Empire chinois*, and *Le Christianisme en Chine*. His descriptions of the strange things encountered in Tibet were received with much incredulity, but travelers have since verified his statements. Died, 1860.

Hucbald or **Hubaldus,** medieval writer of music, was born at Saint Amand near Tournai, about 840. He studied at Saint Germain d'Auxerre, where he made notable progress in the sciences and arts, especially music, and, in 872, became head master of the convent school at Saint Amand. Between 883 and 900, he visited several schools of music, including that of Reims, which he reformed and improved, returning later to Saint Amand, where he spent the remainder of his life.

Numerous musical writings of the period were attributed to him, but his authorship of the *Harmonica Institutio* is unchallenged. He was the leading theoretical writer on music of his century, and the beginnings of harmony are found in his diaphonic music, which consists of simultaneous progressions of two parts in parallel fifths, called by him the organum. The substitution of fourths for fifths by Guido d'Arezzo in the 11th century very soon resulted in the use of the other intervals, and, finally, in the development of

the harmonic chord, which, together with measured rhythm, constitutes the chief advance of modern music over the purely melodic music of the Greeks and their successors in the middle ages. Hucbald died about 930.

Hudson, Henry, English navigator, flourished in the early 17th century. In 1607, he sailed in search of a short route to China and India by way of the Northern Ocean, but was stopped by the ice off the coast of Greenland and was forced to return. In 1609, while in the service of the Dutch East India Company, he discovered the Hudson river, up which he sailed to the present site of Albany. On a fourth voyage, 1610, he discovered the strait and bay which are called Hudson after him. Finding his progress blocked by ice fields, he determined to spend the winter on the shores of the bay. Here he and his men suffered terribly from want of food, and he set out to return in 1611. The men mutinied and, getting possession of the ship, put Hudson, his son John, and seven sailors into an open boat and turned them adrift. Nothing was ever known of their fate.

Hudson, Henry Norman, American Shaksperian scholar, was born at Cornwall, Vt., 1814. He began his active life as a baker and a wheelwright; but he later attended Middlebury college, graduating in 1840, after which he devoted several years to teaching in Kentucky and Alabama. He made a special study of Shakspere, lectured extensively on his works, and became professor in Boston university. In 1848, he published *Lectures on Shakespeare*, which was followed by an excellent annotated edition of *Shakespeare's Works* and, in 1872, by *Shakespeare, his Life, Art, and Characters*. He entered the Episcopal ministry, became editor of the *Churchman*, was rector at Litchfield, Conn., and served in the Union army as chaplain during the Civil War. His published works include also *A Chaplain's Campaign with General Butler*, *Studies in Wordsworth*, *Essays in Education*, and *Sermons*. He died in 1886.

Hudson, W. H., English naturalist and writer, was born of English parents in 1841 at Quilmes, Argentina, in which country he spent the early part of his life. He there acquired the knowledge and the love of nature which are admirably displayed in his *Naturalist in La Plata*, published in 1892. Other works treating of his travels and observations in South America include *The Purple Land* (Uruguay), *Idle Days in Patagonia*, and *Argentine Ornithology* (jointly with P. L. Sclater).

About 1890, he settled in London. Soon afterward he began to study rural England with a rare and appreciative insight which is reflected in many charming books. He first became widely known to the literary world by his novel *Green Mansions*, published in 1904. While recognition of the originality of his work came late, at the time of his death he was regarded as one of the foremost of modern writers on natural history and was especially noted for the quality of his literary style. His "peculiar genius lay in setting forth nature and its minutest creatures with gentleness and understanding, not 'scientifically' and coldly."

Besides the foregoing, his writings include *Birds in a Village*, *British Birds*, *Birds in London*, *Birds and Man*, *Adventures Among Birds*, *Nature in Downland*, *Hampshire Days*, *The Land's End*, *Afoot in England*, *A Shepherd's Life*, and *Far Away and Long Ago*. He died in 1922.

Huggins (*hŭg'ĭnz*), **Sir William,** English astronomer and spectroscopist, was born in London, 1824. In 1852, he was elected a member of the British microscopical society, and for some years studied physiology with the microscope. But, having built an observatory near London in 1856, he began the study of the physical constitution of stars, planets, comets, and nebulæ. He introduced spectroscopic photography into astronomy; proved the existence of carbon in comets and of calcium in the chromosphere of the sun; and made many other valuable contributions to science. Died, 1910.

Hugh Capet (*hū kā'pĕt*), founder of the Capetian dynasty of French monarchs, was born, 939, and was king of France, 987–996. As count of Paris, on the death of Louis V, last of the Carolingians, he usurped the throne and was confirmed in its possession by a confederacy of nobles. Died, 996.

The race of Capet has given 119 sovereigns to Europe: 36 kings to France, 22 to Portugal, 5 to Spain, 11 to Naples and Sicily, 3 to Hungary, and 3 to Navarre; 3 emperors to the Byzantine Empire; 17 dukes to Burgundy, 13 to Brittany, 2 to Lorraine, and 4 to Parma.

Hughes, Charles Evans, American lawyer and jurist, was born in Glens Falls, N. Y., 1862. He graduated from Brown university, 1881, and from Columbia law school with high honors in 1884. He was a teacher in Delaware academy, Delhi, N. Y., 1881-82; was admitted to the New York bar, 1884; and practiced in New York, 1884–1906, with the exception of two years, 1891–93, when he was professor of law at Cornell university. In 1905, he was attorney for the committee appointed by the state legislature to investigate financial methods of great life insurance companies. His skill and ability in securing disclosures of these methods won him a national reputation and led to radical reforms.

Hughes was elected governor of New York in 1906 and was re-elected in 1908. After a notable contest with the legislature, he secured enactment of the direct primary, short ballot, antigambling, and other progressive laws. In 1910, he was appointed justice of the United States supreme court. He resigned in 1916 upon receiving the Republican nomination for president, but was defeated by Woodrow Wilson and resumed legal practice in New York. In 1921, he became secretary of state and was elected chairman of the Washington Conference, which assembled in the same year. He resigned in 1925. Three years later he was appointed a judge in the World Court.

Hughes, Raymond Mollyneaux, American educator, was born in Atlantic, Iowa, 1873. He was graduated at Miami university, Ohio State university, and the Massachusetts institute of technology. He was appointed to the faculty of Miami university in 1898, serving successively as professor of physics and chemistry, dean of the college of liberal arts, and, beginning in 1913, as president of the university. In 1927, he was made president of Iowa state college.

Hughes, Sir Samuel, Canadian statesman, was born in Darlington, Ont., 1853. He was educated at Toronto university. In 1885, he purchased the Lindsay *Warder*, of which he was editor until 1897. He entered the militia at the age of 12; served in the South African war, 1899-1900; and attained the rank of major general in 1914. In 1892, Hughes was elected to the House of Commons and, in 1911, became minister of militia in the Borden cabinet. Upon the outbreak of the World War, he was active in organizing the Canadian military forces. In September-October 1914, he assembled and forwarded 33,000 troops to English ports. He continued the work of organization with notable energy, securing a total exceeding 350,000 men previous to his resignation in November 1916. Died, 1921.

Hughes, Thomas, English author, was born at Uffington, 1822. He was educated at Rugby under the celebrated Dr. Arnold; entered Oriel college, Oxford, and took his degree in 1845; was called to the bar at Lincoln's Inn, 1848; and later became a member of the chancery bar. In 1857, he gave to the world *Tom Brown's School Days*. It was followed by *The Scouring of the White Horse*, *Tom Brown at Oxford*, and *Alfred the Great*.

Hughes pursued, meanwhile, the practice of law. He gained the confidence and good will of the working classes by endeavoring to promote a better understanding between masters and men and by teaching the latter the value of co-operation. He was instrumental in establishing a model colony at Rugby, Tenn., 1880. Died, 1896.

Hughes, William Morris, Australian statesman and labor leader, was born in Wales, 1864. He was trained as an elementary school teacher and, in 1884, went to Australia. He affiliated himself with the Labor party and was elected to the legislature of New South Wales in 1894 and, in 1901, to the Federal legislature. He had taken a prominent part in the organization and leadership of labor unions, and, after an election favorable to his party in 1904, he was made minister of foreign affairs and later held other cabinet offices. During 1915–22, he was premier of Australia, in which capacity he favored a vigorous prosecution of the World War and became known as an enthusiastic imperialist.

Hugo (*hū'gō*; F., *ü'gō'*), **Victor Marie,** French poet, novelist, and orator, was born at Besançon, France, February 26, 1802. As a child, he was taken in the train of his father, a French general, through the south of France and finally into Spain, where his education was begun at the Nobles' college, Madrid. Upon the advance of the English to free Spain from the French armies, he was taken to Paris. There he was taught by priests until General Lahorie undertook to tutor him in Old French and Latin. Hugo later entered the College of Louis-le-Grand, where, at 14, he wrote the tragedy *Irtamène*. In 1817, the French academy mentioned honorably his poem "On the Advantages of Study."

Early Literary Career. Hugo married his cousin Adèle Foucher in October 1822. Soon his West Indian romance, *Bug Jargal*, appeared, followed, in 1826, by a book of *Odes and Ballads*. With the appearance of his tragedy *Cromwell* in 1827, Hugo became immediately the leader of the romantic movement in literature.

His two plays *Marion Delorme* and *Hernani* were suppressed by the censor. *Notre Dame de Paris*, written in 1831, the historical romance in which Hugo vied with Scott, was translated into many languages, and plays and operas were founded on it. *The King Takes His Pleasure* of 1832 is familiar in the opera *Rigoletto*.

In 1837, Louis Philippe made Hugo an officer of the legion of honor. *Ruy Blas* was acted successfully in 1838; three years later, the French academy, having rejected Hugo several times, admitted him to membership.

Later Activities. To distract himself from the grief occasioned by the drowning of his daughter, Hugo plunged into politics. He was created a peer in 1845 and sat in the Constituent Assembly of France. When he was banished from the country by Louis Napoleon, Hugo betook himself to Brussels, London, and the Channel islands. Meanwhile, he satirized the usurper in lampoons that were collected from 1853 to 1859 in *Castigations*. Refusing to avail himself of the amnesty of 1859, he remained in exile and soon began his greatest creations in fiction. In 1862, *Les Misérables*, the most celebrated of his novels, appeared; in 1866, *The Toilers of the Sea*; in 1869, *The Man Who Laughs*.

Upon his return to France in 1870, he again joined the Republican movement and was returned to the National Assembly. After the Commune, he fled to Brussels and Luxemburg. Poems written during the Franco-Prussian war and the siege of Paris and collected under the title *The Terrible Year* betray the long tried exile.

In 1874, his novel *Ninety-Three* pleased the public, and phases of a bounteously paternal mood appeared in his *Art of Being a Grandfather* of 1877. The same year, he published his graphic *History of a Crime*, which depicted the Republicans' side of the *coup d'état* of Louis Napoleon in 1851. The poetic romance *Torquemada*, published when Hugo was 80, proved that his pen had not lost its skill.

Rank Among Writers. Hugo's place in world literature is secure. No other author while living achieved such national popularity as his. In romance, he stood first, although George Sand and Balzac were his rivals; in lyrical poetry, also first, despite Lamartine and De Musset; in the drama, he had no close competitor among the writers then living. His range of character creation was very broad. He possessed the genius of emotion, though he was less richly endowed with the qualities that come through reflection. He gave to French rhythm a strength and variety it had never known, and he employed a prose style that was singularly effective. Died, May 22, 1885. See *Les Misérables*, *Notre Dames de Paris*, *Quasimodo*.

Hull, Isaac, American naval officer, was born in Derby, Conn., about 1773. In 1812, he commanded the frigate *Constitution*, which was pursued by a British squadron for three days but escaped by skillful sailing. While cruising in the Gulf of St. Lawrence in the same year, he met the British frigate *Guerrière*, which surrendered after a bloody fight of half an hour. The *Guerrière* was so injured in the battle that she soon sank. The British ship lost 100 men; the *Constitution* lost but 14 men killed and wounded, and within an hour or so was ready for another fight. This was the first naval battle of the War of 1812, and Congress gave Captain Hull a gold medal for his services. He died in 1843.

Humbert I (*hŭm'bĕrt*), former king of Italy, eldest son of King Victor Emmanuel, was born at Turin in 1844. He took part in the work of reorganizing the ancient kingdom of the Two Sicilies, and, from his association with the unification of Italy, he shared the popularity of Garibaldi. After the occupation of Rome by the Italian troops in 1870, Prince Humbert took up his residence there and succeeded to the throne on the death of his father in 1878. The most notable event in his reign was the formation in 1882 of the triple alliance between Italy, Germany, and Austria-Hungary. This alliance lasted until the World War, when Italy abandoned her former allies. Humbert was assassinated in 1900.

Humboldt, Friedrich Heinrich Alexander, Baron von, German geographer and traveler, was born in Berlin, 1769. After studying at Frankfort on the Oder, Gottingen, and Freiberg, he became director general of the mines of Bayreuth and Anspach in 1792, which office he held for about four years. He had already made a considerable reputation as a writer on science when, in 1799, he set out with Bonpland for South America and occupied four years in the exploration of that continent and about a year more in investigating the natural history of Mexico. After his return to Europe in 1804, he passed a period of 20 years in Paris, preparing and publishing a monumental work of 30 volumes describing his travels.

In 1829, Humboldt made a scientific exploration of Central Asia and, during the 18 years following, was engaged in diplomatic affairs in behalf of the Prussian government. His chief works include *Journey to the Equinoctial Regions of the New Continent*, *General Physics and Geology*, *On the Geographical Distribution of Plants according to the Temperature and Altitude*, *Aspects of Nature*, and what is commonly esteemed his masterpiece, *Kosmos—Essay of a Physical Description of the Universe*, begun in his 74th year.

Humboldt's influence upon modern science has been profound and far-reaching. He founded the modern science of physical geography and made important contributions to geology and valuable discoveries in chemistry and magnetism. He died in 1859.

Hume, David, Scotch philosopher and historian, was born in Edinburgh, Scotland, April 26, 1711. Law and commerce, to which he first turned, both proved uncongenial, and he ultimately devoted himself to a life of study and the cultivation of literature and philosophy.

The years 1734–37 he spent at La Fleche, France. Here Hume studied, and wrote *A Treatise of Human Nature*, which was published in Great Britain in 1739. It was a work of demolition. He separated ideas, or the impressions created by an external world, from the absolute existence of that world itself. He saw that the fact of self-consciousness is not more amenable to demonstration than our belief in the existence of an outer world. He contended it was not possible for man to prove the validity of these beliefs. He thus threw down a challenge to philosophers either to refute what he had said or seriously to fill up the blanks which he had discovered. To this impetus are due both Scotch and German schools of metaphysicians.

Hume now turned, for a time, to literary fields which brought him greater financial recompense. In 1741-42 appeared two volumes of *Essays*, whose enlightened treatment of morals and politics caused Hume to be called the father of the liberal and rational policy. In 1746, he became secretary to General Saint Clair, with whom he went to France and later to Turin and Vienna. In the next few years, he wrote his *Enquiry Concerning the Principles of Morals*, his *Political Discourses*, and his *Dialogues on Natural Religion*.

After an unsuccessful attempt to obtain the chair of logic at the University of Glasgow, Hume settled at Edinburgh and, in 1752, was elected librarian to the faculty of advocates. This post encouraged him to write the *History of England*, 1754–61, which long held its ground as the chief authority on the subject despite its strong partisan spirit of Toryism. In 1757, Hume brought out his *Natural History of Religion*, which was violently assailed by theologians.

As secretary and, later, as *chargé d'affaires* to the British embassy at Paris, 1763–66, Hume became familiar with the wits and *savants* of the Parisian circle. From 1767 to 1769, he held the office of British undersecretary of state. He then returned to Edinburgh, where he wrote his autobiography, *My Own Life*.

Hume's great distinction is attributable to the fact that, by his acute investigation into the nature of man from the point of view of Locke's system, he gave to philosophical skepticism a strength and logical consistency which it never had before. His influence has extended to many writers and is far from exhausted. Died, August 25, 1776.

Humperdinck (*hōōm'pĕr-dĭngk*), **Engelbert,** German composer, was born in Siegburg, near Bonn, 1854. While studying at Cologne in preparation for the profession of architect, he became acquainted with Hiller, who induced him to study music instead. He studied at the Cologne conservatory in 1874–76 and in Munich, 1876–79. He then went to Italy, where he formed an intimate friendship with Wagner, who made him practically a member of his family and employed him in preparing *Parsifal*. Upon the death of Wagner, he taught in the conservatory at Barcelona, 1885–86. After spending some years in Cologne, he became an instructor in the Hoch conservatory in Frankfort, and, in 1900, he was made director of the Meisterschule there.

Humperdinck's fame as a composer rests upon the success of his fairy operas *Hänsel und Gretel*, 1893, and *Die Königskinder*, written in 1896 but first produced at the Metropolitan opera house in New York in 1910. He composed also ballads and choruses and the operas *Die sieben Geislein*, *Dornröschen*, *Die Heirat wider Willen*, and *Die Marketenderin*. Died, 1921.

Huneker (*hŭn'ĕ-kĕr*), **James Gibbons,** American writer and musical critic, was born in Philadelphia, Pa., 1860. He studied music in Paris, 1878–80, under Ritter and Barili. Returning to the United States, he was associated for 10 years with Rafael Joseffy as teacher of piano at the national conservatory, New York. He began writing musical criticisms for New York newspapers in 1891. He later became musical editor and, in 1902, dramatic editor of the New York *Sun*, achieving distinction for his vigorous and able advocacy of his artistic ideals. His writings include *Mezzo-tints in Modern Music*, *Chopin—The Man and His Music*, *Melomaniacs*, *Visionaries*, *Egoists—A Book of Supermen*, *Promenades of an Impressionist*, *Franz Liszt*, *The Pathos of Distance*, *Ivory Apes and Peacocks*, and many magazine articles. Died, 1921.

Hunt, Helen. See *Jackson, Helen Hunt.*

Hunt, James Henry Leigh, English poet and essayist, was born at Southgate, near London, 1784. He was educated at Christ's hospital, where he was a schoolfellow of Coleridge and Charles Lamb. In 1813, as editor of the *Examiner*, he wrote some articles severely criticizing the prince regent, afterward George IV, and for these he was prosecuted by order of the government and sentenced to two years' imprisonment in the Surrey jail. While in jail, he wrote *The Descent of Liberty, a Masque*, *The Story of Rimini*, and *The Feast of the Poets*.

In 1819, Hunt began a small periodical, called the *Indicator*, in which many of his essays appeared. In 1828, he published *Lord Byron and Some of His Contemporaries*, in which, having quarreled with his former friend Byron during a visit to Italy, he indulged in some severe animadversions upon the character of that poet. All his life was devoted to literature, and all his writings have a fascination of their own. Among his last works was his *Autobiography*. He died, 1859.

Hunt, Richard Morris, American architect, brother of William Morris Hunt, the painter, was born at Brattleboro, Vt., 1828. He began to study architecture at the age of 15 in Geneva, Switzerland. At 20, he entered the École des Beaux-Arts, Paris, the first American student there. After a period of travel in Europe, Egypt, and Asia, he became inspector of works on the Louvre. In 1855, he returned to America; was employed on the extension of the Capitol at Washington; and founded in New York the pioneer American studio of architecture, where many great architects were trained.

Hunt designed the Lenox Library, the Tribune building, and the original building for the Metropolitan museum of art, New York; The naval Observatory at Washington; the Administration building at the Columbian exposition, Chicago; the Divinity building at Yale; the pedestal of the statue of Liberty in New York harbor; the Yorktown monument; and many noted private houses, including the Vanderbilt country house at Biltmore, N. C. His influence, both personal and artistic, upon the development of architecture in the United States was very great. Died, 1895.

Hunt, Thomas Forsyth, American agriculturist, was born in Ridott, Illinois, 1862. Educated at the University of Illinois, he held many positions as an agricultural educationist and investigator. In the years following 1903, he was connected successively with Cornell university, Pennsylvania State college, and the agricultural experimental station of the University of California. He is the author of *The Cereals in America*, *How to Choose a Farm*, and many other publications on agriculture. Died, 1927.

Hunt, William Holman, English religious painter, was born in London, 1827. In 1845, he was admitted as a student to the royal academy, and he exhibited his "Flight of Madeline and Porphyro" in 1848. He shared a studio with D. G. Rossetti, and the two, along with Millais and a few others, inaugurated the "Pre-Raphaelite brotherhood," which aimed at detailed and uncompromising truth to nature. Among the first of his Pre-Raphaelite works was "Rienzi," in 1849. It was followed by "Valentine Rescuing Sylvia," "The Hireling Shepherd," "Claudio and Isabella," and "Strayed Sheep."

The result of several visits to Palestine appeared in "The Scapegoat"; "The Finding of Christ in the Temple," now in the Birmingham art gallery, for which he received £5000; "The Shadow of Death," in the corporation gallery, Manchester, for which he was paid £10,000; and "The Triumph of the Innocents." Among his latest works were "Isabella and the Pot of Basil" and "May Morning in Magdalen Tower." The most widely known of his paintings is "The Light of the World," now at Keble college, Oxford. Died, 1910.

Hunt, William Morris, American genre and portrait painter, was born in Brattleboro, Vt., 1824. He studied in Dusseldorf and under Couture in Paris, and became a friend and follower of J. F. Millet, but made the technique of the French school subsidiary to his own original ideas. He established and conducted a large art school in Boston and exerted a powerful influence by his high artistic standards and the admirable quality of his own work. His sayings in the studio were collected by his pupil Helen Knowlton and published under the title *Talks on Art*.

Among his important figure paintings are "The Farmers' Return," "Sheep Shearing at Barbizon," "The Fortune Teller," "The Bugle-Call," and "The Prodigal Son." In the Boston museum are several of his canvases, including "Girl Reading," "Peasant Girl at Barbizon," "Marguerite," and "Hurdy-Gurdy Boy." Among seven of his works in the Metropolitan museum, New York, are an excellent "Landscape," "Girl at a Fountain," and "The Bathers." He also painted portraits of many celebrated persons as well as "The Flight of Night" and other decorations in the State capitol at Albany, N. Y. Died, 1879. See *Painting*.

Hunter, John, British surgeon, anatomist, and physiologist, was born at Glasgow, Scotland, 1728. He spent five years at the University of Edinburgh and, deciding to adopt the profession of medicine, went to London and studied at Chelsea hospital. His progress in anatomy and surgery was so rapid that, in the second session, he was able to undertake the directing of the pupils in their dissections. After 10 years in the dissecting room, his health gave way.

In 1759, he applied for an appointment in the British army; he was immediately made staff surgeon and served in the Seven Years' war until the conclusion of peace in 1763. He then settled in London, where, in 1785, he built a museum. This museum became the place of meeting of the *lyceum medicum*, a society established by Hunter and Fordyce.

His famous operation for the cure of aneurism, that of simply tying the artery at a distance from the tumor and between it and the heart, led to important advances in surgery. He was an indefatigable student, made innumerable dissections and experiments, and was the greatest anatomist and the best operative surgeon of his day. He wrote *Natural History of the Human Teeth* and *Treatise on the Blood, Inflammation, and Gunshot Wounds*. He died in 1793. In 1859, his remains were interred in Westminster Abbey.

Huntingdon (*hŭn'tĭng-dŭn*), **Selina, Countess of,** daughter of Earl Ferrers, was born in 1707. She married the earl of Huntingdon, 1728, and became a widow in 1746. Joining the Methodists in 1739, she made Whitefield her chaplain in 1748 and assumed a leadership among his followers, who became known as "the countess of Huntingdon's connection." For the education of ministers, she established, in 1768, a college at Trevecca in Brecknockshire and built or bought numerous chapels, the principal one at Bath. She died in London, 1791, bequeathing to four persons her 64 chapels. In 1910, the connection consisted of 44 churches and mission stations, 2400 communicants, and 26 ordained pastors.

Huntington, Archer Milton, American Hispanic scholar, adopted son of Colis P. Huntington, was born at New York City in 1870. He was privately educated in New York and Spain, and conducted for the Spanish government excavations of the old Roman city of Italica. He founded the Hispanic society of America in 1904 and donated to it a building, endowment, and rich collection. Huntington edited *The Poem of the Cid* and other Spanish texts and *Lady Aulnoy's Travels in Spain*. He is the author of *A Note Book in Northern Spain*. He was elected in 1919 to the American academy of arts and letters.

Huntington, Henry Edwards, American capitalist and art collector, was born at Oneonta, N. Y., 1850. He entered the hardware business in Oneonta and later removed to New York. He was a lumberman at Saint Albans, W. Va., from 1874 to 1880. He then entered railway work as superintendent of construction for the Chesapeake, Ohio & Southwestern railway, of which he became superintendent in 1884 and general manager in 1886. He later became engaged in numerous navigation, transportation, and other development enterprises on the Pacific Coast, particularly in southern California, where he was actively identified in the development of that section.

He made one of the finest collections of rare books and pictures in existence, housing it in Pasadena, to which city, in 1922, he gave his estate there to be used as a public park. He purchased Gainsborough's "Blue Boy" at a great price and brought it to America. Died, 1927.

Hunyadi (*hōōn'yŏd-ĭ*) **János,** Hungarian national hero, was born in Hunyad, Transylvania, about 1387. As governor of Transylvania in 1442, he distinguished himself against the Turks, who at that time were the terror of the whole of Christendom. During the period of his rule, he was the shield of Hungary, not only against external foes, but also against the lawless attempts of the nobles. During the minority of Ladislaus V, he was elected regent of Hungary. The most splendid of his deeds was the storming of Belgrade, where the monk John Capistran, carrying the holy cross, raised the enthusiasm of the Christian warriors to such a height that a complete victory over the defending Turks brought that fortress again into the possession of the Hungarians. He died in 1456.

Huss, or **Hus** (*hŭs*; G., *hōōs*), **John,** Bohemian religious reformer, was born at Husinetz, now in Czechoslovakia, about 1370. He studied at the University of Prague and was appointed dean of the philosophical faculty in 1401 and rector of the university in 1402. As a preacher, he was greatly esteemed both by the common people and by the students, while, as confessor to Queen Sophia, he obtained access to the court. At this time, he became acquainted with the writings of Wiclif, which exercised a great influence over him.

The works of Wiclif had recently been condemned by the pope, and Huss, accused of being a Wiclifite, was excommunicated. He denounced the indulgences granted by the pope, who desired by such means to make an effective crusade against Ladislaus, the excommunicated king of Naples. Huss was supported in his attack on indulgences by his friend Jerome.

The pope issued an interdict against Huss in 1412, but Huss appealed to a general council and to Christ, and wrote his *On the Church* as a reply to the pope. He went to a general council at Constance in 1414 under a safe-conduct from the king. His enemies secured his imprisonment as a heretic and, despite the guarantee of safe-conduct, he was burned at the stake in 1415. The popular indignation aroused by his death resulted in the so-called Hussite war.

Hutchins (*hŭch'ĭnz*), **Harry Burns,** American educator, was born at Lisbon, N. H., 1847. He graduated in 1871 at the University of Michigan, where he became assistant professor of history and rhetoric in the following year and professor of law in 1884. After spending the years 1887–94 as professor of law at Cornell university, he returned to the University of Michigan as dean of the law school and became president of the university in 1910, retiring in 1920. He revised and annotated five volumes of *Michigan Supreme Court Reports* under appointment by the supreme court, 1882-83; edited the American edition of *Williams on Real Property*; and wrote a life of T. M. Cooley in the "Great American Lawyers" series.

Hutchinson (*hŭch'ĭn-sŭn*), **Anne,** religious leader, was born about 1590, and emigrated from Lincolnshire, England, to Boston, Mass., 1634. Living in a community prone to religious excitement, she claimed to be a medium of divine revelations and conducted meetings for women in which she expressed such antinomian doctrines as that the conscious judgment of each believer was a paramount authority in religion.

Great controversies arose, and a synod was called, in which her teachings were condemned and she was banished from the colony. She and her friends obtained from the chief of the Narragansetts liberty to reside in Rhode Island, where they set up a community on the principle that no one was to be "accounted a delinquent for doctrine." After the death of her husband, who shared her opinions, she removed to a Dutch settlement in the colony of New York, where, in 1643, she and her whole family of 15 persons were taken prisoners by the Indians and all but one daughter were barbarously murdered.

Hutchinson, Arthur Stuart Menteth, English novelist, was born at Gorakpur, India, of English parentage, in 1879. He studied medicine at Saint Lawrence college, Thanet, Eng., but did not practice, devoting himself instead to literary and editorial work. His earlier novels include *The Happy Warrior* and *The Clean Heart*. By 1912, he had risen to the position of editor of the London *Daily Graphic*. After a period of active war service with the British army in France, he wrote two novels which attained great popularity—*If Winter Comes* and *This Freedom*. His later novels include *The Eighth Wonder* and *One Increasing Purpose*.

Hutchinson, Thomas, American magistrate and historian, was born in Boston, 1711. He graduated at Harvard and began the practice of law. He was several times elected to the general court and, for three years, served as speaker. In 1760, he held at one time four offices, being judge of probate, councilor, chief justice, and lieutenant governor. In the time of the Stamp Act agitation, he favored the British government, as a result of which attitude his house was sacked and many valuable manuscripts relating to the history of Massachusetts were destroyed. In 1769, he became acting governor, serving in that capacity at the time of the Boston massacre. His conduct further incensed the public, and he was driven from the country. In 1774, he returned to England and was pensioned by the government. He published *A Brief Statement of the Claims of the Colonies*. Died, 1780.

Hutton (*hŭt''n*), **Maurice,** Canadian educator, was born at Manchester, Eng., 1856. He was educated at Magdalen college school and at Worcester college, Oxford. He was fellow of Merton college, Oxford, 1879–86; became a lecturer on classics and ancient history at Firth college, Sheffield, 1880; and, the same year, was made professor of classics in University college, Toronto, where he became professor of Greek in 1887 and principal in 1901. He is known as a popular after-dinner speaker and is the author of *Hellenism, Thucydides and History, Many Minds*, and articles of a popular character on the classics and on Oxford. He retired from his academic duties in 1928.

Huxley (*hŭks'lĭ*), **Thomas Henry,** English biologist and comparative anatomist, was born at Ealing, 1825. He graduated at London university, 1845. In 1846, he entered the medical service of the royal navy and was appointed assistant surgeon on board the *Rattlesnake*. This vessel, commanded by Capt. Owen Stanley, was commissioned to survey the eastern shores of Australia. Imbued with a passion for natural history, Huxley devoted himself with zeal and intelligence to the study of the numerous marine animals collected from time to time during the survey and made them the subject of scientific papers, which he sent home, diffident as to their value.

In 1851, papers from his pen on other branches of the same subject were printed in the *Philosophical Transactions*, and, in the same year, Huxley was elected a fellow of the royal society. In 1854, he was appointed professor of natural history in the royal school of mines, a chair which he later made one of the most distinguished in the scientific world. In 1857, in conjunction with Dr. Tyndal, he wrote *Observations on Glaciers*, and, in 1858, this was followed by his important lecture *On the Theory of the Vertebrate Skull*. In 1872, he was made lord rector of Aberdeen university, and he was president of the royal society, 1881–85.

Huxley possessed the gift of exposition as well as remarkable powers of research. He was a forceful and luminous speaker, always clear and accurate, and exercised an incalculable influence as a teacher and popularizer of science. He was the foremost advocate in England of Darwin's theory of evolution, and his own researches form a substantial contribution to 19th-century knowledge. Among his many works in addition to those mentioned are *Man's Place in Nature, Elements of Biology, The Crayfish, Science and Education, Darwiniana, Science and Culture*, and *Evolution and Ethics*. He died in 1895.

Huygens (*hī'gĕnz*; Dutch, *hoi'gĕns*), or **Huyghens, Christian,** Dutch physicist and astronomer, was born at The Hague in 1629. He devoted himself to mathematics, improved the telescope, and devised new methods for grinding and constructing lenses. He also invented the first pendulum clock and, in 1659, discovered the ring of Saturn; developed a longitudinal wave theory of light; and first demonstrated polarization. He frequently visited England and was made a fellow of the royal society, 1663; at the invitation of Louis XIV, he lived for a number of years in Paris. Died, 1695.

Huysmans (*hūs'mâns*), **Cornelis,** Flemish landscape painter, was born in Antwerp, 1648 He studied in Antwerp and Brussels, and lived many years at Malines. His style resembles that of Poussin, whom he surpasses in color. In addition to landscapes, he painted large sacred pieces, among them "Christ on the Road to Emmaus" for the cathedral of Notre Dame of Malines. Died, 1727.

Hyatt, Anna Vaughn, American sculptor, was born at Cambridge, Mass., 1876. She received her training in sculpture at the art students' league, New York City, and was a pupil of H. A. MacNeil and Gutzon Borglum. Her work consists chiefly of small bronze figures of animals. Among her larger sculptures is a colossal lion at Dayton, Ohio. Her equestrian statue "Joan of Arc," exhibited at the Paris salon in 1910, was selected for erection in Riverside park, New York, 1914. She married Archer M. Huntington in 1923. See *Sculpture*.

Hyatt, John Wesley, American inventor, was born at Starkey, N. Y., 1837. He was educated in the common schools with one year at Eddytown seminary. He began his career as a printer, but subsequently devoted his attention exclusively to invention. His first important achievement was a composition billiard ball, 1865. In 1869, he discovered a means of dissolving pyroxylin under pressure and, with his brother Isaac Smith Hyatt, invented celluloid and laid the foundation for the extensive celluloid industry.

His most important contribution to science was his purifying system for treating large bodies of water, devised in 1881 and since widely adopted. In 1892, he invented a roller-bearing, and in 1900 a lock-stitch, sewing machine for belting. The list of his patented devices exceeds 200. Among later inventions were an improved cane crusher for sugar manufacturing and processes for solidifying woods for billiard balls and mallet heads. Died, 1920.

Hyde, Douglas, known in Irish as Craoibhim Aoibhinn, Irish scholar and writer, was born in 1860. Educated at Trinity college, Dublin, he taught at the University of New Brunswick, Canada, in 1891-92, thereafter returning to Ireland, where he distinguished himself in the movement for an "Irish Ireland." He helped toward the establishment of the National University of Ireland with a chair in modern Irish, which he was the first to fill. He collected Irish love songs and folklore in the original Celtic and wrote in Irish the play *Twisting of the Rope*, which was produced in 1901 with the author in the principal rôle. He was elected a senator of the Irish Free State in 1925.

Hyde, William DeWitt, American educator and writer, was born in Winchendon, Mass., 1858. He graduated at Harvard in 1879 and at Andover theological seminary, 1882. He entered the Congregational ministry; was pastor at Newark, N. J., 1883 to 1885, when he was chosen president of Bowdoin college. Among his writings are *Practical Ethics, Social Theology, Practical Idealism, God's Education of Man, The College Man and the College Woman*, and *The Quest of the Best*. He died in 1917.

Hymans (*ē'mănz'*), **Paul,** Belgian statesman, was born at Brussels in 1865. He was educated for law and became a barrister at the Brussels court of appeals in 1885; was elected a member of the Belgian House of Representatives in 1900; and became a member of the faculty of Brussels university. In 1915–17, he was Belgium's ambassador to Great Britain; represented his country at the Paris Peace Conference; was president of the council of the League of Nations in 1920; and later held various cabinet offices in the Belgian government. His writings include *Histoire parlementaire de la Belgique, Bruxelles moderne*, and *Frère Orban-Biographie*.

Hyndman (*hĭnd'măn*), **Henry Mayers,** English journalist and social reformer, was born in London, 1842. He graduated at Trinity college, Cambridge, and, in 1866, became war correspondent for the *Pall Mall Gazette* to report the Italian war. He was in Australia, New Zealand, Polynesia, and America, in 1869–71; visited America at intervals in 1874–80; and, in 1881, founded the social democratic federation. In 1884, he founded *Justice* and began his career as an agitator for social remedies. He was a vigorous opponent of the South African war, 1899-1900. Beginning with 1874, he was an active writer in behalf of socialism. Among his books are *Bankruptcy of India, Historical Basis of Socialism, A Commune for London, Commercial Crises of the 19th Century, The Record of an Adventurous Life, The Awakening of Asia,* and *Marx Made Easy.* Died, 1921.

Hypatia (*hī-pā'shĭ-ă*), Greek philosopher, daughter of the Alexandrian astronomer Theon, was born in Alexandria about 355 A. D. She was renowned for her knowledge of mathematics and of the Platonic philosophy, her teaching of which at Alexandria drew students from all the Hellenized regions of the East. She was celebrated also for both beauty and an ascetic austerity. She met a tragic fate. Being accused by the clergy of unduly influencing Orestes, prefect of Alexandria, against Saint Cyril, then archbishop there, she was attacked by a mob led by priests, dragged into a church, stripped of her clothing, and killed. This occurred about 415 A. D., when she was about 60 years of age. She is the heroine of Charles Kingsley's romance *Hypatia.*

Hyrcanus (*hĕr-kā'nŭs*), **John,** Jewish high priest, flourished about 135 B. C. He succeeded his father, Simon Maccabæus, in the high priesthood as one of the Hasmonæan rulers of Judæa. He was at first compelled to pay tribute to Antiochus Sidetes, after whose defeat and death in 130 he re-established his independence, subdued Samaria, took several other cities from Syria, conquered the Idumæans, and formed an alliance with the Romans. He was long a Pharisee, but late in life became a Sadducee. His reign of 30 years closed the period of the later Jewish kingdom's independence. Died about 105 B. C.

Hyslop (*hĭs'lŭp*), **James Hervey,** American psychologist and psychic investigator, was born at Xenia, Ohio, 1854. He graduated at Wooster college and at Johns Hopkins university. He taught in Lake Forest college, Ill., Smith college, Northampton, Mass., and Bucknell university, Lewisburg, Pa., before being appointed, in 1889, as a lecturer in the department of philosophy at Columbia university. He was professor of logic and ethics there from 1895 to 1902, when he organized and became secretary of the American institute for scientific research, devoting his remaining years to psychic investigations. His works include *Problems of Philosophy, Science and a Future Life, Enigmas of Psychical Research, Psychical Research and the Resurrection,* and *Contact with the Other World.* Died, 1920.

Hyvernat (*hī'vĕr-nät*), **Eugène Xavier Louis Henry,** educator and Orientalist, was born at Saint Julien en Jarret, Loire, France, 1858. He graduated at the University of France, Lyon, 1876; studied divinity at the Séminaire de Saint Sulpice, Issy, and at Paris. He was chaplain at Saint Louis of the French, Rome, 1882–85; served as professor interpreter of Oriental languages for Propaganda, Rome, 1885–89; was professor of Assyriology and Egyptology in the Roman seminary, 1885–88; and became professor of Oriental languages and archeology at the Catholic University of America in 1889. He wrote *Les actes des martyrs de l'Egypte; Album de paléographie copte;* and *Du Caucase au Golfe Persique,* with Dr. Paul Muller-Simonis. He has been a contributor to Vigouroux's *Dictionnaire de la Bible, The Jewish Encyclopedia, The Catholic Encyclopedia,* and various American, French, and German reviews.

Ibañez. See *Blasco Ibañez, Vicente.*

Iberville (*ē'bĕr'vēl'*), **Pierre le Moyne, Sieur d',** French-Canadian commander, was born at Montreal, Canada, 1661, and became distinguished in the French service. In 1686, he joined the expedition of De Troye from Canada against the English forts on Hudson bay and, in 1690, took part in the Indian and French massacre of the inhabitants of Schenectady. He captured forts Nelson and Bourbon on Hudson bay in 1694 and 1697 respectively. In 1696, he destroyed Saint John's, Newfoundland, taking most of that province from the British, and, in 1697, defeated them in naval fights in Hudson bay.

Sailing from Brest in 1699 with two frigates, he reached the mouth of the Mississippi with his brother Bienville. He fortified Biloxi, the first post on the Mississippi, and, in 1700, ascended the river. In 1701, on account of the unhealthful climate, he transferred the colony from Louisiana to Mobile, and began the settlement of Alabama. In 1702, he fortified Dauphin island, in Mobile bay; in 1706, with three ships, he captured the isle of Nevis, one of the Leeward group. Died at Havana, Cuba, 1706.

Ibrahim Pasha (*ĭb'rä-hēm' pä-shä'*), Egyptian general, adopted son of Mehemet Ali, viceroy of Egypt, was born at Kavala, Rumelia, in 1789. Mehemet Ali having conceived the design of adding Syria to his dominions, Ibrahim crossed the Egyptian border with an army in 1831, took Acre by storm, and quickly made himself master of the whole of Syria. When war broke out between Mehemet Ali and the sultan in 1839, Ibrahim was again successful, totally routing the Turks in the great battle of Nisib. The interference of the great powers eventually compelled him to return to Egypt, suffering, during his passage through the desert, the most terrible hardships and losses, while the attempt to elevate Egypt to complete independence came to an end. In 1848, when the aged pasha had sunk into absolute dotage, Ibrahim went to Constantinople and was installed viceroy of Egypt. Died at Cairo, 1848.

Ibsen (*ĭb'sĕn*; *ĭp'sĕn*), **Henrik,** Norwegian poet and dramatist, was born at Skien, Norway, 1828. He studied medicine, was a chemist's assistant at Grimstad, 1843–50, but soon devoted himself wholly to literature. His first drama, *Catilina,* was a failure; but, after a short period of study at Christiania and nearly two years of journalism, he became director of Ole Bull's theater at Bergen, for which he wrote five romantic dramas.

In 1857, Ibsen became director of the national theater in Christiania. His next dramas were *The Warriors in Helgeland, The Pretenders,* and *Love's Comedy.* The first two, reproducing the spirit of the old sagas, placed Ibsen in the foremost rank of Scandinavian dramatists; the last was a precursor of his satirical social dramas. In 1862, the national theater became bankrupt, and Ibsen, enraged because Norway held aloof from the Danes in their struggle against the Germans, forsook his country. From 1864 to 1891, he lived in Rome, Dresden, and Munich. The Norwegian Parliament granted him a pension in 1866.

In 1866–67 appeared the dramatic poems *Brand* and *Peer Gynt.* There followed *Emperor and Galilean, The Pillars of Society, A Doll's House, Ghosts, An Enemy of the People, The Wild Duck, Rosmersholm, The Lady from the Sea, Hedda Gabler, The Master Builder, Little Eyolf, When We Dead Awaken,* and *John Gabriel Borkman.*

Leaving the controversial aspects aside, Ibsen's social dramas mark a new epoch in the development of dramatic art. In swiftness, certainty, and unity of action, in fascinating naturalness of dialogue and in realistic illusion, these powerful plays are unexcelled in any literature and assure Ibsen a high place among world dramatists. He died at Christiania, 1906. See *Peer Gynt.*

Ignatiev (*ĭg-nä'tyĕf*), **Nikolai Pavlovitch, Count,** Russian diplomat, was born at Petrograd, 1832. In 1856, he entered the diplomatic service and, in 1858, induced China to give up the Amur province. In 1860, while ambassador at Peking, he secured another large strip of territory of the maritime province. With Khiva and Bokhara he also concluded treaties. He was ambassador at Constantinople, 1864–77. An ardent Panslavist, he intrigued with the Balkan Slavs and took a principal part in the diplomatic proceedings before and after the Russo-Turkish war of 1877-78. The Treaty of San Stefano was mainly his work. Under Alexander III he was minister of the interior, 1881-82, and subsequently he retired to private life. Died, 1908.

Illington, Margaret, is the stage name of Mrs. E. J. Bowes, American actress, born at Bloomington, Ill., 1881, daughter of I. H. and Mary Ellen Light. She was educated at Illinois Wesleyan university and studied at Chicago musical college. In 1903, she married Daniel Frohman, from whom she was later divorced; in 1909, she married Edward J. Bowes. She made her début in *The Pride of Jennico* at the Criterion theater, New York, in 1900 and, in 1902-03, played in Daniel Frohman's stock company, Lyceum theater, New York. She created leading rôles in *The Japanese Nightingale, The Two Orphans, Mrs. Leffingwell's Boots, The Lion and the Mouse, His House in Order, The Thief, Until Eternity, The Whirlwind, The Encounter,* and *Mrs. Maxwell's Mistake.* She also starred in *Kindling, Within the Law, The Lie,* and *Our Little Wife,* and played with John Drew in *The Gay Lord Quex.*

Indy (*ăN'dē'*), **Paul Marie Théodore Vincent d',** French composer and pianist, was born in Paris, 1851. He received his first musical instruction from his mother, and continued study under Diémer and others. After serving in the army during the Franco-Prussian war, he renewed musical study under César Franck. In 1885, he became manager of the national music society, of which, upon Franck's death in 1890, he was made president. With Bordes and Guilmant, he established the Schola Cantorum, which became world famous. In 1906, he made a notable tour of the United States and conducted his own works with the Boston symphony orchestra.

In composition he became a leader of the new school developed by the pupils of Franck and ranks with Berlioz and Franck as one of the three foremost instrumental masters of modern France. His numerous compositions

include symphonic poems, orchestral suites, chamber music, choruses, and works for the piano and organ. He wrote also biographies of César Franck and Beethoven.

Ingalls, John James, American lawyer, essayist, and statesman, was born at Middleton, Mass., in 1833. He was graduated at Williams college, studied law, and was admitted to practice in Massachusetts in 1857; in 1858, he settled in Kansas. In 1860, he was secretary of the territorial council, or legislature, and, in 1861, was secretary of the state senate. Of that body he was elected a member in 1862. He was elected United States senator from Kansas in 1873, and was again elected in 1879 and in 1885. During his last senatorial term he was president *pro tem.* of the Senate.

Ingalls was noted among his contemporaries for scholarly attainments and quick and acute perception. He was an eloquent speaker, his power of sarcastic rejoinder being a marked trait. As a writer of essays and as a lecturer, his diction was elegant and concise, and he excelled in the power of picturesque description. He is the author of the widely known sonnet *Opportunity.* He died at Las Vegas, New Mexico, 1900.

Ingalls, Melville Ezra, American railroad official, was born in Harrison, Me., 1842. He was educated at Bridgton academy and Bowdoin college, and graduated at Harvard law school, 1863. He practiced first at Gray, Me., but soon removed to Boston. In 1867, he was elected a member of the Massachusetts senate. He became president in 1870, and receiver in 1871, of the Indianapolis, Cincinnati, and Lafayette railroad, which he reorganized upon a sound footing as the Cincinnati, Indianapolis, Saint Louis, and Chicago. Later he consolidated this road with others into the Cleveland, Cincinnati, Chicago, and Saint Louis, comprising the "Big Four" system, of which he was chairman until 1912. He was also president of the Chesapeake and Ohio Railway Company, 1888–1900. He was Democratic candidate for mayor of Cincinnati, 1903, and president of the national civic federation, 1905. Died in 1914.

Inge (*ĭnj*), **William Ralph,** English theologian, was born at Crayke, Yorkshire, in 1860. He was educated at Eton and at King's college, Cambridge. From 1884 to 1888, he was assistant master at Eton and, from 1889 to 1904, he was fellow and tutor of Hertford college, Oxford. He was repeatedly select preacher at Oxford and at Cambridge and was professor of divinity at Oxford from 1907 to 1911, when he was chosen dean of Saint Paul's, London. Among his writings are *Society in Rome under the Cæsars, Christian Mysticism, Faith and Knowledge, Studies of English Mystics, Truth and Falsehood in Religion, Faith, Speculum Animal, The Church and the Age, Types of Christian Saintliness, Outspoken Essays, The Idea of Progress,* and *The Victorian Age.*

Ingelow (*ĭn'jĕ-lō*), **Jean,** English poet and novelist, was born at Boston, Lincolnshire, in 1820. A great part of her poetry is of a devotional type, sweet and simple, and filled with beautiful thoughts. Among her noted works is the ballad *The High Tide on the Coast of Lincolnshire* and the larger poem *A Story of Doom.* Her works of fiction are *Off the Skelligs, Fated to be Free, Sarah de Berenger, Don John, John Jerome, The Suspicious Jackdaw,* and *A Motto Changed.* She died in 1897.

Ingersoll (*ĭng'gĕr-sōl*), **Robert Green,** American lawyer, orator, and writer, was born at Dresden, N. Y., in 1833, the son of a Congregational minister of very broad views. He began the practice of law at Peoria, Ill., in 1857; became colonel of the 11th Illinois cavalry, 1862; was captured and exchanged, after which he resigned and retired to private life. In 1866, he was made attorney-general of the state. He was a successful lawyer and a well-known orator, lecturer, and religious controversialist. He published *The Gods, and Other Lectures; Some Mistakes of Moses;* and *Great Speeches.* Died at Dobbs Ferry, N. Y., 1899.

Ingres (*ăN'gr'*), **Jean Auguste Dominique,** French painter, was born at Montauban, 1780. He studied under David and, after taking the *grand prix* in 1801, worked in Rome, 1806–20. At Florence, where he spent four years, he painted "The Vow of Louis XIII." To this period belong his best portraits and his "Œdipus and the Sphinx," "Venus Anadyomene," "Virgil Reading the Æneid," and "Raphael and the Fornarina." His "Apotheosis of Homer," in the Louvre, is considered his finest epic painting. He became the leader of the classicists as opposed to the growing school of the romanticists under the leadership of Delacroix. Died, 1867. See *Painting.*

Inman, Henry, American portrait painter, was born in Utica, N. Y., 1801. Besides making portraits of Chief Justice Marshall and many other distinguished Americans, he visited England and painted portraits of Wordsworth and Macaulay. In 1845, he began a series of historical paintings for the Capitol at Washington, but before completing them he died in New York, 1846.

Inness (*ĭn'ĕs*), **George,** American painter, was born at Newburgh, N. Y., 1825; studied art in New York, France, and Italy. Inness is regarded the foremost painter among American landscape artists, the acknowledged leader of the important Hudson River group. His pictures are distinguished for their beauty of color, atmospheric charm, and poetic sentiment. He devoted a powerfully original and distinctly American mind to the creation of his paintings, and his remarkable work is regarded with ever-increasing admiration.

Most of Inness's paintings are privately owned, but leading galleries possess representative examples. The finest public exhibit is the Butler collection, occupying an entire room at the art institute, Chicago. In this are "Catskill Mountains," "Home of the Heron," "The Storm," "Millpond," and "After a Summer Shower." The Metropolitan museum, New York, contains several of his paintings, including "Peace and Plenty," "Autumn Oaks," and "Delaware Valley." In the national gallery, Washington, are the well-known "Georgia Pines," "Niagara," and "September Afternoon." Inness is represented also in the art museums of Boston, Worcester, Brooklyn, Buffalo, Pittsburgh, Toledo, Saint Louis, and other cities and in many private collections. In 1916 it was reported that 21 of his paintings retained by his family were sold for $200,000. He died in Scotland in 1894.

Inness, George, Jr., American painter of animals and landscapes, was born in Paris, France, in 1854, son of the preceding. He was a pupil of his father in Rome, 1870–74; studied one year in Paris, 1875; afterward he lived in Boston and New York, where he occupied a studio with his father, 1878. He resided with his family in Montclair, N. J., after 1880, but had a studio in Paris, 1895–99, and exhibited annually at the Paris salon. In 1913, he formed a connection with the *Century Magazine,* in which his work often appeared.

In the Metropolitan museum, New York, are his "Shepherd and Sheep" and "First Snow at Cragsmoor." Among his animal pictures are "Surf Horse," "Mother of the Herd," and "Monarch of the Farm." His landscapes "Morning on the River" and "The Coming Storm" resemble his father's work in light and color. His writings include *Life and Letters of George Inness.* Died, 1926.

Innocent III, pope, was born at Anagni, Italy, 1161, son of Count Trasimund, a Roman noble. He was educated at Paris, Rome, and Bologna, and was elected pope in 1198. He aimed to establish the supremacy of papal power in all European affairs; extended the territorial power of the Church; and made nearly all Christendom subject to its sway. He attempted the recovery of Palestine; promoted a crusade against the Albigenses; excommunicated Otto IV, emperor of Germany; put England under an interdict; and deposed King John.

Zealous for the purity as well as the supremacy of the Church, he countenanced every movement that contributed to enhance its influence and to fix firmly its beliefs as well as its forms of worship. He was personally a man of blameless life, and did much to reform and universalize Roman Christianity. He died in 1216.

Ireland, John, American Roman Catholic prelate, was born in Burnchurch, County Kilkenny, Ire., 1838. He came to the United States in boyhood; was educated in the cathedral school, Saint Paul; studied theology in France; and was ordained priest in 1861. He was chaplain of the 5th Minnesota regiment in the Civil War. Subsequently, he became rector of the cathedral at Saint Paul and later coadjutor bishop. In 1884, he was made bishop and, in 1888, first archbishop of Saint Paul. He was a commanding figure in many important movements and was especially active in establishing Roman Catholic colonies in the Northwest, in organizing total abstinence societies, and in establishing the Catholic University of America. He wrote *The Church and Modern Society.* Died in 1918.

Irene, Byzantine empress, once a poor orphan girl of Athens, Greece, was born about 752. Her beauty and talents drew the attention and the love of the emperor Leo IV, and he married her in 769. After his death, in 780, she ruled as regent during the minority of her son Constantine VI. When her son attained his majority, Irene dethroned him and deprived him of sight.

Confirmed in her title as empress in 792, she ruled in splendor for several years and is said to have aspired to a marriage between herself and Charlemagne. In 802, the patricians, upon whom she had always lavished favors, conspired against her and placed Nicephorus upon the throne. Thereupon she was banished to Lesbos, where she died in 803. Because of her zeal in restoring images and monasteries, the Greek Church counts her among its saints.

Irving, Sir Henry, is the stage name of John Henry Brodribb, English actor, born in Keinton, near Glastonbury, 1838. He acted at the Theater Royal, Edinburgh, 1856–59, and later for seven years at Manchester. He played in London in 1859, but attracted little notice until his appearance at Saint James's theater in 1866. He soon established

a connection with the Lyceum, of which he became manager in 1878. There he played his chief parts, in conjunction with Ellen Terry, producing *Hamlet*, *The Merchant of Venice*, *Faust*, *Macbeth*, *Henry VIII*, *The Bells*, and other well-known plays.

Irving first came to the United States in 1883, and made his début in New York as Mathias in *The Bells*. Subsequently, he made several tours in America. In 1895, he received the honor of knighthood, the first ever accorded an actor. He died in England, 1905, and was buried in Westminster Abbey.

Irving, Isabel, American actress, was born at Bridgeport, Conn., 1871. She made her début as Gwendolyn Hawkins in *The Schoolmistress*, with the Rosina Vokes Company in 1887. She was with Augustin Daly's company, 1888–94; was leading woman at the Lyceum theater, New York; was in John Drew's company several years; and has also played leading rôles in England. She created the rôle of Lady Jocelyn Leigh in *To Have and To Hold*; later, under the management of James K. Hackett, she starred in *The Crisis*.

She also played Louise in *The Two Orphans*, played the comedy part in *The Toast of the Town*, and starred in *Susan in Search of a Husband* and in *The Girl Who Has Everything*. In 1908, she created the title rôle in *Mater*. More recently she has played the leading part in *The Flag Lieutenant*, *The Commanding Officer*, *Smith*, *The Concert*, *The Temperamental Journey*, *The Truth*, *Under Cover*, *She Walked in Her Sleep*, *Mistress Page*, *Civilian Clothes*, *A Bachelor's Night*, and other plays. In 1916-17, she played with Tom Wise and Constance Collier in *The Merry Wives of Windsor*. In 1899, she married William H. Thompson.

Irving, Washington, American author, was born in New York City, 1783. He was the youngest son of William Irving, who had emigrated from Scotland and settled in New York as a merchant before the Revolution. Irving, at the age of 16, entered a law office; but he found greater profit from his father's well stocked library. In 1804, he traveled extensively in Europe; in 1806, he returned to New York and contributed a series of genial and humorous essays to a periodical called *Salmagundi*. In 1809, he wrote *A History of New York, from the Beginning of the World to the End of the Dutch Dynasty, by Diedrich Knickerbocker*, a burlesque chronicle written in so quiet a vein of humor that it has sometimes been taken for a veritable history.

Having no inclination for law, Irving engaged in commerce as a silent partner with his brothers, but devoted his time to literature. In 1813, he edited the *Analectic Magazine* in Philadelphia. In 1815, he visited England, where he was warmly welcomed by Campbell, whose biography he had formerly written, and was introduced by him to Walter Scott. In 1819, he published the well-known *Sketch Book*, containing *The Legend of Sleepy Hollow* and *Rip Van Winkle*. He then went to Paris; in 1822, he wrote *Bracebridge Hall* and, in 1824, the *Tales of a Traveler*.

In 1826, at the invitation of Alexander H. Everett, American minister to Spain, Irving accompanied him to Madrid to translate documents connected with the life of Columbus. With these materials he wrote his *History of the Life and Voyages of Columbus*, *Voyages of the Companions of Columbus*, *The Conquest of Granada*, *The Alhambra*, and other works regarding Spain. He was United States minister to Spain, 1842–46.

Irving's *Life of Goldsmith* was published in 1849 and his great work, the *Life of Washington*, was published in 1855–59. The remarkable clearness and purity of his English and the genial spirit in which he handled his themes readily secured the attention of appreciative readers, and won for him a high place among early classic writers of America. He spent the last years of his life at Sunnyside, in his own "Sleepy Hollow," on the Hudson, near Tarrytown. He died, 1859; was elected to the American hall of fame, 1910. See *Rip Van Winkle*, page 309.

Irwin, May, American actress, best known in farce comedy, was born at Whitby, Ontario, 1862, daughter of Robert E. Campbell. She made her début at the Adelphi theater, Buffalo, 1876; was a member of Tony Pastor's company, 1877–83; was with Augustin Daly's company, 1883–87; and later was with Charles Frohman and with Rich and Harris. Subsequently, she starred in *The Widow Jones*, *Kate Kip—Buyer*, *Sister Mary*, *Mrs. Black is Back*, *Mrs. Wilson*, *Mrs. Peckham's Carouse*, *Getting a Polish*, *She Knows Better Now*, *Widow by Proxy*, *She Just Wouldn't*, *No. 13 Washington Square*, and *On the Hiring Line*. In 1878, she married Frederick W. Keller, who died in 1886; in 1907, she married Kurt Eisfeldt.

Irwin, Wallace, American author, was born at Oneida, N. Y., in 1875. He studied at Leland Stanford university, and entered journalism. He was a special writer on the San Francisco *Examiner*, 1900; was editor of the San Francisco *News Letter*, 1901; and was editor of the *Overland Monthly*, 1902. In 1903, he was burlesque writer for the Republic theater, San Francisco; in 1904-05, he was writer of topical verse for the New York *Herald*, and, in 1906-07, he was on the staff of *Collier's Weekly*. His numerous writings include *The Love Sonnets of a Hoodlum*, *Fairy Tales Up to Now*, *Nautical Lays of a Landsman*, *At the Sign of the Dollar*, *Chinatown Ballads*, *Letters of a Japanese Schoolboy*, *Pilgrims into Folly*, *Venus in the East*, *Suffering Husband*, and *Seed of the Sun*. He is a prolific contributor to periodicals.

Irwin, William Henry, best known as Will Irwin. American author and editor, was born at Oneida, New York in 1873 and was graduated at Leland Stanford university in 1899. His editorial activities were connected chiefly with San Francisco and New York daily newspapers and with *McClure's Magazine* and *Collier's Weekly*. During the World War, he was a war correspondent for the London *Daily Mail* and several American newspapers. He acted on the commission for relief in Belgium and was decorated by the Belgian and the French government for his services. A few of the numerous works from his pen are *The City That Was*, *The Confessions of a Con Man*, *A Reporter in Armageddon*, and *The Next War*.

Isabella, queen of Castile, daughter of John II, was born in 1451. In 1469 she married Ferdinand V, king of Aragon. On the death of her brother, Henry IV, in 1474, she took possession of the throne of Castile, to the exclusion of Joanna, the true inheritor of the crown. When a union of the kingdoms of Aragon and Castile took place, Ferdinand and Isabella together assumed the royal title of Spain. She was a woman of fine intellect and a wise, humane ruler, was always present during the transaction of state business, and her name was placed beside that of the king in state ordinances. She proved also a stanch supporter of Columbus in his search for the western route to India. Died, 1504.

Isidore (*ĭz'ĭ-dōr*) **of Seville, Saint,** Spanish ecclesiastic, was born at Cartagena, Spain, about 560. He was active in the great movement in the Western Church by which the doctrinal and moral system of Christianity was brought into harmony with the habits and institutions of those various races and nationalities which, by successive immigrations and wars, were eventually erected into the Hispano-Gothic kingdom. This kingdom exercised a powerful influence on what is called Latin Christianity.

The episcopate of Isidore, which began in 600, is notable for the half-ecclesiastical, half-civil councils of Seville in 619 and of Toledo in 633. The canons of these councils may almost be said to have formed the basis of the constitutional law of the Spanish kingdoms, both for church and for state, down to the great constitutional changes of the 15th century. Isidore wrote on science, art, history, and theology. He died in 636.

Ismail Pasha (*ĭs'mā-ēl' pä-shä'*), khedive of Egypt, was born at Cairo in 1830. He succeeded Said Pasha as viceroy of Egypt in 1863, promoted the Suez Canal project, and gained wealth by the cultivation of cotton during the American Civil War. The sultan settled the direct succession in his line in 1866, and his ambition afterward made him master of the upper Nile region. He rebuilt a large part of Cairo, greatly improved Alexandria, and constructed immense public works. Financial disaster coming in 1879, he abdicated in favor of his son, Mohammed Tewfik. After 1888, he lived in Constantinople, where he died in 1895.

Isocrates (*ī-sŏk'rä-tēz*), Greek orator and teacher, was born in Athens, 436 B. C. Among his teachers were Tisias, Gorgias, Theramenes, and Socrates. He was early attracted to the career of an orator and politician, but the possession of a weak voice induced him to abandon his ambition. He then devoted himself to speech writing and to the development of a system of rhetorical education.

He founded a school at Athens which advertised two-year and four-year courses. Its popularity is attested by the fact that it is said to have had, at one time, over 2000 students. The work avoided the more technical subjects and was designed to give the students a liberal education in political and social science. The list of his pupils contains the names of many men who later became famous. The discipline involved the writing of speeches for real or imaginary occasions. Many of Isocrates' own speeches were of this nature and may be regarded as among the earliest political pamphlets. They include the *Panegyricus*, *Areopagiticus*, the *Panathenaicus*, the *Archidamus*, and the *Antidosis*. His style exhibits a high degree of literary finish and a careful attention to melodious cadence. Died in 338 B. C.

Israëls (*ĭs'rä-ĕls'*), **Josef,** Dutch painter, was born at Groningen, 1824, of Jewish parents. He studied at Amsterdam under Kruseman and at Paris under Picot. His pictures of humble life, particularly of seafaring and fisher folk, won him foremost place among Dutch painters of his century. Like J. F. Millet, he saw in the struggles of the poor and the humble an opportunity to express his deep human sympathy. His works are widely known throughout the world and many are now in the United States.

Among the best-known of Israëls' works are "The Cradle," "Shipwrecked Mariner," "Alone in the World,"

"Toilers of the Sea," "A Son of God's People," "Children of the Sea," and "When One Grows Old." "Expectation," "The Frugal Meal," "The Bashful Suitor," and "Waiting for Papa," in the Metropolitan museum, New York, are fine examples of his work. He died in 1911.

Ito (*ē'tō*), **Hirobumi, Prince,** Japanese statesman, was born in the province of Choshu in 1841. In 1871, he visited the United States for the purpose of examining the coinage system, and on his return to Japan was successful in establishing a mint at Osaka. In 1878, he was transferred from the office of minister of public works to that of minister of the interior. He was four times premier between 1886 and 1901. He was the chief founder of the constitution of Japan which was promulgated in 1889. In 1897-98, he made a tour of the United States and Europe. In the latter year he visited China to arrange an alliance between that country and his own, and, in 1900, on the resignation of the Yamagata ministry, he was summoned by the emperor to form a cabinet. He revisited the United States in 1901, and subsequently became the chief administrative officer of Korea. Assassinated in 1909.

Ivan III (*ē-vän'*; *ī'vĕn*), **Vasilevitch,** czar of Russia and regarded as the founder of the Russian empire, was born in 1440. He was at first only grand duke of Moscow, but succeeded in shaking off entirely the yoke of the Tatars and in subjecting a number of the Russian principalities to his own sway. In 1472, he married Sophia, a niece of Constantine Palæologus, assumed the title of "ruler of all Russia," and adopted the two-headed eagle of the Byzantine empire. Died, 1505.

Ivan IV, Vasilevitch, czar of Russia, called "the Terrible," was born in 1530. He did much for the advancement of his country in arts and commerce as well as for its extension by arms. He subdued Kazan and Astrakhan, and made the first annexation of Siberia. He concluded a commercial treaty with Queen Elizabeth of England after the English had discovered the way to Archangel by sea. But, in the latter part of his reign, his hand fell with merciless cruelty upon the boyars of his kingdom and upon some of his towns, as Moscow, Tver, and Novgorod. In 1581, Ivan, in a fit of ungovernable rage, killed his oldest surviving son. Remorse at the enormity of the deed hastened his own death, which occurred in 1584.

Ives (*īvz*), **Frederic Eugene,** American inventor, was born at Litchfield, Conn., in 1856. He was educated in the public schools at Litchfield, Norfolk, and Newtown, Conn. While in charge of the photographic laboratory, Cornell university, 1874–78, he worked out the first practically successful process of orthochromatic photography. In 1886, he invented the process of half-tone photo-engraving now universally employed. His experiments in color photography culminated in the three-color printing process, now the basis of an important industry.

His more recent inventions include glass sealed spectroscope gratings, the diffraction chromoscope, the universal colorimeter, and a process for producing moving pictures in natural colors.

His son, Herbert Eugene (b. 1882), working in the Bell Telephone laboratories, invented the most widely used method of phototelegraphy. He devised apparatus also for the first public demonstration of television in 1927 and for the production of artificial sunlight.

Ixtlilxochitl (*ēsh'tlēl-shō'chēt'l*), **Fernando de Alva,** Mexican antiquary, was born about 1568. He was a descendant of the kings of Tezcuco, was interpreter of the native languages to several viceroys of Mexico, and a laborious collector of the ancient manuscripts and traditions of his country. Both Prescott and Lord Kingsborough made use of his writings in the compilations of their histories. Many of his valuable manuscripts are in the archives of Mexico. Died, 1648.

Jacks, Lawrence Pearsall, English author and theologian, was born in Nottingham, 1860. He was educated at the University of London, Manchester college, Gottingen, and Harvard. He entered the Unitarian ministry and, in 1887, became assistant to Stopford A. Brooke, whose daughter he married in 1889. He became the editor of the *Hibbert Journal* at the time of its founding in 1902 and, in 1903, was appointed professor of philosophy at Manchester college, Oxford, of which he was made principal in 1915. In addition to much editorial work, he has written brilliant articles and sketches, among which are *Mad Shepherds, and Other Human Studies*; *The Alchemy of Thought*; *Among the Idolmakers*; *All Men are Ghosts*; *The Legends of Smokeover;* and *Constructive Citizenship*.

Jackson, Andrew, seventh president of the United States, was born in Waxhaw settlement, S. C., 1767, two years after his father had emigrated from northern Ireland. At the outbreak of the American Revolution, he and his brothers were summoned to the field. Though but 13 years old, he fought under Sumter and remained with the army until the end of the war.

In 1784, he began the study of law and, in 1788, was appointed solicitor for the western district of North Carolina, now the state of Tennessee. In 1796, he was a member of the convention which modeled the constitution and organized the state of Tennessee, and was elected respectively representative, United States senator, judge of the state supreme court, and major general of state militia.

In 1813, at an outbreak of hostilities with the Creek Indians, he raised a volunteer force of 3000 men and defeated them. Jackson's final victory on March 27, 1814, broke the power of the Indian race in North America. He was appointed general in the United States army and defended New Orleans against the attack of the British under General Pakenham, January 8, 1815. The result of this action gave General Jackson a great and enduring popularity. After Spain had ceded Florida to the United States, he was made governor of the territory.

Jackson was elected president of the United States by the Democratic party, 1828, and was re-elected by a still larger majority, 1832. His administration was marked by singular firmness. He vetoed important measures against large majorities, destroyed the bank of the United States, and took the first steps toward a specie currency and an independent treasury. He retired with undiminished popularity after witnessing the election of his favorite, Martin Van Buren. His administration began the spoils system in American politics. Died, 1845. He was elected to the American hall of fame in 1910. See *Spoils System, Jacksonian Democracy*.

Jackson, Charles Thomas, American scientist, was born at Plymouth, Mass., 1805. He graduated from Harvard medical college in 1829 and practiced in Boston. He claimed to have indicated as early as 1832 the applicability of electricity to telegraphic communication. He was associated also with the discovery of the anesthetic effects of ether about 1842. After an investigation, the French academy of sciences awarded Dr. Jackson 2500 francs for the discovery of the anesthetic effects of ether and Dr. W. T. G. Morton a like amount for the application of ether as an anesthetic in surgical operations. These awards were made, however, as were the conflicting claims of both Jackson and Morton, in ignorance of the actually successful though unpublished use of ether in surgery by Dr. C. W. Long of Georgia in 1842. Dr. Jackson published in 1861 a *Manual of Etherization, with a History of its Discovery*. He died in 1880.

Jackson, Helen Fiske Hunt, American author, was born in Amherst, Mass., 1831. Her maiden name was Helen Maria Fiske. She studied at Ipswich female seminary, and, in 1852, she married Major E. B. Hunt, who was accidentally killed in 1863. She afterward married William S. Jackson and lived most of the latter part of her life at Colorado Springs. About 1870, she began to write verses over the signature "H. H.," which soon became familiar to magazine readers. She had always been interested in the welfare of the Indians, and her book *A Century of Dishonor* made her their champion. In 1883, Mrs. Jackson was made a commissioner by the government to look into the condition of the Mission Indians in California. Her last book, *Ramona*, which deals with Indian life, had a wide circulation. She died at San Francisco, 1885. See *Ramona*.

Jackson, Sheldon, American missionary and educator, was born at Minaville, N. Y., 1834. He graduated from Union college in 1855 and from Princeton theological seminary in 1858. He engaged in missionary work among the Indians, 1858–64, and organized mission schools in the Northwest from 1869 to 1877. He then began organizing educational work in Alaska, where he was general superintendent of schools until 1900.

Jackson conceived and carried out with government aid the plan of introducing Siberian reindeer for the use of the Eskimo in Alaska. A small herd with Lapp attendants was landed in northern Alaska in 1889. These with their increase and later additions amounted to 5000 in 1903. Stations were established, where the deer were bred and the Eskimos were trained in their care and use so that in 1922 there were over 250,000 reindeer in Alaska. Among Jackson's publications are the *First Annual Report on Education in Alaska* and *Alaska and Missions on the North Pacific Coast*. Died, 1909.

Jackson, Thomas Jonathan, better known as "Stonewall Jackson," American general, was born at Clarksburg W. Va., 1824. He was graduated at West Point academy in 1846, and, after serving with distinction in the Mexican war, he became a professor in the military institute at Lexington, Va.

At the outbreak of the Civil War, he was appointed brigadier general in the Confederate service. At the battle of Bull Run, July 1861, his command "stood like a stone wall"; hence the sobriquet. In September, he received the rank of major general; defeated General Banks at Front Royal, 1862; fought an indecisive battle with Frémont at Cross Keys; commanded a corps in the battles of Gaines's Mill and Malvern Hill; again defeated General Banks, at

Cedar mountain; captured Harpers Ferry with 11,000 Federal prisoners; commanded a corps at Antietam; and was made lieutenant general for his services in contributing to the Federal defeat at Fredericksburg. In 1863, by a clever flank movement, he defeated the 11th corps of General Hooker's army at Chancellorsville. On the evening of his victory, he was fired on and fatally wounded by a patrol party of his own men, who mistook him and his staff for a detachment of Union cavalry.

Jacobi (*jä-kō'bē*; Ger., *yä-kō'bē*), **Abraham,** physician, was born at Hartum, Germany, 1830. He studied at the universities of Greifswald, Gottingen, and Bonn. He became identified with the German revolutionary movement and was held in detention at Berlin and Cologne, 1851–53, on a charge of high treason. He later settled in practice in New York and was professor of diseases of children at New York medical college, 1860–65, and at New York university, 1865–70. He held a similar chair at the college of physicians and surgeons, Columbia university, for many years. In 1873, he married Mary Putnam, who was a distinguished physician and a pioneer in the movement for the medical education of women in America. He was an editor of *American Journal of Obstetrics and Diseases of Women and Children*, 1868–71, and wrote *Dentition and Its Derangements, The Raising and Education of Abandoned Children in Europe, Infant Diet, Diphtheria*, and *Intestinal Diseases*. Died, 1919.

Jacobi, Karl Gustav Jakob, German mathematician, especially noted for his discoveries in elliptic functions, was born at Potsdam, Prussia, 1804. He was professor at Konigsberg, 1827–42. In 1829, he published his celebrated work *Fundamenta nova Theoriæ Functionum Ellipticarum*, for which he received the medal of the academy of sciences of Paris. He also wrote a great number of memoirs on the different branches of the higher mathematics, chiefly on *Series and Definite Integrals*, and was a regular contributor to Crelle's *Journal für reine und angewandte Mathematik*. Died, 1851.

Jacobi, Moritz Hermann, German physicist, brother of Karl Gustav Jacobi, was born at Potsdam, 1801. In 1835, he became professor of physics at the University of Dorpat, where he conducted important researches in electricity, inventing galvano-plastics and electrotyping. He wrote a remarkable essay upon the *Use of Electro-magnetism in Locomotion* in 1835 and is said to have constructed in 1839 the first boat electrically propelled. In 1840, he published his *Galvano-plastics* and, in 1842, was made a member of the academy of sciences at Petrograd. He died in 1874.

Jacoby (*jä-kō'bē*), **Harold,** American astronomer, was born in New York City, 1865. He was graduated at Columbia, 1885, and was assistant astronomer in the United States eclipse expedition to West Africa in 1889-90. He directed the Columbia observatory, beginning in 1903, and was made professor of astronomy at Columbia university in the following year. His publications include *Practical Talks by an Astronomer*; *Astronomy, a Popular Handbook*; *Navigation*; and many technical papers on astronomical photography, stellar parallax, and star clusters. He was a contributor of articles on astronomical subjects to the daily papers of principal cities and a public lecturer on astronomy and other subjects.

Jacquard (*zhà'kàr'*), **Joseph Marie,** French inventor, was born at Lyon, 1752. He attempted to establish a manufactory for weaving figured fabrics; planned several ingenious improvements in machinery; and brought to perfection the so-called Jacquard loom, an apparatus for figured weaving. Jacquard also invented a machine for weaving nets. For this invention, he received a gold medal in 1804 from the inspectors of Paris. He resided for many years at Lyon, where, for some time, he encountered much opposition from a prejudice against machinery. He received the cross of the legion of honor. Died in 1834. In 1840, a statue was erected to his memory at Lyon.

Jacque (*zhàk*), **Charles Emile,** French painter and etcher, was born in Paris, 1813. He studied engraving in Antwerp and in London, where he made wood engravings illustrating Shakspere's works. Upon his return to France, he became a member of the Barbizon group and won great distinction as a sheep painter, paralleling Troyon's success as a cattle painter. His pictures, though small, display fine power of conception, strong, conscientious execution, and marked mastery of sky effects. He became an intimate friend of Millet, under whose influence his work showed continuous improvement. Among his many paintings in the Louvre is his well-known "Flock of Sheep." His work is represented by numerous examples in the Metropolitan museum, New York, and in other American collections. Died, 1894.

Jahn (*yän*), **Friedrich Ludwig,** known as the "father of gymnastics," was born at Lanz, Germany, 1778. In 1811, he started the first gymnasium in Berlin. His system, which was designed to revive patriotism, attracted the Prussian youth, and the training and inspiration thus obtained contributed in no small degree to the subsequent victories of Germany over the Napoleonic armies. In this struggle, Jahn received the command of a volunteer corps. After the peace of 1815, he resumed his teaching and published *Die Deutsche Turnkunst*.

But the gymnasiums began to witness political gatherings too liberal to please the Prussian government, and they were closed in 1818. Jahn was arrested in 1819 and suffered five years' imprisonment. He was elected to the Frankfort national assembly in 1848. Died, 1852.

James, Edmund James, American educator, was born in Jacksonville, Ill., 1855. He was educated at the Illinois State normal school and at Northwestern and Harvard universities. He was appointed to the faculty of the University of Pennsylvania in 1883, becoming professor of political and social science there in the following year. After five years as professor of public administration at the University of Chicago, he became president of Northwestern university in 1902 and, in 1904, of the University of Illinois, from which he retired in 1920. His works include *Relation of the Modern Municipality to the Gas Supply, The Legal Tender Decisions, The Canal and the Railway, Federal Constitution of Germany, Education of Business Men in Europe, Growth of Great Cities in Area and Population*, and *A Naval Program*. Died, 1925.

James, Henry, American author, brother of William James, the psychologist, was born in New York, 1843. He was educated in France and Switzerland and at Harvard law school. He began his literary career as a contributor to periodicals in 1866. His writings include *A Passionate Pilgrim, Roderick Hudson, The American, The Europeans, Daisy Miller, An International Episode, Diary of a Man of Fifty, The Portrait of a Lady, Tales of Three Cities, The Bostonians, The Aspern Papers, A London Life, The Tragic Muse, The Two Magics, The Soft Side, The Lesson of Balzac, Julia Bride, Finer Grain*, and *Small Boys and Others*. He was a member of the American academy of arts and letters. Much of his later life was spent in England, where he died in 1916.

James, William, American psychologist and philosophical writer, was born in New York, 1842. He was educated privately and at Lawrence scientific school and Harvard medical school. He was appointed to the faculty of Harvard university as an instructor in comparative anatomy and physiology in 1872, but most of his many years of teaching there were spent as professor of philosophy. Upon the publication of his *Principles of Psychology* in 1890, he became the most influential American psychologist. His work in philosophy was notably keen and original. He largely developed and became a leading expounder of the doctrines of pragmatism and radical empiricism. His writings include *The Will to Believe, and Other Essays in Popular Philosophy*; *Talks to Teachers on Psychology, and to Students on Some of Life's Ideals*; *The Varieties of Religious Experience*; *Pragmatism*; *A Pluralistic Universe*; *The Meaning of Truth*; *Some Problems of Philosophy*; and *Essays in Radical Empiricism*. Died, 1910.

James I of England and **VI of Scotland,** the only son of Mary Queen of Scots and Henry Stuart, Lord Darnley, was born in Edinburgh, 1566. When his mother was forced to resign the crown, James was proclaimed king of Scotland, 1567. The training of his childhood was under the care of the earl of Mar. His tutor was the scholar George Buchanan. In 1578, the earl of Morton, then regent, was driven from power, and James assumed full control. The new government was unpopular, and Morton was once more made regent, but was at length condemned and executed as one of the murderers of Lord Darnley.

In the winter of 1589, James went to Denmark, where he married Princess Anne, daughter of Frederick II, king of that country. By the death of Elizabeth in 1603, James succeeded to the throne of England. He governed through his favorites Carr and Buckingham, both of them unpopular; and England's prestige as a power, which had been gained under Elizabeth, soon disappeared. The anger of the Roman Catholics toward him because of his severities led to the famous gunpowder plot. One of the most noteworthy achievements in his reign was the production of the so-called King James version of the Bible. The king's learning contrasted with his weakness of character later prompted the application to him of the celebrated descriptive phrase "the wisest fool in Christendom." Died, 1625.

James II of England and **VII of Scotland,** son of Charles I and Henrietta Maria, was born in 1633. In 1648, during the Civil war, he made his escape to France. For some time, he served in the French army under Turenne; but, when peace was made with Cromwell, he was obliged to leave both the army and the territory of Louis XIV. He then entered the military service of Spain. At the Restoration, he was made lord high admiral of England. On the death of Charles II, 1685, James succeeded to the crown without opposition.

On becoming king, he promised to maintain the Church and to respect the liberties of the people. Nevertheless, his

government was arbitrary and tyrannical; he persecuted the covenanters; subordinated English interests to French; permitted the "bloody assize"; suspended the Test act; violated the rights of the universities; gave church offices to Roman Catholics; and, by these and many other acts of despotism, aroused his subjects to attempt his deposition. Leading statesmen invited William of Orange to assume the throne, and James fled to France; his invasion of Ireland in 1689 ended in his defeat by William at the battle of the Boyne, 1690. He again retired to France, and lived at Saint Germain until his death in 1701.

James IV of Scotland, son of James III and Margaret of Denmark, was born in 1473. He became king in 1488. He exhibited great energy and good sense in the management of public affairs, in vindicating the law and punishing crime, in encouraging shipbuilding, and in developing the agriculture and the manufactures of the country. In 1503, the king married Margaret, daughter of Henry VII of England, an alliance which led to the union of the two crowns just 100 years later. Henry VIII came to the English throne in 1509, and ensuing disputes led James to invade England with an army. He was met by the earl of Surrey, and, in the battle which took place at Flodden, 1513, the king and many of his nobles were killed.

Jameson, John Franklin, American educator and historian, was born in Boston, 1859. He graduated at Amherst college and became assistant professor of history at Johns Hopkins in 1882. He was later professor of history successively at Brown university and the University of Chicago and, in 1905, was made director of the department of historical research in the Carnegie institution, Washington. He was the managing editor of the *American Historical Review* for many years and edited the correspondence of John C. Calhoun and the historical publications of the Carnegie institution. Among his works are *Willem Usselinx, Founder of the Dutch and Swedish West India Companies*; *History of Historical Writing in America*; and *Dictionary of United States History*.

Jameson, Sir Leander Starr, British physician, soldier, and statesman, was born at Edinburgh, 1853. He studied medicine at Edinburgh and London, and began practice at Kimberley, South Africa, in 1878. He engaged in pioneer work in association with Cecil Rhodes and, in 1891, was made administrator of Rhodesia, where he won enormous popularity.

During the troubles at Johannesburg in 1895 between the Uitlanders and the Boer government, Jameson, by order of Rhodes, led a military force to support the Uitlanders. At Doornkoop, they were overpowered by a force of Boers and were compelled to surrender, January 2, 1896. Handed over to the British authorities, Jameson was in May condemned in London to 15 months' imprisonment, but was released in December. In 1900, he was elected to the legislative assembly of Cape Colony and was premier from 1904 to 1908. Died, 1917. See *Jameson Raid*.

Jansen (*jăn'sĕn*; Dan., *yän'sĕn*), **Cornelis,** sometimes called Jansenius, Dutch religious leader, was born at Acquoi, near Leerdam in Holland, 1585. He studied at Utrecht, Louvain, and Paris; filled a chair at Bayonne; and, in 1630, became professor of theology at Louvain. In 1636, he was made bishop of Ypres and shortly afterward completed his great work, the *Augustinus*, which sought to prove that the teaching of Saint Augustine on grace, free will, and predestination was directly opposed to the teaching of the Jesuit schools.

The school of Jansenism, which derived its theological doctrines from Jansen, repudiated the Catholic dogma of the freedom of the will, maintaining that divine grace is irresistible and that Christ died for all. The circulation of the *Augustinus* was prohibited by a decree of the Inquisition in 1641, and, in the following year, it was condemned by Urban VIII in the bull *In eminenti*. Jansen, who died in 1638, was supported by such writers as Arnauld, Pascal, and the Port-Royalists.

Jastrow (*jăs'trō*), **Joseph,** American educator, brother of Morris Jastrow, Jr., was born at Warsaw, Poland, 1863. He was graduated at the University of Pennsylvania and at Johns Hopkins university. He was in charge of the psychological section of the World's Columbian exposition in 1893. In 1903, he became professor of psychology at the University of Wisconsin. He wrote *Time-Relations of Mental Phenomena, Fact and Fable in Psychology, The Subconscious, Character and Temperament*, and *The Psychology of Conviction*.

Jastrow, Morris, Jr., American Orientalist, was born in Warsaw, Poland, 1861. He was educated at the University of Pennsylvania and various universities of Germany and France. He became a recognized authority on Semitic religions, languages, and literatures. His works include *Religion of the Babylonians and Assyrians, The Study of Religion*, and *The Civilization of Babylonia and Assyria*. He edited *Selected Essays of James Darmesteter* and the series of *Handbooks on the History of Religion*. Died, 1921.

Jay, John, American statesman and jurist, was born in New York City, 1745. He was admitted to the bar in 1768. In 1774, as a member of the First Continental Congress, he formed one of the committee of three which drew up the celebrated address to the people of Great Britain. He assisted in framing the New York State constitution; in 1777, was appointed chief justice of New York; and, in the following year, became president of the provincial congress of New York. He next took part in negotiating the treaty of peace entered into at Paris, 1783, between Great Britain and the United States. On his return, he was appointed secretary for foreign affairs and, in 1789, became chief justice of the United States supreme court. In 1794, he went on a special mission to England, where he concluded a treaty which met with violent opposition from the Anti-federalist party. He was governor of New York State, 1795–1801. Died, 1829.

Jebb, Sir Richard Claverhouse, British Hellenic scholar, was born at Dundee, Scotland, 1841. He was graduated from Trinity college, Cambridge, and was elected fellow. He took a prominent part in organizing intercollegiate classical lectures and was secretary to the newly founded Cambridge philological society. In 1869, he became public orator of Cambridge university; in 1875, was made professor of Greek at Glasgow; and, in 1889, was appointed regius professor of Greek at Cambridge. In 1891, he was elected member of Parliament for Cambridge university. His books include *The Attic Orators, Primer of Greek Literature, Modern Greece, Richard Bentley, Introduction to Homer, Erasmus, Influence of Classical Greek Poetry*, and an edition of Bacchylides' works and of the *Characters* of Theophrastus. His greatest work is his translation of Sophocles. Died, 1905.

Jeejeebhoy (*jē'jēb-hoi'*), **Sir Jamsetjee,** Indian merchant and philanthropist, was born in Bombay, 1783. At an early age, he manifested great mercantile ability, traveling extensively throughout maritime Asia and visiting Egypt, Syria, and England. At the end of his 20th year in business, he had made a vast fortune for those days and was everywhere acknowledged the leading merchant of the East.

Remembering his own early struggles with poverty, he then began an admirable career of philanthropy throughout India, extending his benevolences to Mohammedans, Hindus, Christians, and Parsis alike. While his known benefactions exceeded $1,000,000, the amount is far less notable than the circumstances and the spirit in which it was given. His broad-minded, nonsectarian philanthropy created a new bond between the communities of India. He was the first native British subject in India to receive the honor of knighthood and a baronetcy. He also became the recognized titular head of the Parsis in India. Died in 1859.

Jefferson, Charles Edward, Congregational clergyman, was born at Cambridge, Ohio, 1860. He was graduated at Ohio Wesleyan university and at the school of theology of Boston university. He was ordained to the Congregational ministry in 1887 and became pastor of Broadway tabernacle, New York, 1898. His publications include *Quiet Talks with Earnest People in My Study, Doctrine and Deed, Faith and Life, The New Crusade, Christianity and International Peace*, and *Old Truths and New Facts*.

Jefferson, Joseph, American actor, was born at Philadelphia, Pa., in 1829. He came from a family of actors, and made his first appearance as a child in *Pizarro*. From 1856 to 1858, he played minor parts, managed several theaters in the South, and also visited London. Shortly after, he made his first substantial success as Dr. Pangloss in *The Heir at Law*, at New York. From 1861 to 1865, he toured in Australia and New Zealand. He returned by way of London and played an engagement at the Adelphi theater in that city in an adaptation of *Rip Van Winkle*. He presented the same play in New York in 1866 and thereafter confined himself almost solely to it for 15 years. In 1880, he produced *The Rivals* with himself as Bob Acres. In the two characters Rip Van Winkle and Bob Acres his great reputation on the American stage was achieved. He published his *Autobiography* in 1890, and made his last appearance on the stage at Paterson, N. J., 1904. In 1905, he was elected member of the American academy of arts and letters. He died at Palm Beach, Fla., in 1905.

Jefferson, Thomas, American statesman and third president of the United States, was born at Shadwell, Virginia, April 13, 1743. At the age of five, he was sent to an elementary school. Four years later, he commenced the study of Latin, Greek, and French, and, in 1760, entered an advanced class at William and Mary college. In 1767, he was admitted to the bar, and he continued the practice of law until the Revolution closed the courts of justice.

While he was a student at law, Jefferson heard, in the Virginia house of delegates, the famous speech of Patrick Henry against the Stamp act. Animated by the spirit of that great orator, he thereafter stood forth as a champion of independence. In 1769, he was chosen by the people of his county to represent them in the legislature of the province. In January 1772, he married Mrs. Martha Skelton.

She brought him a large dowry in lands and slaves about equal in value to his own estate, which was named Monticello, but liberality and generous living left Jefferson insolvent at his death.

Declaration of Independence. In the spring of 1773, he was appointed by the house of burgesses a member of the "committee of correspondence and inquiry for the dissemination of intelligence between the colonies," the plan of which he had aided in devising. Illness prevented Jefferson from attending the first convention of deputies, in 1774, but he was present at the second convention, in March 1775. This convention then elected delegates to the Continental Congress, where Jefferson took his seat in June. Early in June 1776, a committee to draw up a declaration of independence was appointed with Jefferson for its chairman. The instrument itself was written by Jefferson and was adopted, with certain amendments, on July 4, 1776. This declaration remains his noblest monument.

Political Activities. Jefferson then devoted himself to carrying out radical changes in the laws of his native state. He took his seat in the Virginia house in October 1776, and, on June 1, 1779, he was elected by the legislature to succeed Patrick Henry as governor of Virginia. In 1782, Congress appointed him one of the commissioners to arrange the treaty of peace. He was elected a delegate to Congress in 1783, and, in the next year, he wrote notes on the establishment of a coinage for the United States.

In 1785, Jefferson succeeded Benjamin Franklin as minister at the French court, and he remained at Paris until the latter part of 1789. Soon after his return to the United States, he entered the cabinet of President Washington in March 1790 as secretary of state. Jefferson was democratic by nature and training, strongly opposed to the English political system, a friend to the Revolutionary cause in France, and an unyielding advocate of state sovereignty and decentralization. In nearly all measures he was opposed by Alexander Hamilton, then secretary of the treasury. On December 31, 1793, Jefferson resigned from the cabinet and retired to Monticello.

Presidency. In 1796, Jefferson was supported for the presidency; but John Adams received the highest number of votes, and Jefferson then became vice president. In 1800, he was again nominated for the presidency and was elected. He entered upon the duties of office March 4, 1801. His inaugural address was a lucid and forcible production, explaining his ideas on good government and tending to conciliate all parties. Majorities in both houses of the Seventh Congress enabled the president to carry through many measures not otherwise practicable, and the foreign relations of the United States were managed with consummate skill. The most important event of his administration was the purchase of Louisiana from Napoleon in 1803 for 15 million dollars.

Jefferson was re-elected president in 1804. After the expiration of his second term, March 1809, he retired to Monticello and became interested in the establishment of a system of education for Virginia. Through his instrumentality, the University of Virginia was founded in 1818 and was chartered in the following year with him as its first rector.

Influence. His whole life was consecrated to the improvement and happiness of his fellow men, and he always evinced an intense enthusiasm for knowledge and liberty. As the author of the Declaration of Independence, of the statute of religious freedom in the constitution of Virginia, and as a founder of the Democratic party, Jefferson perhaps exerted a greater influence on the institutions of the United States than any other American except Washington and Alexander Hamilton. Died, July 4, 1826. See *Declaration of Independence, Monticello.*

Jeffreys, George, Baron, English judge, was born at Acton, Wales, in 1648. Admitted to the bar in 1668, he rose rapidly, and became, in 1671, common sergeant of the city of London. Hitherto nominally a Puritan, he now began to intrigue for court favor, was made solicitor to the duke of York, was knighted in 1677, and became recorder of London in 1678. He was made chief justice of Chester and king's sergeant in 1680, baronet in 1681, and chief justice of king's bench, 1683.

In state trials, he proved subservient to the crown, thus earning the favor of King James, who raised him to the peerage in 1685. He was unfair in his rulings in the trial of Algernon Sidney and he condemned Sir Thomas Armstrong to death without trial. Among his earliest trials were those of Titus Oates and Richard Baxter. Later, he was sent to try the followers of Monmouth. Of these, he hanged 320, transported more than 800 to the American plantations, and maimed or fined many others. He was lord chancellor from 1685 until the downfall of James; supported all the king's measures as president of the newly revised court of high commission, and in the trial of the seven bishops. On the flight of King James, Jeffreys tried to follow his example, but was caught at Wapping, disguised as a sailor, and sent to the Tower, where he died, 1689.

Jellicoe (*jĕl'ĭ-kō*), **John Rushworth, Lord,** British admiral, was born in 1859. He was educated at Rottingdean and entered the navy in 1872. He served in the bombardment of Alexandria and in the battle of Telel Kebir in 1882. In 1893, as commander, he was wrecked on the ill-fated *Victoria*. From 1898 to 1901, he commanded the naval brigade in China and was seriously wounded when serving as chief of staff to Admiral Seymour in the Peking relief expedition during the Boxer rebellion. He was promoted rear admiral in 1907, commanded the Atlantic fleet, 1910–11, and in 1912 became second sea lord of the admiralty. At the outbreak of the World War, in 1914, he was made commander in chief of the home fleet, and, in 1915, he became admiral.

On May 31, 1916, Jellicoe commanded the grand fleet in the great naval battle of Jutland, inflicting such damage on the German fleet that it risked no further engagements during the war. He received the thanks of Parliament together with a grant of £50,000. In 1918, he was created Viscount Jellicoe of Scapa; in 1920-24, he served as governor-general of New Zealand. See *Jutland, Battle of.*

Jelliffe (*jĕl'ĭf*), **Smith Ely,** American physician, was born in New York, 1866. He was graduated at the Brooklyn polytechnic institute in 1886 and at the medical department of Columbia university, 1889. He then studied in Europe and, in 1903, became visiting neurologist to the City hospital, New York. From 1907 to 1912, he was professor of mental diseases at Fordham university. From 1911 to 1917, he was adjunct professor of diseases of the mind and the nervous system at the postgraduate hospital and medical school, New York.

He became widely known as a specialist in mental and nervous diseases, and wrote, translated, or edited many works on medical subjects. Among his writings are *Essentials of Vegetable Pharmacognosy, Morphology and Histology of Plants,* and *Outlines of Pharmacognosy.* He revised *Butler's Materia Medica* and *Shaw on Nervous Diseases.* He translated and edited Dubois' *Psychoneuroses,* Payot's *Education of the Will,* Dejerine's *Psychoneuroses and Psychotheropy,* Rank's *Myth of the Birth of the Hero,* and also edited the sections on *Hysteria, Tetany,* and *Migraine* in Osler's *System of Medicine.* He was coeditor of *Diseases of the Nervous System, Technique of Psychoanalysis,* and (with W. A. Dana) *Modern Treatment of Nervous and Mental Diseases.*

Jenks, Jeremiah Whipple, American economist and educator, was born in Saint Clair, Mich., 1856. He was graduated from the University of Michigan in 1878 and, in 1885, received the degree of doctor of philosophy from the University of Halle. He studied law, was admitted to the Michigan bar, and, after teaching various subjects in Mt. Morris college, Knox college, and Indiana university, was professor of political economy, Cornell university, 1891–1912, when he was called to the chair of economics and finance, New York university. In 1917, he was made research professor of government and public administration and also director of the division of Oriental commerce and politics at New York university.

Dr. Jenks served as government expert in many investigations of trusts, industrial combinations, labor conditions, currency problems, and internal taxation. In 1912, he was appointed financial adviser to the Chinese republic. His publications include *The Trust Problem, Industrial Combinations in Europe, Citizenship and the Schools, Life Questions of High School Boys, Principles of Politics, The Making of a Nation, Personal Problems of Boys Who Work, Business and the Government,* and *Great American Issues* (with J. H. Hammond). He edited *Trusts and Industrial Combinations* and wrote numerous articles on political and economical questions.

Jenner (*jĕn'ẽr*), **Edward,** English physician, discoverer of vaccination, was born at Berkeley in Gloucestershire, 1749. He was apprenticed to a surgeon at Sodbury, and, in 1770, went to London to study under John Hunter. In 1773, he settled at Berkeley, where he acquired a large practice. In 1775, he began to investigate the truth of the traditions respecting cowpox. As a result, he became convinced that a person who has had cowpox is immune against smallpox. From this, he was led to hope that he would be able "to propagate cowpox from one human being to another, until he had disseminated the practice over all the globe, to the total extinction of smallpox."

Many investigations delayed the actual discovery of the prophylactic power of vaccination, and the crowning experiment was made on May 14, 1796. This experiment was followed by many others. In 1798, Jenner published his *Inquiry into the Causes and Effects of the Variolæ Vaccinæ.* The practice met with violent opposition for a year, when upward of 70 of the principal physicians and surgeons in London signed a declaration of their entire confidence in it.

Jenner's discovery was soon made known throughout the civilized world. Honors were conferred upon him, and he was elected an honorary member of nearly all the learned societies of Europe. Parliament voted him, in 1802, a grant of 10,000 pounds and, in 1807, a second grant of 20,000 pounds. He died, 1823.

Jerome (*jē-rōm'*; *jĕr'ŏm*), **Saint,** or **Sophronius Eusebius Hieronymus,** was born at Stridon, Dalmatia, about 340 A. D. He studied Greek and Latin, rhetoric, and philosophy under Ælius Donatus at Rome. He began his theological studies in Trier, but, in the year 370, he settled in Aquileia with his friend Rufinus. In 374, he retired to the desert of Chalcis, where he spent four years in penitential exercises and in study, especially of the Hebrew language.

In 379, Jerome was ordained a priest at Antioch, and, in 380-381, visited Constantinople, where he formed a friendship with Saint Gregory Nazianzus. He went in 382 to Rome, where he resided until 385, in close association with Pope Damascus, and where, although already engaged in his great work of the revision of the Latin version of the Bible, he attained great popularity and influence by his sanctity, learning, and eloquence.

Many pious persons placed themselves under Jerome's spiritual direction, the most remarkable of whom were Lady Paula and her daughter Eustochium. These ladies followed Jerome to Palestine, where he permanently fixed his residence at Bethlehem in 386. Here Lady Paula founded three convents and a monastery, the latter governed by Jerome himself. The remaining 35 years of his life were spent in the Holy Land, where he engaged in study and writing and in theological controversies with Rufinus and with the Pelagians. He is universally regarded as one of the most learned and eloquent of the Latin fathers. Died in 420.

Jerome, Jerome Klapka, English humorist, writer, and lecturer, was born at Walsall, Staffordshire, in 1859. He became a clerk, a schoolmaster, and then an actor. Finally, he devoted himself to writing and entered journalism. He was editor, with Robert Barr, of the *Idler* from 1892 to 1897, and, from 1893 to 1897, was editor of *To-Day*. His numerous writings include *On the Stage and Off, Idle Thoughts of an Idle Fellow, Three Men in a Boat, Diary of a Pilgrimage, Novel Notes, Sunset, New Lamps for Old, Prude's Progress, Sketches in Lavender, Tea Table Talk, Susan in Search of a Husband, Passing of the Third Floor Back, The Angel and the Author, The Great Gamble, Malvina of Brittany,* and *All Roads Lead to Calvary*. Died, 1927.

Jerome, William Travers, American lawyer, was born at New York, 1859. He was educated at Williston seminary and Amherst college. In 1884, he was graduated at Columbia law school and was admitted to the bar. He was assistant district attorney of New York county, 1888–90, and was justice of special sessions from 1895 to 1902. From 1901 to 1909, he was district attorney of New York county. During his career in this office, he appeared in many noted trials and attained high rank as a lawyer and pleader.

Jerome of Prague, was born at Prague between 1360 and 1370. He studied at Oxford, became a convert there to Wiclif's doctrines, and zealously taught them after his return home in 1407. The king of Poland employed him to reorganize the University of Krakow in 1410; the king of Hungary invited him to preach before him at Budapest. Jerome entered with his whole soul into the contest carried on by his friend John Huss. When Huss was arrested at Constance, Jerome hastened to his side to defend him, but, being refused a safe-conduct, he endeavored to return to Prague. He was arrested in Hirschau in 1415 and was brought back to Constance. He recanted, but withdrew his recantation, was condemned, and burned at the stake, 1416.

Jerrold (*jĕr'ŭld*), **Douglas William,** English journalist and author, was born at London in 1803. In the main, he was self-educated. He served as a midshipman in the royal navy from 1813 to 1815 and, about 1821, produced a successful comedy. He is remembered chiefly for his contributions to *Punch*, with which he was connected from 1841 until his death. His best play is *Black-eyed Susan*, published in 1829. This was followed by other plays of merit. His best novels are *St. Giles and St. James* and *The Chronicles of Clovernook*. The most popular of his works, however, is *Mrs. Caudle's Curtain Lectures*. From 1852 to 1857, he edited *Lloyd's Weekly*. He was considered one of the most brilliant wits of his time. Died in 1857.

Jessup, Walter Albert, American educator, was born at Richmond, Ind., in 1877. He was graduated at Earlham college in 1903 and received the degree of doctor of philosophy at Columbia university in 1911. Devoting himself to teaching, he was superintendent of schools at Westfield, Ind., from 1900 to 1907 and at Madison, Ind., from 1907 to 1909. In 1912, he served as dean of the school of education in the University of Indiana. He was dean of the college of education in the State University of Iowa from 1913 to 1916, when he was made president of the university. He served as member of the survey commissions of the Cleveland and the Los Angeles public school systems. His writings include *Social Factors Affecting Supervision of Special Subjects* and, in collaboration, *The Supervision of Arithmetic*.

Jevons (*jĕv'ŭnz*), **William Stanley,** English economist and logician, was born at Liverpool in 1835. He was educated at University college, London. From 1854 to 1859, he was assayer in the mint at Sydney, Australia. In 1866, he became professor of logic and political economy at Owens college, Manchester, and, in 1876–80, he held the chair of political economy in University college, London. He wrote *Elementary Lessons in Logic, Principles of Science, Studies in Deductive Logic, Theory of Political Economy, Pure Logic,* and other works. Died in 1882.

Jewett, Sarah Orne, American novelist, was born at South Berwick, Me., in 1849. She was educated at Berwick academy, devoted herself to writing, and, in 1869, became a contributor to the *Atlantic Monthly*. Her work is noteworthy for its simplicity and naturalness, and for its accurate and sympathetic portrayal of New England character. Her writings include *Deephaven, Play Days, Old Friends and New, Country By-Ways, A Country Doctor, A Marsh Island, The King of Folly Island and Other People, A Native of Winby and Other Tales, The Life of Nancy, The Country of the Pointed Firs, The Queen's Twin,* and *The Tory Lover*. She died in 1909.

Joachim (*yō'ä-kĭm*), **Joseph,** Hungarian violinist, was born in Kittsee, near Pressburg, in 1831. He manifested such talent at the age of five that his father placed him for instruction under the concert master at Budapest, where he made his first public appearance at the age of seven. He entered the Vienna conservatory in 1841, and, in 1843, when only 12 years of age, appeared with distinction at a concert of Madame Viardot-García in Leipzig. He visited England in 1844, playing with marked success.

Following the advice of Mendelssohn, Joachim then continued to study for some years at Leipzig. From 1849 to 1854, he was concert master at Weimar. He then became concert conductor at Hanover, where he married Amalie Weiss, a noted contralto. He was one of the great violinists of the 19th century and excelled especially in quartet playing. He composed much valuable music for the violin, including his widely known *Hungarian Concerto in D-minor*. Died in 1907.

Joan of Arc (*jōn ŭv ärk'*; *jō-ăn'*), or **Jeanne d'Arc, Saint,** the maid of Orleans, French national heroine, was born of poor but devout parents, in the village of Domremy, 1412. Her religious faith was ardent almost from her cradle. During the unhappy time of national degradation in which she lived, a prophecy was current in Lorraine that the kingdom lost by a woman—Queen Isabella—should be saved by a virgin, and no doubt this, together with her visions, helped to define her mission in the brooding and enthusiastic mind of the young peasant girl.

Joan put on male dress and a suit of white armor and mounted a black charger, bearing a banner of her own device. Her sword was one that she divined would be found buried behind the altar in the church of Sainte Catherine de Fierbois. Thus equipped she put herself at the head of an army of 6000 men, dictated a letter to the English, and advanced to aid Dunois in the relief of Orleans.

Her arrival fired the fainting hearts of the French with a new enthusiasm, and, on April 29, 1429, she threw herself into the city, where, after ten days of fighting, the English were compelled to raise the siege and retreat. At once the face of the war was changed, the French spirit again awoke, and within a week the enemy were swept from the principal positions on the Loire. But all thoughts of self were lost in devotion to her mission, and now, with resistless enthusiasm, she urged on the weak-hearted dauphin to his coronation.

On May 24, 1430, with a handful of men, Joan forced her way into Compiegne, which was then besieged by the forces of Burgundy. She was left behind by her men, taken prisoner, and, six months later, was sold to the English by John of Luxemburg. She was carried to Rouen, the headquarters of the English, confined in chains, and at length brought before the Inquisition. She was charged with witchcraft, with cutting off her hair, and with wearing men's clothes. Her trial was long and was disgraced by shameful brutality. Having been condemned to death, she was burned at the stake on May 30, 1431.

In 1909, Joan was beatified and, in 1920, she was canonized by Benedict XV. Schiller's drama *Die Jungfrau von Orleans* is the noblest of many literary tributes to her character. Among noteworthy recent lives of Saint Joan of Arc are those of Anatole France, Andrew Lang, and Samuel L. Clemens.

Joffre (*zhŏf'r'*), **Joseph Jacques Césaire,** French general, was born at Rivesaltes, Pyrenees, in 1852. He was educated at the College of Perpignan and, in 1868, began to study military engineering at the Ecole Polytechnique. He entered active service in an artillery battery in the Franco-Prussian war, at the close of which he returned to the Ecole Polytechnique. In 1874, he was made captain and assisted in planning the defenses of Pontarlier. After serving with distinction in various parts of the world, he became professor in the higher war school for France, was made brigadier general, and in 1911 was appointed chief of the general staff.

At the outbreak of the World War, in 1914, Joffre became commander in chief of the French army and soon after

of the entire Allied armies in France. His first great success was the victory of the Marne, which stopped the German advance and saved Paris from investment. For this he was hailed as "the savior of France," was made field marshal, and was awarded the grand cross of the legion of honor.

In 1917, he yielded the command of the armies in the field to General Nivelle and was made adviser of the general staff. In April of the same year, he became a member of the French high commission to confer with the United States in regard to the conduct of the war, in connection with which he made a memorable visit to the United States. Joffre was the first French general since 1870 to be created a marshal of France. See *World War*.

John, king of England, surnamed Lackland, was born in 1167. He was the youngest son of Henry II, and the successor, in 1199, of Richard I, his brother. He had several wars with Philip II of France, who espoused the cause of Arthur, the son of Geoffrey, John's deceased elder brother and the rightful heir to the throne. In 1203, he murdered his nephew Arthur at Rouen, and imprisoned Arthur's sister Eleanor, known as the damsel of Brittany, in Bristol castle.

In 1207, Pope Innocent III appointed Stephen Langton to the archbishopric of Canterbury, but John refused to sanction the nomination; whereupon the pontiff laid England under an interdict in 1208, excommunicated John, absolved the people from their allegiance to the king in 1212, and authorized Philip of France to dethrone him. Terrified at this, John yielded to the pope, and swore that he would hold his kingdom as the pope's vassal, paying an annual tribute.

In 1215, on the demand of his barons, who were headed by Stephen Langton, now archbishop of Canterbury, he signed the *Magna Charta*. Though John thus accepted the charter, yet he had no intention of being bound by it. He actually procured from the pope a bull annulling the charter, and introduced foreign soldiers to fight against the barons, who immediately offered the throne to Louis, son of Philip of France, an offer which was readily accepted but which led to no result. During his reign, the English lost nearly all their French possessions, even Normandy falling to the crown of France. He died in 1216. See *Magna Charta*.

John III, Sobieski, king of Poland, was born about 1624. He fought bravely against the Cossacks and against the Swedes and other invaders, and was foremost in saving the country from ruin. Shortly before the abdication of John Casimir, he received the chief command of the army. In 1672, he defeated the Turks and Tartars, and, in 1673, he again routed the Turks at Khotin. The king died in 1673 and Sobieski was elected his successor in 1674.

In 1683, John went to the rescue of Vienna, which was besieged by an army of 275,000 Turks. The Poles, numbering about one-tenth as many, were joined by a somewhat larger body of German troops. Scarcely had they arrived before Vienna when Sobieski gave the signal for attack, and, after a short struggle, the Turks were completely routed. Sobieski, after a triumphal entry into Vienna, pursued the enemy into Hungary, which was soon restored to the emperor. The last years of his life were embittered by civil as well as by domestic troubles. He died in 1696.

John of Austria, or **Don Juan de Austria,** natural son of the emperor Charles V, was born at Regensburg about 1547. He was early taken to Spain, and, after the death of his father, was acknowledged by his half brother Philip II. In 1570, he was sent with an army against the Moors in Granada, whom he completely expelled from the country. In 1571, with the fleets of Spain, of the pope, and of Venice, he defeated the Turks in the great sea fight of Lepanto.

In 1573, John took Tunis, and conceived the scheme of forming a kingdom for himself. But Philip, jealous of this design, sent him to Milan, and, in 1576, made him viceroy to the Netherlands. In the Netherlands, he sought to win the favor of the people by mildness. For a time, he was hard pressed by William the Silent, but, with the help of Parma's troops, he won, in 1578, the victory of Gembloux. But Philip now feared he might make himself king of the Netherlands, and Don Juan's death at Namur, 1578, was not without suspicion of poison.

John of Salisbury, English schoolman, was born at Old Sarum, about 1118. He studied at Paris and Chartres, and from 1150 lived at Canterbury, meanwhile often visiting Italy. From 1164 to 1170 he had to take refuge at Reims. In 1176, he became bishop of Chartres. He was highly reputed not only as a scholar, but as a poet and orator. His Latin works include over 300 letters, the *Policraticus*, and the *Metalogicus*. Died in 1180.

Johnson, Andrew, 17th president of the United States, was born at Raleigh, N. C., in 1808. He was self-educated, a tailor by trade, and made his entry into politics in 1840 as a presidential elector in Tennessee for Van Buren, the Democratic candidate. In 1841, he was elected to the state senate of Tennessee and, in 1843, became a member of Congress, where for ten years he supported the policy of the Democratic party. In 1853, he was elected governor of Tennessee and he was re-elected in 1855. In 1857, he was elected to the United States Senate, in which he advocated the Union policy of the Republican party.

On the occupation of Nashville by the Federals in 1862, he was appointed by President Lincoln military governor of Tennessee. In this office he gave such satisfaction to the North that in 1864 he was nominated and elected by the Republican party for the office of vice president on the ticket with President Lincoln, who was elected for a second term. On April 14, 1865, by the assassination of President Lincoln, he succeeded to the presidency. Some indiscreet and violent speeches turned the tide against him, and in the Congressional elections his opponents triumphed by increased majorities. His vetoes were generally nullified by the two-thirds vote of both houses.

In 1867, Johnson suspended Stanton, secretary of war, who was reinstated by the Senate the following year. An attempt to gain possession of the war department during this quarrel led, in 1868, to the impeachment of the president, but the two-thirds vote necessary to convict lacked one vote. The Constitutional right of the president, for which Johnson contended, was upheld by decision of the Supreme Court in 1926. Johnson's term of office expired in 1869. He was elected United States Senator in 1875, and died the same year.

Johnson, Eastman, American artist, was born in Lovell, Me., 1824. He studied in the royal academy at Dusseldorf, at The Hague, and in Paris. Among his best-known pictures are "The Savoyard," "The Card Players," "Spanish Woman," "Old Stage Coach," "Milton Dictating to His Daughters," "Old Kentucky Home" (in the New York public library), "Corn Husking at Nantucket" (in the Metropolitan museum, New York), "Boyhood of Abraham Lincoln" (in the University of Michigan), and numerous portraits of eminent Americans, including Daniel Webster, J. Q. Adams, Grover Cleveland, and Benjamin Harrison. He is represented in many American galleries and public buildings. Died in 1906.

Johnson, Emory Richard, American economist and educator, was born at Waupun, Wis., in 1864. He was graduated from the University of Wisconsin in 1888 and received the degree of doctor of philosophy from the University of Pennsylvania in 1893. After teaching economics in Haverford college for three years, he was made, in 1896, professor of transportation and commerce in the University of Pennsylvania. In 1919, he was made also dean of the Wharton school of finance and commerce.

He was expert on transportation for the United States industrial commission, 1899, and was a member of the United States isthmian canal commission from 1899 to 1904. In 1911, he was appointed expert by President Taft to report on Panama Canal traffic, tolls, and measurement of vessels. In 1918-19, he was rate expert for the United States shipping board, and, in 1919–21, he was transportation expert for the United States chamber of commerce.

His extensive writings on transportation and commerce include *Inland Waterways, Ocean and Inland Water Transportation, Panama Canal Traffic and Tolls, Measurement of Vessels for the Panama Canal, History of Domestic and Foreign Commerce of the United States, Principles of Railroad Transportation*, and *Principles of Ocean Transportation*.

Johnson, Hiram Warren, American politician, was born at Sacramento, Cal., in 1866. After working as a shorthand reporter, he studied law. In 1888, he was admitted to the bar. He began practice in Sacramento but, in 1902, removed to San Francisco.

In 1906, he became associated with Francis Heney and other attorneys in the prosecution of graft cases. In 1908, while prosecuting Abe Ruef, the leader of a San Francisco graft ring, Heney was shot down in court. Johnson took Heney's place and secured the conviction of Ruef, who was sentenced to the penitentiary for 14 years.

In 1911, on a platform designed to free the state of undue corporate influences, Johnson was elected governor of California. During his term, he was influential in securing the adoption of more than 20 amendments to the state constitution. In 1912, he was nominated for vice president of the United States on the Progressive ticket. In 1915, he was re-elected governor, but resigned the governorship in 1917 to become a member of the United States Senate, to which he was elected for the term 1917–23. At the Republican national convention in 1920, he was a prominent candidate for the presidential nomination. In 1922, he was re-elected United States senator for the term 1923–29.

Johnson, Owen, American novelist, son of Robert Underwood Johnson, was born in New York City in 1878. He received his education at Lawrenceville, N. J., school and at Yale university, from which he was graduated in 1900. Among his numerous novels, *The Varmint*, a clever and wholesome story of school life, is one of the most admirable. Some of his criticisms on phases of college life

at his alma mater in *Stover at Yale* aroused much controversy. The list of his writings includes *Arrows of the Almighty, In the Name of Liberty, Max Fargus, The Eternal Boy, The Humming Bird, Tennessee Shad, The Sixty-first Second, The Salamander, Murder in Any Degree, Making Money, The Woman Gives, The Spirit of France, Virtuous Wives,* and *The Wasted Generation.* He wrote also the plays entitled *Comedy for Wives, The Comet,* and *The Return from Jerusalem.*

Johnson, Reverdy, American lawyer and politician, was born at Annapolis, Md., in 1796. He was educated at Saint John's college, Annapolis, studied law with his father, and was admitted to the bar in 1815. He began to practice in Upper Marlboro, and, in 1817, removed to Baltimore. From 1821 until 1825 he was a state senator. From 1845 to 1849 he sat in the United States Senate as a Whig. He was attorney-general in President Taylor's cabinet. In 1856, he united with the Democrats, and supported the administration of James Buchanan. He again entered the United States Senate in 1863, and, after the Civil War, argued in favor of the prompt readmission of the Southern states. In 1868-69, he was minister to Great Britain. Died in 1876.

Johnson, Richard Mentor, American legislator, was born at Bryants Station, Ky., in 1781. He was educated at Transylvania university, studied law, and began practice. He was elected to the state legislature in 1805 and to Congress for three terms, 1807–13. In the War of 1812, he raised two regiments of riflemen and served under General Harrison in the Canadian campaign. According to tradition, he shot and killed Tecumseh at the battle of the Thames, October 5, 1813. He re-entered the lower house of Congress in 1814, and, in 1819, he was elected to the Senate, where he served until 1829, when he again became representative, serving until 1837. He was candidate for vice president on the ticket with Van Buren and was finally chosen vice president for the term 1837–41 after the election had been thrown into the Senate. He died in 1850.

Johnson, Robert Underwood, American editor and poet, was born in Washington, D. C., 1853. He was graduated from Earlham college in 1871 and joined the staff of the *Century Magazine* in 1873. He was made associate editor in 1881, and was editor, succeeding R. W. Gilder, from 1909 to 1913. Aside from his literary work, he became known for his activities in behalf of the international copyright. With C. C. Buel he edited *Battles and Leaders of the Civil War.* In 1908, he was elected member of the American academy of arts and letters, of which he became permanent secretary. He has published several small volumes of poems, among them *The Winter Hare and Other Poems, Songs of Liberty and Other Poems,* and *Saint Gaudens: An Ode,* all of which have been collected in one volume. He was ambassador to Italy in 1920-21.

Johnson, Rossiter, American editor and author, was born at Rochester, N. Y., in 1840 and was educated at the University of Rochester. He was associated in an editorial capacity with several newspapers between 1864 and 1872, after which period he edited a large number of reference or literary works, including the *Standard Dictionary, Annual Cyclopedia, The World's Great Books, Little Classics,* and *The Great Events.* Among the many works written by him are *Phaeton Rogers—A Novel of Boy Life, The Turning Points of the Civil War, The Hero of Manila,* and *The Clash of the Nations.* He wrote also *The Battle of Gettysburg* in the enlarged edition of Creasy's *Fifteen Decisive Battles of the World.*

Johnson, Dr. Samuel, English writer and lexicographer, was born at Lichfield, 1709, where his father was a bookseller. He was educated partly at Lichfield and partly at Stourbridge, and entered Pembroke college, Oxford, 1728. Here he remained for three years, but, owing to lack of money, was compelled to leave the university without a degree.

In 1731, his father died, greatly involved in debt; and, in order to earn a living, Johnson became usher in a school in Market Bosworth, Leicestershire. Disgusted with the illtreatment he received there, he left, and was next employed in Birmingham in translating for a bookseller. Here, in 1735, he married the widow of a Birmingham mercer, 20 years his senior, who brought him a fortune of £600. Relying upon this capital, he opened a classical boarding school, but procured only three pupils, one of whom was the celebrated David Garrick.

Disappointed in this enterprise, he started in company with Garrick for London. In 1737, they reached the metropolis, where Johnson was employed by Cave, the founder and proprietor of the *Gentleman's Magazine.* In 1738, his poem *London,* an imitation of the third satire of Juvenal, was published and attracted some notice. From 1740 to 1743, he wrote the Parliamentary debates for the *Gentleman's Magazine.*

In 1747, Johnson issued the prospectus of his *English Dictionary,* for which he was to receive £1575. In 1750, he commenced his amusing periodical, *The Rambler,* and, in 1755, his great *Dictionary* appeared. On the death of his mother, in 1759, Johnson wrote the admirable story of *Rasselas* to pay her funeral expenses. In 1762, a pension of £300 per annum was granted to him by the king, and subsequently he received the title of doctor of laws from the universities of Dublin and Oxford. In 1781, he published his *Lives of the Poets.* After a life spent in incessant literary labor, he died in 1784. In 1791 appeared Boswell's *Life of Johnson,* which is regarded as one of the greatest of all biographies. See *Rasselas.*

Johnson, Tom Loftin, American politician and municipal reformer, was born at Georgetown, Ky., in 1854. He was educated in Indiana. In early youth he obtained employment in a street railway office. He soon advanced to responsible positions and devoted himself to the solution of various transportation problems. He invented several street railway devices, among them an improved fare box and the Johnson rail. In 1876, he bought an interest in a street railway in Indianapolis and later acquired large street railway interests in Cleveland, Detroit, and Brooklyn. He also engaged in the business of iron manufacturing in Cleveland. From 1891 to 1895, he was member of Congress. He was mayor of Cleveland, 1901–10, and during his tenure of office gained national prominence by his campaign for a three-cent fare on the Cleveland street railway system. Died, 1911.

Johnston, Albert Sidney, American general, was born in Washington, Mason county, Ky., in 1803. He was graduated at West Point, 1826. In 1837, he superseded General Houston as commander in chief of the Texan army. He next became Texan war secretary, and served as a colonel of American regulars during the Mexican war. In 1857, he commanded the expedition sent against the Mormons of Utah. Upon the outbreak of the Civil War, in 1861, he was made military commander of the department of Kentucky and Tennessee by the Confederate government. After the surrender of Fort Donelson, he formed a junction with the army of General Beauregard and fell in the battle of Shiloh, 1862.

Johnston, Sir Harry Hamilton, English traveler and writer, was born at Kennington, London, in 1858. He was graduated at King's college, London; was a student at the royal academy of arts, 1876–80; and studied biology at the zoological gardens. He traveled in North Africa, 1879-80; explored Portuguese West Africa and the Congo river in 1882-83; and commanded a scientific expedition of the royal society to Mount Kilimanjaro in 1884. In 1889, he made an expedition to lakes Nyasa and Tanganyika, which led to the founding of the British Central Africa protectorate. He served as consul at various African ports, and, in 1889–91, was special commissioner for the Uganda protectorate. In 1901, the first entire skin of the newly discovered okapi to reach Europe was forwarded to England by him.

His extensive writings include *River Congo, Kilimanjaro, History of a Slave, A History of the Colonization of Africa by Alien Races, The Uganda Protectorate, British Mammals, The Nile Quest, Liberia, A History of the British Empire in Africa, The Negro in the New World, The Black Man's Part in the War, Comparative Study of the Bantu and Semi-Bantu Languages, The Man Who Did the Right Thing, Mrs. Warren's Daughter, The Veneerings,* and *The Story of My Life.* Died, 1927. See *Okapi.*

Johnston, Joseph Eggleston, American soldier, was born at Farmville, Va., 1807. He was graduated at West Point in the same class with Robert E. Lee, 1829. Entering the army, he served in the Black Hawk war and in the Seminole war. In the Mexican war he won promotion for distinguished conduct at Cerro Gordo and Chapultepec. On the outbreak of the Civil War, he joined the army of the Confederacy as brigadier general and became one of its most distinguished commanders. With Beauregard he won the battle of Manassas, called also the first battle of Bull Run, in 1861. In 1862, he commanded against McClellan in the peninsular campaign and was severely wounded at Fair Oaks.

After Bragg's defeat at Chattanooga in November 1863, Johnston was made commander of the entire army of the Southwest. He skillfully opposed Sherman at Dalton, Resaca, and Kenesaw mountain. During the defense of Atlanta he was superseded by Hood but was later selected by Lee to concentrate all available forces against Sherman. After learning of the surrender at Appomattox, he capitulated to Sherman at Durhams Station, N. C., April 26, 1865.

After the war Johnston engaged in railway, express, and insurance management, was elected to Congress in 1876, and, in 1885, was made United States railway commissioner by President Cleveland. He was a pallbearer at the funerals of Grant and of Sherman. Died, 1891.

Johnston, Mary, American novelist, was born at Buchanan, Botetourt county, Va., in 1870, daughter of John William Johnston. She was educated at home, and exhibited literary talent at an early age. In 1898, she became widely known for her *Prisoners of Hope,* a story of colonial Virginia. Her next novel *To Have and to Hold.*

another tale of early Virginia, was still more popular. Her subsequent writings include *Audrey, Sir Mortimer, The Goddess of Reason, Lewis Rand, The Long Roll, Cease Firing, Hagar, The Witch, The Fortunes of Garin, Pioneers of the Old South, Foes, Michael Forth,* and *Sweet Rocket.* Of these, *Audrey* and *Sir Mortimer* have been dramatized.

Jókai (*yō'kō-ē*), **Maurus,** Hungarian novelist, was born at Komorn, Hungary, 1825. He published his first book in 1845 and took part, as a journalist, in the revolution of 1848. In 1863, he entered the Hungarian Parliament, and during his long career there was one of the principal supporters of Koloman Tisza, 1875–90. His novels include *Timar's Two Worlds, Black Diamonds, The Romance of the Coming Century, The New Landlord, Pretty Michal, The Lion of Janina, A Christian but a Roman, The Baron's Sons,* and *Tales from Jókai.* His works are written in brilliant style and afford an intimate view of the political and social life of Hungary during the 19th century. Many of his novels have been translated into other languages. He died in 1904.

Joliet (*jō'li-ĕt*; Fr., *zhō'lyā'*), **Louis,** French-Canadian explorer, was born at Quebec, 1645. He studied for the priesthood at the Jesuit college, Quebec. He abandoned this intention, however, and spent some years as an Indian trader, thus getting a knowledge of the languages and the geography of the West. With Marquette he was selected to explore the western country and to push through to the Mississippi. They started West in May 1673, reaching the Mississippi at the mouth of the Wisconsin in June. They floated down the Mississippi, passing the mouths of the Missouri and the Ohio, and going far enough to be sure that the river flows into the Gulf of Mexico. Joliet upset his canoe on his way back, losing all his maps and papers, so that the only accurate report of the expedition was Marquette's. Joliet was given the seigniory of Anticosti island in 1680, and, in 1697, that of Joliette. Died, 1700.

Jolly (*yōl'lē*), **Philipp von,** German physicist, was born at Mannheim in 1809. He was educated at the universities of Heidelberg, Vienna, and Berlin. He became an instructor at the University of Heidelberg in 1834, and was made professor in 1839. In 1854, he was called to the chair of physics in the University of Munich. He invented many valuable scientific instruments, including the air thermometer, the Jolly, or spring, balance for specific-gravity determinations, the copper eudiometer, and the mercury air pump. He made researches on osmosis, the expansion of gases, and the mass and density of the earth. He published *Anleitung zur Differential und Integralrechnung, Die Principien der Mechanik,* and *Die Physik der Molekularkräfte.* Died in 1884.

Jomini (*zhō'mē'nē'*), **Henri, Baron,** soldier and military writer, was born at Payerne, Switzerland, in 1779. When very young he entered the Swiss guard of Louis XVI, but, when it was disbanded, he returned to his own country and, before he was 20 years old, was made head of the war department. In 1803, he went to Paris and became aid-de-camp to Ney, who recommended him to the emperor. In 1809, he quarreled with Ney in Spain and went back to Switzerland.

In 1812, Jomini was invited by Napoleon to join the campaign against Russia and was appointed historian of the grand army. When the cause of Napoleon was almost lost, he resented an affront he had received by going over to the allies. Napoleon bore him no ill-will for this course, saying, "He was not a Frenchman, and there was no love of country to retain him." The emperor of Russia made him his aide and lieutenant general, and he served in the war against Turkey. He is known chiefly by his works on military history and the art of war. He died in 1869.

Jones, Cecil Charles, Canadian educator, was born at Moncton, N. B., 1872. He graduated at the University of New Brunswick, 1897, and continued study at Harvard and at the University of Chicago. He was professor of mathematics in Acadia college from 1898 to 1906, when he became professor of mathematics and chancellor of the University of New Brunswick. In 1909, he was made delegate to the Darwin centenary, Cambridge, England, and was also appointed member of the royal conservation commission.

Jones, Henry Arthur, English dramatic author, was born at Grandborough in 1851. He attended Winslow school, but was thrown on his own resources at 13. Later, he engaged in business and became a commercial traveler. Becoming interested in the drama, he produced his first play, *Only 'Round the Corner,* in 1878, and, in 1882, in collaboration with Henry Herman, the widely known melodrama *The Silver King,* which still holds the stage.

His play entitled *Saints and Sinners,* which appeared in 1884, was warmly praised by Matthew Arnold. This was the first of a series of more than 50 social dramas, which have been widely successful in the English-speaking world. Among these are some of the finest present-day character plays. His work throughout is characterized by a keen sense of humor and excellent dramatic construction. By the wholesome spirit of his plays and by his numerous essays and lectures, he notably advanced the English stage.

Among his many plays are *The Middleman, Judah, The Dancing Girl, The Tempter, The Triumph of the Philistines, Michael and His Lost Angel, The Physician, The Liars, The Hypocrites, The Evangelist, Mary Goes First,* and *The Pacifists.* His other writings include *Renascence of the English Drama, Foundations of a National Drama, The Theater of Ideas,* and *Patriotism and Popular Education.* Died, 1929.

Jones, Inigo, English architect, was born in London, 1573. In his youth his talent for drawing attracted the notice of the earls of Arundel and Pembroke; the latter enabled him to visit Italy to study landscape painting. At Venice his attention was drawn to the works of Palladio. These awoke in him a passion for architecture, to which his attention was thenceforward wholly directed. In 1620, he was named one of the commissioners for repairing Saint Paul's cathedral, and, in 1622, he completed the banqueting house at Whitehall. He introduced a new monumental style of design into English architecture, and was long considered the foremost architect of England. He wrote a book on *Stonehenge.* Died, 1652.

Jones, Jenkin Lloyd, American clergyman, was born in Cardiganshire, South Wales, 1843. His parents removed to Wisconsin when he was an infant. He served as a private for three years in the Civil War; graduated from Meadville, Pa., theological seminary, 1870; was nine years pastor of All Souls church, Janesville, Wis.; in 1878, with others, established and became editor of *Unity,* the organ of the congress of religion; organized and became pastor of All Souls church, Chicago, 1882; and, in 1905, became director of Abraham Lincoln center, an institutional outgrowth of All Souls church. His publications include *Practical Piety, Bits of Wayside Gospel, A Search for An Infidel, Reinforcement of Faith,* and *Love and Loyalty.* Died, 1918.

Jones, John Paul, American naval commander, was born in Kirkcudbrightshire, Scotland, 1747. His original name was John Paul. He became a sailor, was for a short time engaged in the slave trade, and afterward settled in Virginia, assuming the name of Jones. He ardently embraced the cause of the American colonies. When the Congress, in 1775, resolved to fit out a naval force, he offered his services. Visiting the British coast in a brig of 18 guns, he performed some remarkably bold exploits, and took advantage of his familiarity with the scenes of his boyhood to make a hostile visit to the shores of the Solway firth.

In 1779, Jones was appointed to the command of a squadron of five vessels, three American and two French, and again visited the British coasts, causing great alarm and taking some prizes. Off Flamborough he fell in with a fleet of 41 British merchantmen, convoyed by the 40-gun *Serapis* and the 20-gun *Countess of Scarborough.* Jones lashed his *Bon Homme Richard* to the *Serapis* and after three hours of desperate fighting compelled her surrender, after which, his own ship sinking, he transferred his crew to the *Serapis.*

In 1788, he accepted an appointment in the Russian service and took an active part in the Turkish war, but soon left the service. He died at Paris in 1792. After a long search instituted by General Horace Porter, American ambassador to France, his burial place was discovered, 1905, in the old Saint Louis cemetery in Paris. In 1906, his body was conveyed by a United States squadron to Annapolis, Md., where it was buried with naval honors. He was elected to the American hall of fame in 1925.

Jones, Samuel Milton, American political reformer, known as "Golden Rule" Jones because of his persistent advocacy of that practice in politics and in business, was born in Wales, 1846. Brought to America in 1849, he worked as a boy in the oil fields. Later, he established manufacturing plants at Toledo, Ohio. He gained a large fortune and an enviable reputation in business. Elected Republican mayor of Toledo in 1897, he was thrice re-elected, 1899, 1901, and 1903, on an independent ticket. He used his office to defeat graft and dishonesty and to secure the rights of the common citizen. Died in 1904.

Jones, Samuel Porter, American evangelist, commonly known as Sam Jones, was born in Chambers county, Ala., 1847. He was educated for the law, was admitted to the bar in 1869, and began successful practice, but blighted his professional career by indulgence in drink. In 1872, he was converted and soon afterward was ordained a clergyman of the Methodist Episcopal Church, South. His success in the pulpit was immediate, and he became widely popular as an evangelist and as a lecturer. While his sermons and discourses were often extremely unconventional, his personal sincerity and oratorical force made his work notably effective. After his death the following volumes were published: *Famous Stories of Sam Porter Jones, Popular Lectures of Sam Porter Jones, Sam Jones's Revival Sermons,* and *Lightning Flashes and Thunderbolts.* He died in 1906.

Jones, Wesley Livsey, American politician, was born at Bethany, Ill., in 1863. He was graduated at Southern Illinois college in 1886, studied law, and was admitted to the bar. In 1889, he went to the Territory of Washington, shortly before its admission as a state. He settled at North Yakima and, in 1890, began the practice of law. In 1917, he removed to Seattle. From early youth he took great interest in political matters. He was a speaker in Illinois in the Blaine campaign of 1884 and in the Harrison campaign of 1888. After his removal to the Pacific Northwest, he participated actively in public affairs. He was member of Congress from 1899 to 1909, when he was chosen United States senator for the state of Washington. He was re-elected for terms extending from 1915 to 1933.

Jones, Sir William, English Oriental scholar, was born at London in 1746 and was educated at Oxford university. In 1783, he was made a judge of the supreme court in India, where he had opportunity to translate extensively from Hindu and Mohammedan literature. He founded the royal Asiatic society and did more perhaps than any other English scholar to make known Oriental culture to the Western world. On his death in 1794, the East India Company erected a monument to his memory in Saint Paul's cathedral.

Jonson, Benjamin, or **Ben,** English dramatist, was born probably at Westminster about 1573, and was educated at Westminster school. After serving in the English army against Spain in the Netherlands, he returned to England in 1592 and devoted himself to writing. The first piece that brought him into prominence was *Every Man in His Humor*, produced in 1598. The best of his subsequent productions are *Volpone, or the Fox*; *The Silent Woman*; and *The Alchemist*. He also composed two tragedies, *Sejanus* and *Catiline*. His *Masques*, written for the courts of James and Charles, are very graceful. In his dramas he sought to adapt the spirit of ancient comedy to a setting of contemporary life. Jonson was the intimate friend of many of the poets of the time, including Shakspere. He died in 1637. His tombstone in Westminster Abbey bears the inscription, "O rare Ben Jonson." See *Alchemist, The*.

Jordaens (*yōr'dāns*), **Jakob,** Flemish painter, was born at Antwerp in 1593. He ranks next to Van Dyck among the pupils of Rubens. He excelled in humorous scenes of Flemish life; also painted scriptural and mythological subjects. Among his works are "Jupiter and Mercury," "The Adoration of the Shepherds," and many other religious and mythological paintings. In the Metropolitan museum, New York, are his "Holy Family" and "The Philosophers." Died, 1678.

Jordan, David Starr, American zoologist and educator, was born at Gainesville, N. Y., in 1851. He was graduated at Cornell university in 1872, at Indiana medical college in 1875, and received the degree of doctor of philosophy from Butler university in 1878. After teaching natural history subjects in various collegiate institutions from 1872 to 1879, he became professor of zoology in the University of Indiana, of which he was president, 1885–91. From 1891 to 1913, he was president of Leland Stanford Jr. university, of which he was chancellor from 1913 to 1916, when he became chancellor emeritus.

In zoology he specialized in the study of fishes and became prominent as an ichthyologist. For many years he was assistant to the United States fish commission. In 1903–04, he conducted the salmon investigation in Alaska and, in 1906–09, was international fish commissioner for the United States and Canada. His extensive zoological writings include *A Manual of the Vertebrates of the Northern United States, A Guide to the Study of Fishes, The Genera of Fishes, Fossil Fishes of Southern California, Footnotes to Evolution, Evolution and Animal Life* (with V. L. Kellogg), *Animal Life*, and several hundred scientific papers and reports.

In 1910, he was made director of the world peace foundation and became notably active in opposing the war system of the world. Among his writings in this connection are *The Blood of the Nation, War and the Breed, War and Waste, World Peace and the College Man*, and *Ways to Lasting Peace*. He wrote also *The Stability of Truth, The Religion of a Sensible American, Life's Enthusiasms, Democracy and World Relations, Eric's Book of Beasts* (for children), *Book of Knight and Barbara* (for children), *To Barbara* (verse), and *The Days of a Man* (autobiography).

Joseph II, emperor of Germany, son of Francis I and Maria Theresa, was born in 1741. In 1764, he was elected king of the Romans, and, after his father's death in 1765, emperor of Germany; but until his mother's death his power was limited to the command of the army and the direction of foreign affairs. Although he failed to add Bavaria to the Austrian dominions, he acquired Galicia, Lodomeria, and Zips, at the first partition of Poland in 1772. In 1780, he appropriated a great part of Passau and Salzburg.

As soon as he found himself in full possession of the government of Austria, he declared himself independent of the pope, and prohibited the publication of any new papal bulls without his *placet*. He suppressed 700 convents, reduced the number of the regular clergy from 63,000 to 27,000, prohibited papal dispensations as to marriage, and, in 1781, published the edict of toleration for Protestants and Greeks. He also abolished serfdom, reorganized taxation, and curtailed the feudal privileges of the nobles. He died in 1790.

Josephine, Marie Josèphe Rose Tascher de la Pagerie, first empress of the French, was born in Martinique, 1763. She married first the Vicomte de Beauharnais, by whom she became mother of Eugène Beauharnais and of Hortense, mother of Napoleon III. Her husband perished during the reign of terror, and she married, in 1796, Napoleon Bonaparte, the newly appointed commander in chief of the army in Italy. Sharing her husband's fortunes, she became in time the occupant of an imperial throne, which she adorned by her beauty, grace, and womanly virtues. But, as she failed to produce an heir to the new monarchy, Napoleon divorced her, and she retired into privacy at her château of Malmaison. She died in 1814.

Josephus (*jō-sē'fŭs*), **Flavius,** Jewish historian of priestly descent, was born at Jerusalem, 37 A. D. He took part in the revolt of the Jews against the Romans, 66–73, and served as one of the Jewish generals. He was taken prisoner by Vespasian, by whom, however, and by Vespasian's successors, Titus and Domitian, he was treated with great favor. As a dependent of the Flavian family, he assumed the name of Flavius. His *Antiquities of the Jews* gives an account of Jewish history from the creation of the world to 66 A. D. A remarkable passage in this work relating to Jesus Christ is now believed to be spurious. His other works are a *History of the Jewish War* and an *Autobiography*. He died about 100 A. D.

Joubert (*you'bĕrt*), **Petrus Jacobus,** Boer general and statesman, was born in Cape Colony, 1831. He was a farmer and ranchman; became a member of the Volksraad; was attorney-general in 1870; and, in 1874, was acting president. He was one of the triumvirate who organized a Transvaal revolt against the British government in 1880, and he held the chief command in the engagements at Laings Nek, Ingogo river, and Majuba hill. In 1899, he was commander in chief of the Boer forces in the war with England. He conducted the siege of Ladysmith, but was forced to retire on account of ill health. Died in 1900.

Joule (*joul*), **James Prescott,** English physicist, was born at Salford in 1818. He was a pupil of Dalton and devoted his time to physical and chemical research. He made discoveries in connection with the production of heat by voltaic electricity, demonstrated the equivalence of heat and energy, and established on experimental grounds the doctrine of the conservation of energy. His contributions to scientific periodicals and other publications are numerous and important. Died in 1889.

Jovanović (*yō-vä'nō-vĭch*), **Jovan,** Serbian poet and journalist, known also by the pen name Zmaj, was born at Novi Sad in 1833. He studied law at Pest, Prague, and Vienna. Following a period of editorial work, he studied medicine six years at Pest, and, after practicing at Belgrade, removed to Vienna. In 1864, he founded the humorous periodical *Zmaj*, and his poetical work, chiefly lyrics and humorous poems, began to appear at this time. In 1866, his play *Saran* was published, and, in 1872, following the death of his wife and daughter, his volume of verse, *Faded Roses*. During the Russo-Turkish war, he returned to journalism and soon afterward founded humorous and juvenile periodicals. He died in 1904.

Jowett (*jou'ĕt*), **Benjamin,** English classical scholar, master of Balliol college, Oxford, was born at Camberwell, 1817. He was a fellow and tutor of his college until his election to the mastership in 1870. In 1882, he was appointed vice chancellor of the university. His name will always be associated with Balliol college, where his influence made a deep impression. He wrote *On the Interpretation of Scripture*, a commentary on certain epistles of Saint Paul; but he achieved his greatest literary successes by his translation of Plato's *Dialogues*, the *History* of Thucydides, and the *Politics* of Aristotle. Died in 1893.

Jowett, John Henry, English clergyman, was born in Halifax, England, 1864. He was educated at the universities of Edinburgh and Oxford and entered the Congregational ministry. From 1890 to 1895, he was pastor at Newcastle on Tyne and from 1895 to 1911 at Birmingham. In 1911, he became pastor of the Fifth Avenue Presbyterian church of New York City, serving until 1918, when he returned to England and was minister of Westminster chapel until 1922. His writings include *Apostolic Optimism, From Strength to Strength, Meditations for Quiet Moments, Brooks by the Traveller's Way, Thirsting for the Springs, Silver Lining, The High Calling, Our Blessed Dead, Things that Matter Most, The Eagle Life*, and *The Friend on the Road*. Died, 1923.

Juárez (*hwä'räs*), **Benito Pablo,** Mexican politician, was born in Oaxaca, 1806, of Indian parents. He became an advocate, and was governor of his native state, 1847–52. Exiled by Santa Anna in 1853, he returned two years later, and, in 1857, was elected president of the supreme court. In 1858, he assumed the office of chief executive, but was compelled to retire to Vera Cruz, whence he issued decrees abolishing religious orders and confiscating church property. In 1861, he entered the capital and was elected president for four years.

In 1862, Napoleon III, the emperor of France, declared war against Juárez, who retreated to the northern frontier. By the aid of French troops, Maximilian, archduke of Austria, was installed as emperor of Mexico. Following the complete withdrawal of the French forces at the demand of the United States, Maximilian, in 1867, was captured and shot. Juárez immediately re-entered Mexico City. He was again chosen president and, in 1871, was re-elected. He died in 1872.

Judd, Charles Hubbard, American psychologist and educator, was born at Bareilly, British India, in 1873 and came to America in 1879. He was graduated from Wesleyan university in 1894 and received the degree of doctor of philosophy from the University of Leipzig in 1896. After serving as instructor in philosophy at Wesleyan university, 1896–98, he was professor of psychology successively at New York university, at the University of Cincinnati, and at Yale university. In 1909, he became professor of education at the University of Chicago, and was made director of its school of education.

His writings on psychology and education include *Genetic Psychology for Teachers, Psychology—General Introduction, Psychology of High School Subjects, Measuring the Work of the Public Schools, Introduction to the Scientific Study of Education, Evolution of a Democratic School System,* and numerous articles in scientific and educational journals.

Judd, Orange, American agricultural journalist, was born at Niagara Falls, N. Y., in 1822. He was graduated at Wesleyan university in 1847. From 1853 to 1883, he was editor of the *American Agriculturist.* From 1855 to 1863, he edited the agricultural department of the New York *Times.* In 1883, he assumed editorship of the *Prairie Farmer* and, in 1888, became editor of the *Orange Judd Farmer.* By his efforts and financial support, he secured, in 1875, the establishment of the first state agricultural experiment station. This was located in the Orange Judd hall of natural sciences, which he had previously presented to Wesleyan university at Middletown, Conn. He ranks among the pioneer promoters of scientific agriculture, upon the progress of which he exercised a notable influence. Died, 1892.

Judson, Adoniram, pioneer American missionary, was born at Malden, Mass., in 1788. He was graduated at Brown university in 1807 and at Andover theological seminary in 1810. Becoming inspired with missionary zeal, he sailed with his wife for India in 1812. He settled soon afterward at Rangoon and began to preach and to write in Burmese, translating parts of the New Testament into Burmese. During the Burmese war, he was imprisoned at Ava, 1824–26. Subsequently, he labored in various towns of British Burma and among the Karens with remarkable success. During 37 years of missionary service, he translated the Bible and other valuable works into Burmese and compiled a Burmese-English dictionary and also a Pali grammar.

Dr. Judson was thrice married. In 1812, he married Ann Hasseltine (1789–1826), who shared with great fortitude her husband's pioneer hardships in Burma. In 1834, he married Sarah Hall Boardman (1803–45), widow of George Dana Boardman. She translated a hymn book and part of the *Pilgrim's Progress* into Burmese and aided in translating the New Testament into Peguan. In 1846, he married Emily Chubbock (1817–54), who became known as a writer under the pen name Fanny Forester. Died, 1850.

Judson, Harry Pratt, American educator, was born at Jamestown, N. Y., in 1849. He was graduated at Williams college in 1870 and engaged in teaching. From 1870 to 1885, he was teacher and high school principal at Troy, N. Y. He was professor of history in the University of Minnesota from 1885 to 1892. He then became head professor of political science and dean of the faculties of arts, literature, and science in the University of Chicago, serving in this capacity until 1907. From 1907 to 1923, he was president of the University of Chicago. His writings include *History of the Troy Citizens' Corps, Cæsar's Army, Europe in the Nineteenth Century, The Growth of the American Nation, The Higher Education as a Training for Business, The Government of Illinois, The Essentials of a Written Constitution,* and *Our Federal Republic.* Died, 1927.

Julian (*jōōl'yăn; jōō'lĭ-ăn*), or **Julianus Flavius Claudius,** surnamed the Apostate, Roman emperor, was born in Constantinople, probably 331 A. D. He was a nephew of Constantine the Great and was educated in the tenets of Christianity; but, at an early age, he renounced that religion in favor of Neoplatonism. In 355, he received the title of Cæsar and was sent to Gaul, where he obtained several victories over the Germans. In 361, the troops in Gaul revolted from Constantius and declared for Julian, who soon afterward made a triumphal entry into Constantinople. He publicly declared himself a pagan, but the mildness of his edict of toleration surprised Christians and non-Christians alike. However, he selected most of his officers from the old Roman religion and compelled the Christians to aid in restoring the heathen temples. He was a prolific writer and composed in Greek a large number of orations, letters, satires, and poems. He was killed in 363 in an expedition against the Persians.

Julius II, otherwise known as Giuliano della Rovere, pope, was born in Italy, 1443, and became pope in 1503. He endeavored to extend the papal territory and, in 1508, after driving Cesare Borgia from the Romagna, formed the league of Cambrai with Maximilian and Louis XII against Venice. After the submission of the Venetian republic, he turned his arms against France in 1510. In 1511, the Holy league was formed, and the French army was driven back over the Alps. He sanctioned the marriage of Henry VIII with Catherine of Aragon; commenced to rebuild Saint Peter's at Rome; and was the patron of Michelangelo and Raphael. Died, 1513.

Jusserand (*zhü's'-răN'*), **Jean Adrien Antoine Jules,** French diplomat and man of letters, was born at Lyon, 1855. He was educated at Lyon and Paris, and entered the foreign office in 1876. He was councilor of the French embassy at London from 1887 to 1890 and minister to Denmark from 1898 to 1902, when he was appointed French ambassador to the United States. In this last-named office he served with distinction for more than 20 years. His writings include *Les Anglais au moyen âge, La vie nomade et les routes d'Angleterre au xiv. siècle, Le roman au temps de Shakespeare, Historie littéraire du peuple anglais, Shakespeare en France, Les sports et jeux d'exercice dans l'ancienne France, Ronsard,* and *With Americans of Past and Present Days.*

Jussieu (*zhü'syû'*), **Antoine Laurent de,** French botanist, was born at Lyon in 1748. At the age of 17, he began his botanical studies under his uncle Bernard, and four years later was nominated assistant to Lemonnier, the professor of botany in the Jardin du Roi. He reformed the arrangement of the gardens and collections of plants under his charge, and applied to them his own and his uncle's ideas in regard to the natural method.

For 30 years he continued to develop his novel views; and, when his *Genera Plantarum* was completed in 1789, the natural system was finally established as the true basis of botany. In 1793, he became professor of botany in the newly organized Jardin des Plantes, where he continued to teach until 1826. His papers in the *Annales du Muséum* and his articles in the *Dictionnaire des Sciences Naturelles* rank among the most valuable contributions to the literature of botany. He died at Paris in 1836.

Justin, surnamed the Martyr, was born at Shechem in Samaria about 100 A. D. He was first a Stoic and then a Platonist. Later, after his conversion to Christianity, he wandered about, arguing for the truth of the new faith. At Rome between 150 and 160, he wrote the *Apologia* of Christianity addressed to the emperor. He is said to have been martyred about 165 A. D.

Justinian the Great, Roman emperor, was born, 483 A. D., in the village of Tauresium. His reign, which extended from 527 over a period of 38 years, was the most brilliant in the history of the Eastern Empire. Justinian had the fortune or the skill to select the ablest generals of the last days of Roman military ascendancy. He constructed or renewed and strengthened the vast line of fortifications along the eastern and southeastern frontier of his empire. These works of defense and the construction of many public buildings involved an enormous expenditure. In consequence, the fiscal administration of Justinian pressed heavily on the public resources; but it is admitted to have been ably and uprightly conducted.

It is, however, as a legislator and jurist that Justinian has gained widest renown. Immediately on his accession, he compiled a code, now known as the *Code of Justinian,* which comprised all the constitutions and laws of his predecessors. The authoritative commentaries of the jurists were next harmonized and published under the title *Digesta* or *Pandectæ.* The code was republished in 534 with the addition of Justinian's own constitutions. His third great legal undertaking was the composition of a systematic treatise on the laws for the guidance of students and lawyers, published under the title of *Institutiones.* He died in 565.

Juvenal, or **Juvenalis, Decimus Junius,** Latin poet and satirist, was born in Aquinum, about 60 A. D. He was a friend of Martial and contemporary of Statius and Quintilian. He practiced at Rome as an advocate. His

satires, 16 in number, are characterized by a burning moral indignation at the vices and follies which they depict. Juvenal may be regarded as a type of the older Roman moralist, in distinction to an urbane satirist like Horace, who aimed to amuse by the depiction of human frailties. Died about 140 A. D.

Kahn (*kän*), **Julius,** American lawyer and politician, was born at Kuppenheim, Germany, in 1861, and, at the age of five, went to California. He was educated in the public schools of San Francisco and entered the theatrical profession. During his career on the stage, he played with Edwin Booth, Joseph Jefferson, Clara Morris, and other noted actors. In 1890, he returned to San Francisco and took up the study of law; in 1892, he was elected to the state legislature; and, in 1894, he was admitted to the bar. In 1898, he was elected to Congress as a Republican. With the exception of one term, 1903–05, he was continuously re-elected. Following the declaration of war against Germany in 1917, Kahn was the leader in the House of Representatives in securing the passage of the Selective Draft act. In 1919, he became chairman of the House committee on military affairs. After his death in 1924, his seat was occupied for the balance of the term by his wife, Florence Prag Kahn, who was regularly elected in 1925.

Kahn, Otto Hermann, American financier, was born at Mannheim, Germany, in 1867. His father was a German refugee to the United States following the revolution of 1848, and had become an American citizen, but later returned to Germany. Otto Kahn was educated at Mannheim, spent a year in the German army, and then entered a banking house. In 1888, he entered the London branch of a German bank. He served in this post five years and became a British citizen.

In 1893, he joined the house of Speyer and Company in New York City. After two years' service, followed by travel in Europe, he entered the firm of Kuhn, Loeb, and Company, bankers, of New York. In 1917, he again became an American citizen. As a patron of music and art, he served as chairman of the board of directors of the Metropolitan Opera Company and of the French theater of New York. He was a founder of the New Theater Company and a trustee of numerous institutions, including Rutgers college and the Massachusetts institute of technology.

During the World War, he took an active part in showing the Germans in the United States that Germany was in the wrong and must be resisted. In support of this view, he published *Right above Race.* His other writings include *Our Economic Problems* and *Two Years of Faulty Taxation.*

Kalakaua (*kä'lä-kou'ä*), **David,** king of the Hawaiians, 1874–91, was born in Honolulu, 1836. He was descended from Keawe, an ancient king of the islands. With Prince Lunalilo and 15 other hereditary chiefs, he received an English education in the royal school at Honolulu. In 1860, he visited California. In 1874, on the death of Lunalilo, who appointed no successor, the legislature elected Kalakaua king, over Emma, queen dowager and relict of Kamehameha IV. The partisans of Emma, on hearing the result, broke into the courthouse and attacked the legislature. With assistance from the English and the American ships in port, the rioters were dispersed, and Kalakaua was crowned the seventh king of the Hawaiians. In 1887, he granted a new constitution, restricting the royal prerogative. Died, 1891.

Kalb (*kälb*), **Johann, Baron de,** general in the American Revolution, was born in Bavaria in 1721. After studying the art of war in the French army, he accompanied Lafayette to America in 1777. He was then appointed a major general by Congress, served in the field in New Jersey and Maryland, and was second in command to General Gates. He died, 1780, three days after the battle of Camden, in which he was mortally wounded.

Kames (*kāmz*), **Henry Home, Lord,** Scottish philosopher and critic, was born at Kames in Berwickshire, 1696. He was admitted to the bar in 1724 and was appointed to the bench as Lord Kames in 1752. Besides books on Scotch laws, he published *Essays on Morality, An Introduction to the Art of Thinking, Elements of Criticism* (his best-known work), *Sketches of the History of Man,* and *Loose Thoughts on Education,* written in his 85th year. He died in 1782.

Kamimura (*kä'mē-mōō'rä*), **Hikonojo,** Japanese admiral, was born in Satsuma, 1850. He commanded a cruiser in the Chino-Japanese war of 1894–95, became vice admiral, 1903, and, at the outbreak of the Russo-Japanese war, was placed in command of the second Japanese squadron. In 1904, he sank the Russian cruiser *Rurik* off Ulsan, Chosen, and gained a decisive victory over the Russian squadron. Died in 1916.

Kant (*känt*; G., *känt*), **Immanuel,** German metaphysician and founder of so-called critical philosophy, was born in Konigsberg, Prussia, April 22, 1724. In 1740, he entered the University of Konigsberg, where he studied mathematics, theology, and science with great thoroughness, but gave comparatively little attention to history and poetry. In 1755, he received from the university the degree of doctor of philosophy and published an essay on *Natural History and Theory of the Heavens.*

Kant now settled as a *docent* at the university and delivered lectures on logic, metaphysics, natural philosophy, and mathematics. In 1770, he obtained the chair of mathematics. He soon exchanged this for the professorship of metaphysics and logic, which he held until 1797.

Works. Kant's inaugural dissertation, *Form and Principles of the Sensible and Intelligible World,* contains germs of his metaphysical system. Not until 1781, however, did his scheme of a transcendental philosophy appear in the form of the *Critique of Pure Reason.* The negative results of the system of pure reason prepared the way for more positive work, *Foundation of the Metaphysics of Ethics* in 1785 and *Metaphysical Elements of Natural Science* in 1786. In 1787, he developed more fully the principles of the metaphysics of the natural sciences and supplemented many positions in his other treatises.

Besides his larger works and essays, Kant wrote many minor treatises, sufficient to have made a literary reputation for most men. He was a zealous advocate of freedom and sympathized with the American colonies and the French people in their revolutions and struggles for liberty. He acted always from a keen and paramount sense of duty. His habits were severely simple, and he was well known for his benevolence.

Manner of Life. Kant spent his entire life in Konigsberg, engaged in his professorial duties and the evolution of his great philosophical works. He lived in retirement under strict, self-imposed rules for health and study, never having traveled, it is said, more than sixty miles outside of his native city.

Philosophy. Kant's chief contribution to philosophy is the conception of knowledge as the result of the interaction of two factors,—one supplied by the outer world, the other by the structure of the human mind. Against the materialist and the skeptic, he proved that the mind has its *a priori* principles of knowledge. In opposition to the dogmatist, he maintained that the sphere of the supersensible, though a reality, is not disclosed to positive thought. He declared that empiricism is right in so far as it asserts that the matter of our ideals is drawn from without, but wrong in so far as it implies that their form can also be found there. He is allied with the principle of the traditional moralists in ascribing an absolute validity to certain moral ideas by which life should be guided. Died, February 12, 1804.

Kater (*kā'tĕr*), **Henry,** English scientist, was born at Bristol in 1777. He began the study of law at his father's request, but gave up his legal studies in 1794 upon securing a commission in an infantry regiment stationed in India. In 1795, he was engaged in the survey of India; upon his return in 1808, he became a student in the military college at Sandhurst and was soon promoted to a captaincy. In 1814, he retired on half pay to devote himself exclusively to scientific research.

Kater invented the floating collimator, an instrument of great value to trigonometers, for which service he received the gold medal of the royal astronomical society. He devised the reversible pendulum, which enables the physicist to determine the length of the simple pendulum at any point on the earth. From 1821 to 1823, he collaborated with Arago and others in determining the difference of longitude between Greenwich and Paris. He died in 1835.

Katsura (*kä'tsōō-rä*), **Taro, Prince,** Japanese statesman, three times premier of Japan, was born in the province of Choshu, 1847. During the restoration era, in 1867, he distinguished himself in the civil war. He studied military science in Germany, and, for some time, he was military attaché in Berlin. On his return home, he was gazetted major general, was appointed vice minister of the war office, under General Oyama, and took a prominent part in the reform of the Japanese army. In 1891, he was promoted to lieutenant general, and, in the following year, he was appointed to the command of the third division of the army. In the Chino-Japanese war he marched with his division through Chosen to Manchuria. He subsequently served under General Nodzu. For his services he was created a viscount, and, two years later, he was promoted to the rank of general. In 1898, he was appointed war minister, and held that post until the downfall of the Yamagata cabinet in 1900. He was premier of Japan from 1901 until 1906, covering the period of the war with Russia. In 1906, he was appointed a member of the high military council of Japan. He was again premier, 1908–11 and 1912–13. Died in 1913.

Kauffmann (*kouf'män*), **Angelica,** Swiss historical and portrait painter, was born at Chur in 1741. She began to paint portraits when only a child. In 1765, persuaded by Lady Wentworth, she went to London, where she became famous as a painter of portraits and of classical and mythological pictures. She married the Italian painter Zucchi in

1781, and, returning to Rome, she spent the remainder of her life in a circle of poets, artists, and scholars. Died in 1807.

Kean, Charles John, British actor, son of Edmund Kean, was born at Waterford, Ireland, in 1811. He was educated at Eton. He made his début at Drury Lane, 1827, but did not establish his reputation until 1838, when he appeared as Hamlet, Richard III, and Sir Giles Overreach. In 1842, he married Miss Ellen Tree, a celebrated actress. From 1850 to 1859, he was manager of the Princess's theater, London. In 1865, he played in the United States. He died in 1868.

Kean, Edmund, celebrated English actor, son of Ann Carey, a strolling actress, was born in London, 1787. At an early age he played children's parts. He himself at 16 turned "stroller," and, after ten years in the provinces, made his first appearance at Drury Lane as Shylock in 1814. He at once took rank as the first actor of the day. A period of wonderful success followed; but, by his irregularities, he gradually forfeited public approval. His greatest successes were as Shylock, Hamlet, Iago, Othello, and as Luke in *Riches*. Died, 1833.

Keane, Augustus Henry, British ethnologist and geographer, was born at Cork, Ireland, in 1833. He was educated in Jersey, Italy, Dublin, and in Hanover, Germany, and traveled extensively in Europe, Asia, and North America. He was author or editor of Stanford's *Asia, Africa, Central and South America; Ethnology; Man, Past and Present; The Gold of Ophir; The Boer States; The World's Peoples*; and other anthropological works. He made also numerous contributions to the *Encyclopædia Britannica, Nature, The Academy, The Edinburgh Review; International Monthly, Geographical Journal, Hibbert Journal, Harmsworth's Encyclopædia*, and the *Anthropological Journal*. He died in 1912.

Keane, John Joseph, American scholar and educator, was born in Ballyshannon, Ireland, in 1839. He came to the United States in 1846 and was educated at Saint Charles's college and at Saint Mary's seminary, Baltimore, Md. Ordained priest in 1866, he was assistant pastor of Saint Patrick's church, Washington, D. C., from 1866 to 1878, when he was made bishop of Richmond, Va. He was rector of the Catholic University of America at Washington from 1886 to 1897. He was then elevated to archiepiscopal dignity, with the title of archbishop of Damascus, and went to Rome. Upon his return to America in 1900, he was transferred to the see of Dubuque, Iowa. He wrote *Onward and Upward*. Died in 1918.

Kearny (*kär'nĭ*), **Philip,** American soldier, was born in New York, 1815. He was attached to the staff of General Scott, 1841–44, and distinguished himself in the Mexican war. He then served as a volunteer in the French army in the war against Austria, and was present at the battles of Magenta and Solferino. He commanded the cavalry of the army of the Potomac in the peninsula campaign during the Civil War, in which he won an enviable reputation for courage and gallantry. He took an active part in the second battle of Bull Run, 1862, and was killed at Chantilly, Va., while reconnoitering in front of his command.

Keats, John, English poet, was born in London, 1795. He was apprenticed to a surgeon at Edmonton, near London. From his boyhood he exhibited a taste for poetry. In 1817, he published a volume of juvenile poems, having already made several contributions to the London *Examiner*, then under the editorship of Leigh Hunt.

In 1818 appeared his *Endymion*, a poetic romance founded in part on the model of Fletcher's *Faithful Shepherdess*. This work was severely criticized in the *Quarterly Review* and in *Blackwood's Magazine*, the wrath of the reviewers being probably inspired by their hatred of the political party with which Keats had identified himself and which was represented by Keats's friends Hazlitt and Hunt. He profited, however, by the criticisms of his reviewers.

In 1820, Keats published his *Eve of St. Agnes*, his odes to *The Nightingale* and *The Grecian Urn*, and the fragments of *Hyperion*, taken, like *Endymion*, from mythological sources and written in an airy strain of classic imagery, characterized by much pensive, quiet beauty. Like Spenser, Keats was a poet's poet and his work profoundly influenced 19th-century poetry in England. He died in 1821.

Keble (*kē'b'l*), **John,** English clergyman and poet, was born in 1792. His early education was directed by his father. At the age of 15 he entered Corpus Christi college, Oxford, where he won several prizes and otherwise distinguished himself. In 1827, he published his volume of sacred poetry entitled the *Christian Year*, which attained a very large circulation and an influence that can scarcely be overestimated. He was one of the leading spirits in what was known as the "tractarian movement" in the English Church, and for several years was actively engaged with Pusey, Newman, and others in issuing *Tracts for the Times*. He died in 1866.

Keen, William Williams, American surgeon, was born in Philadelphia, Pa., 1837. He was graduated at Brown university in 1859 and at Jefferson medical college, Philadelphia, in 1862. From 1862 to 1864, he was a surgeon in the United States army. He studied in Europe from 1864 to 1866, when he began practice in Philadelphia. He was lecturer on pathological anatomy in Jefferson medical college from 1866 to 1875, professor of artistic anatomy at the Pennsylvania academy of fine arts from 1876 to 1889, and professor of surgery in Jefferson medical college from 1889 to 1907. His writings include *Keen's Clinical Charts, Early History of Practical Anatomy, Surgical Complications and Sequels of Typhoid Fever, Treatment of War Wounds*, and *Animal Experimentation and Medical Progress*. He also edited Heath's *Practical Anatomy, American Health Primers*, Holden's *Medical and Surgical Landmarks*, Gray's *Anatomy, American Text-Book of Surgery*, and Keen's *System of Surgery*.

Kellar, Harry, public entertainer and magician, was born in Erie, Pa., 1849. He was educated at Painesville, Ohio, 1866. When a young man, he was assistant to the "fakir of Ava," the magician. He joined Davenport Brothers, spirit mediums, as business manager in 1867. With other illusionists he traveled in Mexico, South America, Africa, Australia, and Oriental countries. After 1884 he performed in American cities. He was perhaps the most widely known illusionist of his time. He published *A Magician's Tour up and down and round about the Earth* and *Kellar's Variety Entertainments*. He died in 1922.

Keller, Helen Adams, American writer and lecturer, was born at Tuscumbia, Ala., 1880. By severe illness, at the age of 19 months, she was deprived of both sight and hearing. Until she was seven, no serious attempt was made toward her education. She was then placed in charge of Miss Anne Mansfield Sullivan, of the Perkins institute for the blind, Boston, who came to her home. As a result of Miss Sullivan's teaching, she learned the deaf and dumb language by touch; she also learned to read by the Braille system and to write by using a special typewriter. At the age of ten, under the instruction of Miss Sarah Fuller, of the Horace Mann school, New York, she learned to speak.

In 1892, Miss Keller went to Boston, where she has since lived, and, at 16, entered a preparatory school. She was accompanied to all classes by Miss Sullivan, who repeated the lectures and discussions by touch. In 1900, Miss Keller entered Radcliffe college, and, with the continued aid of her devoted teacher, she graduated with honors in 1904. She used textbooks printed in Braille and wrote examinations on her own typewriter. After graduation she became well known as a writer and lecturer on educational possibilities for the blind. Her writings include *The Story of My Life, Optimism, The World I Live in*, and *Out of the Dark*.

Kelley, Edgar Stillman, American composer, was born at Sparta, Wis., in 1857. He studied music in Chicago, 1874–76, and at Stuttgart, where he graduated from the conservatory in 1880. Later he taught in San Francisco and contributed musical criticism to the *Examiner*. In 1896, he became a teacher in the New York college of music, and was engaged as lecturer on music in university extension work. He resided in Berlin from 1902 to 1910, and, upon his return, became professor of composition at the Cincinnati conservatory. Among his compositions are the comic opera *Puritania*; incidental music to *Ben Hur, Prometheus Bound*, and *Macbeth*; the orchestral suite *Aladdin*, on Chinese themes; and the *New England Symphony*. He published a scholarly book entitled *Chopin the Composer*.

Kellogg, Frank Billings, American lawyer, was born at Potsdam, N. Y., in 1856. He removed to Minnesota with his parents in 1865; studied law; and, in 1877, was admitted to the bar. He was city attorney in Rochester, Minn., for three years and county attorney in Olmstead county for five years. In 1887, he removed to Saint Paul, forming a partnership with Senator Cushman Kellogg Davis and Cordenio A. Severance. He was special counsel for United States in the cases against the paper trust and the Standard Oil trust. He was also special counsel for the interstate commerce commission in the investigation of the Harriman railroads and for the United States in the action to dissolve the Union Pacific and Southern Pacific merger. He was elected United States senator for the term, 1917–23. Soon after the expiration of his term, he was appointed United States ambassador to England, serving until 1925, when he became secretary of state. His principal achievement in this office was the negotiation of the Paris Pact, a multilateral treaty renouncing war as an instrument of national policy. He retired to private life in 1929.

Kellogg, Vernon Lyman, American zoologist, was born at Emporia, Kansas, in 1867. He was educated at the University of Kansas, Cornell university, University of Leipzig, and the University of Paris. He lectured at the University of Kansas from 1890 to 1894, and thereafter until 1920 was professor of entomology in Leland Stanford university. During the World War, he was successively

director in Brussels of the American Commission for Relief in Belgium and assistant to the United States food administrator. He was associated with relief missions to Poland, Russia, and other European countries from 1918 to 1921. In 1919, he was made permanent secretary of the National Research Council, Washington. His publications include *American Insects, Darwinism Today, Headquarters Nights,* and *Nuova, the New Bee.*

Kelly, Howard Atwood, American physician, was born at Camden, N. J., 1858. He was graduated from the University of Pennsylvania in 1877 and from the medical department in 1882. He was founder of the Kensington hospital, Philadelphia. In 1888-89, he was associate professor of obstetrics in the University of Pennsylvania. He was professor of gynecology and obstetrics in Johns Hopkins university from 1889 to 1899 and professor of gynecology there and gynecological surgeon in Johns Hopkins hospital from 1899 to 1919. His writings include *Operative Gynecology, The Vermiform Appendix and Its Diseases,* and *A Scientific Man and the Bible.*

Kelly, James Edward, American sculptor, was born at New York, in 1855. He studied wood engraving and became an illustrator, principally for magazines. After 1881 he devoted his time exclusively to sculpture and became known as "the sculptor of American history." His first piece of sculpture was "Sheridan's Ride," 1878. Forty generals, including Grant, Sherman, Sheridan, and Hancock, gave him sittings for a series of bronzes. His work includes also "Monmouth Battle Monument"; "Call to Arms," Troy, N. Y.; "General John Buford at Gettysburg"; "Battle of Harlem Heights" memorial at Columbia university; equestrian figures of General Sherman and Colonel Roosevelt at San Juan hill; and busts from life, of Admirals Dewey, Sampson, and Clark, and of Roosevelt as colonel of the Rough Riders.

Keltie (*kĕl'tĭ*), **Sir John Scott,** British editor and geographer, was born at Dundee, Scotland, in 1840. He was educated at Perth and at the universities of Saint Andrews and Edinburgh. In 1861, he joined the editorial staff of W. & R. Chambers, Edinburgh, and, from 1871 to 1884, he was an editorial writer for Macmillan and Company. In 1880, he was made editor of the *Statesman's Year-Book,* a post which he held for more than 40 years. He was librarian of the Royal geographical society from 1885 to 1892 and secretary of the society from 1892 to 1915. His writings include *The Partition of Africa, History of the Scottish Highlands and Clans, Report on Geographical Education, Applied Geography,* and, with O. J. R. Howarth, *The History of Geography.* Died, 1927.

Kelvin, Lord, British physicist and mathematician, was born at Belfast, Ireland, June 26, 1824. Before his elevation to the peerage in 1892, he was known as Sir William Thomson. He early distinguished himself at Glasgow university in mathematics and the classics. In 1841, he went to Cambridge university, where he received his bachelor's degree and was elected a fellow in 1845. He then went to Paris, studied for a time under the famous Regnault, and there, as at Cambridge, made valuable original contributions to science.

In 1846, Lord Kelvin was appointed professor of natural philosophy in Glasgow university. Here he carried forward his investigations into thermodynamics, electrostatics and the theory of magnetism, contact electricity, thermoelectricity, the mechanical energies of the solar system, the action of the tides, and the size and motion of atoms. Popular attention was directed to his scientific attainments by his connection with the more practical problems of ocean telegraphy. Lord Kelvin was electrical engineer to the Atlantic Cable Company in 1857-58 and again in 1865-66. After the construction of the Atlantic cable, his most popular achievement was the invention of a mariner's compass that was free from the magnetic action of the iron of the ship.

Theory of the Earth's Age. As early as 1842, Lord Kelvin had published, in a paper which appeared in the Cambridge and Dublin *Mathematical Journal,* the germ of his theories about the age of the earth. He announced that the age of the earth as a habitable planet, far from being unlimited, could not possibly exceed 400 million years and was more probably within 20 million. The resulting controversy among biologists and geologists has lasted until the present day.

Electrical Measurement. In 1851, Lord Kelvin, impelled by the characteristic precision of his scientific spirit and by the need which he perceived for exact measurement in telegraphy, had already adopted the so-called C. G. S., or absolute, system of measurement, based on the centimeter, the gram, and the second. Its general acceptance also was more directly due to him than to any other man. The unit of electric energy known as the kilowatt hour was first defined by him, and much of his attention was devoted also to the production of commercial instruments for the measurement of the electric current.

Later Work. Lord Kelvin's later work included many valuable investigations in molecular physics. The lectures that he delivered at Johns Hopkins university in 1884 on his first visit to America ranged from the most recondite problems of optics to speculations on molecular dynamics and were both a criticism and a protest regarding the ultimate dynamics of physical nature. In 1897 and again in 1902, he revisited both Canada and the United States.

His chief publications were: a *Treatise on Natural Philosophy,* which he wrote in conjunction with Professor Tait and issued in 1867; *Mathematical and Physical Papers,* published 1882-90; *Popular Lectures and Addresses,* 1889-94; *Molecular Tactics of a Crystal,* 1894; and *Baltimore Lectures,* delivered in 1884, in the later revision of which he practically abandoned his famous vortex theory of atoms.

Honors Received. The labors of Lord Kelvin were rewarded with many honors. He was knighted in 1866, and the peerage was conferred upon him in 1892 following his election to the presidency of the royal society in 1890. In 1902, he was made a member of the British privy council. At the time of the jubilee of his professorship at Glasgow in 1896, he received from the French academy of sciences the Arago gold medal. The genius of Lord Kelvin, as one of the greatest scientific intellects of the latter half of the 19th century, displayed a threefold ability: power to construct valuable theories, ingenuity in their application, and the capacity to secure their general usefulness by the invention of appropriate instruments. Died, December 17, 1907.

Kemal Pasha. See *Mustapha Kemal Pasha.*

Kemble, Charles, English tragedian, was born at Brecknock, South Wales, in 1775, younger brother of John Philip Kemble. He received his education at Douai, France, and, on his return to England, he devoted himself to the stage. In 1794, he made his first appearance at Drury Lane, London, in the character of Malcolm in *Macbeth.* He gained wide fame for his impersonations of such characters as Romeo, Falconbridge, Charles Surface, Cassio, and Benedick. He also gave readings from Shakspere with notable success. In 1832, he visited the United States, accompanied by his daughter Frances Anne Kemble, and met with an enthusiastic reception. He died in 1854.

Kemble, Frances Anne (Fanny Kemble), English actress and Shaksperian reader, was born in London in 1809, daughter of Charles Kemble. She was educated chiefly in France. In 1829, she made her début on the stage as Juliet at Covent Garden, London. By her attractive personality she soon won great popularity, playing such rôles as Portia, Beatrice, Lady Teazle, and Julia.

In 1832, she came to the United States with her father and met with noted success. In 1834, she married Pierce Butler, an American, and retired from the stage to her husband's plantation in Georgia. They were divorced in 1849, and she resumed her maiden name. Returning to the stage, she appeared as a Shaksperian reader, attracting for several years large audiences in Boston and in other cities. In 1877, she returned to England, where she was a prominent figure in the social life of London.

Besides several plays and a volume of poems, she wrote *A Journal of a Residence in America, A Year of Consolation, Records of a Girlhood, Records of Later Life, Notes on Some of Shakespeare's Plays, Far Away and Long Ago,* and *Further Records.* Her grandson Owen Wister became a well-known American novelist. She died in 1893.

Kemble, John Philip, English tragedian, was born at Prescott, Lancashire, in 1757. His father intended him for the Catholic priesthood, and sent him to a seminary at Sedgley Park, Staffordshire, and to the English college at Douai. His first appearance as an actor was at Wolverhampton in 1776. The success of his sister, Mrs. Siddons, gave him his opportunity, and, in 1783, he played Hamlet at Drury Lane, arousing the keenest interest. For many years he continued to play leading tragic characters at Drury Lane, and, in 1788, he became Sheridan's manager. In 1803, he purchased a share in Covent Garden theater, became manager, and made his first appearance there as Hamlet in the same year. As a tragedian, Kemble had no superior in his time. He retired in 1817 and afterward settled at Lausanne, where he died in 1823.

Kemmerer, Edwin Walter, American educator and economist, was born at Scranton, Pa., in 1875. He was graduated at Wesleyan university in 1899 and received the degree of doctor of philosophy from Cornell university in 1903. He was instructor of economics and history in Purdue university, 1901-03; financial adviser to United States Philippine commission, 1903; and chief of the division of currency, Philippine Islands, 1904-06. He was assistant professor of political economy from 1906 to 1909 and professor of economics and finance from 1909 to 1912, in Cornell university. In 1912, he became professor of economics and finance in Princeton university.

His writings include *Money and Credit Instruments in Their Relation to General Prices, Modern Currency Reforms, The United States Postal Savings System, The A B C of the Federal Reserve System, High Prices and Deflation*, and, in collaboration, *Standard Banking*.

Kempis, Thomas à, German devotional writer, was so called from Kempen, a town in the Prussian Rhine provinces, where he was born about 1380. He was educated at Deventer, and, in 1400, entered the monastery of Mount Saint Agnes, near Zwolle. Here he took the vows in 1406. He entered into priest's orders in 1413 and was chosen subprior in 1425, to which office he was re-elected in 1448. His whole life appears to have been spent in the seclusion of this convent.

For sanctity and ascetic learning, Thomas à Kempis stood very high among his contemporaries. His historical reputation rests almost entirely on his writings, which consist of sermons, ascetical treatises, pious biographies, letters, and hymns. Of these, the celebrated *Imitation of Christ* is a work that in the regard of many ranks second only to the Bible. It has been translated into many languages. He died in 1471.

Kendal, Margaret Brunton Robertson (Grimston), English actress, was born at Cleethorpes, Lincs, in 1849. She was a sister of F. W. Robertson, the dramatist, and was first known on the stage as "Madge Robertson." At a very early age she showed marked talent in singing and in acting. In 1865, she appeared in the rôle of Ophelia at London and soon achieved marked success in high comedy. In 1869, she married William Hunter Grimston and assumed his stage name of Kendal. At the Haymarket theater, in London, as "Mr. and Mrs. Kendal," they won great popularity in Shaksperian revivals and in old English comedies. In 1871, she created the rôle of Galatea in Gilbert's *Pygmalion and Galatea*.

From 1879 to 1889, the Kendals were associated with John Hare, as joint managers of the Saint James's theater. Here they brought out many successful productions, among which were *The Squire, The Ironmaster*, and *A Scrap of Paper*. Later, she toured with her husband in America and in various parts of Great Britain, with an occasional season in London. She published *Dramatic Opinions*.

Kendall, William Mitchell, American architect, was born at Jamaica Plain, Mass., in 1856. He studied architecture at the Massachusetts institute of technology and in Italy and France. Returning to America, he joined the famous firm of McKim, Mead and White. The long list of well-known structures designed by him includes the Plymouth Rock portico, the Tennessee war memorial at Nashville, the Harvard School of Business, the Arlington memorial bridge at Washington, D. C., and the building for the American academy of arts and letters, to which body he was elected in 1929.

Kennan (*kĕn'ăn*), **George,** American author and lecturer, was born at Norwalk, Ohio, in 1845. He studied telegraphy and, in 1865, went to Siberia as explorer and telegraphic engineer. In 1870-71, he explored the eastern Caucasus. From 1877 to 1885, he was night manager of the Associated Press at Washington, D. C. Kennan lectured extensively in the United States and Great Britain on the exile system in Siberia and on other subjects relating to his varied travels, notably his experiences with the American Red Cross in Cuba, 1908, and his visit to the volcano Mont Pelee in 1902. He reported on the Russo-Japanese war in 1904. Besides books on the above subjects he wrote *Misrepresentation in Railroad Affairs, The Salton Sea*, and a biography of E. H. Harriman. Died, 1924.

Kennedy, Charles Rann, dramatic writer, was born at Derby, England, in 1871. At 13 he became an office boy and largely educated himself. At an early age he began lecturing and writing. Later, he became an actor, press agent, and theatrical business manager. These activities led him to write dramas for the stage. With this work he combined the production of short stories, poems, and critical articles. In 1898, he married Edith Wynne Matthison, the actress. Removing to America, he settled in New York, where he made his first appearance on the American stage in 1903. Since 1905, he has devoted himself chiefly to writing dramas. These deal mainly with social problems and are characterized by seriousness of purpose and by reforming tendencies. Among his plays are *The Servant in the House, The Terrible Meek, The Necessary Evil, The Idol-Breaker, The Rib of the Man, The Army with Banners, The Fool from the Hills*, and *Old Nobody*.

Kensett (*kĕn'sĕt*), **John Frederick,** American landscape painter, was born at Cheshire, Conn., 1818. In early life he became an engraver but devoted his leisure to the study of painting. In 1840, he began a period of five years' study in England, supporting himself by engraving. The success of his first picture, exhibited at the royal academy, led him to devote himself entirely to painting. After two years' work in Italy he exhibited his view on the "Arno" and the "Shrine" in New York in 1848. This established his reputation and he was elected to the national academy in 1849.

Kensett was a versatile painter of moods and seasons and ranks as one of the greatest of early artists of the so-called Hudson River school. About 40 of his works, some unfinished, are in the Metropolitan museum, New York. His "Sunset on the Coast" and "October Afternoon" are in the Corcoran art gallery, Washington. He died in 1872.

Kent, James, American lawyer and jurist, was born in Philippi, N. Y., 1763. He was graduated at Yale in 1781, was admitted to the bar in 1785, and soon became noted for his legal learning. He was several times elected to the New York legislature, and, in 1793, became professor of law in Columbia college. Afterward he was chosen to many important offices, becoming chief justice of New York in 1804, and chancellor, or judge of the court of chancery, in 1814. His decisions in hundreds of law cases are still often cited; but he is best known for his *Commentaries on American Law*, which were published from 1826 to 1830 and are now used by every American lawyer as well as by many in other countries. He died, 1847; was elected to the American hall of fame, 1900.

Kent, William, American legislator, was born in Chicago in 1864, and with his parents removed to California in 1871. After his graduation from Yale in 1887, he located in Chicago to look after his father's business enterprises. In 1890, he formed a partnership with his father in real estate and cattle business. Later, he was president of cattle companies in Nevada and North Carolina. He manifested much interest in social and civic improvement; served as alderman in Chicago, 1895–97; and was president of the municipal voters' league, 1899-1900. He returned to California in 1907; was elected to Congress as a Republican in 1910; and was re-elected as an Independent in 1912 and 1914. In 1917, he was made a member of the United States tariff commission. He published various pamphlets and articles on national and municipal civics. Died, 1928.

Kepler, or **von Kappel, Johann,** German astronomer, was born December 27, 1571, at Weil der Stadt, Wurttemberg, Germany. As a child, he was of a sickly constitution and of marked precocity. From the University of Tubingen he received his bachelor's degree in 1588 and his master's degree in 1591.

Though he knew little of the subject, Kepler was unwillingly made to accept the class in astronomy at Graz in 1594. Forced into this branch of learning, he bent all his energy to ascertaining the size, motions, and orbits of the planets. In 1596, he published his *Cosmographical Mystery*, a book filled with fanciful hypotheses. He was saved from continued extravagance of this kind by his connection with the celebrated astronomer Tycho Brahe at Prague.

After an unfortunate marriage in 1597, pecuniary difficulties and religious persecution soon obliged Kepler to escape into Hungary. In 1600, he became the assistant of Tycho Brahe. Their first joint work was the computation of the *Rudolphine Tables*, named for Rudolph II, who was to defray the expense of their publication. Upon the death of Tycho in 1601, Kepler succeeded him as principal mathematician to the emperor. In 1606, he published a *Supplement to Vitellio*, in which he treated the optical part of astronomy. His *Dioptrics* of 1611 definitely founded the science of optics.

The work on which Kepler's fame chiefly rests is his *New Astronomy, or Commentaries on the Motions of Mars*, published in 1609. He proved that Mars moves in an elliptical orbit, in one of the foci of which is the sun. He also ascertained that the radius vector, or the line joining the planet and the sun, passes over equal areas in equal times. These two great principles he extended to all the planets in the solar system. His third great law, that the squares of the periodic times of the planets vary as the cubes of their distances, he discovered in 1618. It was announced in *The Harmonies of the World*, which he dedicated to James I of England in 1619. These three laws were the basis of Newton's discoveries, by which the nature of the planetary system was finally made intelligible.

Kepler became professor of mathematics at Lienz, Austria, in 1612. In 1615, he was summoned to the diet at Ratisbon to give his opinion on the reformation of the calendar. Kepler worked incessantly to complete the astronomical *Rudolphine Tables*, and, in 1627, they at length appeared. Two years later he obtained a professorship in the University of Rostock. Died, 1630.

Key (*kī*), **Ellen Karolina Sofia,** Swedish writer, was born at Sundsholm, Smaland, 1849, of Scottish and English descent. In her 20th year, she became secretary to her father, who was a member of the Riksdag. Beginning in 1870, she contributed to periodicals, chiefly on historical and sociological subjects. From 1880 to 1899 she was a teacher in a private school, and, in addition to writing, she lectured at Stockholm and elsewhere. She lived much abroad from 1899 to 1910 but subsequently established a permanent home at Strand, Alvastra, Sweden.

While primarily a writer on sex questions and social ethics, she attained success in other fields. Her radical views subjected her to severe criticism but early won the admiration of advanced thinkers, such as Maeterlinck, Brandes, and Havelock Ellis. Among her works are *The Century of the Child, Love and Ethics, The Morality of Woman, The Younger Generation, The Misuse of Woman's Power*, and *Life-Lines*. Died, 1926.

Key (*kē*), **Francis Scott,** American poet, author of "The Star-Spangled Banner," was born in Maryland, 1780. He was educated at Saint John's college, Annapolis, Md. He was a lawyer of note, and for many years was district attorney of the District of Columbia. Being detained by the British during the bombardment of Fort McHenry, September 13, 1814, his feelings found vent in the verses which have become a national lyric. They were printed on his return to Baltimore and were soon widely diffused through the country. He died in 1843.

Keynes (*kānz*), **John Maynard,** English economist, was born at Cambridge in 1883, son of John Neville Keynes. He was educated at Eton and at King's college, Cambridge. Entering the civil service, he served in the India office and later was attached to the treasury, of which he became acting principal clerk, 1917–19. He was a member of the royal commission on Indian finance and currency, 1913-14, and was chief representative of the British treasury at the Peace Conference of Versailles in 1919. His views regarding the financial effects of the World War attracted wide attention. Among his writings are *Economic Consequences of the Peace* and *A Tract on Monetary Reform*, advocating a partial abandonment of the gold standard.

Keyser, Cassius Jackson, American mathematician and author, was born at Rawson, Ohio, in 1862 and was educated at Ohio normal school and the universities of Michigan, Missouri, and Columbia. He taught in public schools, in Washington university, and, after 1904, in Columbia university, where he became head of the department of mathematics in 1910. Among his publications are *Science and Religion* and *The Rational and the Super-Rational*.

Keyserling (*ki'zĕr-ling*), **Hermann Alexander,** German philosopher, was born in 1880 at Konno, Esthonia, of a noble family, through which he inherited the title of count. He studied sciences, philosophy, and literature in the principal European universities and, in 1907, began a long period of travel in Europe, Asia, and America, the fruit of which was his *Travel Diary of a Philosopher*. In 1919, his estates were confiscated by the Esthonian government. He later opened at Darmstadt, Germany, a center for the creative study of philosophy, known as the school of wisdom. He married a granddaughter of Bismarck. Among his publications are *Immortality, The Book of Marriage*, and *The World in the Making*.

Kiepert (*kē'pĕrt*), **Heinrich,** German geographer and cartographer, was born in Berlin, 1818. He was educated at the University of Berlin, specializing in history, philology, and geography. He became greatly interested in geography and, after studying with Karl Ritter, he spent two years, 1841-42, exploring in Asia Minor. His first work, an atlas of ancient Greece, brought him at once into prominence in historical cartography. This was followed by a series of exceedingly valuable works containing maps of the ancient world, some of which were issued in six languages. In 1859, he became professor of geography at the University of Berlin. Died in 1899.

Kilmer, Joyce, American poet, was born at New Brunswick, N. J., in 1886. He was educated at Rutgers college and at Columbia university, graduating from the latter in 1908. After a year of teaching, he took up editorial work and journalism in New York City. He was a leader among the younger poets of America. His works in verse included *Summer of Love, Trees and Other Poems*, and *Main Street and Other Poems*. Soon after the entrance of the United States into the World War in 1917, he became a private in the 165th infantry regiment of the national army. He was killed at the battle of the Ourc, in France, 1918.

King, (William Benjamin) Basil, American novelist, was born at Charlottetown, Prince Edward Island, Canada, in 1859. He was educated in his native town and at King's college, Windsor. Entering the Episcopal ministry, he became rector of Saint Luke's, Halifax, N. S., and later was rector of Christ church, Cambridge, Mass. In 1900, he published *Griselda* and, having lost his eyesight, thereafter devoted himself to literary work. Among his subsequent writings are *Let Not Man Put Asunder, The Wild Olive, The Way Home, The City of Comrades*, and *Faith and Success*. In 1909, he wrote *The Inner Shrine*, which became very popular, but was long anonymous. Died, 1928.

King, Charles, American soldier and author, was born at Albany, N. Y., in 1844. He was graduated at West Point in 1866 and served in the artillery and in the cavalry until he was retired as captain, in 1879, for wounds received in action. In 1898, he was appointed brigadier general of volunteers in the war against Spain, and served in the Philippines under General Lawton. In 1901, he was commandant of the Michigan military academy. His numerous works include *Famous and Decisive Battles, Between the Lines, The Colonel's Daughter, Marion's Faith, Captain Blake, The General's Double, The Iron Brigade, A Conquering Corps Badge*, and *Medal of Honor*.

King, Clarence, American geologist, was born at Newport, R. I., in 1842. He was graduated from Yale in 1862. From 1863 to 1866, he was a member of the California geological survey directed by Professor J. D. Whitney. In this exploration he discovered Mount Whitney, the highest mountain in California, and, with J. T. Gardiner, made the first survey of the Yosemite valley. In 1866, he originated and secured government sanction for the notable "survey of the fortieth parallel" across the Rocky mountains. The survey, which was conducted under his scientific direction and completed in 1872, resulted in signal contributions to science. His important volume on the *Systematic Geology* of the region of this survey was published in 1878.

In 1879, King organized and became the first director of the United States geological survey. He resigned this office in 1881 to become a mining engineer, investigating the Comstock lode and the Eureka and Leadville districts and making many contributions to economic geology. Among his important writings are *Mountaineering in the Sierras, On the Discovery of Actual Glaciers on the Mountains of the Pacific Slope*, and *The Age of the Earth*. He died in 1901.

King, Henry Churchill, American educator, was born at Hillsdale, Mich., in 1858. He was graduated from Oberlin college in 1879, from Oberlin theological seminary in 1882, and continued postgraduate study at Harvard university, 1882–84. Returning to Oberlin college, he was associate professor of mathematics from 1884 to 1890, associate professor of philosophy, 1890-91, professor of philosophy from 1891 to 1897, and professor of theology from 1897 to 1902, when he was made president of the college. He retired from this office in 1927.

His numerous writings include *Outline of the Microcosmus of Hermann Lotze, The Appeal of the Child, Personal and Ideal Elements in Education, Rational Living, The Seeming Unreality of the Spiritual Life, The Laws of Friendship, The Ethics of Jesus, Religion as Life, Fundamental Questions, The Way to Life, For a New America in a New World, A New Mind for the New Age*, and various pamphlets on philosophy and education.

King, Rufus, American statesman, was born at Scarboro, Me., in 1755. He was graduated at Harvard college in 1777, studied law, and was admitted to the bar in 1780. In 1783, he was sent to represent Newburyport in the state legislature. In 1784, he became a member of the Continental Congress and was re-elected in 1785 and in 1786. In 1787, he was a delegate to the constitutional convention in Philadelphia, and, in 1788, he removed to New York City.

In 1796, King was appointed minister to England and remained there for seven years with equal honor to the country and to himself. In 1813, he was elected United States senator, and served until the expiration of his second term in 1825. He was again minister to England, 1825-26. Died in 1827.

King, Thomas Starr, American clergyman and author, was born in New York City, 1824. He studied theology and became pastor of a Unitarian church at Charlestown, Mass., in 1846. He removed to Boston in 1848 and occupied the pastorate of the Hollis Street church until 1860, when he was called to a church in San Francisco, Cal. He gained wide popularity as a lecturer. His activity in the presidential campaign of 1860 had an important part in preserving California to the Union. He wrote *The White Hills: Their Legends, Landscapes, and Poetry; Christianity and Humanity*; and several volumes of lectures. Died in 1864.

King, William Lyon Mackenzie, Canadian statesman and economist, was born at Kitchener, Ont., 1874, a grandson of William Lyon Mackenzie. He graduated from the University of Toronto, 1895, studying later at the University of Chicago and at Harvard university. Becoming deputy minister of labor for Canada in 1900, he served with distinction on many commissions relating to labor and immigration. He was elected member of Parliament as a Liberal in 1908; was minister of labor from 1909 to 1911; and, in 1919, was chosen leader of the Liberal party. On its victory in 1921, he became prime minister. An election in 1925 left King without a clear majority, but he retained office for some months with the help of the Progressive party. A general election in 1926 returned him to power with an effective majority. His publications include *The Secret of Heroism* and *Industry and Humanity*.

Kinglake, Alexander William, English historian, was born in Taunton, 1809. He was educated at Eton and at Trinity college, Cambridge. He studied law and, in 1837, was called to the bar. In 1845, he went to Algiers and, in

1854, served in the British army in the Crimea until the siege of Sebastopol. He represented Bridgewater in Parliament from 1857 to 1868. His chief writings are *Eothen*, a classic of travel; and *The Invasion of the Crimea*, an important historical work. Died, 1891.

Kingsley, Charles, English clergyman and author, was born in Devonshire, 1819. He was educated at King's college, London, and at Cambridge university. In 1842, he became curate and, two years later, rector, of Eversley. In 1848, he published *The Saint's Tragedy, or The True Story of Elizabeth of Hungary*, an admirable illustration of medieval piety. His opinions on the social anarchy of modern times are to be found in his *Alton Locke, Tailor and Poet*, a novel of extraordinary power. This was followed in 1849 by *Yeast, a Problem*, in which he handles the condition of the English agricultural laborer.

In 1853 appeared *Hypatia, or New Foes with an Old Face*, a most vigorous and brilliant delineation of Christianity. Two years later, Kingsley published *Westward Ho!*, probably the greatest of his works. In 1860, he was appointed professor of modern history at Cambridge. After resigning his chair he was made canon of Chester in 1869, canon of Westminster in 1873, and chaplain-in-ordinary to Queen Victoria. Died in 1875. See *Hypatia*, *Yeast*.

Kingsley, Mary Henrietta, English traveler and author, niece of Charles Kingsley, was born in Islington, London, in 1862. She went to Cambridge, where she studied sociology, but was most attracted to natural history. In 1893, she went to West Africa to investigate native folklore and religions and to study biology. She pursued her researches at Kabinda, Fernando Po, and on the lower Congo, returning to England the next year.

In 1894, Miss Kingsley made a second trip to explore the lower Niger region and to study its flora. She traveled through the Niger Coast Protectorate, Cameroon, and Gabun, often with only native attendants. The results of these two journeys were published in her interesting *Travels in West Africa* and *West African Studies*. She prepared for a third journey but while nursing sick Boer prisoners at Simons Town, South Africa, she contracted typhoid fever, of which she died in 1900.

Kinley, David, American educator and economist, was born at Dundee, Scotland, in 1861 and, in 1871, came to the United States with his father. He was graduated at Yale university in 1884, studied at Johns Hopkins university, 1890–92, and, in 1893, received the degree of doctor of philosophy from the University of Wisconsin. He then began his long career as a teacher and as an administrator in the University of Illinois. After serving one year as assistant professor of economics, he was successively professor of economics, dean of the college of literature and arts, and director of courses in commerce from 1894 to 1906. He was dean of the graduate school from 1906 to 1914, and was vice president of the university from 1914 to 1919, when he became acting president. In 1920, he was chosen president of the university. His writings include *The Independent Treasury of the United States*, *Monograph on Trusts*, and *Money*.

Kipling, Joseph Rudyard, English short story writer, novelist, and poet, was born in Bombay, India, 1865. He was educated in United Services college, North Devon, England. He was assistant editor of *Civil and Military Gazette* and *Pioneer* in India, 1882–89. His stories of Indian life, written in his early twenties, won world-wide reputation. These were followed by novels, tales, sketches, and poems, which stamped him as one of the most original, versatile, and effective writers of his time.

Kipling traveled extensively in Japan, China, Africa, Australasia, and America. In 1892, he married Caroline Starr Balestier, daughter of H. Wolcott Balestier, of New York, and lived in Vermont, where he built a home with his own hands. He settled in England in 1896. In 1907, he was awarded the Nobel prize for literature. He was made rector of Saint Andrews university in 1923.

Among his writings are *Plain Tales from the Hills*, *Soldiers Three*, *In Black and White*, *The Story of the Gadsbys*, *The Light that Failed*, *Barrack-room Ballads*, *The Jungle Book*, *The Seven Seas*, *Captains Courageous*, *Just So Stories*, *The Five Nations*, *Puck of Pook's Hill*, *Actions and Reactions*, *The New Armies in Training*, *France at War*, *Fringes of the Fleet*, *Sea Warfare*, *A Diversity of Creatures*, *The Years Between*, *Inclusive Verse*, and *Letters of Travel*. See *Literary Plots*, *Characters*, *and Allusions* under titles of chief works.

Kirkland, James Hampton, American educator, was born in Spartanburg, S. C., 1859. He was graduated at Wofford college in 1877 and received the degree of doctor of philosophy from the University of Leipzig in 1885. He was professor of Greek and German in Wofford college, 1881–83. From 1883 to 1886, he traveled and studied abroad. He was professor of Latin in Vanderbilt university from 1886 to 1893, when he was made chancellor of the university. He edited the *Satires and Epistles of Horace* and wrote many monographs and review articles on philology.

Kitchener of Khartum, Horatio Herbert, Earl, British general, was born at Ballylongford, Ireland, in 1850. He was educated at the Royal military academy at Woolwich and, in 1871, entered the British army. In 1882, he began service in Egypt, and in the action at Handub, in 1888, he led the Egyptian troops against Osman Digna. He was appointed Sirdar in 1888. In 1896, he commanded at the taking of Dongola; in 1898, he was in command of an English and Egyptian army near Omdurman, opposite the site of Khartum, and gained a notable victory. On his return to England, he was raised to the peerage and received a grant of £30,000.

During the Boer war, he was chief of the staff of the forces in South Africa, 1899-1900, and was commander in chief, 1900–02. In recognition of his services, he was promoted to lieutenant general and general, created viscount, and given a grant of £50,000. At the outbreak of the World War, in 1914, he was created earl, became British secretary of state for war, and devoted his great organizing ability to the formation of an army of several million men. While en route to Russia, in 1916, he was drowned by the sinking of the cruiser *Hampshire*.

Kjerulf (*kyâ'rōōlf*), **Halfdan,** Norwegian composer, was born at Christiania, 1815. He was educated for the law at Christiania university, but in his 26th year determined to devote himself entirely to music. After 10 years' work as music teacher and song composer, he was sent to Leipzig for special instruction at the expense of the government.

Upon his return to Norway, Kjerulf directed his attention to the composition of songs and piano music, and, for many years, he exercised a powerful influence in the development of music of the purely national Norwegian type. Nordraak and Grieg received much encouragement and inspiration from him. His compositions are chiefly songs of great melodic excellence, many of which were written especially for Sontag, Jenny Lind, and Christine Nilsson, who gave them popularity throughout the world. He died in 1868.

Klaproth (*klä'rôt*), **Martin Heinrich,** German chemist, was born at Wernigerode in 1743. In early life he followed the profession of an apothecary, first as an assistant in pharmacies at Hanover, Berlin, and Danzig, and later as proprietor of a pharmacy in Berlin. In 1787, he was appointed lecturer in chemistry to the royal artillery. He became the leading chemist of his time in Germany, and, in 1810, was selected professor of chemistry for the then newly established University of Berlin. His exact and thorough work did much to improve analytic chemistry. He was the first to discover and to characterize uranium, zirconium, and titanium as elements. He also distinguished the compounds of tellurium, strontium, cerium, and chromium. Died in 1817.

Klaw, Marc, American theatrical manager, was born at Paducah, Ky., in 1858. He was educated in the public and high schools of Louisville, Ky., studied law, and was admitted to the bar. After 1881 he was engaged as a theatrical manager. He became a member of the theatrical firm of Klaw and Erlanger of New York, and of other firms, gaining control of many theaters throughout the United States.

Klein (*klīn*), **Charles,** playwright, was born in London, England, 1867, and was educated at North London college. He was at one time censor of plays for Charles Frohman. His plays include *A Mile a Minute*, *A Paltry Million*, *The District Attorney*, *Heartsease*, *A Royal Rogue*, *The Music Master*, *The Lion and the Mouse*, *The Daughters of Men*, *The Third Degree*, *The Gamblers*, *The Outsiders*, *The Ne'er Do Well*, and *The Moneymakers*. He died in the sinking of the *Lusitania*, 1915

Kleinsmid, Rufus Bernhard von, American psychologist and educator, was born at Sandwich, Ill., in 1875. He was educated at Oberlin academy, was a traveling student in Europe, and, in 1905, was graduated at Northwestern university. He was superintendent of public schools in Illinois from 1897 to 1904. After teaching for a year in Northwestern University academy, he was principal of the academy and professor of education in De Pauw university from 1905 to 1909, when he was made professor of education and psychology, serving in this chair until 1914. He was president of the University of Arizona from 1914 to 1922, when he became president of the University of Southern California. He is the author of numerous monographs on education, applied psychology, and criminology.

Kleist (*klīst*), **Bernd Heinrich Wilhelm von,** German poet, dramatist, and novelist, was born in Frankfort on the Oder, 1777. With scanty education he entered the Prussian army at 15 and served seven years. After two restless years of study and clerical work, he visited Paris and then settled in Switzerland, becoming acquainted there with Zschokke and Wieland, son of the poet. In 1802, he returned to Germany, visiting Goethe, Schiller, and Wieland in Weimar. After some years of wandering, he settled in Berlin.

During a period of national disgrace, literary stagnation, and personal unrest, he produced dramas of great literary

merit and still greater promise, all left unrealized by his untimely death. Kleist's dramas are still popular on the stage. *Der Zerbrochene Krug*, "The Broken Pitcher," is considered by many the best one-act comedy in German, and *Michael Kohlhaas* is one of the best German stories of the time. *Prinz Friedrich von Homburg* and *Die Hermannsschlacht* are regarded as his finest tragedies. Kleist was the most important North German dramatist of the romantic movement. Died, 1811.

Klinck, Leonard Sylvanus, Canadian agriculturist and university president, was born at Victoria Square, Ont., in 1877 and was educated at Guelph agricultural college and Iowa State college. He lectured on agricultural subjects successively at Iowa State college, McGill university, and the University of British Columbia, of which, in 1919, he was appointed president. He is the originator of several varieties of corn and beans.

Klopsch (*klŏpsh*), **Louis,** American journalist and philanthropist, was born in Germany, 1852, and was educated in the public schools of New York City. He was proprietor of the New York *Daily Reporter*, 1877–90, and of the Pictorial Associated Press, 1884–90. In 1892, he became proprietor of *The Christian Herald*, through which medium he raised and distributed over $4,000,000 in international charities. He was the originator of the red-letter Testament and the red-letter Bible. Died, 1910.

Klopstock (*klōp'shtŏk*), **Friedrich Gottlieb,** German poet, was born at Quedlinburg, Prussia, in 1724. Incited by Virgil's *Æneid* and Milton's *Paradise Lost*, he resolved to write a great epic, and as a student at Jena, in 1745, he began *The Messiah*. In 1746, he went to Leipzig, where the first three cantos of *The Messiah* appeared in 1748. He settled in Hamburg in 1771 with a sinecure appointment and with pensions from the king of Denmark and the margrave of Baden. The last cantos of *The Messiah* were published in 1773. Regarded in his own time as a great religious poet, he helped to inaugurate the golden age of German literature. Odes, tragedies, biblical dramas, and hymns make up the greater part of his poetry. Of these his odes alone possess interest now. *The Messiah* was translated into both English verse and prose. He died in 1803.

Kneisel (*k'nī'zĕl*), **Franz,** violinist and musical conductor, was born in Rumania, of German parentage, in 1865. He was educated in Bucharest and later studied violin under Grün and Hellmesberger in Vienna. He was concert master of Hofburg theater orchestra, Vienna, later of Bilse's orchestra, Berlin, and concert master of the Boston symphony orchestra, 1885–1903. In 1885, he became director of the famous Kneisel quartet. He was especially prominent as violin soloist. From 1886 to 1909, he was assistant conductor and conductor of the Worcester music festivals. In 1905, he became head of the violin department in the institute of musical art, New York. His compositions include *Advanced Studies for the Violin*. Died, 1926.

Knight, Charles, English publisher and author, was born at Windsor in 1791. Among his first publications was *The Etonian*, a periodical supported by the Eton boys. In 1823, he started *Knight's Quarterly Magazine*, and continued it for some time in London. The whole of his noteworthy career was devoted to the publishing of popular literature. Among the works which he published or edited are the *Penny Magazine*, which at one time enjoyed a circulation of nearly 200,000 copies weekly; the *British Almanac* and *Companion to the Almanac*; *Penny Cyclopædia*; *Library of Entertaining Knowledge*; and *History of England*. He died in 1873.

Knowles, James Sheridan, British dramatist, was born at Cork in 1784. He was the son of James Knowles, lexicographer and teacher of elocution. After serving in the militia and studying medicine, he appeared on the stage first at Bath and then at Dublin. He never attained much eminence as an actor, and subsequently taught elocution in Belfast and in Glasgow. His *Caius Gracchus* was first performed at Belfast in 1815. *Virginius*, his most effective play, had been a success in Glasgow before Macready in 1820 produced it at Covent Garden. Besides *William Tell*, in which Macready achieved one of his greatest triumphs, mention should be made of *Love*, *The Hunchback*, *The Love Chase*, and *The Wife*. He appeared with fair success in many of his own plays. In 1845, he left the stage, joined the Baptist Church, and became an eloquent preacher. Died, 1862.

Knox, Henry, American general, was born at Boston, Mass., in 1750. He became a thriving bookseller in Boston, his store being a favorite resort of cultivated people. He was also an officer in a military company, and, when the Revolution broke out, he escaped from the city with his wife, who hid his sword in the folds of her dress. He took part in the battle of Bunker Hill. By his skill in planning fortifications and by his knowledge of artillery, he soon attracted the attention of Washington, and throughout the war he commanded the artillery in various battles. After the capture of Yorktown, Congress made him a major general, and, from 1785 to 1795, he was secretary of war. He died in 1806.

Knox, John, Scottish religious reformer, was born at Giffordgate, in Haddingtonshire, about 1505. He became a priest and notary in the diocese of Saint Andrews before he had attained the age of 25. Having studied the writings of Saint Augustine and Saint Jerome, he renounced Catholicism about 1543, and openly preached the Protestant faith.

Engaged with other reformers in defending Saint Andrews against the French, Knox was taken prisoner and sent to the galleys. After a detention of 19 months, he returned to England, and was appointed chaplain to Edward VI; but he declined to accept a bishopric at the hands of that monarch on account of his objection to the common prayer and to Episcopacy. In the reign of Mary, he retired to Frankfort, and thence to Geneva, where he became acquainted with Calvin.

Having returned to his own country in 1559, Knox denounced the priesthood, and especially the mass and image worship, and declaimed against the queen of Scots, whom he called Jezebel. The queen sent for him and sought to influence him, but in vain. His preaching was so powerful that many of the cathedrals and parish churches were demolished by the excited populace as a result of his vigorous invectives. Until his death he labored with tireless perseverance and vehement eloquence for the establishment of Protestantism in Scotland. He was the author of several works, notably of a *Historie of the Reformation of Religion in Scotland*. But the influence he exerted was by the tongue rather than by the pen. He died in 1572.

Knox, Philander Chase, American lawyer and statesman, was born at Brownsville, Pa., in 1853. He was graduated at Mount Union college, Ohio, 1872, studied law, and was admitted to the bar in 1875. In 1877, he formed a partnership with James H. Reed under the name of Knox and Reed, the firm representing many large corporations, including the Carnegie Company. He was attorney-general of the United States from 1901 to 1904, United States senator from 1904 to 1909, and was secretary of state from 1909 to 1913. In 1917, he was again elected to the United States Senate. He died in 1921.

Kobbe (*kŏb'bē*), **Gustav,** American author and journalist, was born in New York, 1857. He was graduated at Columbia university in 1877 and at Columbia law school in 1879. Devoting himself to literary pursuits, he engaged in newspaper and magazine work, chiefly as a writer on musical and dramatic subjects. His works include *The New Jersey Coast and Pines*, *The New Jersey Central*, *The Ring of the Nibelung*, *Wagner's Life and Works*, *New York and Its Environs*, *Plays for Amateurs*, *My Rosary and Other Poems*, *Miriam*, *Signora*, *Famous Actors and Actresses and Their Homes*, *Wagner's Music Dramas Analyzed*, *Loves of the Great Composers*, *Opera Singers*, *Wagner and His Isolde*, *Famous American Songs*, *How to Appreciate Music*, *The Pianolist*, *Portrait Gallery of Great Composers*, *Modern Women*, and *All-of-a-Sudden Carmen*. He died in 1918.

Koch (*kŏĸ*), **Robert,** German physician and bacteriologist, was born at Klausthal, Prussia, in 1843. He studied medicine at Gottingen, receiving his doctor's degree in 1866. His first substantial achievement was the result of the penetration, skill, and thoroughness of his researches on the contagion of splenic fever in cattle. This gained for him a seat on the imperial board of health in 1880. In 1882, he announced his discovery of the tubercle bacillus before the physiological society of Berlin. In 1883, he was made a privy councilor, and was placed in charge of the German expedition sent to Egypt and India to investigate the causes of cholera.

This journey resulted in the discovery of the comma bacillus, or cholera germ, in 1884. He was rewarded with a gift of 100,000 marks by the government, and imperial titles and honors were bestowed upon him. In 1885, he was appointed a professor in the University of Berlin, the chair of hygiene having been created for him. He subsequently returned to the investigation of tubercular diseases; but five years of research were required before he was able to announce his treatment for consumption and its allied diseases. In 1905, he was awarded the Nobel prize for medicine. Died, 1910.

Kocher (*kŏĸ'ĕr*), **Emil Theodor,** Swiss surgeon, was born at Bern, 1841. He was educated in medicine and surgery at Bern, Berlin, Paris, and London. After 1866, he was connected with the University of Bern, becoming professor of surgery in 1872. He specialized in operative surgery on the thyroid gland and was the first to investigate and describe cachexia thyreopriva. His researches include transplanting the thyroid gland, a study of cancer of the thyroid, a study of the blood in exophthalmic goiter, and the prevention of cretinism. He received the Nobel prize for medicine in 1909. His *Text Book of Operative Surgery*, translated into English, is a standard work. His other writings include *Die antiseptische Wundbehandlung*, *Vorlesungen über chirurgische Infektionskrankheiten*, and *Encyklopädie der Chirurgie*. Died, 1917.

Kohlsaat (*kōl'sät*), **Herman Henry,** American capitalist and journalist, was born in Albion, Ill., 1853. After an education in the common schools, he began business life as cash boy and later was cashier in a dry goods store. From 1875 to 1880, he was traveling salesman for Blake, Shaw and Company, wholesale bakers. He rose to a prominent position in this firm and, in 1883, founded a company which engaged with notable success in the same kind of business. In 1891, he purchased an interest in the Chicago *Inter-Ocean* and later became editor of the *Times-Herald*, subsequently reorganized under the name of the *Herald*. He presented a statue of General Grant to the city of Galena, Ill., and contributed largely to charities. He wrote a book of political memoirs entitled *From McKinley to Harding*. Died, 1924.

Kolbe (*kōl'bē*), **Adolph Wilhelm Hermann,** German chemist, was born near Gottingen, 1818. He studied chemistry under Wöhler and became assistant to Bunsen and to Playfair. He was professor of chemistry at Marburg, 1851–65, and at Leipzig, 1865–84. In the field of organic chemistry Kolbe conducted extensive original researches. He studied the decomposition of organic acids by electrolysis, and, in association with Lautermann, he discovered in 1860 a method of making salicylic acid by a combination of carbolic and carbonic acids. This achievement led the way to the artificial production of many organic compounds. Kolbe edited textbooks and chemical journals, and did much valuable work as a scientific critic. He died, 1884.

Komura (*kō'mōō-rä*), **Count Jutaro,** Japanese statesman, was born at Hyuga, 1855. He was educated at the University of Tokyo and Harvard law school. He entered the Japanese diplomatic service and served successively as minister to Washington, Petrograd, and Peking. He negotiated the Treaty of Portsmouth, which closed the Russo-Japanese war; arranged the Anglo-Japanese alliance of 1902; and became the first Japanese ambassador to Great Britain. Died, 1911.

Koo, Vi Kuyuin Wellington, Chinese diplomatist, was born in China, 1887; was educated at Columbia university; and became a councilor in the Chinese foreign office. He was appointed Chinese minister to Washington in 1915; represented China at the Peace Conference in Paris and in the League of Nations at Geneva; and, in 1920, was made Chinese minister to Great Britain. He was a delegate for China at the Washington Disarmament Conference in 1921-22. In the latter year, he became the Chinese minister for foreign affairs.

Körner (*kûr'nĕr*), **Karl Theodor,** German lyric poet, was born at Dresden, 1791. He studied at Freiberg, Leipzig, and Berlin and settled at Vienna in 1811. He was dramatist to a Vienna theater and wrote *Der Grüne Domino*, *Der Nachtwächter*, and other light comedies besides some tragedies, of which *Zriny* was the most successful. The uprising of the German nation against Napoleon inspired him with patriotic ardor, and, in 1813, joining Lützow's corps, he distinguished himself by his valor and encouraged his comrades by fiery patriotic songs. These were published in 1814 under the title of *Leier und Schwert*. The most famous, *Das Schwertlied*, was hastily composed during a pause in battle only a few hours before the author fell at Gadebusch near Schwerin, 1813.

Korngold (*kôrn'gôlt*), **Erich Wolfgang,** Austrian musical composer, was born at Brunn, 1897. His father, a music critic, encouraged his son's precocious talent for composition. In his 12th year he wrote a two-act musical pantomime entitled *The Snowman*, which was produced at the Vienna imperial opera. He later composed piano and orchestral works of remarkable fertility, originality, and technical excellence. In 1915, his *Sinfonietta* was produced by the Chicago orchestra and by the New York Philharmonic orchestra. He has composed piano sonatas; *Fairy Pictures* for the piano; a trio for piano, violin, and cello; and an overture for full orchestra. Since the time of Mozart and Mendelssohn the musical world has not witnessed so notable an exhibition of precocious talent.

Kosciusko (*kŏs'ĭ-ŭs'kō*), **Tadeusz,** Polish general and patriot, was born in Minsk, West Russia, 1746. He became a captain in the Polish army; came to America and served in the Revolutionary War; and returned to Poland in 1786 with the rank of general. At the second partition of Poland, Kosciusko resigned his command of the Polish army and retired to Leipzig; but he returned in 1794 and put himself at the head of the national movement in Krakow and afterward in Warsaw. With 20,000 regular troops and 40,000 poorly armed peasants, he resisted for months the united Russian and Prussian armies of 150,000 men. Overpowered by superior numbers in the battle of Maciejowice, 1794, he was captured and kept a prisoner until after the accession of the emperor Paul.

When Napoleon, in 1806, formed a plan for the restoration of Poland, Kosciusko felt himself restrained from taking an active part by his promise to the emperor Paul. In 1814, he wrote to the emperor Alexander, entreating him to grant an amnesty to the Poles in foreign countries and to make himself constitutional king of Poland. In 1817, he released from servitude the peasants on his own estate in Poland. His death took place in 1817 in consequence of a fall from his horse.

Kossel, Albrecht, German physiologist, was born in Rostock, 1853. He studied medicine at Rostock and at Strasbourg, where he became an assistant and instructor. In 1883, he became director in the physiological institute of Berlin. He was made professor of physiology at Marburg in 1895 and at Heidelberg in 1901. His important contributions to science have been in the realm of medical chemistry, particularly the chemical composition of cells, of nuclei, and of albumins. For his investigations in biochemistry, he was awarded the Nobel prize in medicine in 1910 and received honorary degrees from several universities. He edited the *Zeitschrift für physiologische Chemie*. He wrote an *Introduction to Medical Chemistry* and also *Gewebe des menshlichen Körpers und ihre mikroskopische Untersuchung*. Died, 1927.

Kossuth (*kŏsh'ŏōt*; *kō-sōōth'*), **Louis,** Hungarian patriot, orator, and leader, was born at Monok, Hungary, in 1802. In 1832, he commenced his political career as editor of a Liberal paper. In 1847, he was sent by the county of Pest as deputy to the Hungarian diet. To his speeches must in part be ascribed not only the Hungarian revolution but the insurrection in Vienna in 1848. On the dissolution of the ministry in 1848, he found himself at the head of the committee of national defense, and he prosecuted with extraordinary energy the measures necessary for carrying on the war. To put an end to all the hopes and schemes of the moderate party, he induced the National Assembly at Debreczen, in 1849, to declare the independence of Hungary and that the Habsburg dynasty had forfeited the throne. He was then appointed provisional governor of Hungary. In 1849, he was compelled to abandon his position and to flee into Turkey, where he was made a prisoner.

In 1851, Kossuth was liberated and sailed in an American frigate to England, where he was received with every demonstration of public respect and sympathy. In December of the same year, he landed in the United States, where he met with a most enthusiastic reception. He returned in 1852 to England, and there he chiefly resided until the Italian war broke out against Austria, when he organized a Hungarian legion in Italy. Later he lived in Turin, where he died in 1894.

Krauskopf (*krous'kŏpf*), **Joseph,** rabbi, lecturer, and author, was born in Ostrowo, Prussia, 1858, and came to America in 1872. He graduated at the University of Cincinnati, 1883, and as rabbi from Hebrew Union college, 1883. Soon afterward, he accepted a call from a Hebrew congregation at Kansas City, and he became rabbi of the Reform congregation, Keneseth Israel, Philadelphia, in 1887. He founded the Jewish publication society of America and was the founder and president of the National farm school, in which Jewish boys are trained in practical and scientific agriculture. He wrote *The Jews and Moors in Spain*, *Evolution and Judaism*, *A Rabbi's Impression of the Oberammergau Passion Play*, *The Seven Ages of Man*, *Society and its Morals*, *Gleanings from Our Vineyard*, and *Sunday Lectures*, the last being in 34 volumes. Died, 1923.

Krehbiel (*krā'bēl*), **Henry Edward,** musical author and critic, was born at Ann Arbor, Mich., 1854, and studied law in Cincinnati. He became musical critic for the Cincinnati *Gazette* in 1874 and, in 1880, for the New York *Tribune*. He was made chevalier of the legion of honor, 1901. His publications include *Studies in Wagnerian Drama*, *How to Listen to Music*, *A Book of Operas*, *The Pianoforte and Its Music*, *Afro-American Folksongs*, and a version of *Parsifal* for performance in English. He edited an *Annotated Bibliography of Fine Arts*. Died, 1923.

Kreisler (*krīs'lĕr*), **Fritz,** Austrian violinist, was born in Vienna, 1875. He entered the Vienna conservatory at the age of seven; won the gold medal for violin playing at ten; and then went to the Paris conservatory, where he studied violin under Massart and composition under Delibes. At the end of two years, he won the gold medal. In 1888, he began concert tours, appearing with Moritz Rosenthal in the United States in 1889. He then temporarily gave up music, studied art and medicine, and served a year in the army.

In the period of his retirement from the concert hall, he completely changed his musical ideals from those of a marvelous technician of the Paganini type to those of an interpretative artist of the foremost rank. When, in 1899, he again appeared in Berlin, it was as one of the greatest masters of the violin. His repertoire is extraordinarily large and has won enthusiastic acclamation on the numerous tours that he has made in Europe and America. He was wounded at Lemberg in 1914, while serving with the Austrian army. He later described his experiences in *Four Weeks in the Trenches—The War Story of a Violinist*.

Krogh, August, Swedish physiologist, was born at Grenaa, Sweden, in 1874. He was educated at Aarhaus Cathedral school and Copenhagen university, with which he was later connected as lecturer in physiology. He received the Nobel prize in medicine in 1920 for his biochemical researches, some of which were embodied in his *Respiratory Exchange of Animals and Man.*

Kropotkin (*krō-pôt'kĕn*), **Peter Alexëievitch, Prince,** Russian socialist and writer, was born at Moscow, 1842. At 15, he entered the corps of pages at Petrograd. After five years' service and exploration in Siberia, he returned to Petrograd in 1867 to study mathematics at the university while acting as secretary to the Russian geographical society. In 1871, he explored the glacial deposits of Finland and Sweden. In 1872, while on a visit to Belgium and Switzerland, he associated himself with the most extreme section of the International Working Men's Association. In 1874, after his return to Russia, he was arrested, but, in 1876, effected his escape to England. He was condemned at Lyon, in 1883, to five years' imprisonment for anarchism, but was released in 1886 and returned to England. His publications include *In Russian and French Prisons*; *The State, Its Part in History*; *Fields, Factories, and Workshops*; *Mutual Aid, a Factor of Evolution*; *Modern Science and Anarchism*; *Ideals and Realities in Russian Literature*; *The Conquest of Bread*; and *Terror in Russia.* Died, 1921.

Kruger (*krū'gẽr*), **Stephanus Johannes Paulus,** Boer statesman, was born in Colesberg in Cape Colony, 1825. With his family, he "trekked" to Natal, the Orange River Free State, and the Transvaal, and won such a reputation for cleverness, coolness, and courage that, in the war against England in 1881, he was appointed head of the provisional government. In 1883, he was elected president of the Transvaal, or South African Republic, and held that office as long as the Republic stood. "Oom Paul," as he was often called, was the soul of the policy that resulted in the Boer war of 1899–1902, in the prosecution of which he showed consummate resolution and energy. After the tide had fairly turned against the Boers, he went to Europe to seek alliances against Britain. He made his headquarters at Utrecht and thence issued *The Memoirs of Paul Kruger.* Died in 1904. See *Boers.*

Krupp (*krōōp*), **Alfred,** German ironmaster, was born at Essen, Prussia, 1812. He succeeded his father, Friedrich Krupp, who had founded a small iron forge at Essen in 1810. Krupp established the first Bessemer steelworks and the first forging hammer erected in Germany and was foremost in the technical development of the German iron and steel industry. The first steel gun manufactured by him, in 1847, was a 3-pounder muzzle-loader; in 1880, at the Dusseldorf exhibition, he showed the first 100-ton steel gun. He acquired large mines and collieries and greatly extended his works at Essen. He supplied artillery to almost every European nation and was the recipient of many foreign orders and decorations. Died, 1887.

Kubelik (*kōō'bĕ-lĭk*), **Jan,** Bohemian violinist, was born at Miehle, near Prague, in 1880. He received his first musical instruction from his father, a market gardener, and, at 12, entered the Prague conservatory. He was very successful at concerts in Austria-Hungary prior to appearing in Berlin with the Philharmonic orchestra, 1900. In 1905, he began a two years' tour round the world and met with notable success. These and his later triumphs have been crowned with honors and decorations in many countries.

Kundt (*kōōnt*), **August,** German physicist, was born at Schwerin, 1839. In 1866, he became instructor at the University of Berlin; in 1868, was made professor of physics at Zurich; and later taught at Wurtzburg, at Strasbourg, and at the University of Berlin, where he succeeded Helmholz in the chair of experimental physics. He made notable researches on sound, discovering a method, named after him, of determining the velocity of sound in gases. He made elaborate investigations also on the dispersion of light, on the conduction of heat and the friction of gases, the electrical properties of crystals, the rotation of the plane of polarization in gases, and the optical characteristics of metals. He published numerous works and scientific papers embodying his researches. Died in 1894.

Kuroki (*kōō'rō-kē*), **Tamesada, Count,** Japanese general, was born in Satsuma, 1844. He was a colonel on the Imperialist side during the Satsuma rebellion of 1877; distinguished himself in the war with China in 1895; and was promoted to the rank of general in 1903. He commanded the first army in the Russo-Japanese war, 1904-05, and was victorious at Yalu, Kiulienling, Liaoyang, Mukden, and Shaho. In 1906, he became inspector general of the Japanese army, and he subsequently made a tour of the United States. For his military services, he was made baron after the war with China and count after the war with Russia. Died, 1923.

Kuropatkin (*kōō'rō-pät'kĭn*), **Alexei Nikolayevitch,** Russian general, was born in the government of Pskov, 1848. After receiving an excellent education in the Russian military schools, he entered the army and distinguished himself in the war against the Bokharans. He served in the Russo-Turkish war; was governor of Transcaspia, 1890–98; and, in 1904, was made commander in chief of the Russian army for the period of the Russo-Japanese war. In 1905, he was succeeded by General Linievitch, and, at his own request, was appointed to command the first Manchurian army. He commanded a Russian army group for a period of the World War and, in 1916, was made governor of Turkestan. He retired the next year. He wrote on the Balkan campaign and on the Central Asian wars. Died, 1925.

Kutuzov (*kōō-tōō'zôf*), **Mikhail,** prince of Smolensk, Russian field marshal, was born at Petrograd, 1745. He early entered the Russian army; distinguished himself in the Turkish wars; and, in 1787, was appointed governor-general of the Crimea. After various other services, he was appointed, in 1805, to the command of the first army corps against the French. In that year, he was victorious over Marshal Mortier at Durrenstein. At Austerlitz, he was second in command of the allied army, of which Emperor Alexander was commander in chief. In 1811-12, he commanded the Russian army in the war against the Turks. Notwithstanding his advanced age, he succeeded Barclay de Tolly in 1812 as commander in chief of the army against the French and obtained a great victory over Davout and Ney at Smolensk. Died in 1813.

Kyne, Peter Bernard, American author, was born at San Francisco in 1880. Educated in the public schools, he was successively a clerk, a lumber broker, and a newspaper man. He was captain of the 144th Field Artillery in the World War. Among his best-known works are *Cappy Ricks, The Valley of the Giants, Kindred of the Dust, The Pride of Palomar,* and *Never the Twain Shall Meet.*

Labouchere (*lăb'ōō-shâr'*), **Henry du Pré,** British Radical politician and editor, was born in London, 1831. He was educated at Eton, and, for a short time, attended Cambridge. He entered the diplomatic service at a very early age, and, in 1861, became a secretary in the British embassy at Constantinople. In 1864, he left the diplomatic service to engage in politics. From 1880 to 1905, he was a Radical member of the House of Commons, with Charles Bradlaugh as his colleague.

He began his journalistic career on the London *Daily News,* just before the Franco-Prussian war. He was the author of *Letters of a Besieged Resident,* sent by him from Paris to the *Daily News* by balloon post during the siege. In 1876, he founded the London *Truth,* as a rival society paper to the London *World.* For many years it had a remarkable record in the exposure of various shams and organized impostures.

In Parliament, where he was familiarly known as "Labby," he was the recognized jester of the House. Nevertheless, his pungent and frequently cynical speeches reflected highly independent democratic convictions. He vigorously urged the abolition of the House of Lords. After 1903, he lived chiefly in Italy. He died in 1912, leaving a fortune valued at about ten million dollars.

Lacordaire (*là'kôr'dâr'*), **Jean Baptiste Henri,** French divine, was born at Recey sur Ource in 1802. He went to Paris to continue his legal studies, but in 1824 gave up law for theology. After three years at the seminary of Saint Sulpice, he was ordained priest in 1827 and became chaplain to the Collège Henri IV. He assisted Lamennais and Montalembert in editing *L'Avenir,* and was once summoned for opposing the government. A free school opened in Paris by him and Montalembert was closed by the police; and *L'Avenir,* condemned by the pope, was given up.

In 1834, Lacordaire gave to students a series of "conferences" or lectures which attracted great attention and led the way to his famous conferences in Notre Dame, Paris, in 1835-36. When at the height of his success as a preacher, he withdrew and went to Rome. In 1839, he entered the Dominican order, and, in 1840, he reappeared in the pulpit of Notre Dame, where, from 1843 to 1850, he continued his conferences. His last conferences, delivered at Toulouse in 1854, were the most eloquent of all. He died in 1861.

Ladd, George Trumbull, American psychologist and philosopher, was born at Painesville, Ohio, in 1842. He was graduated at Western Reserve college in 1864 and at Andover theological seminary in 1869. He occupied pastorates until 1879, when he became professor of philosophy at Bowdoin college. From 1881 to 1895, he was professor of philosophy at Yale university. Besides a translation of Lotze's *Outlines of Philosophy,* his writings include *Principles of Church Polity, Introduction to Philosophy, Outlines of Physiological Psychology, Philosophy of Mind, Philosophy of Knowledge, A Theory of Reality, What Can I Know?, What Ought I to Do?, What Should I Believe?, What May I Hope?,* and articles in various magazines. He died in 1921.

La Farge (*là fârzh'*), **Christopher Grant,** American architect, son of John La Farge, the painter, was born at Newport, R. I., 1862. He studied at Massachusetts institute

of technology and, in 1882, entered the office of H. H. Richardson in Boston. In 1883, he formed a partnership with G. L. Heins and began practice in Minneapolis. The firm was transferred to New York in 1886 and continued there until 1910. In collaboration with his partner he produced the designs for the new Protestant Episcopal cathedral of Saint John the Divine, New York, one of the most elaborate religious edifices in the New World. The firm designed many other churches, libraries, and mausoleums erected in various parts of the United States; also the buildings for the New York zoological park and the stations for the New York subway. From 1910 to 1915, he was a member of the firm of La Farge and Morris. In 1918, he served as assistant general manager of the United States housing corporation.

La Farge, John, American mural painter, was born in New York, 1835. He studied with Couture in Paris and with William Morris Hunt in Boston. In 1876, he was employed to execute the mural decorations of Trinity church, Boston, and, in 1878, began glass painting and window designing. During an extended tour in 1886, he made many water color studies of native life and scenes in Japan and in the Pacific islands. In 1887, he painted his fine altarpiece in the Church of the Ascension, New York.

La Farge was a pioneer in mural painting and exercised great influence upon American art, particularly in the making of stained glass. In recognition of distinguished achievements, he was chosen, in 1904, one of the seven original members of the American academy of arts and letters. Among his best paintings are "Christ and Nicodemus," Trinity church, Boston; "The Three Kings," Boston art museum; "The Muse of Painting," Metropolitan museum, New York; and "The Arrival of the Magi," church of the Incarnation, New York.

His writings include *Considerations on Painting*, *Great Masters*, *The Higher Life in Art*, and *Reminiscences of the South Seas*. He died in 1910. See *Painting*.

Lafayette (*lă'fā-yĕt'*), **Marie Jean Paul Roch Yves Gilbert Motier, Marquis de,** French general and statesman, descended from an ancient family of Auvergne, was born in the castle of Chavagnac, now in the department of upper Loire, 1757. He became a soldier at an early age, and, in 1777, came to America to take part with the colonists in the war for independence.

The friendship of Washington exercised a great influence over the development of his mind and the formation of his opinions. The declaration of war between France and Britain gave him opportunity to aid the new republic in America and, following 1779, in France, where he was received with honor by the court and with enthusiasm by the people. He again came to America and was intrusted by Congress with the defense of Virginia, where he rendered important services.

Lafayette had imbibed liberal principles, and, on his second return to France, eagerly sought to promote a thorough reform in his native country. He was called to the assembly of notables in 1787, and was one of those who most earnestly urged the summoning of the States-General. He took part also in the movements which converted the assembly of the states into the National Assembly in 1789. He was very active in the proceedings of the assembly, and, being appointed to the chief command of the armed citizens, laid the foundation of the national guard and gave it the tricolor cockade.

The extreme French Republicans soon came to dislike Lafayette because he advocated a constitutional kingdom, and the court party, especially the queen, were displeased because of his zeal for the new order of things. After the adoption of the constitution of 1790, he retired to his estate of Lagrange until he received the command of the army of Ardennes, with which he won the first victories at Philippeville, Maubeuge, and Florennes. Nevertheless, the calumnies of the Jacobins rendered him exceedingly unpopular and he was accused of treason, but acquitted.

After several vain efforts to maintain the cause of national liberty, Lafayette left Paris for Flanders. He was taken prisoner by the Austrians and remained at Olmutz until Bonaparte obtained his liberation in 1797; but he took no part in public affairs during the ascendancy of Bonaparte. He sat in the Chamber of Deputies from 1818 to 1824 and from 1825 to 1830. In 1824, he revisited America by invitation of Congress, which voted him a grant of $200,000 and a township of land. Died in 1834.

La Follette (*lă fŏl'ĕt*), **Robert Marion,** American lawyer and legislator, was born at Primrose, Wis., in 1855. He was graduated at the University of Wisconsin in 1879; studied law; was admitted to the bar; and, in 1880, became district attorney of Dane county. He was a member of Congress from 1885 to 1891, and took a prominent part in framing the McKinley bill. He was governor of Wisconsin from 1901 to 1905 and led the successful movement to nominate all candidates by direct vote. In 1905, he was elected United States senator and was re-elected in 1911, 1917, and 1923.

La Follette made important contributions toward railway regulation and other public reforms and came to be regarded as one of the ablest debaters in the United States Senate. In 1909, he established a weekly periodical known as *La Follette's Magazine*.

In March 1917, during the closing days of the 64th Congress, he led a historic filibuster against authorizing President Wilson to arm merchant ships against German submarines. After the entrance of the United States into the World War, he became a pronounced and conspicuous pacifist. To him chiefly was due the investigation disclosing the Teapot Dome lease irregularities of 1924. Later in the same year he was nominated for the presidency by the Progressive party and received nearly 5 million votes in the ensuing election. His writings include an *Autobiography*. Died, 1925.

La Fontaine (*lä'fôN'tän'*), **Henri,** Belgian jurist, the son of a banker, was born in Brussels, 1854. He was educated for the law at the University of Brussels. In 1889, he became secretary of the Belgian peace society and, in 1892, head of the International Peace Bureau. He was made professor of international law in the University of Brussels in 1893. In 1907, he was chosen president of the Interparliamentary Peace Congress at Bern. In recognition of his efforts to promote international peace, he was awarded, in 1913, the Nobel peace prize.

La Fontaine, Jean de, French poet and fabulist, was born at Chateau Thierry in Champagne, 1621. He early devoted himself to the study of the old writers and to verse making. In 1654, he published a verse translation of the *Eunuchus* of Terence and then went to Paris, where Fouquet awarded him a pension of 1000 francs for a piece of verse quarterly. His *Contes et nouvelles en vers* appeared in 1665, his *Fables* in 1668, and his *Amours de Psyché et de Cupidon* in 1669. In 1683, he read an admirable *Discours en vers* on his reception by the academy. The subjects of the *Contes* are taken from Boccaccio, Ariosto, Machiavelli, Rabelais, and other fabliau writers and the stories are retold with inimitable skill and wit. He was a brilliant prose writer, but not a great poet. Died in 1695.

Lagerlöf (*lä'gĕr-lûf*), (**Ottilia Lovisa**) **Selma,** Swedish story-writer, was born at Marbacka, Vermland, 1858. In 1891, she produced her first book, *Gösta Berling's Saga*, which won immediate and notable success. Subsequent study in Italy resulted in *Miracles of Anti-Christ*; after a year's travel in Greece, Egypt, and Palestine, she finished her *Jerusalem* in 1902. In 1907, she completed *Nils Holgersson's Wonderful Journey through Sweden*, a children's classic in Swedish literature, now widely known in English as *The Wonderful Adventures of Nils*. For these successes the Swedish academy awarded her its goid medal and Upsala university conferred upon her the degree of doctor of letters. In 1909, she received the Nobel prize for literature, and, in 1914, she was elected to the Swedish academy—the first woman so honored. Her writings include also *Christ Legends*, *From a Swedish Homestead*, *Invisible Links*, *The Girl from the Marsh Croft*, *Further Adventures of Nils*, *Liljecrona's Home*, *The Legend of the Sacred Image*, *Matilda Wrede*, *Dunungen*, *The Emperor of Portugallia*, *Troll och Människor Bannlyst*, *Kavaljersnoveller*, and *Hem och Stat*.

Lagrange (*lä'grănsh'*), **Joseph Louis, Count,** French mathematician, was born at Turin, Italy, in 1736, of French parentage. He was educated in the college of his native city and, at the age of 19, became professor of mathematics in the royal school of artillery there. In 1764, he won a prize offered by the French academy of sciences for a *Theory of the Librations of the Moon*. In 1766, he was appointed by Frederick the Great to succeed Euler as director of the Berlin academy of sciences, a post which he held for 20 years. He then settled in Paris, where he remained during the Revolution. Afterward, he was patronized by Napoleon, who made him a count and a senator. His writings include *Method of Variations*, *Variations of the Elliptic Elements*, and the *Mechanique analytique*, his most noted work. Lagrange's works show great originality and power and each of his treatises marks a distinct advance in the history of mathematics. He died in 1813.

Lalande (*lä'lănd'*), **Joseph Jérôme Le-Français de,** French astronomer, was born at Bourg in 1732. He devoted himself to mathematics and astronomy with such success that, in 1751, the French academy sent him to Berlin to determine the moon's parallax. He returned in 1752, was subsequently made astronomer royal, and, in 1762, professor of astronomy in the Collège de France. In 1795, he became director of the Paris observatory. His chief work is his *Treatise on Astronomy*. He died in 1807.

Lamarck (*lä'märk'*), **Jean Baptiste Pierre Antoine de Monet de,** French naturalist and pre-Darwinian evolutionist, was born at Bazentin in 1744. At 16, he joined the French army in Germany. Stationed as an officer at Monaco, he became interested in the Mediterranean flora. After an injury, he resigned and held a post in a Paris bank, meanwhile pursuing the study of botany. In 1778, he published his *Flora of France*. In 1779, he became a member of

the French academy and keeper of the royal garden, afterward the nucleus of Jardin des Plantes, and here he lectured for 25 years on invertebrate zoology.

About 1801, Lamarck began to think about the origin of species, expressing his conclusions in his famous *Zoological Philosophy*, published in 1809. His *Treatise on Invertebrate Animals* appeared between 1815 and 1822. He strongly opposed Cuvier's views and expressly denied the unchangeableness of species. He sought to explain their transformations and thus account for the evolution of the animal world. While his views concerning the effects of use and disuse and upon the inheritance of acquired characters are not now considered tenable by most naturalists, he was the first to make a clear statement of the doctrine of evolution. He thus prepared the way for the now widely accepted theory of descent. Died in 1829. See *Evolution, Organic.*

Lamb, Charles, English essayist and poet, the son of a clerk to one of the benchers of the Inner Temple, was born in London, 1775. He was educated at Christ's Hospital, where he was the schoolfellow and friend of Samuel Taylor Coleridge. From 1792 to 1825, he was a clerk in the accountant's office of the East India Company, retiring on a pension. During most of these years, and indeed up to the close of his life, he devoted himself, in a spirit of noble self-sacrifice, to the care of his sister Mary, who suffered from recurrent mania.

Lamb's earliest literary efforts were in verse. In 1807, he published, in conjunction with his sister, a series of *Tales from Shakespeare* and, in 1808, two volumes of *Specimens of English Dramatic Poets who lived about the time of Shakespeare*, with short but felicitous notes. On the establishment of the *London Magazine* in 1820, he began that series of essays, signed *Elia*, which are the chief foundation of his literary fame. He died in 1834.

Lancaster, Joseph, English educator, founder of the Lancastrian system of instruction, was born in London, 1778. At an early age, he served as a seaman, but motives of philanthropy impelled him to teach the children of the poor. When only 20 years of age and utterly untrained, he had 1000 pupils under his supervision. He was, however, enabled to accomplish remarkable results by his adoption and improvement of the monitorial system previously developed by Dr. Andrew Bell at Madras.

Following this system, pupils as they advance in their work become, under the direction of the master, instructors or monitors of those in the grades below. For a time this plan was very popular in England, Holland, France, and Germany. Lancaster personally introduced his system into America, where it was adopted in New York, Philadelphia, Baltimore, and other cities. While long outgrown where originally established, the Lancastrian system has been used with success in Mexico and in South American countries. He died in 1838.

Lanciani (*län-chä'nē*), **Commendatore Rodolfo,** Italian archeologist and architect, was born at Rome in 1846 and was educated in Rome and Wurzburg. He was professor of ancient topography in the University of Rome from 1878 and produced over 500 historical or archeological publications, many of which have been translated into English. He designed and superintended the building of the archeological park at Rome. His books include *Rome in the Light of Recent Discoveries, Pagan and Christian Rome*, and *Wanderings in the Roman Campagna.* Died, 1929.

Landor, Arnold Henry Savage, English artist and traveler, grandson of Walter Savage Landor, was born at Florence, Italy, in 1865, and was educated there and at Paris. For several years he traveled in the East, also in America, Australia, the Azores, and Africa. He was the first white man to reach both sources of the great Brahmaputra river and to explore central Mindanao island, where he discovered the "white tribe," Mansakas. For many years he held the world's record in mountaineering, having reached, in 1899, an altitude of 23,490 feet on Mount Lumpa, Nepal. Among his publications are *Alone with the Hairy Ainu, Corea, A Journey to the Sacred Mountain of Siao-ou-tai-shan, In the Forbidden Land, China and the Allies, Across Coveted Lands, The Gems of the East, Tibet and Nepal, Across Widest Africa, Across Unknown South America*, and *Mysterious South America.* Died, 1924.

Landor, Walter Savage, English poet and prose writer, was born at Warwick in 1775. He studied at Oxford, where he won high reputation as a scholar. In 1808, he raised a body of men at his own expense and joined the Spanish patriots to fight against Napoleon, returning after the disaster of Cintra. In 1798, he wrote a poem called *Gebir*, which was followed by *Count Julian, Idyllia Heroica*, and *Imaginary Conversations of Literary Men and Statesmen.* He was a thorough classical scholar, and his Greek and Roman characters speak as we should expect the ancient heroes to have spoken. He is greater as a prose writer than as a poet; but, according to Emerson, nature meant him rather for action than for literature. "He has," says Emerson, "an English appetite for action and heroes." Died in Florence, Italy, 1864.

Landseer, Sir Edwin Henry, English animal painter, was born in London, 1802. He was trained in sketching by his father and studied at the royal academy schools. His first notable work was "Fighting Dogs," exhibited in 1819. This was followed by the "Dogs of St. Gothard," the popularity of which was very great. For more than 30 years every London exhibition contained new successes from his brush. In 1831, he was elected a royal academician, and, in 1850, was knighted.

Among Landseer's most noted pictures are "High Life," "Low Life," "A Jack in Office," "The Old Shepherd's Chief Mourner," "A Random Shot," "A Distinguished Member of the Humane Society," "Dignity and Impudence," and "The Monarch of the Glen." He painted animals, especially the dog, in their relation to man and endowed them with human sentiments. This is the secret of the great popularity of his pictures. Died in 1873.

Lane, Franklin Knight, American public official, was born in Prince Edward Island, Canada, in 1864. He removed to California in early childhood and was educated at the University of California. At first he engaged in journalism and became editor of the Tacoma *Daily News.* He then studied law, was admitted to the bar in 1889, and practiced in San Francisco, where he was corporation counsel from 1897 to 1902. In 1905, he was appointed member of the interstate commerce commission, of which he later became chairman.

In 1913, Lane entered President Wilson's cabinet as secretary of the interior. In this capacity he advocated conservation of coal lands and was influential in securing the enactment of the Alaska Railway bill of 1914. He gave special attention to the Indians, maintaining that perpetual tutelage is wrong. An earnest advocate of reclamation of land, he suggested that farms for soldiers returned from the World War could be supplied by extensive drainage and irrigation. He also urged a policy of Americanization for the foreign population. In 1917, he was made a member of the council of national defense. In 1920, he resigned from the cabinet. He died in 1921. In 1922 were published *The Letters of Franklin Lane*, edited by his wife, Anne Wintermute Lane, and by Louise Herrick Wall.

Lang, Andrew, Scottish writer and critic, was born at Selkirk, 1844. He was educated at Saint Andrews university and at Balliol college, Oxford. He was elected a fellow of Merton college, 1868, and became one of the busiest and brightest writers in the world of London journalism. His varied writings include *Ballads and Lyrics of Old France, Helen of Troy, Grass of Parnassus, Ballads of Books, Custom and Myth, Modern Mythology, The Making of Religion, In the Wrong Paradise, Letters to Dead Authors, Homer and the Epic, Life of Lockhart, History of Scotland, The Mystery of Mary Stuart, Magic and Religion*, and *Homer and his Age.* He translated Theocritus, besides editing Scott, Burns, and various fairy books. Died, 1912.

Lange, Christian, Norwegian pacifist, was born in 1869. He became professor of history at the Norwegian Nobel institute and secretary to the Nobel committee in the *Storthing*, or Norwegian Parliament. In 1907, he was the Norwegian representative to the Second Peace Conference at The Hague. He represented Norway in the League of Nations Assembly, and, in 1921, severely criticized the League Council for its inaction in regard to disarmament. His writings include many works, pamphlets, and articles for the promotion of peace among the nations. In 1921, jointly with his compatriot Hjalmar Branting, he was awarded the Nobel prize for peace.

Langland, William, English poet, was born about 1332, probably near Malvern. He spent most of his life in London in poverty, a clerk and singer of masses for the dead in churches. The allegorical poem *The Vision of Piers Plowman*, attributed to him, contains much vigorous satire on the abuses of the church and the state and is one of the earliest and most eloquent cries from an oppressed people. Nothing is known of Langland except the supposed evidence in the text of the poem itself. Some consider it the work of several writers and regard Langland as a mythical author. See *Piers Plowman.*

Langley, Samuel Pierpont, American astronomer and physicist, was born at Roxbury, Mass., in 1834. He was educated at Boston Latin school, studied in Europe, and worked for a time as architect and civil engineer. In 1865, he became assistant in astronomy at Harvard; in 1867, he was made director of the Allegheny observatory; and, in 1887, was appointed secretary of the Smithsonian institution. He made important solar observations, invented the bolometer, and established at Washington the astrophysical observatory and the national zoological park.

Langley also made valuable researches in the dynamics of the air and developed the principles upon which successful airplanes were later constructed. In 1896, a motor-driven airplane, designed and built by him, made the first sustained flight on record, but his further experiments were not so successful. Congress voted him $5000 with which to

carry out his plans, but criticism, ridicule, and the lack of proper support caused him to abandon his experiments when, as it appears now, he was on the verge of success. The correctness of his design of apparatus and of the fundamental principles upon which it was constructed are now recognized by aeronautical engineers. In proof of this, Glenn Curtiss, in 1914, after installing a more powerful engine in Langley's machine of 1903, made a successful flight with it.

In recognition of his various achievements, Langley was awarded the Janssen medal of France, the Rumford medal of England, and the Draper medal of the national academy of sciences. His writings include *The New Astronomy*, *Experiments in Aero-Dynamics*, and *Internal Work of the Wind*. He died in 1906.

Langmuir, Irving, American chemist, was born at Brooklyn, N. Y., in 1881. He was graduated from the Columbia school of mines in 1903 and, in 1906, received the degree of doctor of philosophy from the University of Gottingen. He was instructor in chemistry in Stevens institute of technology from 1906 to 1909, when he became research chemist in the research laboratory of the General Electric Company at Schenectady, N. Y. In this post he has been engaged in the development of gas-filled tungsten lamps, electron discharge apparatus, and condensation high vacuum pumps. During the World War, 1917-18, he experimented on devices for submarine detection. For his researches on chemical reactions at low pressures, he was awarded, in 1915, the Nichols medal. For his work on molecular physics, he received, in 1918, the Hughes medal of the royal society of London. In 1920, for his theory of atomic structure, he was again awarded the Nichols medal, and, in the same year, for his investigations of thermionic phenomena, he received the Rumford medal.

Lanier (*lă-nēr'*), **Sidney,** American poet, was born at Macon, Ga., in 1842. He was graduated at Oglethorpe college, Ga., in 1860. During the Civil War, he served in the Confederate army. He then studied law and from 1868 to 1872 practiced in company with his father at Macon. His passionate devotion to music as well as to literature impelled him to give up the law. In 1873, he settled in Baltimore, where he joined an orchestra and delivered lectures on English literature. He formed a helpful friendship with Bayard Taylor, won recognition by his writings, and, in 1879, was appointed lecturer on English literature at Johns Hopkins university. His two most notable books are his *Science of English Verse* and *Poems*. Of his poems, "Corn" and "The Marshes of Glynn" contain elevated passages that mark the truly endowed poet. He died in 1881.

Lankester (*lăng'kĕs-tĕr*), **Sir Edwin Ray,** English zoologist, was born in London, 1847. He was educated at Downing college, Cambridge, and at Christ Church, Oxford. He was professor of zoology, University college, London, 1874–90; professor of comparative anatomy, Oxford, 1891–98; and director of the natural history departments of the British museum, 1898–1907. He became member of many scientific and learned societies, and was editor of the *Quarterly Journal of Microscopical Science* for nearly 50 years. Among his numerous publications are *A Monograph of the Cephalaspidian Fishes, Comparative Longevity, Degeneration, The Advancement of Science, The Diversions of a Naturalist, Extinct Animals, The Kingdom of Man*, and *Secrets of Earth and Sea*. He also edited an extensive *Treatise on Zoology*.

Lansing, Robert, American cabinet officer and authority on international law, was born at Watertown, N. Y., in 1864. He was graduated from Amherst college in 1886, was admitted to the bar in 1889, and practiced law at Watertown until 1907. He was associate counsel for the United States in the Bering Sea arbitration, 1892-93; served as counsel for the United States in the Bering Sea claims commission, 1896-97; and represented the government before the Alaskan boundary tribunal in 1903. He was counsel for the North Atlantic fisheries in the arbitration at The Hague, 1909-10, and appeared for the United States in the American and British claims arbitration, 1912–14.

Lansing was made counselor for the department of state in 1914 and, from June 1915 to February 1920, was secretary of state in President Wilson's cabinet. He was a member of the American commission to the Peace Conference at Versailles, 1918-19, and, during 1923-25, was counsel for Chile in the Tacna-Arica controversy. His writings include *Government, its origin, Growth, and forms in the United States* (with G. M. Jones); *The Piece Negotiations; The Big Four and Others of the Peace Conference;* and *Notes on Sovereignty*. Died, 1928.

Lao Tzu (*lä'ô tsû'*), Chinese sage, a contemporary of Confucius, was born about 604 B. C. He is the reputed founder of Taoism, one of the principal religions of China. His followers, the Tao-sze, as they are called, are now greatly degenerated. He wrote the celebrated *Tao Te King* canon, one of the sacred books of China and a work of high ethical value.

Lapérouse (*là'pā'rōōz'*), **Jean François de Galaup, Count de,** French navigator, was born near Albia in 1741. He entered the navy in 1756, fought against the English, and was made captain in 1780. In 1785, supplied with two well equipped ships and accompanied by scientists, he was placed in command of an expedition of general discovery. After exploring the west coast of the Americas from Cape Horn to Mount Saint Elias, he crossed the Pacific, discovered Necker island northwest of the Hawaiian group, and found the passage between Sakhalin and Yezo, now called Lapérouse strait. From the coast of Kamchatka he sent Lesseps, his interpreter, across Siberia to France with the valuable records of the expedition. Turning south he landed at the Navigator islands, touched at Tasmania, and was last seen at Botany bay early in 1788. In 1828, a French expedition found that Lapérouse and his entire party had perished in shipwreck in the New Hebrides about 1788.

Laplace (*là'plās'*), **Pierre Simon, Marquis de,** French mathematician and astronomer, was born at Beaumont en Auge, Normandy, in 1749. At 18 he went to Paris, where he attracted the notice of D'Alembert, through whose influence he was appointed professor in the military school and admitted to the academy of sciences. He rapidly rose to distinction and became one of the foremost scientists of France. He was the author of the nebular hypothesis, and with Lagrange did much to verify Newton's theory. Next to Newton's *Principia*, Laplace's *Mécanique céleste* and supplements to it are the greatest of astronomical works and constitute one of the world's most valued contributions to science. He died in 1827.

Lardner, Ring W., American writer, was born at Niles, Mich., in 1885 and was educated at the Armour institute of technology, Chicago. He was connected with various newspapers in Chicago, Saint Louis, and Boston until 1919, when he became a writer for the Bell syndicate. His works, most of which are humorous, include *You Know Me, Al*; *Gullible's Travels*; *My Four Weeks in France*; and *The Big Town*.

Larned, Josephus Nelson, American author and journalist, was born in Chatham, Ont., in 1836. He was educated in the public schools of Buffalo, N. Y. Entering journalism, he served on the editorial staff of the Buffalo *Express* from 1859 to 1872. He was superintendent of education in Buffalo in 1872-73, and from 1877 to 1897 was superintendent of the Buffalo public library. His published works include *Talks About Labor, Talk About Books, History of England for Schools, A Multitude of Counsellors, Primer of Right and Wrong, History of the United States for Secondary Schools*, and *Seventy Centuries—a Survey*. He also edited *The Literature of American History*. Died in 1913.

La Rochefoucauld (*là rôsh'fōō'kō'*), **François, Duc de,** French moralist was born at Paris, in 1613. At an early age he joined the army and after some years of service became engaged in intrigues against Richelieu. He joined the Fronde and was wounded at the siege of Paris. In 1652, again wounded, he retired to the country. On Mazarin's death in 1661 he repaired to the court of Louis XIV. His celebrated *Réflexions ou sentences et maximes morales* appeared in 1665. For epigrammatic force, brevity, clearness, and finish of style these maxims, some 700 in number, have never been surpassed. He died in 1680.

LaSalle (*là-sàl'*), **René Robert Cavelier, Sieur de,** French navigator and explorer, was born in Rouen, 1643. He came to America in 1666, and became a trader in furs and the possessor of a tract of land in Canada. After a voyage of exploration from Lake Erie to Lake Superior and down the Mississippi, he took possession of the land around the Gulf of Mexico, called it Louisiana in honor of the French king, and went to France to get men and means to colonize it.

LaSalle succeeded in sailing from France with four vessels. But quarrels arose between him and Beaujeu, the commander of the fleet, resulting in the return of the latter, with a part of the people, to France. With the remainder LaSalle kept on his way, but failed again to find the Mississippi, and wandered from place to place until nearly all his followers were dead. At last, giving up hope of reaching the land he was seeking, he set out for Canada with a small company in 1687. On the way two of the men shot him. LaSalle was the first European to travel from the upper waters of the Mississippi to its mouth.

Lassalle (*là'sàl'*), **Ferdinand,** founder of socialism in Germany, was born of Jewish parents in Breslau, 1825. He attended the universities of Breslau and Berlin, became a disciple of Hegel, took part in the revolution of 1848, and was sent to prison for six months. In 1861, his *System of Acquired Rights* started an agitation of labor against capital and he was again thrown into prison. On his release he founded an association to secure universal suffrage and other reforms. While he added little to the socialistic teachings of Marx, yet by his eloquence and fascinating personality he established modern socialism as a political force. He was killed in a duel, the result of a love affair, in 1864.

Lasso (*lăs'sō*), **Orlando di,** composer of church music, was born at Mons, Belgium, about 1532. When a choir boy in Mons he is said to have been taken by the viceroy of Sicily to Milan, where he remained some years. In 1557, he went to Munich and was organist in the court chapel from 1563 until his death. He was the forerunner of Palestrina, devoting his talents chiefly to the composition of sacred music in contrapuntal style. He was one of the most prolific composers in the history of music, the number of his known works exceeding 2000. The *Penitential Psalms of David* ranks as his finest work, and his influence on the development of church music is second only to that of Palestrina. He died in 1594.

Lathrop, Julia Clifford, American humanitarian, was born at Rockford, Ill., in 1858. She was educated at Rockford college and Vassar college, from the latter of which she was graduated in 1880. Devoting herself to various reform movements, she made a special study of child welfare and of the care of the insane. From 1893 to 1909, she was a member of the Illinois State board of charities. Beginning with 1899, she spent much time as a voluntary resident of Hull House, Chicago, studying various civic and social problems. She acted also as chief of the children's bureau in the department of labor, Washington. Her writings include numerous reports and articles on child welfare, the civil service, and the care of the insane.

Latimer, Hugh, English bishop and martyr, was born at Thurcaston about 1490. He was educated at the University of Cambridge. In early life he was a zealous Catholic, but, being converted to Protestantism, he became an equally zealous champion of the Reformation and, in 1535, was made bishop of Worcester by Henry VIII. On the passing of the "Act of the Six Articles," he resigned the bishopric and was punished therefor by being imprisoned during the remainder of Henry's reign. The accession of Edward VI set Latimer at liberty and he began preaching anew, but refused to resume the miter. Shortly after Mary's ascent to the throne he was again incarcerated. In 1555, he was brought to the stake where he suffered with unshaken courage. Ridley was his fellow martyr.

Latrobe (*lă-trōb'*), **Benjamin Henry,** American architect and engineer, was born in Yorkshire, England, 1764. He studied architecture, and, in 1789, was made surveyor of the public offices of London. In 1796, he came to the United States, was made engineer of the James River and Appomattox canal, and superintended the building of the penitentiary in Richmond. He designed the bank of Pennsylvania, the old academy of art, and the bank of the United States, in Philadelphia. In 1803, he was made surveyor of public buildings in Washington, and advised concerning the plans of the Capitol, which he was engaged to rebuild after it was burned by the British in 1814. Latrobe originated the design of a new column for architecture. He died in 1820.

Lauder (*lô'dĕr*), **Sir Harry,** Scottish singer whose real name is MacLennan, was born at Porto Bello, near Edinburgh, in 1870. When a boy, he was employed in a flax-spinning mill at Arbroath, and later he worked in the coal mines. He finally took to the variety stage, and became immensely popular for his Scottish songs, written and composed by himself and sung in character. His many tours throughout Great Britain, the United States, Australia, and New Zealand were highly successful and netted him a large fortune.

At the outbreak of the World War, he threw himself wholeheartedly into the recruiting service. He organized and paid the expenses of a band of Scottish pipers which became famous, and personally toured England in the work of recruiting. Later, he obtained permission to sing on the firing line in the front trenches in France. For a time after the death of his only child, Captain John Lauder, in 1916, at the front in France, he refused to return to the stage, but later he resumed singing in public. Soon after his visit to the front, he organized the "Harry Lauder Million Pound Fund for Maimed Men, Scottish Soldiers and Sailors."

Although Lauder is generally regarded as a comedian, his songs and characterizations include not only rollicking humor but also the tenderest tributes to home, love, and country. Among his numerous songs are "Roamin' in the Gloamin'," "Wee Hoose amang the Heather," "She's the Lass for Me," and "The Laddies Who Fought and Won." He wrote also *Harry Lauder at Home and on Tour, Harry Lauder's Logic, A Minstrel in France,* and a Scottish comedy. In recognition of his services during the World War, he was knighted in 1919.

Laue (*lou'ĕ*), **Max von,** German physicist, was born at Ehrenbreitstein, near Koblenz, in 1879. He was educated in the universities of Strasbourg, Gottingen, Munich, and Berlin. He devoted himself principally to physics, mathematics, and philosophy and became professor of theoretical physics in the University of Zurich. For his distinguished researches he was awarded, in 1914, the Nobel prize for physics. His works include *The Principle of Relativity* and *Interference Phenomena in Parallel Plane Surfaces.*

Laurier (*lō'rĭ-ā'*), **Sir Wilfrid,** Canadian statesman, first French Canadian premier of the Dominion, was born in Saint Lin, Quebec, 1841. He was educated for the bar at L'Assomption college and at McGill university, and rose rapidly in his profession. In 1871, he was elected as a Liberal to the Quebec provincial assembly, and, in 1874, he was elected to the Federal assembly. His high personal character, his undoubted loyalty and attachment to the connection of the colony with Great Britain, together with the great oratorical powers which earned for him the title "silver-tongued Laurier," soon gave him high rank in the Liberal party.

On the retirement of Blake in 1887, Laurier was chosen leader of the Liberal party, and, at the general election of 1896, he led his followers to victory. In 1900, he again secured the approval both of the Dominion and of the British Empire by the prompt dispatch of Canadian troops to aid the mother country in South Africa, and led his party to another triumph at the polls. He was returned to power in 1904 and again in 1908 but was defeated in the elections of 1911 on the issue of reciprocity with the United States.

Laurier's premiership was notable for transcontinental railway building, development of agriculture, expansion of trade, and promotion of close relationship with Great Britain, while constantly increasing Canadian initiative. He also labored zealously to establish good relations between the two races in Canada and between Canada and the United States. Died in 1919.

Laut, Agnes C., writer and newspaper correspondent, was born at Stanley, Ontario, in 1871. She was taken to Winnipeg in childhood and was educated at Manitoba university. In 1895–97, she was editorial writer for the *Manitoba Free Press,* Winnipeg, and later became correspondent for Canadian, English, and American newspapers and magazines, finally settling in New York. Her writings include *Lords of the North, The Story of the Trapper, Pathfinders of the West, Vikings of the Pacific, Hudson's Bay Company, Freebooters of the Wilderness, New Dawn, Through the Unknown Southwest, Canadian Commonwealth,* and *Pioneers of the Pacific Coast.*

Lavedan (*lăv'dăn'*), **Henri,** French dramatist and novelist, was born at Orleans in 1859. He was educated at Orleans and later studied law at Paris. He began his literary career with a series of dialogues picturing the *flâneurs* of Parisian society, but soon turned his attention to the drama, in which he has done his best work. From the standpoint of a moralist and a keen observer, he has depicted Parisian society, problems of domestic life, the nobility of France, and various historical episodes.

Lavedan is at his best in character portrayal, the finest examples of which are found in *The Prince d'Aurec,* his best-known play, in *The Latest Fad,* and in *The Marquis de Priola.* He has since written some fifteen plays, of which *The Duel* and *Sire* have been presented in the United States by Otis Skinner. *The Prince d'Aurec* has been published in English. Lavedan was elected to the French academy in 1898.

Laveran (*lăv'răn'*), **Charles Louis Alphonse,** French physician, was born in Paris, 1845. He was educated in military medicine at Strasbourg and, in 1873, became professor at Val de Grace. In 1878, he went to Algeria to study malarial fevers, returning in 1883 to Val de Grace, where he was professor of military hygiene until 1894. He then entered the medical service of the army and later became head physician at the Lille hospital and a member of the French academy of medicine. In a treatise on fevers, published in 1884, he announced his important discovery of the blood parasite of malaria, for which service he was awarded the Bréant prize. His writings include various other works on pathology and hygiene. In 1907, he received the Nobel prize for medicine. Died in 1922.

Lavoisier (*là'vwà'zyā'*), **Antoine Laurent,** French chemist and one of the founders of modern chemistry, was born at Paris, France, August 26, 1743. He was carefully educated at the Collège Mazarin. In 1766, he received the prize offered by the French academy of sciences for the best and cheapest means of lighting city streets, and, two years later, he was admitted to the academy. In 1769, he was appointed farmer-general of revenue.

Lavoisier's entire scientific career is marked by his use of the experimental, inductive method. From mineralogy he turned his attention to chemistry about 1770. After four years, he published his *Physical and Chemical Essays,* in which he described his own theory of combustion, the destined center of modern chemistry. It had been believed that bodies decomposed upon combustion and that a substance termed phlogiston was released from them. Lavoisier determined by precise, unwearied experimentation that, in all cases of combustion, the one real combustible substance receives an addition, and that the matter with which it combines is, in all instances, "vital air," termed today oxygen.

In 1776, Turgot, then minister of finance, engaged Lavoisier to superintend the manufacture of gunpowder

for the government. In 1778, Lavoisier announced the great discovery "that the respirable portion of the atmosphere is the constituent principle of acids," which he named oxygen. Plenteous riches afforded Lavoisier unlimited instrumental aid, and he generously extended similar advantages to others. His house soon became a point of general resort for the philosophers of Europe and brought into communication men engaged in many different branches of science.

With Lavoisier's *Method of Chemical Nomenclature*, published in 1787, phraseology in the chemical sciences assumed precision. He synthesized his scientific views into a connected system, which appeared in 1789 under the title *Elementary Treatise on Chemistry*. He then began his researches for the application of pneumatic chemistry to the science of medicine.

Lavoisier also served the government in various capacities. He improved the methods of agriculture on scientific principles; took an active part in the preparation of the metric system; and formed a plan for simplifying the collection of taxes. After the Revolution, this connection with the government was the occasion of his indictment in 1794 before the Revolutionary tribunal, by which he was condemned to the guillotine. He was executed on May 8, 1794.

Law, Andrew Bonar, British statesman, was born in New Brunswick, Canada, in 1858, of Scottish parentage. His education was begun in Canada, but he removed to Scotland when still a boy and finished his schooling at the Glasgow high school. He entered commercial life in Glasgow, became an iron merchant, and acquired a substantial fortune. At the age of 40, he retired from business and entered politics. In 1900, he was elected to Parliament as a Conservative and Unionist. In 1902, he was made Parliamentary secretary of the board of trade. By his ability and forcefulness in debate, he became a prominent figure in the Unionist party and served as its leader in the House of Commons from 1911 to 1921.

At the outbreak of the World War, in 1914, he promptly tendered the support of his party to the Asquith ministry in all measures for the support of France and Russia. He was secretary of state for the colonies in 1915-16. In 1916, he was instrumental in forming the coalition war cabinet, headed by Lloyd George, in which he became chancellor of the exchequer. Upon the retirement of Lloyd George in 1922, Bonar Law became prime minister, but, owing to rapidly failing health, he resigned after a few months. Died in 1923.

Lawrence, Abbott, American merchant and philanthropist, was born at Groton, Mass., in 1792. In partnership with his brother Amos, he acquired a large fortune, a part of which was invested in the cotton factories of Lowell and Lawrence. He was member of Congress, 1835–37 and 1839-40. In 1842, he was chosen one of the commissioners to settle the northeast boundary question with Great Britain. He founded the Lawrence scientific school at Harvard university and made a bequest for model lodging houses. Died in 1855.

Lawrence, Amos, American merchant, manufacturer, and philanthropist, brother of Abbott Lawrence, was born at Groton, Mass., in 1786. Having acquired an immense fortune in cotton manufacturing, he devoted large sums to charities and donations, to Kenyon and Williams colleges, to the theological seminary at Bangor, Me., and to other institutions. He died in 1852. His son, in 1855, published his *Life and Correspondence*.

Lawrence, James, American naval officer, was born at Burlington, N. J., in 1781. In the war with Tripoli, 1804, he served under Commodore Decatur. By brave conduct, he rose successively to the command of the *Argus*, the *Vixen*, the *Wasp*, and the *Hornet*. In 1813, after a short engagement, he captured the British brig-of-war *Peacock* and afterward was made commander of the frigate *Chesapeake*. In June 1813, he met the British frigate *Shannon* just out of Boston, and, after a hard fight, he was mortally wounded and his ship was captured. It was here that he uttered the words, "Don't give up the ship!," which became a motto in the navy.

Lawrence, Sir Thomas, English portrait painter, was born in Bristol, 1769. He succeeded Sir Joshua Reynolds in 1792 as first painter to King George III. From 1820 until his death, he was president of the royal academy. He painted portraits of nearly all the monarchs and other notable personages of Europe. His pictures are distinguished by thoroughly refined taste and great technical perfection. He died in 1830. See *Painting*.

Lawson, Harry Sutherland Wightman, Australian statesman, was born at Dunolly, Australia, in 1875, and was educated at the University of Melbourne. In 1899, he was elected member of the Victoria state legislature, in which he sat continuously for more than two decades, being premier of the state in 1919-24.

Layard (*lā'ärd*), **Sir Austen Henry,** English archeologist and diplomat, was born in Paris, 1817. He spent his boyhood in Italy and developed a taste for travel. Journeying along the Tigris in 1840, he was struck with the ruins of Nimrud, the supposed site of Nineveh. In 1845–47, he carried on excavations there, finding the remains of ancient buildings. Many large stone slabs covered with bas-reliefs and cuneiform inscriptions, together with gigantic winged human-headed bulls and lions, were unearthed and sent by Layard to the British museum, London. He published *Nineveh and its Remains* and *Monuments of Nineveh*. In 1852, he became a member of Parliament; in 1869, he was made British ambassador to Spain; and, from 1877 to 1880, he was ambassador to Turkey. Layard was the author of the famous expression "the right man in the right place." He died in 1894.

Lea (*lē*), **Henry Charles,** American author and ecclesiastical historian, was born at Philadelphia in 1825. He received a private education, and engaged in the publishing business from 1843 to 1880. He then retired and engaged in literary and historical research, specializing in the history of the medieval Church. In this field he rose to foremost rank among modern historians. His collection of books and manuscripts, the finest of its kind in the world, was bequeathed to the University of Pennsylvania. In recognition of his distinguished work, he was, in 1908, made member of the American academy of arts and letters.

Lea's historical works include *Superstition and Force*, *A History of Sacerdotal Celibacy in the Christian Church*, *A History of the Inquisition of the Middle Ages*, *Chapters from the Religious History of Spain*, *The Moriscos of Spain*, *History of the Inquisition of Spain*, and *The Inquisition in the Spanish Dependencies*. He died in 1909.

Leacock, Stephen Butler, humorist and economist, was born at Swanmoor, England, in 1869. He was educated at the University of Toronto and the University of Chicago. He taught in Upper Canada college and in the University of Chicago prior to 1904, when he became head of the department of economics at McGill university, Montreal. His publications include *Elements of Political Science*, *Behind the Beyond*, *Moonbeams from the Larger Lunacy*, *College Days*, and *Over the Footlights*.

Lebrun (*lē-brŭn'*), **Charles,** French historical painter, was born in Paris, 1619. He studied four years in Rome and, for nearly 40 years, exercised a dominating influence over French art and artists, being generally considered the founder of the French school of painting. He was made, in 1662, the first director of the Gobelins tapestry works and was employed by Louis XIV in the decoration of the palace of Versailles. His series entitled "History of Alexander the Great" and many other works are now in the Louvre. He died in 1690.

Lebrun, Marie Anne Elisabeth Vigée. See *Vigée-Lebrun, Marie Anne*.

Lecky (*lĕk'ĭ*), **William Edward Hartpole,** British historian and philosopher, was born near Dublin, Ireland, 1838. He was graduated at Trinity college, Dublin, in 1859. In 1861, he published anonymously *The Leaders of Public Opinion in Ireland*, four brilliant essays on Swift, Flood, Grattan, and O'Connell. In 1865, his *Rationalism in Europe* created a marked impression on the literary world for its erudition and profundity. This was followed by other historical works which gained him literary eminence. Among his chief works are *History of European Morals*, *History of England in the 18th Century*, *The Political Value of History*, *The French Revolution*, and *Democracy and Liberty*. He died in 1903.

Le Conte (*lē kŏnt'*), **Joseph,** American geologist and physicist, was born in Liberty county, Ga., 1823. He was graduated at Franklin college, University of Georgia, in 1841 and at the New York college of physicians and surgeons in 1845, and practiced his profession at Macon, Ga. In 1850, he went to Harvard, where he studied under Agassiz. He subsequently held several professorships and, in 1869, became professor of geology and natural history in the University of California. He made many important contributions to geology and did much to popularize the study of this science in America. Among his chief works are *Religion and Science*, *Elements of Geology*, *Sight*, *A Compend of Geology*, and *Evolution*. He died in 1901.

Lee, Henry, American general, familiarly known as "Light Horse Harry," was born in Virginia, 1756. He was one of the most daring, vigilant, and successful cavalry officers on the side of the colonists. "Lee's legion" was probably the most effective and courageous body of troops raised in America. In the famous retreat of Greene before Lord Cornwallis, it formed the rear guard, the post of honor, and covered itself with glory. At the battles of Guilford Courthouse and Eutaw Springs, Lee particularly signalized himself. After the war, he was sent to Congress as a delegate from Virginia. He advocated the adoption of a federal constitution, and, in 1792, was chosen governor of

Virginia. When Washington died, Lee was chosen by Congress to write a eulogy of him; in it occur the famous words, "First in war, first in peace, and first in the hearts of his countrymen." Lee died in 1818.

Lee, Richard Henry, American patriot and signer of the Declaration of Independence, was born in Virginia, 1732, and received his education in England. He returned to America in 1752, and, at the age of 25, was chosen a delegate to the house of burgesses, where he soon distinguished himself by his powers in debate. In 1766, he was appointed to draft an address to the king and a memorial to the House of Lords, which are among the best state papers of the period.

Lee's efforts in resisting the various encroachments of the British government were indefatigable, and, in 1774, he attended the first Continental Congress at Philadelphia, as a delegate from Virginia. The memorial of Congress to the people of British America and the second address of Congress to the people of Great Britain were from his pen. In June 1776, he introduced the measure that declared the colonies free and independent states and supported it by a speech of the most brilliant eloquence. He was a member of the convention which adopted the present Constitution of the United States and was one of the first senators under it. In 1792, he retired from public life. Died in 1794.

Lee, Robert Edward, American general, son of Henry Lee, was born in Westmoreland county, Va., in 1807. At 18, he entered West Point, graduated second in his class in 1829, and received a commission in the corps of engineers. During the Mexican war, he was repeatedly promoted for distinguished services, first at Cerro Gordo, again at Churubusco, and finally at Chapultepec. From 1852 to 1855, he was superintendent of the United States military academy and greatly improved its efficiency. His next service was as cavalry officer on the Texan border, 1855–59. At the John Brown raid he was ordered to Harpers Ferry to capture the insurgents. He was in command in Texas in 1860, but was recalled to Washington in March 1861, when seven states had formed the Southern Confederacy.

In April 1861, Colonel Lee sent in his resignation, and, within two days, he was made commander in chief of the military forces of Virginia. At Richmond he superintended the defenses of the city until the autumn, when he was sent to oppose General Rosecrans in West Virginia. In the spring of 1862, he was working at the coast defenses of Georgia and South Carolina, but on McClellan's advance was summoned to Richmond. General J. E. Johnston, chief in command, was wounded at Seven Pines in May and Lee was put in command of the army around Richmond. In the seven days' battles around Richmond, he defeated McClellan's purpose.

His successes against McClellan in the peninsular campaign led Lee to invade Maryland. This advance was checked by McClellan at the battle of Antietam in September 1862. Lee then withdrew to Virginia, followed somewhat later by the Union forces. Defeating Burnside's larger army at Fredericksburg in December 1862 and outgeneraling Hooker's superior forces at Chancellorsville in May 1863, Lee once more determined to invade the North. Attacking the Union army under General Meade at Gettysburg, Pa., in a terrific three days' battle, in July 1863, Lee was decisively defeated, but conducted his shaken army safely back to Virginia. Here he devoted himself mainly to defensive operations until attacked, in May 1864, by Grant's superior armies. Temporarily staying the Union advance in the desperate conflicts of the Wilderness, Spottsylvania, and Cold Harbor, Lee was at length forced into the defenses of Richmond. Here he withstood siege until April 1865, when he was compelled to abandon the Confederate capital. He made an attempt to join forces with General J. E. Johnston in North Carolina but failed. On April 9, 1865, Lee surrendered his army to General Grant at Appomattox courthouse, Virginia, and the war was practically ended.

Lee frankly accepted the result, and, although deprived of his former property at Arlington on the Potomac, he declined proffers of pecuniary aid and accepted the presidency of Washington college, now Washington and Lee university, at Lexington, Va., at whose head he remained until his death. Died, 1870; elected to the American hall of fame, 1900. See *Civil War*.

Leeuwenhoek (*lā'vĕn-hōk*), **Antony van,** Dutch microscopist and naturalist, was born at Delft, in 1632. Although without technical education, he was possessed of funds which enabled him to devote himself to the manufacture of lenses and to the study of the minute structure of plants and animals by means of the microscopes which he constructed. The excellent quality of his lenses and his own remarkable powers of observation enabled him to make many interesting discoveries.

In 1674, he discovered and described the red corpuscles of the blood, which he noted were circular in man but oval in frogs and fishes. In 1677, he described and illustrated spermatozoa though the actual discovery is credited to his pupil, Ludwig Hamm. In 1680, he detected in yeast what are now known as yeast plants. By revealing the true life history of various low forms of animal life, he did much to disprove Aristotle's doctrine that these could be generated spontaneously. His various papers and contributions to learned societies exceeded 100 titles. He died in 1723.

Le Gallienne (*lē gāl'ĭ-ĕn'*), **Richard,** journalist and man of letters, was born in Liverpool, England, in 1866. He was educated at Liverpool, entered business, but, after seven years, abandoned it for literary pursuits. He became literary critic for the *Star* and for a time lived in London. In 1902, he took up his residence in New York. Among his numerous writings are *My Ladies' Sonnets, Volumes in Folio, The Book-Bills of Narcissus, The Religion of a Literary Man, The Quest of the Golden Girl, If I Were God, Little Dinners with the Sphinx, Vanishing Roads and Other Essays, Love Letters of the King, Omar Repentant, The Junk-Man,* and *Modern Book of English Verse.* He also edited Izaak Walton's *The Compleat Angler,* Hazlitt's *Liber Amoris,* and Hallam's *Remains.*

Leibnitz (*līp'nĭts*), **Gottfried Wilhelm von,** German philosopher and mathematician, was born at Leipzig, July 6, 1646. He learned Greek and Latin at the School of Saint Nicholas and, at the age of 15, he entered the University of Leipzig, where he devoted himself to philosophy, literature, jurisprudence, and mathematics. He received his bachelor's degree in 1663, when he presented the remarkable thesis *On the Principle of Individuation.* In 1666, he published his *Treatise on the Art of Combination* and received his degree as doctor of laws at Altdorf university.

Leibnitz became councilor of state at Frankfort in 1667, and later he was appointed to the bench of the upper court of appeals there. His time was divided between philosophical jurisprudence, theology, mathematics, and physics. In 1672, he submitted to Louis XIV the essay *Egyptian Project,* containing a plan for the invasion of Egypt. In Paris, Leibnitz became associated with that critical period of mathematical research which, dating from the geometry of Descartes, was to culminate four years later in his own discovery of the infinitesimal calculus. Public business took him in 1673 to London, where he made the acquaintance of the founders of the royal society, among them, Newton.

Leibnitz entered the service of the duke of Brunswick at Hanover and, in 1676, was made privy councilor and librarian. He rearranged and enriched the famous Wolfenbuttel library, and he took an active part in negotiations for church union between Protestants and Catholics, as is evidenced by his *System of Theology.* His private studies were chiefly philosophical and philological. He corresponded extensively on these subjects and contributed to literary and scientific journals, especially the *Acta Eruditorum* of Leipzig. Leibnitz was the chief organizer and first president, in 1700, of the academy of sciences at Berlin. He originated projects for the establishment of similar bodies at Dresden, Vienna, and Petrograd.

In 1704, Leibnitz wrote his examination of Locke's philosophy. Six years later he published, in French, the noblest monument of his genius, *Theodicy.* The fragment *Monadology,* in which he developed his system of metaphysics, belongs to the year 1714. A controversy with Newton concerning the discovery of the differential calculus embittered his later years, though there is little doubt that Newton's method of fluxions and Leibnitz's method of infinitesimals were independent and original discoveries.

Leibnitz is one of the most extraordinary examples of universal scholarship in intellectual history. He was eminent in languages, history, divinity, philosophy, political studies, experimental science, mechanical science, and even belles-lettres. He was perhaps the first among modern philosophers to read the literature of opinion in an eclectic spirit and to recognize the mutual relations of the different systems. Died at Hanover, November 14, 1716.

Leighton (*lā'tŭn*), **Frederick, Lord,** English historical painter, was born at Scarborough, in 1830. His early years were spent in the study of art under eminent masters in Rome, Florence, Frankfort, Paris, and Brussels. His famous picture "Cimabue's Madonna Carried in Triumph through the Streets of Florence" was first exhibited at the royal academy in 1855 and was at once purchased by the queen. Among his chief paintings are "Ariadne," "Hercules Wrestling with Death," "Captive Andromache," "The Harvest Moon," "Helen of Troy," "Romeo and Juliet," "Bath of Psyche," and "Wedded." His "Lachrymae," "Lucia," and "An Odalisque" are in the Metropolitan museum, New York. In 1878, he became president of the royal academy, was made a baronet in 1886, and was raised to the peerage in 1896, a few days before his death.

Lemaître (*lē-mā'tr'*), **François Elie Jules,** French critic and dramatist, was born at Vennecy, in 1853. He began his active life as a teacher at Havre in 1875, became professor at Grenoble in 1883, and, at 31, went to Paris, where he became a dramatic critic. His *Impressions of the Theater* and *Contemporaries* contain his widely known articles on criticism. His first drama, *The Woman Who Resolted,* appeared in 1889, after which he wrote several social dramas

of a high order, the best of which are *The Pardon*, translated into English in 1914, and *The Studio Assistant*, which was produced in New York as *Poor Little Thing*. He wrote also some graceful verse, numerous short stories, and a novel. In 1895, he was elected to the French academy. Died in 1914.

Lenard (*lē-närt'*), **Philipp,** Hungarian physicist, was born at Pressburg, in 1862. He received his education at the universities of Budapest, Vienna, Berlin, and Heidelberg. He was appointed professor at Heidelberg in 1896 and professor and director of physical sciences at Kiel in 1898. In 1909, he became head of the radiological institute in Heidelberg. He was the first to discover the peculiar properties of cathode rays penetrating into the external air from the Crookes tube and these rays now bear his name. In recognition of his researches in electricity, he received in 1905 the Nobel prize for physics. He wrote *Cathode Rays* and *Ether and Matter*.

Lenbach (*lĕn'bŏĸ*), **Franz von,** German portrait painter, was born at Schrobenhausen in 1836. He studied art at the polytechnic school in Augsburg and under Graeffe and Piloty at Munich. In 1857, he visited Italy, where he studied old masters, and, in 1860, he was called to teach in the new art school at Weimar. Between 1863 and 1868, he again spent much time in Italy, where he made numerous copies of old masterpieces for a private collector at Munich.

Lenbach then devoted himself exclusively to portraiture and became the foremost portrait painter of his century in Germany. His long series of portraits includes the greatest Germans of his generation and constitutes a pictorial epic of his age and country. His widely known portraits of Bismarck, Moltke, William I, Liszt, Helmholtz, Wagner, and Mommsen are excellent examples of his strong, individual style. He died in 1904.

Lenine (*lyĕ'nĕn*), **Nicolai,** first ruler of Soviet Russia, was born at Simbirsk, Russia, 1870. His true name was Vladimir Ilich Ulianof. His elder brother was hanged for the attempted assassination of the czar. Lenine studied law at Kazan and Petrograd and was exiled from Russia in 1896 on account of his revolutionary activities. During his exile, he published many scholarly but radical works in favor of Marxian socialism and the "class war."

Lenine became, by 1903, the recognized leader of the Bolsheviki, the more radical wing of the Russian Socialists with its headquarters then in London. The German government subsidized his activities during the World War and facilitated his return to Russia in 1917. Early in 1918, Lenine became the president of the Soviet Republic of Russia and was mainly responsible for introducing the great economic and social changes which occurred in Russia subsequent to the Revolution. A failure in health in 1923 forced him to relinquish the direct participation in affairs of state. Died, 1924. See *Bolsheviki*.

Lenroot, Irvine Luther, American politician and legislator, was born at Superior, Wis., in 1869. He received a common school and business education; became a legal stenographer and court reporter; studied law; and, in 1897, was admitted to the bar. In 1901, he was elected to the lower house of the Wisconsin legislature, of which he was chosen speaker in 1903 and in 1905. In 1908, he became Republican candidate for Congress and was elected continuously for the period of 1909–19. He achieved wide reputation as an effective speaker and debater and became one of the leaders of his party in the lower house. In 1918, he resigned his seat in the House to become United States senator, having been elected to fill the vacancy caused by the death of Senator P. O. Husting. In 1920, Lenroot was re-elected senator for the term 1921–27.

Leo XIII, Pope, Gioacchino Pecci, son of Count Lodovico Pecci, was born at Carpineto, in the papal states, in 1810. He was educated at the Collegio Romano and the Accademia dei Nobili, and, in 1837, was appointed a domestic prelate by Gregory XVI. He was made archbishop of Damietta *in partibus* and, in 1843, was sent to Belgium as nuncio. In 1846, he was nominated archbishop of Perugia and, in 1853, was created a cardinal by Pius IX.

Upon the death of Pius IX in 1878, he was elected to the papacy under title of Leo XIII. He manifested enlightened views, but on questions affecting the Church and his own status held firmly to his idea of papal rights. He regarded himself as the despoiled sovereign of Rome and as a prisoner at the Vatican. He protested against heresy and "godless" schools, and in his encyclicals affirmed that the only solution to the socialistic problem is the influence of the papacy.

In 1883, he opened the archives of the Vatican for historical investigations, and made himself known as a poet, chiefly in the Latin tongue. He was one of the foremost figures of his time and a potent force in religion, education, and morals. Died in 1903.

Leoncavallo (*lā'ŏn-kä-väl'lō*), **Ruggiero,** Italian composer, was born at Naples in 1858. He received his musical education at the conservatory of music in his native city. He was an admirer of Wagner and his compositions reflect German influence. The world-wide success of his short opera *I Pagliacci*, produced in 1892, indicated where his talents as a composer lay. Among his other operas are *Chatterton*, *La Bohème*, *Zaza*, *Maia*, *Malbruk*, and *La Reginetta delle Rose*. Like Wagner, he wrote his own librettos. Besides operas, his compositions include a symphony, a ballet, and songs. He died in 1919. See *I Pagliacci*.

Leonidas I (*lē-ŏn'ĭ-dăs*), king of Sparta, succeeded his half brother, Cleomenes I, about 490 B. C. When the Persian monarch Xerxes approached with an immense army, Leonidas opposed him at the narrow pass of Thermopylæ, 480 B. C., with a force of 300 Spartans and more than 5000 auxiliaries. The treachery of one of his men having made it impossible to bar any longer the progress of the foe, Leonidas and his little band threw themselves on the swarming myriads, and met a heroic death.

Lepsius (*lĕp'sē-ŏŏs*), **Karl Richard,** German Egyptologist, was born at Naumburg in 1810. His first work on paleography as an instrument of philosophy, in 1834, obtained the Volney prize of the French institute. In 1835, he went to Rome, where he studied Egyptology, also the Nubian, Etruscan, and Oscan languages, writing numerous treatises. From 1842 to 1845, he was at the head of an antiquarian expedition sent to Egypt by the king of Prussia. In 1846, he was appointed professor of Egyptology in Berlin. His *Denkmäler aus Aegypten und Aethiopien* still remains a masterpiece, and, in his *Chronologie der Aegypter*, he laid the foundation for a scientific treatment of early Egyptian history. Among his other works are *A Standard Alphabet*, the *Königsbuch*, and the *Todtenbuch* or the Egyptian "Book of the Dead." He wrote also on Chinese, Arabic, and Assyrian philology. Died in 1884.

Lesage (*lē-säzh'*), **Alain René,** French novelist and dramatist, was born at Sarzeau, Brittany, in 1668, and studied at the Jesuit college at Vannes. He was called to the bar in Paris, 1692, practiced law for a short time, and then adopted the profession of letters. For some years he was little known as a writer, but, in 1707, he rose at once into popularity by his comedy of *Crispin the Rival of his Master* and by his romance of *Le diable bŏîteux*. The comedy of *Turcaret*, in 1709, added to his fame, which subsequently was rendered imperishable by his admirable *Gil Blas*. Among his other novels are *The Adventures of Guzman d'Alfarache*, *The Adventures of the Chevalier Beauchesne*, *The History of Estévanille Gonzales*, and *The Bachelor of Salamanca*. He died in 1747. See *Gil Blas*.

Leschetizky (*lĕsh'ĕ-tĭts'kĭ*), **Theodor,** Austrian pianist and teacher, was born in Lancut, near Lemberg, in 1831. He received musical instruction from his father, from Czerny, and from Sechter. In 1852, he became an instructor at the Petrograd conservatory. In 1864, he was favorably received in London as a pianist and also won distinction in Berlin and Vienna, both for his playing and for his compositions. In 1880, he settled permanently in Vienna and devoted himself mainly to teaching the art of piano playing. He was one of Paderewski's chief instructors and achieved a world-wide reputation as a teacher. Besides an opera entitled *Die erste Falte*, his published compositions include *Souvenirs d'Italie*, *Suite à la campagne*, and numerous similar pieces. He died in 1915.

Lesseps (*lĕ'sĕps'*), **Ferdinand, Viscount de,** French engineer and diplomat, was born at Versailles in 1805. He held various consular offices. When in Egypt in 1854 he proposed to the viceroy the cutting of the Suez canal. The concession was granted, the financial assistance of the Egyptian government was secured, and, after much delay, diplomatic obstructions were removed. De Lesseps began actual work in 1859 and completed the canal in 1869.

After this achievement he entertained other great projects, such as a Central Asian railroad and the conversion of a part of the Sahara into an inland sea. In 1881, he began the construction of the Panama canal, subsequently taken over and completed by the United States. He died in 1894.

Lessing, Gotthold Ephraim, German dramatist and critic, was born at Kamenz, Germany, January 22, 1729. His father, a Lutheran pastor, intended him for the ministry, and, accordingly, at the age of 17, he entered the University of Leipzig. Although he was withdrawn on account of his taste for general literature and his fondness for the theater, he later went to Berlin and completed his academic education at Wittenberg, receiving his master's degree in 1752.

After graduation, Lessing became a man of letters, took up his residence in Berlin, and there wrote several essays and criticisms. With Moses Mendelssohn, he wrote *Pope as a Metaphysician*; in a literary journal, *The Library of the Beautiful Sciences*, and in his *Letters on Literature*, he cooperated with Mendelssohn in creating a school of criticism in Germany. In addition to several dramas of minor importance, he wrote in 1755 the prose tragedy *Miss Sara Sampson*, which won extraordinary favor and was translated into other languages. His *Emilia Galotti* was under composition at this time, as well as his prose and metrical fables.

In 1760, Lessing lived at Breslau as secretary to the commandant, and, among his military acquaintances, he planned his spirited drama *Minna von Barnhelm*. Returning to Berlin, he completed his *Laokoön*. This essay, like his other philosophical speculations, is merely a collection of hints, not the exposition of a system; but the principles here established go further toward founding a just theory of literature and art than any other work on æsthetics.

For some years, Lessing now led an uncomfortable and shifting life. In Hamburg, he wrote a masterly criticism on celebrated plays, called the *Hamburg Dramaturgy*. In 1770, he was appointed librarian of the celebrated library at Wolfenbuttel, near Brunswick. Here he spent his last eleven years and completed his *Emilia Galotti*. Shortly after taking up work at Wolfenbuttel, he married the widow of a Hamburg merchant. Upon her death and that of their child, Lessing was prostrated by grief. After a spirited theological controversy, in which he appeared as the champion of toleration, he gave his confession of faith in poetical and dramatic form in *Nathan the Wise*.

Lessing polished his mother tongue and made it classic. He never resigned his freedom of thought nor compromised its dignity. His interests and influence were extended through theology, æsthetics, drama, poetry, criticism, and philology. He died impoverished at Brunswick, February 15, 1781.

Leutze (*loit'sĕ*), **Emanuel,** German American historical painter, was born at Gmund in Wurttemberg, 1816. He was brought up in America, studied art and resided at Dusseldorf, 1841–59, then returned to the United States. Among his works are "Washington Crossing the Delaware," "Washington at Monmouth," "Washington at Princeton," "Landing of the Norsemen," "Cromwell and his Daughter," "Cromwell's Visit to Milton," "Lafayette in Prison," and "News from Lexington." He died in 1868.

Lever (*lē'vĕr*), **Charles James,** Irish novelist, was born in Dublin, 1806. He was graduated at Trinity college, Dublin, in 1827; studied medicine at Gottingen, and then returned to Dublin. His most popular work, *Charles O'Malley*, is based on his college life at Dublin, and many of the incidents in this novel are no doubt drawn from his own experience in the world. His other notable novels include *Harry Lorrequer*, *Con Cregan*, *Roland Cashel*, *Lord Kilgobbin*, *Tom Burke of Ours*, and *Jack Hinton*. He died in 1872.

Leverrier (*lĕ-vĕ ryā'*), **Urbain Jean Joseph,** French astronomer, was born at Saint Lo, Normandy, in 1811. Appointed professor of astronomy in the Ecole Polytechnique, Paris, in 1837, he continued the work of Laplace in celestial mechanics. His *Tables de Mercure* appeared in 1843. At the suggestion of Arago, he attacked the problem of the unexplained motions of Uranus and solved it by making the calculations by which the planet Neptune was discovered, September 23, 1846, from his indications. These same calculations had been independently made during the previous year by the English astronomer J. C. Adams, but no search for the undiscovered planet had been instituted. Leverrier entered the Legislative Assembly in 1849, was later named senator by Napoleon III, and, in 1854, became director of the Paris observatory, a post which he held, except during three years, until his death in 1877.

Lewes (*lū'ĭs*), **George Henry,** English philosopher and critic, was born at London in 1817. He was educated at various schools, and, after entering upon a business career, decided to devote himself to literature. In 1838, he went to Germany and remained there nearly two years, studying the life, language, and literature of the country. On his return to London, he became a miscellaneous writer. He was editor of the *Leader* from 1850 to 1854 and of the *Fortnightly*, which he himself founded, in 1865-66. In 1854, he set aside an early and unhappy marriage and lived with Mary Ann Evans (George Eliot) until his death.

Lewes's many-sidedness of mind made him one of the best critics and biographers. As a popularizer of philosophy and science he had few superiors. His works include *The Spanish Drama*, *Comte's Philosophy of the Sciences*, *Life and Works of Goethe*, *Physiology of Common Life*, *Studies in Animal Life*, *Aristotle*, *On Actors and the Art of Acting*, and *Problems of Life and Mind*. He died in 1878.

Lewis, Isaac Newton, American soldier and inventor, was born at New Salem, Pa., 1858. After his graduation at the United States military academy in 1884, he held various army commands. A report made by him in 1900 led to the rearmament of the United States field artillery. About the time of his retirement from active service in 1913, he obtained a patent for the so-called Lewis machine gun, which was extensively used during the World War. He refused about $1,000,000 in royalties on his guns made for the United States government after the country entered the war. Among the many artillery devices patented by him was the first successful artillery range finder.

Lewis, Meriwether, American explorer, was born near Charlottesville, Va., in 1774. He was a volunteer at the time of the Whisky insurrection of 1794, an ensign in the regular army in 1795, and a captain in 1800. Shortly afterward he became President Jefferson's private secretary. During 1803–06, he was engaged with Captain William Clark in an expedition to the Pacific Ocean, the results of which were important to geographical science. In 1807, he was made governor of the territory of Louisiana. He planned to publish an account of his great journey but met his death mysteriously in a pioneer cabin in Tennessee when en route to Washington, 1809. His memoir by Jefferson was published, together with Biddle and Allen's *Narrative of the Lewis and Clark Expedition*, in 1814.

Lewis, Sinclair, American novelist, was born at Sauk Center, Minn., in 1885. He was graduated at Yale in 1907 and engaged in editorial work, contributing also short stories to periodicals. In 1914, he published the novel entitled *Our Mr. Wren*, which was followed by *The Trail of the Hawk*, *The Innocents*, and *Free Air*. In 1920, his *Main Street*, depicting life in a small Middle-Western town, attracted wide attention, as did also his *Babbitt*, a story of a self-made business man, which appeared in 1922. His later works include *Arrowsmith*, awarded the Pulitzer prize for 1925, and *Elmer Gantry*, a satire on the professional evangelist.

Liebig (*lē'bĭk*), **Justus, Baron von,** German chemist, was born in Darmstadt, 1803. He studied at Bonn and Erlangen; then went to Paris, and attracted the attention of Humboldt by a paper on the fulminates. In 1824, he was appointed professor at Giessen, where he established a laboratory noted for researches in organic chemistry and for the application of chemistry to agriculture and food. In 1852, he became professor of chemistry at Munich. He was one of the great chemists of his century and contributed notably to the immense advance of chemical science made during his lifetime. Among his chief works are *Organic Chemistry in its Application to Agriculture and Physiology*, *The Natural Law of Husbandry*, *Researches on the Chemistry of Food*, *Handbook of Organic Analysis*, *Familiar Letters on Chemistry*, and *Dictionary of Chemistry*. He died in 1873.

Li Hung Chang (*lē'hŏŏng'chäng'*), Chinese statesman, was born in 1823, and studied at the imperial Hanlin college. In 1853, in the Taiping rebellion, he joined the imperial army as secretary, was appointed provincial judge, and, in 1861, governor of Kiangsu, out of which, in conjunction with "Chinese" Gordon, he drove the rebels in 1863. In 1864, he was appointed governor-general of the Kiang provinces and, in 1872, of Chihli. He founded the Chinese navy and promoted a native mercantile marine.

On the outbreak of the war with Japan in 1894, Li, in command of the forces in Chosen, was thwarted by the incompetence, dishonesty, and cowardice of inferior officers. The Chinese forces were swept out of Chosen, and Li, whose policy was that of peace, was deprived of his honors. The disastrous course of events soon compelled the emperor to restore him to honor. Through his efforts, the war was brought to a termination in 1895, China ceding Formosa and paying a war indemnity of about $150,000,000.

Well aware of the value of Western culture and industry, Li visited Russia, Germany, France, England, and America in 1896. Because of intrigues with Russia, he fell from power in 1898, but was later appointed by the government with full power to settle the Boxer troubles with the European governments. He died in 1901.

Lily, William, English grammarian and schoolmaster, was born at Odiham about 1468. After graduation at Oxford, he traveled in the East to increase his knowledge of the Greek language, and studied several years in Rhodes, Rome, and Venice. Upon his return to London, about 1509, he engaged in private teaching and, in 1512, was appointed by Dean Colet first head master of St. Paul's school, where he became one of the most noted exponents of the "new learning." With Grocyn and Linacre, he ranks among the earliest English classical scholars of the Renaissance period. He was probably the first teacher of Greek in London. His fame rests on his *Latin Grammar*. He died in 1522.

Linacre (*lĭn'ä-kẽr*), **Thomas,** English humanist and physician, was born at Canterbury about 1460. He was educated at Oxford, where he became fellow of All Souls college in 1484. Following a period of study in Italy, devoted to Latin, Greek, natural philosophy, and medicine, he was appointed professor of medicine at Oxford and became physician to the court, serving Henry VII and Henry VIII. After a time he gave up practicing and studied for the Church. In 1509, he was made rector of Mersham and, in 1519, became precentor in York cathedral.

With Latimer and Grocyn, Linacre was among the earliest teachers of Greek at Oxford, where Sir Thomas More and Erasmus were among his pupils. While his permanent fame rests upon his classical scholarship, he rendered notable service to the study of medicine by his translations of Galen's treatises. In 1518, he assisted in founding the college of physicians, of which he became president. Died, 1524.

Lincoln, Abraham, American statesman and 16th president of the United States, was born February 12, 1809 at Nolin Creek, near Hodgenville, Kentucky, where his grandfather had settled after leaving his former home in Virginia. His family was descended from Samuel Lincoln, who emigrated from Norfolk, England, and settled at Hingham, Mass., in 1637. Abraham's father, Thomas, was a carpenter and farmer; his mother, Nancy Hanks, was a woman of humble birth but of keen intellect and considerable force of character.

Education and Early Life. Lincoln was born in a log cabin. His school attendance was very limited, amounting probably in all to less than one year. Nevertheless, in his early years, he read and became intimately familiar with the Bible, Shakspere, Æsop's *Fables*, *Robinson Crusoe*, *Pilgrim's Progress*, a history of the United States, and Weems' *Washington*. He developed also great physical strength, became a powerful wrestler, runner, and lifter of weights, and grew to be 6 feet, 4 inches in height.

When Lincoln was in his eighth year, his father removed to southern Indiana, settling near the present village of Gentryville. Here, in a rude frontier cabin, at first scarcely more comfortable than a shed, the boy grew to manhood, knowing only the primitive manners, conversation, and ambitions of a sparsely settled backwoods community. About two years after coming to Indiana, Lincoln's mother died. A year later, his father married Mrs. Sarah Bush Johnston, a thrifty widow, who exerted a great influence over her stepson. Schools were scarce and poor, but Lincoln's mother had taught him to read and his stepmother urged him to study.

When Lincoln was 21 years of age, he went with his father to settle in Illinois, where he performed the various tasks of a pioneer, such as clearing the bush and splitting rails. In 1831, he took a flatboat to New Orleans, on which occasion he had an opportunity of observing the nature of slavery. The following year, he was chosen captain of a volunteer company for service in the Black Hawk war. The company saw no fighting.

After an unsuccessful candidacy for the state legislature, he formed a partnership for operating a small store. Its failure and the flight of his partner left Lincoln with a debt, which he scrupulously discharged in the course of the next 17 years. In 1832, he began to study law by himself; the following year, he received an appointment as postmaster; and, in 1834, he was elected to the legislature of Illinois.

Political Life. Lincoln was re-elected to the legislature in 1836 on a platform favoring privileges of government for all who bore the burdens of government, "by no means excluding females." When the legislature proposed to pass a resolution deprecating antislavery agitation, he presented a protest, averring that the Federal government, while not interfering with the individual states, might, in the event of a popular approval, abolish slavery in the District of Columbia. In this manner, Lincoln first placed on record his antislavery views, which, by their moderation, bespoke his careful statesmanship.

In 1837, Lincoln was admitted to the bar. When Springfield was made the capital of Illinois in 1839, he went there and continued practicing law until his election to the presidency. In 1844, he was elected to Congress, but, at the end of his term, declined to be a candidate for re-election.

The slavery issue became acute in 1854, when Stephen A. Douglas offered a bill in Congress proposing to establish a territorial government in Nebraska. Lincoln opposed the extension of slavery in the territory and delivered a strong antislavery speech at the state convention in Bloomington, 1856, when the Republican party in Illinois was organized.

In 1858, in a speech accepting the Republican nomination for United States senator, Lincoln said: "'A house divided against itself cannot stand.' I believe this government cannot endure permanently half slave and half free. I do not expect the Union to be dissolved, I do not expect the house to fall, but I do expect it will cease to be divided." This became famous as the "house-divided-against-itself speech."

During the ensuing campaign, Lincoln met Douglas, his Democratic opponent, in a series of memorable debates on slavery. The struggle over the whole question was at its height. Public interest had been intensified by the Dred Scott decision, so that the debate drew the attention of the whole country. Douglas's continual assumptions of superiority and sneers at his antagonist's early poverty and occupations were met with humorous retorts, with sharp exposures of sophistry, and with masterly arguments stated with great clearness and force.

With all the resources of an experienced debater, Douglas endeavored to defend an intermediate position that would satisfy both the supporters and the opponents of slavery. But Lincoln finally compelled Douglas to take ground against the Dred Scott decision and forced him to make other admissions, which, later, led to disruption in the Democratic party and destroyed Douglas's hopes of the presidency. Yet Douglas won temporarily. Receiving a scant majority in the legislature, he was elected by that body to the Senate. But Lincoln, though defeated, had received the greatest number of popular votes and was now a figure of national importance. Two years later, the Republican party in its national convention at Chicago, 1860, nominated him as presidential candidate.

Presidency. Lincoln was elected, but before his inauguration, seven states had formally seceded from the Union and inaugurated a president of their own. There was danger that seven other states would follow, four of which ultimately did. Within six weeks of Lincoln's inauguration, the Civil War broke out with the capture of Fort Sumter by the Confederate forces.

The earlier operations of the war were unfavorable to the Northern forces, but Lincoln shrank from no act which he judged necessary for the preservation of the Union. Following the battle of Antietam, September 1862, he issued a proclamation stating that on January 1 following, as an act justified by military necessity, he would declare all slaves in states or parts of states then in rebellion thenceforth free. On January 1, 1863, he issued the formal Emancipation Proclamation.

This measure at once tended to deprive the South of an advantage it enjoyed and consolidated the antislavery element of the North in favor of the war. The crisis of the war was passed with the battle of Gettysburg, the field of which was dedicated as a national cemetery on November 19, 1863. At this dedication, Lincoln delivered his Gettysburg speech, which ranks among the most famous orations of all literature.

Lincoln was re-elected president in 1864. He insisted upon three things: (1) restoration of the national authority throughout all the states; (2) no receding from the position of the national executive on the subject of slavery; (3) no cessation of hostilities short of an end of the war and the disbanding of the forces hostile to the government. Ultimate success crowned his labors, and the war ended.

Death. On the evening of April 14, 1865, Lincoln visited Ford's theater, Washington, and during the performance he was shot by John Wilkes Booth, an obscure actor. He died the next day, on April 15, 1865. His body was laid to rest in Oak Ridge cemetery near Springfield, Illinois. His unique position among the presidents of the United States is signalized in the beautiful Lincoln Memorial building at Washington, D. C. A second national memorial to him has been erected near Hodgenville, Ky. It is in the form of a building of classic style and covers the log cabin in which the president was born.

Lincoln, Robert Todd, American lawyer, oldest son of Abraham Lincoln, was born at Springfield, Ill., in 1843. He was graduated at Harvard in 1864, entered Harvard law school, but left to enter the army, serving until the end of the war as captain on the staff of General Grant. He then finished his law studies, was admitted to the Illinois bar in 1867, and practiced at Chicago. He was secretary of war from 1881 to 1885 and United States minister to Great Britain from 1889 to 1893. In 1893, he became counsel for the Pullman Company, of which, in 1907, he was made president. Died, 1926.

Lind, Jenny (Madame Otto Goldschmidt), Swedish singer, was born in Stockholm, 1820. At the age of nine years, her wonderful voice was discovered by an actress, who secured her admission to the Stockholm conservatory of music. In 1838, she made her operatic début as Agathe in *Der Freischütz*.

Jenny Lind began in 1844 a series of tours in Continental Europe, England, and America, singing with unparalleled success and becoming popularly known as "the Swedish nightingale." In 1849, she withdrew from the operatic stage and devoted herself exclusively to concert singing. At Boston, in 1852, she was married to Otto Goldschmidt, a musical conductor and composer, and, after a few years' residence at Dresden, settled permanently in London. Her last public appearance was at Dusseldorf in 1870. She died in 1887.

Lindbergh, Charles Augustus, American aviator, was born in Detroit, Mich., in 1902, of Swedish-Irish descent. He was taken as a child to Little Falls, Minn., from which state his father was elected to Congress in 1907. He entered the University of Wisconsin in 1921, but left the next year to learn aviation at Lincoln, Nebraska, and later at Brooks field, Texas.

After a period of flying in the Army and as chief pilot on the Chicago-St. Louis air mail route, he became famous almost overnight by a daring transatlantic flight in 1927. Setting out on May 20 from Curtiss field, near New York City, he flew unattended to Le Bourget, near Paris, a distance of 3610 miles in 33 hours, 29½ minutes. This was the first non-stop flight between the United States and Europe and the first solo transatlantic flight. The flight was made in the plane, *Spirit of St. Louis*, built especially for him at San Diego and according to his own specifications. The success of the trip was due in large measure to his careful planning for every aspect of the undertaking as well as

to the skill and courage with which he carried it through. His achievement was greeted by world-wide acclaim, which was heightened by admiration for his personal qualities. He was made a colonel in the U. S. officers reserve corps.

On December 13, 1927, he set out on a good-will flight from Washington, D. C., spanning 2200 miles to Mexico City. He visited the capitals of Central American countries, also Colombia and Venezuela in South America, returning on his flight northward by way of the West Indies. He arrived at St. Louis, his home city, on February 13, 1928, having flown on this trip a total of 9390 miles and having visited seventeen cities in fourteen countries. He received the Woodrow Wilson peace award for 1928, amounting to $25,000, and a Congressional medal. He accepted the general managership of Transcontinental Air Transport, Inc., and was appointed technical adviser on aeronautics to the U. S. department of commerce.

Lindbergh wrote *We*, a narrative of himself and the airplane in which he crossed the Atlantic Ocean.

Lindenthal (*lĭn'dĕn-tăl*), **Gustav,** American bridge builder, was born in Brunn, Austria, 1850. He was educated in his native city and at Vienna and came to America in 1874, where he was first employed in the construction of buildings for the Centennial exhibition held at Philadelphia in 1876. From the following year, he was engaged in the designing of bridges, including many of the largest in America. In 1902-03, he was commissioner of bridges in New York City. One of the most notable of the bridges planned by him is that over Little Hell Gate on Long Island, which, when completed in 1917 at a cost of 15 million dollars, had the longest steel arch in the world. He was engineer also for the Fort Lee suspension bridge, New York.

Lindsay, Nicholas Vachel, American writer, was born at Springfield, Ill., in 1879. After graduating from the Springfield high school in 1897, he attended Hiram college, Ohio, 1897–1900, and studied art in Chicago and New York. He also made long tours afoot, somewhat in the manner of the medieval troubadours, paying his way by reciting and selling his poems. In the summer of 1912 he walked from Illinois to New Mexico, distributing his poems and speaking in behalf of the "gospel of beauty." His works include *General William Booth Enters Heaven*, *Adventures while Preaching the Gospel of Beauty*, *The Congo*, and *The Art of the Moving Picture*.

Lindsey, Benjamin Barr, American jurist and reformer, was born in Jackson, Tenn., 1869. He was educated in the public schools, studied law, and was admitted to the bar. In 1894, he began the practice of law in Denver, Colo. While judge of the juvenile court there, 1901–27, he made important contributions to that system, notably the practice of punishing adults who contribute to juvenile delinquency. *The Companionate Marriage*, published by him in 1927, aroused much controversy and gave wide currency to that phrase. His other publications include *The Beast*, *Children in Bondage*, and *The Revolt of Modern Youth*.

Linnæus (*lĭ-nē'ŭs*), **Carolus,** Swedish botanist and naturalist, was born at Rashult, Sweden, on May 23, 1707. This name is a Latinized form of Carl von Linné.

In 1727, he studied medicine and botany at the University of Lund; the next year, he transferred to the University of Upsala. There, in 1730, the famous Dr. Anders Celsius made him assistant curator of the botanic gardens.

Career and Chief Works. Linnæus obtained his medical degree from the University of Harderwijk, Holland, in 1735. To this year belongs his important *System of Nature*, which contains his classification of animals. While in Holland, Linnæus became botanical director and naturalist at the countryseat of George Clifford. In 1736, he inspected the gardens of England at the expense of Clifford and published his *Elements of Botany*.

In 1737, Linnæus visited France and finished his *Genera of Plants*, in which he developed fully his theory of the sexual system of plants. In the following year, he returned to Sweden and established himself as a physician in Stockholm. In 1739, he married Sara Morœus and, in 1741, became professor of medicine at the University of Upsala. Within twelve months, he was transferred to the chair of botany at Upsala and found himself in the long coveted situation of director of the botanic gardens. These he laid out on a new plan. Within six years, to the original 50 exotic plants he had added 1100 new specimens, besides examples of the species in Sweden itself. His collections became unrivaled.

The efforts of Linnæus extended the fame of the university, increased the number of students, and won for him the appointment of rector. To this period of activity belong his *Botanical Science* and *Species of Plants*, published in 1751 and 1753 respectively. The latter laid the foundation for the modern system of plant nomenclature.

Honors. Gustavus III, the Swedish sovereign, exalted Linnæus by creating him a knight of the Polar Star in 1753 and, in 1761, issued a patent of nobility in his honor. Linnæus was made a member of the royal academies of sciences of Paris, Petrograd, and Berlin, and was elected a fellow of the royal society of London. In 1773, he was appointed to assist in making a new translation of the Bible into Swedish.

Place in History of Science. Linnæus found biology a chaos, but he left it a cosmos. His grounds for classification have not always proved adequate, but he bears the credit of first enunciating the true principles of classifying plants. To him is due also the credit of establishing the binomial name to indicate genus and species, a contribution which immensely advanced the study of systematic botany and zoology. He imbued his pupils with his own intense acquisitiveness and enthusiasm, trained them to close and accurate observation, and then dispatched them to various parts of the globe, where they furthered his influence as the reformer of botany and one of the world's greatest promoters of natural history studies. Died, January 10, 1778.

Lippi (*lēp'pē*), **Fra Filippo,** Florentine painter, was born in Florence, 1406. His parents died in his early childhood and he was placed in a Carmelite monastery in Florence, where he remained until 1432. He studied the works of Masaccio in a neighboring chapel and, about 1430, executed some paintings at the monastery. In 1456, he was made prior of Santa Margherita at Prato, where, according to Vasari, he first met the beautiful Lucrezia Buti, mother of his son Filippino Lippi (1460–1504), also a famous painter.

In skill Fra Filippo was superior to any of his predecessors, blending the idealism of Fra Angelico with the realism of Masaccio. His paintings are noted for dignity of composition, pleasing human faces, and fine golden color. Among his best works are the frescoes in the cathedral at Prato and numerous madonnas, the finest of which is the "Coronation of the Virgin," now in the academy at Florence. He died in 1469.

Lippmann (*lĕp'măn'*), **Gabriel,** French physicist, was born at Hallerich in Luxemburg, 1845. He was educated at the Ecole Normale in Paris and studied physics and chemistry in Germany. In 1883, he became professor in the University of Paris and director of the physical laboratory in the Sorbonne. He made important discoveries in electricity and in color photography and enunciated the principle of the conservation of electricity. In 1891, he discovered a process of photographing in colors by the interferential method. He received, in 1908, the Nobel prize for physics. His publications include *Course in Thermodynamics*, *Course in Acoustics and Optics*, *Electrical Unities*, and *Teaching Mathematics and the Physical Sciences*. He died in 1921.

Lippmann, Walter, American author, was born at New York City in 1889. He was graduated in 1909 from Harvard university, where he continued postgraduate studies in philosophy. Turning his attention to literary work, chiefly in journalistic lines, he became associate editor of the *New Republic*, and later joined the editorial staff of the New York *World*. In 1917, he served as assistant to the secretary of war, and, in 1918-19, he was secretary of the organization directed by E. M. House to prepare data for the Peace Conference. His writings include *A Preface to Politics*, *Drift and Mastery*, *The Stakes of Diplomacy*, *The Political Scene*, *Liberty and the News*, *Public Opinion*, and various contributions to magazines.

Lipton, Sir Thomas Johnstone, British merchant and yachtsman, of Irish parentage, was born in Glasgow, 1850. He began life as a retail merchant, acquired extensive tea, coffee, cocoa, and rubber estates in India and Ceylon, and accumulated a large fortune. He became president of the Lipton Company and also acquired large interests in business enterprises in the United States and Canada. He organized Lipton, Limited, the largest commercial establishment in the United Kingdom, controlling more than 400 stores and capitalized at 200 million dollars. An enthusiastic yachtsman, he challenged for the American cup, 1899, 1901, 1903, and 1913. He founded the Alexandra trust fund for providing the poor with cheap, wholesome meals.

Lister, Joseph, Baron, English surgeon, was born at Upton in 1827. He was graduated at London university in 1847 and received his degree in medicine in 1852. He was successively lecturer on surgery, Edinburgh, professor of surgery, Glasgow, professor of clinical surgery, Edinburgh, professor of clinical surgery, King's college hospital, London, and surgeon extraordinary to Queen Victoria. His great work was the introduction of the antiseptic system which revolutionized modern surgery. He received many foreign honors, was made a baronet in 1883, and a peer in 1897. He died in 1912.

Liszt (*lĭst*), **Franz,** Hungarian pianist and composer, was born at Raiding, near Odenburg, in 1811. He made his first appearance at a concert in his ninth year. Later, he studied under Czerny and Salieri at Vienna, and, from 1839 to 1847, he traveled throughout Europe as a virtuoso. In 1849, he became conductor of the court theater at Weimar.

Here, in 1850, he conducted the first performance of Wagner's *Lohengrin*. In 1865, he took minor orders and was subsequently known as the Abbé Liszt.

In 1875, Liszt was made president of the Hungarian academy of music at Budapest and divided the remaining years of his life among that city, Weimar, and Rome. One of his two daughters married Richard Wagner, his lifelong friend. Though Liszt's fame as a pianist overshadows his name as a composer, yet he was the creator of the symphonic poem, and his *Hungarian Rhapsodies* for the piano are unrivaled. He died in 1886.

Littleton, Sir Thomas, English jurist and legal writer, was born in Worcestershire, 1402. He was recorder of Coventry in 1450, king's sergeant in 1455, judge of common pleas in 1466, and knight of the bath in 1475. His reputation rests on his treatise *The Tenures*, written in law French and turned into English about 1500. Coke commented on this text in his celebrated *Coke upon Littleton*, published in 1628. With or without commentary, *The Tenures* constituted a part of legal education for more than three centuries, and it is still cited as authoritative on the feudal law of real estate. He died in 1481.

Littré (*lē'trā'*), **Maximilien Paul Emile,** French philosopher and lexicographer, was born in Paris, 1801. He studied at the Lycée Louis-le-Grand, then graduated in medicine, and finally turned to philology. His translation of Hippocrates procured, in 1839, his election to the academy of inscriptions. His *La poésie homerique et l'ancienne poésie française* was an attempt to render the first book of the *Iliad* in the style of the Trouvères. In 1854, he became editor of the *Journal des Savants*. His *Dictionnaire de la langue française*, the greatest modern French dictionary, appeared, 1863–72. In 1871, Gambetta appointed him professor of history and geography at the Ecole Polytechnique, Paris. In the same year he was elected member of the French academy. He was one of the foremost linguists of the 19th century. Died in 1881.

Livingston, Edward, American jurist and statesman, was born at Clermont, N. Y., in 1764. He was graduated at Princeton in 1781, studied law, and, in 1785, was admitted to the bar. He was a member of Congress from 1795 to 1801, when he became Federal attorney and mayor of New York. He joined the New Orleans bar in 1804 and speedily acquired a commanding position. In the second war with England he was aid-de-camp and secretary to General Jackson, 1814-15.

In 1821, Livingston was commissioned by the legislature to prepare a code of civil procedure for Louisiana. While never adopted by the state, his code was published as *A System of Penal Law* and gave him great fame throughout America and Europe. He was again member of Congress, 1823–29, was United States senator from Louisiana, 1829–31, and secretary of state, 1831–33. While serving as minister to France, 1833–35, he supported the demand of the United States government for $5,000,000 indemnity on account of French spoliations and succeeded in securing its payment. Died in 1836.

Livingstone (*liv'ing-stŭn*), **David,** African explorer and missionary, was born at Blantyre, in Lanarkshire, Scotland, 1813. During childhood and youth he worked in a cotton mill, but educated himself by private study and by attending night schools. In 1840, he was sent to southern Africa by the London missionary society. He resided for several years at various stations near the Limpopo, discovering Lake Ngami in 1849 and penetrating to the Makololo country in 1851.

In 1853-54, he crossed Africa from the Zambezi to the Congo and, in 1854–56, made his way from Loanda to Quilimane, following the course of the Zambezi and discovering the Victoria falls. He returned to England, 1856, and published *Missionary Travels*, 1857. Proceeding anew to Africa as consul at Kilimane in 1858, he explored the country north of the Zambezi from 1858 to 1864, discovering lakes Shirwa and Nyasa. In 1865, he published *The Zambesi and its Tributaries*, a narrative of the discoveries. He undertook in 1866 his third expedition and spent the remainder of his life endeavoring to ascertain whether the Zambezi joins the Nile or is a tributary of the Congo.

In 1871, after suffering great privations, Livingstone was found at Ujiji by H. M. Stanley's relief party. He continued his explorations, endeavoring to solve the Nile-Congo problem, but, exhausted by continued hardships, died on the shore of Lake Bangweolo, 1873. In 1874 his body was taken to England and buried in Westminster Abbey. He was an intrepid traveler, a noble benefactor of mankind, and his monumental labors did much to unveil the mystery of the "dark continent."

Livy (*liv'i*), or **Titus Livius,** Roman historian, was born at Patavium (Padua), in the north of Italy, 59 B. C. *The Annals of the Roman People*, as Livy styles his history, begins with the foundation of the city and ends with the death of Drusus, the younger brother of the emperor Tiberius, 9 B. C. It was written partly at Rome and partly at Naples, under the patronage of the emperor Augustus. The work consisted originally of 142 books, but only 35 have come down to us, and some of these are in a very imperfect state. Of all but two, however, we possess fragments, with short epitomes from another hand.

Livy's history is distinguished for the animation of its narrative and for the purity of its style, though the accuracy of the statements is sometimes prejudiced by the author's desire for rhetorical effect and by his patriotism. He was not an investigator, and it was his purpose to write an inspiring rather than a critical history of his country. Livy died in 17 A. D.

Lloyd George, David, British statesman and prime minister, was born of Welsh parentage in Manchester, 1863. His father, William George, was a poor schoolteacher and his mother was a daughter of David Lloyd, a Baptist minister. He was educated at a church school and privately. Deciding to study law, he was articled to a firm of solicitors at the age of 14 and, in 1884, qualified for practice.

As winner of a great lawsuit involving the right of burial in parochial grounds, Lloyd George achieved wide reputation and was elected to Parliament in 1890. During the Boer war, he vigorously opposed the policy of the Conservative government and for a time was the most unpopular man in England. However, his independence, brilliant debating, and notably conspicuous ability steadily gained recognition.

In 1905, Lloyd George was made member of the Liberal ministry as president of the board of trade. In 1908, he became chancellor of the exchequer and took an increasingly active part in constructive legislation. His settlement of the railway dispute in 1906 was generally applauded. He was the author of the Old-age Pension law of 1908 and of the Workingmen's Insurance act of 1912. He vigorously advocated the Minimum-wage law of 1912, which settled by intervention of the government the great coal strike of that year. His financial policy finally resulted in the bill to destroy the veto power of the House of Lords.

After the outbreak of the World War, Lloyd George became minister of munitions in Asquith's coalition cabinet. He succeeded Kitchener as secretary of state for war in June 1916 and, in the following December, was made prime minister. He then formed a new coalition cabinet, became member of its specially created war council, and was granted practically dictatorial powers. In this post of gravest responsibility he served the British nation with great ability, devotion, and skill. Following the successful termination of the war, his ministry was given in 1918 overwhelming endorsement in the Parliamentary elections.

In 1919, Lloyd George headed the British delegation to the Peace Conference of Versailles. In 1921, he brought about the conference with the Irish leaders which later resulted in the establishment of the Irish Free State. Following the defeat in 1922 of the Greeks by the Turks, in which British prestige was involved, Lloyd George resigned the premiership. He appealed to the country for support but was defeated in the ensuing elections. In 1923, he made an extended visit to the United States. He wrote *Where Are We Going?* and *Is It Peace?*

Locke, John, English philosopher, was born at Wrington, England, August 29, 1632. In 1646, he was sent to Westminster school. Six years later, he entered Christ Church, Oxford, where he took his bachelor's degree in 1655 and his master's degree in 1658. Despite an inclination toward experimental science, he decided to study medicine. In 1665, he went to Berlin as secretary to the British ambassador there. Subsequently, he returned to Oxford to continue his studies, but apparently he never obtained a degree in medicine.

A particularly acute diagnosis which Locke made of a disease afflicting Lord Ashley in 1666 led to their lifelong friendship. He now entered Lord Ashley's family as physician, tutor, and confidential adviser. In 1672, Locke was appointed secretary of presentations and, in the following year, secretary to the council of trade and plantations. In 1675, failing health obliged him to take up residence at Montpellier in the south of France; but he resumed his tutorial life at Oxford in 1679. Following the disgrace of Lord Shaftesbury (formerly Lord Ashley) in 1682, he went to Holland. By an act of Charles II, Locke was expelled from Christ Church. After the revolution of 1688, he returned to England and rendered services of great value in the cause of toleration and in maintaining the principles of the revolution. He took an active part in the establishment of the Bank of England, the abolition of the censorship of the press, reform of the coinage, and the promotion of Irish linen manufacture.

His *Adversariorum Methodus* was published in 1686, and, four years later, his famous *Essay Concerning Human Understanding* attained extensive celebrity. To this period belong various letters on toleration and his treatises on government. In 1693, he published his *Thoughts on Education* and, in 1695, his treatise on *The Reasonableness of Christianity*. The latter was written to promote King

William's scheme of a comprehension of all Christian sects in one national church.

In 1696, Locke received a reappointment as commissioner of trade and plantations, but failing health compelled him to resign his office and quit London. He spent the remainder of his life at Oates in Essex, at the seat of Sir Francis Masham.

Great as were Locke's services to his country and to the cause of civil and religious liberty, his fame rests chiefly on the *Essay Concerning Human Understanding*. He rejected the Cartesian doctrine of the reason as the source of knowledge and maintained the derivation of all knowledge from experience through the senses. His principles of philosophy and psychology affected the general modes of thought in many countries and led to the great critical philosophy of Kant. Died, October 28, 1704.

Locke, William John, English novelist, was born in Barbados, 1863. He was educated at the Queen's Royal college, Trinidad, and at Saint John's, Cambridge, where he graduated in 1884. He was an architect by profession, but turned to novel writing about 1895 and published *At the Gate of Samaria*. For ten years he wrote novels with little recognition until *The Morals of Marcus Ordeyne* gave him wide popularity. This story, as also *The Beloved Vagabond*, was dramatized with great success. Both are typical of Locke's admirable gift for depicting whimsical, eccentric characters, and reveal the influence of Murger and Anatole France on the author's method and style.

Besides the foregoing, Locke's novels include *Derelicts, Where Love Is, Simon the Jester, The Glory of Clementina Wing, Stella Maris, The Fortunate Youth, The Wonderful Year, The Rough Road, The House of Baltasar*, and *The Tale of Triona*. He wrote also the plays *Mr. Cynic, The Lost Legion, The Palace of Puck, Jaffery*, and *An Adventure of Aristide Pujol*.

Lockhart, John Gibson, Scottish biographer, was born in Lanarkshire, 1794. He was graduated at Oxford, studied law at Edinburgh, and, in 1816, was admitted to the Scottish bar. He soon adopted the profession of letters. For a long period Lockhart and John Wilson were the chief editors of *Blackwood's Magazine*. It was this connection which led to Lockhart's acquaintance with Sir Walter Scott, whose daughter Sophia he married in 1820. In 1821–24, he wrote the novels *Valerius, Adam Blair, Reginald Dalton*, and *Matthew Wald*. In 1825, he became editor of the *Quarterly Review*, a place which he held for more than 10 years. His *Life of Burns* and *History of Napoleon* were followed, 1836–38, by his admirable work *The Life of Scott*, which, with the exception of Boswell's *Johnson*, is generally regarded as the most noted biography in the English language. He died in 1854.

Lockwood, Belva Ann Bennett, American lawyer, was born at Royalton, N. Y., in 1830. In 1848, she was married to Uriah H. McNall, who died in 1853. She was graduated at Genesee college, Lima, N. Y., in 1857. After teaching 11 years, she was married to Dr. Ezekiel Lockwood. Soon afterward she began the study of law in Washington. She was graduated at the National University law school in 1873 and was admitted to the District of Columbia bar. She was active in securing the passage, in 1879, of an act admitting women to the United States supreme court and was herself admitted under it the same year. She was engaged in many important law cases, of which several came before the United States supreme court. She became prominent in temperance, peace, and woman suffrage movements and was a prolific writer on political and social subjects. In 1884 and in 1888, she was nominated for president by the Equal Rights party. She was a delegate to the International Peace congresses at London in 1908 and Rome in 1911, and, in 1913, became a member of the International Peace bureau at Brussels. Died in 1917.

Lockyer (*lŏk'yĕr*), **Sir Joseph Norman,** English astronomer, was born at Rugby in 1836. He was educated in England and on the continent. In 1857, he became a clerk in the war office, devoting his leisure time to astronomy. In 1869, he was made a fellow of the royal society and, in 1870, was appointed lecturer on astronomy at the normal school of science at South Kensington. From 1885 to 1913, he was director of the solar physics observatory at South Kensington. He made important spectroscopic researches and, between 1870 and 1905, conducted eight eclipse expeditions to Sicily, India, Egypt, and other parts of the world. His writings include *Elementary Lessons in Astronomy, Contributions to Solar Physics, The Spectroscope, Star-Gazing—Past and Present, The Chemistry of the Sun*, and *The Dawn of Astronomy*. He died in 1920.

Lodge, Henry Cabot, American statesman and author, was born in Boston, Mass., 1850. He was graduated from Harvard in 1871, from Harvard law school in 1874, and received the degree of doctor of philosophy in 1876. He was editor of the *North American Review* in 1873–76, university lecturer on American history at Harvard in 1876–79, and lecturer before the Lowell institute, Boston, in 1880. He was member of Congress from 1887 to 1893 and thereafter was elected United States senator for six consecutive terms, 1893–1929.

In both houses of Congress, Lodge served with marked ability and distinction. He was chairman of the Republican national conventions of 1900 and 1908. In 1918, he was elected Republican floor leader of the Senate. He led the group of senators who opposed, and finally wrecked, President Wilson's plans for American membership in the League of Nations. In 1921, he was commissioner plenipotentiary for the United States at the international conference on the limitation of armaments held at Washington.

Among his numerous writings are *Life and Letters of George Cabot, Short History of the English Colonies in America, Life of Daniel Webster, Life of Washington, Hero Tales from American History* (with Theodore Roosevelt), *Story of the Revolution, One Hundred Years of Peace, The Democracy of the Constitution*, and *The Senate and the League of Nations*. He was elected, in 1908, a member of the American academy of arts and letters. Died, 1924.

Lodge, Sir Oliver Joseph, British educator and physicist, was born at Penkhull, Staffordshire, in 1851. He was educated at Newport grammar school and at first planned for a business career. Becoming attracted to science, he entered University college, London, in 1872, and was graduated at the University of London in 1877. He taught natural science in Bedford college for women from 1877 to 1879 and applied mathematics at University college from 1879 to 1881. From 1881 to 1900, he was professor of physics in University college, Liverpool, and, from 1900 to 1919, he was principal of Birmingham university.

In addition to making important discoveries in electricity, notably in connection with the development of wireless telegraphy, he interested himself in educational reforms and devoted much attention to psychic research. He publicly affirmed his belief in a life after death and his expectation that eventually communication would be possible between living persons and the spirits of the dead.

His numerous writings include *Lightning Conductors and Lightning Guards, Signalling Without Wires, Modern Views of Electricity, Pioneers of Science, Life and Matter, Electrons, The Ether of Space, The Substance of Faith, Man and the Universe, The Survival of Man, Reason and Belief, The War and After*, and also *Raymond, or Life After Death*, and *Christopher: a Study in Human Personality*.

Loeb (*lōb*), **Jacques,** physiologist and biologist, was born in Germany, 1859. He was educated in the universities of Berlin, Munich, and Strasbourg, graduating in medicine in 1884 from the University of Strasbourg and later receiving the degree of doctor of philosophy from the University of Leipzig. Between 1886 and 1891, he was instructor in physiology in the universities of Wurzburg and Strasbourg and also a research student at the Naples zoological station.

Removing to America, Loeb was associate professor of biology at Bryn Mawr college in 1891-92. Between 1892 and 1902, he was successively assistant, associate, and full professor of physiology and experimental biology in the University of Chicago. He was professor of physiology in the University of California from 1902 until 1910, when he was made head of the department of experimental biology at Rockefeller institute, New York. He conducted extensive researches in comparative physiology and psychology and did pioneer work on artificial parthenogenesis and in analyzing the process of the fertilization of the egg.

Among his writings are *The Heliotropism of Animals, Comparative Physiology of the Brain and Comparative Psychology, Dynamics of Living Matter, Mechanistic Conception of Life, Artificial Parthenogenesis and Fertilization, The Organism as a Whole*, and *Forced Movements, Tropisms, and Animal Conduct*. Died, 1924.

Loeffler (*lĕf'lĕr*), **Friedrich,** German bacteriologist, was born at Frankfort on the Oder, in 1852. He was educated at the universities of Wurzburg and Berlin. In 1879, he became assistant in the imperial health office; in 1884, he was made staff physician in Friedrich Wilhelm institute in Berlin; and, in 1888, he was appointed professor in the University of Greifswald. He made important researches on the bacterial origin of contagious diseases. With Schütz, he discovered the bacillus of glanders in 1882, and, in 1884, he isolated and described the Klebs-Loeffler bacillus of diphtheria, first detected by Klebs in 1883. Loeffler greatly improved the technical methods of bacteriology and made notable contributions to pathological knowledge. He died in 1915.

Lombroso (*lôm-brō'zō*), **Cesare,** Italian alienist and criminologist, was born at Venice in 1836. He was educated at Padua, Vienna, and Paris. In 1862, he became professor of mental diseases at the University of Pavia, and later he was professor of medical law and psychiatry at Turin. Lombroso was the author of many books on his special subject, and his investigations of insanity and criminology led the way to great reforms in the treatment of criminal classes in Europe and elsewhere. He was also a noted linguist and a keen student of the occult. Died in 1909.

London, Jack, American author and socialistic lecturer, was born in San Francisco, Cal., 1876. He was educated at Oakland high school and at the University of California, but left his course unfinished to go to the Klondike. He traveled widely at various times, and partially completed a seven years' cruise around the world in a 50-foot yacht. He possessed a forceful, vivid style, and many of his books became widely popular.

Among his numerous writings are *The Son of the Wolf, A Daughter of the Snows, The Children of the Frost, The Call of the Wild, The Faith of Men, The Sea Wolf, The Game, War of the Classes, Before Adam, Love of Life, The Iron Heel, John Barleycorn, The Mutiny of the Elsinore,* and *The Valley of the Moon.* He died in 1916.

Long, Crawford W., American surgeon, was born in Danielsville, Ga., 1815. He was graduated at Franklin college in 1835 and in medicine at the University of Pennsylvania in 1839. He was probably the first to employ ether as an anesthetic in surgery. In March 1842, he administered ether to a patient and during the ensuing period of unconsciousness removed a tumor from the neck. Between this date and 1845 he operated upon several other patients under ether, but did not announce his observations. While Long was still hesitating, Dr. W. T. G. Morton of Boston, at Dr. C. T. Jackson's suggestion, made, in 1846, his first public demonstration, which was followed by the world-wide publication of the successful application of ether anesthesia to surgery. Long died in 1878. A statue of him was unveiled in statuary hall, 1926.

Long, John Luther, American novelist, was born in Pennsylvania, 1861. He studied law and after admission to the bar settled in Philadelphia, dividing his time between legal practice and literary work. In 1898, he published *Madame Butterfly,* later dramatized by David Belasco and played by Blanche Bates with notable success. The theme also inspired Puccini to compose his celebrated opera of the same name. The list of Long's stories and plays includes *Miss Cherry-Blossom of Tōkyō, The Fox-Woman, The Prince of Illusion, Heimweh and Other Stories, The Dragon Fly, The Way of the Gods, Felice, Baby Grand, War—or What Happens When One Loves One's Enemy, Lady Betty Martingale,* and *Billy Boy.* He wrote also the text for various cantatas and operas. Died, 1927.

Longfellow, Henry Wadsworth, American poet, was born at Portland, Me., in 1807. He was graduated from Bowdoin at 18, began his poetical career while in college, and at 19 was made professor of modern languages and literature in his alma mater. After three years spent in further preparation in Europe, he held this chair from 1830 until 1835. At 26, he translated the Spanish elegy of *Coplas de Manrique.*

Following the publication of *Outre-Mer* and another year of study in Europe, he filled the chair of modern languages and literature at Harvard with increasing distinction from 1836 to 1854. During this period he published *Hyperion, Voices of the Night, The Spanish Student, The Belfry of Bruges, Evangeline, The Seaside and the Fireside, Kavanagh,* and *The Golden Legend.*

Upon resigning from Harvard, Longfellow's literary career went steadily on. New volumes appeared at frequent intervals for nearly 30 years. His later works include *The Song of Hiawatha, The Courtship of Miles Standish, Tales of a Wayside Inn, Flower-de-Luce, New England Tragedies, Three Books of Song, Aftermath, The Hanging of the Crane, The Masque of Pandora, Kéramos, Ultima Thule,* and *In the Harbor.* He also published a translation of Dante's *Divine Comedy.*

Longfellow is justly popular as the American poet who, above all others, expressed the simple, natural affections and sentiments with unvarying kindliness, moral elevation, and fine artistic sense. Died, 1882; elected to the American hall of fame, 1900. See *Literary Plots, Characters, and Allusions* under names of his chief works.

Longstreet, James, American general, was born in Edgefield district, S. C., 1821. He was graduated at West Point in 1842 and was on duty on the Mexican frontier until 1846. He took part in the Mexican war, 1846–48, serving with distinction at Contreras, Churubusco, Molino del Rey, and also at Chapultepec, at the storming of which he was severely wounded.

In 1861, he resigned his commission as major to take part with the South in the Civil War. He commanded a brigade under Beauregard, fought brilliantly at the battle of Bull Run, and was made major general in 1862. He commanded with increasing distinction in the Seven Days' battles, in the second battle of Bull Run, and at Fredericksburg, after which he was promoted lieutenant general. He commanded the right wing of Lee's army at Gettysburg. At Chickamauga his opportune attack was decisive. In the campaign of the Wilderness in 1864 he was severely wounded, but recovered in time to direct the defense of Petersburg. He surrendered with General Lee in April 1865, and labored zealously for the restoration of harmony between the two sections.

Longstreet was one of the greatest fighters of the Confederacy, although the controversy over the failure at Gettysburg injured his popularity in the South. President Grant appointed him surveyor of the port of New Orleans, and, during 1880–81, he served as minister to Turkey. He was United States marshal, 1881–84, and United States railroad commissioner from 1898 until his death in 1904.

Longworth, Nicholas, congressman and capitalist, was born at Cincinnati, Ohio, in 1869. He was graduated at Harvard in 1891 and at Cincinnati law school in 1894, being admitted to the bar the same year. He was a member of the Ohio house of representatives in 1899–1901 and of the Ohio senate in 1901–03. In 1903, he was elected to Congress, and, with the exception of a single term, 1913–15, was continuously re-elected. He was made floor leader of the Republican party in the House and, in 1925, speaker of the House. In 1906, he married Alice Roosevelt, daughter of Theodore Roosevelt.

Loomis, Elias, American mathematician, was born at Willington, Conn., in 1811. In 1830, he was graduated from Yale, where he was tutor from 1833 to 1836. He was professor of mathematics, Western Reserve college, Ohio, 1837–44, of natural philosophy in New York university, 1844–60, and of natural philosophy and astronomy at Yale, 1860–89. He published a series of widely popular textbooks embracing mathematics, natural science, astronomy, and meteorology, and also many scientific papers. Died in 1889.

Lope de Vega, Felix. See *Vega Carpio, Lope Felix de.*

Lorentz (*lō'rĕnts*), **Hendrik Antoon,** Dutch physicist, was born at Arnheim in 1853. He was educated at the University of Leiden, where he was professor of physics from 1877 to 1923. He did notable work as one of the developers of Maxwell's theory of the ether and of Thomson's theory of electrons. With Lorenz of Copenhagen he discovered the so-called Lorenz-Lorentz formula for refraction. While working with his pupil Zeeman, he foretold and, in 1896, explained the "Zeeman effect" by showing that the radiating centers were electrons. For these important researches the Nobel prize for physics in 1902 was divided between him and Pieter Zeeman. His publications include *Maxwell's Electromagnetic Theory, Textbook of Physics,* and *The Theory of Electrons.* Died, 1928.

Lorenz (*lō'rĕnts*), **Adolf,** Austrian surgeon, was born in Silesia, 1854. In 1880, he was graduated in medicine at Vienna university, in which, in 1889, he was made professor of general surgery. He became widely known for his bloodless methods in orthopedic surgery, and has taught the cure of hip deformities and all forms of clubfoot, without bone resections. During a visit to the United States in 1902, he performed many operations in demonstration of his methods. After the World War, he made other visits to America. His writings include papers on his methods and with Saxl he published *Orthopædics in Medical Practice.*

Lorenzo de' Medici. See *Medici, Lorenzo de'.*

Lorimer (*lŏr'ĭ-mĕr*), **George Horace,** American journalist and writer, was born at Louisville, Ky., in 1868. He was educated at Colby college and at Yale university and entered upon a journalistic career. After serving first as literary editor and as managing editor, he was, in 1899, made editor in chief of the *Saturday Evening Post.* His best-known work is *Letters from a Self-Made Merchant to His Son.* Among his other writings are *Old Gorgon Graham, The False Gods,* and *Jack Spurlock—Prodigal.*

Lossing (*lŏs'ĭng*), **Benson John,** American historian, was born at Beekman, N. Y., in 1813. He edited magazines and prepared several illustrated works, among which are an *Outline History of the Fine Arts, Lives of the Signers of the Declaration of Independence,* and *Pictorial Field-Book of the Revolution.* The last is the result of journeys to every place of note connected with the American war for independence. Its popularity caused the author afterward to prepare along similar lines the *Pictorial Field-Book of the War of 1812.* He also published a *History of the United States, The Civil War in America,* biographies of several distinguished Americans, and a *Cyclopedia of United States History.* Died in 1891.

Loti, Pierre. See *Viaud, Louis Marie Julien.*

Lotze (*lōt'sĕ*), **Rudolf Hermann,** German philosopher, was born in Bautzen, Saxony, 1817. He was educated at Leipzig, where he studied medicine and philosophy, and was appointed to a professorship there in 1842. From 1844 to 1881 he occupied the chair of philosophy at Gottingen and in the latter year was transferred to the Univérsity of Berlin. His philosophy is dominated by the stress of his own feelings and emotions rather than by the demands of logic. In consequence his idealism is ethical rather than intellectual. Lotze will be remembered for his attempt to show that a scientific explanation of phenomena by efficient causation does not exclude purpose. Among his

works are *Metaphysics, Universal Pathology, Logic, On the Idea of Beauty, Medical Psychology, Microcosmus, Ideas for a History of Nature,* and *System of Philosophy.* He died in Berlin in 1881.

Loubet (*lōō'bĕ'*), **Emile,** French statesman, seventh president of France, was born at Marsanne, Drome, in 1838. He became a barrister, practiced at Montelimar, and rose steadily. He was mayor of Montelimar, 1870–99; member of the Chamber of Deputies, 1876; senator of France, 1885; minister of public works, 1887; prime minister, 1892; president of the senate, 1896; president of France, 1899–1906. His uprightness, patriotism, and simplicity of demeanor made him exceedingly popular. Throughout his political career he exhibited the strong democratic tendencies representative of the peasant proprietor class. As an orator, he possessed great power, and, as a statesman, he displayed marked diplomatic skill.

Louis IX (*lōō'ĭs, lōō'ē;* F., *lōō'ē'*), or **Saint Louis,** king of France, was born in Poissy, 1214, and succeeded his father, Louis VIII, in 1226. When he attained his majority, he became involved in a war with Henry III of England, and, finally, in 1242, defeated the English at Saintes. In 1244, during a dangerous illness, he made a vow that if he recovered he in person would join the crusaders. In 1248, having appointed his mother regent, Louis sailed with a large army to Cyprus. In the following year, he proceeded to Egypt, planning by the conquest of that country to open the way to Palestine. He took Damietta, but at Mansura he was defeated and taken prisoner by the Mohammedans. Procuring release in 1250 by the payment of an enormous ransom, he proceeded to Palestine with the survivors of his army. There he fought with the crusaders until 1254.

Louis then returned to France, where he ruled his kingdom with admirable justice and marked ability. In 1270, he set out upon a new crusade but on arriving at Tunis was stricken with the plague. Fearless in battle, heroic in adversity, energetic, firm, and unswervingly just, Saint Louis was the ideal king of the middle ages. He died in 1270.

Louis XII, king of France, was born in 1462, and succeeded Charles VIII in 1498. He laid claim to the kingdom of Naples and the duchy of Milan. In 1499, he invaded Italy and gained possession of Milan. With the assistance of Ferdinand of Aragon, he conquered Naples in 1500, but, having quarreled with his ally, was expelled in 1503. In 1508, he united with Ferdinand, Pope Julius II, and the emperor Maximilian in the league of Cambrai against the Venetians. In 1509, he won the battle of Agnadello, which crushed the power of Venice.

In 1511 Ferdinand joined Julius in the Holy league against the French, who, notwithstanding their victory at Ravenna in 1512, were finally driven out of Italy in 1513. At the same time, Henry VIII invaded France and was successful at Guinegate. At the conclusion of peace in 1514, Louis took for his third wife Mary Tudor, sister of Henry VIII of England. By his good government he earned the title of "father of his people." Died in 1515.

Louis XIII, king of France, was born at Fontainebleau, 1601. When his father, Henry IV, was assassinated in 1610, Louis succeeded to the throne, but during his youth his mother, Marie de' Medici, was regent. The Huguenots rose against her alliances with the pope and Spain, but concluded a peace in 1614. When the king was declared of age, he confirmed the edict of Nantes and summoned the States-General, for the last time until the reign of Louis XVI. Under the guidance of his great minister Richelieu, the king gradually increased the power of the monarchy at the expense of the Protestant nobles, and eventually overthrew the Huguenots by the capture of La Rochelle in 1628. In the Thirty Years' war, Louis sided with Gustavus Adolphus against Spain and Austria. He died in 1643.

Louis XIV, king of France, 1643–1715, was born in 1638. He was the son and successor of Louis XIII. The first years of his reign were under the regency of his mother, who was guided in all matters of state by her favorite, Cardinal Mazarin. From his father he inherited the war with Spain, and this was followed by the civil war of the Fronde, which lasted from 1648 to 1653.

During the life of Mazarin, Louis interfered little with public affairs, but, after Mazarin's death in 1661, he resolved to become his own minister. He changed the feudal monarchy of France into an absolute one, and his favorite motto, *L'état c'est moi,* "I am the state," was at once the expression of the ruling principles of his life and a description of his policy.

On the death of Philip IV, the father of his queen, Louis laid claim to Holland, which he invaded; but this led to the alliance of England, Sweden, and Holland, usually called "the triple alliance," against him and Louis was speedily compelled to make peace. In 1672, he made an attack upon Holland, having engaged on his side Charles II of England. But, at this juncture, William of Orange, who had been raised to the stadtholdership, revived the drooping spirits of his countrymen, and Holland was evacuated as fast as it had been overrun.

Several other wars followed, notably the war of the Spanish succession, in which Louis sought to secure the Spanish monarchy for his grandson the duke of Anjou. This war began in 1701, convulsed Europe for nearly 13 years, and was terminated by the peace of Utrecht in 1713. Many of the most famous names in French literature belong to the reign of Louis XIV. He died in 1715.

Louis XV, king of France, 1715–74, was born at Versailles in 1710. During his minority the duke of Orleans was regent. In 1723, Louis was declared of age, and two years later married Maria Leszczynska, daughter of Stanislas, the dethroned king of Poland. On the death of Augustus, king of Poland, in 1733, Louis supported the pretensions of his father-in-law to the vacant throne and was opposed by the emperor of Germany, who upheld the claims of the elector of Saxony.

On the death of the emperor Charles VI in 1740, new dissensions arose, and Louis, who had guaranteed the pragmatic sanction and the succession of Maria Theresa, dishonorably united with Prussia and Poland to place the duke of Bavaria on the throne. This led to the war of the Austrian succession, which was terminated by the Treaty of Aix la Chapelle in 1748.

In 1756, a new war was kindled between England and France in regard to their possessions in Canada. This war was not terminated until 1763, when, by the treaty signed in Paris in that year, France formally ceded to England Canada, Nova Scotia, and its other North American colonies, besides Granada, Dominica, and Tobago, in the West Indies. During his later years, Louis suffered himself to be governed wholly by favorites, among whom were Marchioness de Pompadour and Madame Du Barry. He died in 1774.

Louis XVI, king of France, was born at Versailles, 1754. He was the grandson of Louis XV, whom he succeeded in 1774. He had already, in 1770, married Marie Antoinette of Austria, daughter of Maria Theresa and sister of the emperor Joseph.

The first acts of Louis, after his accession, endeared him to his people, for he gave them immunities to which they had been hitherto unaccustomed and effected many reforms in the administration; but he soon became embarrassed by financial difficulties and was not fortunate in his choice of ministers.

Necker, his comptroller-general, advised the summoning of the States-General, which had not been summoned since 1614. It was convoked in May 1789, and in June was superseded by the National Assembly, which assumed the whole legislative authority. His abrupt dismissal of Necker was followed by the destruction of the Bastille, the declaration of the rights of man, and an attack of an armed mob, chiefly women, on the palace at Versailles in October. The king and the queen were then forcibly removed by Lafayette to Paris.

The revolution thus begun culminated, as far as the king was concerned, in the insurrection of 1792, the storming of the Tuileries, the abolition of the monarchy, the declaration of the republic, and the execution of the king on the scaffold in January 1793.

Louis XVIII, king of France, a younger brother of Louis XVI, was born at Versailles in 1755. In 1791, he fled from Paris on the same night as the king, Louis XVI, and reached the Belgian frontier in safety. From his retreat he issued from time to time declarations against the Revolutionists, which damaged the king, who had been captured and brought back to Paris. After the execution of his brother, he proclaimed the dauphin king, under the title of Louis XVII, and, in 1795, assumed the title of king himself.

The fall of Napoleon opened his way to the French throne, and, in 1814, he landed at Calais after 23 years of exile. He ruled by the "divine right of kings." The Revolution taught him nothing, and his treatment of the Protestants, the Republicans, and the followers of Napoleon resulted in the latter's return from Elba. Louis again went into exile until after the battle of Waterloo. He was restored to the throne by the allied powers in 1815 and ruled until his death at Paris in 1824.

Louise, queen of Prussia, was born in 1776 at Hanover, where her father, Duke Karl of Mecklenburg Strelitz, was commandant. In 1793, she was married to the crown prince of Prussia, afterward Frederick William III, and was the mother of Frederick William IV and of William I, who was later emperor. She endeared herself to her people by her spirit and energy during the period of national calamity that followed the battle of Jena, and especially by her patriotic and self-denying efforts to obtain concessions from Napoleon at Tilsit. Died, 1810.

Louis Philippe (*lōō'ē' fē'lĭp'*), king of France, eldest son of Louis Philippe Joseph, duke of Orleans, was born in Paris, 1773. During the French Revolution he first sought security in Switzerland; later he traveled in northern Europe;

from 1796 to 1800, he resided in the United States; and afterward he located in England. On the fall of Napoleon he hastened to Paris, where he was received with distrust by Louis XVIII. He was very popular in Paris, but kept aloof from political intrigues. The revolution of 1830 resulted in his appointment as lieutenant general of the kingdom, from which office he proceeded to the acceptance of a constitutional throne.

The country prospered under the government of Louis Philippe, but demands for reform in the electoral system became loud and general. These were unwisely opposed by the king and the Guizot ministry. Insurrectionary movements in the streets of Paris ensued in February 1848, and the "citizen king" saw with alarm that the national guard could not be expected to support him. On February 24, Louis Philippe, deserted by his courtiers, abandoned his throne and fled to England. He died in 1850.

Lounsbury (*lounz'bĕr-ĭ*), **Thomas Raynesford,** American literary scholar, critic, and educator, was born at Ovid, N. Y., in 1838. He was graduated at Yale in 1859. In 1860–62, he was engaged editorially on the *New American Cyclopædia*. He then enlisted in the Union army and served until the end of the Civil War. After teaching in New York and studying Early English, he became, in 1871, professor of English language and literature at Yale. He occupied this chair until 1906, when he was made professor emeritus. From 1873 to 1906, he was librarian of the Sheffield scientific school.

As a student of Chaucer, of Shakspere, and of the history and development of the English language, he won a high reputation for accurate scholarship and literary acumen. In 1905, he was elected member of the American academy of arts and letters. He edited Chaucer's *Parliament of Foules* and wrote *History of the English Language*, *Life of James Fenimore Cooper*, *Studies in Chaucer*, *Shakespeare as a Dramatic Artist*, *Shakespeare and Voltaire*, *The Text of Shakespeare*, and *The Standard of Usage in English*. Died in 1915.

Lovett, Robert Scott, lawyer and railway president, was born in San Jacinto, Texas, 1860. He was educated in the public schools, studied law, and, in 1882, was admitted to the bar. He was attorney for the Houston, East and West Texas railroad, 1884–89, and for the Texas and Pacific railroad, 1889–92. From 1904 to 1909, he was general counsel for the Harriman system. From 1909 to 1913, he was president of the Union Pacific railroad, succeeding E. H. Harriman. In 1913, he was made chairman of the executive committee of the Union Pacific system. In 1917-18, he was member of the war industries board, and, in 1918-19, he was director of the division of capital expenditures under the United States railway administrator. He was president of the Union Pacific Railway system in 1919-20, and, in the latter year, he became chairman of the board of directors.

Low, Seth, American educator and publicist, was born in Brooklyn, N. Y., 1850. He was graduated at Columbia in 1870 and entered his father's tea importing house, from which he withdrew, in 1888, with a large fortune. He was mayor of Brooklyn, 1882–86, and his administration was noted for his application of the civil-service system to city offices. In 1890, he was elected president of Columbia college, which, under his constructive leadership, was transformed into a great modern university. In 1895, he erected for the university the Low Memorial library at the cost of $1,000,000.

In 1897, he resigned as president of Columbia university to become an independent candidate for mayor of New York. He was defeated, but later was elected for the term 1902-03 upon a fusion ticket. He was president of several important societies, received many honorary degrees, and, in 1914, was appointed by President Wilson a member of the Colorado miners' strike commission. Died in 1916.

Low, Will Hicok, American illustrator and painter, was born at Albany, N. Y., in 1853. In 1870, he began making illustrations for New York magazines, and, in 1873, he went to Paris, where he studied under Gérôme and Carolus-Duran. He was also influenced by his association with Millet and other painters of the Barbizon group. He returned to America in 1877 and soon attained prominence. He is most widely known for his illustrations, mural decorations, and stained-glass work. Among his paintings are "May Blossoms," "My Lady," "Aurora," "The Orange Vendor," and "Christmas Morn." His best-known mural decorations are panels in the Waldorf-Astoria hotel, New York, in the county courthouse, Newark, N. J., in the Federal building, Cleveland, and in the New York State educational building at Albany. He is the author of *A Chronicle of Friendships, 1873–1900*; *A Painter's Progress*; and many articles on art subjects.

Lowden, Frank Orren, American politician, was born at Sunrise City, Minn., in 1861. He was graduated at the State University of Iowa in 1885 and at the Union college of law, Chicago, in 1887. For 20 years he practiced law in Chicago. From 1904 to 1912, he was a member of the Republican national committee. In 1906, he was elected to Congress to fill an unexpired term and was twice re-elected. From 1917 to 1921, he was governor of Illinois.

During the World War, he displayed notable energy in marshaling the resources of the state in support of the government. In 1917, when the mayor of Chicago refused to interfere with the activities of an organization accused of pro-Germanism, Lowden ordered out the state troops to suppress it. At the Republican national convention of 1920, he was a prominent candidate for the presidential nomination, standing first or second for several ballots.

Lowell, Abbott Lawrence, American educator and writer, was born in Boston, Mass., 1856. He was graduated at Harvard in 1877 and at Harvard law school in 1880. After practicing law in Boston from 1880 to 1897, he became connected with Harvard university. He was lecturer on government, 1897–99, and professor of the science of government from 1900 to 1907, when he was elected president of the university succeeding Charles W. Eliot.

Lowell became an authority in the field of government and comparative politics. His *Governments of France, Italy, and Germany* is regarded as one of the most valuable English works on European governments. His writings include also *Essays on Government*, *The Influence of Party Upon Legislation in England and America*, *The Government of England*, and *Public Opinion and Popular Government*. In 1910, he was elected member of the American academy of arts and letters.

Lowell, Amy, American poet, essayist, and critic, sister of Abbott Lawrence Lowell, was born at Brookline, Mass., in 1874. She was privately educated and devoted herself to literary study. In 1912, she published *A Dome of Many-Colored Glass*, which was followed by *Sword Blades and Poppy Seed* and *Six French Poets*. By her essays and poems she became a prominent advocate of "vers libre" and other modern tendencies in American poetry, although her poetic genius never allowed itself to be dominated by these formulas. Her later writings include *Men, Women and Ghosts*; *Tendencies in Modern American Poetry*; *Pictures of the Floating World*; and, with Florence Ayscough, *Fir-Flower Tablets—Poems Translated from the Chinese*. She wrote also a biography of Keats, which embodied her views on the nature of poetry. Her *What's O'clock?* was awarded the Pulitzer prize for the best book of poems published in 1925, the announcement being made after her death in that year.

Lowell, James Russell, American poet, essayist, and diplomat, was born in Cambridge, Mass., 1819. He was educated at Harvard university and, at graduation in 1838, was poet of his class. He then spent several years abroad studying languages. His *Legend of Brittany* appeared in 1844, and, in 1845, he published a prose work entitled *Conversations on Some of the Old Poets*. In 1846 appeared the first of the famous satirical series of *Biglow Papers*.

In 1855, Lowell succeeded H. W. Longfellow as professor of modern languages at Harvard and held the chair until 1877. From 1857 to 1862 he was editor of the *Atlantic Monthly*, and from 1864 to 1872 he was editor of the *North American Review*. He was United States minister to Spain, 1877–80, and to Great Britain, 1880–85.

His writings during the period when he was professor and diplomat include *Under the Willows, and Other Poems*; *The Cathedral*, an epic; *Among My Books*, a collection of essays; *My Study Windows*; *Democracy*; *Political Essays*; *Heartsease and Rue*; *Latest Literary Essays*; and *The Old English Dramatists*.

Lowell possessed a many-sided genius, and, although an uneven writer, produced some of the best verse in American literature. Among his finest poems are *The Vision of Sir Launfal*, *She Came and Went*, *The First Snowfall*, *After the Burial*, and the *Commemoration Ode*.

He excelled as a prose writer rather than as a poet. His descriptive sketches, political lectures, and critical essays rank among the first in American letters. In brilliancy, suggestiveness, and force, his best prose has seldom been surpassed. Died, 1891; elected to the American hall of fame, 1905.

Lowell, Percival, author and astronomer, brother of Abbott Lawrence Lowell, was born in Boston, Mass., 1855. He graduated at Harvard in 1876. In 1883, he went to Japan and lived there at different times until 1893. He established the Lowell observatory at Flagstaff, Ariz., in 1894. For his observations and writings on what he regarded as canals and other indications of life on the planet Mars, Lowell became widely known. In 1904, he received the Janssen medal of the French astronomical society and, in 1908, he was awarded the gold medal of the astronomical society of Mexico. His writings include *Chosŏn, The Soul of the Far East*, *Noto, Occult Japan*, *Mars, Annals of the Lowell Observatory*, *The Solar System*, *Mars and its Canals*, *Mars as the Abode of Life*, and *The Evolution of Worlds*. He died in 1916.

Loyola (*lō-yō'lä*; *loi-ō'lä*), **Saint Ignatius de,** Spanish reformer and founder of the Society of Jesus, was born at the ancestral castle of Loyola in the Basque province of

Guipuzcoa, Spain, in 1491. His original Spanish name was Iñigo de Loyola y Balda, Ignatius having been assumed in later life.

Early Life. Loyola was sent, at the age of 14, to the court of Ferdinand V to learn the rudiments of war and gallantry. Having been wounded at the defense of Pamplona in 1521, he read some biographies of the saints and other devotional books to relieve his weariness in convalescence. His thoughts were thus directed into a new channel, and he resolved to devote himself to the Church. On March 24, 1522, he made a vow to perform a pilgrimage barefoot to Jerusalem. Receiving the papal benediction from Adrian VI in Rome, he proceeded in 1523 to Venice and there embarked for the Holy Land.

Loyola returned to Venice and Barcelona in 1524. Feeling his literary acquirements to be insufficient, he studied at the universities of Alcala and Salamanca in 1526-27. He assimilated a considerable fund of knowledge and directed his energies to personal intercourse with those about him. Having been imprisoned during the inquisition at Salamanca, he sought a wider and safer field for his exertions in France, arriving at Paris in February 1528.

Society of Jesus. He continued his studies at the University of Paris, where he received his degree of master of arts in 1535. Here he gathered the first members of his "company of Jesus," which, later incorporated as the Society of Jesus and known popularly as Jesuits, exercised such an extensive influence upon the religious, moral, and social condition of the modern world. In 1534, Loyola and six disciples met formally in the chapel of Montmartre at Paris and took vows to make a pilgrimage to the Holy Land or, failing in that, to offer their lives to the service of the pope.

In 1537, the rule of the proposed society was submitted to the pope, Paul III. Their chief aim was expressed in their adopted motto, "To God's greater glory." In addition to the vows of chastity, poverty, and obedience, they bound themselves to go as missionaries to any country that the pope might indicate to them. The new rule was approved by a bull of September 27, 1540.

The association was practically inaugurated at Rome in 1541 by the election of Loyola as its first general, with tenure for life and with absolute powers. The disciples were sent on various missions into different parts of Europe. Loyola remained at Rome, devoted himself to many offices of piety, and spent all possible leisure on composing the *Constitutions of the Society* and his famous *Spiritual Exercises*, published in 1541.

Influence of the Society. While Loyola enjoined mental prayer, frequent self-examination, and religious retirement, he urged his disciples also to use every exertion for the instruction and sanctification of the rest of mankind. The progress of the Society of Jesus surpassed in rapidity all that is recorded of the infancy of the older establishments, and, with a high degree of zeal, learning, and skill, the Jesuits spread their influence to every quarter of the world. Loyola died at Rome, July 31, 1556, and was canonized in 1622 by Gregory XV. See *Jesuits, Jesuit Schools, Educational Reformers.*

Lubbock (*lŭb'ŭk*), **Sir John, Lord Avebury,** English naturalist, anthropologist, and politician, was born in London, 1834. He was educated at Eton college and entered his father's banking house. In 1870, he became a member of Parliament, where he served at intervals until elevated to the peerage in 1900. In Parliament he accomplished several economic reforms, but was most widely noted for his achievements in anthropology and entomology. His *Prehistoric Times* was long a standard textbook on archeology and was translated into many languages.

While Lubbock published technical works of great value, his most popular books are his *Ants, Bees and Wasps* and the charming volume entitled *British Wild Flowers Considered in Relation to Insects.* His writings include also *The Origin of Civilization and the Primitive Condition of Man, Fifty Years of Science, Pleasures of Life, The Scenery of England,* and *Marriage, Totemism, and Religion.* He died in 1913.

Lucas (*lū'kăs*), **Frederic Augustus,** American geologist and museum director, was born at Plymouth, Mass., in 1852. After receiving a public school education, he became, in 1871, an assistant in Ward's natural science establishment at Rochester, N. Y. In 1882, he was made osteologist; in 1887, assistant curator; and, in 1893, curator of comparative anatomy in the United States national museum. From 1904 until 1911, he was curator of the museum of the Brooklyn institute of arts and sciences. In 1911, he was made director of the American museum of natural history, New York. In addition to numerous papers on fossil vertebrates, on the anatomy of birds, and on museum methods, he published *Animals of the Past* and *Animals Before Man in North America.* Died, 1922.

Lucretius (*lū-krē'shĭ-ŭs*), or **Titus Lucretius Carus,** Roman poet, was born about 99 B. C. His principal work, *De Rerum Natura*, a philosophical didactic poem, appeared in 56. He was a follower of Epicurus, and his great poem is largely an exposition of the tenets, physical and moral, of that philosopher. It is inspired throughout, however, with intense moral earnestness and supports the thesis of the mechanistic nature of life with a fervor seldom exceeded by exponents of the more orthodox types of religion. It is doubtful, moreover, if a scientific theme has ever been presented with such a powerful appeal to the sense of beauty. This work stands in a class by itself in Latin literature and ranks perhaps as the world's greatest didactic poem.

According to tradition, Lucretius committed suicide about 55 B. C. in a fit of madness, this affection having been caused by a love potion which his wife administered to him in order to render his attentions to her more ardent.

Lucullus (*lū-kŭl'ŭs*), **Lucius Licinius,** Roman general, was born about 110 B. C. He commanded the fleet in the first Mithridatic war. As consul in 74 B. C., he defeated Mithridates, and introduced admirable reforms into Asia Minor. He twice defeated Tigranes of Armenia; but Lucullus' legions became mutinous, and he was superseded by Pompey in 66 B. C. He attempted to check Pompey's power, and was one of those who brought about the coalition known as the First Triumvirate, but soon withdrew from politics. He had acquired an enormous fortune, and spent the rest of his life surrounded by artists, poets, and philosophers, exhibiting a luxury which became proverbial. He died about 57 B. C.

Ludendorff (*lū'dĕn-dôrf*), **Erich,** German general, was born at Kruszevnia, near Posen, Prussia, in 1865. He entered the army, completed his military training at the war academy in 1895, and soon afterward was made member of the general staff at Berlin. From 1904 to 1913, he was engaged in the department which organized plans for the transport, disposition, and advance of armies in the field.

At the outbreak of the World War, in 1914, he was made chief quartermaster of von Emmich's army and took a prominent part in the assault on Liege. After advancing into France as far as the Somme, Ludendorff was sent to East Prussia as chief of staff of Hindenburg's army. The battles of Tannenburg and the Masurian lakes, in which the Russians were driven out of East Prussia, gave Hindenburg and Ludendorff great fame in Germany. In 1916, following the failure of von Falkenhayn to capture Verdun, Hindenburg was made chief of the general staff of the whole German army and Ludendorff was made chief quartermaster-general. Thenceforth until the collapse of the German front under the Allied drive of 1918, Ludendorff was the most powerful military chief in Germany. For a time he was virtually dictator.

As a military organizer and as a resourceful man of action in the field, Ludendorff has had few, if any, equals since Napoleon. But, like Napoleon, he was utterly unable to realize either the limits of military success or the spirit of the peoples whom he sought to crush. His ruthless methods were largely responsible for bringing the United States into the war and for aligning nearly the entire world against Germany.

When the German armies were being driven out of France in October 1918, Ludendorff was forced to resign his high command. After the Armistice, he took refuge in Sweden. In 1919, he returned to Germany and gave his support to Kapp's attempt at usurpation and other reactionary movements designed to overthrow the newly founded German republic. In 1923, he was a leader of a monarchist insurrection in Bavaria. This was quickly suppressed by the government forces, and Ludendorff was made a prisoner.

Lully (*lū'lē'*), **Jean Baptiste,** composer and founder of French opera, was born at Florence, Italy, in 1633. At the age of 14 he went to Paris, where he found employment as a servant. He taught himself to play the violin and became attached as a musician to the service of the king. He soon began to compose successfully, became superintendent of court music, and finally was made director of the royal academy of music, founded in 1669. His compositions include operas, ballets, and miscellaneous music. He made simplicity and directness the basis of the French school of opera. Among his chief compositions are *Alceste, Thésée, Persée,* and *Armide.* He died in 1687.

Lummis (*lŭm'ĭs*), **Charles Fletcher,** American author and explorer, was born at Lynn, Mass., in 1859. He studied at Harvard and, during 1881-83, edited a newspaper in Ohio. In 1884, he walked from Cincinnati to Los Angeles by a roundabout route, purely for pleasure, 3507 miles in 143 days. He lived five years in the Indian pueblo of Isleta, New Mexico, studying Indian languages and customs. He traveled extensively in the Southwest on horseback; also in Mexico, Central America, and South America, and explored much of the continent from Canada to Chile.

From 1894 to 1909, he was editor of the *Out West Magazine*, and, from 1905 to 1910, he was librarian of the Los Angeles public library. In 1895, he founded the Landmarks' club to preserve historical landmarks. This has preserved the remains of the Pala, San Juan Capistrano, and San Fernando missions in California. In 1902, he

organized the Sequoya league for the improvement of the Indians. In 1917, he established the Institute of the West to found local museums throughout the Southwest.

His writings include *A New Mexico David, A Tramp Across the Continent, Some Strange Corners of our Country, The King of the Broncos, The Enchanted Burro, The Awakening of a Nation, and My Friend Will.* Died, 1928.

Luther, Martin, German religious reformer and translator of the Bible, was born at Eisleben in Prussian Saxony, November 10, 1483. He was graduated at the University of Erfurt with a master's degree in 1505 and then entered the monastery of the hermits of Saint Augustine. In 1507, he was ordained a priest, and, in the following year, he removed to Wittenberg, where he lectured at first on dialectics and physics and, later, on the Holy Scriptures. In 1511 Luther was sent on a mission to Rome where for the first time he came into contact with the authority of the Roman Church. His recollections of this trip were used some years later in his attacks on the Roman Church.

The Ninety-five Theses. In the decade preceding 1517 Luther evolved his doctrine of salvation by faith rather than by faith and good works. In 1517, when John Tetzel, a Dominican monk, was commissioned by Albert, Archbishop of Brandenburg, to preach the doctrine of indulgences following the publication of the Papal Bull of Julian II on indulgences, Luther nailed his 95 theses to the door of the Castle church at Wittenberg. These theses attacked the abuses of the time which crept into the matter of giving indulgences; although it is commonly admitted that Luther had not had in mind a declaration of war but simply an academic challenge to a disputation. This debate marked the beginning of a popular movement destined to have the most far-reaching consequences for Christianity. Among the influential friends attracted to him were Bucer, Melanchthon, Erasmus, and Hutten.

The Diet of Worms. Luther entered into a public debate with Dr. Eck in 1519 at Leipzig, where he called into question the authority of the pope and of the general council, setting up in their place the authority of the Scriptures as interpreted by the individual's reason. Pope Leo X issued a bull of excommunication against Luther, June 15, 1520, if he should not recant within 60 days; Luther's reply was publicly to burn the bull. His cause was tried at Worms by the secular authority. He was put under the ban of the Empire, but his seizure by his enemies was prevented by friends, who concealed him in a castle at Wartburg for a year. During this period, he made a translation of the New Testament, which was published in 1522.

The Lutheran Church. In 1522, Luther returned to Wittenberg and set about organizing his new church. His doctrines included a rejection of asceticism and of the monastic life, and, in 1525, he married Katharina von Bora, who had been a nun but repudiated her vow of celibacy in accordance with the new doctrine. The translation of the Bible occupied large portions of his time, while commentaries, hymns, and other works also came from his pen. At the diet of Augsburg in 1530, the Confession of Augsburg was adopted, and Protestantism, despite all obstacles, was firmly established among the German states.

Character and Accomplishments. Luther was a Titan in intellectual robustness. He was not, however, an exponent of reason or toleration nor a social reformer. He insisted on the Scriptures, privately interpreted, as an authority in the Christian religion. The religious movement that he initiated changed the face of Europe and effectively divided Christendom into two great sections. Died, February 17, 1546.

Lycurgus (*lī-kûr'gŭs*), lawgiver of Sparta, flourished in the 9th century B. C. He was uncle of the young king Charilaus, and governed wisely during his nephew's infancy. He traveled in Crete, Ionia, and Egypt. On his return, finding Sparta in anarchy, he redivided property and remodeled the constitution, giving to the city its characteristic institutions, which were designed to produce hardy warriors. Lycurgus was afterward honored at Sparta as a god. Laws attributed to him remained in force nearly 1000 years.

Lyddeker (*lĭ-dĕk'ĕr*), **Richard,** English naturalist and geologist, was born at London in 1849. He was educated at Trinity college, Cambridge, graduating in 1871 with honors in natural science. From 1874 to 1882, he served on the staff of the geological survey of India. He became widely known for his researches as a naturalist, and, in 1894, was elected to the royal society. His works include *Phases of Animal Life, The Royal Natural History* (with Sir W. H. Fowler), *The Great and Small Game of India, Burma and Tibet,* and a *Manual of Paleontology* (with H. A. Nicholson). He died in 1915.

Lyell, Sir Charles, British geologist, was born in Kinnordy, Scotland, 1797. He was graduated at Oxford and studied law, but left his practice for the study of geology. In 1824 and again in 1828–30, he made geological tours over various parts of Europe. His important work, *The Principles of Geology,* was published in 1830–33.

Lyell was the ablest early advocate of the theory of uniformitarianism and was successful in securing its universal adoption by geologists. This theory assumes that the great geologic changes which the earth has undergone are the cumulative results of slow-working but persistent processes rather than of transformations due to sudden catastrophic agencies.

For his notable work in establishing this great fundamental conception, Lyell has been called the father of modern geology. He was influential also in securing the recognition of Darwin's theory of evolution. His works include *Elements of Geology, Travels in North America, with Geological Observations,* and *The Antiquity of Man.* He died in 1875.

Lyon, Mary, American educator, founder of Mount Holyoke college, was born at Buckland, Mass., in 1797. By great effort and perseverance she gained a good education and for several years taught in the public schools of the state. In 1837, she founded a famous seminary, now Mount Holyoke college, at South Hadley, Mass., upon the plan of uniting domestic service with intellectual culture. Her success as president of this institution caused many similar schools to be established throughout the country, and the name of Mary Lyon became a household word among all friends of the education and the elevation of women. Her writings include an account of the seminary and a book entitled *The Missionary Offering.* She died, 1849; was elected to the American hall of fame, 1905.

Lytton (*lĭt'ŭn*), **Edward George Earle Lytton, Bulwer-Lytton, Lord,** English novelist, was born in London, 1803. In 1826, he was graduated at Cambridge, and, in 1827, he published his first novel, *Falkland.* In 1828, his *Pelham* appeared. This work placed him at once in the first rank of contemporary writers of fiction. Thenceforward his literary career was one of great brilliancy, and for a quarter of a century he reigned as the master of English fiction—the successor to Scott, the predecessor of Dickens.

Among his other novels are *The Disowned, Paul Clifford, The Pilgrims of the Rhine, The Last Days of Pompeii, Night and Morning, Zanoni, The Last of the Barons, Lucretia, Harold, The Caxtons, My Novel, A Strange Story, What will He Do With It?, The Coming Race,* and *Kenelm Chillingly.* He wrote also the plays *The Lady of Lyons, Richelieu,* and *Money* and the poems *The New Timon* and *King Arthur.* He was created a peer in 1866. Died in 1873.

Lytton, Edward Robert Bulwer-Lytton, Earl of, "Owen Meredith," English poet, diplomat, and statesman, was born in London, 1831. He was educated at Harrow and Bonn. In 1849, he came to Washington as an attaché and private secretary to his uncle Sir Henry Bulwer, and subsequently was sent in a diplomatic capacity to nearly all European capitals. He was viceroy of India from 1876 to 1880. In 1873, he succeeded his father as Lord Lytton, and, in 1880, he was made earl of Lytton. His literary works, of which perhaps the most popular is *Lucile,* have been published under his pseudonym. He wrote also *Clytemnestra, The Wanderer, The Ring of Amasis,* and *Fables in Song.* He died in 1891.

Maartens (*mär'tĕns*), **Maarten,** is the pen name of Joost Marius Willem van der Poorten-Schwartz, a Dutch author born at Amsterdam, 1858. He attended school in Germany and studied law at Utrecht university. He is the author of a series of powerful novels in which the moral idea predominates. Among these are *The Sin of Joost Avelingh, A Question of Taste, God's Fool, The Greater Glory, My Lady Nobody, Some Women I Have Known, The Woman's Victory, Brothers All,* and *Eve.* Died, 1915.

Mabie, Hamilton Wright, American editor, essayist, critic, and lecturer, was born at Cold Spring, N. Y., 1846. He graduated at Williams college in 1867 and at Columbia law school in 1869. He joined the editorial staff of the *Christian Union* in 1879. This was afterward called the *Outlook,* of which he became associate editor. His writings consist chiefly of essays on literature, nature, and the spiritual life. Among them are *Nature in New England, My Study Fire, Nature and Culture, Work and Culture, The Life of the Spirit, Works and Days, Parables of Life, Myths Every Child Should Know, Heroes Every Child Should Know,* and *Japan To-Day and To-Morrow.* He was elected to the American academy of arts and letters in 1908. Died, 1916.

McAdam (*măk-ăd'ăm*), **John Loudon,** Scottish engineer, was born at Ayr, 1756. At the age of 14, he was sent to an uncle in New York, where he remained until the close of the Revolutionary War, acquiring a comfortable fortune as agent for the sale of war prizes. He returned to Britain and, in 1815, was appointed surveyor-general of Bristol roads, where he effected notable improvements in road building by the use of crushed stone. In demonstrating his method of road making, he spent several thousand pounds of his own private means; but the House of Commons later reimbursed him for the actual outlay and gave

him an honorarium of £2000. His name soon became synonymous with his valuable invention and macadamized roads were rapidly introduced throughout the civilized world. Died, 1836.

McAdoo (*mȧk'ȧ-dōō*), **William Gibbs,** American lawyer, railway official, and cabinet officer, was born near Marietta, Ga., 1863, and was educated at the University of Tennessee. He was deputy clerk of the United States circuit court of Tennessee, 1882, and, after studying law, was admitted to the bar in 1885. He practiced at Chattanooga and, in 1892, removed to New York. In 1902, he was elected president of the Hudson and Manhattan railroad and exhibited great ability in connection with the construction of a tunnel made by that railroad under the Hudson river. He was secretary of the treasury during 1913–18. In 1914, he married Eleanor Wilson, the youngest daughter of President Wilson. He served, 1917–19, as director general of the railways, resigning in the latter year to resume the practice of law. At the Democratic national convention, 1924, he received a maximum of 530 votes for the presidential candidacy, but failed of the necessary two-thirds majority.

Macaulay (*mȧ-kô'lĭ*), **Thomas Babington, Lord,** British historian and statesman, was born at Rothley Temple, Leicestershire, 1800. He entered Trinity college, Cambridge, at the age of 18 and acquired a brilliant reputation both as a scholar and as a debater.

The periodical to which he first contributed was *Knight's Quarterly Magazine*, for which he wrote several of his ballads, including *The Spanish Armada*, *Moncontour*, and *The Battle of Ivry*, besides essays and critiques. In 1825, he contributed to the *Edinburgh Review* his famous essay on Milton. He was a member of Parliament, 1830–34; member of the supreme council in India, 1834–38; and war secretary, 1839–41. His fine martial ballads entitled *Lays of Ancient Rome* appeared in 1842. In 1843, he published his *Essays*, in three volumes.

In 1848 appeared the first two volumes of his justly celebrated *History of England from the Accession of James II.* These created great excitement and met with an enormous sale. The third and fourth volumes were published in 1855. On account of rapidly failing health, he was unable to complete his great history. It has been characterized as "a great Whig pamphlet," and some passages have been attacked with telling criticism; but as a literary and historical reviewer, Macaulay stands unchallenged. He was elevated to the peerage as baron in 1857. He died in 1859 and was buried in Westminster Abbey.

Macbride, Thomas Huston, American botanist and educator, was born at Rogersville, Tenn., 1848. He graduated at Monmouth college, 1869, and later studied at the University of Bonn. From 1870 to 1878, he was professor of mathematics at Lenox college. He was assistant professor of natural sciences, 1878–84, and professor of botany, 1884–1914, in the State University of Iowa, of which he was made president in 1914 and president emeritus in 1916. His most distinctive work in botany is his authoritative treatise entitled *North American Slime Moulds*.

McBurney, Charles, American surgeon, was born in Roxbury, Mass., 1845. He graduated at Harvard, 1866, and from the college of physicians and surgeons, New York, 1870. He then began practice as a surgeon in New York and was professor of clinical surgery at the college of physicians and surgeons in 1892–1907. His reputation as a skillful operative surgeon and as a teacher of surgery was world-wide. He became an authority on appendicitis and discovered "McBurney's point," which is of great value in diagnosing that disease. He was consulting surgeon to President McKinley after he was shot by an assassin in 1901. Died, 1913.

M'Cabe, Joseph, British author and lecturer, was born in 1867 and was educated in Roman Catholic colleges at Manchester and Forest Gate. He studied also at Louvain university, where, after having become a Franciscan monk and later a priest, he was made, in 1890, professor of scholastic philosophy. In 1895, he became rector of Buckingham college, Eng. The next year, he left the Church and devoted himself to writing and lecturing. His interests embrace a wide variety of topics, and his viewpoint is rationalistic. His publications include *Twelve Years in a Monastery*, *Can We Disarm*, *Religion of Woman*, *The Decay of the Church of Rome*, *The Evolution of Mind*, *The Empresses of Rome*, *Goethe*, *The Soul of Europe*, and *Ice Ages*.

McCarthy, Justin, Irish historian and political leader, was born at Cork, 1830. He engaged in journalism successively in Cork, Liverpool, and London. In the last named city, he became editor of the *Morning Star* in 1864 and editorial writer for the *Daily News* in 1870. From 1879 to 1900, he was a member of Parliament. He became prominent in the Irish Home Rule party and was chairman of the Irish Parliamentary party in 1890–96.

Novels from his pen include *Miss Misanthrope*, *Donna Quixote*, *Maid of Athens*, and *Mononia*. His reputation as a historian rests on his *History of Our Own Times*. Among his other works are *A History of the Four Georges*, *Epoch of Reform*, *Life of Pope Leo XIII*, *The Story of Mr. Gladstone's Life*, *Modern England*, *The Reign of Queen Anne*, and *The Story of an Irishman*. Died, 1912.

McClellan, George Brinton, American general, was born at Philadelphia, Pa., 1826. He graduated at West Point, 1846, and distinguished himself in the Mexican war.

After four years spent in railroad development, he was, in 1861, commissioned major general of the United States army and was appointed to the command of the department of the Ohio. He subsequently commanded the army of the Potomac, in the organization and training of which he showed great vigor and skill. After the costly Seven Days' battles, he was superseded by General Halleck. Following General Pope's defeat in the second battle of Bull Run, McClellan was again placed in command of the army of the Potomac and fought with Lee the indecisive battle of Antietam, 1862. McClellan's failure vigorously to pursue Lee's retreating army led to the removal of the former from his command.

In 1864, as a Democrat, he was the unsuccessful opponent of Lincoln for the presidency. In 1877 he was elected governor of New Jersey. Died, 1885.

McCloskey (*mȧ-klŏs'kĭ*), **John,** American Roman Catholic prelate, was born at Brooklyn, N. Y., 1810. After pursuing a collegiate and theological course at Mount Saint Mary's college, Emmitsburg, Maryland, he was ordained priest at Saint Patrick's cathedral, New York, 1834. He was the first president of Saint John's college, now Fordham university, Fordham, N. Y., 1841-42; was consecrated bishop of Albany in 1847; became archbishop of New York in 1864; and, in 1875, was created cardinal, the first in America. He built the cathedral at Albany and the theological seminary at Troy, and, besides being an effective preacher, was distinguished as an able executive and administrator. He died in 1885.

McClure, Samuel Sidney, editor and publisher, was born at Frocess, Ireland, 1857. He came to America at an early age and was graduated at Knox college, Galesburg, Ill., in 1882. During the ensuing two years, he edited *The Wheelman* in Boston. He organized, in 1884, the McClure newspaper syndicate, which purchased manuscripts from authors and sold them for simultaneous publication in various newspapers. In 1893, he began publishing *McClure's Magazine* and, in 1915, became editor of the New York *Mail*. He published his *Autobiography* and *Obstacles to Peace*.

McCollum, Elmer Verner, American physiological chemist, was born near Fort Scott, Kans., 1879. He was educated at the University of Kansas and Yale university. In 1907, he was appointed on the faculty of the University of Wisconsin, where he became professor of agricultural chemistry in 1913. Four years later, he went to Johns Hopkins university as professor of biochemistry. He is the author of numerous papers on nutrition and on the relation of diet to growth and to disease; also *The Newer Knowledge of Nutrition*, *The American Home Diet*, and a textbook of organic chemistry for medical students.

McConnell, Francis John, American prelate and educator, was born at Trinway, Ohio, in 1871. He was educated at Ohio Wesleyan university and Boston university. In 1894, he was ordained to the ministry of the Methodist Episcopal Church and, at different times, held important pastorates in Massachusetts and New York. He was made president of De Pauw university in 1909 and, three years later, was elected bishop. His published works include *Religious Certainty*, *Christian Focus*, and *Democratic Christianity*.

McCormack (*mȧ-kôr'mȧk*), **John,** Irish tenor, was born at Athlone, Ireland, 1884. He received his first vocal training in the choir of Dublin cathedral in 1903. In 1905, he studied under Sabatini in Milan. At London, in 1907, he made his first appearance as a concert singer and also his operatic début as Turiddu in *Cavalleria Rusticana*. Engaged by Hammerstein, he achieved immense popularity at the Manhattan opera house, New York, in 1909. He later sang with the Chicago Opera Company and with other operatic organizations and made many concert tours, in which he won notable success by his rendition of Irish songs He is one of the finest lyric tenors of his time. He became a citizen of the United States in 1919.

McCormick (*mȧ-kôr'mĭk*), **Cyrus Hall,** American inventor and manufacturer, was born in Virginia, 1809. In 1831, he invented a reaping machine, which he patented and later perfected with further improvements. However, all of the essential elements of modern harvesting machines—the reel, the divider, the reciprocating knife, and the platform—were embodied in his original invention of 1831. In 1847, he removed to Chicago, where he formed a partnership with his brother Leander James McCormick and established a reaping machine plant, which became the most extensive manufactory of harvesting machines in the world. He contributed liberally to education and endowed a chair in Washington and Lee university. Died in 1884.

McCormick, Joseph Medill, American politician, was born at Chicago in 1877. He was educated at Yale university and became publisher and editor of the Chicago *Tribune*, which, under his direction, became one of the most influential papers in the United States. He was twice elected to the Illinois general assembly and became a member of Congress in 1917. Two years later, he was elected to the United States Senate. Died, 1925. His wife, Ruth, daughter of Mark Hanna, was elected to the House of Representatives in 1928.

McCormick, Robert Rutherford, American publisher, was born in Chicago, 1880. He was educated at Yale and Northwestern universities and, taking up the practice of law in Chicago, was active in civic circles from 1904 to 1910. In the latter year, he became, with his cousin Joseph Medill Patterson, coeditor and publisher of the Chicago *Tribune*. The *Tribune's* circulation became the greatest of any newspaper in the United States except that of the New York *Daily News*, a "tabloid" founded by them in 1921. They founded, in 1924, *Liberty*, a weekly magazine which attained immediate success.

MacCracken (*mă-krăk'ĕn*), **Henry Noble,** American educator, was born at Toledo, Ohio, in 1880. He graduated at New York university and at Harvard and, in 1900, became instructor in English at the Syrian Protestant college, Beirut, Syria. He lectured in English at Smith college and at Yale prior to 1915, when he was chosen president of Vassar college. He is the author of a number of textbooks on English and edited works by Chaucer, Lydgate, and Shakspere.

MacCracken, John Henry, American educator, was born at Rochester, Vt., 1875, a brother of Henry Noble MacCracken. He was graduated from New York university and from the university at Halle, Germany. He lectured in philosophy successively at New York university and Westminster college, and, in 1903, he became professor of politics at New York university. He was president of Lafayette college, Easton, Pa., from 1915 to 1926. He wrote *College and Commonwealth*.

McCrae, John David, Canadian physician and poet, was born at Guelph, Ont., in 1872. He was educated at the University of Toronto and studied also at McGill university, where he became a lecturer in pathology and medicine; was appointed surgeon to the Alexandra hospital in Montreal; and contributed to Osler and McCrae's *System of Medicine*.

He served as a lieutenant in the Boer war and, in the World War, was second in command of the medical unit provided by McGill university. During the battle of Ypres, he wrote the famous lyric "In Flanders' Fields," for which he is chiefly remembered. Died in France, 1918.

McCutcheon (*mă-kŭch'ĕn*), **George Barr,** American author, was born in Tippecanoe county, Indiana, 1866, and was educated at Purdue university. He entered journalism, becoming city editor of the Lafayette *Courier* in 1893. Later devoting himself to the writing of short stories and novels, he produced many popular works, including *Graustark*, a tale of adventure in "Graustark," an imaginary petty kingdom of Europe. He is said to have amassed one of the largest fortunes won by any American writer from the sale of his books. Besides *Graustark*, these include *Brewster's Millions*, *A Fool and his Money*, *The Light That Lies*, *West Wind Drift*, *Oliver October*, and *The Inn of the Hawk and Raven*. Died, 1928.

McCutcheon, John Tinney, American cartoonist, brother of George Barr McCutcheon, was born near South Raub, Ind., 1870. He was graduated at Purdue university in 1889 and, from that time, was connected with leading Chicago newspapers. His cartoons first became famous in the presidential campaign of 1896. He set out for a trip around the world on the dispatch boat *McCulloch* in 1898 and, in the interest of his paper, visited the Philippine Islands, various other parts of the Orient, and South Africa, where he joined the Boers. In 1909-10, he visited Africa; went to Mexico in 1914; was with the Belgian and German armies later the same year; and spent much of 1915 and 1916 in France and the Balkan peninsula. Among other works, he published *Filipino Warfare*; *Cartoons by McCutcheon*; *Congressman Pumphrey, the People's Friend*; *T. R. in Cartoons*; and *The Restless Age*.

MacDonald, George, Scottish novelist, was born at Huntly, 1824; was educated at Aberdeen and the Independent college at Highbury; became pastor at Arundel and at Manchester; and, on account of ill health, retired, devoting himself to literature. His first books were volumes of poems. A long series of popular novels followed, including *The Portent*, *Guild Court*, *The Seaboard Parish*, *Malcolm*, *The Marquis of Lossie*, *What's Mine's Mine*, and *Salted with Fire*. These novels reveal the author's deep spiritual instincts in reaction against Calvinism. He published books for the young entitled *Dealings with the Fairies*, *At the Back of the North Wind*, and *The Princess and the Goblin*. His writings also include *Unspoken Sermons*, *The Miracles of Our Lord*, and *Poetical Works*. Died. 1905.

Macdonald, James Alexander, Canadian clergyman and journalist, was born in Middlesex county, Ont., 1862. He graduated at Knox college, Toronto, 1887; was ordained to the ministry of the Presbyterian Church; and became pastor of Knox church, Saint Thomas, Ont., 1891. He resigned his pastorate in 1896 and removed to Toronto to become first editor of *The Westminster*, a religious monthly magazine which was later consolidated with other similar periodicals as *The Presbyterian*. He was principal of the Presbyterian Ladies' college, 1896–1901, and was appointed on the board of governors of the University of Toronto, 1906. From 1902 to 1916, he was editor in chief of the Toronto *Globe*. He became widely known as a vigorous editorial writer and as a forceful lecturer on religious and political subjects. Died, 1923.

MacDonald, James Ramsay, British politician, labor leader, and Socialist writer, was born at Lossiemouth, Scotland, in 1866. Except for brief attendance at board schools, he was practically self-educated. At 19, he went to London and soon afterward engaged in secretarial work. In 1891, he threw himself into the Socialist movement, soon attaining prominence as an organizer and as a writer. From 1900 to 1911, he was secretary of the Labor party, and, in 1905, he became editor of the *Socialist Library*.

Turning his attention to public affairs, MacDonald served on the London county council, 1901–04, and, from 1906 to 1918, was elected continuously to Parliament as a Labor member. In 1911, he was made leader of the Labor party. Strongly opposing the entrance of Great Britain into the World War, he resigned the leadership of his party in 1914. MacDonald's record as a consistent and outspoken pacifist cost him his seat in Parliament in 1918. With the success of the Labor party in the elections of 1923, MacDonald again came into prominence as a political leader. Early in 1924 he was made prime minister. Although his government fell later in the same year, he had the distinction of heading the first Labor administration in Great Britain. He was again returned to power in 1929.

His writings include *Margaret Ethel MacDonald: a Memoir*, *The Social Unrest*, *National Defense*, *The Government of India*, and *Parliament and Evolution*.

Macdonald, Sir John Alexander, Canadian statesman, was born in Glasgow, Scotland, 1815. His parents settled in Upper Canada during his childhood. After attending Kingston grammar school, he studied law and was admitted to the bar in 1836. He entered the Legislative Assembly of Upper Canada in 1844; became receiver-general, 1847; attorney-general, 1854–57; prime minister, 1857; and government leader in the Assembly, 1864–67. He was chairman of the London Colonial Conference of 1866-67 and, more than any other person, was responsible for the federation of provinces to form the Dominion of Canada. After its establishment, he took a leading part in the new Dominion government as minister of justice and attorney-general, 1867–73, and as premier from 1878 until his death in 1891.

MacDowell (*măk-dou'ĕl*), **Edward Alexander,** American composer, was born in New York City, 1861. His first important teacher was Teresa Carreño. He entered the Paris conservatory in 1876; in 1878, he went to Germany, where he studied at Wiesbaden under Ehlert and at Frankfort under Heymann and Raff. In 1882, he met Liszt, who brought about the public performance of his *First Modern Suite*. In 1888, he located in Boston, where he soon rose to fame as a performer and as a composer of orchestral numbers. In 1896, he was made the first professor of music in Columbia university. He was also chosen one of the seven original members of the American academy of arts and letters.

MacDowell's music displays the most striking originality and individuality of style attained by an American composer. In the smaller forms of composition, he is ranked with Schumann and Grieg. Among his works are the symphonic poems *Hamlet*, *Ophelia*, *Lancelot and Elaine*, *Lamia*, *The Saracens*, and *Lovely Alda*; four sonatas for the piano, *Tragica*, *Eroica*, *Norse*, and *Keltic*; orchestral suites; concertos for piano and orchestra; many lesser compositions for the piano, including the excellent *Woodland Sketches* and *Sea Pieces*; and numerous songs. His mind failed, 1905, and he died in 1908.

McDowell, William Fraser, American prelate, was born at Millersburg, Ohio, in 1858. He was educated at Ohio Wesleyan and Boston universities and was ordained to the ministry of the Methodist Episcopal Church in 1882. After occupying various pastorates in Ohio, he was made chancellor of the University of Denver in 1890 and was elected bishop in 1904. He officially visited various Oriental countries in 1910-11. His published writings include *In the School of Christ* and *A Man's Religion*.

MacFarland, Sir John Henry, Australian educator and financier, was born at Omagh, Ireland and was graduated at Queen's college, Belfast, and at Cambridge university. He transferred his residence to Australia, where he served at various times as member of the royal commission

on education, member of the government board for the protection of aborigines, and director of a life insurance company and of a trust company. In 1918, he became chancellor of the University of Melbourne.

McGill, James, merchant, was born in Glasgow, Scotland, 1744. About 1770, he went to Canada and engaged in the fur trade at Montreal, accumulating a substantial fortune. He became a member of Parliament and served as brigadier general of militia in the War of 1812. Upon his death, in 1813, he left £10,000, together with certain lands, for a college to be named for him. Such a college was founded and, in 1821, received a royal charter, incorporating it under the name of McGill university. It is now one of the leading institutions of higher learning in Canada.

McGroarty, John Steven, American author, was born in Luzerne county, Pa., 1862. He was educated at Harry Hillman academy, Wilkes-Barre; studied law; and was admitted to the bar, 1894. After two years' practice, he removed from Pennsylvania and finally settled in Los Angeles, 1901. His writings include *Poets and Poetry of Wyoming Valley, Just California, Wander Songs, The King's Highway, California—Its History and Romance, The Mission Play,* and contributions to magazines.

Machiavelli (*mä'kyä-vĕl'lē*), **Niccolò,** Italian statesman and author, son of a jurist of noble family, was born in Florence, 1469. He was secretary of the Ten at Florence from 1498 to 1512; went on several important missions; but was deprived of office and exiled by the Medici. Subsequently he retired to a country estate near San Casciano and devoted himself to literary pursuits. His chief works are *The Prince, Discourses, History of Florence, The Art of War,* comedies, and poems. His noted theory of government is contained in *The Prince* and in the *Discourses.* His maxims of practical statecraft contained in these famous books have given Machiavelli a sinister reputation scarcely justified by a full knowledge of his political ideas. Died, 1527.

McKay, Gordon, American inventor and manufacturer, was born at Pittsfield, Mass., 1821. In 1860, he perfected and brought into practical use a shoe sewing machine originally invented by L. R. Blake. Later he invented the heeler, the lasting machine, and the nailing machine which revolutionized the boot and shoe industry and contributed largely to American leadership in shoe manufacturing. During the Civil War, he leased his machines to more than 60 firms and, in a short time, became a millionaire. In 1878, he organized the McKay Sewing Machine Association, which had a virtual monopoly and collected commissions on all American shoes made by the assistance of his inventions. In 1893, he donated a trust fund of $4,000,000 to Harvard university, to which he later left most of his fortune. Died, 1903.

Mackaye (*mă-kī'*), **Percy,** American dramatist and poet, was born in New York City, 1875. He graduated from Harvard, 1897, and continued literary studies at Leipzig. After residing successively in Rome, Switzerland, and London, he returned to New York and engaged in teaching. Upon joining the literary colony at Cornish, N. H., in 1904, he devoted himself mainly to dramatic work, making notable contributions to American poetic drama. He has composed operas and has produced several community masques written by himself. His works include *The Canterbury Pilgrims, Fenris the Wolf, Jeanne d'Arc, Sappho and Phaon, Anti-Matrimony, The Civic Theatre, Caliban by the Yellow Sands, Rip Van Winkle,* and *Dogtown Common.*

Mackensen (*mäk'ĕn-zĕn*), **August von,** German military leader, was born in Haus Leipnitz, Saxony, 1849. He entered the army in 1869 and served as lieutenant of the reserve during the Franco-Prussian war, 1870-71. In 1882, he was promoted to the general staff. He took a distinguished part in the World War, being one of the leaders in the campaigns against the Russians that culminated in the victories of 1916. He was made field marshal and placed in command of the Teutonic armies which conquered Serbia and Rumania. After the Armistice, he was detained as a prisoner by the French for several months. His writings include several books on military subjects.

Mackenzie, Alexander, Canadian statesman, was born near Dunkeld, Scotland, 1822. He removed to Canada in 1842 and was a contractor and journalist until 1861. He was elected to the Assembly of Upper Canada in 1861 and, beginning in 1867, was a member of the Dominion Parliament for 25 years. Upon the resignation of Sir John Macdonald in 1873, he became the first Liberal premier of the Dominion and continued at the head of the government until the election of a Conservative majority to Parliament in 1878. His administration was responsible, among other important measures, for the introduction of vote by ballot, the creation of the supreme court of Canada, and the institution of the rule by which the governor-general was bound to act on instructions from the Dominion government. Died, 1892.

MacKenzie, Arthur Stanley, Canadian educator and physicist, was born at Picton, N. S., 1865, and was educated at Dalhousie, Johns Hopkins, and Cambridge universities. From 1887 to 1911, he taught at different times in Dalhousie university, Bryn Mawr college, and Stevens institute of technology. In 1911, he became president of Dalhousie university.

Mackenzie, Sir William, Canadian financier and railroad builder, was born at Kirkfield, Ont., in 1849 and was educated in the public schools. He taught school but soon left that occupation to engage in the lumber business. His first experience in railroad building was the construction of a section of the Grand Trunk line in Ontario; later he built part of the mountain division of the Canadian Pacific railroad; and, in 1886, formed a partnership with Sir Donald Mann for the building of the Canadian Northern railway, a transcontinental line that was subsequently incorporated in the Canadian National system. He was knighted in 1911. Died, 1923.

McKim, Charles Follen, American architect, was born in Chester county, Pa., 1847. He was educated at Lawrence scientific school, Harvard, and the Ecole des Beaux-Arts, Paris. He began practice in 1872 and was joined in partnership by William R. Mead in 1877 and by Stanford White in 1879, the firm then becoming McKim, Mead, and White.

He made the designs for the Boston public library; the Columbia University library and the Morgan library, New York; the agricultural building at the World's Columbian exposition, Chicago; and the great Pennsylvania Railway station, New York, completed after his death. With D. H. Burnham and F. L. Olmsted, Jr., he planned the scheme for the improvement of the city of Washington. He had a part also in the plans for Washington arch, for the library and hall of fame of the University of New York, and for Madison Square garden in New York. By his skill in producing monumental effects and by his refined taste, he contributed greatly to architectural progress in the United States. He was elected a member of the American academy of arts and letters in 1905. Died, 1909.

McKinley, William, 25th president of the United States, was born in Niles, Ohio, 1843. He was educated at Poland academy and Allegheny college, though he never finished his course in the latter institution. In 1861, he volunteered in the Union army and entered the Ohio infantry as a private. He served four years, rising by merit to the captaincy of his company and to the rank of major when mustered out in 1865.

He then began the study of law; was admitted to the bar in 1867; and commenced practice at Canton, Ohio. In 1869, he was elected prosecuting attorney for Stark county, where his success attracted local attention. Entering politics, he was elected to Congress in 1876, and was re-elected for six successive terms. In 1882, his election was contested and he was unseated, but he was triumphantly returned at the next election. In 1890, a Democratic legislature grossly gerrymandered his district, making it easy to defeat him for re-election.

His reputation in Congress rests chiefly on the tariff bill that bears his name. This bill and his able advocacy of it before the House distinguished him as the leader of the Republican party on the tariff question. The Republican party went before the country in 1892 almost solely on the issue raised by the McKinley tariff; but a reaction against it had set in, and Cleveland was elected.

In 1891, McKinley was elected governor of Ohio by a large plurality and was re-elected in 1893. By this time, his name was frequently mentioned as a possible candidate for the presidency. In 1895, a systematic canvass in McKinley's behalf was instituted by his supporters and was continued until the election of 1896. He was nominated, and, after a campaign of more intense interest than had been displayed in any election since the Civil War, he was elected.

President McKinley's first term is memorable chiefly for the occurrence of the Spanish American war. That his policy during 1896–1900 was acceptable was shown by his unanimous renomination and by his re-election in 1900 by an electoral majority of 137. His second term began most auspiciously but ended tragically. On September 5, 1901, he visited the Pan-American exposition in Buffalo, that day having been set apart in his honor and called "the president's day." On the afternoon of the following day, while holding a public reception in the Temple of Music, he was shot twice by Leon Czolgosz, an anarchist, who was at once arrested. The wounded president was removed to the residence of John G. Milburn, president of the exposition, and he died there, September 14. His remains lay in state in the Capitol at Washington on the 17th and were taken to his home city, Canton, Ohio, where they were interred on the 18th, amid universal mourning.

Maclaren, Ian. See *Watson, John.*

McLaughlin (*măk-lôk'lin*), **Andrew Cunningham,** American historian and educator, was born at Beardstown,

Ill., 1861. He graduated at the University of Michigan and was instructor there from 1885 to 1891, when he was made professor of American history. In 1906, he was appointed professor of history at the University of Chicago. He was director of the bureau of historical research of the Carnegie institution, Washington, 1903–05. His works include *Lewis Cass*, in the American Statesmen series; *History of Higher Education in Michigan*; *Civil Government in Michigan*; *A History of the American Nation*; and *The Confederation and the Constitution*. He edited *The Study of History in Schools* and *Cyclopedia of American Government*, the latter with A. B. Hart.

MacLean (*măk-lān'*), **James Alexander,** Canadian educator, was born at Mayfair, Ont., 1868, and was educated at the University of Toronto and Columbia university. After serving as professor of political science at the University of Colorado for six years, he was appointed president of the University of Idaho in 1900 and became president of the University of Manitoba in 1913.

MacLeod (*măk-loud'*), **John James Rickard,** physiologist, was born at Aberdeen, Scotland, in 1876; was graduated at Aberdeen university and the University of Leipzig; and, in 1901, became professor of physiology at the University of Aberdeen. He lectured at Western Reserve university, Cleveland, 1903–18, and then went to the University of Toronto as head of the department of physiology. He carried on investigations there with Dr. F. G. Banting on diabetes, and, for their joint discovery of insulin as a means of combatting this disease, they were awarded the Nobel prize for medicine in 1923. He returned to Aberdeen university in 1928 as regius professor of physiology.

McMaster, John Bach, American historian and educator, was born in Brooklyn, N. Y., 1852. He graduated at the College of the City of New York, 1872. After practicing as a civil engineer, he became an instructor in civil engineering at Princeton, 1877–83, and, in 1883, was appointed professor of American history in the University of Pennsylvania, retiring in 1920.

His *History of the People of the United States*, covering the period 1783 to 1861 and valuable for its treatment of social and economic conditions, is a standard work. Among his other writings are *Benjamin Franklin as a Man of Letters*; *With the Fathers*, *Studies in American History*; *Origin, Meaning, and Application of the Monroe Doctrine*; *Daniel Webster*; *The Struggle for the Social, Political, and Industrial Rights of Man*; and *The United States in the World War*.

MacMonnies (*măk-măn'iz*), **Frederick William,** American sculptor, was born in Brooklyn, N. Y., 1863. He studied under Saint-Gaudens in New York, under Falguière in Paris, and also in Munich. In 1886, he received the *prix d'atelier*, the highest prize open to foreigners, and, in 1887, established his own studio in Paris.

Among his numerous works are statues of Nathan Hale, City Hall park, New York, and J. S. T. Stranahan, Prospect park, Brooklyn; "Pan of Rohallion"; "Faun with Heron"; a statue of Sir Henry Vane, Boston public library; a colossal fountain at the World's Columbian exposition, Chicago; "Bacchante with Infant Faun," Metropolitan museum of art, New York, and Luxembourg gallery, Paris; "Venus and Adonis"; "Cupid"; the figure of Victory for the Battle monument, West Point; the central bronze doors and the statue of Shakspere in the Congressional library; the army and navy groups for the Soldiers' and Sailors' arch, Prospect park, Brooklyn; the equestrian statue of General Slocum, Brooklyn; an equestrian statuette of Theodore Roosevelt; an equestrian statue of General G. B. McClellan, Washington; and the colossal group entitled "Civic Virtue" in New York City. He was elected a member of the American academy of arts and letters in 1915. See *Sculpture*.

McMurry, Charles Alexander, American educator, brother of Frank Morton McMurry, was born at Crawfordsville, Ind., 1857. He graduated at the Illinois State normal university, 1876, and studied at the University of Michigan, 1876–80, at Jena, and at Halle, where he received the degree of Ph. D. in 1887. He engaged in teaching and became principal of the practice school of the Illinois State normal university in 1899 and of the Northern Illinois normal school in 1900. In 1915, he was made professor of education in the George Peabody college for teachers, Nashville, Tenn.

With his brother and Charles De Garmo, he was influential in establishing the national Herbart society in 1892 and in introducing Herbartian principles into American pedagogical methods. His works include *The Elements of General Method, Special Method in Literature and History, Special Method in Natural Science, Handbook of Practice for Teachers*, and *Teaching by Project*.

McMurry, Frank Morton, American educator, brother of Charles Alexander McMurry, was born at Crawfordsville, Ind., 1862. He received his education at the University of Michigan, at Halle, and at Jena. He studied also in Geneva and Paris. He was professor of pedagogy at the University of Illinois, 1893-94; became principal of Franklin school, Buffalo, in 1894; and was dean of Teachers college at the University of Buffalo, 1895–98. In 1898, he was appointed professor of elementary education at Teachers college, Columbia university. He was among the early advocates of Herbartian principles in education in the United States. With his brother, he published *The Method of the Recitation* and with R. S. Tarr the *Tarr and McMurry Common School Geographies*. His writings also include *How to Study and Teaching How to Study* and *Elementary School Standards*.

McReynolds, James Clark, American cabinet officer and jurist, was born at Elkton, Ky., 1862. He graduated at Vanderbilt university and at the University of Virginia. He began practice in Nashville, Tenn., and became professor of law in Vanderbilt university, 1900. From 1903 to 1907, he was assistant attorney-general of the United States and, in 1913, was made attorney-general by President Wilson. In securing the enforcement of the Sherman Anti-trust law, he had direction of the dissolution suits against several large corporations. In 1914, he was appointed associate justice of the United States supreme court.

Madison, James, fourth president of the United States, was born at Port Conway, Va., 1751. He graduated at Princeton, 1771, and studied law. In 1776, he was a member of the Virginia convention, and, though too modest for an orator, he became one of the most eminent, accomplished, and respected of American statesmen.

He was sent to the Federal Congress, 1780, and, in 1784, to the legislature of Virginia, in which he supported the measures of Jefferson in the revision of the laws and in placing all religious denominations on an equality of freedom without state support. As a member of the convention of 1787, which framed the Federal Constitution, Madison took complete notes in shorthand, thus producing the only record of its proceedings and debates. With Jay and Hamilton, he wrote the *Federalist* in order to induce New York to adopt the Federal Constitution. He supported the adoption of the Constitution but opposed the financial policy of Hamilton and became a leader of the Republican, or Jeffersonian, party. In 1792, he became the leader of the Republican party in Congress, and wrote the Kentucky resolutions of 1798, which contain the basis of the State Rights doctrines. In 1801, Jefferson having been elected president, Madison was made secretary of state, which post he held during the eight years of Jefferson's administration.

In 1809, Madison became president of the United States. The European wars of that period, with their blockades and orders in council, were destructive of American commerce. The claim of the English government to impress seamen from American vessels was violently resisted. Madison vainly endeavored to avoid a war with England, which, nevertheless, was declared in 1812 and continued for over two years. He was elected for a second term, during which he approved the establishment of a national bank as a financial necessity—a measure he had previously opposed and vetoed. In 1817, he retired to his seat at Montpelier, Va., where he served as a rector of the University of Virginia. Died, 1836. He was elected to the American hall of fame in 1905.

Mæcenas (*mē-sē'năs*), **Gaius Cilnius,** Roman statesman, was born about 70 B. C. He was the friend of Virgil and Horace and was celebrated for his patronage of letters. He had a talent for private diplomacy and was employed mainly in that capacity. In 36, he was in Sicily, helping Octavian. Five years later, when the latter was fighting the great sea battle of Actium with his rival Antony and the Egyptian Cleopatra, Mæcenas proved himself an able and vigilant governor of Rome by crushing a conspiracy of the younger Lepidus, thereby preventing a second civil war. Died, 8 B. C.

Maeterlinck (Du., *mā'tĕr-lĭngk*; F., *mā'tĕr'lăNk'*), **Maurice,** Belgian poet and dramatist, was born at Ghent, 1862. He was educated for the law, but early turned his attention to writing. In 1896, he located in Paris and devoted himself entirely to literature, producing, besides many plays and poems, a number of philosophical works, which have been widely translated. The best known of these are *Wisdom and Destiny*, *The Treasure of the Humble*, *The Buried Temple*, and *The Life of the Bee*.

Among his dramatic works are *The Blind*, *The Intruder*, *The Seven Princesses*, *Alladine and Palomides*, *Sister Beatrice*, *Monna Vanna*, *Joyzelle*, *The Blue Bird*, *Mary Magdalene*, and *The Betrothal*. Several of Maeterlinck's plays have been presented on the American stage, *Monna Vanna* and especially *The Blue Bird* having become well known.

Maeterlinck is a mystic and a symbolist, and created the so-called static drama. In some respects Maeterlinck resembles Poe and Emerson, both of whom influenced his development. In 1911, he was awarded the Nobel prize for literature. See *Bluebird, Pelléas et Mélisande*.

Magellan, or **Magalhaens, Ferdinand,** Portuguese navigator, was born about 1480. He served his country in the East Indies and Morocco, but, becoming dissatisfied

with King Manuel's treatment of him, he offered his services to Spain.

Under Charles V's patronage, Magellan set out in 1519 to reach the Moluccas by the west. Early in 1520, he had reached the Rio de la Plata and, after some months' delay, he passed through the strait called by him Todos los Santos but later renamed, in his honor, the Strait of Magellan. He then sailed across the ocean named by him the Pacific and reached the Philippine Islands. Since, on a previous voyage, he had sailed from Europe farther east than these islands, he had by this time actually circumnavigated the globe. He did not, however, complete his last voyage, but, having become involved in military operations in the Philippine Islands, he was killed in action, 1521. His ship, the *Vittoria*, under the command of Sebastian del Cano, arrived in Spain the next year, after completing the first trip around the world.

Mahan (*mȧ-hȧn'*), **Alfred Thayer,** American naval officer and writer, was born at West Point, N. Y., 1840. He graduated at the United States naval academy, 1859; served in the Civil War; was president of the naval war college, 1886–89 and 1892–93; and visited Europe in command of the *Chicago*, 1893–95, receiving many honors, including degrees from both Oxford and Cambridge. He was retired at his own request in 1896. During the war with Spain, he was a member of the naval board of strategy.

By his great historical work, *Influence of Sea Power Upon History*, Mahan established an international reputation. His other works, likewise of a high order, include *The Gulf and Inland Waters*, *Life of Admiral Farragut*, *Life of Nelson*, *The Interest of the United States in Sea Power*, *The Problem of Asia*, *Types of Naval Officers*, *From Sail to Steam*, *Naval Administration and Warfare*, and *Armaments and Arbitration*. He was elected to the American academy of arts and letters in 1905. Died, 1914.

Mahomet. See *Mohammed*.

Main, John Hanson Thomas, American educator, was born at Toledo, Ohio, in 1859. He graduated at Moores Hill college, Ind., and Johns Hopkins university. He was professor of ancient languages at Moores Hill college, 1880–89, and, in 1890, became assistant professor of Greek and Latin at Woman's College of Baltimore. In 1892, he was made acting president of Iowa college, now Grinnell college; was dean of the faculty there from 1902 to 1906; and, in the latter year, became president of the college. After the World War, he served as a member of the American relief commission to the Near East.

Major, Charles, American lawyer, author, and novelist, was born in Indianapolis, Ind., 1856. He was educated in the common schools, studied law, was admitted to the bar, and engaged in practice at Shelbyville. In 1898, he published *When Knighthood Was in Flower*, which met with great popular success. This was followed by *The Bears of Blue River*, *Dorothy Vernon of Haddon Hall*, *A Forest Hearth*, *Uncle Tom Andy Bill*, *A Gentle Knight of Old Brandenburg*, *The Little King*, and *Touchstone of Fortune*. He used the pen name Edwin Caskoden. Died, 1913.

Malibran (*mȧ'lē'brȧN'*; E., *mȧl'ĭ-brȧn*), **Maria Felicita,** Spanish mezzo-soprano operatic singer, daughter of Manuel García, was born at Paris, 1808. She very early showed extraordinary talent and made her début in Italian opera, in London, 1825. Shortly afterward, her father attempted to establish Italian opera in New York, but without success. There she married M. Malibran, a French banker. After her husband's failure in business, she returned to the stage. She was received with great enthusiasm in France, England, Germany, and Italy and became one of the most popular and successful prima donnas of modern times.

She divorced M. Malibran and, in 1836, married Charles de Bériot, a famous violinist. In September of that year, however, she died at Manchester, England. A statue was erected to her memory in Brussels, where she last resided.

Malory, Sir Thomas, author of the celebrated *Morte D'Arthur*, flourished in England about 1470. Nothing is positively known concerning his life except the statements in the preface and at the end of his famous book. Some have identified him with a Sir Thomas Malory of Warwickshire who died in 1470. His translation of *Morte D'Arthur* from French sources was completed in 1469 or 1470 and was delivered to Caxton, who printed it in 1485. It contains the great stories of the King Arthur legend—the tales of Lancelot and Guinevere, Tristan and Isolt, and other famous knights and ladies that appear in Tennyson's *Idylls of the King*. See *Morte D'Arthur*, *Round Table*.

Malpighi (*mȧl-pē'gē*), **Marcello,** Italian anatomist, was born near Bologna, 1628. He lectured in Bologna, Pisa, and other places and wrote works on the anatomy of plants, the physiology of the silkworm, and medical subjects. He is known for his discoveries in capillary circulation and in connection with the anatomy of the kidneys. In 1691, he became physician to Pope Innocent XII. Died, 1694.

Malthus (*mȧl'thŭs*), **Thomas Robert,** English economist, was born near Guildford, Surrey, 1766. He graduated at Cambridge, 1788, and was for some time fellow of Jesus college. In 1798, he published his celebrated *Essay on Population*, in which he maintained that population tends to increase out of proportion to the increase of means of subsistence. He predicted a period of overpopulation on the earth and advocated moral restraint in order to check the birth rate. The influence of Malthus on economics, sociology, and biology has been extraordinarily far-reaching.

Beginning in 1807, Malthus held, throughout the remainder of his life, the professorship of history and political economy in the East India Company's college, Haileybury. Others of his works are *The Nature and Progress of Rent* and *Political Economy*. Died, 1834.

Manet (*mȧ'nĕ'*), **Edouard,** pioneer French impressionist painter, was born at Paris, 1832. In 1850, he began a period of five years' study with Couture, after which he traveled in Holland, Germany, Italy, and Spain, where he was influenced by the work of Velasquez. He later developed a style which proved highly successful in modern painting. The chief tenet of the school practicing this style is that "things should be represented, not as experience teaches us they are, but as they appear to the eye of the painter." While his principles of art were ably defended by his friend Zola, the importance of his work was not fully realized until after his death, which occurred at Paris in 1883.

Mann, Horace, American educational reformer and statesman, was born at Franklin, Mass., 1796. He graduated at Brown university, 1819; studied law; and was admitted to the bar, 1823. He was a member of the Massachusetts legislature, 1827–37 and, in the latter year, became secretary of the Massachusetts board of education, continuing to act until 1848, when he was elected to Congress. He sat as a member until 1853 and was then made president of Antioch college, Ohio. He wrote *Lectures on Education*; *Report of an Educational Tour of Germany, Great Britain, and Ireland*; and *On the Study of Physiology in Schools*.

Horace Mann was untiring in his efforts in the cause of educational reform, in the suppression of slavery, and in the promotion of temperance. By his effective championship of modern educational ideas, he inspired the whole teaching body, and his numerous reports have become classics of educational literature. It was through his efforts that the first normal school in the United States was established, 1839, at Lexington (now Framingham), Mass. He has been justly called the father of the American free public school of today. He died in 1859 and was elected to the American hall of fame in 1900. See *Educational Reformers*.

Mann, James Robert, American politician and legislator, was born at Bloomington, Ill., 1856. He graduated at the University of Illinois, 1876, and, in 1881, he graduated from Union college of law at Chicago, where he was admitted to the bar and established a successful practice. He was elected to Congress for consecutive terms from 1897 to 1923. In 1911, he was chosen floor leader of the Republican minority in the House of Representatives. He won wide reputation as a debater in opposition to the canal tolls, currency, and tariff policies of the Democratic majority. In 1917, he was Republican candidate for speaker. Died, 1922.

Mann, Thomas, German author, was born at Lubeck in 1875, the son of a wealthy merchant and a Creole lady of Portuguese descent. He entered the insurance business, but soon abandoned that occupation for a more or less nomadic career made possible by the financial success of his writings. His works include *Die Buddenbrooks*, *Der Tod in Venedig*, *Tonio Kröger*, and *Königliche Hoheit*. These and other novels, short stories, and essays entitle Mann to a foremost place among Germany's prose writers of the early 20th century.

Manning, Henry Edward, English prelate, was born at Totteridge, 1808. He graduated at Oxford in 1830; studied theology; was appointed rector of Lavington with Graffham, Sussex, 1834, and archdeacon of Chichester, 1841. In 1851, he withdrew from the Church of England and joined the Roman Catholic Church; was ordained a priest in the same year; was nominated archbishop of Westminster, 1865; and was created cardinal in 1875. He founded a Roman Catholic college at Kensington, 1863, and took an active part in the Vatican Council, vigorously defending the dogma of papal infallibility. His controversial writings are very voluminous and include *Unity of the Church*, *The Temporal Mission of the Holy Ghost*, *Temporal Power of the Pope*, and *England and Christendom*. Died, 1892.

Mansfield, Richard, actor, was born, 1857, in Helgoland, Germany, the son of an English merchant. He studied painting at South Kensington, England, and later came to Boston, where he was employed as a clerk, painting during spare hours. Failing to sell his pictures upon his return to England, he entered the theatrical profession. At first he played small parts in comic opera. His first American appearance was at New York in *Les Manteaux Noirs*. He was

very successful in a wide repertoire and attained foremost rank among American actors. As manager of his own company, he created such parts as Beau Brummell, Baron Chevrial, and the titular rôles in *Dr. Jekyll and Mr. Hyde*. In 1898, he appeared as Cyrano de Bergerac and played Shylock, Henry V, Beaucaire, Brutus in *Julius Cæsar*, and leading parts in *The Scarlet Letter, Arms and the Man, The Devil's Disciple, Old Heidelberg, Ivan the Terrible, Don Carlos, The Misanthrope*, and *Peer Gynt*. Died, 1907.

Manship, Paul, American sculptor, was born at Saint Paul, Minn., in 1885. He received his education in art at the Pennsylvania academy of fine arts and the American academy at Rome. His work exhibits a classic precision combined with a Western virility and sense of reality. The element of design is prominent in his figures, and he has adopted many suggestions of Greek sculpture, accommodating them to his modern decorative themes. Among the products of his art are "The Awakening of Spring," "Salome," "Playfulness," "Portrait of a Baby Three Weeks Old," and "Centaur and Dryad," the original of the last being in the Detroit museum of art.

Mantegna (*măn-tän'yä*), **Andrea,** Italian painter, chief master of the Paduan school, was born at Vicenza, 1431. He was the favorite pupil and adopted son of Squarcione, the tailor-painter. A precocious genius, he set up a studio of his own when only 17 years old. About 1460, he was induced by Lodovico Gonzaga, duke of Mantua, to settle in that city. There he spent the remainder of his life with the exception of a visit to Rome, 1488–90, to paint a series of frescoes for Pope Innocent VIII.

Mantegna's greatest works produced at Mantua include the nine tempera pictures representing the "Triumph of Cæsar," now at Hampton court, England. Mantegna was also the greatest engraver of northern Italy. His *Entombment* had a deeper effect on art than did any other engraving ever executed, its composition being adopted later by Raphael, Holbein, and Dürer. His work throughout was characterized by strength, realism, and a wide and accurate knowledge of antique art. Died, 1506.

Mantell (*măn'tĕl*), **Robert Bruce,** actor, was born in Irvine, Ayrshire, Scotland, 1854. He made his professional début at Rochdale, England, as the sergeant in *Arrah-na-Pogue*, 1876. He came to the United States in 1878 and played juvenile rôles in the company of Modjeska. His first appearance on the London stage was in 1880. In 1882, he returned to America, where he took the rôle of Loris Ipanoff in *Fédora* with Fanny Davenport. He afterward became a star and appeared with his own company in classic and romantic plays, including *Hamlet, Othello, Richard III, Macbeth, Romeo and Juliet, Richelieu, Lady of Lyons, Monbars, and The Dagger and The Cross*. Died, 1928.

Manzoni (*măn-dzō'nē*), **Alessandro,** Italian novelist and poet, was born at Milan, 1785. His first tragedy, *Il Conte di Carmagnola*, published in 1820, was warmly praised by Goethe; but the work which gave him European fame is his historical novel, *I Promessi Sposi*, a Milanese story of the 17th century and probably the greatest novel in all Italian literature. His noble ode *Il Cinque Maggio* was inspired by the death of Napoleon. Although a devout Catholic, he was a strong advocate of a united Italy. He died at Milan, 1873, leaving the memory of a great writer and a singularly noble man. For his funeral, Verdi composed the celebrated *Manzoni Requiem*.

March, Francis Andrew, American philologist and author, was born at Millbury, Mass., 1825. He graduated at Amherst, 1845; studied law; and was admitted to the New York bar in 1850. From 1856 to 1906, he was professor of English language and comparative philology at Lafayette college. In 1879, he was chosen head of the American staff of the *New English Dictionary*, prepared under the editorship of Sir J. A. H. Murray.

March's writings include *Method of Philological Study of the English Language, Comparative Grammar of the Anglo-Saxon Language, Anglo-Saxon Reader*, many addresses, and articles in encyclopedias and periodicals. He edited *Latin Hymns, with English Notes*; *Eusebius*; *Tertullian*; *Athenagoras*; and, with his son F. A. March, Jr., *A Thesaurus Dictionary of the English Language*. Died, 1911.

March, Peyton Conway, American general, son of Francis Andrew March, the philologist, was born at Easton, Pa., 1864. He graduated at Lafayette college, 1884, at the United States military academy, West Point, 1888, and at the artillery school, Fort Monroe, 1898. He served with distinction in the Philippines, 1898–1901, rising from the rank of second lieutenant to that of lieutenant colonel. From 1903 to 1907, he was a member of the general staff and, in 1904, was military attaché to observe the Japanese army in the Russo-Japanese war. In 1917, he was army artillery commander of the American expeditionary forces in France and was promoted to the rank of major general. In 1918, he was appointed chief of staff with the rank of general of the United States army. At his own request, he was retired from active service in 1921.

Marchesi (*mär-kā'zē*), **Mathilde,** née Graumann, singing teacher, was born at Frankfort on the Main, 1826. After receiving vocal training under Nicolai at Vienna and under Manuel García in Paris, she appeared as a concert singer in London and in Continental capitals. In 1852, she married Salvatore Marchesi. She taught voice at the Vienna conservatory from 1854 to 1861 and then went to Paris, where her salon became an important factor in the musical life of the city.

The list of her distinguished pupils includes Tremelli, Caroline Sulla, Etelka Gerster, Melba, Emma Eames, Calvé, Sibyl Sanderson, and her own daughter, Blanche Marchesi. She is the author of an *Ecole de Chant* and numerous books of *Vocalises*. Her *Ten Singing Lessons* appeared in English in 1901. Died in 1913.

Marconi (*mär-kō'nē*), **Guglielmo,** electrical engineer and inventor, was born at Bologna, 1874. His father was Italian and his mother was Irish. He was educated at Leghorn and Bologna universities.

On his father's estate, 1890, he began experiments to test the theory that the Hertzian electrical waves are capable of passing through any substance and, if started in any given direction, of following an undeviating course without need of a wire or other conductor. These experiments led to the invention of an apparatus for wireless telegraphy, which attracted the attention of Sir William Henry Preece and successfully stood a test conducted by him in England.

Marconi soon afterward succeeded in sending messages from Spezia to a steamer fifteen kilometers distant. He came to the United States, 1899; used his method in reporting the election, 1900; and succeeded, 1902, in establishing wireless telegraphic communication across the Atlantic Ocean. A daily ocean news service by wireless telegraphy was inaugurated by him on transatlantic liners in 1904.

He invented a directive method of wireless telegraphy, 1905; devised a persistent-wave system, 1906; and, in 1907, began a public service of wireless telegraphy across the Atlantic. In 1910, he brought out a new receiver and other improvements, by which the Marconi Company's station in Argentina was enabled to receive signals from Nova Scotia and from Ireland, a distance of 5600 miles. When Italy entered the World War, Marconi assumed charge of his government's wireless service. With Ferdinand Braun, he was awarded the Nobel prize for physics, 1909. See *Radiotelegraphy*.

Marcosson, Isaac Frederick, American editor and author, was born at Louisville, Ky., in 1877 and was educated in the public schools. He was connected, in an editorial capacity, with the Louisville *Times*, *World's Work*, *Saturday Evening Post*, and *Munsey's Magazine*. His publications include *How to Invest Your Savings*, *The War After the War*, *Peace and Business*, and *An African Adventure*.

Marcus Aurelius Antoninus. See *Aurelius, Marcus*.

Marcy, William Learned, American statesman, was born at Southbridge, Mass., 1786. Following his graduation from Brown university in 1808, he studied and practiced law in Troy, N. Y. After serving in the War of 1812, he entered politics and became prominent in the Albany Regency. In 1831, he was elected United States senator, resigning to become governor of New York, to which office he was elected by the Democrats in 1832, 1834, and 1836. In 1845, he was made secretary of war under Polk, serving throughout the trying period of the Mexican war and taking an influential part in settling the Oregon boundary question. He entered Pierce's cabinet as secretary of state in 1853 and handled with marked ability such problems as the Mexican boundary dispute, the Canadian Reciprocity Treaty, the British fishery question, and the Koszta affair. He ranked high as an administrative statesman in both domestic and foreign affairs. Died, 1857. See *Albany Regency, Koszta Incident*.

Marden, Orison Swett, American editor and author, was born at Thornton, N. H., about 1850. He graduated from Boston university, 1877, and from Harvard medical school, 1881. In 1897, he established the *Success* magazine, of which he was editor until 1912. Among his published works are *Pushing to the Front, The Secret of Achievement, The Hour of Opportunity, Stepping Stones, Training for Efficiency, Hints for Young Writers, The Crime of Silence*, and *Masterful Personality*. Died, 1924.

Margaret of Angoulême (*ăn'gōō'lăm'*), queen of Navarre and daughter of Charles of Orleans, was born in 1492. In 1527, she was married to Henri d'Albret, king of Navarre, to whom she bore a daughter, Jeanne d'Albret, mother of the great French monarch Henry IV. She encouraged the arts and learning. To a certain extent she embraced the cause of the Reformation, and she never ceased to act with a courageous generosity toward the Reformers, who always found an asylum and a welcome in Navarre. She is the author of the *Heptameron*, a narrative poem descriptive of the world's creation. Died in 1549.

Maria Theresa (*mȧ-rī'ȧ tē-rē'sȧ*), daughter of the emperor Charles VI of Germany, was born at Vienna, 1717. In 1736, she married Francis of Lorraine, afterward grand duke of Tuscany; at her father's death, in 1740, she became queen of Hungary and Bohemia and archduchess of Austria.

At her accession, the monarchy was exhausted, the people were discontented, and the army was weak, while Prussia, Bavaria, Saxony, and Sardinia, abetted by France, put forward claims to her dominions. The young queen was saved by the chivalrous fidelity of the Hungarians, supported by Great Britain. Their aid, however, did not prevent her losing, through the war of the Austrian succession, 1740–48, Silesia to Prussia, Parma and Piacenza to Spain, and some Milanese districts to Sardinia. On the other hand, her rights were admitted, and her husband was recognized as emperor.

The loss of Silesia continued to rankle in her mind; and, with France as an ally, she renewed the contest with the Prussian king. But the issue of the Seven Years' war, 1756–63, was to confirm Frederick in the possession of Silesia. She joined with Russia and Prussia in the first partition of Poland, 1772, securing Galicia and Lodomeria, while, from Turkey, she obtained Bukowina in 1777. She secured also several districts from Bavaria.

A woman of majestic figure and an undaunted spirit, she combined feminine tact with masculine energy, and raised Austria from a wretched condition to a position of assured power. She died in 1780. See *Austrian Succession, War of.*

Marie, queen of Rumania, was born at Eastwell, Kent, England, in 1875, a granddaughter of Queen Victoria and of Alexander II of Russia. Her early life was spent in England, Malta, and Germany. When 17 years of age, she was married to Ferdinand, heir to the Rumanian throne, to which he succeeded in 1914. By her tact, beauty, and energy, Queen Marie exerted an unofficial but powerful influence on Rumania's part in the World War and in the favorable settlement at the Paris peace conference. She has written, among other books, *The Story of Naughty Kildeen* and *The Voice on the Mountain.*

Marie Antoinette (*mȧ'rē' ăn'twȧ'nĕt'*), **Josèphe Jeanne,** wife of Louis XVI of France, youngest daughter of Francis I, emperor of Germany, was born at Vienna, 1755. Her mother was the famous Maria Theresa. At the age of 14, she was betrothed to the dauphin and married at Versailles.

Soon after the accession of Louis XVI, libels were circulated by her enemies, accusing her of intrigues in the interests of Austria. From the first hour of the Revolution, she was an object of fanatical hatred to the mob of Paris. At last she resolved on flight. Her husband long refused to abandon his country, and she would not go without him. Finally he consented, and the flight took place on the night of June 20, 1791. The royal fugitives were recognized and captured at Varennes. She was suspected, not unjustly, of inviting an invasion of France by Austrian forces, and, after the storming of the Tuileries, she was confined in the Temple. On October 16, 1793, she was condemned by the Revolutionary tribunal and was guillotined the same day.

Marion, Francis, American general and patriot, was born near Georgetown, S. C., 1732. He served in the Cherokee war, 1759–61, and, at the outbreak of the Revolution, was chosen a delegate to the South Carolina congress. He was present at the siege of Charleston, 1780; raised several companies of volunteers among the country lads, or "cowboys," as the British called them; and, with this force, marched to the relief of General Gates, at that time in North Carolina. Marion's men proved of the greatest value through their intimate knowledge of localities and their native shrewdness, which earned for their leader the sobriquet of "Swamp Fox." Among the most noted engagements in which Marion took part were those at Fort Motte, Fort Watson, Parkers Ferry, and Eutaw Springs. Died, 1795.

Mariotte (*mȧ'rē'ŏt'*), **Edmé,** French natural philosopher, was born in Burgundy about 1620. He was educated for the Church and became the prior of Saint Martin sous Beaune, near Dijon. Turning his attention to science, he did much to promote experimental research in France and was one of the first members of the French academy of sciences, founded in 1666. In his *Treatise on the Nature of Air,* he published, in 1676, the discovery that the volume of a gas varies inversely as the pressure to which it is subject, a principle since known in France as Mariotte's law. This same discovery was made 16 years earlier by Robert Boyle in England, where it is known as Boyle's law. Mariotte published also *Traité du mouvement des eaux.* Died, 1684.

Marius (*mā'rĭ-ŭs*), **Gaius,** Roman general, was born near Arpinum about 156 B. C. He served with distinction at Numantia under the younger Scipio Africanus and, in 119, was tribune of the plebs. In 114, he went to Spain as prætor. He then married Julia, the aunt of Cæsar.

Marius served in Africa during the war against Jugurtha, and, as consul, he closed the Jugurthine war in 106. Meanwhile an immense horde of Cimbri and Teutones had burst into Gaul and repeatedly defeated the Roman forces. After two years' fighting, Marius annihilated the Teutones in a terrible two days' battle near Aix, in Provence, where 100,000 Teutones were slain. Then, turning to the Cimbri in north Italy, he crushed them also near Vercellæ in 101. Marius was declared the savior of the state and the third founder of Rome, and, in 100, was made consul for the sixth time.

When Sulla as consul was intrusted with the conduct of the Mithridatic war, Marius, insanely jealous of his patrician rival, attempted to deprive him of the command, and a civil war began in 88. Marius was soon forced to flee, and, after frightful hardships and hairbreadth escapes, he made his way to Africa. Here he remained until a rising of his friends took place under Cinna. He then hurried back to Italy and, with Cinna, marched against Rome, which was compelled to yield. Marius and Cinna were elected consuls for the year 86, but Marius died 17 days after taking office.

Markham, Sir Clements Robert, English traveler, geographer, and author, was born at Stillingfleet, 1830. After attending Westminster school, he entered the navy, 1844, and accompanied the expedition sent in search of Sir John Franklin, 1851. In 1859–62, he traveled in Peru, from which country he introduced into British India the cultivation of the quinine-yielding cinchona trees. He was geographer to the British expedition to Abyssinia, 1867-68. He then became editor of the *Geographical Magazine* and later president of the royal geographical society. His works include *Franklin's Footsteps, Travels in Peru and India, A History of the Abyssinian Expedition, Richard III, Quichua Dictionary,* and *The Incas of Peru.* Died, 1916.

Markham, (Charles) Edwin, American poet, was born in Oregon City, Oreg., 1852. He went to California, 1857, and, during his boyhood, worked at farming and blacksmithing. Earning his way through two Western colleges, he pursued special studies in ancient and modern literature and in Christian sociology. He became a teacher and was principal and superintendent of schools in California until his removal to New York in 1899. In early youth, he began writing poems for California newspapers and later won recognition in Eastern magazines. Some of his poems, notably his "Lincoln" and "The Man with the Hoe," have become widely known. He was elected to the American academy of arts and letters in 1929. His writings also include *Field Folk—Interpretations of Millet; Virgilia, and Other Poems; The Poetry of Jesus; Children of Bondage; California the Wonderful;* and *Gates of Paradise.*

Marlborough, John Churchill, Duke of, English general and diplomat, was born in 1650. Through the influence of his sister, he obtained a commission with the duke of York, and he first served under Turenne. He deserted James II at the revolution of 1688, but, though created earl and commander in chief by William III, intrigued with his former master. After a period of disgrace, he went to The Hague to organize the Grand Alliance. Under Queen Anne, he was appointed captain general and duke and won the victories of Blenheim, 1704; Ramillies, 1706; Oudenarde, 1708; and Malplaquet, 1709. He was recalled in 1711 and was dismissed on a charge of peculation, but was restored by George I in 1714. Among great military commanders he is one of the few who never lost an important battle and never failed in a campaign. Died, 1722.

Marlowe, Christopher, English dramatist, was born at Canterbury, 1564. He graduated at Cambridge, 1583, and took his master's degree there in 1587. His literary associates included Kyd, Nash, Greene, Chapman, Raleigh, and probably Shakspere. He was the first to attain mastery of the blank verse adopted by the dramatists of his period, using it with wonderful vigor. In English dramatic literature, he is the most important predecessor of Shakspere. His chief plays are *Tamburlaine; Doctor Faustus,* to which Goethe acknowledged his obligations; *The Jew of Malta; Edward the Second.* He was killed, 1593, in a tavern brawl at the age of 29. See *Faustus.*

Marlowe, Julia, actress, was born in Caldbeck, England, 1870. Her real name is Sarah Frances Frost. She came to the United States with her parents at the age of five, locating finally in Cincinnati; attended public schools until her 12th year; and then joined a juvenile opera company. At 16, she began serious study for the stage. She made her metropolitan début as Parthenia in *Ingomar* and, from 1888, played throughout the United States with increasing distinction in Shaksperian and other tragic and romantic rôles.

She was married to Robert Taber, with whom she played for a time, but, in 1899, they were divorced. In 1904, she became leading woman with E. H. Sothern, whom she married in 1911, appearing chiefly in Shaksperian plays and meeting with great success as Portia, Juliet, Beatrice, and Rosalind. In artistic merit and in popularity, the Sothern and Marlowe productions were among the most notable of recent revivals of Shakspere.

Marquette (*mär'kĕt'*), **Jacques,** French Jesuit missionary and American explorer, was born at Laon, France, 1637. He founded Sault Sainte Marie and Kaskaskia missions; accompanied Joliet in his exploration of the Mississippi; and died, 1675, while attempting to establish a mission among the Illinois Indians.

Marryat (*măr'ĭ-ăt*), **Frederick,** English novelist, was born in Westminster, 1792. For many years he served in the navy, in which he rose to the rank of post captain. He devised a signal system for the mercantile marine. The many novels from his pen include *Frank Mildmay, The King's Own, Mr. Midshipman Easy, Japhet in Search of a Father, Jacob Faithful, The Phantom Ship,* and *The Privateer's Man.* Died, 1848.

Marsh, Othniel Charles, American zoologist and paleontologist, was born at Lockport, N. Y., 1831. He attended Phillips academy, Andover, and graduated at Yale in 1860. After a period of study at Berlin, Heidelberg, and London, he was appointed in 1866 to the chair of paleontology at Yale, which he filled with great distinction.

Marsh made valuable contributions to science by his discovery and description of new fossil vertebrates from the Western states and territories. At his own expense, he organized and conducted exploring and collecting expeditions involving an outlay of $250,000. He described several hundred species of fossil vertebrates, including such remarkable types as flying lizards and toothed birds. His discoveries of the fossil ancestors of the horse marked a new era in evolutionary science. Among his publications, embracing 237 titles, some of the most important are *Birds with Teeth, The Gigantic Mammals of the Order Dinocerata, The Dinosaurs of North America, Dinocerata,* and *The Ceratopsia.* Died, 1899.

Marshall, John, American jurist, was born in Fauquier county, Va., 1755. In 1781, he began to practice law in his native county and soon rose to the head of the Virginia bar. He was a member of the Virginia state legislature and of the state convention that adopted the Constitution. In 1797, he was sent as an envoy to France with Pinckney and Gerry. In 1798, he was elected to Congress and, in 1800, became secretary of state. He was made chief justice of the United States supreme court by President John Adams in 1801.

Marshall's great legal learning and judicial poise dominated the supreme court for 34 years, during which his decisions on constitutional questions established precedents in the interpretation of the Constitution that have been accepted ever since. He has perhaps never been excelled by any American jurist in power of analysis, lucidity of statement, and in ability to present a legal proposition from so many different points of view. Died, 1835, and was elected to the American hall of fame in 1900. See *Federalists.*

Marshall, Louis, American lawyer, was born at Syracuse, N. Y., in 1856. He received his education in the public and high schools of Syracuse and in the Columbia law school. In 1878, he engaged in law practice in his native city. Later he became a member of the legal firm of Guggenheim, Untermeyer, and Marshall, New York City. Specializing in constitutional and corporation law, Marshall argued many important cases in the higher courts. He was a member of the New York constitutional conventions of 1890, 1894, and 1915. In 1910, he was mediator in settling the cloakmaker's strike. The conditions of settlement have since been made the basis for numerous other strike adjustments.

Marshall has served as an official or as a trustee of various educational, religious, and philanthropic institutions and has taken an active part in Jewish charitable enterprises. He acted as president of the American Jewish relief committee, which, with affiliated organizations, collected to 1921 more than 50 million dollars for the aid of Jewish war sufferers. In 1910, he became a trustee of Syracuse university, to which he presented a law library.

Marshall, Thomas Riley, American lawyer and politician, was born in North Manchester, Ind., in 1854. He was educated at Wabash college. On his 21st birthday, he was admitted to the bar at Columbia City, Indiana, where he practiced as member of the firm of Marshall and McNagny until 1892 and later of Marshall, McNagny, and Clugston. He attained success in his profession and became known as an orator and after-dinner speaker. In 1908, he was elected governor of Indiana for the term 1909–13. During his administration, he advocated the direct election of United States senators, legislation against race track gambling, and an employers' liability law. He was elected vice president in 1912 and was re-elected in 1916. He wrote his *Reminiscences* shortly before his death in 1925.

Martel, Charles. See *Charles Martel.*

Martin, Homer Dodge, American landscape painter, was born at Albany, N. Y., 1836. He was essentially self-taught; first exhibited at the national academy in 1857; and, in 1862, located in New York. Beginning with 1881, he spent five years in France, where he came under the influence of Boudin and Corot.

Martin was a leader among the artists of the Hudson River school. With George Inness and Alexander Wyant, he is ranked as one of the three great masters of American landscape. Among his best-known works are "The Old Mill," "Old Manor House," "The Iron Mine," "Newport Neck," "Lighthouse at Honfleur," and "Lake Sandford." His view on the Seine, called by him "Harp of the Winds," his "Sand Dunes, Lake Ontario," and "Mounts Adams and Jefferson" are in the Metropolitan museum, New York. Died, 1897.

Martin, Riccardo, American operatic tenor, was born at Hopkinsville, Ky., 1878. He manifested musical talent at an early age and, in 1893, went to Germany to study the piano. Later he devoted himself to composition and orchestration under MacDowell at Columbia university. In 1900, he went to Florence for vocal instruction under Lombardi. He finished his vocal preparation with Sbriglia and Escalais in Paris and made his operatic début as Faust at Nantes in 1904. After singing two years in Milan and Verona, he joined the San Carlo Opera Company, with which he made his first appearance in opera in America at New Orleans in 1906. In 1907, he began singing lyric rôles at the Metropolitan opera house, New York, and later appeared successfully at Covent Garden, London, and in Mexico. In 1920, he joined the Chicago Opera Company.

Martineau (*mär'tĭ-nō*), **Harriet,** English writer, of Huguenot descent, was born at Norwich in 1802. At 19, she began contributing to magazines. She became a prolific writer of essays on history, politics, economics, and philosophy and did much to popularize the advanced thinking of her day. Besides *Deerbrook, The Hour and the Man,* and other novels, she wrote many tales for children. She is also author of a condensation of Comte and of *History of England During the Thirty Years' Peace.* Died, 1876.

Martineau, James, English theologian, brother of Harriet Martineau, was born at Norwich, 1805. He graduated at Manchester college, 1827, and preached as a Unitarian minister at Dublin and Liverpool. In 1840, he was appointed professor of mental and moral philosophy at Manchester New college, Liverpool, of which, after its transfer to London, he was principal, 1868–85. He received degrees from Harvard, Oxford, and Edinburgh in recognition of his ability as one of the profoundest thinkers and most effective writers of his day. His works include *The Rationale of Religious Inquiry, Studies of Christianity, Hours of Thought on Sacred Things, A Study of Spinoza, Types of Ethical Theory,* and *The Seat of Authority in Religion.* Died in 1900.

Martinelli (*mär'tē-nĕl'lē*), **Giovanni,** operatic tenor, was born near Venice, Italy, in 1885. He made his début as Ernani in Milan. Being heard by Puccini at Rome, he was engaged to appear in "The Girl of the Golden West"; sang at Covent Garden, London, in 1912; and, in the following year, became a leading member of the Metropolitan Opera Company, New York.

"Marvel, Ik." See *Mitchell, Donald Grant.*

Marx, Heinrich Karl, German economist and socialist, was born of Jewish parents at Treves, 1818. He was educated at Bonn and Berlin; took an active part in the Liberal movement of 1840; and, after the suppression of the *Rheinische Zeitung,* edited by him, went to Paris. Being expelled from Paris and later from Brussels and Cologne, he settled in London, where he engaged in literary work and took an active part in the international workingmen's association.

By his writings and by the assistance which he gave Liebknecht in establishing the Social Democratic Labor party in 1869, Marx is regarded as the founder of the modern socialistic movement. His chief work, *Das Kapital,* has had an enormous influence, providing much of the theoretical background for socialist programs and, in particular, for the Russian Revolution. Marx died in 1883.

Mary, queen of England, the daughter of Henry VIII and Catherine of Aragon, was born at Greenwich, 1516. She succeeded to the throne in 1553 on the death of her half brother, Edward VI, and after the deposition of Lady Jane Grey.

She began her reign by releasing Gardiner, Bonner, Tunstall, Day, and Heath, Catholics who had been confined during the previous reign for their religious opinions, and by imprisoning in their stead Ridley, Latimer, Cranmer, and other Protestants. Soon afterward, she beheaded Northumberland, Sir Thomas Palmer, and Sir John Gates for advocating the cause of Lady Jane Grey; a few months later she beheaded that unfortunate lady and her husband, Lord Guilford Dudley. In 1554, Mary was married to Philip II of Spain. In 1555, having already repealed all the laws enacted in favor of Protestantism and re-established Catholicism, she began those persecutions of the Protestants which have earned for her the title of "the bloody Mary." In 1558, Calais, which had been in the possession of the English ever since the time of Edward III, a period of 210 years, was taken by the duke of Guise. This loss to the English nation so distressed Mary that she said the name of

Calais would, after death, be found engraven on her heart. She died in 1558 and was succeeded by her half sister, Elizabeth.

Mary Queen of Scots, daughter of James V and Mary of Lorraine, was born at Linlithgow, Scotland, 1542. By her father's death she became queen before she was a week old. In 1548, she was sent to France; was brought up at court with the royal princes; and, in 1558, married the dauphin, who for a year, 1559-60, ruled as King Francis II.

On her husband's death, Mary returned to assume the government of Scotland, now in the throes of the Reformation. Refraining from interference with the Protestant movement, she retained her own Catholic faith, but chose Protestant advisers. Despite all protests, she was married to her cousin Lord Darnley in 1565. Darnley, granted the title of king, tried to force her, in the event of her dying childless, to settle the succession on him and his heirs. Deeming her favorite, Rizzio, to stand in the way, Darnley plotted with the Protestant lords to have him murdered, and Mary was obliged to agree to the demands. Her only son, afterward James VI, was born three months later. Darnley in turn was murdered by the earl of Bothwell in February 1567 under circumstances pointing to Mary's connivance, and her marriage with Bothwell in the following May alienated the nobles. They revolted; took the queen prisoner at Carberry Hill in June; and carried her to Edinburgh, then to Lochleven castle, where they forced her to abdicate in July.

The following year, she fled to England and was a prisoner there for many years. The Catholics formed plots to liberate her and put her in place of Elizabeth on the English throne. Mary was accused of complicity in a conspiracy headed by Babington and was tried, found guilty, and executed in Fotheringay castle, 1587. An interest in Mary has been kept alive by the romantic appeal of her beauty and her dramatic career and by the fact that she was the last hope of the Catholic party in England.

Masaryk (*mä'sä-rĭk*), **Thomas Garrigue,** Slovak scholar and patriot, was born at Goding, Moravia, 1850. He began life as a blacksmith; later studied at Vienna and Leipzig; and, in 1882, was made professor in the new Czech university at Prague. He sat in the Austrian Parliament, 1891–93, resigning to devote himself entirely to moral education, and became a leader of the so-called realistic movement in philosophy, literature, and politics. Elected deputy in 1907, he vigorously opposed German encroachment upon Austria and combated Austrian aggression in the Balkans. In 1909, he exposed the forgeries upon which Austria based the forced annexation of Bosnia-Herzegovina. At the outbreak of the World War, he went to Italy and thence to England. Later he organized the movement for Czechoslovak independence. In 1918, he was appointed provisional president and, in 1920, was regularly elected president of Czechoslovakia. His wife, who died in 1923, was an American, and he is well known in the United States for his lectures on political economy at leading universities. His publications include *Suicide and Modern Civilization, Blaise Pascal, The Problems of Small Nations in the European Crisis,* and *The Spirit of Russia.*

Mascagni (*mäs-kän'yē*), **Pietro,** Italian composer, was born at Leghorn, 1863. He began early to manifest interest in music. He studied at Milan conservatory for a brief period, but discontinued this pursuit in order to join a touring operatic troupe. He supported himself by conducting traveling opera companies until 1890, when he won world-wide fame with *Cavalleria Rusticana,* a work of great dramatic intensity which gained unprecedented popularity. Without attempting to improve his deficient technique by careful study, he continued to compose, producing a succession of failures. Later he achieved moderate success with *Iris* and *Isobel.* In 1915, he produced his first comic opera, *L'Alodoletta.* None of his work has fulfilled the promise of his first phenomenal success.

Masefield, John, English poet and play writer, was born at Ledbury, 1875. He ran away from home at the age of 14; became a sailor; and traveled in many lands, spending some time in the United States. Upon returning to England, he devoted his time to writing poems, stories, novels, and plays. Since the appearance of *The Everlasting Mercy,* which won the Polignac prize in 1912, his position as a successful writer has been assured.

Masefield excels in vigorous narrative poems of striking originality, such as *The Widow in the Bye-Street* and *Dauber,* which express his conception of the tragic and the beautiful. The same originality characterizes his novels *The Street of Today* and *Multitude and Solitude* and his powerful play *The Tragedy of Nan.* He has also written *Salt Water Ballads, Captain Margaret, The Tragedy of Pompey the Great, Poems and Ballads, The Daffodil Fields, Philip the King, Good Friday,* and *Esther.*

Mason, Walt, humorist and poet, was born at Columbus, Ont., in 1862. He was self-educated. Coming to the United States in 1880, he was connected successively with various newspapers. His reputation was established especially by his prose poems, which were published regularly in more than 200 newspapers in the United States and Canada. Among works of his authorship are *Uncle Walt, Rippling Rhymes, Terse Verse,* and *Walt Mason, His Book.*

Maspero (*mäs'pē-rō'*), **Sir Gaston Camille Charles,** Egyptologist, was born of Italian parents at Paris, 1846. In 1874, he became professor of Egyptology at the Collège de France. From 1881 to 1886, he was keeper of the Bulak museum and, from 1899 to 1914, was director of explorations in Egypt. He made valuable discoveries at Sakkara, Akhmym, and elsewhere. He wrote many valuable works on Egyptian philology, history, and archeology, among which are *Egyptian Archæology, Life in Ancient Egypt and Assyria, Dawn of Civilization, The Struggle of the Nations,* and *The Passing of the Empires.* Died, 1916.

Massasoit (*mäs'ä-soit'*), chief of the Pokanoket, or Wampanoag, Indians, ruled over most of south Massachusetts from Cape Cod to Narragansett bay. His tribe, once very numerous, was reduced, shortly before the landing of the English, to about 300 by a disease, probably the yellow fever. In 1621, three months after Plymouth had been founded, Massasoit and 60 warriors, armed and painted, came to the settlement and made a treaty of peace. This treaty was kept for 50 years, and Massasoit was always friendly to the settlers. His home was at Sowams within the present town of Warren, R. I., and here he entertained Roger Williams for several weeks when the latter was on his way to Providence after being banished from Massachusetts. Massasoit was honest, kept his word, and loved peace. He died in 1661.

Massenet (*mä's'-nĕ'*), **Jules Emile Frédéric,** French composer, was born at Montaud, 1842. He was educated at the Paris conservatory under Laurent, Reber, Savard, and Ambroise Thomas. He was professor of composition at the conservatory, 1878–96. By the excellence of their instrumentation, euphony, and melody, his compositions won wide popularity. His works include the following operas: *Don César de Bazan, Le roi de Lahore, Le Cid, Le Mage, Thaïs, La Navarraise, Sapho, Cendrillon,* and *Le jongleur de Notre-Dame.* He also wrote an oratorio, cantatas, overtures, and orchestral suites. Died, 1912.

Masters, Edgar Lee, American poet, was born at Garnett, Kans., 1868. He was graduated at Knox college, Ill.; studied law; and was admitted to the bar in 1891. His first volume of poems, entitled *A Book of Verses,* appeared in 1898 and was followed by plays and other productions in verse. In 1915, his *Spoon River Anthology,* containing a frank post-mortem appraisal of character in modern free verse, created wide interest. His writings also include *Maximilian,* a drama in blank verse; *Blood of the Prophets; Starved Rock; Open Sea;* the plays *Althea* and *The Trifler;* numerous articles; and essays.

Mather (*măTH'ẽr*), **Cotton,** American colonial divine, was born in Boston, 1663. He was very precocious; entered Harvard at 11, graduated at 15, preached his first sermon at 17, and was minister at Old North church at 20.

The phenomenon termed "Salem witchcraft" having appeared in the colony, he made investigations and, in 1689, published his *Memorable Providences Relating to Witchcraft and Possessions* and, in 1693, his *Wonders of the Invisible World.* Despite his narrow-mindedness, he was a man of extraordinary learning, a remarkably prolific writer, sincere in his convictions, and not purposefully cruel. Nevertheless his connection with the persecutions of witches gave him a sinister reputation which the appreciation of his many good qualities has not fully counterbalanced. The most important of his numerous works are *Magnalia Christi Americana, Poem to the Memory of Urian Oakes,* and *Essays to Do Good.* Died, 1728. See *Salem Witchcraft.*

Mather, Increase, American colonial divine father of Cotton Mather, was born at Dorchester, Mass., 1639. For about 60 years he was pastor of the North church, Boston. In 1685, he was chosen president of Harvard college. He published a large number of works, the chief of which are *A Brief History of the War with the Indians in New England, Cometographia,* and *An Essay for the Recording of Illustrious Providences.* His influence in the colony was so great that he was sent to England in 1688 to secure a new charter. Died, 1723.

Matheson, Samuel Pritchard, Canadian prelate, was born at Kildonan, Manitoba, 1852. He was educated at Saint John's college, Winnipeg. In 1876, he was ordained priest of the Church of England in Canada. He became canon of Saint John's cathedral, Winnipeg, in 1882 and bishop of Rupert's land and metropolitan with title of archbishop in 1905. In 1909, he was made primate of all Canada. He was also professor of theology in Saint John's college and was made chancellor of the University of Manitoba.

Matthews, James Brander, American author and educator, was born at New Orleans, 1852. He graduated at Columbia college, 1871, and at Columbia law school, 1873.

He was admitted to the New York bar, but soon turned to literature. From 1892 to 1900, he was professor of literature at Columbia and became widely known as a critic of the drama. In 1900, he was appointed professor of dramatic literature, Columbia. He retired in 1924. His extensive writings include *The Theaters of Paris*, *The Story of a Story*, *Introduction to the Study of American Literature*, *The Action and the Word*, *The Historical Novel*, *Development of the Drama*, *Shakespeare as a Playwright*, *These Many Years*, and *Essays on English*. He was elected to the American academy of arts and letters in 1908. Died, 1929.

Matthison, Edith Wynne, actress, was born at Birmingham, Eng., in 1875. She married Charles Rann Kennedy, the actor, in 1898. Beginning her stage career in musical comedy, she appeared later in Greek tragedies, mystery plays, and Shakesperian dramas. In the revival of *Everyman*, for which she created the title rôle, she achieved a striking success. Other productions in which she took part in England and in America include *The Servant in the House*, *The Blue Bird*, *The Terrible Meek*, and *The Necessary Evil*. She appeared at different times with Sir Henry Irving and Sir Herbert Tree. Her best work has been in Shaksperian plays and in imaginative types of modern dramas.

Matzenauer (*mät'sĕn-ou'ĕr*), **Margarete,** operatic mezzo-soprano, was born in Hungary, 1881, and was educated by her parents. She made her début in 1901 as Puck in *Oberon* at Strasbourg, where she remained three years. After singing at Munich till 1911, she became a member of the Metropolitan Opera Company, New York. The numerous operas in which she played leading rôles include *Salome*, *Elektra*, *The Ring*, and *Carmen*. The extraordinary range of her voice enables her to sing both soprano and contralto parts.

Maupassant (*mō'pȧ'sŭn'*), **Henri René Albert Guy de,** French short story writer and novelist, was born at Chateau Miromesnil, 1850. After beginning active life as a clerk and serving as a soldier in the Franco-Prussian war, he was patiently trained to story writing by Flaubert, the novelist. His first story, *Boule de suif*, which appeared in 1880, immediately stamped him as a finished and masterly writer of the naturalistic school.

From 1880 to 1890, he produced about 200 short stories, which, though often morbid, sensual, cynical, and unmoral, are, on the whole, in style, art, and deftness of portraiture, the best in French literature, and some are unexcelled in any literature. In form, scope, and artistic completeness, *The Necklace* is by many regarded as the most remarkable short story in world literature. He also wrote volumes of travel and several novels. He became insane in 1892 and died in the following year.

Maurice (*mō'rĭs*), prince of Orange and count of Nassau, was born at Dillenburg, Prussia, 1567, son of William I, founder of the Dutch Republic. After his father's assassination in 1584, the provinces of Holland and Zealand and, afterward, Utrecht elected him stadholder. A great portion of the Netherlands was still in the hands of the Spaniards, but, under the leadership of Maurice, the Dutch rapidly wrested cities and fortresses from their enemies. In 1597, with the help of some English auxiliaries, he defeated the Spaniards at Turnhout in Brabant and, in 1600, won a splendid victory at Nieuwport. Finally, in 1609, largely through Maurice's generalship, Spain was compelled to agree to a truce which resulted in the independence of the Dutch. From political motives Maurice caused the death of Barneveldt, which is the only blot upon his career. Died, 1625.

Mauve (*mouv*), **Anton,** Dutch landscape and animal painter, was born at Zaandam, 1838. Though he studied with the cattle painter Van Os at Haarlem, he was largely self-taught. His paintings are chiefly landscapes with sheep, horses, cattle, or figures of peasants and include also seashore scenes characterized by fine poetic quality and refined, truthful treatment. With Israëls he stands in the foremost rank of modern Dutch painters. Excellent examples of his works are "Heath Near Laren" and "Milking Time," in the Rijks museum, Amsterdam; "Watering Horses," in the national gallery, London; and "Spring" and "Autumn," in the Metropolitan museum of art, New York. Died, 1888.

Mawson (*mô'sŭn*), **Sir Douglas,** Australian antarctic explorer, was born in Bradford, England, 1882 but went at an early age to Australia. He was educated in mining engineering and science at the universities of Sydney and Adelaide. As a member of the scientific staff of Shackleton's expedition, 1908-09, he reached and determined the location of the south magnetic pole on Victoria land, in lat. 72° 25′ S., long. 155° 16′ E. He organized and conducted the Australasian exploring expedition to antarctic lands south of Australia, 1911–14. By journeys covering 2400 miles he discovered and explored King George V land. Queen Mary land was also explored by him on a sledge trip of 800 miles.

As a result of his explorations, the continent of Antarctica, an elevated, glacier-covered region, was proved to extend without interruption between 86° E. and 150° W. Mawson's discoveries and their results form the most extensive contribution to antarctic exploration during the first 15 years of the century.

In 1920, he was appointed to the chair of geology and mineralogy in the University of Adelaide. Besides various scientific papers, he published *The Home of the Blizzard*.

Maxim, Sir Hiram Stevens, American inventor, was born at Sangerville, Me., 1840. He received a common school education, and obtained his scientific knowledge by private study and by attending lectures. He was for four years an apprentice to a coach builder; worked in various ironworks; patented numerous inventions in the United States; and, in 1881, went to England, where he became a naturalized citizen.

Maxim obtained over 100 international patents for inventions. These include the incandescent lamp and other electrical appliances; the celebrated Maxim machine gun, automatically loaded and discharged by the force of the recoil; and cordite, a smokeless powder. He devoted much attention also to aerial navigation. For many years he was a director in the British ordnance firm of Vickers Sons and Maxim. In 1901, he was knighted by Queen Victoria. He published *My Life*, an autobiography, in 1915. Died, 1916.

Maximilian, Ferdinand Joseph, archduke of Austria and emperor of Mexico, was born in Vienna, 1832. He was the brother of Francis Joseph, emperor of Austria-Hungary. In 1863, Napoleon III planned to conquer Mexico and set up an empire there. He offered the crown to Maximilian, who went to Mexico in 1864. The country had long been in a state of confusion, and at first the people seemed inclined to welcome him and to look for peace under his rule. But he pleased no one; the people rose against him; and, in 1866, when the French troops left the country, the empire fell to pieces. Maximilian tried to form a native army for his own defense, but he was captured by the Republicans, and, after a trial, was shot near Queretaro, 1867.

Maxwell, James Clerk, British physicist, was born at Edinburgh, 1831. He was educated at the University of Edinburgh and at Cambridge, and, before he was 15, wrote papers of scientific value. In 1856, he became a professor in Marischal college, Aberdeen; in 1860, was appointed to a chair in King's college, London; and, in 1871, was made professor of experimental physics at Cambridge.

In his work *Electricity and Magnetism*, he demonstrated that electromagnetic action travels through space in transverse waves similar to those of light and having the same velocity. His hypothesis that electricity and light are the same in their ultimate nature has been amply confirmed. He was the first to make color sensation the subject of actual measurement. He obtained the Adams prize for his essay *Stability of Motion of Saturn's Rings*. He investigated also the kinetic theory of gases. His publications include a textbook on the *Theory of Heat* and a treatise on *Matter and Motion*. Died, 1879.

Mayer (*mī'ĕr*), **Julius Robert von,** German physicist, was born at Heilbronn, 1814. He was graduated in medicine at Tubingen and studied also at the universities of Munich and Paris. In 1840, he went to Java, where he made researches on the blood and on animal heat, which led him to consider the problems of the conservation and correlation of forces. In 1842, he published the first announcement of the principle underlying the theory of the conservation of energy. Although soon followed by Joule and Helmholtz with papers on the same subject, Mayer is entitled to the credit of first conceiving this great doctrine. His complete works were produced in *Die Mechanik der Wärme*. Died, 1878. See *Conservation of Energy*.

Mayo, Charles Horace, American surgeon, was born at Rochester, Minn., in 1865. He received his education at Northwestern university and graduated from Chicago medical college in 1888. He immediately began practice at Rochester, Minn., where he was made surgeon at Saint Mary's hospital. He became widely known for successful operations for goiter and, together with his brother W. J. Mayo, achieved world-wide fame, not only for successful operations, but also for the development of a remarkable surgical clinic. With his brother, he donated 2 million dollars in 1915 to establish at Rochester, for medical education and research, the Mayo foundation, now a part of the University of Minnesota.

Mayo, William James, American surgeon, was born at Le Sueur, Minn., in 1861. He graduated in medicine at the University of Michigan, 1883, and became a practicing surgeon at Rochester, Minn. Here he served with his brother C. H. Mayo as surgeon of the Mayo clinic of Saint Mary's hospital and achieved unusual success in his operations for gallstones and cancer. In connection with this work at Saint Mary's hospital was developed a clinical and nursing staff of specialists of foremost rank in American surgery. Some 3000 physicians annually visit this clinic, where, in 1914, more than 10,000 operations were performed. In 1915, with his brother, he donated 2 million dollars to establish the Mayo foundation at Rochester for medical education and research.

Mazarin (F., *mà'zà'răN'*; E., *măz'ă-rēn'*), **Jules,** prelate and diplomat, was born at Piscina, Italy, 1602. Having accompanied a papal legate to the court of France, he became known to Richelieu about 1628. The latter perceived his great political talents and engaged him to maintain the French interests in Italy. In 1639, he openly entered the service of Louis XIII and was naturalized as a Frenchman. In 1641, he received a cardinal's hat through the influence of Richelieu, who, when dying, recommended him to the king as the only person capable of carrying on the latter's political system. Under Mazarin, the influence of France among the nations was increased and, in the internal government of the country, those principles of despotism were established on which Louis XIV afterward acted. Mazarin died in 1661

Mazzini (*măt-sē'nē*), **Giuseppe,** Italian patriot and revolutionist, was born at Genoa, 1805. Sentiments of social equality were early instilled into him by parental example. In 1830, his affiliation with the secret society of the Carbonari led him to enter a political career. The organization of a new Liberal league, "Young Italy," was Mazzini's next work. The first fruit of his league was the revolutionary expedition of Savoy, which was organized by Mazzini at Geneva but was defeated by the royal troops.

An association entitled "Young Europe" and based on principles of European rights and enfranchisement was inaugurated by him in Switzerland. In 1837, he quitted Switzerland and finally took up his abode in London. From there, his labors in the Italian revolutionary cause were unremitting. He assisted in organizing Garibaldi's expeditions of 1860, 1862, and 1867. After an ineffective scheme for a Republican uprising in Sicily in 1870, he ventured to enter Italy and was arrested at Gaeta, where he remained a prisoner until Rome was taken by the Italian army. Mazzini remained throughout his life an uncompromising republican. Died in 1872.

Mead, William Rutherford, American architect, was born in Brattleboro, Vt., 1846. After graduating at Amherst college in 1867, he studied architecture. In 1872, he formed a partnership with C. F. McKim. Joined by Stanford White in 1879, the firm was thereafter known as McKim, Mead, and White. Mead participated in much of the notable work of the firm, including the designs for the Boston public library; Columbia University library; New York University library and the American hall of fame; Bellevue hospital; the magnificent Pennsylvania station, the new post office, and the municipal office buildings, New York; the Brooklyn institute of arts and sciences; the Rhode Island capitol; the bank of Montreal at Montreal; the war college at Washington; and other important structures. He was elected to the American academy of arts and letters in 1910. Died, 1928.

Meade, George Gordon, American general, was born in 1815 in Cadiz, Spain, where his father was an agent of the United States navy. He graduated at West Point, 1835, and, after serving one year in the army, resigned to begin practice as a civil engineer. He re-entered military life in 1842, serving with distinction in the Mexican war on the staffs of Taylor and Scott and in the engineer corps.

At the outbreak of the Civil War, he was placed in command of a brigade of volunteers and soon rose to the command of a division. He led his division through the Seven Days' battles; was severely wounded at Frazier's farm; went through the Antietam campaign; and commanded at Fredericksburg, where he particularly distinguished himself. At Chancellorsville, he commanded the fifth corps. When Hooker resigned the command of the army of the Potomac and while the army itself was in hasty movement northward to check Lee's invasion of the North in 1863, Meade was appointed to the command. He accepted it with the greatest reluctance and altogether from a sense of duty. He planned to fight on the line of Pipe creek, but Reynolds fell into collision with Lee's advance at Gettysburg, and Meade's ensuing victory, July 1–3, 1863, became historical. When Grant assumed general command in 1864, Meade continued to command the army of the Potomac. At the close of the war he was made major general in the regular army. Died, 1872.

Mechnikov (*měch'nĭ-kôf*), **Elie,** Russian biologist, was born in the province of Kharkov, 1845. He studied at Kharkov and afterward at Giessen and at Munich. He occupied the chair of zoology at Odessa, 1870–82, but resigned to devote himself to special research. He became chief assistant to Pasteur in 1892, and, at the latter's death, in 1895, succeeded him as director of the Pasteur institute at Paris.

Mechnikov conducted researches on intracellular digestion; formulated the theory of phagocytosis, which led to vaccinotherapy; devoted special attention to the microscopic study of blood diseases; and demonstrated the value of experiments on lower animals in connection with human physiology and medical practice. With Paul Ehrlich, he was awarded the Nobel prize in medicine in 1908. His numerous writings include *The Nature of Man, Immunity in Infective Diseases, The Prolongation of Human Life, Old Age,* and *The New Hygiene.* Died, 1916.

Medici (*mā'dē-chē*), **Catherine de'.** See *Catherine de' Medici.*

Medici, Lorenzo de', surnamed "the Magnificent," was born in 1449. He was a member of an illustrious Florentine family which for centuries exerted great influence throughout Europe. He was instructed by some of the most learned men of the age. In 1469, he succeeded to the wealth and the power of his father and became the virtual head of the Florentine state.

During his rule he exerted himself in every way to promote the growth of literature and the arts. In 1478, the Pazzi, another distinguished family of Florence, formed a conspiracy against him and his brother Giuliano. The plot very nearly succeeded, Giuliano being assassinated and Lorenzo being wounded. The remainder of Lorenzo's administration was unmarked by any great public events, but his regard for literature was further manifested by his establishment of the printing press in his dominions and by his notable efforts to enlarge the Laurentian library. Died, 1492.

Meighen (*mē'ĭn*), **Arthur,** Canadian statesman, was born at Anderson, Ont., 1874. He was educated at Saint Marys collegiate institute and at Toronto university, graduating with honors, 1896. After teaching high school at Caledonia, Ont., 1897-98, he studied law at Winnipeg; was admitted to the bar; and, in 1902, located at Portage la Prairie, Man. He was elected to the Dominion House of Commons, 1908, as a Conservative member; was re-elected in 1911 and in 1917; was appointed solicitor-general of Canada, 1913; was made member of the Imperial war cabinet, 1918; and became premier in 1920. After the defeat of the government in 1921, he was leader of the Conservative party in the House until 1927.

Meissonier (*mĕ'sô'nyā'*), **Jean Louis Ernest,** French military painter, was born in Lyon, 1815. He was a pupil of Cogniet and became a member of the Beaux-Arts in 1861. He first attracted attention by his "Little Messenger" in 1836 and continued to exhibit at the Paris salon for many years. Among his best pictures are those of the "Napoleon Cycle," containing the widely known "1807," "1814," and "1815." He served in Napoleon III's Italian compaign and the early part of the Franco-Prussian war, and was colonel at the siege of Paris. He painted upward of 500 pictures, many of which are owned in the United States. Died, 1891.

Melanchthon (*mĕ-lăngk'thŭn; -tŭn*), **Philipp,** Luther's fellow laborer in the Reformation, was born at Bretten, Baden, 1497. He early decided in favor of the Reformation and brought to the aid of Luther great attainments in learning, unusual acuteness in dialectics and exegesis, a remarkable power both of clear thinking and of clear expression, and withal a gentleness and a moderation that most advantageously tempered Luther's vehemence. In 1521, he published his *Loci Communes Rerum Theologicarum,* the first great Protestant work on dogmatic theology. In 1530, by drafting the Augsburg Confession, he made a most important contribution to the cause of Protestantism.

After Luther's death, he lost, in some measure, the confidence of the Protestants by those concessions to the Roman Catholics which his anxiety for peace led him to make, while the zealous Lutherans were no less displeased because of his approximation to the doctrine of Calvin on the Lord's supper. He sincerely endeavored to bring about Christian unity in an age of fanatical strife and was one of the most judicious and progressive leaders of the Reformation. Died, 1560.

Melba, Nellie, née Helen Porter Mitchell, Australian dramatic soprano, was born at Melbourne, 1861. Her father was Scotch and her mother of Spanish descent. She studied under Madame Marchesi in Paris and made her stage début in 1887 in *Rigoletto* at Brussels. In the following year, she appeared as Lucia at Covent Garden, London. She first appeared in the United States in *Lucia di Lammermoor* at the Metropolitan opera house, New York, 1893. While lacking the dramatic intensity and histrionic ability necessary for the greatest rôles, she became known and admired throughout the world for the exceptional purity and beauty of her voice. She was notably successful in grand opera in America and, after some years in concert, returned to opera in 1915-16 as member of the Chicago Grand Opera Company. Melba's stage name is derived from Melbourne, her birthplace.

Melchers (*mĕl'kĕrz*), **Gari,** American painter, was born in Detroit, Mich., 1860. He studied at Dusseldorf academy and at the Ecole des Beaux-Arts, Paris. Early in his career he devoted himself to painting Dutch peasant life, which he portrays with sympathetic insight. His pictures are characterized by firm outlines and by simple, direct, and natural treatment. He also paints religious pictures, portraits, and mural decorations. Examples of his mural paintings are "Peace" and "War" in the Congressional library at Washington.

Among his chief works are "Maternity," in the Luxembourg, Paris; "The Ship Builder," royal gallery, Dresden; "Dutch Skaters," at the Pennsylvania academy, Philadelphia; "Madonna," in the Metropolitan museum, New York; and "Sailor and his Sweetheart," in Carnegie institute, Pittsburgh. He was elected to the American academy of arts and letters in 1916.

Mellon, Andrew William, American manufacturer and banker, was born at Pittsburgh, Pa., in 1854; was educated in the University of Pittsburgh; and was long engaged in the development of coal, coke, and iron enterprises. He founded the town of Donora, Pa., and established steel mills there. He became an officer or director of many industrial and financial corporations, including the Mellon National bank, the presidency of which he resigned in 1921 in order to become secretary of the treasury for the United States.

Menander (*mē-năn'dĕr*), Greek comic poet, was born at Athens, 342 B. C. His uncle was the poet Alexis. The influence of the latter as well as that of Menander's teacher Theophrastus and of his friend Epicurus is discernible in his style of thought and feeling. He wrote more than 100 comedies, which for wit and grace were held in higher esteem than the works of any other writer of the so-called New Comedy. Many of his plays were adapted for the Roman stage by Plautus and Terence. In the latter part of the 19th century, a fairly complete text of several of Menander's plays was discovered in Egypt. The poet was drowned about 291 B. C.

Mencken, Henry Louis, American satirist and editor, was born at Baltimore in 1880. He was connected in an editorial capacity with the *Baltimore Herald*, the *Baltimore Sun*, and, 1908-23, with the *Smart Set*. In 1923, he founded the *American Mercury* and, as its editor, notably extended his influence as an incisive critic of many features of American life. His publications include *The American Language*, *George Bernard Shaw*, *Prejudices*, and *Americana*. His *American Credo* has been translated into German and French.

Mendel, Gregor Johann, Austrian botanist, was born at Heinzendorf, Silesia, 1822. He was educated at Brunn; became a priest in 1847; continued his studies at Vienna; and later taught at Brunn, where he became abbot. During 15 years devoted to teaching natural science he conducted extensive experiments in hybridization. In 1865, he announced the discovery of a law of heredity now universally known as Mendel's law. It was published by the natural history society of Brunn, but attracted little attention until 1900, when De Vries and other investigators brought it to light. This law, based on Mendel's original experiments with garden peas, has become the working basis of nearly all recent investigations in genetics. Died, 1884.

Mendeléev (*mĕn'dyĕ-lyā'yĕf*), **Dmitri Ivanovitch,** Russian chemist, was born at Tobolsk, Siberia, 1834. In 1850, he went to Petrograd to study natural science and, in 1866, was made professor of chemistry at the University of Petrograd. He is best known for the enunciation of his celebrated principle, now universally called the periodic law, whereby he was enabled to foretell the existence and even the properties of several unknown chemical elements which have since been discovered. He published many scientific papers and several textbooks, of which his *Elements of Chemistry* has become a standard work and has been translated into many languages. Died, 1907.

Mendelssohn-Bartholdy (*mĕn'dĕl-sōn-bär'tōl'dē*), **Felix,** German composer, was born of wealthy and cultured Jewish parents at Hamburg, 1809. His father became a convert to Christianity and young Felix was brought up in the Lutheran faith. Zelter was his instructor in composition; Ludwig Berger, on the piano.

At the age of nine, Mendelssohn gave his first public concert in Berlin. From this period he began to write compositions of all kinds. At 17, he wrote his well-known overture to *A Midsummer Night's Dream*. In 1825, he went to Paris. He gave concerts there and in Berlin, and later traveled for three years in England, Scotland, France, and Italy. In 1835, he accepted the directorship of the Leipzig concerts. Here, in the center of the musical world of Germany, he was stimulated to his highest and most brilliant efforts. His oratorios *St. Paul* and *Elijah* are his two greatest works, the latter ranking second only to the greatest works of Handel. His *Hymn of Praise*, *Songs Without Words*, and *Wedding March* are among the most admired of his minor compositions. Died, 1847. See page 1517.

Menzel (*mĕn'tsĕl*), **Adolf von,** German painter and illustrator, was born at Breslau, 1815. In 1833, his series of pen and ink drawings entitled "The Artist's Earthly Pilgrimage" attracted attention, and, in 1839, he won both royal and popular favor with his notable illustrations of Kugler's *History of Frederick the Great*. At the age of 20, he began painting without instruction and devoted himself chiefly to historical subjects, rising to the front rank among German painters of his century. Among his most noted pictures are "Coronation of King William I at Konigsberg," "Modern Cyclops," "The Ball Supper," and "Ash Wednesday Morning." Died, 1905.

Mercator (*mĕr-kā'tĕr*; *mĕr-kā'tôr*), **Gerardus,** Flemish geographer, was born at Rupelmonde, Flanders, 1512. His real name was Kremer, "Merchant," of which Mercator is the Latinized form. He took his degree as bachelor of philosophy at Louvain, but devoted his later years to the study of geography. In 1559, he was appointed cosmographer to the duke of Cleves. He published several important works, including maps and descriptions of France, Germany, and Great Britain. He did much to establish geographical science upon a secure footing. His name is perpetuated by the projection used in nautical maps, in which the meridians are represented as straight vertical lines and the parallels of latitude as horizontal lines perpendicular to the meridians. Mercator died in 1594.

Mercier (*mĕr'syā'*), **Desiré Joseph, Cardinal,** Belgian prelate, was born at Braine l'Alleud, 1851. He was educated at Malines, Paris, and Leipzig; became a priest in 1874; and taught philosophy at Malines, 1877-82, and later at Rome. In 1906, he was consecrated archbishop of Malines and primate of Belgium, and, in 1907, he was made cardinal. Cardinal Mercier came into world-wide notice through his fearless, patriotic conduct during the German occupation of Belgium from 1914 to 1918. In 1919, he visited the United States and Canada. Among his various writings on metaphysics, philosophy, and psychology, the most important is his *Origins of Contemporary Psychology*. Died, 1926.

Meredith, Edwin Thomas, American publisher and politician, was born at Avoca, Iowa, in 1876. He was educated at Highland Park college and, in 1896, began the publication of the *Farmers' Tribune*. In 1902, he founded *Successful Farming*. He became a director of the Chicago Federal Reserve bank and of the Iowa Trust and Savings bank. In 1920, under the Wilson administration, he was appointed secretary of agriculture, but retired to private life after the ensuing defeat of the Democratic party. Died, 1928.

Meredith, George, English poet and novelist, was born in Portsmouth, 1828. After studying for some time in Germany, he began his literary career with the publication of a volume of poems. As a novelist he rose to a high position in British letters. His fiction is characterized by much introspection and psychological analysis. Among his numerous writings are *The Ordeal of Richard Feverel*, *Emilia in England*, *Rhoda Fleming*, *Beauchamp's Career*, *The Tragic Comedians*, *Diana of the Crossways*, *Ballads and Poems of Tragic Life*, *The Amazing Marriage*, *The Tale of Chloe*, *The House on the Beach*, and *Last Poems*. Died, 1909.

Meredith, Owen. See *Lytton, Edward Robert, Earl of.*

Meredith, Sir William Ralph, Canadian jurist, was born in Middlesex county, Ont., 1840. He was educated at London, Ont., and Toronto university. He studied law; was called to the bar in 1861; practiced law at London; and, in 1888, became established in Toronto. He was elected to the provincial legislature in 1872 and was leader of the Conservative opposition from 1878 until 1894, when he was made chief justice of the court of common pleas. In 1895, he was made senator of Toronto university, of which he became chancellor in 1900. He was knighted in 1896. In 1912, he was appointed chief justice of the supreme court of Ontario. Died, 1923.

Mergenthaler (*mĕr'gĕn-tä'lĕr*), **Ottmar,** inventor of the typesetting machine bearing his name, was born in Wurttemburg, Germany, 1854. He came to the United States in 1872 and entered the employ of the government at Washington, D. C., where he kept in order clocks and electric bells throughout various government buildings. In 1876, he removed to Baltimore, where he devoted many years to the perfection of a typesetting machine. In its final form this became the linotype now in common use in printing establishments. Died, 1899. See *Composing Machine*.

Mérimée (*mā'rē'mā'*), **Prosper,** French novelist, historian, and archeologist, was born at Paris, 1803. He studied law; entered the civil service; and, in 1831, was made inspector of archeological and historical monuments in France. While he published various historical and scientific researches, he is best known for his narrative and dramatic fiction. This includes *Colomba*, which is his most popular novel, and *Carmen*, a Spanish gypsy romance. The latter was made the subject of Bizet's noted opera of the same name. He became a member of the French academy in 1844 and was chosen senator of the Empire in 1853. Died, 1870.

Merle d'Aubigné (*mĕrl dō'bēn'yā'*), **Jean Henri,** Swiss ecclesiastical historian, was born near Geneva, 1794. He studied at Geneva and Berlin and, in 1818, became pastor of the French Protestant church in Hamburg. In 1823, he was appointed court preacher at Brussels. In 1831, he returned to Geneva; took part in the founding of the new Evangelical college; and filled its chair of church history for many years. His *History of the Reformation in the 16th Century* enjoyed immense popularity. Died in 1872.

Merriam (*mĕr'ĭ-ăm*), **Clinton Hart,** American naturalist, was born at New York in 1855. He was educated at Sheffield scientific school, Yale, and at the College of physicians and surgeons, Columbia, from which he was graduated in 1879. After practicing medicine at Locust Grove, N. Y., from 1879 to 1885, he was made chief of the United States biological survey. He served in this post until 1910, when he resigned to conduct biological and ethnological investigations under a trust fund established by Mrs. E. H. Harriman.

Merriam was a member of the Hayden survey in 1871, visited the arctic seal fisheries from Newfoundland in 1883, and, in 1891, as United States Bering Sea commissioner, investigated the fur seal on the Pribilof islands. He also conducted numerous biological explorations in the western United States. His extensive writings include *The Birds of Connecticut, Mammals of the Adirondacks, Geographic Distribution of Life in North America, Biological Survey of Mount Shasta, Life Zones and Crop Zones of the United States, Totemism in California,* and *Review of the Grizzly and Big Brown Bears of North America.* He wrote also several hundred papers on zoological, botanical, and ethnological subjects.

Merriam, John Campbell, American paleontologist, was born at Hopkinton, Iowa, in 1869. He was graduated at Lenox college, Iowa, in 1887 and received the degree of doctor of philosophy from the University of Munich, Germany, in 1893. After serving as instructor from 1894 to 1899, as assistant professor from 1899 to 1906, and as associate professor from 1906 to 1912, he was professor of paleontology and historical geology from 1912 to 1920 at the University of California. In 1920, he was made president of the Carnegie institution of Washington. He made extensive researches on the fossil reptiles and on the fossil mammals of western North America, concerning which he has published numerous monographs. He is also the author of many papers on the general historical geology of the Pacific Coast region of the United States.

Merry del Val (*mĕr'ĭ dĕl văl'*), **Raphael,** Catholic prelate and diplomat, was born of Spanish parents in London, 1865. He was educated at Ushaw college, Durham, England, and at Rome. In 1888, he took orders; in 1892, was made papal chamberlain; and, in 1897, became prelate of the papal household. In 1903, he succeeded Cardinal Rampolla as papal secretary of state and was made cardinal. On the accession of Pope Benedict XV, 1914, he was succeeded by Cardinal Ferrata and was appointed secretary of the congregation of the holy office. He wrote *The Truth of the Papal Claims.*

Merwin, Samuel, American editor and author, was born at Evanston, Ill., 1874. He was educated at Northwestern university and early devoted himself to journalism. He was associate editor of *Success* magazine, 1905–09, and editor in 1909–11. In 1907 he traveled in China investigating the opium question. His published works include *The Whip Hand, The Merry Anne, Drugging a Nation, Anthony the Absolute, The Honey Bee, The Passionate Pilgrim,* and *Silk.* In collaboration with Henry Kitchell Webster he wrote *The Short Line War, Calumet K,* and *Comrade John.*

Metternich (*mĕt'ĕr-nĭĸ*), **Clemens Wenzel, Prince,** Austrian diplomat and statesman, was born in Coblenz, 1773. After a distinguished diplomatic career, he became chief minister of Austria in 1809. After the Congress of Vienna, he was the foremost statesman of Europe, and the period 1815–48 is sometimes styled the "age of Metternich." He was the inspiring genius of the reaction, organizing the Holy Alliance to stem the rising tide of popular government. The revolution of 1848 sent him into exile, from which he returned three years later. Died, 1859.

Meunier (*mû'nyā'*), **Constantin,** Belgian sculptor and painter, was born at Etterbeek, 1831. He first painted religious and historical subjects, which he treated in a realistic style. About 1880, he began to study the workers in the mining and factory districts of Belgium, and from that time he devoted his life to what has been styled the "æsthetics of work," producing, after his 50th year, many great sculptures depicting the struggle of man with the earth. Among the finest of these are "The Dock Hand," "The Sower," "The Mine Girl," and "Puddler Resting." His most noted achievement is the "Monument to Labor" in the Brussels gallery. Died, 1905.

Meyerbeer (*mī'ĕr-bâr*), **Giacomo,** noted German composer, was born of Jewish parents in Berlin, 1791. He early displayed musical talent and made his first public appearance at the age of seven. In 1810, he entered the school of Vogler, at Darmstadt, where he formed an intimate friendship with Weber. His opera *Jephthah's Vow* was produced at Munich in 1813.

He was induced by his friend Salieri to visit Italy, where he became an enthusiastic convert to the new Italian school and began the composition of a series of operas which proved highly popular. His subsequent works include *Romilda e Constanza, Semiramide riconosciuta, Emma di Resburgo, L'esule di Granata, Il Crociato in Egitto, Robert le Diable,* and *Les Huguenots,* in the last of which he reached the climax of his fame. Died, 1864. See *Huguenots,* page 1552.

Meyerhof, Otto, German physiologist, was born in 1884. He became professor at the University of Kiel, specializing in researches on the chemical processes involved in muscular contraction. For his work in this field, he was awarded one-half the Nobel prize for medicine in 1922, the other half going to an English physiologist, A. V. Hill.

Meynell (*mĕn'nĕl*), **Alice,** English poet and essayist, was born in London about 1853, the daughter of Thomas J. Thompson, by whom she was educated. Her family resided in Italy during her girlhood. In her early years, she joined the Roman Catholic Church and was followed by other members of her family. In 1877, she married Wilfred Meynell, an author and journalist.

Shortly after her marriage, she began to contribute to periodical literature. A graceful and delicate style contributed to the popularity of her works, the titles of which include *The Rhythm of Life, The Flower of the Mind, John Ruskin, Ceres Runaway,* and *Collected Poems.* Died, 1922.

Michelangelo (*mī'kĕl-ăn'jĕ-lō*) **Buonarroti,** Italian painter, sculptor, and architect, born at Caprese near Arezzo in Tuscany, Italy, March 6, 1475. His mother belonged to the noble Tuscan family of Canossa; his father was a descendant of an old Florentine family.

When only 13 years of age, Michelangelo was apprenticed to the painter Ghirlandajo for three years. Sculpture, however, appears in a short time to have engrossed his attention. Lorenzo de' Medici, attracted by the drawings and models of the young student, gave him some commissions in sculpture in 1489.

Early Works. After the death of Lorenzo in 1492, Michelangelo received nearly equal attention from Piero de' Medici; but political disturbances soon caused him to take refuge in Bologna. He also visited Venice, but returned to Florence in 1494. Two years later he made his first trip to Rome. He now rapidly distinguished himself in sculpture. Among other works, he finished his colossal "David" in 1504, in which he displayed his own characteristic style of form,—a heaviness of the limbs compared with the body.

Monument of Julius II. In 1505, Pope Julius II called the great sculptor to Rome to design for him a sepulchral monument. It was to be a four-sided marble structure decorated with some 40 figures of heroic size. Michelangelo spent 8 months in Carrara superintending the sending of the marble to Rome. The pope suddenly changed his mind and began to consider instead the building of Saint Peter's after the designs of Bramante. In 1545, after the pope's death, the designs for the monument to Julius II were carried out on a much reduced scale, and it was completed in the form now to be seen in the San Pietro in Vincoli. The artist's masterpiece of sculpture, "Moses," was to have formed a part of the monument as originally designed.

Paintings. In 1508, he was ordered to paint the Vatican chambers. He disliked the commission but produced the frescoes of the "Prophets and Sibyls" and the "History of the Creation and Fall of Man." He returned to Florence in October 1512, and, in 1513, his patron, Julius II, died.

During the pontificate of Leo X, Michelangelo's great powers were wasted. During that of Adrian VI and part of that of Clement VII, beginning about 1524, he was engaged on the Laurentian library and the Medici chapel in San Lorenzo and on the famous mausoleum where are the celebrated allegorical figures of "Night" and "Day."

There is no evidence of Michelangelo's presence in Rome between 1513 and 1525. Part of his time was devoted to improving the fortifications of Florence, used against Pope Clement VII in 1529. The city surrendered in 1530, and afterward the artist went to Rome. In 1533, he was commissioned to adorn the Sistine chapel and accordingly began his famous fresco of the "Last Judgment," which was completed in 1541.

Architecture. After this time, Michelangelo produced no great works in painting. He was chiefly employed in architecture, having become architect of Saint Peter's in 1547. By the touch of his genius, this edifice was converted from a mere Saracenic hall into the most superb model of a Christian church.

Cosmo de' Medici made Michelangelo vice president of the Academy of Florence in 1563. The great artist, without remuneration, devoted the remainder of his life to the Church. He carried forward at Rome the Palazzo Farnese, rebuilt an old bridge across the Tiber, converted the baths of Diocletian into the magnificent church of Santa Maria degli Angeli, and superintended the construction of Saint Peter's as far as the dome.

Genius. Whether as painter, sculptor, or architect, he succeeded in uniting magnificence of plan and endless variety of parts with the utmost simplicity and breadth. In his Sistine frescoes, he was the inventor of epic painting. In his "Cartoon of Pisa," he personified motion; and he



AMERICAN NOBEL PRIZE WINNERS

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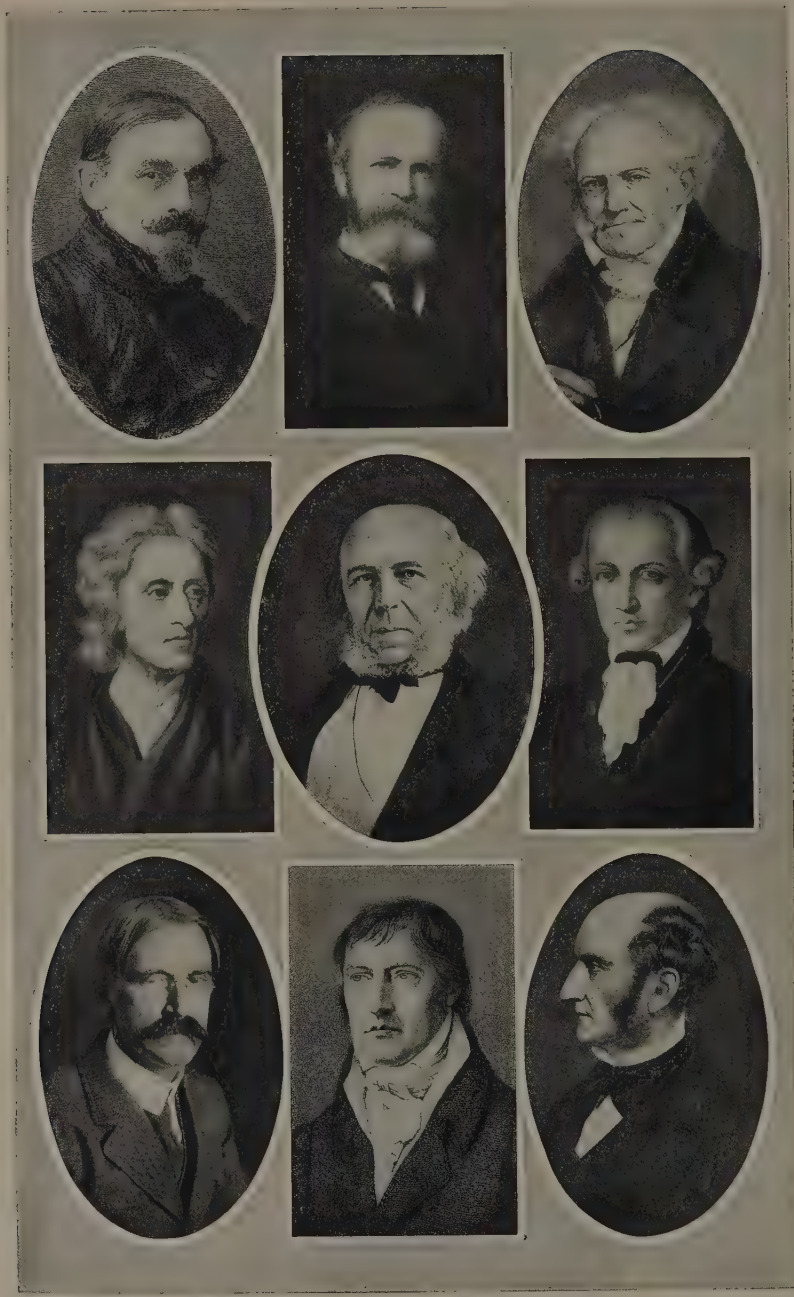
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EMINENT PHILOSOPHERS

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George W. F. Hegel

John Stuart Mill

embodied sentiment in the monument of San Lorenzo. His "Last Judgment" exhibits a powerful portrayal of every passion that sways the human heart. Consummate mastery of artistic expression enabled him to surmount the greatest difficulties with the appearance of perfect ease. He died on February 17, 1564, and was buried at Florence. See *Painting*, *Sculpture*.

Michelson (*mī'kĕl-sŭn*), **Albert Abraham,** American physicist, was born at Strelno, Germany, 1852. He graduated at Annapolis, 1873, and became midshipman in the United States navy. After teaching in the United States naval academy, 1875–79, and serving on the staff of the *Nautical Almanac*, Washington, 1880, he studied at Berlin, Heidelberg, and Paris. After his return, he was professor of physics at the Case school of applied science, Cleveland, 1883–89, and at Clark university, 1889–92. In 1892, he was made professor and head of the department of physics in the University of Chicago.

Michelson determined the velocity of light with a high degree of accuracy and invented an interferential refractometer, making it possible to express linear standards of measure in terms of wave lengths of light. His echelon spectroscope and improved engine for constructing diffraction gratings were also notable achievements. He received the Rumford medal and the Copley medal, and, in 1907, he was awarded the Nobel prize for physics. His writings include *Light Waves and Their Uses* and numerous scientific papers, chiefly on researches in light.

Miles, Nelson Appleton, American army officer, was born in Westminster, Mass., 1839. At the outbreak of the Civil War, he was engaged in mercantile pursuits in Boston, Mass. He entered service as first lieutenant of volunteers in 1861 and distinguished himself at the battles of Fair Oaks and Malvern Hill. In 1862, he was commissioned colonel and led his regiment at Fredericksburg and at Chancellorsville, where he was severely wounded. He commanded a brigade in the Richmond campaign; was promoted brigadier general, 1864; and was brevetted major general for gallantry. At the close of the war, he was commissioned colonel of United States infantry.

Miles succeeded Schofield as commander of the United States army in 1895. In July 1898, he assumed personal command of the army around Santiago, Cuba. On the reorganization of the army in 1901, he was promoted to the grade of lieutenant general. Upon reaching the age limit in 1903, he retired from the army. His published works include *Military Europe* and *Serving the Republic*. Died, 1925.

Mill, James, British economist, philosopher, and historian, was born near Montrose, Scotland, 1773. He studied at the University of Edinburgh, where he distinguished himself in Greek and in moral and metaphysical philosophy. He became editor of the *Literary Journal* and wrote for various periodicals, including the *Edinburgh Review* and the *Westminster Review*. His writings embrace works of great value. Among these are *History of British India*, *Liberty of the Press*, *Law of Nations*, *Elements of Political Economy*, and *Analysis of the Human Mind*. Died, 1836.

Mill, John Stuart, English philosopher and economist, son of James Mill, was born in London, 1806. He was educated at home by his father. In 1820, he went to France, made himself master of the French language, and occasionally attended public lectures on science. In 1823, he entered the India house as a clerk in the examiner's office, where his father was assistant examiner. For 33 years, he continued in the service of this company and rose gradually until he became head of the political department.

His first publications consisted of articles in the *Westminster Review*. He took an active part in the political discussions that followed the revolution of 1830 in France and in the Reform Bill movement in England. From 1836 to 1840, he was editor of the *London and Westminster Review*, in which many of his articles appeared.

Mill established his reputation in 1843 by the publication of *A System of Logic, Ratiocinative and Inductive*, the success of which paved the way for the *Principles of Political Economy*. His later works include *Essay on Liberty*, *Examination of Sir William Hamilton's Philosophy*, and *The Subjection of Women*, in which he avowed himself a partisan of what has been popularly termed the "woman's rights movement." He wrote also *Auguste Comte and Positivism*, *Nature*, *Utility of Religion*, and *Theism*. He is justly regarded as one of the foremost thinkers of his time. Died, 1873.

Millais (*mĭl-lā'*), **Sir John Everett,** English painter, was born at Southampton, 1829. He studied at the royal academy, where he won many prizes, including a gold medal in 1847. In 1848, he became associated with Rossetti, Holman Hunt, and others in forming the pre-Raphaelite brotherhood of artists.

His paintings, which include landscapes, portraits, and genre pictures, are vigorous in style and brilliant in color. Among his portraits, which are noted for masterly characterization, are those of Gladstone, Lord Beaconsfield, Carlyle, John Bright, Irving, and Tennyson. His better-known pictures include "Chill October," "The Vale of Rest," "Dew-Drenched Furze," "Eve of St. Agnes," "Effie Deans," "The Blind Girl," all in British galleries; and "Portia" and "The Bride of Lammermoor," in the Metropolitan museum, New York. Died, 1896.

Miller, Henry John, actor and manager, was born in London, England, 1860. Coming to America in 1871, he made his first appearance on the stage in 1879 at Toronto in *Amy Robsart*. The following year, he played in *Cymbeline* at New York, later appearing repeatedly with Ruth Chatterton and Billie Burke. He produced *Her Husband's Wife*, *The Rainbow*, *A Marriage of Convenience*, and numerous other plays, in many of which he created the leading rôles. Died, 1926.

Miller, Hugh, Scottish geologist, was born at Cromarty, 1802. From the age of 16 to 31 he worked as a stonemason, devoting the winter months to writing, reading, and natural history. In 1829, he published *Poems Written in the Leisure Hours of a Journeyman Mason*, followed in 1835 by *Scenes and Legends of the North of Scotland*. From 1834 to 1840, he was a bank accountant. He was then invited to Edinburgh to edit the *Witness* and, in 1840, published in its columns the popular geological articles afterward collected as *The Old Red Sandstone*. His other works include *First Impressions of England*, *Footprints of the Creator*, *My Schools and Schoolmasters*, *Testimony of the Rocks*, *The Cruise of the Betsey*, and *Popular Geology*. Died, 1856.

Miller, Joaquin, pen name of Cincinnatus Heine Miller, American poet, who was born in Indiana, 1841. He became a miner in California; lived among the Indians; was an express messenger; practiced law in Oregon; and edited a paper, which was suppressed for disloyalty. From 1866 to 1870, he was a county judge in Oregon. After serving as journalist in Washington, he visited London, where he published his *Songs of the Sierras* in 1871 and became a social celebrity. Finally, he settled at Oakland, Cal., making his home a feature of the city.

Among his numerous writings are *Songs of the Sunlands*, *Songs of the Mexican Seas*, *Shadows of Shasta*, *The Ship in the Desert*, *Life among the Modocs*, *The One Fair Woman*, and *True Bear Stories*. His play *The Danites*, dramatized from his novel *The Danites in the Sierras*, met with considerable success. He died in 1913. In compliance with his desires, his body was cremated and the ashes were taken up into the Sierras and scattered to the winds.

Millerand (*mēl'rĂN'*), **Alexandre,** French statesman, was born in Paris, 1859. He was educated at the Lycée Vanves and the Lycée Henri IV, and studied law at the University of Paris. Entering politics, he became a Radical Socialist leader and, in 1885, was elected to the Chamber of Deputies. Later he edited *The Voice* and *The Little Republic*, both Socialist organs. Severing his connection with the Socialist party, he served as minister of public works, 1909-10, and as minister of war, 1912–15. Continuing active service in the Chamber of Deputies, he was selected delegate to the War Conference in London, 1916, and, following the retirement of Clemenceau in 1920, was chosen premier. Upon the resignation of Deschanel, Millerand was elected president of France, Sept. 23, 1920, for the remainder of the unexpired term, 1920–27. He resigned in 1924, however, yielding to criticism of his support of the national *bloc*—an act of partisanship inconsistent with the traditions of the presidency.

Millet (*mĭl'ĕt*), **Francis Davis,** American painter, illustrator, and author, was born at Mattapoisett, Mass., 1846. He graduated from Harvard in 1869 and studied art at the royal academy at Antwerp and also in France and Italy. As an artist he is most widely known for his mural paintings, the most noted of which is "Evolution of Navigation," in the customhouse at Baltimore. Other important mural decorations are in the Cleveland post office, the Minnesota State capitol, and the supreme court at Madison, Wis. Among his chief easel pictures are "A Cozy Corner" and "An Old-Time Melody," in the Metropolitan museum, New York; and "Between Two Fires," in the Tate gallery, London. He was a member of the American academy of arts and letters. His books include *Capillary Crime and Other Stories*, *The Danube*, and *The Expedition to the Philippines*. Drowned on the *Titanic*, 1912.

Millet (*mē'lĕ'*), **Jean François,** French artist, the greatest of all painters of peasant life, was born in the village of Gruchy, 1814. He first worked as a farm laborer, but his taste for painting was so evident that he was sent to study with Mouchel, a painter in Cherbourg. Mouchel induced the town authorities to grant his pupil an annuity to help him in his studies. Millet afterward went to Paris and studied with Delaroche. He painted small pictures, portraits, and signboards in his first efforts to support himself.

In 1849, Millet settled in Barbizon near the forest of Fontainebleau. He lived here much like the peasants and began his work of painting the peasant life of France, which he depicted with great simplicity, dignity, and truth. Millet was a friend of Rousseau, Corot, Troyon, Dupré, Daubigny, Diaz, and other noted masters of the Barbizon

school, which has exercised a great influence upon modern painting. His most widely known work, "The Angelus," now in the Louvre, Paris, was sold for over $100,000. "The Gleaners," one of his best paintings, and some 20 other works are also in the Louvre.

Among the important works of Millet owned in the United States are "The Sower" and the "Knitting Lesson," in the Metropolitan museum, New York; "A Shepherdess Seated," "Harvesters Resting," and portrait of himself, Boston museum of fine arts; "Potato Harvest," "Sheepfold," "Breaking the Flax," and others in the Walters gallery, Baltimore; "Bringing Home the Calf" and "Woman Feeding Chickens," art institute, Chicago; and the famous "Man with the Hoe," in the San Francisco museum. Died, 1875. See *Painting*.

Millikan, Robert Andrews, American physicist, was born at Morrison, Ill., in 1868. He was educated at Oberlin college and Columbia, Berlin, and Gottingen universities. In 1896, he was appointed on the faculty of the University of Chicago and rose by 1910 to the position of professor of physics there. In 1921, he was made director of the laboratory of physics at the California institute of technology, Pasadena.

Millikan performed experiments establishing the electrical nature of the electron and he determined its electrical charge with an accuracy that had never before been approached. For his achievements in this field, he was awarded the Nobel prize for physics in 1923. He subsequently detected a cosmic radiation of great penetrating power, named for him the Millikan ray.

Miltiades (*mĭl-tī'ă-dēz*), Athenian general, was born about 540 B. C. Forced by Darius to flee from the Chersonese, of which he had become tyrant, he took refuge in his native city, Athens. On the second Persian invasion of Greece, he was chosen one of the ten generals. He particularly distinguished himself by the great victory which he gained over the Persians at Marathon, 490, with a small body of Athenians and 1000 Platæans. For his failure in an expedition which he led against Paros, he was fined 50 talents, which he was unable to pay. He was accordingly thrown into prison, where he died in 489 B. C.

Milton, John, English poet and publicist, was born in London, December 9, 1608. His education, begun under a private tutor of Puritanical opinions, was continued at Saint Paul's school, London, from his 15th year. A love of letters was early instilled into him, and he delighted in poetical reading and the study of both modern and ancient literatures. When 16, Milton entered Christ's college, Cambridge, and he received his degree of bachelor of arts in 1629. He composed several odes and elegies in this period, among which stands his noble "Hymn on the Morning of Christ's Nativity."

Early Poems. In 1632, he went to his father's house at Horton, where he lived for five years. Here he studied Spenser and Shakspere, read the classics, and became a great admirer of Italian poetry. His *Masque of Comus* was acted at Ludlow castle at Michaelmas, 1634, and, in 1637, "Lycidas" was written. "L'Allegro" and "Il Penseroso," among the most beautiful of descriptive poems, were produced in these years of calm and pleasant solitude.

Life Abroad. In 1638, Milton's father gave him money to visit the continent, where he remained 15 months. In Paris, he made the acquaintance of Grotius, the celebrated founder of international law; in Florence, he passed readily into literary society, where he became known for the skill of his Italian verses; at Arcetri, he visited Galileo; Rome and Tuscany nourished his classic predilections and his sense of beauty in form. News of the outbreak of disturbances in England caused him to return home, and, after some time spent in Geneva, he reached England in August 1639 and took up his residence in London.

Political Tracts. In the following 20 years of civil war and political unrest in England, Milton wrote no poetry, but he contributed his keen polemical writings to the struggle. These are singularly able and entitle him to a place among the most eloquent writers of English prose. In 1644, his treatise *Of Education* expressed views tending to utopianism; this same year, he published his greatest prose work, an appeal against all parties in behalf of freedom of the press, entitled *Areopagitica: a Speech for the Liberty of Unlicensed Printing*.

In 1649, Milton was appointed secretary for foreign tongues to the council of state. He was completing, in 1652, two books in Latin designed for circulation abroad as a defense of the people of England, when he became totally blind. His blindness, though it incapacitated him for regular official business, left him able to perform public duties, and he drew up several controversial treatises for Cromwell during the last years of the Commonwealth.

Later Works. At the Restoration in 1660, two of Milton's books were publicly burned, and his arrest was ordered; but this only consigned him to an obscurity that gave him full leisure to write his *Paradise Lost*. This he completed about 1665, and it immediately commanded a large sale, the respectful admiration of Dryden, the applause of many, and the sneering criticism of the poet Waller and some others. Milton next published his *History of England*, and, in 1671, his *Paradise Regained* and *Samson Agonistes* appeared. His literary labors closed in 1674 with a treatise *On Logic* and another, *Of True Religion*.

Domestic Life. Milton was thrice married: in 1643, to Mary Powell; in 1656, to Catharine Woodcock; in 1663, to Elizabeth Minshull. His domestic relations were not of the happiest, partly, perhaps, because of his explosive temper and his Puritanical austerities. By his first wife he had three daughters, whose conduct reminds the reader of King Lear's experiences.

Genius. Milton enriched the world with many of its noblest images and sentiments. Like Dante and Virgil, Milton was a prophet of social regeneration. The originality of his *Paradise Lost* and its sublimity of conception become more impressive with the passing years. Since Dante, there has been no such approach to the ideal epic of humanity. Died, November 8, 1674, and was buried at Saint Giles, London. See *Paradise Lost*.

Mirabeau (*mē'rȧ'bō'*), **Gabriel Honoré Riqueti, Count de,** French orator and statesman, was born at Bignon, near Nemours, 1749. He was endowed with an athletic frame and extraordinary mental abilities, but was of a fiery temper and disposed to every kind of excess. When the States-General was convened in 1789, he sought to be elected a representative of the nobles of Provence, but was rejected and, like Marius in ancient Rome, left them with the threat that he would overthrow the aristocracy.

He offered himself as a candidate to the Third Estate; was enthusiastically returned both at Aix and at Marseille; and, by his talents and oratorical powers, soon acquired great influence in the States-General and the National Assembly. To suppress insurrection, he effected, in 1789, the institution of the national guard. In 1790, he was elected president of the club of the Jacobins and, in 1791, of the National Assembly. Both in the club and in the Assembly, he displayed great boldness and energy; but soon after his appointment as president of the Assembly he died, 1791.

Mistral (*mēs'trȧl'*), **Frédéric,** French poet, was born at Maillane, 1830. He attended school at Avignon and began preparation for the law at Aix, but soon decided to devote his growing powers to the creation of a literature in Provençal. In 1859, the appearance of his *Mirèio*, a pastoral poem, brought him national fame. He continued to write lyrics, fantasies, and pastoral and dramatic poems, by which he elevated Provençal to the dignity of a literary language. Later he produced a monumental dictionary embracing all the dialects of the *Langue d'oc*. In 1904, he was awarded the Nobel prize for literature with José Echegaray. Died, 1914.

Mitchell, Donald Grant, "Ik Marvel," American novelist and essayist, was born at Norwich, Conn., 1822. He graduated at Yale, 1841, and studied law. He was consul at Venice, 1853, and, in 1855, settled on his farm, "Edgewood," near New Haven. His best-known works are the volumes of sentimental essays entitled *Reveries of a Bachelor* and *Dream Life*. These gained his election to the American academy of arts and letters in 1908. Among his other writings are *French Gleanings*, *The Battle Summer*, *The Lorgnette*, *My Farm at Edgewood*, *Doctor Johns*, and *American Lands and Letters*. Died, 1908. See *Reveries of a Bachelor*.

Mitchell, John, American labor leader, was born at Braidwood, Ill., 1870. He received a common school education, later read law one year, and privately made a special study of economic questions. He began work in coal mines, 1882, and, as worker or labor leader, continued to be identified with mines and mining.

His official connection with the united mine workers of America began in 1895 and, from 1899 to 1908, he served as president of that organization. He directed the strikes of the anthracite miners in 1900 and 1902 and was a vice president of the American federation of labor, 1898–1914.

With Gompers and Morrison, he was involved in the famous Buck Stove case and, in 1908, by virtue of an injunction was adjudged in contempt of court and was sentenced to imprisonment. However, the entire case against him and the other leaders of the American federation of labor was dismissed upon appeal to the United States supreme court. The outcome greatly hastened the movement against the employment of injunctions in labor cases and, in 1914, prohibition of their use was embodied in the Clayton Antitrust act. Mitchell's writings include *Organized Labor, Its Problems, Purposes, and Ideals* and *The Wage Earner and his Problem*. Died, 1919.

Mitchell, Maria, American astronomer, was born at Nantucket, Mass., 1818. She assisted her father, William Mitchell, in his work in astronomy and soon became fitted to make investigations herself. In 1847, she was awarded a gold medal by the king of Denmark for the discovery of a comet. She was employed in observations connected with

the coast survey and in compiling the *Nautical Almanac*, and was the first woman to become a member of the American academy of arts and sciences. From 1865 to 1888, she was professor of astronomy at Vassar college. Died, 1889. She was elected to the American hall of fame in 1905.

Mitchell, Silas Weir, American physician, poet, and novelist, was born in Philadelphia, Pa., 1829. He was educated at the University of Pennsylvania and graduated at Jefferson medical college, 1850. He established a practice in Philadelphia and became prominent as a physiologist and especially as a neurologist, devising a system of rest treatment now widely adopted throughout the world. Among his many medical writings are *Injuries of Nerves and Their Consequences*, *Rest in the Treatment of Disease*, and *Doctor and Patient*.

During the Civil War, he turned his attention to literature and achieved eminence as a man of letters, producing novels, essays, and poems of a high order of merit. Among his literary works are *Hephzibah Guinness*, *Hugh Wynne*, *Far in the Forest*, *The Autobiography of a Quack*, *Dr. North and His Friends*, *Youth of Washington*, *A Diplomatic Adventure*, *The Red City*, and *Complete Poems*. Died, 1914.

Modjeska (*mō-jĕs'kȧ*), **Helena** (Mme. Chlapowski, née Opido), actress, was born in Krakow, Poland, 1844. She made her début in Bochnia, 1861, and soon became a leading actress in her native country. Her first appearance in English drama was in *Adrienne Lecouvreur* at San Francisco, 1877, after which she made a tour of the United States and England. She returned to America and gained foremost rank as a tragic actress, playing with great distinction many noted Shaksperian rôles, including Rosalind, Viola, Imogen, Cleopatra, and Lady Macbeth. She was famous also as Camille, as Mary Stuart, and in other tragic rôles. She retired from the stage in 1905. Died, 1909.

Modjeski (*mō-jĕs'kē*), **Ralph,** American bridge builder, was born at Krakow, Poland, in 1861, the son of the celebrated actress Modjeska. He changed his name to Modjeski for purposes of naturalization. He came with his mother to America when he was 15 years of age; was educated at Paris and the University of Illinois; and became consulting bridge engineer at Chicago in 1892. The greater bridges designed by him include the Northern Pacific Railway bridge at Bismarck and the Columbia River bridge at Celilo, Oregon. He was also on the board of engineers for the reconstruction of the Quebec bridge and was the chief engineer for the Delaware River bridge at Philadelphia.

Mohammed, or **Mahomet,** the founder of the religion of Islam, commonly called Mohammedanism, was born about 570 at Mecca, Arabia. He first gained his livelihood by tending the flocks of his uncle Abu Talib, who had adopted him at an early age and with whom he later made trading journeys to southern Arabia and Syria. In his 25th year, he took service, probably as a camel driver, with the rich widow Khadija, who married him in 595. For some time he carried on a trade as merchant in Mecca.

Religious Conditions of Arabia. At this time, no central government had been established in Arabia, and various tribes, partly nomad, partly sedentary, held sway over ill-defined districts. A certain unity was maintained by language and custom and by mercantile and religious pilgrimages. From time immemorial, the city of Mecca had been sacred to these peoples. Jews, Christians, and Magi, mingling with innumerable Oriental worshipers, all congregated in Mecca at stated times. Mohammed was thus familiarized with the religious ideas prevailing then in southwestern Asia.

Mohammed's Mission. Mohammed was in the habit of withdrawing from his usual occupation to a cave, where he remained alone for hours, wrapped in thought. When 40 years of age, at the mountain of Hira near Mecca, he had the first of a long series of visions that convinced him of being the special messenger of God.

When his mission in life was thus revealed to him, Mohammed began to announce the eternal rewards awaiting those who pleased God by prayer and righteousness and the eternal punishments in store for those guilty of murder, theft, adultery, dishonesty, luxury, and other sins. By obedience to his message, each one might attain to *islam*, that is, the perfect surrender of the will to God. God's mercy was principally to be obtained by prayer, fasting, and almsgiving. The pilgrimage to Mecca was recognized by the new creed. He did not preach openly at first. His earliest revelation was communicated only to his family and one friend, Abu Bekr, and by the fourth year of his mission, he had made but 40 proselytes.

Persecution and Conflict. Mohammed's contravention of tribal and religious customs and beliefs gradually awakened opposition against the new prophet and against his adherents. He emigrated to Taif, from which he soon barely escaped with his life. With his loyal followers he went to Medina about 622. From this memorable migration, called the hegira, dates the origin of Islam and of the Mohammedan era. At Medina, Mohammed became the head of a civil community, which he ruled as a theocracy. He went to war with the enemies of Islam, especially the Meccans. With the aid of his allies, the Chuzaites, Mohammed took Mecca in 630 and was publicly recognized as chief and prophet. With this recognition, the victory of the new religion in Arabia was assured.

Mohammedanism. Toward the end of the 10th year of the hegira, he undertook, at the head of at least 40,000 Moslems, his last solemn pilgrimage to Mecca, and there on Mount Arafat, he instructed them in all the important laws and ordinances of the faith. The ceremonies observed by him on that occasion were fixed for all time.

Mohammed was prophet, teacher, legislator, and conqueror. When he died, unbelievers were brought to the faith by force of arms. A vast empire bowed before the shibboleth, "Koran, tribute, or sword." Islamism was later checked in the West by Charles Martel and in the East by Leo the Isaurian.

Mohammed's whole religious system is embodied in the *Koran*, which is the standard of faith as well as the basis of Mohammedan law. This book is made up of the successive revelations received by Mohammed through a series of years. The confession of faith of a Moslem serves as the summary of his religion,—"There is no God but the true God, and Mohammed is His messenger." He died at Medina, June 8, 632.

Moissan (*mwȧ'sȧN'*), **Henri,** French chemist, was born in Paris, 1852. He was educated at the museum of natural history and became professor of chemistry at the Sorbonne.

He is best known for his success in obtaining the element fluorin in the free state, which he accomplished by electrolysis, and for his development of the electrical furnace for producing high temperatures. He melted and volatilized many substances previously considered infusible and prepared numerous new compounds, particularly carbides, silicides, and borides. From these results he was led to undertake the artificial preparation of the diamond and succeeded in making minute specimens. His published works include *Fluorine and Its Compounds*, a *Treatise on Chemical Mineralogy*, and numerous scientific papers. In 1906, he was awarded the Nobel prize for chemistry. Died in 1907.

Molière (*mō'lyâr'*) is the stage name of Jean Baptiste Poquelin, greatest of French dramatists. He was born in Paris, January 1622. His father, Jean Poquelin, who was purveyor of furniture to the royal court, trained the boy to follow his trade of upholsterer. He was, however, further educated, 1636–41, at the Jesuit college at Clermont, where he studied philosophy under the famous Gassendi. Upon the illness of his father, he pursued the family trade in the household of Louis XIII. He followed the king in his journey to Narbonne in 1642 and saw there the French theater as it was emerging from neglect and flourishing under the talents of Corneille and the patronage of Richelieu. A passion for the stage awoke in him and became so insistent that he quitted his employment, assumed the name of Molière, and joined a society of young men devoted to theatrical pursuits.

Earlier Successes. For the next few years, Molière wandered in the provinces, an active actor-manager and playwright. In 1653, his first regular comedy, *The Giddy-Head*, played by his troupe at Lyon, won a great success by the wit and skill of its dialogue. The next year, in Languedoc, he produced *The Loving Spite*.

In 1658, Molière and his company received the patronage of the court in Paris. Molière already possessed a reputation for great power of invention and for skill in dramatic construction. His troupe became known as the "King's comedians," and, for his remaining 15 years, Molière labored incessantly as a player and dramatist under the marked favor of Louis XIV. His first great Paris success, *The Affected Misses*, was a keen satire on the ridiculous pedantry of the women in the literary salons. In this play we see Molière at his best, in the satiric comedy of manners.

For types of character, Molière now needed but to study the world before him. Although he occasionally fell back on farces in the manner of Plautus and the Italian comedy and wrote extravaganzas for court pleasures, these were only interludes in his career. His particular forte was in submitting contemporary customs and manners to a penetrating analysis and imparting to his characters vitality, wit, and realism.

Greatest Dramas. Within the next few years, Molière wrote *The School for Husbands*, *The Bores*, and *The School for Wives*. The truth with which he depicted the frailties of women is sometimes ascribed to his unfortunate marriage, in 1662, at the age of 40, to 18-year-old Armande Béjart, an actress. In 1666, Molière produced *The Misanthrope*, one of his best plays. As a comedy it has less interest than *The Hypocrite*, produced in 1667, which is generally considered his greatest drama.

Then followed in 1668 *The Miser* and, in 1670, *The Simple Gentleman* and *The Cheats of Scapin*. Absurd affectation of learning is satirized ingeniously in *The Learned Ladies*. His

last play, *The Imaginary Invalid*, exposed the quackery of the medical profession.

CHARACTER AND GENIUS. Molière's conduct in public affairs was honorable and manly. He was devoted to his professional comrades and sincere in his friendship with Corneille, Racine, Boileau, and the nobles who were glad to place his genius on a level with their affluence and rank. His many marks of distinction did not corrupt either his heart or his mind.

Molière was much greater as a dramatist than as an actor. His work is marked by the profound study that he devoted to every type of folly, affectation, and hypocrisy that beset his age. His characters are strong types rather than individuals, and his conceptions lack mystery and beauty. On the other hand, his gift for immortalizing various types of character, his creative art, and his knowledge of men and their motives make him unique in comedy. Died on February 17, 1673, following a convulsion which seized him on the stage when playing *The Imaginary Invalid*. A monument to him is to be seen in the cemetery of Père Lachaise, Paris. See *Literary Plots, Characters, and Allusions* under titles of chief works.

Moltke (*mōlt'kĕ*), **Helmuth Karl Bernhard, Count von,** Prussian general, was born in Parchim, 1800. He graduated from the military academy at Copenhagen, 1818, and entered the Prussian service in 1822. In 1835, he went to Turkey; remained there several years; and took part in the campaign of the Turks in Syria against the viceroy of Egypt. He became lieutenant general of the Prussian army, 1859, and drew up the plans of the campaigns against Denmark, 1864, and Austria, 1866. He was commander in chief in the Franco-Prussian war, 1870-71, and to his brilliant strategy are ascribed the splendid victories of the German arms. In recognition of his distinguished service to the nation, he was created count in 1870 and field marshal of the German Empire in 1871. Died, 1891.

Mommsen (*mōm'zĕn*), **Theodor,** German historian and classical scholar, was born at Garding, 1817. He studied at Kiel, 1838-43; examined Roman inscriptions in France and Italy for the Berlin academy, 1844-47; and, in 1848, was appointed to the chair of law at Leipzig, of which he was deprived two years later on account of the part he took in politics. In 1852, he became professor of Roman law at Zurich; in 1854, obtained a similar appointment at Breslau; and, in 1858, was made professor of ancient history at Berlin.

He edited the monumental *Corpus Inscriptionum Latinarum*; helped to edit the *Monumenta Germaniæ Historica*; and, from 1873 to 1895, was secretary of the academy of sciences. His greatest works are his *History of Rome* and *The Roman Provinces*. Freeman characterized Mommsen as "the greatest scholar of our times, well-nigh the greatest scholar of all times. . . . Language, law, mythology, customs, antiquities, coins, inscriptions, every source of knowledge of every kind—he is master of them all." He made important contributions to almost every field of classical learning. In 1902, he was awarded the Nobel prize for literature. Died, 1903.

Monet (*mō'nĕ'*), **Claude,** French landscape painter, was born in Paris, 1840. While influenced by Courbet, Corot, and Manet, he formed his own style directly from the study of nature, endeavoring to depict the fleeting aspects of things and to reproduce effects of light and air without regard for elements of detail or composition. In 1874, he exhibited the painting entitled "Impression, Rising Sun," which suggested the name for the impressionist school, of which he was the leader.

After 20 years of struggle against ridicule and criticism, his artistic ideas were recognized and have since been influential in modern art. Among his characteristic pictures are "The Orchard," "The Sun in a Fog, Waterloo Bridge," and "Rouen Cathedral," all in the Luxembourg museum, Paris. Representative works are found in the Walters gallery, Baltimore; the art institute, Chicago; and other American collections. Died, 1926.

Moneta (*mō-nā'tä*), **Ernesto Teodoro,** Italian journalist and peace advocate, was born in Milan, 1833. He took part in the Milan uprising of 1848; was a general staff officer in Garibaldi's army; and, from 1861 to 1867, served in the Italian army. From 1867 to 1896, he was director of the influential Milan newspaper *Il Secolo*.

About 1886, he began to advocate the cause of international peace and to form peace societies in northern Italy. He represented Italy in several peace congresses and was president of the international congress at Milan in 1906. In 1903, he published *Le guerre, le insurrezione, e la pace nel secolo XIX*, in recognition of which he was awarded one-half the Nobel peace prize in 1907. Died, 1918.

Monroe, James, fifth president of the United States, was born in Westmoreland county, Va., 1758. He was educated at William and Mary college; served in the Revolutionary army; was present at several battles; and, in 1783, entered the General Congress as a delegate from his native state. In the Virginia convention, 1788, he opposed the adoption of the Federal Constitution and allied himself with the Republican party, which party elected him a member of the United States Senate in 1790.

Four years later, he went to France as minister, but was recalled in 1796. He was governor of Virginia, 1799-1802. In 1803, as the associate of Livingston, he was dispatched on a special mission to negotiate for the purchase of Louisiana. In 1803 in England, and, in 1805 in Spain, he performed special diplomatic services for his country. In 1811, he again accepted the governorship of Virginia and, in the same year, became secretary of state under President Madison.

In 1816, Monroe was elected president of the United States by the Republican (now Democratic) party. The acquisition of Florida from Spain and the settlement of the vexed question respecting the extension of slavery by the Missouri Compromise helped to secure his practically unanimous re-election in 1820.

President Monroe's most noteworthy acts included the recognition of the independence of Mexico and of the South American republics and the promulgation of what has since been called the "Monroe Doctrine." The period of his administration was known as the "era of good feeling." In 1825, he retired to his seat at Oak Hill, Loudoun county, Va., and later to New York, where he died in 1831—like his predecessors Adams and Jefferson—on the 4th of July. See *Monroe Doctrine*.

Monroe, Paul, American educator, was born at North Madison, Ind., 1869. He graduated at Franklin college, 1890, and received the degree of Ph.D. at the University of Chicago, 1897. In 1899, he was made professor of the history of education at Teachers college, Columbia university, later becoming director of the school of education there.

He soon won recognition as an authority in his specialty, and, by his comprehensive textbooks, he established the foundation for the adequate study of the history of education in normal schools and colleges. His most notable service in this field was performed as editor in chief of the five-volume *Cyclopedia of Education*. Following 1921, he was governmental adviser on education for China and Poland, and directed educational surveys of the Philippines and Porto Rico. Works from his pen include *Source Book in the History of Education for the Greek and Roman Period, A Textbook in the History of Education*, and *Brief Course in the History of Education*.

Montagu (*mŏn'tä-gū*), **Lady Mary Wortley,** English poet and letter writer, eldest daughter of Evelyn Pierrepont, afterward duke of Kingston, was born in 1689. She was carefully educated and manifested precocious talents. In 1712, she married Edward Wortley Montagu and, in 1716, accompanied him on his embassy to Constantinople. To this journey we are indebted for her admirable *Letters*. After her return to England in 1718, she shone conspicuously in the circles of talent and fashion. Pope was among her friends, but he at length quarreled with and satirized her. In 1739, she settled on the continent, remaining there until 1762, when she returned to England. Her collected works have been published in six volumes. Her *Letters* place her in the front rank of feminine epistolary writers in Great Britain. Died in 1762.

Montaigne (*mŏn-tān'*; F., *mōn'tän'y'*), **Michel-Eyquem de,** French essayist, was born on the feudal estate of his father, Pierre Eyquem, in Perigord, February 28, 1533. As soon as he could speak, he was placed under the care of a German tutor, with whom he conversed entirely in Latin, learning Greek as a pastime and speaking no French. He became so familiar with Latin, the language of learning, that he was able, at 13 years of age, to complete his formal education in the College of Guienne at Bordeaux.

Having no taste for military life, Montaigne studied law and, from 1554, served as councilor in the parliament of Bordeaux. He went several times to court and enjoyed the favor of Henry II. Montaigne married Françoise de la Chassaigne when he was 33 years of age. In 1569, he translated into French a Latin work by Sebonde.

The cruelty and bloodshed of the religious wars filled Montaigne with distaste for public life, and he retired to his estate, resolved to spend the rest of his life in study. During this dismal period, he began his *Essays*, which were first published in March 1580 and won such immediate popularity that within a few years they had been read by nearly every man of education in France.

Shortly after the publication of the *Essays*, Montaigne undertook a journey for his health to Germany, Switzerland, and Italy, which he described in his *Journal of Travel*. While abroad, he was elected mayor of Bordeaux by the votes of the citizens, and he was subsequently honored with re-election. In 1586, he retired from office and returned to his estate. When, soon afterward, the plague added to the miseries and difficulties with which he was surrounded, he became a wanderer with his family. In 1588, he went to Paris and engaged in vain attempts to reconcile Henry of Navarre and the duke of Guise. Here he made the ac-

quaintance of Mademoiselle de Gournay, whom he regarded tenderly as his adopted daughter and to whom his widow intrusted the task of publishing the first complete edition of his works.

His *Essays* have exercised an influence, particularly on French and English literature, greater perhaps than any other single modern book. An English translation of it by John Florio is the only book that Shakspere is definitely known to have possessed. These essays range over every subject connected with human life and manners, and exhibit acuteness of thought combined with great depth of sympathy. Montaigne's merit is that he tried to build up a human morality and to lead man into the paths of justice, integrity, and forbearance, without appeal to supernatural fears. Died, September 13, 1592.

Montcalm (*mŏnt-kăm'*), **Louis Joseph, Marquis de,** French general, was born near Nimes, France, 1712. He was commander in chief of the French troops in Canada, 1756–59. He captured Fort Ontario, Oswego, 1756, and Fort William Henry, 1757. He repulsed the British under Abercrombie at Ticonderoga in 1758; repelled Wolfe's attack on Quebec in 1759, but was defeated and mortally wounded in the battle of the Plains of Abraham, near Quebec, September 13th of the same year. By this defeat, France lost Canada, which then passed under the control of England.

Montesquieu (*mŏn'tĕs-kū'*; F., *môN'tĕs'kē'û'*), **Baron la Brede et de,** French publicist, was born of a noble family at the Château de la Brede near Bordeaux, France, January 18, 1689. His great abilities were soon apparent; and he passionately devoted himself in his youth to study, collecting a large mass of extracts from the civil law, which later formed the first part of his great work, *The Spirit of Laws*.

In 1714, he became a councilor in the parliament of Bordeaux, and, in the following year, he married Mademoiselle de Lartigues. In 1716, he was made president of the parliament. In 1721, he published his *Persian Letters*, which, purporting to be from the pen of two Persians traveling in Europe, satirized the follies and vices of France. Although this small book appeared anonymously, its authorship was soon revealed. Its success was great, but, in 1728, Montesquieu altered some of the more offensive pages to facilitate his admission to the French academy.

The years 1729–31 Montesquieu spent traveling in Hungary, Italy, Switzerland, Germany, Holland, and England and made the acquaintance of many eminent men. Following these travels by a studious retirement of two years, he was able to give to the world in 1734 his *Considerations on the Causes of the Grandeur and Decadence of the Romans*.

He devoted the next 14 years to the preparation of *The Spirit of Laws*, which appeared at Geneva in 1748. It found an audience immediately and ran through 22 editions in 18 months. The purpose of this book was to find in nature and history the explanation of the existing maxims and institutions of various nations, and to show how diversities in physical and moral circumstances have contributed to produce diversities in social institutions. Many attacks were made upon *The Spirit of Laws*, but only one provoked any reply from the author. He made answer to the charge of atheism, in his *Defence of the Spirit of Laws*.

Montesquieu enjoyed his triumph quietly in La Brede. His extensive influence in France and Great Britain has been due to his genius for generalization, his sure instinct in political science, and his sincere desire for human improvement and happiness. Died in Paris, February 10, 1755.

Montessori (*mŏn'tĕs-sō'rē*), **Maria,** Italian educator, was born in 1870. She studied medicine at the University of Rome and, in 1894, secured the first degree of doctor of medicine awarded in Italy to a woman. In 1898, she was made principal of a school for feeble-minded children. She put into practice the ideas of Itard and Séguin with such success that she determined to adapt and apply the same methods and principles to the education of normal children.

The essentials of her system consist, first, in the strong emphasis placed on sense training by means of specially prepared teaching materials, and, secondly, in the great stress laid upon the freedom of the child. Private Montessori schools were soon instituted throughout the world, and, in Switzerland, public Montessori schools were established by law in 1911. She became director of the Montessori research institute established at Barcelona in 1917 and in 1922 was made government inspector of schools for Italy. She set forth the principles of her system in two works translated under the titles *Pedagogic Anthropology* and *The Montessori Method*.

Monteverde (*mŏn'tā-vâr'dā*), **Claudio,** Italian composer, was born at Cremona, 1567. He introduced many innovations in musical composition; originated the monodic style; and was thus the forerunner, and by some regarded as the founder, of modern opera. From 1601 to 1612, he was chapelmaster at Mantua, and, from 1613 until 1643, he held a similar position at San Marco in Venice. He composed operas, songs, motets, and church music. Died, 1643.

Montgolfier (*mŏnt-gōl'fĭ-ēr*; F., *môN'gôl'fyā'*), **Jacques Etienne** and **Joseph Michel,** distinguished as the inventors of the balloon, were the sons of a paper manufacturer at Annonay, France. The former was born in 1745 and the latter in 1740. Etienne, after a few successful experiments with the balloon, went to Paris, where his discovery created a great sensation. In recognition of their work, Louis XVI decorated Etienne, gave Joseph a pension, ennobled their father, and later granted the brothers 40,000 francs with which to make further experiments. Etienne died in 1799. Joseph was decorated by Napoleon, and was elected to the institute in 1807. The parachute also is one of his inventions. Died, 1810. See *Airship*.

Montgomery, Lucy Maud, Canadian novelist, was born in Prince Edward Island, 1877. She was educated at Dalhousie university and taught school for a short period. She was married in 1911 to Rev. Ewen McDonald. Her best-known novels include *Anne of Green Gables* and *Anne of Avonlea*.

Moody, Dwight Lyman, American evangelist, was born at Northfield, Mass., 1837. He became a Congregationalist and, from 1856, devoted himself to religious work in Chicago and elsewhere. During the Civil War, he served on the Christian commission. His church and school at Chicago having burned in 1871, he went to England and succeeded in raising funds for rebuilding them. For many years Ira D. Sankey, the singer, was associated with Moody in a remarkably successful evangelical campaign. He established a school for Christian workers at Northfield, Mass., and a Bible institute at Chicago. Died, 1899.

Moody, William Vaughn, American poet and playwright, was born at Spencer, Ind., 1869. Upon graduation from Harvard, 1893, he taught English at Harvard and Radcliffe, leaving in 1895 to become instructor at the University of Chicago, where he was appointed assistant professor of English and rhetoric, 1901. The high quality of verse in his lyrical drama *The Masque of Judgment*, in *Poems*, and in *The Fire-Bringer* caused him to be regarded as one of the most promising American poets. He won marked success also in the drama. His *Great Divide*, which appeared in 1907, is one of the best American plays; *The Faith Healer*, 1909, though of less merit, is noteworthy among the dramas of its day. He wrote *History of English Literature*, in collaboration with R. R. Lovett, and edited many English classics. He was elected to the American academy of arts and letters in 1908. Died, 1910.

Mooney, James, American ethnologist, was born at Richmond, Ind., 1861, and was educated in the public schools. After teaching school for a short time, he engaged in journalism and, in 1885, began a connection with the bureau of American ethnology that lasted throughout the remainder of his life. His investigations were concerned chiefly with the Indians of the South and the West. He learned the religious ritual of the Cherokees and studied the ghost dance. He also prepared a large number of Indian exhibits in different American cities. His publications include *Sacred Formulas of the Cherokees*, *Calendar History of the Kiowa Indians*, and *Cheyenne Indians*. Died, 1921.

Moore, Sir John, British general, was born in Glasgow, Scotland, 1761. He served in the British army during the American Revolutionary war; in Corsica, 1793-94; and subsequently in Ireland, Holland, Egypt, and Sicily. In 1798, he was made major general. On his return from an expedition in aid of Sweden, he was sent to Portugal in 1808 to command an army in co-operation with the Spaniards against the French. He was obliged to retreat from Salamanca to the sea; won the battle of Corunna in 1809; but fell during the action, dying at the moment of victory.

Moore, John Bassett, American publicist and authority on international law, was born in Smyrna, Del., 1860. He graduated at the University of Virginia, 1880; studied law at Wilmington, Del.; and was appointed law clerk in the state department. In 1886, he became third assistant secretary of state. In 1891, he was made professor of international law and diplomacy at Columbia university and was appointed, 1898, assistant secretary of state, resigning to become secretary and counsel to the peace commission at Paris. He represented the government in various foreign missions and, in 1913, became counselor to the department of state, resigning in 1914 to resume his chair at Columbia. In 1921, he was appointed a judge of the Permanent Court of International Justice. He served until 1929.

His works, which are of great importance in their field, include *Extradition and Interstate Rendition*, *American Notes on the Conflict of Laws*, *History and Digest of International Arbitrations*, *Four Phases of American Development*, and *Digest of International Law*.

Moore, Thomas, Irish poet, was born in Dublin, 1779. He graduated at Trinity college, Dublin, 1798, and, in 1799, went to London to study law, taking with him a translation of the *Odes* of Anacreon, which he published in 1800. In 1801, he published *The Poetical Works of the Late Thomas Little, Esq.*, a pseudonym suggested by his diminutive

stature. In 1803, he was appointed registrar to the admiralty in Bermuda, but soon returned to England, having first made a rapid tour through a portion of the United States and Canada. He settled in Derbyshire and later in Wiltshire.

Here were written many of the songs known as *Irish Melodies*, which enjoyed great popularity. He published also *Sacred Songs*, *National Airs*, *Legendary Ballads*, and many miscellaneous pieces. In 1817, he published his famous *Lalla Rookh*, the most elaborate of his works. His writings include also *The Fudge Family in Paris*, *Tom Crib's Memorial to Congress*, *Rhymes on the Road*, *Fables for the Holy Alliance*, *Loves of the Angels*, *Life of Sheridan*, and a prose fiction entitled *The Epicurean*. Moore was intrusted with the memoirs of Lord Byron and, by use of them, composed his *Notices of the Life of Lord Byron*. He afterward reluctantly destroyed the memoirs. Died, 1852.

Moran (*mō-răn'*), **Thomas,** American artist, was born at Bolton, Lancashire, England, 1837. His early life was spent at Philadelphia, where he learned engraving. He then studied painting in England, France, and Italy. His large paintings the "Grand Cañon of the Yellowstone" and the "Chasm of the Colorado" were bought by Congress. His other works include "The First Ship" and "Ruins on the Nile," in the Wilstach collection, Philadelphia; "Bringing Home the Cattle," in the Albright gallery, Buffalo; also "Balboa Discovering the Pacific," "Hiawatha and the Serpents," and "The Wilds of Lake Superior." Died, 1926.

More, Paul Elmer, American essayist and critic, was born in Saint Louis, 1864. He graduated at Washington university in 1887 and continued his studies at Harvard. He taught Sanskrit at Harvard, 1894-95, and at Bryn Mawr, 1895–97. He was literary editor of the *Independent*, 1901–03, and of the New York *Evening Post*, 1903–14. From 1909 to 1914, he was editor of the *Nation*, to which he contributed many reviews and critical essays.

In the field of literary criticism he achieved foremost rank by his profound scholarship, keen philosophical analysis, and effectiveness of method. His critical work is contained in the *Shelburne Essays*. His writings include also *Helena and Occasional Poems*, *The Great Refusal*, *Benjamin Franklin*, *Nietzsche*, *Hellenistic Philosophies*, and *The Christ of the New Testament*. In 1915, he became a member of the American academy of arts and letters.

More, Sir Thomas, English author and statesman, was born in London, 1478. He was educated at Oxford and Lincoln's Inn; rose to eminence as a lawyer; was appointed undersheriff for London; and was elected a burgess of the Parliament under Henry VII, where he was often successful in resisting claims of the crown. In 1514 and 1515, he was sent on commercial embassies to the Netherlands and, after his return, became a privy councilor. In 1521, he was knighted; in 1523, was chosen speaker of the House of Commons; and, in 1525, was appointed chancellor of the duchy of Lancaster. He became lord chancellor in 1529 and held the great seal for two and a half years.

His political duties did not prevent his production of a number of literary works, the chief of which was the *Utopia*. He constantly refused to lend his authority to Henry VIII's project of divorce and second marriage. In 1534, he refused to swear allegiance to the Act of Succession for securing the throne to the offspring of Anne Boleyn and was committed to the Tower. In July 1535, he was charged with traitorously attempting to deprive the king of his title as supreme head of the Church and was condemned and executed. See *Utopia*.

Morehouse, Daniel Walter, American astronomer, was born at Mankato, Minn., 1876. He was graduated at Northwestern Christian college, Excelsior, Minn., at Drake university, and at the universities of Chicago and California. In 1900, he was appointed professor of physics and astronomy at Drake university. In 1908, he discovered a comet, which was named Morehouse in his honor. He lectured on astronomy at the University of California in 1910-11. In 1922, he became president of Drake university.

Morgan, John Pierpont, American financier and art collector, was born in Hartford, Conn., 1837. He graduated at English high school, Boston; studied at the University of Gottingen; and entered the bank of Duncan, Sherman, and Company, 1857. In 1871, he became a member of the firm Drexel, Morgan, and Company, later J. P. Morgan and Company, leading private bankers of the United States, with branch houses in London and Paris.

He financed the largest reorganization of railways and consolidation of industrial properties in the United States; organized and floated securities of the United States Steel Corporation, 1901, with a capital of $1,100,000,000; and gained financial control over many important railway systems and large American and British ocean transportation lines.

Morgan gave large donations to the New York trade schools, the cathedral of Saint John the Divine, and many other institutions. He made valuable gifts to the American museum of natural history, the Metropolitan museum of art, and the New York public library.

The greatest art collector of his day, Morgan owned famous collections of pictures, books, manuscripts, tapestries, and porcelains. His wonderful collection of rare books was housed in a white marble structure built for the purpose in connection with his New York home. In 1912, he gave to the library of Congress a complete set of autographs of the signers of the Declaration of Independence. Died, 1913.

Morgan, John Pierpont, son of the preceding, was born at Irvington, N. Y., 1867. He graduated from Harvard and joined the firm of Morgan and Company, to the control of which he succeeded at the death of his father in 1913.

Under his management, the firm greatly extended its business. It took a leading part in financing Allied loans during the World War and in the unprecedented expansion of American investments abroad in the post-War period. In 1924, Morgan presented his father's library valued at 7 million dollars, as a memorial to New York City, adding a substantial endowment for its upkeep. With Owen D. Young, he served as one of the two American representatives on the international conference on reparation payments in 1929.

Morgan, John Tyler, American statesman, was born at Athens, Tenn., 1824. He removed to Alabama in 1833; was admitted to the bar in 1845; became a delegate to the Alabama secession convention, 1861; joined the Confederate army as a private, becoming a brigadier general in 1863. After the war, he resumed the practice of law at Selma, Ala. From 1877 to 1907, he was a United States senator. He was appointed arbitrator on the Bering Sea fisheries dispute, 1892, and, in 1898, was one of the commissioners to organize the government of Hawaii. Died, 1907.

Morgan, Thomas Hunt, American zoologist, was born at Lexington, Ky., in 1866. He was educated at the State College of Kentucky and Johns Hopkins university. He was made professor of biology at Bryn Mawr college in 1891 and of experimental zoology at Columbia university in 1904. His investigations, mainly in the field of animal evolution, genetics, and heredity, place him among the foremost zoologists of the time. His publications include *Evolution and Adaptation* and *The Physical Basis of Heredity*.

Morgenstern, Julian, American educator, was born at Saint Francisville, Ill., 1881. He was graduated at the University of Cincinnati and at Hebrew Union college, becoming a rabbi. He studied also at Berlin and Heidelberg. In 1907, he became professor of Biblical and Semitic languages at Hebrew Union college, and president in 1922. He was also made director of the American school for Oriental research at Jerusalem and Bagdad. His publications include *The Doctrine of Sin in the Babylonian Religion* and *A Jewish Interpretation of the Book of Genesis*.

Morgenthau (*môr'gĕn-tou*), **Henry,** American diplomat, was born in Mannheim, Germany, 1856. He was brought to the United States in 1865 and was educated in the College of the City of New York and Columbia university. He practiced law in New York from 1879 to 1899 and then was made president or director of a number of financial or industrial corporations and became prominent in the Democratic national committee. In 1913–16, he was ambassador to Turkey, where, after the outbreak of the World War, he was charged also with the diplomatic interests of Great Britain, France, Italy, Russia, Belgium, and other countries. He later served on a commission sent to Poland and as chairman of the Near East Relief. His *Ambassador Morgenthau's Story* has been translated into several foreign languages.

Morley, Christopher (Darlington), American editor and author, was born at Haverford, Pa., 1890. He was graduated at Haverford college and, as a Rhodes scholar, studied at Oxford university, 1910–13. He joined the editorial staff of Doubleday, Page and Company in 1914 and was later an editor successively of the *Ladies Home Journal*, the Philadelphia *Public Ledger*, and the New York *Evening Post*. His works include *The Eighth Sin*, *Parnassus on Wheels*, *Thunder on the Left*, and *The Romany Stain*.

Morley of Blackburn, John, Viscount, English statesman and writer, was born in Blackburn in 1838 and was educated at Cheltenham and Oxford. He was called to the bar, but devoted his time chiefly to writing and public duties. Among other publications, he edited the *Fortnightly Review*, 1867–83, and *Macmillan's Magazine*, 1883–85.

In 1883, Morley entered Parliament. From the first, he advocated home rule for Ireland, and his articles in favor of it, followed by speeches in 1885, made him Gladstone's most conspicuous supporter. He became chief secretary for Ireland in 1886 and again in 1892. From 1905 to 1910, he was secretary for India and was lord president of the council until 1914, when he resigned from the cabinet because his convictions were opposed to war.

Morley's place in English letters is assured by his authoritative *Life of Gladstone*, his *Life of Burke*, *Life of Cobden*, and other important works, among which are *Critical Miscellanies*, *Voltaire*, *On Compromise*, *Rousseau*, *Diderot and*

the Encyclopædists, *Notes on Politics*, and *Recollections*. He was created viscount in 1908. Died, 1923.

Morrill, Justin Smith, American legislator, was born in Strafford, Vt., 1810, and devoted himself to mercantile pursuits until his election to Congress. He sat in the House of Representatives from 1855 to 1867 and in the Senate from 1867 until 1898. In 1861, he secured President Lincoln's approval of a bill for the establishment, through public land grants, of state colleges for teaching agriculture and the mechanic arts. By virtue of this bill, there had been established, by 1915, 67 institutions, giving instruction to 69,000 students. Senator Morrill was also the author of the famous Morrill Tariff bill of 1861. Died, 1898.

Morris, Gouverneur, American statesman, was born at Morrisania, N. Y., 1752; graduated at King's college, now Columbia, 1768; studied law; and was admitted to the bar, 1771. He was one of those who drew up the state constitution of New York in 1776. He was also a member of the Continental Congress, 1777–80, and aided Robert Morris in the organization of the bank of North America in 1781. In 1787, he was one of the committee to draft the Federal Constitution; was minister to France, 1792–94; and served as a United States senator, 1800–03. Died, 1816.

Morris, Gouverneur, American novelist and short story writer, was born in New York City, 1876, a great-grandson of the Revolutionary leader of the same name. He was graduated at Yale university and immediately devoted himself to literary work. His novels include *The Pagan's Progress*, *The Goddess*, and *Yellow Men and Gold*. Many of his short stories, including *The Footprint* and *Spread Eagle*, have been collected and published in book form.

Morris, Robert, American financier and statesman, was born in Liverpool, England, 1734, and was sent to America at the age of 14. He amassed a large fortune as a merchant in Philadelphia. Sent as a delegate to the Continental Congress in 1775, he signed the Declaration of Independence. In 1781, he was created superintendent of finance. Failing public support, he borrowed on his personal credit, when necessary, to provide funds for the army. He founded the Bank of North America, which proved highly serviceable in financing the Revolution. In 1787, he nominated Washington for the presidency. Died, 1806.

Morris, William, English poet and artist, was born near London, 1834. He was educated at Marlborough school and Oxford; studied architecture and painting; and became the associate of Burne-Jones and Rossetti. In 1861, he established a business in artistic furniture, tapestry, printing, book-illumination, and stained glass. Artistically he did much to elevate the public taste in domestic decoration.

Morris also carried on for a time the *Kelmscott Press*, which reprinted various choice works. In his later years, he became known as one of the leaders of the socialist movement in England. His works include *The Earthly Paradise*, *The Life and Death of Jason*, *Love is Enough*, and *News from Nowhere*. Died, 1896. See *Earthly Paradise*, page 281; also page 1569c.

Morse, Jedidiah, author of the first American schoolbooks on geography, was born in 1761. He was educated at Woodstock academy and at Yale college, where he graduated in 1783. After teaching for a few years, he entered the Congregational ministry. While active in religious and moral movements, his most prominent work was the authorship of schoolbooks. In 1784, he published *Geography Made Easy*; in 1797, *Elements of Geography*; and, in 1814, *Universal Geography*, for many years practically the only textbooks on the subject used in American schools. Died, 1826.

Morse, Samuel Finley Breese, American artist and inventor, was born at Charlestown, Mass., on April 27, 1791. From Phillips academy he was admitted to Yale university, at which he was graduated in 1810. After five years passed in the study of painting and sculpture in England, Morse opened a studio at Boston in 1815. Indifferent success led him to travel as a portrait painter. At this time he met Lucretia P. Walker of Concord, N. H., whom he married October 1, 1818.

Invention of the Telegraph. After the death of his wife in February 1825, Morse settled in New York. There he made general progress with his brush and became first president of the national academy of design. He sailed for Italy in 1829 in order to execute a commission for some pictures. At this time, he spent two years in Rome and one in Paris. On the return voyage from Havre to New York in 1832, in the course of a conversation on recent discoveries in electromagnetism, Morse conceived the idea of a magnetic telegraph. His plan was complete as to its main features—a current passing through a wire between two places, signals to be made at one terminus by alternately making and breaking the circuit at the other. The inventor now faced the problem of devising an apparatus to embody his ideas.

Development of the Invention. In 1835, Morse was appointed professor of the literature of the arts of design in New York university. In a studio allotted to him in Washington square, he prosecuted his experiments with Professor Gale and Alfred Vail, both of whom he subsequently admitted into partnership. In 1837, Morse filed a caveat at the patent office in Washington and applied to Congress for $30,000 to defray the expense of an experimental line of 50 miles. With the Honorable F. O. J. Smith, now admitted as the fourth member into partnership, Morse sailed for Europe to procure patents there in 1838. Discouragement and disappointments awaited him except in France, where he readily obtained a patent.

In 1840, Morse obtained his American patent, but not until 1843 did Congress appropriate the money for the establishment of the trial line between Washington and Baltimore. On May 24, 1844, success crowned the public test of the telegraph. Early in August 1845, he sailed from New York to present his telegraph again to European governments.

Honors. In his last years, Morse received not only an adequate pecuniary reward for his services, but countless other honors. In 1848, he married Sarah E. Griswold and moved to a splendid mansion which he had built near Poughkeepsie, N. Y. He received the degree of doctor of laws from Yale and was elected to membership in learned societies of the United States, France, Belgium, Sweden, and Switzerland. Orders and decorations were bestowed upon him by the sovereigns of Turkey, Prussia, Wurttemberg, Austria, France, Denmark, Spain, Portugal, and Italy.

In 1856, Morse went to Europe to superintend some of the preparations for laying the Atlantic cable. Presentations at royal courts and honors by men of science and affairs attended his progress. In 1858, he received $80,000 from the nations of Europe and saw his telegraph then in use, to the almost complete exclusion of its rivals everywhere. America honored him by the erection of a bronze statue in Central park, New York. Morse died on April 2, 1872, and memorial services were held in many American cities. The reports of these meetings, with their addresses and poems, were collected and published by order of Congress. See *Telegraph*.

Morton, William Thomas Green, American dental surgeon, was born at Charlton, Mass., 1819. After establishing himself in dental practice in Boston, he began, early in 1844, to study medicine in the office of Dr. Charles T. Jackson, where he became acquainted with the value of sulphuric ether as a local anesthetic and used it first in dental operations. Actual surgical anesthesia by ether was made known to the public, October 16, 1846, through an operation for facial tumor performed at the Massachusetts general hospital by Dr. J. C. Warren, to whom Morton had imparted his knowledge of the method. In November 1846, Morton obtained a patent for the process of anesthesia by means of ether.

Although he was probably the first to recognize the general anesthetic properties of ether and deserves credit for its public introduction into surgery, its use was doubtless first suggested to him by Dr. Jackson, while the discoveries of both seem to have been antedated by the successful though unpublished employment of ether in surgical operations by Dr. C. W. Long of Georgia in 1842. Morton was awarded the Montyon prize for medicine and surgery by the French academy in 1852. He refused $100,000 offered by Congress for his patent. Died in 1868. He was elected to the American hall of fame in 1920.

Mosander, Karl Gustav, Swedish chemist and mineralogist, was born at Kalmar. He was professor of chemistry at Stockholm and became distinguished in the scientific world for discoveries resulting from his researches upon rare earths. In 1839, while examining the Swedish mineral cerite, he discovered the element lanthanum, a moderately ductile, white metal resembling cerium and now found to occur in lanthanite in Pennsylvania and New York. In 1843, he discovered didymium and erbium. The mineral mosandrite, which is zirconium-titanium silicate, was named in his honor. Died, 1858.

Moses, Hebrew lawgiver and prophet, is believed to have lived and flourished about the 15th century B. C. Moses, according to the traditional account, was the son of Amram, of the tribe of Levi, and was born when this Hebrew tribe was settled in northeastern Egypt in bondage to the Egyptians.

To save him from the consequences of an Egyptian royal edict that all male infants of the Hebrews should be drowned, Moses was placed in a basket and hidden among the rushes which grew along the banks of the Nile. The king's daughter came to the river, where she found the child. She took it and brought it up as her own. When grown, Moses was sent to the king's palace at Heliopolis, where he enjoyed the advantages of education and refinement. He became adept in all the sciences of Egypt, Assyria, and Chaldea. He also led armies against the Ethiopians, pursuing them to Saba, or Meroe.

Fearing because he had murdered an Egyptian overseer who was illtreating a Hebrew slave, Moses fled and escaped into Midian, where he remained for many years tending the flocks of his father-in-law, Jethro. While there, he heard the voice of Jehovah bidding him deliver his race from slavery. He returned to Egypt and prevailed on the Egyptian king to permit the Hebrews to depart. Their departure is known in history as the Exodus.

Shortly after the Exodus, Moses heard a voice calling him into Mount Sinai. He ascended and, after 40 days, returned, bearing a stone tablet on which was written the decalogue, or ten commandments. These laws were more or less successfully enforced on the Hebrews, who for the space of a generation, fought under the leadership of Moses against various peoples of the desert northeast of Egypt. Their conquests brought them eventually to the more fertile land of Canaan. Throughout this period, Moses appeared as a representative of Jehovah, the worship of whom became, mainly through his efforts, the national religion of the Hebrews. Moses has therefore continued to be reverenced as the prophet of Jehovah and the lawgiver of Israel.

Moses did not enter the land of Canaan with the Hebrews but is said to have obtained a view of it from the top of Mount Pisgah just before his death at 120 years of age. According to the biblical account, he was buried at the foot of Mount Nebo by Jehovah himself.

Motley, John Lothrop, American historian and diplomat, was born in Dorchester, Mass., 1814. He graduated at Harvard in 1831 and afterward studied at Gottingen and Berlin. After traveling for some years in Europe, he returned to the United States; studied law; and was admitted to the bar. In 1841, he became secretary of legation at Petrograd; was minister to Austria, 1861–67; and served as minister to England, 1869-70. The three great works upon which Motley built up one of the foremost literary reputations of the century are *The Rise of the Dutch Republic—a History*; its sequel, *The History of the United Netherlands*; and *John of Barneveld*. Died, 1877. He was elected to the American hall of fame in 1910.

Mott, John Raleigh, American Y. M. C. A. leader, was born at Livingston Manor, N. Y., 1865. He graduated from Cornell university in 1888 and immediately engaged in Y. M. C. A. work, rising to the foremost rank among the leaders of the organization. As general secretary of the international committee of the Y. M. C. A., his lectures, conferences, and mission work were remarkably successful and influential throughout the United States. He resigned in 1928 and became president of the International Missionary Council. His published works include *Strategic Points in the World's Conquest, Christians of Reality, The Pastor and Modern Missions, The Future Leadership of the Church*, and *World Student Christian Federation*.

Mott, Lucretia, née Coffin, Quaker philanthropist and reformer, was born in Nantucket, Mass., 1793. She was a delegate to the world's antislavery convention in London, 1840, but was not allowed to take a seat as delegate because of her sex. She was prominently identified with the early stages of the movement for the larger emancipation of women. In 1848, with Elizabeth Cady Stanton, she launched the woman's rights movement at a convention at Seneca Falls, N. Y. Her discourses and sermons were frequently printed in the newspapers. She married James Mott, who constantly co-operated with her in her philanthropic work. She died in 1880.

Moulton (*mōl'tŭn*), **Forest Ray,** American astronomer, was born at Le Roy, Mich., in 1872. He was educated at Albion college and the University of Chicago, to the faculty of which institution he was appointed in 1898. He rose by 1912 to a professorship in the department of astronomy there and, by his various researches, won a position of prominence among the scientific scholars of America. In 1928 he resigned to devote himself to business. His publications include *Celestial Mechanics, Descriptive Astronomy*, and *Periodic Orbits*.

Moulton, Richard Green, educator and author, was born in Preston, England, 1849. He graduated from London and Cambridge universities and from the University of Pennsylvania. He was a university extension lecturer with English and American universities, 1874–92. In 1892, he became professor of English literature at the University of Chicago, and, in 1901, was made head of the department of general literature. Among his works are *The Ancient Classical Drama, The Literary Study of the Bible, Shakespeare as a Dramatic Thinker, The Modern Study of Literature*, and *The Modern Reader's Bible*. Died, 1924.

Mozart (*mō'zärt*; G., *mō'tsärt*), **Johann Wolfgang Amadeus,** Austrian composer and chief founder of the opera, was born at Salzburg, Austria, January 27, 1756. When three years old, Mozart attracted attention by his delight in striking chords on the piano. With his sister he made his first appearance in public at Munich in his sixth year, later visiting Vienna, Paris, and London. After his return to Salzburg, his father gave him a thorough education in musical theory and practice.

At the age of 15, he produced his opera *Mithradates* at Milan amid great applause. After a long series of concert journeys over Europe, 1763–1773, he sought other employment in Paris without success. He had, however, the opportunity of hearing the various kinds of music then in vogue.

He was now appointed concert master and organist at Salzburg with a small salary and permission to travel occasionally to perform his new works. His opera *Idomeneo*, composed in 1780, was as original in its phraseology and development as in its modulation, harmony, and instrumentation. He is said to have written it to win the good graces of the Webers, a musical family of Mannheim, with whom he subsequently lived in Vienna and whose daughter Constanza he married in 1781.

Mozart was obliged to break with his hard master, the archbishop of Salzburg, and he supported himself with difficulty by giving concerts and music lessons. Amid incessant rebuffs and violent intrigues, he set *The Marriage of Figaro* to music as an Italian opera in 1786. Its happy reception at Prague induced him to settle there, where he finished his master opera, *Don Giovanni*, in 1787.

In 1788, he returned to Vienna. Then followed the busiest period of his life. Frequent concert journeys and incessant labor exhausted him; the fear of early death oppressed him. In this condition he composed his exquisite opera *The Magic Flute* and commenced a *Requiem*, which was never finished.

Mozart united profound learning and universal genius in all his works, whether song, sonata, concerto, symphony, mass, or opera. He was the greatest pianist of his time in Germany. He revolutionized the lyrical drama by *Idomeneo*, and the romantic opera may be said to have been created in *Don Giovanni* and *The Magic Flute*. Mozart is the first composer in whose works all traces of the old tonality disappear; he was the father of the modern school. Died, December 5, 1791. See *Music: German Classic Masters*.

Muhlenberg (*mū'lĕn-bûrg*), **Frederick Augustus Conrad,** American clergyman and political leader, son of Heinrich Melchior Muhlenberg, was born at New Providence (now Trappe), Pa., 1750. He was educated at the University of Halle, Germany; entered the Lutheran ministry; and was pastor in New York City, 1773–76. He then returned to his native state; resigned from ministerial work; entered politics; and was elected to the Continental Congress in 1779. After distinguished service in the Pennsylvania legislature, of which he was twice speaker, he was elected to the first United States Congress. He was the first speaker of the House of Representatives, 1789–91, and was again speaker, 1793–95. Died, 1801.

Muhlenberg, Heinrich Melchior, American clergyman, founder of the German Lutheran Church in America, was born at Einbeck, Germany, 1711. He studied at Gottingen and Halle; was pastor of a Lutheran church in Lusatia, 1739–41; and settled in Pennsylvania, 1742, as a missionary. In 1748, he was instrumental in forming the first American Lutheran synod. In 1762, while he resided in Philadelphia, he formulated the constitution for the Lutheran congregation there. This became the basis of the constitutions under which most congregations were subsequently established. He died in 1787.

Muir (*mūr*), **John,** American naturalist and explorer, was born at Dunbar, Scotland, 1838; was educated in Scotland and at the University of Wisconsin. He discovered Muir glacier, Alaska, and visited the arctic regions in search of the DeLong expedition. Between 1899 and 1912, he traveled in Asia, Australasia, South America, and Africa. He was a pioneer advocate of forest conservation and of the establishment of national parks.

His writings include *The Mountains of California, Our National Parks, My First Summer in the Sierra, The Yosemite, The Story of My Boyhood and Youth*, and many scientific articles. In 1915 appeared *Letters to a Friend* and *Unpublished Prose and Letters*, both of which contain much material on Alaska. He was a member of the American academy of arts and letters. Died, 1914.

Müller (*mūl'ĕr*; E., *mŭl'ĕr*), **Friedrich Max,** British philologist and Orientalist, son of a German poet, Wilhelm Müller, was born in Dessau, Germany, 1823. He was educated at Leipzig; studied at Paris; and settled in England in 1846. In 1854, he was appointed professor of modern languages at Oxford, where, from 1868 to 1875, he was professor of comparative philology, a science to which he made large contributions.

Besides editing the *Rig-Veda*, he published *Lectures on the Science of Language* and *Chips from a German Workshop*, dealing, not merely with the origin of languages, but with the early religious and social systems of the East; also *The Origin and Growth of Religion, Comparative Mythology*, and *Biographical Essays*. He was chief editor of the series of works entitled *The Sacred Books of the East*. Died, 1900.

Mulock (*mū'lŏk*), **Dinah Maria** (Mrs. Craik), English novelist, was born at Stoke upon Trent, 1826. Devoting

herself at an early age to writing, she published, beginning with *The Ogilvies* in 1849, a series of novels and poems which became widely popular. Her literary fame rests chiefly upon her classic novel of English middle-class life, *John Halifax, Gentleman*. Of her *Poems of Thirty Years* "Douglas" and "Philip, my King" are well known. Some of her stories for children, particularly *The Adventures of a Brownie* and *The Little Lame Prince*, have become a permanent part of juvenile literature. In 1865, she married George Lillie Craik and spent a period of quiet happiness and literary industry at Shortlands, Kent, where she died, 1887.

Münchhausen (*mŭng'k'hou-zĕn*), **Hieronymus Karl Friedrich, Baron,** member of an ancient and noble German family, was born in Hanover, Germany, 1720. He served as cavalry officer in the Russian campaign against the Turks, 1737–39. By false and ridiculously exaggerated tales of his exploits and adventures, he attained celebrity so remarkable that his name has become proverbial. The title of the tales ascribed to him is *Baron Münchhausen's Narrative of His Marvelous Travels and Campaigns in Russia*. Died in 1797.

Mundelein (*mŭn'dĕ-līn*), **George William,** American prelate, was born at New York in 1872. He was educated at Manhattan college, Saint Vincent seminary, and the Urban College of Propaganda, Rome. Having been ordained a priest of the Roman Catholic Church in 1895, he served successively as a pastor in Williamsburg, Pa.; chancellor of the diocese there; titular bishop of Sorgma and auxiliary bishop of Brooklyn; and, from 1916 to 1924, archbishop of Chicago. In the latter year he was created a cardinal.

Munkácsy (*mŏŏn'kä-chē*), **Michael,** Hungarian painter whose real name was Michael Lieb, was born at Munkacs, 1844. Left an orphan, he was apprenticed to a joiner at the age of 11 and, after several years of hard work and privation, he made the acquaintance of artists who befriended him. In 1865, he was enabled to study art at Vienna and, in 1868, began work under Knaus at Dusseldorf.

In 1870, his first important picture, "The Last Day of a Condemned Man," now in the Wilstach collection, Philadelphia, was exhibited with great success at Paris. Soon afterward, he established his residence there and became one of the most popular artists of his time. Among his best-known pictures are "Milton Dictating *Paradise Lost* to his Daughters," and the world-famous "Christ before Pilate," purchased by John Wanamaker. Many public and private collections in the United States contain examples of his paintings. Died, 1900.

Munsey, Frank Andrew, American publisher, was born in Mercer, Me., 1854. He was educated in the public schools of Maine and began his business career in a country store. He went to New York, 1882, and started *The Golden Argosy*, a juvenile weekly, now the adult monthly *The Argosy*. In 1889, he launched *Munsey's Weekly*, which was converted, in 1891, into *Munsey's Magazine*. He also acquired *The All-Story Magazine*, the New York *Sun*, and the Baltimore *News*. His publications include *Afloat in a Great City, The Boy Broker, A Tragedy of Errors*, and *Derringforth*. On his death, in 1925, he bequeathed his residuary estate, about 40 million dollars, to the Metropolitan Museum of Art, New York City.

Münsterberg (*mŭn'stĕr-bĕrĸ*), **Hugo,** psychologist, was born at Danzig, Germany, 1863. He graduated at the universities of Leipzig and Heidelberg and taught psychology at the University of Freiburg five years. In 1892, he was made professor of psychology and director of the psychological laboratory at Harvard university.

At first his researches were in the field of physiological psychology, but, in later years, he devoted himself to the application of psychological laws to the problems of everyday life and wrote various popular books dealing with the psychology of testimony, of medicine, and of education. Besides important works in German, his writings include *Psychology and Life, The Americans, Science and Idealism, Psychology and Industrial Efficiency*, and *The War and America*. Died, 1916.

Murat (*mū'rä'*), **Joachim,** French marshal, was born near Cahors, France, 1767. Rising from the ranks, he was elevated by Napoleon to the highest commands and married Napoleon's sister Caroline. He was made king of Naples as Joachim I Napoleon. He led the cavalry in Napoleon's Russian campaign, 1812, and at the battle of Leipzig. Following the emperor's return from Elba, Murat was defeated in Italy and, after a trial, was shot, 1815.

Murfree, Mary Noailles, "Charles Egbert Craddock," American novelist, was born in Murfreesboro, Tenn., 1850. For many years, she concealed her identity and her sex under her pen name. Her literary work, chiefly descriptive of the life of the mountain regions of Tennessee, has won her high rank among recent writers of the South. Her writings include *In the Tennessee Mountains, Where the Battle was Fought, The Story of Keedon Bluffs, His Vanished Star, The Phantoms of the Footbridge, The Mystery of Witchface Mountain, The Champion, A Spectre of Power, Storm Centre, The Windfall, The Raid of the Guerilla*, and *The Story of Duciehurst*. Died, 1922.

Murillo (*mū-rĭl'ō*; Sp., *mōō-rēl'yō*), **Bartolomé Estéban,** Spanish painter, was born in Seville, Spain, 1617. Left an orphan at 10, he was apprenticed to an artist who taught him the rudiments of painting. From 1642 to 1645, he studied the works of the great masters under Velasquez at Madrid. Returning to Seville, he married, in 1648, a wealthy and noble lady; established a distinguished home; and became the most celebrated religious painter of Spain, ranking high among the great painters of the world.

A favorite subject with Murillo was "The Immaculate Conception," which he painted 15 times. One of the most famous of his pictures by this name was purchased by the French government in 1852 for 586,000 francs, and this painting has been numbered among the twelve great masterpieces sometimes called "world pictures." Other noted works are "Saint Anthony of Padua and Infant Jesus" and "Saint Francis of Assisi" at Seville; "Children of the Shell," "The Divine Shepherd," and "Annunciation," at the Prado museum, Madrid; "Holy Family," "Angels' Kitchen," and "Beggar Boy," in the Louvre, Paris; "Melon Eaters," "Boys Playing Dice," "Boy and Girl Counting Money," in the old Pinakothek, Munich; "Holy Family," national gallery, London; and various madonnas. Died, 1682. See *Painting*.

Murlin, Lemuel Herbert, American educator, was born in Mercer county, Ohio, 1861. He studied at DePauw university, at the University of Pennsylvania, at Clark university, and in Europe. After a few years spent in teaching school, he was ordained to the ministry of the Methodist Episcopal Church. He held pastorates in Indiana and, in 1891, became an instructor in DePauw university. He was president of Baker university during 1894–1911, of Boston university from 1911 to 1925, and of DePauw university until 1928, when he went to Berlin, Germany, as pastor of the American church there.

Murphy, John Benjamin, American surgeon, was born at Appleton, Wis., in 1857. He graduated from Rush medical college, Chicago, in 1879. After engaging in practice, 1879–82, he studied surgery in Vienna, 1882–84. Returning to Chicago, he attained eminence as a surgeon. He invented the anastomosis button, known as Murphy's button, which greatly facilitated intestinal operations. He was widely known also for his success in autogenous bone grafting and in uniting the femoral artery when severed by a gunshot wound. Murphy became professor of surgery in Northwestern medical school and chief surgeon at Mercy hospital. His writings include *Gunshot Wounds of the Abdomen, Surgery of the Stomach*, and *Original Experimental and Clinical Research*. Died in 1916.

Murray, George Gilbert Aimé, British scholar and publicist, was born at Sydney, Australia, in 1866. He went to England in 1877 and was educated at Oxford university. During 1889–99, he was professor of Greek at the University of Glasgow and, in 1908, became regius professor of Greek at Oxford university. Following the World War, he took a prominent part in advocating the organization of the League of Nations. His publications include *Four Stages of Greek Religion; Faith, War, and Policy; Problems of Foreign Policy; Hamlet and Orestes; The Classical Tradition in Poetry;* and many verse translations of Greek dramas.

Murray, Sir George John Robert, Australian jurist, was born in 1863; was educated at the University of Adelaide and Cambridge university; and was admitted to the bar in 1889. In 1916, he became chief justice of the supreme court of South Australia and was made lieutenant governor of that state and chancellor of the University of Adelaide.

Murray, Sir James Augustus Henry, British lexicographer and philologist, was born at Denholm, Scotland, 1837. He graduated from London university and engaged in teaching during 1855–85. His *Dialect of the Southern Counties of Scotland* established his reputation as a philologist. The great work of his life, the editing of the philological society's *New English Dictionary*, was begun at Mill Hill, 1870, and was continued at Oxford for the remainder of his life. This dictionary, designed to be the most complete and exhaustive ever attempted in any language, was nearly finished at his death in 1915.

Murray, John Clark, Canadian educator and writer, was born at Paisley, Scotland, 1836. He was educated at the universities of Glasgow, Edinburgh, Heidelberg, and Gottingen, and was called to the chair of philosophy in Queen's university, Kingston, Ont., 1862. He was appointed professor of moral philosophy, McGill university, Montreal, 1872. His writings include *Outline of Sir W. Hamilton's Philosophy, A Handbook of Psychology, An Introduction to Ethics, An Introduction to Psychology*, and *A Handbook of Christian Ethics*. Died, 1917.

Murray, Walter Charles, Canadian educator, was born at Studholm, N. B., 1866. He was educated at the universities of New Brunswick, Edinburgh, and Berlin. He was professor of philosophy and economics at New Brunswick university, 1891-92. He then became professor of philosophy at Dalhousie university, continuing until 1908, when he was appointed president of the University of Saskatchewan. His writings include *Studies in Mind Growth* and *Local Government in the Maritime Provinces.*

Mussolini, Benito, Italian statesman, was born at Dovia, Italy, in 1883 of a family long identified with revolutionary politics. His earlier activities were in the field of journalism. He traveled extensively throughout Europe and was known for his extreme socialistic views, his unguarded expression of which led to his expulsion from Switzerland. He narrowly escaped hanging for his utterances against the Austrian government.

About 1908, his opinions began to take a nationalistic direction. In 1915, he was one of the strongest advocates of war against Austria. He served at the front until he was incapacitated by a wound. Then he set about organizing the so-called Facisti, originally a group of intellectuals opposed to Bolshevism. The group became a party in 1921 and, in 1922, succeeded in making Mussolini prime minister and virtually dictator of Italy. In this capacity, he devoted himself vigorously to the strengthening of Italy's economic and political situation. He also abolished representative government. In 1929, he liquidated the Roman question by granting the pope sovereignty over a newly created Vatican City within Rome.

Mussorgsky (*mŭs-sôrg'skĕ*), **Modest Petrovitch,** Russian composer, was born at Karev, 1839. He became an able performer at the age of 10. After entering the military academy at Petrograd, he continued musical studies. Upon graduation, he entered the Russian army, but later resigned his commission to devote himself entirely to musical composition. In 1870, he completed his celebrated opera *Boris Godounov*, which treats an intensely national subject with remarkable dramatic power. His other works include the operas *Khovanstchina, The Match-Maker, Œdipus,* and *The Fair at Soroschini.* Died, 1881.

Mustapha (*mŏŏs'tä-fä*) **Kemal Pasha,** Turkish ruler, was born of humble parentage at Saloniki in 1879. He came into prominence as a leader of the Young Turks and won recognition by his reckless courage while fighting against the Italians in Tripoli. In the World War, he further distinguished himself in the defense of the Gallipoli peninsula against the Allied forces and was a trusted confidant of the German commander in chief, von Sanders.

After the conquest of Palestine by the Allies in 1918, Kemal organized the so-called Nationalist army. He established a new government at Angora, supplanting the regular government in Constantinople; refused to recognize the terms of peace proposed by the Allies; inflicted a disastrous defeat on the Greeks in 1922, when they attempted to take possession of territory assigned to them; and obtained recognition and favorable terms of peace from the dominant European powers. Having been elected as first president of the Turkish republic in 1924, he pursued a vigorous policy of modernization, abolishing the caliphate and polygamy, and adopting the Latin alphabet for Turkish use.

Mutsuhito (*mŏŏt'sŏŏ-hē'tō; mŏŏ-t'se'tō*), former emperor of Japan, was born in 1852. He ascended the throne in 1867. His reign was marked by great reforms. The feudal system, which had impeded the general progress of the country, was abolished. Under his rule Japan entered upon an unprecedented era of prosperity. Civilization made rapid progress, and the introduction of Western arts and ideas secured for Japan the foremost place among Asiatic nations. He gave the Japanese a Parliamentary constitution based on European principles. Died, 1912.

Myers, Philip Van Ness, American historian, was born at Tribes Hill, N. Y., 1846. He graduated at Williams college, 1871, and studied at Yale law school, 1873-74. After returning from two years' study in Europe, he was president of the Farmers' college, Ohio, 1879–90. From 1890 to 1900, he was professor of history and political economy at the University of Cincinnati. His works, some of which have become standard textbooks, include *Life and Nature Under the Tropics, Remains of Lost Empires, History of Rome, History of Greece, The Middle Ages,* and *History as Past Ethics.*

Myrick, Herbert, American agricultural publisher, editor, and author, was born at Arlington, Mass., 1860. He graduated at the Massachusetts agricultural college, Amherst, Mass., 1882. He was a writer for the *New England Homestead* and was the agricultural editor of *Farm and Home.* Later he became president and editor of the Phelps Publishing Company and of the Orange Judd Company; director of *Good Housekeeping;* managing editor of the *American Agriculturist* at New York, 1888; and managing editor of the *Orange Judd Farmer* at Chicago, 1894. Among his writings are *How to Coöperate, Key to Profitable Stock Feeding, The American Sugar Industry, The Hop, The Book of Corn,* and *Poems by Mother and Son.* Died, 1927.

Nansen (*nän'sĕn*), **Fridtjof,** Norwegian arctic explorer, was born near Oslo, 1861, and graduated from the University of Oslo, 1888. He started on his first arctic expedition in 1882 and, in 1888-89, undertook his celebrated journey across Greenland. The highest altitude registered was over 10,000 feet, with a temperature of from 80° to 90° below zero. In 1893, Nansen sailed in the *Fram* to make an examination of the entire polar regions and penetrated farther north than any of his predecessors.

Nansen then became professor of zoology at Oslo university; took an active part in the separation of Norway and Sweden in 1905; was minister for Norway at London, 1906–08; and was made professor of oceanography in Oslo university, 1908. During the World War, he was active in providing for the welfare of prisoners and was later appointed high commissioner of the League of Nations for the repatriation of war prisoners. His efforts were directed also toward the relief of the famine sufferers in Russia in 1921-22. He received the Nobel peace prize for 1922. His publications include *Across Greenland, Eskimo Life, Farthest North, Norway and the Union with Sweden,* and *Hunting and Adventure in the Arctic.*

Napier (*nā'pyĕr; nâ-pēr'*), **Sir Charles James,** British general, was born at London, 1782. He served first during the Irish rebellion, 1798. At the battle of Corunna, during the Napoleonic wars, he was severely wounded and was taken prisoner. He then returned to England and devoted himself to literary work. In 1810, he went to the Iberian peninsula; fought at Coa and at Busaco, where his jaw was broken and his eye was injured by a shot; and took part in actions at Fuentes de Onoro and Badajoz, both in 1811.

From 1822 to 1830, Napier was governor of Cephalonia; in 1841, he was sent to India to command the army of Bombay against the amir of Sind. Here he destroyed the fortification of Emaun Ghur, 1843, and at the battle of Meanee (Miani), with 2800 English and Sepoys, he defeated 30,000 Baluchs. After the annexation he was governor of Sind until 1847. Died, 1853.

Napier (*nā'pēr*), **John,** Scottish mathematician, inventor of logarithms, was born at Edinburgh, 1550. He matriculated at Saint Andrews in 1563, traveled on the continent, and settled down to a life of literary and scientific study. In 1594, he published his *Plaine Discovery of the Whole Revelation of Saint John,* which was translated into Dutch, French, and German. He described his famous invention of logarithms in *Mirifici Logarithmorum Canonis Descriptio,* 1614, and the calculating apparatus called "Napier's bones" in *Rabdologiæ seu Numerationis per Virgulas libri duo,* 1617. Died, 1617. See *Logarithms.*

Napoleon Bonaparte, military leader and emperor of France, was born of Italian parents at Ajaccio on the island of Corsica, August 15, 1769. After a few months spent in learning French at Autun, he was sent, at the age of 10, to the military school at Brienne, France, and subsequently to Paris, where, in 1785, he obtained a commission in the artillery. He saw action first at the siege of Toulon in 1793. After the fall of Toulon, Napoleon was suspected, not without reason, of being implicated with the government of Robespierre, and he shared in the disgrace of its fall.

Early Campaigns. Napoleon's defense of the Tuileries in October 1795 led the Directory to put him in charge of the army operating against Italy. Two days before entering upon the campaign, he married Josephine Beauharnais, March 1796. In Italy began the course that marked him as a man of determination, force, and quick action. After his victories there, he decided to move on to Vienna; but Austria made overtures of peace with large cessions of territory.

The Directory placed Napoleon in command of a great expedition then being prepared against Egypt. He reached Alexandria, July 1, 1798, and took possession of Cairo. His fleet, however, was destroyed in the Nile by Nelson. Unable to return to Europe, he immediately prepared an expedition into Turkey. Success attended his first efforts, but he was checked at Acre by British marines under Smith.

Period of Greatest Power. Hearing that the armies at home were meeting with misfortune, Napoleon secretly embarked for France. The revolution of November 10, 1799, gave rise to the formation of a new constitution, and Napoleon, as "first consul," became the virtual ruler of France. In 1800, failing to conclude peace with Austria and England, he determined to stake all on the chance of a campaign, and entered Italy. He won brilliant victories at Marengo and at Hohenlinden, after which he made peace with Austria and England, gaining all Italy.

In August 1802, Napoleon was made consul for life. In this capacity, he reorganized and centralized governmental administration in France. In May 1804, he was proclaimed hereditary emperor of the French and, a year later, king of Italy. England, Russia, and Austria formed against him a

coalition, which was dissolved as a result of three great victories won by Napoleon: over the Austrians and Russians at Austerlitz in 1805; over the Prussians at Jena in 1806; and over the Russians at Friedland in 1807.

Napoleon's chief aim was now the humiliation of England. In this, however, he failed, being compelled to witness the defeat of his army in Spain and Portugal and the destruction of his navy assembled for the invasion of Britain. In 1809, Austria attacked Napoleon, but was decisively defeated at Ratisbon and Wagram. With a view to stopping the hostile machinations of the old legitimate dynasties, Napoleon obtained a divorce from Josephine in 1809 and married Maria Louisa, archduchess and daughter of the emperor of Austria.

Downfall. In order to break the power of England, Napoleon had, in 1806, promulgated the Berlin decree, forbidding all trade with England. This decree caused great hardship and discontent on the continent. Russia allied herself with England and was accordingly attacked by Napoleon in 1812. He defeated the Russians at Borodino, September 7, 1812, and entered Moscow. The burning of the city and a subsequent military reverse compelled the French to retreat in the dead of winter. In this disastrous campaign, Napoleon lost nearly 400,000 men as well as much of his prestige. Hastening to Paris, he raised new armies with which to face a combination of all the powers of Europe. After a series of terrible battles, including Lutzen, Boutzen, and Dresden, he made a last stand at Leipzig. Here, in the "battle of the nations," he was overwhelmingly defeated, October 1813. Paris was taken by the allied armies on March 30, 1814. Napoleon was forced to abdicate unconditionally on April 11, 1814. He received the sovereignty of Elba, a small Italian island.

Last Campaign. Napoleon, ascertaining that general discontent in France followed the accession of the Bourbons, left Elba, accompanied by 600 soldiers of the old guard, and landed at Cannes. He entered Paris on March 20, 1815, dethroned Louis XVIII, and re-established himself on the throne of France. He was immediately denounced by the allied sovereigns. Despairing of averting a war by negotiation, Napoleon resolved, with his usual vigor and decision, to strike the first blow. He defeated the Prussians in Flanders, but ultimately suffered an overwhelming defeat at the hands of the English and Prussians on June 18, 1815, at Waterloo.

Banishment. The defeated emperor fled to Paris and finally abdicated in favor of his son, Napoleon II, June 22. Finding escape impossible, he surrendered on July 15 and was carried a prisoner to the island of Saint Helena. The remainder of his life was politically insignificant, but he wrote several able and interesting works, chiefly relating to his eventful career.

Genius and Achievements. Napoleon ranks as one of the world's greatest military leaders. His career has been variously estimated, some regarding him as the chief bearer of the Revolutionary gospel to Europe, while by others he has been described as an archadventurer, who used democratic ideas to cloak the most despotic tyranny. His career caused the last remnants of feudalism to crumble and was an important factor in making possible the modern middle-class society. He is responsible also for the codification of French law, which was adopted in many parts of Europe. Died, May 5, 1821, and was buried at Paris in a mausoleum under the dome of the Hôtel des Invalides.

Napoleon III, or **Charles Louis Napoleon Bonaparte,** emperor of the French, was born in Paris, 1808. He was the son of Louis Bonaparte, king of Holland, and of Hortense Beauharnais, daughter of Empress Josephine.

In 1830, he took part in a revolutionary movement in Italy and, in 1836, entered France; but, seeking to arouse the soldiery at Strasbourg in his favor, he was taken prisoner and was transported to the United States, whence he went to Switzerland and later to England. In 1840, he landed at Boulogne, again hoping to arouse the French soldiery in his favor. For this second attempt, he was tried for high treason and received a sentence of perpetual imprisonment in the castle of Ham. In 1846, he escaped in the disguise of a workman and once more took up his residence in London.

In 1848, on the abdication of Louis Philippe, the provisional government permitted his return to France. In December of the same year, he was elected by an immense majority president of the newly-constituted republic. In 1851, by his bloody *coup d'état*, Louis Napoleon secured his election as president for ten years. A year later, he again appealed to the people and obtained an almost unanimous vote for the restoration of the empire.

In 1854, Napoleon joined England and Turkey in the war against Russia. In 1859, in behalf of Italy, he entered upon the war with Austria which ended in the Treaty of Villafranca. This was followed by the annexation of Savoy and Nice by France, 1860. He occupied Mexico in 1863, but the issue of that occupation was the execution of the emperor Maximilian in 1867. In 1870, the Franco-Prussian war broke out. This led to the surrender of the emperor and his army at Sedan and to the ultimate re-establishment of the republic. Died at Chislehurst, England, 1873.

Nazimova (*nä-zē'mō-vä*), **Alla,** actress, was born in the Crimea, Russia, 1879. She studied in Switzerland, Petrograd, and Moscow. Her first appearance on the American stage was in 1905, at New York, where she took the part of Lia in *The Chosen People*, produced in Russian. Learning the English language, she played in several of Ibsen's dramas and in others which give scope to an emotional and tragic rôle. Her first motion picture was *War Brides*, made in 1916.

Nebuchadnezzar (*nĕb'ū-kăd-nĕz'är*), king of ancient Babylon, was the son of Nabopolassar. Proceeding by command of his father, Nebuchadnezzar defeated Necho, king of Egypt, and conquered Palestine. In 605 or 604 B. C., he became king; took Jerusalem about 597; and made Zedekiah king as his vassal. Zedekiah soon rebelled and Nebuchadnezzar again took Jerusalem after a terrible siege, destroyed the temple, threw down the walls of the city, and carried the people captive to Babylon. He took Tyre after a siege of 13 years, overran Egypt, and became one of the most powerful sovereigns of his time. His restoration of Babylon by the erection of walls, magnificent temples, and other notable structures has been revealed in modern times by archeological excavations. He died about 562 B. C.

Necho (*nē'kō*), Egyptian king, the Pharaohnechoh of the Bible and the Nechos of Greek writers, succeeded Psammetichus in 610 B. C. When the Assyrian empire fell, Necho endeavored to conquer Syria and, at the beginning of his campaign, defeated and slew Josiah, king of Judah, at Megiddo, and, shortly afterward, deposed Josiah's son Jehoahaz, elevating Eliakim in his stead under yearly tribute.

Necho extended his conquests to the Euphrates, but was disastrously overthrown by Nebuchadnezzar, suffering the loss of all his newly conquered dominions. He then withdrew to Egypt, where he ruled with vigor, sending an exploring expedition by sea around Africa and attempting to build a canal from the Nile to the Red Sea. This ancient project was a forerunner of the modern Suez canal. Died 594 B. C.

Necker (*nĕk'ĕr*; F. *nĕ'kâr'*), **Jacques,** French financier and statesman, was born at Geneva, 1732, and was for many years a banker at Paris. His economic writings inspired such confidence in his talent for finance that, in 1776, he was appointed director of the treasury and, a little later, comptroller-general of France. Before his resignation in 1781, he published a statement of his operations, addressed to the king. He was reinstated in the comptrollership in 1788 and advised the convocation of the States-General; in 1789, he was abruptly dismissed and was ordered to quit the kingdom, but was almost instantly recalled. Necker, however, soon became as much an object of antipathy to the people as he had been of their idolatry, and, in 1790, he left France forever. He died in Switzerland, 1804. After his death, a complete edition of his writings was published in 15 volumes. His daughter was the famous Madame de Staël.

Neilson, William Allan, educator, was born at Doune, Scotland, 1869. He was graduated at the University of Edinburgh and Harvard university. He taught in Scotland and in Toronto, Can., 1893–95; at Bryn Mawr college, 1898–1900; and, beginning in 1900, at Harvard university. He was a member of the faculty of Columbia university in the department of English from 1904 to 1906, when he accepted a professorship of English at Harvard university. He resigned in 1917 to become president of Smith college. His publications include *Essentials of Poetry*; *The Facts about Shakespeare*; *Burns, How to Know Him*; and a *History of English Literature*. He has also edited a number of works from Early English literature.

Nelson, Horatio, Viscount, English admiral, was born at Burnham Thorpe, Norfolk, 1758. He entered the navy as a midshipman in 1770 and, after voyages to the West Indies, the arctic regions, and the East Indies, was promoted to a lieutenancy in 1777. Three years later, he headed the expedition against San Juan; was invalided home; and, in 1782, acted under Lord Hood in American waters.

He lived for five years in retirement, but, on the eve of the French Revolutionary war, he was again summoned to active service. In command of the *Agamemnon*, he advanced his reputation by gallant conduct, losing his right eye during the storming of Calvi, in Corsica. His conspicuous bravery at the engagement with the Spaniards off Cape Saint Vincent in 1797 brought him the rank of rear admiral. In the same year he lost his right arm at Santa Cruz and, in the following year, with an inferior force, annihilated the French fleet in the bay of Abukir, for which act he was raised to the peerage as Baron Nelson.

In 1801, for his victory over the Danish fleet at Copenhagen, he was made viscount and commander in chief. During the threatened Napoleonic invasion, he kept a

vigilant watch in the channel. In 1805, he crowned his great career by a memorable victory off Trafalgar over the French fleet commanded by Villeneuve. It was before this battle that Nelson gave his famous signal "England expects that every man will do his duty." The admiral was mortally wounded in action and died the same day.

Nelson, Knute, American lawyer and legislator, was born in Norway, 1843. He came to the United States in early childhood; lived in Wisconsin, 1850–71; and then settled in Minnesota. During the Civil War, he served as a private and, in 1863, was wounded and taken prisoner at Port Hudson, La.

Admitted to the bar in 1867, he became a member of the Wisconsin legislature, 1868. He was elected to the state senate of Minnesota, 1875, and served as regent of the state university, 1882–93. From 1883 to 1889, he was a member of Congress. In 1892, and again in 1894, he was chosen governor of Minnesota and was elected United States senator for five consecutive terms, 1895–1925. He was a Republican in politics, but showed considerable independence by voting for many Democratic measures. Among his important contributions to legislation is the act creating the department of commerce and labor. Died, 1923.

Nepos (*nē'pŏs*), **Cornelius,** Roman historian, was born probably at Verona and flourished during the time of Julius Cæsar and the first years of the reign of Augustus. He enjoyed the friendship of Cicero. His only extant work, *Vitæ Excellentium Imperatorum,* is held in high esteem as an educational class book. It is a series of brief biographies, based mainly on Greek sources.

Nernst (*nĕrnst*), **Walter,** German chemist and physicist, was born at Briesen, Prussia, 1864. He was educated at Zurich, Berlin, and Wurzburg. In 1887, he was appointed assistant to Professor Ostwald at Leipzig and, in 1891, became professor of physics at Gottingen, where, in 1895, he organized the institute for physical and electrical chemistry, of which he became director. In 1905, he was called to a similar position at the University of Berlin.

His work in electricity and chemistry is of a high order. He is the inventor of the Nernst electric lamp and is the author of a valuable treatise entitled *Theoretical Chemistry* and of other publications. He was awarded the 1920 Nobel prize for chemistry.

Nero Claudius Cæsar Drusus Germanicus, Roman emperor, was born at Antium, in Latium, 37 A. D. His father was a Roman consul and his mother was Agrippina, daughter of the emperor Germanicus. He was adopted by the emperor Claudius, who had married Agrippina, and, four years later, he succeeded Claudius on the throne, which he occupied for 14 years.

His whole reign was characterized by licentiousness, brutality, and cruelty. In order to please his mistress Poppæa Sabina, he put his mother to death, on the plea that she had plotted against him; and he afterward murdered his wife, Octavia, in order to marry the same mistress.

A fire destroyed a great part of Rome in Nero's reign. It is asserted by some writers that the city was set on fire by the order of Nero, who attributed the fire to the Christians and persecuted them with the most unrelenting cruelty. He afterward killed Poppæa Sabina; murdered Antonia, the daughter of Claudius, because she refused to marry him; and finally married Statilia Messalina, whose husband he had put to death. The philosopher Seneca, who had been his tutor, and the poet Lucan took their own lives at his order. Finally the senate declared him an enemy of his country and he committed suicide in the year 68.

Nestorius (*nĕs-tō'rĭ-ŭs*), bishop of Constantinople, was born in Syria. He was made patriarch of Constantinople in 428; was deposed for heresy by the council of Ephesus, 431; and was banished to the Libyan desert, where he died after 439. The heresy he taught, called Nestorianism, was that the two natures, the divine and the human, coexist in Christ, but are not united. He would not allow the Virgin Mary the title that had been given to her as the "mother of God." The orthodoxy of the Church, as against the doctrine of Nestorius, was championed by Cyril of Alexandria.

Nevin, Ethelbert, American composer, was born at Edgeworth, Pa., 1862. As a child he was a remarkable pianist; later he studied in Europe under von Bülow and Klindworth, exhibiting a rare gift for composition. From 1887 to 1893, he taught in Boston, then studied in southern Europe until 1900, when he returned and associated himself with Horatio Parker at Yale. His compositions, all cast in miniature form, are characterized by dainty originality and exquisite melody. *Narcissus,* one of a group entitled *Water Scenes,* and a song, "The Rosary," are perhaps the most popular. Died, 1901.

Newcomb (*nū'kŭm*), **Simon,** astronomer and mathematician, was born in Wallace, N. S., 1835. He came to the United States in 1853; graduated at Harvard, 1858; and was appointed professor of mathematics, United States navy, 1861. From 1877 to 1897, he was director of the *Nautical Almanac;* was professor of mathematics and astronomy, Johns Hopkins, 1884–94; and, for many years, served as editor of the *American Journal of Mathematics.*

For his notable achievements in mathematics and astronomy, Newcomb was awarded many honorary degrees and medals. He was made rear admiral in 1906. His numerous writings include *Popular Astronomy, Principles of Political Economy, His Wisdom the Defender, The Stars, Reminiscences of an Astronomer,* and *Side Lights on Astronomy.* Died, 1909.

Newcomen (*nū-kŭm'ĕn*), **Thomas,** English inventor, was born at Dartmouth in 1663. A blacksmith by trade, he is known chiefly as the inventor of the atmospheric steam engine. In this engine, steam was admitted into the cylinder and was then suddenly condensed by a stream of cold water, thus creating a vacuum into which the piston was driven by atmospheric pressure. This engine was commonly used for pumping. Watt's acquaintance with it was a contributing cause of the invention of his engine, in which steam provided the motive power. Died, 1729. See *Steam Engine.*

Newlands, Francis Griffith, American lawyer and legislator, was born in Natchez, Miss., 1848. He studied at Yale; attended Columbian law school, Washington; was admitted to the bar; and went to San Francisco, practicing his profession there until 1888, when he settled in Nevada. He was elected as a Democrat to Congress for five consecutive terms, 1893–1903, and to the United States Senate for three terms, 1903–21. In 1913, he was instrumental in passing the Newlands act, providing means for mediation and arbitration in railway wage controversies. Died, 1917.

Newman, John Henry, English prelate and author, son of a London banker, was born in London, 1801. He graduated from Trinity college, Oxford, 1820; was ordained to the ministry of the Anglican Church in 1824; and, in 1828, became vicar of Saint Mary's. He was a leader in the tractarian, or Oxford, movement and, in 1841, wrote *Tract XC,* which was severely condemned by officials of the Anglican Church.

After three years of retirement, Newman became a convert to the Roman Catholic Church. As he had exerted great influence among the Anglicans, the effect of this step was great. He went to Rome and was ordained a priest; founded the Brompton oratory in 1850; and directed the Edgbaston oratory for many years. He took part in controversies with Kingsley in 1864 and with Gladstone in 1874. He was created cardinal in 1879. Among his chief works are *Apologia pro Vita Sua, An Essay in Aid of a Grammar of Assent,* and *The Dream of Gerontius.* He wrote also the well-known hymn, "Lead Kindly Light." Died, 1890. See *Oxford Movement.*

Newton, Sir Isaac, English mathematician and scientist, was born at Woolsthorpe near Grantham, Lincolnshire, England, December 25, 1642. He obtained his early education at Grantham grammar school, where he already showed a keen interest in mechanical contrivances. In his 15th year, he was recalled from school to assist in the management of the family's farm. Having demonstrated his unfitness for the business of a farmer, he was sent back to school at Grantham. In 1661, he was admitted to Trinity college, Cambridge, at which he was graduated with the degree of master of arts in 1668. While at Cambridge, he formulated the binomial theorem.

Early Discoveries. In May 1665, Newton committed to writing his first ideas on fluxions, or the calculus, a subject which afterward gave rise to an unfortunate controversy with Leibnitz. In 1665, he discovered the unequal refrangibility of light and the true doctrine of colors. Driven from Cambridge by the plague of this year, he went to Woolsthorpe. It is said that, at Woolsthorpe, in 1666, the fall of an apple, as Newton sat in his garden, suggested to him the most magnificent of his later discoveries, the law of gravitation.

The Law of Gravitation. On his first attempt, however, by means of the law so suggested to his mind, to explain the lunar and planetary motions, he employed a current estimate of the radius of the earth which was so erroneous as to produce a serious discrepancy between the real force of gravity and that required by theory to explain the motions. He accordingly abandoned the hypothesis and returned to his inquiries into the application of fluxions and to the construction of a small telescope, which he completed in 1668. The next year, Newton was appointed to the Lucasian chair of mathematics at Cambridge. In 1672, he was elected a member of the royal society, to which he disclosed, in February of that year, his discovery of the composition of light.

Newton had long since deduced from the laws of Kepler the important law that gravity decreases with the square of the distance. In 1682, he heard of Picard's more accurate measure of the earth's diameter, and, repeating with this measure his former calculations, he found to his extreme delight that the force of gravity by which bodies fall at the earth's surface, 4000 miles from the earth's center, when

diminished as the square of 240,000 miles, the moon's distance, was almost exactly equal to that which kept the moon in its orbit. Hence it followed that the same power retained all the other satellites round their primaries and all the primaries round the sun.

Newton had surmounted the difficulties of the planetary motion. The results of his profound studies were afterward set forth in his immortal work, the *Principia*, 1686-87. In this book, written in Latin, Newton established the science of theoretical mechanics as it exists today. In the whole history of science, no single contribution of any man has been as great as this.

Public Services. Shortly before the *Principia* was given to the public, Newton had been called to take an active part in defending the rights of Cambridge university against the illegal encroachments of James II. He sat in the Convention Parliament, 1689-90. He was made warden of the mint in 1696, and, three years later, he was appointed master of the mint, an office which he held until the end of his life. Newton again took a seat in Parliament in 1701, as the representative of his university. In 1705, he was knighted.

Thus engaged in public service, Newton had little time left for scientific studies. In Parliament, he recommended the public encouragement of various inventions. He was president of the royal society from 1703 until his death, a period of 25 years. In this office, he did much toward the advancement of science. Newton died at Kensington on March 20, 1727, and was interred in Westminster Abbey.

Ney (*nā*), **Michel,** marshal of France, the son of a cooper, was born in Saarlouis, 1769. He entered the army as a private hussar in 1788; became a general of brigade in 1796; and distinguished himself by his bravery in the wars of the Revolution and of the Empire. He earned for himself from the army under Napoleon and from Napoleon himself the title of "the bravest of the brave." When Napoleon abdicated in 1814, Ney attached himself to Louis XVIII, but, on the former's return from Elba, he joined his old master and commanded the Old Guard at Waterloo. On the second return of the Royalists to power, he was arrested, tried by his peers, and shot, December 7, 1815.

Nicholas II, emperor of Russia, son of Alexander III, whom he succeeded, was born in Petrograd, 1868. His coronation as czar took place with impressive ceremonial at Moscow, 1896. His famous peace proposals, made to the powers in 1898, led to the First Peace Conference at The Hague in 1899 and to the establishment of the Permanent Court of Arbitration. His reign was marked by the construction of the Trans-Siberian railroad to the Pacific coast, by the Russo-Japanese war, by the granting of a constitution in 1905, and by participation in the World War. Increasing dissatisfaction with his rule in internal as well as external affairs culminated in the Russian Revolution. He was dethroned in March 1917 and, with his whole family, was officially murdered in July 1918.

Nichols, Edward Leamington, American physicist, was born of American parentage at Leamington, England, 1854. He graduated at Cornell in 1875; studied at the universities of Leipzig, Berlin, and Gottingen. He was an assistant of T. A. Edison at Menlo Park, N. J., 1880-81; professor of physics and chemistry, Central university, Ky., 1881-83; and professor of physics and astronomy in the University of Kansas, 1883-87. In the latter year, he was made professor of physics at Cornell university and served there until the year of his retirement, 1919. He was editor of the *Physical Review*, 1893-1912, and is author of *The Galvanometer*; *The Elements of Physics*, with Professor W. S. Franklin; *Outlines of Physics*; and numerous scientific papers.

Nicholson, Meredith, American novelist, was born at Crawfordsville, Ind., 1866. He received his education in the public schools of Indianapolis. In 1891, he published a volume of poems called *Short Flights* and, in 1900, an account of Indiana authors entitled *The Hoosiers*. In 1905, he produced his widely popular novel *The House of a Thousand Candles*. His writings include also *The Main Chance*, *The Port of Missing Men*, *The Little Brown Jug at Kildare*, *The Lords of High Decision*, *The Siege of the Seven Suitors*, *The Provincial American*, and *The Poet*, the last being a story with James Whitcomb Riley as the central character. Titles of his later works include *The Madness of May*, *The Valley of Democracy*, and *Honor Bright*.

Nicias (*nĭsh'ĭ-ăs*), Athenian statesman and general of the Peloponnesian war, was the son of the wealthy Niceratus. After the death of Pericles, he was the political opponent of Cleon and later of Alcibiades, attracting to his cause the more conservative elements in the state. In 427 B. C., he defeated the Spartans and Corinthians. In 415, he was appointed one of the commanders against Sicily in spite of the fact that he opposed that ruinous expedition. At first, he was successful; but later his fleet was destroyed, his army began a retreat, and he was captured and put to death in 413 B. C.

Nicolle (*nē'kŏl'*), **Charles Jules Henri,** French bacteriologist, was born 1866. From an assistant professorship at the Rouen school of medicine, he was called to the Pasteur institute at Tunis. There he served also as surgeon in the French army, stationed at Algiers. In 1909, he made the first of a series of discoveries by which he demonstrated that typhus germs are transmitted through lice. This led to his development of a vaccine which imparts immunity to the human organism. His researches, with their promise of wiping out typhus as a plague, were signalized by the award of the 1928 Nobel prize in medicine.

Niehaus (*nē'hous*), **Charles Henry,** American sculptor, was born at Cincinnati, Ohio, 1855. He was educated in the public schools of Cincinnati and at the royal academy, Munich, and studied classical sculpture at Rome. His ability is best displayed in his monumental sculpture, which is distinguished for dignity of composition and purity of line.

He executed the Garfield statue, Cincinnati; statues of Ingalls, Allen, Garfield, and Morton in the rotunda of the Capitol, Washington; statues of Gibbon and Moses, Congressional library; the Astor historical doors in Trinity church, New York; statues of Hooker and Davenport, Connecticut statehouse; two large groups entitled "Mineral Wealth" shown at the Pan-American exposition; an equestrian statue of General Forrest, Memphis, Tenn.; a statue of McKinley at Canton, Ohio; the pediment of the State capitol at Frankfort, Ky.; the John Paul Jones monument in Washington; and soldiers' and sailors' memorials at Hoboken, Newark, and Hackensack, N. J.

Nielsen (*nēl'sĕn*), **Alice,** American opera singer, was born at Nashville, Tenn., 1876. She received her musical education in San Francisco and made her first stage appearance at Oakland, Cal., 1893, as Yum Yum in *Mikado*. She then joined the Bostonians, 1896, and took the rôle of Annabel in *Robin Hood*; the following season, she played the principal soprano rôle in *The Serenade*. In 1898, she appeared in *The Fortune Teller* and later starred in *The Singing Girl*.

She then studied in Rome; made her first appearance in grand opera at Bellini theater, Naples, as Marguerite in *Faust*; appeared at Covent Garden, London, in *Don Giovanni*, *The Marriage of Figaro*, *La Bohème*, and *Rigoletto*. Beginning with 1906, she repeatedly toured the United States in grand opera and won success also on the concert stage.

Nietzsche (*nē'chē*), **Friedrich Wilhelm,** German philosopher, was born at Rocken, near Leipzig, 1844. He was educated at the universities of Bonn and Leipzig. He was at first the friend and follower of Wagner in art and Schopenhauer in philosophy, although later both fell under his condemnation. At 25, he became professor of philology at Basel, resigning in 1879 on account of failing health.

In the ensuing ten years, he wrote, often during acute physical distress, the daring philosophical essays on which his fame rests. He maintained that there are two fundamental ethical types: the morality of slaves, or the weak and inferior among mankind, who foster all virtues that protect their weakness; the morality of the strong, the masters of mankind, who stand superior to the common mass of slaves and have no need for their utilitarian virtues. He denounced Christian morality as belonging to the slave type, asserting that only through the morality of the strong can men, that is, the few, the masters, rise to higher stages and attain the state of the "superman."

Among his works are *Thus Spake Zarathustra*, *Beyond Good and Evil*, *The Genealogy of Morals*, *The Twilight of the Gods*, and *The Will to Power*. His latest works are characterized by an insane egoism, the symptom of a mental disease from which he suffered before his death in 1900.

Nightingale, Florence, a philanthropic nurse, was born of wealthy English parents at Florence, Italy, 1820. At the age of 22, she entered a training school for nurses and she afterward studied the methods of nursing and hospital management with the sisters of Saint Vincent de Paul, Paris. In 1854, she volunteered to organize a staff of nurses for service in the Crimean war, and, during the terrible winter of 1854-55, she ministered with unwearied devotion to the suffering soldiers. On her return to England in 1856, she established a training college for nurses at Saint Thomas's and King's College hospitals. She wrote *Notes on Nursing* and *Notes on Hospitals*. It is largely due to her influence that women have been employed as nurses for military hospitals. Died, 1910.

Nikisch (*nĭk'ĭsh*), **Arthur,** Hungarian musical conductor, was born at Lebeny Szent Miklos, 1855. He was educated at the Vienna conservatory and became a violinist. His first position as conductor was at the Leipzig theater, where he achieved a great reputation for conducting without musical score. From 1889 to 1893, he was conductor of the Boston symphony orchestra. In 1895, he won marked success as conductor of the Gewandhaus concerts at Leipzig. In 1897, he made the first of a series of long tours in Europe

with the Berlin philharmonic orchestra. Beginning in 1902, he conducted for many years symphony concerts and Wagner operas in London. In 1912, he made a tour of the United States with the entire London symphony orchestra. Died, 1922.

Nilsson (*nĭl'sŭn*), **Christine,** Swedish operatic singer, daughter of a peasant, was born near Vexio, Sweden, 1843. Her singing at a fair in 1857 so impressed a magistrate of Ljungby that he provided for her musical education at Stockholm and at Paris. She made her début at Paris in 1864 and at London in 1867, and soon became one of the foremost soprano singers, distinguished for dramatic as well as vocal talent. During her career she repeatedly visited the United States. In 1872, she married Auguste Ronzeau, a Paris broker who died in 1882. She became the wife of the Comte de Miranda in 1887 and retired in 1888. Her chief successes were in *The Magic Flute, Martha, Don Juan, Faust,* and *Robert le Diable.* Died, 1921.

Nixon, Lewis, American shipbuilder, was born in Leesburg, Va., 1861. He graduated at the United States naval academy, 1882; was then sent by the navy department to the royal naval college, Greenwich, England; and, in 1884, was transferred to the construction corps of the navy. In 1890, he designed the battleships *Oregon, Indiana,* and *Massachusetts,* and then resigned from the navy to become superintending constructor of the Cramp shipyard, Philadelphia, Pa.

In 1895, he founded the Crescent shipyard, Elizabeth, N. J., where he built 100 vessels in six years, among them the submarine torpedo boat *Holland.* He organized and was president of the Standard Motor Construction Company; became proprietor of Lewis Nixon's shipyard; and acquired the sole ownership of the Nixon Nitrate works. In 1901, he succeeded Richard Croker as leader of Tammany Hall, but resigned the following year. In 1919, he became commissioner of public works for New York State and later served as a commissioner of public utilities in New York City. He is the author of *The Canal Tolls and American Shipping.*

Nobel (*nō-bĕl'*), **Alfred Bernhard,** Swedish chemist and inventor, was born at Stockholm, 1833. In 1862, his father, a mechanician, began to manufacture nitroglycerin. In 1867, through the accidental escape of some nitroglycerin from a cask into the siliceous sand of the packing, Alfred discovered how to make a safe and manageable explosive—dynamite. He also invented blasting gelatin and several kinds of smokeless powder. Ultimately he patented more than 100 inventions and established manufactories in various parts of the world.

He died in 1896, leaving a fund of $9,200,000 to provide five annual prizes to be awarded to the persons making the most important contribution in physics, chemistry, physiology or medicine, literature, and the cause of world peace. These prizes amount to about $40,000 each, and the first awards were made in 1901. See *Nobel Prizes.*

Nodzu (*nō'dzōō*), **Michitsura, Count,** Japanese general, was born in Satsuma, 1840. He fought on the side of the mikado in the War of the Restoration and with the Imperialists in the Satsuma rebellion. During the war with China, he was placed in command of a division and captured Ping-yang. In the Russo-Japanese war, he was commander in chief of the fourth army. He was created count, 1895. Died, 1908.

Nogi (*nō'gē*), **Maresuke, Count,** Japanese general, was born in Choshu, 1849. He served in the Satsuma rebellion of 1877 and was twice severely wounded. In the Chinese-Japanese war of 1894-95, he commanded a brigade at the battles of Kinchow and Port Arthur and, at the conclusion of the war, was promoted lieutenant general. While in command of the third army in the Russo-Japanese war, he captured Port Arthur, 1905. He was created baron in 1895, and count in 1906. Died in 1912.

Nordau (*nōr'dou*), **Max Simon,** German physician and writer, of Jewish descent, was born at Budapest, 1849. He received his university education at Budapest, Berlin, and Paris; traveled through Europe; and took up his residence in Paris, 1880. His books on moral and social questions, more especially two in English translation, *Conventional Lies of the Children of Culture* and *Degeneration,* were much criticized and led to extensive discussion. They were followed by *The Drones Must Die.* He published works also in Italian and French. Died, 1923.

Nordenskjöld (*nō'rĕn-shûl'*), **Nils Adolf Erik, Baron,** explorer and geologist, was born at Helsingfors, Finland, 1832. He was educated at the University of Helsingfors and was appointed curator of the faculty of mathematics and physics. In 1855, he was dismissed for political reasons and left the country. In 1858, he was appointed state mineralogist at Stockholm, having obtained letters of naturalization as a Swedish subject.

Nordenskjöld conducted several voyages of exploration in the Arctic Ocean and made frequent visits to Spitsbergen, where he measured an arc of the meridian. In 1878-79, he discovered the so-called northeast passage, traversing, along the northern shores of Europe and Asia, the whole Arctic sea from the Atlantic to the Pacific. Proceeding on his cruise, he was the first to circumnavigate Asia and Europe. For these achievements he was created baron in 1880. He is the author of several scientific works. Died, 1901.

Nordica (*nōr'dĭ-kä*), **Lillian,** née Lillian Norton, American dramatic soprano, was born at Farmington, Me., 1859. Her earlier musical education was obtained at the New England conservatory, Boston, and her later training at Milan, Italy.

She made her début as an opera singer at Brescia, Italy, in *La Traviata.* In 1887, she appeared in London with marked success, continuing her triumphs in Paris, Petrograd, and other European capitals. She sang leading soprano parts in many operas and oratorios, but she was best known in Wagnerian rôles.

Possessed of a magnificent voice, a pleasing presence, and marked dramatic ability, she ranked among the foremost American singers of her time and won great distinction abroad. While engaged in a world tour, she contracted pneumonia from exposure in shipwreck and died at Batavia, Java, 1914.

Norris, Benjamin Franklin, American novelist, generally known as Frank Norris, was born in Chicago, 1870. He studied art in Paris, 1887–89, and pursued literary courses at the University of California and at Harvard, 1890–95. He was war correspondent in South Africa at the time of the Jameson raid; was editor of the San Francisco *Wave,* 1896-97; and, during the Spanish American war, was correspondent in Cuba for *McClure's Magazine.*

His story of San Francisco slums, *McTeague,* published in 1899, was his first successful novel. This was followed by an ambitious trilogy comprising *The Octopus, The Pit,* and *The Wolf*—the last left unfinished. This series was intended to constitute the epic of the wheat and contains a notable arraignment of the evils of railway monopoly and grain speculation. His other writings include *Yberville, Moran of the Lady Letty, Blix, A Man's Woman,* and *The Third Circle.* He was one of the most striking writers of his day. His untimely death in 1902 removed from American letters a figure of unusual promise. See *Octopus, The.*

Norris, Kathleen, née Kathleen Thompson, American author, was born at San Francisco in 1880. In 1909, she married Charles Gilman Norris. In the following year, she began writing short stories and contributed to the leading popular periodicals of America. Her works include *Mother, The Story of Julia Page, The Heart of Rachael, Undertow, The Beloved Woman,* and *Lucretia Lombard.*

North, Frederick, Lord, English statesman, was born, 1732, and was educated at Oxford. He entered the House of Commons at the age of 22 and was made junior lord of the treasury in 1759. In 1767, he was appointed chancellor of the exchequer and leader of the House of Commons, being there opposed to Fox and Burke. In 1770, he became prime minister and his course, to a large extent, caused England to lose the American colonies. He resigned in 1782. Died, 1792.

Northcliffe, Alfred Charles William Harmsworth, Baron, British newspaper proprietor, was born in Chapelizod, Ireland, 1865. In 1888, he founded the weekly periodical *Answers,* which had an immediate success. In 1894, he bought the London *News* and, two years later, founded the *Daily Mail.* He subsequently founded the Glasgow *Daily Record,* acquired the Leeds *Mercury,* the Birmingham *Gazette,* and the London *Times.* In 1898, he founded *Harmsworth's Magazine.* He was elevated to the peerage as Lord Northcliffe in 1905.

After the outbreak of the World War, he conducted a vigorous editorial campaign to secure greater efficiency in providing military equipment and munitions. In June 1917, Northcliffe was sent to the United States as special representative of the British government to co-ordinate the work of the various war commissions. He was also made director of propaganda in enemy countries.

The influence which Northcliffe was able to wield by means of his chain of newspapers was an unprecedented factor in British public life. He wrote *The War in 1916* and *My Trip around the World.* Died, 1922.

Northrop, Cyrus, American educator, was born at Ridgefield, Conn., in 1834. Having graduated at Yale in 1859, he was admitted to the bar in 1860. At different times, he was clerk of the Connecticut house of representatives and of the senate, editor of the New Haven *Palladium,* professor of English at Yale university, and, from 1884 to 1911, president of the University of Minnesota. During his presidency, the University of Minnesota became one of the leading state universities of the country. Died, 1922.

Norton, Charles Eliot, American educator, critic, and scholar, was born at Cambridge, Mass., 1827. He graduated at Harvard, 1846, and entered a countinghouse in Boston. He went as supercargo on an East Indian voyage, 1849; later made several trips to Europe; and became known as

a Dante scholar and an authority on art. From 1864 to 1868, he was editor, with James Russell Lowell, of the *North American Review*. He was professor of the history of art at Harvard, 1875–98.

By his finely endowed personality, he exercised a great cultural influence upon his generation. Among his writings are *Considerations on Some Recent Social Theories*, *Historical Study of Church-Building in the Middle Ages*, and translations of Dante's *Vita Nuova* and *Divina Commedia*. Works edited by Norton include *Letters of James Russell Lowell*, *Correspondence of Carlyle and Emerson*, *Correspondence of Goethe and Carlyle*, and *Letters of John Ruskin*. He became a member of the American academy of arts and letters in 1905. Died, 1908.

Nourse, Elizabeth, American painter, was born at Mount Pleasant, Ohio, 1860. As a child she showed remarkable talent for painting. She began study at the Cincinnati art school at 13 and, by designing and decorative work, earned means to continue study in Paris. At 18, she entered the Académie Julien, studying under Boulanger and Lefêbvre and later under Carolus-Duran. Boulanger influenced her to open a studio in Paris, and soon afterward her painting "A Mother and Child" was accepted at the salon.

Continuing to work in Paris, she became one of the ablest American painters in France. The new salon elected her to its membership and her painting "Closed Shutters" was purchased by the French government for the Luxembourg gallery. Among her other paintings are "Good Friday in Rome," "Consolation," "The First Communion," "Little Sister," and "The Family Repast." Her work is represented in America by "Mother and Children," in the art institute, Chicago; "Happy Days," in the Detroit art museum; and paintings in other art collections.

Noyes (*nois*), **Alfred,** English poet, was born in Staffordshire, 1880. He received his education at Exeter college, Oxford, and was awarded the degree of Litt. D. by Yale in 1913.

From early life he devoted himself to literature. He contributed numerous poems and critical articles to English and American reviews. In 1913, he gave the Lowell lectures on "The Sea in English Poetry" in Boston. He was elected to the professorship of modern English literature at Princeton university in 1914. During the World War, he was temporarily attached to the British foreign office. His many books of prose and verse include *The Loom of Years*, *The Flower of Old Japan*, *Forty Singing Seamen*, *The Enchanted Island*, *Tales of the Mermaid Tavern*, *The Winepress*, *Walking Shadows*, *The Elfin Artist*, and *Torch-bearers*.

Noyes, Arthur Amos, American chemist, was born at Newburyport, Mass., 1866. He was educated at the Massachusetts institute of technology and the University of Leipzig. Beginning in 1887, he was connected with the Massachusetts institute of technology for many years, becoming director of the research laboratory of physical chemistry there in 1903. From 1907 to 1909, he was also acting president of the institute. In 1915, he was appointed director of the Gates chemical laboratory in the California institute of technology. His published works include a textbook on the qualitative analysis of inorganic substances, *The General Principles of Physical Science*, and *Electrical Conductivity of Aqueous Solutions*.

Noyes, Harry Alfred, American chemist, was born at Marlborough, Mass., 1890, and was educated at Massachusetts agricultural college. In 1913–18, he was engaged in chemical and bacteriological research at the Purdue University experimental station and, in the latter year, joined the Mellon institute of industrial research at Pittsburgh. He also became director of the research department of the Welch Grape Juice Company. His investigations are concerned chiefly with hydrolytic mass action reactions in soils, plants, and fruit juices.

Noyes, John Humphrey, American religious leader, was born at Brattleboro, Vt., 1811. His father was a representative in Congress and his mother was an aunt of President Hayes. After graduation at Dartmouth college, he studied at Andover and Yale and became a Congregational minister in 1833.

Professing a second conversion and a revelation of the dual sexual nature of God, he gathered around him, in 1838, a group which attempted to return to the communism of the early Church. Property was held in common and a system of complex marriages led to a communism in the care of children. The community was forced to migrate to Oneida, N. Y., where the hostility chiefly of the Protestant churches induced an abandonment of the more distinctive institutions of the community. In 1881, most of the members formed a joint stock company, which has become known especially for the manufacture of mousetraps and the so-called Community silverware. Noyes, however, and some of his adherents removed to Canada. Noyes died at Niagara Falls, Ont., in 1886.

Nye, Edgar Wilson, "Bill Nye," American writer and humorist, was born at Shirley, Me., 1850. After spending his childhood in Wisconsin, he went to Wyoming; studied law; was admitted to the bar in 1876; and was elected to the state legislature. He also acted as postmaster and newspaper correspondent. Through his humorous contributions to the press he achieved wide popularity. His health failing, he returned East, finally settling in New York.

In company with James Whitcomb Riley, he made frequent tours of the country, giving entertainments consisting of lectures and readings. His writings include *Bill Nye and the Boomerang*, *The Forty Liars*, *Baled Hay*, *Remarks*, *Chestnuts*, *Bill Nye's Blossom Rock*, *The Cadi*, and comic histories of England and the United States. With J. W. Riley, he wrote *Railroad Guide* and *Fun, Wit, and Humor*. Died, 1896.

Oberlin (*ō'bĕr-lĭn*), **Jean Frédéric,** Alsatian clergyman and philanthropist, was born in Strasbourg, 1740. He was educated at Strasbourg university; studied theology; and became a Lutheran clergyman. He was celebrated for his philanthropy and for his services to the population of Ban de la Roche, among whom he labored for 60 years. He made roads, improved the system of agriculture, and promoted education. At the time of the French Revolution, not only was Ban de la Roche saved, through the reputation of the people and their pastor, from all molestation, but Oberlin was able to offer an asylum to proscribed persons. Died, 1826. Oberlin college, Ohio, is named for him.

Obregon (*ō'brā-gōn'*), **Alvaro,** Mexican statesman, was born in Nogales, Sonora, Mex., 1880, of Basque and Yaqui parentage. Joining Carranza in 1913, he distinguished himself by defeating Huerta and winning several other victories at the head of a Constitutionalist army. In 1915, he opposed Villa, over whom he won four victories, losing his right arm in one of these engagements.

After serving as Carranza's minister of war, he resigned in May 1917 and retired to his estate, where he accumulated a fortune by controlling the chick-pea crop on the Western coast. Becoming a candidate for the presidency, he was charged by Carranza with rebellion and was arrested. He escaped; raised an army; succeeded in driving Carranza from power; and was elected president in 1920.

Obregon's administration resulted in an agreement for refunding Mexico's debts, in the breaking up of many large estates, and in important educational reforms. After an intervening term by Calles, Obregon was again elected president in 1928, but before taking office he was assassinated July 17, 1928.

Occam (*ŏk'ăm*), or **Ockham, William of,** English scholastic, was born at Ockham in Surrey about 1280. He entered the Franciscan order; studied at Oxford and Paris; and was a leader in the Franciscans' protest against Pope John XXII's denunciation of evangelical poverty. After imprisonment at Avignon, Occam fled to Munich and there found a defender in Emperor Louis of Bavaria, whom he in turn stoutly defended against the temporal claims of the pope. Besides insisting on the divine right of rulers, Occam won fame as the reviver of nominalism. Among his numerous writings on government, philosophy, and theology are his *Dialogus*, *Summa Logices*, *Tractatus de Sacramento Altaris*, and various commentaries. Died about 1349.

Ochs (*ŏks*), **Adolph S.,** American newspaper proprietor, was born in Cincinnati, O., 1858, of Jewish parentage. He attended public school in Knoxville, Tenn. Beginning work as a printer's devil at 15, he succeeded, five years later, in acquiring the debilitated Chattanooga *Times*, which he made a leading paper in the South. In 1896, he obtained ownership and control of the New York *Times*, then in financial difficulties, and increased its net circulation from about 10,000 to over 400,000 in the next 35 years, the annual receipts rising to more than 25 million dollars. This result was secured largely through improvements in news service. A staff of about 4000 was regularly employed. The *Times* published also the *Annalist*, a financial review; *Current History Magazine*; a weekly *Book Review*; the *Mid-Week Pictorial*; and the *New York Times Index*. Ochs owned the Philadelphia *Public Ledger* from 1902 to 1912, when he sold it to Cyrus H. K. Curtis.

O'Connell, Daniel, Irish Nationalist leader and orator, was born in County Kerry, 1775. He studied at the college of Douai, France, and was admitted to the Irish bar in 1798. He was head of the Catholic party and contended for the admission of Catholics to Parliament, himself entering Parliament in 1829. His remarkable speeches in Parliament were equaled only by his popular addresses throughout Ireland. In 1840, he founded his famous repeal association. Supported by voluntary contributions, he carried on a remarkable campaign in behalf of reform measures for Ireland. In 1844, he was found guilty of sedition, but the House of Lords set aside the verdict. Died, 1847.

O'Connell, Dennis Joseph, American prelate and educator, was born at Charleston, S. C., 1849. He completed his education at the American college at Rome and

was head of the college, 1884–95, and rector of the Catholic University of America, 1903–09. In 1909, he was consecrated auxiliary bishop of San Francisco and, in 1912, was appointed bishop of Richmond, Va. He was a well-known student of Dante. Died, 1927.

O'Connell, William Henry, American cardinal, was born at Lowell, Mass., 1859. He graduated at Boston college, 1881, and immediately entered the American college at Rome, where he was ordained priest, 1884. In 1895, he was appointed rector of the American college at Rome. He was made bishop of Portland, Me., 1901, and was named assistant at the pontifical throne, 1905. He became archbishop of Constance, 1906; succeeded to the see of Boston, 1907; and, in 1911, was made cardinal.

O'Conner, Thomas Power, Irish journalist and politician, popularly known as "Tay Pay," was born at Athlone, Ire., 1848. He graduated at Queen's college, Galway, 1866; took up journalism in Dublin, 1867; went to London, 1870; and there became an editor on the *Daily Telegraph*. Afterward he was employed in the London office of the New York *Herald*. In 1880, he entered Parliament as member for Galway and, after 1885, was member for Liverpool for more than 30 years. He was a powerful supporter of the Irish Nationalist party and toured the United States several times, speaking in the interests of Irish home rule. He founded and was editor of the *Star*, the *Sun*, the *Weekly Sun*, and *T. P.'s Weekly*. His publications include *Lord Beaconsfield, a Biography*; *The Parnell Movement*; *Gladstone's House of Commons*; *Some Old Love Stories*; *Napoleon*; *The Phantom Millions*; and many articles and essays.

Oehlenschläger (*ûl'lĕn-shlâ'gĕr*), **Adam Gottlob,** Danish poet and dramatist, was born near Copenhagen, 1779. In 1803, he published *The Play of St. John's Eve*, which attracted favorable notice. This was followed by a series of national tragedies in verse, which raised him to the first rank among Danish poets. His plays show epic and lyric rather than dramatic qualities and they display unrivaled command of language. He ranks among the Danes as Goethe among the Germans. His works, in 33 volumes, include *Haakon Jarl*, *Correggio*, *Palnatoke*, and *Aladdin*. Died, 1850.

Oersted (*ûr'stĕтн*), **Hans Christian,** Danish physicist, was born at Rudkjobing, in the island of Langeland, 1777. He studied at the University of Copenhagen and received the degree of Ph. D. in 1799. He then traveled in Holland, Germany, and France and, in 1806, was appointed professor of natural philosophy in the University of Copenhagen.

In 1820, he published an essay entitled *Experiments on the Effect of Opposing Electricity Upon the Magnetic Needle*, in which he showed the identity of the forces of magnetism, electricity, and galvanism. Oersted desired to make science popular and he wrote numerous works with that object in view. He also gave many popular lectures on scientific subjects. Died, 1851.

Offenbach (*ôf'ĕn-bäĸ*; *ôf'ən'bäk'*), **Jacques,** French composer of comic operas, was born of German Jewish parents in Cologne, 1819. In 1833, he began study at the Paris conservatory; in 1848, became leader of the orchestra at the Théâtre Français; and, in 1855, opened the Bouffes Parisiens, where he produced operas of his own composition until 1866. Among his many works are *Les Deux Aveugles*, *Le Violoneux*, *Le Mariage aux Lanternes*, *Orphée aux enfers*, *Barbe-Bleue*, *La Grande Duchesse*, *Geneviève de Brabant*, and *Les Brigands*. His *Tales of Hoffmann*, published after his death, became very popular. Died at Paris, 1880.

Ogden, Robert Curtis, American merchant and philanthropist, was born at Philadelphia, Pa., 1836. From 1885 to 1907, he was a member of the firm of John Wanamaker. He served as president of the Southern education board and was a trustee of Tuskegee institute and of the general education board. As president of the board of trustees of Hampton institute, he became widely known for his efforts in behalf of education for the colored people of the South. His writings include *Pew Rents and the New Testament*, *Sunday School Teaching*, and *Samuel Chapman Armstrong*. Died, 1913.

Oglethorpe (*ō'g'l-thôrp*), **James Edward,** English general and founder of Georgia, was born at London, 1696. He served in the British army and in Parliament. He planned a colony in America as a refuge for debtors then imprisoned in English jails and also for persecuted German Protestants. George II gave the necessary land, named Georgia in his honor, and Parliament contributed $50,000. He brought over 120 persons and founded the city of Savannah in 1733. In anticipation of a war with Spain, Oglethorpe returned to Georgia in 1738 with a regiment of 600 men. He invaded Florida and was unsuccessful in an attack on Saint Augustine, but later repulsed a Spanish invasion of Georgia. He left the colony in 1743 and surrendered the charter to the British government in 1752. Died in England, 1785.

Ohm (*ōm*), **Georg Simon,** German physicist, was born at Erlangen, 1787. He was educated at the University of Erlangen. He held the chair of physics at Cologne, 1817–26; was director of the Nuremberg polytechnic school, 1833–49; and became professor at Munich in 1849. "Ohm's law" was a result of his researches in electricity. The unit of resistance in an electrical conductor was named the ohm by the Paris congress of physicists in 1881 in honor of his achievements. Died in 1854. See *Ohm's Law*.

Okuma (*ō'kōō-mä*), **Marquis Shigenobu,** Japanese statesman, was born at Saga, Hizen, 1838. He was a retainer of Lord Nabeshima; was one of the founders of the new government; and served at different times as finance minister, foreign minister, minister of agriculture and commerce, and prime minister. He was the organizer and former leader of the Progressive party. He founded Waseda university, Tokyo, and became its president. The foundation of the Japanese Women's university is also due to his initiative. Died, 1922.

Olaf (*ō'läf*), **Saint,** king of Norway, was born in 995. When a youth he went as a viking to England, where he fought many battles and became zealously interested in Christianity. In 1015, he succeeded in securing the throne of Norway. The severity with which he sought to exterminate paganism alienated his subjects, who adhered to Canute of Denmark. Olaf fled to Russia and, in 1030, gave Canute battle at Stiklestad, where Olaf was defeated and slain. His body, laid in the cathedral of Trondhjem, is said to have wrought many miracles. Olaf became the patron saint of Norway.

Oldham (*ōld'ăm*), **William Fitzjames,** American preacher, was born of American parents at Bangalore, India, in 1854. He was educated in Boston university and, in 1883, was ordained to the ministry of the Methodist Episcopal Church. Going to Singapore, Straits Settlements, he founded there a Malaysia mission and an Anglo-Chinese school. In 1895, he founded and occupied a chair of missions at Ohio Wesleyan university, continuing until 1900, when he became assistant secretary of the missionary society of the Methodist Episcopal Church. After 8 years spent as missionary bishop in southern Asia and 4 years as secretary to the board of foreign missions, he was elected, in 1916, a bishop of his Church. His principal publications include *Thoburn—Called of God* and *India, Malaysia, the Philippines*.

Oliphant (*ŏl'ĭ-fănt*), **Margaret,** née Wilson, British novelist and biographical writer, was born at Wallyford, Scotland, 1828. In 1849, she published *Passages in the Life of Mrs. Margaret Maitland of Sunnyside*, which instantly won approval; but the *Chronicles of Carlingford* securely established her reputation as a novelist. Besides many other works, she published *Life of Edward Irving*, *Saint Francis of Assisi*, *Memoir of the Comte de Montalembert*, *The Makers of Florence*, *Literary History of England*, and *The Makers of Venice*. In 1852, she married Francis Oliphant. Died in 1897.

Olmsted (*ōm'stĕd*), **Frederick Law,** American landscape architect, was born at Hartford, Conn., 1822. He studied engineering at Yale and became interested in landscape gardening. About 1850, he traveled on foot through England and on the continent, studying parks and ornamental grounds. He is best known for planning Central park, New York, and the Capitol grounds, Washington. He designed parks and public works at Chicago, Buffalo, Brooklyn, Boston, Milwaukee, and Montreal and acted as commissioner of the national park of the Yosemite. He published *Walks and Talks of an American Farmer in England*, *A Journey in the Seaboard Slave States*, *A Journey Through Texas*, and *A Journey in the Back Country*. Died, 1903.

Olney (*ōl'nĭ*), **Richard,** American lawyer and statesman, was born at Oxford, Mass., 1835. He graduated at Brown, 1856, and at Harvard law school, 1858. He was admitted to the bar in 1859; practiced law at Boston; was elected to the Massachusetts legislature, 1874; and became a member of President Cleveland's cabinet, serving as attorney-general, 1893–95, and secretary of state in 1895–97. He then resumed the practice of law in Boston. In public office he evinced great ability and his state papers are noteworthy for their vigor. Died, 1917.

Omar (*ō'mär*), **Abu-Hafsa-ibn-al-Khattab,** second caliph of the Moslems, was born about 581. Before 617, he persecuted Mohammed and his followers, but, having been converted to the faith of Islam, he devoted himself to its interests and advised the Mohammedan leader Abu-Bekr to undertake conquests in order to propagate the new religion.

On the death of Abu-Bekr, Omar became caliph and pushed on the wars of conquest with increased vigor, subduing Persia, Syria, Palestine, Egypt, and Armenia. Omar is thus to be considered the organizing genius of Mohammedanism, which he found an obscure sect and left a powerful empire.

In 637 A. D., he was summoned to Jerusalem to receive the keys of that city and, while there, he gave orders to build a mosque, now called by his name, on the site of the temple of Solomon. He instituted the practice of dating from the hegira. Assassinated, 644.

Omar Khayyam (*ō'mär Kī-yäm'*), Persian astronomer and poet, was born at Nishapur in the latter part of the 11th century. Having been appointed astronomer to the sultan, he reformed the Moslem calendar. Of his Arabic mathematical treatises, one on algebra was edited and translated by Woepcke in 1851. Omar was known to the Western world only as a mathematician until the fine translation of his *Rubaiyat* by Edward Fitzgerald was published in 1859. Omar was the poet of agnosticism. Though some see nothing in his poetry save the wine cup and roses, others read into it the multiple meanings of Sufi mysticism. Died about 1123.

O'Neill, Eugene Gladstone, American playwright, was born in New York City, 1888. He studied at Princeton and Harvard universities. Prior to 1914, he had a varied career; he engaged in different kinds of business in the United States, Central America, and South America; spent two years at sea; was a vaudeville actor; and served as a reporter on the New London *Telegraph*. *Thirst, and Other One-act Plays*, published in 1914, is the first of a series which brought him to the forefront of contemporary dramatists. Those of later authorship include *The Moon of the Caribbees, and Other Plays of the Sea*; *Emperor Jones*; *All God's Chillun Got Wings*; and *Desire under the Elms*. His *Beyond the Horizon* and *Anna Christie* won awards of the Pulitzer prize for the best play of 1920 and 1922 respectively.

Onnes (*ŏn'nĕs*), **Heike Kamerlingh,** Dutch physicist, was born at Groningen, 1853. He was educated at the University of Groningen; became assistant in the Delft polytechnic school; and later was appointed professor of physics at Leiden. In 1883, he instituted a long series of investigations into the effects of low temperatures on matter. He succeeded in liquefying helium in 1908 and also determined its boiling point, density, and critical temperature. Continuing his experiments with helium, he produced, in 1911, a temperature very near to absolute zero. He also showed that, at certain temperatures, there might be a perpetual electric current through metals. In 1913, Onnes was awarded the Nobel prize for physics. Died, 1926.

Oppenheim, E. Phillips, author, was born in England, 1866, and obtained a grammar school education at Leicester, England. His writings attained to great popularity both in England and in the United States. They include *Anna the Adventuress*, *A Prince of Sinners*, *Conspirators*, *The Amazing Partnership*, *The Double Traitor*, and *The Golden Beast*.

Opper, Frederick Burr, American illustrator and cartoonist, was born at Madison, Ohio, 1857. He left school at 14; worked in the village newspaper office; went to New York; and, having sold some humorous sketches to *Wild Oats* and other comic papers, began drawing as a profession. He was on the art staff of *Frank Leslie's* 3 years and served as an artist on *Puck* for 18 years, leaving in 1899 to accept employment with Hearst's New York *Journal*. He was illustrator for Bill Nye, Mark Twain, and F. P. Dunne. His published works include *The Folks in Funnyville*, with his own verses and pictures; *Our Antediluvian Ancestors*; *Happy Hooligan*; *Alphonse and Gaston*; *John Bull*; *Maud the Matchless*; and other comic sketches.

Optic, Oliver, is the pseudonym of William Taylor Adams, American juvenile writer, born in Medway, Mass., 1822. For many years he was a public school teacher in Boston. He wrote a large number of books, which are published in the different series entitled "Army and Navy Stories," "Boat Club Series," "Great Western Series," "Riverdale Story Books," "Sailor Boy Series," "Soldier Boy Series," "Starry Flag Series," "Woodville Stories," "Yacht Club Series," and "Young America Abroad Series." Each of these series is composed of several books, making more than one hundred volumes in all. Died, 1897.

Orange, Prince of. See *William I*, the Silent; *William III*, king of England.

Orcagna (*ôr-kän'yä*), **Andrea di Cione,** Italian painter, sculptor, architect, and poet, was born at Florence about 1300. His father was a sculptor and goldsmith, and his elder brother was a painter. He was appointed architect of the church of Or San Michele at Florence, 1355, and his greatest work, the marble tabernacle of this church, is considered one of the most beautiful art creations of Italy. He was also chief architect of the cathedral at Orvieto. The frescoes of the "Last Judgment" and "Christ and the Virgin," in the church of Santa Maria Novella at Florence, still survive as examples of his painting. His work was studied by succeeding painters, especially by Michelangelo and Raphael. Died about 1368.

O'Reilly, John Boyle, poet, was born at Dowth Castle, County Meath, Ireland, 1844. He passed through the various stages of journalism from typesetting to the writing of editorials. Although a Fenian, he enlisted in the Irish hussars with the intention of exciting a revolt. Being discovered, he was tried for treason, convicted, and banished to Australia in 1866. Escaping from that country, he reached the United States in 1869 and became the editor of the Boston *Pilot* in 1870. Some of his poems were of high merit and attained deserved popularity. Among his books are *Songs from the Southern Seas*; *Songs, Legends, and Ballads*; *Statues in the Block*; *America*; *Moondyne*; and *Stories and Sketches*. He died in 1890.

Origen (*ŏr'ĭ-jĕn*), Greek church father, was born at Alexandria about 185. Much of his life was spent in Alexandria, where he won a great reputation as a teacher. He succeeded Clement as the head of the Catechetical school, but was finally compelled by persecution to leave in 231. From Alexandria he retired to Cæsarea and afterward to Tyre. In the persecution under Decius in 250, Origen was cast into prison and was subjected to protracted torture.

His writings were exceedingly numerous but by far the greater part is lost. A treatise on *Prayer*, an *Exhortation to Martyrdom*, and a polemical pamphlet *Against Celsus* are the most important of his works left to us. Of Origen's learning and his teaching ability we possess the most ample testimony, but some of his opinions were for a long period the subject of violent controversy in the Church. Died about 254.

Orlando, Vittorio Emanuele, Italian statesman, was born in 1860. Becoming a barrister and a law professor, he was elected to the Chamber of Deputies in 1898. At different times he served as minister of education, minister of justice, and minister of the interior. He favored Italian intervention in the World War. After the disastrous defeat of Italian arms at Caporetto, he became premier and represented Italy at the Versailles Peace Conference. Popular dissatisfaction with the results of his negotiations led to the downfall of his ministry in 1919.

Osborn, Henry Fairfield, American paleontologist, was born at Fairfield, Conn., 1857. In 1877, he graduated at Princeton, where he was assistant professor of natural science, 1881–83, and professor of comparative anatomy, 1883–90. He was professor of zoology at Columbia university from 1890 until 1910, when he was made research professor. From 1891 to 1910, he was also curator of vertebrate paleontology in the American museum of natural history and, in the latter year, was made honorary curator.

His explorations in various western states resulted in important contributions to American paleontology. He also conducted exploring expeditions in Africa in search of mammalian fossils. His published works include *Evolution and Heredity*, *From the Greeks to Darwin*, *Hereditary Mechanism*, *Evolution of Mammalian Molar Teeth*, *The Age of Mammals*, *Huxley and Education*, and *Men of the Stone Age*.

Oscar II, king of Sweden and Norway, was born in Stockholm, 1829. He was trained for the navy; studied at the University of Upsala; and was crowned king in Stockholm and at Drontheim in 1872. He reigned over Sweden and Norway until 1905 and thereafter over Sweden. He was an intelligent and judicious ruler and, though he opposed the separation of Norway from the joint kingdom, his patience and tact made a peaceful solution possible. He was a keen student of naval and military history and a talented writer. Among his works are *Some Contributions to the Military History of Sweden*, *Memorials of the Swedish Fleet*, and translations from Goethe and Herder. Died, 1907.

O'Shaughnessy, M. M., American hydraulic engineer, was born in Limerick, Ireland, 1864. He was educated at the Royal University of Dublin and, in 1885, emigrated to California. Seven years later, he was appointed chief engineer of the California midwinter exposition, held in 1893-94. He was construction engineer of numerous water power and drainage projects in California and Hawaii, including the Morena dam at San Diego, Cal., which at the time of its construction, was the largest rock-filled dam in the world.

O'Shea, Michael Vincent, American educator, was born at Le Roy, N. Y., 1866. He was educated at Cornell university. He became professor of psychology at the state normal school, Mankato, Minn., 1892, and at the teachers' college, Buffalo, 1895, and was appointed professor of education at the University of Wisconsin, 1897.

He lectured extensively on educational subjects in the United States, England, and Scotland and became editor of the *Wisconsin Journal of Education*, director of the department of child training, editor of *Mother's Magazine*, and contributor to numerous educational reviews and journals. His publications include *Suggestions for the Observation and Study of Children*, *Aspects of Mental Economy*, *Education as Adjustment*, *Dynamic Factors in Education*, *Social Development and Education*, and *Every-day Problems in Teaching*.

Osler (*ŏs'lĕr*), **Sir William,** physician, educator, and author, was born at Bondhead, Ont., 1849. He graduated at McGill university, Montreal, 1872. He was professor of the institutes of medicine, McGill university, 1874–84; served as professor of clinical medicine at the University of Pennsylvania, 1884–89, and at Johns Hopkins university, 1889–1905; and was appointed regius professor of medicine at Oxford university in 1905.

Osler worked in nearly every field of medicine and, by his ability as an organizer and as a teacher, greatly influenced medical progress in all English-speaking countries. A remark of his on the comparative uselessness of men over 60 years of age gained wide notoriety in the distorted form that men over 60 should be chloroformed. He took an active part in the medical preparations for the British forces in the World War. His publications include *Cerebral Palsies of Children, Chorea and Choreiform Affections, Lectures on Abdominal Tumors, Angina Pectoris and Allied States, Cancer of the Stomach, Science and Immortality, Counsels and Ideals,* and *A Way of Life.* Died, 1919.

Ossoli (*ŏs'ō-lē*), **Marchioness.** See *Fuller, Sarah Margaret.*

Ostwald (*ŏst'vält*), **Wilhelm,** chemist, was born at Riga, Latvia, 1853. He was educated at Riga and Dorpat; was professor of chemistry at Riga, 1882–87, and at Leipzig, 1887–1906. His extensive researches in physical chemistry and in chemical affinity earned him international fame. His most valuable contributions deal with the electric conductivity of organic acids and with the parallel relationship existing between their electrolytic dissociation and their power of chemical reaction. In 1909, he was awarded the Nobel prize for chemistry. With Van't Hoff, he established the *Zeitschrift für physikalische Chemie* in 1887. His published works include *Lehrbuch der allgemeinen Chemie, Grundriss der allgemeinen Chemie, Elektrochemie, Vorlesungen über Naturphilosophie,* and *Conversations on Chemistry.*

Otho I (*ō'thō*), the Great, emperor of the West, son of the emperor Henry I of Germany, was born in 912. In 936, he was formally crowned king of the Germans and, in 962, became Holy Roman emperor. His reign was a succession of generally triumphant wars, during which he brought many turbulent tribes into subjection and acquired and maintained almost supreme power in Italy, imposing laws with equal success on the kings of Lombardy and the popes at Rome. He also consolidated the disjointed power of the German emperors and established Christianity at many different points in the Scandinavian and Slavonic lands, which lay beyond the circuit of his own jurisdiction. He died in 973.

Otis, Elisha Graves, American inventor, was born at Halifax, Vt., 1811. He became a carriage worker and established manufacturing concerns at Albany and Yonkers, N. Y. In his Yonkers factory, he perfected a safety device for passenger elevators by means of which the suspended car is prevented from falling even though the cables on which it is hung should break. This safety elevator made the modern high building possible and probably increased the value of city real estate more than any other 19th-century invention. Died, 1861.

Otis, James, American statesman and orator, was born at West Barnstable, Mass., 1725, and became a leader of the Boston bar. He was advocate general in 1760, when the revenue officers demanded his assistance in obtaining from the superior court general search warrants allowing them to enter any man's house in quest of smuggled goods. Otis refused, resigned his office, and appeared in defense of popular rights. Elected to the Massachusetts assembly in 1761, he became prominent in resistance to the revenue acts. His fame rests chiefly on *The Rights of the British Colonies Asserted and Proved,* published by him in 1764. Killed by lightning, 1783.

Oudinot (*ōō'dē'nō'*), **Charles Nicolas,** duke of Reggio, marshal of France, was born at Bar le Duc, 1767. He served in the Revolutionary wars. In 1805, he obtained the grand cross of the legion of honor and the command of ten reserve battalions, the "grenadiers Oudinot." He fought at Austerlitz and Jena, gained the battle of Ostrolenka in 1807, and assisted at Friedland. He was conspicuous at Wagram in 1809 and was created marshal of France and duke of Reggio. In 1810, he was charged with the occupation of Holland. He took part in the Russian campaign and in the battles of 1813 with Russians and Austrians. He fought valiantly at Leipzig and was one of the last to abandon Napoleon. At the Second Restoration, he became a minister of state, commander in chief of the royal and national guards, and a peer of France. Died, 1847.

Ouida (*wē'dà*). See *Ramée, Louise de la.*

Ovid (*ŏv'ĭd*), or **Publius Ovidius Naso,** Roman poet, was born of a noble family at Sulmo, 43 B. C. He was educated for the law, but his love of poetry turned him from the legal profession. In 8 A. D., he was banished to Tomi, but the cause of the exile has remained a mystery.

Besides his celebrated *Metamorphoses,* treating in the spirit of burlesque all the transformations recorded in legend from the creation of the world to the time of Julius Cæsar, he was the author of a poem called *Ars Amatoria; Fasti,* a sort of poetical Roman calendar; *Tristia* and *Epistolæ ex Ponto,* elegies written during his banishment; and other works.

His poetical genius has always been admired. A masterly facility of composition, a vigorous fancy, a fine eye for color, and highly musical versification are the merits which have made him a favorite in spite of his occasional slovenliness and falsity of thought. He died in exile at Tomi, 18 A. D.

Owen, Sir Richard, English comparative anatomist, was born at Lancaster, Eng., 1804. He studied medicine at Edinburgh and London, but soon began work in zoology by preparing catalogues of the collections in the museum of the royal college of surgeons and by lecturing on comparative anatomy. In 1856, he became superintendent of the natural history department of the British museum, a position favorable for studying living and fossil animals.

By his monumental work on anatomy and fossils, Owen became the logical successor of Cuvier in the fields of zoology and paleontology. His numerous researches in zoology were largely devoted to structure and embraced every class of animals from the sponges to man. Among his voluminous writings are *Comparative Anatomy of Invertebrates, Comparative Anatomy and Physiology of Vertebrates,* and *The Skeleton and the Teeth.* Died in 1892.

Owen, Robert, English social reformer, was born in North Wales, 1771. In 1799, he married the daughter of David Dale, from whom he, with others, bought the village and cotton mills of New Lanark, Scotland. Here he introduced a system of reform which proved for a time highly successful. He came to the United States in 1824 and attempted to found a communist society at New Harmony, Ind.; but the scheme failed and, in 1827, he returned to Great Britain, where similar experiments attended by a similar result were made at Ralahine and at Tytherley. His ideas are clearly developed in his *Book of the New Moral World.* Died, 1858.

Owen, Robert Latham, American lawyer and politician, was born at Lynchburg, Va., 1856. He graduated at Washington and Lee university, 1877, and began the practice of law in 1880. He became editor and owner of the *Indian Chieftain,* Vinita, 1884; was United States Indian agent for the five civilized tribes, 1885–89; and organized and was president of the First National bank of Muskogee, 1890–1900. In 1891, he framed the bill, which later became an act of Congress, opening United States citizenship to every Indian in Indian Territory. He was elected from Oklahoma to the United States Senate for three terms, 1907–25; became chairman of the banking and currency committee, 1913; and was one of the authors of the Glass-Owen Currency act, which created the Federal Reserve banking system. See *American Indian.*

Oyama (*ō'yà-mà*), **Iwao, Prince,** Japanese soldier, was born in Kagoshima, 1842. He entered the Japanese army; was appointed colonel in 1871; and was promoted to the rank of major general in the same year, lieutenant general in 1878, general in 1891, and field marshal in 1898.

During the war between Japan and China, he was minister of war, but took the field as commander of the second army and captured Kinchow, Talienwan, Port Arthur, and Weihaiwei. In 1904, he was chief of the general staff and, when war broke out with Russia, he was appointed commander in chief in Manchuria, defeating the Russians at the three great battles of Liaoyang, the Shaho, and Mukden. He was created prince in 1907. Died, 1916.

Packard, Alpheus Spring, American naturalist, was born at Brunswick, Maine, 1839. He graduated at Bowdoin college in 1861 and later became assistant to Agassiz at Harvard. After taking part in several scientific expeditions, he was made professor of zoology and geology at Brown university. He became widely known as an entomologist and zoologist. Besides many technical papers, his publications include *Guide to the Study of Insects, Our Common Insects, Zoology,* and *Text-Book of Entomology.* He died, 1905.

Paderewski (*pà'dĕ-rĕf'skē*; *-rĕs'kē*), **Ignace Jan,** Polish pianist and composer, was born in Podolia, Poland, 1860. He began to play the piano at three and, at seven, was placed under a local teacher. In 1872, he studied under Raguski at Warsaw and later under Kiel at Berlin. In 1884, he resolved to adopt the career of a virtuoso; removed to Vienna; placed himself under his fellow countryman Theodor Leschetizky; and, at the end of three years' hard study, made his début in Vienna, immediately taking rank among the foremost pianists of the world.

In 1890, he astonished London with his marvelous playing and, in 1891, made the first of many remarkably successful tours in the United States. His compositions include the operas *Manru* and *Sakuntala,* a symphony, and numerous works for the piano, of which his *Minuet* has become widely known.

During and after the World War, he took a prominent part in securing the independence of Poland and he signed the treaty of peace in behalf of the newly formed republic. In 1919, he was chosen the first premier of Poland. He resigned the same year and later resumed his career as a pianist, taking up his residence in the United States near Paso Robles, Cal.

Paganini (*pä'gä-nē'nē*), **Niccolò,** Italian violinist, was born at Genoa in 1782. His musical talent was revealed in early childhood. He received instruction in his ninth year from Costa at Genoa and afterward from Rolla at Parma. In 1798, he began foreign tours alone; from 1801 to 1804, he lived in retirement; resumed concert tours in 1805; and played in Italy with great success for more than 20 years.

Paganini was one of the world's greatest masters of the violin. His technique was marvelous, while his intensity and passion enabled him to sway great audiences at his will. A feat that attracted special attention was his playing of a military sonata on a single string. He wrote many compositions for the violin. Died, 1840.

Page, Thomas Nelson, American novelist and diplomat, was born on Oakland plantation, Hanover county, Virginia, 1853. He was educated at Washington and Lee university and graduated in law at the University of Virginia, 1874. He practiced law at Richmond, Va., 1875–93, but subsequently turned to literature and lecturing.

His novels deal chiefly with the courtly and high-spirited aristocracy of Virginia at or about the time of the Civil War. Besides novels, he produced dialect stories and verse. In 1913, he was appointed American ambassador to Italy and served until 1922.

Among his numerous writings are *In Ole Virginia, Two Little Confederates, On Newfound River, The Old South, Elsket and Other Stories, The Burial of the Guns, Meh Lady, Marse Chan, Polly, The Old Gentleman of the Black Stock, Santa Claus's Partner, Gordon Keith, The Negro—The Southerner's Problem, Bred in the Bone, The Land of Spirit,* and a book of poems entitled *The Coast of Bohemia.* He was elected a member of the American academy of arts and letters in 1908. Died, 1922.

Page, Walter Hines, American journalist and diplomat, was born at Cary, N. C., 1855. He was graduated at Randolph-Macon college, Virginia, and at Johns Hopkins university. He was editor of the *Forum* from 1890 to 1895 and, for the next few years, acted as literary adviser to Houghton, Mifflin and Company and as editor of the *Atlantic Monthly.* In 1899, he helped to found the firm of Doubleday, Page and Company and became editor of its magazine, the *World's Work.*

In 1913, Page was appointed ambassador to England. At the opening of the World War, his situation was a delicate one since he was charged with the diplomatic interests of Germany and Austria and with many other difficult ambassadorial tasks imposed by American neutrality. Then and later he labored strenuously for his ideal of cooperation among the English-speaking peoples. After his death, in 1918, he was honored by a tablet unveiled in 1923 in Westminster Abbey.

Paine, John Knowles, American composer, was born in Portland, Me., 1839. After studying in his native city, he continued his musical education in Germany, 1858–61. In 1862, he became instructor and, from 1876 until 1906, he was professor of music at Harvard, occupying the first chair of music established in an American university.

While his early works are strictly classical in form and spirit, his later compositions show transitions to the romantic school. His choral music to the *Œdipus Tyrannus* of Sophocles, 1881, was perhaps the best American composition of its time. He became a leader also among American composers of orchestral music. His works include *Centennial Hymn; St. Peter,* an oratorio; *Azara,* an opera; *Spring,* a symphony; *The Tempest* and *An Island Fantasy,* symphonic poems; and the vocal-orchestral works *The Nativity, Song of Promise,* and *Phœbus, Arise.* Died, 1906.

Paine, Thomas, political and philosophical writer, was born at Thetford, England, 1737. He was at first a staymaker and afterward an exciseman. In 1774, he came to America and found employment with a publisher in Philadelphia. In 1776, Paine wrote a pamphlet entitled *Common Sense,* which maintained the cause of the colonies against the mother country. The influence of this publication was extraordinary, and it won him the friendship of Washington, Franklin, and other American leaders. He became secretary to the committee of foreign affairs; visited France, 1787; and later went to England, where he published *The Rights of Man* in reply to Burke's *Reflections upon the Revolution in France.*

Going to France, he was elected in 1792 by the department of Pas de Calais as a deputy to the National Convention. At the trial of Louis XVI, he proposed that the king should be spared and offered him an asylum in America. In 1793, Robespierre caused Paine to be imprisoned for nearly a year. While in France, he wrote his famous *Age of Reason* in favor of deism. In 1802, he returned to the United States. He was a versatile, forceful writer and exercised an immense influence as a pamphleteer. Died in 1809.

Palestrina (*pä'lâs-trē'nä*), **Giovanni Pierluigi da,** Italian composer, was born near Rome about 1526. In 1551, he was made master of the Julian chapel, Rome, and, in 1554, published a collection of masses that were so highly approved by Pope Julius III that he appointed their author one of the singers of the papal choir.

During his remaining years the number and the quality of the works of Palestrina were remarkable. His numerous masses, motets, hymns, offertories, magnificats, litanies, and madrigals mark an epoch in the annals of music and have led to his being called the "Homer of music." His place in the older styles of composition corresponds to that of Bach in the modern forms. Died, 1594. See *Counterpoint, Schools of.*

Paley (*pā'lĭ*), **William,** English prelate and writer, was born at Peterborough in 1743. He was educated at Christ's college, Cambridge. In 1776, he obtained the vicarage of Dalston and, within the next nine years, became prebendary, archdeacon, and chancellor of Carlisle. In 1785, he attained high reputation by his *Principles of Moral and Political Philosophy.* In this work he propounds his ethical theory, which is commonly called utilitarianism. In 1790 appeared his most original and valuable work, *Horæ Paulinæ,* which was followed by *A View of the Evidences of Christianity* and by *Natural Theology.* Died, 1805.

Palissy (*pä'lē'sē'*), **Bernard de,** French potter and naturalist, was born at La Chapelle Biron in the province of Perigord, France, about 1510. In early youth, Palissy worked at his father's kiln; later he was apprenticed to a glass stainer at Agen. He spent his nights in study to obtain scientific knowledge and manual skill in his craft. Contact with geometry and designing and his love of outdoor life led him to study surveying.

In 1528, Palissy set out to make a tour of France, living by the practice of his two trades. His scientific knowledge was extended by experience thus gained, and his latent artistic qualities were stimulated. About 1539, Palissy married and settled at Saintes. An enameled cup of *faïence,* probably of Oriental ware, inspired him in an attempt to discover how white enamel was produced. He experimented for 16 years, exhausting all his resources and even burning his furniture. Disappointed in this quest, he nevertheless discovered a new kind of ware superior in workmanship, design, and color to any previously made in France.

He became famous and was patronized by the nobility, who employed him to embellish their mansions with ornaments of the newly discovered ware. These ornaments received the name of *rustic figulines.* The marshal De Montmorency became his patron, and Catherine de' Medici protected him, although he was a stout Huguenot, and gave him a site in Paris for his furnaces.

Palissy remained in Paris for many years and devoted himself to his artistic employments and to the study of chemistry, geology, and natural history. Beginning in 1575, he delivered a number of public lectures on natural history, which were published later under the title *Discourses on Waters and Fountains.* In 1588, he was thrown into the Bastille as a heretic and was condemned to death. There he wrote many of his philosophical, artistic, and horticultural meditations, which were included in the *Garden.*

In chemistry, Palissy's classification of salts is still regarded as exact, and he was the first to establish a rational theory of crystallization. In literature, his poetic power and graphic style place him among the great writers of France; yet it is to the practical craftsman and artist that the world is most indebted. Died, 1589, while in the Bastille under sentence of death.

Palladio (*päl-lä'dyō*), **Andrea,** Italian architect, was born at Vicenza, 1518. Having studied with the greatest care the writings of Vitruvius and the monuments of antiquity at Rome, he settled in his native city, where he acquired a wide reputation by his restoration of the basilica of Vicenza. His style, a composite characterized by great splendor of execution and justness of proportion, exercised an immense influence on the architecture of northern Italy. From his writings Thomas Jefferson obtained the architectural ideas carried out in the University of Virginia. Died, 1580.

Palma (*päl'mä*), **Tomás Estrada,** Cuban patriot, was born at Bayamo, 1835, and studied law at the University of Seville, Spain. He took part in the Cuban revolution of 1868–78; rose to the rank of general; and became president of the Cuban republic. He was captured, however, by the Spaniards in 1877 and was imprisoned until the close of the rebellion.

Palma then went to Honduras; became a teacher and later postmaster-general; married a daughter of President Guardiola; came to the United States; and established a boys' school in Central Valley, N. Y. During the last

Cuban revolution, he was delegate at large and minister plenipotentiary for the Cuban republic and was subsequently president of Cuba, 1902–06. Died, 1908.

Palmer, Alice Freeman, American educator, was born at Colesville, N. Y., 1855. She graduated at the University of Michigan, 1876; was professor of history at Wellesley college, 1879–81, and president in 1882–87; and served as nonresident dean of the woman's department at the University of Chicago, 1892–94. In 1887, she married George Herbert Palmer, professor of philosophy at Harvard university.

She was styled the "incomparable president of Wellesley" and was one of the most forceful and cultured of American educators. Her sudden death at Paris, 1902, removed perhaps the most inspiring personality among modern teachers of women. A beautiful memorial to Alice Freeman Palmer, sculptured in relief by Daniel Chester French, has been erected at Wellesley college. She was elected to the American hall of fame in 1920.

Palmer, D. D., founder of chiropractic, was born near Toronto, Ont., 1845, and removed later to Iowa. He practiced so-called magnetic healing. In 1895, he treated a partially deaf patient by correcting, through manipulation, the abnormal placement of certain vertebræ, and, the subsequent restoration of the patient's hearing led Palmer to regard such vertebral adjustments as a treatment of extremely wide curative value. Later, in co-operation with his son B. J. Palmer, he founded at Davenport, Iowa, the Palmer school of chiropractic, which has been instrumental in spreading widely this type of therapeutics. Died, 1913.

Palmer, George Herbert, American educator and scholar, was born in Boston, 1842. He was educated at Harvard, the University of Tubingen, and Andover theological seminary. He was appointed to the faculty of Harvard university in 1873 and became professor of philosophy there ten years later and professor of natural religion, moral philosophy, and civil polity in 1889. He retired as professor emeritus in 1913.

In 1887, Palmer married Alice Freeman, whose biography he wrote after her death in 1902. His other works include a translation of Homer's *Odyssey* in rhythmic prose, *The New Education*, *The Glory of the Imperfect*, *The Field of Ethics*, *The Nature of Goodness*, *The Life and Works of George Herbert*, *Trades and Professions*, and *Formative Types of English Poetry*.

Palmerston (*păm'ĕr-stŭn*), **Henry John Temple, Viscount,** English statesman, was born at Broadlands, Hampshire, 1784. He entered Parliament in 1807 and, in the same year, became a junior lord of the admiralty. From 1809 to 1828, he was secretary for war. In the administrations of Earl Grey, Viscount Melbourne, and Lord John Russell, he held the post of foreign secretary, resigning in 1851 owing to a disagreement regarding the *coup d'état* of Louis Napoleon. In 1852, he became home secretary under the earl of Aberdeen, whom he succeeded as first lord of the treasury in 1855. In 1858, he was defeated, but, in 1859, he was returned to power and remained prime minister until 1865.

Palmerston's strong foreign policy was marked by sympathy for oppressed nationalities. He aimed at being the minister of the nation rather than of a political party, and consequently his party affiliations varied at different stages of his career. He was one of the most generally acceptable ministers since the time of Pitt. Died, 1865.

Papin (*pă'păN'*), **Denis,** French physicist, was born at Blois, 1647. He studied medicine and practiced for some time. Later he became a pupil and assistant of Huygens; made improvements in the air pump; and attained wide reputation as a scientist.

While associated with Robert Boyle in London, he invented the double air pump and the air gun. To Papin undoubtedly belongs the honor of having first applied steam to produce motion by raising a piston. He invented also the safety valve; showed that liquids in a vacuum boil at a lower temperature than when exposed to the air; discovered the principle of the action of the siphon; and improved the pneumatic machine of Guericke. He died about 1712.

Paracelsus (*păr'ă-sĕl'sŭs*), otherwise **Theophrastus Bombastus von Hohenheim,** physician and alchemist, was born in Switzerland in 1493. He entered Basel university at 16; studied alchemy and chemistry with Withemina, bishop of Wurzburg; and, at the mines in Tyrol, learned the properties of metals and minerals. He acquired fame as a medical practitioner; was made town physician at Basel; and lectured on medicine at the university. He flouted the teachings of the medical authorities of the time, Galen and Avicenna, and publicly burned their works, declaring himself to be the monarch of medicine. A dispute with the authorities in 1528 drove him from Basel, and, after wandering for a dozen years, he settled in 1541 at Salzburg.

Paracelsus insisted vigorously on the necessity of observation in science and he learned many facts which he used to confound those who depended on older authorities. He appears also to have believed in magic and alchemy, and he claimed to have discovered the secret of prolonging human life indefinitely.

The hostility excited by his contempt for the authorities of the day and by the measure of quackery in his pretensions long blinded the world to the man's real achievements. He improved pharmacy and therapeutics, introduced many new remedies, made new chemical compounds, and taught that diseases were not mere excesses or deficiencies of certain liquids but were actual entities. Died, 1541.

Park, Mungo, African explorer, was born near Selkirk, Scotland, 1771, and was educated at Edinburgh university. In 1795, he set out for Africa to find the source and the course of the Niger river, in which undertaking he succeeded the following year. He returned to Great Britain and published his *Travels in the Interior of Africa*. In 1805, he headed an expedition in search of the mouth of the Niger. After suffering great hardships, Park and his three remaining companions were drowned in the rapids near Bussa, 1806. The details of the expedition were made known through his journal and the discoveries of later explorers.

Parker, Sir Horatio Gilbert, novelist, was born in Camden East, Ont., 1862. He was educated at Trinity college, Toronto; was trained in journalism in Australia; and there began his literary and dramatic work. He traveled extensively in the East, in Europe, Egypt, and northern Canada, and settled in England, where he became a member of Parliament in 1900 and was knighted in 1902. He initiated and organized the first imperial universities conference in London, 1903. Parker was in charge of publicity work for the British government for more than two years in the first part of the World War. His services were rewarded by a baronetcy in 1915.

His writings include a book of poems entitled *A Lover's Diary*, *The Vendetta*, *The Trail of the Sword*, *When Valmond Came to Pontiac*, *The Seats of the Mighty*, *The Battle of the Strong*, *The Right of Way*, *History of Old Quebec*, *A Ladder of Swords*, *Northern Lights*, *The Judgment House*, and *The World in the Crucible*.

Parker, Horatio William, American composer, was born at Auburndale, Mass., 1863. He graduated at the royal conservatory, Munich, 1885; was professor of music in the cathedral school of Saint Paul, Garden City, L. I., 1885–87; and was organist in Holy Trinity church, New York, 1888–93, and Trinity church, Boston, 1893–1901. He became professor of the theory of music at Yale in 1894.

In 1893, he produced his oratorio *Hora Novissima*, regarded as one of the finest American compositions. In 1911, with Brian Hooker, who wrote the libretto, he won the Metropolitan Opera prize of $10,000 for the opera *Mona*. In 1914, with Hooker, he was awarded for the *Fairyland*, which was produced in a municipal anniversary celebration at Los Angeles in 1915, the $10,000 prize offered by the national federation of women's clubs for an American opera.

Parker's other compositions include the overtures *Regulus* and *Count Robert of Paris*; the oratorios *St. Christopher* and *Morven and the Grail*; the choral works *King Trojan*, *The Holy Child*, *The Kobolds*, *Harold Harfagar*, *The Dream King*, *A Wanderer's Psalm*, and *A Star Song*; *The Leap of Roushan Bey*; numerous pieces for piano and organ; and songs. He was elected to the American academy of arts and letters in 1905. Died, 1919. See *American Composers*.

Parker, Louis Napoleon, English dramatist and composer, was born of English parents at Calvados, France, in 1852. He was educated at Freiburg, Germany, and at the Royal academy of music, London, of which he became a fellow in 1898. He was director of music in Sherborne school, Dorsetshire, from 1877 to 1896. Cantatas composed by him include *Silvia* and the *Twenty-third Psalm*. He is the author of many plays, including *The Love-Knot*, *Rosemary*, *Disraeli*, and *Pomander Walk*.

Parker, Matthew, English prelate, was born at Norwich, England, 1504. He studied at Corpus Christi college, Cambridge, and was ordained a priest in 1527. In 1535, he was appointed chaplain to Queen Anne Boleyn. In 1552, he was presented by King Edward VI with the deanery of Lincoln. On the accession of Queen Mary, he was deprived of his preferments and was even obliged to conceal himself.

On the death of Mary and the accession of Elizabeth, 1558, Parker was appointed by the queen archbishop of Canterbury. "The subsequent history of Archbishop Parker," it has been justly remarked, "is that of the Church of England." It is to Parker we owe the "Bishops' Bible," undertaken at his request and published at his expense in 1572. He had also the principal share in drawing up the *Book of Common Prayer*. It was under his presidency, too, that the *Thirty-nine Articles* were finally reviewed and subscribed to by the clergy, 1562. He died in 1575.

Parker, Theodore, American clergyman and scholar, was born at Lexington, Mass., 1810. He entered Harvard in 1830 and, during his collegiate course, supported himself

by teaching private classes and schools. He graduated from Harvard divinity school in 1836 and, the next year, became a Unitarian minister at West Roxbury.

Parker was somewhat separated from the conservative Unitarians, as shown by his sermon *The Transient and Permanent in Christianity* and by his *Discourse on Matters Pertaining to Religion*, which attracted widespread notice and comment. For many years he preached to immense congregations at Melodeon and Music halls, Boston. He also lectured throughout the country and became an ardent antislavery agitator. His complete works were published in 14 volumes. Died, 1860.

Parkhurst, Charles Henry, American Presbyterian clergyman, was born in Framingham, Mass., 1842. He graduated from Amherst, 1866, and studied theology at Halle and Leipzig. He was pastor of the Congregational church, Lenox, Mass., from 1874 to 1880, when he was made pastor of Madison Square Presbyterian church, New York.

Parkhurst became widely known for his vigorous, fearless sermons and by his work in behalf of civic and social reform. In 1891, he was made president of the society for prevention of crime. His investigations indicating partnership of police with criminals led to an investigation of the New York police by the state legislature in 1894.

Besides numerous contributions to newspapers and magazines, his writings include *The Blind Man's Creed*, *The Swiss Guide*, *Our Fight with Tammany*, *A Little Lower than the Angels*, and *The Pulpit and the Pew*.

Parkman, Francis, American historian, was born in Boston, 1823, and graduated at Harvard in 1844. He began the study of law, but soon chose as his life work the writing of the history of French power in America. In preparation for his task he made several trips to Europe and lived for some time among the Indians of the Northwest.

In addition to rare powers as an investigator, he possessed consummate literary ability and produced a series of valuable works, which place him in the highest rank among American historians. His books include *The Conspiracy of Pontiac*, *The Jesuits in North America*, *La Salle and the Discovery of the Great West*, *The Old Régime in Canada*, *Montcalm and Wolfe*, *A Half Century of Conflict*, and *California and the Oregon Trail*. He died in 1893 and was elected to the American hall of fame in 1915.

"Parley, Peter." See *Goodrich, Samuel Griswold.*

Parmenides (*pär-mĕn'ĭ-dēz*), Greek philosopher, the greatest member of the Eleatic school, was born at Elea and flourished about the 5th century B. C. In his didactic poem *On Nature*, he sought to demonstrate the reality of absolute being, or matter. He held that nonexistence, or empty space, was inconceivable. This belief involved logically the denial of all motion. Parmenides took this step and maintained that motion was only apparent and existed for the senses alone, whereas the intelligence must refuse to recognize the validity of such appearances.

Parnell (*pär'nĕl*), **Charles Stewart,** Irish statesman, was born in Avondale, 1846, and was educated at the University of Cambridge. He entered public life in 1875 as member of Parliament for Meath. In 1880, he became leader of the Irish party and entered upon an agitation for a reform in the method of landownership in Ireland. In October 1881, he was imprisoned at Kilmainham under the Coercion act, but was released in April 1882.

At the general election of 1885, all Home Rule candidates nominated by Parnell were elected, and he subsequently entered into an alliance with the followers of Gladstone. In the next Parliament, he proposed a bill to suspend evictions in Ireland and to reduce rent; the bill was rejected, but the agitation continued.

In 1888, a special commission was appointed to examine the charges made against Parnell and others by the London *Times* of palliating the murder of a government official in Ireland. The inquiry cleared Parnell, and he then brought suit for libel against the *Times* and recovered £5000 damages. As the result of his connection with a divorce case in 1890, Parnell was deposed by the majority of his party, but continued to lead the minority.

Parnell was a remarkably effective debater, possessed great political ability, and notably promoted the cause of home rule for Ireland. Died, 1891.

Parrhasius (*pă-rā'shĭ-ŭs*), Greek painter, son of Evenor, also an artist, was born at Ephesus in the 5th century B. C. He practiced his profession at Athens, where he received the rights of citizenship. According to Pliny, he was the first to establish a true proportion between the different parts of a picture and to indicate the round by light and shade. One of his most notable pictures represented a personification of the Athenian democracy, showing graphically the varying moods which actuated it.

Concerning his skill, a tale is recorded describing his contest with Zeuxis. The latter painted some grapes with such perfection that birds came to peck at them. Zeuxis then demanded that Parrhasius should draw aside the curtain and display his picture. Upon discovering that his competitor's painting was the curtain itself, Zeuxis acknowledged himself outdone, for, while Zeuxis had deceived birds, Parrhasius had deceived a skilled artist. The date of his death is unknown. See *Painting, Greek.*

Parry, Sir Charles Hubert Hastings, English composer and musical scholar, was born in Bournemouth, 1848. He was educated at Eton and Oxford, where he received the degree of M. A. in 1874. He then took an extended course in music. In 1883, he was appointed choragus of Oxford university and, in 1891, was made professor at the royal college of music, succeeding Sir George Grove as director in 1894. From 1900 to 1908, he was professor of music at Oxford.

Parry is best known by his oratorios *Judith*, *Job*, and *King Saul* and by his choral works with orchestra *The Glories of our Blood and State*, *Ode to St. Cecilia's Day*, *War and Peace*, *The Pied Piper of Hamelin*, and *The Soul's Ransom*. He also composed symphonies, overtures, and chamber music. His numerous writings include *The Evolution of the Art of Music*, *Style in Musical Art*, and many important contributions to Grove's *Dictionary of Music*. Died, 1918.

Parsons, Sir Charles Algernon, English inventor and shipbuilder, was born in 1854 and was educated at the University of Cambridge. He devoted his attention to electricity and engineering and became proprietor of electrical supply and marine engine works. He invented the compound steam turbine about 1884; notably improved it by a condenser in 1891; and adapted it for practical maritime use in 1897. In 1910, he invented a geared turbine engine. He wrote *The Steam Turbine* and numerous papers on related subjects. See *Steam Engine.*

Parsons, William Barclay, American engineer, was born in New York City, 1859. He graduated at Columbia university in 1879. He made surveys for the Canton-Hankow railway, China, 1000 miles, in 1898-99; designed and constructed the underground railway system in New York; and was a member of the isthmian canal commission and of the board of consulting engineers of the Panama canal. For his services in the World War, he was decorated by the governments of Great Britain and Belgium besides being cited by the American government for conspicuous distinguished service. His writings include *Turnouts, Track*, *An American Engineer in China*, and various monographs.

Partridge, William Ordway, American sculptor and author, was born at Paris, France, 1861. He studied at Columbia university and received his art education in Rome, Florence, and Paris.

Partridge's sculpture is characterized by refinement, imagination, and versatile technique. He excels in portrait busts. His works include a statue of Shakspere, Lincoln park, Chicago; a bronze statue of Alexander Hamilton, Brooklyn; the Kauffmann memorial, Washington; a statue of Whittier, Boston public library; an equestrian statue of General Grant for Grant square, Brooklyn; the Schermerhorn memorial at Columbia university; the group "Christ and Saint John," Brooklyn museum of fine arts; and a statue of Pocahontas made for the Jamestown exposition, 1907. His writings include *Art for America*, *The Song Life of a Sculptor*, *The Technique of Sculpture*, *The Angel of Clay*, and *The Czar's Gift.*

Pascal (*pȧs'kȧl*; F., *pȧs'kȧl'*), **Blaise,** French philosopher and mathematician, was born at Clermont Ferrand, 1623. His gift for mathematics was extraordinary, and he contributed largely to the development of that science. In 1654, he gave up the study of mathematics and natural philosophy and embraced the austere religious life of the Jansenists at Port Royal near Paris, where he spent his remaining years.

The controversy between the Jesuits and the Jansenists led to Pascal's publication of the *Provincial Letters* in favor of the latter. The wit and the genius of the *Provincial Letters* have always been acknowledged, though their fairness has been questioned. His celebrated *Thoughts on Religion* has been translated into most European languages. Pascal's style is unsurpassed in graceful energy and remains a model of French prose. Died, 1662.

Passy (*pȧ'sē'*), **Frédéric,** French statesman and economist, was born in Paris, 1822. He was educated for the law and, in 1846, became auditor to the council of state. He entered politics but withdrew upon the proclamation of the Second Empire. He then turned his attention to topics of social science, on which he lectured extensively. In 1868, he founded the international league of peace. After the fall of Napoleon III, he re-entered politics, serving in the Chamber of Deputies, 1874–89. Thenceforward he devoted himself to the cause of pacifism, assisting Sir W. R. Cremer in founding the Interparliamentary union. In 1901, he was awarded, with Henri Dunant, the first Nobel peace prize. His publications include various works on economic subjects and the peace movement. Died, 1912.

Pasteur (*pȧs'tûr'*), **Louis,** French chemist and bacteriologist, was born at Dole in 1822. He received the degree of doctor of science at the Ecole Normale, Paris, 1847. He became professor of physics at Dijon, 1848, and of chemistry at Strasbourg, 1849. After holding various scientific positions at Lille and Paris, he was professor of chemistry at the Sorbonne, 1867–89. Later his researches were made in connection with the Pasteur institute.

From 1854 to 1857, Pasteur conducted researches on ferments and fermentation, which led directly to his further studies in specific germs. He studied and successively combated the contagious silkworm disease as well as fowl cholera and anthrax, which he treated by vaccines of diluted virus. His last work was connected with a vaccine treatment for hydrophobia. Pasteur is regarded as the founder of the modern science of bacteriology. He was elected to the French academy in 1882. Died, 1895.

Pater (*pā'tĕr*), **Walter Horatio,** English essayist and critic, was born in London, 1839. He was educated at Oxford; became a fellow at Brasenose college; and spent practically all of his life in quiet study at Oxford. He came early under the influence of Ruskin and found his mission in interpreting the spirit and the ideals of the Renaissance. His *Studies in the History of the Renaissance*, published in 1873, revealed him as a penetrating critic with a beautiful prose style. Among his other works are *Marius the Epicurean, Imaginary Portraits, Plato and Platonism, The Child in the House,* and *Greek Studies.* Died, 1894.

Patten, Simon Nelson, American economist and writer, was born at Sandwich, Ill., 1852. He graduated at Halle, Germany, 1878, with the degree of Ph. D. In 1888, he was elected professor of political economy at the University of Pennsylvania. While a large part of his work is in the field of sociology, he ranks among the most brilliant and original American writers on economics. His works include *Economic Basis of Protection, Theory of Social Forces, Development of English Thought, Theory of Prosperity, Heredity and Social Progress, The New Basis of Civilization,* and *The Reconstruction of Economic Theory.* Died, 1922.

Patti (*pȧt'ē*), **Adelina** (Baroness Rolf Cederström), operatic singer of Italian parentage, was born at Madrid, Spain, 1843. She made her first appearance in New York, 1859. Her début in grand opera was made in London in 1861 as Amina in *La Sonnambula.* For more than 30 years, she was one of the greatest artists of the operatic stage. Her voice was a high soprano of rich bell-like quality and a remarkable evenness of tone; to these qualities she added purity of style and high artistic finish. Died, 1919.

Patton, Francis Landey, American educator and theologian, was born in Warwick parish, Bermuda, 1843. He was educated at Knox college, Toronto, at the University of Toronto, and at Princeton theological seminary. He was then ordained to the Presbyterian ministry and held several pastorates. In 1872, he was appointed professor of theology in McCormick theological seminary, Chicago, and, nine years later, became professor of the relations of philosophy and science to the Christian religion at Princeton theological seminary. From 1886 to 1913, he was professor of ethics at Princeton university. He was president of Princeton university in 1888–1902 and president of Princeton theological seminary, 1902–13.

Patton achieved a wide reputation as a convincing speaker and as a keen thinker on theological and ethical subjects. His publications include *The Inspiration of the Scriptures* and *Summary of Christian Doctrine.*

Paul III (Alessandro Farnese), pope from 1534 to 1549, was born in Tuscany in 1468. His acts include the issuing of two edicts of great historical importance—a decree of excommunication against Henry VIII of England, which was a contributing cause to the foundation of the Church of England, and the edict incorporating the order of the Jesuits. He supported Charles V in his struggles against the Protestant league in Germany. Died, 1549.

Paul, Saint, apostle of Christianity among the Gentiles and chief founder of the Christian Church, was born in the second year of the Christian era at Tarsus, a Greek city of Cilicia in Asia Minor. His family were Jews, belonging to the tribe of Benjamin, but they enjoyed the rights of Roman citizenship. His Jewish name was Saul, but, among the Gentiles, he adopted the Latin name Paul. By trade, he was a tentmaker.

Conversion. Paul obtained a knowledge of the Greek language and literature at Tarsus and then, about the year 19, went to Jerusalem to study the law of Moses under Gamaliel. He became a strict member of the sect of the Pharisees and took a prominent part in the persecution of the Christians that broke out in Jerusalem. When the rumor spread that some of the worst offenders were actual members of the synagogue in Damascus, he obtained an order to go and arrest them. On the road to that city about the year 37, he experienced a vision that convinced him of the Messiahship of Jesus and inspired him with a belief that he was commissioned to preach the new religion among the nations of the earth.

He did not immediately carry out this mission, but retired to Arabia for the greater part of three years. Returning to Damascus and Jerusalem, he proceeded to preach the new gospel, but hostility on the part of his former associates among the Jews made it advisable for him to leave these cities and carry on his ministry among the Gentiles.

Missionary Journeys. In the year 40, he assisted Barnabas in the evangelization of Antioch. After a short visit to Jerusalem in the famine year of 44, Paul and Barnabas were set apart by the prophets and elders of the church at Antioch for the evangelization of the more distant Jews. From Seleucia, they proceeded to the southern district of Asia Minor,—Pamphylia, Pisidia, and Lycaonia.

At Antioch, Paul's preaching occasioned a controversy that was of great moment for Christianity. The extreme Jewish element of the Church insisted on the need of circumcision in order to attain salvation. Paul, however, maintained that faith by itself was sufficient. The victory of Paul's contention was facilitated partly by his own success in evangelizing the Gentiles. Paul thus was chiefly responsible for freeing Christianity from specifically Jewish elements which would have made its general acceptance doubtful.

Silas accompanied Paul on his second expedition, begun in 51. Traversing the whole of Asia Minor from south to north and crossing the Ægean, they landed in Europe, where they visited Philippi, Thessalonica, Berea, Athens, and Corinth. On his return to Asia Minor, Paul visited Ephesus, proceeded thence to Cæsarea and Jerusalem, and closed his journey at Antioch.

The third journey of Paul commenced about 57 and extended over much the same district as the previous one. Returning to Jerusalem, he was brought to trial by his Jewish opponents before Felix, the procurator at Cæsarea, and, later, before King Agrippa. Using his right as a Roman citizen, Paul appealed to Cæsar, arriving at Rome in 62, where he was a prisoner for two years. He is believed by some scholars to have made a fourth missionary journey, going into Spain and other countries.

Character and Influence. In the quality of his moral energy Paul surpassed all other apostles of Christianity. His teaching was essentially practical in its nature. The central doctrine of salvation by faith in the Christ, although fundamentally experiential rather than intellectual, became, in his ministry, the means of making Christianity a universal religion rather than a Jewish sect. He was executed in Nero's reign about the year 67.

Pavlov (*pȧv'lôf*), **Ivan Petrovitch,** Russian physiologist, was born in Rjasau, 1849. He graduated in medicine at Leningrad, 1883. In 1890, he was made professor at the military academy, Leningrad, and, in 1897, was appointed director and professor of physiology in the imperial academy of sciences.

Pavlov established a new school of Russian physiologists and made important researches in connection with the physiology of the heart, secretive glands, and digestion. In 1904, he was awarded the Nobel prize for medicine. His *Work of the Digestive Glands* has been translated into many languages.

Pavlowa, Anna, Russian dancer, was born in Leningrad in 1887. At the age of 10, she entered the Imperial ballet school at Leningrad and, in the years succeeding 1904, appeared in the principal Russian cities. In 1911, she undertook the first of many tours in Europe and America, winning great admiration for her dance creations in both the classical and ballet styles. Among her most successful dance creations are "The Swan," "The Butterflies," "Dionysus," "Amarilla," and "The Fairy Doll."

Payne, John Howard, American dramatist, was born at New York, 1791. He made his début as an actor in New York City in 1809; was successful for 30 years; and also wrote several plays, of which *Brutus, Charles II,* and *Clari* are the best-known. The song "Home, Sweet Home" occurs in *Clari,* which was produced as an opera in London, 1823. Yet the author of "Home, Sweet Home" had no home for the last 40 years of his life and died while American consul at Tunis, 1852. His remains were brought to America and were buried at Washington in 1883.

Peabody, Elizabeth Palmer, American educator, was born at Billerica, Mass., 1804. She was a sister of Mrs. Nathaniel Hawthorne and Mrs. Horace Mann. She taught in the celebrated school of Bronson Alcott and later was one of the most active in introducing the methods of Froebel into American schools. She established at Boston, 1860, the first kindergarten in America. She published many educational works, the best known of which are *The Kindergarten in Italy, Letters to Kindergartners,* and *Guide to the Kindergarten.* Died, 1894.

Peabody, George, American merchant and philanthropist, was born at South Danvers, now Peabody, Mass., 1795. When 22 years old, he was a partner of Elisha Riggs in a

wholesale dry goods business in Baltimore. In 1829, he became the head of this firm, which established branches in New York and Philadelphia. Withdrawing from the Baltimore firm in 1843, he established himself in London as a merchant and broker and accumulated a large fortune.

In 1852, Peabody sent a large donation to found an educational institute and library in his native town. He contributed $1,400,000 to the city of Baltimore for an institute of science, literature, and fine arts. The Peabody education fund received more than $3,000,000 for the promotion of education in the Southern states. In appreciation of his gifts for education, which amounted to about $7,000,000, Congress authorized a medal to be struck. To the city of London he donated a fund of $2,500.000 for the construction of lodging houses. His philanthropic munificence, at that time unparalleled, brought him great honors and gratitude from England and from the United States. Died, 1869. He was elected to the American hall of fame in 1900.

Peabody, Josephine Preston (Mrs. L. S. Marks), American poet and dramatist, was born in New York, 1874. She began her advanced education at the girls' Latin school, Boston; attended Radcliffe college, 1894–96; and was instructor in English literature at Wellesley college, 1901–03. In 1906, she married Professor Lionel S. Marks of Harvard university.

In 1897, she published *Old Greek Folk-Stories*, which was followed in 1898 by *The Wayfarers*, her earliest volume of verse, and by *Fortune and Men's Eyes* in 1900. Her first drama, *Marlowe*, appeared in 1901. In 1910, her drama in verse entitled *The Piper* was awarded the Stratford on Avon prize and its favorable reception in England and America won for the author high rank in American poetical drama. Her works include also *The Singing Man*, *Harvest Moon*, and *The Wolf of Gubbio*. Died, 1922.

Peale, Charles Willson, American portrait painter, was born in Maryland, 1741. He received his art education from Copley and Benjamin West. Among his portrait paintings are several of Washington. In 1785, he formed a collection of natural curiosities and founded Peale's museum at Philadelphia. In 1805, he helped to found the Pennsylvania academy of fine arts, the first of its kind in the United States. Died, 1827.

His son, Rembrandt (1778–1860), painted several historical pictures, among them the well-known "Roman Daughter," in the Boston museum, and "The Court of Death," in the Detroit art gallery.

Pearl, Raymond, American biologist, was born at Farmington, N. H., in 1879. Having graduated at Dartmouth college and the University of Michigan, he studied further at Leipzig, Naples, and London. He was called to a chair at Johns Hopkins university in 1918 and, in 1925, became head of the Institute of Biological Research there. His studies on heredity and population were based largely on statistics, by the application of which to biological problems he opened up a new and fertile field for research. Among his publications are *The Biology of Death* and *The Biology of Population Growth*.

Pearson, Karl, English sociologist, was born in England in 1857 and was educated at Cambridge university and in Germany. He was admitted to the bar in 1882 and, in the same year, was appointed professor of geometry at the University of London. In 1885, he became professor of applied mathematics and mechanics and, in 1911, was made professor of national eugenics.

Pearson has won an authoritative place in the field of eugenics by his researches and publications. Among the latter are *The Ethic of Free-thought*, *The Grammar of Science*, and *National Life from the Standpoint of Science*.

Pearson, Raymond Allen, American educator and agriculturist, was born at Evansville, Ill., 1873, and was educated at Cornell university, where he specialized in agricultural science. He was appointed in 1903 professor of dairying at Cornell university. He was commissioner of agriculture for New York State from 1908 to 1912, president of the Iowa State college of agriculture and mechanical science until 1926, and then became president of the University of Maryland. During the war emergency of 1917-18, he acted as assistant secretary of agriculture. His many bulletins on agricultural subjects have won him a prominent place in the field of agricultural education and science.

Pearsons, Daniel Kimball, American philanthropist, was born at Bradford, Vt., 1820. He graduated in medicine at Woodstock, Vt., and practiced in Chicopee, Mass., until 1857. He then became a farmer at Hinsdale, Ill., but, in 1860, removed to Chicago, where he accumulated a large fortune in real estate. He became widely known for his interest in the smaller colleges of the South and West. By requiring in each instance that a larger sum be secured from other sources, he aided more than 40 colleges, the sums donated amounting to about $4,000,000. Died, 1912.

Peary, Robert Edwin, American arctic explorer and discoverer of the north pole, was born at Cresson, Pa., 1856. He graduated at Bowdoin, 1877; entered the United States navy as a civil engineer in 1881; was assistant engineer for the Nicaragua ship canal, 1884-85; and was engineer in charge of the Nicaragua canal surveys, 1887-88.

In 1886, he made a reconnaissance of the Greenland inland ice cap. He was chief of the arctic expedition of the academy of natural sciences of Philadelphia which, in 1891-92, sailed to the northeast angle of Greenland, and he discovered and named Melville land and Heilprin land, lying beyond Greenland. He made another arctic voyage in 1893–95, when he discovered the famous Eskimo meteorites near Melville bay. These were later removed to the American museum of natural history, New York. One of them, the largest known meteorite, weighs 90 tons.

Peary made many other voyages to the Arctic Ocean, continuing his explorations and ethnographic studies. In 1902, he made his first attempt to reach the north pole, attaining lat. 84° 17′ north. In the summer of 1905, he reached 87° 6′—a new "farthest north." On July 6, 1908, he left New York in the steamer *Roosevelt* on his final voyage. Establishing winter quarters at Cape Sheridan, he made preparations for the northward journey over the ice pack. On March 1 following, he set out from Cape Columbia over the frozen ocean and, on April 7, 1909, reached the north pole. In honor of this achievement, he received the thanks of Congress and was promoted to the rank of rear admiral. His writings include *Northward Over the Great Ice*, *Snowland Folk*, *Nearest the Pole*, and *The North Pole*. Died, 1920. See *Polar Exploration*.

Pedro I (*pē'drō*; *pā'drō*), emperor of Brazil, the second son of John VI of Portugal, was born in 1798. At the time of Napoleon's invasion of Portugal, he was taken to Brazil by his parents and became prince regent of Brazil on his father's return to Portugal, 1821. He declared the independence of Brazil and was crowned as Pedro I in 1822. The new empire did not prove successful under his rule, and, in 1831, Pedro abdicated and withdrew to Portugal, the throne of which he secured for his daughter. Died, 1834.

Pedro II, or **Dom Pedro de Alcantara,** son of Pedro I, was born in 1825. Upon his father's abdication, the son was declared emperor of Brazil at the age of five years. He was crowned in 1841. He was distinguished by his love of learning and his wide culture, and he gave the country an enlightened and progressive administration. In 1871, a law was passed providing for the gradual abolition of slavery and, in 1888, the immediate emancipation of slaves was decided upon. The result was a revolt of the Republican party supported by the rich planters. Pedro was forced to abdicate and a republic was established in 1889. The deposed emperor spent the remainder of his life in France, dying at Paris in 1891.

Peel, Sir Robert, English statesman, was born near Bury, Lancashire, 1788. He graduated at Oxford in 1808 and entered Parliament as a Tory in the following year.

In 1810, Peel was appointed undersecretary for the colonies; from 1812 to 1818, was secretary for Ireland; and, in 1821, became home secretary. In 1829, he sponsored a bill relieving Catholics of disabilities due to their religion. This bill was carried in spite of the fact that Canning, the head of the government, strongly opposed it.

He was premier for a short time in 1834-35. In 1841, he came into power again as a result of a victory of his party's protectionist policy over free trade. He carried legislation revising the tariff and introduced an income tax. The famine in Ireland in 1845 increased the popular pressure in favor of the free admission of grain, a policy which was supported by the Liberal party. Peel yielded, and the so-called Corn laws were repealed. This action caused the temporary disruption of the Conservative party, and Peel retired from office in 1846. He continued to lead a group in Parliament which gave a general support to the Liberal party.

Peel was a statesman of great integrity, a master of finance, and a fluent speaker. He was slow in forming his convictions, but was conscientious in acting on them. Died in 1850 as the result of a fall from his horse. See *Corn Laws*.

Peirce, Benjamin, American mathematician and astronomer, was born at Salem, Mass., 1809. In 1829, he graduated at Harvard, where he became professor of mathematics, 1833, and was professor of mathematics and astronomy from 1842 until his death. He was superintendent of the United States coast survey, 1867–74. His papers on Saturn's rings and his other scientific contributions entitle him to high rank among American mathematicians. Died, 1880.

Peirce, Cyrus, American educator, was born in 1790. He graduated from Harvard in 1810; studied for the ministry; and was pastor for eight years. He then taught several years at Andover and at Nantucket. In 1839, he was chosen by Horace Mann as principal of the newly organized state normal school at Lexington, now Framingham, Mass. This institution was the first state normal school in the United States. Only three students enrolled at

the opening of this school, but the earnestness and the skill of the principal soon established confidence and attracted students. Died, 1859.

Pelopidas (*pĕ-lŏp'ĭ-dăs*), Theban general and patriot, flourished in the first part of the 4th century B. C. He was a fast friend of the Theban statesman Epaminondas, whom he aided in a military capacity throughout the period of the Theban struggle against Sparta.

In 382 B. C., Pelopidas was driven from Thebes by the Spartans and was forced to seek refuge at Athens, whence he returned secretly with a few associates, 379, and recovered possession of the citadel, with his own hand slaying the Spartan leader Leontiades. His "sacred band" of Theban youth largely contributed to the victory of Epaminondas at Leuctra, in 371, but failed in a subsequent attack on Sparta itself. In 364, he won the battle of Cynoscephalæ, but was himself killed.

Pendleton, Ellen Fitz, American educator, was born at Westerly, R. I., in 1864. She was educated at Wellesley college and Newnham college, Cambridge university. In 1886, she was appointed as tutor in mathematics at Wellesley college, where she was made dean and associate professor of mathematics in 1901 and president of the college in 1911. She has received honorary degrees from Brown university and Mount Holyoke college.

Penn, William, founder of Pennsylvania, was born in London, 1644. He studied at Oxford; early gave evidence of strong religious impulses; and adopted the new doctrines of the Society of Friends. His excessive zeal led to his expulsion from the university and a consequent estrangement from his father. In 1668, he was arrested for attending religious meetings forbidden by law and was tried before the court of common pleas and heavily fined. He remained in prison for some time, refusing to pay the fine, but his father ultimately paid it for him.

In 1681, Penn, who had inherited from his father a claim of £16,000 against the government, obtained from the king in satisfaction therefor a grant of an extensive tract of country lying west of the Delaware river and north of Maryland and which, in the royal patent, was called Pennsylvania. This territory Penn resolved to form into a commonwealth based upon perfect religious toleration. He accordingly set sail thither, arriving in Delaware bay on October 27, 1682, and founded the city of Philadelphia. In 1683, he entered into his famous treaty of lasting friendship with the Indians.

In 1684, he returned to England, where, by his influence with James II, he secured the release of 1200 imprisoned Quakers. After the accession of the prince of Orange as William III, Penn was twice accused of treason and was arrested in 1690 on a charge of conspiracy, but was at length honorably acquitted in 1693. In 1699, he paid a second visit to Pennsylvania and his stay, which lasted two years, was marked by many useful measures. Died, 1718.

Pennell (*pĕn'ĕl*), **Joseph,** American etcher, illustrator, and author, was born of Quaker parentage in Philadelphia, 1860. He attended art schools in his native city and studied etching under S. J. Ferris. In 1884, he went to Europe and thereafter lived chiefly in London.

Pennell was greatly influenced by Whistler, but developed a strongly original style and became the most widely known of all American graphic artists. His art is simple and direct, and he excels in grasping the artistic possibilities of his subjects, which are chiefly landscape and architectural. He is represented by etchings, drawings, and lithographs in the leading art collections of Europe and America. He also illustrated a large number of books.

His written works include *A Canterbury Pilgrimage, Our Journey to the Hebrides, The Stream of Pleasure, Modern Illustration, The Alhambra, Lithography and Lithographers, The Glory of Greece,* and, jointly with his wife, *The Life of James McNeill Whistler.* He was elected to the American academy of arts and letters in 1921. Died, 1926.

Penniman, Josiah Harmon, American educator, was born at Concord, Mass., in 1868. He was graduated at the University of Pennsylvania, where he was appointed professor of English in 1896. He became dean of the faculty in the following year and, in 1911, was chosen as the acting provost of the university, becoming president in 1923. His publications include *The War of the Theatres* and *A Book About the English Bible.*

Pepin (*pĕp'ĭn*) **the Short,** king of the Franks and father of Charlemagne, was born in 714, the second son of Charles Martel. In 751, he deposed Childeric III and founded the Carlovingian dynasty. He was the first Frankish monarch whose election received the sanction of the pope. He conquered the Lombards and gave the pope part of their territory. This gift may be said to have laid the foundation of the temporal power of the popes. Died, 768.

Pepper, George Wharton, American jurist and politician, was born at Philadelphia in 1867 and was educated at the University of Pennsylvania. He was admitted to the bar in 1889 and began to practice law in Philadelphia. He was professor of law in the University of Pennsylvania from 1893 to 1910. In 1922, he was appointed United States senator to fill the unexpired portion of the term of Senator Penrose, deceased, and was elected for a term ending in 1927. Pepper's published works include *The Borderland of Federal and State Decisions, Pleading at Common Law and Under the Codes, The Way,* and *A Voice from the Crowd.*

Pepper, William, American physician and educator, was born at Philadelphia, 1843, and was educated at the University of Pennsylvania, from which he received both a classical and his medical degree. In 1868, he was appointed lecturer in his alma mater; in 1876, was made professor of medicine; and, in 1881, became provost of the university.

During his administration of 13 years, the institution became one of the foremost in America. So great was his devotion to the university that he not only gave his services, but donated many thousand dollars from his own private fortune toward various endowments. He edited important medical works and contributed many valuable papers to medical literature. Died, 1898.

Pepperrell, Sir William, American colonial general, was born at Kittery, Me., 1696. From 1727 until his death, he was a member of the British council for the province of Massachusetts and, after 1730, was also chief justice of the court of common pleas. He commanded a successful expedition against Louisburg in 1745 and was made a baronet in 1746. He was acting governor of Massachusetts, 1756–58, and, in 1759, was made lieutenant general. He published an account of a *Conference with the Penobscot Tribe.* Died, 1759.

Pepys (*pēps; pĕp'ĭs; pĕps*), **Samuel,** English administrator and diarist, was born in 1633. During the reigns of Charles II and James II, 1660–88, he was secretary for the affairs of the navy, a position which he filled with diligence and skill. He wrote *Memoirs of the Royal Navy.* He left to Magdalene college, Cambridge, his large collection of books, manuscripts, and prints, including about 2000 ancient English ballads. His reputation is founded on his famous *Diary,* written from 1660 to 1669, which affords a curious insight into the manners and court life of his day and is one of the most diverting books in the language. Died, 1703.

Pérez Galdós (*pā'rāth gäl-dōs'*), **Benito,** Spanish novelist and dramatist, was born at Las Palmas, Canary islands, 1845. He began the study of law at Madrid, but soon turned his attention to journalism and the writing of fiction. His series of historical romances known as "National Episodes," together with a collection of novels dealing with present day social problems and religious difficulties, extended his fame throughout his own country and later throughout Europe. In extent and in character creation, this work of Galdós rivals that of Balzac. The best known of his romances are *Doña Perfecta, Gloria, La Familia de León Roch, Marianela, Fortunata y Jacinta,* and *Angel Guerra.*

About 1890, Galdós turned his attention to the drama, producing a series of brilliant plays which placed him next in rank to Echegaray among contemporary Spanish writers. The list of his plays includes *Reality, Mad for the Sake of the Family, The Condemned, Will, The Wild Beast, The Grandfather,* and *Love and Science.* Died, 1920. See *Spanish Literature: Contemporary Writers.*

Peri (*pâ'rē*), **Jacopo,** Italian composer, was born in Florence, 1561. He made an attempt to reconstruct the music to the Greek tragedies. This resulted in his development of a new recitative style adapted to dramatic declamation. In 1594, he applied his new method to the composition of *Dafne,* now regarded as the first opera. In 1600, he composed *Euridice,* on a text by the poet Rinuccini. Soon afterward, Caccini produced a composition, using the same text, and claimed the credit for originating the declamatory style, but the priority of Peri's work has been established beyond question. Died, 1633.

Pericles (*pĕr'ĭ-klēz*), Athenian statesman, was born at Athens about 490 B. C. He received a careful education and, when about 26, began to take part in public affairs. He soon gained the leadership of the Democratic party in the state and was elected general for many successive years. Cimon, the head of the Aristocratic party, was ostracized and gradually Pericles attained an unrivaled ascendancy in the affairs of the city.

Pericles made it his aim to create a state which should be unique in history both for the qualities of its citizens and for the achievements of its architects and its other artists and thinkers. To this end, he strengthened the position of Athens at the head of the Athenian empire, preparing her for a war with Sparta which he regarded as inevitable. The wealth accruing from the empire was devoted to the erection of the Parthenon, the Propylæa, and other buildings that converted Athens into the most beautiful city of the ancient world.

In private life, Pericles gathered about himself a coterie of brilliant spirits, including Anaxagoras, Phidias, and Aspasia.

Indictments brought against his friends marked a certain waning of Pericles' influence. This change was due partly to the hardships attendant on the prosecution of the Peloponnesian war, which broke out in 431 B. C. mainly as a result of Pericles' foreign policy. He conducted the war with vigor and skill during the first two years of hostilities but, having been weakened by an attack of the plague in 430 B. C., he died in 429 B. C. See *Pericles, The Age of.*

Périer, Jean Paul Pierre. See *Casimir-Périer.*

Perkin, Sir William Henry, English chemist, was born in London, 1838. He was educated in chemistry at the royal college in London and there became an assistant in chemical investigation and research.

In 1856, he discovered the aniline dye known as Perkin's purple and thereby became the founder of the coal-tar dye industry. He invented a method for the artificial production of madder red, or alizarin; also a process of making coumarin from the Tonka bean and cinnamic acid from benzaldehyde. In recognition of his valuable discoveries, he received the Hofmann medal from Germany, the Lavoisier medal from France, and the Davy medal from the royal society of London. Died, 1907. See *Dyes and Dyeing.*

Perkin, William Henry, English chemist, son of Sir William Henry Perkin, was born at Sudbury, 1860. He was educated at the royal college of science, South Kensington, and at the universities of Wurzburg and Munich. He was professor of chemistry at Heriot-Watt college, Edinburgh, 1887–92, and at Victoria university, Manchester, from 1892 to 1912, when he was made professor of chemistry at Oxford. His scientific work includes extensive researches in alkaloids, camphor, natural coloring matters, and terpenes. In 1912, he succeeded in preparing rubber artificially from isoprene.

Perosi (*pâ-rō'zē*), **Lorenzo,** Italian organist and composer of sacred music, was born in Tortona, 1872. He received his musical education chiefly at the Milan conservatory; completed studies for admission to the priesthood; and was appointed choirmaster at Imola and later at San Marco, Venice. In 1897, he produced a sacred trilogy, *The Passion of Christ,* which gave him a national reputation and resulted in his appointment as conductor of the pontifical choir at the Sistine chapel.

Perrault (*pĕ'rō'*), **Charles,** French poet and critic, was born in Paris, 1628. He was educated for the law, but turned his attention to letters, winning election to the French academy by his verses. Most important of all his many writings are the *Mother Goose Stories,* published in 1697, in which *Sleeping Beauty, Little Red Riding Hood, Cinderella, Bluebeard, Puss in Boots,* and *Tom Thumb,* now comprising an indispensable part of the world's nursery books, were first put into literary form. Died, 1703. See *Bluebeard, Mother Goose.*

Perrin (*pĕ'răN'*), **Jean Baptiste,** French physicist, was born in 1870. He was appointed professor of physical chemistry in the University of Paris and became known for his explanation of the so-called Brownian movement in liquids. He did valuable work also in photosynthesis, or chemical reactions due to light. His discoveries were rewarded by the Nobel prize in physics for 1926.

Perry, Bliss, editor, author, and educator, was born in Williamstown, Mass., 1860. He graduated at Williams in 1881 and studied also at Berlin and Strasbourg universities. He was professor of English at Williams college in 1886–93 and at Princeton in 1893–1900; edited the *Atlantic Monthly,* 1899–1909; and, in 1906, was appointed to the chair of belles-lettres at Harvard, a position formerly filled by Longfellow and by Lowell. He was the general editor of Cambridge editions of the poets besides editing a number of smaller works. His publications include *The Broughton House, The Plated City, The Amateur Spirit, Walt Whitman,* and *The American Mind.* He became a member of the American academy of arts and letters in 1910.

Perry, Matthew Calbraith, American naval officer, a brother of Oliver Hazard Perry, was born at Newport, R. I., in 1794. He entered the naval service in 1809; in 1819, was appointed executive officer of the *Cyane,* which convoyed the pioneer settlers of Liberia to Africa; and later took effective action to extirpate piracy in the West Indies.

In 1833, Perry was stationed at the Brooklyn navy yard, where, under his superintendence, was built the first regular steamship for the United States navy. Its construction and successful operation won for him the name of father of the steam navy. He was made commodore in 1841 and, in 1852, was sent to Japan to induce that country to enter into relations with the countries of the West. Two years later a treaty was concluded with Japan by which an American consul was to be received in one of the Japanese ports. From this time dates the remarkable change in Japanese life due to contact with the West. Perry's visit may thus be regarded as inaugurating a new era in the history of Japan. Died, 1858.

Perry, Oliver Hazard, American naval commander, was born in South Kingston, R. I., 1785. During the war of 1812, he was chosen to fit out a fleet at Presque Isle, now Erie, Pa. After equipping nine vessels, he sailed against the British fleet, comprising six ships, though larger and stronger than those of the Americans. The English so hotly attacked the *Lawrence,* Perry's flagship, that out of 101 men on it only 18 were uninjured. At this juncture, Perry left the *Lawrence* and was rowed to the *Niagara* in a small boat. Resuming the conflict, he gained a splendid victory, taking all the English ships. He sent the following dispatch announcing the result: "We have met the enemy and they are ours. Two ships, two brigs, one schooner, and one sloop." For this service, Congress gave Perry a gold medal and promoted him to the rank of captain. Died, 1819.

Perry, Ralph Barton, American philosopher, was born at Poultney, Vt., 1876, and was educated at Princeton and Harvard universities. He lectured on philosophy in Williams college, 1889–1900; Smith college, 1900–02; and Harvard university, where he was appointed instructor in 1902 and was advanced to a professorship in 1913. He was chosen to deliver the Hyde lectures in French universities in 1921-22.

Perry is known especially as a critic of philosophies of the absolute and an exponent of the so-called new realism. He edited William James's *Essays in Radical Empiricism* and published, among other works, *The Moral Economy, The New Realism, The Free Man and the Soldier,* and *The Plattsburg Movement.*

Pershing, John Joseph, American soldier, was born in Linn county, Mo., 1860. He graduated at Kirksville state normal school, 1880, and at West Point, 1886. He served as lieutenant of cavalry in the Apache Indian campaign in New Mexico and Arizona in 1886 and in the Sioux campaign, 1890-91. He was in Cuba, 1898; saw action in the Philippine Islands, 1899–1903; and, as military attaché, accompanied Kuroki's army in Manchuria in the Russo-Japanese war, 1905. The following year, he was made brigadier general. Later, in the Philippines, he commanded operations against the Moros, resulting in their final defeat at the battle of Bagsag, 1913. In 1916, he was placed in command of the United States troops sent into Mexico in pursuit of Villa and was promoted to the rank of major general.

After the declaration of war against Germany, 1917, he was made commander of the southern division and was selected leader of the first military force sent to France. He was elevated to the permanent rank of general, an honor which he was the fourth American to receive, the others being Washington, Sherman, and Sheridan.

Pershing showed his military capacity in the World War most notably by offering effective resistance to the German offensive at the Marne salient in 1918, by planning and successfully carrying out operations contributing largely to crushing this salient, by the victorious annihilation of the salient at Saint Mihiel, and by the winning of the desperate battle of the Argonne forest. His offer to place his forces at Foch's disposal at a critical moment in the campaign of 1918 greatly served the cause of Allied unity. In 1925-26, he headed a commission for holding a plebiscite in Tacna-Arica to determine its disposition between Chile and Peru. See *Battle of the Hindenburg Line,* page 542c.

Pestalozzi (*pĕs'tä-lôt'sē*), **Johann Heinrich,** Swiss educational reformer, was born at Zurich, 1746. He studied at Zurich; became extremely interested in the problems of education; and, in 1775, established on his estate, Neuhof, a school which was intended to draw its support from popular subscription. This venture proved a financial failure and he gave it up in 1780. With government support, he founded a school for poor children at Stanz in 1798. Later he conducted schools at Burgdorf and Yverdun.

The idea which lay at the basis of his method of intellectual instruction, known as the Pestalozzian system, was that everything should be treated in a concrete way. Objects themselves became, in his hands, the subjects of lessons tending to the development of the powers of observing and reasoning. His special attention, however, was directed to moral and religious training of children as distinct from their mere instruction.

Almost all Pestalozzi's methods are now adopted in the elementary schools of Europe and America, and to no other man has modern primary instruction been so largely indebted. His chief works are *How Gertrude Instructs Her Children* and *Leonard and Gertrude.* Died in 1827. See page 1631c.

Pétain (*pā'tăN'*), **Henri Philippe,** French general, was born in 1857. While widely known on account of his lectures at the Ecole de Guerre, he was in rank only a colonel of infantry at the outbreak of the World War.

For notable services in the French retreat from Charleroi to the Marne, 1914, he was promoted to the rank of general of a division. In the battle of Artois, May 1915, Pétain's corps broke the German front, taking Carency. In the following June, Pétain completed the capture of the so-called Labyrinth. When the Germans carried the outer

works of Verdun, Feb. 21–24. 1916, **Pétain** was chosen to defend the fortress. He reorganized the battered French defenses and defeated the Germans, successfully resisting the greatest and most costly series of attacks ever made on a single position. During the victorious Allied offensive directed by Foch in 1918, Pétain was commander in chief of the French armies. Upon his triumphal entry into Metz, 1918, he was made a marshal of France.

Peter the Great, or **Peter I,** former emperor and civilizer of Russia, was born on June 9, 1672, at Moscow. He became joint czar of Muscovy in 1682 with his half brother Ivan. From Timmermann of Strasbourg, Peter received lessons in military art and mathematics. He afterward had the good fortune to fall under the guidance of Lefort of Geneva, who initiated him into the sciences and arts of civilization and, by showing him how far Muscovy was in these respects behind the rest of Europe, influenced the whole of Peter's future career. By the death of Count Ivan in 1696, he became sole master of the empire and devoted himself vigorously to the task of introducing Western methods and Western culture into Russia.

Campaigns and Policy. Peter's first step was to secure access to the Baltic Sea and the Black Sea in order to build up a commerce with other European nations. He took Azof from the Turks in 1696, thus obtaining an outlet on the Black Sea. He brought from abroad engineers and naval architects to build a fleet, and he visited Holland and England, traveling as a subordinate member of the Russian embassy in order to study shipbuilding and other Western arts. He returned to Russia to suppress a rebellion of the army. This accomplished, he set about reorganizing the army on Western models. He also introduced into Russia printing, systematic taxation, and Occidental habits of dress.

Access to the Baltic Sea was prevented by Sweden, which Peter attacked in 1700. Although he was defeated at Narva, he later appropriated a portion of Ingria, a province of Sweden on the Baltic coast, when the Swedish king Charles XII was occupied elsewhere. Here he laid the foundation of the new capital, Saint Petersburg, now Petrograd. In 1709, Charles XII invaded southern Russia and was defeated at Pultowa. The following year, Peter seized the whole of the Baltic provinces and a portion of Finland. In 1711, he carried on an unsuccessful war with the Turks, losing the port of Azof and the territory belonging to it.

In 1712, Peter carried his arms into Pomerania and Finland, completely subduing the latter province in the next year. In 1716-17, he visited Germany, Holland, and France, and collected books and art treasures. His policy, particularly in the reorganization of the Church, excited intense opposition in conservative circles in Russia. A widespread conspiracy was formed against him in 1718. His eldest son, Alexei, was implicated and, having been condemned to death by Peter, is believed to have died as the result of torture. In 1722, Peter forced the shah of Persia to give up the three Caspian provinces along with the towns of Derbent and Baku.

Achievements. Peter's accomplishments were many. He established a body of 100,000 troops, under a discipline as regular as that of any army in Europe. He built a navy of 40 ships and 200 galleys. He fortified all the chief cities and beautified them. He built an academy for naval affairs and navigation, and also colleges at Moscow, Petrograd, and Kiev for languages, literature, and mathematics. He established schools in the villages for the peasants, a college of physicians and a dispensary at Moscow, an observatory, a repository for natural curiosities, botanical houses, and printing houses. Lastly, he permitted a general liberty of conscience among his people. Died, February 8, 1725.

Peter the Hermit, French monk and preacher, was born at Amiens about the middle of the 11th century. He is said to have made a pilgrimage to the Holy Land about 1093, and, having there witnessed the cruelties inflicted upon the Christians by the Mohammedans, communicated on his return with Pope Urban II, by whom he was authorized to preach the First Crusade for the recovery of Jerusalem from the hands of the Turks. His enthusiasm aroused western Europe to undertake several expeditions, all of which, except the last, were unfortunate; but at length, in 1099, he had the satisfaction of seeing Jerusalem throw open its gates to the victorious crusaders under Godfrey de Bouillon, though he himself had little share in the glory of the victory. His last years were spent in a monastery, which he had founded at Huy. Died, 1115.

Peterson, Sir William, Canadian educator, was born in Edinburgh, Scotland, 1856. He was educated at the universities of Edinburgh, Gottingen, and Oxford. He was assistant professor of humanity in the University of Edinburgh, 1879–82; served as principal of University college, Dundee, 1882–95; and became principal of McGill university in 1895. His publications include *Quintilian's Institutes of Oratory, The Dialogues of Tacitus, The Speech of Cicero for Cluentius, The Cluni MS. of Cicero,* and *Canadian Essays and Addresses.* Died, 1921.

Petrarch (*pē'trärk*), **Francesco,** Italian poet, was born at Arezzo in Tuscany, 1304. He was educated at Avignon, Montpellier, and Bologna. His attentions were early devoted to literature; but it was not until the death of his father, in 1326, that he was allowed to follow his inclination. Having settled at Avignon, he became deeply attached, in 1327, to the beautiful Laura de Noves. After having traveled in the vain attempt to forget his love, he settled at Vaucluse, a romantic spot, where he wrote some of his finest works.

His literary reputation attracted the regard of princes. He was invited to Naples, to Paris, and to Rome, and received the laureate crown in the capitol of the last-named city. Among his warmest friends and patrons was the Colonna family. While he prided himself on his Latin works, his lasting fame rests upon the *Canzoniere* in Italian, which contain the sonnets to the golden-haired Laura. Died, 1374. See *Italian Literature: Early Period.*

Petrie, William Matthew Flinders, English Egyptologist, was born at Charlton, Eng., 1853. He was educated privately and, in 1875–80, was occupied in the study of ancient remains at Stonehenge, Eng. In 1881, he began a long series of investigations and excavations at Giza, Egypt. He discovered the long-lost Greek city of Naucratis and the towns of Am and Daphnæ. After the publication in 1893 of his *Ten Years Diggings in Egypt,* he was made professor of Egyptology in the University of London. In 1894, he was instrumental in establishing a fund for Egyptian research, which made possible, besides other important excavations, that of the site of Memphis. His numerous publications include *Religion and Conscience in Ancient Egypt, The Formation of the Alphabet, Some Sources of Human History,* and *Prehistoric Egypt.*

Pfeffer (*pfĕf'ĕr*), **Wilhelm,** German botanist, was born at Kassel, 1845. He was educated at the universities of Gottingen, Marburg, Wurzburg, and Berlin. He was made professor of botany at Bonn in 1873, at Basel in 1877, at Tubingen in 1878, and at Leipzig in 1887. While his earlier researches were connected with taxonomy and morphology, he soon changed from the study of plant forms to the study of plant functions and, with Sachs, rose to unquestioned pre-eminence in plant physiology. By his work on osmotic pressure, he laid the basis of modern physical chemistry. His *Pflanzenphysiologie,* translated by Ewart in 1905, forms the most comprehensive treatise on plant physiology in the English language. Died, 1920.

Phelps, Elizabeth Stuart. See *Ward, Elizabeth Stuart Phelps.*

Phelps, William Lyon, American scholar and educator, was born at New Haven, Conn., 1865. He was graduated at Yale and at Harvard and, in 1892, was appointed to the faculty of Yale university in the department of English. He was promoted at different times and became Lampson professor of English at Yale in 1901. His numerous publications include *A Dash at the Pole, The Advance of the English Novel, The Twentieth Century Theatre,* and *Essays on Modern Dramatists.* He has also edited many works and has contributed much to periodical literature.

Phidias, Grecian sculptor, is generally supposed to have been born in Athens about 500 B. C. He was the son of Charmides and was descended from a family of artists. He studied art under Hegias at Athens and then under Ageladas of Argos.

Phidias began his career as a painter, but came into prominence as a sculptor upon the rebuilding and adorning of Athens after its destruction by Xerxes. His great works were all executed during the favorable period when Greece was triumphant over her foreign enemies and her people enjoyed liberty at home.

His first public work was probably the statue of Athena (Minerva) at Platæa. The bronze "Athena Promachos," which stood on the Acropolis at Athens, doubtless came soon afterward. Among his other works are the ivory and gold "Minerva" in Pellene, Achaia; the thirteen statues which the Athenians placed as an offering in the temple of Delphi in memory of the victory at Marathon; and the "Lemnian Minerva," presented by the inhabitants of Lemnos to their new Athenian allies. During this period, the sculptor was training his two famous pupils, Alcamenes and Agoracritus.

When Pericles became the virtual ruler of Athens, Phidias received a commission to execute all the more splendid statues that were to be erected, and he was made general superintendent of all works of art under construction in the city. To Phidias we owe the supervision of the glorious Propylæa and Parthenon. His genius is still attested by the sculptures and friezes taken from the Parthenon in modern times and preserved in London under the name of the Elgin marbles.

About 433 B. C., Phidias went to Olympia, where he produced a colossal statue of Zeus (Jupiter Olympus) made of ivory and gold. This statue was considered one of the seven wonders of the ancient world. It served, also, to fix

for all time the material form in which Zeus was represented. A gold and ivory statue of Athena in the Parthenon vies with that of Zeus as the sculptor's most famous work.

On his return to Athens, political passions were running high. The party inimical to Pericles attacked that great statesman through his friends. Phidias was accused of fraud and impiety and was thrown into prison.

Phidias' work is as free as that of Homer himself from any taint of exaggeration, affectation, or false emphasis. With his keen power of ideal majesty, he combined a full technical mastery over every form of plastic art. He was a consummate master in marble, bronze, ivory, gold, or ebony; in sculpture, relief, engraving, chasing, enameling; in colossal statues or the most delicate ornamentation of a fringe or molding. Died about 432 B. C. See *Sculpture*.

Philip II, king of Macedon, father of Alexander the Great, was born at Pella, 382 B. C., and came to the throne in 359. He completed the thorough unification of his kingdom and then speedily entered upon a policy of aggression, his object being to subject all the Grecian states to his rule.

In Thrace, he captured the small town of Crenides, which, under its new name of Philippi, soon acquired great wealth and fame. After capturing all the towns of Chalcidice, the last of which was the city of Olynthus, he made peace with the Thracians and the next year with the Athenians. It was while this siege of Olynthus was in progress that Demosthenes delivered his famous oration *On the Peace*, in which he sought in vain to arouse his countrymen to a sense of their danger.

In 339, the Amphictyonic council, composed of several Grecian states, declared war against the Locrians and, the next year, appointed Philip commander in chief of all their forces. The Athenians, alarmed at his entrance into Greece, formed a league with the Thebans against him; but their united forces were utterly defeated at the battle of Chæronea, 338. Philip was now master of all Greece. In attaining this end, he had shown himself to be possessed of a high degree of astuteness as a soldier and statesman, but the means which he employed were utterly unscrupulous. While he was busily engaged in preparations for war upon the Persian king, he was assassinated in 336 B. C. and was succeeded by his son, Alexander the Great.

Philip II, of France, called Philip Augustus on account of his great abilities and successful administration, was born in 1165. He was crowned king with his father, Louis VII, in 1179 and, on the death of the latter, in 1180, came into full possession of the kingdom. He was one of the greatest monarchs of the Capetian dynasty.

Following the accession of Richard the Lion-hearted to the throne of England in 1189, Philip and he set out together on the Third Crusade. After staying three months in the Holy Land, Philip returned home and waged war against Richard's dominions in France. He conquered Normandy, Anjou, Maine, Poitou, and Touraine and was one of the chief consolidators of the French monarchy. The first charter of the University of Paris was granted in his reign. Died in 1223.

Philip II, king of Spain, son of Charles V, was born in 1527 at Valladolid. After the death of his first wife, Maria of Portugal, he married Mary, the queen of England, in 1554. He spent over a year in England and, in 1556, succeeded his father in the sovereignty of Spain, Sicily, Milan, the Netherlands, Franche Comte, Mexico, and Peru. A league between Henry II of France and the pope was overthrown by Philip, and, on the death of Mary, he married the French princess Isabella and retired to Spain, 1559. Devoting himself to the cause of the Church, Philip determined to crush all opposition to it in his dominions. This policy caused a revolt in the Netherlands, which, after a long struggle, achieved independence in 1579. His great effort to overthrow Protestant England ended in the disaster of the Armada, 1588. He fatally injured Spain by crushing the spirit of liberty, by persecuting the industrious Moors, and by destroying her commerce by heavy taxation. Died in 1598. See *Armada, The*.

Philip, King, sachem of the Wampanoag tribe of Indians, was the son of Massasoit, who, for nearly 30 years, was the stanch ally of the Pilgrim settlers. In 1662, Philip succeeded his elder brother and, for several years, kept the treaties of his father. But at length, goaded by the encroachments of the whites, he formed a confederation of tribes and, in 1675, "King Philip's war" broke out. The Indians surprised and murdered a great many colonists, but were eventually overcome and, in 1676, Philip himself was captured and slain in Rhode Island. See *King Philip's War*.

Philip Neri, Saint, was born of a distinguished family at Florence in 1515. From 1533 to 1537, he studied theology and philosophy in Rome. In 1548, he established the confraternity of the Holy Trinity for aiding the sick and founded a hospice which later became one of the finest at Rome. He entered the priesthood and, in 1574, established the famous congregation of the Oratory, where instruction was given to the uneducated. For their benefit sacred musical entertainments were given in the Oratory and hence were designated by the name oratorio.

At first these entertainments consisted of hymns set to popular tunes, but later Neri introduced sacred dramas with music composed by Palestrina and other leading musicians of Rome. From these musical productions developed the modern form of composition known as oratorio. Philip Neri died in 1595, was beatified in 1615, and was canonized in 1622. The apostle of Rome, as he is called, is the most popular saint of the Roman people.

Phillips, David Graham, American novelist, was born at Madison, Ind., 1867. He graduated at Princeton, 1887, and immediately adopted literature as a profession. He first engaged in journalism, but, after the publication, in 1901, of *The Great God Success*, he devoted himself to writing fiction. His novels, which are largely directed to social and ethical problems of the day, include *The Husband's Story, Old Wives for New, The Hungry Heart, A Woman Ventures, The Social Secretary, The Deluge, The Fortune Hunter, Light-Fingered Gentry, The Worth of a Woman,* and *The Story of Susan Lenox*, the last published posthumously. He was killed by an insane assassin in 1911.

Phillips, Stephen, English poet, was born at Somertown, near Oxford, 1868. He entered Queen's college, Cambridge, in 1886, but, at the end of the first term, joined Benson's company of Shaksperian players. After six years, he left the stage and soon devoted himself entirely to literature.

In 1897, his volume of *Poems* containing "Christ in Hades," "Marpessa," and the fine lines "To Milton, Blind" established his rank as a poet of a high order. This volume was followed by *Paolo and Francesca, Herod, Ulysses, The Sin of David, Nero, The Last Heir, Pietro of Siena*, and *The King*, a series of beautiful poetic dramas which stand unsurpassed in recent English verse. His writings also include *Iole, Lyrics and Dramas, Panama and Other Poems*, and *Armageddon*. Died, 1915. See *Paolo and Francesca*.

Phillips, Wendell, American orator and reformer, was born in Boston, Mass., 1811. He graduated at Harvard in 1831; studied law there; was admitted to the bar in 1834; but soon withdrew from this profession and began the real work of his life.

A remarkably eloquent speech in Faneuil hall in 1837 made him at once the principal orator of the Antislavery party, and thenceforth he was William Lloyd Garrison's loyal and valued ally in the struggle for abolition. He also championed the cause of temperance and woman's rights and advocated the rights of the Indians. As an orator Phillips ranked with Clay, Webster, and Everett, and for effectiveness in the face of hostile audiences his eloquence was unsurpassed. His Faneuil Hall speech has been classed with Patrick Henry's oration at Williamsburg and Lincoln's Gettysburg address. Died, 1884.

Phillpotts (*fil'pŏts*), **Eden,** English novelist, was born at Mount Aboo, India, 1862. He was educated at Plymouth, England; was a clerk in the Sun Fire Insurance Company's office, 1880–90; studied for the stage; but soon adopted literature. In his earlier novels *Lying Prophets* and *Children of the Mist*, he described Devonshire life in the charming manner of Blackmore, with tragic elements resembling Hardy. His later writings include *The Human Boy, Sons of the Morning, The Secret Woman, The Whirlwind, The Virgin in Judgment, Dance of the Months, The Joy of Youth, The Forest on the Hill, The Bronze Venus*, and *Children of Men*.

Phipps, Henry, American steel manufacturer and philanthropist, was born in Philadelphia, 1839. He was educated in the public schools of Allegheny City, now a part of Pittsburgh. He worked as office boy and clerk in Pittsburgh and, within five years, became a partner in a powder distributing agency and in a small iron mill. Later he became associated with Andrew Carnegie in iron and steel manufacture, amassing great wealth and having, next to Carnegie, the largest individual interest in the United States Steel Corporation, of which he was a director. A multimillionaire, he devoted much time and money to artistic and philanthropic undertakings. He contributed $1,000,000 to the University of Pennsylvania for the establishment of Phipps institute and built a psychiatrical clinic for Johns Hopkins hospital, Baltimore. He gave $1,000,000 also to New York City for the construction of tenement houses.

Piccolomini (*pēk'kō-lō'mē-nē*), **Ottavio,** military leader, was born in Italy, 1599. He belonged to an aristocratic Italian family. Serving in the armies of the German emperor, he became one of the distinguished generals in the Thirty Years' war. Wallenstein intrusted him with his secret designs against the emperor. In spite of this, Piccolomini made himself the chief instrument of Wallenstein's overthrow, and, after the latter's assassination in 1634, was rewarded with a portion of his estates. He was defeated by

Torstenson at Leipzig in 1642, but later won successes against the French and the Dutch in the Netherlands. Died, 1656.

Pickering, Edward Charles, American astronomer, was born at Boston, 1846. He graduated at Harvard, 1865. He was instructor in mathematics at Harvard, 1865–67, and professor of physics at the Massachusetts institute of technology from 1867 to 1876, when he was appointed director of the observatory, Harvard.

At the institute of technology he established the first physical laboratory in the United States. Under his administration, the work of the observatory was extended to photometry and photography as applied to astronomical observation. He established also an important astronomical observatory at Arequipa, Peru. His writings include *Elements of Physical Manipulation* and various publications of Harvard College observatory. Died, 1919.

Pickett, George Edward, American soldier, was born at Richmond, Va., 1825. He graduated at West Point, 1846, and entered the army as second lieutenant in the war with Mexico, during which he was brevetted captain for conspicuous bravery. Between 1848 and 1861, he served for the most part on the western frontier.

At the outbreak of the Civil War, Pickett resigned from the United States army and entered the Confederate service. Beginning as colonel in July 1861, he rose to the rank of major general by October 1862. He was engaged in several desperate battles under Lee, but won especial distinction at Gettysburg, July 3, 1863, as the leader of the unsuccessful assault upon which the fate of the Confederacy hung. The point reached by his troops in this charge is marked upon the field of Gettysburg by a granite monument. In the campaign of 1864-65, he made the final stand at Five Forks. Pickett was one of the finest infantry soldiers of the war. Died, 1875.

Pickford, Mary, motion picture actress, was born at Toronto, Ont., in 1893. Her family name was Smith. She made her début on the regular stage at the age of five, but her chief successes have been in motion pictures. She starred in *Tess of the Storm Country*, *Madam Butterfly*, and numerous other pictures that made her the most popular favorite in the early history of the motion picture drama. After her marriage with Douglas Fairbanks in 1920, she became a member of the United Artists' Corporation. As head of her own company, she produced *Coquette* in 1929.

Pierce, Franklin, 14th president of the United States, was born in Hillsboro, N. H., 1804. His father, General Benjamin Pierce, was a soldier in the war for independence and governor of New Hampshire. Franklin Pierce was educated at Bowdoin college, where he formed a lifelong friendship with his biographer, Nathaniel Hawthorne. In 1837, he was elected to the United States Senate, of which he was the youngest member. At the commencement of the Mexican war, he volunteered as a private, but was appointed brigadier general and led his brigade in the battles of Contreras and Churubusco.

In 1852, Pierce was nominated Democratic candidate for the presidency against General Scott, the Whig nominee, and received the votes of all but four states. He appointed an able cabinet and one of the very few that have remained unchanged throughout the administration. The chief events of Pierce's administration were the Kansas-Nebraska bill, specifically repealing the Missouri Compromise; the Gadsden Purchase; the Koszta incident; and commercial treaties with Great Britain and Japan. Died, 1869.

Pike, Zebulon Montgomery, American soldier and explorer, was born in Lamberton, N. J., 1779. At 15, he was cadet in his father's regiment, and was made first lieutenant in 1800. In 1805, he set out from Saint Louis to explore the sources of the Mississippi, returning in 1806. He then immediately began the exploration of the Arkansas river, which he ascended to Pueblo, Colo. He discovered Pike's Peak, which is named in his own honor, and visited the site of the present town of Leadville. He was promoted to the rank of major in 1808, colonel in 1812, and brigadier general in 1813. He died of wounds received in the expedition against York, now Toronto, Ont., 1813.

Piloty (*pē-lō'tē*), **Carl von,** German historical painter, was born at Munich in 1826. In 1874, he became director of the Munich academy, which, as a result of his able instruction, became the foremost art school of Germany. Among his best works are "Death of Cæsar" and "Columbus Discovering America." The Metropolitan museum, New York, contains a replica of his "Triumph of Germanicus" and the original of his only biblical picture, "The Wise and the Foolish Virgins." Died, 1886.

Pilsudski (*pēl-sōōt'skē*), **Joseph,** Polish soldier and statesman, was born near Vilna, Poland, in 1867. He organized the Polish Socialist party which aimed, in part, at the freeing of Poland, then divided among Russia, Austria, and Germany. The Russian government, which had exiled him to Siberia, 1887-92, imprisoned him in 1900. He simulated insanity and escaped through an ingenious plot by his supporters. During the World War, he commanded a brigade in the Austrian army. On Austria's defeat in 1918, he organized the Polish army, with which he maintained the independence of Poland and, in 1920, inflicted a crushing defeat on the Russian armies advancing against Warsaw. He was made chief of state and first marshal of Poland. Prompted by fear of national chaos, he assumed a dictatorship of Poland in 1926.

Pinchot (*pĭn'shō*), **Gifford,** American forester and politician, was born in Simsbury, Conn., 1865. He graduated from Yale in 1889 and studied forestry extensively in Europe. At Biltmore, N. C., he began the first systematic forest work ever done in America. He was chief of the forest service in the United States department of agriculture, 1898–1910. He became professor of forestry at Yale in 1903 and, with his mother and his brother, founded the Pinchot school of forestry at that university. In 1920, Pinchot became commissioner of forestry for Pennsylvania and was governor of the state from 1922 to 1927.

Pinckney (*pĭngk'nĭ*), **Charles Cotesworth,** American statesman, was born at Charleston, S. C., 1746. He fought during the Revolution; assisted in framing the Constitution of the United States; acted as special envoy to France, 1796-97; and was an unsuccessful Federalist candidate for vice president of the United States in 1800 and for president in 1804 and 1808. He is the author of the famous sentiment "Millions for defense, but not one cent for tribute," in answer to Talleyrand's insulting proposal from the French Directory. He died in 1825.

Pindar (*pĭn'dẽr*), Greek lyric poet, was born at Cynoscephalæ, near Thebes, about 522 B. C. He began his career as a poet at an early age. Infused with marked piety and true Homeric spirit, Pindar's work illustrates the spiritual unity of Greek art. Of his many works—which consisted of hymns, poems, odes, songs, dirges, and encomiums on princes—only his *Epinicia*, or *Odes*, have come down to us entire. These odes, commemorating victories in the public games, are characterized by great nobility and splendor of style. Died, 443 B. C.

Pinero (*pĭ-nĕr'ō*), **Sir Arthur Wing,** English dramatist, was born in London, 1855. He was educated in private schools; was an actor from 1874 to 1881; and then became a playwright. He produced a long series of cleverly written plays, including several of the most popular successes of the modern English stage. He excelled in technical construction, and, as a dramatic craftsman, he had no superior among English playwrights of his time. His works include *Dandy Dick*, *Sweet Lavender*, *The Profligate*, *The Cabinet Minister*, *Lady Bountiful*, *The Princess and the Butterfly*, *Iris*, *His House in Order*, *The Thunderbolt*, and *The Enchanted Cottage*.

Pinkerton, Allan, detective, was born in Glasgow, Scotland, 1819. He emigrated to America in 1842 and, in 1850, opened a detective agency in Chicago. He guarded President Lincoln on his inaugural journey to Washington and was authorized to organize the United States secret service, which he conducted until the close of the Civil War. Later his recovery of $700,000 for the Adams Express Company, the arrest of some noted English bank forgers, and the breaking up of the notorious "Molly Maguire" murderers in the coal districts gained him an international reputation. He wrote several books on subjects connected with his work. Died, 1884. His sons carried on his work under the name of the Pinkerton detective agency.

Pisistratus (*pĭ-sĭs'trà-tŭs*), tyrant of Athens, the son of Hippocrates, was born about 612 B. C. He won popularity as a private citizen by his charm of manner and generosity and by the part he took in a successful war with Megara about 570–565 B. C. In the turbulent politics of the time, he adopted the cause of the laborers and seized the government in 560 by means of an artifice. Inflicting wounds on himself, he claimed that his political enemies had done it and asked for a bodyguard to defend him. His fellow citizens voted him a guard, which he armed and used to crush opposition to his government.

Pisistratus was twice expelled, but he regained his power and ruled with mildness and justice. He enforced the laws of Solon, who was his friend and relative; reduced taxation; made provision for the disabled and aged; and greatly extended Athenian influence, notably by occupying the ports controlling navigation to the wheat producing territory about the Black Sea. Pisistratus also encouraged literature and the arts. Died, 527 B. C.

Pitcher, Molly, American heroine of the Revolutionary War, was born probably near Carlisle, Pa., about 1744. Her maiden name was Mary Ludwig. She married John Hayes, an artillerist, and accompanied him in his campaigns.

At the battle of Monmouth, Hayes was shot and his cannon was in imminent danger of capture. Molly took her husband's place and worked the gun against the enemy. According to some accounts, she received a sergeant's commission from General Washington and remained with the army several years. She died in 1823. On the battlefield at

Monmouth, there is a monument commemorating her exploit, and, in 1876, a monument was erected over her grave at Carlisle.

Pitman, Sir Isaac, English educator and inventor of the Pitman system of stenography, was born at Trowbridge, 1813. He became master of a school at Barton on Humber, Lincolnshire, in 1832. In 1837, he published *Stenographic Soundhand*, his first studies of the art which made him famous. A few years later, he issued a second volume, called *Phonography, or Writing by Sound.*

About 1840, Pitman won a prize of £200 offered by the British government for the best method of collecting the proposed "penny postage" on prepaid letters. His suggestion was the use of postage stamps, which have since been universally employed.

In 1843, he founded the phonetic society and soon afterward began the publication of the weekly *Phonetic Journal.* He also published many textbooks. His system was soon extensively introduced into the United States. Died, 1897.

Pitt, William, first earl of Chatham and often referred to as the Elder Pitt, an English statesman, was born in Westminster, 1708. He was educated at Eton and at Trinity college, Oxford. In 1735, he entered Parliament. From the beginning, his oratory made him a leader, and he contributed greatly to Walpole's downfall in 1742. He later became a member of the privy council and, in 1756, was called upon to form a new cabinet, of which the duke of Devonshire was prime minister. Pitt's vigorous war policy brought England successfully through the struggle with France and earned for Pitt the title of the "Great Commoner."

Pitt resigned in 1761, but, five years later, was called upon to form a new cabinet and became Viscount Pitt and earl of Chatham. Ill health forced his retirement in 1768; but he kept up an active interest in public affairs; opposed Lord North's policy of taxing the colonies; and, upon the alliance of the colonies and France, protested, in a last great effort, against the proposal to make peace. At the close of this speech, he fell into the arms of his friends and died a few days later, 1778.

Pitt, William, English statesman, son of William Pitt, the "Great Commoner," and called the Younger Pitt, was born at Hayes, 1759. He was educated at Cambridge; studied for the bar; and entered Parliament in 1781. His first speech, favoring Burke's plan of economical reform, was made in the same year. At the age of 23, he became chancellor of the exchequer and, at 25, was regarded as one of England's most powerful prime ministers. He ruled absolutely over the cabinet and was at once the favorite of the sovereign, of the Parliament, and of the nation.

From this time, the life of Pitt becomes the history of England. For 17 years, he held his great position without a break. The year 1793 saw the beginning of the Anglo-French war. His successful leadership of the government during one of the most trying periods of British history led his admirers to confer on him the title of "the pilot that weathered the storm." His persistent enmity to Napoleon contributed much toward the emperor's final overthrow.

In 1800, Pitt effected the union with Ireland, but, chagrined because the king had frustrated his Catholic Emancipation measures, he resigned office in 1801. In 1804, he again became prime minister. He effected the third great coalition against France, but the defeat of Austria and Russia at Austerlitz proved his deathblow, and he died soon after, in 1806.

Pius IX (Giovanni Maria Mastai-Ferretti), pope, was born at Sinigaglia, Italy, 1792. He was educated at Volterra and Rome; was ordained priest, 1819; was created archbishop of Spoleto, 1827; became cardinal in 1840; and was made pope in 1846.

Shortly after his accession, Pius granted a constitution to the Italian states, but refused to declare war against Austria. After the insurrection at Rome, 1848, he fled to Gaeta, but was restored by French aid two years later. In 1859-60, he lost the greater part of his dominions, but was maintained in Rome by a French garrison. In 1870, the infallibility dogma was promulgated by the ecumenical council held at Rome. In that year, when the French left the city, Rome was declared the capital of Italy and was occupied by the troops of Victor Emmanuel, the pope being held practically a captive in the Vatican. His pontificate was the longest and covers one of the most eventful periods in the history of the papacy. Died, 1878.

Pius X (Giuseppe Melchiorre Sarto), pope, was born at Riese, Treviso, Italy, 1835, the son of a postman. He was educated at Castelfranco and at the diocesan seminary of Padua and was ordained priest, 1858. He officiated nine years as curate at Tombolo; was parish priest of Salzano for nine years; and was made canon and chancellor of the diocese of Treviso in 1875. In 1884, he was appointed bishop of Mantua, and, in 1893, Leo XIII made him a cardinal and patriarch of Venice. His charity and tact brought him unbounded popularity, and he was more than once instrumental in settling serious strikes and labor disputes.

On the death of Leo XIII, 1903, the conclave elected him pope. As priest and bishop, his life had been spent in the pastoral and episcopal service of the Church rather than in the paths of diplomatic and official service and he continued to display deep interest in social questions and in bettering the life of the poor. He was zealous in the reform of church music and in other matters of ecclesiastical discipline. In 1907, he issued an encyclical against the Modernist movement in the Church. Anxiety over the outbreak of the World War probably hastened his death, which occurred on August 20, 1914.

Pius XI (Achille Ratti), pope, was born at Desio, near Milan, Italy, 1857, the son of a weaver. He was educated for the Church, finishing his studies at Rome, where he celebrated his first mass, 1879, and later received the doctorates of theology, philosophy, and canon law. Returning to Milan in 1882, he taught theology and sacred eloquence. In 1888, he became a director, and later prefect, of the famous Ambrosian library at Milan, where he labored many years. He was appointed subprefect, 1910, and, prefect, 1914, of the Vatican library, Rome. At a critical period in the World War, 1918, he was designated apostolic visitor to Poland, and, during the ensuing two years, he performed services of great value. In recognition of these, he was named papal nuncio, 1919, and was appointed titular archbishop of Lepanto, 1920. Succeeding Cardinal Ferrari, he was elevated, July 3, 1921, to the cardinalate as archbishop of Milan. Upon the death of Benedict XV, Cardinal Ratti was elected pope, Feb. 6, 1922.

Pizarro (*pĭ-zär'rō*; Sp., *pē-thär'rō*), **Francisco,** conquerer of Peru, was born at Trujillo, Spain, about 1470. He received little education; entered the army; and, in 1509, embarked with other adventurers for America. Having distinguished himself in Panama, he set out in 1524 by way of the Pacific on a voyage of discovery with another soldier named Almagro; landed on the island of Gallo, on the coast of Peru; and afterward returned to Spain for authority to conquer the country. In 1529, he obtained the royal sanction and, in 1531, set sail from Panama with three ships.

On his arrival at Peru, Pizarro found a civil war raging between the two sons of the emperor, who had just died. The Spaniard saw his opportunity. With overtures of peace he approached the victorious Atahualpa, who had become the reigning Inca, and was admitted into the interior of the country. He then invited Atahualpa to a banquet; had him imprisoned; and commenced a wholesale butchery of his subjects, after which he forced Atahualpa to disclose his treasures and then perfidiously put him to death.

Pizarro's power, by virtue of the mere terror he inspired, was now established and he might have continued to maintain it, had not a contest arisen between him and his old comrade Almagro, whom he put to death. Finally the sons and friends of the latter rose against Pizarro, seized him in his palace at Lima, and executed him, 1541.

Planck, Max, German physicist, was born at Kiel, 1858, and was educated at the universities of Munich and Berlin. He taught at Munich, at Kiel, and later at Berlin, where he became professor of mathematical physics and director of the institute of theoretical physics. Planck won for himself a distinguished place in the history of science by his so-called quantum theory of radiant energy, according to which such energy is "not emitted continuously but in discrete atomic quantities." He received the Nobel prize in physics for 1918. His publications include technical works on thermodynamics and radiation.

Plato, Greek philosopher, was born of noble parents in Ægina, about 429 B. C. His own name was Aristocles, the surname Plato, "Broad," being applied to him as indicative of his broad shoulders. He was of robust constitution and thoroughly trained in gymnastics. His mind was no less carefully cultivated. He made rapid progress in mathematics, mastered all the philosophies of his day, and wrote many poems, most of which he afterward burned.

Association with Socrates. The outstanding fact of his life was his connection with Socrates, in whose society Plato spent the ten years from 409 to 399 B. C. After the trial and execution of his beloved teacher, in 399 B. C., Plato quitted Athens and resolved to keep clear of politics and to give himself wholly to philosophy.

The Academy. He retired first to Megara, where he resided with Euclid. He then visited Cyrene and Egypt, returning to Athens about 395 B. C. Some years later he visited Italy and Sicily. In 387 B. C., he settled at Athens in a small house adjoining the "Academia," one of the principal gymnasiums of the city. Here he founded his school of philosophy, known as the Academy, which attracted pupils from all parts of Greece, among them Aristotle. This school was endowed and became the first university known to history. It flourished for about 900 years, and was finally closed by Justinian in 529 A. D.

Experiences in Sicily. Upon the death of Dionysius the Elder, tyrant of Syracuse, Plato, at the instance of his

friend Dion, again went to Sicily, about 367 B. C., planning to assist the younger Dionysius in establishing a model state. The project failed. A second visit likewise ended in disappointment. These relations with the tyrant of Sicily brought down severe censure on the philosopher. His last years were saddened both by the failure of his hopes and by the reproaches of his enemies.

WRITINGS. Plato was the most Socratic of all the disciples of Socrates. His reverence for his master is shown by the place that he assigned to him in his works, all of which are written in the form of dialogue with Socrates in the leading rôle. The well-known *Phædo*, for example, gives the last conversations of Socrates on the immortality of the soul. The fullest account of Plato's own philosophy and social theories are given in the *Republic*, the *Timæus*, and the *Laws*.

One of the most notable of Plato's doctrines is his theory of ideas. These ideas are not mere concepts of our minds; they are realities of which material objects are copies. His picture of the ideal state in the *Republic* entitles him to be called the first scientific socialist.

INFLUENCE. Plato's writing exercised an inestimable influence on Aristotle, the Stoics, Cicero, Plutarch, the Neoplatonists, the Christian fathers, the earlier scholastics, the philosophy and poetry of the Renaissance in Italy and England, and on the 19th-century revival of historical and philosophical studies in Germany. His influence is rather increasing than diminishing in the higher literature and scholarship of our own time. Died, 347 B. C. See *Educational Reformers*.

Platt, Charles Adam, American painter and landscape architect, was born in New York City, 1861. He studied in art schools of New York and Paris. His early paintings are largely views in New England, smooth in surface and sympathetically handled. These include "Snow" and "Clouds," the latter of which was awarded the Webb prize, offered by the society of American artists. He later turned to landscape architecture and etching. The subjects of his etchings are drawn largely from scenes in Holland and from the life of fishermen. He was elected to the American academy of arts and letters in 1919.

Plautus (*plô'tŭs*), **Titus Maccius,** comic poet of ancient Rome, was born at Sarsina in Umbria about 254 B. C. He early associated himself with actors, and, while employed to turn a baker's hand mill, wrote three plays. From the proceeds of these he was enabled to devote himself to the work of a playwright.

Twenty-one comedies legitimately assigned him are extant, though several are incomplete. They are based on Greek comedies, but the genius of Plautus imparted to them an essentially Roman quality. They present great vivacity, well constructed plots, and humorous, lifelike characters and situations. His Latin is particularly pure and vigorous. He has found noteworthy imitators in Shakspere, Molière, Dryden, Addison, and Lessing. His literary career continued uninterrupted until his death in 184 B. C.

Pletho, Georgius Gemistus, Byzantine humanist and philosopher, was born at Constantinople about 1355 and, after a period of exile spent among the Turks, settled at Mistra, the site of ancient Sparta. There he spent most of his life as a judge. He became known early as a vigorous exponent of the Neoplatonic philosophy, which he adapted into a creed for a religion that he hoped would supersede Christianity and Mohammedanism. On an official visit to Italy in 1438, he lectured and wrote a tract on the works of Plato, thereby arousing a wide interest in this philosopher among the scholars of the West. Died, 1450.

Pliny (*plĭn'ĭ*) **the Elder,** known in Latin as **Gaius Plinius Secundus,** Roman naturalist and encyclopedist, was born probably at Como, Italy, 23 A. D. Of his many works, his famous *Historia Naturalis* is the only one that has come down to us. This comprises 37 books, embracing 20,000 topics collected from about 2000 different volumes. While of little scientific merit, it is a monument of industry and contains much information not available elsewhere. He was an intimate friend of the Roman emperor Vespasian. He was admiral of the fleet when the eruption of Vesuvius in 79 A. D. overwhelmed Herculaneum and Pompeii. He approached this volcano during the eruption partly to rescue victims and partly to investigate the phenomenon, but was overcome by poisonous fumes and perished. See *Biology, History of*.

Pliny the Younger, known in Latin as **Gaius Plinius Cæcilius Secundus,** nephew and adopted son of Pliny the Elder, was born at Como about 61 A. D. He is celebrated chiefly for his *Letters*, of which ten books are extant. In 100, he was appointed consul; he then composed his *Panegyricus*, a eulogy of Trajan, which is also extant. In 111, he was appointed governor of the provinces known as Bithynia and Pontica; in this capacity, he wrote to Trajan, with respect to the Christians in his province, an interesting letter which is one of the earliest historical references to Christianity. The *Letters* of Pliny are remarkable, not only for their elegance, but for the light they throw upon the history of the period in which they were written. Died about 113 A. D.

Plotinus, Neoplatonic philosopher, was born of Roman parents at Lycopolis, Egypt, about 205 A. D. At 28 years of age, he went to Alexandria to study philosophy. For some time he listened unsatisfied to the different lecturers, but, having heard the Platonic philosopher Ammonius Saccas, he zealously embraced his teachings and subsequently elaborated them. He set out in 242 to visit Persia and India, but was compelled by circumstances to turn back to Antioch, whence he went to Rome in 244. There he spent the remainder of his life lecturing on philosophy to enthusiastic audiences.

Plotinus' system was based mainly on Plato's "theory of ideas," and he taught that from the invisible world of ideas emanate powers which produce, at various stages, pure intelligence, the soul of the world, the souls of men and of animals, and, finally, matter. Man, according to Plotinus, belongs to the world of intelligence and to that of the senses, and the character of his life determines the world to which he will incline the more strongly. The supreme goal of human life is union with pure intelligence and finally with God.

The emperor Gallienus assigned to Plotinus two cities in Italy in which to establish an ideal state to be called Platonopolis and to be modeled after the commonwealth described in Plato's *Republic*. The project was prevented, however, by the interference of courtiers. Plotinus died in the year 270.

Plutarch, Greek moralist and biographer, was born at Chæronea in Bœotia, probably between 45 and 50 A. D. He belonged to a good family and received an excellent preliminary education in Athens under Ammonius of Alexandria. Subsequently, he traveled and accumulated in Egypt vast stores of historical and mythological lore. He acquired the habit of diligently examining public and private records and of carefully writing down his observations.

On his return to Greece, he visited the principal academies, studied the government of Sparta, and collected much historical information from books, statues, medals, inscriptions, and paintings. Plutarch studied in turn the positive sciences and medicine. Apparently, he remained ignorant of nothing connected with the history and development of the philosophic sects known in his time.

His fellow citizens sent him as proconsul to Achaia. This and other public offices that he held give evidence of the high public esteem he enjoyed. During his residence in Rome, he gave courses in philosophy and developed his ideas and doctrines through familiar conversations and discourses.

Later, Plutarch returned to establish himself in his native Chæronea, where he continued to live an extremely public-spirited and laborious life. His renown as a sage had spread through Greece; Athens accorded him the right of citizenship; Corinth and Elis invited him to their great civic feasts; and he was made priest of the oracle of Apollo at Delphi.

Plutarch was a well bred, well read, honorable moralist of the old school. His ethical writings, bearing the Latin title of *Moralia*, are most valuable pictures of antique manners and thoughts; but they are surpassed by the *Parallel Lives*, in which Plutarch made a character study of illustrious Greeks and Romans in pairs, from Theseus to his own age. There were in all 50 lives, of which 14 have been lost.

Plutarch was not a philosopher, for he had no powers of original thought and precision of reasoning; nor was he a historian interested in the evolution of civilization as a whole. He was a moralist, a student of character; and his *Parallel Lives* are pictures of human nature, not narrations of events. This book is one of our best records of antiquity. Died about 125 A. D.

Pocahontas (*pō'kà-hŏn'tàs*), Indian princess, the daughter of Powhatan, an Indian chief of Virginia, was born about 1595.

In 1612, she was enticed aboard a British ship, taken to Jamestown, and held as a hostage for the return of white prisoners. Converted to Christianity, she was baptized in 1613. In the following year, she was married to John Rolfe, with whom, in 1616, she went to England, where she was received as the daughter of an American king.

In a letter to the queen of England, Captain Smith related how Pocahontas, in 1607, saved him from death at the hands of the Indians. It is on account of this dramatic rescue, further elaborated by Captain Smith in his *General Historie*, 1624, that Pocahontas is chiefly known.

Pocahontas died at Gravesend, England, 1617, leaving a son, Thomas Rolfe, who later settled in Virginia. From him several noted Virginia families trace their descent.

Poe, Edgar Allan, American poet, short story writer, and critic, was born in Boston, Mass., 1809. He was adopted by John Allan of Richmond. He entered the University of Virginia in 1826, but left after a term and became a private in the regular army. In 1827, Poe published a

volume of poems, his first attempt in literature, under the title of *Tamerlane and Other Poems*. He entered the military academy at West Point, but was cashiered in 1831.

Thrown now upon his own resources, Poe devoted himself to literature as a profession. In the same year, he published a volume containing the poems "The Valley of Unrest," "The City in the Sea," "Lenore," "To Helen," and "Israfel." In a magazine competition in 1833, he won a prize for the best prose story. This led to his employment in connection with the *Southern Literary Messenger*. In 1837, he removed to New York, where he lived by contributing to the New York *Quarterly Review* and other periodicals. In 1839, he became associate editor of *The Gentleman's Magazine* at Philadelphia and, in 1840, published a collection of his best stories, with the title *Tales of the Grotesque and Arabesque*. The year 1845 was marked by the appearance of his famous poem *The Raven*.

While Poe's criticism was of great importance in his day and while his prose tales have become a part of the world's literature, his poems, which are marked by marvelous fancy and exquisite felicity of language, remain the most distinctive expression of his genius. Died, 1849. He was elected to the American hall of fame in 1910.

Poincaré (*pwăn'kä'rā'*), **Raymond,** French statesman, was born of a distinguished family in Bar le Duc, 1860. He made a brilliant record as a law student in Paris; practiced his profession; wrote articles for political journals; and, at the age of 27, was elected to the Chamber of Deputies. Appointed prime minister in 1912, he became an energetic supporter of the alliance with Russia and of the entente with England. In 1913, he was elected president of France. At the outbreak of the World War, his effective appeals aroused the nation to supreme efforts of patriotism.

On the expiry of his term as president, Poincaré was made president of the reparations commission, from which he subsequently resigned on account of its alleged leniency to Germany. In 1922, he became premier of France and sponsored the policy of the seizure of the Ruhr. Following his defeat at the polls in 1924, the country drifted to the brink of financial ruin. He was called on to head a coalition ministry in 1926 and, by 1928, had placed French finances and credit on a stable basis.

Polk (*pōk*), **James Knox,** 11th president of the United States, was born in North Carolina, 1795. He was educated at the University of North Carolina; was admitted to the bar; and began practice at Columbia, Tenn., in 1820. He was a Democratic member of Congress from Tennessee, 1825–39; was speaker of the House of Representatives, 1835–39; served as governor of Tennessee, 1839–41; and was elected to the presidency in 1844.

The outstanding event of Polk's administration, 1845–49, was the Mexican war, by which the United States acquired Texas, California, and New Mexico. Texas was annexed by Congress just before Polk's inauguration.

During his administration, by a compromise treaty with England, the northern boundary line of Oregon territory—now the state of Washington—was fixed at 49° north latitude despite the fact that his platform in the campaign had promised to carry the line up to 54° 41′, "with or without war with England," which was condensed into the famous watchword "Fifty-four forty or fight." The low tariff act of 1846 was a favorite measure of Polk's, being passed in the Senate by the vote of Vice President Dallas. Other features of Polk's administration were the admission of Wisconsin as a state in 1848; the adoption of the subtreasury system, by which some portion of the government funds is kept in vaults in Washington instead of in banks; the creation of the interior department, its secretary being added to the cabinet of the president; and the establishment of the naval academy at Annapolis. Died, 1849.

Polo, Marco, Italian traveler, was born of a noble family in Venice about 1254. In 1271, he accompanied his father and his uncle to the court of the famous Kublai Khan, Tartar emperor of China, by whom he was received with favor in 1275 and was employed on several embassies as well as being given a territory to rule. After spending many years in the service of the emperor, who was unwilling to part with them, the three Europeans finally obtained permission to accompany an embassy to Persia, whence they proceeded to Venice in 1295, laden with rich presents.

In 1298, Polo was captured by the Genoese and was put in prison. There he dictated to another captive, Rustichello of Pisa, the story of his adventures. This story, later published under the title of *The Book of Marco Polo*, revealed to a wondering Europe the magnificence of the Eastern world. It was one of the most important compilations in the history of geographical discovery. Died, 1324. A golden statue of him, erected in a temple at Soochow, China, still bears witness to his visit to the Orient.

Polybius (*pō-lĭb'ĭ-ŭs*), Greek historian, was born at Megalopolis in Arcadia about 205 B. C. He was educated for a public career and was one of the thousand distinguished Achæans carried as prisoners to Rome, 168, where he remained in exile for about 17 years. While in Rome, he moved in the society of the most distinguished citizens, being a member of the coterie known as the Scipionic circle.

After his return, Polybius undertook numerous journeys into foreign countries and spent the remainder of his life writing his celebrated *History* in 40 books. Of this work, which was a general history of Rome and adjacent countries from 266 to 146 B. C., only the first five books and some fragments remain. It is, apart from the work of Thucydides, the best example in the ancient world of a history which endeavors obstinately to obtain the facts and to learn their causes. His style is one of the earliest examples of the so-called common dialect, that was used in nearly all late Greek compositions. Died about 122 B. C.

Pompey, known in Latin as **Gnæus Pompeius Magnus,** Roman general and statesman, was born, 106 B. C. He was the son of Gnæus Pompeius Strabo, under whom he served in the Italian campaigns. He was an ally of Sulla and aided him in crushing the forces of the Popular leader, Marius. These services won him the title of "The Great." He later obtained credit for suppressing the forces led by Sertorius and by Spartacus and, in 67–66 B. C., cleared the seas of pirates.

The most important of Pompey's foreign military successes were his campaign against Mithridates, which made Pontus a Roman province, and his capture of Jerusalem, which added Syria to the Empire. Shortly after this, he joined the party of Cæsar and formed with him and Crassus the First Triumvirate.

Finding his dominant position threatened by Cæsar's growing influence, Pompey headed a party opposed to Cæsar, who was driven to take up arms against his former ally. The final struggle took place at Pharsalus, 48, when Pompey was defeated and fled to Egypt, hoping for protection. But, by the order of Ptolemy, king of Egypt, a former centurion of the unfortunate general slew Pompey as he was landing. His body was left on the sands and his head was taken to Cæsar, who ordered that the murderer should be put to death.

Ponce de León (*pŏn'thā dā lā-ōn'*), **Juan,** Spanish explorer, was born at San Servas, Leon, about 1460. He accompanied Columbus on his second voyage and, in 1510, began the conquest of Porto Rico, of which he became governor. Having heard of the existence of a fountain which possessed wonderful curative properties, he set out in search of it in 1513 and, on Easter Sunday, discovered and named Florida. On a subsequent expedition to Florida, he was wounded by the Indians and died on the return voyage to Porto Rico, 1521.

Pontiac (*pŏn'tĭ-ăk*), chief of the Ottawa Indians, was born about 1720. At an early age he won distinction fighting in the service of the French, and, at Braddock's defeat in 1755, he is said to have led the warriors of his own tribe.

After the French had surrendered Canada, his hatred of the English prompted him to organize a combined attack upon all the English garrisons and settlements from Pennsylvania to Lake Superior. The attack, which was made early in May 1763, was in most places successful; but, at Detroit, where Pontiac led in person, the English commander was forewarned, and a five months' siege ensued. Pontiac resorted to every means known to savages to reduce the place, but was unsuccessful. Peace was finally made in 1766, Pontiac being forced to submit to British rule. He was killed at Cahokia, Ill., 1769.

Pontoppidan (*pŏn-tŏp'ĭ-thăn*), **Henrik,** Danish novelist, was born in Fredericia, 1857. He was educated at the University of Copenhagen. His book of sketches entitled *Clipped Wings*, published in 1881, established his reputation as an outstanding figure among the younger writers of Denmark. He produced many short stories, novels, and plays, of which his *Promised Land* trilogy, a study of Danish rustic life, is the most important. With Karl Gjellerup, he was awarded the Nobel prize in literature for the year 1917.

Poole, Ernest, American author and journalist, was born at Chicago in 1880. He was educated at Princeton university and, from 1902 to 1905, lived at the university settlement in New York. He entered journalism and became a correspondent for different magazines, treating of affairs in the United States, Germany, France, and Russia, mainly from a sociological point of view. His publications include *None so Blind*, *The Harbor*, *His Second Wife*, *Beggars' Gold*, and *The Dark Moon*.

Pope, Alexander, English poet, was born in London, 1688. His father was a prosperous linen draper. Pope was of small frame and of delicate constitution. The groundwork of learning he acquired at two private schools and from two priests who were his tutors; his further education resulted from his own persevering efforts.

Pope was a poet almost from infancy. His pastorals and some translations appeared in Tonson's *Miscellanies* in 1709. These were soon followed by the *Essay on Criticism*

and *Rape of the Lock*. From 1715 to 1726, he was engaged chiefly on his translations of the *Iliad* and the *Odyssey*. In 1728-29, he published his greatest satire, the *Dunciad*, an attack on all poetasters and pretended wits. Of his many productions, the most widely known is the *Essay on Man*.

Pope's rank as a poet has been variously estimated. To his contemporaries, among whom perfection of form was highly regarded, he was considered the greatest English poet. The romanticists, however, who value sincerity of sentiment most highly, are inclined to deny him all recognition as a poet. Died, 1744.

Pope, John Russell, American architect, was born in New York City, 1874. He was educated at the College of the City of New York and Columbia university. In 1895, he was a fellow of the American academy in Rome and studied later at the school of fine arts, Paris. He began practice in New York in 1900. Among the monuments of Pope's architectural skill are the Scottish Rite temple, Washington; the MacDonough memorial, Plattsburg; the Lincoln memorial, at Hodgenville; the Richmond, Va., terminal station; and many fine residences. He was elected to the American academy of arts and letters in 1927.

Porter, David Dixon, American admiral, was born at Chester, Pa., 1813. He entered the navy as midshipman in 1829. From 1836 to 1841, he was employed in the coast survey of the United States and held various other appointments until the outbreak of the Civil War.

Porter was then made commander of the sloop of war *Powhatan*; distinguished himself in the capture of New Orleans; and commanded the gunboat and mortar flotilla which co-operated with the squadron of Admiral Farragut in the first attack on Vicksburg. In the fall of 1862, as acting rear admiral, he was placed in command of all the naval forces on the river above New Orleans. At the termination of the war, he was appointed superintendent of the United States naval academy, Annapolis. He was made vice admiral in 1866 and admiral in 1870. Died in 1891.

Porter, Gene Stratton, American novelist and ornithologist, was born in Wabash county, Ind., 1868. She was privately educated and, in 1886, married Charles Darwin Porter. After working as editor of the camera department of *Recreation*, as member of the editorial staff of *Outing*, and as specialist in natural-history photography, she devoted her attention chiefly to writing. In her novels, some of which attained great popularity, she reveals a remarkably intimate knowledge of the plant and the bird life of her region. Her works include *The Song of the Cardinal*, *What I Have Done with Birds*, *At the Foot of the Rainbow*, *A Girl of the Limberlost*, *Friends in Feathers*, *Music of the Wild*, *Laddie*, *Homing with the Birds*, and a book of poems entitled *The Fire Bird*. Died, 1924.

Porter, Jane, English novelist, was born in Durham, 1776. She was educated in Edinburgh.

Her first work, *Thaddeus of Warsaw*, published in 1803, was immensely popular, bringing her the personal congratulations of Kosciusko. *Scottish Chiefs*, a historical romance dealing with the heroic times of Bruce and Wallace, established her fame throughout Europe. With her sister Anna Maria, she wrote *Tales Round a Winter Hearth* and *The Field of Forty Footsteps*. Her later novels include *The Pastor's Fireside*, *Coming Out*, and *Sir Edward Seaward's Diary*. She died in 1850.

Porter, William Sydney, commonly known by the pen name "O. Henry," American short story writer, was born in Greensboro, N. C., 1862. He spent his early life as a wandering journalist, finally settling in New York in 1901. His most notable work is found in tales of shop girls, office boys, clerks, tramps, and the floating and outcast life of New York City.

Porter was an exceedingly prolific author with a remarkable gift of story telling. While his works exhibit numerous defects of style, he ranks among the foremost modern American short story writers. The list of his books includes *The Trimmed Lamp and Other Stories*, *The Gentle Grafter*, *The Voice of the City*, *Strictly Business*, *Two Women*, *Let Me Feel Your Pulse*, *Cabbages and Kings*, and *Rolling Stones*. He died in 1910. See *Gifts of the Magi*.

Post, George Browne, American architect, was born in New York City, 1837. He graduated in civil engineering at New York university, 1858, and studied architecture under Richard Morris Hunt. Enlisting as a volunteer in the Civil War, he rose to the rank of colonel. In 1865, he began the practice of his profession in New York.

With Hunt, Mead, McKim, and Richardson, he became prominent in the notable revival and advance of American architecture between 1875 and 1890. Among the important structures designed by him were the original Equitable and Western Union buildings, the buildings of the College of the City of New York, and the Cornelius Vanderbilt residence, in New York; the Prudential building in Newark, N. J.; the Liberal Arts building at the Chicago Columbian exposition; and the Wisconsin State capitol. He was elected to the American academy of arts and letters in 1911. Died, 1913.

Post, Guy Bates, American actor, was born at Seattle, Wash., in 1875, of English and French ancestry. He studied law in the University of Washington. His first appearance on the stage was in 1893, when he acted a rôle in *Charlotte Corday*. He subsequently appeared in *She Stoops to Conquer*, and, with Otis Skinner, in various Shaksperian plays. Other plays in which he took prominent rôles were *The Virginian*, *The Bird of Paradise*, *Omar the Tentmaker*, and *The Masquerader*.

Potter, Henry Codman, American Protestant Episcopal prelate, was born at Schenectady, N. Y., 1835. He graduated at the theological seminary of Virginia, 1857. He was pastor of Christ church, Greensburg, Pa., 1857-58, and of Saint John's church, Troy, N. Y., 1859-66. In 1868, he became rector of Grace church, New York, and was made bishop of New York in 1887.

While at Grace church he promoted many institutional activities. He was one of the founders of the national civic federation and, through his efforts, the great cathedral of Saint John the Divine on Morningside Heights, New York, was designed and begun. His writings include *Thirty Years Reviewed*, *The Religion for To-day*, *The Gates of the East*, *The Scholar and the State*, *The Industrial Situation*, and *Law and Loyalty*. Died, 1908.

Potter, Paul, Dutch painter, was born at Enkhuizen in 1625. His best pictures are pastoral scenes with animal figures, the life-size "Young Bull" being especially celebrated. His "Dairy Farm" was sold in London in 1890 for £6090. The Rijks museum at Amsterdam possesses his widely known "Bear Hunt." His pictures of animals and landscapes show great power and truth and his etchings also are excellent. Died, 1654.

Pound, Roscoe, American jurist, was born at Lincoln, Nebr., 1870. He was educated at the University of Nebraska and Harvard university. He was admitted to the bar in 1890 and practiced at Lincoln, Nebr., until 1901, when he became assistant professor of law at the University of Nebraska. After acting as dean of the law department there from 1903 to 1907, he served successively as professor of law at Northwestern university, the University of Chicago, and Harvard university, becoming dean of the Harvard law school in 1916. Besides a botanical work, *Phytogeography of Nebraska*, written with F. E. Clements, Pound's publications include *Readings on the History and System of the Common Law*, *Readings on Roman Law*, *Lectures on the Philosophy of Freemasonry*, and *The Spirit of the Common Law*.

Powell, John Wesley, American geologist, was born at Mount Morris, N. Y., 1834. He attended Oberlin college, 1857-58, and became interested in natural science. He enlisted as a private in the Civil War; rose to the rank of major; and lost his right arm at the battle of Shiloh.

In 1865, Powell became professor of geology at Illinois Wesleyan university and, in 1867, made his first journey of exploration to the Colorado Rockies. In 1869, he made a voyage of great danger and hardship through the grand canyon of the Colorado river, the valuable results of which brought him into scientific prominence. Congress voted him funds to continue explorations, and, 1871-73, he made a second voyage down the Colorado river, surveying an area of 100,000 square miles. Largely upon his recommendation, Congress established, in 1879, the United States geological survey, of which he was director from 1881 until 1894.

His writings include *Exploration of the Colorado River*, *Geology of the Uinta Mountains*, *Introduction to the Study of Indian Languages*, *Studies in Sociology*, and *Truth and Error*. Died, 1902.

Powell, Maud, American violinist, was born in Peru, Ill., 1868. She studied music in Chicago and later at Leipzig, Paris, and Berlin. She made her first public appearance, with notable success, in a concert in Berlin, 1885. On her return to the United States, she met with immediate recognition and was a soloist with leading orchestras. She made numerous tours in England and on the continent and also visited South Africa.

Her efforts were indefatigable in making the world's best violin music familiar to American audiences, before whom she appeared for many successive seasons following the year 1903. In 1904 she was married to H. Godfrey Turner of London. Died, 1920.

Powers, Hiram, American sculptor, was born at Woodstock, Vt., 1805. In early youth, he was apprenticed to a clockmaker in Cincinnati; was later taught by a German sculptor to model in plaster; and was employed for several years in making wax figures for a dime museum. In 1835, he went to Washington, where he executed busts of the most distinguished persons of the day. In 1837, he established his residence in Florence, Italy, where he passed the remainder of his life.

In 1838, Powers produced his statue "Eve," which excited the admiration of Thorvaldsen, and, in 1843, the still more popular "Greek Slave." He produced also "The



AMERICAN ARCHITECTS AND ENGINEERS

John Merven Carrère
Richard Morris Hunt
Charles Bulfinch

George Washington Goethals
Henry Hobson Richardson
John Augustus Roebling

Charles Follen McKim
Thomas Ustick Walter
Cass Gilbert



AMERICAN INVENTORS

Elias Howe
Ottmar Mergenthaler
Eli Whitney

John Ericsson
Samuel Finley Breese Morse
Wilbur Wright

Cyrus Hall McCormick
Alexander Graham Bell
Glenn Curtiss

Fisher Boy," "Proserpine," "California," "America," and "Eve Disconsolate." Died, 1873.

Praxiteles (*prăk-sĭt'ê-lēz*), Greek sculptor, a citizen of Athens, flourished in the 4th century B. C. He executed statues in both bronze and marble and was unrivaled in his treatment of the beauties of the human figure. His statues of gods are less august than those by earlier Greek sculptors, but they present a finer and more human type.

The most celebrated work of Praxiteles is the marble Aphrodite of Cnidus, which Pliny called the finest statue in the world. He is known also for his satyrs, one of which has been made familiar to readers of English by Hawthorne's *Marble Faun*. He executed famous statues of Eros and Apollo, which have perished. His statue of Hermes of Olympia was found during the excavation of the Heræum at Olympia in 1877. The dates of his birth and death are unknown. See page 1588.

Pregl, Fritz, Austrian chemist, was born at Laibach (now in Jugoslavia) in 1869. As professor of medical chemistry at the University of Graz, he conducted extensive research in the microanalysis of organic matter, and his discoveries in this field were crowned by the award of the Nobel prize for chemistry in 1923.

Prescott, William Hickling, American historian, was born at Salem, Mass., 1796. During his college course at Harvard, he accidentally lost the sight of an eye, the other being so seriously affected that he was nearly blind. He was then sent abroad for his health, traveling in England, France, and Italy. On his return to America, he gave his attention to literature and, in 1825, selected materials for his *History of Ferdinand and Isabella*, which appeared in 1837. He next devoted six years to the *History of the Conquest of Mexico* and four years to the *Conquest of Peru*. He left his *History of Philip II* unfinished. Prescott's histories rank high as literature and have become household classics. Died, 1859.

Priestley, Joseph, English chemist and clergyman, was born at Fieldhead in 1733. He was educated at Daventry and was subsequently pastor to various congregations. In 1774, he announced his notable discovery of oxygen. In 1780, he settled at Birmingham and proceeded actively with his researches; became the associate of Boulton, Watt, and Erasmus Darwin, grandfather of Charles Darwin; and was also pastor of a Unitarian congregation.

In 1791, Priestley's fortunes changed. His religious principles and his avowed partiality to the French Revolution excited the hatred of the High Church and Tory party, and, in the riots of July in that year, his house, library, manuscripts, and apparatus were committed to the flames. Conceiving himself to be insecure from popular rage, he embarked for America in 1794, settling at Northumberland, Pa. His writings include more than 130 separate works, covering a vast range of subjects. Died, 1804.

Pritchett, Henry Smith, American astronomer and educator, was born at Fayette, Mo., 1857. He graduated at Pritchett college, Glasgow, Mo., 1875; studied astronomy under Asaph Hall at Washington, 1876; and became assistant astronomer in the United States naval observatory, 1878. He was made astronomer of Morrison observatory, Glasgow, Mo., 1880; was sent to New Zealand to observe the transit of Venus, 1882; and was professor of astronomy at Washington university, Saint Louis, 1883–97. He became superintendent of the United States coast and geodetic survey in 1897, acting until 1900, when he was chosen president of the Massachusetts institute of technology. In 1906, he became president of the Carnegie foundation for the advancement of teaching.

Protagoras (*prō-tăg'ô-răs*), Greek educator and philosopher, was born at Abdera, Thrace, about 485 B. C. He settled in Athens and gained a reputation as a teacher of literature, sociology, and philosophy. He was the first to call himself a sophist, and he made a considerable amount of money by offering courses in general culture. He was a friend of the statesman Pericles.

As a philosopher, Protagoras is often regarded as the forerunner of pragmatism. In his famous saying "Man is the measure of all things," he crystallized his doctrine, developed in his *Truth*, that all things actually are only what they appear to each person. He wrote a work also entitled *On the Gods*. It expressed doubt regarding the existence of divinities and led to its author's banishment from Athens. Protagoras is credited with being the first to systematize grammar and to distinguish the parts of speech, the tenses, and the modes. Perished at sea about 411 B. C.

Przhevalski (*pzhĕ-vāl'y'skē*), **Nikolai Mikhallovitch,** Russian explorer, was born at Kimbrovo, 1839. He was educated at Smolensk and Petrograd. During 1870–73, he made his first important journey to the west central part of China, giving the results in his *Travels in Mongolia*. In his second journey, 1876-77, described in his book *From Kulja across the Tian-Shan to Lob-nor*, he rediscovered the large lake Lobnor, until then unvisited by Europeans since the time of Marco Polo. In his third journey, he explored the sources of the Hwang and eastern Tibet, and, on his fourth, he crossed the great desert of Gobi, locating the watershed between the Hwang and Yangtze rivers.

During these explorations, he secured valuable collections of animals and plants and made many remarkable discoveries, including the wild camel and a true wild horse, now known as Przhevalski's horse. Died, 1888.

Ptolemy (*tŏl'ê-mĭ*), astronomer and geographer, whose proper name is Claudius Ptolemæus, was a native of Egypt and flourished in Alexandria about 139–161. Both as an astronomer and as a geographer, he held supreme sway over the minds of almost all the scientific men from his own time down until about the 15th century.

Ptolemy collected the astronomical learning of the ancient world and, by adding improvements, arrived at the astronomical system which he described in his Greek work known best by its medieval title of the *Almagest*. This system, known as the Ptolemaic system, was superseded by the Copernican system within the past four centuries. Ptolemy's *Geography* contains a calculation of the size of the sphere of the earth, a description of the surface of the earth as then known, a list of places, each located by its latitude and longitude and followed by a brief description with notes on interesting features. See *Astronomy, History of.*

Ptolemy I, king of Egypt, known by his surname Soter "Preserver," was born about 367 B. C. Ptolemy was a Macedonian and acted as one of Alexander's generals in his Eastern campaigns. When Alexander's possessions were divided after his death at Babylon, 323, Egypt fell to Ptolemy.

Wars followed the partition. Ptolemy was a man of energy and valor and not only warded off danger from his own realm, but also extended his dominions by the addition of Phœnicia and made his influence paramount in the Mediterranean Sea. His capital, Alexandria, became the foremost city of the world, and its museum and library, founded by Ptolemy, attracted numerous scholars, making Alexandria a successful rival of Athens as a center of culture. Died, 283 B. C.

Ptolemy II, surnamed Philadelphus, son of Ptolemy I, was born, 309 B. C. His reign, which began in 285 B. C., is remarkable for the successful cultivation of the arts of peace rather than for the practice of war. He carried on the work of his father by enriching the library of Alexandria with all the literary treasures which he could procure.

Tradition alleges that it was by his orders that the Hebrew Scriptures were translated into Greek and that the version called the Septuagint was formed. He is said to have induced Manetho to write, in Greek, a political history of Egypt and an account of the religious tenets of the Egyptians. He expended large amounts on public works and was the builder of a famous lighthouse on the island of Pharos, which became known as one of the seven wonders of the ancient world. Died, 247 B. C.

Puccini (*pōōt-chē'nē*), **Giacomo,** Italian composer, was born at Lucca in 1858. He received his musical education at Lucca and at the conservatory at Milan. Puccini's first opera, *Le Villi*, attracted much notice in Italy. The success of *Manon Lescaut* in 1893 was surpassed in 1896 by that of *La Bohème*, which immediately became favorably known throughout the musical world. In 1904, he won a still greater triumph with *Madama Butterfly*, the libretto of which is based on the novel by J. L. Long. *The Girl of the Golden West*, a typical American subject, was first produced at the Metropolitan opera house in 1910. Puccini is the chief representative of the Italian veristic school and is the most eminent of recent Italian composers. Died, 1924. See *Madame Butterfly*, page 1553.

Pulitzer (*pū'lĭt-sẽr*), **Joseph,** journalist, was born in Budapest, Hungary, 1847, and was educated by private tutors. He came to the United States in 1864 and served until the end of the Civil War in a cavalry regiment with the Union forces. He went to Saint Louis, where, in 1868, he became a reporter and later managing editor and part owner of the *Westliche Post*. In 1878, he bought the Saint Louis *Dispatch*, with which he combined the *Evening Post*.

Having previously served as a member for the Missouri state legislature, he removed to New York and was elected to Congress in 1884 as a Democratic member. He resigned shortly, however, in order to devote himself to editing the New York *World*, which he had acquired in 1883. By appealing to popular taste in his news items and editorials, he built up a circulation unrivaled before the advent of the Hearst papers. In 1903, he endowed with $1,000,000 a school of journalism at Columbia university. He donated funds also for the Pulitzer prizes—$500 to $2000 to be awarded annually for the year's best American novel, play, book of poetry, historical work on the United States, biography, cartoon, editorial, and example of newspaper reporting. Died, 1911.

Pullman, George Mortimer, American inventor, was born in Chautauqua county, N. Y., 1831. For a time he worked as a cabinetmaker and, in 1853, became engaged in

moving buildings which obstructed the widening of the Erie canal. In 1859, he located in Chicago as a building contractor and, in 1863, began constructing the sleeping cars now called by his name throughout the world. A few years later he organized the Pullman Palace Car Company and, in 1880, he founded the town of Pullman, now part of Chicago, where the coaches were built. In 1887, he added the vestibule to his sleeping cars, thereby greatly increasing their comfort. He died in 1897, having amassed a large fortune from his inventions and his various business enterprises.

Pupin (*pū-pēn'*), **Michael Idvorsky,** physicist and electrician, was born in Idvor, Hungary, 1858. He came to America in 1874; graduated at Columbia, 1883; and studied physics and mathematics at Cambridge and at Berlin. In 1901, he was appointed professor of electromechanics at Columbia university. His researches in electrical resonance and wave propagation greatly extended the range of long-distance telephony. He took an active part in aiding Serbia during the World War and organized a corps of Columbia students who served in relief work in the Balkans in 1915. In 1923, he published his autobiography entitled *From Immigrant to Inventor*.

Púshkin (*pōōsh'kĭn*), **Alexander Sergéievitch,** Russian poet, the son of a nobleman, was born at Moscow, 1799. In 1817, he became a government clerk, but, having written an *Ode to Liberty* which offended the emperor, he was banished to southern Russia. In 1825, Emperor Nicholas reinstated him and appointed him to write a history of Peter the Great. His greatest work, *Yevgény Onégin*, is a romance in verse. Among his other writings are *The Gypsies*, *Poltava*, *Dubrovsky*, and a novel entitled *The Captain's Daughter*. His drama *Boris Godounov* was used as the basis of Mussorgsky's noted opera. Púshkin ranks as the foremost poet of Russia. He was killed in a duel at Petrograd, 1837.

Putnam, Israel, American soldier, was born at Danvers, Mass., 1718. Removing to Pomfret, Conn., he became a farmer and woolgrower. In 1755, he helped to repel a French invasion of New York and was present at the battle of Lake George. In 1758, he was captured by a force of French and Indians and narrowly escaped death. He was later exchanged. In 1762, he served as colonel in the West Indian campaign and, in 1764, aided in the relief of Detroit, then besieged by Pontiac.

In 1775, after the battle of Concord, Putnam took command of the forces of Connecticut; was at Bunker Hill; held the command at New York; and, in August 1776, fought at Brooklyn Heights, where he was defeated by Howe. In 1777, he was appointed to the defense of the highlands of the Hudson. Died, 1790.

Pyle, Howard, American illustrator and author, was born at Wilmington, Del., 1853. He was educated in private schools and at the art students' league, New York. He became one of the foremost American illustrators, excelling in work for children. Possessing marked literary ability, he often wrote the text for his illustrations. He wrote and illustrated *The Merry Adventures of Robin Hood*, *The Rose of Paradise*, *A Modern Aladdin*, *Men of Iron*, *Twilight Land*, *The Garden Behind the Moon*, *The Champions of the Round Table*, *Stolen Treasure*, and many other stories and articles. Died, 1911.

Pyrrhus (*pĭr'ŭs*), Greek general, king of Epirus, was born about 318 B. C. and came to the throne in 306. He was expelled a few years later, but was restored by the help of Ptolemy Soter in 295; held the kingdom of Macedonia for a short time; and, in 281, went to Italy to help Tarentum against the Romans.

He was at first successful, winning several victories. That at Asculum, in 279 B. C., gave rise to the phrase "Pyrrhic victory," meaning a victory won at great cost. The origin of the phrase is to be found in Pyrrhus's answer to congratulations on his victory, "Another such victory and Pyrrhus is destroyed." After successes against the Carthaginians in Sicily, Pyrrhus was finally defeated by the Romans in 275 B. C.

Pyrrhus is regarded as one of the ablest of Greek generals, being one of the few who ever defeated a Roman army in the field. Returning to Macedonia, he recovered that kingdom, but was killed in 272 B. C.

Pythagoras, (*pĭ-thăg'ô-răs*), Greek philosopher and mathematician, was born probably at Samos about 582 B. C. He is said to have traveled from Persia to Gaul, and even to India, seeking wisdom, and to have resided many years in Egypt.

About 530, he settled at Crotona, in Italy, and established a theosophical sect, the members of which sought release from "the wheel of change" by an ascetic regimen and by mathematical studies. One of its doctrines was the so-called transmigration of souls, according to which the soul resides successively in different bodies of men or other animals. His mathematical interests gave rise to the proof of the geometrical proposition regarding the square upon the hypotenuse of a right-angled triangle and the discovery of the numerical relations between the musical notes. He propounded the theory that the basis of the universe is number and originated the idea of the harmony of the spheres. Died about 500 B. C.

Quayle, William Alfred, American preacher, was born at Parkville, Mo., 1860, and was educated at Baker university. He was ordained to the Methodist Episcopal ministry in 1886, when he was made adjutant professor of Greek at Baker university. Two years later he was made professor and, in 1890, became president of the university. From 1894 to 1908, he held at different times pastorates in Kansas City, Indianapolis, and Chicago. He was made bishop in 1908. His publications include *Poems*, *The Dynamite of God*, and *The Uncommon Common Pace*. Died, 1925.

Quesnay (*kĕ'nĕ'*), **François,** French economist and physician, was born at Mere, France, 1694. He studied medicine at Paris and rose to be first physician to the king. His chief title to fame, however, rests on his essays in political economy. Around him gathered the famous group of economists known as the physiocrats, who insisted on the folly of governmental interference with the operation of economic laws. His views are set forth in *Tableau économique*. Died, 1774. See *Physiocrat*.

Quesnel (*kĕ'nĕl'*), **Pasquier,** French Jansenist theologian, was born in Paris, 1634. He studied at the Sorbonne; in 1662, became director of the Paris congregation of the Oratory; and here began to write his *Réflexions morales* on the New Testament. In 1675, he published an edition of the works of Leo the Great, annotations in which inclined toward the heresy of Gallicanism and led to the book being placed on the list of prohibited works. Having refused to condemn Jansenism, Quesnel fled in 1685 to Brussels, where his *Réflexions* were published, 1687–94. The Jesuits were unceasing in their hostility and Quesnel was flung into prison in 1703, but escaped to Amsterdam. His book was condemned in the bull *Unigenitus* in 1713. Died, 1719.

Quick, John Herbert, American author, was born in Grundy county, Iowa, 1861. He engaged in teaching from 1882 to 1890, becoming principal of a school in Mason City, Iowa. He studied law in the meantime; was admitted to the bar in 1889; and practiced in Sioux City until 1909. He then became associate editor of *La Follette's Weekly* and, later, editor of *Farm and Fireside*; was appointed member of the Federal farm loan bureau in 1916; but resigned this office in 1918. His publications include *Double Trouble*, *American Inland Waterways*, *Yellowstone Nights*, *The Brown Mouse*, and *Vandemark's Folly*. Died, 1925.

Quidde (*kvĭ'dă*), **Ludwig,** German publicist, was born at Bremen in 1858. After an education at the universities of Strasbourg and Gottingen, he spent considerable time in foreign travel before taking the chair of history in Munich university. He wrote *Caligula*, a veiled attack on the kaiser and German imperialism. These he regarded as a menace to international peace, the cause to which he devoted his life's efforts. After a term as member of the Reichstag, he was arrested for treason in 1924, but was acquitted. The Nobel peace prize for 1927 was awarded to him jointly with Ferdinand Buisson of France.

Quiller-Couch (*kwĭl'ĕr-kōōch'*), **Sir Arthur Thomas,** English novelist and essayist, was born in Cornwall, 1863. He graduated at Trinity college, Oxford; was lecturer there in classics, 1886-87; removed to London; and was connected with the *Speaker* until 1899, although in 1891 he returned to Cornwall, where he devoted himself to literary work. In 1912, he was made professor of English literature at Cambridge. His numerous writings include *The Blue Pavilions*, *Poems and Ballads*, *On the Art of Writing*, *A Tale of Troy*, and *On the Art of Reading*.

Quincy, Josiah, American statesman, was born in Boston, Mass., 1772. He graduated at Harvard, 1790; studied law; and entered politics. From 1805 to 1813, he was a member of Congress. He opposed the War of 1812 and was one of the first to denounce the slaveholding interest as a rising and dangerous tyranny. In 1813, he was elected to the Massachusetts State senate, in which he remained until 1820. He was then elected to the state house of representatives, of which he became speaker. He was mayor of Boston, 1823–28, and president of Harvard, 1829–45. He published *History of Harvard University*, *The Municipal History of the Town and City of Boston*, *The Life of John Quincy Adams*, and other works. Died, 1864.

Quinet (*kē'nĕ'*), **Edgar,** French poet, literary historian, and publicist, was born at Bourg, 1803. He studied at Bourg, Lyon, and Heidelberg. He became a contributor to the *Revue des Deux Mondes*, in which *Ahasvérus*, perhaps his finest work, appeared in 1833. After holding the chair of foreign literature at Lyon, 1839–42, he became professor at the Collège de France, where he assailed the Jesuits. Throwing himself into the agitation preceding the revolution of 1848 and seeking to unmask the purposes of Napoleon, he was expelled from France. On the fall of the

Empire, 1870, he returned and was restored to his professorship. His complete works were published in 26 volumes. Died, 1875.

Quintilian (*kwĭn-tĭl'ĭ-ăn*), or **Marcus Fabius Quintilianus,** Latin rhetorician and educator, was born in Spain about 35 A. D. Going to Rome in the train of Galba, he began practice at the bar. However, he achieved fame chiefly as a teacher of rhetoric, in which, for 20 years, he instructed the foremost youth of Rome.

As the first public teacher benefited by the endowment established by the emperor Vespasian, Quintilian received a fixed salary from the government. His famous *Institutes of Oratory*, comprising 12 books, contains all that he considered most valuable in earlier rhetorical treatises, both Greek and Latin. In addition, the work contains the only practical exposition of the whole field of education given by a Roman. It describes the methods of the best Roman schools and for many centuries was a standard textbook for the guidance of teachers. Died about 95 A. D. See *Educational Reformers.*

Rabelais (*răb'ĕ-lā'*), **François,** French humorist and satirist, was born near Chinon about 1490. In 1530, he began the study of medicine at Montpellier; took his degree; and, in 1532, was appointed hospital physician at Lyon, there publishing several works on medical science.

His famous romances, in which are narrated the wonderful adventures of *Gargantua* and *Pantagruel*, rank among the world's masterpieces of humor and grotesque invention. The work abounds in good sense and folly, delicate thoughts and gross obscenities; it is, in effect, a protest, in the interests of humanism, against Christian asceticism and faith and represents a return to nature. It brought him into conflict with the Church, and, on several occasions, he found it prudent to disappear. Died, 1553. See *Gargantua, Pantagruel, Panurge.*

Rachmaninov (*răk-mä'nĕ-nôf'*), **Sergei Vassilievitch,** Russian pianist and composer, was born at Novgorod, Russia, in 1873. He was educated at Petrograd and Moscow and won a gold medal for composition when 19 years of age, touring Russia the same year. He gave performances at London, Vienna, Dresden, and, in 1909 and 1910, in the United States, where he appeared as pianist and as conductor of his own works. For several years following 1912, Rachmaninov was chief conductor of the imperial opera at Petrograd. His operas include *Aleko* and *The Parsimonious Knight.* One of his best-known compositions is the prelude in C-sharp minor.

Racine (*rä'sēn'*), **Jean Baptiste,** French dramatic poet, was born at La Ferte Milon, 1639. He completed his education at the seminary of Port Royal. His first dramatic efforts gave but faint indication of superior talent, but his tragedy *Andromache* placed him above all his contemporaries except Corneille. *Britannicus, Berenice, Iphigenia,* and other tragedies as well as his comedy *The Pleaders* increased his fame; but a base cabal against his *Phædra* caused him to discontinue writing for the stage. After a lapse of 12 years, he wrote the dramas *Esther* and *Athalie,* to be performed at the seminary of Saint Cyr. "A commentator upon Racine," says Voltaire, "has only to write at the bottom of every page, beautiful, pathetic, harmonious, admirable, sublime!" Died, 1699. See *French Literature: The Seventeenth Century.*

Raeburn, Sir Henry, Scottish portrait painter, was born at Stockbridge, 1756. He was apprenticed to a goldsmith, but early devoted himself to art, producing first water-color miniatures and then portraits in oil. At 22, he married the widow of Count Leslie. After studying in Rome, 1785–87, he settled in Edinburgh and soon attained pre-eminence among Scottish artists. His portraits, which are painted in full light, are realistic and intense, resembling in some respects the work of Frans Hals and Velasquez. Died, 1823. See *Painting.*

Raikes (*rāks*), **Robert,** English publisher and philanthropist, was born at Gloucester, 1735. In 1757 he succeeded his father as proprietor of the Gloucester *Journal.* In 1780, he opened at Gloucester the first Sunday school, which was designed to teach poor children to read and understand the Bible. He thus led the way to an institution that has been adopted widely throughout Christendom. Died, 1811.

Raleigh (*rô'lĭ*; *răl'ĭ*), or **Ralegh, Sir Walter,** English courtier, navigator, and man of letters, was born at Budleigh about 1552 and was educated at Oriel college, Oxford. Between 1569 and 1581, he served with distinction in the army of the French Protestants, in the Netherlands, and in Ireland and accompanied his half brother, Sir Humphrey Gilbert, on a voyage to America.

Shortly after his return, he seems to have first attracted the attention of Queen Elizabeth and soon rose high in her favor. In 1585, he fitted out an expedition, which resulted in the discovery and the temporary occupation of Virginia. It was through Raleigh that the potato and tobacco were introduced into England at this time. He held the post of admiral in the great expedition against Cadiz, 1596. With the death of Elizabeth, in 1603, the brilliant and successful portion of his career ended.

From the first, King James regarded him with suspicion and dislike. Accused of complicity in a plot against the king, Raleigh was sentenced to death; but James did not venture to execute him, and Raleigh was sent to the Tower, where, for 13 years, he remained a prisoner. During his imprisonment, he devoted himself to literary and scientific pursuits and wrote his *History of the World.* In 1616, he procured his release and sailed for Guiana. Upon his return, in 1618, he was arrested and executed, nominally by virtue of the former sentence.

Ramée (*rä-mā'*), **Louise de la,** better known as "Ouida," English novelist, was born at Bury Saint Edmunds, 1839. Her father was French and her mother English. She made her literary début in London in 1859 with a short story in the *New Monthly Magazine.* Most of her life after 1860 was spent in Italy. Her first novel, *Held in Bondage,* appeared in 1863.

Ouida was a picturesque and dramatic story-teller, and she enjoyed great popularity. Her descriptions of Italian peasant life and her sympathetic sketches of animals will probably outlast her romances. Two of her stories of childhood, *The Nürnberg Stove* and *A Dog of Flanders,* have become classic. Among her most popular novels and stories are *Idalia, Under Two Flags, Puck, Two Little Wooden Shoes, Moths,* and *Bimbi.* She died in 1908.

Rameses I (*răm'ĕ-sēz*), the first king of the 19th Egyptian dynasty, ruled about 1355 B. C. and maintained the conquests of Egypt as far as Wady Halfa. Rameses II, his grandson, usually called the Great, after defeating the Hittites at Kadesh, formed a peace with them and married a Hittite princess. He subjugated Ethiopia and is known also as the builder of some of the largest of the Egyptian edifices. He had at least 162 children, the names of that number being found on monuments. His name and reputation formed the basis of the legendary Sesostris. His mummy was discovered in 1881 A. D. His son Merenptah is believed to be the Pharaoh of the Exodus.

Ramón y Cajal (*rä-mōn' ē kä-häl'*), **Santiago,** Spanish histologist, was born at Petilla, 1852. He graduated in medicine at the University of Saragossa, 1873, and became professor of anatomy at Valencia, 1881, resigning in 1886 to accept the chair of histology at Barcelona, 1886. He accepted a similar chair at Madrid in 1892. He made extensive researches in the histology of the brain and the nerves, in recognition of which he was awarded, with Camillo Golgi, the Nobel prize for medicine in 1906. His writings include many scientific papers on the subject of his researches.

Ramsay, Sir William, British chemist, was born at Glasgow, 1852. He was educated at Glasgow university and at Tubingen. He was professor of chemistry at University college, Bristol, 1880–87, and at University college, London, 1887–1913. In conjunction with Lord Rayleigh, he discovered argon in 1894 and, in 1895, he obtained helium from cleveite. In 1904, he was awarded the Nobel prize for chemistry. He also discovered other gaseous elements of the air, including neon, xenon, and krypton. His writings include *The Gases of the Atmosphere, Elements and Electrons, Essays Biographical and Chemical,* several textbooks on chemistry, and numerous scientific papers. Died, 1916. See *Argon, Helium.*

Randolph, John, of Roanoke, American orator and statesman, was born in Chesterfield county, Va., 1773. At the age of 26, he was elected a member of Congress and at once became a leader in politics. He was United States senator, 1825–27; member of Congress, 1827–29; United States minister to Russia, 1830; and member of Congress again in 1832. He was conspicuous for his many odd ways and for a wit so sharp that he terrorized in Congress all who opposed him. Randolph prided himself on his descent from Pocahontas, and his marked Indian features bore witness to his origin. Died, 1833. See *Quids.*

Ranke (*räng'kē*), **Leopold von,** German historian, was born at Wiehe, Saxony, 1795. He was educated at Leipzig. At 23, he became head master of the high school at Frankfort on the Oder and devoted his leisure to historical studies. In 1824, he published the *History of the Roman and Germanic Peoples from 1494 to 1535,* thus winning, in 1825, the chair of history at Berlin, which he retained until 1871.

Ranke was the founder of the modern historical school, and his fame rests upon his scientific method of studying history from original sources. He prepared many valuable works on the period of the Reformation. One of his works has been several times translated into English under the title of *History of the Popes.* In his 84th year, he published the first volume of his *History of the World,* writing a volume annually. Probably no man of his time toiled more indefatigably or laid up greater stores of knowledge. Died in 1886.

Rankin, Jeannette, first woman member of the United States Congress, was born on a ranch near Missoula, Mont., 1882. She graduated at the University of Montana; studied music at Seattle; and later pursued a course at the school of philanthropy in New York City. She then continued study at the University of Washington, making special preparation for suffrage work.

When the suffrage amendment was first submitted in Montana, she conducted a campaign throughout the mining camps of the state and appeared before the legislature in behalf of the cause. Later she became president of the state suffrage organization. In 1916, as Republican nominee for representative at large from Montana, she was elected by a substantial majority. In 1918, she failed of renomination.

Raphael (*răf'ă-ĕl*; *rā'fā-ĕl*), or **Raffaelo Santi,** Italian painter, was born at Urbino in central Italy, April 6, 1483. Upon the early death of his parents Raphael found a sincere friend in his maternal uncle Simone Ciarla.

Earliest Works. It is probable that Raphael received his first instruction from his father, a poet and painter. He seems also to have studied under Timoteo Viti, and then, from 1500, at Perugia under Pietro Perugino, who was at that time engaged on the Cambio frescoes. Here Raphael adopted and carried to its highest point the tender grace and mystical development of that master, often surpassing him in beauty, simplicity, and charm. He was in some degree influenced by other Umbrian artists, particularly by Justus van Ghent and Fra Carnevale, who was one of the earliest to attempt perspective and to whom Raphael may have been indebted for a knowledge of architecture. During this period at Perugia, he produced "The Crucifixion." In 1502, he was employed at Siena in helping Pinturicchio with the library frescoes. His "Coronation of the Virgin" was finished in 1503; the celebrated "Espousal of the Virgin," in the following year.

Life in Florence. Raphael's career is usually divided into three periods, of which the first terminated with his visit to Florence in the autumn of 1504. His amiability and talents soon procured him the admiration and notice of the Florentine artists. Among his chief friends were Taddeo Gaddi, Ghirlandajo, and Fra Bartolommeo. Inspection of the works of Michelangelo and of Da Vinci increased his knowledge of form and execution, but he never imitated them as he imitated the first models he studied in his Perugian period. A picture he painted at Florence in this period, "Madonna of the Grand Duke," so called because Ferdinand III always took it with him on his travels, is almost entirely in his earlier style.

With the exception of a few months spent in Perugia in 1505 and a short interval at Bologna and Urbino in 1506, the whole period from 1504 to 1508 was spent by Raphael at Florence. His principal works executed in this period are "Saint Catherine of Alexandria," "The Beautiful Gardener," and "The Entombment."

Activity at Rome. The third and last period of his work comprises the time from his invitation to Rome by Pope Julius II, about the middle of 1508, until his death. He was first employed on the frescoes of the *Stanzas*, or lower chambers beneath the Apartamento Borgia in the Vatican. The first of these works was the "Dispute on the Sacrament," painted in his second, or Florentine, manner. His later works, including all the other Vatican frescoes, are painted in that style which peculiarly characterizes him and constitutes the Roman school at its highest development. They are distinguished for dramatic composition and expression, for correct and vigorous design, and, at least in the frescoes, for an appropriate tone of coloring. Among these later frescoes are the famous "School of Athens" and "Parnassus."

Leo X, who succeeded Julius II in 1513, continued his predecessor's patronage of Raphael. The enthusiasm for classical antiquity that prevailed among the learned men whom Leo X attracted to his court strongly influenced those productions of Raphael which date from the accession of this pope. They became more allied to the antique and less imbued with the purely religious spirit of his earlier works.

Under Leo X, the works in the Vatican were continued, of which "Attila" is justly considered to be the most perfect example of fresco painting and to exhibit the greatest command over the resources of the painter's art. The celebrated "Cartoons" are the original designs executed by Raphael and his pupils, 1515-16, as copies to be used in tapestry work for the pope. Among the numerous commissions executed by Raphael for other patrons are many frescoes, a long list of portraits, many interesting designs in architecture, and some productions in sculpture. In 1517–20, he painted the celebrated "Sistine Madonna" and "Saint Cecilia." "The Transfiguration" occupied his last years.

Genius. Among all the painters of the world, none has ever been so universally popular as Raphael. Apart from his combined merits as draftsman, colorist, and master of graceful composition, he owes the constancy of the admiration felt for him partly to the wide range of his subjects, but still more to the wonderful varieties of his style. Died, April 6, 1520, and was buried in the Church of the Pantheon near his betrothed bride, Maria di Bibbiena. See *Painting*.

Rawlinson, George, English historian and Orientalist, brother of Sir Henry Rawlinson, was born at Chadlington, 1812. He graduated at Oxford and became professor of ancient history there in 1861; canon of Canterbury cathedral in 1872; and rector of All Hallows, London, in 1888. His historical works, beginning with an édition of Herodotus, cover nearly the entire history of the ancient Orient and include *The Five Great Monarchies of the Ancient Eastern World, The Sixth Great Oriental Monarchy, The Seventh Great Oriental Monarchy, A Manual of Ancient History,* and *A History of Ancient Egypt.* Died, 1902.

Rawlinson, Sir Henry Creswicke, English Oriental scholar and diplomat, was born at Chadlington, 1810. He was educated in Ealing; entered the East India military service in 1827; and served in the Bombay presidency until 1833. The following six years were spent in Persia, where he began the study of the cuneiform inscriptions and made a translation of the famous Behistun inscription of Darius. Rawlinson's successful decipherment of these ancient writings paralleled in importance the reading of hieroglyphics on the Rosetta Stone. His works include *England and Russia in the East, The Cuneiform Inscriptions of Western Asia,* and *Outline of the History of Assyria.* Died, 1895.

Rayleigh (*rā'lĭ*), **John William Strutt, Baron,** English physicist, was born in 1842. He graduated at Trinity college, Cambridge, 1865, and became a fellow in the following year. He succeeded to the title of baron in 1873; was professor of experimental physics at Cambridge, 1879–84, and of natural philosophy at the royal institution, London, 1887–1905.

In 1894, with Sir William Ramsay, he discovered argon. His experimental work in physics, characterized by the most extreme care, extended to almost every branch of the science. Much of it was done in co-operation with his son Robert John Strutt, who is known especially for his researches on radioactivity. Lord Rayleigh was awarded the Nobel prize for physics in 1904. Died, 1919.

Read, Thomas Buchanan, American poet and painter, was born in Chester county, Pa., 1822. He devoted himself chiefly to painting; visited Europe several times; and finally settled in Rome. He made many portraits, including those of Mrs. Browning, Longfellow, and George Peabody, the last named being now in the Peabody institute, Baltimore. His best-known poem is "Sheridan's Ride." Died, 1872.

Reade, Charles, English novelist, was born in Oxfordshire, 1814. He graduated at Oxford in 1835 and, in 1843, was admitted to the bar. He began his literary career by play writing and first made his mark as a novelist in 1852 by the publication of *Peg Woffington.* This was followed by *Christie Johnstone, It Is Never too Late to Mend,* and *The Cloister and the Hearth,* his best and most popular work. His later writings include the well-known problem novels *Hard Cash* and *Foul Play.* Died, 1884. See *Cloister and the Hearth, The.*

Reading, Rufus Daniel Isaacs, Viscount, English jurist, was born in London, 1860. He was educated in University College school there and in Brussels and Hanover. He was admitted to the bar and rose rapidly until, in 1913, he was made lord chief justice of England. He was a member of Parliament from 1904 to 1913 and, in 1916, was created viscount. On the death of Sir Cecil Spring-Rice in 1918, he served as a special British ambassador to the United States until the appointment of Viscount Grey in 1919. He was viceroy of India, 1921–26.

Réaumur (*rā'ō'mûr'*), **René Antoine Ferchault de,** French naturalist and physicist, was born at La Rochelle, 1683. He was educated at Poitiers, Bourges, and Paris and subsequently devoted himself to biological study. He discovered the method of tinning iron and invented the Réaumur thermometer. His most important work is *Mémoires pour servir à l'histoire des insectes.* Died, 1757.

Récamier (*rā'kà'myā'*), **Madame,** French society woman, was born at Lyon, 1777. At 15, she married Jacques Récamier and, during the Consulate and the Empire, attracted a brilliant circle to her salon at Paris. She was beautiful and possessed in rare measure a Frenchwoman's indefinable fascination and brilliancy. A record of the social triumphs of Mme. Récamier would include mention of nearly all celebrities in Paris during a period of 50 years. She was a power in France in spite of all changes of fortune. Died, 1849.

Reclus (*rē-klü'*), **Jean Jacques Elisée,** French geographer, was born in the Gironde, 1830. He was educated at Montauban and Berlin. An extreme Democrat, he left France after the *coup d'état* of 1851 and spent seven years in England, Ireland, and America. For his share in the Commune of 1871, he was banished. Going to Switzerland,

he began his masterpiece, *Nouvelle géographie universelle*. He wrote also *Les phénomènes terrestres* and *La Terre*. Died in 1905.

Redfield, Edward Willis, American painter, was born at Bridgeville, Del., 1868, and obtained his education in art at the Pennsylvania academy of fine arts and in Paris. He became known particularly as the painter of winter landscapes, of which typical examples are "The Three Boats," "Brook in Winter," and "The Old Bridge." The French government purchased his "February" for the Luxembourg gallery, Paris.

Red Jacket, or **Sa-go-ye-wat-ha,** "He Keeps Them Awake," a chief of the Seneca tribe of Indians, was born at Old Castle, on Seneca lake, New York, about 1751. In early life, he was noted for his swift running and, during the Revolution, the British officers employed him as a messenger. One of them gave him a bright red coat, hence his name Red Jacket.

He was a friend of the whites, although he wished to have the Indians keep their own lands; and, in 1784, in an eloquent speech, he strongly opposed the Treaty of Fort Stanwix, by which the six nations ceded some of their land to the United States. During the War of 1812, he several times gave advice which proved of great service to the American army. Later in life, he visited New York and Washington, and the speeches he made there are among the finest examples of Indian eloquence. Died at Seneca village, near Buffalo, N. Y., 1830.

Reed, James A., American politician, was born near Mansfield, Ohio, in 1861. He removed with his parents to Iowa in 1864 and was educated at Coe college. He studied law and, in 1885, was admitted to the bar, practicing at Cedar Rapids until 1887 and then in Kansas City, Mo. Entering politics as a Democrat, he was made prosecuting attorney for Jackson county, Mo., in which office he secured 285 convictions out of 287 cases tried. He was mayor of Kansas City in 1900–04 and was elected a United States senator from Missouri for three successive terms beginning in 1911. Reed was one of the leaders in opposing President Wilson during the latter's campaign for the League of Nations in 1919.

Reed, Thomas Brackett, American lawyer and legislator, was born at Portland, Me., 1839, and graduated from Bowdoin college in 1860. After serving a short time as paymaster in the navy, he studied law, and began legal practice in 1865. He was a member of the Maine legislature; became attorney-general of the state; and was elected to Congress in 1876.

His conspicuous ability led to his appointment as floor leader of the Republican party. He served in Congress until 1899 and was thrice elected speaker of the House of Representatives, 1889–91 and 1895–99. His ruling, as speaker, that all members present, though not voting, should be counted toward a quorum, won national attention and approval. He published *Reed's Rules* in 1894 and edited *Modern Eloquence* in 1901. Died in 1902.

Rehan (*rē'ăn; rā'ăn*), **Ada,** American actress, was born in Limerick, Ireland, 1860, and came to the United States in childhood. She made her first appearance on the stage at 14, in Newark, N. J., and later played in various stock companies. In 1879, she was engaged by Augustin Daly, filling leading positions in his theater until his death in 1899. With remarkable skill and distinction she played such characters as Rosalind, Katharine, Viola, Beatrice, Portia, Lady Teazle, Peggy in *The Country Girl*, and also many high-class modern comedy parts. Died, 1916.

Reid, George Agnew, Canadian painter, was born near Wingham, Ont., 1860. He studied at the Philadelphia academy and later in France, Spain, and Italy. His work is characterized by admirable technique and color and by original treatment of atmospheric effects. Among his chief pictures are "Dreaming," "Mortgaging the Homestead," and "Champlain's Arrival at Quebec," all in the national gallery, Ottawa. He also executed landscapes and mural decorations. In 1912, he became principal of the Ontario college of art, Toronto.

Reid, Whitelaw, American journalist and diplomat, was born at Xenia, Ohio, 1837. He graduated at Miami university, Oxford, Ohio, 1856. He entered newspaper work; became a war correspondent; and, in 1868, joined the editorial staff of the New York *Tribune*, of which he was editor and principal owner, 1872–1905. In 1892, he was Republican nominee for vice president. During 1889–92, he was minister to France and, from 1905 to 1912, he was ambassador to England. His writings include *Schools of Journalism, The Scholar in Politics, Some Newspaper Tendencies, Town Hall Suggestions, The Monroe Doctrine,* and *The Scot in America*. He died in 1912.

Reinhardt, Aurelia Henry, American educator, was born at San Francisco in 1877. She was graduated at the University of California and Yale university; lectured in English successively at the University of Idaho and Lewiston state normal school; and retired in 1909 at the time of her marriage with Dr. George Frederick Reinhardt of Berkeley, Cal. On her husband's decease in 1914, she became a lecturer in English at the University of California and, in 1916, was appointed president of Mills college, Oakland, Cal.

Rembrandt Harmenszoon van Rijn, Dutch painter, was born at Leiden, Holland, July 15, 1607. At the age of 12, Rembrandt was placed under Van Swanenburch, a painter of moderate talent in Leiden, and there he attended the university. From Leiden he went to study at Amsterdam under Lastman, then to Haarlem, to frequent the studio of Pinas. From 1623 to 1630, he devoted himself to solitary study in his father's house.

At the age of 23, Rembrandt established himself at Amsterdam and began his remarkable career, never leaving that city until his death 39 years later. In his first year there, he painted the "Portrait of an Old Man." Thereafter followed in great numbers portraits, landscapes, and historical and *genre* subjects as well as hundreds of wondrous etchings that have served almost as much as his paintings to immortalize him. There are two pictures dated by him 1631, a "Portrait of a Young Man" and "Simeon in the Temple." In the following year, he finished his famous "The Anatomist Nicholas Tulp and His Pupils," which placed him in the first rank of the Dutch masters.

Commissions flowed in upon him faster than he could execute them, and, from the beginning, pupils came clamoring to his doors. In 1633, Rembrandt finished "The Naval Architect and His Wife." The next year occurred his marriage to Saskia, with whom the happiest period of his life was spent. She died in 1642, leaving a son named Titus. In the year of Saskia's death, he produced the famous "Sortie of the Civic Guard," usually known as "The Night Watch."

The decade following his wife's death brought disastrous changes in the financial fortunes of Rembrandt, though in it he produced some of his best work. "Christ at Emmaus" was painted in 1648. "The Cloth Syndics," probably his greatest work, was completed in 1661. Never before had Rembrandt achieved such perfection.

Rembrandt painted more than forty portraits of himself. Of his landscapes, a very characteristic specimen is his well-known work entitled "The Mill." He is one of the most perfect of colorists; in *chiaroscuro*, or contrasts of light and shade, he has no equal. Because of his aerial gradations, the figures in his pictures appear to be raised from the canvas. Mentally he was keen to observe, assimilate, and synthesize. His conception was localized with his own people and time. He never built up the imaginary, nor followed Italy, but into types taken from the streets and shops of Amsterdam he infused his large, inherent sympathy with man. Died, October 8, 1669. See *Painting*.

Remington, Frederic, American illustrator, sculptor, and author, was born in Canton, N. Y., 1861. He studied at Yale art school and at the art students' league, New York, after which he led the life of a cowboy and stockman and became noted as an animal painter and an illustrator of Western scenes. He subsequently achieved distinction as a magazine illustrator of military subjects and ranching life and, after the Spanish American war, of Cuban scenes and characteristics. His best-known paintings are "A Dash for the Timber," "The Last Stand," "Past All Surgery," "The Emigrants," and "Conjuring the Buffalo Back." Among his works in sculpture are "The Broncho Buster" and "The Wounded Bunkie." His writings include *Pony Tracks, Crooked Trails,* and *The Way of an Indian*. Died, 1909.

Remsen, Ira, American chemist and educator, was born in New York City, 1846. He was graduated at College of the City of New York in 1865 and from the college of physicians and surgeons, New York, in 1867. In 1870, he received the degree of doctor of philosophy from the University of Gottingen. From 1872 to 1876, he was professor of chemistry in Williams college, and, from 1876 to 1913, he was professor of chemistry in Johns Hopkins university, of which he was president from 1901 to 1912. He founded, in 1879, the *American Chemical Journal*, which he edited for more than 40 years. Among his many contributions to chemical science is the discovery of saccharin. His writings include several important textbooks on chemistry, many scientific articles, and addresses. Died, 1927.

Renan (*rē-nāN'*; E., *rē-nān'*), **Joseph Ernest,** French philologist, historian, and critic, was born at Treguier, 1823. He began preparation for the priesthood, at Paris, but, as the result of the study of Hebrew and of German criticism, he renounced traditional Christianity and, in 1845, abandoned all thoughts of the Church as a profession. At 25 he received his doctorate at the University of Paris; in 1850, he obtained a post in the Bibliothèque Nationale. In 1862, he was chosen professor of Hebrew in the Collège de France and was later elected to the academy.

Renan's European reputation dates from the publication, in 1863, of the *Life of Jesus*, the first in the series entitled

History of the Origin of Christianity, which its author regarded as the special work of his life. He wrote also many other works of a more general character, including *The Future of Science* and several volumes of essays. Died in 1892.

Renault (*rē-nō'*), **Louis,** French jurist, was born at Autun in 1843. After teaching commercial law at Dijon from 1868 to 1873, he removed to Paris, becoming professor at the school of political sciences in 1874 and professor of international law at the university in 1881. He became counselor for the French foreign office in 1890. Later, he was elected president of the institute of international law and appointed a member of The Hague tribunal. With Ernesto T. Moneta he was awarded in 1907 the Nobel prize for peace. His writings include *Introduction to the Study of International Law* and *Treatise of Commercial Law*. Died, 1918.

Reni (*rā'nē*), **Guido,** Italian painter of the eclectic school, was born at Calvenzano, near Bologna, in 1575. He studied under Calvaert, but subsequently followed the more refined and ideal school of the Carracci prior to originating a style for himself. In 1602 he went to Rome, where he remained for 20 years, a rival of Caravaggio.

Reni's authorship of the famous portrait of Beatrice Cenci is now seriously doubted. The "Aurora" of Reni, a famous fresco in the Rospigliosi palace, Rome, usually considered his masterpiece, is placed among the twelve so-called greatest "world pictures." He died in 1642. See *Painting*.

Renwick, James, American architect, was born in New York, 1818. He was graduated at Columbia in 1836. He built the distributing reservoir of the Croton aqueduct, New York City, and was for some years employed as architect for the Erie railroad. His work shows marked versatility, his mastery of the French Gothic style being reflected in two of the noblest exteriors in New York—Grace church, completed in 1845, and Saint Patrick's cathedral, opened in 1879. Among other notable buildings designed by him were the original structure for Vassar college at Poughkeepsie, N. Y., and the first Corcoran art gallery and the Smithsonian institution at Washington. He died in 1895.

Repplier (*rĕp'lēr*), **Agnes,** American author and critic, of French extraction, was born at Philadelphia in 1858, and was educated at Sacred Heart convent, Torresdale, Pa. She received the honorary degree of doctor of letters from the University of Pennsylvania in 1902 and, in 1912, the Lætare medal from the University of Notre Dame. Her works combine a lightness of touch with incisiveness and a keen irony. They include *Books and Men*, *A Happy Half Century*, *Americans and Others*, and *Points of Friction*.

Reszke (*rĕsh'kĕ*), **Edouard de,** Polish singer, was born in Warsaw, 1855. Making his début as a bass singer in Aïda at Paris in 1876, he continued for 25 years thereafter to appear in grand opera in Europe and America. He won his most conspicuous successes in Wagnerian rôles. Died in 1917.

Reszke, Jean de, Polish singer, brother of the preceding, was born at Warsaw in 1850. Making his début as a tenor in *Robert le diable* at Madrid in 1879, he won immediate success and, until his retirement from the stage in 1902, ranked as one of the foremost tenors of the world. His interpretation of the great Wagnerian rôles was unsurpassed. Died, 1925.

Revere (*rĕ-vēr'*), **Paul,** American patriot, was born in Boston, Mass., 1735. He learned the business of a goldsmith. He was conspicuous for his zeal in behalf of the Revolutionary cause and became famous for his ride from Boston to Lexington to arouse the minutemen, April 18-19, 1775. Longfellow made this the subject of his poem "The Midnight Ride of Paul Revere." He died in 1818.

Reymont, Wladislaw Stanislaw, Polish novelist, was born in 1868. He was expelled from several schools in Russian Poland for using the Polish language, then under a ban by the Russian Authorities. After working successively as a clerk, railway employee, telegraph operator, and actor, he devoted himself exclusively to literature from 1894, when his story *The Death* was favorably received. *The Promised Land* brought him national recognition, which was widened to international fame by his *Peasants*, consisting of four volumes entitled respectively *Autumn*, *Winter*, *Spring*, and *Summer*. These volumes, published in 1904–09, won for him the Nobel Prize award for literature in 1924. Died, 1925.

Reynolds, George McClelland, American banker, was born at Panora, Iowa, in 1865. After graduating from the Guthrie County high school in 1879, he was employed as a clerk in a local bank until 1886. After serving as cashier of the Guthrie County National bank from 1888 to 1893, he was made cashier of the Des Moines National bank, of which he became president in 1895. In 1897, he was made cashier of the Continental National bank, Chicago, and rose to be president of the institution in 1906. In 1910, upon the consolidation of this bank with the Commercial National bank of Chicago to form the Continental and Commercial National bank, he was made president of the new institution. He served in this office until 1920, when he became chairman of the board of directors. Under his administration, this bank became one of the great financial institutions of the Middle West. In 1908, he accompanied the American monetary commission to Europe as adviser. In 1909, he declined the portfolio of secretary of the treasury in President Taft's cabinet. From 1917 to 1919, he was president of the citizens war board of Chicago.

Reynolds, Sir Joshua, English painter, was born at Plympton in 1723. When about 20 years of age he began his career as a portrait painter at Devonport. In 1746, he established himself in London, where, except three years in Italy, he passed the rest of his life. When the royal academy was instituted in 1768, he became its president and was knighted by George III.

Reynolds was especially famous for his portraits, of which he is said to have painted more than 2000. Although he preferred historical painting, his works of this class are relatively unimportant. His widely known "Angel Heads" are portrait studies. Many examples of his paintings are found in American collections. He was the friend of Johnson, Burke, Goldsmith, and other eminent literary men of his time. Died in 1792. See *Painting*.

Rhees (*rēs*), **Benjamin Rush,** American educator, was born at Chicago, in 1860. He was graduated from Amherst college in 1883 and from Hartford theological seminary in 1888. In 1889, he was ordained to the Baptist ministry and served as pastor at Portsmouth, N. H., until 1892. He was professor of New Testament interpretation at Newton theological institution, Newton Center, Mass., from 1892 to 1900, when he was chosen president of the University of Rochester. His writings include *The Life of Jesus of Nazareth* and *Saint Paul's Experience as a Factor in His Theology*.

Rhodes, Cecil John, South African statesman and financier, was born at Bishop Stortford, England, in 1853. He was sent to Natal for his health and subsequently made a fortune at the Kimberley diamond mines. He then returned to England, entered Oriel college, Oxford, and took his degree, 1881. In 1890, he was made prime minister of Cape Colony; but before this he had become a ruling spirit in the extension of British territory, having secured, in 1889, the charter for the British South Africa Company, of which, until 1896, he was managing director. This territory is now known as Rhodesia. His policy was the ultimate establishment of a federal South African dominion under the British flag.

In 1896, Rhodes resigned the Cape premiership in consequence of complications arising from Dr. Jameson's raid into the Transvaal. He was a conspicuous figure during the South African war of 1899–1902. In a remarkable will he left nearly his entire fortune to the foundation of the Rhodes scholarships at Oxford. He died in 1902. See *Rhodes Scholarships*.

Rhodes, James Ford, American historian, was born at Cleveland, Ohio, in 1848. He was educated at New York university, the University of Chicago, and the Collège de France. He engaged in coal mining and the manufacture of pig iron from 1870 to 1885, when he retired from business to devote himself to historical writing. His *History of the United States from the Compromise of 1850* was published between 1893 and 1906. He wrote also *Historical Essays* and *Lectures on the American Civil War*. In 1905, he was elected member of the American academy of arts and letters. Died, 1927.

Rhondda (*rŏnd'dă*), **Lord David,** Welch coal mine operator and public administrator, was born in Aberdare, Wales, 1856; was educated at Clifton college and Cambridge university; and, later, joined his father in the coal business. He soon became a leading figure in the Welch coal industry, having organized a coal combine which produced an annual output of six million tons and being, at one time, director of 40 companies. From 1888 to 1910, he sat as a Liberal member of the House of Commons. At the outbreak of the World War, he aided in placing British industry on a war basis, and, in 1917, as food controller, he instituted a system of compulsory rationing for the country. Lord Rhondda was one of the passengers who were rescued from the sinking *Lusitania*. He died in 1918.

Ricardo (*rĭ-kär'dō*), **David,** British political economist, of Jewish extraction, was born in London, 1772. After receiving a common school education he entered upon a mercantile life. He gained a large fortune, obtained a seat in Parliament, and acquired a high reputation as an economist and a writer. He wrote *Principles of Political Economy and Taxation*, *Essay on Rent*, *Funding System*, and other works of a similar nature. Died in 1823.

Rice, Alice Caldwell Hegan, American novelist and humorous writer, was born at Shelbyville, Ky., 1870. She was educated at Hampton college, Louisville, and, in 1902, married Cale Young Rice. She became interested in philanthropic work and was one of the founders of the Cabbage Patch settlement house at Louisville, Ky. Her writings include *Mrs. Wiggs of the Cabbage Patch, Lovey Mary, Sandy, Captain June, A Romance of Billy-Goat Hill, The Honorable Percival, Calvary Alley, Miss Mink's Soldier and Other Stories, Quin Turn About Stories* (with Cale Young Rice), and numerous short stories for magazines.

Richard I, surnamed Cœur de Lion, former king of England, was born probably at Oxford, 1157. After his accession to the throne in 1189, he flung himself with characteristic ardor into the Crusade movement. In 1190, he joined his forces with Philip Augustus of France in the Third Crusade and upheld the claims of Tancred in Sicily. In 1191, he captured Cyprus. In the Holy Land he won great renown for personal valor, particularly by his defeat of Saladin in 1192. After shipwreck on the coast, on his way home, he was captured by Leopold, archduke of Austria, and was handed over to the emperor Henry VI in 1193. Ransomed by his subjects at a heavy price, he returned to England in 1194. His later years were spent in his French possessions warring against Philip. He died of an arrow wound at the siege of Chaluz in 1199.

Richards, Charles Russ, American engineer and educator, was born at Clarkshill, Ind., in 1871. He was graduated in mechanical engineering at Purdue university in 1890. After serving as instructor of mechanical engineering in Colorado agricultural college, 1891-92, he was made adjunct professor of manual training at the University of Nebraska in 1892 and became professor of mechanical engineering there in 1898. From 1911 to 1920, he was professor of mechanical engineering in charge of the department at the University of Illinois. In the last-named university he was acting dean of the college of engineering and acting director of the engineering experimental station from 1913 to 1915, becoming dean and director of this station in 1917. In 1922, he became president of Lehigh university, Bethlehem, Pa.

Richards, Theodore William, American chemist, son of William Trost Richards, was born at Germantown, Pa., in 1868. He was educated at Haverford college and at Harvard, where he was graduated in 1886 and received the degree of doctor of philosophy in 1888. After studying at Gottingen under Nernst, at Leipzig under Ostwald, and in the technical school at Dresden, he became assistant professor of chemistry at Harvard in 1894, professor in 1901, and director of Wolcott Gibbs memorial laboratory in 1912.

Richards conducted valuable researches in thermometry, in calorimetry, and in the compressibility of compounds, and redetermined with extreme precision the atomic weights of many chemical elements. In 1914, he was awarded the Nobel prize for chemistry. Died, 1928.

Richards, William Trost, American landscape and marine painter, was born in Philadelphia, 1833. He studied art in his native city and in Europe, later exhibiting at the royal academy in London and at the French salon. He came under the influence of the Pre-Raphaelite artists in England and for a time endeavored to introduce their principles into American art. In landscape painting he followed the general tendencies of the Hudson River school. Among his works are "On the Coast of New Jersey," in the Corcoran art gallery, Washington; "Bell Buoy," in the Pennsylvania academy; "Rocky Coast" and many other water colors, in the Metropolitan museum, New York. He died in 1905.

Richardson, Henry Hobson, American architect, was born at Priestley's Point, La., 1838. After graduation at Harvard in 1859, he studied architecture at the Ecole des Beaux-Arts in Paris. He began the practice of his profession in New York, but removed to Boston in 1878. He appreciated to a high degree the value of sculpture in its application to buildings, successfully established artistic adaptations of the Romanesque style, and rose to foremost rank among American architects.

Among the important structures designed by Richardson are Trinity church and Brattle Square church, Boston; the law school for Harvard university; county buildings, Pittsburgh; and many public library buildings and railway stations. His work has exercised great influence upon the development of architecture in the United States. He died in 1886.

Richardson, Samuel, English novelist, was born in Derbyshire, 1689. He was early apprenticed to a printer in London. After some years he became a master printer, and was successively printer to the House of Commons, master of the Stationers' Company, and law printer to the king. When more than 50 years of age Richardson published his first novel, *Pamela, or Virtue Rewarded*. In 1747-48 appeared his second work, *The History of Clarissa Harlowe*, which greatly increased his reputation; in 1753 he published *The History of Sir Charles Grandison*. He greatly influenced the development of novel writing. Died in 1761. See *Clarissa Harlowe, Pamela*.

Richelieu (*rē'shē-lyû'*; E., *rēsh'ē-lōō'*), **Armand Jean du Plessis, Duc de,** French statesman and cardinal, was born of a noble family at Paris in 1585. He was educated for the military profession at the Collège de Navarre. He then pursued ecclesiastical studies and, in 1607, was consecrated bishop of Luçon. Appointed one of the representatives of the clergy at the States-General in 1614, he attracted notice by an address which he delivered in the presence of the young king, Louis XIII. By his appointment in 1616 as secretary of war and foreign affairs, the way was opened to Richelieu's political success. In 1622 he became a cardinal and from 1624 to 1642 was the principal minister of Louis XIII.

The administration of Richelieu forms an epoch in the history of France and her relations with other countries. It is memorable for the completeness with which the absolute authority of the sovereign was established. At the close of his career Richelieu delivered up the royal authority, which he had wielded for 18 years, almost without a single constitutional check upon its arbitrary exercise. Another of Richelieu's great enterprises was the overthrow of the Huguenot party as a political power. Richelieu was a generous patron of literature and founded the famous French academy. He died in 1642. See *Academy, French*.

Richet (*rē'shâ'*), **Charles Robert,** French physiologist, was born in Paris, 1850. He was educated in his native city and, in 1887, became professor of physiology in the University of Paris. In recognition of his important researches in anaphylaxis and serum therapy, he was awarded in 1913 the Nobel prize for medicine. His writings include important works on physiology and psychology.

Ridley, Nicholas, English reformer, was born in Northumberland about 1500. He was educated at Cambridge and later studied at Paris and at Louvain. Returning to Cambridge, he became in 1537 chaplain to Cranmer and, about 1540, was made master of Pembroke hall. He was appointed bishop of Rochester in 1547, of London in 1550, and took a leading part in composing the liturgy and in drawing up the 39 articles. He favored the attempt to place Lady Jane Grey on the throne and was imprisoned in the Tower. Condemned to death for heresy, he was burned with Latimer at Oxford in 1555.

Ridpath, John Clark, American historian and educator, was born in Putnam county, Ind., 1840. In 1863, he was graduated at Asbury (now De Pauw) university, in which he became professor of literature and history. He was the author of various histories, cyclopedias, and biographies, some of which became widely popular. His works include *New Complete History of the United States, Ridpath's History of the World*, and biographies of James Otis, J. A. Garfield, and J. G. Blaine. He was editor in chief of the *Library of Universal Literature*. Died in 1900.

Riggs, Mrs. George C. See *Wiggin, Kate Douglas*.

Riley, James Whitcomb, American poet, was born at Greenfield, Ind., in 1853. He received a common school education. Several years of his life were spent as itinerant sign painter, actor, and musician. This experience gave him opportunity to remodel plays and to compose songs, and brought him into intimate touch with the life and the speech of the common people, whom he later portrayed admirably in prose and in verse.

About 1873, Riley began to contribute poems to Indiana newspapers and for some time served as reporter. His many poems, partly in inimitable dialect and partly in purest English, reflect with true feeling and kindly insight the faith, humor, pathos, and sentiment of the "old folks at home." Riley is pre-eminent as an interpreter of simple life, of childhood, and of common, homely scenes. He has been styled the "poet laureate of democracy."

Riley's works include *The Old Swimmin' Hole and 'Leven More Poems, The Boss Girl and Other Sketches, Rhymes of Childhood, Green Fields and Running Brooks, A Child-World, Neighborly Poems, Home Folks, Book of Joyous Children, An Old Sweetheart of Mine, A Defective Santa Claus, Raggedy Man, Morning, Knee Deep in June*, and *Old Times*. In 1911, he was elected a member of the American academy of arts and letters. Died in 1916.

Rimski-Korsakov (*rĭm'skĭ-kôr'sà-kôf*), **Nicholas Andreyevitch,** Russian composer, was born at Tikhvin, Novgorod, 1844. Although he displayed remarkable musical gifts at an early age, his parents sent him to the naval academy at Petrograd, where he was graduated in 1862. While a midshipman he composed his first symphony, produced by Balakirev in 1865. He then decided to leave the navy, and, devoting himself entirely to music, became the leader of the new Russian nationalistic school. In 1871, he was made professor of composition in the conservatory at Petrograd and held this place until his death.

Rimski-Korsakov ranks among the greatest Russian masters, excelling in brilliant instrumentation and in the

skillful development of folk themes. His best-known operas are *The Snow Maiden, Sadko, Mlada, The Czar's Betrothed, Immortal Kastchei, Mozart and Salieri,* and *Pan Voyevoda.* His compositions also include symphonies, overtures, choruses, and piano pieces. He died in 1908.

Rinehart, Mary Roberts, American author, was born in Pittsburgh, Pa., 1876. She was educated in the public schools and in the training school for nurses at Pittsburgh. In 1896 she married Dr. Stanley Marshall Rinehart. Her earlier writings, through which she won wide popularity, were chiefly entertaining mystery stories. Later, she became widely known as a novelist and as a playwright. In 1915, she made a tour of the western battle front under the protection of the Allied governments and recorded her impressions in *Kings, Queens, and Pawns.* After the entry of the United States into the World War, she volunteered as a nurse.

Among her writings are *The Man in Lower Ten, When a Man Marries, Where There's a Will, Case of Jennie Brice, The After House, The Street of Seven Stars, Bab—A Sub-Deb, Tenting Tonight, The Amazing Interlude, Love Stories, Dangerous Days, A Poor Wise Man, Affinities, Sight Unseen, The Confession, More Tish,* and *The Breaking Point.*

She wrote also the one-act play *The Avenger,* with her husband; the farces *Seven Days* and *Cheer Up;* and the plays *Double Life, Tish, Bab, Spanish Love,* and *The Bat.*

Rinehart, William Henry, American sculptor, was born in Carroll county, Md., 1825. He received a common school education. At the age of 21 he began his career as a marble worker in Baltimore. In 1855, he went to Florence for further study and later located permanently in Rome. He completed Crawford's bronze doors for the Capitol at Washington. His best-known works are "Latona and Her Children" and "Rebecca" in the Metropolitan museum, New York; "Clytie," "Strewing Flowers," "Hero," "Day," and "Night" in the Corcoran gallery, Washington; and the marble statue of Chief Justice Taney at Annapolis. While classic in tendency, Rinehart's sculpture displays poetic charm and refined technique. Died in 1874.

Rives, George Lockhart, American lawyer and historian, was born in New York City, 1849. He was graduated at Columbia in 1868 and continued study at Trinity college, Cambridge, England. Admitted to the bar in 1874, he practiced law in New York. From 1896 until 1902 he was a member of the Rapid Transit Railroad commission and was corporation counsel, 1902–04. He achieved wide reputation through his work entitled *The United States and Mexico, 1821–1848.* In 1915, he was elected member of the American academy of arts and letters. Died in 1917.

Rizal (*rē-säl'*), **José Mercado,** Philippine patriot, was born in the province of Laguna, Luzon, of Tagalog parentage in 1861. He acquired a broad education in medicine, ethnology, and linguistics, studying at Manila and European universities. In 1886, he published *Noli Me Tangere,* in which he attacked the Spanish administration of the islands and the religious orders. A sequel, *El Filibusterismo,* followed in 1891. Although compelled to leave his native island a few months after entering in 1887, he returned in 1892, but was arrested and banished to Mindanao, where he continued to labor for the social improvement of the nation. Volunteering in 1896 to act as a physician in Cuba, where yellow fever was raging, he was seized, given the form of a trial for complicity in a revolt against Spain, condemned, and shot as a traitor. His influence among the Filipinos is enormous. By many he is regarded as the ablest man whom the Malay race has produced. Rizal, a province adjacent to Manila, was named in his honor, and his day of execution, December 30, was made a Philippine national holiday.

Robbia (*rôb'byä*), **Lucca della,** Italian sculptor, was born at Florence in 1399. He decorated the campanile of the cathedral at Florence and also made a bronze door for the sacristy. His master creation is his series of "Singing Galleries," consisting of ten panels executed in high relief for one of the organ galleries in the cathedral of Florence. These panels represent groups of children singing, dancing, and playing musical instruments and are notable for their naturalness and grace. He died in 1482.

Robert I, king of Scotland. See *Bruce, Robert.*

Roberts, Charles George Douglas, Canadian poet and novelist, was born at Douglas, N. B., in 1860. He was graduated at the University of New Brunswick, 1879. He was professor of English in King's college, Windsor, N. S., from 1885 to 1895, when he resigned to devote himself to literature. His reputation rests chiefly on his highly imaginative and artistically finished poetry, though his novels present exquisite descriptions of nature and some of his animal stories are masterpieces.

His numerous writings include *Orion and Other Poems, The Book of the Rose, The Canadians of Old, Earth's Enigmas, The Forge in the Forest, The Kindred of the Wild, Red Fox, The Heart that Knows, Feet of the Furtive, Babes of the Wild, The Secret Trails, Canada in Flanders, The Ledge on Baldface, In the Morning of Time,* and *New Poems.*

Roberts, Sir Frederick Sleigh, earl of Kandahar and Waterford, British general, was born at Cawnpore, India, in 1832. He was educated at Eton, at Addiscombe, and at Sandhurst. At 19 he joined the Bengal artillery, serving through the Indian mutiny; participated in the siege and capture of Delhi, the relief of Lucknow, the battle of Cawnpore, and other actions of the period, receiving the Victoria cross for his heroism.

In the Afghan war of 1878–80, Roberts made his famous march from Kabul to Kandahar, effecting the relief of the latter place. For this military feat he was created a baronet and earned from his soldiers the familiar sobriquet of "Little Bobs" or "Bobs Bahadur." In 1895, he was made field marshal, and, in 1899, he proceeded to South Africa to take supreme command during the Boer war, where he turned the fortunes of that struggle in favor of the British.

With keen military foresight, Roberts anticipated the World War and endeavored in vain to persuade England to prepare for it. His writings include *Rise of Wellington* and *Forty-one Years in India.* He died while reviewing the British army in France, 1914. See *Roberts's March.*

Robespierre (*rō'bĕs-pyâr'*; E., *rō'bĕs-pēr'*), **Maximilien Marie Isidore,** French Revolutionist, was born at Arras in 1758. After studying law and gaining some distinction as an advocate, he entered the States-General in 1789. As a popular leader in the famous Jacobin club, his influence became powerful. After the death of Mirabeau, Robespierre's biography is in effect the history of the Revolution. He was elected to the National Convention as head of the Paris deputies, and was one of the chief agents in procuring, in 1792, the execution of the king. In 1793 occurred the final struggle with the Girondists, the chief men among whom he sent to the scaffold.

A period of terror followed: Marie Antoinette and the duke of Orleans were the first victims; Danton and Camille Desmoulins were next immolated; and for months Paris was the scene of an indiscriminate quasi judicial slaughter, in which thousands of lives were sacrificed. With these atrocities the name of Robespierre remains peculiarly associated. A conspiracy was organized against "the tyrant," and, in July 1794, Robespierre closed his career on the scaffold. See *Terror, Reign of.*

Robinson, Benjamin Lincoln, American botanist, was born at Bloomington, Ill., in 1864. He was graduated at Harvard in 1887 and later studied at the University of Strasbourg. In 1892, he was made curator of the Gray herbarium at Harvard and, in 1899, was appointed Asa Gray professor of systematic botany. As editor of Gray's *Synoptical Flora* he did valuable taxonomic work. In collaboration with M. L. Fernald he edited the seventh edition of Gray's *New Manual of Botany.*

Robinson, Corinne Roosevelt, American writer and lecturer, sister of Theodore Roosevelt, was born at New York City in 1861. She was in the main educated by private tutors. In 1882, she married Douglas Robinson, a capitalist of New York City, who died in 1918. Mrs. Robinson became active in Red Cross work and in various other forms of social service, especially during the World War. She was a speaker in Liberty Loan campaigns, worked in the Salvation Army campaign for World War service, and organized the New York City commission for the "fatherless children of France." Her writings include *The Call of Brotherhood* (poems), *One Woman to Another, Service and Sacrifice, Collected Poems,* and *My Brother, Theodore Roosevelt.*

Robinson, Edwin Arlington, American poet, was born at Head Tide, Me., in 1869. He was educated at Harvard university. His first volume of poems, *The Torrent and the Night Before,* appeared in 1896. Robinson's verse, which displays high intellectual quality, has won him prominent rank among American poets. His other books of verse include *The Children of the Night, Captain Craig, The Town down the River, The Man against the Sky, Merlin, Lancelot,* and *Dionysius in Doubt.* He published also a comedy, *Van Zorn,* and a tragic drama, *The Porcupine.* His *Poems* and *The Man Who Died Twice* both won Pulitzer prizes. He was elected to membership in the American academy of arts and letters in 1927.

Robinson, James Harvey, American historian and educator, brother of Benjamin Lincoln Robinson, was born at Bloomington, Ill., in 1863. He was educated at Harvard and the University of Freiburg. In 1891, he was lecturer on European history in the University of Pennsylvania. From 1892 to 1919, he was a professor of history at Columbia university and, 1919–21, lecturer and organizer for the new school of social research, New York City.

Robinson's textbooks, which have profoundly influenced the teaching of history in America, emphasize the thought element in world changes and the importance of considering social, scientific, intellectual, and artistic development in connection with the study of politics and wars. His writings include *The German Bundesrath; Petrarch, the First Modern*

Scholar and Man of Letters, with H. W. Rolfe; *Introduction to the History of Western Europe*; *Readings in European History*; *The Development of Modern Europe*, with C. A. Beard; *The New History*; *Medieval and Modern Times*; *The Mind in the Making*; *The Humanizing of Knowledge*; and numerous articles and historical texts.

Robinson, Joseph Taylor, American politician, was born at Lonoke, Ark., in 1872. He was educated in the public schools and at the University of Arkansas. Admitted to the bar in 1895, he later became established in law practice at Little Rock. He was elected to Congress continuously from 1903 to 1913. In January 1913, he resigned from Congress and was inaugurated governor of Arkansas. Before the end of the same month he was elected United States senator. He resigned the governorship and, in March 1913, took his seat in the Senate, to which he was re-elected for succeeding terms. Upon the withdrawal of Senator Underwood from the party leadership in 1923, Robinson was chosen Democratic leader of the Senate.

Rochambeau (*rō'shäN'bō'*), **Jean Baptiste Donatien de Vimeur, Comte de,** marshal of France, was born in 1725. He served in the war of the Austrian succession; distinguished himself in the Seven Years' war; and co-operated with Washington at the siege and capture of Yorktown in the American war for independence. In 1790, he became commander of the French army of the North, but resigned in 1792. He narrowly escaped execution during the reign of terror. Died, 1807.

Rockefeller, John Davison, American capitalist, was born at Richford, N. Y., in 1839. At the age of 14, he moved to Cleveland, Ohio. He received a public school education; was clerk in a forwarding and commission house; and, at 19, became a partner in the firm of Clark and Rockefeller, commission merchants. Subsequently the firm engaged in the oil business. In 1865, the firm, then William Rockefeller and Company, built the Standard Oil works at Cleveland and, in 1870, was consolidated with others to form the Standard Oil Company. Still other interests were later acquired and the Standard Oil trust was formed in 1882, but was dissolved in 1892.

Thereafter the various Standard Oil companies were operated separately with Rockefeller at the head until 1911, when he retired, without a near rival, the wealthiest man in the world. He devoted much time and money to the promotion of various educational, religious, and charitable interests. In 1892, he established the University of Chicago, to which he made gifts exceeding $46,000,000.

At the end of 1928, it was estimated that Rockefeller's total benefactions then exceeded $540,000,000. About four-fifths of this amount had been given to the four great philanthropic and charitable corporations founded by him, which are as follows: The Rockefeller foundation, $180,000,000; general education board, $130,000,000; The Laura Spelman Rockefeller memorial, $73,000,000; and The Rockefeller institute for medical research, $39,000,000. The Laura Spelman Rockefeller memorial fund was consolidated with the Rockefeller Foundation in 1929, making the largest single philanthropic endowment in existence.

Rockefeller, John Davison, Jr., capitalist, son of John Davison Rockefeller, was born in Cleveland, Ohio, 1874. He was graduated at Brown university, 1897. In 1901, he married Abby Greene Aldrich, daughter of Nelson W. Aldrich, then senator from Rhode Island. He is associated in various business enterprises established by his father. During 1913–15, he was prominently before the public in connection with the Colorado miners' strike. He devotes much time to religious and philanthropic work; is chairman of the board of the Rockefeller foundation; is a trustee of the Rockefeller institute for medical research; and is a director of the general education board.

Rodin (*rō'dăN'*), **Auguste,** French sculptor, was born at Paris, 1840. He studied under Barye, and began to exhibit in the salon in 1877. He produced many great scriptural and symbolical works, including "Adam," "Eve," "Les Bourgeois de Calais," "La Guerre," "The Kiss," "The Age of Bronze," and "The Hand of God"; but he is best known for his portrait busts and statues, notably the bust and the monument of Victor Hugo and the statue of "The Thinker." The naturalistic sculpture of the 19th century reached its culmination in the powerful art of Rodin. Died in 1917. See *Sculpture*.

Rodney, George Brydges, Lord, English admiral, was born in 1719. He entered the navy as letter boy in 1732 and after 27 years of active service was made rear admiral. In 1762, he became vice admiral and, in 1764, was made a baronet. During the Seven Years' war he accomplished the relief of Gibraltar and Minorca; defeated, near Martinique, the French fleet under Count de Guichen; took Saint Eustatius from the Dutch; encountered and, in 1782, totally defeated the French fleet under De Grasse off Dominica. Rodney's victory saved Jamaica, ruined the naval power of France and Spain, and dealt the final blow of the war. He died in 1792.

Roebling (*rōb'lĭng*), **John Augustus,** American civil engineer, was born in Muhlhausen, Prussia, 1806. In 1831 he emigrated to the United States. He became designer and constructor of many great public works, among them the suspension aqueduct across the Allegheny river and the Monongahela suspension bridge, both at Pittsburgh; the suspension bridge at Niagara Falls; and the Ohio bridge at Cincinnati. Shortly before his death, he designed the great suspension bridge over the East river, connecting New York and Brooklyn. Died in 1869.

Roentgen (*rûnt'gĕn; rĕnt'-*), **Wilhelm Konrad,** German physicist, discoverer of the X-, or Roentgen, rays, was born at Lennep, Prussia, in 1845. He was educated at the University of Zurich, where he studied under Kundt. After holding professorships at Hohenheim, Strasbourg, and Giessen, he was made professor at Wurzburg in 1885 and at Munich in 1899. At Wurzburg, in November 1895, he announced the discovery of the X-rays, now called Roentgen rays. In honor of this important discovery, he received the Rumford medal and the Barnard medal, and, in 1901, he was awarded the Nobel prize for physics. He died in 1923.

Rogers, Will, American actor and humorist, was born at Oologah, Okla., in 1879. After a secondary school education, he entered vaudeville in New York, 1905. In 1914 he joined Ziegfeld's Follies and Night Frolics, usually taking the part of a cowboy while entertaining his audience with humorous or satirical remarks. His books of "Rogerisms" and contributions to the press have given still wider publicity to his humor and helped to win him an established reputation as America's leading political and social satirist.

Rohlfs (*rōlfs*), **Anna Katharine Green.** See *Green, Anna Katharine*.

Roland (*rō'lăN'*), **Marie Jeanne,** heroine of the French Revolution, wife of Jean Marie Roland de la Platière, was born at Paris in 1754. From 1791 to 1793, preceding and during the French Revolution, her salon in Paris was the headquarters of the Republicans and Girondists. Upon the fall of the Girondists she was arrested and imprisoned in the Abbaye. A more dauntless and intrepid spirit never entered its walls. Summoned before the Revolutionary tribunal, she was condemned and on November 8, 1793, was guillotined. According to a popular statement, her last words were: "O Liberty, what crimes are committed in thy name!"

Rolfe (*rōlf*), **William James,** American Shaksperian scholar, was born at Newburyport, Mass., in 1827. He was graduated from Amherst college in 1849, and from 1852 to 1868 was principal of high schools in the vicinity of Boston. His important Shaksperian work began with an edition of G. L. Craik's *English of Shakespeare* in 1867. During 1870–83 he prepared, and, in 1903–07, re-edited, the Friendly edition of Shakspere in 40 volumes. He edited Tennyson's complete works in 12 volumes in 1898 and verse by other English poets as well as some prose works. His published works include *Shakespeare the Boy*, *Life of Shakespeare*, and *Shakespeare Proverbs*. Died in 1910.

Rolland (*rō'lăN'*), **Romain,** French author, was born at Clamecy in 1866. He received his education at the Ecole Normale Supérieure, Paris, in which he later became professor of the history of art. He wrote numerous plays and historical works and also valuable biographical and critical studies, chiefly of musicians and other artists, including *Beethoven*, *Life of Michelangelo*, *Life of Tolstóy*, *Musicians of Other Days*, *Musicians of Today*, and *Masters of Music*.

Jean-Christophe, published originally in 10 volumes, which appeared at intervals between 1904 and 1912, brought Rolland world-wide fame. In this remarkable work he places a musician of genius in present-day society and reveals to the reader the emotions and trials which an artist and thinker would experience in such environment. Rolland was awarded the Nobel prize in literature for 1915. During the World War, his pacifist attitude was expressed in his collection of essays entitled *Above the Battle*.

Rolph, James, Jr., American shipowner and merchant, was born at San Francisco in 1869. He was educated in the public schools and at Trinity academy in his native city. He began active life in 1888 as an office boy in a shipping firm; was made a partner in Hind, Rolph and Company in 1898; and later became identified with extensive banking and marine interests. He served as president of the merchants' exchange and of the shipowners' association of the Pacific coast, and, in 1915, was vice president of the Panama-Pacific exposition. He was elected mayor of San Francisco for five consecutive terms, 1911–1931.

Romney (*rŭm'nĭ*), **George,** English painter, was born at Dalton in 1734. After some lessons from an itinerant artist, he studied art in London, 1762, and in Paris, 1764. During 1773–75 he devoted himself to study in Italy and on his return to London became the rival of Reynolds as a portrait painter. Most of his finest paintings are privately

owned. His "Lady Hamilton as Daphne" is in the Metropolitan museum, New York, and other excellent examples are found in American galleries. Died, 1802. See *Painting*.

Roosevelt (*rō'zē-vĕlt*), **Franklin Delano,** American politician, a distant cousin of Theodore Roosevelt, was born at Hyde Park, N. Y., in 1882. He was graduated at Harvard university in 1904 and at Columbia law school in 1907. He began the practice of law in New York City. In 1910, he was elected to the New York State senate, and, in 1912, was re-elected. He strongly supported Woodrow Wilson for president, and, in 1913, he was appointed assistant secretary of the navy in Wilson's cabinet. He supported the League of Nations, endorsed woman suffrage, and urged the extension of civil service reform. In 1920 he was a candidate for the vice presidency of the United States on the Democratic ticket, but was defeated. Eight years later, however, he was elected governor of New York State.

Roosevelt, Theodore, American statesman and author, 26th president of the United States, was born in New York City, 1858, of a distinguished family of Dutch origin. Though physically delicate in youth, he entered Harvard university at 18 and was graduated in 1880. In 1881, he began the study of law, but in the same year was elected to the New York legislature, of which he was the youngest member. He was twice re-elected and, in the second term, became the candidate of the minority party for speaker. In 1884, he went to North Dakota, where he spent two years on a ranch, raising cattle.

In 1886, Roosevelt was an unsuccessful candidate for mayor of New York. In 1889, President Harrison appointed him member of the United States civil service commission, in which capacity he served until 1895, when he resigned to accept the presidency of the police commission of New York City. In 1897, President McKinley appointed him assistant secretary of the navy. Upon the outbreak of the Spanish American war, in April 1898, he resigned to assist in organizing a regiment of volunteer cavalry, afterward known as Roosevelt's roughriders, of which he became colonel.

In November 1898, Roosevelt was elected governor of New York. Two years later he was nominated for vice president of the United States by the Republican national convention, at Philadelphia, and was elected. Upon the death of President McKinley, September 14, 1901, he succeeded to the presidency. At the close of the term he was unanimously nominated by his party to succeed himself and was elected for the term 1905–09.

Roosevelt's efforts in bringing about the treaty of peace between Japan and Russia in 1905 were important and effective, and, in 1906, he was awarded the Nobel prize for peace. An enthusiastic hunter of big game, he led in 1909 an expedition to East Africa for the Smithsonian and national museums. In 1910, he returned through Europe, receiving numerous honors and delivering notable addresses at the Sorbonne in Paris and at the universities of Berlin, Christiania, and Oxford. In 1912, he was presidential candidate of the Progressive party, which he organized. During the campaign he was shot by a fanatic, at Milwaukee, but was not seriously injured.

In 1914, he engaged in an exploring expedition in South America, discovering the large tributary of the Madeira river named for him the Roosevelt river. After the sinking of the *Lusitania* in 1915, he denounced the conduct of Germany, supported the cause of the Allies, and vigorously advocated national preparedness.

He wrote numerous books and contributed widely to periodicals and to general literature. Among his writings are *The Winning of the West, History of the Naval War of 1812, Hunting Trips of a Ranchman, Life of Thomas Hart Benton, American Ideals and Other Essays, The Rough Riders, Life of Oliver Cromwell, The Strenuous Life, African Game Trails, Through the Brazilian Wilderness, America and the World War, National Strength and International Duty,* and *The Great Adventure.* In 1905, he was elected member of the American academy of arts and letters. He died in 1919. In 1923, Roosevelt house, his birthplace, in New York City, was opened as a permanent memorial. See *Insurgents, New Nationalism, Progressive Party.*

Roosevelt, Theodore, American soldier and public official, was born at Oyster Bay, N. Y., in 1887, son of Theodore Roosevelt, 26th president of the United States. He was graduated at Harvard in 1908 and entered commercial life, becoming identified with motor manufacturing and oil refining interests. When the United States entered the World War in April 1917, he joined the army and became a major and later lieutenant colonel of infantry in the American expeditionary forces. Colonel Roosevelt was wounded in action, received the United States distinguished service cross, and was awarded the *croix de guerre* and made a member of the legion of honor by France. In 1919, he was elected member of the assembly in the New York State legislature. He was assistant secretary of the navy in Harding's cabinet, 1921-24; unsuccessfully contested the governorship of New York State in 1924; in 1925 headed a Field Museum expedition into central Asia; and in 1929 was appointed governor of Porto Rico.

Root (*rōōt*), **Elihu,** American statesman and lawyer, was born at Clinton, N. Y., in 1845. He graduated at Hamilton college in 1864, taught at Rome academy in 1865, and graduated at the law school of New York university, 1867. Admitted to the bar in 1867, he began practice in New York City, and rose to eminence in his profession.

In 1899, Root was appointed secretary of war by President McKinley and served until 1904. After the Spanish American war he represented the United States government in all official relations with Cuba, Porto Rico, and the Philippine Islands. During 1903, he was member of the Alaskan boundary tribunal. In 1905, President Roosevelt appointed him secretary of state, and in that office he did much to unify the Pan-American countries. In 1908, he was elected U. S. senator from New York for the term 1909–15. In 1912, he was awarded the Nobel prize for peace.

Root was chairman of the Republican national convention of 1912 and, in 1915, was president of the New York State constitutional convention. In 1917, he was appointed by President Wilson ambassador extraordinary at the head of a special diplomatic mission to Russia. He drew up, in 1920, the plan on which the organization of the World Court was based. For this achievement he received in 1926 the $25,000 award of the Woodrow Wilson foundation. In 1921, he was appointed by President Harding commissioner plenipotentiary for the United States at the Washington Conference. In 1929, he aided in revising the statutes of the World Court to facilitate the entry of the United States.

His writings include *Addresses on International Subjects, Addresses on Government and Citizenship, Latin America and the United States,* and *Men and Policies.* In 1917, he was elected member of the American academy of arts and letters.

Rosenwald (*rō'zĕn-wâld*), **Julius,** American merchant and philanthropist, was born at Springfield, Ill., in 1862. He was educated in the public schools and, at the age of 17, became connected with a wholesale clothing firm of New York City, with which he was engaged for six years. From 1885 to 1906, he was president of Rosenwald and Weil, clothing manufacturers of Chicago. He was vice president and treasurer of Sears, Roebuck and Company, mail order house of Chicago, from 1895 to 1910, when he was made president. Under his management, the mail order sales of this firm increased from somewhat less than $2,000,000 in 1896 to approximately $350,000,000 in 1928. Among his many benefactions is the creation of a 22 million dollar Julius Rosenwald fund, the entire fund to be spent within 25 years after his death. He made substantial gifts for Negro education and the relief of Jews in the Near East.

Ross, Betsy, maker of the first American flag adopted by Congress, was born in Philadelphia, 1752. She was a daughter of Samuel Griscom, who aided in building Independence hall. In 1773, she married John Ross, a nephew of George Ross, signer of the Declaration of Independence. On June 14, 1777, the Continental Congress decided upon the design for a national flag. A committee requested Mrs. Ross to make the flag. She accepted and her suggestion that five-pointed instead of six-pointed stars be used in the design was adopted. She was awarded a contract to make all government flags. She died in 1836 and the business was continued by her daughter, Mrs. Wilson, until 1857. In 1905, the Betsy Ross memorial association opened to the public the old home of Betsy Ross in Arch street, Philadelphia, as the American flag house.

Ross, Sir James Clark, English arctic and antarctic explorer, was born in London, 1800. He made five successive voyages to the arctic regions, in the last of which, in 1831, he determined the position of the north magnetic pole. From 1839 to 1843 he commanded the antarctic expedition of the *Erebus* and *Terror,* reached latitude 78° 10′ south, and discovered Victoria land and two volcanoes, which he named after his ships. Died in 1862.

Ross, Sir Ronald, British physician, was born at Almora, India, in 1857. He received his medical education at Saint Bartholomew's hospital, London, and, in 1881, he entered the Indian medical service. As the result of researches in malaria, which he began in 1892, he revealed the life history of the malaria-producing parasites found in certain mosquitoes. In recognition of the importance of this contribution to medical knowledge, he was awarded the Nobel prize for medicine in 1902. He became professor of tropical sanitation in the University of Liverpool and, in 1913, physician for tropical diseases at King's College hospital, London. His published works include *Mosquito Brigades and How to Organize Them; Malarial Fever—Its Cause, Prevention, and Treatment;* and *The Prevention of Malaria.*

Rossetti (*rō-sĕt'ē*), **Christina Georgina,** British poet, was born at London in 1830, the youngest of the four children of Gabriele Rossetti, an Italian poet, who settled in England, and sister of Dante Gabriel Rossetti, the painter. She was educated at home and led a life of retirement and devotion. At an early age she began writing verse. In 1848, she contributed poems to the *Athenæum,* and, in 1850,

she published under the pen name Ellen Alleyne several beautiful lyrics in the *Germ*. Among her published volumes of verse are *Goblin Market and Other Poems*, *The Prince's Progress and Other Poems*, *A Pageant and Other Poems*, and *New Poems*. She wrote also several religious books and many devotional pieces in prose. As a poet she ranks high among the English women writers of the 19th century. Her short and intense lyrics, as, for example, *After Death* and *Passing and Glassing*, are by many regarded as her most successful poems. She died in 1894.

Rossetti, Dante Gabriel, British painter and poet, was born at London in 1828, son of Gabriele Rossetti, an Italian poet, and brother of Christina Rossetti, also a poet. He first became prominent by his association with Millais and Holman Hunt in the Pre-Raphaelite brotherhood. His chief paintings include "Girlhood of Mary, Virgin," "Boat of Love," "Dante's Dream," "Proserpina," "The Blessed Damozel," "Beata Beatrix," and "Lady Lilith." As an author he is well known by his *Early Italian Poets*, *Ballads and Sonnets*, *Dante and His Circle*, and *Hand and Soul*. He died in 1882. See *Painting: The Pre-Raphaelites*.

Rossini (*rôs-sē'nē*), **Gioacchino Antonio,** Italian composer, was born at Pesaro in 1792. At the age of 15 he was sent by the Countess Perticari to the lyceum of Bologna for musical instruction. In 1813, he produced his opera *Tancredi*. Three years later he produced *Il Barbiere di Siviglia*, "The Barber of Seville." *La Cenerentola*, *Otello*, *Mosè in Egitto*, *La Donna del Lago*, *Semiramide*, *Guillaume Tell*, *Stabat Mater*, and many other works followed. Rossini's music is stirring, melodious, and brilliant. He ranks as the greatest Italian composer of the *bel canto* school of opera. Died in 1868.

Rostand (*rôs'tänⁿ'*), **Edmond,** French poet and dramatist, was born at Marseille, 1868. He was educated at the Lycée de Marseille and at the Collège Stanislas. Early in his career he settled in Paris and began to write verse. His first successful drama was *Les Romanesques*, produced in 1894. It was followed by *La Princesse Lointaine* and *La Samaritaine*. *Cyrano de Bergerac*, the most notable contribution to French poetic drama since the production of Victor Hugo's *Hernani* in 1830, was presented in 1897 with Coquelin and Bernhardt in the leading rôles. This romantic tragedy immediately became the success of two continents. Rostand's later dramas include *L'Aiglon* and *Chantecler*. As a poet and as the most gifted representative of the modern romantic school, Rostand occupies foremost place in recent French letters. He was elected to the academy in 1901. Died in 1918. See *Bergerac, Cyrano de*.

Rothschild (*rŏths'chĭld*) is the name of a celebrated Jewish family of bankers and financiers. The founder, Mayer Anselm, named from his father's signboard, Rothschild, or "Red Shield," was born at Frankfort on the Main in 1743. He was educated for a rabbi, but founded a business as a money-lender and became financial adviser of the landgrave of Hesse. The house received a heavy commission for transmitting money from the English government to Wellington in Spain, paid the British subsidies to continental princes, and between 1802 and 1812 negotiated loans for Denmark.

At his death, in 1812, the founder left five sons, all of whom were made barons of the Austrian empire in 1822. Mayer Anselm (1773–1855), eldest son, succeeded as head of the firm at Frankfort. Solomon (1774–1855) established a branch at Vienna; Nathan (1777–1836), a branch at London; Karl (1788–1855), a branch (discontinued about 1861) at Naples; Jacob, or James (1792–1868), a branch at Paris.

The Rothschilds negotiated many of the great government loans of Europe in the 19th century, and Nathan raised the house to be first among the banking houses of the world. He staked his fortunes on the success of Great Britain in her duel with Napoleon, and, receiving the first news of Waterloo, bought and sold stock which brought him a million pounds profit. His son Lionel (1808–79) did much for the civil and political emancipation of the Jews in Great Britain.

Lionel's son Nathaniel Mayer (1840–1915) succeeded to the baronetcy conferred in 1846 on his uncle and was made Baron Rothschild in 1885. At the time of his death the aggregate wealth of the various branches of the Rothschild family was estimated at $2,000,000,000. Lionel Walter, born in 1868, son of Nathaniel, succeeded his father in the family title. He was educated at Cambridge and at Bonn, sat in Parliament, 1899–1910, and has written extensively on zoology.

Rouget de Lisle (*rōō'zhĕ' dē lēl'*), **Claude Joseph,** French soldier and poet, was born in Lons le Saunier, 1760. In 1792, when stationed as captain of engineers at Strasbourg, he wrote the immortal *Marseillaise*, by its author called *Chant de guerre de l'armée du Rhin*, which was made known in Paris by troops from Marseille. In 1796, he left the army and devoted himself to poetry and music. He died in 1836.

Rouleau (*rōō'lō'*), **Raymond Marie,** Canadian prelate, was born in Isle Verte, Quebec, in 1866. He was educated in the Catholic seminary of Rimouski and entered the Dominican order in 1886. Ordained priest in 1892, he became first prior of the House of the Dominican Friars at Ottawa in 1900 and provincial of the Dominican Province of Canada in 1919. In 1923, he was appointed bishop of Valleyfield, Quebec; became archbishop of Quebec in 1926; and, in 1927, was appointed cardinal priest, the third Canadian to attain that honor.

Rousseau (*rōō'sō'*), **Jean Jacques,** French social philosopher and writer, was born at Geneva, Switzerland, in 1712. He was apprenticed to an engraver, but made his escape in 1728 and for many years found a home with Madame de Warens at Annecy.

In 1741, he went to Paris, whence in 1742 as secretary he accompanied the French ambassador to Venice. In 1750, he gained a prize, offered by the academy of Dijon, for an essay attacking the influence of the arts and sciences on society. Later he removed to Montmorency, to Switzerland, to England, and back to France, where he remained until his death.

Rousseau was a renewer of the force of the imagination and the feelings in an artificial time. He loved nature and praised its beauties; he broke with the arid traditions of the past and formed a new ideal for the future, with an eloquence and a warmth that had great influence in bringing on the French Revolution. He wrote on education and profoundly modified its tendencies, and, in literature, he led the way to the romantic reaction against the cold copying of classicism. His personal character is a puzzle to moralists. The vices and meannesses which stained his life are set forth with melancholy sincerity in his *Confessions*.

The most famous of Rousseau's writings are *Discourse on the Origin of Inequality among Men*; *Julie, or The New Héloïse*; *The Social Contract*; and *Emile*, or *Education*. He died in 1778. See *Educational Reformers*.

Rousseau, Théodore, French landscape painter, was born at Paris in 1812. He studied at the Ecole des Beaux-Arts. At 19 he revolted against the prevailing classicism and joined the romanticists, later becoming one of the leaders. In 1833, he settled at Barbizon, at the edge of the forest of Fontainebleau, where he was soon joined by Diaz and later by Millet, who became his intimate friend. Rousseau was the pioneer and leader of a group known as the Barbizon school of painters, the most important in the history of landscape art.

Depicting every phase of nature with remarkable harmony of the intellectual and emotional elements, Rousseau ranks as the epic poet of landscape art. His best paintings are in the Louvre, Paris, and in the Metropolitan museum, New York. He died at Barbizon, 1867.

Rowell (*rou'ĕl*), **Newton Wesley,** Canadian lawyer and statesman, was born in Middlesex county, Ont., 1867. He was called to the bar in 1891 and began practice in Toronto, becoming eminent in his profession. From 1911 to 1917, he was leader of the Liberal opposition in the provincial legislature. In 1914, he led his party in a movement, successful in 1916, to abolish the barrooms of Ontario. In 1917, he joined in the formation of a Federal (Unionist) government in which he was president of the council and vice chairman of the war committee of the cabinet, retiring in 1920. In 1919, he was the representative of the Canadian government at the international labor conference at Washington. In 1920, he was the Canadian delegate at the first assembly of the League of Nations at Geneva.

Rowland (*rō'lănd*), **Henry Augustus,** American physicist, was born at Honesdale, Pa., in 1848. He was graduated at Rensselaer polytechnic institute, Troy, N. Y., in 1870. He then taught chemistry at Wooster, Ohio, and physics at Troy. In 1873 his article on *Magnetic Permeability* won wide recognition in the scientific world. In 1876, after a brief period of study under Helmholtz at Berlin, he became the first occupant of the chair of physics at Johns Hopkins university, a position which he filled with distinction until his death, taking rank among the greatest physicists of the 19th century.

Among Rowland's important contributions to science are his determination of the mechanical equivalent of heat and of the ohm, his discovery of the magnetic effect of electric convection, and especially his researches in spectroscopy. His work on the solar spectrum led to his valuable discovery of the principle of the diffraction grating. Died, 1901.

Royce, Josiah, American philosopher, was born at Grass Valley, Cal., in 1855. He was graduated at the University of California in 1875 and received the degree of doctor of philosophy at Johns Hopkins university in 1878. During the ensuing four years, he was instructor in English literature and logic in the University of California. He was then called to Harvard university, in which he was instructor and assistant professor of philosophy from 1882 to 1892, professor of the history of philosophy from 1892 to 1914, and professor of natural religion, moral philosophy, and civil polity from 1914 until his death.

Royce became one of the foremost American metaphysicians. He developed a philosophy of idealism in which emphasis is placed on individuality and upon will rather than upon intellect. His philosophical writings include *Religious Aspect of Philosophy, The Spirit of Modern Philosophy, The Conception of Immortality, Studies of Good and Evil, Outlines of Psychology, Herbert Spencer, Philosophy of Loyalty,* and *Sources of Religious Insight.* He died in 1916.

Rubens, Peter Paul, Flemish painter, was born at Siegen, Prussia, June 29, 1577. He was educated at the Jesuit college in Antwerp, to which he was indebted for his excellent classic training. He was intended for the law, but he was allowed to enter the studio of Otto Van Veen about 1596.

In the spring of 1600, Rubens set out for Italy, where he spent eight years at Venice, Mantua, Rome, Florence, and Genoa and painted numerous pictures. He was especially attracted by the Venetian colorists. At Mantua, he was appointed court painter, and here he became familiar with the manners of courts.

In 1608, he returned to Antwerp and accepted the title of official painter to Archduke Albert. The next year, he married Isabella Bran. With the exception of the months occupied by embassies to Spain and England and some other short journeys, he dwelt in Antwerp for the remainder of his life.

His colorful "Adoration of the Magi" was followed in 1612 by his acknowledged masterpiece, "The Descent from the Cross." The extent and range of his productive powers was remarkable. At this time, he was also teaching extensively and collaborating with Breughel and Frans Snyders. In 1621, he received a commission from Marie de' Medici to adorn the Luxembourg palace at Paris. He visited Philip IV of Spain on a diplomatic mission in 1628. Here he met Velasquez and renewed his study of Titian, who so greatly influenced his later works. In 1630, his wife, Isabella, died, and he married Helena Fourment, whose features he never tired of painting. In 1635, he designed the decorations that celebrated the entry of the infant Ferdinand into Antwerp, and, in 1639, he completed the "Crucifixion of Peter."

Of Rubens's personal character we may speak in terms of high praise. He was uncontaminated by envy, conscious as he must have been of his own extraordinary endowments. In extent of range Rubens is unrivaled; history, portrait, landscape under the aspect of every season, animal life in every form—all are familiar to him. In addition to his paintings, he etched a few plates and made some designs for printers, silversmiths, and tapestry weavers. Rubens wanted only a purer style in designing the human form to have been a perfect, as well as a universal, painter. After a career marked by all the distinction that fame, riches, and universal admiration could bestow and distinguished in the triple character of painter, diplomatist, and man, Rubens died at Antwerp on May 30, 1640. See *Painting.*

Rubinstein (*rōō'bin-stīn*), **Anton,** Russian pianist and composer, was born in Russian Bessarabia, 1829. In 1840 he entered the Paris conservatory, soon attracting the attention of Chopin and Liszt. In 1844, he began the study of composition under Dehn at Berlin. In 1848, he settled in Petrograd, studying and writing music. He founded the Petrograd conservatory of music in 1862 and remained its director until 1867. As a pianist he was Liszt's only rival and ranks as one of the world's greatest masters. His compositions include the operas *Ivan the Terrible, Feramors, Nero,* and *The Demon*; the oratorios *Paradise Lost* and *The Tower of Babel*; and numerous other works. He died in 1894.

Rudolf I, or **Rudolph,** founder of the Habsburg dynasty, was born at Limburg in 1218. He was the son of Albert IV, count of Habsburg and landgrave of Alsace, whom he succeeded in 1239. Partly by inheritance and partly by seizure, he acquired large estates in what is now Alsace and Switzerland, and became the most powerful prince in southwest Germany. In 1273, the electors chose him king of Germany, the first monarch of the Habsburg line. He died in 1292.

Ruffo (*rōōf'fō*), **Titta,** Italian singer, was born at Pisa, Italy, in 1878; studied vocal music in Rome, where he was advised by one of his teachers to give up singing; and made his début in Rome, 1898. His initial successes were in Rio de Janeiro and other cities of South America. Returning to Europe, he appeared at Milan, Vienna, and, with Caruso, at Paris. In 1912, Ruffo was engaged for the Chicago-Philadelphia Opera Company. He later returned to Italy.

Rumford, Benjamin Thompson, Count, American physicist, was born at Woburn, Mass., 1753. He began the study of medicine at 13 and later taught school. Accepting an appointment in the militia from the English governor, he innocently incurred the distrust of the colonists. Although acquitted of all charges of disloyalty, he left America in 1776 for England, where he rose to high place in the British foreign office, made notable scientific experiments, and became a fellow of the royal society.

In 1785 Rumford entered the service of the elector of Bavaria at Munich, where he inaugurated important reforms and reorganized the army. For these valuable services he was made minister of war and count of the Holy Roman Empire. Returning to England in 1795, he made notable experiments on heat, which he was the first to recognize as a mode of motion. He also made many practical improvements in heating and lighting.

With Sir Joseph Banks, in 1799, Rumford founded the royal institution. About 1802 he located in Paris. He founded, and was the first to receive, the Rumford medal of the royal society; he also established the Rumford professorship at Harvard. Died in 1814.

Ruskin, John, English author, art critic, and social reformer, was born at London in 1819. He studied at Christ Church, Oxford, where he gained the Newdigate prize for English poetry in 1839 and took his degree in 1842. In the year following appeared the first volume of his *Modern Painters,* whose aim was to prove the superiority of modern landscape painters, especially Turner, to the old masters.

In 1849 appeared *The Seven Lamps of Architecture* and, in 1851–53, *The Stones of Venice,* both being efforts to introduce a new and loftier conception of the significance of domestic architecture. They were exquisitely illustrated by the author himself. At this time Pre-Raphaelitism began to develop as a distinctive phase of modern art, and Ruskin warmly espoused its cause.

About 1860 Ruskin became deeply interested in the social problems of the age and published *Unto this Last* and *Munera Pulveris.* Among his later works are *Sesame and Lilies, The Ethics of the Dust, The Crown of Wild Olive,* and *Præterita,* a charming autobiography. In 1870, he became professor of art at Oxford. Ruskin did much to increase the appreciation of the beautiful in nature and in art. He died in 1900.

Russell, Bertrand Arthur William, English mathematician and philosopher, was born at Trelleck, England, in 1872. He was educated at Cambridge university, where he remained as lecturer and fellow until 1916. In that year, he was deprived of his appointment on account of his pacifist views and his opposition to the World War. As a philosopher, he was known as a prominent opponent of Bergson. His chief publications include *German Social Democracy, Essay on the Foundations of Geometry, Mysticism and Logic, The Practice and Theory of Bolshevism, The Analysis of Mind, On Education,* and, with Dora Russell, *The Prospects of Industrial Civilization.*

Russell, James Earl, American educationist, was born at Hamden, N. Y., 1864. Having obtained academic degrees from Cornell and Leipzig universities, he accepted a chair in philosophy and pedagogy at Colorado university in 1895. In 1897, he went to Teachers college, Columbia university, of which he became dean in 1898. He resigned the deanship in 1927, to devote himself to teaching, and was succeeded by his son, Dr. W. F. Russell. As a teacher, a writer on educational subjects, and editor of the "American Teachers Series," he has exercised an important influence on American educational thought and practice.

Rutherford (*rŭth'ĕr-fĕrd*), **Sir Ernest,** British physicist, was born in Nelson, New Zealand, 1871. He was educated at Nelson college, Canterbury college, New Zealand university, and the University of Cambridge. He became professor of physics at McGill university, Montreal, in 1898 and at the University of Manchester in 1907. For his valuable researches in radioactivity he was awarded the Rumford medal and the Barnard medal, and, in 1908, he received the Nobel prize for chemistry.

Ruysdael (*rois'dăl*), **Jacob,** Dutch painter, was born at Haarlem about 1628. In 1648 he entered the artists' guild at Haarlem and about 1657 removed to Amsterdam. He traveled in various parts of Holland, also in Germany and Switzerland. While given scant recognition during his lifetime, he now ranks among the greatest Dutch painters of landscape. His forest, waterfall, shore, and mountain scenes are highly poetic. Excellent examples of his work are found in the leading galleries of Europe and in the Metropolitan museum, New York. He died in 1682.

Ryan, Abram Joseph, known as "Father Ryan," American priest and poet, was born at Norfolk, Va., in 1839. Soon after his ordination he was made chaplain in the Confederate army and served throughout the war. His lyrics of the conflict, *The Deathless Dead, The Sword of Lee,* and especially *The Conquered Banner,* became well known. Toward the end of his life he published *Poems, Patriotic, Religious, and Miscellaneous.* He died in 1886.

Ryan, Patrick John, American prelate, was born at Thurles, Ireland, in 1831. He was graduated at Carlow college in 1852; came immediately to the United States and taught English literature in Carondelet theological seminary, Saint Louis. He was ordained priest in 1853 and became rector of the Saint Louis cathedral in 1856. In 1872, he was made coadjutor bishop of Saint Louis; was

promoted archbishop in 1883; and, in 1884, was transferred to the see of Philadelphia. His writings include *What Catholics Do Not Believe* and *Some of the Causes of Modern Religious Skepticism.* He died in 1911.

Ryan, Thomas Fortune, American financier, was born in Nelson county, Va., 1851. He began business life in 1868 in a Baltimore dry goods house. In 1870, he located in New York and, in 1874, became a member of the New York Stock Exchange. He was afterward interested in the consolidation and the extension of street railway and lighting systems in New York, Chicago, and other cities, in the reorganization of various railways in the South, in coal properties in Ohio and West Virginia, and in Ohio railways. In 1905, he purchased a controlling interest in the Equitable life assurance society. In 1908, he retired as officer or director of more than 30 corporations in which he was the controlling member. In 1906, he became interested in the development of mining activities in the Belgian Congo, and, in 1912, he engaged in the development of similar interests in Portuguese Angola. In 1912, he gave $1,000,000 for a Roman Catholic church in New York City. Died, 1928.

Sabatier (*sȧ'bȧ'tyā'*), **Paul,** French chemist, was born in Carcassonne in 1854. After a short experience as a teacher at Nimes, he became assistant to Berthelot in the Collège de France. In 1880, he was made instructor of physics at Bordeaux and, in 1883, professor of chemistry at the University of Toulouse. For his researches in catalysis he was the recipient of numerous scientific honors, and, with Victor Grignard, was awarded in 1912 the Nobel prize for chemistry. The royal society of Great Britain awarded him the Davy medal in 1915. His most noted work is *La catalyse en chimie organique.* Died, 1928.

Sabin, Florence Rena, American anatomist, was born at Central City, Colo., in 1871. She was graduated from Smith college in 1893 and later studied at Johns Hopkins university, from which she received in 1900 the degree of doctor of medicine. She was associate professor of anatomy at Johns Hopkins university from 1902 to 1917, when she became professor of histology. In 1925, she joined the staff of the Rockefeller institute. Her writings include *An Atlas of the Medulla and Mid-Brain* and articles on the origin of blood cells and on embryology.

Sachs (*zȧks*), **Julius von,** German botanist, was born at Breslau in 1832. In 1868, he became professor of botany at Wurzburg. He retained this chair for the remainder of his life, a period of nearly 40 years. He made important experiments in plant physiology, especially in determining the influence of light and heat upon plants and in investigating organic activities of vegetable growth. He wrote extensively on botany, and is considered the founder of experimental plant physiology. Died in 1897.

Sadi-Carnot. See *Carnot, Marie François Sadi.*

Sage, Margaret Olivia Slocum, philanthropist, was born at Syracuse, N. Y., in 1828. She was graduated at Troy female seminary in 1847 and, in 1869, married Russell Sage. After the death of her husband she began to devote his large fortune to educational and religious purposes. In 1915, the aggregate of her gifts exceeded $23,000,000, the most important being $10,000,000 for the establishment of the Russell Sage foundation. She died in 1918. See *Russell Sage Foundation.*

Sage, Russell, American capitalist, was born at Shenandoah, N. Y., in 1816. He was educated in the public schools. After several years as errand boy and grocer's clerk he held an interest in a wholesale grocery in Troy, 1839–57. He was a member of Congress, 1853–57. In 1863, he removed to New York, purchased a seat on the stock exchange in 1874, and thereafter was known as a financier, closely associated with Jay Gould in extensive railway operations. His fortune, estimated at more than $50,000,000, was bequeathed unconditionally to his wife, Margaret Slocum Sage. He died in 1906.

Sainte-Beuve (*sȧNt'bûv'*), **Charles Augustin,** French literary critic, was born at Boulogne sur Mer in 1804. He chose medicine as a profession and for some years studied at Paris. In 1827, he became acquainted with Victor Hugo, whose influence drew him into the romantic movement and determined for him a literary career. In 1828, he published a critical work on French poetry of the 16th century, two volumes of poetry in 1829–30, and a psychological novel, *Volupté,* in 1834. He received an appointment in the Mazarin library, Paris, 1840, and for eight years wrote for the *Revue des Deux Mondes.* In 1845 he was elected to the academy. From 1849 to 1869 he contributed to the *Constitutionnel* his famous *Causeries du lundi* and *Nouveaux lundis,* which, for variety of human interest, critical insight, and breadth of sympathy, remain unsurpassed. He died in 1869.

Saint-Gaudens (*sȧnt-gô'dĕnz*), **Augustus,** American sculptor, was born in Dublin, Ireland, in 1848, and was brought to the United States in infancy. During 1861–66 he was a student at Cooper institute and at the academy of design, New York. He then went to Paris and studied under Jouffroy at the Ecole des Beaux-Arts, becoming intimately associated with Dubois, Mercié, Falguière, and Saint-Marceaux. After a year spent at Rome, where his first work, "Hiawatha," was produced, he returned to New York in 1873.

Beginning with the statue of Farragut, in Madison square, New York, 1880, Saint-Gaudens executed many notable works which gave him foremost rank among American sculptors. His "Lincoln" in Lincoln park, Chicago, is considered by many the finest portrait statue in the United States. The Shaw memorial on Boston common, regarded by many as Saint-Gaudens's masterpiece, ranks among the best relief sculptures of the 19th century. Other important works are the statue "Deacon Chapin," called also "The Puritan," in Springfield, Mass.; the memorials to Dr. Bellows and Dr. McCosh at Princeton; and the equestrian statues of General Sherman, New York, and of General Logan, Chicago.

The ideal sculptures of Saint-Gaudens, distinguished for refinement of design and poetic feeling, include "Amor Caritas," in the Luxembourg, Paris; "Peace of God," in Rock Creek cemetery, Washington; and "Diana," on the tower of Madison Square garden, New York. In low relief sculpture, Saint-Gaudens stands pre-eminent in America. Saint-Gaudens was one of the seven original members of the American academy of arts and letters. He died in 1907. See *Sculpture.*

Saint-Pierre (*sĂN'pyâr'*), **Jacques Henri Bernardin de,** French writer, was born in Havre, 1737. He entered the army as a military engineer, but was dismissed; and for some years thereafter led an adventurous life in different countries of Europe. In 1768 he went to Mauritius. On his return to France, 1771, he published an account of his voyage and several other works. He is best known for his beautiful story *Paul and Virginia,* which has been translated into many languages. He died in 1814. See *Paul and Virginia.*

Saint-Saëns (*sĂN' sĂNs'*), **Charles Camille,** French composer and organist, was born at Paris in 1835. At the age of 12 he entered the Paris conservatory, at 18 was made organist of the church of Saint-Merri, and, from 1858 to 1877, was organist at the Madeleine. After 1870, he devoted himself chiefly to composition. His works include the operas *La princesse jaune, Le timbre d'argent, Etienne Marcel, Henry VIII, Les barbares, Parysatis, Hélène,* and *L'Ancêtre;* the sacred drama *Samson et Dalila;* the widely known symphonic poems *Le Rouet d'Omphale, Phaëton, La danse macabre,* and *Jeunesse d'Hercule;* also symphonies, church music, chamber music, and much piano and vocal music. In 1915, he was guest conductor of concerts at the Panama-Pacific exposition, composing in its honor the fantasia *Hail, California.* Died in 1921. See *Samson and Delilah.*

Saintsbury (*sānts'bĕr-ĭ*), **George Edward Bateman,** English critic, was born at Southampton, 1845. He was educated at London and at Merton college, Oxford. From 1868 to 1876 he was a schoolmaster at Manchester, Guernsey, and Elgin. Soon afterward he established himself in London as one of the most active critics of the day. From 1895 to 1915 he was professor of English literature at Edinburgh. Among his works are *Short History of French Literature, Marlborough, Elizabethan Literature, History of Criticism, The Earlier Renaissance, A History of English Prosody, The Later Nineteenth Century, The English Novel, The Peace of the Augustans, History of the French Novel, Notes on a Cellar Book,* and *A Letter-Book.*

Saionji (*sī'ôn-jē*), **Kinmochi, Prince,** Japanese statesman, was born at Kyoto, of a noble family, in 1849. He was educated at the University of Paris. In 1880, he entered the diplomatic service and became envoy at Vienna, 1885, and at Berlin, 1887. From 1892 to 1896, he served as minister of education and as acting foreign minister. He was made premier in 1906 and again in 1911. In 1919, he represented Japan as chief envoy to the Peace Conference at Versailles. He was made prince in 1920 in recognition of his services in connection with the World War.

Saladin (*sȧl'ȧ-dĭn*), or **Salah-ed-Din,** sultan of Egypt, was born at Tekrit, of Kurdish parents, in 1138. He was one of the great conquerors of his time. In 1187, he defeated the Christians at Hittin, afterward storming and capturing Jerusalem. He was, however, defeated by Richard Cœur de Lion in 1191. The valor and magnanimity conspicuous in the life and actions of Saladin are the subject of praise, not only in Eastern writings, but in the Christian chronicles of the Crusades. He died in 1193.

Salandra (*sȧ-län'drȧ*), **Antonio,** Italian statesman, was born at Troia in 1853. He graduated from the University of Naples in 1875 and later became professor of law at the University of Rome. In 1886, he was elected to the Chamber of Deputies, and, from 1891 to 1910, he served in various positions in the cabinets of Rudini, Crispi, Pelloux, and

Sonnino. In 1914, he became premier and minister of the interior, resigning in 1916. He was one of the Italian representatives at the Peace Conference at Versailles in 1919. Like Woodrow Wilson, Salandra was an example of the scholar in politics. His writings include various works on economics, history, and law.

Salisbury (*sôlz'bĕr-ĭ*), **Robert Arthur Talbot Gascoyne-Cecil, Marquis of,** British statesman, was born at Hatfield, England, in 1830. He was graduated from Christ Church, Oxford, in 1849. He sat in Parliament for Stamford, 1853–68; was secretary for India, 1866-67, and again, 1874–76. In 1878, he was appointed foreign secretary, and, with Lord Beaconsfield, took a prominent part in the Congress of Berlin. After the latter's death, he became the leader of the Conservatives in the House of Lords, and was prime minister, 1885-86, 1886–92, and 1895–1902. He died in 1903.

Sallust (*săl'ŭst*), or **Gaius Sallustius Crispus,** Roman historian, was born at Amiternum, 86 B. C. He rose from a plebeian to a senator, but was expelled from the Senate in 50 B. C. probably because of an intrigue with the wife of Milo. Cæsar restored him to his seat and made him successively quæstor, prætor, and governor of Numidia. In the office of governor, he amassed an enormous fortune. On his return to Rome, he built a splendid palace on a site still known as Sallust's garden and devoted himself to the writing of history.

With the exception of some fragments, his *History of the Roman Republic* is lost; but his masterly *History of the Jugurthine War* and the *Conspiracy of Catiline* are extant and bear ample testimony to his genius. In marked contrast to the annalists, Sallust was the first Roman who wrote what may be properly regarded as history. Died in 34 B. C.

Sampson, William Thomas, American naval officer, was born at Palmyra, N. Y., in 1840. He was graduated at Annapolis in 1861. He served six years as instructor at Annapolis, commanded successively the *Swatara*, *San Francisco*, and *Iowa*, and then became chief of the bureau of ordnance. On the outbreak of the war with Spain in 1898, he was placed in command of the North Atlantic squadron. When the Spanish fleet under Cervera took refuge in the harbor of Santiago de Cuba, Sampson established a close blockade, resulting in the destruction of the Spanish fleet when it attempted to escape from the harbor, July 3, 1898. He died in 1902.

Sand, George, is the pen name of Amantine Lucile Aurore, Baroness Dudevant, French author, who was born at Paris in 1804. She was descended on her father's side from the famous Marshal Saxe, and her maiden name was Dupin. After receiving a conventual education, she married M. Dudevant in 1822, but separated from him in 1831. She then settled in Paris and began a literary career that brought her both fame and fortune. Among her friends were Alfred de Musset, Chopin, Liszt, Balzac, and Lamennais. Of her numerous works the best-known are *Indiana*, *Valentine*, *Rose et Blanche* (written in conjunction with Jules Sandeau), *Lelia*, *La Comtesse de Rudolstadt*, *Consuelo*, *Jacques*, *Mauprat*, *La mare au diable*, *François le Champi*, *La petite Fadette*, and *Jean de la Roche*. Her writings are characterized by a passionate rebellion against moral and social conventions. She died in 1876.

Sandburg, Carl, American writer, was born at Galesburg, Ill., in 1878. He was educated at Lombard college in his native city. Devoting himself to secretarial and editorial work, he was secretary to the mayor of Milwaukee, 1910–12; was assistant editor of the *System* magazine in 1913; and later became an editorial writer for the Chicago *Daily News*. His writings include *Chicago Poems*, *Corn Huskers*, *The Chicago Race Riots*, and *Smoke and Steel*. His poetry is characterized by great vigor.

Santa Anna (*săn'tä ä'nä*), **Antonio López de,** Mexican general, was born at Jalapa about 1795. In 1810, he entered the Spanish army; in 1821, he joined Iturbide but overthrew him in the following year. Santa Anna was elected governor of the city and province of Vera Cruz in 1822 and in the same year proclaimed a Mexican republic. In 1829, he expelled a Spanish army of invasion.

Santa Anna vigorously opposed the separation of Texas from Mexico. In 1836, he attacked San Antonio, captured the Alamo, and massacred the garrison. A little later, he committed another massacre at Goliad, but soon afterward, at the battle of San Jacinto, he was defeated and made prisoner by General Houston. Promising to acknowledge Texan independence, he returned to Mexico and defended Vera Cruz against the French in 1838. In the war against the United States, 1847, Santa Anna took command of the Mexican forces. He was defeated by General Taylor at Buena Vista and by General Scott at Cerro Gordo, and, after the fall of Mexico City, fled to Venezuela. After various periods of exile and recall, he died in Mexico City, 1876.

Santayana (*săn'tĭ-yä'nä*), **George,** philosopher, was born at Madrid, Spain, in 1863 and was educated at Harvard university, the University of Berlin, and Cambridge university. He became an instructor at Harvard university in 1889, Hyde lecturer at the Sorbonne in 1905-06, and professor of philosophy at Harvard university in 1907. In 1912, he took up his residence in Paris. His writings are distinguished for their clear, brilliant style and for their broad, human viewpoint. They include *The Life of Reason*, *Three Philosophical Poets*, *Character and Opinion in the United States*, and *Skepticism and Animal Faith*.

Santos-Dumont (*săn'tôs'dü'môN'*), **Alberto,** aeronaut and inventor, was born at Sao Paulo, Brazil, in 1873. He was educated chiefly in France and after the death of his father, a Brazilian coffee planter, resided in Paris. Interested from an early age in the theory of aeronautics, he began experimenting with balloons, making his first ascent in 1897. In 1898, he adapted a gasoline engine and a propeller to an elongated balloon of his own design, the first application of an internal combustion motor to an airship. He made successful flights in 1899, and, in 1901, in his sixth airship, he flew from Saint Cloud to the Eiffel tower and back in 30 minutes, winning the Deutsch prize of 100,000 francs. See *Airship*.

Sappho (*săf'ō*), lyric poetess of Greece, was a native, probably, of Mytilene, in Lesbos. She flourished about 600 B. C. and was a contemporary and friend of Alcæus. The ancient writers agree in expressing the most unbounded admiration for her poetry, and the few extant fragments of her work reveal her as a genius of the highest order. Her love poetry is almost unexampled in the intensity of feeling which it expresses. Her predilection for love poetry probably gave rise to the legend that, upon finding her passionate love for Phaon unrequited, she cast herself into the sea from the Leucadian promontory known, in ancient times, as "Sappho's Leap."

Sardou (*sär'dōō'*), **Victorien,** French dramatist, was born at Paris in 1831. He studied medicine, but subsequently turned to literature. He won reputation by *M. Garat* and other pieces, produced at the Déjazet theater, and was admitted to the academy in 1877. With Augier and the younger Dumas, Sardou dominated the French drama during the Second Empire, and several of his plays are among the most popular on the modern stage. Some, like *La Tosca*, have been made into grand operas; others, such as *Les pattes de mouche*, original of "The Scrap of Paper," *Divorçons*, and *La sorcière*, have become successful on the English and the American stage. Among other well-known plays are *La Taverne*, *Nos intimes*, *Candide*, *La famille Benoîton*, *Daniel Rochat*, *Théodora*, *Cléopâtre*, *Thermidor*, *Pamêla*, *Robespierre*, *Dante*, *Madame Sans-Gêne*, *Odette*, and *Fédora*. Died in 1908.

Sargent, Charles Sprague, American arboriculturist, was born at Boston in 1841. He was graduated from Harvard university in 1862, and, from 1863 to the end of the Civil War, he served in the Federal army. In 1872, he was appointed director of the Arnold arboretum and, in 1879, was made also professor of arboriculture, Harvard university. He planned the extensive Jesup collection of woods now in the American museum of natural history, New York City. In 1889, he edited the posthumous papers of Asa Gray. His writings include *Catalogue of the Forest Trees of the United States*, *The Woods of the United States*, *The Forest Flora of Japan*, *Silva of North America*, *Trees and Shrubs*, and *Manual of the Trees of North America*. Died, 1927.

Sargent, John Singer, painter, was born in Florence, Italy, of American parents, in 1856. He studied painting at the academy of fine arts, Florence, and in Paris under Carolus-Duran. In 1879, he traveled in Spain, studying the work of Velasquez, which greatly influenced his style. He resided in Paris until 1884, when he removed to London. Sargent ranks as one of the greatest modern portrait painters. His mural decorations in the Boston public library are among the most notable works of the kind. Well-known examples of his work are "El Jaleo" in the Boston museum; "Gitana," "Hermit," "Padre Sebastiano," and portraits of W. M. Chase and Henry Marquand in the Metropolitan museum, New York; "Carnation Lily, Lily Rose" in the Tate gallery, London; and "Carmencita" in the Luxembourg. In 1905, he was elected member of the American academy of arts and letters. Died, 1925. See page 1570b.

Sarolea, Charles, scholar, author, and publicist, was born at Tongres, Belgium, 1870. He was educated at Liege, Paris, Palermo, and Naples. He traveled extensively in Africa, America, and the Near East and, in 1894, became first lecturer and head of the French department of Edinburgh university. He founded *Everyman* in 1912 and edited it until 1917. During the period of the World War, he was war correspondent for the London *Daily Chronicle* and, by means of lectures in Great Britain and America, raised about $500,000 for Belgian relief. His numerous writings include *H. Ibsen*, *La Liberté et le determinisme*, *Life of Tolstoy*, *The Russian Revolution*, *How Belgium Saved*

Europe, German Problems and Personalities, Joan of Arc, and *Europe and the League of Nations.*

Sarto (*sär'tō*), **Andrea del,** Italian painter, was born near Florence in 1487. His family name was Vanucchi, but he was named Del Sarto, "the tailor's son," from his father's business. Of numerous frescoes which he painted in Florence the best are "Birth of the Virgin," "Adoration of the Kings," and the "Madonna of the Sack." Among his most celebrated single pictures are the "Assumption," "Madonna of the Harpies," "Disputa," and "Saint John the Baptist." Sarto ranks second only to Michelangelo and Da Vinci in accurate drawing and rivals the great Venetian masters in color. He was called "the faultless painter." Died in 1531.

Savonarola (*säv'ô-nä-rō'lä*; It., *sä'vô-nä-rō'lä*), **Girolamo,** Italian preacher and reformer, was born at Ferrara in 1452. He became a Dominican monk in 1475, and, in 1482, he removed to Florence, where, in 1491, he was made prior of Saint Mark's. Toward the close of the 15th century, he led the democratic party in Florence and effected important reforms. He held that the mortal enemy of Christ's gospel in all ages of the world has been mammon. Accordingly, he boldly denounced the abuses of the time, the licentiousness of the great, and the corruptions of the Church. He aroused the enmity of the Arrabbiati, the party of the Medici. In 1497, Savonarola was excommunicated by the pope and, in 1498, was arrested and put to death.

Scaliger (*skăl'ĭ-jẽr*), **Joseph Justus,** French classical scholar, was born in Guienne, 1540. He was educated at Bordeaux. In 1593, he was made professor of literature at Leiden. In his treatise, *De Emendatione Temporum,* he laid down for the first time a complete system of chronology formed upon fixed principles. He was master of many languages and was recognized as one of the great scholars of his time. He died in 1609.

Schaff (*shäf*), **Philip,** American church historian, was born at Chur, Switzerland, 1819. He was educated at Stuttgart, Tubingen, Halle, and Berlin. In 1844, he was called from his place as instructor at Berlin to a chair at the German Reformed seminary at Mercersburg, Pa., and, in 1870, he became professor in Union theological seminary, New York. He was president of the American Bible revision committee. Among his important works are a *History of the Christian Church, The Creeds of Christendom,* and *The Schaff-Herzog Encyclopædia of Religious Knowledge.* He died in 1893.

Scheele (*shā'lẽ*), **Carl Wilhelm,** Swedish chemist, was born at Stralsund, Pomerania, 1742. In 1770 he settled in Upsala. He made many important chemical discoveries, among which were tartaric acid, 1770; oxygen (independent of Priestley), chlorin, and baryta, all in 1774; prussic acid, 1782; and glycerin, 1784. He discovered also the arsenite of copper, commonly known as Scheele's green. Died in 1786.

Schelling (*shĕl'ĭng*), **Friedrich Wilhelm Joseph von,** German philosopher, was born in Wurttemberg, 1775. He was educated at Tubingen and at Leipzig. In 1798, he succeeded Fichte as teacher of philosophy at Jena; in 1803 he became professor at Wurzburg, later at Erlangen and Munich, and, in 1841, he was called to the University of Berlin. In philosophy he began as a follower of Fichte and of Hegel, but he was later influenced by Spinoza and Böhme. His numerous works include *Inquiry into the Nature of Human Freedom, On the Possibility of Any Form of Philosophy, Philosophy of Nature,* and *The World Soul.* He died in 1854.

Schiff, Jacob Henry, American banker, was born at Frankfort on the Main, Germany, in 1847. He received his education in the schools of Frankfort and, at the age of 18, came to New York, where, in 1867, he established a brokerage firm. In 1875, he was taken into the firm of Kuhn, Loeb and Company, bankers, of which, in 1885, he assumed leadership. Through his efforts the business of the firm was greatly expanded. In 1897, his house was actively associated with E. H. Harriman in reorganizing the Union Pacific railway and in gaining control of the Southern Pacific. In 1901, the Schiff and Harriman interests, on the one side, and J. J. Hill and J. P. Morgan, on the other, engaged in a titanic financial struggle for the possession of the Northern Pacific railway. This contest resulted in the formation of the Northern Securities Company as a holding company for their joint interests.

During his later years, Schiff devoted much attention to philanthropic enterprises, and made substantial gifts to various institutions. He presented a Semitic museum to Harvard and founded the Montefiori home for chronic invalids. He left an estate valued at about 50 million dollars. Died in 1920.

Schiller, Johann Christoph Friedrich von, German poet and dramatist, was born at Marbach, Wurttemberg, Germany, November 10, 1759. In his 9th year he was sent to school at Ludwigsburg. He early preferred nature to books. At first he was destined for the clerical profession, but this was abandoned upon his entrance to the academy in Stuttgart in his 14th year. He began the study of law, which he soon changed for that of medicine, but both were uncongenial. He continually fretted against the inflexible, formal school system.

In 1780, he was appointed by the duke of Wurttemberg as surgeon in a regiment. The whole bent of his inclinations, however, was toward literature. The next year, he brought out *The Robbers.* This drama was a daring defiance of the artificial restraints of civilization; it was the natural rebound of his mind from the cramping influences of school. Schiller was present without leave at its presentation. Afterward, being arrested and condemned by the duke to write nothing but medical treatises, he escaped from Wurttemberg and wandered from place to place until the duke's anger subsided.

Being allowed later to reside where he pleased, Schiller went to Mannheim, where, in 1783, he was appointed poet of the theater. Here he produced his dramas *Fiesco* and *Intrigue and Love.* He strove incessantly to improve himself in dramatic art and to render the theater of Mannheim the instrument of a high moral purpose in the work of national instruction. At this time, he was raised to the rank of councilor to the duchy of Weimar.

Shortly afterward, he left Mannheim, and then followed another period of wandering. He stopped at Leipzig. Disappointed in love, he gave up his intention of devoting himself to a professional calling. He removed to Dresden, where he completed his historical *Don Carlos* in 1787. After two years, he shifted his residence to Weimar, then the intellectual capital of Germany; and here he met Charlotte von Lengefeld, whom he married in 1790. He was appointed in 1789 to the office of professor of history at Jena, following his publication of *Revolt of the Netherlands.* His *History of the Thirty Years' War* appeared in 1792. Both reveal a marked genius for the effective handling of facts.

From 1791 to 1799, Schiller resided principally at Jena, though incapacitated by ill health for the active duties of his professorship. During these years of pain, he executed his greatest achievements. In 1799, he completed *Wallenstein,* perhaps his greatest work and regarded by many as the finest tragedy in the German language. A period of happy intimacy with Goethe at Weimar followed in 1799–1805, during which he produced *The Maid of Orleans, The Bride of Messina, Mary Stuart,* and some minor poems. In 1804, he wrote *William Tell,* the most popular of his dramas.

Schiller has long been recognized as second only to Goethe in German literature and, in some ways, even surpassing him. As a poet, he is characterized by strong feeling and intense idealism. He stands foremost among German dramatists, and ranks among the greatest of all writers of drama. Died, May 9, 1805. See *William Tell.*

Schleiermacher (*shlī'ẽr-mä'kẽr*), **Friedrich Ernst Daniel,** German philosopher and theologian, was born at Breslau in 1768. He was educated at the Moravian schools of Niesky and Barby and studied philosophy and theology at Halle. His first important literary work, *Discourses on Religion,* appeared in 1799. He was professor at Halle, 1804–06, and, in 1810, was called to a theological chair in the University of Berlin. In 1811 appeared his *Brief Outline of the Study of Theology;* in 1817, his *Critical Essay on the Writings of Luke;* and, in 1821-22, his greatest work, *Christian Faith.* Schleiermacher exercised a unique influence upon philosophy, and his works and teachings mark an epoch in the development of Christian thought. He died in 1834.

Schley (*slī*), **Winfield Scott,** American naval officer, was born near Frederick, Md., in 1839. He was graduated from the United States naval academy in 1860, served in West Gulf blockading squadron in 1862-63, and was in the engagements leading to the capture of Port Hudson, La., in 1863. In 1884, he took command of the Greely relief expedition and rescued Lieutenant Greely and six survivors at Cape Sabine. He commanded the *Baltimore* and settled the trouble at Valparaiso, Chile, 1891, when several American sailors were stoned by a mob. In the war with Spain he was in immediate command at the destruction of Cervera's fleet off Santiago, July 3, 1898. He wrote *Rescue of Greely* and *Forty-five Years under the Flag.* Died in 1911.

Schliemann (*shlē'män*), **Heinrich,** German traveler and archeologist, was born in Neu Buckow, 1822. After mastering several modern languages, he engaged in business, traveled extensively, and accumulated a large fortune. In 1863 he retired, settled in Paris, and devoted himself to archeological studies. Becoming convinced that the hill of Hissarlik in Asia Minor covered the site of ancient Troy, he began in 1870 to excavate it at his own expense. This was the first of a series of excavations which greatly extended modern knowledge of the early Greek civilization. He wrote an account of his work in *Mycenæ, Tiryns, Ilios, Troja,* and other volumes. Died in 1890.

Schnitzler (*shnĭts'lẽr*), **Arthur,** Austrian dramatist, was born in Vienna, 1862. He was graduated at the university of his native city in 1885 and devoted himself to the

practice of medicine and to literature. Beginning in 1893, he wrote stories, novels, and plays, which placed him in the front rank of Austrian writers and gave him a leading place in the modern Viennese school of drama. He possesses high technical skill, treats his themes with grace and charm, and excels in the one-act play and the sketch. Of his numerous plays, some of the best-known are *Anatol*, *The Legacy*, *The Green Cockatoo*, *Paracelsus*, *The Companion*, *Living Hours*, *The Woman with the Dagger*, *The Lonely Way*, *Intermezzo*, *Professor Bernhardi*, *Playing with Love*, and *Countess Mizzi*.

Schoolcraft, Henry Rowe, American ethnologist, was born at Watervliet, N. Y., in 1793. After studying at Union college, he visited the mining region of southern Missouri in 1817-18 and acted as geologist in an exploring expedition to the copper regions of Lake Superior in 1820. In 1822, he was made Indian agent for the tribes about Lake Superior and thereafter devoted himself chiefly to ethnology. In 1831, he assisted in founding the Algic society in Detroit, devoted to the antiquities and ethnology of the American Indians. His works include *Notes on the Iroquois*, *The Red Race of America*, *Thirty Years with the Indian Tribes*, and a history of the Indians of the United States. He died in 1864.

Schopenhauer (*shō'pĕn-how'ĕr*), **Arthur,** German philosopher, was born at Danzig in 1788. He studied at Gottingen, Berlin, and Jena. He spent the winter of 1813 at Weimar, where he enjoyed the society of Goethe. He then proceeded to Dresden, where he published a treatise, *Sight and Color*, which was followed three years later by his great work, *The World as Will and Idea*. In 1831, he removed to Frankfort on the Main and thereafter devoted himself uninterruptedly to the elaboration of his philosophical system. Among the results of these studies were his works *On the Will in Nature* and *The Fundamental Problems of Ethics*. He died in 1860.

Schouler (*shōō'lĕr*), **James,** American lawyer and historian, was born at Arlington, Mass., in 1839. He was graduated at Harvard in 1859 and was admitted to the Massachusetts bar in 1862. From 1882 to 1902, he was professor of law in Boston university, and, from 1891 to 1908, he was lecturer on American history at Johns Hopkins. He wrote numerous legal treatises and historical works, but his reputation rests chiefly on his valuable *History of the United States under the Constitution*. Died in 1920.

Schreiner (*shrī'nĕr*), **Olive,** South African author, was born in Basutoland, 1855, the daughter of an English missionary. She married S. C. Cronwright in 1894. Her *Story of an African Farm*, published under the pseudonym of Ralph Iron, won instant success. It is the autobiography of a sensitive and imaginative spirit as it passes from extreme Calvinism to a convinced atheism. Her other works include *Dreams*, *Dream Life and Real Life*, and *Trooper Peter Halket*. Her *Woman and Labor* is one of the strongest pleas for feminism in the English language. Died, 1921.

Schubert (*shōō'bĕrt*), **Franz Peter,** Austrian composer, the son of a poor schoolmaster, was born at Vienna in 1797. At 11 he became a singer in the court choir and later leading violinist in the school band. At 14 he began writing songs and at 18 his supreme gift of lyric melody was revealed in "The Erlking," one of the world's most dramatic songs, written by him in a single day. His brief life, spent chiefly in the drudgery of teaching, was harassed by pecuniary embarrassment and embittered by the slow recognition accorded to his work. Schubert's fame rests upon his songs, some 600 in number, which constitute an imperishable monument to his genius. He originated the modern artistic song (*Kunstlied*) of which he still remains the unsurpassed master. Died in 1828.

Schumann, Robert, German composer, was born in Zwickau, 1810. He was educated at Heidelberg and studied music under Wieck at Leipzig. At first he planned to become a pianist but, upon permanently injuring his hand, devoted himself to composition and musical criticism. In 1834, he founded the *Neue Zeitschrift für Musik*, which under his editorship greatly influenced musical progress. In 1840, he married the pianist Clara Wieck, whose brilliant interpretations did much to establish his fame throughout Europe. While Schumann's early compositions were chiefly for the piano, he produced between 1840 and 1854 nearly 250 songs, many of which have become classic. During this time he wrote also his celebrated piano quintet; the choral work *Paradise and the Peri*; the opera *Genoveva*; symphonies; and various other works. As a song composer Schumann is one of the greatest successors of Schubert and in musical beauty his piano compositions rank with those of Chopin. Died in 1856.

Schumann-Heink (*shōō'mān-hĭngk'*), **Ernestine,** née Roessler, dramatic contralto, was born at Lieben, Bohemia, in 1861. She studied at Graz and made her début at Dresden, 1878, as Azucena in *Il Trovatore*; sang in Dresden four years and, in 1883, went to Hamburg. In 1896, she sang at Bayreuth in *Der Ring des Nibelungen*, and won a national reputation. She made her American début in 1898 and at once became popular, especially in Wagnerian rôles. Since 1908 she has devoted herself chiefly to concert work, attaining distinction as a lieder singer. She married Ernst Heink of Dresden in 1882, Paul Schumann of Hamburg in 1893, and William Rapp, Jr., of Chicago in 1905. In 1905, she bought a large estate at Montclair, N. J.

Schurman (*shōōr'mān*), **Jacob Gould,** American educator, was born at Freetown, Prince Edward Island, in 1854. He was graduated at the University of London, 1877; studied at Paris and at the University of Edinburgh, 1877-78, also at Heidelberg, Berlin, Gottingen, and in Italy, 1878–80. From 1880 to 1882, he was professor of English literature, political economy, and psychology, Acadia college; from 1882 to 1886, he was professor of metaphysics and English literature, Dalhousie college. He was professor of philosophy in Cornell university from 1886 to 1892, when he was made president of the university, an office which he filled with distinction until 1920. In 1899, he was appointed president of the first United States Philippine commission. He was United States minister to Greece and Montenegro in 1912-13; to China in 1921–25; and then ambassador to Germany. His writings include *Kantian Ethics and the Ethics of Evolution*, *The Ethical Import of Darwinism*, *Belief in God*, *Agnosticism and Religion*, *A Generation of Cornell*, *The Balkan Wars*, and *Why America Is in the War*.

Schurz (*shōōrts*), **Carl,** American political leader and soldier, was born near Cologne, Germany, in 1829. He was educated at the University of Bonn and began the publication of a Liberal newspaper. He took part in the revolutionary movement of 1848 and joined the revolutionary army, but was finally forced to flee to Switzerland.

Schurz came to the United States in 1852, settled at Watertown, Wis., in 1856, and, at the outbreak of the Civil War in 1861, he joined the Union army. Appointed brigadier general in 1862 and promoted major general in 1863, he commanded a division at Chancellorsville and a corps at Gettysburg.

After the war he engaged in journalistic work and in 1867 became editor of the Saint Louis *Westliche Post*. From 1869 to 1875, he was United States senator from Missouri. He was one of the organizers of the Liberal party, 1872; presided over the Cincinnati convention which nominated Greeley for president; supported Hayes, 1876; and was secretary of the interior, 1877–81. From 1881 to 1883, he was editor of the New York *Evening Post*.

An orator and writer of marked ability and an indefatigable advocate of political reform, Schurz for a quarter of a century was a prominent figure in American public life. His writings include *Speeches*, *Life of Henry Clay*, *Abraham Lincoln*, and *Reminiscences*. In 1905, he was elected a member of the American academy of arts and letters. Died in 1906.

Schwab (*shwāb*), **Charles M.,** American capitalist, was born in Williamsburg, Pa., 1862. He was educated in the village school and at Saint Francis college. As a boy he drove a stage from Loretto to Cresson, Pa.; entered the service of the Carnegie Company as stake driver in the engineering corps of Edgar Thompson steelworks and rose steadily. He was superintendent of the Homestead works, 1892–97; president of the Carnegie Steel Company, limited, 1897–1901, and president of the United States Steel Corporation, 1901–03. He then became president and manager of the Bethlehem Steel Corporation. After the outbreak of the World War in 1914 and prior to the entrance of the United States into the conflict, this corporation and its subsidiary establishments filled orders for munitions and other war supplies for the Allied powers aggregating more than 400 million dollars. Early in 1918, Schwab was made director general of the shipbuilding board of the emergency fleet corporation and devoted his efforts to speeding up shipbuilding until the end of the war. He then resigned and returned to his former position with the Bethlehem Steel Corporation.

Scipio (*sĭp'ĭ-ō*), **Publius Cornelius,** surnamed Africanus Major, Roman general, was born about 237 B. C. In 212, he was elected ædile and, in 211, became proconsul with command of the Roman forces in Spain, where the Carthaginian forces had opened hostilities against the Romans.

Scipio found, on arriving, that the Carthaginians, under Hannibal, had eluded him and had invaded Italy, where they continued to win signal victories for many years. In 205, he returned to Rome and, having been elected consul, persuaded the Senate to permit him to invade the African territory of Carthage. Thus, "carrying the war into Africa," he compelled Hannibal to return from Italy, and the two generals met at Zama in 202 B. C. Scipio won a complete victory, and peace was concluded in the following year. He later accompanied his brother Lucius in the campaign against Antiochus in 190. Scipio is considered the greatest Roman general before Julius Cæsar. Died, 185 or 183 B. C.

Scipio, Publius Cornelius Scipio Æmilianus, surnamed Africanus Minor, was born about 185 B. C. After distinguishing himself in Spain, he took part in the third

Punic war in Africa. Here he laid siege to Carthage, took it by storm, and leveled it to the ground in 146. He was later sent to Spain, where he captured Numantia after a stubborn resistance. After his return to Rome, he became leader of the aristocratic party in the Senate. Upright and magnanimous, he was neither an uncompromising oligarch nor a servile flatterer of the people. He gathered about himself a brilliant group of men, who formed what has been called the Scipionic circle. He was assassinated in 129 B. C.

Scollard (*skŏl'ärd*), **Clinton,** American poet, was born at Clinton, N. Y., in 1860. He was graduated at Hamilton college in 1881 and continued study at Harvard and at Cambridge, England. He was professor of rhetoric and English literature in Hamilton college from 1888 to 1896 and again in 1911-12. His verse, much of which reaches a high level, is marked by genuine poetic feeling and almost faultless technique. Among his numerous volumes of poems are *Pictures in Song, Old and New World Lyrics, Songs of Sunrise Lands, A Boy's Book of Rhyme, The Lyric Bough, Songs of a Syrian Lover, The Vale of Shadows, Italy in Arms, Ballads Patriotic and Romantic, Elegy in Autumn,* and *War Voices and Memories.*

Scott, Duncan Campbell, Canadian poet, was born in Ottawa, Ont., 1862. He was educated at Stanstead Wesleyan college. In 1893 he became an accountant in the Canadian civil service. In the same year he published his first volume of verse entitled *The Magic House,* which was followed by *Labour and the Angel, New World Lyrics and Ballads, Via Borealis, Lundy's Lane,* and *Beauty and Life.* His writings include also a collection of short stories entitled *The Village of Viger* and *John Graves Simcoe,* a biography. In 1921, he was made president of the royal society of Canada.

Scott, Robert Falcon, English antarctic explorer, was born at Outlands, in 1868. He entered the navy at 14 and, in 1889, was promoted lieutenant. In 1901, he was placed in command of an antarctic expedition, during which he discovered King Edward VII land and reached latitude 82° 17′ S., then a new "farthest south." Valuable scientific work was accomplished, in recognition of which he was promoted captain and awarded many honors. In 1910, he set out in command of a new expedition for antarctic discovery. By a continuous sledge journey of 1842 miles, the longest made in polar regions, he reached the south pole, January 18, 1912, only five weeks later than Amundsen, but perished with his entire party some two months later while making the return journey. His writings include *Voyage of the Discovery* and the posthumous *Scott's Last Expedition.*

Scott, Sir Walter, Scottish poet and novelist, was born in Edinburgh, August 15, 1771. He was descended from an old family of border freebooters; and the stories of his marauding ancestors, to which he listened, produced a deep and indelible impression upon his mind.

Education. He entered the high school at Edinburgh in 1779. There he became distinguished for his courage, his extraordinary memory, his vast store of miscellaneous information, and his skill in story telling. In the winter of 1783, he entered Edinburgh university, but he attended only one session. When 15 years of age, he was in his father's office and studied law sedulously. Undesignedly he was at this time preparing himself for his later literary pursuits by devouring romances, novels, histories, and old plays.

Early Career. In 1792, he was admitted a member of the Scottish faculty of advocates. In 1797, he married Charlotte Margaret Carpenter, daughter of a French emigrant, whose small fortune, together with his own income from the shrievalty of Selkirkshire, made Scott sufficiently independent of professional labor to devote himself more and more to congenial literary pursuits. He gradually made authorship the main business of his life. To this earlier period belong several of his original ballads and the translation of Goethe's prose drama *Götz von Berlichingen.*

Literary Success. The most brilliant period of Scott's literary career extends from 1802 to 1825. In the first of those years, he published his *Minstrelsy of the Scottish Border,* which gave him a distinguished reputation for his annotations upon the old ballads and for the promise of his own ballads inserted in the collection. *The Lay of the Last Minstrel,* which appeared in 1805, is a romance of border chivalry. Its success was phenomenal. *Marmion* came in 1808 and *The Lady of the Lake* in 1810. These were followed by several other metrical romances. During this time Scott edited the works of Dryden and Swift, contributed for a time to the Edinburgh *Review,* and assisted in establishing the *Quarterly.*

Publishing Enterprise. Having quarreled with his publisher, Constable, Scott became a third partner in a new publishing house with the two brothers Ballantyne. This arrangement, kept secret, was to exercise a disastrous effect upon his later fortunes.

Scott wished for fame; therefore, seeing the waning popularity of his poetry, he set to work to win laurels in a new field. He wished for gain, that he might gratify his ambition to possess an estate in land. He accepted an appointment as one of the principal clerks of the court of sessions in 1812 in order to add to his income and to enable him to buy lands. His success enabled him shortly to create a country estate at Abbotsford. For these ends at first, and, later, to avert the ruin that threatened his publishing interests, Scott turned to the writing of historical novels.

The first of the historical novels was *Waverley,* which gave its name to the series. *Guy Mannering* appeared in 1815; *The Antiquary* and *Old Mortality,* in 1816; *Rob Roy* and *The Heart of Midlothian,* in 1818; *The Bride of Lammermoor,* in 1819; *Ivanhoe,* in 1820; *Kenilworth,* in 1821; *The Pirate,* in 1822; *St. Ronan's Well,* in 1824. Few writers have been so prolific as Scott. He was created a baronet in 1820 for his distinguished work.

In 1826, the Ballantyne's firm failed; Scott's concealed partnership was revealed, and he pledged himself to devote the labor of his subsequent life to the payment of the liabilities. Breaking up his establishment at Abbotsford, he hired a lodging in Edinburgh, and, for some years, he toiled at his prodigious work. His *Life of Napoleon* and *The Fair Maid of Perth* belong to this period. He made amazingly large payments to his creditors; but the limits of endurance were reached, and, in 1830, he was smitten with paralysis. A brief trip to Italy failed to restore his health, and he returned to Abbotsford.

Place in Literature. It is one of the most melancholy thoughts in the history of English literature that Scott was prematurely sacrificed. No writer ever exercised a greater influence over the public mind or led to so much imitation. His writings never foster a base feeling nor throw ridicule on good and generous impulses. His unfailing wholesomeness and freshness, the variety and richness of his range, his Homeric simplicity and charm, place him second only to Shakspere in English creative and imaginative literature. The greatness of Scott's heart, the loyal and sympathetic affection of his nature, are as remarkable as his astonishing genius. In an important sense, he was the greatest of peaceful conquerors in the world of letters. Died, 1832. See *Literary Plots, Characters, and Allusions* under titles of chief works.

Scott, Walter Dill, American educator, was born at Cooksville, Ill., in 1869. He was graduated at the Illinois State normal university in 1891, at Northwestern university in 1895, at McCormick theological seminary in 1898, and at the University of Leipzig in 1900. Returning to Northwestern university, he was associate professor of psychology and education from 1901 to 1908 and professor of psychology from 1908 to 1920, when he was made president of the university. Among his published works are *The Theory of Advertising, The Psychology of Public Speaking, The Psychology of Advertising in Theory and Practice, Influencing Men in Business, Increasing Human Efficiency,* and *Science and Common Sense in Working with Men.*

Scott, Winfield, American general, was born near Petersburg, Va., in 1786. He studied at William and Mary college and became a lawyer; but in 1808 he entered the army as captain. In the War of 1812 he fought at Queenston, Chippewa, and Lundys Lane, and, in recognition of his services, he was made major general. As commander in chief of the United States army, 1841–47, he led the expedition invading Mexico. He captured Vera Cruz and defeated Santa Anna at Cerro Gordo, taking Jalapa and Puebla. After capturing the castle of Chapultepec by storm, he led his army, on September 14, 1847, into the city of Mexico, where he commanded until the treaty of peace was signed in February 1848. In 1852, he was a candidate for the presidency, but was defeated. He published an autobiography entitled *Memoirs.* Died in 1866.

Scotti (*skŏt'tē*), **Antonio,** Italian dramatic basso, was born at Naples in 1866. He received his entire musical training from Madame Paganini. In 1889, he made his first appearance in grand opera at Malta as Amonasro in *Aïda.* His superb voice and notable histrionic ability won immediate recognition, and he soon established a world-wide reputation. In 1899, he was engaged for the Metropolitan opera house, New York, where he has been a leading singer for many years.

Scribe (*skrēb*), **Augustin Eugène,** French dramatist, was born in Paris, 1791. He was educated for the law, but early turned his attention to the stage. Beginning with his first successes in 1816, he produced, alone or in collaboration, about 400 plays, remarkable for their mastery of stagecraft. He tried every form of dramatic composition—tragedies, comedies, vaudevilles, and opera librettos—often doing little more than editing the ideas of others. Dumas the Younger, Augier, and especially Sardou gained from Scribe that mastery of theatrical technique which gave France undisputed leadership in 19th-century drama. He was elected to the French academy in 1834. Among his best

plays are *Valérie*, *Le mariage d'argent*, *Bertrand et Raton*, *La camaraderie*, *Le verre d'eau*, *Adrienne Lecouvreur*, *Bataille de dames*, and *Les doigts de fée*. His librettos include *Fra Diavolo*, *Robert le Diable*, *La Juive*, *Les Huguenots*, *Le prophète*, and *L'Africaine*. He died in 1861.

Seeger, Alan, American poet, was born in New York City, 1888, of New England parentage. In 1906, he entered Harvard university, where he displayed much interest in literary studies and contributed verse to the *Harvard Monthly*. Following graduation, he spent two years in New York, and, in 1912, he went to Paris, where he wrote most of the poems entitled *Juvenilia*. In August 1914, he enlisted in the foreign legion of France. While in service at the front he produced some excellent verse entitled *Later Poems*. A collection embracing the foregoing, entitled *Poems*, with an introduction by William Archer, was published shortly after his death, as was also the *Letters and Diary of Alan Seeger*. He was killed in battle near Belloy en Santerre, July 4, 1916.

Selden, George Baldwin, American inventor, was born in 1845. He was graduated from Yale university in 1869, studied law for a time, and then turned his attention to experimenting with engines for propelling light vehicles. For many years he was president of the Selden Motor Company of Rochester, N. Y.

In 1879, he filed the first patent for a gasoline motor-propelled vehicle. This later resulted in protracted litigation, which is said to have cost Selden nearly all of the financial returns realized from the invention. In 1900, he sued Ford and Winton for infringement of his basic patent. He was successful in the lower courts, but appeals were taken to higher courts. In the meantime, all automobile manufacturers, except Ford, agreed to recognize the Selden patent as binding and to pay a small royalty on all motor cars manufactured.

In 1911, the higher court rendered a decision upholding Selden's patent but ruling that the Ford engine was of the Otto type and therefore not covered by the Selden patent. As the other makers of cars were then using engines similar in type to that used by Ford, all the royalties that were being paid to Selden ceased. He died at Rochester in 1922. See *Automobile*.

Selous (*sĕ-lōō'*; *sĕ-lōōs'*), **Frederick Courtenay,** English explorer and writer, was born in London, 1851. He was educated at Rugby and in Germany. From 1871 to 1893 he was an explorer, ivory hunter, and natural history collector in South Africa. In 1890 he piloted the British pioneer expedition through Mashonaland and in 1893 fought in the Matabele war. He retired to England but, in the World War, he joined the Allied forces in Africa. His numerous writings include *A Hunter's Wanderings in Africa*, *Travel and Adventure in Southeast Africa*, *Sunshine and Storm in Rhodesia*, and *African Nature Notes and Reminiscences*. He was killed in action in 1917.

Sembrich (*zĕm'brĭk*), **Marcella** (Praxede Marcelline Kochanska), Austrian operatic soprano, was born at Lemberg in 1858. She studied at the Lemberg conservatory under Professor William Stengel, whom she married, also at Vienna under Rokitansky, and made her début in opera at Athens in 1877 as Elvira in *I Puritani*. In 1880, as Lucia, she won distinction at London and soon attained remarkable success in other European centers. She made her first appearance in America at the Metropolitan opera house, New York, 1883, and for many years sang in various cities of the United States. She retired from the operatic stage in 1909, but continued to appear in concerts.

Seneca, Lucius Annæus, Roman Stoic philosopher, was born at Cordoba, Spain, about 4 B. C. He was educated at Rome and became a successful advocate in the courts of justice. Accused of intrigue, he was exiled to Corsica, but, on the marriage of the emperor Claudius to Agrippina, Seneca was recalled and made instructor to Agrippina's son Nero, who ascended the throne five years later.

Seneca became one of the young emperor's chief advisers, attaining great power and immense wealth. Seneca's influence, however, failed to restrain the vicious propensities of Nero. On the latter's murder of his own mother, Seneca offered to return all his rich gifts, craving only permission to retire. Nero refused but soon afterward attempted to poison Seneca.

His extant writings are chiefly moral and philosophical. Ten tragedies ascribed to Seneca by Quintilian have also come down to us. While not intended for the stage, these plays are important on account of their influence upon the classical French drama. Following the conspiracy of Piso in 65 A. D., Seneca received an order from Nero to put himself to death, which he promptly acted upon with the traditional Stoic contempt for life.

Senefelder (*zā'nĕ-fĕl'dĕr*), **Aloys,** Bohemian inventor, the son of an actor, was born at Prague in 1771. After studying the art of printing, he determined to invent a process of his own and, in 1798, made his discovery of lithography. Constructing a suitable press and obtaining a patent, he soon was successfully established as a lithographic printer in Munich, which became the center of the lithographic art. In 1819, he published *Elements of Lithography*. Died in 1834.

Serra (*sĕr'rà*), **Junipero** (*Hōō-nē'pâ-rō*), Franciscan missionary, founder of early Indian missions in California, was born at Petra, island of Majorca, in 1713. He received the degree of doctor of theology at the Lullian university at Palma, where he became professor of philosophy. In 1749, he joined the missionary college of San Fernando, Mexico. For nine years he served in Indian missions north of Queretaro and meanwhile translated the catechism into the Pame language. Returning to Mexico City, he became a zealous and effective preacher of missions.

In 1767, Serra was made superior of a band of 15 Franciscans for the missions of Lower California, and, in 1769, he accompanied Portola's overland expedition to Upper California. En route he established at San Diego, July 16, 1769, the first of the 21 California missions extending along the coast as far north as Sonoma. During the last three years of his remarkable life he visited all the missions from San Diego to San Francisco and confirmed over 5000 Indians who had been converted during his 14 years of service.

Irrespective of creed, all serious students of his period unanimously rank Serra's heroic and self-denying labors in behalf of the Indians among the most effective and admirable in the history of America. He died in 1784 at San Carlos mission, near Monterey, where a monument was erected to his memory by Mrs. Leland Stanford. See *California Missions*.

Service, Robert William, Canadian poet and novelist, was born at Preston, England, in 1876. He was educated in Glasgow, where he served an apprenticeship in a bank. He then went to Canada, first settling on Vancouver island, B. C. Later, he spent eight years in the Yukon region, during which he traveled extensively. Following the success of his *Songs of Sourdough*, 1907, he devoted himself to writing poems and novels. On account of his vigorous, descriptive style, he has been called the "Kipling of Canada." For two years during the World War, he drove an ambulance in France, and, as war correspondent, he wrote a series of letters entitled *Impressions of a Red Cross Man*. His writings include *Ballads of a Cheechako*, *The Trail of '98*, *Rhymes of a Rolling Stone*, *The Pretender*, and *Rhymes of a Red Cross Man*.

Sesostris. See *Rameses I*.

Seton (*sē'tŭn*), **Ernest Thompson,** American artist, author, and lecturer, was born at South Shields, England, 1860. In childhood he lived in the forests of Canada and, later, on the western plains. He was educated at Toronto collegiate institute and at the royal academy, London. From 1890 to 1896 he studied art in Paris. As official naturalist to the government of Manitoba, he published *Mammals of Manitoba* and *Birds of Manitoba*. He became widely known as a writer and illustrator of animal stories and as a lecturer. He was one of the originators of the Boy Scout movement in America and started the outdoor life organization known as the Woodcraft league. Among works written and illustrated by him are *Wild Animals I Have Known*, *Trail of the Sandhill Stag*, *The Biography of a Grizzly*, *Lives of the Hunted*, *Two Little Savages*, *Animal Heroes*, *Woodcraft and Indian Lore*, *Manual of the Woodcraft Indians*, *Woodcraft Boys*, *Woodcraft Girls*, *Sign Talk*, and *Woodland Tales*.

Sévigné (*sā'vēn'yā'*), **Marquise de,** née Marie du Rabutin-Chantal, one of the most charming of letter writers, was born at Paris in 1626. At 18 she married the Marquis de Sévigné, who left her a widow at 25. To her children, especially to her daughter, Madame Sévigné devoted the rest of her life. Her beauty, vivacity, and social tact attracted many distinguished friends, among them Turenne and Prince de Conti. Her fame rests upon her *Letters*, written chiefly to her daughter, and reflecting the brightest and purest side of Parisian social life. Unrivaled for freshness, vividness, and wit, these letters form an intimate chronicle of the court and the high society of the time, 1669–95. She died in 1696.

Seward (*sū'ĕrd*), **William Henry,** American statesman, was born in Florida, N. Y., 1801. He was graduated at Union college in 1820, was admitted to the bar in 1822, and settled in Auburn, N. Y., 1823. He was elected state senator as an Antimason, in 1830, and governor of New York as a Whig, in 1838. In 1849, he was elected to the United States Senate, where he became the acknowledged leader of his party. In 1860, he was a candidate favored by a large part of the Republican party for nomination for the presidency. Seward accepted the post of secretary of state in Lincoln's cabinet, rendering services of great value during the Civil War, notably his handling of the Trent affair.

On April 14, 1865, President Lincoln was assassinated at a theater in Washington. At the same time, another assassin entered Seward's room and inflicted dangerous wounds upon him. Seward recovered and continued as

secretary of state throughout the administration of President Johnson, during which time he conducted the negotiations for the purchase of Alaska. He published *Speeches and Orations* and *Life of John Quincy Adams*. Died in 1872. See *Alaska Purchase, Seward Whigs, Trent Affair*.

Shackleton, Sir Ernest Henry, British naval officer and antarctic explorer, was born at Kilkee, Ireland, in 1874. He entered the navy and, in 1901–04, was lieutenant in the national antarctic exploration under Captain R. F. Scott, with whom he attained a new "farthest south," lat. 82° 17′. During 1907–09, he commanded an expedition which ascended Mount Erebus, reached for the first time the south magnetic pole, and personally led a party which reached 88° 23′ S., within 97 geographic miles of the south pole. During 1914–16, he conducted an expedition which made an unsuccessful effort to cross the antarctic continent. He published *The Heart of the Antarctic, The Diary of a Troopship*, and *South*. While on a third antarctic expedition, he died near South Georgia island, 1922.

Shaftesbury (*shăfts'bĕr-ĭ*), **Anthony Ashley Cooper, Earl of,** English statesman and philanthropist, was born in London, 1801. He was graduated at Oxford in 1822. In 1826, he entered Parliament as a Conservative, serving until 1851, when he succeeded his father in the peerage. His fame lives by reason of his lifelong philanthropy, which took shape in numerous acts of Parliament, such as the Mines and Collieries act, excluding women and boys under 13 from working in the mines; the factory acts, and the Workshop Regulation act. Outside of Parliament he worked in behalf of benevolent and religious movements, notably the ragged school movement and for the better housing of the London poor. He died in 1885.

Shahan (*shä'ăn*), **Thomas Joseph,** American educator, was born at Manchester, N. H., in 1857. He studied at the American college in Rome from 1878 to 1882 and was then ordained to the priesthood. From 1883 to 1888 he was chancellor and secretary of the diocese of Hartford. After further study at the Roman seminary, 1889, and at the University of Berlin, 1889–91, he served as professor of church history and patrology in the Catholic University of America from 1891 to 1909, when he was made rector. Among his writings are *The Blessed Virgin in the Catacombs, Giovanni Battista de Rossi, The Beginnings of Christianity, The Middle Ages*, and *St. Patrick in History*.

Shah Jehan (*shä jē-hän'*), fifth of the Mogul emperors of Delhi, was born about 1592, and succeeded his father in 1627. He was a man of great administrative ability and a skilled warrior; he conquered Bijapur and Golconda, and raised the Mogul empire to its zenith. He founded the modern city of Delhi, where he constructed the famous peacock throne, valued at 30 million dollars, and built the Taj Mahal and other magnificent edifices at Agra. A victim of the perfidy of his usurping son, Aurungzebe, he died in prison, 1666.

Shakspere, William, English dramatist and poet, was born at Stratford on Avon, Warwickshire, England, where his baptism was registered April 26, 1564. His mother's name was Mary Arden. "Born at Stratford on Avon, married and had children there; went to London, where he commenced as an actor, and wrote poems and plays; returned to Stratford, made his will and died — this," says Steevens, "is all that is known, with any degree of certainty, about Shakspere." His real biography lies in a critical estimate of his writings.

There was a free grammar school at Stratford, and the probabilities are that here Shakspere received his education,—English, besides "small Latin and less Greek." We have no trace of his employment in the interval between his school days and manhood. Some hold that he was an attorney's clerk. The tradition is that he was a wild young fellow, stealing deer. The certainty is that he was treasuring up that store of knowledge and cultivating that range of genius which made him what he became.

Private Life. Shakspere married Ann Hathaway in 1582, and to them were born three children — Susanna, Hamnet, and Judith. In 1586, Shakspere became connected with the Blackfriars theater in London. In 1589, he was a joint proprietor of that theater. The players of the Blackfriars were the lord chamberlain's company, who acted under royal patronage. We know nothing of the date of the production of his first play. Shakspere became rich in connection with the theaters. In 1597, he purchased the principal house in Stratford and also some lands in that parish.

It is supposed that he ceased to be connected with the theaters in 1609. His father died in 1601, and it is more than probable that Shakspere succeeded him as a practical farmer in his native place. At any rate, he is known to have brought action in the bailiff's court there to collect money for corn sold and delivered.

Dramas and Poems. In the 20 years between 1590 and 1610, Shakspere wrote and produced most of his plays. To the first decade belong chiefly the histories and comedies; to the second, the tragedies. Some or all of them were performed before the royal court as well as elsewhere. In 1623, his stage companions, Heminge and Condell, having affectionately preserved his plays, gave them to the world in what is known as the *First Folio*. Prefixed to this edition was a half-length portrait, engraved by Droeshout and regarded as an authentic likeness of the poet.

The evidence by which the chronology of Shakspere's works is inferred is of various kinds: entries of publication in the stationers' registers; statements about the plays and poems; allusions to them; quotations from them by contemporary writers; facts connected with the history of dramatic companies that presented plays of Shakspere; allusions in the plays to historical events; and quotations made by Shakspere from publications of the day. There are not many instances of the mention of Shakspere's name during his lifetime.

In 1593 appeared Shakspere's first work, the narrative poem "Venus and Adonis," dedicated to the earl of Southampton, the poet's friend and patron. "Lucrece" followed in 1594, and this also became very popular. Of his many comedies, tragedies, historical dramas, and farces, the following are perhaps the most widely known: *Merchant of Venice*, 1596; *Romeo and Juliet*, 1598; *Twelfth Night* and *Julius Cæsar*, both 1601; *Hamlet*, 1602; *Othello*, 1604; *King Lear*, 1605; *The Tempest*, 1610.

Character and Genius. His dramas and his poems furnish a full record of Shakspere's mental endowments. The peculiar quality of his mind has been expressed in three words, *a complete imagination*. His favorite books were those of Plutarch and Montaigne; his hero was Julius Cæsar; his aversion was the Puritan spirit; his greatest creation was Hamlet. In reality, that which we think of first and last in connection with Shakspere is his *creation* of characters.

Place in Literature. A full appreciation of Shakspere's extraordinary genius was not reached until the 19th century, and his place in the intellectual development of mankind was even less appreciated. He belonged to what has been called the modern transition,—that general movement which issued out of the decaying feudal society and led confusedly toward a new era of literary art. For centuries before his time, particularly during the middle ages, whatever there was of art belonged to the feudal world, and its dominant notes were the Church and chivalry. The ideals created by these two forces were sacramental ceremonies, gracious manners, beauty of costume, and worship of women.

At the beginning of the 14th century, the system gave signs of decay. The artistic mind gradually receded from religious themes and sought secular objects. Shakspere was the luminous chief of a band of poets of the secular drama, whose subject was mankind. He took the human soul to be his province, and he made it both web and woof of art and worship, without rival and without disguise.

By the whole civilized world, Shakspere is now recognized as a creative genius unique in all literature. In imagination, fancy, knowledge of man, wisdom, humor, pathos, strength, and versatility, in the music of his verse and the felicity of his language, and also in that mysterious power which fuses all these separate gifts into one, he stands unapproached and apparently unapproachable. Died, April 23, 1616, and was buried in the chancel of the parish church at Stratford. See *Literary Plots, Characters, and Allusions* under titles of plays and names of characters.

Shanklin, William Arnold, American educator, was born at Carrolton, Mo., in 1862. He was graduated at Hamilton college in 1883 and at Garrett biblical institute in 1891. He was ordained to the Methodist Episcopal ministry in 1889, and served in various pastorates until 1905. From 1905 to 1909 he was president of Upper Iowa university and from 1909 to 1923 he was president of Wesleyan university at Middletown, Conn. Died, 1924.

Shaughnessy (*shô'nĕ-sĭ*), **Thomas George, Baron,** Canadian railway president, was born at Milwaukee, Wis., 1853. He received his training in railway administration in the service of the Chicago, Milwaukee, and Saint Paul railroad, 1869–82. He then became identified with the Canadian Pacific railway, serving successively as purchasing agent, assistant general manager, assistant to the president, vice president, director, and, beginning with 1898, president. In 1901, he was knighted and, in 1916, was created baron. Died in 1923.

Shaw, Albert, American editor, was born at Shandon, Ohio, in 1857. He was graduated at Grinnell college in 1879 and received the degree of doctor of philosophy at Johns Hopkins in 1884. He was editorial writer for the Minneapolis *Tribune*, 1883–88 and 1889-90, studying in Europe, 1888-89. In 1891, he established and became editor of the *American Review of Reviews*. His writings include *Icaria—A Chapter in the History of Communism, Municipal Government in Great Britain, Municipal Government in Continental Europe, The Outlook of the Average Man*, and *A Cartoon History of Roosevelt's Career*.

Shaw, Anna Howard, American woman suffragist, was born at Newcastle upon Tyne, England, in 1847, and came to America with her parents at an early age. She studied at Albion college, 1872–75; was graduated in theology in 1878 and in medicine in 1885, at Boston university. She was ordained to the ministry of the Methodist Protestant Church in 1880—the first woman to receive ordination in that denomination—and was pastor until 1885. She was lecturer from 1886 to 1904 for the national American woman's suffrage association, of which she was president from 1904 to 1915. She addressed audiences throughout America, speaking before state legislatures and committees of both houses of Congress, and for a third of a century was a notable figure in the woman's suffrage movement. In 1915, she published an autobiographical work, *The Story of a Pioneer*. Died in 1919.

Shaw, George Bernard, English dramatist and critic, was born in Dublin, Ireland, 1856. Self-educated after his 15th year, he went to London at 20 to devote himself to a literary career. He did unremunerative hack work, wrote unsuccessful novels, and became an ardent socialist. Finally, he won recognition as a critic on art, musical, and dramatic subjects for London newspapers. As a critic, he championed Whistler, the impressionists, Wagner, Ibsen, the drama of ideas, and other at first unpopular but later victorious causes.

In 1892, Shaw produced *Widowers' Houses*, his first play, which was followed almost yearly by other little-noticed plays until 1904, when he scored a notable triumph with *John Bull's Other Island*. By the increasing popularity of his earlier plays and by the success of many new productions, he attained eminent rank among British dramatists. His plays are clever, witty, and pregnant with ideas. Among his best plays are *Candida*, *Man and Superman*, and *Arms and the Man*. He was awarded the Nobel prize in literature for 1925, but refused to accept the money payment.

His dramas include also *The Philanderer*, *Mrs. Warren's Profession*, *The Man of Destiny*, *The Devil's Disciple*, *Cæsar and Cleopatra*, *The Doctor's Dilemma*, *Misalliance*, *Fanny's First Play*, *Androcles and the Lion*, *Pygmalion*, *Great Catherine*, *The Music Cure*, and *Back to Methuselah*.

He wrote also many remarkably effective prefaces and essays, such as *The Quintessence of Ibsenism*, *The Perfect Wagnerite*, *The Sanity of Art*, and *Fabian Essays*. See *Man and Superman*.

Shaw, Henry Wheeler, American humorist, was born in Lanesborough, Mass., 1818. He entered Hamilton college but soon after went West, where for more than 20 years he worked on farms and steamboats, finally becoming an auctioneer. In 1859, he began writing and, in 1860, sent to a New York paper "An Essa on the Muel, bi Josh Billings," which was extensively copied. His most successful literary venture, however, was his *Farmers' Allminax*, a travesty on the *Old Farmers' Almanac*. His best writings are collected in *Josh Billings's Complete Works*. He died in 1885.

Sheldon, Arthur Frederick, American teacher and writer on salesmanship, was born at Vernon, Mich., in 1868. He was graduated from high school in 1885, and taught district school two years. At 19 be became a book salesman and from his earnings while thus engaged paid his way through college. After graduating in law at the University of Michigan in 1892, he entered the employ of Werner Company, publishers. He was president of the Sheldon Publishing Company from 1899 to 1902, when he organized and was made president of the Sheldon school. Later he became president of the Sheldon university press and editor of the *Business Philosopher*. His writings include *Science of Successful Salesmanship*, *Science of Industrial Success*, *The Science of Service*, and *The Science of Business Building*.

Sheldon, Edward Brewster, American dramatist, was born in Chicago, 1886. He was graduated at Harvard in 1907, and devoted himself to play writing. With the production of his first play, *Salvation Nell*, by Minnie Maddern Fiske, in 1908, his reputation as a dramatist was established. His plays include also *The Nigger*, *The Boss*, *The High Road*, *Princess Zim-Zam*, *Egypt*, *The Song of Songs*, *Romance*, and *The Garden of Paradise*.

Shelley, Mary Wollstonecraft Godwin, English author, was born in London in 1797. She married Percy Bysshe Shelley in 1816. In 1818, she produced a remarkable novel entitled *Frankenstein*. Among her other novels are *Valperga*, *The Last Man*, *Lodore*, and *The Fortunes of Perkin Warbeck*. She wrote also *Rambles in Germany and Italy* and edited her husband's poems. She died in 1851. See *Frankenstein*.

Shelley, Percy Bysshe, English poet, was born near Horsham, 1792. In 1810, he entered Oxford, but, in 1811, a pamphlet entitled *The Necessity of Atheism*, which he had published and circulated, caused his expulsion. A few months later he married Harriet Westbrook, from whom he separated in 1814, and, in 1816, he married Mary Godwin. His poem, *Queen Mab*, appeared in 1813. In 1816, he wrote his *Alastor*, one of the most finished and characteristic of his works. This was followed by *The Revolt of Islam*. In 1818, he left England and spent the remainder of his life in Italy. While a resident at Rome he produced two of his finest poems—the lyrical drama, *Prometheus Unbound*, and the tragedy, *The Cenci*. At Venice, in 1820, he wrote *Julian and Maddalo*. Other important works are *Rosalind and Helen*, *The Witch of Atlas*, *Epipsychidion*, *Adonais*, and *Hellas*. He died in 1822.

Shepard, Helen Miller Gould, American philanthropist, was born in New York, 1868, eldest daughter of Jay Gould. She has been identified with philanthropic work for many years. She has made many notable gifts, including the library building with its widely known hall of fame to New York university and numerous donations for educational and charitable purposes. She also established a home for children. During the Spanish American war, she was an active member of the women's national war relief association, and, at Camp Wyckoff, gave her personal care to sick and convalescent soldiers. She became a member of the board of the Russell Sage foundation and of the national board of the Young Women's Christian Association. In 1913, she married Finley J. Shepard of Saint Louis.

Sheppard, Morris, American politician and lawyer, was born at Wheatville, Texas, in 1875. He was graduated at the University of Texas in 1895 and at the Yale law school in 1898. He first entered upon the practice of law at Pittsburg, Texas, but, in 1899, he removed to Texarkana and established himself in his profession there. In 1902, he was elected to Congress to fill the unexpired term of his father, deceased. Upon the resignation of Senator J. W. Bailey in 1913, Sheppard was elected to the United States Senate to fill the unexpired term. He was re-elected for three regular terms, 1913–31.

Sheridan, Philip Henry, American general, was born at Albany, N. Y., in 1831. He was graduated at West Point in 1853. At the beginning of the Civil War he was a captain, and rapidly rose to major general of volunteers. He performed brilliant service in the battles of Perryville, Murfreesboro, Chickamauga, Chattanooga, Winchester, Cedar Creek, Five Forks, and Appomattox Courthouse.

Sheridan's dashing ride of 20 miles from Winchester to Cedar Creek to rally his army and rout the enemy was a notable exploit. For this victory he was promoted to major general in the regular army and received the thanks of Congress. Rejoining the army of the Potomac in 1865, he was conspicuous under Grant in the operations before Petersburg. His masterly handling of his forces at Five Forks resulted in a decisive victory. Lee was thereby compelled to give up Petersburg and soon afterward began his disastrous retreat ending in surrender at Appomattox.

When Sherman was made general, following the election of Grant to the presidency, Sheridan was raised to the rank of lieutenant general and, when Sherman retired in 1883, Congress conferred the further rank of general upon Sheridan. He died in 1888. See *Sheridan's Ride*.

Sheridan, Richard Brinsley, British dramatist and statesman, was born in Dublin, Ireland, 1751. He was educated at Harrow and studied law, although he was never called to the bar. In 1773, he married and for a time devoted himself to literature. In 1775, he produced *The Rivals* at Covent Garden, and, in 1776, he became part proprietor of Drury Lane theater, for which he wrote *The School for Scandal* and also *The Critic*, one of the wittiest farces in the language.

In 1780, through the influence of Fox, Sheridan was elected to Parliament and soon became distinguished as a speaker on the side of the opposition. During the entire period of Pitt's ascendancy, the talents of Sheridan were displayed in combating that great statesman. His most notable speeches were against Warren Hastings.

For his powerful speeches against the American war the Continental Congress desired to present him with £20,000, but he declined to accept. Sheridan's fame is made secure by *The Rivals* and *The School for Scandal*, which rank among the best prose comedies in English. He died in 1816. See *Rivals, The*.

Sherman, John, American statesman, brother of William Tecumseh Sherman, was born at Lancaster, Ohio, in 1823. He was admitted to the bar in 1844; was elected to Congress in 1855; and soon rose to prominence. He entered heartily into the movement for the formation of the Republican party, and ardently supported Frémont in 1856. As the recognized leader of the Republicans, he served in the House until 1861. He was United States senator continuously from 1861 until 1897, except during 1877–81, when he was secretary of the treasury. During 1897-98 he was secretary of state.

In the Senate Sherman was prominently identified with all measures for the prosecution of the Civil War. He supported the reconstruction measures, defended the protective tariff, and took a leading part in the legislation for the restoration of specie payments and for the refunding of the national debt. He was author of the famous Sherman Antitrust law. Died in 1900.

Sherman, Stuart Pratt, American writer and educator, was born at Anita, Iowa, in 1881. He was graduated from Williams college in 1903 and received the degree of doctor of philosophy from Harvard in 1906. After serving as assistant and associate professor, he was made professor of English in the University of Illinois in 1911, continuing until 1924, when he accepted the literary editorship of the New York *Herald Tribune*. His writings include *Matthew Arnold, On Contemporary Literature*, and magazine articles, many of which were **subtly** satirical. In 1923, he was elected a member of the American Academy of Arts and Letters. He lost his life in a canoe accident in 1926.

Sherman, William Tecumseh, American general, was born in Lancaster, Ohio, 1820. He was graduated at West Point in 1840. During the war with Mexico he obtained the rank of captain, resigning in 1853. In 1861, he offered his services to the Federal government and was appointed colonel of infantry. Raised to the rank of brigadier general, he succeeded Anderson in the department of Ohio, from which he was removed for declaring that it would require 200,000 men to end the war in the West.

In 1862, he distinguished himself at the battle of Shiloh and, in 1863, as major general in the siege of Vicksburg. He took an active part under Grant in the successful operations around Chattanooga, 1863, and forced Longstreet to abandon the siege of Knoxville. Placed in command of the army of Georgia, 1864, he fought Johnston at Dalton, Resaca, and Kenesaw Mountain, and forced Hood to evacuate Atlanta. He then began his famous march to the sea and captured Savannah and Charleston. The surrender of the army of General Johnston to Sherman in North Carolina, 1865, shortly after the surrender of Lee, together with that of General Kirby Smith, west of the Mississippi, closed the war.

Sherman was appointed lieutenant general in 1866 and in 1869 became general and head of the army. In point of daring, originality of design, fertility of resource, brilliant strategy, and untiring energy, Grant pronounced him the best field officer that the Civil War produced. In 1875, he published his *Memoirs*. Died, 1891; elected to the American hall of fame, 1905. See *Sherman's March*.

Sholes, Christopher Latham, American inventor, was born in Columbia county, Pa., 1819. At 18 years of age, he went to Wisconsin, where he became an editor, and, in 1848, was elected to the state legislature. He removed to Milwaukee in 1860 and was engaged in various departments of government service. In 1866, he began to devote his leisure hours to the devising of a machine that became, after six years' work, the first practical typewriter. In 1868, he won the financial aid of James Densmore, who was instrumental in selling the manufacturing rights to the firm of E. Remington and Sons. Sholes parted with his patent rights for $12,000. He died in 1890. See *Typewriter*.

Shorey, Paul, American classical scholar, was born at Davenport, Iowa, in 1857 and was educated at Harvard university, the universities of Leipzig, Bonn, and Munich, and the American school of classical studies, Athens. He was admitted to the bar in 1880; became professor of Greek at Bryn Mawr college in 1885 and at the University of Chicago in 1892. He was chosen Roosevelt professor at the University of Berlin for 1913-14, and, in 1918, became a member of the American academy of arts and letters. His publications include *The Unity of Plato's Thought* and *The Assault on Humanism*.

Siddons, Sarah, English tragic actress, was born at Brecon, Wales, 1755. In 1773, she married William Siddons, an actor, and, in 1775, made her first appearance in London as Portia, but was unsuccessful. She reappeared at Drury Lane in 1782 in the character of Isabella in *The Fatal Marriage*. In 1785, she appeared as Lady Macbeth, her greatest rôle, and in 1788 as Queen Catherine. Thenceforth, until her retirement in 1812, her course was a continual triumph. In 1783 Sir Joshua Reynolds painted her as "The Tragic Muse." Died, 1831.

Sidney, Sir Philip, English writer and soldier, was born in Kent, 1554. He was educated at Oxford; traveled throughout Europe; and, upon his return, became a favorite at the court of Elizabeth, who called him "the jewel of her dominions." For the entertainment of his sister, he wrote his celebrated *Arcadia* and several minor poems. Among his works are also *Apologie for Poetrie* and *Defense of Poesie*. He was mortally wounded at the battle of Zutphen, 1586. The singular beauty of his character is evidenced by an incident which occurred when he was being carried from this field of battle. Seeing a common soldier lying wounded near by, Sidney handed him his bottle of water, saying, "Thy necessity is greater than mine."

Siegbahn, Karl Manne Georg, Swedish physicist, was born in Orebro, Sweden, in 1886. He made important discoveries in the X-ray spectra of elementary substances while professor of physics at the universities of Lund and Upsala. The Nobel prize in physics for 1924 was awarded to him for his work in this field.

Sienkiewicz (*shĕn-kyā'vĭch*), **Henryk,** Polish novelist, was born at Wola Okrzejska, Lithuania, 1846, and was educated at the University of Warsaw. He wrote *The Deluge*, *Pan Michael*, *Without Dogma*, and *Children of the Soil*, which are remarkable for vigorous characterization, historical truth, and psychological analysis. In 1896 appeared his masterpiece, *Quo Vadis?*, which gave him worldwide fame. In 1905, he was awarded the Nobel prize for literature. Died, 1916. See *Quo Vadis?*, page 308.

Sieyès (*syā'yĕs'*), **Emmanuel Joseph,** better known as the Abbé Sieyès, French Revolutionist, was born at Frejus in 1748. He was educated for the Church and became chancellor and vicar-general at Chartres, but took active interest in public affairs. In 1789, he published his celebrated pamphlet, *What Is the Third Estate?*, in which he demanded political recognition for the people. This publication procured his election to the States-General, and, in 1790, he was made president of the National Assembly.

After the downfall of Robespierre, Sieyès became a member of the council of five hundred, and, in 1799, he was made a member of the Directory. Subsequently, he aided in the overthrow of the Directory and in the establishment of the consular government, with Napoleon, Duclos, and himself as consuls. Soon completely overmatched by Napoleon, Sieyès withdrew from the consulate, retiring with the title of count. He died in 1836.

Sigsbee, Charles Dwight, American naval officer, was born in Albany, N. Y., 1845, and graduated at the naval academy in 1863. He was present at the battle of Mobile bay and at both attacks on Fort Fisher. In 1865–69, he was attached to the Asiatic squadron, and, during 1874–78, sounded and explored the Gulf of Mexico.

Sigsbee introduced numerous inventions and new methods into deep-sea exploration. In 1897, he took command of the battleship *Maine*, which was blown up and sunk in Havana harbor, February 15, 1898. He commanded the battleship *Texas*, 1898–1900, and was made rear admiral in 1903. He wrote *Deep Sea Sounding and Dredging* and *Personal Narrative of the Battleship Maine*. Died, 1923.

Sill, Edward Rowland, American poet and essayist, was born at Windsor, Conn., 1841. He graduated at Yale, 1861, and studied theology at Harvard. In 1871, he became principal of the Oakland, Cal., high school and, from 1874 to 1882, was professor of English in the University of California. In 1883, he settled in Ohio and devoted himself entirely to literary work.

While the number of his poetical writings is not large, his poems have steadily grown in influence and insure him permanent rank among American minor poets. His writings include *Hermione, and Other Poems*; *The Hermitage, and Other Poems*; *The Venus of Milo, and Other Poems*. Died, 1887.

Simms, William Gilmore, American poet and novelist, was born at Charleston, S. C., 1806. He studied law, which he soon abandoned for literature. His chief poetical production, *Atalantis*, a story of the sea, published in 1832, established his reputation. He became a very prolific writer, producing numerous volumes of verse and short stories, novels, historical and biographical books, and dramas. For many years he was the leader of a Southern literary coterie, of which Timrod and Hayne were prominent members. Died, 1870.

Simonds, Frank Herbert, American journalist, was born at Concord, Mass., in 1878 and was educated at Harvard university. He was connected as reporter, and later as editor, with various New York newspapers, including the *Sun* and the *Tribune*. In 1914, he became military editor of the *American Review of Reviews*, and attained to distinction as a war correspondent; being decorated for his services by the governments of France, Greece, and Rumania. He is the author of *They Shall Not Pass—Verdun* and a five-volume *History of the World War*.

Simpson, Sir James Young, Scottish physician, was born at Bathgate, 1811. He graduated in medicine at the University of Edinburgh, 1832, and was appointed to the chair of obstetrics, 1840. In 1846, he introduced into England the use of ether as an anesthetic and, in 1847, first employed chloroform for the same purpose. In 1856, he was awarded the Montyon prize for his discovery of chloroform as an anesthetic and for introducing its use into obstetrics. Died, 1870.

Simpson, Matthew, American prelate and educator, was born in Cadiz, Ohio, 1810. He graduated in medicine, 1833, and soon after entered the ministry of the Methodist Episcopal Church. He was vice president and professor in Allegheny college, 1837; president of Indiana Asbury university, 1839; and editor of the *Western Christian Advocate*, 1848. He was elected bishop in 1852 and, in 1859, became president of Garrett biblical institute.

During the Civil War, he delivered numerous addresses in behalf of the Union and officiated at the funeral of President Lincoln. He was one of the most eminent pulpit

orators of the 19th century. His publications include *A Hundred Years of Methodism* and *Cyclopedia of Methodism*. Died in 1884.

Sims, William Sowden, American naval officer, was born at Port Hope, Ont., 1858. In childhood, he was brought to Pennsylvania, and, in 1880, was graduated from the United States naval academy. After some years spent in naval service on the sea and in the American embassy at Petrograd, he came into notice through recommending, in a personal letter to President Roosevelt, that improved methods of gunnery should be introduced into the navy. He rose rapidly in rank and, when the United States entered the World War in 1917, he was made rear admiral with command of the American fleet in European waters. His management of the fleet throughout the remainder of the war won high praise both in America and abroad. As a result of outspoken criticism which he directed against the secretary of the navy, he was retired in 1919 from his command, and he resumed duties in which he had previously been engaged as president of the Naval War college at Newport.

Sinclair, May, English novelist, was born at Rock Ferry and was educated at the ladies' college, Cheltenham. She began her career by writing verse and philosophical criticism. In 1895, she published her first story, which was followed in 1896 by her novel *Audrey Craven*. She first became widely known, however, in 1904, when she wrote *The Divine Fire*. Other novels from her pen include *The Judgment of Eve*, *The Three Sisters*, *The Tree of Heaven*, and *The Romantic*. *A Defense of Idealism* and *The New Idealism* show her as an acute critic and philosophic writer. Her later writings include *The Life and Death of Harriet Frean* and *Uncanny Stories*.

Sinclair, Upton Beall, American author and socialist, was born in Baltimore, 1878, and graduated from the College of the City of New York, 1897. He assisted the government in the stockyard investigation in Chicago in 1906 and has taken a leading part in socialist movements. His published works include *Springtime and Harvest*, *Manassas*, *The Jungle*, *The Industrial Republic*, *The Overman*, *Sylvia's Marriage*, *The Profits of Religion*, and *The Brass Check*.

Sinding (*sin'ding*), **Christian,** Norwegian composer, was born at Kongsberg, 1856. He studied under Reinecke at Leipzig, 1874–77, and, after further preparation at Dresden, Munich, and Berlin, settled in Oslo as organist and teacher. His piano compositions are notable for their brilliancy and for their reflection of Norwegian characteristics. He wrote the opera *Der Heilige Berg*.

Sitting Bull, a "medicine man" of the Sioux Indians, was born about 1837. He exercised great influence over various chiefs and was an obdurate foe of the whites. He was conspicuous in the Sioux massacre of 1862; was constantly on the warpath for 14 years; was a leader in the Indian outbreaks of 1876; and directed operations leading to the battle of the Little Big Horn, in which General Custer and his entire force were killed. With his band, he escaped into Canada, but continued even there to incite rebellion among the Sioux Indians. In 1880, receiving the promise of pardon, he returned to Dakota and surrendered to General Miles. He again incited the Indians to renewed outbreaks. His arrest was ordered and, in attempting to resist, he was killed December 15, 1890.

Sixtus V (Felice Peretti), former pope, was born in Ancona, Italy, 1521. He was professor of theology at Rimini and Siena; became known as an eloquent preacher; was made vicar-general and cardinal; and, in 1858, succeeded Gregory XIII in the pontifical office. His pontificate was notable for a vigorous administration. He built the Library of the Vatican; authorized a new edition of the Septuagint and the Vulgate; and carried out a general policy of aggrandisement for the Church. Died, 1590.

Skinner, Otis, American actor, was born at Cambridge, Mass., in 1858. He was an amateur reader and actor at Hartford, Conn., prior to 1877, when he made his professional début as Jim in *Woodleigh*. He appeared at different times with Edwin Booth, Lawrence Barrett, Mme. Modjeska, and Augustin Daly, with the last of whom he played in New York, London, Paris, Berlin, and other cities for a period of five years. The later plays in which he was seen include *Sire*, *Kismet*, *A Celebrated Case* and *Sancho Panza*.

Slater, Samuel, American manufacturer, was born in Derbyshire, England, in 1768. Having acquired a thorough knowledge of cotton spinning under a partner of Richard Arkwright, he emigrated secretly to the United States in 1789 and, in the following year, founded a spinning factory at Pawtucket, R. I., the first in America. With his brother John, he built extensive cotton mills on the site of the present town of Slatersville, R. I., in 1806 and others at Oxford, Mass., in 1812. In 1815-16 he erected woolen mills. To these activities of Slater, the present textile industry of New England owes its origin. Died, 1835.

Sloane, William Milligan, American educator and historian, was born at Richmond, Ohio, 1850, and was graduated at Columbia and Leipzig universities. He was secretary to George Bancroft, the historian, in Berlin, 1873–75; was professor at Princeton, 1876–96; and became professor of history at Columbia in 1896. His writings include *The French War and the Revolution*, *French Revolution and Religious Reform*, *Party Government in the United States of America*, and *Greater France in Morocco*. He was elected to the American academy of arts and letters in 1905. Died, 1928.

Slosson, Edwin Emery, American editor and scientist, was born at Albany, Kans., 1865. He was educated at the University of Kansas and the University of Chicago; was professor of chemistry at the University of Wyoming and chemist for the Wyoming agricultural station from 1891 to 1903; and, in the latter year, became literary editor of *The Independent*, serving until 1920. He then became editor for the Science service at Washington and was engaged in publicity work in the interests of the sciences. His writings include *Great American Universities*, *Major Prophets of Today*, *Creative Chemistry*, *Lessons in Einstein*, *The American Spirit in Education*, and *Snapshots of Science*.

Smiles, Samuel, British biographer, was born at Haddington, Scotland, 1812. At 20, he graduated in medicine at Edinburgh and began practice in his native town. Subsequently he became editor of the Leeds *Times* and was, for some years, secretary of the Leeds and Thirsk railway and of the South-Eastern railway, retiring in 1866.

Smiles became the biographer of self-made men and the historian of worthy industry. His book of practical talks to young men, *Self-Help*, met with extraordinary success. Among his other books are *Life of George Stephenson*, *Character*, *Thrift*, *Duty*, *Life and Labor*, *Industrial Biography*, and *Josiah Wedgwood*. Died, 1904.

Smith, Adam, Scottish political economist, was born at Kirkcaldy, 1723. He was educated at Glasgow university and at Oxford. In 1751, he was elected professor of logic in Glasgow, and, in the following year, he became professor of moral philosophy. In 1759, he published his *Theory of Moral Sentiments*, still well known in the history of ethics. After a period of travel and study, he produced, in 1776, his *Wealth of Nations*, upon which his world-wide reputation rests. Died, 1790.

Smith, Alfred Emanuel, American statesman, was born in New York City in 1873 of humble parentage. Elected to the state assembly in 1903 as a Democrat, he served continuously until 1915, being Democratic floor leader during the later years. He took a prominent part in the insurance and factory investigations ordered by the legislature and in amending the constitution to permit the passage of a Workmen's Compensation law. He was made president of the board of aldermen of Greater New York in 1917 and was elected governor of New York State for terms extending over 1919-20 and 1923-28. At the Democratic national convention in 1924, Smith was a prominent candidate for the presidential nomination, receiving a maximum of 364 votes. In 1928, he was chosen on the first ballot as Democratic candidate, but was defeated by his Republican opponent, Herbert Hoover, in the ensuing election. He had appealed to the country as favoring modification of the Prohibition law.

Smith, Benjamin Eli, American lexicographer and editor, was born of American parents in Beirut, Syria, 1857. He graduated at Amherst college, 1877. In 1889, he became managing editor, and later editor, of *The Century Dictionary*; he was editor also of *The Century Cyclopedia of Names* and *The Century Atlas*. He translated Schwegler's *History of Philosophy* and Cicero's *De Amicitia*, and edited various other works. Died, 1913.

Smith, Francis Hopkinson, American author, artist, and engineer, was born at Baltimore, 1838, and was educated as a mechanical engineer. He built the government sea walls at Governors island and at Tompkinsville, Staten island, the Race Rock lighthouse off New London, Conn., and the foundation for the Bartholdi statue of Liberty.

He became known also for his water-color paintings, charcoal sketches, and illustrations. His work is represented in the public art collections of Baltimore, Washington, and Buffalo.

Smith traveled extensively and wrote many novels, of which *Colonel Carter of Cartersville* and *Caleb West, Master Diver* rank among the most successful. His other writings include *Well-worn Roads*, *Gondola Days*, *The Fortunes of Oliver Horn*, *The Under Dog*, *The Veiled Lady*, and *Felix O'Day*. As a writer, he excelled in depicting Southern life and manners. He was made a member of the American academy of arts and letters in 1908. Died, 1915.

Smith, Goldwin, publicist, historian, and educator, was born in Reading, England, 1824. He graduated from Magdalen college, Oxford, 1845, and was called to the English bar, 1847. He was professor of modern history at Oxford, 1858–66; was a champion of the North during the American

Civil War; visited the United States, 1864; and was lecturer, 1868–71, and later honorary professor of English and constitutional history, at Cornell university.

After 1871, he lived in Toronto. Among his numerous writings are *Rational Religion*, *The Civil War in America*, *The Political Destiny of Canada*, *Oxford and Her Colleges*, *Bay Leaves*, *Specimens of Greek Tragedy*, *Commonwealth or Empire*, *In the Court of History*, *Labor and Capital*, *In Quest of Light*, and *No Refuge but in Truth*. He died in 1910, leaving most of his fortune to Cornell university and bequeathing his Toronto estate, known as the Grange, to be used by the city as an art gallery and art school.

Smith, John, English adventurer and colonist, was born at Willoughby, England, 1580. He was a soldier of fortune, traveled in various parts of Europe, and met with many romantic adventures. In 1606, he sailed with an expedition of three vessels and 105 men to found a colony in Virginia. On the voyage he was accused of conspiracy to make himself king and was kept a prisoner. The expedition, arriving at James river, founded the colony of Jamestown there in May 1607.

After being tried and acquitted, Smith was made a member of the council and for a time was the head of the colony, to which he rendered valuable service by reason of his familiarity with Indian characteristics. On one of his journeys into the country for corn, he was captured by Indians under chief Powhatan, but his life was saved through the intercession of the chief's daughter Pocahontas.

Having been superseded as governor of the colony by Lord Delaware in 1609, Smith returned to England. In 1614, he explored the coast of New England and, in 1615, undertook the founding of a colony in New England, but his vessel was captured by a French warship. His most important writings are *True Relation*; *Generall Historie of Virginia, New England, and the Summer Isles*; *Description of New England*; and *New England's Trials*. He died in 1631.

Smith, Joseph, founder of Mormonism, was born in 1805, the son of a farmer in Vermont state. He claimed to have been divinely directed in 1823 to a place in Wayne county, N. Y., where he should find golden plates on which were engraved "the fullness of the everlasting gospel." Their text was orally translated by Smith, according to his own account, and the alleged translation was called the "Book of Mormon." Seven years later, the Mormon religion was founded under Smith's leadership. Persecution induced the sect to migrate to Illinois, where Smith was instrumental in founding Nauvoo. He was slain by a mob in 1844.

Smith, Lyman Cornelius, American manufacturer, was born in Connecticut, 1850, and was educated in the state normal school. In 1872, he removed to New York; entered the commission and lumber business; and, from 1877 to 1890, was engaged in the manufacture of firearms. In 1886, he began the manufacture of typewriters and, in 1890, organized the Smith Premier Typewriter Company. In 1903, he established the L. C. Smith and Brothers Typewriter Company. He became president of various other corporations and, in 1900, gave to Syracuse university funds for establishing the Lyman Cornelius Smith college of applied science. Died, 1910.

Smith, Sydney, English humorist and essayist, was born at Woodford, 1771. He graduated from Oxford and was ordained to the Anglican Church. In 1802, he resided in Edinburgh. There he joined Brougham, Jeffrey, and others in establishing the *Edinburgh Review*, of which he edited the first three issues. In 1803, he removed to London, where, 1804–06, he delivered *Lectures on Moral Philosophy*. In 1807-08, he published *Letters on the Subject of the Catholics*, which had an immense success, and later wrote a number of political speeches and pamphlets, all characterized by brilliant wit, forceful argument, and graceful expression. Many of his epigrams have had frequent repetition, and his denunciation of all things American has been called the most famous sneer in history. From 1831 until his death, in 1845, he was a canon of Saint Paul's, London.

Smollett (*smŏl'ĕt*), **Tobias George,** British novelist, was born near Dumbarton, Scotland, in 1721. After a meager schooling at Dumbarton, he was apprenticed to a physician in Glasgow, where he attended lectures at the university and acquired some knowledge of languages. At 18, he went to London. Failing to find a publisher for his play *The Regicide*, he became a surgeon's mate in the navy and served in the Carthagena expedition, 1740-41. Quitting the navy, he set himself up as a surgeon in London, but lived chiefly by his pen. An autobiographical novel *Roderick Random*, published in 1748 and containing realistic pictures of life in the navy, was a notable success. Of his subsequent novels, the best known are *Peregrine Pickle* and *Humphrey Clinker*. Smollett is regarded as the founder of the satirical novel. He died in Italy, 1771. See *Peregrine Pickle*, *Roderick Random*.

Smoot, Reed, American legislator, was born at Salt Lake City, 1862. He graduated at Brigham Young academy, Provo, Utah, 1879. In 1900, he was made an apostle of the Mormon Church. He became president of numerous banks and other corporations and accumulated a large fortune. He was elected to the United States Senate in 1903 and was re-elected for terms extending to 1927.

Smuts (*smōōts*), **Jan Christiaan,** South African statesman and general, was born at Cape Town, 1870. He was educated at Victoria college and at Cape and Cambridge universities. Having been admitted to the bar, he practiced in Cape Town and later at Johannesburg, where he was appointed attorney of the Transvaal republic at 28 years of age. During the South African war of 1899–1902, he rose by sheer military genius to be one of the outstanding Boer leaders and was one of the negotiators of the treaty of peace.

The formation of the Union of South Africa as a British dominion is due more to him than to any other man, and, after its establishment, he held various cabinet offices in the Union. On the outbreak of the World War in 1914, he organized the South African forces and, with Botha, crushed a rebellion at home and conquered South West Africa. In 1916, he was made commander of the British forces in German East Africa and showed great vigor in crushing all opposition. He represented South Africa in the Imperial War Cabinet and at the Paris Peace Conference, where he took the leading part in securing the recognition of the autonomy of the British dominions. Smuts was premier of South Africa from 1919 to 1924.

Snow, Francis Huntington, American educator and entomologist, was born at Fitchburg, Mass., 1840. He graduated at Williams college and at Andover theological seminary. He was professor of mathematics and natural science, 1866–70, professor of natural history, 1870–89, chancellor, 1890–1901, and professor of entomology and meteorology, 1901–08, at the University of Kansas. He conducted 26 expeditions to western Kansas, Colorado, New Mexico, Texas, and Arizona, making the Kansas University collection of insects one of the largest in the United States. Died, 1908.

Snowden, Philip, English socialist writer and politician, was born at Cowling, Yorks, in 1864. He received his education in part at a board school and in part privately. In 1886, he entered the civil service from which, in 1893, he retired. He then devoted himself to journalism and politics, becoming well known for his advocacy of socialistic views. From 1906 to 1918, he sat in Parliament as a Socialist, and was again elected to Parliament in 1922. He was chancellor of the exchequer in Ramsay MacDonald's Labor cabinet in 1924. His writings include *Socialism and Syndicalism*, *Socialism and the Drink Question*, *The Living Wage*, *Labor and Finance*, *Labor and the New World*, and numerous articles in reviews and newspapers.

Sobieski (*sō-byĕs'kē*). See *John III, Sobieski.*

Socrates, Greek philosopher, was born at or near Athens, Greece, about 470 B. C. He was the son of Sophroniscus, a sculptor, and he himself followed this profession in the early part of his life. Socrates saw Athens at its zenith, and he lived to witness its fall.

Character and Public Life. He received the usual education of the Athenian citizen, which included the study of the Greek poets and the elements of the sciences then known. He had an ungainly figure, a bald head, prominent eyes, and a snub nose. His wife, Xanthippe, possibly nursing a grievance against her husband for his indifference to wealth, has passed into history as the typical scold. Socrates distinguished himself for his courage at the battles of Potidæa, Delium, and Amphipolis. He was remarkable for his endurance in hardships and his self-control in pleasures. On two occasions he risked his life rather than consent to an unworthy deed—once when, having been selected by lot as president of the assembly of citizens, he refused to yield to their angry clamor and permit an illegal execution of the city's military leaders; and once when, commanded by the so-called 30 tyrants, he refused to slay one of their enemies.

Socrates found no satisfaction in the vast and vague speculations of the physical philosophers. He turned his attention exclusively to the study of man and of morals. He believed that it was his divinely appointed mission to test the reputed wisdom of the great and the accepted opinions of the average man and, by means of skillful questioning, to force upon all a consciousness of ignorance as the first step toward self-improvement. In his questioning, he sought to arrive at definitions of the different virtues. He is credited with having originated the scientific definition and formal inductive reasoning as aids in thought and investigation. The basis of his ethics is the principle or paradox that all vice is ignorance and that no one is willingly bad.

It is not clear what was the exact position of Socrates as to the religion of the state, but it is probable that he believed in the traditional deities. That he believed in one supreme God, the ruler of the universe, is clear. He constantly asserted that he was guided by an inner voice, which

warned and restrained him when he contemplated any action that might have an undesirable issue.

CONDEMNATION. Socrates' habit of questioning together with his own avowal of ignorance, known as Socratic irony, made him many enemies. As early as 423 B. C., the satirist Aristophanes voiced in *The Clouds* the hostile feeling already existing. Some feared Socrates for his seemingly ambiguous position in religion; others bore grievance because he questioned the traditional morality and proposed to substitute reason for custom in the conduct of life. Association with Alcibiades and Critias, who were justly hated by the Democratic party, helped also to bring him into disfavor with the dominant faction at Athens. In 399 B. C., he was formally charged with impiety and the corruption of the youth. He defended himself in a simple speech in which he maintained that, so far from meriting any penalty, he deserved to be supported at the state's expense. He was condemned to death by a jury of Athenian citizens.

INFLUENCE. Socrates left no writings. Few men, however, have so powerfully influenced the world's thought. Through the works of Plato, Socrates may be said to have been the originator of idealistic philosophy. His words were made the basis both for the Stoic and for the Epicurean system of philosophy. In the decay of the old beliefs, he became the chief religious type of the ancient world. He was executed in 399 B. C. in the manner customary at Athens, being compelled to drink a cup of poison hemlock. See *Educational Reformers*.

Soddy, Frederick, English chemist, was born at Eastbourne, 1877. He was educated at Eastbourne college, University College of South Wales, and Oxford university. He taught at McGill university from 1900 to 1902 and, after working in the laboratory with Rutherford and Ramsay, he became, in 1904, lecturer in radioactivity at Glasgow university. In 1914, he was made professor of chemistry at Aberdeen university, from which he went in 1919 to Oxford university as professor of inorganic and physical chemistry. For his work on radioactivity, he was awarded the Nobel prize in chemistry for 1921. His publications include *Radioactivity, The Interpretation of Radium, Matter and Energy,* and *The Inversion of Science.*

Solon (*sō'lŭn*), Athenian legislator and one of the seven sages of Greece, was born of an ancient family at Salamis about 639 B. C. After acquiring a fortune by commerce and gaining much knowledge by travel, he turned his attention to writing and to public affairs, making a practice of expressing his political opinions in elegiac verse.

Solon first came into notice as a leader in the war by which Athens wrested Salamis from Megara. In an economic crisis, he was chosen to devise remedial measures, and his statesmanlike measures led to his being clothed with full powers to remodel the constitution. He framed a new code of laws containing great advances directed toward individual liberty and democracy.

According to tradition, Solon bound the citizens by oath to observe these laws for ten years, during which he withdrew from Athens, but, upon his return, he found the tyranny of Pisistratus established. Died about 559 B. C.

Solvay (*sōl'vā*), **Ernest,** Belgian manufacturing chemist, by some styled the Carnegie of Belgium, was born at Rabeck, near Brussels, in 1838. He was educated at Liege and early in life began the manufacture of chemicals. His greatest achievement was the development of the ammonia process, commonly called the Solvay process, for the manufacture of soda. In 1863, at Couillet, Belgium, he built a plant for utilizing this process. The enterprise was eminently successful and was extended throughout Europe and America. In 1880, he manufactured about one-half, and in 1913 nearly all, of the world's supply of soda. He amassed a large fortune, founded the Solvay institute in Brussels, and was active in philanthropic enterprises. Much of his wealth was taken from him during the German occupation of his country in the World War. He died in 1922. See *Soda, Solvay Process.*

Solyman II (*sōl'i-mȧn*), surnamed "The Magnificent," sultan of Turkey, was born in 1496. He was the greatest of the Turkish sultans, and was scarcely less remarkable for the wisdom and justice of his internal administration than for the extent of his conquests. He encouraged literature and was himself a poet of no mean rank. He died of fever in 1566 while besieging the town of Szigeth, in Hungary.

Sonnino (*sôn-nē'nō*), **Sidney, Baron,** Italian statesman, was born at Pisa, 1847, and took his law degree at the university there in 1865. From 1867 to 1872, he was engaged in the diplomatic service and, after 1880, was a deputy in the Italian legislature.

Sonnino held various cabinet positions and was twice prime minister of Italy—once in 1906 and again in 1909-10. He was minister of foreign affairs during the period of the World War and served as a representative of Italy at the Paris Peace Conference. He retired into private life in 1919. Sonnino was one of the ablest of Italy's foreign ministers and was known also as a Dante scholar. Died, 1922.

Sophocles, Greek dramatist, was born at Colonus near Athens in 495 B. C. From his father, Sophilus, he received a liberal education in all the literary and personal accomplishments of his age. He was proficient in poetry and music and was handsome in person. At 15, he was chosen to play on the lyre an accompaniment to the pæan that celebrated the battle of Salamis. At 27, in the festival of the Dionysia, he was awarded the first prize in tragedy over Æschylus. In the following 32 years, he won the first prize about 20 times and never fell below second place. His first recorded contest with Euripides was in 438 B. C., when the latter came off second best.

As a result of the success of *Antigone,* presented in 440 B. C., Sophocles won an appointment as colleague of Pericles and Thucydides in the Samian war. His greatest laurels, however, were won in literary rather than in political and military fields.

Sophocles' tragedies mark the transition from the drama as a religious institution to the drama as a work of pure art. He added the third speaker to the second already introduced into tragedy by Æschylus. The dramas of Sophocles hold an even balance between the titanic symbolism of Æschylus and the sentimental realism of Euripides. A slight plot sufficed him for a masterpiece because his subtle dramatic art and his exhaustive psychological analysis could elicit from a simple situation a complete revelation of character and destiny. Fate is, with him, not a capricious power, but an inevitable outcome of given characters and situations. His dramas are written in a concise, elegant style and are rich in deep poetic sentiment.

His *Œdipus the King* is regarded as the most perfect Greek tragedy. Of about 120 plays composed by him, only 7 are extant in their entirety; namely, *Œdipus the King, Œdipus at Colonus, Antigone, Philoctetes, Ajax, Maidens of Trachis,* and *Electra.* He died in 406 B. C., remembered as a man of sweet temper, consummate grace, and rare balance of mind. See *Œdipus Tyrannus.*

Sorolla y Bastida (*sō-rōl'yȧ ē bȧ-stē'dȧ*), **Joaquin,** Spanish painter, was born in Valencia, 1863, and studied art in the academy there and later in Paris. His first successes were "Another Marguerite," 1892, now in the Saint Louis museum, and "The Fishing Boats' Return," in the Luxembourg, Paris.

Producing landscapes, figure paintings, and portraits with great rapidity, he soon became one of the foremost modern impressionistic painters. His subjects are chiefly out-of-door scenes in brilliant sunlight, rendered with remarkable vigor and sure technique. The Metropolitan museum, New York, contains his "Swimmers," "The Bath," "After the Bath," "Beaching the Boat," and the portrait "Señora de Sorolla in Black." For practically the whole of the decade 1910–20, he was engaged on work for the Hispanic society of America, for which he produced portraits of Spanish writers and a "Panorama of the Forty-nine Provinces of Spain." Died, 1923.

Sothern (*sŭтн'ĕrn*), **Edward Hugh,** American actor, was born in New Orleans, La., 1859. He received an academic education in England; first appeared on the stage in New York, 1879; and won his first real success in *One of Our Girls,* 1885. During the ensuing ten years, his most popular plays were *If I Were King, The Highest Bidder, The Three Musketeers,* and *The Adventure of Lady Ursula.* In 1904, in conjunction with Julia Marlowe, whom he married in 1911, he began presenting Shaksperian plays and attained first rank among living Shaksperian actors in America. His successful rôles include Hamlet, Macbeth, Jacques, Petruchio, Malvolio, Shylock, and Romeo.

Soto, Hernando de, Spanish explorer, was born in Estremadura about 1500. He joined the expedition of Pizarro, under whom he served in Peru. About 1536, he was made governor of Cuba. In 1539, he explored and took possession of Florida, and, in the same year, he conducted an expedition from there and discovered the Mississippi river, on the banks of which he died in 1542.

Soult (*sōōlt*), **Nicolas Jean de Dieu,** marshal of France, was born at Saint Amans la Bastide in 1769. In 1785, he entered the army; was appointed general of a division in 1799 by Masséna; became an ardent Napoleonist; and was made marshal of France in 1804.

He achieved brilliant success at the battle of Austerlitz, which he decided by piercing the Russian center. He took part in the Russian campaign of 1806-07, after which he was created duke of Dalmatia. In 1809, he became commander in chief in Spain; gained a brilliant victory at Ocana; subdued Andalusia; but was defeated at Talavera and Albuera. He was sent to hold Wellington in check, but suffered further reverses at Salamanca and Toulouse in 1814.

He became a Royalist after the abdication of Napoleon; but, on the return of the latter from Elba, he abandoned Louis XVIII and became major general of the Imperial army. After Waterloo, he was banished from France, 1816–19, but later served as minister in various cabinets and was made marshal-general of France in 1847. Died, 1851.

Sousa (*sōō'zä*), **John Philip,** American bandmaster and composer, was born at Washington, D. C., 1854. He studied music and became first violin in Jacques Offenbach's orchestra. He was bandmaster of the United States marine corps, 1880–92, and, after 1892, was director of Sousa's band. His ability as a composer of marches won him the title of "the march king." His compositions include the operas *The Smugglers, The Queen of Hearts, El Capitán, The Bride-Elect, The Charlatan, Chris and the Wonderful Lamp,* and *The Free Lance;* five suites; a symphonic poem; and many popular marches. He made a tour of the world in 1910-11. His publications include *The Fifth String, Dwellers in the Western World,* and *Transit of Venus.*

Southey (*south'ĭ*; *sŭth'ĭ*), **Robert,** English author, was born at Bristol, 1774. He was educated at Oxford, but he left without a degree in 1794 and traveled in Spain and Portugal. In 1803, he settled at Greta Hall, Cumberland, where he devoted the remainder of his life to literature.

In addition to his formal works, he wrote extensively for periodicals, notably for the *Quarterly Review.* On the death of Pye, 1813, Southey was made poet laureate. His chief poetical works are *Madoc, Thalaba, The Curse of Kehama,* and *Roderick.* As a prose writer, Southey is well represented by his *Letters from England by Don Manuel Alvarez Espriella, The Doctor,* and *The Life of Nelson.* His prose style is easy, lucid, and agreeable. Died, 1843.

Spargo (*spär'gō*), **John,** socialist and author, was born at Stithians, Cornwall, England, 1876. He was educated in the public schools and through the Oxford and Cambridge university extension courses. At 18, he became identified with the socialist cause in England. He publicly opposed the Boer war; came to the United States in 1901; and has been active as a socialistic lecturer, writer, and worker. He was one of the founders of the Prospect House social settlement, Yonkers, N. Y. In 1917, he left the Socialist party on account of its attitude on the issues involved in the World War. His writings include *The Bitter Cry of the Children, Socialism, Marxian Socialism and Religion, Capitalist and Laborer, The Psychology of Bolshevism,* and *The Jew and American Ideals.*

Sparks, Jared, American historian, was born at Willington, Conn., 1789. He graduated at Harvard, 1815; was a Unitarian minister at Baltimore; and finally became editor of the *North American Review.* For ten years, he was professor of history at Harvard and, for four years, was its president. His writings include *Life of John Ledyard, Life of Gouverneur Morris,* and *Library of American Biography.* He edited *The Works of Benjamin Franklin, Writings of George Washington,* and *Correspondence of the American Revolution.* Died, 1866.

Spartacus, a Thracian bandit, who, having been captured by the Romans and placed in a Roman gladiatorial "school," escaped in 73 B. C. and headed a revolt of the slaves. He defeated army after army of the Romans and threatened the city itself, but was finally defeated by Crassus and, being trapped, died fighting bravely, 71 B. C.

Speke (*spēk*), **John Hanning,** English explorer, was born at Jordans, 1827. At the age of 17, he entered the Indian army and distinguished himself as a soldier and a naturalist, making several trips to the Himalayas and reaching Tibet.

In 1854, he accompanied Captain Burton into Somaliland and, in 1857–59, from Zanzibar into the interior of Africa. They discovered Lake Tanganyika in 1858, and, in the same year, Speke reached Lake Victoria. He then believed this lake to be one of the sources of the Nile, but was unable to verify his opinion until 1862, when, by proceeding northward, he proved that his belief had been correct. He wrote *What Led to the Discovery of the Source of the Nile* and *Journal of the Discovery of the Source of the Nile.* Died, 1864.

Spencer, Herbert, English philosopher, was born at Derby, England, April 27, 1820. Ill health in childhood necessitated a home education. Spencer early showed a great fondness for studies of nature and exhibited a marked independence of mind.

In 1837, he took up civil engineering, and, for ten years, he was engaged in this pursuit. He had leisure for a good deal of miscellaneous reading. In 1845, he obtained employment on *The Economist* of London and, three years later, became its assistant editor. This position, which he held until 1853, gave him time for his studies and made him acquainted with such brilliant thinkers as George Henry Lewes, "George Eliot," and John Stuart Mill.

Spencer published in 1850 his *Social Statics.* This work was of a decidedly *a priori* character and did not show the inductive spirit of his later writings. It reveals, however, his tendency to reconcile opposing influences and to discover closeness of relations where others did not suspect them. In 1855, he published a work on psychology, which he afterward revised and expanded into a part of his *Synthetic Philosophy.* Over application brought on a serious attack of nervous prostration, in consequence of which he was obliged, for the rest of his life, to abridge his hours of study.

Meanwhile, Spencer had conceived a system of philosophy that should embrace the general principles of all existing knowledge. He brought out a prospectus indicating his intention to give 20 years to its development. He published the *First Principles* in 1862. Then, fearing that he would not live to complete the system, he wrote *The Data of Ethics,* which had been the object of the whole system and in which it was intended to culminate. Fortunately, he was able to complete the undertaking and to revise an important part of it. It consists of two volumes on biology, two on psychology, three on sociology, and two on ethics.

Spencer wrote also several essays, including two important commentaries on the theories of Weismann. In 1882, he visited the United States and lectured before a number of academies and scientific societies. His later years were devoted to his *Autobiography.*

Spencer's philosophy is a philosophy of evolution. Beginning with the first principles of all we know, he proposed to trace how the law of evolution was realized in life, mind, society, and morality. Few men have ever dominated contemporary thought more completely or have succeeded to such a degree in popularizing a scientific point of view. Died at Brighton, England, December 8, 1903. See *Educational Reformers.*

Spenser, Edmund, English poet, was born of humble parentage in London about 1552. He studied at Pembroke college, Cambridge, and was brought under the notice of Queen Elizabeth by the earl of Leicester. In 1579, he published *The Shepherd's Calendar,* which marks an epoch in the development of English poetry. Through the influence of Leicester, he was appointed chief secretary to the lord lieutenant of Ireland. Queen Elizabeth conferred on him an estate at Kilcolman, where he wrote *The Faery Queen,* his greatest work. His other works include *Tears of the Muses, Amoretti, Epithalamion, Astrophel, Hymns,* and *Visions.*

In 1598, a rebellion broke out; Spenser's castle at Kilcolman was burned, and an infant child of the poet perished in the flames. Spenser returned to London, impoverished and broken-hearted. He died in 1599 and was buried near Chaucer in Westminster Abbey. See *Faery Queen, Shepherd's Calendar.*

Sperry, Elmer Ambrose, American electrical engineer and inventor, was born at Cortland, N. Y., 1860, and was educated there and at Cornell university. He founded the Sperry Electric Company in Chicago in 1880, engaging in the manufacture of arc lamps, dynamos, and other electrical appliances. He invented the gyrocompass, instruments for stabilizing airplanes and ships, gas engines, a searchlight having a luminosity of 1½ billion candle power, and many special devices for the United States navy. He became president of the Sperry Gyroscope Company in 1910. His numerous inventions have brought him many awards and other honors both at home and abroad. See *Compass, Mariner's.*

Spinoza, Baruch, Dutch philosopher, was born of Jewish parentage at Amsterdam, Holland, November 24, 1632. From childhood, Spinoza was physically delicate and was inclined to retired and studious habits. He received his early education from the rabbis. His extraordinary talents coupled with his penetrating studies of the physical sciences and of the writings of Descartes resulted in his excommunication from the synagogue in 1656.

He was later exiled from Amsterdam. In 1661, he settled at Rhynsburg near Leiden, where he became a master craftsman in lens polishing and devoted his spare time to abstruse and difficult studies. In 1663, Spinoza brought out his abridgment of the *Meditations* of Descartes under the general title *Descartes's Principles of Philosophy.* He attached an appendix, which was the first draft of his own *Ethics.*

In 1664, Spinoza removed to Voorburg, a few miles from The Hague. About 1668, he received a small pension from the statesman Jan de Witt and settled in The Hague. There, in 1670, he completed his great work, the *Tractatus Theologico-Politicus.* His *Ethics* was written about 1674, but was published posthumously because of his dislike of controversy. In this period, the elector of the Palatinate offered Spinoza the vacant chair of philosophy at the University of Heidelberg. This he refused, as well as all other honors and offers which he considered would endanger his independence and integrity of thought.

The attainment of truth was the one object of Spinoza's life. For this he sacrificed all natural ties of affection and endured want and persecution. He was stigmatized as an atheist and Epicurean in his day, but his abstemious life and the profoundly religious nature of his writings indicate how erroneous was this opinion.

Spinoza endeavored to found a system that should deduce the fundamental principles of moral life by strictly mathematical demonstrations founded on the knowledge of God. He held that existence consisted of extension, or the material world, and thought. Each of these realms was independent of the other: thought did not influence matter,

and matter did not influence thought. Nevertheless the movements of one were parallel or analogous to the movements of the other, and the movements of each depended on an all pervading essence, which was equivalent to God. The system is thus a thoroughgoing pantheism. Spinoza, though not a voluminous writer, has had an extensive and enduring influence on modern thought. Died, February 21, 1677.

Spitteler, Karl Friedrich Georg, Swiss author, was born at Liestal, Switzerland, in 1845 and was educated at Basel, Zurich, and Heidelberg universities. From 1871 to 1879, he was a tutor in Russia and later devoted himself wholly to literary work, contributing extensively to leading Swiss newspapers. The titles, in English, of his principal works, which were written in German, include *Truths Spoken in Jest, My Earliest Experiences, Literary Reminiscences,* and the poems *Prometheus and Epimetheus* and *Olympian Spring.* He received the Nobel prize for literature in 1919. Died, 1924.

Spreckels, Claus, sugar refiner, was born in Darmstadt, Germany, 1828. He came to the United States in 1846 and was employed in Charleston, S. C., and New York City. In 1856, he went to San Francisco and, in 1863, established the Bay sugar refinery, procuring his raw material from Hawaii, where he acquired extensive property. He invented improved processes for refining, engaged in beet-sugar farming and manufacturing, and acquired large shipping interests. Died, 1908.

Spurgeon, Charles Haddon, English preacher, was born at Kelvedon, Essex, 1834. In 1850, his sympathies drew him toward the Baptists, and, removing to Cambridge in 1851, he began to deliver cottage sermons. In 1854, he entered upon the pastorate of the New Park Street chapel, London, where his preaching proved so popular that finally his followers built for him the well-known Metropolitan tabernacle, opened in 1861.

Until 1891, Spurgeon continued to preach in the tabernacle every Sunday to thousands of hearers. His sermons were published weekly, and yearly volumes were issued. He also wrote *John Ploughman's Talk, Morning by Morning, The Treasury of David, Lectures to My Students,* and *The Saint and His Saviour.* Died, 1892.

Staël (*stä'ĕl*; F., *stäl*), **Madame de** (Anne Louise Germaine de Staël-Holstein), French writer, was born at Paris in 1766. She was the daughter of Jacques Necker, minister of finance under Louis XVI. In 1786, she married Baron de Staël-Holstein, Swedish minister to Paris. In 1788, she published *Letters on the Works and Character of Rousseau,* which attracted attention. Compelled by the Revolution to leave France and later exiled by Napoleon, she traveled in Germany and Italy, making the acquaintance of Goethe, Schiller, and other eminent men and gathering the material for her novel *Corinne* and for her widely known work *De l'Allemagne.* She also visited England, where she wrote *Ten Years of Exile.* After the fall of the Empire, she returned to Paris. Besides the foregoing, her works include *Thoughts on the French Revolution*; *Delphine,* a novel; and many other publications. While not a great writer, Madame de Staël notably influenced the romantic movement in France. She died in 1817.

Standish, Miles, New England colonist, was born in Lancashire, England, about 1584. He served in the army in the Netherlands and sailed with the Pilgrims in the *Mayflower* in 1620. On reaching Massachusetts, he was chosen captain and led expeditions against the Indians. He settled finally at Duxbury, Mass., where he died, 1656. The story of his unsuccessful effort to secure a wife is told by Longfellow in his *Courtship of Miles Standish.*

Stanford, Leland, American capitalist and philanthropist, was born in Watervliet, N. Y., 1824. Early in life, he studied law and was admitted to the New York bar. Attracted to California by the gold discoveries, he engaged in mercantile business in San Francisco, 1856. He was one of the organizers and became president of the Central Pacific Railroad Company. Entering political life, he was Republican governor of California, 1861–63, and United States senator from California, 1885–93. He gave property to the value of $20,000,000 to found at Palo Alto, in memory of his deceased son, a university to be known as Leland Stanford Junior university. Died, 1893.

Stanley, Arthur Penrhyn, English scholar and divine, was born at Alderley, 1815. He was educated at Rugby and at Oxford and was a tutor from 1841 to 1851, when he was appointed canon of Canterbury. From 1856 to 1863, he was professor of ecclesiastical history at Oxford and canon of Christ Church. In 1864, he succeeded Archbishop Trench as dean of Westminster.

Stanley was one of the most accomplished and liberal theologians of his age and was the leader of the Broad Church party. His principal writings are *Life of Dr. Arnold, The Epistles to the Corinthians, Sinai and Palestine, Lectures on the Eastern Church, Lectures on the Jewish Church,* and *Memorials of Westminster Abbey.* Died in 1881.

Stanley, Sir Henry Morton, African explorer, was born near Denbigh, Wales, of obscure parentage, 1841. He went to Louisiana at an early age, served first in the Confederate army, then in the Federal navy during the Civil War, and subsequently went to Turkey as a newspaper correspondent. In 1867, he made a reputation as war correspondent in Abyssinia.

Sent by James Gordon Bennett to find Livingstone, he reached Zanzibar early in 1871; organized a large expedition; and found Livingstone, November 10, 1871, at Ujiji, on Lake Tanganyika.

In 1874, he set out on a second African expedition for the New York *Herald* and the London *Daily Telegraph.* He reached Lake Victoria in 1875; proceeded to Lake Tanganyika; pushed westward to the Lualaba, which he descended; and finally reached the Atlantic coast in 1877, proving the identity of the Lualaba and the Congo. During this notable journey, Stanley crossed equatorial Africa from east to west and traveled more than 7000 miles.

Stanley's next expedition to Africa was made under the auspices of the African international association and it led to the foundation of the Congo Free State, now Belgian Congo. In 1886, Stanley undertook an expedition for the relief of Emin Pasha, who had been cut off in the interior of Africa by the Mahdi rebellion. Stanley left England in 1887 and returned in 1890 after escorting Emin and a large troop of followers from the interior to the coast. This was his last journey in Africa; it occupied 1012 days, replete with peril and tragic incident. Stanley wrote, among other works, *Congo and the Founding of Its Free State* and *In Darkest Africa.* He was a member of Parliament, 1895–1900, and was knighted in 1899. Died, 1904.

Stanton, Edwin McMasters, American statesman, was born in Steubenville, Ohio, 1814. He practiced law in his native town until 1847, when he settled in Pittsburgh, Pa., and there became a leader of the bar. In 1860, he was made attorney-general of the United States and, in 1862, secretary of war. The latter post he filled throughout the Civil War with ability, energy, and industry. He retained office until 1867, when he was suspended by President Johnson. Stanton was reinstated by the Senate in January 1868. In December 1869, he was appointed associate justice of the U. S. supreme court and died the same month.

Stanton, Elizabeth Cady, American reformer and suffragist, was born in Johnstown, N. Y., 1815. She married Henry B. Stanton, Antislavery reformer. She signed the call for the first woman's rights convention, at Seneca Falls, N. Y., 1848, and became president of the national woman's suffrage association formed there, retaining the office until 1893. After 1848, she devoted much time to traveling and lecturing in behalf of woman's rights. She wrote *A History of Woman Suffrage* and an autobiography. Died, 1902.

Stanton, Frank Lebby, American poet and journalist, was born at Charleston, S. C., in 1857. From 1889 he was editor and column writer for the Atlanta *Constitution.* His poetry is largely lyrical and in Southern Negro dialect. Many of his poems have been put to music and have become very popular. These include "Just A-Wearyin' for You," "Li'l Feller," and "Mighty Lak a Rose." He was proclaimed poet laureate of Georgia in 1925. Died, 1927.

Stark, Johannes, German physicist, was born at Schickenhof in 1874. He was professor of physics in the technological school of Aachen from 1909 to 1917 and professor in the University of Greifswald from 1917 to 1920, when he was called to the University of Wurzburg. For his discovery of the so-called Stark effect, or decomposition of spectrum lines by an electric field, and for his discovery of the Doppler effect in canal rays, he was awarded in 1919 the Nobel prize for physics.

Stark, John, American soldier, was born at Londonderry, N. H., 1728. He served in the French and Indian war; at Bunker Hill, was colonel of a regiment raised by himself in one day; and was in the attack on Trenton and in the battle of Princeton. He raised a regiment in 1777 and took command of the New Hampshire troops sent against the British forces from Canada. On August 16, 1777, he won the battle of Bennington, which brought him the thanks of Congress and the rank of brigadier general. With a force recruited by him in New Hampshire, he cut off Burgoyne's retreat from Saratoga. Died, 1822.

Stead, William Thomas, English journalist and writer, was born at Embleton, 1849. He was editor of the *Northern Echo* at Darlington, 1871–80, and, from then until 1889, was connected in an editorial capacity with the *Pall Mall Gazette.* In 1890, he founded the *English Review of Reviews* and was its editor, 1890–1912. He was a prominent exponent of spiritualism. Among his works are *Maiden Tribute of Modern Babylon, If Christ Came to Chicago, Satan's Invisible World, The United States of Europe,* and *The Americanization of the World.* Died on the *Titanic,* 1912.

Stedman, Edmund Clarence, American poet and critic, was born in Hartford, Conn., 1833. He was educated at Yale; entered journalism; became an editorial writer

and war correspondent for New York newspapers; and was a member of the New York stock exchange, 1869–1900. Devoting his leisure to literature, Stedman rose to a leading place among American poets and critics. He was one of the seven original members of the American academy of arts and letters. Among his writings are *Alice of Monmouth, The Blameless Prince, Lyrics and Idylls, Mater Coronata, Victorian Poets, Poets of America,* and *The Nature and Elements of Poetry.* He edited *A Victorian Anthology; An American Anthology; A Library of American Literature,* with E. M. Hutchinson; and *The Works of Edgar Allan Poe,* with G. E. Woodbury. Died, 1908.

Steele, Sir Richard, British essayist and playwright, was born in Dublin, Ireland, 1672. He was educated at Charterhouse and at Oxford. Leaving college without a degree, he entered the army and rose to the rank of captain. In 1702, he wrote the comedy *The Funeral, or Grief à la mode,* followed by *The Tender Husband* and *The Lying Lover.*

In 1709, Steele founded the *Tatler,* a tri-weekly periodical containing short essays on life and manners, which was succeeded by the *Spectator,* a daily literary journal of a higher tone and character. To both of these Addison, whom Steele had met at Charterhouse, contributed extensively and became the more important figure. Steele founded also the *Guardian,* the *Englishman,* and other short-lived periodicals. Preceding the more finished work of Addison, Steele originated the essay describing contemporary manners which was later developed into the novel. In 1722, he produced his successful comedy *The Conscious Lovers.* Died, 1729.

Steen (*stān*), **Jan,** Dutch painter, was born at Leiden, 1626. He became a pupil of Van Goyen, whose daughter he married. The paintings "St. Nicholas Day," "Human Life," and "Marriage Feast" established his reputation and he ranks as one of the foremost artists of the Dutch school. His genius is displayed at its best in homely family scenes. Died, 1679.

Stefánsson (*stā'fāns-sŏn*), **Vilhjálmur,** arctic explorer, of Icelandic descent, was born at Gimli, Manitoba, 1879. He graduated at the University of Iowa, 1903, and studied anthropology at Harvard, where he became an instructor. In 1904-05, he made archeological researches in Iceland. He spent the winter of 1906-07 with the Eskimo of the Mackenzie delta and returned alone by way of the Porcupine and Yukon rivers.

Between 1908 and 1912, Stefánsson was engaged in the ethnological survey of the central North American arctic coasts, exploring Coronation gulf and discovering the so-called blond Eskimo. During 1913–16, he conducted explorations for the Canadian government, making sledge journeys over the moving ice pack and discovering new land north of Prince Patrick island. In 1921, he was instrumental in having Wrangell island claimed for Canada. His writings include *My Life with the Eskimo* and *The Friendly Arctic.*

Steiner, Edward Alfred, sociologist, was born at Vienna, Austria, 1866. He was educated in Pilsen and at the University of Heidelberg. He came to the United States; engaged in various occupations; and then studied theology at Oberlin. In 1891, he was ordained to the Congregational ministry and held pastorates in Minnesota and Ohio. He was called, in 1903, to the chair of applied Christianity at Grinnell college and became widely known as a speaker and writer on sociological subjects with special reference to problems of immigration. His writings include *Tolstoy the Man, The Mediator, The Immigrant Tide, The Broken Wall, From Alien to Citizen,* and *Old Trails and New Borders.*

Steinmetz (*stīn'mĕts*), **Charles Proteus,** electrical engineer, was born in Breslau, Germany, 1865, and was educated at Breslau, Berlin, and Zurich. He came to America and, in 1893, became consulting engineer for the General Electric Company. In 1902, he began also to serve as professor of electrical engineering in Union university. He became widely known as an authority on electric currents and on mathematics related to that field. His publications include *Theory and Calculation of Alternating-Current Phenomena, Theoretical Elements of Electrical Engineering,* and *Engineering Mathematics.* Died, 1923.

Stephen, Sir Leslie, English biographer and critic, was born at Kensington, 1832. He was educated at Eton, King's college, and Trinity hall, Cambridge, where he was fellow and tutor. He was editor of the *Cornhill Magazine,* 1871–82, and of the first 26 volumes of the *Dictionary of National Biography.* His works include *The Playground of Europe, Hours in a Library, The English Utilitarians, The Science of Ethics, An Agnostic's Apology,* and *Studies of a Biographer.* Died, 1904.

Stephens, Alexander Hamilton, American statesman, was born in Georgia in 1812. He graduated at the University of Georgia in 1832 and was admitted to the bar in 1834. In 1843, he was elected to Congress by the Whig party, and he retained his seat until 1859, during which period he supported the annexation of Texas, promoted the passage of the Kansas-Nebraska act of 1854, and joined the Democratic party in upholding the measures of President Buchanan.

In 1860, he opposed the secession of his state, but, in the following year, expressed his adherence to sectional views and was elected vice president of the Confederate States of America. In 1866, he was elected United States senator, but was not allowed to take his seat. He was, however, a member of the House of Representatives, 1873–82, and governor of Georgia, 1882-83. In 1869, he published *A History of the War of Secession* and, in 1870, *A Constitutional View of the War Between the States.* Died, 1883.

Stephenson, George, English engineer and inventor, was born near Wylam, Northumberland, England, on June 9, 1781. His early life was a contest between determined purpose, industry, and sagacity on the one hand, and poverty on the other. He worked on the farm and at the colliery and, at 17, became engineman at Throckley bridge. He heard that the engines of Watt and Boulton were to be found described in books, and, though a grown man, he went to night school in order to learn the elements of English and mathematics.

In 1806, Stephenson had charge of an engine in a large spinning mill near Montrose, Scotland, and, in 1812, he became enginewright at Killingworth. There he began his own experiments with the engine. Watt had shown the practicality of fixed steam engines. Trevithick had invented, in 1804, the first self-acting steam carriage. Blackett, in 1811, on the Wylam railway, proved that engines running with smooth wheels on smooth rails could draw heavy loads up a moderate incline. The means for imparting speed, however, had not yet been devised.

From an early period, Stephenson was quite sanguine as to the "traveling engine." He had the happy thought of utilizing the escaping steam by making it blow his fire. This imparted velocity to the smoke and increased the ascending current of air to such an extent that the speed of the engine was more than doubled. He continued his experimentation, and, in 1815, in conjunction with Dodds, he took out a patent for this improved engine. In the same year, the invention of a colliery safety lamp, the "Geordie," also brought Stephenson's name before the public.

In 1821, Stephenson became constructing engineer for the Stockton and Darlington railway. In 1826, he accepted a similar position with the Liverpool and Manchester railway, and, upon the completion of the line in 1829, he astonished every one, even himself, by the success of his "Rocket" in a celebrated competitive trial of locomotives over the Liverpool and Manchester railway. The "Rocket" attained a speed of 44 miles an hour.

The subsequent career of Stephenson was rapid and smooth. He was principal engineer on the North Midland, York and North Midland, Manchester and Leeds, Birmingham and Derby, and Sheffield and Rotherham railways. In 1845, he visited Belgium and Spain for professional purposes. He was created a knight of Leopold of Belgium and was made a fellow of the royal society in England. He was the founder and first president of the society of civil engineers. Stephenson was offered knighthood by the sovereign of England, but declined the offer. Died at Tapton, England, August 12, 1848.

Sterne, Laurence, British novelist, was born at Clonmel, Ireland, 1713. He studied at Cambridge and became a clergyman. In 1759, he wrote the first two volumes of his famous *Life and Opinions of Tristram Shandy.* His reputation rests on his humor and the immortal characters of "Corporal Trim," "Yorick," and "My Uncle Toby," found in this novel. Died in 1768. See *Shandy, Tristram; Toby, Uncle.*

Steuben (*stū'bĕn*), **Friedrich Wilhelm von, Baron,** general in the American Revolutionary army, was born at Magdeburg, Prussia, 1730. When only 14, he was a volunteer at the siege of Prague, and he steadily rose until, in 1752, he was on the staff of Frederick the Great.

Steuben came to America in 1778 and served with Washington during the dark days of Valley Forge. He was appointed inspector general, remodeled the army, and took part in the siege of Yorktown. In 1790, Congress voted him $2400 yearly and a township of land near Utica, N. Y., where he died, 1794. A monument to his memory was unveiled at Utica in 1914.

Stevens, John, American inventor, was born in New York, 1749. He graduated at King's college, 1768, and was admitted to the bar in 1771. He secured the establishment of the American patent system in 1790 and obtained patents for his own inventions in connection with steam engines.

In 1807, he constructed the *Phœnix,* a paddle-wheeled steamer, which he operated successfully on the Delaware river for several years. The *Phœnix* was completed but a short time after Fulton finished his famous *Clermont.* In 1811, Stevens established between Hoboken and New York the first steam ferry in the world. In 1815, he secured a

charter for the first American railroad and, in 1824, obtained a charter for the first part of what is now the Pennsylvania system. Died, 1838.

Stevens, Thaddeus, American statesman, was born at Danville, Vt., 1792. He graduated at Dartmouth college, 1814; studied law; practiced at Gettysburg, Pa.; and served in the Pennsylvania legislature. He was a member of Congress, 1849–53 and 1859–68, and rose to prominence at the bar. In 1850, he opposed the Clay compromise measure and the Fugitive Slave law. He was regarded as the most radical Antislavery advocate in Congress and was the most powerful opponent of President Johnson's plan of reconstruction. Died, 1868.

Stevenson, Robert Louis Balfour, British novelist and essayist, was born at Edinburgh, 1850. He was educated at Edinburgh university. He was admitted to the bar in 1875, but soon abandoned law for literature.

In 1878 appeared his first book, *An Inland Voyage*, which was quickly followed by *Travels with a Donkey*, *Virginibus Puerisque*, and *Familiar Studies*. As a writer of adventure and romance, he won permanent fame with *Treasure Island*, *Kidnapped*, *The Master of Ballantrae*, and *Dr. Jekyll and Mr. Hyde*. His versatility was further revealed in *A Child's Garden of Verses*, *Ballads*, *Memories and Portraits*, and *A Footnote to History*.

Stevenson's fiction and essays, written in an exquisite and finished style, reveal the charming personality which made him one of the best-loved writers of his time. Failing health led him to settle in the island of Upolu, Western Samoa, where he died in 1894. A fine monument has been erected to his memory on the estate which he had owned in that island. See *Jekyll, Doctor, and Mr. Hyde*; *Treasure Island*.

Stewart, Alexander Turney, merchant and capitalist, was born of Scotch parentage near Belfast, Ireland, 1803. He settled in New York, 1823, and, two years later, opened a dry goods store, from which he acquired great wealth. In 1848, he built on Broadway a store which, at the time, was the largest dry goods store in the world, and, in 1862, he removed to a still more extensive establishment. His business led to the opening of branches in leading European cities and of numerous factories in the United States. He died in 1876, leaving an estate of 30 million dollars.

Still, Andrew Taylor, founder of osteopathy, was born near Jonesboro, Va., 1828. He farmed in Missouri, studied medicine at Kansas City, fought along with John Brown in the border warfare, and saw considerable service in the Civil War. In 1864, when three of his children died with spinal meningitis, he devised the treatment known as osteopathy and practiced as an itinerant physician for some years. In 1887, he settled in Kirksville, Mo., and developed a large practice. Five years later, he opened the American school of osteopathy at Kirksville. Died, 1917.

Stimson, Henry Lewis, American statesman, was born in New York City, 1867. After graduating from Yale and from the Harvard law school, he was admitted to the bar and began practicing law in 1893. He was Republican candidate for governor of New York in 1910 and secretary of war in Taft's cabinet, 1911-13. President Coolidge sent him in 1927 as his representative to Nicaragua, then torn by civil war, where he induced both warring parties to permit a peaceful election. On his return he was made governor of the Philippines, from which post President Hoover called him in 1929 to accept the portfolio of secretary of state.

Stinnes, Hugo, German industrialist and capitalist, was born in 1870 at Mulheim, in the Ruhr district. In 1892, he founded a coal company with a capital of about $12,000. His interests rapidly expanded through his acquisition of barges and steamers, coal and iron mines, manufacturing plants, electric power stations, and insurance companies. During the World War, he was placed in charge of industrial production in Germany and in the occupied part of Belgium; became associated with the chief shipping lines of Germany; acquired extensive timber lands to provide material for shipbuilding; and purchased many of the leading newspapers of the country, as well as paper mills to insure a paper supply. His property rapidly disintegrated after his death in 1924.

Stockley, Cynthia, novelist, was born in South Africa and was educated at home. She married Philip George Stockley, after whose death she married Captain Pelham Browne. In 1898, she went to London, Eng., to take up journalism. She appeared on the stage for nearly two years, mainly with Benson's Shaksperian company. Her extensive travels have included tours in America, where she lived for some years. The titles of her novels include *Virginia of the Rhodesians*, *Poppy*, *The Claw*, *The Dreamship*, and *Pink Gods and Blue Demons*.

Stoddard, John Lawson, American traveler, author, and lecturer, was born at Brookline, Mass., 1850. He graduated from Williams college, 1871, and later studied theology at Yale. He then traveled extensively and, for about 20 years, devoted himself largely to lecturing on travel subjects, in which he attained great popular success. His works include *Red Letter Days Abroad*, *Glimpses of the World*, *Stoddard Lectures on Travel Abroad and in America*, *The Stoddard Library*, and *Poems on Lake Como*.

Stokes, Sir George Gabriel, British mathematician and physicist, was born at Skreen, Ireland, 1819. He graduated at Cambridge, 1841, and was elected professor of mathematics there in 1849. He is best known for his discovery of the cause of fluorescence, published in his paper *On the Change of the Refrangibility of Light*, 1852. For his work in optics, Stokes stood pre-eminent among the scientists of the 19th century. Died in 1903.

Stone, Lucy Blackwell, pioneer American woman suffragist, was born at West Brookfield, Mass., 1818. She graduated at Oberlin college, 1847; devoted herself to the advocacy of woman suffrage and to the Antislavery cause; lectured widely; and became editor of the *Woman's Journal*. In 1850, she assisted in organizing, at Worcester, Mass., the first national woman's rights convention. In 1855, she married Henry B. Blackwell, although retaining her maiden name. Died, 1893.

Stone, Melville Elijah, American journalist, was born at Hudson, Ill., 1848, and received a high school education. He was editor of several Chicago dailies, 1871–74, and, in 1875, established the Chicago *Daily News*. In 1881, in partnership with Victor F. Lawson, he started the Chicago *Morning News*, which became the Chicago *Record*. Withdrawing in 1888, he organized the Globe National bank, of which he was president, 1891–98. In 1893, he removed to New York and acted until 1921 as general manager of the associated press. Died, 1929.

Story, Joseph, American jurist and legal writer, was born at Marblehead, Mass., in 1779. He graduated at Harvard college in 1798; rapidly rose to eminence at the bar; and, in 1808, was elected to Congress. In 1811, he was appointed associate justice of the United States supreme court and, after 1829, was professor of law at Harvard. His published works include *Commentaries on the Conflict of Laws*, *Commentaries on the Constitution of the United States*, *Commentaries on Equity Jurisprudence*, and *A Treatise on the Law of Agency*. He died in 1845 and was elected to the American hall of fame in 1900.

Stowe, Harriet Elizabeth Beecher, American novelist, sister of Henry Ward Beecher, was born at Litchfield, Conn., 1811. She married Professor Calvin Ellis Stowe in 1836. She became a frequent contributor to periodicals; published a volume of stories; and, in 1851, commenced, in *The National Era*, an Antislavery paper at Washington, D. C., a serial entitled *Uncle Tom's Cabin*. When issued in book form, 1852, this unnoticed serial immediately became one of the most successful and influential novels in American literature.

By its emotional appeal, dramatic force, and intense human interest, *Uncle Tom's Cabin* aroused the conscience of the nation and made the slavery question an imperative moral issue. It has been translated into 40 languages and, in dramatized form, has been widely presented on the stage in America and in other countries.

A prolific writer for a half century, Mrs. Stowe produced many other novels, the best of which are *Oldtown Folks*, *The Minister's Wooing*, and *The Pearl of Orr's Island*. She died in 1896 and was elected to the American hall of fame in 1910. See *Topsy*, *Uncle Tom*.

Strabo (*strā'bō*), Greek geographer, was born at Amasia, in Pontus, about 64 B. C. He spent much of his life in travel and study, settling about 20 B. C. in Rome, whence he is believed to have made extensive journeys over most of the world as then known.

His *Geography*, in 17 books, describing Europe, Asia, Egypt, and Libya, is a work of great value, based partly on his own observations and partly on the geographical writings of Eratosthenes and other earlier authorities. He wrote also a history of Rome to 27 B. C., but this work has not survived. Died about 21 A. D.

Strachey (*strā'chi*), **Giles Lytton,** English author, was born in 1880 and was educated at Trinity college, Cambridge. His first published work was *Landmarks in French Literature*. He attained considerable prominence by his realistic methods of biographical treatment in his *Eminent Victorians* and *Queen Victoria*. His publications include also *Books and Characters*.

Stradivari (*strä'dē-vä'rē*) or **Stradivarius, Antonio,** Italian violin maker, was born at Cremona, 1644. His instruments are known for their finish and fine tone. The great care with which he selected and cut his wood, the study he gave to the shape and the proportions, and the quality of the varnish used combined to make an unrivaled instrument. Of 2000 violins made by him, only a few now exist, and they are valued at fabulous prices. Died, 1737.

Strathcona (*străth-kō'nȧ*), **Donald Alexander Smith, Baron,** Canadian railway builder and statesman, was born at Forres, Scotland, 1820. He went to Canada in 1838; entered the Hudson's Bay Company's service; and rose to the position of resident governor and chief commissioner. He was a special commissioner during the first Riel rebellion in the Red River settlements, 1869-70; represented Winnipeg and Saint Johns in the Manitoba legislature, 1871–74; and was, for many years, a member of the Dominion House of Commons.

Lord Strathcona was the chief promoter and builder of the Canadian Pacific railroad, of which he became a director. In 1889, he was elected chancellor of McGill university and, in 1899, lord rector of Aberdeen university. He made large donations to McGill university and other Canadian educational institutions, and, with Lord Mount Stephen, gave an endowment to the Royal Victoria hospital at Montreal, to which he also bequeathed $1,000,000. He was raised to the peerage in 1897. Died, 1914.

Stratton, Samuel Wesley, American physicist, was born at Litchfield, Ill., 1861. He was educated at the University of Illinois, where he began to teach in 1885 and rose to be professor of physics. He was professor of physics at the University of Chicago from 1892 to 1901 and, in the latter year, became the director of the bureau of standards at Washington. In 1923, he was chosen president of the Massachusetts institute of technology.

Straus (*strous*), **Nathan,** merchant and philanthropist, was born in Bavaria, Germany, in 1848. He was brought to the United States in 1854 and resided at Talbotton, Ga. He afterward went to New York, where, in 1866, he joined his father's firm, L. Straus and Sons, which was engaged in the importation of pottery and glassware. From 1888 to 1914, he was a partner in the firm of R. H. Macy and Company, conducting a department store. He retired in the latter year in order to devote himself to philanthropy.

Straus originated and maintained a laboratory and system of distribution for pasteurized milk to the poor of New York City. He has been one of the most active exponents of pasteurizing milk and contributed equipment for the process to various cities in the United States and abroad. He also established soup kitchens in Jerusalem for supplying food to the needy, irrespective of race. His many benefactions each year are said to exceed his income.

Straus, Oscar Solomon, merchant, diplomat, and publicist, was born at Otterberg, Germany, 1850. In 1854, he was brought to the United States and lived in Georgia until 1865, when he removed to New York. He graduated at Columbia university; practiced law, 1873–81; entered mercantile life; was United States minister to Turkey under three administrations; and, in 1902, was appointed member of the Permanent Court of Arbitration at The Hague. He was secretary of commerce and labor, 1906–09. His writings include *Roger Williams, the Pioneer of Religious Liberty*; *Reform in the Consular Service*; *United States Doctrine of Citizenship*; and *The American Spirit*. Died, 1926.

Strauss (*shtrous*), **Johann,** Austrian composer and conductor, was born at Vienna, of an eminently musical family, 1825. He became an orchestra conductor, toured in many European countries, and composed dance music and operettas. Of nearly 500 pieces of dance music, many of which became immensely popular, the best-known is *The Beautiful Blue Danube Waltz*. His operettas, several of which are classics in their field, include *Indigo, Cagliostro, Die Fledermaus, Der lustige Krieg, Simplicius, Eine Nacht in Venedig, Ninetta, Waldmeister*, and *Der Zigeunerbaron*. Died, 1899.

Strauss, Joseph Baermann, American bridge builder, was born at Cincinnati in 1870 and was educated at the University of Cincinnati. He designed and built over 225 bascule bridges in America and other parts of the world. These include the Saint Charles Air Line bridge, one of the longest one-leaf bascule bridges in the world; the Canadian Pacific Railway bridge at Sault Sainte Marie, one of the longest two-leaf bascule bridges in the world; a bridge at Copenhagen, the design of which was chosen in an international competition; and a bridge at Tientsin, China, built in the Chinese style of architecture.

Strauss, Richard, German composer, was born at Munich, 1864. He studied music at Munich and, in 1885, became conductor at Meiningen. From 1889 to 1894, he was chapelmaster at Weimar; was later conductor at the Munich opera house; and, in 1898, became conductor of the royal opera, Berlin.

By compositions which display great power of invention and originality, Strauss has become a commanding figure in modern music. His works include the tone poems *Don Juan, Tod und Verklärung, Macbeth, Till Eulenspiegel. Also Sprach Zarathustra, Don Quixote*, and *Ein Heldenleben* and the operas *Guntram, Feuersnot, Salome*, and *Elektra*.

Strayer, George Drayton, American educationist, was born at Wayne, Pa., in 1876. He was educated at Johns Hopkins and Columbia universities, and, in 1905, was appointed to the faculty of Teachers college, Columbia university, where he became professor of educational administration in 1910 and, in 1921, director of field studies in the college's institute of educational research. His important studies in retardation of students are embodied in his *Retardation and Elimination in Schools and Colleges*.

Stresemann (*strā'zā-mȧn'*), **Gustav,** German statesman, was born in Berlin in 1878. He studied political economy in Berlin and Leipzig and was highly successful in organizing industrial associations. He was elected to the Reichstag in 1907. At the height of the Ruhr conflict, in 1923, he became chancellor and took steps which terminated that conflict and, under his later guidance as foreign minister, led ultimately to the Locarno treaties and the admission of Germany to the League of Nations. He was awarded one-half the Nobel peace prize for 1926.

Street, Julian Leonard, American author, was born at Chicago in 1879 and was educated in the public schools and at Ridley preparatory college, Saint Catharines, Ont. He was connected with the *Evening Mail*, New York, from 1899 to 1901. His books include *My Enemy the Motor, The Goldfish, American Adventures*, and *Mysterious Japan*.

Strindberg (*strĭnd'bĕr-y'*), **August,** Swedish dramatist, was born at Stockholm, 1849. He studied at the University of Upsala. He became successively schoolmaster, journalist, and author of scientific and political treatises. In 1883, he began a period of travel, during which he wrote many stories, novels, and plays. The production of *The Father* in 1887 won wide recognition. In 1897, he returned to Stockholm and published a large number of plays, which established his position as Sweden's most eminent dramatist.

While Strindberg's dramas reveal trenchant and searching character analysis, his greatest power lies in portraying conflicts of human minds. Of his long list of about 50 plays, the following were among the first to be translated into English: *The Father, The Dance of Death*, and *The Spook Sonata*. Died, 1912. See *The Father*, page 284.

Stuart, Gilbert, American portrait painter, was born in Rhode Island, 1755. In 1775, he made his way to London, where his talent was recognized by Benjamin West. In 1781, he opened a studio in London and painted the portraits of George III, Mrs. Siddons, Sir Joshua Reynolds, and many other celebrated characters. At the height of his fame, he returned to America, 1792, and painted portraits of many of the distinguished men and women of the period, including the first five presidents of the United States.

Among the most celebrated of Stuart's portraits are those of Washington. The best of these include the "Gibbs-Channing" portrait, in the Metropolitan museum, New York; the "Athenæum" portrait, in the Boston museum; and the full-length portrait painted for the marquis of Lansdowne. He died in 1828 and was elected to the American hall of fame in 1900. See *Painting*.

Stubbs, William, English historian and prelate, was born at Knaresborough, 1825. He graduated at Oxford, 1848, and was ordained to the Church the same year. In 1866, he was appointed professor of modern history at Oxford; in 1884, was made bishop of Chester; and, in 1889, became bishop of Oxford.

By his profound learning and rare impartiality, Stubbs exercised a great influence upon the study of history. His valuable *Constitutional History of England*, published in 1874–78, immediately took rank as an authoritative work. His other historical works include *The Early Plantagenets, Seventeen Lectures on the Study of Mediæval and Modern History*, and *Germany in the Middle Ages*. Died, 1901.

Sturgis, Russell, American architect and author, was born at Baltimore, 1836. He graduated at the College of the City of New York, 1856. He studied architecture in Europe and practiced his profession, 1865–80, designing important buildings for Yale university and also the Flower hospital in New York. In 1878, he was made professor of architecture in the College of the City of New York.

After 1885, Sturgis became editor of art and archeology for the *Century Dictionary*, Webster's *International Dictionary*, and Johnson's *Universal Encyclopedia*. His published works include *European Architecture, Annotated Bibliography of Fine Art*, and *Appreciation of Sculpture*. He was also editor and chief author of the *Dictionary of Architecture and Building*. Died, 1909.

Stuyvesant (*stī'vĕ-sȧnt*), **Peter,** director general of the New Netherlands, 1647–64, and last Dutch governor of New York, was born in Holland, 1592. He served first in the West Indies and arrived at New Amsterdam, 1647. He made peace with the Indians; settled the English and Dutch boundary question; recaptured, 1655, the fort on the Delaware river, taking possession of the Swedish colony at the same time; but was forced to surrender the city of New York to the English, 1664. He then retired to his farm, the "Bouwerij," which gave the name to the modern Bowery. Died, 1672.

Sudermann (*zōō'dĕr-măn*), **Hermann,** German dramatist and novelist, was born in Matzicken, East Prussia, 1857. He studied in the universities of Konigsberg and Berlin, and was a teacher and journalist, 1881–89. In 1888, he won European fame by a play entitled *Die Ehre*, and a novel, *Frau Sorge*, which reached its 125th edition in 1912. These were followed by works of fiction and dramas, which placed Sudermann second only to Hauptmann among modern German writers.

Although lacking the poetic beauty which is Hauptmann's distinctive charm, Sudermann's dramatic works otherwise surpass those of his most distinguished contemporary. His greatest drama, *Heimat*, translated as *Magda*, was presented by Duse, Modjeska, Mrs. Patrick Campbell, and Mrs. Fiske.

Among Sudermann's other dramatic works are *Sodoms Ende*, *Die Schmetterlingsschlacht*, *Morituri*, *Johannes*, *Johannisfeuer*, and *Es Lebe das Leben*, which was translated as *The Joy of Living* and was acted by Mrs. Patrick Campbell. His novels include *Katzensteg*, *Iolanthes Hochzeit*, and *Es War*, and among his later works are *Die indische Lilie*, *Der gute Ruf*, and *Das höhere Leben*. Died, 1928.

Sue (*sū*), **Marie Joseph,** known as **Eugène,** French novelist, was born in Paris, 1804. He studied medicine and served as surgeon in the army and afterward in the navy. Having inherited wealth, he resigned in 1829 and devoted himself to literature. His reputation as a writer rests mainly on *The Wandering Jew* and *The Mysteries of Paris*, both of which attained a world-wide reputation. Died, 1857. See *Jew, The Wandering*.

Sulla, Lucius Cornelius, Roman general and dictator, was born at Rome, 138 B. C. He acquired military fame in the armies of Marius and Catulus. His great popularity among the soldiers incited him to aspire to the sovereign power of dictator; and, though opposed by Marius, he gained his end, proscribing and putting to death all who opposed him. He used his power to establish a constitution of a thoroughly oligarchic type. After holding the dictatorship for about two years, he resigned his office in 79, and retired to his estate at Puteoli, where he died, 78 B. C.

Sullivan, Sir Arthur Seymour, British composer, was born in London, of Irish parents, 1842. He studied in London and at Leipzig, and, in 1861, composed incidental music for *The Tempest*. He wrote a grand opera entitled *Ivanhoe*, cantatas, overtures, oratorios, church music, and ballads, but is best known for his comic operas written in collaboration with W. S. Gilbert, who contributed inimitable librettos. The most famous of these operas are *H. M. S. Pinafore*, *Pirates of Penzance*, *Patience*, *Iolanthe*, *The Mikado*, and *The Yeomen of the Guard*. Essentially lyric in quality, Sullivan's music abounds in melody and dainty orchestration. Died, 1900. See *Mikado, The*; *Pinafore*.

Sully, Thomas, portrait painter, was born in Horncastle, England, in 1783. While a boy, he emigrated to America and studied at Charleston, S. C., afterward residing in Richmond, New York, and Philadelphia. He enjoyed a great reputation as a portrait painter, executing portraits of Jefferson, Lafayette, Madison, Jackson, and other prominent personages. Died, 1872.

Sully-Prudhomme (*sū'lē' prü'dôm'*), **René François Armand,** French poet, was born in Paris, 1839. He was educated for the law and studied also science and philosophy.

Encouraged by the success of his *Stances et poèmes*, 1865, he devoted his efforts entirely to poetry. Soon afterward he published *Les épreuves* and *Les solitudes*, worthy forerunners of his great philosophical poems, *La justice* and *Le bonheur*, which rank among the most notable efforts in French poetry since Hugo. *Impressions de la guerre* gave some aspects of the Franco-Prussian war and was followed by *Les destins*, *Vaines tendresses*, and *Le prisme*. In 1905, he produced *La vraie religion selon Pascal*. He was elected to the French academy in 1881 and, in 1901, he was awarded the Nobel prize for literature. Died, 1907.

Sumner, Charles, American statesman, was born at Boston, 1811; graduated at Harvard, 1830; studied law; and was admitted to the bar, 1834. He became a writer and lecturer on law, taking no part in politics until 1840, when he identified himself actively with the Antislavery movement.

In 1845, he delivered a notable Fourth of July oration on "The True Grandeur of Nations," which offended the Whig leaders and led to Sumner's withdrawal from their party. He then became a leader of the Free-Soil party and, in 1850, was elected successor to Daniel Webster in the United States Senate.

Sumner's first important speech in the Senate was in opposition to the Fugitive Slave law. His speech delivered in 1856 under the title "The Crime against Kansas," greatly incensed the members of Congress from South Carolina, one of whom, Preston S. Brooks, assaulted Sumner at his desk in the Senate chamber. Sumner supported the election of Lincoln, urged upon him the proclamation of emancipation, and became the leader of the Senate as chairman of the committee on foreign relations. Died 1874.

Sunday, William Ashley, American evangelist, popularly known as "Billy" Sunday, was born at Ames, Iowa, 1863, and was educated in the public schools. In 1883, he became a professional baseball player, and, for seven years, made a notable record with the Chicago, Pittsburgh, and Philadelphia teams. From 1891 to 1895, he was assistant secretary of the Y. M. C. A. in Chicago.

In 1896, Sunday began evangelistic work and, in 1903, was ordained to the Presbyterian ministry. His unusual and unconventional methods aroused great diversity of opinion, ranging from the severest criticism to enthusiastic admiration. His evangelical campaigns rank among the most successful ever held in America.

Sun Yat Sen, Chinese revolutionary leader, was born of native Christian parentage in the Kwangtung province in 1867. He was educated in Hongkong as a physician. Shortly after 1892, he devoted himself to secret activities aiming at the overthrow of the Chinese monarchy. Following the Chinese revolution in 1911, he was chosen provisional president of the Chinese Republic, but resigned the following year. In 1921, he was elected president by the Southern Parliament and led a military campaign against the Northern government at Peking. Died, 1925.

Suttner (*zōōt'nĕr*), **Bertha, Baroness von,** Austrian writer and peace advocate, was born at Prague, 1843. She was the daughter of Count Franz Kinsky, Austrian field marshal. She was carefully educated, traveled extensively, and lived for a long period in Italy and in Paris.

In 1876, she married the novelist Baron Arthur von Suttner and resided with him at Tiflis in the Caucasus until 1885, after which she lived in Austria. At one time, she was secretary to Alfred Nobel, whom she greatly influenced by her championship of the brotherhood of nations.

She was a prolific writer of stories, novels, and books on social science. Her novel entitled *Die Waffen nieder*, "*Lay Down Your Arms*," ran through many editions. In 1905, she was awarded the Nobel prize for peace. Died in 1914.

Suzzallo (*sū'zā-lō; sū'z'-lō*), **Henry,** American educator, was born at San Jose, Cal., 1875. He was graduated at the state normal school there, at Stanford university, and at Columbia university. After teaching in the public schools, he became assistant superintendent of schools in San Francisco, 1903, and lectured at Stanford university, 1902–07, and in the state normal school of San Jose, 1905–07. From 1907 to 1909, he was adjunct professor of elementary education at Columbia university and, from 1909 to 1915, was professor of educational sociology at Teachers college, Columbia university. In 1915, he was elected president of the State University of Washington, from which position he retired in 1926 as the result of a disagreement with the state governor.

Svedberg, The, Swedish chemist, was born in 1884. He was appointed professor of physical chemistry in Upsala university, and became widely known for his researches in colloidal chemistry. For his work in this field he received the Nobel prize in chemistry for 1926.

Swedenborg (*swē'dĕn-bôrg*), **Emanuel,** Swedish scientist and theologian, was born at Stockholm, 1688. He studied at Upsala and traveled abroad for four years. In 1716, Charles XII appointed him assessor of mines. He was ennobled in 1719; took a prominent part in the House of Peers; and wrote on many scientific subjects, publishing *Opera Philosophica et Mineralia*, *The Economy of the Animal Kingdom*, and *The Animal Kingdom*.

In 1743, Swedenborg claimed a divine commission to disclose the internal or spiritual sense of Scripture by the correspondence existing between natural and spiritual things. He taught that all angels were formerly human beings and that, in heaven, they live together in societies and marry, although only in a spiritual sense.

Among his chief theological works are *Arcana Cœlestia*, his most extensive and valuable treatise; *Heaven and Hell*; *Divine Love and Wisdom*; and *The True Christian Religion*. He died in London, 1772. The New Church, which accepts Swedenborg's mission and general views, held its first public services in 1778.

Swift, Jonathan, British satirist, was born in Dublin, of English parents, 1667. After graduation from Trinity college, he removed to London and, in 1689, became secretary to Sir William Temple. At this time, he first met Esther Johnson, then eight years old, whom he subsequently immortalized as "Stella."

Entering the Church, he became established in a parsonage at Laracor, near Dublin, 1700, but spent much time in London. In 1704 appeared *The Battle of the Books* and *The Tale of a Tub*, which brought him into notice as the most powerful satirist of his time. In politics, he became an important figure by his effective attacks upon the Whigs. Retiring to Ireland upon the fall of the Tory ministry, he became dean of Saint Patrick's cathedral, Dublin, 1713. In 1724, he wrote the noted *Drapier Letters* and, in 1726,

Gulliver's Travels, the most famous of all his works. His later life was embittered by failure to realize his ambitions and by the death of Esther Johnson, to whom he wrote the *Journal to Stella*. He had previously lost by death a second sweetheart, whom he called Vanessa.

The most original writer of his time, Swift was one of the great masters of English prose, and, in vigor, directness, and convincing power, he has never been surpassed. His *Gulliver's Travels* has the unique distinction of being, at the same time, a charming tale for children and, for the discerning reader, perhaps the most savage satire on mankind that has ever been written. Died, 1745. See *Gulliver*, *Lilliput*.

Swinburne, Algernon Charles, English poet, was born in London, 1837. He was educated at Eton and at Oxford, and afterward traveled on the continent, visiting Landor at Florence in 1864. Upon returning to England, he became intimately associated with William Morris and Dante Gabriel Rossetti. In 1865, he published a lyric tragedy *Atalanta in Calydon*, which is regarded as his masterpiece. This was followed by *Poems and Ballads*, *Songs before Sunrise*, and other works which revealed great originality, passionate intensity, and an unusual power of melodious versification.

At the death of Tennyson, Swinburne was the greatest living English poet, but his radical views prevented his appointment as poet laureate. His works include also *Bothwell*, *Songs of Two Nations*, *Songs of the Springtides*, *Mary Stuart*, *A Century of Roundels*, *A Study of Victor Hugo*, *Astrophel and Other Poems*, and *Rosamund*. Died, 1909.

Symonds (*sĭm'ŭnz*), **John Addington,** English literary historian and critic, was born at Bristol, 1840. He graduated at Oxford and began the study of law, which ill health compelled him to abandon. For several years, he lived chiefly in Switzerland, where he wrote extensively on Italian history and literature.

Symonds's chief writings are *Introduction to the Study of Dante*, *Studies of the Greek Poets*, *Sketches in Italy and Greece*, *The Renaissance in Italy*, *Italian Byways*, *Shakespeare's Predecessors*, and lives of Shelley, Ben Jonson, Sir Philip Sidney, Boccaccio, Benvenuto Cellini, and Michelangelo. His work is marked by accurate learning and much critical insight. *The Renaissance in Italy* is his most important work and consists of several large volumes. Died, 1893.

Synge (*sĭng*), **John Millington,** Irish dramatist and poet, was born at Newton Little, near Dublin, 1871. He was educated at Trinity college, graduating in 1892. Always an ardent nature lover, with a passion for languages and music, he went to Germany to study music and later to Paris to do literary criticism.

In 1898, William Butler Yeats induced Synge to return to Ireland and join the movement for the revival of the ancient Irish language and drama. His first plays, *Riders to the Sea* and *The Shadow of the Glen*, immediately established his reputation as a dramatist of a high order. He wrote also *The Well of the Saints*, which was followed by *The Playboy of the Western World*, his most remarkable drama. Among his other productions are *The Aran Islands*, *The Tinker's Wedding*, and *Deirdre of the Sorrows*. Synge possessed unusual imagination, perfect mastery of words, and rare delicacy of style, and, at his untimely death, in 1909, ranked among the foremost young Irish poets.

Tacitus (*tăs'ĭ-tŭs*), **Publius Cornelius,** Roman historian and orator, was born about 55 A. D. In 78, he married the daughter of the famous Agricola; was quæstor, 79; became prætor in 88; and was elected consul in 97. He attained distinction as an orator and, in 99, was appointed, with the younger Pliny, to conduct the prosecution of Marius, then proconsul of Africa.

After his consulship, Tacitus devoted himself chiefly to literature. His works include *Dialogue on Orators*; *Agricola*, a biography; *Germania*, describing the German peoples; *Annals*, covering the period from 14 to 68; and *Histories*, which narrates events from 68 to 96. He possessed a remarkably forceful style and many of his maxims have become proverbial. Died about 120.

Tadema, Alma. See *Alma-Tadema, Sir Laurence.*

Taft, Lorado, American sculptor, was born at Elmwood, Ill., in 1860. After graduation from the University of Illinois in 1879, he studied sculpture at the Ecole des Beaux-Arts, Paris, 1880–83. Returning to America, he settled in Chicago, and, in 1886, became an instructor at the art institute. In this capacity, he exercised a marked influence upon the development of sculpture in the Middle West. He lectured extensively upon art subjects, not only to students in the art institute and in the University of Chicago, but also to art workers and to the public throughout the country.

Besides extensive portraiture, Taft's sculptural works include "Sleep of the Flowers" and "Awakening of the Flowers," World's Columbian exposition; "Mountains" and "Prairie," Saint Louis exposition; "The Blind," inspired by Maeterlinck's drama; "The Solitude of the Soul," a marble group at the Metropolitan museum, New York; Washington monument, Seattle; Columbus memorial fountain, Washington, D. C.; Thatcher memorial fountain, Denver; and "Black Hawk," heroic statue, Oregon, Ill.

Taft also undertook to carry out an extensive plan of sculptural decoration for Chicago which had been made possible by the Ferguson bequest of 1905. One group, "The Spirit of the Great Lakes," was completed in 1912 and a second, the colossal "Fountain of Time," was finished in 1920. He published *The History of American Sculpture* and *Recent Tendencies in Sculpture*. In 1920, he was elected member of the American academy of arts and letters.

Taft, William Howard, 27th president of the United States, was born in Cincinnati, Ohio, 1857. He was graduated at Yale in 1878 and at the law school of Cincinnati college in 1880. He practiced law from 1883 to 1887; was judge of the superior court of Ohio, 1887–90; and solicitor-general of the United States, 1890–92. He was dean and professor in the law department, University of Cincinnati, 1896–1900; United States circuit judge, 1892–1900; president of the United States Philippine commission, 1900-01; first civil governor of the Philippine Islands, 1901–04; secretary of war, United States, 1904–08; and president of the United States, 1909–13.

Taft's record on the Federal bench and as an administrator in the Philippines was remarkably distinguished. As member of Roosevelt's cabinet, he ably represented the administration on important missions to Cuba, Japan, China, and Russia. Although elected president by an overwhelming majority, he lost popularity by reason of his attitude in the Ballinger-Pinchot controversy and by his defense of the Payne-Aldrich Tariff act of 1909. His final alignment with the reactionary group as against the progressive element divided his party. While renominated by the Republicans in 1912, he received only eight electoral votes at the ensuing election.

In 1913, Taft was made professor of law at Yale and, in 1916, became chairman of the central committee of the American Red Cross. In 1918, he was made a member of the national war labor board. In 1921, he was appointed chief justice of the United States supreme court. His writings include *Four Aspects of Civic Duty*, *Present-Day Problems*, *The Anti-Trust Act and the Supreme Court*, *The United States and Peace*, *Ethics in Service*, and *The Presidency: Its Duties, Opportunities, and Limitations*.

Tagore (*tä-gōr'*), **Rabindranath,** Hindu poet, was born at Calcutta in 1861. He spent his childhood in his native city but at 17 was taken to Europe for further education. Returning to India and devoting his time to writing, he became a successful journalist and well-known also as an educator, philosopher, and religious teacher. His early productions were romantic and sensuous, but his later work reveals a marked change to idealism and spirituality.

Tagore's poetry has exerted a remarkable power over the masses in Bengal. His native tongue is Bengali, but he has also acquired a fine English style so that his influence, at first confined to the Bengal peoples, has extended to the Western world. In 1913, he was awarded the Nobel prize for literature.

Among Tagore's works available in English are *The Crescent Moon* (child poems), *The Gardener*, *Gitanjali*, *Song Offerings*, *Sādhāna*, *Chitra*, *The King of the Dark Chamber*, *The Post Office* (play), *Fruit-Gathering*, *Nationalism*, *Mashi*, *Lover's Gift*, *The Home and the Hearth*, *The Wreck*, *Glimpses of Bengal*, and *The Fugitive*.

Taine (*tān*), **Hippolyte Adolphe,** French literary historian and critic, was born at Vouziers in 1828. He went to Paris in 1841, studied at the Collège Bourbon, and, in 1848, entered the Ecole Normale. In 1851, he was appointed professor of philosophy at Toulon. He immediately resigned, however, and devoted himself to the study of medicine and the sciences in order to bring himself in touch with the growing scientific spirit of the time. In 1864, he was made professor of the history of art and of æsthetics in the Ecole des Beaux-Arts.

Among his important works is his *History of English Literature*, a valuable criticism brilliantly written. His monumental achievement, *Origins of Contemporary France*, engaged his efforts for more than 20 years. His other writings include *Voyage in Italy*, *Voyage to the Pyrenees*, *The Ancient Régime*, *Notes on England*, *Philosophy in Art*, and *The Ideal in Art*. In 1878, Taine was elected to the French academy. He died in 1893.

Talleyrand-Périgord (*tăl'ĭ-rănd'*; Fr., *tä'lĕ'răN' pā'rē'gôr'*), **Charles Maurice de, Prince de Benevento,** French statesman and diplomat, was born at Paris in 1754. He was educated for the Church, becoming in 1775 abbot of Saint Denis and, in 1788, bishop of Autun. He was a member of the States-General in 1789 and took a leading part in the proceedings of that assembly and also of the National Assembly. He was soon afterward excommunicated by the pope, and then devoted himself entirely to politics.

The excesses of the Revolution led to his withdrawal to England and afterward to America. After the fall of Robespierre, he returned to Paris, and, through Madame de Staël's influence with Barras, he was appointed foreign minister, an office which he retained until 1807. In return for notable services, Napoleon made Talleyrand grand chamberlain and prince. After the fall of Napoleon, he was for a time prime minister under Louis XVIII, and under Louis Philippe he was ambassador to London.

Talleyrand possessed unrivaled skill and finesse in diplomacy and, despite the inconsistencies of his character and career, rendered services of inestimable value to his country. He died in 1838.

Talmage, Thomas De Witt, American Presbyterian clergyman, was born at Bound Brook, N. J., in 1832. He was educated at New York university and at the New Brunswick, N. J., theological seminary. He was pastor of the Brooklyn tabernacle, 1870–94, and pastor at Washington, D. C., 1895–99. His sermons, published weekly for a long period, and his sensational oratory on the lecture platform gained him wide reputation. For several years he edited *The Christian at Work*, later the *Christian Herald*, and wrote extensively. Among his writings are *Crumbs Swept Up*, *Abominations of Modern Society*, and *The Marriage Ring*. He died in 1902.

Tamerlane. See *Timur*.

Taney (*tô'nĭ*), **Roger Brooke,** American jurist, was born in Calvert county, Md., 1777. He was graduated at Dickinson college, studied law, and entered politics as a Federalist. He afterward became a Democrat and was made attorney-general in President Jackson's cabinet, 1831. Two years later he was appointed secretary of the treasury, and, in 1836, succeeded John Marshall as chief justice of the United States supreme court. His famous decision in the Dred Scott case, 1857, denying the right of citizenship to Negroes, and also the authority of Congress to keep slavery out of the territories, caused greater excitement than any previous decision of the supreme court. He died in 1864.

Tarbell, Ida Minerva, American author and editor, was born in Erie county, Pa., in 1857. She was graduated from Allegheny college in 1880 and, from 1883 to 1891, she was associate editor of the *Chautauquan*. From 1891 to 1894, she was a student at the Sorbonne and at the Collège de France, Paris. Returning to America, she was associate editor of *McClure's Magazine* from 1894 to 1906 and of the *American Magazine* from 1906 to 1915.

In addition to many contributions to magazines, her writings include *Short Life of Napoleon Bonaparte*, *Life of Madame Roland*, *Life of Abraham Lincoln*, *History of the Standard Oil Company*, *The Tariff in Our Times*, *The Business of Being a Woman*, *New Ideals in Business*, *The Rising of the Tide*, and *In the Footsteps of the Lincolns*.

Tarkington, (Newton) Booth, American novelist and playwright, was born at Indianapolis, Ind., in 1869. He was educated at Phillips academy, Purdue university, and at Princeton, where he was graduated in 1893. At first he planned to pursue a business career, but, after a few years, turned his attention wholly to writing. His first story, *The Gentleman from Indiana*, was published in 1899. This was followed in 1900 by *Monsieur Beaucaire*, which established his reputation. Both of these stories were successfully dramatized. In 1919, he was awarded the Pulitzer prize by Columbia university for his novel *The Magnificent Ambersons*.

Among his other stories are *Cherry*, *The Conquest of Canaan*, *Beauty and the Jacobin*, *His Own People*, *Penrod*, *Seventeen*, and *Alice Adams*. His plays include *Cameo Kirby*, *Your Humble Servant*, *Mister Antonio*, *Clarence*, *Poldekin*, *The Wren*, and *Intimate Strangers*. In 1920, he was elected member of the American academy of arts and letters. See *Monsieur Beaucaire*.

Tarr, Ralph Stockman, American educator, was born at Gloucester, Mass., in 1864. He was graduated at Harvard in 1891 and was assistant professor of geology there, 1892–97. From 1897 until his death, he was professor of physical geography at Cornell university. His works include *Economic Geology of the United States*, *Elementary Physical Geography*, *Elementary Geology*, *Physical Geography of New York State*, and many monographs on geological and geographical subjects. He died in 1912.

Tasso (*tăs'ō*; Ital., *tàs'sō*), **Torquato,** Italian poet, was born at Sorrento in 1544, the son of a nobleman of Bergamo. He studied law at Padua and philosophy at Bologna. In 1562, he published his earliest poem, *Rinaldo*. In 1565, he entered the service of Cardinal Luigi d' Este and, in 1570, accompanied him to Paris. In 1572, Tasso was invited to the court of Alfonso II, duke of Ferrara. While there he produced his most important works. His *Aminta*, a pastoral drama of exquisite lyrical charm, was published in 1573. In the following year, he completed his *Jerusalem Delivered*, one of the great epic poems of modern times.

For some years Tasso lived on intimate terms with the duke of Ferrara and his sisters, the princesses Lucrezia and Leonora. About 1577, Tasso's mind began to fail and, in 1579, he was confined as insane in a hospital of Ferrara. A theory that he was imprisoned because of his aspirations for the hand of the princess Leonora gained wide acceptance. While now generally discredited, this legend formed the basis for Goethe's *Tasso* and Byron's *Lament of Tasso*.

Following his release in 1586, Tasso led a broken and wandering life, residing for brief periods in various Italian cities. In these last years he wrote the tragedy *Torrismondo* and several poems as well as a revised version of his *Jerusalem Delivered*, which he called *Jerusalem Conquered*. All these are inferior to his earlier works. At Rome, whither he had been summoned by Pope Clement VIII to be crowned poet laureate at the Capitol as Petrarch had been, Tasso was stricken with a fatal illness and the ceremony was never performed. Died, 1595. See *Jerusalem Delivered*.

Taylor, (James) Bayard, American author and traveler, was born at Kennett Square, Pa., in 1825. In 1844 he published a volume of poems, *Ximena*. Soon afterward he set out on a pedestrian tour of Europe, and, in 1846, published *Views Afoot, or Europe Seen with Knapsack and Staff*. After his return he settled in New York, wrote for the *Tribune*, and, as its correspondent, made extensive travels in various countries. In 1878, he was appointed United States minister to Berlin.

Taylor wrote many volumes of verse, fiction, sketches, essays, translations, and criticisms, besides several books of travel. Among his best poems are "Bedouin Song," "The Song of the Camp," and "The Quaker Widow." Of his novels *The Story of Kennett* and *Hannah Thurston* were in greatest favor. Taylor made an excellent translation of Goethe's *Faust*. He died in 1878.

Taylor, Frederick Winslow, American management engineer, was born at Germantown, Pa., in 1856. He went to work as a machinist in 1874 and by 1884 was chief engineer of the Midvale Steel Company. There he made systematic studies of the motions necessary to perform various industrial operations. His work in analyzing and standardizing these motions was the beginning of scientific management in industry. During his employment by the Bethlehem Steel Company, 1898–1901, a similar systematic study of machine tools resulted in his discovery, with Maunsel White, of high-speed steel, first made public at the Paris Exposition of 1900. Died, 1915.

Taylor, Henry Osborne, American author, was born in New York City, 1856, and was educated at Harvard and Columbia universities. His *Treatise on Law of Private Corporations* has gone through many editions, but he is perhaps better known for his scholarly and readable works on various phases of the history of thought and institutions. The latter include *Ancient Ideals*, *The Classical Heritage of the Middle Ages*, *The Mediæval Mind*, and *Thought and Expression in the Sixteenth Century*.

Taylor, Jeremy, English divine, was born at Cambridge in 1613. He was graduated at Cambridge; was admitted to holy orders about 1633; and shortly attracted the attention of Archbishop Laud, who, in 1636, procured him a fellowship at Oxford. He was soon afterward made chaplain to Charles I, and from 1638 to 1642 was rector of Uppingham. About 1645 he withdrew to Wales, where he had charge of a school, and, in 1658, he removed to Ireland. After the Restoration he was made bishop of Down and Connor. His chief works are *Holy Living*, *Holy Dying*, *Liberty of Prophesying*, *Ductor Dubitantium*, and *Sermons*. Jeremy Taylor is sometimes styled "the modern Chrysostom" on account of his eloquence. He died in 1667.

Taylor, Zachary, American general and 12th president of the United States, popularly known as "Old Rough and Ready," was born in Orange county, Va., 1784. He was educated in Kentucky, entered the army as lieutenant in 1808, became major in the War of 1812, and served as colonel in the Black Hawk war, 1832. After defeating the Seminoles at Okechobee in 1837, he received the chief command in Florida. He led the army which entered Mexico in 1846; gained the battles of Palo Alto, Resaca de la Palma, and Buena Vista, and, in 1847, successfully closed the campaign. As Whig candidate, he was elected to the presidency in 1848, and inaugurated in 1849. Important questions under discussion during his term of office were the admission of California, the boundary between Texas and Mexico, and the extension of the slave power. He died in 1850.

Tchaikovsky (*chi-kôf'skĭ*), **Peter Ilyitch,** Russian composer, was born in the Ural mining region, 1840. He studied law at Petrograd, and, in 1859, secured a place in the ministry of justice but soon resigned to study music under Rubinstein at the conservatory. In 1866, he became teacher of harmony at the Moscow conservatory, and later he devoted himself entirely to composition and travel.

Eugene Onyegin is the best of his ten operas, which, however, are overshadowed by his great orchestral works,

notably by his symphonies. These include the world-famous *Symphonie Pathétique* and his symphonic poems *Manfred, Romeo and Juliet,* and *Francesca da Rimini.* He wrote also overtures, concertos, chamber and piano music, and songs. Tchaikovsky ranks as the greatest composer that Russia has produced. He died in 1893.

Tecumseh (*tē-kŭm'sē*), Shawnee chief, was born near Springfield, Ohio, in 1775. He headed an Indian alliance against the whites in the Northwest, but was defeated by the American general Harrison at Tippecanoe, 1811. In the War of 1812, he became an ally of the English, obtained the rank of brigadier general, and in 1813 commanded the right wing in the battle of the Thames, where he fell mortally wounded.

Tennant, Smithson, English chemist, was born at Selby, Yorkshire, in 1761. He studied botany, chemistry, and medicine at Cambridge, where he was graduated in medicine in 1790. Settling soon afterward on an estate near Cheddar, he conducted a series of agricultural and other experiments. In 1813, he was appointed professor of chemistry at Cambridge. His most notable achievement was the discovery of the metals iridium and osmium, both of which have unique uses in the arts. He died in 1815.

Tennyson, Alfred, Baron, English poet, was born at Somersby, Lincolnshire, in 1809. He was educated at Cambridge, gaining the chancellor's medal by his poem entitled "Timbuctoo." His literary career dates from the appearance of *Poems, Chiefly Lyrical* in 1830, after which his reputation slowly increased until the publication, in 1842, of *Poems, by Alfred Tennyson* raised him to supremacy among living English masters of verse. In 1847, *The Princess* appeared and, in 1850, the elegies entitled *In Memoriam.*

On the death of Wordsworth in 1850, Tennyson was made poet laureate. In 1852, he issued his magnificent *Ode on the Death of the Duke of Wellington. Maud, and Other Poems* appeared in 1855. The *Idylls of the King,* published in 1859, at once took rank among the noblest poems of the language. Next followed *Enoch Arden, Aylmer's Field,* and *Tithonus.* In 1875, he published the poetic drama *Queen Mary,* which was followed by *Harold* and *Becket.* Other works were *Locksley Hall Sixty Years After*; *Demeter, and Other Poems*; *Robin Hood*; and *Maid Marian.*

Tennyson was the representative poet of the Victorian era, as Spenser was of the Elizabethan court, Milton of the Protectorate, and Pope of the reign of Queen Anne. In 1884, he was created baron. Died in 1892. See *Arden, Enoch*; *Idylls of the King*; *Locksley Hall.*

Terauchi (*tā'rou'chē'*), **Seiki, Count,** Japanese statesman, was born in Choshu, 1853. He entered the army in 1871, rose to rank of lieutenant general in 1892, and later became inspector general of military instruction. In 1902, he was made war minister in the Katsura cabinet, and, in 1911, governor-general of Chosen. His greatest achievement was the annexation of Chosen to Japan. In October 1916, Terauchi was appointed premier and minister of finance, succeeding Marquis Okuma. He died in 1919.

Terence (*tĕr'ĕns*), or **Publius Terentius Afer,** Roman writer of comedies, was born in Carthage, of African origin, about 190 B. C. He was the slave of a Roman senator, who educated him in Rome and finally gave him his freedom. The success of his first play, *Andria,* in 166, won him the patronage of Lælius and the younger Scipio. While inferior to Plautus in comic power, he excels him in character drawing and metrical skill. Terence's plays served as a model for Molière and other modern dramatists. His extant plays include also *Hecyra, Heautontimoroumenos, Eunuchus, Phormio,* and *Adelphi.* While on a trip to Greece made for the purpose of studying the comedies of Menander and other comic poets, he died about 159 B. C.

Terry, Ellen Alice (Mrs. James Carew), English actress, was born at Coventry, in 1848. She made her first appearance on the stage in 1856, as the boy Mamillius in *The Winter's Tale.* In 1867, she appeared for the first time with Henry Irving, with whom, after 1878, she was associated for 24 years, rising to foremost rank among English actresses. Her notable rôles include Portia, Hermione, Juliet, Mistress Page, and Viola, in Shaksperian plays; Fair Rosamund in Tennyson's *Becket*; Madame Sans-Gêne in a Sardou adaptation; Clarisse in *Robespierre*; Alice Grey in Barrie's *Alice Sit-by-the-Fire*; and Lady Waynflete in Shaw's *Captain Brassbound's Conversion.* With Henry Irving, Miss Terry made in 1883 the first of many successful visits to the United States. Her writings include *The Russian Ballet* and *The Story of My Life.* Died, 1928.

Tertullian (*tĕr-tŭl'i-ăn*), **Quintus Septimius Florens,** a father of the Latin Church, was born at Carthage about 150 A. D. He practiced law in Rome and later returned to his birthplace, where he became a presbyter and spent the rest of his life. Well versed in Greek and Roman literature, he was remarkable for his impassioned eloquence, which was given full sway in his most famous work, *Apology for the Christian Religion.* Died about 230.

Tesla (*tĕs'lä*), **Nikola,** American electrical inventor, was born in Smiljan, Jugoslavia, in 1857. He studied engineering in Graz. In 1884, he came to the United States and for several years was employed in the Edison establishment at Orange, N. J. Subsequently he devoted himself to electrical research and invention, discovering the principle of the rotary magnetic field and applying it to the induction motor. Tesla's inventions include dynamos, transformers, induction coils, oscillators, and arc and incandescent lamps.

Tetrazzini (*tā'trät-sē'nē*), **Luisa,** Italian coloratura soprano, was born in Florence, 1874. She studied under Signor Ceccherini and, in 1895, made her operatic début as Inez in *L'Africaine.* She sang in Rome and other cities, everywhere increasing her fame. In 1907, she won a great triumph at Covent Garden, London. Upon appearing at the Manhattan opera house, New York, in 1908, she was recognized as a worthy successor to Patti. From 1910 to 1913, Tetrazzini made extended concert tours in the United States, and, in 1913-14, she was a regular member of the Chicago Opera Company. Possessing a voice of remarkable purity and beauty, Tetrazzini ranks among the greatest modern coloratura singers.

Thackeray, William Makepeace, English novelist, was born at Calcutta, India, in 1811. He was educated at the Charterhouse and at the University of Cambridge. After working unsuccessfully as an illustrator, he abandoned art for literature and rose to share with Dickens foremost rank among British novelists of his time. His earlier writings, which appeared under the pseudonym "Michael Angelo Titmarsh," included contributions to *Punch* and several volumes of wit and satire. *Vanity Fair,* which appeared in 1847-48, established his reputation. Then followed *Pendennis, Henry Esmond, The Newcomes, The Virginians,* and *The Adventures of Philip,* which have become classics of English fiction. Thackeray's last novel, *Denis Duval,* was left unfinished at his death in 1863. See *Barry Lyndon*; *Sedley, Mr.*; *Sharp, Rebecca*; *Vanity Fair.*

Thales (*thā'lēz*), Greek philosopher and scientist, was born in Miletus about 640 B. C. Thales is universally recognized as the founder of Greek geometry, astronomy, and philosophy. His claim to be the founder of mathematics rests upon his proofs of some of the elementary propositions of geometry. In astronomy, his most notable achievement was his prediction of an eclipse of the sun, which occurred May 28, 585. In philosophy, he sought a single constituent element, or principle, out of which the world was formed; this he declared to be water, or moisture. Died about 546 B. C.

Thanet, Octave. See *French, Alice.*

Thaxter, Celia Laighton, American poet and juvenile writer, was born at Portsmouth, N. H., in 1836. She spent much of her girlhood and later life on the Isles of Shoals, where her father was the lighthouse keeper. In 1851, she married Levi Lincoln Thaxter, a Browning scholar. Her poetry is reflective of her quiet life and the gentler aspects of nature. Her works include *Among the Isles of Shoals, Idyls and Pastorals,* and *Stories and Poems for Children.* Died, 1894.

Thayer (*thâr*; *thā'ĕr*), **Abbott Handerson,** American painter, was born at Boston, Mass., in 1849. After preliminary study in Boston, he continued at Paris under Gérôme and Bastien-Lepage. In his early work he produced portraits and landscapes, but he later devoted himself chiefly to painting ideal figure compositions, which he treated with marked dignity and charm. Notable examples of his highly individual style are "Young Woman," in the Metropolitan museum, New York; "Caritas," in the Boston museum; "Winged Figure," in the Albright art gallery, Buffalo; and a "Virgin," in the national gallery, Washington. In 1909, he was elected a member of the American academy of arts and letters. Died in 1921.

Thayer, William Roscoe, American author and editor, was born at Boston in 1859. He was graduated at Harvard in 1881 and was made editor of the *Harvard Graduates' Magazine* in 1892. His writings in verse include *The Confessions of Hermes, Hesper,* and *Poems, New and Old.* Among his prose works are *Throne-Makers, A Short History of Venice, Life and Times of Cavour, Life and Letters of John Hay, Collapse of Superman,* and *Theodore Roosevelt—An Intimate Biography.* In 1914, he was elected to the American academy of arts and letters. Died in 1923.

Themistocles (*thē-mĭs'tō-klēz*), Athenian general and statesman, was born at Athens about 514 B. C. He fought at Marathon, and devoted the succeeding years to the upbuilding of the Athenian navy, greatly adding to its power when he was chief archon in 481. On the invasion of Greece by Xerxes, he was appointed commander of the Athenian fleet, and the great naval victory of Salamis was due to his courage, his foresight, and his astute diplomacy. Accused of peculation about 471, he was ostracized and retired for a time to Argos. In 465, he went to the Persian court, where he was received by Artaxerxes, and thereafter lived securely in Magnesia until his death, 449 B. C.

Theocritus (*thē-ŏk'rĭ-tŭs*), Greek bucolic poet, flourished about 310–245 B. C. He was reputed to be a native of Syracuse, but very little is known of his personal history. Of his writings about 30 idyls and a number of epigrams are extant. In his poems Theocritus united popular and artistic elements with marvelous skill and is justly called the father of pastoral poetry. Virgil in Latin poetry and Spenser and Milton in English have imitated his style.

Theodore, Edward Granville, Australian statesman, was born at Port Adelaide, South Australia, 1884, and was educated in the public schools. He was elected to the legislative assembly of Queensland in 1909. Ten years later, he became leader of the Labor party and premier of the state, resigning in 1925 to enter the Federal parliament.

Theodoric (*thē-ŏd'ō-rĭk*) **the Great,** founder of the Ostrogothic kingdom in Italy, was born in Pannonia about 454. For ten years during his youth he was a hostage at Constantinople. In 474, he succeeded his father as king of Pannonia. In 489, he advanced upon Italy, overthrew Odoacer, and became sole ruler. He was then the most powerful of the Gothic kings, with an empire embracing Italy, Sicily, and Dalmatia, besides German possessions. Proving himself a wise and strong ruler, he became one of the great heroes of German legend and figures in the *Nibelungenlied*. Died in 526.

Theodosius (*thē'ō-dō'shĭ-ŭs*) **the Great,** Roman emperor, was born near Segovia about 346. He accompanied his father, a celebrated Roman general also named Theodosius, on successful campaigns in Britain and elsewhere. His father was beheaded at Carthage in 376 and the son thereupon retired to his patrimonial estates in Spain. Upon the death of Valens, Gratianus called Theodosius from retirement, made him coruler, placing, in 379, Egypt and the East under his administration and intrusting him with the protection of the empire against the Goths.

In four years Theodosius pacified the Visigoths, and, in 386, he conquered the Ostrogoths. In 388, he restored Valentinian II to the throne of the Western empire. In 394, Theodosius overthrew the armies of Valentinian's successor, Arbogastes, and reunited the Eastern and the Western empire for a period of a few months preceding his death in 395.

Theophrastus (*thē-ō-frăs'tŭs*), Greek philosopher and naturalist, was born at Eresus, in Lesbos, about 372 B. C. He became a pupil of Plato at Athens and later of Aristotle, at whose death he was made head of the Peripatetic school, which he conducted for 35 years. He maintained the high character of the school, which for a time enrolled more than 2000 students and won distinguished reputation in Greece and in other countries. Aristotle also made Theophrastus guardian of his children and bequeathed to him his library and the original manuscripts of his works.

While in philosophy Theophrastus closely adhered to the teachings of his great master, he was more devoted to natural history than to metaphysics and his chief fame rests upon his botanical works. In his *History of Plants* and in his *Theoretical Botany*, he describes about 500 species then made use of in treating diseases. He wrote treatises *On Mineralogy*, *On Fire*, *On the Senses*, and on *Metaphysics*. His famous book of sketches called *Characters* was widely popular and has often been imitated by modern writers. He died in 287 B. C.

Thespis, Greek poet, generally regarded as the father of tragic drama, flourished in the 6th century B. C. Before his time, choruses sang hymns in honor of Bacchus or other deities, relating their exploits. According to Diogenes Laërtius, Thespis introduced into the chorus an actor to play the part of the deity or hero. By his dialogue with the leader of the chorus this actor gave dramatic vigor to the story.

The plays of Thespis were usually given under his direction on a rude stage, the paraphernalia for which were transported by wagons and were set up at different places suitable for giving performances. He is said to have lived, however, to see the drama established as a state institution by Pisistratus, 535 B. C.

Thiers (*tyâr*), **Louis Adolphe,** French statesman and historian, was born at Marseille in 1797. He was educated for the law, but discarded it for journalism. During 1823–27 appeared his *History of the French Revolution*. Active in promoting the revolution of 1830, he became minister of the interior in 1832, served in various offices in several cabinets, and, for a brief period in 1840, was premier. Withdrawing from politics, he then wrote his *History of the Consulate and the Empire*. He entered the *corps législatif* in 1863 and, in 1870, resolutely opposed the impending war against Germany. In 1871, he succeeded in effecting peace on the best terms possible, and was elected president of the new republic. He resigned this office in 1873. Thiers was one of the most influential political leaders of France, and, on the collapse of the Empire, was the foremost figure in reconstructing the nation. He died in 1877.

Thirkield, Wilbur Patterson, American preacher and educator, was born at Franklin, Ohio, in 1854. He was graduated at Ohio Wesleyan university in 1876 and at the theological school of Boston university in 1881, and entered the Methodist Episcopal ministry. From 1883 to 1899 he was president of Gammon theological seminary at Atlanta, Ga. In 1899, he was made general secretary of the Epworth league, and, from 1900 to 1906, he was general secretary of the freedmen's aid and Southern educational society of the Methodist Episcopal Church. He was president of Howard university, Washington, from 1906 to 1912, when he was elected bishop of the Methodist Episcopal Church. His writings include *Personality and Message of the Preacher*, *The Higher Education of the Negro*, *The Negro and Organic Union of Methodism*, and *Service and Prayers for Church and Home*.

Thomas (*tô'mâ'*), **Ambroise,** French composer, was born at Metz in 1811. He received his education in music at the Paris conservatory. His first opera, *La Double Echelle*, published in 1837, was followed by *Betty*, *Le Caïd*, *Le Songe d'une Nuit d'Été*, *Le Carnaval de Venise*, *Mignon*, *Hamlet*, and *Françoise de Rimini*. His *Hamlet* was very successful in France and his *Mignon*, which appeared in 1866, won world-wide popularity. He wrote also many cantatas, part-songs, and choral pieces. He died in 1896. See *Mignon*.

Thomas, Augustus, American playwright, was born at Saint Louis, Mo., in 1859. He received a public school education, studied law two years, spent six years in practical railroading, and became a special writer and illustrator on Saint Louis, Kansas City, and New York newspapers.

He dramatized Mrs. Burnett's story *Editha's Burglar* in 1887; produced his first original play, *A Man of the World*, in 1889; and soon rose to first rank among American dramatists. The masterly dramatic technique of Thomas is well exemplified in *Arizona* and in *The Witching Hour*, while in *Alabama* his earlier, and in *As A Man Thinks* his later, method is revealed.

Among his other plays are *Reckless Temple*, *The Man Upstairs*, *Oliver Goldsmith*, *On the Quiet*, *The Hoosier Doctor*, *Soldiers of Fortune*, *The Embassy Ball*, *The Harvest Moon*, *The Member from Ozark*, *The Rio Grande*, *The Copperhead*, *Kentuck*, *Nemesis*, and *Song of the Dragon*. In 1912, he was elected a member of the American academy of arts and letters. See *Witching Hour, The*.

Thomas, George Henry, American general, was born in Southampton county, Va., 1816. He was graduated at West Point in 1840 and served with distinction in the Mexican war. In 1861, he was appointed brigadier general of volunteers, and, in January 1862, he won the battle of Mill Springs. As major general in command of the center, he saved the battle of Stone River. At Chickamauga, he rendered the victory a barren one for the Confederates and gained the title of "the rock of Chickamauga." In November 1863, at the battle of Chattanooga, he captured Missionary ridge. In 1864, he commanded in Sherman's advance on Atlanta, following which he was sent to oppose Hood in Tennessee. In December, he won the battle of Nashville, crushing Hood's army, for which he received the thanks of Congress. Died in 1870.

Thomas, John Martin, American educator, was born at Fort Covington, N. Y., in 1869. He was graduated at Middlebury college, Vermont, in 1890 and at Union theological seminary in 1893. Later, he studied at the University of Marburg. Ordained to the Presbyterian ministry, he was pastor at East Orange, N. J., from 1893 to 1908. He was president of Middlebury college, 1908–21, president of Pennsylvania State college until 1925, and then was made president of Rutgers university. His published writings include *The Christian Faith and the Old Testament*.

Thomas, Martha Carey, American educator, was born at Baltimore, Md., in 1857. She was graduated at Cornell university in 1877, studied at Johns Hopkins in 1877-78, at Leipzig from 1879 to 1883, and received the degree of doctor of philosophy from the University of Zurich in 1883. In 1885, she became professor of English and dean of Bryn Mawr college, of which she was president from 1897 to 1922. In 1915, Miss Mary Garrett, prominent in woman suffrage work and a benefactor of Bryn Mawr college, left to President Thomas $15,000,000 to be used for such purposes as she deemed fit. Among Miss Thomas's writings are *Sir Gawayne and the Green Knight* and *Should the Higher Education of Women Differ from that of Men?*

Thomas, Theodore, American orchestral conductor, was born at Esens, East Friesland, Germany, in 1835. At the age of 14 he came with his parents to New York City, where he joined the orchestra of the Italian opera. In 1861, he began organizing his famous orchestra and, in 1864, gave his first symphony concerts in New York. In 1869, he originated the plan of traveling when not occupied in New York, and for nine years visited leading American cities each season.

Thomas was director of the college of music at Cincinnati, 1878–80, and was conductor of the New York philharmonic society, 1880–90. He then went to Chicago, where he developed one of the great orchestras of the world. He exercised a deep influence upon the development of musical taste in America. Died, 1905.

Thomas à Becket. See *Becket, Thomas à.*

Thomas à Kempis. See *Kempis, Thomas à.*

Thompson, Ernest Seton. See *Seton, Ernest Thompson.*

Thompson, William Oxley, American educator, was born at Cambridge, Ohio, in 1855. He was graduated at Muskingum college in 1878 and from Western theological seminary, Allegheny City (now Pittsburgh), Pa., in 1882, following which he was ordained to the Presbyterian ministry. After serving in pastorates in Iowa and Colorado, he was president of Miami university from 1891 to 1899 and of Ohio State university from the latter year until 1925.

Thomson, Elihu, American electrician and inventor, was born in Manchester, England, 1853. After graduation from Central high school, Philadelphia, 1870, he was a teacher of chemistry and mechanics there until 1880. He then became electrician for the Thomson-Houston and General Electric companies, which manufacture his inventions, covered by more than 700 patents. He invented the process of electric welding which bears his name, many important devices in electric lighting and electric motor systems, and a technique for making fused quartz.

Thomson, John Arthur, British biologist, was born in East Lothian, Scotland, in 1861. He was educated at the universities of Edinburgh, Jena, and Berlin. After serving as lecturer on biology and zoology in the school of medicine, Edinburgh, he was appointed, in 1899, professor of natural history in Aberdeen university. Among his extensive scientific writings are *Evolution of Sex* (with Patrick Geddes), *The Study of Animal Life, Outlines of Zoology, The Science of Life, Heredity, The Bible of Nature, Darwinism and Human Life, Introduction to Science, Progress of Science in the Nineteenth Century, Secrets of Animal Life, The Control of Life,* and *The Gospel of Evolution.* He wrote also numerous zoological papers and edited *The Outline of Science.*

Thomson, Sir Joseph John, English physicist, was born near Manchester in 1856. He was graduated at Trinity college, Cambridge, 1880. In 1884, he became professor of experimental physics, Cambridge, and, in 1905, professor of physics at the royal institution, London. In 1918, he was made master of Trinity college, Cambridge.

Thomson's researches on the ionic theory of electricity, on radioactivity, and on the electrical theory of inertia of matter were of great importance. In recognition of his contributions to science he was awarded in 1906 the Nobel prize for physics. His works include *Treatise on the Motion of Vortex Rings, Application of Dynamics to Physics and Chemistry, Conduction of Electricity through Gases, Electricity and Matter, The Atomic Theory,* and *Thermochemistry.*

Thomson, Sir William. See *Kelvin, Lord.*

Thoreau (*thō'rō; thō-rō'*), **Henry David,** American naturalist and author, was born at Concord, Mass., in 1817. He was graduated at Harvard in 1837, and devoted himself to the study of nature and to writing. Emerson says of him: "He was bred to no profession; he never married; he lived alone; he never went to church; he never voted; he refused to pay a tax to the state; he ate no flesh; he drank no wine; he never knew the use of tobacco; and, though a naturalist, he used neither trap nor gun." This "poet naturalist" built with his own hands a small cabin on the banks of Walden pond, near Concord, and lived there alone for two years. He gave an account of his experiences in his *Walden,* published in 1854. Among his other works are *Cape Cod, The Maine Woods, Excursions,* and *A Yankee in Canada.* He died in 1862. See *Walden.*

Thorndike, Edward Lee, American psychologist, was born at Williamsburg, Mass., in 1874 and was educated at Wesleyan, Harvard, and Columbia universities. After a year spent as instructor in education at Western Reserve university, he was appointed to the faculty of Teachers college, Columbia university, and became professor of educational psychology in 1904. In 1921, he was made professor and director of the division of psychology of the institute of educational research.

Thorndike has become well known for his work in psychological measurement, particularly with reference to its bearing on educational problems. His published works include *Mental and Social Measurements, Principles of Teaching, Animal Intelligence, The Original Nature of Man,* and *The Psychology of Learning.*

Thornton, Sir Henry, British railway manager, was born at Logansport, Ind., in 1871. He was educated at Saint Paul's school, Concord, N. H., and at the University of Pennsylvania. Entering the service of the Pennsylvania railway in 1894, he rose to the post of division engineer in 1899. He was superintendent of various divisions from 1901 to 1911, when he was made general superintendent of the Long Island railway, a part of the Pennsylvania system.

In 1914, Thornton became general manager of the Great Eastern railway of England. In 1917, he was made also deputy director of inland waterways and docks, and, in the following year, he became inspector general of movements and railways. In 1919, he was appointed inspector general of transportation, with temporary rank of major general, and, in recognition of his services during the World War, was created baronet. In 1922, he was made general manager of all government-owned railways in Canada.

Thorvaldsen (*thōr'vál-sĕn*), **Bertel,** Danish sculptor, was born at Copenhagen, 1770. He studied at the academy of Copenhagen; in 1793, gained the gold medal in sculpture; and, in 1797, went to Rome for further study. His first great work was the colossal statue "Jason." Except for a visit to Denmark, 1819-20, when he executed the statues of Christ and the twelve apostles, he remained in Rome until 1838. Thorvaldsen's masterpieces include "Entry of Alexander into Babylon," "Cupid and Psyche," "St. John Preaching in the Wilderness," "Christus Consolator," the statue of "Prince Poniatowski," the medallions "Night" and "Morning," and the "Lion of Lucerne." Approaching the purity and the repose of Greek art, Thorvaldsen's work is the best which the so-called classicist school has produced in modern sculpture. He died in 1844. See *Sculpture.*

Thucydides (*thū-sĭd'ĭ-dēz*), Greek historian, was born at Athens, of a noble Athenian family, about 454 B. C., and possessed great wealth and influence. Failing in an expedition which he commanded during the Peloponnesian war, he was banished from Athens in 423. During his exile he wrote his *History of the Peloponnesian War,* remarkable for the fullness and the exactness of its details and for its philosophical spirit. Thucydides is universally regarded as the first critical historian and the greatest historian of antiquity. Died about 399 B. C.

Thwing (*thwing*), **Charles Franklin,** American educator and author, was born at New Sharon, Me., in 1853. He was graduated at Harvard in 1876 and at Andover theological seminary in 1879. Ordained to the Congregational ministry, he was pastor at Cambridge, Mass., 1879–86, and at Minneapolis, 1886–90. From 1890 to 1921, he was president of Western Reserve university. Among his writings are *The Reading of Books, The College Woman, College Training and the Business Man, A History of Higher Education in America, The American College,* and *The American Colleges and Universities in the Great War.*

Ticknor (*tĭk'nẽr*), **George,** American literary critic and historian, was born at Boston, Mass., in 1791. He was graduated at Dartmouth in 1807, studied at Gottingen and elsewhere in Europe, 1815–19, and then became professor of modern languages and literature at Harvard. His *History of Spanish Literature,* published in 1849, at once took high rank. He wrote also a valuable *Life of Prescott.* Died in 1871.

Tiffany, Charles Lewis, American merchant, was born at Killingly, Conn., 1812. In 1837, in partnership with John B. Young, on a borrowed capital of $1000, he established a stationery and fancy-goods store next door to A. T. Stewart's establishment in New York City. The jewelry part of the business grew rapidly. In 1847, Tiffany began the manufacture of gold jewelry and, in 1848, made immense profits in the diamond trade. The firm became Tiffany and Company in 1851; later it established branches in several European centers, and became the leading importing and manufacturing jewelry firm in the United States. Tiffany adopted the sterling silver standard, .925 fine, which has since become standard throughout the country. He died in 1902.

Tiffany, Louis Comfort, American artist, son of Charles Lewis Tiffany, was born in New York City, 1848. He studied under George Inness and Samuel Coleman, New York, and under Léon Bailly, Paris, and devoted himself chiefly to decorative art, particularly mosaics, stained glass, and enamels. His best-known invention is the Tiffany favrile glass, which possesses refractive powers capable of iridescent effects. Among his oil paintings are "Algerian Shops" and "The Pool."

In 1918, he established at Oyster Bay, N. Y., the Louis Comfort Tiffany foundation for art students. To this he deeded his entire art collection, his country home known as Laurenton Hall, a museum, and Tiffany chapel, together with a substantial endowment for maintenance.

Tilden, Samuel Jones, American statesman, was born at New Lebanon, N. Y., in 1814. He was educated at Yale and at New York university, and, in 1841, was admitted to the bar. He was a member of the New York legislature in 1846 and of the constitutional convention in the same year. In 1868, he was leader of the Democrats in the state, and attacked and vigorously aided in destroying the "Tweed Ring." In 1874, he became governor of New York; in 1876, he was Democratic candidate for the presidency, and received a majority of the popular vote, but on final count

lacked one of a majority in the electoral vote. He left a large part of his fortune of 5 million dollars to found a free library in New York City. He died in 1886.

Tillman, Benjamin Ryan, American politician, was born in Edgefield county, S. C., 1847. He was educated at Bethany academy and became a planter, rising to the leadership of the farming element in state politics. In 1890, he was elected governor; was re-elected in 1892; and secured the passage of a law establishing the dispensary system for selling liquor under state control. He was elected United States senator continuously for four terms, 1895–1919. By his speeches against President Cleveland, 1895-96, he won the name "Pitchfork" Tillman. In the presidential campaigns of 1896 and 1900 he was an ardent supporter of the candidacy of W. J. Bryan. A debater of acknowledged ability, Tillman was for many years a prominent figure in the Senate and on the lecture platform. He died in 1918.

Tilly, Johann Tserklaes, Count of, Belgian general, one of the great leaders of the Thirty Years' war, was born near Gembloux, Belgium, in 1559. He was educated for the priesthood but abandoned the church for the army, receiving his military training under Parma and Alva. Devoted to the Catholic cause, he was given command of the Catholic army at the outbreak of the Thirty Years' war, during which he won many notable battles. In 1630, he succeeded Wallenstein as commander in chief of the Imperial forces. In 1631, he sacked with merciless cruelty the town of Magdeburg, a deed which Gustavus Adolphus avenged by crushing Tilly's forces in two successive battles, at Breitenfeld and at the river Lech, in the latter of which Tilly was mortally wounded, 1632.

Timrod, Henry, American poet, was born at Charleston, S. C., in 1829. He was educated at the University of Georgia, and after some study of law became a tutor, devoting his leisure to writing. During the period immediately preceding the Civil War, he contributed poems to *Russell's Magazine* and to the *Southern Literary Messenger*. In 1860, he published a volume of poems which was favorably received. Timrod and P. H. Hayne were prominent members of the Southern literary group of which W. G. Simms was the leader. Among his best poems are *Charleston, At Magnolia Cemetery, Katie,* and *The Cotton Boll*. He died in 1867.

Timur (*tī-mōōr'*; *tē-mōōr'*), Oriental conqueror, sometimes called Tamerlane, was born at Sebz, near Samarkand, about 1336. He began his military career at an early age, and, in 1361, he succeeded his father as chief of the Turkish tribe of the Berlas. In 1369, he made himself master of Balkh, assuming the title of Sahib Karan, or Emperor of the Age, and repaired to Samarkand, which he made the seat of his empire.

Timur afterward overran the country now called Turkestan, subdued Persia, with his victorious hordes penetrated Russia as far north as Moscow, and then, turning back, crossed into India, where Delhi, with all its immense treasures, fell into his hands. He subsequently invaded Syria, and took Damascus, Ephesus, and Smyrna. In this campaign, he captured the Turkish Sultan Bajazet I. The latter's army was thereby compelled to raise the siege of Constantinople. Fifty additional years of independence were thus secured to that city through the activities of Timur. Died, 1405.

Tintoretto (*tēn'tō-rĕt'tō*), Venetian historical painter, was born in 1518. His real name was Jacopo Robusti, but he was called Tintoretto—"little dyer"—from his father's trade. He was self-taught except for a few lessons from Titian. He took as his motto "The design of Michelangelo and the coloring of Titian." His work is notable for its mastery of light and shade, vigorous, dramatic action, and rich color. Tintoretto was an exceedingly prolific painter. Among his famous pictures are "The Last Supper," "The Last Judgment," "Paradise," "The Presentation of the Virgin," and "Miracle of Saint Mark," his masterpiece. He died in 1594.

Tirpitz (*tĭr'pĭts*), **Alfred von,** German admiral, was born at Kustrin on Oder, in 1849. Beginning naval service as a cadet in 1865, he was successively made captain, rear admiral, and vice admiral and, in 1903, was created admiral. In 1908, he was made a life member of the Prussian upper house, and, in 1911, he was appointed lord high admiral. At the outbreak of the World War, in 1914, he came into international prominence by reason of the German declaration of a "war zone" and a "submarine blockade."

The most spectacular result of Von Tirpitz's naval régime was the destruction of the *Lusitania*, May 7, 1915, which strained relations between the United States and Germany and resulted in his retirement as minister of the navy early in 1916. Tirpitz was the foremost advocate of the policy of "unrestricted marine warfare," which led the United States in 1917 to join the Allies in the war against Germany. Upon the downfall of the German Imperial government in 1918, Tirpitz sought temporary refuge in Switzerland, and soon afterward published a volume of memoirs.

Tischendorf (*tĭsh'ĕn-dôrf*), **Lobegott Friedrich Konstantin von,** German biblical scholar, was born at Lengenfeld, Saxony, in 1815. In 1845, he became professor of theology at Leipzig. His labors in search of the best and most ancient manuscripts of the New Testament resulted in the discovery of the fourth century *Sinaitic Codex* at the monastery on Mount Sinai. Among his works are the editions of the Sinaitic and many other manuscripts, critical editions of the New Testament, and the *Monumenta Sacra Inedita*. He died in 1874.

Titchener (*tĭch'ĕn-ĕr*), **Edward Bradford,** American educator, was born at Chichester, England, in 1867. He was graduated at Brasenose college, Oxford, in 1890 and received the degree of doctor of philosophy at Leipzig in 1892. He became assistant professor of psychology in 1892, professor in 1895, and research professor in 1910, Cornell university. Titchener developed the laboratory of experimental psychology at Cornell to a point of great efficiency, making extensive original investigations. His works include *An Outline of Psychology, A Primer of Psychology, Experimental Psychology, Elementary Psychology of Feeling and Attention, Experimental Psychology of the Thought Processes,* and *A Beginner's Psychology*. Died, 1927.

Titian, or **Tiziano Vecelli,** the greatest painter of the Venetian school, was born at Capo del Cadore, Venetia, Italy, about 1477. His early disposition toward art was fostered at Treviso under the Zuccatis, who were masters in drawing and mosaics; but, as he was more inclined to painting, Titian was placed under the tuition of Gentile Bellini at Venice. Again he changed; this time, to Giovanni Bellini, whose less labored manner he preferred. Guided by his own genius, the study of nature, and the example of Giorgione, his older fellow pupil, he soon acquired a bolder touch and more vigorous execution.

It is probable that Titian first employed his talents as decorator of the palaces of the great Venetian nobles. His "Pope Alexander VI Commending Jacopo Pesaro to the Madonna," an altarpiece at Antwerp, was painted in 1502 or 1503.

With Giorgione, in 1507-08, he was occupied in the decoration of the new Venetian exchange. In 1512, he produced "Sacred and Profane Love"; in 1514, "The Tribute Money." "The Assumption of the Virgin," begun in 1516 and finished two years later, has been rated among oil paintings as second only to Raphael's "Sistine Madonna."

Titian's reputation soon spread throughout the whole of Italy. While employed by the duke of Ferrara from 1518 to 1523, he produced three famous mythological pictures, "Worship of Venus," a "Bacchanal," and "Bacchus and Ariadne." His "Death of Peter, Martyr," the most celebrated of his numerous productions, was finished about 1530. In this year he met Charles V. During their intimate, lifelong friendship, Titian executed countless commissions for the emperor. Perhaps the most remarkable portrait extant is his "Emperor Charles V on Horseback."

Accepting an invitation from Paul III to visit Rome, Titian resided there for three years and painted many potentates and men of distinction. The latter part of his life was occupied in working at Venice, chiefly for Philip II of Spain, for whom he painted portraits and various religious and mythological subjects.

Very little is known of his domestic life, save that he married in 1525 and had three children. His beautiful daughter Lavinia has been immortalized by her father's brush.

The works of Titian are said to number more than 600. As a portrait painter and a master of color, he has never been surpassed. His draftsmanship, however, at times is defective. He is noteworthy for the complete, harmonious perfection of his method and for his mastery of all subjects, whether in the realm of nature or of man. Died in Venice, 1576, at 99 years of age. See *Renaissance, The*.

Tocqueville (*tŏk'vĭl*; Fr., *tôk'vēl'*), **Alexis Charles Henri Clérel de,** French statesman and writer, was born at Verneuil in 1805. He studied at Metz and at Paris, and, in 1825, was admitted to the bar. He was sent in 1831 to America to report on the penitentiary system and wrote *Democracy in America*, which made a profound impression in Europe. He became a member of the academy of moral and political sciences and of the French academy. In 1849, he became vice president of the Assembly and for a short time in the same year was minister of foreign affairs. After the *coup d'état* of 1851, he retired to his Norman estate. He published in 1856 *L'Ancien régime et la révolution*. Died in 1859.

Togo (*tō'gō*), **Heihachiro, Count,** Japanese admiral, was born at Kagoshima in 1847. He was sent to England for training, 1873-74. As commander of the *Naniwa*, he sank the Chinese transport *Kowshing* and thereby brought on the war with China. In 1904, he was selected to command the entire Japanese fleet in the hostilities against Russia. Togo won the great naval battle of the Sea of Japan, May 27-28, 1905, sinking 20 Russian ships and capturing or disabling the remainder of the fleet.

Tolstóy (*tŏl-stoĭ'*), **Liov Nikolaievitch, Count,** Russian novelist and social reformer, was born in the government of Tula, 1828. He studied at the University of Kazan. In 1851, he entered the army, and served in the Caucasus and at Sebastopol. Leaving the army soon after the close of the Crimean war, he devoted himself to literature. His *War and Peace* is regarded as his masterpiece; but his *Anna Karenina*, largely autobiographical, is better appreciated.

Tolstóy wrote much on education, and in his later years devoted himself to religious teaching. He made "Resist not evil" the keystone of the Christian faith. His religious views are set forth in *My Confession*. His writings include also *The Kingdom of God Is Within You, The Four Gospels Harmonized and Translated, The Cossacks, The Kreutzer Sonata, Master and Man, The End of the Age*, and *Ivan Ilyitch*. He died in 1910. See *War and Peace*.

Torrey, John, American botanist, was born in New York, 1796. He was graduated from the New York college of physicians and surgeons in 1818. In 1824, he gave up medical practice to become professor of chemistry and geology at West Point. From 1827 to 1855 he was professor of chemistry at the college of physicians and surgeons, serving also as professor of chemistry at Princeton, 1830–54. From 1853 until his death, he was chief assayer in the United States assay office, New York. Torrey's numerous scientific publications were chiefly on botany. With Asa Gray he began the publication of the *Flora of North America*, a monumental work of great value. He gave his fine herbarium and botanical library to Columbia. Died in 1873.

Torricelli (*tŏr'rē-chĕl'lē*), **Evangelista,** Italian physicist and mathematician, was born probably at Piancaldoli, in the Romagna, 1608. He was a pupil of Galileo at the University of Florence, and succeeded him as professor of natural philosophy and mathematics in 1642. He invented the barometer and made improvements in lenses for telescopes. Died in 1647.

Tory, Henry Marshall, Canadian educator and physicist, was born at Guysboro, N. S., in 1864; was educated at McGill university and Cambridge university; and, from 1891 to 1908, was a lecturer at McGill university. In the latter year, he became president of the University of Alberta. In 1917, he organized the so-called Khaki University of Canada, the purpose of which was to afford educational opportunities to soldiers on active service.

Tourgée (*tōōr-zhā'*), **Albion Winegar,** American author, was born at Williamsfield, Ohio, 1838, and was educated at the University of Rochester. In the Civil War, he was taken prisoner. His experiences in the South during the period of reconstruction provided material for numerous novels, of which the best-known was *A Fool's Errand*. In 1897, he was appointed American consul at Bordeaux, France, where he died in 1905.

Tournefort, Joseph Pitton de, French botanist, was born at Aix, Provence, in 1656. After exploring the flora of his native district, he was sent by the government to investigate the plants of various European countries. In 1702, he became professor in the Collège de France, Paris. He described 8000 species of plants, was the first to group plants into genera, and published numerous botanical works. Died in 1708.

Toussaint L'Ouverture (*tōō'săN' lōō'vĕr'tür'*), **François Dominique,** Haytian soldier and statesman, son of African slaves, was born near Cape Français in 1743. He became prominent as a leader of his race in the insurrections of 1791-92, which resulted in the emancipation of all slaves in the island. In 1796, he was appointed by the French Directory chief of the army, and afterward established his authority throughout the island, ruling with justice and vigor. When Napoleon sought to re-establish slavery, 1801, Toussaint resisted, but was forced to surrender and was sent to France, where he died in prison, 1803.

Trajan (*trā'jăn*), or **Marcus Ulpius Traianus,** Roman emperor, was born near Seville, Spain, 51 A. D. After winning distinction in Parthian and German campaigns, Trajan was adopted by Nerva in 97 as his colleague and successor, and, in 98, became emperor. In civil affairs he ruled wisely, and in his military character he sustained the glory of Rome by defeating the Dacians, Parthians, and Persians. The column of Trajan in Rome was erected to commemorate his victory over the Dacians. He died in 117 A. D.

Trent, William Peterfield, American educator and critic, was born at Richmond, Va., in 1862. He was educated at the University of Virginia and at Johns Hopkins. In 1888, he became professor of English and history in the University of the South and, in 1900, was made professor of English literature at Columbia. Among his numerous writings are *William Gilmore Simms, Robert E. Lee, Verses, Authority of Criticism, The Progress of the United States during the Nineteenth Century, A History of American Literature, A Brief History of American Literature, Greatness in Literature and Other Papers*, and *Daniel Defoe*.

Trevelyan (*trê-vĕl'yăn*; *-vĭl'-*), **Sir George Otto,** English statesman and author, was born at Rothley Temple, Leicestershire, in 1838. He was educated at Harrow and at Trinity college, Cambridge, where he was graduated in 1861. He was elected to Parliament, 1865, and held his seat until 1897. During this period he was also lord of the admiralty, 1868, secretary to the admiralty, 1880–82, chief secretary for Ireland, 1882–84, held a seat in the cabinet, 1884-85, and was secretary for Scotland, 1886 and 1892–95.

Trevelyan deserves more credit than any other man for the abolition of purchase in the army and for the enfranchisement of the agricultural laborer in England. He wrote *The Early History of Charles James Fox* and *The American Revolution*, a most valuable work. He published also *The Ladies in Parliament, The Competition Wallah, Cawnpore, Interludes in Prose and Verse*, and *The Life and Letters of Lord Macaulay*. Died, 1928.

Tripler, Charles Eastman, American physicist and inventor, was born in New York City, 1849, and was privately educated. He made a special study of the physical sciences, establishing a private laboratory, where he conducted extensive experiments in electricity and mechanics. His greatest achievement was the production of liquid air, which he obtained in 1895 by devising a machine for the compression of atmospheric air at a temperature of about 200° below zero. Machines making use of the same principle were devised almost simultaneously by Karl von Linde in Germany and by Hampson and Dewar in England. He died in 1906.

Troels-Lund (*trŏls-lŏŏnd'*), **Troels Frederik,** Danish writer, was born in Copenhagen, 1840. He was educated for the Church, but gave up theology to devote himself to the study of history. In 1871, he published a biography of Socrates, which established his reputation among European scholars. From 1870 to 1875 he was assistant in the Danish *Geheimarchiv*. He then became instructor of history, and later professor, in the military school at Copenhagen. His writings, characterized by profound scholarship and an exceptionally brilliant narrative style, deal chiefly with Scandinavian history in the 16th century. He died in 1921.

Trollope (*trŏl'ŭp*), **Anthony,** English novelist, was born in London, 1815. He was educated at Winchester and at Harrow, and for many years thereafter held a place in the London post office. He produced a long series of entertaining novels, admirable for their pleasing realism and truthfulness of detail. Among these are *Barchester Towers, Doctor Thorne, The Bertrams, The Claverings, Castle Richmond*, and *The Golden Lion of Granpere*. He wrote also several volumes of travel and an autobiography. Died in 1882.

Tromp (*trŏmp*), **Martin Harpertzoon,** Dutch admiral, was born at Brielle in 1597. He entered the navy in 1624, and as lieutenant admiral defeated a superior Spanish fleet off Gravelines in 1639. In May 1652, he was beaten by an English fleet under Blake but, in November following, severely defeated Blake off Goodwin Sands. In February 1653, Blake, with Monk and Penn, defeated Tromp off Portland. In June, a terrific battle, in which the Dutch were defeated, took place between Tromp and Dean. In the final battle with Monk, in midsummer 1653, off the coast of Holland, the Dutch lost 30 men-of-war, but their greatest loss was the heroic admiral, the victor in 33 seafights.

Trotzky (*trŏt'skē*), **Leon,** Russian minister of war under the Soviet government, was born of Jewish parentage at Odessa in 1879. His real name is Leon Bronstein. After two periods of imprisonment, 1900 and 1905, on account of his revolutionary activities, he fled from Russia and conducted socialist propaganda in Paris, Vienna, Switzerland, the Balkan states, and, finally, in New York, where, in 1917, he was an editor of the Russian socialist paper *Novy Mir*. Returning to Russia when the czar was overthrown, he rose to power with Lenine and organized the so-called Red army. He conducted the negotiations with Germany leading up to the Treaty of Brest-Litovsk. After the death of Lenine in 1924, Trotzky found himself opposed by political groups that virtually compelled his retirement.

Trowbridge, John, American physicist, was born in Boston, Mass., 1843. He was graduated at Harvard, 1866, and was tutor there until 1869. He was professor of physics at Harvard, 1870–88, after which he was called to the Rumford chair of applied science. He instituted a laboratory course in physics and was a pioneer in advocating laboratory work as an essential element of instruction in the physical sciences.

Trowbridge conducted important investigations in electricity and made researches on the Roentgen rays. In addition to numerous scientific papers, his writings include *The New Physics, Three Boys on an Electrical Boat, What is Electricity?* and *Philip's Experiments in Electrical Science*. Died in 1923.

Trowbridge, John Townsend, American novelist, juvenile writer, and poet, was born at Ogden, N. Y., in 1827. After receiving a common school education, he became a journalist. Settling in Boston in 1848, he devoted himself to authorship. Many of his stories for boys rank with the best of their kind. Among these are *Father Brighthopes*, *Cudjo's Cave*, *The Three Scouts*, *The Silver Medal*, the *Jack Hazard* series, the *Tide Mill* series, the *Toby Trafford* series, and the *Start in Life* series. Trowbridge wrote several volumes of verse, his poem entitled *Darius Green and His Flying Machine* being especially well known. He died in 1916.

Troyon (*trwä'yôn'*), **Constant,** French painter, was born at Sevres in 1810. While working as a decorator in the porcelain factory at Sevres, he studied designing and painting. He exhibited his first salon pictures in 1833, but did not attain distinction as a landscape painter until after his inspiring association with Rousseau, Diaz, and Dupré, of the Barbizon group.

The next great turning point in Troyon's career dates from a visit to Holland in 1847. There he studied Dutch art, particularly the works of Potter and Cuyp, after which he devoted himself to animal painting.

Within a period of 15 years, Troyon made himself the foremost animal painter of France and perhaps of modern times. Honors were showered upon him and orders for his pictures were so overwhelming that, in 1863, he became insane from overwork. Died in 1865.

Trumbull, Henry Clay, American author and educator, was born at Stonington, Conn., in 1830. He was educated at Williston seminary, at Yale, and at the University of New York. He entered the Congregational ministry and, in 1858, he became state missionary of the American Sunday-school union for Connecticut. In 1862, he joined the Union army and served as chaplain throughout the remainder of the Civil War. He then re-entered Sunday-school work. In 1875, he purchased the Philadelphia *Sunday-School Times*, of which he was editor until his death. His published works include *The Sabbath School Concert*, *Studies in Oriental Social Life*, *War Memories of an Army Chaplain*, and *Old-Time Student Volunteers*. He died in 1903.

Trumbull, James Hammond, American philologist, brother of Henry Clay Trumbull, was born at Stonington, Conn., in 1821. He was educated at Yale, but was prevented by impaired health from entering an active professional life. Between 1847 and 1865 he served for various periods, some 12 years in all, first as assistant secretary and then as secretary of state for Connecticut. He was president of the Connecticut historical society and librarian of the Watkinson library of reference at Hartford from 1863 to 1897. In 1873, he was made lecturer on Indian languages of North America at Yale.

Trumbull's catalogue of the George Brinley *Americana* gave him high standing as a bibliographer. He compiled a dictionary from John Eliot's *Indian Bible*, which was published as the *Natick Dictionary*. Among his other works are *Colonial Records of Connecticut*, *The Best Method of Studying the Indian Languages*, and *Indian Names of Places*. Died in 1897.

Trumbull, John, American historical and portrait painter, was born at Lebanon, Conn., in 1756. He was graduated at Harvard in 1773 and studied art at Boston. He served in the army during the Revolutionary War, becoming aid-de-camp to Washington. While studying under West in London, 1780, he was arrested and imprisoned for eight months during the excitement produced by the execution of André. His first American historical pictures were "Battle of Bunker Hill" and "Death of Montgomery." He painted portraits of Washington and other Revolutionary characters. In 1817, he was employed by Congress to paint four pictures for the rotunda of the Capitol, and, in 1824, he completed "The Signing of the Declaration of Independence," "Surrender of Burgoyne," "Surrender of Cornwallis," and "Resignation of Washington." Died in 1843.

Tupper, Sir Charles, Canadian statesman, was born in Amherst, Nova Scotia, 1821. He studied medicine at Edinburgh university and practiced in his native county. In 1855, he was made a member of the provincial legislature, and he was prime minister of Nova Scotia in 1864–67.

Tupper was among the strongest supporters of Confederation. After its consummation, he was for many years a member of the cabinet in the Dominion Parliament and, as minister of railways and canals, promoted the construction of the Canadian Pacific railway. In 1896, he became prime minister, but was defeated in the same year. In 1914, he published *Recollections of Sixty Years*. Died, 1915.

Turenne (*tü'rĕn'*), **Henri de la Tour d'Auvergne, Vicomte de,** marshal of France, was born in Sedan, 1611, and was brought up in the Protestant faith. In 1630, he entered the French army. He served with distinction under Bernhard of Weimar in 1637-38. In 1642, he conquered Roussillon from Spain, for which service he was made a marshal of France. Commanding an army in Germany in 1643, he defeated the Bavarians, but was himself defeated by their general, Mercy, at Marienthal in 1645. With Condé, he avenged this defeat at Nordlingen, where Mercy was slain. In 1646, he joined the Swedes to complete the conquest of Bavaria and by his victories hastened the close of the Thirty Years' war.

In the civil wars in France the two greatest generals of the period, Condé and Turenne, were on opposite sides, and Turenne, with inferior forces, was uniformly victorious, finally driving Condé from France. Louis XIV made Turenne marshal-general of France and, in 1668, induced him to embrace the Catholic faith. In the campaign in Holland in 1672, Turenne compelled the elector of Brandenburg to sue for peace. Turenne was killed at the battle of Sasbach in 1675.

Turgéniev (*tōōr-gĕn'yĕf*), **Ivan Sergeyevitch,** Russian novelist, was born in Orel, Russia, 1818. After studying at Moscow, Petrograd, and Berlin, he obtained a government position at Petrograd. On account of his liberal ideas he was banished, but later was permitted to return to Russia. After 1855 he lived chiefly in Paris. His literary fame rests upon the powerful novels *Fathers and Sons*, *Liza*, *Smoke*, *Rudin*, *Faust*, *On the Eve*, *Virgin Soil*, and *Clara Militch*. Turgéniev ranks as one of the greatest prose artists in Russian letters and has exercised a notable influence on modern literature. He died in 1883.

Turgot (*tür'gō'*), **Anne Robert Jacques,** French statesman and economist, was born at Paris in 1727. He was educated for the Church, but later turned to the law and to political economy. He identified himself with the philosophical and liberal thought of the time, contributed to the *Encyclopédie*, and was a member of the physiocratic school of economists. In 1761, he was made intendant of Limoges, where he introduced many reforms, such as abolishing the method of mending the roads by the compulsory labor of the poor. Under Louis XVI he was put in charge of the finances of the country, and, if his plans had been received with favor by the nobility and the statesmen, France might have been spared the horrors of the Revolution. Among his writings are *Reflections upon the Formation and Distribution of Wealth* and a work on *Usury*. He died in 1781.

Turner, Joseph Mallord William, British landscape painter, was born at London in 1775. His genius for art was revealed very early, and, at 15, he exhibited a drawing at the royal academy. His industry was almost as unexampled as his genius. To the exhibitions of the royal academy he contributed over 250 pictures. Among his most celebrated paintings are "Dido Building Carthage," "Sun Rising in the Mist," and "The Fighting *Téméraire*," in the national gallery, London; "The Slave Ship," in the Boston museum; "The Castle of Indolence" and "Grand Canal," in the Metropolitan museum, New York. Turner surpassed all other English landscape artists of his time. His most striking quality is a splendid, brilliant, though sometimes unreal, color. He died in 1851. See *Painting*.

Tutankhamen (*tōōt-ănk'ă-mĕn*), king of Egypt, was the last legitimate monarch of the famous 18th dynasty, which ruled from about 1588 to about 1350 B. C. He was a son-in-law of the powerful Amenhotep IV and reigned for a brief period between about 1360 and 1350 B. C. Tutankhamen died young and seemingly left no issue. His fame rests chiefly on the fact that he restored the national religion of Amen which had been converted into a form of sun worship by his predecessor Amenhotep IV.

When Tutankhamen came to the throne, he professed the same religion as his wife and father, which was that of the monotheistic cult of the visible sun disk Aten, or Atenism. Soon realizing that Atenism had failed, he substituted the name Amen for Aten in his own name and in that of his wife and became an ardent follower of Amen. Immense popular, as well as archeological, interest was aroused by the unearthing of his tomb in November 1922 by Lord Carnarvon and Howard Carter. See *Amen*; *Luxor*; *Tutankhamen, Tomb of*.

Twain, Mark. See *Clemens, Samuel Langhorne*.

Tycho Brahe. See *Brahe, Tycho*.

Tyler, John, 10th president of the United States, was born in Greenway, Va., 1790. He was graduated at William and Mary college in 1807, studied law, and, in 1809, was admitted to the bar. He was elected five times to the state legislature and three times to Congress. He sympathized with the States'-Rights party, and opposed the United States bank, the protective tariff, and all restrictions of slavery. After serving as governor of Virginia, 1825–27, he was then elected United States senator. From this time he acted with the Whig party, and, in 1840, was elected vice president of the United States.

The death of President Harrison, a month after his inauguration in 1841, made Tyler president. The annexation of Texas and the passing of a protective tariff law were among the important acts of his administration. In 1861,

Tyler was president of the peace convention which met at Washington to effect a compromise between the North and the South. He afterward joined the Southern cause, and was a member of the Confederate Congress at his death in 1862.

Tyler, Moses Coit, American literary historian and educator, was born at Griswold, Conn., in 1835. He was graduated at Yale in 1857. He spent several years in the ministry, later traveling in Europe. From 1867 to 1881 he was professor of English at the University of Michigan. For a time he was literary editor of the *Christian Union*. In 1881, he was called to the chair of American history at Cornell university, which he held until his death. His works include *History of American Literature during the Colonial Time, 1607–1765*; *A Literary History of the American Revolution*; *Three Men of Letters*; *Glimpses of England*; and *Life of Patrick Henry*. He died in 1900.

Tylor, Sir Edward Burnett, English anthropologist, was born at London in 1832. He was educated at Tottenham. After traveling in Cuba and Mexico, he wrote *Anahuac, or Mexico and the Mexicans*. In 1883, he was appointed keeper at the Oxford university museum and, in 1896, was made professor of anthropology. His *Researches into the Early History of Mankind, Primitive Culture, The Natural History of Religion*, and *Anthropology* rank among the most valuable works of their class. He died in 1917.

Tyndale (*tĭn'dăl*), **William,** English divine, was born in Gloucestershire in 1484. He studied at both Oxford and Cambridge, where he acquired a knowledge of Greek. Impressed with the importance of giving to the people the Bible in their own language, he determined to translate the New Testament into English. Failing to obtain support in London, he went to Germany. In 1525, the New Testament was printed at Worms and was carried to England.

Tyndale remained on the continent, associated with Luther and other reformers, and wrote tracts advocating the reformed doctrine. In 1530, he published a translation of the Pentateuch. He separated himself from the other English reformers by opposing the divorce of Henry VIII from Catherine of Aragon. In 1535, he was arrested and, after a year's imprisonment at the castle of Vilvorde, near Brussels, was publicly executed as a heretic, 1536.

Tyndall (*tĭn'dăl*), **John,** British physicist, was born in County Carlow, Ireland, in 1820. He began his career as surveyor and railway engineer. He studied in Germany from 1848 to 1851, and, in 1853, was made professor of natural philosophy in the royal institution, London. Tyndall achieved great reputation as a lecturer and did invaluable work in popularizing science. His lecture tour in the United States in 1872-73 was notably successful. Among his writings are *Heat Considered as a Mode of Motion, On Sound, Faraday as a Discoverer, Fragments of Science, The Forms of Water, Notes on Light*, and *The Glaciers of the Alps*. He died in 1893.

Ulfilas (*ŭl'fĭ-lăs*), translator of the Bible into Gothic, was born in Dacia about 311. He was made bishop in 341; was expelled by his heathen compatriots seven years later; and sought refuge, together with a number of newly converted Christians, in lower Mœsia, where he remained for 30 years. Familiar with Latin, Greek, and Gothic, he undertook to translate the whole Bible, with the exception of *Kings*, into Gothic. The chief manuscript of this work, the *Codex Argenteus*, in silver letters on purple parchment, is now in the university library at Upsala. Died about 383.

Underwood, Oscar Wilder, American legislator, was born in Louisville, Ky., 1862. He was educated in law at the University of Virginia; settled in Birmingham, Ala.; and was admitted to the bar, 1884. He was elected to Congress in 1895 and served continuously until 1915, when he was elected to the United States Senate and was re-elected for the term 1921–27.

He became prominent as a debater and parliamentarian. In 1911, he was made chairman of the ways and means committee and Democratic floor leader in the House. In 1913, he was responsible for the Underwood-Simmons Tariff act and, in 1920, was elected Democratic leader of the Senate. Died, 1929.

Undset, Sigrid, Norwegian novelist, was born in Kallundbord, Denmark, 1882, of a Norwegian father, who took her at an early age to reside in Oslo, Norway. She was educated in a business college and was a municipal clerk at Oslo until 1909, when she began to support herself by her writings. These include *Kristin Lavransdatter*, a trilogy comprising *The Bridal Wreath, The Mistress of Husaby*, and *The Cross*. She wrote also *The Axe* and *The Snake Pit*. Her work is characterized by a keen insight into feminine psychology and into the mind of the middle ages. She received the Nobel prize for literature in 1928, about $42,000, all of which she devoted to charity.

Untermeyer (*ŏŏn'tĕr-mī'ĕr*), **Louis,** American poet and journalist, was born in New York City, 1885. He received a high school education and entered a firm of manufacturing jewelers, of which he later became vice president and the manager of a factory at Newark. In addition to his other duties, he joined the editorial staff of *The Masses* and, in the Chicago *Evening Post*, conducted a column under the head "and Other Poems." He contributed many articles to the *New Republic*. His poems, noted for their lyric quality, are of a high order. Among his writings are *First Love, Challenge, The Younger Quire, These Times*, and *The New Adam*. He also translated poems of Heinrich Heine and compiled or edited several anthologies.

Untermyer, Samuel, American lawyer, was born in Lynchburg, Va., 1858. He was educated at the College of the City of New York and at Columbia law school. He was admitted to the bar, 1879, and attained notable success as a corporation attorney. He was active in 1912 in the investigation of the so-called money trust, and, in 1913-14, he assisted in framing the Clayton Antitrust act. He served as special adviser to the government on the interpretation of legislation regarding war taxes and the income tax.

Ussher (*ŭsh'ĕr*), **James,** British theologian and scholar, was born in Dublin, 1581. He graduated at Trinity college, Dublin, 1600; was ordained deacon and priest, 1601;, and was professor of divinity in the University of Dublin, 1607–20. In 1624, he was made archbishop of Armagh. Among his best-known works are *Annals of the Old Testament* and *Chronologia Sacra*. These contain the chronological calculations by Ussher which long appeared in the inner margin of the Bible in the authorized version. According to his calculations, the world was created in the year 4004 B. C. Died, 1656.

Vail, Theodore Newton, American capitalist, was born in Carroll county, Ohio, 1845. He was educated at Morristown, N. J., academy; studied medicine; and then entered the United States railway mail service, of which, in 1875, he was made superintendent. In 1878, he entered the telephone business and, after 1896, was engaged in electrical enterprises in Argentina, establishing the American electric system of street railways in Buenos Aires and installing telephone systems in the leading cities. In 1907, he was made president of the American Telegraph and Telephone Company and later of the Western Union Telegraph Company. Upon the reorganization of these companies in 1913, he withdrew from the presidency of the Western Union. Died, 1920.

Van Alstyne, Mrs. Frances Jane. See *Crosby, Fanny*.

Van Buren, Martin, eighth president of the United States, was born of Dutch ancestry, in Kinderhook, N. Y., 1782. After becoming a member of the bar, he was elected by the Democratic party to the New York State senate in 1812 and became attorney-general in 1815. In 1821, Van Buren entered the United States Senate; was re-elected in 1827; but resigned in 1828 to accept the governorship of New York. In 1829, he became secretary of state in President Jackson's cabinet, resigning in 1831. Following the Senate's rejection of his nomination as minister to England, he was elected vice president of the United States in 1832 and, in 1836, was elected president.

On account of the financial crisis of 1837 and the suspension of specie payments by the banks, he recommended to Congress the establishment of an independent treasury, a measure carried into effect in 1840. Renominated by the Democrats, he was defeated by William Henry Harrison and, in 1841, temporarily retired to private life. His third candidacy for the presidency, in 1844, was frustrated by Southern opposition. Subsequently he joined the Free-Soil party and was its unsuccessful nominee for president in 1848. Died, 1862. See *Albany Regency, Barnburners, Free-Soil Party*.

Vancouver, George, English naval officer and explorer, was born in 1758. He served with Captain Cook in his second and third voyages and, in 1791, was sent to Nootka sound to take possession of disputed territory. Proceeding by way of the Cape of Good Hope, he surveyed and mapped portions of the coasts of Australia and New Zealand and then sailed by way of Tahiti to Nootka. In 1792, he explored the strait of San Juan de Fuca and discovered the gulf of Georgia and Vancouver island. He described his explorations in *A Voyage of Discovery to the North Pacific Ocean and Round the World in the Years 1790–95*. Died in 1798.

Vanderbilt, Cornelius, American capitalist, was born near Stapleton, Staten island, N. Y., 1794. He early engaged in steamboat transportation between Staten island and New York and gained control of the New York and Staten Island lines. Later he established steamship and transfer connections between New York and California. In 1864, he withdrew his capital from shipping and invested it in railroads. In 1867, he secured control of the New York Central railroad; became its president; and, in 1869, consolidated it with the Hudson River road. By securing the Lake Shore and other railways, he established a trunk line to Chicago. At his death in 1877 he left a

fortune estimated at $100,000,000. A bequest of $1,000,000 was made for founding Vanderbilt university at Nashville, Tenn

Vanderlip, Frank Arthur, American financier, was born in Aurora, Ill., 1864. He studied at the University of Illinois and at the University of Chicago; became a reporter for the Chicago *Tribune*; and later was made financial editor and associate editor of the Chicago *Economist*. He was assistant secretary of the treasury, 1897–1901, and vice president of the National City bank, New York, from 1901 to 1909, when he was made president. In 1915, Vanderlip became chairman of the American international corporation to promote American industrial and commercial interests in foreign countries. His industrial interests include the chairmanship of the board of directors of a large number of corporations. In 1917, he was intrusted by the government with the task of conducting the sale of war savings certificates. He is the author of *The American Commercial Invasion of Europe, Business and Education, What Happened to Europe*, and various other works, mainly on economic subjects.

Van der Stucken, Frank Valentin, American musical director and composer, was born at Fredericksburg, Texas, in 1858. He lived in Europe for 18 years following 1866 and from 1908 to 1917. He studied music chiefly at Antwerp and conducted orchestras at Breslau and Weimar in Germany. In 1884, he became leader of the Arion singing society and took it on a European tour in 1892. He was director of the Cincinnati college of music, 1895–1903, and conducted the Cincinnati symphony orchestra from 1895 to 1907. His compositions include the opera *Vlasda*, the symphonic prologue *Pax Triumphans*, and the festival march *Louisiana*. In 1929, he was made a member of the American academy of arts and letters.

Van Dyck, or **Vandyke, Sir Anthony,** Flemish painter, was born in Antwerp, 1599. He was a pupil of Rubens, and subsequently studied in Venice, Genoa, and Rome. In 1632, he became court painter to Charles I of England. His "Christ on the Cross," at Antwerp, is his greatest historical work, and his full-length picture of "Charles I on Horseback" is his best example of portraiture, the type of painting for which he is especially celebrated. Van Dyck is well represented in art galleries of the United States. Died, 1641.

Van Dyke, Henry, American clergyman, educator, diplomat, and author, was born in Germantown, Pa., 1852. He graduated at Princeton university and at Princeton theological seminary, and studied also at the University of Berlin. He was pastor of the Brick Presbyterian church, New York City, from 1883 to 1900, when he became professor of English literature at Princeton university. From 1913 to 1917, he was minister to the Netherlands and Luxemburg. Returning to America in the latter year, he resumed the duties of his professorial chair, from which he resigned in 1923.

His writings, notably those on nature subjects, have become widely popular. Among his works are *The Reality of Religion, The Poetry of Tennyson, The Other Wise Man, The Lost Word, The Ruling Passion, The Blue Flower, The Open Door, Essays in Application, The Spirit of America, Grand Canyon and Other Poems, Golden Stars*, and *Half-told Tales*. He was elected to the American academy of arts and letters in 1908.

Van Dyke, John Charles, American art historian and critic, was born in New Brunswick, N. J., 1856, and studied at Columbia and in Europe. He was admitted to the New York bar, 1877, but turned his attention to literature. In 1878, he was made librarian of Sage library, New Brunswick, N. J., and, in 1889, professor of the history of art at Rutgers college. Among his works are *How to Judge a Picture, Art for Art's Sake, A History of Painting, Nature for its Own Sake, Grand Canyon of the Colorado*, and *In the Open*. He also edited many valuable art histories. He was elected to the American academy of arts and letters in 1923.

Van Loon, Hendrik Willem, author and lecturer, was born in Rotterdam, the Netherlands, 1882, and was brought at an early age to America. He was educated at Harvard university and the University of Munich; served as a correspondent of the Associated Press in Washington and during the political disturbances in Russia in 1906 and throughout the course of the World War; lectured widely in America; and was appointed professor of history at Antioch college. His publications include *The Fall of the Dutch Republic, Ancient Man, The Story of Mankind, The Story of the Bible*, and *Tolerance*.

Van Rensselaer, Martha, American home economist, was born at Randolph, N. Y. After graduating from Chamberlain institute in her native town in 1884, she taught in public schools for 10 years. Beginning in 1894, she served as school commissioner of Cattaraugus county, N. Y., until 1900. From 1896 to 1903, she was an instructor at teachers' institutes. In 1900, she became extension lecturer for the college of agriculture, Cornell university, in which, in 1911, she was made professor of home economics and head of the home economics department. In 1918-19, she served as member of the executive staff of the United States food administration.

Van't Hoff (*vänt hôf'*), **Jacobus Henrik,** Dutch chemist, was born at Rotterdam, 1852. In 1878, he was appointed professor of chemistry, mineralogy, and geology at Amsterdam and, in 1896, became professor of chemistry at Berlin. He made notable researches in physicochemistry and was the founder of stereochemistry. In 1901, he received the Nobel prize for chemistry. Died, 1911.

Vasari (*vä-zä'rē*), **Giorgio,** Italian art historian, painter, and architect, was born at Arezzo, 1511. He studied under Michelangelo and Andrea del Sarto, and entered the service of Duke Cosimo de' Medici, with whom he remained throughout his life. Vasari was one of the most versatile artists of the later Renaissance and an architect of ability. His greatest service to art is his world-renowned *Lives*, which furnishes our chief knowledge of the artists of the Italian Renaissance. Vasari has been termed the founder of modern art history and art criticism. Died, 1574.

Vassar, Matthew, American philanthropist, was born in Norfolk, England, 1792. At four years of age, he came to America with his father, who settled on a farm near Poughkeepsie and established a brewery in that city. The son subsequently succeeded to his father's interests and amassed a fortune. In 1861, he donated $400,000 to the institution in Poughkeepsie later known as Vassar college. He died in 1868, and his will provided for a further donation of about $400,000 to Vassar.

Vauquelin (*vō'k'lăn'*), **Louis Nicolas,** French chemist, was born in Normandy, 1763. In 1783, he became assistant to the chemist A. F. Fourcroy, with whom he later published joint researches. In 1790, he began to publish on his own responsibility. He became professor in the school of mines, the polytechnic school, and the Collège de France, where, upon Fourcroy's death in 1809, he was made professor of chemistry in the medical faculty. In 1797, he discovered the element chromium in lead ore from Siberia, and, in 1798, while analyzing beryl, he detected beryllium (glucinum), which was first obtained in metallic state by Wöhler in 1828. Died, 1829.

Veblen (*vĕb'lĕn*), **Thorstein B.,** American economist and author, was graduated at Carleton college and at Yale university. He taught political economy at the University of Chicago, 1892–1906, and at Stanford university until 1909, when he was made professor of economics at the University of Missouri. In 1918, he became a teacher in the new school for social research, New York. His publications include *The Theory of the Leisure Class, The Theory of Business Enterprise, The Higher Learning in America, The Vested Interests*, and *The Engineers and the Price System*.

Vedder, Elihu, American painter, was born in New York, 1836; studied in Paris and Florence; and, in 1867, settled in Rome. Gifted with a weird and powerful imagination, Vedder rose to distinction by his original, virile, intellectual style. In 1884, he won world-wide reputation with his series of striking illustrations for Fitzgerald's *Omar Khayyám*.

Among Vedder's best-known paintings are "Roman Girls on the Seashore," "Phoroydes," "Cumæan Sibyl," "Lair of the Sea Serpent," "Lazarus," "The Fisherman and the Djinn," all in the Boston museum; "The African Sentinel" and "The Pleiades," in the Metropolitan museum, New York; "Storm in Umbria," art institute, Chicago; and "The Keeper of the Threshold," Carnegie institute, Pittsburgh. He was made a member of the American academy of arts and letters in 1908. Died, 1923.

Vega (*vā'gä*), **Garcilaso de la,** Spanish soldier and poet, was born at Toledo, 1503. Early adopting the profession of arms, he gained a distinguished reputation for bravery in the wars carried on by Emperor Charles V against the French and the Turks. He wrote a number of sonnets, eclogues, and other poems, and is sometimes called "the Spanish Petrarch." His poems rank high in European literature for delicacy of expression and place him among the most gifted and artistic of Spanish poets. He was mortally wounded while storming a castle near Frejus, France, in 1536.

Vega, Garcilaso de la, Spanish historian, known as "the Inca," was born at Cuzco, Peru, about 1540. He was the son of a Spanish conquistadore who had married a niece of the last Inca emperor of Peru. At the age of 20, he went to Spain and never again visited America. He lived at Cordoba throughout most of his life. His first work was a *History of Florida*, containing an account of the conquest of the country by Hernando de Soto, and was followed by his largest work, *Royal Commentaries of Peru*, which was a history of the royal Incas. Died, 1616.

Vega Carpio (*vā'gä kär'pyō*), **Lope Felix de,** generally known as Lope de Vega, Spanish dramatist, was born at Madrid, 1562. He was a student of Alcalá; served in the Portuguese campaign and in the Armada in 1588; was secretary to the duke of Alva, the marquis of Malpica, and the marquis of Sarria; was banished from Madrid because of a quarrel; and, about 1614, took priest's orders.

The mere list of Lope's books presents a picture of unparalleled mental activity. Of his numerous works, 431 plays and 50 religious pieces are extant. His plays, both in comic and in tragic vein, cover a vast range of historical, legendary, religious, and everyday subjects.

Lope de Vega first emphasized the *pundonor*, or point of honor, as a controlling principle of Spanish cultured life. By ignoring the restrictions of the so-called classic unities, he did for Spain what Shakspere did for England—created a national theater. A few of his many noted plays are *El castigo sin venganza, Porfiar hosta morir, La Estrella de Sevilla, El mejor alcalde el Rey, Los cautivos de Argel, Si no vieran las mujeres,* and *La fuente Ovejuna.* Died in 1635.

Velásquez (*vā-läs'käth*), **Diego Rodriquez de Silva y,** Spanish painter, was born at Seville, Spain, June 5, 1599. He was intended for some liberal profession; but, on account of his unmistakable bent toward art, he was placed as a pupil with Herrera the Elder, with Pacheco, and later with Luis Tristan of Toledo. The true masters of Velásquez, however, were his models. He worked directly from nature with determined sincerity.

In 1618, Velásquez married Pacheco's daughter, Juana. In April 1622, he visited Madrid, where he was presented by Fonseca, canon of Seville, to Olivares, the minister. In the first months of 1623, he received a letter recalling him to the capital. A portrait of Fonseca, which he had painted, met with such favorable recognition that he was commissioned to paint Don Ferdinand, the king's brother, and later Philip IV himself. In the autumn, Philip's portrait was finished; and, from that time, the life of Velásquez was spent in the service of the king. He was formally installed with a studio in the palace, a residence in the city, and a monthly stipend. The interest and admiration of the king continued through 40 years of growing intimacy.

In 1627, Velásquez completed the "Expulsion of the Moriscos," and, in August 1628, Rubens arrived in Madrid just as Velásquez was finishing his famous "Topers." No direct echo from Rubens can be traced in the work of the Spaniard; but, through his advice, Velásquez made his first journey to Italy in 1629. His time there was spent in studying the Italian masters and in completing the "Forge of Vulcan" and "Joseph's Coat."

Early in 1631, Velásquez was again in Madrid. In 1634, he was permitted to hand down to his son-in-law, Mazo-Martinez, his court appointment, but was himself continued as an honorary attaché. In 1638, probably, he painted "The Crucifixion." The great equestrian portrait of Philip in the Prado was executed in 1644. To these years, also, belong the portraits of dwarfs, fools, and other eccentric members of Philip's household. "The Surrender of Breda," perhaps the finest purely historic picture in the world, was painted in 1647.

In January 1649, Velásquez embarked on his second visit to Italy. At Rome, he painted the portrait of Innocent X, now considered one of his finest works. He returned to Madrid in 1651. Such was the favor in which he continued to be held by Philip that the cross of Santiago was conferred on him in 1659, an honor never before awarded except to the highest of the nobility. In 1652, he was appointed marshal to the king. His "Tapestry Weavers," "Maids of Honor," "Portrait of Alonzo Cano," "Æsop," "Mœnippus," and the later portraits of Philip and his family belong to this period.

Not only was Velásquez the greatest of Spanish painters, but his impressionism has constituted him the foremost master of modern painting. He is the most objective of painters; the subject itself tells the whole story. His draftsmanship is firm, his modeling is delicate, and his subdued color scheme enables him to use occasional patches of bright color with telling effect. He has been termed the painter's painter. Died, August 6, 1660.

Venizelos (*vĕn'ē-zā'lŏs*), **Eleutherios,** Greek statesman and diplomat, was born in Crete, 1864. He graduated in law at the University of Athens, 1886.

He attracted notice first in 1897 as one of the leaders of the Cretan insurrection that resulted in the removal of Turkish rule from Crete. In 1908, he led the movement for the union of Crete and Greece. In 1910, he was premier of Crete, but was invited to Athens, where he carried out a revision of the constitution, reorganized the army and the navy, and laid the foundation for the Balkan league, which made war against Turkey in 1912. In the second Balkan war, Venizelos was the leader in forming the alliance against Bulgaria.

In 1914, as premier of Greece, Venizelos became a champion of the Allies and urged the nation to join them. He was vigorously opposed by King Constantine, and, in March 1915, he resigned the premiership. Upon the abdication of King Constantine in June 1917, Venizelos became virtually the ruler of Greece. Under his direction, Greece joined the Allies and gained great advantages at the Paris Peace Conference. In 1920, however, he was defeated at the polls and retired until the early part of 1924, when he was invited to become premier once more. The achievements of Venizelos entitle him to rank as one of the leading statesmen in modern times.

Verdi (*vār'dē*), **Giuseppe,** Italian composer, was born at Roncole, 1813. He began his musical training at seven, attended the academy at Busseto, and later studied at the conservatory of Milan. His first opera, *Oberto*, appeared in 1839, and was followed by *Nabucco, I Lombardi,* and *Ernani*, 1842–44. Thereafter Verdi was regarded as the foremost composer in Italy. In 1851, he produced *Rigoletto* and, in 1852, *Il Trovatore* and *La Traviata*, whose phenomenal success won him international fame.

Changing from his earlier melodic style to his later dramatic method in *Aïda*, 1871, Verdi began his final and greatest period. His celebrated *Manzoni Requiem* followed in 1874 and *Otello* in 1887. In 1893, he closed his remarkable career with *Falstaff*. Died, 1901. See *Italian Opera, Stories of the Leading Operas.*

Verhaeren (*vĕr-hä'rĕn*), **Emile,** Belgian poet, was born at Saint Amand, near Antwerp, 1855. He was educated at Ghent and at the University of Louvain. In 1881, he was admitted to the bar at Brussels, but soon decided upon a literary career, at first devoting his energies to the cause of "Young Belgium" and impressionistic art.

In his early poetical works, *Les Flamandes*, 1883, and *Les Moines*, 1886, he displays great strength. His pictorial method is applied to psychological studies, to descriptions of the cities, villages, and fields of Belgium; to the tragedies of farms deserted for the towns; and to the constant destruction of the fields by growing cities.

In 1898, he wrote the lyric drama *Les Aubes*, which has been widely translated. It was followed by two other dramas, *Le cloître* and *Philippe II*. His published works include numerous volumes of poems, many of which have been translated into English. Died, 1916.

Verne (*vĕrn*), **Jules,** French novelist, was born at Nantes, 1828. He studied law, but turned to literature, producing his *Cinq semaines en ballon* in 1863. In this work, Verne struck the rich and then unexplored vein of scientific adventure. His fertile imagination anticipated some of the later discoveries in aerial and submarine navigation, and his work to some extent influenced the writings of Rider Haggard and H. G. Wells. Among his other works are *Twenty Thousand Leagues Under the Sea, The Mysterious Island, Around the World in Eighty Days, Michael Strogoff, From the Earth to the Moon,* and *The Purchase of the North Pole.* Died, 1905.

Verrazano (*vĕr'rät-sä'nō*), **Giovanni da,** Florentine navigator, was born about 1480. He sailed in 1524 on a voyage of discovery in American waters and, on sighting Cape Fear, coasted along the shore until he reached what is now New York bay, continuing his explorations as far as Rhode Island and New Hampshire. Died probably about 1527.

Vesalius (*vē-sā'lĭ-ŭs*), **Andreas,** Belgian anatomist and physician, was born in Brussels, 1514. He lectured on anatomy at Basel, Padua, and elsewhere, 1537–44, and was appointed physician to Charles V and later to Philip II of Spain. Vesalius was the pioneer of comparative anatomy and race craniology. His great work was *De Corporis Humani Fabrica.* He died in 1564 in Zante, where he had been shipwrecked on his return from Jerusalem.

Vespasian (*vĕs-pā'zhĭ-ăn*), or **Titus Flavius Vespasianus,** Roman emperor, was born, 9 A. D. His father was of humble origin but his mother was the sister of a Roman senator. In the reign of Claudius, he was appointed to a military command in Britain, 43, when he conquered the Isle of Wight, and was afterward governor of Africa under Nero, who sent him to the East to conduct the war against the Jews.

After the death of Vitellius, 69, he was proclaimed emperor by the soldiers and ruled with wisdom, moderation, and firmness. The most important events of his reign were the destruction of Jerusalem by Titus and the conquest of North Wales by Agricola. The Colosseum was built in his reign. Died, 79 A. D.

Vespucci (*vĕs-pōōt'chē*), **Amerigo,** Italian navigator, was born at Florence, 1451. He was first employed in the commercial house of the Medici; in 1492, went to Spain; and, about 1495, became a member of a commercial firm in Seville.

In 1497, Vespucci embarked at Cadiz in one of a fleet of five ships commanded by Alonso de Ojeda; after 37 days' sailing, reached America; coasted along the continent for several hundred leagues; and returned to Spain, 1498. Columbus had previously landed on the mainland of America, so that to him doubtless belongs the honor of being the

discoverer of the continent; but the discovery had been kept a state secret, and the prior publication of Vespucci's narrative led to his name being given to the continent. He made several other voyages, first in the service of Spain and afterward of Portugal.

Many scholars doubt the authenticity of Vespucci's narratives of discovery, since the extant abridged translations of them contain many statements difficult to reconcile with known facts. Died, 1512.

Viaud (*vyō*), **Louis Marie Julien,** "Pierre Loti," French writer of Huguenot ancestry, was born at Rochefort, 1850. He entered the navy in 1867, became a lieutenant in 1881, and resigned in 1898.

Viaud traveled extensively and, in 1879, produced *Aziyadé*, picturing life on the Bosporus. This was followed by a long series of novels displaying remarkable power of impressionistic description. In 1891, he was elected to the French academy. His works include *Le mariage de Loti*, *Propos d'exil*, *Madame Chrysanthème*, *Japonneries d'automne*, *Le roman d'un enfant*, *Fantôme d'orient*, *Le désert*, *Figures et choses*, and *Le pèlerin d'Angkor*. Died, 1923.

Victor Emmanuel II, first king of modern Italy, was born in Turin, 1820. After serving gallantly in the army, he became king of Sardinia by the abdication of his father, 1849. From the Austrian conquerors of his country he succeeded in obtaining the withdrawal of their demand that the Sardinian constitution should be abolished. This liberal constitution, granted by his father, he faithfully maintained, thereby winning the confidence of the Italian nation. He chose wise counselors, and, with Cavour to guide, made many reforms and took part in the Crimean war.

With the help of the French, the battles of Solferino and Magenta were fought against Austria, but the peace of Villafranca between Austria and France left Italy still far distant from its hoped-for unity. But Tuscany, Modena, Parma, and the Romagna voted for annexation to Sardinia, and the Prussian alliance in 1866 gave Venice to Italy. Following the withdrawal of the French after Napoleon's overthrow in 1870, the people of Rome voted for union with Italy and, July 2, 1871, Victor Emmanuel formally entered Rome, the capital of a united Italy. Died in 1878.

Victor Emmanuel III, king of Italy, was born at Naples, 1869. In 1887, he entered the army as second lieutenant and rose until he became commanding general in 1897. He was a keen student of military affairs and increased his knowledge by numerous visits to the German army. In 1896, he married Princess Helena, daughter of Prince Nicholas of Montenegro.

Upon the assassination of King Humbert at Monza, 1900, Victor Emmanuel ascended the throne. When Italy entered the World War in 1915, he assumed nominal command of the Italian armies on the Austrian frontier and remained with the troops throughout the whole course of the war, delegating his regal duties to his uncle. His studies on coins resulted in his monumental *Corpus nummorum italicorum*.

Victoria, Alexandrina, former queen of Great Britain and Ireland, was born at Kensington palace, 1819. She was the only child of Edward, duke of Kent, fourth son of George III, and, on the death of William IV, she succeeded to the throne in 1837 and was crowned queen in 1838.

In 1840, she married Albert, prince of Saxe Coburg Gotha, by whom she had nine children. He died in 1861. The jubilee of her reign was celebrated in 1887 and her diamond jubilee in 1897.

The chief events of her reign were the establishment of the penny post; the repeal of the Corn laws; the annexation of the Punjab; the Crimean war; the Indian mutiny, followed by the assumption of sovereignty over India; wars in Afghanistan, China, South Africa, and Egypt; and the Fenian and Home Rule agitations in Ireland.

Queen Victoria was strictly impartial in the party politics of her reign. The strict standard of propriety which she set for her court had a wide social influence and was reflected in the literature of the period, which has become known as the Victorian period. Died, 1901.

Vigée-Lebrun (*vē'zhā'lē-brŭn'*), **Marie Anne Elisabeth,** French painter, was born in Paris, 1755, daughter of a painter. In 1776, she married Jean B. P. Lebrun, picture dealer and grandnephew of Charles Lebrun. Her great beauty and the charm of her painting speedily made her very popular. Her portrait of Marie Antoinette, in 1779, led to a lasting friendship with the queen. She painted numerous portraits of the royal family. At the outbreak of the Revolution, she left Paris for Italy and, after a tour through Europe, arrived in London in 1802. There she painted portraits of the prince of Wales, Lord Byron, and others, and later returned to France.

Her figures are well posed, well drawn, and always admirably presented. She is best known by her portraits of herself and her daughter. Died, 1842.

Vigny (*vēn'yē'*), **Alfred, Comte de,** French poet and novelist, was born at Loches, France, 1799. He entered the French army at 16 and served 12 years. In 1822, he published a small volume of verse, followed in 1824 by *Eloa*, an exquisite piece of mystic fantasy. He then issued his collected *Poèmes antiques et modernes*; *Cinq-Mars*, a notably popular historical romance; a translation of *Othello*; and a drama, *La maréchale d'Ancre*. After 1830, he published chiefly prose works, including *Stello*, *Servitude et grandeur militaires*, and a drama entitled *Chatterton*. A volume of verse under the name *Destinées* and his *Journal d'un Poète* were published after his death. In 1845, he was elected to the academy. Died in 1863.

Vilas (*vī'lăs*), **William Freeman,** American lawyer and legislator, was born at Chelsea, Vt., 1840. He graduated at the University of Wisconsin and at the Albany law school. In 1862, he recruited a company of volunteers, was promoted to the rank of lieutenant colonel, and commanded his regiment during siege of Vicksburg. He later had a distinguished career as professor of law in the University of Wisconsin and, after entering politics, as a cabinet officer and senator. At his death, in 1908, he left an endowment of $3,000,000 to the University of Wisconsin.

Vincent, John Heyl, American Methodist Episcopal bishop, was born in Tuscaloosa, Ala., 1832; was educated in Lewisburg, Pa., academy and at Wesleyan institute, Newark, N. J. He was pastor of churches in Chicago and established the *Northwest Sunday-School Quarterly*, 1865, and the *Sunday-School Teacher* in 1866. He was the chief founder of the Chautauqua assembly, 1874, and became chancellor of the Chautauqua literary and scientific circle upon its organization in 1878. His works include *The Chautauqua Movement*, *The Church School and Its Officers*, and *A Study in Pedagogy*. Died, 1920.

Vincent de Paul (*văn'săn' dē pôl'*), **Saint,** French philanthropist and ecclesiastical reformer, was born at Pouy, Gascony, about 1576. He was captured by Tunisian pirates in 1605 and remained for two years in slavery. After his escape, he went to Paris, where he became curate of Clichy and preceptor to the celebrated Cardinal de Retz. There he engaged in various works of benevolence and church improvement; he established a foundling hospital at Paris in 1640, organized the congregation of the Missions, and instituted the order of Sisters of Charity. Died in 1660 and was canonized by Pope Clement XII in 1737.

Vinci (*vēn'chē*), **Leonardo da,** Italian painter, sculptor, architect, scientist, and engineer, was born at Castello da Vinci near Florence, Italy, in 1452. Discovering the boy's fondness for drawing, his father placed him, at the age of 18, with Verrocchio, a versatile Florentine artist. In this early period of his career, Leonardo produced several religious and mythological works, and his genius for mechanics manifested itself in architecture and engineering.

From 1482 to 1499, which may be considered the most active and glorious period of his life, Leonardo was at Milan in the service of the duke Lodovico Sforza. The warlike habits of the sovereigns of Italy at this time rendered his scientific knowledge particularly useful, and he was constantly inventing arms and machinery for attack and defense. He was engaged in the architecture of the cathedral; he supervised all the pageants and masques; he improved the neighborhood by canals and irrigation; he produced a colossal statue of the duke.

As the founder of the Milanese academy, Leonardo composed his *Treatise on Painting*, which was first published in Paris in 1651 and contained his studies in optics, perspective, anatomy, libration, and proportion. His works in painting during his years in Milan were by no means numerous, since he was engaged in many different kinds of occupation. In 1496, he began his greatest work, "The Last Supper," in the refectory of the Dominican convent of Santa Maria delle Grazie. It was painted on the wall in tempera, and it soon partly decayed. D'Annunzio lamented its disintegration in his "Death of a Masterpiece." But about 1907 the genius of Cavaliere Cavenaghi succeeded in restoring it with remarkable skill and effectiveness.

In 1500, Leonardo returned to Florence; two years later, he entered the service of Cesare Borgia, duke of Romagna, as architect and engineer. To this period belong many fine paintings, one of which, his portrait of Mona Lisa, is probably the most famous portrait in the world.

In 1514, Leonardo went to Rome at the invitation of Pope Leo X; but friends of Michelangelo and Raphael prejudiced the pope against him. He again visited Milan in 1516 and supervised the pageant produced in celebration of the victory of Marignano. Leonardo then went to France to plan canals in the department of Cher and Loire. While engaged in this task, he painted little.

It may be laid to Leonardo's gigantic conceptions, his unattainable ideals of perfection, and his insatiable thirst after new achievements that he left only three or four works of supreme beauty and perfection. Every art and almost every science engaged his attention; in all, he anticipated in various points the discoveries of later philosophers and scientists. It is to his eternal honor that he first dissipated

the film of ignorance that impeded the progress of the arts. He was, unquestionably, the founder of the Italian process of oil painting, and he effected, by his exquisite taste and profound knowledge of nature, a nearer approach to perfection than had ever been attained. Died, May 2, 1519. See page 1562d.

Vinson, Robert Ernest, American educator, was born in Fairfield county, S. C., 1876, and was educated at Austin college, Union theological seminary, and the University of Chicago. He was ordained to the Presbyterian ministry in 1899 and, after three years spent in a pastorate in Charleston, W. Va., became a professor in Austin college in 1902. In 1908, he was made president and acted until 1916, when he resigned to accept the presidency of the University of Texas. He became president of Western Reserve university in 1923.

Virgil, or **Publius Virgilius Maro,** Roman poet, was born at Andes, a small village near Mantua, in the year 70 B. C. His father, a well-to-do farmer, sought to give his son the best education that could be obtained. Accordingly, Virgil was sent in turn to Cremona, Milan, Naples, and Rome. Of frail physique and of delicate health, the boy shrank from the ruder avocations of oratory and arms which appealed to his more robust companions. Instead, he devoted himself with zealous intensity to study, thus laying the foundation of a rich and varied knowledge scarcely less remarkable than was his extraordinary poetic genius.

Returning subsequently to his paternal home, the youthful poet found that his father's farm had been sequestrated in the confiscations after Philippi. Virgil succeeded in regaining it, however, through the influence of his patron Asinius Pollo, who, later, introduced him to Mæcenas and the emperor Augustus.

Several minor works are ascribed to Virgil's youth, but their authenticity has not been satisfactorily proved. The first important work through which his genius shines was the *Eclogues*, or *Bucolics*, a series of pastorals written in 42–37 B. C., when he was still young and under the influence of Theocritus. They are full of delightful pictures of the country of his boyhood. To one of these pastorals a special significance was attached by the early Christians, inasmuch as the poet prophesies the birth of a wondrous child, which was interpreted to mean that of Christ. This poem is still called the *Messianic Eclogue*.

The *Georgics*, written in 37–30 B. C., are four books dealing with husbandry. The purpose of this, perhaps the most finished poem in Latin literature, was to win the Romans back to the soil.

The *Æneid*, Virgil's great masterpiece, written at the instance of Augustus in 29–19 B. C., remained unrevised at the time of the poet's death. It is said that Virgil desired to burn it, but, happily, it was saved to posterity. This great national epic profoundly impressed the entire Roman world. In it was beheld the highest expression of Roman genius and the embodiment of the idealized spirit of Roman nationality. For commentators, it was the source of all wisdom and morality, and Christian writers regarded its author as an inspired prophet. Thus Dante in his *Divine Comedy* represented Virgil as his guide through the greater part of the abode of the dead.

In character, Virgil was shy and retiring, courting seclusion and, as far as possible, shunning publicity. His personal friends who had access to him in his privacy at Campania were won by his graciousness and charm of manner. Earnest and sincere in all his dealings, he was known as one with deep religious feelings toward the gods. The influence of the *Æneid* on subsequent Roman writers cannot be overestimated. The greatest Roman epic ever written, for purity of style and transcendency of expression, it remains today unsurpassed. Virgil died on September 22, 19 B. C., in the 51st year of his age.

The Italian government took steps in 1924 to purchase Virgil's burial place near Naples and to construct there a garden in the Greco-Roman style. See *Æneas, Æneid*.

Vittoria Colonna. See *Colonna, Vittoria*.

Viviani (*vē'vyä'nē'*), **René,** French statesman and orator, was born in Sidi Bel Abbes, French North Africa, 1863. At an early age he joined the Socialist party and became one of its leaders. He was elected deputy in 1893 and served continuously until 1902. Again entering the Chamber in 1906, he held various cabinet offices and was premier in 1914-15. In 1917, he visited the United States on a special war commission and, again in 1921-22, he was the chief French representative to the Washington Conference. Died, 1925.

Vizetelly (*vĭz'ĕ-tĕl'lĭ*), **Frank Horace,** editor and encyclopedist, was born in London, Eng., 1864, and was educated in France and at Arnold college, Eastbourne, Eng. He was connected with his father's publishing firm from 1882 to 1891, when he sailed for America and joined the editorial staff of Funk and Wagnalls Company, New York, becoming general editor of Funk and Wagnalls *New Standard Dictionary* in 1913. His editorial activities have been instrumental in the production of numerous reference works, including the *Jewish Encyclopedia*. He was editor also of "The Lexicographer's Easy Chair" in the *Literary Digest* and office editor of more than 100 miscellaneous publications on English public speaking, medicine, history, social reform, travel, and other subjects. Among the works written by him are *Essentials of English Speech and Literature, A Dictionary of Simplified Spelling, English Idioms and Idiotisms,* and *Words we Misspell in Business*.

Vladimir (*vlăd'ĭ-mĭr*; R., *vlä-dyē'mēr*) **the Great,** Russian emperor, who reigned from 980 to 1015. He added largely to the kingdom by conquest, but is best known for the introduction of Christianity into the Empire. He embraced the doctrines of the Greek Church and was baptized at Kherson in 988 at the time of his marriage to Anna, sister of Constantine IX of Constantinople. Died, 1015.

Volstead, Andrew J., American legislator, was born in Goodhue county, Minn., 1860, and was educated at Saint Olaf's college and Decorah institute. He was admitted to the bar in 1894 and developed a practice at Granite Falls, Minn., of which he was at one time mayor. He was elected to Congress in 1903 and continued to sit until 1923. He was the author of the Volstead act, which gave effect to the amendment to the Constitution regarding the prohibition of intoxicating liquors.

Volta (*vōl'tä*), **Alessandro, Count,** Italian physicist, was born at Como, 1745. In 1774, he became professor of physics in the royal school at Como, and, 1779, in the University of Pavia. He devised the electrophorus, the electroscope, and various experiments, such as that resulting in the ignition of gases in a closed vessel by means of the electrical spark. In 1800, he announced his important discovery of the voltaic battery. The volt, the unit of electric pressure, was named after him. Died, 1827.

Voltaire (*vōl'târ'*), **Jean François Marie Arouet,** French writer and critic, was born February 21, 1694, at Chatenay near Paris. To the influence of his godfather and first teacher, the Abbé de Châteauneuf, may be traced his first acquaintance with the skeptical literature then in vogue in France.

His further education was obtained in the Jesuit college of Louis-le-Grand. Following his return from Holland, where he had acted as secretary to the French ambassador, he entered an attorney's office; but he found this calling uncongenial. A satire on the deceased French monarch sent Voltaire to the Bastille in 1717.

In 1722, he made the acquaintance of Rousseau in Brussels, but they separated with enmity. The publication of *La Henriade* in 1724 attracted general attention to Voltaire's genius; but he was soon in disgrace on account of a satire against a courtier; and he was again thrown into the Bastille in 1726. Liberated on condition that he quit Paris, he went to England. The three years spent there were important for the friendships and knowledge gained and for their influence upon his *History of Charles XII* and his *Letters on the English* published on his return to Paris. Shortly afterward came his *Zaire*.

He retired in 1734 to Cirey in Lorraine. During his five years' residence there, he wrote his dramas *Merope* and *Mahomet*, his *Treatise on Metaphysics*, much of his *Age of Louis XIV*, and his *Elements of the Philosophy of Newton*. The appearance of his *Princess of Navarre* won him the favor of Louis XV, various appointments at court, and his election to the French academy in 1746. To this period belong *Zadig* and other Oriental tales.

In 1743, Voltaire had been successful in a mission to Frederick the Great to secure Prussia's alliance with France. Many invitations from Frederick followed, and, in July 1750, Voltaire was at Berlin as the king's chamberlain. Here he completed his *Century of Louis XIV*. In 1753, a rupture came between the two, and Voltaire returned to France.

About 1755, he wrote his mock-heroic poem "The Maid." Five years later, he established himself at Ferney near Geneva. Here he finished his *Essay on the Manners and Spirit of Nations*, a philosophy of history. His *Candide*, the most remarkable of his prose fictions, appeared in 1758. He now became the founder of a new group of thinkers, who, under Diderot and D'Alembert, embodied their ideas in the *Encyclopedia*. At the age of 84, Voltaire went to Paris for the presentation of his new play *Irene*.

Voltaire was the sovereign writer of his century. He had no equal in power of simplification and popularization, in keen metaphors and ready satire. He placed the greatest discoveries and theories of science within the reach of the people. His name is still a rallying point for critics of Christianity and the Church. Died, May 30, 1778.

Von Bülow (*fôn bü'lō*), **Hans Guido,** German pianist and conductor, was born in Dresden, 1830. He began to study law at Leipzig, but soon devoted himself to music. He studied under Wagner and Liszt. In 1864, he became conductor of the royal opera at Munich and produced there the first performances of Wagner's *Tristan und Isolde* and *Die Meistersinger*. From 1880 to 1885, he conducted the

Meiningen orchestra, which he made the most celebrated in Germany. Died, 1894.

Waals (*wäls*), **Johannes Diderik van der,** Dutch physicist, was born at Leiden, 1837. After teaching at Deventer and The Hague, he became, in 1877, professor of physics in the University of Amsterdam. He investigated the continuity of state of liquids and gases, the thermodynamic theory of capillarity, electrolytic dissociation, and related subjects. For work on the nature of gases, he was awarded the Nobel prize for physics in 1910. Died, 1923.

Wadsworth, James Wolcott, Jr., American politician, was born at Genesee, N. Y., in 1877. After graduation at Yale university in 1898, he engaged in live stock and general farming business at Mount Morris, N. Y., later becoming interested also in banking. He was a member of the state assembly in 1905–10, being speaker from 1906. In 1915 he became a United States senator from New York and was re-elected for the term 1921–27. In 1926, he declared in favor of a referendum on prohibition.

Wagner, Wilhelm Richard, German composer, romantic poet, and philosopher, was born at Leipzig, Prussia, on May 22, 1813. After the death of his father, from whom Wagner inherited his love for the theater, his mother remarried and removed to Dresden, Saxony. There, in 1821, Wagner was sent to the Kreuzschule. The bent of his tastes and his passion for poetry early found expression in translations from Homer and in the writing of a tragedy based on *Hamlet* and *King Lear*.

Earlier Works. In 1827, the family removed to Leipzig. Weber, then conductor of the Leipzig opera, and Beethoven's music so captivated the boy's artistic temperament that he decided to set his youthful tragedy to music. In 1830, he entered the University of Leipzig, where his career was marked both by individuality and by brilliant talents. For the next three years, he composed many works after standard models; in 1833, he began his long career as an operatic composer with *The Fairies*.

In 1836, Wagner married an actress, Minna Planer. During the years 1837–39, spent in Riga, he completed the libretto and first two acts of the opera *Rienzi*, and, with this, he resolved to try his fortune in Paris. He sailed first, however, to England, experiencing an exceedingly tempestuous voyage from which he gained his first inspiration for *The Flying Dutchman*.

The years in Paris were filled with bitter experiences; he left in 1842 with *Rienzi* unperformed. This was first produced in October 1842, at Dresden, and the performance led to his appointment as chapelmaster there in 1843. *The Flying Dutchman* was produced in 1843. *Tannhäuser*, two years later, proved a complete failure in Dresden, but it was produced in Weimar by Liszt in 1849 with better results. This event led to a lifelong friendship between Wagner and Liszt.

Years of Exile. *Lohengrin*, which had been suggested during his stay in Paris, was finished early in 1848 and was about to be performed in Dresden the following year, when Wagner became an active leader in the revolutionary outbreak there. Shortly after the suppression of the movement, news reached Wagner in Weimar that a warrant had been issued for his arrest. He fled to Paris, then to Zurich; and, for nearly 12 years, the bitterness of exile was added to the hardship of poverty. In 1850, he was appointed director of the Zurich musical society and of the orchestra of the theater. During these years, Liszt was Wagner's most faithful friend and benefactor. Liszt first produced *Lohengrin*, in 1850, at Weimar. This performance started the historic "Wagner question" in art circles.

Life in Munich. Wagner went to London in 1855 for one ill-fated season as conductor for the philharmonic society. In 1861, he received permission to return to Germany. For three years he struggled, and he was about to give up the unequal contest with fortune, when Ludwig II of Bavaria induced him to settle in Munich. *Tristan and Isolde* of 1865 was followed by *Die Meistersinger* three years later. *Siegfried* was completed in 1869. In the following year, Wagner married Cosima, the daughter of Liszt.

In 1870, the pianist Tausig sent an appeal to the admirers of the new Wagnerian music throughout the world; and, in 1876, Wagner's hopes were attained in the erection at Bayreuth of the theater where the ideas of his later operas could be carried out. Wagner had settled at Bayreuth in 1872, and here he produced his *Nibelungen* trilogy. In July 1882, his stormy career was crowned by the first performance of *Parsifal*, which, with its sacred allegory, its lofty nobility of tone, and pure mysticism, stands above criticism, praise, or blame.

Operatic Innovations. Wagner was a musician of the highest type and a poet of supreme eminence in romantic drama. He aimed to reform the whole structure of opera. He used the Beethoven development of instrumental music as a basis and introduced his own radical developments in vocal music and poetry. By locating his operas in the dreamland of myth and legend, he endeavored to remove all sense of dramatic inconsistency. The orchestra was, for him, no longer a mere accompaniment to the singer; it became a running parallel of the play, heightening its dramatic effect; and he utilized all the arts of painting, sculpture, and architecture to further the visible unfolding of the opera. Died, February 13, 1883. See pages 1551–57: *Flying Dutchman, Lohengrin, Meistersinger, Parsifal, Ring of the Nibelung, Tannhäuser, Tristan und Isolde.*

Wagner-Jauregg (*väg'nĕr you'rĕg*), **Julius,** Austrian pathologist, was born in 1857. He became professor of medicine at the University of Vienna, where he discovered a method of curing general paralysis of the insane by the injection of malaria germs, the patient being later cured of malaria. For this discovery he received the Nobel prize in medicine for 1927.

Walcott (*wôl'kŭt*), **Charles Doolittle,** American scientist, was born in New York Mills, N. Y., 1850, and was educated in the public schools of Utica, N. Y. He early showed a predilection for geological research and, after a short period as assistant in a New York State survey, he became assistant geologist to the United States geological survey, in the service of which he rose to be director by 1894. The Cambrian rocks and the fauna of the United States were his special subjects of inquiry. In 1907, Walcott resigned the directorship of the United States geological survey to become secretary of the Smithsonian institution, of which he had previously acted as assistant secretary. Died, 1927.

Walker, Francis Amasa, American political economist, was born at Boston, Mass., 1840. He graduated from Amherst college, 1860, and served in the Civil War, rising to the rank of brigadier general. In 1869, he was made chief of the bureau of statistics at Washington and was superintendent of the 9th and 10th United States censuses. From 1873 to 1881, he was professor of political economy at Yale and, in 1881, became president of the Massachusetts institute of technology at Boston. Walker was a leading advocate of international bimetallism. His treatment of wages and profits profoundly influenced economic theory. Died in 1897.

Walker, Horatio, Canadian painter, was born in Listowel, Ont., 1858. After studying miniature painting at Toronto, he located in New York, where he devoted himself chiefly to animal, figure, and landscape painting. While notably influenced by the Barbizon painters, he was practically self-taught. He chose his subjects largely from French Canadian types, portraying them somewhat in the style of Millet. Among his works are "The Harrower," in the Metropolitan museum, New York; "Oxen Drinking" and "Ave Maria," in the Corcoran gallery, Washington; "Sheep-shearing," in the Albright gallery, Buffalo; and "The Woodcutter," in the Saint Louis museum.

Walker, Nellie Verne, American sculptor, was born at Red Oak, Iowa, 1874, the daughter of a marble cutter. She studied under Lorado Taft and at the art institute, Chicago, where she later became an instructor. Her artistic efforts have been devoted chiefly to portrait busts and to ideal groups for memorials. One of her finest works is "Her Son," at the art institute, Chicago. Other examples are the statue of Chief Keokuk, overlooking the Mississippi river at Keokuk, Iowa; the Decker memorial at Battle Creek, Mich.; and the Stratton monument at Colorado Springs, Colo.

Walker, William, American adventurer and filibuster, was born at Nashville, Tenn., 1824. He graduated at the University of Nashville; studied law; and was admitted to the bar. Later he studied medicine at Edinburgh and Heidelberg, and afterward engaged in journalism in New Orleans and San Francisco.

In 1853, Walker attempted unsuccessfully to found a new republic in northern Mexico. He next planned an expedition against Nicaragua, and, in 1855, he took the capital, Granada. He was elected president, and his government, recognized by the United States, restored slavery. Meanwhile his enemies were closing in on him, and, in 1857, he surrendered for protection to a United States sloop of war. Later in the same year, he made an unsuccessful attempt to recapture Nicaragua.

In 1858, he attempted to lead a band of adventurers against Honduras, but was foiled by shipwreck. In 1860, he conducted a second expedition against Honduras and captured Truxillo, but was soon compelled to flee. Subsequently he surrendered himself to the captain of a British warship, by whom he was turned over to the Honduran government. Condemned by court-martial, Walker was shot at Truxillo, September 12, 1860.

Wallace, Alfred Russel, English naturalist and traveler, was born in Monmouthshire, 1823. He was educated as a surveyor and an architect, but devoted his attention to natural history after 1845. He visited South America and the Malay archipelago; on his return published the results

of his observations; and, simultaneously with Darwin, announced the theory of natural selection. Among his works are *Contributions to the Theory of Natural Selection*, *Miracles and Modern Spiritualism*, *Darwinism*, *Geographical Distribution of Animals*, *The World of Life*, *Social Environment and Moral Progress*, and *Letters and Reminiscences*. Died, 1913.

Wallace, Henry, American agricultural editor and author, was born at West Newton, Pa., 1836. He graduated at Jefferson college and attended also Allegheny theological seminary and Monmouth theological seminary. He entered the United Presbyterian ministry and held pastorates in Illinois and Iowa, 1863–80. After editing the *Iowa Homestead*, 1883–95, he established and became editor of *Wallace's Farmer*, which rose to prominence among the agricultural journals of the Mississippi valley. In addition to extensive editorial work, he wrote, among other books, *Plymouth Brethren*, *Clover Culture*, *The Skim-Milk Calf*, and *Letters to the Farm Folk*. Died, 1916.

Wallace, John Findley, American civil engineer, was born at Fall River, Mass., 1852, and was educated at Monmouth college and the University of Wooster. He was engaged in government improvements on the Mississippi river, 1871–76; entered railroad work; and, from 1891 to 1904, worked with the Illinois Central, becoming general manager in 1901. In 1904, he became the first American chief engineer of the Panama canal. After 1906, he was identified with various important corporations. Died, 1921.

Wallace, Lewis, American soldier and novelist, was born at Brookville, Ind., 1827. He was first lieutenant in the Mexican war; began the practice of law in Indiana, 1848; entered the Union army in the Civil War, becoming a brigadier general in 1861 and serving until the close of the struggle. He was governor of New Mexico, 1878–81, and, from 1881 to 1885, he was United States minister to Turkey. His novel *Ben Hur*, 1880, achieved remarkable success. Among other well-known works from his pen are *The Fair God* and *The Prince of India*. Died, 1905. See *Ben Hur*.

Wallace, Robert Charles, Canadian geologist, was born at Orkney, Scotland, in 1881 and was graduated at Edinburgh and Gottingen universities. In 1910, he was appointed a lecturer in geology in the University of Manitoba and, in 1912, became professor and head of the department of geology there. He undertook many investigations on the geology of Manitoba, aiding materially in the development of the province's mineral resources. In 1918–21, he was commissioner of northern Manitoba and, in 1927-28, commissioner of natural resources for Manitoba. He became president of Alberta university in 1928. He is the author of *Dolomitization Processes* and *The Resources of Manitoba and Their Development*.

Wallace, Sir William, Scottish patriot, was born about 1270. He headed the uprising of 1297 against the English and won a victory at Stirling bridge, after which he crossed the border, devastated northern England, and, on his return, was named the guardian of Scotland. The next year, however, he was defeated by Edward I at Falkirk, after which, deserted by the nobles, he carried on a guerilla warfare for several years. He was declared an outlaw in 1304 and was captured, sent to London, and hanged in 1305.

Wallach (*vŏl'ăk*), **Otto,** German chemist, was born in Konigsberg, 1847. He was educated in the universities of Gottingen and Berlin and became professor of chemistry at Bonn in 1876 and at Gottingen in 1889. Through his researches on the chemical composition of the essential oils, he gave impetus to the development of the present extensive industry devoted to the artificial production of essential oils, perfumes, and gums. In recognition of his achievements in organic synthesis, he was awarded the Nobel prize for chemistry in 1910.

Wallenstein (*wŏl'ĕn-stīn*; G., *vŏl'ĕn-shtīn*), **Albrecht Wenzel Eusebius von,** duke of Friedland, German military leader, was born in Bohemia, 1583. At the head of a formidable army raised by him for the service of the emperor and paid from his own resources and from unlimited plunder, he distinguished himself during the Thirty Years' war by his successes in Moravia, Bohemia, and northern Germany, and was rewarded with the dukedoms of Mecklenburg and Friedland. His enemies succeeded in procuring his dismissal in 1630, and he retired to Prague, where he lived with all the state of a sovereign.

The successes of Gustavus Adolphus compelled the emperor in 1632 to place Wallenstein again in command with almost regal authority. He foiled Gustavus at Nuremberg, but was defeated at Lutzen. At length he was accused of treason; his commission was revoked; and, in 1634, he was assassinated by some of his own officers. A famous trilogy by Schiller is based on Wallenstein's career.

Walpole, Horace, earl of Orford, English author, son of Sir Robert Walpole, was born in London, 1717. He graduated from Cambridge, and entered Parliament in 1741. Although he remained a member of the House of Commons until 1768, he devoted himself chiefly to literary and artistic pursuits.

In 1747, Walpole purchased the famous estate of Strawberry Hill, Twickenham, the building and the adornment of which occupied him throughout much of his life. In this house he collected many works of art and curiosities, and established a private printing press, at which several of his own works and some others were printed.

He is now remembered chiefly for his *Letters*, which are of great literary value. These extend over a period of 60 years and are remarkable for their wit and humor and for their delineations of the society of the time. Died, 1797.

Walpole, Hugh, English novelist, was born in 1884. He was educated at Cambridge, and, during the World War, he served with the Russian Red Cross. His already numerous publications include *The Wooden Horse*, *The Dark Forest*, *The Secret City*, *The Young Enchanted*, *The Cathedral*, and *Jeremy and Hamlet*.

Walpole, Sir Robert, English statesman, was born at Houghton, Norfolk, 1676. He was educated at Cambridge, and entered Parliament in 1701. He held various cabinet offices and was prime minister from 1721 to 1742. As chancellor of the exchequer, he had to deal with the difficulty resulting from the collapse of the South Sea Company, and he was one of the first to urge the establishment of a sinking fund for the purpose of reducing the national debt. He was an enemy of war and a strong supporter of the Protestant succession. On his retirement in 1742 he was created earl of Orford. Died in 1745.

Walter, Eugene, American play writer, was born in Cleveland, Ohio, 1874. Educated in the public schools, he began his career as a reporter on Cleveland newspapers, later joining the New York *Sun* and serving in the army during the Spanish American war. About 1907, he began to devote his attention entirely to play writing.

With little concern for ideas or characterization, Walter's plays are chiefly melodramas which endeavor simply to furnish interesting stories for the stage. The list of his plays includes *Sergeant James*, *The Undertow*, *Paid in Full*, *The Wolf*, *Just a Wife*, *The Assassin*, *The Trail of the Lonesome Pine*, *Little Shepherd of Kingdom Come*, *The Sinking Ship*, *The Toy Girl*, and *The Onlooker*.

Walter, Thomas Ustick, American architect, was born in Philadelphia, 1804. In 1833, he made the designs for the Girard College building, which, on its completion in 1847, was pronounced the finest specimen of classic architecture in the United States. In 1848, his design for the extension of the Capitol at Washington, D. C., was adopted. Appointed government architect, he removed to Washington and remained there until the completion of the work. He designed also the extensions of the patent-office, treasury, and post-office buildings, and the dome of the Capitol. Died in 1887.

Walton, Izaak, English writer, was born at Stafford, England, 1593. He was a linen draper in the city of London. At 50 years of age, he retired from business and thenceforward devoted himself to literary pursuits and to angling, the latter of which seems to have been his passion. His *Compleat Angler* is still a popular book, especially pleasing for its quiet and quaint dialogue and for its glimpses of rural scenery, manners, and pastimes. He died in 1683. See *Compleat Angler, The*.

Wanamaker, John, American merchant, was born at Philadelphia, 1838. He was educated in the public schools and, for a time, was an errand boy. Entering mercantile life in Philadelphia, 1856, he developed an enormous retail business. He also reopened in New York in 1896 the department store founded by A. T. Stewart. He was an organizer and director of the Merchants' bank and was a director of the Philadelphia and Reading railway.

Wanamaker was the first salaried Y. M. C. A. secretary, and he erected many Y. M. C. A. and college buildings in India, China, Japan, and Chosen. He was also the founder and, for many years, the superintendent of the Bethany Sunday school. From 1889 to 1893, he was postmaster-general in President Harrison's cabinet. He sent two relief ships to Belgium in 1914. Died, 1922. A bronze monument was erected to his memory by the school children of Philadelphia.

Ward, Aaron Montgomery, American merchant and originator of mail order merchandising, was born at Chatham, N. J. 1843. At the age of five, he was taken to live at Niles, Mich., where he attended the public schools. He acquired his first experience in merchandising at Saint Joseph, Mich., beginning as a clerk in a general store, of which he was made manager in three years. In 1866, he obtained employment with Field, Palmer, and Leiter, later Marshall Field & Company, Chicago, and, after two years' experience, became traveling salesman for a Saint Louis firm.

In 1872, with his brother-in-law G. R. Thorne and with the assistance of one clerk, he established the mail order house of Montgomery Ward and Company. Under Ward's management, this firm developed a vast business extending to all parts of the world, employing 6000 persons and handling sales amounting to $70,000,000 annually. In civic affairs, he was noted for his persistent and successful efforts to preserve Grant park to the city of Chicago. Died, 1913.

"Ward, Artemus." See *Browne, Charles Farrar.*

Ward, Elizabeth Stuart Phelps, American author, was born at Andover, Mass., 1844. Besides lecturing on temperance, writing for magazines, and engaging in various kinds of work for the advancement of women, she wrote *Hedged In, The Silent Partner, Poetic Studies, An Old Maid's Paradise, Doctor Zay, The Madonna of the Tubs, Struggle for Immortality, A Singular Life,* and *The Man in the Case.* In 1888, she married Rev. Herbert D. Ward. Died, 1911.

Ward, Mrs. Humphry, née Mary Augusta Arnold, English novelist and writer, niece of Matthew Arnold, was born at Hobart, Tasmania, 1851. In 1872, she married Thomas Humphry Ward, a well-known critic and writer. She began early to contribute to *Macmillan's Magazine.* Her first notable success was *Robert Elsmere,* 1888, a religious problem novel. Among her subsequent works are *Marcella, Sir George Tressady, Eleanor, The Marriage of William Ashe, Fenwick's Career, The Testing of Diana Mallory, Marriage à la Mode, Canadian Born, The Coryston Family, Eltham House, The War and Elizabeth,* and *A Writer's Recollections.* Died, 1920.

Ward, John Quincy Adams, American sculptor, was born at Urbana, Ohio, 1830. He began the study of law, but, in 1850, turned his attention to sculpture. His first work was done in Washington, where he executed busts of Alexander Stephens and others. After 1861, his home was in New York. His "Indian Hunter," "A Private of the Seventh Regiment," "Pilgrim," and "Shakespeare" are in Central park, New York; his colossal statue of Washington is on the steps of the subtreasury building, New York; and his statue of Henry Ward Beecher stands in Brooklyn. He executed also the "Good Samaritan," "The Freedman," statues of Commodore Perry and General Thomas, and equestrian statues of Sheridan and Hancock.

Strong, virile, and broadly but simply conceived, Ward's work ranks high in contemporary American sculpture. He was elected a member of the American academy of arts and letters in 1905. Died, 1910.

Warde, Frederick, actor, was born at Oxfordshire, England, in 1851. He studied law but early turned his attention to the stage, appearing for the first time at Sunderland in 1867. In 1874, he came to America, where he played with Edwin Booth and other distinguished American dramatists. In the years following 1880, Warde starred in many of the greater tragedies. He lectured, also, on Shakspere and wrote *Shakespeare's Fools* and *Fifty Years of Make Believe.*

Warfield, David, American actor, was born in San Francisco, 1866. He received a public school education and made his first appearance on the stage in 1888. He went to New York in 1890; played in Casino theater and Weber and Fields music hall; was starred by David Belasco in *The Auctioneer,* which he played 1400 times, and in *The Music Master,* in which he appeared more than 1000 times; created the title rôle in *The Return of Peter Grimm;* and, in 1916–18, appeared in *Van der Decken* and *The Music Master.*

Warming (*vär'mĭng*), **Johannes Eugenius Bülow,** Danish botanist, was born in the island of Mano, in the North Sea, in 1841. He studied at Bonn, Germany, under Hanstein and spent three years in Brazil. In 1871, he received the degree of doctor of philosophy at the University of Copenhagen, in which, in 1876, he was made professor of pharmaceutical botany. From 1882 to 1885, he was professor of botany at Stockholm. Returning to the University of Copenhagen, he served from 1885 to 1911 as professor of botany and director of the botanical garden. Besides doing valuable work in arctic botany, Warming established plant ecology as one of the main divisions of botanical science and also made valuable researches in morphology and taxonomy. He published several important works, among which are his *Handbook of Systematic Botany* and *Ecology of Plants.*

Warner, Charles Dudley, American author, was born at Plainfield, Mass., 1829. He graduated at Hamilton college in 1851 and practiced law in Chicago, 1856–60, when he settled at Hartford, Conn., engaging in editorial work. He became associate editor of the Hartford *Courant* in 1867. In 1884, he became coeditor of *Harper's Magazine,* in which appeared his papers on the South, on Mexico, and on the West. In 1873, he wrote, with Mark Twain, *The Gilded Age.* His other works include *My Summer in a Garden, Back-log Studies, Being a Boy, Washington Irving, Captain John Smith,* and books of travel, such as *In the Levant.* Died, 1900.

Warren, Joseph, American soldier, was born at Roxbury, Mass., 1741. He graduated at Harvard in 1759 and became a physician in Boston, 1764. He associated himself with Samuel Adams and other ardent Whigs and, in 1772, became a member of the committee of correspondence. In 1774, he was a member and president of the Massachusetts congress and chairman of the committee of public safety. He had much to do with the success at Lexington and, in 1775, was commissioned major general. Overruled by a majority of the council, which resolved to fortify Bunker Hill, he went there as a volunteer, refusing to take the chief command offered to him by both Prescott and Putnam. He was killed during the battle, 1775.

Warwick, Richard Neville, Earl of, surnamed the "king-maker," was born in 1428. The wealthiest and most powerful subject of his time in Europe and allied by blood to the royal houses of England and France, he was the most prominent figure in the Wars of the Roses. After joining the Yorkists in the commencement of that calamitous war and taking King Henry VI prisoner, Warwick, in 1461, placed Edward, duke of York, on the throne as Edward IV. Following a quarrel with Edward, Warwick joined the Lancastrians; formed an alliance with France; and, in 1470, at the head of a powerful army, drove Edward out of England and reinstated Henry VI on the throne. Edward, however, soon returned to England at the head of an army. At the battle of Barnet, 1471, the forces of Henry VI were defeated and Warwick was killed. Warwick is the hero of Lytton's novel *The Last of the Barons.*

Washington, Booker Taliaferro, American educator of the Negro, was born near Hales Ford, Va., about 1858, the son of a mulatto slave and of a white man. He graduated from Hampton institute, Va., Harvard, and Dartmouth. He was a teacher at Hampton institute until elected by the state authorities, 1881, as head of Tuskegee institute, which he organized and made notably successful. He became a well-known and able writer and speaker on racial and educational subjects. His publications include *Sowing and Reaping, Up From Slavery, Future of the American Negro, Character Building, Story of My Life and Work, Working With Hands, The Negro in Business,* and *The Man Farthest Down.* Died, 1915.

Washington, George, first president of the United States, was born in Westmoreland county, Virginia, February 22, 1732. He was the son of Augustine Washington, a planter, and of Mary Ball, his second wife. His ancestors belonged to an old English family, traceable as far back as the 13th century.

Education. The province of Virginia offered but scanty opportunities for education. Reading, writing, arithmetic, and some other branches of mathematics alone were within the reach of Washington. It is said that he was a diligent student, but that his passion for active sports and military exercise was displayed at a very early age. Another tradition states that, while he was at school, his reputation for truth and judgment was so well established that his fellow pupils were accustomed to make him the arbiter of their disputes, seldom failing to be satisfied with his decision.

Early Career. After leaving school in the autumn preceding his 16th birthday, Washington went to reside with his brother Lawrence at Mount Vernon. There he became acquainted with the Fairfax family, from whom he obtained employment as a surveyor of large tracts of territory in the rich valley of the Allegheny mountains. In this service, at which he was engaged during the summer months of the years 1748–1750, Washington established a high professional reputation by his skill and accuracy. The acquaintance which he gained with the wilderness and its inhabitants was of great use to him later in military expeditions. By the practice of economy he saved money and purchased property before reaching his majority.

In 1751, Washington entered the military service. The frontiers were threatened at that time by the French and Indians, and the militia was put in a condition for defense. The province was divided into districts, and Washington received charge of one of these districts as adjutant general with the rank of major. He entered into his duties with zeal and alacrity and applied himself to the study of tactics.

Military and Political Activities. At the outbreak of the French and Indian war in 1753, Washington made himself so prominent a figure by his defense of Fort Necessity that he was commissioned commander in chief of all the Virginia forces in 1755. He served in General Braddock's campaign in the same year as an aide to the general. In the attempt to take Fort Duquesne, which, because of Braddock's stupidity and refusal to take advice, resulted in a pitiful disaster, Washington's clothing was riddled with bullets, but he escaped unhurt. The war in Virginia was soon at an end. Washington resigned his post, married Mrs. Martha Custis in 1759, and settled at Mount Vernon.

His life for the next 15 years was that of a typical Virginia planter, a consistent member of the Episcopal Church, a large slaveholder, a strict but considerate master, and a

widely trusted man of affairs. He was repeatedly elected to the legislature and, in 1774, was sent as a delegate to the Continental Congress. With this appointment his national career began.

Washington's associates in Congress recognized his military ability at once, and most of the details of the work looking toward preparations for armed resistance against England were left by common consent to him. War broke out in Massachusetts, and, after the affairs at Lexington and Concord, Washington was unanimously elected commander in chief of the armed forces of the united colonies. Refusing any salary, he accepted the office despite his skepticism as to his fitness for it. He was commissioned June 15, 1775, and reached Cambridge, Mass., July 2, taking command of the levies there assembled against the British garrison of Boston.

Washington drove the British out of Boston in March 1776, and, from that time until his death, he was the foremost man on the continent. The military operations of the remainder of the war are familiar to all readers of American history. The war was actually over when Washington received the surrender of Cornwallis at Yorktown; but not until December 23, 1783 did he resign his commission and retire to Mount Vernon.

PRESIDENCY. When the Federal Convention met at Philadelphia in May 1787 to frame the present Federal Constitution, Washington was present as a delegate from Virginia, and a unanimous vote soon made him the presiding officer. After the Constitution had been ratified and the time had come to elect a president, in 1789, there was no hesitation. The unanimous vote of the electors made Washington the first president of the United States and re-elected him in 1793. The success of the new system of government was due mainly to the presence at that time of such a character as Washington; for he prevented party contest until the new government was firmly established. Refusing a third term of office, Washington left the presidency in 1797 and resumed his life as a planter.

CHARACTER. Washington was distinguished less by the brilliancy of his talents than by his moral strength, sound judgment, and plain, but excellent, understanding. Of all great men in history he was perhaps the most invariably judicious and evenly poised. A resolution introduced in the House of Representatives five days after his death and passed unanimously states exactly, if a trifle rhetorically, the position of Washington in American history: "First in war, first in peace, and first in the hearts of his countrymen."

He died on December 14, 1799, when commander in chief of a provisional army raised in the expectation of open war with France. His remains were laid in a private vault at Mount Vernon, where his tomb has since been converted into a veritable shrine for all patriotic Americans.

Watson, John, philosopher, was born at Glasgow, Scotland, 1847. He graduated at Glasgow university in 1872 and was immediately appointed professor of logic, metaphysics, and ethics in Queen's university, Kingston, serving until 1923. An intellectual idealist, he has made valuable contributions in the exposition of Kant. His works include *Schelling's Transcendental Idealism*, *The Philosophical Basis of Religion*, *The Philosophy of Kant Explained*, and *The Interpretation of Religious Experience*.

Watson, John, better known by his pseudonym "Ian Maclaren," British preacher and writer, was born of Scottish parents at Manningtree, Essex, 1850. He was educated at Edinburgh university and at Tubingen; was ordained a minister of the Free Church of Scotland; and had important pastorates in Glasgow and Liverpool.

In 1894, Watson acquired wide fame by a series of Scottish prose idyls entitled *Beside the Bonnie Brier Bush*. This work portrayed humble and pious Scottish life and scenes. The volume was followed by *The Days of Auld Lang Syne*, *Rabbi Saunderson*, *Afterwards*, and other stories. His religious writings embrace *The Mind of the Master*, *The Potter's Wheel*, and *The Cure of Souls*. Died, 1907.

Watson, John Broadus, American psychologist, was born at Greenville, S. C., 1878; was educated at Furman university and the University of Chicago, where he was an instructor in 1903–08; and, in 1918, became professor of psychology at Johns Hopkins university. He is regarded as the founder of the school of behaviorism, that is, the branch of psychology which ignores consciousness and studies psychic activity solely in terms of observable behavior. He resigned his professorship in 1920 and joined an advertising agency in 1924. His writings include *Animal Education*, *Homing and Related Activities of Birds*, and *Behaviorism*.

Watson, William, English poet, was born in Yorkshire, 1858, and was educated in Liverpool. He first attracted attention in 1884 by his *Epigrams of Art, Life, and Nature*. Delicate but sure in workmanship and pleasingly reflective in tone, Watson's verse has won high rank in contemporary English poetry. His works include *Lyric Love*, *Eloping Angels*, *The Father of the Forest*, *The Purple East*, *The Year of Shame*, *The Heralds of the Dawn*, *The Muse in Exile*, and various other volumes of poems.

Watt, James, Scotch engineer and inventor, was born at Greenock on the Clyde, Scotland, January 19, 1736. He was educated mainly at the Greenock grammar school, which he was unable to attend regularly on account of poor health. He early showed an exceptional mechanical ingenuity and acquired skill in drawing and in carpentry.

In 1755, Watt placed himself under a maker of mathematical instruments in London. He went to Glasgow in 1756 and was soon employed by the university there in fitting up the instruments in the Macfarlane observatory. His constant intercourse with the professors of the university and his ready access to books enabled him to acquire a considerable knowledge of science.

During the winter of 1763-64, Watt repaired a working model of the Newcomen engine, kept for the use of the natural science class in the college. He was impressed with its contrivance, but he soon perceived its defects. It was worked by means of atmospheric pressure, steam being used only in producing, by its condensation, a vacuum in a cylinder into which a piston was forced by the pressure of the air. Watt found that about four-fifths of the steam, and consequently of the fuel, was wasted. At length, in 1765, he hit upon the expedient of the separate condenser. He did not rest content, but resolved to make steam his motive power. This done, he received a patent for his engine in 1769.

In 1774, Watt entered into partnership with Matthew Boulton at Soho, near Birmingham, and laid the foundation of one of the principal establishments in England for the construction of steam engines. He continued also to prosecute his scientific investigations. In 1782, he invented a double-acting engine, in which steam was admitted into the cylinder on each side of the piston alternately instead of on one side only. To his first three distinct inventions—the condenser, the employment of steam above and below the piston, and parallel motion—Watt later added the crank, the flywheel, and the governor. By 1785, his engine had become available for the most delicate, as well as for the most laborious, forms of industry.

Honors and affluence came to Watt as the inventor of the steam engine. He was made a fellow of the royal societies of Edinburgh and London in 1784 and 1785 respectively. The University of Glasgow gave him the degree of doctor of laws in 1806, and, in 1808, he was made a foreign member of the Institute of France. Died in Heathfield, England, August 25, 1819. See *Steam Engine*.

Watterson, Henry, American journalist and orator, was born at Washington, D. C., 1840. He was privately educated; entered journalism in Washington as a reporter; served in the Confederate army; and subsequently founded, 1868, the Louisville *Courier-Journal*. Under his brilliant editorship, this newspaper rose to foremost rank.

In 1876-77, Watterson was a member of Congress and, in 1876, was temporary chairman of the national Democratic convention. In other national conventions he was chairman of the platform committee, and he is said to be the author of the phrase "tariff for revenue only." He opposed Bryan and the Democratic platform of 1896 and the nomination of Wilson in 1912. In 1915, he denounced hyphenated Americans and advocated a vigorous foreign policy. He published a *History of the Spanish-American War*, *Oddities of Southern Life and Character*, *Abraham Lincoln*, and *The Compromises of Life*. Died, 1921.

Watts, George Frederick, English painter and sculptor, was born at London, 1817. He studied in the royal academy and later in Italy. Watts's art is didactic; many of his works symbolize the power of love and the danger of riches. His best paintings are in the Tate gallery, London. Among these are "Love and Life," of which a replica is in the White House, Washington; "Love and Death," "Love Triumphant," "Faith," and "Hope." Other well-known works from his brush are "Sir Galahad" and "Orpheus and Eurydice." Among his many noted portraits are those of Gladstone, Tennyson, Browning, Swinburne, Matthew Arnold, William Morris, Carlyle, Meredith, Leighton, Rossetti, and Burne-Jones. His sculpture is distinguished for its boldness and nobility of style. Died in 1904.

Watts, Isaac, English hymn writer and theologian, was born at Southampton, 1674. From 1696 to 1701, he was tutor in the family of Sir John Hartopp. He became minister of the independent church at Mark lane, London, 1702, resigning in 1712 because of ill health. Watts was a popular writer, and his theological works were numerous. His treatise on *Logic* became well known, but his reputation rests chiefly upon his hymns. Died in 1748.

Wayne, Anthony, American general, was born at Easttown, Pa., 1745. At the outbreak of the Revolutionary War, he raised a regiment of volunteers, of which he was

appointed colonel, and was sent on an expedition to Canada. He commanded at Ticonderoga until 1777, when he was made brigadier general and joined Washington in New Jersey; led the attack at Germantown; captured supplies for the distressed army at Valley Forge; distinguished himself at Monmouth; was defeated at Paoli; but achieved a brilliant victory in the storming of Stony Point, 1779. His courage and skill greatly assisted Lafayette in Virginia, 1780. He aided in the siege of Yorktown and commanded in Georgia. By his dash and audacity, he acquired the sobriquet of "Mad Anthony." He became major general and commander in chief in 1792. Died in 1796.

Webb, Sidney, English socialist writer and politician, was born in London, 1859. He was educated at private schools in London and Switzerland and at the City of London college. After seven years in the civil service, he was called to the bar in 1885. He was one of the early members of the Fabian society and became known as an exponent of socialism. In 1892, he married Beatrice Potter, a writer on sociology and economics, who thereafter was nearly always associated with her husband in authorship and socialist activities.

Webb became a member of the city council of London in 1892, was chairman of the technical educational board of London, and served on several government commissions concerned with economic conditions. In 1914, he was elected to the national executive of the Labor party, the constitution of which was remodeled closely in accordance with his views as expressed in his *Labour and the New Social Order*. He and his wife were active in founding the *New Statesman* and the London school of economics and political science. In 1923, he was elected to Parliament and, in 1924, became a cabinet member of Great Britain's first Labor government.

Besides several works published by himself, he is coauthor, with his wife, of *Industrial Democracy, The State and the Doctor, The Prevention of Destitution, English Prisons under Local Government*, and numerous other books looking toward economic and social reform.

Weber (*vā'bĕr*), **Ernst Heinrich,** German physiologist and anatomist, brother of Wilhelm Eduard Weber, was born at Wittenberg, 1795. Educated in medicine at Wittenberg and Leipzig, he was made professor of comparative anatomy at Leipzig, 1818; professor of human anatomy, 1821; and professor of physiology, 1840.

Weber made valuable discoveries in anatomy, but his fame rests chiefly upon his pioneer researches on the sense organs. His investigations upon the ear, upon the tactile senses, and upon what was then designated as the "space sense" initiated the experimental movement in psychology. His formula expressing the relation of sensation to intensity of stimulus, now universally known as Weber's law, was the first notable generalization in psychophysics. Died, 1878.

Weber, Karl Maria von, German composer, was born at Eutin, 1786. He early gave proof of musical talent; studied at Salzburg and Munich; and became director of the German opera at Dresden. His first great production was *Der Freischütz*, 1821, which established his fame. It was followed by his masterpiece, *Oberon*, produced in London in 1826. Weber founded the romantic school of German opera and exercised a profound influence upon Wagner. He wrote also some excellent piano and orchestral music and songs. Died, 1826. See *Freischütz, Der*; *Oberon*.

Weber, Wilhelm Eduard, German physicist, was born at Wittenberg, 1804. He was educated at Halle. In 1825, with his brother E. H. Weber, he began the publication of *Die Wellenlehre*. Weber became assistant professor of physics at Halle, 1827, and professor at Gottingen in 1831, but was removed for political reasons in 1837. He was professor of physics at Leipzig from 1843 to 1849, when he regained his former position at Gottingen.

Weber's most notable contribution to electrical science was the introduction of an absolute system of electrical units based on the work of Gauss in magnetism. In 1881, Weber's system, with some modifications, was adopted by the international electrical congress in Paris, and the values of the practical working units—the volt, the ampere, the coulomb, the farad—were defined. Died, 1891.

Webster, Daniel, American statesman, lawyer, orator, and publicist, was born at Salisbury, N. H., January 18, 1782. He gained the rudiments of education at home and was sent to Phillips Exeter academy in 1796; the next year he entered Dartmouth college, where he was graduated in 1801. He then began to study law in the office of Thomas Thompson of Salisbury, and, in 1805, he was admitted to the bar. He removed to Portsmouth, N. H., where he soon acquired distinction.

In 1812, he was elected as a Federalist to the House of Representatives. He was re-elected to the 14th Congress, which met in 1815 and in which he rendered important services in financial legislation. In 1816, he resolved to withdraw from public life and devote himself to his profession. He removed to Boston, where his reputation grew constantly, and he was soon the foremost lawyer of New England. He exhibited great skill in his presentation of important cases, and the effect of his arguments was enhanced by his deep-toned, musical, and powerful voice.

In 1820, Webster was a member of the convention that met to revise the constitution of Massachusetts, and, in December of the same year, he pronounced at Plymouth a memorable oration on the anniversary of the landing of the Pilgrims. In 1822, he was elected by the voters of Boston as a member of the Congress that met in December 1823, and he was subsequently re-elected by a nearly unanimous vote. Several of his famous patriotic orations belong to this period. Webster continued to serve in the House of Representatives until he was transferred to the Senate in 1827.

In January 1830, he made his great argument in defense of the Union and the Constitution. In September 1837, as a member of the Senate, he opposed the subtreasury bill in an elaborate speech, considered to have been the most effective of all his arguments on the subjects of finance and currency. In 1839, Webster visited France, Scotland, and England, where he particularly won the admiration of Carlyle.

President Harrison appointed Webster his secretary of state in 1841. Three years later, Webster was again returned to the Senate, as the successor of Rufus Choate. In December 1845, he made a speech against the admission of Texas as a slave state, and, in 1847, he declared that he was opposed to the prosecution of the Mexican war for the conquest of territory to form new states of the Union. He was again an unsuccessful candidate for presidential nomination in 1848.

As a result of his support of Clay's "compromise measures" in 1850, Webster was widely criticized by many of his admirers and by the opponents of slavery. Later in the same year, he became secretary of state under Fillmore. In 1852, his desire for the presidential nomination was again frustrated. Webster died at Marshfield, Massachusetts, October 24, 1852.

Webster, John, English dramatist, was born about 1580. Little of his life is known. He collaborated with a number of writers of the period, and then produced unaided, about 1610, the tragedy *The White Devil*, one of his masterpieces. *Appius and Virginia* followed, and, about 1616, Webster wrote his famous *Duchess of Malfi*. As a master of tragedy, Swinburne ranks Webster second only to Shakspere. Died about 1625.

Webster, Noah, American lexicographer, was born at Hartford, Conn., 1758. He graduated at Yale; was admitted to the bar in 1781; but devoted himself chiefly to literary work. While teaching at Goshen, N. Y., he prepared his *Grammatical Institute of the English Language*, the first part of which became known as *Webster's Spelling Book*. In 1889, it was estimated that more than 60 million copies of this spelling book had been printed.

In 1785, Webster published *Sketches of American Policy*, advocating the formation of a new constitution. In 1807, he produced *A Philosophical and Practical Grammar of the English Language* and commenced his *American Dictionary of the English Language*; but, upon finding difficulties in etymology, he devoted ten years to its study. He then began his dictionary anew and, in 1828, published this great work, which contained 12,000 more words and 40,000 more definitions than any earlier English dictionary. Webster was also a judge, a member of the state legislature, and one of the founders of Amherst college. Died, 1843.

Wedekind (*vā'dĕ-kĭnt*), **Frank,** German play writer, was born in Hanover, 1864. He first studied law, but soon devoted himself to writing. He traveled extensively; became a vaudeville performer, acting his own plays; and, in 1906, located in Munich.

Wedekind can be classed in no school of writers. He is an audacious iconoclast, defying morality, accepted beliefs, and established forms, yet possessing to a high degree the art of presenting life and character, of creating illusion, and of producing works of power and beauty. Among his plays are *Pandora's Box, The Dance of Death, The Love Potion, The Young World, Censorship, The Philosopher's Stone, Such is Life, The Awakening of Spring*, and *The Earth Spirit*. Died, 1918.

Wedgwood, Josiah, English potter, was born in Staffordshire, 1730. On account of the death of his father, also a potter, his schooling ended with his ninth year. After being apprenticed to his brother and later associated with a prominent potter of Fenton, he opened works of his own in Burslem in 1759 and soon began the manufacture of an improved cream-colored domestic earthenware, named queen's ware in honor of Queen Charlotte. After establishing the most successful business in domestic pottery known up to that time, he directed his attention to artistic pottery, using for his patterns and inspiration the classic examples newly recovered from Pompeii and Campania. The result was the famous Wedgwood ware.

Wedgwood was the most successful and original workman known in the history of pottery, and its whole subsequent manufacture has been influenced by his skill. One of his daughters was the mother of the naturalist Charles Darwin. Wedgwood died in 1795.

Weed, Thurlow, American journalist and political leader, was born at Cairo, N. Y., 1797. At 14, he was an apprentice in a printing office; established the *Agriculturist* in western New York; edited several other journals; and became famous as the editor, 1830–63, of the Albany *Evening Journal*, the organ of the Whig party. Here he became an acknowledged leader of the Whig and the Republican party, and had great influence in securing the nominations of Harrison, Clay, Taylor, Scott, and Frémont. He was a member of the powerful "political firm of Seward, Weed, and Greeley," which dominated politics in New York for many years. In 1865, he removed to New York City and became editor of the New York *Times* and afterward of the *Commercial Advertiser*. Died in 1882.

Weir, Julian Alden, American painter, was born at West Point, N. Y., 1852. He received his first instruction from his father and, after studying at the national academy of design, New York, spent three years in Paris, 1873–76, under Gérôme. He was one of the founders of the society of American artists, 1877, but, in 1898, seceded as one of the "ten American artists." In 1915, he succeeded J. W. Alexander as president of the national academy of design.

Weir won many important prizes and, in 1915, was elected a member of the American academy of arts and letters. His work includes portraits, genre and landscape pictures, and etchings. His "Portrait of a Young Girl" is in the Luxembourg museum, Paris, and other examples of his paintings are found in the leading American galleries. Died, 1919.

Weismann (*vīs'măn*), **August,** German biologist, was born at Frankfort on the Main, 1834. He studied medicine at Gottingen, and, in 1861, became physician to the archduke Stephen of Austria. From 1871 to 1912, he was professor of zoology at the University of Freiburg. During 1868–76 appeared a series of papers by him, which were translated in 1882 as *Studies in the Theory of Descent*. His *Essays upon Heredity and Kindred Biological Problems*, denying that characters acquired by the individual are transmitted to offspring, raised a notable biological controversy.

While many of Weismann's theories have been criticized as superscientific speculations, his contributions to philosophical biology were very important. He published also *The Evolution Theory* and many other works. Died in 1914.

Weizmann, Chaim, chemist and Zionist leader, was born in the province of Grodno, Russia, 1874, and was educated at Pinsk, Berlin, and Freiburg. He was a lecturer in chemistry at the University of Geneva and later was appointed as reader in biochemistry at Manchester university. In 1916–19, he was director of the British admiralty laboratories, in which capacity he was associated with many inventions of naval or military value. His devotion to Jewish interests was rewarded by his election to the presidency of the world Zionist organization.

Welch, William Henry, American pathologist, was born at Norfolk, Conn., 1850. He graduated from Yale and from the college of physicians and surgeons, New York, and studied also at Strasbourg, Leipzig, Breslau, and Berlin. He was professor of pathological anatomy at Bellevue Hospital medical college from 1879 to 1884, when he became professor of pathology at Johns Hopkins university. In 1901, he was made president of the board of directors of the Rockefeller institute for medical research and, in 1913, was elected president of the national academy of sciences. An eminent authority in bacteriology and pathology, he published *General Pathology of Fever, Biology of Bacteria, Infection and Immunity*, and *Bacteriology of Surgical Infections*.

Wellington, Arthur Wellesley, Duke of, British general, was born in Ireland, 1769. He completed his military education in the military college of Angers, France; entered the army as ensign in 1787; and became lieutenant colonel in 1793. While he fought with ability in Holland in 1794, he won his first fame in the Mahratta war in India, 1803.

In 1808, he commanded the first division of the British army sent out from Cork to assist in the expulsion of the French from Spain and Portugal. Throughout the peninsular campaigns, 1809–14, success crowned his efforts and the French were everywhere repulsed or vanquished, Napoleon's ablest marshals, Soult, Victor, Masséna, and Marmont, each suffering defeat. In 1814, he was created marquis of Douro and duke of Wellington.

When Napoleon escaped from Elba and again headed his army in France, the defense of Belgium was assigned to an army under Wellington and a Prussian army under Blücher. The battles of Ligny and Quatre Bras were followed on June 18, 1815, by the great battle of Waterloo, in which the power of Napoleon was finally crushed. When the allied armies evacuated France in 1818, the rulers of Russia, Austria, and Prussia created Wellington field marshal of their armies. In 1827, he succeeded the duke of York as commander in chief of the British army and, from 1828 to 1830, was prime minister of Great Britain. He died in 1852 and was buried under the dome of Saint Paul's cathedral.

Wells, Carolyn, American juvenile and humorous writer, was born at Rahway, N. J. In 1896, she published *At the Sign of the Sphinx*, which was followed by numerous books for children, as well as stories, sketches, parodies, and humorous verse. The titles of her works include *A Nonsense Anthology, Eight Girls and a Dog, Fluffy Ruffles, The Lovers' Baedeker, Rainy Day Diversions, The White Alley, Two Little Women, The Come Back*, and *The Mystery Girl*.

Wells, David Ames, American economist, was born at Springfield, Mass., 1828. He graduated at Williams college, 1847, and at the Lawrence scientific school, Harvard, 1851. He was for a time associate editor of the Springfield *Republican*.

His early interests were scientific and he published textbooks on physics, chemistry, and geology. Later he devoted himself to economics and finance, and was at first a defender of the protectionist policy but afterward an extreme advocate of free trade. His chief works are *Our Merchant Marine, A Primer of Tariff Reform, Practical Economics, The Relation of the Tariff to Wages, Recent Economic Changes*, and *The Theory and Practice of Taxation*. He died in 1898.

Wells, Herbert George, English novelist, was born at Bromley, Kent, 1866. He studied under Huxley, graduated at London university with high honors, and taught biology several years.

His scientific training and his contributions to the *Pall Mall Gazette* and the *Saturday Review* prepared him for writing a long series of books remarkable for weird adventure, scientific knowledge, and bold imagination. Beginning with fantastic romances, somewhat in the manner of Jules Verne, he rose to foremost rank among living British novelists. Most of his works bespeak sociological interests and indicate a hope of reforming human affairs in accord with present or future scientific knowledge.

Among his many works are *The Time Machine, The First Men in the Moon, The Invisible Man, Mankind in the Making, The Food of the Gods, A Modern Utopia, The Future of America, The War in the Air, Ann Veronica, The New Machiavelli, The Passionate Friends, The Research Magnificent, Mr. Britling Sees It Through, Joan and Peter*, and *Men Like Gods and Air Like Wine*. His *Outline of History*, an attempt to replace national histories by an account of the human race, was one of the most successful books of recent times.

Wells, Horace, American dentist, was born in Hartford, Vt., 1815. He studied dentistry in Boston and began practice there, but, in 1836, removed to Hartford, Conn. Here he conceived the idea of employing some means of preventing pain in dentistry and, in 1840, began experimenting with nitrous oxide, or laughing gas. After using nitrous oxide successfully in several cases in 1844, he proved its efficiency, at the Harvard medical school in 1845, being the first to demonstrate publicly the use of an anesthetic in surgical operations. After his return from Paris, where he communicated his discovery to French medical societies, he published in 1847 *A History of the Application of Nitrous Oxide Gas, Ether and Other Vapors to Surgical Operations*. Controversies regarding his discovery as well as experiments upon himself with chloroform affected his mind; and, in 1848, he committed suicide.

Welsbach (*vĕls'bäĸ*), **Karl Auer, Baron von,** Austrian chemist and inventor, was born in Vienna, 1858. He was educated at the universities of Heidelberg and Vienna and early devoted his attention to the study of the rare metallic earths.

In 1883, Welsbach began publishing the results of his researches, which he conducted for more than 20 years. While investigating certain metallic earths with the spectroscope, he found that, upon burning a thread soaked in a solution of their metallic salts, a replica of the original thread was left composed of the oxides of the metals and that it glowed brightly in the flame. From this fact he obtained the idea of using, for gas lighting, cotton fabric impregnated with rare earth salts. This resulted in the invention of the Welsbach incandescent light in 1885 and to the further great discovery that the presence of salts of the metal cerium gives to the mantle a marvelous illuminating power. His investigations added much to chemical knowledge concerning gadolinium, lanthanum, yttrium, thorium, cerium, and other rare metals. See *Welsbach Mantle*.

Wendell, Barrett, American educator and critic, was born at Boston, 1855. He graduated at Harvard and was appointed to the faculty in 1880. In 1898, he became professor of English there. His writings include *The Duchess*

Emilia, Rankell's Remains, Cotton Mather, William Shakespere, A Literary History of America, Raleigh in Guiana, The France of To-day, The Privileged Classes, and *The Mystery of Education.* He was elected to the American academy of arts and letters in 1916. Died, 1921.

Wendt (*wĕnt*), **William,** landscape painter, was born in Germany, 1865. He came to Chicago in 1880, received a public school education, and learned art without special training. His first successes, notably his paintings of wild-poppy fields and other typically Californian scenes, were the result of long sojourns on the Pacific coast. Later he painted in England and in France, and exhibited at the royal academy in London, at the Paris salon, and in leading American galleries. Settling in Los Angeles, he rose to high rank among American landscape artists. Representative works from his brush are "The Silence of the Night" and "When All the World is Young," in the art institute, Chicago; "Cañon Diablo"; "The Arcadian Hills"; "Wilderness"; and "Autumn Melody."

Wenley, Robert Mark, American philosophical scholar and educator, was born at Edinburgh, Scotland, 1861. He graduated at the University of Glasgow and studied in France, Italy, and Germany. He taught in Glasgow until 1896, when he became head of the department of philosophy at the University of Michigan. He was especially well known as an interpreter of Kant. His works include *Socrates and Christ, Aspects of Pessimism, Introduction to Kant, The Anarchist Ideal,* and *Stoicism and Its Influence.* Died, 1929.

Werner (*vĕr'nẽr*), **Alfred,** Swiss chemist, was born at Mulhausen, Alsace, 1866. He was educated at the Zurich polytechnic school and later studied under Berthelot in Paris. In 1895, he became professor in the University of Zurich. Werner's most important work was in connection with the theory of molecules. He developed the conception of a molecule in three dimensions and demonstrated that two compounds identical in composition might differ in structure and in properties. This theory led him to perform experiments resulting in the formation of many new synthetic compounds of a complex nature. He was awarded the Nobel prize for chemistry in 1913. Died, 1919.

Werrenrath, Reinald, American baritone operatic singer, was born in Brooklyn, N. Y., 1883. He was educated at New York university and studied music under various eminent instructors in America. He made his début in *Pagliacci* at the Metropolitan opera house, New York, in 1919, later appearing with marked success in recitals and oratorios in leading American cities. He collected and edited *One Hundred Modern Scandinavian Songs.*

Wesley, Charles, English clergyman and hymn writer, was born at Epworth, England, 1707, and was associated with his brother John in the Methodist movement. He studied at Christ Church, Oxford, visited Georgia with his brother, and took an active part in the subsequent work in England. He was a clear and simple preacher and a man of fervent piety. He wrote many hymns, which were published in two volumes. Some of them are among the most admired in the English language. Died, 1788.

Wesley, John, English preacher and founder of Methodism, was born at Epworth, Lincolnshire, England, June 17, 1703. When ten years of age, he was sent to school at the Charterhouse in London; at 17, he entered Christ Church college, Oxford; in 1725, he was ordained a deacon in the Church of England; and, in the following year, he was appointed Greek lecturer and moderator of the classics. In 1727, he obtained his M. A. degree and left Oxford to assist his father at Wroote. While serving there, he was advanced to priest's orders in 1728. He then returned to Oxford as a tutor and fellow of Lincoln college.

In 1735, Wesley accompanied General Oglethorpe to Georgia in order to preach as a missionary to the Indians and the colonists. On his return to England in 1738, already impressed with his own unworthiness and failure as a missionary, he became thoroughly convinced that he, who would have converted others, had not yet converted himself. Through the instruction of Bohler, a Moravian pietist, Wesley entered upon a session of prayer, and, on the evening of May 24, 1738, he became aware of a great change of religious feeling within him.

His first act after his conversion was to set out on a journey to the Moravian brotherhood at Herrnhut in Saxony. He returned, burning with enthusiasm, and began field preaching at Kingswood near Bristol. His purpose was to awaken the spirit of religion slumbering within the Church, and it was rather an order than a sect that he designed to found.

Wesley discovered that he differed widely from the Moravains on the doctrine of Christian perfection and the means of grace, and the ensuing controversy between them terminated in a complete breach. His dispute with Whitefield, occasioned by the latter's doctrine of predestination, soon followed. The first of the societies that later grew into the Methodist Church was formed in 1740. Two years later, the members were divided into groups of 12, each group having a leader who reported to Wesley on the conduct of the members and on the receipt of money. Thus originated the class meetings, which formed a characteristic feature of the new denomination.

In 1744, Wesley summoned the first conference of the Methodist preachers. The Annual Conference became thereafter the governing body of the Methodist societies. Wesley's evangelization extended from England into Ireland in 1749 and to Scotland in 1751. In the latter year, he married a widow named Vazeille, from whom he was ultimately separated in 1771.

Wesley opened a school at Kingswood chiefly for the education of the sons of preachers; he founded an orphans' home at Newcastle, charity schools in London, and a dispensary at Bristol. During his unparalleled apostolate he traveled 250,000 miles and delivered 40,000 sermons, yet he managed to do a prodigious amount of literary work also. Probably no man ever exerted a greater influence on the religious condition of the people of England, and the organization which he founded has spread to the remotest parts of the world. Died at London, March 2, 1791.

West, Andrew Fleming, American educator, was born at Allegheny, now part of Pittsburgh, Pa., 1853. He was graduated at Princeton university in 1883 and was immediately appointed professor of Latin. In 1891, he entered on the additional duties of dean of the graduate school, serving until 1928. He planned the graduate college at Princeton, which was opened in 1913. He is a well-known writer on university education and particularly on classical education. His published works include *Alcuin and the Rise of the Christian Schools, American Liberal Education,* and *Education and the War.*

West, Benjamin, American historical painter, was born at Springfield, Pa., 1738. He began to paint at an early age, worked in Philadelphia and New York, studied in Italy, 1760–63, and then settled in England. In 1792, he succeeded Sir Joshua Reynolds as president of the Royal academy. His paintings were very highly esteemed, and he exercised great influence as a teacher upon early American painters. Died, 1820.

Westinghouse, George, American inventor and manufacturer, was born at Central Bridge, N. Y., 1846. He served in the Union army, 1863-64; was assistant engineer in the United States navy, 1864-65; and then attended Union college to the end of his sophomore year. In 1868, he invented and successfully introduced the Westinghouse air brake, now in universal use. He made inventions in railway signals, steam and gas engines, steam turbines, and electrical machinery. He was the pioneer in introducing into America alternating-current machinery, which rendered possible the great development of water power for long-distance electrical transmission. Died in 1914. See *Air Brake.*

Wharton, Edith Newbold, née Jones, American novelist, was born in New York, 1862. She was educated privately and, in 1885, was married to Edward Wharton of Boston. Her first work of fiction, *The Greater Inclination,* 1899, was followed by a series of novels distinguished for subtle character analysis and for careful, finished style. Her works include *The House of Mirth, The Hermit and the Wild Woman, Artemis to Actæon, Tales of Men and Ghosts, Book of the Homeless, The Marne, Glimpses of the Moon, A Son at the Front, The Mother's Recompense,* and *The Writing of Fiction.*

Wheeler, Benjamin Ide, American educator and philologist, was born at Randolph, Mass., 1854. He graduated at Brown and Heidelberg universities. After three years spent as instructor at Brown and Harvard universities, he became professor of comparative philology at Cornell in 1886 and professor of Greek two years later. From 1899 to 1919, he was president of the University of California. His publications include *Dionysos and Immortality, Life of Alexander the Great,* and *Unterricht und Demokratie in Amerika.* Died, 1927.

Whistler, James Abbott McNeill, painter and etcher, was born in Lowell, Mass., 1834. He studied drawing and painting in Petrograd and Paris, and, in 1863, he settled in London. In 1878, Whistler sued Ruskin for libel as a result of criticisms contained in the latter's *Foris Clavigera.* He obtained as damages one farthing and thereafter always wore the coin as a watch charm.

Whistler occupies a unique position in the development of art, embodying something of all the modern tendencies but remaining independent of them. He was a fine draftsman and a master of color value, resembled the Japanese in decorative quality, and imbued his work with subtle, dreamy, unreal effects. He won great distinction also as an etcher. He possessed a gift for keen satire, which he used unsparingly in debates with art critics. His most celebrated painting, "Portrait of My Mother," is in the Luxembourg, Paris. Of almost equal merit is his portrait of Carlyle, now in Glasgow. Died, 1903. See *Painting.*

White, Andrew Dickson, American educator and diplomat, was born in Homer, N. Y., 1832. He graduated at Yale in 1853 and studied later at the University of Berlin. He was professor of history and of English literature at the University of Michigan from 1857 to 1863. In 1867, he became the first president of Cornell university, to which he gave $300,000 and a historical library of 30,000 volumes. He resigned the presidency in 1885. At different periods, he served as minister to Petrograd and as minister, and later ambassador, to Berlin. His published works include *Warfare of Science with Theology, The New Germany, Seven Great Statesmen in the Warfare of Humanity with Unreason, The Work of Benjamin Hale,* and an autobiography. He was made a member of the American academy of arts and letters in 1908. Died, 1918.

White, Gilbert, English naturalist, was born at Selborne, Hampshire, 1720. In 1743 he graduated at Oriel college, Oxford. Ordained in 1747, he became curate at Swarraton and later at Selborne and at Faringdon, a nearby parish. He spent his life in pastoral duties and in the study of nature. His charming *Natural History and Antiquities of Selborne* is an English classic, admired alike by masters of science and of literature. Died, 1793.

White, Stanford, American architect, son of Richard Grant White, was born in New York City, 1853. He was educated privately, studied architecture under C. D. Gambrill, and later worked under H. H. Richardson, being the latter's chief assistant in erecting Trinity church, Boston. In 1879, he became a member of the firm of McKim, Mead, and White. White designed Madison Square garden, Madison Square Presbyterian church, Washington arch, and buildings of New York university, New York; buildings of the University of Virginia; pedestals and settings for numerous statues; and many private residences. He was killed by H. K. Thaw in 1906.

White, Stewart Edward, American author, was born in Grand Rapids, Mich., 1873. He graduated at the University of Michigan, 1895, and studied law at Columbia. In 1901, he published *The Westerners.* He became a frequent contributor to magazines. His works include *The Blazed Trail, The Forest, The Silent Places, The Mountains, Arizona Nights, The Leopard Woman, The Rose Dawn, Daniel Boone,* and *Skookum Chuck.*

White, William Allen, American journalist and author, was born at Emporia, Kans., 1868, and was educated at Emporia college and at the University of Kansas. Devoting himself to journalism, he became, in 1895, editor and proprietor of the Emporia *Gazette,* which he made notable among the small papers of the United States. His "What's the Matter with Kansas?," published in 1896, was widely reprinted and, with other virile, picturesque editorials, gave him a national reputation. His writings include *The Real Issue, The Court of Boyville, In Our Town, A Certain Rich Man, God's Puppets, In the Heart of a Fool,* and biographies of Woodrow Wilson and Calvin Coolidge.

Whitehill, Clarence Eugene, American baritone, was born at Marengo, Iowa, 1871, and received his education in the public schools. He studied music under L. A. Phelps in Chicago and later under Giraudet and Sbriglia in Paris. Having made his début in opera as Friar Lawrence in Gounod's *Romeo and Juliet* at Brussels, 1900, he returned to Paris and appeared at the Opéra Comique in *Lakmé.* In 1903, he went to Germany, where he remained several years. In 1909, he made his first appearance in New York as Amfortas in *Parsifal,* and has since sung with notable success in the leading opera houses of America.

Whitlock, Brand, American municipal reformer, diplomat, publicist, and novelist, was born at Urbana, Ohio, 1869. He was educated in the public schools and at an early age entered journalism. Later he studied law and, in 1894, was admitted to the bar, establishing a successful practice in Toledo. He became widely known for his vigorous writings exposing corrupt political and unfair economic conditions. He was four times elected mayor of Toledo. In 1913 he was appointed minister to Belgium.

Following the outbreak of the World War, 1914, Whitlock achieved international reputation for tact, vigor, and efficiency in handling problems of great difficulty, and notably facilitated the work of Belgian relief. His writings include *Her Infinite Variety, Abraham Lincoln, The Gold Brick, The Enforcement of Law in Cities, Memories of Belgium under the German Occupation, J. Hardin & Son,* and *Uprooted.*

Whitman, Walt, American poet, was born at West Hills, L. I., 1819. He learned the printing trade, taught school, and wrote for newspapers and magazines. Later he was a newspaper publisher and editor, practiced carpentry, built and sold houses, and traveled extensively on foot.

In 1855 appeared his first collection of *Leaves of Grass,* to the elaboration of which chiefly he devoted the remainder of his life. This work attracted attention first as a result of Emerson's recognition of its merit. It is largely unmetrical, but, for richness of poetic imagination, some of it is unexcelled in American literature. His *Drum Taps,* 1865, recalls the poet's experiences while an army nurse at Washington in the Civil War period.

Although a glorification of democracy and of the average man, Whitman's poetry has not been popular, mainly on account of its express defiance of literary and other conventions. He has long been recognized, however, by European and other critics as one of the outstanding figures in American literature. Died, 1892.

Whitney, Eli, American inventor, was born in Westboro, Mass., 1765. He graduated at Yale, 1792; went to Georgia; and, for a time, read law, while living on the plantation of the widow of Nathanael Greene. Here he invented the cotton gin, from which, however, he realized but little financial profit on account of expensive litigation growing out of the claims of imitators and general disregard of his patents in the Southern states. The Carolinas voted him a moderate compensation. Between 1791 and 1803, the cotton exports were multiplied by 200, largely as a result of the use of Whitney's gin.

In 1798, he became successfully engaged in the manufacture of firearms at factories which he established at Whitneyville, near New Haven, Conn. Died, 1825, and was elected to the American hall of fame in 1900.

Whittier, John Greenleaf, American poet, was born of Quaker parents at Haverhill, Mass., 1807. He learned the shoemaking trade, but early began to write for the press. In 1831, he published his first work, *Legends of New England,* in prose and verse. After editing several papers, he went to Philadelphia to edit the *Pennsylvania Freeman,* an Antislavery paper, the office of which was burned by a mob, 1838. In 1840, he settled at Amesbury, Mass.

Distinguished by simplicity and sincerity, Whittier ranks with the foremost American poets. Among his best-known poems are "Barbara Frietchie," "The Barefoot Boy," "Maud Muller," "The Eternal Goodness," "The Pipes at Lucknow," and some that have been set to music as hymns. Died, 1892; elected to the American hall of fame in 1905.

Wiclif (*wĭk'lĭf*), **John,** English religious reformer, was born probably near Richmond, in Yorkshire, about 1320. Studying first at Oxford, he attained a high reputation in theology and logic. He was made master of Balliol and warden of Canterbury hall. Taking orders, he became rector of neighboring parishes and later was made king's chaplain.

Wiclif insisted boldly on the right of the individual to form his own opinions on the basis of Scripture and reason. Attacking the abuses of the Church, he was condemned as a heretic. He suffered no harm, however, since he had made himself the champion of the nation in providing a logical ground for refusing dues claimed by the pope, then residing in France.

He devoted himself to translating the Scriptures, and the Wiclif Bible was the first complete translation of the book into English. Copies of the translation were expounded by followers of Wiclif, who were known as Lollards. Their doctrines were later carried to Bohemia and bore fruit in the teaching of Huss and Jerome. Wiclif is often called the morning star of the Reformation. Died, 1384.

Wieland (*vē'lănt*), **Christoph Martin,** German poet, was born near Biberach, Wurttemberg, 1733. He studied at Tubingen and at Zurich, returning to Biberach in 1760. In 1767, he published the partly autobiographical novel *Agathon,* which did much to establish his literary reputation. After attaining a professorship at Erfurt, 1769, he wrote *Der goldene Spiegel,* a philosophical novel, which so pleased the duchess of Weimar that she made him tutor to her sons, 1772. With Goethe, Herder, and Schiller, Wieland was a member of the notable group which for decades made Weimar the Athens of Germany. His numerous works include also *Geron der Adelige; Oberon,* his best-known epic; and *Die Abderiten.* Died, 1813.

Wieland, Heinrich, German chemist, was born at Pforzheim, Baden, in 1877. He was educated at the universities of Munich, Berlin, and Stuttgart. He taught chemistry at the University of Munich from 1901, becoming professor of organic chemistry in 1917. For his investigations in fermentation he was awarded the Nobel prize in chemistry for 1927.

Wien (*vēn*), **Wilhelm,** German physicist, was born at Gaffken, near Fischhausen, East Prussia, 1864. Educated at the universities of Gottingen, Heidelberg, and Berlin, he became an instructor at the University of Berlin, 1892; professor in the technical high school at Aachen, 1896; professor of physics at Giessen, 1899; and, in 1900, professor at the University of Wurzburg. His published works include *Electrodynamik, Kathoden- und Röntgenstrahlen,* and *Positive Strahlen.* For his researches in radioactivity, he was awarded the Nobel prize for physics, 1911. Died, 1928.

Wiggin, Kate Douglas, American author, was born in Philadelphia, Pa., 1859. She graduated at Abbott academy, Andover, Mass., 1878, and went to California, where she became a successful teacher and organized the first free kindergartens on the Pacific coast. In 1880, she was married

to S. B. Wiggin, a California lawyer, who died in 1889. Following her marriage to G. C. Riggs, 1895, she resided in New York and Maine.

Her first literary success was *The Birds' Christmas Carol*, 1888. Other widely popular stories followed, including *A Cathedral Courtship*, *Penelope's English Experiences*, *The Diary of a Goose Girl*, *Rebecca of Sunnybrook Farm*, *Mother Carey's Chickens*, *Penelope's Postscripts*, and *Homespun Tales*. She wrote her autobiography, *My Garden of Memory*, shortly before her death in 1923.

Wilberforce, William, English statesman and philanthropist, was born at Hull, 1759. He was educated at Saint John's college, Cambridge, and, at 21, entered Parliament as the representative of his native town. His Parliamentary career lasted until 1825. In 1789, he first proposed in the House of Commons the abolition of the slave trade, and, with the aid of Charles James Fox, this measure was carried in 1807. He afterward devoted himself to a movement for the extinction of slavery, the bill being finally passed a few days before his death in 1833. He was buried in Westminster Abbey.

Wilbur, Ray Lyman, American educator and physician, was born at Boonesboro, Iowa, 1875. He graduated at Stanford university and at the Cooper medical college, continuing his studies later at Frankfort on the Main, London, and Munich. After several years spent as instructor, he was appointed assistant professor of physiology at Stanford university in 1900 and became professor of medicine in 1909. He was dean of the School of medicine from 1911 to 1916, when he was made president of the university. In 1929, he was made secretary of the interior in President Hoover's cabinet.

Wilde, Oscar O'Flahertie Wills, British dramatist, essayist, and poet, was born in Dublin, 1856. After distinguishing himself in the classics at Trinity college, Dublin, he went to Oxford in 1874 and made a brilliant intellectual record. While at Oxford he was the leader of the so-called æsthetic movement, which emphasized the "art for art's sake" dictum of Whistler. He was satirized for this activity in the character Bunthorne in Gilbert and Sullivan's *Patience*.

Beginning in 1884, he devoted his attention to writing poetry, essays, stories, and plays. In 1888, he produced a volume of charming fairy tales entitled *The Happy Prince*, which was followed by *The House of Pomegranates* and by *The Picture of Dorian Gray*, a novel of sparkling literary cleverness. His poetic plays *The Duchess of Padua*, *A Florentine Tragedy*, and *Salomé* contain some good poetry; but his chief contribution to literature consists of the prose comedies *Lady Windermere's Fan*, *A Woman of No Importance*, and *The Importance of Being Earnest*. For ingenuity, cleverness, and wit these plays are unsurpassed in modern times. His *Ballad of Reading Gaol* and *De Profundis* are the literary result of two years spent in prison after conviction on a charge of immorality. Died, 1900.

Wilhelmina (*vĭl'hĕl-mē'nä*), **Helena Pauline Maria,** queen of the Netherlands, was born at The Hague, 1880. She succeeded to the throne of the Netherlands on the death of her father in 1890, although she did not become of legal age until 1898, when she was crowned queen. In 1901, she married Duke Henry, youngest son of the grand duke of Mecklenburg Schwerin. Queen Wilhelmina is the fourth in the list of sovereigns of the Netherlands of the house of Orange since the reconstruction of the kingdom by the Congress of Vienna in 1814-15.

Wilkes, Charles, American naval officer and explorer, was born in New York City, 1798. Entering the navy as a midshipman, 1818, he rose until, in 1830, he became head of the department of charts and instruments. From 1838 to 1842, he commanded, and later wrote an account of, an important exploring expedition, during which he visited the antarctic regions, many groups of islands in the Pacific, and the coasts of California and Oregon.

During the Civil War, he commanded the sloop *San Jacinto*. On Nov. 8, 1861, he stopped the British mail steamer *Trent* and removed the two Confederate envoys, Mason and Slidell, thereby precipitating the Trent affair. Wilkes was made commodore in 1862 and retired, 1866, as rear admiral. His publications include *Western America* and *The Theory of the Winds*. Died, 1877. See *Trent Affair*.

Wilkins, Mary E. See *Freeman, Mary Eleanor Wilkins*.

Willard, Emma Hart, American educator, was born at Berlin, Conn., 1787. She was educated at Hartford academy and, in 1809, married Dr. John Willard. She established a girls' boarding school at Middlebury, with improved methods of teaching. In 1821, partly with state support, she established at Waterford, N. Y., a girls' seminary, which was afterward removed to Troy and became well known as the Troy female seminary and later as the Emma Willard school. In 1830, she traveled in Europe, and, by her efforts, a school for the training of women teachers was founded in Greece. Among her books are *History of the United States*, *Universal History in Perspective*, *Last Leaves of American History*, and a book of poems, of which the best known is "Rocked in the Cradle of the Deep." Died, 1870. She was elected to the American hall of fame in 1905.

Willard, Frances Elizabeth, American educator and reformer, was born in Churchville, N. Y., 1839. After some years spent in teaching, she became professor of æsthetics in Northwestern university and was made dean of the woman's college in 1871. She began active temperance work in 1874 as secretary of the national woman's Christian temperance union; in 1879, she was made president of that organization, and held the office for nearly 20 years. She founded the world's woman's Christian temperance union in 1883 and, in 1888, became its president.

She was an orator of great eloquence, humor, and power, possessing marked executive ability and a genius for organization. Besides many magazine articles and pamphlets, her writings include *Woman and Temperance* and *Glimpses of Fifty Years*. Died, 1898, and was elected to the American hall of fame in 1910. See *Woman's Christian Temperance Union*.

William I, commonly called "the Conqueror," former king of England, was born in Normandy, 1027. He was the illegitimate son of Robert the Devil, duke of Normandy, and succeeded to the dukedom in 1035. He laid claim to the sovereignty of England on the death of Edward the Confessor, claiming title to it under the will of that monarch. In 1066, he defeated and slew Harold II at the battle of Hastings and was crowned king of England in Westminster Abbey.

During his reign the feudal system was developed in England, the forest and game laws were introduced, and the large district of country now called the New Forest was laid waste in order to provide the king with a hunting ground. Possessed of remarkable ability, he ruled strictly, kept excellent order, and won success by his own exertions. He died while waging war with Philip I of France, 1087.

William I, called "the Silent," prince of Orange and count of Nassau, founder of the Dutch republic, was born in Dillenburg, 1533. At the age of 15, he became page to the emperor Charles V, who, in 1555, promoted him to the command of the Imperial army on the French frontier.

William opposed Philip's persecution of the Protestants in the principality of Orange, the government of which he had inherited, and in several provinces, of which he had become stadholder. He was compelled to flee to Germany on the approach of Philip's representative, the duke of Alva, who seized William's property and took his son to Spain as a hostage.

William joined the Huguenots in France, and, in 1572, several Dutch cities chose him as their prince to defend them against the Catholic monarch Philip. The massacre of Saint Bartholomew and numerous Spanish victories drove William to desperate straits, and he was able to save Leiden for the Protestant cause only by cutting the dikes, thus permitting a relieving fleet to approach the besieged city. In 1576, five provinces that had been loyal to Spain joined William, but, in 1578, their forces were defeated at Gembloux by Alva's successor, John of Austria. The Walloon provinces were detached from the Protestant cause, but, in 1579, a league formed that successfully defended itself against Spain. It comprised the provinces of Holland, Zealand, Utrecht, Friesland, Gelderland, Groningen, and Overyssel. These provinces declared their independence in 1581 and were later organized as the Dutch republic.

William is known as one of the earliest champions of religious toleration. His piety and integrity were unquestioned, and his sagacity and persevering courage made him a leader in one of the most desperate enterprises that ever led to the foundation of a nation. A price of 25,000 crowns was placed on his head by Philip of Spain, and he was assassinated in 1584.

William I, king of Prussia and emperor of Germany, was born in 1797. He joined the army at an early age, and was engaged in the campaigns of 1813-14 against France. On the coronation of his brother Frederick William IV in 1840, he became governor of Pomerania, and afterward sat in the Prussian diet, where he vigorously supported the Absolutist party. In consequence, he was so disliked by the people that, on the outbreak of the revolution of 1848, he fled to England, though he returned some months later and was elected to the National Assembly.

In 1857, William was commissioned regent, and, in 1861, he ascended the throne. He found in Bismarck an able minister who could rule without a Parliamentary majority. In the Franco-Prussian war, 1870-71, William commanded at the decisive battles of Gravelotte and Sedan and, in 1871, was proclaimed emperor of Germany in the palace at Versailles. He died in 1888.

William II, Friedrich Wilhelm Viktor Albert, emperor of Germany, eldest son of Frederick III and Victoria, princess royal of England, was born in 1859. Upon succeeding his father in 1888, he took much interest in social questions, and his strong initiative in political affairs brought about the dismissal of Prince Bismarck in 1890. His ability and aggressiveness did much to place Germany

in the foremost rank of the world powers. His grandiose and militant speeches, on the other hand, did much to foster sentiments which made it easy to precipitate the World War. His support of Austrian aggression against Serbia in 1914 and his flagrant violation of Belgian neutrality were among the most effective causes of that stupendous conflict. On the defeat of Germany and the resulting revolution in 1918, William fled to Holland, where he remained in retirement as a political refugee.

William III, former king of England, was born at The Hague, 1650. He was the posthumous son of William II of Orange and, through his mother, was a grandson of Charles I of England. In 1678, being then stadholder of Holland, he went to England, and married Mary, a daughter of the duke of York, afterward James II. In 1688, he landed with a Dutch army at Torbay, in Devonshire, and was soon after invited by the English Parliament to accept the throne which James had vacated. In April 1689, he was crowned, together with his wife, Mary, with whom he reigned jointly until her death in 1694. In 1690, he defeated James at the battle of the Boyne. He afterward engaged in a war with France, which was brought to a close by the Treaty of Ryswick, 1697. He died in 1702.

Williams, Sir George, founder of the Young Men's Christian Association, was born in Somersetshire, England, 1821. In 1841, he began work for a London dry goods firm. Two years later, he induced some of the employees to hold prayer meetings at regular intervals. In June 1844, he, with eleven others, formed a society under the name of Young Men's Christian Association, and to Williams belongs the chief credit for its organization. After serving as treasurer of the society from 1863 to 1885, he was made president. He also became head of the firm of Hitchcock, Williams and Company, whose employ he had entered in 1841. In 1894, he was knighted. Died, 1905.

Williams, Roger, English colonist and founder of Rhode Island, was born probably in London about 1604. He was educated at Cambridge and was ordained a clergyman of the Church of England; but, having embraced Puritan views, he emigrated to New England in 1631 and was assistant pastor at Plymouth from 1631 to 1633, when he became pastor at Salem.

For his insistence on religious liberty, he incurred the opposition of the government; was banished from the colony in 1635; and, in 1636, founded Providence, R. I., with a government based on complete toleration. Here, with eleven others, he founded the first Baptist Congregation in America, 1639. The uniform justice and kindness with which he treated the Indians is frequently referred to in the records of the time. His chief written work is *The Bloudy Tenent of Persecution for Cause of Conscience Discussed.* Died, 1683.

Willingdon, Freeman Freeman-Thomas, Viscount, British administrator, was born in 1866. He was educated at Eton and Cambridge with a political career in view. Elected to Parliament in 1900, he became junior lord of the treasury in 1905, serving until 1912, when he was made governor of Bombay. He occupied the governorship of Madras from 1919 to 1924 and, in 1926, he was made governor-general of Canada in succession to Lord Byng of Vimy.

Williston, Samuel Wendell, American paleontologist, was born in Boston, 1852. He graduated at Kansas agricultural college in 1872 and later at Yale university, where he was professor of anatomy from 1886 to 1890. He was professor of historical geology and anatomy and dean of the medical school, University of Kansas, from 1890 to 1902, when he was made professor of paleontology at the University of Chicago. By his researches and discoveries in reptilian paleontology, Williston attained an international reputation. His writings include *Manual of North American Diptera* and *Water Reptiles of the Past and Present.* Died, 1918.

Willstätter (*vĭl'stĕt-ẽr*), **Richard,** German chemist, was born in Karlsruhe, Baden, 1872. He was educated at the University of Munich, where he studied chemistry under von Baeyer and became assistant professor. In 1905, he was made professor in the Zurich technical school. In 1912, he was appointed fellow in the Kaiser Wilhelm institute and honorary professor in the University of Berlin. For notable researches in complex organic compounds, particularly the coloring substances of plants, he was awarded the Nobel prize for chemistry for 1915.

Wilson, Alexander, American ornithologist, was born at Paisley, Scotland, 1766. Coming to the United States, 1794, he taught school until 1802. Settling near Philadelphia, he became acquainted with the naturalist William Bartram and determined to illustrate the ornithology of the United States. In 1804, he traveled through the wilderness to Niagara, making collections, and described the journey in a poem entitled *The Foresters.* From 1808 until his death, Wilson published seven volumes of *American Ornithology.* He ranks with Audubon among the founders of American ornithology. Died, 1813.

Wilson, Allen Benjamin, American inventor, was born in New York, 1824. His trade was that of cabinetmaker; but he turned his attention to the problem of mechanical sewing. In 1849, he constructed a sewing machine which contained a device by means of which the material was carried forward by a feeding plate, so that an endless seam could be made at any curve. In 1850, he notably improved this feature by the principle of the now universally used four-motion feed. At this time he added also the rotary hook and the stationary bobbin. During the same year, he began the manufacture of sewing machines at Bridgeport, Conn. Died, 1888. See *Sewing Machines,* page 1330.

Wilson, Charles Thomas Rees, British physicist, was born at Glencorse, Scotland, in 1869. He was educated at Cambridge university, where he became a fellow and spent over 30 years investigating problems of atmospheric electricity. He was made Jacksonian professor of natural philosophy at Cambridge in 1925 and received one-half the Nobel prize in physics for 1927.

Wilson, James, American agriculturist, was born in Ayrshire, Scotland, 1835. He came to the United States in 1851 and, in 1855, went to Tama county, Iowa, and engaged in farming. He rose to prominence as a member of the Iowa legislature and of Congress and lectured six years at Iowa agricultural college. In 1897, he was appointed secretary of agriculture, and served continuously for 16 years. During his administration a national forest policy and a system of soil survey were inaugurated, and the work and influence of the department notably expanded. Died, 1920.

Wilson, (Thomas) Woodrow, American educator, publicist, historian, statesman, and 28th president of the United States, was born at Staunton, Va., in 1856. He graduated from Princeton university in 1879, and later studied at the University of Virginia and at Johns Hopkins university. He practiced law in Atlanta, Ga., in 1882-83; became associate professor of history and political economy at Bryn Mawr college in 1885; held a similar chair at Wesleyan university from 1888 to 1890; and, in the latter year, was appointed professor of jurisprudence and political economy at Princeton. He was made president of the university in 1902 and continued to act until 1910, when he entered politics and was elected governor of New Jersey for the term 1911–1913. In 1912, he was elected Democratic president of the United States, and was re-elected in 1916.

Presidential Administration. In his administration, Wilson frequently appeared in person to address joint sessions of Congress on matters of importance, thus reviving a custom long in disuse. He enjoyed at first a marked personal ascendancy in Congress. Three amendments to the Constitution were made in his terms of office—the 17th, providing for the direct popular election of senators; the 18th, or Prohibition amendment; and the 19th, extending the right of suffrage to women. Other important events of his administration were the Underwood Tariff act, the Clayton Antitrust law, the establishment of the Federal Reserve banks, the repeal of the Panama Canal tolls, the Workman's Compensation act, the Eight-hour Railway Wage law, the Federal Child Labor law, the purchase of the Virgin islands, a punitive expedition into Mexico, and the participation of the United States in the World War.

Part in World War. Although Wilson made world peace his ideal and was awarded the Nobel peace prize for 1919, yet, by the force of events, he became, with Lincoln, one of the two great war presidents. On the outbreak of the war in 1914, he adopted a policy of strict neutrality. Continued provocation on the part of Germany, especially the sinking of the *Lusitania* in 1915 and the prosecution of unrestricted submarine warfare in direct violation of promises made to the United States government, roused public indignation and led to America's declaration of war against Germany. Wilson at once took steps to unify and centralize all services looking to the efficient prosecution of hostilities. At the same time, by his vigorous idealistic leadership, he rallied the national spirit to a point of effective enthusiasm seldom paralleled in the history of a great nation. He stated in his celebrated fourteen points the general terms on which America would be willing to cease hostilities, and, when the Germans were defeated in 1918, their government appealed to Wilson regarding terms for an armistice. The Allies agreed, with certain reservations, to grant an armistice on the basis of the fourteen points.

Efforts for Enduring Peace. Wilson went to Paris in 1919 to help negotiate the Treaty of Versailles, to which, mainly through his influence, was attached the covenant of the League of Nations. Wilson is thus to be regarded as the chief founder of the League of Nations, although, on his return to Washington, he found Congress unwilling to join the league or to ratify the treaty. He appealed for popular support, setting out on a speaking tour through the country; but his strength had been overtaxed by his efforts of the preceding years, and, in September 1920, he suffered a collapse, from which he never completely recovered. The

Democratic candidate for president in 1920, who supported Wilson's policy, was decisively defeated.

Among the published works of Woodrow Wilson are *A History of the American People*, *The New Freedom*, and *International Ideals*. He was elected to the American academy of arts and letters in 1908. Died, 1924. In his honor was organized, in 1922, the Woodrow Wilson foundation, which awards annually a peace prize of $25,000.

Winthrop, John, first governor of Massachusetts colony, was born at Edwardston, Suffolk, England, 1588. He attended Trinity college, Cambridge, 1602–04; became a lawyer; and, in 1626, was appointed attorney in the court of wards and liveries.

When, in 1629, the London proprietors of the Massachusetts Company decided to transfer the seat of government to the New World, they chose Winthrop governor. In 1630, he arrived at Salem, Mass., with eleven ships and 900 colonists, removing soon afterward to Charlestown and thence to Boston, which they founded in the same year. He was governor for a total of about 12 years and exercised a powerful influence. His *Journal* is one of the most important sources of early American history. Died, 1649.

Wirt, William Albert, American educator, was born at Markle, Ind., 1874. He graduated from DePauw university and studied also at the University of Chicago. After investigating educational methods in France, Germany, Belgium, and England, he became, in 1899, superintendent of schools at Bluffton, Ind., and, in 1907, at Gary, Ind.

He developed educational methods known as the Gary system, among the chief features of which are the economical use of the school plant, which is kept open evenings, Saturdays, and part time during vacations; combination of elementary and high schools in the same building; and provision for recreation and social centers for parents. The system or modifications of it were introduced into many schools in the United States and Canada.

Wise, Stephen Samuel, Jewish rabbi, was born at Budapest, Hungary, in 1872. Coming to America at an early age, he studied in the College of the City of New York and, in 1901, graduated from Columbia university. He was a pastor of synagogues in New York and Portland, Oreg., until 1907, when he founded, and became rabbi of, the free synagogue in New York. He founded the Oregon State conference of charities and correction and is the founder of the first section of the federation of American Zionists. For many years he has been a leader of American liberal thought and an outstanding figure in charitable enterprises. His works include *How to Face Life* and *Child versus Parent*.

Wissler, Clark, American anthropologist, was born in Wayne county, Ind., 1870, and was educated at Indiana and Columbia universities. He was a lecturer or assistant in Columbia university for some years following 1901 and, in 1906, became curator of the American museum of natural history. From 1924 he was also professor of anthropology at Yale university. He wrote *The American Indian* and *Man and Culture*.

Wister, Owen, American author, was born in Philadelphia, Pa., 1860. He graduated from Harvard, studied law, and was admitted to the bar in 1889. Beginning in 1891, he devoted himself chiefly to literature and won wide popularity by his stories, particularly those descriptive of Western life. Besides short stories and verse, his writings include *Red Men and White*, *The Virginian*, *Benjamin Franklin*, *Members of the Family*, *Padre Ignacio*, *The Pentecost of Calamity*, and *Indispensable Information for Infants*. He was elected a member of the American academy of arts and letters in 1912. See *Virginian, The*.

Witherspoon, Herbert, American basso, was born at Buffalo, N. Y., 1873. He graduated at Yale, 1895, and studied harmony and musical theory under Horatio Parker at Yale and under MacDowell in New York. After studying singing with M. Treumann and W. J. Hall, New York, he appeared as soloist with the New York symphony orchestra, 1896. Continuing vocal study in Paris, he made his operatic début, 1898, as Ramfis in *Aïda*. In 1908, Witherspoon became a member of the Metropolitan Opera Company, appearing chiefly in Wagnerian rôles. He later opened a school of singing in Chicago.

Witte (*vĭt'ĕ*), **Sergei Yulievitch, Count,** Russian statesman, was born at Tiflis, 1849. He was educated at Odessa, entered the railway administration, and first gained distinction by his clever organization of the transport of troops in the war of 1877-78.

Becoming known as an expert in railroad finance, he was made minister of means of communication in 1892 and later, as minister of finance, was chiefly instrumental in securing funds for building the Trans-Siberian railroad. In 1903, he was made president of the committee of ministers; was one of the Russian plenipotentiaries in the negotiations for peace with Japan in 1905; and was afterward appointed the first prime minister of Russia. He resigned in 1906. His writings include *The Principles of Railway Rates* and *Friedrich List, Economist*. Died, 1915.

Wöhler (*vû'lĕr*), **Friedrich,** German chemist, was born near Frankfort on the Main, 1800. He studied at the universities of Marburg and Heidelberg; worked under Berzelius at Stockholm; and, in 1836, became professor of chemistry at Gottingen.

Wöhler is rightly regarded as one of the founders of organic chemistry. In 1828, by laboratory methods, he produced urea, the first organic compound made artificially without the agency of life. He discovered isomerism, and the nickel industry was founded through his invention of a process for producing the pure metal on a large scale. He was the first to produce calcium carbide (1862), from which acetylene is made. Died, 1882.

Wolfe, James, English general, was born in Westerham, Kent, 1727. His first service was in Flanders, where he took part in the famous battle of Dettingen; in Scotland, he was in the battles of Falkirk and Culloden. His skill and bravery at the attack of Louisburg, 1758, won him the title of "hero of Louisburg." In the final effort to drive the French out of Canada, Pitt gave the command of the invading army to Wolfe. His successful attack on Quebec, September 13, 1759, was one of the most famous exploits in Canadian colonial history. Though defeated in his first attempt, he scaled the cliffs with his army by night, and died in the moment of victory, while his brave antagonist, Montcalm, dying too, said, "It is a great consolation to have been vanquished by so brave an enemy."

Wollaston (*wo͝ol'a-stŭn*), **William Hyde,** English chemist and natural philosopher, was born at East Dereham, Norfolk, 1766, and was educated at Cambridge. He discovered how to work platinum on a practical scale and first detected the metals palladium and rhodium. He was the first to observe the dark lines in the solar spectrum, 1802. In 1809, he invented the reflecting goniometer and, in 1812, the camera lucida. He furnished the "Wollaston doublet" to microscopists and adapted concavo-convex lenses for oculists' use. Died, 1828.

Wolsey (*wo͝ol'zĭ*), **Thomas,** English statesman and cardinal, was born at Ipswich about 1475. He was the son of a butcher, and was educated at Magdalen college, Oxford, where he graduated at 15. Ordained priest in 1498, he rose rapidly and was introduced at the English court, where he gained the esteem of Henry VII and, in 1509, was made dean of Lincoln.

After the accession of Henry VIII, he was appointed archbishop of York in 1514 and became cardinal in 1515. The king elevated him to the position of lord chancellor and prime minister.

For about 15 years, he was one of the foremost men in Europe, enjoying great wealth and honor. Among his other acts, he founded and endowed Christ college, Oxford. In 1529, he was commissioned by Henry to procure from the pope the annulment of the royal marriage with Catherine of Aragon. Failing in the attempt, Wolsey was driven from the court and, in 1530, was arrested on a charge of high treason. He died while on the way to London to answer the charge.

Wood, Leonard, American soldier and administrator, was born at Winchester, N. H., 1860, and graduated from Harvard medical school. He was President McKinley's personal surgeon and became the close friend of Theodore Roosevelt. On the outbreak of the Spanish American war in 1898, Wood was associated with Roosevelt in raising and leading the famous regiment of "Rough Riders." For his conduct in this war, he became major general. He acted as military governor of Cuba, 1899–1902, and made great improvements there in sanitation and education. He served later as a governor in the Philippines and, returning to America in 1908, was chief of staff until 1914.

His advocacy of preparedness brought him into disfavor with the administration, and he held inferior commands during the World War. He was governor-general of the Philippines from 1921 to 1927. His writings include *The Military Obligation of Citizenship*, *Our Military History*, and *Universal Military Training*. Died, 1927.

Woodberry, George Edward, American literary critic and poet, was born at Beverly, Mass., 1855. He graduated at Harvard in 1877 and became professor of English at the University of Nebraska. From 1882 to 1891, he devoted himself to literary work and, from 1891 to 1904, was professor of comparative literature at Columbia university. His publications include *History of Wood Engraving*, *Edgar Allan Poe*, *The Heart of Man*, *Wild Eden*, *America in Literature*, *Poems*, *North Africa and the Desert*, *Two Phases of Criticism*, *Ideal Passion*, and *The Roamer*. He was elected a member of the American academy of arts and letters in 1908.

Woolley, Mary Emma, American educator, was born at South Norwalk, Conn., 1863. She taught history at Wheaton seminary, 1886–91; graduated at Brown university, 1894; and, from 1895 to 1900, taught biblical history at Wellesley, becoming professor in 1898. In 1900, she was made president of Mount Holyoke college, and, for many

years, has been prominently identified with the development of educational opportunities for women in America and in other countries.

Woolworth, Frank W., American merchant, was born at Rodman, N. Y., 1852. He received a public school and business college education. In 1879, he opened a 5-cent store in Utica, N. Y., removing in the same year to Lancaster, Pa., where he continued in the same business. This he eventually developed to vast proportions, embracing about 800 "5- and 10-cent" stores in the United States and Canada and more than 50 in Great Britain. In 1911-12, at a cost of $14,000,000, he erected in New York City the Woolworth building, 792 feet high. This vast structure, designed in modified Gothic style by Cass Gilbert was, at the time of its completion, the tallest inhabited building in the world. Died, 1919.

Wordsworth, William, English poet, was born at Cockermouth, in Cumberland, England, April 7, 1770. He was sent to school first at Penrith; subsequently he was transferred to Hawkshead, Lancashire; in 1787, he was sent to Saint John's College, Cambridge. The future poet of nature was imbued with a lifelong passion for travel. His first tour was made in the autumn of 1790, in France, Switzerland, and Italy. The next year, he took his bachelor's degree at Cambridge; but, except in poetical literature, his knowledge of books was slight.

After a twelve months' sojourn in France, Wordsworth returned to London, where he published two volumes of verse,—*Descriptive Sketches* and *An Evening Walk*,—both written in college. He considered the ministry, but the political beliefs of his early manhood would not have been reconcilable with the position of clergyman in the Church of England. After wandering about for some years, he felt justified in regarding poetry as his true vocation.

He received in 1795 a legacy from his friend Raisley Calvert, which enabled him to live with entire singleness of aim until the settlement of his father's affairs. That autumn, Wordsworth took a house with his sister in Racedown, Dorsetshire, whence he removed two years later to Alfoxden, Somersetshire, in order that he might be near Coleridge. Here the two poets wrote in conjunction the famous *Lyrical Ballads*.

After spending the winter of 1798-99 in Germany with Coleridge, Wordsworth and his sister Dorothy, his most intimate friend and confidant, returned to their native Cumberland and settled at Grasmere. In 1803, he married Mary Hutchinson, to whose amiability his poems pay warm tribute. This same year, he made a trip to Scotland. There he met Scott and also Sir George Beaumont, whose name appears often in his writings.

With his wife, his sister, and his three children, Wordsworth removed to Allan Bank, 1808, and, in 1813, he established permanent residence at Rydal Mount. A second tour of Scotland, in 1814, resulted in a few poems; in the summer of that year, he published *The Excursion*, one of his longest pieces. Various sonnets belong to this period. In 1820, Wordsworth made a tour of four months on the continent, the fruit of which appeared some time afterward in *Memorials*.

For his remaining 30 years, he lived among his beloved mountains and traveled much, but wrote very little. He made two visits to Scotland; in 1837, he again toured Italy. In 1839, the University of Oxford conferred upon him its honorary degree of D. C. L. Three years later, he received a pension from the government, and, in 1843, he accepted nominal appointment as poet laureate of England.

Wordsworth, by his insistence on truth and simplicity of natural feeling, did much toward the revival of English poetry at the opening of the 19th century. He possessed an exceptional and passionate susceptibility to effects of beauty in the material world. From this arose a mystical communion with nature, which pervades the whole body of his poetry and constitutes its chief claim to originality. Died, April 23, 1850.

Wren, Sir Christopher, English architect, was born at East Knoyle, Wiltshire, 1632. He graduated at Oxford, and became professor of astronomy in 1660. As a mathematician and scientist, he was engaged in 1663 by the dean of Saint Paul's to make a survey of the cathedral with a view to certain projected repairs. While thus employed, he became greatly interested in architecture, which he began to study with enthusiasm. In 1666, Saint Paul's was totally destroyed in the great fire, and Wren became the architect of the new cathedral, his masterpiece. His genius here displayed led to his being chosen to plan the most important buildings erected in London in the following 40 years. Died, 1723.

Wright, Sir Almroth Edward, English physician and pathologist, was born in 1861. After graduation at Dublin university, he continued his studies at Leipzig, Strasbourg, and Marburg. He was made demonstrator of pathology at Cambridge university, 1887, and of physiology at Sydney university, Australia, 1889. From 1892 to 1902, he was professor of pathology in the army medical school at Netley and was then appointed professor of experimental pathology in the University of London.

Wright made notable researches in vaccinotherapy, was the author of the system of therapeutic inoculations for bacterial infections, and introduced the successful method of immunization against typhoid fever by means of inoculation. His writings include *System of Anti-Typhoid Inoculation*, *Principles of Microscopy*, *Studies in Immunisation*, and *The Unexpurgated Case against Woman Suffrage*.

Wright, Harold Bell, American novelist, was born at Rome, N. Y., 1872. After attending Hiram, Ohio, college, he took up painting and decorating and then became a landscape painter. Ordained minister in the Christian church, 1897, he held pastorates in Missouri, Kansas, and California until 1908. He then retired to devote himself more exclusively to literary work. Several of his novels attained great popular success. Among his works are *The Shepherd of the Hills*, *The Calling of Dan Matthews*, *The Uncrowned King*, *The Winning of Barbara Worth*, *The Eyes of the World*, *When a Man's a Man*, *The Mine with the Iron Door*, and *God and the Grocery Man*.

Wright, Orville, American airplane inventor, was born at Dayton, Ohio, 1871. He was educated in the public schools. After 1903, he devoted his attention mainly to the invention and the improvement of Wright Brothers' airplane flying machine. He made the first test at Kitty Hawk, N. C., 1903, and a successful long-distance test near Dayton, 1905, and afterwards gave many exhibitions in Europe and the United States. In 1915, he sold his interest in the Wright Aeroplane Company and was appointed member of the United States naval consulting board. He has received numerous honors both in America and abroad for his pioneer work in the development of the airplane. See *Airplane*.

Wright, Wilbur, American pioneer in aviation, was born near Millville, Ind., 1867. He was educated in the high schools of Richmond, Ind., and Dayton, Ohio. With his brother Orville, he became interested in the problem of mechanical flight, making at Dayton, Ohio, many experiments with kites and gliders. In a series of tests at Kitty Hawk, N. C., one of their machines, on December 17, 1903, rose of its own power, remained in the air 59 seconds, and carried the operator 852 feet, the first instance of actual mechanical flight. In 1905, their airplane made a flight of 24¼ miles. Patents were secured, and numerous exhibitions were made in the United States and abroad, demonstrating the success of the invention. Died, 1912. See *Airplane*.

Wrong, George MacKinnon, Canadian historian, was born at Grovesend, Ont., in 1860. He was graduated at the University of Toronto and studied also at Oxford and at different German universities. He took orders in the Church of England in 1883 but later became a lecturer at the University of Toronto, serving as professor of history from 1894 to 1927. His publications include *The British Nation*, *A Canadian Manor and Its Seigneurs*, *The Fall of Canada*, *Washington and His Comrades in Arms*, and *The Rise and Fall of New France*.

Wundt (*vōōnt*), **Wilhelm Max,** German physiologist and psychologist, was born at Neckarau in Baden, 1832. He studied at Tubingen, Heidelberg, and Berlin. In 1875, he became professor of philosophy at Leipzig. Wundt was not only the most distinguished investigator in experimental psychology, but was the creator of the modern science of psychology. He united the work of Herbart, Weber, Fechner, and Lotze, bringing into correlation the mathematical, the experimental, the psychophysical, and the physiological movements in psychology. Among his many works are *Human and Animal Psychology* and *Outlines of Psychology*. Died, 1920.

Wyant, Alexander Helwig, American landscape painter, was born at Port Washington, Ohio, 1836. He began portrait painting in Cincinnati; went to Paris in 1860, where he was much influenced by the work of Corot and Dupré; and later spent three years under Hans Gude at Dusseldorf and Karlsruhe. After 1864, he settled in New York. Losing the use of his right hand, he trained himself to paint equally well with the left, and rose to a distinguished place in American art. Wyant ranks second only to the more versatile Inness among the great painters of the Hudson River school and, in delicate refinement of work, is unexcelled by any American. Notable examples of his landscapes are "A Glimpse of the Sea," "Mohawk Valley," "Forenoon in the Adirondacks," "View in County Kerry," and "Broad, Silent Valley," in the Metropolitan museum, New York; "Edge of the Woods," in the art institute, Chicago; also "The Connecticut Valley," "A View on Lake George," and "Moonlight and Frost." Died, 1892.

Wyss (*vis*), **Johann Rudolf,** Swiss educator and author, was born at Bern in 1781. He is known chiefly as the author of *Swiss Family Robinson* and of the Swiss national anthem. Most of his life was spent as professor of philosophy at the University of Bern. Died, 1830.

Xavier (*zăv'ĭ-ĕr*), **Saint Francis,** Jesuit missionary, styled the "apostle of the Indies," was born of a noble family in the north of Spain in 1506. At Paris, where he studied and then lectured, he was associated with Loyola in founding the Society of Jesus. He was ordained priest in 1537, lived at Rome in the service of the Society, and was sent out as a missionary to the Portuguese colonies in the East.

Xavier arrived at Goa in 1542, and labored with equal zeal and success among the Europeans and the native population. After a year he visited Travancore, where in a month he baptized 10,000 natives. He then visited Malacca, the Banda islands, Amboyna, the Moluccas, and Ceylon, where he converted the king of Kandy with many of his people. The mission which he founded in Japan flourished for a hundred years. He returned to Goa in 1552 to organize a mission to China. His strength had been worn out, however, by his labors and privations, and he died in the same year. He was canonized in 1622.

Xenophanes (*zē-nŏf'ā-nēz*), Greek philosopher, founder of the Eleatic school, was born at Colophon in Asia Minor about 570 B. C. Xenophanes is the first man who is known to have observed the so-called anthropomorphic character of popular religions, which he attacked on the ground that, in them, men conceived of gods in their own image. He taught that there was one god and that he was changeless and eternal. His chief work, *On Nature*, has not survived, but a celebrated sentence has been preserved to the effect that, if oxen had gods, their gods would have the form of oxen. The date of his death is unknown.

Xenophon (*zĕn'ō-fŏn*), Greek historian and military commander, was born at Athens about 434 B. C. He was a pupil and friend of Socrates. He joined the expedition of Cyrus against his brother Artaxerxes, and, on its failure and the subsequent treacherous murder of the leaders of the Greek division, he was chosen to lead this force back from a point near Babylon to Trebizond on the Black Sea. After other military service, he retired to Elis, where he spent 20 years in the pursuits of country life and in the prosecution of literature.

His principal works are the *Anabasis*, an account of the expedition of Cyrus and of the retreat; the *Memorabilia*, an account of the life and teaching of Socrates; the *Hellenica*, a history of Greece beginning at the point where Thucydides discontinued his *Peloponnesian War*; and the *Cyropædia*, an ideal account of the education of Cyrus the Elder. He died about 355 B. C.

Xerxes I (*zûrk'sēz*), king of Persia, son of Darius I, whom he succeeded on the throne in 485 B. C., was born about 519. In 481, he attempted to subdue Greece by both sea and land. With his army he crossed the Hellespont by means of a bridge of boats; was checked for a time at Thermopylæ by Leonidas and his three hundred; advanced to Athens to see his fleet destroyed at Salamis by Themistocles; and left 300,000 men under Mardonius, who suffered defeat at Platæa in 479. He returned to Asia Minor, and, after an expedition against Babylon, in which he razed its temples to the ground, he was assassinated in 465 B. C.

Yale, Elihu, English colonial official, was born at or near Boston, Mass., 1648. When four years old, he was taken to England by his father, and he never returned to America. From 1687 to 1692, he was governor of Fort Saint George, Madras, and, in 1699, became governor of the East India Company. Yale college received his name in the charter of 1745. Previously the building and, before that, the school at Saybrook had been called by his name. His gifts to the institution amounted to about £500 in money and many books. He died in England, 1721, and was buried at Wrexham, Wales.

Yeats (*yāts*; *yēts*), **William Butler,** Irish poet and dramatist, was born in Dublin, 1865. His father was John Butler Yeats, a distinguished artist. His education was received in his native city and in London. He studied art for a time, but soon turned to literature. He devoted much effort to gathering folklore, which he utilized in poems, plays, tales, essays, and sketches. His new versions of the *Countess Kathleen* and the *Wanderings of Oisin*, with the *Poems* of 1895, marked the rise of a new Irish school and definitely established his fame. An Irish literary theater was founded with the assistance of Lady Gregory, Edward Martyn, and George Moore, and Yeats brought to the theater great poetic gifts. His works include *The Celtic Twilight*, *A Book of Irish Verse*, *The Wind Among the Reeds*, *Kathleen ni Houlihan*, *The Hourglass*, *Ideas of Good and Evil*, *Deirdre*, *The Green Helmet*, *Plays for an Irish Theater*, *Per Amica Silentia Lunæ*, and *The Trembling of the Veil*. He received the Nobel prize for literature in 1923. See *Hourglass, The*.

Yerkes (*yĕr'kēz*), **Charles Tyson,** American capitalist, was born in Philadelphia, 1837. After receiving a high school education, he became a clerk in a grain commission house. Rising rapidly, he obtained important holdings in the street railway system of Philadelphia and, by 1886, controlled the Chicago street railway system. He later took part in constructing the underground railway system of London, Eng. In 1892, he endowed the famous Yerkes observatory, at Williams bay, Wis. Died, 1905.

Young, Brigham, former leader of the Mormon Church, was born at Whitingham, Vt., 1801. In 1832, having become a convert to the teachings of Joseph Smith, he was made an elder of the Church and began to preach at the Mormon settlement at Kirtland, Ohio. Three years later, he was sent as a missionary to New England, where he secured numerous converts. After the death of Joseph Smith, at Nauvoo, Ill., 1844, Young assumed leadership and, in 1847, was chosen president of the Church of Jesus Christ of Latter-Day Saints, commonly called Mormons.

In 1845, he led the first party westward from Nauvoo and reached the Salt Lake valley in 1847, where he located the site of a new temple and founded Salt Lake City. In 1851, he established a system of public schools. In 1852, he proclaimed polygamy, which had already been condemned by the Mormon Church and which was finally officially prohibited in 1890. In 1868, he established a system of stores called Zion's co-operative mercantile institution, which still controls a large amount of business in Utah.

Young was a leader of great force and remarkable foresight. The substantial growth and material prosperity of the Mormon settlements in Utah under his rule are proof of his notable administrative ability. He died in 1877, leaving about two million dollars, to be divided among numerous wives and more than 50 children. See *Salt Lake City*.

Young, Charles Augustus, American astronomer, was born at Hanover, N. H., 1834. He graduated at Dartmouth college, 1853; taught at Philips academy, Andover, until 1855; and was professor of mathematics at Western Reserve college, 1857–66. He was then made professor of astronomy at Dartmouth, serving until 1877, when he was called to the chair of astronomy at Princeton, which he filled with distinction until his retirement in 1905.

Young was the first to observe the spectrum of the solar corona, discovered the reversing layer in the solar atmosphere, and studied other solar phenomena. His works include *The Sun* and *Manual of Astronomy*. Died, 1908.

Young, Ella Flagg, American educator, was born at Buffalo, N. Y., 1845. She graduated at the University of Chicago; first engaged in teaching, 1862; and married William Young at Chicago, 1868. She was district superintendent of schools for Chicago from 1887 to 1899, when she became professor of education at the University of Chicago. She served as principal of the Chicago normal school, 1905–09, and superintendent of the Chicago public schools, 1909–15. During a career extending over 50 years, she exercised a notably constructive influence. She was, in 1910, the first woman to be president of the national education association. Her writings include *Ethics in the School* and *Some Types of Modern Educational Theory*. Died, 1918.

Young, George Paxton, Canadian educator, was born at Berwick upon Tweed, Scotland, 1818. He was educated at the University of Edinburgh; entered the ministry of the Free Church of Scotland; removed to Canada in 1847; and, after serving as pastor at Hamilton, 1850–53, became professor at Knox college. During his term as inspector, beginning in 1864, he reorganized the grammar schools of Ontario. From 1871 to 1889, he was professor of metaphysics in University college, Toronto. He was regarded as one of the ablest teachers in Canada. Died, 1889.

Young, Owen D., American industrial leader, was born at Van Hornesville, N. Y., in 1874. Educated at St. Lawrence and Boston universities, he was trained for the law, beginning practice at Boston in 1896. He became, in 1912, general counsel for the General Electric Company, of which he was elected vice president in 1913 and chairman of the board of directors in 1922. He organized and became chairman of the board of the Radio Corporation of America. Having attained prominence in various industrial and economic conferences called by President Wilson and President Harding, Young was invited, in 1923, to serve on the committee which drew up the Dawes plan, and he supervised the putting of this plan into operation in 1924. In 1929, he acted as chairman of the international committee of experts charged with drawing up a revision of the plan.

Young, Thomas, English scientist and archeologist, was born at Milverton, of Quaker parents, 1773. He was educated in London, Edinburgh, and Gottingen and began a medical practice in London. In 1801, he was made professor of natural history in the newly founded royal institution, but resigned in 1803. He was chosen on the staff of Saint George's hospital in 1811. He retired from practice in 1814 to become an insurance actuary.

In 1818, he was made superintendent of the *Nautical Almanac* and, in 1828, became sole conductor. He was the first to describe and measure astigmatism and is considered the founder of physiological optics. His most celebrated work was his demonstration of the wave theory, which he effected by his discovery of the interference of light. Despite all scientific opposition, he maintained that "radiant

light consists of undulations of the luminiferous ether." Young also made notable researches in Egyptian hieroglyphics and was engaged on an Egyptian dictionary at the time of his death, 1829.

Younghusband, Sir Francis Edward, English soldier, explorer, and writer, was born at Murree, India, 1863. He was educated at Clifton and Sandhurst; entered the British army; and became lieutenant colonel, 1908, for service in India. Younghusband has long been known as a veteran traveler in Asia. His explorations have covered parts of Manchuria, Chinese Turkestan, the Pamir, Tibet, and northern India. In 1904, as the British commissioner to Tibet, he forced his way into the sacred city of Lassa. He was president of the royal geographic society in 1919. His writings include *Heart of a Continent, Kashmir, The Heart of Nature,* and *The Gleam.*

Ypsilanti (*ĭp'sē-lăn'tē*), **Alexander,** Greek soldier and revolutionary leader, was born at Constantinople, 1792. He accompanied his father, Constantine, to Petrograd; joined the Russian army in 1809; and fought with distinction in the campaign of 1812 and 1813, losing an arm at the battle of Dresden. He was made major general in the Russian army in 1817. He became president of the Greek league in 1820 and, in the following year, led an insurrection against the Turks in the Danube provinces. After a series of defeats, he fled to Austria, where he was kept in prison for seven years. Shortly before his death in 1828, his release was effected by Czar Nicholas I. His brother Demetrius (1793–1832) succeeded to the command of the Greek revolutionists and, in 1828, forced the capitulation of Aslan Bey at the pass of Petra, virtually ending the war for Greek independence.

Ysaye (*ē-zā'yē*), **Eugène,** Belgian violinist, was born at Liege, 1858. He studied at Liege conservatory, Brussels, and Paris. After an engagement as orchestra leader in Berlin, he made concert tours in Europe and America. From 1886 until 1897, he was professor and director of the violin department at the Brussels conservatory, where he organized the famous Ysaye quartet in 1891. He composed several concertos, mazurkas, and other pieces for the violin and ranks as one of the greatest contemporary violinists.

Zahm, John Augustine, American scientist, was born at New Lexington, Ohio, 1851, and graduated at Notre Dame university, 1871. He entered the order of Holy Cross, 1871. He was placed in charge of the scientific department of Notre Dame university in 1874 and later became president of the board of trustees. He was a member of numerous scientific societies and lectured widely on scientific and allied topics. His publications include *Evolution and Dogma, Bible Science and Faith, Sound and Music,* and *Science and the Church.* Died, 1921.

Zamenhof (*zä'mĕn-hôf*), **Lazarus Ludwig,** Russian oculist and linguist, was born at Bielostok in the government of Grodno, 1859. He was educated at the universities of Moscow and Warsaw. He settled in Warsaw, where he practiced his profession and became noted for his advocacy of an international language. In 1887, he published his first book on Esperanto, an artificial language which attracted the attention of linguists throughout the world. Died, 1917.

Zane, Ebenezer, American pioneer of the Revolutionary period, was born in Berkeley county, W. Va., 1747. He held several civil and military offices and attained the rank of colonel. In 1769, he established on the site of the present city of Wheeling the first permanent settlement on the Ohio river. For the protection of the settlers, he built a blockhouse, called Fort Henry, which was several times attacked by the Indians during the Revolutionary War. Zane owned the land where the city of Zanesville, Ohio, now stands and, in 1799, assisted in laying out the original town, at first called Westbourn but in 1802 renamed Zanesville. He died in 1811.

Zangwill (*săng'wĭl*), **Israel,** British man of letters, was born in London, 1864, of Jewish parentage. He was practically self-educated, and received the degree of B. A. from London university. He became a journalist; edited *Ariel;* and has written many novels, essays, poems, and plays. He was long a leader in the Zionist movement, but refused to work for the settling of Jews in Palestine, preferring a location in Angola. He was active in deflecting Jewish immigrants from the New York ghetto to the Southern states. His numerous writings include *The Premier and the Painter, The Old Maids' Club, The King of Schnorrers, Dreamers of the Ghetto, The Moment of Death, The Revolted Daughter, Jinny the Carrier, The Melting Pot, The Next Religion, Plaster Saints,* and *The Forcing House.* Died, 1926.

Zeeman (*zā'mən*), **Pieter,** Dutch physicist, was born at Zonnemaire, 1865. He was educated at the universities of Leiden and Strasbourg and became an assistant in physics at Leiden in 1890. In 1894 he was made instructor of physics in the University of Amsterdam, where he became professor in 1900. In 1896, while investigating the spectrum of light coming from a source influenced by a magnetic field, he observed the so-called "Zeeman effect," a discovery of great significance in its bearing upon the ultimate cause of the ether vibrations which produce light. For this discovery, he received in 1902, with H. A. Lorentz, his instructor and colleague, the award of the Nobel prize for physics.

Zeisler (*zīs'lĕr*), **Fannie Bloomfield,** American pianist, was born at Bielitz, Austrian Silesia, 1866, and came with her parents to Chicago at the age of two years. She displayed marked musical talent at an early age and studied chiefly under Leschetizky at Vienna. In 1885, she married Sigmund Zeisler, a Chicago jurist. She appeared in concerts in leading American cities during 1883–93 and in the principal cities of Germany in 1893–95. In 1898, she made a concert tour in England, which was followed by numerous successful tours in America, Germany, Austria, and France. She ranked among the foremost American women pianists of the time. Died, 1927.

Zeiss (*tsīs*), **Carl,** German optician, was born at Weimar, 1816. He was educated for medicine. In 1846, he established at Jena the now world-famous optical factory, which still bears his name, being incorporated in 1889 as the Carl-Zeiss-Stiftung. Died, 1888.

Zenker (*tsĕng'kĕr*), **Friedrich Albert von,** German physician, noted for his discovery of trichinosis, was born in Dresden, 1825. He was educated in Leipzig and Heidelberg. In 1851, he became attached to the city hospital of Dresden, where, in 1855, he became professor of pathology in the surgico-medical academy. In 1862, he was made professor at Erlangen. His discovery of the true nature and danger of trichinæ was made in 1860, when he published *Trichinosis in Man.* Died, 1898. See *Trichina.*

Zeno, Greek philosopher of Elea, in Italy, was born about 490 B. C. Being a favorite disciple of Parmenides, he accompanied him to Athens and there taught the illustrious Pericles. He devoted his great powers of argumentation to enforce the doctrines first broached by Xenophanes and more systematically developed by Parmenides, attempting to demonstrate by ingenious examples the impossibility of motion. His paradoxes of Achilles and the hare and of the flying arrow have, in modern times, been used by Bergson in an attempt to show that motion alone exists. Zeno is said to have been arrested for conspiring to drive the tyrant Nearchus from Elea and to have been put to death by torture.

Zeno, Greek philosopher, was born at Citium, in Cyprus, and flourished in the early part of the 3d century B. C. He was at first a trader. Coming to Athens, he was attracted by the Cynic philosophy, the asperities of which he somewhat modified in doctrines that later became known under the term Stoicism. This name was derived from the *stoa poikile,* "painted porch," which he selected for the delivery of his lectures throughout his 58 years of teaching in Athens.

Stoic doctrine honored virtue above all things, esteeming as indifferent all other common objects of desire. Socrates was held up as the exemplar of the virtuous man. Zeno died about 264 B. C. The Athenians honored his memory by a public tomb and monument.

Zenobia (*zē-nō'bĭ-ȧ*), queen of Palmyra, succeeded her husband Odenathus in 267 and showed an independence of her Roman suzerains that resulted in several clashes with the Roman troops. When Aurelian became emperor, he marched with a large army against Zenobia and, after defeating her in several battles, besieged her in Palmyra. She attempted to escape, but was captured and brought to Rome in 272 to adorn the triumph of her conqueror. She was later presented by Aurelian with large possessions near Tivoli, where the remainder of her life was passed. She was a woman of great courage, high spirit, and remarkable beauty, and, with austerity of morals in private life, she combined prudence, justice, and liberality in her administration of public affairs.

Zeppelin (*tsĕp'ĕ-lēn'*), **Ferdinand, Count von,** German inventor, was born at Constance, Baden, 1838. He received his education in the polytechnic school at Stuttgart, in the military school at Ludwigsburg, and in the University of Tubingen. He entered the army and became a cavalry officer in 1858. In 1863, he came to the United States, where he fought with the Union army in the Civil War. He later returned to Germany.

Zeppelin spent much of his life in experimenting with dirigible balloons. The first large one was built in 1892 and, in 1909, he was able to make a flight from Friedrichshafen to Berlin. In the former place, he established a factory for manufacturing dirigible airships, a large number of which were used by Germany in the World War. Died, 1917. See *Airship.*

Zeuxis (*zūk'sĭs*), Greek painter, lived about the end of the 4th century B. C. He improved the methods of Apollodorus of Athens and excelled in coloring and expression. He executed small works for private patrons rather than decorations of a public or monumental character. Among his famous works were "Helen," which he presented to the people of Crotona; "Alcmena," given to Agrigentum; "Pan,"

presented to Archelaus; a youthful "Hercules"; and "Zeus Surrounded by the Gods." None of his works are extant.

Ziegfeld, Florenz, Jr., American theatrical producer, was born in 1869 at Chicago, where he entered the theatrical business in 1892. He brought military bands from Europe for the world's fair, Chicago, in 1893. Besides producing *Ziegfeld's Follies* annually since 1907, he has produced *Papa's Wife*, *The Parisian Model*, *Miss Innocence*, *The Pink Lady*, and many other spectacular shows. He married Billie Burke in 1914.

Zimbalist (*zĭm'bä-lĭst*), **Efrem,** violinist, was born at Rostof, Russia, in 1889 and studied at Petrograd, where he made his début at the age of 17. He subsequently toured Germany and England and came to the United States in 1911, appearing in all the leading cities. Zimbalist is the composer of numerous songs and of suites for violin, orchestra, and piano. In 1914, he married Alma Gluck.

Zimmern, Alfred Eckhard, English historian and publicist, was born at Surbiton, England, in 1879. He was educated at Oxford and became a lecturer there in 1903. He has since lectured at University College of Wales and Cornell university. He translated the first two volumes of Ferrero's *Greatness and Decline of Rome* and has written, among other works, *Henry Grattan*, *The Greek Commonwealth*, *Nationality and Government*, and *Europe in Convalescence*.

Zinzendorf (*tsĭn'tsĕn-dôrf*), **Nikolaus Ludwig, Count von,** religious leader, was born at Dresden, 1700. He was educated by his grandmother, a learned and pious lady, and, in 1710, went to Halle, where he spent six years under the special care of Francke, the philanthropist.

While residing in his country seat in upper Lusatia, he accidently met a wandering carpenter named Christian David, a member of the old sect of Moravian brethren, who described the persecutions to which the sect was exposed. Zinzendorf invited him and his friends to settle on his estate. They accepted the proposal, and the colony received the name of Herrnhut. In 1737, Zinzendorf himself was ordained bishop of the Moravians. In the same year, he went to London, where he was received with much consideration by Wesley. In 1741, he went to America and founded the celebrated Moravian colony at Bethlehem, Pa. He finally settled at Herrnhut and died in 1760.

Zittel (*tsĭt'ĕl*), **Karl Alfred von,** German geologist and paleontologist, was born at Bahlingen, Baden, 1839. He was educated at Heidelberg and Paris. In 1866, he was made professor of paleontology at Munich, where he won an international reputation by his researches and publications in paleontology. He accompanied Rohlfs's exploring expedition to Egypt and the Libyan desert in 1873-74. Among his publications are *Studies in the Geology and Paleontology of the Libyan Desert*, *The Sahara*, and *History of Geology and Paleontology to the End of the Nineteenth Century*. With Schimper and Schenk, he published *Handbook of Paleontology*, a notably important work. Died in 1904.

Zola (*zō'lä*; F., *zô'lä'*), **Emile,** French novelist, was born at Paris, 1840. He was educated at the Lycée Saint-Louis and settled in Paris. His first important venture in fiction was *Les mystères de Marseille*. In this and in *Thérèse Raquin*, he at once displayed his remarkable power in the critical analysis of human character. With Flaubert and the Goncourts, he founded the naturalistic school of fiction. His famous series known as *The Rougon-Macquart Family* was modeled somewhat after Balzac's *La comédie humaine*.

Among his more notable subsequent stories are *La joie de vivre*, *Au bonheur des dames*, *La terre*, *La bête humaine*, *La débâcle*, *Le docteur Pascal*, *Le rêve*, and *Lourdes*. The last forms one of a trilogy, which he called *Les trois villes*—Lourdes, Rome, and Paris—all in the extreme realistic vein. His last work, written in the exile occasioned by his courageous advocacy of justice in the notorious Dreyfus case, is entitled *Fécondité*. Zola was one of the most brilliant, impassioned, and sincere of modern French writers. He died in 1902. See *La débâcle*.

Zorn (*tsôrn*), **Anders Leonhard,** Swedish painter, was born at Mora, Dalarne, 1860. He studied at Stockholm academy and in London, where he exhibited water colors at the royal academy. In 1888, his first oil painting, "Fisherman from Saint Yves," was placed in the Luxembourg museum. Although traveling extensively in Europe and America, he resided chiefly at Mora, where he devoted himself largely to painting Swedish subjects, excelling in the female figure and portraiture.

Zorn ranks among the foremost modern portrait painters, combining strong naturalism with fine powers of characterization. Among his well-known figure paintings are "Baking in Mora," "Summer in Sweden," "Dagmar," "Watering the Horse," and "Dance at Dalecarlia." His etchings include fine portraits of Renan, Strindberg, Verlaine, Rodin, and Anatole France. In sculpture he produced many works of merit. His "Nude" was placed in the Metropolitan museum, New York, in 1915. Died, 1920.

Zoroaster (*zō'rō-ăs'tẽr*), often referred to under the Avestan form of his name, Zarathustra, was the founder of the Persian-Iranian religion, usually designated as Zoroastrianism. Forms of this religion are now held by the Ghebers in Persia and the Parsis in India. There is doubt as to the period in which he lived, some modern scholars placing it in the 7th and 6th centuries B. C.; others, in the 11th and 10th. He seems to have been born in Bactria, in the northwestern part of Iran. His doctrine then spread to Media and Persia.

Tradition leaves space for a period of religious preparation from his 15th to his 30th year, when he received a revelation of the faith and came forward as a reformer of the beliefs of the old Brahmanic creed. He was the leader of a group of chieftains who, after a period of political, military, and religious struggles, established a holy agricultural state. The laws of this state encouraged pastoral labor and thrift.

That Zoroaster was legislator, prophet, pontiff, and philosopher, as tradition asserts, may well be true. The propagation of his religious system occupied him until the time of his death. His end seems to have been violent and to have taken place during the invasion of Iran by the Turanians, who waged a religious war against Vishtaspa.

The present *Avesta*, or *Zend-Avesta*, the bible of Zoroastrianism, is the remnant of a greater religious literature. It includes (1) various hymns, or *gathas*, (2) a collection of liturgical forms, (3) sundry religious laws, (4) mythical fragments devoted to several divinities, and (5) several prayers. The *gathas*, verses from the sermons of Zoroaster, form the oldest and most sacred part of the *Avesta*.

Zoroastrianism teaches that the world is the scene of a conflict between two principles: the good, called Ormuzd; the evil, called Ahriman,—the god of life and the god of death. Every good action helps the one; every evil action, the other. Those who touch what is impure give Ahriman the more power over them. Zoroaster's belief in immortality and in the final triumph of good over evil resembles both the later Jewish and the Christian dogmas. Zoroaster died at the age of 77.

Zsigmondy (*tsĭk-môn'dē*), **Richard,** German chemist, was born in 1865. He was appointed to the faculty of the University of Gottingen as professor of organic and colloid chemistry. For his valuable researches in this field he recieved the Nobel prize in chemistry for 1925.

Zueblin (*zū'blĭn*), **Charles,** American sociologist, was born at Pendleton, Ind., 1866. He was educated at Northwestern university, Yale divinity school, and Leipzig. In 1891, he founded the Northwestern university settlement, and, in 1892, became instructor in sociology at the University of Chicago, where he was professor, 1902–08. He then removed to Boston and was editor of the *Twentieth Century Magazine*, 1911-12. His works include *The Religion of a Democrat* and *Democracy and the Overman*. Died, 1924.

Zuloaga (*sōō'lō-ä'gä*), **Ignacio,** Spanish painter, was born at Eibar, Spain, 1870. He studied in Paris, devoting himself to the old Spanish masters, notably Velásquez. He first achieved distinction with his portrait group "Daniel Zuloaga and His Daughters," now in the Luxembourg museum, Paris. He later settled in Spain, where he traveled extensively in remote districts, portraying with notable individuality gypsies, bull fighters, beggars, fruit sellers, water carriers, and dancers.

His work is animated, intense, and powerful. While a master of rich and varied color harmonies, he excels in somber effects. In the Metropolitan museum, New York, he is represented by "The Gypsy Bull Fighter's Family" and by "Mlle. Lucienne Breval as Carmen." His portrait group "My Uncle Daniel and His Family" was purchased for the Boston museum of fine arts for $25,000.

Zurbarán (*thōōr'bä-rän'*), **Francisco de,** Spanish painter, was born at Fuente de Cantos, Estremadura, 1598. He studied painting at Seville and developed a strong, realistic style of an intentionally Spanish character. His "Scenes from the Life of Saint Peter," executed for the cathedral of Seville in 1625, brought him wide fame. Among his important paintings are scenes from "The Life of Saint Buenaventura," in the Louvre, Berlin, and Dresden museums; "Apotheosis of Saint Thomas Aquinas"; "Saint Francis of Assisi"; "Immaculate Conception"; and "The Crucifixion." Through the influence of Velásquez he was made painter to the king in 1633. Zurbarán's religious pictures and fine portraits of monks did for the cloister what the work of Velásquez did for the court, and Zurbarán stands next to Velásquez and Murillo among the great Spanish painters of his time. Died, 1662.

Zwingli (*tsvĭng'lē*), **Ulrich,** Swiss religious reformer, was born at Wildhaus, 1484. He served in Italy as a soldier; visited Erasmus at Basel in 1514; and, two years later, at the monastery of Einsiedeln, began to preach freely, opposing the sale of indulgences and favoring changes in doctrine and practice similar to those advocated by Luther. He met Luther in 1529 but failed to agree with certain of his more radical innovations in doctrine. Zwingli was one of the leaders of the Protestant cantons of Switzerland, and was slain in a battle against the Catholic cantons, 1531.

STUDY AND REFERENCE GROUPS

When one studies the life and work of a notable person, the question naturally arises, Who were his important predecessors, successors, coworkers, or opponents? In order to provide a convenient means of answering such questions, the names of people described in the foregoing pages have been classified into groups on the basis of the fields in which their activities lay and the time in which they lived.

Purpose. The average reader, upon learning the facts about a single leader in a sphere of achievement, often finds himself in a position very similar to that of a primary pupil whose knowledge of the American Revolution is limited to the information that George Washington was the father of his country and the first president of the United States. So long as the schoolboy's knowledge is confined to a few personal facts, he will have only an imperfect idea of Washington or of the epoch-making events in which Washington played a dominant part.

Even when the pupil has acquired similar facts about Franklin and Jefferson, his idea of that period of history, although valuably enlarged, still remains incomplete. But upon advancing to the possession of similar knowledge concerning Patrick Henry, James Otis, Samuel Adams, John Hancock, Paul Revere, Joseph Warren, Gates, Lee, Arnold, DeKalb, Rochambeau, Lafayette, Gage, Howe, Burgoyne, Cornwallis, and other leaders, on both sides of the conflict, the pupil's conception of the whole period becomes immeasurably broadened. He then grasps far more comprehensively the entire history of the American struggle for independence and democracy. In this widened range of vision Washington stands revealed in his true greatness, and each of the other leaders assumes proper rank in the pupil's mental picture of this important period.

The purpose of these classified groups is to perform for the general reader, student, or teacher precisely what progressive instruction concerning the chief characters in American history does for the schoolboy. These groups not only introduce the reader to the Washingtons, the Franklins, and the Jeffersons of a hundred different fields of achievement, but they also make him acquainted with the Patrick Henrys, John Hancocks, Paul Reveres, Lafayettes, Burgoynes, and Cornwallises, as well as other leaders of still less importance.

Plan and Arrangement. The following study and reference groups contain the names of the noted men and women whose biographies are sketched in the preceding pages. These names have been classified under 100 subdivisions, or groups. These groups are arranged in some 20 logically related general divisions embracing the important fields of human activity. In all groups, except those numbered 98, 99, and 100, the names appear in *chronological* order.

This feature gives to the Department of Biography the valuable advantages of the *historical* as well as of the *encyclopedic* arrangement. The reader may refer to each biographical sketch alphabetically, as in an encyclopedia; he may study each noted character in the order of his appearance, as in a history; and he may further consider each person's achievements in relation to other important figures in the same group or in relation to members of related groups.

Explanations for the User. The classification of the 100 groups under major divisions, together with the enumeration of the respective groups, is shown in the Topical Index to Study Groups at the end of this section. The study and reference groups are numbered from 1 to 100. In making reference to a name in any group, the following points should be observed:

1. The name of a man or woman whose sketch is given in the Department of Biography appears usually in but *one* group. The only exceptions are those names in the last five groups, 96 to 100 inclusive, and in a limited number of special cases as indicated in paragraph 3 below. Each name, therefore, has generally been placed in the group in which the person did his most distinguished work.

2. A number in parenthesis following a name indicates another group in which the person in question achieved a noteworthy degree of distinction. Two or more numbers found opposite any name indicate that such a person was distinguished in two or more other fields of achievement. The names of these additional fields of effort may be promptly found by turning to the study groups designated by these numbers.

3. A group name in parenthesis, either in full or abbreviated following the name of a person, indicates that he is properly classified in that group, but, because of varied achievements, his name has been repeated in this group for convenience in study. Relatively few such repetitions occur.

4. A geographical name in *italics* following the name of a person indicates the country to which the person belongs.

5. Under English Literature, group 41 (Juvenile Writers), the name or abbreviation of a country in parenthesis denotes that the writer's work properly belongs in the literature of the country so indicated, but that, in this instance, the writer's name is arbitrarily placed with English juvenile writers for convenience in reference.

Illustrative Examples. A few concrete instances will make clear the value of these groups when used for systematic study or reference.

By turning to group 2, the reader will find a list of nearly 50 noted astronomers arranged in chronological order. It begins with Thales, one of the seven wise men of ancient Greece, and ends with Morehouse, a present-day scientist who has discovered a number of comets. The group, therefore, comprises the leaders of astronomical progress covering a period of 2500 years. If placed together in the section on astronomy, the sketches of these astronomers would form a valuable supplement of several pages. By studying, in historical order, the lives of these men, the reader will be able greatly to enlarge his knowledge of astronomical science.

Group 14, consisting of inventors, will illustrate still other valuable features. It consists of two parts, the first of which is an honor roll of famous American inventors arranged in chronological order from John Fitch to Lee De Forest. The other part, beginning with Gutenberg and ending with Marconi, is a similar roster of the greatest inventors who were not Americans The reader may thus study at pleasure either American inventors or world inventors.

In studying the list of American inventors, the reader will notice that Morse, Samuel F. B., is followed by the numbers, in parenthesis, 55, 7, and 98. These numbers refer to other fields of achievement in which Morse attained distinction. Consulting the groups designated by these numbers, the reader discovers that the number 55 means that Morse may be classified also among the painters; that 7 indicates that he was a physicist; and that 98 conveys the fact of his election to the American hall of fame.

Many other examples of such multiple classification will be found in this section. Thus Cooper, Peter, immediately preceding Morse, is followed by the group numbers 17, 90, and 98, which, when looked up in the serial list, are found to show that Cooper was distinguished as a manufacturer, as a philanthropist, and, like Morse, was elected to the American hall of fame. Again, upon referring to Marconi, one finds that his name is followed by the group numbers 13 and 100, indicating that Marconi is noted also as an engineer and as a winner of a Nobel prize.

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(1) Anthropologists:

Blumenbach, J. F. (8)
Schoolcraft, Henry R.
Galton, Sir Francis (5)
Tylor, Sir Edward B.
Keane, A. H. (5)
Lubbock, Sir J. (10)
Powell, J. W. (22) (5)
Brinton, Daniel G.
Fewkes, J. W.
Deniker, Joseph
Bertillon, Alphonse
Fraser, Sir J. G.
Cushing, Frank H.
Boas, Franz
Mooney, James
Hrdlicka, Ales
Wissler, Clark

(2) Astronomers:

Thales (phil.) (62)
Aristarchus
Eratosthenes (5)
Hipparchus
Ptolemy (5)
Copernicus, Nicolas (6)
Brahe, Tycho (6)
Kepler, Johann (6) (7)
Cassini, G. D. (6)
Flamsteed, John
Halley, Edmund (6)
Bradley, James (6)
Celsius, Anders (14)
Lalande, J. J. de
Bailly, Jean S. (84)
Herschel, Sir W. (7)
Bode, Johann E. (6)
Delambre, J. B. J. (6)
Laplace, P. S. (6) (7)
Herschel, Caroline L.
Bowditch, N. (6)
Biela, W. von (81)
Bessel, F. W. (6)
Encke, Johann Franz
Herschel, Sir J. F. W.
Airy, G. B. (6) (7) (13)
Leverrier, U. J. J.
Galle, Johann G.
Mitchell, Maria (98)
Adams, John C. (6)
Gould, Benjamin A.
Huggins, Sir William
Hall, Asaph
Young, Charles A.
Newcomb, S. (6) (24)
Lockyer, Sir J. N. (7)
Ball, Sir R. S. (26) (6)
Flammarion, C. (47)
Darwin, Sir G. H. (5)
Pickering, E. C. (7) (24)
Lowell, Percival
Barnard, E. E. (24)
Campbell, W. W.
Cannon, Annie J.
Eichelberger, W. S. (6)
Jacoby, Harold (24)
Hale, George Ellery
Moulton, F. R.
Morehouse, D. W. (24)

(3) Botanists:

Theophrastus (phil.) (62)
Tournefort, J. P. de
Bartram, John
Linnæus, Carolus (10)
Bonnet, Charles (63)
Jussieu, A. L. de
Brown, Robert
De Candolle, A. P.
Torrey, John (4) (15)
Brongniart, A. T.
Endlicher, S. L. (27)
Braun, Alexander
Chapman, A. W. (15)
Gray, Asa (98)
Hooker, Sir J. D.
Mendel, Gregor J. (61)
Sachs, Julius von
Sargent, C. S.
Warming, J. E.
Bessey, Charles E. (24)
Pfeffer, Wilhelm
Darwin, Sir Francis
De Vries, Hugo
Macbride, T. H. (24)
Coulter, John M. (24)
Britton, Nathaniel L.
Robinson, Benjamin L.
Cowles, Henry C.
Clements, F. E.

(4) Chemists:

Helmont, Jan B. van
Glauber, J. R. (15)
Cronstedt, A. F. (5)
Cavendish, Henry (7)
Priestley, Joseph (61)
Scheele, Carl W.
Klaproth, Martin H.
Lavoisier, A. L. (7)
Berthollet, C. L.
Gregor, William (5)
Tennant, Smithson
Vauquelin, Louis N.
Dalton, John (7)
Wollaston, W. H. (7)
Avogadro, A. (7)
Courtois, Bernard
Davy, Sir Humphry
Gay-Lussac, J. L. (7)
Berzelius, Jöns J.
Guthrie, Samuel (15)
Chevreul, Michel E.
Mosander, K. G. (5)
Dumas, Jean B.
Wöhler, Friedrich
Balard, Antoine J.
Liebig, J., Baron von
Bunsen, Robert W.
Draper, John W. (8)
Gerhardt, Charles F.
Fresenius, Karl R.
Hofmann, A. W. von
Kolbe, Adolph W. H.
Cannizzaro, Stanislao
Cailletet, Louis Paul
Crookes, Sir William (7)
Mendeléév, Dmitri I.
Baeyer, A. von (100)
Perkin, Sir W. H.
Remsen, Ira (24)
Wallach, Otto (100)
Fischer, Emil (100)
Moissan, Henri (100)
Ramsay, Sir W. (100)
Van't Hoff, J. (100)
Ostwald, W. (100)
Sabatier, Paul (100)
Dabney, C. (24) (12)
Arrhenius, S. A. (100)
Curie, Pierre (7) (100)
Buchner, Eduard (100)
Perkin, William H.
Franklin, E. C. (24)
Zsigmondy, R. (100)
Noyes, Arthur A.
Werner, Alfred (100)
Bancroft, W. D.
Curie, Madame (7) (100)
Haber, Fritz (100)
Richards, T. W. (100)
Pregl, F. (100)
Baskerville, Charles
Grignard, Victor (100)
Willstätter, R. (100)
Weizmann, Chaim
Alsberg, Carl L.
Wieland, H. (100)
Soddy, Frederick (100)
McCollum, Elmer V.
Langmuir, Irving
Svedberg, T. (100)
Noyes, Harry A.

(5) Geologists, Paleontologists, Meteorologists, Geographers:

Strabo
Mercator, Gerardus
Humboldt, F. von (7) (4)
Espy, James Pollard
Hitchcock, E. (24) (61)
Lyell, Sir Charles
Miller, Hugh
Guyot, Arnold Henry
Dana, James D. (24)
Kiepert, Heinrich
Dawson, Sir J. W. (26)
Le Conte, Joseph (7)
Hayden, Ferdinand V.
Reclus, Jean J. E.
Marsh, Othniel C. (10)
Geikie, Sir Archibald
Hitchcock, C. H.
Geikie, James
Zittel, Karl A. von
Cope, Edward D. (10)
Keltie, Sir John (38)
King, Clarence (13)
Chamberlin, T. (24)
Gannett, Henry
Davis, W. M. (24)
Lucas, Frederic A.
Walcott, C. D.
Williston, S. (8) (10)
Osborn, Henry F.
Edgeworth, Sir T. W.
Tarr, R. S. (24)
Merriam, John C.
Case, Ermine C.
Atwood, Wallace W. (24)
Wallace, R. C.

(6) Mathematicians:

Anaximander (2) (62)
Euclid
Archimedes (14)
Apollonius
Cardan, J. (63) (26) (15)
Napier, John
Briggs, Henry
Gunter, Edmund (2)
Bernoulli, James
Bernoulli, John
Bernoulli, Daniel (7)
Euler, Leonhard
Clairaut, A. C. (7) (2)
Alembert, J. le R. d' (63) (45) (64)
Lagrange, J. L., Count
Atwood, George (7)
Fourier, Baron (7)
Gauss, Karl F.
Cauchy, A. L., Baron
Abel, Niels Henrik
Jacobi, Karl G. J.
Hamilton, Sir W. R.
Peirce, Benjamin (2)
Loomis, Elias
Stokes, Sir G. G. (7)
Cajori, Florian
Keyser, Cassius J.

(7) Physicists:

Gilbert, William (15)
Galileo (2) (14)
Mariotte, Edmé
Guericke, Otto von
Torricelli, E. (6)
Boyle, Robert (4)
Huygens, C. (2) (14)
Newton, Sir Isaac (6)
Fahrenheit, G. D. (14)
Coulomb, Charles A.
Galvani, Luigi (15)
Volta, Alessandro
Rumford, Count (69)
Biot, Jean B. (2)
Ampère, A. M. (6) (14)
Kater, Henry (14)
Oersted, Hans C.
Brewster, Sir David
Arago, Dominique
Fraunhofer, J. von
Ohm, Georg Simon
Becquerel, Antoine C.
Fresnel, Augustin J.
Faraday, Michael (4)
Haidinger, W. von (5)
Carnot, N. L. S.
Henry, Joseph (98)
De la Rive, A. A.
Jacobi, Moritz H.
Weber, Wilhelm E.
Jolly, Philipp von
Mayer, Julius R. von
Zeiss, Carl
Joule, James P.
Foucault, Jean B. L.
Becquerel, A. E.
Tyndall, John
Helmholtz, H. von
Clausius, Rudolf J. E.
Hittorf, Johann W.
Kelvin, Lord (6)
Maxwell, James C.
Waals, J. v. der (100)
Gibbs, Josiah Willard
Kundt, August
Dewar, Sir James (14)
Rayleigh, Baron (100)
Trowbridge, John
Lippmann, G. (100)
Roentgen, W. K. (100)
Rowland, Henry A.
Braun, F. (100)
Lodge, Sir O. J. (26)
Becquerel, A. H. (100)
Michelson, A. A. (100)
Lorentz, H. A. (100)
Onnes, Heike K. (100)
Nichols, E. L. (24)
Ewing, Sir J. A. (13)
Thomson, Sir J. J. (100)
Hertz, Heinrich
Planck, Max (100)
Pupin, Michael I. (14)
Guillaume, C. E. (100)
Stratton, S. W.
Bragg, W. H. (26) (100)
Gullstrand, A. (100)
Lenard, Philipp (100)
Franklin, W. S. (24)
Wien, Wilhelm (100)
Zeeman, Pieter (100)
Millikan, R. A. (100)
Wilson, C. T. R. (100)
Perrin, J. B. (100)
Rutherford, E. (4) (100)
Einstein, Albert (100)
Stark, Johannes (100)
Aston, F. W. (100)
Barkla, C. G. (100)
Laue, Max von (100)
Franck, J. (100)
Bohr, N. H. D. (100)
Siegbahn, K. M. (100)
Hertz, G. (100)
Bragg, W. L. (100)
Compton, A. H. (100)

(8) Physiologists, Anatomists, Histologists, Bacteriologists, Pathologists:

Eustachio, B.
Vesalius, A. (15)
Fallopius G. (15)
Fabricius, H. (15)
Harvey, William
Malpighi, Marcello
Haller, A. von (3) (48)
Bichat, Marie F. X.
Weber, Ernst H.
Owen, Sir Richard
Pasteur, Louis (4)
Gegenbaur, Karl
Koch, R. (15) (100)
Golgi, Camillo (100)
Laveran, C. L. (15) (100)
Mechnikov, E. (10) (100)
Fletcher, Horace (92)
Pavlov, Ivan P. (100)
Richet, C. R. (100)
Welch, William H.
Loeffler, Friedrich
Ramón y Cajal, S. (100)
Kossel, Albrecht (100)
Wagner-Jauregg, J. (100)
Bayliss, Sir W. M.
Einthoven, W. (100)
Haldane, John S.
Flexner, Simon (24)
Nicolle, C. J. H. (100)
Fibiger, J. (100)
Bordet, Jules (100)

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Sabin, Florence R.
Krogh, August (100)
Barany, R. (15) (100)
MacLeod, J. J. R. (100)
Meyerhof, O. (100)
Hill, A. V. (100)
Harvey, E. N.
Banting, F. G. (100)

(9) Psychologists:

Beneke, F. E. (26)
Fechner, G. T. (7)
Wundt, W. Max (8)
Ladd, G. T. (63) (24)
Hall, G. Stanley (24)
Hyslop, James H.
Freud, Sigmund (15)
Binet, Alfred (26)
Cattell, J. McK. (24)
Baldwin, James M.
Jastrow, Joseph (24)
Münsterberg, H. (24)
Titchener, E. (24)
Angell, J. R. (24)
Judd, Charles H. (24)
Thorndike, E. L.
Watson, John B.

(10) Zoologists:

Pliny the Elder (3)
Leeuwenhoek, A. van (7)
Réaumur, R. A. de (7)
Buffon, Count de
White, Gilbert (3)
Banks, Sir J. (22)
Lamarck, J. B. de (3)
Huber, François
Wilson, A. (30) (55)
Cuvier, G. C. (8)
Brongniart, A. (5)
Geoffroy Saint-Hilaire, E. (8)
Audubon, J. J. (55) (98)
Baer, Karl Ernst von
Bonaparte, C. Lucien
Agassiz, Louis (98)
Darwin, Charles R. (3)
Gosse, Philip Henry
Baird, Spencer F.
Fabre, Jean Henri
Wallace, Alfred R.
Bates, Henry W.
Huxley, T. H. (8)
Haeckel, Ernst H.
Weismann, August
Agassiz, Alexander
Elliot, Daniel Giraud
Gill, T. N. (24)
Packard, Alpheus S.
Snow, F. H. (24)
Coues, Elliott
Lankester, Sir Edwin Ray (8)
Brooks, W. K. (24)
Holland, W. J. (5)
Comstock, John H.
Hertwig, Oscar
Lyddeker, Richard
Balfour, Francis M.
Birge, E. A. (24)
Goode, George B.
Holder, C. F.
Comstock, Anna B. (24) (53)
Geddes, P. (3) (92) (26)
Hornaday, W. T.
Hudson, W. H.
Merriam, C. Hart
Howard, Leland O.
Loeb, Jacques (8)
Seton, E. T. (55)
Bateson, William
Thomson, J. Arthur
Bailey, Florence A.
Chapman, Frank M.
Davenport, C. B.
Morgan, T. H.
Kellogg, V. L.
Beebe, William
Pearl, Raymond

USEFUL ARTS

(11) Aeronautists:

Montgolfier, J. Michel
Montgolfier, J. E.
Langley, S. P. (2) (7)
Zeppelin, Count von
Wright, W. (14) (17)
Wright, O. (14) (17)
Santos-Dumont, A.
Curtiss, Glenn (14) (17)
Byrd, R. E.
Lindbergh, C. A.

(12) Agriculturists, Horticulturists, Foresters:

Columella, Lucius J.
Judd, Orange
Hellriegel, Hermann
Hilgard, Eugene W.
Wilson, James (69)
Wallace, Henry
Davey, John
Burbank, Luther
Bailey, L. H. (3) (24)
Myrick, H. (30) (19)
Hunt, Thomas F.
Holden, Perry G.
Pinchot, Gifford
Funk, Frank H.
Pearson, R. A.
Klinck, L. S.

(13) Engineers, Constructors, Builders:

McAdam, John L.
Stephenson, George (14)
Fairbairn, Sir W.
Brassey, Thomas
Lesseps, Viscount de
Cooke, Sir W. F. (14)
Roebling, John A.
Eads, J. B. (14) (98)
Fleming, Sir S.
Eiffel, A. G. (11)
Holley, Alexander L.
Haupt, Lewis M.
Fleming, John A. (7)
Lindenthal, Gustav
Burr, W. H. (24)
Wallace, John F.
Hammond, John H.
Taylor, Frederick W.
Goethals, G. W.
Hammer, William J.
Gaillard, D. Du Bose
Parsons, W. Barclay
Modjeski, Ralph
Nixon, Lewis
O'Shaughnessy, M. M.
Steinmetz, C. P.
Dalén, N. G. (7) (100)
Hobson, R. P. (69)
Strauss, J. B.
Richards, C. R.

(14) Inventors:

AMERICAN

Fitch, John
Stevens, John (13)
Evans, Oliver
Fulton, R. (13) (98)
Whitney, E. (17) (98)
Hoe, Robert (17)
Cooper, Peter (17) (90) (98)
Morse, Samuel F. B. (55) (7) (98)
Babbitt, Isaac (17)
Bogardus, James
Goodyear, Charles
Borden, Gail (17)
McCormick, C. H. (17)
Otis, Elisha Graves
Hoe, Richard M. (17)
Colt, Samuel (17)
Corliss, G. H. (17)
Gatling, Richard J.
Howe, Elias (17) (98)
Sholes, C. L.
McKay, Gordon (17)
Wilson, A. B. (17)
Gordon, C. G.
Gray, Elisha
Dolbear, A. E. (24)
Hyatt, John Wesley
Hammond, J. B.
Hoe, Robert (17)
Maxim, Sir H. S. (13) (17) (11)
Holland, John Philip
Selden, G. B.
Westinghouse, G. (17)
Bell, A. G. (7) (24)
Edison, Thomas Alva
Tripler, C. E. (7)
Berliner, Emile
Frasch, Herman
Thomson, Elihu
Eastman, George (17)
Fiske, B. A. (68)
Mergenthaler, Ottmar
Browning, John M.
Acheson, E. G.
Ives, Frederic Eugene
Tesla, Nikola (13)
Lewis, Isaac N.
Sperry, E. A.
Hewitt, Peter C. (13)
Baekeland, L. H.
Hall, C. M. (17) (4)
De Forest, Lee

WORLD

Gutenberg, Johannes
Palissy, Bernard de (4) (7)
Böttger, J. F. (4)
Papin, Denis (7)
Newcomen, Thomas
Ged, William
Harrison, John
Dollond, John
Arkwright, Sir Richard (17)
Watt, James (13)
Cartwright, Edmund
Hargreaves, James
Jacquard, Joseph M.
Crompton, Samuel
Senefelder, Aloys
Daguerre, L. J. (55)
Ericsson, John (13)
Armstrong, Sir W. G. (13) (17)
Bessemer, Sir Henry (13) (17)
Geissler, Heinrich (17)
Albert, Joseph
Nobel, A. B. (17) (4)
Hampson, William
Parsons, Sir C. A. (13)
Welsbach, K. A. von (4)
Nernst, W. (4) (7) (100)
Marconi, Guglielmo (13) (100)

(15) Physicians and Surgeons:

AMERICAN

Bache, F. (4) (24)
Jackson, Charles T.
Flint, Austin (8) (24)
Long, Crawford W.
Wells, Horace
Morton, William T. G. (98)
Blackwell, Elizabeth
Still, Andrew T.
Mitchell, Silas Weir (8) (35) (36) (32)
Jacobi, Abraham (24)
Flint, Austin (8) (24)
Keen, W. W.
Pepper, W. (24)
McBurney, Charles
Palmer, D. D.
Hamilton, Allan McL.
Gorgas, William C.
Holt, Luther E.
Murphy, John B.
Kelly, Howard A.
Mayo, William J.
Mayo, Charles Horace
Jelliffe, Smith Ely
Carrel, A. (8) (100)

WORLD

Hippocrates
Erasistratus (8)
Dioscorides
Galen
Avicenna (62)
Linacre, T. (28) (25)
Paracelsus
Graaf, Regnier de
Boerhaave, H. (4)
Auenbrugger von A., Leopold
Hunter, John (8)
Jenner, Edward
Hahnemann, S. C.
Gall, F. J. (8)
Abernethy, John
Cooper, Sir A. P.
Bright, Richard (8)
Simpson, Sir J. Y. (8)
Zenker, F. A. von (8)
Lister, Joseph, Baron
Kocher, E. T. (100)
Osler, Sir William (26)
Guiteras, J. (8) (26)
Behring, E. A. von (8) (100)
Ehrlich, Paul (8) (4) (100)
Lorenz, Adolf
Ross, Sir R. (8) (100)
Finsen, Niels Ryberg (14) (8) (100)
Wright, Sir A. E. (8)

COMMERCE, FINANCE, INDUSTRY, TRANSPORTATION

(16) Capitalists and Financiers:

Gresham, Sir T. (90)
Halifax, C. M. (79)
Necker, Jacques (84)
Rothschild, Mayer A.
Rothschild, Mayer A.
Rothschild, Solomon
Rothschild, Nathan
Rothschild, Karl
Rothschild, Jacob
Cornell, Ezra (90)
Rothschild, Lionel
Sage, Russell
Flagler, H. M. (20)
Higginson, H. L. (90)
Green, Hetty H. R.
Clews, Henry
Gage, Lyman Judson
Gould, Jay (20)
Morgan, J. Pierpont
Yerkes, C. T. (20)
Rockefeller, J. D.
Rothschild, N., Baron
Vail, Theodore N.
Gary, E. H. (87) (17)
Schiff, J. H. (90)
Astor, William W.
Candler, Asa G. (90)
Ryan, Thomas F.
Forgan, James B.
Mellon, A. W. (17) (69)
Astor, John J. (14)
Vanderlip, Frank A.
Reynolds, G. M.
Davison, H. P.
Kahn, Otto H.
Morgan, J. Pierpont
Rothschild, L., Baron
Baruch, B. M.
Rockefeller, J. D., Jr.
Dillon, Clarence

(17) Manufacturers and Industrial Leaders:

Alstroemer, Jonas
Wedgwood, Josiah
Slater, Samuel
Lawrence, Amos (90)
Krupp, Alfred
Faber, Johann L.
Spreckels, Claus
Pullman, G. M. (14)
Armour, P. D.
Carnegie, A. (90) (16)
Solvay, Ernest (4) (14)
Phipps, Henry (90)
Douglas, W. L. (69)
Frick, H. C. (16)
Gompers, Samuel
Smith, Lyman C.
Doheny, E. L.
Rhondda, Lord
Durant, W. C.
Schwab, C. M. (16)
Ford, Henry
Armour, J. O.
Du Pont, T. Coleman
Corey, W. E. (16)
Mitchell, John
Stinnes, Hugo
Couzens, James (69)
Young, Owen D.
Grace, E. G.

(18) Merchants:

Faneuil, Peter (90)
McGill, James (90)
Girard, Stephen (90)
Astor, John Jacob
Lawrence, Abbott (90)
Stewart, A. T.
Claflin, H. B.
Tiffany, C. L.
Eaton, Timothy
Field, Marshall (90)
Ogden, Robert C. (90)
Wanamaker, John
Altman, Benjamin
Ward, Montgomery
Straus, Nathan
Francis, D. R. (69)
Lipton, Sir T. J.
Straus, O. S. (69) (86)
Woolworth, Frank W.
Rosenwald, Julius

(19) Publishers and Printers:

Fust, Johann
Caxton, William
Brockhaus, F. A.
Knight, C. (38) (40)
Chambers, W. (38)
Chambers, R. (38)
De Vinne, Theodore L.
Childs, G. W. (90)
Ginn, Edwin (90)
Funk, I. K. (30) (61) (93)
Holt, Henry (30)
Curtis, Cyrus H. K.
Klopsch, L. (90) (30)
Kohlsaat, H. (30) (16)
Munsey, F. A. (30)
McClure, S. S. (30)
Ochs, Adolph S.
Doubleday, F. N.
Hearst, W. R. (16) (69)
Capper, A. (30) (69)
Northcliffe, Baron (38)
Meredith, E. T. (69)
McCormick, R. R.

(20) Railway Managers and Ship Owners:

Cunard, Sir S. (17) (13)
Vanderbilt, C. (16)
Fargo, William G.
Field, C. W. (16)
Strathcona, Baron (79) (90)
Stanford, Leland (16) (90) (69)
Depew, C. (69) (96) (87)
Hill, James J. (16)
Ingalls, M. Ezra
Harriman, E. H. (16)
Mackenzie, Sir W.
Huntington, H. E. (16)
Shaughnessy, Baron
Lovett, R. S. (87)
Rolph, James, Jr.
Thornton, Sir H.

EXPLORATION AND DISCOVERY

(21) Archeologists:

Ixtlilxochitl, F. de Alva (46)
Young, Thomas (7)
Champollion, J. F.
Lepsius, Karl R.
Curtius, E. (46) (27)
Layard, Sir A. H. (79)
Schliemann, Heinrich
Cesnola, Count di
Lanciani, C. R.
Maspero, Sir Gaston Camille (27) (46)
Evans, Sir A. J.
Petrie, W. M. F.
Budge, E. A. W. (28)
Breasted, J. H.
Huntington, A. M. (99)
Currelly, C. T.

(22) Explorers:

Polo, Marco (5)
Columbus, Christopher (66)
Bruce, James
Vancouver, G. (77)
Park, Mungo
Franklin, Sir J. (77)
Ross, Sir James C.
Livingstone, David (miss.) (60)
Baker, Sir S. W.
Barth, Heinrich (5)
Burton, Sir R. F.
Speke, John H.
Markham, Sir C. (5)
Nordenskjöld, Nils, Baron (5)
Du Chaillu, P. (10) (3)
Muir, John
Przhevalski, Nikolai M. (10) (5)
Emin Pasha (15)
Stanley, Sir H. M. (38) (79)
Greely, A. W. (67)
Selous, F. C.
Conway, Sir W. M. (38)
Peary, R. E. (1) (68)
Johnston, Sir H. (40)
Nansen, Fridtjof (100)
Kingsley, Mary (10)
Younghusband, Sir F. E. (76)
Borchgrevink, C. E.
Hedin, S. A. (5)
Landor, A. H. S. (53)
Scott, Robert Falcon
Amundsen, Roald
Abruzzi, Duke of the
Shackleton, Sir E. H.
Stefánsson, V. (1)
Franck, Harry A.
Mawson, Sir Douglas
Andrews, R. C.

(23) Navigators:

Diaz, Bartholomew (22)
Vespucci, A. (22)
Gama, Vasco da (22)
Magellan, F. (22)
Verrazano, G. da
Frobisher, Sir Martin (77) (97)
Davis, John (22)
Baffin, William
Bering, Vitus (22)
Cook, Captain J. (22)
Bougainville, L. A. de (22) (5)
Lapérouse, Count de (22)
Flinders, M. (5)
Wilkes, C. (22) (68)

EDUCATION

(24) American Educators:

Harvard, John (61)
Yale, Elihu
Dwight, Timothy (61)
Morse, Jedidiah
Gallaudet, T. H.
Willard, Emma (98)
Peirce, Cyrus
Colburn, Warren
Mann, H. (69) (98)
Lyon, Mary (98)
Hopkins, M. (61) (98)
Peabody, Elizabeth
Barnard, F. A. (6) (7)
Barnard, Henry (30)
Hill, T. (61) (6) (28)
Calkins, Norman A.
Angell, J. B. (69)
Gilman, D. C. (30) (99)
White, A. D. (69) (99)
Eliot, C. W. (4) (86)
Northrop, Cyrus
Adams, C. K. (33)
Harris, W. T. (63)
Gallaudet, E. M.
Young, Ella Flagg
Draper, A. S. (87)
De Garmo, Charles
Barnes, Mary S.
Dewey, Melvil
Zahm, John A.
Harker, J. R.
Thwing, Charles F.
West, Andrew F.
Schurman, J. G. (64)
Palmer, Alice F. (98)
Thompson, W. O.
McMurry, Charles A.
Pritchett, H. S. (2)
Thomas, Martha C.
King, H. C. (61)
Washington, Booker
Kirkland, James H.
Main, J. H. T.
Bryan, William Lowe
Rhees, B. Rush (61)
Alderman, E. A.
Brown, E. E.
Murlin, L. H.
Claxton, P. P.
McMurry, Frank M.
Shanklin, W. A. (61)
Brooks, S. P.
Finley, J. H. (86)
Garfield, Harry A.
Woolley, Mary Emma
Russell, James E.
Pendleton, Ellen F.
Avery, Samuel
Benton, Guy Potter
Bryan, Elmer B.
Gulick, Luther H.
Baker, George P. (99)
O'Shea, M. V.
Flexner, Abraham
Blaisdell, J. A.
Farrand, L.
Hoffman, John W.
Penniman, J. H.
Brooks, Stratton Duluth
Graves, Frank P.
Grose, George R. (61)
Hill, Albert Ross
Monroe, Paul
Scott, Walter D.
Thomas, John Martin (61)
Dinwiddie, A. B.
Carlin, James J.
Hughes, R. M.
Burton, M. L.
Wirt, William A.
Van Rensselaer, Martha
Coffman, L. D.
Kleinsmid, R. B.
MacCracken, J. H.
Suzzallo, Henry
Wilbur, R. L.
Vinson, R. E.
Strayer, George Drayton
Bowman, John G.
Jessup, Walter A.
Reinhardt, Aurelia H.
Capen, S. P.

EDUCATION—Con.

Flint, Charles W.
Ayres, Leonard P. (89)
MacCracken, H. N.
Frank, Glenn
Bird, R. du Bois

(25) Ancient and Medieval Educators:

Protagoras (62)
Socrates (phil.) (62)
Isocrates (orat.) (45) (96)
Plato (phil.) (62)
Aristotle (phil.) (62)
Cicero (orat.) (96) (45) (73)
Apollonius of Tyana (62)
Quintilian
Clement of Alexandria (61)
Origen (61)
Benedict, St. (61)
Alcuin (61)
Alfred the Great (ruler) (75)
Anselm, Saint (phil.) (62)
John of Salisbury
Albertus Magnus (61)
Aquinas, St. Thomas (phil.) (62) (61)
Pletho (phil. wr.) (6)
Gaza, Theodorus

(26) Modern World Educators:

Colet, John (61)
Ascham, Roger (28)
Comenius, J. A.
Epée, Abbé de l' (90)
Rousseau, J. J. (92)
Basedow, Johann B.
Pestalozzi, J. H.
Bell, Andrew (93)
Girard, Jean B.
Herbart, J. F. (9) (63)
Jahn, Friedrich L.
Lancaster, Joseph
Froebel, F. W.
Diesterweg, F. A.
Arnold, Thomas (40)
Braille, Louis
Pitman, Sir Isaac
Young, George P.
Fryer, John (28)
Hutton, Maurice
Peterson, Sir W.
Gandier, Alfred (61)
Bowles, Richard P.
MacFarland, Sir J. H.
Tory, Henry M.
MacKenzie, A. S.
Murray, Walter C.
Falconer, R. A. (61)
Cody, Henry J.
MacLean, J. A.
Montessori, Maria (15)
Jones, Cecil C.

LANGUAGE

(27) Philologists, Lexicographers, Linguists, Grammarians:

Webster, Noah
Grimm, Jakob L. (41)
Littré, M. P. (63)
Freund, Wilhelm
Blackie, J. S. (26)
Drisler, H. (28) (24)
Trumbull, James Hammond (1) (33)
Müller, F. Max (28)
Furnivall, F. J.
March, F. A.
Murray, Sir James A. H.
Harper, William R. (24) (28)
Smith, B. E. (30)
Zamenhof, Lazarus L.
Vizetelly, F. H.

(28) Classical and Oriental Scholars:

Einhard (hist.) (46)
Erasmus, D. (61)
Budæus
Lily, William (26)
Scaliger, Joseph J.
Casaubon, I. (45)
Galland, A. (26)
Heyne, Christian G.
Jones, Sir William
Rawlinson, Sir H. C. (79)
Hepburn, J. C. (15)
Jowett, B. (26)
Curtius, G. (27) (26)
Harkness, A. (24)
Gildersleeve, B. L. (24) (99)
Goodwin, W. W. (24)
Fryer, John (24)
Jebb, Sir R. C.
Hall, Frederic A.
Wheeler, B. I.
Shorey, Paul (99)
Haupt, Paul (24)
Hyvernat, E. X. (21) (26)
Jastrow, Morris, Jr.
Adler, Cyrus (21)
Fairbanks, A. (24)
Murray, G. G. A.
Goodspeed, E. J.
Morgenstern, J. (24)

AMERICAN LITERATURE

(29) Dramatists:

Payne, John H.
Herne, James A. (49)
Howard, B. (99)
Gillette, Wm. (49) (99)
Brown, Alice (35) (36)
Thomas, A. (99)
Fitch, W. Clyde
Klein, Charles
Moody, W. V. (36) (99)
Kennedy, C. R.
Peabody, Josephine Preston (36)
Walter, Eugene
Mackaye, Percy (36)
Cohan, George M.
Sheldon, E. B.
O'Neill, E. G.

(30) Editors and Journalists:

Hale, Sarah Josepha (36) (35)
Bennett, J. G. (19)
Greeley, Horace (69)
Allibone, Samuel A.
Bigelow, John (31) (33) (99)
Dana, Charles A.
Field, Henry M.
Curtis, G. W. (31) (86)
Bowles, Samuel
Warner, C. D. (31)
Alden, Henry Mills (28) (99)
Reid, Whitelaw (69)
Johnson, Rossiter
Watterson, Henry (96)
Gilder, R. W. (36) (99)
Kennan, George
Anderson, Rasmus B. (24) (69)
Bishop, J. B.
Pulitzer, Joseph
Stone, Melville E.
Marden, O. S. (31)
Grady, H. W. (96)
Dole, Nathan H.
Johnson, Robert U. (36) (99)
Bigelow, P. (33)
Carpenter, Frank G. (24) (5)
Page, Walter H.
Graves, J. T. (96)
Kobbe, Gustav
Shaw, Albert (92)
Foss, S. W. (34) (36)
Camp, Walter
Lummis, C. F. (22)
Thayer, William R. (33) (36) (99)
Perry, Bliss (31) (24) (99)
Crane, Frank
Bok, Edward W.
Howell, Clark (69)
Brisbane, Arthur
Harvey, George B.
Colby, Frank M. (24)
Slosson, E. E.
Barrett, John (69)
Adams, Franklin P.
Blythe, Samuel G.
Hapgood, N. (31)
Lorimer, George H.
White, W. Allen (35)
Croly, Herbert
Baker, Ray S.
Irwin, W. H.
Grosvenor, G. H.
Cobb, Irvin S. (34)
Marcosson, I. F.
Hard, William
Simonds, Frank H.
Street, Julian L.
Lardner, Ring W.
Hall, James Norman
Lippmann, Walter
Morley, Christopher

(31) Essayists and Critics:

Irving, Washington (35) (34) (98)
Ticknor, George (33)
Fuller, Margaret
Hudson, H. N. (61)
Thoreau, H. D.
Mitchell, Donald G. (35) (99)
Higginson, T. W. (33) (99)
Norton, C. E. (24) (99)
Rolfe, William J.
Furness, H. (30) (99)
Burroughs, John (99)
Lounsbury, T. R. (24) (99)
Mabie, Hamilton W. (30) (99)
Moulton, R. G. (24)
Hearn, Lafcadio
Brownell, W. C. (99)
Egan, Maurice F. (99)
Matthews, Brander (24) (99)
Van Dyke, Henry (24) (61) (69) (99)
Finck, Henry T.
Krehbiel, H. E.
Henderson, W. J.
Wendell, B. (24) (99)
Woodberry, G. E. (36) (99)
Van Dyke, J. C. (99)
Gayley, C. M. (24)
Repplier, Agnes
Hubbard, Elbert (30)
Huneker, James G.
Dale, Alan (30)
McGroarty, J. S. (29)
Trent, W. P. (24)
More, Paul Elmer (99)
Phelps, W. L.
Le Galliene, R.
Cortissoz, R. (99)
Corbin, John (35)
Keller, Helen Adams
Sherman, S. P. (99)

(32) Juvenile Writers:

Goodrich, Samuel G.
Optic, Oliver
Trowbridge, J. T. (35) (36)
Finley, Martha
Alcott, Louisa May
Eggleston, Edward (35) (33) (30)
Dodge, Mary E. M.
Cox, Palmer (53)
Harris, J. C. (35) (99)
Holder, C. F. (10)
Pyle, Howard (illus.) (53)
Wiggin, Kate D. (24)
Burgess, Frank G. (34) (53)
Eaton, Walter P.
Wells, Carolyn

(33) Historians and Biographers:

Sparks, Jared (24)
Prescott, W. H.
Bancroft, George (98)
Hildreth, Richard
Lossing, Benson J.
Motley, J. L. (98)
Parkman, F. (98)
Smith, Goldwin (publ.) (86) (24)
Lea, H. C. (99)
Fisher, G. P. (61)
Bancroft, Hubert H.
Adams, C. F., Jr. (86) (20) (99)
Tyler, Moses Coit (24)
Larned, J. N. (30)
Adams, Henry (99)
Schouler, James (87)
Ridpath, J. C. (24)
Holst, H. E. von (24)
Fiske, John (63)
Myers, P. Van Ness
Rhodes, J. F. (31) (99)
Rives, G. L. (87) (99)
Sloane, William M. (24) (99)
Adams, G. B. (24)
McMaster, J. B. (24)
Hart, Albert B. (86) (24)
Channing, Edward
Taylor, Henry O.
Tarbell, Ida M.
Jameson, J. F. (24)
McLaughlin, Andrew C. (24)
Robinson, J. H. (24)
Bassett, J. S. (24)
Hazen, Charles D. (99)
Neilson, W. A.
Van Loon, Hendrik Willem

AMERICAN LITERATURE—Con.

(34) Humorists and Satirists:

Shaw, Henry Wheeler
Browne, Charles F.
Clemens, Samuel L. (35) (98) (99)
Burdette, Robert Jones (30) (61)
Nye, Edgar Wilson
Bunner, Henry C. (35) (36) (29)
Bangs, John K. (30)
Mason, Walt
Ade, George (29)
Burgess, F. G. (juv. wr.) (32)
Dunne, F. P. (30)
Wells, Carolyn (juv. wr.) (32)
Irwin, Wallace (30)
Rogers, Will
Mencken, H. L.
Guest, E. A.

(35) Novelists:

Brown, Charles B.
Cooper, James Fenimore (98)
Hawthorne, Nathaniel (32) (98)
Stowe, Harriet B. (93) (30) (98)
Wallace, L. (67) (69)
Barr, Amelia Edith
Davis, Rebecca H.
Jackson, Helen Hunt (36)
Howells, W. D. (30) (36) (31) (99)
Smith, F. Hopkinson (55) (13) (99)
Tourgée, A. W.
Harte, Bret (36)
James, H. (31) (99)
Cable, G. W. (99)
King, Charles (67)
Ward, Elizabeth (31)
Green, Anna K.
Harrison, Constance C. (29)
Foote, Mary H. (53)
Hardy, A. S. (69)
Boyesen, H. H. (31)
Allen, James Lane
Burnett, Frances H. (29) (32)
Jewett, Sarah Orne
French, Alice
Murfree, Mary N.
Grant, R. (31) (99)
Page, T. N. (69) (99)
Crawford, F. M. (99)
Major, Charles (87)
Atherton, Gertrude F.
Deland, Margaretta Wade
Hough, Emerson
Bacheller, Irving
King, Basil
Garland, Hamlin (36) (99)
Wister, Owen (99)
Long, J. L. (87)
Quick, J. H.
Freeman, Mary E.
Porter, W. S. (30)
Wharton, Edith
Fox, J. W., Jr.
Davis, R. H. (30)
Dixon, Thomas (29)
Chambers, Robert W. (53)
Ford, P. L. (33)
McCutcheon, G. B.
Nicholson, Meredith
Phillips, David G.
Herrick, Robert (24)
Porter, Gene Stratton (10)
Harris, Corra M.
Tarkington, Booth (29) (99)
Johnston, Mary
Norris, Frank
Rice, Alice C. H.
Churchill, Winston
Dreiser, Theodore (30)
Wright, Harold B.
White, Stewart E.
Gale, Zona (30) (31)
Glasgow, Ellen A.
Merwin, Samuel (30)
Cather, Willa (30)
Grey, Zane
Anderson, Sherwood
London, Jack (91) (92)
Morris, Gouverneur
Rinehart, Mary Roberts (29)
Beach, Rex (29)
Glass, Montague
Curwood, J. O.
Johnson, Owen
Fisher, Dorothy Canfield (31)
Harrison, H. S.
Hergesheimer, J.
Kyne, P. B.
Norris, Kathleen
Poole, Ernest
Lewis, Sinclair
Dell, Floyd
Ferber, Edna

(36) Poets:

Hopkinson, F. (69)
Freneau, Philip
Barlow, Joel (69)
Key, Francis Scott
Halleck, Fitz-Greene
Payne, J. H. (dram.) (29)
Bryant, William C. (30) (98)
Emerson, Ralph W. (63) (31) (98)
Simms, W. G. (35)
Longfellow, Henry W. (98)
Whittier, John G. (93) (98)
Holmes, Oliver W. (31) (15) (98)
Poe, Edgar Allan (31) (98)
Lowell, James R. (31) (69) (98)
Whitman, Walt
Cary, Alice
Crosby, Fanny
Read, Thomas B.
Cary, Phœbe
Taylor, Bayard (30)
Finch, F. M. (88)
Timrod, Henry
Hayne, Paul Hamilton
Stedman, E. (31) (99)
Aldrich, T. B. (29) (99)
Thaxter, Celia (32)
Ryan, Abram Joseph
Miller, Joaquin
Sill, Edward R. (31)
Lanier, Sidney
O'Reilly, John Boyle
Brooks, Fred E.
Field, Eugene (30) (32)
Markham, Edwin
Riley, J. W. (99)
Stanton, Frank L.
Bates, Katharine Lee (24) (31) (32)
Scollard, Clinton (24)
Robinson, Corinne R.
Masters, Edgar Lee
Robinson, E. A.
Dunbar, Paul L.
Lowell, Amy (31)
Frost, Robert
Sandburg, Carl
Lindsay, Nicholas V.
Untermeyer, Louis (30)
Kilmer, Joyce
Seeger, Alan

ENGLISH LITERATURE

Including Canadian and Other Colonial Writers

(37) Dramatists:

Marlowe, Christopher
Shakspere, William (poet) (43)
Jonson, Ben
Fletcher, John (43)
Webster, John
Beaumont, F. (43)
Ford, John
Congreve, William
Sheridan, R. B. (79) (96)
Knowles, James S.
Gilbert, W. S. (39)
Jones, Henry A.
Parker, L. N.
Pinero, Sir A. Wing
Shaw, G. Bernard (38)
Wilde, Oscar (43) (38)
Gregory, Lady
Chambers, Charles Haddon
Galsworthy, John (42)
Phillips, Stephen (43)
Synge, J. M. (43)
Dunsany, Lord
Houghton, Stanley
Drinkwater, John
Francis, John O.
Ervine, St. John G. (42)

(38) Essayists, Critics, Journalists:

Walton, Izaak
Addison, Joseph
Steele, Sir Richard (37)
Montagu, Lady Mary Wortley (43)
Chesterfield, Earl of (79)
Kames, Henry Home, Lord (63)
Johnson, Samuel (27)
Walpole, Horace
Lamb, Charles (43) (41)
Hazlitt, William
Hunt, Leigh (43)
De Quincey, Thomas
Clarke, Charles C.
Carlyle, Thomas (40) (63)
Newman, John Henry (card.) (43) (59)
Martineau, Harriet
Ruskin, John (93) (41)
Grove, Sir G. (13)
Labouchere, H. du Pré (79)
Browning, Oscar (40)
Pater, Walter H.
Lang, Andrew (41)
Saintsbury, George Edward
Graham, Baron (19)
Gosse, E. (43) (40)
Stead, William T.
Macdonald, James Alexander (61)
Chisholm, Hugh
M'Cabe, Joseph (40) (64)
Belloc, Hilaire
Laut, Agnes C.
Chesterton, G. Keith (42) (37)
Gibbs, Sir Philip
George, W. L.

(39) Humorists and Satirists:

Butler, Samuel
Swift, Jonathan (38)
Smith, Sydney (38)
Barham, R. H. (43)
Haliburton, T. C.
Jerrold, Douglas W. (38) (37)
Jerome, Jerome K. (38)
Leacock, Stephen B.
Beerbohm, Max

(40) Historians and Biographers:

Bede, The Venerable (61) (28) (25)
Holinshed, Raphael
Hakluyt, Richard (5)
Pepys, Samuel (79)
Gibbon, Edward
Boswell, James
Aikin, J. (38) (15)
Hallam, Henry (38)
Grote, George (79)
Lockhart, John G.
Macaulay, Lord (38) (79)
Fergusson, James
Kinglake, A. W.
Creasy, Sir E. S.
Forster, John
Rawlinson, George
Smiles, Samuel
Froude, James A.
Freeman, Edward A.
Stubbs, William (61)
Gardiner, Samuel R.
McCarthy, Justin (42) (79)
Hodgkin, Thomas
Stephen, Sir L. (38)
Acton, Baron
Bourinot, Sir J. G. (79)
Green, John R.
Lecky, W. E. (63)
Morley of Blackburn, Viscount (38) (79)
Trevelyan, Sir G. O. (79)
Symonds, J. A. (38)
Creighton, Mandell (61)
Doughty, C. M.
Wrong, G. M.
Bury, John B. (26)
Charnwood, Lord
Zimmern, A. E.
Strachey, G. L.
Asquith, Margot

(41) Juvenile Writers:

Æsop (Gr.) (47)
La Fontaine, Jean de (Fr.) (47)
Perrault, Chas. (Fr.) (48) (45)
Grimm, J. L. (Ger.) (27) (21)
Andersen, Hans C. (Dan.) (47) (48)
Hughes, Thomas (93)
Mulock, Dinah M. (42)
Carroll, Lewis (39)
Lagerlöf, Selma (Swed.) (47) (100)

ENGLISH LITERATURE—Con.

(42) Novelists:

Malory, Sir Thomas
Bunyan, John (61)
Defoe, Daniel (38)
Richardson, Samuel
Fielding, Henry
Sterne, Laurence
Smollett, T. G.
Goldsmith, Oliver (43)
Edgeworth, Maria
Scott, Sir Walter (43)
Austen, Jane
Porter, Jane
Marryat, Frederick
Shelley, Mary G.
Lytton, Bulwer-Lytton, Lord
Ainsworth, W. H.
Lever, Charles J.
Gaskell, Elizabeth
Thackeray, Wm. M. (38) (39)
Dickens, Charles
Reade, Charles
Trollope, Anthony
Brontë, Charlotte
Eliot, George (38) (43)
Kingsley, Charles (41) (61)
Collins, Wilkie
MacDonald, George
Blackmore, R. D.
Meredith, George (43)
Oliphant, Margaret (40)
Edwards, Amelia B. (21)
De Morgan, W. F. (14)
Ramée, Louise de la
Hardy, Thomas
Black, William
Stevenson, Robert Louis (38) (41)
Watson, John (61)
Ward, Mrs. H.
Caine, Hall (37)
Conrad, Joseph
Haggard, Sir H. R. (93) (87)
Doyle, Sir A. C. (15)
Barrie, Sir J. M. (37) (41)
Gordon, C. W. (61)
Roberts, C. G. (43)
Hewlett, Maurice H.
Parker, Sir H. G.
Phillpotts, Eden
Hawkins, Anthony H.
Locke, William J.
Quiller-Couch, A. T.
Corelli, Marie
Harraden, Beatrice
Hichens, Robert S.
Zangwill, Israel (37) (38) (43)
Grand, Sarah
Hannay, J. O. (61)
Kipling, Rudyard (43) (41) (100)
Hornung, E. W. (38)
Oppenheim, E. P.
Wells, Herbert G.
Bennett, Arnold (38) (37)
Hobbes, John Oliver
Montgomery, Lucy M.
Hutchinson, A. S.
Walpole, Hugh
Sinclair, May
Stockley, Cynthia

(43) Poets:

Cædmon
Barbour, John (40)
Langland, William
Chaucer, Geoffrey (79)
Spenser, Edmund
Chapman, George
Shakspere, Wm. (37)
Herrick, Robert
Milton, John (38)
Cowley, Abraham
Dryden, John (38) (37) (39)
Cibber, Colley (37) (49) (52)
Watts, Isaac (61)
Gay, John
Pope, Alexander (39)
Wesley, Charles
Gray, Thomas
Akenside, Mark
Cowper, William
Darwin, Erasmus (15)
Beattie, James (64)
Barbauld, Anna L.
Crabbe, George
Blake, W. (53) (55)
Burns, Robert
Baillie, Joanna (37)
Wordsworth, William
Cary, H. F. (61)
Coleridge, Samuel T. (38) (63)
Southey, Robert (40)
Landor, W. S. (38)
Campbell, Thomas
Moore, Thomas
Heber, R. (61)
Byron, Lord
Keble, John (61)
Shelley, Percy B.
Hemans, Felicia D.
Keats, John
Hood, Thomas (39)
Browning, Elizabeth Barrett
Bonar, Horatius
Fitzgerald, Edward
Tennyson, Alfred
Browning, Robert
Faber, F. W.
Ingelow, Jean (42)
Arnold, Matthew (38)
Rossetti, Dante G. (55)
Rossetti, Christina G.
Lytton, Bulwer-Lytton, Earl of (79)
Arnold, Sir E. (38)
Morris, William (55)
Austin, Alfred (38) (42)
Swinburne, Algernon
Dobson, H. A. (38)
Bridges, Robert
Henley, William E. (38) (37)
Meynell, Alice
Drummond, W. H.
Watson, William
Housman, A. E. (28)
Carman, Bliss (38)
Tagore, R. (100)
Scott, Duncan C.
Yeats, William Butler (37) (100)
McCrae, John D.
Masefield, John (37)
Service, Robert (42)
Brooke, Rupert
Noyes, Alfred

WORLD LITERATURE

(44) Dramatists:

Thespis (48)
Æschylus (48)
Sophocles (48)
Euripides (48)
Aristophanes (48)
Plautus (48)
Terance (48)
Vega Carpio, Lope Felix de (48)
Calderón de la Barca, Pedro (48)
Corneille, Pierre (48)
Molière
Racine, Jean B. (48)
Goldoni, Carlo
Lessing, Gotthold E. (45) (48)
Beaumarchais, Pierre de (48)
Alfieri, Count (48)
Schiller, Johann von (48) (45)
Kleist, Bernd von (48) (47)
Grillparzer, F. (48)
Scribe, Augustin E.
Hertz, Henrik (48)
Hugo, Victor Marie (47) (48)
Augier, G. V. E.
Dumas the Younger (47)
Ibsen, Henrik (48)
Sardou, Victorien
Echegaray, José (84) (26) (100)
Becque, Henri F.
Pérez Galdós, B. (47)
Giacosa, Giuseppe
Strindberg, August (47) (46)
Hervieu, Paul E. (47)
Sudermann, H. (47)
Brieux, Eugène
Donnay, Maurice C.
Lavedan, Henri (47) (45)
Hyde, Douglas
Hauptmann, Gerhart (48) (100)
Maeterlinck, Maurice (45) (100)
Schnitzler, Arthur
Annunzio, Gabriele d' (48) (47)
Wedekind, Frank
Benavente, Jacinto (48) (100)
Bergström, Hjalmar
Rostand, Edmond (48)
Bernstein, Henry L.

(45) Essayists, Critics, Journalists:

Gorgias (96) (25)
Æschines (orat.) (96)
Demosthenes (orat.) (96) (73)
Cicero (orat.) (73) (96)
Pliny the Younger (71)
Gellius, Aulus
Montaigne, M. de (64)
Sévigné, Marquise de
Fontenelle, B. de (64)
Grimm, F., Baron von (84)
Epinay, Louise d'
Staël, Madame de (47)
Hoffmann, Ernst (47) (51) (53)
Sainte-Beuve, Charles
Gervinus, Georg G. (86) (26)
Renan, Joseph E. (46) (27)
Ghika, Helena (44)
Taine, Hippolyte A.
Ducommun, Élie (100)
Moneta, Ernesto T. (100)
Brandes, Georg
France, Anatole (47) (100)
Brunetière, Ferdinand
Lemaître, François (44)
Harden, Maximilian

(46) Historians and Biographers:

Herodotus
Thucydides (96)
Xenophon (25)
Polybius
Nepos, Cornelius
Sallust
Livy
Josephus, Flavius
Plutarch
Tacitus, Publius (96)
Arrian
Eusebius of Cæsarea
Cassiodorus
Einhard
Anna Comnena
Froissart, Jean (48)
Vasari, Giorgio (55) (50)
Vega, Garcilaso de la
Wyss, Johann R. (26)
Guizot, François (84)
Eckermann, J. P.
Ranke, Leopold von
Cantù, Cesare (47)
Droysen, Johann Gustav
Graetz, Heinrich (26)
Mommsen, Theodor (28) (100)
Gregorovius, F. (48) (45)
Troels-Lund, Troels Frederik
Ferrero, Guglielmo

(47) Novelists and Fabulists:

Æsop
Apuleius
Boccaccio, Giovanni
Rabelais, François
Cervantes
Bergerac, Cyrano de (44)
La Fontaine, Jean de (48)
Perrault, Charles (poet) (41)
Lesage, Alain R. (44)
Saint-Pierre, J. de (45)
Chateaubriand, Vicomte de (84)
Fouqué, F. H. (48)
Manzoni, Alessandro (48)
Almqvist, Karl Jonas (45) (48) (44)
Balzac, Honoré de
Bremer, Fredrika
Dumas the Elder (44)
Mérimée, Prosper (46) (21)
Sand, George
Sue, Eugène
Andersen, Hans C. (48) (41)
Gógol, Nikolai V.
Gautier, Théophile (48) (45)
Auerbach, Berthold
Freytag, Gustav (44) (45)
Turgéniev, Ivan
Dostoiévsky, Fiódor
Flaubert, Gustave
Erckmann-Chatrian (44)
Jókai, Maurus
About, Edmond F. (45)
Tolstóy, Liov (93) (44)
Verne, Jules
Ebner-Eschenbach, Marie (48)
Heyse, Paul (48) (44) (100)
Björnson, Björnstjerne (44) (48) (100)
Halévy, L. (44)
Ebers, Georg M. (21)
Daudet, Alphonse
Zola, Emile
Suttner, Baroness von (93) (100)
Sienkiewicz, H. (100)
Franzos, Karl E. (45)
Maupassant, Guy de
Viaud, Louis Marie

WORLD LITERATURE—Con.

Bourget, Paul (45) (48)
Schreiner, Olive
Gjellerup, K. (100)
Pontoppidan, H. (100)
Lagerlöf, S. (41) (100)
Maartens, Maarten
Heidenstam, Verner von (48) (100)
Chékov, Anton (44)
Hamsun, Knut (100)
Couperus, Louis
Rolland, R. (45) (100)
Blasco Ibañez, V.
Gorky, Maxim
Reymont, W. S. (100)
Andréiev, L. K. (44)
Mann, Thomas
Deledda, G.
Undset, Sigrid (100)

(48) Poets:

Homer
Hesiod
Alcæus
Sappho
Anacreon
Pindar
Menander (44)
Apollonius Rhodius
Theocritus
Ennius, Quintus
Lucretius
Catullus
Virgil
Horace
Ovid
Juvenal
Ausonius, Decimus
Boethius (64)
Firdousi
Omar Khayyam (2)
Bernard of Cluny (61)
Dante
Hafiz
Petrarch
Ariosto, Ludovico
Colonna, Vittoria
Vega, G. de la (81)
Camoëns, Luiz Vaz de
Ferreira, Antonio (44)
Tasso, Torquato
Alarcón y Mendoza
Perrault, Charles (45) (41)
Holberg, Baron (46) (44) (47)
Klopstock, Friedrich
Wieland, C. (45)
Bellman, Karl Mikael
Derzhavin, Gavril (84)
Herder, J. von (45)
Goethe, Johann von (44) (45) (10)
Rouget de Lisle
Franzén, F. M. (61)
Oehlenschläger, Adam Gottlob (44)
Béranger, Pierre de
Chamisso, A. (47) (3)
Körner, Karl Theodor
Bretón de los Herreros
Heine, Heinrich
Púshkin, Alexander
Vigny, Comte de (47)
Quinet, E. (46) (86)
Cremazie, Octave
Mistral, Frédéric (100)
Jovanović, Jovan (45)
Becquer, G. A. (47)
Carducci, G. (84) (100)
Sully-Prudhomme, René (100)
Coppée, F. (47) (44)
Spitteler, K. F. G. (100)
Verhaeren, Emile
Bialik, Hayim N.
Hofmannsthal, H. (44)

FINE ARTS

(49) Actors:

AMERICAN

Forrest, Edwin
Cushman, Charlotte (98)
Jefferson, J. (55) (99)
Booth, Edwin Thomas
Barrett, Lawrence
Crane, William Henry
Drew, John
Mantell, Robert B.
Goodwin, Nathaniel C.
Mansfield, Richard
Hopper, De Wolf
Skinner, Otis
Sothern, E. H. (52)
Miller, Henry J.
Rehan, Ada
Irwin, May
Fiske, Minnie M. (29)
Warfield, David
Allen, Viola
Arthur, Julia
Hackett, J. K.
Marlowe, Julia
Elliott, Maxine
Irving, Isabel
Adams, Maude
Post, Guy B.
Barrymore, Ethel
Hampden, Walter
George, Grace
Illington, Margaret
Fairbanks, Douglas
Burke, Billie
Chaplin, Charles S.
Chatterton, Ruth
Pickford, Mary

WORLD

Clive, Kitty
Garrick, David (52)
Siddons, Sarah
Kemble, John Philip
Kemble, Charles
Kean, Edmund
Kemble, Frances A.
Kean, Charles John
Irving, Sir Henry
Coquelin, Benoît (45)
Modjeska, Helena
Bernhardt, Sarah (44) (56)
Terry, Ellen Alice
Kendal, Mrs.
Warde, Frederick
Forbes-Robertson, J.
Duse, Eleonora
Hading, Jane
Campbell, Mrs. P.
Arliss, George
Matthison, Edith W.
Anglin, Margaret
Nazimova, Alla
Pavlowa, Anna

(50) Architects:

AMERICAN

Bulfinch, Charles
Latrobe, Benj. (13)
Walter, Thomas U.
Renwick, James
Olmsted, Frederick L.
Hunt, Richard Morris
Sturgis, Russell (31)
Post, George B. (99)
Richardson, Henry H.
Burnham, Daniel H.
Mead, William R. (99)
McKim, Charles F. (99)
White, Stanford
Kendall, W. M. (99)
Flagg, Ernest
Carrère, John Merven
Coolidge, Charles A.
Cobb, Henry Ives
Gilbert, Cass (99)
Hastings, Thos. (99)
Heins, George Lewis
La Farge, C. G.
Howard, J. G.
Bacon, Henry (99)
Goodhue, B. G.
Pope, John R.

WORLD

Callicrates
Callimachus (56) (55)
Apollodorus
Brunelleschi, Filippo
Alberti, Leon B.
Bramante
Palladio, Andrea
Fontana, D. (13)
Jones, Inigo
Wren, Sir C. (2) (6)
Garnier, Jean Louis

(51) Composers:

AMERICAN

Foster, Stephen C.
Buck, Dudley (54)
Paine, John Knowles
Foote, Arthur (54)
Chadwick, George W. (54) (99)
Kelley, Edgar S.
Herbert, Victor (54)
De Koven, R. (54) (31)
MacDowell, E. A. (54) (99)
Bond, Carrie J. (36)
Damrosch, W. (54)
Nevin, Ethelbert
Parker, H. W. (54) (99)
Cole, R. G. (31) (54)
Beach, Amy M. C.
Converse, Frederick S.
Hadley, Henry K. (54)
Carpenter, John A.
Cadman, Charles W.

WORLD

Huebald
Guido d' Arezzo
Dunstable, John
Dufay, Guillaume
Palestrina, G. da (54)
Lasso, Orlando di
Cavalieri, Emilio del
Peri, Jacopo
Monteverde, Claudio
Cavalli, Francesco
Carissimi, Giacomo
Lully, Jean B. (54)
Bach, Johann Sebastian
Handel, George Frederick (54)
Arne, Thomas A.
Bach, Karl Philipp
Gluck, Christoph W.
Haydn, Joseph (54)
Mozart, J. W. A. (54)
Beethoven, Ludwig Van (54)
Auber, Daniel F.
Bishop, Sir H. R. (54)
Weber, Karl M. von
Czerny, Karl (54) (45)
Meyerbeer, G. (54)
Rossini, G. A.
Donizetti, Gaetano
Schubert, Franz P.
Bellini, Vincenzo
Bériot, Charles de (54)
Berlioz, Hector (54)
Glinka, Mikhail I.
Balfe, Michael W.
Mendelssohn-Bartholdy (54)
Chopin, Frédéric (54)
David, Félicien César
Schumann, R. (45)
Thomas, Ambroise
Flotow, Friedrich von
Verdi, Giuseppe (84)
Wagner, R. (48) (44)
Franz, Robert
Heller, Stephen (54)
Kjerulf, Halfdan
Bennett, Sir W. (54)
Gade, Niels Wilhelm
Gounod, Charles F.
Offenbach, Jacques
Franck, César (54)
Bruckner, Anton (54)
Strauss, Johann (54)
Brahms, Johannes
Borodin, Alexander P. (4)
Cui, César A. (13)
Saint-Saëns, C. C. (54)
Balakirev, Mili A.
Barnby, Sir J. (54)
Bizet, Georges
Bruch, Max
Mussorgsky, M. P.
Tchaikovsky, P. I.
Dvořák, Antonin
Boito, A. (44) (47)
Massenet, Jules E.
Sullivan, Sir A. S. (54)
Grieg, Edvard H.
Rimski-Korsakov, Nicholas A.
Parry, Sir C. H. (45)
Godard, Benjamin
Indy, Paul M. d' (54)
Cowen, Sir F. (54)
Huber, Hans
Humperdinck, E.
Sinding, Christian
Elgar, Sir E. (54)
Leoncavallo, Ruggiero
Puccini, Giacomo
Charpentier, Gustave
Franchetti, Baron
Arensky, Anton
Bossi, Enrico Marco
Chaminade, Cécile
Debussy, Claude A.
German, Edward
Mascagni, Pietro
Strauss, Richard
Glazunov, Alexander
Bantock, G. (54)
Perosi, Lorenzo (54)
Rachmaninov, S. V.
Coleridge-Taylor, S.
Korngold, Erich W.

(52) Dramatic Managers:

Hare, Sir John (49)
Hammerstein, O.
Grau, Maurice
Frohman, Daniel
Klaw, Marc
Belasco, David (29)
Frohman, Charles
Fiske, H. G. (30) (29)
Gatti-Casazza, Giulio
Ziegfeld, Florenz, Jr.
Barker, H. G. (37) (49)
Griffith, D. W.

(53) Engravers, Etchers, Illustrators:

AMERICAN

Durand, Asher B. (55)
Darley, Felix O. (55)
Whistler, James A. (paint.) (55)
Vedder, Elihu (paint.) (55) (99)
Millet, Francis D. (paint.) (55) (99)
Dielman, F. (55)
Frost, Arthur B. (32)
Cole, Timothy (99)
Low, Will H. (55)

FINE ARTS—Con.

Pyle, Howard (32)
Opper, Frederick B.
Pennell, Joseph (99)
Remington, F. (56)
Davenport, Homer
Gibson, C. D. (99)
McCutcheon, J. T.
Christy, H. C. (30)
Fisher, Harrison
Flagg, James M. (55)
Carr, Gene

WORLD

Mantegna, Andrea (paint.) (55)
Dürer, Albrecht (paint.) (55)
Holbein, Hans (paint.) (55)
Van Dyck, Sir A. (paint.) (55)
Claude Lorraine (paint.) (55)
Rembrandt (paint.) (55)
Potter, Paul (paint.) (55)
Ruysdael, Jacob (paint.) (55)
Hogarth, Wm. (paint.) (55)
Bewick, Thomas
Turner, J. M. W. (paint.) (55)
Cruikshank, George
Jacque, Charles (55)
Millet, Jean F. (paint.) (55)
Menzel, A. (paint.) (55)
Daubigny, C. F. (paint.) (55)
Doré, Paul G. (55)
Du Maurier, G. L. (42)
Crane, Walter

(54) Musical Artists, Conductors, Organists, Pianists, Singers, Violinists:

AMERICAN

Gottschalk, L. M. (51)
Damrosch, L. (51)
Thomas, Theodore
Sousa, John P. (51)
Bispham, David S.
Van der Stucken, F. (99)
Nordica, Lillian
Schumann-Heink, E.
Kneisel, Franz
Zeisler, Fannie B.
Eames, Emma
Powell, Maud
Fremstad, Olive
Homer, Louise
Whitehill, Clarence
Witherspoon, Herbert
De Gogorza, E. E.
Nielsen, Alice
Garden, Mary
Hofmann, Josef
Martin, Riccardo
Farrar, Geraldine
Alda, Frances
Werrenrath, R.
Gluck, Alma
Case, Anna

WORLD

García, Manuel del P.
Paganini, Niccolò
García, Manuel
Malibran, Maria F.
Bull, Ole Bornemann
Grisi, Giulia
Liszt, Franz (51)
Lind, Jenny
Marchesi, Mathilde
Rubinstein, A. (51)
Faure, Jean B. (51)
Von Bülow, Hans G.
Joachim, Joseph
Leschetizky, Theodor
Clauss-Szavardy, Wilhelmina
Goddard, Arabella
Guilmant, Félix (51)
Nilsson, Christine
Patti, Adelina
Reszke, Jean de
Albani, Madame
Carreño, Teresa
Nikisch, Arthur
Reszke, Edouard de
Sembrich, Marcella
Ysaye, Eugène (51)
Albeniz, Isaac (51)
Paderewski, I. (51)
Melba, Nellie
Albert, E. F. d' (51)
Busoni, Ferruccio (51)
Calvé, Emma
Scotti, Antonio
Godowski, Leopold
Lauder, Sir Harry
Gadski, Johanna
Hertz, Alfred
Caruso, Enrico
Chaliapin, Theodore
Tetrazzini, Luisa
Kreisler, Fritz
Casals, Pablo (51)
Gabrilovitch, Ossip
Ruffo, Titta
Amato, Pasquale
Kubelik, Jan
Culp, Julia
Matzenauer, Margarete
Grainger, Percy (51)
McCormack, John
Martinelli, G.
Zimbalist, E.
Galli-Curci, Amelita
Elman, Mischa
Heifetz, Jascha

(55) Painters:

AMERICAN

Copley, John S.
West, Benjamin
Peale, Charles W.
Stuart, Gilbert (98)
Trumbull, John
Sully, Thomas
Cole, Thomas
Inman, Henry
Cranch, C. (36)
Leutze, Emanuel
Kensett, John F.
Read, Thos. B. (36)
Gifford, Sandford R.
Hunt, William M.
Johnson, Eastman
Inness, George
Church, Frederick E.
Bierstadt, Albert
Richards, William T.
Whistler, J. A. (53)
La Farge, John (99)
Homer, Winslow (99)
Martin, Homer D.
Vedder, E. (53) (99)
Wyant, Alexander H.
Moran, Thomas
Hovenden, Thomas
Millet, F. D. (99)
Blakelock, R. A.
Blashfield, E. (53) (99)
Duveneck, Frank (56)
Tiffany, Louis C.
Chase, W. M. (99)
Thayer, A. H. (99)
Abbey, E. A. (53) (99)
Weir, Julian (53) (99)
Harrison, Thomas A.
Inness, George, Jr.
Brush, G. de F. (99)
Alexander, J. W. (99)
Cox, Kenyon (53) (99)
Sargent, John S. (99)
Daingerfield, E. (53)
Hassam, Childe (53) (99)
Melchers, Gari (99)
Nourse, Elizabeth
Platt, Charles A. (99)
Benson, F. W. (53)
Beaux, Cecilia
Cox, Louise (53)
Henri, Robert
Wendt, William
Redfield, E. W.
Fuertes, Louis Agassiz

WORLD

Parrhasius
Apelles
Zeuxis
Giotto (50)
Orcagna, A. (56) (50) (48)
Eyck, Hubert van
Eyck, John van
Angelico, Fra
Lippi, Fra Filippo
Bellini, Giovanni
Bellini, Gentile
Mantegna, A. (53)
Botticelli, Alessandro
Ghirlandajo, D.
Vinci, Leonardo da (50) (56) (8)
Carpaccio, Vittore
Dürer, Albrecht (53)
Cranach the Elder
Bartolommeo, Fra
Giorgione
Titian
Ghirlandajo, Ridolfo
Raphael
Sarto, Andrea del
Giulio Romano (50)
Correggio
Holbein, Hans (53)
Tintoretto
Cagliari, P. V.
Carracci, Lodovico
Carracci, Agostino
Carracci, Annibale
Reni, Guido
Rubens (53)
Hals, Frans
Domenichino
Jordaens, Jakob
Zurbarán, F. de
Van Dyck, Sir A. (53)
Velásquez
Claude Lorraine
Rembrandt (53)
Dou, Gerard
Dolci, Carlo
Murillo
Lebrun, Charles
Potter, Paul (53)
Steen, Jan
Ruysdael, Jacob (53)
Hobbema, Meindert
Huysmans, Cornelis
Hogarth, William (53)
Reynolds, Sir Joshua
Greuze, Jean Baptiste
Gainsborough, Thos.
Fragonard, Jean H.
Romney, George
Kauffmann, Angelica
Goya, Francisco de
David, Jacques L.
Vigée-Lebrun, Marie
Raeburn, Sir Henry
Crome, John
Lawrence, Sir Thos.
Gérard, Baron
Turner, J. M. (53)
Constable, John
Ingres, Jean Auguste
Cornelius, Peter von
Eastlake, Sir Charles
Corot, Jean Baptiste
Delaroche, Paul
Hiroshige, Ando
Delacroix, Ferdinand
Landseer, Sir E. H.
Decamps, Alexandre
Diaz de la Peña
Gallait, Louis
Troyon, Constant
Dupré, Jules
Rousseau, Théodore
Millet, Jean F. (53)
Meissonier, Jean L.
Menzel, Adolf von (53)
Daubigny, C. F. (53)
Watts, G. F. (56) (53)
Courbet, Gustave
Faed, John
Frère, Pierre E.
Fromentin, Eugène
Brown, Ford Madox
Bonheur, Rosa
Gérôme, Jean Léon
Hofmann, H.
Israëls, Josef
Bouguereau, W. A.
Faed, Thomas
Piloty, Carl von
Böcklin, Arnold
Breton, Jules A.
Hunt, W. Holman
Millais, Sir John E.
Leighton, Lord
Manet, Édouard
Bonnat, Léon J.
Burne-Jones, Sir E.
Boughton, George H.
Defregger, Franz von
Alma-Tadema, Sir L.
Lenbach, Franz von
Duran, Carolus
Fortuny, Mariano
Mauve, Anton
Monet, Claude
Cazin, Jean Charles
Fildes, Sir Luke
Munkácsy, Michael
Bell-Smith, Frederic
Crofts, Ernest
Detaille, Jean B.
Harris, Robert
Dicksee, Margaret I.
Walker, Horatio
Reid, George Agnew
Zorn, Anders L.
Sorolla y Bastida
Zuloaga, Ignacio

(56) Sculptors:

AMERICAN

Greenough, Horatio
Powers, Hiram
Brown, H. K. (55)
Crawford, Thomas
Rinehart, William H.
Hosmer, Harriet
Ward, J. Q. A. (99)
Bissell, George Edwin
Hoxie, Vinnie Ream
Saint-Gaudens, Augustus (99) (98)
French, Daniel C. (99)
Kelly, James Edward
Niehaus, Charles H.
Adams, Herbert (99)
Taft, Lorado (99)
Dallin, Cyrus Edwin
Partridge, William O.
Grafly, Charles
Barnard, George G.
MacMonnies, F. (99)
Bartlett, Paul W. (99)
Flanagan, John
Bitter, Karl
Borglum, G. (55) (53)
Borglum, Solon H.
Walker, Nellie Verne
Fraser, James E.
Hyatt, Anna Vaughn
Aitken, Robert I.
Manship, Paul

WORLD

Phidias
Praxiteles
Ghiberti, Lorenzo
Donatello
Robbia, Lucca della
Michelangelo (55) (50)
Bandinelli, Baccio
Cellini, Benvenuto
Goujon, Jean (50)
Bernini, G. (50) (55)
Algardi, Alessandro
Gibbons, Grinling

FINE ARTS—Con.

Houdon, Jean A.
Flaxman, John
Canova, Antonio
Dannecker, J. von

Thorvaldsen, Bertel
Baily, Edward H.
David, Pierre Jean
Barye, Antoine Louis

Foley, John Henry
Frémiet, Emmanuel
Meunier, C. (55)
Bartholdi, Frédéric

Dalou, Jules
Rodin, Auguste
Hébert, Louis P.
Allward, Walter S.

RELIGION

(57) Biblical Characters and Saints:

Moses
Paul, St.
Justin (61)
Anthony, St. (60) (61)
George, St.
Athanasius, St. (61) (96)
Basil, St. (61)
Ambrose, St. (87) (61)
Jerome, St. (61) (28) (46)
Chrysostom, St. John (96) (61)
Augustine, St. (61)
Geneviève, St.
Benedict, St. (61) (25)
Isodore, St. (61) (28)
Boniface, St. (60)
Dunstan, St. (61) (73)
Olaf, St. (ruler) (75)
Gregory VII (pope) (59) (61)
Bruno, St.
Anselm, St. (61) (62) (25)
Bernard, St. (61)
Becket, Thomas à
Dominic, St. (61)
Francis of Assisi, St. (61)
Anthony of Padua, St. (61)
Louis IX, St. (ruler) (75) (74) (97)
Alexander Nevsky (97)
Aquinas, St. Thomas (phil.) (62) (25)
Bonaventura, St. (61)
Catherine, St.
Francis of Paola, St.
Loyola, St. Ignatius de (60) (61)
Xavier, St. Francis (60)
Philip Neri, St. (90) (26)
Francis de Sales, St. (61) (96)
Vincent de Paul, St. (90)

(58) Oriental Religions:

Zoroaster
Lao Tzu
Confucius
Buddha
Mohammed

(59) Popes and Cardinals:

Gregory I (61) (60) (73)
Gregory VII (57) (61)
Adrian IV
Innocent III (61) (87)
Julius II (74)
Paul III
Bembo, P. (28) (46)
Wolsey, Thomas (stat'm'n) (79)
Sixtus V
Richelieu, Duc de (stat'm'n) (84)
Mazarin, Jules (stat'm'n) (84)

Pius IX
Newman, John (61) (38)
Manning, H. E. (61)
Leo XIII
McCloskey, John
Gibbons, James
Pius X
Begin, Louis Nazaire
Falconio, Diomede
Farley, John Murphy
Mercier, D. J.
Benedict XV
Pius XI
O'Connell, Wm. H.
Dougherty, Dennis
Merry del Val (84)
Rouleau, R.
Hayes, Patrick J.
Mundelein, G. W.

(60) Religious Reformers, Evangelists, Missionaries:

Ulfilas
Wiclif, John (61)
Jerome of Prague
Huss, John
Savonarola (61)
Luther, Martin (61)
Zwingli, Ulrich
Melanchthon, Philipp (26) (28)
Ridley, Nicholas
Knox, John (61)
Calvin, John (61)
Hutchinson, Anne
Eliot, John
Williams, Roger (Am. col.) (65)
Fox, George
Hennepin, Louis (expl.) (66)
Swedenborg, E. (8)
Zinzendorf, Count von (61)
Wesley, John (61)
Huntingdon, Countess
Serra, Junipero
Raikes, R. (90) (19)
Hicks, Elias (61)
Judson, Adoniram
Young, Brigham
Smith, Joseph
Noyes, John H.
Huc, Evariste R. (22)
Livingstone, D. (22)
Holyoake, George J.
Eddy, Mary B. G.
Williams, Sir George
Booth, William (90)
Jackson, Sheldon (24)
Moody, Dwight L.
Damien, Joseph
Dowie, John A.
Jones, Samuel Porter
Clark, Francis E. (61)
Booth, Ballington (90)
Sunday, William A.
Grenfell, Wilfred T.

Mott, John R.
Booth, Evangeline C.

(61) Theologians, Preachers, Religious Writers, Church Historians:

AMERICAN

Mather, I. (24) (33)
Mather, Cotton
Edwards, J. (63) (98)
Muhlenberg, H. M.
Asbury, Francis
Ballou, Hosea
Beecher, Lyman
Channing, W. E. (98)
Campbell, A. (24)
Bushnell, Horace
Clarke, James F.
Parker, Theodore (93)
Simpson, M. (24) (96)
Beecher, Henry Ward (96) (98)
Hecker, Isaac (30)
Schaff, Philip
Hale, Edward E. (30) (35) (90) (99)
King, Thomas Starr
Trumbull, H. C. (30)
Ryan, Patrick John
Doane, William C.
Talmage, T. DeWitt
Vincent, John H. (24)
Abbott, Lyman (30)
Brooks, P. (96) (98)
Potter, Henry C.
Buckley, J. M. (30)
Gladden, W. (93)
Ireland, John
Keane, John Joseph
Briggs, Charles A.
Conwell, R. H. (24)
Parkhurst, C. H. (93)
Griffis, W. E. (24)
Jones, Jenkin Lloyd
Patton, F. L. (24)
Hamilton, J. W.
Barrows, J. H. (24)
Conaty, T. (24) (30)
Hendrix, E. R.
Bashford, James W.
O'Connell, D. J. (24)
Burt, William
Hall, Charles C.
Hirsch, Emil G. (90)
Gordon, George A.
Oldham, W. F.
Thirkield, W. P.
Burton, Ernest DeW.
Gailor, T. F. (24)
Gunsaulus, F. W. (24) (96) (31)
Hodges, George
Candler, Warren A.
Shahan, T. J. (24)
Hillis, Newell D.
Hyde, W. D. (24) (64)
Krauskopf, J.

McDowell, W. F.
Faunce, W. H. P. (24)
Jefferson, C. E.
Quayle, W. A.
Brent, Charles H.
Cadman, S. Parkes
Blake, Edgar
Guth, W. W. (24)
McConnell, F. J.
Wise, Stephen S.
Fosdick, Harry E.
Fisher, F. B.

WORLD

Hyrcanus, John
Hillel
Tertullian
Arius
Nestorius
Peter the Hermit (96)
Duns Scotus, J. (62) (25)
Kempis, Thomas à
Coverdale, Miles
Cranmer, Thomas
Latimer, Hugh
Tyndale, William
Bonner, Edmund
Parker, Matthew
Foxe, John
Canisius, Petrus (60)
Hooker, Richard
Arminius, Jacob
Ussher, James
Jansen, Cornelis
Taylor, Jeremy
Biddle, John
Pascal, Blaise (6)
Bossuet, Jacques (96)
Bourdaloue, Louis
Quesnel, Pasquier
Fleury, Claude
Collier, Jeremy (40)
Fénelon, François
Butler, Joseph
Paley, William
Clarke, Adam
Merle d'Aubigné, Jean (26)
Döllinger, Johann v.
Lacordaire, Jean Baptiste
Herzog, Johann J.
Alzog, Johann B.
Stanley, A. P.
Tischendorf, L. von
Blavatsky, Helena
Farrar, F. W. (43)
Brooke, S. A. (38)
Baring-Gould, S. (43)
Spurgeon, Charles H.
Cheyne, Thomas K.
Gauthier, C. H. (26)
Besant, Annie
Drummond, Henry
Harnack, Adolf (26)
Matheson, Samuel P.
Chown, Samuel D.
Inge, William R.
Jacks, L. P. (38)
Jowett, John Henry

PHILOSOPHY

(62) Philosophers, Ancient and Medieval:

Thales (6) (2)
Pythagoras (6)
Xenophanes

Empedocles
Parmenides
Anaxagoras
Zeno of Elea
Socrates (25)
Democritus
Plato (64) (25) (89)

Aristippus
Diogenes
Aristotle (64) (25) (9) (8) (10) (3) (89) (45)
Theophrastus (3)
Epicurus (25)

Zeno (25)
Seneca (44)
Epictetus
Athenagoras
Plotinus
Hypatia
Erigena (61) (25)

PHILOSOPHY—Con.

Anselm, Saint (25)
Averroës (25)
Bacon, R. (61) (4) (7)
Aquinas, St. Thomas (61) (25)
Occam, W. of (61) (25)

(63) Philosophers, Modern:

Bruno, Giordano
Bacon, Francis (87)
Campanella, T. (48)
Hobbes, T. (9) (89)
Gassendi, P. (6) (7)
Descartes, René (6)
Locke, John (86)
Spinoza, Baruch
Leibnitz, G. von (6)
Bayle, Pierre (45)
Berkeley, George (61)
Hume, David (46) (89)
Condillac, Etienne de
Kant, Immanuel
Fichte, Johann
Schleiermacher, F. (61)
Hegel, Georg W. (64)
Schelling, F. von
Hamilton, Sir W.
Schopenhauer, Arthur
Comte, Auguste
Mill, J. S. (89) (93)
Lotze, Rudolf H.
Spencer, Herbert (26)
Green, T. H. (64)
Hartmann, Karl von
James, Wm. (9) (64)
Höffding, Harald (9)
Eucken, R. (64) (100)
Watson, John
Bosanquet, B.
Royce, J. (64) (24)
Bergson, Henri
Dewey, J. (24) (9) (64)
Santayana, George
Perry, Ralph B.

(64) Philosophical and Ethical Writers:

Aurelius, Marcus (ruler) (71)
Abelard, P. (61)
Pletho, G. G. (25)
Browne, Sir T. (15)
La Rochefoucauld
Voltaire (44) (46)
Diderot, Denis
Paine, Thomas
Bentham, Jeremy (88) (89)
Cousin, Victor
Martineau, James (61)
Lewes, G. H. (38) (8)
Fischer, E. K. (63)
Harrison, F. (38)
Howison, G. H.
Harris, W. T. (24)
Murray, John C. (26)
Palmer, G. H. (61) (24)
Nietzsche, F. (63)
Nordau, Max Simon
Adler, Felix
Carus, Paul
Haldane, Viscount (79)
Hibben, J. G. (24)
Wenley, R. M. (24)
Russel, B. A. (6) (91)
Keyserling, H. A.

AMERICAN HISTORY

(65) Colonists and Colonial Leaders:

Carver, John
Baltimore, Lord (69)
Smith, John
Standish, Miles
Hooker, Thomas (61)
Endicott, John
Winthrop, John
Bradford, William
Stuyvesant, Peter
Alden, John
Williams, Roger (60) (98)
Berkeley, Sir W.
Frontenac, Comte de
Andros, Sir Edmund
Bacon, Nathaniel
Penn, William
Braddock, Edw. (67)
Pepperrell, Sir W.
Franklin, Benjamin (69) (14) (19) (30) (98)
Hutchinson, T. (33)
Montcalm, Marquis de
Amherst, Lord (76)
Gage, Thomas (76)
Adams, S. (69) (96)
Gadsden, C. (67)
Otis, James (69) (96)
Wolfe, James (76)
Howe, Sir Wm. (76)
Lee, R. H. (69) (96)
Washington, George (gen., stat'm'n) (67) (69) (98)
Henry, P. (96) (69) (98)
Hancock, John (69)

(66) Discoverers:

Cabot, John (22)
Columbus, Christopher
Ponce de León (22)
Cabot, Sebastian (22)
Balboa, Vasco de (81)
Alvarado, Pedro
Cartier, Jacques
Soto, Hernando de
Gosnold, Bartholomew
Raleigh, Sir W. *Eng.*
Champlain, S. de (68)
Hudson, Henry (23)
Marquette, Jacques
Hennepin, Louis (60)
LaSalle, Sieur de (23)
Joliet, Louis
Clark, William
Lewis, Meriwether
Pike, Zebulon M. (67)
Frémont, J. C. (67) (69)

(67) Military Leaders:

Herkimer, Nicholas
Putnam, Israel
Kalb, Baron de
Rochambeau *Fr.*
Gates, Horatio
Stark, John
Steuben, Baron
Lee, Henry (69)
Marion, Francis (70)
Washington, George (69) (65) (98)
Allen, Ethan (69)
Warren, Joseph
Greene, Nathanael
Wayne, Anthony
Kosciusko, T. *Pol.*
Knox, Henry
Lee, Henry
Lafayette, Marquis de *Fr.* (81) (84)
Jackson, Andrew (stat'm'n) (69)
Harrison, William H. (stat'm'n) (69)
Taylor, Zachary (stat'm'n) (69)
Scott, Winfield
Johnston, Albert S.
Anderson, Robert
Johnston, Joseph E.
Lee, R. E. (24) (98)
Hooker, Joseph
Kearny, Philip
Meade, George G.
Early, Jubal A. (87)
Thomas, George H.
Bragg, Braxton
Beauregard, P. G.
Hampton, Wade (69)
Sherman, W. T. (98)
Longstreet, James
Grant, U. S. (69) (98)
Burnside, A. E. (69)
Hancock, Winfield S.
Jackson, T. J.
Hill, Ambrose Powell
Pickett, George E.
McClellan, G. B. (69)
Howard, Oliver Otis
Hood, John Bell
Sheridan, Philip H.
Gordon, John B. (69)
Custer, George A.
Miles, Nelson A.
Bliss, T. H.
Pershing, John J.
Wood, Leonard
March, P. C.
Funston, Fred

(68) Naval Commanders:

Hopkins, Esek
Barry, John
Jones, John Paul (97)
Hull, Isaac
Bainbridge, William
Decatur, Stephen
Lawrence, James
Perry, Oliver Hazard
Perry, M. C.
Farragut, D. G. (98)
Foote, Andrew Hull
Porter, David Dixon
Dewey, George
Schley, Winfield S.
Mahan, A. T. (99)
Sampson, W. T.
Sigsbee, Charles D.
Evans, Robley D.
Sims, W. S.

(69) Statesmen, Legislators, Political Leaders, Diplomats:

Franklin, Benjamin (65) (14) (19) (30) (98)
Washington, George (65) (67) (98)
Morris, Robert
Adams, John (98)
Carroll, Charles (70)
Clinton, George (67)
Jefferson, Thomas (98)
Gerry, Elbridge
Jay, John (87)
Pinckney, C. C.
Muhlenberg, F. (61)
Madison, James (98)
Morris, Gouverneur
King, Rufus
Burr, Aaron
Hamilton, A. (16) (98)
Monroe, James
Gallatin, Albert (16)
Adams, J. Q. (96) (98)
Jackson, A. (67) (98)
Clinton, DeWitt
Quincy, Josiah
Harrison, W. H. (67)
Clay, Henry (96) (98)
Johnson, R. M.
Benton, Thomas H.
Calhoun, John C. (96)
Cass, Lewis
VanBuren, Martin
Webster, Dan. (96) (98)
Taylor, Zachary (67)
Marcy, Wm. Learned
Gadsden, James (67)
Tyler, John
Buchanan, James
Hayne, R. Y. (96)
Stevens, Thaddeus
Everett, Edward (96)
Polk, James Knox
Clayton, John M.
Johnson, Reverdy (87)
Weed, Thurlow (30)
Fillmore, Millard
Seward, William H.
Pierce, Franklin
Dorr, Thomas Wilson
Fessenden, Wm. Pitt
Adams, C. F. (89)
Davis, Jefferson (67)
Fish, Hamilton
Johnson, Andrew
Hamlin, Hannibal
Lincoln, Abraham (98)
Morrill, Justin S. (12)
Sumner, Charles (96)
Stephens, A. H.
Douglas, Stephen A.
Stanton, Edwin McM.
Tilden, Samuel J.
Davis, H. W. (96) (87)
Butler, B. F. (67)
Breckinridge, J. C.
Hayes, R. B. (67)
Sherman, John
Morgan, John T. (67)
Hoar, G. F. (87)
Edmunds, G. F. (87)
Conkling, Roscoe
Cullom, Shelby M.
Schurz, Carl (67) (96) (99)
Arthur, Chester Alan
Blaine, James G. (96)
Frye, William Pierce
Garfield, J. A. (67)
Harrison, Benj. (87)
Ingalls, J. J. (31) (87)
Olney, Richard (87)
Cannon, J. G. (87)
Hale, Eugene
Cleveland, Grover
Hanna, M. A. (18) (20)
Hay, John (33) (99)
Bacon, A. O. (87)
Reed, T. B. (87)
Vilas, W. F. (24) (90)
Croker, Richard
McKinley, William
Nelson, Knute (87)
Root, Elihu (86) (87) (99) (100)
Jones, Samuel Milton
Tillman, Benjamin R.
Newlands, F. G. (87)
Clark, Champ (87)
Cummins, A. B. (87)
Lodge, H. C. (86) (99)
Burton, T. E. (87)
Gillett, F. H.
Ferris, W. N. (24)
Fordney, Joseph W.
Knox, P. C. (87)
Johnson, Tom L. (17)
Marshall, Thos. R.
Bourne, J., Jr.
LaFollette, R. M. (87)
Mann, James R.
Morgenthau, H.
Owen, R. L. (87)
Wilson, Woodrow (24) (33) (99) (100)
Taft, W. H. (87)
Dolliver, J. P. (96)
Glass, Carter
House, E. M.
Roosevelt, Theodore (33) (22) (99) (100)
Curtis, Charles
Bryan, W. J. (86)
Volstead, A. J.
Esch, John J.
Kahn, Julius

AMERICAN HISTORY—Con.

Lowden, F. O.
Reed, J. A.
Beveridge, A. J. (30)
Daniels, Josephus (30)
Smoot, Reed
Underwood, O. W.
Jones, Wesley L. (87)
McAdoo, W. (20) (87)
Kent, William
Lane, Franklin K.
Lansing, Robert (86)
Borah, W. E. (87)
Dawes, C. G. (16)
Garfield, J. R. (87)
Harding, W. G.
Houston, D. F. (24)
Johnson, H. W. (87)
Gerard, J. W. (87)
Stimson, H. L.
Folk, J. W. (87)
Lenroot, Irvine L.
Longworth, N. (16)
Whitlock, B. (35) (99)
Cox, James M.
Gore, Thomas P. (87)
Baker, N. D. (87)
Coolidge, Calvin
Robinson, J. T.
Smith, Alfred E.
Hoover, Herbert C.
Sheppard, Morris
McCormick, J. M.
Wadsworth, J. W.
Roosevelt, F. D.
Roosevelt, Theodore

(70) Noted Characters: Patriots, Pioneers, Plainsmen, Scouts, Indians, etc.

Pocahontas
Massasoit
Philip, King
Pontiac
Boone, Daniel (98)
Revere, Paul (97)
Arnold, Benedict
Brant, Joseph
Zane, Ebenezer
André, John
Red Jacket
Ross, Betsy
Hale, Nathan
Genest, Edmond C.
Black Hawk
Tecumseh
Crockett, David (69)
Houston, Sam
Carson, Christopher
Walker, William
Sitting Bull
Cody, Wm. F.
Aguinaldo, E.

ANCIENT HISTORY

(71) Rulers:

Cheops
Hammurabi
Tutankhamen
Rameses
Arbaces
Draco (87)
Nebuchadnezzar
Necho
Crœsus
Pisistratus
Cyrus the Great
Cambyses
Leonidas I
Darius I
Gelon
Xerxes I
Agesilaus
Dionysius the Elder (72) (48) (44)
Cyrus the Younger
Philip II
Artemisia
Darius III
Ptolemy I
Ptolemy II
Asoka
Antiochus III
Herod the Great
Cleopatra
Augustus
Claudius I
Vespasian
Caligula
Nero
Trajan
Hadrian
Antoninus Pius
Aurelius, Marcus (64)
Caracalla
Alexander Severus
Diocletian
Zenobia
Constantine the Great
Julian
Alaric I
Theodosius (72)
Attila
Genseric

(72) Military Leaders:

Miltiades
Themistocles (73)
Cimon
Pelopidas
Alcibiades (73)
Camillus, Marcus
Epaminondas (73)
Alexander the Great (73)
Pyrrhus
Hamilcar Barca
Fabius, Maximus
Hannibal
Scipio Major
Scipio Minor
Marius, Gaius
Sulla, Lucius (71)
Spartacus
Crassus, Marcus (73)
Lucullus, Lucius
Pompey (73)
Cassius
Cæsar, Julius (73) (71)
Antony, Mark (73) (96)
Ariovistus
Drusus, Nero C.
Arminius
Aurelianus (71)

(73) Statesmen:

Lycurgus (71)
Draco (ruler) (87)
Solon (87) (48)
Aristides (72)
Cincinnatus (72)
Pericles
Cleon
Nicias (72)
Cato, Marcus
Crassus, Lucius (96)
Catiline
Cato the Younger (72)
Brutus, Marcus Junius (72)
Mæcenas, Gaius
Agrippa, Marcus
Agricola

MEDIEVAL HISTORY

(476 A. D. to 1492 A. D.)

(74) Military Leaders:

Belisarius
Charles Martel (75)
William I *Eng.* (75)
Godfrey of Bouillon (97)
Saladin (75) (97)
Richard I *Eng.* (75) (97)
Genghis Khan (75)
Wallace, Sir W. (97)
Bruce, Robert (75)
DuGuesclin, Bertrand
Edward, the Black Prince (75)
Timur (75)
Bajazet I (75)
Glendower, O. (75) (97)
Hunyadi János (97)
Joan of Arc (97)
Warwick, Earl of (75)

(75) Rulers:

Theodoric (74)
Clovis I
Justinian the Great
Brunhilde
Ethelbert *England*
Heraclius
Omar, Abu-Hafsa
Al-Mansur
Pepin the Short
Charlemagne (74)
Irene
Haroun-al-Raschid
Alfred the Great
Otho I
Brian Boroihme
Hugh Capet
Vladimir the Great
Edmund *England*
Canute *England*
Olaf, St. (57) *Norway*
Ferdinand I, the Great
Edward the Confessor
Alexius I Comnenus
Henry IV *Germany*
Henry I *England*
Frederick I, Barbarossa
Henry the Lion
Henry II *England*
Philip II *France*
John *England*
Henry III *England*
Louis IX (saint) (57) (97)
Rudolf I *Germany*
Alfonso X (62) (2)
Edward I *England*
Edward II *England*
Edward III *England*
Henry IV *England*
Henry V *England*
Constantine XIII
Henry the Navigator
Charles VII *France*
Charles the Bold
Ivan III *Russia*
Edward IV *England*
Medici, Lorenzo de'

MODERN HISTORY

BRITISH EMPIRE

(76) Military Leaders:

Sidney, Sir Philip
Marlborough, Duke of (79)
Oglethorpe, James E.
Burgoyne, John
Clive, Baron (79)
Abercromby, Sir R.
Clinton, Sir Henry
Cornwallis, Marquis (79)
Moore, Sir John
Brock, Sir Isaac
Wellington, Duke of (79)
Napier, Sir Charles J.
Campbell, Sir Colin
Havelock, Sir Henry
Roberts, Sir F. S.
Gordon, Charles G.
Denison, George T.
Connaught, Duke of
Kitchener of Khartum
French, Lord John D.
Baden-Powell, R. S.
Allenby, Sir Edmund
Haig, Douglas, Earl
Byng, Sir Julian
Currie, Sir Arthur

(77) Naval Commanders:

Hawkins, Sir John
Drake, Sir F. (23) (22)
Raleigh, Sir W. (22)
Blake, Robert
Boscawen, Edward
Rodney, Lord
Howe, Richard, Earl
Collingwood, Lord
Nelson, H. (97)
Fisher, John Arbuthnot, Lord
Beresford, Lord C.
Jellicoe, John Rushworth, Lord
Beatty, Sir David

(78) Rulers:

Henry VII
James IV of Scotland
Henry VIII
Mary
Elizabeth
Mary Queen of Scots
James I
Cromwell, Oliver (stat'm'n) (76) (79)
Charles I
Charles II
James II
William III
George I
Anne
George II
George III
Victoria
Edward VII
George V

(79) Statesmen, Political Leaders, Diplomats:

Wolsey, Thomas (59)
More, Sir T. (86) (28)
Cromwell, Thomas
Cecil, William, Lord Burleigh
Bodley, Sir T. (28)
Hampden, J. (76) (97)
Cromwell, Oliver (76) (78)
Harley, Robert
Walpole, Sir Robert
Bolingbroke, Viscount
Pitt, William (96)
Burke, E. (96) (38)
Hastings, Warren
North, Frederick, Lord
Francis, Sir Philip
Grattan, Henry (96)
Fox, Charles J. (96)
Curran, J. P. (96) (87)

MODERN HISTORY—Con.

Pitt, William (96)
Wilberforce, Wm. (90)
Grey, Charles, Earl
Castlereagh, Viscount
Canning, George (96)
Ashburton, Lord
O'Connell, Daniel (96)
Elphinstone, M. (40)
Palmerston, Viscount
Peel, Sir Robert
Derby, Earl of
Bulwer, Sir W. H. (40)
Disraeli, Benj. (42)
Howe, Joseph
Gladstone, W. (96) (38)
Bright, John (96)
Elgin, Earl of
Macdonald, Sir J. A.
Tupper, Sir Charles
Mackenzie, Alexander
Salisbury, Marquis of
Fawcett, Henry
Chamberlain, Joseph
Bryce, James, Viscount
Cremer, W. (86) (100)
Cromer, Earl
Laurier, Sir Wilfrid
Alverstone, Viscount
Gibson, Sir John M.
Davitt, Michael (38)
Parnell, Charles S.
Borden, Sir F. W. (15)
Balfour, A. J. (64)
O'Conner, T. P. (38)
Dillon, John
Grey, A. H. G., Earl
Asquith, Herbert H.
Hughes, Sir Samuel
Jameson, Sir L. S. (15) (76)
Rhodes, Cecil J. (16)
Borden, R. L. (87)
Aikins, J. A. M.
Deakin, Alfred
Haldane, Viscount (64)
Hardie, James Keir
Burns, John
Law, A. Bonar
Curzon, Earl
Fuller, Sir G. W.
Grey, Edw., Viscount
Lloyd George (96)
Howard, Sir E. W.
Chamberlain, J. Austen
Cecil, Lord E. A. R.
Hughes, W. M.
Willingdon, Viscount
MacDonald, J. R.
Baldwin, Stanley
Rowell, N. W. (87)
Devonshire, Duke of
Smuts, Jan C.
Churchill, W. L. S. (40)
Gandhi, M. K.
King, W. L. M.
Meighen, Arthur
Lawson, H. S.
Geddes, Sir Auckland
Cosgrave, W. T.
DeValera, Eamonn
Bruce, Stanley M.
Theodore, E. G.
Collins, Michael (67)

(80) Noted Characters:

Catherine of Aragon
Boleyn, Anne
Grey, Lady Jane
Fawkes, Guy
Brummell, "Beau"
Emmet, Robert
Albert, Prince
Bradlaugh, C. (79) (93)
Edward, Pr. of Wales

OTHER NATIONS

(81) Military Leaders:

Boabdil
Pizarro, Francisco
Bayard, Chevalier (97)
Berlichingen, G. von (97)
Cortés, Hernando (22)
Alvarado, Pedro de
Foix, Gaston de (97)
Bourbon, Charles
Gustavus I Vasa (ruler) (83) (84)
Alva, Duke of (84)
Condé, Louis I, Prince de
William the Silent (ruler) (83) (84)
Crillon, Louis de (97)
John of Austria
Guise, Henri de Lorraine (83)
Henry IV of France (ruler) (83) (84)
Tilly, Johann T.
Maurice, Prince of Orange (84)
Wallenstein, A. von
Gustavus II Adolphus (ruler) (83) (84)
Piccolomini, Ottavio
Turenne, Vicomte de
Condé, Louis II, Prince de
John III, Sobieski (83)
Eugène, François
Frederick the Great (ruler) (83) (84)
Rochambeau, C. de
Dumouriez, Charles F.
Blücher, Gebhard von
Toussaint L'Ouverture, François (84)
Kutuzov, Mikhail
Kosciusko (70)
Augereau, Pierre F.
Lafayette (84)
Barclay de Tolly, M.
Grouchy, Marquis de
Hofer, Andreas (97)
Murat, Joachim
Oudinot, Charles N.
Napoleon Bonaparte (83) (84)
Ney, Michel
Soult, Nicolas
Davout, Louis N.
Jomini, Henri, Baron
Bolivar, S. (84) (97)
Ibrahim Pasha
Bozzaris, Marcos (97)
Ypsilanti, Alex.
Bem, Joseph
Santa Anna, A. de
Moltke, Count von
Garibaldi, G. (97)
Joubert, Petrus (84)
Nodzu, Count
Oyama, Iwao, Prince
Kuroki, Count
Hindenburg, P. von (83)
Kuropatkin, Alexei
Gallieni, Joseph S.
Mackensen, A. von
Nogi, Count
Cadorna, Count Luigi
Foch, Ferdinand
Joffre, Joseph J.
Fukushima, Baron
De Wet, C. R.
Pétain, Henri P.
Diaz, Armando
Botha, Louis (84)
Ludendorff, E.

(82) Naval Commanders:

Coligny, G. de (81)
Tromp, Martin Harpertzoon
Iberville, Sieur d'
Estaing, Count d'
Togo, Count
Tirpitz, Alfred von
Kamimura, Hikonojo

(83) Rulers:

Isabella
Ferdinand V
Louis XII
Emanuel I
Atahualpa
Baber (81) (84)
Margaret of Angoulême
Francis I
Gustavus I Vasa (81) (84)
Solyman II
Charles V of Germany (84)
Ferdinand I of Germany
Catherine de' Medici
Philip II *Spain*
Ivan IV
William the Silent (81) (84)
Akbar
Charles IX *France*
Henry III *France*
Henry IV *Fr.* (81) (84)
Christian IV
Ferdinand II *Germany*
Shah Jehan (81) (84)
Gustavus II Adolphus
Louis XIII
Frederick William
Charles X Gustavus
Christina
Louis XIV
Peter the Great (84)
Charles XII *Sweden*
Frederick William I
Francis I *Germany* (84)
Louis XV
Maria Theresa
Catherine II
Joseph II *Germany*
Gustavus III
Louis XVI
Barras, Count Paul
Louis XVIII
Charles XIV John
Bonaparte, Joseph
Francis II *Germany*
Frederick VI
Frederick William III
Louis Philippe
Bonaparte, Lucien
Louise *Prussia*
Alexander I
Bonaparte, Louis
Bonaparte, Jérôme (81)
William I *Germany*
Pedro I
Napoleon III
Alexander II
Victor Emmanuel II (81) (84)
Pedro II
Oscar II
Diaz, Porfirio (84)
Francis Joseph
Ismail Pasha
Maximilian, Ferdinand
Kalakaua, David
Humbert I
Mutsuhito
Gustavus V
Carranza, V. (84)
William II
Ferdinand I *Rumania*
Constantine I *Greece*
Nicholas II
Victor Emmanuel III
Christian X
Ebert, Friedrich
Hakon VII
Albert I
Mustapha Kemal
Obregon, Alvaro
Wilhelmina
Alfonso XIII
Charles I
Hirohito

(84) Statesmen and Political Leaders:

Machiavelli, N. (86)
Borgia, Cesare
Barneveldt, John
Grotius, H. (86) (87)
Richelieu (59)
Mazarin, Jules (59)
Colbert, Jean B. (16)
DeWitt, Jan
Sieyès, Emmanuel
Mirabeau, G. (96)
Hardenberg, Prince
Cambacérès, J. J. (87)
Carnot, Lazare N. (6)
Talleyrand-Périgord
Robespierre, M.
Danton, Georges (96)
Desmoulins, Camille
Fouché, Joseph
Esterházy, Prince (81)
Metternich, Prince
Thiers, L. A. (46)
Kossuth, Louis (96)
Deák, Ferencz
Mazzini, Giuseppe
Tocqueville, A. de (86)
Juárez, Benito
Grévy, F. P. J.
Apponyi, Count G.
Favre, J. C. G. (96)
Cavour, Count
Bismarck, Prince
Crispi, Francesco
Andrássy, Count G.
Li Hung Chang
Kruger, S. J. P.
Gómez y Báez, M. (81)
Beernaert, A. (100)
Castelar, Emilio (96) (26) (46) (47)
Ferry, Jules F.
Ignatiev, Nikolai P.
Palma, Tomás E.
Bajer, Fredrik (100)
Carnot, Marie Sadi
Asser, T. (88) (100)
Gambetta, Léon
Loubet, Emile
Okuma, Marquis
Clemenceau, G. (45)
Fallières, Clément A.
Faure, François F.
Ito, Prince
Casimir-Périer, J. P.
Katsura, Prince
Sonnino, Baron
Saionji, Prince
Witte, Count
Masaryk, T. G.
Fukushima, Baron
Salandra, A. (26) (86)
Terauchi, Count (81)
Jusserand, J. A. (45)
Komura, Count
Bethmann-Hollweg
Millerand, A.
Orlando, Vittorio
Poincaré, Raymond
Briand, Aristide
Doumergue, Gaston
Viviani, R. (96)
Venizelos, Eleutherios
Hymans, Paul
Sun Yat Sen
Pilsudski, J.
Lenine, Nicolai
Stresemann, G. (100)
Trotzky, Leon
Mussolini, B.
Benes, Edward
Koo, V. K. W.

(85) Noted Characters:

Borgia, Lucrezia
Anne of Austria
Münchhausen, Baron
DuBarry, Countess
Marie Antoinette
Josephine, Marie
Corday, Charlotte (97)
Récamier, Madame
Albert, Prince Consort
Eugénie-Marie de Montijo
Dreyfus, A.
Francis Ferdinand
Marie of Rumania

GOVERNMENT AND LAW

(86) Political Scientists and Publicists:

Machiavelli, Niccolo (stat'm'n) (84)
Bodin, Jean (econ.) (89)
Grotius, Hugo (84) (87)
Hobbes, T. (phil.) (63)
Locke, John (phil.) (63)
Montesquieu, M. de (63)
Tocqueville, A. de (stat'm'n) (84)
Bluntschli, J. (89)
Smith, Goldwin (33)
Bascom, J. (educ.) (64)
Foster, J. W. (69)
Bryce, J. (stat'm'n) (40)
Buisson, F. (100)
Gobat, C. A. (84) (100)
Arnoldson, K. P. (100)
Judson, Harry Pratt
Hill, David Jayne (99)
Low, Seth (24)
Jordan, D. S. (10) (24)
Bourgeois, L.V. (84) (100)
Estournelles de Constant, Baron d' (100)
La Fontaine, H. (87) (100)
Hart, A. B. (33) (24)
James, E. J. (24)
Jenks, J. W. (24)
Quidde, Ludwig (100)
Lowell, A. L. (24)
Moore, John B.
Butler, N. M. (24)
Fried, A. H. (100)
Lange, Christian (100)
Sarolea, Charles
Barrows, D. P. (1) (24)
Fosdick, R. B.

(87) Lawyers and Jurists:

Jeffreys, Baron
Erskine, Lord (96)
Marshall, John (69) (98)
Taney, Roger B.
Brougham, Henry P. (79) (63)
Choate, Rufus (69) (96)
Field, David D.
Chase, S. P. (69)
Field, Stephen J.
Evarts, W. M. (69)
Dwight, T. W. (24) (88)
Lockwood, Belva A.
Choate, J. H. (69) (96)
Fuller, Melville W.
Harlan, J. M.
Ingersoll, R. G. (96)
Brewer, D. J. (86)
Meredith, Sir W. R.
Holmes, Oliver W.
Lincoln, Robert T.
Renault, Louis (100)
Dole, S. B. (69)
Cooper, Sir P. A.
Day, W. R. (69)
Bonaparte, C. J. (69)
Cochran, W. B. (96)
Cullen, Sir W. P.
Brandeis, L. D. (86)
Kellogg, Frank B.
Marshall, Louis
Clarke, John H.
Untermyer, Samuel
Heney, Francis J.
Jerome, William T.
Reading, R. D. Isaacs, Viscount (79)
Hughes, C. E. (69)
McReynolds, J. (69)
Murray, Sir G. J. R.

(88) Legal Writers:

Gaius (87)
Justinian (ruler) (75)
Bracton, H. de (61)
Littleton, Sir T. (87)
Coke, Sir E. (87)
Hale, Sir M. (87)
Blackstone, W. (87)
Bentham, Jeremy (phil.) (89) (64) (63)
Kent, James (87) (98)
Livingston, E. (69)
Story, Jos. (87) (98)
Dana, R. H. (87) (35)
Ames, J. B.
Hutchins, H. B.
Goodnow, F. J. (24)
Pepper, G. W. (69)
Pound, Roscoe (3)

SOCIOLOGY

(89) Economists:

Bodin, Jean (86)
Quesnay, F. (15)
Hume, David (63) (46)
Smith, Adam
Turgot, A. R. J.
Malthus, Thomas R.
Ricardo, David
Mill, James (63) (40)
Cobden, Richard (79)
Mill, John S. (63) (93)
Passy, F. (84) (100)
Bagehot, Walter (38)
Wells, David Ames
Jevons, William S.
George, Henry (92)
Walker, Francis A.
Clark, John B. (24)
Adams, H. C. (24)
Boehm-Bawerk
Patten, Simon N.
Ely, R. T. (24) (92)
Hadley, A. T. (24) (99)
Veblen, T. B. (24) (92)
Kinley, David (24)
Commons, J. R. (24) (92)
Fetter, F. A. (24)
Hicks, F. C. (24)
Johnson, E. R. (24)
Fisher, Irving (24)
Kemmerer, E. W. (24)
Babson, Roger
Friday, David (24)
Ayres, Leonard P. (24)
Keynes, J. M.
Gilbert, S. P.

(90) Philanthropists:

Atticus Herodes
Epée, Abbé de l' (26)
Howard, John (93)
Raikes, Robert (19)
Oberlin, Jean F. (61)
Wilberforce, Wm. (stat'm'n) (79)
Fry, Elizabeth (93)
Jeejeebhoy, Sir J. (18)
Vassar, Matthew (17)
Peabody, G. (18) (98)
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Pearson, Karl
Ellis, Henry H.
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Zueblin, Charles
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(93) Social Reformers:

Owen, Robert
Cabet, Etienne
Hill, Sir Rowland
Brown, John
Dow, Neal
Garrison, W. L. (30)
Burritt, E. (27) (30)
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Douglass, F. (96)
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Comstock, Anthony
Lathrop, Julia C.
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Lindsey, B. B. (87)

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Barnum, Phineas T.
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Clark, Alvan
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Aldrich, Thomas B.
Alexander, John W.
Bacon, Henry
Baker, George P.
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Hay, John
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Homer, Winslow
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James, Henry
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Johnson, Robert U.
Kendall, W. M.
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Van der Stucken, F.
Van Dyke, Henry
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Haber, F.
Moissan, Henri
Nernst, Walter
Ostwald, Wilhelm
Pregl, Fritz
Ramsay, Sir W.
Richards, T. W.
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Branting, H.
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IN the following section, where the names of the persons are given in any question, the precise passage containing the answer is easily found from the given page number because of the alphabetic arrangement of the names on each page of text. Where no name is mentioned in the question, however, the reader is referred, not only to the page containing the answer, but to the exact quarter page. This is done by means of the letters a, b, c, and d. The upper and lower halves of the first column are designated by a and b and the corresponding halves of the second column are indicated by c and d. Thus 1955 c means the upper right-hand quarter of page 1955; 1955 b means the lower left-hand quarter of the same page.

Name and give the birth date of an American illustrator of Shakspere; a scholastic philosopher whose romance has become one of the great love stories of the world . . . 1701 a, b

Give the name of a noted Italian arctic explorer; the inventor of carborundum . . . 1701 c

Who was the second president of the United States? the founder of Hull House, Chicago? . . . . . 1702 a

Characterize the plays of Æschylus. Outline the career of Aguinaldo 1703

What rôle does Albertus Magnus play in medieval legend? State the enduring results of the conquests of Alexander the Great 1705, 1706

Estimate the constructive achievements of Alfred the Great. Name General Allenby's greatest victory. Account for the notoriety of the duke of Alva. What is Amundsen's chief title to fame? Indicate a noteworthy point in the doctrine of Anaxagoras. Of what nationality was Hans Christian Andersen? 1707, 1708

What were Sir Richard Arkwright's chief contributions to modern industrial progress? . 1712

For what is each of the following persons chiefly noted: Asoka, Aspasia, John Jacob Astor, John James Audubon, Avicenna, Johann Sebastian Bach, Henry Bacon, General Baden-Powell, Baekeland, Balboa? 1713–1719

Indicate the contributions to science made by F. G. Banting and Heinrich Barth. Name five works of sculpture by George Barnard. Describe some of Barnum's more notable exhibits 1720–1722

Who produced the famous statue of Liberty in New York harbor? . . . . . 1722 d

What part did Sir David Beatty have in the World War? Outline the chief activities of Henry Ward Beecher 1724, 1725

Where did Beethoven spend most of his life? Name five of his compositions 1725, 1726

With what activity is each of the following names chiefly associated: Alexander Graham Bell, Vitus Bering, Bernard of Cluny, Sir Henry Bessemer, John Biddle, Alfred Binet, Black Hawk, and Helena Blavatsky? 1726–1733

What did Edward Bok do in the interests of world peace? For what is Simon Bolivar noted? Name three songs of Carrie Jacobs Bond 1734, 1735

In what science or art was each of the following men distinguished: Robert Boyle, James Bradley, W. L. Bragg, J. Brahms, Bramante, A. Braun, H. Briggs? 1739–1742

Describe the chief exploit of John Brown; the poetic qualities of Robert Browning; the career of S. M. Bruce; the manner of Giordano Bruno's death; William Jennings Bryan's activities as a member of President Wilson's cabinet; and the doctrines of Buddha 1743–1746

Name ten varieties of plants originated by Luther Burbank and six buildings designed by D. H. Burnham 1746, 1747

Outline the military and political achievements of Julius Cæsar 1750

Explain Calvin's connection with the history of Geneva 1751

Name three important books of which Carlyle is the author. About how much money did Carnegie give to philanthropic enterprises? 1753, 1754

What is the most famous work of Cervantes? Outline the conquests and other important achievements of Charlemagne 1758–1760

What English author recently wrote popular biographies of two great Americans? . . 1761 a

Where did Chopin spend the greater part of his active life? Estimate the character of Cicero 1762, 1763

For what particularly is each of the following people noted: F. E. Clark, Cleopatra, F. W. Cody, George Cohan, Samuel Colt? . .1764–1768

What were the chief motives of Columbus in undertaking his voyage of discovery? . . . 1768

Describe the work done by Anna B. and John H. Comstock. Mention the chief features of the doctrines of Confucius. In what type of novel does Joseph Conrad excel most conspicuously? Where did Captain Cook meet his death? Mention an institution founded by Peter Cooper; by Ezra Cornell. What change in astronomy is associated with the name of Copernicus? 1769–1773

How did Crassus lay the foundation of his fortune? 1775

State briefly what Oliver Cromwell accomplished during his protectorate 1776

What unique honor in science was won by Madame Curie? 1777

Name three battles in which General Currie took part. Outline the publishing activities of Cyrus Curtis 1778

State the chief contributions to science by Cuvier; by Dalton; by Charles Darwin. 1778–1781

Name the earliest work and the most celebrated work of Dante 1780, 1781

Who introduced the art of tree surgery into America? What type of music did F. C. David originate? . . . . . 1782 c

Outline the career of Charles Gates Dawes. What books did Defoe write besides *Robinson Crusoe*? What recent inventions owe much to the activities of De Forest? .1783, 1784

Who first propounded the atomic theory in ancient times? . . . . . 1785 c

In what respect was Demosthenes a self-made orator? What was Descartes's chief contribution to mathematics? 1785, 1786

Mention qualities that help to account for the popularity of Charles Dickens. With what monumental work is Diderot's name associated? 1788

State interesting facts regarding Saint Dominic, P. G. Doré, F. N. Doubleday, C. M. Doughty, Neal Dow, J. A. Dowie, Conan Doyle, and Albert Dreyfus 1790–1792

Name the leading Negro poet of America . 1793 c

For what is each of the following people particularly noted: George Eastman, Mary Baker Eddy, Thomas Edison, Jonathan Edwards, Alexandre Eiffel, Albert Einstein, Charles Eliot? 1795–1797

Name five works from the pen of Ralph Waldo Emerson. Describe the career of Emin Pascha, the teaching of Empedocles, and the character of Epicurus 1798, 1799

What was James Pollard Espy's chief contribution to human progress? 1800

Who has been called the "Watt of America"? 1801 c

Name a famous German manufacturer of lead pencils; the originator of the Fahrenheit scale on thermometers . . . . . 1802 a, c
Who was the English chemist that first used the terms "anode" and "cathode"? the originator of the "pony express"? the founder of the parcel post system in England? . . . . . 1803 a, b, d
For what conspicuous achievement is each of the following persons remembered: C. W. Field, D. D. Field, Marshall Field, Emil Fischer, Harrison Fisher? 1804–1806
What Persian poem did Fitzgerald popularize in the English-speaking world? For what reform is Sir Sandford Fleming noteworthy? 1807, 1808
What was the approximate output of Ford cars in 1923? 1809
Describe the life and achievements of Saint Francis of Assisi 1812
What important scientific discovery was made by Benjamin Franklin? 1813
What achievements justified the election of Robert Fulton to the American hall of fame? 1817–1818
Who painted "The Blue Boy"? . . . . . 1819 b
Catalogue the contributions of Galileo to science and inventions 1819
Name the founder of modern eugenics . . 1820 d
Classify the following persons according to nationality and field of activity: Vasco da Gama, Gandhi, Mary Garden, Garibaldi, David Garrick, Gassendi, R. J. Gatling, and Théophile Gautier. What economic theory was popularized by Henry George? Name Edward Gibbon's masterpiece .1820–1826
Who designed the Woolworth building, New York? . . . . . 1827 a
What story by Montague Glass attained the widest popularity? Mention three conspicuous achievements of G. W. Goethals in addition to his construction of the Panama canal 1829
Show why Goethe is considered one of the greatest figures in literature 1829–1830
What part had W. C. Gorgas in the construction of the Panama canal? In what field is Asa Gray a distinguished authority? .1831–1834
Describe the chief steps in the conflict between Pope Gregory VII and Henry IV of Germany. Name four noteworthy motion picture productions by D. W. Griffith . .1835, 1836
Who invented the first air pump? the staff used in musical notation? What is invar, and who originated it? . . . . . 1837 c, d
Explain briefly the medical doctrines of Hahnemann. Quote the heroic last words of Nathan Hale. Estimate the influence of Alexander Hamilton on the history of the United States 1840–1842
Characterize the music of Handel. Outline the career of Hannibal. Mention President Harding's principal act in the field of international politics 1844, 1845
Show how Hegel's philosophy lent itself to the support of Prussian absolutism. Describe the style of Heine 1850, 1851
Who first described Niagara falls? . . . . . 1852 b
Show the steps by which Henry VIII made himself the head of the Church of England. What qualities enabled Patrick Henry to exert the influence which he wielded? Indicate the ground covered by Herodotus' *Histories* 1853, 1854
What fact was demonstrated in Hertwig's *Animal Egg*? Mention an important practical result of the investigations of Heinrich Hertz 1855
Who originated penny postage? . . . . . 1856 d
Who is called the creator of modern Danish literature? Name seven of his works . . . 1859 d
Indicate the theme of the two chief Homeric poems. Describe Herbert Hoover's career 1860, 1861
Name the sculptor who produced a famous portrait statue of Voltaire . . . . . 1862 c
Give an account of John Howard's work in the reform of prisons. What is Elias Howe's chief title to fame? Who was Joseph Howe? 1863
What is Ales Hrdlicka's theory regarding the origin of the North American Indians? Describe the fate of the discoverer of Hudson bay. Estimate the rank of Victor Hugo in French literature. State Hume's contribution to philosophy 1864–1866
Describe the part of John Huss in the history of religion; that of Anne Hutchinson. Estimate Huxley's place in the development of science 1867, 1868
State the chief facts in the life of Hypatia . . 1869
State the chief contributions of F. E. Ives to photography. What military action contributed conspicuously to the popularity of Andrew Jackson? Make a list of the victories won by "Stonewall" Jackson. With what school of philosophy is William James identified? 1871–1873
Name a prominent philanthropist of India. 1874 c
Estimate Thomas Jefferson's influence in early American history 1874–1875
Who originated vaccination? . . . . . 1875 d
Who procured the first entire skin of an okapi to reach Europe? . . . . . 1878 c
In what field of achievement is Justinian most famous? Describe the chief activities of Otto H. Kahn; the personal habits of Kant; the education of Helen Keller; the career of F. B. Kellogg; Lord Kelvin's work in electrical measurement; the astronomical discoveries of Kepler . . .1881–1885
In what part of the United States did Kipling live at one time? How did Lord Kitchener meet his death? 1887
Outline the career of John Knox. For what is Alfred Krupp remembered? 1888, 1890
Indicate Lafayette's part in the American Revolution and the grant awarded him by Congress 1891
Name a Swedish woman who received a Nobel prize . . . . . 1891 c
In what kind of painting did Landseer excel? Describe the explorations of La Salle .1892, 1893
Name four songs made popular by the singing of Sir Harry Lauder. What were the political aims of Sir Wilfred Laurier? For what achievements is Lavoisier entitled to fame? Outline the military campaigns of Robert E. Lee. What was the occasion of Leibnitz's controversy with Newton?. 1894–1896
Sketch the career of Lenine. What was De Lessep's greatest engineering triumph? . . 1897
Why is Li Hung Chang a notable name in Chinese history? Trace the steps by which Lincoln rose from obscurity to the presidency 1898, 1899
Indicate the place of Linnæus in the history of science 1900
By means of the map of Africa in the Department of Geography, trace the approximate course of David Livingstone's travels. What legislative enactments did Lloyd George promote? What was John Locke's chief contribution to the history of thought? In what three principal fields of human interest was Sir Oliver Lodge engaged? .1901–1902
Mention an adventurous exploit of Jack London. 1903
In what organization did the work of Loyola result? Name and characterize the masterpiece of Lucretius. Estimate the military caliber of Ludendorff 1905–1906

Give an account of Luther's life under the headings: early life, the 95 theses, struggle with the authorities of church and state, marriage, and the founding of Protestantism. 1907

Outline the political career of Lord Macaulay; name two of his most successful literary works. What invention brought fame and fortune to Cyrus McCormick? 1908

Tell the story of J. Ramsay MacDonald's rise from obscurity to the premiership of Great Britain. How does E. A. MacDowell rank among American and among world musicians? 1909

For what chiefly is each of the following persons noted: James McGill, August von Mackensen, Sir William Mackenzie, Mæcenas, Magellan, Sir Thomas Malory, T. R. Malthus, Edouard Manet? 1910–1912

Briefly describe the sculpture of Paul Manship. With what important recent invention is Marconi's name associated? Explain Marie Antoinette's connection with the French Revolution. Indicate the place of Christopher Marlowe in the history of English literature 1913, 1914

Estimate the contribution of John Marshall to American life and institutions. Describe the work and influence of Heinrich Karl Marx. Account for the long-continued interest that has been shown in Mary Queen of Scots. Outline the career of T. G. Masaryk .1915, 1916

Who wrote *Spoon River Anthology*? . . . . 1916 c

Name a famous short story from the pen of Maupassant; the gun which made Sir Hiram Maxim celebrated; the man who first conceived and set forth the doctrine of the conservation of energy . . . . . 1917 a, c, d

Give the name and birthplace of the man who drafted the Augsburg Confession; the founder of Donora, Pa.; the author of *The American Language* . . . . . 1918 d, 1919 a

Indicate the name and the nationality of the discoverer of a law of heredity that has been the basis of all recent investigations in eugenics; the scientist who formulated the periodic law of chemical elements; the Belgian cardinal renowned for his fearless patriotic conduct during the World War; the inventor of the typesetting machine . . . 1919 a, b, c, d

Discuss the work of Michelangelo under the headings of sculpture, painting, architecture 1920–1921

Indicate the principal scientific achievements of Michelson; of Millikan 1921, 1922

Contrast the work of Sir John Everett Millais, Francis Davis Millet, and Jean François Millet from the viewpoint of type of paintings and name the masterpieces of each that are located in the United States . . .1921–1922

Catalogue the chief works of Milton 1922

What famous actress had a son highly distinguished as a bridge engineer? . . . . 1923 a

State the substance of Mohammed's preaching. Characterize the genius of Molière. What school of painting was founded by Claude Monet? 1923–1924

On what book does the fame of Montesquieu chiefly rest? State the essentials of the Montessori system 1925

Give an account of J. P. Morgan as a financier and as a public benefactor. Distinguish between two prominent Americans named Gouverneur Morris 1926, 1927

State the chief results of the influence of Moses on the early Hebrews. Name four operas composed by Mozart 1927–1928

How many pictures did Murillo paint entitled "The Immaculate Conception"? Sketch the career of Benito Mussolini; of Mustapha Kemal Pasha. What was the lowest temperature experienced by Nansen in crossing Greenland? 1929, 1930

Describe the disasters which led to the downfall of Napoleon. State two views regarding the character of Napoleon as a world figure 1930–1931

Quote the famous signal raised by Admiral Nelson before the battle of Trafalgar. Who sponsored the Congressional act creating the department of commerce and labor? . . . . . .1931–1932 a

Recount the principal crimes of Nero. In what manner was the motive power obtained in the Newcomen engine? Describe the central event in the life of John Henry Newman. Give an account of the steps by which Newton reached a verification of the law of gravitation 1932–1933

Outline briefly the ethical doctrines of Nietzsche. Why is Florence Nightingale remembered? How has A. B. Nobel perpetuated his name? Who first circumnavigated Europe and Asia? 1933, 1934

Indicate the character of the man after whom Oberlin college was named. Describe the colonizing activities of General Oglethorpe. Name two parks planned by F. L. Olmsted 1935, 1936

Who was the chief organizer of Mohammedanism? Who first liquefied helium?. 1936 d, 1937 a

Mention an important dam constructed by M. M. O'Shaughnessy 1937

Name the perfecter of an invention by which elevator systems might be made safe . . 1938 b

Describe the poetical style of Ovid. Name a popular composition of Paderewski; outline his political career 1938

Indicate the activities of Thomas Paine in America, in England, and in France. State the source of Palissy's fame; other meritorious work for which he is less well known . 1939

Make a list of the contributions of Papin to science and invention. Estimate the place of Paracelsus in the history of medicine . . 1940

How did Francis Parkman prepare himself for the literary task which he undertook? Trace the connection of C. S. Parnell with the agitation for Irish reforms in the 19th century . 1941

Who designed the New York subway? Who received the first Nobel peace prize?. . 1941 c, d

Why is Pasteur honored as a master of achievement? Indicate the part played by Saint Paul in the development of Christianity. Describe the philanthropic activities of George Peabody 1942–1943

Outline William Penn's accomplishments in the interests of religious toleration. What American university owes its importance in large measure to William Pepper? Name the work which has kept alive the memory of Samuel Pepys. Describe Pericles' ideals for the city of Athens 1944

Mention the service performed by Charles Perrault for the children of the world. Name the three Americans besides General Pershing who received the permanent rank of general 1945

State briefly what Peter the Great accomplished in his attempt to introduce Western civilization into Russia. Whose preaching led directly to the First Crusade? Name Petrarch's ladylove. Which of the seven wonders of the ancient world was created by Phidias? 1946

How did the word oratorio come to be applied to musical compositions so designated? 1947 b-c

State the activities that enabled Henry Phipps to amass his fortune and indicate some of his philanthropic undertakings . . 1947

Give Mary Pickford's family name? How did the discoverer of Pikes peak meet his death? . . . . . 1948 a, b

Mention four tasks in detective work that Allan Pinkerton completed with success. . 1948

Sketch the career of the Younger Pitt. Recount the treachery shown by Pizarro in his activities in Peru. 1949

What famous school was founded by Plato? Name the work on which the fame of Plutarch chiefly rests. State briefly what is known about Pocahontas 1949–1950

Mention six events that occurred during the presidency of James Polk. Under what circumstances was *The Book of Marco Polo* written? State two opposing estimates of the poetic value of Pope's work . . . 1951–1952

With what physical disability was the author of *The Conquest of Peru* afflicted? Who discovered oxygen? Name the ancient philosopher whose thought was the forerunner of pragmatism . . . . . 1953 a-b

Give the name of the composer of the opera *Madama Butterfly*; of the man who endowed the Columbia University school of journalism; of the creator of the sleeping car; of a Greek general who defeated a Roman army . . . . . 1953 d–1954 a, b

Describe the chief ideas or principles with which Pythagoras' name is associated . . 1954

Who originated the Sunday-school movement? . . . . . 1955 b

Describe the life of Raphael under the following heads: earliest works, life in Florence, activity at Rome, and grounds of popularity. 1956

Make a list of 8 paintings of Rembrandt, appending to each title the year in which the picture was painted. Outline the work of F. Remington, giving the names of 5 of his paintings, 2 pieces of sculpture, and 3 books. 1957

Characterize the style of Agnes Repplier. Indicate the source of Cecil Rhodes's fortune and the chief purpose to which it was devoted. What did Lord Rhondda accomplish after he was rescued from the *Lusitania*? 1958

Mention some of the qualities of James Whitcomb Riley that account for his popularity. Name five plays written by Mary Roberts Rinehart. Account for Robespierre's notoriety in the French Revolutionary period 1959, 1960

Describe the benefactions of John D. Rockefeller, indicating the approximate amount of money he donated to the different causes. Give the titles of eight notable pieces of sculpture by Rodin 1961

Who was the discoverer of X-rays? . . . 1961 c

Describe Roosevelt's activity as a soldier; as a statesman; as a hunter; as an author . . 1962

Describe briefly the rise and the financial strength of the Rothschild family; the strength and the weakness of Rubens as a painter; the chief purpose of Ruskin's *Modern Painters* 1963, 1964

Name eleven works of sculpture by Saint-Gaudens. Who was the most gifted poetess of Greece? . . . . . 1965, 1966 c

Explain the circumstances that resulted in the formation of the Northern Securities Company . . . . . 1967 b

What sentence was passed on Schiller after his arrest by the duke of Wurttemberg? Give the titles of two historical works of Schiller; four dramas. Who began the systematic excavation of early Greek remains? . . 1967 c, d

Mention a prominent early investigator of North American Indian lore; a book in favor of feminism by a South African author . . . . . 1968 a-b

Indicate some of Charles Schwab's contributions to victory in the World War; the name of the conqueror of Hannibal . . . 1968 d

Explain the financial pressure which encouraged Sir Walter Scott to produce his historical novels. Describe the relations between Seneca and Nero. By what evidence are the dates of Shakspere's plays inferred? Outline the career of Baron Shaughnessy 1969–1971

Give the name of the first woman ordained to the ministry of the Methodist Protestant Church; the author of *Frankenstein*; the inventor of the first practical typewriter . . . . . 1972 a, b, 1973 a

How did William Sowden Sims first rise to prominence? 1974

Narrate the story of the founding of Mormonism . . . . . 1975 a

Indicate three political or military achievements due chiefly to Jan Christian Smuts. Mention occasions on which Socrates showed noteworthy courage and describe the mission to which he considered himself called 1975–1976

In what industry did "the Carnegie of Belgium" make his fortune? Who discovered the Mississippi river? . . . . . 1976 b, d

Estimate the accomplishments of Herbert Spencer. Describe briefly the chief features of Spinoza's philosophy 1977–1978

Describe the steps by which George Stephenson rose from being a coal miner to a position where he had the opportunity to refuse an offer of knighthood. Trace the expansion of the financial influence of Hugo Stinnes 1979, 1980

Name the chief promoter and builder of the Canadian Pacific railroad; one of the most active advocates of the use of pasteurized milk; an American engineer who built a bridge at Tientsin, China; the man whose farm gave the name to the modern Bowery . . . . . 1981 a, b, d

Mention the most famous work of Jonathan Swift; two sculptural groups created by Lorado Taft for the adornment of Chicago 1982–1983

Name a poet of India whose influence has been extensive in the West . . . . . 1983 d

Who predicted the eclipse of the sun that occurred on May 28, 585 B. C.? . . . . . 1985 c

How old was Tennyson when Thackeray died? 1985

Quote Emerson's description of Thoreau. Name the greatest historian of antiquity. 1987 b, c

Explain how Timur's conquests prolonged the period of Constantinople's independence. Name three famous mythological pictures painted by Titian 1988

Explain the religious changes in ancient Egypt with which Tutankhamen's name is associated. Who made the chronological calculations according to which the world was created in 4004 B. C.? . . . . . 1990, 1991 c

Describe the artistic merits of Velásquez. Outline the career of Venizelos. What is Leonardo da Vinci's most famous portrait? 1993, 1994

Describe the character of Virgil; the operatic innovations of Richard Wagner; Washington's first victory in the Revolutionary War 1995–1999

Contrast the activities of Daniel Webster and Noah Webster. Characterize the fiction written by H. G. Wells 2000, 2001

Indicate the magnitude of John Wesley's activities. What is Walt Whitman's chief poetical work? 2002, 2003

Describe William the Silent's part in the founding of the Dutch republic. Name an early American exponent of religious toleration . . . . . 2004, 2005 a

Discuss the life of Woodrow Wilson, showing legislative enactments during his presidency, his part in the World War, and his efforts for enduring peace 2005

Mention one of the chief merits in Wordsworth's poetry; two achievements of Yerkes 2007, 2008

Describe the teaching of Zoroastrianism . . 2010

BIBLIOGRAPHY

The following list of carefully selected biographical works, while by no means exhaustive, contains a substantial number of the great biographical works which are easily available in English. Some of them have recently come from the press; others have stood the test of enduring popularity.

In addition to biographies will be found the best standard biographical reference works. By consulting these the reader may find information regarding thousands of persons who are known only for certain special reasons and may also obtain additional details concerning the smaller number who have become more universally famous. A selection from the more celebrated autobiographies is given in a separate group. The biographies proper may be either the greatest works of their class or the best available works on the greatest men. The list contains also a liberal proportion of works on famous women and on members of the American hall of fame.

GENERAL WORKS

Title	Author
The Art of Biography	W. R. Thayer
American Portraits	Gamaliel Bradford
Appletons' Cyclopædia of American Biography.	
Century Cyclopedia of Names.	
Dictionary of National Biography (British),	ed. Leslie Stephen and Sidney Lee
Eminent Victorians	Lytton Strachey
Famous Scouts	Charles H. L. Johnston
Great Men of the Christian Church,	Williston Walker
Heroes of Science	Charles R. Gibson
Leading American Inventors	George Iles
Leading American Men of Science, ed. D. S. Jordan	
Leading American Soldiers	R. M. Johnston
Makers of Florence	Mrs. Margaret Oliphant
Masters of Science and Invention, Floyd L. Darrow	
Notable Women in History	W. J. Abbott
Pathfinders of the West	Agnes C. Laut
Plutarch's Lives.	
Portraits of Women	Gamaliel Bradford
Prophets, Priests and Kings	A. G. Gardiner
Roll Call of Honour	A. T. Quiller-Couch
Winning Their Way: Boys Who Learned Self-help,	J. F. Faris and F. A. Stokes
Who's Who (chiefly British).	
Who's Who in America.	
Who's Who in Canada.	

AUTOBIOGRAPHIES

Author	Title
Abbott, Lyman	Reminiscences
Augustine, Saint	Confessions
Barr, Amelia	All the Days of My Life
Bernhardt, Sarah	Memories of My Life
Bispham, David	A Quaker Singer's Recollections
Burroughs, John	My Boyhood
Carnegie, Andrew	Autobiography
Cellini, Benvenuto	Autobiography
Clark, Francis E.,	Memories of Many Men in Many Lands
Cody, W. F.	Autobiography of Buffalo Bill
Conrad, Joseph	Personal Record
Crockett, David	Autobiography
Damrosch, Walter	My Musical Life
Depew, C. M.	My Memories of Eighty Years
Drew, John	My Years on the Stage
Ford, Henry	My Life and Work
Francis of Assisi, Saint,	Little Flowers of Saint Francis
Franklin, Benjamin	Autobiography
Galton, Francis	Memories of My Life
Garland, Hamlin	A Son of the Middle Border
Goethe	Truth and Poetry
Gorky, Maxim	In the World
Grant, Ulysses S.	Personal Memoirs
Grenfell, Wilfred Thomason	A Labrador Doctor
Hale, Edward Everett	A New England Boyhood
Hall, G. Stanley,	Life and Confessions of a Psychologist
Hudson, W. H.	Far Away and Long Ago
Hyndman, H. M.,	The Record of an Adventurous Life
Irving, Henry,	Personal Reminiscences of Henry Irving
Johnson, R. U.	Remembered Yesterdays
Johnston, Sir Harry H.	The Story of My Life
McCarthy, Justin	Reminiscences
McClure, S. S.	My Autobiography
Modjeska, Helena	Memories and Impressions
Morley, John	Recollections
Muir, John	Story of My Boyhood and Youth
Newman, J. H., Cardinal	Apologia Pro Vita Sua
Parkhurst, C. H.	My Forty Years in New York
Pepys, Samuel	Diary
Pupin, Michael	From Immigrant to Inventor
Riis, Jacob A.	The Making of an American
Roosevelt, Theodore	Autobiography
Ross, Ronald	Memoirs
Rousseau, J. J.	Confessions
Saint-Gaudens, Augustus	Reminiscences
Stanton, Elizabeth Cady,	Eighty Years and More
Steiner, E. A.	From Alien to Citizen
Tagore, Rabindranath	My Reminiscences
Thomas, Augustus, The Print of My Remembrance	
Washington, Booker T.	Up from Slavery
Watterson, H. W.,	Marse Henry—An Autobiography
Wiggin, Kate Douglas	My Garden of Memories
Yeats, W. B.,	Reveries Over Childhood and Youth

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Subject and Title	Author
Adams, John	J. T. Morse
Adams, Samuel	R. V. Heald
Agassiz, Louis	C. F. Holder
Alcott, Louisa May	Belle Moses
Aldrich, Thomas Bailey, Life of,	Ferris Greenslet
Alexander the Great	B. I. Wheeler
Alfred, King, Story of	Sir Walter Besant
Audubon the Naturalist, Life and Adventures of,	Robert Buchanan
Austen, Jane	O. W. Firkins
Balzac, Honoré de	M. F. Sandars
Barnum (Phineas Taylor)	M. R. Werner
Barton, Clara, Life of	P. H. Epler
Beecher, Henry Ward	Lyman Abbott
Beethoven	Romain Rolland
Bismarck	E. G. Robertson
Boone, Daniel, Wilderness Scout	S. E. White
Bright, John, Life of	G. M. Trevelyan
Brontë, Charlotte, Life of	Mrs. E. S. Gaskell
Brooks, Phillips	A. V. G. Allen
Brown, John	W. E. B. DuBois
Browning, Elizabeth Barrett	J. H. Ingram
Browning, Robert	Edward Dowden
Bryant, William Cullen, Life of	John Bigelow
Burke, Edmund	John Morley
Burns, Robert, Life of	J. G. Lockhart
Cæsar, Julius	Warde Fowler
Calhoun, John C.	Gaillard Hunt
Calvin, John	Williston Walker
Carlyle, Thomas	J. A. Froude
Caruso, Enrico	P. V. R. Key
Cavour, Life and Times of	W. R. Thayer
Cervantes	Rudolph Schevil
Channing, William Ellery	J. W. Chadwick
Charlemagne, the Hero of Two Nations,	H. W. C. Davis
Charles XII	Voltaire
Cicero	J. L. Strahan-Davidson
Clay, Henry, Life of	Carl Schurz
Clemens, Samuel, See Twain, Mark.	
Cleveland, Grover	R. M. McElroy
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Cook, Captain	Sir Walter Besant
Cooper, James Fenimore	T. R. Lounsbury
Cromwell, Oliver	Theodore Roosevelt
Cushman, Charlotte, Life of	W. T. Price
Dante Alighieri	J. B. Fletcher

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Darwin, Charles, Life and Letters of,	Francis Darwin
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Machiavelli, N.	Pasquale Villari
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Mahomet, Founder of Islam	G. M. Draycott
Maid of France (Joan of Arc)	Andrew Lang
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Raphael	Mrs. J. C. Ady
Rhodes, Cecil John	Sir T. E. Fuller
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Taylor, Frederick W.	F. B. Copley
Tennyson, Alfred	Andrew Lang
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CALIFORNIA MISSIONS

Santa Barbara, Open Continuously since Established (1786)

San Carlos (Carmel), near Monterey (1770) San Gabriel, near Pasadena (1771)

Corridor, San Juan Capistrano, Orange County (1776)

MISCELLANY

INTRODUCTORY

THIS department bears the title Miscellany primarily because it comprises groups of information that are more or less unrelated to each other. Moreover, each group contains material which, in its entirety, cannot properly be classified under any particular one of the preceding departments.

In no sense, however, is this department a mere medley of odds and ends. On the contrary, each group contains some of the most carefully arranged, informing, and useful material in the work. This material has been placed here, not because it could not be readily distributed elsewhere in the volume, but because its arrangement in these specially constituted groups greatly enhances its reference value.

The advantages of this plan may be seen in the section on Heroic Deeds, in which the various stories inspire far greater human interest than would the same material scattered through the departments of History, Geography, Useful Arts, and Biography. Again, the combined historic, romantic, artistic, and spiritual suggestiveness of the section on California Missions would be all but lost should this material be separated into its component parts and the fragments placed under History, Geography, Biography, and Fine Arts.

A second important advantage gained by bringing things of the same kind together in the manner adopted for these miscellaneous groups is the ease of reference thereby secured. Instead of finding it necessary to turn to two or more widely separated departments and then to combine the information obtained, the user will discover that this task has been performed for him in advance. The marked saving of time and effort effected by this arrangement is clearly shown in the numerous groupings, which include Sobriquets and Nicknames, Popular Names of States and Peoples, State Mottoes, State Emblems, State Flowers, and various other somewhat similar assemblages of interesting information.

Parliamentary Law. To an ever increasing extent this is an age of organization, of association, and of co-operation. We act more and more in groups and less and less solely as individuals. Every progressive community, as a rule, contains several active organizations. In the country there are farmers' clubs and co-operative associations in great variety. In villages and in towns there are men's clubs, women's clubs, and numerous other organizations. In the larger cities there are organizations in connection with practically every activity in which the citizens engage—commercial, social, civic, political, musical, literary, educational, or religious. Moreover, in many schools, formal organization has become part of the regular procedure of the institution.

From time to time it is necessary for such bodies to transact business and to act upon various matters presented for consideration. It is highly desirable that such transactions should be made in accordance with correct parliamentary procedure. This is extremely important whenever financial considerations are involved. In such cases parliamentary proceedings have a legal significance and may affect the title to valuable property or the disposition of large sums of money.

In the section devoted to this subject, the essentials of a complete manual have been brought together within the compass of 12 pages. Great care in preparation has been exercised in order to secure a simple and effective arrangement combined with absolute clearness of presentation. By studying this material, the user of this volume will be enabled to acquaint himself very quickly with the parliamentary rules in conformity with which organizations of all types should conduct their deliberations.

Societies and Organizations. It has been stated above that the present age is pre-eminently one of organization and co-operation. The total number of organizations, in fact, has become so enormous that a mere catalogue of their names would fill volumes.

With a view to furnishing the reader with helpful information concerning some of the larger and more distinguished of these, concise articles treating some 70 orders, societies, and various other organizations are presented in an ensuing section. Here will be found authoritative facts regarding the history, scope, and purpose of the most notable organizations in the United States and in other countries.

California Missions. Among the recollections which remain most sharply etched in the minds of travelers upon the Pacific coast are the impressions produced by visits to the old California missions. Most persons dwelling in other parts of the continent have a very imperfect knowledge of these historic institutions or of the influence which they exerted in many ways upon the later development of California.

In the section devoted to this subject will be found an array of facts of unusual interest concerning the long chain of missions founded among the Indians of the Pacific coast more than 150 years ago by heroic Franciscan padres from Mexico. Authentic information is presented in regard to the origin, history, former prosperity, and later decline of these celebrated missions. Of especial value are the descriptions of their modern remains and the exact information given in regard to their location and their accessibility to the traveler.

Heroic Deeds. Courage is a virtue of the most universal appeal. The American Indians used to take steps which they believed would secure for themselves the heroism of their most daring enemies. No less marked is the homage which the children of a civilized age pay to those who show themselves intrepid in the face of danger. A thrill of admiration and pride passed through millions of hearts when they read of the numerous acts of quiet heroism performed when the *Titanic* or the *Lusitania* was sinking in mid-ocean.

The division reserved for the description of notable deeds of heroism recounts those of many different types. Heroes of science will be found treated, as well as heroes of the sea. There are exploits of women, of children, of priests and warriors, of explorers, workmen, and kings. The human interest of these stories is increased by the fact that, except for one or two which depend on tradition, they are authentic accounts of actual occurrences.

Sobriquets and Nicknames. Often a person or a place bears a distinctive name that has long been applied by general consent. It may not for the time seem appropriate. It may appear as meaningless as a word of an unknown tongue. Yet those names frequently carry interesting stories for the one who can interpret them.

The origin and the meaning of a large number of such names are explained in the section under the above caption. There one may find answers to such questions as Who was called the mill boy of the slashes? How did Uncle Sam come to symbolize the United States? Who was the weeping philosopher? By finding the answers to these and many similar questions, the reader will travel far over the field of human history and will bring back with him many interesting items of information which it will long be a pleasure to remember.

National Symbols and Flags. In every land the sentiments of millions of human beings are centered about certain objects usually insignificant in themselves—a piece of colored cloth or an arbitrarily chosen flower or animal. An insult to these enshrined symbols is instantly resented as an indignity to the people who have chosen them. Fealty to its symbols is interpreted as a sign of friendship to the people.

The reader may see in the following pages an account of the flowers and the animals which have been made emblematic of various countries of the world as well as of each state of the Union. The flags of the countries formed since the World War are not generally known, because they are not given in the ordinary encyclopedias. Such information has been specially secured for this department and will be found set forth along with a clear description of the flag used by each of the other chief countries of the world.

Festivals and Holidays. This section brings together for reference and comparison a fund of instructive information, a large part of which is not readily accessible to the average reader. While fairly clear ideas prevail as to the origin and meaning of patriotic holidays, such as July Fourth, Memorial Day, and Flag Day, and also concerning religious holidays, such as Christmas and Easter, most persons find themselves at a loss to explain the significance of various other festivals and holidays observed in their own country, not to mention those celebrated in other lands.

The section devoted to this subject gives the history and meaning of Saint Valentine's Day, April Fool's Day, May Day, and Halloween. It likewise enlightens the reader concerning some of the more important local festivals which have become established in the United States, including the Mardi Gras, the Rose Festival, the Tournament of Roses, Labor Day, Arbor Day, and Mothers' Day.

Popular Superstitions. It will be a matter of astonishment to many people to read in a following section that many of the common superstitions playfully discussed nowadays were once elements of magic accepted in dead earnest by people hundreds of years ago. Familiar as they are, they often bear an age-long antiquity. Such are those connected with charms, like the lucky horseshoe, and with customs, like shoe throwing at weddings.

The reader will find also the scientific explanation of many of the common errors which have passed current for many generations. These include the belief that toads or frogs fall in rain and that horsehairs turn to snakes if left for a certain length of time in water.

Great Disasters. The customary security in which we live tends to make us forget that we have no guarantee against catastrophe. Nature pursues her regular course regardless of human life. Cataclysmic earthquakes occur alike in unpeopled tracts and in the most populous lands. Volcanoes may break forth not merely in Alaska but also above great cities, such as Naples. It makes no difference to the seething waters of a flood whether they carry away broken trees or human habitations.

Particularly at the time of such unhappy occurrences, people's minds revert to earlier catastrophes. They desire to learn how many perished in this or that former disaster. A clear and concise presentation of such information is given in this department, which records the most notable modern disasters.

Discoveries and First Uses. From the earliest times people have shown a lively curiosity in regard to the origin of the various objects with which they meet. It is such curiosity regarding the origin of the world that accounts for the myths of creation invented by nearly all early peoples. Their customs, their arts, and even the geographical features of their countries are frequently explained by stories which make their surroundings seem more understandable to primitive people.

In the present age, which is distinguished from all others by the multitude of newly invented arts and sciences which it possesses, a knowledge of the origins of these various innovations is especially interesting. For the first time in history, careful records make it possible to give the true answers to such queries as When did the first locomotive run? Who made the first dynamo? What was the first newspaper published in America?

The interesting list of discoveries and first uses given in the following section will be found to include dates for the discovery of bacteria, the establishment of the first free public bath in America, the first manufacture of artificial ice, the determination of the velocity of light, the construction of the first suspension bridge, and numerous other events which were the first of their kind.

Drawing and Design. Within the past decade or two has occurred a widespread popular awakening of interest in applied art. Not only have advertisements in magazines become veritable picture galleries, but large numbers of people are becoming aware of the fact that, by desirable combinations of color and lines, it is possible greatly to enhance the beauty of their houses, their gardens, and their costumes. It is a commonplace among psychologists that to have pleasing and restful surroundings conserves the nervous energy. It does more—it enriches life.

Up to the present the possibilities lying in the application of artistic principles in everyday life have scarcely begun to be realized. Without the expenditure of a single additional dollar, the charm of nearly every house might be vastly increased by the application of certain simple rules. The section on drawing and design, besides containing much else of great value, explains these principles and gives many useful hints for household decoration.

Furniture. This instructive section gives a brief outline of the history of furniture and an account of the chief types of period furniture. It characterizes the ornamentations found on the chairs and couches made in ancient times and enables one to recognize by their qualities the articles which copy the furniture of Louis XIV, Queen Anne, or the American Colonial days.

Games and Sports. It is a curious fact that many of our familiar games date from a remote antiquity. Cards and chess, for example, were known among the ancient Egyptians. Lacrosse is a game which originated among certain North American Indians. The phenomenal popularity of tennis and baseball, however, is of more recent date. Interesting articles on the character and the history of these and many other well-known games will be found in the section entitled Games and Sports.

General Miscellany. The material which will be found arranged alphabetically in General Miscellany includes some of the most useful and interesting information in this volume. The reader may there read of the origin of our alphabet and may solve the mystery of the triple form of many of our letters, as in A, a, and *a*. He may learn much about patents, ways of reckoning time, the significance of various flowers as emblems, the Nobel prizes, the history of the American Cup races, ways of making fire, notable communistic societies, and a large number of other engrossing subjects.

PARLIAMENTARY LAW

The term "parliamentary law" was applied originally to the customs and rules under which business was conducted in the English Parliament. As these usages of Parliament became fixed for that body, they gradually came to be recognized outside of Parliament, not only as authoritative in the governing of deliberative assemblies, but also as forming part of the unwritten law of the land. From England, the usages of Parliament spread to America as well as to other countries, and, with modifications to suit the needs of individual bodies, these usages have formed the basis for rules and regulations governing all of our deliberative assemblies, including legislative bodies and legal corporations. Parliamentary law in America has very generally conformed to the usages of Congress. These, of course, differ somewhat in the two houses of Congress, and are changed and revised from time to time.

Definition. Parliamentary law is, therefore, a set of customs and rules used by organized bodies in the conduct of their meetings, defining what may or may not be fairly or properly done at such meetings.

While no organized body need be bound by any set parliamentary rules, it is quite impossible, without such rules, to conduct a meeting with fairness and alacrity. Most organizations, therefore, not only follow general parliamentary rules, but adopt some particular work on parliamentary law as a guide for the conduct of their meetings.

A typical work on parliamentary law should describe methods of organizing societies and of conducting meetings, and should outline the duties of officers. It should give also the names of motions, with comment upon each motion. This comment should cover the following points: the object and effect of the motion; whether it can be amended or debated; if debatable, the extent to which it opens the main question to debate; the circumstances under which the motion may be made; and what other motions may be made while it is pending. The purpose of this section is to present to the reader, in a brief, concise form, as much of parliamentary law as one needs to know in order to be an alert, intelligent citizen, competent to participate in public discussions and organizations.

TEMPORARY ORGANIZATION

When a number of persons who previously have agreed to meet for the purpose of organization are assembled, anyone present may rise and say, "I move that Mr. A act as chairman." Anyone else present, either seated or standing, may say, "I second the motion." The maker of the motion, standing, should then say: "It has been moved and seconded that Mr. A act as chairman. All in favor say *aye*. All opposed say *no*." If the maker of the motion is satisfied that a majority have voted aye, he says: "The motion is carried. Will Mr. A please take the chair." If he is satisfied that a majority have voted no, he says: "The motion is lost. I will receive the nomination of some one else." If, at this time, more than one person is nominated, the maker of the first motion puts before the assembly the name that he first hears, and so on until a choice is made.

Alternative Method. Instead of some one's rising and himself nominating a chairman, any person may rise and say, "Will the meeting please come to order. I will receive nominations for chairman." Thereupon he becomes a kind of temporary chairman, and continues to receive and to put nominations for chairman until some one is elected in the manner explained above.

The Temporary Chairman. The person elected should immediately take the chair, when he may speak very briefly of the honor conferred upon him or on the purpose of the organization or on both subjects. He may call for the nomination of a secretary, tellers, and other officers, to be elected in the same manner as the chairman, by saying, for example, "Nominations for secretary are in order," or "I will receive nominations for secretary"; or he may simply say, "What is your further pleasure?" and await the action of some member. To expedite matters, the newly elected chairman may say, "If there are no objections, I will appoint a secretary and tellers." Hearing no objections, he immediately appoints a secretary and at least two tellers, and proceeds with the organization.

PERMANENT ORGANIZATION

First Meeting. If a permanent organization is contemplated, after the election of the chairman and the election or appointment of the secretary and tellers, either the chairman, or some one previously agreed upon, at the call of the chairman, sets forth, somewhat in detail, the purpose of the meeting. This person usually concludes his remarks by offering a resolution, previously prepared. This resolution is usually passed to and read by the secretary, although it may be read by the person offering it. A motion to adopt the resolution is then in order and, when made and seconded, may be freely debated by anyone present. Such a resolution might read, "Resolved, That it is the sense of this meeting that a society or club shall be formed in this city for the purpose of the improvement of the city."

If the resolution as read or as amended is adopted, some one makes a motion that the chairman appoint a committee (specifying the number to be on the committee) to draft a constitution and by-laws for such an organization as has been agreed upon by the passing of the resolution. Usually, if this motion is carried, the chairman appoints a committee or announces his intention of doing so later. A motion to adjourn to some definite time or place, or both, may now be made. Such a motion is debatable. Or a motion to adjourn, or to adjourn subject to the call of the chairman, may be made. Neither of these two motions is debatable. If any motion for adjournment is carried, the chairman states the effect of the action, using the words of the motion; as, for example, "We stand adjourned subject to the call of the chair."

Second Meeting. At the next meeting, the officers of the former meeting are in charge until superseded by permanent officers.

The chairman calls the meeting to order and asks the secretary to read the minutes of the preceding meeting. The chairman then says: "You have heard the minutes; are there any corrections or additions?" If no one replies, he then says: "If there are no corrections or additions to the minutes as read, they stand approved." (Pause) "Hearing none, I declare them approved." If corrections or additions are made by anyone and the assembly seems to agree, the chairman says, "The minutes as corrected (or enlarged) stand approved."

Adopting Constitution and By-Laws. The chairman then says, "The next order of business is the report of the committee on constitution and by-laws." The chairman of this committee rises, addresses the chair, and, when recognized, either reads the proposed constitution or passes it to the secretary to be read. When the reading has been concluded, the chairman of the meeting says: "You have heard the report of this committee. What is your pleasure concerning it?" Anyone present may rise and say, "I move the adoption of the constitution and by-laws as read." If the motion is seconded, the chairman puts it, and, if it is carried, the constitution and by-laws as read become the fundamental law of the society or club.

Instead of the assembly's voting on the constitution and by-laws as a whole, any person present may move that the constitution and by-laws be

considered (or acted upon) article by article. If this motion is adopted, the secretary of the meeting, or the chairman of the committee, reads the first article.

The chairman of the meeting then says, "Are there any amendments or additions to this article?" If there are amendments or additions, he must entertain motions to that effect until the first article is amended or enlarged to the satisfaction of a majority of those present, when he will proceed in like manner with the second and subsequent articles. If, after a short pause following the reading of the first article, no amendments or additions are suggested, the chairman says, "There being no amendments or additions to this article, we will pass to the reading of the second article." Each succeeding article should be taken up in like manner.

After each article has been so considered, separately, the chairman says, "You have passed upon the constitution and by-laws by sections (or articles); will you adopt them as a whole?" Any person present may offer further amendments or additions to the constitution and by-laws as a whole, or may move their adoption as read (or as amended or enlarged) and as a whole.

If no motion of any kind is offered concerning the whole, the chairman says, "There being no further amendments or additions, all who are in favor of adopting the constitution and by-laws as read (or as amended or enlarged) and as a whole, manifest it by saying *aye*." After considering the apparent number of favorable votes carefully, he says, "Those opposed manifest it by saying *no*." He then announces the result by saying, "The constitution and by-laws as read (or as amended or enlarged) have been adopted (or have not been adopted)." At this juncture it is customary to have an intermission, when those who wish to become members of the newly organized society or club sign the constitution and by-laws, if these have been adopted.

ELECTION OF OFFICERS

After the intermission, the chairman says, "The next order of business is the election of officers in accordance with our constitution." Officers are usually elected in one of two ways.

(1) COMMITTEE ON NOMINATIONS

A committee on nominations may be provided for and appointed. When the committee has made its report, the chair asks if there are any other nominations. At this time any member present is at liberty to nominate a candidate from the floor in the same way as he could if no nominating committee had been appointed. If no member nominates a candidate from the floor or if all nominations seem to have been made, the presiding officer proceeds to the election according to the by-laws of the organization, or according to any acceptable method of voting if the by-laws do not prescribe a method. See *Voting: Ballot*; also (2) below.

Accepting the Committee's Report. Instead of procedure according to the above plan, it frequently happens, when no nominations are made from the floor, that some member moves that the report of the nominating committee be accepted and that the candidates be declared elected. The acceptance of the report of the nominating committee is thus considered to be the election. Although this plan is commonly practiced and quite generally accepted, it has no authority either in parliamentary rules or in law. The acceptance of the report of the nominating committee means that the assembly regards the persons whose names are reported by the committee as candidates for the respective offices. It means nothing more; an election is still necessary. If one or more candidates are nominated from the floor, the presiding officer properly treats the nominee of the nominating committee in exactly the same way as those nominated from the floor, and proceeds with the election as indicated under (2) below.

(2) NOMINATIONS FROM THE FLOOR

According to the second plan, the chairman says, "Nominations for president (or whatever the presiding officer's title is) are in order." Any member present, upon being recognized by the chair, may nominate a candidate. A nomination does not require to be seconded. Sometimes, however, a nomination is seconded in a brief speech.

When the chairman is satisfied that sufficient time has been given for nominations for any office, he says, "Are there any further nominations?" Hearing no response, he says: "If there are no further nominations for (president), I declare the nominations closed. You may prepare your ballots for (president)." At this point, the chairman either reads the list of nominations or asks the secretary to do so. If tellers have not previously been appointed, the chairman, with the consent of the assembly, now appoints them, usually three or more.

The Election. The tellers should distribute and collect the ballots. Before they begin to count the ballots, the presiding officer says, "Have all voted who wish?" Hearing no response, he says, "If so, I declare the ballot closed." The tellers count the ballots, sometimes in the presence of the assembly and sometimes in a separate room. They should tabulate the vote in writing and announce the result to the chairman, who should announce it to the members, as follows: "Whole number of votes cast, 39. Necessary for a choice, 20. Mr. A received 21; Mr. B, 12; Mr. C, 5; and Mr. D, 1. Mr. A having received a majority, I declare him duly elected (president)." If no one receives a majority, the chairman, after announcing the count, says, "No one having received a majority, you may prepare your ballots for (president)." The same procedure is continued until some one receives a majority. After the first or any subsequent ballot, if no one has received a majority, a candidate may withdraw his name.

Only One Nomination. If only one nomination is made, it is, in some organizations, customary for the chairman to say, "There being but one nomination for (president), I declare Mr. A elected." Sometimes a member, having addressed the chair, says, "There being but one nomination for (president), I move that the secretary cast one ballot for Mr. A for (president)." If the motion is seconded and carried, the secretary writes the ballot and formally announces that the ballot has been cast, and the chairman announces the member duly elected. These two methods of electing officers are regarded as bad practices and are usually held to be illegal and unparliamentary. Neither is ever allowable when the constitution or a law or a rule of the organization specifies that the officers shall be elected by ballot. If but one member is nominated, exactly the same procedure is followed as if two or more were nominated. This gives any member a right to vote in secret for some one else if he chooses.

Nomination by Informal Ballot. Instead of having nominations made from the floor, it is sometimes decided beforehand, either by common consent or by formal vote, that nominations shall be made by "informal ballot." According to this method, each member present writes the name of his choice on a piece of paper. The papers are collected by the tellers, counted, and the result reported to the assembly in the same manner as are votes in a regular ballot. The names of those receiving one or more votes are then declared by the chairman to be nominees, and the election proceeds as though the members had been nominated from the floor. This is the most democratic way of making nominations.

Time of Taking Office. It is customary, in many organizations, for the chairman to vacate his seat when a new presiding officer has been chosen, and for the newly elected official to take his place and conduct the election of the other officers.

The new presiding officer begins by calling for nominations for the office next in importance. The same procedure is followed in the election of all officers, each taking his seat as soon as elected. The election of officers completes the permanent organization.

Installation of Officers. Instead of the officers immediately taking office as indicated above, it is customary in some organizations for the officers to be "installed" at a later meeting. Such "installation of officers" is accompanied by more or less ceremony and may be made very solemn and impressive. The time when officers shall assume their duties is usually specified in the constitution.

CONSTITUTION AND BY-LAWS

A constitution is the fundamental, organic law or principles of government of a nation, a society, or the like, whether embodied in writing or not. By-laws are detailed regulations for working out the objects of the organized body and the purposes of the constitution. The constitution may be so complete that few, if any, by-laws are necessary. On the contrary, the by-laws may so completely cover the field that a constitution is hardly needed.

Constitution. A constitution should be brief, and should contain only important essentials. In general, it should include the following topics: (1) The name of the organization. (2) The object of the organization. (3) Requirements for membership. (4) The officers: their terms of office; when they shall assume office; the manner of their election; and their duties, if these differ from those of similar officers in other organizations. (5) Committees. (6) Time and place of meeting. (7) How the constitution can be amended. The process of amendment should be made difficult. It should require a two-thirds vote and action in at least two meetings.

By-Laws. The by-laws should cover all details of procedure not included in the constitution. They may include the following: (1) How many shall constitute a quorum. (2) Rights and duties of members. (3) Punishment of members. (4) Fees or dues. (5) Authority for settling disputed points. (6) How by-laws may be amended. It should be possible to amend by-laws more easily than the constitution. The general rule is that amendments to the by-laws be proposed at one meeting and voted on at the next. Usually a majority vote is held to be sufficient for such action. (7) Order of business. A special provision should be made for setting aside the order of business in case of emergency.

TYPICAL CONSTITUTION AND BY-LAWS

CONSTITUTION

Article I—Name

The name of this organization shall be the Booster Club of the city of Oswego.

Article II—Object

The Booster Club shall have for its object the improvement and entertainment of its members; and the moral, social, and business improvement of the city of Oswego.

Article III—Members

Members of the Booster Club shall consist of two classes, active and honorary. Any adult resident of the city of Oswego may become an active member of this club by making written application to the secretary, paying a fee of one dollar, and signing the constitution. Any former adult resident of the city of Oswego may become an honorary member of this club by signing an application blank and paying a fee of five dollars.

Article IV—Officers

The officers of the Booster Club shall be a president, a vice president, a recording secretary, a corresponding secretary, and a treasurer, elected by ballot from the active members of the club at the first regular meeting in January of each year. The officers shall assume office at the first regular meeting following their election and shall serve for a period of one year or until their successors are elected. A vacancy in any office may be filled at any regular meeting, for the balance of the term.

Article V—Committees

There shall be the following standing committees, of five members each, and as many other committees as from time to time may seem necessary: membership, entertainment, municipal, and welfare. Members of these committees shall be appointed by the president, at the second regular meeting in January, and shall serve for one year or until their successors are elected.

It shall be the duty of the membership committee to attempt to secure desirable members for the club. The entertainment committee shall provide some entertainment for each regular meeting and for any special meeting, when so directed by the club. The municipal committee shall co-operate with the city officials in enforcing all laws; and with progressive citizens in an attempt to secure better local, state, and national laws relating to the city. The welfare committee shall co-operate, with any organized or unorganized group of citizens, in an effort to aid the weak or unfortunate in the city.

Special committees, with specified duties, may be appointed from time to time as necessity arises. Unless otherwise provided for in the resolutions creating them, all special committees shall be appointed by the president.

Article VI—Meetings

There shall be a regular meeting at 12:30 P. M., at some place designated by the entertainment committee, on each Thursday during the year, except during the months of July and August. Special meetings may be called by the president, with the consent of the entertainment committee, at such times and places as seem advisable to the members authorized to call such meetings.

Article VII—Amendments

Proposed amendments to this constitution must be presented in writing at a regular meeting, read by the secretary at such meeting, and left on the table until the next regular meeting, when a vote on such amendment or amendments shall be taken. If two-thirds of the members present at the regular meeting, following the meeting when the amendment or amendments were proposed, vote in favor of such amendment or amendments, this constitution shall be so amended.

BY-LAWS

Article I—Quorum

Three-fifths of all the active members constitute a quorum.

Article II—Rights and Duties of Members

Active members shall have all the rights and be subject to all the duties customary in parliamentary bodies. Honorary members shall have all the rights of active members except the right to vote. An honorary member cannot be required to serve on a committee.

Article III—Punishment of Members

Each active member shall pay a fine of twenty-five cents for nonattendance at any regular meeting. Any active member who refuses or neglects to act on any committee to which he or she has been appointed shall be fined one dollar. When the unpaid fines of any active member amount to two dollars, written notice shall be sent to him or her by the secretary. Refusal or neglect to pay such fines, within thirty days, shall constitute just cause for dismissal from the club.

Article IV—Fees and Dues

The dues of active members shall be five dollars annually, payable semiannually, in advance. The dues of honorary members shall be ten dollars annually, payable, in advance, in January of each year. Special fees or dues may be levied on active members by a two-thirds vote at a regular meeting.

Article V—Authority in Disputes

The final authority in the settlement of disputes shall be *Robert's Rules of Order Revised.*

Article VI—Amendments

Proposed amendments to these by-laws must be presented in writing at a regular meeting, read by the secretary at such meeting, and left on the table until the next regular meeting, when a vote on such amendments shall be taken. If a majority of the members present at the meeting following the meeting when the amendments were proposed vote in favor of such amendments, these by-laws shall be so amended.

Article VII—Order of Business

At every regular meeting, the following order of business shall be followed:

I. Roll Call.
II. Reading Minutes of Preceding Meeting.
III. Receipt of Communications, Bills, etc.
IV. Report of Standing Committees.
V. Report of Special Committees.
VI. Unfinished Business.
VII. New Business.
VIII. Lunch or Dinner.
IX. Speeches, Stories, Songs, etc.
X. Adjournment.

By a two-thirds vote, at any regular meeting, the order of business may be set aside for that meeting.

GENERAL POWERS AND DUTIES OF THE PRESIDING OFFICER

Not only the success of an individual meeting, but the success of a year's work, frequently depends on the skill of the presiding officer. Consequently, great care should be exercised in selecting a person for this position. Not only is executive ability necessary, but the knack of getting along affably with people and of inducing people to work congenially with each other is equally important. Under no consideration should anyone be elected presiding officer of an organization for social or political reasons or because of long and faithful service. The ability to preside and to direct the affairs of the organization should be the determining factors, in the selection of a presiding officer.

Duties. The presiding officer calls the meeting to order, announces the business to be transacted according to regular or special order, preserves quiet, decides all questions of order unless an appeal is made to the members, states and puts all questions. In speaking, in stating and putting questions, and in announcing the results of votes, the presiding officer should always stand. Under no circumstances should he allow anyone to speak to the members without "addressing the chair." When a member rises and addresses the presiding officer, the latter should recognize him by saying, "Mr. A"; or, if two or more rise and address the chair at about the same time, he should first decide which is entitled to the floor and then say, "Mr. B has the floor."

Putting Motions. When a motion has been regularly made and seconded, the presiding officer should say, "The motion has been made and seconded," or "It has been moved and seconded that (here give the exact words as stated by the maker)." If he cannot remember the exact words, he may call on the secretary to read the motion or on the maker to state it again. If the motion is debatable, he should then say, "Are there any remarks?" When the discussion lags, he may say: "Are there any further remarks? If not, are you ready for the question?" If there is no response, or if one or more members call out "Question," he should say: "The motion has been made and seconded," or "It has been moved and seconded that (the exact words of the motion). All those in favor manifest it by saying *aye* (or whatever expression the customary manner of voting calls for). Those opposed, by saying *no*." Or, in calling for the negative vote, he may say, "Contrary, the same sign."

When both favorable and unfavorable votes have been taken, the chair announces, "The motion is carried," or "The motion is lost." If the vote was upon a motion that had been amended, he should say, "The motion, as amended, is carried." Sometimes, in political and other organizations, the presiding officer, instead of simply saying, "It has been moved and seconded," says, in putting a motion, "It has been moved by Mr. B and seconded by Mr. K that, etc."

Putting Resolutions. In presenting a resolution, the presiding officer says, "It has been moved and seconded that the resolution that you have just heard read (by the secretary) be adopted." If no one offers to discuss the resolution, the presiding officer may say, "Does anyone wish to discuss the resolution that is before us or to have some part of it reread or explained?" If there is no response or if the discussion lags, he may say, "Are you ready for the question?" Hearing no response, or upon call for the "question," he may say: "The question is on the adoption of the resolution you have heard read; as many as are in favor of its adoption say *aye*. As many as are opposed say *no*." He then announces the result by saying, "The resolution has been adopted," or "The resolution has been lost." As in the case of a motion, if the resolution has been amended, he says, "The resolution, as amended, has been adopted."

Approving Minutes. After the reading of the minutes of the preceding meeting or meetings, the presiding officer may expedite matters by not waiting for a formal motion to adopt the minutes. He may say: "If there are no corrections or additions to the minutes as read, they stand approved." (Pause) "Hearing none, I declare them approved." Any member may, upon being recognized, correct an error in the minutes or add something which the secretary overlooked. In such a case, the presiding officer proceeds as above, saying, instead of "minutes," "minutes as corrected," or "as enlarged," or "with additions."

General Conduct of the Meeting. The presiding officer should never interrupt a speaker when the latter is in order. If the speaker is not in order, the presiding officer should use the gavel in calling him to order, and, if requested, should explain why he rules that the speaker is not in order. Except on questions of order and in performing the necessary routine of his office, the presiding officer should never discuss any question nor address the members from the chair. If he wishes to discuss any question that is before the house or to bring some question before the house, he should ask the vice president or some other member to take the chair, whereupon he should take his seat with the members and speak only when recognized by the chair.

When speaking of himself, the presiding officer should always use his title, as, "the chair." In a firm but affable manner, he should insist on good order. He should be strictly nonpartisan on all questions while presiding. The dignity of the meeting depends almost entirely on the dignity and skill of the presiding officer. If the chairman will carefully plan the details of each meeting and will speak in a clear, deliberate tone, he will add greatly to the decorum of the meeting.

VICE PRESIDENT

While the office of vice president is usually regarded as unimportant, great care should be taken in selecting this officer, as he is likely to succeed to the office of president or to be called upon at any time to preside.

Responsibility. A person elected to the vice presidency of any organization should immediately acquaint himself with the powers and duties of a presiding officer, and should make himself familiar with the ordinary forms of parliamentary law. If he neglects to do this, he is likely to embarrass greatly both the organization and himself, if he be called upon unexpectedly to preside.

RECORDING SECRETARY

The recording secretary should be careful to take down every motion that is made, whether it be seconded or not, as only in this way can an accurate record of the motions passed be available for the permanent record. If the recording secretary be in doubt as to the wording of a motion, he should ask the maker to repeat it or to put it in writing. The rough notes taken down as the meeting progresses should show, in full, the exact wording of every motion, resolution, or petition (including the names of the maker and seconder) which was stated by the chair, and what disposition was made of each by the assembly. Motions lost, as well as motions passed, should be recorded.

Contents of Minutes. Either as the meeting proceeds or soon after adjournment, the recording secretary should transcribe his rough notes to a permanent book, in ink. Motions made but not seconded need not be transcribed to the permanent record. The minutes should give an accurate account of the entire proceedings of the meeting, showing in detail the things done rather than the things said. Especial care should be taken to record accurately motions authorizing the expenditure of

money. The record should show the amount to be paid, to whom, and for what.

Besides an accurate record of every motion stated by the chair, as indicated above, the minutes should show also the following: the kind of meeting,—whether regular or special, adjourned regular, or adjourned special; the name of the organization; date and place of meeting, if not always the same; the fact of the presence or the absence of the regular presiding officer and the secretary,—in case of their absence, the names of their substitutes; disposition of minutes of preceding meeting; the hours of meeting and adjournment. Brief extracts from speeches, if important, may be recorded, but no comment of any kind, either favorable or unfavorable, should be made. Every important communication received by the organization should be recorded in the minutes, either in its entirety or in substance, as well as what disposition was made of it by the organization. This rule applies to reports of committees as well as to communications from nonmembers. When an important matter is before the organization, and the yeas and nays are called for, the list of the names of those voting, with the side upon which each voted, should be recorded.

Reading of Minutes. When regular meetings are held weekly, monthly, or quarterly, it is customary to read the minutes of the preceding meeting at the opening of each meeting. Corrections are made, if necessary, and the minutes as read or as corrected and read are approved. If meetings are held several days in succession, with recesses during the day, the minutes are read at the opening of business each day. If the next meeting is not to be held for a period of many weeks or months or for a year, the minutes that have not been read previously should be read and approved before final adjournment. When minutes have been approved, they should be marked "Approved,"—with date of approval, if approved at an irregular time,—and signed by the secretary. If minutes are to be published, they should be marked "Approved" and signed by both the president and the secretary.

Custodial Duties. It is the duty of the recording secretary to keep a register, or roll, of the members and to call the roll when it is requested by the presiding officer. All bills rendered to the organization should be kept on file, where they may be consulted by any member. When bills are paid, the recording secretary should see to it that they are receipted and permanently filed. The recording secretary should carefully preserve the constitution and by-laws, together with amendments thereto. It is especially important that the constitution and by-laws and a permanent record of the proceedings of all previous meetings be available at every meeting. Consequently, the recording secretary, if unable to be present at any meeting, should see to it that these records are at the place of meeting, and especially that the report of the last meeting is properly transcribed, so that it may be read and acted upon.

When the Recording Secretary Presides. When both the president and the vice president are absent, the recording secretary should call the meeting to order and act as presiding officer until some one regularly succeeds him. At other times, a motion that refers especially to the presiding officer should be stated and put to a vote by the recording secretary.

Other Duties. Unless otherwise specified in the by-laws, it is the duty of the recording secretary to notify officers, committees, and delegates of their election or appointment, to furnish committees with all papers referred to them, and to supply delegates with credentials; also to sign with the president all orders on the treasurer which have been authorized by the organization. When the word "secretary" is used, it always refers to the "recording secretary," other secretaries being designated by specific titles.

CORRESPONDING SECRETARY

It is the duty of the corresponding secretary to send out proper notices of all called meetings, and of other meetings when necessary, and to conduct the correspondence of the organization, unless it is otherwise provided for.

SECRETARY'S TYPICAL REPORT OF A MEETING

A regular meeting of the Booster Club was held in the dining room of the Pontiac, on Thursday, June 21, 1923. The president was in the chair. In the absence of the secretary, E. J. Nearbin acted for him. Following the roll call, the minutes of the preceding meeting were read and approved. A communication was received from the Salvation Army requesting aid in providing suitable bathing facilities for the poor children of the city. On motion of Mr. A, seconded by Mr. B, the communication was referred to the welfare committee for immediate and favorable action. A bill was received from The Wells Clothing Co. for two suits of clothes ordered by the welfare committee, at $14 each.

On motion of Mr. D, seconded by Mr. F, it was ordered paid. The membership committee reported the names of Mr. M and Mr. N for active membership. The secretary was instructed, by the chair, to add their names to the list of active members. The special committee on an "Evening Meeting" reported in favor of such a meeting at the Country Club on Thursday, June 28, 1923 at 6:30 P. M.

On motion of Mr. G, seconded by Mr. K, it was voted to accept the recommendation of the special committee on "Evening Meeting" and to hold such meeting as recommended. On motion of Mr. H, seconded by Mr. K, it was resolved that the municipal committee be requested to confer with the commissioner of public works in regard to having the weeds and grass, along the water front, cut.

A delicious luncheon was then served by the Pontiac staff. This was followed by several original songs by the Booster quartet and stories by Messrs. P, Q, and R. Mr. William R. Benjamin, editor of the *Boston Star*, spoke at some length on "Co-operation between the Community and the Press." The meeting adjourned at 1:45 P. M.

E. J. Nearbin, Secretary, Pro. Tem.

TREASURER

The treasurer should keep in a permanent book, with ink, an accurate record of all moneys received and paid out. This record should show from whom or from what sources all moneys were received and to whom and for what they were paid out. A receipt should be given by the treasurer to every person from whom he receives money. The treasurer should insist on a receipt from every person or firm to whom he pays money.

Orders for Payment. Under no circumstances should the treasurer pay out money except upon written orders signed by the proper officers. The treasurer should preserve these orders as evidence of his authority to pay out such sums. The treasurer should refuse to pay out money on orders properly signed unless he knows the persons who signed them were authorized to do so in accordance with the rules of the organization. It is customary in most organizations to pay out no money except after the payment has been authorized by a majority vote at a legal meeting.

Care of Money, Forms. It is usually best to deposit all moneys belonging to the organization in some bank in the name of the organization and to pay all bills by checks. Before paying any bills, the treasurer should insist on some written forms of order and receipt, similar to the following:

FORM OF ORDER

$28.00 Oswego, N. Y., June 7, 1923.

To John Simmons, Treasurer of the Booster Club

Pay to the order of Frank Beal

Twenty-eight .....Dollars

For two suits of clothes.

Thomas Broad,
Secretary of the Booster Club.

FORM OF RECEIPT

$5.00 Oswego, N. Y., Jan. 11, 1923.

Received from Stephen A. Soule

Five and no/100.....Dollars.

For annual dues to the Booster Club from Jan. 1, 1923 to Jan. 1, 1924.

John Simmons,
Treasurer of the Booster Club.

Reports. The treasurer should be prepared at every meeting to tell definitely how much money there is in the treasury, and he should from time to time make detailed reports to the organization of all receipts and disbursements since the last report. Copies of these reports should be carefully made, with ink, and should be open to the members of the organization at all times.

COMMITTEES

To expedite the transaction of business, it is customary, in all organized bodies, to refer to committees nearly all matters that come before the assembly. The object of this procedure is to have the committee make a more detailed study of conditions than it is possible for the whole assembly to make. When the report of a committee on any question is favorable, it frequently happens that the assembly adopts their report with little or no discussion. An unfavorable report often results in "dropping the question," that is, in giving it no further consideration.

Committee of the Whole. When the main body of an organization has to consider a subject, the statement of which is not in proper form for definite action, or when it is deemed advisable to consider the subject without all the formalities and restrictions attending the conduct of the main body, and yet it is not desired to refer the matter to a small committee, the freedom of an ordinary committee can be secured by referring the question to the committee of the whole, that is to say, to a committee consisting of the entire membership. This committee may consider anything the organization may desire. The committee of the whole is useful where the subject to be considered contains many items and relates to divers subjects. One great advantage of this committee is that it tends to prevent the organization from rushing precipitately to a conclusion on a question before the subject has been thoroughly considered, discussed, and matured.

The committee of the whole is usually formed in pursuance of a motion similar to the following: "I make a motion (or I move) that the assembly do now resolve itself into a committee of the whole, to take under consideration (whatever the subject may be)." If this motion is carried, the presiding officer names a member to act as chairman of the committee; or the committee of the whole may demand that it elect its own chairman. The latter action is unusual and by some authorities is considered "contrary to sound parliamentary sense." The secretary of the organization is usually secretary of the committee of the whole.

Procedure in the committee of the whole differs from that in other committees in the following respects: The previous question cannot be moved; a motion to postpone to a certain day or to postpone indefinitely cannot be made; nor can a motion to lie on the table or to adjourn to some other time or place be made; the committee cannot order the yeas and nays; it cannot refer anything to a subcommittee; every member may speak as often as he pleases, provided he can obtain the floor. The only motions in order in the committee of the whole are to amend, to adopt, and that the committee rise and report.

When the committee has finished the consideration of the subject, or when it desires to adjourn or to have the main body limit debate, a motion is made that the committee rise, and that the chairman (or some other member) report its proceedings to the assembly. The motion having been carried, the chairman resumes his place on the floor, and the presiding officer takes his chair. Then the person designated to make the report rises and informs the presiding officer that he is ready to make the report. He then awaits the pleasure of the assembly.

Authority of Committees. The person who makes a motion that a committee be appointed should specify the purpose for which the committee is to be appointed, the number to serve upon the committee, and who should appoint them, unless the constitution provides how all committees are to be formed. A committee has no authority except that which is granted to it by the constitution and by-laws or by a vote of the organization. A committee authorized to investigate in regard to the expense and desirability of a certain thing has no right, even if it finds the thing very desirable, to incur any debt or to involve the organization in any way. Instead, it should report its findings and await further authority from the organization.

Committee Procedure. Unless the position is otherwise provided for, the person first named on a committee is its chairman and should preside at its meetings. The chairman should call the committee together; but, if he neglects to do so, a majority of the committee may agree on a time and place of meeting and may notify all members to that effect. The majority of a committee constitutes a quorum, whether the chairman be one of the number or not, provided the committee has been regularly called together.

When a committee has been regularly appointed or elected, it should be definitely understood that under no consideration should one or more members go ahead with the business of the committee without action by the committee as a whole. Before any action is taken by any member, the committee should be regularly called together as explained above. No action should ever be taken and no report should be made except that agreed upon at a meeting regularly called. If emergency makes it necessary, action may be taken in accordance with the wish of the majority, provided all members of the committee have been consulted in regard to, or notified of, the intended action.

Committee Reports. The chairman of a committee is expected to report for the whole committee. He may begin his report as follows: "The committee appointed to investigate the desirability of having a municipal garbage plant wishes to submit the following report." (Here the member may read the report or give it orally.) Written reports sometimes end with the following: "All of which is respectfully submitted." This form, however, is wholly unnecessary. If the members of a committee are unable to agree as to the report to be made, there may be a "majority" and a "minority" report.

In making such reports, the person reporting should say, "The majority of the committee appointed, . . . ," or "The minority of the committee appointed, ..." Both reports are entitled to a reading, but only the report of the majority may be considered, unless a motion is passed to substitute the minority report for the majority report. In the latter case, the minority, and not the majority, report is considered. If the organization votes to adopt or to accept the report of the committee, all the recommendations of the committee become binding on the organization.

Care should be taken not to confuse the word "receive" with the word "adopt" or "accept." If the assembly votes to "receive" the report of a committee, the vote means simply that the body will take the report under consideration. If it votes to "adopt" or to "accept" the report of the committee, all the recommendations of the committee become binding on the assembly.

When a committee has performed the duties for which it was appointed, it goes out of existence without any action on the part of the body authorizing it.

MOTIONS

A motion is the usual form of bringing before an organization a question for consideration or a proposal of action. Though most of the motions presented to organizations are oral, the presiding officer may refuse to receive or to put a motion unless it be in writing. When a motion is reduced to writing, it

may be read by the mover and then passed to the secretary, or it may be handed to the secretary, who should read it, when so requested by the presiding officer. The rule requiring that motions be in writing applies only to principal motions.

PRINCIPAL MOTIONS

A principal motion is a motion which brings a particular subject before an assembly for consideration. When a member of an organization wishes to bring any matter before the body for its consideration, he rises, addresses the chair, and, when recognized, states his motion; as, for example, "I move that a committee of three be appointed by the chair to inquire into the possibility of securing the Robinson Auditorium for a public meeting."

The mover should be very careful to word his motion so that it may not be misinterpreted. Custom requires that a motion be seconded, although it may be put and legally passed without a second. In seconding a motion, strict parliamentary rules require that the member wishing to second it shall rise, address the chair, and, when recognized, say, "I second the motion," or "I second Mr. A's motion." However, if there is but one motion pending, in many organizations it is customary for any member, without rising or addressing the chair, to call out, "I second the motion." Thereupon the presiding officer assumes that the assembly wishes to vote on the motion, and regularly puts it before the body. In routine business the presiding officer sometimes seconds the motion himself.

Resolutions. When the motion is lengthy, it should always be in writing. In this case it is known as a resolution. Such motions usually begin with the word "Resolved." The member wishing to put a resolution before an organization should carefully write out the resolution in advance. When the proper time arrives for the consideration of such business, he should address the chair, and, when recognized, say, "I move the adoption of the following resolution." (Here he reads the resolution and passes it to the chairman.) The resolution may now be seconded and acted upon in the same way as any other motion. Any member who is in doubt as to the wording or the meaning of some part of the resolution may request that a part or all of it be read again. Upon request of the presiding officer, the secretary should then read part or all of the resolution.

Petitions. A petition to be presented to an organization should be carefully worded and should be signed by the person who wrote it. It is customary to have a petition presented by some member other than the one who wrote it. The member presenting the petition should be thoroughly familiar with it and know that the language of the paper contains nothing disrespectful to the assembly or to any of its members.

Upon addressing the chair and being recognized, the presenter, with petition in hand, should briefly inform the members as to the substance of the petition and move that it be received. If his motion is seconded and carried, he takes the petition to the desk of the secretary, who, when formally requested by the chair, reads the document. It is then regularly before the organization and may be disposed of by immediate consideration, or by a motion to assign some future time for its consideration, to refer it to a committee, or to lay it on the table, etc. If there be no objection, the presiding officer may receive a petition and order it read without the formality of a motion to receive it. However, the formal motion is preferable.

Withdrawal. A motion which has been made and seconded may be withdrawn by the maker at any time before it is stated by the chair, but not after.

Rescinding. At any time after a motion has been passed, it may be annulled by passing a motion or resolution to rescind or repeal it. If notice of such proposed action is not given at a previous meeting, a two-thirds majority of those present or a majority of all the membership is required to rescind. The motion to rescind is a main motion without any privilege, and can be introduced only when there is nothing else before the assembly. The effect of a motion to rescind is to revoke or set aside a previous act.

SUBSIDIARY MOTIONS

When a principal motion has been made and seconded and has been stated by the chair, the assembly is not at liberty to consider any other business. A motion bearing on any other subject would be out of order and could not be considered. However, certain motions are always in order and may have precedence over others. Such motions are known as subsidiary motions.

Amend. When it is desired to change a motion which is regularly before an assembly, by unanimous consent, the maker may change it, the seconder giving his consent. Instead, however, any member, on being recognized, may propose an amendment to the motion. The amendment, if seconded, is debatable and should be voted on in the same way as any other motion. If carried, it becomes part of the original motion. The original motion as amended should then be considered as a whole and disposed of. While the amendment is pending, any member, when recognized, may propose an amendment to the amendment, which, if seconded, should be voted on, and which, if carried, becomes a part of the amendment. The amendment, as amended, is then put to a vote, and, if carried, it becomes part of the original motion. The original motion, as amended, should then be put to a vote.

Adjourn. A motion to adjourn is always in order except when a speaker has the floor, when a vote is being taken, or when the assembly is in the midst of some business that cannot be abruptly stopped. If the motion is simply to adjourn, it is not debatable and, if voted down, may be renewed any number of times during a session, but not immediately after being voted down. If the motion is to adjourn to some definite time or place, or both, it is debatable, and, if voted down, may be reconsidered.

Commit or Refer to a Committee. If a motion becomes involved through amendments, or in any other way, or is unexpectedly introduced and not well understood by the members, a motion may be passed referring it to a committee for further consideration. The motion to commit is intended to take the subject from the main body and transfer it to the consideration of a smaller number, or to the whole number acting under broader privileges than those of the formal body. See *Committees*.

The form of the motion is as follows: "I move that the (matter, motion, or whatever the proposition may be) be referred to a committee" (indicating the character of the committee). The motion to commit may be made as soon as the matter is introduced or after there has been discussion or amendment, or when any other stage in the consideration has been reached. This motion may be made while an amendment is pending, and it is debatable. It is amendable only as to the membership of the committee, its place of meeting, or other similar details. If more than one kind of committee is suggested, then the vote will be, first, on the committee of the whole; second, on a standing committee; and, third, on a special (or select) committee. The effect of the adoption of the motion to commit is to end the consideration of the matter in the body, and to pass it over to the designated committee.

Recommit. The motion to recommit is the same as to commit, except that it refers to a matter which has already been reported by a committee.

Lie on the Table. If at any time an assembly does not wish to consider further a motion which is before it, or wishes to dispose of the question permanently without allowing it to come to a vote, a

motion may be introduced that the question lie on the table. The motion is neither debatable nor amendable, and permanently disposes of the question until a majority see fit to take it up again.

Postpone to a Certain Time. A motion to postpone the question before the house to some definite future time is in order, except when a speaker has the floor. It is debatable as to the question of postponement only.

Reconsider. A member who voted with the majority on a motion may, on the same day or at the same session in which the motion was disposed of, make a motion to reconsider the previous motion. Such a motion can be made in the midst of debate and when another member has the floor, but cannot be considered while another motion is pending. However, when it is taken up, it has precedence over every other motion except a motion to adjourn. If the original question was debatable, the motion to reconsider is debatable, but not otherwise. If the motion is carried, the original question is before the assembly for consideration. If a motion to reconsider is entered on the minutes, it need not be acted upon at that session, but it must be acted upon at the session following or it is lost.

Take from the Table. A motion to take from the table a question which lies there may be made at any time under the head of unfinished business. If adopted, it cannot be reconsidered; if lost, it can be reconsidered. It cannot be amended, is not debatable, and does not open the main question to debate.

Withdraw. A motion can be made to withdraw a motion which is before the house. Such a motion is undebatable, cannot be amended, and does not open the main question to debate.

Previous Question. If debate on any question becomes tiresome or is long drawn out, any member may rise and, when recognized, say, "I move the previous question." If this motion is seconded, the presiding officer says, "Shall the main question be now put? All those in favor manifest it by (usual sign). Opposed, by the same sign." If the vote on the previous question is in the affirmative, a vote on the main question shall follow immediately. If the vote on the previous question is in the negative, the discussion continues as if the motion on the previous question had not been made. The previous question takes precedence of all subsidiary motions except the motion to lie on the table. It is neither debatable nor amendable, and requires a two-thirds vote for adoption.

To Limit Debate. A motion to limit debate to a certain number of minutes for each person on each side may be made, if there is a tendency to prolong debate unnecessarily.

STANDING RULES

Standing rules are resolutions of a more or less permanent nature, which are binding until they are modified or rescinded.

PARLIAMENTARY INQUIRIES

Parliamentary inquiries are questions addressed to the presiding officer in order to ascertain the status of the business, the effect of a proposition, or the proper procedure at a particular time. Both the inquiry and the response of the chair are usually informal and no appeal can be taken from the "response of the chair."

READING PAPERS

When papers are laid before a formal body for action, every member has a right to have them once read before he votes on them. When a call is made for the reading of a paper on a question before the assembly, the presiding officer directs it to be read. Papers not on a question before the house can only be read with the consent of the assembly. Motions for the reading of papers cannot be debated.

FILLING BLANKS

Propositions are often introduced with blanks purposely left to be filled in by the meeting. These can be filled by suggestions without the formality of a motion if the assembly consents. If there is objection, action on these may be taken as on any amendment.

UNANIMOUS CONSENT

The decisions of a parliamentary body are usually ascertained by voting, but the judgment of the body may be ascertained in two ways: first by vote; second, by "unanimous consent," the latter method being employed particularly in matters of routine or on questions of little moment. In matters of ordinary routine, the presiding officer may say, "If there is no objection, (a certain thing) will be considered the action of the meeting," or "If there is no objection, I will (do a certain thing or appoint a committee, etc.)." If any member objects, the matter must be decided by a vote.

POINT OF ORDER

While the presiding officer should insist on conducting the affairs of an organization according to parliamentary rules, it frequently happens that he fails to do so. If the violation of order is a flagrant one or if, when continued, it would result in a procedure different from that which would result if the affairs were conducted according to rule, some member should rise to a point of order.

Regardless of who has the floor, any member may rise and, without waiting to be recognized, say, "Mr. President (or Mr. Chairman), I rise to a point of order." Hereupon, whoever is speaking should stop, and the presiding officer should say, "Please state your point of order." The member, in a calm, deliberate manner, should explain as briefly as possible why he regards the speaker as out of order or the procedure as not parliamentary. If the presiding officer agrees with the member, he says, "The point of order (or the contention) is sustained. The speaker will please yield the floor," or he will say whatever is necessary to halt the unparliamentary procedure. If the chair disagrees with the member and thinks the procedure in order, he says, "The point of order (or the contention) is denied. The speaker may continue," or he will say whatever is necessary to continue the procedure.

At this point the member who arose to a point of order, or any other member, may rise, and, without waiting to be recognized, say, "Mr. President (or Mr. Chairman), I appeal from the decision of the chair." Whereupon the presiding officer says, "Shall the decision of the chair stand as the decision of the assembly?" The question is now open for debate and may be discussed freely by any members. The presiding officer is at liberty to discuss this question without leaving the chair. At the conclusion of the debate a vote is taken in the same manner as on other questions. If the presiding officer is sustained, his decision stands. Otherwise, he yields to the wish of the majority and proceeds accordingly.

PRIVILEGED QUESTIONS

A privileged question, or motion, is one which, by reason of its importance when raised, demands immediate attention and decision, excluding for the time being any other business that may be before the house.

Types. There are five privileged questions: 1. To adjourn. 2. To fix the time to which the body shall adjourn. 3. To take a recess. 4. To call for the orders of the day. 5. To raise a question of privilege.

General Conditions. Privileged questions do not modify nor bear upon the main question, though they may be presented while the principal motion or other motions are being considered. They may be introduced at any time, and must be considered before any other subject or proposition that may be before the house.

Orders of the Day. Orders of the day are matters the consideration of which has been fixed for some particular day or time. This is done by a motion that the subject be made "the order of the day" for such a time, and the matter so assigned becomes the subject for consideration on that day or at that time. If several subjects are assigned for the same day they are called "orders of the day."

Questions of Privilege. Questions of privilege should not be confused with privileged questions in general. A question of privilege is a privileged question, but not all privileged questions are questions of privilege. Questions of privilege relate to the rights and privileges of the body, or of any of its members, and are of many kinds. Such, for example, are questions arising when charges are made against the official character of a member, when the proceedings are disturbed by members or strangers, or when an open window endangers the health or comfort of a member. Questions of privilege supersede all other questions, excepting the motions to fix the time to which to adjourn and to adjourn. If the question requires immediate action, a member who has the floor can be interrupted. A member rises, addresses the chair, and says, "I rise to a question of privilege." The procedure which follows is virtually the same as that outlined above under *Point of Order*.

ADDRESSING THE CHAIR

The term "chair" is a parliamentary form used in speaking of the person who presides at a formal meeting, and refers to the one who occupies the presiding officer's chair.

If a man occupies the chair, it is customary to say, "Mr. President (or Mr. Chairman)." If the chair is occupied by a woman, either married or single, it is customary to say, "Madam President (or Madam Chairman)." Similarly, whatever title the presiding officer bears may be used.

Having the Floor. A member is said to "have the floor" when he has been granted by the presiding officer the privilege of speaking to the members.

A MEMBER SPEAKS BUT ONCE

Except to clear a matter of fact or to explain himself in some material part of his speech, a member can speak but once on any motion or question before an organization. When all have spoken who wish to do so, a member may speak a second time if permitted by a majority vote of the assembly.

MEMBERS MUST VOTE

It is customary for every member who is in the room at the time the question is stated to vote, and for those not in the room at that time not to vote. It sometimes happens that, for special reasons, a member, by a majority vote of the others present, is excused from voting.

REQUIRED ATTENDANCE

Most legislative bodies have rules requiring attendance at important meetings. When a vote on some important measure is to be taken in either house of Congress, the party "whip" puts forth every effort to secure the attendance of all members of his party. Failing in this, he may appeal to the speaker who may send sergeants-at-arms to "arrest" the members and bring them to the meeting. Many organizations secure attendance through fines for absence or by dismissal after a certain number of absences.

MENTION OF NAMES IN DEBATE

In speaking before an assembly, no one is expected to mention by name a member then present. Instead, a member is identified by the location of his seat, or as the member who last spoke or last but one, or as one's opponent, if the occasion be a formal debate.

PAYING OUT MONEYS

No member of an organization has a right to spend money belonging to the organization or to contract debts against it unless he has been authorized to do so by some by-law or by a majority vote of the members. Organizations frequently, by a majority vote, authorize a member or a committee to expend money not to exceed a certain amount for some specified thing (possibly flowers).

Under no circumstances should accounts against an organization be paid unless a written bill is presented. These bills when paid should be receipted and kept as part of the secretary's or treasurer's permanent record. In most organizations the treasurer pays accounts only when he receives written orders to do so, signed by the secretary or by the president and the secretary. Before such orders can be drawn by the secretary or signed by the president, a majority vote of the members is necessary. Such vote usually takes the following form: A member rises and, when recognized by the chair, says, "I move that the secretary draw an order on the treasurer for seven dollars and sixteen cents in favor of Fisher and Co. for badges furnished (or in payment of bill rendered) June 22, 1923." See *Treasurer, Recording Secretary*.

DECORUM

Probably the most serious defect in most organizations is the lack of reasonable decorum. If business is to be transacted or a program is to be carried out, it is necessary that good order be maintained. While whispering need not be prohibited, it should be absolutely avoided while anyone is speaking from the floor. Common courtesy demands observance of this rule. From the time the gavel drops to call the meeting to order until it falls again, dismissing the assembly, loud talking and indiscriminate laughing should not be indulged in by any member. Such conduct interferes greatly with the progress of the meeting and conveys the impression of ill-breeding on the part of the offending member.

Permission to Withdraw from Meeting. No member of an organization should leave during the progress of a meeting unless he is formally excused by the presiding officer. Courtesy demands that any member wishing to leave should rise, address the chair, and, when recognized, courteously ask to be excused; or he should rise and say, "I rise to a question of personal privilege." In the latter case, the presiding officer says, "The member (or gentleman) will state his question of privilege." The member then courteously asks to be excused and may give briefly his reason. If the request seems reasonable, the presiding officer says: "The question of privilege is sustained. The member is excused."

If the absence of the member would reduce the number in the assembly to less than a quorum or would interfere with the progress of the meeting, the presiding officer should say, "The question of privilege is denied." In case of sickness, the member should, of course, be excused, and the assembly may if necessary take a recess or even adjourn. Where circumstances seem to demand it, in cases other than sickness, the member should be excused, even if such action forces an adjournment. Any member may appeal from the decision of the chair to the assembly, in which case the method of procedure is the same as appealing from the decision of the chair upon a point of order.

Recess. When the business under discussion at a meeting seems to demand an informal treatment, it is often wise to take a recess for a short time to allow members to move about and talk informally.

Manner of Speaking. In speaking from the floor, members should be very careful to maintain a calm attitude and a deliberate tone of voice, even though inwardly they may feel neither calm nor deliberate. Nothing so mars the dignity of a meeting as a retort from some member in a harsh or loud, angry voice. The deliberate speech is much more effective, and lends dignity to the meeting and respect to the speaker.

MEETINGS

Regular. Regular meetings are those fixed by the constitution or the by-laws or by the rules of the body.

Special. Special meetings are called in the interim between regular meetings. Due notice of such meetings, including the times and places, and the specific purposes for which such meetings are called, must be given to every member. The business of any special meeting is limited to the specific matters mentioned in the call.

Adjourned. When circumstances demand it, a regular or a special meeting may adjourn to some later time. In such a case the second meeting is known as an "adjourned meeting." An adjourned meeting has all the powers of the original meeting which was adjourned, and is a continuation of it, as though there had been no adjournment.

Quorum. A quorum is such a number of members of an assembly as must be present in order that business can be legally transacted. See *Constitution and By-Laws.*

Counting a Quorum. When the roll is called to ascertain whether a quorum is present, it sometimes happens that members refuse or neglect to respond to their names, when called, and the presiding officer doubts the accuracy of the record, if it shows less than a quorum present. In such cases, he may direct the clerk or secretary to count the members present. This procedure is called "counting a quorum."

VOTING

Various forms of voting are in use. The simplest and most common is the voice vote, in which those in favor say *aye* and those opposed say *no*. The chairman determines the result from the sound or volume of the voice. Other forms of voting are *raising the hands, rising, standing in different parts of the room, recording the yeas and nays,* and *by tellers.* The vote by rising or by standing in different parts of the room is known as a *division.*

Division. While the voice vote and the raising of hands are commonly used, neither is satisfactory, if the question is important and the vote close. If the chair is in doubt as to which side has it, he may call for a division or any form of voting by which he can determine the exact result. If the chair announces the result of the approximate vote, and a member in his own mind questions the decision of the chair, or thinks it uncertain, he can compel a further test. This he can do by rising and saying, "Mr. President, I call for a division of the house." Thereupon the chair calls for a division by asking those in favor to rise or to stand in a certain part of the room, while they are counted, either by the chair, by the secretary, or by tellers from both sides, appointed by the chair. When these have been counted and recorded, he calls for those opposed to rise or assemble and be counted, in like manner.

Yeas and Nays. When an important question is before an assembly and there is a desire to record how each member votes, any member present may rise and say, "Mr. President, I move that the yeas and nays be recorded on the question now before the house." If this motion is seconded and carried, the clerk or secretary calls the roll and records the votes of the members.

Ballot. Voting by ballot is a form of secret voting in which each member writes his decision on a piece of paper and deposits it in a common receptacle. After these ballots have been shaken up, so that the writers cannot be identified from the order of the ballots, they are counted by the tellers (usually in the presence of the members, but sometimes, for convenience, in a separate room).

Informal Ballot. By this method an expression of opinion upon a subject is secured from individual members without the formality of a definite motion upon the matter. Each member writes on a piece of paper his decision. The ballots are collected in a receptacle, are counted, and are classified. The result is announced to the assembly. It shows the opinions of members, but is not binding as a decision without some further action by the assembly.

Deciding Vote. If the presiding officer is a member of the assembly, he may vote on all questions. In oral voting, it is customary for him not to vote unless his vote will render or change a decision. If the vote is a tie, he may break the tie. If the vote lacks one of being a tie, he may make it a tie and thus defeat the measure. In voting by ballot, if the presiding officer does not vote before the ballots are counted, he cannot then vote without permission of the meeting. The principle of making and breaking a tie does not apply to a ballot vote.

Proxy. One is said to vote by proxy, who, though absent from the meeting, votes through another member who is present and who casts the vote of the absent member by virtue of a written authority called a proxy, signed by such absent member. Voting by proxy is allowed only when that right has been specifically given, either by public law or by the constitution or the by-laws of the particular society.

Kind of Vote Required. Unless the constitution, the by-laws, or the rules of the assembly specify otherwise, at least a majority vote is required on all questions. In important questions, such as amending the constitution or expelling a member or passing a law over the veto of the chief executive of a state or nation, it is customary to call for a vote greater than a majority. In most of such cases, a two-thirds vote is necessary, and, in rare cases, a three-fourths vote is required.

A *majority* is more than half the total number of votes cast. A candidate having more votes than any other of several rivals is said to have a *plurality.* See *Political Terms and Institutions.*

Unanimous vote means that all members vote on the same side of a question.

Pairing. In order that they may be absent from a meeting or that they may avoid having their names recorded in a yea and nay vote, two members, who have agreed to vote on opposite sides of some question, agree not to attend the meeting or not to vote if present. This practice is known as "pairing."

PROGRESSIVE ACTION ON MEASURES

Some bodies take only one vote upon a proposition, but other parliamentary bodies, such as Congress, with more time at their disposal, take several actions upon a measure before it is finally adopted.

First Reading. At the request of the presiding officer, the clerk or secretary reads the proposed measure in full, and the presiding officer states it by title. It may then be acted upon by passing it to a second reading, but it cannot be amended upon a first reading.

Second Reading. Regularly, the second reading must occur on another day than that of the first reading. It is done by the clerk, who then hands the measure to the presiding officer. The presiding officer, rising, states to the assembly the title of the bill; that this is the second time of reading it; and that the question will be whether it shall be committed or engrossed and read a third time. Upon vote, the bill may be ordered engrossed and passed to a third reading, or it may be referred to a special committee or to a committee of the whole.

Third Reading. After the bill has been approved by a special committee or by the committee of the whole, either with or without amendments, it comes before the assembly for final disposition. The assembly now decides whether the bill shall be engrossed and passed to a third reading. If the vote is favorable to this action, the measure is engrossed and read in full by the clerk. It is then passed to the presiding officer, who states the title and asks what action shall be taken on the bill. It is then before the house for final passage. Sometimes slight amendments are made to the measure after the third reading.

In some legislative bodies, bills are first read by title only; the second and third times they are read in full.

TABLE SHOWING PRECEDENCE OF MOTIONS

Motions rank in order as follows, the highest in rank being at the top of the list and the lowest at the bottom. When any one of these motions is pending, the motions above it in the list are in order, and those below are out of order. All of these motions require a majority vote, except the "previous question" and "extend limits of debate," which require a two-thirds vote.

Numbers 1 to 8, inclusive, are undebatable; 9 to 13, inclusive, are debatable. Numbers 1 to 5, inclusive, are privileged. Numbers 7 to 12, inclusive, are subsidiary.

1. Fix the Time to Which to Adjourn
2. Adjourn (when not qualified)
3. Take a Recess (when other business is pending)
4. Raise a Question of Privilege
5. Call for the Orders of the Day
6. Lie on the Table
7. Previous Question
8. Extend Limits of Debate
9. Postpone to a Certain Time
10. Commit or Refer
11. Amend
12. Postpone Indefinitely
13. A Main Motion

TABLE OF RULES RELATING TO MOTIONS

Answering More than 300 Questions in Parliamentary Procedure

	1	2	3	4	5	6	7	8
Explanation of the Table. Eight general rules appear in headings at the right. If a rule applies to a motion listed on the left, the letter "Y" is found under the rule and to the right of the motion. If a rule does not apply to a motion listed on the left, the letter "N" is found under the rule and to the right of the motion. A figure instead of the letter "Y" or "N" refers to a note of explanation below.	Amendable	Debatable	Must Be Seconded	Can Be Reconsidered	Requires Only a Majority Vote	Subsidiary Motions Can Be Applied	Debate Confined to Pending Question	Out of Order when Another Has the Floor
Adjourn	N	N	Y	N	Y	N	Y	Y
Adjourn (to a definite time or place)	Y	Y	Y	1	Y	N	Y	Y
Adopt or Accept a Report	Y	Y	Y	Y	Y	Y	Y	Y
Adopt Rules of Order, Constitutions, or By-Laws	Y	Y	Y	2	Y	Y	Y	Y
Adopt Standing Rules	Y	Y	Y	Y	Y	Y	Y	Y
Amend	Y	3	Y	Y	Y	Y	Y	Y
Amend an Amendment	N	3	Y	Y	Y	Y	Y	Y
Amend Rules of Order, Constitutions, or By-Laws	Y	Y	Y	2	4	Y	Y	Y
Amend Standing Rules	Y	Y	Y	Y	12	Y	Y	Y
Appeal (except relating to indecorum)	N	Y	Y	Y	Y	Y	Y	N
Appeal (relating to indecorum, etc.)	N	N	Y	Y	Y	Y	Y	N
Blanks, Filling	N	Y	N	Y	Y	Y	Y	Y
Commit, Recommit, or Refer	Y	Y	Y	5	Y	Y	Y	Y
Debate, To Close, Limit, or Extend	Y	N	Y	Y	N	Y	Y	Y
Division of the Assembly	N	N	N	N	Y	N	Y	N
Division of the Question	Y	N	6	N	Y	Y	Y	6
Fix the Time to Which to Adjourn	Y	7	Y	Y	Y	Y	Y	Y
Informal Consideration of a Question	N	Y	Y	2	Y	Y	Y	Y
Leave to Continue Speaking after Indecorum	N	N	Y	Y	Y	N	Y	Y
Lie on the Table	N	N	Y	N	Y	N	Y	Y
Main Motion or Question	Y	Y	Y	Y	Y	Y	Y	Y

TABLE OF RULES RELATING TO MOTIONS—Con.

Answering More than 300 Questions in Parliamentary Procedure

	1	2	3	4	5	6	7	8
Explanation of the Table. Eight general rules appear in headings at the right. If a rule applies to a motion listed on the left, the letter "Y" is found under the rule and to the right of the motion. If a rule does not apply to a motion listed on the left, the letter "N" is found under the rule and to the right of the motion. A figure instead of the letter "Y" or "N" refers to a note of explanation below.	Amendable	Debatable	Must Be Seconded	Can Be Reconsidered	Requires Only a Majority Vote	Subsidiary Motions Can Be Applied	Debate Confined to Pending Question	Out of Order when Another Has the Floor
Nominations, To Make	N	Y	N	N	Y	Y	Y	Y
Nominations, To Close	Y	N	Y	N	N	Y	Y	Y
Nominations, To Reopen	Y	N	Y	2	Y	Y	Y	Y
Objection to Consideration of a Question	N	N	N	2	8	N	Y	N
Order, Questions of	N	N	N	N	Y	N	Y	N
Order, To Make a Special	Y	Y	Y	Y	N	Y	Y	Y
Orders of the Day, To Call for	N	N	N	N	Y	N	Y	N
Order of the Day (when pending)	Y	Y	Y	Y	Y	Y	Y	Y
Parliamentary Inquiry	N	N	N	N	Y	N	Y	N
Postpone Definitely	Y	Y	Y	Y	Y	Y	Y	Y
Postpone Indefinitely	N	Y	Y	9	Y	Y	N	Y
Previous Question	N	N	Y	10	N	N	Y	Y
Privilege, To Raise Question of	N	N	N	N	Y	N	Y	N
Privilege, Questions of (when pending)	Y	Y	Y	Y	Y	Y	Y	Y
Reading Papers	N	N	Y	Y	Y	N	Y	Y
Recess, To Take a (when privileged)	Y	7	Y	N	Y	Y	Y	Y
Reconsider	N	3	Y	N	Y	Y	11	N
Rescind or Repeal	Y	Y	Y	2	2 13	Y	N	Y
Substitute (same as Amend)	Y	Y	Y	Y	Y	Y	Y	Y
Suspend Rules	N	N	Y	N	N	N	Y	Y
Take from the Table	N	N	Y	N	Y	N	Y	Y
Take up a Question out of its Proper Order	N	N	Y	N	N	N	Y	Y
Voting, Motions Relating to	Y	N	Y	Y	Y	Y	Y	Y
Withdraw a Motion, Leave to	N	N	N	2	Y	N	Y	Y

1. Cannot be reconsidered until after some business has intervened.
2. An affirmative vote on this motion cannot be reconsidered.
3. Not debatable when the motion to be amended or reconsidered is not debatable.
4. Before adoption, a majority vote. After adoption the vote named in rules of order, constitution, or by-laws, usually a two-thirds vote.
5. Cannot be reconsidered after the committee has taken up the subject, but by two-thirds vote the committee, at any time, may be discharged from further consideration of the question.
6. If resolutions or propositions relate to different subjects which are independent of each other, they must be divided on request of any member, which can be made when another has the floor. If they relate to the same subject and yet each part can stand alone, they must be divided only on a regular motion and vote.
7. Not debatable if made when another question is before the assembly.
8. Objection can be made only before debate begins. A two-thirds vote must be opposed to the consideration in order to sustain the objection.
9. A negative vote on this motion cannot be reconsidered.
10. Cannot be reconsidered after a vote has been taken under it.
11. Opens main questions to debate when those questions are debatable.
12. Standing rules may be amended at any time by a majority vote if previous notice has been given, or by a two-thirds vote without notice.
13. Rescind is under the same rules as to amend something already adopted. See *Note 4*.

ORDERS, SOCIETIES, AND ORGANIZATIONS

THE following section contains brief accounts of a few of the numerous orders, societies, and organizations existing in America and elsewhere. The list includes organizations devoted to fraternal, scientific, charitable, religious, patriotic, or other purposes.

The number of such societies in existence is extraordinarily great; consequently it is impossible, within a limited scope, to deal with all of them. The ones selected for special treatment, however, are prominent among the societies regarding which detailed and authentic information will be found of value to the greatest number of people.

Academy of Arts and Letters, American. This distinguished body owes its foundation to the action of the American Social Science Association, which, at its annual meeting of 1898, nominated a small group of noted authors and artists to constitute the National Institute of Arts and Letters. Membership in this body was at first restricted to one hundred fifty, but later was increased to two hundred fifty. Eligibility for membership was conditioned on distinguished attainment in literature or in the fine arts. In the course of six years the membership of the institute had grown to embrace a large proportion of the most eminent writers and artists in the United States.

In 1904 the institute proceeded to organize the American Academy of Arts and Letters. Seven members of the institute were elected founding members of the academy, and these were authorized to choose from the membership of the institute eight additional members of the academy. The fifteen members then proceeded to choose five more, and the twenty in turn selected an additional five. This method of selecting members of the academy from the larger membership of the institute was continued until the entire membership of the academy, limited by its constitution to fifty, had been chosen.

The original seven members of the academy were William Dean Howells, the novelist; Edmund Clarence Stedman, the poet; Samuel Langhorne Clemens, the humorist; John Hay, the author and statesman; Augustus Saint-Gaudens, the sculptor; John LaFarge, the painter; and Edward Alexander MacDowell, the composer.

In 1916 the organization received a national charter from Congress. Vacancies are filled by vote of the members, at the annual meetings of the academy. On Feb. 22, 1923, the academy occupied its permanent home, 633 West 155th street, New York City.

Academy, French. This famous honorary society of letters was founded by Cardinal Richelieu in 1635. The cardinal's purpose was to enlist the service of a group of literary men in developing and purifying the French language. The academy enjoyed great prestige down to the French Revolution, when it was suppressed. It was revived, however, in 1795, as the principal branch of the newly created Institute of France. The academy is restricted to 40 members, commonly called "the immortals." Vacancies are filled through election by the remaining members.

The most important work of the academy has been the publication, in several editions, of a dictionary of the French language. Out of the income of certain trust funds, the academy each year grants various prizes to persons notable for "virtuous and laborious lives," as well as prizes for literary works most serviceable to morality. The academy shares with the other branches of the institute the policy of appointing correspondents, some of whom are foreigners.

Alliance Française, Federation de L'. An association of local groups, clubs, and societies in the United States and Canada, formed in 1902 for the purpose of encouraging the study of the language, literature, art, and history of France. A large portion of the federation's membership is composed of students and teachers in schools and colleges. The federation holds general annual meetings, and, under its auspices, lecturers, particularly French men of letters, visit the local groups.

American Legion. A patriotic, nonmilitary, nonpartisan organization to which all those who served honorably in the armed forces of the United States during the World War are eligible for membership. The society originated at a meeting of about 1000 officers and enlisted men of the A. E. F., held at Paris, France, in March 1919. As a result, a committee of fifteen returned to the United States to promote the organization among the men at home. A preliminary convention was held at Saint Louis, Mo., May 1919; the society was incorporated by act of Congress, September 16, 1919; and the first regular convention was held at Minneapolis in November of the same year.

The objects of the association are: to uphold and defend the Constitution of the United States; to maintain law and order; to foster and perpetuate a 100 per cent Americanism; to combat autocracy whether of the classes or the masses; to make right the master of might; to promote peace and good will on earth; to safeguard and transmit to posterity principles of justice, freedom, and democracy; and to sanctify the comradeship of the war by mutual helpfulness.

Local units of the order are known as posts. These are organized into departments, of which there is one for each state and territory, the District of Columbia, Alaska, the Canal Zone, the Philippine Islands, Canada, Mexico, and continental Europe. The governing body is the national encampment, which meets annually. National headquarters is at Indianapolis, Ind.

Army and Navy Legion of Valor. A patriotic society organized in 1890, to which anyone is eligible who has received a medal of honor or the distinguished service cross of the United States.

Association for the Advancement of Science, American. The leading scientific society in America. It was organized under its present title in 1847, being an outgrowth of the original Association of American Geologists, which was founded at Philadelphia in 1840. It meets each summer in 11 sections devoted to the following departments of science: mathematics and astronomy; physics; chemistry; mechanical science and engineering; geology and geography; zoology; botany; anthropology and psychology; social and economic science; physiology and experimental medicine; and education. During the past half century, the names of practically all the leaders of science in America have been on the roll of this association.

Association for the Advancement of Science, British. A society organized in 1831, "to give a stronger impulse and a more systematic direction to scientific inquiry; to promote the intercourse of those who cultivate science in different parts of the British Empire with one another and with foreign philosophers; to obtain a more general attention to the objects of science and a removal of any disadvantages of a public kind which impede its progress."

The association holds meetings annually, each year in a different city. Besides its general development of science through discussions and publications, the society grants funds to enable scientists to pursue definite investigations.

Audubon Societies, National Association of. An endowed association in the United States, the object of which is to protect wild birds and wild animals. It was the outgrowth of a movement begun in 1886 by George Bird Grinnell, then editor of *Forest and Stream*. The name of the society was

chosen in honor of John James Audubon, a pioneer American ornithologist and painter of birds.

The association has an annual income of about $100,000, which is devoted to many different means of furthering the protection of wild life in America. In its junior department it annually organizes 150,000 children into bird study classes and provides them with material for study. It has also been instrumental in securing the enactment of the Audubon law in 38 states of the Union. This law makes it a misdemeanor to trap, snare, or kill nongame birds. Other results achieved by this organization include laws in 14 states prohibiting the sale of aigrettes and feathers of native birds; a Federal law prohibiting the importation of feathers from foreign countries; and the establishment of government reservations in which breeding colonies of birds are protected from molestation. Its magazine, *Bird Lore*, is the leading bird periodical in the world.

Aztec Club of 1847. A hereditary, patriotic society formed at Mexico City in 1847 by officers of the United States army, in order to cherish the memories and traditions of the Mexican war. Each member nominates either his first-born son or a male blood relative to succeed him in the society.

Baptist Young People's Union of America. A religious organization in which are united many of the young people's societies that are connected with Baptist churches in the United States and Canada. It was founded at Chicago in 1891.

Benedictines. The general name of the monks living under the rule of Saint Benedict. The order spread from the monastery founded by Saint Benedict at Monte Cassino, Italy, about the year 529. The vows demanded of the monks were originally three—to remain at the monastery, to labor till death in order to attain perfection, and to obey their superiors.

In the 10th century, the abbey of Cluny in southeastern France became the virtual head of the Benedictine monasteries, which so increased throughout Europe that, in the 15th century, they numbered about 37,000. The order was the chief agent in the preservation of art and literature during the middle ages, and Benedictine vows were taken by many of the greatest figures of the time, including Hildebrand, Bede, Alcuin, and Anselm.

The first congregation of the Benedictines in the United States came from Bavaria in 1846 and was established in 1855 as Saint Vincent's priory, Latrobe, Pa. There are now about 700 Benedictine monasteries in the world, to which are attached about 22,000 religious.

B'nai B'rith, Independent Order of, or **Sons of the Covenant.** A Jewish fraternal organization, founded in New York City in 1843 by a group of German Jews headed by Henry Jones. It has for its object the development of morality and of the principles of charity, benevolence, and brotherly love among its members. The subordinate bodies are called lodges; the governing bodies, grand lodges.

Boy Scouts of America. An organization composed chiefly of boys from 12 to 18 years of age, which has for its object the mental, moral, and physical training of its members so that they may become good citizens and live up to their motto, which is "Be Prepared."

The unit of organization is a patrol of eight boys. Four patrols compose a full troop, which is under the leadership of a scout master. The scout master is selected by a troop committee of three or more citizens, who usually represent some institution, such as a school or church, with which the troop is connected. Administration of the entire organization is directed by the national council, working through an executive board. The president of the United States is honorary president of the council.

Every boy who joins the Boy Scouts of America must promise: "On my honor I will do my best,—to do my duty to God and my country, and to obey the scout law; to help other people at all times; to keep myself physically strong, mentally awake, and morally straight." The scout law states that a scout is trustworthy, loyal, helpful, friendly, courteous, kind, obedient, cheerful, thrifty, brave, clean, and reverent. There are three classes of scouts,—tenderfoot, second class, and first class. Succeeding ranks, of life, star, and eagle scout, are attained by the acquirement of a specified number of merit badges, each of which denotes recognized accomplishment in some special branch of activity. Awards are also made for life-saving by a national court of honor. A large proportion of scouts spend a week or more in camp each summer, and there are also week-end and winter camps.

The boy scout movement was originated in England by Sir Robert Baden-Powell. The Boy Scouts of America was incorporated February 8, 1910, and was further authorized by an act of Congress in June 1916. The organization is nonmilitary and undenominational. The first international meeting, or jamboree, was held in 1920 at London, boy scouts from 23 nations being represented.

Brotherhood of American Yeomen. A fraternal, beneficiary society organized in 1897, with headquarters at Des Moines, Iowa. The society aims to unite in fraternal association all acceptable white men between the ages of 18 and 45 years. Accident, sickness, and death benefits are paid to members or their beneficiaries. The meetings of local bodies are conducted according to the ritualistic lodge system. The governing body, called the supreme conclave, meets every four years, and acts through a board of five directors who are elected by the conclave.

Brotherhood of Saint Andrew. A religious society of laymen connected with the Protestant Episcopal Church, founded in Saint James parish, Chicago, in 1883. The unit of organization is the local chapter. The headquarters of the association is at Boston. A corresponding society of women is known as the Daughters of the King.

Camp Fire Girls. An organization for girls, having as one of its more important objects that of "helping girls and mothers to discover that there are more interesting and happy things to do, and relationships to enjoy, in connection with everyday life than are to be found in the commercially supplied amusements." The work and ideals of the organization were to a large extent developed by Mrs. L. H. Gulick at her camp on Lake Sebago, Me. The name and the ranks were suggested by Mr. W. C. Langdon. The society was made public March 17, 1912.

Girls of 12 or older are eligible to membership in local groups, called "camp fires." Each camp fire is under the direction of a guardian of the camp fire, who must be more than 18 years of age. Each camp fire and each member receives a distinctive name and symbol. The three ranks are those of wood gatherer, fire maker, and torch bearer. These ranks must be attained by the acquirement of a definite number of honors, each of which is granted for a certain accomplishment in camp craft, home craft, health craft, nature lore, etc. With each honor is granted a distinctively colored bead for the ceremonial necklace. The lessons of the camp fire are taught and expressed by symbols. The watchword of the Camp Fire Girls is "Wohelo," made from the first two letters of the words work, health, and love.

Catholic Benevolent Legion. A fraternal, benevolent, and beneficiary society of Roman Catholic men, which was organized in New York in 1881. Members are accepted between the ages of 18 and 55. The organization, which is under the direction of a supreme council, has had the express approval of the pope, and of all the archbishops and bishops within whose jurisdictions councils of the society have been formed.

Catholic Knights of America. The first Roman Catholic fraternal organization in America. It was founded at Nashville, Tenn., in 1877, with the primary object of providing male Roman Catholics between the ages of 18 and 45 with the intellectual, social, and business advantages of a fraternal, mutual life insurance association. Since 1901, Catholic women have been eligible to membership. The executive authority of the order is held by the supreme council, with headquarters in Saint Louis, Mo.

Christian Endeavor. A religious society founded February 2, 1881, in Williston Congregational church of Portland, Me., by the Rev. Francis E. Clark. Its purpose is distinctly religious, and the full privileges of membership are extended to any society that belongs to an evangelical church and adopts the name and pledge of the organization. The pledge includes an agreement to be a regular attendant at the weekly prayer meeting which is conducted by each local society. The organization extends to more than 60 countries and is sponsored by more than 80 religious denominations. Its membership exceeds 3,500,000.

Cincinnati, Society of the. A patriotic, memorial society organized by the officers of the Continental army at their last encampment, May 13, 1783. The first meeting was held in the Verplanck house, the headquarters of Baron Steuben, on the Hudson river, near Fishkill. As the officers were leaving the army to return to their farms, they named their society after Lucius Quinctius Cincinnatus, who left the plow to become dictator of Rome and returned to his farm when the civil emergency had passed. Membership in the society was declared to be hereditary. Washington, the first president general of the society, held this position until his death. The hereditary membership is now about 1000.

Colonial Dames of America, National Society of the. An ancestral and patriotic society of American women, founded May 19, 1892. Its objects are to preserve colonial history and relics and to encourage patriotism. To be eligible, a woman must be a descendant of an ancestor who settled in America before 1750 and who rendered important service to the colonies. The valuable collection of historical relics in the old Van Cortlandt manor house in New York City is under the control of the New York branch of the society.

Confederate Veterans, United Sons of. A patriotic society organized in 1896 at Richmond, Va., for the purpose of cultivating friendship among its members, collecting material for an accurate history of Confederate activities, perpetuating the memories of Confederate veterans, and giving aid to their widows and orphans. Membership is confined to the male descendants of veterans who served actively in the Confederate cause.

Daughters of the American Revolution. A patriotic society of women, organized at Washington, D. C., in 1890, and incorporated by act of Congress in 1896. The objects of the society are: to perpetuate the memory of the spirit of those who achieved American independence; to promote institutions for the diffusion of knowledge; to cherish, maintain, and extend the institutions of American freedom; to foster true patriotism; and to aid in securing for mankind the blessings of liberty. Membership is open to women, one or more of whose ancestors gave active aid in the establishment of American independence.

The society has its headquarters in the Memorial Continental Hall, which it erected in Washington, D. C. Delegates from local chapters meet in annual convention at Washington during the week in which April 19 occurs.

Daughters of the Confederacy, United. A woman's patriotic society, organized at Nashville, Tenn., in 1894. Membership is open to mothers, sisters, daughters, wives, widows, or direct female descendants of those who served in the Confederate army or navy or who personally aided the Confederate cause. Local branches of the society are called chapters; the state organization is known as a division. Annual reunions are usually held in November.

Daughters of the Revolution. A patriotic, hereditary society of women, founded at New York in 1891, largely by a group which withdrew from the Daughters of the American Revolution because they wished to have more stringent eligibility requirements. The objects are very similar to those of the older society. Membership is open to women one or more of whose direct ancestors actively assisted in the American Revolution and thus became liable to conviction for treason against the government of Great Britain.

Deaconesses. The name applied, in the early Church, to groups of women to whom certain charitable and educational work was assigned. Usually, only women who were widows of one husband and had borne children could be appointed deaconesses. In the Roman Catholic Church, the sisterhoods gradually displaced the deaconesses, although the latter survived as orders in the Greek Church until the 12th century. In the 19th century, the deaconess function was revived among Protestants, especially in the Episcopal and the Methodist Episcopal churches. The deaconesses conduct orphanages, hospitals, and schools, and assist in parish work.

Dominicans. A Catholic religious order founded in 1216 by Saint Dominic for the purpose of reclaiming heretics and ministering to the spiritual needs of the poor and ignorant. The organization includes the order of the preachers, sometimes called black friars from the black outer mantle of their uniform; the Dominican sisters, an order of nuns; and the brothers of penitence, which is open to men and women married and following secular pursuits. The order of the preachers numbers about 5000 fathers, of which about 350 are in the United States.

Eastern Star, Order of the. A charitable and benevolent association to which only master masons, their mothers, wives, widows, sisters, and daughters are eligible. It was originated by the poet Robert Morris about 1850, and, in 1868, it was revised to approximately its present form by Robert Macoy.

Elks, Benevolent and Protective Order of. A fraternal organization founded in New York City in 1868 from an older society composed chiefly of members of the theatrical profession and known as the Jolly Corks. White, male citizens, 21 years or more of age, are eligible for membership. Only one lodge is established in any city, and the city must have a population of at least 5000. Each year, on the first Sunday of December, a memorial service is held for the deceased members of the order. The organization has been noted for the aid given to members, and for its ready response and assistance in time of calamity.

Epworth League. A society of young people founded May 15, 1889, for the purpose of promoting Christian living according to the standards of the Methodist Episcopal Church. The motto of the organization is "Look up, Lift up." Local branches are known as chapters. The League was extended also to the Methodist Episcopal Church, South, and to the Methodist Church of Canada. Its membership exceeds 2,000,000.

Foreign Wars of the United States, Military Order of. A hereditary, patriotic, military organization instituted December 27, 1894. Membership is open to commissioned officers of the United States army who have served in wars against foreign powers, and to their direct lineal descendants. The order stands for the principle of national defense against foreign aggression.

Foresters, Orders of. A group of benevolent and beneficent fraternal orders founded on the history and tradition of the English royal forests, especially in connection with the story of Robin Hood and his followers. The first authentic records of the society, known originally as the Royal Order of Foresters, were made at Leeds, England, in 1813. Division in the ranks of the Royal Foresters led, in 1834, to the formation of the *Ancient Order of Foresters*, which eventually superseded the Royal order. The society was introduced into America at Philadelphia, 1832, when "court good speed" was chartered by the Royal order. Four years later this "court" changed from the Royal to the Ancient Order of Foresters.

All American "courts" held allegiance to the high court of the ancient English order until 1874. In June of that year, at Newark, N. J., several bodies seceded to form the *Independent Order of Foresters*. This was later reorganized in Canada, largely under the direction of Dr. Oronhyetkha, a Mohawk Indian. Membership of women is provided for by the Miriam degree, and a uniformed grade or rank is known as the knights of Sherwood forest.

In 1889, another dissatisfied American group separated from the Ancient order and assumed the name of Ancient Order of Foresters of America, which, in 1895, was changed to *Foresters of America*. The uniformed grade of this society is called the Glenwood degree. Women members are organized as circles of companions of the forest. There are, at present, these three large and distinct orders of foresters operating in North America, together with several similar bodies of less importance.

Franciscans. The name applied to three religious orders instituted by Saint Francis of Assisi in the 13th century. These are the Friars Minor, the Poor Clares, and the Third Order, or Brothers and Sisters of Penance. The first-named is the original society and the order commonly known as the Franciscan. The Franciscans have devoted themselves particularly to missionary and educational work. Franciscan fathers who accompanied Columbus in 1493 established convents on the island of Haiti. Missions of the order which were founded by Father Junipero Serra in California in the 18th century are famous. The order now conducts numerous missions and several colleges in the United States.

The Poor Clares is the oldest of the several Franciscan orders for women, having been established in 1212, when Saint Clare adopted the religious life under the teaching of Saint Francis.

Garter, Order of the. The highest order in Great Britain, and one of the oldest of European orders of knighthood. The date of its institution has been fixed approximately between the years 1346 and 1348, in the reign of Edward III, although the precise occasion of its inception is still obscure. Membership in the order is restricted to 25 knights companions, the original number, and the British sovereign, who is the permanent head of the order. However, royal princes are admitted as supernumerary members, and the distinction is frequently conferred upon foreign sovereigns. Until the reign of Edward VI, the order was known as the Order of Saint George, and the badge bears the figure of the saint on horseback fighting the dragon. The emblem is a garter of dark blue ribbon edged with gold, bearing the motto, *honi soit qui mal y pense*, "shame to him who thinks evil of it."

Girl Scouts. An organization of girls, very similar to, and based on, that of the Boy Scouts. It was founded in England by Sir Robert Baden-Powell, originator of the Boy Scouts, and is known in British countries as the Girl Guides. The name Girl Scouts was adopted in America in 1915 by an organization founded in 1912 at Savannah, Ga., by Mrs. Juliette Gordon Low (1860–1927), and previously known as Girl Guides.

Girls of ten years or more may become scouts. Eight girls form a patrol, and several patrols are placed under the guidance and direction of a captain. The three grades of membership are: tenderfoot or third class, second class, and first class. Each grade represents a definite degree of attainment.

The badge of a girl scout is the trefoil, the threefold division of which reminds her of her three promises: to do her duty to God and her country; to help other people at all times; and to obey the scout law. This law, as well as the motto, "Be Prepared," is the same as that of the Boy Scouts.

Good Templars, International Order of. A fraternal society having for its object the promotion of total abstinence from the use of alcoholic beverages, and of universal prohibition of the manufacture and sale of such products. Membership is unrestricted by age, sex, or color. A committee appointed by the governing body of the society inaugurated the Prohibition party in 1869. In 1874, Good Templar women founded the Woman's Christian Temperance Union.

Grand Army of the Republic. A patriotic society of former soldiers and sailors who served honorably in the Union forces during the Civil War, or who were members of state militia on active duty and subject to national call at that time. The organization was due largely to the efforts of Dr. B. F. Stephenson and the Rev. W. J. Rutledge, who had been, respectively, the surgeon and the chaplain of the 14th Illinois infantry. The first local group or post of the G. A. R. was established at Decatur, Ill., April 6, 1866. The society continued to grow until 1890, when the membership became 409,489. From that date the enrollment suffered an average annual decline of about 10,500, until, in 1920, for the first time in 39 years, the membership was again under 100,000.

The principal objects of the G. A. R. have been to maintain comradeship and fraternity among its members; to perpetuate the memory of their deeds; and to aid needy soldiers, their widows and orphans.

Hibernians, Ancient Order of. A fraternal, beneficiary society of men of Irish birth or descent who are of the Roman Catholic faith. The order originated in Ireland, and was introduced into America at New York City in 1836. One of the main objects of the society is "the advancement of the principles of Irish nationality."

Holy Name Society, The. An important religious factor in the life of Catholic men in the United States. Its origin dates back to the Council of Lyon, 1274, which decreed that the faithful have a special devotion to the Name of Jesus and that reparation be offered for insults to that Name by unthinking men. Gregory X, the Roman pontiff of that period, selected the order of St. Dominic to preach the devotion. Under the direction of John of Vercelli, master-general of the Dominicans, the society was formed and spread to every nation in Europe before the close of the 16th century.

Owing to a lack of documents it is impossible to determine at what time this society was introduced into the United States. The apostle of the devotion to American Catholic manhood is generally accepted as the Very Rev. Charles H. McKenna, O. P., who was assigned to Holy Name work in 1871. In his missionary travels he established a large number of branches and rekindled the enthusiasm of members wherever it existed. To him goes a large share of the credit of propagating the Holy Name Society, which numbers at present approximately one million Catholic men.

The purpose of the society may be summed up in one sentence used by Pope Gregory in writing to John of Vercelli, requesting him to spread devotion to the Name of Jesus among Catholic men: "We have judged it proper to persuade the faithful to demonstrate more reverence for that Name above all Names, the only Name in which we claim salvation—Jesus Christ who has redeemed us from the bondage of sin."

Honor, Legion of. A French order founded by Napoleon Bonaparte in 1802, for the purpose of recognizing and rewarding distinguished service in military and civil life. As constituted by Napoleon in 1804, after he had become emperor, the order comprised a grand master, which capacity the emperor assumed, 7 grand officers, 20 commanders, 30 officers, and 350 legionaries. The rank of grand eagle, now grand cross, taking precedence of grand officer, was added in 1805. The order was displaced at the Restoration (1815) but was reinstated in 1830 in its unique position as the only French order. The president of the republic is now the grand master, and the various grades rank as follows: (1) grand cross; (2) grand officer; (3) commander; (4) officer; (5) chevalier.

Admission to the legion of honor is, in peace time, based upon distinguished services continued through 20 or 25 years, although, in extraordinary circumstances, this condition may be waived. Promotion to one of the higher ranks is granted only upon completion of a certain period of years in a lower grade. *Légionnaires* who have served in the French army or navy receive small pensions, according to their rank in the legion. Loss of French citizenship involves forfeiture of membership in the legion. Women, notably Madame Curie, have been admitted. For unusual service, foreigners are accorded membership in the legion of honor.

The badge of the chevalier of the legion, when worn by a civilian or by a military or naval officer in civilian clothes, is a red watered ribbon fastened in the left lapel of the coat. For the higher grades, the badge is a red rosette. There is now no official limit to the number of crosses that may be granted.

Jesuits or **Company of Jesus.** A religious society of the Roman Catholic Church growing out of the work of Ignatius Loyola. It was formally incorporated by the pope in 1540. Its motto is Ad Maiorem Dei Gloriam (A. M. D. G.), "To the Greater Glory of God." The members pledge themselves to poverty, chastity, obedience, and willingness to go as missionaries wherever the pope may send them. The head of the order is called a general, and his rule is subject only to constitutional restrictions.

Novices are required to spend 18 years in preparation for admission to the order. This preparation consists of meditation, a thorough and wide course of study, and a strict regimen. Only those who have completed this 18-year preparation and have taken the four solemn vows are eligible to be generals or other high officials of the order.

The influence of the order spread rapidly. In the middle of the 18th century, it had 700 colleges with an enrollment of about 300,000 students, including many in China, Japan, Mexico, and Brazil. The attachment of the Jesuits to the papacy caused strained relations between the papacy and various Catholic nations, and the result was that, in 1773, the pope issued a bull suppressing the society. In 1814, the order was completely rehabilitated by papal order. The Jesuits now number about 17,000.

In the United States there are about 1700 Jesuit fathers, 1500 scholastics, and 450 lay brothers.

Knights of Columbus. A fraternal beneficiary society of Roman Catholic men, organized under a charter granted by the state of Connecticut, March 29, 1882. The membership is divided into two classes,—insurance and associate. Insurance policies are issued to members of the first class between the ages of 18 and 60. Associate members are those who do not make use of the insurance feature. In addition to the insurance of members, the society is devoted to the promotion of charity and vocational education. Applicants for membership must subscribe to being opposed to Socialism as an economic system. Subordinate bodies of the order are known as councils; the governing body is the supreme council. The ritualistic work leading to full membership consists of four degrees. The society has over 700,000 members.

Knights of Pythias. A social brotherhood founded at Washington, D. C., February 19, 1864, by Justus Henry Rathbone and four others, to promote the principles of friendship, charity, and benevolence. The fundamental tenets of the order are "toleration in religion, obedience to law, and loyalty to government." Accepted candidates are advanced through the three ranks or degrees of page, esquire, and knight. Local bodies are known as lodges; the governing body is the supreme lodge.

Loyal Legion, Military Order of the. A hereditary, patriotic organization composed chiefly of commissioned officers of the United States army, navy, or marine corps who served during the Civil War, and of their direct male descendants. The order had its beginning in 1865 at a meeting of officers of the army and navy, held on April 15, 1865, the day following the assassination of President Lincoln. Its objects are: to strengthen the ties of fraternal fellowship and sympathy formed by companionship in arms; to care for and relieve the widows and orphans of deceased companions of the order; and to promote the general welfare of the soldiers and sailors of the United States.

Luther League of America. A national organization having for its purpose the unification of the young people's religious societies that are connected with the Lutheran churches in America. It was founded at Pittsburgh, Pa., in 1895. The motto is "Of the Church, by the Church, for the Church."

Maccabees, The. A secret, fraternal, mutual assessment beneficiary society, organized at London, Ontario, in 1878 by the members of the Order of Foresters. The organization was incorporated in Michigan, June 11, 1881, and later became known as the Knights of Maccabees of the World. It is founded on the tradition of the followers of Judas Maccabeus, as given in several of the apocryphal books of the Old Testament. Because of internal dissension, a seceding body was formed under the name of Knights of the Modern Maccabees. These rival fraternities reunited in 1914, under the present name. The Maccabees provide life, health, accident, and disability insurance for their members. Subordinate bodies are known as tents, while the lawmaking body is the supreme tent.

The Woman's Benefit Association of the Maccabees is an entirely independent organization. It is the largest, and financially the strongest, fraternal benefit society conducted by women for women.

Masons, Free and Accepted. A secret, fraternal organization which claims a very remote origin and seems to have descended from the craft guilds of operative masons that existed in the medieval period. Speculative masonry as known today dates from June 24, 1717, when four of the old lodges united at London, to form the Grand Lodge of England. Masonry was introduced into America about 1730.

The basic unit of the order is the lodge, wherein are conferred the three degrees of entered apprentice, fellowcraft, and master mason. In the United States and Canada, two systems of higher degrees, known as the York rite and the Ancient Accepted Scottish rite, are open to master masons. The degrees or grades of the York rite are conferred progressively by three distinct bodies,—the chapter, the council, and the commandery of Knights Templars. The Scottish rite, which was developed into a rite of 33 degrees at Charleston, S. C. in 1801, is organized into separate bodies called lodges, councils, chapters, and consistories. These confer the degrees up to and including the 32d. The 33d, and last, degree is restricted to active and to honorary members of the governing body known as the supreme council.

Merit, Order for, *Ordre pour le mérite.* Among the European distinctions based upon achievement, this German order is one of the most highly prized. It was the only distinction accepted by Thomas Carlyle. The order was founded in 1667 by Prince

Frederick, later Frederick I of Prussia, with the name Order of Generosity. Frederick the Great gave it the present title as a civil and military order in 1740. The peace class of the order, for recognition of meritorious service to art or science, was founded in 1840 by Frederick William IV. The numbers are restricted to 30 German and 30 foreign members. Upon the occurrence of a vacancy, a new member is chosen from three candidates recommended by the Academy of Sciences and Arts.

Moose, Loyal Order of. A secret, beneficiary, fraternal society founded in 1888 at Louisville, Ky., by Dr. J. H. Wilson. The society aims to furnish the advantages of fraternal membership without the necessity of accepting life insurance or of pledging to any particular cause. The society maintains a home and vocational school for needy members and their orphans at Mooseheart, near Aurora, Ill.

Odd Fellows, Independent Order of. A secret, fraternal, beneficiary society, founded in England sometime during the second quarter of the 18th century. A grand lodge of Odd Fellows for England was formed at London in 1803. In 1809 a subordinate lodge at Manchester successfully declared itself independent of the grand lodge, and, as the Independent Order of Odd Fellows, Manchester Unity, constitutes today the largest English branch of the order.

Thomas Wildey is considered to have been the founder of the society in America, although other lodges are known to have existed before Wildey came to the United States. In 1819, Wildey and other English associates organized a lodge of Odd Fellows at Baltimore, which received a charter from the Manchester Unity. In 1843 the American order declared its independence of the older society.

Three degrees are conferred in lodges of Odd Fellows. Those who have received the third degree are eligible to membership in an encampment, where three further degrees are conferred. A uniformed degree of the order, known as the patriarchs militant, is open only to those who have received the royal purple degree of an encampment. The Rebekah degree for women members was established in 1851.

Phi Beta Kappa. This honorary college fraternity in the United States is the oldest of the Greek-letter fraternities. Its title consists of the names of the initial letters of the three Greek words φιλοσοφία βίου κυβερνήτης, "philosophy the guide of life". Active membership is extended as a rule only to members of a senior class studying for a baccalaureate degree in arts or science and, within these limits, is further restricted to those of superior scholarship. Alumni and honorary members may also be chosen. The badge of membership is a specially engraved watch key.

Phi Beta Kappa was organized at William and Mary college, December 5, 1776, as a secret social club and literary society. Its secret character was subsequently abandoned by the individual chapters. Women were first admitted in 1875. A national organization was effected in 1883.

The *Sigma Xi* fraternity, organized at Cornell university in 1886, is a similar society devoted to the interests of scientific research. Its name embodies the initial letters of σπουδῶν ξυνῶνες, "companions in zealous research." The badge is also a watch key, and the colors are electric blue and white.

Red Cross Societies. National organizations devoted primarily to the care of those who are wounded in battle. These associations, which now comprise millions of members throughout the world, are largely due to the activities of two Swiss gentlemen, Jean Henri Dunant and Gustave Moynier. Dunant, who, by chance, was an eyewitness of the battle of Solferino, published a book entitled *A Memory of Solferino*, in which he vividly described the horrors of the battlefield caused by the inability of the regular surgical corps to care properly for the wounded. He also suggested the need for an organization which in time of peace should train nurses and provide supplies with which to supplement the regular medical service in time of war.

The book was widely read, and the resulting agitation led to an international conference at Geneva, Switzerland, in 1863, when a provisional plan was adopted by delegates from 16 countries. The following year, diplomatic representatives from the same nations met and signed what is known as the Geneva Convention. This convention did not provide for the organization of Red Cross societies. It did make such organizations possible by providing for the neutrality of those officially engaged in relieving the wounded.

The Geneva Convention was almost immediately ratified by 14 nations, and the number was later increased to 43, the United States joining in 1882. The agreement was revised in the Geneva Convention of 1906, and its provisions have become a part of international law. The relief societies, organized as a result of the Geneva Convention, selected as their emblem the flag of Switzerland with the colors reversed, that is, a red cross on a white background. As Mohammedan soldiers objected strenuously to this emblem, which seemed to them to have religious significance, the Turkish organization has adopted a red crescent as its emblem. The watchword of the societies is "Humanity and Neutrality."

The American Red Cross was organized in 1881 under the leadership of Clara Barton, who became its first president. It was reorganized, and was chartered by act of Congress, January 5, 1905. There are more than 3000 local chapters, with national headquarters at Washington, D. C. The work of the organization is not confined to war time, but includes the relief of suffering caused by great calamities, such as epidemics, storms, earthquakes, and fires. During the period from July 1, 1917 to June 30, 1922, in addition to the work done in America, the society spent $285,769,000 abroad, on account of the World War.

Red Men, Improved Order of. A fraternal, beneficiary, and benevolent society, organized October 14, 1833, and based upon the manners, traditions, and customs of the North American Indians. Subordinate bodies are known as tribes, and the supreme body as the great council of the United States. Councils of Pocahontas provide for female membership in the society. The ritual work of a tribe is divided into three sections or degrees,—those of the adoption, the warrior, and the chief. The motto of the order is "Freedom, Friendship, and Charity."

Royal Arcanum. A fraternal, mutual assessment, beneficiary, and benevolent society, founded in Boston, June 23, 1877, by Darius Wilson. The object of the organization is to provide its members with safe insurance at the minimum cost. Local bodies of the order, known as councils, are under the jurisdiction of a supreme council. The motto is "Mercy, Virtue, and Charity."

Royal Society, London. This organization dates its foundation from the year 1660, although the weekly meetings of scientists, out of which it grew, began as early as 1645. The purpose of the society is the "improvement of natural knowledge." From November to June of each year, weekly meetings are held for discussion of scientific subjects. The organization administers, for the encouragement of discovery and invention, both its private funds and Parliamentary grants. The roll of the presidents of the society includes many of the most distinguished men of the scientific world.

Salvation Army. A religious organization founded in England by William Booth in 1865 for the purpose of bringing spiritual and material benefit to the nonchurchgoing masses of people whom conservative religious bodies do not reach. The present name, military type of organization, and style of uniform were adopted in 1878, with William Booth as the "general" in command. In 1880 George

Railton was sent from England to organize the Salvation Army in the United States.

In connection with the evangelistic meetings of the army, carried on chiefly in the poorer districts of large cities, an extensive system of social relief institutions has been developed. This includes rescue homes, shelters, and boarding houses for women, shelters and industrial homes for men, slum settlements, employment bureaus, free distribution of ice and fuel, missing friends bureau, poor men's lawyers, prison department, anti-suicide bureau, day nurseries, fresh air camps, and farm colonies. The organization has developed until it now has more than 12,000 posts distributed in 73 countries and colonies. The army publishes about 80 periodicals, the printing being done in 35 different languages. William Bramwell Booth, eldest son of the founder of the Salvation Army, is now general of the entire organization, of which the international headquarters is in London.

Shrine, Ancient Arabic Order of Nobles of the Mystic. A secret social organization whose members must be either knights templars or Scottish rite masons of the 32d degree. This order was first conferred at New York City, June 16, 1871.

A similar social organization open to all master masons is known as the Mystic Order, Veiled Prophets of the Enchanted Realm. A local body of this order is called a grotto.

Sisters of Charity. Under this name many Roman Catholic communities are to be included. In general, they devote their energies and resources to religious, charitable, and educational work. The oldest of such communities was founded in Paris in 1634, by Saint Vincent de Paul. In the United States, the community of Sisters of Charity was organized by Mother Seton in 1809 at Emmitsburg, Md. In 1812 the notable community of the Sisters of Charity of Nazareth was established near Bardstown, Ky.

Society of Colonial Wars. A patriotic organization incorporated in the state of New York, October 18, 1892, for the purpose of perpetuating the names and valor of those who participated in the warfare of American colonial history. Membership is open to the male descendants of certain classes of men who, in the period between the settlement of Jamestown and the battle of Lexington, were active in the service of the colonies which afterward became the United States of America. These classes include officials of the colonies, officers and men in the armed colonial forces, and officers and men of the British forces which served with the colonists in any colonial war.

Sons of the American Revolution. A hereditary, patriotic society in which membership is open to direct male descendants of an ancestor who actively aided the cause of the American Revolution as an officer, soldier, sailor, marine, militiaman, or minuteman. The society was organized at New York City in 1889 by members of the Sons of the Revolution and of the Sons of Revolutionary Sires, the latter society becoming the California state branch of the Sons of the American Revolution. The national society was incorporated by act of Congress in 1906. Its objects are to foster American patriotism and to perpetuate the memory of those who achieved American independence.

Sons of the Revolution. A hereditary, patriotic society organized in 1876 and reorganized in 1883, to which is eligible any male descendant from an ancestor who, between April 19, 1775 and April 19, 1783, gave active assistance to the cause of American independence. The society has been notably active in marking with suitable tablets many of the historic locations in and around New York City.

Sons of Veterans. A patriotic society founded at Philadelphia, in September 1879. It admits to membership all male descendants, not less than 18 years old, of soldiers, sailors, and marines who served with the Union forces during the Civil War. A society of similar character, for women, is known as the Daughters of Veterans.

Spanish American War, Naval and Military Order of the. A patriotic society, instituted February 2, 1899. Membership is open to commissioned officers of the United States army, navy, marine corps, and revenue-cutter service and to contract surgeons who served in the Spanish American war or the Philippine insurrection incident thereto, and to all sons of such officers.

United American Mechanics. A secret, patriotic, political, benevolent society, founded at Philadelphia in 1845. Only native Americans are eligible to membership. Among the objects of the society are: the exhibition of the American flag on public schools; the restriction of immigration; opposition to any union of church and state; practical business aid to members; and relief for their widows and orphans. It was the parent of the *Junior Order of United American Mechanics*, which was formed at Germantown, Pa., in 1853 in order to train younger members for the senior order. In 1885 the junior order separated from the older society, which it has since surpassed in size and activity. It pays sick benefits to members and funeral benefits to their beneficiaries.

United Confederate Veterans. A federation of various organizations of former Confederate soldiers and sailors, formed June 10, 1889. The first reunion was held at Chattanooga, Tenn., in 1890. The objects of the society are: to unite all Confederate veterans and to cherish the ties of friendship that should exist among those who have shared a common danger; to gather authentic dates for an impartial history of the war between the states; to preserve relics or mementos of the war; to cherish and preserve the memory of deceased comrades; and to extend aid to their widows and orphans. Local groups are termed camps, and state organizations are called divisions. Headquarters of the society is at New Orleans.

United Spanish War Veterans. A patriotic society similar in many respects to the G. A. R., but devoted to the interests of the American veterans who served in the Spanish American war, the Philippine insurrection, and the Chinese expedition.

The society has been known under its present name since 1904, when the Spanish War Veterans, which was incorporated November 28, 1899, united with the Society of Spanish American War Veterans, the Society of the Service Men of the Spanish War, and the Society of the Hispano-American War.

United Workmen, Ancient Order of. A fraternal, beneficiary society founded at Meadville, Pennsylvania, October 27, 1868, by John Jordan Upchurch. The objects of the order are expressed by the motto "Charity, Hope, and Protection." Insurance is afforded the members, who attain full membership after receiving three degrees. Local bodies are known as lodges, and the governing body is the supreme lodge.

Veterans of Foreign Wars of the U. S. A national society of ex-service men who, as members of the United States army, navy, or marine corps, have participated in wars or campaigns upon foreign soil or in foreign waters.

This society had its beginning in 1899, when the American Veterans of Foreign Service was organized at Columbus, Ohio, and the Army of the Philippines was founded at Denver, Colo. Each of these societies expanded,—the American Veterans merging with several similar Pennsylvania organizations. Finally, at a convention at Denver in 1913, they amalgamated under the name of Veterans of Foreign Wars of the United States.

The society has for its objects the preservation of comradeship among its members; the assistance of disabled or needy veterans and of the widows and

orphans of deceased ex-service men; and promotion of the teaching of true patriotism and Americanism by schools and other institutions.

Volunteers of America. A religious society that is very similar in its objects and military form of organization to the Salvation Army. It was organized in New York City, March 6, 1896 by Commander and Mrs. Ballington Booth. Ballington Booth was the second son of William Booth, who originated the Salvation Army.

Among the notable social activities of the Volunteers of America are the maintenance of about 60 principal institutions where free lodgings and meals are supplied to those out of work, a free hospital in New York City, homes for friendless young women, and a prison league which endeavors to aid discharged prisoners to return to honest living.

War of 1812, General Society of the. A patriotic, hereditary association of male descendants from ancestors who served in the United States army, navy, marine corps, or revenue service, or as privateersmen during the War of 1812. An organization of similar purpose known as the *Military Society of the War of 1812* is open only to acceptable descendants of commissioned officers who served honorably during that war.

Woman's Christian Temperance Union. An organization of women founded at Cleveland, Ohio, in 1874 as the outcome of a women's crusade against the liquor traffic in the states of the Middle West in 1870–73. Its activities became much wider, however, and it aimed to influence public opinion and legislation in regard to prostitution, the sale of habit forming drugs, and various other matters affecting the welfare of individuals or society. It was largely responsible for introducing the study of hygiene and physiology into the public schools and long worked for the consummation of national prohibition of intoxicating liquors. An international association was founded in 1883 largely through the efforts of Frances E. Willard.

Woman's Relief Corps. A patriotic society of women, composed chiefly of mothers, wives, daughters, and sisters of Union soldiers. It was organized in 1883, to aid the Grand Army of the Republic, to perpetuate the memory of their heroic dead, to extend needful aid to the widows and orphans, and to cherish and emulate the deeds of the army nurses. The national organization is divided into 40 departments, made up of about 2500 local groups called corps. A similar society, organized at Chicago, in 1886, as the *Ladies of the Grand Army of the Republic*, is composed of wives, mothers, daughters, sisters, nieces, and direct female descendants of Union soldiers.

Woodmen of America, Modern. A fraternal, beneficiary society organized by Joseph Cullen Root, January 5, 1883, at Lyons, Iowa. The order provides life insurance for its members to a maximum of $3000 each. The recognized women's auxiliary of this organization is known as the Royal Neighbors of America.

Woodmen of the World, Sovereign Camp. This fraternal and beneficiary order was founded June 3, 1890 at Omaha, Nebr., by Joseph Cullen Root and associates. The principal purpose of the society is to afford insurance to its members. A monument is placed at the grave of every deceased member. The organization has its headquarters in a modern 18-story building which it erected in Omaha, Nebr. The women's auxiliary is known as the Woodmen Circle.

Young Men's Christian Association. An organization founded in London, in 1844, by George Williams, a dry goods clerk, for the "improvement of the spiritual condition of young men in the drapery and other trades." Similar associations were first established in North America at Montreal and Boston, in 1851. The movement developed rapidly, and soon attention was directed to the social, mental, and physical improvement of the members, as a means of strengthening their moral and spiritual characteristics.

The organization in North America is now composed of about 1650 local associations, each of which is entirely self-governing. These co-operate under the guidance of 42 state and provincial committees, which in turn co-operate under two national councils, one for the United States and the other for Canada. An international committee acts as a holding body for the two national councils. It consists of 200 representative business men. A world organization is also maintained, with headquarters at Geneva, Switzerland. Controlling membership in the local associations is composed of those who are connected with some evangelical church. Associate membership, with all privileges except the right to vote, is open to any man of good character without regard to his church affiliations.

The symbol of the association is a red triangle, standing for the equal upbuilding of "Mind—Spirit—Body." The movement is carried on chiefly in the larger cities, where, in the Y. M. C. A. buildings, members may attend religious meetings, Bible classes, other educational classes of all kinds, recreation rooms, or well equipped gymnasiums. Special attention has been given to Y. M. C. A. work among college students, railroad and industrial employees, the men in the army and the navy, Negroes, and Indians.

The Y. M. C. A. has a membership of approximately 1,000,000 in North America, of whom about one-fourth are boys. It owns property valued at more than $200,000,000 and has annual operating expenses of about $57,000,000. Over 167 million dollars were raised by subscription to be used for work among the soldiers and sailors during the World War.

Young Men's Hebrew Association. An organization founded in 1874, at New York City, having for its object the mental, moral, social, and physical improvement of Jewish young men. It has branches in many of the larger American cities.

Young Men's National Union, Catholic. A national federation of the local diocesan unions of Roman Catholic young men. It was organized at Newark, N. J., in 1875. In addition to its work of uniting and strengthening local societies, it has established night schools and reading rooms, and supplied reading material for soldiers and sailors.

Young Women's Christian Association. An organization designed to advance the physical, social, intellectual, and spiritual interests of young women. The society had its beginning in England in 1855, when Miss Emma Robarts founded the English Prayer Union. Its existence in the United States dates from 1858, when the Ladies' Christian Association of New York City was founded. The first association bearing the present name was formed in Boston in 1866. The World's Young Women's Christian Association was organized in 1894, although a complete national organization including almost all the local associations in the United States was not perfected until 1906.

The activities of the Y. W. C. A. include religious and missionary work; travelers' aid, with especial attention to immigrant girls; the operation of rooming and lodging houses, cafeterias, restaurants, and gymnasiums; and vocational and other forms of instruction.

In the United States there are from 900 to 1000 local associations, with a total membership exceeding 575,000. These own property valued at over $55,000,000 and have annual operating expenses approximating $24,000,000.

Active or controlling membership in the organization was formerly open only to those affiliated with some evangelical church. This denominational test was abandoned in 1928 and was replaced by a pledge to uphold the purposes of the organization. The symbol of the Y. W. C. A. is a blue triangle.

CALIFORNIA MISSIONS

This term is applied to a group of missions founded by Spanish missionaries from 1697 to 1823 in Lower and Upper California. A total of 17 were built in Lower California by the Jesuits, who were intrusted with complete control, religious and civil, throughout the peninsula. The arid nature of the soil and the unpromising character of the aboriginal Indians whose conversion was the object of the enterprise made the task one of extreme difficulty. In 1767, the Jesuits were expelled, and the missions were handed over first to the Franciscans and later to the Dominicans, who founded seven more missions. The work in Lower California was much less successful than that of the missions founded in the more favorable territory to the north in Upper California.

Northern Missions. In 1769, Spain took measures to make good her claims to Upper California. Father Junipero Serra, the Franciscan superior of the missions in Lower California, was encouraged to found a mission farther north, and the government planned to support the missions by a number of garrisoned forts. The first mission was founded by Serra the same year and was called San Diego. In the ensuing half century, 20 other missions were founded, which, in the order of their establishment, are as follows: San Carlos, 1770; San Antonio, 1771; San Gabriel, 1771; San Luis Obispo, 1772; San Francisco de Asis (Dolores), 1776; San Juan Capistrano, 1776; Santa Clara, 1777; San Buenaventura, 1782; Santa Barbara, 1786; La Purisima Concepcion, 1787; Santa Cruz, 1790; La Soledad, 1791; San Fernando, 1797; San Miguel, 1797; San Juan Bautista, 1797; San Jose, 1797; San Luis Rey, 1798; Santa Ynes, 1804; San Rafael, 1817; and San Francisco Solano, 1823.

The first nine of these missions were established by Serra before his death in 1784, and the remainder were founded by his successors between 1786 and 1823. They were located on carefully chosen sites in fertile valleys near streams, whose waters were often used to irrigate a part of the surrounding land. In general, they lay at intervals of about 30 miles, a full day's journey apart, and most of them were connected by a highway called El Camino Real, "The King's Highway."

Organization. As each new mission was opened, two fathers were placed in charge of it, and to them the secular governor attached a guard of five or six soldiers under a corporal. The guard was subject to the authority of the missionaries. The church, built usually of sundried brick, or adobe, and in a few cases of stone, occupied one corner of a courtyard. The quarters of the missionaries adjoined the church, and no girl or woman was admitted into them. Then followed the rooms of the attendants and cooks, who were Indian youths selected from among the converts. The sides and rear of the courtyard consisted of shops, storerooms, granaries, stables, and the apartments for the young women, who remained under the eye of a matron until they were married. The unmarried men were also kept in a building by themselves. If a young man asked for one of the girls and she was willing, a marriage ceremony was performed and the couple was housed in a hut in the village of converts which surrounded the mission. After baptism, converts were not allowed to return to their former homes without the consent of the missionaries, and then only for short periods. The administration of justice was entirely in the hands of the missionaries.

Economic Activities. The day was devoted mainly to work, by means of which the community not only supported itself but enjoyed a considerable measure of prosperity. The Indians in their wild state were acquainted with practically none of the arts that give men a measure of independence from their immediate environment. They lived on berries, seeds, roots, and sometimes fish. Under the control of the missions, however, the Indians learned to practice agriculture, tanning, weaving, and many other arts of civilization. The products of their labor included wheat, oranges, leather, cloth, soap, furniture, some ironware, and a little wine and olive oil. They possessed immense herds of cattle and sheep. At the time of their greatest prosperity, these communities sheltered, clothed, and gave instruction to about 30,000 Indians.

Final Results. As a permanent Christianizing process, the enterprise failed in its main purpose; when the missions were later disrupted, the Indians relapsed into barbarism. Nevertheless, the work of Serra and of his associates and his successors transformed the lives of a large part of these Indians over a period of half a century, and about 90,000 in all were baptized. This achievement stands out as perhaps the greatest missionary accomplishment on the American continent.

Disruption of the Missions. Soon after Mexico threw off its allegiance to Spain, the California missions were secularized and their property was confiscated. The final decree for their disestablishment was signed in 1823, and, for the next ten years, the lands, buildings, and goods of the missions fell a prey to unscrupulous speculators and politicians. The Indians, unable to carry on by themselves the economic activities that had been directed by the missionaries, were speedily reduced in numbers by hardship and starvation. The survivors, tardily established in reservations by the United States government, now number about 2500.

Later Influence. The style of architecture used in the California missions has been extensively imitated in many public buildings and residences in the Pacific states, especially in southern California. It is characterized by a rugged strength combined with charming simplicity and harmony of design. The Mission style of furniture also recalls the industry which the Indians of California formerly practiced under the tutelage of their Franciscan *padres*.

Modern Remains. Most of the original mission buildings are now in a state of more or less complete ruin, although a few, such as the Santa Barbara mission and the San Gabriel mission, are well preserved and several have been partially restored. The work of restoration owes much to the labors of various organizations formed for the purpose, conspicuous among which is the Landmarks club, founded by Charles Fletcher Lummis. All these missions which have visible remains continue to attract thousands of visitors and tourists annually. In historic and romantic interest, they far surpass all other vestiges of the former Spanish and Mexican rule.

Nearly all the missions are readily accessible to the traveler. The automobile highway from San Diego to San Francisco known as El Camino Real closely follows the route of the famous thoroughfare which formerly connected the 600-mile chain of missions. The following paragraphs contain information of historical or general interest regarding each of these missions, the names of which are given in the order of their location from south to north.

San Diego, 6 miles east of the city of San Diego, was the first mission founded by Serra. He labored for a whole year at this point before making his first convert. In 1775, an attack by the Indians resulted in the ruin of most of the buildings and the death of several of the defenders. Better buildings were erected and, by 1800, there were 1523 converts living around the courtyard. A dam was built about 3½ miles above the mission in order to irrigate the land. Today the mission is in a ruined condition, although the walls remain standing and the dam may also be seen.

San Luis Rey, about 85 miles south of Los Angeles, is similarly in a ruinous state. It has a perfectly proportioned dome over the chancel and beautiful groined arches on each side of and over the altar. A Byzantine pulpit is one of the few ornaments of which the building has not been despoiled. At the time of its greatest prosperity, this mission numbered 2869 resident Indians. About 1200 bushels of grain were raised yearly, and the flock of sheep owned by the community comprised about 29,000 animals. The accessory mission of San Antonio de Pala may be reached by auto stage, 25 miles from Oceanside.

San Juan Capistrano, 58 miles south of Los Angeles, is one of the best preserved of the missions, although the church was damaged by an earthquake in 1812. Some parts of the mission, however, are still habitable. It has several large bells, which were imported from Chile. This mission was founded in 1776 and, by 1800, there were 1046 Indian residents. These Indians were taught to weave by a Spaniard named Mendoza, who was sent from Monterey under contract from the government to work for $30 a month. Instructions were given by the government that, if he neglected his work, he was to be chained up at night.

San Gabriel, in the town of San Gabriel, is 8 miles east of Los Angeles. The tribes surrounding this mission were numerous, but for a considerable period they were hostile to the Spaniards, partly on account of the treatment they received at the hands of the soldiers comprising the guard of the mission. The earlier buildings were badly damaged by earthquake in 1812; the steeple of the church and the main altar were thrown down, and the walls were cracked. A new church was built as a result. It consisted of rubble stone as far as the windows, and the upper part was of brick. The mission celebrated 7709 baptisms in the course of its history.

In 1912, the first performance of the famous mission play was given at San Gabriel. The drama tells vividly a story of the early mission settlements. For the periodical presentation of the play a well equipped theater was erected.

San Fernando, about 20 miles northwest of Los Angeles, is in a state of almost complete ruin. A Spaniard connected with this mission, Francisco Lopez by name, is said to have been the original discoverer of gold in California. In 1841, when digging up some wild onions, he found a piece of gold. This and other discoveries soon attracted prospectors from all parts of the continent.

San Buenaventura is about 75 miles northwest of Los Angeles and may be reached by electric car from the railroad station of San Buenaventura. In 1893, the old church was so renovated as to lose most of its distinctively historic characteristics. The largest population of this mission was attained in 1830, when it amounted to 1330. In that period, it owned about 4500 horses and 13,000 sheep.

Santa Barbara, in the city of the same name, about 90 miles northwest of Los Angeles, is still in the hands of the Franciscans. It is well preserved and has a carefully cultivated garden, into which no woman may enter except a queen or the wife of the president of the United States. The walls, which are six feet thick, consist of irregular limestone blocks and are further strengthened by solid stone buttresses measuring nine by nine feet. This mission has a very fine fountain ornamented with carvings, most of which are intact.

Santa Ynes, about 25 miles northwest of Santa Barbara, is less accessible than the other missions; it lies 25 miles east of Lompoc and 6 miles southeast of Los Olivos. It is in a ruined condition, but two reservoirs may be seen which were formerly used for laundry and bathing purposes, being supplied with water brought by a conduit from a point several miles distant. In 1835, the mission was secularized, but was restored to Franciscan control in 1843. It never became as prosperous, however, as it had previously been. The maximum number of cattle owned was 7300 and of sheep, 6000.

La Purisima Concepcion is about 40 miles northwest of Santa Barbara and 5 miles from Lompoc, the nearest railroad station. It is one of the most desolate of the ruins, consisting now of one long, low adobe building with a few arches of the corridor. The maximum population of the mission was reached in 1803, when it housed 1522 people. The earliest buildings were destroyed by earthquake in 1812.

San Miguel, about 210 miles southeast of San Francisco, is notable for the completeness of its interior decorations. There were 2917 Indians baptized in the course of the mission's history.

San Luis Obispo is in the town of the same name about 250 miles southeast of San Francisco. Being founded in 1772, it was one of the earliest missions. The first buildings had roofs of bulrushes, to which hostile Indians twice set fire by discharging burning arrows upon them. As a protection against this mode of attack, tile roofs were made and, from San Luis Obispo, this practice was adopted by all the other missions. The greatest population attained by San Luis Obispo was 946. This was the figure for 1794 and, in that year, the live stock owned by the mission consisted of 6500 head of cattle and horses and 6150 sheep. The church has been restored in a form quite different from the old church, the likeness of which is known from an old painting.

San Antonio de Padua, about 180 miles southeast of San Francisco, is reached from Kings City station 20 miles by stage to the quaint village of Jolon and thence by a 6-mile drive to the ruined mission.

La Soledad is about 45 miles south of San Francisco and 4 miles from the town of Soledad. The original buildings are in complete ruin.

San Carlos, sometimes called the Carmel mission, is about 125 miles southeast of San Francisco and 6 miles from the town of Monterey. The original roof has collapsed. In this mission is the tomb of Father Junipero Serra. The town of Monterey contains the old presidio church of San Carlos de Borromeo, which is sometimes confused with the San Carlos mission. The presidio church contains many relics of the mission days.

San Juan Bautista, 6 miles from Sargent and 87 miles south of San Francisco, is one of the better preserved missions. It has been partially restored, but many of the original features remain, including a bell cast in 1809 and several figures of saints. The greatest population was reached in 1823, when 1248 people were attached to the mission. It is said that this is one of two missions in which secularization was a success, the other being San Antonio de Padua. The Indians in these two places alone appear to have profited by their freedom to use for themselves some of the economic arts which they learned from the Spanish missionaries.

The *Santa Cruz* mission, 80 miles south of San Francisco, has virtually disappeared and a modern parish has been built on the site. It was one of the less successful of the missions, never having included more than 644 persons. Its history is clouded by certain charges and countercharges of cruelties and murders.

Santa Clara, in the town of the same name, near San Jose, has been restored and has been used in recent times as a college. It contains an old picture representing Jesus multiplying the loaves and fishes. The mission at one time had a population of 1464, but, after 1820, it began to decline and, at the time of its secularization, the number of live stock was less than one-third the 17,806 which had been owned in 1820.

The four remaining missions are all in advanced stages of ruin. They are *San Jose*, 14 miles from the city of San Jose; *San Francisco de Asis*, on 16th and Dolores streets in San Francisco; *San Rafael*, in the town of that name; and *San Francisco Solano*, in Sonoma about 45 miles north of San Francisco.

HEROIC DEEDS AND EXPLOITS

HERO is derived from the Greek word *heros*, applied to those who were more than men but less than gods. Heroes were capable of performing exploits that were above the capabilities of mere men. In modern English, the word designates a person distinguished for deeds that appear to demand a courage not possessed by the average man. The most heroic deeds are generally acknowledged to be those in which the actor voluntarily risks his dearest possession—his life—in order to attain a highly important result, such as the preservation of other people's lives or the safety of his country.

For rewarding acts of heroism performed in the United States, Canada, or Newfoundland, the Carnegie hero fund was established in 1904 by Andrew Carnegie. The commission administering the fund awards medals to persons who, upon conclusive evidence, are shown to have risked their lives voluntarily in some heroic effort for the benefit of others. Acts thus recognized must have been performed outside the regular course of a person's occupational duties. Medals are presented to the heroes themselves or to their surviving dependents or nearest relatives. In case of need, the commission pays money grants also, not exceeding $1000 in any one year, for the support of the hero, if he is disabled, or of his widow and children. Special grants are frequently made for educational and other worthy purposes.

The following pages contain a selection of the more noteworthy deeds of heroism performed from early times down to the present. The great number of such deeds that have been recorded makes it necessary that this selection should be limited to acts of especial distinction or impressiveness. Many others will be found in the Department of Biography. Among these latter are, for example, the stories of Edith Cavell, Grace Darling, Joan of Arc, Leonidas, Richmond P. Hobson, and many others whose acts entitle them to a place in the roll of heroes. Others will be found in appropriate passages of the Department of Geography and Travel. The ride of Lady Godiva, for example, is dealt with under *Coventry* on page 793, and the heroic conduct of the Swiss guards of Louis XVI is narrated under *Lucerne*, page 798, where a memorial to their valor is described.

Alfred the Great in the Danish Camp. Among the many heroic tales of Alfred is this one of his playing the spy among the Danes. Having gathered enough soldiers to make practicable an attack upon the invading Danes, he approached the Danish camp in the guise of a musician and was allowed to wander through it at will, so excellently did he play the harp and sing. What he learned enabled him to lead a successful attack. It is said that, after the victory, he enjoyed the pleasure of disclosing his identity to the captured Danish chief by singing for him again the song which the chief had previously heard from the wandering musician.

Arnold von Winkelried (*är'nôlt fôn vĭng'kĕl-rēt*). A national hero of Switzerland. The Swiss cantons were compelled to fight for their independence against Austria in 1386. In the battle of Sempach, when the day was too hot for fighting in armor and the Swiss forces had beaten in vain against the serried array of Austrian spears, Arnold von Winkelried persuaded his compatriots to form in the shape of a wedge while he took his place at its point. In this formation, they charged the Austrian army. When at close quarters, von Winkelried gathered as many Austrian spears as he could reach by his outstretched arms and concentrated them against his own breast. He thus fell transfixed, but he had opened a breach, into which his friends rushed. The Austrian army was routed, and the liberty of the Swiss cantons was preserved.

The authenticity of this early incident has not been positively established. Nevertheless, unlike the tradition of William Tell, the story involves no mythical or impossible elements.

Betty Zane, the Heroine of Fort Henry. In the days of the Revolutionary War, the Indians were frequently induced by the British forces to attack the American settlements in the western wilderness. Fort Henry, situated near the present site of Wheeling, West Virginia, was at that time assaulted by about 500 Indians led by Simon Girty, a white man who had lived with the Indians since childhood.

On the approach of the Indians, the settlers hastily took refuge within the fort. After beating off the first attack, the defenders found that they were short of powder, a small keg of it having been left behind in a hut outside. The commander asked for a volunteer to fetch the precious explosive. Betty Zane, the young daughter of one of the settlers, urged that, since she was of no value as a combatant, she should be permitted to undertake the venture. Realizing the value of every fighter in the crisis, the men consented. The girl boldly crossed the open space, found the powder, carried it through the midst of whizzing bullets, and returned safely to the fort. This powder enabled the men to beat back all attacks until help arrived.

Borromeo (*bôr'rô-mē'ō*), **Saint, Cardinal of Milan.** An outstanding example of the few heroic souls that have had the courage to minister to the sick and dying in time of plague. Milan was devastated by this terrible disease in 1576. Infected houses were marked with a cross and were carefully guarded, the inhabitants being left within to perish in the order in which the plague or starvation and thirst should carry them off.

Cardinal Borromeo, conceiving it to be his duty as bishop to minister to the sick and dying, resisted the admonition of his friends and, with his 28 priests, continued, throughout the 4 months in which the plague raged, to visit the stricken and to perform the last rites over those claimed by death. Neither the cardinal nor the priests were attacked by the disease. A statue 112 feet high stands in a park at Arona, Italy, erected to the memory of the cardinal.

Captain Smith and the Elsie. Captain John W. Smith, commanding his little boat, the *Elsie*, succeeded in effecting a heroic rescue of a number of survivors of the wreck of the *Larchmont*. The *Larchmont*, a side-wheeler from Providence, R. I., was making its way in a stormy midwinter night through the eastern entrance of Narragansett bay when a schooner drove into its side and the ship sank. Its hurricane deck, being torn from the hull, continued to float, carrying a few men who had not been able to get into the lifeboats.

In order to save these survivors, Captain Smith, a fisherman who had learned of the disaster from the occupants of one of the lifeboats, set out with the *Elsie* and seven helpers. Hours were spent in battling with the storm. The ice-incrusted survivors of the wreck had to be lifted into a dory which the *Elsie* had in tow and into which four of the fishermen had climbed in order, with it, to approach the raft. When the party reached land two hours later, every one on board was almost helpless from the cold. One of the rescued men died later from the exposure. Each of the fishermen received a Carnegie gold medal, and funds were made available for the education of their children.

Carlyle and the Loss of His Manuscript. After Thomas Carlyle had produced the manuscript for the first volume of his French Revolution, expending on it the passionate pains characteristic of his rugged spirit, he loaned the manuscript to John Stuart Mill. The latter's servant girl, not

understanding the unique value of the paper littering her employer's desk, consigned the manuscript to the flames. Mill was compelled to inform his friend of what had happened. When Carlyle heard the tragic news, he remained silent and for several days did not utter a word. Then with undaunted spirit, he set about rewriting the book. Mill persuaded him later to accept $500 indemnity for the loss of his work.

Catharina the Heroic. After the battle of Muhlberg in 1547, Charles V desired to have his Spanish army pass through the Thuringian town of Schwarzburg, which was governed by the countess Catharina. She gave him the right of passage and agreed to provision his troops at a fair price on condition that her people should not be molested.

When the army arrived at Schwarzburg, the emperor's general invited himself to the countess's castle for entertainment. While he and his aides were dining, their arms laid aside, a messenger arrived, announcing that the Spaniards were looting the houses of the town and taking the cattle. The countess immediately armed her retainers and secretly locked all the doors and gates. She then protested to the general and asked him to restrain the soldiers. Her only satisfaction was his explanation that the troops were merely following the custom of war. "Very well," replied the countess, "but my poor subjects must have their own again, or prince's blood shall be given for oxen's blood." The general found himself helpless and was compelled to order his men to make full restitution and then pass on before he was allowed to leave the castle.

Cecil Rhodes in Rhodesia. The British diamond miner and imperialist Cecil Rhodes set out in 1896 to colonize the African territory now called, after him, Rhodesia. The natives, judging themselves wronged by the British settlers, took up arms and, after several months of hostilities, retreated to an almost impregnable position in the Matoppo hills. With characteristic daring and candor, Rhodes undertook to end the war single-handed.

Moving his tent away from the British troops to the base of the Matoppo hills, he encamped alone and without weapons for six weeks, in the power of the enemy if they chose to attack. Word was circulated among the natives that he had come alone and undefended to hear their side of the case. He was invited to attend a council held by the natives in the midst of their camp. He accepted without hesitation and rode unarmed into their midst. After mutual concessions were agreed upon, Rhodes asked them, "Now for the future, is it peace or war?" The chiefs, laying down their weapons, replied, "We give you one word; it is peace."

Chivalry of Sir Philip Sidney. The story told by Lord Brooke of Sir Philip's conduct after the battle at Zutphen illustrates the character of this mirror of knighthood. As he was being borne from the field, severely wounded, he called for water, which was brought to him. Then, seeing a poor wounded soldier look longingly at the bottle, he forbore to drink, giving the water instead to the soldier, with the words, "Thy need is greater than mine."

Conquerors of Yellow Fever. When, at the close of the Spanish American war, the United States army assumed control of the city of Havana, that capital was still subject to the dread tropical scourge of yellow fever. No one knew how the disease was transmitted, although a Havana physician had suggested that it was carried by a certain kind of mosquito. In 1900, the government of the United States appointed a yellow-fever commission to study the disease. This task, which involved a thorough test of the "mosquito theory," was in charge of four physicians—Major Walter Reed, James Carroll, Jesse W. Lazear, and Aristides Agramonte.

Since yellow fever is a disease that attacks human beings only, it was necessary to find those who would volunteer to be made the subject of experimentation. Dr. Lazear and Dr. Carroll consented and permitted themselves to be bitten by infected mosquitoes. Both contracted the fever, and Dr. Lazear died, leaving to Dr. Carroll the account of his experience and his observations. In memory of this hero of science a tablet was erected in Johns Hopkins hospital at Baltimore. Dr. Reed's health was so broken that he succumbed to fever the following year.

Besides the physicians, however, there were several men from the army and from civil life who sacrificed themselves in the hope of conquering the disease. Among the latter were two young soldiers from Ohio, John Kissinger and John Moran, who, refusing money compensation, entered a room containing infected mosquitoes in order to make a further test. They contracted the fever, while men in a room with no mosquitoes remained in health. Equally heroic were Dr. Robert Z. Cooke and his two companions, who, to prove that the fever was not carried by clothing, slept for many nights under blankets used by yellow-fever patients.

Such deeds of deliberate heroism deserve perhaps to rank above acts of a more impulsive courage. Assuredly few sacrifices have been so valuable to the human race. Through these experiments, it was proved that the germ of yellow fever is carried by the mosquito *stegomyia fasciata*. Consequently, by taking means to prevent the breeding of these mosquitoes, the disease has been virtually stamped out. See *Mosquitoes*.

Escape of Grotius (*grō'shĭ-ŭs*). Although sentenced to life imprisonment for his religious views, Grotius, the jurist and author, was permitted to have his wife with him in captivity. After he had been confined in a castle for nearly two years, she contrived a means for his escape.

Grotius was in the habit of having books sent to him from a friend, and the trunk in which they arrived was returned with clothing to be washed and books which the author no longer required. His wife persuaded him to feign illness and, when the guards brought the trunk, she asked them not to disturb the invalid. On their withdrawal, she locked Grotius in the trunk, making holes to admit air. The guards who came to remove the trunk supposed the sick man was still in bed. The trunk was sent to the friend's house, and Grotius, disguised as a miller, escaped to safety.

His wife dressed in her husband's clothes in order to delay discovery. When the guards did not appear for some time, however, she went to them, told them of the escape, and took them to task for failure in their duty. They were so taken aback that she was enabled to walk from the castle unmolested.

Garibaldi's Summons to His Troops. After Rome had surrendered to the French in 1848, this indomitable hero of Italian liberty addressed his men in the square of Saint Peter's: "I offer you hunger, thirst, cold—no pay, no barracks, no rations—forced marches, bayonet charges, battles, death. Whoever loves Italy in his heart, and not with his lips only, let him follow me! We leave from the Lateran gate." Four thousand men followed him.

Geneviève. The patron saint of Paris. About 450, news reached Paris that Attila the Hun was approaching. The people would have fled, had not Geneviève stood on the bridge over the Seine and urged them to return and to pray for and defend their homes. A present arrived at that moment for her from the bishop Germanus, and the people were so impressed that they turned back. Attila never reached Paris, but was stopped at Chalons.

Later the city was besieged by the Franks and was suffering cruelly from hunger. Geneviève embarked in a small boat on the Seine river, begged

the people outside to send food, and brought into the city a convoy of boats laden with provisions. The Franks did not molest her, apparently believing her person to be sacred.

On another occasion, when the Franks had taken Paris while Geneviève was outside, the chief of the Franks gave orders that she should not be admitted into the city since he feared her power. Dressed in a shepherdess' gown, she entered unnoticed and, making her way to the spot where the chief was holding revelry, she begged for the safety of the citizens and of the prisoners that had been taken. Her prayer was granted. She lived to see Clovis, the king of the Franks, embrace Christianity.

Golyer's Ben and the Indians. Before the days of railroad travel in the Western states, one of the regular stage routes was covered by Golyer's Ben, an intrepid young man whose real name was unknown and who was called Golyer's because he had worked for a man named Golyer.

On one occasion, a child recently orphaned was being taken on the stage to relatives who had volunteered to care for him. He wished to sit with Golyer's Ben, who made a place for him on the driver's seat. When the coach was nearing the end of the day's trip, the air was suddenly rent with the fierce yells of Indians. The driver, crouching down to cover the body of his companion, urged on the horses through the hail of bullets that the Indians sent after their escaping victims. When the stage reached its destination, the passengers were all found to be safe, including the child, but the driver had been pierced by three bullets. He expired shortly, having saved the life of his young charge.

John Maynard. The pilot of a passenger steamer on Lake Erie whose heroism saved all on board. The incident occurred before the general use of effective safety devices on steamers.

One night when his ship was plying at some distance from the shore, fire broke out near the bow. The captain gave orders to steer for the shore. The lifeboats were hastily manned but were found unseaworthy. The only remaining hope was that the ship might traverse the intervening three miles of water and come to shore before the flames overcame those on board. Twice the pilot house took fire, but the conflagration was extinguished by means of fire hose. The hose burst later and, when the ship was safely beached, the flames were wreathing about the pilot house. John Maynard was seen to be still clinging to the wheel, but he was dead. The passengers were all taken safely ashore.

John Paul Jones and the Bon Homme Richard. The conflict between the English *Serapis*, under Captain Pearson, and the American *Bon Homme Richard*, commanded by John Paul Jones, on September 23, 1779, is famous in naval annals for the bravery of both commanders. The daring of Captain Jones won the battle. With his old and rotten ship riddled below the water line, four feet of water in the hold, all guns but three silenced, the intrepid captain heard amid the smoke and hail, "Have you struck?" Instantly he replied, "I have not yet begun to fight." Matching the word with the deed, by seizing a favorable chance, he boarded and captured the *Serapis*, while the *Richard* sank with colors flying.

Kate Barlass. A name given to Katherine Douglas, a maid of James I of Scotland, in allusion to her brave attempt to save the king.

When the king was staying at the abbey in Perth and his men were scattered about the city, certain conspirators bribed the servants of the abbey to leave the door unbarred. That night a noise of arms was heard. The king surmised his danger and concealed himself beneath some boards in the floor. In order to obtain time for the replacing of the boards, Katherine placed her arm in the bolt rings of the door, thus replacing the missing barlass, or bolt. At the same time she begged the men to keep out since only ladies were in the room and they were disrobing. The conspirators, however, forced open the door, thereby breaking the maid's arm. The king was discovered and murdered.

Lafayette in Prison. In the course of the French Revolution, the Jacobins dismissed Lafayette from the army, declared him an exile, and offered a reward for his capture. While attempting to escape to America, he was taken at Liege and was then imprisoned in Germany. When he fell ill in prison, he was offered freedom on condition that he would join in a plot against France. His heroic reply, which brought him long confinement in an Austrian prison, was "Never! I am still Lafayette."

Laura Secord. A Canadian heroine of the War of 1812. In the Niagara campaign of 1813, after the American advance had been halted at Stony Creek, 500 British regulars and Indians were stationed at Beaver Dams, between Stony Creek and the Niagara river. The words of the American commander, who was planning a surprise attack on Beaver Dams, were overheard by Secord, a wounded Canadian officer residing at Queenston. The information was imparted to his wife, Laura, who straightway undertook to pass through the American lines in order to warn the British forces at Beaver Dams. She avoided suspicion by driving a cow before her until she reached the forest, through which she hastened for a distance of 20 miles despite danger from Indians and hostile soldiers. Her warning was delivered before the attack took place and enabled the British force to capture the larger American detachment.

Madeline de Verchères. A French Canadian girl who held a fort near Montreal against a large force of Iroquois Indians about the year 1700. Her father had been in command of the fort, but he and nearly all his soldiers were captured by the Indians, who had surprised them while gathering their harvest outside the fortifications.

Besides women, children, and a man aged 80 years, the occupants of the fort consisted of five people capable of shooting—two soldiers, two boys, sons of the former commander, and their elder sister Madeline, then 14 years of age. Madeline closed the doors, prevented the two soldiers from blowing up the fort as a measure less terrible than being captured, and had the defenders open fire on the Indians. She also fired the fort's cannon as a signal of distress. The Iroquois, believing the fort to be well guarded, fell back but continued the siege.

Later on the same day, a French settler with his family was seen to be approaching the fort, ignorant of the immediate presence of the Indians. Madeline marched boldly out of the fort, her gun on her shoulder, met the party on the river bank, told them to follow her without showing haste, and conducted them safely into the barricade.

For seven days the defenders remained continuously at their posts. Finally, a French relief party arrived from Montreal, whither the distress signal had been relayed. The besiegers were scattered and their French prisoners were recovered. Madeline was rewarded with a pension by the governor of Canada.

Some years later, she saved the life of M. de la Perade from Indians who were crossing her father's seigniory to attack the white settlers. She married the man whom she rescued on this occasion. Her father's seigniory, being in an exposed position, was known as Castle Dangerous, and, for this reason, Madeline is frequently called "the heroine of Castle Dangerous."

Maid of Saragossa, The. A heroine of Spanish history, Agustina by name. In the siege of Saragossa by the forces of Napoleon in 1808-09, Agustina's lover was slain. She took his place in the artillery and served with great heroism until the city was forced by famine to capitulate.

Man Who Saved Saint Helier, The. Edward Touzel, a carpenter connected with the fort at Saint Helier, in the island of Jersey, preserved the town from a disastrous explosion on June 4, 1804. A celebration of the coronation of King George IV of Great Britain took place on that day, and the sticks dipped in brimstone, by means of which the guns of the fort had been fired, were returned and locked in the powder magazine.

In the evening, smoke was noticed issuing from beneath the great door of the magazine. Edward Touzel, asking his brother Thomas to hasten to the commander for the keys, seized a crowbar and, with the help of a soldier named Ponteney, forced open the door. The sticks had taken fire, but he carried them out at the cost of severe burns. At the same time, the soldiers of the fort brought water and succeeded in extinguishing the flames that were already curling ominously about the barrels of gunpowder.

Men of the Birkenhead, The. Of the many instances of heroism exhibited during shipwrecks, one of the most impressive is that which occurred off the west coast of Africa in 1852, when the steamer *Birkenhead* struck a hidden rock and foundered. The ship was carrying a detachment of soldiers intended for garrison duty in South Africa, and with them were a number of women and children.

The small boats had been launched and had pushed off with the women and children. The ship broke in two, and the captain called to the soldiers to swim for the boats. The military officer, however, seeing that to do so would swamp the boats and mean the death of all, kept the soldiers drawn up in their ranks. As the ship sank lower, they calmly and heroically awaited death in the engulfing waves.

Oates and the South Pole Tragedy. Captain Scott's party reached the south pole on January 18, 1912, a few weeks after Amundsen had won the honor of its discovery. The expedition had encountered such difficulties that all the pack animals had been lost or killed before arrival at the pole. The return journey without the help of dogs was likely to be beyond human endurance.

L. E. G. Oates was taken sick after some weeks of traveling. Perceiving that delay might cause the death of the whole party, he arose unobserved, and, leaving the shelter where his companions slept, he wandered out into the night in order to court death in the blizzard. This sacrifice proved unavailing, however, for the whole party perished later a few miles from a relief post. The diary of Captain Scott, narrating this incident, among other records, was recovered by a search party and was made the basis of a recent book entitled *The Worst Journey in the World*.

Perry at the Battle of Lake Erie. Among the many heroic exploits of American naval officers and men, that of Commander Oliver Hazard Perry in the battle on September 10, 1813, is unique. When, after desperate fighting, his flagship, the *Lawrence*, was hopelessly shattered, Perry seized his blue ensign, bearing the legend "Don't Give Up the Ship," and, with eight men and his 12-year-old brother, made his way in a small boat, among the battling ships, to the *Niagara*. Commanding from this vessel, within a few minutes he forced the British to surrender their fleet. "We have met the enemy and they are ours—two ships, two brigs, one schooner, and one sloop," was Perry's report concerning the battle.

Regulus (*rĕg'ū-lŭs*). A Roman general who became a type of heroic endurance and of patriotism. In 255 B. C., he was defeated near Carthage and was taken prisoner. According to a later account, he was kept in prison for two years and, after a defeat of the Carthaginians by the Romans, was sent to Rome on parole to negotiate a peace or to effect an exchange of prisoners. Before leaving Carthage he was compelled to swear that he would return in case he was unsuccessful in persuading his compatriots at Rome.

On arrival in Rome, Regulus urged the Senate that they should continue the war and dissuaded them from exchanging the numerous Carthaginian officers for him, whose strength had already been undermined in Punic prisons. True to his oath, he then returned to Carthage, where he was tortured to death.

Robert Emmet. The character of Robert Emmet is a favorite with his countrymen. Particularly famous is his heroic speech before the court that condemned him to death. The revolt which he led in Dublin having failed through treachery, he turned back in flight to see his sweetheart, Sarah Curran, who had refused to go to America with him. Betrayed and captured, he refused to defend himself in court lest Miss Curran's name be dragged in. "What have you to say?" asked the clerk when the verdict of guilty had been rendered. Then, facing ignominious death, Emmet's defiant eloquence in the cause of liberty blazed out in a historic speech, which closed with the words, "When my country takes her place among the nations of the earth, then, and not till then, let my epitaph be written."

Sergeant York. An American hero of the World War. In the battle of the Argonne forest, October 8, 1918, the body of troops in which York was a sergeant was ordered to attack a German position. The expected barrage, which was to prepare the way for their advance, failed to take place, and the charging troops were decimated by the German machine guns. Sergeant York and 17 other survivors made their way to a German machine gun nest. Most of the 17 were killed or wounded, but York himself succeeded in capturing the whole German body of about 90 men. Then, marching his prisoners before him toward a second machine gun stronghold, he captured that also, taking in both places a total of 132 captives.

Marshal Foch stated that this feat was the greatest thing accomplished by any noncommissioned soldier of all the armies in Europe. On his return, Sergeant York received a farm in his native state of Tennessee and a York foundation was established at his request, the proceeds of which were to be used for the support of primary schools in the mountains of Tennessee.

Stephen Girard, Hospital Nurse. It was during the terrible epidemics of yellow fever in Philadelphia in 1793 and 1797 that his fellow citizens discovered the true nobility in the character of the great merchant Stephen Girard. His reputation had previously been that of a cold, heartless moneymaker. When the epidemic of 1793 broke out, however, he not only gave liberally of his wealth, but entered the hospitals himself, risking all the danger of infection, and tenderly nursed the sick. During the second scourge of the fever, Girard again gave his services courageously. To hundreds of children orphaned by the plague he became a second father, and out of this interest grew his purpose which found expression in the establishing of Girard college.

Vincent de Paul. This French priest, known as the slaves' friend, had learned by experience in northern Africa the hard lot of a slave. After his escape, he visited a gang of convicts on a galley at Marseille. Seeing a broken-down man in chains, Vincent was so moved with pity that he offered to take the man's place. The guard agreed, and the priest became a galley slave. Though he was soon released, the hardships then suffered affected him for many years. The remainder of his life was devoted to ameliorating the lot of convicts and slaves, and he founded the orders of the Lazarists and the Sisters of Charity.

SOBRIQUETS AND NICKNAMES

THESE terms refer to names given in place of real names. They have much the same meaning, although their origins are diverse. Sobriquet is a French word of uncertain derivation; it is sometimes explained as having originally meant an affront. Nickname is derived from an Old English term *ekename*, "additional name," or "surname." "An ekename" was pronounced like "a nekename," just as, in conversation, "an ice man" is easily confused with "a nice man." The form nekename later became nickname.

Nicknames may express derision, affection, sportive familiarity, or various other feelings. They arise in ways too numerous to catalogue, but their essential features are that they should be graphic and should have a certain inevitable fitness about them which makes their use contagious and enduring.

Sobriquets may be applied, not only to individuals, but, in some cases, to nations or to an imaginary person typifying a nation, such as Uncle Sam, Jack Canuck, or John Bull. A particular type of person also is frequently designated, in malice or otherwise, by some picturesque name, such as Bluestocking. The more common sobriquets of these and other types will be found in the following section, in which also, wherever possible, their origin, application, and explanation are stated.

Almighty Dollar. The earliest use of this Americanism is attributed to Washington Irving. It is to be found in *A Creole Village*, published in 1837. The phrase pungently expresses the old idea of the power of wealth. Ben Jonson is credited with a similar phrase, "almighty gold."

Amen Corner. A small locality in the neighborhood of Paternoster Row, London, England. In Pre-Reformation days a procession of clergy and people on the feast of Corpus Christi foregathered at the end of Cheapside. There the first two words of the Our Father, or Paternoster, were intoned, and the prayer continued as the procession passed through the full length of the street. When the Paternoster came to an end and the word Amen was sung, the procession stopped to turn down Ave Maria Lane. Hence the stopping place came to be called Amen Corner.

American Sphinx. One of numerous nicknames applied to General Grant on account of his uncommunicative, enigmatic attitude while in command of the army during the Civil War.

Anzac (*ăn'zăk*). A composite word made from the initials of the Australian-New Zealand Army Corps, the British troops whose gallant, though unsuccessful, attempts at Gallipoli form one of the most brilliant pages in the history of the World War.

Apostate, The. The Roman emperor Julian (331–363) was so designated by Christian writers, and the sobriquet has since become virtually a surname of the ruler. He had been educated as a Christian but renounced that religion in favor of Neoplatonism and tried to restore the pagan worships in the Roman Empire.

Apostle of Free Trade. Richard Cobden (1804–65) was so called because of his effective advocacy of the policy of free trade in England.

Attic Bee. This sobriquet has been often applied in ancient and modern times to Sophocles, the Athenian dramatist. Athens is situated in Attica, and the word bee alludes to the sweetness of Sophocles' poetry. Plato also is sometimes so designated.

Beggars. A nickname applied to deputies in Holland who protested against the establishment of the Inquisition in 1556. The name was later adopted by the Dutch patriots.

Black Friday. Good Friday; so called from the black vestments worn by the clergy on that day. The term has also been applied to any Friday on which some public calamity has happened. In England, Dec. 6, 1745, the date of the Pretender's landing in London, was called by this name. In the United States, Sept. 24, 1869, and Sept. 19, 1873, occasions when great financial panic occurred, were each known as Black Friday.

Black Maria. A term used colloquially both in England and in the United States to denote the closed van, or wagon, in which prisoners are conveyed to or from jail.

Black Monday. In English history, the name given to Easter Monday, April 14, 1360, when numerous soldiers in the army of Edward III died from cold before the city of Paris. English schoolboys apply this name to the first Monday after the long vacation, when they are forced to resume studies. The term is applied also in reference to Monday, March 30, 1209, when the Irish made an onslaught on the English settlers in Ulster and put some thousands to the sword.

Blighty. A corruption of a Hindustani word used to designate England or Europe in general. During the World War, it was introduced into the British army by troops who had seen service in India. It gained popularity at once with the rest of the British "Tommies," who thereafter used "Old Blighty" as the slang term for their native land.

Blood and Iron, The Man of. A nickname of Prince Bismarck, taken from a phrase in a speech delivered by him in 1862.

Bluestocking. Applied to one, particularly a woman, who makes a pretentious or unnecessary display of erudition. The expression, it is said, originated in Dr. Johnson's time from the fact that Mr. Stillingfleet invariably wore blue stockings when attending Mrs. Vesey's or Mrs. Montagu's celebrated literary receptions.

Bobby. See *Peeler*.

Boche (*bôsh*). A term applied to the Prussians by the French soldiers at the beginning of the World War to signify "barbarian." It may possibly be an abbreviation of the Alsatian word *Alboche* meaning "German." Zola in his novel *La Débâcle* makes the French soldiers of the Franco-Prussian war use it in referring to their enemies. The more likely origin of the term seems to be the French word *caboche*, which means "fathead" or "thickhead." A very old slang phrase among schoolboys, *tête de boche*, signifying "blockhead," confirms this derivation.

Bohemian. This term is applied to an artist or a literary person who leads a free and easy life and gives but little heed to the conventions of society. Ignoring its distinctions and despising its formalities, his heart and studio door are ever open to friend and stranger alike.

Bonaparte of Politics. A sobriquet which attached to William McKinley because of his resemblance to Bonaparte in figure and manner.

Boy Orator. This sobriquet and also the longer one, "Boy Orator of the Platte," were applied to William Jennings Bryan, on his entrance into national politics, in reference to his remarkable oratorical power and his youth. The longer phrase carries reference to his home state, Nebraska, in which the Platte river is an important stream.

Brother Jonathan. A nickname used in England to designate an American of the United States. Its origin is obscure and has never been satisfactorily explained.

Buffalo Bill. The well-known sobriquet of William F. Cody. It is said that the name was applied to him in consequence of his success in supplying immense quantities of buffalo meat to the construction gangs when the Union Pacific railroad was being built.

Canuck or **Jack Canuck.** A type name applied to Canadians. It referred earlier to Canadians of French descent, but outside Canada, and recently in Canada, its application has widened to include any inhabitant of that country. The origin of the name is uncertain. Some scholars derive it from an Indian word; others say that it was originally applied by the French to the English and is a corruption of Connaught.

Carpet Knights. Civilians knighted in the old days were so called because they received this honor in times of peace as they knelt on a carpet before the king in his royal chamber. They were also known as "knights of the green cloth" to distinguish them from warriors who were dubbed knights on the field of battle. The expression as now used is one of contempt to denote the drawing-room or easy-chair soldier who wins all his battles "on the carpet."

Cincinnatus, The American. A sobriquet of George Washington, given in allusion to his services in saving the country like the Roman statesman Cincinnatus, who was called from his agricultural labors to be dictator of Rome.

Commoner, The Great. The sobriquet by which William Pitt, Earl Chatham, is best known. It was occasioned by his outstanding skill and authority as a leader of the English House of Commons in the middle of the 18th century.

Czar Reed. This title was given to Thomas Brackett Reed, former speaker of the House of Representatives. He won it by his ruling that all members present, though not voting, should be counted toward a quorum.

Dircæan (*dûr-sē'ăn*) **Swan.** This name has been frequently applied to Pindar, the Greek lyric poet who flourished in the early 5th century B. C. He was born in Bœotia near the fountain of Dirce and was called a swan because this bird was sacred to Apollo, the father of the Muses.

Dixie. A popular name used to designate the southern United States. Various origins have been put forward for the name, but none seem to be authentic. The most plausible, however, is that to be found in the folklore of old New York, which shows that Manhattan island was called Dixie Land by the Negroes in the early 19th century. Dixie was a slave owner on the island and was a kind and beneficent master; hence Dixie, or Dixie's Land, among the Negroes came to mean paradise. When sentiment for abolition began to grow, Dixie sent many of the slaves south. They bitterly regretted the change and expressed a longing to remain in "Dixie's Land." Their distress inspired D. D. Emmett in 1859 to compose the famous "Dixie" ballad, which afterward became the war song of the Confederates.

Dumb Ox. The sobriquet given to Saint Thomas Aquinas by the Dominican novices in the monastery at Cologne. They found the nickname well suited to the young monk, who was shy, retiring, and somewhat rotund. On one occasion, however, Albertus Magnus, their master, interrogated him on some very deep and abstruse metaphysical problems. The answers given by Thomas displayed so profound an intellect that the great master, addressing the other students, said: "You call him 'the dumb ox'; one day his bellowing will be heard throughout the world."

Easy Boss. The American politician Thomas Collier Platt (1833–1910) earned this title by the lack of ambition for wealth or preferment which he displayed in spite of the fact that he dominated Republican politics for many years.

Expounder of the Constitution. A sobriquet of Chief Justice John Marshall. Its appropriateness was due to his great influence in determining the interpretation of the Constitution.

Eye of Greece. The ancient city of Athens has been so designated because it was long the center of the brilliance and intellect of the Greek world.

Father of His Country. The most popular of the sobriquets applied to George Washington. It is said to have been used of him first in an almanac printed at Lancaster, Pa., in 1799.

This name, it should be noted, has been applied to many national heroes in the course of history. The first instance of its use within strictly historical times is the application of the title *Pater Patriæ* to Cicero by the Roman Senate.

Father of History. Herodotus was so called because he was the earliest writer to raise historical narrative to the level of literature. The name was first applied by the Roman orator Cicero.

Fourth Estate. A term analogous to the *tiers état*, "third estate," of the French Revolution period. Fourth estate is used humorously to designate the press, the laboring classes, or other elements of a state which exercise a great, but unofficial, power in politics.

Gadfly of Athens. A term applied to Socrates. It arose from a simile attributed to him when on trial for his life. According to Plato's account, Socrates declared that, in rousing the Athenians from intellectual apathy by means of questioning, he was like a gadfly stinging a lazy horse into activity.

Gods, Gallery. In the old days, the ceiling of the Drury Lane theater, London, was painted to represent a blue sky with clouds and the conventional cupids and cherubs disporting themselves thereon. Since the ceiling extended over those seated in the gallery, such occupants were said to be "among the gods." Subsequently, "the gods" or "gallery gods" came to mean those who occupied the uppermost seats in any theater.

Golden Mouthed. The Greek church father Saint John received the surname Chrysostom, "Golden Mouthed," because of his conspicuous oratorical ability.

Grand Old Man. A sobriquet of William E. Gladstone. It expresses the affectionate admiration inspired by his long career of political leadership in England.

Gringo. A contemptuous term applied by Spanish Americans to foreigners, especially to Englishmen or to Americans of the United States. The word is from the Spanish meaning gibberish, or unintelligible speech, and is possibly a variant of *Griego*, the Spanish word for Greek.

Honest Old Abe. This is perhaps the most widely known of the sobriquets applied to Abraham Lincoln. During the Civil War, the Confederates applied to Mr. Lincoln the term "Old Abe," and to the Negroes he was "Uncle Abe."

Iron Duke. This sobriquet was conferred on the Duke of Wellington to express admiration for his determination and vigor that resulted in the victories over Napoleon's forces in Spain and at Waterloo.

Jingo. This word has been found within recent years to be a transliteration of a Basque word *Jinko* which means "God." It is not at all improbable that *by jingo* was heard as an oath among the Basques by British sailors in foreign parts. The word came into especial prominence in the year 1878, when Disraeli, then English prime minister,

announced his resolution of defending Turkey against the advance of Russia. In a topical song composed at the time, and sung by "the Great Macdermott," occurred these lines:

"We don't want to fight, but by jingo, if we do,
We've got the ships, we've got the men, we've got the money too."

In a flash, the expression became a happy catchword for the opponents of Disraeli, whose followers there and then were christened Jingoes and whose policy thereafter was known as jingoism. The word still retains this meaning of national aggressiveness and braggadocio.

John Bull. A popular nickname for England and the English people. It was used first by Arbuthnot in the title of his satire *The History of John Bull*, published in 1712. F. C. Gould, the celebrated cartoonist of the *Pall Mall Gazette*, has long since made the figure of John Bull familiar. He is depicted by the artist as a stout old gentleman, wearing a "tile" hat, cutaway coat, riding breeches, and boots.

Kickshaws. A corruption of the French word *quelquechose* meaning "something" and analogous to *vol-au-vent*, a light and airy trifle which a breath of wind can blow away. It is used half contemptuously of certain dainty and delicate French dishes which fascinate the eye but give no substantial support to the "inner man."

King Maker. The earl of Warwick was so designated because of his decisive influence in the Wars of the Roses. He succeeded in having Henry VI deposed in favor of Edward IV, whom he later drove from the country and supplanted by restoring Henry VI to the throne.

Last Cocked Hat. This nickname was applied to President Monroe in reference to his being the last of the presidents to wear the characteristic hat of the Revolutionary period.

Laughing Philosopher. The Greek philosopher Democritus was so called. He believed all happenings in the universe to be dependent on the mechanical interaction of atoms. He therefore regarded the drama of mankind's activities as a mere puppet show, in which the actors thought they moved themselves and followed their own purposes, but Democritus, believing that he and Nature knew better, is said to have professed ceaseless amusement at the spectacle.

Lion of Sweden. Johan Gustafson Banér, a Swedish field marshal (1596–1641), was so called because of his military prowess.

Lion of the North. The sobriquet of Gustavus Adolphus of Sweden (1611–32), whose extraordinary successes in the Thirty Years' war made this appellation appropriate.

Little Corporal. A sobriquet applied to Napoleon Bonaparte after the victorious battle of Lodi in 1796. On this occasion, Napoleon, who was only 5 feet, 2 inches tall and had begun his career as a corporal, led his troops across a bridge against a greatly superior number of Austrians.

Longshanks. The nickname of Edward I, king of England, 1272–1307. He was a tall man with long legs.

"Mad Anthony" Wayne. The popular nickname applied to General Anthony Wayne during the Revolution on account of his energy and reckless daring.

Maiden Queen. This name is frequently applied to Queen Elizabeth, who ruled England from 1558 to 1603. Disregarding the wishes of her advisers, she persistently refused to choose a husband.

Maid of Orleans. The name given to Joan of Arc after the relief of Orleans in 1429.

Mantuan Bard. So Virgil is often called in allusion to Mantua, his birthplace.

Mill Boy of the Slashes. A popular nickname applied to Henry Clay. It originated in his boyhood, when he was frequently seen driving a donkey on which was loaded a bag of meal being brought to his home from a mill on the Pamunky river. His home at that time was situated in low, marshy ground, known as slashes.

Old Hickory. The nickname is probably the earliest of the numerous names applied to Andrew Jackson. The use of the name is traced to the soldiers under his command in 1813, who, observing his endurance, remarked that he was as tough as hickory. The sobriquet developed from this beginning.

Old Lady of Threadneedle Street. The humorous appellation given to the Bank of England, obviously from its location in a street formerly called Three Needle street. The name of the street owes its origin, according to some authorities, to the circumstance that the Merchant Tailors' Company have their hall in it; others trace the name to the three needles on the coat of arms of the Needlemakers' Company in Crooked lane.

Old Man Eloquent. His eloquent defense of the right of petition in Congress occasioned the application of this sobriquet to John Quincy Adams.

Old Rough and Ready. General Zachary Taylor, president of the United States, 1849–50, was so called by his soldiers during the Mexican war.

Pearl of the East. Zenobia, queen of Palmyra, was so designated. A closely allied sobriquet, Pearl of the East Indies, is applied to Java in allusion to its natural beauty.

Peeler. A nickname given by the Irish to the police constabulary formed under the secretaryship of Sir Robert Peel (1812–18). It was thereafter applied to policemen in England until 1828, when Peel, who was then home secretary, introduced the new Metropolitan Police act. The former slang name then was changed to "Bobby," the perversion of Peel's first name, which is now regularly used in England to designate a policeman. In Ireland, however, the old name "Peeler" still obtains.

Perfidious Albion. In the French form *Albion perfide*, this appellation is said to have been applied to England by the emperor Napoleon I, who thereby expressed his attitude toward his chief antagonist. Albion was an ancient name for the island of Britain, probably derived from the Latin *albus*, "white," and applied in allusion to the white chalk cliffs on the southeastern coast of England. The name Albion is still often used in poetry to designate England.

Plumed Knight, The. The striking sobriquet applied by his admirers to James G. Blaine. It was first used in 1876 as a rhetorical comparison in a speech by Robert G. Ingersoll when nominating Blaine for the presidency.

Prince of Sceptics. This name is frequently applied to Voltaire, who rejected Christianity and devoted his life to the crushing of the spirit of intolerance which characterized the Church of his day.

Printer's Devil. A term applied to a young apprentice who does the odd chores in a printing office. The innocence of a black appearance resulting from printer's ink has alone earned for him this invidious appellation. In England a junior legal counsel serving a barrister without pay, or any literary hack, is likewise referred to as a "devil."

Rail-Splitter. The origin of this sobriquet of Abraham Lincoln is traceable to the Republican state convention in Illinois in 1859, when two rails said to have been split by Thomas Hanks and Abraham Lincoln were presented to the convention. The nickname immediately became popular.

Rare Ben. Ben Jonson is often so referred to in allusion to Shakspere's words, "O, rare Ben Jonson!"

Roe and Doe. The names given to fictitious parties in a suppositious case devised by Chief Justice Rolle in the reign of Edward III of England. By the framing of this imaginary lawsuit between Richard Roe and John Doe, a plaintiff who claimed title was saved the costly procedure of a *real action* against the wrongful possessor of an estate and could sue through the simple *action of ejection*. Hence arises the expression "John Doe proceedings."

Roorbach or **Roorback.** A libel, or falsehood of a defamatory nature, used for political ends. The word had its origin in the election of 1844, when a forgery of this nature was published to the detriment of James K. Polk, a candidate for the presidency. The slanderous report was supposed to be an extract from the *Travels of Baron Roorbach*, but was later traced to G. W. Featherstonhaugh's *Tour*, whence the malicious statement had been drawn by a newspaper writer named William Linn.

Roughrider. The sobriquet applied to Theodore Roosevelt in reference to his organization of the so-called Roughriders, a regiment of volunteer cavalry in the Spanish American war.

Sage of Monticello. This sobriquet of Thomas Jefferson contains an allusion to his Virginia estate and his great reputation for statesmanship and political wisdom.

Scourge of God. The terror aroused in Europe by Attila the Hun in the 5th century is reflected in this appellation applied by medieval writers to that conqueror.

Serpent of the Nile. Cleopatra has been so called. In the 1st century B. C., she ruled Egypt, the habitable part of which is confined to the vicinity of the Nile river. A serpent was the ancient symbol of Egyptian royalty.

Sir Veto. The name applied to Andrew Johnson because of the unusual number of his vetoes of Congressional bills.

Son of Liberty. A sobriquet of John Adams occasioned by his direct descent from some of the first New England immigrants.

Spellbinders. A sobriquet which seems to have assumed its particular present day sense of a political orator during the presidential campaign of 1888. It is said to have been applied by a member of the Republican national committee to speakers who reported that they held their audiences "spellbound."

Swan of Avon, Sweet. A name sometimes applied to William Shakspere, who was born at Stratford on Avon. The swan is traditionally a bird sacred to the Greek god Apollo, who was the father of all the Muses, and its song is accordingly regarded as due to inspiration from the god. The epithet was used first by Ben Jonson.

Teddy. The most popular of the several nicknames applied to Theodore Roosevelt during his vigorous career.

Tenth Muse. This sobriquet is often applied to women poets and, by implication, raises them to the dignity of the nine muses of Greek mythology. The earliest and most appropriate use of the term was that made by Plato, who so designated the Greek poetess Sappho.

Tiger. The famous French statesman, Georges Clemenceau, earned this sobriquet early in his career. It was applied to him because of his watchful, dangerous, and relentless character in political conflict. The fitness of the name was emphasized by the determined patriotism he exhibited as a publicist and as premier of France during the World War.

Tippecanoe. The popular nickname applied to William H. Harrison during the campaign which resulted in his election to the presidency. The name refers to his military success at the battle of Tippecanoe, Nov. 7, 1811.

Tuxedo. A name given to the ordinary dinner jacket and said to have originated with a country club at Tuxedo Park, New York.

Uncle Joe. Joseph Gurney Cannon received this familiar name in the course of the 46 years which he spent as a member of Congress.

Uncle Sam. A sobriquet for the United States, which probably originated during the War of 1812. A commissarial contractor named Ebenezer Anderson had his store yard at Troy on the Hudson. Samuel Wilson, who, with his brother, superintended the examination of provisions, was known as "Uncle Sam" among the workmen. As each case or package of provisions was passed, it was marked with letters EA—U. S. A wag among the longshoremen, being asked what the initials meant, replied that they stood for Ebenezer Anderson and "Uncle Sam." The joke spread at once throughout the country. The name since that time has passed current as a personification of the United States among other countries.

"Uncle Sam" appeared in caricature before the Civil War in various guises. It is probable that the present conception of him, which began to appear in cartoons about 1880, had its inspiration in the tall, gaunt figure of Abraham Lincoln.

Unconditional Surrender. The sobriquet applied to General Grant on account of his famous message to the commander of Fort Donelson in 1862, "No terms other than unconditional and immediate surrender can be accepted."

Watchdog of the Treasury. William Steele Holman, long a member of Congress from Indiana, earned this title by his persistent opposition to unnecessary appropriations.

Weeping Philosopher. The Greek philosopher Heraclitus was so described, who, in the early 5th century B. C., taught that there is nothing permanent except change. The realization of the transient character of all things human produced in him a sadness memorialized by this sobriquet.

Whig and **Tory.** Names applied to political parties in British and early American history. Whig was originally an opprobrious term, being derived, it is said, from the Scotch word for whey. Tory is derived from the Irish *Tar a Ri*, "Come, Oh King!" The Tories were Royalists.

Wisest Fool in Christendom. This appellation, first applied to James I of England by the French statesman Sully, attained wide celebrity. It expresses the combination of the king's considerable range of learning and his notable weakness of character.

Wizard of Kinderhook. A nickname applied to Martin Van Buren in reference to his reputation for political sagacity and skill.

Yankee. Throughout the British Empire, this name is applied to any inhabitant of the United States. In its narrower meaning in America, however, it is limited to the people of the New England states. During the Civil War, the name was applied generally to Northerners. Various derivations have been given to account for the origin of the word. It has been traced to a corrupt pronunciation of the word *English* or the French word *Anglais* by the North American Indians; also, and more appropriately, to the Scotch word *yankie*, meaning "shrewd, sharp, clever." A more probable source still, however, is that of the Dutch diminutive *Jankin*, "Johnny," a name which the Dutch settlers of New York gave to the English colonists of Connecticut.

NATIONAL AND STATE EMBLEMS

THE human sentiments of fealty to rulers and of tribal or national loyalty have been embodied in many different symbols. On the other hand, for rulers and reigning houses there have been evolved, through the science of heraldry, elaborate emblems and arms. Heraldry has devised an extensive and intricate system of patterns and colors by which to depict the relationships and the history of families.

In the Old World, national coats of arms have often combined the personal emblems of rulers with symbols of the composition and the authority of the state. Primitive tribes had their totems, or figures of animals or birds, which served as tribal symbols. These emblems carried more or less religious meaning. In the ancient Eastern nations, the emblem of the ruler was frequently some animal form which represented a deity.

For the Romans, the *fasces*, or rods, of the lictor became the symbol of civil authority, while the eagle was adopted as the sign of the conquering might of Roman legions. Both these symbols have persisted down to modern times. The official seal of France, for example, carries a seated female figure representing the republic, bearing the fasces. Recent coinage of the United States bears the same emblem.

The eagle and the lion have been the favorite animal emblems of European states. The Byzantine emperors adopted the double-headed eagle as representing their sovereignty over the East and the West. The black double-headed eagle was the emblem of the former Austrian and Russian empires. Montenegro also made it the chief feature of her national arms. Imperial Germany and Italy use the single black eagle; the arms of Serbia bear a silver eagle. In the New World, Mexico and Chile each show a gold eagle in their official arms.

American Eagle, The. The white-headed or bald eagle is the emblem on the coat of arms of the United States, and is also the adopted badge of the order of the Cincinnati. Owing to the alleged cowardice and predatory habits of the white-headed eagle, Benjamin Franklin is said to have expressed regret that it had been chosen as America's national emblem. Geographically, however, the choice of this bird is appropriate, since its habitat extends over the whole of North America, so that veritably it is the American eagle.

Among European states, the lion as a heraldic device symbolizes power and has shared honors with the eagle. The arms of Great Britain, Belgium, Bulgaria, Holland, and Norway bear each a golden lion; those of Denmark carry blue lions; while those of Spain bear a red lion. Rumania and Sweden have in their arms both an eagle and a lion. On the arms of Czechoslovakia, two gold lions support a shield, in the quartering of which appear eagles. In the middle ages, travelers' stories about the courage of a fabulous animal called the unicorn, from the one horn in its forehead, were widely current. Belief in these tales doubtless accounts for the adoption of the unicorn into the royal arms of Scotland and its incorporation in the British arms after the union of the kingdoms of England and Scotland.

Latin American states have generally avoided in their emblems all suggestions of Old World royalty. In their official arms, the liberty cap and flags frequently appear. For Bolivia, Colombia, and Ecuador, the condor, native to these countries, takes the place which the eagle holds in the heraldry of other nations.

Greece and Switzerland have a cross as the chief emblem in their arms, the former silver, the latter white. In Japan, the imperial emblem is the golden chrysanthemum. The national emblem of China is very complicated, its central element being a hatchet, with a flowery bird on the right and a green dragon on the left.

By accident or design or through association with some great event, a flower, a leaf, or a plant—the commonest thing growing near to hand—has frequently been chosen for a nation's emblem. The following list gives those that by tradition have come to be regarded as emblems of various nations.

Canada	Maple Leaf
China	Narcissus
Egypt	Lotus
England	Rose
France	Fleur-de-lis
Germany	Cornflower
Greece	Violet
India	Lotus
Ireland	Shamrock
Italy	White Lily
Japan	Chrysanthemum
Mexico	Nopal Cactus, or Prickly Pear
Persia	Rose
Scotland	Thistle
Spain	Pomegranate
Switzerland	Edelweiss
United States	Goldenrod (by popular choice)
Wales	Leek

NATIONAL FLAGS

Flags appear to have been originally heraldic ensigns, that is, pieces of textile material of a shape convenient for bearing a representation of the armorial insignia of persons of distinction. The word flag is of uncertain origin. It is common to Teutonic languages, but was probably first recorded in English in the 15th century. Ancient nations had a great variety of emblems which were borne in battle by their armies. The Romans had a cavalry flag, termed *vexillum*, which was a square piece of cloth attached to a bar of wood fixed crosswise on a spear. The *labarum*, or standard of the later emperors, somewhat resembled the vexillum. The use of bunting, silk, or other textiles as the special material for military ensigns, however, is a development of the middle ages.

The designs exhibited upon these early medieval flags were almost entirely of a religious character. Crosses of various forms were frequently used, and these persist in several modern flags. It has been suggested that the three points which appear upon many flags shown in the Bayeux tapestry were emblematical of the belief in the Trinity, professed by those who carried these standards. The celebrated *oriflamme* of France was originally the flag of the abbey of Saint Denis. It seems to have been a plain red ensign.

During the middle ages, three varieties of flags were clearly distinguished. The *pennon* was the personal ensign of a knight simple. It was usually swallow-tailed, or forked, in shape. The *banner* was borne by knights of higher rank. It was either square or, especially in later times, oblong, like most modern flags. It indicated that its owner was in command of a military force. The *standard* was a flag of great size, designed to indicate the position or headquarters of its possessor. It might bear a variety of designs.

From these early forms, many different types of flags have been developed in modern times. Modern national flags are to be distinguished principally by the colors they display. Different arms of the national service, however, and various officers and dignitaries usually have flags of special designs. Thus, the merchant marine flags are generally different in design from the naval flags and ensigns. The use of the various designs is most conspicuous on board naval vessels, each rank of admiral, for example, having its appropriate flag. In the United States navy, the admiral's flag is a solid blue field bearing four stars. The flag of the president is a blue banner bearing in its center the arms of the United States.

The official flags of the principal countries of the world are here briefly described. For United States and British flags, see page 384 and illustrations opposite pages 428 and 429.

Abyssinia. The national banner consists of three equal horizontal stripes,—green above, yellow in the center, red at the bottom.

Albania. A red field bearing the figure of a black, double-headed spread eagle is the national flag.

Argentina. In the flag of Argentina are three horizontal stripes. The top band is blue, the center white, and the bottom blue. Upon the naval ensign a golden sun appears in the white bar.

Austria. The flag of the republic of Austria is a rectangular banner, with three horizontal stripes of equal width,—red at the top, white in the middle, and red at the bottom. This design, with the addition of a shield and crown in the center, was formerly that of the imperial naval flag of Austria-Hungary.

Belgium. For both the naval and the merchant marine flag of Belgium, the vertical tricolor,—black next the staff, yellow in the middle, and red on the outer margin,—is employed. This is the ancient standard of Brabant. The royal ensign bears the king's coat of arms in the yellow stripe.

Bolivia. The Bolivian flag is a tricolor with horizontal bars. At the top is red; in the middle, yellow; at the bottom, green. The naval flag shows the national arms in the center of the yellow band.

Brazil. The national standard is a green field in the center of which appears a yellow lozenge. Upon the lozenge is a blue circle in which is represented a heavenly constellation. Across the blue circle runs a white band bearing the motto, *Ordem e progresso*, "Order and Progress."

Bulgaria. The naval flag, which is the national ensign, has three equal horizontal stripes,—the upper white, the middle green, the lower red. The gold crowned lion appears on a red ground, in the upper corner next the staff. For the merchant marine, the plain tricolor is used.

Chile. In the Chilean flag are two wide horizontal bars, the upper white, the lower red. Upon the blue canton, next the staff, appears a five-pointed white star.

China. The flag of the Chinese republic consists of five horizontal bars. The uppermost, red, represents China; the next, yellow, Manchuria; the next below, blue, Mongolia; the next, white, Tibet; the lowest, black, Turkestan. The naval flag has a red field and a blue canton bearing a white sun.

Colombia. The upper half of the Colombian flag is a horizontal yellow band. Below this is a blue stripe, and under the latter a red band. In the center of the naval flag are the state arms; in the same position, the merchant ensign bears a white star on a blue ground set in a red oval.

Costa Rica. The flag is composed of five horizontal bands. The topmost band is blue, with a white stripe below it. At the bottom is a blue stripe, with a white band above it. The center stripe, broader than the others, is red. In the naval flag, the red stripe bears the Costa Rican arms.

Cuba. The standard of Cuba bears next the staff a red triangle, upon which is a white star. From the triangle run alternating horizontal stripes, two white and three blue.

Czechoslovakia. The flag of the Czechoslovak republic is a tricolor. The portion next the staff is a triangle of blue. The apex of the triangle lies in the line dividing the two equal horizontal bars which make up the rest of the flag,—white above and red below.

Denmark. The flag of Denmark, the Dannebrog, is a red field bearing a white cross dividing the field in quarters. This is the oldest national flag design in the world, said to date from 1219. The naval ensign is swallow-tailed.

Dominican Republic. The field of this flag is divided by a white cross. The upper quarter next the staff is blue; the upper outer quarter is red. The lower outer quarter is blue; the lower, next the staff, is red.

Ecuador. The upper half of the flag of Ecuador is a yellow horizontal band. The lower half is divided equally between a blue and a red band, the latter being at the bottom. The national ensign bears the arms of the state.

Esthonia. The national flag is a horizontal tricolor. The stripes are of equal width,—the topmost bar is blue; the center is black; the lower is white.

Finland. The national flag of Finland, similar in general design to the standards of Norway and Sweden, carries a blue Latin cross on a white field.

France. The flag of France is the tricolor, composed of three vertical stripes of equal width,—blue next the staff, white in the middle, and red at the outer edge. The French Revolution, in 1789, gave rise to this standard, which combines the colors of the city of Paris with the white of the former monarchy.

Germany. The flag of the German republic is a tricolor of equal horizontal bars. The topmost stripe is black; the middle is red; the bottom is gold.

Greece. The national flag is a white rectangular cross on a dark blue field. The naval ensign has four white and five blue alternating horizontal stripes, with a canton of blue upon which appears the white cross, with a crown in the center. The merchant flag is like the naval, lacking the crown.

Guatemala. This state has a flag of three vertical bars,—blue, white, blue. On the central white band, in the national ensign, appear the state arms. The merchant flag is plain.

Haiti. The Haitian merchant flag has two horizontal bands,—blue above, red below. At the center of the naval ensign appear the national arms in a white rectangle.

Honduras. The Honduran national ensign is three horizontal bars,—blue, white, blue. On the central white stripe are the national arms surmounted by five gold stars.

Hungary. The flag of the Hungarian state is a tricolor. It is made up of horizontal bars,—the upper being red, the center white, and the bottom green. Formerly, the lower stripe of the Austro-Hungarian flag carried the red of Austria in the half next the staff and the green of Hungary in the outer half.

Italy. The Italian flag consists of three equal vertical bands,—green next the staff, white in the middle, red at the outer border. On the white stripe is a blue-bordered red shield, bearing a white cross, the latter being the arms of Savoy. On the naval flag, a crown surmounts the shield.

Japan. The flag of the mikado is a rectangular field of red bearing a gold chrysanthemum in the center. For the merchant marine, a white field with a red disk in the center is used. On the naval flag, the rayed, red disk is placed just out of the center of the white field, toward the staff.

Jugoslavia. A horizontal tricolor is the national flag of the Kingdom of the Serbs, Croats, and Slovenes. The top bar is blue; the middle one is white; the bottom, red.

Latvia. The flag of Latvia, like that of Austria, is composed of three equal horizontal stripes. The upper bar is red, the middle white, and the lower red.

Liberia. The ensign of the Negro republic has 11 horizontal alternating red and white stripes, with a union of blue. In the union is a large white star.

Lithuania. The Lithuanian national flag is a horizontal tricolor. The bars are of equal width,—yellow at the top, green in the middle, and red at the bottom.

Mexico. The flag of Mexico is a vertical tricolor. The green bar is next the staff; the central stripe is white; the outer one is red. On the naval ensign, the white stripe bears the national arms.

Netherlands, The. The design of the naval and merchant flag of Holland is a tricolor of three equal horizontal bands,—red above, white in the middle, blue at the bottom.

Nicaragua. A flag of three horizontal stripes, white between blue. In the central white stripe of the naval flag are the state arms; on the merchant ensign, a blue anchor.

Norway. The merchant flag of Norway is red and bears a blue cross edged with white. The field of the naval ensign is red and bears a broad blue cross. This latter flag is swallow-tailed, with the end of the cross projecting in the angle of the swallowtail.

Panama. This republic has a flag of four quarters. The upper, inner quarter is white and bears a blue star; the upper outer quarter is red; the lower inner quarter is blue; the lower outer quarter is white, bearing a red star.

Paraguay. The Paraguayan flag is a tricolor of horizontal stripes. The upper bar is red; the lower is blue; the center, white. On the white band are the national arms.

Persia. The Persian imperial flag is blue with a white circle in the center bearing the national arms. The military ensign, as well as the merchant flag, is a tricolor, with horizontal stripes,—green above, white in the center, and red at the bottom.

Peru. A flag of three stripes is the national ensign. The inner and the outer bar are red. On the center, white, band are the national arms.

Poland. The Polish flag is a simple banner of two equal horizontal stripes,—white above and red below.

Portugal. The field of the Portuguese flag is made up of a green and a red portion divided in the proportion of two to three, the green being next the staff. Over the dividing line are placed the arms of Portugal, a red-bordered white shield on a gold armillary circle, the latter commemorating the fame of the explorer, Prince Henry.

Rumania. Three equal vertical bars,—blue next the staff, yellow in the middle, red in the fly,—constitute the national ensign. In the naval flag, the yellow band bears the national arms.

Russia. The banner of Soviet Russia is a plain red field, upon which appear, in gold, the letters R. S. F. S. R. These are the initials of the title, Russian Socialist Federal Soviet Republic.

Salvador. The national flag has three horizontal stripes. The upper and the lower bar are blue; the center band is white, bearing the national arms and, in Spanish, the legend, Republic of Salvador and Central America.

Siam. On the red field of the national Siamese flag appears a white elephant, with harness, standing on a platform. In the upper corner, next the staff, are an anchor and a wheel. The merchant ensign is simply a red field with a white elephant.

Spain. The naval flag of Spain has a broad yellow horizontal stripe bordered with a narrow red stripe at the top and the bottom. The arms of Castile and Leon appear on the yellow field. Alternating horizontal bars, three yellow and two red, constitute the merchant flag.

Sweden. The merchant flag of Sweden is a rectangular blue field bearing a yellow cross. The naval ensign is of the same colors, but swallow-tailed, with the cross projecting in the angle of the swallowtail.

Switzerland. The flag of Switzerland has a rectangular red field, upon which a white cross is blazoned. The ends of the cross do not touch the edges of the flag.

Turkey. The Turkish flag is a red field on which, in white, is the historic emblem of a star and the crescent moon. The symbol of star and crescent was the ancient emblem of Byzantium (Constantinople), said to have been adopted by the city when, by the light of a crescent moon, a night attack by Philip of Macedon was foiled. Mohammed III appropriated the device after the Turkish capture of Constantinople in 1453.

Uruguay. The flag of Uruguay is made up of nine alternating white and blue stripes,—five white and four blue,—with a white canton bearing a golden sun.

Venezuela. The Venezuelan naval flag is a horizontal tricolor. The upper stripe is yellow, the center blue, the lower red. On the yellow stripe, at the end next the staff, appear the national arms. In the center of the flag are grouped seven white stars.

STATE MOTTOES, EMBLEMS, AND POPULAR NAMES

State	Motto, with Year of Adoption	Translation	Popular Name of State	Popular Name of People	State Flower
Alabama	Here We Rest. 1868	. . . . .	Cotton	Lizards. Yellow-Hammers	Goldenrod
Arizona	Ditat Deus. 1863	God Enriches	Sunset. Apache	. . . . .	Saguaro
Arkansas	Regnant Populi. 1864	The People Rule	Bear. Bowie	Toothpicks	Apple Blossom
California	Eureka.	I Have Found It	Golden. Grizzly Bear	Gold Hunters	California Poppy
Colorado	Nil sine Numine	Nothing without Providence	Centennial	Rovers	Blue Columbine
Connecticut	Qui Transtulit Sustinet. 1842	He Who Transplanted Still Sustains	Nutmeg. Blue Law. Freestone	Wooden Nutmegs	Mountain Laurel (*Kalmia*)
Delaware	Liberty and Independence	. . . . .	Blue Hen. Diamond	Blue Hen's Chickens. Muskrats	Peach Blossom

STATE MOTTOES, EMBLEMS, AND POPULAR NAMES—Con.

State	Motto, with Year of Adoption	Translation	Popular Name of State	Popular Name of People	State Flower
Florida	In God We Trust. 1846		Flower. Gulf	Fly-up-the-Creeks	Orange Blossom
Georgia	Wisdom, Justice, Moderation		Empire State of the South. Cracker. Buzzard	Crackers	Cherokee Rose
Idaho	Esto Perpetua. 1886	May It Be Perpetual	Gem		Western Syringa
Illinois	State Sovereignty, National Union. 1818		Prairie. Sucker	Suckers	Blue Violet
Indiana	None		Hoosier	Hoosiers	Tulip Tree
Iowa	Our Liberties We Prize, and Our Rights We Will Maintain		Hawkeye	Hawkeyes	Wild Rose
Kansas	Ad Astra per Aspera. 1861	To the Stars through Difficulties	Sunflower. Garden. Squatter	Jayhawkers	Sunflower
Kentucky	United We Stand, Divided We Fall. 1792		Blue Grass. Corn-cracker	Corn-crackers	Goldenrod
Louisiana	Union, Justice, and Confidence		Creole. Pelican	Creoles	Magnolia
Maine	Dirigo	I Direct	Pine-Tree. Lumber	Foxes	Pine Cone and Tassel
Maryland	Fatti Maschii, Parole Femine. 1648	Manly Deeds, Womanly Words	Old-Line	Crawthumpers	Black-eyed Susan
Massachusetts	Ense Petit Placidam sub Libertate Quietem. 1780	With the Sword She Seeks Quiet Peace under Liberty	Bay. Old Colony	Bean Eaters	Mayflower (Trailing Arbutus)
Michigan	Si Quæris Peninsulam Amœnam Circumspice. 1835	If Thou Seekest a Beautiful Peninsula, Behold It Here	Wolverene. Lake State	Wolverenes	Apple Blossom
Minnesota	L'étoile du Nord. 1858	The Star of the North	North Star. Gopher. New England of the West	Gophers	Moccasin Flower (Lady's-Slipper)
Mississippi	Virtute et Armis. 1894	By Valor and Arms	Bayou. Mud Cat	Tadpoles	Magnolia
Missouri	Salus Populi Suprema Lex Esto. 1822	Let the Welfare of the People Be the Supreme Law	Bullion	Pukes	Hawthorn
Montana	Oro y Plata. 1864	Gold and Silver	Mountain. Treasure	Bug-Eaters	Bitterroot
Nebraska	Equality before the Law. 1867		Tree-Planter	Corn Huskers	Goldenrod
Nevada	All for Our Country. 1866		Silver. Sagebrush	Sage Hens	Sagebrush
New Hampshire	None		Granite	Granite Boys	Purple Lilac
New Jersey	Liberty and Prosperity. 1776		Garden. Mosquito	Jersey Blues. Clam Catchers	Violet
New Mexico	Crescit Eundo. 1850	It Increases as It Advances	Sunshine		Yucca
New York	Excelsior. 1809	Upward	Empire	Knickerbockers	Rose
North Carolina	Esse quam Videri. 1893	To Be rather than to Seem	Old North. Turpentine	Tarheels	Goldenrod
North Dakota	Liberty and Union, Now and Forever, One and Inseparable		Sioux	Tuckoes	Prairie Rose
Ohio	Imperium in Imperio. 1866	An Empire within an Empire	Buckeye	Buckeyes	Scarlet Carnation
Oklahoma	Labor Omnia Vincit	Labor Conquers All			Mistletoe
Oregon	Alis Volat Propriis. 1857	She Flies with her own Wings.	Beaver	Webfeet	Oregon Grape
Pennsylvania	Virtue, Liberty, and Independence. 1809		Keystone	Pennanites. Leatherheads	
Rhode Island	Hope. 1864		Little Rhody	Gunflints	Violet
South Carolina	Animis Opibusque Parati. Dum Spiro, Spero	Prepared in Mind and Resources. While I Breathe I Hope	Palmetto	Weasels	Yellow Jessamine
South Dakota	Under God the People Rule		Coyote		Pasque Flower
Tennessee	Agriculture, Commerce. 1797		Volunteer	Butternuts	Passion Flower
Texas	None		Lone-Star	Beefheads	Bluebonnet
Utah	Industry				Sego Lily
Vermont	Freedom and Unity. 1866		Green Mountain.	Green Mountain Boys	Red Clover
Virginia	Sic Semper Tyrannis	Ever So to Tyrants	Old Dominion	Beadles	Dogwood
Washington	Ai-Ki	By and By	Evergreen. Chinook		Pink Rhododendron
West Virginia	Montani Semper Liberi. 1863	Mountaineers Are Always Free Men	Panhandle	Panhandlers	Great Rhododendron
Wisconsin	Forward		Badger	Badgers	Violet
Wyoming	Cedant Arma Togæ. 1868	Let Arms Yield to the Garb of Peace	Equality		Indian Paintbrush

FESTIVALS AND HOLIDAYS

THE word festival still carries the joyous sense of the Latin word *festum*, "feast," from which it is derived. The etymology of the word holiday, so commonly associated nowadays with business and national life, suggests in the old form, "holyday," the religious significance of all feasts and days of cessation from labor among early peoples. Popular customs, especially among more backward nations, still bear witness to the origin of popular festivals.

At the very dawn of history we find the widespread cult of the dead, accompanied with banquets at which, in the act of eating, there was believed to be communion with departed spirits. Thus the striking fact and mystery of death became the occasion of social and religious observance. Similarly, nomadic tribes, whose habits were vitally affected by the variation of light due to the phases of the moon, developed lunar feasts, in which they celebrated with joy the return of the new moon. Out of such recognition of the phases of the moon probably came originally the Jewish Sabbath, or "day of rest," which in turn gave rise to the Christian Sunday, dedicated to rest and religious observance. At a later stage of civilization, the mysterious succession of the seasons, governing human activity, occasioned the observance of festive days at planting time and at harvest. All these celebrations assumed a religious character.

The commemoration of notable events in the history of peoples and nations has given occasion for patriotic holidays. Many cities and other local communities maintain certain civic holidays upon which notable features of the community life and enterprise are celebrated. Such are the flower festivals of European and of some American cities. Colleges and schools observe many of their own holidays in celebration of their founding and of various stages of the school year.

Many of the modern festivals and holidays preserve, according to their season, much of the character of very ancient nature feasts. Recent years have seen fruitful efforts to give the festival a more effective place in modern community life. Under wise direction, it has become in many places an occasion for community expression in music, drama, and other forms of art. The ancient purpose of the holiday and the festival in æsthetic and spiritual education is thus happily being recaptured. In the following section, the observances of the most notable of the world's festal days and seasons are described, and the occasions of the most important modern national holidays are explained.

April Fools' Day or **All Fools' Day.** The first day of April, when for centuries throughout Christendom it has been customary to play irresponsible tricks on one's neighbors. Many and varied explanations have been vouchsafed for the origin of this practice, but all seem to lack the stamp of authenticity. The most convincing surmise, however, is that the custom owes its origin to the French, who adopted the Gregorian calendar in 1564. Prior to this date the French were wont to pay formal visits to their friends on April 1. On the change of the calendar these visits took place on January 1, but mock visits continued to be paid on April 1, especially on those who might forget the new order of things. The French term for this custom, *poisson d'avril*, is more euphemistic and appropriate than our own. It means an "April fish," that is, a young fish, consequently one that is easily caught.

Arbor Day. This annual tree-planting day is now generally observed throughout the United States and in parts of Canada and Britain. In some of the states, it is a legal holiday. The particular date selected varies necessarily with the climate and season, from January in Florida to April or May in most of the Northern states. To Mr. J. Sterling Morton, former commissioner of agriculture, belongs the credit for the suggestion of a definite Arbor Day. In 1872, he induced the authorities of his state, Nebraska, to set apart a day for tree planting.

Arbor Day is now the occasion of impressing upon children in the schools the importance of forestry. Its observance has grown from the simple school exercises and the planting of single trees to beautify school grounds or streets to the planting of thousands of seedlings to reforest and utilize otherwise waste lands.

Ash Wednesday. The first day of the forty days of Lent according to modern observance. The name is significant of the custom of the Jews, who were wont to garb themselves in rough sackcloth and sprinkle their heads with ashes. It refers, however, in particular to the ritual observed by the Catholic Church. On this day the priest, before beginning mass, blesses a quantity of ashes made from the palms blessed on the Palm Sunday of the previous year. The people approach the altar rails, and the ashes are placed on the forehead of each one in the manner of a small cross, the act being accompanied by the words: *Memento homo quia pulvis es, et in pulverem reverteris*, "Remember, man, that thou art dust and unto dust thou shalt return." The exact date of the origin of this custom is not authentically known, but it was in vogue as far back as the beginning of the 8th century, as may be gathered from the chapter records of a church in Toulon, dated 714 A. D.

Bank Holiday. In Great Britain, a secular day when by law banks are closed, and parties are exempt from presentment or payment of negotiable paper. The bank holidays in England, established by act of Parliament in 1871, are Easter Monday, Whitmonday, the first Monday in August, and Dec. 26 (boxing day). In Scotland, New Year's Day, the first Monday in May, the first Monday in August, and Christmas Day are bank holidays. In Ireland, these holidays are, or were formerly, the same as those in England. In Canada, the term bank holiday is used as an alternative expression for legal holiday.

Candlemas Day. In its ecclesiastical meaning, Candlemas is the feast of the Purification of the Virgin Mary, and is observed on February 2. This festival is very strictly kept by the Roman Catholic Church, there being a procession with many lighted candles, and those required for the service of the ensuing year being consecrated on that occasion; hence the name Candlemas Day. The candles symbolize the words spoken by Simeon of the Infant Christ, "a light to lighten the Gentiles."

Popular observance of this date seems, however, to have prevailed in pre-Christian times. The Romans were accustomed to burn candles on February 2 to the goddess Februa. In modern times many traditions have attached themselves to the day. Among these is the belief that a fair Candlemas Day indicates a long winter. This is expressed in the Scotch lines:

"If Candlemas is fair and clear,
There'll be twa winters in the year."

In the United States the day is popularly known as Ground-hog Day, in reference to the fancy that if on this day the ground hog, or woodchuck, comes out of his burrow and sees his shadow, he will go back for another six weeks. In Canada, the bear is commonly substituted for the ground hog in this fanciful belief. A popular rural proverb runs thus:

"February, second day,
Have half your corn
And half your hay."

Carnival. The word comes from the Latin through the Italian *carnevale*, meaning "farewell meat!" It is applied to a season of feasting and merrymaking observed, especially in Italy, Spain, and France, as an offset to the gloomy forebodings which the forty days of approaching Lent

are said to bring. It is probably a relic of a pagan festival held in honor of Saturn. The period of carnival extends from the feast of the Epiphany, or Twelfth Day, to the eve of Ash Wednesday; but it is on the last three days, known as high carnival, that the spirit of revelry is supreme. Arrayed in whatever garb fancy may suggest, masked revelers with music and song parade the streets and give themselves up to acts of irresponsible folly. Rome has always been the recognized home of carnival; but, among all the cities in which this reign of abandoned merriment holds sway, Venice stands unrivaled for its scenes of picturesque splendor and romantic pageantry such as are to be witnessed by day or night on the Grand Canal. In 1830, carnival was established in New Orleans, and has since grown in popularity each succeeding year. See *Mardi Gras*.

Christmas. This name, meaning Christ's Mass, is applied to the festival commemorating the birth of Christ celebrated on December 25.

The exact day of the birth of Jesus is unknown. It was not until the 3d century that his birth anniversary was celebrated to any appreciable extent by Christians, nor was there then any general agreement regarding the date on which it should be celebrated. January 6 and December 25, however, were commonly chosen in the 4th century. The general adoption of December 25, first in the West and a little later in the East, dates from the 5th century. December 25 was already a festive day for the sun god Mithra and appealed to the Christians as an appropriate date to commemorate the birth of Jesus, the "Light of the world." Theaters in the Roman Empire were ordered closed on Christmas as early as 400 but the day did not become a legal (court) holiday until 534.

In Germany the Yule feast, held at the winter solstice, had been celebrated in pre-Christian times, and many customs of the earlier festival were transferred to the Christian holiday. To replace some of these, dramatic representations of Jesus' early life were instituted; hence arose the medieval "manger songs" and Christmas carols. The Yule log first became a public ceremony in England in 1577. Plum puddings and mince pies had long since been associated with the day. The exchange of gifts at Christmas had its origin in early medieval times, but the use of Christmas cards dates from the latter half of the 19th century.

The Christmas tree is believed to have its origin in the ceremonial use of the palm tree in the worship of the Egyptian goddess Isis. A palm with twelve shoots, one to represent each month of the year, was carried in a festival of Isis at the winter solstice, celebrating the completion of one year and the beginning of another. In northern climates, this association of the palm tree with the celebration of December 25 was modified by the substitution of a fir tree.

The Christmas stocking comes from an Italian practice associated with January 6. The fairy Befana is supposed on that night to fill the stockings of children with gifts in accordance with their deserts, the naughty children receiving only ashes.

Chrysanthemum, Feast of. A celebration day observed by the Japanese, toward the end of October, when as a rule the chrysanthemum is to be found blooming in almost solitary splendor. The *Kiku-no-sekku*, as the feast is called by the Japanese, partakes of the nature of a public holiday. Gay crowds, wearing kimonos and dalmatics that take on the colors of the rainbow, pass through the streets on their way to the flower shows where gorgeous specimens of this favorite flower are on view. It is the custom on this day to sprinkle chrysanthemum leaves over the tables spread for tea, to which quaint and picturesque practice is attributed the virtue of conferring longevity.

Coconut Day. A festival observed among the Hindus for the purpose of propitiating Varuna, the god of the waters and the floods. With the Brahmans at their head, vast multitudes wend their way in procession to the sea or a river, singing hymns and reciting prayers. On the arrival at the shore or river bank, lighted tapers together with garlands of flowers and innumerable coconuts are cast into the waters. By this means, Varuna is conciliated, and, in consequence, it is believed, the earth bears fruit plentifully.

Dead, Festival of the. Among the Japanese the belief is held that the dead return once a year to visit their living relatives. In honor of such visitation a festival is celebrated from the 13th to the 15th of July. In all the temples and private shrines, fruit and other delicacies are placed upon the altars, and from time to time tea is poured out for the refreshment of the unseen visitors. Many prayers meantime are recited, and, when night sets in, tapers are lighted to guide the footsteps of the unseen, and innumerable lanterns are hung along the streets and in the cemeteries. From this picturesque display, the Festival of the Dead has come to be known among strangers as the Feast of Lanterns.

Dead, Festival of the Unforgotten. This festival among the Chinese corresponds to that of the Christian All Souls' Day. The Chinese have always been noted for their filial piety, and this love does not cease with the death of relatives, but rather is increased; hence ancestor worship forms an essential doctrine of the Chinese religion. The Festival of the Unforgotten Dead is celebrated twice a year, in the third and seventh months. On these occasions the people pay solemn visits to the tombs of their ancestors, and, after adorning these houses of the dead with flowers, they place thereon food, paper money, and paper figures representing servants. The worshipers then prostrate themselves and perform many devotions at the altars erected before each tomb, and, when the prayers are ended, wine is poured over the altars, and fireworks and crackers are lighted to exorcise the evil spirits. Finally, the pious celebrants seat themselves and partake of the material portion of the viands provided, the spiritual elements of which have already been consumed by the dead.

Dolls, Festival of. A gala day celebrated in Japan for the delectation of little girls and their dolls. The festival usually takes place toward the latter end of April. It is at this time that the sakura trees, somewhat akin to our peach trees, begin to blossom. The children and their mothers don holiday attire and proceed to decorate a special room in the house with sakura blossoms and other festoons for the reception of the waxen visitors. A banquet is then prepared for the protégées of the little foster mothers, and friends are invited to the feast. When the dolls have been admired, petted, and flattered, they are then supposed to partake of as many luxuries as they are able to consume; whatever delicacies may be left over, the children and the grown-ups finish by way of economy.

Dominion Day. The national holiday in the Dominion of Canada. It is celebrated on July 1 and commemorates the formation of the Dominion, which took place in 1867 in accordance with the British North America act, previously passed by the British Parliament. By this act, Upper Canada (Ontario), Lower Canada (Quebec), Nova Scotia, and New Brunswick were united under one Federal government.

Easter. The season which commemorates the death and resurrection of Jesus Christ is universally regarded as the chief of Christian festivals. The Venerable Bede, who was the great scholar of the early English churches, is authority for the derivation of the word Easter from the name of the Anglo-Saxon or Norse goddess of spring, Eostre or Ostara, to whom the month Eostur, corresponding to our April, was sacred. The French name *pâque*, as well as similar names in other languages, is derived through the Greek from the Aramean *pascha*, which

signifies "passing over." In apostolic times, the Christians continued to celebrate the Jewish passover, giving to the feast a Christian significance. Hence the retention of the ancient name.

Between the Jewish Christians and the Gentile Christians there arose very early a dispute as to the proper date for the celebration of the resurrection. The former adhered to the 14th day of the month *Nisan*, while the latter adopted the Sunday following as the day commemorative of the resurrection. A wide variation soon arose in the date observed among the churches. This diversity was not obviated by the calendar issued from Alexandria under the authority of the Council of Nice (325). Gradually, however, with the adoption of corrected calendars, a uniformity has been attained. Easter is now celebrated on the first Sunday after the full moon which follows the vernal equinox. If that full moon falls on a Sunday, Easter is the following Sunday.

The times of the movable feasts in the Church calendar are reckoned from the date upon which Easter falls in each year. In this connection, four periods closely connected with Easter should be mentioned: Lent, or the forty days preceding Easter Sunday; the period of Holy Week, beginning with Palm Sunday and ending with Easter; the Octave of Easter, extending from Easter to the following Sunday; Eastertide, the season from Easter Sunday to Whitsunday, or Pentecost, 7 weeks after Easter.

In addition to the ecclesiastical observances of Easter, numerous ancient pagan customs have persisted in more or less altered form. These latter are such as were connected with the primitive spring festival celebrating the return of the goddess of spring and the signs of rebirth in the world. Thus, from the Norse peoples have come the popular Easter egg and Easter rabbit legends and customs. See *Calendar*; *Freya.*

Ember Days. So called from an Old English word *ymbryne*, signifying a recurring period of time, although the name is commonly regarded as a corruption of the Latin *quatuor tempora* "four seasons." The Ember Days are four periods of fast and abstinence appointed by the Church, and can be traced as far back as the early part of the 3d century. Originally there were only three, but in the time of Pope Gelasius I (492–496) a fourth had already been added. These Ember Days were definitely prescribed by Pope Gregory VII (1073–1085) to be observed by the whole Church in the four seasons of the year; namely, Wednesday, Friday, and Saturday following (1) December 13 (Feast of Saint Lucy), (2) the first Sunday in Lent, (3) Whitsunday, (4) September 14 (Exaltation of the Cross).

Empire Day. See *Victoria Day.*

Feast of Banners. A Japanese festival held annually on May 5 in honor of male children. As is usual on such occasions, every house wherein a male toddler resides is gayly decorated outside with variegated colored flags and banners. An especial feature of these decorations is a long bamboo cane representing a fishing rod, from which are suspended one or two or more paper fish, according to the number of little boys within each house.

Feast of Lanterns. See *Dead, Festival of the.*

Flag Day. A holiday observed in the United States to commemorate the adoption of the stars and stripes by the Continental Congress, June 14, 1777. This patriotic anniversary has become an important one in the calendar of the schools. Appropriate exercises are held, and the attention of pupils and teachers is directed to the history and the symbolic meaning of the national standard. On this day also, it is generally customary to display the flag on residences and business houses.

Flowers, Battle of. The most fascinating feature of all the carnival celebrations. It originated at Nice, where it is always to be witnessed to best advantage. Carriages and vehicles of all descriptions and sizes come into requisition. Those of the wealthy are adorned with a profusion of flowers, while those of the humbler classes are decked out in white calico on which are sewed rosettes of various hues and colors. The vehicles drive up and down the *promenade des anglais*, and the occupants, as they pass, salute their friends by hurling bunches of flowers at them. The greeting is returned in the same way, and so the battle begins and is continued for many hours.

In many places on the continent of Europe, these battles of flowers take place outside carnival, generally in April, May, or June. At Ventnor, in the Isle of Wight, a famous battle takes place every year the first week of April.

Fools, Feast of. One of several strange and amazing celebrations which were permitted to take place with the sanction of ecclesiastical authority during the latter part of the middle ages. This "feast" was a development of a celebration observed by the subdeacons, on or about the Feast of the Circumcision (Jan. 1), who on this day were allowed, by way of relaxation, to assume the dignity and privileges of the higher clergy. This feast of the subdeacons was later taken up by the lower clerics called *esclaffardi*, and also by guilds and brotherhoods of "fools." It was then that it turned into a blasphemous extravaganza ending often in sacrilegious orgies and riots. Eventually it was suppressed by ecclesiastical authority.

Good Friday. The Friday before Easter, celebrated in commemoration of the crucifixion of Jesus. It was made a legal holiday by Constantine the Great in the early fourth century and is still so observed in England, Ireland, Canada, and certain parts of the United States. The eating of "hot cross buns" on Good Friday goes back to very early times.

Halloween. The name of the popular, boisterous autumn celebration means "holy eve," the occasion being the eve of "All Hallows'" or All Saints' Day, November 1. These names represent a Christian appropriation of an ancient pagan festival of autumn. Indeed the familiar customs of our Halloween—the games and pranks of children and grown-ups, together with the ghostly tales by the firelight—are relics of ancient pagan days. Long before Christian times, the Romans celebrated, at about the Halloween season, the festival of Pomona, goddess of gardens. The druidic autumn feast fell at about the same time. Hence, in western Europe and in England, Roman customs were added to the druid observances and perpetuated in the popular festivities of modern times.

Jackson's Day. The popular name given to the anniversary celebration of the defeat of the English at New Orleans, January 8, 1815, by General Andrew Jackson, who afterward became seventh president of the United States. It is a legal holiday in Louisiana, and is observed by the Democrats in general throughout the United States.

Jubilee. From the Hebrew word *jobel* or *yobel*, which means a "ram" or "ram's horn" and, by extension, "the blast of a trumpet." According to the Jewish law mentioned in Leviticus XXV, the year following each seventh Sabbatical year was to be announced by the sound of trumpets on the Day of Atonement as a year of remission and universal pardon. The year of Jubilee occurred, therefore, once in every 50 years.

The year of Jubilee was instituted in the Christian Church by Pope Boniface VIII in 1300. From the year 1450, the Jubilee has been held every 25 years, with but three exceptions due to political upheavals.

July First. See *Dominion Day.*

July Fourteenth. The national festival of France, which practically corresponds to Independence Day in America. The Bastille, a huge fortress built in the 14th century, and used as a prison for political offenders and victims of those in power,

had long since become the symbol of despotism and oppression to the French people. Goaded by the memory of centuries of persecution and tyranny, the mob of Paris, on the morning of July 14, 1789, stormed and took this hitherto impregnable fortress. The taking of the Bastille was the tocsin of the Revolution, for on the ruins of the old régime typified by this hated structure was to be built at no distant date the Republic of France.

The first anniversary of the capture of the Bastille was called the Feast of Federation, at which the unfortunate Louis XVI swore allegiance to the Revolutionary constitution, which oath was later to be sealed by his blood. Only in 1880 was July 14 proclaimed by the National Assembly a general holiday. Since then, the Republican anniversary is celebrated with unabated enthusiasm and rejoicing, such as the French, especially those of Paris, know so well how to manifest.

July Fourth. The birthday of American independence and the greatest holiday of all those observed in the United States. On this day in the year 1776, the Declaration of Independence, as prepared by a committee of five, of which Thomas Jefferson was chairman, and amended by the Congress, was adopted.

Kermis or **Kirmess.** As the name indicates, *kirmess* or *kirkemesse*, that is, Church mass, was an old religious festival which took place on the anniversary of the dedication of a church. After the mass, the people gave themselves up to merrymaking and general feasting, for which purpose they were supplied with cakes and ale by the parish priest. The kermis is now held in Holland, Belgium, and Germany, but has lost its former devotional significance, being in the nature of an annual fair where music and dancing are the order of the day. The idea of the kermis has long since been adopted in America, and under this name fairs and open-air bazaars are frequently organized for the benefit of some hospital or other charity.

Kiteflying Festival. Once a year, the Chinese, young and old, devote a day to kiteflying. This day is called *Teng Kao*, or "Feast of High Flight," which is celebrated on the ninth day of the ninth month of the Chinese calendar. If the kiteflier be guilty of wrongdoing, the kite will fly away with the penalty due to it. Accordingly, when the kite is sky-high, the Chinaman cuts it loose, and settles down once again with an easy conscience.

Labor Day. In America, the celebration of the first Monday in September with parades and demonstrations in the cause of improved labor conditions was begun by the Knights of Labor in 1882. The plan was adopted by other organizations. Since 1887, when the first act making the day a legal holiday was passed in Colorado, Labor Day has been established in most of the states of the Union and in Canada, the first Monday in September being the usual date adopted. In Europe, since about 1890, the first day of May has been observed as Labor Day. See *Holidays in the United States*; *Holidays in Canada*.

Lent. A word from the Anglo-Saxon *lencten* meaning "springtime." It is employed to denote the forty days preceding Easter, the period observed in the Catholic Church as a fast. From the earliest times this custom of fasting was enjoined on Christians. For instance, Saint Leo, who died 461 A. D., exhorts his hearers "to fulfill with their fasts the Apostolic institution of the forty days." But the law requiring of all Catholic Christendom the fast from Ash Wednesday to Holy Saturday (Sundays excluded) was not promulgated until the beginning of the 9th century.

In those early days the law of fasting was very strictly enforced and kept. Only one meal a day, and that to be taken in the evening, was permitted. In the course of succeeding centuries many relaxations and concessions were allowed, and in modern days the pope is accustomed to grant various dispensations lightening the burdens of strict observance. However, those whose health will permit are still bound to but one meal a day, two ounces of solid food being allowed as *frustulum* or *break-fast* in the morning, and a collation of eight ounces sometime before or after the chief meal.

Wednesdays and Fridays throughout Lent, and also the days of Holy Week, except Maundy Thursday, are days when flesh meat is forbidden. By special indult, the Holy See grants faculties to bishops in the United States, whereby workingmen and their families may use flesh meat once a day throughout the year, except on Fridays, Ash Wednesday, Holy Saturday, and during the vigil of Christmas.

Lupercalia. A name signifying "the festival of the wolf," which was celebrated by the ancient Romans on the 15th of February in honor of Lupercus, the protector of shepherds. Goats and young dogs were sacrificed on this day by the Luperci or priests of Lupercus. Clothed in the skins of the slaughtered animals and armed with thongs, they ran through the street striking all whom they met. Such blows were welcomed by women in the belief that thereby they were preserved from sterility.

Mardi Gras (*mär'dē grä'*). The French name for Shrove Tuesday, and, by extension, for the celebration of that day in the European carnival. In the United States, the most elaborate festival of Mardi Gras is that held annually at New Orleans, in which much of the Old World carnival spirit is preserved. The principal feature of this festival is a magnificent civic procession and pageant. See *Shrove Tuesday*; *Carnival*.

Marriage of the Adriatic. After the victory of the Venetians over the Imperial fleet in 1177, Pope Alexander III sent to the doge a gold ring as a symbol of the city's dominion over the sea. Thereafter the annual celebration of the victory took place on Ascension Day, when the doge from his state barge cast into the sea a consecrated ring, with the words: "We wed thee, O Sea, in sign of true and everlasting dominion." Thus, as a bride to her husband, the sea became subject to Venice. This picturesque ceremony was called by the Venetians, *il sposalizio del mare*, or "espousal of the sea."

May Day. The first day of May, which in olden times in England, France, and Germany was celebrated with much show of rejoicing and merrymaking. This festival is said to be a survival of an ancient one observed by the Romans in honor of Flora, the goddess of flowers.

Though the custom of keeping May Day still survives in country districts and attempts are being made to revive it in the schools, as a general celebration it may be said to be moribund. In medieval England, lads and lassies sallied forth on May Day morning to gather the hawthorn blossom or "May" along the country lanes. With it they crowned the fairest maiden of them all and proclaimed her "Queen o' the May." They then set up the Maypole decked with garlands, and danced the morris dance the whole of the livelong day. "Old times have changed, old manners gone!" True, in France they still crown the May queen, but the ceremony in Paris smacks too much of carnival, the atmosphere of the village is not there, the gayety is but artificial, and the laughter is not that of running waters that flow under old rustic bridges.

Toward the end of the 19th century, the various labor organizations in Europe adopted May Day as the occasion of annual demonstrations. In some countries, the day was frequently marked by clashes between the workingmen and government troops. More recently the First of May has been observed in an orderly manner as Labor Day.

Memorial Day or **Decoration Day.** This annual memorial takes place on May 30 throughout the Northern states, where it is observed generally

as a legal holiday. The beautiful custom, now nation-wide, was first inaugurated by the women of the South who, in the first days of early spring, went out to strew flowers on the graves of their beloved dead. This example was imitated here and there in the North. In 1868, General John A. Logan, then commander in chief of the Grand Army of the Republic, issued an order designating May 30 as a day for the decorating of soldiers' graves. Since that time, the 30th of May has become the occasion in most states for the commemoration of American soldiers and, in many localities, of all dead.

Middle Kingdom, Feast of the. This is a feast celebrated among the Chinese usually about the middle of the second month according to their calendar. On this occasion, branches of the cactus tree with bunches of sago plant and garlic are hung outside the doors. The women bake a special cake, the chief ingredient of which is the poison-fish plant. These cakes are to be eaten sitting, as thus they are efficacious against evil spirits. The cakes are frequently sent also to friends who have emigrated to other countries.

Mother's Day. The honor of suggesting this festival is due to Miss Anna Jarvis of Philadelphia, who, in a public meeting in 1907, proposed the wearing of a carnation on the second Sunday of each recurring May "in honor of the best of mothers—your own." If one's mother be dead it is befitting the flower shall be white; if she be living, it may be of any color. Philadelphia was the first city to observe this feast, May 10, 1908. Since then, state after state has taken up the celebration. Observance of the day began in England as early as 1913, and, through the activity of Miss Jarvis, an international organization to promote the recognition of the day has been formed.

Navy Day. Since 1922, the anniversary of Theodore Roosevelt's birthday, October 27, has been observed as Navy Day in the United States. Its purpose is to educate the people in navy policy. Addresses are given by public men setting forth the requirements of sea service, the value of the navy as the first line of defense, and its importance in international affairs.

New Year's Day. The celebration of the first day of the calendar year is one of the oldest of festivals. The reason of its observance has varied, of course, with the different calendar systems. Its holiday character is today well-nigh universal in civilized countries. In China and Japan, and generally throughout the Orient, the customs attending New Year's Day are elaborate, and in the air of rejoicing and the exchange of gifts the festival partakes of the nature of the Western Christmas celebrations.

New Year's Day in Scotland, as well as in France and some other countries of Europe, is a more important holiday than Christmas. In America, observance of the day has varied with the sections of the country and the traditions of the people.

Generally, New Year's Eve and New Year's Day are occasions of visiting and entertainment; in many communities, churches observe New Year's Eve with watch night services. The arrival of the new year is signalized by the clang of bells and the blare of whistles. The former custom of New Year's calls has virtually been abandoned. Since Washington's time it has been the custom for the president of the United States to hold a reception on New Year's Day.

Olympic Games. These contests formed the most notable of the four Greek festivals of ancient times, and citizens from all the Grecian states were eligible to take part in them, provided they gave proofs of civic and personal integrity. The games took place on the plain of Olympia in Elis every fourth year, and consisted of wrestling, throwing of the discus, chariot racing, and foot racing. The names of the victors were kept on record, and great honors were shown them. Each successful competitor was crowned with a garland of wild olive and received a palm branch, the emblem of victory. Moreover, their statues were erected in the Altis, or central enclosure of the sacred precincts of Olympia. The year 776 B. C. was taken as the date of the first Olympic games, and Greek dates were reckoned from that time.

In 396 A. D., the Olympic games were suppressed by order of Theodosius, the Roman emperor. After a lapse of 15 centuries, they were revived, and in 1896 a great international contest of athletes was organized at Athens, to be the forerunner of a long series of such competitions. The outstanding feature of the modern Olympic games is the Marathon race, over a course of 26 miles, 385 yards—the distance from Marathon, Greece, to Athens. This race commemorates the famous run of Phidippides, the messenger who brought to Athens the report of the Greek victory over the Persian army at Marathon in 490 B. C. Phidippides is said to have expired immediately after delivering the message. The dates and places of holding the modern Olympic games are as follows: 1896, Athens, Greece; 1900, Paris, France; 1906, Athens, Greece; 1908, London, England; 1912, Stockholm, Sweden; 1920, Antwerp, Netherlands; 1924, Paris, France; 1928, Amsterdam, Netherlands; 1932, Los Angeles, U. S. A.

Passover. The most important of the Jewish festivals, called also the Feast of Unleavened Bread. It is observed in commemoration of the liberation of the Hebrews from bondage in Egypt. This feast begins on the 14th day of the month known as *Nisan*, the first of the Jewish year, corresponding to parts of March and April, and lasts until the 21st. The first and last days of the feast are observed as holydays. During this week Passover cakes, made simply of flour and water and baked hard, are eaten. For many centuries this festival has been begun with a festal meal, at which appear symbols of the meaning of the celebration. The three cakes of unleavened bread, *matzoth*, symbolize the haste in leaving Egypt; the roasted lamb bone and egg commemorate the sparing of the first-born; a dish of bitter herbs recalls the sorrow of life in Egypt; a paste of nuts, fruit, and spices represents, in its mortar-like consistency, the people's burden of toil.

Red-Letter Days. Saints' days and other holidays were formerly, and usually are still, marked in Church calendars with a red letter. From this custom comes the expression "red-letter day," meaning an especially fortunate or happy one.

Rose Festival. The annual civic celebration held in Portland, Oregon, during a week in the early part of June, when the roses, for which the city is noted, are at the height of their splendor. The festivities include a pageant of roses, a water carnival, and a program of athletic games.

Sabbatical Year. According to ancient Jewish law, every seventh year the Israelites allowed their fields to lie fallow, neither tilling nor sowing them, and even refraining from gathering the vintage. By extension, this term is applied to prolonged vacations which, in some colleges, are allowed to professors about every seventh year for the purpose of travel and research.

Saint Patrick's Day. March 17, the day on which the Irish commemorate their great national saint, who died at Saul (Sabhal), County Down, March 17, 493, at the patriarchal age of 106. He was buried at the chieftain's dun or fort two miles outside the town. From all parts, it is recorded, bishops, priests, and people gathered round his tomb to honor the venerable father of their faith. For over 14 centuries, this same spirit of reverencing the memory of Patrick has survived in the hearts of Irish men and Irish women in every part of the world.

Saint Valentine's Day. A festival called also popularly Valentine Day, falling on February 14. The origin of the observance of this day is

altogether uncertain. Equally vague are the circumstances that led to its connection with Saint Valentine. Among the many interesting folk customs of medieval France and England was a gathering of the young people on Saint Valentine's eve. Names were drawn by chance from a receptacle, the person whose name was on a slip becoming the "valentine" or sweetheart of the holder for the ensuing year. Some antiquarians find a precedent also in certain similar customs connected with the ancient Lupercalia, which occurred in February.

Saturnalia (*săt'ŭr-nā'lĭ-ă*). An ancient festival among the Romans, held in honor of Saturn and celebrated about the middle of December. It usually lasted several days beyond the date set apart for the official rites. A king was chosen to preside over the feasting, which was a mixture of mirth and license, when masters and mistresses were wont to wait on their slaves. The term is now used to designate any festivity where the manner of merrymaking is of an unrestrained and intemperate nature.

Shrove Tuesday. The Tuesday before Ash Wednesday, which is the equivalent for the French *mardi gras* and the Italian *martedi grasso* (fat Tuesday), the last day of carnival in the greater part of southern Europe. The English term shrove comes from "to shrive," or hear confessions, and is further explained by a quotation from the *Ecclesiastical Institutes*, translated by Abbot Ælfric, 1000 A. D.: "In the week immediately before Lent every one shall go to his confessor and confess his deeds, and the confessor shall so shrive him as he then may hear by his deeds what he is to do (by way of penance)."

The English custom of eating pancakes on this day undoubtedly arose from the economy of using up the eggs and fat which were formerly forbidden articles of diet during the forty days of Lent; hence also the origin of the name Pancake Tuesday, or Pancake Day.

Sunday or **Sabbath.** The first day of the week, called Sunday, is recognized by Christians as a holy day. By the church, the sanction of the fourth commandment has long been invoked for the observance of Sunday by worship and by cessation of ordinary labor. The Jewish Sabbath, or "day of rest," coincides with Saturday in the modern calendar. The word Sabbath is also frequently applied to the first day of the week. Following precedents of English common law, Sunday is generally recognized as a legal holiday throughout the United States.

Terminalia (*tûr'mĭ-nā'lĭ-ă*). An ancient Roman festival held annually on February 23 in honor of Terminus, the god of boundaries. Neighbors on adjoining lands met at the boundary stones and there united in offering up sacrifices, after which they gave themselves up to feasting, games, and dances.

Thanksgiving Day. In the United States, a day set apart annually and appointed by the president and by the governors of the various states for giving thanks to God for the favors and mercies of the year past. It is essentially a harvest festival and owes its origin to the Pilgrim Fathers. Despite the lean harvest of the summer of 1621, Governor Bradford decreed a day of thanksgiving and rejoicing after the scanty crop had been gathered in. This example of sturdy faith spread to the other New England colonies.

In the course of the Revolution, Congress frequently recommended days of thanksgiving and prayer. After the close of the war many of the states adopted the custom of an annual day of thanksgiving. There was, however, no uniformity of date for holding this festival. Owing, however, to the admirable persistence of Mrs. Sarah Josepha Hale, President Lincoln at last in 1863 appointed Thursday, August 6, "as a day for national thanksgiving, praise, and prayer." Since 1864, the last Thursday in November has been proclaimed annually by the president as the day of national thanksgiving.

The holiday has long been celebrated in Canada also, where it is proclaimed annually by the governor-general. The date is now fixed as Monday of the week in which November 11 occurs.

Tournament of Roses. At Pasadena, California, on January 1 of each year, is held a festival to which the floral wealth of southern California contributes in lavish profusion. The fête is a civic enterprise of the city of Pasadena, in which neighboring communities, large and small, participate. A brilliant pageant of flower-decked floats, automobiles, and carriages forms the principal feature of the celebration, which includes also games and races. Since its inauguration in 1890, this festival has become a famous event which attracts thousands of visitors from all parts of the world.

Victoria Day. The birthday of Queen Victoria, May 24. A movement to celebrate this date as Empire Day was initiated by Reginald Brabazon, earl of Meath, an English philanthropist. The aim of the proposal was to emphasize the unity of interest among the parts of the British Empire. Both the observance and the name of Empire Day have gained wide acceptance in Canada and in other parts of the British Commonwealth of Nations.

Wedding Anniversaries. Anniversaries of the wedding day are named from a custom (generally observed in all civilized countries) of giving certain kinds of presents as each anniversary comes about. The three most important anniversary celebrations are known as the silver wedding, after twenty-five years; the golden wedding, after fifty years; and the diamond wedding, after sixty, seventy, or seventy-five years. Other anniversaries of different periods have various other names, but are observed only locally, as in England. For instance, the first anniversary is known as the *paper* or *iron* wedding; the second, *straw*; the third, *candy*; the fourth, *leather*; the fifth, *wooden*; the seventh, *floral*; the tenth, *tin*; the twelfth, *linen*; the fifteenth, *crystal*; the twentieth, *china*; the thirtieth, *pearl*; the thirty-fifth, *coral*; the fortieth, *emerald*; and the forty-fifth, *ruby*. These latter names are now practically moribund and are seldom used.

HOLIDAYS IN THE UNITED STATES

In the United States, the expression, national holiday, is used popularly in reference to the Fourth of July and other generally observed holidays. Strictly, however, the United States has no national holidays, in the sense of days set apart by national law authorizing suspension of business and official activities.

Any action of Congress in respect to holidays applies only to the District of Columbia, other territory under direct Federal control, and to Federal offices wherever located. By a general act, Congress has made Labor day a legal holiday in the District of Columbia. Apart from this instance, legal holidays in the United States are those established by statute in the various states. In the following list, Labor day is the first Monday in September unless otherwise stated.

HOLIDAYS IN THE VARIOUS STATES

Alabama.—Jan. 1; Jan. 19 (Lee's birthday); Feb. 22 (Washington's birthday); Mardi Gras; Apr. 13 (Jefferson's birthday); Apr. 26 (Confederate Memorial day); June 3 (Jeff. Davis's birthday); July 4; Labor day; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Alaska.—Jan. 1; Feb. 12 (Lincoln's birthday); Feb. 22; Mar. 30 (Seward day); May 30; July 4; Oct. 18 (Alaska day); Thanksgiving day; Dec. 25.

Arizona.—Jan. 1; Feb. 14 (Admission day); Feb. 22; May 30; July 4; Labor day; Oct. 12 (Columbus day); General Election day; Nov. 11; Thanksgiving; Dec. 25; Arbor day.

Arkansas.—Jan. 1; Jan. 19; Feb. 22; June 3; July 4; Oct. 12; Labor day; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

California.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Sept. 9 (Admission day); Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Colorado.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Aug. 1 (Colorado day); Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Connecticut.—Jan. 1; Feb. 12; Feb. 22; Good Friday; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Delaware.—Jan. 1; Feb. 12; Feb. 22; Good Friday; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

District of Columbia.—Jan. 1; Feb. 22; March 4 (Inauguration day); May 30; July 4; Labor day; Thanksgiving day; Dec. 25; Arbor day.

Florida.—Jan. 1; Jan. 19 (Lee's birthday); Feb. 22; Mardi Gras; Good Friday; April 26 (Confederate Memorial day); June 3 (Jeff. Davis's birthday); July 4; Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Georgia.—Jan. 1; Jan. 19 (Lee's birthday); Feb. 12 (Georgia day); Feb. 22; Apr. 26 (Confederate Memorial day); June 3; July 4; Labor day; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Idaho.—Jan. 1; Feb. 22; May 30; June 15 (Pioneer day); July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Illinois.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Indiana.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Iowa.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Kansas.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Kentucky.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Louisiana.—Jan. 1; Jan. 8 (anniversary of the battle of New Orleans); Feb. 22; Mardi Gras; Good Friday; June 3 (Jeff. Davis's birthday); July 4; Labor day; Oct. 12; Nov. 1 (All Saints' day); General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Maine.—Jan. 1; Feb. 22; Apr. 19 (Patriots' day); May 30; July 4; Labor day; Oct. 12; General Election day (Courts only); Thanksgiving day; Dec. 25; Arbor day.

Maryland.—Jan. 1; Feb. 22; Mar. 25 (Maryland day); Good Friday; May 30; July 4; Labor day; Sept. 12 (Defenders' day); Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Massachusetts.—Jan. 1; Feb. 12; Feb. 22; Apr. 19 (Patriots' day); May 30; July 4; Labor day; Oct. 12; Thanksgiving day; Dec. 25; Arbor day.

Michigan.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Minnesota.—Jan. 1; Feb. 12; Feb. 22; Good Friday; May 30; July 4; Labor day; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Mississippi.—Jan. 1; Jan. 19; Feb. 22; Apr. 26 (Confederate Memorial day); June 3; July 4; Labor day; Thanksgiving day; Dec. 25; Arbor day.

Missouri.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 1 (Missouri day); Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Montana.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Nebraska.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Nevada.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; Oct. 31 (Admission day); General Election day; Thanksgiving day; Dec. 25; Arbor day.

New Hampshire.—Jan. 1; Feb. 22; fast day appointed by the governor; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

New Jersey.—Jan. 1; Feb. 12; Feb. 22; Good Friday; May 30; July 4; Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

New Mexico.—Jan. 1; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

New York.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

North Carolina.—Jan. 1; Jan. 19; Feb. 22; Apr. 12; May 10 (Confederate Memorial day); May 20 (anniversary of the signing of the Mecklenburg declaration of independence); July 4; Labor day; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

North Dakota.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Ohio.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Oklahoma.—Jan. 1; Feb. 22; May 30; July 4; Labor day; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Oregon.—Jan. 1; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Pennsylvania.—Jan. 1; Feb. 12; Feb. 22; Good Friday; May 30; July 4; Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Philippines.—Jan. 1; Feb. 22; Thursday and Friday of Holy Week; Labor day (May 1); May 30; July 4; Aug. 13; Thanksgiving day; Dec. 25; Dec. 30; Arbor day.

Porto Rico.—Jan. 1; Feb. 22; Mar. 22 (Emancipation day); Good Friday; May 30; July 4; July 25 (Occupation day); Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Rhode Island.—Jan. 1; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

South Carolina.—Jan. 1; Jan. 19 (Lee's birthday); Feb. 22; May 10 (Confederate Memorial day); June 3 (Jeff. Davis's birthday); July 4; Labor day; General Election day; Thanksgiving day; Dec. 25; Arbor day.

South Dakota.—Same as in North Dakota, excepting Oct. 12.

Tennessee.—Jan. 1; Jan. 19; Feb. 12; Feb. 22; Good Friday; May 30; June 3; July 4; July 13 (Gen. Bedford Forrest's birthday); Labor day; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Texas.—Jan. 1; Feb. 22; March 2 (anniversary of Texas independence); Apr. 21 (anniversary of battle of San Jacinto); June 3 (Jeff. Davis's birthday); July 4; Labor day; Oct. 12; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Utah.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; July 24 (Pioneer day); Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Vermont.—Jan. 1; Feb. 22; May 30; July 4; Aug. 16 (Bennington Battle day); Labor day; Oct. 12; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Virginia.—Jan. 1; Jan. 19; Feb. 22; May 30; June 3; July 4; Labor day; General Election day; Nov. 11; Thanksgiving day; Dec. 25; Arbor day.

Washington.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

West Virginia.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; Labor day; Oct. 12; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Wisconsin.—Jan. 1; Feb. 22; May 30; July 4; Labor day; General Election day; Thanksgiving day; Dec. 25; Arbor day.

Wyoming.—Jan. 1; Feb. 12; Feb. 22; May 30; July 4; General Election day; Thanksgiving day; Dec. 25; Arbor day.

HOLIDAYS IN CANADA

The following holidays are generally observed in the Dominion of Canada with the closing of banks and public offices and the cessation of business: Jan. 1, Good Friday, Easter Monday, May 24 (Victoria day or Empire day), June 3 (King's birthday), July 1 (Dominion day), first Monday in September (Labor day), Dec. 25 (Christmas day). The Monday of the week in which November 11 occurs is celebrated as Armistice day and also as Thanksgiving day. In the province of Quebec, the following are holidays: Epiphany, Ascension, All Saints' day, Conception day.

STATISTICS OF RELIGIOUS BODIES

THE accompanying table, *Churches in the United States*, shows the number of churches and of members of the various denominations as of 1926, based on the enumeration made by the United States bureau of the census released in 1928. For purposes of comparison, the membership in 1916 is also given. The total church membership in 1926 was 54,624,976, or 46.7 per cent of 117,136,000, the population of the United States for that year as officially estimated by the bureau of the census. In 1916, there were 41,926,854 church members, 41 per cent of the population at that time. The total number of churches in 1926 was 231,983, divided among 213 religious bodies. The reported expenditure for the year was $814,371,529; the total value of church edifices was $3,842,577,133.

CHURCHES IN THE UNITED STATES

NAME	Churches	Members	
	1926	1916	1926
Adventists (5 bodies)	2,576	114,915	146,177
African Orthodox	13		1,568
American Ethical Union	6	2,850	3,801
American Rescue Workers	97	611	1,989
Assemblies of God, General Council	671	6,703	47,950
Baha'is	44	2,884	1,247
Baptist Bodies—Total	60,192	7,153,313	8,440,922
Northern Convention	7,611	*1,244,705	1,289,966
Southern Convention	23,374	2,708,870	3,524,378
Negro Baptists	22,081	2,938,579	3,196,623
Others (15 bodies)	7,126	261,159	429,955
Brethren, German Baptists (Dunkers)	1,279	133,626	158,248
Brethren, Plymouth	633	13,717	22,961
Brethren, River	119	5,389	5,697
Catholic Apostolic	11	2,768	3,408
Christadelphians	134	2,922	3,352
Christian and Missionary Alliance	332	9,625	22,737
Christian Church (General Christian Conv.)	1,044	118,737	112,795
Christian Union	137	13,692	8,791
Church of Armenia in America	29	27,450	28,181
Church of Christ, Holiness	82		4,919
Church of Christ, Scientist	1,913		202,098
Church of God	644	7,784	23,247
Church of God†	932		38,249
Church of God and Saints of Christ	112	3,311	6,741
Church of God in Christ	733		30,263
Church of the Nazarene	1,444	32,259	63,558
Churches of Christ	6,226	317,937	433,714
Churches of God, Holiness	29		2,278
Churches of God in N. A. (General Eldership)	428	28,376	31,596
Churches of the Living God	230	11,635	17,402
Churches of the New Jerusalem	98	7,085	6,438
Communistic Societies	13	1,901	1,577
Congregational Churches	5,028	‡809,236	881,696
Disciples of Christ	7,648	1,226,028	1,377,595
Divine Science	22		3,466
Eastern Orthodox	446	249,840	259,394
Evangelical	2,054	210,530	206,080
Evangelical Congregational	153		20,449
Evangelical Synod, N. A.	1,287	339,853	314,518

CHURCHES IN THE UNITED STATES*—Con.

NAME	Churches	Members	
	1926	1916	1926
Evangelistic Assoc'ns	257	12,184	15,763
Federated Churches	361		59,977
Friends (Quakers)	885	112,982	110,422
Independent Churches	257	56,757	34,501
Jewish Congregations	2,953		4,087,357
Latter Day Saints	1,867	462,329	606,561
Liberal Catholic	39		1,799
Lutherans—Total	19,854	2,464,538	5,258,623
United Lutheran	3,650	763,596	1,214,340
Evangelical Synodical Conf. of America	4,752	777,701	1,292,620
Evangelical Synod of Mo. Ohio, etc.	3,917		1,040,275
Others (19 bodies)	7,535	923,241	1,711,388
Mennonites (17 bodies)	826	79,363	87,164
Methodists—Total	60,644	7,165,575	8,070,619
Total White:	48,731	6,098,787	6,842,685
Meth. Episcopal	26,130	3,717,785	4,080,777
Methodist Episcopal, South	18,096	2,114,479	2,487,694
Others (8 bodies)	4,505	266,523	274,214
Total Colored:	11,913	1,066,788	1,227,934
African M. E.	6,708	548,355	545,814
Colored M. E.	2,518	245,749	202,713
African M. E. Zion	2,466	257,169	456,813
Others (6 bodies)	221	15,515	22,594
Moravians (3 bodies)	164	28,407	37,243
New Apostolic	25	3,828	2,938
Old Catholic Churches in Amer. (3 bodies)	47	5,175	18,048
(Original) Church of God	50		1,869
Pentacostal Assemblies of the World	126		7,850
Pentacostal Holiness	252	5,353	8,096
Pilgrim Holiness	441	5,276	15,040
Polish National Catholic	89	28,245	60,974
Presbyterian—Total	14,848	2,255,626	§2,625,284
Presbyterian, U. S. A.	8,947	1,625,817	§1,894,030
Presbyterian, U. S.	3,469	357,769	451,043
Cumberland Presb.	1,097	72,052	67,938
United Presb. N. A.	901	167,726	171,571
Others (5 bodies)	434	39,262	40,702
Protestant Episcopal	7,299	1,092,821	1,859,086
Reformed Bodies—Total	2,751	539,021	626,202
Reformed in U. S.	1,709	344,374	361,286
Reformed in Amer.	717	144,929	153,739
Others (3 bodies)	325	49,718	111,177
Roman Catholic	18,940	15,721,815	18,605,003
Salvation Army	1,052	35,954	74,768
Scandinavian Evangelical (3 bodies)	505	37,816	48,785
Schwenkfelders	6	1,127	1,596
Social Brethren	22	950	1,214
Spiritualists (3 bodies)	611	29,028	50,631
Theosophical Societies (3 bodies)	225	5,169	57,503
Unitarians	353	82,515	60,152
United Brethren (3 bodies)	3,375	367,934	395,885
Universalists	498	58,566	54,957
Volunteers of America	133	10,204	28,756
Other Denominations	141	46,184	7,828

*Includes Free Baptists. †Headquarters at Anderson, Ind.
‡Includes Evangelical Protestant Church of N. A. §Includes Welch Calvanistic Methodists.

RELIGIONS OF THE WORLD

NAME	North America	South America	Europe	Asia	Africa	Oceania	Total
Christians	104,000,000	36,000,000	374,000,000	30,000,000	8,000,000	14,000,000	566,000,000
Jews	3,380,000	120,000	10,480,000	430,000	380,000	20,000	14,810,000
Mohammedans	20,000	10,000	4,000,000	140,000,000	45,000,000	30,000,000	219,030,000
Buddhists	5,000	1,000	100,000	135,000,000	5,000	50,000	135,161,000
Hindus	100,000	100,000	50,000	210,000,000	100,000	50,000	210,400,000
Confucianists, Taoists	100,000	5,000	25,000	300,000,000	25,000	1,000,000	301,155,000
Shintoists	1,000	1,000	5,000	20,000,000	5,000	500,000	20,512,000
Animists	20,000	1,300,000	5,000	30,000,000	85,000,000	20,000,000	136,325,000
Miscellaneous	8,000,000	1,000,000	2,000,000	5,000,000	100,000	200,000	16,300,000

POPULAR SUPERSTITIONS

The term superstition, like religion, is a word of uncertain origin. The process by which the Latin word, *superstitio*, literally "standing over," acquired the sense of "awe" or "excessive devotion" is a matter of conjecture. In modern times, especially within the recent scientific period of thinking, superstition has borne two related meanings. As contrasted with the development and application of scientific knowledge, superstition is a relic of the prescientific ages,—of the childhood thought and fancy of the race. As compared with the orderly, systematic conceptions of science about the world and human conduct, superstition accepts a strange, disorderly world of chance, in which men must encounter the play of unknown forces with traditional rites and irrational charms. The practices of primitive superstition are usually directed to propitiation or control of mysterious and lawless powers.

The early history of the human race produced a huge mass of superstition, born of ignorance and fear. Much of this body of beliefs and practices is yet in vogue among primitive tribes, and not a little of it persists in the backward sections of civilized nations. Indeed recent studies have shown that few even of the most highly educated men and women are free of traces of superstition. Many of these appear, however, merely as survivals of childhood practices; others are retained as amusing, playful fancies.

Because of the fact that many superstitions arise from efforts to explain phenomena and to adapt human activity to the explanations, a close relationship between superstition and science is observable. This fact is particularly evident in the connection between the pseudo science astrology and the science astronomy. Astrology, like alchemy, mingles much true scientific observation with superstitious reasoning.

As science advances, superstition recedes. For science brings increasing freedom through comprehension and rational use of natural forces, while superstition holds the human mind in bondage to blind magic and fear. The progress of education is indicated by the disappearance of superstitions from among the people.

In the following pages, a large number of the most prevalent superstitions are briefly treated. Some of these examples are drawn from the lore of primitive peoples, but most are such as are found today in America and Europe and may be termed popular superstitions.

Astrology. The pseudo science which purports to explain human character and to forecast conduct by the supposed influences of the planets and the stars. The practice of the art of casting *horoscopes*, or predicting the course of a person's life by reference to the positions of heavenly bodies at the time of his birth, is almost as ancient as civilization. By means of great circles passing through the poles, the astrologers divided the heavens into 12 "houses," each house having a planet as lord. That "house" which, at the moment of a person's birth, was about to appear above the horizon was said to be in ascendant, and to be most powerful in its influence. The point just visible on the ecliptic was called the horoscope. If, for example, the house of Mars was in ascendant at a child's birth, it was prophesied that the child would become warlike. Other qualities and fortunes were predicted from various relations of the planets and constellations.

Astrology is the most elaborately organized of superstitions. It was practiced as a means of livelihood by the celebrated astronomer Kepler. It became more and more discredited in Europe during the 17th century, although it still has its devotees in all countries.

Basilisk (*băz'ĭ-lĭsk*; *băs'-*). A serpent, lizard, or dragon, mentioned in fable, whose hissing could drive away all other snakes. By its very look, it was said to fascinate to helplessness, and its breath meant death to its victims. To have the eye of a basilisk means figuratively to attract others by one's gaze and to have a mysterious sway over them.

Birds and Beasts, Superstitions about. In Holland and in other northern European countries, the *stork* is welcomed about homesteads. Platforms are often erected on the roofs of houses to induce the birds to build their nests. The birds are fabled to bring children, and there is a prevalent fancy that where the storks nest no fire will come.

According to the ancients, the seven days prior to and the seven days following the winter solstice, the shortest day of the year, were halcyon days. During this period the *halcyons*, or kingfishers, are said to build their floating nests upon the sea and hatch their young, "so that by their privilege we have seven days and seven nights in the very heart of winter, wherein we may sail without danger." Hence the expression "halcyon days" is used figuratively to mean a time of rest and tranquil enjoyment.

In Ireland is found the belief that a *robin* entering a peasant's house is a sign of severe frosts and snow. In the Kentucky mountains, the flight of a bird into a house is a sign of bad luck, particularly an omen of death.

The common *dragon fly* is the object of several curious superstitions. Perhaps the most prevalent is that this beautiful insect will get into children's hair and sew up their ears. Hence the name "devil's darning needle."

Around the *petrels* many superstitions have gathered. These birds are supposed by sailors to be under the Virgin Mary's protection. Each is said to represent the soul of a mariner lost at sea. The coming of one species near a ship is believed to forbode storm; hence the name "storm petrel."

Certain Eskimo tribes are said to bury a *dog* with a dead child, that the dog may guide the child in another world.

Among the Negroes of the southern United States, much superstitious lore about animals is current. It is regarded as an omen of bad luck, for example, to have a *rabbit* cross one's path from right to left; if the rabbit crosses from left to right, good luck will follow. The left hind foot of a rabbit is held to be a lucky talisman. While possession of a horseshoe is lucky, finding a mule shoe is most unlucky.

Birthstones. In addition to their value as ornaments, certain precious stones have been endowed with fancied lucky qualities and worn as talismans. Astrologers have developed an elaborate symbolism of gems, and out of this has arisen the widely prevalent fancy of birthstones, or jewels supposed to be magically appropriate to the month of one's birth. Several lists of these lucky gems are current, the most common being the following: January, garnet; February, amethyst; March, bloodstone; April, diamond; May, emerald; June, pearl; July, ruby; August, sardonyx; September, sapphire; October, opal; November, topaz; December, turquoise.

Bugaboo (*bŭg'ă-bōō'*), **Bogie** (*bō'gĭ*). Names with which nurses in former times were wont to frighten recalcitrant infants into being "good." The origins of the words seem to be doubtful, though bugaboo (and possibly bogie) may be traced to the Celtic word *pouca* (pooka) meaning a mischievous phantom; or to the Old French *bugibu*, the name of a demon.

Caul (*kôl*), **Lucky.** The caul is a membrane found sometimes enveloping the head and face of a child at birth. It is regarded as an omen of good luck and as a talisman against drowning. Sailors

are known to give large sums of money to be in possession of "lucky cauls." Whence the superstition arose is a mystery, but its antiquity is vouched for by no less a personage than Saint John Chrysostom (347–407 A. D.), who tells us that the midwives of his time sold these cauls for the purposes of magic.

Charms. Belief in magic gives rise to faith in the power of various objects to produce unusual effects, especially in either bringing on or warding off evil. Among primitive folk, probably the most potent charms are believed to reside in material upon which magic words have been written. Extraordinary virtue also is ascribed to objects of unusual form, especially if they resemble the human body or some of its parts. Thus the ginseng root is said to be especially prized among the Chinese if it suggests the form of the body.

Through long years of tradition, certain stones, gems, bones, and pieces of metal have acquired a popular reputation as charms which, when worn on the body, will ward off various diseases and troubles. As words are held to be of greatest magical potency, so their evil effects may often be obviated by touching some substance. The common, jocular custom of rapping on wood when a possible disaster is mentioned is a survival of this ancient superstition.

The pain and the crippling effects of rheumatism have occasioned the wearing of many kinds of charms against the disease. In some parts of America, cedar knots or galls from goldenrod stems are esteemed for this purpose. Elsewhere, a buckeye or horse-chestnut or a ring made of a potato is deemed efficacious. The wearing of an iron ring for a similar purpose is said to be a survival of primitive notions that the metal would draw out the disease as the magnet or lodestone attracts metal.

Dwellings also, as well as human bodies, are believed to need protection from evil influences. For this purpose, the familiar horseshoe serves. In China, certain herbs are suspended over doorways as protection against witchcraft. In rural England, hawthorn branches are similarly used.

An *amulet* is a charm worn on the person as a protection against evil. The word is of uncertain origin, being referred by some authorities to the name of a plant, *amuletum*, mentioned by Pliny as reputed to possess magic powers. A *talisman* is a charm believed to endow its wearer with power over other things and people.

A *fetish* is a charm or amulet in which the protecting spirit is supposed actually to dwell.

Clover, Four-Leaved. The fancy of luck attaching to the finding of four-leaved clovers probably springs, like so many other beliefs, from the rare or unusual occurrence of the four leaves. In Ireland, the corresponding superstitions are connected with the four-leaved shamrock. The miniature maltese cross formed by the leaves is suggested as additional reason for belief in the four-leaved clover as a talisman.

Divining or **Dousing Rod.** The belief that hidden springs and water courses may be located by means of a forked hazel or apple twig is widespread and persistent. Only certain gifted persons, however, are supposed to be able to use the method. The twig, held firmly and horizontally in the hand, is said to tilt or bend downward when the operator stands over a vein of water. Much popular evidence for the efficacy of the practice is available, but recent careful, scientific study has failed to justify the claims made for the rod.

Evil Eye. The superstitious belief persists that certain persons are endowed with diabolical powers which they exercise through looking at people. This belief and its attendant fears are found among all peoples. Certain charms and talismans are supposed to afford protection against the malignant influence of the evil eye.

Friday, Ill Luck of. The superstition which attributes ill luck to this day of the week may have originated among the Norsemen. With them, Friday was sacred to the goddess Freya, the northern Venus, after whom it was named. Anyone who undertook a journey or devoted himself to business projects on this day was looked upon as dishonoring her, and she was known to avenge herself by overwhelming him with misfortune. Among Christians, this irrational fear of Friday as a day of ill omen is no doubt associated with the death of Christ. Friday is, however, but one of many days which the strange fancies of astrology have declared unlucky.

It is interesting to note, in this connection, that Friday is the Moslem Sabbath. Among Mohammedans generally, the day is regarded as especially lucky. The Mohammedan peasants in the northwest frontier of Hindustan are said to reverence the day particularly because of a tradition that on that day God rested from the work of creation.

Horsehair Turning to Snake. Among children, especially, and even among many grown-ups, it is believed that, if a horsehair is thrown into a pool, the hair will be changed into a snake. The truth is that what people imagine to be snakes are merely what are known as hairworms, which usually breed in ditch water or in any stagnant pool. These worms belong to the genus *Gordiacea*, named in reference to the Gordian knot, because they are often found in tangled masses. The larvæ develop in the bodies of insects, whence they escape into the water. In this breeding stage, they have the appearance of threads, and measure about 10 to 30 inches in length. Their eggs are deposited in long strings in the water.

Horseshoe, Lucky. The custom of nailing a horseshoe over the door of a house, as a talisman and a charm against evil spirits, is to be found in all English-speaking countries, as well as among the Norwegians, Swedes, Danes, and several other northern races. Nor is the custom unknown in Hindustan. Among the ancient Saxons and the Irish, the horse was regarded as a creature that brought good luck, and from this belief their superstition of the power existing in the horseshoe may have arisen. Ancient authorities aver that the horseshoe must be placed with the open side up, else the luck will all run out. Finding horseshoes also is said to be lucky, and it is said that, if a maid find a horseshoe with nails in it, their number counts the years before she shall marry.

Magic. A word of very wide application. It is used to signify the entire field of primitive religion and science as well as the tricks of the modern sleight of hand performer. As a phase of superstition, magic includes the use of occult formulas and strange devices to insure success in daily affairs, to cure disease, to avert punishment or catastrophe, to punish enemies, and generally to command the aid of powerful spirits.

The use of magical words, such as are employed in the *Arabian Nights* tales, which, when pronounced, will open doors or summon genii, is a typical form of magic. Perhaps the most widespread and interesting form is the so-called sympathetic magic. This practice rests upon the idea that effects produced upon a representation or image of a thing will be accompanied by similar effects upon the thing itself. Hence arises the practice of making an image of a person one desires to injure or torment. Injury or mutilation of the image, accompanied by proper incantations, will, it is believed, result in corresponding suffering and injury to the person himself. The widely prevalent custom of hanging people in effigy probably has its origin in these beliefs.

To the kinds of magic which were employed to do harm, the name "black magic" is applied; magical practices used to summon good spirits and to counteract evil are called "white magic."

Magic in Medicine. Among many primitive tribes the mystery of death presented itself as the result of evil magic worked by some enemy. Disease also was looked upon as the work of evil spirits controlled by magicians and sorcerers. In consequence, treatment of the sick became a magical process of weird performances of the savage priest or medicine man. Among the ignorant of all countries many survivals of this primitive magic are to be found. One of the greatest tasks of modern medical science is to banish the suffering and cruelty which attach to these ancient practices.

A common practice of the savage doctor is the use of loud noises to frighten away evil spirits. For this purpose, he uses drums and rattles. The patient is often subjected to physical torture to accomplish the same results. Exorcism, or the banishment of spirits by magical formulas of words, is also a frequent practice.

Sympathetic magic finds its place in medicine also, as in the prescription of a flower resembling the eye for eye trouble, or, for disease of the brain, a nut having a shell resembling the skull and a kernel resembling the two halves of the brain. A more primitive belief leads to applying cooling remedies to a weapon that has made a wound rather than to the wound itself. Very widespread also is the belief that, by contact, or even by wishing, a disease may be passed to an animal, and thus the human sufferer be cured.

A very persistent superstition is that which ascribes potency to a medicine in proportion to its disagreeable taste,—the more uncanny and nauseating the mixture, the more efficacious it is believed to be. Similarly, the wearing or carrying of onions, pieces of sulphur, or camphor gum is superstitiously regarded as a shield against various diseases. See *Charms*.

Mascot. A word brought into prominence by Audran's comic opera "La Mascotte" in 1880. It signifies something animate or inanimate that brings good luck to the one who wears it or to whom it belongs. Thus, "for luck," baseball and other playing teams will take some animal with them on their tours. The derivation of this word is somewhat uncertain, though it has a very close analogy to the Provencal *masco*, a sorceress or witch. It has been traced also to the French term *né masqué*, said of a child born with a membrane or *caul* over its face, which was regarded even among the ancients as being extremely lucky. Though the cult of the mascot has always been cherished among sailors and soldiers, it came much more into evidence during the World War, when such was the demand for these charms that their manufacture became a thriving business. See *Caul*, *Lucky*.

Mistletoe, Legends of. The mistletoe is a parasitic, excrescent shrub which grows on the trunks and between the forked branches of various trees, such as hawthorn, sycamore, pear, and apple. With its white, translucent berries, the mistletoe is a great favorite at Christmastide, both as a decoration and as a license-giving sign for the harmless pastime of promiscuous kissing.

In ancient times it was regarded by the druids as sacred when it grew on the oak—which seldom happens with the European variety. It was then supposed to have all-healing properties. It had also the reputation among the early Christians of helping in cases of old age infirmities and was called *lignum Sanctæ Crucis*, "wood of the Holy Cross." In northern European mythology, Balder, the sun god, who was held to be invulnerable, was shot to death with an arrow made from this wood. In the Saturnalia of the pagans, the mistletoe played a prominent part, whence the tradition of kissing has been handed down to modern times.

Numbers, Luck of Odd. One of the most ancient types of superstition is that which is concerned with the magical significance of odd numbers. In various forms, this kind of belief is widely prevalent today. The ancient Pythagoreans regarded the unit as the father of numbers. Odd numbers were consequently held to be masculine and more worthy than the feminine, even numbers. In China, pagodas are built with odd numbers of stories, for good luck, and the Siamese construct their houses with odd numbers of floors and stair steps.

The number three has been regarded as sacred by many peoples, including the Phœnicians, the Greeks, and the Hindus as well as Christians. Multiples of three, such as nine, share in the mystical significance of three. It is said that among the ancient Mayas the number nine signified indefinite power and excellence. A very fortunate man was said to have nine souls. Thirteen, with these people, had similar significance.

Seven, likewise, has been endowed with mystic significance. It was used frequently in ancient Babylonian incantations. The astrologers divided man's life into seven parts, each governed by one of the seven planets. Indeed, the widespread reverence for the number seven is probably traceable to the speculations of ancient astronomers or astrologers.

Oak, Ash, and Thorn. In English folklore, popular beliefs about these trees represent very well the persistence of superstitions attaching to trees. These beliefs may be regarded as remnants of ancient religious ideas. Among English country folk, quaint rimes and oaths "by oak, ash, and thorn" survive. A curious old fancy is that, when the butter will not "come" promptly in the churn, the dairy maid must stir the cream with a twig of the mountain ash, or rowan, which will correct the trouble. Hawthorn branches suspended in houses were formerly deemed effective protection against witchcraft.

The oak was regarded as a sacred tree by the druids, and many curious beliefs in its power to bring good fortune are current. Among the Kentucky mountaineers, it is said that washing in water that stands in an oak stump will remove freckles. It is deemed lucky for a miner to skin his back against an oak board.

Omens and Signs. Among primitive peoples there has always flourished a belief in the prophetic nature of certain events and natural appearances. The ancient nations developed an elaborate system of foretelling the course of both public and private enterprises. Among the signs observed were the flight of birds, the behavior of animals, the growth of vegetation, and the condition of the entrails of slaughtered beasts.

The advance of human knowledge has largely done away with belief in signs having no rational connection with events in question. Many curious sayings persist, however, which still command more or less acceptance among the credulous. For example, many people deem it unlucky to pass beneath a standing ladder. Others are dismayed at the breaking of a mirror, while the hoot of an owl or the howling of a dog is affirmed to presage evil and death.

There are, however, lucky as well as unlucky omens. Thus, seeing the new moon for the first time over one's left shoulder is said to be lucky, though it is also affirmed by some that over the right shoulder is the lucky way to view the moon. The possession of a black cat with no white in its fur is fortunate. In some districts of England, the first person in a neighborhood to hear the cuckoo's song in the spring is regarded as lucky. Such a saying as this last may have arisen as a way of expressing the joy that men feel at the coming of spring. Somewhat similarly, the saying that full saltcellars on New Year's Day are omens of a lucky year may be traced to times when salt was a precious thing in the household. If it was present in plenty, the house would probably be well supplied with other things.

Palmistry. The so-called art of reading character and personal fortune by inspection of the elevations, or "mounts," and the lines on the palm of a person's hand. The elaborate principles and rules that, since the middle ages, have been developed for the practice of this type of fortune telling form a conspicuous example of a pseudo science.

Prayer Wheel. A wheel or cylinder used among Buddhists of Tibet and Mongolia for the purpose of offering up prayer. Lengthy strips of paper with seemingly interminable prayers inscribed thereon are wound around these cylinders. When a Buddhist feels piously inclined, all he has to do is to set the cylinder in motion with his hand or by some artificial means. Thus is a blessing brought down on the head of the ingenious devotee.

Rain of Toads. Because small toads or frogs are seen hopping about in great numbers after heavy rain, many people think they have dropped from the sky as an effect of the rainstorm. The simple truth is that toads go through a tadpole existence in stagnant pools or ponds, which overflow with the rain, leaving the young toads high and dry on the grass or sedgy banks.

Shoe-Throwing at Weddings. The custom of throwing an old shoe after the bride and bridegroom as they leave the church or as they start on their honeymoon is of exceedingly ancient date, though of uncertain origin. It is nevertheless strongly reminiscent of what took place among the Jews of old, who were wont to give a shoe in witness of a covenant. For instance, when property or land changed ownership, the original possessor untied his shoe and gave it to the new purchaser or inheritor in token of complete abandonment of all present and future claim. It is said that in early Anglo-Saxon marriages the father of the bride delivered one of her shoes to the bridegroom, who touched her head with it, as a symbol of his authority. Today, only the idea of luck is associated with the custom, particularly at the beginning of a journey.

Tabu or **Taboo.** Among the South Sea Islanders, from whose language this word is derived, tabu signifies a kind of consecration of objects or persons. It involves a prohibition against touching certain things or approaching certain persons except in prescribed attitudes. In its original use, the term has a distinct religious meaning, but it is commonly used in English to signify similar customs found among many primitive peoples. The hunters of some American Indian tribes, for example, were forbidden to kill the animal represented in their tribal totem. The superstitious reverence for the tabu, cultivated by savage priests and chiefs, made it a very effective instrument of tribal discipline and control.

Tar Water. A cold infusion of tar in water, used as a drug. In 1739, Bishop Berkeley, Protestant bishop of Cloyne in Ireland, found during a visit to America that the Indians of Narragansett made lavish use of tar in concocting their medical nostrums. The people of his diocese at this period were stricken with violent dysentery, and he became obsessed with the idea of the efficacy of tar water for all maladies. He wrote a treatise on the virtues of tar water, which, together with his insistent advocacy of the drug, drew down upon him the indignation of medical men and the ridicule of the American and British newspapers of the time.

Telling the Bees. A very old superstitious fancy is that, when a death occurs in a family, some one must go to the hives and tell the bees of it, else the bees will become spiteful and hard to manage. A further phase of this belief is that just before the funeral of one who owns bees the hives must be turned around. It has been suggested that these fancies had their origin in a superstitious reverence for the extraordinary intelligence of the bees. Whittier, in his verses "Telling the Bees," beautifully described the custom.

Thirteen, Unlucky. In nearly all civilized countries, this number is regarded as unlucky, not only by the simple and unlettered, but by many persons of education. By many authorities this superstitious dread is said to have had its origin in the fact that Christ and his disciples made a total of thirteen and that he was betrayed by one of them. Traces of the superstition are found, however, in the traditions of many ancient peoples as widely separated as the Norsemen and the Hindus. Among the Turks, aversion to the number thirteen is strongly marked. The French and Italians and Latin races, in general, have a distinct horror of this number. In many streets of Paris there is no house to be found bearing the number thirteen.

In America there are hotels in which the number thirteen is applied to no floor and to no rooms. Imposing lists of eminent people who were superstitious on this point have been drawn up. Equal numbers could be cited who found good luck rather than ill in thirteen. Nevertheless, the belief still lingers as one of the ancient human follies that have resisted the attacks of satire and the admonitions of reason.

Vampire. A word of uncertain origin, used to signify a kind of spectral being with a human body, which, according to a very ancient superstition, leaves the grave at night and preys upon sleeping men and women. It is said that the vampires are the ghosts of dead wizards and people of evil life, and that, by sucking the blood of their victims, they maintain in their buried bodies a semblance of life.

Witchcraft. The delivery of the modern Western world from the terrible delusion of witchcraft is one of the great triumphs of the type of scientific thought which began to exercise wide influence in the 17th century. The superstition is very ancient and widespread among untutored and savage peoples, and it assumed persistent forms in the cultures of ancient nations. The witch was supposed to be a woman leagued with evil spirits and therefore equipped with supernatural powers, not only to foretell events, but to work evil by magical means. However, among primitive folk, the terror inspired by the witch operated to protect her from harm.

In the 16th and 17th centuries in Europe, both Catholics and Protestants engaged in a systematic persecution of supposed witches. The literal enforcement of certain ancient laws of the Old Testament intensified the movement. Hundreds of old women, who had incurred the ill will of their neighbors, were executed in Europe, and the practice found an echo in New England. Stimulated by Cotton Mather and other ministers of his party, the witchcraft craze reached its climax at Salem in 1692. During the continuance of the craze, numerous persons were tortured, 19 were hanged, and one victim was pressed to death.

The growth of rational, liberal thought during the late 17th and the 18th century put an effectual check upon the continuance of this cruel delusion.

Yule Log. A great log of wood, sometimes the root of a tree, which, preparatory to the old English Christmas festivities, was brought into the house with great ceremony on Christmas Eve, laid in the fireplace, and lighted with the brand of last year's log. While it lasted, there was great drinking, singing, and telling of tales. Sometimes it was accompanied by Christmas candles, but in the cottages the only light was from the ruddy blaze of the great wood fire. The Yule log was to burn all night; if it went out, it was considered a sign of ill luck that would govern the ensuing year.

NOTABLE ACCIDENTS AND DISASTERS

Apart from the ravages of famine and disease and the fatalities incident to war, astonishing toll of human life is taken by violent natural cataclysms,—earthquakes, volcanic eruptions, storms, and floods,—as well as by fire and explosions occasioned in the course of human industry. In addition to the loss of life from these causes, the accompanying destruction of economic resources is such as to challenge attention. Only within recent years has the advance of science demonstrated how large a portion of this human and economic waste is preventable.

Sanitary engineering is today accomplishing much toward the checking of great epidemics of disease. In America, particularly in the Mississippi and Ohio valleys, the danger from floods has already been decreased through scientific construction of dams and levees. In the great river valleys of China, however, where in some years loss of life mounts into the millions, only small beginnings have been made toward flood control. The destruction of life and property by forest fires in the United States is being checked through the vigilance of the rangers in the forest service.

Fires and explosions still hold appalling threats to life and property. Despite legal regulations for mining and other industries and for building in densely populated centers, public sentiment still tolerates unjustified risks. Fire losses in the United States in 1925 were estimated as amounting to $570,256,000, an increase of approximately $120,000,000 over 1920. The national board of fire underwriters estimated that 64 per cent of this loss was due to preventable causes. The cost of all this enormous waste must be borne by all the people. It must be paid in the form of increased taxes and higher insurance rates as well as in depletion of resources. Economic reasons, therefore, prompt the co-operation of all citizens in safety movements.

RAILWAY AND AUTOMOBILE ACCIDENTS

The enormous increase of travel by train and by motor car within recent years has introduced new hazards. By the introduction of many safety devices and by better construction of roads and cars, the railways have made much progress in decreasing the number and the seriousness of accidents. The following table shows the record of railroad accidents from 1916 to 1926.

RAILROAD ACCIDENTS

Year	Passengers			Employees		
	Carried (Thousands)	Killed	Injured	Average Number (Thousands)	Killed	Injured
1916	1,039,012	291	8008	....	2941	176,923
1918	1,122,963	519	8082	1842	3493	156,211
1920	1,269,913	264	8456	2023	2667	149,602
1922	989,541	228	7363	1627	1721	116,896
1924	950,459	153	6023	1853	1543	125,319
1926	860,343*	155	5149	1884†	1675	111,903

* On class I roads, normally about 98% of total. † Estimated.

Both states and municipalities have been compelled to enforce stringent regulations of automobile driving. The best available statistics show that, from 1915 to 1925, the death rate, per 100,000 of the population, from automobile accidents increased about threefold. In the same period, the death rate per 1000 vehicles decreased about 44 per cent. In 1925, with approximately 20 million motor vehicles in the United States, the fatalities totaled about 17,500. The menace of the railroad grade crossing appears vividly in the fact that, in 1925, 2206 persons were killed and 6555 were injured in grade crossing accidents.

FIRES, EARTHQUAKES, MINING AND MARINE DISASTERS

The following lists exhibit in some detail the most notable disasters of recent times, arranged according to causes. All figures representing property losses must be regarded as approximate. Estimates of numbers killed and injured are from the best available data.

GREAT FIRES

1794	London, Eng. . .	650 houses; $5,000,000 loss.
1812	Moscow, Russia .	Set on fire at the approach of Napoleon I and the French; 12,000 houses burned, besides palaces and churches; $150,000,000 loss.
1835	New York City .	600 buildings; loss $20,000,000.
1842	Hamburg, Germany	$35,000,000 loss.
1845	New York City .	$7,500,000 loss.
1845	Pittsburgh, Pa. .	1000 buildings; loss $6,000,000.
1848	Constantinople, Turkey . . .	3000 shops and houses; $15,000,000 loss.
1850	Philadelphia, Pa.	39 killed, 100 injured; 400 buildings burned.
1851	Saint Louis, Mo..	Large part of city burned; $15,000,000 loss.
1851	San Francisco, Cal.	2500 buildings destroyed; property loss $6,500,000; many deaths.
1861	London, Eng. . .	Tooley Street fire; $10,000,000 loss.
1863	Santiago, Chile .	Church of the Campania burned, with loss of 2000 lives, mostly women.
1870	Constantinople, Turkey . . .	7000 buildings; loss $25,000,000.
1871	Chicago, Ill. . .	3½ miles laid waste; over 200 persons killed; nearly 100,000 made homeless; 17,450 buildings destroyed; loss $290,000,000.
1871	Wisconsin . . .	Forest fires; 1500 lives lost.
1872	Boston, Mass. .	600 buildings; loss $73,000,000.
1877	Saint John, N. B.	12 churches, 25 public buildings; thousands homeless, about 20 killed; $15,000,000 loss.
1889	Seattle, Wash. .	Business district almost entirely destroyed; loss $10,000,000.
1894	Minnesota . . .	Forest fires; $25,000,000 damage; 418 lives lost.
1900	Hoboken, N. J. .	215 lives; $4,627,000 loss.
1900	Hull and Ottawa, Canada . . .	$10,000,000 loss; 18,000 homeless.
1901	Jacksonville, Fla.	$10,000,000 loss; 148 blocks burned; several deaths.
1904	Baltimore, Md. .	75 city blocks covering 140 acres; $85,000,000 damage.
1904	Toronto, Ont. .	130 business buildings destroyed; $12,000,000 loss.
1906	San Francisco, Cal.	Fire following earthquake; 4 square miles burned out; loss $350,000,000.
1908	Chelsea, Mass. .	Manufacturing and business section; $17,000,000 loss.
1911	Albany, N. Y.. .	State Capitol building, $5,500,000 loss.
1911	Coney Island, N. Y.	Amusement parks; $2,225,000 loss.
1911	Porcupine Dist., Ont.	Mining property, lumber mills, etc.; loss $3,500,000.
1912	Houston, Texas .	Business district; $4,500,000 loss.
1912	New York City .	Equitable Life building, $3,000,000 damage.
1914	Salem, Mass. . .	1700 buildings destroyed; $14,000,000 loss.
1916	Jersey City, N. J.	Railroad terminal warehouses and steamers; $11,000,000 loss.
1916	New York harbor	Black Tom Island explosion and fire; $11,000,000 loss.
1916	Ottawa, Ont. . .	Parliament buildings of Canada; $3,000,000 loss.

GREAT FIRES—Con.

1917	Halifax, N. S.	Explosion of war materials and fire; 1500 killed, 4000 seriously injured, 20,000 homeless; property loss $50,000,000.
1917	Kingsland, N. J.	Munition factory; $12,000,000 loss.
1918	Minnesota . . .	Forest fires; $35,000,000 loss.
1918	Minnesota and Wisconsin . .	Forest fires; 1000 dead; $100,000,000 property damage.
1918	Morgan Station, N. J.	Munition plant; $20,000,000 loss.
1918	Saint Louis, Mo. .	Government warehouse; $3,000,000 loss.
1919	Long Island City, N. Y.	Oil works and other plants; $4,250,000 loss.
1919	Savannah, Ga. .	Fertilizer factory, cotton and railroad terminals; $4,000,000 loss.
1920	Galveston, Texas	Morgan line piers and warehouses; loss $3,250,000.
1920	Old Point Comfort, Va.	Chamberlin hotel; $2,000,000 loss.
1921	Hoboken, N. J. .	4 piers; 20 lighters; loss $6,000,000 to $10,000,000.
1921	Tokyo, Japan . .	1000 houses burned in residence district; $12,500,000 loss.
1922	Smyrna, Asia Minor	City almost completely destroyed on eve of Turkish occupation; great loss of life; 100,000 homeless; $200,000,000 property loss.
1923	Berkeley, Cal. . .	600 residences, covering 35 blocks; $5,000,000 loss.
1923	Mexicali, Mexico	Fire starting in movie theater; 30 lives lost; $5,000,000 property damage.
1926	Lake Denmark, N. J.	Naval arsenal struck by lightning; 22 lives lost; property loss $47,000,000.

THEATER FIRES

1811	Richmond, Va. .	75 dead.
1836	Petrograd, Russia	Lehman's theater, 700 lives lost.
1845	Canton, China .	1670 lives lost.
1846	Quebec, Que. . .	200 lives lost.
1847	Petrograd, Russia	Carlsruhe theater, 200 lives lost.
1871	Shanghai, China.	120 lives lost.
1872	Trenton, N. J. .	600 lives lost.
1876	Brooklyn, N. Y.	Conway's theater, 295 lives lost.
1881	Nice, France . .	70 lives lost.
1881	Vienna, Austria .	Ring theater, 640 lives lost.
1883	Berdichef, Russia	268 lives lost.
1887	Exeter, Eng. . .	200 lives lost.
1887	Paris, France . .	Opera Comique, 100 lives lost.
1888	Oporto, Portugal	Banquet theater, 200 lives lost.
1892	Philadelphia, Pa.	Central theater, 6 lives lost.
1895	Baltimore, Md. .	Front Street theater, 23 lives lost.
1903	Chicago, Ill. . .	Iroquois theater, 575 lives lost.
1908	Boyertown, Pa. .	Rhode's opera house, 170 lives lost.
1909	Acapulco, Mexico	Flores theater, 250 lives lost.
1911	Bologoe, Russia .	120 lives lost.
1911	Canonsburg, Pa..	Opera house, 26 lives lost.
1912	Villarreal, Spain	80 lives lost.
1913	Calumet, Mich. .	Italian hall, 72 lives lost.
1913	Vervins, France .	10 lives lost.
1914	Java, Dutch East Indies	Surabaya theater, 75 lives lost.
1919	Mayaguez, Porto Rico	60 lives lost.
1919	Valence sur Rhone, France	80 lives lost.
1921	Milan, Italy . .	31 lives lost.
1922	Washington, D. C.	Knickerbocker theater, 97 lives lost.*
1923	Cleveland, S. C.	Schoolhouse hall, 77 lives lost.

*Roof collapsed from weight of snow.

EARTHQUAKES AND VOLCANIC ERUPTIONS

1755	Lisbon	About 40,000 people killed; many cities damaged
1783	Calabria and Messina . . .	100,000 lives lost.
1797	Quito and Cuzco, Peru	40,000 lives lost.

EARTHQUAKES AND VOLCANIC ERUPTIONS—Con.

1812	Caracas, Venezuela	12,000 lives lost.
1822	Aleppo, Syria . .	22,000 lives lost.
1857	Calabria, Italy .	Great Neapolitan earthquake, more than 10,000 lives lost.
1859	Quito, Peru . .	5000 lives lost.
1861	Mendoza, Argentine Republic .	7000 lives lost.
1861	Peru and Ecuador	25,000 lives lost.
1880	Manila, Philippine Islands. .	3000 lives lost.
1883	Mount Krakatoa, Strait of Sunda	35,000 lives lost.
1886	Charleston, S. C.	About 100 lives lost; $8,000,000 property damage.
1902	Mont Pelée, Martinique, W. I. .	Volcanic eruption annihilated the town of Saint Pierre, caused death of 30.000.
1905	Northern India .	Shock felt over area of 1,600,000 sq. mi.; great property damage; about 20,000 lives lost.
1906	Chile.	Large area affected, especially in Valparaiso and Santiago; 5000 lives lost; property loss $100,000,000.
1907	Kingston, Jamaica	Earthquake and fire; 1100 lives lost, 2000 persons injured; $25,000,000 property loss.
1907	Turkestan . . .	14,000 lives lost.
1908	Sicily and Calabria	Messina and Reggio destroyed; 96,000 dead, 95 injured, 1,000,000 homeless.
1910	Cartago, Costa Rica	1500 lives lost.
1912	Guadalajara, Mexico . . .	Great part of the city destroyed; many deaths.
1912	Turkey	3000 lives lost, 6000 persons injured, 40,000 persons homeless.
1914	Sakura, Japan. .	Earthquake and eruption; 43 lives lost; 855 houses destroyed; 20,000 persons made destitute.
1914	Sicily	200 lives lost, 1000 persons injured.
1915	Avezzano, Italy .	30,000 killed; many towns ruined.
1915	Central Italy . .	29,978 lives lost; 372 communes damaged; Aquila, Caserta, and Rome affected; Avezzano, largest city destroyed.
1917	Guatemala, Guatemala . .	2500 lives lost.
1918	Porto Rico . . .	$34,000,000 property damage; 100 killed, 300 injured; tidal wave following earthquake.
1919	Java, Dutch East Indies	Eruption of Mount Kalut; 5000 lives lost.
1919	Mugello valley, Italy	100 lives lost; many towns damaged.
1919	San Salvador, Salvador . . .	Nearly all houses in the city destroyed.
1920	Giarre, Sicily . .	Both Giarre and Codadivople destroyed.
1920	Kansu province, China	100,000 lives lost; area of several hundred sq. mi. affected; 10 cities destroyed.
1920	Mendoza province, Argentine Republic	150 persons killed in village of La Valle.
1920	Orizaba district, Mexico . . .	3000 lives lost.
1920	Southern Albania	42 persons killed, 200 injured, 500 homeless.
1921	Elbassan, Albania	City almost obliterated; 14 persons killed, 300 injured, 10,000 made homeless.
1923	Chile.	Shocks felt over a distance of 1100 miles north and south; 1800 deaths.
1923	Japan	200,000 killed, 125,000 injured; property loss over $900,000,000.

FLOODS

1811	Hungary	Overflow of Danube; 24 villages swept away.
1813	Austria, Hungary, Poland, and Prussian Silesia	4000 perished in Poland; 6000, in Silesia.
1824	Petrograd and Kronstadt, Russia	Overflow of Neva; 10,000 people perished.
1874	Mill River valley, Mass.	Inundated by bursting of dam; 144 drowned.
1874	Western Pennsylvania	River floods; 220 drowned.
1881-1882	Mississippi; Ohio	$15,000,000 loss; 138 lives lost.
1883	Java and Sumatra	Earthquake wave; 30,000 people killed; many villages destroyed.
1887	China	Overflow of Hwang river in Honan; millions of lives lost.
1889	China	Yellow river burst its banks in Shantung; countless lives lost.
1889	Johnstown, Pa. .	Reservoir burst; 2200 dead.
1891	Consuegra, Spain	1781 lives lost; town nearly destroyed.
1896	Japan	Earthquake wave; 27,000 lives lost; 60,000 made homeless.
1900	Galveston, Texas	4500 lives lost; 3000 buildings destroyed; $30,000,000 property damage.
1903	Heppner, Oreg. .	Cloudburst; 300 lives lost.
1903	Kansas City, Mo., and Mississippi River towns .	Millions of dollars in property destroyed; many lives lost.
1906	Hongkong, China	Typhoon; 10,000 lives lost.
1910	Paris, France . .	Rising of Seine; property damage $200,000,000; several lives lost.
1912	Mississippi valley	River floods; 200 lives lost, 200,000 homeless; property loss $45,000,000.
1913	Dayton, Ohio . .	Nearly destroyed; damage $128,000,000; 84 lives lost.
1913	Japan	Typhoon; 1100 lives lost.
1913	Ohio and Indiana	River floods; 730 lives lost; $180,873,000 property loss; 60,000 buildings destroyed.
1915	China	Provinces of Kwangtung, Kwangsi, and Kiangsi; several thousand lives lost; $90,000,000 damage.
1915	Gulf coast . . .	300 lives lost; $20,000,000 property damage.
1915	Shanghai, China	500 dead; $5,000,000 damage.
1916	Cabin Creek valley, W. Va. . .	About 100 dead, 5000 homeless; $5,000,000 damage.
1916	South Atlantic coast	50 killed; $15,000,000 property damage.
1917	Tientsin, China .	15,000 square miles inundated; millions of people homeless; $50,000,000 loss.
1919	Porto Rico . . .	116 killed, 241 injured; $3,500,000 property loss.
1921	Pueblo, Colo. . .	120 dead, 140 missing; $20,000,000 property loss.
1927	Mississippi valley	About 310 dead; 700,000 made homeless; damage over $300,000,000.
1927	New England	88 lives lost; damage over $40,000,000.
1928	St. Francis dam, near Los Angeles	Dam failure; over 250 dead; 15,000 homeless.
1928	Lake Okeechobee, Florida	Rain and hurricane; 2000 lives lost.

MINE DISASTERS

1905. Khartsisk, Russia; 500 dead.
1906. Courriere, France; explosion; 1060 dead.
1907. Jacobs Creek, Pa.; explosion; 239 dead.
1907. Monongah, W. Va.; explosion; 361 dead.
1907. Toyooka, Japan; 400 dead.
1908. Hamm, Germany; explosion; 300 dead.
1909. Cherry, Ill.; fire; 259 killed.
1910. Bolton, Eng.; 300 dead.
1913. Dawson, N. Mex.; explosion; 263 killed.
1913. Senghenydd, Wales; 423 dead.
1924. Castlegate, Utah; 175 dead.

MARINE DISASTERS

1800. U. S. frigate *Insurgent* sailed from Hampton Roads and never heard from; 380 lives lost; greatest wreck disaster to the American navy.
1831. Immigrant vessel *Lady Sherbrooke*, bound from England to Quebec, wrecked off Cape Ray; 273 lives lost.
1837. British transport *Albeuria*, foundered in Gulf of Saint Lawrence; regiment from garrison at Quebec on board; 525 lives lost.
1847. Immigrant vessel *Exmouth*, bound to Quebec from Londonderry; 200 lives lost.
1850. Steamer *Royal Adelaide*, wrecked off Margate, England; 400 lives lost.
1850. Steamer *Griffith*, burned on Lake Erie; 300 lives lost.
1852. Troopship *Birkenhead*, bound from Queenstown to Cape of Good Hope, wrecked; 454 lives lost.
1854. Steamer *City of Glasgow*, Liverpool to Philadelphia; never heard from; 450 lives lost.
1854. Troopship *Lady Nugent*, from Madras, foundered in a storm; 400 lives lost.
1857. Steamer *Central America*, Havana to New York, sunk; 400 lives lost.
1858. Steamer *Austria*, Hamburg to New York, burned in mid-ocean; 471 lives lost.
1859. American ship *Pomona*, Liverpool to New York, wrecked; 400 lives lost.
1859. Steamer *Royal Charter*, wrecked on the Anglesey coast; 446 lives lost.
1865. Steamboat *Sultana* with exchanged Union prisoners of war aboard, destroyed on Mississippi river, above Memphis, by boiler explosion; 1400 lives lost.
1867. Royal mail steamers *Rhone* and *Rye* and numerous smaller vessels, wrecked near Saint Thomas, W. I.; 1000 lives lost.
1868. *City of Glasgow*, on the Grand Banks; 489 lives lost.
1870. British warship *Captain*, foundered off Finisterre; 472 lives lost.
1873. White Star steamer *Atlantic*, wrecked off Nova Scotia; 547 lives lost.
1874. Emigrant ship *Cospatrick*, burned at sea; 470 lives lost.
1878. British steamer *Princess Alice*, sunk in collision in the Thames; 700 lives lost.
1880. British training ship *Atlanta* left Bermuda with 290 men; never heard from.
1887. British steamer *Wah Yeung*, burned; 400 lives lost.
1889. U. S. warships *Trenton*, *Vandalia*, and *Mipsic*, and German ships *Adler* and *Eber*, wrecked off Samoa by hurricane; 147 lives lost.
1890. British steamer *Duburg*, wrecked in China Sea; 400 lives lost.
1890. Turkish frigate *Ertogrul*, foundered off coast of Japan; 540 lives lost.
1891. British steamer *Utopia*; collision off Gibraltar; 574 lives lost.
1893. British battleship *Victoria*, sunk by collision with her sister ship *Camperdown* off Tripoli; 350 lives lost.
1894. Steamer *Norge*, wrecked on Rockall Reef in the North Atlantic; 600 lives lost.
1895. Spanish cruiser *Reina Regenta*, foundered in the Atlantic near Gibraltar; 400 lives lost.
1898. French liner *La Bourgogne*; collision off Sable island; 560 lives lost.
1898. U. S. battleship *Maine*, blown up in Havana harbor; 260 lives lost.
1904. Steamer *Norge*, wrecked off coast of Scotland; 646 lives lost.
1904. Excursion boat *General Slocum*, burned in East river; more than 1000 lives lost.
1905. Japanese warship *Mikasa*, sunk by explosion; 599 lives lost.
1912. White Star liner *Titanic*; collision with iceberg off the Grand Banks; 1517 lives lost.
1912. Japanese steamer *Kickermaru*, sunk off Japanese coast; 1000 lives lost.
1914. Canadian Pacific liner *Empress of Ireland*, in collision with the Danish liner *Storstad*, in Saint Lawrence river; 1024 lives lost.
1915. *Lusitania*, sunk off coast of Ireland by German submarine; 1154 lives lost.
1915. Steamboat *Eastland*, capsized at wharf on Chicago river; 812 lives lost.
1916. *Provence II*, torpedoed in Mediterranean; 3100 lost.
1916. Chinese steamer *Hsin Yu*, sunk off coast of China; 1000 lives lost.
1917. The British warship *Vanguard*, blown up at her dock in a British port; 800 lives lost.
1919. French steamer *Chaonia*, lost in Straits of Messina; 460 lives lost.
1921. Steamer *Hongkong* hit rock near Swatow, China; 1000 lives lost.
1922. Japanese cruiser *Niitaka*, sunk in storm off Kamchatka; 300 lives lost.
1928. British liner *Vestris* disabled by storm, sinks off eastern U. S. coast; 111 lives lost. S. O. S. call delayed.

DISCOVERIES, BEGINNINGS, AND FIRST USES

Aberration of light discovered by Bradley, 1725.
Adrenalin prepared by Takamine, 1901.
Agricultural chemistry founded by Liebig, 1840.
Airplane mail service, first regular transcontinental trip, New York to San Francisco, Sept. 8–11, 1920.
Antiseptic surgery introduced by Dr. Lister, 1867.
Armor plate for steel vessels made in U. S., 1889.
Atomic numbers determined by means of X-ray spectrums, Moseley, 1914.
Atomic structure, concentric shell theory presented by Langmuir, 1919.
Atoms of other elements are shown by Rowley to consist of multiples of a reduced hydrogen atom, 1922.

Bacteria discovered by van Leeuwenhoek, 1680.
Baldwin locomotive, first, 1832.
Bath, Public, first free, established in Chicago, Ill., 1904.
Benzene ring theory devised by Kekulé, 1865.
Box car, first iron, B. & O. R. R., 1867.
Brick, first made in America, Virginia, 1612.

Carrel-Dakin antiseptic treatment of infected wounds, first used, 1915.
Cast-iron bridge in America, first, over Erie canal at Frankfort, N. Y., 1840.
Cell theory of organic structure formulated by Schwann, 1839.
Cholera bacillus discovered by Koch, 1884.
Coal first mined in America, Virginia coal mine, on James river, Chesterfield county, 1750.
Anthracite first successfully used in American blast furnace, at Pottsville and at Catasauqua, Pa., 1839.
Coal-tar dye, mauve, discovered by Perkin, 1856.
Coke, manufacture of Connellsville, begun, 1841.
Cotton manufacturing begun in South, about 1870.
Cotton spinning mill, first complete, in U. S., built by Samuel Slater for Moses Brown at Pawtucket, R. I.
Cotton spinning and weaving mill, first complete, built at Waltham, Mass., by Francis Cabot Lowell, 1814.
Cottonseed oil, first produced by Dr. Otto, Bethlehem, Pa., 1768.

Diamond, atomic structure determined by Bragg by means of the X-ray, 1913.
Diphtheria antitoxin discovered by Behring, 1889.
Diphtheria germs discovered by Klebs, 1883.
Dynamo, first to give continuous current, constructed by Charles Wheatstone, 1841.

Electron, charge of an, measured, by Millikan, 1909.
Expansion of gases, law of, announced by Charles, 1787.

Fertilization, artificial, of eggs of sea urchin by means of chemicals, Jacques Loeb, 1910.
Fixed stars, Halley discovers the proper motions of, 1718.
Flour sieves, first woven of fine wire instead of horsehair, 1834.
Friction matches, first made in England by John Walker, 1827.

Gas, Coal, first used by William Murdoch, Cornwall, 1792.
First used for street lighting, London, 1807.
First used for street lighting in America, Baltimore, 1821.
Germ plasm, Weismann announces his theory of, 1892.

Horseshoes, first machine-made, Henry Burden, Troy, N. Y., 1835.
Hydrophobia, Pasteur introduced his famous antitoxin treatment to prevent, 1885.

Ice, Artificial, first plant, New Orleans, La., 1866.
Incandescent lamp, first commercially successful, made by Thomas A. Edison, 1879.
Insulin, an internal secretion of the pancreas, is proved by Banting and coworkers to be specific for relief of diabetes, 1922.
Iron.
Angle iron, first rolled in U. S., Pittsburgh, 1819.
Blast furnace, first in Pennsylvania, Colebrookdale, 8 miles north of Pottstown, Thomas Rutter and others, 1720.
Blast furnace, first in Pittsburgh, 1811.
Blast furnace recorded in Elizabethtown, Ill., 1839.
Iron discovered in North Carolina, 1585.
First exported from America, Virginia Company, 1608.
Ironworks, first successful in colonies, Lynn, Mass., 1644.
Ironworks, in New Haven, Conn., first included blast furnace, 1658.
Ironworks, first in New Jersey, Tinton Falls, near Shrewsbury, 1682.
Ironworks, first in Pennsylvania, 1692.
Ironworks, first in Maryland, Cecil county, 1716.
Ore, first imported to U. S. from Cuba, 1884.
Ore discovered in Lake Superior region, by Wm. A. Burt, government surveyor, 1844; first shipment, to Pennsylvania, 1850.
Pig iron first produced on Pacific coast, near Portland, Oregon, 1867.
Rolling mill, first in Pittsburgh, 1811.
Rolling mill, first in Chicago, 1857.
Shot for use of Continental army, made at Durham, Bucks county, Pa.,—shipped Aug. 25, 1775, by George Taylor, a signer of Declaration of Independence.
T rails, rolled in U. S., Allegany county, Md., 1844.

Lavoisier, relation of metals to oxides discovered by, 1782.
Light, velocity proved by Majorana to be independent of the velocity of its source, 1919.
Logarithms invented by Napier, 1614.

Malaria, parasites discovered by Laveran in 1880.
Motion, Kepler published his three laws of, 1609–19.
Mutation theory published by De Vries, 1901–03.

Nail machine, first for making cut nails, made by Ezekiel Reed, Bridgewater, Mass., 1786.
Neanderthal man skeleton found, 1856.
Newspaper, first in America, *Public Occurrences*, Boston, Mass., 1690.
Newspaper, first daily in London, *Daily Courant*, 1702.
Newspaper, first Sunday, London, *British Gazette and Sunday Monitor*, 1780.
Newton's famous *Principia*, in which he demonstrated the law of gravity published, 1687.
Nitrogen atom decomposed with emission of hydrogen, when subject to action of alpha rays, Rutherford, 1919.
Nonmagnetic ship, *Carnegie*, used for making magnetic surveys of the ocean, completed, 1909.

Phosphorus, first used in matches, in England, 1833.
Pig iron produced in U. S. first exceeded that of Great Britain, 1889.
Plague bacillus discovered by Kitasato and Yersin, 1894.
Porcelain, first true (hard paste) made in Europe by J. F. Böttger, about 1709; in U. S., at Philadelphia, 1825.
Printing press, first in New England, 1639.

Quantum theory of energy developed by Planck, 1901.

Refrigerator car, first, 1869.
Relativity theory enunciated by Einstein, 1905.
Rubies, first prepared artificially by Verneuil, 1903.

Savings Bank, first in U. S., Philadelphia Savings Fund Society, 1816.
Skyscraper, first, "Rookery" office building, Chicago, 1887.
Sleeping sickness shown by Bruce to be transmitted by the tsetse fly, 1903.
Steamboat, first on Great Lakes, launched at Buffalo, 1819.
Steam engine, first entirely constructed in America, Belleville, N. J., 1794.
Steam power first used for printing, London *Times*, 1814.
Steel, first made in America, Hartford county, Conn., 1728.
Basic open hearth, first made in U. S., Homestead, Pa., 1888.
Bessemer steel, first produced in U. S., Wyandotte, Mich., Kelly pneumatic process, 1864.
Bessemer steel rails, first rolled, Chicago, 1865.
Open-hearth steel, production of, in U. S., first exceeds that of Bessemer steel, 1908.
Open-hearth furnace, first in U. S., Trenton, N. J., 1868.
Steel screws, first in U. S., Cleveland, Ohio, 1871.
Steel wire nails, first made by Father Goebel, Covington, Ky., 1875.
Sun proved to be a magnetized sphere, 1912-13.
Sun's atmosphere analyzed by means of the spectroscope, Kirchhoff, 1860.

Technical school first in English-speaking country, except West Point, Rensselaer Polytechnic Institute, Troy, N. Y., 1824.
Tetanus germs discovered by Nicolaier, 1884.
Transatlantic radio-telephone service inaugurated, 1927.
Tubercle bacillus discovered by Robert Koch, 1882.
Typhoid bacillus discovered by Eberth, 1880.
Typhus fever shown by doctors Ricketts and Wilder to be transmitted by body lice, 1910; the germs were first discovered by Dr. H. Plotz, 1915.

Vaccination; Dr. Jenner makes his first inoculation, 1796.
Vaccination first performed in America, 1801.
Velocity of light determined by Roemer, 1675.

Wire suspension bridge, first in world, over Schuylkill river, near Philadelphia, 1816.
Wool fulling mill, first in America, John Pearson, Rowley, Mass., 1643.
Wool spinning machine in a factory, Peace Dale, R. I., 1804.
Wool, worsted, first made in U. S., Ballardvale, Mass., 1843.
Wool, worsted combing machine, first in U. S., Pacific mills, Lawrence, Mass., 1854.

X-rays used to show molecular structure of crystals, Laüe, 1912.

DRAWING AND DESIGN

DRAWING may be defined as the expression of ideas or the representation of objects by means of line or color. For conveying emotion or thought, drawing is as essential to human beings as is song or speech or writing. Much of our knowledge of the customs and history of primitive peoples is derived from the study of the forms and shapes of their dwellings and utensils and the designs and pictures with which they decorated their pottery and even the walls of their cave dwellings.

An interest in the various phases of applied art is characteristic of our present-day civilization. A growing sentiment insists that there is no excuse for unsightliness in the plans of our towns and cities and in the designs of public or of private buildings. In a democratic state, beauty of dwelling and environment should be within reach of every citizen. On the other hand, citizens should feel their responsibility for maintaining standards of civic beauty. These enthusiasms call for wider diffusion of knowledge of the principles of design. To this end, the public schools and many special schools of applied art are contributing.

The subject of drawing may be divided roughly into two classes,—free-hand and mechanical. Free-hand drawing is done without the guidance of drawing instruments. Free-hand work includes the great mass of pictures and studies, etchings, engravings, and illustrations and cartoons in papers and magazines. Mechanical drawing is the applied art, growing out of free-hand drawing, which is used in industry for purely mechanical and practical working drawings.

Free-Hand Drawing. Free-hand drawings are done in charcoal, pencil, litho pencil, crayon, pastel, pen and ink, "wash," or in any combination of these mediums. In etching, engraving, and lithography, special tools are employed. Charcoal is probably the simplest medium, since it is inexpensive, easy to apply and to erase, and is, besides, susceptible of great variety of treatment. With it, many varying effects are possible, ranging from that of plain line to the highly modeled effect of oil painting, the latter being produced when the charcoal is rubbed down with the fingers or with a kneaded eraser.

The pencil ranks with charcoal for convenience as a medium of expression in drawing. It requires a harder, smoother surface than does charcoal, but it may be used on virtually any material. It does not require "fixing," and, though requiring greater skill than charcoal, since it cannot be worked over, it is better adapted to fine sketching. Its effect is brilliant and rather harsh—more positive than charcoal.

Crayon, which is a colored chalky substance, and pastel, which is a crayon of a finer texture, give the same range of effects as charcoal, but they are difficult to erase. Work in wax crayons, such as are used in architectural free-hand sketches, has great brilliancy and is impossible to erase. Pen and ink resembles the pencil as a medium, but it is more difficult of application and removal. It is the harshest medium, requiring a hard, glazed paper. "Wash" drawings are made in one tone of water color with a brush. Drawings intended for reproduction in print are generally done in black wash.

Mechanical Drawing; Design. Strictly used, the term mechanical drawing applies only to drawing done with the aid of the T square and the compass. A broader description is "drawing with the emotion left out," that is, done as if by a machine. In this wider use, it signifies the application of free-hand drawing to industry. When thus applied, the art is known as design.

The development of a design may be illustrated by the following example: An artist sketches free-hand a cluster of narcissuses, as he sees the flowers growing. A manufacturer of metal book ends, for which designs in applied silver are desired, tells the artist to *conventionalize* the form of the flower and make a drawing from which the working blue prints are to be taken. The artist then, studying the stiff character of the narcissus blossom, decides that straight lines and triangles will best represent the flower. Upon this plan, he builds up a design of triangular flower forms, draws it to a scale to fit the book ends, using his T square and triangle to make the drawing mechanically perfect, traces the design on glazed tracing linen in waterproof, nontransparent ink, and sends it to be blue-printed.

Harmony and Rhythm. The theory of design embraces those laws of harmony in line, shape, proportion, and tone, acquaintance with which is necessary to the critic or the maker of designs. Harmony is the result of a combination of elements properly related to each other by some common factor. Take, for example, a still life study, drawn within a frame form, of a group of five books, some standing, and others lying, on a table top. The books are the elements of the composition, and they are related to each other by their straight-line structure or by a common background line, such as the line marking the edge of the table. Their relation may be apparent because of a rectangular plane that is common to all of them; or they may show some pleasing direct proportional relation in size,—as 2 to 3 or 3 to 5. Certain color values in the scale from black through gray to white may be repeated on the covers of the books and on the table top to indicate a relation of the elements.

Again, if the books were done in color, certain common colors might serve as relating factors to unify the composition. For instance, we may suppose the scheme to be black, gray, and white, with the addition of one color—red. If the first book of the five, lying on the table, has a red binding, and the third, standing upright, has a small design of the same red on the cover, while the fifth has a large quantity of red showing on the edges of the pages, the eye will be carried through the composition by the three spots of color, which thus relate the book elements in harmony.

If there is harmony in a drawing, *rhythm* also will surely be present. The repetition of line, space, shape, or color will carry the eye through the details of the composition, and this directing of the eye, step by step, or from color spot to color spot, to the center of interest, constitutes rhythmical movement.

The steps may be regular, as in a repeated border design of wild geese, in which every third goose is a repetition in line, shape, and color. Or the steps through which the eye is led may occur at varying intervals in an unconventional composition,—such as a design of flamingos in a circular frame. The eye may be directed from the first flamingo to the fourth, from the fourth to the fifth, and thence to the ninth, which last holds the center of the picture stage. If the observer feels a definite arrangement in these steps that the eye has taken, then the design has rhythm.

Values. The term values refers to degrees of light and shade or of color intensity. In *chiaroscuro*, or representation in black and white, if one takes black as a unit of value, the highest values are the shades nearest to black, and the lowest values are the shades farthest removed from black.

Values in colors are spoken of in the same sense as values in the black and white scale. To determine the value of a certain object in a design,—for example, a red tomato,—one should make a set of five or six 2-inch squares ranging from black to light gray. Then, with the eyes partly closed, one can shut out from view the brightness of the red in the tomato, so that he will be able to compare its black and white value with the degrees in the black and white scale furnished by the little squares. He will find that it matches in degree of darkness one of the gray squares near black. Similarly, in the

scale from deep red to pale pink, the pink will correspond to one of the lighter gray squares, some degrees removed from white.

Applications of Design. In proportion as our state of culture develops, the range of design expands. Progressive city governments are applying the principles of design to city planning. By means of building laws, many cities are seeking to secure harmonious relations between streets, between buildings, and between streets and buildings. Some cities are attempting to make their water fronts pleasing to the eye, and to place buildings in such relations that the city sky line will be harmonious. A special problem is that of planning streets which will afford pleasing vistas, in which parks, fountains, and other decorative features may be seen to advantage.

Individuals are showing more and more interest today in landscape gardening about their own homes. The old-fashioned method of making disconnected, unrelated flower beds wherever fancy led is giving place to well planned exterior decoration. This takes into account the relation between house and grounds and makes evident the relation between one flower bed and another by their shape or location or by the color arrangement of the flowers.

The same simple, fundamental laws of harmony and rhythm which are applicable to city planning and to laying out flower beds apply to home building. One cannot depend upon the ornamentation of the entrance or upon the style of blinds to secure beauty in a house. The safe principle to apply is the test of the laws of design, by which one will secure the right proportion of roof to the entire house, of window surface to plain surface, and of masses of color to each other.

Decoration of the interior of a home affords the greatest opportunities for producing good effects. Here the laws of design can be applied to every detail. The colors and values of the walls and ceilings and floors must bear definite relations to one another. The pictures on the walls must hang in such relations of height, color, and interest as will readily direct and please the eye. It is well to let one point of interest dominate, so that the eye can find repose. A safe rule to follow in hanging pictures is to let the upper edges of the frames fall on a common horizontal line about the room, so that the centers will be at about the level of the eye when the observer is standing. A more effective method is to determine the point of interest in every picture and let those points fall upon a common line. The wall spaces between pictures should bear a harmonious relation to each other and to the pictures. The spaces should not be uniform in area, because regularity would detract from the interest of the whole arrangement.

In seeking a pleasing relation in the intervals between three paintings to be hung on one wall of a living room, the safest proportion to observe is that of 2 to 3. If two of the pictures are similar in size and the other is considerably larger, the two small ones might be hung four feet apart, the large one at a distance of six feet from the second. If, however, the larger picture and one of the small pictures are dominantly blue, while the other small one has touches of brilliant red and orange color, let the two dull blues hang together, and place the small brilliant picture at a distance, to balance the blue group in space and in color intensity.

The window treatment in line and color is important. If one has a long, narrow room with plain, unrelieved gray walls and a row of small windows across the end, the room can be made or marred by the draperies at those windows. Floor-length overdrapes of a soft material in old rose or some other one tone, presenting no horizontal lines in color, will impart to the room the appearance of a long hall, the contrast between the solid color and gray intensifying the perpendicular effect of the curtains. If, however, one introduces a starched material in a brilliant, spotty pattern, preferably with a horizontal line effect in strong color or in black, and also runs a lambrequin across the top of the windows, the room will appear wider by several feet.

Furniture should harmonize with the style of the room in which it is used. If the room has long French windows and a high ceiling, with paneled walls and gilt molding and a tapestry or two, it fairly demands furniture designed according to the style of one of the Louis periods. A delicate, gateleg dining set would be lost in a long, severely heavy, beamed and paneled dining room. Such a room requires the massive, plain monastic type of table and benches or chairs. For a room that is frankly of the modern American type, however, harmony is secured by variety in styles of furniture; no one predominating period style would be desirable.

These same principles apply to costume design. In this art there is quite as much opportunity to make lines harmonize as there is in decorating a room. For example, an unusual cut to the line of the neck of a costume may be repeated in the sleeves and thus greatly enhance the artistic effect of the whole. The following color rule applies to the designing of a costume as well as to the decoration of a room,—let the darkest color be lowest in position and the lightest color be highest.

Color Balance. In the most carefully planned buildings, rooms, and garments, the effect of their beautiful proportions may be obliterated by ill-judged use of color. For a color scheme, the safest course is to use one color with black and cream or with gray and soft ivory. If more than one color is desired, a color chart should be consulted with regard to complementary colors and color intensity. The greater the number of colors introduced into a scheme, the more difficult it is to arrive at a color balance, that is, to have enough of each primary color represented to satisfy the eye.

Red, yellow, and blue are called primary colors, because by combinations of these the other colors may be produced. Orange, green, and violet are secondary colors. The following chart exhibits the relations of these colors and supplies a guide for their use in design and decoration. Two colors marked with the same superior letter are complementary, that is, taken together they make a neutral gray. The primary colors are printed in boldface; the secondary colors, in italics.

	Yellow[a]
Yellow-Orange[f]	Yellow-Green[b]
Orange[e]	*Green*[c]
Red-Orange[d]	Green-Blue[d]
Red[c]	**Blue**[e]
Red-Violet[b]	Blue-Violet[f]
	Violet[a]

Two-color schemes may be carried out by using two complementary colors, in combination with some values of black. One of the colors should be given greater intensity than the other. If a three-color scheme is desired, correct combinations may be discovered by starting with any color in the chart and counting around the list, in either direction. The fifth and the eighth color in the count will harmonize with the first one chosen. One of the three should be used full strength; one, half strength; one, reduced very nearly to a neutral tone.

Good taste is, in large part, the ability to appreciate relations of harmony and rhythm of line and color. In design applied to furniture and other objects of use, good taste requires that an article, beautiful in itself, shall be appropriate to its purpose and its surroundings. One may enhance his power of appreciation by a study of the art principles outlined in these paragraphs. These principles apply to the appreciation as well as to the creation of beauty. They govern both the critic and the artist, not only in the arts already outlined, but also in those of pottery, jewelry, and textiles, and in all other forms of artistic design.

FURNITURE

FURNITURE, called "movables" in the European languages (French, *meubles*; German, *möbel*; Italian, *mobiglio*), includes those articles of convenience or decoration that are used by man to make his dwelling places more comfortable. As these articles are produced in order to satisfy certain recognized needs, the furniture of any race or country is usually indicative of the customs, skill, and degree of civilization of the people who used it.

The furniture used by royalty in ancient Egypt was well made, beautifully carved, and decorated with gold, ivory, and veneering. Chairs were frequently upholstered or covered with leather; the legs were carved to resemble those of animals. Neither the Greeks nor the Romans used a great variety of furniture. But their chairs, tables, beds, and couches were generally of pleasing form, and were frequently decorated with magnificent inlays of ivory, tortoise shell, and precious metals.

From the early period of classical antiquity to the beginning of the Renaissance in Italy, very little change or improvement took place in furniture. Beds, couches, tables, chairs, and stools were the customary pieces used by all of the civilized nations. In the great houses of medieval England, the dining table was customarily formed of boards placed on trestles. For the lord of a manor and for his lady, there were usually placed beside the table large, high-backed, covered chairs. An honored guest might be seated upon a stool, but all the common folk, those who sat "below the salt," occupied simple benches.

Gothic Style. During the late medieval period, the decorations used upon the characteristic, large, heavy furniture of the time followed closely the prevalent Gothic style of architecture. Forms were massive and rectangular; lines were predominatingly straight, usually capped by a pointed arch. Characteristic ornamental details were the trefoil and quatrefoil, together with religious figures. Wrought iron bands were frequently placed upon chests and cupboards.

Renaissance Period. During the Renaissance, as in the Gothic period, styles of furniture closely followed those of architecture. Pieces were massive, well proportioned, and elaborately carved with ornamentation suggested by the classical art of Greece and Rome. In Italy, the most characteristic domestic piece of the period was the ornamental bride's-chest, or *cassone*. As a rule, Renaissance furniture, whether of Italian, French, or English origin, is of palatial rather than of domestic character. It is, therefore, more suitable for use in public buildings or theaters than in the home. Nevertheless, the Renaissance marks the beginning of the development of modern furniture. From Italy the influence of the Renaissance spread to France and to England.

French Periods. In France the chief periods which were marked by characteristic styles of furniture were those of Louis XIV, Louis XV, Louis XVI, and the Empire under Napoleon I.

Louis Quatorze.—The magnificence of the reign of Louis XIV was reflected in the massive size, elaborate ornamentation, and lavish decoration of his furniture. The structural lines were generally rectangular; the woods used were oak, walnut, and ebony. Upholstering was commonly of tapestry or brocades with large patterns. Especially notable was the type of ornamentation known as buhlwork, after its originator André Charles Boulle. This consisted of a veneer of tortoise shell inlaid with elaborate patterns of brass. Decorative motifs included cupids, satyrs, the acanthus leaf, and the shell. The feet of chairs frequently had the form of doe's hoofs, *pieds de biche*. Marble tops were used on tables and commodes.

Louis Quinze.—At the court of Louis XV, gayety replaced formality, and the pleasure-loving, extravagant luxury of the king and his favorites, Countess du Barry and Madame Pompadour, found expression in the more graceful curved lines and the greater comfort of the furniture.

The workmanship was of the finest, and all exposed surfaces were covered with carving, gilding, inlay, metal mounts, or porcelain plaques. Interest in Chinese art, which began about 1720, resulted in Robert Martin's invention of *vernis martin*, a lacquer-like finish which was extensively used in red, brown, gold, bronze, and black. Pastoral scenes by Watteau and Boucher were often painted upon the lacquered surfaces.

Carving was most elaborate, with scrolls, shells (rococo), the curled endive leaf, flowers, ribbons, and musical instruments exhibited as predominating motifs. A distinguishing characteristic was due to what may be termed unbalanced symmetry. While masses of decoration were applied so as to appear symmetrical, the details of each mass differed from those within the others. Chairs usually exhibited the cabriole leg, with dolphin-head or leaf-scroll feet, and with no stretchers to hold the legs together. The fronts of cabinets and commodes were generally convex.

Louis Seize.—During the reign of Louis XVI, furniture design was marked by a change from extremely elaborate decoration and curved lines to a more classical straight line style, with delicate and simple ornamentation.

This change may be credited to a general reaction from the preceding period; to the refined taste of Marie Antoinette; and, most important of all, to the popular interest in classic art aroused by the discoveries of the buried cities of Herculaneum and Pompeii. By those who have seen how quickly the introduction of Egyptian motifs into current forms of personal decoration followed the discovery and opening of Tutankhamen's tomb, the effect produced upon popular fancy by the uncovering of two ancient cities can readily be comprehended.

The structural lines of the Louis Seize furniture were generally rectangular. Straight legs were fluted and tapered. Classic details formed the basis of ornamentation, the Greek band replaced rococo, and laurel or oak leaves were used instead of acanthus and endive patterns. Decorative paintings on wall panels or on furniture represented cupids, garlands of flowers, and classical subjects, rather than the pastoral scenes of the preceding period or the armor, victor's palm, and martial decorations of Louis Quatorze.

The Empire.—The styles of the First Empire, under the dominating personality of Napoleon I, also had their source in ancient times. But it was the Roman rather than the Greek that appealed to the emperor, and the motifs selected were those which suggested the imperial power of the Cæsars,—the Roman eagle, wreath, torch, fasces, and winged victory. After the expedition to Egypt, the figure of the sphinx was extensively employed. A notable characteristic of the period was the use of carved brass decorations applied to plain surfaces.

Beds changed from heavy, overdraped affairs to an uncovered, couchlike form. Chairs were comfortable, with convex backs which often prolonged the curve of the arms. The arm supports frequently were carved in the form of swans or sphinxes.

Considered as a whole, the Empire style was rich and impressive, but also rather stiff, cold, and formal. It is not extensively copied today.

English Furniture. The three great periods of English furniture making which have exerted marked influence on modern styles are the Jacobean and Restoration, the Anglo-Dutch, and the Georgian. The Jacobean, 1603–49, was separated from the Restoration by the Cromwellian period of the

Commonwealth, during which the styles acquired a Puritan sternness and severity. With the Restoration, King Charles II brought back to England a taste that had been influenced by the Flemish Renaissance and the styles of Louis XIV, so that this period was marked by an increase in ornateness and grace.

Jacobean.—Furniture of this period was chiefly of oak, with straight line structure, and a sturdy, somewhat heavy, appearance. Chairs had flat seats, and the straight, turned legs were strengthened by heavy stretchers placed near the floor. Carving was cut into flat surfaces. Characteristic ornamental designs were the running figure 8, semicircles filled with petals, a conventionalized tulip, the Tudor rose, and geometrical figures. Typical pieces were the chests and cupboards, the high-backed wainscot chairs, tables, and tall clocks.

Anglo-Dutch.—Furniture of this style is divided between the William and Mary and Queen Anne periods. The predominating Dutch influence was due to the elevation of William, stadholder of the Netherlands, to the English throne. French influence was also noticeable, because of the immigration of Huguenot refugees who left France after the revocation of the Edict of Nantes. The new styles were more suitable to comfortable, domestic use than any of those preceding. Walnut was the favorite wood; inlay, the characteristic form of ornament. Straight lines gave place to delicate curves. Legs of typical chairs were straight, with inverted cup turning, curved underbracing, and bun-shaped feet. The backs and seats were usually upholstered. Cabinets, cupboards, chests on chests, and chests on stands were characteristic pieces.

Queen Anne.—During this period the Dutch and French influences were assimilated and developed into a more national type. The structural lines were those of slender, graceful curves. Walnut was the principal wood. The turned leg was replaced by the undecorated cabriole, and the bun foot by the hoof or the claw and ball. Typical pieces were the splat-back chairs, wing chairs, gate-leg tables, chests of drawers, highboys, lowboys, cabinets, and the tall, well proportioned mirror with an elongated S-curve at the upper side. Chair backs, high and comfortably curved, were outlined by a rather narrow rim and supported by a wide fiddle-back or lyre-shaped splat. Seats were upholstered. Underframing was gradually discarded.

Georgian Furniture. The Georgian period is known as the Golden Age of English furniture. It was marked, not by the influence of the sovereign, but by that of great designers and cabinetmakers. Most notable of these were Thomas Chippendale (1705–79); Robert and James Adam, architects who designed furniture to harmonize with the interiors of their houses; George Hepplewhite (?–1786), who executed many of the Adam designs and developed characteristic types of his own; and Thomas Sheraton (1750–1806), designer and "master of inlay."

Chippendale.—The characteristic style of this master designer is best shown in his graceful, beautifully proportioned chairs. The lines of the back usually taper gracefully from top to feet, and, from a bow-shaped curve at the top, a carved, pierced splat extends to the seat frame. The seat is widest at the front. The legs are cabriole with ball-and-claw feet or straight and square. The ladder-back chair with four or five horizontal bow-shaped pieces instead of the splat is also typical. Carving is the principal method of decoration; mahogany is the preferred wood. Chinese influence is shown by fretwork in the arms and backs of some chairs. Chippendale originated the pie crust table with scalloped edged, tilting top.

Hepplewhite.—The obvious characteristic of a Hepplewhite chair is its shield-, oval-, or heart-shaped back, which does not join the seat frame, together with square tapering legs and spade feet. The top curve of the back was usually bow-shaped and smooth. A carved, three-feathered prince of Wales plume, used in the design of the back was sometimes a distinguishing feature. The structural lines were usually curved; the general appearance, slender and delicate.

Adam.—The Adam brothers designed graceful, very delicate furniture in a manner which was inspired by the classic decoration of Pompeii. The backs of Adam chairs were narrow and rather low; the legs were straight and tapered or round and fluted. Wedgewood plaques were used as inserts, and raised ornaments of plaster composition were applied. Ornamental details included the urn, vase, lyre, and acanthus, together with rosettes, festoons, and delicate fluting.

Sheraton.—Thomas Sheraton is considered by many to have been the greatest of the famous Georgian designers of furniture. The lines of his creations were usually rectangular, the general appearance graceful, dignified, and rather fragile. His principal method of decoration was inlay work. The typical rectangular back of a Sheraton chair ended with a horizontal bar above the seat frame. The top line was not regular, but broken. This use of the broken curve at the top frequently serves to distinguish one of Sheraton's shield-shaped chair backs from those of Hepplewhite. Typical chair legs, whether round or square, were tapered, frequently with fluting or reeding.

Colonial Furniture. The term Colonial, as applied to early American furniture, is properly employed to indicate furniture used in the colonies before they became states. When it is remembered that the Dutch settled in New York, the English in New England and Virginia, and the French in Louisiana, it becomes obvious that the best Colonial furniture was of three different styles. There were many good cabinetmakers in the colonies, and their products were based on the current modes of the mother countries. The Colonial style, as such, resulted chiefly from simplification, omission of ornament, and adaptation of the best European practice. That a blending of styles occurred is evident in some of the chairs of early New York, in which may be found a typical Dutch fiddle-back, Jacobean legs, and Spanish feet.

The comfortable Windsor chair, with its bow-shaped, spindle filled back, shaped seat, and turned legs set at an angle, was of English origin, but was greatly improved upon in America. The rocking-chair was an American product, but the date of its introduction is unknown.

Most important of the early cabinetwork was that of Duncan Phyfe, a Scotchman who came to America about 1784 and, after establishing himself at his trade in New York, produced, between the years 1795 and 1830, work equal in quality to that of the best European designers. Phyfe's lyre-backed chair was a characteristic piece. From 1830 to 1847 his work was not of so high a standard, he himself classifying his overdecorated mahogany as "butcher furniture."

Mission. The type of furniture known as Mission resulted from the application of the styles found in the old California missions. Much of the early Mission style of furniture was heavy and crude, but modern designers have refined the type so that the straight-line simplicity is pleasing to many people.

Modern furniture makers follow generally the historic styles already described. Popular demand for simple, well built, and artistic furniture has enabled American manufacturers to produce, in quantities and at moderate prices, pieces which, in grace, proportion, and utility, should satisfy any unbiased critic. That these designs follow closely those of the master cabinetmakers of the past is not due to lack of originality, but to recognition of the fact that beauty of line and proportion, together with adaptability to surroundings, forms the safest standard for the designing of furniture.

GAMES AND SPORTS

From the earliest times, men have engaged in various forms of more or less highly organized play activity. Athletic contests, whether for amusement and recreation, or as a means of training for the serious pursuits of life, have always been highly valued. Games of chance and of intellectual skill are also of very ancient origin. The following section presents briefly outlines of the history and important features of a number of the most popular games of the present day. The many special principles and rules under which the athletic games are played may be found in various rule books, such as those published in Spalding's Athletic Library.

Baseball. A field game played with a round wooden bat and a hard, leather-covered ball which weighs 5 ounces and is 9 inches in circumference. The game derives its name from the circuit of four bases which the batter must make in order to score after striking the ball. The bases,—home, first, second, and third,—are located at the corners of a 90-foot square, called the diamond. The pitcher stands between home and 2d base, 60½ feet from the batter. The area enclosed by the lines connecting the bases is called the *infield*. The *outfield* is the space outside the diamond and between the extensions of the lines connecting home base with first and third base respectively.

A baseball team consists of 9 players, and a game regularly continues through 9 innings. An inning is completed when each team has succeeded in "putting out" three of the opposing batters. A batter is out under the following principal conditions: if he fails three times in succession to hit a fairly pitched ball, provided that the third ball is retained by the catcher; if he hits the ball and it is caught before it strikes the ground; if the struck ball is in the hands of the first-baseman before he can run to that base; or if, when between bases, he is touched by the ball in the hands of an opponent. A score of 1 is given for each run, or completed circuit of the bases, by a player.

This national game of the United States appears to have been first played in something like its present form at Cooperstown, N. Y., in 1839. The earliest organized clubs date from 1843; at about this time, the first code of rules was drawn up by the Knickerbocker club of New York City. The ball used was of lively rubber, covered with yarn and leather; it measured 10½ inches in circumference and weighed 6½ ounces.

A national association was formed in 1858. The first strictly professional club was the Red Stockings of Cincinnati. In their famous tour of 1869, they won all games. The first college circuit, including Harvard, Princeton, Amherst, Brown, and Dartmouth, was formed in 1879. The National League was organized in 1876, an American association in 1882, and the American League in 1900.

Basketball. The invention of this popular game, in 1892, is credited to Dr. James Naismith, at the Y. M. C. A. training school in Springfield, Mass. Designed first as a boys' game, it was soon adopted in a modified form by girls' schools. It is usually played indoors upon a rectangular court, which must not exceed 4000 sq. ft. in area. The goals are elevated "baskets," 18 inches in diameter, placed on the center line, 10 feet above the floor, one at each end of the court. The restricted number of players, 5 on each side, and the small area of the court make basketball a practicable sport for many clubs of small membership and resources.

At the beginning of the game, an inflated leather ball, 30 to 32 inches in circumference, is tossed up between two opposing players at the center of the court. A score of 2 points results when the ball is thrown into the basket guarded by the opponents. A game is usually divided into two periods of 20 minutes each.

Billiards. A game of very ancient origin. It is known to have been played before the Christian era. Saint Augustine mentions billiards in his *Confessions*, written in the 5th century, and both Shakspere and Spenser speak of the game in the 16th century. The earliest full description of billiards is found in Cotton's *Complete Gamester*, 1674.

The modern American game of billiards is played with 3 ivory balls, on a table, the bed of which is formed of a heavy slab of slate and is surrounded by rubber cushions. Both the slate and cushions are covered with fine green cloth. A regulation table is 10 ft. long by half as wide, but smaller sizes are frequently used, especially in homes. Standard balls are 2⅜ inches in diameter; one is red, the others white, but one white ball is marked by a small black spot. The object of the game is to strike one of the white balls with the small, leather-tipped end of a tapering stick or cue, in such a manner as to cause the cue ball to strike in succession each of the two other balls, thus making a billiard, or carom.

In order to prevent the high scores that may be obtained when the two object balls are close together in a corner, "balk" lines are frequently drawn on the table at a distance of 14, 18, or 22 inches from the sides. When playing balk-line billiards, every second or every third shot must be made sufficiently hard to drive one of the object balls outside of the rectangle in which they lay when the shot was made.

Pool or pocket-billiards is played with 15 object balls and a single cue ball on a table provided with 6 pockets, the object of the game being to drive into the pockets as many of the object balls as possible.

Bowling. Outdoor bowling or bowls is one of the oldest of games, and its ancient form was closely similar to that of the present day. The early balls were of stone, one half spherical, the other oval, a shape adapted to give the course of the ball a curve. In outdoor bowling, cones were first used for marks, later being displaced by the round balls or jacks. The game was introduced in America early in the 18th century, and the Bowling Green, in the locality still known by that name, was laid out by the City of New York in 1732.

Indoor bowling probably originated in various games in which clubs were hurled at groups of bone pins. The first recorded indoor game on a covered alley took place in London in the 12th century. In America, the first recorded match game was played on the Knickerbocker alleys in New York City on January 1, 1840, and the first general code of rules was adopted in 1875.

The American indoor game is played upon a smooth board floor or alley, 42 in. wide and 60 ft. from the foul line, which the player must not cross, to the center of the first pin. The ten wooden, bottle-shaped pins, 15 in. high, are arranged in a triangle with the apex toward the bowler. Pins must weigh at least 50 ounces each, and are placed 12 inches apart from center to center. The balls may not exceed 16½ pounds in weight or 27 inches in circumference.

The object of the game is to bowl down all of the pins with one shot, the result being called a *strike*. A maximum of two shots is allowed in a *frame*, there being ten frames to a game. If the pins are all down after the second shot, the result is a *spare*. After a strike, the number of pins bowled down by the next two balls is added to the ten already scored; after a spare, the number falling from the next ball is added to the score. If, in the tenth frame, the player achieves a strike, he is allowed two additional shots; and if a spare, one additional shot. The maximum score possible for a single player is, therefore, 300.

Cards, Playing. Cards for playing games of chance probably had their origin in the East, and are certainly of extreme antiquity. They were known to the Egyptians as well as to the Jews, and were in

common use among the Hindus and Chinese long before they were introduced into Europe by the crusaders. Toward the end of the 14th century, the game of cards was in common vogue in Italy, Germany, France, and Spain, and, by the middle of the 15th, cards were even being manufactured in England. They were introduced into America by the Spaniards.

In the modern pack of playing cards, there are four suits of thirteen cards each; clubs and spades are printed black; hearts and diamonds, red. It is supposed that the figures in the various suits were originally intended as symbols of the different classes of men. Hearts represented the *gens de chœur*, that is, the ecclesiastics, or choir men; *espada*, a Spanish word for sword and indicating nobility, has become spade. Clubs represented the trefoil and symbolized the peasantry, while diamonds represented square tiles, symbolical of the merchants. This symbolism is, of course, lost today in the great variety of games of skill and chance in which cards are employed. Among these games, the following are today widely popular: auction bridge, five hundred, cribbage, pedro, solitaire, hearts, pinochle, and poker.

Checkers. A game played on a board like that used in chess. Each of the two players has 12 pieces, or men, which are placed on the first three rows of squares of the same color. Each piece is moved forward one space at a time in a diagonal direction. The object of the game is to capture all the opposing pieces, capture being effected by "jumping," or passing over the opponent's piece to the first space beyond it, which must be unoccupied. When a man reaches the row of squares farthest from his side of the board, he becomes a king and may then move backward as well as forward.

Checkers is called draughts in England and *les dames*, "the women," in France. It is a very ancient game. Homer refers to it, and an ancient Egyptian vase shows a lion and an antelope playing checkers, with the lion making the winning move and seizing the prize.

Chess. The origin of chess is lost in remote antiquity. The name is a corruption of the Persian *shah*, "king." Chess is the most intellectual and the most cosmopolitan of all games of skill. National and international contests have been held regularly in the course of the past several centuries. It was first brought into prominence in America by Benjamin Franklin.

The game is played on a chessboard divided into 64 squares colored, as a rule, alternately black and white. Each of the two players has a set of 16 pieces, or men, placed on the two rows of squares nearest the player. The two groups thus appear in opposing array, like two armies, one black and the other white. Each player has a king, a queen, 2 bishops, 2 knights, 2 rooks, or castles, and 8 pawns. Each kind of piece moves according to special rules, the object of each player being to take the men of his opponent in order to checkmate the latter's king. Checkmate is accomplished when the king cannot move without being open to attack from an opposing man. The word checkmate is derived from the Persian *Shah mat*, "The king is dead."

Cricket. In Great Britain, cricket occupies the place held by baseball in America. It is the popular game played by school and college, as well as by professional teams. The cricket ball is a hard, leather-covered ball, of about the size and weight of a baseball. The bat, usually of willow, is about 36 inches long, with a flat blade 4½ inches wide and 22 inches in length.

Cricket is played by opposing teams of 11 men each, on a turf field, in the middle of which are placed two wickets facing each other at a distance of 22 yards. Each wicket consists of three round sticks, called "stumps," standing 27 inches high, with a distance of 8 inches between the two outer stumps. In grooves upon the top of the stumps lie two light pieces of wood called "bails."

The team at bat has a batsman at each wicket. The opposing team has a bowler at one wicket and a wicket keeper behind the other, with fielders in positions surrounding both wickets. The wicket keeper corresponds to the catcher in baseball.

The bowler pitches, or "bowls," the ball, trying to place it so that, on a first bounce, it will strike the opposite wicket and dislodge a bail, so putting the batsman out. The object of the batsman at this wicket is to protect it by striking the ball. If he hits the ball, he and the other batsman run to exchange places. If they succeed, without being put out, a run is scored. Not more than six runs may be made on one hit. During an attempted run, if the bail of a wicket is displaced by a fielder holding the ball, the batsman nearest that wicket is out. The batsman striking the ball is out if the ball is caught by a fielder before it touches the ground.

When a bowler has thrown six times, another bowler takes the ball and pitches from the opposite wicket. An inning lasts until ten men of one side have been put out. A game usually allows two innings for each team. Matches frequently last for two or three days.

Football. American Intercollegiate football is played by opposing teams of 11 men each, on a field measuring 160 feet in width and 300 feet in length between goal lines. The field is marked with cross-lines at intervals of 5 yards; to the resulting appearance is due the popular name of "gridiron." A goal 18 feet, 6 inches wide is marked in the middle of each end of the field by goal posts, with a crossbar 10 feet from the ground.

The principal object of play is to carry the ball over the goal line of the opposing team. Scores are given for thus making the goal and for kicking the ball over the crossbar between the goal posts. A game is divided into 4 periods of 15 minutes each.

Although the ancient Greeks and Romans had games of a nature similar to football, the modern game is of English origin. As early as the 12th century, whole villages played a game of football, in which the ball was kicked and carried through the streets. The game was first organized in the English public schools. When introduced into America, it appeared in two forms, Association football, or soccer, in which carrying the ball is forbidden, and Rugby football. The rules of the latter game were adopted by Harvard and Yale in the early '70's of the 19th century. After years of great independence and confusion as to methods of play, a general committee of colleges, united with a former committee of the University Athletic Club, formulated the rules for 1906. These rules, with some modifications tending to more open play, now govern the American Intercollegiate game.

Golf. This open-air game consists in driving a small, solid, resilient ball successively into each of a series of 9 or 18 holes arranged at varying intervals over a course, or links. The holes are placed in smooth areas, called putting greens, between which hazards, such as pits, mounds, clumps of trees, and similar natural or artificial obstacles, are placed. The object of play is to make the round of all the holes in the least possible number of shots. A great variety of clubs, with heads especially adapted to the conditions under which they are to be employed, are used to drive the ball.

The origin of the game of golf is obscure, though an ancient game of Holland and Belgium, played usually on the ice and called *Kolf*, may be its progenitor. The Scotch were among the earliest golf players, although the game was popular in England in the 15th century. The most famous Scottish links are those of Saint Andrews and of Leith. The Royal and Ancient Golf Club of Saint Andrews was established in 1754. Toward the close of the 19th century, the game was introduced into America, where at the present time both private and public links are patronized by increasing numbers.

Handball. A very ancient game, probably of Celtic origin, now played in America chiefly for the vigorous exercise it provides. The game requires a firm floor with a smooth front wall and side walls. A small, solid rubber ball is used. It is batted against the wall with the player's hand, and on rebound must strike the floor in front of a crossline called the "ace line." Each player tries to make the ball rebound from the wall in such a way that it cannot be successfully returned by his opponent. The server scores 1 point, or "ace," when his opponent fails to return the ball. Usually, a score of 21 aces wins the game.

Hockey. The ancestry of this game includes the Irish game of "shinty" and the Scottish "hurley." The Scottish game was played on hard sea beaches, with 200 or 300 players on a side. A hard knob of wood was used as a puck, and the players were armed with roots of trees. The first organized hockey clubs in the world were established at Montreal in 1881.

Two games under this name are played at present—field hockey and ice hockey. Field hockey is played on a field 100 yards long and 60 yards wide, with a goal 12 feet wide and 7 feet high at each end. In this game a ball is used, and a team consists of 11 players.

In ice hockey, a hard rubber disk, called the puck, is used instead of a ball. The game, lasting through three 20-minute periods, is played on skates, a team consisting of 6 players. Goal posts are set 6 feet apart and at least 10 feet from the ends of the ice field or rink.

In both games a hook-shaped stick is used, the crooked end having flat faces. A score is made when the puck, or the ball, is driven between the opponents' goal posts.

Lacrosse. A game which probably originated among the North American Indians, and which was a favorite sport among many tribes. It is said that sometimes several hundred men would participate in a match. Before a game, the players went through a course of rigorous training. Tribes were often pitted against each other, old medicine men acting as umpires. A game might be continued for days. The sport even took on a ceremonial character. A ball of hide stuffed with hair was commonly employed. The shape of the stick used, crooked at one end like a crosier, suggested to the French explorers the name *la crosse*.

About 1840, white men adopted the game, and in Canada it rapidly grew in popularity. In 1867, rules were formulated, and the National Lacrosse Association of Canada was formed. A little later the game was introduced into the United States.

The modern game is played upon a field about 120 yards long, with a goal 6 feet square at each end. There are 12 players on a side, and the object of play is to send a small solid rubber ball into the opponents' goal. The ball is carried or thrown with the *crosse*, or stick, 3 or 4 feet long, shaped like a shepherd's crook, from the broad, curved end of which a netting of rawhide or catgut extends about halfway up the handle.

Mah Jong. An ancient Chinese game which has recently become popular in America and Europe. According to the generally accepted legend, it was invented about 3000 years ago by Sze, the Chinese fisherman who first hired men to fish from boats. His employees became seasick, and, believing that the malady was imaginary, he invented the game to keep their minds from their condition.

Mah Jong is played with 136 pieces, or tiles, somewhat like dominoes. They are grouped, according to the designs upon them, into 34 different suits of 4 each. There are ordinarily four players. The tiles are placed face down on a table, two deep, in the form of a square city wall. This wall is opened at a point determined by a throw of dice. The opening is made by taking from the wall two pieces, which are placed on the wall at one side of the opening. Beginning with the opposite side of the opening, the players then draw tiles from the wall in a fixed order until each player holds 13 pieces. The one who first drew takes one more piece. The object of each player is to build up a high-scoring hand by drawing and discarding according to certain rules. When one player obtains what is known as a complete hand, he cries Mah Jong and the game is completed. The scores are then computed according to a system of rules, the different designs and combinations of pieces having certain fixed values.

In China, the game was played in accordance with the above essentials. Since the beginning of its vogue abroad, modifications have been introduced in regard to terms, manner of scoring, and other details.

Polo. This thrilling field game is played by two teams of four players each, mounted on ponies. The field is turf, 300 yards long by 150 to 200 yards wide. The object of play is to drive a light wooden ball through the opponents' goal. A long-handled mallet is used to drive the ball. The goals are 8 yards wide between goal posts. A game commonly consists of 8 periods of 7½ minutes each.

The Persians were among the earliest players of this ancient game, as they were among the first of ancient horsemen. A definite record of a game much like the modern sport is found in China in the 6th century A. D. English officers adopted the game as they found it in India, and brought it to England, where, in 1877, the first definite rules were adopted.

Rowing. This is the oldest of organized college sports. From 1841 to 1923, Oxford and Cambridge held 73 contests over a 4¼-mile course. The first American college boat club was organized at Yale in 1843. Harvard followed the next year. Their first meet was a 2-mile race on Lake Winnepesaukee. Since 1878 the annual Yale-Harvard race has been rowed on the Thames river at New London, Conn.

Since 1896, an intercollegiate rowing regatta has been an annual event on the Hudson at Poughkeepsie. The course is 2 to 4 miles, and several university crews compete. Another famous regatta is the American Henley, held at Philadelphia. Besides these, many amateur rowing contests are held in the United States. In 1920, the navy crew, defeating a picked English crew, won the Olympic championship at Brussels.

Tennis, Lawn. A game usually played by 2 or 4 players upon an outdoor court. The court is 78 feet long and 27 feet wide, with an extra 9 feet of width when 4 are playing. A light racket and a small inflated ball are used.

The game consists in driving the ball back and forth over a net stretched across the court midway of its length. Each player tries to direct, or place, the ball within his opponent's court, so that it cannot be returned. His first successful attempt gives him a score of 15; the second makes the score 30; the third, 40; and the fourth wins the game, unless the opponent also has made 40. In this case, the score is deuce, and the winning of two successive points is necessary to win the match. Games are usually played in sets; the player who first wins 6 games wins the set unless his opponent ties the score at 5 all, in which case the winning of two successive games is necessary to win the set.

Before 1870, tennis as an indoor game, now called court tennis, had been first played in modern times by the French. The name is by some authorities derived from the word *tenez*, meaning "seize it" or "play." Modern lawn tennis, however, was patented by Major Wingfield in England in 1874. The present great popularity of the game dates from about 1880.

Volley Ball. A game, usually played indoors, in which 5 or more players on a side may engage. A spherical, leather-covered ball is used. The object of play is to volley the ball, striking it with the hand, back and forth over an elevated net. The failure of one side to return the ball scores a point for their opponents.

PUBLIC HEALTH STATISTICS

THE study of the conditions governing the physical well-being of communities has taken its rightful place within recent years, not only as an activity of government, but as a function of various private organizations, and as a subject of instruction in universities.

In the United States, a bureau of the Federal treasury department, established by Congress in 1798 for the management of hospitals, has developed into the bureau of public health service. In addition to affording medical treatment for merchant seamen and for Federal employees, this bureau, with a large staff of experts, conducts the medical examination of immigrants and carries on a highly efficient program of investigation of problems of public health and of sanitary engineering. It co-operates with local authorities in the control of epidemics, and, through demonstrations and publications, conducts public health instruction throughout the United States. The activities of state and municipal health departments have done much to improve health conditions in both urban and rural communities.

The science of public health rests upon medical science and upon the sciences of chemistry and engineering applied to such matters as disinfection and drainage and other physical aids to sanitary conditions. Its practical service is dependent also upon accurate records with regard to distribution of population, births and deaths, prevalence of diseases, and causes of deaths. These facts are now collected under the title *Vital Statistics*.

At the present time the most general and dependable body of facts concerns the number and causes of deaths. In the United States, the bureau of the census now recognizes a registration area within which mortality records suitable for inclusion in the census reports are kept. This area in 1920 included 35 states, or about 58 per cent of the land area of the country and 82 per cent of the population. Outside these states certain cities also are included in the registration area.

BIRTH AND DEATH RATES PER 1000 OF POPULATION IN VARIOUS COUNTRIES

COUNTRY	Year	Births	Rate	Deaths	Rate
Argentine Republic	1920	276,800	31.8	129,600	14.9
Australia	1921	136,202	25.0	54,085	9.9
Austria	1920	137,324	22.4	116,284	19.0
Belgium	1921	163,333	21.8	100,468	13.4
Canada	1921	253,069	29.4	118,405	13.7
Chile	1920	146,725	39.3	115,426	30.7
Costa Rica	1921	18,252	31.5	10,044	17.4
Denmark	1921	78,808	23.9	36,195	11.0
Ecuador	1921	78,569	39.3	49,111	24.6
Egypt	1921	558,898	41.7	334,439	25.0
England and Wales	1922	780,187	20.5	486,829	12.8
Ireland	1921	90,720	20.2	63,838	14.2
Scotland	1922	115,085	23.5	72,904	14.9
Finland	1920	84,174	25.0	53,304	15.8
France	1921	813,396	20.7	696,373	17.7
Germany	1919	1,299,404	21.7	1,017,284	16.9
India	1919	. . . .	30.2	. . . .	35.9
Italy	1921	1,086,149	27.9	625,136	16.1
Japan	1920	2,061,981	36.8	1,444,193	25.8
Netherlands	1921	189,546	27.1	77,002	11.0
New Zealand	1921	28,567	23.3	10,682	8.7
Norway	1920	70,691	26.8	33,502	12.6
Panama	1920	11,616	28.7	5,801	11.1
Portugal	1919	167,704	29.9	153,697	27.3
Rumania	1919	285,589	16.4	261,107	15.1
Salvador	1921	55,539	36.4	30,613	20.1
Spain	1920	622,468	29.1	494,290	23.2
Sweden	1921	126,770	21.3	73,460	12.3
Switzerland	1920	83,623	21.3	58,425	15.1
Uruguay	1920	39,335	26.3	19,041	12.7
Venezuela	1920	74,174	30.8	54,715	22.6

BIRTHS AND DEATHS IN UNITED STATES REGISTRATION AREA, 1921

AREA	Births	Deaths	RATE PER 1000 POPULATION		Excess of Births Over Deaths
			Births	Deaths	
California	72,325	47,377	20.2	13.2	24,948
Connecticut	34,071	16,167	24.0	11.4	17,904
Delaware	5,063	2,970	22.4	13.1	2,093
Indiana	68,246	35,220	23.0	11.9	33,026
Kansas	41,535	18,106	23.3	10.2	23,429
Kentucky	67,341	25,669	27.6	10.5	41,672
Maine	17,712	10,815	22.9	14.0	6,897
Maryland	36,971	19,980	25.1	13.6	16,991
Massachusetts	92,225	47,787	23.5	12.2	44,438
Michigan	96,322	44,132	25.3	11.6	52,190
Minnesota	57,526	22,806	23.6	9.4	34,720
Mississippi	46,159	19,950	25.8	11.1	26,209
Nebraska	32,201	12,017	24.5	9.2	20,184
New Hampshire	10,129	6,102	22.8	13.7	4,027
New Jersey	78,230	37,928	24.1	11.7	40,302
New York	239,875	130,394	22.7	12.3	109,481
North Carolina	88,466	29,454	33.8	11.3	59,012
Ohio	129,375	67,104	21.9	11.3	62,271
Oregon	15,468	8,304	19.3	10.4	7,164
Pennsylvania	229,452	109,919	25.8	12.4	119,533
Rhode Island	14,499	7,756	23.6	12.6	6,743
South Carolina	50,464	20,377	29.5	11.9	30,087
Utah	14,591	4,783	31.6	10.4	9,808
Vermont	7,930	4,999	22.5	14.2	2,931
Virginia	70,162	28,534	29.9	12.2	41,628
Washington	27,267	13,254	19.6	9.5	14,013
Wisconsin	61,669	27,552	23.0	10.3	34,117
* Total, 1921	1,714,261	825,511	24.3	11.7	888,750

* Includes District of Columbia.

DEATH RATES FROM IMPORTANT CAUSES IN THE UNITED STATES

CAUSE	DEATH RATE PER 100,000		INCREASE OR DECREASE	
	1910	1920	Increase	Decrease
Typhoid fever	23.5	7.8	. .	15.7
Malaria	2.2	3.6	1.4	
Measles	12.3	8.8	. .	3.5
Scarlet fever	11.6	4.6	. .	7.0
Whooping cough	11.4	12.5	1.1	
Diphtheria and croup	21.4	15.3	. .	6.1
Influenza	14.4	71.0	56.6	
Tuberculosis of the lungs	139.7	100.8	. .	38.9
Tuberculous meningitis	8.6	5.6	. .	3.0
Other forms of tuberculosis	12.0	7.8	. .	4.2
Rheumatism	7.4	4.9	. .	2.5
Cancer and other malignant tumors	76.2	83.4	7.2	
Diabetes	14.9	16.1	1.2	
Meningitis	14.2	6.0	. .	8.2
Cerebral hemorrhage and softening	75.7	81.9	6.2	
Organic diseases of the heart	141.5	141.9	.4	
Bronchitis	23.4	13.3	. .	10.1
Pneumonia (all forms)	147.7	137.3	. .	10.4
Other diseases, respiratory system	16.1	11.5	. .	4.6
Diarrhea and enteritis (under 2 years)	100.8	44.0	. .	56.8
Appendicitis and typhlitis	11.4	13.4	2.0	
Hernia, intestinal obstruction	12.4	10.6	. .	1.8
Cirrhosis of the liver	13.9	7.1	. .	6.8
Acute nephritis and Bright's disease	99.0	89.4	. .	9.6
Puerperal septicemia	7.2	6.6	. .	.6
Other puerperal causes	8.5	12.6	4.1	
Congenital debility and malformations	74.9	69.8	. .	5.1
Violent deaths (suicide excepted)	90.3	78.5	. .	11.8
Suicide	16.0	10.2	. .	5.8
Unknown or ill-defined diseases	23.1	17.7	. .	5.4
All other causes	264.0	211.9	. .	52.1
All deaths	1495.7	1305.9	80.2	270.0

Academy. This name was applied originally to an olive grove of ancient Athens used as a gymnasium. The name was given also to the estate of Plato, which was situated near by, and to the school which he founded at his house. In later times, the name has been used as a common noun to designate either an institution of learning or an association of scholars or artists.

Among the earliest of the innumerable academies, in the sense of associations of scholars, were the academy of Alcuin and other friends of Charlemagne about 800 A. D., one at Constantinople in the 11th century, and the Platonic academy at Florence in the 15th century. In 1635, Richelieu organized the French academy, which survives to the present day as one of the constituent societies which went to form the institute of France. The American academy of arts and letters is the most notable society of this type in America. The name academy has also been frequently used in America to designate a certain type of high school or preparatory school.

According to Hoyle. Edmond Hoyle, an Englishman who lived from 1672 to 1769, was the first to systematize the laws of whist, and he was considered the highest authority on the game until 1862, when the modernized form of play was introduced by Cavendish. This expression is no longer confined to card games but is now applied colloquially in any field, and means "according to the strict rules" obtaining in that field.

Aeronautics (*ā'ĕr-ō-nŏ'tĭks*). Mechanical flight is pre-eminently a development of the 20th century. Its success demanded the improved gasoline engine, a light, strong metal, such as duralumin, and a knowledge of air dynamics. These discoveries led to the evolution of the airship from the balloon and to the building of successful heavier-than-air machines, or airplanes.

For the invention and evolution of these aircraft, see *Airplane* and *Airship*.

The flight of an airplane is analogous to that of a kite. The string by which the kite is drawn forward corresponds to the forward drive of the propeller, and the upward pressure of the air on the kite corresponds to the lift exerted on the wings of the airplane. This lift is due partly to the pressure exerted on the under side of the wings, and partly to the suction caused by a partial vacuum on the upper side of the wings. Neither surface of the wing is flat. The cross section of the wing follows certain stream-line designs which are a balance between three requirements—maximum lifting power, strength, and minimum resistance in passing through the air. The last mentioned requirement demands also that the body of the airplane should conform to stream-line design.

To exert effective lifting power the wings must be driven forward at a certain minimum speed and must be inclined upward at an angle of from 2° to 20°. Below this limit, or above it, the air resistance, or "drag," causes the plane to "stall"; that is, to fall below the minimum speed necessary for horizontal flight or control. The minimum speed required to keep the average plane in the air is about 35 miles an hour. Average flying speed approximates 90 miles per hour. The record speed approaches 300 miles per hour.

The mechanisms for stabilizing the airplane's course include a vertical tail fin and a horizontal tail plane. Control of its course is effected through an "elevator," jointed to the tail plane, a rudder, jointed to the fin, and aillerons, or adjustable wing flaps. Landing on rough ground is facilitated by the use of pneumatic tired wheels on axles fitted and designed for maximum shock absorbing capacity.

While the control of an automobile involves only two main factors—speed and steering in a horizontal plane—the control of an airplane involves at least two additional factors. One is steering in a vertical plane; that is, going upward, downward, or on the level. The other is maintaining an even keel; that is, avoiding undue tipping, or "banking." Most planes have a so-called stick control. Moving the "stick" forward or backward causes a fall or rise in height; moving it sideways causes tipping to the right or left. Steering right or left is accomplished by a foot bar.

In order that the aviator may direct his course properly, the plane is equipped with numerous recording instruments. These include the special earth induction compass, an altimeter for recording elevation, and a log for indicating speed through the air.

In speed and in independence of natural barriers, air travel enjoys enormous advantages. Relative safety is assured by making planes entirely of metal and equipping them with several motors, as in the case of the Ford monoplanes. The construction of numerous airports further reduces the danger of forced landings on unsuitable ground. Lighted airways and powerful revolving beacons afford direction for night flying. Improved weather forecasting service reduces the peril of inclement weather, since fog and ice remain the most serious obstacles to dependable air travel. To be entirely free of "weather," the aircraft would have to travel at a height varying from 13 miles at the equator to 2½ miles at the poles.

Alchemy. The chemistry of the middle ages. It most frequently took the form of a search for the "philosopher's stone," which should transform all baser metals into gold, cure all diseases, and restore youth. For this last property, it was sometimes called the elixir of youth. The search for this philosopher's stone led to many important practical discoveries in chemistry. They were long unavailable for classification and general use, however, because the alchemists kept them as profound secrets.

Almanacs. The word almanac is of uncertain derivation, most authorities tracing it to the Arabic article *al* and the word *manākh*, the latter perhaps signifying "sundial." In modern times, almanacs have been books, pamphlets, or tables containing a calendar showing the days, weeks, and months of the year, various festivals, and certain astronomical facts. Ancient nations of the East probably possessed such tables, but the *fasti* or calendars of the Romans most closely resembled the modern almanac. The first notable printed almanac in Europe was compiled by Regiomontanus and covered the 57 years from 1475 to 1531 inclusive. Manuscript almanacs existed in England in the 13th and 14th centuries.

The first almanac in America is said to have been *Bradford's*, issued in Philadelphia. Benjamin Franklin's *Poor Richard's Almanac*, published for about 25 years from 1732, became famous for its wit and wisdom. At the present time, several famous almanacs that are really useful handbooks of current information are issued annually in Europe and America. The *Almanach de Gotha*, which was published first in 1763, is devoted to political information about the countries of the world. *Whitaker's Almanack*, published in England, and several American almanacs issued by newspapers, such as the *World Almanac*, are compact summaries of current political facts and of general events.

America's Cup Race. This famous yachting race derives its name from a schooner yacht *America*, built in 1851 for Commodore Stephens of the New York yacht club. On Aug. 22 of the same year, the *America* won a race open to all comers, over a course around the Isle of Wight, near England, her owner receiving the prize cup valued at $2500. In the numerous races since that date, the cup has been successfully defended against the English challengers. Since 1899 Sir Thomas Lipton has been the gallant sponsor of several attempts to recapture the coveted prize.

Animism (*ăn'ĭ-mĭz'm*). In its recent modern use the term animism, from *anima*, "soul," is widely employed to denote the most primitive or

superstitious forms of religion. In this sense the term was popularized by E. B. Tylor, who defined it as "the doctrine of souls and other spiritual beings generally."

But when so employed animism has come to have at least three distinct meanings. Of these, the first is belief which ascribes conscious life to all objects or to all nature in general, without assuming, however, the existence of separate souls. This embraces many superstitions, of which fetishism may be cited as a typical example. The second meaning is the belief that all material bodies are inhabited by souls; that these souls may be either material or immaterial, and that they may exist in a separate, disembodied state. Such souls are ascribed not only to men, but also to plants, animals, mountains, rocks, implements, weapons, and to other objects. The third meaning which animism is employed to signify is belief in the activity of the spirits of those recently deceased and in the possession of persons or things by ghosts or by benign and evil spirits.

Animistic beliefs, such as the foregoing, are extensively found among savage, barbaric, and semi-civilized peoples. To a greater or less degree, they persist also in the most advanced races. Although animism is commonly described as the most primitive form of religion, the view is also widely held that, in a true sense, animism is not a religion. Those who maintain this position emphasize that while religion implies some form of emotion, animism is simply an attempted explanation of puzzling phenomena and is not an attitude of mind toward the cause of them.

Barber's Pole. A pole striped slantingly with alternate bands of red and white and placed as a sign outside the door of a barber's shop. In former times, barbers practiced bleeding and leeching. The red striping on the pole symbolized the blood; the white, bandages.

Benefit of Clergy. By an ordinance enacted in 1087 in England, any man sentenced to death could save his life if he could prove that he was a clerk, or man of learning. This might be done by reading a certain verse of Scripture proposed to him. The privilege was known as the benefit of clergy. It was officially withdrawn in the 18th century.

Bessemer Steel, Invention of. Bessemer steel is produced by blowing air through a mass of molten pig iron. During the process of blowing, the carbon and silicon, together with some of the other impurities contained in the iron, are burned to forms which pass away as gases or are retained in the slag so that they may be separated from the liquid metal. The heat formed by the combustion of these impurities, especially the silicon, is so great that, instead of being cooled by the blast of air, the liquid actually becomes hotter.

The product which remains after the treatment with air is not steel but is in many respects similar to wrought iron. In order to obtain steel, a certain amount of spiegeleisen, containing known percentages of iron, manganese, and carbon, is added to the molten iron. See *Steel*, page 977.

This process of removing the carbon and silicon from pig iron was invented by the great English ironmaster, Henry Bessemer, who received his patent in 1855. The process of recarburizing the molten iron and removing oxygen by means of spiegeleisen was patented by Robert Mushet.

When, in 1856, Bessemer took out patents for his process in the United States, his claims were immediately contested in the courts by William Kelly. It then developed that Kelly, who operated an iron refinery and foundry at Eddyville, Ky., had during the years 1846-47 independently invented the pneumatic process of refining pig iron. The United States courts decided that Kelly was the prior inventor, and he received a patent which was later renewed. Bessemer's patents were not renewed.

Bible, Modern Translations of. No manuscript of the Old Testament in Hebrew is extant that dates before the 9th century, and none of the New Testament in the Greek is earlier than the 4th; but critics are agreed that we possess the text of the 1st century substantially entire. Of the versions in modern languages, among the earliest was an Italian version prepared by the Waldenses in the 13th century. The first printed Bible in Italian was issued at Venice in 1471. A printed Bible in Spanish appeared at Valencia, Spain, in 1478. The New Testament in French was first printed in 1477, at Lyon; in 1487, a large edition of the whole Bible was issued. The Louvain Bible, 1550, became the popular French Catholic version; the translation by Olivetan, 1535, was the corresponding Protestant version. Eighteen printed editions of the Bible had been issued in Germany before Luther's translation appeared in 1534.

The first complete English translation was made from the Vulgate, or Latin version. It was issued about 1382, and is known as the Wiclif translation because John Wiclif did much of the work and sponsored the version. His friend, John Purvey, revised this version within the next few years, producing what is known as the Wiclif-Purvey Bible. William Tyndale issued (1525-26) the first printed English New Testament translated from the Greek. Between this date and 1536, he translated from the Hebrew the Pentateuch and other parts of the Old Testament.

Miles Coverdale published the first complete printed English Bible in 1535. Subsequent important English versions are: Matthew's Bible, 1537; the Great Bible, 1539; Cranmer's Bible, 1540; the Genevan Bible, so called because prepared by English exiles at Geneva, Switzerland, 1560; the Bishops' Bible, 1568; the Authorized Version, or King James Bible, 1611; the Reims New Testament (Catholic), 1582; the Douai Bible (Catholic), 1609; the Revised Version, 1881 and 1885; American Revised Version, 1901. A new and complete version of the whole Bible is at the present time in the course of construction at Rome under the guidance of Cardinal Gasquet, an English Benedictine monk. An excellent English version of the Jewish Scriptures was issued in 1917.

In recent years, much activity has been directed toward rendering the New Testament into the forms of modern English speech. Several notable versions of this character have been produced by both English and American scholars. See *English Literature*, pages 214, 215, 216.

Camouflage. A term coined from the French word *camoufler*, "to disguise." During the World War, the word camouflage came to be used by the Allied troops to denote means employed in concealing from the enemy the whereabouts of men, guns, supplies, or other objects. This result was ordinarily secured either by substituting for the real objects dummies which resembled them or by making the objects to be protected blend with their surroundings in such a way as to be inconspicuous. The latter method was used frequently in the protective coloring applied to ships in order to save them from submarines. The word has come to be used colloquially as a general term for the art of effecting disguise of any sort.

Capital Punishment. In the United States, capital punishment, as the extreme penalty for crime, prevails throughout the Union except in Kansas, Maine, Michigan, Minnesota, North Dakota, Rhode Island, South Dakota, and Wisconsin. A number of states have abolished, and later restored, capital punishment. These include Arizona, Colorado, Iowa, Oregon, and Washington. Hanging is the mode of execution in 19 states. In 19 others, electrocution is the legal method. In Nevada, an act was passed in 1921 providing for the use of lethal gas in carrying out the death penalty. The first execution by this method took place in 1924. In Utah, condemned persons may elect to be shot by a firing squad.

Nations which have abolished capital punishment include Argentina, Austria, Belgium, Brazil, Italy, The Netherlands, Russia, Rumania, and the Scandinavian countries.

CEMETERIES, NATIONAL *

Name and Location	Area Acres	Interments
Alexandria (Pineville), La.	8.24	4,670
Alexandria, Va.	5.50	3,576
Andersonville, Ga.	120.00	13,737
Andrew Johnson (Greenville), Tenn.	15.00	47
Annapolis, Md.	4.125	2,561
Antietam (Sharpsburg), Md.	11.00	4,820
Arlington (Fort Myer), Va.	408.03	36,100
Balls Bluff (Leesburg), Va.	.006	25
Barrancas, Fla.	8.56	2,604
Baton Rouge, La.	7.50	3,278
Battle Ground, Dist. of Columbia	1.033	44
Beaufort, S. C.	29.00	9,726
Beverly, N. J.	1.00	260
Camp Butler (Springfield), Ill.	6.02	1,616
Camp Nelson, Ky.	9.50	3,672
Cave Hill (Louisville), Ky.	4.29	5,200
Chalmette (Arabi), La.	16.00	13,353
Chattanooga, Tenn.	129.53	14,286
City Point, Va.	7.49	5,210
Cold Harbor (Richmond), Va.	1.75	1,971
Corinth, Miss.	20.00	5,754
Crown Hill (Indianapolis), Ind.	1.37	1,037
Culpeper, Va.	6.00	1,377
Custer Battlefield, Mont.	640.00	1,641
Cypress Hills (Brooklyn), N. Y.	18.14	11,408
Danville, Ky.	.31	362
Danville, Va.	8.50	1,331
Fayetteville, Ark.	6.63	1,375
Finns Point (Salem), N. J.	2.50	2,651
Florence, S. C.	3.76	3,019
Fort Donelson (Dover), Tenn.	15.34	682
Fort Gibson, Okla.	6.90	2,556
Fort Harrison (Richmond), Va.	1.55	820
Fort Leavenworth, Kans.	15.00	5,959
Fort McPherson (Brady), Nebr.	20.00	1,095
Fort Scott, Kans.	10.26	1,070
Fort Smith, Ark.	14.74	2,575
Fredericksburg, Va.	12.005	15,217
Gettysburg, Pa.	14.87	3,747
Glendale, Va.	2.12	1,200
Grafton, W. Va.	3.40	1,322
Hampton, Va.	19.611	13,306
Jefferson Barracks, Mo.	50.00	13,740
Jefferson City, Mo.	2.00	898
Keokuk, Iowa	2.75	999
Knoxville, Tenn.	9.85	3,865
Lebanon, Ky.	2.50	881
Lexington, Ky.	.75	1,757
Little Rock, Ark.	23.12	7,307
Loudon Park (Baltimore), Md.	3.69	4,774
Marietta, Ga.	24.00	10,583
Memphis, Tenn.	43.91	14,836
Mexico City, Mexico	2.00	1,563
Mill Springs (Somerset), Ky.	3.50	746
Mobile, Ala.	2.68	1,233
Mound City, Ill.	10.50	5,539
Nashville (Madison), Tenn.	65.00	16,862
Natchez, Miss.	11.07	3,629
New Albany, Ind.	5.46	3,326
Newbern, N. C.	7.69	3,448
Philadelphia (Pittsville Sta.), Pa.	13.26	4,287
Poplar Grove (Petersburg), Va.	8.65	6,229
Port Hudson, La.	8.00	3,858
Quincy, Ill.	.459	321
Raleigh, N. C.	7.83	1,243
Richmond, Va.	9.74	6,620
Rock Island, Ill.	1.00	514
Saint Augustine, Fla.	1.33	1,861
Salisbury, N. C.	6.00	12,186
San Antonio, Tex.	3.63	2,890
San Francisco (Presidio Sta.), Cal.	9.5	10,540
Santa Fe, N. Mex.	9.44	1,214
Seven Pines (Richmond), Va.	1.55	1,405
Shiloh (Pittsburg Landing), Tenn.	10.05	3,636
Sitka, Alaska	3.98	63
Soldiers' Home, D. C.	16.00	8,729
Springfield, Mo.	11.00	2,683
Staunton, Va.	1.15	774
Stone River (Murfreesboro), Tenn.	20.10	6,152
Vicksburg, Miss.	40.00	17,319
Wilmington, N. C.	5.00	2,414
Winchester, Va.	4.89	4,561
Woodlawn (Elmira), N. Y.	2.36	3,315
Yorktown, Va.	3.00	2,204

* Official statistics as of 1927.

AMERICAN WAR CEMETERIES IN EUROPE

Name	Location	Interments†
Meuse-Argonne	Romagne-sous-Montfaucon (Meuse), France	14,134
Saint Mihiel	Thiaucourt, Meurthe-et-Moselle, France	4,143
Somme	Bony, Aisne, France	1,830
Oise-Aisne	Seringes-et-Nesles, Aisne, France	5,962
Aisne-Marne	Belleau, Aisne, France	2,212
Suresnes	Suresnes, Paris, France	1,507
Flanders Field	Waereghem, Belgium	367
Brookwood	Brookwood, Surrey, England	437

† Numbers given are derived from official sources as of the year 1927.

Chemical Warfare. The use of poisonous, asphyxiating, or irritating chemicals in warfare was attempted as early as 425 B. C., when the Spartans burned sulphur near the walls of besieged Athenian cities with the intention of driving the defenders from their positions. In modern warfare, employment of poisons or poisonous weapons was expressly forbidden by the rules of the Hague Congress of 1907. The Allied armies were therefore totally unprepared when, at the battle of Ypres on April 22, 1915, the Germans let loose a dense cloud of greenish yellow chlorine gas upon the junction of the French and the British lines, which was at that time held by a French African regiment and by Canadians.

As a defense against poisonous gas, masks were gradually developed which were capable of giving complete protection to the wearer for hours at a time. In their final form these masks were equipped with eyepieces and completely covered the eyes, nose, and mouth. Air for breathing was drawn through a canister filled with chemicals and absorbent charcoal; the exhaled breath escaped through an outlet valve.

Of the absorbent ingredients used in the canister, charcoal and soda lime were probably of greatest importance. Charcoal prepared from coconut shells proved to be the best material for this purpose.

Mustard gas, or di-chloro-ethyl-sulphide, a heavy liquid of high boiling point, was the most extensively used of the so-called gases. Mustard gas is equally as poisonous as hydrocyanic acid; it is very permanent, and it produces a terrible blistering effect whenever it comes into contact with the skin.

Another type of gases were the lachrymators, or tear gases, which were almost as effective as the more poisonous materials because of the fact that even in very low concentrations they were capable of causing tears and involuntary closing of the eyes. Bromo-benzyl-cyanide was found most useful for this purpose.

Chloropicrin, or vomiting gas, and di-phenyl-chloro-arsine, or sneezing gas, were frequently employed in order to force the removal of gas masks and thus expose the wearer to more intense poisons which were discharged at the same time. The most dangerous of all poisonous gases developed during the World War is Lewisite, named for its discoverer, Capt. W. L. Lewis. This gas was never used in battle, but, because of its potential destructiveness if dropped from airplanes, it has been called the "Dew of Death."

The effects of poisonous gases upon unprotected troops are such that great efforts have been made to prevent the further use of gases in war, on the grounds that they are not humane. In this connection, however, statistics show that only 2 per cent of the American soldiers who were injured by gas died and very few were permanently injured, while more than 25 per cent of those injured in other ways lost their lives and from 2 to 5 per cent more were disfigured for life.

Chronology. The science of determining historical dates and the correct arrangement of the records of events in order of time. The development

of this branch of knowledge, so necessary to the modern writing of history and in the conduct of affairs, involves, first, a material means of keeping records and, secondly, a definite unit of time measurement. A third factor has proved to be necessary in practice, that is, a definite date or epoch from which to reckon intervals of time. For the historian, problems of chronology arise, particularly in the ancient and medieval periods, from the prevalence of different methods of reckoning, as well as from inaccuracies of record.

Ancient Eras. Perhaps as early as the 8th century B. C., the Babylonians adopted the year of the accession of Nabonassar as the epoch from which to reckon time. The beginning of the Babylonian era falls, therefore, in 747 B. C. It is interesting that the other two generally accepted eras of antiquity are both dated from years within the 8th century B. C. The Greeks reckoned in olympiads, counting from the accepted date of the first Olympic games, 776 B. C., while the Romans counted from the supposed date of the founding of Rome, 753 B. C. However, the Greek olympiad was four years in length, while there was a discrepancy in length between the Babylonian and the Roman year. Besides, both the Greek and the Roman system were introduced several centuries after the epochs taken as their beginnings.

The Christian Era. It is evident that the task of synchronizing dates in the history of the ancient world, where records were kept according to these varying systems, would not be easy. These and several other modes of reckoning periods longer than a year were in general use when, in 533 A. D., Dionysius Exiguus, a Roman abbot, introduced into Italy the system of the Christian era, according to which dates are reckoned forward and backward from the birth of Christ. This method of chronology came into use in France and England in the 8th century. There were still, however, considerable variations in the fixing of dates.

Dionysius used the year 754 A. U. C. as the year of the birth of Christ, and fixed the beginning of the Christian era at March 25 of the preceding year, dating from the Annunciation. Subsequently throughout the middle ages, in church and secular records, various dates for the beginning of the year,—March 25, March 1, Easter, and Christmas, for example,—were in use. Not until 1752 was the present date of January 1 in general use as the first day of the year. The fact that Dionysius placed the birth of Christ in 754 A. U. C., instead of 750, the commonly accepted year among early Christians, accounts in part for the necessity of reckoning that Christ was born in 4 B. C., instead of 1 A. D.

Modern chronology has been further complicated by the use of different calendars. The calendar having a year of 365 days, authorized by Julius Cæsar and known as the Julian calendar, was corrected by a council of astronomers summoned by Pope Gregory XIII in 1582. The new Gregorian calendar gradually came into use in western Europe, being finally adopted in England in 1752 and in the American colonies about the same time.

In eastern Europe, however, where the Greek Church was dominant, the Julian reckoning was retained. In 1917, Turkey adopted the Gregorian calendar; Russia followed in 1918; and, in 1923, a congress of the Eastern Orthodox Church decreed the adoption of the reckoning used by the rest of the world. Bulgaria and Greece accepted the change. At the opening of 1924, except for the small group of Ruthenian Catholics, the use of the Gregorian calendar was uniform throughout the civilized world. See *Calendar*.

Several attempts have been made to construct, by the use of the Old Testament records, a Creation era. The best-known of these is that which was computed by Archbishop Ussher (1650), in which the date of creation of the world is fixed as 4004 B. C. Other assumed dates of the creation vary from 3483 B. C. to 6984 B. C.

The eras mentioned above, as well as others that have been widely used in the Western world, are given in the following table.

Era	Beginning
	B. C.
Era of Constantinople	Sept. 1, 5508
Alexandrian Era	Aug. 29, 5502
Mundane Era of Antioch	Sept. 1, 5492
Julian Period	Jan. 1, 4713
Mundane Era of Ussher	Oct. 19, 4004
Jewish Mundane Era	Oct. 3761
Era of Abraham	Oct. 1, 2015
Era of the Olympiads	July 1, 776
Roman Era (A. U. C.)	April 24, 753
Grecian or Syro-Macedonian Era	Sept. 1, 312
Era of Maccabees	Nov. 24, 166
Tyrian Era	126
Sidonian Era	Oct. 110
Spanish Era	Jan. 1, 38
Augustan Era	Feb. 14, 27
	A. D.
Christian Era	Jan. 1, 1
Mohammedan Era	July 16, 622

Oriental Reckoning. In both Hindu and Chinese chronology, the cycle of 60 years is employed. The Hindus assume four ages, three of which elapsed before the beginning of the present age, called *kali-yug*, 3101 B. C. Various eras, dating from different reigns or events, are used in different parts of India. The Chinese cycles of 60 years begin with 2277 B. C. However, since 163 B. C., Chinese writers have followed the practice of dating events according to periods beginning with the accession of some emperor.

Mayan Calendar, The. The ancient Mayas of Central America developed a remarkably elaborate and accurate system of chronology. Their inscriptions which archeologists have examined appear to have been almost exclusively devoted to the reckoning of periods of time. In the Mayan system, the day is the basal unit. Cycles of about 52 years were employed, and, at intervals of approximately 5 years (1800 days), monuments were erected. The inscriptions on each set of monuments appear to constitute a 5-year almanac. So complete was the Mayan reckoning that it is said to be capable of locating accurately any date in a range of 370,000 years.

Codes. Messages written by means of a secret arrangement of letters or figures so that such communications may not be deciphered by a third party. This device is widely used in diplomacy, war, and business. One of the commonest ways of forming these codes is to make an arbitrary sentence containing 26 letters, each letter of the alphabet occurring once, and to use these in their order as the ordinary alphabet. Thus if c were the 14th letter of the key sentence, it would always be employed in the code writing for n, the 14th letter of the alphabet.

Communistic Societies. Most primitive tribes held much of their property in common. In more advanced stages of civilization, private ownership has played a much larger rôle. At the same time, idealists and religious leaders have looked toward a communistic organization as an escape from the evils that accompany private ownership of property. One of the most notable exponents of the common possession of property was Plato, who advocated communism in wives and husbands also.

Many of these programs have been tried in actual practice, but none have been permanently successful. Their failure is generally attributed to the fact that they do not call forth the individual initiative essential to efficient production. The early Christian Church for a short time practiced this manner of life, and, in the middle ages, several religious orders attempted to return to it.

In the United States, there have been numerous experiments of this order. Among the first were the communities of Shakers, who derived their inspiration from the religious leader Ann Lee. She

came to America in 1774 and founded several societies, the members of which were celibates. Fifteen of these societies are said to exist to the present day. The Harmony Society, or Harmonists, practiced communism and celibacy, beginning in 1805. They were located first in Butler county, Pa.; in 1814, they founded New Harmony, Ind., whence, in 1824, they removed to Economy, Pa., where the society continued until formally dissolved in 1906.

The most famous of American communistic societies was that called the Brook Farm at West Roxbury, Mass. It was actively supported by such prominent figures as Hawthorne, Emerson, and Horace Greeley. Founded in 1841, it was later modeled on the views of the French writer Fourier. Waning enthusiasm and a disastrous fire hastened its dissolution in 1856.

The Amana community originated in 1842. Its members were German and Swiss immigrants who represented an organization going back almost to 1700. They still survive in Iowa. Their manner of life is ascetic and forbidding.

The Oneida community was founded in 1848 by J. H. Noyes. Communism in it extended not only to property but also to sex relationships. It later became a commercial organization. See *Noyes, John Humphrey*. The Icarian community, founded in 1848, owed its origin to Cabot, the author of the utopian work entitled *Icaria*. It lacked the rigid regulations of most of the others. Located in Illinois for some time, it was later compelled to seek a place in Iowa.

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Cross. The chief symbol of Christianity. As a sacred symbol, however, the cross is of much earlier origin and of much wider diffusion, being found in its more primitive forms in every part of the world. The Spanish conquerors of South America were astonished to find the cross an object of worship there. The swastika,  , and the *crux ansata*, "handle-shaped cross,"  , are the principal early forms, the latter being still found among the Copts of Egypt as a symbol of Christianity. Among most early peoples, the cross symbolized the life-giving principle in nature.

The cross was also used as an instrument of torture and execution from early times, particularly among the Romans as a penalty inflicted on slaves and others who could not claim citizenship. From the fact that Jesus was put to death in this manner, the cross, already an object of religious veneration, assumed a new significance for the Christians. It has also been adopted as ensigns for various Christian countries and organizations.

Crusades, The. The several religious and military expeditions undertaken by European powers in the middle ages to rescue the holy places of Palestine from the Mohammedans. In the following paragraphs, the dates, leaders, and results of the seven chief crusades are summarized. See also *Children's Crusade*, page 560.

1096–1099. Chief leaders, Godfrey of Bouillon and Robert, duke of Normandy. Established kingdom of Jerusalem.

1147–1149. Chief leaders, Conrad III of Germany and Louis VII of France. No result.

1189–1192. Chief leaders, Emperor Frederick I, Richard the Lion-hearted, and Philip II of France. Capture of Acre.

1202–1204. Chief leaders, Baldwin, count of Flanders, and Boniface, marquis of Montferrat. Latin empire founded.

1228–1229. Chief leader, Frederick II, emperor. Jerusalem regained.

1248–1254. Chief leader, Louis IX of France. No result.

1270. Chief leader, Louis IX of France. Fruitless.

Date Line, International. A line, following approximately the 180th meridian, on opposite sides of which the reckoning of the date differs by one day. As one travels from west to east, standard time advances one hour for each 15°, that is, each twenty-fourth of a circle of latitude about the earth. In passing completely around the earth, therefore, one gains twenty-four hours, or one complete day. The 180th meridian is chosen as the one at which this change of date should be made because it is farthest from the first, or Greenwich, meridian and because, passing near the center of the Pacific Ocean, it avoids inhabited lands, where it might cause serious confusion. The date line departs from the 180th meridian sufficiently to pass through Bering strait, west of the Aleutian islands, and east of certain British islands near New Zealand. The date on the American side of the line is one day behind the date on the Asiatic side.

Dictionaries. Compilations of words or terms which are arranged in a definite order, usually alphabetical, each one being accompanied by an explanation of its meaning, and, frequently, by other detailed information.

The modern dictionary is the result of a long evolution. The earliest work of the kind mentioned was made at Nineveh in the 7th century B. C. and was impressed in cuneiform letters on clay tablets. Large lexicons were constructed also in Arabic and Sanskrit.

The earliest Greek and Latin dictionaries were not meant to contain all the words in the language but embraced only more difficult words and phrases, which needed explanation. Some were confined to words in special fields, such as those of Homeric expressions, of words used in cooking, or Zenodotus' dictionary of the cries of animals. Only in modern times have attempts been made to compile explanations of all the words used by the ancient Greeks and Romans.

The first dictionary aiming to give a complete collection of English words was published in 1721 by Nathan Bailey, and was called *The Universal Etymological English Dictionary*. This work was also the first in English to trace on a large scale the

derivation of words and to mark accents as an aid in pronunciation. It was the standard until the famous dictionary of Dr. Samuel Johnson appeared in 1755. This latter work began the custom of illustrating the use of words by quotations from the best writers. Among several useful dictionaries that appeared during the 19th century, those of Stormonth and of Worcester proved especially valuable for pronunciation. The most scholarly and authoritative work of the present day is the monumental *New English*, or *Oxford, Dictionary*.

The greatest American lexicographer was Noah Webster. His *American Dictionary of the English Language*, published in 1828, has been repeatedly revised. Under its present name, *Webster's New International Dictionary*, it is provided with many features not included in the older dictionaries, such as illustrations, synonyms, sections containing biographical and geographical information, lists of abbreviations, and numerous other useful additions. Other notable American dictionaries in English are *Funk and Wagnalls New Standard Dictionary* and the *Century Dictionary and Cyclopedia*, which includes an atlas and a volume on proper names.

Dollar Mark. The old Spanish dollar was called the pillar dollar, as it bore, on the reverse side, two pillars, symbolic of the Pillars of Hercules. These pillars with the ribbon, or scroll, with which they were interlaced is believed to be the source of the present dollar mark. Many other surmises have been advanced in explanation of this sign, one of the more common of which explains the mark as an abbreviation for United States, an "S" having been placed over a "U." The lower part of the "U" is supposed to have been deleted.

FAMOUS SIEGES

Acre. Besieged for 2 years by the Crusaders. Surrendered, July 1191.

Alesia, Gaul. Besieged for a month by the Romans under Julius Cæsar. Surrendered, 51 B. C.

Antwerp. Besieged for 14 months by Spaniards. Belgians surrendered, 1585.
Besieged for 15 months by populace. Dutch garrison surrendered, Dec. 23, 1832.
Besieged for 10 days by Germans. Belgians surrendered, October 9, 1914.

Arcot. Besieged for 50 days by French and Sepoys. Siege raised, 1751.

Boston, Mass. Besieged by American forces for 8 months. Evacuated by British, March 17, 1776.

Candia, Crete. Besieged for 2 years by Turks. Venetians surrendered, September 1669.

Carthage. Besieged for 2 years by Romans. The city fell, 146 B. C.

Constantinople. Besieged by Saracens for 5 years. Siege raised, 677.
Besieged by Saracens for 1 year. Siege raised, 718.
Besieged by Turks for 54 days. City surrendered, May 29, 1453.

Delhi. Besieged by British for 131 days. Indian mutineers surrendered, Sept. 20, 1857.

Gibraltar. Besieged by Spaniards 3 years, 7 months, 12 days. Siege raised, Sept. 13, 1782.

Jerusalem. Besieged by Mohammedans for 4 months. Byzantine garrison surrendered, 637.

Kimberley. Besieged by Boers for 126 days. British garrison relieved, Feb. 15, 1900.

Kut-el-Amara. Besieged by Turks for 144 days. British surrendered, April 29, 1916.

Ladysmith. Besieged by Boers for 118 days. British garrison relieved, Feb. 28, 1900.

La Rochelle. Besieged by forces of Richelieu for 14 months. Huguenots surrendered, October 28, 1628.

Leiden. Besieged by Spaniards for 4 months. Dutch cut dikes. Siege raised, Oct. 3, 1574.

Lucknow. Besieged by Indian mutineers for 149 days. City relieved finally, Nov. 25, 1857.

Mafeking. Besieged by Boers for 217 days. City relieved, May 17, 1900.

Mantua. Besieged by Napoleon for 8 months. Austrians surrendered, Feb. 2, 1797.

Orleans. Besieged by English for 10 months. City relieved by Joan of Arc, May 8, 1429.

Ostend. Besieged by Spanish for 3 years. Flemish garrison surrendered, Sept. 28, 1604.

Paris. Besieged by Germans 135 days. City surrendered, Jan. 28, 1871.
Besieged by French national troops for 46 days. Communist insurrection suppressed, May 28, 1871.

Peking. Foreign legations besieged by Boxers for 55 days. Relieved, August 14, 1900.

Plevna. Besieged by Russians and Rumanians for 144 days. Turks surrendered, Dec. 10, 1877.

Port Arthur. Besieged by Japanese for 241 days. Russian garrison surrendered, Jan. 2, 1905.

Przemysl. Besieged by Russians for 182 days. Austrians surrendered, March 22, 1915.

Richmond. Besieged by Federal troops for 287 days. Evacuated by Confederates, April 3, 1865.

Saragossa. Besieged by French troops for 62 days. Siege raised, August 15, 1808.
Besieged by French a second time for 62 days. City capitulated, Feb. 20, 1809.

Sebastopol. Besieged by allies for 355 days. The city fell, Sept. 8, 1855.

Syracuse. Besieged by Romans for 2 years. The city fell, 212 B. C.

Troy. Besieged by Greeks for 10 years. City captured, 1184 B. C.

Tyre. Besieged by Nebuchadnezzar for 13 years. Siege raised, 572 B. C.
Besieged by Alexander for 7 months. City captured, 332 B. C.

Vicksburg. Besieged by Federal troops for 186 days. City surrendered, July 4, 1863.

Vienna. Besieged by Turks. Siege raised, 1529.
Besieged by Turks. City relieved, Sept. 12, 1683.

Yorktown. Besieged by American and French forces for 20 days. British surrendered, Oct. 19, 1781.

Fire, Methods of Making. One of the most important steps in the development of civilization was man's discovery of a means of producing fire. This powerful agency was thereby reduced to control and was put to numerous uses.

One of the earliest methods of kindling fire was to rub together two pieces of dry wood until the violent friction caused the emission of sparks. This device was much more laborious than the so-called bowstring method, which is now often used by boy scouts in fire lighting competitions. A bowstring is looped once about a notch in a hard, sharpened stick. This stick is held with the sharp end pressing against a piece of softer wood surrounded by tinder. As the bow is drawn back and forth, the stick revolves rapidly, and the heat so developed causes the tinder to ignite. A boy scout record of 7⅕ seconds was made for the time consumed in producing fire in this way.

A later means of making fire was to strike together two pieces of flint or a piece of flint and a piece of steel. This method was used as late as the beginning of the 19th century, when matches began to be employed. See *Match*, page 1370.

Forty Immortals, The. The name popularly applied to the members of the French Academy. When the roll of the academy is full, it numbers 40 regular members. Besides these, there are 10 members at large, 8 foreign members, and 70 corresponding members. The following table contains the names of the regular members as the list stood in 1929. See *Academy, French*, page 2047.

Year Elected	Names of Members	Born
1894	Paul Bourget	Amiens, 1852
1897	Gabriel Hanotaux. . .	Beaurevoir, 1853
1898	Henri Emile Lavedan .	Orleans, 1859
1903	René Bazin	Angers, 1853
1907	Maurice Donnay . . .	Paris, 1859
1909	Raymond Poincaré . .	Bar le Duc, 1860
1909	Eugène Brieux	Paris, 1858
1909	René Doumic	Paris, 1860
1909	Marcel Prevost . . .	Paris, 1862

Year Elected	Names of Members	Born
1911	Henri de Regnier . . .	Honfleur, 1864
1912	Marshal Lyautey . . .	Nancy, 1854
1914	Pierre de la Gorce . .	Vannes, 1846
1914	Henri Bergson	Paris, 1859
1918	Marshal Joffre	Rivesaltes, 1852
1918	Louis Barthou	Oloron Ste. Marie, 1862
1918	Alfred Baudrillart. . .	Paris, 1859
1918	Georges Clemenceau .	Mouilleron en Pareds, Vendee, 1841
1918	Jules Cambon	Paris, 1845
1919	Henri Bordeaux . . .	Thonon, 1870
1920	Joseph Bedier	Paris, 1864
1920	Louis Chevrillon . . .	Ruelle, 1864
1922	Pierre de Nolhac . . .	Puy de Dome, 1859
1922	Georges Goyau . . .	Orleans, 1869
1923	Rev. Henri Bremond .	Aix en Provence, 1865
1923	Georges de Porto-Riche	Bordeaux, 1849
1923	Henri Robert.	Paris, 1863
1923	Edouard Estaunie . .	Dijon, 1862
1924	Camille Jullian	Marseille, 1859
1924	Georges Lecomte . . .	Mâcon, 1867
1924	Emile Picard.	Paris, 1856
1924	Albert Besnard. . . .	Paris, 1849
1925	Auguste de Caumont (Duc de la Force)	Dieppe, 1878
1925	Louis Bertrand	Spinourt, 1866
1925	Paul Valery	Cette, 1871
1927	Abel Hermant	Paris, 1862
1927	Emile Male	Commentry, 1862
1927	Louis Madelin	Raon l' Etape, 1871
1928	Maurice G. Paleologue	Paris, 1859

Ghetto. In the middle ages, when the Jews were obliged to live apart from the rest of the community, the quarter of the city in which they dwelt was known by the name of *ghetto.* The word has long ceased to have any sinister significance, and is used simply to denote the section of any large town which is occupied by Jews of the humbler class. The most famous and densely populated ghetto in the world is that of the "East Side" in New York.

The ghetto was instituted by Pope Paul IV at Rome in 1556, who assigned to the Jews a distinct quarter along the banks of the Tiber and forbade them to appear outside it unless the men wore yellow hats and the women yellow veils. This allotment was enclosed by walls, and guards were set at various gates. It was not until the time of Pius IX, about 1885, that the walls of the Roman ghetto were pulled down and the Jews were allowed to live how and where they pleased.

Hall of Fame. A hall erected on University heights, New York, in 1900 for use as a memorial to great Americans. It is a semicircular colonnade 500 feet in length connecting two of the buildings of New York university. Within it is provided space for 150 panels, which are to contain bronze tablets bearing the names of such Americans as shall be judged most famous in their respective fields by an electorate of eminent American citizens appointed by the senate of the university. Above each name is placed, on a parapet, a bust or statue of the honored person. Beneath the colonnade is a museum for a permanent exhibition of portraits and other memorials.

According to the conditions laid down by Helen Gould, the donor of the hall, only persons who shall have been dead ten or more years are eligible to be chosen. Fifty names were to be inscribed on the tablets at the beginning, and five additional names every fifth year thereafter until the year 2000, when the 150 inscriptions will be completed. In case of failure to fill all the panels allotted, the vacancies are to be filled in a following year.

The rules prescribe that New York university shall invite nominations from the public. Every nomination seconded by a member of the university senate shall then be submitted to an electorate of one hundred eminent citizens selected by the university, and their votes shall determine the names admitted to the Hall of Fame.

In 1900, 29 names were chosen out of a total of 252 that had been nominated. The 29 were as follows: George Washington, Abraham Lincoln, Daniel Webster, Benjamin Franklin, Ulysses S. Grant, John Marshall, Thomas Jefferson, Ralph Waldo Emerson, Henry W. Longfellow, Robert Fulton, Washington Irving, Jonathan Edwards, Samuel F. B. Morse, David G. Farragut, Henry Clay, Nathaniel Hawthorne, George Peabody, Robert E. Lee, Peter Cooper, Eli Whitney, John J. Audubon, Horace Mann, Henry Ward Beecher, James Kent, Joseph Story, John Adams, William E. Channing, Gilbert Stuart, and Asa Gray.

In 1905, the following 8 names were added: John Quincy Adams, James Russell Lowell, William Tecumseh Sherman, James Madison, John Greenleaf Whittier, Mary Lyon, Emma Willard, and Maria Mitchell.

The third election was held in 1910, and 10 new members were elected. Their names are Harriet Beecher Stowe, Oliver Wendell Holmes, Edgar Allan Poe, James Fenimore Cooper, Phillips Brooks, William Cullen Bryant, Frances E. Willard, Andrew Jackson, George Bancroft, John Lothrop Motley.

Nine new members were added in 1915; namely, Mark Hopkins, Francis Parkman, Elias Howe, Joseph Henry, Rufus Choate, Daniel Boone, Charlotte Cushman, Alexander Hamilton, and Louis Agassiz.

The election of 1920 resulted in 7 new members: Samuel L. Clemens (Mark Twain), James B. Eads, Patrick Henry, William T. G. Morton, Alice Freeman Palmer, Augustus Saint-Gaudens, and Roger Williams. Edwin Booth and John Paul Jones were added in 1925.

The Hall of Fame as it is now constituted includes 15 authors, 12 statesmen, 5 teachers, 5 preachers, 5 scientists, 5 soldiers and sailors, 4 inventors, 4 jurists, 2 philanthropists, 2 artists, 2 actors, 1 reformer, 1 pioneer, 1 engineer, and 1 dentist.

The Hall of Fame is not to be confused with the National Hall of Statuary in the Capitol, Washington, in which each state of the Union is entitled to erect statues to two of her deceased citizens.

Hermitage, The. The former home of Andrew Jackson, near Nashville, Tennessee, is owned by the state of Tennessee, and is preserved as a memorial of the state's famous citizen. By this name is designated also a famous art gallery of Leningrad.

Hinduism. The religion of the Hindus of India. It has grown out of the more ancient Brahmanism, but contains many modifications and additions, influenced by Buddhistic and other elements. Siva, or Shiva, the third member of the Brahman trinity, has been elevated to the position of Maha-deva, the "great god," or the destroyer. Under his many aspects he bears more than 1000 titles.

A prominent feature of Hinduism has been the caste system. Originally, there were four great castes: the Brahmans, or priestly class; the Kshatriyas, or warriors; the Vaisyas, or husbandmen; and the Sudras, or servants. Each Hindu has his own place in the social system and must observe the laws peculiar to it. Formerly, the chief distinction between castes appears to have been that of occupation, but now many mixed castes have arisen. The highest law which concerns the devout Hindu is to eat correctly, to drink correctly, and to marry correctly, that is, to do these things in accordance with the rules of his caste. Hinduism embraces more than 200 million adherents, or about two-thirds of the population of India.

Hobson's Choice. A synonym for no choice at all. The phrase owes its origin to Thomas Hobson, an old carrier and livery stable keeper, who plied between Cambridge and London in the 17th century. When a man came to Hobson's stable for a horse, he found that he was obliged to take the one nearest to the stable door. In this way the old carrier considered that he was serving each of his clients impartially.

IMMIGRATION TO UNITED STATES FOR SELECTED YEARS

The figures below show clearly the trend of immigration into the United States in recent years and particularly as affected by the Immigration law in 1924 which made definitive the limitations first imposed by a law of 1922. By the law of 1924, the number of immigrants from each nation was limited to 2 per cent of the number of persons born in that country who were residents of continental United States as shown by the 1890 census.

In 1910, over 1 million immigrants entered the United States, more than half being from Russia, Italy, Austria, and Hungary. The number fell off markedly during and immediately after the war and was restricted later by Congressional action. See *Immigration Legislation.*

(Reports of Commissioner General of Immigration)

Country of Last Permanent Residence	1900	1910	1920	1928
Austria	114,847	135,793	268	1,277
Hungary		122,944	84	857
Belgium	1,196	5,402	6,574	698
Bulgaria	108	4,737	90	158
Czechoslovakia	. . .	. . .	3,426	3,571
Denmark	2,926	6,984	3,137	2,473
Finland	. . .	. . .	756	473
France, including Corsica	1,739	7,383	8,945	4,438
Germany	18,507	31,283	1,001	45,778
Great Britain:				
England	9,951	46,706	27,871	7,338
Ireland	35,730	29,855	9,591	25,268
Scotland	1,792	20,115	9,347	11,085
Wales	764	2,120	1,253	1,535
Greece	3,771	25,888	11,981	2,328
Italy, including Sicily and Sardinia	100,135	215,537	95,145	17,728
Netherlands	1,735	7,534	5,187	1,843
Norway	9,575	17,538	4,445	5,660
Poland	. . .	. . .	4,813	8,755
Portugal, including Cape Verde and Azores islands	4,234	8,229	15,472	584
Rumania	6,459	2,145	1,890	1,376
Russia	90,787	186,792	995	1,254
Serbs, Croats, and Slovenes, Kingdom of	. . .	. . .	1,888	1,386
Spain, including Canary and Balearic islands	355	3,472	18,821	455
Sweden	18,650	23,745	5,862	8,051
Switzerland	1,152	3,533	3,785	1,994
Turkey in Europe	285	18,405	1,933	242
Other Europe	2	151	1,735	1,908
Total Europe	424,700	926,291	246,295	158,513
China	1,247	1,968	2,330	1,320
Japan	12,635	2,720	9,432	550
India	9	1,696	300	102
Turkey in Asia	3,962	15,212	5,033	59
Other Asia	93	1,937	410	1,349
Total Asia	17,946	23,533	17,505	3,380
Africa	30	1,072	648	475
Australia, Tasmania, and New Zealand	214	998	2,066	578
Pacific Islands (not specified)	214	99	119	28
Canada, Newfoundl'd	396	56,555	90,025	75,281
Central America	42	893	2,360	1,751
Mexico	237	18,691	52,361	59,016
South America	124	2,151	4,112	4,166
West Indies	4,656	11,244	13,808	4,058
Other countries	13	43	702	9
Grand total	448,572	1,041,570	430,001	307,255

Jihad or **Jehad** (*jē-hăd'*). A religious war which Mohammedans are urged in the Koran to make on all infidels and in which every person that refuses to accept Islam or to pay a poll tax is to be put to the sword. Souls of the faithful who fall in such a war are taken directly to paradise. There has actually been no such holy war waged by the whole Mohammedan world since the early Moslem conquests, although an attempt was made to have one declared in the interest of the Central Powers during the World War. The term is frequently used in the wider sense of any bitter and uncompromising crusade for some belief or principle.

Kiwanis International. The international association of Kiwanis clubs has for its purpose the general supervision and control of chartered Kiwanis clubs throughout the world. Each club is composed of business and professional men, whose club activity is largely devoted to civic and social service in their community.

The first Kiwanis club was organized in Detroit, Mich., in 1915; a national constitution was adopted at Cleveland in 1916; and, in 1917, the international organization was formed.

The major objects of Kiwanis are to emphasize human rather than material values in life; to encourage the adoption of higher business standards; to develop more intelligent citizenship; and to promote good will and better social relations through better understanding among the people of various communities. The motto of Kiwanis is "We Build."

A Kiwanis club includes in its membership two representatives from each business and profession in a community. As a rule, not more than one man may be elected from any one firm or organization. Agriculture is especially well represented in Kiwanis. Classification of occupations is made by each club under international regulations.

League of Women Voters, National. This organization of American women is an outgrowth of the National American Woman Suffrage Association, the specific object of which had been accomplished by the passing, in 1920, of the woman suffrage amendment to the Federal Constitution. The prime mover in effecting the new organization was Mrs. Maud Wood Park, who, in April 1921, was elected first president of the National League.

Affiliated with the National League are state leagues in practically all the states of the Union and leagues in the District of Columbia and Hawaii. The Ladies of the Maccabees and the National Council of Jewish Women are associate members. Individual membership is in local leagues, which are represented in state leagues.

The objects of the organization are to promote education in citizenship, efficiency in government, certain types of legislation, and international cooperation to prevent war.

In pursuance of its educational aims, the National League chose a jury of prominent women who were requested to select, from nominations made by the League, the most noted living American women in each of twelve important departments of activity. The selection, which was made public in 1924, consisted of the following names: Jane Addams, Cecilia Beaux, Annie Jump Cannon, Carrie Chapman Catt, Anna Botsford Comstock, Minnie Maddern Fiske, Louise Homer, Julia Lathrop, Florence Rena Sabin, M. Cary Thomas, Martha Van Rensselaer, and Edith Wharton. For further information regarding these women, see the Department of Biography.

Liberty, Statue of. The colossal statue, representing a female figure of Liberty holding aloft an immense torch, erected on Bedloe's island, New York harbor. The statue, which was unveiled in 1886, was a gift from the people of France to the United States in commemoration of the 100th anniversary of American independence. The cost of the pedestal was met with funds raised by popular subscription in the United States, as the statue itself, designed by M. Frédéric Bartholdi, was paid for by popular subscription in France.

The height from water level to the top of the torch is 301 feet, 3 inches. The statue itself weighs 225 tons, and the total cost of the work was about $600,000. The United States lighthouse service maintains the light in the top of the torch. Since 1916, the entire statue has been illuminated, the expense being provided for from funds obtained by the New York *World* through popular subscription.

Libraries and Museums. Libraries are primarily collections of books and the buildings which house them. The term includes also, however, those collections of written records assembled before the invention of books, such as clay tablets and papyrus rolls. Museums are properly collections of other objects of interest, relating either to science, to history, or to the arts.

Early Libraries. One of the earliest libraries dates from about 2500 B. C., when clay tablets began to be collected at the temple of En-Lil in Nippur, Babylonia. Some 40,000 tablets or fragments have been discovered there, consisting of temple records, textbooks, mathematical tables, and literary works. Both tablet and papyrus collections were made by Rameses II at Thebes, Egypt, about 1300 B. C. The library of Sardanapalus in Babylon, collected about 650 B. C., contained 30,000 tablets. The Ptolemies in Egypt, beginning in the 4th century B. C., collected in Alexandria the greatest ancient library of Greek literature, consisting of 700,000 rolls of papyrus. The last remnants of this library are said to have been destroyed by the Arabs in 640 A. D.

During the middle ages, rolls were superseded by parchment or vellum bound in book form. Various monasteries collected and copied manuscripts, notably those of Monte Cassino in Italy, Cluny and Corbie in France, Fulda and Saint Gall in Germany, Canterbury and York in England, and Mount Athos in Greece. The number of books in each library, however, seldom exceeded 1000.

Great Modern Libraries. With the manufacture of paper in the 12th century and the invention of the printing press in the 15th century came a rapid increase in the production of books. The Vatican library in Rome, the Laurentian library in Florence, and other libraries at Leningrad, Oxford, London, and Munich grew rapidly and now have irreplaceable collections of manuscripts and early printed books. The greatest modern libraries, in point of size, include the National library at Paris, the Library of Congress, and the British museum, each of which has over 3 million volumes. The New York Public library and Harvard University library collections exceed 2 million volumes each.

Public Libraries. The recent history of libraries is largely the story of making books easily available to all people desirous of reading or consulting them. Benjamin Franklin initiated in 1732 the first membership library—the Library Company of Philadelphia. Subscription (circulating), apprentice, mercantile, and atheneum, or culture society, libraries followed, but these were largely supplanted by tax-supported libraries, the first of which was established at Peterboro, N. H., in 1833. Library taxes were authorized by law in Massachusetts in 1848. Andrew Carnegie donated over 60 million dollars to found nearly 2000 free libraries in the United States, besides 660 in Great Britain, 156 in Canada, and 49 elsewhere.

The American Library Association. The first American library convention was held in 1853 in New York City. In 1876 at Philadelphia the American library association was organized, membership being open to libraries and individuals. Among the leading spirits were Melvil Dewey, Justin Winsor, and William F. Poole. The purpose of the organization is to foster the establishment and development of libraries and to promote the use of books. It has served as a clearing house for helpful innovations, such as a decimal system of indexing books, devised by Melvil Dewey, who also helped to found a library journal and instituted training courses for librarians. Other improvements include the institution of shelves open directly to readers, first used in Cleveland about 1890, and the adding of children's departments. Branch libraries in cities were established, and provision was made for the blind, prisoners, high school students, and other special groups of readers, including soldiers and sailors during the World War.

The Association prepares advisory book lists to guide libraries in making purchases; encourages, through attractive booklets, the systematic reading of informing and educational books; and promotes the establishment of county branches in order to reach potential readers in smaller centers. It has also made extensive surveys, such as that for determining the books preferred by children and an investigation of the status and possibilities of adult education.

Museums of Art. The growth of art museums belongs mainly to the late 19th and the 20th century, although the beginnings of a number of notable art collections date from earlier periods. The National museum at Florence contains collections made by the de' Medici family at the time of the Renaissance. The art treasures of the Vatican and the Dresden museum likewise date, in part, from the 15th and 16th centuries. The Louvre in Paris contains many masterpieces taken by Louis XIV and Napoleon as prizes of war. The systematic arrangement of exhibits, however, based on research and aiming at instruction, was entirely a development of the 19th century and has been most thoroughly carried out in British, Scandinavian, and particularly in American museums.

Among the world's greatest art museums not already mentioned are the Luxembourg, Paris; the National gallery and the Victoria and Albert museum, London; the Hermitage, Leningrad; the Metropolitan museum of art, New York; the Philadelphia academy of fine arts; the Boston museum of fine arts; and the Corcoran art gallery, Washington.

Museums of Science. In the front rank of the world's museums of science are the British museum, London; the National museum, Washington; the American museum of natural history, New York; the Carnegie institute, Pittsburgh; and the Field museum, Chicago.

Beginning as private collections of curiosities, science museums have become public institutions for research and popular education. In America, especially, exhibits have been arranged so as to display rock formations and composition, the habits, habitats, and evolution of plants and animals, technological processes, tribal customs and costumes, periods of civilization as reflected in implements and objects of art, as well as useful facts in sanitation and dietetics. Exhibits are frequently supplemented by public lectures and the loan of pictures, lantern slides, and phonograph records. The extraordinary wealth of recent discoveries in archeology and paleontology, particularly, have enabled museums to present an easily understood picture of life on the earth, as far as it is known.

Adult Education. Libraries and museums play a vital part in adult education and their popularity marks the passing of the idea that education is confined to schooling. The period of education, as it is coming to be understood, properly extends from the cradle to the grave. For other institutions ministering to this demand for education in a wider sense, see the articles *University Extension, Agricultural and Industrial Education, Corporation Schools, Continuation Schools, Evening Schools, Americanization Classes, Preschool Study Circles,* and *Correspondence Schools.*

Lions International. The international association of Lions clubs, which was formed in 1916. The association, in 1924, included over 800 clubs located in various cities of the United States and Canada. In general outline of international and district organization, Lions resembles Rotary and Kiwanis, which preceded it in origin.

The leading purposes of Lionism include the cultivation of a spirit of good fellowship and co-operation among the members of Lions clubs and the directing of their organized efforts toward useful social service. Both local clubs and the international organization have adopted an active program of

practical aid for the blind. The motto of the clubs is "Liberty, Independence, Our Nation's Safety," the initial letters forming the word Lions.

The membership of a Lions club may comprise one active representative from each branch of business in a community. A business associate of each active member also may be elected to associate membership.

Little Church around the Corner. This quaint title was given to the Protestant Episcopal Church of the Transfiguration in 29th Street, New York City, in 1870. On the death of George Holland, a well-known comedian, his friends applied to a neighboring clergyman, asking him to perform the burial service. This he declined to do, but referred them to "the little church around the corner." Dr. Houghton, rector of the church thus designated, on being approached, at once acquiesced in the request of the deceased man's relatives. From that date, the church of the Transfiguration became famous and has been affectionately known among actors as "the little church around the corner," which they have ever since patronized.

Mausoleums. From the earliest times it has been the custom among civilized nations to perpetuate the memory of the noble deeds of great men by the erection of sepulchral monuments of imposing architectural magnificence. The mausoleum of Halicarnassus erected in memory of Mausolus, king of Caria, in 353 B. C. was known as one of the "seven wonders of the world," and from the name of this king is derived the word mausoleum.

Other ancient and notable mausoleums are these of Augustus, 28 B. C.; of Hadrian, now the Castle of San Angelo; and of Cecilia Metella, on the Appian Way at Rome. The Taj Mahal at Agra in India, built by Shah Jehan in the 17th century, is a dream of architectural beauty. Its name signifies "gem of buildings."

More modern monuments are those of the Bourbons at Dreux; of Queen Victoria and the prince consort at Frogmore, near Windsor; of Napoleon III at Farnborough; of the House of Hanover at Herrenhausen; and of Frederick William III at Charlottenburg. In America, the most striking specimen of this kind of memorial is that of Grant in New York City, which resembles in general outline the tomb of Cecilia Metella.

Mint, The United States. The United States mint was established by act of Congress, April 2, 1792. It is now a bureau of the department of the treasury, and is under the supervision of the director of the mint, who is appointed by the president. The principal purpose of the mint is to coin money for the country. In addition, it frequently makes coins for other countries, notably those of South and Central America; it makes the dies and prepares the official medals issued by the army, the navy, and the marine corps, or by Congress; it refines and sells large amounts of gold and silver bullion to be used for industrial purposes; and it also serves the public by making, at a nominal charge, assays of ores and bullion.

Three coinage mints are now operated by the bureau. The largest, at Philadelphia, first made coins in 1793; that at San Francisco was established in 1854; and the branch at Denver was opened in 1906. A mint organized at New Orleans, 1836, was closed in 1861, was reopened in 1879, and again ceased operations in 1909. It is now operated as an assay office, as is the mint which was organized at Carson City, Nevada, in 1870. Other assay offices are located at New York City, Boise, Helena, Deadwood, Salt Lake City, and Seattle. Mints organized in 1838 at Dahlonega, Ga., and Charlotte, N. C., were permanently closed in 1861.

The first coins officially made by the United States mint were the large copper cents of 1793. From that year until June 30, 1923, 9,359,155,429 pieces were turned out, with a value of $4,967,832,-113.01.

Memorial coins of special design must be authorized by an act of Congress, as the law provides that the design of standard coins may not be changed more frequently than once in 25 years. The present type of "peace dollar" was first issued in 1921 to commemorate the signing of treaties of peace between the United States, Germany, and Austria. The design of the current Lincoln cent was made by Victor David Brenner. The largest gold coins ever produced by the mint were $50 pieces made as souvenirs of the Panama-Pacific International Exposition. In addition to the "peace dollar," the memorial coins of the United States are as follows:

Denomination	Year authorized	Number of Pieces
Gold		
Fifty-Dollar:		
Panama-Pacific Exposition		
Round	1915	1510
Octagonal	1915	1509
Two-and-one-half-Dollar:		
Panama-Pacific Exposition	1915	10,017
Sesquicentennial Exposition	1925	200,226
Dollar:		
Louisiana Purchase Exposition	1902	250,258
Lewis and Clark Exposition	1904	60,069
Panama-Pacific Exposition	1915	25,034
McKinley Memorial	1916	30,040
Grant Memorial	1922	10,016
Silver		
Dollar:		
Lafayette Memorial	1899	50,026
Half-Dollar:		
Columbian Exposition	1892	5,002,105
Panama-Pacific Exposition	1915	60,030
Illinois Centennial	1918	100,058
Maine Centennial	1920	50,028
Pilgrim Tercentennial	1920	300,165
Alabama Centennial	1920	70,044
Missouri Centennial	1921	50,028
Grant Memorial	1922	100,061
Monroe Doctrine Centennial	1923	274,007
Huguenot Tercentennial	1924	142,080
Stone Mountain	1924	2,314,709
Battle Lexington-Concord	1925	162,099
California Diamond Jubilee	1925	150,200
Fort Vancouver	1925	50,028
Sesquicentennial Exposition	1925	1,000,528
Battle of Bennington	1925	40,034
Oregon Trail	1926	148,085
Quarter-Dollar:		
Columbian Exposition	1893	40,023

Months, Names of. The months of the year received their English names from corresponding Latin names. Those from September to December are so called from the numerals *septem*, "seven"; *octo*, "eight"; *novem*, "nine"; and *decem*, "ten." September was the seventh month when the year began with March. July was formerly called Quintilius, from *quintus*, "fifth"; but, when Julius Cæsar reformed the calendar, he changed the month's name to Julius in his own honor. Julius became July in English. Similarly, Sextilius, from *sextus*, "sixth," was named Augustus after the emperor of that name and became our August.

January was named from Janus, god of entrances. February is derived from *februa*, a festival of purification held in that month by the Romans. Martius is the month of Mars, who was originally a god of agriculture, his month being the one when crops were ordinarily planted. The origin of April is not known. May is named from Maia, the mother of the Roman god Mercury. June is derived from Juno, the goddess of women and of marriage.

NATIONAL HYMNS AND ANTHEMS

Argentine Republic. *Oid, mortales, el grito sagrado* (Hear, O Mortals, the Sacred Call). Music by D. V. Lopez.

Belgium. *La Brabançonne.* Words by Jenneval; music by F. van Campenhout.

Bohemia. "War Song of the Hussites."

Brazil. *Hymno da Proclamacão da Republica* (Hymn of the Proclamation of the Republic). Words by Medeiros e Albuquerque; music by Leopoldo Miguez.

Burma. *Kayah Than* (Sound the Trumpet).

Canada. *The Maple Leaf Forever.*

Chile. *Dulce Patria*; national air, by Carnicer.

Costa Rica. *De la Patria.* Music by M. M. Gutierrez.

Czechoslovakia. *Kde Domov Muj* (Where is My Homeland?)

Denmark. *King Kristian stod ved höien Mast* (King Christian Stood beside the Mast). Words by Ewald; music by Hartmann.

Ecuador. *Salve, O Patria.*

Egypt. *Salaam, Effendi* (March of the Khedive).

Finland. *Vårt Land* (Our Land). Words by J. L. Runeberg; music by F. Pacius.

France. *La Marseillaise.* Words and music by Rouget de Lisle.

Germany. *Deutschland über Alles* (Germany over All) and *Die Wacht am Rhein* (The Watch on the Rhine).

Great Britain. "God Save the King." Composed by Henry Carey. The words were in part adapted from verses written by others; the air was adapted from the French.

Greece. "Sons of Greece, Come, Arise." The words and air date from the Greek war for independence, 1821–29.

Hungary. *Isten áld meg a Magyart* (Lord Bless the Hungarian). Music by F. Erkel.

Italy. *Marcia Reale Italiana* (Royal Italian March). Composer, G. Gabetti.

Japan. *Kimi Ga Yo Wa.* Composer, Hayashi Hiromori.

Jugoslavia. Combination of Serbian *Boze Pravde*, Croatian *Liepa Nasa Domovina*, and Slovene *Napred Zastava Slave.*

Latvia. *Dievs sveti Latviju* (God Bless Latvia).

Mexico. *Mexicanos, al grito de guerra* (Mexicans, at the Cry of War). Words by F. G. Bocanegra; music by James Nunó.

Netherlands, The. *Wilhelmus van Nassouwe* (William of Nassau) and *Wein Neerlandsch Bloed* (Old Dutch Blood), the latter hymn composed by H. C. Tollens.

Nicaragua. National air, by Blas Villatas.

Norway. *Sang for Norge* (Song for Norway). Words by Björnstjerne Björnson.

Persia. *Salamati Shah.* Music by A. Lemaire.

Peru. *Somos libres, seámoslo siempre* (We Are Free, Let Us Be So Ever).

Poland. *Jeszcze Polska Nie Zginęła* (Poland's Not Yet Dead).

Rumania. *Traeasca Regale* (Long Live the King).

Salvador. *Saludemos la Patria* (Let Us Hail Our Country). Words by J. J. Canas; music by J. Aberle.

Serbia. "God in His Goodness." Music by D. Jenko.

Spain. *Himno de Riego.* Music by Huerta.

Sweden. *Ur Svenska Hjertans djup* (From the Depths of Swedish Hearts). Words by Strandberg; music by Lindblad.

Switzerland. *Dem Vaterland* (To the Fatherland). Words by J. R. Wyss. The music is that of "America."

United States, The. "Star-Spangled Banner." Words by Francis Scott Key. Music adopted from an old drinking song.

"America." Words by Samuel F. Smith; music that of "God Save the King."

Uruguay. *Himmo Nacional de la República Oriental del Uruguay.*

Venezuela. *Gloria al bravo pueblo* (Honor to a Brave Nation). Words by V. Salvias; music by J. Sandaeta.

NEGRO POPULATION OF THE UNITED STATES

Division and State	1910	1920	Per Cent of Increase or Decrease *
United States	9,827,763	10,463,131	6.5
Geographic Divisions:			
New England	66,306	79,051	19.2
Middle Atlantic	417,870	600,183	43.6
East North Central	300,836	514,554	71.0
West North Central	242,662	278,521	14.8
South Atlantic	4,112,488	4,325,120	5.2
East South Central	2,652,513	2,523,532	−4.9
West South Central	1,984,426	2,063,579	4.0
Mountain	21,467	30,801	43.5
Pacific	29,195	47,790	63.7
States:			
Alabama	908,282	900,652	−0.8
Arizona	2,009	8,005	298.5
Arkansas	442,891	472,220	6.6
California	21,645	38,763	79.1
Colorado	11,453	11,318	−1.2
Connecticut	15,174	21,046	38.7
Delaware	31,181	30,335	−2.7
District of Columbia	94,446	109,966	16.4
Florida	308,669	329,487	6.7
Georgia	1,176,987	1,206,365	2.5
Idaho	651	920	41.3
Illinois	109,049	182,274	67.1
Indiana	60,320	80,810	34.0
Iowa	14,973	19,005	26.9
Kansas	54,030	57,925	7.2
Kentucky	261,656	235,938	−9.8
Louisiana	713,874	700,257	−1.9
Maine	1,363	1,310	−3.9
Maryland	232,250	244,479	5.3
Massachusetts	38,055	45,466	19.5
Michigan	17,115	60,082	251.0
Minnesota	7,084	8,809	24.4
Mississippi	1,009,487	935,184	−7.4
Missouri	157,452	178,241	13.2
Montana	1,834	1,658	−9.6
Nebraska	7,689	13,242	72.2
Nevada	513	346	−32.6
New Hampshire	564	621	10.1
New Jersey	89,760	117,132	30.5
New Mexico	1,628	5,733	252.1
New York	134,191	198,483	47.9
North Carolina	697,843	763,407	9.4
North Dakota	617	467	−24.3
Ohio	111,452	186,187	67.1
Oklahoma	137,612	149,408	8.6
Oregon	1,492	2,144	43.7
Pennsylvania	193,919	284,568	46.7
Rhode Island	9,529	10,036	5.3
South Carolina	835,843	864,719	3.5
South Dakota	817	832	1.8
Tennessee	473,088	451,758	−4.5
Texas	690,049	741,694	7.5
Utah	1,144	1,446	26.4
Vermont	1,621	572	−64.7
Virginia	671,096	690,017	2.8
Washington	6,058	6,883	13.6
West Virginia	64,173	86,345	34.6
Wisconsin	2,900	5,201	79.3
Wyoming	2,235	1,375	−38.5

* A minus sign (−) denotes decrease.

Newspaper Press Associations. Within the past century the collection and distribution of news has become a vast organized business. While each newspaper usually maintains its own staff of editors and reporters and may employ its own special correspondents, virtually all newspapers now depend upon the service of organized news agencies. These

agencies have their trained correspondents in all parts of the world and control facilities for more complete, rapid, and economical transmission of news than any one paper could enjoy alone.

The first news agency appears to have been that organized by Charles Havas in Paris in 1835. Havas began by translating articles for the French press. In 1840, he established news service by carrier pigeons between Paris, London, and Brussels. The Havas agency is now subsidized by the French government. It supplies stories and special articles as well as news to the French press.

The Reuter News Agency was organized in 1849 by Julius Reuter, a Prussian government messenger. In 1851, he established his headquarters in London, and, in 1865 and 1866, he gained control of several cable lines. Reuter's is now the greatest of European news agencies.

The Wolff Bureau, the most important news agency in Germany, became the organ of the German government after 1917.

In the United States, there are several news service agencies. The Associated Press, which, in its present organization, dates from the year 1900, is a co-operative association of American newspapers. It has contracts for the distribution of copy through Reuter's, the Havas, and the Wolff agency in Europe. The United Press Associations is an agency which, through its connections in Europe, Asia, and Australia, supplies a world-wide service. It supplies the most extensive news service in South America. The Consolidated Press Association supplies by wire and also by mail, to one newspaper in each city, special articles and reports designed to supplement, with interpretation and explanation, the items of general news reports obtained through other channels. This association features especially a week-end service for Sunday editions.

Nobel Prizes. Five annual prizes, amounting to about $40,000 each, awarded to persons who, in different fields of activity, have made the greatest contributions to the progress and the welfare of the world. The prizes are made available by a fund of about $9,000,000 bequeathed for the purpose by Alfred Bernhard Nobel, a Swedish philanthropist and the inventor of dynamite.

The prizes are awarded for distinguished work in (1) chemistry, (2) physics, (3) physiology or medicine, (4) literature, and (5) the cause of international peace. In chemistry and physics, the awards are made by the Swedish Royal Academy of Sciences; in medicine, by the Caroline Institute of Stockholm; in literature, by the Swedish Academy; and for peace, by a committee appointed by the Norwegian Parliament.

Awards were made first in 1901 and have continued more or less regularly to the present time. During the period of the World War, however, and in certain years after its close, a number of the prizes were not awarded. In some instances, a prize has been divided among two or more people with equal honor to each.

The total number of awards to the end of 1928 was 143, including three awards of the peace prize to institutions instead of individuals. The institutions so honored were the Institute of International Law, the International Peace Bureau of Switzerland, and the International Red Cross. The remaining 140 awards may be classified as follows according to the nationality of the recipients: Germany 32; France 23; England 16; Sweden and the United States 9 each; Switzerland, the Netherlands, and Denmark 7 each; Italy, Austria, and Norway 5 each; Belgium 4; Spain 3; Canada, Russia, and Poland 2 each; and Ireland and India 1 each. Of the total of 140 personal and 3 institutional awards, 33 have been for physics, 25 for chemistry, 26 for medicine, 28 for literature, and 31 for peace.

Five women have won Nobel prizes. One of these, Madame Curie, is the only person who has been distinguished by more than one Nobel award. In 1903, she shared in the prize for physics, and, in 1911, she received the full prize for chemistry. Thus the highest honors of 20th-century science have been bestowed upon a woman. See *Nobel, Alfred Bernhard*; *Nobel Prize Winners*.

Passion Play. This form of religious drama in which are portrayed the sufferings and death of the Savior originated in the ritual prescribed by the Catholic Church on Good Friday. On this day the Gospel describing minutely the happenings that led to the tragedy of Calvary is sung by three of the clergy who represent respectively the Christus, Peter, and the narrator. From this gradually evolved the passion plays of the 13th century. Between 1400 and 1515 these plays reached their highest development. Their presentation was characterized by much elaboration and splendor, the action sometimes lasting over seven days.

At the present day, passion plays may be witnessed from time to time in different parts of the world, especially in the Tyrol and in southern Bohemia. However, the most notable survival of all is that of Oberammergau in upper Bavaria. It dates back to the year 1633, and was the result of a vow made by the villagers to depict the sufferings of Christ every ten years should they be spared from the Black Death, a plague then sweeping over Europe. From the date of that vow but few interruptions have occurred in the decennial celebration of the Passion Play at Oberammergau.

No less than 700 villagers take part in the Oberammergau Passion Play, each one of whom must be of proved moral integrity. Tradition forbids that married women shall be participants in the sacred drama. Of the proceeds, one-fourth goes to the performers, the remainder being devoted to local charities and religious purposes and to the improvement of the town.

Patents. A patent represents a legal right to a monopoly of the production, use, and sale of an invention. This right is granted for a limited time to the inventor by a government. In order to receive such a privilege from the government of the United States, an inventor must have produced some "*new* and *useful* art, machine, manufacture, or composition of matter, or some new and useful improvement thereof." However, such a discovery does not of itself entitle the inventor to a patent. He must, in addition, make known the details of his invention by means of specifications written so clearly and definitely that the desired result could be obtained by other skillful persons who should follow his directions.

Thus it may be seen that the issuance of a patent implies a contract between the government and the inventor. The government gives a temporary monopoly in exchange for complete public information concerning the details of the invention. Should the inventor try to conceal his secret by omitting from his specifications some point which is vital although superficially unimportant, the patent may be declared invalid.

That the importance of patents and copyrights was recognized even in the early days of American history is shown by the fact that authority for their issuance is provided in Article I, Section 8, of the Federal Constitution. Congress created the first patent commission in 1790. The first United States patent was issued July 31, 1790, to Samuel Hopkins of Vermont, for an improved method of preparing pot- and pearl-ashes. Previous to this event patents had been issued by several of the states. The present American patent system was created in 1836.

The United States patent office, which is a branch of the department of commerce, is headed by a commissioner of patents. The commissioner is assisted by a large corps of examiners, whose principal duty is to consider applications for patents and to examine the records of the office in order to determine whether or not the invention claimed is actually new.

An application for a patent, in order to be considered, must consist of the following items: A petition, addressed to the commissioner of patents and accompanied by a fee of $20; a carefully prepared specification in which are presented the claims on which a patent is asked; a drawing, if possible; and, finally, a statement under oath, that the claimant or claimants personally made the invention which they believe to be new.

Applications are considered strictly in the order in which they are received. If the examiners are satisfied that the claim is for a new and useful invention, the patent is issued after the payment of a second fee of $20. About 1½ million patents have been issued. The life of the patent is 17 years. Patents for designs are issued for 3½, 7, or 14 years, whichever term the applicant may prefer. Unless a patented article is so marked, and also bears the date and year of the patent, it does not receive the protection provided by the law.

Patents are not granted for printed matter, for methods of doing business, or on devices for which claims contrary to natural laws are made. The chief examples of the last class are perpetual motion machines. When a patent is asked for such a device, the applicant is informed that his claims cannot be considered unless accompanied by a working model.

An inventor is free to apply personally for his patent. Nevertheless, an official publication of the patent office states that, "Every applicant is advised to employ a competent patent attorney. Great care should be exercised in his selection."

The term of a patent in France and Germany is 15 years. In Canada, the term is 18 years, and in Great Britain the term extends over a period of 16 years.

Pawnbroker's Sign. This well-known sign of three golden balls has its origin in the golden byzants, or coins, in which certain officers of the crusaders received payment. These byzants appeared later on the coats of arms of the Lombards, who were the great bankers and money lenders of Europe in the time of the Medici. In course of time the round golden disks were metamorphosed into globes and became the common sign of money lenders and pawnbrokers.

Perfumes. Fragrant flowers are the principal source of the finest perfumes. Nevertheless, the contributions of the animal kingdom and of the chemical laboratory are almost as important to the finished product of a master perfumer as are the essential oils from flowers and other parts of plants.

The principal perfumes obtained from animals are musk, ambergris, civet, and castor. *Musk* is a thick, red-brown, pasty material obtained from the scent glands of the musk deer. The best grades come from China in the original glands, but, because of the high price, adulteration is very common. Musk is sometimes dried and sold as grain musk. *Ambergris* is a soft, variously colored, waxy substance produced by the sperm whale. Whether it is a natural or a morbid secretion is still undecided. It has been taken from the intestines of captured whales, but is usually found floating on the sea or washed up on the shores of the Indian Ocean. Masses of ambergris have been found which weighed 350 pounds. *Civet* is a yellowish brown, buttery secretion from glands of the civet cat, native to Asia and northern Africa. *Castor* comes from glands of the beaver. Each of these materials possesses an intense, more or less nauseating smell. When sufficiently diluted, however, the odors become pleasant.

In perfumery, these animal secretions are valued chiefly because, when used in very small quantities, they add permanence to the lighter floral odors with which they are mixed. A most valuable vegetable fixative is the oil from clary sage.

Cultivation of flowers for the preparation of perfumes has reached its highest point in southern France, where, in the vicinity of Grasse, Cannes, and Nice, thousands of tons of blossoms are picked each year. At Grasse the average annual production includes 2200 tons of orange blossoms, 1650 tons of roses, 1320 tons of jasmine flowers, 440 tons of violets, 330 tons of tuberoses, and 165 tons of carnations. About 3500 pounds of roses are required to yield 1 pound of the attar, of which the finest quality is produced in Bulgaria.

Pidgin, or Pigeon, English. A mixed language used much in the ports of China between foreigners and Chinese traders and servants. It is made up of English words, mostly monosyllables, and corrupted Chinese, Portuguese, Malay, and other terms, arranged according to Chinese idiom. The endings ee or o are often added to certain consonants which Chinese find it difficult to pronounce without a following vowel sound. Thus large becomes largee; wife, wifo. The letter r is replaced by l, so that American becomes Melican. "To be or not to be! That is the question," would appear in pidgin English as "Can do, no can do! How fashion?" Pidgin is a Chinese corruption of the word business. Hence pidgin English is business English.

POPULAR NAMES OF CITIES

Aberdeen, Scotland. Granite City, from its many granite buildings.

Amsterdam, The Netherlands. Venice of the Netherlands, from its many canals.

Athens, Greece. City of the Violet Crown, in reference to beautiful effects of sunset light on the Acropolis.

Bagdad, Mesopotamia. City of Peace, a name acquired during the reign of the Abbassides.

Baltimore, Md. Monumental City, from the fact that it was the first to erect a monument to the memory of George Washington.

Birmingham, Eng. The Midland Capital, from its central geographical position.

Boston, Mass. Athens of America; City of Notions, from the amount of "Yankee notions," so called, manufactured there; Hub of the Universe, so called by Dr. Oliver Wendell Holmes; Tri-Mountain City, from the three hills on which it was originally built.

Brighton, Eng. Queen of Watering Places, from its popularity as a seaside resort.

Brooklyn, N. Y. City of Churches, from the number of churches it contains.

Buffalo, N. Y. Queen City of the Lakes, from its importance as a lake port.

Chicago, Ill. Garden City, from the number and beauty of its private gardens; Windy City, from the prevalence of strong winds.

Cincinnati, Ohio. Queen City, so called when it was the commercial metropolis of the Middle West.

Cleveland, Ohio. Forest City, from the number of trees on its streets.

Columbus, Ohio. The Arch City.

Constantinople, Turkey. City of the Golden Horn, from the name of its harbor.

Damascus, Syria. Pearl of the Desert, from the beauty of its situation.

Detroit, Mich. City of the Straits, from its location on the strait connecting Lake Saint Clair and Lake Erie.

Duluth, Minn. Zenith City of the Unsalted Seas, from its position at the head of the Great Lakes.

Edinburgh, Scotland. Modern Athens, from its fame as a center of learning.

Foochow, China. Happy City, from the meaning of the name.

Halifax, N. S. Warden of the North, from its importance as a British fortified post and naval base.

Hannibal, Mo. Bluff City, from its location on the bluffs of the Mississippi river.

Hartford, Conn. Charter Oak City, in reference to the oak tree in which the charter of the colony of Connecticut is said at one time to have been concealed.

Indianapolis, Ind. Railroad City, from its prominence as a railroad center.

Jerusalem, Palestine. Holy City; City of David; City of Peace.

Keokuk, Iowa. Gate City, from its situation at the foot of the Mississippi rapids.

Lassa, Tibet. Forbidden City, from the former rigid exclusion of foreigners.

Liverpool, Eng. The Modern Tyre, from its importance as a seaport.

Louisville, Ky. Falls City, from the falls of the Ohio river, here located.

Lowell, Mass. Spindle City, from its large textile manufacturing interests.

Manchester, Eng. Cottonopolis, because of its great cotton mills.

Milwaukee, Wis. Cream City, from cream-colored brick manufactured there.

Minneapolis, Minn. Flour City, from its great milling industry.

Montpelier, Vt. Green Mountain City.

Nashville, Tenn. City of Rocks, from its natural surroundings.

New Haven, Conn. Elm City, from the great number of elm trees it contains.

New Orleans, La. Crescent City, from its position on a curve of the Mississippi.

New York, N. Y. Empire City, from its being the chief city of the United States; also Gotham, applied by Washington Irving in his *Salmagundi*.

Niagara Falls, N. Y. Power City, from immense amount of electric power generated there.

Paris, France. City of the Lily; City of Louis.

Philadelphia, Pa. City of Brotherly Love, from the meaning of the name; also Quaker City.

Pittsburgh, Pa. Iron City, from the extent of its iron manufactures; Smoky City, from the smoke which overhangs it.

Portland, Me. Forest City, from the number of trees bordering its streets.

Portland, Oreg. Rose City, from its prolific rose gardens.

Quebec, Que. Gibraltar of America, from the almost impregnable heights upon which the city stands.

Rochester, N. Y. Flower City, from the profusion of flowers and extensive nurseries there; also Kodak City, from its extensive manufacture of photographic cameras.

Rome, Italy. City of the Seven Hills, from the seven eminences over which the city extends.

Saint Louis, Mo. Mound City, from the many ancient mounds found in the vicinity.

San Francisco, Cal. City of the Golden Gate, from its location at the entrance to San Francisco bay.

Savannah, Ga. Garden City, from its beautiful parks and gardens.

Springfield, Mass. City of Homes, from the many people of the city who own their homes.

Springfield, Ohio. Flower City, from the beauty of its surroundings.

Stockholm, Sweden. Venice of the North, from its many islands and waterways.

Venice, Italy. City of Saint Mark; City of the Seventy Isles, from its situation on a group of islands.

Washington, D. C. City of Magnificent Distances, from its being laid out on a large and regular scale; also Federal City.

Worcester, Mass. The Faithful City, so called from its motto: *Floreat Semper Civitas Fidelis*.

Red Tape. An expression signifying official formality and delay. It owes its origin to the red tape usually employed in tying up public documents. The phrase is said to have been first used in this sense by Lord Minto in 1775.

Rhodes Scholarships. By the will of Cecil John Rhodes, who died in 1902, a number of scholarships were founded in Oxford university, to be available for students from the British dominions and colonies, the United States, and Germany. In 1916, the German scholarships were annulled and new scholarships assigned to parts of the British dominions.

Each scholarship is of three years' duration and has an annual value of about $1500, to which, at present, a bonus of $250 is added. Usually, about 190 Rhodes scholars are in residence at Oxford. Two scholarships are assigned to each state in the United States. The selection of the scholars is made by a committee appointed for the purpose in each state. A candidate must be unmarried, be between 19 and 25 years of age, and must have completed at least the second year of a college course. The basis for selection involves four considerations: (1) scholarship; (2) character; (3) interest in outdoor sports; (4) interest in one's fellows and instinct for leadership.

Roland for an Oliver. Roland and Oliver were two of the most noted champions in the court of Charlemagne. In deeds of prowess they were equally matched. On one occasion they fought for five consecutive days. Neither gained the advantage, hence the phrase "to give a Roland for an Oliver," meaning "blow for blow." The expression is also used to signify the matching of one exaggeration by another equally preposterous.

Roosevelt House. The house at 28 East 20th street, New York City, the birthplace of Theodore Roosevelt, 26th president of the United States, was formally dedicated as a permanent memorial on October 27, 1923. In structure and furnishings, the house has been restored as nearly as possible to its original conditions. It contains a growing collection of books and other objects of interest in connection with the career of Roosevelt.

Rotary International. The international association of Rotary clubs, which has for its purpose the world-wide development of the Rotary principles and the general supervision and aid of Rotary clubs. The Rotary clubs of Great Britain and Ireland are also organized in an affiliated association.

The first Rotary club was organized in Chicago, in 1905; a national association was formed in 1910; and in 1912 an international organization was perfected. The name Rotary was adopted originally because the members met in rotation at their places of business.

The general objects of Rotary are the development and application of the ideal of service as the basis of business; the cultivation of acquaintance and good fellowship among members; and the promotion of the cause of international peace. Two mottoes are recognized,—"Service above Self," "He profits most who serves best." Rotary International proposes each year a general program of interests, but each club is free to select activities appropriate to the purposes of Rotary and suitable to the needs of its own community. The general association encourages particularly aid of under-privileged boys and relief of crippled children.

A Rotary club includes in its membership one representative from each class of industry in the community. In addition, each member may propose a man from his own business, who becomes an associate member. Classifications are determined by each club under general international regulations.

Scythe Tree. Near Waterloo, New York, is to be seen an isolated and very fine specimen of a Balm of Gilead tree with which has grown a somewhat pathetic story of no little historic interest locally. A young farm hand at the opening of the Civil War, eager to join the forces, hung up his scythe on a fork of this tree, saying he would find it on his return. He never came back, and the tree has so enveloped the blade that little of it is visible.

Seven Wonders of the World. The seven most remarkable structures among the ancients, noted either for their beauty or for their size, were: the Pyramids of Egypt; the mausoleum erected by Artemisia at Halicarnassus; the Hanging Gardens of Babylon; the statue of Jupiter at Olympia made by the sculptor Phidias; the temple of Diana at Ephesus; the Colossus of Rhodes; and the Pharos, or lighthouse, at Alexandria.

Such lists are necessarily somewhat arbitrary and will vary to a certain extent with the judgment of the persons making the selection. For the middle ages, the following are sometimes listed as the seven wonders of the world: the Colosseum at Rome; the catacombs at Alexandria; the great wall of China; Stonehenge in England; the leaning tower of Pisa; the porcelain tower of Nanking; and the mosque of Saint Sophia at Constantinople.

The following scientific achievements have been designated as the seven wonders of the modern world: wireless telegraphy and telephony; the automobile and locomotive; the airplane; the discovery of radium; the discovery of anesthetics, antiseptics, and antitoxins; spectrum analysis; and the discovery of X-rays and ultraviolet rays.

Shinto (*shĭn'tō'*) or **Shintoism.** The ancient mythology and religion of the Japanese. In early times, the religion had no dogmas, moral teachings, or sacred writings, nor did it at first receive a distinctive name. There were numerous gods, some good and others malevolent. Some gods were wedded to women, and from one of these the emperor was descended. After the 6th century A. D., Buddhism, the chief religion of China, was united with Shinto.

In the 18th century, a group of eminent Japanese scholars attacked Buddhism, Confucianism, and all else that was of foreign origin in an endeavor to re-establish the Shinto of the ancient period. Although their efforts produced a marked effect upon literature and politics, Shintoism failed to gain a religious hold upon the people. However, when the revolution of 1865–68 overthrew the rule of the shogun and restored the emperor, Buddhism was disestablished in favor of Shintoism. But, even with this advantage, the pure Shinto could not maintain itself as a religion. Shinto now merely symbolizes the intense patriotism of the Japanese people and provides rites for ceremonials at the imperial court, which all officials are required to observe.

Signature of the Cross. The custom of placing the sign of a cross on deeds and documents dates back to early medieval times. With or without the name of a person, it was regarded as equivalent to an oath, and appeared either at the head or the foot of the script. Roughly drawn crosses are frequently met with on wills and contracts dating from the 10th century and later, which indubitably were meant as legal signatures. It was thus that the royal Capets of France and Henry I and Philip I of Castile signed official documents. This usage still survives in the attestation mark of those who are illiterate, and is likewise employed by all Catholic bishops in signing their names both to private and to pastoral letters.

S. O. S. The signal for distress at sea in the continental wireless telegraphy code. This code is universally used except in the overland service in the United States and Canada, where the American Morse code is employed. The signal, consisting of three dots—three dashes—three dots, is one of the easiest to send and the least easily mistaken.

Statuary Hall. A hall in the Capitol, Washington, D. C., in which the House of Representatives formerly met. In 1864, it was officially designed as a national statuary hall, and an invitation was extended to each state to contribute marble or bronze statues of her two most distinguished deceased citizens.

Symbolism of Flowers. The following is a brief list selected from a large number of flowers and plants to which poetry, tradition, or usage has attached particular meanings. It should be remembered that there is no uniformity of agreement concerning these symbolisms and that no truly authoritative list can be presented. To numerous flowers and plants several or even many different meanings have been ascribed. Some of these are contradictory; others are incompatible; and a few seem to be gross anomalies.

Amaranth	Immortality
Anemone	Anticipation, Frailty
Apple Blossom	Admiration
Aspen Leaf	Fear
Asphodel	Death, Memorial sorrow
Bay	The poet's crown
Buttercup	Wealth
Calla	Magnificent beauty, Pride
Camellia, White	Innate worth
Candytuft	Indifference
Cardinal Flower	Distinction
Cornflower	Delicacy
Cowslip	Youthful beauty
Cyclamen	Diffidence
Cypress	Mourning
Daffodil	Unrequited love
Daisy	Simplicity, Innocence
Dandelion	Coquetry
Everlasting	Undying affection
Fern	Sincerity
Fir Tree	Time
Forget-me-not	True love
Four-leafed Clover	Good luck
Foxglove	Insincerity
Gentian	Virgin pride
Geranium	Gentility
Goldenrod	Encouragement
Heather	Loneliness
Heather, White	Good fortune
Heliotrope	Devotion
Hepatica	Anger
Hollyhock	Ambition
Honeysuckle	Friendship
Hyacinth	Sorrow
Ivy	Trustfulness, Wedded love
Laurel	Fame
Lilac	Fastidiousness
Lily, White	Purity
Lotus	Forgetfulness, Estranged love
Marigold	Contempt
Myrtle	Beauty's crown, Wedded bliss
Narcissus	Vanity
Oak Leaf	Patriotism, Hospitality
Olive Branch	Peace
Orange Blossom	Marriage
Oxalis	Pangs of regret
Palm Leaf	Victory
Pansy	Thoughts
Peony	Indignation
Poppy, White	Oblivion
Primrose	Early youth
Rose	Love
Rosemary	Remembrance
Rue	Repentance, Disdain
Scotch Thistle	Retaliation
Shamrock	Loyalty
Snowdrop	Friend in need
Sting Nettle	Slander
Sweet William	Gallantry
Tuberose	Bereavement
Tulip, Yellow	Hopeless love
Violet	Modesty
Wallflower	Faithful love
Water Lily	Purity of heart
Yellow Rose	Jealousy
Yew	Death

Theaters. Within recent years, the art and the management of the theater have undergone some very interesting developments. In America, the more general use of dramatic representations in the form of pageants, the recognition of the value of dramatic form in education, and the systematic study of the art of the theater in schools and colleges have enlarged the place of the theater in popular culture. The consolidation of the management of theaters in the great centers and of theater circuits throughout the country has been accompanied by movements toward the establishment of local and independent playhouses under the direction of drama leagues and local organizations of amateur or semiprofessional players. Many schools and colleges also maintain small indoor and outdoor theaters for the production of plays either by students or by professional companies.

This recent period has witnessed a process of adjustment between the regular, or "legitimate," stage and the "screen," or moving picture theater. The ultimate relation of the two is not yet clear. Vaudeville houses now employ both the silent and the spoken drama as means of entertaining their patrons. The movie brings, or is capable of bringing, high-class dramatic entertainment to localities where, on account of the expense, good spoken drama would not be available.

In present-day theaters, two distinct tendencies in the use of scenery are perceptible. One is the realistic method, exhibited in the productions of David Belasco, where minute details of setting are elaborately worked out. The other is that of simple or impressionistic settings, in which, by the use of line and color, the appropriate atmosphere of the

play is suggested. Gordon Craig is the leading English exponent of this new stage art. A type of stage setting which consists only of a background of screens and hangings is exhibited by the "portmanteau theater," as managed by Stuart Walker.

In these various recent developments there appear phases which have marked the history of the theater. The outdoor theaters of classic design, such as that erected at the University of California, recall the great unroofed theaters of ancient Athens, where the seats for spectators were ranged in tiers on sloping hillsides. The Romans, building on level land, erected the sloping tiers of seats upon arches.

When, after several centuries of neglect, the building of theaters was begun in London in the 16th century, they were at first erected without roofs, except over part of the stage and some of the stalls or boxes which were ranged around the central "pit." This form of building has been traced to the innyards surrounded by balconies, in which strolling players gave their entertainments.

The 17th and 18th centuries saw the building of elaborate theaters in Europe, and the 19th century followed the precedents thus established. The theater stage became a bewildering mass of ingenious mechanical devices. As has been mentioned above, in the 20th century there has appeared a tendency to greater simplicity of stage. This movement has been aided by the remarkable improvements in stage lighting by electricity.

The first recorded theatrical season in America was conducted in New York in 1750-51. The first play of this season was *Richard III*, in which Thomas Kean played Richard. The Southwark theater, built in Philadelphia in 1766, was the first permanent theater in the colonies. In 1800, there were only three theaters of any importance in American cities; by 1850, probably 50 were in actual use. At the present time, it is estimated that in America more than 100,000 people are engaged in occupations connected with the spoken drama, the number of actors exceeding 10,000.

Third Degree. The psychological or moral method used by the police in the United States for the purpose of forcing the truth from a suspected criminal. It consists in continuous and relentless questionings, lasting for many hours or even for days, until the prisoner, if guilty, is morally compelled to give way and confess. The system has been at times severely criticized, and charges of cruelty have been brought against the police on this account. The authorities have denied such accusations and are firm in their belief in such moral suasion. The method of the "third degree" seems to have developed imperceptibly and no fixed period can be mentioned when it originated.

Tinker's Dam. A little mound of soft clay or dough placed round a leak or a joint that a plumber is about to mend, in order to retain the melted solder until it cools. After the clay has served its purpose, it is thrown away as it cannot be used a second time. Hence the proverbial worthlessness of "a tinker's dam." The latter word, however, through perversity or misunderstanding is often spelled *damn* to the detriment of the tinker's reputation.

Tip. A gratuity given to waiters, porters, and other servants for services rendered or expected. In this sense the term is used in America. In England it is employed, moreover, to denote a small present of money made to a relative or schoolboy by an elder. Hence the expression "a schoolboy's tip." The origin of the word is dubious, but would seem closely allied to the kindred word "tip" or tap, with the sense of touching the elbow slightly by way of private hint. Various other explanations have been advanced, none of which has obtained the support of authority. One of the most ingenious of these is that the word was formed by placing in order the first letters of the words in the phrase "to insure promptness."

Totem Poles. Carved wooden poles or pillars which are set up before the houses of certain Indian tribes of the northwest coast of North America, especially those of Koluschan stock in southeastern Alaska. These poles are used to exhibit totem figures.

A typical totem pole is fashioned from a huge log 40 or 50 feet in length. This is erected like a flagstaff in front or by the side of a low wooden dwelling and rudely carved throughout its entire length with immense grotesque figures of man, beast, and bird, the weird effect of which is heightened by daubs of blue, green, and red paint. Usually the carvings consist principally of three half human, half animal figures, seated above one another, upholding the remainder of the pole at the summit of which is a figure representing the totem. Sometimes the totem pole is only a smooth massive tree trunk with the totem figure, usually that of a bird or of some weird animal, displayed at the top.

The totem and other signs and symbols on a pole serve to identify Indians of one particular family, group, or kindred, so closely allied that intermarriage is forbidden among them. Totem poles, therefore, have a profound social and religious significance and are emblematic of family pride, veneration of ancestors, and legendary religion.

Tutankhamen (*tōōt-ănk'ă-mĕn*), **Discovery of Tomb of.** In November 1922, Mr. Howard Carter, an American Egyptologist, and Lord Carnarvon of England, who for seven years had been conducting excavations in the Valley of the Kings, near Luxor, were rewarded by the discovery of the undespoiled tomb of the ancient Egyptian emperor, Tutankhamen, who reigned in the 14th century B. C. Their achievement is recognized as one of the most remarkable in the history of archeological research.

The discovery is notable because this is the first tomb of any monarch of the great empire period to be found intact, virtually as it was left after the entombment of the emperor. This fact is explained as due to the action of workmen who, in excavating the tomb of Rameses VI on a higher level, threw their rubbish down upon the entrance to the earlier tomb, thus effectually hiding it from view. The supreme importance of the discovery, however, lies in the number, variety, and excellence of the works of art with which the several chambers of the tomb were filled. For the first time, men of the modern world are now able to examine and estimate the artistic achievements of the greatest period of Egyptian culture.

The objects here discovered include magnificent chairs and couches overlaid with gold and jewel work, caskets adorned with painted scenes from the life of the monarch, and royal chariots of rich workmanship, on the wheels of which are traces of their use upon the rough streets of ancient Thebes. Vases and golden shrines of skillful workmanship, as well as furniture of more perishable materials, are numbered among the treasures here revealing an ancient civilization.

In the course of 1923, much was accomplished in removing the contents of the tomb and providing for the preservation of materials which would be damaged by exposure to the air. On Feb. 12, 1924, the granite cover was lifted from the splendid sarcophagus, and within was revealed, under linen shrouds, a magnificent anthropoid coffin, or mummy case, with a face beautifully modeled in solid gold.

Under the Rose. (Lat., *sub rosa*) An expression of very ancient date meaning in strict secrecy or confidence. According to classic mythology, Cupid gave Harpocrates, the god of silence, a rose to bribe him not to betray the amours of Venus. Hence the flower became a symbol of secrecy. The expression is now common to all European languages, but is said to have originated in Germany. The phrase came into vogue in England about the middle of the 16th century. As a flower sacred to Freya, under which name Venus was known to the

Norsemen, the rose appeared as an architectural decoration on the ceilings of banquet halls. Thus, at table, when wine flowed free and tongues were loosed, words uttered beneath the flower of Freya became hallowed and could not be uttered elsewhere.

United States Money. The money of the United States consists of gold, silver, and minor coins, and seven different types of certificates or notes.

Gold Coin is customarily issued in denominations of $2.50 (quarter eagle), $5 (half eagle), $10 (eagle), and $20 (double eagle). These coins contain 23.22 grains of pure gold plus 2.58 grains of copper alloy for each dollar of face value. The gold dollar was first issued in 1849. It was discontinued in 1889, with the exception of a small number of souvenir coins which are occasionally issued in small numbers. See *Mint*.

Standard Silver Dollars contain 371.25 grains of pure silver plus 41.25 grains of copper alloy. Coinage of silver dollars was discontinued in 1905 and recommenced in 1921. The ratio of the weight of silver in a silver dollar to gold in a gold dollar is 15.988 to 1.

Subsidiary Silver Coins in the denominations of 10, 25, and 50 cents contain 347.22 grains of silver plus 38.58 grains of alloy for each dollar of face value. When new, these coins have a weight of 1 gram for each 4 cents of their face value.

Minor Coins. The 5-cent piece, or nickel, and the 1-cent piece.

Gold Certificates, issued against gold deposited in the U. S. treasury, in denominations of $10, $20, $50, $100, $500, $1000, $5000, and $10,000.

Silver Certificates, issued against silver dollars deposited in the treasury of the United States, in denominations of $1, $2, $5, $10, $20, $50, and $100.

United States Notes, issued in denominations of $1, $2, $5, $10, $20, $50, $100, $500, and $1000. Limited to a total issue of $346,681,016.

Treasury Notes of 1890 in same denominations as U. S. notes. No longer being issued.

National Bank Notes, issued in denominations of $5, $10, $20, $50, and $1000.

Federal Reserve Bank Notes, face value of $1, $2, $5, $10, $20, $50, $100, $500, and $1000.

Federal Reserve Notes in customary denominations from $5 to $10,000.

The seal of the United States treasury, which is placed upon each piece of paper money, bears the abbreviations of the Latin words, *Thesauri Americani Septentrionalis Sigillum*, meaning "Seal of the Treasury of North America." This is an interesting relic of those days when it was believed that Canada would become a part of the United States.

Certificates of the smaller denominations are usually worn out within three years by handling. About $1 of every $200 issued is never returned for redemption. Torn, burned, or otherwise damaged bills will be redeemed at their full face value if at least .6 of the surface is delivered at the Treasury; half of the face value will be redeemed if less than .6 but more than .4 of the surface has been saved. See *Money in the United States*.

Universal Languages. The chief obstacle to communication between people inhabiting different parts of the world is diversity of language. At various times in history, certain languages have attained sufficient prestige to be widely used as an international medium of expression. Among them have been Assyrian, Greek, Latin, Arabic, French, and English. In recent times, however, an opposite tendency has appeared; the growth of nationalism has resulted in the revival of many languages which had been dying out. One notable revival is that of Irish, which has been declared the official language of Ireland. In the meantime, closer commercial relations, the increasing popularity of travel, and the development of radiotelephony make it more and more desirable that people of all nationalities should be able to understand each other.

There have been a number of attempts to construct an artificial language which might easily be learned by people of different tongues. Those which have won the widest recognition are Volapük, Esperanto, Idiom Neutral, and Ido.

Volapük was published in 1880 by J. M. Schleyer, a priest of southern Germany. It is based mainly on English, the rest of the vocabulary being drawn from Latin and the Romance languages. The name is a combination of words meaning "world" and "speak." The language spread rapidly, and, when the third Volapük congress met at Paris in 1889, there were 283 Volapük societies and the total number of students of the language was estimated at more than one million. Its popularity rapidly declined because of dissensions, the founder refusing to accept modifications desired by the Volapük academy, which, under the direction of M. Rosenberger of Petrograd, began to construct a new language entitled Idiom Neutral.

Esperanto was set forth by a Russian physician, Zamenhof, whose first publication on the subject appeared in 1887 over the signature Dr. Esperanto, "Hopeful." By means of using as roots many words common to various European languages and by adding certain prefixes and suffixes, the structure of the language is made very much simpler than that of any natural tongue. German words are used more frequently than in Volapük, but there are very few Russian elements. Esperanto is spelled strictly in accordance with pronunciation. The spread of the language has been remarkable in spite of the fact that several new letters are introduced, type for which is not possessed by most printers. These include ĉ, ĝ, and ĥ.

An early rival of Esperanto was Idiom Neutral, which made its appearance in 1902. Its most marked feature is the fact that its vocabulary is based systematically on the maximum internationality of roots. Many of these, such as *tri*, "three," occur in seven chief European languages. Only occasionally has it been necessary to adopt a root that is common to less than four. On account of the large Latin element in the modern tongues of Europe, the result of the selection is a vocabulary which is practically Romance-Latin.

Ido is a compromise between the more successful Esperanto and the more scientific Idiom Neutral. It made its appearance about 1908. The rapid changes which it underwent before 1913 led to the adoption of a resolution according to which no modification should be permitted for 10 years. This period was subsequently extended to 16 years. Other artificial languages have been recently advocated, such as Latino sine Flexione, which is a simplified form of Latin.

Water. The fluid which falls from the clouds in rain, which forms lakes and streams in the land, and which fills the vast ocean that surrounds the land. Because of its universal presence, its multifold usefulness, and its immense extent, water is one of the most important of all substances. It covers more than five-sevenths of the earth's surface, makes up about seven-eighths of the animal body, constitutes fully nine-tenths of the bodies of many plants, and is found in numerous minerals and rocks. Moreover, it is absolutely necessary to the existence of life. Without water, the entire vegetable and animal kingdoms would quickly perish and the teeming earth would soon become as lifeless as the moon.

Occurrence and Quantity. In addition to forming streams, seas, and a large part of all plant and animal structures, water occurs throughout the soil and rocks and, as vapor, enters into the composition of the air. Water, therefore, is an important factor in the earth's lithosphere, hydrosphere, and atmosphere. It is estimated that if the water of the ocean were distributed in a layer of equal thickness over the whole earth, it would cover it to a depth of about two miles. It is computed also that if all the water on the earth were gathered together into one mass, it would form a sphere 900 miles in diameter.

Chemical Composition. Water is a chemical compound composed of oxygen and hydrogen. It is formed by the union of one volume of the former

with two of the latter. By weight, water contains 88.814 per cent oxygen and 11.186 per cent hydrogen. Chemically pure water, therefore, is the oxide of hydrogen and has the formula H_2O. In the popular sense, pure water usually contains small quantities of various substances which do not impair its usefulness for practical purposes. In all ordinary waters these impurities, however, amount to less than one-tenth of one per cent by weight.

Physical Properties. Water occurs in nature in three states,—liquid, solid, and gaseous. Under normal atmospheric pressure, water is a liquid between 32° F., or 0° C., its freezing point, and 212° F., or 100° C., its boiling point. At the freezing point it becomes ice and at the boiling point, steam. In dry air, however, both liquid water at temperatures above freezing and solid ice at temperatures below freezing evaporate slowly. Water attains its greatest density at 39.2° F., or about 4° C.

The specific heat of water is greater than that of any other substance except hydrogen. The amount of heat required to raise the temperature of one gram of water from 18° C. to 19° C. has been adopted as the unit of heat known as the gram-calorie. Water is only very slightly compressible. In small quantities water appears transparent and colorless, but, when viewed through layers of considerable height, it possesses a faint bluish tinge. Liquid water is a poor conductor of heat, and, when absolutely pure, is one of the poorest conductors of electricity known. The solvent powers of water are very great, and, for this reason, it is very seldom found absolutely pure. For scientific and technical purposes it is readily purified by distillation.

Importance in Nature. For the action of water in nature, the reader is referred to the articles on *Sedimentary Rocks*, *Erosion*, *Flood*, *Geysers*, *Glaciers*, *Ground Water*, *Hot Springs*, *Rivers*, *Tides*, *Climate*, *Gulf Stream*, *Ocean Currents*, *Rainfall*, and *Snow*.

Further information regarding water in its three states may be found as follows: for liquid water, see *Hydrosphere*, *Lake*, *Ocean*, *River*, *Rainfall*, *Springs*; for solid water or ice, see *Frost*, *Ice*, *Iceberg*, *Ice Cap*, *Snow*; for gaseous water, see *Atmosphere*, *Cloud*, *Dew*, *Dew Point*, *Humidity*.

More detailed discussion of the physical properties of water will be found in the division of Physics under such topics as *Boiling Point*, *Expansion of Freezing*, *Freezing Point*, *Hydraulic Machines*, *Latent Heat*, *Specific Gravity*, and *Specific Heat*.

Watermark. The faintly marked letter, figure, or design, seen on paper when held to the light, is used to denote place of manufacture, size, or quality. The watermark is formed during the process of manufacture by the pressure of wires on the wet pulp. One of the earliest watermark designs was that of a dolphin, the coat of arms of Rives, a small town in France noted for its paper factories. This same mark is still frequently used by manufacturers in general to denote a good quality of paper. The names of various watermarks employed by the earlier paper makers now serve to denote some of the present standard sizes of paper, as, for example, *foolscap*, *crown*, *elephant*, and *post*. The last mentioned is so named because of the device of a postman's horn used as a watermark.

Wayside Inn, The. This house, in the town of Sudbury, Mass., was a famous tavern in colonial days. Longfellow gave it immortality in his *Tales of a Wayside Inn*. An interesting collection of colonial furniture and prints has been gathered together here. The inn was purchased in 1923 by Henry Ford, to be preserved as a memorial to Longfellow.

White House. The name applied, both popularly and officially, to the residence of the president of the United States. The mansion is located on Pennsylvania avenue, about a mile and a half from the Capitol, upon a site selected by President Washington and Major L'Enfant in 1791. The original design of the building was made by James Hoban of Dublin, and was selected through a competition in 1792. On October 13 of that year, the corner stone was laid.

The White House was occupied for the first time by President John Adams in November 1800. It was burned by the British in 1814 and rebuilt under the supervision of Mr. Hoban. In order to cover the traces of fire, white paint was applied to the original sandstone. From this circumstance the name White House arose. The structure, two stories in height, with a frontage of 170 feet and a depth of 86 feet, is surrounded by a park of 75 acres. The first floor is occupied mainly by the rooms for public functions. On the second floor are the apartments of the president and his family.

In 1902, a thorough remodeling of the White House was carried out, partly to restore the original design. A presidential office building was erected at the west end of the official residence in 1902-03.

WORLD EXPOSITIONS

Name of Exposition	Place	Date	Area Acres	Exhibitors*	Visitors*	Cost*	Receipts*
Crystal Palace	London	1851	19	15,000	6,000,000	$ 1,600,000	$ 2,500,000
Dublin	Dublin	1853	12	7,000	1,000,000	400,000	230,000
New York	New York	1853	13	4,000	1,250,000	640,000	340,000
Munich	Munich	1854	12	6,700	600,000	450,000	200,000
Paris International	Paris	1855	24	24,000	4,500,000	5,000,000	500,000
International	London	1862	17	26,000	6,000,000	2,000,000	2,000,000
French International	Paris	1867	119	50,000	9,000,000	6,000,000	3,000,000
Austrian International	Vienna	1873	280	55,000	7,000,000	10,000,000	2,000,000
Philadelphia Centennial	Philadelphia, Pa.	1876	236	50,000	10,000,000	8,500,000	4,000,000
French International	Paris	1878	140	52,000	16,000,000	8,000,000	2,500,000
Melbourne	Melbourne, Australia	1880	29	12,000	1,300,000	1,000,000	330,000
French International	Paris	1889	173	61,000	25,000,000	8,300,000	10,000,000
World's Columbian	Chicago, Ill.	1893	600	65,000	28,000,000	31,000,000	33,000,000
Cotton States and Industrial	Atlanta, Ga.	1895	189	.....	1,000,000	2,000,000	18,000
Tennessee Centennial	Nashville, Tenn.	1897	200	2,000	2,000,000	1,000,000	1,000,000
Trans-Mississippi	Omaha, Nebr.	1898	200	4,600	2,600,000	.....	2,000,000
French International	Paris	1900	336	80,000	47,000,000	27,000,000	22,000,000
Glasgow	Glasgow, Scotland	1901	....	.....	11,000,000	2,000,000	2,000,000
Pan-American	Buffalo, N. Y.	1901	350	.....	8,000,000	9,000,000	5,000,000
Louisiana Purchase	Saint Louis, Mo.	1904	1142	.....	20,000,000	20,000,000	12,000,000
Lewis and Clark	Portland, Oreg.	1905	406	3,000	2,500,000	7,000,000	.....
Jamestown Tercentennial	Jamestown, Va.	1907	350	2,500	2,800,000	10,000,000	7,000,000
Alaska-Yukon-Pacific	Seattle, Wash.	1909	250	.....	4,000,000	10,000,000	.....
Panama-Pacific	San Francisco, Cal.	1915	635	80,000	19,000,000	50,000,000	12,500,000
Panama-California	San Diego, Cal.	1915	618	.....	2,250,000	2,000,000	.....
Brazilian Centennial	Rio de Janeiro	1922	....	.....	.....	20,000,000	.....
British Empire	Wembly, Eng.	1924-25	220	.....	27,102,350	15,000,000	7,100,000
Sesquicentennial	Philadelphia, Pa.	1926	1010	.....	5,852,783	26,000,000	5,000,000

*All figures are approximate.

TEST QUESTIONS

PARLIAMENTARY LAW

Indicate the origin of the term parliamentary law and state its present meaning 2035
Describe two methods of beginning the temporary organization of a society 2035
Outline the steps to be taken in adopting a constitution 2035–2036
Outline a typical order of business 2037
State a reason for referring matters to committees 2040
Describe the order to be followed in voting upon a motion and amendments to it . . 2041
Under what circumstances is a motion to adjourn in order? When is such a motion debatable? 2041
Outline the procedure involved in raising a point of order 2042
When is a person said to "have the floor" in an assembly? 2043
What is meant by a quorum? 2044
What motion takes precedence of all others?. 2045

ORGANIZATIONS

How are members of the American Academy of Arts and Letters elected? Who founded the French Academy? 2047
Summarize the objects of the American Legion 2047
State the purpose of the British Association for the Advancement of Science 2047
What promise must every Boy Scout make? Describe the organization of ranks among the Camp Fire Girls 2048
What valuable historical collection is controlled by the Colonial Dames of America?. 2049
Where is the headquarters of the Daughters of the American Revolution? 2049
For what purpose was the order of the Dominicans founded? 2049
Describe the organization of the Girl Scouts . 2050
Give a brief history of the Legion of Honor . 2051
When was the order of Masons introduced into America? 2051
Outline the history of the Red Cross societies. Summarize the extent of their work . . . 2052
Who was the founder of the Salvation Army?. 2052
Tell who founded the Young Men's Christian Association 2054
State an interesting fact about each of the following California missions: San Diego; San Gabriel: Santa Clara 2055–2056

HEROIC DEEDS—SOBRIQUETS

What kind of rewards are given from the Carnegie hero fund? 2057
Tell a story of heroism from the life of Arnold von Winkelried. Who was Betty Zane?. . 2057
Recount the story of the loss of Thomas Carlyle's manuscript of his *French Revolution* 2057–2058
Relate the heroic acts connected with the conquering of yellow fever in Cuba in 1900. . 2058
For what exploit is the name of John Maynard famous? How did Katherine Douglas win the name of Kate Barlass? 2059
Who was the Maid of Saragossa? 2059
Relate a tale of heroism about each of the following: L. E. G. Oates; Oliver Hazard Perry; Robert Emmet; Sergeant York. . 2060
Explain the origin of the following sobriquets: Amen Corner; Anzac; Attie Bee 2061
Point out the origin and meaning of the word "blighty" 2061
Explain the origin and application of the name Dixie 2062
What famous scholar was called in school the dumb ox? 2062
Explain the phrase "fourth estate" 2062
Whence did the expression "gallery gods" arise? the term jingo? 2062–2063
Where does the nickname John Bull first appear? 2063
What famous persons are designated by the following sobriquets: Lion of Sweden? Little Corporal? Mad Anthony? Maiden Queen? Maid of Orleans? 2063
To what famous Americans were the following nicknames applied and why: Mill Boy of the Slashes? Old Hickory? Old Man Eloquent? Rail-Splitter? 2063
State the reason for the following sobriquets: Roughrider; Serpent of the Nile; Sir Veto; Tiger 2064
Give an explanation of the origin of the nickname of Uncle Sam; of Yankee 2064

NATIONAL EMBLEMS—HOLIDAYS

Describe several representations of the eagle and of the lion in the arms of various nations 2065
What emblem is used by both Greece and Switzerland? 2065
State an interesting historical fact about the flag of Denmark 2066
Point out a reason for the use of red, blue, and white in the French flag 2066
What famous explorer is commemorated in the design of the flag of Portugal? 2067
Indicate the interesting history of the flag of Turkey 2067
Point out an explanation of the origin of April Fools' day 2069
To whom is the credit due for originating the observance of Arbor day? 2069
What is a bank holiday? 2069
Describe the celebration of the carnival. . . 2070
Trace the origin of the Christmas celebration; of the Christmas tree 2070
Describe the observances connected with the Japanese feast of chrysanthemum; with the Chinese festival of the unforgotten dead. . 2070
In what city did the carnival battle of flowers originate? 2071
Describe the medieval celebration of the feast of fools. Trace the origin of the Halloween celebration 2071
What event in French history is commemorated on July 14? 2071–2072
Trace the history of Labor day 2072
In what American city is the celebration of Mardi Gras especially important? 2072
Tell the story of the Venetian ceremony of the "marriage of the Adriatic" 2072
Trace the origin of the observance of Memorial day in the United States 2072–2073
Indicate the character of the ancient and of the modern Olympic games 2073
Explain the origin and point out some customs of the Jewish Passover 2073
Why are red-letter days so called? 2073
Describe some medieval customs connected with Saint Valentine's day 2073–2074
Point out two distinguishing features of the ancient Roman festival of Saturnalia . . . 2074
Outline the history of Thanksgiving day in America 2074
Name the wedding anniversaries according to the kinds of presents that have been regarded as appropriate for them. 2074

SUPERSTITIONS—FIRST USES

Relate a superstition about the stork; about the halcyons; about the dragon fly; about the petrels 2077
Name the birthstone appropriate to each month of the year 2077
What is an amulet? a fetish? 2078
Explain the origin of belief in the luck brought by the four-leaved clover 2078
How is the divining, or dousing, rod supposed to be used? 2078

Discuss the prevalence of belief in the ill luck of Friday 2078
Distinguish black magic from white magic. . 2078
Explain the origin of the word mascot. . . . 2079
To what origins are modern customs connected with the mistletoe traced? 2079
Name some signs by which ancient peoples attempted to foretell events 2079
What is palmistry? a "rain of toads"? . . . 2080
Point out the significance of shoe-throwing at weddings 2080
What is a tabu? 2080
Among what peoples is the belief in the ill luck of the number 13 especially prevalent? . . . 2080
What is a vampire? 2080
Give the date of the beginning of airplane mail service between New York and San Francisco 2084
When did Lister introduce antiseptic surgery? Who discovered bacteria? 2084
When and where was brick first made in America? When and where was coal first mined in America? Who first produced cottonseed oil? 2084
Who made the first friction matches? . . . 2084
When was gas first used for street lighting in London? in America? 2084
Where was the first artificial ice plant established? 2084
Who discovered iron ore in the Lake Superior region? When? 2084
Name and give the date of the first newspaper in America; of the first daily newspaper in London; of the first Sunday newspaper. . 2084
Where and when was the first skyscraper erected? When and where was the first steamboat launched on the Great Lakes? . . 2084
What was the location of the first wire suspension bridge? 2084

DESIGN—FURNITURE—GAMES

Outline the process of developing a conventional design 2085
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THE INDEX

THE Lincoln Library has been so built that, in some respects, an index is superfluous. The material in the various departments has been arranged in such a manner that, with a brief period of intelligent use, the reader will be able to turn directly to a required fact without the initial step of consulting the general index.

This advantage is due to the fact that related material is grouped in sections, a large proportion of it taking the form of dictionaries and carefully prepared tables, which are practically self-indexed. In the aggregate, there are some 66 separate dictionaries and 330 tables. A representative selection from these dictionaries and tables will be found alphabetized for quick reference on page 2114.

Advantages of Arrangement. The intelligent user will take advantage of the general plan of this volume by becoming so familiar with the location of the departments, sections, dictionaries, and tables that the mechanical consultation of the index will become less and less imperative. With practice, the driving of an automobile becomes one of the simplest of operations. Likewise, familiarity with the electric switches in a house makes the control of the lighting system easy even for a child. So in the use of this volume, a little practice will insure a surprising mastery over its resources. When the reader has learned, for example, that in the Department of Science there is a comprehensive dictionary of animals on pages 1006–1070, he will go directly to that section in order to learn the difference between a toad and a frog or to settle similar questions regarding animal life. For the geography of Japan, he will consult the Department of Geography and, in particular, the section on Asia, pages 805–814, in which the countries of that continent are treated in alphabetical order.

The extraordinary range of the facts in the text, dictionaries, and tables of this work makes it obviously inadvisable that every individual item should be entered in the general index, which would thereby become much too unwieldy for convenient and quick reference. Thus the populations of many small towns of the United States or Canada appear, not in the general index, but in the tables of populations, to which the reader will be referred under "Population" in the general index. After a brief period of use, however, he will be likely to remember the fact that these tables are on pages 739–744 and 760 respectively, and, on occasion, will turn directly to these pages, where the various entries will be found arranged in alphabetical order. In the same way, he will soon be able, almost on opening the book, to find electrical terms, points in good usage, musical terms, stories of the operas, national flags, historical topics, mythological references, and numerous other types of information, even though the great majority of the items may be located also by means of the general index.

Fullness and Simplicity of Index. Despite this surprising availability of material in a book embracing the essentials of a whole library, a general index has certain supplementary values which make its inclusion necessary in a work that is to give the greatest possible service. The Lincoln Library has, therefore, been provided with a full, simple, systematic key to its contents.

The index which follows is larger than has ever been placed in a single volume of similar scope. It contains more than 22,000 line entries, many of which include two or more page references. The following example will reveal the ease with which a specific fact may be located by means of the index.

If the reader wishes to learn the growth of Chicago's population, he will probably turn first to "Chicago" in the index. He is there referred to the article on Chicago, page 682, in the last paragraph of which, entitled History, the required facts are summarized. The index leads him also directly to the full, authentic figures desired. Under the word "Chicago" in the index, and slightly to the right, will be found the words "Population, Growth of," with a reference to page 661. Turning to this page, the reader will find a table of the 25 largest American cities with their population figures from 1820 to 1920. Chicago appears second in this table. In case the user has thought first of the word population, he will turn to the index, where, subindexed under "Population," he will discover "American Cities" with a reference to page 661. He will thus be led by this route also to the desired information.

Special Values. This index does vastly more, however, than lead the reader to specific passages. It is, in the first place, a guide to the plan of the volume. If one wishes to find a synonym for "Copy" or some other word, a reference to the word "Synonyms" in the index will lead one to the dictionary of synonyms and antonyms on pages 137–171 and to the key to that dictionary on pages 172–178. Similarly, under "Plants," "Agriculture," or other general subjects, the user will be referred to these important divisions.

For gathering many items on a given topic, as for the preparation of a school theme or a club paper, the index will be found indispensable. If, for example, the user wishes to bring together as many facts as possible about the state of California, he will, by turning to "California" in the index, find no less than 25 different references to various informing passages regarding the state. These include, besides area and population, such items as agricultural statistics, birth and death rate, chief manufacturing cities, number of men who served in the World War, number of motor vehicles, petroleum production, and suffrage requirements.

Suggestions. In order to obtain the greatest value from this index, the reader will find it advantageous to keep in mind the following facts:

When a phrase appears in the index, its words are so arranged that the most important, usually a noun, occupies the first place. "The Junior College," for example, should be sought, not under T or J, but under C, in the form "College, The Junior."

In all cases where an indexed item appears in the text as a heading, as the title of a separate article in a dictionary, or as an entry in a table, only the page number is given in the index. If, however, the item cannot so readily be located on its page, a letter is added, which indicates the particular quarter page in which the word or fact occurs. The letters a and b refer respectively to the upper and the lower half of the first column, while c and d refer to the corresponding halves of the second column. Thus 218a means the upper left-hand quarter of page 218; 218d means the lower right-hand quarter of the page.

Where two or more page references appear in one index entry, the most important reference, as a rule, is given first. Under all names of people treated in the Department of Biography, the first page reference is to the biographical article.

When an entry is followed by a second entry in italics, the latter is the title under which the first subject is treated. Thus "Aspen, *Poplar* 1109" means that information regarding Aspen is to be found in the article entitled Poplar, which occurs on page 1109.

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